Setup Procedure for Production

The following steps are required for proper setup and operation of the M1700.

1.0 Modulation Adjustment

Transmitter modulation adjustments are required when non-standard video signals are transmitted. Figure 9 shows a video signal (with averaging on) that contains NTSC standard timing but non-standard video levels. The red line marker shows a .34Vdc shift for blanking, and sync tip amplitude is only .18Vdc as indicated by the blue line marker. In order to maintain proper video scaling between sync tip and maximum video level the maximum peak to peak voltage of video would be .64V. Any voltage over this value would result in an over-white condition and over-modulation would occur which would result in white streaks or tearing in the video image.

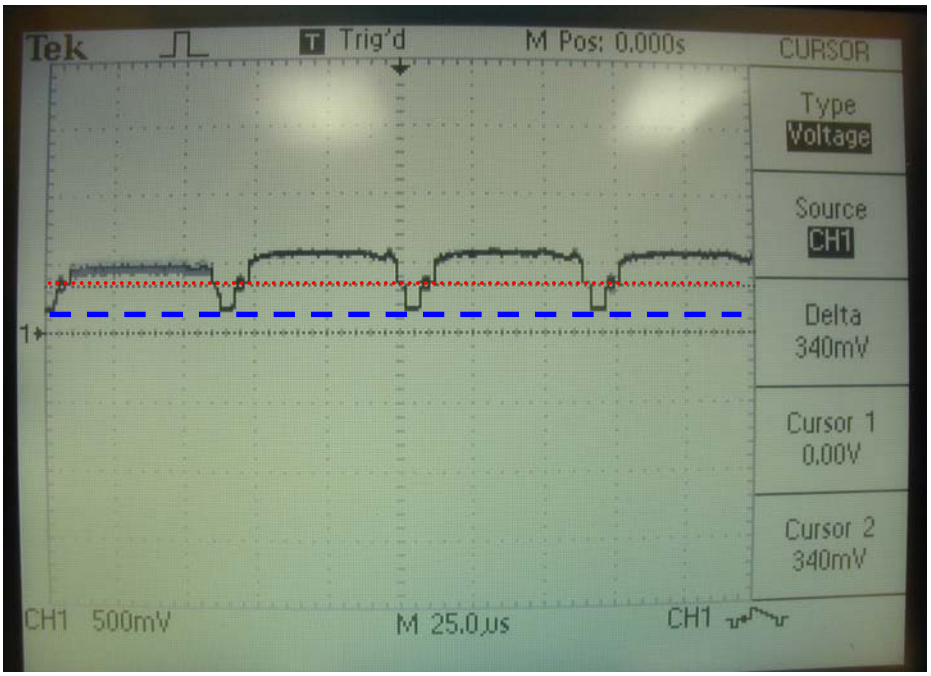

Figure 1 Non-Standard Video Level Output

The M1700 modulation circuit is based off of a monolithic VCO with a tuning sensitivity of 140MHz/V. Through software and passive circuit design the tuning sensitivity is reduced to about 25MHz/V. That means that .1V over a .64Vp-p video signal will change the RF bandwidth from 8MHz to 10.5MHz. Since the receiver is set for an 8MHz RF channel you will lose the modulated video information that exists outside this 8MHz

channel. The result will be white steaks or tearing in video when over-modulation[1] is present.

To adjust the modulation level to accommodate the video signal in Figure 9, you will need the following items.

1. Function generator capable of a DC offset square wave at 1.5 KHz.
2. Oscilloscope capable of viewing line video information.
3. Spectrum Analyzer with a RBW of 30kHz and capable of measuring an RF signal up to 2.5GHz

Step1

Setup the function generator to output a 1.5 KHz .64Vp-p square wave and add a plus .34Vdc shift.

Step2

Power up the transmitter and apply the test signal to the video input port of the transmitter. Be mindful of the impedance mismatch possibility between the function generator and the video port on the transmitter. If there is a mismatch you will need to adjust the amplitude of the test signal back to .64Vp-p.

Step3

Using a spectrum analyzer measure the deviation from the nominal carrier frequency and adjust this deviation until you have a deviation of .5 MHz.

At this point all that is left is to apply the actual signal in Figure 9 to test the adjustment and you're done. Verifying this measurement insures that the spectral mask is within the limitations defined by Part 90 of the FCC Rules and Regulations (Fig. 11**). Failure to do so will void the transmitter's FCC compliance and it will be unlawful to operate the unit in the United States.**

For situations where the above mentioned test equipment is not available and jurisdiction allows, simple comparative measurements can be made between non-transmitted and transmitted images.

[1] Over-modulation in FM occurs when the deviation exceeds the maximum allowable for the desired RF channel.

As a baseline, apply the video signal of the target video source directly to a display device and carefully observe the image in terms of resolution and brightness. Next, apply the video source to the transmitter and observe the received video image and adjust the modulation input until the received image matches the baseline image in resolution and brightness. Typically, attention is given to the brightness level as this is what is affected most by non-standard video levels. Once the modulation level is adjusted for a matching picture a “black to white” test needs to be performed in order to insure that an over-white condition does not tear the video image. “White streaks” in the image usually is a result of over-modulation. “Black streaks” or “a dim image” can be attributed to under-modulation[2]. Moving a soldering iron in and out of the scene several times works well for this test. The image should not tear upon white out. If it does, continue to adjust the modulation level until the over-modulation or under-modulation condition stops.

It should be made aware that this is an approximate method for setting the deviation level of the transmitter and is subject to the display device, FM receiver and video source levels being known good constants if this is to become the chosen method of adjustment for production. **This procedure is not recommended for transmitters being used in the United States and doing so will void FCC compliance.**

1.1 RF Power Output Adjustment

The M1700 is adjustable for power levels from 1mW up to 1000mW. The adjustment can be achieved by manually rotating the adjustment potentiometer. It is important to remember that increasing the RF power output also increase the power required to operate the transmitter and careful consideration should be given to the power supply circuits selected. Please refer to Section 4.2 for more information.

[2] Under-modulation in FM occurs when the maximum deviation is 20% or more below the maximum allowable for the desired RF channel.