

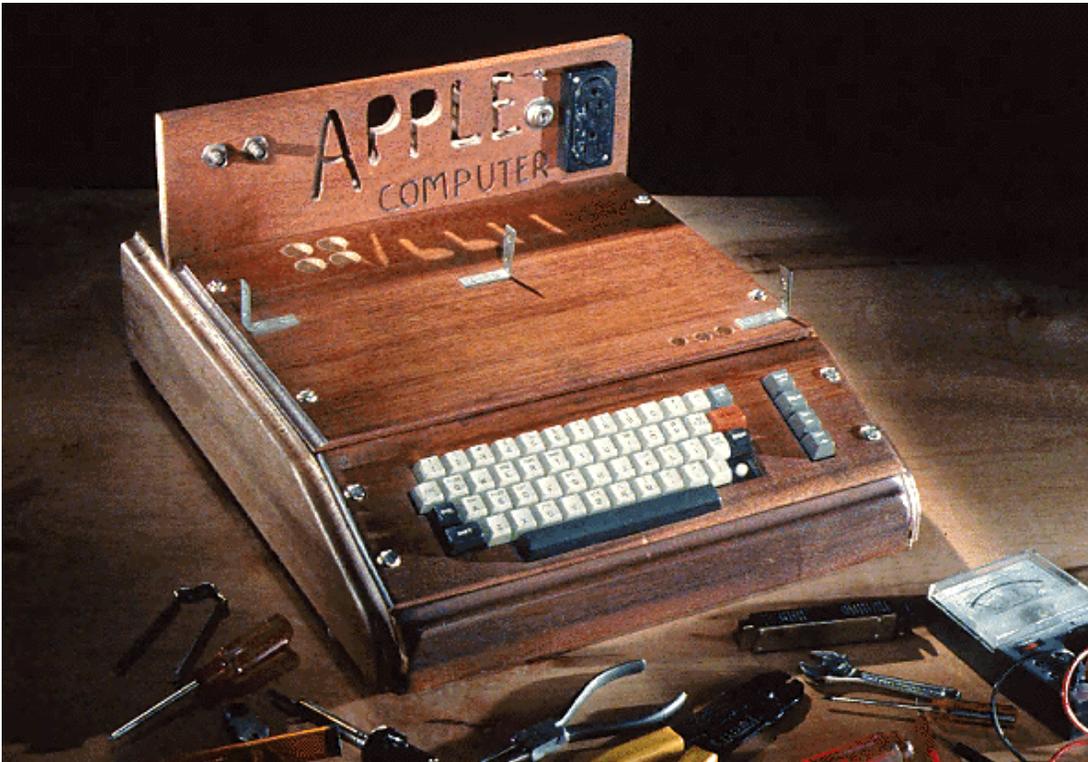
# Apple II Computer Family Articles

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## Apple Technical Info Library (TIL)

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March 1997



Ex Libris David T. Craig

APPLE II COMPUTER TECHNICAL INFORMATION

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APPLE ][ COMPUTER FAMILY  
TECHNICAL INFORMATION

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 A2TIL328.TXT Logo II: How to print procedures  
 A2TIL329.TXT Macintosh 512K/512Ke: Cable Compatibility (7/95)  
 A2TIL330.TXT Macintosh PC Exchange: Troubleshooting Overview (7/96)  
 A2TIL331.TXT Macintosh, Apple II: Specifications of Plastic Enclosures (4/94)  
 A2TIL332.TXT MacPeak SCSI Drive: How to Use with an Apple IIGS  
 A2TIL333.TXT Manx Software Systems  
 A2TIL334.TXT Monitor III: Repair Tips  
 A2TIL335.TXT Motorola CDX268: Terminal Emulation for Macintosh or Apple II  
 A2TIL336.TXT Mouse Compatibility: Macintosh Plus and Apple II Computers  
 A2TIL337.TXT MousePaint: Printing  
 A2TIL338.TXT MouseText: Display for Characters "F" and "G"  
 A2TIL339.TXT Moving Apple II DOS 3.3 Data to Macintosh  
 A2TIL340.TXT Nite Owl Productions (5/93)  
 A2TIL341.TXT Parallel Interface Card: 3rd Party Printers (11/96)  
 A2TIL342.TXT Parallel Interface Card: Product Description (11/96)  
 A2TIL343.TXT Pascal 1.2 128K Development System: Using it with a QC Hard Disk  
 A2TIL344.TXT Pascal 1.3: Compatible With IIGS RAM Disk, 3.5" Disk  
 A2TIL345.TXT Pascal 1.3: Using it on a Hard Disk 20SC  
 A2TIL346.TXT Pascal 1.3: Using UNITSTATUS  
 A2TIL347.TXT Pascal II: Using Library Name Files  
 A2TIL348.TXT PC Transporter: IIGS Driver Not Available For AppleShare  
 A2TIL349.TXT Performa: Running Apple II Software (3/93)  
 A2TIL350.TXT Practical Computer Technologies (5/93)  
 A2TIL351.TXT Preowned Electronics  
 A2TIL352.TXT Problem using Apple II parallel cable with UPIC  
 A2TIL353.TXT ProDOS 8: Finding Volume Size using Assembly Language  
 A2TIL354.TXT ProDOS 8: How To Find Disk, Controller, and Block Information  
 A2TIL355.TXT ProDOS Applications Need "Chooser II" To Select A Printer  
 A2TIL356.TXT ProDOS Assembler Tools: Startup Sequence  
 A2TIL357.TXT ProDOS Assembler Tools: Technical product description  
 A2TIL358.TXT ProDOS Can't Handle Disk Volumes Larger Than 32MB  
 A2TIL359.TXT ProDOS GS/OS, and Instant Pascal: Launching and Quitting  
 A2TIL360.TXT ProDOS: Converting Files from 5.25-inch Disks to Macintosh  
 A2TIL361.TXT ProDOS: Limited to 32 megabyte access on HD40SC and HD80SC  
 A2TIL362.TXT ProDOS: Product Overview  
 A2TIL363.TXT ProDOS: Using /RAM and Double High-Resolution Graphics  
 A2TIL364.TXT ProFile Formatting Error #21  
 A2TIL365.TXT ProFile Hard Drive: Specifications (Discontinued)  
 A2TIL366.TXT ProFile: Formatting Compatibility (10/94)  
 A2TIL367.TXT Quality Computers (11/94)  
 A2TIL368.TXT Quark QC Hard Disk: Specifications (Discontinued)  
 A2TIL369.TXT Queue, Inc.  
 A2TIL370.TXT QuickFile IIe and QuickFile III File Sharing  
 A2TIL371.TXT Reading ProDOS Diskettes on a Power Macintosh (9/94)  
 A2TIL372.TXT Redmond Cable Corporation (5/93)  
 A2TIL373.TXT Resource Central (5/93)  
 A2TIL374.TXT Roger Wagner Publishing, Inc.  
 A2TIL375.TXT School Office Software Systems  
 A2TIL376.TXT Scribe Printer: Specifications (Discontinued)  
 A2TIL377.TXT SCSI Hard Disk Drives: Interleave Information (11/94)  
 A2TIL378.TXT Shreve Systems (5/93)  
 A2TIL379.TXT So What Software  
 A2TIL380.TXT SoftCard III (CP/M): Moving Files from Apple II CP/M  
 A2TIL381.TXT Softcard III: Diskette compatibility with Apple II CP/M  
 A2TIL382.TXT SoftSpoken, Inc.  
 A2TIL383.TXT Southern California Research Group  
 A2TIL384.TXT Sun Remarketing, Inc. (11/96)  
 A2TIL385.TXT Super Serial Card: Accessing it through Machine Language

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A2TIL388.TXT System 7 Pro: Read Me Incorrect About Apple IIe Card SW (10/93)  
A2TIL389.TXT Temporal Acuity Products, Inc.  
A2TIL390.TXT The Apple II Cassette Interface (2 of 2)  
A2TIL391.TXT The Apple II Cassette Interface (1 of 2)  
A2TIL392.TXT The ByteWorks, Inc.  
A2TIL393.TXT Thirdware Computer Products  
A2TIL394.TXT ThunderWare  
A2TIL395.TXT Tulin Technology  
A2TIL396.TXT UniDisk: Specifications (Discontinued)  
A2TIL397.TXT UPIC: Interfacing the Epson MX-80 Printer  
A2TIL398.TXT UPIC: Interfacing the OKIDATA 83A printer  
A2TIL399.TXT US Apple SW Updates Available Online (03/97)  
A2TIL400.TXT Using DOS 3.3 with Catalyst 2.1 (1 of 5)  
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A2TIL403.TXT Using DOS 3.3 with Catalyst 2.1 (4 of 5)  
A2TIL404.TXT Using DOS 3.3 with Catalyst 2.1 (5 of 5)  
A2TIL405.TXT Using the Old Monitor with the Apple Language Card  
A2TIL406.TXT Word Juggler for the Apple II Print To Disk Option  
A2TIL407.TXT WPL: How to make AUTOLETTER use surnames

[END]

### END OF FILE A2TIL000.TXT

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#####  
### FILE: A2TIL001.TXT  
#####

Description: Apple Tech Info Library Overview: How to Search for Articles  
Header: Apple Tech Info Library Overview: How to Search for Articles  
Article Created: 22 February 1995

TOPIC -----

The following discussion gives an overview of the use of the Technical Information Library, keywords, constructing searches, and relevance ranking.

For a description of how to submit an article for publication, refer to the article titled "Tech Info Library: Submitting Articles for Publication".

DISCUSSION -----

=====  
THE TECHNICAL INFORMATION LIBRARY  
=====

What Is The Technical Information Library?  
=====

The Apple Technical Information Library (TIL) is Apple's official technical support database. The TIL is a textual database of several thousand articles about Apple and third-party product technical issues. The TIL is accessible by thousands of users world-wide on online services such as AppleLink, eWorld, CompuServe, and the Internet (both World Wide Web and WAIS). The TIL is updated daily or weekly (depending on the online service you are using) with new information and is the same database that Apple employees use to answer customer questions.

Where You Can Find the TIL  
=====

A subset of the TIL is available to anyone through these online services:

CompuServe

-----  
Located in the Apple Tech Info area (go apltil).

The Internet

-----  
Maintained in two locations:

info.hed.apple.com (Home Gopher Server)  
Path: Home Gopher Server -> Computer Information -> Apple Tech Info Library

info.apple.com

World Wide Web

-----  
Located at this URL: <http://www.info.apple.com>

eWorld

-----

# APPLE II COMPUTER TECHNICAL INFORMATION

Located in the Quick Answers Area (shortcut: tech info) in the Apple Customer Center of the Computer Center building.

## AppleLink

-----

Located in the Support Area.

## SEARCHING THE TIL

=====

There are four ways to search the TIL:

- \* By keyword (not available on CompuServe)
- \* By full text search
- \* By publication date (on AppleLink, CompuServe, and eWorld -- See NOTE)
- \* By browsing folders (on eWorld and AppleLink)

NOTE: This search varies slightly between platforms. See the specific platform section below for information on searching by date.

## Searching with Keywords

=====

Use keywords to quickly and easily find the information you are looking for in the TIL. For best results, use a keyword and a product name. Here is an example of using a keyword and product name in a search string:

"SPECSHT and Quadra 840AV"

This search string finds the "Quadra 840AV: Specifications" article.

Using a keyword in a search string may not find all relevant articles; some articles were in the TIL prior to the implementation of keywords. In addition, some related articles do not include the keyword for the article to which it relates.

Keywords are available in the TIL on all online services except CompuServe. See the section "The TIL on CompuServe" later in this article for information on searching the TIL on CompuServe.

The keywords in the following list can help you easily narrow a search. This list is current as of February 20, 1995:

Description	Keyword
-----	-----
Available in rich text via FAX	KFAX
Cable Information	CABINFO
Compatibility	KCOMPAT
Document Manual Errors	KMANERR
Emerging Issues	KISSUE
Information Alley	KALLEY
Internet Related Information	KINTER
Matrix/ Table	KTABLE
Newton Message Pad	KNMP
Online Information	KOL
PowerBook	KPBOOK
PowerPC, Power Macintosh	KPPC
Read Me files	KREADME (see NOTE)

## APPLE II COMPUTER TECHNICAL INFORMATION

Specification Sheets	SPECSHT
Support Issues	SUPT
System 7.0 Articles	SYS7
System 7.5 Articles	SYS75
Technical Information Library	KHELP
Third Party Compatibility Lists	PCOMPAT
Third Party Info	3PTY
Troubleshooting: Hardware	HTS
Troubleshooting: Network	KNTS
Troubleshooting: Software	KSTS
Windows/MS-DOS	KWINDOW

NOTE: Currently being added. Articles will become active with this keyword over the next several weeks.

### Entering Text Queries

=====

You can search the TIL by simply typing in a word or phrase and then clicking the Search button. A list of all articles that contain the word or phrase you entered displays in a scrolling field. You can then double-click on an individual title to view the article.

### Spell Correctly

-----

To ensure a complete search, it is important to spell correctly. Products are indexed into the TIL by their full name. Capitalization and trademark symbols are not necessary.

### Use Full Product Names

-----

When making searches, it is important to use the full product name. For a complete listing of all Apple product names, see the Apple Computer, Inc. Trademark List. This can be located by searching the TIL using "trademark list" as the search information.

### Use Full Search Phrases When Appropriate

-----

It is possible to use a full search phrase when searching the TIL. For example: searching for "color stylewriter pro" finds all articles that contain the exact phrase "Color StyleWriter Pro".

### Searching Tips

-----

When you do not know an exact phrase, use operators such as AND, OR, or NOT between words to expand or limit your search. For example, typing in "PowerBook and Printer" gives you a listing of all articles that contain the words PowerBook and Printer anywhere in the document. If you're looking for information on toner cartridges for a LaserWriter, typing the search string "laserwriter and (toner or cartridge)" finds every document that includes the words LaserWriter and toner or the words LaserWriter and cartridge.

### Relevance Ranking of Articles

=====

The theory of relevance ranking is that it matches your search words against

## APPLE II COMPUTER TECHNICAL INFORMATION

the textual content of selected information sources to find articles that match the search request. A statistical algorithm then ranks the articles according to relevancy and displays the most relevant article(s) at the top of the hit list. As a result, you can see at a glance which articles are most relevant. Relevance ranking helps you find more pertinent information with less effort.

=====  
THE TIL ON COMPUERVE  
=====

This section describes the differences in searching the TIL on CompuServe. You can search the TIL on CompuServe in three ways:

- \* By product category
- \* By Publication date
- \* By full text search

You can perform a search using one or a combination of these methods.

We recommend using "Full Text Search" in your search (alone or in combination with one or both of the other methods). Although searching requires more time, in many cases you get more matches based on your search criteria.

Searching on CompuServe  
=====

The following instructions assume that you are using CIM (CompuServe Information manager) software. (If you are using the text mode, please type the number next to the appropriate line item.)

Step 1: Type "Go APLTIL" to access the main search screen for the TIL.

Step 2: Select "Search the Apple Technical Information Library"

Step 3: Complete Step 3 as described below for the type of search you want.

Step 4: Complete Step 4 as described below for the type of search you want.

The remaining search steps follow the separate Step 3 and Step 4 procedures. To perform a combination search, complete Step 3 and Step 4 for each desired type of search before continuing with Step 5.

Searching by Product Category  
-----

Step 3: Select "Product Category."

Step 4: Select the product category you want to search:

- Any Product Category
- AppleTalk
- A/UX
- HyperCard
- LaserWriter
- Newton
- Performa
- PowerBook
- Power Macintosh

## APPLE II COMPUTER TECHNICAL INFORMATION

- Quadra
- System 7

### Searching by Publication Date

-----

Step 3: Select "Publication Date."

Step 4: Select the date specification and enter the search date in MM/DD/YY format.  
The date specifications are:

- Any Date
- On or After a Specific Date
- On or Before a Specific Date

### Searching with Full Text

-----

Step 3: Select "Full Text Search"

Step 4: Enter the word or words you want to search for. You can enter all words in the first of the three available rows, which results in a search for the exact string. You can enter words in different rows, which results in a search for the specified words in any order (in other words, the multiple rows provide an "and" function). For example: Entering "Power Macintosh printing" on the first row searches for this exact string; entering "Power Macintosh" on the first row and "printing" on the second row searches for an article that includes the two strings "Power Macintosh" and "printing" somewhere in the article. (CompuServe does not support boolean "or" or "not" type searches.)

Step 5: The Apple Tech Info Library performs the search and reports the results labeled "Records selected: nnn".

Step 6: Select "Display Selected Records" to view all article titles of articles found in the search.

Step 7: Select individual article title(s) to view the article(s).

=====  
THE TIL ON APPLELINK  
=====

This section describes how to browse folders and search by date in the TIL on AppleLink.

### Browsing Folders

You can browse folders on AppleLink and eWorld by clicking on the Index button in the main TIL window. When you click on this button, a List of Library Subjects window displays. This window lists all the folders in which TIL articles are stored. Double click on a folder, opening any subsequent folders, until you find the article title you are looking for.

### Searching by Date

You can search by date on AppleLink by entering a date string (format MMM DD, YYYY, as in Oct 23, 1994) in either the Newer Than or Older Than fields. Then click on Search Library.

=====  
THE TIL ON eWORLD  
=====

This section describes how to browse folders on eWorld.

Browsing Folders  
=====

The default view for the TIL on eWorld is by folder. Simply double click on the desired folder, and open any subsequent folders, until you find the article title you are looking for.

Searching With a Text String  
=====

To search the TIL on eWorld with a text string, click the Find button. A text search window displays. Enter the desired string and click the Find button.

Support Information Services  
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### END OF FILE A2TIL001.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL002.TXT  
#####

Description: 16K RAM / Language Cards: Alternate Suppliers  
Header: 16K RAM / Language Cards: Alternate Suppliers

1. Saturn RAM Expansion Card

- Expands memory by 32K or 64K and functions as a language card.
- Includes software:
  - 1. RAMEXPAND and MOVEDOS memory enhancers
  - 2. PSEUDODISK disk emulation for:
    - a. DOS
    - b. Pascal
    - c. CP/M (64K only).
- Minimum Configuration Requirements: Apple II; Apple II+; Apple IIe
- Source:
  - Titan Technologies Inc.
  - 310 W. Ann Street
  - Ann Arbor, MI 48104
  - (313) 662-8542

2. Micro-Design 16K RAM Card

- Minimum Configuration Requirements: Apple II; Apple II+; Apple IIe
- Source:
  - Micro-Design
  - 6301-B Manchaca Road
  - Austin, TX 78745
  - (512) 441-7890
  - (800) 531-5002

3. Supercom 16K RAM Card

- Increases memory to 64K and allows a user to run CP/M-80 software requiring 44K-56K.
- Permits a user to write programs in FORTRAN, Pascal, LISP and BASIC under the UCSD p-System.
- Minimum Configuration Requirements; Apple II; Apple IIe
- Source:
  - ADT Enterprises
  - P.O. Box 1500 #315
  - Corona Del Mar, Ca. 92625
  - (714) 760-7065

4. Apricorn 16K RAM / Language Card

- Source:
  - Apricorn
  - 7050 Convoy Court
  - San Diego, CA 92111

APPLE II COMPUTER TECHNICAL INFORMATION

(619) 569-9483

5. Microtek 16K RAM / Language Card

-- Source:

Personal Computer Products  
11590 West Bernardo Court  
San Diego, CA 92127  
(619) 485-8411

6. Legend Industries RAM card products

-- 3 RAM card products

-- Source:

Legend Industries, Ltd.  
2220 Scott Lake Road  
Pontiac, MI 48054  
(313) 674-0953

7. Prometheus Products 16K & 128K RAM cards

-- Source:

Prometheus Products, Inc.  
45277 Fremont Blvd.  
Fremont, CA 94538  
(415) 490-2370

8. R.H. Electronics 16K RAM card

-- Source:

R.H. Electronics, Inc.  
(805) 688-2047 ext. 4709  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL002.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL003.TXT  
 #####

Description: 80-Column Text Card: Applesoft Control Codes (11/96)  
 Header: 80-Column Text Card: Applesoft Control Codes (11/96)

Article Created: 1 January 1986  
 Article Reviewed/Updated: 14 November 1996

TOPIC -----

When you write BASIC programs while the 80-Column Text Card is active, there are a number of functions you can use by pressing the CTRL key in conjunction with another key. Functions activated by pressing these two-key combinations are called control character functions. Some control character functions work when you type them in from the keyboard as well as when used within PRINT statements in BASIC programs.

DISCUSSION -----

Table of Control Character Codes:

Key to Notes codes:

- 1 - Only available when 80-Column Text Card is active
- 2 - Only works from the keyboard, not in a program
- 3 - Only works in a program, doesn't work from the keyboard
- 4 - Not supported under BASIC

Control Character	ASCII Name	Apple IIe Name	ASCII Decimal Code	Notes	What is Executed
CTRL-G	BEL	bell	7		Produces a 1000 Hz tone for 0.1 second
CTRL-H	BS	backspace	8		Moves cursor position one space to the left; from left edge of window, moves to right end of line above.
CTRL-J	LF	line feed	10		Moves cursor position down to next line in window; scrolls if needed.
CTRL-K	VT	clear EOS	11	1	Clears from cursor position to the end of the window.
CTRL-L	FF	clear	12	1	Moves cursor position to upper-left corner of window and clears window.
CTRL-M	CR	return	13		Moves cursor position to left end of next line in window; scrolls if needed.
CTRL-N	SO	normal	14	1,3	Sets display format normal.
CTRL-O	SI	inverse	15	1,3	Sets display format inverse.
CTRL-Q	DC1	40-column	17	1,3	Sets display to 40 columns.
CTRL-R	DC2	80-column	18	1,3	Sets display to 80 columns.
CTRL-S	DC3	stop list	19	1,2	Stops sending characters to the display until a key is pressed.
CTRL-U	NAK	quit	21	1,3	Deactivates 80-column Text Card, homes cursor, and clears screen.
CTRL-V	SYN	scroll	22	1	Scrolls the display down one line, leaving the cursor in the current position.
CTRL-W	ETB	scroll up	23	1	Scrolls the display up one line,

## APPLE II COMPUTER TECHNICAL INFORMATION

					leaving the cursor in the current position.
CTRL-Y	EM	home	25	1	Moves cursor position to upper-left corner of window (but doesn't clear).
CTRL-Z	SUB	clear line	26	1	Clears the line the cursor position is on.
CTRL-\	FS	forward	28	1	Moves cursor position one space to the right; from right edge window, moves it to left end of line
					below.
CTRL-]	GS	clear EOL	29	1	Clear line from cursor position to the right edge of the window.
CTRL-^	RS	gotoXY	30	1,4	Using the next two characters, minus 32, as one-byte X and Y values, moves the cursor position
					to
					CH=X, CV=Y.

The Apple 80-Column Card in an Enhanced IIe has some additional features documented in the Programmer's Guide to the Enhanced IIe.

### Important Information About CTRL-U

=====

A "CHR\$(21)" response (Control-U) to a "GET A\$" input statement in a BASIC program may disable the 80-column card on an Apple IIGS, Apple IIe, Apple IIc, and Laser 128 (but not an Apple II Plus with Applied Engineering's Viewmaster 80).

To halt the CONTROL-U function, the CONTROL-U keystroke needs to be trapped on input. Using the "GET A\$" method:

```

10 GET A$
20 IF A$ = CHR$(21) THEN A$ = "" :REM traps the CONTROL-U, sets it to blank
30 PRINT A$;
40 GOTO 10

```

### Article Change History:

14 Nov 1996 - Reviewed for technical accuracy, revised formatting.

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Keywords:

### END OF FILE A2TIL003.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL004.TXT  
#####

Description: 80-Column Text Cards: Apple II & II Plus Compatibility (11/96)  
Header: 80-Column Text Cards: Apple II & II Plus Compatibility (11/96)

Article Created: 19 April 1991  
Article Reviewed/Updated: 14 November 1996

TOPIC -----

Does the Extended 80-column card work in the Apple II or Apple II Plus? If not, is there any way to upgrade an Apple II or Apple II Plus to 80-Column?

DISCUSSION -----

The 80-Column Card and Extended 80-Column Card work only in the Apple IIe; they cannot be used in any other computer.

Our databases do not show an 80-column interface for the Apple II or Apple II Plus. There were once several on the market, but the demand for this type of card has almost disappeared. You might still be able to find these 80-column cards through some of the computer remarketing companies, or where use computer equipment is sold.

An alternative is to purchase an Apple IIe or Apple IIGS computer. You need to to contact computer remarketing companies, or look where use computer equipment is sold.

Article Change History:  
14 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL004.TXT

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#####  
### FILE: A2TIL005.TXT  
#####

Description: Access II and Apple IIc Plus: No 40-Column Mode  
Header: Access II and Apple IIc Plus: No 40-Column Mode

Article Created: 25 February 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I am using an Apple IIc Plus and Apple Access II. The Volume Slide Control on the keyboard for the Apple IIc Plus replaces the 40- or 80-column mode switch found on the original Apple IIc.

Typing PR#3 for 80-column mode and PR#0 for 40-column mode works when in ProDOS, but when using Apple Access how can I switch between 40- and 80-column mode?

Aren't both 40- and 80-column modes supported in Apple Access II?

DISCUSSION -----

Apple Access II does not support 40-column mode on the Apple IIc Plus. The software detects that the 80-column mode is available and wants to switch the system into that mode. There is no workaround.

Copyright 1991, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL005.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL006.TXT  
#####

Description: Access II: Does Not Support VT100 Line Graphics  
Header: Access II: Does Not Support VT100 Line Graphics

This article last reviewed: 21 September 1988

Apple's Access II does NOT support the VT100 line graphics character set. If you need this character set, there may be third-party terminal emulators for the Apple II family that provide VT100 character graphics.

Apple is not currently aware of manufacturers of such emulators. If you have information on third party suppliers, please contact the Apple Technical Information Library (at AppleLink address TECH.DB).  
Copyright 1988 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL006.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL007.TXT  
#####

Description: Access II: Specifications (Discontinued)  
Header: Access II: Specifications (Discontinued)

Article Created: 31 May 1991

TOPIC -----

This article describes Apple Access II communication software.

DISCUSSION -----

Overview  
-----

Apple Access II provides intelligent and easy-to-use terminal software to Apple II users. It uses the power of the computer for automatic communications and full disk support, including file transfer. Apple Access II incorporates the AppleWorks user interface, making its operation is clear and easy to understand.

Apple Access II allows the user to send and receive any type of ProDOS file via modem. Apple Access II supports all features of Apple Modems, including automatic dialing of telephone numbers. In addition, it allows users to automatically log on to remote computers. Procedures for automatic log-on to Dow Jones, CompuServe, and the Source are included on the disk.

Apple Access II can be used with any modem that operates through an RS-232 port, or by direct connection to another computer. The software supports speeds up to 9600 baud. (It does not support split speeds, modems that send at one rate and receive at another.) Apple Access II provides complete TTY, ANSI (VT100), and VT52 terminal emulation for advanced users (less graphics).

A training disk, included with the software, allows users of all levels of proficiency to see results quickly. The Reference Manual explains introductory as well as advanced concepts of telecommunications.

Equipment Requirements  
-----

Apple Access II requires:

- \* either an Apple IIc, or an Apple IIe with 64K RAM and a Super Serial Card in Slot 2
- \* either a disk drive, or RS-232 (Serial) connection to either a modem or to another computer or terminal

Apple Access II does not work with the following equipment:

- \* Apple II or Apple II Plus
- \* Apple III in Apple II emulation mode
- \* Any modem for the Apple IIe that comes with its own interface card.

Copyright 1991 Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL007.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL008.TXT  
#####

Description: Apple 3.5 Drive: Description  
Header: Apple 3.5 Drive: Description

Article Created: 26 May 1992  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

This article describes the Apple 3.5 Drive.

DISCUSSION -----

The Apple 3.5 Drive adds 800K of data storage to the Apple IIGS, Macintosh 512K, Macintosh 512K Enhanced, Macintosh Plus, and Macintosh SE personal computers. The Apple 3.5 Drive uses 3.5-inch, 800K, double-sided disks.

Features

-----

- \* Over 5 times the storage capacity of 5.25-inch drives.
- \* Daisy-chaining capability (for Apple IIGS only). An additional port on the back of the unit allows you to connect another Apple 3.5 Drive or Apple 5.25 Drive directly. Up to three extra drives can be daisy-chained for a total of 3.2MB of external storage. (3.5 drives must come first in the chain.)
- \* In-use light that indicates when the drive is running.
- \* Direct connection to the Apple IIGS without an interface card.
- \* Platinum finish that matches the Apple IIGS, Macintosh Plus and Macintosh SE.

Benefits

-----

- \* Multiple programs and increased data can be stored on a single disk; disk swapping is reduced.
- \* All ProDOS- or Pascal-based Apple II software can be run on 3.5-inch media.
- \* Users can load programs and retrieve data faster.
- \* For the Apple IIGS only, the Apple 3.5 Drive provides flexibility by allowing connection of up to three extra drives (3.5-inch or 5.25-inch) to the first drive; users can mix a 3.5-inch and 5.25-inch drive in the same system. (3.5 drives must come first in the chain.)

Order Number

-----

\* Apple 3.5 Drive A9M0106  
Copyright 1992, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL008.TXT

#####  
### FILE: A2TIL009.TXT  
#####

Description: Apple 5.25 Drive: Specifications  
Header: Apple 5.25 Drive: Specifications

Article Created: 31 May 1991  
Article Reviewed/Updated: 11 July 1994

TOPIC -----

This article describes the Apple 5.25 Drive.

DISCUSSION -----

The Apple 5.25 Drive is ideal for users who need compatibility with thousands of Apple II software programs.

The unit adds 143K of on-line storage to an Apple II system. You can further increase storage capacity by connecting an additional drive directly to it. Depending on which computer system you have, you may be able to "daisy chain" several drives (including 3.5-inch drives) in this manner.

System Requirements  
-----

The Apple 5.25 Drive can be used with any Apple II personal computer:

- \* Apple IIGS
- \* Apple IIe\*
- \* Apple IIc Plus
- \* Apple IIc
- \* Apple II Plus\*
- \* original Apple II\*

\* the Apple IIe, Apple II Plus, and Apple II require the Apple 5.25 Controller Card

Technical Specifications  
-----

\* Recording medium  
recording surfaces: 1  
tracks per surface: 35

\* Capacity  
Formatted data capacity: 143K, 16 sectors  
Available data capacity:  
- ProDOS or Pascal: 137K  
- DOS 3.3 (16 sectors): 124K

\* Drive Characteristics  
Seek/settle time (track to track): 30 milliseconds maximum  
Drive-motor startup time: 500 milliseconds maximum  
Data transfer rate: 250 KBytes/second  
Disk rotational speed: 299 RPM  
Seek/settle time (track to track): 30 milliseconds max.  
Drive motor start time: 500 milliseconds max.  
Number of read/write heads: 1  
Head positioning:  
-- Adjusted to a tolerance of 0.002 inches maximum deviation from ideal on track  
Tracks per surface: 35  
Tracks per inch: 48  
Data surfaces: 1

## APPLE II COMPUTER TECHNICAL INFORMATION

### \* Power consumption

+12 ( 0.6) volts DC  
typical: 800 milliamps  
maximum: 1.6 amps

-12( 0.6) volts DC  
typical: 10 milliamps  
maximum: 20 milliamps

+5( 0.25) volts DC  
typical: 200 milliamps  
maximum: 400 milliamps

### \* Head Positioning

Adjusted to 0.002 inches maximum deviation from ideal on track

### \* Interfaces

one built-in cable with 19-pin D-style plug  
- Plugs directly into the disk drive port of an Apple IIGS, Apple IIc Plus, or Apple IIc.  
- Plugs into the Apple 5.25 Controller Card installed in an Apple IIe, Apple II Plus, or Apple II.  
one 19-pin D-style jack for connection of additional drive

### \* System Configuration

- Replaces UniDisk as standard floppy disk drive  
- Can be "daisy chained" or connected to the back of another drive using the disk drive port of the Apple IIGS, the disk drive port of the Apple IIc, or using UniDisk controller card in the Apple II series computers Apple II, Apple II Plus, Apple IIe, or Apple IIGS.

### \* Environmental requirements

operating temperature: 50 to 105 degrees F (10 to 46 degrees C)  
operating humidity: 20% to 80% (noncondensing)  
maximum wet bulb temperature: 85 degrees F (29.4 degrees C)

### \* Dimensions and Weight

height: 3.13 in. (7.96 cm)  
width: 6.37 in (16.2 cm)  
depth: 8.50 in. (21.6 cm)  
weight: 4.62 lb. (2.1 kg)

### Article Change History:

11 Jul 1994 - Added more information from another Tech Info Library article.

### Support Information Services

Copyright 1991-1994 Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL009.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL010.TXT  
#####

Description: Apple Access II 1.3.1: Description and Compat (Discontinued)  
Header: Apple Access II 1.3.1: Description and Compat (Discontinued)

Article Created: 6 February 1991

TOPIC -----

I need a product description for Access II v1.3.1, which differs from version 1.2.

DISCUSSION -----

Here are the specs for Apple Access II, Version 1.3.1 (A2D2013).

Description  
-----

Apple Access II turns an Apple IIc, IIc Plus, IIe, or Apple IIGS personal computer into an intelligent terminal that can communicate with a variety of computers and on-line information services.

You can use Apple Access II with any modem that operates through an RS-232 port or by direct connection to another computer with an asynchronous port.

Features  
-----

The software supports transmission speeds of up to 9600 baud. Other features of Apple Access II include:

- \* All features of the Apple Modems including automatic dialing
- \* Automatic logon to remote computers
- \* Emulation of TTY, ANSI VT100(TM), and VT-52(TM) terminals
- \* Support for special keyboard features of VT100 and VT-52 terminals including the four PF (programmable function) keys
- \* The ability to upload and download ASCII files to and from other computers
- \* Support for 40- and 80-column video displays
- \* Processing of downloaded data from remote systems and working with it off-line, significantly reducing timesharing costs
- \* Sending or receiving any type of ProDOS file
- \* Support for XMODEM and Binary II file transfer protocols
- \* The AppleWorks user interface
- \* Automatic communications and full disk support, including file transfer
- \* A command-file, programming language for development of logon scripts
- \* Preconfigured scripts for the following online information services:
  - Dow Jones
  - CompuServe
  - The Source
  - Delphi

## APPLE II COMPUTER TECHNICAL INFORMATION

- Genie
  - Dialog Information Services
- \* For the IIGS, the ability to capture text directly to the printer and 64K serial buffer

### Requirements

-----  
To use Apple Access II, you need the following components:

- \* An Apple IIc, IIc Plus, IIe, or IIGS personal computer with at least 64K of RAM (128K recommended)
- \* For the Apple IIe, an Apple Super Serial Card in Slot 2
- \* An Apple Modem or another modem with RS-232 interface
- \* An RS-232 cable
- \* A compatible video display device
- \* An external disk drive or hard disk (optional)
- \* An 80-column card for the IIe (optional)
- \* A compatible printer (optional).

### Apple Access II Kit

-----  
The Apple Access II kit includes:

- \* Access II program disks in both 5.25-inch and 3.5-inch form ats
- \* An interactive tutorial disk
- \* A user's guide.

### Incompatibilities

-----  
Apple Access II does NOT work with the following equipment:

- \* Apple II or II Plus
- \* Apple III in Apple II emulation mode
- \* A modem for the Apple IIe that has its own interface card.

Note: Apple Access II does NOT support split-speed transmissions (sending at one rate and receiving at another).

Copyright 1991-94, Apple Computer, Inc.

Keywords: specsht

### END OF FILE A2TIL010.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL011.TXT  
#####

Description: Apple Access II version 1.2: Specifications (Discontinued)  
Header: Apple Access II version 1.2: Specifications (Discontinued)

Order #: A2D4503

--Technical Specifications

Connections:

1. RS-232 port with modem
2. direct connection with another computer

Baud rates: up to 9600

Terminal Emulations:

1. TTY
2. ANSI (VT100)
3. VT52

Protocols: Christensen

--System Configuration

1. Apple IIc, Apple IIgs or Apple IIe with Super Serial Card in Slot 2 and one disk drive
2. Modem
3. Another computer or terminal
4. Options: 80-column Text Card, Extended Memory, Printer, ProFile

NOTE: Apple Access II will NOT work with the following equipment:

1. Apple II or II Plus
2. Apple III in Apple II emulation mode.
3. A modem for the Apple IIe which has its own interface card.

--Features

- Sends or receives any type of ProDOS file
- Incorporates AppleWorks user interface
- Automatic communications and full disk support, including file transfer
- Supports all features of the Apple Modems including automatic dialing
- Supports automatic log on for remote computers and services including:
  1. Dow Jones
  2. CompuServe
  3. The Source
- Does NOT support split speed transmissions (sending at one rate and receiving at another)

Apple Technical Communications

Keywords: SPECSHT

### END OF FILE A2TIL011.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL012.TXT  
#####

Description: Apple Access II: 'Character Delay' and 'Line Delay'  
Header: Apple Access II: 'Character Delay' and 'Line Delay'

Access II version 1.1 has fixed the problem of 'Line Delay' working erratically. In versions previous to 1.1, a line delay of 100 resulted in a considerable delay, but changing the line delay to 9999 resulted in less delay.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL012.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL013.TXT  
#####

Description: Apple Access II: 1.1 Update  
Header: Apple Access II: 1.1 Update

The new version of Access II (1.1) solves many of the bugs that were associated with Access 1.0. Here are the main changes:

- Text file send delay (The 1.0 version would only accept 99 as a value when the maximum input should have been 9999)
- XMODEM file transfer (Access 1.0 would 'lock-up' during XMODEM transfers and the file would be lost)
- Formatting routines (The formatting routines now operate)

The Access II 1.1 upgrade may be obtained by the user through the Apple media exchange program.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL013.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL014.TXT  
#####

Description: Apple ADB Keyboard: Specifications (Discontinued)  
Header: Apple ADB Keyboard: Specifications (Discontinued)

Article Created: 4 December 1989  
Article Reviewed/Updated: 25 June 1992

TOPIC -----

This article provides specifications for the Apple ADB Keyboard.

DISCUSSION -----

System Requirements:

Any Apple personal computer with an Apple Desktop bus interface

Technical Specifications:

- 81 keys
- 10-key numeric pad
- 4 cursor-control keys

Size and Weight:

- Height: 1.75 in. (44.5 mm)
- Width: 16.5 in. (418 mm)
- Depth: 5.6 in. (142 mm)
- Weight: 2.25 lbs (1 kg)

The Apple ADB Keyboard has an 8-event buffer, and the Apple Extended Keyboard has a 16-event buffer. Events include key-down and key-up events.

NOTE: The Apple ADB Keyboard has been replaced by the Apple Keyboard II.  
Copyright 1989 Apple Computer, Inc.  
Keywords: SPECSHT

### END OF FILE A2TIL014.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL015.TXT  
#####

Description: Apple Color Plotter: Product Description (Discontinued)  
Header: Apple Color Plotter: Product Description (Discontinued)

This article last reviewed: 8 November 1988

The Apple Color Plotter will work with the Apple II family (through a Super Serial Card, not supplied with plotter) and the Apple III (through the RS-232 port). It uses a standard RS-232 interface so anyone who can send out ASCII and meet the handshake specifications will be able to use this plotter. The plotter offers a 255 byte buffer and is provided with switches to allow it to be matched to many computers. Options available with the switches are:

Baud Rate: 75 to 9600  
Stop Bit: 1 Bit  
          1 1/2 Bit  
          2 Bit  
Parity: Odd  
          Even  
          None  
Data Length: 7 Bit  
             8 Bit

The Apple Color Plotter accepts several different sizes and thicknesses of paper and can draw on transparency materials as well as paper. There are 8 different colors of pins and two thicknesses (.3mm or .7mm). The colors come in both water base and oil base (quick drying) inks.

A company called Sun Remarketing specializes in obsolete Apple products. For more information, search on "Sun Remarketing".  
Copyright 1988 Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL015.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL016.TXT  
#####

Description: Apple DMP Card: How to Identify (2/97)  
Header: Apple DMP Card: How to Identify (2/97)

Apple DMP Card: How to Identify (2/97)

Article Created: 30 August 1991  
Article Reviewed/Updated: 12 February 1997

TOPIC -----

This article describes how to identify the DMP card, how to find the Apple part number and it use.

DISCUSSION -----

The Module Identification manual can be used to match the card with its photograph. The Module Identification manual will also have the part's service part number: 661-XXXX.

The card was used for connecting the Apple DMP (parallel printer) to an Apple II family computer.

Article Change History:  
12 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL016.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL017.TXT  
#####

Description: Apple FORTRAN: Specifications (Discontinued)  
Header: Apple FORTRAN: Specifications (Discontinued)

--Order #: A2D0032

--Technical Specifications:

- 1. Format: 16-sector disks
- 2. Language:
  - a. Pascal
  - b. Produces P-code, which runs in the Apple Pascal Operating System
- 3. Intrinsic Functions:
  - ABS, ACOS, AINT, ALOG, ALOG10, AMAX0, AMAX1, AMIN0, AMIN1, AMOD,
  - ANINT, ASIN, ATAN, ATAN2, CHAR, COS, COSH, DIM, EOF, EXP, FLOAT,
  - IABS, ICHAR, IDIM, IFIX, INT, ISIGN, LGE, LGT, LLE, LLT, MAX0, MAX1,
  - MIN0, MIN1, MOD, NINT, REAL, SIGN, SIN, SINH, SQRT, TAN, TANH

--Package:

- 1. Disk: Apple FORTRAN System
- 2. Disk: Apple FORTRAN System
- 3. Manual: Apple FORTRAN Language Reference

--System Configuration:

- 1. Computer:
  - a. Apple II
  - b. Apple II Plus with Language Card
  - c. Apple IIe
  - d. Apple IIc
- 2. disk drive: Apple Disk II

NOTE: While a single drive system is adequate for very small programs, two drives are strongly recommended for ease of operation and more serious program development

- 3. video display: Monitor II
- 4. Apple Pascal package

--Features:

- 1. Industry standard, ANSI X3.9-1978
- 2. ANSI Standard Subset of the FORTRAN 77 standard

--Supports enhancements and facilities from the full FORTRAN 77 language

--Contains enhancements beyond the full FORTRAN 77 specifications:

- 1. Compiler directives in the source code permit many files in one compilation.
- 2. An additional parameter to the OPEN statement allows you to specify that the file is blocked or unblocked.

--Minor differences between the ANSI Standard Subset FORTRAN 77 and Apple FORTRAN:

- 1. Subprogram names cannot be passed as parameters.
- 2. INTEGER and REAL data types have different storage requirements:
  - a. 2 bytes for INTEGER

## APPLE II COMPUTER TECHNICAL INFORMATION

b. 4 bytes for REAL

NOTE: Apple FORTRAN does not support double-precision arithmetic.

3. Apple Pascal Operating System Linker links:
  - FORTRAN P-Code files
  - Compiled P-code
  - Assembled machine code
4. Interfaces to routines in Pascal system library
  - High-res graphics
  - Sound generation
  - Hand control routines
5. Subscript expressions may include array elements and function calls
6. DO statement limits may be defined by expressions, rather than just single variables
7. Input/output (I/O) units may be specified by expressions, rather than just constants or simple variables
8. The I/O list of a WRITE statement may include expressions
9. All combinations of FORMATTED/UNFORMATTED and SEQUENTIAL/DIRECT files are allowed, with the following restrictions:
  - BACKSPACE is supported only for files connected to the blocked devices -- it is not supported for UNFORMATTED SEQUENTIAL files;
  - DIRECT files must be connected to block devices

Apple Technical Communications

Keywords: SPECSHT

### END OF FILE A2TIL017.TXT

#####  
### FILE: A2TIL018.TXT  
#####

Description: Apple ftp Sites Frequently Asked Questions (2/97)  
Header: Apple ftp Sites Frequently Asked Questions (2/97)

Article Created: 7 June 94  
Article Reviewed/Updated: 09 January 1997

TOPIC -----

This article provides an overview of ftp sites in general, a description of the ftp sites maintained by Apple, and answers to common problems.

DISCUSSION -----

What are ftp Sites?  
=====

An ftp site is a server which has an Internet connection and uses the File Transfer Protocol (an agreed upon standard for transferring files using the TCP/IP protocol) to let you log on and download files.

Servers can be Macintosh computers, MS-DOS machines, or UNIX based PCs or workstations. Limits, such as the number of users logged on, can be placed on an ftp site. Obviously, the more memory and processor speed a machine running as an ftp site has, the better able it is to handle more users, more file transfers, and so on.

Apple's ftp Sites  
=====

There are currently a number of ftp sites maintained at Apple, most of which are located in Austin, TX or Cupertino, CA. We are constantly adding additional ftp servers:

- ftp.info.apple.com (Austin, TX)
- ftp.apple.com (Cupertino, CA)
- ftp.info.euro.apple.com (Zeist, the Netherlands)

- The following web page (<http://support.info.apple.com/ftp/mirrors.html>) lists \*all ftp sites\* Apple has around the world. The ftp.info.apple.com site(s) has a current capacity of over 2,000 concurrent ftp sessions, with several thousand more coming this winter and spring - all served by 3 T-1s and a T-3 connection. (ftp.apple.com has capacity for approx. 1,000)

Apple Computer Gopher Server  
-----  
gopher://gopher.info.apple.com/

Contains both the complete collection of Apple Software Updates and the Apple Tech Info Library.

How the Software is Posted  
=====

All files are compressed using Stuffit Deluxe into self extracting archive files (usually identified by the .sea suffix appended to the end of the file name). They are then converted to the BINHEX format uploaded using Fetch (see the next section for an explanation of software). We then download and check each file we upload.

Many files start out as Disk Images. Customers downloading disk image files

## APPLE II COMPUTER TECHNICAL INFORMATION

need to download and use Apple's Disk Copy application to create floppy disk copies of each disk image. There is a Quick Reference Guide (QRG) on how to use Disk Copy available from the Apple Fax Info system, as well as document "Dealing with Disk Images" posted on [info.hed.apple.com](http://info.hed.apple.com) in the Apple Support Area.

### The Software That is Available

=====

The Apple software updates collection is very large and is broken into two major categories: US and Worldwide. Inside the worldwide directory, is a large of localized software - that is, software that has been translated into other languages for use with localized MacOS systems.

Inside both the US and Worldwide folders is the following directories, many of which contain subdirectories:

Apple II  
DOS-Windows  
Macintosh  
Newton  
UNIX (on some servers)

### What software You Should Use

=====

In general, Apple recommends that you obtain the latest version of an application that uses the ftp protocol to transfer files.

The following are the most common applications, many of which are included in the Apple Internet Connection Kit, now available in the USA.

#### Fetch 2.1.2 or 3.0

-----

An application developed at Dartmouth College; the most popular ftp client for Macintosh users. It automatically downloads and converts the binhexed files to the .sea file format.

#### Anarchie 140

-----

Anarchie is an ftp and Archie client. It lets you browse ftp sites, download files, or find them using an Archie server. It requires System 7 and MacTCP 1.1 or later. Anarchie lets you view any directory as a folder, making it a very Macintosh-like application.

#### Turbogopher 1.0.8b4

-----

An Internet surfing application developed by the University of Minnesota, capable of downloading and converting binhexed files to the .sea file format.

#### Netscape Navigator

-----

A web client from the NetScape Communications Corp.

#### Microsoft Internet Explorer

-----

A web client from Microsoft Corp.

### Common Problems

=====

The following common problems may be encountered by customers on Apple's ftp servers.

## APPLE II COMPUTER TECHNICAL INFORMATION

ftp server: cannot log on

-----  
You cannot log on due to the maximum concurrent user limit. You should try again later or another Apple ftp server.

Apple Computer gopher server: cannot download files successfully, ftp client reports "end of file error" or "EOF error"

-----  
We do verify each file we upload, but occasionally files do get corrupted and we replace them.

However, most of the time, you cannot download a file due to one of following problems:

\* Not using most current version of ftp client, such as Fetch 2.1.2 or Fetch 3.0.

\* The server connection "times out" or disconnects. Try logging on again, either early in the morning or late at night.

\* You cannot establish a consistent connection with any ftp site. Make sure TCP/IP software is the most current version.

Other Commercial Online Services Apple Supports

=====  
Currently Apple publishes to America Online and CompuServe in addition to the Internet.

Article Change History:

06 Feb 1996 - Updated urls.

09 Jan 1996 - Updated article, removing AppleLink, updating Internet references.

21 May 1996 - Removed reference to eWorld

Support Information Services

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Keywords: kol,kinter,kalley,kfaq

### END OF FILE A2TIL018.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL019.TXT  
#####

Description: Apple II 3.5 Disk Controller Card: Specifications (2/97)  
Header: Apple II 3.5 Disk Controller Card: Specifications (2/97)

Apple II 3.5 Disk Controller Card: Specifications (2/97)

Article Created: 11 December 1991  
Article Reviewed/Updated: 12 February 1997

TOPIC -----

This article gives technical specifications for the Apple II 3.5 Disk Controller Card. This card has been discontinued by Apple.

DISCUSSION -----

## Overview -----

The Apple II 3.5 Disk Controller Card allows you to use the 3.5-inch floppy disk drives, including the Apple SuperDrive and Apple 3.5 Drive, with an Apple IIGS or Apple IIe computer. The card also supports the operation of older model Apple II UniDisk 3.5 drives with the Apple IIe computer. This card replaces the UniDisk 3.5-inch Controller Card.

## Drives Supported -----

Apple SuperDrive

Apple 3.5 Drive

Apple UniDisk 3.5 Drive (Apple IIe only)

## Specifications -----

Microprocessor: 65C02

Disk controller: SWIM

Memory: 32K SRAM 32K ROM

Connector: DB-19

Power: Less than 4 watts

## Environmental Requirements -----

Operating temperature: 50 to 104 degrees F (10 to 40 degrees C)

Storage temperature: 50 to 140 degrees F (10 to 60 degrees C)

Relative humidity: 20% to 80% noncondensing

## Article Change History:

12 Feb 1997 - Reviewed for technical accuracy, revised formatting.

Copyright 1991-97, Apple Computer, Inc.

Keywords: SPECSHT

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL019.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL020.TXT  
#####

Description: Apple II 5.25 Drive: Using It With Other Disk Controller Cards  
Header: Apple II 5.25 Drive: Using It With Other Disk Controller Cards

This article last reviewed: 15 October 1987

New Apple II 5.25 drives can be connected to controller cards other than the ones specifically designed for those drives.

- an Apple 5.25 drive can be daisy-chained to a UniDisk, either 5.25 or 3.5.
- an Apple 5.25 drive can be connected to a DuoDisk controller card.
- an Apple 5.25 drive can be connected to a Disk II controller card, if you first use Quark's adaptor to make the Apple 5.25 drive's cable fit the Disk II controller card.

Keywords:

### END OF FILE A2TIL020.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL021.TXT  
#####

Description: Apple II and Apple II Plus: Hardware Specs (Discontinued 6/83)  
Header: Apple II and Apple II Plus: Hardware Specs (Discontinued 6/83)

Electrical

AC power: 107-132 VAC 60Hz  
DC power at I/O ports  
(48K RAM)  
+ 5v @ 1.0 amp  
- 5v @ 0.25 amps  
+12v @ 1.1 amps (Can supply 2.1 amps for 20 minutes with rest of 10 minutes)  
-12v @ 0.23 amps  
Power Dissipation: 60 Watts

Environmental

Temperature Range  
Operating 0C to 45C (disk media is limited to 35C)  
Storage -35C to 140C  
Relative Humidity  
20% to 90% non-condensing  
Altitude  
Operating - 1,000 to 15,000 ft  
Non-operating 50,000 ft  
(derate maximum ambient temp. by 1 degree C per 1000 feet over 5,000 ft)

Physical Characteristics

Height 4.5 in  
Width 15.1 in  
Length 18.0 in  
Weight 12.0 lbs

Safety and RFI Qualifications

The Apple II meets the following agency regulations.  
FCC Part 15, Class B Personal Computers  
CSA 22.2, No. 154-1979  
UL 114 - Office Machines  
VDE 0871/6.28"A"Limit  
Apple Tech Notes

Keywords: SPECSHT

### END OF FILE A2TIL021.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL022.TXT  
#####
```

Description: Apple II And II Plus Hardware: Stopping The Blinking Cursor  
Header: Apple II And II Plus Hardware: Stopping The Blinking Cursor

This article last reviewed: 9 November 1988

Hardware generates the blinking cursor on the Apple's screen. You can stop the blinking using this Applesoft program:

```
10 FOR A = 935 TO 941  
20 READ B  
30 POKE A,B  
40 NEXT A  
50 POKE 56,167  
60 POKE 57,3  
70 CALL 1002  
80 END  
100 DATA 72,41,63,145,40,104,76,27,253
```

This program assumes that you have DOS booted. If you don't have DOS, delete line 70.

After you run the program, the cursor will be a solid block until the RESET key is pressed, until there is an IN#0 command, or until the Apple is turned off.

The cursor can be completely eliminated by changing the 63 in line 100 to a 191.

Copyright 1988 Apple Computer, Inc.

Keywords:

```
### END OF FILE A2TIL022.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL023.TXT  
#####
```

Description: Apple II and II Plus: Shift-Key Modification  
Header: Apple II and II Plus: Shift-Key Modification

This article last reviewed: 26 September 1984

Probably all Apple II owners have heard of a mysterious "Shift-Key Mod". To many it has remained nothing more than a rumor, possibly because most modifications are thought to be costly additions. Not so the "Shift-Key Mod", the most simple and least expensive addition anyone could do for their Apple II. Of software recognizing this modification, there is a wide variety: Apple Writer, most other word processing software packages, and the firmware of most 80-column cards.

Software must recognize this alphabetic modification; the Apple alone does not do it automatically. After modification, the shift key allows you to enter uppercase characters as you do on a typewriter, without the need to precede them with a press of the Escape key or some other control character. You can still use the shift key to type the regular "shift" non-alphabetic characters, such as !,@,#,\$,%,&,\*,(,), and so on.

With the "Shift-Key Mod", you use the shift key to signal the software from an unused part of the Apple II Game port. The Port can address four separate hand controls and three hand-control pushbuttons of which only two of each are used by the standard game paddles and joysticks. This leaves unused two hand control inputs and a hand-control pushbutton input. The "Shift-Key Mod" exploits the address of this remaining pushbutton input. In practice, software supporting the modification first reads the character value at the address of the keyboard. Then, since joysticks use pushbuttons #0 and #1, the software reads the state of the address of pushbutton #2 (PB2). If the PB2 address is operated then the software simply makes the keyboard value represent uppercase.

To keep things in perspective, please note that this does not modify the Apple II to display lowercase nor enter lowercase characters into your programs when the II is in its native 40-column mode. To read the shift key's new address, the Apple II must have special software; without it, the II stays in 40-column mode. Most 80-column cards have firmware to read the address and display lowercase when in 80-column mode. When coding, you can easily enter lowercase characters into your own program's output strings with 80-column cards supporting the modification. However, when the program runs in 40-column mode, lowercase characters will appear as "garbage" characters. Adding the reasonably-priced "Lowercase Character Generator" on the motherboard allows proper display of lowercase characters in 40-column mode. Apple Writer also supports lowercase character generators.

Now to make the modification. Connect two micro test clips together with 8 inches of 28 AWG wire and solder the connections. Use micro test clips to match the size of Radio Shack #270-370 clips. 28 AWG wire-wrap will do. Clip size is most important; wire size and brands are less important. Once the jumper cools, install it this way:

1. Clip one end to pin 1 of the IC located at motherboard location H14, a 74LS251.
2. Clip the other end to pin 24 of the molex connector that connects the keyboard electronics to the keyboard. Pin 25 of this connector is at the end away from the Apple's power supply. Pin 24 is to the left of pin 25.

Copyright 1988 Apple Computer, Inc.

Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL023.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL024.TXT  
#####
```

Description: Apple II and II+: Memory typically available to users  
Header: Apple II and II+: Memory typically available to users

After startup, Applesoft's FRE(0) statement reports the same amount, 48K, of free memory in the II Plus, the Apple IIe with 64K, and the Apple IIe or IIc with 128K. No matter how much the maximum memory of the CPU is, you will never have more than 48K of memory available to you, since the microprocessor lets BASIC have DIRECT access to only 48K in Apple II family computers with memory configurations equal to or greater than 48K.

This discrepancy stems both from the microprocessor's memory limit and from the demand placed on the system by the software. The Apple's 6502 microprocessor can directly access only 64K of memory (address 65536 (\$FFFF)). Some of the 64K has to be loaded with system software: the monitor, Applesoft, I/O, stacks, keyboard, vectors, and text display. The Apple's system monitor and Applesoft language routines reside in upper memory from \$D000 to \$FFFF. I/O ROM locations span from \$C000 to \$CFFF. Finally, the system uses \$0000 to \$07FF for its stack, keyboard input, system vectors and text display. This amount of software leaves you with 47103 bytes (the memory space between \$0800 and \$BFFF) that you can directly access through BASIC.

The user can then decide to give more of this memory to an operating system and high resolution graphics. For example, if you use DOS 3.3, you relinquish approximately 10.5K, the memory space from \$9600 to \$BFFF. Similarly, high resolution graphics page 1 or 2 takes another 8K for each page.

--> Adding more memory for the user

Adding memory allows you to load operating systems not dependent on BASIC; it also lets you take advantage of the full 64K from assembly language programs.

Apple II and II+ users can add 16K to a 48K configuration if they install a RAM card in slot #0.

In the IIe, this 16K "RAM card" is built onto the motherboard and is addressed in the same way as the card in the II and II+; that's why there's no slot #0 on the Apple IIe. This additional 16K actually overlays the upper 16K of memory only by bank-switching between the ROM and RAM.  
Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL024.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL025.TXT  
#####

Description: Apple II and II+: Problems with keypresses on the keypad  
Header: Apple II and II+: Problems with keypresses on the keypad

A keypress on the numeric keypad is only retained as long as the key is held down. When the key is let up, the keyboard returns to its previous state (with the key that was last pressed on the keyboard at location \$C000). This causes many strange problems, like having to hit the key longer to have it recognized. There is no way to correct this on the current keypad because of the limitations of the keyboard encoder chip.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL025.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL026.TXT  
#####
```

Description: Apple II and IIe: Controlling the Reset key  
Header: Apple II and IIe: Controlling the Reset key

On an Apple II or Apple IIe computer, the programmer can control how a BASIC program will react when reset or control-reset is pressed. DOS uses three special locations which it consults whenever reset or control-reset is pressed. Based on the values contained in these memory locations, DOS may halt a program, rerun the program, reboot a disk, or take another action you specify.

Changing these values changes the results of typing reset or control-reset from the keyboard.

To discourage users from breaking into a Basic program, some programmers change the reset vector to restart a running program whenever reset is pressed. Put the following line at the beginning of your program to get this effect:

```
10 POKE 1010, 102 : POKE 1011, 213 : CALL -1169
```

A value is not POKEd into location 1012 because the CALL statement sets location 1012 to the correct value for the current situation. When you wish to return reset to its normal action, include this Basic line:

```
20 POKE 1010, 191 : POKE 1011, 157 : CALL -1169
```

You can also force a disk boot to occur whenever reset is pressed. Simply change the value of one of the three reset vector locations. An example is:

```
30 POKE 1012,1
```

You may instruct the reset vector to call one of your own machine language routines by placing the address of this routine in locations 1010 and 1011, and CALLing the ROM routine at location -1169 to set location 1012. Your routine may process information, display a warning message, or do anything else you wish.

Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL026.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL027.TXT  
 #####

Description: Apple II and IIe: Interface I/O Signal Timing (2/97)  
 Header: Apple II and IIe: Interface I/O Signal Timing (2/97)

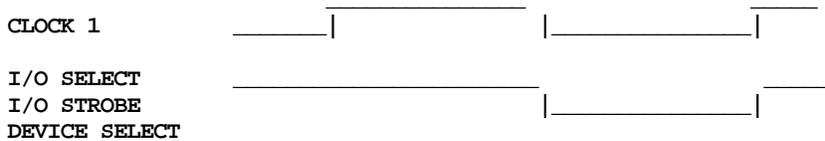
Article Created: 21 September 1984  
 Article Reviewed/Updated: 28 February 1997

TOPIC -----

This article describes how the I/O strobe signals on the Apple II peripheral connector are handled.

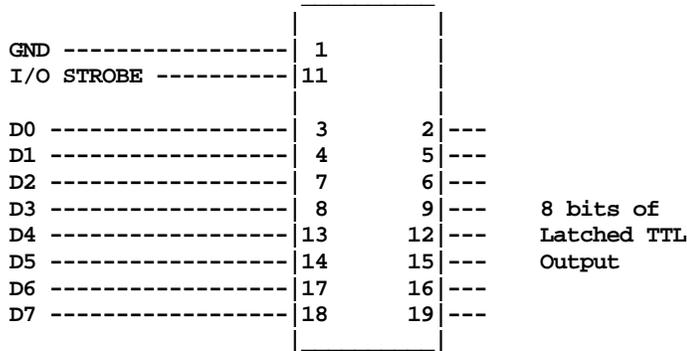
DISCUSSION -----

The I/O strobe signals on the Apple II peripheral connector are decoded from the appropriate address lines and combined with the phase one clock. This is to reduce the TTL circuitry required to build a simple I/O port.



A simple 8 bit output port would be a positive edge triggered latch with the clock tied to I/O select.

74LS374



Assuming that this interface is plugged into slot 1, any write operation to \$C090..\$C09F will transfer the data to the output lines. This is a very simple interface, so any read to \$C090..\$C09F will transfer random data to the output latch and to the Apple.

Article Change History:  
 28 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
 Copyright 1984-97, Apple Computer, Inc.  
 Keywords:

### END OF FILE A2TIL027.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL028.TXT  
#####

Description: Apple II and IIe: Power Supply Input Frequency Limitations  
Header: Apple II and IIe: Power Supply Input Frequency Limitations

This article last reviewed: 18 September 1987

The Apple II and IIe power supply is a switching power supply. It is designed to accept 107 to 135 volts from DC to 60 Hz. It will also work at up to 400 Hz but this endangers a circuit which protects the supply from shorting to the point that the protecting circuit will not work.

Keywords:

### END OF FILE A2TIL028.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL029.TXT  
#####

Description: Apple II AppleShare Network: Troubleshooting Freeze-Ups  
Header: Apple II AppleShare Network: Troubleshooting Freeze-Ups

Article Created: 15 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I have three AppleShare networks. One has all new Apple IIGS computers, and the other two are mixed with Apple IIe systems, plus both old and new Apple IIGS computers. They all come up fine but, two or three hours later they freeze. When we restart the computers most (not always the same ones) freeze at the IIGS loading gauge. This happens only on the new IIGS models.

I have about thirty Apple networks installed. On some of them, new Apple IIGS computers froze from the beginning. Replacing their logic boards seems to fix the problem. However, on the last one, the problem just moved to another, previously "clean" computer.

DISCUSSION-----

First, check for bad RAM, the most common cause of a system locking up during startup. This would explain why swapping logic boards cured the one case.

Second, check for bad software on server. In this case, this diagnosis is more likely, because the condition is appearing on more and more systems. Try re-installing the server, making sure you use the Network Products Installer disk. Re-install the following:

- 1) System 6.0.5
- 2) AppleShare 2.0.1
- 3) AppleShare Apple II Setup 2.1.1
- 4) GS/OS 5.02

Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL029.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL030.TXT  
#####

Description: Apple II BASIC: How to Convert Into Macintosh QuickBasic  
Header: Apple II BASIC: How to Convert Into Macintosh QuickBasic

Article Created: 13 August 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

Is there a way to convert Apple IIe/IIGS BASIC files into Microsoft QuickBasic files for the Macintosh?

DISCUSSION -----

Yes, follow these steps:

- 1) Save a listing of the program as an ASCII text file.
- 2) Transfer the file to the Macintosh using Apple File Exchange.
- 3) Import it directly into Microsoft QuickBasic. QuickBasic accepts ASCII Text Files.
- 4) Now, it's just a matter of modification (if needed). According to Microsoft, some programs work even without conversion.

Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL030.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL031.TXT  
#####
```

Description: Apple II Business Graphics: Specifications (Discontinued)  
Header: Apple II Business Graphics: Specifications (Discontinued)

## I. Technical Specifications

### A. Language:

- Pascal
- Assembly

### B. Format:

- 16-sector diskette.

### C. Imaging:

- Graph Types: Scatter, solid-line, dash-line, bar (vertical or horizontal), pie (filled or outline), and multiple overlays
- Color: Six available on color monitor--user-selectable or default values
- Titling/Labeling:
  1. Alphanumeric labeling on x- and y-axis
  2. Auto-scale or user-defined label ranges
  3. Centered titles
  4. Floating titles:
    - any number
    - horizontal or vertical
  5. Tick marks and extended grid lines

### D. Graphic Devices:

- Console
- Silentype
- Apple Color Plotter
- Qume Sprint 5 printers
- Hewlett-Packard 7225A/B with 17603A, RS-232 Personality Module
- Houston Instruments DMP-3, -4 high-quality pen plotters

### E. Data Manipulation:

- Curves that can be FITed to any data set:  
LINE LOGARITHMIC CONSTANT SINE PARABOLA
- Coefficients can be manually set to produce known curves.
- Statistical analyses that can be performed on any data set:  
MINIMUM MEAN MAXIMUM STANDARD DEVIATION SUM VARIANCE
- Either moving average or exponential smoothing may be performed with a single command.
- Additional data manipulation commands:  
ADD SHIFT DIFFERENCE SUBTRACT(FROM) DIVIDE(BY/INTO)  
SUM MULTIPLY
- TAKE Files:
  1. Store business Graphics commands in a single file that allows multiple, complex plots to be recreated with a single command.
  2. WAIT command allows users to insert a timed pause in a TAKE file.
- Virtual files:
  1. System allows user to utilize large data files exceeding the size of computer memory.
  2. Default virtual file provides space for approximately 90-100 points.
  3. SET VIRTUAL FILE command allows user to define a virtual file on another diskette, greatly expanding the maximum number of points to be processed.

## APPLE II COMPUTER TECHNICAL INFORMATION

### --Interchange Facility:

Generates a Business Graphics data file from these common formats:

1. VisiCalc print files (13- and 16-sector)
2. ApplePlot (13- and 16-sector)
3. DIF format
4. BASIC text files (13- and 16-sector)
5. Apple Pascal

### II. System Configuration:

#### A. Apple

1. II Plus with 48K of memory
2. IIe
3. IIC

#### B. Two 5 1/4 inch disk drives

#### C. Apple Language Card

#### D. Video display device

#### E. Optional compatible printer and printer controller card

1. With Silentype Interface Card: Silentype
2. With High Speed Serial Interface Card with P8-02 PROM:  
Qume Sprint 5 printers

#### F. Optional compatible plotter and plotter controller card

--With High Speed Serial Interface Card:

1. Hewlett-Packard 7225A/B with 17603A, RS-232 Personality Module
2. Houston Instruments DMP-3, -4 high-quality pen plotters

NOTE: Apple Business Graphics includes drivers supporting the printers and plotters mentioned here. Using a special kit, called a Printer/Plotter Installation Kit (PIK), Apple Business Graphics can support other plotters, letter quality printers, and dot matrix printers.

### III. Features

--Enlarges any area of a graph for close study

--User may specify all graph parameters:

1. axis labels
2. floating labels
3. plot colors,
4. horizontal and vertical axis ranges

--Macro commands can replace multiple command sequences

Apple Technical Communications

Keywords: SPECSHT

### END OF FILE A2TIL031.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL032.TXT  
#####

Description: Apple II Family and Chooser: Frequently Asked Questions (12/95)  
Header: Apple II Family and Chooser: Frequently Asked Questions (12/95)

Article Created: 8 August 1989  
Article Reviewed/Updated: 1 December 1995

TOPIC -----

This article contains frequently asked questions (FAQ) on the Apple II computer and the Chooser.

DISCUSSION -----

Question: When I choose a printer is the choice saved on disk so that I do not need to use Chooser again?

Answer: Yes, the Chooser selection is saved to disk as the user exits Chooser.

Question: When I choose a printer do I need to use Chooser each time?

Answer: You do not need to use the Chooser each time you print. The Chooser is used only when changing printers.

Question: If the choice is saved is it saved on the current startup disk or on the disk Chooser resides on?

Answer: The printer choice is saved to the disk with Chooser on it.

Question: If the choice is saved is it saved only if the disk Chooser resides on is the current startup disk?

Answer: The choice is saved to the Chooser disk no matter where Chooser resides.

Question: If an AppleShare user who starts up over the network does not have a default printer assigned from the server, will their most recent choice be saved after powering down?

Answer: The last choice is saved as the user exits Chooser.

Question: If an AppleShare user who starts up over the network does not have a default printer assigned from the server, where is it saved?

Answer: This choice is saved on the server from which Chooser is run.

Question: Is there any difference in these characteristics between the Apple IIe and the Apple II GS?

Answer: There are no differences between an Apple IIe and an Apple II GS in these matters. The Chooser program is the same on both computers.

NOTE: The user's Chooser selection overrides the Server Admin default printer assignment.

ADDITIONAL NOTE: GS/OS 5.0 uses the Control Panel for network choices. If

## APPLE II COMPUTER TECHNICAL INFORMATION

GS/OS 5.0 is being used, the Chooser program is no longer needed.

### Article Change History:

01 Dec 1995 - Changed title, added keyword, and updated format.

### Support Information Services

Copyright 1989-95, Apple Computer, Inc.

Keywords: kfaq

### END OF FILE A2TIL032.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL033.TXT  
#####

Description: Apple II Family: Cycle Speeds  
Header: Apple II Family: Cycle Speeds

This article last reviewed: 18 February 1991

TOPIC -----

What are the cycle speeds for the Apple II family?

DISCUSSION -----

Apple IIGS: 2.6 MHz  
Apple IIc Plus: 4 MHz  
all other Apple II models: 1 MHz.  
Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL033.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL034.TXT  
#####

Description: Apple II Family: Driver Not Yet Available for LaserWriter SC  
Header: Apple II Family: Driver Not Yet Available for LaserWriter SC

Article Created: 29 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I want to connect my Apple IIe to the Personal LaserWriter SC. Are there printer drivers to do this?

DISCUSSION -----

There is no Apple support for connecting either the older LaserWriter IISC nor the new Personal LaserWriter SC to any Apple II computer. Apple has made low-level driver information available to developers to create such a driver, but we don't know of any available drivers as of April 1991. Copyright 1991, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL034.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL035.TXT  
#####

Description: Apple II Family: No Support for Macintosh Hard Disk 20  
Header: Apple II Family: No Support for Macintosh Hard Disk 20

Article Created: 30 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

Is it possible to use a Macintosh Hard Disk 20 with any Apple II computer?

DISCUSSION -----

No, there is no support for the serial Macintosh Hard Disk 20 on any of the Apple II computers. A controller card was never produced to provide this compatibility.

Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL035.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL036.TXT  
#####

Description: Apple II Family: Square Wave Power Source (2/97)  
Header: Apple II Family: Square Wave Power Source (2/97)

Article Created: 01 September 1987  
Article Reviewed/Updated: 17 February 1997

TOPIC -----

This article discusses the use of a square wave AC power source, as opposed to the normal sine wave, with the Apple II family of computers.

DISCUSSION -----

The Apple II power supply is of a switching type that rectifies the AC input voltage to a DC voltage for use internal to the supply. The AC input is first sent through a line filter and then to a diode bridge for rectification. The line filter consists of inductors and capacitors to smooth the waveform of the input voltage. This action would soften the square waves an inverter might supply and the whole combination makes it OK to use an Apple II on a square wave AC supply.

Article Change History:  
17 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1988-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL036.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL037.TXT  
#####
```

Description: Apple II Family: Using With LaserWriter (2/97)  
Header: Apple II Family: Using With LaserWriter (2/97)

Article Created: 22 March 1988  
Article Reviewed/Updated: 17 February 1997

TOPIC -----

This article discusses using a LaserWriter printer with the Apple II family of computers.

DISCUSSION -----

A LaserWriter can be connected to any Apple II containing a Super Serial Card, or the serial ports (modem port and printer port) in an Apple IIc or Apple IIgs.

This is made possible by setting the serial interface to use XON/XOFF protocol using one of the following two methods.

1st Method  
-----

Send the following code exactly as shown. The Super Serial Card must be in communications mode (jumper block set to "modem"), because print mode (jumper block set to "terminal") doesn't support XON/XOFF.

```
Apple IIc/IIgs printer port:   Control-I X E  
Apple IIc/IIgs modem port:    Control-A X E  
Super Serial Card:           Control-I X
```

- Control-I (or Control-A) tells the firmware that you are sending a character to act on.
- The X tells the firmware to use XON/XOFF protocol.
- The E says 'Enable the function designated by the next printable character.'

2nd Method  
-----

Set up the LaserWriter for DTR handshake (requires version 2 or greater of the LaserWriter ROMs). This can be done by sending the following code segment to the LaserWriter with the switch set to 9600:

```
serverdict begin 0 exitserver  
statusdict begin  
25 9600 7 setsccbatch  
end
```

This sets the 25-pin connector to 9600 baud, DTR flow control, no parity. Substituting 9 for 25 sets the 9-pin connector to the same parameters. This change is written into EEROM, and remains as what is called a persistent parameter until changed back. To change the printer back to XON/XOFF, send this code segment:

```
serverdict begin 0 exitserver  
statusdict begin  
25 9600 3 setsccbatch  
end
```

## APPLE II COMPUTER TECHNICAL INFORMATION

Article Change History:

17 Feb 1997 - Reviewed for technical accuracy, revised formatting.

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Keywords:

### END OF FILE A2TIL037.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL038.TXT  
#####

Description: Apple II FORTRAN: Double precision arithmetic  
Header: Apple II FORTRAN: Double precision arithmetic

Usually, in FORTRAN IV & 77, the way to handle numbers up to 10 to 11 significant figures is to declare double precision variables or implicit double precision variables.

The new strategy here is to use the Pascal SANE unit linked to a FORTRAN program following the instructions in the Apple FORTRAN Language Reference Manual Chapters 15 and 16. Double precision poses more difficult problems. With the advent of the SANE package there are solutions possible. In short, such Pascal units are not available and must be written and created by the FORTRAN user.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL038.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL039.TXT  
 #####

Description: Apple II Hardware: 6522 Versatile Interface Adapter (2/97)  
 Header: Apple II Hardware: 6522 Versatile Interface Adapter (2/97)

Article Created: 21 September 1984  
 Article Reviewed/Updated: 28 February 1997

TOPIC -----

This article describes the 6522 Versatile Interface Adapter (6522 VIA).

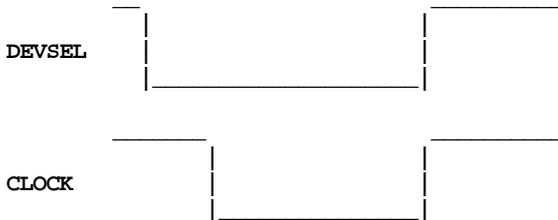
DISCUSSION -----

The 6522 Versatile Interface Adapter (6522 VIA) is a popular integrated circuit for use with microcomputers because it operates in a variety of modes. The precursor to the 6522, the 6520, has been used in several interfaces with no difficulty. Unfortunately, although these two parts have identical timing specifications, their operation is different. The 6520 is very tolerant of operation outside of the parameter limits on its data sheet while the 6522 must have its timing specifications met exactly.

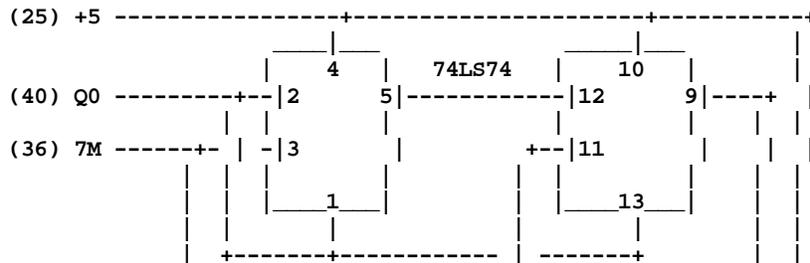
The most critical timing parameter for the 6522 is the address set-up time, the delay between the chip select and the rising edge of the 1MHz clock. The 6522 will not operate under the nearly identical Device Select and 1 MHz clock of the Apple II. The solution is to shorten the positive half-cycle of the 1 MHz waveform. This can be achieved by various methods, but, since the length of the positive half-cycle is critical, it is essential to have a well-controlled circuit to do this.

The circuit below is proposed for use with the Apple II. The 74LS74 circuit delays the positive edge of the clock by one cycle of the 7 MHz clock, generating the clock waveform that the 6522 needs. The negative edge of the clock is set by the falling edge of the 1 MHz clock; this also holds off the flip-flop until the next cycle. The shortened positive half-cycle of the clock waveform results in a leading edge delayed by 140 nanoseconds from the falling edge of Device Select.

The 6522A is required to meet the data sheet timing parameters. The 6522 will usually work but its operation cannot be guaranteed.



SUGGESTED SCHEMATIC



APPLE II COMPUTER TECHNICAL INFORMATION

+-----+					
(41) DEVSEL	-----		23	25	---+
(18) R/W	-----		22		
	11 9			24	-----+
				20	-----+
(42) D7	-----	19 1	-----	26	
(43) D6	-----	18 2	-----	27	
(44) D5	-----	17 8 3	-----	28	
(45) D4	-----	16 3 4	-----	29	
(46) D3	-----	15 0 5	-----	30	6
(47) D2	-----	14 4 6	-----	31	
(48) D1	-----	13 7	-----	32	5
(49) D0	-----	12 8	-----	32	5
				2	I/O Lines: Port A
( 5) A3	-----		-----	35	
( 4) A2	-----		-----	36	2 and
( 3) A1	-----		-----	37	
( 2) A0	-----		-----	38	A Port B
(31) RESET	-----		-----	34	
(30) IRQ	-----		-----	21	

Article Change History:

28 Feb 1997 - Reviewed for technical accuracy, revised formatting.

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Keywords:

### END OF FILE A2TIL039.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL040.TXT  
#####
```

Description: Apple II Hardware: Apple II vs Apple II+  
Header: Apple II Hardware: Apple II vs Apple II+

The only difference between the Apple II and the Apple II+ is that the Apple II has Integer BASIC and the "old" monitor ROM, while the Apple II+ has Applesoft BASIC and the Autostart monitor ROM. Most of the game programs available today are written in Integer BASIC and most of the business, scientific, and industrial programs require Applesoft, so the selection depends upon what your application requires. Apple offers firmware cards that will supply Applesoft to Apple II owners and Integer Basic to Apple II+ owners.

Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL040.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL041.TXT  
 #####

Description: Apple II Hardware: Character Generator ROM  
 Header: Apple II Hardware: Character Generator ROM

To allow you to write programs involving special characters or lower case characters, you can get a 2716 PROM to replace the the character generator ROM in revision 7 and later Apples. This note describes how the characters are mapped in the ROM.

Characters storage uses a scheme of eight bytes per character, arranged in the ROM in the order shown in Table 7 on page 15 of the Apple II Reference Manual. The starting address for each character is the address from Table 7 multiplied by eight. Lower case characters, if desired, should be mapped in place of the numbers and punctuation in columns \$E0 and \$F0.

Each character is made up of eight bytes. Each byte represents one row of dots. The most significant bit of each byte is ignored by the hardware. The lowest-addressed byte of each character is the topmost row of dots of the displayed character. The first and last bits of each row of dots are usually set to zero to supply a two dot space between characters. The bottom row of dots is usually left set to zero to allow a one row space between lines. Some lower case character sets use the bottom row for descenders (the letter "g", for example). This causes overlap when the descender is directly above an upper case letter like "B". The following diagram shows how the characters are built. The three digit hexadecimal number is the hexadecimal ROM address for each byte and the two digit hexadecimal number is the pattern of on and off bits.

\$208	\$08	...*...	\$708	\$00	.....	\$730	\$08	...*...
\$209	\$14	..*.*..	\$709	\$00	.....	\$731	\$14	..*.*..
\$20A	\$22	*...*	\$70A	\$1C	..***..	\$732	\$10	..*....
\$20B	\$22	*...*	\$70B	\$02	.....*	\$733	\$10	..*....
\$20C	\$3E	*****	\$70C	\$1E	.....*	\$734	\$3E	*****
\$20D	\$22	*...*	\$70D	\$22	*...*	\$735	\$10	..*....
\$20E	\$22	*...*	\$70E	\$1E	.....*	\$736	\$10	..*....
\$20F	\$00	.....	\$70F	\$00	.....	\$737	\$00	.....
\$210	\$3C	.....*	\$710	\$20	*...*	\$738	\$00	.....
\$211	\$22	*...*	\$711	\$20	*...*	\$739	\$00	.....
\$212	\$22	*...*	\$712	\$3C	.....*	\$73A	\$1C	..***..
\$213	\$3C	.....*	\$713	\$22	*...*	\$73B	\$22	*...*
\$214	\$22	*...*	\$714	\$22	*...*	\$73C	\$22	*...*
\$215	\$22	*...*	\$715	\$22	*...*	\$73D	\$1E	.....*
\$216	\$3C	.....*	\$716	\$3C	.....*	\$73E	\$02	.....*
\$217	\$00	.....	\$717	\$00	.....	\$73F	\$1C	..***..

Apple Tech Notes

Keywords:

### END OF FILE A2TIL041.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL042.TXT  
#####

Description: Apple II Hardware: Direct Memory Access (2/97)  
Header: Apple II Hardware: Direct Memory Access (2/97)

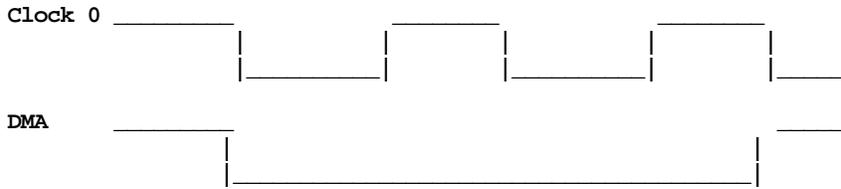
Article Created: 21 September 1984  
Article Reviewed/Updated: 28 February 1997

TOPIC -----

This article describes DMA (Direct Memory Access) and how it can be used to control the Apple's memory and I/O.

DISCUSSION -----

DMA (Direct Memory Access), is designed to allow the hardware on an interface card to completely take over the Apple's memory and I/O. The DMA pin on the Apple II interface bus disconnects the Apple's 6502 from the Apple's address bus, data bus, R/-W signal, and clock. The DMA pin should be pulled low immediately after phase 0 goes low and should be released when phase 0 again goes low. The 6502 is a dynamic device that will lose its registers' memory if DMA is held low for more than 40 microseconds. Here is an example where the DMA lasts for two microseconds.



The 6502 normally sets up its addresses, control, and data while clock 0 is low. The memory or I/O device decodes and reads the data while clock 0 is high. The actual transfer occurs when clock 0 goes from high back to low. During cycles when DMA is low, the user must supply the address, control, and data information for that memory cycle in synchronization with the Apple's clocks.

Enabling Unlimited DMA  
-----

\* Point the reset vector to a restart routine, assuming the Apple has the Auto-Start ROM.

\* Have the peripheral card generate a RESET when the 6502 is to have control of the bus. The Apple II Reference Manual explains the RESET vector starting on page 36.

Article Change History:  
28 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1984-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL042.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL043.TXT  
#####

Description: Apple II Hardware: Errata in Apple II Reference Manual (1 of 2)  
Header: Apple II Hardware: Errata in Apple II Reference Manual (1 of 2)

Page 4

Because of continuing cost reductions on 16K RAMs, current revisions of the Apple II accept only 16K RAMs.

Page 7

Table 2, the backspace key are reversed.

-> \$95 \$95 \$95 \$95  
<- \$88 \$88 \$88 \$88

Page 9

2nd Paragraph, the pins carrying the video signals are referred to as being on the left side of the board. They are on the RIGHT.

Page 10

The photograph refers to a Revision 6 Apple. Revision 7 and later Apples will look slightly different.

Page 10

The Eurapple modification is not complete and we do not support or recommend modification of Apples for European television signals.

Page 11

The photograph refers to a Revision 6 Apple. Revision 7 and later Apples will look slightly different.

Page 23

The photograph refers to a Revision 6 Apple. Revision 7 and later Apples will look slightly different.

Page 25

First paragraph, line 4; The address is actually \$C040 instead of \$C04F.

Page 31

Paragraph 3, line 3, "the leftmost column" should read "the rightmost column"

Page 31

Table 11 should read:

LEFT EDGE 32 \$20 0/ 0/39 \$0/\$ 0/\$27  
WIDTH 33 \$21 0/39/39 \$0/\$27/\$27  
TOP EDGE 34 \$22 0/ 0/23 \$0/\$ 0/\$17  
BOTTOM EDGE 35 \$23 0/24/24 \$0/\$18/\$18

Page 35

ESC E "When COUT detects this" should read "When RDKEY detects this"

Page 36

The Autostart ROM initializes the annunciators 0 and 1 to OFF and annunciators 2 and 3 to ON.

Page 37

Paragraph 5 refers to to using call -1169 to set \$3F4 to XOR of \$3F3 in autostart reset vector. This may garbage the diskette in drive 1 if used on a non-autostart system.

## APPLE II COMPUTER TECHNICAL INFORMATION

-) and the forward copy key (-

Page 47

The line of monitor command just under the first paragraph should read

```
*0:FF FF AD 30 C0 88 D0 04 C6 01 F0 08
*:CA D0 F6 A6 00 4C 02 00 60
```

Page 70

Paragraph 2, the page 3 memory usage chart is actually on page 65 of the manual instead of page 62.

Page 70

RAM Configuration Blocks are not included on Revision 7 and later Apple boards.

Page 74

The Zero Page memory maps are incomplete. Applesoft also uses \$D6 and Applesoft HIGH-RES uses \$19 to \$1D.

Page 79 Table 22

The line for \$C060 should be

```
      $0  $1  $2  $3  $4  $5  $6  $7
$C060 cin pb0 pb1 pb2 gc0 gc1 gc2 gc3
```

Page 81

Paragraph 3 recommends IOSAVE and IORESTORE. These routines must be used with caution because if any other routine in the system uses them, they will overwrite your information. The 6502 stack is a better place to save the registers.

Page 84

Expansion ROM, paragraph 3, This flip-flop should be turned on by the I/O SELECT signal, not the DEV SEL signal.

Page 89

The photograph refers to a Revision 6 Apple. Revision 7 and later Apples will look slightly different.

Page 89

The pointer to the USER 1 jumper is wrong. See the photograph on page 99 for the correct location.

Page 90 Paragraph 5

RDY, RES, IRQ, NMI lines are held high by a 1000 ohm resistor, NOT 3300 ohm.

Page 91

Data from 6502 (read) and Data to 6502 (write) are reversed. They should be:

```
Data from 6502 (write)
Data to 6502 (read)
```

Page 96

Paragraph 4, line 5, the 74LS283 is at location E14.

Page 100

The Apple's new built-in keyboard is built around a AY-5-3600 keyboard encoder. The inputs to this ROM, pins 17 through 26 and 36 through 40, are connected to the matrix of keyswitches on the keyboard. The outputs of this ROM are buffered by a 74LS04 and are connected to the Apple keyboard connector.

The keyboard decoder rapidly scans through the array of keys on the keyboard, looking for one that has been pressed. This scanning action is controlled by

## APPLE II COMPUTER TECHNICAL INFORMATION

the free running oscillator made up of three sections of a 74LS00 at location B3 on the separate encoder board. The speed of this oscillation is controlled by C7, R7 and R8 on the encoder board.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL043.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL044.TXT  
#####

Description: Apple II Hardware: Errata in Apple II Reference Manual (2 of 2)  
Header: Apple II Hardware: Errata in Apple II Reference Manual (2 of 2)

Page 104  
The +12 and -5 volt levels are documented on page 92 as +11.8 and -5.2. The levels will vary from Apple to Apple.

Page 107  
Pin 19, SYNC, is connected only on Apples manufactured for sales overseas.

Page 107  
Pin 21, RDY, is pulled high with a 1000 ohm resistor to +5 volts.

Page 107  
Pin 22, DMA, is held high by a 1000 ohm resistor to +5 volts. This signal will stop the 6502 clock. It should not be held low for more than two clock cycles or the 6502 internal registers may be lost.

Page 108  
Pin 28, INT IN, is the second item on the page and is mislabeled 26.

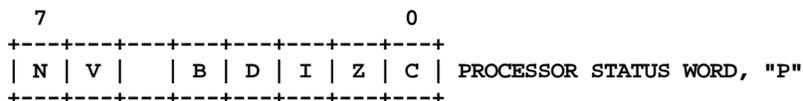
Page 108  
Pin 32, INH, is pulled high by a 1000 ohm resistor.

Page 108  
Pin 35, COLOR REF, is connected only on Apples manufactured for sales overseas.

Page 119  
Figure 3 should be labeled:

ROTATE ONE BIT RIGHT (MEMORY OR ACCUMULATOR) M or A.

Page 120  
The Processor status word should be



^  
This bit is undefined.

Page 121  
Note 1 should read "Bits 6 and 7 are transferred to the Status Register. If the result of A AND M is zero, then Z=1; otherwise Z=0."

Page 127-128  
The unimplemented opcodes are shown as NOPs, which is wrong. \$EA is the only code defined as NOP. The others should NOT be used as they perform undefined operations.

Page 128  
Op-code \$AD is a LDA, Absolute

Page 137  
The addresses starting at line 100 should be:

CLRAN0 EQU \$C058  
SETAN0 EQU \$C059  
CLRAN1 EQU \$C05A

APPLE II COMPUTER TECHNICAL INFORMATION

```
SETAN1 EQU $C05B
CLRAN2 EQU $C05C
SETAN2 EQU $C05D
CLRAN3 EQU $C05E
SETAN3 EQU $C05F
```

Page 143

Starting at address \$FA6F the comments should read:

```
FA6F LDA CLRAN0 ;AN0 = TTL LO
FA72 LDA CLRAN1 ;AN1 = TTL LO
FA75 LDA SETAN2 ;AN2 = TTL HI
FA78 LDA SETAN3 ;AN3 = TTL HI
```

Page 165

The comment after address \$FCAC should read

```
1.0204 USEC * (13+27/2*A+5/2*A*A)
```

Pages 172-176

These tables were cut up to fit the pages so they are no longer in numeric or alphabetic order.

Apple Tech Notes

Keywords:

### END OF FILE A2TIL044.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL045.TXT  
#####
```

Description: Apple II Hardware: The Apple II Keyboard  
Header: Apple II Hardware: The Apple II Keyboard

The keyboard on the Apple II has an upper-case-only encoder. It can produce ASCII characters 0 through 95, excluding `_`, `\`, `[`, `CTRL-_`, `CTRL-[`, and `CTRL-\`. The Apple III uses the very same encoder. However, the Apple III also has a second keyboard port; with this port, the Apple III can independently to sense the shift, control, and alpha lock keys, as well as a number of other functions.

You can modify an existing Apple II to allow it to sense whether or not the shift keys are depressed. This modification is supported by system software such as Pascal 1.1 and Pilot, as well as some word processing software. The core of the modification is a wire running from the shift keys to button input 2 of the game I/O port which button input the paddles don't use. This modification is not recommended for in-warranty Apples and should be only performed by an authorized service technician.

Since the modified Apple can sense whether or not the shift key is being pressed, it can distinguish 51 new characters: `CTRL-SHIFT-A` thru `Z` excluding `M`, `N`, and `P`, `SHIFT-A` thru `Z` excluding `M`, `N`, and `P`, `SHIFT-0`, `SHIFT-RETURN`, `SHIFT-ESC`, `SHIFT-LEFT ARROW`, and `SHIFT-RIGHT ARROW`. This raises the total number of distinguishable characters to 141, which easily encompasses the 128 member ASCII character set.

To facilitate the most natural use of the keyboard, software sometimes rearranges the interpretation of these characters so that the keyboard resembles that of a typewriter. Apple has employed several types of keyboards on the Apple II since its introduction, so the modification has two appearances.

1. On the older style keyboard, a wire should be run between pin 2 of the 74LS00 and pin 4 of the keyboard connector on the keyboard.
2. On the newer style keyboard with the "piggy-back" electronic assembly, the wire should be run between pin 9 of the 74LS00 closest to the keyboard connector and pin 4 of the keyboard connector.

In either case, a second wire should connect the bottom of pin 4 at location A7 to pin 7 at location J14 on the motherboard. Check carefully that the wire isn't connected to pin 7 of H14. The keyboard cable acts as a connection between these two wires.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL045.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL046.TXT  
#####

Description: Apple II High Speed SCSI Card: CMS Hard Drive (11/96)  
Header: Apple II High Speed SCSI Card: CMS Hard Drive (11/96)

Article Created: 15 May 1991  
Article Reviewed/Updated: 14 November 1996

TOPIC -----

My computer does not recognize a CMS hard drive when using the Apple II High Speed SCSI card. How can I correct this problem?

DISCUSSION-----

Ensure DIP switch 8 on the CMS hard drive is in the closed position. DIP switch 8 controls the reset line at pin 40. All Apple SCSI cards use the reset line for handshaking. If this pin is disconnected or turned off, the computer will not recognize the hard drive.

If your computer still doesn't recognize the CMS hard drive, check the SCSI switch to make sure it is not set to 7.

Article Change History:  
14 November 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL046.TXT

#####  
### FILE: A2TIL047.TXT  
#####

Description: Apple II High-Speed SCSI Card: Description (11/96)  
Header: Apple II High-Speed SCSI Card: Description (11/96)

Article Created: 31 May 1991  
Article Reviewed/Updated: 14 November 1996

TOPIC -----

This article describes the Apple II High-Speed SCSI Card. This card has been discontinued and is no longer available from Apple.

DISCUSSION -----

Overview  
-----

The Apple II High-Speed SCSI Card lets you connect an Apple IIe or Apple IIGS computer to any device using the SCSI standard. Such devices include hard disk drives, CD-ROM drives, scanners, tape drives, and laser printers. Using DMA (direct memory access) data transfer, this card offers impressive data throughput. It functions more than 10 times faster than the earlier Apple II SCSI Card. The Apple II High-Speed SCSI Card comes with software utilities for use with hard disk drives and CD-ROM drives.

System Requirements  
-----

To use the Apple II High-Speed SCSI Card, you need an Apple IIGS or Apple IIe computer with a 65C02 microprocessor. This includes all Apple IIe systems manufactured in 1986 or later, as well as any earlier models that have been enhanced with the Apple IIe Enhancement Kit. If you have an early-model Apple IIe that has not been enhanced, contact your dealer about the enhancement kit.)

A 3.5-inch disk drive (Apple IIGS or Apple IIe) or a 5.25-inch disk drive (Apple IIe)

A device with an SCSI port, appropriate SCSI cabling, and one SCSI terminator.

Technical Specifications  
-----

Interface: DB-25 SCSI port

Maximum data throughput  
- 1MB per second (Apple IIGS)  
- 511K per second (Apple IIe)

Environmental requirements  
- Operating temperature: 50 to 104 degrees F (10 to 40 degrees C)  
- Relative humidity: 20% to 95% (noncondensing)

Article Change History:  
14 November 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL047.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL048.TXT  
#####

Description: Apple II High-Speed SCSI Card: SCSI Reset Line (11/96)  
Header: Apple II High-Speed SCSI Card: SCSI Reset Line (11/96)

Article Created: 19 March 1991  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

Does the new Apple II High-Speed SCSI Card use the SCSI Reset line as the older Rev C card? I have a series of hard drives that have the reset line is cut in the cable and need to know if they will function with the high-speed card, or will the cable have to be replaced.

DISCUSSION -----

The Apple II High-Speed SCSI Card pin assignments are identical to the older Apple II SCSI Interface card.

The newer card still uses the SCSI Reset Line. You may need to use a special cable or, in the case of some third-party hard drives, make the appropriate DIP switch selections.

Article Change History:  
15 November 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL048.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL049.TXT  
#####

Description: Apple II High-Speed SCSI Card: Setting DMA (11/96)  
Header: Apple II High-Speed SCSI Card: Setting DMA (11/96)

Article Created: 18 January 1995  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

This article discusses how to change the Apple II High-Speed SCSI Card's PDMA (pseudo direct memory address) switch settings.

DISCUSSION -----

The computer's SCSI ID number is determined by the positions of switches 2, 3, and 4 on the SCSI card. See the article "Apple II High-Speed SCSI Card: Setting SCSI ID."

Switch 1 turns DMA on or off.

DMA is a feature that allows the SCSI card to read or write information directly to a storage device (such as a hard disk drive) without having to depend on the computer's microprocessor to manage the operation.

The Apple II High-Speed SCSI Card comes with the DMA switch already in the closed (on) position. However, if you have another card (such as an accelerator card) that uses its own DMA, you may need to turn off the SCSI card's DMA. Follow these instructions to turn DMA off:

1. Switch the computer off, but leave the power cord plugged in.
2. Locate Switch 1 on the SCSI card and carefully move Switch 1 to the open (off) position.
3. Refer to the information in the article entitled "Apple II High-Speed SCSI Card: Setting SCSI ID" if you want to set the rest of the switches.
4. Be sure to follow the installation instructions in the Apple II High-Speed SCSI Card Owners Guide to install the SCSI card.

Article Change History:  
15 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1995-96, Apple Computer, Inc.  
Keywords: hts

### END OF FILE A2TIL049.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL050.TXT  
 #####

Description: Apple II High-Speed SCSI Card: Setting SCSI ID (11/96)  
 Header: Apple II High-Speed SCSI Card: Setting SCSI ID (11/96)

Article Created: 18 January 1995  
 Article Reviewed/Updated: 15 November 1996

TOPIC -----

This article discusses how to change the Apple II High-Speed SCSI Card's SCSI ID switch settings.

DISCUSSION -----

Switch 1 turns on and off DMA (Direct Memory Access). See the article "Apple II High-Speed SCSI Card: Setting DMA" for more information on this subject.

The computer's SCSI ID number is determined by the positions of switches 2, 3, and 4 on the SCSI card. Follow these steps to reset the computer's SCSI ID number:

1. Switch the computer off, but leave the power cord plugged in.
2. Choose an appropriate SCSI ID number for the computer. If you are using a LaserWriter IISC, Personal LaserWriter SC or Apple Scanner, use the settings for SCSI ID 2.
3. Refer to the information that follows for the correct position of switches 2, 3, and 4.

Switch indication

-----							
0 = Open or off				x = Closed or on			
SCSI	SCSI	SCSI	SCSI	SCSI	SCSI	SCSI	SCSI
ID 0	ID 1	ID 2	ID 3	ID 4	ID 5	ID 6	ID 7
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
1234	1234	1234	1234	1234	1234	1234	1234
----	----	----	----	----	----	----	----
000	00	0 0	0	00	0	0	
x	x x	x x	x xx	xx	xx x	xxx	xxxx

4. Be sure to follow the installation instructions in the Apple II High-Speed SCSI Card Owners Guide to install the SCSI card.

Article Change History:  
 15 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
 Copyright 1995-96, Apple Computer, Inc.  
 Keywords: hts

### END OF FILE A2TIL050.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL051.TXT  
#####

Description: Apple II High-Speed SCSI Card: Using with GS (11/96)  
Header: Apple II High-Speed SCSI Card: Using with GS (11/96)

Article Created: 13 August 1991  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

I have an Apple IIGS with a High-Speed SCSI Card but am unable to access my SCSI Hard Drive. I am using the drivers that came on the System Tools disk 5.0.2.

DISCUSSION -----

You need to install the drivers on System Tools disk 5.0.4, which should support the High Speed SCSI card. The SCSI card is also self-terminating and any external terminators should be removed.

Article Change History  
15 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL051.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL052.TXT  
#####

Description: Apple II High-Speed SCSI Card: Description (2/97)  
Header: Apple II High-Speed SCSI Card: Description (2/97)

Article Created: 03 April 90  
Article Reviewed/Updated: 28 Feb 1997

TOPIC -----

This article describes the Apple II High Speed SCSI Card.

DISCUSSION -----

The new Apple II High-Speed SCSI Card provides faster data transfer primarily because of a new feature called "direct memory access" (DMA) data transfer. Data is transferred directly between the computer's memory and the SCSI peripheral, with minimal interaction from the computer's microprocessor. The result is improved, data-transfer performance. With the new high-speed card, data transfers at a rate of up to 1MB per second on the Apple IIGS computer, and up to .5MB per second on the Apple IIe computer. In addition to DMA, the SCSI manager and firmware have been improved and also contribute to the increased performance.

Compatible with all SCSI peripherals, the Apple II High-Speed SCSI Card requires only that device-specific applications and drivers be installed on the system. The card ships with drivers and applications for hard disk and CD-ROM drives, so that users can take advantage of these devices immediately. Device drivers for the tape backup drive and scanner will be made available to developers. Users will be able to take advantage of these devices as applications are developed. In addition, the new card enables users to connect as many as seven SCSI peripherals to their computer.

Another feature of the card is an on-board terminator, which simplifies setup when connecting SCSI peripherals to the computer. Previously, the Apple II SCSI Card required users to understand rules regarding placement and quantity of terminators between SCSI devices. With the new card, you place one terminator at the end of the chain of SCSI devices.

The Apple II High-Speed SCSI Card also includes improved, hard-disk utilities. These utilities make it easy to handle hard-disk management tasks, like data backup, disk partitioning and disk verification. The partition and verify utilities take advantage of the improved firmware commands for hard disk drives. The backup utility can now handle the resource forks that are part of the IIGS files. Because these are ProDOS utilities, they can be used by both Apple IIe and Apple IIGS users.

As far as system requirements, the Apple II High-Speed SCSI Card works on an Apple IIGS computer or an Apple IIe computer with a 65C02 microprocessor. The Apple IIGS requires a 3.5-inch disk drive, while the Apple IIe requires either a 5.25- or a 3.5-inch disk drive. Both require a device with a SCSI port, appropriate SCSI cabling and one SCSI terminator.

Article Change History:  
28 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
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Keywords:

### END OF FILE A2TIL052.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL053.TXT  
#####

Description: Apple II Language Card Changes  
Header: Apple II Language Card Changes

This article last reviewed: 17 March 1989

Effective immediately, Apple is substituting a different Apple II Language Card for the original one. The new card is smaller and no longer includes the connector that plugs into the RAM socket. It also does not contain the Autostart ROM. Now, when Apple II Language Cards are exchanged, Apple will include a 16K RAM chip with the replacement module.

- When you install a new Language Card into an Apple II or Apple II+ system, you need to install the 16K RAM chip into the vacant RAM socket on the main logic board.
- In the unlikely event that customers do not already have the Autostart ROM in their Apple II systems, they will need to purchase one for you to install in location F8 on the main logic board. The Autostart ROM (p/n 342-0020) can be ordered from the price pages.
- Refer to the Apple II Family Technical Procedures for instructions on installing Autostart ROMs and the 16K RAM.

The new Apple II Language Card is available from the price pages under the same part number as the old card. The new card is available as an Exchange Module only. When you return a language card to Apple for exchange, a new language card will be returned to you.

## INSTALLATION

-----

WARNING: Be sure the power is off before installing or removing any modules or components, or before connecting or disconnecting any peripheral devices. Failure to do so may result in damage to the computer, module, components, and/or peripheral.

Remember to follow basic ESD precautions when installing, removing, or troubleshooting modules.

- 1) Insert the Language Card into slot 0, component side facing away from power supply.
- 2) Insert a 16K RAM chip (p/n 334-0002) at location E3 on the motherboard. (Location E3 is in the left rear corner of the outlined memory area and was used for the cable header on the old Language Card.

Apple II Standard Computers without Autostart ROM on Motherboard:

- 1) Replace the Monitor ROM (p/n 342-0004) with an Autostart ROM (p/n 342-0020) at location F8-ROM on the motherboard.

## TESTING

-----

The new language card can be tested with your existing Apple II Product Diagnostics Disk.

- 1) Install the new Language Card in slot 0. Ensure that you've inserted a RAM at location E3 and that the motherboard F8 ROM is p/n 342-0020.
- 2) Start up the Apple II Product Diagnostics Disk.

## APPLE II COMPUTER TECHNICAL INFORMATION

- 3) Press the <ESC> key to move the cursor to the CARD TESTS line on the main menu, then press <RETURN>.
- 4) Press the <ESC> key to move the cursor to the LANGUAGE CARD line on the CARD test menu, then press <RETURN>.

If any RAM is highlighted in inverse video, replace the Language Card. If any of the status states are bad, then replace the Language Card. If the message "NO ERRORS ENCOUNTERED" appears, then the ROM at Location F8 is good. If the message "CAN NOT MATCH CODE" appears, then the ROM at F8 is bad and must be replaced.

### Motherboard RAM Test

-----

Perform the Motherboard RAM test to ensure that the RAM at location E3 is good.

- 5) Use the <ESC> key to move the cursor to the MOTHERBOARD RAM TEST line on the main test menu, then press <RETURN>.
- 6) Press <RETURN> to start the test.
- 7) The test will end and the display will show any bad RAM in inverse video. If the display shows that the LANG CARD RAM is bad then replace the RAM at E3.

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Keywords: hts

### END OF FILE A2TIL053.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL054.TXT  
#####
```

Description: Apple II Machine Language: Accessing the keyboard  
Header: Apple II Machine Language: Accessing the keyboard

When writing a machine language routine to check the keyboard for a single character, make sure that the routine checks for the high bit at the keyboard, signifying valid data, before the routine attempts to read data there.

Here is an example of such a routine:

```
          ORG  $300  
KBD      EQU  $C000      ; location of keyboard data  
KBDSTRB  EQU  $C010      ; location of keyboard strobe latch  
  
ReadKey  BIT   KBD        ; test high bit of data reg.  
          BPL  ReadKey    ; If not set retest till it is set  
          LDA  KBD        ; Data at KBD is Valid (High Bit set)  
          BIT  KBDSTRB    ; now clear the keyboard for the next char  
          RTS             ; and we are done.
```

The act of striking a key will set the strobe bit automatically, so this routine clears it before returning.

If you are testing for a particular keystroke, put the test in a separate routine. Here is an example of how that would be done:

```
...  
          BIT  KBDSTRB    ; Clear out any data that is already at KBD  
WaitForA JSR  ReadKey    ; get a key from the keyboard  
          CMP  #$C1      ; is it an A???  
          BNE  WaitForA  ; Nope go get another  
          RTS  
...
```

These methods apply to all Apple II's: II, II Plus, IIe, IIe enhanced, and IIc.

Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL054.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL055.TXT  
#####

Description: Apple II Memory Expansion Card: Diagnostics (11/96)  
Header: Apple II Memory Expansion Card: Diagnostics (11/96)

Article Created: 16 December 1985  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

This article describes the Apple II Memory Expansion Card diagnostics. These procedures can be used for any RAM configuration.

DISCUSSION -----

Always verify the card size and the positioning of the ICs before running the internal diagnostics.

A card failure is indicated if the internal dagnostics will not run. In that case, remove the RAM, install them on an exchange module, and retest.

1. Install the Memory Expansion Card in any slot except 3 in a known good Apple IIe. No disk drive is necessary.
2. Power on the Apple IIe.

The words Apple II will be displayed at the top of the screen. The prompt and cursor will be displayed on the screen in the upper left hand corner.

3. Enter CALL -151 and press RETURN. The monitor prompt, \*, will appear.
4. Verify which slot the Memory Expansion Card is in by entering cX0AG, where X is the slot number, and press RETURN.
5. The following display will appear. Verify the card size (RAM configuration) which appears is the actual size for the card installed (in this case a 256K card is installed). The dots appear on the screen as the card is tested. The test will repeat until an error is encountered or the ESC key is pressed.

```

MEMORY CARD TEST
ESC TO EXIT
TEST WILL TAKE 45 SECONDS      Seconds:    45    90    135    180
CARD SIZE = 256K                Card size: 256K 512K 768K 1024K

```

```

PASSES = 0001
....
....
....
....
....
....
....
CARD OK

```

Error Code Interpretation  
-----

The Memory Expansion Error Code Chart in the December 1985 mailing was incorrect. This article and the January 1986 mailing contain a corrected chart.

If an error is found during the internal diagnostic it will be displayed in

## APPLE II COMPUTER TECHNICAL INFORMATION

one of the following formats: ADDRESS ERROR XXYYYY-ZZ or DATA ERROR XXYYYY-ZZ. There are, in fact, 4 error situations: address error, data error, non-existent RAM error, and card size error.

### Address Error

-----  
 An address error usually indicates a card failure. Remove all the customer's RAM, install them on an exchange module, and run the test again.

### Data Error

-----  
 Data errors usually indicate a RAM failure. The ZZ in the error code specifies the section of the card where the error took place. The XX in the error code specifies the suspected faulty RAM within that section. Ignore the YYYY.

### Memory Expansion Error Code Chart

```

      RAM locator      Section
in specified section  of card
      ||              ||
      XXYYYY-ZZ
      ||||
      ignore
  
```

### Range of RAM Locator in specified

Card section	Chip number	Card section	Chip number	Card section
ZZ		XX		ZZ
10	C1	0C - 0F	A1	01
	C2	08 - 0B	A2	
	C3	04 - 07	A3	
	C4	00 - 03	A4	
20	C5	0C - 0F	A5	02
	C6	08 - 0B	A6	
	C7	04 - 07	A7	
	C8	00 - 03	A8	
40	C9	0C - 0F	A9	04
	C10	08 - 0B	A10	
	C11	04 - 07	A11	
	C12	00 - 03	A12	
80	C13	0C - 0F	A13	08
	C14	08 - 0B	A14	
	C15	07 - 04	A15	
	C16	00 - 03	A16	

To locate DATA ERROR 08000 - 40 using the chart,

The bad chip is in section 40.

```

      Card      Chip
      section  number
      ZZ
  
```

APPLE II COMPUTER TECHNICAL INFORMATION

40 C9  
C10  
C11  
C12

The bad chip is located where the RAM locator falls into the range that includes 08.

Range of RAM Locator in specified  
-----

Card section	Chip number	Card section
ZZ		XX
40	C10	08 - 0B

The position of the bad chip is C10. Replace the RAM chip on the card.

```

A x x x x x x x x x x x x x x x x
B x x x x x x x x x X x x x x x x
C 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

```

Re-run the diagnostic.

Non-Existent RAM Error  
-----

Any other section ZZ codes, for example 0B, 0E, FC, and so on, usually indicate a card failure. Remove all RAM and install it on an exchange module.

Other error codes might point to a RAM chip which is not installed, for example, if a 256K Memory Expansion Board gave an error of 0C0000 - 40, change the RAM which is installed in that section. If the test still gives the same error message, change the RAM in the adjoining sections.

Card Size Error  
-----

If the actual card size does not correspond to the card size listed on the built-in diagnostic, you will need to exchange eight RAMs. For example, if the card size indicated on the internal diagnostic is 768K, and the actual RAM on the card is 1 megabyte, remove the RAM at locations A1, C1, A5, C5, A9, C9, A13, and C13. Reinstall known good RAM and run the diagnostics.

If the card size is now correct, there may be one or more bad ICs among the RAM removed. Replace the removed RAM one at a time, testing after each installation, until the bad RAM is located.

If the card size is still incorrect, this will indicate a card failure. Remove all the RAM and install it on an exchange module and retest.

Article Change History:

15 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1988-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL055.TXT

#####  
### FILE: A2TIL056.TXT  
#####

Description: Apple II Memory Expansion Cards: Decsription (11/96)  
Header: Apple II Memory Expansion Cards: Decsription (11/96)

Article Created: 31 May 1991  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

This article describes Apple's three Apple II Memory Expansion Cards.

DISCUSSION -----

Overview  
-----

An Apple Memory Expansion Card adds up to one megabyte (1MB) RAM to any Apple II personal computer, allowing it to run more sophisticated applications and to create larger files. On the Apple IIGS personal computer, memory expansion lets you run high-performance programs that take full advantage of the computer's sound and graphics capabilities.

Three cards are available:

- Apple IIGS Memory Expansion Card
- Apple IIc Memory Expansion Card (for Apple IIc only, not Apple IIc Plus)
- Apple II Memory Expansion Card (for Apple IIe, Apple II Plus, and Apple II computers)

These cards are compatible with three operating systems: ProDOS, DOS 3.3, and Pascal 1.3. (Earlier versions of Pascal can be upgraded to version 1.3.) DOS 3.3 programs cannot be booted from the Memory Expansion Card.

Environmental requirements are the same for all three cards:

- ambient temperature: 50 to 104 degrees F (10 to 40 degrees C)
- relative humidity: 0% to 95% (non condensing)

Voltage is the same for all three cards: 4.75 to 5.25 volts DC

Apple IIGS Memory Expansion Card  
-----

This card is used with an Apple IIGS personal computer with a monitor and disk drive.

Power Consumption:

- operating: 200 milliamps in 256K configurations  
600 milliamps in 1MB configuration
- standby: 140 milliamps in 256K configuration  
370 milliamps in 1MB configuration

Apple IIc Memory Expansion Card/Kit  
-----

The Apple IIc Memory Expansion Card is used with an Apple IIc personal computer (model number A2S4100).

