

Testing Composite NTSC Monitors With The CM2000 Computer Monitor Analyzer

Some computer monitors, as well as video monitors, use a composite input signal that conforms to the NTSC standard rather than having separate video and sync signals that conform to a particular computer display standard. You can test these monitors, plus all other computer monitors, with your CM2000 Computer Monitor Analyzer.

This Tech Tip explains how to select the proper input signal for a composite monitor, how to connect your CM2000 output to the monitor input, and how to select video patterns for testing composite monitors.

Selecting The Input Signal

The CM2000 is able to provide the standard 1 volt PP composite video signal normally present at the input of a composite monitor. The bandwidth of the signal can be adjusted to match any resolution monitor. Adjust the CM2000 as follows to obtain a standard composite video signal.

Set the VIDEO FORMAT switches as follows:

1. Set ☒ DIGITAL ☐ ANALOG to "analog".

2. Set ☒ VIDEO to "+".

(horizontal and vertical sync polarities don't matter)

3. Set SYNC ADDERS ☒ R ☒ G ☒ B to "on".

4. Set INTERLACE ☒ ON ☐ OFF to "off".

5. Set VIDEO OUTPUT ☒ R ☒ G ☒ B ☒ I to "off".

Set the signal PARAMETERS as follows:

1. Press
2. Press
3. Press
4. Press
5. Press
6. Press
7. Press
8. Press

Note: 325 horizontal pixels at the NTSC scan rate is equivalent to a 3.0 MHz video input signal for a 40 column monitor. To adjust the number of horizontal pixels for different resolution NTSC monitors, see Figure 1.

Video Bandwidth	H Pixels
3 MHz (40 Col)	325
4 MHz	430
5 MHz	540
6 MHz (80 Col)	650
7 MHz	760

Fig. 1: Horizontal Pixels for Various Resolution NTSC Monitors.

At this point the CM2000 is producing a signal you can connect to the composite monitor you wish to test. However, when you enter monitor scan parameters, such as these, that don't correspond to a standard the CM2000 recognizes, it automatically sets the blanking timing to a default condition. The default blanking timing is 80% active video time and 20% blanking time, with blanking time divided equally among front porch, sync, and back porch. This blanking timing will give you a usable display on the monitor, but the patterns may be slightly off center.

You have two options. First, you can use the new composite signal format you have created with the default timing parameters, which may result in your test patterns being slightly off center. If you wish to do so and want to connect the CM2000 to the monitor now, skip to the section titled "Hooking Up To The Monitor." Second, if you wish to see the pattern positioned exactly as it will be for the user, you can easily change the blanking timing parameters as follows.

Changing Blanking Timing Parameters For A Composite Monitor

The CM2000 has a manual blanking timing mode that allows you to easily customize the blanking timing for a monitor that doesn't use one of the preprogrammed formats in memory locations 0 thru 19. This mode allows you to set the blanking timing to exactly match NTSC standards. Figure 2 lists the complete NTSC format.

To change to NTSC blanking timing parameters:

1. Disconnect any adapter from the SYNC & VIDEO OUTPUT jack.

2. Press STORE 8 0 ENTER
(Switches to manual blanking timing mode.)

You are now ready to enter your desired vertical sync parameters in locations 81 thru 83.

3. Press STORE 8 1 ENTER
. 1 9 1 ENTER
(Enters vertical front porch time in milliseconds.)

4. Press STORE 8 2 ENTER
. 8 9 2 ENTER
(Enters vertical back porch time in milliseconds.)

5. Press STORE 8 3 ENTER
. 1 9 1 ENTER
(Enters vertical sync time in milliseconds.)

You are now ready to enter your desired horizontal sync parameters in locations 84 thru 86.

6. Press STORE 8 4 ENTER
1 . 5 ENTER
(Enters horizontal front porch time in microseconds.)

7. Press STORE 8 5 ENTER
ENTER 3 . 2 ENTER
(Enters horizontal back porch time in microseconds.)

8. Press STORE 8 6 ENTER
4 . 7 ENTER
(Enters horizontal sync time in microseconds.)

You must enter each of the three parameters for either vertical or horizontal blanking timing before those parameters take effect. Once you have entered values for all three, you can then go back and modify any of the three parameters you wish. To recall a blanking timing parameter to see what you have entered, press STORE, the location # of the parameter, and ENTER.

Also, anytime you wish to switch from the manual blanking timing parameters you have just entered, back to the default blanking timing mode, just repeat the keystrokes RECALL, 8, 0, ENTER. To return to the manual blanking timing parameters you have have entered, enter the keystrokes STORE, 8, 0, ENTER. Three eights in the right

H Scan	15.7 kHz
V Scan	60 Hz
H Pixels	See Fig. 1
V Pixels	242
V Front Porch	0.191 msec
V Back Porch	0.892 msec
V Sync	0.191 msec
H Front Porch	1.5 usec
H Back Porch	3.2 usec
H Sync	4.7 usec

Fig. 2: Composite NTSC Format

hand display when you attempt to recall a blanking timing parameter indicates you are in the default blanking timing mode.

Once you enter the manual blanking timing mode, the vertical sync frequency is automatically calculated from the horizontal sync frequency, vertical pixel number, and blanking timing parameters you enter. If you attempt to set the vertical sync frequency while in the manual blanking timing mode, the error code "E 1" will appear in the right hand digital display.

Storing The New Format

Once you have created a new format (by manually entering horizontal and vertical sync frequencies and pixel rates, and at your option blanking timing parameters), you can store the new format for later use in one of memory locations 20 thru 39. To store a new format in location 20, for example, press STORE, 2, 0, ENTER. The format you currently have entered in the CM2000 will be stored at memory location 20 and can be recalled for use at a later time by pressing RECALL, 2, 0, ENTER.

Hooking Up To The Monitor

Attach connector cable #6 (398272) to the CM2000 SYNC & VIDEO OUTPUT jack. If the monitor uses an RCA phono jack as its video input connector, use a BNC to RCA phono adapter (such as Radio Shack #278-250) to connect the green BNC connector from cable #6 to

the monitor's video input jack. If the monitor uses a BNC jack as its video input connector, connect the green BNC connector from cable #6 directly to the monitor's video input jack.

Selecting Video Patterns

The video patterns you select for testing composite monitors will be the same as those you use for testing any other monitor, with one exception. The COLOR BARS pattern will be monochrome on both monochrome and color monitors. This is because the CM2000 does not produce the chroma subcarrier signal required by a color NTSC monitor to produce color. Also, since the monitor is being fed from just a single color output line, green in this case, the full monochrome signal normally seen from color bars is not present. The upper half of the screen will contain two half-intensity rectangles and the lower half of the screen will contain two full-intensity rectangles, with the remainder of the screen dark.

You will use the remainder of the video patterns and the other CM2000 testing features, including the troubleshooting drive signals, the same as with any other monitor you test. Consult the CM2000 Operation and Application Manual or Tech Tip for more information on using these features.

For more information,
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