ProGrappler®
Printer Interface

Operator's Manual

PRO**Grappler**

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GETTING STARTED

INTRODUCTION
The PRO-GRAPPLER is a board which acts as a link between your Apple computer and your printer. It allows you to print graphics and text onto a wide variety of high-quality dot-matrix printers, including color printers. Many of these printers have very powerful features which may not be accessible from your pre-packaged program. The PRO-GRAPPLER allows you to access these powerful features directly.

The PRO-GRAPPLER is designed for your Apple II, II +,IIe, or IIGS computer. It is easy to install, easy to learn, and easy to use. You simply plug the PRO-GRAPPLER board into your computer, plug your printer cable into the end of the PRO-GRAPPLER board, then use the many powerful features available from the PRO-GRAPPLER to print out text or graphics.

About This Manual
This manual is written for the first time user who might not be familiar with how to install a circuit board. But we've also included enough detail for those of you who are more experienced or would like to know more about how the PRO-GRAPPLER works.

Chapter 1, **Getting Started,** discusses the computers, soft-ware, and printers you will need; how to install the PRO-GRAP-PLER; and how to make your PRO-GRAPPLER look invisible to programs which might not work well when its there. Once you read this chapter and follow the instructions, you will have plug - ged the PRO-GRAPPLER board into your computer, hooked everything up, turned everything on, and run a test print to make sure everything works properly. Now you are ready for some basics in Chapter 2.

Chapter 2, **PRO-GRAPPLER BASICS,** describes what the PRO-GRAPPLER will do for you and how it is done. You will also learn how to use the Pull-Down Menus (similar to the menus used by many Apple programs) and how to enter keyboard commands directly or from within a program. After you read this chapter, you are ready to actually use the PRO-GRAPPLER.

Chapter 3, **PRO-GRAPPLER SCREEN MENUS,** describes the use of each menu which you see on the screen. These menus are grouped into six Main Menus according to the type of functions they perform. Read this chapter to become familiar with what each menu does. Later, you can use this chapter as a quick reference.

Chapter 4, **PRO-GRAPPLER COMMANDS,** is for those who are comfortable with keyboard commands such as (Control-I) commands, and PRINT statements. This chapter provides only a brief description of each command. Details of each command are found in Chapter 3 under the appropriate menu name.

Chapter 5, **TROUBLESHOOTING,** provides information on how to identify and correct the most common operational problems, it is not meant to provide exhaustive detail for every conceivable situation, but it should cover problems you might encounter with most popular software.

The **APPENDIXES** provides information on how to run graphics test programs; how to print in color (with a color printer); how to load DUAL HI-RES pages; how to simulate a chart recorder: routines for advanced programmers; and cable connector pin-outs.

EQUIPMENT YOU NEED
As a minimum, you need the following equipment:
- An Apple lle, Apple II+, or Apple IIGS computer system w ith a monitor, floppy disk drive, and software;
- Any Centronics-type parallel printer; and
- The PRO-GRAPPLER board.

NOTE: if you want to use the Apple lle Mouse (or any compatible mouse), you must also have an Enhanced Apple lle and an 80 column card.

COMPATIBILITY NOTES
Before you start, you should be aware of any limitations which might exist when using certain computers, printers, and programs.

Computer Compatibility
The PRO-GRAPPLER was specially designed for the Apple IIGS. However, it is also designed to be used with the Apple lle and the Apple II **+.** Although the PRO-GRAPPLER works essentially the same with each of these computers, it is assumed that we are talking specifically about the Apple IIGS. Any differences relative to the Apple lle or Apple II + are called out in special notes where appropriate.

Software Compatibility
The PRO-GRAPPLER is fully compatible with Applesoft BASIC, DOS 3.3, ProDos, ProDos 16, integer BASIC, PASCAL, and CP/M. The PRO-GRAPPLER functions normally, with a few minor exceptions noted here:
1. PASCAL 1.0 and CP/M use (Control~i)1 to represent a horizontal tab. If you are listing a file which contains tabs, first set the tabs according to your printer manual. Then list the file.

PASCAL 1.1 correctly interprets that the PRO~GRAPPLER is a firmware printer interface and accesses it accordingly.

2. PASCAL 1.0 and GRIM use one of the I/O RAM locations to pass the output character. Since the PRO-GRAPPLER uses all available locations for its variable, the Right Margin function is not available to maintain compatibility with existing software.2

Printer Compatibility

The PRO-GRAPPLER provides hardware interfacing for Centronics-type parallel printers. The features provided by the PRO-GRAPPLER will support the printers named on the box top or those listed in Table 1 (DIP Switch Settings). Specific features not available in certain printers are provided in Appendix H — Printer Compatibility.

WHAT YOU GET

When you open the PRO-GRAPPLER box, you should find the following items:
1. The PRO-GRAPPLER board
2. A parallel printer cable
3. PRO-GRAPPLER Operators Manual

INSTALLING THE PRO-GRAPPLER

Each step for installing the PRO-GRAPPLER board into your Apple computer is detailed for the first-time user. All you need is a flathead screwdriver. Just follow these steps:
1. **POWER OFF.** Unplug your computer, printer, and monitor from power outlets before doing anything.

NOTE: Do not install or remove a board when power is applied. This could damage the board and/or the computer

2. **REMOVE COMPUTER COVER.** Remove the cover from your computer.
3. **SET THE PRO-GRAPPLER DIP SWITCHES.**

NOTE: First, touch any metal part of the back panel of the Apple with your finger to discharge any static electricity you may have built up so tar This protects any sensitive components on the PRO-GRAPPLER from damage due to high static voltages.

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2 This feature is still available from BASIC and PASCAL 1.1.

Figure 1 shows the location of the major components of the PRO-GRAPPLER board. Notice the group of switches located at the top left of the board. These switches are labeled "1,2,3,4,5,6," and are collectively referred to as DIP switches. The setting o f these DIP switches determines how the Pull-Down Menus respond for the printer you are using. Find your printer in Table 1 then set each switch according to the settings shown.3

Dip Switches

Header Connector

Edge Connector
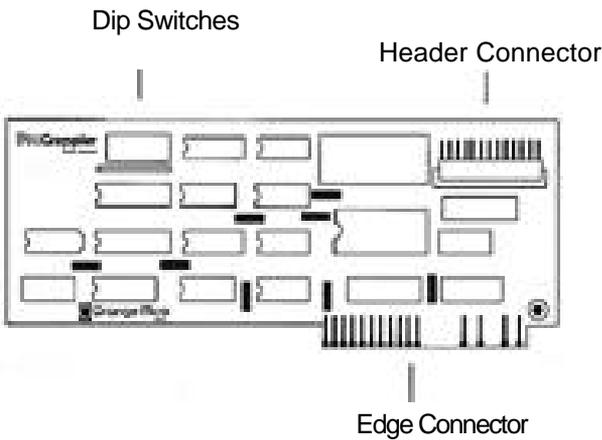
Figure 1

NOTE: A toothpick works best to flip the switches ON or OFF but you can also use a straightened paper clip, pencil or pen.

if your printer is not listed in Tablet, try using the settings for the Epson printers. Epson codes are widely used throughout the printer industry If this tails, contact your printer manufacturer and ask which major printer brands your printer is compatible with. If your printer is not compatible with any of the printers listed in Table 1, contact your dealer immediately. Your PRO-GRAPPLERs built-in graphics features may not be available for your particular printer.

DIP SWITCH
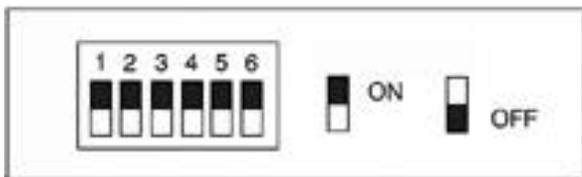
DIP SWITCH SETTINGS

Printer and Model	SWITCHES					
	#1	#2	#3	#4	#5	#6
Brother						
1109, 1509, 2024L, Twinwriter 5	OFF	OFF	ON	OFF	OFF	OFF
Citizen						
MSP 10, MSP 15, MSP 20 MSP 25	OFF	ON	OFF	OFF	OFF	OFF
C. Itoh						
Pro Writer 8510	ON	ON	OFF	OFF	OFF	OFF
Epson						
RX,LX,LQ,FX,DX Series,SQ 2000,HS 80	ON	ON	ON	OFF	OFF	OFF
Color Models	ON	ON	ON	OFF	OFF	ON
Hewlett Packard						
ThinkJet	ON	ON	ON	ON	OFF	OFF
IBM						
ProPrinter	ON	OFF	OFF	OFF	OFF	OFF
NEC						
Pinwriter P2, P3, and P5	OFF	OFF	ON	ON	OFF	OFF
Color Models (C P2. CP3)	OFF	OFF	ON	ON	OFF	ON
Okadata						
80. 90, 190 Series, 2410	OFF	ON	ON	OFF	OFF	OFF
Color Models (290 Series)	OFF	ON	ON	OFF	OFF	ON
Okimate 10 and 20	OFF	ON	ON	ON	OFF	ON
Panasonic						
KX-P1 080, KX-P1 090, KX-P1 091, KX-P1092,						
KX-P1592	ON	ON	ON	OFF	OFF	OFF
Star Micronics						
5G. SR, SD Series	ON	OFF	ON	OFF	OFF	OFF
Toshiba						
P-321,P-341,P-350,P-351,P-1341,P-1350,						
P-1351	OFF	ON	OFF	ON	OFF	OFF
Color Model (P-351C)	OFF	ON	OFF	ON	OFF	ON
Transparent Mode	OFF	OFF	OFF	OFF	OFF	OFF

Table 1. DIP Switch settings for various printers.

