

DClockTM

User's Manual

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v 1.0

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DClockTM

User's Manual

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Table Of Contents

CHAPTER ONE - THE DCLOCK MODULE	1
What It Is	1
Installing DClock	1
<hr/>	
CHAPTER TWO - USING DCLOCK	5
Boot the Disk	5
"Cannot find clock" Message	5
Set the time	5
Load the Driver to Your ProDOS Boot Disks	6
The ClockWorks Enhancements	6
What ClockWorks Is...	6
Making the ClockWorks Enhancements	7
<hr/>	
CHAPTER THREE - ABOUT THE DCLOCK BATTERY	9
What it is	9
Replacing	9
<hr/>	
APPENDICES	10
A: Taking Out and Putting In Your Memory Expansion Card	10
Removing the Card	10
Putting the Card Back In	12
B: DClock Register Structures	14
C: Bird's Better 'Bye'	17
D: Getting Help	18
Returning a Product	19
When You Ship	20
When We Receive	20

CHAPTER ONE

The DClock Module

What it is and how to install it

What It Is

DClock is the clock option for the Ram Express and Apple's IIC Memory Expansion Card or compatibles. It's called DClock because it fits into a DRAM socket on the expansion boards. DClock adds a precision electronic time-keeping device to your Apple IIC. The clock keeps track of the year, month, day of the month, day of the week, and time, right down to 1/10 and 1/100 of a second.

An on-board lithium battery maintains the current date and time even when the computer is turned off.

DClock will enable you to:

- Support applications that can use a ProDOS time clock.
- Add the current date and time to ProDOS disk files.
Display the current date and time on the AppleWorks screen.
- Enter the current date or time to AppleWorks data base categories with just a single keystroke.

Installing DClock

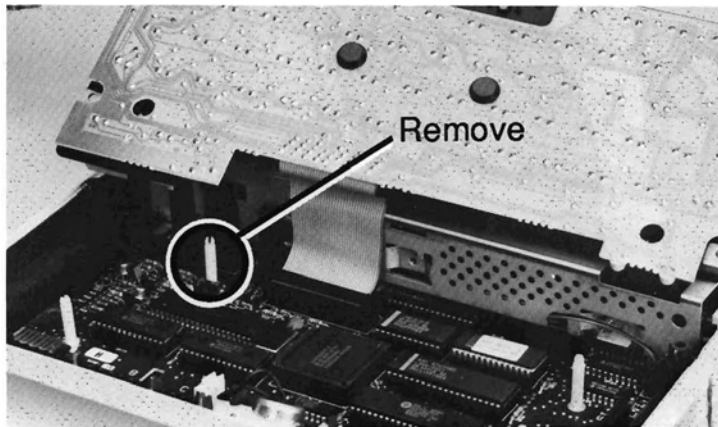
It is very easy to install DClock. Before performing any one of the steps in the installation, read through the step thoroughly and make sure that you understand it completely.

Step 1 Remove the memory expansion card

You must first remove the memory expansion card if it is currently installed in your IIC. Refer to your memory expansion manual for instructions. If your manual does not have instructions for removing the card, refer to Appendix A.

Step 2 Remove the upper left stand-off

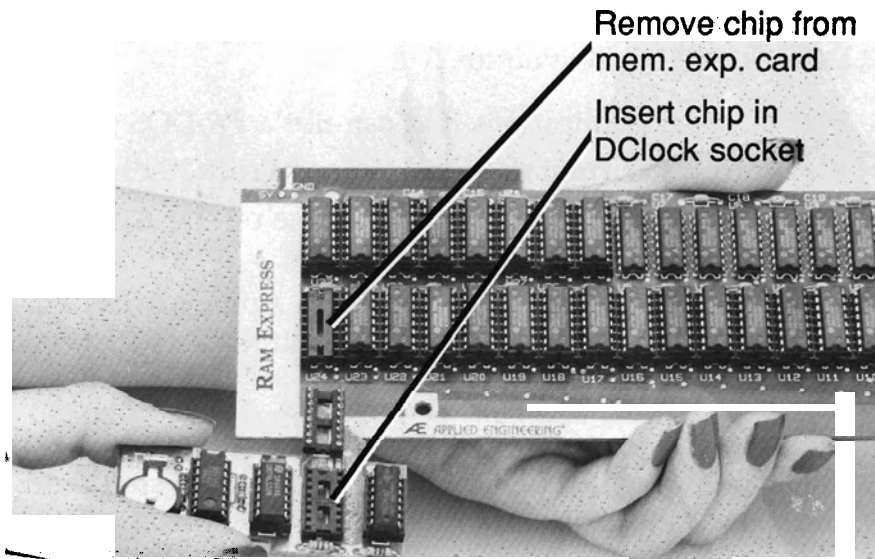
There should be a plastic stand-off in the upper left corner of the motherboard. If there is, remove it by pulling it up and out of the motherboard. Needle-nosed pliers may help.