The Apple IIc Memory Expansion Kit is used with an Apple IIc personal computer (model number A2S4000).

Power Consumption:

- operating: 100 milliamps in 256K configurations

# APPLE II COMPUTER TECHNICAL INFORMATION

200 milliamps in 1MB configuration

- standby: 90 milliamps in 256K configuration  
180 milliamps in 1MB configuration

## Apple II Memory Expansion Card

-----  
The Apple II Memory Expansion Card is used with an Apple IIe personal computer (preferably enhanced) that has a monitor and disk drive, or with an Apple II Plus or Apple II personal computer with a monitor and disk drive.

### Power Consumption:

- operating: 100 milliamps in 256K configurations  
200 milliamps in 1MB configuration
- standby: 50 milliamps in 256K configuration  
150 milliamps in 1MB configuration

## Apple II Memory Expansion Card Technical Reference

=====

The Memory expansion card looks like, operates as, and is accessed exactly the same way as an Apple Protocol Converter device.

There are only two ways to access the card:

- as an Apple Protocol Converter device
- as a RAM disk.

Through the protocol converter, you can access all the memory on the card at any time.

### Article Change History:

15 Nov 1996 - Revised formatting.  
30 Aug 1994 - Reviewed for technical accuracy.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL056.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL057.TXT  
#####

Description: Apple II Monochrome Monitors: Specifications (Discontinued)  
Header: Apple II Monochrome Monitors: Specifications (Discontinued)

Article Created: 31 May 1991

TOPIC -----

This article describes two Apple II Monochrome Monitors:

- \* the Apple Monochrome Monitor (for the Apple IIGS, Apple IIc Plus, or Apple IIc)
- \* the Apple Monochrome Monitor IIe (for the Apple IIe, Apple II Plus, or Apple II)

DISCUSSION -----

Both these monitors display crisp, easy-to-read text and sharp graphics. Their 12 inch high-resolution antiglare screens are easy on your eyes, making them the low-cost displays of choice for text-based applications and other applications that don't require color.

System Requirements

- \* To use an Apple Monochrome Monitor IIe, you need an Apple IIe, Apple II Plus, or Apple II personal computer.
- \* To use an Apple Monochrome monitor, you need an Apple IIGS, Apple IIc Plus, or Apple IIc personal computer. If you have an Apple IIc Plus or Apple IIc, you may also wish to purchase an Apple Monitor Stand.

Picture Tube

- \* Apple Monochrome Monitor IIe  
12 inches (30.5 centimeters) diagonal  
High-contrast  
Antiglare  
90 degrees diagonal deflection  
Green Phosphor (EIA Type P31)
- \* Apple Monochrome Monitor  
12 inches (30.5 centimeters) diagonal  
High-contrast  
Antiglare  
90 degrees diagonal deflection  
White Phosphor (EIA Type P4)

Active Display Area

- \* both monitors:  
215mm horizontal by 160mm vertical (remainder of area is used for border)

Scanning

- \* both monitors:  
EIA standard: 525 lines; 30 frames, 60 fields/second; overscan

Scan Rates

- \* both monitors:  
Horizontal: 15.7 kilohertz

# APPLE II COMPUTER TECHNICAL INFORMATION

Vertical: 59.9 hertz

## Input Signal

-----

### \* both monitors:

Composite video, 1.0 ( 0.1) volts peak-to-peak, negative sync

## Video Bandwidth

-----

### \* both monitors:

Less than 3 decibels down at 10 megahertz

## Display Capability

-----

### \* Apple Monochrome Monitor IIe

With Apple IIe: 560 dots horizontally by 192 dots vertically

### \* Apple Monochrome Monitor

With Apple IIc Plus or Apple IIc: 560 dots horiz. by 192 dots vert.

With Apple IIgs: 640 dots horizontally by 200 dots vertically

## Text display

-----

\* both monitors: up to 80 columns by 25 lines

## Horizontal linearity

-----

\* both monitors: less than 10%

## Vertical linearity

-----

\* both monitors: less than 7%

## Video Input Connector

-----

\* both monitors: RCA-style phone jack (75 ohm)

## Controls

-----

### \* Apple Monochrome Monitor IIe

Front: power on/off, contrast

Rear: brightness, vertical hold, height

### \* Apple Monochrome Monitor

Side: power on/off, contrast

Rear: brightness, vertical hold, vertical amplitude

## Electrical Requirements

-----

### \* both monitors:

Line voltage 108 to 132 volts AC

Frequency 50 to 60 hertz

Power consumption

Typically less than 20 watts

Maximum 45 watts

## Environmental requirements

-----

### \* Apple Monochrome Monitor IIe

Operating temperature: 41 to 104 degrees F (5 to 40 degrees C)

Maximum humidity: 90%

Altitude: 0 to 10,000 ft. (0 to 3,048 m)

### \* Apple Monochrome Monitor

Operating temperature: 32 to 122 degrees F (0 to 5 degrees C)

Maximum humidity: 90%

## APPLE II COMPUTER TECHNICAL INFORMATION

Altitude: 0 to 10,000 ft. (0 to 3,048 m)

### Dimensions

-----

\* Apple Monochrome Monitor IIe

Height: 10.63 in. (27.0 cm)

Width: 14.56 in. (37.0 cm)

Depth: 12.50 in (31.8 cm)

Weight: 18 lbs. (8.16 kg)

\* Apple Monochrome Monitor

Height: 10 in. (25.5 cm)

Width: 12.3 in. (31.0 cm)

Depth: 14.3 in (37.5 cm)

Weight: 18 lbs. (8.16 kg)

Copyright 1991 Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL057.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL058.TXT  
#####

Description: Apple II Network: Drop Box Creation From Finder Only  
Header: Apple II Network: Drop Box Creation From Finder Only

This article last reviewed: 6 September 1989

TOPIC -----

I work on an AppleShare/Aristotle network setup. I created a Drop Box on the server, so that users can save their AppleWorks files directly into the Drop Box on the server by using the appropriate ProDOS pathname. It doesn't work! (Owner has all privileges, everyone else has Make Changes only.)

I first tested this on a Macintosh workstation, trying to save a document to a Drop Box using the "Save As" command. Drop Boxes are dimmed in the dialog box, so I wasn't able to open the Drop Box folder and save the document. The only alternative I could think of was to save the document somewhere else, return to the Finder, and then drag the document into the Drop Box.

Are there any alternatives for Apple II users who want to use Drop Boxes?

DISCUSSION -----

The Finder is the only mechanism we are aware of that lets you put files into a

Drop Box folder.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL058.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####
### FILE: A2TIL059.TXT
#####
```

Description: Apple II Pascal: Disk directory structure  
 Header: Apple II Pascal: Disk directory structure

```
Const
  maxdir= 77; {Maximum number of entries in directory}
  vidleng= 7; {Number of characters in volume ID}
  tidleng= 15; {Number of characters in title ID}
  fblksize= 512; {Standard disk block length}
  dirblk= 2; {Directory starts at this disk-block address}

TYPE
  datarec=
    PACKED RECORD
      month: 0..12; {0 implies meaningless data}
      day: 0..31; {Day of the month}
      year: 0..100; {100 implies the dated volume is temporary}
    END {datarec};

  vid=
    string[vidleng];

  dirrange=
    0..maxdir;

  tid=
    string[tidleng];

  filekind=
    {untyped, xdskfile, codefile, textfile, infofile, datafile,
     graffile, fotofile, securedir};

  direntry=
    PACKED RECORD
      dfirstblk: integer; {1st physical disk address}
      dlastblk: integer; {Points at block following last used block}
      CASE dfkind: filekind of
        Securedir, untypedfile: {Only in dir[0] - this is volume info}
          [Filler1: 0..2048; {waste 13 bits for compatability}
           dvid: vid; {name of disk volume}
           deovblk: integer; {last block in volume}
           dnumfiles: dirrange; {number of files in directory}
           dloadtime: integer; {Time of last access}
           dlastboot: datarec; {Most recent date setting}

        xdskfile, codefile, textfile, infofile, datafile,
        graffile, fotofile: {regular file info}
          [filler2: 0..1024; {waste 12 bits for compatability}
           status: boolean; {for filer wildcards}
           dtid: tid; {title of file}
           dlastbyte: 1..fblksize; {Number of bytes in files last block}
           daccess: datarec; {date of last modification}
          END; {case dfkind; direntry}

  directory =
    ARRAY[dirrange] of direntry;
```

To use this information, do a UNITREAD on the desired volume.

For example,

PROGRAM ShowHow;

## APPLE II COMPUTER TECHNICAL INFORMATION

All of the above declarations plus:

VAR

DirInfo: Directory;

UnNum: Integer

BEGIN

UnNum:=4;

UNITREAD(UnNum,DirInfo,SIZEOF(DirInfo),2);

END.

This program reads the directory information on volume 4 and stores it in the Directory variable DirInfo. The last parameter, 2, indicates to UNITREAD to start reading with block 2, where the directory information starts.

With Pascal 1.3, you can chain to and from the filer and thereby easily handle files within programs.

Pascal Technote #4

Keywords:

### END OF FILE A2TIL059.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL060.TXT  
#####

Description: Apple II Peripheral Cards: How Pascal identifies (2/97)  
Header: Apple II Peripheral Cards: How Pascal identifies (2/97)

Apple II Peripheral Cards: How Pascal identifies (2/97)

Article Created: 27 July 1985  
Article Reviewed/Updated: 12 Feb 1997

TOPIC -----

This article discusses how Pascal v1.1 identifies peripheral cards.

DISCUSSION -----

Pascal 1.1 uses four firmware bytes to identify the peripheral card. Both the identifying bytes and the branch table are near the beginning of the \$Cs00 ROM space (where s = slot). The identifiers are listed in Table A-2.

Address	Value
\$Cs05	\$38 (like the old Serial Interface Card)
\$Cs07	\$18 (like the old Serial Interface Card)
\$Cs0B	\$01 (like Generic Signature of new FW cards)
\$Cs0C	\$ci (like Device Signature; see below)

Table A-2. Bytes Used for Device Identification

The first digit, c, of the Device Signature byte identifies the device class as listed in Table A-3.

Digit	Class
\$0	reserved
\$1	printer
\$2	joystick or other X-Y input device
\$3	serial or parallel I/O card
\$4	modem
\$5	sound or speech device
\$6	clock
\$7	mass storage device
\$8	80-column card
\$9	network or bus interface
\$A	special purpose (none of the above)
\$B-F	reserved for future expansion

Table A-3. Device Class Digit

The second digit, i, of the Device Signature byte is a unique identifier for the card, assigned by Apple Developer Technical Support. For example, in the Device Signature of the SSC--\$31--the 3 signifies that the device is a serial or parallel I/O card; the 1 is Apple Developer Technical Support's unique identifier for that card.

Article Change History:  
12 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1985-97, Apple Computer, Inc.  
Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL060.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL061.TXT  
#####
```

Description: Apple II Peripheral Cards: Sending TABs to your Printer  
Header: Apple II Peripheral Cards: Sending TABs to your Printer

Problems you may have sending TAB commands to your printer may stem from the interface cards "trapping" the <CTRL-I> before it goes to the printer.

To send a TAB to a DMP from an Apple IIe using a Parallel Interface Card:

Change the I/F card command character to something other than <CTRL-I>.

```
10 I$ = CHR$(9): Q$ = CHR$(17)  
15 PRINT I$; Q$: REM command char for card is now CTRL-Q  
20 PRINT I$: REM this sends the TAB
```

Reference: Parallel Interface Card Manual, p.12

To send a TAB to an Imagewriter from an Apple IIc:

First send <CTRL-I>Z to "zap" future commands. The I/F card will ignore following <CTRL-I>'s.

```
10 I$ = CHR$(9)  
15 PRINT I$;"Z": REM zap  
20 PRINT I$: REM this sends the TAB
```

Reference: Apple IIc Reference Manual, section 7.1

To send a TAB to an Imagewriter from an Apple IIe using a Super Serial Card:

Send the TAB character twice or "zap" as with the Apple IIc.

```
10 I$ = CHR$(9)  
15 PRINT I$;I$: REM this sends the TAB
```

Reference: Super Serial Card Manual, page 12

BASIC's TAB command doesn't work properly with either the (old) High Speed Serial Interface or the Apple Silentyte. Integer BASIC it is limited to 40 columns, while a TAB(20) in Applesoft will sometimes output 20 spaces instead of going to column 20. An example that gets around this is:

```
10 PRINT "HI";:POKE 36,55: PRINT "THERE"
```

POKE 36,55 will put the "THERE" in the 56th column (remember, Apple counts columns from 0 to 79) while still printing "HI" in column 0.

Following is a sample program that dealers can show to customers:

```
10 PRINT CHR$(4);"PR#1" :REM TURN THE PRINTER ON WITHOUT DISCONNECTING PRODOS  
20 PRINT CHR$(9);CHR$(1) :REM SWITCH THE CONTROL CODE FROM CTL-I TO CTL-A  
30 PRINT CHR$(27);"(010,020,030." :REM SET UP THE TAB LOCATIONS  
40 I$=CHR$(9)  
50 PRINT I$;"TEN";I$;"TWENTY";I$;"THIRTY":REM SEND THE LINE WITH TAB'S  
60 PRINT CHR$(4);"PR#0":REM TURN OFF THE PRINTER  
Apple Technical Communications
```

Keywords:

```
### END OF FILE A2TIL061.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL062.TXT  
 #####

Description: Apple II Peripherals: Quick Reference Chart (2/97)  
 Header: Apple II Peripherals: Quick Reference Chart (2/97)

Apple II Peripherals: Quick Reference Chart (2/97)

Article Created: 23 October 1986  
 Article Reviewed/Updated: 12 February 1997

TOPIC -----

The following table identifies compatible peripherals for the Apple II line of computers.

DISCUSSION -----

The X means that the peripheral product is compatible with the CPU. The footnotes explain the numbers.

Item	Apple II CPU				
	II Plus	IIe	IIc	IIc(new)	IIGS
<b>Drives</b>					
Disk II	X 1	X 1	9	9	X 1
DuoDisk	X 2	X 2	14	14	X
Unidisk	X 2	X 2	X	X	X
Unidisk 3.5	X 3,7	X 3,5		X	X
IIc External	X 2	X 2	X	X	X
Apple 3.5					X
Apple 5.25	X 11	X 11	X	X	X
Profile (5M,10M)	X 4,7	X 4			X 4
Hard Disk 20SC	X 6,7	X 6			X 6
<b>Cards</b>					
II Memory Expansion	X 7	X			X
IIc Memory Expansion				X	
IIGS Memory Expansion					X
Super Serial	X	X	8	8	X
Parallel Interface	X	X	9	9	X
80-column		X	8	8	
Extended 80-column		X	8	8	
Apple Modem 300/1200	X 12	X 12	X	X	X
Apple Personal Modem	X 12	X 12	X	X	X
Imagewriter	X 12	X 12	X	X	X
Imagewriter II	X 12	X 12	X	X	X
Daisy Wheel Printer	X 12	X 12	X	X	X
LaserWriter	X 12	X 12	X	X	X
<b>Monitors</b>					
II	X	X	X	X	X
IIc	X	X	X	X	X
ColorMonitor IIc, IIe	X	X	X	X	X
ColorMonitor 100		X 10	9	9	
AppleColor RGB	9	9	9,13	9,13	X
AppleColor Composite	X	X	X	X	X
Monochrome	X	X	X	X	X

## APPLE II COMPUTER TECHNICAL INFORMATION

### Footnotes:

- 1 - Requires Disk II controller card
- 2 - Requires Duodisk/Unidisk controller card
- 3 - Requires Unidisk 3.5 controller card
- 4 - Requires Profile Interface Card
- 5 - Will auto boot on an enhanced IIE
- 6 - Requires Apple II SCSI Card
- 7 - Requires 64K RAM for Prodos
- 8 - This function is built into the Apple IIC
- 9 - A third party solution is available
- 10- Requires Extended 80-Column AppleColor Card
- 11- May be daisy-chained from a Unidisk
- 12- Requires a Super Serial Card
- 13- Limited color capability
- 14- Will only have access to one of the drives

Note: "IIE" stands for either the unenhanced or the enhanced Apple IIE.  
"IIC(new)" refers to an Apple IIC with memory expansion socket.

### Article Change History:

12 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1989-97, Apple Computer, Inc.  
Keywords: ktable

### END OF FILE A2TIL062.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL063.TXT  
#####

Description: Apple II Plus: How To Generate Lowercase & Uppercase Characters  
Header: Apple II Plus: How To Generate Lowercase & Uppercase Characters

This article last reviewed: 23 November 1988

To make an Apple II Plus generate both lowercase and uppercase characters for word processing applications you need a Videx (or other manufacturer) 80-column card for the Apple II Plus. The Videx VideoTerm card handles both the reading of keystrokes and their proper display.

Note: You must make the Apple II Plus shift key modification for this to work. Search on "shift key mod" in the Tech Info Library for the modification requirements.

Copyright 1988 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL063.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL064.TXT  
#####

Description: Apple II Plus: How to Identify a Revision 7 Motherboard?  
Header: Apple II Plus: How to Identify a Revision 7 Motherboard?

This article last reviewed: 19 November 1987

Here's how to determine whether an Apple II Plus has a revision 7 motherboard or a pre-revision 7 motherboard:

- Look at the motherboard's part number. As you face the front of the computer, it's in the upper-left corner of the motherboard. The number begins with nnn-nnnn.
- If the part number ends with 07, or with A, B, or C -- the motherboard is revision 7. Otherwise, it's pre-revision 7.

Keywords:

### END OF FILE A2TIL064.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL065.TXT  
#####

Description: Apple II Plus: Monitor and Drives Compatible with Apple IIe  
Header: Apple II Plus: Monitor and Drives Compatible with Apple IIe

Article Created: 13 August 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

Can I use the monitor and disk drives from an Apple II Plus with an Apple IIe?

DISCUSSION -----

Yes, it's okay to switch the monitor and drives between the two systems.  
Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL065.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL066.TXT  
#####

Description: Apple II Plus: Relocation/Configuration Error (2/97)  
Header: Apple II Plus: Relocation/Configuration Error (2/97)

Article Created: 02 July 1991  
Article Reviewed/Updated: 17 February 1997

TOPIC -----

What is the meaning of a relocation/configuration error on the Apple II Plus when running ProDOS?

DISCUSSION -----

ProDOS requires 64K of RAM to run. The error you are getting means that you have only 48K of RAM.

Article Change History:  
17 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL066.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL067.TXT  
#####

Description: Apple II ProFile Interface Card Modification for the Apple II GS  
Header: Apple II ProFile Interface Card Modification for the Apple II GS

This article last reviewed: 28 March 1988

PROBLEM DESCRIPTION: Some ProFile Interface cards will not work properly when installed in the Apple IIGS. ProFile directory information might become damaged and cause the user not to be able to access data stored on the ProFile.

CAUSE: There might be an incomplete ground path through the card.

CURE: If ANY ProFile Interface Card is to be installed in an Apple IIGS, check first to see that a jumper, made of 24-26 gauge multistrand wire is installed between pin 12 of IC C6 (2716 EPROM-Apple Part# 341-0299) and pin 1 of IC B4 (74LS368-Apple Part# 305-0368) on the non-component side of the board. If needed, the jumper should be installed by a knowledgeable technician to assure proper operation of the ProFile when interfaced with the Apple IIGS. The jumper wire should be just long enough to make the connection. The technician should remove the EPROM before soldering, thus preventing any damage to the chip.  
Copyright 1988, Apple Computer, Inc.  
Keywords: hts

### END OF FILE A2TIL067.TXT



APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL068.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL069.TXT  
#####

Description: Apple II SCSI Card: Interrupt Problem (11/96)  
Header: Apple II SCSI Card: Interrupt Problem (11/96)

Article Created: 26 November 1986  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

This article discusses a potential problem with the Apple IIGS, Apple II SCSI card and programs using interrupts.

DISCUSSION -----

Apple IIGS system crashes may occur with programs using interrupts during access of SCSI disk drives connected to the Apple II SCSI card. Once interrupts are enabled, it is possible an interrupt may occur during a SCSI drive data transfer. Programs initiate data transfer by passing control to the SCSI card.

The SCSI card firmware places code in its own stack for executing. If taking an interrupt also places code on the same stack it may wipe out some or all of the previous SCSI firmware code. Returning from the interrupt, returns to the portion of the stack corrupted by the interrupt, which results in some kind of unidentifiable system crash.

Crashes are possible if BOTH of the following conditions apply:

- The SCSI card is used with an interrupt driven program, like AppleTalk.
- This application program calls the SCSI card directly, NOT using ProDOS.

To work around this possibility, make sure your applications use ProDOS to handle any interrupts. This may decrease SCSI disk data transfer rates but will help reduce system crashes.

Article Change History:  
15 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1986-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL069.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL070.TXT  
#####

Description: Apple II SCSI Card: Large File Transfer (11/96)  
Header: Apple II SCSI Card: Large File Transfer (11/96)

Article Created: 15 May 1991  
Article Reviewed/Updated: 14 November 1996

TOPIC -----

I am using an Apple II SCSI card to transfer files and sometimes large files become corrupted. Is there a fix for this problem?

DISCUSSION -----

Files larger than 64K become corrupted during the transfer process when using the Apple II SCSI Card. Use the newer High Speed SCSI card drivers with the older SCSI cards.

Article Change History:  
14 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL070.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL071.TXT  
#####

Description: Apple II SCSI Card: Product Description (11/96)  
Header: Apple II SCSI Card: Product Description (11/96)

Article Created: 20 October 1996  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

This article contains the technical specifications for the Apple II SCSI card.

DISCUSSION -----

Technical Specifications  
=====

Hardware  
-----

Provides an electrical interface between external SCSI devices and the CPU.

Provides the address and control lines required by the Apple II's microprocessor for accessing and controlling the SCSI chip and Smartport firmware.

Provides other circuitry to interface the 5380 IC with the Apple II CPU control signals.

NCR 5380 SCSI IC  
-----

Implements SCSI bus (5380 data sheet in Chapter 2 of the Hardware Technical Reference manual).

On board RAM  
-----

8 banks of 1K, accessed with special logic circuits. Used for status of devices at SCSI bus initialization (including the status of the Apple II SCSI card itself)

On Board ROM  
-----

8 banks of 1K, accessed with special logic circuits and used for storing Smartport firmware

Interface  
-----

25-pin SCSI connector

Input/Output  
-----

- Parallel transmission, two modes for data i/o operations
- PDMA (pseudo-DMA), default
- Block Move only supported by 65816 CPUs and must be enabled by the application
- Maximum storage area under ProDOS: 32 megabytes

Firmware

## APPLE II COMPUTER TECHNICAL INFORMATION

-----

Smartport program converts the microprocessor commands or calls issued by CPU to a format compatible with external SCSI devices

Issues calls to the microprocessor to give it the status of the external SCSI devices and allow the CPU to control their operation

Commands supported: STATUS, READ BLOCK, WRITE BLOCK, FORMAT, CONTROL, INIT, OPEN, CLOSE, READ, WRITE

Boot capability with Autostart ROM when you install the card in the slot with highest priority, which may depend on the operating environment

When Smartport does not find the SCSI device capable of starting up the system, Smartport returns control to the environment of the Apple II and the startup search continues through lower-priority slots.

### Electrical

-----

Voltage requirement: 4.75 to 5.25 volts DC

Power consumption in milliamps (ma)

Standby: 340 ma

Operating: 390 ma

### Environmental

-----

Ambient temperature: 50 to 104 deg F (10 to 40 deg C)

Relative humidity: 20 to 95 percent (non condensing)

### System Requirements

-----

Apple IIGS, Apple IIe or Apple II Plus

Apple II SCSI Card

Apple SCSI System Cable

One or more SCSI-compatible peripherals, can be a high-speed printer interface

### Daisy chaining

-----

Apple II with the SCSI card in slot 5 and ONLY a serial printer or modem card in slot 2.

- Running ProDOS 1.2: 4 external devices

- Running ProDOS 16: 7 external devices

### Additional SCSI system components as required

-----

Cable Terminator

Peripheral Cables

Cable Extenders (Maximum total length of cables: 20 feet (6.5 meters)).

Read the manual for the Apple SCSI Cable System before trying to connect any SCSI devices.

### Article Change History

15 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1986-96, Apple Computer, Inc.

Keywords: specsht

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL071.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL072.TXT  
#####

Description: Apple II SCSI Card: ROM Upgrade (2/97)  
Header: Apple II SCSI Card: ROM Upgrade (2/97)

Article Created: 14 February 1991  
Article Reviewed/Updated: 28 February 1997

TOPIC -----

This article describes how to obtain the Apple II SCSI Card ROM upgrade.

DISCUSSION -----

There is a repair extension that covers your on this. Contact your dealer about getting the cards upgraded. Here is the information the dealer will need:

SCSI INTERFACE CARD IIE & IIGS ROM UPGRADE--OLC123  
(Announced March 88)

Users who upgrade to Apple IIGS Operating System Version 4.0 or greater must use the latest revisions of both the SCSI Interface Card and the ProFile Interface Card. You can determine the latest version of these interface cards by checking the part number of their ROM. As of March 88, ROM part number 341-0437, Revision A, is the latest version of the SCSI Interface Card. All SCSI and ProFile Interface Cards now shipped by Apple are the latest revisions.

Apple has revised the ROM on the Apple II SCSI Interface Card to make the card compatible with the Apple-CD SC and the Apple IIGS Operating System. When other products requiring the new ROM are introduced, you will be notified by a Service mailing. The ROM on the card can be identified by the new part number, 341-0437. All Service Stock and Finished Goods inventory has been upgraded to the new ROM.

Article Change History:  
28 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL072.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL073.TXT  
#####

Description: Apple II Setup and GS/OS: Compatible Versions  
Header: Apple II Setup and GS/OS: Compatible Versions

This article last reviewed: 6 March 1990

TOPIC -----

I installed the software from the Apple II Setup 2.1.1 disk (680-5060-B) on top of Apple II Setup 2.0.1. I did the other setup steps and tried to start up an Apple IIGS from the server. A GS/OS-specific file could not be found, and I got an error \$0046.

I went back to Apple II Setup 2.0.1, and all was well.

Can you explain?

DISCUSSION -----

The \$0046 error is a "file not found" error. This error normally occurs because part of GS/OS is not on the startup disk--in this case, the server. For the server to have a working GS/OS system to start up the Apple IIGS, the GS/OS Installer needs to be run from an Apple IIGS that is logged on to the server. Then you install the desired GS/OS configuration on the server volume. We believe that this is what is meant by "did the other setup steps".

If we are correct, it is most likely that an older version of the 16-bit operating system is on the server. The 2.1.1 version was a release specifically for version 5.0.2 of GS/OS. If version 2.1.1 was installed while ProDOS 16 (System Disk 3.2 or earlier) is used on the server, there will be a problem with versions being matched correctly. Version 2.0.1 was designed to work with ProDOS 16, the predecessor to GS/OS. The files used on version 2.0.1 are quite different from the files used with 2.1.1.

We suggest that you use version 2.1.1 of the Apple II Setup Installer with a server having GS/OS 5.0.2 installed. Use version 2.0.1 on servers providing the earlier ProDOS 16 system files, which are found on System Disk 3.2 and earlier.

Also note that GS/OS 5.0 provided a version of Apple II Setup labelled "2.1." This version should be used only with GS/OS 5.0. However, the best solution is

to use GS/OS 5.0.2 and Apple II Setup 2.1.1.

Copyright 1990 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL073.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL074.TXT  
#####

Description: Apple II Silentye manual A2L0034/030-0095-00: Errata  
Header: Apple II Silentye manual A2L0034/030-0095-00: Errata

Page 11... The procedure for printing a High-Res image doesn't work, since Pascal clears the High-Res buffer when you go to the Filer. We suggest modifying the program as shown below:

```
Program Sprio;

USES Turtlegraphics, Applestuff;
Var angle, distance : integer;
    CH : Char;                (* added *)

Begin
  angle := 0;
  While not Keypress Do
  Begin
    InitTurtle;
    Pencolor (white);
    For distance := 0 to 99 Do
    Begin
      Move (2 * distance);
      Turn (angle);
    End;
    angle := angle + 5;
  End;
  CH:=CHR (17);              (* added *)
  Unitwrite (6,CH,1,0,12);  (* added *)
  Textmode
End.
```

Page 13...The discussion on "Echoing to the screen" assumes that you have already done a PR#1 before you do the T command.

Page 18...The discussion in the last paragraph assumes that you have already done a PR#1 before you do the Q command.

Page 38...Line 4, "for the right margin is 2" should be "for the left margin is 2"

Page 39...Program line 6040 should end with Then Goto 6070  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL074.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL075.TXT  
#####

Description: Apple II Software: Current Versions (10/94)  
Header: Apple II Software: Current Versions (10/94)

Article Created: 7 December 1992

TOPIC -----

The table below lists current SHIPPING Apple software products for the Apple II and provides for each:

Version      The current version number.  
Notes        Additional information

DISCUSSION -----

Product	Version	Notes
-----	-----	-----
Apple Access II	1.3.1	For Apple II
Apple II System	3.2	For Apple II systems
Apple IIGS System	6.0.1	For Apple IIGS only.
Apple IIe Card Software	2.2.1	For Macintosh computers using IIe card.
Aristotle	xxx	For Apple II
HyperMover	1.1	HyperCard IIGS

Support Information Services  
Copyright 1994, Apple Computer, Inc.  
Keywords: ktable,ksts,kcompat

### END OF FILE A2TIL075.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL076.TXT  
#####

Description: Apple II System Disk 3.0: Requires MouseText, 128K Memory  
Header: Apple II System Disk 3.0: Requires MouseText, 128K Memory

This article last reviewed: 20 January 1989

Here are some questions and answers about Apple II System Disk 3.0 for the Apple IIe and Apple IIc:

Q) Will this disk operate on an unenhanced Apple IIe?

A) System Disk v3.0 uses an AppleWorks-style interface, and this requires the availability of MouseText characters, which do NOT exist in an unenhanced Apple IIe. The program may also use some of the additional 27 instructions available only in the 65C02 CPU.

Q) What is the latest version of System software that will operate with an unenhanced Apple IIe?

A) System Utilities Version v2.1.1 will work on an unenhanced Apple IIe, but even that requires some MouseText characters, and will show an abnormal display -- for example, Upper Case Inverse Capital S characters instead of straight horizontal lines.

However, the program runs properly in spite of this display anomaly. System Utilities v2.1 does not use MouseText characters and should function normally on an unenhanced Apple IIe.

Q) How much memory does the System Disk v3.0 require to operate?

A) When booted on a 64K enhanced Apple IIe, the program gives an error message stating it requires 80-column text, and this indicates it requires 128K of memory.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL076.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL077.TXT  
#####
```

Description: Apple II Systems: How to Identify them With Inter-Poll  
Header: Apple II Systems: How to Identify them With Inter-Poll

This article last reviewed: 28 April 1989

This article describes what to do, so that Inter\*Poll can identify an Apple IIe or Apple IIGS connected to a network. There are some very specific criteria that must be met:

- The Apple IIGS must have Built-in AppleTalk selected in the Control Panel.
- The Apple IIGS must have the proper port set to "Your Card".
- An Apple IIe with the Workstation Card must be past the Password screen.

The steps for each computer are given below.

## Apple IIGS

-----

For an Apple IIGS to appear in the "Device List" window of Inter\*Poll, these steps must be followed:

- 1) Select "Built-in AppleTalk" from the Control Panel. At the same time, set the port that the network is connected to, generally the Printer port, to "Your Card".
- 2) Shut down and restart the system.
- 3) Run Inter\*Poll on the Macintosh, or have it running and checking the network.

The Apple IIGS should show up in the Device List window.

Note: Responder is built into the AppleTalk portion of the software for the Apple IIGS.

## Apple IIe

-----

- 1) Install the Apple II Workstation Card in slot 7 of the Apple IIe and connect the LocalTalk port to the network.
- 2) Start up the system and log on to a ProDOS server on the network.

Once the system goes past the Password screen, the device shows up in the Device List window of Inter\*Poll.

To see if there was something unique about this setup procedure, we considered the Macintosh in a similar environment. If the system is powered up, but no software is loaded (that is, the Macintosh screen shows the disk with a flashing question mark in the middle of the disk), the system is not identifiable from Inter\*Poll. At this point, there is no AppleTalk software to respond to the Inter\*Poll request. The same is true for an Apple II.

Copyright 1989 Apple Computer, Inc.

Keywords:

```
### END OF FILE A2TIL077.TXT
```

#####  
### FILE: A2TIL078.TXT  
#####

Description: Apple II Video Overlay Card: Connectors (11/96)  
Header: Apple II Video Overlay Card: Connectors (11/96)

Article Created: 03 June 1988  
Article Reviewed/Updated: 15 November 1996

TOPIC -----

The Apple II Video Overlay card can receive video signals from any number of sources: VCR, Video camera, Video disc player, even cable television. Because there are numerous connectors associated with these video sources, it is necessary to clarify the connection schemes as they relate to the Apple II Video Overlay Card.

DISCUSSION -----

Connection Schemes  
=====

RGB Connections

----- Any RGB monitor must be connected to the DB-15 connector on the card. The AppleColor RGB Monitor connects directly with the DB-15 cable that ships with the monitor.

If you are using another RGB monitor, you must build the correct cable. The Apple II Video Overlay Card DB-15 connector has the same pinout as the AppleColor RGB Monitor. For more information on this reference Tech Info Library article "AppleColor RGB Monitor input connector: Pinouts". It is a simple matter to construct the rest of the cable, using the pinout supplied with the third-party monitor.

External Video Source Connections  
-----

To connect external video sources to the Apple II Video Overlay Card, at least one end of the cable must have an RCA phono plug. This end will connect to the overlay card. Normally, consumer electronics video sources will have an RCA connector for direct video output. To ensure top quality video reproduction, use gold-plated RCA connectors.

BNC-Style Connections  
-----

It is normal for some high-end professional video equipment to have BNC-style connectors for the video output. If this is the case, an adapter must be used to convert the BNC connector to RCA phono type for connection to the card. These are readily available at most electronics stores.

RF Connections (also known as an "F" connector)  
-----

If your video equipment uses an RF cable (also known as an "F" connector), it cannot be directly connected to the Apple II Video Overlay Card. You must connect this cable to a VCR first, then connect the VCR to the overlay card, using an RCA phono type cable.

S-VHS Information  
-----

It is not possible to feed an S-VHS (Super VHS) signal into the overlay card. If your S-VHS equipment has RCA phono jacks, cables can be connected from

## APPLE II COMPUTER TECHNICAL INFORMATION

these jacks to the card, but the overlays resulting from this connection will have the resolution of standard VHS, not S-VHS.

### Article Change History:

15 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1988-96, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL078.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL079.TXT  
#####

Description: Apple II Video Overlay Card: Configurations (11/96)  
Header: Apple II Video Overlay Card: Configurations (11/96)

Article Created: 03 April 89  
Article Reviewed/Updated: 18 November 1996

TOPIC -----

Listed below are several possible configurations using the Video Overlay Card.

DISCUSSION -----

Depending on how sophisticated a user wishes to be, and what the user wishes to accomplish, there are numerous possibilities for connecting monitors and other video equipment, to the Apple II Video Overlay Card. A setup could be as simple as a VCR, an Apple IIGS, and a single monitor; or as complicated as a videodisc player with a composite monitor, an Apple IIGS with RGB and a composite monitor, and a VCR with a composite monitor.

Typical Configuration  
-----

A typical configuration might be a VCR or video camera, for a video source, an Apple IIe (or Apple IIGS) with the Overlay card and VideoMix software installed, and a RGB monitor. This configuration would allow creation of overlays for direct viewing only. The addition of a second VCR would permit recording of the overlays created. If a composite monitor were connected to the output of the Overlay Card, the picture displayed there would be representative of what is being recorded on the VCR.

High-end Configuration  
-----

A high-end configuration might include the connection of an interactive video source, which would then display selected video sequences, as directed by the computer, while the program would automatically provide the proper window for the resulting video input. This setup would require the connection of the device control cable from the external device to the serial port on the computer.

Article Change History:

18 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1989-96, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL079.TXT

#####  
### FILE: A2TIL080.TXT  
#####

Description: Apple II Video Overlay Card: Description (11/96)  
Header: Apple II Video Overlay Card: Description (11/96)

Article Created: 31 May 1991  
Article Reviewed/Updated: 18 November 1996

TOPIC -----

This article describes the Apple II Video Overlay Card. This card has been discontinued and is no longer available from Apple.

DISCUSSION -----

Overview  
-----

The Apple II Video Overlay Card offers Apple II computer owners a wealth of possibilities for learning and creativity by merging video and computing.

The Apple II Video Overlay Card lets you superimpose Apple II screen images on video from a variety of sources: VCR, video disc, video camera, or television. It also allows you to display the combined images of an RGB or composite monitor and to record them on a VCR.

You start by using the Apple II application of your choice to create your own text, graphics, or animations. Then with VideoMix, the software included with the card, you control where these overlays appear and blend them with the video to achieve the effects you want.

With the Apple II Video Overlay Card and an Apple IIGS or IIe computer, you can add your own captions and notes to educational videos. You can also create your own video productions and interactive application for use at home or in school.

System Requirements  
-----

To use the Apple II Video Overlay Card, you will need one of the following systems:

- an Apple IIGS personal computer with at least 512K of RAM, ROM version 01 or 03, and at least one 800K 3.5-inch disk drive; and a VCR, videodisc player, or video camera
- an Apple IIe personal computer with 128K of RAM and an enhanced main logic board (revision B); and a VCR, videodisc player, or video camera

To display your videos, you can use the Apple IIGS or IIe computer with either the AppleColor RGB Monitor or the AppleColor Composite Monitor. The AppleColor RGB Monitor comes with the required DB-15 connector. The AppleColor Composite Monitor comes with the required RCA cable.

Technical Specifications  
-----

- NTSC output: the output of the Apple II Video Overlay Card meets RS-170A output specifications with RS-170A input.
- Environmental requirements
  - Operating temperature: 50 to 104 degrees F (10 C to 40 degrees C)
  - Storage temperature: -40 to 116.6 F (-40 to 47 degrees C)
  - Relative humidity: 20% to 95% (noncondensing)

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Altitude: 0 to 10,000 ft. (0 to 3,048 m)

Article Change History:

18 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1991-96, Apple Computer, Inc.

Keywords: specsht

### END OF FILE A2TIL080.TXT

#####  
### FILE: A2TIL081.TXT  
#####

Description: Apple II Video Overlay Card: Features (11/96)  
Header: Apple II Video Overlay Card: Features (11/96)

Article Created: 04 March 1996  
Article Reviewed/Updated: 18 November 1996

TOPIC -----

This article discusses the features of the Apple II Video Overlay Card.

DISCUSSION -----

Genlock circuitry  
-----

- Synchronizes the Apple II timing to external video timing.
- Allows a user to superimpose Apple II graphics on top of an external video signal for titling or annotating video material.

RGB and Composite Outputs  
-----

Allows a user to simultaneously view overlays on an AppleColor Composite or RGB monitor while recording the overlay to a VCR.

Apple IIGS Graphics Chip Set  
-----

- Allows the video overlay card to display standard graphics when not producing overlays.
- Improves composite video output by re-generating the video output signal from the computer.
- Broadcast-quality video output.
- Allows a user to use the overlay card in a professional broadcast environment (no degradation of video quality when passed through the overlay card).

VideoMix Software  
-----

- Allows
- software control of the overlay card's functions.
  - choice of key color (color which is transparent to the video signal), set the video/graphic mix, and adjust the color/tint of the RGB video.
  - Apple IIe and Apple IIGS compatibility
  - use of the overlay card with existing hardware and the extensive library of Apple II software.

Article Change History:  
18 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1989-06, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL081.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL082.TXT  
#####

Description: Apple II Video Overlay Card: Product Description (11/96)  
Header: Apple II Video Overlay Card: Product Description (11/96)

Article Created: 03 April 89  
Article Reviewed/Updated: 18 November 1996

TOPIC -----

Below is a description of the Apple II Video Overlay Card. This product has been discontinued and is no longer available from Apple.

DISCUSSION -----

The Apple II Video Overlay Card product, for the Apple IIe and Apple IIGS, includes an interface card and VideoMix software.

When in operation, the overlay appears as a computer image on top of a video image. The video image can be from any external video source: video tape, video disc, cable television, or video camera and the image can be shown on either a composite or RGB monitor. The NTSC signal output from the overlay card is of broadcast quality and can be recorded on a VCR.

The Apple II Video Overlay Card brings previously expensive genlock capabilities to the Apple II family of computers, and creates new possibilities for learning and creativity.

The overlay card has a complete, though modified, Apple IIGS graphics subsystem (Mega II, VGC, and supporting circuitry), which provides genlock and overlay capabilities, as well as improved composite video output. With a proper NTSC signal presented to the card, an FCC-legal output is supplied from the card, therefore the card is usable in professional broadcast environments.

After genlocking to the incoming signal, the overlay card determines which pixels will be video and which will be graphics, or if there will be combinations. These combinations are selected by way of the VideoMix software, which sets up the card for the desired mix of graphics and video. The user chooses a key color (the color that is transparent to the incoming video and is treated separately from the other colors), and what the video/graphic mix will be. VideoMix also allows the user to adjust the tint and color of the RGB video, as on a color television. The user can also choose a color from the screen to be the key color.

Because the overlay card is a completely independent subsystem, it functions with any existing Apple II painting, drawing, and animation software -- these being the more relevant products conducive to creating overlays. The overlay card works with virtually all Apple II software.

Article Change History:  
18 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1988-96, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL082.TXT

#####  
### FILE: A2TIL083.TXT  
#####

Description: Apple II Video Overlay Card: Tips (11/96)  
Header: Apple II Video Overlay Card: Tips (11/96)

Article Created: 03 April 89  
Article Reviewed/Updated: 18 November 1996

TOPIC -----

Here are some helpful tips and hints for using the Apple II Video Overlay card.

DISCUSSION -----

As you plan your video presentation, think about how the overlay will enhance your presentation. Do you want to include:

- Opening title and closing credits?
- Highlight information presented in the video?
- Dazzle the audience with special effects?

Planning For Computer Graphics  
-----

Try to determine where the computer graphics would be useful only where appropriate. You may find yourself overusing computer graphics. Consider whether you should highlight your video with computer graphics, narration, or a combination. Your overlays will be more effective if you use them judiciously.

Decide on a workable design for your graphics, and use it consistently throughout your presentation. For example, always use the same font for the text, the same colors for the graphic elements, such as line and boxes, and the same kind of special effects. Consistent use of computer graphics will make your presentation seem more unified and easier to follow.

Use high-quality video equipment and software that allows high resolution graphics. Clean the heads on your VCR if you haven't cleaned them lately. The better the video equipment and computer images, the better your overlays will look.

When shooting a video for an overlay, try to anticipate where your graphics will fit into the shot and leave enough space for them. For example, if you plan to superimpose someone's name below a close-up of their face, leave enough room in the lower third of the screen. Treat the graphics as an integral part of the composition, not as an afterthought.

Designing For The Screen  
-----

Keep it simple, don't try to cram too much into a single overlay. If your video has lots of motion, use simple graphics. If your graphics are complex, consider using a still scene for the video portion.

Limit the information in each overlay to one or two points. Presenting too many facts in one overlay will not help the viewers remember them. Television viewers may not be able to flip back to review something they missed.

Use readable fonts for text. Bold, simple fonts seem crisp and are easily read on the screen. The color of your text should contrast with the video colors. If you plan to record the overlay, make the text at least 16 point.

## APPLE II COMPUTER TECHNICAL INFORMATION

### Special Considerations for Composite Video

-----

Avoid using computer graphics that are extremely bright. If the colors in your graphics are too intense, especially if they are hot colors such as bright red, the graphics may appear to vibrate along the edges. You can correct the problem by using a less intense color, like off-white instead of white. You can also reduce the intensity of a color by allowing some of the video image to blend in, using VideoMix.

If you are recording your overlays, view them on a composite monitor or a television.

Colors displayed on an RGB monitor are more stable than colors displayed on a composite monitor as they are less likely to shimmer or bleed into another color. If you are recording your overlays on tape, a composite monitor or a television will show you a better representation of the overlay's appearance during playback. By viewing your overlays this way, without an RGB monitor, you will be better able to see, and correct, problems before they are recorded on the videotape.

#### Article Change History:

18 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1989-96, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL083.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL084.TXT  
#####

Description: Apple II Video Overlay Card: Using Key Colors (11/96)  
Header: Apple II Video Overlay Card: Using Key Colors (11/96)

Article Created: 03 April 89  
Article Reviewed/Updated: 18 November 1996

TOPIC -----

This article discusses how to use the Key Color selection of the Video Overlay Card.

DISCUSSION -----

Creating an overlay with the Apple II Video Overlay Card requires selection of a control color, called Key Color.

The VideoMix software treats the Key Color differently from the other colors. All colors not designated as the Key Color are treated as a group and are called non-Key colors.

For example, if the Key Color is Black, the video input signal will show through only where black is displayed on the screen. Where any other color is shown, the video will not show through and those areas will be showing the computer generated graphic. This would be the display, assuming VideoMix is set for 100% Key and 0% non-Key. By moving the sliders within VideoMix, these proportions can be changed to suit the user.

There are two methods for selecting the Key Color, select from Screen, and select from the color palette.

Selecting from the color palette allows selection of the Key Color from a palette of sixteen different colors. Use the mouse (Apple IIGS), or the arrow keys (Apple IIe), to select a color rectangle from the palette.

The other method is to use the option Select From Screen. An "X" appears in the box, and a hand with a pointing finger replaces the arrow cursor on the screen. With the hand cursor in the computer graphics area of the screen, click on the color of your choice. This becomes the Key Color.

Apple IIGS Note  
-----

The Apple IIGS can display graphics in one of two modes: 320 mode or 640 mode. In 320 mode, the computer can display sixteen pure colors. In 640 mode, it can display only two true colors: black and white. All other colors are blended colors formed by a process known as dithering. Dithered colors are formed by displaying two colors in adjacent pixels. Because the pixels are so small and close together, your eye perceives them as a single color. Light blue, for example, is formed by adjacent blue and white pixels. When a dithered color is picked, the Key Color is the color of the pixel you happened to click on. If you picked the light blue color, the key color could be either blue or white.

Using dithered colors for your Key Color can produce some interesting, and sometimes unexpected, translucence effects in your overlay. These effects, while attractive, may not be completely reproducible. To avoid this, it would better to have your computer in 320 mode when making overlays. If you wish to use 640 mode, it is best to use black or white as your Key Color.

Article Change History:

APPLE II COMPUTER TECHNICAL INFORMATION

18 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1989-96, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL084.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL085.TXT  
#####

Description: Apple II VisiCalc: How To Convert Its Files To MS-DOS  
Header: Apple II VisiCalc: How To Convert Its Files To MS-DOS

This article last reviewed: 19 January 1988

Here's how to transfer Apple II VisiCalc files to an MS-DOS format:

1. Save the Apple II VisiCalc file to disk in the DIF format.
2. Transfer the file, via terminal software, to the MS-DOS system.
3. Save the file.

The file can now be read into any of the MS-DOS spreadsheet applications that support a DIF format -- Lotus 1-2-3, for example.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL085.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL086.TXT  
#####

Description: Apple II Workstation Card: Description (11/96)  
Header: Apple II Workstation Card: Description (11/96)

Article Created: 15 July 1991  
Article Reviewed/Updated: 18 November 1996

## TOPIC -----

This article describes the Apple II Workstation Card. This product has been discontinued and is no longer available from Apple.

## DISCUSSION -----

The Apple II Workstation Card connects the Apple IIe computer to an AppleTalk network using the LocalTalk Cabling System. This card includes a built-in Super Serial port for direct connection to serial devices such as ImageWriter printers. This card is ideally suited to educational environments where users want to share printers and reduce the amount of time spent handling disks.

The Apple II Workstation Card, together with the AppleShare IIe Workstation software included with it, gives users of enhanced Apple IIe computers access to AppleShare file servers, network printers (such as LaserWriter and ImageWriters), and to AppleShare print servers. Also, in conjunction with an AppleShare file server connected to an AppleTalk network, allows Apple IIe users to start up from the file server without using local disk drives.

Apple IIe users can print to network printers and share information stored on AppleShare file servers. At the same time, other Apple II, Macintosh, and MS-DOS users can access folders, documents, applications, and shared storage. Using an AppleShare file server or network printer is as easy as using a local ProDOS disk or serial printer.

## System and Network Requirements

-----  
An enhanced Apple IIe computer with 128K RAM, monitor, LocalTalk cabling and Apple II Workstation Card installed.

An Apple IIGS system (in which the function of the Apple II Workstation Card is built-in).

If the network doesn't include an AppleShare file server, each workstation requires a 3.5-inch disk drive.

To initially load workstation software onto an AppleShare file server, a 3.5-inch disk drive is required at one of the workstations.

## Recommended Equipment

-----  
The following are recommended, but not required.

One or more AppleShare file servers (for diskless startup and file server access).

One or more LaserWriter, ImageWriter II, or ImageWriter LQ printers.

## Technical Specifications

-----  
Processor: 65C02, two-megahertz clock speed

## APPLE II COMPUTER TECHNICAL INFORMATION

Memory: 16K RAM, 64K ROM

Two 8-pin minicircular (RS-422) ports:

- one LocalTalk port
- one Super Serial port

Article Change History:

18 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1991-96, Apple Computer, Inc.

Keywords: specsht

### END OF FILE A2TIL086.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL087.TXT  
#####

Description: Apple II Workstation Card: Magic Slate Printing Issue (11/96)  
Header: Apple II Workstation Card: Magic Slate Printing Issue (11/96)

Article Created: 14 May 1991  
Article Reviewed/Updated: 18 November 1996

TOPIC -----

When attempting to print from Magic Slate v2.0 using an Apple IIe and a Workstation Card connected to an ImageWriter II , using AppleTalk, we get the message "includeProcSet IWEm 1 1" on the printout. Is there a fix for this problem?

DISCUSSION -----

Magic Slate thinks it is talking to a LaserWriter instead of an ImageWriter II. Because the Apple II Workstation card emulates a Super Serial Card, you should select that interface in the Magic Slate program.

Also, on an Apple IIe, you always have to run Chooser.II before you run an application and without powering off the computer, see below.

- 1) Launch your Apple II workstation disk.
- 2) Choose your printer.
- 3) Quit Chooser.II, but DO NOT power off.
- 4) Launch Magic Slate by ProDOS pathname. For example, - /volumename/application name.
- 5) Configure Magic Slate to print to an ImageWriter at the slot that contains the workstation card.

If this doesn't work, perhaps Magic Slate is not flexible in the slot location or is clearing the Chooser.II info on launch.

Article Change History:  
18 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL087.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL088.TXT  
#####

Description: Apple II Workstation Card: No Apple IIGS Support (2/97)  
Header: Apple II Workstation Card: No Apple IIGS Support (2/97)

Apple II Workstation Card: Apple IIGS Support (2/97)

Article Created: 03 August 1989  
Article Reviewed/Updated: 12 February 1997

TOPIC -----

This article discusses the Apple II Workstation card and Apple IIGS support.

DISCUSSION -----

The Apple II Workstation Cards is not supported in the Apple IIGS because of the following reasons.

\* When the Apple II Workstation Card is installed, only ProDOS 8 applications can run. The Workstation Card tells the server that it is an Apple IIe. Therefore, it will not work in a ProDOS 16 network environment. Typically, this means only the first 64K of memory will be used.

\* The Workstation Card is not fully tested in this configuration and it is not supported by Apple.

Article Change History:  
12 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1989-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL088.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

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#####  
### FILE: A2TIL089.TXT  
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Description: Apple II Workstation Card: Printing Via a Serial Port  
Header: Apple II Workstation Card: Printing Via a Serial Port

This article last reviewed: 7 December 1988

If you want to run Apple II Workstation Cards on a network, and also want to have some workstations' printers directly connected to the serial port on the Workstation card, try the following solution:

Install the card in slot 7 on the Apple II.

Run the new Chooser II (ver. 1.2.1) software. When the Apple II WorkStation Card is installed, a new option window appears in the lower righthand corner that allows the output to be directed to either the serial port or the AppleTalk port on the card. Once the serial port is selected, everything should work perfectly.

Copyright 1989 Apple Computer, Inc.

Keywords:

```
### END OF FILE A2TIL089.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

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#####  
### FILE: A2TIL090.TXT  
#####
```

Description: Apple II Workstation Card: Product Information (2/97)  
Header: Apple II Workstation Card: Product Information (2/97)

Article Created: 01 March 1988  
Article Reviewed/Updated: 28 February 1997

TOPIC -----

This article describes the Apple II Workstation Card.

DISCUSSION -----

The Apple II Workstation Card provides an AppleTalk interface for the enhanced Apple IIe computer. It makes the Apple IIe an AppleTalk node on a LocalTalk network.

## Hardware -----

The card has its own 65C02 processor, ROM, RAM, and a custom PAL chip. The card attaches to a connector module housing two Mini-8 serial ports. One of these ports supports AppleTalk, the other emulates a Super Serial Card.

The card can be installed in any Apple IIe slot except for slot 3 (the additional 64K of RAM on the Extended 80-Column card is assigned to slot 3, making it unavailable). Slot 7 is the usual choice for the Workstation Card.

The red and green LEDs indicate only that the card has passed an internal diagnostic, and do not indicate that the network interface is active.

The upper Mini-8 connector (PORT A) supports either the AppleTalk interface or a Super Serial interface. The lower Mini-8 connector (PORT B) supports only the serial interface.

## Software -----

The Apple IIe Workstation Card contains AppleTalk code in ROM, code to allow printing over the network, printing at the workstation, and starting up over the network. The Apple IIe Workstation Card can start up either from a local disk, or remotely over the network from a startup server running on a file server.

## Local Startup -----

When the workstation starts up from a local device, the card makes itself look like a Super Serial Card, with special ID bytes to indicate that it is actually an Apple II Workstation Card.

## Network Startup -----

The card emulates a Disk II drive on power up to enable network startup, and, if in the highest number slot (normal practice) downloads the operating system from a network startup server, if available.

In addition, either of these other two methods can be used to start up over a network:

- Use the PR# command specifying the card's slot and hold down the Open Apple key while pressing Return. (Issuing the PR# command and pressing Return without pressing the Open Apple key causes printing to take place.)
- Using a BOOT call also causes the startup process to take place.

## APPLE II COMPUTER TECHNICAL INFORMATION

### Printing Over the Network

-----  
The printing task begins when you issue a PR# command from the workstation. The application program sends print data out through the SSC entry points as defined by the PR# command. The card captures the stream of characters to be printed, because it appears to be a normal Super Serial Card in a slot and sends it to the selected printer or spooler.

Only ProDOS applications are supported on the network using the card. An important feature of the card is that it does not require the use of main memory, because most applications use all or almost all of Apple IIe memory (including "reserved" areas).

#### Article Change History:

28 Feb 1997 - Reviewed for technical accuracy, revised formatting.

Copyright 1988-97, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL090.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL091.TXT  
#####

Description: Apple II Workstation Card: Specifications (2/97)  
Header: Apple II Workstation Card: Specifications (2/97)

Apple II Workstation Card: Specifications (2/97)

Article Created: 03 May 1991  
Article Reviewed/Updated: 12 February 1997

TOPIC -----

This article provides technical specifications for the Apple II Workstation Card. This card has been discontinued by Apple.

DISCUSSION -----

Processor  
-----  
6501; 2 MHz clock speed

Memory  
-----  
16K RAM  
64K ROM

Ports  
-----  
Two 8-pin, mini-circular, RS-422 ports:  
\* One LocalTalk port  
\* One Super Serial port

Article Change History:  
12 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-97, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL091.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL092.TXT  
#####

Description: Apple II Workstation Card: Workstations and Zones (2/97)  
Header: Apple II Workstation Card: Workstations and Zones (2/97)

Apple II Workstation Card: Workstations and Zones (2/97)

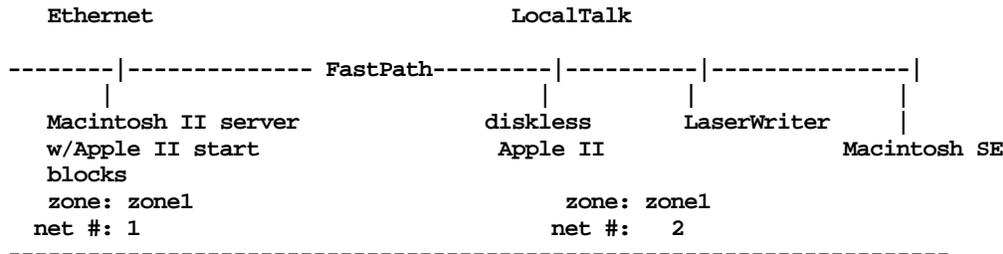
Article Created: 25 May 1989  
Article Reviewed/Updated: 12 February 1997

TOPIC -----

This article discusses the ways in which the Apple II Workstation Card understands zones and network IDs. Some of the discussion refers to the following setup diagram:

DISCUSSION -----

Setup:



The only zone-related limitation concerns starting an Apple II diskless workstation. The ProDOS-prepared AppleShare server must be within the same zone as the diskless workstation. Once the Apple II has started over the network, the Workstation Card and the Apple IIGS are fully aware of zones and network IDs. This means that, once started, the Apple II can log on any ProDOS-prepared, AppleShare file server in any zone available on the Internet. The number of bridges or zones does not affect the access to another server.

When the Apple II broadcasts an AppleTalk Transaction Protocol (ATP) request, this ATP request is sent across the entire zone in search of a file server with boot blocks. In the given example, both 'net#1' and 'net#2' are in the same zone, "zone1". The FastPath passes zone broadcasts from either "net#1" or "net#2" to the other.

Once startup is completed, the AppleShare II Workstation software is executed. From this application, the user can choose the appropriate zone and log on to the desired ProDOS-prepared server. At this time, Name Binding Protocol (NBP) translates the names into the associated Internet socket addresses of the corresponding network entities. In this case, the Apple II workstation name is translated to an address, and the server name is translated to an address. These addresses notate network IDs, zone IDs, bridge IDs, and network entity IDs.

When a workstation is instructed to print, it looks for the chosen printer with the address provided by NBP. The address specifies the location of the printer. Because the printer is on "net#2" (the same network as the Macintosh SE), the FastPath determines that the address belongs on "net#2". The FastPath does not accept the traffic, because the address is local to "net#2". However, when the Apple II requests service from the server, the FastPath recognizes the address as one that belongs to "net#1". In this

## APPLE II COMPUTER TECHNICAL INFORMATION

condition, the FastPath lets the request travel over the bridge to the server.

Typically, routing is handled at the fourth OSI layer, the transport layer of AppleTalk. Manufacturers working with AppleTalk use the transport layer to handle routing. Manufacturers working with other protocols may handle routing at a higher layer in the OSI model.

### Article Change History:

12 Feb 1997 - Reviewed for technical accuracy, revised formatting.

Copyright 1989-97, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL092.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL093.TXT  
#####
```

Description: Apple II+ Mini-Assembler (1 of 4)  
Header: Apple II+ Mini-Assembler (1 of 4)

This article last reviewed: 21 September 1984

The attached listing is a relocated version of the mini-assembler for the Apple II+ with instructions for the Apple II version. This version can be BRUN from the disk or BLOADEd and start with CALL 2048 from Applesoft. To restart use CALL 2051. From machine language the start is 800G and the restart is 803G. Users who have Integer Basic available need only enter that language and use the instructions in part one of this note.

Please note that the mini-assembler performs a NEW command, so it will wipe out any resident Applesoft program. Also note that the mini-assembler loads from \$800 to \$947. Don't try to assemble anything into those locations.

This note covers the operation of the mini-assembler only. It is not a course in assembly language programming. For a reference on programming the 6502 microprocessor, refer to the Synertek Programming manual or any of the tutorials available. This note assumes the user has a working knowledge of 6502 programming and mnemonics.

The mini-assembler is a programming aid aimed at reducing the amount of time required to convert a handwritten program to object code. The mini-assembler is basically a look-up table for opcodes. With it, you can type mnemonics with their absolute addresses, and the assembler will convert it to the correct object code and store it in memory.

Typing "F666G" puts the user in mini-assembler mode. While in this mode, any line typed in will be interpreted as an assembly language instruction, assembled, and stored in binary form unless the first character on the command line is a "\$".

If the first character of a command line is a "\$", the remainder of the line will be interpreted as a normal monitor command, executed, and control returned to the mini-assembler. To get out of the mini-assembler, press RESET.

If the first character on the line is blank, the assembled instruction will be stored starting at the address immediately following the previously assembled instruction. If the first character is not a blank nor a "\$", the line is assumed to contain an assembly language instruction preceded by the instruction address (a hex number followed by a ":"). In either case, the instruction will be retyped over the line just entered in dis-assembler format to provide a visual check of what has been assembled.

The counter that keeps track of where the next instruction will be stored is the pseudo PC (Program Counter) and it can be changed by many monitor commands (eg. 'L', 'T', . . .). Therefore, it is advisable to use the explicit instruction address mode after every monitor command and, of course, when the mini-assembler is first entered.

Errors (unrecognized mnemonic, illegal format, etc.) are signalled by a "beep" and a caret ("^") will be printed beneath the last character read from the input line by the mini-assembler.

Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL093.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL094.TXT  
#####

Description: Apple II+ Mini-Assembler (2 of 4)  
Header: Apple II+ Mini-Assembler (2 of 4)

This article last reviewed: 21 September 1984

The mnemonics and formats accepted by the mini assembler are the same as those listed by the 6502 Programmers Manual, with the following exceptions and differences:

1. All imbedded blanks are ignored, except inside addresses.
2. All addresses typed in are assumed to be in hex (rather than decimal or symbolic). A preceding "\$" (indicating hex rather than decimal or symbolic) is therefore optional, except that it should not precede the instruction address).
3. Instructions that operate on the accumulator have a blank operand field instead of "A".
4. When entering a branch instruction, the argument of the branch mnemonic should be the address of the target of the branch. If the destination address is not known at the time the instruction is entered, simply enter an address that is in the neighborhood, and later re-enter the branch instruction with the correct target address. NOTE: If a branch target is specified that is out of range, the mini-assembler will flag the address as being in error.
5. The operand field of an instruction can only be followed by a comment field, which starts with a semicolon (";"). Obviously, the mini-assembler ignores the field and in fact will type over it when the line is typed over in disassembler format.
6. Any page zero references will generate page zero instruction formats if such a mode exists. There is no way to force a page zero address to be two bytes, even if the address has leading zeroes.

In general, to specify an addressing type, simply enter it as it would be listed in the disassembly. For information on the disassembler, see page 49 of the Apple II Reference Manual.

```

0000:          *****
0000:          *                *
0000:          *      APPLE II      *
0000:          *    MINI-ASSEMBLER    *
0000:          *                *
0000:          *****
002E:      FORMAT  EQU    $2E
002F:      LENGTH  EQU    $2F
0031:      MODE    EQU    $31
0033:      PROMPT  EQU    $33
0034:      YSAV    EQU    $34
0035:      L        EQU    $35
003A:      PCL    EQU    $3A
003B:      PLH    EQU    $3B
003D:      A1H   EQU    $3D
003E:      A2L   EQU    $3E
003F:      A2H   EQU    $3F
0042:      A4L   EQU    $42

```

APPLE II COMPUTER TECHNICAL INFORMATION

0043:	A4H	EQU	\$43
0044:	FMT	EQU	\$44
0200:	IN	EQU	\$200
D64B:	NEW	EQU	\$D64B
F88E:	INSDS2	EQU	\$F88E
F8D0:	INSTDSP	EQU	\$F8D0
F94A:	PRBL2	EQU	\$F94A
F953:	PCADJ	EQU	\$F953
F9B4:	CHAR1	EQU	\$F9B4
F9BA:	CHAR2	EQU	\$F9BA
F9C0:	MNEML	EQU	\$F9C0
FA00:	MNEMR	EQU	\$FA00
FC1A:	CURSUP	EQU	\$FC1A
FD67:	GETLNZ	EQU	\$FD67
FDED:	COUT	EQU	\$FDED
FE00:	BL1	EQU	\$FE00
FE78:	A1PCLP	EQU	\$FE78
FF3A:	BELL	EQU	\$FF3A
FFA7:	GETNUM	EQU	\$FFA7
FFBE:	TOSUB	EQU	\$FFBE
FFC7:	ZMODE	EQU	\$FFC7
FFCC:	CHRTBL	EQU	\$FFCC

Keywords:

### END OF FILE A2TIL094.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####
### FILE: A2TIL095.TXT
#####
```

Description: Apple II+ Mini-Assembler (3 of 4)  
 Header: Apple II+ Mini-Assembler (3 of 4)

This article last reviewed: 21 September 1984

```
0800:                ORG $800
0800: 20 4B D6        JSR NEW          ;SCRATCH ANY BASIC PROGRAM
0803: A9 00          LDA #$00
0805: 8D 00 08       STA #$0800
0808: 4C 9D 08       JMP RESETZ        ;BRANCH MINI/ASSEM'S START
080B: E9 81         REL   SBC #$81        ;IS FMT COMPATIBLE
080D: 4A            LSR A            ;WITH RELATIVE MODE?
080E: DO 14         BNE ERR3         ;NO.
0810: A4 3F         LDY A2H
0812: A6 3E         LDX A2L         ;DOUBLE DECREMENT
0814: DO 01         BNE REL2
0816: 88            DEY
0817: CA            REL2  DEX
0818: 8A            TXA
0819: 18            CLC
081A: E5 3A         SBC PCL         ;FORM ADDRESS PC-2
081C: 85 3E         STA A2L
081E: 10 01         BPL REL3
0820: C8            INY
0821: 98            REL3  TYA
0822: E5 3B         SBC PCH
0824: D0 6B         ERR3  BNE ERR        ;TOO FAR TO BRANCH ERROR
0826:                *
0826: A4 2F         FINDOP LDY LENGTH
0828: B9 3D 00       FNDOP2 LDA A1H,Y        ;MOVE INST TO (PC)
082B: 91 3A         STA (PCL),Y
082D: 88            DEY
082E: 10 F8         BPL FNDOP2
0830: 20 1A FC       JSR CURSUP
0833: 20 1A FC       JSR CURSUP        ;RESTORE CURSOR
0836: 20 D0 F8       JSR INSTDSP       ;TYPE FORMATTED LINE
0839: 20 53 F9       JSR PCADJ         ;UPDATE PC
083C: 84 3B         STY PCH
083E: 85 3A         STA PCL
0840: 4C A0 08       JMP NXTLINE       ;GET NEXT LINE
0843: 20 BE FF       FKMON3 JSR TOSVB        ;GO TO DELIM HANDLER
0846: A4 34         LDY YSAV         ;RESTORE Y-INDEX
0848: 20 A7 FF       FKMON  JSR GETNUM       ;READ PARAM
084B: 84 34         STY YSAV         ;SAVE Y-INDEX
084D: A0 17         LDY #$17         ;INIT DELIM INDEX
084F: 88            FKMON2 DEY            ;CHECK NEXT DELIM
0850: 30 4B         BMI RESETZ       ;ERR IF UNRECOGNIZED DELIM
0852: D9 CC FF       CMP CHRTEL,Y     ;COMPARE WITH DELIM TABLE
0855: D0 F8         BNE FKMON2       ;NO MATCH
0857: CO 15         CPY #$15         ;MATCH, IS IT CR?
0859: D0 E8         BNE FKMON3       ;NO HANDLE IT IN MONITOR
085B: A5 31         LDA MODE
085D: A0 00         LDY #$00
085F: C6 34         DEC YSAV
0861: 20 00 FE       JSR BL1          ;HANDLE CR OUTSIDE MONITOR
0864: 4C A0 08       JMP NXTLINE
0867:                *
0867: A5 3D         TRYNEXT LDA A1H        ;GET TRIAL OPCODE
0869: 20 8E F8       JSR INSDS2       ;GET FMT + LENGTH FOR
086C: AA            TAX            ;OPCODE
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```

086D: BD 00 FA      LDA MNEMR,X      ;GET LOWER MNEMONIC BYTE
0870: C5 42        CMP A4L          ;MATCH?
0872: D0 13        BNE NEXTOP      ;NO, TRY NEXT OPCODE
0874: BD CO F9      LDA MNEML, X     ;GET UPPER MNEMONIC BYTE
0877: C5 43        CMP A4H          ;MATCH ?
0879: DO OC        BNE NEXTOP      ;NO, TRY NEXT OPCODE
087B: A5 44        LDA FMT          ;
087D: A4 2E        LDY FORMAT      ;GET TRIAL FORMAT
087F: CO 9D        CPY #$9D        ;IS TRIAL FORMAT RELATIVE?
0881: FO 88        BEQ REL         ;YES
0883: C5 2E        CMP FORMAT      ;SAME FORMAT?
0885: FO 9F        BEQ FINDOP      ;YES
0887: C6 3D        NEXTOP DEC A1H     ;NO, TRY NEXT OPCODE
0889: DO DC        BNE TRYNEXT
088B: E6 44        INC FMT         ;NO MORE, TRY WITH LEN=2
088D: C6 35        DEC L          ;WAS L=2 ALREADY?
088F: FO D6        BEQ TRYNEXT     ;NO
0891:
0891: A4 34        ERR   LDY YSAV      ;YES, UNRECOGNIZED INST.
0893: 98          ERR2  TYA
0894: AA          TAX
0895: 20 4A F9      JSR PRBL2      ;PRINT ^ UNDER LAST READ
0898: A9 DE        LDA #$DE       ;CHAR TO INDICATE ERROR
089A: 20 ED FD      JSR COUT       ;POSITION
089D: 20 EA FF      RESETZ JSR BELL
08A0: A9 A1        NXTLINE LDA #$A1     ; '!'
08A2: 85 33        STA PROMPT     ;INITIALIZE PROMPT
08A4: 20 67 FD      JSR GETLNZ    ;GET LINE
08A7: 20 C7 FF      JSR ZMODE     ;INIT SCREEN STUFF

```

Keywords:

### END OF FILE A2TIL095.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####
### FILE: A2TIL096.TXT
#####
```

Description: Apple II+ Mini-Assembler (4 of 4)  
 Header: Apple II+ Mini-Assembler (4 of 4)

This article last reviewed: 21 September 1984

```
08AA: AD 00 02          LDA IN          ;GET CHAR
08AD: C9 A0            CMP #$A0        ;ASCII SPACE?
08AF: FO 13           BEQ SPACE      ;YES
08B1: C8              INY
08B2: C9 A4           CMP #$A4        ;ASCII '$' IN COL 1?
08B4: FO 92           BEQ FKMON      ;YES,SIMULATE MONITOR
08B6: 88             DEY
08B7: 20 A7 FF        JSR GETNUM     ;GET A NUMBER
08BA: C9 93           CMP #$93        ;':' TERMINATOR?
08BC: DO D5          ERR4  BNE ERR2      ;NO, ERR
08BE: 8A             TXA
08BF: FO D2           BEQ ERR2      ;NO ADDR PRECEDING COLON
08C1: 20 78 FE        JSR A1PCLP     ;MOVE ADDR TO PCL, PCH
08C4: A9 03          SPACE  LDA #$03      ;COUNT OF CHAR IN MNEMONIC
08C6: 85 3D           STA A1H
08C8: 20 EF 09       NXTMN  JSR GETNSP     ;GET 1ST MNEMONIC CHARACTER
08CB: OA             ASL A
08CC: E9 BE           SBC #$BE      ;SUBTRACT OFFSET
08CE: C9 C2           CMP #$C2        ;LEGAL CHARACTER?
08D0: 90 C1           BCC ERR2      ;NO
08D2: OA             ASL A          ;COMPRESS-LEFT JUSTIFY
08D3: OA             ASL A
08D4: A2 04           LDX #$04
08D6: OA          NXTM2  ASL A          ;DO 5 TRIPLE WORD SHIFTS
08D7: 26 42           ROL A4L
08D9: 26 43           ROL A4H
08DB: CA             DEX
08DC: 10 F8           BPL NXTM2
08DE: C6 3D           DEC A1H        ;DONE WITH 3 CHAR?
08E0: FO F4           BEQ NXTM2     ;YES BUT DO 1 MORE SHIFT
08E2: 10 E4           BPL NXTMN     ;NO
08E4:                *
08E4: A2 05           LDX #$05      ;5-CHAR ADDRESSING MODE
0836: 20 3F 09       FORM2  JSR GETNSP     ;GET 1ST CHAR OF ADDRESS
08E9: 84 34           STY YSAV
08EB: DD B4 F9        CMP CHAR1,X    ;1ST CHAR MATCH PATTERN?
08EE: DO 13           BNE FORM3     ;NO
08FO: 20 3F 09        JSR GETNSP     ;YES, GET 2ND CHAR
08F3: DD BA F9        CMP CHAR2,X    ;MATCHES SECOND HALF?
08F6: FO 0N           BEQ FORM5     ;YES
08F8: BD BA F9        LDA CHAR2,X    ;NO, IS 2ND HALF ZERO?
08FB: FO 07           BEQ FORM4     ;YES
08FD: C9 A4           CMP #$A4        ;NO 2ND HAL OPTIONAL?
08FF: FO 03           BEQ FORM4     ;YES
@L 0901: A4 34          LDY YSAV
0903: 18          FORM3  CLC          ;CLEAR CARRY NO MATCH
0904: 88          FORM4  DEY          ;BACK UP ONE CHARACTER
0905: 26 44       FORM5  ROL FMT      ;FORM FORMAT BYTE
0907: EO 03           CPX #$03        ;TIME TO CHECK FOR ADDRESS
0909: DO OD           BNE FORM7     ;NO
090B: 20 A7 FF        JSR GETNUM     ;YES
090E: A5 3F           LDA A2H
0910: FO 01           BEQ FORM6     ;HIGH ORDER BYTE ZERO
0912: E8             INX          ;NO, INCR FOR 2-BYTE
0913: 86 35       FORM6  STX L          ;STORE LENGTH
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```

0915: A2 03          LDX #$03      ;RELOAD FORMAT INDEX
0917: 88            DEY          ;BACKUP A CHARACTER
0918: 86 3D        FORM7  STX A1H    ;SAVE INDEX
091A: CA          DEY          ;DONE WITH FORMAT CHECK?
091B: 10 C9       BPL FORM2    ;NO
091D: A5 44       LDA FMT      ;YES PUT LENGTH
091F: OA          ASL A        ;IN LOW BITS
0920: OA          ASL A
0921: 05 35       ORA L
0923: C9 20       CMP #$20
0925: B0 06       BCS FORM8    ;ADD $ IF NONZERO LENGTH
0927: A6 35       LDX L        ;AND DON'T ALREADY HAVE IT
0929: FO 02       BEQ FORM8
092B: 09 80       ORA #$80
092D: 85 44       FORM8  STA FMT
092F: 84 34       STY YSAV
0931: B9 00 02    LDA IN,Y    ;GET NEXT NONBLANK
0934: C9 BB       CMP #$BB    ;',' START OF COMMENT
0936: FO 04       BEQ FORM9    ;YES
0938: C9 8D       CMP #$8D    ;A CARRIAGE RETURN ?
093A: DO 80       BNE ERR4    ;NO, ERR
093C: 4C 67 08   FORM9  JMP TRYNEXT
093F:             *
093F: B9 00 02   GETNSP LDA IN,Y
0942: C8         INY
0943: C9 A0       CMP #$A0    ;GET NEXT NON BLANK CHAR
0945: FO F8       BEQ GETNSP
0947: 60         RTS

```

Keywords:

### END OF FILE A2TIL096.TXT



# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####
### FILE: A2TIL098.TXT
#####
```

Description: Apple II, II+, IIe, IIC: ASCII characters, values & keystrokes  
 Header: Apple II, II+, IIe, IIC: ASCII characters, values & keystrokes

The following table contains the ASCII codes generated by pressing a key or combination of keys on the Apple II, Apple II Plus, Apple IIe, Apple IIC, and Enhanced Apple IIe. The character names come from the American Standard Code for Interchange of Information. Certain peripherals or programs or functions, such as the BASIC function CHR\$, may require the decimal values; certain peripherals or programs may require the hexadecimal values as well.

The fourth column in the table below is for simple keystrokes or those made with the SHIFT key held down; the fifth and sixth columns are for those made either with the CTRL key held down or with both the SHIFT and CTRL keys held down simultaneously.

NOTE: An asterisk next to keystrokes or character names means that the Apple II and Apple II Plus can't generate that character from its keyboard. The double asterisk indicates a special case.

The comments column defines the non-printing ASCII characters.

Char	Dec	Hex	Keystrokes		Comments
			Regular	Holding down: CTRL    SHIFT-CTRL	
NUL	00	00		@ **	null character
SOH	01	01		a    A	start of header
STX	02	02		b    B	start transmission
ETX	03	03		c    C	end of text
EOT	04	04		d    D	end of transmission
ENQ	05	05		e    E	enquire
ACK	06	06		f    F	acknowledge
BEL	07	07		g    G	bell
BS	08	08	Left-arrow	h    H	back space
HT	09	09	Tab	i    I	horizontal tab
LF	10	0A	Down-arrow	j    J	line feed
VT	11	0B	Up-arrow	k    K	vertical tab
FF	12	0C		l    L	form feed
CR	13	0D	Return	m    M	carriage return
SO	14	0E		n    N	shift out
SI	15	0F		o    O	shift in
DLE	16	10		p    P	data link escape
DC1	17	11		q    Q	device C 1
DC2	18	12		r    R	device C 2
DC3	19	13		s    S	device C 3
DC4	20	14		t    T	device C 4
NAK	21	15	Right-arrow	u    U	negative acknowledge
SYN	22	16		v    V	synchronous idle
ETB	23	17		w    W	end of text block
CAN	24	18		x    X	cancel
EM	25	19		y    Y	end of medium
SUB	26	1A		z    Z	start subroutine
ESC	27	1B	Escape	[ * { *	escape
FS	28	1C		\ *   *	file separator
GS	29	1D		] * } *	group separator
RS	30	1E		^	record separator
US	31	1F		_ *	unit separator
SP	32	20	Space Bar		space
!	33	21			
"	34	22			
#	35	23			
\$	36	24			

# APPLE II COMPUTER TECHNICAL INFORMATION

%	37	25
&	38	26
'	39	27
(	40	28
)	41	29
*	42	2A
+	43	2B
,	44	2C
-	45	2D
/	47	2F
0	48	30
1	49	31
2	50	32
3	51	33
4	42	34
5	43	35
6	44	36
7	45	37
8	46	38
9	57	39
:	58	3A
;	59	3B
<	60	3C
=	61	3D
>	62	3E
?	63	3F
@	64	40
A	65	41
B	66	42
C	67	43
D	68	44
E	69	45
F	70	46
G	71	47
H	72	48
I	73	49
J	74	4A
K	75	4B
L	76	4C
M	77	4D
N	78	4E
O	79	4F
P	80	50
Q	81	51
R	82	52
S	83	53
T	84	54
U	85	55
V	86	56
W	87	57
X	88	58
Y	89	59
Z	90	5A
[ *	91	5B
\ *	92	5C
] *	93	5D
^	94	5E
_ *	95	5F
` *	96	60
a	97	61
b	98	62
c	99	63
d	100	64
e	101	65
f	102	66
g	103	67

## APPLE II COMPUTER TECHNICAL INFORMATION

h	104	68	
i	105	69	
j	106	6A	
k	107	6B	
l	108	6C	
m	109	6D	
n	110	6E	
o	111	6F	
p	112	70	
q	113	71	
r	114	72	
s	115	73	
t	116	74	
u	117	75	
v	118	76	
w	119	77	
x	120	78	
y	121	79	
z	122	7A	
{	*	123	7B
	*	124	7C
}	*	125	7D
~	*	126	7E
DEL	*	127	7F

Delete

\* The Apple II and Apple II Plus can't generate that character from the keyboard.

\*\* Use SHIFT-P.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL098.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL099.TXT  
#####
```

Description: Apple II, IIe and IIC: Mini-Assembler  
Header: Apple II, IIe and IIC: Mini-Assembler

This article last reviewed: 21 September 1984

This note covers use of the Apple II, IIe and IIC mini-assembler only, not the II+. This is not a course in assembly language programming. For a reference on programming the 6502 microprocessor, refer to the Synertek Programming manual or any of the tutorials available. This note assumes the user has a working knowledge of 6502 programming and mnemonics.

The Apple II mini-assembler is a programming aid aimed at reducing the amount of time required to convert a handwritten program to object code. The @L mini-assembler is basically a look-up table for opcodes. With it, you can type mnemonics with their absolute addresses, and the assembler will convert it to the correct object code and store it in memory.

Typing "F666G" will put you in mini-assembler mode. While in this mode, any line typed in will be interpreted as an assembly language instruction, assembled, and stored in binary form unless the first character on the command line is a "\$".

If the first character of a command line is a "\$", the remainder of the line will be interpreted as a normal monitor command, executed, and control returned to the mini-assembler. To get out of the mini-assembler, press RESET.

If the first character on the line is blank, the assembled instruction will be stored starting at the address immediately following the previously assembled instruction. If the first character is not a blank nor a "\$", the line is assumed to contain an assembly language instruction preceded by the instruction address (a hex number followed by a ":"). In either case, the instruction will be retyped over the line just entered in dis-assembler format to provide a visual check of what has been assembled.

The counter that keeps track of where the next instruction will be stored is the pseudo PC (Program Counter) and it can be changed by many monitor commands (eg. 'L', 'T', . . .). Therefore, it is advisable to use the explicit instruction address mode after every monitor command and, of course, when the mini-assembler is first entered.

Errors (unrecognized mnemonic, illegal format, etc.) are signalled by a "beep" and a caret ("^") will be printed beneath the last character read from the input line by the mini-assembler.

The mnemonics and formats accepted by the mini-assembler are the same as those listed by the 6502 Programmers Manual, with the following exceptions and differences:

1. All imbedded blanks are ignored, except inside addresses.
2. All addresses entered are assumed to be in hex (rather than decimal or symbolic). A preceding "\$" (indicating hex rather than decimal or symbolic) is therefore optional, except that it should not precede the instruction address).
3. Instructions that operate on the accumulator have a blank operand field instead of "A".

## APPLE II COMPUTER TECHNICAL INFORMATION

4. When entering a branch instruction, the argument of the branch mnemonic should be the address of the target of the branch. If the destination address is not known at the time the instruction is entered, simply enter an address that is in the neighborhood, and later re-enter the branch instruction with the correct target address. NOTE: If a branch target is specified that is out of range, the mini-assembler will flag the address as being in error.
5. The operand field of an instruction can only be followed by a comment field, which starts with a semicolon (";"). Obviously, the mini-assembler ignores the field and in fact will type over it when the line is typed over in disassembler format.
6. Any page zero references will generate page zero instruction formats if such a mode exists. There is no way to force a page zero address to be two bytes, even if the address has leading zeroes.

In general, to specify an addressing type, simply enter it as it would be listed in the disassembly. For information on the disassembler, see page 49 of the Apple II Reference Manual.

Keywords:

### END OF FILE A2TIL099.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL100.TXT  
#####
```

Description: Apple II, IIe and II+: Auto-Run Apple w/o DOS (2 of 2)  
Header: Apple II, IIe and II+: Auto-Run Apple w/o DOS (2 of 2)

Article Created: 21 September 1984  
Article Last Reviewed: 3 May 1988  
Article Last Updated: 3 May 1988

For the next step a copy of the image of the application program needs to be programmed into the EPROMs. The program starts at the address pointed to by \$67 and \$68 and ends at the address pointed to by \$AF and \$B0. The contents of the end address pointer, \$AF and \$B0, will be inserted in the control ROM at locations \$1F and \$23. When control comes back through the input routine pointer, Applesoft has already initialized \$67 and \$68. So the next step is to move the image of the Applesoft program down to where it originally came from. How this is done will depend on the hardware of the ROM card and the length of the Applesoft program. If you use the Apple firmware card you will have to address the soft switch to select the firmware card and then address the switch again to re-select the Applesoft ROMs. With the ROMPLUS it could be as simple as using the monitor move routine, \$FE2C, to move a program of less than 2 kilobytes long.

There is a little more initialization to be done before the Applesoft program can be RUN. The end of program pointer mentioned earlier must be put into \$69 and \$6A and one more Applesoft routine must be called. Unfortunately this one also drops into Applesoft's command mode so we have to modify the input pointer again to point to a third part of the control ROM. Once this is done the final initialization can be done with a jump to \$D4F2.

And now the final part, we need to reset the input pointer so that the program can input normally from the keyboard and actually RUN the program. To make things easier there is a routine set by the Auto-Start ROM that will set the input pointers to the keyboard at location \$FE89. Then all that's left to do is jump to \$D566 which will run the program.

For a bit of finesse, if we put a \$80 into location \$D6, the user will not be able to list the program. In fact any attempt to do any Applesoft command except LOAD from cassette will cause the program to RUN. Also, by changing the reset vectors in the Auto-Start ROM to point to the RUN routine, the program will become very difficult to stop or modify. (To change the reset vector, load memory starting at \$3F2 with 66 D5 70. See page 36 and 37 of the Apple II Reference manual for more details)

## THE LISTING

This listing is all done relative to the start of the ROM so all address are given as one byte. If you use an assembler, simply origin the code in RAM and when it is programmed into the control ROM it will work just fine. The routines are not arranged in order of execution so that the move routine will be at the end since the length of the move routine will vary with the hardware requirements. Just be sure that the three byte jump is inserted behind the move routine.

```
* THE FIRST 4 INSTRUCTIONS LOOK LIKE A DISK BUT DON'T  
* DO ANYTHING  
*  
00: 24 20      BIT $20  
02: 24 00      BIT $00  
04: 24 03      BIT $03  
06: 24 3C      BIT $3C  
*
```

## APPLE II COMPUTER TECHNICAL INFORMATION

\* THIS PART INITIALIZES APPLESOFT AND GETS CONTROL BACK

\* AT ENTRY2

\*

```
08: A9 1A      ENTRY1 LDA # ENTRY2
0A: 85 38              STA KSWL
0C: A5 F8 07         LDA $07F8
0F: 85 39              STA KSWH
11: 4C 00 E0         JMP COLDSTART
```

\*

\* RESET INPUT TO THE KEYBOARD AND RUN THE PROGRAM

\*

```
14: 20 8 1a     ENRTY3 JSR SETKBD
17: 4C 66 D5         JMP RUN
```

\*

\* FINISH INITIALIZATION & MOVE THE PROGRAM TEXT DOWN

\* FROM THE ROMS

\*

```
1A: A9 14      ENTRY2 LDA # ENTRY3
1C: 85 38              STA KSWL
1E: A9 LL      LDA # LENGTH-L
20: 85 69              STA LOMEML
22: A9 HH      LDA # LENGTH-H
24: 85 6A              STA LOMEMH
```

INSERT YOUR MOVE ROUTINE HERE FOLLOWED BY

```
: 4C F2 D4          JMP INIT PART 2
```

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Keywords:

### END OF FILE A2TIL100.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL101.TXT  
#####
```

Description: Apple II, IIe and II+: Auto-Run Apple w/o DOS (1 of 2)  
Header: Apple II, IIe and II+: Auto-Run Apple w/o DOS (1 of 2)

This article last reviewed: 21 September 1984

Some applications require that an Apple start running an Applesoft program from power-up without human interaction. This is easy with the disk and Auto-Start ROM. Simply initialize the diskette with the desired program in memory and the disk will boot and run it when the power comes on. But sometimes a disk drive is undesirable, especially where there is only one program to run and the cost must be kept low. So here is a way to have a card that will load and run an Applesoft program automatically on power-up in any Apple II+.

I will assume the use of a card like the Mountain Computer ROM+ that has a 256 byte "control ROM" and room for some larger ROMs to store the Applesoft program. On the ROM+ this is a bank of up to six 2716 type EPROMs. Using EPROMs has the advantage that you can change your Applesoft program later by erasing the EPROMs and reprogramming and the disadvantages of higher cost and using more power from the Apple's power supply. The power consumption of the EPROMs won't be a problem if the Apple isn't filled with cards.

The software in the control ROM is required to do five things:

1. Pretend that it's a disk controller card so that the Auto-Start ROM will execute its code.
2. Initialize Applesoft.
3. Move an image of the Applesoft program down from the ROMs into the proper area of RAM.
4. Set up the required Applesoft pointers for the end of the program.
5. RUN the program.

All that's needed to convince the Auto-Start that there's a disk controller card out there is to have a ROM whose first four odd bytes match the Apple P5 or P5A PROM. If the monitor finds a ROM that matches it in slot N, it will do a jump to \$CN00. The routine that does this starts at \$FAA6 and is listed on page 144 of the Apple II reference manual. The first eight bytes in the control ROM will be

```
24 20 24 00 24 03 24 3C
```

Note that by having the even numbered bytes equal to \$24, (BIT Page zero) when the code is executed starting at \$CN00 nothing will happen until the byte after the \$3C.

The proper way to initialize Applesoft is to jump to \$E000. Unfortunately this entry into Applesoft falls into the normal command level routine. To regain control so that the control ROM can load a program we can use the same trick that DOS uses. As soon as Applesoft reaches its command level it prints a prompt, ("]") and waits for the user to type in a command. Since all input and output in the Apple is handled through two pointers in RAM, we can divert the input routine to point back into the control ROM. This will leave several levels of subroutine on the 6502 stack but Applesoft will re-initialize the stack when we RUN the program so it doesn't matter.

Now the question becomes what address to put into the pointer. The control

## APPLE II COMPUTER TECHNICAL INFORMATION

ROM's address will change depending on which peripheral slot it's plugged into.

The low byte is just the offset from the start of the ROM since the address always starts on a 256 byte boundary but the high byte could be anything from \$C1 to \$C7. When the Auto-Start ROM looks for a disk controller card it saves the high order byte in \$7F8. So the contents of \$38 and \$39, the input pointer, becomes the offset which is stored at location \$7F8. Then we can jump to \$E000 to initialize Applesoft confident that we will regain control when it's done.

Keywords:

### END OF FILE A2TIL101.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL102.TXT  
#####

Description: Apple II: "Muffin" Is on DOS 3.3 System Master  
Header: Apple II: "Muffin" Is on DOS 3.3 System Master

Article Created: 14 May 1991  
Article Last Reviewed: 29 May 1991  
Article Last Updated:

TOPIC -----

Where can I find the program Muffin?

DISCUSSION -----

It's on the DOS 3.3 System Master.  
Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL102.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL103.TXT  
#####

Description: Apple II: "Understanding the Apple II"  
Header: Apple II: "Understanding the Apple II"

"Understanding Your Apple II", an in-depth Apple II and II+ hardware manual, is now available from Quality Software or from your local dealer. The book, by Jim Sather, has a foreword by Steve Wozniak. Some of the book's features:

- Documents all motherboard circuits, including some discussed nowhere else.
- Describes disk controller operation, including previously undocumented details of the logic state sequencer.
- Explains RAM and ROM card operation.
- Reveals previously unnoticed features of Apple graphics.
- Contains 23 software and hardware Application Notes including the shift key mod, disk write protect mod, and EPROM mods.
- Includes a chapter on simple user troubleshooting and maintenance.
- Contains over 100 figures and illustrations, including more than 20 schematics, ten appendices, a glossary and index.

This book runs 352 pages in all! A companion text, "Understanding Your Apple IIe", is also available from:

Quality Software  
21601 Marilla Street  
Chatsworth, CA - 91311  
(818) 709-1721  
Copyright 1991 Apple Computer, Inc  
Keywords:

### END OF FILE A2TIL103.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL104.TXT  
#####

Description: Apple II: 80 Column Card Cannot Handle Some "Color" Programs  
Header: Apple II: 80 Column Card Cannot Handle Some "Color" Programs

Article Created: 29 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I have an Apple IIe, an Enhanced 80 Column card, and an Apple Color Monitor 100. I have two games, Batman and Hunt for Red October, that do not display in color even though they are both advertised as able to run on the Apple II with double high-resolution color graphics.

DISCUSSION -----

The problem is that your software is trying to write directly to the video circuitry instead of using calls to the software. The 80 column card cannot handle these kinds of requests.

There are only two possible fixes:

- \* Get a different type of monitor and video card
- \* Call the software companies and ask if they have a software patch.

Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL104.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL105.TXT  
#####

Description: Apple II: Conflict between Versions of ProDOS and Backup II  
Header: Apple II: Conflict between Versions of ProDOS and Backup II

Article Created: 4 June 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I backed up my hard disk with Backup II version 1.01, and the drive went down (total loss of data). While trying to restore from the backup I get through 13 of 34 disks, and then I get a DATE/TIME STAMP DO NOT MATCH error. I have looked for the date and time stamp bytes on the disks to no avail.

Can I fix Backup II to not look for a DATE/TIME STAMP? Which bytes should I look for on the bad disks? I have looked at the information on the disks in question and the data is there.

DISCUSSION -----

The actual problem may be with your versions of ProDOS and Backup II. Specifically, versions of Backup II before 1.1.1 are not compatible with any ProDOS version greater than 1.1.1. If your Backup II and ProDOS are incompatible, you have two options:

- \* Use Backup II v1.1.1, which will read your backup disks
- \* Downgrade ProDOS to 1.1.1.

The Date/Time stamps for a ProDOS volume reside in bytes \$1C-\$1F of block 2. Matching these against previous volumes may solve the problem.

To help you find block 2, here is a good formula for converting ProDOS blocks to DOS 3.3 sectors:

$$\text{Block} = (8 * \text{Track}) + \text{SectorOffset}$$

Sector:	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
SectorOffset:	0	7	6	6	5	5	4	4	3	3	2	2	1	1	0	7
Half of Block:	1	1	2	1	2	1	2	1	2	1	2	1	2	1	2	2

It looks like the bytes you need are on Track 0, Sector 11 (first half of block

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Keywords:

### END OF FILE A2TIL105.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL106.TXT  
#####

Description: Apple II: Digitizers  
Header: Apple II: Digitizers

Article Created: 21 September 1984

Article Change History

-----  
02/09/93 - UPDATED  
          Micron Technology acquired by Xceed Technologies.  
09/21/84 - REVIEWED  
          \* For accuracy.

Here are a few digitizers for the Apple II:

- Computereyes           by   Digital Vision, Inc.  
                          14 Oak St. #2  
                          Needham, MA 02192  
                          (617) 444-9040
  
- Dithertizer II        by   Computer Station  
                          11610 Page Service Drive  
                          Saint Louis, Mo 63146  
                          (314) 432-7019
  
- Digisector            by   Micro-Works  
                          P.O. Box 1110  
                          Del Mar, CA 92014  
                          (619) 942-2400
  
- Micro D-Cam           by   Micro Mint  
                          561 Willow Ave.  
                          Cedarhurst, NY 11516  
                          (516) 374-6793
  
- Micron-Eye            by   Micron Technology (acquired by Xceed Technologies)  
                          Xceed Technologies  
                          37560 31 Mile Rd.  
                          Richmond, MI 48062                               313-727-4085  
                          800-642-7661

The Dithertizer and the Digisector accept input from a standard video camera. The Micro D-Cam and Micron-Eye use a solid state camera made from a special purpose imaging chip. All have software to map the output from the camera to the High-Res Screen of the Apple II.

The Dithertizer uses a feature called contouring. This makes the processor display only those portions of an image which fall in a certain brightness (or darkness) range. With this method you could set the digitizer to display only the darkest spots on the screen. Then you could write software to scan the digitized image for spots, count them and note their position.

Micron-Technology (acquired by Xceed Technologies) makes an RS-232 version of the Micron-Eye. With the proper software, this could be your digitizer for Macintosh, Lisa or Apple III.

To locate a vendor's address and phone numbers, use the vendor name as a search string.

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APPLE II COMPUTER TECHNICAL INFORMATION

Keywords:

### END OF FILE A2TIL106.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL107.TXT  
#####

Description: Apple II: Disabling Keyboard During Serial I/O (2/97)  
Header: Apple II: Disabling Keyboard During Serial I/O (2/97)

Article Created: 31 March 1988  
Article Reviewed/Updated: 17 February 1997

TOPIC -----

This article disucsses how to disable the keyboard during serial I/O on the Apple IIc, Apple IIGS and Apple IIe Super Serial card.

DISCUSSION -----

The Apple II serial interface (Apple IIc serial port, Apple IIGS serial port, and Apple IIe Super Serial Card) has a built-in command that disables the keyboard during serial I/O. The command is FD. Here's how to send it from BASIC:

```
10 print chr$(4);"pr#2"  
20 print chr$(1);"FD": REM Disable the keyboard...
```

Article Change History:  
17 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1988-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL107.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL108.TXT  
#####

Description: Apple II: Function of Start 13  
Header: Apple II: Function of Start 13

Article Created: 8 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I have an Apple IIc Plus with a 5.25-inch drive. Do I need a file called Start 13 on my system for the drive to work properly?

DISCUSSION -----

The file Start 13 was used early on when the Apple II went to a 16-sector disk format. Start 13 made it possible for older, 13-sector diskettes to be read. You don't need it for the Apple IIc to work with current diskettes.

Copyright 1991 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL108.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL109.TXT  
#####

Description: Apple II: How to Copy Software from 5.25 to 3.5-inch Disks  
Header: Apple II: How to Copy Software from 5.25 to 3.5-inch Disks

Article Created: 11 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I want to copy Apple IIe software from 5.25-inch to 3.5-inch disks, using an Apple IIGS--and then run the programs. I get a message that the Apple IIe disk was not formatted in ProDOS. What should I do?

DISCUSSION -----

If the program was written to run under DOS 3.3, it probably won't work under ProDOS. You can use the System Utilities Disk 3.1 to copy the information over to a 3.5-inch disk (the DOS to ProDOS conversion is handled automatically during the copy). However, if the application interacts with the operating system giving DOS 3.3 commands, it won't run. We recommend that you ask the software developer if they have a ProDOS version.  
Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL109.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL110.TXT  
#####

Description: Apple II: Information Sources (2/97)  
Header: Apple II: Information Sources (2/97)

Article Created: 25 February 1993  
Article Reviewed/Updated: 17 February 1997

TOPIC -----

This article describes some information sources for the Apple II products.

DISCUSSION -----

GS+  
---

An Apple IIGS magazine published bimonthly by EGO Systems.

EGO Systems  
P.O. Box 15366  
Chattanooga, TN 37415-0366

A+/InCider  
-----

An Apple II and Macintosh magazine published monthly by IDG.

IDG Communications/Peterborough, InCider  
P.O. Box 50358  
Boulder, CO 80321-0358

A2-Central  
-----

Publishes a number of newsletters that are devoted to the Apple II only.  
Here's the current list:

A2-Central  
-----

Published monthly since January, 1985 and provides technical information on the Apple II.

A2-Central on Disk has been published monthly since February, 1989. Each 800K 3.5-inch disk contains the full text of that month's paper issue, plus text-talking software for blind subscribers. In addition, specific issues contain Apple system software, technical note updates, public domain and shareware software.

Studio-City  
-----

Published every other month since February, 1990. Each issue consists of two 800K 3.5-inch disks and includes a HyperStudio stack containing editor Terry Baker's tips, tricks, and letters from readers.

TimeOut-Central  
-----

Published every other month since September, 1990. Each issue consists of one 800K 3.5-inch disk and includes a column by the editor, letters from readers, as well as public domain and shareware AppleWorks and TimeOut files.

Script-Central  
-----

Published bimonthly and is all about Apple's HyperCard IIGS and HyperTalk, its scripting language.

APPLE II COMPUTER TECHNICAL INFORMATION

A2-Central  
P.O. Box 11250  
Overland Park, KS 66207

The Road Apple  
-----

An Apple II "End Users" Underground Newsletter published six times a year.

Al Martin  
1121 NE 177th, Suite B  
Portland, OR 97230.

Scarlett  
-----

A monthly newsletter published by:

Big Red Computer Club  
423 Norfolk Avenue  
Norfolk, NE 68701.

AppleWorks Forum  
-----

A monthly newsletter published by:

The National AppleWorks User Group  
Box 87453  
Canton, MI 48187

HyperStudio Network  
-----

A quarterly newsletter about HyperStudio. They publish an annual 'Best of HyperStudio' disk of stacks, and have discounts on HyperStudio accessories. They also have some teacher-oriented materials.

HyperStudio Network  
Box 103,  
Blawenburg, NJ 08504

Softdisk and Softdisk GS  
-----

Monthly disk magazines containing a variety of software (public domain, shareware, clip art, reviews, etc.). Softdisk is available on 5.25- or 3.5-inch disks. Softdisk GS is available only on 3.5-inch disks.

Softdisk Publishing  
P.O. Box 30008  
Shreveport, LA 71130-0008  
AOL: zak    Internet: zak@aol.com

USUS  
-----

An international non-profit organization dedicated to promoting and influencing software standards to aid in the development of portable software. They have a large software library including a lot of source code (for almost every language or computer).

USUS Inc.  
P.O. Box 1148  
La Jolla, CA 92038

Article Change History:

APPLE II COMPUTER TECHNICAL INFORMATION

17 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1993-97, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL110.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL111.TXT  
#####

Description: Apple II: Interrupt Handling (2/97)  
Header: Apple II: Interrupt Handling (2/97)

Article Created: 21 September 1984  
Article Reviewed/Updated: 28 February 1997

TOPIC -----

This article describes interrupt handling routines in the Apple II.

DISCUSSION -----

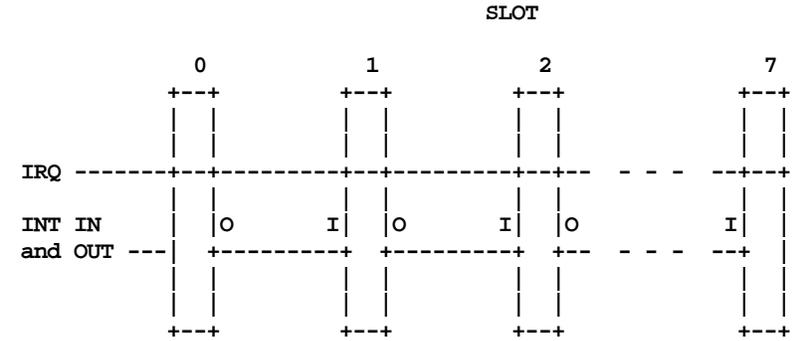
The user should be familiar with the 6502 interrupt requirements as defined in the Synertek Programming and Hardware manuals. This article applies to the interrupt request (IRQ). The use of the non-maskable interrupt (NMI) in a disk system is not recommended. The data and programs on the disk may be destroyed if an NMI occurs while the Apple is writing data to the disk. The DOS disables IRQ during critical code making it relatively safe to use.

HARDWARE  
-----

For interrupts, the Apple peripheral slots have defined three pins:

IRQ, Interrupt ReQuest            pin 30  
INT IN, daisy chain in            pin 28  
INT OUT, daisy chain out         pin 23

The daisy chain structure allows an interface card to disable the next higher number card from requesting an interrupt. Slot 0 has the highest priority and slot 7 has the least.



The system was designed so that if INT IN for a slot is low then that slot may not generate an interrupt. Each slot should pull INT OUT low when it is requesting an interrupt to disable lower priority slots. Cards that don't use IRQ should wire INT IN and INT OUT together so that any higher priority slots can still disable cards in lower priority slots. This priority system fails if there is an empty slot between any two interrupting cards.

The hardware logic required to generate INT OUT is INT IN anded with the active low interrupt signal from the peripheral device. IRQ is INT IN anded with the active high interrupt signal from the peripheral device.

SOFTWARE  
-----

There are two ways to cause the 6502 to follow the IRQ vector. A logical zero

## APPLE II COMPUTER TECHNICAL INFORMATION

on the IRQ pin of the 6502 while the IRQ flag of the processor is cleared, or executing a BREAK instruction in a program:

First, the Apple monitor determines whether a BREAK or an IRQ has occurred. In the Auto start ROM, this routine is at \$FA40 and in the old monitor it's at \$FA86. This routine stores the 6502 accumulator at location \$45 and retrieves the processor status flags. A BREAK drops into the monitor with the address of the BREAK operation code + 2 and a dump of the 6502 registers. The Auto-Start ROM has the option of jumping to a user's routine after a break. Both monitor ROMs jump to the address contained in memory at \$3FE and \$3FF after an IRQ.

### Interrupt Request

-----

The user must have the address of his interrupt handler stored in \$3FE and \$3FF before the first interrupt is generated.

Caution: The accumulator does not contain valid data when it is vectored to \$3fe and \$3FF.

The accumulator must be restored from location \$45 before the return from interrupt instruction, (RTI) is executed. The user must also be careful to leave the other registers as they were when an interrupt occurred.

### Interrupts and BASIC

-----

If the user is careful to restore all the 6502 registers and not disturb BASIC's memory locations in the interrupt handling routine, the interrupt will be transparent to BASIC. Be very careful of page 0 locations. Save and restore any information on the stack when you're not sure.

Applesoft and Integer BASIC both use the 6502 stack extensively in keeping track of GOSUBS and FOR-NEXT loops. This makes it difficult to have an interrupt modify BASIC program execution. To do this the easiest way, program the interrupt routine to set a flag byte when an event occurs and then program the BASIC program to PEEK that flag byte's address and respond when the flag byte is set.

You may use the Applesoft ONERR GOTO statement to modify the execution of an Applesoft program when the interrupt occurs. The following machine language routine causes an 'error' condition in Applesoft.