4. **LOCATE SLOT** #1. Figure 2 shows an illustration of the inside of an Apple II computer. There are seven slots inside the Apple IIe and Apple IIGS. These slots are lined up in a row towards the back as you face the keyboard. Slot #1 is the first slot on the left side of the computer chassis (nearest the power supply), and is marked with a 1".

5. **ATTACH CABLE.** There are a series of oval shaped cutouts which are lined up with each slot at the rear of your computer.

NOTE: If the hole for the board's connector is covered for that slot, remove it at this time.

Insert the smallest end of the printer cable (included in box) into the cutout (from the outside going in) nearest slot #1. Using a flathead screwdriver, loosen the ground clamp on the cable. Slide the ground clamp up inside the cutout such that the screw fits into the notch. Tighten the screw with the screwdriver.6

Now attach the cable end (which is now inside your computer) to the connector on the PRO-GRAPPLER board marked 'Printer".

6. **INSERT BOARD.** If Slot #1 is empty, position the PRO-GRAPPLER board such that the card edge connector (see Figure 1) is directly over Slot #1. Now gently push the card edge connector into the slot by slowly rocking the board into the slot as you press down. It feels solid when the board is secure.

Cable Cutout
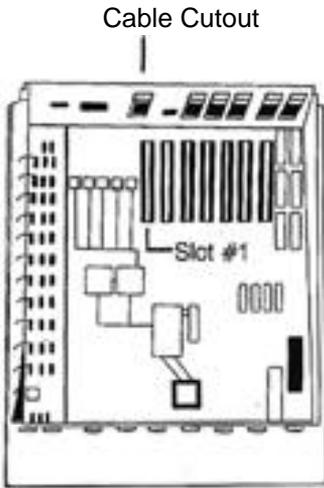
Figure 2

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4 The Apple IIe, Apple II--, and Apple IIGS all look nearly the same from the inside.

5 We assume that you inserted the PRO GRAPPLER into Slot #1. If you inserted the PRO-GRAPPLER into a different slot, be sum to remember that slot number. Substitute that slot number wherever references to a "#" are made For example, if the PRO-GRAPPLER is in Slot #2, then whenever you see the command PR#1 ,type 'PR#2 instead.

6 FCC regulations require that the printer cable be grounded to the computer chassis to minimize computer interference with nearby radio and television reception (within FCC Class B limits).

6. **REPLACE COMPUTER COVER.** Replace the cover to the computer.

7. **GET YOUR PRINTER READY.** Refer to your Printer Manual and set the DIP switches inside your printer to correspond to the following :7

   Data Bits = 7, LineFeed = None.

   Now connect the largest end of the printer cable to the printer.

8. **PLUG EVERYTHING IN.** You may now plug your computer, monitor, and printer into a power outlet, but **do not turn anything on yet.**

Testing The Installation

Now that you have installed the board, run a simple print test to verify that everything works as it should.

PREPARING THE APPLE IIGS "CONTROL PANEL"

If you are using an Apple IIGS, you must tell it which slot the PRO-GRAPPLER is in. This is done by setting up the Control Panel"
menu with the following procedure:

1. **TURN POWER ON.** Turn on the power to the Apple IIGS.

2. **DESK ACCESSORIES MENU.** Bring up the Desk Accessories Menu by entering (Control - ⌘ -E SC).

3. **SELECT "CONTROL PANEL".** Select the Control Panel" item with the up/down arrow keys, then hit (Return). This brings up the Control Panel menu.

4. **SELECT "SLOTS".** Select the Slots" item with the up/ down arrow keys, then hit (Return). This brings up the Slots sub-menu.

5. **SELECT "SLOT** 1". Select the 'Slot 1: Printer Port" item 8, then hit the right arrow key to change 'Printer Port" to 'Your Card".

6. **RETURN TO ORIGINAL SCREEN.** Hit (Return) to bring you back to the Control Panel menu. Select "Quit" from the Control Panel menu. Hit (Return) to bring you back to the Desk Accessories menu. Select "Quit" from the Desk Accessories menu. Hit (Return) to bring you back to the Desk Accessories menu. Select "Quit" from the Desk Accessories menu. You now see the "]" prompt.

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7 Most printers are already set for this standard setting.

8 Remember to substitute the correct slot number here if the PRO-GRAPPLER is not plugged into Slot #1.

7. **RE-BOOT THE APPLE IIGS.** Turn your Apple IIGS off, wait about 5 seconds, then turn it back on. This installs the selections you just made. You only need to perform this procedure once. The settings are retained by your Apple IIGS until you change it again.

IF YOU ARE USING APPLE DOS

1. **INSERT APPLE DOS DISKETTE.** Insert an Apple DOS diskette all the way into your Disk Drive and close the door.

NOTE: It's not a good idea to insert a diskette while the disk drive is running. If the red light on the disk drive is lit, turn off the power to your corn puter insert the diskette.

2. **NOW TURN ON POWER.** After double-checking everything, you may now turn on your computer, monitor, and printer. This automatically starts your program.

3. **RUN INSTALLATION TEST.** When you see the "]" prompt on the screen, type: PR#1[9], then hit the (Return) key several times. Your printer should be printing a "]" each time you hit the (Return) key.

IF YOU ARE USING CP/M

1. **INSERT CP/M DISKETTE.** Insert the CP/M diskette all the way into the Disk Drive and close the door.

NOTE: It you are using CP/M, the PRO-GRAPPLER **must** be installed in **Slat #1.** If it is not, go back to the beginning of this section **(Installing The PRO-GRAPPLER)** and re-install the PRO-GRAPPLER into Slot #1 at this time.

2. **NOW TURN ON POWER.** After double-checking everything, you may now turn on your computer, monitor, and printer This automatically starts your program.

3. **RUN INSTALLATION TEST.** When you see the "A>" prompt, enter (Control~P)[1O], then hit (Return) several times. Your printer should be printing an "A>'"each time you hit the (Return) key.

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[9] Remember to substitute the the correct slot number here if the PRO-GRAPPLER S not plugged into Sot #1.

[10] If this is your first time,(Confrol-P) means to hold down the Control) key and type P then release the (Control) key. Follow this same procedure anywhere there is a (Control-x), where a in the character indicated, for that command.

If You Have Trouble

Double-check everything in this last section. If you cannot find the problem, check for the following:

   a) Printer power cord is plugged in
   b) Printer power is on
   c) Printer cable is solidly attached
   d) Printer Select" is on
   e) Paper is in printer.

Congratulations

You have now successfully installed the PRO-GRAPPLER! You have also tested it to make sure everything is working. Now read the next chapter to learn a few basics before actually using it to print something.

PRO-GRAPPLER BASICS

In this chapter, you learn what the PRO-GRAPPLER does, how it does it, how to turn it on and off, how to use the Pull - Down Menus and the keyboard, and how to do some special things with the PRO-GRAPPLER which you may not be able to do with other interface products.

What the PRO-GRAPPLER Will Do

The PRO-GRAPPLER has built-in capabilities to allow you to print text and graphics on a dot-matrix printer without using another software programs commands. This means that you can specify things like left and right margins, top and bottom margins, line length, page size, magnification, rotation, colors, page titles, and much more, independent of the pre-packaged program you are using. Of course, if your program has some of these features, you can use either that programs' commands or those available from the PRO-GRAPPLER. You can even combine the features from both to get exactly what you want.

How the PRO-GRAPPLER Works

The PRO-GRAPPLER links your Apple to your printer. The PRO-GRAPPLER executes printing commands only when you turn it ON. If you are using print commands from a pre-packaged program, these commands are passed on to the printer and print as usual.

