

Connecting The CM2000 To A Computer Monitor

There are three steps to connecting a computer monitor to the CM2000 and getting a pattern on the CRT. They are:

- 1) Setting the parameters
- 2) Setting the video format
- 3) Hooking up the correct connector

This Tech Tip covers each of these three steps. It also shows how the setup process can be simplified when you use the CM2000's RECALL memory function.

Setting The Parameters

Four main parameters determine the performance capabilities of a computer monitor: horizontal frequency, horizontal pixels, vertical frequency, and vertical pixels (lines). Here is a brief explanation of each:

Horizontal frequency is the number of times per second the electron beam travels hori-

Monitor Type	H FREQ	V FREQ	H PIXEL	V PIXEL	DIGITAL ANALOG	H SYNC	Y SYNC	Sync Adder	Interface
CGA	15.7	60.0	640	200	DIGITAL	+	+	OFF	OFF
NEC DH	16.0	60.3	640	200	DIGITAL	+	-	OFF	OFF
HITACHI 2	17.3	62.4	512	512	ANALOG	+	-	OFF	ON
HERCULES	18.4	50.0	720	350	DIGITAL	+	-	OFF	OFF
MDA	18.4	50.0	720	350	DIGITAL	+	-	OFF	OFF
EGA	21.8	60.0	640	350	DIGITAL	+	-	OFF	OFF
NEC P2	24.8	56.4	640	400	DIGITAL	-	-	OFF	OFF
		60.0	640	400	ANALOG	-	-	OFF	OFF
							COMPOSITE SYNC	OFF	

Fig. 2: A portion of the chart that contains the setup information of common computer monitor types. The full chart appears on the CM2000 Pull Chart and in the CM2000 manual Appendix D.

zontally across the CRT and back (horizontal scan).

Horizontal pixels are the number of dots or picture elements that can be displayed horizontally. A pixel is the smallest dot or picture element the monitor can produce.

Vertical frequency is the number of times per second the electron beam travels from the top of the CRT to the bottom and back (vertical scan).

Vertical pixels are the number of picture elements that are displayed vertically on the CRT. Vertical pixels are also referred to as "lines."

These four parameters are generally found in the computer monitor's service literature. If you do not have the service literature, you can identify the computer monitor type and find the parameter information in the CM2000 Pull Chart or appendix of the CM2000 manual (Figure 2).

For an example, let's walk through the steps that would be needed to set the parameters for an EGA computer monitor.

1. Find the parameters for an EGA monitor in the monitor's service literature, CM2000 Pull Chart or in the appendix of the CM2000 manual.

2. Press
3. Press
4. Press
5. Press

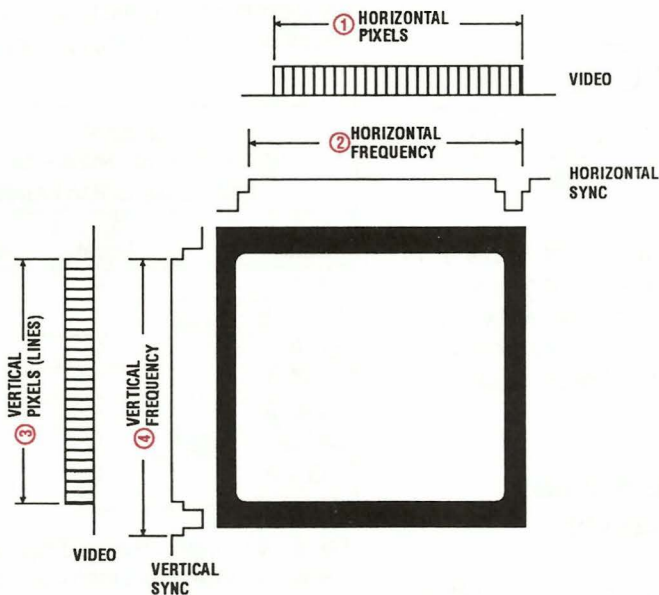


Fig. 1: A computer monitor's performance capabilities can be defined by four parameters: (1) horizontal pixels, (2) horizontal frequency, (3) vertical pixels and (4) vertical frequency.

After you have completed the five steps, the CM2000 is generating the horizontal and vertical sync frequencies and pixel resolutions required by an EGA computer monitor. The numbers in the PARAMETERS display should match those shown in Figure 3.