Remove the upper left stand-off

Step 3 Remove the bottom left chip from its socket

The clock installs into the DRAM socket located at the far left end of the bottom row of chips.



Where the DClock plugs in

If you don't have a chip in that socket, go to Step 5.

If you have a chip installed in that socket, you will need to remove it first.

Remove the chip by gently prying up the chip with the tip of a small flatblade screwdriver. Slightly pry up one end, then the other. The chip's legs will bend easily so rock the chip out gently using the flat tip of the screw to push up from beneath.

Use your thumb and forefinger to pull it completely out.

Step 4 Insert the memory chip into the DClock socket

If you have removed the chip described above, insert it into the empty socket on the DClock card with the notch toward the top (the connector end) of the card. (Refer to previous picture.)

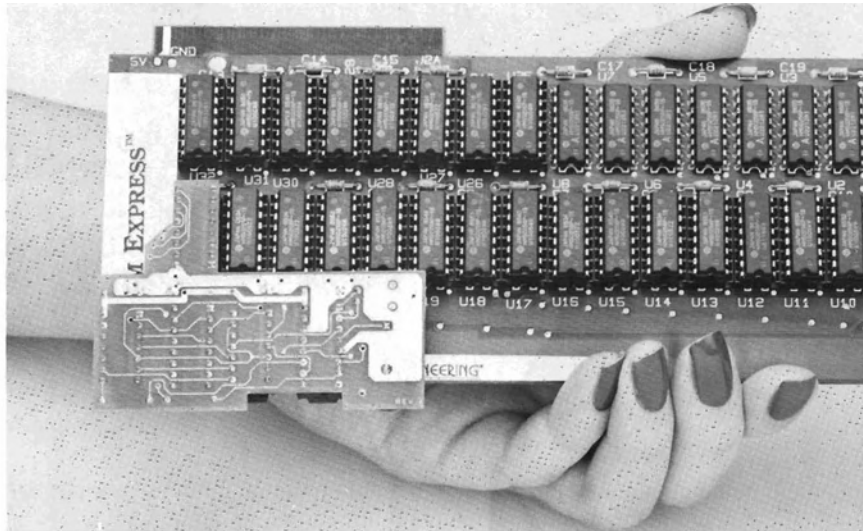
- ❖ **Important!** Make sure the notch is pointed toward the top of the card. If the chip is inserted upside down, the chip can be damaged but is usually not. However, the memory board will not recognize the chip unless it is installed correctly.

Step 5 Plug the DClock connector into the DRAM socket

If the protective foam block is still covering the connector pins on the DClock card, remove it.

- ❖ **Note:** If you did not have a chip in the lower left socket of the memory card as described in steps 3 and 4, the socket below the connector on the DClock will remain empty.

Insert the pins of the DClock's connector into the Ram Express' empty socket and press in until the card is completely seated.



Insert DClock connector into socket

Step 6 Install the memory card

- ❖ **Ram Express Owners:** Go to Chapter 2 Step 7 of the Ram Express manual.

Follow the directions in the memory card manual for proper installation and reassemble the IIc. (Refer to "Putting the Card Back In" in Appendix A, for installation instructions if your memory card does not include them.)

That's all there is to it!

Read on to find out how to access the clock and set the time.