The PRO-GRAPPLER is activated whenever it sees a "+"[11] preceding a word. This tells the PRO-GRAPPLER that this is a print command. There are three ways in which a "+" command is sent to the PRO-GRAPPLER:

1.With Pull-Down Menus ("+" command sent automatically)
2.From the Keyboard (using a "+" command directly)
3.With "PRINT" statements inside a program.

11 This a interpreted as a (Control-I) by the PRO-GRAPPLER.

The first method uses Pull-Down Menus and is the easiest to use. You don't have to remember any commands. Just use the menus presented on the screen.

The second method uses the keyboard to enter commands. Commands can be "+" commands (because each command is preceded with a "+ "). They use simple English words like " "+" ROTATE". Or they can be (Control-I) commands which use mnemonics12 such as (Control-IGR).

The third method uses PRINT statements which execute from within a program. PRINT statements are for experienced users and programmers. A list of the PRINT statements is available in the Summary of Commands at the end of Chapter 4.
But first, let's see how you turn the PRO-GRAPPLER on and off.

TO TURN PRO-GRAPPLER ON.
If you are using Applesoft BASIC, type: PR#1 after the "]" prompt, then hit (Return).
If you are using CP/M, enter: (Control-P).

TO TURN PRO-GRAPPLER Off.
If you are using Applesoft BASIC, type: PR#0 after the "]" prompt, then hit (Return).
If you are using CP/M, enter: (Control-P) again.

Controlling the PRO-GRAPPLER
The use of Pull-Down Menus and (Control-I) commands are explained in this section. Once you are familiar with their use, you can use the commands listed in Chapters 3 and 4.

Using Pull-Down Menus
Pull-Down Menus are easy to use because commands are listed on-screen. No commands need to be remembered or even typed in.

The procedure for using Pull-Down Menus is the same whether you use a keyboard or a mouse. These are:
1. Open the Menu Bar
2. Pull down a menu
3. Select an item within a menu
4. Set the item
5. Close the menu
6. Close the Menu Bar.

Table 2 shows the procedure to follow in more detail. The procedure when dealing with a Dialog Box 13 is the same as for a Pull-Down Menu.

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12 Mnemonics use only one or two letters to represent a function and can be rather cryptic sometimes.
13 A Dialog Box is opened when there are more selections to make under a given menu item.

NOTE: To use a mouse, you must have the following: an enhanced Apple IIe[14] or an Apple IIGS[15]. The Apple II+ does not support a mouse interface.

Pull-Down Menu Procedure

Action	Using Keyboard	Using Mouse
1) To Open Menu Bar	Type PR#1 Then type + MENU Then hit (Return)	
2) To Select a Menu	Use Arrow Keys[16]	Point Mouse
3) To Pull Down a Menu	Hit (Return)	Click and Hold Button
4) To Choose a Menu Item	Use Arrow Keys	Drag Mouse To Selection
5) To Set a Menu Item	Hit (Return) Key	Release Button

If a Dialog Box opens:

(a) To Select Item	Use Arrow Keys	Point Mouse
(b) To Open item	Hit (Return)	Key Click Button
(c) To Enter Response	Use Keyboard	Use Keyboard
(d) To Set Response	Hit (Return) Key	Hit (Return) Key
(e) Repeat (a) through (d) as needed.		
(f) To **Close** Dialog Box	High (ESC) Key	Click Button on "OK" Box
6) To Close Pull-Down Menu	Hit (ESC) key	(this happens automatically)
7) Repeat steps 1) through 6) as needed.		
8) To Close Menu Bar	Hit (ESC) Key	Select 'Quit' from File Menu

Table 2. Procedure for Using the Pull-Down Menus

14 The Apple lie requires an extended 80 column card.

15 The Apple IIGS comes with built-in 80 column capability, and a mouse.

16 Alternatively, you can enter (Shift-n), where "n" is the number in trust of the menu tam.

What You Will See

The Menu Bar

When the Menu Bar opens, it looks like this:

1.⌂   2. File   3. Format   4, Size   5. Style   6. Graphics

When one of these items is selected, that item will be high -
lighted and a Pull-Down Menu appears. Select the desired menu
using the arrow keys.[17]

A **Pull-Down Menu**[18]

A **Pull-Down Menu** looks like this (the File Menu is used as an
example):

1.⌂   2. File   3. Format   4. Size   5. Style   6. Graphics

```
I. Set Values...
2. Text Dump 80
3. Text Dump 40
4. Text Dump 1&2
5. Form Feed
6. Print Test
7. Quit
```
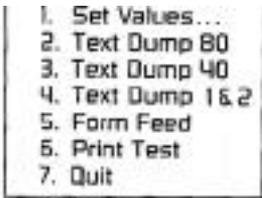
When an item is selected, a "check mark" ($\sqrt{}$) appears next to
that item. Some items may have check marks at the same time,
while others are mutually exclusive (only one item or the other).

NOTE: Three dots (...) are used to indicate that **a Dialog Box**
will appear when selected, providing further selections.

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17   You may also select a menu by entering (Shift-n), where "n" is the number in front of the desired menu.

18   You get this by sitting (Return) or by clicking the mouse while highlighting a Menu. You may

     also select a menu item by entering (Shift-n), where n is the number in front of the desired

     item.

A Dialog Box

A Dialog Box looks like this (we use the Set **Values...** item from

the previous example):

1. ⌂   2. File   3. Format   4. Size   5. Style   6. Graphics

---

Set Values. . .

☐ 1. Bell   ☐ 2. Linefeed
☐ 3. Bit8   ☐ 4. Printer
☐ 5. Hold   ☐ 6. Video
☐ 7. Transparent

8 Color =

☐ 0. Black ☐ 1. Red   ☐ 2. Blue   ☐ 3. Purple
☐ 4. Yellow ☐ 5. Orange ☐ 6. Green ☐ 7. White

9. Control Character

☐ 1. I   ☐ 2. Y
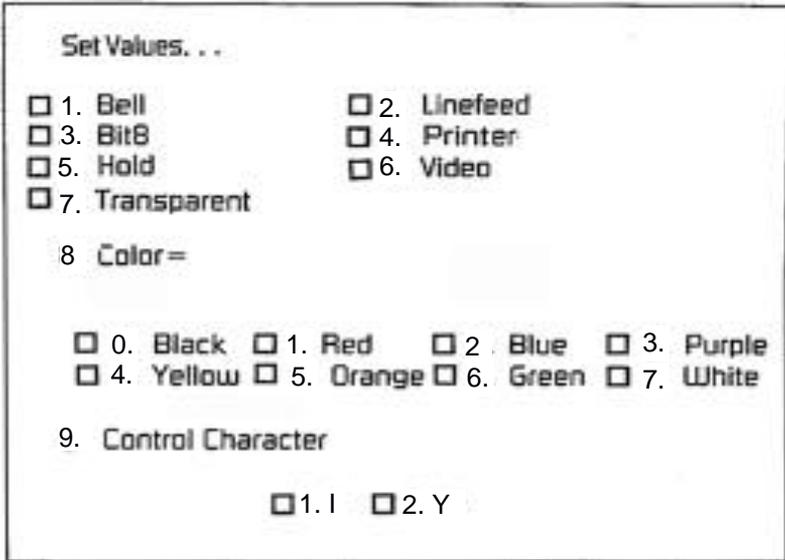
When a Dialog Box appears, the Pull-Down menu is hidden
from view. The name of the Dialog Box is indicated on the top left
side of the Dialog Box. The Pull-Down Menu name in the Menu
Bar remains highlighted. A "check mark" is also used to indicate
which item is selected.

Using the PRO-GRAPPLER as a Desk Accessory
Since the PRO-GRAPPLER has the ability to function as an
Apple IIGS Desk Accessory, it provides one of the PRO-GRAP-
PLER'S most useful and unique features: **Screen Shot. Screen
Shot** is a very powerful feature which allows you to print (dump)
whatever is on your screen without having to exit your program!
Here's how to do it:

1.Enter "PR#1", then hit (Return). This must be done at some
point after you turn on your computer. It is suggested that you
make this a part of your normal start-up routine.
2.Enter (Control- ⌂-ESC). This brings up the Apple Desk
Accessories Menu. You should see the file named PRO-
GRAPPLER as one of the files listed.
3.Select PRO-GRAPPLER with the up/down arrow keys (then
hit (Return). This opens the PRO-GRAPPLER Menu Bar.

4. You may now activate any of the PRO-GRAPPLER features from this menu, such as formatting and printing your screen.
5. To get back to your original program, first select Quit from the File Menu. This brings you back to the Desk Accessories Menu.
6. Now select Quit from the Desk Accessories Menu. This restores the screen you had previously You are now back to your original screen just prior to the Desk Accessories Menu.

