

NOTICE

Your C3-1000 memory board has been sent to you with a 58174 clock chip in it.

Please remove Chapter 7, and replace other appropriate pages in your Installation Guide with the enclosed pages, which apply to the 58174 clock chip.

We recommend that you keep the removed pages for use if/when the 58274 clock chip becomes available again .

Thank you ,

Valid Technologies

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VT-CLK Screen

The VT-CLK screen (Figure 6-2) consists of a number of different areas. The area in the middle center of the screen is the dynamic Date/Time display. The display cursor can select any of the display values to change except DOW (Day Of Week) and SS .S (Seconds). Below the display area is the edit area. It is in this area where all changes to the display are first made.

The dynamic Date/Time display area consists of the following display data.

Display Data	Definition	Valid Range of Values
YYYY	Years	1980..2099
MM	Months	1..12
DD	Day	1..31 depending on month
DOW	Day Of Week	Automatically calculated and set
HH	Hour	0..23
MN	Minute	0..59
SS.S	Seconds	Automatically set to 00.0

The edit area consists of five different message/value regions. They are defined as follows:

Edit Region	Definition
ENTRY VALUE DESCRIPTION	Detailed description of the value being edited.
EDIT ERROR	Edit error messages. There are two edit error messages. Invalid Entry: Value entered is out of range. Out Of Editing Limit: Edit cursor backed up out of edit region.
ENTRY VALUE	Value of edited display data.
EDIT MODE	Mode the editor is in. There are three modes which may be used : Clear, Overtyp, or Insert. Clear Mode is the only mode needed.
CURSOR LINE	States that the cursor keys are used to move the display/edit cursor left and right. ALT Q is used to quit the VT-CLK utility.

VT-CLK Keyboard Operations

The VT-CLK utility uses a special keyboard for editing the entries presented by the utility. The keys which may be used for editing are :

CURSOR KEYS :

- Left Cursor - moves the entry selection cursor to the left in a circular fashion.
- Right Cursor - moves the entry selection cursor to the right in a circular fashion.
- Up Cursor - moves the entry selection cursor to the left in a circular fashion.
- Down Cursor - moves the entry selection cursor to the right in a circular fashion.

SHIFT WORD LEFT - Increments the ENTRY VALUE selected by the cursor by one.

SHIFT WORD RIGHT - Decrements the ENTRY VALUE selected by the cursor by one.

BACKSPACE - Deletes the character at the position to the left of the edit cursor of the ENTRY VALUE.

DEL - Deletes the character at the position of the edit cursor of the ENTRY VALUE.

ALT Q - Pressing the ALT key down and the Q key down together will terminate the operation of the VT-CLK program.

VT-CLK Operations

A. Cursor Key Operations

When using the cursor keys it is important to note that the day of week (DOW) and seconds (SS.S) cannot be selected. The reason for this is that the day of week is automatically calculated and seconds cannot be set on the Clock/Calendar.

B. Setting of Seconds

Seconds and tenths of seconds are always set to zero by the clock/calendar chip when changes are made to the time.

C. Year Updates

Vt-CLK will automatically update the VT-CLK and VT-ICLK.EXE programs when changes are made in the year. This keeps the year current for the diskette used.

NOTES:

1. **DO NOT** change the names of these files or programs. **DO** keep these two programs on the default diskette.
2. If you are using MS-DOS 2.11, these files must also reside on the default directory.

VT-CLK Error Messages

There are four error messages associated with the VT-CLK utility. The messages and causes are listed below.

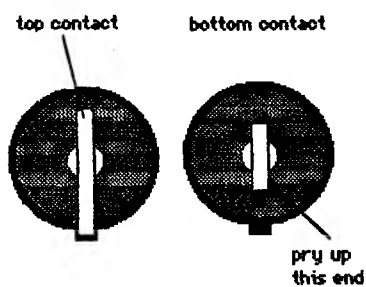
1. ERROR IN READING THE CLOCK.

REASON:

The Clock/Calendar has been read ten times and a read error has occurred each time.

PROBABLE CAUSES:

- A. The bottom contact of the battery holder is not touching the battery. Remove the battery. Take a small screwdriver and bend the bottom contact of the battery up slightly (see Figure 6-3), being careful not to break the contact.
- B. The battery is too low on power to operate the clock while the computer is turned off. Replace the battery with any lithium coin type 3 volt battery of the correct size. (i.e. Matsushita BR2325)
- C. The Clock/Calendar chip is not installed in the C3-1000 board. Call Valid Technologies for a Clock/Calendar upgrade kit.
- D. The Clock/Calendar chip is not being addressed properly. Call Valid Technologies Technical Support (VTTS). (817) 467-0116
- E. The Clock/Calendar chip is not functioning properly. Call VTTS. (817) 467-0116



Top Down View of Battery Holder

Figure 6-3: Battery Contacts

2. INSERT DISKETTE WITH THE VT-CLK.EXE FILE AND HIT ANY KEY WHEN READY.

REASON:

The VT-CLK utility tried to modify the start year it uses to keep track of the years in the file VT-CLK.EXE

PROBABLE CAUSES:

- A. VT-CLK.EXE has been named to something else. Rename it VT-CLK.EXE or insert a diskette that has VT-CLK.EXE on it.
- B. For MS-DOS 2.11 the VT-CLK.EXE file is not located in the default directory.

3. INSERT DISKETTE WITH THE VT-ICLK.EXE FILE AND HIT ANY KEY WHEN READY.

REASON:

The VT-CLK utility tried to modify the start year in VT-ICLK used to keep track of years for MS-DOS time and date initialization.

PROBABLE CAUSES:

- A. VT-ICLK.EXE has been named to something else. Rename it VT-ICLK.EXE or insert a diskette that has VT-ICLK.EXE on it.
- B. For MS-DOS 2.11 the VT-CLK.EXE file is not located in the default directory.

4. FILE NOT FOUND. CHANGE DISKETTE AND HIT ANY KEY WHEN READY.

REASON:

The VT-CLK utility tried to find VT-CLK or VT-ICLK on the diskette on the default drive.

PROBABLE CAUSES:

- A. No diskette in drive. Insert proper diskett into the default drive.
- B. For MS-DOS 2.11 the VT-CLK.EXE file is not located in the default directory.

6.3 VT-ICLK.

Setting the Clock Upon System Boot

VT-ICLK is intended to be used to set the MSDOS clock upon system boot. To accomplish this:

1. Create an AUTOEXEC.BAT file on the system diskette with an editor. If you are unsure how to do this, consult your operator reference guide for your editor.
2. Place into this file the line "VT-ICLK", without the double quotes. Then exit the editor.
3. Copy VT-ICLK.EXE to the system diskette if it is not already there.

The next time the system is booted from this diskette the MSDOS clock will automatically be set to the time and date of the Clock/Calendar.

VT-ICLK Error Messages

1. CLOCK NOT INSTALLED OR NOT OPERATIONAL

This is the only error message which will be generated by VT-ICLK.

REASON:

VT-ICLK read invalid data from the Clock/Calendar more than 10 times.

PROBABLE CAUSES:

- A. The bottom contact of the battery holder is not touching the battery. Remove the battery. Take a small screwdriver and bend the bottom contact of the battery holder up slightly, being careful not to break the contact. See Figure 6-3.
- B. The battery is too low on power to operate the clock while the computer is turned off. Replace the battery with any lithium coin type 3 volt battery of the correct size.
- C. The Clock/Calendar chip is not installed in the C3-1000 board. Contact Valid Technologies for a Clock/Calendar upgrade kit.
- D. The Clock/Calendar chip is not being addressed properly. Call Valid Technologies Technical Support (VTTS). (817) 467-0116
- E. The Clock/Calendar chip is not functioning properly. Call (VTTS). (817) 467-0116

6.4 CLOCK TROUBLE SHOOTING

There are two problems that may occur with the Clock/Calendar:

1. The clock runs too fast or too slow.
2. The Clock/Calendar does not keep correct time/date when the machine is turned off.

Solutions to these problems are as follow:

Clock Runs Too Fast or Too Slow

SYMPTOM:

While the machine is turned on, the Clock/Calendar time is either faster or slower than expected.

PROBABLE CAUSES:

- A. This is usually a result of the Trimmer Capacitor being out of adjustment. If the clock/calendar is running too fast, turn the Trimmer Capacitor **counterclockwise** (in approximately 1/8 turn increments). This should **slow down** the clock. If the Clock/Calendar is running slow, turn the Trimmer Capacitor **clockwise**. This should **speed up** the clock. See Figure 6-4

NOTES:

1. When adjusting the Trimmer Capacitor, use a screwdriver with a **plastic** blade and handle. (A **plastic** bladed screwdriver may be purchased at Radio Shack). Use of a screwdriver with a metal blade can **destroy** the Clock/Calendar Circuit.
2. The C3-1000 diagnostic utilities offer a means of determining the accuracy of the C3-1000 clock versus the MS-DOS clock. They are available from your dealer or Valid Technologies.

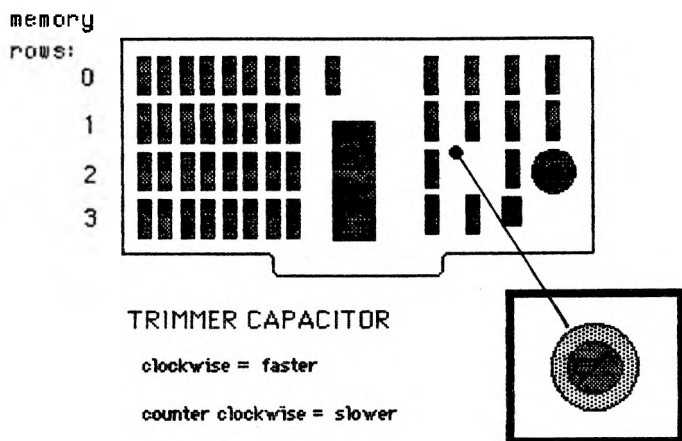


Figure 6-4: Trimmer Capacitor Adjustment

The Clock/Calendar does not keep correct time/date when the machine is turned off.

SYMPTOM:

Upon system boot, the time and date are not correct.

PROBABLE CAUSES:

- A. The bottom contact of the battery holder is not touching the battery. Remove the battery. Take a small screwdriver and bend the bottom contact of the battery up slightly, being careful not to break the contact.
- B. The battery is too low on power to operate the clock while the computer is turned off. Replace the battery with any lithium coin type 3 volt battery of the correct size.
- C. The Clock/Calendar chip is not functioning properly. Call Valid Technologies Technical Support (VTTS). (817) 467-0116

6.5 CLOCK/CALENDAR PROGRAMMERS INFORMATION.

The information given below is for those individuals wishing to access the CLock/Calendar with their own programs. This will allow the programmer to obtain time information down to a tenth of a second and up to the month. The address decodings for the Clock/Calendar counters are given in Figure 6-5.

ADDRESS	FUNCTION	MODE	REMARK
EFFF0	test only	write only	must set to 0
EFFF1	tenths of seconds	read only	0..9
EFFF2	units of seconds	read only	0..9
EFFF3	tens of seconds	read only	0..9
EFFF4	units of minutes	read/write	0..9
EFFF5	tens of minutes	read/write	0..5
EFFF6	units of hours	read/write	0..9
EFFF7	tens of hours	read/write	0..2
EFFF8	units of days	read/write	0..9
EFFF9	tens of days	read/write	0..3
EFFFA	day of week	read/write	1..7
EFFFB	units of months	read/write	0..9
EFFFC	tens of months	read/write	0..1
EFFFD	year status	write only	leap year = 8 leap year + 1 = 4 leap year + 2 = 2 leap year + 3 =
EFFFE	stop/start	write only	start = 1 stop = 0
EFFFF	interrupt status	read/write	used by VT-CLK

Figure 6-5: Clock/Calendar Address Decoding.

The following apply when writing programs for the Clock/Calendar.

- A. Reads and Writes to the clock take place as standard assembler MOVs, (in BASIC PEEK and POKE, value assignments in PASCAL) to the addresses given above. There is no special timing to consider.
- B. The valid values are held in the lower nibble of the byte accessed. Although the individual digits have valid values as given in Figure 6-5 the individual values which have special two digit values are given below.

- 1. Minutes - 0..59
- 2. Hours - 0..23
- 3. Days - 1..31
- 4. Months - 1..12

- C. If the clock is busy updating a counter that is being read the value returned will be an F in the lower nibble. To obtain the proper value the location must be read again until a non F value is returned.
- D. Stopping the Clock/Calendar automatically sets tens of seconds, seconds, and tenths of seconds to zero (00.0).
- E. The interrupt status is used by VT-CLK to determine the year. It cannot be used to generate interrupts to the processor. Changing the value will cause VT-CLK to operate improperly on read by displaying the incorrect value for the year.
- F. Day of the week (DOW) setting is arbitrary. VT-CLK uses 1 to represent Sunday. VT-ICLK does not use DOW.

NOTES:

C3-1000

memory board

Installation Guide

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- 1.0 May 1984**
- 1.1 December 1984**
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- 2.1 August 1985**

C3-1000 MEMORY BOARD INSTALLATION GUIDE

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Machine B: Valid Technologies
C3-1000 Memory Board
CMX-0DR-0CC
SN 850813004
Lot 3089
Purchased 19 August 1985

Machine A: Valid Technologies
C3-1000 Memory Board
CMX-0X-02 ver 2.3
SN 860718003
Lot 8144
Purchased 29 July 1986

Clock Battery: VR2325 3volt lithium

Computer Craft #

930 79699

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Chapter 1

INTRODUCTION

The C3-1000 memory board is a MEMORY-CLOCK/CAL-
ENDAR board for the Victor 9000 computer. It contains
0KB to 768KB of user expandable memory, and optionally a
battery operated time-of-day clock/calendar.

The C3-1000 board is easy to install in your Victor 9000
computer. **BE SURE TO COMPLETELY READ THIS
INFORMATION BEFORE INSTALLING THE BOARD.**
Installation sections which are applicable to the various
C3-1000 board configurations are listed below. The board
configuration is given by the first one to three letters of
the board part number as placed on the board.

- CM - Clock/Calendar-Memory board
- M - Memory board
- TOD - Clock/Calendar board

<u>CHAPTER</u>	<u>Applicability</u>
1.	CM, M, and TOD
2.	CM, M, and TOD
3.	CM, M and TOD
4.	CM, and M
5.	CM, and M
6.	CM and TOD
APPENDIX	CM, M and TOD

**BE SURE TO FILL IN AND RETURN THE WARRANTY
REGISTRATION WITHIN 15 DAYS OF DELIVERY. WE
CANNOT ACCEPT FOR REPAIR ANY BOARDS THAT
DO NOT HAVE A WARRANTY REGISTRATION ON
FILE**

Warranty information can be found in the Appendix.

Chapter 2

PREPARATION FOR INSTALLATION

Before the C3-1000 Board can be installed, it must be configured to your system. The configuration process consists of three simple steps.

1. Determining the board configuration.
2. Determining the start address of the board.
3. Determining and setting the dip switches on the board.

Additionally, the New Boot Address is determined for use in verifying memory operation.

A Configuration Worksheet is provided (in Appendix) to aide you in the configuration process. You may wish to photocopy the original, and use the copies as your working sheets. The original will remain as a 'backup'.

2.1 CONFIGURING THE C3-1000 BOARD

The Configuration/Address switches are set as given in the sub-sections below. The TOD series board has all switches set off. If you have a TOD series board set the switches on the board to **OFF** and continue with Chapter 3: INSTALLING THE C3-1000 BOARD.

Determining the Memory Configuration

Before installing the C3-1000 board the memory board configuration must first be determined. This can be done as follows:

1. If you are installing the board:
 - a. As purchased, locate the **part number** in Figure 2-1.
 - b. After a memory size modification, locate the **board size** in Figure 2-1.
2. Circle the appropriate number from step one on Figure 2-1.
3. Read across the figure in the same row for the corresponding memory configuration.
4. Enter the **memory configuration** on the Configuration Worksheet.

Example:

A CMX-0X-02 as purchased would have a memory configuration of 0.

A CMX-0X-02 modified to a 384KB would have a memory configuration of 1.

Note: The memory configuration also corresponds to the number of rows of 256KB Drams.

Part Number	Part Number	Modified Board Size	Memory Configuration
CMX-0X-02	MX-0X-01	0 KB	0
CM1-64X-02	M1-64X-01	64 KB	0
CM1-128X-02	M1-128X-01	128 KB	0
CM1-192X-02	M1-192X-01	192 KB	0
CM1-256X-02	M1-256X-01	256 KB	0
CM2-256X-02	M2-256X-01	256 KB	1
CM3-320X-02	M3-320X-01	320 KB	1
CM3-384X-02	M3-384X-01	384 KB	1
CM3-448X-02	M3-448X-01	448 KB	1
CM3-512X-02	M3-512X-01	512 KB	2
CM3-576X-02	M3-576X-01	576 KB	2
CM3-640X-02	M3-640X-01	640 KB	2
CM3-768X-02	M3-768X-01	768 KB	3

B
A

Figure 2-1: Memory Configurations

NOTE:

CM1-256X-02 contains 4 rows of 64Kb chips.
 CM2-256X-02 contains 1 row of 256Kb chips.