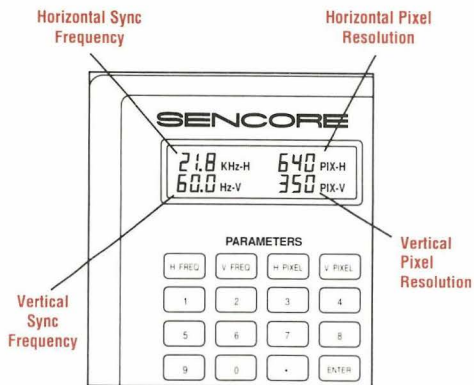


Fig. 3: This is how the display should look after you've entered the parameters for an EGA computer monitor.

Setting The Video Format

The second step to hooking up to a computer monitor is setting the correct video format. This includes setting: the monitor type, the polarity of the video, horizontal and vertical sync signals, the sync adder, interlace, and the video outputs. Again this information is found in the service literature, the CM2000 Pull Chart or in the CM2000 manual appendix.

Here is a brief explanation of each of these settings:

Type - Monitors require either digital or analog input signals. This button sets all the SYNC & VIDEO OUTPUT video signals to digital levels (LED "on") or analog levels (LED "off").

Polarity - The POLARITY format buttons establish the polarity of the video, horizontal sync, and vertical sync signals at the SYNC & VIDEO OUTPUT jack. The LED indicator lights for "+" polarity and is not lit for "-" polarity. Most monitors require "+" video polarity. Incorrect sync polarities may have no effect on some monitors and may cause loss of sync in others. Some monitors use different sync polarity combinations to select operating modes.

Sync Adder - The SYNC ADDER buttons select the video line to which the sync infor-

mation is added. Selecting R, G, or B adds both the vertical and horizontal sync (composite sync) to that signal line. Sync is added to a line when the corresponding LED indicator is lit. Sync can only be added to analog monitors.

Interlace - This button switches the vertical sync between interlaced scan (LED "on") and progressive scan (LED "off"). Set it to match the monitor type you are servicing. Most monitor types use progressive scan.

Video Output - Use these buttons to make the R, G, B, and I output lines active (LED "on") or inactive. The "I" (intensity) line is used by some digital monitors to provide an additional signal level step between on and off.

To continue with our example, let's walk through the steps needed for setting the video format of an EGA computer monitor.

1. Find the video format information for an EGA monitor in the monitor's service literature, CM2000 Pull Chart or in Appendix D of the CM2000 manual.
2. Set DIGITAL ANALOG to DIGITAL.
3. Set VIDEO to "+".
4. Set H SYNC to "+".
5. Set V SYNC to "-".
6. Set SYNC ADDERS R G B to "off".
7. Set INTERLACE ON/OFF to OFF.
8. Set VIDEO OUTPUT R G B I to "on".

After you have completed the above eight steps, the format of the signals generated by the CM2000 match those required by an EGA computer monitor. The LED indicators on the video format buttons should match those shown in Figure 4.

Using The Memory STORE And RECALL Functions

The parameter values and video format settings of the most common computer monitor types are stored in the CM2000's permanent

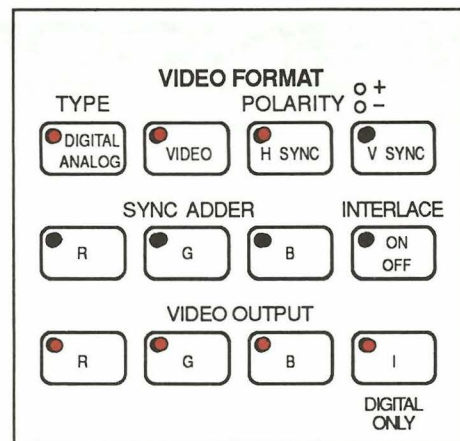


Fig. 4: Here's how the VIDEO FORMAT buttons should look for an EGA computer monitor.

memory. This memory function saves you the hassle of having to enter all of the setup data on each monitor you service. It allows you to quickly recall complete monitor setups, by entering the storage location of the desired setup.

The memory presets consist of three groups:

- 1) Standard Setups
- 2) User Setups
- 3) Computer Interface Setups.

All the setups can be recalled from the front panel keypad, but only the "User Setups" can be programmed from the front panel.