Using Keyboard Commands

There are two types of keyboard commands: "+" commands, and (Control-I) commands. These commands can be viewed by pulling down the" "menu in the Menu Bar, then selecting 'PRO-GRAPPLER Commands". They are also listed in Chapter 4- PRO-GRAPPLER COMMANDS.

The '"+" commands use simple English words to represent the various features available from the Pull-Down Menu. These are much easier to remember than the (Control-I) commands which are abbreviated.

The (Control-I) commands are provided to maintain total compatibility with software using the existing Grappler + commands. They are faster to use (when you are familiar with them), and most programmers actually prefer them over typing out the full name of a "+" command.

There is an equivalent (Control-I) command for every '"+" command. You can use either or both types of commands at any time you wish. The choice is yours.

Using "+" Commands

A ' +" command always begins with a ' +"in front of an English-like word (such as ± ITALIC"), and ends with a space, comma, or carriage return. The space, comma, or carriage return following the "-i-" command is part of the command. They are not sent to the printer.

To activate a command, enter the command as shown. To de-activate a command, precede the command with an 'X".

There are three types of commands:

1. Commands requiring a number (n) to be entered, as in "+ LEFT = n".
When you see an "n" after a command, you must enter a number appropriate for that command.
Example: The command "+ LEFT = n" requires a number to be entered for the number of spaces of the left margin. The actual entry for a left margin of 6 spaces would be:
"+ LEFT=6"

2. Commands requiring a string (T$) to be entered, as in "+TITLE =T$.
  When you see a "T$" after a command, you must enter a string" appropriate for that command. A 'string" is any series of characters, such as a title or heading.
  Example: The command "+ TITLE T$" requires a string to be entered for the title. To have the title "Chapter 1" appear at the top of all pages, the actual entry would be: "± TITLE = Chapter 1".
3. Commands using options, such as "+GRAPH,COLOR", where GRAPH is the command and COLOR is the option. Any number of options may be linked together at one time > a comma in front of each option (called "command delimiters") separates them.
  Example: The command "+ GRAPH" has options which may be entered. There are several options available, such as ",COLOR" or ", PITCH n". If you wanted to print in color; the entry would be: "+ GRAPH,COLOR". If you wanted to set an Aspect Ratio of 3 (described in Chapter 4), the entry would be: ' ± PITCH 3". If you want to enter both commands at once, the entry would be: "+ GRAPH,COLOR,PITCH = 3".

Using Control Commands

A (Control-I) is used for Applesoft, Integer BASIC, ProDos, ProDos 16, DOS 3.3, or PASCAL 1.1, A (Control-Y) followed by a "function-specific" mnemonic is used for PASCAL 1.0 or CP/M.

NOTE: We assume the use of (Control-I) commands throughout this manual. Be sure to substitute "Y" for "I" if you are using PASCAL 1.0 or CP/M.

Enter (Control-I) commands by the following simple procedure:
1. While holding down the (Control) key, type the letter "I", then release the (Control) key. This is what is meant by (Control-I).[19]
2.   Now type whatever follows the "I", such as 'G" for graphics.

Stringing (Control-IG) Commands Together

Several (Control-IG) commands may be executed with a single command by adding on the "function-specific" part of each command to the first command. Only graphics commands may be strung together.
  Example: To print an inverted and rotated color image, the entry looks like this: (Control-IGCIR), where "IG" activates the graphics mode, "C" prints a color image, "I" inverts the image, and "R" rotates the image.

19 If you see (Control ⌨). hit the "⌨"key instead of the "I", and so on.

Using 'PRINT" Statements
The use of PRINT statements usually requires some knowl-edge of BASIC programming. Therefore no attempt is made to explain the details. A list of PRINT statements are provided in Chapter 4 for those who wish to use them.

TRANSPARENT MODE
If you have a program (such as Wordstar CP/M, PFS Write, and PFS Graph)which uses the same control codes as the PRO-GRAPPLER, you need to make the PRO-GRAPPLER trans--parent to that program. The Transparent Mode causes the PRO-GRAPPLER to pass all commands on to the printer just like a standard parallel printer controller would.
You can activate the Transparent Mode with a "+" command or a Control code.[20] It remains in effect until you turn the PRO-GRAPPLER off, or until you reset the computer.

To activate the Transparent Mode
Type PR#1, enter "+ZAP" or (Control-IT), then hit (Return). This causes the PRO-GRAPPLER to ignore all subsequent con-trol codes until the PRO-GRAPPLER is turned off with a PR#O, or when the computer is reset.

NOTE: Characters sent to the printer either from a program or from the keyboard, are not echoed to the screen when in the Transparent Mode.

To de-activate the Transparent Mode:
Type PR#O, then hit (Return), or reset the computer by enter-ing (Control-✪ -Reset).

PRO-GRAPPLER SCREEN MENUS

1. " ✪ " Menu

1. **About PRO-GRAPPLER** - Provides a brief description of the PRO-GRAPPLER, and displays the copyright notice and PRO-GRAPPLER Version # on screen.
2. **PRO-GRAPPLER Commands** - Displays all (Control-I) and "+" commands on the screen for quick reference.
3. **DIP Switch Settings** — Displays all DIP switch settings for all supported printers, along with the Transparent Mode setting.
4. **Troubleshooting** — Displays common incompatibilities between certain combinations of hardware and software and methods of resolving them.

20 You can also activate the Transparent Mode by setting the DIP switches according to the settings indicated in Table 1 under Transparent Mode. To deactivate the Transparent Mode using the DIP switch, first turn power OFF Then remove the PRO-GRAPPLER board and set the switch positions according to the settings indicated for your printer, then reset the computer

2."File" Menu

1. Set Values... When selected, a Dialog Box appears with the following selections (each affect the file as a whole):

1. Bell — When selected, allows the printer bell (or buzzer) to ring, indicating a problem (such as "paper out"). When unselected, prevents the bell from ringing.

2. Linefeed — When selected, automatically appends a linefeed after every carriage return. When unselected, linefeed must be generated by software.

3. Bit8 — When selected, allows the eighth (high order) bit to be sent to the printer. When unselected, prevents the eighth bit from being sent to the printer. Some printers use the eighth bit to set an alternate character set for special print formatting such as italics and block graphics. The standard character set may not be available when Bit8 is selected.

4. **Hold** — When selected, the values entered in the Format, Style, and Size Menus are held (or "fixed") and are automatically set the next time you turn on your PRO-GRAPPLER. When unselected, the normal (default) values are used.

Note: All special settings are lost when power is turned off

5. Video — When selected, text sent to the printer is also sent to the screen. When unselected, text is only sent to the printer.

6. Transparent — When selected, the PRO-GRAPPLER operates as a normal ('dumb") printer controller and forwards all print commands directly to the printer. When unselected, the PRO-GRAPPLER operates as an "intelligent" printer controller and interprets all (Control-I) commands to the printer.

7. Color — Selects the ribbon color to be used for printing:
    0. Black   **1**. Red   **2**. Blue   **3.** Purple
    4. Yellow   **5.** Orange   **6.** Green

8. Control Character — Selects the control character recognized by the PRO-GRAPPLER for print commands. Use "I" when using Applesoft BASIC, DOS 3.3, ProDos, ProDos 16, PASCAL 1.1, or Integer BASIC. Use "Y" when using PASCAL 1.0, or CP/M.
    1.1   2.Y

2. Text Dump 80 — Prints from an 80 column wide screen (for Apple lie systems using an Apple 80 column board, or for an Apple IIGS in 80 column mode).

3. Text Dump 40— Prints from standard 40 column wide screen.

4. **Text Dump 1 & 2** —Prints two 40 column text pages side-by-side (page 1 on the left, page 2 on the right).

5.**Form Feed** — Sends a "top-of-form" command to the printer each time this command is issued. This advances the paper to the next page.

6.**Print Test** — Prints the standard Alpha-Numeric character set in its entirety.

7.**Quit** — Returns you to where you were in the program just prior to calling the Menu Bar.

3. Format" Menu

1. **Page Set-up...** A Dialog Box appears with the following selections:

1. **Left Margin** = _____ Sets the left margin, as measured from the left edge of the paper. User may enter any number desired (within range of the printer).

2.**Right Margin** = _____ Sets the right margin to the number of spaces entered here, as measured from the left edge of the paper. A carriage return is generated at the first space after the right margin setting, but before the end of the line if set by the Line Length command. This helps to prevents words from being split (this is often called 'word-wrap"). A value of "0" disables this command.