M1-256X-01 contains 4 rows of 64Kb chips.
 M2-256X-01 contains 1 row of 256Kb chips.

This means that:

- 256Kb boards containing 64Kb chips are configuration 0
- 256Kb boards containing 256Kb chips are configuration 1

Determining the Start Address and Switch Settings

After determining the memory configuration, the **start address** for the board must be determined. This can be done by turning on your system (without the new board in it) and making note of the **old boot address** (the number which appears at the bottom of the display screen). Write the **old boot address** which is shown on your screen, on your Configuration Worksheet. This **old boot address** will become the **start address** used by the C3-1000 memory board. Now find the row in the chart of Figure 2-2 which matches the **memory configuration** and **start address determined**. The corresponding information on the right of the chart shows the proper setting of the Configuration/Address switches. Enter these switch settings on the Configuration Worksheet.

Memory Configuration	Start Address		Configuration/Address			
	Decimal	HEX	CA3	CA2	CA1	CA0
0	128 KB	2000	ON	ON	ON	ON
0	256 KB	4000	ON	ON	ON	OFF
0	384 KB	6000	ON	ON	OFF	ON
0	512 KB	8000	ON	ON	OFF	OFF
* 0	640 KB	A000	ON	OFF	ON	ON
* 0	768 KB	C000	ON	OFF	ON	OFF
1	128 KB	2000	ON	OFF	OFF	ON
1	256 KB	4000	ON	OFF	OFF	OFF
* 1	384 KB	6000	OFF	ON	ON	ON
* 1	512 KB	8000	OFF	ON	ON	OFF
* 1	640 KB	A000	OFF	ON	OFF	ON
2	128 KB	2000	OFF	ON	OFF	OFF
*B 2	256 KB	4000	OFF	OFF	ON	ON
2 +PC	256 KB	4000	OFF	OFF	OFF	OFF
* 2	384 KB	6000	OFF	OFF	ON	OFF
*A 3	128 KB	2000	OFF	OFF	OFF	ON

Figure 2-2: C3-1000 Configuration/Address Switch Setting

+PC NOTE:

Configurations with asterisks (*) cannot be used with the + PC due to addressing limitations.

Setting the Switches

With the connector side of the board pointing toward you the switch is located on the lower right side of the board. Locate the switch on the C3-1000 board. The individual switches are positioned as illustrated in Figure 2-3. Switch CA0 being closest to the edge of the board. Set the switches as you have marked them for your configuration/address.

NOTES

1. On some switches you may have to use the toothpick provided to set the dip switches.
2. Disregard the numbering on the switches and follow the directions and Figure 2-3.
3. When setting the switches push gently. Pushing too hard can ruin the dip switch.

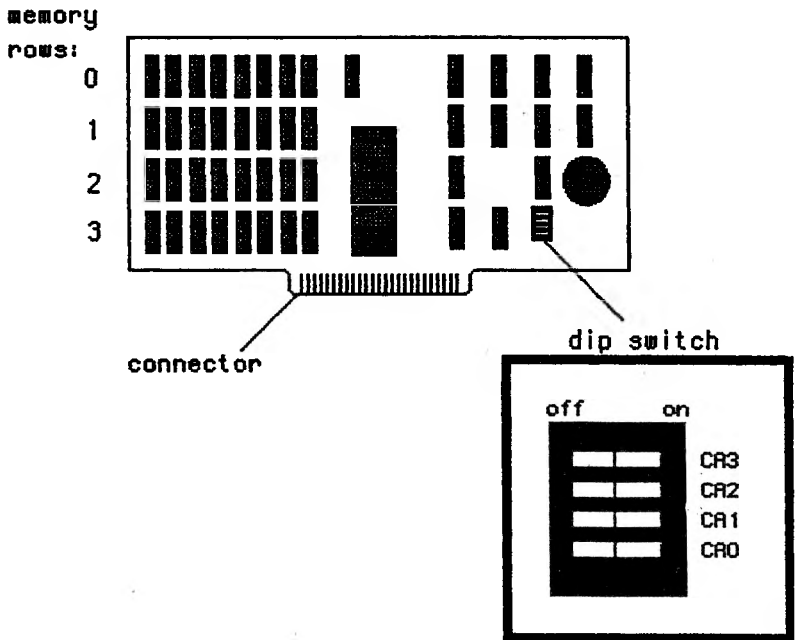


Figure 2-3: C3-1000 Configuration/Address Switches

Figure 2-3 illustrates the location of the dip switch, and the on/off position. The correct **on** switch positions for the different switch types are described below.

- slide switch - slide to right for on.
- toggle switch - toggle is right for on.
- push down switch - push down on right for on.

2.2 DETERMINING THE NEW BOOT ADDRESS

The New Boot Address is the address which will be displayed upon system boot after successful installation of the CM or M series C3-1000 board. You will need to write down this number for later use during memory checkout. This number can be determined in the following manner:

Memory Size

- A. Locate your memory board configuration (from the worksheet) in Figure 2-4.
- B. Look at the C3-1000 board to determine which memory rows have chips in them. Locate these in the Memory Row columns in Figure 2-4.
- C. The decimal and HEXadecimal memory sizes are given in the Memory Size columns. Write the **memory size** in the space on your Configuration Worksheet

Memory Configuration	Memory Row				Memory Size	
	0	1	2	3	Decimal	HEX
0	64	-	-	-	64 KB	1000
0	64	64	-	-	128 KB	2000
0	64	64	64	-	192 KB	3000
0	64	64	64	64	256 KB	4000
1	256	-	-	-	256 KB	4000
1	256	64	-	-	320 KB	5000
1	256	64	64	-	384 KB	6000
1	256	64	64	64	448 KB	7000
2	256	256	-	-	512 KB	8000
** 2 +PC	256	256	N/U	N/U	512 KB	8000
2	256	256	64	-	576 KB	9000
B 2	256	256	64	64	640 KB	A000
*A 3	256	256	256	N/U	768 KB	C000

Figure 2-4: C3-1000 Memory Size

+PC NOTE:

* Cannot be used with the +PC.

** This is the only valid memory size using configuration 2 with 256KB start address when +PC is installed.

New Boot Address

- A. In Figure 2-5, locate the following:
1. In the Memory Size column, your hex or decimal *board* memory size. Circle it.
 2. In the first 2 rows beneath Start Addressing, your **old boot address** (from your worksheet)
- B. The **new boot address** will be given by the number in the cell at the intersection of the memory size row and the starting address column. (The number in the body of the chart is in Hex. If your machine boot displays in Decimal, convert to decimal using Figure 2-6. Write this number down in the worksheet.
- C. If the **new boot address** falls into a cell with dashes this means you will not be able to take advantage of all the memory on the board and should consider using a board with less memory on it.

Memory Size (KBytes)	Starting Address (KBytes)						
	<i>A</i>	<i>B</i>					
DECIMAL	128	256	384	512	640	768	
HEX	2000	4000	6000	8000	A000	C000	
64	1000	3000	5000	7000	9000	B000	D000
128	2000	4000	6000	8000	A000	C000	E000
192	3000	5000	7000	9000	B000	D000	----
256	4000	6000	8000	A000	C000	E000	----
320	5000	7000	9000	B000	D000	----	----
384	6000	8000	A000	C000	E000	----	----
448	7000	9000	B000	D000	----	----	----
512	8000	A000	C000	E000	----	----	----
576	9000	B000	D000	----	----	----	----
640	A000	C000	E000	----	----	----	----
768	C000	E000	----	----	----	----	----

Figure 2-5: New Boot Address

New Boot Address Conversion Chart	
HEX	DECIMAL
2000	128
4000	256
5000	320
6000	384
7000	448
8000	512
9000	576
A000	640
B000	704
C000	768
D000	832
E000	896

Figure 2-6: New Boot Address Conversion Chart

Chapter 3

INSTALLING THE C3-1000 BOARD.

Chapter 3 presents step by step instructions on installing the C3-1000 board into your Victor 9000. It is a relatively simple procedure, and in itself does not take long to do.

3.1 TOOLS NEEDED FOR INSTALLATION

The following tools will be required to properly install the C3-1000 Board.

- A. Phillips number 2 screwdriver.
- B. Small cup to hold screws.
- C. Toothpick, may be required to change configuration address dip switch.

3.2 PREPARING FOR INSERTION

Turn off the Computer

Turn off your computer and unplug it. It is best to unplug the system from the end which is plugged into the computer system unit.

SEVERE DAMAGE to both the computer system and the C3-1000 board can occur if boards are inserted into or removed from the system unit while it is powered up.

Preparation for Top Cover Removal

- A. Clear a space at the side of the computer large enough to hold the monitor and its platform. Remove the monitor and its platform, placing them in the clear space at the side of the computer.
- B. Remove the 4 screws that hold the back panel and top cover together. There is one in each position as shown in Figure 3-1. Place the screws into the small cup, they will be needed later when you reassemble the computer.
- C. Separate the back panel from the top of the computer by firmly grasping the top of the center of the back panel and **gently** pulling it away from the top cover. This will disengage the plastic connector.

- D. After the back panel has been disengaged from the plastic connector rock the back panel away from the computer such that there is about a one inch gap at the top.

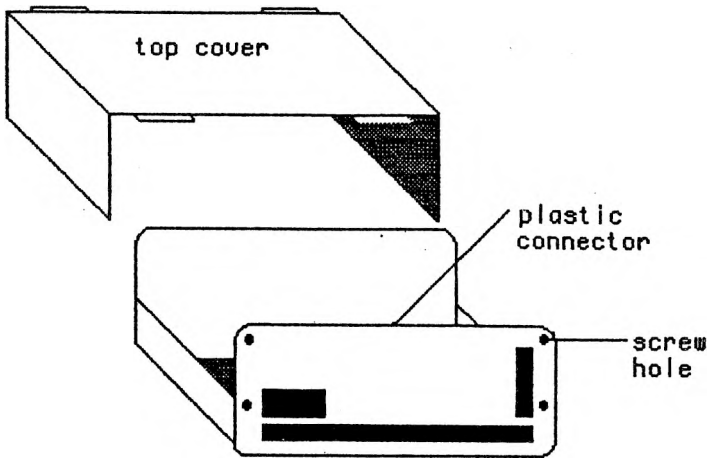


Figure 3-1: Rear View Orientation

Removing The Top Cover

- A. Slide the top cover back and disengage the front tabs.
- B. Lift the front of top cover above the front of the computer.
- C. Slide the top cover up and forward to fully remove the top cover from the computer.
- D. Set the top cover in a safe place to prevent accidental breakage.

Enabling the Battery Backup

If you have a CM or TOD series board you will want to enable the battery for the time of day clock calendar. This allows the battery backup to keep the clock/calendar circuits operational while power is off.

- A. Remove the plastic tube which insulates the battery holder terminals from the battery.

Check the Configuration Switches

Before inserting the board into the computer check the configuration switches on the C3-1000 against the proper switch setting you wrote down on your worksheet. If the switches are set properly proceed to the next step, otherwise reset the switches correctly and then go on to the next step.

Record Serial, Part, and Lot Numbers

Write your Serial, Part, and Lot numbers in the spaces provided below. You will need these for warranty registration and if you need to contact Valid Technologies regarding your board. The serial and part numbers are located on the lower left corner of your C3-1000 board. The lot number is located on the back of your board, on the top left side.

Serial Number _____

Part Number _____

Lot Number _____

3.3 INSERTING THE C3-1000 BOARD

Although the C3-1000 board may be inserted into any of the four Victor 9000 expansion slots, it is best to place the CM and TOD series boards into slot four. This is the slot closest to the outside of the system unit, away from the floppy disk drives as shown in Figure 3-2. The reason for using this slot is that it permits easy adjustment of the time of day clock/calendar.

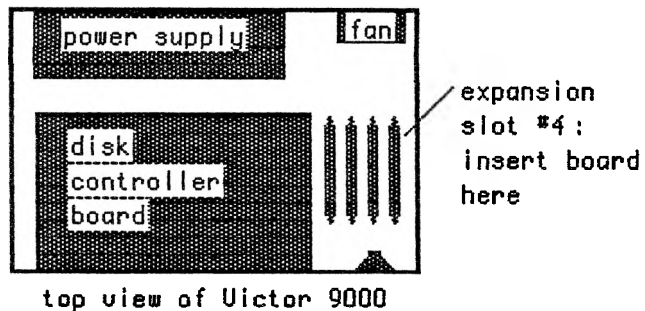


Figure 3-2: Computer System Slots

- A. If there is a plastic board spacer already in your system remove it by gently rocking and pulling up the end which is connected to the computer system.
- B. Select the slot in the motherboard into which you will place the C3-1000 board. Slot four (4) is recommended.
- C. Hold the board such that the memory side of the C3-1000 board is toward the front of the the computer system unit and the battery edge is toward the back. This will place the component side of the C3-1000 board to the outside of the computer as

shown in Figure 3-3. **IF YOU DO NOT PLACE THE BOARD IN PROPERLY YOU WILL RUIN YOUR BOARD AND PERHAPS YOUR SYSTEM UNIT.**

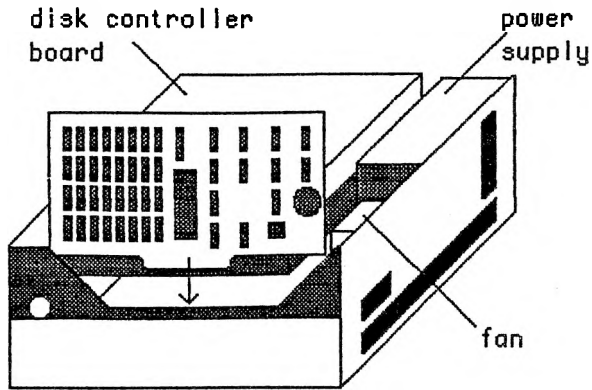


Figure 3-3: C3-1000 Board Orientation

- D. Insert the C3-1000 board into the selected slot by **gently** but firmly pushing it into the slot connector.

3.4 PUTTING THE SYSTEM BACK TOGETHER

After installing the C3-1000 board the system can now be put back together by following these simple instructions.

Check Your Work

Make sure all boards in the system unit expansion slots are firmly and evenly seated.

Install The Board Spacer

The board spacer will prevent the C3-1000 board and all other boards in the expansion slots from touching each other. This will help prevent accidental electrical contact between boards, or the board and the system chassis, which could damage either.

- A. Place the spacer over the boards and the metal chassis which holds the spacer in place.
- B. Gently push the spacer partially down into the metal chassis support.
- C. Move the top of the boards such that the top of each board fits into the proper slot of the spacer.
- D. Gently but firmly push the spacer the rest of the way down into the metal support and on top of the boards.

Replacing the Top Cover

The top cover may be replaced by reversing the removal instructions.

- A. Take the top cover from the safe storage space and orient it such that the air vents (slots which go all the way through the top cover) are toward the front of the system unit. This should place the large tabs

- of the top cover towards the front.
- B. Rock the back panel away from the computer such that there is about a one inch gap at the top.
- C. Align the sides of the top cover over the system unit.
- D. Slide the top cover back toward the back panel.
- E. Lower the front of the top cover and engage the front tabs of the top cover into the system unit by gently moving it forward.
- F. Move the top cover as far forward as possible. The top cover should now be resting in its proper position.

Replacing the Back Panel

- A. Tilt the back panel forward to engage the tabs on the back of the top cover.
- B. Press the top of the middle of the back panel to set the plastic connector.
- C. Replace the four screws. Gently tighten the screws as over tightening will strip the threads.

Replace the Monitor

- A. Take the monitor stand and place it on the top cover such that it fits onto the peg in the middle of the cover.
- B. Place the monitor on top of the stand.

Reattach the Power Cord

- A. Take the power cord which was unplugged from the back of the system unit and plug it back in. If you are installing a TOD series skip to Chapter 6: CLOCK/CALENDAR.

NOTES:

Chapter 4

TESTING THE INSTALLATION

It is now time to test the installation of the C3-1000 board. First the memory portion of the board will be tested for CM and M series boards. After this the clock/calendar portion of the board will be tested for the CM and TOD series boards.

4.1 MEMORY CHECKOUT

The memory of the C3-1000 CM and M series boards can be checked for proper installation by following the instructions below.

