

## How To Set VCR FM Modulator Frequencies

FM modulator frequencies are little understood and seldom adjusted VCR performance parameters. Improperly adjusted, they can cause low contrast, weak color, compressed grey scale, or white streaking. Properly adjusted, they can give your customer a significant picture quality improvement. This Tech Tip covers a simplified method for setting a VCR FM modulator's Sync Tip (Carrier) Frequency and FM Deviation (peak white frequency).

### Understanding VCR FM Modulators

The Sync Tip Frequency control adjusts the DC bias to the FM modulator input (Figure 1). This adjustment controls the frequency that the modulator oscillates at when the lowest level signals (sync tips at 0 V) are present at the modulator input.

The Deviation control adjusts the amplitude of the video signal applied to the FM modulator. Since the sync tip level is clamped to 0 V earlier in the circuit, this control adjusts the voltage level of peak whites at the modulator input. Therefore, the Deviation Control controls the frequency the modulator oscillates at when peak white signals are present at the modulator input.

### Conventional Deviation Adjustment Procedures

Manufacturers usually specify one of the following methods for setting FM deviation:

1. You use an external RF generator to mix with the FM modulator signal. You then adjust the FM modulator's frequency until a beat occurs in the proper part of the output signal. Pitfall: The beat isn't always easy to see and it is easy to adjust to a "false beat", as the manufacturers warn you.

2. You use a DC supply to bias the FM modulator to the peak white frequency.

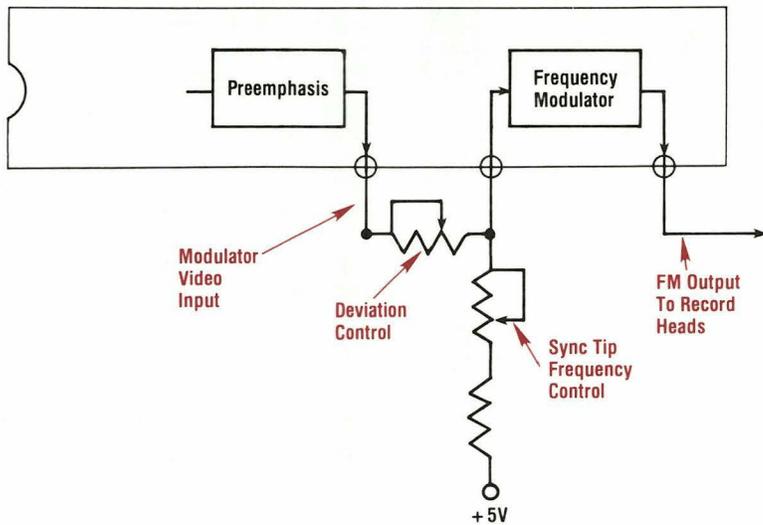


Fig. 1: Properly adjusted FM Modulator controls are essential for a top quality video recording.

You then adjust the deviation control until the video signal's peak white level matches the DC bias level. Pitfall: This method sounds easier, but often involves hard-to-access test points and requires a very fine adjustable DC supply.

3. You first set the playback circuits for the correct output level. You then make a recording and play back the recorded signal while checking for the correct playback level. If the level is incorrect, you adjust the deviation control slightly and make another recording. Pitfall: You must continue in this trial and error manner until you obtain the correct output level.

While all of these methods work, they aren't as easy as they should be to save you time. Let's discuss a faster and easier method for making these adjustments; one that works on any type VCR.

### Simplified Adjustment Method Saves You Time

The VA62A video patterns, along with the SC61 Waveform Analyzer, provide an easy

way to check or set the FM modulator frequencies for recording. There are a couple of advantages to this method. You don't need a separate signal generator and you won't adjust the circuit for a "false beat." You only need to access one point in the VCR (a test point is usually provided), and you don't need to switch back and forth between record and playback for a trial and error adjustment.

This simplified method basically consists of using your VA62A to supply the proper signal to the VCR in record mode and using your SC61 to measure the FM modulator output frequencies. Here's how.

### To Check Or Adjust The Sync Tip (Carrier) Frequency:

- 1. Connect VA62A VCR STANDARD output jack to the VCR video input jack.
- 2. Select Multiburst Bar Sweep and release all the BAR SWEEP INTERRUPT buttons (gives you a 100% black raster).

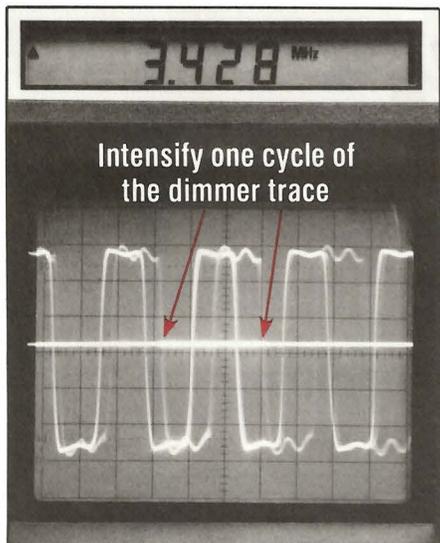


Fig. 2: With a black raster input, the sync tip signal is easily identified as the dimmer of the two traces. Use 1/DELTA TIME to measure its frequency.