```
10 POKE 800,162: POKE 801,100: POKE 802,104: POKE 803,104
20 POKE 804,104: POKE 805,76 : POKE 806,233: POKE 807,242
30 POKE 1022,0 : POKE 1023,8
40 ONERR GOTO 1000
50 PRINT "NO INTERRUPT"
60 GOTO 50
1000 IF PEEK (222) <> 100 THEN END
1010 PRINT "INTERRUPT!!!"
1020 RESUME
```

The POKES set the IRQ vector to generate an error number 100 when an interrupt occurs. The Applesoft onerr routine can check decimal location 222 and if it doesn't equal 100 then you have a normal Applesoft or DOS error. Treat the IRQ generated error like any other Applesoft error. RESUME and the routine on page 82 of the Applesoft reference manual will work normally. Please do a search on ON ERR GOTO for more information.

### Interrupts and DOS

-----

The interrupt checking routine in the monitor saves the 6502 accumulator at location \$45 while it checks for a break. Unfortunately, DOS also uses

## APPLE II COMPUTER TECHNICAL INFORMATION

location \$45 as temporary storage while DOS parses the numeric parts of its commands. This can result in range errors or reading the wrong record, slot, or drive if an interrupt occurs during parsing. There is no way around this problem at this time. To use interrupts with DOS in the safest way, disable IRQ when doing any disk access.

### Article Change History:

28 Feb 1997 - Reviewed for technical accuracy, revised formatting.

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Keywords:

### END OF FILE A2TIL111.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL112.TXT  
#####

Description: Apple II: LocalTalk ImageWriter Delay from BASIC (2/97)  
Header: Apple II: LocalTalk ImageWriter Delay from BASIC (2/97)

Article Created: 24 June 1991  
Article Reviewed/Updated: 17 February 1997

TOPIC -----

I'm running an Apple IIGS lab (28 systems) with seven LocalTalk ImageWriters.

When using Applesoft BASIC, my computers print properly with a "PR#1" command. However, there is a 30-second delay from the time one computer finishes printing until the next system is allowed to print.

Here is a test program that I'm using:

```
10 PRINT CHR$(4);"PR#1"
20 FOR I=32 TO 126
30 PRINT CHR$(I);
40 NEXT:PRINT
50 PRINT CHR$(4);"PR#0"
```

If I run the above test program simultaneously on two Apple IIGS computers trying to print to one LocalTalk ImageWriter, the first computer to type "run" prints fine. The other computer has to wait for the LocalTalk option board to release the printer.

I have gone through the ImageWriter technical book and can't find anything that allows the LocalTalk card to release the printer immediately after the "PR#0" command.

Is there a reset or release command that I can add to the program to eliminate this wait?

DISCUSSION -----

You are experiencing the time it takes the ImageWriter to release after the connection to the computer is lost. Your problem is that the "PR#0" command just changes the mode of the computer; the printer still thinks the first computer should be there.

The printer has a built-in timeout that can't be changed. Something you might try is to insert an "ESC c" as line 45. This command resets the printer and might cause the printer to drop its connection before the computer does.

Article Change History:  
17 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
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Keywords:

### END OF FILE A2TIL112.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL113.TXT  
#####

Description: Apple II: Mouse Memory Locations  
Header: Apple II: Mouse Memory Locations

Article Created: 13 August 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

What are the memory addresses for mouse information on the Apple IIe and Apple IIGS?

DISCUSSION -----

Apple IIe/IIC  
-----

With the mouse card in slot four of the Apple IIe, locations are stored as follows:

- low byte x   \$047C
- high byte x  \$057C
- low byte y   \$04FC
- high byte y  \$05FC

(This is different if the card is in a slot other than slot four.)

More data on Apple IIe and IIC applications is on pages 196 through 198 and page 363 of the "Apple IIC Technical Reference Manual" from Addison-Wesley.

Apple IIGS  
-----

Information on the Apple IIGS locations is on pages 200 through 205 of the "Apple IIGS Firmware Reference" from Addison-Wesley.

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Keywords:

### END OF FILE A2TIL113.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL114.TXT  
#####

Description: Apple II: No Diskless Startup Across Zones  
Header: Apple II: No Diskless Startup Across Zones

This article last reviewed: 23 February 1989

If you are having problems starting a diskless Apple II on LocalTalk over a Kinetics FastPath, from a server residing on Ethernet, it may be because the diskless start-up capability of Apple II workstations is designed to work over a FastPath or other AppleTalk bridges -- but not across zones. If your FastPath has been set up with the Ethernet as a separate zone from the LocalTalk side, this is your problem.

You should also look at the configuration of the FastPath itself. If a Macintosh can access the server normally from the LocalTalk side of the network, then the Apple II should be able to start, because the same network layers are being used for the information transfer. If a Macintosh cannot access the server properly, then you should suspect the configuration of the FastPath itself.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL114.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL115.TXT  
#####

Description: Apple II: Program To Recover Deleted Files  
Header: Apple II: Program To Recover Deleted Files

This article last reviewed: 22 June 1989

TOPIC -----

Is there a way to recover deleted files on an Apple II under Apple DOS 3.3 and ProDOS?

DISCUSSION -----

Central Point Software offers Copy II Plus, which allows deleted files to be restored in both DOS 3.3 and ProDOS--provided you have not written to the disk since the file was deleted.

For more details, search the Tech Info Library under "Central Point".  
Copyright 1989 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL115.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL116.TXT  
#####

Description: Apple II: Sources of Used Equipment  
Header: Apple II: Sources of Used Equipment

Article Created: 3 June 1991

TOPIC -----

I want to purchase discontinued Apple II equipment. Where can I find it?

DISCUSSION -----

Preowned Electronics has a large selection of used Apple II equipment.

Sun Remarketing is another source as well.

You can find the address and phone number for these companies in a separate article on the Tech Info Library. Search under the name you want to find.

Copyright 1991 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL116.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL117.TXT  
#####

Description: Apple II: Starting Over Bridges  
Header: Apple II: Starting Over Bridges

This article last reviewed: 10 April 1989

When an internet has each side of the InterBridge assigned a different zone name (common practice when using the InterBridge) In this type of internet, the Apple IIe and the Apple IIGS cannot boot across an InterBridge.

However, when both sides of the InterBridge have the same zone name on a one-zone internet, the Apple II systems can start across the InterBridge. This difference occurs, because AppleTalk uses the Name Binding Protocol to understand the network design. (AppleTalk is more concerned with names than it is with numbers.) With both sides of the InterBridge having the same zone name, AppleTalk believes it is dealing with one network (one zone).

This method of name assignment has one disadvantage. All network traffic is passed across the InterBridge, thus defeating the usual reason for installing the bridge--the logical separation of network traffic.

Note: Routers and bridges are different devices. They do perform similar functions, but the router is a higher-level device than the bridge.  
Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL117.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL118.TXT  
#####

Description: Apple II: Transferring Data to the Macintosh  
Header: Apple II: Transferring Data to the Macintosh

This article last reviewed: 23 June 1990

TOPIC -----

Can the Apple 5.25 PC Drive (and card) read ProDOS 5.25-inch disks under AFE?

DISCUSSION -----

Apple 5.25 PC Drive only supports disks that are formatted using the MFM encoding methods. Therefore, it does not read ProDOS-formatted disks, which use GCR. Alternative ways to move data from the Apple II to the Macintosh include AppleShare, a serial link (cable and/or modem), and by first moving the ProDOS data to 3.5-inch disks, which any Macintosh will mount.

You may find the AFE Works-Works translator helpful when actually translating the files. It is on the InfoSource CD-ROM available from Apple.  
Copyright 1990 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL118.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL119.TXT  
#####

Description: Apple II: Transferring Files To a Macintosh (9/95)  
Header: Apple II: Transferring Files To a Macintosh (9/95)

Article Created: 6 September 1995

TOPIC -----

This article provides instruction on converting Apple II files to MacWrite files using Bank Street Writer.

DISCUSSION -----

To convert Apple II Bank Street Writer word processor files into Macintosh MacWrite files follow these steps.

Step 1  
-----

Use the System Utility option within Bank Street writer to convert the binary Bank Street Writer documents to ProDOS 3.3 ASCII text files. This must be done for each file that you intend to transfer to the Macintosh.

NOTE:

Make sure that the names of the files contain only the letters (A-Z), no numbers or other marks.

Step 2  
-----

Use the ProDOS System Utilities Diskette to copy the DOS 3.3 ASCII text files that you have created to a ProDOS formatted disk. (You will need your original DOS 3.3 disk, and a new disk that has been formatted with ProDOS.)

Step 3  
-----

Use an Apple II computer that is equipped with both a 5 1/4" disk drive and a 3 1/2" disk drive. Again, use the ProDOS System Utilities disk to copy the files from the 5 1/4" disk to a ProDOS formatted 3 1/2" disk.

Step 4  
-----

Use a Macintosh computer equipped with a FDHD (high density) disk drive (Macintosh SE/30 or later) and PC Exchange 1.1 or later.

Step 5  
-----

Insert the disk into your Macintosh and use MacWrite or your favorite word processor to open each file. Once you have verified that everything is intact, choose "Save as..." from the file menu and save the file.

Support Information Services  
Copyright 1995, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL119.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL120.TXT  
#####

Description: Apple II: Translating Graphics Files to Macintosh  
Header: Apple II: Translating Graphics Files to Macintosh

Article Created: 13 August 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

Is it possible to convert ProDOS clip art files to Macintosh SuperPaint files using Apple File Exchange (AFE)? If so, what translator is needed?

DISCUSSION -----

We don't know of a product that converts graphic files between Apple II and Macintosh formats. This type of conversion is one of the most difficult, as the files are usually stored as an approximation of the hardware's display capabilities, which vary greatly between different computer lines.

Though we couldn't find a product that will do this, what you're probably looking for is a utility that will convert a file into a "standard format," such as Graphic Interchange Format (GIF). Once in this format, you could move it to the Macintosh and re-translate it.

Checking the MENU software library on AppleLink for a utility to do this.  
Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL120.TXT

#####  
### FILE: A2TIL121.TXT  
#####

Description: Apple II: Turn Off Line Feed When Using 3rd Party Printers  
Header: Apple II: Turn Off Line Feed When Using 3rd Party Printers

This article last reviewed: 19 February 1988

Third party dot matrix impact printers need to receive a Carriage Return within a control code in order to set print densities to certain values. Unfortunately, when a CR is sent from an Apple IIc or a Super Serial Card, the interface automatically sends a Line Feed as well. Temporarily turning off the interface's automatic LF can be done with a Control-I K. To turn automatic LF back on, use Control-I L.

The problem is, these characters may be ignored by the interface and sent to the printer instead.

There are other ways of getting back to default conditions on a printer, such as sending a 'RESET' code, or turning off/turning on the printer. The problem with this is that some printers take a long time resetting. This can be noisy and sometimes very time consuming, especially if done often.

Here is why this happens (and a solution):

The Super Serial Card (and its Apple IIc serial port equivalent) will forward control characters if preceded by a Control-I. While it's true that Control-I is the command to send to set up specific functions, in order to send the command to the card without it forwarding said command to the printer, you must send the command preceded by TWO Control-I's.

- The first Control-I alerts the card that a command it needs to operate on is forthcoming.
- The second Control-I is used by the card, along with its attendant characters, as the command string, to change interface functions.

If what follows the first Control-I is not a control character, the card (firmware) forwards the next characters to the printer.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL121.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL122.TXT  
#####

Description: Apple II: Using a Switchbox With ImageWriter II  
Header: Apple II: Using a Switchbox With ImageWriter II

This article last reviewed: 14 November 1989

TOPIC -----

I am having problems with my Apple II, switch boxes, and ImageWriter II.

What actually is the difference between the ImageWriter and the ImageWriter II?

Is there solution guaranteed to work?

Do you know of anybody who is having success with ImageWriter IIs and switch boxes?

DISCUSSION -----

The workaround is to use XON/XOFF handshaking.

Following is an explanation of what happens when switching between an Apple IIGS and an Apple IIe. Also included is an explanation of why this may not be a problem with ImageWriters, and why a MicroBuffer may cure this as well.

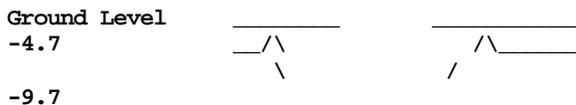
Set-Up:  
-----

Our configuration to test this problem was an Apple IIe equipped with a Super Serial Card, an Apple IIGS, and an ImageWriter II, along with two commercial switch boxes. Line status was monitored with a Data Specification RS-232 Break-Out box. A Fluke 8050A Digital Multi-Meter was used to measure the voltage levels. Software used was AppleWriter II with the same file open on both systems.

The Test:

When switching between the systems, transitions were noted on the Transmit line, which caused DTR from the printer to go into the high state, effectively shutting off communication with the connected computer. If the printer does a reset in between the systems, the now-connected system prints correctly. If there is no reset when switching, it is necessary to reset the printer by either deselecting/selecting, as you stated, or by powering off the printer, and powering it on again. Either of these actions resets the DTR line and re-establishes communications with the computer.

Our first thought was to use a switch box with a make-before-break switch. The reason this would not work with Apple IIe and Apple IIGS systems connected is the difference in voltage levels between the systems. The Apple IIGS system output device, AMD 26LS30, is supplied with +/-5VDC, while the Super Serial Card output device, TI 75189, is provided with +/-12VDC. This means that the Apple IIGS outputs -4.7 volts for a "Low" signal while the Apple IIe outputs -9.7 volts. When the switch is thrown from one position to the other, here's what happens:



## APPLE II COMPUTER TECHNICAL INFORMATION

GS-> IIE      IIE-> IIGS

With the switch type a break-before-make, when the switch opens between contacts, the voltage level rises to Ground, then drops to a Low level again. This positive transition to Ground causes the printer to see either a start bit or a DSR level shift from the computer, which then sets DTR false. If the switch box is a make-before-break switch, there would be current flow from the Apple IIE into the Apple IIGS output because of the different voltage level in the output "Low" signal, which could cause damage to the interface chips in the Apple IIGS.

XON/XOFF works because the printer sends/receives the XON/XOFF handshaking over the normal data communications lines, pins 2 and 3, and even though these lines are affected by the level transitions caused by the switch action, these transitions are not recognized as XON/XOFF by the printer or the computer. Because the equipment doesn't see these transitions as requests to halt data flow, there is no attendant response to incorrect data by the printer, and the information flow continues.

The ImageWriter has 75189 receiver chips installed, functionally equivalent to the 1489 Line Receiver, which are much less sensitive to level transitions because they are designed to operate at lower frequency limits. This causes them to be much more tolerant of the level transitions that occur during the actual time of the switch. ImageWriter IIs have 26LS32s for receivers. They are designed for higher speed use, and thus are much more sensitive to the level transitions occurring. This is our interpretation of why this problem does not exist with the ImageWriter.

A MicroBuffer might cure this problem because the ImageWriter II responds to the level transitions occurring during the switch time, but when this transition is sent to a buffer, it knows it is not data, so it ignores the change in potential between connections.

To use XON/XOFF with older software, it is necessary to use a pre-boot program to set up the Super Serial Card before using the software. On the Apple IIGS, if you cannot gain access to the Control Panel from within the application, the pre-boot needs to be used there, too.

The pre-boot program should look like this in DOS 3.3 or ProDOS:

```
10 D$=CHR$(4)
20 PRINT D$;"PR#1"
30 PRINT CHR$(9);"X E";CHR$(13)
40 PRINT D$;"PR#0"
```

Enter this short program into the system in immediate mode prior to starting up the systems, or save it on disk as either a HELLO (DOS 3.3) or STARTUP (ProDOS) program to run before the software boots.

Bottom Line  
-----

Change the ImageWriter II to XON/XOFF handshaking by setting SW 2-3 Open, and the problem of not being able to print from multiple systems should vanish. It is less convenient, but we have not been able to make the setup fail using this method.

Copyright 1989 Apple Computer, Inc.  
Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL122.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL123.TXT  
#####

Description: Apple II: Wrong Version of Setup Causes Aristotle Problems  
Header: Apple II: Wrong Version of Setup Causes Aristotle Problems

Article Created: 14 May 1991  
Article Last Reviewed: 29 May 1991  
Article Last Updated:

TOPIC -----

I'm having a problem in setting up a lab network using a Macintosh SE/30 as a server, with a combination of Apple IIGS and Apple IIe workstations. I am also using Apple II Setup v2.0.1.

I get the following error message when I try to log on to Aristotle as Administrator from an Apple IIGS: "an error occurred loading the file /volumename/System/System.Setup/Cdev.Init".

When I try using a different startup application (such as BASIC.SYSTEM), I get this message: "Bad OS ver 0011" I'm using version 5.0.2 to install Server Network Startup, and Server Quick Logoff.

Also, I've been getting a System Error when setting up a Macintosh SE/30 as a server and installing System 6.0.3 from the Install menu of the File Server installation disk. Reinstalling System 6.0.5 seems to cure this, however.

DISCUSSION -----

The problem you are seeing with Aristotle is a result of using the wrong version of the Apple II Setup. You have to use Apple II Setup v2.1 or 2.1.1, not v2.0.1, when setting up the software.

As for the problem of installing 6.0.3 from the File Server installation disk, it could be that there is something corrupted in the installation scripts for that version. Nothing you described is a wrong procedure. Copyright 1991, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL123.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL124.TXT  
#####

Description: Apple II-to-IBM Host File Transfer  
Header: Apple II-to-IBM Host File Transfer

This article last reviewed: 1 May 1990

TOPIC -----

How can I transfer an ASCII file from an Apple IIe to an IBM mainframe?

I haven't been able to find any 3270 Apple II solutions. Assuming there isn't a Macintosh available, we could send the ASCII file from the Apple IIe over CompuServe or some other network to a Macintosh (or even an MS-DOS PC) connected to a mainframe. Then, we could make the ASCII-to-EBCDIC conversion and store it on the mainframe.

Are there any other solutions?

DISCUSSION -----

There are two other options. All options, including the one you mentioned, are based on file transfer from the ASCII environment to the EBCDIC environment (microcomputer to mainframe host). This file transfer is where the conversion will take place.

The first option depends on the services available from the mainframe. This method requires a mainframe-attached protocol converter that uses the XModem protocol, plus a communications package on the Apple IIe that also supports XModem. This setup should allow the Apple IIe to dial directly into the protocol converter and upload the file to the mainframe.

The second option is to dial the Macintosh or MS-DOS PC directly instead of paying for a commercial communications service. Since both computers require modems to access the commercial service, and most likely use XModem for the transfer, there should be no difficulties connecting directly to one another with their communications software and using XModem for the transfer. Once transferred from the Apple IIe to the Macintosh or PC attached to the mainframe, the file can be uploaded from the Macintosh or PC using the host's file transfer method.

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Keywords:

### END OF FILE A2TIL124.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL125.TXT  
#####

Description: Apple II/II+/IIE: Cable Compatibility (9/94)  
Header: Apple II/II+/IIE: Cable Compatibility (9/94)

Article Created: 27 September 1994

TOPIC -----

This article provides cable compatibility information for Apple computer systems and a variety of Apple peripherals.

The left column lists the peripherals, the right column lists the cable required to connect one of the following computers to it; Apple II, Apple II Plus, or the Apple IIE.

Part numbers which begin with a letter are the finished goods part number, the seven digit numbers are the service part numbers.

DISCUSSION -----

Peripheral -----	Cable part number -----
AppleFax Modem	N/A
Apple Personal Modem Apple Data Modem 2400	A2C0312/590-0555 (smoke) or A9C0314/590-0556 (w/jumper on Super Serial Card)
Apple Modem 300 Apple Modem 1200	A2C0354/590-0121
Apple ImageWriter II or II/L ImageWriter LQ	A9C0314/590-0556 (smoke) or LocalTalk or A2C0312/590-0555 (w/jumper to modem)
Apple ImageWriter Printer Apple ImageWriter 15"	A2C0352/590-0037
LaserWriter, Plus, IInt, IIntx, IIf, IIG LaserWriter Pro 600/630/810 Personal LaserWriter NT, NTR	LocalTalk (Req. WorkStation Card)
Personal LaserWriter LS StyleWriter & StyleWriter II Color StyleWriter/Color StyleWriter Pro	N/A
Apple LaserWriter IIsC Personal LaserWriter SC	N/A
AppleCD SC cable)* Apple Hard Disk 20/40/80	M0206/658-8031 (SCSI System)

# APPLE II COMPUTER TECHNICAL INFORMATION

Apple Tape Backup 40SC  
Apple Scanner  
Apple Color OneScanner  
Apple Color Printer

N/A

## LEGEND

\* Requires M3503LL/B/658-8032 Cable Terminator and Apple II SCSI Card.

A9M0320 or A3M0025 w/590-0037 require Super Serial Card BUT A9M0302 or A3M0025 w/590-0037 & 590-0550 doesn't (Buses Built In).

When using an ImageWriter II/LQ with the Apple IIe and cable part number 590-0555, the jumper on the Super Serial Card must be on "Modem".

Support Information Services  
Copyright 1994, Apple Computer, Inc.  
Keywords: ktable,cabinfo,review

### END OF FILE A2TIL125.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL126.TXT  
#####

Description: Apple IIc Plus: Cable Compatibility (9/94)  
Header: Apple IIc Plus: Cable Compatibility (9/94)

Article Created: 27 September 1994

TOPIC -----

This article provides cable compatibility information for Apple computer systems and a variety of Apple peripherals.

The left column lists the peripherals, the right column lists the cable required to connect one of the following computers to it; Apple IIc Plus.

Part numbers which begin with a letter are the finished goods part number, the seven digit numbers are the service part numbers.

DISCUSSION -----

Peripheral -----	Cable part number -----
AppleFax Modem	N/A
Apple Personal Modem Apple Data Modem 2400	M0197/590-0552 (smoke)
Apple Modem 300 Apple Modem 1200	590-0197 & 590-0341
Apple ImageWriter II or II/L ImageWriter LQ	M0197/590-0552
Apple ImageWriter Printer Apple ImageWriter 15"	M0150/590-0169 & 590-0553 or A2C0352/590-0037 & A9M0333/590-0550
LaserWriter, Plus, IInt, IIntx, IIf, IIg LaserWriter Pro 600/630/810 Personal LaserWriter NT, NTR	N/A
Personal LaserWriter LS StyleWriter & StyleWriter II Color StyleWriter/Color StyleWriter Pro	N/A
Apple LaserWriter IIsc Personal LaserWriter SC	N/A
AppleCD SC Apple Hard Disk 20/40/80	N/A
Apple Tape Backup 40SC Apple Scanner Apple Color OneScanner	N/A

APPLE II COMPUTER TECHNICAL INFORMATION

Apple Color Printer

Support Information Services  
Copyright 1994, Apple Computer, Inc  
Keywords: ktable,cabinfo,review

### END OF FILE A2TIL126.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL127.TXT  
#####

Description: Apple IIc Plus: Specifications (Discontinued 11/90)  
Header: Apple IIc Plus: Specifications (Discontinued 11/90)

This article last reviewed: 13 September 1988

Here are specifications for the Apple IIc Plus:

## CENTRAL PROCESSING UNIT (CPU)

- Microprocessor: 4 Mhz 65C02
- Clock Speed: 1 or 4 Mhz (user selectable -- press ESC key when you power the unit on)
- Address bus: 16 bits
- Address range: 65,536 bytes (64K)
- Data bus: 8 bits
- Registers (8 bit): accumulator, two index registers, stack pointer, and processor status register

## MEMORY

- 128K or RAM (random-access memory), optionally expandable to 1.125 megabytes
- 32K of ROM (read-only memory), containing:
  - System monitor
  - AppleSoft BASIC interpreter
  - 80-column display firmware

## TEXT DISPLAY MODES

- 80-column text (80 columns by 24 lines)
- 40-column text (40 columns by 24 lines)
- All text can appear on the screen as normal, inverse, flashing, or MouseText characters

## GRAPHICS DISPLAY MODES

- Double high-resolution (560 dots horizontally by 192 dots vertically; 16 colors)
- High-resolution (280 dots horizontally by 192 dots vertically; 6 colors)
- Low-resolution (40 dots horizontally by 48 dots vertically; 16 colors)
- All graphics can be configured to allow four lines of text at the bottom of the screen.

## KEYBOARD

- 63-key full-sized keyboard
- Full 128-character ASCII, including 96 uppercase and lowercase alphanumeric characters, and 32 control characters
- Special-purpose keys: shift, caps lock, control, escape, return, tab, delete, up arrow, down arrow, left arrow, right arrow, reset, open apple, option
- Keyboard is switchable between QWERTY and Dvorak layouts
- Includes volume slide control for speaker

## DISK DRIVE

- Disk size: 3.5 inches
- Capacity: 800 kilobytes
- Recording surfaces: 2
- Tracks per surface: 80
- Blocks per disk:1,600
- Push button for motorized eject

## INTERFACES

- External disk drive port using 19-pin, D-style connector, allows a daisy-chain connection of up to three additional drives (Apple 3.5 Drive, UniDisk 3.5, and/or Apple 5.25)
- Two RS-232 serial ports with 8-pin minicircular connectors (for printer,

## APPLE II COMPUTER TECHNICAL INFORMATION

modem, and other accessories)

- NTSC (composite) color video, via RCA phone jack
- 15-pin, D-style connector for video expansion
- 9-pin, D-style connector for mouse, joystick, hand controllers, or other accessories
- Internal, 34-pin connector for memory expansion up to 1.125 megabytes
- Standard, 3-pin grounded power plug

### ELECTRICAL REQUIRMENTS

- Line voltage: 90 to 130 volts AC
- Line frequency: 50 to 60 hertz
- Maximum power consumption: 20 watts continuous
- Supply voltages:
  - +5 volts (+-5%)
  - +12 volts (+-10%)
  - 12 volts (+-10%)
- Maximum supply currents:
  - +5 volts=1.5 amps
  - 5 volts= 30 milliamps
  - +12 volts= 0.9 amps continuous -- 1.5 amps intermittent
  - 12 volts= 100 milliamps

### ENVIRONMENTAL REQUIREMENTS

- Operating temperature: 50 to 104 degrees F (10 TO 40 degrees C)
- Relative humidity: 20% to 95%

### SAFETY AND EMI QUALIFICATIONS

- FCC part 15 Class B Computing Devices
- UL 11 Office Appliances and Business Equipment

### SIZE AND WEIGHT

- Height: 2.5 inches (6.35 cm)
- Width: 12 inches (30.48 cm)
- Depth: 11.5 inches (29.2 cm)
- Weight: 7lb. (3.2 kg)

Included with the Apple IIc Plus package:

- Apple IIc Plus personal computer with built-in 800K disk drive
- Power cord
- Apple II System Disk
- Tutorial disk
- Owner's guide
- Apple II System Disk User's Guide
- A Touch of AppleSoft BASIC manual
- Limited warranty statement
- Packing list

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Keywords: SPECSHT

### END OF FILE A2TIL127.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL128.TXT  
#####
```

Description: Apple IIc: 80/40 switch  
Header: Apple IIc: 80/40 switch

The 80/40 switch on the Apple IIc only sets a bit in memory. While a program can read this bit and use the setting in a decision to display 80 or 40 columns, in practice, only a few programs, e.g. Apple Writer, take advantage of the switch in that way. In itself, the 80/40 switch does not force 80 column firmware on or off; only a software command like Applesoft's PR#3 or PR#0 can do that.

The 80/40 switch on the Apple IIc was designed for customers who use their television set as a monitor. A television set doesn't display 80 columns of text very legibly; 40 columns reads much better. Unfortunately, most Apple II software packages, written before the Apple IIc, don't check the bit set by the 80/40 switch.

Because the bit setting is independent from the PR#3 command, programmers can use the bit set by the 80/40 switch for features other than 80/40 column display:

```
10   TEXT:HOME:REM INITIALIZATION  
100  SWITCH = PEEK(49248):REM MEMORY LOCATION FOR CURRENT SWITCH SETTING  
110  VTAB 12  
120  IF SWITCH > 127 THEN PRINT "80/40 SWITCH DOWN":REM OR ANYTHING ELSE  
130  IF SWITCH < 128 THEN PRINT "80/40 SWITCH UP ":REM OR ANYTHING ELSE  
140  GOTO 100
```

For more info, see the two-volume Apple IIc (16K ROM) Technical Reference Manual, pages 5 and 77 of Volume I and page 128 of Volume II, or the one-volume manual published by Addison-Wesley, pages 5, 80, and 342. Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL128.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL129.TXT  
 #####

Description: Apple IIc: Cable Compatibility (10/95)  
 Header: Apple IIc: Cable Compatibility (10/95)

Article Created: 27 September 1994  
 Article Reviewed/Updated: 3 October 1995

TOPIC -----

This article provides cable compatibility information for Apple computer systems and a variety of Apple peripherals.

The left column lists the peripherals, the right column lists the cable required to connect the Apple IIc.

Part numbers which begin with a letter are the finished goods part number, the seven digit numbers are the service part numbers.

DISCUSSION -----

Begin Table

Peripheral -----	Cable part number -----
AppleFax Modem	N/A
Apple Personal Modem Apple Data Modem 2400	A2C4505/590-0554 (smoke)
Apple Modem 300 Apple Modem 1200	A2C0354/590-0121
Apple ImageWriter II or II/L ImageWriter LQ	A2C4505/590-0554 (smoke) or 590-0333 (beige)
Apple ImageWriter Printer Apple ImageWriter 15"	590-0191
LaserWriter, Plus, IInt, IIntx, IIf, IIg LaserWriter Pro 600/630/810 Personal LaserWriter NT, NTR	N/A
Personal LaserWriter LS StyleWriter & StyleWriter II Color StyleWriter/Color StyleWriter Pro	N/A
Apple LaserWriter IIsc Personal LaserWriter SC	N/A
AppleCD SC Apple Hard Disk 20/40/80	N/A
Apple Tape Backup 40SC	N/A

APPLE II COMPUTER TECHNICAL INFORMATION

Apple Scanner  
Apple Color OneScanner  
Apple Color Printer

End\_Table

Article Change History:  
03 Oct 1995 - Updated service part numbers.

Support Information Services  
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Keywords: ktable,cabinfo,review

### END OF FILE A2TIL129.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL130.TXT  
#####

Description: Apple IIc: Description (Discontinued)  
Header: Apple IIc: Description (Discontinued)

Article Created: 1 May 1992

TOPIC -----

This article describes the Apple IIc computer (now discontinued).

DISCUSSION -----

The Apple IIc is a compact personal computer about the same size as a loose-leaf notebook, small enough to fit in a briefcase, and light enough to carry with you. It has 128K of RAM, a built-in disk drive, and a full-size keyboard. It runs thousands of programs from the Apple II software library.

Features

-----

- 128K RAM and 16K ROM
- Enhanced version of the processor used in the Apple IIe
- Built-in 5.25-inch disk drive
- Full-size keyboard that produces the entire ASCII character set in both 80-column and 40-column formats.
- Three separate color graphic modes
- Built-in speaker with volume control and a headphone jack
- Two built-in serial ports for adding a modem and printer, as well as built-in connectors for attaching a mouse, joystick, hand controllers, second disk drive, and television display
- External (floor-mounted or table-mounted) power unit
- Built-in Applesoft BASIC programming language

Support Information Services  
Copyright 1992-1994 Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL130.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL131.TXT  
#####

Description: Apple IIe and IIGS: Optical Character Recognition Software  
Header: Apple IIe and IIGS: Optical Character Recognition Software

Article Created: 30 May 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

Is Optical Character Recognition software available for Apple II computers?

DISCUSSION -----

WestCode Software developed INWORDS, Optical Character Recognition (OCR) software for the Apple IIe and Apple IIGS. You use the software with hand-held scanners. It scans text at up to 3000 characters per minute.

You can find the address and phone number for this company in a separate article in the Tech Info Library.

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Keywords:

### END OF FILE A2TIL131.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL132.TXT  
#####

Description: Apple IIe Card: Can't Use Apple II Memory Expansion Cards  
Header: Apple IIe Card: Can't Use Apple II Memory Expansion Cards

Article Created: 13 August 1991  
Article Last Reviewed: 23 July 1992  
Article Last Updated:

TOPIC -----

Up to 1MB of the Macintosh LC's memory can be addressed via a "virtual" Apple IIe-style memory expansion card. Does this mean that an Apple IIe memory card can be installed in the Macintosh LC?

DISCUSSION -----

The Apple IIe Card uses the memory of the Macintosh LC. The Macintosh LC cannot utilize Apple II memory expansion cards, for several reasons:

- No slot available in the Macintosh LC.
- Apple II cards are too large for the Macintosh LC.
- The RAM is too slow.

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Keywords:

### END OF FILE A2TIL132.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL133.TXT  
#####

Description: Apple IIe Card: Hardware Specifications (7/93)  
Header: Apple IIe Card: Hardware Specifications (7/93)

Article Created: 7 March 1991

## Article Change History

-----  
07/12/93 - REVISED  
    \* To include Performa  
06/08/92 - REVIEWED  
    \* For technical accuracy

## TOPIC -----

This article gives the specifications for the Apple IIe Card for the Macintosh LC and Performa 400, 405, 430, and 450 computers. For a description of the Apple IIe Card software, search under "Apple IIe Card" and "software".

## DISCUSSION -----

### OVERVIEW

-----  
The Apple IIe Card lets the Apple Macintosh LC computer and Performa 400 series run the more than 10,000 Apple IIe programs. To assure compatibility with virtually all Apple IIe applications, the Apple IIe Card contains a 65C02 microprocessor -- the same one that's built in to the Apple IIe personal computer. The card comes with 128K RAM standard and can use up to 1MB of Macintosh LC RAM. A floppy-drive controller and connector ports for a 5.25-inch floppy disk drive and an Apple Joystick II are also included.

The Apple IIe Card takes full advantage of the Macintosh LC Performa 400 series' components, including the monitor, keyboard, mouse, and internal disk drives. With the superior resolution offered by Macintosh monitors, text and graphics generated by Apple IIe applications appear crisp and clear in all Apple IIe video modes. Regardless of the video mode, Apple IIe applications run at normal Apple IIe speeds -- or, using an optional mode of the Apple IIe Card, they can be run up to twice as fast.

### SPECIFICATIONS

#### Central Processing Unit

- \* Processor: 65C02  
\* Clock Speed: 1.02MHz or 1.9MHz  
\* Address Bus: 16 bits  
\* Address Range: 2 banks of 65,536 bytes (128K total)  
\* Data Bus: 8 bits - Registers: Accumulator, two index registers, stack pointer, processor status, and program counter

#### Memory

- \* 256K of RAM (Apple IIe uses 128K of this RAM) on Apple IIe Card  
\* Ability to access up to 1MB of Macintosh LC RAM  
\* Apple IIe ROM in write-protected portions of Apple IIe Card memory

#### Text Display Modes

- \* 80 columns, 24 lines, 5x7 dot matrix

## APPLE II COMPUTER TECHNICAL INFORMATION

- \* 40 columns, 24 lines, 5x7 dot matrix
- \* All text can appear on the screen as normal, inverse, or MouseText characters

### Graphics Display Modes

- \* Low-resolution color: 16 colors, 40x48
- \* High-resolution color: 6 colors, 280x192
- \* Double high-resolution color: 16 colors, 140x192
- \* Double high-resolution monochrome: 560x192

### Compatible Operating Systems

- \* ProDOS
- \* DOS 3.3
- \* Pascal

### Drives Supported

- \* Two Apple 5.25 Drives (Platinum 5.25 Drive is the only 5.25-inch drive supported)
- \* One UniDisk 3.5 Drive (White 3.5-inch external)
- \* Internal SuperDrive

### Monitors Supported

All Macintosh LC monitors are supported (12- and 13-inch)  
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Keywords: SPECSHT

### END OF FILE A2TIL133.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL134.TXT  
#####

Description: Apple IIe Card: How to Save Information to a Hard Drive  
Header: Apple IIe Card: How to Save Information to a Hard Drive

Article Created: 4 December 1992

TOPIC -----

How do you specify applications on the IIe card to save on a hard drive with a ProDOS partition?

DISCUSSION -----

There are two different methods of specifying the hard drive when saving applications on the Apple IIe or, in this case, the Apple IIe card. A ProDOS device is designated by a physical location and by path name. The physical location on an Apple IIe is determined by the physical location of the SCSI card.

On the Apple IIe card, use the control panel to configure where the hard drive partition is going to be phantom to. This is done for software compatibility. If you look in the Apple IIe control panel slot assignments, you will find a hard-drive icon. When you place the hard drive in a slot (virtual, not physical), you assign how the drive will be accessed when referred to in the physical convention.

In other words, the Apple IIe card doesn't have any physical slots but has to emulate the Apple IIe. You use the control panel to configure how the software will see the Apple IIe card.

In ProDOS, the commands for saving a BASIC file are:

Physical Designation

Save Programname, S7,D1 <---- S7 equals slot 7, D1 = Drive 1  
Change the slot number, Sx to your configuration.

Pathname Designation

Save VolumeName/ProgramName If your hard drive were named ProDOS, you would type Save ProDOS/ProgramName

ProDOS also supports nested folders. All you would have to do is to specify the complete path name, such as VolumeName/Pathname/ProgramName

These commands are all from BASIC. Within an application, you will need to determine what the program is asking for. If it asks for slot and drive, type the slot you configured the hard drive for. If it is asking for path information, type the pathname.

NOTE. The above information applies only to ProDOS. Apple DOS, the original operating system for Apple II computers, does not support hard drives.

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Keywords:

### END OF FILE A2TIL134.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL135.TXT  
#####

Description: Apple IIe Card: ProDOS 1.9. Corrects AppleWorks Date Errors  
Header: Apple IIe Card: ProDOS 1.9. Corrects AppleWorks Date Errors

Article Created: 6 June 1991  
Article Last Reviewed: 2 June 1992  
Article Last Updated:

TOPIC -----

When I'm running the Apple IIe Card, AppleWorks does not seem to access the clock correctly: the date is wrong.

DISCUSSION -----

Update the version of ProDOS on your AppleWorks disk to version 1.9. This version of ProDOS is shipping on the Apple II System Utilities version 3.2. Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL135.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL136.TXT  
#####

Description: Apple IIe Emulation on an Apple III  
Header: Apple IIe Emulation on an Apple III

Titan Technologies, Inc. (makers of the "Accelerator" board) have a new product called the "III PLUS II". This board allows an Apple III to emulate an Apple IIe, features standard Apple II game ports, supports Pilot, Logo, and ProDOS, and comes in 3 flavors: 16K, 64K & 128K. Scheduled release: August 15, 1984.

Titan Technologies, Inc.  
P.O. Box 8050  
310 W. Ann  
Ann Arbor, MI 48107  
(313) 662-8542  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL136.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL137.TXT  
#####

Description: Apple IIe Enhancement Kit: Technical Benefits (10/94)  
Header: Apple IIe Enhancement Kit: Technical Benefits (10/94)

Article Created: 10 May 1985  
Article Reviewed/Updated: 17 October 1994

TOPIC -----

This article documents the benefits of the Apple IIe Enhancement Kit.

DISCUSSION -----

The Apple IIe Enhancement improves the performance of the Apple IIe by replacing four chips on the main circuit board.

The Enhancement has four major benefits:

1. Apple IIc compatibility:

Users can take advantage of software developed for the Apple IIc.

2. Product line consistency:

Apple II software can be used on both the Apple IIe and IIc.

3. The MouseText character set makes it easy for developers to create software that uses pull-down menus, windows, and icons.

4. Easier programming for users:

- a. Accepts BASIC commands in both upper- and lowercase
- b. Additional instructions in the 65C02
- c. Mini-assembler for machine language programs.

The Apple IIe Enhancement Kit, Order A2M2052, is available from Apple Authorized Dealers for users who wish to upgrade their systems.

Article Change History:

17 Oct 1994 - Reviewed for technical accuracy, revised formatting.

Support Information Services

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Keywords:

### END OF FILE A2TIL137.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL138.TXT  
#####

Description: Apple IIe to Epson LX-86: Cable Recommendations  
Header: Apple IIe to Epson LX-86: Cable Recommendations

Article Created: 25 June 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

We are having trouble connecting an Apple IIe configured with an Apple Parallel card to an Epson LX-86. Both the printer and Apple IIe test work okay separately. The only questionable item seems to be the cable.

DISCUSSION -----

We couldn't find anything on connecting the Epson LX-86 printer to an Apple IIe. However, there is an article in the Tech Info Library that may help: "Epson FX 80: Connecting it to an Apple II Plus or Apple IIe".

We recommend that you contact Epson to verify that the connection is the same. If the pinouts on the LX are different from the FX, get the pinouts of the LX from Epson. You can find the pinouts of the Parallel card in the "Peripheral Interface Guide" on page 2.4 with the DIP switch settings for the Parallel card on that page.

To find the article, search the Tech Info Library under "Epson" and "FX 80".

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Keywords:

### END OF FILE A2TIL138.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL139.TXT  
#####
```

Description: Apple IIe: Component diagnostics (1 of 2)  
Header: Apple IIe: Component diagnostics (1 of 2)

Apple IIe computers have built-in diagnostics used during manufacturing. You may invoke the diagnostics by holding down the solid-Apple key while powering the system on, or by unplugging the keyboard and turning the Apple IIe on.

If you depress both the solid and open-Apple keys while powering the system on, the same diagnostics will be run along with a high-pitched tone.

The tone or beep, included in a machine language loop that tests the computers IOU and MMU, merely indicates that the speaker I/O location does indeed work. Because the Apple II performs the IOU/MMU test a random number of times, the beep sounds a random number of times. In addition, the diagnostic routine varies between the Apple IIe, Apple IIe enhanced, and Apple IIC.

The diagnostics test the motherboard's RAM as well as a number of unique LSI components (MMU, IOU, and other ROMs) on the board. If the keyboard is connected, the diagnostic will run through the series of individual tests once. If the keyboard is not connected, the test runs continuously until the system is powered off.

The ICs are tested in the following order: MMU, IOU, E8 ROM, E10 ROM, the eight RAM chips. "Kernel OK" appears on the screen if everything passes the diagnostic.

Note: The diagnostic stops and hangs the processor with the first error detected. There may be subsequent problems in the system; they will go undetected until the first problem is fixed.

Here are some error messages and what they mean:

```
MMU  FLAG E4:0  The Read Lang Card Bank0 switch didn't  
           initialize properly during reset.  
    1  The Read Lang Card RAM switch didn't  
           initialize properly during reset.  
    2  The RAMRD switch didn't initialize  
           properly during reset.  
    3  The RAMWRT switch didn't initialize  
           properly during reset.  
    4  The ALTZP switch didn't initialize  
           properly during reset.  
    5  The C3ROM switch didn't initialize  
           properly during reset.  
    6  The 80STORE switch didn't initialize  
           properly during reset.  
    7  The Read Lang Card Bank0 switch  
           won't change.  
    8  The Read Lang Card RAM switch  
           won't change.  
    9  The RAMRD switch won't change.  
    A  The RAMWRT switch won't change.  
    B  The ALTZP switch won't change.  
    C  The C3ROM switch won't change.  
    D  The 80STORE switch won't change.
```

If you receive an MMU FLAG E4 error number, suspect the MMU at location E4.

```
IOU  FLAG E5:0  The 80VID switch didn't initialize  
           properly during reset.
```

## APPLE II COMPUTER TECHNICAL INFORMATION

- 1 The ALTCHAR switch didn't initialize properly during reset.
- 2 The TEXT switch didn't initialize properly during reset.
- 3 The PAGE2 switch didn't initialize properly during reset.
- 4 The MIXMODE switch didn't initialize properly during reset.
- 5 The HIRES switch didn't initialize properly during reset.
- 6 The 80VID switch won't change.
- 7 The ALTCHAR switch won't change.
- 8 The TEXT switch won't change.
- 9 The PAGE2 switch won't change.
- A The MIXMODE switch won't change.
- B The HIRES switch won't change.

If you receive an IOU FLAG E5 error, suspect the IOU at location E5.

Keywords:

### END OF FILE A2TIL139.TXT



APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL141.TXT  
#####

Description: Apple IIe: Printing to Networked Printers  
Header: Apple IIe: Printing to Networked Printers

This article last reviewed: 15 June 1990

TOPIC -----

I have an Apple IIe network problem. I have a printer network only with no file server. The school district wants to use the printer network with its 5.25-inch disk drives. There are about 50 labs with 20 to 25 Apple IIe systems in each lab.

I created a Chooser and Menu program "startup disk". I copied the necessary files and ATINIT to let the startup disk auto-select the networked printers. We found a public-domain menu program that requires only 1.5K. This lets the Chooser be part of the menu and lets teachers and students (especially K-3) select program without using pathnames.

I understand the AppleTalk network process and the need for the 3.5-inch drive. However, why can't we also provide support for the Apple IIe and the 5.25-inch drives?

DISCUSSION -----

The only issue with using 5.25-inch drives for the described environment concerns disk space. After adding ProDOS 8, Chooser.II (with associated files), and ATINIT, the remaining space is all that is available for applications and data files on the startup disk. This means that there is approximately only 60K available for applications on a disk configured with the needed resources for network printing.

For a printer choice to be retained, you need run Chooser.II only once, as long as the selected printer maintains the same name and stays available on the network. The selected printer is stored in the ATINIT file of the disk that contains Chooser.II. On subsequent startups with that disk, the printer that was previously selected becomes the default printer. Thus, Chooser.II is not required to be run every session.

If only one 5.25-inch drive is available and if applications and/or data files larger than 60K are to be used, it is possible to start up with the disk described above, then switch (without restarting) to a second disk containing the larger application or data file. We do not know of any menu programs that can launch an application on a second disk, although such a program would not difficult for an Apple II programmer to write.

However, since Chooser.II needs to run only once (unless something about the printer changes), alternate methods of launching an application from the second disk can be considered. One example would be an Applesoft program that launched the menu program. By giving the Applesoft program a simple name (like MENU) and placing it in the main directory, the students would be able to switch disks, type RUN MENU, and then select the application desired.

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Keywords:

### END OF FILE A2TIL141.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL142.TXT  
#####
```

Description: Apple IIe: Two Ways to Make it into AppleTalk Workstations  
Header: Apple IIe: Two Ways to Make it into AppleTalk Workstations

This article last reviewed: 13 April 1989

There are two ways to make an Apple IIe with a 5.25-inch drive into an AppleTalk workstation. The first is to start the Apple IIe systems over the network. The second method is to use a 3.5-inch disk drive temporarily to build a startup disk. (Workstation Card software is shipped only on a 3.5-inch disk.)

## Option 1: Startup Across the Network

-----

With this option, there is no need for the 5.25-inch drives or the Workstation software. Just prepare the AppleShare file server for use with Apple II computers. With that done, users with Apple IIe/Workstation Card systems need only power on with no disks in the drives. The computers start across the network. Having the 5.25-inch drives lets users copy files to their own disks to take home.

## Option 2: Building a Local Startup Disk

-----

This second option uses the 5.25-inch drive for local starting. The Workstation Card software ships on a 3.5-inch disk, because of software space requirements. However, you can build a workable 5.25-inch disk. This requires use of a 3.5-inch drive while building the 5.25-inch disk. Once the 5.25-inch disk is built, the 3.5-inch drive is not necessary for running the labs. The following files are the absolute minimum for a network start-up disk:

- PRODOS
- ATINIT
- SELECTOR.SYSTEM
- System.APPS
- LOGOFF
- LOGON
- BASIC

In this configuration, SELECTOR.SYSTEM displays several applications from which to choose. However, only the "File Server Log On", "File Server Log Off", and "ProDOS BASIC" items actually run programs. All other choices display an error message. When acknowledged, the error message returns to the SELECTOR. Unfortunately, the applications list in the SELECTOR window cannot be changed.

With the above files on the 5.25-inch disk, the student may log on, log off, and enter Applesoft BASIC. If leaving the student in BASIC is satisfactory, this is all that is needed.

If Aristotle is used for a menu system, you will need a 3.5-inch drive to transfer the Aristotle programs to the server. Once the Aristotle programs have been moved to the server, saving a one-line Applesoft BASIC program to the 5.25-inch will let the student access the Aristotle program. The program should look something like:

```
10 PRINT CHR$(4);"-/PRODOS.SERVER/ARISTOTLE/MENU.D/DISPLAY"
```

Save this one-line program as "MENU". To use it, select "ProDOS BASIC" in the SELECTOR window, and the Applesoft prompt appears. Then type "-MENU" to get the Aristotle menu. Here is the structure of the Applesoft program:

## APPLE II COMPUTER TECHNICAL INFORMATION

```
PRINT CHR$(4);    -- to let an immediate command be executed
"-               -- run the program at the end of this pathname
/PRODOS.SERVER   -- name of the AppleShare file server volume
/ARISTOLE        -- name of the subdirectory containing Aristotle programs
/MENU.D          -- name of the subdirectory containing Display
/DISPLAY"        -- name of the Aristotle menu program to run
Copyright 1989 Apple Computer, Inc.
Keywords:
```

```
### END OF FILE A2TIL142.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL143.TXT  
#####

Description: Apple IIe: Video Signal "NTSC-Compatible", Not "NTSC-Compliant"  
Header: Apple IIe: Video Signal "NTSC-Compatible", Not "NTSC-Compliant"

This article last reviewed: 8 May 1990

TOPIC -----

I bought Sharp XA305 video recorders to record the video from my Apple IIe systems: however, I am able to record only black and white pictures.

I tried the same setup with an older Sears model VCR and it worked perfectly. I tried a new camcorder and got only black and white pictures again. Sharp told me that this is because the Apple IIe has a substandard NTSC signal.

Can you help?

DISCUSSION -----

The composite video signal coming from the Apple IIe is not stated to be an NTSC-compliant signal. The signal coming from the video-out port is only considered NTSC-compatible video. "Compatible" means that generally the Apple IIe video will work with an NTSC device, although it may not work in all situations. Specifically, the Apple IIe video signal should work with all NTSC display devices.

When the Apple II was first designed, economy was of great importance. The video circuitry was built with as few parts as possible. In the design process, it was discovered that certain portions of the NTSC broadcast specification could be omitted, yet still display a color image on a standard television set. The one element that affects the described situation is color burst. The Apple IIe does not contain the color burst element of the NTSC video signal. By modulating other portions of the video signal, the Apple IIe simulates this missing information and allows an image to be produced on a television. To provide a consistent color video image for video tape, this color burst needs to be present.

In summary, the Apple IIe composite video signal was designed for display purposes, not for videotaping purposes. The Apple IIe composite signal is close to the NTSC specification and allows the video signal to be displayed on television screens. This, however, does not indicate that the signal can be recorded. Since the signal is similar to the full NTSC specification, video sometimes records properly on videotape with certain VCRs. In other environments, the signal may not record at all. The capability to record a monochrome image falls between these extremes.

To have a true NTSC signal designed for videotaping, the Video Overlay Card is required.

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Keywords:

### END OF FILE A2TIL143.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL144.TXT  
#####

Description: Apple IIGS (1MB, ROM 03): Specifications (Discontinued 12/92)  
Header: Apple IIGS (1MB, ROM 03): Specifications (Discontinued 12/92)

Article Created: 31 May 1991

## TOPIC -----

This article describes the Apple IIGS personal computer model with 1MB of RAM and ROM version 03.

## DISCUSSION -----

### OVERVIEW

The Apple IIGS combines the best of the previous Apple II computers: built-in accessory ports for easy addition of peripherals, as well as versatile expansion slots for system customization. The Apple IIGS also provides an easy-to-use interface similar to that of the Macintosh personal computer. It also offers powerful features such as high-resolution color graphics, 15-voice sound capability, and the advanced 65C816 microprocessor.

The Apple IIGS features GS/OS, an operating system developed exclusively to take advantage of the computer's hardware features. GS/OS offers high-performance capabilities such as rapid disk access and program launching, while increasing the system's ease of use.

### SYSTEM SOFTWARE

The Apple IIGS Personal computer features Version 5.0.4 of Apple IIGS System Software, including the following:

- \* GS/OS Operating System. Exclusively created for the Apple IIGS personal computer, GS/OS dramatically increases the speed of both disk access and program launching. It also includes File System Translators (FSTs) that allow applications to directly access files created using other file systems, such as the ISO/High Sierra file system used by CD-ROM devices.
- \* Finder. The Apple IIGS Finder has been revised extensively to take full advantage of the GS/OS operation system. In addition to providing support for disk partitions and other new features, the Apple IIGS Finder is easier to use, faster, and more informative than the earlier version. The Finder also supports the AppleShare File Server, allowing you to share program files and data with other AppleShare users.
- \* Advanced Disk Utility. With its graphics-based interface, the Advanced Disk Utility makes it easy to initialize, name, erase, and partition hard disks, as well as to work with both 5.25- and 3.5-inch floppy disks.
- \* Installer. This program allows you to update your startup disks with the latest system software. It also lets you add special system files to customize startup disks for use with your particular system configuration.

### TECHNICAL SPECIFICATIONS

Central Processing Unit (CPU)

# APPLE II COMPUTER TECHNICAL INFORMATION

-----  
Microprocessor: 65C816

Clock speed: 2.8 or 1.02 megahertz; user- or software selectable

Address bus: 24 bits

Data bus: 8 bits

Address range: 16,777,216 bytes

16-bit registers: accumulator, two index registers, direct register, stack pointer, and program counter

8-bit registers; data bank, status

Addressable memory: up to 8MB of ROM

Memory

-----

1MB RAM, expandable to 8MB

256K ROM, expandable to 1MB (ROM revision 03)

Text Display Modes

-----

40 columns by 24 lines

80 columns by 24 lines

Graphics Display Modes

-----

Super-high-resolution:

- \* 320 dots horizontally by 200 dots vertically, in up to 16 colors per screen, from a palette of 4,069 colors

- \* 640 dots horizontally by 200 dots vertically, in 4 or more colors per line and 128 colors per screen from a palette of 4,096 colors.

Double-high-resolution (560 dots horizontally by 192 dots vertically; 16 colors)

Double-low-resolution (80 dots horizontally by 48 dots vertically; 6 colors)

High-resolution (280 dots horizontally by 192 dots vertically; 6 colors)

Low-resolution (40 dots horizontally by 48 dots vertically; 16 colors)

Sound Capability

-----

An Ensoniq 32-oscillator digital synthesizer chip with dedicated 64K RAM:

- \* produces up to 15 voices simultaneously.

- \* uses external speaker or headphones via audio output jack (volume is set through the Control Panel).

Character Sets

-----

32 letters (uppercase and lowercase), 32 special characters, 32 MouseText characters, and 12 unique characters for each of these international character sets: U.S., U.K., French, Danish, Spanish, Italian, German, and Swedish.

Keyboard

-----

- \* Standard typewriter-style

- \* 80 keys, plus 14 key numeric keypad

- \* Two Apple Desktop Bus (ADB) connectors (one for attaching the keyboard to the computer; one for daisy-chaining additional input devices)

- \* Keyboard layouts, selectable through the Control Panel:

QWERTY (Sholes)

Dvorak

Nine international (all those listed under Character Sets, plus French Canadian)

Interfaces

## APPLE II COMPUTER TECHNICAL INFORMATION

-----

- \* One multipurpose RAM/ROM memory expansion slot
- \* Seven general-purpose input/output slots for peripherals control cards, all fully buffered, with interrupt and DMA priority
- \* Serial ports: two 8-pin minicircular connectors (either can be used to connect AppleTalk devices); utilize SCC communications chip
- \* Disk drive port: one 19-pin D-style connector (allows daisy-chain connection of up to four Apple 3.5, Apple 5.25, or UniDisk disk drives)
- \* Video output
  - Analog RGB, via 15-pin D-style connector
  - Composite color, via RCA phone connector
- \* Apple Desktop Bus port; one 4-pin mini-circular connector on back of computer
- \* Game I/O: 9-pin D-style connector for joysticks, graphics tablet, and similar devices
- \* Audio
  - RCA mini headphone/speaker output jack with programmable volume control
  - Input/Output connector on main logic board

### Operating Systems Supported

-----

- \* GS/OS
- \* ProDOS 16 and ProDOS 8
- \* Pascal
- \* DOS 3.3
- \* CP/M (with appropriate co-processor card)

### Other Features

-----

- \* Real-time clock (set through Control Panel)
- \* Battery backup for Control Panel settings

### Electrical Requirements

-----

- \* Line voltage: 107 to 132 volts AC; 50 to 60 hertz
- \* Power consumption:
  - Typical: 11 watts
  - Maximum: 60 watts
- \* Supply voltages:
  - +5 volts ( 3%)
  - +12 volts ( 6%)
  - 5 volts ( 10%)
  - 12 volts ( 10%)
- \* Maximum supply currents:
  - +5 volts: 2.5 amps
  - +12 volts: 1.5 amps
  - 5 volts: 250 milliamps
  - +12 volts: 250 milliamps

### Environmental Requirements

-----

- \* Operating temperature: 32 to 113 degrees F (0 to 45 degrees C)
- \* Maximum temperature on power supply case: 130 degrees F (55 degrees C)
- \* Relative humidity: 5% to 85%

### Safety and EMI Qualifications

-----

- \* FCC Part 15 Class B Computing Devices
- \* CSA 22.2, NO. 154-1979
- \* UL 114 - Office Appliances and Business Equipment

### Dimensions and Weight (main unit only)

-----

- \* Height: 4.6 in. (11.7 cm)
- \* Width: 11.2 in (28.4 cm)
- \* Depth: 13.7 in. (34.8 cm)

APPLE II COMPUTER TECHNICAL INFORMATION

\* Weight: 8.72 lb. (3.96 kg)  
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Keywords: SPECSHT

### END OF FILE A2TIL144.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL145.TXT  
 #####

Description: Apple IIGS Adapter Cable: Pinouts  
 Header: Apple IIGS Adapter Cable: Pinouts

This article last reviewed: 19 November 1986

Mini-8	Function	DB-25
1	HSKo --> DSR	6
2	HSKi <-- DTR	20
3	TXD- --> RXD	3
+--4	SGND --- SGND	7
5	RXD- <-- TXD	2
6	NC	8
7	GPI* <-- RTS	4--+
+--8	NC CTS	5--+
-	FGND NC FGND	1-----+
Shield	o-----o	Shield---+

Pins 4 and 8 are jumpered on the mini-8 side of the cable; pins 4 and 5 are jumpered on the DB-25 side of the cable as are pins 1 and the shield.

To connect DB-25 cables of Apple II family peripheral cables to the serial ports of the Apple IIGS, use the Apple IIGS Peripheral Adapter Cable. This short cable's male mini-circular 8 connector plugs into the IIGS printer and phone serial ports with the female mini-circular 8 connectors on the back of the IIGS. The DB-25 connector at the other end of the adapter cable will take the DB-25 connectors of the DB-25 cables used with many Apple peripherals.

Some modems and communications software may need a DCD signal and therefore may require a modem eliminator cable in the cable configuration. The modem eliminator cable flips pins 2 with 3 and 6 with 20 and passes GPI access through to pin 8. GPI, for General Purpose input, is a high or low signal read from and determined by the connecting device.

Keywords:

### END OF FILE A2TIL145.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL146.TXT  
#####

Description: Apple IIGS and Integer BASIC  
Header: Apple IIGS and Integer BASIC

Article Created: 18 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I am trying to run old Apple II programs written in Integer BASIC on an Apple IIGS (original Woz version with 256K of RAM). I can list the programs with the CAT command, but can't run them.

DISCUSSION -----

The Apple IIGS can run Integer BASIC programs, but only under DOS 3.3, not under ProDOS. ProDOS is not compatible with Integer BASIC (though it is compatible with Applesoft BASIC).

To run your programs, first start up from a known-good DOS 3.3 System Master (or other DOS 3.3 startup disk that loads Integer BASIC in RAM).  
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Keywords:

### END OF FILE A2TIL146.TXT

#####  
### FILE: A2TIL147.TXT  
#####

Description: Apple IIGS Finder  
Header: Apple IIGS Finder

This article last reviewed: 14 August 1987

Overview  
-----

The Apple IIGS Finder is similar to the Macintosh Finder, but with enough variation to make it a uniquely Apple II product. The Apple IIGS Finder works only on an Apple IIGS with at least 512K of RAM.

Availability and Distribution  
-----

The Apple IIGS Finder was announced August 11, 1987. At that time, it was anticipated that it would be shipped on the Apple IIGS System Disk, revision 3.0, and be part of the Endless Disk Drive mailing the last week of August. The dealers, in turn, are expected to pass out the new System Disk revision freely to their customers. Technical Communications planned to send this disk out to all our audience around the same time.

The Endless Disk Drive mailing will contain two System Disks, revision 2.0 and 3.0. This is bound to cause some confusion, but it is necessary. The Finder application replaces the DeskTop program that has been on earlier versions of the System Disk, including version 2.0. Since the Apple IIGS Finder requires a 512K configuration, we might leave some people out in the cold with their 256K machines. This way, we are able to give them an up-to-date system disk with the DeskTop program on it, which will run on their machines.

This System Disk revision, including the Finder, will make its way into new Apple IIGS boxes in the beginning of September. Because of current stock on hand, these new systems including the Finder are not expected to hit dealer shelves until late September to mid-October.

If current Apple IIGS owners would like the Apple IIGS System Disk manual that is going to be bundled with the new Apple IIGS, along with the System Disk 3.0, they may order it from their dealer.

Finder Notes and Tips  
-----

After making a working copy of the original Apple IIGS System Disk 3.0, unlock the working diskette. If you don't, the window positions and icon arrangements won't be saved to disk.

This Finder allows the user to change and save the color of each individual volume and file icon.

To reach online Help, pull down the Apple menu.

If a volume is brought online while there is another volume of the same name already on the desktop, a dialog box appears, warning the user that the volumes have the same name and that the operation is cancelled. Note, however, that the disk is not ejected, though the volume has not appeared on the desktop. It is best after receiving such a message to manually eject the disk.

If the monochrome monitor is used, be sure to select the Monochrome setting in the Apple IIGS control panel. This will use gray scaling to produce a better overall image.

## APPLE II COMPUTER TECHNICAL INFORMATION

When a 5 1/4" diskette is inserted into the drive, the Apple IIGS Finder doesn't know it's there -- unless you 'tell' it. There are now 5 1/4" disk drive icons on the desktop, directly below any other volumes that are online. When a 5 1/4" disk is inserted, be sure to click on the respective icon so the finder can recognize the disk.

The Put Back function in the Apple IIGS Finder is the same as the Macintosh Finder's Put Away function. This menu choice lets you return files, that you have thrown in the trash can or recently moved to the desktop, back to their original position.

A major difference between the Apple IIGS Finder and the Macintosh Finder is that the Apple IIGS version has a Preferences option in the Special menu. The Preferences dialog gives you six check-box options, all defaulted to a 'checked' state. They are:

- Display help for dimmed commands

If this option is chosen, the user can select a grayed out menu item, and get information on why that item isn't available.

- Double-check before removing files and folders

If this option is chosen, the Finder will not delete files or folders until the user confirms, via a dialog box, that the files or folders should be deleted.

- Color selected icon's background instead of its outline

This is personal preference, but the default (background color fill) is easier to see than a colored outline.

- Save Finder information onto disk

If this option is chosen, the Finder creates a file called FINDER.DATA that records the window position and size for all open windows. There is also a file called FINDER.ROOT that remembers what windows were open on the desktop when the disk was ejected. If you don't want these items recorded, deselect this check box.

- Hide the Finder's data files

When a window is opened, the default is not to display the FINDER.DATA and FINDER.ROOT files. If you want them displayed, deselect this check box.

- Do a smart block copy

When copying disks of the same size, the default mode for the Apple IIGS Finder is to copy only those blocks that contain information. This speeds up the process. If you want to copy all blocks, regardless of whether they contain information, deselect this check box.

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Keywords:

### END OF FILE A2TIL147.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL148.TXT  
#####

Description: Apple IIgs OS v 6.0: Aristotle Installation (2/95)  
Header: Apple IIgs OS v 6.0: Aristotle Installation (2/95)

Article Created: 27 September 1993  
Article Reviewed/Updated: 16 February 1995

TOPIC -----

This document provides installation steps to install Aristotle on an Apple IIgs using GS/OS v 6.0

DISCUSSION -----

## Hardware Requirements

-----

You will need the following hardware:

- \* A Macintosh Plus, SE, or member of the Classic, LC, Macintosh II, Centris or Quadra families of Macintosh computers operating in System 7 with a minimum of 4 Megabytes of random access memory (RAM) installed for Apple IIe networks.
- \* A Macintosh computer with 5 MB of RAM installed is recommended for Macintosh and Apple IIgs networks.

## Installation

-----

### 1) Preparing the hard drive.

Insert the Disk Tools disk from the system software package in the accessory kit, and turn the Macintosh on. Open the program "Apple HD SC Setup" and click "Initialize." Answer any dialogues that ask if you want to erase the hard drive. Once the hard drive has been successfully initialized, click "Quit." When you see the Macintosh desktop, choose "Restart" from the "Special" menu.

### 2) Installing System 7

Insert the Install disk, or the InstallMeFirst disk from the system software package in the accessory kit. Follow any prompts. Be sure to click "Customize" to install any necessary network card services (Ethernet, Router, and so on).

### 3) Installing AppleShare 3

a) With the Macintosh turned on, insert the File Server Disk and double-click on the Installer.

i) Click "Customize"

ii) Select File Server software, and Apple II Startup.

b) Check Computer's clock and set time in the "General Controls" control panel

c) Check Network Connections

i) Choose "Chooser" from the Apple menu and make sure AppleTalk is active

## APPLE II COMPUTER TECHNICAL INFORMATION

- ii) Choose "Control Panels" from the Apple Menu and open the Network control panel to verify correct services (Ethernet, or LocalTalk) are selected.

### 4) Setting Up File Service

- a) Open the System Folder (not the folder titled "system") and locate the AppleShare Admin application. Select its icon by clicking on it once and choose "Make Alias" from the "File" menu. Put the alias in the Apple Menu Items folder.
- b) Open the AppleShare Admin Application
- c) Name the File Server (enter Admin. key and click OK)
  - i) This is the name users will see in the Chooser
  - ii) Admin. Key is a password you enter whenever entering the Admin. Application. Password can be up to 8 characters long.
- d) Enter an Administrator's name and Password
  - i) Enter any name -- Default is "Administrator"
  - ii) Up to 8 characters for password -- For Administrator's personal account on the server.
- e) Check options needed as server Administrator
  - i) You will probably assign yourself all available options. Be sure to click "save."

### 5) Creating Groups

For Aristotle, there must be a group named EXACTLY "Student" and one named EXACTLY "Teacher" not "STUDENTS" and not "TEACHERS."

### 6) Creating Users

Assign each user to Student or Teacher as a primary group.

Only user's who's primary group is Teacher or student can log onto Aristotle

### 7) Allowing Guest Access

Double Click on the <any user? option in User List

Default is turned off. Click Login Enabled.

### 8) Enable Apple II Startup

Select "Enable Apple II Startup" from the Server Preferences in Server menu of the Admin. Program.

This will create a folder named "Users" on the root level of the server volume.

### 9) Selecting Volumes to Share

- a) In the Administrator Application, choose "Access info" from the "Privileges" menu.
- b) Select the item to be shared and click "share." The item will appear in the shared items box on the right side of the dialog box.

## APPLE II COMPUTER TECHNICAL INFORMATION

c) Set privileges for the administrator. Mark check boxes: See folders, See files, Make changes.

d) Set everyone in users and groups to 'See folders'

e) Click the save button, a dialog box will appear. Select explicit.

Note: If you are going to provide Apple II Network Startup, the entire startup hard disk must be shared.

10) Open the AppleShare Server Application

11) Creating AppleShare Workstation Disk for the IIgs on 3.5 disk.

a) Start up with the Apple IIgs GSOS 6.0 System Disk

b) Insert a blank 800 K disk in the second 3.5-inch drive

c) Format the blank disk and name it "Workstation"

d) Remove the blank disk and insert GSOS v 6.0 Install Disk.

e) Open the Installer program on the Install Disk.

f) Click "Customize" when the Installer program appears.

g) Eject the Install disk and insert the Workstation disk.

h) Click "Disk" until you see "Workstation"

i) Select "Network: AppleShare 3.5 Disk" and click "install."

j) Swap disks until the installation is complete

k) Set the Apple IIgs control panel (CMD-CTR-ESC).

Note: It is recommend that you use two 3.5-inch drives.

Note: 01 and 03 ROM revision Setups.

IIgs ROM 01 - Slot 1=your card  
Slot 7=AppleTalk

IIgs ROM 03 - Slot 1=AppleTalk  
Slot 7=AppleTalk

12) Restart the IIgs with the Workstation disk. (CTR-Reset, at prompt type PR#5).

13) Connecting to the server from the IIgs

a) When Launcher window appears, click "Cancel"

b) Choose "Control Panel" from the Apple Menu

c) Select the AppleShare Icon on the left and the name of the server on the right.

d) Click "OK"

e) Type in the name and password of the Administrator and click "OK"

f) Select the name of the volume that will be used for the Apple II software.

## APPLE II COMPUTER TECHNICAL INFORMATION

g) Click "OK" and close the Control Panel.

### 14) Installing GSOS system software

- a) Choose "Launch" from the "File" menu.
- b) When the Launcher window appears, insert the Install disk.
- c) Click "Disk" until Install is the Active disk.
- d) Select Installer and click "Open."
- e) Click "Customize" when the Installer program appears.
- f) Click "Disk" until the name of the Server volume appears.
- g) Choose the "Network: Server Startup" and "Network: Server Quick Logoff". (Open Apple to select multiple items.)
- h) Click "Install" and "Perform this Update"

### 15) Restarting the IIgs from the network.

- a) Open the AppleShare Admin. program from the Macintosh File Server
- b) Select a user from the User list(click one time, do not open)
- c) Choose "Set startup info" from the "Startup" menu
- d) Click "Set Startup App"
- e) Click "Desktop" then double-click the name of hard drive and the open the System folder.
- f) Select the file called "Setstart.Sys16"
- g) Close the Set Startup window and click "OK"
- h) Choose "Verify" from the "Startup" menu.
- i) Click "OK"
- j) Go to the IIgs and change hardware control panel(CMD-CTR-ESC) set the RAM DISK to a minimum of 256k.
- k) Restart the IIgs.
- l) Log in as Administrator.

\*\* Note: Repeat steps b-i for every user who will log in from an Apple IIgs.

### 16) Installing Aristotle

- a) Insert the Aristotle Menu Software disk in the IIgs floppy drive.
- b) Drag the Aristotle folder to the server volume icon on the desktop.  
  
This will put the folder on the root level of the hard disk. This is recommended to minimize problems with access Privileges of enclosing folder.
- c) Eject the Aristotle Menu Software Disk.
- d) Insert the GSOS Install Disk.

## APPLE II COMPUTER TECHNICAL INFORMATION

- e) Open the Installer Program.
- f) Click "Customize" from the Installer program window.
- g) Click "Disk" until the name of the server volume appears.
- h) Choose the Aristotle Update script on the Left.
- i) Open the Aristotle folder on the server volume.
- j) Open the Menu.D. folder within that Aristotle folder.
- k) Click "Install" and quit the Installer.

### 17) Setting Privileges on the File Server

- a) For the folder named "System", NOT the Macintosh System folder.  
  
Verify that Owner, Group and Everyone can See Folder and See Files on the Folder named System. Click "Save"
- b) For the "Users" Folder, verify Owner and Group and Everyone can See Folders. DO NOT change all enclosed folders. Click "Save"
- c) The "users" folder's group should be Teacher
- d) For the Aristotle folder, verify that Owner, Group, and Everyone can See Folders and See Files. Owner and Group should be able make changes.
- e) The Aristotle folder's group should be Teacher. Change all enclosed folders. Click "Save"

### 18) Setting up the Startup application for each user

- a) A Student User should be set to Menu.D as Startup
- b) A Teacher User should be set to Menu.M as startup.
- c) Verify each group from the Startup Menu and select Verify startup.

### Adding New Users

-----

After installing Aristotle, new users that have been added to the Users and Groups datafile will not appear in the User Menu of the Aristotle Menu Management Program.

They will appear after performing these steps:

- 1) Select the name of user.
- 2) Select "Verify Apple II startup Information" from the "Startup" menu in the Administrator Program.
- 3) With Verification complete, open the Users Window in Aristotle (If already open, close and open again.).

If these three steps do not work, check privileges and make sure the user has Teacher or Student assigned as a primary Group.

### Article Change History:

- 16 Feb 1995 - Added heading for installation steps section.
- 03 Feb 1995 - Made corrections to AppleTalk references.

APPLE II COMPUTER TECHNICAL INFORMATION

13 Jan 1995 - Made corrections to select file names appearing in article.

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### END OF FILE A2TIL148.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL149.TXT  
#####

Description: Apple IIGS Super-High-Res Graphics: Access from BASIC  
Header: Apple IIGS Super-High-Res Graphics: Access from BASIC

This article last reviewed: 25 October 1990

TOPIC -----

Are there any Applesoft BASIC commands to invoke super-high-resolution graphics on an Apple IIGS?

DISCUSSION -----

The super-high-resolution graphics of the Apple IIGS are not directly available from Applesoft. Applesoft BASIC supports only the original Apple II low-resolution graphics (40x48 or 40x40 with 4 lines of text) and high-resolution graphics (280x192 or 280x160 with 4 lines of text).

One solution is "Iconix IIGS" from So What Software. This is a set of machine language subroutines accessible from Applesoft. They provide an interface to the super-high-resolution graphics mode of the Apple IIGS.

Other BASIC solutions for super-high-resolution graphics mode include Complete BASIC Compiler from Complete Technologies, AC/BASIC from Absoft Corporation, and Micol Advanced BASIC from Micol Systems.

The Complete BASIC Compiler is similar to Apple's GSBASIC (available from APDA) with the addition of graphics support. AC/BASIC is compatible with Microsoft's QuickBASIC language and provides graphics support similar to what is found in QuickBASIC for the Macintosh. Micol Advanced BASIC is modeled after Applesoft. Anyone familiar with Applesoft should be comfortable with Advanced BASIC.

GSBASIC from APDA provides calls to QuickDraw II. However, GSBASIC does not directly support graphics commands within the BASIC language syntax.

For more details, search the Tech Info Library under "So What Software", "Complete Technologies", "Absoft Corp", and "Micol Systems".

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Keywords:

### END OF FILE A2TIL149.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL150.TXT  
#####

Description: Apple IIGS System 5.0: Setting Up an AppleShare Network (7/91)  
Header: Apple IIGS System 5.0: Setting Up an AppleShare Network (7/91)

Article Created: 14 August 1990  
Article Last Reviewed and Updated: 23 April 1991

TOPIC -----

I have been having problems adding Apple IIGS systems to an AppleShare network under Apple IIGS System Software Update Version 5.0. Can you give me some help?

DISCUSSION -----

The following information applies to Apple IIGS System Software Version 5.0 and later.

Because of recent rapid development of the Apple IIGS operating system, setting up an AppleShare network with IIGS systems can be confusing. For example, the Apple II Setup disk included with AppleShare Version 2.0.1, a Macintosh disk designed to install Apple II features onto the Macintosh file server, is now obsolete. You should use the Apple II Setup disk that comes with the Apple IIGS System Software Update Version 5.0 and later. If you do the AppleShare installation with the obsolete Apple II Setup disk from AppleShare Version 2.0.1, you get the following error message when you try to start an Apple IIGS over the network:

Cannot load (servername) /SYSTEM/SYSTEM.SETUP/CDev.Init.

To add IIGS systems to an AppleShare network properly under Version 5.0, you must buy the Apple IIGS System Software Update Version 5.0 or later. The update package includes the Apple II Setup disk and the manual "AppleTalk Network User's Guide for the Apple IIGS."

Setting up AppleShare on the Macintosh Server  
-----

Follow the steps below to set up AppleShare, so that IIGS systems start over the network.

- 1) Start up with the System Tools disk and run Apple HD SC Setup.
- 2) Initialize the server hard disk.
- 3) Name the hard disk using an Apple II convention; for example, "A2."  
(The shorter the name, the better.)
- 4) Install the Macintosh System Software on the server, making sure to use the latest version possible for your Macintosh computer.
- 5) Restart with the AppleShare Version 2.0.1 Server Installer disk. Install "AppleShare 2.0.1 Server" onto the server volume. Be sure you don't click any of the Macintosh-family installation scripts, because they will install old system software, overwriting the system software you just installed.
- 6) Restart from the AppleShare Server Admin disk and launch the Server Admin application.
- 7) Enter the administrator's key and password, name your server, and create the users and groups you need.

## APPLE II COMPUTER TECHNICAL INFORMATION

8) Choose Volume List from the Volumes menu and double-click the server volume. A dialog box allows you to set access privileges. Click all boxes and save enclosed folders.

9) Quit the Server Admin application and restart the Macintosh server from the Apple II Admin disk that came with the Apple IIGS System Software Update Version 5.0.

10) Launch the Installer program on the Apple II Admin disk, and install "Apple II Info" on the server volume; then quit.

11) Restart from the Server Admin disk and launch the Server Admin application.

12) From the Server menu, choose Server Info and click the Apple II feature. Then, click Save.

13) Choose Volume List from the Volumes menu and double-click the server volume. A dialog box allows you to set access privileges. Click all boxes and save enclosed folders.

14) Quit the Server Admin application and restart the server. Keep the server on-line while you perform the steps for the Apple IIGS.

### Setting up AppleShare on the Apple IIGS

-----  
Follow the steps below to set up AppleShare on the IIGS systems:

1) Start up with the System.Disk that came with the Apple IIGS System Software Update Version 5.0, and format a blank 3.5-inch disk.

2) Launch the System 5.0 Installer on the System.Tools disk.

3) In the Installer, select "AppleShare on 3.5 Disk" and install it on the formatted disk. (You'll have to do some disk swapping.)

4) Shut down the IIGS and restart from the AppleShare 3.5 disk you just created.

5) Enter the administrator's name (usually "Administrator") and password. On the Graphic Control Panel under the Apple menu, click the AppleShare icon and mount the server volume.

6) Launch the Installer program on the IIGS System.Tools disk.

7) Using the Command key (Open Apple), select the following scripts: \* Latest Sys.  
Files (No Finder)

\* Server Network Startup

\* Server Quick Logoff

\* Optional scripts (Install the scripts that the IIGS systems starting up over the network will require; for example, the SCSI driver, 5.25 driver, LaserWriter printer, or AppleTalk printer.)

8) Install the selected scripts on the server volume. The system installs over the network, and the double-arrow icon at the top left of your screen flashes. You may have to do some disk swapping, and the installation may take a fair amount of time.

9) Once the installation is complete, quit and shut off the IIGS.

10) Shut down the file server and restart it from the Server Admin disk.

11) Launch the Server Admin application.

## APPLE II COMPUTER TECHNICAL INFORMATION

- 12) Select all users, or all Apple IIGS users who you want to be able to start up over the network.
  - 13) Under the Apple II menu, choose Set Startup, and designate "Finder" as the startup application. (It will be located at /servername/System/Finder.)
  - 14) When you're prompted for a response, allow the system to set the prefix automatically.
  - 15) If the users you selected will be using a network printer, select Set Printer.
  - 16) Choose Volume List from the Volumes menu and double-click the server volume. A dialog box allows you to set access privileges. Click all boxes and save enclosed folders.
  - 17) Quit the Server Admin program and restart the file server.
  - 18) On the IIGS units that you want to start up over the network, reset the startup slot from the Control Panel. Systems with ROM 01 should have the printer port set to "Your Card," Slot 7 set to "Built-in AppleTalk," and the startup slot set to "7." Systems with ROM 03 should have the printer port set to "Built-in AppleTalk," Slot 7 set to "Built-in AppleTalk," and the startup slot set to "AppleTalk."
- (Note: If you have the newer model Apple IIGS with 1MB of RAM on the logic board, set Slot 7 to AppleTalk and EITHER slot 1 or slot 2 to AppleTalk.)
- 19) Restart the Apple IIGS. It now boots over the network and prompts you to enter a user name and password. Once you enter the name and password, the "progress thermometer" appears, and then you see the Apple IIGS System 5.0 desktop with the server volume icon at the top right.

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### END OF FILE A2TIL150.TXT

#####  
### FILE: A2TIL151.TXT  
#####

Description: Apple IIGS System Disk 5.0: Overview  
Header: Apple IIGS System Disk 5.0: Overview

This article last reviewed: 25 September 1989

Apple IIGS System Disk 5.0 is the new release of system software for the Apple IIGS computer. The main features include:

- Support for AppleShare File Server
- Speed, speed, and more speed
- A Control Panel and Control Panel devices (CDEVs)
- Multiple simultaneous installations with the Installer
- 5.25-inch Disk Driver is installed
- Increased ToolBox support

Packaging

-----  
The AppleTalk Network User's Guide and AppleShare Apple II Setup Disk are included only in the System Software 5.0 update box. It will not ship with the Apple IIGS hardware system.

The Apple IIGS manual is being rewritten to include the information in the AppleTalk Network User's Guide.

System Requirements

-----  
Apple IIGS System Disk 5.0 requires an Apple IIGS with a least 768K of memory when operating on a network. As a stand-alone system the 5.0 System Disk requires only 512K.

AppleShare and Network Support

-----  
One of the main new features of Apple IIGS System Software 5.0 is GS/OS support for AppleShare File Server volumes. To use the Apple IIGS with an AppleShare File Server, you need to use version 2.0 or later of the AppleShare File Server software.

There are a number of additions to GS/OS to support AppleShare. These include:

- Booting GS/OS over the network
- Creation of a 3.5-inch Server Startup Disk
- An AppleShare FST (File System Translator) for GS/OS
- A Control Panel File Server Chooser
- Ability to auto-logon to a server
- Server Logoff

@L - Finder support of AppleShare

Network Booting

-----  
To use the Apple IIGS with an AppleShare File Server, you need to use version 2.0 or later of the AppleShare File Server software. If you have an existing AppleShare File Server you need to order:

## APPLE II COMPUTER TECHNICAL INFORMATION

Apple IIGS System Software version 5.0

This package includes a new "Apple II Setup Disk". This disk is a Macintosh disk that uses the Macintosh Installer to update the AppleShare File Server 2.0.1 server boot blocks to GS/OS. The boot blocks are sent to the workstation when the user requests network booting from the Apple IIGS. The disk is found in the back of the AppleTalk Network User's Guide that ships inside the stand-alone package. After the Macintosh has been updated, you can use the Apple IIGS Installer (located on the SYSTEM.TOOLS disk) to update the SYSTEM folder on the server hard drive.

All servers on the network should be updated to the new boot blocks at the same time. You should not have boot blocks from Apple IIGS Workstation Software and System Disk 5.0 on the same network. AppleShare File Server will start shipping with the new Apple II Setup Disk mid-summer 1989.

### Local Booting

Using a 3.5-inch disk can speed up server boot times. There are two methods of gaining access to an AppleShare File Server from a 3.5-inch disk:

- Local Network Startup
- AppleShare on 3.5-inch Disk

The first method performs the same function as network booting, and the second boots into the Finder.

Local Network Startup saves time and network traffic when booting an entire class of computers at the same time. The Installer update to allow faster network booting is called "Local Network Startup".

The Installer update that lets you boot into the Finder is called "AppleShare on 3.5 Disk". This type of disk is called a "workstation startup disk".

### ExpressLoad

ExpressLoad is new with Apple IIGS System Software 5.0 and causes GS/OS to load the system and applications faster. ExpressLoad enhances the standard Apple IIGS System Loader and lets large applications load in a shorter time.

Developers can turn applications into ExpressLoad format using the APW tool called Express or the MPW IIGS tool called ExpressIIGS. A load file must contain resources and code segments in a specific order to be compatible with ExpressLoad. ExpressLoad checks files first to see if they are in the proper format. If the file is not in ExpressLoad format, the application is launched by the normal Apple IIGS system loader.

To save memory, ExpressLoad is loaded only on systems with more than 512K of memory. Before loading ExpressLoad, the system checks to see if there is more than 512K of memory. It will not ExpressLoad into a 512K system.

### ToolBox

A number of the toolbox routines have been modified to increase speed. They include "special case" code that causes QuickDraw and other routines to operate faster, based on the parameters that were passed to QuickDraw. Programmers do not have to modify their code to support any of these "special case" routines.

### Control Panel and CDEVs

The Apple IIGS System Disk 5.0 includes the Graphics Control Panel, which is similar to the Macintosh Control Panel and Chooser. The Graphics Control

## APPLE II COMPUTER TECHNICAL INFORMATION

Panel is implemented as an NDA (New Desk Accessory). This type of DA is available only to Apple IIGS desktop applications.

The Graphics Control Panel is an expanded facility for controlling any number of system parameters. This functionality lets Apple and third-party developers add Control Panel "devices" (CDEVs). The Graphics Control Panel sets the same information as the existing Apple IIGS Control Panel (now called the Text Control Panel) which is accessed by using the Command-Control-Escape keys. Icons for all CDEVs look the same, letting you identify a CDEV quickly and easily.

CDEVs are located inside the SYSTEM folder, just as fonts and desk accessories:

/disk/SYSTEM/CDEV

### Desk Accessories

Like the current Apple IIGS System Disk, Apple IIGS System Software 5.0 supports New Desk Accessories (NDAs). The system can now support 128 NDAs, thanks to scrolling menus. Desk Accessories are in the following folder:

/disk/SYSTEM/DESK.ACCS

### SCSI Manager

The SCSI manager has been modified to provide a four-fold speed increase and provide additional SCSI support. The new driver is faster because it is loaded into memory and does not use the firmware on the card. When the driver was written, a number of new features were added:

- Full SCSI Device Support
- 7 Physical Devices
- 32 Volumes per Drive
- Full SCSI Command Support
- Access to Non-ProDOS Partitions
- Support for Magneto-Optic Drives (with a driver)

### Related Articles

- Apple IIGS System Disk 5.0: ToolBox Changes
- Apple IIGS System Disk 5.0: Changes to BASIC.SYSTEM
- Apple IIGS System Disk 5.0: Disk II/Apple 5.25-inch Driver
- Apple IIGS System Disk 5.0: Advanced Disk Utility and SCSI Manager

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Keywords:

### END OF FILE A2TIL151.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL152.TXT  
#####

Description: Apple IIGS System Disk 5.0: ToolBox Changes  
Header: Apple IIGS System Disk 5.0: ToolBox Changes

This article last reviewed: 05 May 1989

This article summarizes changes and additions to the Apple IIGS ToolBox that result from Apple IIGS System Disk 5.0.

The Toolbox on the Apple IIGS has been modified to support a number of new features that are available to developers. (If these new features are used in a program, the user must have Apple IIGS System Software 5.0 for the software to function correctly.)

The Resource Manager and Text Edit are new for System Disk 5.0.

Additional documentation is available from APDA.

## Control Manager

-----

The Control Manager has been modified to provide support for more standard control types, including:

- StatText Control -- Display text messages in a rectangle.
- PictureControl -- Display a picture in a rectangle.
- IconButtonControl -- Icon drawn in a rectangle.
- LineEditControl -- Line Edit item used in List Manager.
- TextEditControl -- Works with new TextEdit Tool.
- PopUpControl -- Provide multiple selection buttons within scrolling lists.
- ListControl -- You can now use the control manager to manipulate items in the List Manager.

## Desk Manager

-----

The classic desk accessory (CDA) menu now supports scrolling when more than thirteen CDAs are installed. CDAs are accessed by pressing COMMAND-CONTROL-ESC on the keyboard. Because of this change, selections no longer wrap around the screen. The number of CDAs is limited by disk space and boot time to install the files. You may have problems if you install more than 128 CDAs.

## Event Manager

-----

The Journaling feature is changed, to better support the ReadMouse function.

## Font Manager

-----

A problem was fixed in ChooseFont, which caused the system to hang if any update events were pending when the call was made.

## Line Edit

-----

Line Edit now supports a password field, in which the characters typed by the user appear on the screen as asterisks (\*).

## List Manager

-----

The List Manager has been changed to make it easier for programmers to use,

and to support new controls in the Control Manager.

Memory Manager

-----

The Memory Manager has been modified to improve system performance.

Menu Manager

-----

The Menu Manager now supports a number of new features, including:

- Outline and Shadow text styles in a menu
- scrolling menus
- pop-up menus

Note Sequencer

-----

The Note Sequencer has been modified to make it easier for developers to create and use sequences in programs.

Print Manager

-----

The PrChoosePrinter call has been removed. Users should use the Control Panel to select printers. If an application makes this call, a dialog appears on the screen telling the user to use the Control Panel to select a printer. When printing in draft mode to a text printer, the driver translates QuickDraw II commands into command sequences for the printer.

QuickDraw II

-----

QuickDraw II has been modified to function faster.

Resource Manager

-----

The Resource Manager is an INIT file that is loaded when the Apple IIGS is started, and stays loaded when the system is running. The Resource Manager maintains the resource fork of a file. This is similar to the resource fork in the Macintosh. This is the first time the a resource fork has existed in the Apple II world. The format of the data is defined by the application. Resources are referred to by a resource type and resource ID number.

Sound Tools

-----

Four new calls have been added to the sound tools, allowing greater flexibility when playing sounds.

Standard File

-----

Standard File has been modified to fully support GS/OS path names. The following are GS/OS values, not the ProDOS FST values. These include:

- 13,107 files in a folder
- 254 characters in a file name (using new calls)
- 508 characters in a path name
- The List Manager is being used
- Scan of AppleShare File Server volume every 8 seconds
- Checks for write-protected volumes and folders
- Displays the lock icon next to current path name
- Calls to support multi-selection calls
- Hook so applications can draw custom list items

Text Edit

-----

This is a new feature of Apple IIGS System Software 5.0. It provides standard text editing for any application. It can be used as a complete text editor or as the core of a simple word processor. It is similar to Text Edit calls on the Macintosh. The following features are included in GS TextEdit:

- Edit any amount of text that fits in memory (not 32K as in the Macintosh)
- Mouse activity for text selection (single, double, triple clicking for text, words, lines)
- Auto word wrap
- Cut, Copy, and Paste
- Some support of control keys for text manipulation
- Stylistic variations in the text (fonts, sizes, style, color).
- Text can contain a "ruler" to format the text
- Four types of justification
- Three kinds of Tab support
- Programmer can limit the amount of information that can be entered
- Vertical scrolling in a window
- Automatic drag selection
- It is FAST

Window Manager

-----

Numerous changes speed things up and support the Resource Manager.

Related Articles

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- Apple IIGS System Disk 5.0: Overview
  - Apple IIGS System Disk 5.0: Changes to BASIC.SYSTEM
  - Apple IIGS System Disk 5.0: Disk II/Apple 5.25-inch Driver
  - Apple IIGS System Disk 5.0: Advanced Disk Utility and SCSI Manager
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Keywords:

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# APPLE II COMPUTER TECHNICAL INFORMATION

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#####  
### FILE: A2TIL153.TXT  
#####
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Description: Apple IIGS Workstation Software: New Product Information  
Header: Apple IIGS Workstation Software: New Product Information

This article last reviewed: 1 March 1988

## Overview -----

Apple IIGS Workstation Software lets you connect an Apple IIGS to a LocalTalk network. This software performs the same function as the Apple II Workstation Card for the Apple IIe. The software makes it possible to start up from an AppleShare File Server 2.0 and run an Apple IIGS without disk drives attached.

The only additional hardware needed is an Apple IIGS Memory Expansion Card containing at least 512K of RAM, and a LocalTalk System Connector Kit.

## Apple IIGS Setup -----

Before you can use the Apple IIGS on the AppleTalk Network System, you must configure the system correctly.

From the Control Panel (accessed via Open Apple-Control-Esc):

1. Be sure the Maximum RAM Disk Size is at least 256K less than the Largest Selectable. For example, if the Largest Selectable is 1024K, then set the Maximum RAM Disk Size to 768K or less. The default value of 0K is best if you plan to run any Apple IIGS specific programs.

Control Panel	
RAM Disk	
X Minimum RAM Disk Size:	0K
X Maximum RAM Disk Size:	0K
-Largest Selectable	1024K-
-RAM Status-	
RAM Disk Size:	0K
Total Ram in Use:	84K
Total Free RAM:	1195K

(The numbers following Total RAM in Use and Total Free RAM will vary, depending on phase of startup process.)

2. Set Slot 1 or Slot 2 to "Your Card" (Slot 1 is recommended).
  - If slot 1 = "Your Card", plug LocalTalk connector into the Printer Port.
  - If slot 2 = "Your Card", plug LocalTalk connector into the Modem Port.
3. Set Slot 7 to "Built In AppleTalk"
4. Set Startup to Slot 7

## APPLE II COMPUTER TECHNICAL INFORMATION

```
| Control Panel |
| Slots        |
|              |
|   Slot 1: Your Card
| X Slot 2: Modem Port
| X Slot 3: Built-in Text Display
| X Slot 4: Mouse Port
| X Slot 5: Smart Port
| X Slot 6: Disk Port
|   Slot 7: Built-in AppleTalk
|
| Startup Slot: 7
|_____|
```

5. Exit the Control Panel. If you had to change the RAM Disk settings, you must POWER DOWN (with the power switch). This will reset the RAM Disk to the setting you have selected. It does not change RAM disk values until power down. This way, you can restart without loss of RAM Disk contents.

Keywords:

### END OF FILE A2TIL153.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL154.TXT  
#####
```

Description: Apple IIGS: 5.25" System Utilities  
Header: Apple IIGS: 5.25" System Utilities

To organize a user's disks, the Apple IIGS System Utilities program formats and copies disks and can copy, rename, and delete files, performing most of these functions on 4 of the Apple II operating systems: DOS 3.3, ProDOS, Pascal, and CP/M. Distributed on a 3 1/2" disk, the program works only on the Apple IIGS.

You can create a 5 1/4" floppy disk version of the program using the System Utilities in the following steps:

1. Format a 5 1/4" disk
2. Copy these 5 files from System Utilities to the 5 1/4" disk:
  - a. P8  
-- This is ProDOS - found in the SYSTEM sub-directory.
  - b. SYSUTIL.SYSTEM \*
  - c. GSSU0 \*
  - d. GSSU1 \*
  - e. GSSUE1 \*

\* These 4 files comprise the System Utilities program, and can be found in the SYS.UTILS sub-directory. They must be kept in the same directory.
3. Rename the file 'P8' to 'PRODOS'

System Utilities may now be booted from the floppy disk. The files take up around 180 blocks and leave about 100 blocks for extra file storage.  
Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL154.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL155.TXT  
#####

Description: Apple IIgs: Cable Compatibility (10/94)  
Header: Apple IIgs: Cable Compatibility (10/94)

Article Created: 27 September 1994  
Article Reviewed/Updated: 27 October 1994

TOPIC -----

This article provides cable compatibility information for Apple computer systems and a variety of Apple peripherals.

The left column lists the peripherals, the right column lists the cable required to connect one of the following computers to it; Apple IIgs, or the Apple IIgs upgrade.

Part numbers which begin with a letter are the finished goods part number, the seven digit numbers are the service part numbers.

DISCUSSION -----

Peripheral -----	Cable part number -----
AppleFax Modem	N/A
Apple Personal Modem Apple Data Modem 2400	M0197/590-0552 (smoke)
Apple Modem 300 Apple Modem 1200	A2C0354/590-0121% & 590-0550 or 590-0197 & 590-0553
Apple ImageWriter II or II/L Apple ImageWriter LQ	M0197/590-0552 (smoke), LocalTalk optional
Apple ImageWriter Printer Apple ImageWriter 15"  0550	M0150/590-0169 & 590-0553 or A2C0352*/590-0037 & A9M0333/590-
LaserWriter, Plus, IInt, IIntx, IIf, IIg LaserWriter Pro 600/630/810 Personal LaserWriter NT, NTR	LocalTalk
Personal LaserWriter LS StyleWriter & StyleWriter II Color StyleWriter/Color StyleWriter Pro	*
Apple LaserWriter IIsc Personal LaserWriter SC	N/A
AppleCD SC Apple Hard Disk 20/40/80	M0206/658-8031*
Apple Tape Backup 40SC	N/A

## APPLE II COMPUTER TECHNICAL INFORMATION

Apple Scanner  
Apple Color OneScanner  
Apple Color Printer

### LEGEND

- \* Requires M3503LL/B/658-8032 Cable Terminator
- \* The Apple IIgs with GS/OS ver. 6.0 will support the original StyleWriter only.

A9M0320 or A3M0025 w/590-0037 require Super Serial Card BUT A9M0302 or A3M0025 w/590-0037 & 590-0550 doesn't (Buses Built In).

When using an ImageWriter II/LQ with the Apple IIe and cable part number 590-0555, the jumper on the Super Serial Card must be on "Modem".

### Article Change History:

27 Oct 1994 - Indicated that StyleWriter is supported by GS/OS ver. 6.0.

### Support Information Services

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Keywords: ktable,cabinfo,review

### END OF FILE A2TIL155.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL156.TXT  
#####

Description: Apple IIGS: Cabling Configurations  
Header: Apple IIGS: Cabling Configurations

This article last reviewed: 22 September 1986

The Apple IIGS is very compatible with Apple's existing cable product line. Below you will find the possible configurations for the various Circular 8 cables.

Apple System Peripheral - 8 Cable  
Product M0187 / Part 590-0340-A  
Circular 8 to Circular 8

Can be used as connecting cable for the Apple IIGS to:

- ImageWriter //
- Apple Personal Modem
- Macintosh Plus (data transfe)
- Apple IIGS (data transfer)

Macintosh Peripheral - 8 Cable  
Product M0185 / Part 590-0322-B  
Circular 8 to DB9

Can be used as connecting cable for the Apple IIGS to:

- Macintosh 128K and 512K (data transfer)

In ny other required combination, use the Apple IIGS Adapter Cable (Circular 8 to DB25 adapter) and the appropriate DB-25 Apple II type cable used on the Super Serial Card.

Keywords:

### END OF FILE A2TIL156.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL157.TXT  
#####

Description: Apple IIGS: Connecting Disk Drives  
Header: Apple IIGS: Connecting Disk Drives

This article last reviewed: 22 September 1986

The Apple IIGS is capable of using all drives available for the Apple IIe, as well as drives built for the Apple IIGS, including the Disk II, Duodisk, Unidisk, Unidisk 3.5, Profile, Apple 3.5 Drive, Apple 5.25 Drive, and SCSI-20. Some of these drives may be plugged directly into the SmartPort on the back of the IIGS, while others require an interface card in one of the expansion I/O slots.

The following drives may be plugged into the SmartPort's DB-19 connector:

- one Duodisk
- two Unidisk 5.25 drives
- two Unidisk 3.5 drives
- two Apple 5.25 drives
- two Apple 3.5 drives

Only under Prodos 16 may a combination of up to six drives be daisy-chained to the SmartPort. The chain **MUST** occur in the order given below and may include up to two (excepting the DuoDisk) in each of the following three categories:

- nearest to IIGS (maximum of two):
  1. Apple 3.5 Drives
  2. Unidisk 3.5 drives
- farthest from IIGS (maximum of two):
  3. 5.25 disk drives: Disk II's, Unidisk 5.25 drives, Apple 5.25 drives or ONE Duodisk drive

Under Prodos 8 (also known as Prodos 1.2), four drives are accessible through the SmartPort. These may be a combination of Apple 3.5 drives, Unidisk 3.5 drives, a RAM disk, and a ROM disk, under the same order restrictions as above.

The SmartPort is mapped to slot 5, so drives connected directly to the port are accessed as slot 5, drive 1 and slot 5, drive 2. When more than two drives are used under Prodos 8, or if the RAM disk is active, "phantom slots" are assigned.

To be used on the Apple IIGS, the Disk II requires a Disk II Controller Card, just as on the Apple II or Apple IIe. The drive may be accessed through the slot used for the card, most likely slot 6, in which case the two possible drives are referred to as slot 6, drive 1 and slot 6, drive 2.

A SCSI Interface Card is needed to use the Apple Hard Disk 20SC on the Apple IIGS. A Profile Interface Card must be used with a 5 or 10 Megabyte Profile, accessible by referencing the slot where the interface card resides or by the ProFile's ProDOS pathname.

The Apple IIGS control panel allows you to select the slot from which the computer will be booted, or you may choose to scan slots on bootup to find a device that is ready.

Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL157.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL158.TXT  
#####

Description: Apple IIGS: Contiguous RAM Depends on Memory Board  
Header: Apple IIGS: Contiguous RAM Depends on Memory Board

Article Created: 14 May 1991  
Article Last Reviewed: 31 May 1991  
Article Last Updated:

TOPIC -----

If RAM is added to the Apple IIGS in slot(s) 1-7 instead of the expansion slot -- with an Apple memory card, for instance -- will it be contiguous RAM?

DISCUSSION -----

It depends on the memory board used. The Apple II Memory Expansion card will not be used as contiguous RAM, but can be used as a RAM disk (in fact, both GS/OS and ProDOS automatically make it a RAM disk at startup).

Some other manufacturers make memory boards that reside in an "other" slot and maps to contiguous RAM space.  
Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL158.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL159.TXT  
#####

Description: Apple IIGS: Description (Discontinued)  
Header: Apple IIGS: Description (Discontinued)

Article Created: 8 May 1992  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

This article describes the Apple IIGS computer.

DISCUSSION -----

The Apple IIGS personal computer is the most powerful member of the Apple II family.

## Features

-----

- 256K of built-in RAM and 256K of additional RAM via the Apple IIGS Memory Expansion Card, which is included. The RAM is expandable to 8MB.
- A 16-bit 65C816 processor lets the Apple IIGS run more sophisticated applications, including those with Macintosh-style interface, as well as most existing Apple IIe and IIc software. With a clock speed of 2.8 instead of 1 megahertz, these programs will run up to 2.8 times faster on the IIGS.
- 128K of ROM memory expandable via the memory expansion slot up to one megabyte.
- Control Panel, which enables users to set screen colors and speaker volume.
- Detachable keyboard with 14-key numeric pad. It contains two Apple Desktop Bus ports on opposite ends; one is for connecting the keyboard to the computer, and the second is for the mouse or other ADB-compatible input devices.
- Eight international character sets can be displayed.
- Two built-in serial ports allow for easy connection of AppleTalk, a modem, printer, or other serial devices.
- Seven general purpose expansion slots are available for peripherals, in addition to a dedicated RAM/ROM slot.
- Up to 15 separate audio voices can be generated simultaneously for music, speech, and sound effects.
- Analog RGB port allows for quick connection to the AppleColor RGB Monitor; no adaptors or additional interface are required.

## Benefits

-----

- Compatibility with most Apple peripherals.
- The eight expansion slots give the Apple IIGS a virtually unlimited growth path. One slot is dedicated to RAM/ROM cards, while the other seven are general-purpose peripheral-interface slots.

## APPLE II COMPUTER TECHNICAL INFORMATION

- The disk-drive port lets users take advantage of the 800K Apple 3.5 Drive and 143K 5.25 Drive. They can be used individually, in any combination, or with UniDisk 3.5 drives. Up to four drives can be daisy-chained from the drive port. With the addition of the Apple II SCSI Card and cable, the Apple IIGS can work with the 20MB Apple Hard Disk 20SC.
- With the AppleColor RGB Monitor, the Apple IIGS produces crisp 80-column color text; a palette of 4096 colors, with as many as 256 on screen at once, is available.
- The Apple Desktop Bus (ADB) standard allows for easy connection of multiple input devices such as a graphics table and mouse. Users can connect another ADB peripheral to the keyboard, then daisy-chain more accessories from it. Up to sixteen devices can be connected at one time.
- Access to the AppleTalk Personal Network is possible, without an interface card, via the Apple IIGS's built-in serial ports.
- New applications that use windows, pull-down menus, and other Macintosh features can be used.
- A choice of QWERTY (Sholes), Dvorak, and international keyboard layouts.

Order Number

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A0012LL/A

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Keywords: specsht

### END OF FILE A2TIL159.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL160.TXT  
 #####

Description: Apple IIGS: Differences with other Apple II models  
 Header: Apple IIGS: Differences with other Apple II models

Some of the features found only on the Apple IIGS:

FEATURE -----	SPECIFICATION -----	DESCRIPTION -----
More powerful microprocessor	65C816	16-bit microprocessor has 24 bit address and 6502 compatibility
Faster Operation	CPU clock speeds of 1 MHz and 2.8 MHz	User can select either of two speeds: 1 MHz speed of 6502 or fast 2.8 MHz.
Memory Expansion	24-bit address bus	Expansion card can expand RAM up to as much as 8 megabytes
Detached Keyboard	78 keys	Separate keyboard includes cursor keys and numeric pad.
Apple DeskTop Bus	Low cost serial I/O	Supports detached keyboard, mouse, and other I/O devices.
RGB Video	R, G, B and sync	Provides both RGB and NTSC video outputs.
40 and 80 column text in color	Text, background, and border colors (RGB only)	Text, background, and border can be any of sixteen colors.
Super Hi-Res color	True 320x200 or 640x200	Improved graphics with up to 16 graphics colors per scan line-up to 256 colors on screen out of 4096.
Desktop user interface	Uses Hi-Res color graphics and mouse	Tool box supports desktop interface with mouse, menus, and windows
Improved Sound	Ensoniq digital sound IC with 32 oscillators	Supports 15 independent voices (GS retains Apple II type sound)
Control Panel	Built-in desk accessory	User may set machine parameters for display, operating speed, serial ports, disk drives, etc.
Enhanced Monitor	Monitor in ROM	Handles 16-bit and 24-bit addresses, assembles and disassembles 65C816 and 6502 instructions, performs 32-bit arithmetic, Low level I/O included
Built-in Clock	Time and Date provided	Has battery back up
Built-in Serial ports	Two standard serial ports	Support modems, printers, and AppleTalk. (User can still use serial card in slot)

## APPLE II COMPUTER TECHNICAL INFORMATION

Built-in AppleTalk	Uses one serial port	No card required. User can select either serial port to use for AppleTalk.
Built-in Disk port	Disk I/O port using custom chip	User can select built-in driveport, disk interface cards, or both.

Apple II type features found on the Apple IIGS:

FEATURE -----	DESCRIPTION -----	OTHER MODELS -----
6502 Instruction set	65816 has emulation mode for running 6502 programs	All Apple II
128k RAM	Main and aux banks, with language-card & I/O spaces	IIC, 128 IIE
AppleSoft in ROM	Applesoft Basic with lower case and 80-column features	All Apple II
Monitor in ROM	Supports low level I/O and program development	All Apple II
40 and 80 column text	Black & White text displays (color text on GS only)	IIC, IIE with 128k or 80 column card
Lo-Res Color graphics	48x40, 16 colors	All Apple II
Hi-Res Color graphics	280x192, 6 colors	All Apple II
Double Hi-Res Color graphics	560x192, 16 colors	IIC, 128k IIE
Built-in serial ports	Two RS232 compatible ports, for modem, printer, etc.	IIC (similar)
Built-in disk port	Using IWM chip, supports both 5.25", 3.5" drives	IIC
Expansion slots (7)	Slots for peripheral I/O and expansion cards, in addition to built-in ports	II, II Plus, IIE
Game I/O	9-pin and 16-pin connectors for paddles and joysticks	All Apple II (9 pin IIE, IIC)

Apple Technical Communications

Keywords:

### END OF FILE A2TIL160.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL161.TXT  
#####

Description: Apple IIGS: Disabling the Control Panel  
Header: Apple IIGS: Disabling the Control Panel

This article last reviewed: 12 September 1990

TOPIC -----

How can I disable the Control Panel on the Apple IIGS?

DISCUSSION -----

The following is Electronic Learning Systems' description of Menu Master, a product that provides a way to disable the Apple IIGS Control Panel. For further information on ELS, search the Technical Information Library on "ELS".

"Menu Master is a simple menu system for the Apple II. It allows creation of customized menus and sub-menus to launch all ProDOS, GS/OS, and DOS 3.3 applications. Menu Master provides automatic pathfinding, simplifying the need to understand or manually set ProDOS paths. Menu Master has password protection, is mouse-compatible, and displays the time and date from any ProDOS clock. A utility feature enables or disables the Apple IIGS Control Panel.

"DOS 3.3 programs can now be launched and returned from, within the ProDOS operating system. DOS 3.3 software developers now have the ability to run DOS 3.3 programs on AppleShare or any ProDOS-specific environment.

"Any Apple II with 128K of memory and an 80-column display can now organize, launch and return from ProDOS, GS/OS, and DOS 3.3 applications with Menu Master. Apple IIc Plus systems can have 3.5-inch diskettes created with DOS 3.3 programs that will run on their computers.

"The network version of Menu Master is compatible with all Apple II networks including AppleShare, Corvus, ELAN, VELAN, and DIGICARD. Menu Master provides all the features of Apple's Aristotle program when used on AppleShare, but requires no memory expansion and can launch DOS 3.3 applications."  
Copyright 1990 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL161.TXT

#####  
### FILE: A2TIL162.TXT  
#####

Description: Apple IIGS: Displaying in Monochrome Mode  
Header: Apple IIGS: Displaying in Monochrome Mode

This article last reviewed: 6 March 1990

TOPIC -----

Some of my group's Apple II software applications run in color on the Apple IIGS and look terrible. (Most of the programs with the problem are written in BASIC.) Is there a routine or call for putting the Apple IIGS into monochrome mode?

DISCUSSION -----

What monitor are you using? The AppleColor Composite Monitor (A2M6020) or the AppleColor RGB Monitor (A2M6014)?

AppleColor Composite Monitor  
-----

There is a switch behind the front access door that turns the Composite Monitor to a green character on black background display. This will help the displayed image to appear more clearly.

Additionally, the Apple IIGS Control Panel has the Monitor CDEV for selecting color or monochrome monitor. This may help if you're using the Composite Monitor in the single-color mode. This setting affects only the composite output of the Apple IIGS. This is the only method we know for setting the Apple IIGS to monochrome mode.

AppleColor RGB Monitor  
-----

There are certain issues that affect the display on the RGB Monitor's graphics page. If the graphic images are not placed on even nibble boundaries, there will be color bleed that many consider unacceptable. On the RGB Monitor, the only solution is to rewrite the programs, with the even nibble boundary issue in mind.

Copyright 1990 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL162.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL163.TXT  
#####

Description: Apple IIGS: DOS 3.3 and Hard Drives  
Header: Apple IIGS: DOS 3.3 and Hard Drives

This article last reviewed: 20 November 1990

TOPIC -----

Is it possible to partition the hard drive of a Apple IIGS, so one partition contains DOS 3.3 and applications and the other contains GS/OS? I tried it, and now the IIGS can't recognize DOS 3.3 floppy disks.

DISCUSSION -----

DOS 3.3 was created when hard disk drives were only a dream for microcomputers. Thus, DOS 3.3 and previous versions understand only the 140K 5.25-inch disks. DOS 3.3 does not understand the 3.5-inch disk and hard-disk environments. When hard disks did appear for the Apple II family and DOS 3.3 was still the operating system of choice, individual hard-drive manufacturers devised independent schemes for dividing their products into multiple 140K volumes so DOS 3.3 could work with the hard drives. ProDOS was created to overcome the limits that DOS 3.3 imposed on storage volumes.

GS/OS would require a File System Translator (FST) to recognize the 5.25-inch disks of the DOS 3.3 operating system. However, the FST would be of no assistance in providing DOS 3.3 partitions on a hard disk, because the lack of hard-disk support is a limitation of DOS 3.3 itself, not the FST. To use DOS 3.3 applications on an Apple IIGS requires restarting from a 5.25-inch DOS 3.3 disk.

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Keywords:

### END OF FILE A2TIL163.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL164.TXT  
#####

Description: Apple IIgs: Dropping Off The AppleShare Network (11/94)  
Header: Apple IIgs: Dropping Off The AppleShare Network (11/94)

Article Created: 21 November 1994

TOPIC -----

I have the following configuration:  
\* Apple IIgs running GSOS 6.0.1 or GSOS 6.0  
\* Connected to and AppleShare 3.x server  
\* AppleShare 3.x server has Apple II setup 2.2 installed.

And encounter problems with the Apple IIgs will dropping off the network. Usually within 3-5 minutes of idle time. The server window "Connected Users" will show the user connected for about 1 minute then drop them from the server. This only occurs if you boot the Apple IIgs from the server.

DISCUSSION -----

This problem is difficult to reproduce. Sometimes it will go away simply by doing a clean install of the server and GSOS software. One resolution is to upgrade to Apple II Setup 3.0. You can obtain Apple II setup 3.0 by upgrading to GSOS 6.0.1 or obtaining it from an online service or Apple Authorized Service Provider.  
Note: this software comes with GSOS 6.0.1 not AppleShare 3.x. You will need to look in the Apple II area to locate the software.

Support Information Services  
Copyright 1994, Apple Computer, Inc  
Keywords:

### END OF FILE A2TIL164.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL165.TXT  
#####

Description: Apple IIGS: Duplicate BASIC.SYSTEM Files  
Header: Apple IIGS: Duplicate BASIC.SYSTEM Files

This article last reviewed: 12 December 1989

TOPIC -----

When using Apple IIGS System Installer 5.0 it appears to put the following files into the "Root" directory: BASIC.LAUNCHER, BASIC.SYSTEM, and ICONS.

The same file BASIC.SYSTEM is also in the folder called system. Do we need both? Are they there for Apple IIGS's diskless "boot up"?

DISCUSSION -----

Because you mentioned diskless booting, we assume you are talking about installing Apple IIGS/OS 5.0 on the Macintosh AppleShare File Server.

The only copies of BASIC.SYSTEM and BASIC.LAUNCHER that are installed by the Server Network Startup script are those installed at the root directory. The copy of BASIC.SYSTEM in the Macintosh System Folder is installed by the Apple II Setup installer when the server is set up for use by Apple IIs. A copy is put in the System Folder so that the server will have a default startup application for all Apple II users.

It is perfectly acceptable to remove the copy of BASIC.SYSTEM in the System Folder, so long as you remember to set a startup application for each Apple II user. You should not remove those copies of BASIC.SYSTEM and BASIC.LAUNCHER located at the root directory unless there is no need for Applesoft BASIC.  
Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL165.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

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#####  
### FILE: A2TIL166.TXT  
#####
```

Description: Apple IIGS: Error in Show Text File Desktop Accessory  
Header: Apple IIGS: Error in Show Text File Desktop Accessory

This article last reviewed: 4 February 1987

On version 1.1 of the Apple IIGS System Disk, dated December 2, the Apple II DeskTop gives a "system error" when the desk accessory Show Text File comes to end-of-file. This doesn't happen with version 1.0, dated November 26.

Furthermore, on both versions, 1.0 and 1.1, of the system disk, this desk accessory will only show the first 32K of a text file.

Copyright 1989 Apple Computer, Inc.

Keywords:

```
### END OF FILE A2TIL166.TXT
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APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL167.TXT  
#####

Description: Apple IIGS: Graphics Modes (10/94)  
Header: Apple IIGS: Graphics Modes (10/94)

Article Created: 23 October 1986  
Article Reviewed/Updated: 18 October 1994

TOPIC -----

What are the available graphics modes available on the Apple IIgs?

DISCUSSION -----

The Apple IIGS can perform graphics under a number of different types of graphics displays: Lo-res and Hi-res modes found on all Apple II systems, the double Hi-res mode available on the Apple IIe and IIc, and new Super Hi-Res modes.

Both Lo-res and Hi-res modes are unchanged from the Apple II, and the manual "Applesoft on the IIGS" shows the commands for using those modes. The IIGS ROM doesn't have routines for the use of double Hi-res graphics; a programmer must add assembler routines that will properly draw lines, locate points, etc., in double Hi-res mode. Commercially available packages include these routines.

Only on the Apple IIGS performs in Super Hi-Res graphics modes with a resolution of 320 X 200 or 640 X 200. Using 320 X 200 mode permits a full 16 colors per line. 640 X 200 mode can also use 16 colors per line, but each pixel is limited to a choice of 4 of the 16 colors. Both modes are supported by the Apple IIGS QuickDraw II tools. To make programming easier, screen memory is mapped contiguously in Super Hi-Res mode.

320 X 200 Super Hi-Res mode  
-----

Each line of pixels in 320 mode is associated with a table of 16 entries that correspond to the 16 colors to be shown on that line. Each entry represents one of the possible 4096 colors available on the Apple IIGS. There may be as many as 16 color tables defined, permitting 256 colors on the screen at one time.

Within each line, a byte determines two pixels' colors. The high 4 bits of a byte contain a number from 0 to 15, which is used as an offset into the color table for that line. The pixel mapped to that memory location will have the color found at the appropriate table location. Similarly, the low 4 bits of that byte will determine the color of the adjacent pixel.

Pixels in 320 mode are almost square. The aspect ratio in this mode is 5:6 on an Apple Monochrome Monitor, an AppleColor Monitor, or an Apple RGB Monitor.

640 X 200 Super Hi-Res Mode  
-----

640 mode also allows 16 colors per line, but each pixel is limited to one of four colors (this mode is sometimes called Limited 16 Colors). As in 320 mode, each line addresses one of up to 16 color tables. However, each pixel in the line is represented by only 2 bits, so that each byte contains information about 4 pixels.

To represent 4 adjacent pixels, bits 7 and 6 choose from among colors 0 through 3 in the appropriate color palette, bits 5 and 4 choose colors 4 through 7, bits 3 and 2, from colors 8 through 11, and the last two bits choose from colors 12 through 15. Therefore, each pixel can be one of four colors, but there may be a total of 16 colors on each line.

## APPLE II COMPUTER TECHNICAL INFORMATION

The pixel aspect ratio in 640 mode is 5:12 on an Apple monitor, so that each pixel's height is approximately twice the width.

### Color Fill Mode

-----  
The Apple IIGS can also use 320 X 200 mode with color fill. If this mode is chosen, the color zero (0) takes on a special meaning. A pixel with color 0 will have the same color as the preceding pixel, so that a series of bytes with value 80 00 00 would all be shown in the color represented by the eighth entry in the color palette. Using 0 to represent no color change limits the selection to only 15 colors per line, but does save time for the programmer.

### Article Change History:

18 Oct 1994 - Reviewed for technical accuracy, revised formatting.

Support Information Services

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Keywords:

### END OF FILE A2TIL167.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL168.TXT  
#####

Description: Apple IIGS: High-Speed SCSI Card Memory Requirement (11/94)  
Header: Apple IIGS: High-Speed SCSI Card Memory Requirement (11/94)

Article Created: 10 July 1990  
Article Reviewed/Updated: 21 November 1994

TOPIC -----

How much memory does the Apple II High-Speed SCSI card require? I can't find anything about this in the manual.

DISCUSSION -----

The Apple II High-Speed SCSI card requires a minimum of 768K on the Apple IIGS computer.

Article Change History:  
21 Nov 1994 - Reviewed for technical accuracy.

Support Information Services  
Copyright 1990-94, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL168.TXT

#####  
### FILE: A2TIL169.TXT  
#####

Description: Apple IIGS: How to Access the Clock  
Header: Apple IIGS: How to Access the Clock

This article last reviewed: 14 July 1989

TOPIC -----

I have a customer using Z-BASIC on his Apple IIGS under ProDOS, running as an Apple IIe. Although there no are toolbox calls for accessing the Apple IIGS clock from Z-BASIC, is there a way to do this from Z-BASIC with PEEKS and POKES or a machine language call?

DISCUSSION -----

The preferred method is to use the ProDOS GET\_TIME call. Note: You need ProDOS 8 version 1.2 or later to get the time on the Apple IIGS.

This method works on any Apple II running under ProDOS and with most Apple II-compatible clocks (because they all come with ProDOS patch routines). More information on the format of the GET\_TIME call and other ProDOS commands is in the ProDOS Technical Reference Manual. The GET\_TIME call is documented on page 71. Additional information is on page 99 and pages 104 through 106.

When the GET\_TIME routine is called, the system date and time are placed into the documented locations. Using PEEKs, the data in those location can be extracted.

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Keywords:

### END OF FILE A2TIL169.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL170.TXT  
#####

Description: Apple IIGS: How To Print Low-Res/High-Res Graphics Files  
Header: Apple IIGS: How To Print Low-Res/High-Res Graphics Files

Article Created: 5 December 1988

Article Change History

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- 1/19/93 - UPDATED
  - \* Beagle Brothers now WordPerfect Corporation.
- 11/9/88 - REVIEWED
  - \* For accuracy.

A low-resolution graphics file on the Apple IIGS can be printed from BASIC without using any special interface cards (for instance, an Apple IIGS with an ImageWriter II connected to the serial port) using Triple-Dump from Beagle Brothers (now WordPerfect Corporation).

This application lets any Apple II prints not only low-resolution, but high-resolution, double-high-resolution, and double-low-resolution files, as well as 40-column and 80-column text. Triple-Dump routines can also be used as part of BASIC programs.

To locate a vendor's address and phone numbers, use the vendor name as a search

string.  
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Keywords:

### END OF FILE A2TIL170.TXT

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### FILE: A2TIL171.TXT  
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Description: Apple IIGS: How To Print to Local & Network Printers  
Header: Apple IIGS: How To Print to Local & Network Printers

This article last reviewed: 8 August 1989

TOPIC -----

Is it possible to print to local printers from an Apple IIGS on an Apple II network?