- A. Apply power to the system unit.
- B. Insert a system diskette into drive A:
- C. Close the door and boot the system. The boot process will now take longer due to the extra memory in the system.
- D. As the system is booted watch for the number which appears at the bottom of the middle of the screen.
- E. This number should match the number that you determined as your **new boot address**, listed on your Configuration Worksheet.

Results:

1. If the numbers match and the C3-1000 board is a CM series board then the memory portion of the board is functioning properly and the clock portion of the board may be tested next. Skip to Chapter 6: CLOCK/CALENDAR.
2. If the numbers match and you have an M series board, you have successfully installed your board. You may now place this manual in a safe place and proceed with your normal operations.
3. If the numbers do not match then continue with Section 4.2: Memory Trouble Shooting.

4.2 MEMORY TROUBLE SHOOTING

At this point there are five problems which may occur if the installation is not successful. These five problems are :

1. The system does not come up. There is nothing on the screen.
2. The system comes up with a **new boot address** less than the one noted on your worksheet.
3. The system comes up with a **new boot address** greater than the one noted on your worksheet.
4. The system comes partially up and locks up.
5. The system comes partially up and then reboots itself.

The causes of these problems and their solutions are discussed in five individual sections below. Please select the section with the problem you are experiencing and go through each cause and solution in the order given.

System Does Not Come Up

The probable causes and solutions to this problem are given below. In this case each of the probable causes can be eliminated by going to the back of the system.

SYMPTOM:

No display on the monitor. No disk access.

PROBABLE CAUSES:

- A. The power cord is not properly plugged into the system. Plug the power cord into the system unit. If this does not resolve the problem, go on to cause B.
- B. The system unit is not turned on. Turn on the system unit. If this does not resolve the problem, go on to cause C.
- C. The monitor is not properly plugged into the system unit. Plug the monitor into the system unit.

If this does not resolve the problem, see below.

If none of these solutions clear up the problem turn off the system and call Valid Technologies Technical Support (VTTS). (817) 467-0116

New Boot Address Is Less Than Expected

There are three probable causes and solutions to this problem.

SYMPTOM:

New Boot Address is less than expected or New Boot Address is the same as the Old Boot Address.

PROBABLE CAUSES:

- A. Improper determination of New Boot Address. Go back to section 2.2: DETERMINING THE NEW BOOT ADDRESS. Redo all procedures associated with determining the New Boot Address. If the recalculated number is the same then continue on to cause B.
- B. The C3-1000 board is not seated properly in the expansion slot. Turn off the computer system, remove the top cover, and press all boards firmly but gently into the expansion connector. Reboot the system. If the problem remains the same go on to cause C.
- C. The switches on the C3-1000 board are incorrectly set. Determine proper switch settings by reviewing the calculations in section 2.1: CONFIGURING THE C3-1000 BOARD. Once this has been done turn off the computer and remove the top cover and board spacer. Check the switch settings and reset the switch even if they are already set properly. Reboot the system. If the problem remains then turn off the computer and call Valid Technologies Technical Support (VTTS). (817) 467-0116

New Boot Address Is Greater Than Expected

There are only two potential causes and solutions to this problem. In this case the causes and solutions are simple.

SYMPTOM:

The New Boot Address is greater than expected.

PROBABLE CAUSES:

- A. Improper determination of New Boot Address. Return to section 2.2: DETERMINING THE NEW BOOT ADDRESS. Redo all procedures associated with determining the New Boot Address. If the recalculated address is the same then go on to cause B.
- B. The switches on the C3-1000 board are incorrectly set. Determine the proper switch settings by reviewing the calculations in section 2.1: CONFIGURING THE C3-1000 BOARD. Once this has been done turn off the computer, removing the top cover and board spacer. Check the switch settings and reset the switch even if they are already set properly. Reboot the system. If the problem remains then turn off the computer and call Valid Technologies Technical Support (VTTS). (817) 467-0116

The System Comes Partially Up Then Freezes

Call Valid Technologies Technical Support (VTTS). (817) 467-0116

The System Comes Partially Up With the Correct New Boot Address and then Reboots Itself

Call Valid Technologies Technical Support (VTTS). (817) 467-0116

NOTES:

Chapter 5

MEMORY EXPANSION

The C3-1000 board may be purchased without all of its memory array filled with memory chips. Memory may be added to the array at any time by inserting memory chips (available from your dealer or Valid Technologies) into the appropriate rows of sockets.

NOTE:

If you are going to be upgrading your own board, we **STRONGLY** recommend that you consider purchasing the memory diagnostic software that is available for this board. It will locate minor problems (such as improperly seated chips) which will cause the board **not to work**. This will save you the inconvenience of having to send the board back to us for minor repairs.

A Memory Expansion Worksheet is provided to assist you in the upgrade process. You may wish to make copies of it, keeping the original clean, as a 'backup'.

5.1 DETERMINING THE CHIP REQUIREMENTS

Acceptable Memory Chips

The following chip specifications are acceptable for use in the C3-1000 board.

1. Chips can be 150ns and/or 200ns. Chip speeds may be mixed between rows but we do not recommend mixing speeds within a row.
2. Acceptable 64Kb dynamic ram chips (Drams) are:

NEC	D4164C	
HITACHI	HM4864P-2	HM4864P-3
INMOS	IMS2600P-15	
MOTOROLA	MCM6665-15	
TOSHIBA	TMM4164P-2	TMM4264P-3

In general, any 4164, 150 or 200ns 64Kb Dram **without** pin one refresh. The refresh rate may be either 128 or 256 cycles (2 or 4 milliseconds).

3. Acceptable 256Kb Drams are any NEC, TOSHIBA, or HITACHI 41256 equivalent 150 or 200 ns.

Determining the Number of Chips Needed.

1. Write the **desired memory size** on the Memory Expansion Worksheet. Note that your **desired memory size** must be a multiple of 64KB and cannot exceed 896KB.
2. Write the **current memory size** on the Memory Expansion Worksheet. If you are unsure of the **current memory size**, take the **old boot address** listed on your configuration worksheet, and look it up in the conversion chart in Figure 5-1.

Old Boot Address	Current Memory Size
2000	128
4000	256
5000	320
6000	384
7000	448
8000	512
9000	576
A000	640
B000	704
C000	768
D000	832
E000	896

Figure 5-1: Conversion - Old Boot Address/Current Memory Size.

3. Subtract the **current memory size** from the **desired memory size**. Enter this number into the **memory upgrade required** on the Memory Expansion Worksheet.
4. Locate the **memory upgrade required** in Figure 5-2. Read across the chart to determine the number of rows of 64Kb and 256Kb chips, respectively required for the upgrade. Write the number of rows of each on your Memory Expansion Worksheet.

5. Each **row** contains **8** chips. To determine the number of chips needed, multiply the number of rows required by 8, for both 64kb and 256kb chips.

Example:

Memory Upgrade Required: 384

Chips needed:

2 **rows** of 64's = $2 * 8 = 16$ 64Kb Chips

1 **row** of 256's = $1 * 8 = 8$ 256KB Chips

Calculate the number of chips needed for your upgrade on the Memory Expansion Worksheet.

Memory Upgrade Required	Rows 64 Kb Drams	Rows 256 Kb Drams
0 KB	0	0
64	1	0
128	2	0
192	3	0
256	4	0
256	0	1
320	1	1
384	2	1
448	3	1
512	0	2
576	1	2
640	2	2
768	0	3

NOTE: Each ROW contains eight (8) Drams (chips).

Figure 5-2: Number of **Rows** of Chips Needed

5.2 INSTALLING THE CHIPS

WARNING

STATIC ELECTRICITY DESTROYS CHIPS. When working with your own chips in the C3-1000 Board, **be sure to ground yourself before handling the chips.** To assure that everything is properly grounded, lay a sheet of aluminum foil across your work surface. While **maintaining contact** (i.e. hand, elbow, finger) **with the foil**, place the boards and chips on the foil. Then insert the chips into their sockets. **Do not remove the board or body contact from the foil while inserting the chips.** Correctly following this procedure can save valuable time and money.

When populating the C3-1000 board, it is IMPORTANT that the memory chips be inserted first into row 0 (the row on the top of the board) and in ascending order thereafter. Any rows to be populated with 256K Drams must be placed in the rows before 64K Drams.

Note that the memory chips are very easy to install incorrectly. There is a notch on one end of the chips. When the chips are installed correctly, the notch will be up (away from the PCB connector) and correspond to the notch of the socket as in Figure 5-3. Verify the orientation of the added chips with those already installed on the board. Any chips installed backwards will be **destroyed** when power is applied to the system.

Insert the memory chips into the sockets, one at a time. **Gently** press each chip into its socket. Be very careful not to bend any of the small metal legs. They can easily bend under the chip or out from the socket. If you plan on working with the chips frequently, you may wish to consider obtaining a small chip insertion tool, available at electronic shops (i.e. Radio Shack)

When all of the chips have been installed into the rows,

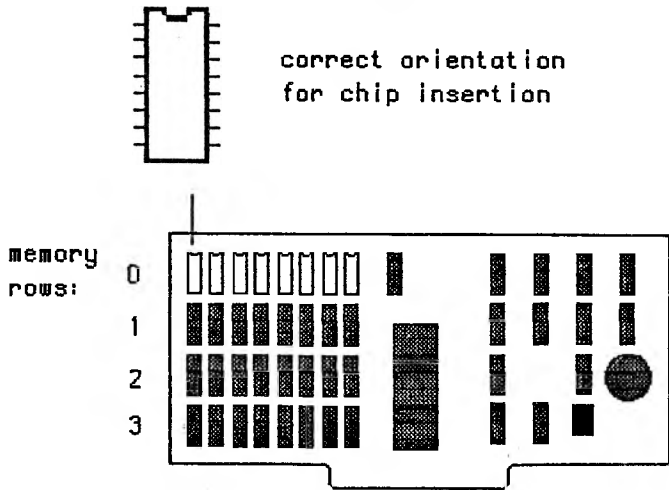


Figure 5-3: Correct Orientation for Chip Insertion

set up the system for the current (upgraded) total amount of memory installed as explained in Chapters 2 and 3.

5.3 TESTING THE UPGRADE

If you have the memory diagnostic program, configure the memory board portion of the test to the new memory board configuration and run the memory diagnostic program with the C3-1000 installed. Any chips which show up on the diagnostic results as bad are most probably chip insertion errors. Write down the locations (row and column) of any such chips and check for bent pins on these chips, upside-down insertion, or chip seating problems.

If you do not have the memory diagnostic return to Chapter 4: TESTING THE INSTALLATION.

Valid Technologies cannot accept any boards for warranty repair or replacement that have user supplied memory chips installed.

NOTES:

Chapter 6

CLOCK/CALENDAR

The C3- 1000 Clock/Calendar is a battery operated real time clock that may be used to set the system Date and Time when the system is turned on. It also provides a higher resolution clock than the standard MSDOS clock. There are two programs provided on diskette for this purpose. The program which is used to set and read the clock is VT-CLK. The second program, VT-ICLK, is a program which will initialize the MSDOS system clock.

6.1 PREPARATION

Verifying The Clock Utilities Diskette

Before attempting the C3-1000 Clock/Calendar software installation first verify that the diskette can be read and contains the Clock/Calendar utility files. This can be done by following the instructions below where the symbol (CR) stands for carriage return.

- A. Boot the system on disk drive A:
- B. Place the VT-CLOCK Clock/Calendar utility diskette into drive B.
- C. Type the command:

DIR B: (CR)

- D. The files listed below should be on the diskette.

- README.1ST** — Information on other files on the diskette that may not be on this list.
- VT-ECLK.EXE** — Read/Set Clock/Calendar utility European Display (DD/MM/YY - HR:MN:SS.S)
- VT-ACLK.EXE** — Read/Set Clock/Calendar utility. American Display: (MM/DD/YY - HR:MN:SS.S)
- VT-LCLK.EXE** — Read/Set Clock/Calendar utility Logical Display: (YY/MM/DD - HR:MN:SS.S)
- VT-ICLK.EXE** — Set MSDOS clock utility.
- VT-CLOCK.BAT** — Batch file for doing a MODCON and invoking the Clock/Calendar Read/Set utility VT-CLK.
- VT-KEYS.KB** — Special Keyboard for use with VT-CLK editing.

Making Clock Utilities Copies

The original diskette should be copied to another diskette and the original diskette used as a backup. This can be done following the steps given below. In the instructions below it is assumed that the system is booted under MSDOS and at the MSDOS command level. The symbol (CR) stands for carriage return.

A. Type the following command: (to set the default drive to A)

A: (CR)

B. Place the original VT-CLK diskette into drive B: and close the drive door.

C. Place the diskette you want to copy to into drive A: and close the drive door.

D. Type the following command: (to copy the clock files to diskette A)

COPY B:*.*(CR)

E. To make copies on other diskettes repeat steps C and D. When you are finished remove the original VT-CLK diskette from drive B.

Place the original VT-CLK diskette in a safe place and use as a backup.

Choosing the Clock/Calendar Display

1. Choose your preferred Clock/Calendar display from Figure 6-1. Circle the corresponding label.

DAY MONTH YEAR	DAY OF WEEK	HR. MN. SEC.
DD MM YYYY	DOW	HR:MN SS.S

European Display: **VT-ECLK**

YEAR MONTH DAY	DAY OF WEEK	HR. MN. SEC.
YYYY MM DD	DOW	HR:MN SS.S

Logical Display: **VT-LCLK**

MONTH DAY YEAR	DAY OF WEEK	HR. MN. SEC.
MM DD YYYY	DOW	HR:MN SS.S

American Display: **VT-ACLK**

Figure 6-1: Clock/Calendar Display Options

2. Set your utility diskette as your default drive.
3. Rename that preferred file to VT-CLK as follows:

ren (preferred filename).EXE **VT-CLK.EXE** (CR)

6.2 VT-CLK

To properly use VT-CLK the system utility MODCON must be on the diskette which contains VT-CLK.EXE and VT-CLOCK.BAT. VT-CLOCK.BAT makes use of this utility to change the keyboard used with VT-CLK. If MODCON is not on the diskette containing the clock utilities copy it there now. If you are unsure how to copy a file, consult your operator reference manual.

1. To verify that the VT-CLK is on the default diskette, type:

DIR VT-CLK.* (CR)

2. Type the command:

VT-CLOCK (CR)

The screen should now look like Figure 6-2.

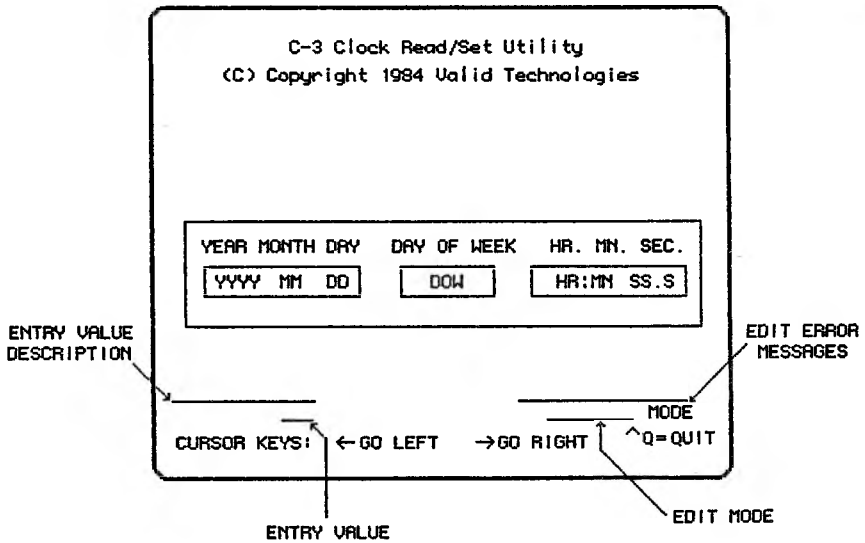


Figure 6-2: VT-CLK Read/SET Screen

VT-CLK Screen

The VT-CLK screen (Figure 6-2) consists of a number of different areas. The area in the middle center of the screen is the dynamic Date/Time display. The display cursor can select any of the display values to change except DOW (Day Of Week) and .S (Tenths of seconds). Below the display area is the edit area. It is in this area where all changes to the display are first made.

The dynamic Date/Time display area consists of the following display data.

Display Data	Definition	Valid Range of Values
YYYY	Years	1980..2099
MM	Months	1..12
DD	Day	1..31 depending on month
DOW	Day Of Week	Automatically calculated and set
HH	Hour	0..23
MN	Minute	0..59
SS	Seconds	0..59
S	Tenths of seconds	Automatically set to .0

The edit area consists of five different message/value regions. They are defined as follows:

Edit Region	Definition
ENTRY VALUE DESCRIPTION	Detailed description of the value being edited.
EDIT ERROR	Edit error messages. There are two edit error messages. Invalid Entry: Value entered is out of range. Out Of Editing Limit: Edit cursor backed up out of edit region.
ENTRY VALUE	Value of edited display data.
EDIT MODE	Mode the editor is in. There are three modes which may be used : Clear, Overtyp, or Insert. Clear Mode is the only mode needed.
CURSOR LINE	States that the cursor keys are used to move the display/edit cursor left and right. ALT Q is used to quit the VT-CLK utility.