3.**Line Length** = _____ Sets the length of a line, as **measured** in characters from the left edge of the paper (not the left margin). A carriage return is generated after the last character or space of the line as specified (except when a Right Margin is set — see Right Margin preceding). Text is not echoed to the screen during printing when this command is selected. Line Length should be selected before Right Margin. A value of "0" disables the carriage return. The carriage return must be provided by your Apple program.

4. **Page Length** Sets the number of lines between the Title and Footer lines. The printer generates six (6) line feeds after the last line printed (or after the Footer line, if used). This allows the perforation between pages to be automatically skipped if the number of lines is set properly[21] A value of "0" disables the automatic six line feeds.

5. **Lines/Inch** = _____ Sets the number of lines per inch according to the following selections:

   1.6   **2**.8

NOTE: If you select 8 lines/inch, you must a/so select the proper page length if you want the printer to skip the perforation for each page.

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21 The Page Length Should be 60 if no Title or Footer is used; 59 if a Title or Footer,is used; and 58 it both are used. This will maintain proper page positioning or 8 1/2' it paper.

2. **Set Titles... A** Dialog Box appears providing a space to type in a title you want printed at the top of every page (like a running header). The Title is the first line printed on the page. It is limited to one line of 50 characters.
3. **Set Footers.** . . A Dialog Box appears providing a space to type in a footer you want printed at the bottom of every page. The Footer is the last line printed on the page. It is limited to one line of 50 characters.
4. **Page Numbers...** A Dialog Box appears providing the following selections:
   1. **Page Numbering On** — When on, prints the page number (numeric only) at the right margin on the Footer line.
   2. **Start From** # _____ Prints page numbers starting with the indicated number

4.'Size" Menu

The following commands provide a selection of text sizes to be printed. These sizes vary according to the printer you use.

1. **Expanded** — The text size you selected is horizontally elongated by a factor of two.
2.
3.
4. (Pitches vary according to your printer)
5.
6.

5."Style" Menu

1. **Draft** — This allows printing draft copies faster.
2. **Double-Strike** — The printer emphasizes text by printing each line twice (two separate passes). This creates a Bold look.
3. **Emphasized** —The printer emphasizes text by striking each dot twice during a single pass. The second dot is slightly offset from the first dot, creating a Bold look to the text. This is usually the preferred way of creating Bold text.
4. **NLQ** — Text is printed using Near Letter Quality" printing.
5. **Headline** — Text is printed using Expanded and Emphasized features. This is useful for headlines and other unique text applications.
6. **Proportional** — Text is printed with a proportional style type.
7. **Underline** — Each character is underlined when printed.
8. **Italic** — Each character is italicized when printed.
9. **Sub-Script** — Each character is sub-scripted when printed.
10. **Super-Script** — Each character is super-scripted when printed.

6."Graphic" Menu

Provides selections for printing graphics. Unlike text commands, which remain in effect until cancelled, you must select options each time you want a screen dump.

1. **Print** — Causes the printer to start printing the graphics you currently have in the Hi-Res screen memory.
2. **Screen Type...** A Dialog Box appears providing the following selections:
   1. **Mix Text and Graphics**[22] — Prints the graphics screen plus the tour-line text window beneath it. The printing begins 20 spaces from the left edge of the paper.
   2. **Page** 1 — Prints the Hi-Res graphics image from Page 1. Each white screen dot is printed with a black dot.
   3. **Page** 2 — Prints the Hi-Res graphics image from Page 2 instead of Page 1.
   4. **Side-By-Side**[23] — Prints both Hi-Res graphics images (Page 1 on the left, Page 2 on the right).
   5. **Double Hi-Res**[24] — Prints the Double Hi-Res graphics image.
   6. **Super Hi-Res** — Prints a graphics image using the 320 x 200 or 640 x 200 dot screen memory. Only available from the Apple IIGS
3. **Invert** — Prints the "inverse" image as seen on the screen. Normally, white dots on the screen print as black dots on paper. This results in an image which looks like a photographic negative. The Invert command produces an image much like a photograph, where the black portions on the screen print as black on paper.
4. **Rotate**[25] — Prints the graphic screen image rotated 90 degrees clockwise.
5. **Color** — When selected, prints a color graphics image as defined by the colors in the image itself. When unselected, prints in black and white.
6. **Hi-Density** — The printer double-strikes each dot during a single printing pass, and prints in only one direction (this provides a high-quality image).
7. **Aspect Ratio**[26]**..** A Dialog Box appears providing a selection from 1 to 6. Only the Epson FX, RX, and LX series printers provide this feature. Consult your Epson manual for details on the ratio's.

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[22] Cannot be used with Rotate, Double-Size, or Left Margin options.

[23] Cannot be used with Rotate or Double-Size options.

[24] Thin is a special Apple IIe Rev B or later option It is not available with Apple It or II **+.** Cannot be uses with Rotate or Double e-Size options.

[25] Only Hi-Res graphics can be rotated. Teat cannot be rotated.

[26] The Aspect Ratio is a measurement of the width of an image relative to the height of that image.

8. Page Position.... A Dialog Box appears providing a choice of
positions:

    1. Center: Narrow Carriage — Prints the image centered on a
      8 1/2" carriage.

    2. Center: Wide Carriage — Prints the image centered on a
      14" carriage. Be sure your printer has a wide carriage.

    3. Left Margin — When selected, prints image using the Left
      Margin set in the Format menu. When unselected, prints
      image centered on an 8 1/2" carriage.

9. Enlargement... A Dialog Box appears providing a choice of
enlargements of the printed screen image:

    1. Double Size — Prints the image with four dots for every
      screen dot (two in the vertical direction and two in the
      horizontal direction). This results in an image twice the
      normal size.

    2. Custom Size — Prints the image using X" dots for each
      screen dot in the horizontal direction (XMAG), and "Y" dots
      for each screen dot in the vertical direction (YMAG):

              1. XMAG _____   2. YMAG _____

10. Window Set — Allows you to print a portion of your image by
setting a window over the part you want printed. When
selected, your screen image is displayed temporarily with a
small box located near the top left corner of the screen. The
First, position the box with the arrow keys (or drag with the mouse)
such that the top left corner of this box aligns with the top left corner
of the desired window. Then hit (Return) to set this position
(or click the button if using a mouse).

    Next, position the lower right corner of the box such that it
aligns with the lower right corner of the desired window. Again,
use the arrow keys (or drag with the mouse). You now see a
window which contains the image you will print. Then hit (Return)
to set this position (or click using a mouse). If you want to make
changes at this point, repeat step 10 until you are satisfied,
then print.

PRO-GRAPPLER COMMANDS

    Menu name's are listed, along with the equivalent "+" com-
mand, (Control-I) command, and PRINT statement. A brief
description of each command is also provided, If you need more
detail about a particular command, please refer to the description
provided in Chapter 3 — PRO-GRAPPLER Menus.

General Commands

Menu Name	"+" Command	(Control-I)	PRINT Statement[27]
Bell	+ BELL	(CONTROL-IB)	? CHR$(9);"B"

Bell   + BELL   (CONTROL-IB)   ? CHR$(9);"B"
Allows Bell (Control-C) command to be sent to the printer
   +XBELL   (Control-IC)   ? CHR$(9); "C"
Cancels the Bell command.

Bit8   + BIT8   Control-IH)   ? CHR$(9);"H"
Allows Bit 8 to be sent to the printer
   +XBIT8   (Control-IX)   ? CHR$(9);"X"
Cancels Bit 8.

Printer   + EXIT   (Control-Ie)   ? CHRS(9);"e"
Turns printer port off and restores normal screen output. It an 80 column card was initialized, it is restored as an output device.

Hold   + HOLD   (Control-IFA)   ? CHR$(9);"FA"
Retains current values during initialization of printer port.
   +XHOLD   (Control-IQA)   ? CHR$(9);"OA"
Restores to default values upon initialization of printer port.
   + MENU   (Control-IFM)   ? CHR$(9);"FM"

Video   Displays the Menu Bar
   + VIDEO   (Control-II)   ? CHR$(9);"I"
Echo's printer output to screen.
   +VIDEO   (Control-IOV)   ? CHR$(9);'Qv"
Cancel's printer echo.

Transparent +ZAP   (Control-IT)   ? CHR$(9);"T"
Instructs PRO-GRAPPLER to ignore all further (Control-I) commands until re-initialized. This is the 'Transparent' mode.

List Commands + COMMAND (Control-IFC)   ? CHR$(9);"FC"
Prints all PRO-GRAPPLER commands to the printer

List DIP Switch's   + DIP   (Control-IFO)   ? CHR$(9);"FD"
Prints all DIP Switch settings for all supported printers, and for the Transparent Mode.

Trouble-shooting   + TROUBLE   (Control-IFT)   ? CHR$(9);"FT"
Prints Troubleshooting information to the printer

Print Test + TEST   (Control-IFS)   ? CHR$(9);"FS"
Prints the entire alpha-numeric character set. Similiar to Printer Self-Test.

27 A "?" is used in place of "PRINT".

Menu Item	"+" Command	(Control-I)	PRINT Statement
Italic	+ITALIC	(Control-IWI)	? CHR$(9);"WI"
	Puts printer in Italic mode.		
	+XITALIC	(Control-IQI)	? CHR$(9);"QI"
	Cancels Italic command.		
Draft	+DRAFT	(Control-I WD)	? CHR$(9);'WD'
	Puts printer in Draft mode.		
NLO	+NLO	(Control-IWN)	? CHR$(9);"WN"
	Puts printer in Near Letter Quality mode.		
	+XNLQ	(Contml-IQN)	? CHR$(9);"ON'
	Cancels NLQ command.		
Double-Strike	+DBLSTRIKE	(Control-IWI)	? CHR$(9);"WL"
	Puts printer in Double-Strike mode.		
	+XDBLSTRIKE	(Control-IQL)	? CHR$(9);"QL'
	Cancels Double-Strike command.		
Emphasized	+EMPHASIZED	(Control-IWE)	? CHR$(9);"WE"
	Puts printer in Emphasized mode.		
	+XEMPHASIZED	(Control-IQE)	? CHR$(9);"QE"
	Cancels Emphasized command.		
Color	+COLOR=n	(Control-InMC)	? CHR$(9);'nMC"
	Sets the ribbon color where:		

$n=0$	Black
$n=1$	Red
$n=2$	Blue
$n=3$	Purple
$n=4$	Yellow
$n=5$	Orange
$n=6$	Green

Menu Item	"+" Command	(Control-I)	PRINT Statement
Custom Font	+CUSTOM	(Control-IFO)	? CHR$(9);'FO"
	Prints using a custom font which is downloaded to the printer. Not all printers support downloadable fonts.		
	+XCUSTOM	(Control-IQO)	? CHR$(9);"QO"
	Cancels Custom Font command. Restores to normal printing.		
Headline	+HEAD	(Control-IWH)	? CHR$(9);'WH'
	Puts the printer into Headline	mode.	
	+XHEAD	(Control-IQH)	? CHR$(9);"OH"
	Cancels Headline command.		
Left Margin	+LEFT=n	(Control-InL)	? CHR$(9);'nL'
	Sets left margin to "n" spaces from left edge of paper		
	+LINFEED	(Control-IA)	? CHR$(9);'A"
	Appends a Line Feed to each Carriage Return.		
	+XLINFEED	(Control-IK)	? CHR$(9);"K"
	Cancels Line Feed command.		

Line Length	+ LINELEN —=n (Control-InN) ? CHR$(9);"nN"

Line Length + **LINELEN** —=**n**   **(Control-InN)**   **? CHR$(9);"nN"**
        Sets Line Length to 'n" characters (n = 0 to 255)
        with a Carriage Return. A value of 0" disables
        line formatting.

Lines/Inch + **LINES** = **n**   **(Control-InMI)**   **? CHR$(9);"nML'**
        Sets the number of lines per inch, where:
            n = 6   Six lines/inch
            n = 8   Eight lines/inch

Page Length + **PAGELEN n**   **(Cantrol-InP)**   **? CHR$(9);"nP"**
        Sets the page length to "if' lines. Six carriage
        returns are generated after "n 'lines are printed. A
        value of "0" disables this command.

Page
Numbering   + **PAGE# n**   **(Control-InMG)**   **? CHR$(9);"nMG"**
        Prints the page number at the bottom right corner
        of each page, where "n" is the initial page number
        desired (n 0 to 9999).
        +XPAGE#   **(Control-IQG)**   **? CHR$(9);"QG"**
        Cancels Page Number command.

Expanded   + **PITCH** = **n**   **(Control-InMP)**   **? CHR$(9);"nMP"**
        Sets printer pitch (characters per inch) to "n",
        where:
            n = 1   Pica
            n = 2   Elite
            n = 3   Condensed
            n = 4   Extended Pica
            n = 5   Extended Elite
            n = 6   Extended Condensed

Proportional +**PROP**   **(Control-IWR)**   **? CHR$(9);"WR"**
        Sets printer to Proportional mode. Not all printers
        support this mode.
        +XPROP   **(Control-IQR)**   **? CHR$(9);"OR"**
        Cancels Proportional command.

Right Margin + **RIGHT** = **n**   **(Control-InR)**   **? CHR$(9);"nR'**
        Sets the right margin to "n" characters by
        generating a Carriage Return after the first space
        following 'n" characters. Same as Word Wrap.

Text Dump 40 + **SCREEN**   **(Control-IS)**   **? CHR$(9);"S"**
        Prints the current 40 column screen to the printer
        Position is 20 spaces from the left edge of the
        paper Not compatible with 80 column text display
        boards.

Text Dump 80 + **TEXT8O**   **(Control-18S)**   **? CHR$(9);"8S"**
        Prints an 80 column screen to the printer

Subscript   +**SUB**   **(Control-IWB)**   **? CHR$(9);"WB"**
        Sets printer to Subscript mode.

Superscrip   + **SUP**   **(Control-IWP)**   **? CHR$(9);"WP"**
        Sets printer to Superscript mode.
        +XSCRIPT   **(Control-IQS)**   **? CHR$(9);"QS"**
        Cancels both Subscript and Superscript
        commands.

Menu Item	+" Command	(Control-I)	PRINT Statement
Set Title	+TITLE T$	(Control-IYT T$)	? CHR$(9);"YT T$'

Prints a double-sized string of characters (up to 50 characters for "T$') at the top of each page.

| | +XTITLE | (Control-IQT) | ? CHR$(9);"QT" |

Cancels Title command.

| Set Footers | +FOOTER = T$ | (Control-IYF T$) | ? CHR$(9);"YF T$" |

Prints footer at bottom of each page (the last line printed after Page Length). Max. 50 characters.

| Form Feed | +TOP | (Control-IFP) | ? CHR$(9);"FP" |

Sends a Form Feed to the printer

| Underline On | +UNDER | Control-I WU) | ? CHR$(9);WU" |

Sets printer to Underline mode.

| | +XUNDER | (Control-IQU) | ? CHR$(9);"QU" |

Cancels Underline command.

| About PRO-GRAPPLER | +VERSION | (Control-IV) | ? CHR$(9);"V" |

Prints version of PRO-GRAPPLER ROM to the printer This is not echoed to the screen.

| Text Dump 1 & 2 | +PAGE12 | (Control-12S) | ? CHR$(9);"2S" |

Prints 40-column Text Pages 1 and 2 side by side (Page 1 on the left, Page 2 on the right). Not compatible with 80 column output boards.

| Control Character | +CHANGE | (Control-I (Control-Y) | ? CHR$(9);CHR$(25); |

Changes the Control character from "I" to "Y". Howe ver care should be taken to avoid using a character already in use by your printer

| Control Character | +XCHANGE | (Control-Y Control-I) | ? CHR$(25);CHR$(9); |

Changes the Control character from Y" back to "I'.

Graphics Commands

Menu Item	+" Command	(Control-I)	PRINT Statement
Page 1	+GRAPH	(Control-IG)	? CHR$(9);"G"

Prints Hi-Res graphics Page 1 to the printer Additional commands which may follow it (using a comma as the delimiter) include:

| Color | ,COLOR | (Control-IGC) | ? CHR$(9);"GC" |

Prints a color image to the printer This option is available for both Normal Hi-Res and Double Hi-Res images.

| Double Hi-Res | ,DBLRES | (Control-IGe) | ? CHR$(9);"Ge" |

Prints a Double Hi-Res image to the printer All options are available in this mode.

Super Hi-Res	**SUPER**	**(Control-IGA)**	**? CHR$(9);"GA"**

Prints an image with a resolution of 320 x 200 or 640x200 pixels to the printer . Only available on the Apple IIGS.

Double Size	**DOUBLE**	**(Control-IGD)**	**? CHR$(9);"GD"**

Prints a double-size image to the printer Each dot is printed with four dots (XMAG 2, YMAG 2).

Hi-Density	**,HI-O**	**(Cantrol-IGE)**	**? CHR$(9);"GE"**

Prints an image using the printers' emphasized print mode.

Invert	**INVERT**	**(Control-IGI)**	**? CHR$(9);"GI"**

Prints a "positive" image of the screen to the printer A black screen dot is printed as a black dot.

Left Margin	**,LEFT**	**(Control-IGL)**	**? CHR$(9);"GL"**

Prints graphics using the left margin set in the "LEFT—n" command. When not set, prints image centered on a narrow carriage (same as for "+ GRAPH").

Page 2	**,PAGE2**	**(Control-1G2)**	**? CHR$(9);"G2"**

Prints the graphics image stored in Page 2.

Aspect Ratio	**,PITCH = n**	**(Control~IG*n)**	**? CHR$(9);"G*n"**

Prints the graphics image with a width to height of "n" (n = 1 to 6). Consult your Epson manual for details.

Rotate	**,ROTATE**	**(Control-IGR)**	**? CHR$(9);"GR"**

Prints a graphics image rotated 90 degrees clockwise.

Center: Wide Carriage	**,WIDE**	**(Control-IGG)**	**? CHR$(9);"GG"**

Prints a graphics image centered on a wide (14") carriage.

Window Set	**,WINDOW** = n	**(Control-IGWn)**	**? CHR$(9);"GWn"**

Prints that portion of an image falling inside a box (n = X1,X2, Y1, Y2) whose upper left coordinate is X1, Y1 and whose lower right coordinate is X2, Y2.

XMAG	**,XMAG** = n	**(Control-IGXn)**	**? CHR$(9);"GXn"**

Prints a graphics image magnified by "n" in the horizontal (X) direction (n = integer from 1 to 6).

YMAG	**,YMAG** = n	**(Control-IGYn)**	**? CHR$(9);"GYn"**

Prints a graphics image magnified by "n" in the vertical (Y) direction (n = integer from I to 6).

Print Side-by-Side	**,PAGE12**	**(Control-IGS)**	**? CHR$(9);"GS"**

Prints graphics images from Page 1 and Page 2 side by side to the printer Cannot be used with Rotate or Double-Size options.

Mix Text & Graphics	**,MIX**	**(Control-IGM)**	**? CHR$(9);"GM"**

Prints the graphics image and the 4 line text window to the printer

Default Parameters

Default parameters are those commands which are automatically set when you turn on your system.

The following is a list of the default parameters as set by the factory:

Command	Applesoft BASIC28	PASCAL & CP/M
Left Margin	Ø	Ø
Right Margin	Ø	Ø
Line Length	Ø	Ø
Page Length	Ø	Ø
Screen	On	Off
Display	On	Off
Line Feed		

TROUBLESHOOTING

The following is intended to provide a guide to the most common problems you might encounter when installing or using the PRO-GRAPPLER. Most of the problems you might encounter are incompatibilities due to certain combinations of hardware and software.

If you are using...
Appleworks version 1.0, 1.1, 1.2, 1.3, or Applewriter IIe version 2.1 (Apple Computer Company)

and the problem is...
An "80N" appears in the upper left corner of all printouts, or...
Strange text formatting appears, then...

The Solution Is...

If you are using version 1.0 or 1.1, obtain a free upgrade to version 1.3 from your Apple dealer. Then enter the Interface Card section in the Appleworks menu and change the code from (Control-I 80N) to (Control-I ØN).
If you are using version 1.2 or 1.3, enter the Interface Card section in the Appleworks menu and follow the same procedure as above.

If you are using...
PFS:Write or PFS: Graph

and the problem is...
The printer prints garbage when you merge a graph with a text file, then...

The Solution Is...

Set the PRO-GRAPPLER to Transparent mode (or enter the "P09,84" command in the PFS software). Then enter the name of your printer in place of "PRO-GRAPPLER'"using the "Print Options" command in the installation section of the PFS software.

28 This also includes Integer BASIC, ProDos, ProDos 16, and DOS3.3.

If you are using...
Wordstar CP,"M (Micro-
Pro) with a Letter Qual-
ity Printer

and the problem is...
You get garbage when you print,
then...

The Solution Is...

Set the Transparent mode in the PRO-GRAPPLER. Insert a
(Control-IT) in the printer installation area of your program if it
allows.

If you are using...
MousePaint with Pro-
Dos(Apple Computer
Company)

and the problem is...
You get garbage when printing a
graphics picture, then...

The Solution Is...

Obtain a patch program called "MousePrint" and instructions
from AHWARE Software Company, Danville, CA.

If you are using...
Homeward (Sierra On-
Line)

and the problem is...
You get no printing, or your soft-
ware hangs, then...

The Solution Is...

Change the selection from PRO-GRAPPLER to "Other" in the
installation program of Homeward Sierra On-Line.

If you are using...
Dollars and Sense
(Monogram Software)

and the problem is...
Graphics cannot be printed from
within the program, then, …

The Solution Is...

First exit the program to the Operating System level. Then boot
up "System Master 3.3" and load the Dollars and Sense graphics
diskette. Then use the PRO-GRAPPLER "BLOAD" command
described in Appendix B of this manual.

If you are using...
VisiPlot or VisiTrend,
Version 1.0 or 1.1
(VisiCorp)

and the problem is...
The program will not do a screen
dump, then,...

The Solution Is...

First, save your graphics to a data disk. Then use the PRO-
GRAPPLER 'BLOAD" command described in Appendix B of this
manual.

APPENDIX A —RUNNING TEST PROGRAMS

The following programs are for the experienced user, and allow
testing the graphics capabilities of the PRO-GRAPPLER.

Applesoft BASIC
```
    5  TEXT
   10  HOME
   20  PRINT ENTER THE SLOT YOUR PRO-GRAPPLER IS
       IN AND"
   30  INPUT HIT THE RETURN KEY:";S
   50  HGR:REM CLEAR HI-RES PAGE 1
   60  HCOLOR=3:REM SET COLOR TO WHITE
   70  POKE 49234,Ø:REM SWITCH TO FULLSCREEN
       GRAPHICS
   80  HPLOT Ø,Ø TO 279,Ø TO 279,190 TO Ø,190 TO
       Ø,Ø:REM DRAWS RECTANGLE
   90  FOR X=Ø TO 279 STEP 9:HPLOT X,Ø TO X,19Ø:REM
       PLOT VERTICAL LINES
  100  NEXTX
  110  FOR Y=Ø TO 19Ø STEP 5:HPLOT279,Y TO Ø,Y:REM
       PLOT HORIZONTAL LINES
  120  NEXTY
  130  PRINT CHR$(4);"PR#";S;REM TURNS ON PRO-
       GRAPPLER
  140  PRINT CHR$(9);"G":REM DUMP HI-RES PAGE 1
       NORMAL
  150  PRINT CHR$(4);"PR#Ø":REM TURNS OFF PRO-
       GRAPPLER
  160  TEXT:REM HOME CURSOR
  999  END
```

If you do not use DOS, substitute the following for lines 130 and
150:

```
  130  PR#S
  150  PR#Ø
```

Line 140 allows you to experiment with different options. Try
changing the function-specific part of the command in the PRINT
statement. For example, substitute "GI" or "GDR" for "G".

PASCAL —Example #1

Appendix A — Running Test Programs
FOR PASCAL USER:

```
PROGRAM DEMO;
USES TURTLE GRAPHICS, APPLESTUF;
VAR ANGLE,DISTANCE:INTEGER PRINT:TEXT
 BEGIN
 ANGLE: = 80;
 INITTURTLE;
 PENCOLOR(WHiTE);
 FOR DISTANCE:=1 TO 99 DO BEGIN
   MOVE(2DISTANCE);
   TURN(ANGLE);
  END REWRITE(PRINT, 'PRINTER
 WRITELN(PRINT,CHR$(25),'G');
END
```

PASCAL —Example #2

This program demonstrates how to load a picture which has been
saved to disk using a BLOCKWRITE command.

```
PROGRAM Load Pic:
USES TURTLEGRAPHICS,APPLESTUF;
CONST Hi-Res_____Page_____1 = 8192:
VAR Disk ____ Block:RECORD CASE BOOLEAN OF TRUE:
                    (Intpart:INTEGER);
                    FALSE:(Ptrpart:Y INTEGER);
END:
  ch:CHAR
fname:STRING;
  prnt:TEXT;
PROCEDURE Bload(Filename:STRING);
VAR io:INTEGER;
  f:FILE;
BEGIN
  Disk_____Block.Intpart; Hi-Res_____Page_____ 1;
  RESET(f,Filename);
  io: = BLOCKREAD(f,Disk_____Block_____Ptrpart Y,16);
  CLOSE(f, LOCK);
END;
PROCEDURE Print ____ Picture; VAR options:STRING;
BEGIN
   WRITEQEnter options:');
  READLN(options);
  REWRITE(prnt,'PRINTER:');
  WRITELN(prnt,CHR$(25),'G',options)
  CLOSE(prnt);
END
```

```
BEGIN
  INITTURTLE
REPEAT
TEXTMODE
WRITELN('Enter picture name (specify drive):)'
(An example of an ently would be:
    #5:Picture, Foto
where Picture Foto is a picture on Drive #2.)
READ LN(fname);
GRAFMODE;
Bload(fname);
REPEAT UNTIL KEYPRESS;(wait until key is pressed)
READ (KEYBOARD,ch);clear keyboard
TEXTMODE;
Print _____ Picture;
WRITE('Print more pictures?);
READLN(ch);
UNTIL(ch='N') or (ch='n');
END
```

APPENDIX B - PRINT GRAPH SAVED TO DISK

The following Applesoft BASIC programs are for the experi-
enced user. They allow you to print graphics (from one of the
popular graphics programs) which have been saved to disk.