3. Connect SC61 CHANNEL A probe to the FM modulator output. Turn the TIMEBASE control to .1 usec and place the TRIGGER MODE switch in the AUTO position. Adjust the VOLTS/DIVISION knob to make the signal at least 5 divisions high. Push the 1/DELTA TIME pushbutton.

**NOTE: The FM modulator will be at the black frequency for the duration of scan time and at the sync tip frequency during retrace time. You will see both of these two signals on your SC61. Since sync time is short compared to trace time, the sync tip signal will be the dimmer of the two signals (Figure 2).**

4. Set the CHANNEL B INPUT COUPLING switch to the ground position, push the A&B button, and adjust the CHANNEL B VERTICAL POSITION control to position the CHANNEL B trace in the middle of the CHANNEL A signal. Use the SC61 DELTA BEGIN and DELTA END controls to intensify one cycle of the dimmer sine wave signal (the intensified CHANNEL B trace just touches the signal on both ends) and read the sync tip frequency on the digital display. It should be very close to the frequency specified in the service literature or in Figure 3.

5. What to do if the Sync Tip frequency is off:

A. Set the left edge of the Delta Bar to a point on the dimmer sine wave signal at the left edge of the SC61 screen (a crossing of the CHANNEL B trace).

B. Adjust the right edge of the Delta Bar until the proper Sync Tip frequency is shown on the digital display.

C. Adjust the VCR's Sync Tip Frequency control until exactly one cycle of the signal is intensified (CHANNEL B trace crossing occurs at the right edge of the Delta Bar).

	Sync Tip (Carrier)	Peak White (Deviation)
VHS	3.4 MHz	4.4 MHz
Super VHS	5.4 MHz	7.0 MHz
Beta	3.6 MHz	4.8 MHz
Beta Hi-Fi	4.0 MHz	5.2 MHz
Super Beta	4.4 MHz	5.6 MHz
U-Matic (3/4")	3.9 MHz	5.4 MHz

Fig. 3: Use available service literature, or this chart, to determine the proper FM modulator frequencies for the type of VCR you are servicing.

**To check or adjust the Deviation Frequency (Peak White Frequency):**

1. Connect VA62A VCR STANDARD output jack to the VCR video input jack.

2. Select CHROMA BAR SWEEP and release the 3.0, 3.5, and 4.0 MHz BAR SWEEP INTERRUPT buttons (gives you a 100% peak white raster).

3. Connect SC61 CHANNEL A probe to the FM modulator output. Turn the TIMEBASE control to .1 usec and place the TRIGGER MODE switch in the AUTO position. Adjust the VOLTS/DIVISION knob to make the signal at least 5 divisions high. Push the 1/DELTA TIME pushbutton.

**NOTE: The FM modulator output will be at the peak white frequency for the entire scan time. During retrace it switches to sync tip and burst level frequencies. You will see all of these signals on your SC61. Since white scan time is long compared to retrace time, the peak white signal you want to measure will be the brightest trace. The other signals will be dim in comparison (Figure 4).**

4. Set the CHANNEL B INPUT COUPLING switch to the ground position, push the A&B button, and adjust the CHANNEL B VERTICAL POSITION control to position the CHANNEL B trace in the middle of the

CHANNEL A signal. Use the SC61 DELTA BEGIN and DELTA END controls to intensify one cycle of the brightest sine wave signal (the intensified CHANNEL B trace just touches the signal on both ends) and read the deviation (peak white) frequency on the digital display (Figure 4). It should be very close to the frequency specified in the service literature or in Figure 3.

5. What to do if the Deviation frequency is off:

A. Set the left edge of the Delta Bar to a point on the brightest sine wave signal at the left edge of the SC61 screen (a crossing of the CHANNEL B trace).

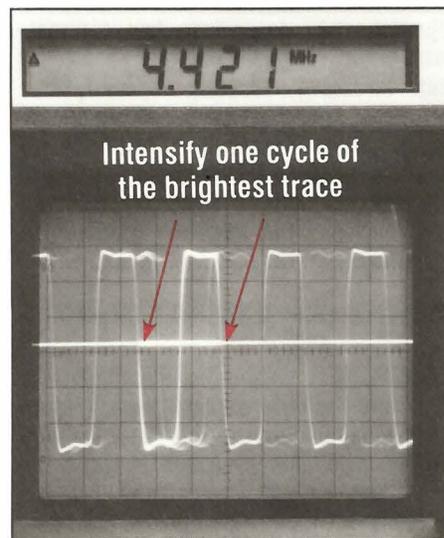


Fig. 4: With a white raster input, the peak white signal is easily identified as the brightest trace. Use 1/DELTA TIME to measure its frequency.

B. Adjust the right edge of the Delta Bar until the proper deviation frequency is shown on the digital display.

C. Adjust the VCR's Deviation control until exactly one cycle of the signal is intensified (CHANNEL B trace crossing occurs at the right edge of the Delta Bar).

**For More Information Call Toll Free 1-800-SENCORE**

**SENCORE**  
3200 Sencore Drive, Sioux Falls, South Dakota 57107