VT-CLK Keyboard Operations

The VT-CLK utility uses a special keyboard for editing the entries presented by the utility. The keys which may be used for editing are :

CURSOR KEYS :

- Left Cursor - moves the entry selection cursor to the left in a circular fashion.
- Right Cursor - moves the entry selection cursor to the right in a circular fashion.
- Up Cursor - moves the entry selection cursor to the left in a circular fashion.
- Down Cursor - moves the entry selection cursor to the right in a circular fashion.

SHIFT WORD LEFT - Increments the ENTRY VALUE selected by the cursor by one.

SHIFT WORD RIGHT - Decrements the ENTRY VALUE selected by the cursor by one.

BACKSPACE - Deletes the character at the position to the left of the edit cursor of the ENTRY VALUE.

DEL - Deletes the character at the position of the edit cursor of the ENTRY VALUE.

ALT Q - Pressing the ALT key down and the Q key down together will terminate the operation of the VT-CLK program.

VT-CLK Operations

A. Cursor Key Operations

When using the cursor keys it is important to note that the day of week (DOW) and tenths of seconds (.S) cannot be selected. The reason for this is that the day of week is automatically calculated and tenths of seconds cannot be set on the Clock/Calendar.

B. Setting of Seconds

Tenths of seconds are always set to zero by the clock/calendar chip when changes are made to the time.

VT-CLK Error Messages

There are four error messages associated with the VT-CLK utility. The messages and causes are listed below.

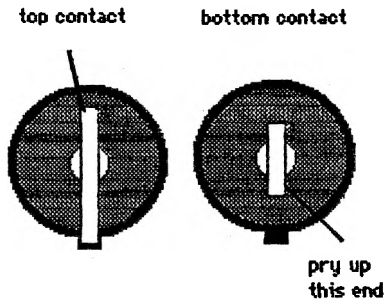
1. ERROR IN READING THE CLOCK.

REASON:

The Clock/Calendar has been read ten times and a read error has occurred each time.

PROBABLE CAUSES:

- A. The bottom contact of the battery holder is not touching the battery. Remove the battery. Take a small screwdriver and bend the bottom contact of the battery up slightly (see Figure 6-3), being careful not to break the contact.
- B. The battery is too low on power to operate the clock while the computer is turned off. Replace the battery with any lithium coin type 3 volt battery of the correct size. (i.e. Matsushita BR2325)
- C. The Clock/Calendar chip is not installed in the C3-1000 board. Call Valid Technologies for a Clock/Calendar upgrade kit.
- D. The Clock/Calendar chip is not being addressed properly. Call Valid Technologies Technical Support (VTTS). (817) 467-0116
- E. The Clock/Calendar chip is not functioning properly. Call VTTS. (817) 467-0116



Top Down View of Battery Holder

Figure 6-3: Battery Contacts

6.3 VT-ICLK.

Setting the Clock Upon System Boot

VT-ICLK is intended to be used to set the MSDOS clock upon system boot. To accomplish this:

1. Create an AUTOEXEC.BAT file on the system diskette with an editor. If you are unsure how to do this, consult your operator reference guide for your editor.
2. Place into this file the line "VT-ICLK", without the double quotes. Then exit the editor.
3. Copy VT-ICLK.EXE to the system diskette if it is not already there.

The next time the system is booted from this diskette the MSDOS clock will automatically be set to the time and date of the Clock/Calendar.

VT-ICLK Error Messages

1. CLOCK NOT INSTALLED OR NOT OPERATIONAL

This is the only error message which will be generated by VT-ICLK.

REASON:

VT-ICLK read invalid data from the Clock/Calendar more than 10 times.

PROBABLE CAUSES:

- A. The bottom contact of the battery holder is not touching the battery. Remove the battery. Take a small screwdriver and bend the bottom contact of the battery holder up slightly, being careful not to break the contact. See Figure 6-3.
- B. The battery is too low on power to operate the clock while the computer is turned off. Replace the battery with any lithium coin type 3 volt battery of the correct size.
- C. The Clock/Calendar chip is not installed in the C3-1000 board. Contact Valid Technologies for a Clock/Calendar upgrade kit.
- D. The Clock/Calendar chip is not being addressed properly. Call Valid Technologies Technical Support (VTTS). (817) 467-0116
- E. The Clock/Calendar chip is not functioning properly. Call (VTTS). (817) 467-0116

6.4 CLOCK TROUBLE SHOOTING

There are two problems that may occur with the Clock/Calendar:

1. The clock runs too fast or too slow.
2. The Clock/Calendar does not keep correct time/date when the machine is turned off.

Solutions to these problems are as follow:

Clock Runs Too Fast or Too Slow

SYMPTOM:

While the machine is turned on, the Clock/Calendar time is either faster or slower than expected.

PROBABLE CAUSES:

- A. This is usually a result of the Trimmer Capacitor being out of adjustment. If the clock/calendar is running too fast, turn the Trimmer Capacitor **counter-clockwise** (in approximately 1/8 turn increments). This should **slow down** the clock. If the Clock/Calendar is running slow, turn the Trimmer Capacitor **clockwise**. This should **speed up** the clock. See Figure 6-4

NOTES:

1. When adjusting the Trimmer Capacitor, use a screwdriver with a **plastic** blade and handle. (A **plastic** bladed screwdriver may be purchased at Radio Shack). Use of a screwdriver with a metal blade can **destroy** the Clock/Calendar Circuit.
2. The C3-1000 diagnostic utilities offer a means of determining the accuracy of the C3-1000 clock versus the MS-DOS clock. They are available from your dealer or Valid Technologies.

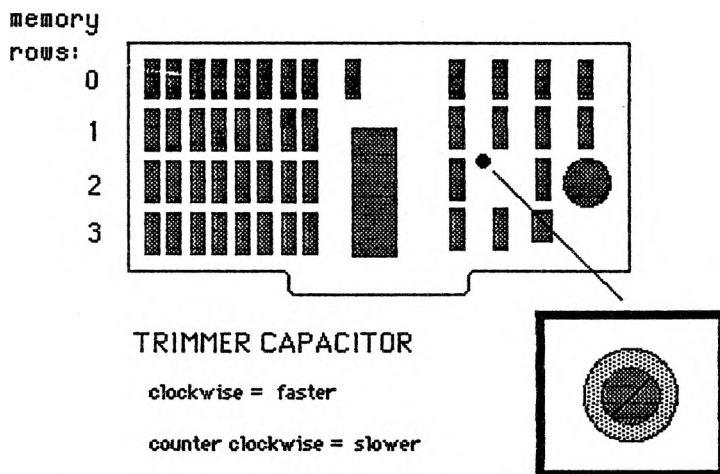


Figure 6-4: Trimmer Capacitor Adjustment

The Clock/Calendar does not keep correct time/date when the machine is turned off.

SYMPTOM:

Upon system boot, the time and date are not correct.

PROBABLE CAUSES:

- A. The bottom contact of the battery holder is not touching the battery. Remove the battery. Take a small screwdriver and bend the bottom contact of the battery up slightly, being careful not to break the contact.
- B. The battery is too low on power to operate the clock while the computer is turned off. Replace the battery with any lithium coin type 3 volt battery of the correct size.
- C. The Clock/Calendar chip is not functioning properly. Call Valid Technologies Technical Support (VTTS). (817) 467-0116

NOTES:

Chapter 7

CLOCK/CALENDAR PROGRAMMER'S INFORMATION

The information presented in this chapter is for those individuals wishing to access the Clock/Calendar with their own programs. This will allow the programmer to obtain time information down to a tenth of a second and up to the year.

7.1 CLOCK/CALENDAR REGISTERS

Writing and reading the Clock/Calendar Registers can be accomplished in any language the user so desires. In assembler the writes and reads take place as standard assembler MOV's. In BASIC, PEEK and POKE can be used after using the appropriate DEF SEG statement. In ADA and Pascal the writing and reading occur as value assignments. There are no special timing considerations with the exception that all Time and Date Registers must be read out within a 100 millisecond period. This is due to the fact that the Clock/Calendar is updated at 100 millisecond increments.

The Clock/Calendar has 17 different registers which can be accessed to control Clock/Calendar operations. The address decodings for the Clock/Calendar registers are shown in Figure 7-1.

Address	Function	Read/Write	Remarks
FFFF0	Control Register	Split Read/Write	Read - Data Change Flag Interrupt Flag Write - Mode Clock Stop/Start Register Select Interrupt Stop/ Start
FFFF1	Tenths of Seconds	Read Only	0..9 - Automatically set to zero upon Clock Stop/Start
FFFF2	Units of Seconds	Read/Write	0..9
FFFF3	Tens of Seconds	Read/Write	0..9
FFFF4	Units of Minutes	Read/Write	0..9
FFFF5	Tens of Minutes	Read/Write	0..9
FFFF6	Units of Hours	Read/Write	0..9
FFFF7	Tens of Hours	Read/Write	0..9
FFFF8	Units of Days	Read/Write	0..9
FFFF9	Tens of Days	Read/Write	0..3
FFFA	Units of Months	Read/Write	0..9
FFFB	Tens of Months	Read/Write	0..1
FFFC	Units of Years	Read/Write	0..9
FFFD	Tens of Years	Read/Write	0..9
FFFE	Day of Week	Read/Write	1..7
FFFF	Multifunction	Read/Write	Clock/Interrupt Setting Register

Figure 7-1 : Clock/Calendar Address Decoding

Control Register : EFFF0

The Control Register is used for different functions depending upon whether it is being read or written. It, like all of the other registers on the Clock/Calendar, has four bits. The bit definitions for the control register are given in Figure 7-2.

	Data Bit	Data Bit	Data Bit	Data Bit
Access	3	2	1	0
Read	Data Changed Flag	0	0	Interrupt Flag
Write	Mode	Clock Stop/Start	Register Select	Interrupt Stop/Start

Figure 7-2 : Control Register Bit Definitions

These data bits have meanings as follows.

Read Access

Data Changed Flag -

- 0 The Clock/Calendar registers have not been updated since the last time the control register was read.
- 1 The Clock/Calendar registers have changed since the last time the control register was read.

Note :

This bit is always reset (set to 0), after the Control Register has been read.

Interrupt Flag -

- 0 Interrupt has not occurred since the last time the register was read.
- 1 Interrupt has occurred since the last time the register was read.

Note :

The Interrupt Flag and the interrupt output are both cleared by a read of the Control Register.

Write Access

Mode -

- 0 Place the Clock/Calendar into normal operational mode.
- 1 Place the Clock/Calendar into test mode.

Clock Start/Stop -

- 0 Start the Clock/Calendar running.
- 1 Stop the Clock/Calendar.

Note :

A stop followed by a start will reset tenths of seconds to zero.

Register Select -

- 0 Select the Clock Setting Register.
- 1 Select the Interrupt Setting Register.

Interrupt Stop/Start -

- 0 Start interrupt generation.
- 1 Stop interrupt generation.

Time and Date Registers : EFFF1-EFFF6

All of the Time and Date registers are full read/write registers with the exception of the one at address EFFF1, which is read only. Some considerations to be given when programming the Clock/Calendar are as follows.

- A. The valid values are held in the lower nibble of the byte accessed. Although the individual digits have valid values as given in Figure 7-1 the individual values which have special two digit meanings are given below.

1. Seconds - 0..59
2. Minutes - 0..59
3. Hours - 0..23 or 0..12 depending upon 24 or 12 hour mode.
4. Days - 1..31
5. Months - 1..12
6. Years - 0..99

The Clock/Calendar does not recognize improper setting of values and as such the software used in setting the Clock/Calendar should be written to check for proper values.

- B. Stopping and re-starting the Clock/Calendar automatically sets tenths of seconds to zero (.0).
- C. The Interrupt Control Register is NOT used by VT-CLK. It cannot be used to generate an interrupt to the processor.
- D. Day of the week (DOW) setting is arbitrary. The Clock/Calendar does not set DOW itself. The software must set this value. VT-CLK uses 1 to represent Sunday. VT-ICLK does not use DOW.

Multifunction Register : EFFFF

The Multifunction Register is actually two different registers. The register in use is selected by Control Register Data Bit One. When this bit is 0 the Clock Setting Register is chosen. Figure 7-3 gives the Clock Setting Register bit definitions.

	Data Bit	Data Bit	Data Bit	Data Bit
Access	3	2	1	0
Read/Write	Leap Year	Counter	AM/PM	24/12 Hour

Figure 7-3: Clock Setting Register Bit Definitions

These data bits have meanings as follows.

Leap Year Counter -

The leap year counter is two of the four data bits.

Data bits 2 and 3 are used for this counter.

0 Indicates a leap year.

1 Indicates one year after a leap year.

2 Indicates two years after a leap year.

3 Indicates three years after a leap year.

AM/PM -

0 Indicates AM

1 Indicates PM

Note :

When the Clock/Calendar is set to 24 hour mode this indicator is set to zero.

- 24/12 Hour Mode -
- 0 Indicates 12 Hour Mode.
 - 1 Indicates 24 Hour Mode.

NOTE :

The 24/12 Hour Mode and AM/PM cannot be programmed at the same time. The Hour mode must be set first and then the AM/PM indicator set.

When Control Register Data Bit One is 1 then the Interrupt Setting Register is chosen. Although interrupts are not enabled for the C3-1000 board the indication of an interrupt occurrence can be gained through polling the Control Register Data Bit Zero. The definition of the Interrupt Setting Register bits is given in Figure 7-4.

NOTES :

- 1) For DB3 -
 - X indicates a DON'T care (either a 0 or a 1)
 - 0/1 0 - for a single interrupt.
 - 1 - for repeated interrupts.
- 2) The timing accuracy for both single and repeated interrupts is plus or minus one millisecond (i.e. timing errors do not accumulate).

Function	DB3	DB2	DB1	DB0	Remarks
No Interrupt	X	0	0	0	Interrupt output cleared, Control Register Data Bit Zero set to 1.
0.1 Second	0/1	0	0	1	One tenth second interrupt period.
0.5 Second	0/1	0	1	0	One half second interrupt period.
1.0 Second	0/1	0	1	1	One second interrupt period.
5.0 Second	0/1	1	0	0	Five second interrupt period.
10.0 Second	0/1	1	0	1	Ten second interrupt period.
30.0 Second	0/1	1	1	0	Thirty second interrupt period.
60.0 Second	0/1	1	1	1	Sixty second interrupt period.

Figure 7-4: Interrupt Setting Register Bits

7.2 SETTING THE CLOCK/CALENDAR

The proper sequence for initializing the Clock/Calendar is given below.

1. Disable the interrupt on the Clock/Calendar by writing a hexadecimal 0F into the Control Register (address EFFF0).
2. Write 0 to the Interrupt Setting Register (EFFFF). This register was selected by writing a one in Control Register Data Bit One.
3. Write 5 to the Control Register (EFFF0). This selects the Clock Setting Register.
4. Write 0 or 1 to the Clock Setting Register (EFFFF) to select either 12 or 24 hour mode of clock operations.
5. Write the Time and Date Registers (EFFF1-EFFFE) to initialize them to the appropriate time and date.
6. Write the appropriate value to the Clock Setting Register (EFFFF) to set the leap year value and AM/PM indicator. Data Bit One MUST be set to the same value as it was in step 4.
7. Write E to the Control Register to start the Clock/Calendar without starting interrupts.

7.3 READING THE CLOCK/CALENDAR

After the Clock/Calendar has been initialized it may be read using three easy steps.

1. Read the Control Register (EFFF0). This is a dummy action to reset the Data Changed Flag prior to reading the Time and Date Registers.
2. Read the Time and Date Registers. All Time and Date Registers should be read out in a block with as little time delay between different registers as possible.
3. Read the Control Register and test the Data Changed Flag. If the flag is zero then the data read are good. If the flag is one then a clock setting pulse occurred during the read and steps 2 and 3 should be repeated until a zero is obtained.

NOTES:

APPENDIX

WARRANTY INFORMATION

Your C3-1000 board is warranted against defects in material and workmanship for a period of one year from the date of purchase. We will repair or replace (at our option) any board that proves defective during the warranty period, provided the defective board is returned to Valid Technologies shipping prepaid. Your dated sales receipt or invoice is your proof-of-purchase. Before returning any board for repair, contact our repair department at 817-467-0116 for a Return Authorization Number. No boards will be accepted for repair without a Return Authorization Number. **Memory chips not provided by Valid Technologies are not covered by this warranty.**

No other warranty is expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular application. Valid Technologies will not be responsible for any damages consequential to the use or installation on any of company's products. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. We reserve the right to refuse warranty repair on any board that, in our opinion has been subjected to any abnormal electrical, mechanical, or environmental abuse. To assure coverage under this warranty, return your warranty registration to Valid Technologies within 15 days of delivery of the product.