CHAPTER TWO

Using DClock

ProDOS does not automatically recognize the clock. However, the ProDOS compatible drivers on the DClock disk allow ProDOS to recognize and use the clock information. When a ProDOS startup disk is booted, the operating-system file, PRODOS, is copied from the disk to a protected area of the computer's memory. The program, DCLOCK.SYSTEM, will install the required clock driver to the image of ProDOS in memory. When executed, the DCLOCK.SYSTEM program will first check for the presence of a clock and, if found, install the clock driver. Then it will execute the next system program (file type of SYS and a filename suffix of .SYSTEM) in the disk's directory.

Boot the Disk

Boot the DClock disk. You should see the message DClOCK Copyright (c) 19-- Applied Engineering in the upper left corner of the screen. DCLOCK.SYSTEM installs the proper drivers to the image of ProDOS in memory and then runs the BASIC program. The BASIC program sends the message, Loading drivers...and brings up the Time Utilities Menu.

"Cannot find clock" Message

If you ever get the message Cannot find clock, it probably means that the clock has been discharged or is improperly installed. If the clock has been discharged but is properly installed, the program will find it and set the time and date to zeros. Set the correct time and date as described below, then choose the option Install clock driver in memory.

If the program does not find the clock, check the clock's installation then try booting the DClock disk again.

Set the time

Select the option, Set the Time. Follow the on-screen directions to set the date and time in the format:

Month (01 - 12)/Day (01 - 31)/Year (00 - 99)

Hour (00 - 23)/Minute (00 - 59)/Second (00 - 59)

- ❖ *Note:* To enter PM, add 12 hours to the corresponding AM time.

Press Return to set the time or use the ESC key to return to the Clock Utilities menu without changing the clock.

If you enter a value outside the range of a particular setting (ex: Month = 13), you will receive an error message and be returned to the main menu.

Load the Driver to Your ProDOS Boot Disks

To automatically install the proper clock driver each time the computer is booted, install DCLOCK.SYSTEM on your ProDOS startup disks.

❖ *Note:* DCLOCK.SYSTEM requires 4 blocks of disk space.

To patch any ProDOS boot disks to recognize the clock, insert the write-enabled disk to be modified into any disk drive and choose the option `Install clock driver on disk`. The installation program will scan the system and display a list of volumes currently on-line and their location. Select the target volume and press the Return key. The DCLOCK.SYSTEM file will be inserted as the first system program in the patched disk's directory. Each time the modified startup disk is booted, DCLOCK.SYSTEM will be executed, displaying `DClock Copyright (c) 19-- Applied Engineering` in the upper left corner of the screen; then the next system program file in the disk directory will be executed.

Whenever you create or modify ProDOS files under the modified operating system, the files will be automatically tagged with the current date and time. Also, any application programs which read the time and date directly from ProDOS will now be able to do so.

The ClockWorks Enhancements

What ClockWorks Is...

Simply put, DCLOCK.SYSTEM makes DClock look like a ProDOS clock; ClockWorks allows AppleWorks to use the "ProDOS clock."

❖ *Important!* The ClockWorks Time Utility is already built into the AW 2 Expander. If you have a Ram Express and have made the AW 2 Expander modifications, you won't need to install the ClockWorks driver. If you're booting your computer with the AppleWorks disk, you'll still need to install DCLOCK.SYSTEM as described above.

ClockWorks modifies the AppleWorks program, replacing the message ⌘-? for Help in the bottom line of the AppleWorks screen with a display of the current date and time. You can still use ⌘-? to access the help screen.

ClockWorks also allows you to enter the current date or time into an AppleWorks Data Base category by typing the @ character as the only entry in the category. The category name must contain either the word DATE or TIME. If both DATE and TIME are used in the same category, the program will default to DATE.

Set up your categories...

```
File:Scarlet          CHANGE NAME/CATEGORY

Category names
=====
Date
Time
Time for a date
Datetime
Text
```

Then, while in the Insert New Records mode, enter the @ next to the time or date category and press Return...

```
File:Scarlet          INSERT NEW RECORDS

Record 1 of 1
=====
Date: Nov  9 88
Time: 11:17PM
Time for a date: Nov  9 88
Datetime: Nov  9 88
Text: Blah, blah, blah.
```

Making the ClockWorks Enhancements

Use the ClockWorks Time Utility to modify only BACKUP copies of the AppleWorks startup and program disks. Any patches to AppleWorks required by other programs, such as the TimeOut series, should be made after the ClockWorks utility is installed.

Select the option Run ClockWorks from the Time Utilities menu and follow the onscreen instructions.

The program will search all the online drives for a volume named /APPLEWORKS. If found, the program will quickly make the modifications.

If ClockWorks cannot find a volume named /APPLEWORKS, you'll get the following message:

```
Unable to find file. Type prefix of AppleWorks to modify  
/
```

If you get this message, enter the complete ProDOS prefix of the AppleWorks STARTUP disk. The leading slash (/) is provided. If you have copied the AppleWorks program to be modified into a ProDOS subdirectory, enter the complete ProDOS pathname of the subdirectory containing the AppleWorks files. Be sure to include slashes for any subdirectories.

CHAPTER THREE

About the DClock Battery

What it is

The DClock's battery is a 3 volt, 12 millimeter lithium battery with a life of about 2 years. You can order these batteries directly from Applied Engineering or check your local computer parts store or camera supplies store.

Replacing

To replace the battery, remove the memory expansion board and unplug the DClock from the board. Remove the battery by pushing on the top edge of the battery with a flatblade screwdriver. Do not bend the clip up. The battery should pop out the bottom of the connector.

Insert the new battery, positive (+) side up.

Now reconnect the DClock (refer to the directions in this manual), and reinstall the memory card according to that card's installation instructions.

Now boot the DClock disk to set the correct time.

APPENDIX A

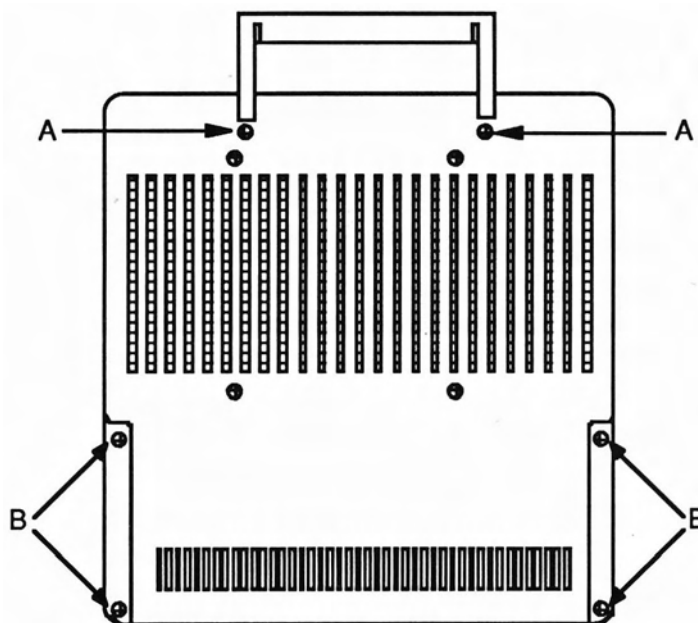
Taking Out and Putting In Your Memory Expansion Card

If your memory expansion card did not come with instructions for installing and/or removing the card, carefully follow the instructions below.

Removing the Card

Step 1 Remove the top cover of the IIc.

- 1) Switch the IIc power OFF.
- 2) Remove all cables connected to the computer.
- 3) Turn the computer upside-down.
- 4) Using the Phillips screwdriver, remove the six screws indicated as in the picture below. Some of the earlier model IIc's have different types of screws, shown as A and B. As you remove these screws, mark them as to type and keep them separated. Do not remove the four remaining screws. They hold the disk drive in place.



Apple IIc case screws

- 5) Turn the computer right-side-up.

- 6) (Iic Plus owners, go to "7").) Lift the left front (keyboard) edge of the top cover about 1/2 inch and insert the flatblade screwdriver between the top and bottom covers, to a depth of approximately 1/4". The insertion point for the screwdriver should be directly in line with the "B" key on the keyboard.

While lifting on the left front edge of the top cover, gently pry (lever) the screwdriver handle up toward the keyboard. This will release the snap connector which holds the front of the Iic case together.

- ❖ *Note:* There are several snap connectors holding the Iic case together. If some of them break off, don't worry; the case is still good. These snaps are required only during the original assembly of the Iic to align and hold the case together before the screws are installed. Just make sure that the broken plastic tabs don't rattle around inside the computer and get into the disk drive! (The Iic Plus does not have the same kind of connectors,)

The next two snaps are a little tougher. These are located on either side of the disk drive door and are unsnapped by lifting the keyboard end of the top cover. It may help to wiggle the top cover gently from side to side while lifting.

- 7) Lift the top cover from the front rearward until it can be unhooked from the back of the Iic.
- 8) Check the top cover to see that there are two metal tabs (Tinnerman nuts) attached to the back panel. If they are not there, find them! They can do serious damage to the computer if left inside.
- 9) Set the top cover aside and proceed to the next step.

Step 2 (Iic Plus only) Remove the volume knob

The volume slide knob comes off easily. Remove it and set it with the screws.

Step 3 Flip over the keyboard

Lift the front (spacebar) edge of the keyboard, gently moving it away from the disk drive, exposing the ribbon cable connecting the keyboard to the Iic main logic board. Flip the keyboard face down over the disk drive.

Step 4 Remove the card

The card should be mounted on four stand-offs directly under where the keyboard normally rests. Remove the card from the stand-offs by pulling up gently on the end of the card while pushing down on the ends of the stand-offs protruding from the back of the memory card. Release the left side of the card first then the right end.

Step 5 Install the DClock

Now continue with Step Two of Chapter One's installation instructions.

Putting the Card Back In

Step 1 Insert the card

Place the memory expansion card on the three stand-offs, component (chip) side down and with the connector on the right side. Make sure the holes in the board are aligned with the stand-offs then gently press down on the board starting at the connector (right) side then at the stand-off on the left side. You'll hear the board snap onto the stand-offs.

Step 2 Re-install the keyboard

Gently flip the keyboard back into place. Make sure that the keyboard cable is still firmly attached to its connector.

Some IIC's will have tabs on the keyboard which fit into the disk drive. Insert these tabs into the drive and lower the front (spacebar) edge of the keyboard into the plastic mounting guides on the bottom case.

Step 3 Replace the volume knob (IIC Plus only)

Return the volume slide knob to its proper position.

Step 4 Replace the top cover.

❖ *Note:* Some of the earlier IIC top covers are made in two pieces, a top panel and a back panel. If yours is a two-piece design, snap the two together and install them as one piece.

- 1) Verify that the Tinnerman nuts are securely attached to the top cover.
- 2) Snap the IIC carrying handle into the notches on the rear panel of the bottom cover.
- 3) Hook the bottom edge of the back panel (top cover) under the power switch and back panel connectors.

- 4) Lower the keyboard end forward, over the front of the computer. Pulling the cover toward the keyboard while lowering it over the disk drive will make it easier to snap the cover in place.
- 5) Holding the top and bottom covers together, turn the computer over and replace the case screws. To prevent binding, don't tighten the screws completely until all screws are threaded in their holes.
- 6) Reconnect the peripheral and power cables.

APPENDIX B

DClock Register Structures

The DClock module uses the DS1215 clock chip. This part coexists with the DRAM chip at Bit 0 of the third bank of memory on the IIC memory expansion card. Normally, the clock is transparent to the memory array. If the proper activation sequence is written to Bit 0 of bank 3, the clock becomes active long enough to read or set the time. The enable sequence is a read followed by 64 writes with a bit pattern of \$5CA3 3AC5 5CA3 3AC5 (LSB first). Any deviation in the sequence or an intervening read will abort the enable. The odds of a random data sequence duplicating this pattern during normal accesses to the memory are less than 1 in 1019.

