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tech tips

Testing Monitors With The RG67 NTSC Video Monitor Adapter

What's Different About RGB Monitors?

Many newer video monitors use a special kind of input signal format called RGB (red, green, blue). RGB monitors use up to six different inputs for the required signals rather than one discrete input. This format gives these monitors the advantages of increased bandwidth and resolution. Since the inputs don't have to go through tuners, IF sections, or color demodulators, the resolution of the picture is much greater meaning the CRT can display much smaller pieces of information.

The problem service technicians face when servicing RGB monitors is supplying all of the required inputs at the same time. Some RGB monitors require up to six different inputs. Technicians can only supply one, maybe two of these inputs with conventional test equipment. If all of the input signals are not supplied, the picture may be missing some colors, it may be out of sync, or there may be no picture at all.

Using The RG67 With RGB Monitors

The RG67 NTSC Video Monitor Adapter extends the capability of the VA62 Universal Video Analyzer by providing all of the video and sync signals an RGB monitor requires in positive or negative polarity. With the 1 VPP into 75 ohm NTSC video source of the VA62 or VA48 feeding into the input of the RG67, the RG67 is ready to test and evaluate any NTSC compatible RGB monitor.

Hooking Up To The Monitor

Since the RG67 has all of the video and sync signals for testing RGB monitors, all of the monitor's inputs can be driven at the same time. There are two ways to connect to a monitor: 1. Use the supplied 39G199 test leads with individual E-Z Hooks, or 2. Use a special cable which matches the individual monitor's input connectors.

The 39G199 test leads are equipped with eight miniature E-Z Hooks® which may be connected directly to the monitor's input connectors. The color of each clip, the single letter abbreviation code, and the signal at each clip are explained in figure 2.

A special adapter cable lets you connect the RG67 directly to the input of your RGB monitor. You can build your own adapter with the 13A64 supplied cable, or use one of the optional cables listed in the manual.

Separate RGB Inputs

Instead of having only one video input, RGB monitors receive their video signals through three different inputs, red, green, and blue. Other video monitors are fed a composite video signal which is separated and processed inside the monitor's circuitry.

Many newer digital monitors use a special signal line called the ''I'' (intensity) line. Enabling this ''I'' line allows these digital monitors to produce eight more color combinatations.

These individual video test signals (red, green, blue, and I) are controlled by the VIDEO SIGNAL OUTPUT SELECT switches on the front panel of the RG67. Each signal is controlled by a separate switch (on or off) for complete color testing of the monitor.

Setting Up The Sync

Synchronizing the picture on RGB monitors is done in one of three ways:

Fig. 1: The RG67 NTSC Video Monitor Adaptor.

Clip Color	Code	RGB Monitor Signal
Red	R	Red Video
Green	G	Green Video
Blue	B	Blue Video
Gray	I	Video Intensity
Orange	H	Horizonal Sync
Yellow	V	Vertical Sync
Purple	C	Composite (V + H) Sync
Black	GND	Ground

Fig. 2: 39G199 test lead clip colors, clip codes, and respective RGB monitor signal.

1. Some RGB monitors use composite sync on a single sync input line. Vertical and horizontal sync are combined into one waveform using this method. This combined sync waveform is supplied through the clip lead marked ''C'' of the 39G199 output leads.

2. Many RGB monitors use two separate lines for sync, one for vertical sync, and one for horizontal sync. The RG67 has a separate output for each of these sync signals.

3. The third method of sync is accomplished by adding composite sync to one or more of the video (RGB) lines. The sync is then separated from the video signals inside the monitor. The RG67 lets you add this composite sync to one, two, or all three of the individual video signals. The COMPOSITE SYNC ADDER switches on the front panel control which color(s) the sync is added to.

Choose The Correct Polarity

Not only do RGB monitors use all of these video and sync signal inputs, but these signals can be positive or negative in polarity, or a combination of both. The most common polarity combination is positive video with negative sync, although some monitors may use different polarities. The most reliable method of determining the signal polarities is referring to the service literature for the RGB monitor being serviced.

The RG67 lets you match the polarities of its signals to the normal input signal polarities of the RGB monitor under test. Use the POLARITY SELECT switches to control the polarities of the video and/or the sync signals.

Adjustable Signal Levels

The output levels of the RG67 video and sync signals are controlled by the OUTPUT LEVEL control. Simply match the output level of the RG67's signals to the normal operating level of the monitor being tested (shown in the service literature). The levels can be adjusted from 0 to 5 VPP.

Choosing The Format (Analog Or Digital)

RGB signals come in one of two formats: analog or digital. An analog signal is a continuously varying signal capable of producing many shades of colors on monitors.

A digital signal, however, is a signal that is either on or off at a given point in time. Figure 5 shows the difference between an analog signal and a digital signal when

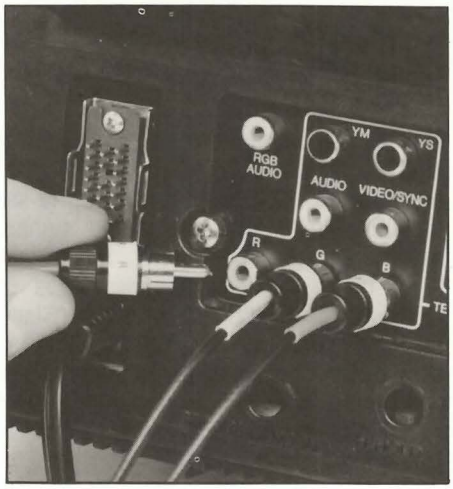


Fig. 3: A set of special leads lets you connect quickly to the RGB monitor.