We cannot honor warranties if the product is not registered within 15 days of receipt

NOTES:

Machine B

CONFIGURATION WORKSHEET

Memory Configuration 2

Old Boot Address 256Kb = 4000
Start Address

Switch Settings:

CA3 OFF
CA2 OFF
CA1 ON
CA0 ON

Board

Memory Size 640Kb = A000

New Boot Address 896Kb = E000

NOTES:

Machine A

CONFIGURATION WORKSHEET

Memory Configuration 3

Old Boot Address 128kb = 2000
* Start Address

Switch Settings:

CA3 off

CA2 off

CA1 off

CA0 on

Board

Memory Size 768kb = C000

New Boot Address 896kb = E000

NOTES:

Machine B

MEMORY EXPANSION WORKSHEET

Desired Memory Size 896 Kb

Current Memory Size 256 Kb

Memory Upgrade Required 640 Kb

Chips Needed:

$$\underline{2} \text{ rows of } 64\text{'s} * 8 = \underline{16} \text{ 64Kb Chips}$$

$$\underline{2} \text{ rows of } 256\text{'s} * 8 = \underline{16} \text{ 256Kb Chips}$$

NOTES:

Machine A

MEMORY EXPANSION WORKSHEET

Desired Memory Size 896Kb

Current Memory Size 128Kb

Memory Upgrade Required 768Kb

Chips Needed:

 rows of 64's * 8 = 64Kb Chips

3 rows of 256's * 8 = 24 256Kb Chips

NOTES:

**VALID TECHNOLOGIES
PROBLEM REPORT**

Product _____
Part No. _____
Serial No. _____
Date Purchased _____
Where _____
Name _____
Company _____
Address _____
City _____
State/Zip _____
Phone () _____

(please turn over)

PROBLEM DESCRIPTION:

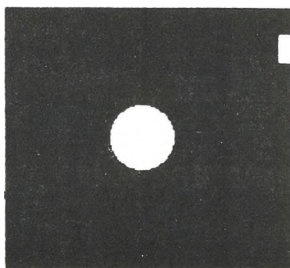
Please describe the problem as concisely as possible. To be sure of proper handling, include all information concerning the exact circumstances around which the problem was experienced. You will be contacted by our Technical Support personnel to help resolve the problem.

Attach additional comments/documentation as necessary.

C3-1000

memory board

Diagnostics



(817) 261-0998

Valid Technologies

(817) 467-0116

~~4021 Glenbrook Dr.~~ Arlington, TX ~~76015-4008~~

1401 Pioneer Parkway West, Suite 107 76013-0251

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revised 5/85

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C3-1000 DIAGNOSTICS

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CHAPTER 1

INTRODUCTION

The C3-1000 Diagnostics are provided for the user of the C3-1000 board who intends to upgrade the board on site and may encounter faulty chips. Additionally, the diagnostics offer comprehensive test capabilities to the user, testing both the Memory and Clock/Calendar circuitry.

1.1 SYSTEM REQUIREMENTS

Both the the memory and clock diagnostics are designed to operate on a standard 128KB system with either MSDOS 1.25 or 2.11.

The amount of memory required to run the diagnostic utilities is as follows:

C3-CLKD : 17 KB
C3-MEMD : 80 KB

The relatively large runtime area needed for the memory diagnostic is due to its relocating ability.

1.2 PREPARATION FOR USE

When using the C3-1000 diagnostics for the first time, complete the following procedures.

Verify the C3-1000 Diagnostic Diskette

Before attempting to use the C3-1000 Diagnostics, verify that the diskette can be read and contains the C3-1000 Diagnostic utility files. This can be done by following the instructions below where the symbol (CR) stands for carriage return.

1. Boot the system on disk drive A:
2. Place the C3-1000 Diagnostic utility diskette into drive B.
3. Type the following command:

DIR B: (CR)

D. The files listed below should be on the diskette.

- C3-MEMD.BAT — Memory diagnostic batch file
- C3D-MEM.EXE — Memory diagnostic program.
- C3-MEMN.EXE — Memory diagnostic configuration program.
- C3-MEMN.HLP — Memory diagnostic main screen help files.
- C3-MEMD.CHR — Memory diagnostic character set.
- C3-MEMD.KB — Memory diagnostic keyboard.
- C3-CLKD.BAT — Clock diagnostic batch file.
- C3D-CLK.174 — Clock diagnostic file.
- C3D-CLK.274 — Clock diagnostic file.
- C3-CLKD.KB — Clock diagnostic keyboard.

If any of the above files are not on your diagnostic diskette, call Valid Technologies to arrange for a replacement.

Load the Chip Specific Clock Diagnostic

Due to differing clock chips, the following procedure must be completed to ensure correct operation of the diagnostics.

1. Locate the clock chip on your memory board (see Figure 1-1). Determine the chip type by the number printed on the chip. It will be either MM58174 or MM58274. The type is determined by the last three numbers on the chip. Write the number in the space below the figure.

chip type MM58274 N

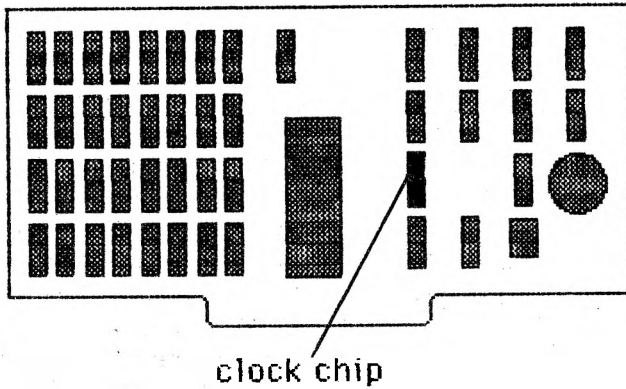


Figure 1-1: Clock Chip Location

2. To make the clock diagnostic an executable file, copy the appropriate clock diagnostics file as follows:

Type:

**COPY C3D-CLK.(last three digits of chip #)
C3D-CLK.EXE (CR)**

i.e. (diagnostics located on drive B):

COPY B: C3D-CLK.174 C3D-CLK.EXE

If this procedure is not completed, the clock diagnostics will not work correctly.

3. If you have the 274 clock chip, insert the pages provided in Appendix B, into your manual. Discard the pages that are replaced. *Completed 24 Sept 1985*

Make C3-1000 Diagnostic Utilities Copies

The diagnostic utilities should be copied to another diskette and the original diskette used as a backup. This can be done following the steps given below. In the instructions below, it is assumed that the system is booted under MSDOS and is at the MSDOS command level. The symbol (CR) stands for carriage return.

1. Type the following command (to set the default drive to drive A:).

A: (CR)

2. Place the original C3-1000 Diagnostic diskette into drive B and close the drive door.
3. Place the diskette you want to copy to into drive A and close the drive door.
4. Type the following command (to copy the diagnostic files to diskette A.)

COPY B:*. * A: (CR)

5. To make copies on other diskettes repeat steps 3 and 4. When you are finished, remove the original C3-1000 Diagnostic diskette from drive B.

Place the original C3-1000 Diagnostic diskette in a safe place and use as a backup.

Modcon

To properly use C3-1000 Diagnostics, the system utility **MODCON** must be on the diagnostic diskette. **C3-MEMD.BAT** and **C3-CLKD.BAT** make use of this utility to change the keyboard used with the C3-1000 Diagnostics. **C3-MEMD.BAT** also changes the system character set and is needed for proper display of the memory diagnostic edit screens. If **MODCON** is not on the diskette containing the clock utilities, complete the following steps.

1. Load your original MSDOS system diskette into drive A.
2. Type the command:

DIR A: MODCON.EXE (CR)

If **MODCON** is on your system diskette, the computer will respond with the following:

MODCON EXE (size) (date) (time)

If **MODCON** is not on your system diskette, you need to check all the diskettes that came with your system to locate it.

3. Once you have located **MODCON**, replace your system diskette with the one containing **modcon** in drive A. Copy **modcon** to your diagnostics diskette by typing the command:

COPY A: MODCON.EXE B: (CR)

Modcon will now be on your diagnostic diskette. Verify this by typing the **dir** command for your diagnostic diskette.

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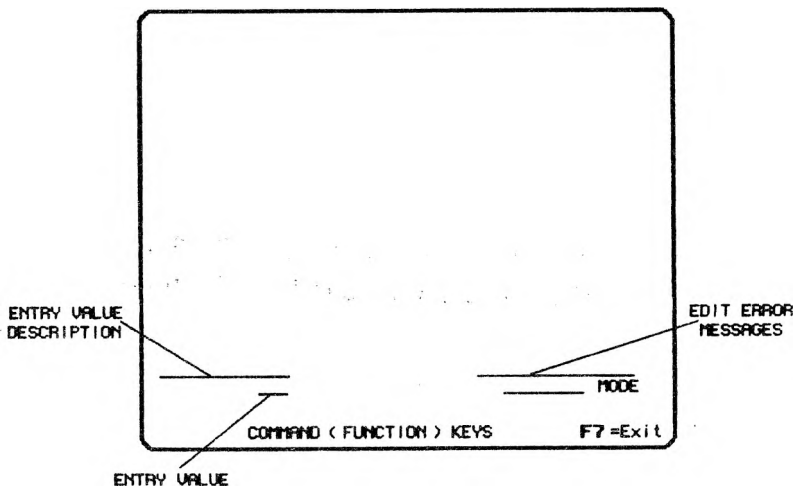


Figure 1-2: Generic Edit Screen

1.3 GENERIC EDIT SCREEN

When the C3-1000 Diagnostics are invoked, the parameter values which control the diagnostic tests must be edited. The C3-1000 Diagnostics utilize a 'generic' edit screen for all editing. This Generic Edit Screen (Figure 1-2) contains a three line edit display. The memory diagnostics use all three lines. The C3-1000 Clock Diagnostics use only the bottom line, also referred to as the **command line**.

Edit Field Descriptions

The generic three line edit area consists of five different message/value fields. They are as defined below.

<u>Edit Field</u>	<u>Definition</u>
ENTRY VALUE DESCRIPTION	Verbal description of the value being edited.
EDIT ERROR MESSAGES	There are two edit error messages. 1. Invalid Entry - The value entered is out of range. 2. Out Of Editing Limit - The edit cursor has backed out of ENTRY VALUE edit region.
ENTRY VALUE	Value of the edited display data.
EDIT MODE	Mode the editor is in. There are three modes which can be used: Clear, Overtyp, or Insert. Clear Mode is the only mode needed.
COMMAND LINE	Displays the valid command keys which can be used for the edit display. These keys normally consist of function keys or ALT keys.

1.4 C3-1000 DIAGNOSTIC KEYBOARD OPERATIONS.

The C3-1000 Diagnostic Utilities use a special keyboard for editing the test parameters. The keys which may be used for editing are :

CURSOR KEYS :

- Left Cursor - moves the entry selection cursor to the LEFT in a circular fashion.
 - Right Cursor - moves the entry selection cursor to the RIGHT in a circular fashion.
 - Up Cursor - moves the entry selection cursor UP in a circular fashion.
 - Down Cursor - moves the entry selection cursor DOWN in a circular fashion.
- SHIFT WORD LEFT - Increments the ENTRY VALUE selected by the cursor by one.
- SHIFT WORD RIGHT - Decrements the ENTRY VALUE selected by the cursor by one.
- BACKSPACE - Deletes the character at the position to the left of the edit cursor of the ENTRY VALUE.
- DEL - Deletes the character at the position of the edit cursor of the ENTRY VALUE.
- F7 - Pressing the Function key **F7** terminates the operation of the diagnostic utility.

1.5 HELP FACILITIES

Both the C3-1000 Memory Diagnostics and Clock/Calendar Diagnostics come with on-line help facilities. Both the menu screens and the edit screens will have associated help screens. The menu help screens will in general give an overview of the diagnostic and information regarding the menu choices. The edit help screens will give information regarding the particular parameter on which help was requested.

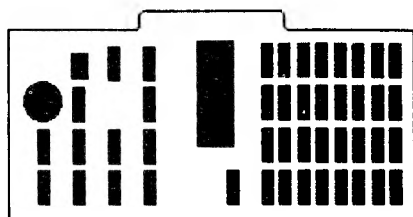
There are four keys used when working with help screens. These keys are:

- F6** : Displays the first help screen associated with a menu or edit text screen.
- (CR)** : Carriage return, returns from the help text display to the associated menu or edit screen.
- (↑)** : Cursor Up - displays the previous help screen.
- (↓)** : Cursor down - displays the next help screen.

NOTES:

- 1) The help screen will be displayed in a circular fashion when using the cursor keys.
- 2) The help screen command line will give the list of valid help keys which can be used.

NOTES:



**DIAGNOSTICS
MEMORY**

PART I

NOTES:



Chapter 2

MEMORY DIAGNOSTICS

OVERVIEW

Chapter 2 introduces the reader to the memory diagnostics. It presents a brief overview of the tests available, the various screens, the steps involved in using the diagnostics, the actual test operations, and the test results.

Tests

The C3-1000 Memory Diagnostics consist of two major tests: the Segment Write Read Test and the Continuous Byte Write Read Test.

The **Segment Write Read Test** is primarily used for isolating malfunctioning memory chips. It may also indicate other malfunctioning parts, such as the configuration address switch (dip switch). There are four basic types of tests, each with a long and short version.

The **Continous Byte Write Read Test** is used primarily for board troubleshooting. It enables the computer to continually access a specific memory location in either a Write, Read, or Write/Read mode. When appropriate test equipment is connected to the board, board signals can be monitored to determine whether or not certain board components are functioning properly.

Edit Screens

The C3 memory diagnostics are accessed through the use of four primary edit screens. The four screens are:

1. C3 Memory Test Utility (Main Menu)
2. Board Configuration
3. Segment Write/Read Test Parameters
4. Continuous Byte Write/Read Test Parameters

NOTE:

At any time an **F6** may be entered for these screens and help files will be displayed on the screen. See Section 1.5: HELP FACILITIES, for explanation of the help facilities.

Steps

The memory diagnostics are normally used in the following manner.

1. The board configuration for the system to be tested is defined using the Board Configuration screen. It allows for up to four memory expansion boards plus main board (mother board) memory. The rows may be populated with either 64 K or 256 K chips. Empty rows are set to zero (0).
2. The tests to perform are then selected from either of the two major types of comprehensive memory tests. The first is a Segment Write/Read test which offers a selection of four different memory tests in either a long or short version. The second is a Continuous Byte Write/Read test. All tests are relocating. Areas of memory which are in use by another program or the operating system are moved to a safe place in memory and the test proceeds as normal. If needed, the diagnostic relocates itself and tests the memory that it was occupying.
3. The edited data is saved.
4. The diagnostic tests are started.

Test Operations

Once the memory diagnostic tests are started, they proceed in the order in which they are displayed on the edit screens. The Segment Write/Read tests will be run before the Continuous Byte Write/Read test.

When running, the Segment Write/Read test will display a runtime screen. The screen will display five pieces of information :

1. The fact that the Segment Write/Read test is run-

ning.

2. The segments which were selected to be tested.
3. The segment which is currently under test.
4. The number of cycles which remain to be run.
5. The requested number of cycles for the tests.

When running, the Continuous Byte Write/Read test will display a runtime screen. The screen will display five pieces of information :

1. The fact that the Continuous Byte Write/Read test is running.
2. The segment location of the byte being tested.
3. The offset location of the byte being tested.
4. The number of cycles which remain to be run.
5. The requested number of cycles for the tests.

Test Results

The test results for the Segment Write/Read tests are displayed for each cycle and again for the entire test. The displays for each are identical except that the results will state that they are for a particular cycle or for the accumulation of the cycles.

The test results display a memory board graphic similar to the board configuration display. The boards are shown in ascending address order and are identical to the configuration boards. The chips are labeled by address row and bit column as they would appear on a C3-1000 board. C1 represents the low order bit and C8 the high order bit.

If all of the memory chips are operating properly then four zeros appear in each of the memory chips checked. If the chips fail the long version of a memory test, the number of the test appears 1, 2, 3, or 4, with the numbers underscored. Short version test failure is indicated by bold numbers. If both the long and short tests fail then the number will be in reverse

video.

The Continuous Write/Read test will not display a results screen.

To Begin

This completes the overview of the Memory Diagnostics. Chapters 3 through 6 present detailed instructions for use and interpretation of the Memory diagnostics.