Example #1

```
   5    S=P~
  10    HOME
  20    0$ = CHR$(4):REM CTRLD for Apple DOS
  40     PRINT ENTER THE NAME OF THE GRAPH:"
  50    INPUTN$
  60    HGR:REM Clear Hi-Res Page 1
  70     PRINT D$;"BLOAD";N$;",A$2000":REM Load Picture
  80    VTAB 22
  90     PRINT ENTER OPTIONS (DIRLENORMAL);"
 100    INPUTA$
 105    IF LEFT$(A$1)="N" THEN A$~~" ':REM If normal, then
        no options.
 110     PRINT D$;"PR#";S:REM Turns PRO-GRAPPLER on
 120    PRINT I$;"G";A$:REM Dump Hi-Res Page 1 with options
 130     PRINT D$;"PR#0":REM Turns PRO-GRAPPLER off
 140    TEXT:HOME
 999    END
```

29 If your PRO-GRAPPLER is not in Slot #1, change this to read the correct slot.

Example #2
Enter a (Control-D) between the quotes in line 30. Enter a
(Control-I) between the quotes in line 4Ø.

```
    5   S=1
   10   CALL-936:REM Home Cursor
   20   DIM N$(3Ø):DIM A$(1Ø)
   30   D$ =" ":REM CTRL-D For Apple DOS
   40   1$ =" ":REM CRTL-I For CP/M
   50   PRINT ENTER THE NAME OF THE GRAPH:"
   60   INPUTN$
   70   PRINT D$        A 2ØØØ":REM Load Picture
          into Hi-Res Page 1
   80   PRINT ENTER OPTIONS (D,I,R,E,L NORMAL):"
   90   INPUT A$
  100   PRINT D$;"PR#";S:REM Turns PRO-GRAPPLER on
  110   PRINT I$;"G';A$:REM Dump Hi-Res Page 1 with options
  120   PRINT D$;"PR#Ø":REM Turns PRO-GRAPPLER off
  130   TEXT:CALL-936:REM Home Cursor
  999   END
```

APPENDIX C—LOADING DUAL HI-RES PAGES
   You must load a a picture file into Hi-Res Pages 1 and 2 in
order to use the DUAL HI-RES command.

From **the Keyboard**

For Hi-Res Page 1, enter:
   BLOAD filename, A$2ØØØ
For Hi-Res Page 2, enter:
   BLOAD filename, A$4ØØØ

From within a **program**

For Hi-Res Page 1, enter:
   PRINT CHR$(4);"BLOAD filename,A$2ØØØ"
For Hi-Res Page 2, enter:
   PRINT CHR$(4);"BLOAD filename, A$4ØØØ"

These DOS commands must precede the line containing the
PR#n which turns the PRO-GRAPPLER on.

Sample program
The following program loads two Hi-Res binary files (pictures):
GRAPH 1 is loaded into Page 1, GRAPH 2 is loaded into Page 2.
They are then printed to the printer using the DUAL HI-RES
command.

```
10      PRINT CHR$(4);"BLOAD GRAPH1,A$2ØØØ"
20      PRINT CHR$(4);"BLOAD GRAPH2,A$4ØØØ"
30      PR#1
40      PRINT CHR$(9);"GS"
60      PR#Ø:END
```

APPENDIX D — SIMULATING A CHART RECORDER

A chart recorder prints a continuous graph on a roll of paper. If your chart might exceed a single page on your printer, you can simulate a chart recorder by printing successive pages together.

The following program loads binary graph files (GRAPH 1 into Hi-Res Page 1, GRAPH 2 into Hi-Res Page 2) and prints one right after the other without the spaces between them (the ROTATE command may also be used with this program):

```
10    PRINT CHR$(4);"BLOAD GRAPH1,A$2000"
20    PRINT CHR$(4);"BLOAD GRAPH2,A$4000"
30    PR#1
40    PRINT CHR$(9);"GR"
50    PRINT CHR$(9);'G2R"
60    PR#0:END
```

APPENDIX E — ROUTINES FOR ADVANCED PROGRAMMERS

The following PRO-GRAPPLER commands are provided for the benefit of advanced (assembly language) programmers:

CTRL-IUA Jump to the user routine starting at $300.
          This bypasses the PRO-GRAPPLER firmware. The
          Accumulator contains the output character. The user routine
          should 'JMP" to $CFO3 when finished. This restores the
          stack and registers.

CTRLI1U Jump to the user routine starting at $DOOO, Bank A
                of a RAM card in Slot #0.
          The PRO-GRAPPLER enables the RAM card prior to the
          Jump instruction. As with the CTRL-IU, the Accumulator
          contains the output character The user routine should
          "JMP' to $CF0O to disable the RAM card and restore the.
          stack and registers when finished.

APPENDIX   F - MEMORY LOCATIONS AND CUSTOM DRIVERS

Memory Locations

The PRO-GRAPPLER uses those RAM locations set aside for its particular slot and the slot scratchpad area common to all slots. The ROM is turned on using the standard ROM expansion protocol and resides in the locations $C800 to $CFFF. The entry points and the various RAM variables are listed below (N = slot number).

Cold Entry	$CNØØ		
Warm Entry	$CNØ2		
Left Margin	$478	+	$ØN
Right Margin	$678	+	$ØN
Line Length	$578	+	$ØN
Page Length	$5F8	+	$ØN
Character Count	$4F8	+	$ØN
Line Counter	$6F8	+	$ØN
Current Cmd. Char.	$778	+	$ØN
Text Flags	$7F8	+	$ØN

Text Flag Bit Representations

Bit 7 =	Output high order bit
Bit 6 =	Video turned on
Bit 5 =	LF after CR
Bit 4 =	Bell On
Bit Ø-3 =	Reversed

Custom Drivers

If you are writing your own drivers, the following locations are used to access the card (Y = NO where N = slot #):

ADDRESS	READ	WRITE
$CØ8Ø, Y	Status	Output
$CØ81, Y		Select bank of ROM

APPENDIX G – PRO-GRAPPLER PIN ASSIGNMENTS

Table 3 lists the pin assignments for each connector on the PRO-GRAPPLER cable. The 36 pin male Centronics printer connector is shown in Figure 3.

| | PRO-GRAPPLER | |
HEADER	SIGNAL NAME	PRINTER SIDE
1	Strobe	1
2	Ground	19
3	DataBit 0	2
4	Ground	20
5	DataBit 1	3
6	Ground	21
7	DataBit 2	4
8	Ground	12
9	DataBit 3	5
10	Ground	23
11	DataBit 4	6
12	Ground	24
13	Data Bit 5	7
14	Ground	25
15	DataBit 6	8
16	Ground	26
17	DataBit 7	9
18	Ground	27
19	Acknowledge	10
20	Ground	28
21	Busy	11
22	Ground	29
23	Paper Empty	12
25	Select	13
26	Ground	30

Table 3. PRO-GRAPPLER Pin Assignments.

36 Pin Male Centronics

Figure 3

Some printers do not have all of the commands which the PRO-GRAPPLER provides. Table 4 shows the PRO-GRAPPLER commands which are not supported by that printer.

PRO-GRAPPLER Commands Not Supported

NEC; C Itoh	Unavailable Text Commands: +PITCH=15; +SUB; + SUPER. Unavailable Graphics Commands: COLOR. Max. Graphics Pitch = 4.
IBM, Epson FX-80 and compatibles	Unavailable Text Commands: + PITCH = 15; Unavailable Graphics Commands: COLOR. Max. Graphics Pitch = 5.
Okidata	Unavailable Text Commands: +PITCH =15; +PROP. Unavailable Graphics Commands: COLOR. Max. Graphics Pitch 2.
"Daisy-Wheel Printers"	Unavailable Text Commands: +BOLD; +COLOR=; +CUSTOM; +HEAD; ±LINES; +PROP; +SUB; + SUPER; + UNDER. Unavailable Graphics Commands: All.

Table 4. PRO-GRAPPLER commands not supported.