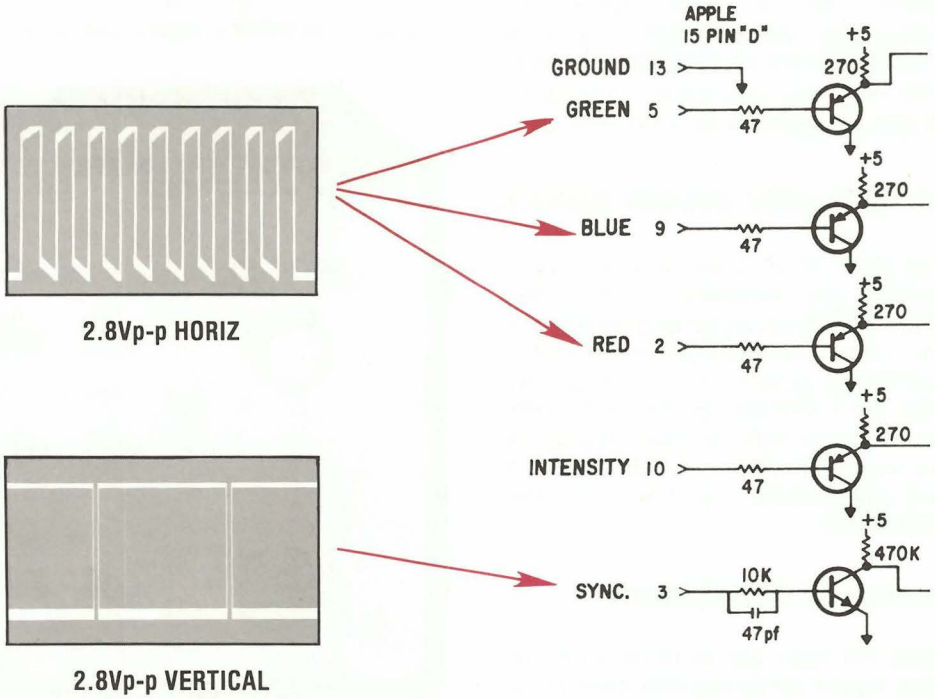
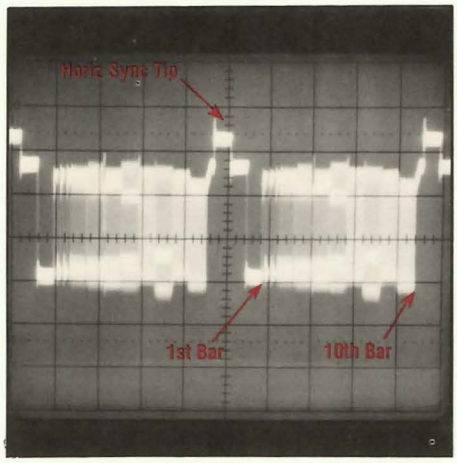
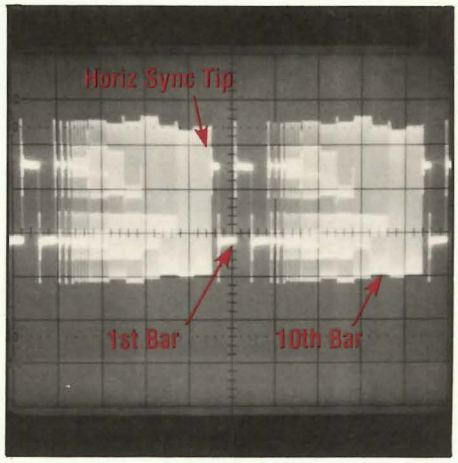


Fig. 4: For this monitor, the manufacturer shows an input of 2.8V for normal operation.



4A



4B

Fig. 5: Input video signals for RGB monitors. Fig. 4A shows an analog signal, while Fig. 4B shows a digital signal. Both figures show the VA62's Multiburst Barsweep pattern.

viewed on a scope. Since there are only two signal levels, on or off, there is a finite number of colors a digital monitor can reproduce (8, or 16 with the "I' line).

The RG67 allows you to test RGB monitors using either format of signal, analog or digital. Simply turn the MONITOR TYPE switch on the front panel to the type of monitor under test.

If you don't know which type of monitor you are servicing, connect the signals and set the MONITOR TYPE switch to each of its positions. Most digital monitors will give no picture when in the ANALOG position, but will provide video when set to DIGITAL. Most analog monitors, on the other hand, will produce a signal in both operating modes. Then, switch the VA62 VIDEO PATTERN switch to the 10 BAR STAIRCASE position (or the VA48 to the BAR SWEEP) to see whether the monitor provides various intensity levels between black and white. If the monitor produces different shades of gray, the monitor is an analog monitor.

RG67 Frees Up The VA62

Since the RG67 is supplying all of the RGB monitor's input signals, the VA62 is free to divide and conquer any problem the monitor may have. Use the VA62 drive signals to drive faulty circuits in the monitor while holding the good circuits in sync with the RG67 input signals.

RG67 Is NTSC Compatible

Most RGB monitors in use today are compatible with the NTSC (National Television Systems Committee) video format. With a few exceptions, most video monitors use this standard format. Figure 6 shows a summary of NTSC standards.

The RG67 is compatible with the standard NTSC system. This allows the RG67 to expand your VA62 or VA48 Video Analyzer to test nearly all of the RGB monitors on the market.

Summary of NTSC Television Standards	
Horizontal scan freq., Hz	15,734.26
Vertical scan frequency, Hz	59.94
Color Subcarrier, MHz	3.579545
Channel Bandwidth, MHz	6
Lines per frame	525
Lines per field	262.5
Frames per second	30
Fields per second	60
Fields per frame	2
Video Bandwidth, MHz	4.2
Video signal	AM
Audio signal	FM
Video Modulation	Negative
Aspect ratio	4:3

Fig. 6: Summary of the standards used by the NTSC format.