Standard Setups: Presets 0 through 19 are the setups for the most common monitor types. They are listed in Appendix E and in the pull chart beneath the CM2000. These setups are preprogrammed into permanent memory and cannot be erased or changed by the user.

CM2000 COMPUTER MONITOR SETUP STORAGE LOCATIONS		
Format	Storage Location	Connector
CGA	0	1
Hercules, MDA	1	1
EGA	2	2
PGC 1	3	3
PGC 2	4	3
MCGA 1, VGA 1	5	4
VGA 2	6	4

Fig. 5: A portion of the chart that contains the storage location of common computer monitor setups. The full chart appears on the CM2000 Pull Chart and in the CM2000 manual appendix.

User Setups: Presets 20 through 39 can be programmed from the front panel keypad using the STORE button. Use these presets to store special setups used in your servicing. The setups will not be lost when power is turned off.

Computer Interface Setups: Presets 40 through 59 can only be programmed via the INTERFACE ACCESSORY jack, but can be recalled from the front panel RECALL button. The setups will not be lost when power is turned off.

Recalling the setup for an EGA computer monitor.

1. Find the memory storage location of an EGA monitor from the table in the CM2000 Pull Chart or appendix in the CM2000 manual.
2. Press

The CM2000 is now generating the correct parameters and video format required for an EGA computer monitor. The parameter display and the LEDs on the VIDEO FORMAT buttons should be the same as those in Figures 3 and 4.

Hooking Up The Correct Connector

Now that the CM2000 is generating the correct signals out of the SYNC & VIDEO OUTPUT jack, you are ready to hook it up to the computer monitor.

There are quite a number of different monitor input connectors and wiring configurations. Some take a 9 pin D-sub; others a 15 pin D-Sub; others a 15 pin high-density D-Sub; and still others BNC connectors. Building a connector for each computer monitor type can be a time consuming task.

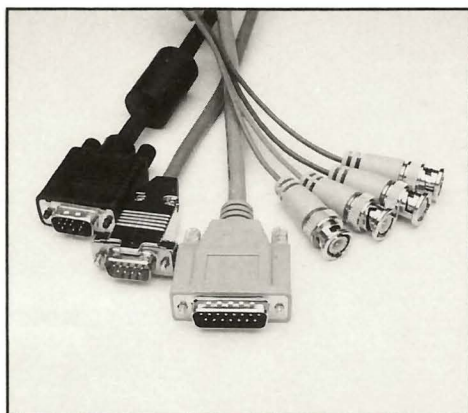


Fig. 6: Computer monitors have a variety of input adaptors.

Along with the CM2000, there are connectors available for hooking to the most common computer monitor types. A listing of the available connectors is shown in Figure 7. This chart also appears on the CM2000 Pull Chart and Appendix A in the CM2000 manual. These connectors convert the output of the CM2000 to match the required input of the monitor you are servicing.

CM2000 Connector Chart	
Connector	Computer Monitor Type
1	CGA, MDA, Hercules
2	EGA
3	PGC
4	VGA, PS/S SVGC, XGA
5	Apple or Mac
6	BNC Input
Universal	Adapts to match any computer monitor type

Fig. 7: Connectors are available for hooking the most common computer monitor types to the CM2000.

Note: The interface connectors may be ordered through the Sencore Service Department. Contact the Service Department at:

SENCORE SERVICE DEPARTMENT
 3200 Sencore Drive, Sioux Falls, SD 57107
 1-800-736-2673

Choosing the correct connector for an EGA computer monitor.

1. Find the type of monitor to be serviced on the CM2000 Pull Chart or appendix in the CM2000 manual and note the necessary connector.
2. For an EGA computer monitor hook up the monitor cable to Connector #2 and the connector to the SYNC & VIDEO OUTPUT jack of the CM2000.

You should now have a pattern on the computer monitor screen. If you do not, make sure the CM2000 is generating the correct signals for the computer monitor being tested. Also make sure you are using the correct connector.



Fig. 8: Plug one end of the connector into the end of the computer monitor's cable and the other end into the CM2000's SYNC & VIDEO OUTPUT jack.

For more information, Call Toll Free 1-800-SENCORE (1-800-736-2673)

SENCORE
 3200 Sencore Drive, Sioux Falls, SD 57107

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