The network in question has an Apple IIGS and an ImageWriter II in each work area. Each of these Apple IIGS systems is networked into a central office where they share a LaserWriter IINTX. Sometimes users need to print to the local printer, other times to the LaserWriter.

Can they do this while on the network without shutting down their machines and restarting with software locally? They are using network versions of AppleWorks with third party applications and E-mail.

DISCUSSION -----

Printing both locally and over the network depends on the application's method of selecting a slot for printing.

AppleWorks does provide a method for assigning a printing slot, allowing three printers to be defined in the Printer Information screen. To do this:

- 1) Set up the printer specifications for the local ImageWriter printer in slot #1.
- 2) Set up an ImageWriter printer for slot #7. (This is for the ImageWriter Emulator used in the LaserWriter.)
- 3) Choose the desired printer by going to the Main Menu/Other Activities/Printer Information screen and selecting a new Open-Apple-H printer.

If the third party programs allow a slot choice within the program, select slot #1 for the local printer and slot #7 for the network printer.

Prior to using a slot #7 printer (the network printer), use the Chooser application to select the appropriate network printer.

(NOTE: These descriptions assume the use of the printer port on the Apple IIGS.)

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Keywords:

### END OF FILE A2TIL171.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL172.TXT  
#####

Description: Apple IIGS: Printing to Legal-Size Paper From AppleWorks  
Header: Apple IIGS: Printing to Legal-Size Paper From AppleWorks

This article last reviewed: 20 July 1989

TOPIC -----

A user is having problems printing to a LaserWriter from AppleWorks (on an Apple IIGS). He can print on letter-size paper but not legal. He has a legal tray and has set the paper length to Legal in AppleWorks. Does AppleWorks on an Apple II support legal printing from a LaserWriter?

DISCUSSION -----

If you print in an AppleWorks 2.0 and ProDOS 8 environment, the ImageWriter Emulator (IWEM) does not support legal-size paper; it supports only letter-size paper. IWEM is not alone; the LaserWriter Diablo 630 emulator does not support paper lengths longer than 11 inches.

However, if you try this in AppleWorks on an Apple IIGS with GS/OS environment, everything works smoothly and with the desired results. In addition, the user can select various fonts and styles in AppleWorks for more pleasing results.

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Keywords:

### END OF FILE A2TIL172.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

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#####  
### FILE: A2TIL173.TXT  
#####
```

Description: Apple IIGS: ProDOS/16 Version 2  
Header: Apple IIGS: ProDOS/16 Version 2

This article last reviewed: 4 September 1987

To support the new fast mode of the Apple IIGS, ProDOS/16 version 2 handles expanded Apple IIGS capabilities, features, and operating modes:

- ProDOS/16 is designed to accept system calls from applications running in either 8-bit or 16-bit mode (the 65816 micro-processor can run in either).
- ProDOS/16 can accept system calls from anywhere in the full 16MB range of memory in the Apple IIGS, and those calls can manipulate data anywhere in memory.
- ProDOS/16 relies on a sophisticated memory management system.
- System calls must be made to ProDOS/16 in order to access system global variables such as date and time, system level, and I/O buffer addresses. ProDOS/16 does not support a global variables page.

There are major differences from ProDOS 1.1.1. ProDOS/16 not strictly upward-compatible from previous ProDOS versions. Programs written to function under ProDOS on an Apple II will not run on the IIGS under ProDOS/16 without some modifications.

ProDOS/16 functions, however, are upward-compatible:

- There is a functionally equivalent ProDOS/16 call for almost every ProDOS system call, usually with the same name.
- Calls are made in nearly the same way as with earlier ProDOS versions.
- For passing values to functions, the parameter blocks have a structure similar to (but not exactly like) earlier ProDOS.
- ProDOS/16, using the same file system as earlier ProDOS, can read from and write to any disk volume produced by ProDOS, using the same file and volume structure, both disk resident and logical.

On the Apple IIGS, ProDOS/8 and ProDOS/16 are designed to the run in tandem, as a package. Whereas ProDOS/16 takes advantage of all the Apple IIGS's hardware and capabilities, ProDOS/8 is provided to maintain compatibility with ProDOS v1.1.1. In normal situations, you need not be concerned with which operating system is functioning; if you run an Apple IIGS application, ProDOS/16 is loaded automatically.

While most ProDOS/8 calls have functionally exact equivalents in ProDOS/16, some ProDOS/8 calls do not appear in ProDOS/16 because they are unnecessary:

- **RENAME:** The ProDOS/16 call `CHANGE_PATH` performs the same function.
- **GET\_TIME:** Under ProDOS/16, the time and date are obtained through a call to the Miscellaneous Tools.
- **SET\_BUF:** Under ProDOS/16, the memory manager, rather than the application, allocates file I/O buffers.
- **GET\_BUF:** This call is unnecessary under ProDOS/16 because the `OPEN` call returns a handle to the file's I/O buffer.

## APPLE II COMPUTER TECHNICAL INFORMATION

- ONLINE: This call is replaced in ProDOS/16 by the VOLUME call.

Under ProDOS/16, you can:

- make ProDOS/16 system calls from anywhere in memory, using ProDOS/16 parameter blocks located anywhere in memory.
- make I/O data transfers to or from anywhere in memory.
- allow limited use of named devices. With ProDOS/8, you must refer to a device by its volume name or its slot and drive number.
- support up to eight system prefixes (ProDOS/8 supports only one).
- have an unlimited number of open files (ProDOS/8 allows only 8).
- have any number of online devices (ProDOS/8 allows a maximum of 14).
  - support of at least 3 separate device protocols (ProDOS/8 supports only one block device protocol).
- extensively support named devices.
- use a volume mounting function, not in ProDOS/8, which prompts the user to mount a needed volume.

Keywords:

### END OF FILE A2TIL173.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

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### FILE: A2TIL174.TXT  
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```

Description: Apple IIGS: ProDOS/8  
Header: Apple IIGS: ProDOS/8

To support the old Apple II mode on the Apple IIGS, system disks have P8, or ProDOS/8, as it is a version of ProDOS 1.1.1 made especially for Apple IIGS, although ProDOS/8 works on an Apple IIe or Apple IIc.

ProDOS/8 handles the following Apple IIGS capabilities, features and operating modes:

- ProDOS/8 accepts system calls from applications running in 8-bit mode only.
- ProDOS/8 accepts system calls from the lowest 64K of memory only.
- ProDOS/8 uses a simple global page bit map.
- ProDOS/8 maintains a section of memory, which can be accessed directly, that contains system global variables such as date and time, system level, and I/O buffer addresses.
- ProDOS/8 reads the Apple IIGS clock rather than the ThunderClock.

On the Apple IIGS, ProDOS and ProDOS/16 are designed to the run in tandem, as a package. ProDOS/8 is provided to maintain compatibility with ProDOS v1.1.1. In normal situations, you need not be concerned with which operating system is functioning; ProDOS/8 is automatically loaded if you run an application designed to run under ProDOS 1.1.1 or versions earlier.  
Apple Technical Communications

Keywords:

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### END OF FILE A2TIL174.TXT
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# APPLE II COMPUTER TECHNICAL INFORMATION

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### FILE: A2TIL175.TXT  
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```

Description: Apple IIGS: Recovering a corrupted ProFile  
Header: Apple IIGS: Recovering a corrupted ProFile

This article last reviewed: 29 March 1988

In the Apple IIGS, the bus' higher 'noise' passes on to the ground traces on the ProFile interface card and, after use, corrupts the directory of the ProFile, rendering it invisible to ProDos and inaccessible to the user.

It is possible to recover the directory and make the ProFile usable again. On the report of a ProFile going bad after installation in a Apple IIGS, first see the article "Apple II ProFile Interface Card Modification for the Apple IIGS. This modification lets the card operate correctly for the directory fix. Don't try to repair a directory with an un-modified ProFile card.

For the recovery, use a disk editor program, like the ProDos MLI Exerciser program here:

1. Execute the ProDos Machine Language Interface Exerciser program with the '-' command and wait for the main menu.
2. From the main menu, type '80' <Return> to command a read of a block; follow that by typing in the following values from the next screen:

Parameter Count	\$03 (Default)
Unit Number	\$50 (The ProFile card's slot followed by a '0')
Data Buffer	\$00 (This value is where the block to be modified \$40 will be loaded)
Block Number	\$02 (This is the bad block to load in) \$00

After typing in each pair of numbers, press <Return> to go on to the next entry prompt. After pressing <Return> on the last entry, you see a message 'PRESS RETURN TO EXECUTE COMMAND', you press <Return> and then see another message 'Error \$00: Call Successful'. At this point, press <Return> to get the main menu.

3. Type 'M' <Return> to modify the buffer. The default should read:

```
$00  
$40
```

This is the correct setting; press <Return> on each entry and press it once more to go on to modify mode. At this point, you should see a table of numbers and a blinking cursor on the entry we want to 'delete', number '55'. Now that we know that problems with the directory exist, press <ESC> to go to the main menu.

If the '55' was not in the first position of the table, then this directory recovery procedure won't work. If the '55' was not shown at all, your ProFile possibly has a different reason for not operating)

4. Type '81' <Return> to write the block out to the disk. Press <Return> through the number entries until you reach the 'data buffer' entry. Change it to look like this:

```
$01  
$40
```

## APPLE II COMPUTER TECHNICAL INFORMATION

Continue to press <Return> through the block number entries and once more to command the actual block write, after which you will see the message 'Error \$00: Call Successful' will be displayed.

5. You may now reboot your system and check to see if the ProFile is now recognized. All of the data previously inaccessible should be back and usable.

For more information about using the ProDOS Exerciser Program, see the ProDOS Technical Reference manual.

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Keywords: hts

### END OF FILE A2TIL175.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL176.TXT  
#####

Description: Apple IIGS: System 6.0 Software and HyperCard IIGS 1.1  
Header: Apple IIGS: System 6.0 Software and HyperCard IIGS 1.1

Article Created: 27 March 1992  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

This article describes Apple IIGS System 6.0 software and an upgraded version of HyperCard IIGS.

DISCUSSION -----

Apple IIGS System 6 software offers an enhanced user interface, greater speed and performance, and data exchange capabilities not available on previous Apple IIGS operating systems. HyperCard IIGS version 1.1 has been upgraded to include a Media Control stack for operating CD ROMs and videodisc players, and new HyperTalk scripting capabilities. As with original HyperCard IIGS, version 1.1 is also in color.

Apple IIGS System 6 provides similar ease-of-use and functionality now available with the System 7 Finder for the Macintosh.

## Features and Benefits of Apple IIGS System 6 -----

- Three New File System Translators  
These provide easy access to Macintosh disks, Pascal disks, and Apple II DOS 3.3 disks
- Control Panel and Desk Accessory Enhancements  
You can open control panels directly from the desktop. The software incorporates Find File and Calculator desk accessories.
- Finder Help  
You can access Finder Help through pop-up menus and keep it on screen while stepping through procedures.
- Enhanced Window Handling and Window Appearance  
It's easier to move between and manage multiple windows on a single screen.
- Two New Applications: Teach and Archiver  
Teach is a desktop text processor that enables you to jot down notes, read disk files, and create formatted or unformatted text documents. Teach also provides file import capability from ASCII, AppleWorks version 3.0, AppleWorks GS, MacWrite version 5.0 formats, and AppleWriter. Archiver offers flexible hard disk backup functions to save and restore either individual files or entire volumes.
- Media Control Toolset  
This is a new tool/driver/control panel/desk accessory combination that allows you to integrate, configure, and manage highly sophisticated multimedia effects. Use it in conjunction with HyperCard IIGS version 1.1 to optimize the toolset's performance.
- The Universal Access Suite  
This suite (also available on Macintosh System 7 software) opens the Apple IIGS to disabled users via Video Keyboard, Easy Access, and Closeview programs.

## APPLE II COMPUTER TECHNICAL INFORMATION

- As with the System 5 series, Apple IIGS System 6 users can network their Apple IIGS computers with each other and with Apple IIe, Macintosh, and MS-DOS computers. However, System 6 improves networking functionality via EasyMount, a new feature that allows users to mount a network server with a simple double-click command.
- Apple IIGS System 6 replaces Apple IIGS System 5.0.4 for the stand-alone Apple IIGS, providing a consistent graphical interface and high performance for both the individual and networked user.

### Speed and Feature Enhancements for HyperCard IIGS 1.1

-----

- Media Control Stack  
This allows control of external media devices such as laserdisc players and CD-ROM drives from within the stack. A common interface to two external devices provides control, using standard buttons or floating control panels for "Play," "Fast Fwd," and so on.
- Tune Builder Stack  
This allows you to create short original tunes by simply clicking the mouse on the stack's music staff. You can play notes in variable time, and with the voices of a large collection of instruments. You can use these tunes as enhancements to other original stacks by cutting and pasting.
- Features from Macintosh HyperCard Versions 2.0 and 2.1
  - HyperTalk extensions
  - X Windows
- The Apple IIGS SuperDrive Controller Card  
Available for the enhanced Apple IIe and Apple IIGS, this allows users to use Apple's SuperDrive, which permits the use of 1.4MB floppy disks. The SuperDrive card also operates all other Apple II 3.5 disk drives.

### System Requirements

-----

- Apple IIGS personal computer with at least 1MB of RAM, ROM version 01 or 03 and one 3.5-inch disk drive, although configurations of 2MB of RAM and a hard drive is recommended for optimal performance.
- Networked systems require Apple IIGS computers with at least 768K RAM, ROM version 01 or 03, and appropriate LocalTalk cables.
- HyperCard IIGS version 1.1 requires an Apple IIGS personal computer with 1.5MB RAM, one 800K disk drive and hard disk or connection to a networked environment, and system software 5.0.3 or subsequent version.

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Keywords:

### END OF FILE A2TIL176.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL177.TXT  
#####

Description: Apple IIGS: System Diagnostic Errors  
Header: Apple IIGS: System Diagnostic Errors

This article last reviewed: 10 November 1988

Here's the currently available, though incomplete, list, with explanations, of error codes generated by the Apple IIGS when running system diagnostics for the Apple II Family (V1.0B1).

Apple IIGS error codes have the form AABBCDD.

Test numbers AA

Error Code (AA)	Test
-----	-----
"RM"/01	Checksum
02	RAM Moving Inversions
03	Softswitch
04	RAM Address
05	FPI Speed
06	Serial I/O
07	Real Time Clock
08	Battery RAM
09	Front Desk Bus
0A	Shadowing
0B	Interrupts

AA=06 serial test	BB Meaning
--	-----
01	Register R/W
04	Tx Buffer empty status
05	Tx Buffer empty failure
06	All sent status fail
07	Rx char available
08	Bad data

AA=03 RAM test  
BBCC= Address

AA=01 ROM Checksum  
BB= Failed checksum  
DD=1 Bad RAM

AA=05 Speed  
BB=1 speed stuck slow  
BB=2 speed stuck fast

AA=08 Battery RAM  
BB=01 address test failure and CC= bad address  
BB=02 memory failure and CC = pattern, DD = Address

AA=02 Softswitches  
Eb= Statereg bit  
CC= Read softswitch address

AA=04 Front Desk Bus  
BBCC= Bad checksum found  
DD=01 FDB toolcode encountered a fatal error and no checksum computed

## APPLE II COMPUTER TECHNICAL INFORMATION

AA=04 Ram Address

BB= failed bank No

CC= failed bit

AA=06 Clock Test

BCCDD=not used

DD=01 a fatal error occurred after the test to within a second

AA=0A shadow register functionality

AA=0B Mega II and VGC capability of generating interrupts.

BB=01 VBL interrupt timeout

BB=02 VBL IRQ status fail

BB=03 1/4 SEC interrupt

BB=04 1/4 SEC interrupt

BB=05 ---

BB=06 VGC IRQ

BB=07 SCAN Line

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Keywords:

### END OF FILE A2TIL177.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

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#####  
### FILE: A2TIL178.TXT  
#####
```

Description: Apple IIGS: Tabbing In Applesoft BASIC  
Header: Apple IIGS: Tabbing In Applesoft BASIC

This article last reviewed: 21 April 1989

An Applesoft "PRINT TAB" statement, such as:

```
PRINT TAB(10);"A"; TAB(20);"B"; TAB(30);"C"
```

works on the Apple IIe and ImageWriter II, provided that you precede it with a Tab Enable statement. For example

```
PRINT CHR$(9);"T E"
```

However, the PRINT TAB statement (shown above) on an Apple IIGS and an ImageWriter II results in spacing 10 or 20 spaces rather than tabbing to those columns. When using PRINT TAB for screen formatting, there is no such problem.

The reason for this is that, when printing hardcopy, PRINT TAB appears to be tabbing the specified spaces from last character. For example:

```
50 PRINT TAB (20);"Column 20";TAB (40);"Column 40"
```

causes the first tab to be placed at column 20, but the second tab is placed at column 68. Here's why. The first tab statement puts the cursor at column 20. Because the Tab Enable statement defines each tab as 9-characters wide, the tab extends from column 20 to column 28 (one character at column 20 with the remaining 8 characters pushing the last character out to column 28). When the TAB 40 statement executes, 40 spaces are added to the last cursor location (column 28), placing the cursor at column 68.

There are two ways to handle this problem on the Apple IIGS. The first way is use the HTAB statement to format columns correctly:

```
40 HTAB 40:PRINT "Column 40":HTAB 60: PRINT "Column 60"
```

Old Apple II manuals state that this is not possible, but HTAB works correctly on the Apple IIGS, both on the screen and on the printer.

Overall, TAB and HTAB work as expected on the screen. When TAB and HTAB are used for printing, three factors must be considered:

- The type of Apple II.
- The interface card through which printing takes place.
- The active printer.

Each of these variables affect the TAB and HTAB commands when used in printing.

The second way to handle this is with the "A" command. Page 92 of the "Apple IIGS Firmware Reference Manual" states that the "A" command ('A'pplesoft Tabbing) duplicates the function of the "T" command of the Super Serial Card. Issuing this command makes the TAB command work as you would expect when using a printer.

Note: The command name ("A") was changed to avoid a conflict between

APPLE II COMPUTER TECHNICAL INFORMATION

"T"erminal mode and "T"abbing.

Keywords:

### END OF FILE A2TIL178.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

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### FILE: A2TIL179.TXT  
#####

Description: Apple IIGS: Using on AppleTalk Phase II Network  
Header: Apple IIGS: Using on AppleTalk Phase II Network

This article last reviewed: 15 July 1990

TOPIC -----

I'm running an Apple IIGS, with GS/OS 5.02, on an AppleTalk LAN with a "II bootblocked" AppleShare server.

Can I upgrade this network to AppleTalk Phase II? I assume that if I do, my Apple IIGS computers will boot from a server in their own zone. What if I want to have two servers in one physical zone? Where will the Apple IIGS computers boot from?

DISCUSSION -----

AppleTalk Phase II has no effect on LocalTalk. The enhancements that Phase II provides are only for EtherNet and Token Ring

There was an upgrade to the boot blocks for loading GS/OS on the server. This is included with GS/OS 5.02 on a new Apple II setup disk.

The Apple IIGS will boot from the first server it finds.

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Keywords:

### END OF FILE A2TIL179.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL180.TXT  
#####

Description: Apple IIGS: Using with a MicroNet Hard Drive  
Header: Apple IIGS: Using with a MicroNet Hard Drive

Article Created: 14 May 1991  
Article Last Reviewed: 27 May 1991  
Article Last Updated:

TOPIC -----

I'm having a problem getting an Apple IIGS to talk to a MicroNet SCSI 30MB HD. I have an Apple High-Speed SCSI card, MicroNet HD, and a 1MB Apple IIGS. I also have v2.0 of the High-Speed SCSI Card Utilities.

Although my Apple II SCSI Utilities see the HD, I can't get GS/OS (v5.0.2) to see the drive.

DISCUSSION -----

Assuming the hard drive is compatible with the Apple IIGS (check with MicroNet) here's what you need to do:

Make a new bootable System Tools disk, using the Installer from the SCSI utilities disk, and specifically install the SCSI driver from the new utilities disk that came with the SCSI card. This makes the disk realize there is a SCSI device attached. As the system starts up, it looks for SCSI devices and if it finds one that should be readable but is not, it will then ask if you want to initialize.

Make sure the slot the SCSI card is installed in is properly set in the Control Panel. (That slot should say "your card".)

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Keywords:

### END OF FILE A2TIL180.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

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### FILE: A2TIL181.TXT  
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```

Description: Apple IIGS: Video Generation Chip (VGC)  
Header: Apple IIGS: Video Generation Chip (VGC)

This article last reviewed: 23 October 1986

The Video Generation Chip (VGC) supports video output from the Mega II for both Apple II graphics and Super Hi-res graphics, provides an interface to the Real Time Clock chip, supports interrupt handling, and assists disk drive interfacing.

The VGC accepts color information from the Mega II, modifies it according to the current Control Panel selections, and puts out appropriate display information for the NTSC composite video jack and the Video RGB port. The VGC accesses text, background, and border information maintained in the Text and Background Color Register and Border Color Register. 4-bit value determines each of the three color areas, so that there are 16 possible colors for each. These colors correspond to the 16 Apple II Lo-res colors.

## Apple II Graphics and Text

If Apple II text mode is used, the VGC removes color information from the NTSC composite output signal, so that color fringing does not occur on a color composite monitor. If a mixed text/graphics mode is chosen, color fringing is unavoidable, since most composite monitors do not have the ability to respond quickly enough to a change in the chroma information. In this case, the bottom four lines of text will show a color fringing anomaly.

The VGC polls the Monochrome/Color Register to determine which type of video signal should be output. If monochrome has been chosen, the VGC will output appropriate dot patterns to represent the chosen colors, so that a monochrome composite monitor will display gray-scale images. An AppleColor RGB Monitor displaying double Hi-res graphics will also display gray-scale images if monochrome is selected.

## Super Hi-res Graphics

After the selection of one of the new Apple IIGS Graphics modes, the VGC is responsible for implementing the color mode. It uses memory in the auxiliary 64K bank of Apple II RAM to implement Super Hi-res graphics. In this display buffer, locations \$2000-\$9CFF are used for pixel information, \$9D00-\$9DFF are pointers that determine the characteristics of each line, and \$9E00-\$9FFF hold color palette information.

For 640 or 320 graphics modes, each pixel may be represented respectively by either 2 or 4 bits, wherein the value is a number of a color in the appropriate color palette. Each of the 200 pointers (one for each line) stores the display mode used, the color palette associated with that line, and a flag of enabled or disabled for scan line interrupts. Each of the 16 color palettes contains information on 16 colors. Each of the colors takes two bytes: 4 bits each for the value of red, green, and blue, which allows the three primary colors can be combined in 4096 different ways.

## Real Time Clock Interface

The Video Generation Chip also works as an interface between the 65816 microprocessor and the Real Time Clock Chip (RTC). A Real Time Clock register in the VGC is used as a command register for the RTC. The RTC then maintains calendar and clock information within parameter RAM.

## VGC Interrupts

## APPLE II COMPUTER TECHNICAL INFORMATION

Two types of internal interrupts are handled by the VGC: the One-Second interrupt generated by the Real Time Clock Chip and the Scan-Line interrupt generated by scan line information in Super Hi-res mode. The status and enable states of these interrupts are found in the VGC Interrupt Register and the VGC Interrupt Clear Register. The VGC also handles one external interrupt line.

### VGC Disk Register

The VGC Disk Register, used as a control register for the disk drive interface, functions in choosing the head to use and the type of drive selected.

Keywords:

### END OF FILE A2TIL181.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

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### FILE: A2TIL182.TXT  
#####

Description: Apple III : Won't Boot AII Disk Calibrate in AII Emulation  
Header: Apple III : Won't Boot AII Disk Calibrate in AII Emulation

Article Created: 11 March 1986  
Article Last Reviewed: 17 July 1992  
Article Last Updated:

PROBLEM DESCRIPTION: Apple II Disk Calibration Program will not boot on the Apple III in Apple II Emulation mode.

CAUSE: Peripheral cards may be interfering with the Apple II Disk Calibration program.

CURE: Power down the Apple III and remove ALL interface cards, (especially the ProFile interface card). Reboot the Apple II Emulation Disk then load and run the Apple II Disk Calibration Program.

If this cure does not resolve the problem, go back to the Word Search screen and search on the product's name and HTS and GTS to obtain a General Troubleshooting procedure.  
Copyright 1988, Apple Computer, Inc.  
Keywords: hts

### END OF FILE A2TIL182.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL183.TXT  
#####

Description: Apple III QuickFile: Converting Data to Macintosh  
Header: Apple III QuickFile: Converting Data to Macintosh

This article last reviewed: 25 March 1988

One method of moving Apple III QuickFile data to a Macintosh involves AppleWorks running on an Apple II with both a 5.25" disk drive and a 3.5" disk drive.

1. Because Apple III SOS and Apple II ProDOS are file-compatible, AppleWorks running on an Apple II can read QuickFile files from an Apple III's 5.25" disk.
2. The AppleWorks files can then be saved to a 3.5 disk.
3. A Macintosh running AFE (Apple File Exchange) can then read, via AFE's Works-to-Works transporter, the files into Microsoft Works.

Keywords:

### END OF FILE A2TIL183.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL184.TXT  
#####

Description: Apple III Universal Parallel Interface Card (UPIC)  
Header: Apple III Universal Parallel Interface Card (UPIC)

This article last reviewed: 2 November 1988

DI=Data In  
DO=Data Out

PIN OUTS

20 Pin Connector

Pin Number	Signal	Pin Number	Signal
1	..... Signal Ground	11	..... Port A output DO1
2	..... Acknowledge input	12	..... Port A output DO2
3	..... Port B input DI0	13	..... Port A output DO3
4	..... Port B input DI1	14	..... Port A output DO4
5	..... Port B input DI2	15	..... Port A output DO5
6	..... Port B input DI3	16	..... Port A output DO6
7	..... Port B input DI4	17	..... Port A output DO7
8	..... Strobe output	18	..... Port B input DI6
9	..... Port B input DI5	19	..... Port B input DI7
10	..... Port A output DO0	20	..... Signal Ground

40 Pin Connector

1	..... Port B output DO0	21	..... Port A output DO1
2	..... Port B output DO1	22	..... Port A output DO2
3	..... Port B output DO2	23	..... Port A output DO3
4	..... Port B output DO3	24	..... Port A output DO4
5	..... Port B output DO4	25	..... Port A output DO5
6	..... Port B output DO5	26	..... Port A output DO6
7	..... Port B output DO6	27	..... Port A output DO7
8	..... Port B output DO7	28	..... Port B input DI6
9	..... Pin removed	29	..... Port B input DI7
10	..... Pin removed	30	..... Signal Ground
11	..... Signal Ground	31	..... Pin removed
12	..... Acknowledge input	32	..... Pin removed
13	..... Port B input DI0	33	..... Data ready output
14	..... Port B input DI1	34	..... Signal ground
15	..... Port B input DI2	35	..... Signal ground
16	..... Port B input DI3	36	..... Signal ground
17	..... Port B input DI4	37	..... Signal ground
18	..... Strobe output	38	..... Data ready ACK in
19	..... Port B input DI5	39	..... Signal ground
20	..... Port A output DO0	40	..... Signal ground

DATA CONFIGURATION BLOCK

Commonly used configurations for the driver .PRINTER on the SOS 1.3  
Update diskette are listed in the following table.

Printer                    Device configuration block (DCB) values  
ERRMASK ERRSTAT AUTOLF CTRLWRD TIMEOUT

APPLE II COMPUTER TECHNICAL INFORMATION

	00	01	02	03	04
Centronics 779/700	E0	C0	40	00	0A
Centronics 730/737	C0	C0	00	00	5A
Anadex DP-8000	E0	C0	00	00	5A
Printronix P300	E0	C0	00	00	0A
C.Itoh 8510A	E8	C8	40	00	0A
IDS 440/445/460	60	40	00	00	5A
Epson MX-80	E8	C8	00	00	0A
TI 810	E8	C0	00	00	0A
Any printer connected with Apple II cable	00	00	00	00	00

For further information on the Data Configuration Block please refer to page 19 onwards of the Universal Parallel Interface card manual.

NOTE:

The driver .PARALLEL is used for two way communications i.e. for input and output, when using the 40 pin connector. This driver has a three byte configuration block. Please refer to pages 29 onwards in the UPIC manual for more information.

Copyright 1988 Apple Computer, Inc.

Keywords: HTS,CNFG

### END OF FILE A2TIL184.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL185.TXT  
#####
```

Description: Apple III: Apple Disk Drives and Emulation Mode  
Header: Apple III: Apple Disk Drives and Emulation Mode

The Apple II emulation mode on the Apple III is configured so that the internal drive looks like Slot 6, Drive 1 and the first external drive looks like Slot 6, Drive 2. Emulation mode can't access the third or the fourth external drive.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL185.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL186.TXT  
#####
```

Description: Apple III: Apple II Emulation mode and RGB Video  
Header: Apple III: Apple II Emulation mode and RGB Video

The Apple III's RGB color video outputs do NOT generate a color signal for High-Resolution Graphics in the Emulator. Apple II High-Resolution images are available only on the NTSC black and white and color video outputs.

On the left border of the high-resolution graphics screen, the dots flicker uncontrollably.  
Apple III Owner's Guide, page 144

Keywords:

```
### END OF FILE A2TIL186.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL187.TXT  
#####

Description: Apple III: Cables for Various Printers (1 of 4)  
Header: Apple III: Cables for Various Printers (1 of 4)

Version 1.0

Special Cables:

APPLE III DRIVERS AID CABLE "A"

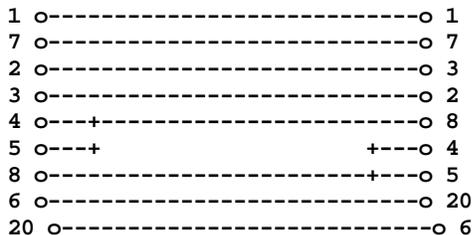
(This is the diagram for the "standard" Apple Distributed Modem Eliminator cable; Apple Part Number A3M0019).

Device Manufacturer and Models:

- Apple Daisy Wheel Printer (Apple P/N A3M0025)
- Apple Sprint 5/45 (Apple P/N D2M0060)
- C. Itoh F-10
- MPI 88G
- MPI 99G
- Comrex CR-1
- Brother HR-1
- Hewlett Packard 7725
- Hewlett Packard 7470A
- Anderson Jacobson 832
- Anderson Jacobson 833
- Anderson Jacobson 841
- Qume Sprint 11

Pin-to-Pin Connections:

Apple II (Male) Serial Device (usually Female)



Wiring Comments:

- Tie Apple III pins 4 + 5 together
- Tie device pins 4 + 5 together
- Apple III pins 4 + 5 tie to device pin 8
- Device pins 4 + 5 tie to Apple III pin 8

NOTE: For proper operation when using the Apple III Super Serial Card (Apple P/N A2B0044) in an Apple III make sure that switch SW 2-6 (on the card) is in the "ON" position and that the jumper block (also on the card) is in the "TERMINAL" Position.

Apple III Drivers Aid Cable "B"

Device Manufacturer and Models:

- NEC 3500R
- NEC 3510
- NEC 3515
- NEC 3520
- NEC 3525

APPLE II COMPUTER TECHNICAL INFORMATION

NEC 7710  
NEC 7715  
NEC 7720  
NEC 7725

Pin-to-Pin Connections:

Apple III (Male)                    N.E.C. Spinwriter (usually Female)

1	o-----o	1
2	o-----o	3
3	o-----o	2
4	o----+	+---o 4
5	o----+	+---o 5
7	o-----o	7
8	o-----o	19
		+---o 6
		---o 8
		+---o 20

Wiring Comments:

Tie Apple III pins	Tie device pins
4 + 5 together; they do	4 + 5 together; they do
not connect to the device	not connect to the Apple III

Tie device pins  
6 + 8 + 20 together; they do  
not connect to the Apple III

Do NOT tie all five:  
4, 5, 6, 8 + 20 together!

Note: For proper operation when using the Apple III Super Serial Card (Apple P/N A2B0044) in an Apple III make sure that switch SW 2-6 (on the card) is in the "ON" position and that the jumper block (also on the card) is in the "TERMINAL" Position. Apple III Drivers Aid Cable "C" description on next record.

Apple Technical Communications

Keywords:

### END OF FILE A2TIL187.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL188.TXT  
#####

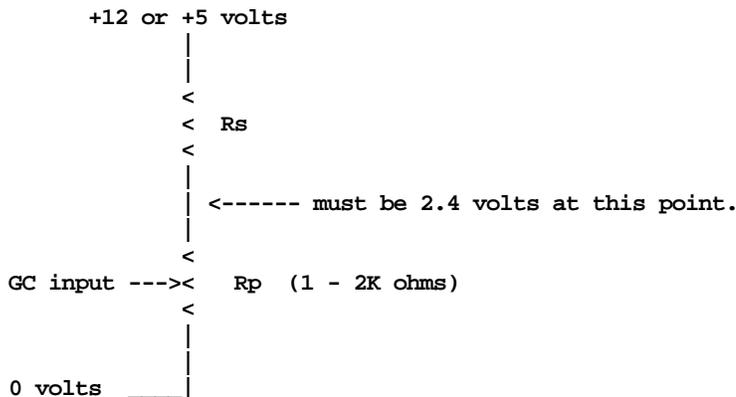
Description: Apple III: Game Paddles  
Header: Apple III: Game Paddles

This article last reviewed: 21 September 1984

Standard Apple II 150K game paddles cannot be used with the Apple III. A high impedance potentiometer like the Apple II paddle will not work properly connected to an Apple III port.

The analog inputs on Port A and Port B of the Apple III are designed to read a voltage between 0 and 2.4 volts and convert it to a number between 0 and 255. The schematic on page 82 of the Apple III Owner's Guide is drawn for a joystick with 5,000 ohm potentiometers. Only the bottom 20% of the potentiometer's range is used. Using the +12 volt power supply will result in the most stable readings.

The following circuit can be used if the entire range of the potentiometer is desired.



The voltage range at the GC inputs should go from 0v to 2.4v. The value of Rs can be calculated for +5 volt systems with this formula:

$$Rs = Rp * 2.6 / 2.4$$

For +12 volt systems use

$$Rs = Rp * 9.6 / 2.4$$

1988

Keywords:

### END OF FILE A2TIL188.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL189.TXT  
#####
```

Description: Apple III: Interrupts and Reset on Peripheral Slots  
Header: Apple III: Interrupts and Reset on Peripheral Slots

The Apple III slots can not respond to IRQ or RESET from the peripheral cards in emulation mode. There is no way around it because the hardware is different. NMI is not on the same pin as in the Apple II and will act like RESET on the Apple II.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL189.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL190.TXT  
#####

Description: Apple III: Joystick Input--Apple II Game Incompatibility  
Header: Apple III: Joystick Input--Apple II Game Incompatibility

This article last reviewed: 21 September 1984

Some machine language games that use the paddle inputs will not work on the Apple III. The hardware for reading the analog inputs is different, and some software will not be able to take this into account.

Also, the joystick ports on the back of the Apple III are arranged such that some games won't work properly in Emulation mode. Most joystick oriented games will use PDL (0) and PDL (1) for X-Y control. The ports on the Apple III put these signals on different connectors. Here are the Apple II Emulation Mode equivalents of the signals available on ports A and B.

pin	Port A	Port B
4	PDL (0)	PDL (1)
5	PB1	PB2
8	PDL (2)	PDL (3)
9	PB3	

Copyright 1984 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL190.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL191.TXT  
#####
```

Description: Apple III: Printing from BASIC and Pascal  
Header: Apple III: Printing from BASIC and Pascal

Many times it is desirable to have a program send selective, processed output to the printer. Both Business BASIC and Pascal have the commands to handle this chore; however, none of the language reference manuals provide an example for printing to a printer where the syntax of the commands is illustrated.

When directing output to the printer, it is important to remember that Apple III's Sophisticated Operating System (SOS) treats everything as a file. In this sense, any output, whether to a printer or diskette, is handled identically:

1. Programs pass data to SOS as files.
2. In SOS, the SOS File Manager passes the file to the appropriate device driver.
3. The device driver passes the output to the selected device.

The device driver does the job of transmitting the output in the fashion that the device requires it. Input data follows the same path, only in reverse. Understand these passes of files through the operating system. SOS and the device drivers can handle the details; you must handle the concept.

Here is an example of printing to both screen and printer from a Business BASIC program. Without the delay subroutine in line 100, everything would appear to happen at once, so we have it in the program only to improve the sense of sequence during execution.

```
10 OPEN#1, ".printer": REM Declare the printer as a file.  
20 PRINT "This is a test.": GOSUB 100  
30 REM Output goes to the screen.  
40 PRINT#1 "This is a test.": GOSUB 100  
50 REM Output goes to File #1, the printer.  
60 PRINT "This goes to the screen.": GOSUB 100  
70 REM Without file specification  
80 PRINT#1 "This goes to the printer."  
90 CLOSE#1: END: REM Close the file ".printer" and end.  
100 FOR delay = 1 to 2000: NEXT delay: RETURN
```

The program could also use ".silentype" for the printer device driver.

The separate statements OUTPUT#x and PRINT can be used in succession to direct output to device x.

For instance, to simply list a program to the printer, the following commands can be entered at the keyboard in direct mode.

```
OPEN#1, .printer (Notice, no quotes are needed in direct mode.)  
OUTPUT#1 (Routes all subsequent output to File #1)  
LIST  
CLOSE (CLOSE in place of CLOSE#1 will close all  
files instead of ".printer" -- with no other  
files open it's just easier to type.)
```

There are other useful commands using this concept which are variations of other familiar BASIC commands besides PRINT. They are GET#1, INPUT#1, READ#1, and WRITE#1. The Apple III can have as many as ten files open for input and output at one time, so, where "#1" is used in the examples, it could be "#7", and so on.

## APPLE II COMPUTER TECHNICAL INFORMATION

The following is an example of how to print both to the screen and printer from a Pascal program. Again, the delay procedure is not necessary.

```
program PRINT_OUTPUT;
  var OutFile: text;

  procedure DELAY;
    var Count: integer;
    begin
      for Count := 1 to 2000 do
        end; {Delay}

begin
  rewrite (OutFile, '.printer'); {Declare the printer}
                                {as a file.}
  writeln ('This is a test. '); {Output goes to the screen.}
  DELAY;
  writeln (OutFile, 'This is a test. '); {Output goes to}
                                           {the printer.}

  DELAY;
  writeln ('This goes to the screen. ');
  DELAY;
  writeln (OutFile, 'This goes to the printer. ');
  close (Outfile) {Close the file ".printer" and end.}
end. {Print_Output}
```

The Apple III can have as many as ten files open for input and output at one time; "OutFile" is only one. Additional files can be declared with additional REWRITE statements.

To simply list a program to the printer, go to the Filer and transfer the text file to .PRINTER (for the Apple III) or to PRINTER: (for the Apple II and Apple IIe).

Since Pascal treats output as a file, both of these examples work with both Apple II and Apple III Pascal.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL191.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL192.TXT  
#####

Description: Apple III: Specifications (Discontinued 9/85)  
Header: Apple III: Specifications (Discontinued 9/85)

Article Created: 14 March 1991

## Video Display

-----  
Text and graphics may be displayed simultaneously. Using graphics commands you can display either of two screen buffers.

### Graphics modes:

- \* 280 x 192, 16 colors (with some limitations)
- \* 280 x 192, monochromatic; -140 x 192, 16 colors
- \* 560 x 192, monochromatic
- \* All Apple II modes (in emulation)

### Text modes:

- \* 80-column, 24-line monochromatic
- \* 40-column, 24-line, 16-color foreground and background
- \* 40-column, 24-line monochromatic

All text modes have a software-definable 128-character set (uppercase and lowercase) with normal or inverse display.

## Central Processing Unit (CPU)

-----  
The custom-designed microprocessor circuitry of the Apple III uses the 6502B as its major component. Other circuitry provides extended addressing capability, relocatable stack, zero page, and memory mapping.

- \* Type: 6502B
- \* Clock Speed: 1.4 MHz average; 1.8 MHz max
- \* Operations per Second (8-bit): up to 750,000
- \* Data Bus: two 8-bit formats, combined for extended addressing
- \* Address Bus: 19 bits
- \* Address Range: 262,144 bytes (256K)
- \* Registers:  
Accumulator (A); Index Registers (X,Y); Stack Pointer (S); Program Counter (PC); Environmental Register (E); Bank (B); Zero Page (Z); Processor Status (P)

## Memory

- 
- \* 256K dynamic RAM
  - \* 4K ROM (initialization and self-test diagnostics)

## SOS (Sophisticated Operating System)

-----  
SOS handles all system I/O and can be configured to handle standard or custom I/O devices and peripherals by adding or deleting "device drivers." All languages and application programs access data through the SOS file system.

## Keyboard

- 
- \* 61 keys on main keyboard
  - \* 13 keys on numeric keypad
  - \* Full 128-Character, ASCII encoded
  - \* All keys have automatic repeat
  - \* Four directional-arrow keys with two-speed repeat
  - \* Two user-definable Apple keys
  - \* Seven other special keys: Shift, Control, Alpha Lock, Tab, Escape,

# APPLE II COMPUTER TECHNICAL INFORMATION

Return, Enter.

## Storage Devices

-----

- \* One built-in 5.25-inch, floppy-disk drive, 140K (143,360 bytes) per diskette
- \* You can connect three additional drives by daisy-chain cable (total: 560K on-line storage)
- \* You can add up to four ProFile hard-disk drives (5MB each) with plug-in interface cards

## Video Output

-----

- \* RCA phono connector for NTSC monochromatic composite video
- \* DB-15 connector for:
  - \* NTSC-color composite video
  - \* NTSC monochromatic composite video
  - \* RGB color video
  - \* Composite sync signal
  - \* Power-supply voltages
- \* Color signals appear as 16-level grey scale on monochromatic displays

## Audio Output

-----

- \* Built-in two-inch speaker, miniature phono jack on back panel
- \* Driven by 6-bit D/A converter or fixed frequency "beep" generator

## Serial (Printer/Modem) Port

-----

- \* RS-232C compatible, DB-25 female connector
- \* Software-selectable baud rate and duplex mode
- \* You can use one port for the Silentype printer.

## Expansion Ports

-----

- \* Four 50-pin expansion slots (fully buffered, with interrupt and DMA priority structure)
- \* Joystick/Silentype Ports: Two DB-9 connectors

## Languages Available

-----

- \* Apple Business BASIC
- \* Apple III Pascal
- \* Apple III COBOL

## Emulation Mode

-----

This mode provides hardware emulation of 48K Apple II Plus. It can run most Apple II programs, with the exception of Pascal and FORTRAN, without modification.

## Electrical Specifications

-----

Plug the Apple III's power cord into a three-wire 110-120 VAC outlet. The Apple III meets the following agency regulations:

- \* UL 114, Office Appliances and Business Equipment
- \* CSA 22.2, No. 154-Data Processing Equipment

## Physical Specifications

-----

- \* Height: 4.8 in. (12.20 cm)
  - \* Depth: 18.2 in. (46.22 cm)
  - \* Width: 17.5 in. (44.45 cm)
  - \* Weight: 26 lb. (11.8 kg)
- Copyright 1991, Apple Computer, Inc.  
Keywords: SPECSHT

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL192.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL193.TXT  
#####

Description: Apple LaserWriter Printers: Models Supporting Apple II (5/96)  
Header: Apple LaserWriter Printers: Models Supporting Apple II (5/96)

Article Created: 8 May 1996

TOPIC -----

This article contains a list of LaserWriter models supporting the Apple II computer series.

DISCUSSION -----

In order for an Apple LaserWriter to work with an Apple II system, the LaserWriter hardware needs to support Diablo (straight text) mode. Diablo mode allows the printer to understand text data from the Apple II and convert that data into a printed page. The Apple LaserWriters supporting hardware Diablo mode are the:

- LaserWriter (original model) LaserWriter Plus
- LaserWriter IINT
- LaserWriter IINTX
- Personal Laserwriter NT

To put the LaserWriter hardware in Diablo (straight text) mode, do the following:

Begin\_Table

Model	What to do for Diabo mode
LaserWriter	Change dial on back of LaserWriter to SPECIAL
LaserWriter Plus	Change dial on back of LaserWriter to SPECIAL
LaserWriter IINT	Dipswitch 1 = UP Dipswitch 2 = Down
LaserWriter IINTX	Dipswitch 2 = UP Dipswitch 3 = UP ALL Others = DOWN
Personal LaserWriter NT	Change pinwheel dial to Setting 3

End\_Table

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Keywords:

### END OF FILE A2TIL193.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL194.TXT  
#####

Description: Apple Logo II: Specifications (Discontinued)  
Header: Apple Logo II: Specifications (Discontinued)

Order #: D2D0100

--Technical Specifications

Operating System: DOS; for use with Logo II, Logo DOS files can be converted to ProDOS files with the CONVERT program on the ProDOS User's Disk or the II System Utilities Disk

--Package

1. Disk: Apple Logo Master
2. Disk: Apple Logo Backup
3. Manual: An Introduction to Programming through Turtle Graphics
4. Manual: Apple Logo Reference

--System Configuration

1. Apple II Plus, IIe or IIc personal computer
2. Apple II disk drive with controller
3. Apple Language Card
4. Video Display: television or monitor
5. Recommended: ImageWriter or other compatible printer; color display;  
AppleMouse

Apple Technical Communications

Keywords: SPECSHT

### END OF FILE A2TIL194.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL195.TXT  
#####

Description: Apple Pascal 1.3: Startup Slot  
Header: Apple Pascal 1.3: Startup Slot

This article last reviewed: 21 January 1991

TOPIC -----

What is the memory location for the slot number of the drive that Apple Pascal starts up from? How can I change that information or location so the computer will think it was booted from the RAM disk (to which I've already copied the appropriate system files)?

DISCUSSION -----

The internals of Apple II Pascal are proprietary and confidential and we cannot divulge such information.

However, it is possible to completely load Apple II Pascal into an Apple II RAM Expansion card and start up from it. Here's how:

- 1) Once you have started Apple Pascal and you are at the command line, type F(ile.
- 2) At the second command line, type V(ols. Write down the volume number with 2048 blocks. This is your RAM Expansion Card volume number.
- 3) Format the RAM Expansion Card. Type Q(uit and then X(ecute. This will prompt you for a file name. Type "Formatter" and press Return. Formatter will ask you for a volume to format: type the volume number you wrote down in step 2, and press Return.
- 4) Do a wild card copy of all the files on Volume 4 to the volume number of your RAM Expansion Card. Type F(ile then T(rans. When you're asked "Transfer What File?", type "#4:=" and press Return. At the "to where?" prompt, type your RAM Expansion Card volume number followed by ":@" and press Return.
- 5) When the copying is finished, make your RAM Expansion Card the startup volume. Type Q(uit followed by another Q and Y. Finally, type Control-Reset.
- 6) At the Applesoft BASIC prompt, type "PR#" followed by the slot number of your RAM Expansion Card. Pascal should start up.

Apple Pascal supports a maximum of 128K RAM for system memory use, and the remaining RAM may be used as a RAM disk only.

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Keywords:

### END OF FILE A2TIL195.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL196.TXT  
 #####

Description: Apple Products: Dates Introduced and Discontinued (2/97)  
 Header: Apple Products: Dates Introduced and Discontinued (2/97)

Article Created: 20 November 1992  
 Article Reviewed/Updated: 25 February 1997

TOPIC -----

This article lists the approximate date of introduction and, where applicable, the date when the model was discontinued for various Apple products. Dates which are missing from the table will be added as they occur.

DISCUSSION -----

Begin\_Table

COMPUTER SYSTEMS  
 =====

Apple II Series	Introduced	Discontinued
-----	-----	-----
Apple II	August 1978	December 1982
Apple II+	June 1979	June 1983
Apple IIc	April 1984	September 1988
Apple IIc Plus	September 1988	November 1990
Apple IIe	January 1983	March 1985
Apple IIe Enhanced	March 1985	November 1993
Apple IIGS	September 1986	December 1992

Apple III Series	Introduced	Discontinued
-----	-----	-----
Apple III	May 1980	September 1985
Apple III+	December 1983	September 1985

Lisa	Introduced	Discontinued
----	-----	-----
Lisa 2	January 1984	January 1985
Lisa 2/5	January 1984	January 1985
Lisa 2/10	January 1984	January 1985

Macintosh	Introduced	Discontinued
-----	-----	-----
Mac 128K	January 1984	October 1985
Mac 512K	September 1984	April 1986
Mac 512Ke	April 1986	August 1986
Mac Plus	January 1986	October 1990
Macintosh Classic	October 1990	October 1991
Macintosh Classic II	October 1991	September 1993
Macintosh Color Classic	February 1993	May 1994
Macintosh LC	November 1990	March 1992
Macintosh LC II	March 1992	March 1993
Macintosh LC III	February 1993	February 1994
Macintosh LC 475	October 1993	
Macintosh LC 520	June 1993	February 1995
Macintosh LC 550	February 1994	April 1995
Macintosh LC 575	February 1994	April 1995
Macintosh LC 580	April 1995	
Macintosh LC 630	July 1994	April 1995
Macintosh LC 630		
DOS Compatible	April 1995	April 1996
Macintosh Portable	September 1989	January 1991

APPLE II COMPUTER TECHNICAL INFORMATION

Macintosh SE	March	1987	October	1990
Macintosh SE/30	January	1989	October	1990
Macintosh SE FDHD	August	1989	October	1990
Macintosh TV	October	1993		
Macintosh XL	January	1985	August	1986

Macintosh II	Introduced		Discontinued	
-----	-----		-----	
Macintosh II	March	1987	January	1990
Macintosh IIX	October	1988	October	1990
Macintosh IICx	March	1989	March	1991
Macintosh IICI	September	1989	February	1993
Macintosh IIFx	March	1990	April	1992
Macintosh IISI	October	1990	March	1993
Macintosh IIVx	October	1992	October	1993

Centris	Introduced		Discontinued	
-----	-----		-----	
Macintosh Centris 610	February	1993	October	1993
Macintosh Centris 650	February	1993	October	1993
Macintosh Centris 660AV	August	1993	October	1993

Quadra	Introduced		Discontinued	
-----	-----		-----	
Quadra 605	October	1993	October	1994
Quadra 610	October	1993	May	1994
Quadra 630	July	1994	April	1995
Quadra 650	October	1993	September	1994
Quadra 660AV	October	1993	September	1994
Quadra 700	October	1991	March	1993
Quadra 800	February	1993	March	1994
Quadra 840AV	August	1993	July	1994
Quadra 900	October	1991	May	1992
Quadra 950	May	1992	October	1995

Power Macintosh	Introduced		Discontinued	
-----	-----		-----	
Power Macintosh 4400/160 (Europe only)	November	1996		
Power Macintosh 4400/200	February	1997		
Power Macintosh 5200/75 LC	April	1995	April	1996
Power Macintosh 5260/100	April	1996		
Power Macintosh 5260/120	October	1996		
Power Macintosh 5300/100 LC	September	1995		
Power Macintosh 5400/120	April	1996		
Power Macintosh 5400/180	October	1996		
Power Macintosh 5500/225	February	1997		
Power Macintosh 6400/200	October	1996		
Power Macintosh 6500/225	February	1997		
Power Macintosh 6500/250	February	1997		
Power Macintosh 6100/60	March	1994	January	1995
Power Macintosh 6100/60AV	March	1994	January	1995
Power Macintosh 6100/66	January	1995	October	1995
Power Macintosh 6100/66AV	January	1995	April	1995
Power Macintosh 6100/66				
DOS Compatible	January	1995		
Power Macintosh 7100/66	March	1994	January	1995
Power Macintosh 7100/66AV	March	1994	January	1995
Power Macintosh 7100/80	January	1995	January	1996
Power Macintosh 7100/80AV	January	1995	August	1995
Power Macintosh 7200/75	August	1995	March	1996
Power Macintosh 7200/90	August	1995		
Power Macintosh 7200/120	April	1996		
Power Macintosh 7200/120	April	1996	February	1997
PC Compatible				
Power Macintosh 7300/180	February	1997		

APPLE II COMPUTER TECHNICAL INFORMATION

Power Macintosh 7300/200	February	1997		
Power Macintosh 7500/100	August	1995		
Power Macintosh 7600/120	April	1996		
Power Macintosh 7600/200	November	1997		
Power Macintosh 8100/80	March	1994	January	1995
Power Macintosh 8100/80AV	March	1994	January	1995
Power Macintosh 8100/100	January	1995	October	1995
Power Macintosh 8100/100AV	January	1995	August	1995
Power Macintosh 8100/110	November	1994	August	1995
Power Macintosh 8200/100	April	1996		
Power Macintosh 8200/120	April	1996		
Power Macintosh 8500/120	August	1995		
Power Macintosh 8500/132	April	1996		
Power Macintosh 8500/150	April	1996		
Power Macintosh 8500/180	August	1996		
Power Macintosh 8600/200	February	1997		
Power Macintosh 9500/120	June	1995	May	1996
Power Macintosh 9500/132	June	1995	July	1996
Power Macintosh 9500/150	April	1996	August	1996
Power Macintosh 9500/200	August	1996		
Power Macintosh 9500/180MP	August	1996		
Power Macintosh 9600/200	February	1997		
Power Macintosh 9600/200MP	February	1997		

PowerBook	Introduced	Discontinued
-----	-----	-----
PowerBook 100	October 1991	July 1992
PowerBook 140	October 1991	August 1992
PowerBook 145	August 1992	June 1993
PowerBook 145b	June 1993	July 1994
PowerBook 150	July 1994	October 1995
PowerBook 160	October 1992	August 1993
PowerBook 165	August 1993	July 1994
PowerBook 165c	February 1993	December 1993
PowerBook 170	October 1991	October 1992
PowerBook 180	October 1992	May 1994
PowerBook 180c	June 1993	March 1994
PowerBook 190/66	August 1995	
PowerBook 190cs/66	August 1995	September 1996*
PowerBook 520	May 1994	June 1995
PowerBook 520c	May 1994	September 1995
PowerBook 540	May 1994	October 1994
PowerBook 540c	May 1994	August 1995
PowerBook 550c	May 1995	
(Available in Japan Only)		
PowerBook 1400cs/117	October 1996	
PowerBook 1400c/117	October 1996	February 1997
PowerBook 1400c/133	October 1996	
PowerBook 3400c/180	February 1997	
PowerBook 3400c/200	February 1997	
PowerBook 3400c/240	February 1997	
PowerBook 5300/100	August 1995	August 1996
PowerBook 5300c/100	August 1995	September 1996**
PowerBook 5300ce/117	August 1995	September 1996
PowerBook 5300cs/100	August 1995	August 1996
PowerBook Duo 210	October 1992	October 1993
PowerBook Duo 230	October 1992	July 1994
PowerBook Duo 250	October 1993	May 1994
PowerBook Duo 270c	October 1993	May 1994
PowerBook Duo 280	May 1994	November 1994
PowerBook Duo 280c	May 1994	January 1996
PowerBook Duo 2300c/100	August 1995	

NOTE:

\* The PowerBook 190cs 8/500 configuration was discontinued 9/96, the 4/500 configuration was not.

APPLE II COMPUTER TECHNICAL INFORMATION

\*\* The PowerBook 5300c 8/500 configuration was discontinued 9/96,  
the 16/750 configuration was not.

PowerBook Docking Solutions	Introduced	Discontinued
PowerBook Duo MiniDock	October 1992	August 1995
PowerBook Duo Dock	October 1992	July 1995
PowerBook Duo Dock II	May 1994	May 1995
PowerBook Duo Dock Plus	May 1995	

Performa	Introduced	Discontinued
Performa 200	October 1992	April 1993
Performa 400	October 1992	April 1993
Performa 405	April 1993	
Performa 410	October 1993	
Performa 430	April 1993	
Performa 450	April 1993	
Performa 460	October 1993	
Performa 466	October 1993	
Performa 467	October 1993	
Performa 475	October 1993	
Performa 476	October 1993	
Performa 550	October 1993	
Performa 560	January 1994	
Performa 575	April 1994	
Performa 577	April 1994	
Performa 578	April 1994	
Performa 580	May 1995	
Performa 588	April 1995	
Performa 600	October 1992	October 1993
Performa 630	July 1994	
Performa 630CD	July 1994	
Performa 631	July 1995	
Performa 635	July 1994	
Performa 635CD	July 1994	
Performa 636	July 1994	
Performa 637CD	July 1994	
Performa 638CD	July 1994	
Performa 640		
DOS Compatible	May 1995	
Performa 5200CD	July 1995	
Performa 5210	May 1995	
Performa 5215	July 1995	
Performa 5220	May 1995	
Performa 5300	October 1995	
Performa 6110	September 1994	
Performa 6112	September 1994	
Performa 6115	September 1994	
Performa 6116	July 1995	
Performa 6117	September 1994	
Performa 6118	September 1994	
Performa 6200	July 1995	
Performa 6205	August 1995	
Performa 6214	August 1995	
Performa 6216	July 1995	
Performa 6218	July 1995	
Performa 6220	July 1995	
Performa 6290	January 1996	
Performa 6230	July 1995	
Performa 6300	October 1995	
Performa 6320	April 1996	September 1996
Performa 6400	August 1996	
Performa 6360/160	October 1996	

Apple Servers	Introduced	Discontinued
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APPLE II COMPUTER TECHNICAL INFORMATION

Model	Introduced	Discontinued
Network Server 500/132	April 1996	
Network Server 700/150	April 1996	
Network Server 700/200	September 1996	
Workgroup Server 60	July 1993	October 1993
Workgroup Server 80	March 1993	October 1994
Workgroup Server 95	March 1993	April 1995
Workgroup Server 6150/60	April 1994	April 1995
Workgroup Server 6150/66	April 1995	October 1995
Workgroup Server 7250/120	Feb 1996	
Workgroup Server 8150/80	April 1994	
Workgroup Server 8150/110	April 1995	
Workgroup Server 8550/132	September 1996	
Workgroup Server 8550/200	September 1996	
Workgroup Server 8550/132	April 1996	
Workgroup Server 9150/80	April 1994	October 1994
Workgroup Server 9150/120	April 1995	

PRINTERS

=====

ImageWriters	Introduced	Discontinued
ImageWriter 15"	April 1984	September 1987
ImageWriter I	June 1984	December 1985
ImageWriter II	September 1985	
ImageWriter LQ	August 1987	December 1990

LaserWriters	Introduced	Discontinued
Color LaserWriter 12/600	June 1995	
LaserWriter	March 1985	February 1988
LaserWriter 12/640 PS	June 1996	
LaserWriter 16/600 PS	September 1994	
LaserWriter Plus	January 1986	February 1988
LaserWriter IISC	January 1988	July 1990
LaserWriter IINT	January 1988	October 1991
LaserWriter IINTX	January 1988	October 1991
LaserWriter IIif	October 1991	May 1993
LaserWriter IIg	October 1991	October 1993
LaserWriter Pro 600	January 1993	October 1993
LaserWriter Pro 630	January 1993	September 1994
LaserWriter Pro 810	October 1993	November 1994
LaserWriter Select 300	February 1993	January 1995
LaserWriter Select 310	February 1993	January 1994
LaserWriter Select 360	October 1993	April 1996
Personal LaserWriter LS	March 1991	May 1993
Personal LaserWriter NT	July 1990	1994
Personal LaserWriter NTR	March 1992	September 1993
Personal LaserWriter SC	June 1990	September 1993
Personal LaserWriter 300	June 1993	1994
Personal LaserWriter 320	October 1993	September 1995

StyleWriters	Introduced	Discontinued
Color StyleWriter 1500	February 1996	
Color StyleWriter 2200	June 1995	
Color StyleWriter 2400	September 1994	
Color StyleWriter 2500	February 1996	
Color StyleWriter Pro	February 1994	December 1995
Portable StyleWriter	June 1993	May 1995
StyleWriter	March 1991	January 1993
StyleWriter 1200	April 1995	
StyleWriter II	January 1993	April 1995

Other Printers	Introduced	Discontinued

APPLE II COMPUTER TECHNICAL INFORMATION

-----	-----	-----
Apple Color Printer	January 1993	February 1994
Apple Daisy Wheel Printer	May 1980	September 1986
Apple Dot Matrix Printer	May 1980	December 1985
Scribe	April 1984	August 1986
Silentype	January 1980	June 1984

OTHER PRODUCTS

=====

Scanners	Introduced	Discontinued
-----	-----	-----
Apple Scanner	August 1988	September 1991
Apple OneScanner	September 1991	June 1994
Apple Color OneScanner	January 1993	
Apple Color OneScanner 600/27	March 1996	
Apple Color OneScanner 1200/30	September 1996	

Digital Cameras	Introduced	Discontinued
-----	-----	-----
QuickTake 100	February 1994	
QuickTake 150	March 1995	
QuickTake 200	February 1997	

Monitors	Introduced	Discontinued
-----	-----	-----
AppleColor High-Res RGB	March 1987	December 1992
AppleColor RGB	September 1986	January 1993
AppleVision 1710	January 1996	
AppleVision 1710AV	August 1995	
Apple AudioVision 14	August 1993	October 1995
Apple Basic Color	February 1993	October 1993
Apple Color Plus Display	October 1993	
Apple High-Res Mono	March 1989	February 1991
Apple Multiple Scan 14	August 1995	February 1997
Apple Multiple Scan 15	July 1994	February 1997
Apple Multiple Scan 17	March 1994	
Apple Multiple Scan 20	March 1994	
Macintosh 12-inch Mono	December 1990	October 1993
Macintosh 12-inch RGB	October 1990	March 1993
Macintosh 16-inch Color	October 1991	April 1994
Macintosh 21-inch Color	October 1991	March 1994
Macintosh Color 14 Display	December 1992	
Macintosh Portrait Display	March 1989	December 1992
Macintosh Two-Page Mono	March 1989	December 1992
Performa Display	September 1992	July 1994
Performa Plus Display	September 1992	

Modems	Introduced	Discontinued
-----	-----	-----
Apple Personal Modem	September 1985	December 1990
Apple Modem 2400	July 1989	December 1992
PowerBook Data/Fax Modem	October 1991	November 1993
PowerBook Express Modem	October 1992	
PowerBook Express Modem II (Available in Europe Only)	October 1992	

PIE	Introduced	Discontinued
-----	-----	-----
Apple MessagePad	August 1993	March 1994
Apple MessagePad 100	March 1994	January 1995
Apple MessagePad 110	March 1994	January 1995
Apple MessagePad 120	January 1995	
Apple MessagePad 130	March 1996	
Apple MessagePad 2000	February 1997	

APPLE II COMPUTER TECHNICAL INFORMATION

Apple eMate 300

February 1997

End\_Table

Article Change History:

25 Feb 1997 - Added discontinued date for 5300ce.

24 Feb 1997 - Corrected name of a PowerBook 5300 model.

18 Feb 1997 - Added new PowerBook Computer and MessagePads.

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Keywords: review,htable,newton

### END OF FILE A2TIL196.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL197.TXT  
#####

Description: Apple Software and Hardware Diagnostic Part Numbers (9/95)  
Header: Apple Software and Hardware Diagnostic Part Numbers (9/95)

Article Created: 20 December 1985  
Article Reviewed/Updated: 7 September 1995

TOPIC -----

The article contains the most recent part numbers for all Apple diagnostics.

DISCUSSION -----

Begin\_Table

PRODUCT P/N REV DESCRIPTION  
-----

- APPLE TECHSTEP: Available Accessories
- Z077-8668 Power Adapter, Apple TechStep, Europe
  - X077-8668 Power Adapter, Apple TechStep, Australia
  - JA077-8668 Power Adapter, Apple TechStep, Japan
  - B077-8668 Power Adapter, Apple TechStep, U.K.
  - 699-0578 Carrying Case, Apple TechStep
  - 590-4512 Cable, Stereo, Apple TechStep
  - 590-4501 Cable, ADB, 2-meter
  - 590-0623 Cable, SCSI, Apple TechStep
  - 077-8405 Cable Wrap Kit, Apple TechStep
  - 590-0552 Cable, Mini-Din 8, 2-Meter
  - 077-8668 Power Adapter, Apple TechStep, U.S.

Service Parts Available for the Apple TechStep

- 661-0703 Assy, TechStep w/o Port or ROM Packs
- 076-0574 Port Pack, Apple TechStep
- 661-0150 ROM Pack, CPU Tests, Vol. 1, v1.01
- 661-0157 ROM Pack, SCSI HD Tests, v1.0
- 661-0147 ROM Pack, CPU Tests, Vol. 2, v1.0
- 661-0148 ROM Pack, CPU Tests, Vol. 3, v1.0
- 661-0149 ROM Pack, CPU Tests, Vol. 4, v1.0

APPLE II FAMILY DIAGNOSTICS STARTER KIT

- 077-8313 Apple II Diagnostics and Updates--REQUIRED  
(includes starter kit and one year of updates)

CONTENTS OF APPLE II FAMILY DIAGNOSTICS STARTER KIT

- 077-0100 B Apple II Product Diagnostic, (5.25)
- 077-0217 A Apple II Peripheral Diskette, (5.25)
- 077-0232 E Apple IIe,IIc Diagnostic 4.0, (5.25)
- 077-0233 H Apple IIe,IIc,IIc Plus,IIGS, IIGS 1MB  
Diagnostic 4.1, (3.5)
- 077-0234 F Apple IIIGS, IIIGS 1MB Diagnostic 4.1, (3.5)
- 077-0274 C Apple II Hard Disk Test 1.0 and  
SCSI Card Test 2.1 (5.25)
- 077-0316 A Apple II Video Overlay Card Diagnostic, 1.0 (5.25)
- 077-0340 C Apple II Hard Disk Test 1.0 and  
SCSI Card Test 2.1 (3.5)
- 077-8148 A Apple IIc Loopback Cable
- 077-8219 C SCSI Loopback Test Card

## APPLE II COMPUTER TECHNICAL INFORMATION

077-8324 A Apple 5.25 Floppy Drive Test Assembly,  
Version 1.0 (replaces 077-8216)  
590-0552 A Cable, APM/ImageWriter II to  
Apple IIGS/Macintosh Plus  
661-91097 A Apple IIe 80 Col/64K Card  
686-0027 A Profile Limited Data Recovery  
Program 2.0, (5.25)

NOTE: Subscriptions are Non-Refundable.

### APPLE II FAMILY DIAGNOSTIC RENEWAL

011-7077 Renewal, Apple II Family Diagnostic  
Updates--REQUIRED

The Apple II Family diagnostics included in this package cover the following products:

CPUs: Apple II, Apple II+, Apple IIe, Apple IIc, Apple IIc Plus,  
Apple IIGS.

Monitors: Monitor II, Monitor IIc, Monitor ///, AppleColor Monitor 100,  
AppleColor Composite Monitor, ColorMonitor IIe/IIc, Apple  
Monochrome Monitor, AppleColor RGB Monitor, Flat Panel Display.

Drives: ProFile, Disk II, Disk ///, DuoDisk, UniDisk-Apple 5.25 Drive,  
Disk IIc, UniDisk 3.5, Apple 3.5, Hard Disk 20SC.

Printers: Daisy Wheel Printer, Dot Matrix Printer, ImageWriter,  
ImageWriter II, Scribe, Silentype.

Other: Apple II Memory Expansion Card, Apple II SCSI Card, Apple IIGS  
Memory Expansion Card, Apple II Workstation Card, Apple IIc  
Memory Expansion Card, Apple II Keyboards and Mice.

### MACINTOSH FAMILY DIAGNOSTICS STARTER KIT

077-8312 Macintosh Diagnostics and Updates--REQUIRED  
(Includes starter kit and one year of updates)  
NOTE: This part number replaced 632-0582 as  
of November 14, 1988

### CONTENTS OF MACINTOSH FAMILY DIAGNOSTICS STARTER KIT

073-0301 Macintosh Family Diagnostics Reference Guide  
073-0326 MacTest Pro Diagnostics User Guide  
073-0368 MacTest Pro Diagnostics Reference Guide  
077-0370 MacTest Pro-Application & Modules Nonbootable Disk  
077-0070 MacTest Pro-Macintosh CPU Tests, Vol. 1A  
077-0071 MacTest Pro-Macintosh CPU Tests, Vol. 1B  
077-0371 MacTest Pro-Macintosh CPU Tests, Vol. 2  
077-4221 MacTest Pro-Macintosh CPU Tests, Vol. 3  
077-0372 MacTest Pro-PowerBook Tests, Vol. 1  
077-0400 MacTest Pro-PowerBook Duo Tests, Vol. 1  
077-0082 MacTest Pro-Power Macintosh CPU Tests, Vol. 1  
077-0083 MacTest Pro-Power Macintosh Upgrade Card Tests  
077-0220 MacTest 7.0  
077-0243 MacTest SE  
077-0244 MacTest II/IIx  
077-0251 MacTest SE/30  
077-0270 MacTest IIcx/IIci  
077-0329 MacTest Portable  
077-0359 MacTest MP  
077-0360 MacTest CL  
077-0258 Macintosh Peripherals Tests, Vol. 1  
077-0323 Macintosh Peripherals Tests Vol. 2  
077-0363 Macintosh Peripherals Test, Vol.3  
077-0268 Macintosh Hard Disk Test

## APPLE II COMPUTER TECHNICAL INFORMATION

077-0362 Macintosh 16"/21" Color Display Patterns  
077-0322 Connect Test  
077-0328 Modem Test  
077-0242 NodeCheck  
072-8220 AppleCAT LaserWriter Quick Reference  
077-0247 AppleCAT LaserWriter Test  
077-8209 AppleCAT LaserWriter Test Adapter Cable  
077-8319 LaserWriter II Test Connector  
689-0045 Using Your ImageWriter LQ  
590-0552 Cable, APM/ImageWriter II to Apple IIGS and Mac Plus  
678-5064 CD Rom Test Disc  
678-5059 Caddy - Compact Disc  
077-8219 SCSI Loopback Test Card  
690-8132 Inter\*Poll, Network Administrator's Utility  
077-8129 DB9 Serial Port Plug (Set of 2)  
590-0169 DB9m to Din 25m Cable  
590-0553 MINI DIN 8M to DB9F Adapter Cable  
077-0673 Blank 800K Diskette  
077-0674 Blank 1.4 Diskette

### MACINTOSH FAMILY DIAGNOSTIC RENEWAL

011-7091 Renewal, Macintosh Family Diagnostic  
Updates--REQUIRED

The Macintosh Family diagnostics included in this package cover the following products:

**CPUs:** Macintosh, Macintosh Plus, SE, SE/30, Macintosh Classic/Classic II Color Classic, Macintosh II/IIx/fx/IIcx/IIci/IIsi/IIvx/IIvi/IIvm Macintosh LC, LC II, LC III, LC 475, LC 520, LC 550, LC 575, Performa Series, Macintosh Quadra 605, 610, 650, 660AV, 700, 800, 840AV, 900, 950, Macintosh Centris 610, 650, 660AV, Apple Workgroup Server 60/80/95, PowerBook 100/140/145/145B/160/PowerBook Duo 210, 230, 250, 270c, Macintosh Portable, Apple Macintosh TV, Power Macintosh 6100/60, 6100/60AV, 7100/66, 7100/66 AV, 8100/80, 8100/80 AV

### Diskette

**Drives:** Macintosh 800K, Apple 3.5, Apple PC 5.25, 1.4MB SuperDrive

### SCSI

**Drives:** Hard Disk 20, Hard Disk 20SC, 40SC, 80SC, 160SC, 400SC, 500SC, 1 GB; DDS-DC Drive, AppleCD SC, AppleCD SC Plus, AppleCD 150, AppleCD 300

### Comm/

**Network:** LocalTalk, EtherTalk Card, AppleFax Modem, Portable Data Modem 2400, Apple Data Modem 2400, Ethernet NB Card, Int'l XP 2400, PowerBook FAX/Data Modem, Macintosh Express Modem

**Printers:** LaserWriter, LaserWriter Plus, LaserWriter II, ImageWriter LQ

**Scanners:** Apple Scanner, Apple OneScanner

**Displays:** 12-inch RGB displays; 12-inch Monochrome display; High Res Monochrome

Monitor; High Res RGB Monitor; Macintosh 13-inch Color Display; Portrait Display; 16-inch Color Display; Two-Page Monochrome

### Display;

21-inch Color Display; Macintosh SE/30 Display; Macintosh Classic Display; Macintosh Classic II Display; Color Compact Macintosh Displays; Macintosh Portable Display; PowerBook Displays, 14" AudioVision Display, Basic Color Display

### Video

**Cards:** Macintosh II Video Card, Macintosh II Display Card 8\*24;

## APPLE II COMPUTER TECHNICAL INFORMATION

8\*24 GC Card, 2-Page Monochrome Display Video Card, Portrait Display Video Card, Monochrome Video Card, High Res RGB Video Card, 4\*8 Video Card, Apple High Performance Video Card, Apple AV Card

### Other

Cards: Mac SE PC Drive Card, Macintosh II PC Drive Card, Mac IIci Cache Card, Apple IIe Card, Workgroup Server PDS Card, Power Macintosh Upgrade Card

### STARTER KIT HARDWARE DIAGNOSTIC TOOLS SOLD SEPARATELY:

#### Apple II Family:

077-0325 A Apple 5.25 Floppy Drive Test Reference Diskette

#### Apple IIe:

077-8219 C SCSI Loopback Test Card

#### Apple IIc:

077-8148 A Apple IIc Loopback Cable

#### Apple IIGS:

077-0317 A Apple II Video Overlay Card  
Diagnostic; 1.0 (3.5)  
077-8219 C SCSI Loopback Test Card  
590-0552 A Cable, APM/ImageWriter II to  
Apple IIGS/Mac Plus

#### Macintosh Family:

076-8354 A SIMM Removal Tool

#### Macintosh Plus:

077-8129 A DB 9 serial port plug (set of 2)--REQUIRED  
077-8219 C SCSI Loopback Test Card  
590-0552 A Cable, APM/ImageWriter to Apple IIGS and Mac Plus

#### Macintosh SE & SE/30:

077-8219 C SCSI Loopback Test Card  
077-8265 A MINI DIN 8 Serial Loopback Plug  
590-0551 A DB9M to MINI DIN 8M Cable  
590-0553 B MINI DIN 8M to DB9F Adapter Cable

#### Macintosh II/IIx/IIfx:

076-0341 A IWM/SWIM IC Extraction Tool  
077-8219 C SCSI Loopback Test Card  
077-8264 A Macintosh II BUS Master Card  
077-8265 A MINI DIN 8 Serial Loopback Plug  
590-0551 A DB9M to MINI DIN 8M Cable  
590-0553 B MINI DIN 8M to DB9F Adapter Cable

#### Macintosh IIcx/IIci:

076-0341 A IWM/SWIM IC Extraction Tool  
077-8219 C SCSI Loopback Test Card  
077-8265 A MINI DIN 8 Serial Loopback Plug  
590-0551 A DB9M to MINI DIN 8M Cable  
590-0553 B MINI DIN 8M to DB9F Adapter Cable

#### Macintosh Portable:

590-0552 A Cable, APM, ImageWriter to Apple IIGS/Mac Plus

#### AppleColor Hi-Res RGB Monitor:

126-6605 A 330 F, 25V, Jitter Adjustment

#### AppleCD Products:

678-5064 A CD ROM Test Disc 2.0

# APPLE II COMPUTER TECHNICAL INFORMATION

## LaserWriter/LaswerWriter Plus:

076-8354 A SIMM Removal Tool  
077-8209 A AppleCAT LaserWriter Test Adapter Cable

## LaserWriter II:

076-8354 A SIMM Removal Tool  
077-8319 A LaserWriter II Test Connector

## HARDWARE AND SOFTWARE DIAGNOSTIC TOOLS NOT INCLUDED IN STARTER KITS:

NOTE: The following tools listed as required are NOT included in the Diagnostic Starter Kits and Updates. Although not included, they are REQUIRED for support of the product listed.

## Apple IIe:

890-5124 Loopback Plug, Communications Protocol Card

## Apple III:

077-0009 A Clock Calibration Kit--REQUIRED  
077-0013 B Apple/// Diagnostic Diskette--REQUIRED

## Apple III Plus:

077-0032 A Apple/// Plus Dealer Diagnostic Diskette--REQUIRED

## LISA:

077-8043 A Video Align Graticule, Lisa 1.0  
077-8102 A Lisa Test for Lisa 1.0  
077-8124 C Lisa 2/Macintosh XL Diag. 3.0--REQUIRED  
077-8169 A Video Align Graticule for Mac XL/Lisa 2.0--REQUIRED

## Macintosh XL:

077-0206 A Screen Mod. Kit Diagnostic 1.0--REQUIRED

## Mac Plus:

077-0135 @ Macintosh Voltage Test Cable  
077-8222 A SCSI Loopback Card to Mouse Port Cable

## Macintosh II/IIx/IIfx/IIcx/IIci:

077-0104 A Twinax Cable w/DB 15 Connector  
077-0105 A Twinax T-Connector  
077-0106 A Twinax Terminator  
077-0107 A Coax Cable  
077-0109 A Token Ring Adaptor Cable  
077-0256 \* EtherTalk: Terminator Kit  
077-0257 \* EtherTalk: Thin Net Test Cable

## Cluster Controller:

077-8156 A DataLine Monitor ROM Pack-Utilities  
077-8157 A DataLine Monitor ROM Pack-SNA  
077-8158 A DataLine Monitor ROM Pack-BSC

## AppleLine:

970-0879 A Loopback Plug--REQUIRED

## LaserWriter/Plus:

076-0121 A Power Checker, Laser--REQUIRED

## LaserWriter II:

076-0121 A Power Checker, Laser--REQUIRED

## Color Plotter:

686-0020 A Apple Plotter Interface Test

## Apple Scanner:

077-8300 Apple Scanner Service Test Chart

# APPLE II COMPUTER TECHNICAL INFORMATION

End\_Table

@ Recommended for Stocking

\* These tools are required only if you support the EtherTalk Card

Article Change History:

07 Sep 1995 - Made minor corrections.

04 May 1995 - Corrected minor problem; reformatted.

27 Jun 1994 - Updated information, revised formatting.

Support Information Services

Copyright 1988-95 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL197.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL198.TXT  
#####

Description: Apple Writer II (ProDOS): Parallel printer interface problems  
Header: Apple Writer II (ProDOS): Parallel printer interface problems

With parallel printer interfaces, the ProDOS version of AppleWriter II has problems somewhat like those in AppleWorks 1.1. Apple Dealers have a patch which upgrades the Apple Writer II software to version 2.1. This upgrade fixes the problems with parallel printer interfaces.

The problems are less obvious with Apple Writer than with AppleWorks because Apple Writer doesn't send as many control codes and formatting commands as AppleWorks.

Apple Technical Communications

Keywords:

### END OF FILE A2TIL198.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL199.TXT  
#####
```

Description: Apple Writer II under DOS 3.3: Printer codes from all Apples  
Header: Apple Writer II under DOS 3.3: Printer codes from all Apples

Many printers have special features that the computer signals by sending command codes. To send codes to a printer from Apple Writer II (DOS 3.3), you must insert the codes into the Apple Writer file you want printed. The manual of the printer may list the codes by several names: decimal, hexadecimal, teletype abbreviations (SOH, ETX, DC1, DC3, etc.), standard keys, and combinations of the above.

Using the chart "ASCII characters, values, and keystrokes", you have to translate from the name of the code in the printer manual into the name of the corresponding keystroke or keystrokes on the keyboards of the Apple II, Apple II Plus, Apple IIe, Enhanced Apple IIe, or Apple IIc.

Some keystrokes put so-called control characters into the Apple Writer file. These control characters are not part of the conventional English character set; while screen shows them, the printer intercepts and does not print them, instead recognizing them as signals to turn special functions on and off or to change printer settings.

NOTE: In the descriptions of the keystrokes, the characters greater than and less than, < and >, are used to contain one keystroke, which can mean that you must simultaneously hold down the control key, the shift key, or both as you press the other key.

With these considerations in mind, here is a list of codes and methods for inserting them in an Apple Writer II file.

Null (ASCII value 0):

II and II Plus: <CTRL-V><CTRL-SHIFT-P><CTRL-V>

All other Apples: <CTRL-SHIFT-2>

Control-A through Control-Z (ASCII decimal values 01 through 26):

Example: Control-Z (ASCII decimal value 26): <CTRL-V><CTRL-Z><CTRL-V>

Exception: Control-V (ASCII decimal value 22) can't be entered.  
See "Missing Keys" below.

Escape (ASCII value 27):

Some keystroke sequences start with or include the ESCAPE character.

On Apple II without shift key modification:

If the printer manual shows the code as an escape followed by an upper case letter: <CTRL-V><ESC><ESC><ESC><CTRL-V>

If the printer manual shows the code as an escape followed by a non-alphabetic character or lowercase letter: <CTRL-V><ESC><ESC><CTRL-V>

On Apple II with shift key modification: <CTRL-V><ESC><CTRL-V>

Missing keys:

To produce uppercase a-z, press the ESC key first, otherwise Apple Writer II under DOS 3.3 enters the a-z keystroke as lowercase.

The Apple II and Apple II Plus don't have some keys: underline, backward

## APPLE II COMPUTER TECHNICAL INFORMATION

slash,  
brackets, braces, vertical line, open single quote, tilde, or delete. You can't enter a Control-V in Apple Writer. To use these and other characters in Apple Writer, it is necessary to create an Apple Writer glossary file from a BASIC program.

For example, to insert the ASCII value 22 (Control-V) into an Apple Writer file, follow these steps:

1. Start up the DOS System Master.
2. Write and save the following program:

```
1 REM APPLE WRITER II GLOSSARY CREATION
10 D$=CHR$(4)
20 PRINT D$;"OPEN CVGLOSS"
30 PRINT D$;"WRITE CVGLOSS"
40 PRINT "V";CHR$(22)
41 REM USE LINE 40 AS A TEMPLATE FOR OTHER NEEDED CODES
42 REM CHOOSE A DIFFERENT GLOSSARY ENTRY FOR EACH CODE
43 REM PRINT "V";CHR$(22) V=ASCII 22 (CONTROL-V)
44 REM PRINT "W";CHR$(31) W=ASCII 31 (CONTROL-UNDERLINE)
45 REM PRINT "X";CHR$(128) X=ASCII 128 (CONTROL-@ WITH THE HIGH BIT SET)
46 REM PRINT "Y";CHR$( ) Y=AND SO ON
50 PRINT D$;"CLOSE CVGLOSS"
```
3. Run the program, thus creating a file called CVGLOSS.
4. Start up the Apple Writer diskette.
5. Press CTRL-Q and select the option to Load a Glossary File.
6. Remove the Apple Writer diskette and insert the diskette containing CVGLOSS.
7. Enter the name CVGLOSS at the "Enter File Name" prompt.
8. Return to Apple Writer and enter your text.
9. At any point where you need to enter a Control-V, type CTRL-G for the glossary function and enter V (uppercase).
10. This procedure should imbed the ASCII 22 in your text. Once CVGLOSS has been created, you can reuse it whenever necessary by following steps 5 through 9 each time you start up Apple Writer.

There's already a glossary file on the Apple Writer II diskette. This file is named SPECIAL and contains key definitions for the keys \, ^, ~, \_, |, [, ], {, }, ESC-D, and ESC-U.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL199.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL200.TXT  
#####
```

Description: Apple Writer II: DOS Version--Printing With Parallel Printers  
Header: Apple Writer II: DOS Version--Printing With Parallel Printers

Apple Writer may not work properly with some parallel interface cards. Often the interface requires a CTRL-I sequence if it is to print wider than 40 columns. This is easy in Apple Writer II. All you need to do is insert the

<CTRL-V><CTRL-I><CTRL-V> 132N

at the start of each file. You will have to use the CTRL-V before and after the CTRL-I to enter it into the file. Please refer to page 51 of the Apple Writer manual for more details.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL200.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL201.TXT  
#####
```

Description: Apple Writer II: DOS Version--Recovering "Lost" Text Files  
Header: Apple Writer II: DOS Version--Recovering "Lost" Text Files

At times you run the risk of saving a short text file over a text file of greater length. You might, for instance, save the empty Apple Writer editor workspace with the same name of a valuable document. This prevents the system accessing the original contents of the file. While the data is still on the diskette, you have made it unaccessible to the system. This program accesses the data so that the system may recover your original file. This program has been tested on Apple Writer II and Apple Writer IIe files. It works with standard DOS Text files, signified by a T in the left margin of a catalog listing. This program does not operate with the ProDOS version of Apple Writer.

```
10 TEXT : NORMAL : HOME  
20 INPUT "ENTER THE FILE NAME TO BE READ ";F$  
30 INPUT "FIRST BYTE TO READ ";C  
40 ONERR GOTO 200  
50 D$ = CHR$(4)  
60 PRINT D$;"OPEN "F$",L1"  
70 PRINT D$;"OPEN NEW";F$  
80 B$ = ""  
90 PRINT D$;"READ "F$,"R";C  
100 GET A$  
110 C = C + 1  
120 IF (ASC (A$) = 13) GOTO 170  
130 B$ = B$ + A$  
140 PRINT  
150 IF (LEN (B$) > 254) GOTO 170  
160 GOTO 90  
170 PRINT : PRINT D$;"WRITE NEW";F$  
180 PRINT B$  
190 GOTO 80 200 PRINT : PRINT D$;"CLOSE ";F$  
210 PRINT D$;"CLOSE NEW";F$  
220 END
```

1. Type in the program and save it on your DOS disk. Run it.
2. After the program requests the name of the file that is to be recovered, type in the name giving slot and drive specifications in necessary--e.g., MYFILE, S6, D2.
3. Next the program prompts you for the first byte that you want to read from the file. You type in a number which should be:
  - a. an integer between 1 and 32768
  - b. the size, in bytes, of the file that was accidentally saved plus 1.

To find the size of this accidentally saved file, [L]oad it under Apple Writer. The size of the file is displayed on the data line after the length entry Len:. Add one to this count and type in the result.

4. Once you have typed in your information, give the program time to run and write the entire file. To read part of the file and the write the new file, the program may go back to the drive several times, so please be patient. The cursor will come back to the screen when the program is finished.

Apple Technical Communications

APPLE II COMPUTER TECHNICAL INFORMATION

Keywords:

### END OF FILE A2TIL201.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL202.TXT  
#####

Description: Apple Writer II: DOS Version--Sup-R-Term and Super Serial Card  
Header: Apple Writer II: DOS Version--Sup-R-Term and Super Serial Card

Apple Writer may not print with these cards unless you set the following switches on the Super Serial Card to:

SW2-3 off  
SW2-4 off

This sets the line width to 132 columns and disables the echo to the 40 column Apple video output.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL202.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL203.TXT  
#####

Description: Apple Writer II: Specifications (Discontinued)  
Header: Apple Writer II: Specifications (Discontinued)

Article Created: 14 March 1991

Format

-----

16-sector disks

Operating System Environment/Language

-----

Apple DOS 3.3 based. Written in machine language, usable with Integer BASIC  
or Applesoft BASIC.

Display

-----

Up to 24 lines of 40 or 80 characters.

Storage

-----

Up to 27,000 characters per file, 56 pages of text per disk  
Copyright 1991, Apple Computer, Inc.  
Keywords: SPECSHT

### END OF FILE A2TIL203.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL204.TXT  
#####
```

Description: Apple Writer IIe under DOS 3.3: Printer codes from all Apples  
Header: Apple Writer IIe under DOS 3.3: Printer codes from all Apples

Many printers have special features that the computer signals by sending command codes. To send codes to a printer from Apple Writer IIe under DOS 3.3, you must insert the codes into the Apple Writer file you want printed. The manual of the printer may list the codes by several names: decimal, hexadecimal, teletype abbreviations (SOH, ETX, DC1, DC3, etc.), standard keys, and combinations of the above.

Using the chart "ASCII characters, values, and keystrokes", you have to translate from the name of the code in the printer manual into the name of the corresponding keystroke or keystrokes on the keyboard of the Apple IIe, Enhanced Apple IIe, or Apple IIc.

Some keystrokes put so-called control characters into the Apple Writer file. These control characters are not part of the conventional English character set; while screen shows them, the printer intercepts and does not print them, instead recognizing them as signals to turn special functions on and off or to change printer settings.

NOTE: In the descriptions of the keystrokes, the characters greater than and less than, < and >, are used to contain one keystroke, which can mean that:

1. You must simultaneously hold down the control key, the shift key, or both as you press the other key, or
2. You must press a special key, such as ESC or RETURN.

With these considerations in mind, here is a list of codes and methods for inserting them in an Apple Writer file.

Null (ASCII value 0):

The following patch is for Apple Writer IIe under DOS 3.3. The patch allows you to enter NULs (CTRL-@) when in CTRL-V mode. The only side-effect is that the DELETE key doesn't work for correcting a filename entered from the keyboard for the DOS COMMANDS or ADDITIONAL FUNCTIONS menu; instead, just use the left arrow key.

--Boot the DOS 3.3 System Master diskette.

--Remove the System Master diskette, insert the Apple Writer IIe under DOS 3.3 diskette and type the following commands.

```
BLOAD OBJ.APWRTIIE  
CALL -151  
1CE1:EA EA EA EA  
3EBA:EA EA EA EA  
3DOG  
UNLOCK OBJ.APWRTIIE  
BSAVE OBJ.APWRTIIE,A$1900,L$2F58  
LOCK OBJ.APWRTIIE  
BLOAD OBJ.APWRTIIF  
CALL -151  
1D81:EA EA EA EA  
4033:EA EA EA EA  
3DOG
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```
UNLOCK OBJ.APWRTIIF
BSAVE OBJ.APWRTIIF,A$1900,L$30D1
LOCK OBJ.APWRTIIF
```

If you don't want to do this to your Apple Writer IIe diskette, refer below to the Applesoft BASIC solution.

Control-A through Control-Z (ASCII decimal values 01 through 26):

Example: Control-Z (ASCII decimal value 26): <CTRL-V><CTRL-Z><CTRL-V>

Exception: Control-V (ASCII decimal value 22) can't be entered.

See "Missing Characters" below.

Escape (ASCII value 27): <CTRL-V><ESC><CTRL-V>

Other Control characters: These can be entered in the manner of Control-A through Control-Z.

### Missing Characters:

You can't directly enter a Control-V in Apple Writer. To use these and other characters in Apple Writer, it is necessary to use an Apple Writer glossary file.

Apple Writer doesn't send a Null character.

Applesoft BASIC can be used to send a Null character to your printer.

1. Create your Apple Writer document as usual, but substitute a unique character in each place that you want a Null character.
2. Type <CTRL-P> to display the Print/Programs Command menu.
3. Type PD8, Apple Writer's code for Print to Disk on an Apple II.
4. Type NP to begin printing.
5. To the Apple Writer prompt for a file name, do not enter the same name with which the file is already saved. Enter a unique name, and note it down.
6. After the printing to disk is finished, exit Apple Writer and boot up a ProDOS diskette.
7. Run the following program:

```
100 HOME
110 PRINT TAB(10);APPLE WRITER TO PRINTER"
120 VTAB 5
130 INPUT "NAME OF APPLE WRITER FILE PRINTED TO DISK: ";F$
140 IF F$="" THEN 900
145 VTAB 12
146 INPUT "CHARACTER TO REPLACE: ";X$
147 IF X$="" THEN 145
150 VTAB 10
160 INPUT "PRINTER SLOT #: ";S$
170 IF S$="" THEN 900
180 S=VAL$(S$); IF S < 1 OR S > 7 OR INT(S) <> S THEN 150
190 D$=CHR$(4)
200 ONERR GOTO 800
210 PRINT D$;"UNLOCK";F$
220 POKE 216,0
230 VTAB 12: PRINT SPC(75)
240 PRINT
250 PRINT D$;"PR#";S
260 PRINT CHR$(9);"132N"
270 PRINT D$;"OPEN";F$280 ONERR GOTO 400
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```
290 PRINT D$;"READ";F$ 300 A$=""
310 GET C$
315 IF C$=CHR$(12) THEN 310
320 IF C$=CHR$(13) THEN 350
330 IF C$=X$ THEN C$=CHR$(0)
340 A$=A$+C$:GOTO 310
350 PRINT A$
390 GOTO 300
400 POKE 216,0
410 PRINT D$;"CLOSE"
420 PRINT D$;"PR#0"
430 VTAB 15
440 PRINT TAB(5);"FILE ";F$;" HAS BEEN PRINTED."
450 GOTO 900
800 POKE 216,0
810 VTAB 12
820 PRINT CHR$(7);"I CAN'T FIND THE FILE ";F$;". "
830 INPUT "";Z$
840 GOTO 100
900 END
Apple Technical Communications
```

Keywords:

### END OF FILE A2TIL204.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL205.TXT  
#####
```

Description: Apple Writer IIe under ProDOS: Printer codes from all Apples  
Header: Apple Writer IIe under ProDOS: Printer codes from all Apples

Many printers have special features that the computer signals by sending command codes. To send codes to a printer from Apple Writer IIe (version 2.1) under ProDOS, you must insert the codes into the Apple Writer file you want printed. The manual of the printer may list the codes by several names: decimal, hexadecimal, teletype abbreviations (SOH, ETX, DC1, DC3, etc.), standard keys, and combinations of the above.

Using the chart "ASCII characters, values, and keystrokes", you have to translate from the name of the code in the printer manual into the name of the corresponding keystroke or keystrokes on the keyboards of the Apple IIe, Enhanced Apple IIe, or Apple IIc.

Some keystrokes put so-called control characters into the Apple Writer file. These control characters are not part of the conventional English character set; while screen shows them, the printer intercepts and does not print them, instead recognizing them as signals to turn special functions on and off or to change printer settings.

NOTE: In the descriptions of the keystrokes, the characters greater than and less than, < and >, are used to contain one keystroke, which can mean that:

1. You must simultaneously hold down the control key, the shift key, or both as you press the other key, or
2. You must press a special key, such as ESC or RETURN.

With these considerations in mind, here is a list of codes and methods for inserting them in an Apple Writer file.

Null (ASCII value 0):

Because Apple Writer IIe (version 2.1) under ProDOS uses the null character to mark the end of a file, Apple Writer does not allow a null to be inserted into the file. The inserted null would effectively delete any text after it.

Apple Writer does send a null in the place of a Control-Underline character:  
<CTRL-V><CTRL-UNDERLINE><CTRL-V>

Control-A through Control-Z (ASCII decimal values 01 through 26):

Example: Control-Z (ASCII decimal value 26): <CTRL-V><CTRL-Z><CTRL-V>

Exception: Control-V (ASCII decimal value 22) can't be entered.  
See "Missing Characters" below.

Escape (ASCII value 27): <CTRL-V><ESC><CTRL-V>

Other Control characters: These can be entered in the manner of Control-A through Control-Z.

Missing Characters:

In typing a file, there is no way to put a Control-V into the text. During printing, Apple Writer doesn't send a Control-Underline as such.

Applesoft BASIC can be used to send a Control-V or Control-Underline to your

## APPLE II COMPUTER TECHNICAL INFORMATION

printer.

1. Create your Apple Writer document as usual, but substitute unique characters in each place that you want a Control-V or Control-Underline character.
2. Type <CTRL-P> to display the Print/Programs Command menu. 3. Type PD8, Apple Writer's code for Print to Disk on an Apple II.
4. Type NP to begin printing.
5. To the Apple Writer prompt for a file name, do not enter the same name with which the file is already saved. Enter a unique name, and note it down.
6. After the printing to disk is finished, exit Apple Writer and boot up a ProDOS diskette.
7. Run the following program, using the following forms of line 330:

Control-V

```
330 IF C$=X$ THEN C$=CHR$(22)
```

Control-Underline

```
330 IF C$=X$ THEN C$=CHR$(31)
```

```
100 HOME
110 PRINT TAB(10);APPLE WRITER TO PRINTER"
120 VTAB 5
130 INPUT "NAME OF APPLE WRITER FILE PRINTED TO DISK: ";F$
140 IF F$="" THEN 900
145 VTAB 12
146 INPUT "CHARACTER TO REPLACE: ";X$
147 IF X$="" THEN 145
150 VTAB 10
160 INPUT "PRINTER SLOT #: ";S$
170 IF S$="" THEN 900
180 S=VAL$(S$); IF S < 1 OR S > 7 OR INT(S) <> S THEN 150
190 D$=CHR$(4)
200 ONERR GOTO 800
210 PRINT D$;"UNLOCK";F$
220 POKE 216,0
230 VTAB 12: PRINT SPC(75)
240 PRINT
250 PRINT D$;"PR#";S
260 PRINT CHR$(9);"132N"
270 PRINT D$;"OPEN";F$280 ONERR GOTO 400
290 PRINT D$;"READ";F$ 300 A$=""
310 GET C$
315 IF C$=CHR$(12) THEN 310
320 IF C$=CHR$(13) THEN 350
330 IF C$=X$ THEN C$=CHR$( ): REM Substitute ASCII value for unique character
340 A$=A$+C$:GOTO 310
350 PRINT A$
390 GOTO 300
400 POKE 216,0
410 PRINT D$;"CLOSE"
420 PRINT D$;"PR#0"
430 VTAB 15
440 PRINT TAB(5);"FILE ";F$;" HAS BEEN PRINTED."
450 GOTO 900
800 POKE 216,0
810 VTAB 12
820 PRINT CHR$(7);"I CAN'T FIND THE FILE ";F$;"."
830 INPUT "";Z$
840 GOTO 100
900 END
```

APPLE II COMPUTER TECHNICAL INFORMATION

Apple Technical Communications

Keywords:

### END OF FILE A2TIL205.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL206.TXT  
#####
```

Description: Apple Writer IIe: DOS version--Patch for the IIC  
Header: Apple Writer IIe: DOS version--Patch for the IIC

Following is the Apple Writer II Utility Program which updates, for running on an Apple IIC, the DOS 3.3 version of Apple Writer for the IIe only.

To use this patch on your system, start by capturing the BASIC code listed below, using MacTerminal and Access II (DOS 3.3).

Remember to capture ONLY the BASIC code portion of this message. As an alternative, you could capture the entire message and then edit out the unwanted portions with a text editor. Save the file as a standard DOS 3.3 text file with the name PATCH.TEXT. Type the following from the keyboard:

```
EXEC PATCH.TEXT
```

You will see several "]"s scroll by at this point. When this stops and the cursor returns, type:

```
SAVE PATCH APPLEWRITER IIE
```

```
RUN PATCH APPLEWRITER IIE
```

Insert your Apple Writer II master disk and press the Return key. You only need to update your Apple Writer disk once.

After updating your Apple Writer IIe disk, mouse characters will appear on the screen, but only when capital letters are shown in inverse--for example, a capitalized file name appearing on the data line, or when the blinking cursor moves over a capital letter.

NOTE: The utility program does not convert Apple Writer to run under ProDOS.

```
100 TEXT : SPEED= 255  
105 ONERR GOTO 500  
110 D$ = CHR$(4): REMCTRL-D  
115 BEL$ = CHR$(7): REMBELL  
120 CR$ = CHR$(13): REMRETURN  
125 ESC$ = CHR$(27): REMESCAPE  
130 NORMAL : HOME  
135 PRINT "APPLEWRITER II UTILITY PROGRAM"  
140 VTAB 4: PRINT "USE THIS PROGRAM TO UPDATE YOUR"  
145 PRINT "DOS 3.3 APPLEWRITER II FOR USE"  
150 PRINT "ON AN APPLE IIC COMPUTER."  
155 VTAB 10: PRINT "INSERT YOUR APPLEWRITER II MASTER DISK"  
160 PRINT "INTO THE DISK DRIVE AND PRESS 'RETURN' ";  
165 GET A$: IF (A$ < > CR$) AND (A$ < > ESC$) GOTO 165  
170 IF (A$ = ESC$) THEN HOME : END  
175 PRINT  
200 HOME : VTAB 12: PRINT "CAREFULLY UPDATING YOUR DISK....."  
205 PRINT D$;"UNLOCK OBJ.APWRITIE"  
210 PRINT D$;"BLOAD OBJ.APWRITIE"  
215 GOSUB 300  
220 HOME : VTAB 12: PRINT "CAREFULLY UPDATING YOUR DISK....."  
225 PRINT D$;"BSAVE OBJ.APWRITIE, A$1900, L$2F58"  
230 PRINT D$;"LOCK OBJ.APWRITIE"  
235 PRINT D$;"UNLOCK OBJ.APWRITIF"  
240 PRINT D$;"BLOAD OBJ.APWRITIF"  
245 GOSUB 300  
250 PRINT D$;"BSAVE OBJ.APWRITIF, A$1900, L$30D1"
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```

255 PRINT D$;"LOCK OBJ.APWRTIIF"
260 HOME : VTAB 12: PRINT "YOUR DISK IS NOW UPDATED."
265 NEW
300 HTAB 11
305 FOR I = 1 TO 10
310 READ AD$,VA$
315 A$ = AD$: GOSUB 400:DA = C
320 A$ = VA$: GOSUB 400:DV = C
325 PRINT ".";
330 POKE DA,DV
335 NEXT I: PRINT
340 RETURN
400 C = 0
405 FOR X = LEN (A$) TO 1 STEP - 1
410 B$ = MID$ (A$,X,1)
415 IF B$ = "A" THEN K = 10: GOTO 450
420 IF B$ = "B" THEN K = 11: GOTO 450
425 IF B$ = "C" THEN K = 12: GOTO 450
430 IF B$ = "D" THEN K = 13: GOTO 450
435 IF B$ = "E" THEN K = 14: GOTO 450
440 IF B$ = "F" THEN K = 15: GOTO 450
445 K = VAL (B$)
450 C = C + 16 ^ ( LEN (A$) - X) * K
455 NEXT X
460 RETURN
500 HOME : VTAB 11: PRINT BEL$
505 IF ( PEEK (222) < > 4) GOTO 515
510 PRINT "YOUR DISK MUST NOT": PRINT "BE WRITE PROTECTED!":
GOTO 520
515 PRINT "I/O ERROR!": RESTORE
520 FOR D = 0 TO 1000: NEXT : REMDELAY
520 GOTO 130
600 REMDATA IS IN FORMAT OF HEX ADDRESS FOLLOWED
601 REMBY THE NEW VALUE
605 DATA2EC0,F2,2ED4,FA,2EB7,F6,2E98,EC,2E94,F5
610 DATA417F,ED,4185,EC,418B,F0,4191,F4,4197,E6
615 DATA3017,F2,302B,FA,300E,F6,2FEF,EC,2FEB,F5
620 DATA42F8,ED,42FE,EC,4304,F0,430A,F4,4310,E6
Apple Technical Communications

```

Keywords:

### END OF FILE A2TIL206.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL207.TXT  
#####

Description: AppleColor Composite Monitor IIe: Description (Discontinued)  
Header: AppleColor Composite Monitor IIe: Description (Discontinued)

Article Created: 26 May 1992  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

This article describes the AppleColor Composite Monitor IIe.

DISCUSSION -----

The AppleColor Composite Monitor IIe allows users to add color capabilities to their Apple IIe systems.

Features  
-----

- \* Displays high-resolution color graphics, 80-column text in monochrome, or color graphics with text in a 40-column format.
- \* Can work with composite (NTSC) video output instead of RGB output, so users simply plug the monitor into the video jack of their Apple IIe, Apple II Plus, Apple II, or Apple IIc computer. No need for special cards or adaptors.
- \* The 13-inch screen provides a large display area for easy viewing.

The monitor provides higher resolution than standard video or television screens. It provides a cost-effective solution for users who require color display and 80-column text, and is compatible with all Apple software.

Order Number  
-----

\* AppleColor Composite Monitor IIe  
A2M6021  
Copyright 1992-1994, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL207.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL208.TXT  
#####

Description: AppleColor Composite Monitors: Compatible With Both IIGS and IIE  
Header: AppleColor Composite Monitors: Compatible With Both IIGS and IIE

Article Created: 6 December 1991

TOPIC -----

There are two AppleColor Composite Monitors shown on the Apple II Products price sheets:

- AppleColor Composite Monitor (IIGS) (part number A2M6020)
- AppleColor Composite Monitor IIE (part number A2M6021)

What are the differences? Are both compatible with both the Apple IIGS and the Apple IIE?

DISCUSSION -----

Both composite monitors work with either computer. The main difference is in the outside designs to better match the case of the computer with which the particular monitor is associated.

Support Information Services  
Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL208.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL209.TXT  
#####

Description: AppleColor Monitor 100: Making it compatible with the Apple IIGS  
Header: AppleColor Monitor 100: Making it compatible with the Apple IIGS

This article last reviewed: 9 November 1988

According to the Apple II Compatibility Guide (P/N A2F2204), the AppleColor Monitor 100 is not compatible with the Apple IIGS. For the many owners of the AppleColor Monitor 100 who are upgrading their IIE's to the Apple IIGS, but who want to avoid having to purchase a new monitor, there is a workaround.

Inside the AppleColor Monitor 100 on the main PC board, almost directly under the neck of the CRT, there is a slide switch labeled "16 color/8 color". To make the AppleColor Monitor 100 work with the Apple IIGS, set the switch to the 8 color position, and use the cable provided with the Color Monitor 100 (svc part # 590-0194-A) to connect it to the the Apple IIGS. This configuration makes all colors available.

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Copyright 1988 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL209.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL210.TXT  
#####

Description: AppleLine: How To Use With an Apple IIe or Apple IIc (10/94)  
Header: AppleLine: How To Use With an Apple IIe or Apple IIc (10/94)

Article Created: 04 November 1987  
Article Reviewed/Updated: 12 October 1994

TOPIC -----

The following information has only been partially verified for the 3274-2.2 ROMs. Though this setup should work with the newer ROMs, this has not been confirmed.

DISCUSSION -----

Hardware Configuration:

Apple IIe  
Super Serial Card in Slot 2. The jumper block should be set to terminal.  
Straight thru cable - 590-0037  
or  
Apple IIc  
Apple IIc-ImageWriter/Scribe printer cable.

Gender changer - 590-0214  
Appleline - 699-0239 with version 2.2 of the ROMs.  
Appleline wall mounting power supply - 970-0950  
(optional - Loop Back Connector - 970-0879)

Software Configuration:

ProDOS 1.1.1  
Apple Access II v 1.1  
Set Access II as follows:  
Terminal Characteristics  
"Set ANSI Mode"  
"Do NOT Send LF After CR" - for Supervisor mode  
or  
"Send LF After CR" - for 'On-Line' mode  
"7 Bits per Character"  
"Enable XON/XOFF"  
"Normal Video"  
"Full Duplex"  
"No Wraparound"  
Set Speed - "2400 baud" Set Parity - "Even"

Appleline Configuration:

Terminal Type....."VT100"  
Baud Rate....."2400"  
Parity....."Even"  
Autobaud....."Enabled"  
Speed Indicator....."Disabled"  
Modem type....."Local Connect"  
Auto Logoff....."Disabled"  
Special Terminal Capability..."None"  
24/25 Line Automatic Toggle..."Disabled"

Notes

# APPLE II COMPUTER TECHNICAL INFORMATION

-----

- 1- Set Access II for 2400 baud. 4800 & 9600 seem to overrun it.
- 2- The autobaud sequence is OpenApple-B Return (OA-B Return).
- 3- If you use 8 bits per character, set parity to None in Access II and on the Appleline.

For more information on VT-100 keypad sequences, see Apple Access II (030-0923-A, copyright 1983), Appendix i, pp 165-166.

4 - The mapping for an Apple IIe or IIc running Access II to IBM 3278 Keys is as follows (not checked):

3278 Key	Press
-----	-----
PF1	Esc 1
PF2	Esc 2
PF3	Esc 3
PF4	Esc 4
PF5	Esc 5
PF6	Esc 6
PF7	Esc 7
PF8	Esc 8
PF9	Esc 9
PF10	Esc 0
PF11	Esc - (minus)
PF12	Esc =
PF13	Esc !
PF14	Esc @
PF15	Esc #
PF16	Esc \$
PF17	Esc %
PF18	Esc ^
PF19	Esc &
PF20	Esc *
PF21	Esc (
PF22	Esc )
PF23	Esc _ (underscore)
PF24	Esc +
* NEW LINE	OA-Return
ENTER	Return
TAB	Tab
BACK-TAB	Control-OA-K
HOME	Control-\
LEFT CURSOR	Left-Arrow or Control-H
RIGHT CURSOR	Right-Arrow or Control-U
DOWN CURSOR	Down-Arrow or Control-J
UP CURSOR	Up-Arrow or Control-K
PA1	Esc [
* PA2	Esc ]
* DUP	Control-OA-U
* FM	Control-Y
ATTN	Control-A
* SYS REQ	Control-B
* CURSR SEL	Control-D
CLEAR	Control-E
ERASE INPUT	Control-L

## APPLE II COMPUTER TECHNICAL INFORMATION

ERASE EOF      Control-F  
\* PRINT         Control-P  
\* IDENT         Control-V  
\* TEST         Control-T  
  RESET         Control-R  
a DEV CNCL      Control-R

  INSERT        Control-]  
b DELETE        Delete

\* NOT TESTED

- According to the documentation (See Appleline Users Manual, Appleline Part II: Guide to Lisa, Chapter 2, p65) Control-X should give a DEV CNCL function, but where DEV CNCL is needed (according to the systems types there) Control-R works. This is the same code as is used for the RESET function.

- According to the documentation (See Appleline Users Manual, Appleline Part II: Guide to Lisa, Chapter 2, p65) Control-underscore should work. Instead it locks Appleline.

### Article Change History:

12 Oct 1994 - Reviewed for technical accuracy.

### Support Information Services

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Keywords:

### END OF FILE A2TIL210.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL211.TXT  
#####

Description: AppleLink for Apple II: Not ProDOS-Based  
Header: AppleLink for Apple II: Not ProDOS-Based

This article last reviewed: 10 September 1987

AppleLink for the Apple II is written in UCSD Pascal, using an operating system that is not entirely compatible with ProDOS. AppleLink is ProDOS-compatible, and you can load and save ProDOS files, but you can't install AppleLink on a ProDOS hard disk.

Keywords:

### END OF FILE A2TIL211.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL212.TXT  
#####

Description: AppleShare & Apple IIGS: "Cannot Load Descriptor File" Error  
Header: AppleShare & Apple IIGS: "Cannot Load Descriptor File" Error

This article last reviewed: 25 February 1991

TOPIC -----

I have a problem trying to install an Apple IIGS workstation on an AppleShare network.

On my Macintosh SE/30 file server, I've installed System 6.0.5, AppleShare, and Apple II network software. On my Apple IIGS, I made an "AppleShare on 3.5" startup disk, started it up, logged on, and installed Network Server Startup on the file server. After starting the Apple IIGS up from the network and setting the startup application to the Finder, I got the error message, "CANNOT LOAD DESCRIPTOR FILE \$0001." I've re-installed everything and the problem persists.

DISCUSSION -----

This sounds like an AppleShare server access privileges problem. Set the System Icons privileges to see files and folders for everyone and make sure that this change is made for all enclosed folders.

Copyright 1991, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL212.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL213.TXT  
#####

Description: AppleShare 3.0: Memory and Apple II Limits (11/94)  
Header: AppleShare 3.0: Memory and Apple II Limits (11/94)

Article Created: 18 October 1991  
Article Reviewed/Updated: 11 November 1994

TOPIC -----

- 1) To run under System 7, AppleShare 3.0 needs 4MB RAM. Does this include having the Print Serving option running as well?
- 2) Is 5MB enough to run AFS 3.0, APS 3.0, AppleTalk Internet Router and support for Apple II users?
- 3) I saw something on a limitation of 20 some Apple II users -- is this a simultaneous log-on limit, or can I assign only 20 users the ability to log on from an Apple II?

DISCUSSION -----

- 1) The 4MB requirement for AppleShare 3.0 includes concurrent operation of both file and print services. This includes Apple II access.
- 2) On a 5MB Macintosh IIci system you would also be able to install the Apple Internet Router, although for performance considerations it would be better to have the Apple Internet Router reside on a dedicated Macintosh. High traffic involving one of the applications can severely impact the performance of the other.
- 3) Although it is possible to define up to 8,192 users/groups (including the ability to log on from an Apple II), we would recommend not more than 2,000 users/groups. As the number of users/groups grows beyond 2000 and approaches 8000, it can take significantly longer to start up because it takes longer for AppleShare 3.0 to read through so many names. It doesn't affect server running performance or the amount of RAM required. The limitations regarding the number of users, Macintosh and Apple II alike, that can sign on concurrently is defined in the AppleShare 3.0 File Server Preferences. AppleShare 3.0 can accommodate up to 120 connections at one time.

If you plan to have Apple IIGS systems start up over the network, experience has shown that the length of time it takes to have more than 20 Apple IIGS systems do so may exceed the customers expectations. This will not be a problem if the Apple II systems are starting locally and then logging on to the file server.

Article Change History:  
11 Nov 1994 - Reviewed for technical accuracy.

Support Information Services  
Copyright 1991-94, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL213.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL214.TXT  
#####

Description: AppleShare File Server: Allowing Apple II Network Startup  
Header: AppleShare File Server: Allowing Apple II Network Startup

Article Created: 5 June 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

This article tells how to set up your AppleShare File Server software so that Apple IIGS and Apple IIe systems can start up over the network.

An earlier version of this article appeared in the June 1990 "TechBeat" and in the "Apple II Tech Bulletin" for February-March 1990. Since then, new versions of the Apple IIGS and Macintosh operating systems have been released, requiring updated documentation.

DISCUSSION -----

Assuming the hardware is already set up, the installation process should take from one to two hours. This article assumes you are installing AppleShare on a newer Macintosh running System 6.0.7. Note: If you are installing on one of the older Macintosh computers, for example an SE/30, System 6.0.5 would be an acceptable replacement for System 6.0.7.

This article also applies to those with existing AppleShare File Servers. Where necessary, we will explain what material to skip over.

Besides Macintosh system software, you need the AppleShare File Server software (version 2.0.1), Apple part number M0548/B. Finally, you need Apple IIGS System Software Update Version 5.0, Apple part number A0013LL/A. (This version is now shipping with version 5.0.4 in the box.)

Note that IIGS System 5.0.4 is a three-disk set. The third disk, a Macintosh disk called "Apple II Setup", is essential. You will need to buy at least one IIGS System 5.0 Software Update, because this third disk does not ship with new IIGS systems. Table 1 lists the disks required. You also need one blank 800K disk.

Note: For future reference, if a new version of IIGS system software is released, use the complete three-disk set from that system instead of version 5.0.4.

Table 1: Required Disks

Disk Name	Format	Comment
System Startup 6.0.7	Mac 1.44MB	
System Additions 6.0.7	Mac 1.44MB	
Network Products Installer 6.0.7	Mac 1.44MB	
AppleShare File Server 2.0.1 Installer	Mac 800K	Part of A'Share 2.0.1.
AppleShare File Server 2.0.1 Admin	Mac 800K	Part of A'Share 2.0.1.
Apple II Setup 2.0.1	Mac 800K	Part of A'Share 2.0.1.
-->Obsolete disk!		
/System.Disk	ProDOS 800K	Part of IIGS System 5.0.4.
/System.Tools	ProDOS 800K	Part of IIGS System 5.0.4.
Apple II Setup 2.1.3	Mac 800K	Part of IIGS System 5.0.4.
-->New version.		

## APPLE II COMPUTER TECHNICAL INFORMATION

### 1. Setting up the AppleShare File Server

-----

Follow these steps to set up the AppleShare File Server:

- 1) If you have an existing server, start up from the Network Products Installer disk and install "Apple II Setup (v2.0.1)". (Others should skip to the next paragraph.)
- 2) When the Installer prompts you for the "Apple II Setup" disk, insert the Apple II Setup version 2.1.3 disk that came with IIGS System Software 5.0.4.

Do not insert the obsolete Apple II Setup disk that comes in the box with AppleShare 2.0.1. For those with an existing file server, proceed to Section 2, "Preparing AppleShare for Apple II Users".

If you haven't set up your server yet, here is how to do it:

- 1) Boot the Macintosh with the System Startup disk
- 2) Launch HDSC Setup and initialize the hard disk. When giving the hard disk a name, use a short name that fits ProDOS conventions. The name must begin with a letter (A to Z) and contain nothing but letters, numerals and periods. No spaces. Lower case is permitted. For this example, we will name the server volume "A2".
- 3) After the hard disk has been initialized, quit HDSC Setup and launch the Installer. Click "Easy Install".
- 4) When the installation is complete, quit the Installer.
- 5) Double-click on the hard disk icon and open the System Folder.
- 6) Drag "Easy Access," and any printer drivers you don't need, to the Trash. You can also delete MultiFinder. If you won't be doing any printing from the file server, you can throw away Backgrounder and PrintMonitor.
- 7) When you are done, select "Empty Trash" from the Special menu and close all open windows. Then select "Shut Down" from the Special menu.

With the cleanup out of the way, it's time to install the software:

- 1) After the Macintosh ejects the System Startup disk, restart from the Network Products Installer disk.
- 2) Launch the Installer and select "AppleShare File Server (v2.0.1)" and holding down the Shift key, select "Apple II Setup (v2.0.1)".
- 3) Click Install. The Installer will prompt you for the "AppleShare File Server" disk (that's the AppleShare Installer disk), and shortly thereafter, the "AppleShare Administration" disk.
- 4) When it prompts you for the "Apple II Setup" disk, insert the Apple II Setup version 2.1.3 disk that came with IIGS System Software 5.0.4.

Important: Do not insert the obsolete Apple II Setup disk that comes in the box with AppleShare 2.0.1

- 5) When the Installer is finished, quit and restart the Macintosh, letting it start up from the hard drive.
- 6) The hard drive isn't an AppleShare File Server yet, so you must set it up. Open the System Folder on the hard drive and double-click

"AppleShare Admin".

- 7) When asked if you want to "Prepare volume 'A2' for use with AppleShare?", click OK. You'll be asked to give the file server a name, for example, "Apple II Forever".
- 8) Next, the system will prompt you for a Users and Groups file. Open the Server Folder and click "New". Create users and groups according to your needs and preferences, starting with the Administrator.
- 9) When you are done, select "Save Users and Groups as " from the File menu and save the Users and Groups in the Server folder.

## 2. Preparing AppleShare for Apple II Users

-----  
Here's how to prepare AppleShare for Apple II Users:

- 1) If you haven't done so, get into the AppleShare Admin program. (There is no need to shut down your server to do this.)
- 2) Under the Server menu select "Server Info" and click on the check box marked "Apple II Features".
- 3) Click "Save". Quit the AppleShare Admin program.
- 4) If you were updating an existing file server, shut down the server and restart. Others can merely select "Restart" from the Special menu to restart the Macintosh. It will come up as an AppleShare File Server.

If you want the file server to support network startup only for Apple IIe users, the server is now ready to start them up over the network, once you set the access privileges on the volume. Users must be able to "See Files, See Folders" to start up.

To set the access privileges, follow these steps:

- 1) Get into AppleShare Admin and select "Volume List" from the Volume menu.
- 2) Double-click the server volume.
- 3) Set the access to "See Files, See Folders" and apply the changes to all enclosed folders -- unless you have an existing file server, in which case you will probably need to assign access by folder.

Apple IIe users need "See Files, See Folders" access to the top level of the server startup volume. Whether you set these changes for the Administrator only, all users, or just the particular groups, depends on how you have planned your server.

If you want IIGS users to be able to start up over the network, you should continue with the next section, which tells you how to install IIGS system software onto the server, over the network. This step is required only if the IIGS users will be starting up over the network. If the IIGS workstations have hard drives, you should set them up to start up GS/OS on their hard drives, and install AppleShare. This way, they can mount server volumes on the desktop, just like Macintosh users.

## 3. Installing IIGS System Software over the Network

-----  
Make sure you have the AppleShare File Server and the Apple IIGS connected via LocalTalk or similar network cabling. The IIGS should have a minimum of 1MB of RAM and one Apple 3.5 Drive. (You'll save time if you equip the IIGS with two Apple 3.5 Drives.)

## APPLE II COMPUTER TECHNICAL INFORMATION

When you turn on the IIGS, hold down the Control Open-Apple Escape keys to get into the text Control Panel. If you have defined a RAM disk, make sure you leave the system with at least 1MB of memory. Under Slots, ensure that the Startup Slot is set to 5, and that Slot 5 is set to "SmartPort" and Slot 7 to "AppleTalk" or "Built-In AppleTalk". Slot 1 should be set to "Your Card", or on a ROM 03 IIGS to "Built-In AppleTalk". Exit from the Control Panel and turn off the computer.

Be sure you have the original (unmodified) System.Disk and System.Tools diskettes. Lock both diskettes to prevent accidental deleting of critical files. You will also need one blank 800K disk to use as an AppleShare startup disk. Follow these steps:

- 1) Insert the System.Disk and power on the IIGS.
- 2) When the Finder desktop appears, insert the blank disk and initialize it. Call it "AppleShare".
- 3) Launch the Installer from System.Tools. If you have two drives, eject the System.Disk. If you have one drive, eject the System.Tools disk.
- 4) Insert the blank "AppleShare" disk you just initialized and click the "Disk" button until its name appears.
- 5) Select the installer script entitled "AppleShare on 3.5 Disk" and click Install. Before installing, the system will display an alert message explaining not to install this on your only copy of the system disk. Click "Perform This Update" to continue. Some disk swapping will be required.
- 6) When the installation is complete, make sure the AppleShare startup disk you just created is in drive 1, and restart. To save time, you can hold down the Control Open-Apple Reset keys rather than quitting to the Finder and doing a Shutdown.
- 7) When the Finder desktop is on the screen, use the mouse to select the graphic Control Panel under the Apple menu. If it isn't already highlighted, click on AppleShare.
- 8) Select the file server and connect using the Administrator name and password. Then select the AppleShare File Server volume and mount it. Close the graphic Control Panel.
- 9) Run the Installer on System.Tools. Click the "Disk" button until the file server name appears -- in our example, "A2".

Here is how to install some files over the network onto the file server volume:

- 1) Select the following scripts: Server Network Startup, Server Quick Logoff and optional scripts.

For optional scripts, select anything that IIGS systems starting over the network will require. For instance, if you need access to a network printer, like a LaserWriter or an AppleTalk ImageWriter, install those scripts.

- 2) Select the optional scripts you need by holding down the Open Apple key when you click on them.

Caution: do not try to install "Latest System Files" or "Latest System Files (No Finder)", or IIGS users will not be able to start up over the network. Note: There was an error in the original version of this article that indicated you should install the "Latest System Files (No Finder)" script. It was corrected in a subsequent issue of "TechBeat."

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When you click "Install", the system installs the IIGS system software over the network. To show network activities, double arrows at the top left of the screen will flash. The installation may take some time.

- 3) Before you run off to grab a coffee, wait for the alert message telling you to "install this update only on a file server's startup volume". Click "Perform This Update" to continue.
- 4) When the installation is complete, hold down the Control Open-Apple Escape keys to enter the text Control Panel.
- 5) Under Slots, set the startup slot to 7. The next time you start up the IIGS, it will be over the network. First, however, you have to set up the server for IIGS users. See section 4 below.

### 4. Setting up the File Server for IIGS Users

-----  
Follow these steps:

- 1) Leaving the file server running, get into the AppleShare Admin program.
- 2) Use the Shift-click method to highlight all the IIGS users you want to start up over the network.
- 3) Select "Set Startup" under the Apple II menu.
- 4) To have IIGS users start up into the Finder, select "Finder" under the System folder. You can also select a default network printer if one is available, and if you installed the drivers for them in section 3. Note that any printers to be selected must be powered up and visible over the network.

For Apple IIe users, you can set the startup application to be any ProDOS 8 application (file type SYS). Apple IIe systems that will start up over the network must be equipped with AppleShare Workstation cards and 128K of RAM. They must also be enhanced. (If you will be running Aristotle Admin, you'll need an Apple II Memory Expansion card with at least 256K of RAM. IIGS users who want to run Aristotle Admin need to define a RAM disk with 256K of RAM.) IIGS users can also start up to any ProDOS 8, ProDOS-16, or GS/OS application.

When you have finished setting up the startup information for your Apple II users, all that remains is setting the access privileges:

- 1) Under the "Volumes" menu, select "Volume List", double-click on the server volume, and a dialog box will be displayed.
- 2) Set the access privileges so that everyone can "See Files, See Folders", and apply changes to all enclosed folders, unless you have an existing server.

In such a case, you should not apply changes to enclosed folders, as there may be folders you do not want IIGS users to have access to. IIGS users need "See Files, See Folders" access to the top level of the server startup volume, the System Folder, and all folders within it. They will also need the same access to the Icons folder, which holds IIGS Finder icons. Users may experience errors if they don't have sufficient access for various operations. If you find some IIGS software that needs write access to a particular folder, you should lock that folder so that adventurous users can't throw it away.

- 3) When you are finished setting up access privileges, quit from the AppleShare Admin program.

5. Booting over the Network

-----  
You should now be able to start up over the network with a IIGS or a IIe. A IIGS starting up over the network displays several different screens during the startup process. You can verify you installed the correct version of the Apple II Setup on your file server by watching the "Starting up over the network" screen. It should say "2.1.3 GS.OS" at the top right if you used version 2.1.3, which comes with IIGS System 5.0.4.

After a few moments, the system prompts the user for a user name or allow guest access, if it is enabled. Be sure to test server logon as a normal user, and not just as the Administrator. That way you can uncover any access privilege problems. If you ever see an error message, take note of any error codes and compare them to the list in the back of the "ProDOS Technical Reference Manual" or in the "Apple IIGS GS/OS Reference." Two of the most common errors are listed in the Appendix at the end of this article. You'll find that most errors are easily explainable unless you mixed up software versions during installation.

You have now completed the installation of software to allow IIGS and IIe users to start up over the network.

Appendix: Common Errors

-----  
Cannot load file Start.GS.OS

Error = \$0046

This is the message you get if you failed to follow Step 3 correctly. It is a ProDOS file system error \$46, which means "Path not found". The GS/OS files the system requires to start up could not be found on the file server. If you have multiple file-server volumes, verify you installed the IIGS System Software over the network onto the server startup volume.

Unable to load descriptors

Error was \$004E

This message denotes an access privileges problem. It is a ProDOS file system \$4E error. This means the user had insufficient access privileges to complete the required operation, or, possibly, the file was locked. Most likely, you haven't given the user who experienced the error "See Files, See Folders" access to the top level of the server startup volume, the System folder, and all folders within it.

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Keywords:

### END OF FILE A2TIL214.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL215.TXT  
#####

Description: AppleShare Network: How to Check for ProDOS Files  
Header: AppleShare Network: How to Check for ProDOS Files

This article last reviewed: 22 May 1990

TOPIC -----

I have Apple IIGS systems and Apple IIe systems on an AppleShare 2.0.1 network. When the Apple IIGS starts up, it shows ProDOS 1.8 and GS/OS, yet when the Apple IIe systems start up, they show ProDOS 1.4.

I have an application (MECC Communikeys) that apparently doesn't work correctly with ProDOS 1.4. (One Apple IIe works OK, but the other Apple IIe systems lock the entire network.)

Where is ProDOS 1.4 coming from? I've checked for P\* and P16 and even copied them from one folder to another.

DISCUSSION -----

When setting up an AppleShare File Server for an Apple IIe and Apple IIGS environment, two copies of P8 are installed. One copy is installed when the server is updated with the Apple II Setup Disk for the AppleShare File Server (a Macintosh disk). This copy is placed in the Server Folder. Another copy is installed when GS/OS is loaded from an Apple IIGS using the GS/OS SYSTEM.DISK and SYSTEM.TOOLS (Apple IIGS disks). This copy is at the root level of the server.

It appears that an early version of the Apple II Setup Disk was used on the server. Earlier versions of that disk contained earlier versions of P8. Reinstalling the Apple II setup should provide the current version of ProDOS. Use the Apple II Setup Disk marked:

"Version 2.1; For use with Apple IIGS System Software 5.0".

How did you check for the ProDOS files? Was the check done from an Apple IIGS? Was the check done from a Macintosh on the network? Was checking done on the server from within the Admin application? Was the server restarted with a floppy disk and then checked for these files?

If the check was from a Apple IIGS workstation, the Server Folder is not visible. This is where one of the ProDOS files resides, and you would find only one of the ProDOS files.

If you checked from a Macintosh on the network, the result would be the same as when checking from an Apple IIGS workstation. There is no Server Folder available.

If checking was done on the server from within the Admin application, you will see the Server Folder, but you cannot open that folder and review its contents.

If the server was started up from a floppy disk and then the check was done, a second P8 file will be visible in the Server Folder.

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Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL215.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL216.TXT  
#####

Description: AppleShare: Apple II Practical Node Limits  
Header: AppleShare: Apple II Practical Node Limits

This article last reviewed: 28 February 1990

TOPIC -----

How many Apple IIs can be started up from an Macintosh SE/30 AppleShare File Server? Theoretically, 50 nodes can be logged on to an AppleShare file server at a time, but what is the practical limit? I've never seen an Apple II network larger than about 30 nodes, so I can't really estimate the degradation in performance. Do you know of any sites running 40 or more Apple IIE or Apple IIGS systems off of one file server?

DISCUSSION -----

With 1MB RAM, a Macintosh SE/30 allows 25 Apple II workstations to start up from the server at the same time. With 2MB RAM, the limit is increased to 50 Apple II workstations.

The practical limit for booting depends on the user's situation. For example, 20 Apple IIGS systems starting up at same time from the same server takes approximately 10 minutes, whereas 20 Apple IIE systems take about 4 minutes. The reason is that the Apple IIGS has more than 120K to load across the network, compared to about 20K for the Apple IIE.

The practical limit for workstations logged on to one server depends on the amount of activity taking place on the network. With low traffic, 50 users logged on at one time may be acceptable. As traffic becomes heavier, it is probable that the practical maximum number of active users will decrease.  
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Keywords:

### END OF FILE A2TIL216.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL217.TXT  
#####

Description: AppleShare: How To Keep Apple II & Macintosh Software Separate  
Header: AppleShare: How To Keep Apple II & Macintosh Software Separate

This article last reviewed: 12 December 1989

TOPIC -----

I want to use a utility (that is: Disk Tools, DiskTop or ResEdit) to make Apple II folders (that is: Aristotle, system, and users) invisible to Macintosh users. I want to prevent the users from going into a folder and trashing its contents. I could "lock" them, but if they don't know they are out there it works better in the long run.

Is this process safe?

DISCUSSION -----

The problem with making those files invisible to Macintosh users is that they will also be invisible to Apple IIIGS users -- the Apple IIIGS users will have no convenient way to launch Applesoft BASIC.

We recommend locking them. This prevents those without adequate AppleShare privileges from removing, renaming, or replacing them.  
Copyright 1989 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL217.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL218.TXT  
#####

Description: AppleShare: Leave LaserWriters on for Apple II Workstations  
Header: AppleShare: Leave LaserWriters on for Apple II Workstations

Article Created: 13 August 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

Is there a way to download the ImageWriter emulation to a LaserWriter for an Apple IIGS on an AppleShare network at the time the servers are turned on each morning?

DISCUSSION -----

That would be a nice enhancement for AppleShare, but presently there is no way to do this. We suggest you download the emulator and leave the printer on. This won't seriously affect the life of the printer.  
Copyright 1991, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL218.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL219.TXT  
#####

Description: AppleShare: Problems Using Chooser with Apple II Computers  
Header: AppleShare: Problems Using Chooser with Apple II Computers

Article Created: 14 June 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I recently set up an AppleShare Network with Apple II and Macintosh computers. All seemed well except for a small item on the Apple II side.

Using Aristotle, everything works fine except the Chooser.

When trying to use Chooser, the window opens to show the application just short of finishing. The Chooser then stops with a message that it cannot load or open:

/System/System.Setup/ATInit

How can I repair the above file without reinstalling the entire AppleShare network?

DISCUSSION -----

If you're using Apple IIGS computers, you don't need to use the Chooser anymore. Select printers with the Control Panel.

If you're using Apple IIe computers, be sure you use the AppleShare Apple II Setup Disk 2.1.1 or greater when setting up your server.

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Keywords:

### END OF FILE A2TIL219.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL220.TXT  
#####

Description: AppleSingle/AppleDouble Formats: Developer's Note (9/94)  
Header: AppleSingle/AppleDouble Formats: Developer's Note (9/94)

Article Created: 21 September 1994

TOPIC -----

This article contains the text from AppleSingle/AppleDouble Formats for Foreign Files Developer s Note.

DISCUSSION -----

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Chapter 1: Choosing AppleSingle or AppleDouble Terminology

Chapter 2: AppleSingle file header

- Magic number
- Version number
- Filler
- Number of entries
- Entry descriptors
- Predefined entry IDs

- File layout
- Filename conventions
  - ProDOS
  - MS-DOS
  - UNIX and NFS
- Usage

Chapter 3: Filename conventions

- ProDOS
- MS-DOS
- UNIX and NFS
- Usage

Appendix

Preface

-----  
This document describes version 2 of the AppleSingle/AppleDouble file formats.

To compare this version with version 1 of the AppleSingle/AppleDouble file formats, refer to Appendix B of the A/UX Toolbox: Macintosh ROM Interface manual.

You can also find a description of version 1 in the Apple II File Type Notes for file types \$E0.0001-AppleSingle and \$E0.0002/\$E0.0003-AppleDouble. These

## APPLE II COMPUTER TECHNICAL INFORMATION

File Type Notes are available through Apple Developer Technical Support.

### Chapter 1: About AppleSingle/AppleDouble Formats

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When a file is exchanged between file systems that do not support the same file attributes, some of the file's attributes are lost. Apple Computer has developed two file formats, called AppleSingle and AppleDouble, that allow files to maintain their file attributes on foreign file systems that do not support the same attributes.

The AppleSingle and AppleDouble formats were initially developed to store Macintosh files on file systems that do not support the Macintosh file structure. However, these formats can also be used to represent almost any kind of file on almost any file system. They assume only that the file systems used allow you to create a file as a set of contiguous bytes.

The AppleSingle/AppleDouble file format is not tied to a single home file system. A file is stored as a heterogeneous collection of data and attributes, which are interpreted as needed by the application reading the file.

The AppleSingle or AppleDouble format can be used

- \* as a standard format for transferring files among differing, or heterogeneous, computers.
- \* as a standard format for transferring files within a single computer.

- Choosing AppleSingle or AppleDouble -

The AppleSingle and AppleDouble formats are alike in that they use the same components to represent a file on a foreign system: data, resources, and attributes. The difference between the two formats is that the AppleSingle format stores these components in a single foreign file, and the AppleDouble format stores these components in two foreign files one for the data, the other for the resources and attributes.

Applications may use either AppleSingle or AppleDouble when they create files on foreign file systems; however, they must understand both formats.

To find out which format is appropriate for you, examine your application. If the AppleSingle format is used, home file system data cannot be moved or deleted inconsistently; however, the AppleSingle format is harder to update. The AppleDouble format is easier to modify but one of the two AppleDouble files can be moved or deleted inconsistently.

If you are building an AppleTalk Filing Protocol (AFP) server (or any other server that supports the Macintosh computer), then you may want to use one of these formats as your application's internal or external file storage format. The choice is yours. It doesn't matter which format is used within your application, but it is suggested that you use one of these formats as your external storage format so that files can be shared by other applications running on the same machine as your application.

- Terminology -

The following terms are relevant to the discussion of AppleSingle and AppleDouble file formats.

A Macintosh file has two forks: the resource fork and the data fork. The resource fork contains data used by an application, such as menus, fonts, and icons. An executable file's code is also stored in the resource fork. The data fork contains data specific to an application.

The home file system is the primary file system for which the file's contents were created. The home file system is not necessarily the file system in which the file was created. For example, if a program running on a UNIX

## APPLE II COMPUTER TECHNICAL INFORMATION

system creates a file that holds a MacWrite document, the file's home file system is the Macintosh file system not the UNIX file system because the file's contents are formatted for a Macintosh application.

In contrast to the home file system is the foreign file system, which is the other file system that stores or processes the created file. In the previous example, the UNIX file system is the foreign file system.

### Chapter 2: The AppleSingle Format

-----

In the AppleSingle format, a file's contents and attributes are stored in a single file in the foreign file system. For example, both forks of a Macintosh file, the Finder information, and an associated comment are arranged in a single file with a simple structure.

An AppleSingle file consists of a header followed by one or more data entries. The header consists of several fixed fields and a list of entry descriptors, each pointing to a data entry. Each entry is optional and may or may not appear in the file.

- AppleSingle file header -

Table 2-1 describes the contents of an AppleSingle file header.

Table 2-1: AppleSingle file header

Field	Length
-----	-----
Magic number	4 bytes
Version number	4 bytes
Filler	16 bytes
Number of entries	2 bytes
Entry descriptor for each entry:	
Entry ID	4 bytes
Offset	4 bytes
Length	4 bytes

Byte ordering in the file header fields follows MC68000 conventions, most significant byte first. The fields in the header file follow the conventions described in the following sections.

#### Magic number

This field, modeled after the UNIX magic number feature, specifies the file's format. Apple has defined the magic number for the AppleSingle format as \$00051600 or 0x00051600.

#### Version number

This field denotes the version of AppleSingle format in the event the format evolves (more fields may be added to the header). The version described in this developer's note is version \$00020000 or 0x00020000.

#### Filler

This field is all zeros (\$00 or 0x00).

#### Number of entries

This field specifies how many different entries are included in the file. It is an unsigned 16-bit number. If the number of entries is any number other than 0, then that number of entry descriptors immediately follows the number of entries field.

#### Entry descriptors

## APPLE II COMPUTER TECHNICAL INFORMATION

The entry descriptors are made up of the following three fields:

- \* Entry ID, an unsigned 32-bit number, defines what the entry is. Entry IDs range from 1 to \$FFFFFFF. Entry ID 0 is invalid.
- \* Offset, an unsigned 32-bit number, shows the offset from the beginning of the file to the beginning of the entry's data.
- \* Length, an unsigned 32-bit number, shows the length of the data in bytes. The length can be 0.

### Predefined entry IDs

Apple has defined a set of entry IDs and their values as follows:

Data Fork	1	Data fork
Resource Fork	2	Resource fork
Real Name	3	File's name as created on home file system
Comment	4	Standard Macintosh comment
Icon, B&W	5	Standard Macintosh black and white icon
Icon, Color	6	Macintosh color icon
File Dates Info	8	File creation date, modification date, and so on
Finder Info	9	Standard Macintosh Finder information
Macintosh File Info	10	Macintosh file information, attributes, and so on
ProDOS File Info	11	ProDOS file information, attributes, and so on
MS-DOS File Info	12	MS-DOS file information, attributes, and so on
Short Name	13	AFP short name
AFP File Info	14	AFP file information, attributes, and so on
Directory ID	15	AFP directory ID

Apple reserves the range of entry IDs from 1 to \$7FFFFFFF. The rest of the range is available for applications to define their own entries. Apple does not arbitrate the use of the rest of the range.

Applications reading an AppleSingle or AppleDouble file interpret the entry IDs that are relevant to their home file system and treat the other entries as opaque data. For example, a Macintosh client application will understand entry IDs 1 through 6 and 8 through 10. A ProDOS client application reading the same file will read entry ID 11 instead of entry IDs 9 and 10.

Entry IDs 1, 3, and 8 are typically created for all files; entry ID 2 only for Macintosh and ProDOS files; entry IDs 4, 5, 6, 9, and 10 only for Macintosh files; entry ID 11 only for ProDOS files; entry ID 12 only for MS-DOS files; and entry IDs 13, 14, and 15 only by AFP servers.

Macintosh Icon entries do not appear in most files because they are typically stored as a bundle in the application file's resource fork.

The File Dates Info entry (ID=8) consists of the file creation, modification, backup and access times (see Figure 2-1), stored as a signed number of seconds before or after 12:00 a.m. (midnight), January 1, 2000 Greenwich Mean Time (GMT). In other words, the start of the year 2000 GMT corresponds to a date-time of 0. Applications must convert to their native date and time conventions. When initially created, a file's backup time and any unknown entries are set to \$80000000 or 0x80000000, the earliest reasonable time.

The Macintosh Finder Info entry (ID=9) consists of 16 bytes of Finder Info followed by 16 bytes of extended Finder Info; that is, the field `ioFlFndrInfo` followed by `ioFlXFndrInfo`, as returned by the Macintosh `PBGetCatInfo` call. (The `PBGetCatInfo` and the internal structures of `ioFlFndrInfo` and `ioFlXFndrInfo` are described in *Inside Macintosh*.)

Newly created files have 0s in all Finder Info subfields. If you are creating an AppleSingle or AppleDouble file, you may assign 0 to any subfield whose value is unknown (most subfields are undefined if the file does not reside on a valid hierarchical file system [HFS] volume), but you may want to set the `fdType` and `fdCreator` subfields.

## APPLE II COMPUTER TECHNICAL INFORMATION

One additional field must be set in the directory Finder Info entry. Whenever the Finder encounters a new ("initiated" bit clear) directory, it initializes the frView field of the directory Finder Info to a value indicating how the contents of the directory should be viewed when opened (by icon, by small icon, and so on). Zero is not a legal value. This is not a problem as long as the client has write permission for the directory.

The Finder will place a legal value into the frView field when it initializes the directory. However, if the directory permissions deny making changes, the initial value will remain unchanged and cause the Finder to display things strangely. Consequently, it is appropriate to set the frView field when the Finder Info is assigned to a new host directory. For example:

```
#define closedView 256 /* Normal view - icon, spatial */
/* ... */
dirFinderInfo.frView = closedView;
```

This results in the traditional "view by icon" display when the Finder first opens the window for that directory.

The Macintosh File Info entry (ID=10) is 32 bits that stores the locked and protected bit. Macintosh file times are stored in entry ID 8.

The ProDOS File Info entry (ID=11) consists of the file access, file type, and file auxiliary type. ProDOS file times are stored in entry ID 8.

The Access word may be used directly in ProDOS 16 or GS/OS calls; only the low byte is significant to ProDOS 8. The File Type word is the file type of the original file; only the low byte is significant to ProDOS 8. The Auxiliary Type long word is the auxiliary type of the original file; only the low word is significant to ProDOS 8.

UNIX file times are stored in entry ID 8.

The MS-DOS File Info entry (ID=12) is 16 bits that stores the MS-DOS attributes. MS-DOS file times are stored in entry ID 8.

The Short Name entry (ID=13) is the AFP short name. AFP servers must keep a mapping of short names for all foreign files. This short name is stored in entry ID 13.

If entry ID 13 does not exist, an AFP server derives a short name and creates this entry. When they derive short names, AFP servers must ensure that the derived names are unique within the directory. In order to ensure that short names for new foreign files don't conflict with existing short names, the following convention is used: AFP servers start all derived names with the character "!" (\$21 or 0x21). AFP clients are not allowed to access foreign files that begin with this character (!). Except for this restriction on foreign AFP servers, the short name algorithm remains flexible.

The AFP File Info entry (ID=14) is the AFP attributes word, as shown in Figure 2-5. AFP servers should set the BackupNeeded bit whenever a file is modified, or if the AppleSingle/AppleDouble foreign file's modification time is later than the modification time in entry ID 8.

The Directory entry (ID=15) is the AFP directory ID. AFP servers keep the 4-byte directory ID in this entry. This ID is assigned when a directory is created, or when a directory AppleDouble header file without an ID entry is found. The next unused ID is kept in the volume root info file, %RootInfo, in the volume root directory. The %RootInfo file is an AppleDouble header file with entries 3, 4, 8, 9, and 15 (Real Name, Comment, Volume Dates, Finder Info, and Next File ID). It must be locked when it is updated.

- File layout -

## APPLE II COMPUTER TECHNICAL INFORMATION

The entry data follows all of the entry descriptors. The data in each entry must be in a single, contiguous block. You can leave holes in the file for later expansion of data. For example, even if a file's comment field is only 10 bytes long, you can place the offset of the next field 200 bytes beyond the offset of the comment field, leaving room for the comment to grow to its maximum length of 200 bytes.

The entries can appear in any order, but you can maximize the efficiency of file access by following these conventions:

- \* Put the data fork entry at the end of the file. The data fork is the most commonly extended entry, and it is easier to increase its length if it is the last entry in the file.
- \* Put the entries that are most often read, such as Finder Info, File Dates Info, and Macintosh File Info, as close as possible to the header, to increase the probability that a read of the first block or two will retrieve these entries.
- \* Allocate the resource fork entry in blocks of 4 kilobytes (K) in order to minimize reorganization of AppleSingle files during updates to the resource fork.

### - Filename conventions -

AppleSingle name derivations for some of the file systems of interest are defined in the following sections.

#### ProDOS

To generate the AppleSingle filename, use character substitution or deletion to remove illegal characters, and use truncation, if necessary, to reduce the length of the name to the maximum filename length of 15 characters.

#### MS-DOS

To generate the AppleSingle filename, use character substitution or deletion to remove illegal characters, and use truncation, if necessary, to reduce the length of the name to 8 characters. Then add the MS-DOS extension that is most appropriate to the file (for example, .TXT for a pure text file).

#### UNIX and NFS

AppleSingle naming conventions for UNIX and the Network File System (NFS) are essentially the same; they vary only according to the capabilities of the foreign file system. The creating application must use the naming convention that is the most complete subset of the foreign file system, and the naming convention must be constant across a single foreign file system volume.

There are three naming conventions:

- \* 8-bit
- \* 7-bit ASCII
- \* 7-bit alphanumeric

With the 8-bit naming convention, the foreign file system can store at least 93 character filenames consisting of all 8-bit characters except slash (\$2f or 0x2f), null (\$00 or 0x00), and percent (\$25 or 0x25). The slash, null, and percent characters are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. For example, the home file system name Ca ada return - 20% becomes Ca ada return - 20%25.

With the 7-bit ASCII naming convention, the foreign file system can store at least 93 character filenames consisting of all 7-bit ASCII characters except slash (\$2f or 0x2f), null (\$00 or 0x00), and percent (\$25 or 0x25). The slash, null, and percent characters are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. In addition, all extended 8-bit characters (\$80 \$ff or 0x80 0xff) are

## APPLE II COMPUTER TECHNICAL INFORMATION

replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. For example, the home file system name Ca ada return - 20% becomes Ca%96ada return - 20%25.

With the 7-bit alphanumeric naming convention, the foreign file system can store at least 93 character filenames consisting of all 7-bit alphanumeric characters except slash (\$2f or 0x2f), null (\$00 or 0x00), and percent (\$25 or 0x25). The slash, null, and percent characters are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. In addition, all nonalphanumeric characters except underscore (\$5f or 0x5f) and the last period (\$2e or 0x2e) are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. For example, the home file system name Ca ada return - 20% becomes Ca%96ada%20return%20%2d%2020%25.

Since expanding characters into "%" followed by two hexadecimal digits can result in long filenames, some foreign systems may not be able to store complete 31-character filenames. Behavior under these conditions is not defined here.

- Usage -

AppleSingle files must be locked during access to ensure data integrity.

Applications that access AppleSingle files ignore all unknown entries, yet preserve the unknown entries when moving or copying files.

The Real Name entry is associated with file storage. File server applications typically use the reverse mapping of the foreign filename when they present names to the client. Servers do not create or read a Real Name entry.

When the home file system name is renamed, the foreign filename must be renamed according to the filename conventions described in the previous sections.

### Chapter 3: The AppleDouble Format

-----  
The AppleDouble format uses two files to store data, resources, and attributes. The AppleDouble Data file contains the data fork and the AppleDouble Header file contains the resource fork.

The AppleDouble Data file contains the standard Macintosh data fork with no additional header. The AppleDouble Header file has exactly the same format as the AppleSingle file, except that it does not contain a data fork entry. The magic number in the AppleDouble Header file differs from the magic number in the AppleSingle Header file so that an application can tell whether it needs to look in another file for the data fork. The magic number for the AppleDouble format is \$00051607 or 0x00051607.

The entries in the AppleDouble Header file can appear in any order; however, since the resource fork is the entry that is most commonly extended (after the data fork), Apple recommends that the resource fork entry be placed last in the file. The data fork is easily extended because it resides by itself in the AppleDouble Data file.

It is possible to create a new type of entry in the AppleDouble Header file that points to the AppleDouble Data file to make it easy to find. For example, an application-defined entry might hold the name of the AppleDouble Data file. Some foreign file systems might provide a feature that allows a more permanent pointer to be created one that would not require the pointer to be updated if the AppleDouble Data file were renamed.

- Filename conventions -

The following sections present a standard for deriving the AppleDouble Data

## APPLE II COMPUTER TECHNICAL INFORMATION

and AppleDouble Header filenames from the file's Real Name. Because filename syntax differs in the various file systems, the standard varies by file system.

Knowing the AppleDouble name derivations for some of the file systems of interest will allow applications running on foreign file systems and users to see which files are AppleDouble pairs. Users who know the derivation can rename or move the files while preserving the connection between the two. However, there is no guaranteed way to prevent one file in the pair from being inconsistently renamed, moved, or deleted.

### ProDOS

To generate the AppleDouble Data filename, use character substitution or deletion to remove illegal characters, and use truncation, if necessary, to reduce the length of the name to 13 characters, two characters less than the maximum filename length.

To generate the AppleDouble Header filename, prefix the AppleDouble Data filename with the characters uppercase-R period (R.).

### MS-DOS

To generate the AppleDouble Data filename, use character substitution or deletion to remove illegal characters, and use truncation, if necessary, to reduce the length of the name to eight characters. Then add the MS-DOS extension that is most appropriate to the file (for example, .TXT for a pure text file).

To generate the AppleDouble Header filename, add the extension .ADF (for AppleDouble file) to the eight-character filename.

### UNIX and NFS

AppleSingle/AppleDouble naming conventions for UNIX and NFS are essentially the same; they vary only according to the capabilities of the foreign file system. The creating application must use the naming convention that is the most complete subset of the foreign file system, and the naming convention must be constant across a single foreign file system volume.

There are three naming conventions:

- \* 8-bit
- \* 7-bit ASCII
- \* 7-bit alphanumeric

With the 8-bit naming convention, the foreign file system can store at least 93 character filenames consisting of all 8-bit characters except slash (\$2f or 0x2f), null (\$00 or 0x00), and percent (\$25 or 0x25). The slash, null, and percent characters are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. For example, the home file system name Ca ada return - 20% becomes Ca ada return - 20%25.

With the 7-bit ASCII naming convention, the foreign file system can store at least 93 character filenames consisting of all 7-bit ASCII characters except slash (\$2f or 0x2f), null (\$00 or 0x00), and percent (\$25 or 0x25). The slash, null, and percent characters are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. In addition, all extended 8-bit characters (\$80 \$ff or 0x80 0xff) are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. For example, the home file system name Ca ada return - 20% becomes Ca%96ada return - 20%25.

With the 7-bit alphanumeric naming convention, the foreign file system can store at least 93 character filenames consisting of all 7-bit alphanumeric characters except slash (\$2f or 0x2f), null (\$00 or 0x00), and percent (\$25

## APPLE II COMPUTER TECHNICAL INFORMATION

or 0x25). The slash, null, and percent characters are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. In addition, all nonalphanumeric characters except underscore (\$5f or 0x5f) and the last period (\$2e or 0x2e) are replaced by a percent character, followed by the two-character hexadecimal code of the escaped character. For example, the home file system name Ca ada return - 20% becomes Ca%96ada%20return%20%2d%2020%25.

To generate the AppleDouble Header filename, prefix the AppleDouble Data filename with the percent character (%). Conflicts between AppleDouble Header files and AppleSingle or data files that begin with "%," are resolved by the file's magic number.

Since expanding characters into "%" followed by two hexadecimal digits can result in long filenames, some foreign systems may not be able to store complete 31-character filenames. Behavior under these conditions is not defined here.

- Usage -

AppleDouble Header files must be locked during access to ensure data integrity.

Applications that access AppleDouble files ignore all unknown entries, yet preserve them when moving or copying files.

Directories are stored as AppleDouble files if they are created by the application.

The Real Name entry is associated with file storage. File server applications typically use the reverse mapping of the foreign filename when they present names to the client. Servers do not create or read a Real Name entry.

When renaming the home file system name, the foreign filename must be renamed according to the filename conventions described in the previous sections.

Applications should not create AppleDouble Header files for preexisting foreign directories or files unless this is necessary to store AppleDouble entries.

### Appendix: Updating Version 1 AppleSingle/AppleDouble Files

-----

Applications should create AppleSingle/AppleDouble files using the version 2 format and naming conventions described in this document. Applications should understand version 1 (\$00010000 or 0x0010000) format and naming conventions but should not create new files in the version 1 format.

You can update version 1 files to version 2 files by performing the following steps:

- \* Overwrite the version number and filler fields in the AppleSingle or AppleDouble file header.
- \* Replace the File Info entry (ID=7) in the version 1 file with the File Dates Info entry (ID=8) and one of the following entry IDs: Macintosh File Info (ID=10), ProDOS File Info (ID=11), or MS-DOS File Info (ID=12).

Support Information Services  
Copyright 1994, Apple Computer, Inc  
Keywords:

### END OF FILE A2TIL220.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL221.TXT  
#####

Description: Applesoft BASIC: Advancing to Next Line After a ProDOS Call  
Header: Applesoft BASIC: Advancing to Next Line After a ProDOS Call

This article last reviewed: 5 February 1988

When you add a function to ProDOS and call the function from BASIC, you don't then return to the BASIC program that called the routine: at that point, you are BASIC. If the added function is more than one word (as specified in the ProDOS Technical Reference Manual), the pointer that should automatically take you to the start of the next line is not updated properly.

You must make a call to Applesoft to go to the end of the current line, which automatically sets the pointer to the start of the next line.

There is a specific call in Applesoft to make this happen. In the Tech Info Library, search on:  
Applesoft and internals

Keywords:

### END OF FILE A2TIL221.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL222.TXT  
#####
```

Description: Applesoft BASIC: Displaying and printing text in 80 columns  
Header: Applesoft BASIC: Displaying and printing text in 80 columns

The Apple II permits input and output to only one device at a time, including the 80-Column Text Card in slot 3.

Here is a BASIC program that will send information to the printer, and then to the screen.

```
10 D$ = CHR$(4)  
20 PRINT D$;"PR#1" : REM Turn on the printer in slot 1  
30 PRINT "This sentence will be sent to the printer. Make it a long sentence,  
so we can see if the printer uses 80 columns."  
40 PRINT D$;"PR#3" : REM Turn off the printer; return to 80 column screen  
50 PRINT "This sentence will appear on the screen."  
60 END
```

If you find that the printer doesn't use 80 columns, then the interface card in the Apple IIe is set for 40 columns. Check the manual for that card, and change the DIP switches for 80 columns.

Use these techniques within any Applesoft BASIC program to turn a printer on and off, and still maintain disk drive access.

This short program shows how to print lines longer than 80 characters without overprinting. An explanation follows the listing.

```
10 D$=CHR$(4)  
20 PRINT D$;"PR#1"  
30 PRINT CHR$(9);"80N"  
40 PRINT CHR$(9);"C"  
50 LIST  
60 S2$ = "We get a lot of calls regarding a problem with the Imagewriter I  
and the Imagewriter II overprinting when using the PRINT command from  
AppleSoft BASIC with lines that are longer than 80 characters. Here is a  
workable solution."  
70 PRINT D$;"PR#3"
```

In the statement PRINT CHR\$(9); "80N", (which sends Control-I 80N) the number 80 sets the printer card so that it sends a carriage return after sending 80 characters to the printer. The choice of the number, 60, 72, 80, or 132, to name a few options, depends on how you want to use the features of the printer and its interface card. This works for an Apple Super Serial Card, Apple Parallel Interface Card, and other popular interface cards.

After sending Control-I 80N to set the SSC to end its lines at 80 columns, it's still necessary to tell the SSC when that Control-I 80N command should work. That's what Control-I C does: it tells the SSC to issue a carriage return on column overflow.

Column overflow occurs when the SSC detects it has reached the end of the column as set by switches 2-3 and 2-4 or by Control-I 80N. The addition of a line like line 40 should correct similar overstriking problems, especially with listings of BASIC programs. If you run this program, it will correctly print S2\$ on an Imagewriter or an ImageWriter II.

On an Apple IIGS, the Control-I C would need to be a Control-I CE.

Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL222.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL223.TXT  
#####
```

Description: Applesoft BASIC: Making a text file from a program file  
Header: Applesoft BASIC: Making a text file from a program file

To transfer a program in Applesoft BASIC from the Apple II family of computers to another computer, you must first make a text file from the program. Adapt to your own situation this example:

Assume that your BASIC program begins with line number 10 and ends with line number 30000. Add these lines to the beginning of the program:

```
1 PRINT CHR$(4);"OPEN TEXTFILE"  
2 PRINT CHR$(4);"WRITE TEXTFILE"  
3 LIST 10-30000  
4 PRINT CHR$(4);"CLOSE"  
5 END
```

Save the program with the new lines added, then run the program.

This will work in DOS 3.3 or ProDOS, so long as either was used to boot the disk, and so long as there is disk space available to write the program file.

If your program has used lines 1-5, put the new lines at the end, as lines 30001-5 for example, and then type RUN 30001.  
Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL223.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL224.TXT  
#####

Description: Applesoft BASIC: Moving a Listing to a Macintosh and Back  
Header: Applesoft BASIC: Moving a Listing to a Macintosh and Back

Article Created: 25 January 1991  
Article Last Reviewed: 11 August 1992  
Article Last Updated:

TOPIC -----

I would like to use a Macintosh word processor to edit Applesoft BASIC files from the Apple II environment. Is there a translator to take "tokenized" Applesoft BASIC files and have them appear on the Macintosh? The tokens (PRINT, DISPLAY...) don't seem to get translated when files are moved to the Macintosh. The original version of Passport (Apple File Exchange) had that capability.

DISCUSSION -----

We don't know of an AFE Translator for Applesoft BASIC files to Macintosh text files. You can get around this limitation by "printing" the Applesoft program files to a disk file before the AFE conversion. After editing on the Macintosh, transfer the files back to the Apple II. Then, EXEC each file to make it an Applesoft file. To do this, add the following code to the existing Applesoft program:

```
1 D$ = CHR$(4)
2 PRINT D$; "OPEN PGM.LIST"
3 PRINT D$; "LIST"
4 GOTO 32766
.
.
add the existing Applesoft program here
.
.
32766 PRINT D$; "CLOSE PGM.LIST"
```

The entire Applesoft program will be saved in a text file called "PGM.LIST" and can be converted to a Macintosh format for editing.

After editing is complete, transfer the file back to Apple II text format using the file name "EDITED.FILE". Use the EXEC command to turn the text listing into an Applesoft program in memory.

```
] EXEC EDITED.FILE
```

Be sure to SAVE the program to disk or the EXEC step will have to be repeated each time the user wants to run the program.  
Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL224.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL225.TXT  
#####

Description: Applesoft Firmware Card: Options  
Header: Applesoft Firmware Card: Options

The Applesoft firmware card was designed to supply floating point BASIC to Apple II owners. There are two options on the card that the user may select.

1. Most obviously, the position of the switch on the rear of the card is used immediately after a system reset to force the selection of one of two banks of ROMs: the firmware card or the motherboard. If the switch is up then the system will default to Applesoft, otherwise the system will default to Integer BASIC.

2. Software, by accessing address \$C080, can select Integer BASIC, or, by accessing address \$C081, Applesoft.

Unfortunately for systems with Auto Start ROM, every time DOS gets control immediately after a reset, DOS forces a load of the version of BASIC DOS last used, regardless of the position of the switch.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL225.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL226.TXT  
#####
```

Description: Applesoft: Commas and printing  
Header: Applesoft: Commas and printing

The following information applies to the Apple II Plus with a 40-column screen.

The third comma tab field is only available if there is nothing beyond column 23. The first character in the third comma field can print outside the text window.

HTAB can force the cursor outside the text window which can kill a program on the next PRINT statement.

VTAB ignores the text window. VTABbing below the text window will cause all output to be on one line. VTABbing above the text window will scroll into the window but the area above the window won't scroll.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL226.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL227.TXT  
#####

Description: Applesoft: Dotted Vertical Lines in High-Res  
Header: Applesoft: Dotted Vertical Lines in High-Res

The Apple HIRES screen, unable to display all colors at all locations, displays colored vertical or near vertical lines as dashed lines, or not at all. Refer to your Apple II Reference Manual for a more thorough explanation.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL227.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL228.TXT  
#####

Description: Applesoft: Internals--Device I/O Routines  
Header: Applesoft: Internals--Device I/O Routines

INLIN D52C  
Input a line of text without sending out a prompt from the current input device into the input buffer, BUF. INLIN uses GDBUF to strip off the most significant bit on all input characters.

INLIN+2 D52E  
Input a line of text prompting with the character in X from the current input device into the input buffer, BUF. INLIN uses GDBUF to strip off the most significant bit on all input characters.

GDBUFS D539  
Puts a zero at the end of the input buffer, BUF, and masks off the msb on all bytes. On entry: X = the end of the input line.  
On exit:

A = 0  
X = FF  
Y = 1

INCHR D553  
Get one character from the current input device in A and mask off the MSB. INCHR uses the main Apple input routines and supports normal handshaking.

STROUT DB3A  
Print string pointed to by Y,A. The string must end with a null or a quote.

STRPRT DB3D  
Print a string whose descriptor is pointed to by FACMO,FACLO.

OUTDO DB5C  
Print the character in A. INVERSE, FLASH, and NORMAL in effect.

CRDO DAFB  
Print a carriage return.

OUTSPC DB57  
Print a space.

OUTQST DB5A  
Print a question mark.

INPRT ED19  
Print " IN " and the current line number from CURLIN. Uses LINPRT.

LINPRT ED24  
Prints the 2 byte unsigned number in X,A.

PRNTFAC ED2E  
Prints the current value of FAC. FAC is destroyed. Uses FOUT and STROUT.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL228.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL229.TXT  
#####
```

Description: Applesoft: Internals--Error Processor Routines  
Header: Applesoft: Internals--Error Processor Routines

**ERROR**           D412  
Checks ERRFLG and jumps to HNDLERR if ONERR is active. Otherwise it prints  
<cr> "?" <error message pointed to by X> "ERROR". If this is during program  
execution then it also prints " IN " and the CURLIN.

**HANDLERR**        F2E9  
Saves CURLIN in ERRLIN, TXTPTR in ERRPOS, X in ERRNUM, and REMSTK in ERRSTK.  
X contains the error code. See the Applesoft Reference Manual page 136 for  
the value of X for a given error.

**RESUME**           F317  
Restores CURLIN from ERRLIN and TXTPTR from ERRPOS and transfers ERRSTK into  
the 6502 stack pointer.

**ISCNTC**           D858  
Checks the Apple keyboard for a CTRL-C (\$83). Executes the BREAK routine  
if there is a CTRL-C.

**CHKNUM**           DD6A  
Make sure FAC is numeric. See CHKVAL.

**CHKSTR**           DD6C  
Make sure FAC is a string. See CHKVAL.

**CHKVAL**           DD6D  
Takes the result of the most recent FAC operation and check this result for a  
string or numeric variable. A TYPE MISMATCH ERROR results if FAC and C don't  
agree.

On entry:  
C set checks for strings  
C clear checks for numerics.

**ERRDIR**           E306  
Causes ILLEGAL DIRECT ERROR if the program isn't running. X is modified.

**ISLETC**           E07D  
Checks A for an ASCII letter ("A" to "Z"). On exit C set if A is a letter.

**PARCHK**           DEB2  
Checks for "(", evaluates a formula, and checks for ")". Uses CHKOPN and  
FRMEVL then falls into CHKCLS.

**CHKCLS**           DEB8  
Checks at TXTPTR for ")". Uses SYNCHR.

**CHKOPN**           DEBB  
Checks at TXTPTR for "(" . Uses SYNCHR.

**CHKCOM**           DEBE  
Checks at TXTPTR for ", ". Uses SYNCHR.

**SYNCHR**           DECO  
Checks at TXTPTR for the character in A. TXTPTR is not modified. Normally  
exits through CHRGET. Exits with SYNTAX ERROR if they don't match.  
Apple Tech Notes

Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL229.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL230.TXT  
#####

Description: Applesoft: Internals--Floating Point Math Package (2 of 3)  
Header: Applesoft: Internals--Floating Point Math Package (2 of 3)

FLOATING POINT REGISTER MOVE ROUTINES

MOVFM            EAF9  
Moves the number in memory Y,A points to into FAC. On exit A and Z reflect FACEXP.

MOV2F            EB1E  
Pack FAC and temporarily moves it into register 2. On exit A and Z reflect FACEXP.

MOV1F            EB21  
Pack FAC and moves it temporarily into register 1. On exit A and Z reflect FACEXP.

MOVML            EB23  
Pack FAC and move it into zero page area starting at X. On exit A and Z reflect FACEXP.

MOVMF            EB2B  
Pack FAC and move it into memory pointed to by Y,X. On exit A and Z reflect FACEXP.

MOVFA            EB53  
Move ARG into FAC. On exit A and Z reflect FACEXP.

MOVAF            EB63  
Move FAC into ARG. On exit A and Z reflect FACEXP.

CONUPK           E9E3  
Load ARG from memory pointed to by Y,A. On exit A and Z reflect FACEXP.

SUMMARY OF MOVES:

FAC	=>	(Y,A)	EB2B	MOVFM
FAC	=>	(0,X)	EB23	MOVML
FAC	=>	TEMP1	EB21	MOV1F
FAC	=>	TEMP2	EB1E	MOV2F
FAC	=>	ARG	EB63	MOVAF
ARG	=>	FAC	EB53	MOVFA
(Y,A)	=>	FAC	EAF9	MOVFM
(Y,A)	=>	ARG	E9E3	CONUPK

FLOATING POINT OPERATORS

The following routines require that A and Z reflect FACEXP. Even though FAC move routines set up A and Z, a LDA \$9D will insure their proper values.

FMULT            E97F  
Multiply the FAC by the number in memory pointed to by Y,A.

FMULTT           E982  
Multiply FAC and ARG. On entry A and Z must reflect FACEXP.

FDIV             EA66  
Divide the number in memory pointed to by Y,A by FAC.

## APPLE II COMPUTER TECHNICAL INFORMATION

**FDIVT**            **EA69**  
Divide ARG by FAC. On entry A and Z must reflect FACEXP.

**FADD**            **E7BE**  
Add the number Y,A points to in memory to FAC.

**FADDT**          **E7C1**  
Add FAC and ARG. On entry A and Z must reflect FACEXP.

**FSUB**            **E7A7**  
Subtract FAC from the number Y,A points to in memory.

**FSUBT**          **E7AA**  
Subtract FAC from ARG. On entry A and Z must reflect FACEXP.

### TRANSCENDENTAL OPERATORS

**FPWRT**          **EE97**  
Raise ARG to the FAC power. On entry A and Z must reflect the value of FACEXP.

**SQR**            **EE8D**  
Takes the square root of FAC

**LOG**            **E941**  
Log base e of FAC

**EXP**            **EF09**  
Raise e to the FAC power

**COS**            **EFEA**  
Returns the cosine of the FAC in radians.

**SIN**            **EFF1**  
Returns the sine of the FAC in radians.

**TAN**            **F03A**  
Returns the tangent of the FAC in radians.

**ATN**            **F09E**  
Returns the inverse-tangent of the FAC in radians.

### OTHER OPERATORS

**SGN**            **EB90**  
Modifies the value of the FAC depending on its value on entry. On exit:

FAC = 1 if FAC was greater than 0  
FAC = 0 if FAC was equal to 0  
FAC = -1 if FAC was less than 0

**ABS**            **EBAF**  
Absolute value of FAC. If FAC is less than 0 then FAC = -FAC.

**INT**            **EC23**  
Greatest integer value of FAC. Uses QINT and floats the result.

**RND**            **EFAE**  
Form a pseudo-random number in FAC and update RND at 00C9.

**SIGN**          **EB82**  
Set A according to the value of FAC. On exit:

A = 1 if FAC is positive  
A = 0 if FAC = 0

## APPLE II COMPUTER TECHNICAL INFORMATION

A = FF if FAC is negative

FCOMP            EBB2

Compare FAC and a packed number in memory pointed to by Y,A. On exit:

A = 1 if (Y,A) < FAC

A = 0 if (Y,A) = FAC

A = FF if (Y,A) > FAC

NEGOP            EED0

FAC = -FAC

FADDH            E7A0

Add 1/2 to FAC

DIV10            EA55

Divide FAC by 10. Returns positive numbers only.

MUL10            EA39

Multiply FAC by 10. Works for both positive and negative numbers.

Apple Tech Notes

Keywords:

### END OF FILE A2TIL230.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL231.TXT  
#####

Description: Applesoft: Internals--Floating Point Math Package (3 of 3)  
Header: Applesoft: Internals--Floating Point Math Package (3 of 3)

## LOWER LEVEL INTERFACE ROUTINES

FOUT ED34

FOUT creates an ASCII string in FBUFFER equivalent to the value of FAC. On exit Y,A points to the string, which ends with an ASCII null. FAC is scrambled. Use STROUT to print the number.

SNGFLT E301

SNGFLT converts the unsigned number in Y to a floating point number in FAC.

GIVAYF E2F2

GIVAYF converts the unsigned number in Y,A to a floating point number in FAC.

FLOAT EB93

FLOAT converts the signed number in A to a floating point number in FAC.

CONINT E6FB

CONINT converts FAC into a single byte integer in X and FACLO. CONINT normally exits through CHRGET unless FAC is greater than 255 or less than 0, when it exits via ILLEGAL QUANTITY ERROR.

AYINT E10C

If FAC is less than +32767 and greater than -32767, then execute QINT. Otherwise AYINT exits via ILLEGAL QUANTITY ERROR.

QINT EBF2

Quick greatest integer function. Leaves INT(FAC) in FACHO,MO,LO signed. QINT assumes that the absolute value of the FAC is less than 8388608 (2<sup>23</sup>rd power).

GETADR E752

GETADR converts the number in FAC to a 2 byte, unsigned integer in LINNUM. When FAC is greater than 65535 or less than -65535, GETADR exits via ILLEGAL QUANTITY ERROR.

GETNUM E746

GETNUM fetches a 2 byte number, a comma and an unsigned, single byte number from TXTPTR. The first number is stored in LINNUM, while the second is returned to the X register. On entry TXTPTR points to the first character of the formula for the first number. GETNUM uses FRNUM, GETADR, CHKCOM and GETBYT.

COMBYTE E74C

COMBYTE checks for a comma, then fetches an unsigned, single byte number returned in X. On entry TXTPTR points to the comma. COMBYTE uses CHKCOM and GETBYT.

FRMEVL DD7B

FRMEVL evaluates the formula at TXTPTR using CHRGET, then leaves the result in FAC. On entry, TXTPTR points to the first character of the formula, while on exit points to the terminator. "A" does not contain the terminator. The format of the temporary result on the stack is:

The address of the operator routine.  
The floating point temporary result.  
The precedence of the operator.

FRMEVL, the main subroutine for the commands that use formulas, works for

## APPLE II COMPUTER TECHNICAL INFORMATION

both strings and numbers. If the formula is a string literal, FRMEVL gobbles the opening quote, then executes STRLIT and ST2TXT.

FRMNUM DD67

FRMNUM evaluates the formula at TXTPTR, puts it in FAC, then makes sure the result is numeric. On entry TXTPTR points to the first character of the formula. FRMNUM exits through TYPE MISMATCH ERROR if the result is a string.

FIN EC4A

FIN inputs a floating point number into FAC from CHRGET. FIN assumes the 6502 registers and A were set up by the CHRGET that fetched the first digit. FIN only operates on numeric constants, not formulas.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL231.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL232.TXT  
#####

Description: Applesoft: Internals--Floating Point Math Package (1 of 3)  
Header: Applesoft: Internals--Floating Point Math Package (1 of 3)

Applesoft's floating point package provides a 9 digit scientific package for evaluating numeric equations. It supports trigonometric functions with arguments in radians, exponents and logarithms to base e.

ABBREVIATIONS

msb: most significant bit or byte  
lsb: least significant bit or byte  
eol: end of line token (\$00)

A: the 6502 accumulator  
X: the 6502 X register  
Y: the 6502 Y register  
Z: the zero flag of the 6502 status register  
C: the carry flag of the 6502 status register

A,X is a 16 bit number where A has the msb and X the lsb.

(Y,A) is the number or string whose address is in Y and A, with the msb in Y and the lsb in A.

FAC: the floating point accumulator  
ARG: the ARGument register

REAL NUMBER FORMAT

The real number format used throughout Applesoft is: the exponent is a single byte signed number (EXP) in excess of \$80 form (the signed value has \$80 added to it); the mantissa is 4 bytes (HO,MOH,MO,LO); the binary point is to the right of the most significant bit. Since in binary floating point notation the msb is always 1, the number's sign replaces the msb when the number is stored in memory in packed form. The sign, though, is kept in a separate byte (SGN) when only bit 7 is significant. If the exponent is zero, the number is zero, although the mantissa isn't necessarily zero.

Examples:

	EXP	HO	MOH	MO	LO	SGN
	Packed format					
-10	84	A0	00	00	00	
10	84	20	00	00	00	
	FAC format					
-10	84	A0	00	00	00	FF
10	84	A0	00	00	00	00

Arithmetic routine calling conventions for single argument functions (e.g., SGN, ABS or INT):

On entry the argument is in the FAC.  
On exit the result is in the FAC.

Arithmetic routine calling conventions for two argument functions (e.g., FADD and FSUB):

On entry the first argument is in the ARG.  
On entry the second argument is in the FAC.

## APPLE II COMPUTER TECHNICAL INFORMATION

On exit the result is in the FAC.

### FLOATING POINT REGISTERS

NOTE: The TEMP locations may be used for other things when not used by the floating point math package.

	FAC	ARG	TEMP1	TEMP2	TEMP3	RND
EXP	9D	A5	93	98	8A	C9
HO	9E	A6	94	99	8B	CA
MOH	9F	A7	95	9A	8C	CB
MO	A0	A8	96	9B	8D	CC
LO	A1	A9	97	9C	8E	CD
SGN	A2	AA	(packed format)			

### FLOATING POINT CONSTANTS

The following addresses point to useful numbers; they're packed and suitable for use by most of the arithmetic routines including CONUPK and MOVMF.

RND	00C9
-32768	E0FE
1	E913
SQR (1/2)	E92D
SQR (2)	E932
-1/2	E937
LN (2)	E93C
10	EA50
1000000000	ED14
1/2	EE64
LOG (2) base e	EEEDB
pi/2	F063
pi*2	F06B
1/4	F070

Apple Tech Notes

Keywords:

### END OF FILE A2TIL232.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL233.TXT  
#####
```

Description: Applesoft: Internals--High resolution graphics routines  
Header: Applesoft: Internals--High resolution graphics routines

NOTE: Regardless of which screen is being displayed, HPAG (location \$E6) determines onto which screen the software draws graphics. (\$20 for HGR, \$40 for HGR2)

HGR2            F3D8  
Initialize and clear page 2 High-Res.

HGR            F3E2  
Initialize and clear page 1 High-Res.

HCLR           F3F2  
Clear the current High-Res screen to black.

BKGND          F3F6  
Clear the current High-Res screen to last plotted color.

HPOSN          F411  
Positions the High-Res cursor without plotting. HPAG determines which page the cursor is pointed at.  
On entry:  
Horizontal = Y,X  
Vertical = A

HPLOT          F457  
Call HPOSN then try to plot a dot at the High-Res cursor's position. The dot may not be plotted if plotting non-white at a complementary color X coordinate.

HLIN           F53A  
Draws a line from the last plotted point or line destination to the coordinate in the 6502 registers.  
On entry:  
Horizontal = X,A  
Vertical = Y

HFIND          F5CB  
Convert the High-Res cursor's position to X-Y coordinates. HFIND allows the user to tell where on the screen the a shape table left the cursor.  
On exit:  
\$E0 = horizontal lsb  
\$E1 = horizontal msb  
\$E2 = vertical

DRAW           F601  
Draw the shape pointed to by Y,X using the current HCOLOR starting at the current High-Res cursor position. On entry A = rotation factor.

XDRAW          F65D  
Draw the shape pointed to by Y,X by starting at the current High-Res cursor position inverting the existing color of the dots the shape draws over. On entry A = rotation factor.

SETHCOL        F6EC  
Set the High-Res color to X. X must be less than 8.

SHLOAD         F775  
Loads a shape table into memory from tape above MEMSIZ (HIMEM) and sets the pointer at \$E8.

APPLE II COMPUTER TECHNICAL INFORMATION

Apple Tech Notes

Keywords:

### END OF FILE A2TIL233.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL234.TXT  
#####

Description: Applesoft: Internals--Index to Routines (1 of 4)  
Header: Applesoft: Internals--Index to Routines (1 of 4)

The following two lists combine all the routines in the INTERNALS series of Apple Tech Notes. The first list is arranged alphabetically by the name of the routine. The second list is arranged in order of increasing address.

ALPHABETIC LIST

Name	Address
-----	-----
ABS	EBAF
ADDON	D998
ARG	A5-AA
ATN	F09E
AYINT	E10C
BKGNL	F3F6
BLTU	D393
CHKCLS	DEB8
CHKCOM	DEBE
CHKNUM	DD6A
CHKOPN	DEBB
CHKSTR	DD6C
CHKVAL	DD6D
CHRGET	00B1
CHRGOT	00B7
CLEARC	D66C
COMBYTE	E74C
CONINT	E6FB
CONT	D898
CONUPK	E9E3
COS	EFEA
CRDO	DAFB
DATA	D995
DATAN	D9A3
DIV10	EA55
DRAW	F601
ERRDIR	E306
ERROR	D412
EXP	EF09
FAC	9D-A2
FADD	E7BE
FADDH	E7A0
FADDT	E7C1
FCOMP	EBB2
FDIV	EA66
FIDVT	EA69
FIN	EC4A
FLOAT	EB93
FMULT	E97F
FMULTT	E982
FNDLIN	D61A
FOUT	ED34
FPWRT	EE97
FREFAC	E600
FRESTR	E5FD
FRETMP	E604
FRETMS	E635
FRMEVL	DD7B
FRMNUM	DD67
FSUB	E7A7
FSUBT	E7AA

APPLE II COMPUTER TECHNICAL INFORMATION

GARBAG E484  
GDBUFS D539  
GETADR E752  
GETARYPT F7D9  
GETBYT E6F8  
GETNUM E746  
GETSPA E452  
GETSPT DA7B  
GIVAYF E2F2  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL234.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL235.TXT  
#####

Description: Applesoft: Internals--Index to Routines (2 of 4)  
Header: Applesoft: Internals--Index to Routines (2 of 4)

ALPHABETIC LIST (continued)

Name Address

-----

GOTO	D93E
GTBYTC	E6F5
HANDLERR	F2E9
HCLR	F3F2
HFIND	F5CB
HFNS	F6B9
HGR	F3E2
HGR2	F3D8
HLIN	F53A
HPLOT	F457
HPOSN	F411
INCHR	D553
INLIN	D52C
INLIN+2	D52E
INPRT	ED19
INT	EC23
ISCNTC	D858
ISLETC	E07D
LET	DA46
LINGET	DA0C
LINPRT	ED24
LOG	E941
MOV1F	EB21
MOV2F	EB1E
MOVAF	EB63
MOVFA	EB53
MOVFM	EAF9
MOVINS	E5D4
MOVMF	EB2B
MOVML	EB23
MOVSTR	E5E2
MUL10	EA39
NEGOP	EED0
NEWSTT	D7D2
OUTDO	DB5C
OUTQST	DB5A
OUTSPC	DB57
PARCHK	DEB2
PLOTFNS	F1EC
PRNTFAC	ED2E
PTRGET	DFE3
PUTNEW	E42A
QINT	EBF2
REASON	D3E3
REMN	D9A6
RESTOR	D849
RESUME	F317
RND	C9-CD
RND	EFAE
RUN	D566
SCRTH	D64B
SETHCOL	F6EC
SGN	EB90
SHLOAD	F775
SIGN	EB82

APPLE II COMPUTER TECHNICAL INFORMATION

SIN       EFF1  
SNGFLT   E301  
SQR       EE8D  
STKINI   D683  
STRINI   E3D5  
STRLIT   E3E7  
STRLT2   E3ED  
STROUT   DB3A  
STRPRT   DB3D  
STRSPA   E3DD  
STRTXT   DE81  
STXTPT   D697  
SYNCHR   DEC0  
TAN       F03A  
TEMP1     93-97  
TEMP2     98-9C  
TEMP3     8A-8E  
XDRAW     F65D  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL235.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL236.TXT  
#####

Description: Applesoft: Internals--Index to Routines (3 of 4)  
Header: Applesoft: Internals--Index to Routines (3 of 4)

Numeric list by Address

Addr.	Name
-----	-----
00B1	CHRGET
00B7	CHRGOT
8A-8E	TEMP3
98-9C	TEMP2
9D-A2	FAC
A5-AA	ARG
C9-CD	RND
D393	BLTU
D3E3	REASON
D412	ERROR
D52C	INLIN
D52E	INLIN+2
D539	GDBUFS
D553	INCHR
D566	RUN
D61A	FNDLIN
D64B	SCRATCH
D66C	CLEARC
D683	STKINI
D697	STXTPT
D7D2	NEWSTT
D849	RESTOR
D858	ISCNTC
D898	CONT
D93E	GOTO
D995	DATA
D998	ADDON
D9A3	DATAN
D9A6	REMN
DA0C	LINGET
DA46	LET
DA7B	GETSPT
DAFB	CRDO
DB3A	STROUT
DB3D	STRPRT
DB57	OUTSPC
DB5A	OUTQST
DB5C	OUTDO
DD67	FRMNUM
DD6A	CHKNUM
DD6C	CHKSTR
DD6D	CHKVAL
DD7B	FRMEVL
DE81	STRTXT
DEB2	PARCHK
DEB8	CHKCLS
DEBB	CHKOPN
DEBE	CHKCOM
DEC0	SYNCHR
DFE3	PTRGET
E07D	ISLETC
E10C	AYINT
E2F2	GIVAYF
E301	SNGFLT
E306	ERRDIR

APPLE II COMPUTER TECHNICAL INFORMATION

E3D5 STRINI  
E3DD STRSPA  
E3E7 STRLIT  
E3ED STRLT2  
E42A PUTNEW  
E452 GETSPA  
E484 GARBAG  
E5D4 MOVINS  
E5E2 MOVSTR  
E5FD FRESTR  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL236.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL237.TXT  
#####

Description: Applesoft: Internals--Index to routines (4 of 4)  
Header: Applesoft: Internals--Index to routines (4 of 4)

Numeric list by Address (continued)

Addr.	Name
-----	-----
E600	FREFAC
E604	FRETMP
E635	FREIMS
E6F5	GTBYTC
E6F8	GETBYT
E6FB	CONINT
E746	GETNUM
E74C	COMBYTE
E752	GETADR
E7A0	FADDH
E7A7	FSUB
E7AA	FSUBT
E7BE	FADD
E7C1	FADDT
E941	LOG
E97F	FMULT
E982	FMULTT
E9E3	CONUPK
EA39	MUL10
EA55	DIV10
EA66	FDIV
EA69	FIDVT
EAF9	MOVFM
EB1E	MOV2F
EB21	MOV1F
EB23	MOVML
EB2B	MOVFM
EB53	MOVFA
EB63	MOVAF
EB82	SIGN
EB90	SGN
EB93	FLOAT
EBAF	ABS
EBB2	FCOMP
EBF2	QINT
EC23	INT
EC4A	FIN
ED19	INPRT
ED24	LINPRT
ED2E	PRNTFAC
ED34	FOUT
EE8D	SQR
EE97	FPWRT
EED0	NEGOP
EF09	EXP
EFAE	RND
EFEA	COS
EFF1	SIN
F03A	TAN
F09E	ATN
F1EC	PLOTFNS
F2E9	HANDLERR
F317	RESUME
F3D8	HGR2

APPLE II COMPUTER TECHNICAL INFORMATION

F3E2 HGR  
F3F2 HCLR  
F3F6 BKGND  
F411 HPOSN  
F457 HPLOT  
F53A HLIN  
F5CB HFIND  
F601 DRAW  
F65D XDRAW  
F6B9 HFNS  
F6EC SETHCOL  
F775 SHLOAD  
F7D9 GETARYPT  
93-97 TEMP1  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL237.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL238.TXT  
#####
```

Description: Applesoft: Internals--Introduction (1 of 2)  
Header: Applesoft: Internals--Introduction (1 of 2)

The following six notes, first published in The Apple Orchard (March 1980) are written for experienced 6502 machine language programmers who wish to use the Applesoft ROM subroutines. The addresses given are for an Apple II+ with an Applesoft firmware card, or Applesoft loaded into a Language Card. Consult your Applesoft Reference manual for more information.

Take special note of CHRGET, the heart of Applesoft. When Applesoft wants the next character of an instruction, it points TXTPTR at the program or input buffer, and JSRs to CHRGET. TXTPTR is temporarily set to the last used DATA statement when Applesoft READS DATA.

## ABBREVIATIONS

msb: most significant bit or byte  
lsb: least significant bit or byte  
eol: end of line token (\$00)

A: the 6502 accumulator  
X: the 6502 X register  
Y: the 6502 Y register  
Z: the zero flag of the 6502 status register  
C: the carry flag of the 6502 status register

A,X is a 16 bit number where A has the msb and X the lsb.

(Y,A) is the number or string whose address is in Y and A, with the msb in Y and lsb in A.

FAC the floating point accumulator ARG the ARGument register  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL238.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL239.TXT  
#####
```

Description: Applesoft: Internals--Introduction (1 of 2)  
Header: Applesoft: Internals--Introduction (1 of 2)

The following six notes, first published in The Apple Orchard (March 1980) are written for experienced 6502 machine language programmers who wish to use the Applesoft ROM subroutines. The addresses given are for an Apple II+ with an Applesoft firmware card, or Applesoft loaded into a Language Card. Consult your Applesoft Reference manual for more information.

Take special note of CHRGET, the heart of Applesoft. When Applesoft wants the next character of an instruction, it points TXTPTR at the program or input buffer, and JSRs to CHRGET. TXTPTR is temporarily set to the last used DATA statement when Applesoft READS DATA.

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(Y,A) is the number or string whose address is in Y and A, with the msb in Y and lsb in A.

FAC the floating point accumulator ARG the ARGument register  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL239.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL240.TXT  
#####

Description: Applesoft: Internals--Miscellaneous Routines  
Header: Applesoft: Internals--Miscellaneous Routines

PTRGET            DFE3  
Read a variable name from CHRGET and find it in memory. On entry TXTPTR points to the first character of the variable name. On exit the address to the value of the variable is in VARPNT and Y,A. If PTRGET can't find a simple variable it creates one. If it can't find an array it creates one dimensioned from 0 to 10 and sets all elements equal to zero.

GETARYPT         F7D9  
Read a variable name from CHRGET and find it in memory. On entry TXTPTR points to the first character of the variable name. This routine leaves LOWTR pointing to the name of the variable array. If the array can't be found the result is an OUT OF DATA ERROR.

FNDLIN            D61A  
Searches the program for the line whose number is in LINNUM.  
On exit:  
C set LOWTR points to the link field of the desired line.  
C clear then not found. LOWTR points to the next higher line.

DATA             D995  
Move TXTPTR to the end of the statement. Looks for the ":" or eol (0).

DATAN            D9A3  
Calculate the offset in Y from TXTPTR to the next ":" or eol (0).

REMN             D9A6  
Calculate the offset in Y from TXTPTR to the next eol (0).

ADDON            D998  
Add Y to TXTPTR.

SCRATCH          D64B  
The "NEW" command. Clears the program, variables, and stack.

CLEARC           D66C  
The "CLEAR" command. Clears the variables and stack.

STKINI           D683  
Clears the stack.

RESTOR           D849  
Sets the DATA pointer, DATPTR, to the beginning of the program.

STXTPT           D697  
Set TXTPTR to the beginning of the program.

BLTU             D393  
Block transfer makes room by moving everything forward.  
On entry:  
Y,A and HIGHDS = destination of high address + 1  
              LOWTR = lowest address to be moved  
              HIGHTR = highest address to be moved + 1  
On exit:  
LOWTR is unchanged  
HIGHTR = LOWTR - \$100  
HIGHDS = lowest address transferred - \$100

REASON           D3E3

## APPLE II COMPUTER TECHNICAL INFORMATION

Makes sure there's enough room in memory for another variable. Checks to be sure that the address Y,A is less than FRETOP. May cause garbage collection. Causes "OUT OF MEMORY ERROR" if there's no room.

GARBAG            E484

Move all currently used strings up in memory as far as possible. This maximizes the free memory area for more strings or numeric variables.

CONT             D898

Moves OLDTEXT and OLDLIN into TXTPTR and CURLIN.

NEWSTT           D7D2

Execute a new statement. On entry TXTPTR points to the ":" preceding the statement or the zero at the end of the previous line. Use NEWSTT to restart the program with CONT. THIS ROUTINE DOES NOT RETURN.

RUN              D566

Run the program in memory. THIS ROUTINE DOES NOT RETURN.

GOTO             D93E

Uses LINGET and FNDLIN to update TXTPTR. GOTO assumes that the 6502 registers and A have been set up by the CHRGET that fetched the first digit.

LET              DA46

Uses CHRGET to get address of the variable, "=", evaluate the formula, and store it. On entry TXTPTR points to the first character of the variable name.

Apple Tech Notes

Keywords:

### END OF FILE A2TIL240.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####
### FILE: A2TIL241.TXT
#####
```

Description: Applesoft: Internals--Page Zero Memory Map (1 of 2)  
 Header: Applesoft: Internals--Page Zero Memory Map (1 of 2)

```
00-02  START  Initialize low RAM memory
03-05  RDYJSR  Jumps to STROUT
06,07  ADRAYI  Address of AYINT subroutine
08,09  ADRGAY  Address of GIVAYF subroutine
0A-0C  USRPOK  Vector for USR() function
0D     CHARAC  String delimiter
0E     ENDCHR  String delimiter
0F     COUNT  General purpose counter
10     DIMFLG  Flag to permit arrays
11     VALTYP  Variable type indicator. 0=numeric, 1=string
12     INTFLG  Variable type indicator. 1=integer, 0=real
13     GARBFL  Flag to signal the need for garbage collection
14     SUBFLG  Flag to permit array variables.
15     INPFLG  Determines if this is INPUT or READ
16     TANSGN  Used for the sign during TAN() function
1A,1B  SHAPE  High-Res shape pointer
1C     HCOLOR1 High-Res running color mask
1D     COUNTH  High-Res counter
26,27  HBAS   High-Res base address pointer
2C     H2
2D     V2
45     ERROV
50,51  LINNUM  16 bit integer work area
53,54  LASTPT  Pointer to last used string temporary
55-5D  TEMPST  Temporary string descriptor storage area
5E,5F  INDEX  General purpose index
60,61  INDEX2  General purpose index
62-66  RES    Multiply or divide result (HO,MOH,MO,LO)
67,68  TEXTAB  Pointer to start of the program text
69,6A  VARTAB  Pointer to start of simple variable space
6B,6C  ARYTAB  Pointer to start of array variable space
6D,6E  STREND  Pointer to end of storage in use
6F,70  FRETOP  Pointer to top of string free space
71,72  FRESPC  Pointer to new string
73,74  MEMSIZ  Pointer to top of memory
75,76  CURLIN  Current line number
77,78  OLDLIN  Old line number, set up by ctrl-C, STOP, or END
79,7A  OLDTXT  Old text pointer
7B,7C  DATLIN  Line number where data for next READ comes from
7D,7E  DATPTR  Pointer to data for next READ
7F,80  INPPTR  Pointer to where input is coming from
81,82  VARNAM  Storage area for a variable's name
83,84  VARPNT  Pointer to a variable in memory
85,86  FORPNT  Variable pointer for FOR and LET
87,88  OPPTR   Pointer to current formula operation in OPTAB
89     OPMASK  Mask created by current operator
8A,8B  DEFPNT  Pointer used in function definition
8C,8D  DSCPNT  Pointer to a string descriptor
8E     TEMPF3  Temporary pointer
8F     FOUR6   Constant for garbage collection
90-92  JMPER   Internal vector
93     TEMPF1  Temporary pointer
94,95  ARRYPT  Pointer into an array
94,95  HIGHDS  Destination of highest element in BLT.
96,97  HIGHTR  Source of highest element to move in BLT.
98     TEMPF2
99,9A  LOWDS   Location of last byte transferred into in BLT.
9B,9C  LOWTR   Last thing to move in BLT. See BLTU.
```

APPLE II COMPUTER TECHNICAL INFORMATION

9D-9F DSCTMP Temporary string descriptor  
9D-A2 FAC Floating point accumulator.  
(EXP,HO,MOH,MO,LO,SGN)  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL241.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL242.TXT  
#####

Description: Applesoft: Internals--Page Zero Memory Map (2 of 2)  
Header: Applesoft: Internals--Page Zero Memory Map (2 of 2)

A3 SNGFLG Sign of FAC. Set up by FIN.  
A4 BITS  
A5-AA ARG Floating point argument (EXP,HO,MOH,MO,LO,SGN)  
AB,AC STRNG1 Pointer to a string or descriptor  
AD,AE FBUFFPT Pointer into FBUFFER for FOUT  
AF,B0 PRGEND Pointer to the end of the program text  
B1-C8 CHRGET Character fetcher  
C9-CD RNDX Random number seed  
D0,D1 DX High-Res delta-X for shape and HLIN  
D2 DY High-Res delta-Y for shape and HLIN  
D3 QDRNT High-Res rotation quadrant  
D4,D5 E High-Res error for HLIN  
D6 RNONLY Run only flag  
D8 ERRFLG Flag set by ONERR GOTO  
DA,DB ERRLIN The line number where the error occurred  
DC,DD ERRPOS Where in memory did the error occur  
DE ERRNUM Which error occurred  
DF ERRSTK 6502 stack pointer from REMSTK after an error  
E0,E1 XO High-Res prior X coordinate save  
E2 YO High-Res prior Y coordinate save  
E4 HCOLOR High-Res color byte for HPLOT, HPOSN  
E5 HNDX High-Res horizontal offset save  
E6 HPAG High-Res page (\$20 = HGR1, \$40 = HGR2)  
E7 SCALE High-Res scale for SHAPE  
E8,E9 SHAPX High-Res start of shape table  
EA COLLSN High-Res collision counter  
F0 FIRST  
F1 SPDBYT Controls delay between printed characters  
F2 TRFLAG Controls TRACE mode.  
F3 ORMASK Controls masking for INVERSE on video output.  
F4-F7 ERRTO Points to the GOTO part of ONERR statement  
F8 REMSTK 6502 Stack pointer save area.  
F9 ROTBYT High-Res rotation factor for SHAPE  
100-10F FBUFFR Buffer for FOUT  
200-2F0 BUF Input buffer  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL242.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL243.TXT  
#####

Description: Applesoft: Internals--String Utilities (1 of 2)  
Header: Applesoft: Internals--String Utilities (1 of 2)

Applesoft strings have two parts: the descriptor and the ASCII string. Your string descriptor contains the length of the string along with the address of the strings first character. Refer to page 137 of the Applesoft Reference Manual for additional information on the string components. During most Applesoft routines the descriptor is left in memory, while a two byte pointer to the descriptor is kept in the FAC. The pointer is the address of the descriptor; therefore, the actual string could be anywhere in memory. The statement 10 A\$ = "HI" leaves a descriptor pointing to the program text.

STRINI E3D5

STRINI obtains space for creating a string whose descriptor is pointed to by FACMO/FACLO; it also creates a descriptor for it in DSCTMP. On entry A = length of the string, while FACMO/FACLO point to the string descriptor. STRINI uses GETSPA to force garbage collection when there isn't sufficient room; GETSPA exits with an "OUT OF MEMORY ERROR" when garbage collection free up enough room. GETSPA moves FRESPC and FRETOP down, making room to store the string. STRINI returns with the descriptor of the new string in DSCTMP and the original pointer in DSCPNT.

STRSPA E3DD

STRSPA obtains space for the creation of a string A bytes long, then creates a descriptor for it in DSCTMP. STRSPA uses GETSPA to force garbage collection when there isn't enough room. If garbage collection is unable to make sufficient room, GETSPA exits with an "OUT OF MEMORY" error. GETSPA moves FRESPC and FRETOP down enough to store the string, then returns A unchanged with the new descriptor in DCSTMP.

GETSPT DA7B

GETSPT moves the descriptor pointed to by FACMO/FACLO into the memory pointed to by FORPNT. GETSPT also moves the string's text up to FRETOP if it isn't in the program's text. GETSPT frees up the string if it was a temporary string. GETSPT uses GETSPA to initiate garbage collection, or alternatively "OUT OF MEMORY" error when the garbage collection dosen't free up sufficient room.

MOVINS E5D4

Moves the string whose descriptor is pointed to by STRNG1 to memory pointed to by FRESPA.

MOVSTR E5E2

MOVSTR moves the string pointed to by Y,X with a length of A to memory pointed to by FRESPA.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL243.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL244.TXT  
#####
```

Description: Applesoft: Internals--String Utilities (2 of 2)  
Header: Applesoft: Internals--String Utilities (2 of 2)

STRTXT DE81

Build a temporary descriptor for a string literal of which the first character is pointed to by TXTPTR plus C and which ends with a quote. FACMO,FACLO points to the resulting temporary descriptor. Skip leading quotes before calling STRLIT. On exit, STRNG2 points to the character after the string literal.

STRLIT E3E7

Build a temporary descriptor for a string literal of which the first character is pointed to by Y,A and which ends with a quote. FACMO,FACLO points to the resulting temporary descriptor. Skip leading quotes before calling STRLIT. On exit, STRNG2 points to the character after the string literal.

STRLT2 E3ED

Take a string literal of which the first character is pointed to by Y,A and build a temporary descriptor for it pointed to by FACMO,FACLO. Save in CHARAC and ENDCHR the characters other than zero that terminate the string. Skip leading quotes before calling STRLIT2. On exit, STRNG2 points to the character after the string literal.

PUTNEW E42A

Move the descriptor in DSCTMP to a temporary descriptor, put a pointer to the descriptor in FACMO,FACLO, and flag the result as a string.

GETSPA E452

Get A bytes of memory below HIMEM for a string. GETSPA forces garbage collection to make room in memory when necessary and exits with an "OUT OF MEMORY ERROR" if garbage collection can't make enough room. GETSPA moves FRESPEC and FRETOP down enough to store the string. On entry, A equals the number of characters. GETSPA returns with A unchanged and pointer to the space in FRESPEC, FRETOP, and Y,X.

FRESTR E5FD

Make sure that the last FAC result was a string and free up the temporary string result. Check the descriptor for a temporary status allocated by PUTNEW. On exit, the address of the string is in INDEX and Y,X. The length of the string is in A. Uses FRETMP.

FREFAC E600

Free up the temporary string pointed to by FACMO,FACLO. Check the descriptor for a temporary status allocated by PUTNEW. On exit the address of the string is in INDEX and Y,X. The length of the string is in A. Uses FRETMP.

FRETMP E604

Free up a temporary string. On entry the pointer to the descriptor is in Y,A. Checks the descriptor for a temporary status allocated by PUTNEW. If so, the temporary is freed up by updating TEMPPT. If a temp is freed up, a further check tests the string's location for the lowest in memory. If so, that area of memory is freed up by updating FRETOP. On exit the address of the string is in INDEX and Y,X. The length of the string is in A.

FRETMS E635

Free the temporary descriptor without freeing up the string. On entry Y,A point to the descriptor to be freed. On exit Z is set if anything was freed. Apple Tech Notes

APPLE II COMPUTER TECHNICAL INFORMATION

Keywords:

### END OF FILE A2TIL244.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL245.TXT  
#####

Description: Applesoft: Internals--TXTPTR routines (2 of 2)  
Header: Applesoft: Internals--TXTPTR routines (2 of 2)

CHRGET 00B1

CHRGET increments TXTPTR. Use CHRGOT to get the character. TXTPTR now points at:

CHRGOT 00B7

CHRGOT loads A from TXTPTR and sets certain 6502 status flags. X and Y are not changed. On exit:

A = the character currently pointed at by TXTPTR  
Z is set if A is ":" or eol (\$3A or \$00)  
C is clear if A is an ASCII number("0" to "9").

LINGET DA0C

LINGET read a line number (integer 0 to 63999) from TXTPTR into LINNUM. LINGET assumes the 6502 registers and A have been set up by the JSR to CHRGET that fetched the first digit. LINGET normally exits through CHARGET, which fetches the character after the last digit. When the number is greater than 63999, LINGET exits via SYNTAX ERROR. LINNUM is zero when there is no number at TXTPTR.

GTBYTC E6F5

GTBYTC causes JSR to CHRGET to gobble a character, then evaluates the formula at TXTPTR, and then it returns a single byte integer in X and FACLO. On entry TXTPTR points to the first character of the formula. GTBYTC normally exits through CHRGET. If FAC is greater than 255 or less than 0, it exits through ILLEGAL QUANTITY ERROR.

GETBYT E6F8

GETBYT evaluates the formula at TXTPTR besides returning a single byte integer in X and FACLO. On entry, TXTPTR points to the first character of the formula. GETBYT normally exits through CHRGET. When FAC is greater than 255 or less than 0, it exits through ILLEGAL QUANTITY ERROR.

PLOTFNS F1EC

PLOTFNS gets two LORES plotting coordinates separated by a comma from TXTPTR (0-47,0-47). TXTPTR when entered, points to the first number of the formula. PLOTFNS puts the first number in FIRST and the second number in H2 and V2.

HFNS F6B9

HGNS gets HIRES plotting coordinates (0-279,0-191) from TXTPTR. TXTPTR points to the first character of the formula for the first number upon entry. HFNS leaves the 6502 registers set up for HPOSN. When exiting:

A = vertical coordinate  
X = lsb of horizontal coordinate  
Y = msb of vertical coordinate  
Apple Tech Notes

Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL245.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL246.TXT  
 #####

Description: Applesoft: Internals--Where to find routines (1 of 2)  
 Header: Applesoft: Internals--Where to find routines (1 of 2)

The following list combines all the routines in the INTERNALS series of Apple Tech Notes with the title of the AppleLink article where the routine description appears. The list is arranged alphabetically by the name of the routine.

Name	Address	Applesoft: Internals--Title
-----	-----	-----
ABS	EBAF	Floating Point Math Package (2 of 3)
ADDON	D998	Miscellaneous Routines
ARG	A5-AA	Introduction (1 of 2)
		Floating Point Math Package (1 of 3)
		Floating Point Math Package (2 of 3)
ATN	F09E	Floating Point Math Package (2 of 3)
AYINT	E10C	Floating Point Math Package (3 of 3)
BKGND	F3F6	High Resolution Graphics Routines
BLTU	D393	Miscellaneous Routines
CHKCLS	DEB8	Error Processor Routines
CHKCOM	DEBE	Floating Point Math Package (3 of 3)
		Error Processor Routines
CHKNUM	DD6A	Error Processor Routines
CHKOPN	DEBB	Error Processor Routines
CHKSTR	DD6C	Error Processor Routines
CHKVAL	DD6D	Error Processor Routines
CHRGET	00B1	TXTPTR Routines (2 of 3)
		Floating Point Math Package (3 of 3)
CHRGOT	00B7	TXTPTR Routines (2 of 3)
CLEARC	D66C	Miscellaneous Routines
COMBYTE	E74C	Floating Point Math Package (3 of 3)
CONINT	E6FB	Floating Point Math Package (3 of 3)
CONT	D898	Miscellaneous Routines
CONUPK	E9E3	Floating Point Math Package (2 of 3)
COS	EFEA	Floating Point Math Package (2 of 3)

## APPLE II COMPUTER TECHNICAL INFORMATION

CRDO	DAFB	Device I/O Routines
DATA	D995	Miscellaneous Routines
DATAN	D9A3	Miscellaneous Routines
DIV10	EA55	Floating Point Math Package (2 of 3)
DRAW	F601	High Resolution Graphics Routines
ERRDIR	E306	Error Processor Routines
ERROR	D412	Error Processor Routines
EXP	EF09	Floating Point Math Package (2 of 3)
FAC	9D-A2	Introduction (1 of 2)
		Floating Point Math Package (1 of 3)
		Floating Point Math Package (2 of 3)
		Floating Point Math Package (3 of 3)
FADD	E7BE	Floating Point Math Package (2 of 3)
FADDH	E7A0	Floating Point Math Package (2 of 3)
FADDT	E7C1	Floating Point Math Package (2 of 3)
FCOMP	EBB2	Floating Point Math Package (2 of 3)
FDIV	EA66	Floating Point Math Package (2 of 3)
FIDVT	EA69	Floating Point Math Package (2 of 3)
FIN	EC4A	Floating Point Math Package (3 of 3)
FLOAT	EB93	Floating Point Math Package (3 of 3)
FMULT	E97F	Floating Point Math Package (2 of 3)
FMULTT	E982	Floating Point Math Package (2 of 3)
FNDLIN	D61A	Miscellaneous Routines
FOUT	ED34	Floating Point Math Package (3 of 3)
FPWRT	EE97	Floating Point Math Package (2 of 3)
FREFAC	E600	String Utilities (2 of 2)
FRESTR	E5FD	String Utilities (2 of 2)
FRETMP	E604	String Utilities (2 of 2)
FRETMS	E635	String Utilities (2 of 2)
FRMEVL	DD7B	Floating Point Math Package (3 of 3)
FSUB	E7A7	Floating Point Math Package (2 of 3)
FSUBT	E7AA	Floating Point Math Package (2 of 3)
GARBAG	E484	Miscellaneous Routines

## APPLE II COMPUTER TECHNICAL INFORMATION

GDBUFS	D539	Device I/O Routines
GETADR	E752	Floating Point Math Package (3 of 3)
GETARYPT	F7D9	Miscellaneous Routines
GETBYT	E6F8	TXTPTR Routines (2 of 3)
GETNUM	E746	Floating Point Math Package (3 of 3)
GETSPA	E452	String Utilities (2 of 2)
GETSPT	DA7B	String Utilities (1 of 2)
GIVAYF	E2F2	Floating Point Math Package (3 of 3)
Apple Technical Communications		

Keywords:

### END OF FILE A2TIL246.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL247.TXT  
 #####

Description: Applesoft: Internals--Where to find routines (2 of 2)  
 Header: Applesoft: Internals--Where to find routines (2 of 2)

The following is a continuation of the list combining all the routines in the INTERNALS series of Apple Tech Notes with the title of the AppleLink article where the routine description appears. The list is arranged alphabetically by the name of the routine.

Name	Address	Applesoft: Internals--Title
-----	-----	-----
GOTO	D93E	Miscellaneous Routines
GTBYTC	E6F5	TXTPTR Routines (2 of 3)
HANDLERR	F2E9	Error Processor Routines
HCLR	F3F2	High Resolution Graphics Routines
HFIND	F5CB	High Resolution Graphics Routines
HFNS	F6B9	TXTPTR Routines (2 of 3)
HGR	F3E2	High Resolution Graphics Routines
HGR2	F3D8	High Resolution Graphics Routines
HLIN	F53A	High Resolution Graphics Routines
HPLOT	F457	High Resolution Graphics Routines
HPOSN	F411	High Resolution Graphics Routines
INCHR	D553	Device I/O Routines
INLIN	D52C	Device I/O Routines
INLIN+2	D52E	Device I/O Routines
INPRT	ED19	Device I/O Routines
INT	EC23	Floating Point Math Package (2 of 3)
ISCNTC	D858	Error Processor Routines
ISLETC	E07D	Error Processor Routines
LET	DA46	Miscellaneous Routines
LINGET	DA0C	TXTPTR Routines (2 of 3)
LINPRT	ED24	Device I/O Routines
LOG	E941	Floating Point Math Package (2 of 3)
MOV1F	EB21	Floating Point Math Package (2 of 3)
MOV2F	EB1E	Floating Point Math Package (2 of 3)
MOVAF	EB63	Floating Point Math Package (2 of 3)

## APPLE II COMPUTER TECHNICAL INFORMATION

MOVFA	EB53	Floating Point Math Package (2 of 3)
MOVFM	EAF9	Floating Point Math Package (2 of 3)
MOVINS	E5D4	String Utilities (1 of 2)
MOVMF	EB2B	Floating Point Math Package (2 of 3)
MOVML	EB23	Floating Point Math Package (2 of 3)
MOVSTR	E5E2	String Utilities (1 of 2)
MUL10	EA39	Floating Point Math Package (2 of 3)
NEGOP	EED0	Floating Point Math Package (2 of 3)
NEWSTT	D7D2	Miscellaneous Routines
OUTDO	DB5C	Device I/O Routines
OUTQST	DB5A	Device I/O Routines
OUTSPC	DB57	Device I/O Routines
PARCHK	DEB2	Error Processor Routines
PLOTFNS	F1EC	TXTPTR Routines (2 of 3)
PRNTFAC	ED2E	Device I/O Routines
PTRGET	DFE3	Miscellaneous Routines
PUTNEW	E42A	String Utilities (2 of 2)
QINT	EBF2	Floating Point Math Package (3 of 3)
REASON	D3E3	Miscellaneous Routines
REMN	D9A6	Miscellaneous Routines
RESTOR	D849	Miscellaneous Routines
RESUME	F317	Error Processor Routines
RND	C9-CD	Floating Point Math Package (1 of 3)
		Floating Point Math Package (2 of 3)
RND	EFAE	Floating Point Math Package (2 of 3)
RUN	D566	Miscellaneous Routines
SCRTH	D64B	Miscellaneous Routines
SETHCOL	F6EC	High Resolution Graphics Routines
SGN	EB90	Floating Point Math Package (2 of 3)
SHLOAD	F775	High Resolution Graphics Routines
SIGN	EB82	Floating Point Math Package (2 of 3)
SIN	EFF1	Floating Point Math Package (2 of 3)
SNGFLT	E301	Floating Point Math Package (3 of 3)

## APPLE II COMPUTER TECHNICAL INFORMATION

SQR	EE8D	Floating Point Math Package (2 of 3)
STKINI	D683	Miscellaneous Routines
STRINI	E3D5	String Utilities (1 of 2)
STRLIT	E3E7	String Utilities (2 of 2)
STRLT2	E3ED	String Utilities (2 of 2)
STROUT	DB3A	Device I/O Routines
STRPRT	DB3D	Device I/O Routines
STRSPA	E3DD	String Utilities (1 of 2)
STRTXT	DE81	String Utilities (2 of 2)
STXTPT	D697	Miscellaneous Routines
SYNCHR	DEC0	Error Processor Routines
TAN	F03A	Floating Point Math Package (2 of 3)
TEMP1	93-97	Floating Point Math Package (1 of 3)
TEMP2	98-9C	Floating Point Math Package (1 of 3)
TEMP3	8A-8E	Floating Point Math Package (1 of 3)
XDRAW	F65D	High Resolution Graphics Routines

Apple Technical Communications

Keywords:

### END OF FILE A2TIL247.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL248.TXT  
#####
```

Description: Applesoft: PEEKs, POKEs, and CALLs  
Header: Applesoft: PEEKs, POKEs, and CALLs

To make Applesoft programs read data from memory, write data to memory, or pass control to machine language programs, programmers use Applesoft's PEEK, POKE, and CALL statements. Here is an explanation of each statement's function.

PEEK makes a program read a memory location. The format of the statement is PEEK (<memory location>) where <memory location> is a positive integer from 0 to 65535. Programmers use PEEK most commonly with a variable: X% = PEEK (2048) assigns the value located at 2048 to the integer variable X%.

POKE makes a program write a value to a memory location. The format of the statement is POKE <memory location>,<value> where <memory location> is a positive integer from 0 to 65535 and <value> is a positive integer from 0 to 255. Programmers use POKE most commonly to write data directly to memory: POKE 2048,128 assigns the value 128 to the memory location 2048.

CALL makes a program pass control to a machine language routine at some memory location. The format of the statement is CALL <memory location> where <memory location> is a positive or negative integer from -32768 to 32767 or a positive integer from 0 to 65535 (note that the signed integers from -32768 to 32767 represent exactly the same memory locations as the positive integers from 0 to 65535). Programmers use CALL most commonly used to invoke routines built into the Apple II's ROM. For example, the statement CALL -936 invokes the routine which clears the screen and homes the cursor (just like using Applesoft's HOME statement).

To change the screen display or make sounds and other special effects on the Apple II, Apple II Plus, Apple IIe, Apple IIc and Apple IIGS, Applesoft accesses various memory locations. Each particular CPU's reference manual includes a memory map where you can find the segments of memory used by text, graphics, Applesoft, the monitor and peripheral cards.

Apple-published memory locations remain the same for most members of the Apple II family; other internal locations may change. Therefore, to assure that your programs will work properly on all Apple II family computers, do not use entry points other than those printed in the Apple manuals.

Locations used to communicate with interface cards may be found in the manuals for those devices. For example, memory locations used by the Apple 80-column card are found in the 80-Column Text Card Manual and the Extended 80-Column Text Card Supplement.

Many computer and book stores sell books with listings of Applesoft, monitor ROM, DOS 3.3 and ProDOS memory locations. You may find the following publications useful:

- What's Where in the Apple by William Luebbert; Micro Ink.
- Beneath Apple DOS by Don Wirth and Pieter Lechner; Quality Software.
- Beneath Apple ProDOS by Don Wirth and Pieter Lechner; Quality Software.
- The Apple Almanac by Eric Goetz and Williams Sanders; Datamost, Inc.

Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL248.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL249.TXT  
#####
```

Description: Applesoft: Stopping the Apple IIe cursor from blinking  
Header: Applesoft: Stopping the Apple IIe cursor from blinking

You prefer a solid non-flashing cursor over the flashing "checkerboard" that the Apple IIe normally provides? If you have Apple's 80-column Text Card just type PR#3, then ESC-4. The system will have the eighty column cursor (a solid non-flashing blank) and will be in 40-column mode.

If you do not have a Text Card, fear not; just type

```
POKE 49162,0: PRINT CHR$(4);"PR#3"
```

and you can get the same effect.

You can use this next sample routine as the startup program on a diskette or the startup routine in an Applesoft program. Line 14 determines whether it is on an Apple IIe or an Apple II. If, by the time Line 16 executes, no Apple Text Card is detected in the system, then Line 18 enables the 80-column firmware.

[NOTE: The firmware is enabled by the monitor during Cold Boot (i.e., power-on startup or OPEN-APPLE-CTRL-RESET) if there is a Text Card installed].

Line 18 activates the firmware now that it is enabled. The 80-column firmware maintains a mode status byte in RAM at location 1275 (\$04FB). Bit 7 of this byte determines whether Lowercase Restrict mode is active or not. Line 28 guarantees that this bit is set to enable the mode. Lowercase Restrict mode is normally only available in direct mode typing Escape-R and cannot be done otherwise in a program.

```
10 TEXT : SPEED= 255  
12 D$ = CHR$(4): REM CTRL-D  
14 IF NOT ( PEEK (64435) = 6) GOTO 30: REM NOT APPLE IIE  
16 IF NOT ( PEEK (49162) < 128) GOTO 20:  
    REM TEXT CARD INSTALLED  
18 POKE 49162,0: REM ENABLE 80-COLUMN FIRMWARE  
20 PRINT D$;"PR#3": PRINT : REM ACTIVATE FIRMWARE  
22 PRINT CHR$(17): REM SWITCH TO 40-COLUMN MODE  
24 MB = 1275: REM 80-COLUMN FIRMWARE MODE BYTE ($04FB)  
26 MS = PEEK (MB): REM READ CURRENT MODE STATUS  
28 IF (MS < 128) THEN POKE MB,MS + 128:  
    REM SET BIT-7 TO ENABLE LOWER CASE RESTRICT MODE  
30 NORMAL : HOME  
Apple Technical Communications
```

Keywords:

```
### END OF FILE A2TIL249.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL250.TXT  
#####

Description: AppleTalk Printing: Apple IIe Workstation Card Slot  
Header: AppleTalk Printing: Apple IIe Workstation Card Slot

Article Created: 14 May 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I want to connect a Macintosh II and an Apple IIe to an ImageWriter II over AppleTalk.

A Workstation card was installed in the Apple IIe, the necessary LocalTalk cables were used, SW-4 was switched for AppleTalk, and AppleTalk was selected in the Chooser. This did not work.

I then installed AppleShare into the Macintosh II. The Macintosh now prints, but the Apple IIe does not. Instead, it gives the message "No boot server -- trying other slots".

What am I doing wrong?

DISCUSSION -----

The Workstation card must be installed in a higher-numbered slot than the disk interface card, otherwise the Apple IIe will try to start up over the network.

\* If you WANT the Apple IIe to start up over the network, you must also install the Apple II Setup on the Macintosh II file server. This is a separate disk (AppleShare File Server Apple II Setup Disk). You would also need to copy Chooser.II to the server.

\* If you DON'T want the Apple IIe to start up from the server, but rather to print to the ImageWriter II, then move the workstation card to a lower-numbered slot than the disk interface card and boot your workstation disk and run Chooser.II.

One other problem might be that you are running Chooser.II, getting a connection, and then inserting your application disk and restarting. This doesn't work. You have to run Chooser.II from the application disk or launch the application by pathname after running Chooser.II from the workstation disk.

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Keywords:

### END OF FILE A2TIL250.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL251.TXT  
#####

Description: AppleTalk Remote Access: Using w/ Apple IIe Emulation (11/94)  
Header: AppleTalk Remote Access: Using w/ Apple IIe Emulation (11/94)

Article Created: 5 November 1991  
Article Reviewed/Updated: 28 November 1994

TOPIC -----

Can I use AppleTalk Remote Access (ARA) in Apple II emulation mode on a  
Macintosh LC with an Apple IIe Card?

DISCUSSION -----

Yes. You must establish the connection before going into emulation mode.  
Once established, you can access network services via the Apple II control  
panel.

Article Change History:  
28 November 1994 - Updated and reviewed

Support Information Services  
Copyright 1991-94, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL251.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL252.TXT  
#####

Description: AppleTalk: Cable TV/Broadband Network Connectivity  
Header: AppleTalk: Cable TV/Broadband Network Connectivity

This article last reviewed: 15 November 1990

TOPIC -----

Can AppleTalk operate over cable TV wires? If so, how?

Since cable TV mainly uses coax-type cable, how do I make the connection? If it needs to be done serially (connection to the cable), would a Hayes InterBridge-type product be able to do this?

For home use, the only thing I can think of is using Liaison (if asynchronous is still the way to go) in the Macintosh.

Can any of the solutions work with Apple II computers? This is needed for home use to connect to a ANS network to a school.

DISCUSSION -----

It is possible to have Ethernet channels running on a broadband network, which is typically used in cable TV installations. It is important that the group responsible for the cable be intimately involved in this process since this is not a plug-and-play situation. There are a number of different alternatives possible once you have the hardware and software support for Ethernet in place on the cable network.

Usually, you would connect routers, such as the AppleTalk Internet Router, to the Ethernet drops from the broadband, and all of the other Macintoshes are connected to the Internet via routers. The routers then would be the only Macintoshes required to have Ethernet boards. You also could use FastPaths, GatorBoxes, or Macintoshes running Liaison as the routers.

Network Resources also offers several products that allow Macintosh users to connect to broadband. Their MultiGate 2000 hardware router connects LocalTalk to broadband, as if connecting a LocalTalk network to Ethernet via a router. Their MultiGate Bridge connects any combination of broadband, Ethernet, and fiber optics. These solutions do not require running Ethernet on broadband. For more information on their products, search on "Network Resources and broadband" in the Technical Info Library.

A Hayes InterBridge would not be a solution because it is a LocalTalk-to-LocalTalk bridge, and you need an Ethernet connection.

For the asynchronous connection, Liaison definitely seems a good choice since it also has the other capabilities mentioned above.

On the Apple II front, we are not aware of anything that will provide remote, serial AppleTalk access similar to what is available for the Macintosh.

We strongly suggest that you get assistance from a network consultant capable of assisting you in all phases of this type of setup. You should also be aware that anyone doing this will need full approval from whomever owns and operates the cable system.

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Keywords:

### END OF FILE A2TIL252.TXT

#####  
### FILE: A2TIL253.TXT  
#####

Description: AppleWorks 2.0: Features  
Header: AppleWorks 2.0: Features

The designers of AppleWorks have changed features in version 1.3 with AppleWorks 2.0:

1. File size limits

When a one megabyte Apple Memory Expansion card (or its Apple IIGS or IIC equivalent) is installed, AppleWorks 2.0 has the capacity for the following file sizes:

-- Database records: 6350 (instead of 1350)

6350 is the maximum number of records that can be placed in the AppleWorks data base with only 1 field identified with 1 character and having entries of only 1 character. Using an Apple II with a 1 megabyte memory board, you can add 6350 records. You will find there is still plenty of memory available, but AppleWorks will tell you the data base has reached the maximum number of records permitted.

On the other hand, on a data base pushed to the maximum of 30 fields, each with a length of 20 characters and filled by 17, you will find that you will run out of desktop memory before the data base reaches the maximum record count.

-- Word processor lines: 7250 (instead of 2250)

-- Spread sheet rows:10K (instead of 1.55K)

2. Automatic RAMDisk pre-load

When an Apple Memory Expansion card (or its Apple IIGS or IIC equivalent) is installed, AppleWorks 2.0 will automatically pre-load into the RAMDisk as a part of the boot process. This pre-loading takes only about 30 seconds and may be halted by pressing the ESC key.

All AppleWorks files except the SEG.PR file are loaded into the RAM card on startup. The SEG.PR file contains only printer data, and, because of its small size, it would be one of the first files to be removed from memory if a file needed that space.

One possible way around this is from the Control Panel:

Set aside 192K for a RAMDisk in the memory expansion area. Copy AppleWorks into the RAMDisk with System Utilities. Then go into BASIC, and run APLWORKS.SYSTEM from the RAMDisk. Appleworks will load itself into memory while recognizing the RAMDisk. Now, when the program requires the SEG.PR file, the program, retaining the fact that it started up from the RAMDisk, goes there to find the SEG.PR file.

3. New Spreadsheet feature: Cut/Copy & Paste:

After a cell has been cut or copied to the clipboard, the user will be able to paste from the clipboard either the value, the formula, or both.

4. New file save feature:

If there is not enough room on a disk to save a file that already exists on the disk, then AppleWorks first allows the user to delete the original file from the disk. With AppleWorks' capability to create larger files, this

## APPLE II COMPUTER TECHNICAL INFORMATION

feature will become important.

### 5. Enhancements and fixes:

#### a. Word Processor:

- Removed code that made the word processor take 13 seconds to process a carriage return in the middle of the first paragraph of a 2000 line document.
- Inserted extra code to make ESC and some OPEN-APPLE keystrokes work faster on large documents.

#### b. Spreadsheet:

- The routine to display spreadsheet rows was changed; it should now work faster on rows that have lots of filled cells.

Keywords:

### END OF FILE A2TIL253.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL254.TXT  
#####

Description: AppleWorks 2.0: Problems Printing to Networked ImageWriter  
Header: AppleWorks 2.0: Problems Printing to Networked ImageWriter

This article last reviewed: 29 August 1989

TOPIC-----

I have an AppleShare network, including Apple IIe, Apple IIGS, and Macintosh systems, with AppleWorks 2.0 running from the server. I cannot print to the LocalTalk ImageWriter II using AppleWorks, but can print to it from a Macintosh.

DISCUSSION-----

The difficulty in printing concerns the version of AppleWorks being run from the server. The ability to print from Applesoft indicates that the hardware is properly configured. AppleWorks 2.0 is not licensed for, nor designed for, running from an AppleShare server. For a version of AppleWorks licensed and designed for running from a server, use AppleWorks version 2.1N. Be sure, in AppleShare Admin under the Apple II menu, to set the user's account to the desired printer. The alternative would be to run AppleWorks 2.0 from a local disk.

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Keywords:

### END OF FILE A2TIL254.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL255.TXT  
#####

Description: AppleWorks on 5.25-Inch Disks: Printing to LaserWriter  
Header: AppleWorks on 5.25-Inch Disks: Printing to LaserWriter

This article last reviewed: 1 May 1989

This article describes how to put together three 5.25-inch disks for printing to a LaserWriter from an Apple II with AppleWorks (releases 2.0 and later). This makes the AppleWorks-LaserWriter connection available when only one or two 5.25-inch disk drives reside on the Apple II system.

## Overview

-----

The process requires these three disks:

- The IWEM.BOOT Disk
- The APPLEWORKS Startup Disk
- The APPLEWORKS Program Disk

Have these disks handy to go through the process described below. The rest of the article describes what to do with each disk, beginning with the IWEM.BOOT disk. The article concludes with listings of the catalogs of the three disks.

## The IWEM.BOOT Disk

-----

For AppleWorks to print to a LaserWriter, you need to download the ImageWriter Emulator (IWEM) to the LaserWriter. To do this, you need the disk labeled: IWEM.BOOT. Follow these steps:

- 1) Start up the Apple II with the IWEM.BOOT disk. This leaves the user at the Applesoft BASIC prompt.
- 2) At the prompt, type:  
  
    -CHOOSER.II
- 3) Select "LaserWriter" in the top left scroll box.
- 4) In the lower left scroll box, select the zone of the desired LaserWriter.
- 5) In the top right scroll box, select the name of the desired LaserWriter. Once you select the LaserWriter in the third box, CHOOSER.II checks for the presence of IWEM. If not already downloaded, it will be downloaded.
- 6) Quit from CHOOSER.II.

This procedure needs to be used each time the LaserWriter is powered off and back on. The power cycle causes IWEM to be purged. Occasionally, the IWEM may be corrupted by other printing sessions, like a Macintosh printing session. If an Apple II workstation attempts to print to the IWEM with no results, try downloading the IWEM again.

## The APPLEWORKS Startup Disk

-----

With the IWEM downloaded, the next step is to start up with the APPLEWORKS startup disk and set the desired printer as the default printer for the user. With the disk configured as below, on startup, the Applesoft prompt

## APPLE II COMPUTER TECHNICAL INFORMATION

appears. Follow these steps:

1) At the prompt, type:

```
-CHOOSEER.II
```

This time, CHOOSEER.II is used only to select the printer for use by AppleWorks. The APPLEWORKS startup disk assumes the IWEM is downloaded.

2) Select the same choices that were selected in the IWEM.BOOT section. The selection is written to the APPLEWORKS startup disk. Unless the printer is MOVED, renamed, or an alternate printer is desired, you do not need to run CHOOSEER.II again during future AppleWorks sessions.

3) Quit CHOOSEER.II.

This presents the following request:

```
ENTER PREFIX (PRESS "RETURN" TO ACCEPT) 4) In response, type:
```

```
/APPLEWORKS/
```

and press RETURN. This displays the request:

```
ENTER PATHNAME OF NEXT APPLICATION
```

5) In response, type:

```
APLWORKS
```

and press RETURN. This runs the AppleWorks application. AppleWorks requests the APPLEWORKS program disk.

The APPLEWORKS Program Disk

-----  
Continue the process by following these instructions:

1) Insert the APPLEWORKS program disk. Then press the space bar and RETURN.  
@L

2) Once in AppleWorks, select:

```
#5: Other Activities.
```

3) Then select:

```
#7: Specify information about your printer(s)
```

4) Then select:

```
#2: Add a printer (maximum of 3)
```

5) Next select:

```
#2: Apple ImageWriter
```

6) Give this ImageWriter driver a name to represent it as the LaserWriter on the network (like "Network LaserWriter").

7) Designate the correct slot -- the slot the Workstation Card is in on an Apple IIe or slot 7 on an Apple IIGS.

8) The default settings on the next screen are correct, therefore, ESCAPE back to the Main Menu. From this point, everything (including control codes for underlining, bold-facing, and so on) functions as though AppleWorks is printing to an ImageWriter.

# APPLE II COMPUTER TECHNICAL INFORMATION

## Changes To Be Made

-----  
Beyond configuring the disks with the following files, one filename needs to be changed. On the APPLEWORKS startup disk, APLWORKS.SYSTEM needs to be changed to APLWORKS. Leaving the .SYSTEM off allows BASIC.SYSTEM to be the startup application, thus, allowing CHOOSER.II to be run, following startup with the APPLEWORKS startup disk and before running APLWORKS.

There are 21 blocks available on the APPLEWORKS startup disk. It may be possible to create a small menu program to "front end" the APPLEWORKS disk. The menu program is not covered in this document.

The three disk configurations follow:

IWEM.BOOT  
-----  
PRODOS  
CHOOSER.II  
CHOOSER5.OVR  
IWEM  
CHOOSER4.OVR  
CHOOSER3.OVR  
MTXABS.0  
CHOOSER2.OVR  
CHOOSER1.OVR  
CHOOSER.0  
ATINIT  
BASIC.SYSTEM

12 Files Listed, 262 Blocks Used, 18 Available

APPLEWORKS (startup disk)

-----  
PRODOS  
APLWORKS  
SEG.00  
SEG.RM  
SEG.XM  
SEG.EL  
CHOOSER.II  
CHOOSER5.OVR  
CHOOSER4.OVR  
CHOOSER3.OVR  
CHOOSER2.OVR  
CHOOSER1.OVR  
CHOOSER.0  
MTXABS.0  
ATINIT  
BASIC.SYSTEM

16 Files Listed, 259 Blocks Used, 21 Available

APPLEWORKS (program disk)

-----  
SEG.M0  
SEG.M1  
SEG.PR

3 Files Listed, 279 Blocks Used, 1 Available  
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Keywords:

### END OF FILE A2TIL255.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL256.TXT  
#####

Description: AppleWorks to LocalTalk ImageWriter: Printing Problems  
Header: AppleWorks to LocalTalk ImageWriter: Printing Problems

This article last reviewed: 6 June 1989

Some users have complained of an inability to print either from an Apple IIe or from an Apple IIGS across an LocalTalk network to an ImageWriter II when using AppleWorks. All reported being able to print from BASIC using PR#7. Although the networks could have rather different configurations and software, these facts were the same.

The difficulty in printing concerns the version of AppleWorks being run from the server. The ability to print from Applesoft indicates that the hardware is properly configured. AppleWorks 2.0 is not licensed for, nor designed for, running from an AppleShare server. For a version of AppleWorks licensed and designed for running from a server, use AppleWorks version 2.1N. Be sure, in AppleShare Admin under the Apple II menu, to set the user's account to the desired printer. The alternative would be to run AppleWorks 2.0 from a local disk.

The printing procedure is the same whether you start across the network or you startup locally. However, the network version of AppleWorks is required, if it is to be run from the server. Here is some background information, relative to this inquiry.

- Aristotle has no effect on the ability to print from AppleWorks.
- The location of ATINIT differs when on a server (as compared to a local disk). On the server, ATINIT should be in the folder assigned to the user. For example: PRODOS.SERVER/USERS/(\_user's name\_)/SETUP/ATINIT.
- The name of the System.APPS subdirectory is not critical, as long as a consistent name is used throughout the network.
- The WWSS file is not necessary for the operation of AppleWorks.

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Keywords:

### END OF FILE A2TIL256.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL257.TXT  
#####
```

Description: AppleWorks: Creating database documents from text with tabs  
Header: AppleWorks: Creating database documents from text with tabs

Some database programs export text files that have fields separated by tabs and records by carriage returns. AppleWorks imports a database file from a text file when all fields and records are separated by carriage returns. To convert the tabbed export format to the format AppleWorks imports, you must use a word processing application or a programming language, such as BASIC or Pascal, whether or not you have to transfer the data from the Macintosh.