To begin the diagnostics, insert your diagnostic diskette into drive B and type:

B: (CR)
C3-MEMD (CR)

The computer will respond with the main menu screen.

NOTES:

Chapter 3
MEMORY DIAGNOSTICS
MAIN MENU

The main menu is the driving screen for the memory diagnostics. It displays a board diagram and seven function keys. This chapter describes the function keys and their purpose.

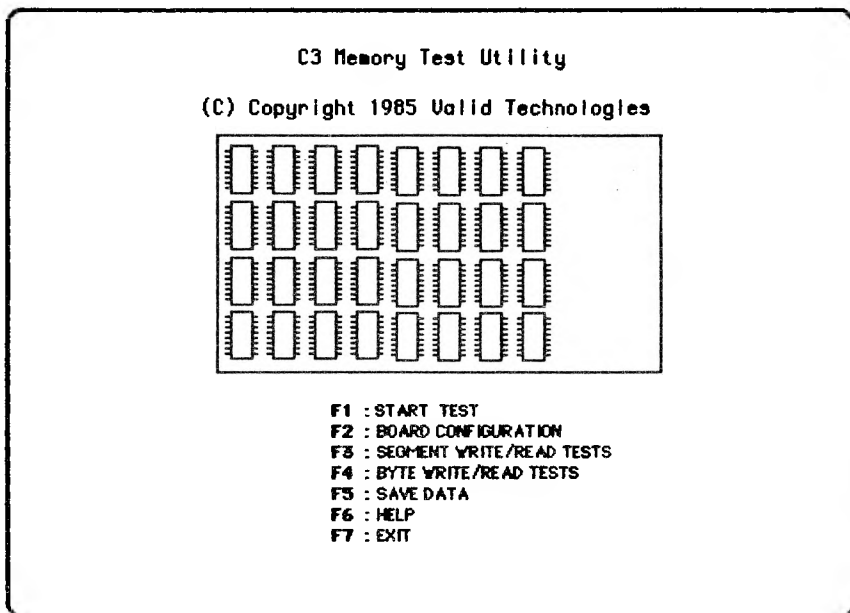


Figure 3-1: Memory Diagnostics Main Menu Screen

3.1 MAIN MENU SCREEN

To begin the diagnostics, insert your diagnostic diskette into drive B and type:

B: (CR)

C3-MEMD: (CR)

The computer will repond with the screen illustrated in Figure 3-1.

3.2 MAIN MENU FUNCTION KEYS

F1 : Start Test

This key starts the diagnostic test running, 5 seconds after being pressed. The delay ensures that all disk operations have completed. **F1** should be pressed **after** you have configured your board(s) and selected the appropriate tests through the other function keys. At any point while a memory test is running, the test may be halted by pressing **alt E**. This causes the diagnostics to complete the current cycle for the segment and display the results as normal. It then prompts for the display of the cumulative results.

F2 : Board Configuration

This key takes the user to the board configuration screen(s). Before running the diagnostics, you must inform the diagnostics of your system set up, by 'configuring' your board(s) (see Chapter 4: Board Configuration). Once you have done this, you need not do it again unless you change your system configuration (i.e. change or expand boards).

F3 : Segment Write/Read Tests

The Segment Write Read Test is primarily used for isolating malfunctioning memory chips. It may also indicate other malfunctioning parts such as the configuration address switch (dip switch). This test is fully explained in Chapter 5.

F4 : Byte Write/Read Tests

The Continuous Byte Write Read Test is used primarily for board troubleshooting. It enables the computer to continually access a specific memory location in either a Write, Read, or Write/Read mode. When appropriate test equipment (i.e. oscilloscope or logic analyzer) is connected to the board, board signals can be monitored to determine whether or not certain board components are functioning properly. As this equipment is used to display the results of this test, there is no screen display of results.

NOTE:

This test is intended for the **advanced** computer user. We strongly recommend that beginners do not attempt to use it.

F5 : Save Data

This key allows you to save data entered into the various screens. You should save each set of edit screen(s) before proceeding to the next. For example, save your board configuration(s) before proceeding to **F3 : Segment Write/Read Tests**. Also, be sure to save all data before starting tests, or quitting diagnostics. This way, it will be available the next time you need to run the diagnostics, and will save you time in setting up the various tests.

F6 : Help

Pressing **F6** for this or **any** screen, will get you help files for that screen. For the specific edit screens, you will be given help files for the specific field that the cursor is located in.

F7: Exit

Pressing **F7** for this or any screen will cause you to exit the diagnostics. You will return to the MS-DOS system level.

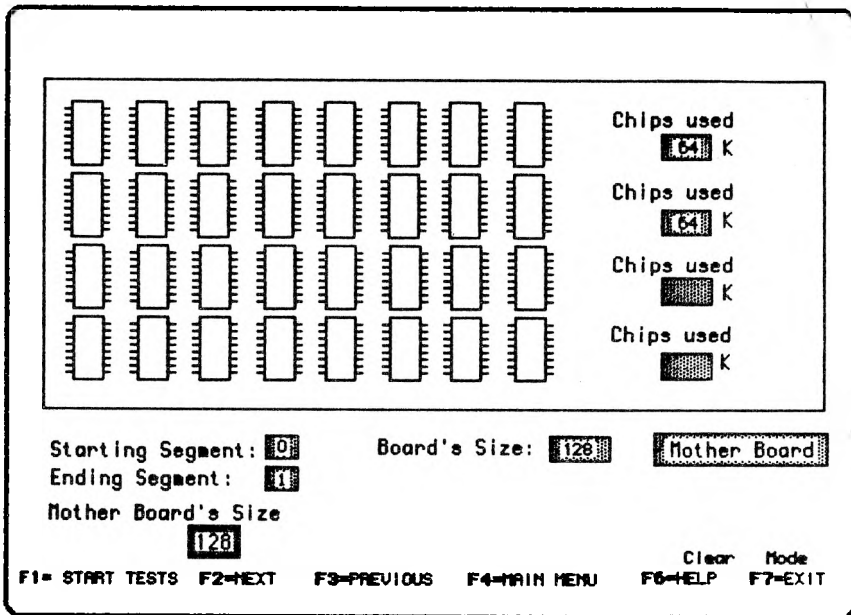
NOTES:

Chapter 4

MEMORY DIAGNOSTICS

BOARD CONFIGURATION

The first step in using the C3-1000 Diagnostics is to inform the diagnostics of your system configuration. This is done using the **Board Configuration Screen**. Press **F2** at the main menu screen to access the board configuration screen.





-  = user entered field
-  = automatically generated fields

Figure 4-1: Board Configuration Screen

4.1 BOARD CONFIGURATION SCREEN

The Board Configuration Screen is used to inform the diagnostic tests of the number and sizes of boards in the system. All boards up to and including the board to be tested must be configured. The diagnostic allows for up to four memory expansion boards plus the motherboard.

To access the board configuration screen, press **F2** on the main menu. The computer will respond with the screen illustrated in Figure 4-1.

The only field directly changeable by the user on the motherboard is the "Mother Board's Size" field. All other relevant fields will be changed by the diagnostics as a result of the entry in the 'Mother Board's Size' field.

4.2 FIELD DESCRIPTIONS

The Board Configuration Screen contains all the fields described in Section 1.3: Generic Edit Screen, with some additions for the configuration screen. The descriptions following will start from the top of the screen.

Chips Used

This field indicates the size chips used in the particular row. i.e. 0K, 64K or 256K.

Starting Segment

Represents the beginning Hex Memory Segment for the board. This is a cumulative value, depending on the

amount of memory on the previous board(s). This value is automatically generated.

Ending Segment

Represents the ending Hex Memory Segment for the board. This is a cumulative value, depending on the amount of memory on the previous board(s) and the amount of memory on the current board. This value is automatically generated.

Board Size

Indicates the size of the board currently being configured. On the motherboard, the user indicates the size (128K or 256K). On the remaining boards, the diagnostic calculates this after the user has completed configuring the board.

Board Number/Motherboard

Indicates the board number being configured. The Mother Board is labeled as such and then the numbering starts at 1. Again, this is a descriptive field, entered by the diagnostic.

Chips Used On The Memory Board/ Mother Board's Size

This field indicates the size of chips used in the row that the cursor is currently located in. Valid chip sizes are 0, 64 and 256. Any other value entered will generate an invalid entry message in the edit error message field.

F1: Start Tests

Pressing **F1**, starts the selected test(s). The tests may be started at the board configuration level, or at the main menu level. Starting tests at the board level is available for those who will usually be running the same test, and may only be changing their board configuration.

F2: Next

Pressing **F2** will take the user to the next sequential board configuration screen.

F3: Previous

Takes the user to the immediately previous board configuration screen.

F4: Main Menu

Will return the user to the memory diagnostics main menu.

F6: Help

Will display help screens for the field that the cursor is located in.

F7:Exit

Exits the diagnostics and returns the user to the MS-DOS system level.

4.3 CONFIGURING YOUR BOARDS

The Motherboard

When entering the Board Configuration Screen, the first screen displayed will always be that of the Mother Board. The only field that the user can enter values into on this first configuration screen is the "Mother Boards's Size" field. This board must be configured first, as follows:

1. Type in the size of your mother board, either 128, or 256. This figure will appear in the lower left Mother Board Size field.
2. Press Return. The computer will automatically generate the remaining fields.
3. If you make an error, simply backspace and type in the correction, before proceeding to the next board.

When you have completed configuring the Motherboard, press F2 to go on to the next board.

The Remaining Board(s)

Before you can configure the remaining boards you must determine the type of chips (64 or 256k) located on each row of each board.

For C3-1000 boards, the rows may be populated with either 64k or 256 K chips. Valid memory chip values are 0K, 64K, or 256K. If 256 K chips are used on a board, they must be in the first rows before any 64 K chips on the board. If you know the memory size of your C3-1000 board, the chart in figure 4-2 gives the type of chips in each row.

memory size	Memory Row			
	0	1	2	3
64KB	64	0	0	0
128KB	64	64	0	0
192KB	64	64	64	0
256KB	64	64	64	64
256KB	256	0	0	0
320KB	256	64	0	0
384KB	256	64	64	0
448KB	256	64	64	64
512KB	256	256	0	0
576KB	256	256	64	0
<i>B</i> — 640KB	256	256	64	64
<i>A</i> — 768KB	256	256	256	0

Figure 4-2: Chip population for Configuring C3-1000 Boards

For boards other than the C3-1000 board, you may have to remove the cover of your Victor 9000 and look to see what type of chips are used. The boards may

contain up to four rows of memory. This gives a capacity of 256KB using 64 K chips or 1MB using 256 K chips. To configure boards with more than 256KB using 64K chips, two memory boards can be used. The position generated for the board is automatically the next sequential address. The board number will, however, be one greater than normal. Care must be taken when interpreting test results to make sure of the chip row position and board number. Care must also be taken when using the results for boards other than the C3-1000. Note that C1 is the least significant bit in the row and C8 is the most significant.

Determine the chips used on each row and note it on the board configuration worksheet provided (in Appendix A) **before** starting to configure the remaining boards.

Now proceed with the following steps:

1. Position the field selection cursor in the top row (chips used field).
2. Type in the type of chips located on that row (64 or 256k).
3. Press **return** to enter the value, or **down cursor(arrow)** to enter the value and automatically proceed to the next field. The entered value will appear in the "chips used" field on the board diagram, **and** in the "Chips Used On The Memory Board" field on the lower left of the screen.
4. Repeat steps 1 through 3 until the board is fully configured:

When the board is configured, press Function key 2 (**F2**) to proceed to the next board. Repeat steps 1 through 4, for each board until you have configured all the boards in your system.

After all boards are configured, press **F4** to return to the main menu. Upon exit to the main menu, the Seg-

ment Write/Read test starting and ending segment values will be set by the diagnostics. The Starting Segment value will be set to the first segment after the Mother Board. The ending segment will be set to the last segment with memory. Once at the main menu press **F5** to save the data. Then select the desired test screen, i.e. Segment Write/Read or Continuous Byte Write/Read.

NOTES:

Chapter 5

SEGMENT WRITE/READ TEST

The **Segment Write/Read Test** is primarily used for isolating malfunctioning memory chips. It may also indicate other malfunctioning parts such as the configuration address switch (dip switch).

5.1 OVERVIEW OF SEGMENT WRITE/READ TEST

To ensure a complete memory board diagnostic, 4 basic types of tests are provided. These are:

- 1) Pattern Write/Read (W/R).
- 2) Pattern Refresh.
- 3) All Refresh.
- 4) All Write/Read (W/R).

The "pattern" tests use a constant byte pattern when executing. The "all" tests exercise every byte pattern from 0 to FF for every byte in the segment.

Each of the four basic tests can be run in two modes: long and short. The "long" mode uses different software instructions than the "short" mode, and takes longer to execute. The different instructions lead to different timing and therefore test the memory in a slightly different manner.

It is recommended when running the memory diagnostics that both the long and short pattern tests be used first. These tests will execute in a reasonable amount of time and quickly isolate memory chips which are 'bad' or improperly seated in their sockets. The 'all' tests can be run when a more extensive diagnostic is desired.

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SEGMENT W/R TEST PARAMETERS

Pattern				All			
W/R		Refresh		Refresh		W/R	
L	S	L	S	L	S	L	S
Byte Pattern		Number of msec . To Wait On Refresh		Number of Cycles			
* Of Bytes	Pattern			20			
3		55AA55		100			

Starting Segment	Ending Segment	Beep On Errors	Time Interv. For Screens
2	3	Y	10

Test Selected
L

F1 = START TESTS F4 = MAIN MENU F6 = HELP Clear Mode
F7 = EXIT

Figure 5-1: Segment Write/Read Parameter Screen

5.2 SEGMENT WRITE/READ TEST SCREEN

To access the Segment Write/Read Test screen, press **F3** on the main menu. The diagnostics will respond with the screen illustrated in Figure 5-1.

All fields in this screen are user changeable, and may be accessed through the cursor keys. To enter a value in any field, place the cursor in that field, select from the valid entries allowed, and press return.

The rest of this section discusses each field, proceeding from the top left corner.

Pattern W/R

The Write/Read test makes sure the memory timing relationships determined by the memory board circuitry are within operational boundaries. Additionally it also tests the memory chips. Should the test results show one or two malfunctioning memory locations the memory chip is most likely the cause. If all of the chips in an entire segment are shown as failing, the cause is probably in the timing circuitry.

The **Pattern Write/Read** test writes the Byte Pattern into each memory location in the selected segments. The test writes the pattern into successive memory locations in the segment and immediately reads the pattern back. If the patterns match then the memory is good and the memory timing is proper.

Long Pattern Write/Read

VALID ENTRIES :

L = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

2 seconds per segment per cycle

FAILURE INDICATION :

1 or **1**

Short Pattern Write/Read

VALID ENTRIES :

S = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

1 second per segment per cycle

FAILURE INDICATION :

1 or **1**

Pattern Refresh

The Refresh Test makes sure the transparent refresh circuitry is operating properly in addition to testing the memory chip. Should the test results show one or two malfunctioning memory locations, the memory chip is most likely the cause. If all of the chips in an entire segment are shown as failing, the cause is probably in the refresh circuitry.

The **Pattern Refresh** test writes a Byte Pattern into each memory location in the selected segments. The test divides each segment into (4) four 16KB sections.

The refresh test consists of three steps:

1. The pattern is written to each section.
2. The program "waits" in a software timing loop, for the amount of time specified in "Number of Milliseconds to Wait On Refresh".
3. The memory is read back and checked against the pattern for the byte. If the patterns match then the memory is good and the refresh circuitry is operating properly.

Long Pattern Refresh

VALID ENTRIES :

L = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

2 seconds per segment per cycle

FAILURE INDICATION :

2 or 2

Short Pattern Refresh

VALID ENTRIES :

S = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

1 second per segment per cycle

FAILURE INDICATION :

2 or 2

All Refresh

The refresh test makes sure the transparent refresh circuitry is operating properly in addition to testing the memory chip. Should the test results show one or two malfunctioning memory locations the memory chip is most likely the cause. If all of the chips in an entire segment are shown as failing the cause is probably in the refresh circuitry.

The **All Refresh** test writes all possible byte patterns, from 0 to FF HEX into each memory location of the selected segments. The test divides each segment into (4) four 16KB sections.

As in the Pattern Refresh, the following three steps are performed.

1. The pattern is written to each section.
2. The program "waits" in a software timing loop, for the amount of time specified in "Number of Milliseconds to wait on refresh".
3. The memory is read back and checked against the pattern for the byte. If the patterns match then the memory is good and the refresh circuitry is operating properly.