The clock contains eight data registers of eight bits each that should be written or read as a block of 64 bits (LSB of register 0 first). The data is stored in BCD format. The structure of the registers are as follows:

Register 7 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Year 10				Year 1			
Bits 0 - 7: Year (00 - 99)							

Register 6 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	0	M10	Month 1			
Bits 0 - 4: Month (01[Jan] - 12[Dec])				Bits 5 - 7: Not used			

Register 5 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	Date 10		Date 1			
Bits 0 - 5: Date (01 - 31)				Bits 6 - 7: Not used			

Register 4 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	Osc	Rst	0	Day		

Bits 0 - 2: Day of Week (01[Sun] - 07[Sat])

Bit 3: Not used

Bit 4: Reset bit. A one will disable external resets. The external reset pin is not used on the DClock.

Bit 5: Oscillator bit. A one will stop the oscillator and halt the clock. When first powered up, this should be set to zero.

Bits 6 - 7: Not used

Register 3 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
12/24	0	10/Am	Hr 10	Hour 1			

Bits 0 - 5: Hour (00 - 23)

Bit 5: If in 12 Hour mode, bits 0-4 are hours (01 - 12) and this bit is Am/Pm. A one is equivalent to Pm. Do not use 12 hour mode because the driver software expects 24 hour mode.

Bit 6: Not Used

Bit 7: Mode bit. A one means 12 Hour mode. Use the 24 Hour mode.

Register 2 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Min 10		Min 1				

Bits 0 - 6: Minutes (00 - 59)

Bit 7: Not Used

Register 1 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Sec 10		Sec 1				

Bits 0 - 6: Seconds (00 - 59)

Bit 7: Not Used

Register 0 -

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Sec 0.1			Sec 0.01				

Bits 0 - 7: Fractional Seconds (0.00 - 0.99)

On the disk supplied with the DClock are some example assembly language routines, in both source and binary, that access the DClock and convert BCD to binary. The routines can be called directly or from BASIC.

APPENDIX C

Bird's Better 'Bye'

The AW 2 Expander contains a modified version of ProDOS 8. It incorporates a program selector, Bird's Better 'Bye' (created by Alan Bird), that lets you exit one system file and easily run another system file (e.g. APLWORKS.SYSTEM, BASIC.SYSTEM, FILER) from a menu.

To use this 'BYE' command, boot your copy of the AW 2 Expander disk or copy the 'PRODOS' file from the AW 2 Expander disk to your boot disks. Then, anytime you quit a system program (such as AppleWorks), a menu of the first 16 executable system files and/or subdirectories on that disk will be displayed on the screen. This menu can also be called from the Applesoft BASIC prompt by entering the 'BYE' command.

```
ESC: CHANGE VOLUME
RETURN: SELECT FILE

/AW2.EXP
PRODOS
AE.AW.SYSTEM
AECACHE.SYSTEM
GSTEST.SYSTEM
RWTEST.SYSTEM
RFTEST.SYSTEM
RETEST.SYSTEM
PCTRAM.SYSTEM
FILER
BASIC.SYSTEM
```

Sample screen display

The sample screen above shows the AW 2 Expander disk online and lists its executable system files.

Use the up and down arrow keys to highlight the selection you want to run. The Esc key will change the volume (disk) selection to the next on-line volume. The Return key selects the currently highlighted file or subdirectory name.

Subdirectory names on the disk will be indicated by a '/' as the first character of the file name.

APPENDIX D

Getting Help

If you have a technical question relating to your DClock card or any other Applied Engineering product that is not covered in the manual, please contact the dealer from whom you purchased the product. If you are experiencing difficulties with one particular program, contact the program's author or publisher.

In the event that the dealer or the publisher's support personnel cannot answer your question, call Applied Engineering Technical Support. The support representatives are experienced in the applications and uses of Applied Engineering products, but in order to provide a quick and effective answer to your question, they will need to know as much as possible about the hardware and software specifically related to your question. Please provide the technical support representative with the following information:

- ◇ The Applied Engineering product related to your question and its revision number.
- ◇ The original and current memory configuration of the card (if applicable).
- ◇ The model and revision of your computer.
- ◇ What peripherals are being used.
- ◇ The name, version, and revision level of the software with which you are experiencing problems.
- ◇ The results of any test programs, diagnostics, or troubleshooting done by you, your dealer, or your software publisher's support department.

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(214) 241-6069**

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(Please call only the number above for technical support. Our sales office cannot transfer calls to the support lines.)

Returning a Product

Include

If your product needs to be returned, the technical support representative will give you a Return Material Authorization (RMA) number.

- Record the RMA number for your own records.
- Write the RMA number on the outside of the package you send to us.
- Write the RMA number at the top of the return form included with your product package.

Fill out the Return Form on back of the yellow sheet marked "Attention!" A correctly completed form will greatly reduce the time it takes to process and return your product.

Attach a copy of your original invoice to the return form.

- ❖ **Warning:** If you don't include an invoice, products will be treated as out of warranty products and will be returned to you C.O.D. for the amount of the service charge.

A completed form should look something like the one below.

Invoice

If you should ever have to return your \textregistered product for repair, please complete this form and attach a copy of your original invoice.

RMA Number IMAL-1-R

Computer:		Peripherals:		OS Slot Settings	
<input type="checkbox"/> II		<input type="checkbox"/> Monitor		1: <input type="checkbox"/> Your	<input type="checkbox"/> Printer
<input type="checkbox"/> II Plus		<input checked="" type="checkbox"/> Printer	<u>ImageWriter II</u>	2: <input type="checkbox"/> Your	<input type="checkbox"/> Modem
<input checked="" type="checkbox"/> IIc <u>Plus</u>		<input type="checkbox"/> Modem		3: <input type="checkbox"/> Your	<input type="checkbox"/> Text
<input type="checkbox"/> IIe Non-Enhanced		<input checked="" type="checkbox"/> Other (list)	<u>dClock</u>	4: <input type="checkbox"/> Your	<input type="checkbox"/> Mouse
<input type="checkbox"/> IIe Enhanced				5: <input type="checkbox"/> Your	<input type="checkbox"/> Smart
<input type="checkbox"/> IICS ROM#				6: <input type="checkbox"/> Your	<input type="checkbox"/> Disk
<input type="checkbox"/> Other (list)				7: <input type="checkbox"/> Your	<input type="checkbox"/> A-Talk

Slot 0 (II Plus): _____ Slot 5 : _____

Slot 1 : _____ Slot 6 : _____

Slot 2 : _____ Slot 7 : _____

Slot 3 : _____ Aux. Slot (I/e) : _____

Slot 4 : _____ Mem. Exp. (IICS): Ram Express

Symptoms: My dClock works great, too well in fact. My teacher makes us time and date stamp our files. I prefer to do them at home 'round about midnight. When I try to set the clock back to a respectable hour, it sends a message, "Time Incorrect. It is Wrong to Lie."

Description of Software (name, version number, any enhancements, etc.):
We're using G. Washington Writer and Pinocchio Knows.

Steps to Duplicate Problem: Bring home schoolwork that you didn't do in class because you didn't feel like it right then. Run either program at midnight or after. Try to set clock back. Observe message.

When You Ship

If you don't have the original packing material, wrap the board in anti-static material (preferably the anti-static bag in which the card was originally shipped; however, aluminum foil will work fine). Pack it in a sturdy box cushioned with wadded papers (e.g. used computer paper or newspaper).

- ❖ **Warning:** If your product is damaged due to inadequate packing, your warranty will be void.

Include the return form and invoice.

Send the package; shipping prepaid, to:

RMA# __?__
Applied Engineering
Technical Support
3210 Belt Line Road, Suite 154
Dallas TX 75234

You should insure your package. *Æ* will not assume any responsibility for inadequate packing or loss or damage during shipping.

When We Receive

Our service department will use your completed form in an attempt to duplicate the problem.

If it is determined that your product is defective due to a manufacturing defect, your card will be repaired or replaced at *Æ*'s option.

Any misuse, abuse, or non-*Æ* authorized alteration, modification, and/or repair to the Applied Engineering product will void the warranty. This warranty will also be void if you use the *Æ* product for any purpose other than its intended use.

Your product will be fully tested before it is shipped back to you, transportation prepaid, via UPS regular delivery.

Once your product is received by Technical Support, it will be processed and delivered to our shipping department within 7 to 10 working days.