Using a word processing application, open the document and change the tabs to carriage returns with a replace command. Most applications have special codes for the tab and carriage return, such as ^t and ^p in MicroSoft Word. Save the changes as a text file, which AppleWorks should accept.

For using a programming language, take this example in Applesoft BASIC under ProDOS.

```
10 ONERR GOTO 130  
20 O$="<OLD FILE NAME>"  
30 N$="<NEW FILE NAME>"  
40 D$=CHR$(4)  
50 PRINT D$"OPEN"O$  
60 PRINT D$"OPEN"N$  
70 PRINT D$"READ"O$  
80 GET A$  
90 PRINT D$"WRITE"N$  
100 IF A$=CHR$(9) THEN A$=CHR$(13)  
110 PRINT A$;  
120 GOTO 70  
130 PRINT D$"CLOSE"  
140 END
```

This program should be saved, along with the exported text file, to a ProDOS disk; save the program with a name such as "TAB2CR". After substituting appropriate names in lines 20 and 30, run the program. AppleWorks should accept the output file.

Here is a MacPascal program that could convert the export file of a Macintosh application such as MacWorks.

```
program Convert;  
type  
  text = file of char;  
  
var  
  infile, outfile : text;  
  c : char;  
  
begin  
  {an example pathname could be 'HD:MS Works:ExportFile'}  
  open(infile, 'export file pathname');  
  open(outfile, 'AppleWorks format file pathname');  
  while not (eof(infile)) do  
    begin  
      read(infile, c);  
      if ord(c) = 9 then  
        begin  
          c := chr(13);  
        end;  
      write(c); {echo to screen}
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```
write(outfile, c);  
end;  
close(infile);  
close(outfile);  
end.
```

Substitute appropriate names for "export file pathname" and "AppleWorks format file pathname". After transferring the output file to the Apple II (with MS Works or MacTerminal), save the captured file as a text file. AppleWorks should accept the captured file.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL257.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL258.TXT  
#####
```

Description: AppleWorks: Desktop size on the Apple IIGS  
Header: AppleWorks: Desktop size on the Apple IIGS

For desktop storage, AppleWorks 2.0 on an Apple IIGS will only use memory found on the Apple IIGS logic board and Memory Expansion Card. When this card is not present and AppleWorks 2.0 is booted from the Apple IIGS System Disk, the Apple IIGS Tools, using a large portion of available logic board RAM, leave only 13K for the AppleWorks desktop. The message "WARNING! Desktop is full. Action not completed. Press space bar to continue." appears when the user attempts to create a word processor file from scratch. If you make a second attempt to create a word processor file, AppleWorks will complete the task.

AppleWorks' users should be aware of this situation before using AppleWorks 2.0 and the Apple IIGS System Disk files on an Apple IIGS without an Apple IIGS Memory Expansion Card installed.

If AppleWorks 2.0 is booted from the AppleWorks Startup Disk, an Apple IIGS 1M Expansion Card will permit up to 1149K on AppleWorks' desktop. Factors that affect the size of AppleWorks' desktop are:

- memory available on the Apple IIGS Memory Expansion Card
- memory occupied by the Apple IIGS RAM disk
- the availability of the Apple IIGS desktop
- other AppleWorks auxiliary programs that are loaded into the Apple IIGS
- the method used to start up AppleWorks.

You may create a disk that will allow AppleWorks and the Apple IIGS Desktop to be used effectively on the same disk:

1. Make a new copy of your AppleWorks 2.0 master disk.
2. Remove the file "PRODOS" from the new AppleWorks disk.
3. Copy the file called "P8" from the System folder on the Apple IIGS System Disk onto the new AppleWorks disk. Rename the copied file "PRODOS". The disk is now bootable for starting up the Apple IIGS.

If you wish to add the desktop:

1. Locate the folder "DESKTOP" on the Apple IIGS System Disk. Copy the contents of this folder onto the root directory of the new AppleWorks disk.
2. On new the AppleWorks disk, rename the file "APLWORKS.SYSTEM" "APPLEWORKS" and "DESKTOP1" "DESK1.SYSTEM".
3. Start your Apple IIGS with the modified AppleWorks disk. Once the desktop appears, double click on the "APPLEWORKS" icon to run the AppleWorks program. Using this disk on an Apple IIGS with 256K memory provides 124K of AppleWorks' desktop space.

AppleWorks versions 1.1, 1.2 and 1.3 can be used on an Apple IIGS, an Apple IIc, or an Apple IIe with either 64K or 128K memory. AppleWorks' desktop size on an Apple IIGS will vary with the version of AppleWorks in use. Because AppleWorks 1.3 and earlier versions do not recognize the newer features of the Apple IIGS, the user can obtain only a 55K AppleWorks desktop, even though the computer may have from 256K to 1.25M of memory on the logic board and in the Memory Expansion Slot. However, if the Apple IIGS has an Apple II Memory Expansion Card in one of its seven slots, AppleWorks 1.3 does recognize it and uses the Memory Expansion Card to increase the desktop

APPLE II COMPUTER TECHNICAL INFORMATION

size.

Apple Technical Communications

Keywords:

### END OF FILE A2TIL258.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL259.TXT  
#####
```

Description: AppleWorks: Installing it on a ProFile or UniDisk 3.5  
Header: AppleWorks: Installing it on a ProFile or UniDisk 3.5

Briefly, these procedures require you to:

1. Install PRODOS and BASIC.SYSTEM on the ProFile or UniDisk 3.5.

This can be done using the ProDOS User's Disk and instructions in the ProDOS User's Manual.

2. Copy all the files on the AppleWorks Startup and Program disk into a subdirectory named AppleWorks on the ProFile or UniDisk 3.5.

After this you will be able to boot and run AppleWorks from the ProFile or UniDisk 3.5.

## I. Equipment Needed:

A. Apple IIe or Enhanced IIe

B. ProFile Hard Disk ( 5 or 10 Meg) with Apple II ProFile interface card or UniDisk 3.5 with UniDisk 3.5 interface card

-- Put the ProFile or UniDisk 3.5 interface card in slot 7 of an Enhanced IIe if, when you turn on the Enhanced IIe, you want it to boot from the ProFile or UniDisk 3.5 instead of the floppy disk drive

C. ProDOS User's Disk

D. AppleWorks Startup and Program disk

## II. Installation Procedure:

A. Boot the ProDOS User's Disk.

B. Format the ProFile with the volume name /PROFILE or Format the UniDisk 3.5 with the volume name /UNI.

C. Use the File handling commands on the ProDOS User's disk to:

1. Copy the files PRODOS and BASIC.SYSTEM to the ProFile or UniDisk 3.5.
2. Create a subdirectory called APPLEWORKS on the ProFile or UniDisk 3.5
3. Copy all the files on the AppleWorks Startup and Program disks into the APPLEWORKS subdirectory you just created.
4. Remove the files PRODOS and BASIC.SYSTEM only from the subdirectory named APPLEWORKS.

-- You already put PRODOS and BASIC.SYSTEM on the root directory of the ProFile or UniDisk 3.5 in step C1.

D. Exit the ProDOS User's disk into Applesoft BASIC.

You need to create a program called STARTUP on the ProFile or UniDisk 3.5. This program will command AppleWorks to run from the ProFile or UniDisk 3.5 when you boot from the ProFile or UniDisk

## APPLE II COMPUTER TECHNICAL INFORMATION

3.5.

E. Type PR#n, where n is the number of the slot of the ProFile or UniDisk 3.5 interface card, e. g., PR#7 in the case of the Enhanced IIe in item IB above.

F. You should now have the ] symbol on the screen. Type in the following program for the ProFile:

```
10 TEXT : HOME
20 PRINT CHR$(4);"PREFIX /PROFILE/APPLEWORKS"
30 PRINT CHR$(4);"-APL.WORKS.SYSTEM"
40 END
```

For a UniDisk 3.5, type in the following program:

```
10 TEXT : HOME
20 PRINT CHR$(4);"PREFIX /UNI/APPLEWORKS"
30 PRINT CHR$(4);"-APL.WORKS.SYSTEM"
40 END
```

G. Save this program on the ProFile or UniDisk 3.5 as STARTUP, i.e. SAVE /PROFILE/STARTUP or SAVE /UNI/STARTUP.

H. Type PR#n using the same number for n as you did in step E above.

-- AppleWorks should now boot from the ProFile or UniDisk 3.5.

I. To set up AppleWorks for use with the ProFile or UniDisk 3.5:

1. In AppleWorks, choose 5. "Other Activities."
2. Then choose 1. "Select standard location of data disk."
3. Type /PROFILE/APPLEWORKS or /UNI/APPLEWORKS.

Apple Technical Communications

Keywords:

### END OF FILE A2TIL259.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL260.TXT  
#####

Description: AppleWorks: Problems Printing to LocalTalk ImageWriter  
Header: AppleWorks: Problems Printing to LocalTalk ImageWriter

This article last reviewed: 29 August 1989

TOPIC-----

AppleShare was recently installed at a client school. I am having problems printing from AppleWorks on the Apple IIe's to a LocalTalk Imagewriter. Here is some background:

- There are no problems accessing the file server.
- The LocalTalk ImageWriter was set as the default printer for Apple II users.
- The AppleShare Print Spooler is NOT on the file server.
- LocalTalk Cards were placed in Slot 7 of the IIe's.
- I added a printer in AppleWorks configured to print to Slot 7.
- If I run CHOOSER.II the printer shows up. If I reselect the printer I still have the same problems.

When I print from AppleWorks I get NOTHING. If I go to BASIC I can type PR#7 and talk to the printer. How can I print to the LocalTalk'd ImageWriter from AppleWorks?

DISCUSSION-----

We cannot get the results you describe. With the Workstation card in slot 7, a networked ImageWriter, a slot 7 ImageWriter selected in AppleWorks, and AppleWorks 2.0 running, we can print across the network with no difficulties.

Our configurations have included all combinations of:

- AppleWorks version 2.0, with an ImageWriter assigned to slot 7
- ProDOS 8 versions 1.4 and 1.6
- Apple IIe, enhanced, with the Workstation card in slot 7
- ImageWriter II with AppleTalk option
- Chooser II version 1.2
- AppleShare II Workstation versions 1.0 and 1.1

In all cases the document printed without need for special actions.

Our boot disk contained

- ProDOS
- ATINIT
- Selector.System
- Sys.Apps (a sub-directory containing:)
  - Basic.System
  - Logoff
  - Logon

## APPLE II COMPUTER TECHNICAL INFORMATION

- Chooser (a sub-directory containing:)
  - Chooser.II
  - Chooser5.OVR
  - IWEM
  - Chooser4.OVR
  - Chooser3.OVR
  - MTXABS.0
  - Chooser2.OVR
  - Chooser1.OVR
  - Chooser.0
- Namer (a sub-directory containing:)
  - Namer.II
  - Namer.0
  - MTXABS.0
- Access ( a sub-directory containing:)
  - Access
  - Priv.0
  - MTXABS.0
  - Priv1.OVR
  - Priv2.OVR
  - Priv3.OVR
  - Priv4.OVR
- AWORKS (a sub-directory containing:)
  - Aplworks.System
  - SEG.00
  - WWSS
  - SEG.M0
  - SEG.EL
  - SEG.XM
  - SEG.RM
  - SEG.M1
  - SEG.PR

Our procedure followed these steps:

- 1) Boot with the above configured disk.
- 2) The selector window will be displayed; select and run Chooser II.
- 3) Press the Down cursor key to highlight "AppleTalk ImageWriter II".
- 4) Press Return to select. The name of the networked ImageWriter should appear in the to right scroll box. If the name does not appear:
  - a) Press the Tab key three times. You are now in the scroll box allowing you to chose between LocalTalk and Serial. Highlight LocalTalk and press Return.
  - b) Press Tab twice. You are now in the top left window. Highlight 'AppleTalk ImageWriter II'. Press Return. The name of the networked ImageWriter should now appear.
- 5) Press Tab twice. Use the Down cursor key to highlight the name of the networked ImageWriter. Press Return to select.
- 6) Press Open-Apple-Q to exit Chooser II.
- 7) Run AppleWorks.
- 8) Select Other Activities, Printer Information.
- 9) Verify a printer is designated as an ImageWriter in Slot 7. If no ImageWriter is set for slot 7, then do these three steps:
  - a) Delete a printer if all three printers are currently defined

## APPLE II COMPUTER TECHNICAL INFORMATION

- b) Add a printer. Use ImageWriter. Set for Slot 7.
  - c) Give a name that indicates it is a network printer,i.e., "Network IW II".
- 10) Return to your document. Press Open-Apple-P to access the printer routines.
- 11) Answer the "Print from?" question. (In our test, we answered from beginning)
- 12) Answer "Where...to print the file?" question with the network printer.
- 13) Answer "How many copies?" question.
- 14) On pressing Return after answering the last question, AppleWorks will send the document over the network to the ImageWriter. There was a slight delay between the screen refresh and the printing.

If you have any further questions about this sequence of events please Link TECH.COMM with details of what is taking place.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL260.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL261.TXT  
#####

Description: AppleWorks: RamWorks Card Needs Larger Memory Capacity (9/95)  
Header: AppleWorks: RamWorks Card Needs Larger Memory Capacity (9/95)

Article Created: 5 December 1985  
Article Reviewed/Updated: 19 September 1995

TOPIC -----

This article describes how to interface Catalyst With An Apple II, AppleWorks & RamWorks IIe 80-column Card.

DISCUSSION -----

This technical note describes the procedure to correctly interface the above products to allow larger memory capacities with the AppleWorks application.

What You Need

=====

Before you begin, be sure you have the following:

- 1. ProDOS users disk.
- 2. Desktop Expander disk from Applied Engineering.
- 3. AppleWorks startup and program disks.
- 4. Catalyst disk.

Procedure

=====

Step 1

-----

Boot the Desktop Expander disk and follow the instructions. This will modify your AppleWorks disk so that it can use the additional memory of the Ramworks board IIe card.

Step 2

-----

Create a subdirectory on your hard disk using Apple's ProDOS Users disk called "/PROFILE/AW"

Step 3

-----

Copy all of the files from the AppleWorks Startup and Program disks to the subdirectory you just created.

Step 4

-----

Once the files have been copied, start up your Catalyst disk and select the Catalyst Editor.

Step 5

-----

Move the cursor to the point where you wish to add your AppleWorks program and press "A".

Step 6

-----

Type "APPLEWORKS" for the program name.

Step 7

## APPLE II COMPUTER TECHNICAL INFORMATION

-----

Type "AW/APLWORKS.SYSTEM" for the interpreter pathname.

Step 8

-----

Type "AW" for the initial prefix.

Step 9

-----

Press RETURN for the program path.

Step 10

-----

You will be asked if all items are correct. Answer "Y" and press ESCAPE to exit to the main menu.

Step 11

-----

Enter "U" to update the INTERPS2E file.

Step 12

-----

Exit to the Catalyst main menu by entering "Q".

When you select the AppleWorks program from the main menu you will notice that you now have 101K available for data storage.

NOTE: Apple Computer Inc. is not responsible for the contents of this article.

Article Change History:

19 Sep 1995 - Reformatted to meet current standards.

Support Information Services

Quark Tech Support

Keywords:

### END OF FILE A2TIL261.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL262.TXT  
#####
```

Description: AppleWorks: Standard and Custom Printer Interfaces (1 of 2)  
Header: AppleWorks: Standard and Custom Printer Interfaces (1 of 2)

Versions of AppleWorks earlier than version 1.2 don't allow you to run Appleworks using any other interface card but the Apple Super Serial card. If you wish to use a different interface card, you must upgrade to 1.2 or later versions.

For a new owner of an Apple IIe with AppleWorks, dealers should include only those interface cards that work. The Silentype has its own interface card. Aside from that, there are two interface cards, the Apple II Parallel Interface Card (A2B0021) and the Apple Super Serial Card (A2B0044), that work correctly with all of the printers on AppleWorks' Add a Printer list:

1. Apple Printers
  - a. Dot Matrix Printer (DMP). AppleWorks is set up for the Apple DMP. If you have any other printer, you must set up AppleWorks for it.
  - b. Daisy Wheel Printer (DWP)
  - c. Imagewriter
  - d. Scribe
2. Epson (tm) Printer Series: MX, MX with Graftrax+, RX, and FX
3. Qume (r) Sprint 5 and Sprint 11

For new owners of a IIc, dealers should make sure that the customer's printer is compatible with a IIc running AppleWorks.

For a IIe owner considering AppleWorks, make sure the owner has a configuration compatible with AppleWorks. If the owner doesn't have such a configuration, the owner's only recourse is to buy an interface card that is compatible.

--> Using AppleWorks with cards and printers not on the standard list

If you're using a card or a printer not on AppleWorks' standard list, you must add a custom printer to your AppleWorks configuration and specify the characteristics of the card or printer.

To choose the following options, type the number and press the RETURN key.

1. From AppleWorks' main menu, choose "5. Other Activities".
2. From the "Other Activities" menu, choose "7. Specify information about your printer(s)".
3. From the "Printer Information" menu, choose "2. Add a printer".
4. From the "Add a Printer" menu, choose "12. Custom printer".
  - a. Enter the name you wish to use for the printer.
  - b. Press RETURN.
  - c. Apple IIe: Choose the slot of the printer's interface card.  
Apple IIc: Choose the port of the printer.
  - d. Press RETURN.
5. Press the ESC key: now the printer has been added to AppleWorks.
6. Now you must give AppleWorks what the printer needs to perform, specifying requirements for:
  1. a line feed after each carriage return,
  2. a top-of-page command,

## APPLE II COMPUTER TECHNICAL INFORMATION

3. stopping at the end of each page,
4. platen width,
5. interface card settings, and
6. codes for special functions of the printer.

Items 1 to 4 are self-explanatory and can readily be changed to meet the requirements of different jobs. You can do this from the "Printer Information" menu, choosing the printer you named under "Add a Printer".

7. With the Apple IIe, choose "5. Interface Cards". Now AppleWorks asks for a code to send to the printer interface card to prepare the card for sending data to the printer. Consult the table below for the appropriate keystrokes. (Note that [CTRL- ] and the character in the bracket means that you must hold the CTRL key down while you type the character; do not type the brackets.)

Interface card	Code string
Apple Parallel Card (2PIC)	[CTRL-I]80N
Apple Super Serial Card	[CTRL-I]80N
Apple Centronix Parallel Card	[CTRL-I]255N
Grappler Plus	[CTRL-I]0N
Microtek RV-611C	[CTRL-I]255N
Pkaso	[CTRL-I]0N
MPC AP Graph and Graphwriter	[CTRL-I]255N

If your card isn't on this chart, look in the card manual; it should have the code string.

It's important to note that, although some printer manuals give code strings in the form of keystrokes, some other manuals give code strings in

numerical form, either decimal (0 to 9) or hexadecimal (0 to F).

AppleWorks won't accept a code string simply typed in as one of these numbers; you must use a keystroke or combination of keystrokes to send the

number from the keyboard to AppleWorks. Look up the decimal or hexadecimal

form of the number in an Apple II ASCII chart; the appropriate keystrokes are on the right.

Suppose, for example, the manual states that the decimal code string 09464878 initializes the card. On an Apple II ASCII chart, 09 is [CTRL-I], 46 is the eight key, 48 is the zero key, and 78 is capital N; altogether, that's [CTRL-I]80N. To put this into AppleWorks you would:

1. Choose "5. Interface Card"
2. Hold down the CTRL key and type I,
3. Type 80
4. Hold down the SHIFT key and type N
5. Hold down the SHIFT key and type 6; this ends the string with the carat or '^' AppleWorks requires.

Keywords:

### END OF FILE A2TIL262.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL263.TXT  
#####

Description: AppleWorks: Using it on the Apple II UniDisk 3.5  
Header: AppleWorks: Using it on the Apple II UniDisk 3.5

To catalog a disk in a Unidisk 3.5 on an Apple IIc with system utilities 2.1,  
you may choose 4 options on the menu screen:

1. built-in drive
2. external disk 3.5 #1
3. external disk IIc
4. Prodos Pathname

When choosing to format a disk, of course, the first 3 options are present.

Users of AppleWorks versions previous to version 1.3 may be confused by the  
menu screen shown when they choose to catalog a disk or change current disk:

1. Drive 1
2. Drive 2
3. Profile or other ProDOS directory

Choose option 3 to use the Unidisk 3.5 with AppleWorks before version 1.3. In  
these earlier versions, you can refer to the UniDisk 3.5 only by its pathname,  
such as /appleworks/business.

Refer to page 9 the pamphlet "Using AppleWorks on the Apple II Unidisk 3.5"  
for  
further explanations of how to load, save and list data files with Appleworks  
and the 3.5 disk.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL263.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL264.TXT  
#####

Description: AppleWorks: Using it on the Apple II and Apple II Plus  
Header: AppleWorks: Using it on the Apple II and Apple II Plus

Videx makes 80-column boards and patch program disks that allow Appleworks to operate on an Apple II or II Plus.

A Videx card gives a normal Apple II or Apple II Plus the ability to run AppleWorks. The AppleWorks diskettes must also be modified with a special patch program in order to run on the Apple II or II Plus.

There are some technical considerations, though:

- a. The user must have purchased the Videx Ultraterm Card or the Videoterm Card with the Inverse Option chip.
- b. The shift key modification must also be in place; if it isn't, you can perform the modification yourself by referring to the manual.
- c. The program requires AppleWorks 1.3 to utilize the Apple RAM card. Titan and Legend RAM cards are supported with AppleWorks versions 1.1 and 1.2.

Videx Inc.  
1105 NE Circle Blvd.  
Corvallis, OR 97330  
503 / 758-0521@

Applied Engineering, best known for its RamWorks board for the Apple IIe, also makes "RamFactor", a memory board for the Apple II, Apple II Plus, IIe, and Apple IIGS.

RamFactor comes with a set of patch disks for AppleWorks versions 1.2 and 1.3 and another set for 2.0. Patch disks from Videx are not required.

Technical requirements for an Apple II Plus are:

- a. 64K main memory in either:
  1. 48K + 16K language card
  - or
  2. Applied Engineering Transwarp Accelerator
- b. 80 column card with inverse video capability
- c. Shift key wire from keyboard to main board (a common modification)
- d. RamFactor board with at least 256K (minimum configuration)
- e. One or more disk drives.

Such an Apple II Plus system has no trouble running AppleWorks 1.3.

The following key substitutions apply:

Apple II Plus	AppleWorks
Escape	Open Apple
Control-J	Up
Control-K	Down

Apple Technical Communications

APPLE II COMPUTER TECHNICAL INFORMATION

Keywords:

### END OF FILE A2TIL264.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL265.TXT  
#####

Description: Applied Engineering (6/95)  
Header: Applied Engineering (6/95)

Article Created: 3 December 1988  
Article Reviewed/Updated: 6 June 1995

Applied Engineering  
-----  
3210 Beltline Rd.  
Dallas, TX 75234

Company Profile:  
Applied Engineering went out of business in May 1994. They made hardware, specializing in Apple II & Macintosh peripheral boards. Tech support for some of their products is now being handled by a few separate companies.

Accelerators  
=====  
Brainstorm Products  
Provides support for Applied Engineering accelerators and related software only.

Apple II Related Products  
=====  
ABC Direct  
\*\* FOR SCHOOLS OR BUSINESSES ONLY. NO INDIVIDUALS PLEASE \*\*  
Provides support for the Applied Engineering products for the Apple II series (including the DOS compatibility card). Also has a repair service available for any Applied Engineering product based on an hourly fee.

Parallel Printer Interface Cards  
=====  
Orange Micro, Inc.  
Offer solutions to many problems with Applied Engineering parallel printer interface cards (similar to their own Grappler boards).

The Tech Info Library article titled "Locating Vendor Information" can help you search for a particular vendor's address and phone number.

Article Change History:  
06 Jun 1995 - Added information about Orange Micro, Inc.  
10 Feb 1995 - Added reference to Locating Vendor Info article.

Support Information Services  
Copyright 1989-95, Apple Computer, Inc.  
Keywords: 3pty

### END OF FILE A2TIL265.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL266.TXT  
#####

Description: Beagle Brothers Inc.  
Header: Beagle Brothers Inc.

Article Created: 02/12/88  
Article Reviewed: 07/06/93  
Article Updated: 07/06/93

Wordperfect Corp  
-----

1555 N. Technology Wy.  
Orem, UT 84057

800-321-4566

801-228-5377 Fax

Company Profile:

Formerly Beagle Brothers Inc., Macintosh software, includes products such as Flash Escape and Beagle Works. Quality Computers (formerly Beagle Bros. Inc.), Apple II software, specializing primarily in Apple II tools.

Quality Computers  
20200 9 Mile Rd.  
P.O. Box 665  
St. Clair Shores, MI 48080  
313-774-7200  
800-443-6697  
800-777-3642  
Fax: 313-774-2698

Article Change History: 07/06/93 Phone number added  
Copyright 1988-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL266.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL267.TXT  
#####

Description: Blyth Software  
Header: Blyth Software

Article Created: 08/13/87  
Article Reviewed: 07/06/93  
Article Updated: 08/21/91

Blyth Software, Inc.  
-----

1065 E. Hillsdale  
Suite 300  
Foster City, CA 94404

800-346-6647

415-571-0222

415-571-1132 Fax

AppleLink: D0102

Company Profile:  
Software, specializing in Macintosh and Apple II databases.  
Copyright 1989-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL267.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL268.TXT  
#####

Description: Business Technology Manufacturing, Inc.  
Header: Business Technology Manufacturing, Inc.

Article Created: 03/27/90  
Article Reviewed: 07/06/93  
Article Updated: 11/09/92

Business Technology Manufacturing, Inc.  
-----

42-20 235th St.  
Douglaston, NY 11363

718-229-8080

Company Profile:

Hardware, specializing in a hands-free phone dialer system that directly connects the "real world" of telephones and telemarketing to the Macintosh and programs used with a telephone or headset. Enlarging monitors for Mac Classic (B&W) and Apple II (color), custom videowork, rack mount cases for all machines

Copyright 1990-93, Apple Computer, Inc.

Keywords: 3PTY

### END OF FILE A2TIL268.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL269.TXT  
#####
```

Description: Changes in Word Juggler for the Apple II (vers. 2.7 or greater)  
Header: Changes in Word Juggler for the Apple II (vers. 2.7 or greater)

Word Juggler for the Apple II (version 2.7 or greater) differs from the older versions in two primary ways; by the elimination of the hardware modification and the addition of a number of enhancements to the program. The following list is a summary of all of the changes.

## Enhancements to the program

### New HELP feature

While editing a document, Open-Apple "?" will display a list of topics that, when selected, explain the various features of Word Juggler. Note that this replaces the old HELP command key (CONTROL V).

### 40 / 80 column support

Word Juggler for the Apple II will work in 40 columns on both the Apple IIe and the Apple IIc. When used on the Apple IIe, Word Juggler will use the 80 column card in the auxiliary slot if it is available. When used on the Apple IIc, Word Juggler checks the 40/80 column switch when the program is booted, and then reacts accordingly.

When used in the 40 column mode, Word Juggler changes in a few minor ways:

- o The main menu changes slightly.
- o The file name does not appear on the status line.

### Main menu changes

- o Purge is now Delete.
- o Define Prefix is now Prefix.

### Printer cards

- o When used on the Apple IIc, the printer card is permanently set to Super Serial to accommodate the two ports on the Apple IIc.
- o When used on the Apple IIc, the printer card must be used in Slot 1 or 2.

### MOVE and COPY commands

Word Juggler now allows you to use the FIND and ^ FIND commands when prompted to "Move cursor to start (or end ) of block and press space", in addition to the normal cursor movement keys.

### FIND and ^ FIND commands

Hitting RETURN when prompted with "Find what?" will find the next occurrence of the string that was last searched for.

### Titles and Page variables

The TEXT LINE/COL command now allows greater flexibility in choosing where on the page a title or page number can appear. In addition to specifying the absolute column number, titles or page numbers may appear on the left or right margin, centered between the margins, or alternating between the margins (which is useful when printing manuals)

### Changes in the keystrokes

Because there is no keyboard enhancer included with Word Juggler version 2.7, some of the keystrokes had to be altered.

- o The Open Apple key is used to access the editing commands (instead of the CONTROL key used in the older versions).

## APPLE II COMPUTER TECHNICAL INFORMATION

- o The "overstrike" feature is no longer available.

### Cursor Movement

	Used to be:	Now is:
o Previous Page	SHIFT Up-Arrow	Open-Apple Up-Arrow
Previous Word	SHIFT Left-Arrow	Open-Apple Left-Arrow
Next Word	SHIFT Right-Arrow	Open-Apple Right-Arrow
	Next Page	SHIFT Down-Arrow

### Open-Apple Down-Arrow

o Beginning of Document	CONTROL SHIFT Up-Arrow	Open-Apple E
Beginning of Line	CONTROL SHIFT Left-Arrow	Open-Apple S
End of Line	CONTROL SHIFT Right-Arrow	Open-Apple D
End of Document	CONTROL SHIFT Down-Arrow	Open-Apple X
o Straight Up	CONTROL Up-Arrow	Open-Apple CONTROL E
Straight Left	CONTROL Left-Arrow	Open-Apple CONTROL S
Straight Right	CONTROL Right-Arrow	Open-Apple CONTROL D
Straight Down	CONTROL Down-Arrow	Open-Apple CONTROL X
o Start of next line	CONTROL RETURN	Open-Apple RETURN
o Tab Set (and Clear)	SHIFT (and CONTROL) TAB	Open-Apple TAB
o Tab Inserting Spaces	SHIFT CONTROL TAB	Open-Apple Space

### Printout Formatting Commands

The following commands not labeled on the command strip are now different:

	Used to be:	Now is:
o Else	ESCAPE CONTROL =	ESCAPE E
o 15 Pitch	ESCAPE CONTROL 4	ESCAPE F
o Ragged Left	ESCAPE CONTROL 2	ESCAPE R
o Triple Space	ESCAPE CONTROL 7	ESCAPE T

### Margin Settings

Both the Top Margin and the Left Margin commands are now counted from "0" instead of "1".

### Printout Enhancement Commands and Special Functions

Printout enhancements (such as bold and underline) and special functions (such as Lexicheck and Terminus) are now accessed with the Solid-Apple key instead of the Open-Apple key. Additionally, Print Form has changed from Open-Apple "." to Solid-Apple "2".

Variables are also entered with the Solid-Apple key.

### Using Word Juggler with the Keyboard Enhancer

If you have a keyboard enhancer already installed and prefer to use the old commands, simply create a document called "OLD.COMMANDS" on the Word Juggler diskette and reboot. (It doesn't matter what is in this document, it just needs to be on the diskette.) This will allow Word Juggler to function almost the same as the earlier versions, while still having access to all of the program enhancements.

The functions that will behave differently are:

- o Help will still be accessed as Open-Apple "?".
- o Margins are still counted from "0" instead of from "1".
- o Print Form will change from Open-Apple "." to Open-Apple "2".

### New features of Word Juggler 2.8

- o Print to Disk option - Allows incorporation of Word Juggler files with

## APPLE II COMPUTER TECHNICAL INFORMATION

other program applications including terminal communications while retaining the original format of the document. This feature may be accessed by pressing Closed-Apple "9".

- o Built in Terminal Program - A scaled down telecommunication package based on Quark's TERMINUS program. This option is able to transmit and receive documents with as much ease as you would expect from a true telecommunications product. It will not, however, support any of TERMINUS' advanced transmission modes such as binary or compressed options.

The package allows you to define 4 Protocols, as opposed to Terminus' 16 Protocols. Furthermore, the Protocols support only two macros each, (the autodial and logon macros) while Terminus' Protocols can support up to 28 user-definable macros each.

NOTE: Apple Computer Inc. is not responsible for the contents of this article.

Quark Technical Support

Keywords:

### END OF FILE A2TIL269.TXT

#####  
### FILE: A2TIL270.TXT  
#####

Description: Color Plotter Model 410: Specifications (Discontinued)  
Header: Color Plotter Model 410: Specifications (Discontinued)

I. Technical Specifications

1. Pens:

- a. Maximum active: 4 in head, software selectable
- b. Tips:
  - 1. Porous plastic for paper
  - 2. Fiber for transparency
- c. 8 colors: black, red, green, blue, violet, orange, gold, brown
- d. Liquid ink
- e. Velocity:
  - 1. Each axis: Pen up or down, max. 10 cm/sec (3.94 in./sec)
  - 2. Programmable: 1 to 10 cm/sec in 1 cm/sec increments
  - 3. Both axes driven to 45 degree line: Max. 14.12 cm/sec (5.56 in./sec)

2. Plot:

- a. Maximum: X axis: 391.8 mm (15.4 in.); Y axis: 257 mm (10.1)
- b. Minimum width: 115 mm (4.6 in.)
- c. Resolution: Smallest addressible step size: 0.1 mm (0.004 in.)
- d. Repeatability:
  - 1. With one pen: 0.2 mm (0.008 in.)
  - 2. Between pens: 0.4 mm (0.016 in.)
- e. Method: X-axis paper motion with Y-axis pen motion
- f. Driving method: Stepper motors
- g. Relative position accuracy: + 1% + 0.3 mm

3. Media:

- a. Paper or Apple Plotter Transparency Film
- b. 9 software-selectable sizes:
  - a. Vertical
    - Inches
      - 1. 8.5 x 11 ANSI Size A
      - 2. 11 x 17 ANSI Size B
    - Millimeters
      - 3. 297 x 420 DIN/JIS A3
      - 4. 210 x 297 DIN/JIS A4
      - 5. 250 x 353 DIN/JIS B4
      - 6. 176 x 250 DIN/JIS B5
  - b. Horizontal
    - Inches
      - 1. 11 x 8.5 ANSI Size A
    - Millimeters

# APPLE II COMPUTER TECHNICAL INFORMATION

2. 297 x 210 DIN/JIS A4
3. 250 x 176 DIN/JIS B5

## c. Thickness:

mm in.

1. Maximum: 0.05 0.002
2. Minimum: 0.8 0.031

## 4. Seven Language font sets

- a. English (U.S.)
- b. English (U.K.)
- c. German
- d. French
- e. Italian
- f. Swedish
- g. Spanish

## 5. Front panel controls:

- a. Operate/Free (LED and switch)
- b. Remote/Local (LED and switch)
- c. Pen Select (switch - local mode only)
- d. Pen Up/Down (switch - local mode only)
- e. Pen Movement (switches - up, down, left, right)
- f. Clear (switch - Free mode only)
- g. Self test (switch - Free mode only)

## 6. Power requirements:

- a. 103.5-126.5 V 57-63 Hz
- b. 200-250 V 48-52 Hz
- 33 watts maximum consumption

## 7. Interface:

- a. RS-232C asynchronous serial ASCII
- b. Hardware handshaking
- c. Switch-selectable baud rates:  
75, 150, 300, 600, 1200, 4800, or 9600
- d. Data format: 7 or 8 bit (switch selectable)
- e. Stop Bit: None, 1 1.5 or 2 (switch selectable)
- f. Parity: None, odd, or even

## 8. FCC Certification: Class B computing device

## 9. Physical

mm in.

Height: 122 4.8

## APPLE II COMPUTER TECHNICAL INFORMATION

Width: 412 16.2  
Depth: 300 11.8

kg lb.

Net: 6 13.2  
Shipping: 10 22

### 10. Environmental requirements

#### a. Temperature

Degrees  
Fahrenheit Celsius

1. Operating: 41 to 104 5 to 40  
2. Storage: -4 to 149 -20 to 65

b. Humidity: 20 to 80% relative humidity at 40 degrees Celsius

### II. System Configuration

1. Computer: Apple II Plus, Apple IIe, Apple IIc, Apple III

#### a. For Apple II Plus and IIe:

--disk drive  
--Super Serial Card

2. Video display

3. Apple Business Graphics users must have a driver installed with  
a PIK (Printer Interface Kit) disk.

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Keywords: SPECSHT

### END OF FILE A2TIL270.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL271.TXT  
#####

Description: ColorMonitor IIc, ColorMonitor IIe: Specs (Discontinued)  
Header: ColorMonitor IIc, ColorMonitor IIe: Specs (Discontinued)

I. Technical Specifications

A. Picture Tube

- 1. 14-inch diagonal (13 inch view)
- 2. Dot pitch: 0.52mm
- 3. High contrast (black matrix)

B. Input Signal:

- 1. Composite (NTSC) only
- 2. Synchronous negative
  - 1.0 +/- 0.5-volts peak to peak
  - internally terminated with 75 ohm resistor.
- 3. Input connector: RCA (phono) jack

C. User Controls:

- 1. Front:
  - Power switch
  - High resolution (white only) button
  - Brightness
  - Contrast
  - Color (hue intensity)
  - Tint
- 2. Rear:
  - Vertical size
  - Vertical hold
  - Horizontal hold
- 3. Side: Power switch of ColorMonitor IIc

D. Scanning Frequencies

	Horizontal Scan	Vertical Scan
1. NTSC/60	15.734 kHz	60 Hz
2. NTSC/50-PAL/50	15.659 kHz	50 Hz

E. Color Reference Frequency

- 1. NTSC/60 Hz: 3.579545 MHz
- 2. NTSC/50 Hz: 3.562456 MHz
- 3. PAL/50 Hz: 4.433618 MHz

F. Video Bandwidth

	Text Video (Monochrome)	Graphics Video (Color)
1. NTSC	8.0 MHz	3.0 MHz
2. PAL	8.0 MHz	3.8 MHz

G. Physical Dimensions:

- 1. Weight: 27.56 lbs (12.5kg) maximum
- |         |             |
|---------|-------------|
| inches  | centimeters |
| IIe/IIc | IIe/IIc     |

# APPLE II COMPUTER TECHNICAL INFORMATION

- 2. Width: 14.4/13.4 36.7/34.0
- 3. Height: 12.4 31.5
- 4. Depth: 14.4 36.5

## H. Power Consumption:

- 1. 50 watts normal at 120VAC
- 2. 75 watts maximum
- 3. Fuse Protection:
  - The monitor contains internal power line fuse protection. This fuse should be replaced with the same type by a qualified service technician.

## I. Input Voltage

	Model	Operating Range	Power	Frequency
1.	120v	108-132		50-60 Hz
2.	220v	198-242		50-60 Hz
3.	240v	216-264		50-60 Hz

NOTE: Input voltage is not adjustable within the monitor.

## J. Environment:

	Degrees	
	Fahrenheit	Celsius
1. Operating:	41 to 86	5 to 30
2. Storage:	-31 to 140	-35 to 60

## II. System Configuration

### A. ColorMonitor IIe:

- 1. Apple II
- 2. Apple II Plus
- 3. Apple IIe

### B. ColorMonitor IIc: Apple IIc

Copyright 1989 Apple Computer, Inc.  
Keywords: SPECSHT

### END OF FILE A2TIL271.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL272.TXT  
#####
```

Description: COMMAND.COM: A General Description  
Header: COMMAND.COM: A General Description

This article last reviewed: 9/1/87

COMMAND.COM is a command interpreter for the ProDOS operating system. When used in place of BASIC.SYSTEM, it gives an Enhanced Apple IIe, Apple IIc, or Apple IIgs some of the power of the MS-DOS operating system.

- You can refer to disks by simple abbreviations such as A: or B:, rather than having to use ProDOS pathnames (you can still use pathnames if you prefer).
- You can run application software by simply typing the name of the program, without using RUN, BRUN, or "-" (you can still use "-" if you like). To change directories (setting the PREFIX under BASIC.SYSTEM), you can type PREFIX pathname, PRE pathname, CHDIR pathname, CD pathname, or just the pathname.
- COMMAND.COM adds the MS-DOS pathing concept to ProDOS. A path is the name of a directory that COMMAND.COM will search when you type the command to run a file. Normally, only the PREFIX directory is searched, but with COMMAND.COM, you can specify up to four additional directories. This allows you to run programs stored on other directories, such as a general utility directory.

COMMAND.COM lets you set up four environments: CP/M, MS-DOS, ProDOS, and UNIX. You can configure for the environment that you are most comfortable with.

COMMAND.COM includes 100 commands. Some are internal, such as the DELETE and COPY commands. Others are external files that are read in from disk before execution. COMMAND.COM, like MS-DOS allows a virtually unlimited number of commands stored as files on disk.

You can use wild cards with commands: for example, typing Copy \* B: would copy all files on the current directory to disk B:. You don't need to know the name of the current disk or the disk to be copied to; COMMAND.COM handles that automatically.

COMMAND.COM supports both I/O re-direction and piping. I/O re-direction sends the output of a command to a device other than the one normally used. The TYPE command normally displays the contents of a text file on the screen. With I/O re-direction, the text could be sent to a printer or to another file.

Piping is used to make the output of one command the input to another. For example, the CATALOG command could 'pipe' the catalog of disk files to the SORT command, which would alphabetize the catalog before displaying it.

COMMAND.COM even lets you create commands that don't exist in your operating system -- for example, a command that MOVES a file from one location to another: not just copying it, but also deleting the original. The MOVE command would be created by combining the COPY, UNLOCK, and DELETE commands. Variables can also be used to assign short (one or two character) names that when typed will run an application program. An example might be typing AW to prefix to the AppleWorks directory and run the file APLWORKS.SYSTEM.

COMMAND.COM includes the following commands:

- Convert any type of file, including AppleWorks Word Processor files,

## APPLE II COMPUTER TECHNICAL INFORMATION

into plain text files.

- Search all directories on a 3.5" disk or hard disk for any file.
- Display all files on a specific disk.
- Search and replace in a variety of formats.
- A picture display command that automatically recognizes all Apple II picture types, including GS pictures.

COMMAND.COM. also supports MS-DOS-style BATCH files. BATCH files are the perfect solution for handling many complex tasks easily and automatically. Running a system application does not effect the BATCH file. One example cited in the manual: a BATCH file can be used to run an application and track elapsed time. At the end of the month, the user can print the text file created by this BATCH file to generate billing information for work done for clients.

COMMAND.COM also includes a full-featured line-oriented text editor.

COMMAND.COM will be available in September 1987 from PinPoint Publishing.  
Copyright Apple Computer, Inc. 1987  
Keywords: specsht

### END OF FILE A2TIL272.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL273.TXT  
#####
```

Description: Communications Interface: Directly controlling the 6850 ACIA  
Header: Communications Interface: Directly controlling the 6850 ACIA

This applies to the Apple II, II+, and IIe.

The Communications Interface Card uses an ACIA (Asynchronous Communications Interface Adapter) to automatically perform the serial transfers with an external device. The ACIA contains 4 registers that control data flow between the Apple and the external device. There are two pairs of registers and each pair has a single address in the Apple. In the following discussion, all addresses will be calculated for slot 2. The addresses can be converted to another slot with the following formula.

$$\text{New Address} = \text{Old Address} + (\text{New Slot} - 2) * 16$$

So, \$C0AE in slot 2 becomes \$C09E for slot 1.

The status/control register is at \$C0AE. Reading from \$C0AE yields the status of the ACIA, and writing to \$C0AE modifies the Operation of the ACIA (baud rate, data bits, stop bits, parity). The tables below are a summary of what the registers control. Refer to the Motorola Semiconductors Data Sheet for the MC6850 for complete details.

## READ FROM STATUS REGISTER (\$C0AE)

- 0 Receive Data Register Full
- 1 Transmit Data Register Empty
- 2 -Data Carrier Detect
- 3 -Clear to Send
- 4 Framing Error
- 5 Receiver Overrun
- 6 Parity Error
- 7 Interrupt Request

## WRITE TO CONTROL REGISTER (\$C0AE)

### 0-1 Baud Rate

- 0 - Unstable at about 1200 baud
- 1 - 300 baud
- 2 - 110 baud
- 3 - Reset the ACIA

### 2-4 Word Control Bits

- 0 - 7 bits + Even Parity + 2 Stop Bits
- 1 - 7 bits + Odd Parity + 2 Stop Bits
- 2 - 7 bits + Even Parity + 1 Stop Bit
- 3 - 7 bits + Odd Parity + 1 Stop Bit
- 4 - 8 bits + 2 Stop Bits
- 5 - 8 bits + 1 Stop Bit
- 6 - 8 bits + Even Parity + 1 Stop Bits
- 7 - 8 bits + Odd Parity + 1 Stop Bits

### 5-6 Transmitter Control Bits

- 0 - -RTS = low, Transmitting Interrupt Disabled
- 1 - -RTS = low, Transmitting Interrupt Enabled
- 2 - -RTS = high, Transmitting Interrupt Disabled
- 3 - -RTS = low, Transmits a Break level on the Transmit Data Output.  
Transmitting Interrupt Disabled

## APPLE II COMPUTER TECHNICAL INFORMATION

- 7 Receive Interrupt Enable Bit
- 0 - No interrupts from receiver section of ACIA
  - 1 - Interrupt on:
    - Receive Data Register Full,
    - Overflow, or
    - A low to high transition on Data Carrier Detect

The data register is located at \$COAF. A read from \$COAF yields the data that has been received from the external device. A write to \$COAF buffers the data and initiates its transmission. Writing or reading to the data register automatically resets the ACIA status.

An Apple II will lose data whenever it is forced to ignore the Communications Interface to either process the incoming data or write it to an I/O device like a disk drive or printer.

This problem is solved by buffering the incoming data. You can do this by:

- 1) Requesting fixed size blocks of data from the remote machine - Reading in all of one block and processing it before requesting the next one.
- 2) Writing a program to control the data flow from the remote device with XON (control S) and XOFF (control Q). The strategy is to receive data until the program's memory buffer is almost full and transmit an XOFF to halt the data flow. Process the data and transmit an XON to resume the transfer. Not all external devices understand XON/XOFF handshaking. Be sure to check your device.

When attempting to use a remote terminal from Applesoft, the output appear on one line of the terminal's screen. To avoid this problem, use the Communications Card Print routine on page 28 of the Communications Interface Card manual. If you are using DOS 3.2 or later you must modify this routine with a POKE 845,110 before saving it to disk.

Modifying the default parameter settings on the Communications card is described on page 27 of the Communications Interface Manual. But please note that the PR#s and IN#s commands do not initialize the interface, they only reset the I/O vectors. It's the first character through the interface that loads the default parameters. So be sure to PRINT or INPUT at least one character before doing the POKES.

Apple Tech Notes

Keywords:

### END OF FILE A2TIL273.TXT

#####  
### FILE: A2TIL274.TXT  
#####

Description: Daisy Wheel Printer: Specifications (Discontinued)  
Header: Daisy Wheel Printer: Specifications (Discontinued)

Article Created: 20 February 1986

I. Technical Specifications

- A. Print Speed: 40 characters per second (average)
- B. Interface: Asynchronous Serial (RS-232C) OCITT-V-24
- C. Forms: Single sheet or continuous forms
  - Maximum width: 15 inches (38.1 cm)
- D. Fonts: 130-character "daisy" print wheels in various alphanumeric type styles, including: Courier 10 pitch, Prestige Elite 12 pitch, Gothic 15 pitch, and Executive/Boldface in English, French, German, and many other languages.
- E. Character Spacing in characters per inch (CPI):
  - 1. 10
  - 2. 12
  - 3. 15
  - 4. Proportional spacing
  - Maximum 198 characters per line
- F. Command set:
  - ASCII
  - space, backspace, carriage return, line feed, horizontal tab, form feed, end-of-text, acknowledge, XON/XOFF
- G. Special Mode Commands:
  - Graphics mode, forward and backward print mode, program mode for hammer intensity and ribbon movement
- H. Weight and Dimensions:

	pounds	kilograms
1. Weight:	37.0	16.8
	inches	centimeters
2. Width:	23.22	59.0
3. Height:	6.87	17.5
4. Depth:	14.84	37.7

II. System Configuration

- A. Lisa system
- B. Apple III system
- C. Apple IIe or Apple II Plus system
  - with Apple II Super Serial Interface Card installed

III. Features

A. Snap-in ribbon cartridge

B. Switch-selectable features:

- horizontal and vertical formatting
- forms length selection
- automatic form feed

Apple Technical Communications

Keywords: SPECSHT

### END OF FILE A2TIL274.TXT

#####  
### FILE: A2TIL275.TXT  
#####

Description: DAP (Drive Acceptance Program) Documentation  
Header: DAP (Drive Acceptance Program) Documentation

This article last reviewed: 15 December, 1987

NOTE: The DAP (Drive Acceptance Program) is an obsolete diagnostic. It has been replaced with the Apple 5.25 Inch Drive Diagnostic. Refer to the Disk Drives Technical Procedures for complete information on the current Apple 5.25 Inch Drive Diagnostic.

The following article describes how the DAP works and what it is designed to do. For a description of how to run the DAP test or what to replace if a failure occurs, search on "HTS and GTS and the disk drive product name".

TEST SEQUENCE AND DESCRIPTION

1. WRITE PROTECT TEST (the digit 1 appears above the selected drive) -

When the right arrow key is detected, several things happen on the screen. The diskette icon is erased, the drive door icon flashes to a closed position, and the IN.USE lamp icon lights as the first test begins. The digit "1" appears above the drive to indicate the test step.

The write protect test reads and saves a copy of sector 5 on track 16 of the test diskette. This helps prevent accidental data loss if the wrong diskette is accidentally inserted. The write-protect test does not bother with the write-protect switch since this may differ in various drives and controllers. Rather, it attempts to write a sector and then reads the sector back. If the read detects the data pattern written, the drive is failed in step one. In the case of failure (i.e. the write is successful) the original sector is re-written to the diskette. If writing does occur, the big "X" fail sign is overlayed on the drive image. This same indication is used for failure of any of the remaining tests.

2. WRITE AND READ TEST -

A. SPEED (The digit 2 appears): The first write test makes 16 D-SPEED passes over track 30. The test is self-adjusting, allowing a variance of +- 26 WOZ counts for Apple II+, IIe and IIc systems, and +- 10 WOZ counts for the Apple III in emulation mode. (If the test fails at the beginning of the test, the drive circuitry may be unable to read/write.)

B. WRITE AND VERIFY TRACKS 31,32,33 (The digit 3 appears): The write test writes patterns to all sectors of tracks 31,32,33 and then attempts to read the track. After each read it compares the read data pattern to the pattern written to verify a good write and read.

3. DYSAN DDD DISKETTE TESTS -

A. SPIN ECCENTRICITY (spindle wobble, collet problems; displays digit 4): Tests tracks 21 and 24. An even amount of error has been encoded on each of these DDD tracks. A properly centered head should read each sector with equal ease or difficulty. Irregularity here generally indicates collet problems or possibly spindle wobble. The program allows for some errors. If the test shows more failures than the limit allows, the user will be prompted to re-insert the DDD. On Disk II and Disk III drives it is best if the DDD is "double clamped". Failure here can also indicate excess noise

## APPLE II COMPUTER TECHNICAL INFORMATION

from nearby equipment or a worn DDD diskette.

B. RADIAL ALIGNMENT (head properly centers on track; displays digit 5): This test reads tracks 0, 5, 16, 19, 30 and 32. Each of these tracks has been encoded with errors which are progressively further from the center track (by one mil) with each sector. A properly aligned drive will have a diminishing ability to read sectors and a perfectly positioned head will be unable to read the sectors furthest away from the center of the track. (Since the Digital Diagnostic Diskette checks alignment at six locations, it is possible that the error will not be detected with the Disk Alignment Aid.)

C. HYSTERISIS (physical slope in arm motion; displays digit 6): This test calibrates the drive, reads tracks 5 and 30, goes to track 34 and then reads tracks 30 and 5. A properly adjusted and functioning drive will not develop more than +- 2 mils of error on reads when the head moves from the opposite direction. Errors discovered here are due to physical slop or wear in the hardware. Failure of this test can often indicate that the guide rails need cleaning.

D. AZIMUTH (ability of head to detect data with 21-42 minutes of error in the angle of data placement; displays digit 7): This test calibrates and moves to track 34. This track has been encoded with data written with angular error which alternates direction with each sector and increases from 21 to 42 minutes of error. The inability to read this data indicates a faulty head. In most cases all sectors are read easily by the heads in Apple drives. Copyright 1988 Apple Computer, Inc.  
Keywords: hts

### END OF FILE A2TIL275.TXT

#####  
### FILE: A2TIL276.TXT  
#####

Description: DART 1.5.3: Version Change History (12/94)  
Header: DART 1.5.3: Version Change History (12/94)

Article Created: 18 March 1993  
Article Reviewed/Updated: 23 December 1994

TOPIC -----

This article details the version change history for last three versions of DART, as well to where to locate a copy of DART.

DISCUSSION -----

What Is DART?  
-----

DART (Disk Archive/Retrieval Tool) is an application that enables you to duplicate Macintosh, Lisa, Apple II, or MS-DOS disks, save disk images, and create disks from image files. DART 1.5 can read disk image files in DART, DiskMaker, or Disk Copy format. DART 1.5 image files are compressed, approaching a reduction in size comparable to that obtained by using a commercial compression utility. DART 1.5 is System 7.0 "savvy", and implements a custom Apple event mechanism to automate the conversion of older DART or Disk Copy files to 1.5 format. The conversion process can be run by "remote control" (even across a network!) using the accompanying HyperCard stack. (For more information, please refer to the DART User Manual.)

What's New in version 1.5.3  
-----

- \* Compatibility with Centris 660AV, Quadra 660AV, and Quadra 840AV.
- \* Compatibility with Apple Event Manager 1.0.1 (a component of AppleScript).

Note: A -64 error occurs launching DART 1.5.3 on a Power Macintosh, but if you click OK, DART continues and everything works as expected.

What's New in version 1.5.2  
-----

- \* Compatibility with new Macintosh Quadra 800 and Centris machines.
- \* Under certain circumstances, it was possible for DART to open a corrupted Disk Copy file and create an identically corrupted disk (or image file) from it. Checksums on source disk images are now verified correctly, and DART will always display a warning message if the expected and actual checksum values don't match. (Note that while a damaged Disk Copy file can no longer be converted to DART format, it's still possible to make a disk from it and potentially salvage the data on that disk.)
- \* Fixed a minor (but annoying) display glitch in "Multiple Copies" mode where a portion of the Status message would sometimes be "hidden" underneath the progress bar.

What's New in version 1.5.1  
-----

- \* Compatibility with A/UX 3.0.
- \* Under System 7, you can now drop a floppy disk onto DART to create an image file.
- \* The default filename in Save dialogs is now filled in with the volume

## APPLE II COMPUTER TECHNICAL INFORMATION

name of the source disk (if a source has been selected.)

- \* Volumes can now be mounted in the Finder when DART is running in the background.
- \* Fixed a bug which could occasionally cause a bus error on certain machines. The error would occur either immediately on launch, or after the about box was dismissed.
- \* Fixed a bug which could cause DART to refuse to format a blank 1.4M floppy disk (or a 1.4M floppy formatted as 800K) when "Format Disk" was checked.

### Where To Locate DART

-----

These articles can help you locate the software update mentioned here:

- \* "Where To Find Apple Software Updates"  
Lists online services for "free" Apple software updates.
- \* "Obtaining Apple Product Support in the USA"  
Lists 800 numbers and online services for software updates, Apple support information, and a subset of the Apple Tech. Info. Library.

### Article Change History:

23 Dec 1994 - Added Power Macintosh note.  
27 Sep 1994 - Reviewed.  
06 Oct 1993 - Updated with info on DART 1.5.3, and revised title.

### Support Information Services

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Keywords: ksts

### END OF FILE A2TIL276.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL277.TXT  
#####

Description: DART: Utility for Duplicating Floppy Disks (10/93)  
Header: DART: Utility for Duplicating Floppy Disks (10/93)

Article Created: 13 August 1991  
Article Reviewed/Updated: 6 October 1993

TOPIC-----

Is there a Macintosh utility program for duplicating Macintosh, Lisa, Apple II or MS-DOS 3.5-inch floppy disks?

DISCUSSION -----

DART (Disk Archive/Retrieval Tool) is an application that enables you to duplicate Macintosh, Lisa, Apple II, or MS-DOS disks, save disk images, and create disks from image files. DART 1.5 can read disk image files in DART, DiskMaker, or Disk Copy format. DART 1.5 image files are compressed, approaching a reduction in size comparable to that obtained by using a commercial compression utility. DART 1.5 is System 7.0 "savvy", and implements a custom Apple event mechanism to automate the conversion of older DART or Disk Copy files to 1.5 format. The conversion process can be run by "remote control" (even across a network!) using an accompanying HyperCard stack. (For more information, please refer to the DART User Manual.)

Features of DART 1.5  
-----

- \* Data compression: more disk images can be archived in the same amount of space.
- \* Data checksumming for reliable disk duplication.
- \* Can read Disk Copy image files.
- \* Requires only 224K of RAM to run.
- \* Stack utility enables you to batch-convert DART 1.4 or Disk Copy files.
- \* Apple events support ("required" AE suite and custom 'cnvt' event.)
- \* System 7 "drag-and-drop" disk image creation.
- \* 32-bit clean.
- \* A/UX compatible.
- \* Color icons and balloon help.

Where to Obtain DART  
-----

The current version of DART may be downloaded from two locations on AppleLink:

1) The Apple SW Updates board. Use the following AppleLink path:

Software Sampler  
  Apple SW Updates  
    Macintosh  
      Utilities

2) On the AppleLink version of the Tech Info Library, posted as an enclosure to the article: "DART 1.5.3: Version Change History (10/93)"

Article Change History:

6 October 1993 - Added new description and features information.  
Copyright 1991-1993, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL277.TXT

#####  
### FILE: A2TIL278.TXT  
#####

Description: Disk II: Specifications (Discontinued)  
Header: Disk II: Specifications (Discontinued)

This article last reviewed: 16 August 1985

I. Technical Specifications

A. Format

1. Sectoring: Soft (hard-sectored disks may be used)
2. Recording Surfaces: 1
3. Tracks per surface: 35
4. Sectors per track: 16
5. Bytes per sector: 256

B. Capacity

1. Formatted data capacity: 140K
  - a. 16 sector
  - b. Under: Pascal, DOS 3.3, and ProDOS
2. Available data capacity:
  - a. 16 sector
  - b. 137K under Pascal
  - c. 124K under DOS 3.3 and ProDOS

C. Characteristics

1. Head movement time:
  - a. 25 milliseconds track to track
  - b. 600 milliseconds across all tracks
2. Head load time: 50 milliseconds
3. Average rotational delay: 100 milliseconds

D. Packaging

1. Controller: Printed circuit board that plugs into one of the expansion slots.
  - a. Drives per controller: 2
2. Drive dimensions:

	inches	centimeters
a. Height:	3.25	8.3
b. Width:	5.75	14.6
d. Depth:	8.0	20.3
	pounds	kilograms
e. Weight:	3.0	1.36
3. Power source for drives: Apple system power supply

II. System Configuration

A. Apple II, II Plus, IIe, or Enhanced IIe

# APPLE II COMPUTER TECHNICAL INFORMATION

1. Recommended minimum memory: 32K

2. Controller card

Copyright 1988 Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL278.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL279.TXT  
#####
```

Description: DOS 3.3 6502 editor assembler: PR slot command  
Header: DOS 3.3 6502 editor assembler: PR slot command

There is a .PR# slot# command in the DOS 3.3 6502 editor assembler of the DOS tool kit. If you use this command you get not a file listing, but a dump of the buffer that starts with data entered by the user or LOAded from a text file. After this part of the buffer has been printed, the dump continues with the garbage in the buffer beyond the last intelligible character to the end of the allowable buffer. This produces numerous @ signs or other characters depending on the contents of buffer memory after power-up and is a normal part of a Print or List of the assembly program to a printer using .PR# slot# from the editor.

Try it yourself.

1. Boot the DOS 3.3 6502 editor/assembler
2. LOAD a large source code file
3. List it to see what it looks like
4. Type NEW to clear the buffer
5. LOAD a smaller source code file
6. Type .PR#1 to send the DOS command to activate the printer
7. Type L to list the buffer to the printer

Notice that the last part of the first file follows the last line of the second file. Also notice that such a listing does not match the screen output when using the List or Print commands but instead follows the input format.

To obtain a listing with the same format as displayed on the screen using Print or List commands you must append ',@' to the ASM command. This assembles the file without generating an OBJect code file (see page 56 of the editor/assembler manual). To speed this process when using an Imagewriter and Super Serial Card on an Apple II+ or Apple IIe, do the following.

1. Set the Imagewriter print style to ultracondensed (17cpi)
2. Set the baud rate of printer and card to 9600
3. Send the output of the assembly to the printer using PR#

Notice that there is no period (.) preceeding the PR# command in this case. This is because you are not using the DOS command version but rather the editor/assembler PR# command. See the editor/assembler manual for the format of the PR# command on page 60 and a discussion on pages 60 and 61.

With an Imagewriter at 9600 baud, the above three steps reduce the listing time by 41% when comparing the default type style to the ultracondensed style.

Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL279.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL280.TXT  
#####
```

Description: DOS 3.3: INTBASIC and FPBASIC on the master diskette  
Header: DOS 3.3: INTBASIC and FPBASIC on the master diskette

The INTBASIC and FPBASIC files on the master diskette load automatically into your Language Card if you have one. Since these files are written to operate specifically in the memory space of the Language Card, they don't work anywhere else.

To use Applesoft with your Apple II (which has Integer BASIC built in), you need either the Applesoft Firmware Card or the Language Card installed into your system.

Apple II+s have Applesoft built in; therefore, your system needs the Integer BASIC firmware card or a language card to use Integer BASIC.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL280.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
 ### FILE: A2TIL281.TXT  
 #####

Description: Dot Matrix Printer (DMP): Printer codes  
 Header: Dot Matrix Printer (DMP): Printer codes

The following are the printer codes used by the Apple Dot Matrix Printer (DMP).

Ascii	Hex	Decimal	Resulting Printer Action
-----	---	-----	-----
Esc n	1B 6E	27 110	9 Characters Per Inch (cpi)
Esc N	1B 4E	27 78	10 cpi
Esc E	1B 45	27 69	12 cpi
Esc q	1B 71	27 113	15 cpi
Esc Q	1B 51	27 81	17 cpi
Esc P	1B 50	27 80	Proportional-1
Esc p	1B 70	27 112	Proportional-2
Esc A	1B 41	27 65	6 Lines per inch (1/6-inch Line Feed)
Esc B	1B 42	27 66	8 Lines per inch (1/8-inch Line Feed)
DC1	11	17	Select printer (online)
DC3	13	19	Deselect printer (offline)
Esc >	1B 3E	27 62	UniDirectional print
Esc <	1B 3C	27 60	Bidirectional print
Esc !	1B 21	27 33	Bold print
Esc "	1B 22	27 34	Deselect Bold print
SO	0E	14	Select Elongated characters (Headline mode)
SI	0F	15	Deselect Elongated characters
Esc X	1B 58	27 88	Start Underline
Esc Y	1B 59	27 89	Stop underline

For additional information or information on graphics, please see the Apple Dot Matrix Printer manual, Apple service part number 030-0607, and see the media exchange listing for price.

Apple II Keystrokes:

- DC1: Control-Q
  - DC3: Control-S
  - SO: Control-N
  - SI: Control-O
  - Esc: Escape key
- Apple Technical Communications

APPLE II COMPUTER TECHNICAL INFORMATION

Keywords:

### END OF FILE A2TIL281.TXT

#####  
 ### FILE: A2TIL282.TXT  
 #####

Description: Double-Density Versus High-Density Disks  
 Header: Double-Density Versus High-Density Disks

Article Created: 25 May 89  
 Article Last Reviewed: 22 August 1991  
 Article Last Updated: 22 August 1991

TOPIC -----

This article gives the specifications for the 800K floppy disks and the 1.4MB floppy disks. It also describes why you should not drill a hole in a double-density disk and format it as a high-density disk.

DISCUSSION -----

The table below compares the formatted capacity of the different media:

	800K Disk 1600 sectors -----	1.4MB Disk 2880 sectors -----
Bytes/Sector	512	512
Sectors/Track	8-12	18
Tracks/Side	80	80
Bytes/Side	409,600	737,280
Bytes/Disk	819,200	1,474,560

The Apple SuperDrive (formerly Apple FDHD) can read and write to any of the major 3.5-inch disk formats, including Macintosh (GCR 400K, 800K, and MFM 1.44MB), Apple II (800K), and MS-DOS and OS/2 (MFM 720 and 1.44MB). GCR stands for "Group Code Recording" and MFM stands for "Modified Frequency Modulation".

When the SuperDrive writes 400K/800K disks in GCR mode, the motor speed is variable, and the disk surface is divided into five zones to allow a constant recording density as the head moves from the outer edge to the center. When using high-density media, data is written in MFM mode, and the drive speed is constant for each track.

The table that follows compares the speed of the different disk structures:

Tracks -----	800K Disk -----	1.4MB Disk -----
00-15	394/12	300/18
16-31	429/11	300/18
32-47	472/10	300/18
48-63	525/9	300/18
64-79	590/8	300/18

Revolutions Per Minute/Sectors Per Track

GCR and MFM only affect how the data is written to the disk. GCR and MFM do not care how the tracks and sectors are laid out on the disk. They also have no effect on the directory structure. GCR and MFM deal with how the bits are recorded on the surface of the media.

The MFM Method  
 -----

MFM was originally recommended by Shugart Associates for double-density, floppy drives and was used in a small number of systems. IBM was the first major vendor to use MFM, and now Apple also provides MFM support for the

## APPLE II COMPUTER TECHNICAL INFORMATION

Apple SuperDrive. MFM uses a transition pulse to write data to drive media. There are two locations for the transition pulse: the data boundary or the cell boundary. A transition occurs at a cell boundary only when two zero bits occur next to each other. This encoding method guarantees that no more than two-bit cells can occur without a transition and is, thus, self-clocking.

### The GCR Method

-----  
GCR is a method that Apple has used to record information since the Apple II Disk Controller. Each group of four bits is translated into a 5-bit code (the Run-Length code). A translation table is used to find this 5-bit code. This 5-bit code seems to increase data bits by 20%. However, the 5-bit codes never contain more than two consecutive zeros, and GCR writes the data in NRZI format. When a 1 occurs in the data stream, a transition occurs on the data boundary. Thus, GCR is guaranteed to be self-clocking. You also save the cell boundary transitions required for MFM. Thus, GCR is more efficient than MFM and is widely used in high-density disks and tape recordings. The disadvantage of GCR is the relatively high complexity of the encoding and decoding logic.

### High-Density vs Double-Density Disks

-----  
High-density disks are physically different and tested to a different specification than double-density disks. In this case, high-density disks are of higher quality than double-density disks. The high-density disks have a special, thin, recording surface that allows the higher data rates used in MFM. The 800K or 400K disk may not be sensitive enough to properly pick up and align the magnetic particles when the SuperDrive writes in MFM. This could cause corruption of the stored data and may result in errors. Thus, it is unreliable, unsupported, and not suggested.  
Copyright 1990, 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL282.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL283.TXT  
#####

Description: Dow Jones News & Quotes Reporter: Specifications  
Header: Dow Jones News & Quotes Reporter: Specifications

Order #: A2D0030

--Technical Specifications

- Format: 16-sector disks.
- Language: Written in Pascal.
- Dow Jones Access: Minimum 15-minute tape delay; exchanges include NYSE, AMEX, Midwest, Pacific, Composite, and OTC NASDAQ.
- Dow Jones Toll-Free Information: (800) 257-5114; in New Jersey, call (609) 452-1511.

--Package

1. Dow Jones News & Quotes Reporter master disk;
2. Dow Jones News & Quotes Reporter backup disk;
3. instruction manual;
4. Dow Jones News/Retrieval operating guide and symbol directory.
5. Dow Jones News/Retrieval contract and password information sheet.
6. One free hour of connect time, to be used during nonprime-time hours, within 30 days of the date of purchase of the Dow Jones News & Quotes Reporter package.

--System Configuration

1. Apple II or Apple II Plus, with a minimum of 48K of memory, or Apple IIe
2. disk drive, such as Apple Disk II
3. video display device, such as Monitor II
4. a recommended modem, either a D.C. Hayes MicroModem or a Novation Apple Cat modem  
NOTE: The Apple modems, in conjunction with the Super Serial Card, will not support the Auto-dial necessary for the Auto-Log-on feature of the Dow Jones Reporter. One of the recommended modems must be used for this feature.
5. standard working telephone;
6. printer with appropriate interface card (optional).

NOTE: This product is no longer supported by Apple Computer, Inc.  
Apple Technical Communications

Keywords: SPECSHT

### END OF FILE A2TIL283.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL284.TXT  
#####

Description: DuoDisk Problem/Cure: Copy Protected Disk Damaged During Boot  
Header: DuoDisk Problem/Cure: Copy Protected Disk Damaged During Boot

This article last reviewed: 24 February 1988

PROBLEM DESCRIPTION: When inserting a copy protected application or game into the DuoDisk and starting up the Apple II, II+, or IIe system, the disk fails to boot. The disk may be damaged in the process.

CAUSE: If capacitors C29 and C30 are present on the analog PCB, they can allow unintentional writing to the disk. This problem can be triggered by certain copy protection schemes.

CURE: Clip off the capacitors C29 and C30 at locations B1 and A1 on the Duodisk Analog PCB.

If the above cure doesn't solve the problem, search on HTS and GTS and the product name to obtain the general troubleshooting procedure for the product.

Copyright 1988, Apple Computer, Inc.

Keywords: hts

### END OF FILE A2TIL284.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL285.TXT  
#####

Description: Educational Resources (5/93)  
Header: Educational Resources (5/93)

Article Created: 05/06/93  
Article Reviewed: 07/08/93  
Article Updated:

Educational Resources  
-----

1550 Executive Drive  
Elgin, IL 60123

800-624-2926

708-888-8499 Fax

Company Profile:  
Specializing in software and hardware for the Apple II.  
Copyright 1993, Apple Computer, Inc  
Keywords: 3PTY

### END OF FILE A2TIL285.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL286.TXT  
#####

Description: Electrical Specifications: Apple Peripherals (2 of 2) (9/96)  
Header: Electrical Specifications: Apple Peripherals (2 of 2) (9/96)

Article Created: 05 September 1996

TOPIC -----

This article provides the electrical specifications for Apple peripherals, including printers, monitors, scanners, drives, modems, and so on. For information about other Apple hardware, see the Tech Info Library article, "Electrical Specifications: Apple Computers (1 of 2)".

DISCUSSION -----

The following Apple products are manufactured for use in the USA. In determining whether a particular product can be used internationally, there are three classes, depending on whether a product accepts a range in voltage, frequency or both (for more specific information, see the article, "Using U.S. Apple Equipment Internationally"):

1) Universal  
-----

These products can be used internationally out of the box. Some of Apple's products are self-configuring devices or "universal" within a certain range. They can accept a range in both voltage and frequency, and only require a plug adapter for the specific locale.

Example: The Quadra 800 accepts between 100-125 and 200-240 volts, 47-63 Hz.

2) Frequency Independent  
-----

These products can be used internationally with a voltage transformer. Generally they are geared for U.S. 120 volt current, but are flexible as to the frequency they accept (for example, 47-63 Hz), and are known as "frequency independent." These products need a stepdown isolation transformer to adapt the voltage, and will handle the different frequency on their own.

Example: The U.S. Performa 200 accepts 120 volts, 47-63 Hz.

3) Frequency Dependent  
-----

These products generally cannot be used internationally. These are products that can work only within a narrow range in frequency; they are "frequency dependent." Transformers only transform voltage, so if the product requires a certain frequency, there's no practical way to convert both voltage and frequency.

These products can ONLY be used internationally in countries with the same frequency as the country for which the product was manufactured. Further, a voltage transformer will be required if the destination country has a voltage different from the home country.

Example: The U.S. Apple Color OneScanner accepts 108-132 volts, 58-62 Hz.

NOTE:

Computers with power outlets for peripherals do not condition the current as it passes through. So, for example, a monitor requiring 120v-60Hz current could not be used in a 220v-50Hz environment even if the computer from which it gets its power is able to accept the local current.

The AC output of a Macintosh II is as follows: the monitor receptacle is

## APPLE II COMPUTER TECHNICAL INFORMATION

rated for 3 amps steady state, 40 amps peak power. The power supply is fused for 6 amps to include the Macintosh II and monitor.

The amperage on the back of the computer is what should be used to calculate load on a circuit. Typical circuits in businesses and houses are 15 Amps (some are 20, but rarer, and an electric dryer is usually 30, an electric range may have DUAL 30 Amp circuits wired together). With that capacity, you could have the following configuration (from the back of the CPU):

```
CPU           5 Amps
Monitor       3 Amps
LaserWriter  7 Amps
Total:       15 Amps
```

Most of the time, the CPU will draw only 1-1.5 Amps, the Monitor about .5-1 Amp, and the LaserWriter about 2 Amps. The difference is sometimes referred to as Nominal (high) versus Actual draw.

These following values are accurate regardless of peripherals used with each device. For example, a Macintosh II with an EtherTalk NB Card, an 8-bit video card, and HD40 SC draws a maximum of 230 watts and 6 amps from the power outlet it is plugged into.

Begin\_Table

```
+=====+
|PRINTERS|
+=====+
```

LaserWriter Printers	Watts*	Amps**	BTU/hr**	Volts	Hertz
LaserWriter	760	6.3	2599.2	115	60
LaserWriter II	900	7.5	3078	90-126	50-60
LaserWriter IISC	900	7.5	3078	90-126	50-60
LaserWriter IINT/NTX	900	7.5	3078	90-126	50-60
LaserWriter IIg/IIf	900	7.5	3078	90-126	50-60
Personal LaserWriter SC	600	5	2052	110-115	50-60
Personal LaserWriter LS	600	5	2052	110-115	50-60
Personal LaserWriter NT	600	5	2052	110-115	50-60
Personal LaserWriter NTR	600	5	2052	110-115	50-60
Personal LaserWriter 300	360	3.00	1231	100-115	50-60
Personal LaserWriter 320	120	1.0	410.4	100-115	50-60
LaserWriter Pro 600	560	4.67	1915	90-110	58-62
LaserWriter Pro 630	560	4.67	1915	90-110	58-62
LaserWriter Pro 810	560	4.67	1915	90-110	58-62
LaserWriter Select 300	450	3.75	1539	110-115	50-60
LaserWriter Select 310	450	3.75	1539	110-115	50-60
LaserWriter Select 360	450	3.75	1539	110-115	50-60

APPLE II COMPUTER TECHNICAL INFORMATION

LaserWriter 4/600	450	3.75	1539	110-115	50-60
LaserWriter 16/600 PS	790	6.8	2701	100-120	58-62
Clr LaserWriter 12/600 PS	1100	9.2	3762	100-120	50-60

Other Printers	Watts*	Amps**	BTU/hr**	Volts	Hertz
Dot Matrix Printer	180	1.5	615.6	100-115	60
Daisy Wheel Printer	150	1.25	513	120	60
Color Plotter	33	.28	112.9	120	48-63
Scribe	60	.5	205.2	120	60
ImageWriter	180	1.5	615.6	120	60
ImageWriter II	180	1.5	615.6	120	60
ImageWriter LQ	180	1.5	615.6	120	60
StyleWriter	23	.19	78.7	110-120	48-62
StyleWriter II	19.5	.16	67	100-120	48-62
StyleWriter 1200	19.5	.16	67	100-120	48-62
StyleWriter 1500	19.5	.16	67	100-120	48-62
Portable StyleWriter	23	0.19	79	100-115	50-60
Color StyleWriter 2200	31.5	1.0	107	120	60
Color StyleWriter 2400	45	.38	154	100-120	50-60
Color StyleWriter 2500	45	.38	154	100-120	50-60
Color StyleWriter Pro	28	.23	95.8	90-132	50-60
Apple Color Printer	30	.25	103	120	60

=====  
|OTHER PERIPHERALS|  
=====

Disk Drives	Watts*	Amps**	BTU/hr**	Volts	Hertz
ProFile	120	1	410.4	110	50-60
Hard Disk 20	30	.25	102.6	85-125/ 200-240	47-64
Apple HD20/40/80/160 SC	30	.25	102.6	85-125/ 200-240	47-64
Apple External160/230/500	40	.33	136.8	85-125/ 200-240	47-64
HD40 SC Tape Backup	15	.125	51.3	85-125/ 200-240	47-64
AppleCD SC	40	.33	136.8	120	47-64

APPLE II COMPUTER TECHNICAL INFORMATION

AppleCD SC Plus	40	.33	136.8	100-125/ 200-240	50-60
AppleCD 150	30	.25	102.6	100-125/ 200-240	50-60
AppleCD 300	33	.28	112.9	100-125/ 200-240	50-60
AppleCD 600e	33	.28	112.9	100-125/ 200-240	50/60
Apple PowerCD	15	.125	51.3	100-125/ 200-240	50-60

Scanners	Watts*	Amps**	BTU/hr**	Volts	Hertz
Apple Scanner	65	.54	222.3	120	58-62
Apple OneScanner	45	.38	153.9	120	58-62
Apple Color OneScanner	45	.38	153.9	120	58-62

Modems	Watts*	Amps**	BTU/hr**	Volts	Hertz
AppleFax Modem	10	.08	34.2	120	60
Apple DataModem 2400	7	.06	23.9	110	60

+=====  
|MONITORS|  
+=====

Apple II Monitors	Watts*	Amps**	BTU/hr**	Volts	Hertz
Color Monitor 100	70	.58	239.4	117	50-60
Color Monitor IIe	48	.4	164.2	108-132	50-60
Color Monitor IIc	48	.4	164.2	108-132	50-60
Monitor II	45	.38	153.9	115	50-60
Monitor IIc	35	.29	119.7	115	50-60
Monitor III	30	.25	102.6	115	50-60
AppleColor RGB	90	.75	307.8	108-132	50-60
AppleColor Monitor	75	.6	256.5	108-132	50-60

Macintosh Monitors	Watts*	Amps**	BTU/hr**	Volts	Hertz
12-Inch Monochrome Display	30	.25	102.6	90-125/ 200-240	47-63
12-Inch RGB Display	90	.75	307.8	110	50-60
Performa Display	85	.71	290.7	100-125	57-63
Performa Plus Display	85	.71	290.7	100-125	57-63

APPLE II COMPUTER TECHNICAL INFORMATION

Apple Hi-Res Monochrome	40	.33	136.8	100-125/ 200-240	50-60
AppleColor Hi-Res RGB	160	1.3	547.2	85-125/ 200-240	47-63
14-Inch Color Display	55	.46	188.1	90-125/ 200-240	47-63
Portrait Display	75	.6	256.5	90-125/ 200-240	47-63
16-Inch Color Display	130	1.18	445	90-125/ 200-240	47-63
Two-Page Mono. Monitor	95	.8	324.9	90-125/ 200-240	47-63
21-Inch Color Display	165	1.38	564.3	120	47-63
Apple Basic Color Monitor	70	.58	240	100-125	50-60
AudioVision 14 Display (US)	55	.46	188.1	100-125	47-63
AudioVision 14 Display (INT)	101	.46	350.1	200-240	50
Apple Color Plus Display	70	.58	240	100-125	50-60
Multiple Scan 14 Dis. (US)	80	.66	273.6	100-125	57-63
Multiple Scan 14 Dis. (INT)	80	.33	1.14	200-240	43-53
Multiple Scan 15 Display	90	.75	307.8	100-125/ 200-240	47-63
Multiple Scan 17 Display	150	1.25	513	100-125/ 200-240	47-63
Multiple Scan 20 Display (Rev A)	180	1.38	615.6	100-125/ 200-240	47-63
Multiple Scan 20 Display (Rev B)	165	1.38	564.3	100-125/ 200-240	47-63
AppleVision 1710AV	130	1.8/	445	100-120/ 200-240	50-60
AppleVision 1710	130	1.8/	445	100-120/ 200-240	50-60
Multiple Scan 1705 Display	100	n/a	342	100-125/ 200-240	47-63

End Table

Additional Information

"Current leakage" is the amount of current that is passed to earth ground.  
The current leakage of all Apple equipment meets the following specifications:

- As specified by the UL standard for Apple equipment distributed in the United States, the current leakage will be less than 5.0 milliamperes.
- As specified by the IEC 380 & 950 standards for Apple equipment distributed in France and most of Europe, the current leakage will be less than 3.5

## APPLE II COMPUTER TECHNICAL INFORMATION

milliamperes.

The PowerBook 500 series AC adapter has two separate outputs, VBatt and Vmain. The VBatt supply is used for charging the batteries while the VMain supply provides power for the PowerBook. Power from VBatt is automatically diverted to power the PowerBook if additional power is needed.

\* Amps calculated based on efficiency of power supply, except for Macintosh PowerBooks (amps calculated at 7.5 volts) and Macintosh Duos (amps calculated at 24 volts).

\*\* The BTU calculation is Watts X 3.42 = BTU/hour.

The BTU ratings for the Macintosh systems take into account any hard disk or expansion card(s) that may be installed internally.

Copyright 1996, Apple Computer, Inc.

Keywords: supt,hts,cnfg

### END OF FILE A2TIL286.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL287.TXT  
#####

Description: Electrical Specifications: Apple Computers (1 of 2) (2/97)  
Header: Electrical Specifications: Apple Computers (1 of 2) (2/97)

Article Created: 21 September 1984  
Article Reviewed/Updated: 24 February 1997

TOPIC -----

This article provides the electrical specifications for Apple computers. For information about other Apple hardware, see the Tech Info Library article, "Electrical Specifications: Apple Peripherals (2 of 2)".

NOTE: This article has been revised and combines two previous articles titled, "Electrical Specifications of Most Apple Hardware" and "BTU Ratings for Most Apple Hardware".

DISCUSSION -----

The following Apple products are manufactured for use in the USA. In determining whether a particular product can be used internationally, there are three classes, depending on whether a product accepts a range in voltage, frequency or both (for more specific information, see the article, "Using U.S. Apple Equipment Internationally"):

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-----

These products can be used internationally out of the box. Some of Apple's products are self-configuring devices or "universal" within a certain range. They can accept a range in both voltage and frequency, and only require a plug adapter for the specific locale.

Example: The Quadra 800 accepts between 100-125 and 200-240 volts, 47-63 Hz.

2) Frequency Independent  
-----

These products can be used internationally with a voltage transformer. Generally they are geared for U.S. 120 volt current, but are flexible as to the frequency they accept (for example, 47-63 Hz), and are known as "frequency independent." These products need a stepdown isolation transformer to adapt the voltage, and will handle the different frequency on their own.

Example: The U.S. Performa 200 accepts 120 volts, 47-63 Hz.

3) Frequency Dependent  
-----

These products generally cannot be used internationally. These are products that can work only within a narrow range in frequency; they are "frequency dependent." Transformers only transform voltage, so if the product requires a certain frequency, there's no practical way to convert both voltage and frequency.

These products can ONLY be used internationally in countries with the same frequency as the country for which the product was manufactured. Further, a voltage transformer will be required if the destination country has a voltage different from the home country.

Example: The U.S. Apple Color OneScanner accepts 108-132 volts, 58-62 Hz.

NOTE:  
Computers with power outlets for peripherals do not condition the current as it passes through. So, for example, a monitor requiring 120v-60Hz current

## APPLE II COMPUTER TECHNICAL INFORMATION

could not be used in a 220v-50Hz environment even if the computer from which it gets its power is able to accept the local current.

The AC output of a Macintosh II is as follows: the monitor receptacle is rated for 3 amps steady state, 40 amps peak power. The power supply is fused for 6 amps to include the Macintosh II and monitor.

The amperage on the back of the computer is what should be used to calculate load on a circuit. Typical circuits in businesses and houses are 15 Amps (some are 20, but rarer, and an electric dryer is usually 30, an electric range may have DUAL 30 Amp circuits wired together). With that capacity, you could have the following configuration (from the back of the CPU):

```

CPU           5 Amps
Monitor       3 Amps
LaserWriter  7 Amps
Total:       15 Amps
    
```

Most of the time, the CPU will draw only 1-1.5 Amps, the Monitor about .5-1 Amp, and the LaserWriter about 2 Amps. The difference is sometimes referred to as Nominal (high) versus Actual draw.

These following values are accurate regardless of peripherals used with each device. For example, a Macintosh II with an EtherTalk NB Card, an 8-bit video card, and HD40 SC draws a maximum of 230 watts and 6 amps from the power outlet it is plugged into.

Begin\_Table

```

+=====+
|COMPUTERS|
+=====+
    
```

Apple II and Apple III	Watts*	Amps**	BTU/hr**	Volts	Hertz
Apple II	60	.5	205.2	107-132	50-60
Apple II Plus	60	.5	205.2	107-132	50-60
Apple III	100	.83	342	107-132	60
Apple III Plus	100	.83	342	107-132	60
Apple IIe	60	.5	205.2	95-127	60
Apple IIc	25	.2	85.5	105-129	60
Apple IIc Plus	60	.5	205.2	90-130	50-60
Apple IIGS	60	.5	205.2	107-132	50-60
=====					
Compact Macintosh & XL	Watts*	Amps**	BTU/hr**	Volts	Hertz
Lisa (Macintosh XL)	150	1.25	513	120	50-60
Macintosh 128K	60	.5	205.2	105-125	50-60
Macintosh 512K, 512Ke	60	.5	205.2	105-125	50-60
Macintosh Plus	60	.5	205.2	105-125	50-60
Macintosh SE	100	.83	342	90-125/ 200-240	47-63

APPLE II COMPUTER TECHNICAL INFORMATION

Macintosh SE/30	75	.63	256.5	120-125/ 200-240	48-62
-----	-----	-----	-----	-----	-----
Macintosh Classic	76	.63	260	120	47-63
-----	-----	-----	-----	-----	-----
Macintosh Classic II	76	.63	260	120	47-63
-----	-----	-----	-----	-----	-----
Macintosh Color Classic	100	.83	342	90-125/ 200-240	47-63
=====	=====	=====	=====	=====	=====
Macintosh II Computers	Watts*	Amps**	BTU/hr**	Volts	Hertz
=====	=====	=====	=====	=====	=====
Macintosh II	230	1.9	786.6	90-125/ 200-240	48-62
-----	-----	-----	-----	-----	-----
Macintosh IIX	230	1.9	786.6	90-125/ 200-240	48-62
-----	-----	-----	-----	-----	-----
Macintosh IICx	159	1.3	543.8	100-125/ 200-240	50-60
-----	-----	-----	-----	-----	-----
Macintosh IICi	159	1.3	543.8	100-125/ 200-240	50-60
-----	-----	-----	-----	-----	-----
Macintosh IIFx	230	1.9	786.6	100-125/ 200-240	48-62
-----	-----	-----	-----	-----	-----
Macintosh IISi	160	1.33	547.2	100-125/ 200-240	50-60
-----	-----	-----	-----	-----	-----
Macintosh IIVx	230	1.9	786.6	100-125/ 200-240	50-60
=====	=====	=====	=====	=====	=====
Macintosh LC Computers	Watts*	Amps**	BTU/hr**	Volts	Hertz
=====	=====	=====	=====	=====	=====
Macintosh LC	50	.42	171	90-125/ 200-240	50-60
-----	-----	-----	-----	-----	-----
Macintosh LC II	50	.42	171	90-125/ 200-240	50-60
-----	-----	-----	-----	-----	-----
Macintosh LC III	50	.42	171	100-125/ 200-240	47-63
-----	-----	-----	-----	-----	-----
Macintosh LC 475	30	.25	102.6	100-125/ 200-240	47-63
-----	-----	-----	-----	-----	-----
Macintosh LC 520	40	.5	136.80	90-125/ 200-240	47-63
-----	-----	-----	-----	-----	-----
Macintosh LC 550	40	.5	136.80	90-125/ 200-240	47-63
-----	-----	-----	-----	-----	-----
Macintosh LC 575	40	.5	136.80	90-125/ 200-240	47-63
-----	-----	-----	-----	-----	-----
Macintosh LC 580	40	.5	136.80	90-125/ 200-240	47-63
-----	-----	-----	-----	-----	-----
Macintosh LC 630 family	45	1.25	153.9	100-125/ 200-240	50-60
-----	-----	-----	-----	-----	-----
Macintosh TV	60	.5	205.2	90-125/ 200-240	47-63

APPLE II COMPUTER TECHNICAL INFORMATION

Macintosh Performa	Watts*	Amps**	BTU/hr**	Volts	Hertz
Performa 200	76	.63	260	120	47-63
Performa 400,405,430,450	50	.42	171	90-125/ 200-240	50-60
Performa 460, 466, 467	50	.42	171	90-125/ 200-240	50-60
Performa 475 & 476	50	.25	171	100-125/ 200-240	47-63
Performa 550 & 560	40	.5	136.8	90-125/ 200-240	47-63
Performa 575,577,578,580	40	.5	136.8	90-125/ 200-240	47-63
Performa 600	230	1.9	786.6	100-125/ 200-240	50-60
Performa 630 Series	45	1.25	153.9	100-125/ 200-240	50-60
Performa 6100 Series	210	1.7	718.2	100-125/ 200-240	50-60
Performa 5200 Series	125	4.0	427.5	100-125/ 200-240	50-60
Performa 5300 Series	125	4.0	427.5	100-125/ 200-240	50-60
Performa 6200 Series	55	1.25	188.1	100-125/ 200-240	50-60
Performa 6300 Series	55	1.25	188.1	100-125/ 200-240	50-60
Performa 6400 Series	220	3.00	752.40	100-125/ 200-240	47-63
Performa 6360 Series	150	5.00	513.00	100-125/ 200-240	47-63

Macintosh Quadra	Watts*	Amps**	BTU/hr**	Volts	Hertz
Quadra 605	30	.44	102.6	100-125/ 200-240	47-63
Centris 610	86	1.70	294.12	100-125/ 200-240	47-63
Quadra 610	210	1.70	718.20	100-125/ 200-240	47-63
Quadra 630 family	45	1.25	153.9	100-125/ 200-240	50-60
Quadra/Centris 650	230	1.9	787	100-125/ 200-240	50-60

APPLE II COMPUTER TECHNICAL INFORMATION

Quadra/Centris 660AV	86	1.70	294.12	100-125/ 200-240	50-60
Quadra 700	50	1.9	171	100-125/ 200-240	50-60
Quadra 800	200	9	684	100-125/ 200-240	47-63
Quadra 840AV	200	9	684	100-125/ 200-240	50-60
Quadra 900	303	10	1036.26	100-125/ 200-240	50-60
Quadra 950	303	10	1036.26	100-125/ 200-240	50-60

Power Macintosh	Watts*	Amps**	BTU/hr**	Volts	Hertz
Power Macintosh 4400/200	150	3.0	513	110/220	47-63
Power Macintosh 5200/75	125	4.0	427.50	100-125 200-240	50-60
Power Macintosh 5260/100	125	4.0	427.50	100-125 200-240	50-60
Power Macintosh 5300/100	125	4.0	427.50	100-125 200-240	50-60
Power Macintosh 5400 Series	220	4.0	752.40	100-125 200-240	50-60
Power Macintosh 5500 Series	220	4.0	752.40	100-125 200-240	50-60
Power Macintosh 6400 Series	220	3.00	752.40	100-125/ 200-240	47-63
Power Macintosh 6500 Series	220	3.0	752.40	100-125/ 200-240	47-63
Power Macintosh 6100 Series	210	1.7	718.20	100-125/ 200-240	50-60
Power Macintosh 7100 Series	230	1.9	786.60	100-125/ 200-240	50-60
Power Macintosh 8100 Series	200	9.0	684	100-125/ 200-240	50-60
Power Macintosh 7200 Series	150	3.0	513	100-125/ 200-240	50-60
Power Macintosh 7300 Series	150	3.0	513	100-130/ 200-270	50-60
Power Macintosh 7500 Series	150	3.0	513	100-125/ 200-240	50-60
Power Macintosh 7600 Series	150	3.0	513	100-125/ 200-240	50-60

APPLE II COMPUTER TECHNICAL INFORMATION

Power Macintosh 8500 Series	225	9.0	769.50	100-125/ 200-240	50-60
Power Macintosh 8600 Series	560	n/a	1915.2	100-125/ 200-240	50-60
Power Macintosh 9500 Series	225	9.0	769.50	100-125/ 200-240	50-60
Power Macintosh 9600 Series	560	n/a	1915.2	100-125/ 200-240	50-60

Apple Workgroup Servers	Watts*	Amps**	BTU/hr**	Volts	Hertz
Workgroup Server 60	86	1.70	294.12	100-125/ 200-240	50-60
Workgroup Server 80	200	9.00	684	100-125/ 200-240	50-60
Workgroup Server 95	303	10.00	1036.26	100-125/ 200-240	50-60
Workgroup Server 6150	210	1.7	718.20	100-125/ 200-240	50-60
Workgroup Server 8150	200	9.0	684	100-125/ 200-240	50-60
Workgroup Server 9150	303	10	1036.26	100-125/ 200-240	50-60
Workgroup Server 7250	150	3.0	513	100-125/ 200-240	50-60
Workgroup Server 8550	225	9.0	769.50	100-125/ 200-240	50-60
Network Server 500	325	7.0	1111.50	100-125/ 200-240	50-60
Network Server 700	425	7.0	1453.50	100-125/ 200-240	50-60

Portable Macintosh	Watts*	Amps**	BTU/hr**	Volts	Hertz
Macintosh Portable	5	.125	.3	70-125/ 200-240	48-62
PowerBook 100	17	2	58.14	100-125/ 200-240	50-60
PowerBook 140	17	2	58.14	100-125/ 200-240	50-60
PowerBook 145,145B	17	2	58.14	100-125/ 200-240	50-60
PowerBook 150	17	2	58.14	100-125/ 200-240	50-60
PowerBook 160	17	2	58.14	100-125/ 200-240	50-60

APPLE II COMPUTER TECHNICAL INFORMATION

PowerBook 165c	24	3.2	82.1	100-125/ 200-240	50-60
PowerBook 170	17	2	58.14	100-125/ 200-240	50-60
PowerBook 180	17	2	58.14	100-125/ 200-240	50-60
PowerBook 180c	24	3.2	82.1	100-125/ 200-240	50-60
PowerBook 190 Series	45	1.88	153.9	100-125/ 200-240	50-60
PowerBook Duo 210	25	1.04	85.5	100-125/ 200-240	50-60
PowerBook Duo 230	25	1.04	85.5	100-125/ 200-240	50-60
PowerBook Duo 250	25	1.04	85.5	100-125/ 200-240	50-60
PowerBook Duo 270c	25	1.04	85.5	100-125/ 200-240	50-60
PowerBook Duo 280	25	1.04	85.5	100-125/ 200-240	50-60
PowerBook Duo 280c	36	1.5	123.1	100-125/ 200-240	50-60
PowerBook Duo 2300	36	1.5	123.1	100-125/ 200-240	50-60
PowerBook 520/520c	40	VBatt 1.0	137	100-125/ 200-240	50-60
PowerBook 540/540c	40	VBatt 1.0	137	100-125/ 200-240	50-60
PowerBook 5300	45	1.88	153.9	100-125/ 200-240	50-60
Duo Dock	87	4.2	297	100-125/ 200-240	50-60
Duo Dock II	87	4.2	297	100-125/ 200-240	50-60
Duo Dock Plus	87	4.2	297	100-125/ 200-240	50-60

End Table

Additional Information

"Current leakage" is the amount of current that is passed to earth ground. The current leakage of all Apple equipment meets the following specifications:

- As specified by the UL standard for Apple equipment distributed in the United States, the current leakage will be less than 5.0 milliamperes.

## APPLE II COMPUTER TECHNICAL INFORMATION

- As specified by the IEC 380 & 950 standards for Apple equipment distributed in France and most of Europe, the current leakage will be less than 3.5 milliamperes.

The PowerBook 500 series AC adapter has two separate outputs, VBatt and Vmain. The VBatt supply is used for charging the batteries while the VMain supply provides power for the PowerBook. Power from VBatt is automatically diverted to power the PowerBook if additional power is needed.

\* Amps calculated based on efficiency of power supply, except for Macintosh PowerBooks (amps calculated at 7.5 volts) and Macintosh Duos (amps calculated at 24 volts).

\*\* The BTU calculation is Watts X 3.42 = BTU/hour.

The BTU ratings for the Macintosh systems take into account any hard disk or expansion card(s) that may be installed internally.

### Article Change History:

24 Feb 1997 - Added new computers.

05 Dec 1996 - Added 6360.

05 Sep 1996 - Updated, re-formated, split into separate articles.

Copyright 1984-97, Apple Computer, Inc.

Keywords: review,htable,ktop20

### END OF FILE A2TIL287.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL288.TXT  
#####

Description: Electronic Learning Systems, Inc.  
Header: Electronic Learning Systems, Inc.

Article Created: 09/29/90  
Article Reviewed: 07/08/93  
Article Updated: 07/08/93

Electronic Learning Systems, Inc.  
-----

4131 N.W. 28th ln.  
Suite 3A  
Gainesville, FL 32606

800-443-7971 (Orders)

904-375-0558 (Tech. Support)

(For Fax call this number first) 904-375-0558  
904-375-5679 Fax

AppleLink: ELS

Company Profile:  
Software, specializing in individual and network educational products for the  
Apple II family, Macintosh Development, security software

Article Change History: 07/08/93 New Product Information Added, Name  
Information Added  
Copyright 1990-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL288.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL289.TXT  
#####

Description: European Apple II: No Color With U.S. Monitor (2/97)  
Header: European Apple II: No Color With U.S. Monitor (2/97)

Article Created: 01 July 1988  
Article Reviewed/Updated: 17 February 1997

TOPIC -----

This article discusses the problem of the European Apple II not producing color when used with a U.S. Apple Color Monitor.

DISCUSSION -----

A European Apple II produces either PAL or SECAM video output, both of which are compatible with European television standards. However, these signals are incompatible with the NTSC signal required for U.S. monitors. The signal is close enough in video content to be resolved in black and white, but the frequency of the color burst is incorrect for an NTSC monitor.

Using a European Apple II system in North America, you can get an acceptable color display from your European monitor, although there may be some problems due to the different line frequency in North America.

Article Change History:  
17 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1988-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL289.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL290.TXT  
#####

Description: Extended 80-Column RGB Card: Color Monitor 100 Pinouts (11/96)  
Header: Extended 80-Column RGB Card: Color Monitor 100 Pinouts (11/96)

Article Created: 19 April 1991  
Article Reviewed/Updated: 14 November 1996

TOPIC -----

Does the Extended 80-column card work in the Apple II or Apple II Plus? If not, is there any way to upgrade an Apple II or Apple II Plus to 80-Column?

DISCUSSION -----

The 80-Column Card and Extended 80-Column Card work only in the Apple IIe; they cannot be used in any other computer.

Our databases do not show an 80-column interface for the Apple II or Apple II Plus. There were once several on the market, but the demand for this type of card has almost disappeared. You might still be able to find these 80-column cards through some of the computer remarketing companies, or where use computer equipment is sold.

An alternative is to purchase an Apple IIe or Apple IIGS computer. You need to to contact computer remarketing companies, or look where use computer equipment is sold.

Article Change History:  
14 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1986-95, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL290.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL291.TXT  
#####

Description: FORTRAN Language Reference Manual: Errata  
Header: FORTRAN Language Reference Manual: Errata

This applies to the Apple II, Apple II+, Apple IIe, and Apple IIc.

Page inside cover  
The number A2D0032 is for the diskette, not the manual. The correct number for the manual is A2L0032 030-0118-00.

Page ix  
The page number for the Appendices should be 135 instead of 134.

Page xi  
The top paragraph should be deleted because the information is presented on page x.

Page 156  
In a multi-drive system, it isn't necessary to duplicate the system files on FORT2:. Here is a configuration for Apple FORTRAN diskettes that leaves you with over 130 blocks of storage on FORT1:, which remains the boot diskette, and allows you to write-protect FORT2: to prevent you from accidentally crashing the diskette that has the uncopyable FORTRAN SYSTEM.COMPIILER .

FORT1:	FORT2:
-----	-----
SYSTEM.APPLE	SYSTEM.COMPIILER
SYSTEM.PASCAL	SYSTEM.FILER
SYSTEM.MISCINFO	SYSTEM.EDITOR
SYSTEM.LIBRARY	SYSTEM.LINKER
SYSTEM.STARTUP	SYSTEM.CHARSET
	FORTMOD.CODE
	FORTLIB.CODE
	SYSTEM.LIBRARY

The copy of SYSTEM.LIBRARY on FORT2: is a copy of the original that came on FORT1:. There is a little room left on FORT2: which makes a good place to archive it. The SYSTEM.STARTUP program is generated from Pascal and contains the following commands:

```
PROGRAM LIBLINK;
USES APPLESTUFF;
BEGIN
END.
```

After compiling the program in Pascal, use the Filer to Transfer the codefile to FORT1: with the file name SYSTEM.STARTUP  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL291.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL292.TXT  
#####
```

Description: FORTRAN: FORT2 Copy protection  
Header: FORTRAN: FORT2 Copy protection

This applies to the Apple II, Apple II+, Apple IIe, and Apple IIc.

The Apple FORTRAN compiler is protected and cannot be copied. A Bad Block scan of the FORT2: diskette will show blocks 30, 31, and 32 as bad. Any attempt to "fix" these blocks will ruin the FORT2: diskette. See your local service center if your FORT2: diskette doesn't work.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL292.TXT
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL293.TXT  
#####
```

Description: FORTRAN: Using FORTRAN 1.0 with Pascal 1.2  
Header: FORTRAN: Using FORTRAN 1.0 with Pascal 1.2

Many Apple II FORTRAN programers have purchased or upgraded their operating system. They have discovered that the new system, the current version of Pascal 1.2, rejects the FORTRAN compiler because it has the wrong version number.

Change the version ID in the FORTRAN Compiler the easy way. Use this program, FORTRANFIX, to modify an Apple II FORTRAN Compiler so that it can be run under Apple II Pascal 1.2 without getting a version error.

Load this entire file into the Pascal Editor. These paragraphs will substitute for the 1K header the editor expects to see at the beginning of a text file. Make NO changes. Quit the editor by choosing "U(pdate the work file and leave". Select "R(un" from the main command line. FORTRAN users, be sure to do this using your Pascal system and not your FORTRAN system.

When the program prompts you, place your FORT2: diskette in drive 1. Upon completion, the FORTRAN compiler will be accepted by the Pascal 1.2 system.

```
program FORTRAN_FIX;  
type Byte      = 0..255;  
  Seg_Info = packed record  
    Mach_Type: 0..9;  
    Filler: 0..1;  
    Major_Revision: 0..7;  
end;  
  
var Num      : integer;  
    ch       : char;  
    Buffer: packed array [0..511] of byte;  
    F       : file;  
    Trix    : record case boolean of  
      true : (Temp: packed array [0..0] of Byte);  
      false: (SI  : Seg_Info);  
end;  
  
procedure RESET_FILE (File_Name: string);  
begin  
  {$I-}  
  reset (F, File_Name);  
  {$I+}  
  if (IORESULT <> 0) then begin  
    Num:= IORESULT;  
    writeln (chr (7));  
    writeln ('I/O ERROR #', Num, ' in opening ', File_Name);  
    exit (program)  
  end  
end; {Reset_File}  
  
procedure READ_BLOCK (Block_Num: integer);  
var Block_Xfer: integer;  
begin  
  {$I-}  
  Block_Xfer:= BLOCKREAD (F, Buffer, 1, Block_Num);  
  {$I+}  
  if (IORESULT <> 0) then begin  
    Num:= IORESULT;  
    writeln (chr (7));  
    writeln ('I/O ERROR #', Num, ' in reading from file.');
```

APPLE II COMPUTER TECHNICAL INFORMATION

```

        exit (program)
    end
end; {Read_Block}

procedure WRITE_BLOCK (Block_Num: integer);
var Block_Xfer: integer;
begin
    {$I-}
    Block_Xfer:= BLOCKWRITE (F, Buffer, 1, Block_Num);
    {$I+}
    if (IORESULT <> 0) then begin
        Num:= IORESULT;
        writeln (chr (7));
        writeln ('I/O ERROR #', Num, ' in writing to file.');
```

exit (program)

```

    end
end; {Write_Block}

begin {Main Program}
    writeln (chr(12)); {Erase screen}
    writeln ('FORTRANFIX');
    writeln;
    writeln ('Copyright 1984 Apple Computer, Inc.');
```

writeln;

```

    write ('This program will modify an Apple II');
    writeln (' FORTRAN compiler so that it can');
```

write ('be run under Apple II Pascal 1.2');

```

    writeln (' without getting a version error.');
```

write ('This program expects the FORTRAN compiler');

```

    writeln (' to be named SYSTEM.COMPILER.');
```

repeat

```

    gotoxy (0,10);
    write (chr(11)); {Erase to end of screen}
    writeln ('Put the disk with SYSTEM.COMPILER in drive 1.');
```

write ('Press RETURN when ready, ESC to exit program. ');

```

    read (ch);
    if (ch = chr(27)) then begin
        write (chr(12)); {Erase screen}
        exit (program)
    end;
    readln;
    RESET_FILE ('#4:SYSTEM.COMPILER');
```

READ\_BLOCK (0);

```

    Trix.Temp [0]:= Buffer [259];
    Trix.SI.Major_Revision:= 5;
    Buffer [259]:= Trix.Temp [0];

    WRITE_BLOCK (0);
    close (F, lock);
    writeln;
    writeln;
    writeln;
    write ('MODIFICATION COMPLETE - Press RETURN to continue.');
```

readln

```

until false
end. {FORTRAN_Fix}
Apple Technical Communications
```

Keywords:

### END OF FILE A2TIL293.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL294.TXT  
#####

Description: FORTRAN: Using WCHAR from FORTRAN  
Header: FORTRAN: Using WCHAR from FORTRAN

This applies to the Apple II, Apple II+, Apple IIe, and Apple IIc. The Turtlegraphics WCHAR procedure, which writes a single character on the high-res screen, will often give a "Value Range Error" (S#20, P#17, I#11) when called from FORTRAN. WCHAR does not check the high byte of the character word passed before calling the DRAWHBLOCK routine, so if the high byte contains a value, WCHAR will choke by trying to access an index beyond the end of SYSTEM.CHARSET.

This error will occur when passing a single character from a character array, but not from a single character "string". For example,

```
CHARACTER CH(10)
READ (*,100) CH(1)
CALL WCHAR (CH(1))
```

will result in a "Value Range Error". However,

```
CHARACTER*1 CH
READ (*,100) CH
CALL WCHAR (CH)
```

will work correctly. To prevent the error in the first example, replace the call statement with

```
CALL WCHAR (CHAR (ICHAR ( CH(1))))
```

which will convert the character to a integer, and then back to a character before calling WCHAR.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL294.TXT

```
#####
### FILE: A2TIL295.TXT
#####
```

Description: GS BASIC: Features and Editing Commands  
 Header: GS BASIC: Features and Editing Commands

This article last reviewed: 15 October 1987

ToolBox Primitives  
 -----

GS BASIC includes primitives (built-in, low-level commands) that let the user interact with the ToolBox routines. Whereas most other ToolBox routines are implemented in external libraries that need to be explicitly called up, these commands -- Eventdef, Menudef, and Taskpoll -- are included in GS BASIC itself because they bind the ToolBox and BASIC line numbers.

Eventdef. The structure of Macintosh-like programs, as implemented by the Apple II GS and its ToolBox routines, requires that programs be event-driven. This means that the heart of a program is a main loop that constantly monitors what events -- mouse clicks, keyboard presses, window update events, network activity, and so on -- have taken place. Eventdef associates BASIC line numbers with these events: whenever one of these events occurs, GS BASIC starts running the instructions specified in a table set up by the programmer and maintained by Eventdef.

Menudef. One of the places a mouse click can occur is in the menu bar. When this happens, a menu is displayed, letting the user select a menu item. The user specifies that a certain function is to be performed. Like Eventdef, Menudef associates BASIC line numbers with menu items, so that when a menu item is selected, GS BASIC can easily determine what statements to run, and run them.

Taskpoll. Programs shouldn't start fielding events and responding to them until all the ToolBox libraries are loaded and the tables that Menudef and Eventdef maintain are initialized. The Taskpoll command lets the programmer turn off the interrupting feature of GS BASIC and turn them on when ready for them.