Long All Refresh Test

VALID ENTRIES :

L = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

No Errors - 6.0 minutes/segment/cycle

Errors - 10.0 minutes/segment/cycle

FAILURE INDICATION :

3 or 3

Short All Refresh Test

VALID ENTRIES :

S = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

No Errors - 1.5 minutes/segment/cycle

Errors - 8.0 minutes/segment/cycle

FAILURE INDICATION :

3 or 3

All W/R

The write/read test makes sure the memory timing relationships determined by the memory board circuitry are within operational boundaries. Additionally it also tests the memory chips. Should the test results show one or two malfunctioning memory locations the memory chip is most likely the cause. If all of the chips in an entire segment are shown as failing, the cause is probably in the timing circuitry.

The **All Write/Read** test writes all possible byte patterns, from 0 to FF HEX, into each memory location of the selected segments. The test writes each pattern into successive memory locations in the segment and immediately reads the pattern back. If the patterns match, the memory and timing are operating properly.

Long All Write/Read Test

VALID ENTRIES :

L = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

No Errors - 4.5 minutes

Errors - 9.5 minutes

FAILURE INDICATION :

4 or 4

Short All Write/Read Test

VALID ENTRIES :

S = Test Selected.

" - " = Test Not Selected.

APPROXIMATE RUN TIME :

No Errors - 4.0 minutes/segment/cycle

Errors - 9.0 minutes/segment/cycle

FAILURE INDICATION :

4 or 4

Byte Pattern

The Byte Pattern is used for all of the pattern tests.

Of Bytes

Indicates how many bytes to write in each pattern. The recommended value is 3. This value performs the most vigorous test on the board.

Pattern

The pattern consists of a hexadecimal value from 0 to FFFF. If less than four hexadecimal characters are entered, the leading digits are defaulted to 0. You may choose the pattern from any of the following:

HEXADECIMAL DIGITS :

0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

i.e. 55AA55

To ensure complete bit testing (all positions, on and off) proceed as follows:

1. Choose from either of the following recommended byte pattern combinations:

A. 55AA55 and AA55AA

or

B. 000000 and FFFFFFFF

2. Run the test with each case of the chosen combination.

For example, if you choose combination A, run the test long and short with byte pattern AA55AA, then run the test again, long and short, with byte pattern 55AA55.

Number of Msec to Wait on Refresh

This field indicates how many milliseconds the diagnostics will wait between refreshes, when testing the refresh circuitry. The recommended delay time is 100 msec for optimal testing. This allows a minimum of 25 refreshes to occur in order to ensure thorough testing.

Number of Cycles

This is the number of times the test is to be run. A number 10 would run all of the selected tests 10 times. A zero (0) indicates the tests will be run continuously. The entry is a decimal integer.

VALID VALUES : 0 .. 65535

Recommended number of cycles is 20

If you wish to stop a test in while it is proceeding through these cycles, press **ALT E**. This will cause the test to complete the current cycle for the segment and display the results.

Starting Segment

This is the segment at which to start the memory test. Memory is tested a segment at a time. No smaller unit of memory can be tested with the Segment Write/Read tests. A segment is a contiguous portion of memory, 64Kbytes long, beginning at memory address 0 in increments of 64Kbytes or HEX 10000. There are a maximum of 16 segments in the address space of the Victor 9000. The segments are labeled as hexadecimal numbers from 0 to F, with 0 being the low memory segment and F the highest memory segment.

Ending Segment

This is the last segment which is tested. The test will be run from the first byte of the Starting Segment through the last byte of the Ending Segment. The memory in the segment is relocated and the memory space is then tested. After the test, the original contents of the memory space are returned to the memory space.

NOTES :

1. Segments 0 and 1. Either segment may be mapped for screen display. As such when testing these segments, the system display may show random patterns while the test is running.
2. Segment E will not be tested because it contains all of the memory mapped I/O.
3. Segment F will be tested as a Reserved System Board. Only the first 4 KB of the segment will be tested. Due to this being the system screen RAM the display will show random patterns while the test is running.
4. The Mother Board will always start at segment 0. For a 128KB (2000 Hex) Mother Board, the ending segment is 1. For a 256KB (4000 Hex) Mother Board, the ending segment is 3.
5. A segment corresponds to 64KB.
1 row of 64kb chips = 1 segment
1 row of 256kb chips = 4 segments
6. After completeing a board configuration the starting segment is automatically set to the first segment after the Mother Board. The Ending Segment is set to the last segment in the configuration. These values may be overridden by setting them explicitly using the write/read display. These new values may be saved by going to the main menu and pressing **F5**: save data.

Beep On Errors

This controls the audible indication of errors when the memory test results are displayed. When enabled, a beep occurs for every chip which fails a memory test on every display cycle. For large number of cycles it may be disabled. For the longer "All" tests, which may require unattended operation it may be enabled.

VALID ENTRIES :

Y - Audible indication.

N - No audible indication.

Time Interval For Screens

This value controls the amount of time (seconds) the results display will wait before showing the next results screen for the cycle. This allows time to read the display and note which memory chips are bad for each cycle.

VALID ENTRIES :

are from 0 to 59.

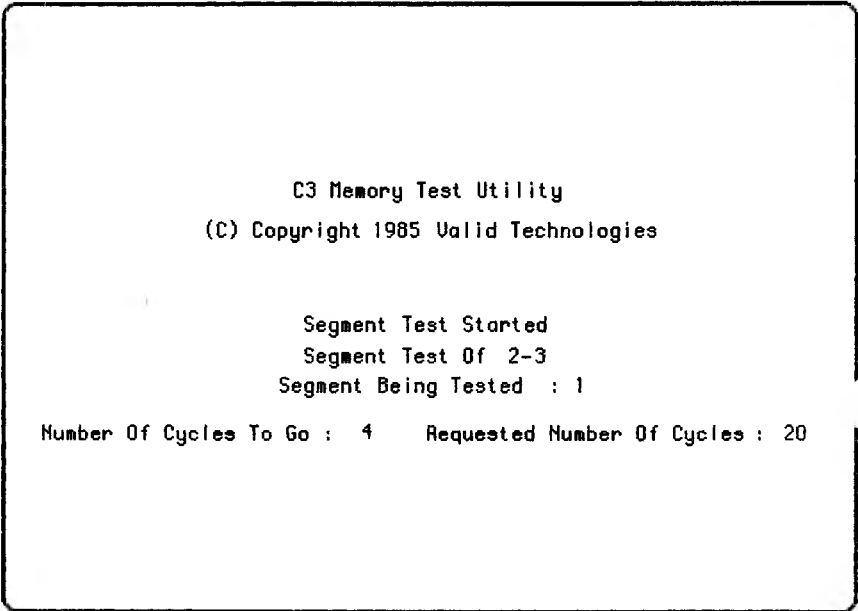


Figure 5-2: Segment Test Running Screen

5.3 RUNNING THE SEGMENT WRITE/READ TEST

Select and Save Parameters

The first step in running the segment write/read test is to select the parameters on the screen, as described in Section 5.2. Return to the main menu (**F4**) and save the data (**F5**).

Start

The test may be started from the main menu, or from the parameter screen itself, by pressing **F1**. Upon pressing **F1**, the diagnostics will pause 5 seconds to ensure that all disk operations have completed, then display the screen illustrated in Figure 5-2

This screen will continually update itself as the tests are running. To stop the tests before the selected number of cycles are completed, press **ALT E**. This will cause the diagnostics to complete the current cycle for the segment and display the results.

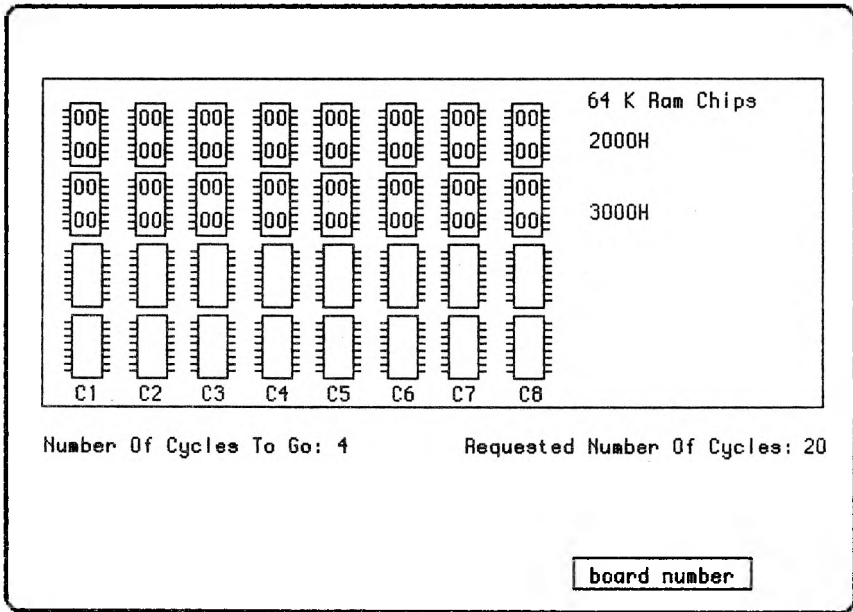


Figure 5-3: Segment Write/Read Results Screen

5.4 INTERPRETING TEST RESULTS

Upon completion of the tests, the diagnostics will automatically display a results screen for each board tested. Each screen will display for the amount of time selected in the parameter screen field "Time Interval For Screens".

Figure 5-3 illustrates a board results screen.

Passing Board

A passing board will display all zeroes in the digit locations on each chip tested, as indicated in Figure 5-3.

Failing Board

A failing board may display any or all of the following digits in any chip.

- 1 = Pattern W/R failure
- 2 = Pattern Refresh failure
- 3 = All Refresh failure
- 4 = All W/R failure

Each digit may be displayed as follows:

- 1. Underscored: fails long test.
- 2. **Bold (bright)**: fails short test.
- 3. **Reverse Video**: fails both tests.

Following are some of the most common indications/examples of failure.

1. ONE OR TWO CHIPS FAIL MULTIPLE TESTS.

REASON:

The problem is most likely due to improper chip seating. To resolve the problem:

1. Remove the affected chips.
2. Bend the legs very slightly in or out to enable better contact in the socket.
3. Reinsert the chip.
4. Run the diagnostics again.

2. ONE OR TWO CHIPS FAIL SINGLE TEST.

REASON:

The chip is most likely bad. There are a number of options in resolving this problem:

1. Reseat the chip as instructed above. If this does not solve the problem,
2. Exchange the 'bad' chip(s) with known good chip(s) from other locations on the board. There are four possible outcomes to this exchange.
 - A. The 'good' chip fails and the 'bad' chip passes. If this occurs, reseat the newly failing chip. If that does not resolve the problem, the socket is most likely the cause. Contact Valid Technologies. (817) 467-0116.
 - B. The 'bad' chip continues to fail, and the 'good' chip passes. This indicates a malfunctioning chip. Replace the failing chip with a new chip. Discard the failing chip.
 - C. Both chips fail. If this occurs, reseat the 'good' chip, and replace the original 'bad' chip.
 - D. Both chips pass. The problem is solved. Continue normal operations.

3. ENTIRE ROW(S) FAIL(S) IN REVERSE VIDEO.

REASON:

The most likely cause for this is improper setting of the C3-1000 board configuration address switch.

1. Confirm that the configuration address switch is set properly.
 - A. If the configuration address switch is set improperly, set the switches to the proper position and rerun the diagnostics.
 - B. If the configuration address switch is set properly, call Valid Technologies (817) 467-0116.

NOTES:

Chapter 6

MEMORY DIAGNOSTICS

CONTINUOUS BYTE WRITE/READ TEST

The **Continuous Byte Write Read Test** is used primarily for board troubleshooting. It enables the computer to continually access a specific memory location in either a Write, Read, or Write/Read mode. When appropriate test equipment (i.e. oscilloscope or logic analyzer) is connected to the board, board signals can be monitored to determine whether or not certain board components are functioning properly.

NOTE:

This test is intended for the **advanced** computer user. We strongly recommend that beginners do not attempt to use it.

CONTINUOUS BYTE W/R TEST PARAMETERS

Continuous Test	
Write	Read
Y	Y
1 Byte Pattern	Number of Cycles
AA	10
Segment Address	Offset Address
F000	0000

Test Selected

Y

Clear Mode

F1 = START TESTS

F4 = MAIN MENU

F6 = HELP

F7 = EXIT

Figure 6-1: Continous Byte Write/Read Parameter Screen

6.1 CONTINOUS BYTE WRITE/READ TEST SCREEN

To access the Continuous Byte Write/Read Test Screen, press **F4** on the main menu. The diagnostics will respond with the screen illustrated in Figure 6-1.

All fields on this screen are user changeable, and may be accessed through the cursor keys. To enter a value in any field, select from the valid entries allowed, and press return.

The rest of this section discusses each field, proceeding from the top left corner.

6.2 FIELD DESCRIPTIONS

Write

This test writes a byte pattern to a specified memory location (specified in the sections: Segment and Offset Address, which follow). It can be used when multiple writes are needed to look at more detailed board timing when trouble shooting memory boards.

VALID ENTRIES :

Y - Test Selected.

N - Test Not Selected.

APPROXIMATE RUN TIME :

1 minute/cycle

Read

This test reads a byte pattern from a specified memory location. It can be used when multiple reads are needed to look at more detailed board timing when trouble shooting memory boards.

VALID ENTRIES :

- Y - Test Selected.
- N - Test Not Selected.

APPROXIMATE RUN TIME :

1 minute/cycle

1 Byte Pattern

The 1 Byte Pattern is the pattern used for the write portion of the Continuous Byte Write/Read memory tests. The pattern consists of a hexadecimal value from 0 to FF. If only one hexadecimal character is entered the leading digit defaults to 0.

VALID ENTRIES:

0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

Number of Cycles

This is the number of times the test is to be run. Thus a number 10 would run all of the selected tests 10 times. A zero (0) indicates that no tests will be run. The entry is a decimal integer.

The Number of Cycles applies to both the write and read tests. It is approximately the number of minutes the test will run. The run time display screen will be updated every minute during which the write/read test will be inactive at the memory location.

VALID ENTRIES :
0 .. 65535

APPROXIMATE RUN TIME :
1 minute/cycle

Segment Address

This number is the hexadecimal segment register value to be used when accessing the byte to read or write. If less than four hex digits are entered the leading digits are assumed to be 0.

VALID ENTRIES :
0 to FFFF

Offset Address

This number is the hexadecimal offset register value to be used when accessing the byte to read or write. If less than four hex digits are entered the leading digits are assumed to be 0.

VALID ENTRIES :
0 to FFFF

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Byte W/R Test Started
Segment Being Tested : F000
Offset Being Tested : 0000

Number Of Cycles To Go : 4 Requested Number Of Cycles : 10

Figure 6-2: Continous Byte Running Screen

6.3 RUNNING THE BYTE WRITE/READ TEST

After editing the parameter screen, return to the main menu and save the data. To start the test, you may press **F1**: from either the main menu or the parameter screen itself.

While running, the test will display the screen illustrated in Figure 6-2. The screen continually updates itself during the course of the tests.

Interpretation of the Byte Write/Read test depends upon the type of test equipment you have connected to the machine, and must be interpreted from that test equipment.

NOTES:

PART II

CLOCK DIAGNOSTICS

YEAR MONTH DAY	DAY OF WEEK	HR. MIN. SEC.
YYYY MM DD	DOW	HR:MM SS.S

NOTES:



Chapter 7

CLOCK DIAGNOSTICS

OVERVIEW

The C3-1000 Clock Diagnostics are designed to assist the user in evaluating clock/calendar operations. Chapter 7 introduces the reader to the clock diagnostics, presenting a brief overview of the tests available.

7.1 OVERVIEW

Tests

The Clock Diagnostics consist of three major tests.

The **Clock/Calendar Comparison Test** checks the time kept by the Clock/Calendar chip against the MS-DOS clock. The MS-DOS clock must be set **prior** to using the clock diagnostics to ensure proper operation. This can be done using the clock/calendar display on the clock diagnostics main menu.

The **Clock/Calendar Register Test** checks each register to ensure that it can read and write the full range of values for that register. It writes into each register used in the Clock/Calendar chip, all valid values for the particular register. It then reads back the register value and compares it to the value written. Each register is written to 5 times and read 20 times with a delay imposed between the write and the read.

The **Clock/Calendar Rollover Test** checks to make sure each digit in the Clock/Calendar chip updates itself properly.

The clock diagnostics are completely self contained. The user cannot select or change parameters (except for the clock on the main menu).

Upon completion of each test, results for each test will be displayed on the same screen as the test. The only items which are user replaceable are the clock battery, and the clock chip itself. Should the Clock/Calendar continue to fail the diagnostics after battery replacement, call Valid Technologies Technical Support at (817) 467-0116

To Begin...

To invoke the clock diagnostics:

1. Insert your diagnostic diskette into drive B:
2. Set default drive to B, by typing:

B: (CR)

3. Type:

C3-CLKD (CR)

The diagnostics will respond with the main clock screen.