Procedures and Functions  
 -----

The most convenient structure of of any program is a procedure, function, or subroutine. In most BASICs, including Applesoft, subroutines are implemented in a very straightforward fashion. GS BASIC provides a more powerful way to specify and call procedures.

Applesoft lets programmers call subroutines with the GOSUB xxx command, where xxx is the line number to which control branches. Statements are then executed until a RETURN command is executed, at which time the program returns to the line that called the subroutines, and continues from there.

GS BASIC allows programmers to define specific procedures that are called with the PROC command. The PROC command performs the same functions as Applesoft's GOSUB, and lets the programmer pass local parameters as well.

Editing Commands  
 -----

GS BASIC has a more powerful line editor than Applesoft's. Access it by typing EDIT linum[-linum]

- CONTROL-D delete character to the left of cursor; moves line to left
- CONTROL-F delete character under the cursor; moves line left
- CONTROL-X delete entire line
- CONTROL-Y delete line to left and under cursor

# APPLE II COMPUTER TECHNICAL INFORMATION

CONTROL-E toggle insert mode  
 RETURN accept entire line (even characters to right of cursor)  
 DELETE same as CONTROL-D

## GS BASIC Commands

```

-----
_ (underscore)  ERRLIN          LOG(              SCALB(
ABS(           ERROR          LOG1(            SCALE(
AND           ERRTOOL        LOG2(            SECONDS@
ANU(          ERRTXT$(       LOGB%(          SET
APPEND        EVENTDEF        MENUDEF         SGN(
AS           EXCEPTION      MID$(           SHOWDIGITS
ASC(          EXEC           MOD             SIN(
ASSIGN        EXEVENT@(          NEGATE(        SPACE$(
ATN(          EXFN           NEW            SPC(
AUTO         EXP(           NEXT           SQR(
AUXID@       EXP1(          NORMAL        SRC
BASIC@(      EXP2(          NOT           STEP
BDF          FILE(         NOTRACE       STOP
BREAK        FILTYP(       OFF           STR$(
BTN(         FILTYP=      ON            SUB$(
CALL         FIX(         OPEN          SWAP
CALL%        FN           OR            TAB(
CAT          FOR           OPUTPUT      TAN(
CATALOG      FRE          OUTREC       TASKPOLL
CHAIN        FREMEM(      PDL(         TASKREC%(
CHR$(        GET          PEEK(        TASKREC@(
CLEAR        GOSUB        PERFORM      TEN(
CLOSE        GOTO        PFX$(        TEXT
COMPI(       GRAF         PI           TEXTPORT
CONT         HEX$(        POKE         THEN
CONV(        HLIST       PREFIX       TIMES$
CONV@(       HOME        PREFIX$      TIME(
CONV#(       HPOS        PRINT        TIMER
CONV$(       IF          PROC         TO
CONV%(       IMAGE       PROGNAME$   TRACE
CONV&(       INDENT      PUT          TXT
COPY         INIT        QUIT         TYPE
COS(         INPUT       R.STACK%(   TYP(
CREATE       INSTR(      R.STACK@    UBOUND(
DATA        INT(        R.STACK&    UCASE$(
DATE$       INVERSE     RANDOMIZE    UIR(
DATE(       INVOKE     READ         UNLOCK
DEF         JOYX(      REC(         UNTIL
DEL         JOYY(      RELATION(    UPDATE
DELETE      KBD        REM          USING
DIM         LEFT$(     REMDR       VAL(
DIR         LEN(       RENAME      VAR(
DIV         LET        REP$(       VAR$(
DO          LIBFIND    RESTORE     VARPTR(
EDIT        LIBRARY    RESUME      VARPTR$(
ELSE        LIST       RETURN      VOLUMES
END         LISTTAB    RIGHT$(     VPOS
EOF         LOAD       RND(        WHILE
EOFMARK(    LOCAL     ROUND(      WRITE
ERASE       LOCATE    RUN         XOR
ERR         LOCK      SAVE
    
```

## Toolbox Definition Files (TDFs)

```

-----
QuickDraw    ADB          Desk          Dialog
Event        Font         Intmath       LineEdit
List         Loader       Locater       Memory
Menu         MiscTool     NoteSyn       Print
QDAux       Scheduler    Scrap         StdFile
Text         Window      Control
    
```

# APPLE II COMPUTER TECHNICAL INFORMATION

## Built-in Constants and Reserved Variables

-----  
PI           to 20 digits  
LISTTAB     number of spaces between line number and first statement  
INDENT      controls indenting of FOR...NEXT and WHILE...UNTIL loops  
OUTREC      maximum line length  
VPOS        vertical cursor position  
HPOS        horizontal cursor position  
FRE         amount of memory available  
SHOWDIGITS  specifies the number of digits to display for REAL numbers  
KBD         holds value of last key pressed  
ERR         contains error number  
ERRLIN      contains line where error occurred

## Variable Specifications

-----  
Real:           (+ or - 1.7E38) (less than 1.5E-45 equals 0)  
Double real:   (+ or - 1.7E308) (less than 5.0E-324 equals 0)  
Integer:       (%) (2 bytes) (-32768 to 32767)  
Double integer: (@) (4 bytes) (-2147483648 to 2147483647)  
Long integer:  (&) (8 bytes) (-9223372036854775808 to 9223372036854775807)  
String:        (\$) 255 characters  
Arrays:        (!)

Keywords:

### END OF FILE A2TIL295.TXT

#####  
### FILE: A2TIL296.TXT  
#####

Description: GS/OS 5.0: "No Finder" Printing Fix  
Header: GS/OS 5.0: "No Finder" Printing Fix

This article last reviewed: 12 December 1989

TOPIC -----

This article discusses a workaround for the problem of a GS/OS 5.0 startup disk without Finder, and its inability to retain default printer information.

DISCUSSION -----

The GS/OS 5.0 AppleShare startup disk without Finder is not capable of retaining default printer information. The startup printer selection made in the Apple II menu of AppleShare Administration is not used. Thus, if the disk is created as described in the manuals, the user must run the Chooser each time they restart the system to set a default printer.

Here is a workaround for this problem:

- 1) Copy the entire Chooser folder from the Apple IIGS workstation disk (or from the server) onto the startup disk. The file IWEM is not required if you are not printing to a LaserWriter.
- 2) Copy the file called ATINIT from the server onto the startup disk.
- 3) Set the Control Panel to either Scan or Startup Slot 5, then restart using this new disk.
- 4) Go into BASIC on the server, launch Chooser.II, and set the default printer settings. That printer will remain "selected" until someone runs Chooser.II to change it.
- 5) If you want the Chooser to be accessed from Aristotle, create an application that accesses the floppy disk copy of the Chooser, rather than the server-based version. The floppy disks must have a common volume name as well as pathname if this method is to be used.

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Keywords:

### END OF FILE A2TIL296.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL297.TXT  
#####

Description: GS/OS 5.0.2: "File Not Found" Error  
Header: GS/OS 5.0.2: "File Not Found" Error

This article last reviewed: 7 March 1990

TOPIC -----

I work at an Apple IIGS (1MB RAM) that is on a network with Macintosh SE/30 with 4MB RAM and HD80 SC File Server.

After updating the GS/OS system files on the server via the Apple IIGS Installer, updating Aristotle likewise, and reinstalling the Apple II Setup disk, I received the following error message:

Sorry, system error \$0046 occurred while loading the start FST file.

I checked all access privileges, and they are not a problem. Can you help?

DISCUSSION -----

The \$0046 error is a "file not found" error. There are two ways this can happen when starting up from the network.

- 1) The Icons folder and the System folder need privileges set to the Bulletin Board item found in the GS/OS Icon Info menu item. If these folders are set otherwise, GS/OS cannot "find" the files inside these two folders.
- 2) There is a file missing or misplaced on the server volume that the Apple IIGS requires for startup. Usually reinstalling GS/OS onto the server resolves the problem.

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Keywords:

### END OF FILE A2TIL297.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL298.TXT  
#####

Description: GS/OS 5.0.2: Solves "No Finder" Printing Problem  
Header: GS/OS 5.0.2: Solves "No Finder" Printing Problem

This article last revieId: 4 January 1990

TOPIC -----

I have a problem on my Apple IIGS lab (LocalTalk and GS/OS 5.0 with the current version of Aristotle) when I start from Aristotle on disk, bypassing the Finder. I log on and run Chooser.II from Aristotle to choose an ImageWriter. When I try to print from AppleWorks or various MECC applications nothing happens.

For the lab to function in an orderly manner, students need to start from disk and be able to choose a printer. Do you have a workaround? Also, just what file is it that holds the name of the chosen printer?

DISCUSSION -----

Upgrading to GS/OS 5.0.2 resolves this issue. This version of GS/OS, when used with the "No Finder" startup disk, defaults to the user's assigned printer set in the AppleShare Admin program.

When using GS/OS 5.0.2, you needn't use Chooser.II to make network printer choices. If you use a Finder startup disk, the Control Panel provides the printer choice via the various printer Control Panel devices. With a "No Finder" startup disk, the printer choice is made in AppleShare Admin's Apple II menu. When starting up across the network, the printer choice is also made in the AppleShare Admin program.

However, if students must dynamically change the printer they use, Chooser.II is required in the "No Finder" and network startup procedures. When running Chooser.II from the server, the printer selection is stored in the ATINIT file located in "USERS/(user's logon name)/ATINIT" on the server. This overrides the choice in the AppleShare Admin setup during this signon. After the user signs off and back on in these two startup procedures, the default printer will be the one set in the AppleShare Admin setup.

Should the desired results be "one student assigned to one printer," then GS/OS

5.0.2 smoothly handles this situation by using the AppleShare Admin setup during a "No Finder" startup.

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Keywords:

### END OF FILE A2TIL298.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL299.TXT  
#####

Description: GS/OS 6.0.1: How It Differs from 6.0 (6/93)  
Header: GS/OS 6.0.1: How It Differs from 6.0 (6/93)

Article Created: 28 June 1993

## TOPIC -----

This is a summary of the visible changes in GS/OS 6.0.1 compared to 6.0. There have been many bugs fixed and many features added that aren't immediately visible. This document helps identify those features or changes.

## DISCUSSION -----

### FINDER (SEE ALSO FINDER HELP)

-----  
You can now click in Name, Size, Kind, or Last Modified at the top of a list-view window to change the view.

To rename an icon, you must now click on its name rather than the icon.

The File Copy Alternatives dialog has been removed. Holding down the Option key now always forces a copy rather than a move.

Dragging certain system-related files to the System folder icon on the boot volume now does "magic routing" much like the Macintosh Finder. Note that this only works when using the folder icon; dragging into a window works as before. The kinds of files that are properly placed in their own folders within the System folder are: Control Panels, Desk Accessories, Drivers, FSTs, Tools, Fonts, Sounds, INITs, and Finder Extensions. Other files are just placed in the System folder.

The Finder now creates the FinderExtras folder for you.

If you open the Icon Info window on an Apple SCSI device, the SCSI ID number appears on the Where card.

The Finder's Clipboard window handles text, pictures, and sounds. If you copy a sound to the Clipboard (using the Sound control panel, for example), you can click on the Speaker icon on the Clipboard to hear the sound. Teach has the same Clipboard window.

### EXTENSIONS

-----  
EasyMount isn't just for servers anymore. It now handles aliases to any disk, folder, or application. In other words, you don't need to drag the icon onto the desktop anymore -- just keep an alias of it on the desktop. Select the icon of the item you want to alias and choose "Make Alias " from the Extras menu. EasyMount will ask you where to save the alias. Later, double-clicking the alias opens the real item, disks and folders are opened, and applications (ProDOS 8 or GS/OS) are launched. The Installer automatically installs EasyMount in your System.Setup folder.

### CONTROL PANELS

#### ----- DC Printer Control Panel -----

This was a change in System 6.0 but not documented: The DC Printer will let you choose LaserWriter, which is potentially useful for "printing" to

## APPLE II COMPUTER TECHNICAL INFORMATION

PostScript files.

### Monitor Control Panel

-----

The new checkbox "Smoother Mouse Cursor" sets a new Battery RAM location. It kills the cursor flicker that's especially noticeable with a Video Overlay card or an accelerator.

### SetStart Control Panel

-----

The new checkbox "Show icons during startup" provides a way to set the Battery RAM location that disables the display of the startup icons. The Battery RAM location has been there since System 6.0, but there was no Apple-provided way to change it.

The new checkbox "Enable programmer CDAs" provides a way to set the Battery RAM location that allows Visit Monitor and Memory Peeker to show up in the CDA menu. Both ROM 1 and ROM 3 Apple IIGS computers now check this location. This checkbox doesn't show up if the ROM 3 Control Panel disable jumper is present.

### STARTUP

-----

During startup, if you have a lot of icons, they no longer keep recycling the bottom row of the screen. They now "wrap up" to the row above.

If you use a Vulcan internal hard drive, you no longer need to copy the Vulcan driver onto the Install disk when installing new system software. You can still use the Vulcan driver for enhanced performance, but you can successfully install without it.

If your ROM 3 Apple IIGS has 8 Megabytes of RAM, the computer fails to create a RAM disk (RAM5) of any size. In this case, System 6.0.1 creates RAM5 and then restarts the system. When you turn on the computer, you will hear an extra beep at the "Apple IIGS ... ROM Version 3" screen.

### DRIVERS

-----

The RAM5 RAM disk has a new driver. The Installer automatically installs it if you have the RAM disk enabled when you do an Easy Update. The driver greatly enhances the disk's performance. It also allows you to have a RAM5 disk in GS/OS (but not in ProDOS 8) even when slot 5 is switched to "Your card." On a ROM 1, you must have the Minimum and Maximum sizes set to the same value; otherwise you'll see a message during startup and it won't use the new driver.

The Apple II Memory Expansion Card has a new optional format. If you have a full megabyte of memory on the card, it lets you format it as either 1,024K or 800K. The 800K option blocks out the remaining 224K, but allows faster block copies to and from other 800K disks.

### FILE SYSTEM TRANSLATORS (FSTs)

-----

The MS-DOS FST is new. To use it, you need a drive that can read MFM disks, such as the Apple SuperDrive with an Apple II SuperDrive Controller Card.

This version is read-only -- it doesn't let you make changes to MS-DOS disks.

### PRODOS 8

-----

The Thunderclock year table in ProDOS 8 has been updated for the years 1993-1998. There's also a Clock.Patch file on the SystemTools2 disk that you may use to update ProDOS 8 (renamed to ProDOS) to include future year groups.

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Keywords:

### END OF FILE A2TIL299.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL300.TXT  
#####

Description: GS/OS: How To See OS Info at Startup  
Header: GS/OS: How To See OS Info at Startup

This article last reviewed: 3 November 1989

TOPIC -----

I have a lab of 16 Apple IIGS systems, running AppleShare 2.0.1 and the GS/OS 5.0 software with the Apple II setup from the GS/OS 5.0 disks. They are exhibiting some strange behavior when starting up over the network. When about half of the systems are started up, they get a list-type screen that says:

Welcome to the World of the Apple IIGS

and then a list of the network program segments that are loading. They get this instead of the Welcome to the Apple IIGS GRAPHIC SCREEN and the "thermometer". DISCUSSION -----

The purpose of this screen is to provide operating system information to the operator. A list of installed GS/OS drivers is displayed as they are loaded.

This alternate screen is normal and is generated by pressing the space bar as GS/OS begins to load--whether starting up from a local disk or over the network. The screen will not appear unless someone presses the space bar sometime during the initial stages of booting the Apple IIGS.

If an Apple IIGS displays the alternate screen even when the space bar hasn't been pressed, there may be a hardware malfunction, and the unit should be serviced.

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Keywords:

### END OF FILE A2TIL300.TXT

#####  
### FILE: A2TIL301.TXT  
#####

Description: GS/OS: How To Use It With A ProFile  
Header: GS/OS: How To Use It With A ProFile

This article last reviewed: 22 December 1988

This article shows you how to use GS/OS with a ProFile hard disk drive.  
Before beginning, make sure that:

- The ProFile Interface Card has the 341-0299 ROM. (See Tech Info Library article "GS/OS: Needs Latest ROM Revision To Work With ProFile" for further information.)
- The ProFile Interface Card has been modified for use with the Apple IIGS. (See Tech Info Library article "Apple II ProFile Interface Card Modification for the Apple IIGS" for further information.)

NOTE: The Partition and Zero option of the Advance Disk Utility does not work with the ProFile; it works with SCSI drives only.

Procedure for Using GS/OS With a ProFile  
-----

Follow these steps:

1. Select a slot for the ProFile Interface Card (this procedure uses slot 7).
2. Install the ProFile Interface Card and turn on the Apple IIGS.
3. Press Apple-Control-Esc to enter the Control Panel. In the Control Panel, under the SLOTS item:
  - a. Set SLOT 7 to "Your Card".
  - b. Set STARTUP SLOT to "5".
  - c. Press Return, Esc, Return to exit from the Control Panel.
4. Turn the computer off.
5. Insert the Apple IIGS System Disk in the first 3.5-inch drive and the System Tools disk in the second 3.5-inch drive (if available).
6. Turn the computer on.
7. After the system starts up, the SYSTEM.DISK, SYSTEM.TOOLS, and ProFile appear on the desktop.

NOTE: If the ProFile was not formatted for ProDOS, GS/OS asks if the volume should be initialized.

To initialize:

- a. Select "Initialize".
- b. Name the volume.

This should take only a few seconds.

8. Open the System Tools disk and run the Installer program.

NOTE for single-drive systems: Eject the System Disk and insert the System Tools disk. The Installer program prompts you with

## APPLE II COMPUTER TECHNICAL INFORMATION

Eject/Insert dialog boxes.

- a. A list of items to install appears.
- b. Select "Install System Files".
- c. Use the "Volume" button to bring the ProFile disk name to the top right of the screen.
- d. Select "Install".

The Installer program copies the System files from SYSTEM.DISK and SYSTEM.TOOLS disks to the ProFile. Old System files are replaced, but Desk Accessories, Fonts, and other files in "SYSTEM FOLDER" are not deleted.

9. To add other items, such as the SCSI card or 5.25-inch drive:

- a. Select the item.
- b. Click Install.

10. Install a printer driver:

- a. Select the item.
- b. Click Install.

11. Set the Control Panel to start up from slot 7.

12. Restart the system using the ProFile.

The ProFile is now set up for use with GS/OS.

NOTE: If you copy applications to the ProFile, copy only the program and data files. Do NOT copy the System Folder from the application disks.

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Keywords:

### END OF FILE A2TIL301.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL302.TXT  
#####

Description: GS/OS: Needs Latest ROM Revision To Work With ProFile  
Header: GS/OS: Needs Latest ROM Revision To Work With ProFile

This article last reviewed: 11 November 1988

When using GS/OS under Apple IIGS System Disk 4.0 with a 5MB ProFile, be sure you are using the latest ProFile ROM revision.

A 5MB ProFile needs the 341-0299 ROM revision to work correctly with GS/OS.

If you have problems formatting, or receive a message stating that your drive appears to be damaged, you need the new ROM.

(NOTE: This ROM is a service part, and is located on the Apple II price pages.)

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Keywords:

### END OF FILE A2TIL302.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL303.TXT  
#####

Description: GS/OS: SCSI and ProFile Card Compatibility  
Header: GS/OS: SCSI and ProFile Card Compatibility

This article last reviewed: 24 April 1989

If you are using GS/OS version 4.0, you must have the latest versions of the ProFile and SCSI Interface Cards as well. Recent testing results show that GS/OS version 4.0 is compatible with revision C of the SCSI and ProFile cards.

You can determine if you have the required version of these cards by the ROM part number that is installed in the card.

SCSI Interface Card  
-----

ROM part number 341-0437 rev. A is the latest ROM for the SCSI Interface Card. When this ROM is installed, it brings the revision of the card up to rev. C. This configuration is compatible with version 4.0 of GS/OS.

ProFile Interface Card  
-----

ROM part number 341-0299 rev. B is the latest ROM for the ProFile Interface Card. When this ROM is installed, it brings the revision of the card up to rev. C. This configuration is compatible with version 4.0 of GS/OS.

As of the date of this article, all service ROM inventory is the latest version, and all ProFile and SCSI Interface Cards shipped by service are the rev. C configuration, which is compatible with all Apple II computers.

Apple IIGS  
-----

The Apple IIGS requires ROM version 01 to run GS/OS 4.0. To determine if you have the correct version boot the Apple IIGS, at the bottom of the screen should be displayed a copyright line and "ROM Version 01". Contact your dealer for the free upgrade.

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Keywords:

### END OF FILE A2TIL303.TXT

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#####  
### FILE: A2TIL304.TXT  
#####

Description: Hard Disk 20SC: How to Connect to an Apple IIe/IIGS  
Header: Hard Disk 20SC: How to Connect to an Apple IIe/IIGS

Article Created: 25 June 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

What do I need to connect an Apple HD20 SC to an Apple IIe or Apple IIGS?

DISCUSSION -----

Apple sells a High-Speed SCSI Card for the Apple II to use a SCSI hard drive. The part number for the card is A0220LL/A. You also need SCSI cables.  
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Keywords:

### END OF FILE A2TIL304.TXT

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#####  
### FILE: A2TIL305.TXT  
#####

Description: HD-20SC: What You'll Need to Format It With an Apple II  
Header: HD-20SC: What You'll Need to Format It With an Apple II

This article last reviewed: 19 January 1988

To format an HD-20SC drive using an Apple II, it's usually best to use System Disk 3.0. System Utilities 2.1.1 can be used for this purpose only with some versions of the Apple IIe, as described below.

- Apple IIGS: requires System Disk 3.0. (System Utilities 2.1.1 won't do it.)
- Unenhanced Apple IIe: is not compatible with System Disk 3.0. (Use System Utilities 2.1.1.)
- Apple IIe (Platinum) with Rev C logic board: use System Disk 3.0 to format an HD-20SC. (System Utilities 2.1.1 won't do it.)

@L

- Apple IIe (Platinum) with Rev E logic board: it's advisable to use System Disk 3.0. System Utilities 2.1.1 can be used, but you'll see flashing garbage on the screen that will make it look like the system has crashed.

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### END OF FILE A2TIL305.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL306.TXT  
#####

Description: Hearlihy and Co. (USA)  
Header: Hearlihy and Co. (USA)

Article Created: 08/09/91  
Article Reviewed: 07/09/93  
Article Updated: 04/03/92

Hearlihy and Co. (USA)  
-----

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Keywords: 3PTY

### END OF FILE A2TIL306.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL307.TXT  
#####

Description: High Speed Serial Interface Card: Settings (11/96)  
Header: High Speed Serial Interface Card: Settings (11/96)

Article Created: 21 September 84  
Article Reviewed/Updated: 19 November 1996

TOPIC -----

The Apple II Serial Interface Card (A2B0008), also known as the High Speed Serial Interface Card, is primarily used with serial letter-quality printers like the Qume, Diablo, and NEC Spinwriter series.

The following explains the functions of the various DIP switches and PROMS on the High Speed Serial Interface Card. This card has been discontinued and is no longer available from Apple.

DISCUSSION -----

Baud Rate - Switches 1,2 and 3  
-----

DIP Switch			Baud Rate
1	2	3	
ON	ON	ON	110
OFF	ON	ON	134.5
ON	OFF	ON	300
OFF	OFF	ON	1200
ON	ON	OFF	2400
OFF	ON	OFF	4800
ON	OFF	OFF	9600
OFF	OFF	OFF	19200

The settings of DIP switch levers 1, 2, and 3 determine the rate at which bits may be transmitted to the external device: 300 baud is 300 bits per second.

Carriage Return Delay - Switch 4  
-----

DIP Switch	Carriage Return Delay
4	
ON	Enabled
OFF	Disabled

If switch 4 is Off (Delay Enabled), the Serial Interface waits briefly (approximately 1/4 second) after transmitting a carriage return before resuming transmission of further characters, allowing the printer's carriage to return. If you are transmitting to an external TV screen, this delay is probably unnecessary, so lever 4 may be turned On (Delay Disabled).

Line Width plus Apple Video - Switches 5 and 6  
-----

DIP Switch		Line Width (characters	Apple Video
5	6	per Line)	
ON	ON	40	Enabled

## APPLE II COMPUTER TECHNICAL INFORMATION

OFF	ON	72	Disabled
ON	OFF	80	Disabled
OFF	OFF	132	Disabled

After a carriage return, the settings of switches 5 and 6 determine the maximum number of characters that can be transmitted before the Serial Interface forces another carriage return to be sent. Characters are displayed on the screen only if line width is set to 40 characters per line (levers 5 and 6 On). After initialization, the line width can be changed from 40 characters per line, but the display on the screen will not correspond to the display on the external device, since transmitted carriage returns are not accompanied on the screen by line feeds.

### Line Feed - Switch 7

-----

DIP Switch	Line Feed
7	
ON	Disabled
OFF	Enabled

If switch 7 is Off (Line Feed Enabled), the Serial Interface transmits a line feed after each carriage return. If the external device automatically supplies its own line feed after each carriage return received, you can set lever seven to On (Line Feed Disabled) to avoid unwanted double-spacing.

### Important Information

=====

#### Permanent Defaults

-----

During each initialization, five remaining operating parameters are set to permanent default values:

1. Parity defaults to disabled (no parity bit).
2. Checksum defaults to disabled (no checksum character).
3. Lower-Case defaults to disabled (converts all incoming lower-case characters to upper-case).
4. Number of Data Bits defaults to 9 (8 data bits plus one start bit).
5. Number of Stop Bits defaults to 2.

After initialization, these five parameters can only be changed by software commands.

### Hardware Handshaking Flow Control

-----

This card does not have any hardware handshaking flow control. It can therefore only be used at slow baud rates. Additional information on flow control can be found in the Tech Info Library article titled "Flow Control Protocols (XOn/XOff or DTR)".

### P7-04 PROM

-----

Early versions of the High Speed Serial Card would not work with certain cards in the next higher numbered peripheral slot. The P7-04 PROM solves this problem.

# APPLE II COMPUTER TECHNICAL INFORMATION

## P8A PROM

-----  
After a program sends output to a printer, and before the P8A PROM allows the Apple to continue executing the program, the P8A sends an ASCII ETX (CTRL-C) to the printer at the end of each line and waits for the printer to send back an ASCII ACK (CTRL-F). So the P8A can send the ASCII ETX, make sure pins 2 & 3 on the interface connector are connected straight across; also make sure the printer can send the ACK. If the pins and the printer do not meet these conditions, then the computer stops running the program after the first line sent to the printer. Neither the original PROM, called the P8 (Apple part# 341-0018), or the basic card provided handshaking capabilities.

The PROM P8A should be installed in place of the existing PROM P8 when using Qume compatible printers. Be aware that switch 4 has a different function with this setup and must be in the OFF position.

The P8A prom uses location \$3C as a temporary memory register. Many of the monitor commands cannot be used with any printer because of this conflict.

## PROM 8A Printer Support

-----  
Printers that support the P8A are:

Anderson Jacobson 832 (send <ESC>!W to set the AJ's mode, page 3-30)  
Qume Sprint 5  
NEC Spinwriter

## DB-25 Connector Pinout

-----  
DB-25 Connector    Signal Name

2.....	Receive Data (Rx)
3.....	Transmit Data (Tx)
7.....	Signal Ground
12.....	Current Loop Data In (Return)
13.....	Current Loop Data In
23.....	Current Loop Data Out

## Current Loop

-----  
The High Speed Serial Interface has a 20ma current loop. It has an active send loop and a passive receive loop.

Page 8 of the card's manual tells how to connect to an 33ASR teletype. This may not work with other 20ma devices. It assumes that the device has a passive send and receive loop.

If the other device has its own active send loop then connect it as follows:

Connect pin 23 to Printer +  
Connect pin 7 to Printer -  
Connect pin 12 to Keyboard +  
Connect pin 13 to Keyboard -

## Article Change History:

19 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1984-96, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL307.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL308.TXT  
#####

Description: High-Density Diskettes: Which Drives Support Them (10/94)  
Header: High-Density Diskettes: Which Drives Support Them (10/94)

Article Created: 16 November 1987  
Article Reviewed/Updated: 18 October 1994

TOPIC -----

In what Apple floppy disk drives can I use high-density diskettes?

DISCUSSION -----

High-density diskettes (1.44MB only) are suitable for use in Apple SuperDrive (formerly Apple FDHD).

High-density diskettes are NOT suitable for use with:

- Macintosh 400K drives
- Macintosh 800K drives
- Apple II 3.5-inch drives

High-density diskettes are physically different from double-density diskettes and are tested to a different specification. The coating on a high-density diskette is thinner for higher data-packing density. Use in 400K or 800K drives is unreliable and can cause data loss.

Article Change History:  
18 Oct 1994 - Reviewed for technical accuracy, revised formatting.

Support Information Services  
Copyright 1988-94, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL308.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL309.TXT  
#####

Description: IEEE-488 Interface Card: Product Description (11/96)  
Header: IEEE-488 Interface Card: Product Description (11/96)

Article Created: 05 August 1996  
Article Reviewed/Updated: 14 November 1996

## TOPIC -----

This article describes the Apple IEEE-488 Interface Card. This card has been discontinued and is no longer available from Apple.

## DISCUSSION -----

### Technical Specifications =====

As a Listener/Talker/Controller, the Apple IEEE-488 Interface card provides a fully compatible subset of the IEEE-488 standard. (Its only limitation is that it cannot pass control to another IEEE-488 controller.)

The interface card can also function as a device on the IEEE-488 bus. With a user-defined program, the card can be used to attach non-IEEE-488-compatible instruments to the bus.

### General Purpose Instrument Bus Commands -----

WRITE	Write Data Out
WRITECNT	Write Data Out with Count
READ	Read Data In
READCNT	Read Data In with Count
XFER	Transfer Data
TRIGR	Group Execute Trigger
CLRAL	Clear All Devices
CLEAR	Clear Selected Devices
REMAI	Remote Enable All
LLKAL	Local Lockout All Devices
LOCAL	Local Mode All Devices
LOCDV	Local Mode Selected Devices
SRQD	Service Requested
SPOOL	Serial Poll
PPOLL	Parallel Poll
PPENB	Parallel Poll Enable
PPDIS	Parallel Poll Disable
PPDIS	Parallel Poll Disable
PPUAL	Parallel Poll Unconfigure All Devices
DEVICE	Controller Device Number
LINEFEED	Line Feed Control
EOS	End of String Character
SCREEN	Screen Control
ABORT	Clear All Interfaces
UNTALK	Universal Untalk

### Device Capabilities -----

SH1, AH1, T3, L1, DC1, DT1, C1, C2, C3, C4, C25.

### Operating Life -----

## APPLE II COMPUTER TECHNICAL INFORMATION

To increase operating life, devices on the bus not in use should be turned off. However, proper operation of the bus requires some of the devices be turned on. The rule of thumb is the computer plus at least half of the devices connected to it must be powered on.

### Software

-----

The following software is supported by on-board, ROM-based firmware and signal protocol on the bus is handled by the resident software. 1. BASIC  
2. Assembly macro commands  
3. Pascal and FORTRAN through assembly language routines

### Maximum Devices

-----

Per card: 14

### Maximum cards

-----

Per computer: 7

### Package

=====

Apple IEEE-488 Interface Card terminates in standard IEEE-488 socket.

Back-panel bracket connects to Apple case ground (for low RFI systems)

Instruction manual includes GPIB connections, listener addresses, talker addresses, secondary addresses, and control codes.

### System Configuration

=====

Apple II or Apple II Plus with a minimum of 32K RAM and available expansion slot.

Apple IIe system with an available expansion slot.

### Article Change History:

14 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1985-96, Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL309.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL310.TXT  
#####

Description: IIGS Memory Expansion Card: Description (11/96)  
Header: IIGS Memory Expansion Card: Description (11/96)

Article Created: 31 May 1991  
Article Reviewed/Updated: 19 November 1996

TOPIC -----

This article describes the Apple IIGS Memory Expansion Card.

DISCUSSION -----

## Overview -----

The Apple IIGS Memory Expansion Card gives your computer the internal memory needed to run sophisticated applications, and gives complete access to the advanced capabilities of the Apple IIGS.

Although the 256K of RAM resident in the computer already lets you keep large documents and many applications close at hand, the Memory Expansion Card will hold even larger files and programs, further reducing time-consuming disk access.

The Apple IIGS Memory Expansion Card adds up to a full megabyte (1MB) of RAM to the computer, in 256K increments. This means the total RAM in your system can be as high as 1.25MB with ROM 01, or 2MB with ROM 03. You can configure and install the card yourself, and increase its capacity at any time.

## System Requirements -----

To use the Apple IIGS Memory Expansion Card, you need an Apple IIGS or an Apple IIe with the Apple IIGS Upgrade installed. (This card is not compatible with other computers in the Apple II family.)

## Technical Specifications -----

### Electrical:

Voltage requirements: 4.75 to 5.25 volts DC Power consumption

Operation: 200 milliamps in 256K configuration  
600 milliamps in 1MB configuration

Standby: 140 milliamps in 256K configuration  
370 milliamps in 1MB configuration.

## Environmental requirements -----

- Ambient temperature: 50 to 104 degrees F (10 to 40 degrees C)
- Relative humidity: 10% to 95% (non condensing)

## Article Change History:

19 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1991-96, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL310.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL311.TXT  
#####

Description: ImageWriter Carriage Assembly stops or vibrates  
Header: ImageWriter Carriage Assembly stops or vibrates

This article last reviewed: 28 March 1988

PROBLEM DESCRIPTION #1: The ImageWriter printer carriage assembly freezes or grinds when connected to a Macintosh or Apple II Super Serial card.

BEFORE YOU START: Familiarize yourself with the ImageWriter Technical Procedures.

CAUSE: One or more of the carriage drive transistors is defective or one or more of the insulators is cracked or broken.

CURE: Remove the string of carriage transistors from the ImageWriter referencing the technical procedures if needed. Check to make sure that none of the insulators is missing. Each transistor should have a mylar insulator between it and the printer chassis. An insulator for the screw should also be present. Install new insulators if any are missing or cracked. Reassemble the printer and run the printer self-test.

In the event that all insulators are in good condition then replace the string of carriage transistors. ALWAYS REMEMBER TO REINSTALL ALL INSULATORS WHEN THE CARRIAGE TRANSISTORS ARE REPLACED. REMEMBER THAT THE PRINTER WILL EXHIBIT THE SAME SYMPTOMS IF THE INSULATORS ARE MISSING. (A TRANSISTOR SHORTED TO GROUND.)

Run an extensive self test on the printer. Sometimes the CPU board will cause transistor(s) to fail again. In the event that this occurs, replace the CPU board and the transistor assembly.

PROBLEM DESCRIPTION #2: The Carriage Assembly stops or vibrates when powered on and the printer IS NOT connected to a computer.

CAUSE: Occasionally, one of the transistor wires is cold-soldered to the transistor itself.

CURE: Replace the string of carriage transistors.  
Copyright 1988, Apple Computer, Inc.  
Keywords: hts

### END OF FILE A2TIL311.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL312.TXT  
#####

Description: ImageWriter I: Settings for All Apples (4/94)  
Header: ImageWriter I: Settings for All Apples (4/94)

Article Reviewed/Updated: 25 April 1994

TOPIC -----

This article gives the proper settings for all Apple computers connected to an ImageWriter I printer.

DISCUSSION -----

Apple II Family with Super Serial Card:

Interface:

The Super Serial Card

	1	2	3	4	5	6	7		1	2	3	4	5	6	7
ON			X		X	X		ON	X				X		
SW1								SW2							
OFF	X	X	X		X			OFF	X	X	X		X	X	
	1	2	3	4	5	6	7		1	2	3	4	5	6	7

Jumper block points to terminal.

Cables:

Internal cable from Super Serial Card to back of machine: 590-0021  
Serial Cable from back of machine to printer: 590-0037

Printer Settings\*:

	8	7	6	5	4	3	2	1
SW 1:		X	X					
	X	X		X	X	X	X	
								OPEN
SW 2:				4	3	2	1	
						X	X	
				X	X			
								OPEN

Apple III and III+:

Interface:

Use .Printer Driver and set first byte in Device Configuration Block to 0E and use printer switch settings A.(9600 Baud) Or leave the settings in the Device Configuration Block at the Default values and use printer settings B. (1200 Baud)

Cables:

Modem Eliminator 590-0029  
Straight Through Cable 590-0037

Printer Settings\*:

APPLE II COMPUTER TECHNICAL INFORMATION

A & B SETTING

```

      8 7 6 5 4 3 2 1
SW 1:   X X
      X X   X X X X
              OPEN
    
```

A SETTING

```

SW 2:   4 3 2 1
              X X
      X X
              OPEN
    
```

B SETTING:

```

SW 2:   4 3 2 1
              X
      X X X
              OPEN
    
```

Macintosh:

Cables:

Accessory Kit Cable 590-0169

Printer Settings\*:

```

      8 7 6 5 4 3 2 1
SW 1:   X
      X X   X X X X X
              OPEN

SW 2:   4 3 2 1
              X X
      X X
              OPEN
    
```

To Build your own cable:

Mac	1	3	5	7	9
Printer	1	7	3	20	2

Lisa:

Cables:

Modem Eliminator 590-0029  
 Straight Through Cable 590-0037

Printer Settings\*:

```

      8 7 6 5 4 3 2 1
SW 1:   X X
      X X   X X X X
              OPEN

SW 2:   4 3 2 1
              X X
      X X
              OPEN
    
```

Make sure the preferences are set. Power off the Lisa so they are saved.

\* The diagrams of these switches are presented as seen from the front of the Imagewriter I printer. The switches are toggle switches; X marks the toggle.

APPLE II COMPUTER TECHNICAL INFORMATION

Article Change History:

25 April 1994 - Corrected Macintosh settings.

Support Information Services

Copyright 1987-1994, Apple Computer, Inc

Keywords:

### END OF FILE A2TIL312.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL313.TXT  
#####

Description: ImageWriter II: Connector cables for all Apples  
Header: ImageWriter II: Connector cables for all Apples

With certain adjustments in software, the cable with order number A2C0311 can perform the same function as the cable with order number A9C0313.

But the cables themselves are different, with different pinouts, and the A2C0311 cable has about eleven intended functions while the A9C0313 cable has three. To keep the differences clear, keep this in mind:

1. The A2C0311 cable is primarily intended to connect the Apple II family to a Personal Modem.
2. The A9C0313 cable is only intended to connect the Apple II family to an ImageWriter II.

You can avoid confusing these cables by using them only for the primary intended functions specified below.

## I. Apple IIe Modem-8 Cable

### A. Number:

1. Order: A2C0311
2. Part: 590-0331-B

### B. Configurations:

1. Primary - from Personal Modem to:
  - a. Apple II
  - b. Apple II Plus
  - c. Apple IIe
2. Secondary - from ImageWriter II or Personal Modem to:
  - a. Apple III
  - b. Macintosh XL
  - c. Lisa
3. Switching:
  - a. From Apple Super Serial Card to ImageWriter II  
-- SSC jumper block pointing to "TERMINAL"
  - b. From Apple Super Serial Card to Personal Modem  
-- SSC jumper block pointing to "MODEM"

## II. Apple IIe Printer-8 Cable

### A. Number:

1. Order: A9C0313
2. Part: 590-0335-A

### B. Configurations:

1. From ImageWriter II to:
  - a. Apple II
  - b. Apple II Plus
  - c. Apple IIe

## III. Macintosh Peripheral-8 Cable

### A. Number:

1. Order: M0185

## APPLE II COMPUTER TECHNICAL INFORMATION

2. Part: 590-0332-B

### B. Configurations:

1. From Macintosh to ImageWriter II or Personal Modem.

## IV. Apple IIc Peripheral-8 Cable

### A. Number:

1. Order: A2C4312
2. Part: 590-0333-B

### B. Configurations:

1. From Apple IIc to ImageWriter II or Personal Modem.

Apple Technical Communications

Keywords:

### END OF FILE A2TIL313.TXT

#####  
### FILE: A2TIL314.TXT  
#####

Description: ImageWriter II: Description  
Header: ImageWriter II: Description

Article Created: 26 May 1992

TOPIC -----

This article describes the ImageWriter II printer.

DISCUSSION -----

The ImageWriter II printer is an entry-level, dot-matrix printer. It offers fast drafts, sharp graphics, near-letter-quality output, easy paper handling, and color printing.

Features  
-----

- \* Three printing speeds
  - \* Fast draft
  - \* Mid-speed correspondence mode
  - \* Near-letter-quality mode
- \* Color printing in six colors with one change of ribbon
- \* Printing on cut-sheet or continuous paper, including labels
- \* Push-button paper loading for single sheets

The ImageWriter II can be expanded by these options:

- \* Sheet feeder option
- \* 32K Memory option increases buffer space so that you can use Apple IIe, IIc, or IIGS computer while the ImageWriter II prints
- \* LocalTalk option allows sharing the printer on any AppleTalk network.

The mini circular-8 connector and cable, available as a separate item, connects the ImageWriter II to Apple CPUs. The Apple II, II Plus, and IIe require a Super Serial Card to connect with an ImageWriter II. The ImageWriter II color printing feature requires an ImageWriter II Color Ribbon and color-compatible software.

Order Number  
-----

ImageWriter II Printer C0090LL/A  
Copyright 1992, Apple Computer, Inc.  
Keywords: specsht

### END OF FILE A2TIL314.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL315.TXT  
#####

Description: ImageWriter II: IBM 3287 printer emulation  
Header: ImageWriter II: IBM 3287 printer emulation

This article last reviewed: 4 June 1986

ImageWriter II's make good replacements for the IBM 3287 dot matrix printers commonly used with the IBM 3270 family of terminal devices. The IBM 3278 terminals can be replaced with an AppleLine-Macintosh-MacTerminal combination, and you can replace the IBM 3287 printers with this simple and cost effective configuration:

Equipment	Vendor	Number
IRMAprint	DCA *	PC3287-S
ImageWriter II Printer	Apple	A9M0310
Apple II Printer 8 cable	Apple	A9C0313

--> Installation Diagram

IBM 3274/6 --> Coax cable --> IRMAprint --> Printer 8 cable --> ImageWriter II

This solution proves to be a good value because it provides better print quality and speed than the IBM 3287 or similar printers such as Telex.

\* DCA is a registered trademark of Digital Communications Association, Inc.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL315.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL316.TXT  
#####

Description: Imagewriter LQ: Connector Cables for Apple Computers (3/95)  
Header: Imagewriter LQ: Connector Cables for Apple Computers (3/95)

Article Created: 16 April 1993  
Article Reviewed/Updated: 14 March 1995

TOPIC -----

What cables does the ImageWriter LQ use to connect to all Apple computers?

DISCUSSION -----

The ImageWriter LQ connects to Apple computers with the following cables:

Note that the cables are listed with their Finished Goods part number followed by their Apple Service part number, where available, in parentheses.

Apple Cable P/N	Computer
-----	-----
M0196 (590-0551)	Macintosh 512 and 512K (Macintosh 128K is not compatible with the ImageWriter LQ printer driver)

M0197 (590-0552) or M2068 - LocalTalk connector	All other Macintosh computers, PowerBook MiniDock, PowerBook Duo Dock, and Apple IIGS
---	--

A9C0314 (590-0556) (w/Super Serial Card jumper set to Terminal) or A2C0312 (590-0555) (w/Super Serial Card jumper set to Modem)	Apple II, Apple II Plus, and Apple IIe
--	--

A2C4313 (590-0554)	Apple IIc
--------------------	-----------

M0197 (590-0552)	Apple IIc Plus
------------------	----------------

Article Change History:  
14 Mar 1995 - Corrected wording of MiniDock.

Support Information Services  
Copyright 1993-95, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL316.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL317.TXT  
#####
```

Description: ImageWriter: Guide to Apple II Errata  
Header: ImageWriter: Guide to Apple II Errata

Page 21 of the Imagewriter User's Manual, Guide to the Apple II, has an error.  
The end of line 340 of the program listing is

```
PRINT CHR$ B$;
```

it should be:

```
PRINT B$;
```

Keywords:

```
### END OF FILE A2TIL317.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL318.TXT  
#####

Description: Innovative Systems  
Header: Innovative Systems

Article Created: 22 July 1993  
Article Reviewed/Updated: 22 July 1993

Innovative Systems  
-----

P.O. Box 444  
Severn, MD 21144-0444

301-987-8688

AppleLink: D2695

Company Profile:  
Hardware, specializing in an arithmetic co-processor card for the Apple II.  
Copyright 1988-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL318.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL319.TXT  
#####

Description: Instant Pascal is Compatible with Apple IIe Card  
Header: Instant Pascal is Compatible with Apple IIe Card

Article Created: 13 August 1991  
Article Last Reviewed: 3 June 1992  
Article Last Updated:

TOPIC -----

Can you use Instant Pascal on the Apple IIe Card and Macintosh LC?

DISCUSSION -----

We tested Instant Pascal and found it was compatible with the Apple IIe Card in the Macintosh LC. Even on the Apple II, Instant Pascal displays poorly on RGB monitors. This condition also appears on the Apple IIe Card/Macintosh LC combination. We suggest black-and-white display for best results.

Copyright 1991 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL319.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL320.TXT  
#####
```

Description: Instant Pascal: Transferring files to and from Apple II Pascal  
Header: Instant Pascal: Transferring files to and from Apple II Pascal

To transfer source code files from Instant Pascal (IP) to Apple II Pascal, you can make use of AppleWorks to massage the IP file type. Follow these steps:

1. Boot AppleWorks and load the IP source file into the word processor as "an ASCII file from disk."
2. Still using AppleWorks, print the file back to disk as an ASCII file.
3. Boot System Utilities 2.1 and copy the "printed" file from the ProDOS disk to an Apple II Pascal disk.

To transfer source code from Apple II Pascal to Instant Pascal, follow these steps:

1. Boot System Utilities 2.1.
  2. Put the Apple II Pascal disk in one drive.
  3. Put a ProDOS formatted disk in a second drive.
  4. Select the Copy Files option from the System Utilities menu and copy the source code files from the Pascal disk to the ProDOS disk.  
  
-- Note that System Utilities 2.1 supports file copying between two differently formatted disks.
  5. The source file on the ProDOS disk will be recognized by Instant Pascal as a "Text" file, but you can open it into the Program window. If you save the file under Instant Pascal, it becomes an "IP" type file.
- Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL320.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL321.TXT  
#####
```

Description: Instant Pascal: Using the Apple DMP  
Header: Instant Pascal: Using the Apple DMP

If the Apple II is equipped with an Apple Parallel Interface card, printing text to a DMP will work fine. Graphic output requires an Imagewriter, Imagewriter II, or Scribe Printer. Text output is also supported on Okidata and Epson printers.  
Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL321.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL322.TXT  
#####

Description: Integer BASIC Firmware Card: Switch Options (2/97)  
Header: Integer BASIC Firmware Card: Switch Options (2/97)

Integer BASIC Firmware Card: Switch Options (2/97)

Article Created: 21 September 1984  
Article Reviewed/Updated: 12 February 1997

TOPIC -----

Listed below are the two options the user may select when using the Integer BASIC firmware card.

DISCUSSION -----

The Integer BASIC firmware card was designed to supply Integer BASIC to Apple II+ owners. Both hardware and software can be used to supply Interger BASIC to the Apple II+.

Hardware  
@L -----

The position of the switch on the rear of the card is used immediately after a system reset to force the selection of one of two banks of ROMs: the firmware card or the motherboard. If the switch is up then the system will default to Integer BASIC, otherwise the system will default to Applesoft.

Software  
-----

By accessing address \$C080, can select Integer BASIC, or, by accessing address \$C081, Applesoft.

NOTE: For systems with Auto Start ROM, every time DOS gets control immediately after a reset, DOS forces a load of the version of BASIC DOS last used, regardless of the position of the switch.

Article Change History:  
12 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1984-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL322.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL323.TXT  
#####

Description: Inter%Poll: How to Identify Active Apple II Systems  
Header: Inter%Poll: How to Identify Active Apple II Systems

This article last reviewed: 17 March 1989

Certain requirements must be met before Inter\*Poll can identify an Apple II on a network:

Apple IIGS  
-----

For an Apple IIGS to appear in the "Device List" window of Inter\*Poll, you must:

1. Select "Built-in AppleTalk" from the Control Panel. At the same time, set the port that the network is connected to, generally the Printer port, to "Your Card".
2. Shut down and restart the system.
3. Run Inter\*Poll on the Macintosh, or have it running and checking the network. The Apple IIGS should show up in the Device List window.

Apple IIe  
-----

1. Install Apple II WorkStation card in slot 7 of Apple IIe and connect LocalTalk port to network.
2. Start up system and log into a ProDOS server on the network. Once the system gets past the Password screen, the device shows up in the Device List window of Inter-Poll.

The important requirements are:

- Having Built-in AppleTalk selected in the Control Panel of the Apple IIGS
- Having the proper port set to "Your Card" on the Apple IIGS
- Being past the Password screen on an Apple IIe with WorkStation Card.

Copyright 1989 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL323.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL324.TXT  
#####

Description: Joystick: You'll Need an Adapter for Use with the Apple II  
Header: Joystick: You'll Need an Adapter for Use with the Apple II

This article last reviewed: 19 January 1988

The packaging for the Apple Joystick (part number A2M2012) states that the Joystick works on the Apple II Plus. In fact, it will not without an adapter plug. Apple no longer supplies that adapter, but there is one available from Southern California Research Group.

Southern California Research Group also supplies adaptors that let you simultaneously connect two joysticks to an Apple II+, Apple IIe, or Apple IIGS (but not to an Apple IIc). If a given software package is specifically written for two Joysticks, it will say so on the box.

For more information, search the library under Southern California Research Group.  
Copyright 1988 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL324.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL325.TXT  
#####

Description: Language Card: Loading Integer BASIC (2/97)  
Header: Language Card: Loading Integer BASIC (2/97)

Language Card: Loading Integer BASIC (2/97)

Article Created: 21 September 1984  
Article Reviewed/Updated: 12 February 1997

TOPIC -----

This article describes how Integer BASIC is loaded into the Language card.

DISCUSSION -----

When you boot an Apple II with the BASICS diskette or the DOS 3.3 System Master Diskette, Integer BASIC and the Programmer's Aid #1 are loaded into the Language Card. The code between Integer BASIC and the Programmer's Aid #1 (\$D800 - \$DFFF) is loaded with a completely useless part of Applesoft.

This applies to the Apple II and Apple II+.

Article Change History:  
12 Feb 1997 - Reviewed for technical accuracy, revised formatting.  
Copyright 1984-97, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL325.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL326.TXT  
#####

Description: LaserWriter: Connecting to Apple II or Apple III  
Header: LaserWriter: Connecting to Apple II or Apple III

This article last reviewed: 17 February 1988

A LaserWriter, mode switch set to Special (Diablo 630 emulation), can be connected to an Apple III or to an Apple II with Super Serial Card (SSC).

from Apple III or SSC			to LaserWriter			
-----						
DB-25 connector			DB-25 connector			
signal	-	pin	wiring	pin	-	signal
Tx		2	<->	3		Rx (Receive Data)
Rx		3	<->	2		Tx (Transmit Data)
Signal Ground		7	<->	7		Signal Ground

Apple II DIP Switch Settings (with SSC in DTE)

-----	
Switch block 1	Switch block 2
1 off	1 on
2 off	2 off
3 off	3 off
4 on	4 off
5 off	5 off
6 on	6 off
7 on	7 off

The above setting result in:  
9600 baud, printer mode  
normal CTS  
8 data bits, 1 stop bit  
no delay after CR  
132 characters/line  
no line feed after CR  
interrupts off  
normal CTS

Apple III Driver

-----  
Use the standard .PRINTER driver, which uses the built-in serial (RS-232C) port. The five parameters to set in the driver configuration block are:  
byte 1 (data rate) 0E = 9600 baud  
byte 2 (data format) 00 = 8 bit, no parity  
byte 3 (CR delay) 00 = no delay  
byte 4 (LF delay) 00 = no delay  
byte 5 (FF delay) 00 = no delay

Keywords:

### END OF FILE A2TIL326.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL327.TXT  
#####

Description: LaserWriter: Shared by Macintosh, Apple IIe, and IBM PC  
Header: LaserWriter: Shared by Macintosh, Apple IIe, and IBM PC

Article Created: 4 April 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I want to connect Macintosh, Apple IIe, and IBM PC, so they can share a LaserWriter IINT. Can this be done? (No file sharing is required.)

DISCUSSION -----

The AppleTalk LaserWriters were designed to be shared.

- \* Any Macintosh has AppleTalk built in.
- \* An Apple II needs the Apple II Workstation card and software to enable access to a networked printer.
- \* An IBM PC needs a LocalTalk PC Card and AppleShare PC to get onto the LocalTalk network to communicate with the LaserWriter.

Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL327.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL328.TXT  
#####
```

Description: Logo II: How to print procedures  
Header: Logo II: How to print procedures

To print procedures using Apple Logo II (128K), type

DRIBBLE 1

which enables the system to print procedures/variables after you type one of the following commands:

PO (name)  
POALL  
PON (name)  
PONS  
POPS  
POT (name)  
POTS

(For information on the above commands, see the Logo II reference manual.)

To disable this printing, type:

NODRIBBLE  
Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL328.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL329.TXT  
#####

Description: Macintosh 512K/512Ke: Cable Compatibility (7/95)  
Header: Macintosh 512K/512Ke: Cable Compatibility (7/95)

Article Created: 27 September 1994  
Article Reviewed/Updated: 06 July 1995

TOPIC -----

This article provides cable compatibility information for Apple computer systems and a variety of Apple peripherals.

The left column lists the peripherals, the right column lists the cable required to connect one of the following computers to it; Macintosh 512K and the 512Ke.

Part numbers which begin with a letter are the finished goods part number, the seven digit numbers are the service part numbers.

DISCUSSION -----

Peripheral -----	Cable part number -----
AppleFax Modem	N/A
Apple Personal Modem Apple Data Modem 2400	M0196/590-0551
Apple Modem 300 Apple Modem 1200	M0170/590-0197
Apple ImageWriter II or II/L Apple ImageWriter LQ	M0196/590-0551 (smoke), LocalTalk optional
Apple ImageWriter Printer Apple ImageWriter 15"	590-0169
LaserWriter, Plus, IInt, IIntx, IIf, IIg LaserWriter Pro 600/630/810 Personal LaserWriter NT, NTR	LocalTalk
Personal LaserWriter LS StyleWriter & StyleWriter II Color StyleWriter/Color StyleWriter Pro	N/A
Apple LaserWriter IIsc Personal LaserWriter SC AppleCD SC Apple Hard Disk 20/40/80 Apple Tape Backup 40SC Apple Scanner Apple Color OneScanner Apple Color Printer	N/A

APPLE II COMPUTER TECHNICAL INFORMATION

Article Change History:

06 Jul 1995 - Updated Cable information for ImageWriter I

Support Information Services

Copyright 1994, Apple Computer, Inc

Keywords: ktable,cabinfo,review

### END OF FILE A2TIL329.TXT

#####  
### FILE: A2TIL330.TXT  
#####

Description: Macintosh PC Exchange: Troubleshooting Overview (7/96)  
Header: Macintosh PC Exchange: Troubleshooting Overview (7/96)

Article Created: 17 November 1993  
Article Reviewed/Updated: 01 July 1996

TOPIC -----

Macintosh PC Exchange is a control panel that lets you format, read, or write DOS-format floppy disks in a Macintosh computer.

Formatting a disk prepares the disk to receive data. PC and Macintosh computers format disks differently. The term "DOS" describes disks formatted using DOS, Windows, or OS/2. Macintosh PC Exchange doesn't provide data translation.

DISCUSSION -----

REQUIREMENTS  
=====

Be sure you have the proper software and hardware to use Macintosh PC Exchange:

- \* System software version 7.0 or later
- \* An Apple SuperDrive (formerly called FDHD), or equivalent third-party drive that reads DOS high-density disks
- \* At least 3 MB of random access memory (RAM)

WORKING WITH DOS DISKS  
=====

After you install Macintosh PC Exchange in your Control Panels folder and restart your computer, DOS-format disks appear directly on your Macintosh desktop when you insert them into the floppy disk drive.

Formatting Disks  
-----

Formatting erases all data on a disk. Be sure the disk you want to format doesn't contain information you need. Click on the disk icon once to select it, and then choose Erase Disk from the Special menu. A format pop-up menu includes these options:

- \* Standard Macintosh format  
Formats high-density disks at 1440K, and low-density disks at 800K.
- \* PC-DOS format  
Formats high-density disks at 1440K, and low-density disks at 720K.
- \* Apple II ProDOS disks  
Formats 400K, 800K, or 1.4MB 3.5 inch Apple II ProDOS disks.

Unreadable Disks  
-----

When you insert a floppy disk into a Macintosh, you may see a message saying the disk isn't readable, and asking whether to initialize it. This might

## APPLE II COMPUTER TECHNICAL INFORMATION

happen for the following reasons:

- \* In the past, many DOS users formatted low-density disks for use as high-density disks. On a DOS computer, always format standard double-sided disks in the 720K capacity, and high-density disks in the 1440K capacity. The Macintosh doesn't recognize an improperly formatted disk.
- \* An unreadable disk might be damaged. Don't try to repair a DOS-format disk with a Macintosh repair utility program. This may destroy information on the disk. If the disk requires repair, use a disk repair utility on a DOS computer.
- \* If a disk has never been used, you just need to initialize it.
- \* If you don't see more than one disk format choice, your computer needs an Apple SuperDrive. You can't use Macintosh PC Exchange in a Macintosh SE or a Macintosh II computer without a SuperDrive upgrade. You can't use Macintosh PC Exchange on a Macintosh Plus computer.
- \* Macintosh PC Exchange might not be properly installed. The PC Exchange icon must be in the Control Panels folder, and you must restart the computer after installation. Read the installation instructions in the Macintosh PC Exchange User's Guide.

### Extension (INIT) Conflicts

-----  
The Macintosh loads system extensions, often called INITs, into system memory when the computer starts up. When they aren't compatible with other software on your computer, you have an INIT conflict. Here are some typical symptoms of INIT conflicts:

- \* System won't accept a correctly formatted DOS disk.
- \* System freezes when you insert a correctly formatted DOS disk.
- \* You can't open the Macintosh PC Exchange control panel to make changes.

If you suspect an INIT conflict, call the Apple Fax Info System at 1-800-505-0171 and order fax document number 20242 for instructions.

### WORKING WITH DOS DOCUMENTS

#### =====

#### DOS Documents Won't Open

-----  
Sometimes you might double-click a document's icon, and see a message saying that the application program couldn't be found. An MS-DOS or Windows document may not open when you double-click the icon for the following reasons:

- \* The Macintosh doesn't know which application program to launch. You can follow the steps in the "Opening a Document from within a Program" section. You can also follow the instructions under "Assigning Document Type."
- \* You may be trying to access the document over a network. PC Exchange assignments don't work for documents over a network. Assignments work only for documents on DOS-format floppy disks and documents copied from DOS-format floppy disks.
- \* The disks currently available on your computer don't have the application. Find the disk that contains the application, and copy the application to your hard disk.

Sometimes the application program launches, but the document doesn't open. Here are some reasons this may happen:

\* The application program may not be able to open DOS documents when you double-click the icon. Follow the instructions in the "Opening a Document from within a Program" section.

\* The document may have been assigned a document type that the program can't open. Follow the instructions in the "Assigning Document Type" section to change the document type. Refer to the table in the "Assigning Macintosh Programs to DOS Documents" section of the "Macintosh PC Exchange User's Guide" to find types that a program can open.

#### Incorrect Document Format

Sometimes you can open a document, but find the format is wrong. It may contain incorrect characters and strange codes. This can happen when an application program recognizes the document's type, but doesn't interpret the document's file format (the way the information in the document is encoded).

Check the application's documentation for document opening and saving procedures with different file formats, or open the document with another program.

You can also try assigning a different document type. Follow the instructions "Assigning Document Type" section of this article. Refer to "the table in the "Assigning Macintosh Programs to DOS Documents" section of the Macintosh PC Exchange User's Guide" to find types that a program can open.

#### Opening a Document from within a Program

To open a document using an application program, follow these steps:

- 1) Launch a Macintosh application.
- 2) Choose the Open command from the File menu.
- 3) In the dialog scroll box, select the DOS document and click Open.

Here's why the document you want may not be listed in the directory dialog box when you choose Open in an application program:

\* The program can't recognize the document type assigned to the document. Try to open the document with another application program. Or reassign a document type following the instructions in the "Assigning Document Type" section to change the document type. Refer to the table in the "Assigning Macintosh Programs to DOS Documents" section of the "Macintosh PC Exchange User's Guide" to find types that a program can open.

\* You may be trying to access the document over a network. PC Exchange assignments don't work for documents over a network. Assignments work only for documents on DOS-format floppy disks and documents copied from DOS-format floppy disks.

#### Assigning Document Type

The Macintosh PC Exchange control panel lets you map file types. A three-letter DOS suffix maps to a corresponding document type on the Macintosh. Here's how to designate a specific Macintosh application for opening MS-DOS documents:

- 1) Choose Control Panels from the Apple menu.
- 2) Double-click the PC Exchange control panel to open it.
- 3) Click on Add.

## APPLE II COMPUTER TECHNICAL INFORMATION

- 4) In the DOS Suffix box, type a period and the three-letter DOS suffix (for example, .TXT). The suffix is required. There is an error in the manual which states that a suffix is NOT required. This is incorrect.
- 5) In the lower part of the dialog box, select the Macintosh application.
- 6) Choose a document type from the Document Type pop-up menu (for example, TEXT).
- 7) Click OK.

Once you make this assignment, you can double-click the icon of the DOS document to open it.

When assigning document types, you must specify the type of document the application supports. If you're unsure of which document type to use, TEXT is the safest.

Once you've made assignments, documents appear on the disk with the icon representing application and document type. Documents with an unassigned DOS suffix appear as generic DOS documents.

So that all network users are consistent, make a master list of assignments on one Macintosh. Also, place a copy of the PC Exchange Preferences file in the Preferences folder, within the System Folder, of each licensed user's Macintosh.

### WORKING WITH MACINTOSH DOCUMENTS =====

#### Document Types -----

Choose Save from the File menu to save documents onto a DOS-format disk. When saving documents created or modified on the Macintosh, be sure to save the document in a file format that the DOS application can read. Refer to the application's documentation to find out what file formats the program can open, import, and save.

The Macintosh also creates two new files for each document, to keep track of such things as the location of icons and windows. You'll need to leave about 5K of extra disk space for each document to accommodate these files.

#### Document Name Length -----

While the Macintosh supports document names up to 31 characters long, DOS supports up to eight characters plus a three-character suffix. Macintosh PC Exchange truncates a longer name used on the Macintosh when saved to a DOS disk. To preview what the shorter name looks like:

- 1) Click on the file to highlight it.
- 2) Choose Get Info from the File menu.
- 3) Click on the document name in the Info dialog box. This switches between the Macintosh and DOS (truncated) version of the name.

If this procedure doesn't work, make sure the File Sharing Extension is in the Extensions folder.

#### Non-English Word Processors -----

When you create a document with a non-English word processor on the Macintosh, the special accent characters (diacritical marks) may change when you open the document on a DOS computer. DOS computers may not support all

## APPLE II COMPUTER TECHNICAL INFORMATION

characters displayed on a Macintosh.

This article is one of many available through the Apple Fax center. For a complete list of available fax documents, search the Tech Info Library for Apple Fax Document Index or call the Apple Fax line at 1-800-505-0171 and select document number 20000 (Apple Fax - Document Index - Product Support Literature). The Apple Fax center is available free of charge 24 hours a day, 7 days a week.

### Article Change History:

01 Jul 1996 - Added Fax Doc Word  
13 Oct 1994 - Added keyword; made several technical corrections.  
28 Sep 1994 - Reviewed for technical accuracy.  
29 Apr 1994 - Indicated that a suffix is required for DOS files.  
09 Feb 1994 - Added more troubleshooting information and retitled.

Support Information Services  
Copyright 1993-96, Apple Computer, Inc.  
Keywords: supt,kfax, kalley

### END OF FILE A2TIL330.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL331.TXT  
#####

Description: Macintosh, Apple II: Specifications of Plastic Enclosures (4/94)  
Header: Macintosh, Apple II: Specifications of Plastic Enclosures (4/94)

Article Created: 22 June 1989  
Article Reviewed/Updated: 1 April 1994

TOPIC -----

What kind of materials are the plastic enclosures for Macintosh computers made of?

DISCUSSION -----

Macintosh cases, mouse devices, and keyboard enclosures through the Macintosh SE are made of Cycolac ABS grade KJC plastic.

Macintosh plastic cases, mouse devices, and keyboard enclosures after the Macintosh SE are made of either

- \* Cycolac ABS grade KJC plastic, rated at 94V-2, or
- \* Cycolac ABS grade KJW plastic, rated at 94V-0.

The keyboards listed below use unreinforced polyester for the keycaps. The polyester makes the sublimation printing of the legends possible.

There is more than one vendor of polyester: the Apple Standard and Extended keyboards use Celanese Celanex 2000-2 resin.

Vendor information on Asian manufacturers' plastic is not available.

- \* the Apple Standard and Extended Keyboards
- \* the Macintosh Plus keyboard
- \* some Apple II GS keyboards
- \* all Apple IIc keyboards
- \* possibly some Apple IIe keyboards

Other keyboards have ABS keycaps; these keycaps are double-shot to put the legends in a different color plastic.

Information on the plastic used in later keyboards is not available at this time.

Article Change History

-----  
 1 April 1994 - Reviewed for technical accuracy.  
 8 July 1992 - Reviewed and retitled for accuracy.  
 Copyright 1989-94, Apple Computer, Inc.  
 Keywords: specsht

### END OF FILE A2TIL331.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL332.TXT  
#####

Description: MacPeak SCSI Drive: How to Use with an Apple IIGS  
Header: MacPeak SCSI Drive: How to Use with an Apple IIGS

This article last reviewed: 23 May 1989

Some people have had problems formatting a MacPeak external SCSI drive (normally for the Macintosh) from an Apple IIGS. One user, who had this problem, was working with an Apple IIGS with 1MB RAM, 3.5-inch and 5.25-inch floppy disk drives, and an Apple II SCSI card in slot 5.

The Apple IIGS recognizes the drive, but the format routine quits after running for about the same time it takes to format a ProDOS floppy and then crashes. A conflict between the SCSI card and the 3.5-inch drive causes this problem.

The 3.5-inch drive plugs into the SmartPort. The SmartPort is slot 5. To use the SCSI card in slot 5, you need to set slot 5 in the Control Panel to "Your Card". When the Control Panel is set in this way, the SmartPort is disabled, and the 3.5-inch drive is also disabled.

To use both the 3.5-inch drive and the SCSI drive on the Apple IIGS, place the SCSI card in a slot other than slot 3 (the 80-column display), slot 4 (the mouse connection), slot 5 (the SmartPort), or slot 6 (the 5.25-inch drive location). This leaves slots 1, 2, and 7 available. Slot 1 is often used for a printer, slot 2 is often used for a modem, and slot 7 is used for AppleTalk. Choose slot 1 if no printer is attached, slot 2 if no modem is attached, or slot 7 if AppleTalk is not in use. No matter which slot you choose, you must set the Control Panel to "Your Card" for that slot.

If, after reassigning slots, there is still difficulty formatting the MacPeak drive, there would appear to be an incompatibility between the SCSI card and the MacPeak drive. (MacPeak indicated that they do not support the use of their drives on the Apple II SCSI card.)

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL332.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL333.TXT  
#####

Description: Manx Software Systems  
Header: Manx Software Systems

Article Created: 02/13/88  
Article Reviewed: 07/13/93  
Article Updated: 07/13/93

Manx Software Systems  
-----

P.O. Box 980  
Freehold, NJ 07728

800-221-0440

908-308-3322 Fax

AppleLink: D0545

Company Profile:  
Software, specializing primarily in Apple II and Macintosh development  
systems.  
Copyright 1989-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL333.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL334.TXT  
#####

Description: Monitor III: Repair Tips  
Header: Monitor III: Repair Tips

This article last reviewed: 7 November 1988

A typical problem reported on the Monitor III is "no video". In these cases, adjusting either the contrast or brightness controls on the monitor solves the problem. With an Apple II or II+, the problem lies in the computer's video adjustment potentiometer, K14 on the main logic board. It is often adjusted too low.

Before you send a Monitor III in for exchange, make sure that the monitor has the problem and not:

1. the video cable or
2. too low of an adjustment of the video signal by the video adjustment potentiometer, K14 on the main logic board.

Copyright 1988 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL334.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL335.TXT  
#####

Description: Motorola CDX268: Terminal Emulation for Macintosh or Apple II  
Header: Motorola CDX268: Terminal Emulation for Macintosh or Apple II

This article last reviewed: 26 May 1989

Emulating a Motorola CDX268 terminal on a Macintosh or Apple II is easy. The CDX286 is what was once, affectionately, called a "glass TTY". It's a very basic terminal that you can configure for baud rate, data and stop bits, and parity. The port can be configured for either RS-232 or RS-422. It requires no strange or out-of-the-ordinary protocols. All of this means that almost any terminal emulation program for the Macintosh or Apple II can be set up to act like a CDX268.

To do the emulation, set it up CDX286 in TTy mode and connect the appropriate cable to the built-in serial port. The cable, like your configuration, depends

on what you're connecting to.  
Copyright 1989 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL335.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL336.TXT  
#####

Description: Mouse Compatibility: Macintosh Plus and Apple II Computers  
Header: Mouse Compatibility: Macintosh Plus and Apple II Computers

Article Created: 19 November 1990  
Article Last Reviewed: 27 July 1992  
Article Last Updated:

TOPIC -----

My official Apple mouse works on my Macintosh Plus, but not on my Apple II computer. What does this mean?

DISCUSSION -----

There are two vendors for the mouse that works with the Macintosh Plus and Apple II line. If you switch mice between systems, the mouse may not work.

One vendor's mouse works with both lines, and the other works only with the Macintosh Plus:

- The mouse identified as "Made in the US" works on both computers.
- The other is identified as "Made in Japan".

All service stock is of the compatible version (P/N 661-0400).  
Copyright 1990 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL336.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL337.TXT  
#####
```

Description: MousePaint: Printing  
Header: MousePaint: Printing

Article Created: 23 October 1984  
Article Last Reviewed: 11 April 1991  
Article Last Updated: 11 April 1991

MousePaint was designed as a black and white program, not a color program. While MousePaint will output to the Scribe in color, the quality is poor. The current version of MousePaint prints directly to Apple dot matrix printers only.

Meanwhile, for printing to third party printers such as Epson or Okidata, here are some indirect methods.

NOTE: All procedures reviewed here use the ProDOS /USERS.DISK that comes with the ProDOS supplied with Disk II's or with the ProDOS User's Kit.

## 1. Using an intelligent graphics interface: Grappler, Pkaso, or other.

- A. Save the picture by selecting the "Put a copy in..." command from the MousePaint File menu. This will create a standard binary picture file on a ProDOS-formatted data disk.
- B. Leave Paint.
- C. Start up Applesoft BASIC using the ProDOS /USERS.DISK. BASIC is an option on the main ProDOS menu.
- D. Now you must instruct your Apple to load the graphics image and to tell the interface to dump it to the printer. Most graphics interfaces come with examples of programs that do this. Enter and save one of these on your ProDOS data disk.

Sales Tip: Enter the programs for the intelligent interfaces you support. Make sure they run under ProDOS and give them to your customers.

## 2. Using a "snapshot" interface.

Some cards, e.g., the "PRINT IT" interface, will print the screen when a button is pressed. Because you would print the Paint palette if you did a MousePaint screen dump, you should save the graphic as above and start up BASIC from the ProDOS /USERS.DISK. Then give these direct commands to your Apple:

```
HGR:POKE -16302,0  
BLOAD picturename, A$2000
```

Then press the interface's button to dump the picture.

## 3. Making your Apple do the work.

This works if you have a graphics printing program that works with your printer, e.g., Printographer, Zoom Grafix, Apple LOGO Tool Kit and so on. Most of these programs run under DOS 3.3.

- A. Follow the instructions above to store a binary file on your ProDOS data disk.
- B. Start up the ProDOS /USERS.DISK.
- C. Now you must convert the binary file over to DOS 3.3 format using the CONVERT option on the ProDOS menu. Follow the instructions in the ProDOS manual for doing this conversion. (See our article on using the ProDOS CONVERT program for more information).
- D. After the file is converted to DOS 3.3, it may be loaded and dumped by

## APPLE II COMPUTER TECHNICAL INFORMATION

your DOS 3.3 graphics program.

Of course, once these programs are published under ProDOS, you will not need to convert the binary file before using the graphics program.

To dump graphics, Apple IIc users can also employ the Imagewriter Tool Kit, Revision B, which works under ProDOS.

Copyright 1984, 1991 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL337.TXT



# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL339.TXT  
#####
```

Description: Moving Apple II DOS 3.3 Data to Macintosh  
Header: Moving Apple II DOS 3.3 Data to Macintosh

This article last reviewed: 21 April 1988

If you wish to run Apple II DOS 3.3 files on a Macintosh (512Ke or newer), you must do the following:

1. If the Apple II Plus is the only Apple II available (NOTE: if an Apple IIe is available, see below), then you need:

- a minimum of 64K in the Apple II Plus
- one 5.25" drive
- one 3.5" drive
- the program "Convert" from a ProDOS System Disk, V1.0, on a bootable 3.5" disk
- the collected data on a 5.25" disk

and

- one Macintosh (512Ke, Plus, SE, or II)
- two disk drives (two 800K floppies or one 800K floppy and a hard drive)
- Apple File Exchange (on one of the floppies or on the the hard drive).

Once these items are together, follow these steps:

- a. Insert the ProDOS disk in the 3.5" drive and the data disk in the 5.25" drive.
- b. Run "Convert".
- c. Transfer the data ("Convert" defaults to 5.25" --> 3.5").
- d. Eject the 3.5" disk, which now has the data converted to ProDOS format.
- e. Launch Apple File Exchange on the Macintosh.
- f. Insert the ProDOS 3.5" disk in the Macintosh drive. (AFE displays its disk in one window and the ProDOS disk in another.)
- g. Select the data file from the ProDOS disk, and click the transfer button.

2. If there is an Apple IIe available, you need:

- a minimum of 128K in the Apple IIe
- one 5.25" drive
- one 3.5" drive
- System Utilities 3.0 on a bootable 3.5" disk
- the collected data on a 5.25" disk

and

- one Macintosh (512Ke, Plus, SE, or II)
- two disk drives (two 800K floppies or one 800K floppy and a hard drive)

## APPLE II COMPUTER TECHNICAL INFORMATION

- Apple File Exchange (on one of the floppies or on the the hard drive).

Once these items are together, follow these steps:

- a. Insert the ProDOS disk in the 3.5" drive and the data disk in the 5.25" drive.
- b. Run System Utilities (labeled SYSUTIL.SYSTEM).
- c. Copy the data file from the 5.25" disk to the 3.5" disk using "Copy Files".
- d. Eject the 3.5" disk, which now has the data converted to ProDOS format.
- e. Launch Apple File Exchange on the Macintosh.
- f. Insert the ProDOS 3.5" disk in the Macintosh drive. (AFE displays its disk in one window and the ProDOS disk in another.)
- g. Select the data file from the ProDOS disk, and click the transfer button.

Using either method, the data from the test instrument is now a Macintosh text file. Once in the Macintosh text file format, it can be loaded into a variety of Macintosh applications.

Keywords:

### END OF FILE A2TIL339.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL340.TXT  
#####

Description: Nite Owl Productions (5/93)  
Header: Nite Owl Productions (5/93)

Article Created: 6 May 1993  
Article Reviewed/Updated: 14 July 1993

Nite Owl Productions  
-----

5734 Lamar Street  
Mission, KS 66202

913-362-9898

913-362-5798 Fax

Company Profile:  
Specializing in software, shareware, accessories for the Apple II, and  
Macintosh and GS batteries  
Copyright 1993, Apple Computer, Inc  
Keywords: 3PTY

### END OF FILE A2TIL340.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL341.TXT  
#####

Description: Parallel Interface Card: 3rd Party Printers (11/96)  
Header: Parallel Interface Card: 3rd Party Printers (11/96)

Article Created: 06 February 86  
Article Reviewed/Updated: 19 November 1996

TOPIC -----

This article discusses connecting the Parallel Interface card to different 3rd party printers.

DISCUSSION -----

Epson FX 80  
=====

General Settings  
-----  
Parallel Interface  
8 Data Bits  
Linefeeds required

Epson DIP switches  
-----

Switch Bank 1	Switch bank 2
1 OFF	1 ON
2 OFF (see notes)	2 ON
3 OFF (see notes)	3 OFF
4 OFF	4 OFF (see notes)
5 OFF (see notes)	
6 ON	
7 ON	
8 ON	

Bank 1  
-----

Switch 2 is set for open zero character; for slashed zero, turn switch 2 on.  
Switch 3 is set for continuous paper; for cut sheet, turn switch 3 on.  
Switch 5 is set for normal density printing at power on; for emphasized printing, turn switch 5 on.

Bank 2  
-----

Switch 4 is set for computer generated carriage return linefeed; for carriage return only, turn switch 4 on.

Parallel Interface  
-----

All switches on the Apple interface card need to be set to factory default settings.

Cable Pinouts  
-----

Apple II Parallel	Epson
CABLE SHIELD ----	1
5 -----	14

# APPLE II COMPUTER TECHNICAL INFORMATION

```
6 ----- 13
8 ----- 12
11 ----- 9
12 ----- 15
13 ----- 16
22 ----- 11
23 ----- 10
15 ----- 3
16 ----- 22
4 ----- 7
7 ----- REMOVE PIN
```

## Centronics 702 or 703

=====

The Centronics printer interface was originally designed to be used with the Centronics microP-1 printer. That printer required a control character to set it into 80-column mode. The firmware on the Centronics printer interface, PROM P9-00, sends a \$1D when ever it receives the <CTRL-I>80N command. This control character is part of a VFU command on a Centronics 702 or 703 and usually deselects the printer. The fix is to send a re-select code, but since the deselected printer doesn't return the Apple's handshake, the reselect will have to be POKED to the interface, as follows:

```
100 FOR J = 1 TO 5
110 POKE -16256 + 16 * SL, 17
120 NEXT
```

## Comrex CR-1 P

=====

Card COMREX CR-1 P

```
5----- DB0-----2
6----- DB1-----3
8----- DB2-----4
11-----DB5-----7
12-----DB6-----8
13-----DB7-----9
15-----STB-----1
16-----ACK-----10
22-----DB3-----5
23-----DB4-----6
24-----SG----- 16
```

## Dip Switch settings

-----

For Parallel card: All down except 4,5

For Comrex: all down except 8

## Article Change History:

19 Nov 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1986-96, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL341.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL342.TXT  
#####

Description: Parallel Interface Card: Product Description (11/96)  
Header: Parallel Interface Card: Product Description (11/96)

Article Created: 24 October 85  
Article Reviewed/Updated: 19 November 1996

TOPIC -----

This article describes the Apple II Parallel Interface card and includes other related information.

DISCUSSION -----

DB-25 Connector Pinout

-----

DB-25

Connector           Signal Name

- 1.....Data In, Bit 0
- 2.....Signal Ground
- 3.....Data In, Bit 2
- 4.....Signal Ground
- 5.....Data Out, Bit 0
- 6.....Data Out, Bit 1
- 7.....Blocked
- 8.....Data Out, Bit 2
- 11.....Data Out, Bit 5
- 12.....Data Out, Bit 6
- 13.....Data Out, Bit 7
- 14.....Data In, Bit 4
- 15.....Strobe Out
- 16.....Acknowledge In
- 17.....Data In, Bit 1
- 18.....Data In, Bit 7
- 19.....Data In, Bit 5
- 20.....Signal Ground
- 21.....Data In, Bit 6
- 22.....Data Out, Bit 3
- 23.....Data Out, Bit 4
- 24.....Signal Ground
- 25.....Data In, Bit 3

Switch Settings

=====

Strobe Length

-----

- 1 microsecond       -> SW1-1:Off, SW1-2:Off, SW1-3:Off
- 3 microseconds     -> SW1-1:On, SW1-2:Off, SW1-3:Off
- 5 microseconds     -> SW1-1:Off, SW1-2:On, SW1-3:Off
- 7 microseconds     -> SW1-1:On, SW1-2:On, SW1-3:Off
- 9 microseconds     -> SW1-1:Off, SW1-2:Off, SW1-3:On
- 11 microseconds    -> SW1-1:On, SW1-2:Off, SW1-3:On
- 13 microseconds    -> SW1-1:Off, SW1-2:On, SW1-3:On
- 15 microseconds    -> SW1-1:On, SW1-2:On, SW1-3:On

Strobe Polarity

-----

## APPLE II COMPUTER TECHNICAL INFORMATION

Positive -> SW1-4:Off  
Negative -> SW1-4:On  
Ack Polarity  
-----  
Positive -> SW1-5:Off  
Negative -> SW1-5:On

### Firmware Select

-----  
Parallel (LF) -> SW1-6:Off  
Centronics (No LF) -> SW1-6:On

### Interrupts

-----  
Disable -> SW1-7:Off  
Enable -> SW1-7:On

Interrupts should be enabled for the Apple III and disabled for the Apple II.

### Switch Setting Explanations

-----  
Different peripherals (non-Apple printers, etc.) may use I/O signals that have different duration and polarity. The STROBE LENGTH, STROBE POLARITY, and ACK POLARITY switch settings on the Parallel Interface Card (2PIC) give you the flexibility to communicate with these other devices. For the I/O signal characteristics of the device you are connecting with, read its manual.

### Controlling Bit 8

-----  
The following program enables you to control bit 8, used by some printers to select expanded or normal print mode or to enable alternate or graphics character sets. DOS 3.2 or DOS 3.3 is required to use this routine, which also works in the Apple III in Emulation mode.

Determine which slot your interface card is in and the corresponding slot code from the table. Replace "<slot>" with the slot number and "<code>" with the code when typing in the program.

slot	1	2	3	4	5	6	7
code	C1	C2	C3	C4	C5	C6	C7

Enter the monitor with Call -155 and type:

```
3B0:A9 <slot>
:20 95 FE
:A9 80
:20 ED FD
:A9 C5
:85 36
:A9 03
:85 37
:4C EA 03
:29 7F
:0D CD 03
:4C 02 <code>
:80
```

To check your typing, type: 3B0L  
Compare your listing to the one below configured for slot 1.

```
03B0- A9 01 LDA #$01
03B2- 20 95 FE JSR $FE95
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
03B5-  A9 80      LDA  #$80
03B7-  20 ED FD   JSR  $FDED
03BA-  A9 C5      LDA  #$C5
03BC-  85 36      STA  $36
03BE-  A9 03      LDA  #$03
03C0-  85 37      STA  $37
03C2-  4C EA 03   JMP  $03EA
03C5-  29 7F      AND  #$7F
03C7-  0D CD 03   ORA  $03CD
03CA-  4C 02 C1   JMP  $C102
03CD-  80        ???
```

Enter 3D0G to return to Basic.

Save the driver to disk by typing: BSAVE CEN 730, A\$3B0, L\$1E

Load the driver and initialize the interface before using the printer. From command mode, type:

```
BLOAD CEN 730
Call 944
```

Or from a program: 100 Print D\$;"BLOAD CEN 730" : Call 944, assuming that D\$ is a CTRL-D.

To switch back to the video monitor for output type: PR#0  
or in a program enter: 200 Print D\$;"PR#0"

To reconnect the printer, all that is required is: Call 954, or from a program: 300 Call 954

To set normal print mode, type POKE 973,0; type POKE 973,128 to set the expanded print mode POKE.

## Cable Pinouts

-----

Here is a sample pinout for an Apple II parallel card to a parallel printer.

20-Pin DIL Connector (Female)	Amphenol Connector (Male)
1 -----	14
2 -----	10
8 -----	1
10 -----	2
11 -----	3
12 -----	4
13 -----	5
14 -----	6
15 -----	7
16 -----	8
17 -----	9
20 -----	16

## Article Change History:

19 Nov 1996 - Reviewed for technical accuracy, revised formatting.  
Copyright 1988-96, Apple Computer, Inc.  
Keywords: HTS,CNFG

### END OF FILE A2TIL342.TXT

## APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL343.TXT  
#####
```

Description: Pascal 1.2 128K Development System: Using it with a QC Hard Disk  
Header: Pascal 1.2 128K Development System: Using it with a QC Hard Disk

If you are fortunate enough to own the Pascal 1.2 development system you can access all features of it from your QC hard disk. The 128K development version is REQUIRED.

It is assumed that you are familiar with the Pascal development system and the workings of the Apple II Pascal Software supplied with your QC hard disk.

### PROCEDURE

1. Create a development version of the Apple Pascal II software disk using the procedure on page 1-4 of the Quark Hard Disk Drive Pascal II Users Manual. In addition to these steps, it is necessary to convert the software from a 64K development version to a 128K development version. To do this place the APPLE3 Pascal disk in the disk drive and T(ransfer "APPLE3:128K.APPLE" and "APPLE3:128K.PASCAL" to "QUARK:SYSTEM.APPLE" and "QUARK:SYSTEM.PASCAL" on the Apple II Pascal software disk. When asked to remove old files, answer "Y".
2. Make a copy of the APPLE1 disk and convert this disk to a 128K development version by T(ransfering APPLE3:128K.APPLE and APPLE3:128K.PASCAL to APPLE1:SYSTEM.APPLE and APPLE1:SYSTEM.PASCAL. When asked to remove old files answer "Y".
3. Boot the newly modified Apple IIPascal Software disk.
4. From the main menu select the VOLUME MANAGER.
5. Select CREATE VOLUMES and make a PASCAL II volume on your QC hard disk that is 800 blocks in size. Mount this volume with Read/Write access by pressing RETURN at the prompt "OK to allow unrestricted access to this volume?".
6. Return to the VOLUME MANAGER main menu and select EDIT CURRENT MOUNTS.
7. Set up the newly created Pascal II volume to currently mount on unit #5. Mount this volume with Read/Write access by pressing RETURN at the prompt "Mount with Read/Write access?".
8. Return to the VOLUME MANAGER main menu and select QUIT.
9. Select RENAME VOLUME and change the volume name to anything you wish.
10. Return to the Pascal QC Hard Disk Utilities menu and select QUIT TO PASCAL.
11. Insert the 128K APPLE1 in the disk drive and select F(iler.
12. Select T(ransfer. Copy the entire contents of APPLE0, APPLE1, APPLE2, and APPLE3 to "#5:=". Certain files, particularly SYSTEM.APPLE and SYSTEM.PASCAL and SYSTEM.COMPIILER are duplicated throughout these disks. When asked to remove old files, answer "N".
13. Place the APPLE3 disk in the disk drive. T(ransfer the files "APPLE3:128K.APPLE" and APPLE3:128K.PASCAL" to "#5:SYSTEM.APPLE" and "#5:SYSTEM.PASCAL". When asked to remove old files, answer "Y".
14. Insert the Apple II Pascal Software disk in the disk drive and T(ransfer "QUARK:=" to "#5:=". When asked to remove old files answer "N".

### FINISHING UP

1. Boot the Apple II Pascal Software disk and select VOLUME MANAGER.
2. Select EDIT CURRENT MOUNTS. Mount your Pascal II volume on unit #4 by selecting "1" and pressing RETURN. Respond to the prompt "Mount which volume?" by typing the name of your Pascal II volume and pressing RETURN. Mount this volume with Read/Write access by pressing RETURN at the prompt "Mount with Read/Write access?".
3. Return to the VOLUME MANAGER main menu and select EDIT AUTOMATIC MOUNTS.
4. Auto mount your Pascal II volume on unit #4 by selecting "1". Respond to the prompt "Mount which volume?" by typing the name of your Pascal II volume

## APPLE II COMPUTER TECHNICAL INFORMATION

and pressing RETURN. Mount this volume with Read/Write access by pressing RETURN at the prompt "Mount with Read/Write access?".

5. Reboot the Apple IIPascal Software disk. You will notice that after the initial boot, all files are being accessed from the QC hard disk. Surprise.... You will be able to access both Apple II Pascal Software files from your hard disk and by quitting to Pascal, will be able to access all Pascal development tools without rebooting.

NOTE: Apple Computer Inc. is not responsible for the contents of this article.

Quark Tech Support

Keywords:

### END OF FILE A2TIL343.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL344.TXT  
#####

Description: Pascal 1.3: Compatible With IIGS RAM Disk, 3.5" Disk  
Header: Pascal 1.3: Compatible With IIGS RAM Disk, 3.5" Disk

This article last reviewed: 1 December 1987

Pascal 1.3 for the Apple II can be loaded into the RAM disk of an Apple IIGS.  
Set your RAM size, and it will be formatted when you start up Pascal.

Pascal 1.3 supports 3.5" disk drives. (In fact, it's now distributed on a  
3.5" disk in addition to the 5.25" disks.)

Keywords:

### END OF FILE A2TIL344.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL345.TXT  
#####

Description: Pascal 1.3: Using it on a Hard Disk 20SC  
Header: Pascal 1.3: Using it on a Hard Disk 20SC

When using Apple Pascal 1.3 (as well as versions 1.0, 1.1, and 1.2) on an Apple II, you cannot use the Hard Disk 20SC as a volume: since Pascal stores the volume size as a signed integer, it cannot work with volumes larger than 32767 blocks. (The HD 20SC has 39165.) The Hard Disk 20SC can be formatted from Apple Pascal, but when you attempt to use the Pascal FILER to copy files to the drive, you get a "NO ROOM ON VOLUME" message. Furthermore, Apple Pascal only supports 77 files per directory, so even if you could use the Hard Disk 20SC, you would run out of directory space before you could even come close to running out of disk space.

The directory limitation applies to 5 meg and 10 meg ProFile drives as well. You can use a ProFile hard drive with Pascal 1.3, but you cannot "share" the drive with ProDOS: you must dedicate the entire hard drive to a maximum of 77 Pascal files.

Apple Technical Communications

Keywords:

### END OF FILE A2TIL345.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL346.TXT  
#####
```

Description: Pascal 1.3: Using UNITSTATUS  
Header: Pascal 1.3: Using UNITSTATUS

The Pascal 1.3 operating system on all Apple systems does not detect characters with the device REMIN:. For example, when an Apple IIc with the 3.5" ROM runs the sample program from volume III, page 191 of the Apple II Pascal 1.3 Workbench Manual, the characters from the modem port (i.e. REMIN:) are not detected.

In previous versions of Pascal, the programmer was requested to use the Applestuff function RemStatus instead of UNITSTATUS when he wanted to use REMIN: and REMOUT:. RemStatus was not included with Pascal 1.3.

To employ REMIN: and REMOUT: with Pascal 1.3, use the Library program to replace the 1.3 APPLESTUFF with the 1.2 APPLESTUFF, following the procedure on pages 216-222 of chapter 8 of the Pascal 1.3 manual, volume II.

After that procedure, the following function and types will be available:

```
TYPE RStatus = (RStatBusy, RStatReady, RStatOffline);  
      RSChannel = (RSOutput, RSInput);
```

```
FUNCTION RemStatus (channel: RSChannel):RstatType;
```

Use this function instead of UNITSTATUS.  
Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL346.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL347.TXT  
#####
```

Description: Pascal II: Using Library Name Files  
Header: Pascal II: Using Library Name Files

Many people have trouble using Library Name Files in Apple II Pascal (v.1.2 and 1.3 ). Here is a short explanation on what library name files are, and how they are used in Pascal.

Library Name files, which contain the names of libraries to be used when running a program, are designed for very large applications, or for multiple program applications that need to use the same libraries.

With small applications, when you want to use a library other than the system library, you can link your libraries ( as regular units ) directly into your program. For larger applications, however, this is impracticable, since each re-compilation makes linking more difficult and cumbersome. The solution for larger applications is to create Program Libraries which allow you to build your own set of intrinsic units without having to place them in the system library. (Intrinsic units have the same root name as the program, but have the suffix '.LIB' on the end; e.g., a program named TRYIT.CODE becomes TRYIT.LIB). What Library Name files do is allow you to handle up to five Program Library files for each program.

To use Library Name files, write your library code and program code in the standard way. Each library unit MUST be an intrinsic unit. When writing your program you must remember to use the "\$U ..." option to tell the compiler where to find your libraries interface (program library names are used only at execution time.). After compiling your library units, don't forget to use the LIBRARY program to place a library header in the file. Now, just compile your program and create your library name file. When you execute, your program will find its units even though you did not have to link them in.

Here are three sample files that illustrate the process:

Main program source code [TRYIT.TEXT]:

```
PROGRAM USEWALLY;  
  
USES    {$U WALLY.LIB} WALLY;  
  
BEGIN  
    DOWALLY;  
END.
```

Wally, library unit source code [WALLY.TEXT]:

```
UNIT WALLY;  
  
INTRINSIC CODE 17 DATA 18  
  
INTERFACE  
  
VAR    WALLSTR:STRING[80];  
  
PROCEDURE DOWALLY;
```

## APPLE II COMPUTER TECHNICAL INFORMATION

### IMPLEMENTATION

PROCEDURE DOWALLY;

BEGIN

    WRITELN('WELL WALLY WORKS WELL I THINK');  
END;

BEGIN

END.

Library name file [TRYIT.LIB]:

LIBRARY FILES:

WALLY.LIB

\$\$

To build this program, you must compile the library unit first, then use LIBRARY to turn it into a library (with the proper header). Finally, compile the main program ( TRYIT.TEXT) and then run it to be sure that it works.

Keywords:

### END OF FILE A2TIL347.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL348.TXT  
#####

Description: PC Transporter: IIGS Driver Not Available For AppleShare  
Header: PC Transporter: IIGS Driver Not Available For AppleShare

Article Created: 16 September 1988  
Article Last Reviewed: 27 January 1992  
Article Last Updated: 27 January 1992

TOPIC -----

Can I use PC Transporter with an AppleShare File Server?

DISCUSSION -----

Applied Engineering's PC Transporter, the MS-DOS card for the Apple II family, can theoretically work with the AppleShare File Server. Specifically, you can use the server as drive "D" when using the MS-DOS software, as well as Apple IIGS mode.

However, such a driver that can access the AppleTalk resources of the Apple IIGS doesn't currently exist. Development of the driver is typically the responsibility of the card's manufacturer.

On AppleLink, you can find contact information for the various vendors by clicking the Library Index button to view the folder structure in the Tech Info Library. An alphabetic listing of vendors is in the Third Party Company Directory folder.

Copyright 1988, 1989, 1992 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL348.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL349.TXT  
#####

Description: Performa: Running Apple II Software (3/93)  
Header: Performa: Running Apple II Software (3/93)

Article Created: 24 March 1993

Article Change History

-----  
06/22/93 - REWROTE  
\* With more complete information.

TOPIC -----

I would like information on running Apple II software on my Performa 430. Do I need a card? Where do I install it? Where do I get it, and the necessary supporting software?

DISCUSSION -----

The Apple IIe Card is an accessory card that lets you run Apple IIe programs on several Macintosh models. At this writing, those models were Performa 400, 405, 430, and 450; Macintosh LC, LC II, and LC III; and Macintosh Color Classic. When the Macintosh is in the Apple IIe mode, it performs just like an Apple IIe Computer. You can start up and use Apple IIe software applications just as you would on an Apple IIe.

Features of the Apple IIe Card:

- \* Runs virtually all Apple IIe applications -- more than 10,000 programs.
- \* Applesoft BASIC programming language is built in. The Apple IIe Card supports ProDOS, DOS 3.3, and Apple II Pascal operating systems.
- \* The Macintosh hard drive may be partitioned for the ProDOS operating system to allow mass storage of Apple IIe programs and files.
- \* The Macintosh's internal SuperDrive can be used with ProDOS-formatted disks. ProDOS disks appear on the Macintosh desktop to allow easy transfer of files to the hard drive.
- \* Allows connection of one UniDisk 3.5 disk drive and two Apple 5.25 disk drives through the Apple IIe Card's connection cable. This cable also allows the attachment of an Apple IIe joystick.
- \* Can print from Apple IIe applications to any printer that the Macintosh can select.

You can purchase the Apple IIe Card at your Local Apple Dealer. Also, the Local Apple Service Provider can install the card. You can find the Local Apple Dealer/Service Provider by calling (800) 538-9696. You can also purchase the Apple IIe Card from the Apple Catalog (800) 795-1000.

If you need help with the Apple IIe Card, then you can call the Apple Assistance Center at (800) SOS-APPL Extension 555.

Here is what you need to order:

- \* Apple IIe Card (Product Number M0444/D,Catalog Number B1043)

Optional Items:

APPLE II COMPUTER TECHNICAL INFORMATION

\* Apple 5.25 Drive (Product Number A9M0107, Catalog Number B1024)  
\* Joystick II (Product Number A2M2012, Catalog Number B1360)  
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Keywords:

### END OF FILE A2TIL349.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL350.TXT  
#####

Description: Practical Computer Technologies (5/93)  
Header: Practical Computer Technologies (5/93)

Article Created: 6 May 1993  
Article Reviewed/Updated: 15 July 1993

Practical Computer Technologies  
-----

5407 Port Royal Road  
Springfield, VA 22151

Phone: 703-321-3003

Fax: 703-321-3053

Company Profile:  
Specializing in consignment and resale of a wide assortment of Macintosh and  
Apple II software and hardware.  
Copyright 1993, Apple Computer, Inc  
Keywords: 3PTY

### END OF FILE A2TIL350.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL351.TXT  
#####

Description: Preowned Electronics  
Header: Preowned Electronics

Article Created: 3 June 91  
Article Reviewed: 15 July 1993

Preowned Electronics  
-----

205 Burlington Road  
Bedford, MA 01730

800-274-5343

617-275-4600

617-275-4848 Fax

Company Profile:

Hardware, specializing in used Apple II equipment and discontinued Macintosh  
equipment

Copyright 1991-93, Apple Computer, Inc.

Keywords: 3PTY

### END OF FILE A2TIL351.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL352.TXT  
#####
```

Description: Problem using Apple II parallel cable with UPIC  
Header: Problem using Apple II parallel cable with UPIC

You may have problems using Pascal III with the Apple II Parallel Printer Interface cable, since Pascal requires different error handshaking than the cable is able to support. Rewire the cable to the pin specifications on page 16 of the Universal Parallel Interface Card manual.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL352.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL353.TXT  
#####

Description: ProDOS 8: Finding Volume Size using Assembly Language  
Header: ProDOS 8: Finding Volume Size using Assembly Language

This article last reviewed: 8 March 1989

You can determine the number of blocks on a ProDOS-compatible device from assembly language.

On a ProDOS volume, the total number of blocks available is stored on block 2, bytes \$29 and \$2A. The number is in low byte/high byte format: for example, an 800K floppy will have \$40 at byte \$29 and \$06 at byte \$2A.

Byte \$2A contains the first two digits and byte \$29 contains the last two digits. \$0640 is equal to 1600 decimal, which is the total number of blocks on an 800K ProDOS disk.

If you need to determine the number of blocks on a device from the hardware, that information can be obtained regardless of whether or not block 2 is intact.

Check memory locations \$Cs01, \$Cs03, \$Cs05 (s = slot number) for \$20, \$00, and \$03, respectively. If these values are found, then the card in the slot is a disk controller.

Check memory location \$CsFF. If the value is \$00 or \$FF, assume that an Apple Disk II disk controller card is installed (\$00 is 16-sector, \$FF is 13-sector).

Otherwise, check memory location \$Cs07. If the value does not equal \$00, the device is not a SmartPort device, and the total number of blocks for the drive are stored at memory locations \$CsFC and \$CsFD in low-byte/high-byte order.

If the total number of blocks is 0, contact the card manufacturer for details on how to determine the number of blocks.

(NOTE: We do not know of any disk controller that does not store the total number of blocks at memory locations \$CsFC and \$CsFD.)

If the value at memory location \$Cs07 is \$00, the drive is a SmartPort device. To find the number of blocks on the drive, you must make SmartPort status call \$03 (get DIB). This call is documented in the "Apple IIGS Firmware Reference Manual" (Apple # 030-3121-A) on pages 114 through 125, with the most specific information starting on page 121.

Copyright 1989 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL353.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL354.TXT  
#####

Description: ProDOS 8: How To Find Disk, Controller, and Block Information  
Header: ProDOS 8: How To Find Disk, Controller, and Block Information

This article last reviewed: 29 March 1989

This article describes how to find disk information, by making calls to significant memory locations.

Is the Card a Disk Controller?  
-----

Check memory locations \$Cs01, \$Cs03, \$Cs05 (s = slot number) for \$20, \$00, and \$03, respectively. If these values are found, then the card in the slot is a disk controller.

Apple Disk II Disk Controller and Disk Capacity?  
-----

Check memory location \$CsFF. If the value is \$00 or \$FF, assume that an Apple Disk II disk controller card is installed (\$00 is 16-sector, \$FF is 13-sector).

SmartPort Device and Number of Blocks?  
-----

If the device is not an Apple Disk II disk controller card, check memory location \$Cs07. If the value does not equal \$00, the device is not a SmartPort device, and the total number of blocks for the drive are stored at memory locations \$CsFC and \$CsFD in low-byte/high-byte order.

If the total number of blocks is 0, contact the card manufacturer for details on how to determine the number of blocks. (Note: We do not know of any disk controller that does not store the total number of blocks at memory locations \$CsFC and \$CsFD.)

If the value at memory location \$Cs07 is \$00, the drive is a SmartPort device. To find the number of blocks on the drive, you must make SmartPort status call \$03 (get DIB). This call is documented in the "Apple IIGS Firmware Reference Manual" on pages 114 through 125 with the most specific information starting on page 121.

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Keywords:

### END OF FILE A2TIL354.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL355.TXT  
#####

Description: ProDOS Applications Need "Chooser II" To Select A Printer  
Header: ProDOS Applications Need "Chooser II" To Select A Printer

This article last reviewed: 13 September 1988

Some users running AppleShare networks have had problems getting the ProDOS applications to print.

To get a ProDOS application to print correctly, you need to run the "Chooser II" program, which is in the AppleTalk folder on Apple II Workstation disk. This program allows you to select a printer.

(NOTE: If the printer selected is a LaserWriter, the ImageWriter emulator is downloaded immediately. "Chooser II" can run from either the server or the work-station. Ensure that the application is printing to slot 7. If printing to

a LaserWriter, set up the program for printing to an ImageWriter.)

Copyright 1988 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL355.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL356.TXT  
#####
```

Description: ProDOS Assembler Tools: Startup Sequence  
Header: ProDOS Assembler Tools: Startup Sequence

This article last reviewed: 22 October 1987

The ProDOS Assembler Tools disk doesn't start up exactly as described on page 15 of the manual. When an Apple II starts up, it looks for a file named PRODOS. After it finds and loads PRODOS, it runs the first file on the disk that has the suffix .SYSTEM in its name. On the ProDOS Assembler Tools disk, the first such file is BASIC.SYSTEM, but the one needed is EDASM.SYSTEM. Here's how to change the name of BASIC.SYSTEM so that EDASM.SYSTEM gets loaded first:

1. Make a copy of the ProDOS Assembler Tools disk.
2. Start up from the new disk.
3. When the Applesoft ] prompt appears, type the following, pressing Return after each line:  

```
] UNLOCK BASIC.SYSTEM  
] RENAME BASIC.SYSTEM,BASIC.SYS
```
4. Either restart the system, or type the following to start the assembler:  

```
] -EDASM.SYSTEM
```

This tells BASIC.SYSTEM to load and run EDASM.SYSTEM. ProDOS Assembler Tools now starts up, as described in the manual.

Keywords:

```
### END OF FILE A2TIL356.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL357.TXT  
#####
```

Description: ProDOS Assembler Tools: Technical product description  
Header: ProDOS Assembler Tools: Technical product description

The ProDOS Assembler Tools is designed for programmers who want to write assembly-language programs for the Apple II, II+, IIC, IIE or IIE enhanced. All five of these computers are based on the 6502 microprocessor, whose command set is supported by the Assembler Tools. Before you attempt using the Tools, we recommend that you be fairly familiar with BASIC or Pascal on the Apple computer system and that you read one or more books on 6502 assembly-language programming.

The ProDOS Assembler Tools include four programming tools that will help you create and execute assembly-language programs to run on any Apple II computer. These tools are the Editor, the Assembler, the Bugbyter debugger, and the Relocating Loader:

--Use the EDITOR to create and modify program source files and to store them on disk. You can also use the Editor to edit ProDOS EXEC files and BASIC program source files.

--Use the ASSEMBLER to generate an executable program.

--Use the BUGBYTER debugger to test and verify the execution of your programs. Also use the Bugbyter to help you locate and fix any errors that might creep into your programs.

Further details can be found in the ProDOS Assembler Tools User's Manual.  
Apple Technical Communications

Keywords: specsht

```
### END OF FILE A2TIL357.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL358.TXT  
#####

Description: ProDOS Can't Handle Disk Volumes Larger Than 32MB  
Header: ProDOS Can't Handle Disk Volumes Larger Than 32MB

This article last reviewed: 5 February 1988

Current versions of ProDOS can't handle more than 32MB of storage on a hard disk volume.

If you connect a Hard Disk 40SC or Hard Disk 80SC to an Apple II, you must partition the hard disk -- that is, divide it into separate volumes. Each volume is then counted as one SCSI device.

Apple does not supply the software that does the partitioning and currently does not know of any other source for such software.

Keywords:

### END OF FILE A2TIL358.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL359.TXT  
#####

Description: ProDos GS/OS, and Instant Pascal: Launching and Quitting  
Header: ProDos GS/OS, and Instant Pascal: Launching and Quitting

This article last reviewed: 7 March 1990

TOPIC -----

We have an AppleTalk network system and have discovered some strange behavior with certain applications on the Apple II.

Using current software, there are three shell programs (besides BASIC) available for AppleTalk network system users. They are Aristotle, the Finder, and Let's Share. We have found that some applications work perfectly when launched from one of the shells, but not when launched from another. Also, when quitting, some return to the shell from which they were launched, while others return directly to the File Server Log-On screen.

Here are some examples:

- Mavis Beacon Teaches Typing (Software Toolworks) works fine when launched from Aristotle or the Finder, but not from Let's Share.
- Medley (Milliken) always returns the user to the Log-On screen on quitting.

Some applications seem to return the user to the shell from which they were launched, while others return the user to the server-defined startup application. (I have no concrete examples of this, but here's an illustration)

- The user logs on and goes to Aristotle, his startup application. He launches the Finder from Aristotle and from there launches "Application X". On quitting Application X, he is returned to the Finder, and on quitting the Finder (Special Menu, Shut Down, Return to Launching Application), he is returned to Aristotle.
- The user repeats the above process to get to the Finder, but this time launches "Application Y". On quitting Application Y, he is returned directly to Aristotle, even though he launched Application Y from the Finder.

Do you have any clues about these differences? Do some of these shells leave memory in a different state than others when they launch applications? Are there any standards for this sort of thing? Is Let's Share a known offender, or does it follow whatever rules there are? Is there a standard GS/OS or ProDOS 16 Quit call? Is everyone not implementing it correctly?

Here's a related question:

I have tried putting ProDOS applications that reside on floppy disks into Aristotle menus. If I put the disk in the drive and choose the menu item, the application launches properly and, on quitting, seems to return the user to Aristotle without a hitch. However, a colleague reports that when doing this with Instant Pascal, the server connection is dropped somewhere, so quitting fails. Do some applications disable network listeners or trash the memory where network files resides? Is there any way to tell what might work in this fashion and what might not?

DISCUSSION -----

## APPLE II COMPUTER TECHNICAL INFORMATION

The behavior is determined by which operating system the application is written under: GS/OS or ProDOS 8.

The ProDOS 8 quit command is quite simple and does not have the ability to put the name of the application to return to on the return stack. ProDOS applications "quit to" the program named Start in the GS/OS volume. As shipped, this is the Finder. However, if the startup program has been set in the AppleShare Admin application, the Finder may not be the "start" program any longer. Whatever is set in Admin is the application to which the ProDOS 8 programs return.

GS/OS applications have the ability to put the name of the program to which one returns onto the return stack. If properly written, quitting a GS/OS application returns the user to the same application that launched the GS/OS program just quit.

For your examples:

- We defer to Russ Systems about all Let's Share issues.
- We are still trying to work a variety of issues out with Medley. We will add this one to the list to investigate.
- With Aristotle (ProDOS 8) as the Admin set startup application, launching the Finder (GS/OS), then launching "Application X" (apparently, a GS/OS application from the behavior described), and quitting "Application X", it would be correct to finish at the Finder, if "Application X" is, indeed, a GS/OS application. Quitting the Finder (GS/OS) would then return to the application that launched it, Aristotle.
- In the next example, instead of launching "Application X", the user launches "Application Y" (apparently, a ProDOS 8 application from the behavior described), then quits "Application Y", and finishes in Aristotle. This would be the correct behavior for a ProDOS 8 "Application Y".

Instant Pascal has several issues associated with it. The primary issue is that it is neither a ProDOS nor a GS/OS application. Instant Pascal has its own operating system with its own input/output routines. These I/O routines know nothing about the network. It is, thus, totally logical that Instant Pascal disregards all network activities. The only solution is to rewrite the Instant Pascal operating system. It is unlikely that this solution will ever be considered.

Copyright 1990 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL359.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL360.TXT  
#####

Description: ProDOS: Converting Files from 5.25-inch Disks to Macintosh  
Header: ProDOS: Converting Files from 5.25-inch Disks to Macintosh

Article Created: 14 June 1991  
Article Last Reviewed:  
Article Last Updated:

TOPIC -----

I'm trying to transfer files from 5.25-inch ProDOS disk to Macintosh SE 3.5-inch disks using a 5.25 drive with a Macintosh SE Bus Controller Card. This works fine with IBM disks, but AFE won't read ProDOS disks (or even give me the option select to select a ProDOS driver).

DISCUSSION -----

The Apple PC 5.25 Drive for the Macintosh SE can see MS-DOS files, but not ProDOS files.

Use the utilities on the Apple II to do a file copy from a 5.25-inch to 3.5-inch, then open the file in the Macintosh SE and convert it using Apple File Exchange with your Apple SuperDrive (formerly Apple FDHD).  
Copyright 1991 Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL360.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL361.TXT  
#####

Description: ProDOS: Limited to 32 megabyte access on HD40SC and HD80SC  
Header: ProDOS: Limited to 32 megabyte access on HD40SC and HD80SC

This article last reviewed: 2 March 1987

A limitation of ProDOS prevents the Apple II from accessing more than 32 megabytes of storage space on an Apple Hard Disk 40SC or Apple Hard Disk 80SC. Those drives can be connected to an Apple II with an Apple II SCSI card.

Copyright 1990 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL361.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL362.TXT  
#####
```

Description: ProDOS: Product Overview  
Header: ProDOS: Product Overview

ProDOS is Apple's new disk operating system for the Apple IIe and II+. It is now included with Apple's Disk II drives with controller and the DuoDisk.

Apple designed ProDOS as a transition from DOS 3.3 and for the greater sophistication and enhanced capabilities demanded by more professional applications. ProDOS provides compatibility between the Apple III and the Apple II line of computers, since ProDOS and SOS share similar file naming conventions and file formats.

ProDOS requires a 64K Apple II+ or IIe, with Applesoft in ROM. Integer BASIC is not supported. Listed below are some of the features of ProDOS.

- Hierarchical file system similar to SOS.
  - Up to 51 files in a volume directory; the number of files in subdirectories is limited only by the space on the disk.
  - 20 different file types; 10 are user-defineable.
  - Up to 8 files may be open at one time.
  - A defined, usable machine language interface.
  - Interrupts up to 4 levels are supported and processed sequentially.
  - Compatibility between files created on an Apple III.
  - Fast transfer speed to and from disk; about 8K per second from Disk II.
  - All disk devices supported by Apple will work automatically.
  - Direct block access.
  - Enhanced BASIC command structure.
  - Easier Assembly Language program development and maintenance.
  - Up to 32 megabytes per volume, 16 megabytes per file.
  - Multiple logical volumes per physical volume.
  - Pseudo disk emulator using the Apple Extended Text Card, enabling fast file access and graphics screen switching.
- Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL362.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL363.TXT  
#####
```

Description: ProDOS: Using /RAM and Double High-Resolution Graphics  
Header: ProDOS: Using /RAM and Double High-Resolution Graphics

Whenever ProDOS is booted, it checks the environment; if ProDOS finds a 128K Apple II system, it configures the auxiliary 64K memory bank as a RAM disk named /RAM. This "disk" is catalogued as slot 3, drive 2, since it's comprised of memory on the 80-column card in slot 3.

If you plan to use this auxiliary memory for high-res graphics, you must protect yourself from /RAM. To construct a space for protecting high-res pages in auxiliary memory while maintaining /RAM as an online storage device, perform the following two steps:

1. Save a "dummy" 8K file as the first entry in /RAM; this file will always be saved at \$2000 to \$3FFF.
2. Immediately afterwards, save a second "dummy" 8K file to /RAM; this file will be saved at \$4000 to \$5FFF.

--> IMPORTANT NOTES:

1. There is no formula for determining where the blocks of /RAM physically reside in memory.
2. The logical blocks in /RAM are not physically contiguous.
3. There is no guaranteed way to protect any other fixed portions of auxiliary memory by means of the "dummy" file method.

If you wish to protect all auxiliary memory not reserved for use by Apple, you must disconnect /RAM. The following three areas of the system global page are of interest to anyone who wishes to disconnect /RAM:

\$BF10-\$BF2F contains the disk device driver addresses.

\$BF31 contains the number of devices minus one.

\$BF32-\$BF3F contains the list of disk device numbers.

Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL363.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL364.TXT  
#####

Description: ProFile Formatting Error #21  
Header: ProFile Formatting Error #21

This article last reviewed: 29 March 1988

PROBLEM DESCRIPTION: Error #21 is generated when the ProFile is formatted using the Apple III System Utilities.

BEFORE YOU START: Familiarize yourself with the Apple III Owners Guide and ProFile Owners Manual.

CAUSE: Software damage has occurred.

CURE: Use the following procedure:

1. Format the ProFile using the Apple III Systems Utilities and define the volume name as HVRMHGL. Another volume name can be defined once the ProFile has been formatted.

Proceed to Step 2 if you again receive the error #21.

2. Format the ProFile using an Apple II/IIe with the ProDos utilities. Reconnect the ProFile to the Apple III once the ProFile has been successfully formatted and perform Step 1.

Use the ProFile troubleshooting procedure (documented in ProFile Technical Procedures) if both Steps 1 and 2 fail to produce satisfactory results.

Copyright 1988, Apple Computer, Inc.

Keywords: hts

### END OF FILE A2TIL364.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL365.TXT  
#####

Description: ProFile Hard Drive: Specifications (Discontinued)  
Header: ProFile Hard Drive: Specifications (Discontinued)

This article last reviewed: 10 May 1985

Model A9M0005 5 Megabyte (Discontinued)  
A9M0100 10 Megabyte (Discontinued)

I. Technical Specifications

1. Data Storage Characteristics:

	A9M0100	A9M0005
Data Capacity (formatted)		
in megabytes:	10	5
Data Surfaces:	4	4
Heads per Surface:	1	1
Track Spacing per inch:	345	254
Tracks per Surface:	306	152
Sectors per Track:	16	16
Sectors per Surface:	4896	2432
Block Size		
in bytes:	512	512
5.25" Floppy Equivalence:	70	35

2. Drive Characteristics:

Average Seek Time		
in milliseconds:	85	180
Data Transfer Rate		
in megabits/sec:	5	5
Rotational Start-up Time		
in seconds:	20	20
Drive Ready to Operate		
in seconds:	120	60
Rotational Speed		
in RPMs +/- 1%:	3600	3600
Mean Time Between Failure:		
in hours:	10,000	10,000

--Winchester technology

3. Interface:

- a. Type: 8-bit parallel
- b. Connector: DB-25
- c. Drives per Interface: 1

4. Power Requirements:

- a. U.S.: 110 VAC, 35 Watts
- b. Europe: 230 VAC
- c. Drive power source internal to the ProFile.

5. Environmental Requirements

- a. Temperature
  - Operating: 50 to 104 degrees F (10 to 40 degrees C)
  - Storage: -7.6 to 176 degrees F (-22 to 80 degrees C)

# APPLE II COMPUTER TECHNICAL INFORMATION

## b. Humidity

- Operating: 20 to 80% noncondensing.
- Storage: 1 to 95%

## 6. Physical Characteristics

	inches	centimeters
Height:	4.39	11.15
Width:	17.28	43.89
Depth:	8.81	22.38

	pounds	kilograms
Weight:	11	5

## II. Package

With the 5 Megabyte or 10 Megabyte ProFile package:

1. Apple ProFile hard-disk drive
2. Apple ProFile Accessory Kit including:
  - a. ProFile interface cable
  - b. System-specific ProFile owner's manual
  - c. Warranty and product registration
  - d. User Input Report
3. Included in the Apple II Accessory Kit:
  - a. Catalyst II software
  - b. Apple II SOS Driver and Utilities software
  - c. Backup II software
  - d. Apple II ProFile Interface Card
4. Included in the Apple III Accessory Kit:
  - a. Catalyst 2.0 software
  - b. Pascal ProFile Manager software
  - c. Backup III software
  - d. Apple III ProFile Interface Card

## III. System Configuration

--Either ProFile may be used the following Apple personal computers:

1. IIe
  - a. RAM: Minimum of 64 kilobytes
  - b. Operating System: ProDOS Pascal 1.2
  - c. Interface Cards:
    - The difference bewteen the 5Mb and 10Mb ProFile Interface cards is the ROM at location C6. The ROM is 341-027 for the 5Mb Card and 341-0299-B for the 10 Mb.
2. Apple III
3. Macintosh XL

NOTE: The Macintosh XL containing a built-in 10-megabyte hard disk requires a Parallel Interface Card (Order A6BB101, obsolete).

## Features

Controller automatically scans for error conditions, relocating marginal data blocks elsewhere on the hard disk, if necessary.

Copyright 1988 Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL365.TXT

#####  
### FILE: A2TIL366.TXT  
#####

Description: ProFile: Formatting Compatibility (10/94)  
Header: ProFile: Formatting Compatibility (10/94)

Article Created: 09 July 1985  
Article Reviewed/Updated: 18 October 1994

TOPIC -----

For what operating systems is the Apple ProFile compatible?

DISCUSSION -----

ProFiles can be formatted for two main types of operating systems:

- 1. the Lisa Operating System for the Lisa

or

- 2. ProDOS for the Apple II, and SOS for the Apple III.

ProFiles are formatted at the factory with the Apple III SOS format and contain the Apple III System Utilities program. This format is completely compatible with the Apple II ProDOS format, and so can be used on either the Apple II or Apple III; additionally, these ProFiles can be used without difficulty on the Macintosh XL (running Lisa or Macintosh software).

Once a ProFile has been formatted by Lisa software, it will not be able to work any longer on an Apple II or III.

ProFiles don't need any special software to function with these systems other than the respective system formatters which accompany each system's operating system utilities, regardless of what system it was used on previously.

NOTES:

- 1. The Pascal ProFile Manager will not format a ProFile; the ProFile must already be formatted with ProDOS.
- 2. If you're unable to initialize a Profile for use with an Apple II or Apple III after it's been used with a Macintosh XL, check with a Level II service center: the ProFile may need reformatting.

Article Change History:  
18 Oct 1994 - Reviewed for technical accuracy, revised formatting.

Support Information Services  
Copyright 1988-94, Apple Computer, Inc.  
Keywords:

### END OF FILE A2TIL366.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL367.TXT  
#####

Description: Quality Computers (11/94)  
Header: Quality Computers (11/94)

Article Created: 6 May 1993  
Article Reviewed/Updated: 11 November 1994

Quality Computers  
-----

P.O. Box 665  
St. Clair Shores, MI 48080-0665

Phone: 800-890-8263  
313-774-7740

Fax: 313-774-2698

Company Profile:

Specializing in software, accessories, and support for the Apple II family.  
Publications include "II alive", a magazine devoted to the Apple II, and a  
magazine and catalog for educators, called "Enhance".  
Copyright 1993-94, Apple Computer, Inc  
Keywords: 3pty

### END OF FILE A2TIL367.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL368.TXT  
#####

Description: Quark QC Hard Disk: Specifications (Discontinued)  
Header: Quark QC Hard Disk: Specifications (Discontinued)

This article last reviewed: 15 January 1988

Performance

Capacity 10.3 & 21.0 Megabytes Formatted  
Access Time  
Track to Track 16.4 mSec  
Average 85 mSec  
maximum 175 mSec  
Average Latency 8.37 mSec  
Startup time(typical) 12 Sec

Functional

Rotational Speed 3600 RPM  
Recording Density 9036 & 9827 BPI  
Track Density 360 & 588 TPI  
Cylinders 306  
Read/Write Heads 4  
Disks 2

Domestic Power Supply 115 VAC 60Hz 0.45 Amps.  
European Power Supply 230 VAC 50Hz <0.25 Amps.

Environmental Limits

Ambient Temperature  
Operating +50 to +115 Degrees F  
+10 to +46 Degrees C  
Non-Operating -40 to +140 Degrees F  
-40 to +60 Degrees C

Relative Humidity

Operating 8% to 80% non-condensing  
Non-Operating 1% to 95%  
Altitude Limit 10,000 ft(3048m) above sea level.  
Shock Non Operating 30g Maximum

Dimensions

Height 3.85 in (97.79mm)  
Width 14.5 in (368.3mm)  
Depth 8.5 in (215.9mm)  
Weight 11.0 lbs (approx. 50 kg)

Performance Comparison

Data based on reading (2000 blocks QC, 200 blocks DiskII, 800 blocks Macintosh 400K internal drive) in sequence from the disks.

Apple IIc

Internal disk drive 16.4 blocks per second  
QC hard disk 25.7 blocks per second

Apple II and III

Disk II, III and Duodisk 16.4 blocks per second  
Profile 41.3 blocks per second  
QC hard disk 55.6 blocks per second

Macintosh 2.0 System

Macintosh 400K 29 blocks per second  
QC hard disk 45 blocks per second

NOTE: Apple Computer, Inc. is not responsible for the contents of this article.

Quark Technical Support

APPLE II COMPUTER TECHNICAL INFORMATION

Keywords: SPECSHT

### END OF FILE A2TIL368.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL369.TXT  
#####

Description: Queue, Inc.  
Header: Queue, Inc.

Article Created:  
Article Reviewed/Updated: 16 July 1993

Queue, Inc.  
-----

338 Commerce Dr.  
Fairfield, CT 06430

203-335-0908

800-232-2224

Fax: 203-336-2481

Company Profile:  
Queue, Inc., software, specializing in educational programs for the Macintosh,  
Apple II and IBM PCs.  
Copyright 1989-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL369.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL370.TXT  
#####

Description: QuickFile IIe and QuickFile III File Sharing  
Header: QuickFile IIe and QuickFile III File Sharing

QuickFile III and QuickFile IIe can share the same files if you format your data diskettes with QuickFile IIe or the Apple II Pascal system. Both QuickFile IIe at home and QuickFile III at the office will recognize the disk.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL370.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL371.TXT  
#####

Description: Reading ProDOS Diskettes on a Power Macintosh (9/94)  
Header: Reading ProDOS Diskettes on a Power Macintosh (9/94)

Article Created: 29 September 1994

TOPIC -----

I am trying to read ProDOS disks from my Apple II on my Power Macintosh, but I am getting the message, "This disk is Unreadable, do you want to initialize?". I thought that my Power Macintosh floppy drive is supposed to be able to read ProDOS disks. How can I read these disks?

DISCUSSION -----

Power Macintosh users that would like to read ProDOS disks have the following solutions:

- 1) Install Macintosh PC Exchange 2.0 or later.

Macintosh PC Exchange software version 1.0.4 or 1.0.5 was included with System Software 7.1.2 for Power Macintosh. Macintosh PC Exchange allows users to easily read, write, and format PC-compatible disks. However, these versions of Macintosh PC Exchange do NOT allow users to read, write, or format ProDOS disks. In June, 1994, Apple announced Macintosh PC Exchange 2.0. In addition to formatting, reading, and writing DOS, and OS/2 disks, Macintosh PC Exchange 2.0 can format and use DOS formatted SCSI hard disks and removable media, such as Bernoulli and SyQuest cartridges and floptical drives. It can also format and use Apple II ProDOS floppy disks.

- 2) Upgrade to Macintosh System Software 7.5.

When System Software 7.5 was announced in July, 1994, Macintosh PC Exchange 2.0 was integrated into the system software.

- 3) Apple File Exchange Utility version 7.0.

Macintosh users have been able to read DOS and ProDOS disks using the Apple File Exchange utility since Macintosh System Software 6.0 shipped in 1988. Apple File Exchange has been part of the Macintosh System Software through System 7 Pro. Since Macintosh PC Exchange 2.0 provides users the ability to read, write and format PC-compatible and ProDOS disks, Apple has discontinued development of Apple File Exchange. Although Apple File Exchange 7.0 may work with the Power Macintosh series, it was not fully tested by Apple and is therefore not supported on PowerPC processor based Macintosh systems.

Support Information Services  
Copyright 1994, Apple Computer, Inc.  
Keywords: kppc,ksts

### END OF FILE A2TIL371.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL372.TXT  
#####

Description: Redmond Cable Corporation (5/93)  
Header: Redmond Cable Corporation (5/93)

Article Created: 6 May 1993  
Article Reviewed/Updated: 16 July 1993

Redmond Cable Corporation  
-----

17371 NE 67th Ct Ste 81  
Suite A1  
Redmond, WA 98052

206-882-2009

206- 883-1430 Fax

Company Profile:  
Specializing in Apple II, Macintosh, and custom cables.  
Copyright 1993, Apple Computer, Inc  
Keywords: 3PTY

### END OF FILE A2TIL372.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL373.TXT  
#####

Description: Resource Central (5/93)  
Header: Resource Central (5/93)

Article Created: 6 May 1993  
Article Reviewed/Updated: 16 July 1993

Resource Central  
-----

P.O. Box 11250  
Overland Park, KS 66207

Phone: 913-469-6502

Fax: 913-469-6507

Company Profile:  
Specializing in technical manuals and books, software, and some hardware for  
the Apple II, aquired all of APDA's Apple II equipment and utilities  
Copyright 1993, Apple Computer, Inc  
Keywords: 3PTY

### END OF FILE A2TIL373.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL374.TXT  
#####

Description: Roger Wagner Publishing, Inc.  
Header: Roger Wagner Publishing, Inc.

Article Created: 27 March 1990  
Article Reviewed/Updated: 26 February 1996

Roger Wagner Publishing, Inc.  
-----

1050 Pioneer Way  
Suite P  
El Cajon, CA 92020

Technical Support: 619-442-0522  
Sales & General Information: 800-HYPERSTUDIO

Fax: 619-442-0525

Internet Address: RWAGNERINC@AOL.COM

Special Information for Schools: 800-448-4797

Company Profile:  
Software, specializing in Apple II family products and hypermedia.  
Copyright 1990-96, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL374.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL375.TXT  
#####

Description: School Office Software Systems  
Header: School Office Software Systems

Article Created: 6 December 1989  
Article Last Reviewed: 9 April 1992  
Article Last Updated:

School Office Software Systems, hardware and software, specializing in  
phone-dialing products for the Apple II family.

School Office Software Systems  
3408 Dover Road  
Durham, NC 27707  
919-493-3366  
800-368-4162  
Copyright 1989, 1991, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL375.TXT

#####  
### FILE: A2TIL376.TXT  
#####

Description: Scribe Printer: Specifications (Discontinued)  
Header: Scribe Printer: Specifications (Discontinued)

I. Technical Specifications

A. Print Speed:

1. Letter mode: 50 cps at 10 cpi
2. Draft mode: 80 cps at 10 cpi
3. Speed selection
  - a. front-panel switch
  - b. software command

B. Print Method: Non-impact matrix printer

C. Character Format:

1. Letter Mode: 12(H) x 15(V) matrix alphanumeric and symbols
2. Draft Mode: 9(H) x 14(V) matrix alphanumeric and symbols
3. Superscripts/Subscripts: 9(H) x 14(V) matrix

D. Character Set:

1. 96 ASCII characters
2. 24 European characters

E. Character Pitch:

1. Letter mode: 10 cpi
2. Draft mode:
  - a. 10 cpi
  - b. 17 cpi

F. Line Spacing: 6 lpi (line per inch) plus n/144 in.

G. Line-Feed Rate:

1. 100 msec (at 6 lpi)
2. 180 msec for manual line feed

H. Graphics Densities: Variable

-- Maximum dots Per Lines: 1280

I. Resolution: Up to 160 by 144 dots per inch

J. Paper:

1. Width: 3.5 in. to 10 in. max
2. Thickness: .003 in. to .07 in. (equivalent to 15 to 25 bond)
3. Formats:
  - a. single cut sheet
  - b. fanfold continuous
  - c. paperback transparencies
  - d. mailing labels
    - adjustable pin-feed tractors for labels
4. Supply: Compact paper supply tray fits under printer

K. Ribbon:

1. Type: single-pass, disposable cassette

## APPLE II COMPUTER TECHNICAL INFORMATION

2. Colors: black or three color
3. Life: 85,000 characters (average 40-50 pages)
4. Dimensions: 5/16 in. x 273 yd.

### L. Interface:

1. Type: RS-232-C (serial)
2. Buffer: 1 line, current print mode
3. Baud Rate: 1200 or 9600
4. Apple systems:
  - a. Apple II
  - b. Apple II Plus
  - c. Apple IIe
  - d. Apple IIc

### M. Electrical:

1. Input Power:
  - a. 115 V 60 Hz
  - b. 230 V 50 Hz
2. Power Consumption:
  - a. Standby: 20 Watts maximum
  - b. Printing: 60 Watts maximum

### N. Physical Dimensions

1. Width: 14.5 in.
2. Height: 6.12 in. (with paper tray)
3. Depth: 12.4 in.
4. Weight: 14.1 lb.

### O. Environmental:

1. Storage Temperatures: -4 to 104 degrees F (-20 to 40 degrees C)
2. Storage Humidity: 20 to 80%

## II. Features:

- A. Cable and power cord connect to the side of the Scribe, well out of the paper path.

Copyright 1986, 1992, Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL376.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL377.TXT  
#####

Description: SCSI Hard Disk Drives: Interleave Information (11/94)  
Header: SCSI Hard Disk Drives: Interleave Information (11/94)

Article Created: 2 March 1987  
Article Reviewed/Updated: 09 November 1994

TOPIC -----

This article pertains to the interleave of Apple external SCSI hard drives of all sizes.

DISCUSSION -----

To initilaize a SCSI hard disk drive you want to use on a Macintosh:

1. Always use Apple HD SC Setup.
2. Always initialize from the type of Macintosh the drive will be connected to. For example, if you wish to connect a Apple HD40 SC to a Macintosh Plus, initialize that hard disk with a Macintosh Plus.

If you want more than one type of Macintosh to access the SCSI hard disk, always initialize it from the slowest system for the best average performance. You must do this because, with Apple HD SC Setup, different types of Macintosh computers require a SCSI hard disk with a different interleave.

Computer	Interleave	relative speed
Macintosh II and later	1:1	fast
Macintosh SE	2:1	medium
Macintosh Plus	3:1	slow
Apple II	3:1	slow

Interleave is the ratio of consecutive sectors a CPU can read from or write to. This means that a Macintosh II is fast enough to read from or write to every consecutive sector, a Macintosh SE can only read every other sector, and the Macintosh Plus is only fast enough to read one in every three sectors. An Apple II also has an interleave of 3:1. The Apple II can support a 3:1 interleave because the SCSI card has a 8K RAM buffer enabling it to buffer data until the CPU is ready for it.

Delays occur when you connect a "slower" Macintosh to a hard disk initialized on a "faster" Macintosh. For example, a hard disk intialized from a Macintosh II has more data on every consecutive sector than a Macintosh Plus can consecutively read, necessitating a full revolution of the platter before the Macintosh Plus can access the sectors it knows it missed. There's a delay of the revolution of only one or two sectors when a "fast" Macintosh accesses a hard disk intialized from a "slower" Macintosh.

For the change in interleave ratio between the Macintosh Plus and the Macintosh SE, there are three reasons: improved performance, hardware handshaking, and changes in SCSI firmware. First, the Macintosh SE performs more quickly, even though it uses the Macintosh Plus' 68000 processor running at the same speed. The Macintosh SE has a change in hardware design that allows the video circuitry 1 long word access to the RAM for every 3 made by the processor, as opposed to the 1 video access for every 1 made by the processor on previous Macintoshes. Next, hardware handshaking was implemented, allowing cleaner and faster communication between the Macintosh

## APPLE II COMPUTER TECHNICAL INFORMATION

SE and the drive. Finally, the SCSI firmware was cleaned up and optimized for the SE. Previous bugs and patches caused the SCSI driver to not perform as quickly as it should.

### Article Change History:

09 Nov 1994 - Reviewed for technical accuracy, revised formatting.

Support Information Services

Copyright 1990-94 Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL377.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL378.TXT  
#####

Description: Shreve Systems (5/93)  
Header: Shreve Systems (5/93)

Article Created: 6 May 1993  
Article Reviewed/Updated: 19 July 1993

Shreve Systems  
1200 Marshall Street  
Shreveport, LA 71101

318-424-9791

800-227-3971

Fax: 318-424-9771

Company Profile:  
Specializing in Apple II hardware such as power supplies, logic boards, and cases.  
Copyright 1993, Apple Computer, Inc  
Keywords: 3PTY

### END OF FILE A2TIL378.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL379.TXT  
#####

Description: So What Software  
Header: So What Software

Article Created: 18 September 1989  
Article Reviewed/Updated: 19 July 1993

So What Software  
-----

10211 Slater Ave.  
Suite 102  
Fountain Valley, CA 92708

714-963-3392

714-964-4298 Fax

AppleLink: D1462

Company Profile:  
Software, specializing in tools for the Apple II familyline.  
Copyright 1989-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL379.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL380.TXT  
#####
```

Description: SoftCard III (CP/M): Moving Files from Apple II CP/M  
Header: SoftCard III (CP/M): Moving Files from Apple II CP/M

Application software often uses direct cursor addressing, enabling you to access specific portions of your display screen. Since a variety of computers use CP/M software, the program diskette itself, or an accompanying utility diskette, often contains a menu allowing you conveniently configure the software for your system. The item you select from the menu informs the system to send the appropriate command to your system to achieve the desired screen effect.

Many CP/M programs for sale work with the Apple II CP/M systems; however, since the Apple III is relative newcomer to the CP/M world, applications may have to be formatted to operate with it. To format an Apple II CP/M program onto an Apple III diskette:

1. Boot with the Apple III "CP/M Master" Diskette.
2. When you see the prompt A>: type "COPY".
3. When the copy program prompts you with a "\*": remove the Master Diskette from you disk drive: insert the Apple II diskette.
4. Place a blank diskette into drive 2.
5. Next type: "B:=A:/S/V".
6. When advised that the operation is complete, and asked if you want another operation: insert the Apple III CP/M Master Diskette into drive 1: type "N".
7. When you see the input prompt A>: type "PIP".
8. Upon prompted with a "\*": type "B:DRIVER.SOS=A:". (This will transfer a copy of the driver file to the new diskette).

The resultant copy will be an Apple III system diskette containing all the Apple II files.  
Apple Technical Communications

Keywords:

```
### END OF FILE A2TIL380.TXT
```

# APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL381.TXT  
#####

Description: Softcard III: Diskette compatibility with Apple II CP/M  
Header: Softcard III: Diskette compatibility with Apple II CP/M

The diskette organization used in the Apple II Softcard CP/M and the Apple III Softcard CP/M are identical. This means that files generated on either system is readable by the other. However, the Softcard III CP/M System File does not work correctly on an Apple II, and visa-versa.

Some programs were designed with specific hardware in mind and may not work correctly on the Apple III. Several examples are MBASIC, GBASIC, and FORTRAN supplied by Microsoft.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL381.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL382.TXT  
#####

Description: SoftSpoken, Inc.  
Header: SoftSpoken, Inc.

Article Created: 30 May 1991  
Article Reviewed/Updated: 19 July 1993

SoftSpoken, Inc.  
-----

P.O. Box 18343  
Raleigh, NC 27619

919-870-5694

Fax: 919-870-5696

Company Profile:  
Specializing in Crossworks, and an Apple II to IBM PC data exchange utility.  
Copyright 1991-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL382.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL383.TXT  
#####

Description: Southern California Research Group  
Header: Southern California Research Group

Article Created: 26 January 1988  
Article Reviewed/Updated: 19 July 1993

Southern California Research Group  
-----

P. O. Box 593  
Moorpark, CA 93020

805-529-2082

Company Profile:  
Hardware, specializing primarily in Apple II adapters and connectors.  
Copyright 1988-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL383.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL384.TXT  
#####

Description: Sun Remarketing, Inc. (11/96)  
Header: Sun Remarketing, Inc. (11/96)

Article Created: 29 September 1987  
Article Reviewed/Updated: 15 November 1996

Sun Remarketing  
-----  
P.O. Box 4059  
Logan, UT 84323-4059  
801-755-3300

800-821-3221 (Sales, Ordering & Product Info)  
1-900-SUN-SRVC (Out of warranty technical support)  
Fax: 801-755-3360

AppleLink: SUNREM

Internet: WWW URL: <http://www.sunrem.com>

Company Profile:

Hardware, software, and manuals. Sun Remarketing specializes in the sale, service, and support of current and obsolete Apple\* and Macintosh products. Sun Remarketing sales and support many third-party software and hardware solutions for the Apple\* and Macintosh products.

\*Apple products include Apple ///, Apple II, Apple IIe, and Apple IIC.  
Copyright 1990-96, Apple Computer, Inc.  
Keywords: 3pty

### END OF FILE A2TIL384.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####
### FILE: A2TIL385.TXT
#####
```

Description: Super Serial Card: Accessing it through Machine Language  
 Header: Super Serial Card: Accessing it through Machine Language

Although Apple's Super Serial Card can be used from Applesoft Basic, it is often desirable to use machine language to increase the speed with which characters are sent and received. The assembler program below illustrates a method of communicating with another Apple computer through the Super Serial Card. You may use this routine as a starting point for your own program.

On page 291 of the Apple IIe Reference manual and on pages 261 to 265 of the Apple IIc Reference Manual there are lists of the registers and entry points used by routines resident in the Super Serial Card. The equates in the program below use these locations, as well as input/output hooks found in the Apple II family of computers.

The initialization routine (INIT) stores the address of the Super Serial Card's initialization routine in CSW (the Apple II monitor character output hook). This activates the card for output by jumping to COUT. Following this, DOS or Prodos hooks are reinstalled.

The OUTPUT routine checks the 6551 status port bit 4. If this is equal to zero, the previous character has not yet been sent, so we must check the status byte again until that register is clear. When the value in bit 4 becomes one, the 6551 is ready to send another character. To accomplish this, simply store the data in the transmit register (TDREG) of the chip.

Bit 3 of the status port is checked by the INPUT routine. If this bit is zero, the program either loops continuously or returns to the calling program, depending on the state of the return flag found in location \$FF. If bit 3 is one, a character is waiting at the input port, and the character is then read from the read register (RDREG) of the 6551.

The DEMO portion of this program calls the INIT routine, and sends each letter of the alphabet to the connected device. After each character is sent, the program waits to see if a response has been received from the external device. If a character is waiting, the program ends.

```
1  * Super Serial Card - Demo of accessing it through machine language
10
*****
11          ORG      $2000
12  COUT      EQU     $FDED      ; CHARACTER OUT IN MONITOR
13  CSWL      EQU     $36        ; OUTPUT HOOK
14  CSWH      EQU     $37
15  WAIT      EQU     $FCA8      ; MONITOR ROUTINE TO WAIT
16  ;
17  ; SSC EQUATES
18  ;
19  DIPSW1    EQU     $C081      ; +N0 DIPSWITCH BLOCK 1
20  DIPSW2    EQU     $C082      ; +N0 DIPSWITCH BLOCK 2
21  TDREG     EQU     $C088      ; +N0 6551 DATA REGISTER
22  RDREG     EQU     $C088      ; +N0 6551 DATA REGISTER
23  STATUS    EQU     $C089      ; +N0 6551 STATUS REGISTER
24  RESET     EQU     $C089      ; +N0 6551 SOFTWARE RESET
25  COMMAND   EQU     $C08A      ; +N0 6551 COMMAND REG
26  CONTROL   EQU     $C08B      ; +N0 6551 CONTROL REG
27  ;
28  START     JMP     DEMO       ; SKIP AROUND ALL THE SUBROUTINES
29  ;
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```

30 ; USE THE SSC FIRMWARE TO INITIALIZE THE 6551.
31 ;
32 INIT   LDA   CSWL      ; STORE THE CURRENT CSW
33       PHA           ; SO THAT WE DO NOT DISCONNECT
34       LDA   CSWH      ; DOS OR PRODOS
35       PHA
36       LDA   #$00      ; STORE $Cs00 IN CSW
37       STA   CSWL
38       STX   CSWH      ; THIS ALREADY CONTAINS $Cs
39       LDA   #$00
40       JSR   COUT      ; JUMP TO COUT TO INIT THE CARD
41       PLA
42       STA   CSWH      ; RESTORE THE DOS OR PRODOS
43       PLA           ; HOOKS AND THEN RETURN
44       STA   CSWL
45       RTS
46 ;
47 ; OUTPUT A CHARACTER TO 6551
48 ;
49 OUT    PHA           ; STORE DATA ON STACK
50 OLP    LDA   STATUS,Y  ; CHECK BIT 4 OF STATUS BYTE
51       AND   #$10      ; TO SEE IF IT'S OK TO SEND
52       BEQ   OLP       ; CHARACTER WAITING TO GO OUT
53       PLA           ; GET DATA BACK FROM STACK
54       STA   TDREG,Y   ; AND OUTPUT THE CHARACTER
55       RTS
56 ;
57 ; INPUT A CHARACTER FROM 6551
58 ;
59 IN     LDA   STATUS,Y  ;
60       AND   #$08      ; BIT 3 OF STATUS
61       BEQ   INTST     ; NO CHAR WAITING TO BE RECEIVED
62       LDA   RDREG,Y   ; GET THE INPUT FROM 6551
63       RTS
64 INTST  LDA   $FF      ; CHECK RETURN FLAG
65       BNE   IN        ; IF NOT 0 THEN WAIT FOR INPUT
66       RTS           ; IF ZERO, DON'T WAIT
67 ;
68 ; BEGIN THE DEMO PROGRAM
69 ;
70 DEMO   LDY   #$10      ; Y CONTAINS $s0 - DEMO USES SLOT 1
71       LDX   #$C1      ; LOAD X WITH $Cs
72       JSR   INIT      ; INIT THE CARD
73       LDA   #$FF      ; SET RETURN FLAG FOR INPUT
74       STA   $FF
75       JSR   IN        ; INPUT A CHARACTER - SEE ABOVE
76 OLOOP  LDX   #$41      ; OUTPUT THE ASCII CODES
77 OLP1   TXA           ; FROM A-Z TO THE SSC. IT WILL STOP
78       JSR   OUT      ; WHEN THE SSC RECEIVES A CHAR.
79       LDA   #$80      ; DELAY BETWEEN CHARACTERS
80       JSR   WAIT      ; TO ALLOW TIME FOR INPUT.
81       LDA   #$00
82       STA   $FF      ; RETURN IF NO CHARS WAITING
83       JSR   IN        ; CHECK FOR A CHARACTER
84       BNE   ALLDONE   ; THEY SENT SOMETHING - WE END
85       INX
86       CPX   #$5B      ; THE LETTER 'Z'
87       BNE   OLP1
88       LDA   #$0D
89       JSR   OUT      ; SEND A CARRIAGE RETURN
90       JMP   OLOOP     ; BEGIN THE ALPHABET AGAIN
91 ALLDONE RTS          ; END ROUTINE

```

Apple Technical Communications

Keywords:

APPLE II COMPUTER TECHNICAL INFORMATION

### END OF FILE A2TIL385.TXT

```
#####
### FILE: A2TIL386.TXT
#####
```

Description: Super Serial Card: Description (12/96)  
 Header: Super Serial Card: Description (12/96)

Article Created: 15 July 1991  
 Article Reviewed/Updated: 16 December 1996

TOPIC -----

This article describes the Super Serial Interface Card.

DISCUSSION -----

Overview  
 -----

The Apple II Super Serial Card provides a configurable RS 232 interface, allowing an Apple II, Apple II Plus, or Apple IIe computer to exchange data with other computers, modems, printers, terminals, and accessories employing a bidirectional RS-232-C interface in serial format (one bit at a time).

The Super Serial Card features an on-board switch allowing the operation of a printer, modem, or other serial device. This switch also eliminates the need for special connection cables such as modem eliminators.

System Requirements  
 -----

- To use the Apple II Super Serial Card, you need:
- \* an Apple II, Apple II Plus, or Apple IIe computer system with an available expansion slot; and
  - \* a printer, modem, or other serial device.

Technical Specifications  
 -----

- \* Single Level: EIA RS-232-C
- \* Connector Type: DB-25 socket
- \* On-Board ROM: 2K x 8 bit (2316 or equivalent)
- \* ACIA: S6551 or equivalent
- \* Baud Rate Selection: via on-board DIP switches (default) or via software commands
- \* Data word format: 1 start bit, 1 or 2 stop bits, 7 or 8 data bits; odd, even, or no parity
- \* Available baud rates: 50, 79, 110, 134.6, 150, 300, 600, 1200, 1800, 2400, 3400, 9600, 19200
- \* RS-232-C Signals Supported: RTS (Request to Send), CTS (Clear to Send), DTR (Data Terminal Ready), DSR (Data Set Ready), DCD (Data Carrier Detect), RXD (Receive Data), TXD (Transmit Data), (SG) Signal Ground.

Internal Cable Pinout  
 -----

10 Pin Connector	25 Pin Connector	Signal Name
pin 1	pin 1	Frame Ground
pin 2	pin 2	Transmit Data
pin 3	pin 3	Receive Data
pin 4	pin 4	Request to Send (RTS)
pin 5	pin 5	Clear to Send (CTS)
pin 6	pin 6	Data Set Ready (DSR)
pin 7	pin 19	Secondary CTS

## APPLE II COMPUTER TECHNICAL INFORMATION

pin 8	pin 7	Signal Ground
pin 9	pin 20	Data Terminal Ready
pin 10	pin 8	Data Carrier Detect

### Pin Explanation

-----  
FRAME GROUND: Provides electrical connection to give both devices connected a common frame ground. Usually tied to Signal Ground inside the cabinet of one of the devices.

TRANSMIT DATA: This pin conveys serial data sent from the Super Serial card. This is one of the pins that may need to be crossed over if the peripheral device is a DTE. The MODEM/TERM plug can perform this crossover.

RECEIVE DATA: This pin receives serial data sent from the device the Super Serial card connects the computer to. This is one of the pins that may need to be crossed over if the peripheral device is a DTE. The MODEM/TERM plug can perform this crossover.

REQUEST TO SEND (RTS): This signal is used by the computer to ask the peripheral device if it is ready to receive computer data. Often a device such as a printer will ignore this signal (will not have a pin connected to it) because the signals primary use is to control half duplex modems.

CLEAR TO SEND (CTS): This pin receives the peripheral's ready to receive data response to an RTS from the computer. Again this pin is used most often by modems.

DATA SET READY (DSR): This pin receives the signal generated by the peripheral that indicates that the peripheral is turned on and ready to communicate. This is one of the pins that may need to be crossed over if the peripheral device is a DTE. The MODEM/TERM plug can perform this crossover.

SECONDARY CTS: Some modems can transmit and receive on two channels (that is two separate communications on the same line). The Secondary CTS pin would be used to receive the peripheral's ready to receive data response to an RTS for the second channel from the computer.

SIGNAL GROUND: When this pin is connected between two RS232 devices it provides a common electrical level that the devices can reference the RS232 signals to.

DATA TERMINAL READY: This pin becomes active when the computer and SSC are ready to go on line. This is one of the pins that may need to be crossed over if the peripheral device is a DTE. The MODEM/TERM plug can perform this crossover. Also this pin can be used for flow control protocol handshaking.

DATA CARRIER DETECT: This pin receives the signal generated by a modem when it senses a carrier on the telephone line. The SSC would then respond by telling the computer that data was going to be coming from the modem.

### Jumper Block

-----  
The jumper block has two positions, Terminal and Modem. The jumper block eliminates the need for special connection cables such as modem eliminators.

### Switches

-----  
The fourteen switches, split into two banks named SW1 and SW2, are diagonally opposite the slot contacts. Holding the card so that the switches are at the top left, the two banks are arranged like this:

SW1 1 2 3 4 5 6 7      SW2 1 2 3 4 5 6 7



# APPLE II COMPUTER TECHNICAL INFORMATION

8 data/1 stop	On	On
7 data/1 stop	On	Off
8 data/2 stop	Off	On
7 data/2 stop	Off	Off

## Parity:

None	N/A	On
Odd	On	Off
Even	Off	Off

## Printer and Printer PROM Emulation Mode

-----  
The remaining switches have the following functions:

### Switches SW1-7 and SW2-7

	SW1	7	SW2	7
Protocol:				
Normal Clear to Send (RS-232C)		On		Off
Secondary Clear to Send		Off		On

### Switches SW2-1, SW2-2, SW2-3, SW2-4

	SW2	1	2	3	4
--	-----	---	---	---	---

#### Data format:

8 data/1 stop	On
8 data/2 stop	Off

#### Delay after carriage return:

32 milliseconds	On
None	Off

#### Line Width (Printer mode has no parity):

40	On	On
72	On	Off
80	On	Off
132	Off	Off

## Important Information

-----  
There is a problem with using the Super Serial Card (SSC) terminal firmware at 1200 baud on an unenhanced IIe. The IIe 80-column card can't keep up with the data stream and eventually loses characters. Avoid this problem with faster, more sophisticated programs that can handle interrupts, such as Access II or third party terminal software. The proper terminal software also will allow use of the Extended Text Card with a modem at 1200 baud.

## Article Change History:

16 Dec 1996 - Reviewed for technical accuracy, revised formatting.

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Keywords:

### END OF FILE A2TIL386.TXT

#####  
 ### FILE: A2TIL387.TXT  
 #####

Description: Super Serial Card: Using with Machine Language (12/96)  
 Header: Super Serial Card: Using with Machine Language (12/96)

Article Created: 22 September 89  
 Article Reviewed/Updated: 16 December 1996

TOPIC -----

This article describes assembly language addressing methods for the 6502 and 6551 microprocessors through the Super Serial Card.

DISCUSSION -----

The 6502 does a false read to the current page. This is inherent in the 6502 design. A false read occurs during a read to memory. The 6502 will hold the target address + 1 line open after it accesses the target address. This does not alter the contents of the address but can affect a memory-mapped I/O device that is toggled by the address line.

The false read does not affect the Super Serial Card as none of the card's functions are set when the address line is held open by the false read. However, for good programming to an I/O device, where false reads could toggle a function, you should use the indirect indexed-addressing mode with the address for your indirect accesses in the zero page.

The following example is available in the Tech Info Library and uses the absolute, indirect-addressing method; it has been modified here as an example of indirect, indexed-addressing. The program uses zero-page addresses \$FA and \$FB, because these are generally unused by both DOS and BASIC. See pages 74 and 75 of the "Apple II Reference Manual" for a map of the zero-page locations.

Super Serial Card: Accessing It Through Machine Language  
 -----

Although Apple's Super Serial Card can be used from Applesoft BASIC, it is often desirable to use machine language to increase the speed with which characters are sent and received. The assembler program below illustrates a method of communicating with another computer through the Super Serial Card. You may use this routine as a starting point for your own program.

On page 291 of the "Apple IIe Reference Manual" and on pages 261 to 265 of the Apple IIc Reference Manual, there are lists of the registers and entry points used by routines resident in the Super Serial Card. The equates in the program below use these locations, as well as input/output hooks found in the Apple II family of computers.

The initialization routine (INIT) stores the address of the Super Serial Card's initialization routine in CSW (the Apple II monitor character output hook). This activates the card for output by jumping to COUT. Following this, DOS or ProDOS hooks are reinstalled.

The OUTput routine checks the 6551 status port bit 4. If this is equal to zero, the previous character has not yet been sent, so we must check the status byte again until that register is clear. When the value in bit 4 becomes one, the 6551 is ready to send another character. To do this, store the data in the transmit register (TDREG) of the chip.

Bit 3 of the status port is checked by the INput routine. If this bit is zero, the program either loops continuously or returns to the calling program, depending on the state of the return flag found in location \$FF. If bit 3 is one, a character is waiting at the input port, and the character is

## APPLE II COMPUTER TECHNICAL INFORMATION

then read from the read register (RDREG) of the 6551.

The DEMO portion of this program calls the INIT routine, and sends each letter of the alphabet to the connected device. After each character is sent, the program waits to see if a response has been received from the external device. If a character is waiting, the program ends.

### Assembly Language Source Code Demo

Here is a demo of accessing the Super Serial Card with Assembly Language.

```

        ORG      $2000
COUT    EQU     $FDED      ; CHARACTER OUT IN MONITOR
CSWL    EQU     $36       ; OUTPUT HOOK
CSWH    EQU     $37
WAIT    EQU     $FCA8     ; MONITOR ROUTINE TO WAIT
BASELO  EQU     $FA       ; ZERO PAGE INDEX ADDRESS FOR INDIRECT ADDRESSING
BASEHI  EQU     $FB       ; THE TARGET ADDRESS IS STORED IN FA AND FB
IO      EQU     $C0       ; IO PAGE HIBYTE ADDRESS THIS GOES IN BASEHI
;
;   SSC EQUATES
;

DIPSW1  EQU     $81       ; +N0 DIPSWITCH BLOCK 1
DIPSW2  EQU     $82       ; +N0 DIPSWITCH BLOCK 2
TDREG   EQU     $88       ; +N0 6551 DATA REGISTER
RDREG   EQU     $88       ; +N0 6551 DATA REGISTER
STATUS  EQU     $89       ; +N0 6551 STATUS REGISTER
RESET   EQU     $89       ; +N0 6551 SOFTWARE RESET
COMMAND EQU     $8A       ; +N0 6551 COMMAND REG
CONTROL EQU     $8B       ; +N0 6551 CONTROL REG
;
START   JMP     DEMO      ; SKIP AROUND ALL THE SUBROUTINES
;
;   USE THE SSC FIRMWARE TO INITIALIZE THE 6551.
;
INIT    LDA     CSWL      ; STORE THE CURRENT CSW
        PHA     ; SO THAT WE DO NOT DISCONNECT
        LDA     CSWH      ; DOS OR ProDOS
        PHA
        LDA     #$00      ; STORE $Cs00 IN CSW
        STA     CSWL
        STX     CSWH      ; THIS ALREADY CONTAINS $Cs
        LDA     #$00
        JSR     COUT      ; JUMP TO COUT TO INIT THE CARD
        PLA
        STA     CSWH      ; RESTORE THE DOS OR ProDOS
        PLA            ; HOOKS AND THEN RETURN
        STA     CSWL
        RTS
;
;   OUTPUT A CHARACTER TO 6551
;
OUT     PHA     ; STORE DATA ON STACK
        LDA     #STATUS   ; GET THE STATUS ADDRESS
        STA     BASELO    ; SET UP THE INDIRECT INDEXED ACCESS
OLP    LDA     (BASELO),Y ; CHECK BIT 4 OF STATUS BYTE
        AND     #$10      ; TO SEE IF IT'S OK TO SEND
        BEQ     OLP       ; CHARACTER WAITING TO GO OUT
        LDA     #TDREG    ; ADDRESS FOR TRANSMIT
        STA     BASELO    ; SET UP THE INDIRECT INDEXED ACCESS
        PLA            ; GET DATA BACK FROM STACK
        STA     (BASELO),Y ; AND OUTPUT THE CHARACTER

```

APPLE II COMPUTER TECHNICAL INFORMATION

```

        RTS
;
; INPUT A CHARACTER FROM 6551
;
IN      LDA    #STATUS    ; GET THE STATUS ADDRESS
        STA    BASELO    ; SET UP THE INDIRECT INDEXED ACCESS
        LDA    (BASELO),Y ; CHECK STATUS
        AND    #$08      ; BIT 3 OF STATUS
        BEQ    INTST     ; NO CHAR WAITING TO BE RECEIVED
        LDA    #RDREG    ; GET THE READ ADDRESS
        STA    BASELO    ; SET UP THE INDIRECT INDEXED ACCESS
        LDA    (BASELO),Y ; GET THE INPUT FROM 6551
        RTS
INTST   LDA    $FF       ; CHECK RETURN FLAG
        BNE    IN        ; IF NOT 0 THEN WAIT FOR INPUT

        RTS            ; IF ZERO, DON'T WAIT
;
; BEGIN THE DEMO PROGRAM
;
DEMO    LDY    #$10      ; Y CONTAINS $s0 - DEMO USES SLOT 1
        LDX    #$C1     ; LOAD X WITH $Cs
        JSR    INIT     ; INIT THE CARD
        LDA    #IO      ; HIBYTE ADDRESS C0 FOR IO ACCESS
        STA    BASEHI   ; STORE IT IN ZERO PAGE AS HIBYTE OF ADDRESS
        LDA    #$FF     ; SET RETURN FLAG FOR INPUT
        STA    $FF      ; FF MEANS WAIT FOR CHAR
        JSR    IN       ; INPUT A CHARACTER - SEE ABOVE
OLOOP   LDX    #$41     ; OUTPUT THE ASCII CODES
OLP1    TXA            ; FROM A-Z TO THE SSC. IT WILL STOP
        JSR    OUT     ; WHEN THE SSC RECEIVES A CHAR.
        LDA    #$80    ; DELAY BETWEEN CHARACTERS
        JSR    WAIT    ; TO ALLOW TIME FOR INPUT.
        LDA    #$00
        STA    $FF     ; RETURN IF NO CHARS WAITING
        JSR    IN      ; CHECK FOR A CHARACTER
        BNE    ALLDONE ; THEY SENT SOMETHING - WE END
        INX
        CPX    #$5B    ; THE LETTER 'Z'
        BNE    OLP1
        LDA    #$0D
        JSR    OUT     ; SEND A CARRIAGE RETURN
        JMP    OLOOP   ; BEGIN THE ALPHABET AGAIN
ALLDONE RTS            ; END ROUTINE

```

Article Change History:

16 Dec 1996 - Reviewed for technical accuracy, revised formatting.

Copyright 1989-96, Apple Computer, Inc.

Keywords:

### END OF FILE A2TIL387.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL388.TXT  
#####

Description: System 7 Pro: Read Me Incorrect About Apple IIe Card SW (10/93)  
Header: System 7 Pro: Read Me Incorrect About Apple IIe Card SW (10/93)

Article Created: 20 October 1993

TOPIC -----

The information about how to obtain Apple IIe Card Software in the Read Me file for System 7 Pro is incorrect. This article explains the best ways to obtain this software.

DISCUSSION -----

The Read Me file that is installed when updating to System 7 Pro reads as follows:

"APPLE IIe CARD SOFTWARE FOR THE MACINTOSH LC II

To use the Apple IIe Card with System 7 Pro on a Macintosh LC II, you need version 2.2 of Apple IIe Card Software. You should upgrade to version 2.2 only if you are using your LC II with System 7 Pro. Apple IIe Card Software 2.2 may also be used with the original Macintosh LC, but it is not required.

You can obtain the upgrade package from an authorized Apple Reseller. In the United States, you can call the Apple Customer Assistance Center at 1-800-776-2333 to request Apple IIe Card Software version 2.2. The new software is also available on AppleLink (AppleLink path: Apple Products: Apple II: Apple II Product Information: Apple IIe Card)."

These instructions aren't correct.

Contact an Apple Reseller to purchase the IIe software update, or download it from AppleLink. You can all the Apple Referral Center at 1-800-538-9696 to locate a reseller near you to purchase Apple part M1222LL/C, Apple IIe card Software Update.

Apple IIe Card (2.2.1) software is available for customers on AppleLink using the following path:

- Software Sampler
  - Apple SW Updates
  - Macintosh
  - Peripheral Software
  - Apple IIe Card (2.2.1)
- Copyright 1993, Apple Computer, Inc.  
Keywords: SUPT

### END OF FILE A2TIL388.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL389.TXT  
#####

Description: Temporal Acuity Products, Inc.  
Header: Temporal Acuity Products, Inc.

Article Created: 3 December 1988

Article Change History

-----

11/30/92 - UPDATED  
\* To reflect changes in company information.

Temporal Acuity Products, Inc., software, music education: harmonic, melodic,  
rythmic dictation, and ear-training software for the Apple II product line.

Temporal Acuity Products, Inc.  
Building 1  
Suite 200  
300 120th Ave. N.E.  
Bellevue, WA 98005  
206-462-1007  
800-426-2673  
Fax: 206-462-1057  
AppleLink: D1089  
Copyright 1988, 1991, 1992, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL389.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL390.TXT  
#####
```

Description: The Apple II Cassette Interface (2 of 2)  
Header: The Apple II Cassette Interface (2 of 2)

For reading data, the cassette recorder uses a more complicated input circuit consisting of a 741 operational amplifier configured as a zero crossing detector. Zero crossing detection means that whenever the voltage at the input jack goes from positive to negative (or negative to positive) the output of the amplifier switches from a 1 to a 0 (or 0 to 1). The detector is accessed by any read to address \$C060. The sign bit (most significant bit) of the byte read reflects the detector status. The read routines continually EXCLUSIVE ORs this bit with the value most recently read to detect a change in state. The amount of time required to change state indicates the incoming frequency which then is used to determine if a one or a zero has been received. After detecting the first zero crossing at the start of the header, the read routine uses HEADR to generate a 3.5 delay, and then the read routine waits for the sync bit. After HEADR generates the synchronous bit, the read routine reads the data and puts it in the specified memory range.

In using the cassette interface to either read or write, all you need do is specify an address range and execute the read or write subroutine. The address range is stored in four bytes, two for the first address to be saved and two for the last to be saved. In both cases the least significant byte is first.

Commanding the cassette interface:

1. from the monitor:

If the start is \$800 and the end is \$9FF, then  
800.9FFW will write the data to the cassette and  
800.9FFR will retrieve it.

2. from machine language:

Again, if the start is \$800 and the end is \$9FF then store the address range,

```
LDA #$00  
STA $3C starting address low  
LDA #$08  
STA $3D starting address high  
LDA #$FF  
STA $3E ending address low  
LDA #$09  
STA $3F ending address high  
JSR $FEDC write to block to tape
```

The JSR \$FEDC will write to the cassette; JSR \$FEFD will read from the cassette.

3. from BASIC:

First set up the address range. If S = the start and E = the end then from integer BASIC,

```
POKE 60,S MOD 256  
POKE 61,S / 256  
POKE 62,E MOD 256  
POKE 63,E / 256
```

4. from APPLESOFT,

```
POKE 60,S - INT(S / 256) * 256  
POKE 61,S / 256
```

## APPLE II COMPUTER TECHNICAL INFORMATION

```
POKE 62,E - INT(E / 256) * 256  
POKE 63,E / 256
```

Then, to write out to cassette, use CALL -307; to read in from the  
cassette,  
use CALL -259.  
Apple Tech Notes

Keywords:

### END OF FILE A2TIL390.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####
### FILE: A2TIL391.TXT
#####
```

Description: The Apple II Cassette Interface (1 of 2)  
 Header: The Apple II Cassette Interface (1 of 2)

This note is about the cassette interface built into the Apple II and Apple II+, subroutines. An assumption made here is that the cassette recorder is in the proper mode, play or record, when the read and write routines are executed. Note also that the timing is approximate and may vary from one Apple to another.

A record is a block of binary data. This data may be a BASIC or APPLESOFT program, a machine language program, or just binary data. Records representing BASIC or APPLESOFT programs are really two records, the length of the program and the actual program. A record consists of a header, synchronous bit, the actual data, and a checksum byte for error detection.

Monitor record format

```
+-----+-----+-----+
| HEADER |S|          DATA          |C|
+-----+-----+-----+
```

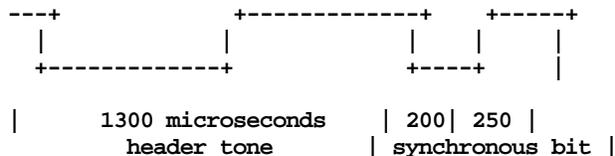
BASIC program record format

```
+-----+-----+-----+-----+
| HEADER |S| LB |C| HEADER |S|   PROGRAM   |C|
+-----+-----+-----+-----+
```

Key: S = SYNC bit  
 C = CHECKSUM byte  
 LB = BASIC program length

The header consists of 10 seconds of 770 Hz tone, (1 cycle equals 1300 microseconds). This gives enough time for the cassette motor to attain speed and the plastic tape leader to go by. A subroutine called HEADR generates a shortened header between the BASIC length bytes and the BASIC program itself. The length of the header tone is controlled by the value of the accumulator on entry to the subroutine. This can vary from 0.2 seconds to 40 seconds. On entry the X register should be 0 and the carry flag should be set. HEADR also generates a synchronous bit at the end of the tone. HEADR resides at hexadecimal address \$FCC9, or decimal address -882.

The last cycle of header tone and SYNC bit

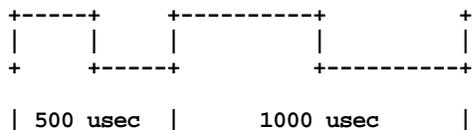


The synchronous bit, generated by HEADR, is one half cycle of 2500 Hz, (200 microseconds) and one half cycle of 2000 Hz, (250 microseconds). It is used to signal the end of the header tone and the start of the data.

The data is recorded on the tape with a low starting address and a high ending address. Each byte of data is shifted out most significant bit first, least significant bit last. A zero bit is made up of one cycle of 2 kHz, (250 microseconds per half cycle) and a one bit is one cycle of 1 kHz, (500 microseconds per half cycle). This works out to 2000 baud for zeros only and 1000 baud for ones, or an average of 1500 baud.

# APPLE II COMPUTER TECHNICAL INFORMATION

A zero bit                      and a one bit



The checksum byte is written on the tape at the end of the data block. All during reading or writing each data byte is EXCLUSIVE OR-ed with the checksum byte. If the checksum computed during a read agrees with the checksum that was written out, then the data is probably good. This method will detect an odd number of errors for any of the eight bits of the byte.

In writing data, the cassette output uses quite simple circuitry, a flip-flop connected through a voltage divider to the jack on the back panel of the Apple. Any time the address \$C020 is accessed this flip-flop changes state. Accessing the flip-flop once every 500 microseconds generates a 1000 Hz tone.

Apple Tech Notes

Keywords:

### END OF FILE A2TIL391.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL392.TXT  
#####

Description: The ByteWorks, Inc.  
Header: The ByteWorks, Inc.

Article Created: 11/06/92  
Article Reviewed: 07/06/93  
Article Updated:

The ByteWorks Inc.  
-----

4700 Irving Blvd., NW, Suite 207  
Albuquerque, NM 87114

(505) 898-8183

AppleLink: X0108

Company Profile:  
Software, specializing in development tools for Apple II computers.  
Copyright 1992-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL392.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL393.TXT  
#####

Description: Thirdware Computer Products  
Header: Thirdware Computer Products

Article Created: 23 April 1991  
Article Last Reviewed: 13 April 1992  
Article Last Updated:

Thirdware Computer Products, hardware/software, specializing in Apple II  
graphics utility and printer interface products.

Thirdware Computer Products  
3300 Corporate Ave., Building 116  
Ft. Lauderdale, FL 33331  
305-389-9009  
800-446-5987  
Fax: 305-389-9066  
Copyright 1991, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL393.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL394.TXT  
#####

Description: ThunderWare  
Header: ThunderWare

Article Created: 2 June 1987  
Article Reviewed/Updated: 25 July 1994

ThunderWare, software and hardware, specializing in scanners and clock cards for Apple II and Macintosh.

ThunderWare  
21 Orinda Way  
Orinda, CA 94563  
510-254-6581  
800-628-0693 (Orders only)  
Fax: 510-254-3047  
AppleLink: D0079

Article Change History:  
25 Jul 1994 - Updated order phone number.

Support Information Services  
Copyright 1989-94 Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL394.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL395.TXT  
#####

Description: Tulin Technology  
Header: Tulin Technology

Article Created: 9 August 1991  
Article Reviewed/Updated: 20 July 1993

Tulin Technology  
-----

2156H O'Toole Avenue  
San Jose, CA 95131

408-432-9025  
408-432-9057

Fax: 408-943-0782

Company Profile:  
Hardware and software, specializing in storage subsystems for the Macintosh  
and Apple II computers.  
Copyright 1991-93, Apple Computer, Inc.  
Keywords: 3PTY

### END OF FILE A2TIL395.TXT

#####  
### FILE: A2TIL396.TXT  
#####

Description: UniDisk: Specifications (Discontinued)  
Header: UniDisk: Specifications (Discontinued)

This article last reviewed: 9 July 1985

I. Technical Specifications

1. Recording Media

- a. Disk diameter: 5.25 inches
- b. Recording surfaces: 1
- c. Tracks per surface: 35

2. Capacities

- a. Formatted data capacity: 140 kilobytes, 16 sectors
  - 1. ProDOS: 137 KB
  - 2. Pascal: 137 KB
  - 3. DOS 3.3: 124 KB

3. Characteristics

- a. Seek/settle time (track to track): 30 milliseconds maximum
- b. Drive-motor start time: 0.5 seconds maximum
- c. Mechanism same as drive for Duodisk, IIC drive, and Disk IIC

4. Power Consumption

- a. +12 VDC with a tolerance of 0.6 V (plus or minus)
  - 1. Maximum ripple 120mV peak to peak
  - 2. 0.8 A typical
  - 3. 1.6 A maximum
- b. -12 VDC with a tolerance of 0.6 V (plus or minus)
  - 1. Maximum ripple 120mV peak to peak
  - 2. 0.01 A typical
  - 3. 0.02 A maximum
- c. +5 VDC with a tolerance of 0.25 V (plus or minus)
  - 1. Maximum ripple 120mV peak to peak
  - 2. 0.2 A typical
  - 3. 0.4 A maximum

5. Head positioning: Adjusted to a tolerance of 0.002 inches (plus or minus) maximum deviation from ideal on track

6. Environmental Characteristics

- a. Operating temperature:
  - 1. 50 to 115 degrees Fahrenheit
  - 2. 10 to 46 degrees Celsius
- b. Operating humidity: 20% to 80% (noncondensing)
- c. Maximum wet bulb:
  - 1. 85 degrees Fahrenheit
  - 2. 29.4 degrees Celsius

7. Drive Dimensions

	inches	millimeters
a. Length	8.50	216.0
b. Width	6.37	162.0
c. Height	3.13	79.6

# APPLE II COMPUTER TECHNICAL INFORMATION

	pounds	kilograms
d. Weight	4.62	2.1

## 8. Connection

For each controller card connected to a Unidisk, a second Unidisk drive can be "daisy chained" or connected to the back of the first.

## II. System Configuration

### 1. Controller Card and

- a. Apple II
- b. Apple II Plus
- c. Apple IIe
- d. Apple II GS

## III. Package

### 1. Order number:

- a. A9M0104: Unidisk drive with controller card
- b. A9M0105: Unidisk drive

Copyright 1988 Apple Computer, Inc.

Keywords: SPECSHT

### END OF FILE A2TIL396.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL397.TXT  
#####

Description: UPIC: Interfacing the Epson MX-80 Printer  
Header: UPIC: Interfacing the Epson MX-80 Printer

\* Table 2-2, which was to appear on page 10 of the Universal Parallel Interface Card manual, was left out. Refer to the identical table 4-2 on page 19.

\* The Epson printer does not work properly with an Apple II parallel interface cable. Wire the cable as specified in table 2-1 on page 8.

\* The UPIC switch must be set to Auto.

\* The SOS driver configuration block must be set to the values in table 4-2 on page 19 for the Epson MX-80.

Apple Tech Notes

Keywords:

### END OF FILE A2TIL397.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL398.TXT  
#####

Description: UPIC: Interfacing the OKIDATA 83A printer  
Header: UPIC: Interfacing the OKIDATA 83A printer

To connect an Okidata 83A printer to an Apple III Universal Parallel Interface Card using an Apple II parallel cable, make the following adjustments:

DCB : 00 00 40 00 5A

Printer : All switches off  
          Jumper set to B

Apple Tech Notes

Keywords:

### END OF FILE A2TIL398.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL399.TXT  
#####

Description: US Apple SW Updates Available Online (03/97)  
Header: US Apple SW Updates Available Online (03/97)

Article Created: 19 September 1994  
Article Reviewed/Updated: 05 March 1997

TOPIC -----

This document serves as an index to the Domestic Apple Software Updates areas located on, AppleLink, America Online and the Internet. The first part of this article: Article Change History, lists the most recent changes to the Software Updates. The second part is an alphabetical list of the software updates, along with the current location.

Please search the Apple Tech Info Library using the string "Apple Software Updates" for a current list of online services to which Apple Software Updates are posted. (You can also use the special keyword: kol to search for this information and other on line related information in the Apple Tech Info Library.)

DISCUSSION -----

- Article Change History:

- 3-Mar-97 - Add QTEASY16.EXE AND QTPLUG16.EXE (Quicktime for Win 3.1)
- 3-Mar-97 - Add QTEASY32.EXE AND QTPLUG32.EXE (Quicktime for Win 95)
- 28-Feb-97 - Add Macsbug 6.5.4 Info
- 28-Feb-97 - Add CD-ROM Software 5.3.2
- 28-Feb-97 - Add WBOFF.EXE
- 28-Feb-97 - Add Cyberdog 1.2.1 (3 disks/Net Install) Delete Cyberdog 1.2
- 25-Feb-97 - Add Fax Cover Pages 1.2.
- 23-Feb-97 - Add CFM-68k 4.0b1.sea
- 13-Feb-97 - Add 7.5.5 SCSI Server Update
- 11-Feb-97 - Add MRJ 1.0 and NCI 1.0b5 (Mac and DOS-Win)
- 07-Feb-97 - Add PB 1400 PMU Updater 1.0.1
- 01-Feb-97 - Add QuickTime Plug-in 1.1

Key to Location Abbreviations:

- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| AIISP - Apple II Supplemental         |                                     |
| ARA - Apple Remote Access             | OPS - Other Printing Software       |
| CTB - Comm Toolbox                    | OSS - Other System Software         |
| D-P - Display-Peripheral              | OLS - Older System Software         |
| LWS - LaserWriter                     | OT - Open Transport                 |
| MP - MessagePad                       |                                     |
| N-C - Networking-Communications       | PSU - PowerBook System Update       |
| NCU - Newton Connection Utilities     | PSW - Printing Software for Windows |
| NSU - Newton System Updates           | PTG - Printing                      |
| ONC - Other Networking-Communications | QTW - QuickTime for Windows         |
| ONU - Other Newton Updates            | SYS - System                        |
| OPB - Other PowerBook Software        | SPE - Speech                        |

The Alphabetical List of USA Apple Software Updates:

- 040 VM Update 1.0 - Macintosh/SYS/Other System
- 32-Bit System Enabler 1.0.3 - Macintosh/SYS/Other System
- 5xxx-6xxx Tester 1.0 - Macintosh/Utilities
- 630 SCSI Update 1.0 - Macintosh/SYS/Other System
- 6360-64xx-54xx Update 1.0 - Macintosh/SYS/Other System

## APPLE II COMPUTER TECHNICAL INFORMATION

7.5.5 SCSI Server Update - Macintosh/N-C/Apple Share  
8\*24 GC Software 7.0.1 - Macintosh/D-P  
950 Color Addition 1.0 - Macintosh/SYS/Other System  
About PlainTalk 1.4.1 - Macintosh/SYS/Speech /PlainTalk 1.4.1  
Adobe Acrobat Reader 2.1 - Macintosh/Utilities  
ADSP 1.5.1 - Macintosh/N-C/Comm Toolbox  
AMK Spinning Cursor Bug Fix - Macintosh/Utilities  
APD 1.1.3 Update - Macintosh/Utilities  
Apple CD-ROM 5.0.4 - Macintosh/D-P  
Apple Color Printer 1.0 - Macintosh/PTG/Other Printing  
Apple Color SW Pro CMM 1.0 - Macintosh/PTG/Other Printing  
Apple DocViewer 1.1.1 - Macintosh/Utilities  
Apple Event Manager 1.0.3 - Macintosh/SYS/Other System  
Apple Guide Authoring Kit Offer - Macintosh/Utilities  
Apple HD SC Setup 7.3.5 - Macintosh/Utilities  
Apple II SCSI Utilities - Apple II/Apple II Supplemental  
Apple II Startup Disk 2.2 - Macintosh/N-C/AppleShare  
Apple II System Disk 3.2 - Apple II/Apple II Supplemental  
Apple II Video Overlay Card - Apple II/Apple II Supplemental  
Apple IIGS CD Setup 5.1 - Apple II/Apple II Supplemental  
Apple IIGS System 6.0.1 - Apple II/Apple IIGS System 6.0.1  
Apple Internet Router 3.0.1 Patch - Macintosh/N-C/Network Software Installer  
Apple LAN Utility 1.0b4 - Macintosh/Unsupported  
Apple Memory Guide 1.3 - Macintosh/Utilities  
Apple Menu Options 1.02 - Macintosh/SYS/Other System  
Apple Modem Tool 1.5.3 - Macintosh/N-C/Comm Toolbox  
Apple Printer Utility 2.1.1 - Macintosh/PTG/LaserWriter  
Apple Remote Access 2.0.1 Info - Macintosh/N-C/ARA  
Apple Spec 11-96 - Macintosh/Utilities  
Apple Spec App - Macintosh/Utilities  
Apple System Profiler 1.0.1 - Macintosh/Utilities  
ApplePhone 1.0.1 - Macintosh/Unsupported  
AppleScan 1.0.2 - Macintosh/D-P  
AppleSearch 1.0.1 Patch - Macintosh/N-C/ONC  
AppleSearch 1.5.1 Patch - Macintosh/N-C/ONC  
AppleShare 3.0.3 Patch - Macintosh/N-C/AppleShare  
AppleShare 4.2.1 to 4.2.2 - Macintosh/Updater Net-Comm/AppleShare  
AppleShare 4.2 Upgrade Info - Macintosh/N-C/AppleShare  
AppleShare Setup 1.0.1 - Macintosh/Utilities  
AppleShare Tune-Up 4.0.1 - Macintosh/N-C/AppleShare  
AppleTalk ADSP Tool 1.0 - Macintosh/N-C/Comm Toolbox  
AppleTalk Image Writer 7.0.1 - Macintosh/PTG/Other Printing  
AppleVision Fix 1.1 - Macintosh/D-P  
AppleVision Fix 1.1 - Macintosh/SYS/System 7.5 Update 2.0  
AppleVision Fix 1.1 Info - Macintosh/SYS/Older SYS/For System 7.5.2 and 7.5.3  
AppleVision Software 1.0.2 - Macintosh/D-P  
ARA 1.0 Client Enabler - Macintosh/N-C/ARA/Other ARA Software  
ARA 1.0 Original Scripts - Macintosh/N-C/ARA/ARA 1.0 Original Scripts  
ARA 1.0 User Scripts - Macintosh/N-C/ARA/ARA 1.0 User Scripts  
ARA 2.0 Original Scripts - Macintosh/N-C/ARA/ARA 2.0 Original Scripts  
ARA 2.0 User Scripts - Macintosh/N-C/ARA/ARA 2.0 User Scripts  
ARA Client 2.1 Updater - Macintosh/N-C/ARA/ARA Updates  
ARA MP Server 2.1 Patches - Macintosh/N-C/ARA/ARA Updates  
ARA PS 2.1 Updater - Macintosh/N-C/ARA/ARA Updates  
AS Custom Settings 1.0 - Macintosh/Unsupported  
ASFU Fixer 1.0.1 - Macintosh/PTG/Other Printing  
Assistant Toolbox 1.0.1d1 - Macintosh/Unsupported  
At Ease 2.0.3 Update - Macintosh/SYS/At Ease  
At Ease 4.0.1 Updater - Macintosh/SYS/At Ease  
At Ease Update 1.0 - Macintosh/SYS/At Ease  
At Ease WG 3.0.3 Updater - Macintosh/SYS/At Ease  
At Ease 3 CDROM Prefs Patch - Macintosh/SYS/At Ease  
At Ease-IDE Utility Disk 1.0 - Macintosh/SYS/At Ease  
Audio Volume 1.1 Installer - Macintosh/SYS/Other System  
AudioVision Installer 1.0.2 - Macintosh/D-P  
AV Serial Extension 1.0 - Macintosh/SYS/Other System

## APPLE II COMPUTER TECHNICAL INFORMATION

Avid Cinema 1.1 Update Macintosh - D-P  
AWS 95 Tune-Up 1.0 - Macintosh/N-C/ONC  
AWS 95 Tune-Up 2.0 - Macintosh/N-C/ONC  
Backgrounder 1.3 - Macintosh/PTG/Other Printing  
Backlight Control 1.0 - Macintosh/Utilities  
Basic Color Monitor (1.0) - Macintosh/D-P  
Basic Connectivity Set 1.1.1 - Macintosh/N-C/Comm Toolbox  
Battery Tools 2.0 - Macintosh/PowerBook/Other PB SW  
Cache Switch 7.0.1 - Macintosh/SYS/Other System  
CD-ROM Software 5.1.7 - Macintosh/D-P  
CD-ROM Software 5.3.2 - Macintosh/D-P  
CFM-68k 4.0b1 - Macintosh/Unsupported  
Chinese Lang. Kit Updater - Macintosh/SYS/Language Kits  
Chooser 7.3 - Macintosh/PTG/Other Printing  
CISMAIL.EXE - Newton/For DOS-Windows/ONU  
CIS Mail 2.0 v.1.0.2 - Newton/For MacOS/ONU  
Color Classic Update 1.0 - Macintosh/SYS/Other System  
Color Laser Writer 8.3.2 - Macintosh/PTG/LaserWriter  
Color SW Pro 1.5.2 - Macintosh/PTG/Other Printing  
Color SW Pro GX 1.0 - Macintosh/SYS/QuickDraw GX  
Color SW Pro GX 1.0 - Macintosh/PTG/OPS  
Color SW 1500 2.2.1 (3.sea disks & NetInst.sea) - Macintosh/PTG/OPS  
Color SW 2500 2.2.1 (4.sea disks & NetInst.sea) - Macintosh/PTG/OPS  
Colorsync 2.0 Plug-ins - Macintosh/Utilities  
ColorSync 2.1.1 - Macintosh/SYS/Other System  
Compatibility Checker 2.0 - Macintosh/SYS/Older SYS/For System 7.1.x  
Cyberdog 1.2.1 - Macintosh/SYS/Net-Comm/Cyberdog  
CPU Energy Saver 1.0.6 - Macintosh/SYS/Other System  
DART 1.5.2 - Macintosh/Utilities  
Desktop Printing 2.0.1 - Macintosh/PTG/Other Printing  
Direct Dialup 1.1.1 - Macintosh/SYS/Other System  
Direct Dialup Mail 1.1.2 - Macintosh/SYS/PowerTalk  
Disk Copy 4.2 - Macintosh/Utilities  
Disk First Aid 7.2.2 - Macintosh/Utilities  
Disk Image Mounter 1.0.1 - Macintosh/Utilities  
Display Card 24AC 1.2 - Macintosh/D-P  
Display Software 2.0.2 - Macintosh/D-P  
Document Converter 1.0.4 - Macintosh/Utilities  
DOS Compatibility 1.5 - DOS-Windows/DOS and PC Compatibility SW  
Drive Firmware Update 1.2 - Macintosh/SYS/Other System  
Drive Setup 1.0.5 - Macintosh/Utilities  
Drive Setup 1.2 - Macintosh/Utilities  
Duo Battery Patch 1.0 - Macintosh/PowerBook/Other PB SW  
EM Sound Update 1.0 - Macintosh/SYS/Other System  
English Speech Recognition - Macintosh/SYS/Speech /PlainTalk 1.4.1  
English Text-to-Speech - Macintosh/SYS/Speech /PlainTalk 1.4.1  
Ethernet Built-In 1.0.2 - Macintosh/N-C/ONC  
Express Modem 1.5.5 - Macintosh/N-C/ONC  
Finder Scripting Ext 1.2 - Macintosh/SYS/Other System  
Font Extension 3 1.0.4 - Macintosh/SYS/Language Kits  
FontSize Patch 1.1 - Macintosh/SYS/Language Kits  
Geoport-EM 3.1.1 Update/Macintosh/N-C/Apple Telecom  
GeoPort/Express Modem 3.0 Updater/Macintosh/N-C/Apple Telecom  
GlobalFax 2.5.2P Update - Macintosh/N-C/ONC  
GrayShare Update 1.0 - Macintosh/PTG/Other Printing  
Graphics Accelerator 1.0.7 - Macintosh/Unsupported  
GX 1.1.3 Net Install - Macintosh/SYS/QuickDraw GX  
HC 2.3 Color Stack Repair.sea - Macintosh/Utilities  
HC 2.3.5 Stacks.sea - Macintosh/Utilities  
HC 2.3.5 Update Installer - Macintosh/Utilities  
HC 2.3.5 Updater - Macintosh/Utilities  
HCIIGS 1.1 - Apple II/HyperCard IIGS 1.1  
HideEworld - Newton/For MacOS/ONU  
HyperCard Player 2.3.5 - Macintosh/Utilities  
HyperMover.IIGS - Apple II/HyperCard IIGS  
HyperMover.Mac - Apple II/HyperCard IIGS

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HyperScan 2.0.1 - Macintosh/D-P  
Ignore Dialtone 1.0.fc1 - Macintosh/Unsupported  
ImageWriter 7.0.1 - Macintosh/PTG/Other Printing  
IMF & DT Disk Images - Macintosh/SYS/System Enablers  
Intelligent Battery Update 1.0.3 - Macintosh/PowerBook/Other PB SW  
Internal HD Format 1.3 - Macintosh/Utilities  
Internet Router 3.0.1 Patch - Macintosh/N-C/ONC  
Invisible AWS 95 Fix (elap) - Macintosh/N-C/ONC  
IP Gateway 1.0.1 Patch - Macintosh/N-C  
IP Gateway 1.0.1 Patch - Macintosh/N-C/ONC  
ISO 9660 File Access 5.0.2 - Macintosh/D-P  
ISO 9660 File Access 5.0.2 - Macintosh/SYS/Other System  
JLK Info - Macintosh/SYS/Language Kits  
LT & LW Bridge 2.1/Macintosh/N-C/Other N-C  
Laser Prep 7.1.2 - Macintosh/PTG/LaserWriter  
Laser Prep 7.2 - Macintosh/PTG/LaserWriter  
LaserWriter 300 1.2 - Macintosh/PTG/LaserWriter  
LaserWriter 8.2.3f - Macintosh/PTG/LaserWriter  
LaserWriter 3.0.8 for Windows 3.1 (LW Win 3.1 3.0.8) - DOS & Windows/PTG  
LaserWriter 4.1 for Windows 95 (LW Win 95 4.2) - DOS & Windows/PTG  
LaserWriter 8.4.1 - Macintosh/PTG/LaserWriter  
LaserWriter Fax Tuneup 1.0 - Macintosh/PTG/LaserWriter  
LaserWriter Printing Software 8.3.2 - Macintosh/PTG/LaserWriter  
LaserWriter Printing Software 8.3.4 - Macintosh/PTG/LaserWriter  
LaserWriter Pro 810 For Windows - DOS & Windows/PTG  
LaserWriter Pro Energy Star Software - Macintosh/PTG/LaserWriter  
LaserWriter Select 310 7.0.1 - Macintosh/PTG/LaserWriter  
LQ AppleTalk ImageWriter 7.0.1 - Macintosh/PTG/Other Printing  
LaserWriter SW for Windows 1.0.2 - DOS & Windows/PTG (older version,.sea file)  
Location Manager 1.0 Macintosh/PowerBook/Other PB SW  
LW Select 310 For Windows - DOS & Windows/PTG (.sea and .exe file formats)  
LWSW102.zip (LW SW for Windows 1.0.2) - DOS & Windows/PTG (older version, zip file)  
Mac Drag and Drop 1.1 - Macintosh/SYS/Other System  
MacDNS 1.0.3 - Macintosh/N-C/ONC  
Macintosh Basics 5.0.3 - Macintosh/Utilities  
Macintosh Tutorial - Macintosh/Utilities  
Macintosh Easy Open 1.1.1 - Macintosh/SYS/Other System  
MacPPP 2.5 - Macintosh/N-C/ONC  
MacsBug 6.5.3 - Macintosh/Utilities  
Macbug 6.5.4 Info - Macintosh/Utilities  
MacTCP 2.0.4 Update - Macintosh/N-C/ONC  
MacTCP 2.0.6 Update - Macintosh/N-C/ONC  
MacTCP Ping 2.0.2 - Macintosh/Unsupported  
MacTCP Token Ring Extension 1.0 - Macintosh/N-C/ONC  
MacX25 1.2 Patch - Macintosh/N-C/ONC  
MailLink for PowerTalk INET - Macintosh/SYS/PowerTalk  
MailLink for PowerTalk MS - Macintosh/SYS/PowerTalk  
MailLink for PowerTalk QM - Macintosh/SYS/PowerTalk  
MANUAL.PDF - Newton/For DOS-Windows/ONU  
MegaPhone 1.0.2 - Macintosh/N-C/Other N-C  
MegaPhone 1.0.3P - Macintosh/N-C/ONC  
MegaPhone Manual 2.0- Macintosh/N-C/Other N-C Mercury ATandT GW 1.0C - Macintosh/Unsupported  
Mercury Envoy GW 1.0C - Macintosh/Unsupported  
Mercury MCI Mail GW 1.0C - Macintosh/Unsupported  
Mexican Spanish TTS - Macintosh/SYS/Speech /PlainTalk 1.4.1  
MIDI Management Tools 2.0.2 - Macintosh/Unsupported  
MODE32 7.5 - Macintosh/SYS/Other System  
Modem Enabler 1.0 - Newton/For MacOS/Other Newton Updates  
MDMENBLR.ZIP- Newton/For DOS-Windows/MP System Updates  
Modem Script Generator 1.0a1 - Macintosh/Unsupported  
Monitor Energy Saver 1.0 - Macintosh/D-P  
Monitor Energy Saver 1.1 - Macintosh/D-P  
Mount IDE Drive 1.0 - Macintosh/SYS/Other System  
Mouse Basics 4.5 - Macintosh/Utilities  
MoviePlayer 2.5- Macintosh/Utilities

## APPLE II COMPUTER TECHNICAL INFORMATION

MovieShop 1.2.1 - Macintosh/Unsupported  
 MP 100 1.3.415333 - Newton/For MacOS/MP System Updates  
 MP 110 1.3.45333 - Newton/For MacOS/MP System Updates  
 MP 120 2.0.516263 - Newton/For MacOS/MP System Updates  
 MP 120 Tour and Handwriting - Newton/For MacOS/ONU  
 MP 130 2.0.526205 - Newton/For MacOS/MP System Updates  
 MP345333.EXE - Newton/For DOS-Windows/MP System Updates  
 MP415333.EXE - Newton/For DOS-Windows/MP System Updates  
 MP445333.EXE - Newton/For DOS-Windows/MP System Updates  
 MP516263.ZIP - Newton/For DOS-Windows/MP System Updates  
 MP526205.ZIP - Newton/For DOS-Windows/MP System Updates  
 MRJ 1.0 - Macintosh/System/Java  
 NBU101EN.ZIP - Newton/For DOS-Windows/ONU  
 NBU User's Guide - Newton/For MacOS/ONU  
 NTK 1.5.2b2 Updater - Newton/For MacOS/ONU  
 Network Access Disk 7.5 - Macintosh/Utilities  
 Network Asst. 2.0.1 Updater - - Macintosh/SYS/At Ease  
 Network Launch Fix 1.0.2 - Macintosh/N-C/ONC  
 Network Software Installer 1.4.4 - Macintosh/N-C/Network Software Installer  
 Network Software Installer ZM-1.4.5 - Macintosh/N-C/Network Software Installer  
 Network Software Installer ZM-1.5 - Macintosh/N-C/Network Software Installer  
 Network Software Installer ZM-1.5.1 - Macintosh/N-C/Network Software Installer  
 NCU 1.0b5 - Newton/For MacOS/Unsupported  
 NCU.10B5 - Newton/For DOS-Windows/Unsupported  
 Newton System Update 1.0.5 - Newton/For MacOS/MP System Updates  
 Newton System Update 1.1.1 - Newton/For MacOS/MP System Updates  
 NewtonMail Modules 1.0.1 - Newton/For MacOS/MP System Updates  
 Ofoto Update 2.0.2 Information - Macintosh/D-P  
 Open Transport 1.0.8 - Macintosh/N-C/OT  
 Open Transport Manual - Macintosh/N-C/OT  
 OpenDoc 1.1 - Macintosh/SYS/OpenDoc  
 OT 1.1 Manual - Macintosh/SYS/System 7.5 Update 2.0  
 OT 1.1.1 - Macintosh Macintosh - N-C/Open Transport  
 OT 1.1.1 Extras - Macintosh - N-C/Open Transport  
 OT 1.1.2 - Macintosh Macintosh - N-C/Open Transport  
 OT 1.1.2 Extras - Macintosh - N-C/Open Transport  
 OT PPP 1.0 Macintosh - N-C/Open Transport  
 OT PPP 1.0 Manual - Macintosh - N-C/Open Transport  
 OT PPP 1.0 Net Install - Macintosh - N-C/Open Transport  
 OPS Info (read me) - Macintosh/PTG/Other Printing  
 PANTONE for AppleVision - Macintosh/Unsupported  
 PANTONE for Color LW - Macintosh/PTG/LaserWriter  
 PANTONE for Color LW (12/600).exe - DOS & Windows - DOS & Windows/PTG  
 PB 1400 HD Updater 1.0 - Macintosh/PowerBook/PB 1400  
 PB 1400 PMU Updater 1.0.1 - Macintosh/PowerBook/PB 1400  
 PB 1400 Floppy Update 1.0.2 - Macintosh/PowerBook/PB 1400  
 PB 2300c Update 1.0 - Macintosh/PowerBook/Other PB SW  
 PC Card Software 2.0 - Macintosh/PowerBook/Other PB SW  
 PC Net Exchange 1.0.1 - Macintosh/N-C/AppleShare  
 PC Setup 1.0.2 - DOS & Windows/DOS and PC Compatibility SW (For Quadra 610  
 DOS Compatible)  
 PC Setup DIMM Patch - Macintosh/Unsupported  
 PS Fax Cover Page Utilities - Macintosh/Unsupported  
 Personal LW NTR For Windows - DOS & Windows/PTG  
 Personal LW SC 7.0.1 - Macintosh/PTG/LaserWriter  
 PhotoFlash 2.0 to 2.0.1 Updater - Macintosh/D-P  
 PlainTalk 1.2.1 - Macintosh/SYS/Speech /PlainTalk 1.2.1  
 PlainTalk 1.3 - Macintosh/SYS/Speech /PlainTalk 1.3.1  
 PlainTalk User Guide 1.2.1 - Macintosh/SYS/Speech /PlainTalk 1.2.1  
 PlainTalk User Guide 1.3 - Macintosh/SYS/Speech /PlainTalk 1.3.1  
 Portable Control Panel 1.3 - Macintosh/SYS/Other System  
 Portable StyleWriter 1.0.1 - Macintosh/PTG/Other Printing  
 Power Macintosh 7500/8500 Disk Tools - Macintosh/SYS/Other System  
 Power Macintosh 7500/8500 Install 1 - Macintosh/SYS/Other System  
 Power Macintosh AV Update 1.0-Bootable Disk - Macintosh/SYS/Other System  
 Power Macintosh AV Update 1.0-Extension Only - Macintosh/SYS/Other System

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PowerBook 150 Enabler 1.1. - Macintosh/SYS/System Enablers  
PowerBook 500 Series 1.0.2 - Macintosh/SYS/System Enablers  
PowerBook 5300 SW Update - Macintosh/PowerBook/PB 5300 SW Update  
PowerBook Duo Enabler 1.0 - Macintosh/SYS/System Enablers  
PowerBook Duo Enabler 2.0 - Macintosh/SYS/System Enablers  
PowerCD Setup 1.0.1 - Macintosh/D-P  
PowerPC Enabler 1.0.2 - Macintosh/SYS/System Enablers  
PowerPC Enabler 1.1.1 - Macintosh/SYS/System Enablers  
PowerPC Interrupt Extension - Macintosh/SYS/Other System  
PowerTalk Gateways - Macintosh/SYS/PowerTalk  
PowerTalk Guided Tour 1.1 - Macintosh/SYS/PowerTalk  
PowerTalk Info - Macintosh/SYS/PowerTalk  
PowerTalk Manager 1.5 - Macintosh/SYS/PowerTalk  
PowerTalk PPC 1.0.2 - Macintosh/SYS/PowerTalk  
PowerTalk PPC 1.0.2 France - Macintosh/SYS/PowerTalk  
PowerTalk Solutions Guide - Macintosh/SYS/PowerTalk  
PPC Upgrade Enabler 1.0.1 - Macintosh/SYS/System Enablers  
Print Monitor 7.0.1 - Macintosh/PTG/LaserWriter  
Printer Share 1.1.2 - Macintosh/PTG/Other Printing  
PrintMonitor 7.1 - Macintosh/PTG/LaserWriter  
PrintMonitor 7.1.2 - Macintosh/PTG/Other Printing  
PT 1.1.6 - Macintosh/SYS/PowerTalk  
PT 1.2.3 - Macintosh/SYS/PowerTalk  
PT Mail Folders 1.5 - Macintosh/Unsupported  
PT Mail Reader 1.1 - Macintosh/SYS/PowerTalk  
QDGS Spooler Patch 1.0.2 - Macintosh/Unsupported  
QTEASY16.EXE- DOS-Windows/QT  
QTPLUG16.EXE- DOS-Windows/QT  
QTEASY32.EXE- DOS-Windows/QT  
QTPLUG32.EXE- DOS-Windows/QT  
QD3D1523.ZIP - DOS-Windows/QuickDraw 3D  
QuickDraw 3D 1.0.6 - Macintosh/SYS/QuickDraw GX  
QuickDraw GX 1.1.3 - Macintosh/SYS/QuickDraw GX  
QuickKeys Test Drive - Macintosh/SYS/Speech /PlainTalk 1.3.1  
QuickKeys Test Drive 1.2.1 - Macintosh/SYS/Speech /PlainTalk 1.2.1  
QuickTake for Power Mac 1.0 Macintosh/Display-Peripheral  
QuickTime 2.1 - Macintosh/SYS/QuickTime  
QuickTime 2.1.1 for Windows 3.1 - DOS & Windows/QTW  
QuickTime 2.1.1 for Windows 95 - DOS & Windows/QTW  
QuickTime 2.5 - Macintosh/SYS/QuickTime  
QuickTime 2.5 Extras - Macintosh/SYS/QuickTime  
QuickTime MPEG 1.0 - Macintosh/SYS/QuickTime  
QuickTime Plug-in 1.1 - Macintosh/SYS/QuickTime  
QuickTime TV 1.0.4b19 - Macintosh/Unsupported  
Rename Rescue 1.0 - Macintosh/SYS/Older SYS/For System 7.0.x  
Scanner 2.0 (system extension) - Macintosh/D-P  
Scanner 3.0 (system extension) - Macintosh/D-P  
Screen 1.0.6 - Macintosh/SYS/Other System  
Security Info - Macintosh/N-C/ARA/Other ARA Software  
Serial Switch 1.1 - Macintosh/SYS/Other System  
Serial Tool 1.0.2 - Macintosh/N-C/Comm Toolbox  
SerialDMA 2.0.2 - Macintosh/N-C/ONC  
Server Remote Control v1.0 - Macintosh/Utilities  
Shrinkit1.1 - Apple II/Apple II Supplemental  
SimpleSound 1.0 - Macintosh/Utilities  
SimpleText 1.3 - Macintosh/Utilities  
Slow SCSI Extension - Macintosh/Unsupported  
SNA\*ps 3270 1.1.2 Patch - Macintosh/N-C/ONC  
Sound Manager 3.1 - Macintosh/SYS/Other System  
SpoolLauncher 2.1.1 - Macintosh/PTG/Other Printing  
SpoolMaster 2.1.1a - Macintosh/PTG/Other Printing  
SSW 6.0.3 - Macintosh/SYS/Older SYS/For System 6.0.x  
SSW 6.0.5 - Macintosh/SYS/Older SYS/For System 6.0.x  
SSW 6.0.8 - Macintosh/SYS/Older SYS/For System 6.0.x  
SSW 7.0 - Macintosh/SYS/Older SYS/For System 7.0.x  
SSW 7.0.1 - Macintosh/SYS/Older SYS/For System 7.0.x

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System 7 Tune-up 1.1.1 - Macintosh/SYS/Older SYS/For System 7.0.x  
System 7.5 Update 2.0 (14 Disks) - Macintosh/SYS/System 7.5 Update 2.0  
Sys75 Upd2.0 Custom Install - Macintosh/Unsupported  
System 7.5.3 Rev 2 - Macintosh/SYS/Older SYS/For System 7.5.2 and 7.5.3  
System 7.5.5 Update - Macintosh/SYS/System 7.5.5 Update  
System Enabler 001 (1.0.1) - Macintosh/SYS/System Enablers  
System Enabler 003 (1.1) - Macintosh/SYS/System Enablers  
System Enabler 040 (1.1) - Macintosh/SYS/System Enablers  
System Enabler 065 (1.2) - Macintosh/SYS/System Enablers  
System Enabler 088 (1.2) - Macintosh/SYS/System Enablers  
System Enabler 131 (1.0.3) - Macintosh/SYS/System Enablers  
System Enabler 401 (1.0.5) - Macintosh/SYS/System Enablers  
System Enabler 403 (1.0.2) - Macintosh/SYS/System Enablers  
System Enabler 404 (1.0) - Macintosh/SYS/System Enablers  
System Enabler 405 (1.0) - Macintosh/SYS/System Enablers  
System Enabler 406 1.0 - Macintosh/SYS/System Enablers  
System Update 3.0 800K Disk - Macintosh/SYS/Older SYS/For System 7.1.x  
System Update 3.0.1 1.4MB Disk -Macintosh/SYS/Older SYS/For System 7.1.x  
Telecom 2.3.3 - Macintosh/N-C/Apple Telecom  
Telecom 2.3.3 PC Card Modem - Macintosh/N-C/Apple Telecom  
Telephone Manager (2.0) - Macintosh/N-C/ONC  
Telephone Manager 1.1.1 - Macintosh/SYS/Other System  
Text Tool (1.0.1) - Macintosh/N-C/Comm Toolbox  
TextEditor (1.3a1) - Macintosh/N-C/ONC  
The Namer (7.0) - Macintosh/PTG/Other Printing  
Thread Manager 2.0.1 - Macintosh/SYS/Other System  
TOUR\_HWI.ZIP - Newton/For DOS-Windows/ONU  
Trackpad Climate COntrol - Macintosh/PowerBook/Other PB SW  
TTY Tool (1.0.1) - Macintosh/N-C/Comm Toolbox  
TTYFont (1.0) - Macintosh/N-C/Comm Toolbox  
TV Setup 1.0.2 - Macintosh/SYS/Other System  
Update 2.0 Late Breaking Tips - Macintosh/SYS/System 7.5 Update 2.0  
Video Monitor 1.0.1 - Macintosh/Unsupported  
Video SW Install 1.5.1 - Macintosh/D-P  
VideoSync 1.0 - Macintosh/Unsupported  
VideoSynchII - Macintosh/Unsupported  
VT102 Tool (1.0.2) - Macintosh/N-C/Comm Toolbox  
VT102Font (1.0.1) - Macintosh/N-C/Comm Toolbox  
Windows NPI 2.0 - Newton/For MacOS/ONU  
WBOFF.EXE - Macintosh/Unsupported  
WINNP12.EXE - Newton/For DOS-Windows/ONU  
WGS Not Supported with System 7.5.5/Macintosh/SYS/System 7.5.5 Update  
WorldScript Updater 1.1 - Macintosh/SYS/Language Kits  
X11 Server Update For A/UX 3.0 - Macintosh/N-C/ONC  
XMODEM Tool (1.1) - Macintosh/N-C/Comm Toolbox  
ZM-AppleShare WS 3.6.5 - Macintosh/N-C/AppleShare  
ZyXEL Modem Scripts - Macintosh/Unsupported/User Contributed CCLs  
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Keywords: kol,kinter,ktop20,kalley,ktop20

### END OF FILE A2TIL399.TXT

```
#####
### FILE: A2TIL400.TXT
#####
```

Description: Using DOS 3.3 with Catalyst 2.1 (1 of 5)  
 Header: Using DOS 3.3 with Catalyst 2.1 (1 of 5)

CHAPTER 1  
 INTRODUCTION  
 OVERVIEW

DOS 3.3 BASIC and its associated Volume Manager (both supplied on your Catalyst diskette VERSION 2.1) may be used to access your DOS BASIC programs directly from your hard disk and have access to "DOS 3.3 volumes" on the hard disk.

The DOS 3.3 Volume Manager is used to create standard ProDOS files which appear as DOS 3.3 volumes to DOS 3.3 BASIC. To access these files, they must be "mounted" and formatted as a floppy diskette within your hard disk. All accesses to the hard disk on which you mounted the ProDOS file are then made to that file.

The Volume Manager also allows you to create a file (named MOUNTS3.3) which tells DOS 3.3 which slot/drive pair to run the startup program (HELLO) from, what ProDOS files to mount on selected slot/drive pairs, and whether or not to reserve room for DOS when you initialize a file or diskette.

When DOS 3.3 is selected from the Catalyst menu, it reads the MOUNTS3.3 file from the directory specified by the current ProDOS prefix. If no MOUNTS3.3 file is found, the following assumptions are made:

- DOS 3.3 will look for its startup program on slot 6, drive 1. If a HELLO program is not found there, you will receive an I/O error.
- No hard disk DOS volumes will be mounted for access.
- The INIT command will reserve room for DOS when you initialize a file or diskette.

The instructions below explain how to install DOS 3.3 BASIC and its associated Volume Manager on your hard disk through the Catalyst Editor program. The Volume Manager may then be used to create volumes on the hard disk for use by DOS 3.3, and to create the MOUNTS3.3 file to enable access to those volumes.

RESTRICTIONS:

1. Catalyst version 2.1 is necessary in order to use the DOS 3.3 option.
2. Copy protected DOS 3.3 programs can not be used.
3. ProDOS files (disk volumes) no larger than 800 sectors (200K) can be created, thus DOS program applications requiring more than 800 sectors can not be used.

INSTALLATION

To install DOS 3.3 BASIC and its associated Volume Manager under Catalyst, perform the following procedure:

1. Select the Catalyst Editor from the Catalyst menu.
2. When the Catalyst Editor main menu comes up, select the "Install program" option.
3. From the list of Program manufacturers, select the entry for "Apple Computer, Inc."
4. Select the entry for "DOS 3.3 BASIC" from the list of Apple programs.
5. You are then prompted to insert the boot diskette of the program to install in the disk drive. Insert the Catalyst PROGRAM diskette in the disk drive, and then press the space bar.
6. DOS 3.3 BASIC and its associated Volume Manager (MAKE.MOUNTS) will then be

## APPLE II COMPUTER TECHNICAL INFORMATION

copied from your Catalyst PROGRAM diskette to the CATALYST2E subdirectory on your hard disk. You are then returned to the Catalyst Editor main menu.

7. Enter "E" to Edit the Catalyst menu.
8. Using the up and down arrow keys, position the inverse bar over the "DOS 3.3 BASIC" entry which now appears on your menu. Type "A" to Add a program entry.
9. Enter "DOS Volume Manager" for the menu Display name.
10. Enter "CATALYST2E/BASIC." for the Interpreter path.
11. Press RETURN for the Initial prefix.
12. Enter "CATALYST2E/MAKE.MOUNTS" for the Program path.
13. If all the above has been entered correctly, press RETURN when asked "Is all this correct?". Otherwise, enter "NO" and fix the incorrect entry.
14. Press ESCAPE to return to the Catalyst Editor main menu. Enter "U" to Update the INTERPS2E file.
15. Enter "Q" to Quit from the Catalyst Editor.

NOTE: Since the ProDOS Prefix for the DOS 3.3 BASIC entry is automatically set to "CATALYST2E" by the above installation process, DOS will expect its MOUNTS3.3 file to be in that subdirectory.

NOTE: Apple Computer Inc. is not responsible for the contents of this article.

Quark Technical Support

Keywords:

### END OF FILE A2TIL400.TXT

```
#####
### FILE: A2TIL401.TXT
#####
```

Description: Using DOS 3.3 with Catalyst 2.1 (2 of 5)  
 Header: Using DOS 3.3 with Catalyst 2.1 (2 of 5)

CHAPTER 2  
 THE DOS 3.3 VOLUME MANAGER

If you have performed the above installation procedure, you may select the DOS 3.3 Volume Manager program directly from your Catalyst menu. Alternatively, you may select ProDOS BASIC and execute the program named MAKE.MOUNTS on your Catalyst diskette by typing "RUN /volume name of your hard disk/CATALYST2E/MAKE.MOUNTS".

1. Catalog

The first entry on the DOS Volume Manager main menu allows you to obtain a standard catalog of files on your hard disk or a floppy diskette. You are prompted to enter the pathname of the directory for which the catalog is to be displayed. In order to freeze the display, press CONTROL "S". Pressing CONTROL "S" again will allow the display to continue.

2. Create DOS 3.3 Volume

The second entry on the DOS Volume Manager main menu allows you to create a ProDOS file which can be used as a DOS 3.3 volume. When you select the "Create DOS 3.3 Volume" option, you are asked to enter the pathname of the new DOS 3.3 volume. Any standard ProDOS pathname may be entered such as "/P/CATALYST2E/DOS".

Next you are requested to enter the size of the volume. Volume size is specified in units of "sectors", where one sector is equivalent to 256 bytes or characters of storage.

The size you specify will depend on what you intend to use the volume for and how much room is left on your hard disk. Volumes must be at least 288 sectors (72K) in size, and may be no larger than 800 sectors (200K). The size you specify will be automatically rounded up to the nearest multiple of 16 sectors (4K). A standard floppy diskette contains 560 sectors (140K).

ADDITIONAL INFORMATION CONCERNING CREATING DOS 3.3 VOLUMES

Once the DOS 3.3 volume has been created and the size has been specified, you must mount it using the Edit Mounts option within Edit mount file for DOS 3.3 application described in part 4 of this chapter in order to grant access to it.

Last but not least, you must initialize the DOS 3.3 volume in order to be able to store information to it. In order to do this, select DOS 3.3 BASIC from the Catalyst main menu. at the prompt "]" type INIT HELLO. The DOS 3.3 volume that you have previously mounted will be initialized for DOS 3.3.

3. Delete DOS 3.3 Volume

The third entry on the DOS Volume Manager main menu allows you to selectively remove previously defined DOS 3.3 volumes from your hard disk. All storage associated with a DOS 3.3 volume is released when IT is deleted. The freed storage is then available for use by any subsequent volume definitions.

Actually, you may delete any ProDOS file, not just DOS 3.3 volumes. When you select the "Delete DOS 3.3 Volume" option, you are asked to enter the pathname of the volume to delete. Any standard ProDOS pathname may be entered.

Note that deleting a DOS 3.3 volume does not remove it from any place where it may have been mounted. Your system may still contain a MOUNTS3.3 file with a reference to the deleted volume. Such a reference will be ignored, however.

4. Edit Mount File for DOS 3.3 Application

## APPLE II COMPUTER TECHNICAL INFORMATION

The fourth entry on the DOS Volume Manager main menu is used to create a new  
or  
edit an existing MOUNTS3.3 file for DOS 3.3 BASIC.

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article.  
Quark Technical Support

Keywords:

### END OF FILE A2TIL401.TXT

```
#####
### FILE: A2TIL402.TXT
#####
```

Description: Using DOS 3.3 with Catalyst 2.1 (3 of 5)  
 Header: Using DOS 3.3 with Catalyst 2.1 (3 of 5)

CHAPTER 2a

When DOS 3.3 BASIC is run, it reads the MOUNTS3.3 file from the directory specified by the current ProDOS prefix, and uses that information to determine on which slot/drive pair to look for its startup program (HELLO), what ProDOS files (DOS 3.3 volumes) to mount on selected slot/drive pairs, and whether or not to reserve room for DOS when you initialize a file or diskette.

When you select the "Edit Mount File for DOS 3.3 Application" option, you are asked to enter the name of the subdirectory containing your MOUNTS3.3 file. When you installed DOS 3.3 a MOUNTS3.3 file was created for you in the CATALYST2E subdirectory. If no MOUNTS3.3 file is found in another subdirectory you specify, you are asked if one should be created. If you enter a negative response, you are returned to the DOS Volume Manager main menu.

If the MOUNTS3.3 file is found (or if you request a new file should be created), you are presented with a display listing some of the file's attributes, including its location, the slot/drive which will be used to find the startup program (HELLO), and whether or not tracks will be reserved for DOS when you initialize diskettes or ProDOS volumes.

Also shown is a menu of options which allow you to set the HELLO program location, change the DOS track allocation for diskettes or DOS 3.3 volumes, and edit the mounts for your MOUNTS3.3 file. Pressing ESCAPE at this menu will return you to the DOS Volume Manager main menu.

If you select the "Edit mounts" option instead, you are presented with a list of all slot and drive combinations, and the DOS 3.3 volume currently associated with each pair. You may mount DOS 3.3 volumes in any location except those slot/drive pairs occupied by a floppy diskette controller card which are noted with a "Disk II" entry. NOTE: The MOUNTS3.3 file can only work with one startup program (HELLO) located on a slot/drive pair at a time. You may, however, mount up to 12 DOS 3.3 volumes under it for access. In order to run a HELLO program from another mounted DOS 3.3 volume, you must select the SET HELLO PROGRAM LOCATION from the EDIT MOUNTS FILE FOR DOS 3.3. APPLICATION menu.

To edit the entry for a particular slot/drive pair, simply select the desired entry when asked, "Edit which mount?". You will then be asked for the "New mount file path". If you don't want any DOS 3.3 volume mounted on the selected slot/drive pair, simply press RETURN. Otherwise, enter the pathname for the DOS 3.3 volume you wish to mount. You will be warned if the name of the DOS 3.3 volume you supply cannot be found.

When you are finished editing the mounts, press ESCAPE and you will be returned to the menu of options for editing your MOUNTS3.3 file. If no further changes are desired, press ESCAPE again, and you are returned to the DOS Volume Manager main menu.

5. Quit

The last entry on the DOS Volume Manager main menu is used to exit the program.  
 To return to the Catalyst menu, type "BYE".

APPLE II COMPUTER TECHNICAL INFORMATION

NOTE: Apple Computer Inc. is not responsible for the contents of this  
article.  
Quark Technical Support

Keywords:

### END OF FILE A2TIL402.TXT

```
#####
### FILE: A2TIL403.TXT
#####
```

Description: Using DOS 3.3 with Catalyst 2.1 (4 of 5)  
 Header: Using DOS 3.3 with Catalyst 2.1 (4 of 5)

CHAPTER 3  
 COPYING DOS 3.3 APPLICATIONS TO THE HARD DISK

Many DOS 3.3 applications can be used with this system provided that the entire application can be installed in 800 sectors or less and it is not copy protected. A quick and easy way to copy applications to the hard disk is to first copy the Apple II File Developer (FID) program to a DOS volume on the hard disk, and then execute the program. To do this, perform the following procedure.

1. Select the DOS 3.3 Volume Manager from the Catalyst menu.
2. Select Create DOS 3.3 Volume from the menu and create a DOS 3.3 volume under the CATALYST2E subdirectory that is 800 sectors in size. This will give you enough room to copy the rest of the Apple System Master files to the volume if you wish. For this example we will use a pathname of /P/CATALYST2E/DOS. Remember that the only MOUNTS3.3 file that exists at this time that can be associated with the new DOS 3.3 volume is located in the subdirectory CATALYST2E. If you wish to locate the DOS 3.3 volume elsewhere, you will have to create a MOUNTS3.3 file for that location by using the Edit Mount File for DOS 3.3 Application option.
3. Once the DOS 3.3 volume has been created, press ESCAPE to return to the DOS 3.3 Volume Manager menu. It is now necessary to edit the MOUNTS 3.3 file for the newly created volume. Select Edit Mount File for DOS 3.3 Application from the menu. You will be asked for the subdirectory containing the MOUNTS3.3 file.  
 Type /P/CATALYST2E and press RETURN.
4. For this exercise, we will mount the DOS 3.3 volume on slot 5, drive 1. Select EDIT MOUNTS from the menu. A list of all slot/drive pairs will be displayed. Select number 9 (slot 5, drive 1) from the menu and enter /P/CATALYST2E/DOS which is the pathname of the DOS 3.3 volume you have created.  
 The volume will be mounted.
5. Press ESCAPE to return to the Edit Mount File for DOS 3.3 Application menu. If you will notice, the BASIC startup program is being run from slot 6, drive 1. Since your newly created DOS 3.3 volume is mounted on slot 5, drive 1, you will have to change this. Select Set HELLO Program Location from the menu and change the slot/drive location to Slot 5, Drive 1.
6. Escape back to the DOS 3.3 Volume Manager menu and select QUIT.
7. At the "]" prompt, type INIT HELLO. The DOS 3.3 volume that you created and mounted will now be formatted for DOS 3.3. To prove this, type CATALOG. A listing with the file HELLO will be displayed.
8. Place your Apple SYSTEM MASTER disk in drive 1. Type CATALOG S6,D1" and press RETURN. Press RETURN until you arrive at the bottom of the catalog. At the prompt "]" type "BRUN FID" and press RETURN.
9. Select COPY FILES. At the prompt SOURCE SLOT? type "6", for DRIVE? type "1". For DESTINATION SLOT? type "5". For DRIVE? type "1". For FILENAME? type "FID".

## APPLE II COMPUTER TECHNICAL INFORMATION

10. The copy program FID will be copied to your hard disk. You may now access it from the hard disk by selecting DOS 3.3 from the Catalyst main menu and at the prompt "]" type "BRUN FID". You may now copy ANY non copy protected DOS 3.3

application to your DOS 3.3 volume.

In order to access DOS 3.3 applications from your hard disk, you may do one of two things:

A.

1. Select DOS 3.3 BASIC from your Catalyst menu.
2. At the BASIC prompt "]" type CATALOG.
3. Run the application as you would from a floppy disk. ie. "]" RUN filename".

B. You may create a Catalyst menu entry for each DOS 3.3 application.

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Quark Technical Support

Keywords:

### END OF FILE A2TIL403.TXT

#####  
### FILE: A2TIL404.TXT  
#####

Description: Using DOS 3.3 with Catalyst 2.1 (5 of 5)  
Header: Using DOS 3.3 with Catalyst 2.1 (5 of 5)

CHAPTER 4  
MAKING CATALYST ENTRIES FOR DOS APPLICATIONS  
You may now wish to make Catalyst menu entries for your individual DOS BASIC applications.

Each application which appears in your Catalyst menu must have an associated MOUNTS3.3 file describing the volumes to be mounted for that application (including the volume on which the application resides).

To make the Catalyst menu entry for your DOS BASIC application, perform the following procedure:

1. Select the Catalyst Editor from the Catalyst menu.
2. When the Catalyst Editor main menu comes up, select the "Edit Catalyst menu" option.
3. Using the up and down arrow keys, position the inverse bar over the menu entry you wish your program entry to precede. Type "A" to Add a program entry.
4. Enter the menu Display name for your application.
5. Enter "CATALYST2E/DOS3.3" for the Interpreter path.
6. Enter the prefix where the MOUNTS3.3 file for your application resides.
7. Press RETURN for P rogram path.
8. If all the above has been entered correctly, press RETURN when asked "Is all this correct?". Otherwise, enter "NO" and fix the incorrect entry.
9. Press ESCAPE to return to the Catalyst Editor main menu. Enter "U" to Update the INTERPS2E file.
10. Enter "Q" to Quit from the Catalyst Editor.

Note that the above Catalyst menu entry will simply execute the DOS 3.3 BASIC interpreter, passing it a specific prefix for a MOUNTS3.3 file.

The MOUNTS3.3 file referenced should be set up to mount the DOS 3.3 volume on which your application resides, and reference it as the startup volume. Since DOS always expects its startup program to be named HELLO, your application should have this name as well.

For example, if you wish to run the application CHECKBOOK from Catalyst, first copy the file to the DOS 3.3 volume you created using FID. From the BASIC prompt "]" type "RENAME CHECKBOOK,HELLO".

NOTE: Binary files are excluded from the above discussion. In order to run a binary application, boot DOS 3.3 from the Catalyst menu and at the BASIC prompt "]" type BRUN filename.

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Quark Technical Support

Keywords:

### END OF FILE A2TIL404.TXT

# APPLE II COMPUTER TECHNICAL INFORMATION

```
#####  
### FILE: A2TIL405.TXT  
#####
```

Description: Using the Old Monitor with the Apple Language Card  
Header: Using the Old Monitor with the Apple Language Card

This applies to the Apple II and Apple II+.

The Apple Language Card gives you all the advantages of the Auto Start ROM whether you have an Apple II or Apple II+. This is because there is an Auto Start ROM on the Language Card that is used instead of the F8 ROM on the main board. There is no way to disable this ROM if you want to use the old monitor in an Apple II. However, there are still two ways to use the old monitor with the Language Card.

1. Replace the Auto Start ROM on the Language Card with an old monitor ROM. In this case, you lose the Auto Start ROM's features when you are in the BASIC that is resident on the main board. The BASIC that is loaded into the Language Card will still be working out of an image of the Auto Start ROM that was loaded with the BASIC. For example, Applesoft would use the old monitor and Integer BASIC would use the Auto start ROM.
2. This method will give you the old monitor while in the BASIC that's in the Language Card but the BASIC on the main board will still access the Auto Start ROM. All you need do is load an image of the old monitor into the Language Card yourself. This is a two step process.

The hard part is to get an image of the old monitor into a DOS binary file. First, boot DOS 3.3 on an Apple II without a Language Card. Then type:

```
INT  
BSAVE OLDMON, A$F800, L$800
```

Now all you need is a program or subroutine to load the monitor into the card. The following program fragment must be in Integer BASIC if you have an Apple II or Applesoft if you have an Apple II+. It can be added to the HELLO or APPLESOFT program on the DOS 3.3 Master diskette.

```
10 D$ = "": REM CONTROL D  
20 A = PEEK ( -16255): A = PEEK ( -16255)  
30 PRINT D$;"BLOAD OLDMON"  
40 A = PEEK ( -16254)
```

The old monitor will stay there until you re-boot or reload the Language card.  
Apple Tech Notes

Keywords:

```
### END OF FILE A2TIL405.TXT
```

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL406.TXT  
#####

Description: Word Juggler for the Apple II Print To Disk Option  
Header: Word Juggler for the Apple II Print To Disk Option

The print to disk option in Word Juggler sends the formatted image of your document to a diskette file just as it would appear on your screen when you use the DISPLAY DOCUMENT feature. This print file is a standard ProDOS text file. Although the actual Word Juggler formatting commands (CENTER, JUSTIFY, etc.) are not written to this file, your text will appear formatted to their specifications.

This feature is accessed from the TEXT ENTRY MODE of Word Juggler with the command Solid-Apple "9". When selected, you will be presented with four prompts:

First page to print? - Enter the starting number to appear in your file. Press RETURN if you wish to start with page 1. Note that in this context, page number does not refer to the page numbers that appear on the output, but rather to the sequential number of the page.

Last page to print? - Enter the last page to appear in your file. Press RETURN if you wish to print to the end of the document.

Remove control codes from output? - If you answer "Y" (or press RETURN) to this question, the file sent to disk will not contain any printer escape code sequences. This is necessary if you wish to transmit the document using a telecommunications package. The escape codes may be interpreted by another computer in a variety of different ways causing errors in transmission or reception.

If you answer "N" to this question, all printer escape sequences will be saved to disk in addition to the text. This will allow you to print the file with all printer enhancements included, such as bold and underline.

Pathname? - Enter the name of the file to hold the format

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Quark Technical Support

Keywords:

### END OF FILE A2TIL406.TXT

APPLE II COMPUTER TECHNICAL INFORMATION

#####  
### FILE: A2TIL407.TXT  
#####

Description: WPL: How to make AUTOLETTER use surnames  
Header: WPL: How to make AUTOLETTER use surnames

Make these modifications to the WPL program Autoletter on page 96 of the  
AppleWriter III manual as follows:

BEFORE  
-----  
L .D1/ADDRS!<(X)>!<!N  
PGO FOUND  
PGO QUIT  
FOUND PLS .D1/ADDRS!<(X)>! !N=\$A

AFTER  
-----  
L .D1/ADDRS!<(X)>!@!N  
PGO FOUND  
PGO QUIT  
FOUND PLS .D1/ADDRS!@(X)@!<!N=\$A

Then modify your address file as below:

BEFORE	AFTER
-----	-----
<1>John Smith	<1>John Smith
1234 Elm Street	1234 Elm Street
Anytown, USA 12345	Anytown, USA 12345
<2>Jane Doe	@1@Mr. Smith<2>Jane Doe
5678 Main Ave.	5678 Main Ave.
Nowhere, Indiana 98765	Nowhere, Indiana 98765
<	@2@Ms Doe<

There are other methods of achieving the desired result, but this one is easy  
and it affords the flexibility of using a different "dear" name than the first  
line of the address (i.e., Company Name on the first line of the address).

This method also works quite well with Apple Writer II & IIe. For the file  
name  
path .D1/ADDRS, substitute ADDRSD1 for DOS or simply ADDRSD for ProDOS.  
Apple Technical Communications

Keywords:

### END OF FILE A2TIL407.TXT

**F I N I S**