NOTES:

Chapter 8
CLOCK DIAGNOSTICS
MAIN MENU

The main menu is the driving screen for the clock diagnostics. It displays 5 function keys and a clock display. This chapter describes the clock display and the function keys.

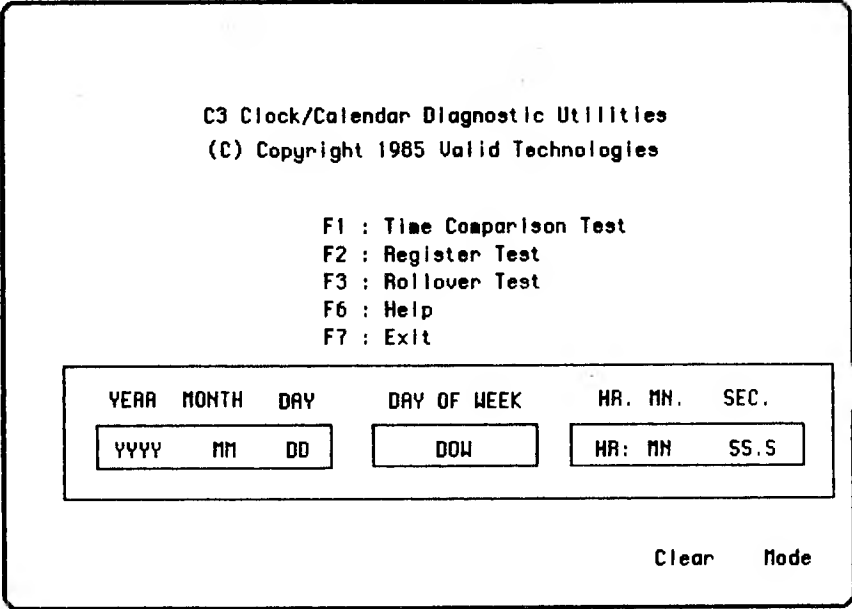


Figure 8-1: Clock Diagnostics Main Menu

8.1 MAIN MENU SCREEN

The Clock Diagnostics can be accessed by inserting your diagnostics diskette in drive B: and typing:

B: (CR)

^{KD}
C3-CL~~CK~~ (CR)

The diagnostics will respond with the screen illustrated in Figure 8-1.

8.2 MAIN MENU CLOCK

Clock Display

Before running any of the clock diagnostics, the clock/calendar must be set. This ensures that 1) the clock is in operational mode vs test mode and 2) the clock is actually running.

The clock may be set using the Date/Time display on the main menu.

The Date/Time display area consists of the following display data.

Display Data	Definition	Valid Range of Values
YYYY	Years	1980..2079
MM	Months	1..12
DD	Day	1..31 depending on month
DOW	Day Of Week	Automatically calculated and set

HH	Hour	0..23
MN	Minute	0..59
SS.S	Seconds	0...59 - tenths of seconds is automatically set to 0

The display cursor can select any of the display values to change except DOW (Day Of Week) and .S (Tenths of Seconds). Below the display area is the edit area. It is in this area where all changes to the display are first made.

Keyboard Operations for Setting the Main Menu Clock

The keys which may be used for editing the main menu clock are :

CURSOR KEYS :

- Left Cursor - moves the entry selection cursor to the LEFT in a circular fashion.
- Right Cursor - moves the entry selection cursor to the RIGHT in a circular fashion.
- Up Cursor - moves the entry selection cursor UP in a circular fashion.
- Down Cursor - moves the entry selection cursor DOWN in a circular fashion.

SHIFT WORD LEFT - Increments the ENTRY VALUE selected by the cursor by one.

SHIFT WORD RIGHT - Decrements the ENTRY VALUE selected by the cursor by one.

- BACKSPACE - Deletes the character at the position to the left of the edit cursor of the ENTRY VALUE.
- DEL - Deletes the character at the position of the edit cursor of the ENTRY VALUE.
- F7 - Pressing the Function key **F7** terminates the operation of the diagnostic utility.

After setting the clock, observe the clock display. The tenths of seconds should turn over smoothly. There should be no flicker in any of the digits and all values should be in their proper range as defined on page 8-3.

NOTES:

1. When using the cursor keys it is important to note that the day of week (DOW) cannot be selected. The reason for this is that the day of week is automatically calculated on the Clock/Calendar.
2. Tenths of seconds are always set to zero by the clock/calendar chip when changes are made to the time.

8.3 FUNCTION KEYS FOR MAIN MENU

The function keys provide the following :

F1 : Clock/Calendar, MS-DOS Time Comparison Test.

The Time Comparison Test compares the battery backed C3-1000 Clock/Calendar time with that of the MS-DOS clock.

RUN TIME = User determined stop.

F2 : Clock/Calendar Register Test.

The Clock/Calendar Register Test tests all register values, making sure that each register in the Clock/Calendar properly sets and retains the value set into the register.

RUN TIME = 12 Seconds or user determined stop.

F3 : Clock/Calendar Rollover Test.

The Clock/Calendar Rollover Test makes sure that each register in the Clock/Calendar changes from one digit to the next proper digit. It uses a leap year to ensure proper functioning.

RUN TIME = 2 minutes or user determined stop.

F6 : Help

When this key is used, a help file will be displayed for the full screen. The cursor keys may be used to access the next help screen when a display has more than a single help screen available.

F7 : Exit

EXITS the Clock/Calendar diagnostic utility and returns the user to the system level prompt.

To begin the clock diagnostics tests, select the desired test from the main menu, and press the appropriate function key.

NOTES:

Chapter 9

CLOCK DIAGNOSTICS

TIME COMPARISON TEST

The time comparison test compares the battery backed C3-1000 Clock/Calendar time with that of the MS-DOS clock. To obtain a proper comparison, the MS-DOS clock should have been set at the main menu. This ensures that both clocks originally started with the same time. The minimum time span to run the test is 5 minutes. This results in the clock being accurate to one part in 3000. To obtain a better accuracy, the test can be run for a longer period of time.

**C3 Clock/Calendar Diagnostic Utility
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Time Comparison Test

ELAPSED TIME

HR:MN SS.S

C3 CLOCK

HR:MN SS.S

DIFFERENCE

+ HR:MN SS.S

MS-DOS CLOCK

HR:MN SS.S

F1= BEGIN TEST

F4= MAIN MENU

F6= HELP

F7= EXIT TEST

Figure 9-1: Time Comparison Test Screen

9.1 TIME COMPARISON TEST SCREEN

To access the Time Comparison Test, press **F1** on the Clock Diagnostics Main Menu.

The diagnostics will respond with the screen illustrated in Figure 9-1.

There are four major information display areas, as listed below.

ELAPSED TIME :

This display shows the time since the test was started. This gives an indication of how much difference there is per given period of time.

C3-CLOCK :

This displays the current value of the C3-Clock.

DIFFERENCE :

This displays the difference in time values of the C3-Clock and the MS-DOS clock. The difference is the C3-Clock minus MS-DOS clock time.

MS-DOS CLOCK :

This is the current time of the MS-DOS clock.

9.2 FUNCTION KEYS FOR THE COMPARISON TEST

The following function keys are valid for the comparison test :

F1 : Begin

Starts the comparison test.

F4 : Main Menu

Return to the main menu of the Clock/Calendar diagnostic utility.

F6 : Help

When this key is used, a help file is displayed for the full screen.

F7 : Exit

Exit the Clock/Calendar diagnostic utility and return to the MS-DOS system level.

Any other key depression at this level will be ignored.

9.3 RUNNING THE TIME COMPARISON TEST

To run the Time Comparison Test, press **F1**. This will begin the test. While in progress, the test will display the same screen, updating itself continually as it runs.

9.4 COMPARISON TEST RESULTS

A time difference of plus or minus two tenths of one second is within the one half second resolution of the MS-DOS clock, and the one tenth second resolution of the C3-1000 clock. If the difference is greater than plus or minus two tenths of one second within a five minute test period, the Clock/Calendar trimmer capacitor should be adjusted to match the MS-DOS clock.

A positive difference means the Clock/Calendar chip is running faster than the MS-DOS clock. The Clock/Calendar can be slowed by turning the trimmer capacitor counter-clockwise in approximately 1/8 turn increments (see Figure 9-2).

A negative difference means the Clock/Calendar chip is running slower than the MS-DOS clock. The Clock/Calendar can be made to run faster by turning the trimmer capacitor clockwise in approximately 1/8 turn increments (see Figure 9-2).

NOTES :

1. When adjusting the trimmer capacitor, use a screwdriver with a **PLASTIC** blade and handle (plastic bladed screwdrivers may be found Radio Shack). Use of a screwdriver with a metal blade can **destroy** the Clock/Calendar circuit.
2. The Trimmer Capacitor is a single turn device. As such, if the capacitor is turned too far it will result in the opposite effect than desired.

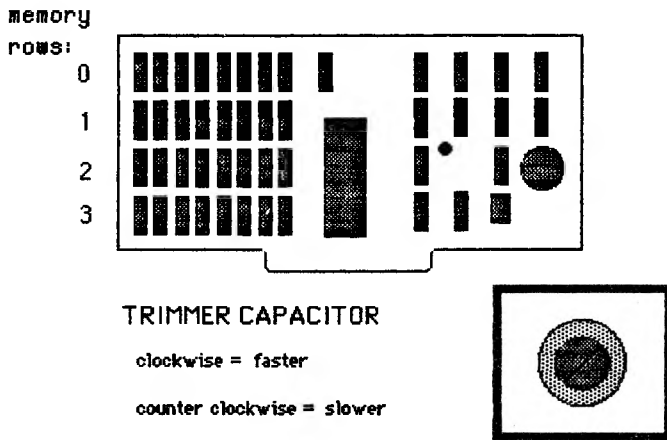


Figure 9-2: Adjusting the Trimmer Capacitor

Chapter 10

CLOCK DIAGNOSTICS

REGISTER TEST

The Clock/Calendar register test makes sure that each register in the Clock/Calendar properly sets and retains the value set into the register. It sets each register 5 times and reads each register 20 times.

C3 Clock/Calendar Diagnostic Utility
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Register Test

SEC	MM	HR	DDW	DAY	MONTH	YEAR	MFR

F1= BEGIN TEST

F4= MAIN MENU

F6= HELP

F7= EXIT TEST

Figure 10-1: Register Test Screen

10.1 REGISTER TEST SCREEN

To access the register test screen, press **F2** on the clock diagnostics main menu.

The computer will respond with the screen illustrated in Figure 10-1.

There are six registers tested with the valid values appropriate to each register. The registers tested are given below.

- | | | |
|----------|--------------------------|-----------|
| 1. SEC | - Seconds | - 0 to 59 |
| 2. MNS | - Minutes | - 0 to 59 |
| 3. HRS | - Hours | - 0 to 23 |
| 4. DOW | - Day of week | - 1 to 7 |
| 5. DAY | - Day in month | - 1 to 31 |
| 6. MONTH | - Month of year | - 1 to 12 |
| 7. YEAR | - Relative Year | - 0 to 99 |
| 8. MFR | - Multifunction Register | |

NOTES:

1. On the 274 chip, the year will automatically roll over.
2. The multifunction register is used to set the leap year counter, AM/PM indicator, and 12/24 hour mode.

10.2 FUNCTION KEYS FOR REGISTER TEST

The following function keys are valid for the register test :

F1: Begin

Begin the register test.

F4: Main Menu

Return to the main menu of the Clock/Calendar diagnostic utility.

F6: Help

When this key is used, a help file will be displayed for the full screen.

F7: Exit

Exits the Clock/Calendar diagnostic utility and returns to the MS-DOS system level.

Any other key depression at this level will be ignored.

10.3 RUNNING THE REGISTER TEST

To run the Register Test, press **F1**. This begins the Register Test.

When running, the message "Test in Progress" will appear beneath the display area. The values in the display area will appear to ripple while the test is running.

10.4 REGISTER TEST RESULTS

The Clock/Calendar register test will display the results after all registers have been tested or an error occurs. If the Clock/Calendar is functioning properly, the message appearing in the middle of the screen in place of the Test In Progress will be :

Clock Running Ok

If the Clock/Calendar is not functioning properly, the register(s) in which errors occurred will be highlighted in reverse video. The message in the middle of the screen will be :

Clock Error

If a clock error occurs:

1. Remove the clock/calendar chip from its socket.
(See Figure 1-1)
2. Gently bend the pins on the chip in or out.
3. Reinsert the chip into its socket.

If this does not solve the problem, call Valid Technologies Technical Support at (817) 467-0116.

This test destroys the contents of Clock/Calendar registers. The Clock/Calendar is reset automatically using the MS-DOS time upon completion of the test.

NOTES:

Chapter 11
CLOCK DIAGNOSTICS
ROLLOVER TEST

The Clock/Calendar rollover test makes sure that each register in the Clock/Calendar changes from one digit to the next proper digit. It uses a leap year to ensure proper functioning.

C3 Clock/Calendar Diagnostic Utility
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Rollover Test

YEAR	MONTH	DAY	DAY OF WEEK	HR:MM	SEC
YY	MM	DD	DOW	HR:MM	SS.S

F1= BEGIN TEST

F4= MAIN MENU

F6= HELP

F7= EXIT TEST

Figure 11-1: Rollover Test Screen

11.1 ROLLOVER TEST SCREEN

To access the Rollover Test Screen, press **F3** on the clock diagnostics main menu.

The computer will repond with the screen illustrated in Figure 11-1

There are seven major information display areas. These are listed below.

1. YEAR - Displays the year.
2. MONTH - Displays the month.
3. DAY - Displays the day.
4. DOW - Displays the day of week.
5. HR. - Displays the hours.
6. MN. - Displays the minutes.
7. SEC. - Displays the seconds and tenths of seconds

11.2 FUNCTION KEYS FOR ROLLOVER TEST

The following function keys are valid for the Rollover Test :

F1: Begin

Begin the rollover test.

F4: Main Menu

Return to the main menu of the Clock/Calendar diagnostic utility.

F6: Help

When this key is used, a help file will be displayed for the full screen.

F7: Exit

Exits the Clock/Calendar diagnostic utility and returns to the MS-DOS system level.

Any other key depression at this level will be ignored.

11.3 RUNNING THE ROLLOVER TEST

To start the rollover test press **F1**. This begins the Rollover Test.

After the test is started the digits currently under test are highlighted and a message displays which of the six areas is under test.

11.4 ROLLOVER TEST RESULTS

The Clock/Calendar test will display the results for each digit tested. If the Clock/Calendar is functioning properly, the first message appearing in the middle of the screen below the display area is :

Tenths of Seconds OK

If the Clock/Calendar is not functioning properly, the register(s) in which errors occurred will be highlighted in reverse video. The message in the lower left corner of the screen will be :

Clock Error

If a clock error occurs:

1. Remove the clock/calendar chip from its socket.
(See Figure 1-1)
2. Gently bend the pins on the chip in or out.
3. Reinsert the chip into its socket.

If this does not solve the problem, call Valid Technologies Technical Support at (817) 467-0116.

This test destroys the contents of Clock/Calendar registers. The Clock/Calendar is reset automatically using the MS-DOS time upon exit to the system or main menu.

NOTES:

APPENDIX A

NOTES:

**VALID TECHNOLOGIES
PRODUCT REGISTRATION**

NOTICE: This registration **must be returned** within 15 days after delivery if you wish to receive product update information.

Product _____

Part No _____

Date of Purchase _____

Place _____

Purchaser's Name _____

Company _____

Address _____

City/State _____ Zip _____

Phone () _____

SIGNATURE _____

(please turn over)

In order for us to be able to serve our customers better, please complete the following questions.

1) Where was your first exposure to this product?

___ Advertising: Where _____
___ Dealer: Which _____
___ Other Users: _____
___ Other: Explain _____

2) What features convinced you to purchase this product?

3) What additional features would you like to see added to this product?

**VALID TECHNOLOGIES
PROBLEM REPORT**

Product Name _____

Versions:

Product: _____

Machine: _____

Operating System: _____

Bios: _____

Date of Purchase _____

Place _____

Purchaser's Name _____

Company _____

Address _____

City/State _____ Zip _____

































Phone () _____

(turn over)

PROBLEM DESCRIPTION:

Please describe the problem as concisely as possible. To be sure of proper handling, include all information concerning the exact circumstances around which the problem was experienced. You will be contacted by our Technical Support personnel to help resolve the problem.

**** Attach additional comments/documentation as necessary.**

								Size of Chips used
								256 K
								256 K
								64 K
								64 K
Board's Size: <input style="width: 50px;" type="text" value="640"/>								Board Number: <input style="width: 50px;" type="text"/>

Board Configuration Worksheet

Note:

You may wish to make copies of this page and keep this original.

NOTES: