

THREE YEAR LIMITED WARRANTY

R.L. DRAKE COMPANY warrants to the original purchaser this product shall be free from defects in material or workmanship for three (3) years from the date of original purchase.

During the warranty period the R.L. DRAKE COMPANY or an authorized Drake service facility will provide, free of charge, both parts and labor necessary to correct defects in material and workmanship. At its option, R.L. DRAKE COMPANY may replace a defective unit.

To obtain such warranty service, the original purchaser must:

- (1) Retain invoice or original proof of purchase to establish the start of the warranty period.
- (2) Notify the R.L. DRAKE COMPANY or the nearest authorized service facility, as soon as possible after discovery of a possible defect, of:
 - (a) the model and serial number,
 - (b) the identity of the seller and the approximate date of purchase; and
 - (c) A detailed description of the problem, including details on the electrical connection to associated equipment and the list of such equipment.
- (3) Deliver the product to the R.L. DRAKE COMPANY or the nearest authorized service facility, or ship the same in its original container or equivalent, fully insured and shipping charges prepaid.

Correct maintenance, repair, and use are necessary to obtain proper performance from this product. Therefore carefully read the Instruction Manual. This warranty does not apply to any defect that R.L. DRAKE COMPANY determines is due to:

- (1) Improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specifications of the original parts.
- (2) Misuse, abuse, neglect or improper installation.
- (3) Accidental or intentional damage.

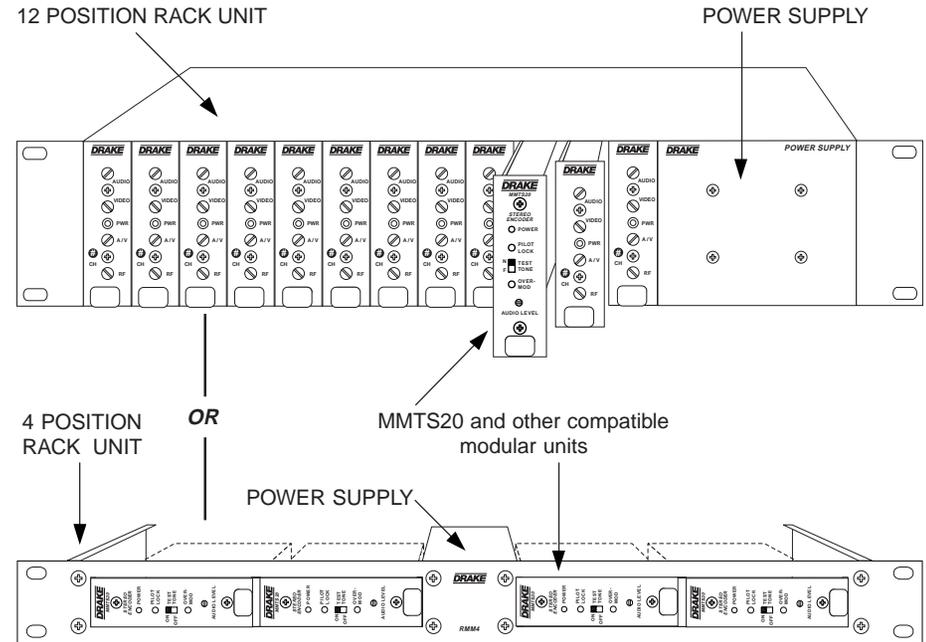
All implied warranties, if any, including warranties of merchantability and fitness for a particular purpose, terminate three (3) years from the date of the original purchase.

The foregoing constitutes R.L. DRAKE COMPANY'S entire obligation with respect to this product, and the original purchaser shall have no other remedy and no claim for incidental or consequential damages, losses or expenses. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusions or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty shall be construed under the laws of Ohio.



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The R.L. Drake MMTS20 is an MTS stereo encoder which accepts left and right channel audio input and generates a composite BTSC format stereo signal. The composite signal is applied to the audio input of a compatible audio/video modulator. The modular design of the MMTS20 permits convenient pairing with a Drake Mini-rack fixed channel or agile type Video Modulator in a multiple unit rack configuration.

Rear panel left and right audio inputs allow either balanced or unbalanced operation. The MMTS20 must be supplied with the modulator video in order to provide the MMTS20 with sync information for the encoding process. A front panel Audio Level control with corresponding Overmodulation indicator permits setting the proper audio input levels to the MMTS20.

A Pilot Lock indicator is provided to verify that the encoder is properly synchronized to the supplied video horizontal sync. A built-in audio test tone generator, turned on or off from a front panel switch, is provided for calibration of the modulator Audio Input level.

As previously described, front panel controls include Audio Level and Test Tone switch. Front panel indicators are Power, Pilot Lock, and Overmodulation. A rear panel 'F' type connector is provided for the video sync reference. Left and right audio inputs are through rear panel 3.5 mm 'stereo' type receptacles. The composite BTSC signal output is through a rear panel RCA type phono connector. The unit is powered by a compatible Drake Mini-rack power supply module.



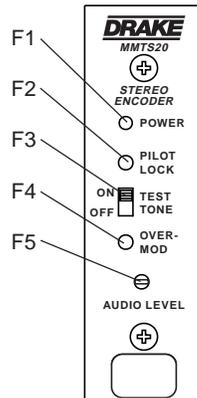


Figure 1

F1 - POWER Indicator

Lights when the unit is connected to the required source of DC power.

F2 - PILOT LOCK Indicator

Lights to indicate that a video signal is applied to the rear panel VIDEO INPUT connector and that the MMTS20 is locked to the video horizontal sync.

F3 - TEST TONE Switch

Switch to the 'ON' position to enable an internal test tone to aid system audio level setup. See the 'Installation' section of this manual for setup information. The normal position of this switch is the 'OFF' position.

F4 - OVERMODULATION Indicator

Lights to indicate greater than 25 kHz of main channel deviation. After system audio modulation levels are properly set, and with left and right audio source input, adjust the AUDIO LEVEL control (see item F5) to a point where the OVERMODULATION indicator just remains off.

F5 - AUDIO LEVEL Control

The setting of this screwdriver adjustment determines the audio input signal level. After system audio modulation levels are properly set, and with left and right audio signals within the 250 mVrms to 2.5 V rms range, set this control to a point where the OVERMODULATION indicator just remains off (see item F4).

AUDIO INPUT

Input Impedance: 40 K Ohms balanced,
20 K Ohms unbalanced.
Input Level: 250 mVrms to 2.5 V, front panel adjustment.

VIDEO INPUT

Input Impedance: High impedance, intended to be paralleled with paired A/V modulator unit.
Input Level Range: Input Level Range: 0.5 Vp-p to 2 Vp-p.

COMPOSITE OUTPUT

Output Impedance: 100 Ohms, intended to drive high impedance audio input of paired A/V modulator.
Output Level: 10 mV/kHz, $\pm 10\%$.
1.1 Vp-p for a 100% modulation signal.

STEREO PERFORMANCE

Stereo Separation: Greater than 20 dB.
Total Harmonic Distortion: Less than .25%.
S/N Ratio: Greater than 65 dB.
Frequency Response: Within ± 1 dB from 40 Hz to 12.5 kHz.
Spurious Subcarrier: -50 dBc typical.
NOTE: System performance is dependant upon paired modulator.

TEST TONE

Frequency: 10.396 kHz ± 50 Hz.
Amplitude: 0.5 Vp-p $\pm 10\%$; all output levels are calibrated to the level of this tone and is used to set system audio levels for proper stereo operation. The paired A/V modulator audio response must be set for "Flat" (pre-emphasis defeated).

GENERAL

DC Power Input: +12 V $\pm 5\%$ @ 150 mA
(+5 V is not required for this unit).
Operating Temperature Range: 0° C to +50° C ambient.
Size: 1" W x 3.5" H x 7.5" D
(2.5 cm) W x (8.9 cm) H x (19.1 cm) D.
Weight: 10.7 oz. (0.3 Kg).

4) Set the MMTS20 'TEST TONE' switch to the 'OFF' position. Connect Left and Right audio source signals to the MMTS20.

5) Set the 'Audio LEVEL' control on the MMTS20 to a point where the 'OVERMODULATION' indicator just remains off or flashes occasionally.

The system audio levels are now properly set. Disconnect the test equipment.

METHOD 2: (If a spectrum analyzer is not available).

1) Connect the MMTS20, A/V modulator, compatible DC power source, and video source signal as shown on this page. Keep the 'TEST TONE' switch 'OFF' for this procedure.

2) Connect a TV receiver (with MTS stereo capability) to the A/V modulator. Tune the TV receiver to the same channel as the modulator output.

NOTE: Make certain that the audio response of the A/V modulator is set for 'FLAT' (pre-emphasis defeated).

3) Connect the audio source signal (not a tone) to either the LEFT or the RIGHT Audio Input of the MMTS20.

4) Set the 'Audio LEVEL' control on the MMTS20 to a point where the 'OVERMODULATION' indicator just remains off or flashes occasionally.

5) While monitoring the opposite audio channel from the TV receiver audio output, set the 'Audio' level control on the A/V modulator for a maximum (stereo) separation condition.

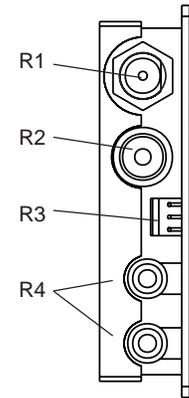
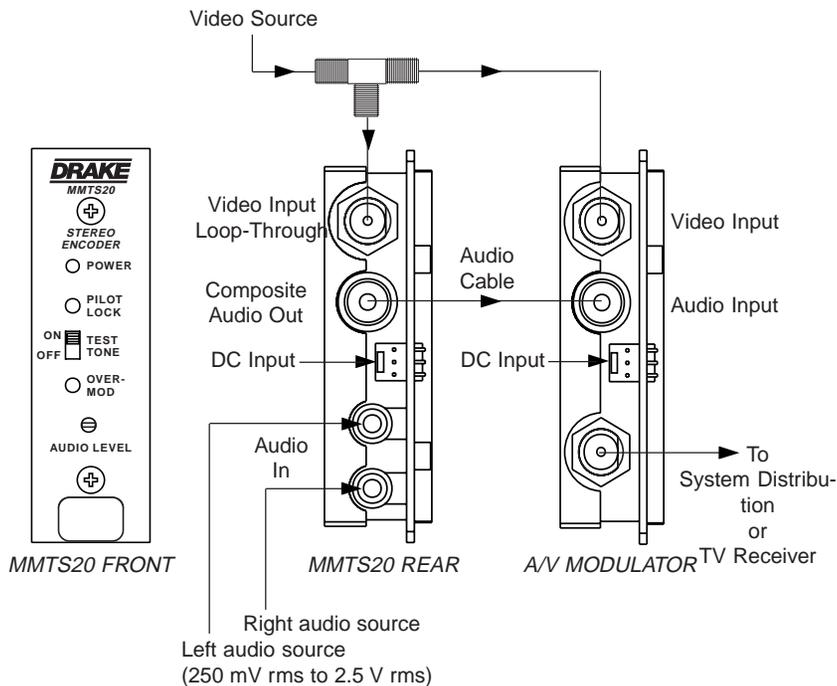


Figure 2

R1 - VIDEO INPUT Connector

This is the baseband video input to the MMTS20 which provides the encoder circuitry with the modulator horizontal sync information. The baseband video to the modulator must be 'looped through' this input using an external 'F' type Tee (T) connector.

R2 - COMPOSITE AUDIO OUT Connector

This is the unbalanced composite BTSC format stereo signal output. The output from this RCA phono receptacle must be connected to the AUDIO INPUT of the modulator. The connected modulator audio response must be set for 'Flat' (pre-emphasis defeated).

R3 - DC INPUT Connector

This 3-pin connector (Male) accepts the appropriate mating DC power cable. Observe proper orientation and wiring.

R4 - LEFT AUDIO INPUT/RIGHT AUDIO INPUT Connectors

These are the left and right audio source input connectors that accept either a balanced or unbalanced configuration. Use the Tip (+) and Ring (-) of a mating male 3.5 mm 'stereo' plug for a balanced connection. If an unbalanced input is required, the Ring (-) contact should be connected to ground (shield) with the audio hot connected to the Tip (+).

CONNECTIONS AND CONTROLS

All connections to and from each modulator are made through the rear panel. Figure 3 illustrates an installation with (11) modulator units combined through a passive signal combiner. Additional channels can be added by using additional fixed channel or agile type modulators and either multi-port combiners or combinations of two-port combiners.

INSTALLATION NOTES

Level adjustment provides optimum performance in multichannel installations. The modulator outputs should be checked periodically with a spectrum analyzer to

maintain a ± 1 dB variation of adjacent channel carriers. Aural/Visual (A/V) ratios should be held to -15 dB or less. The output 'RF' and 'A/V (Ratio)' controls are used respectively to make these adjustments.

RACK MOUNTING

Adequate ventilation is very important in multichannel installations. Some air movement is mandatory in enclosed rack cabinets. Excessive heat will shorten component life and modulator performance will be degraded without proper cooling.

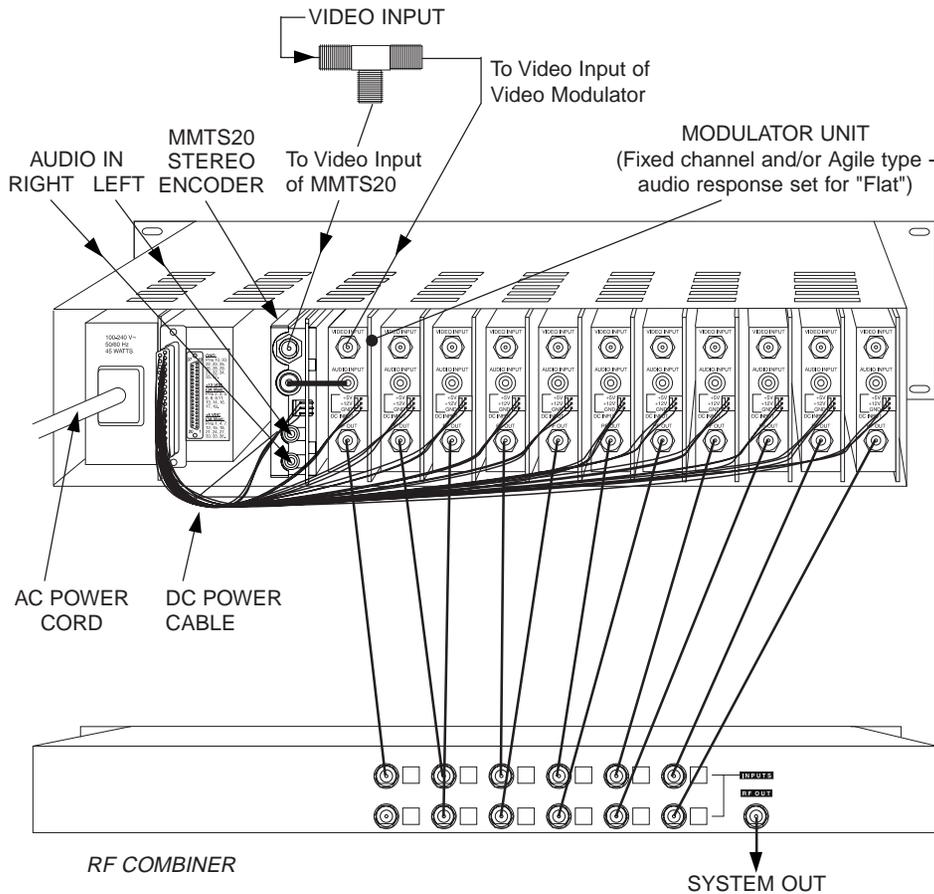
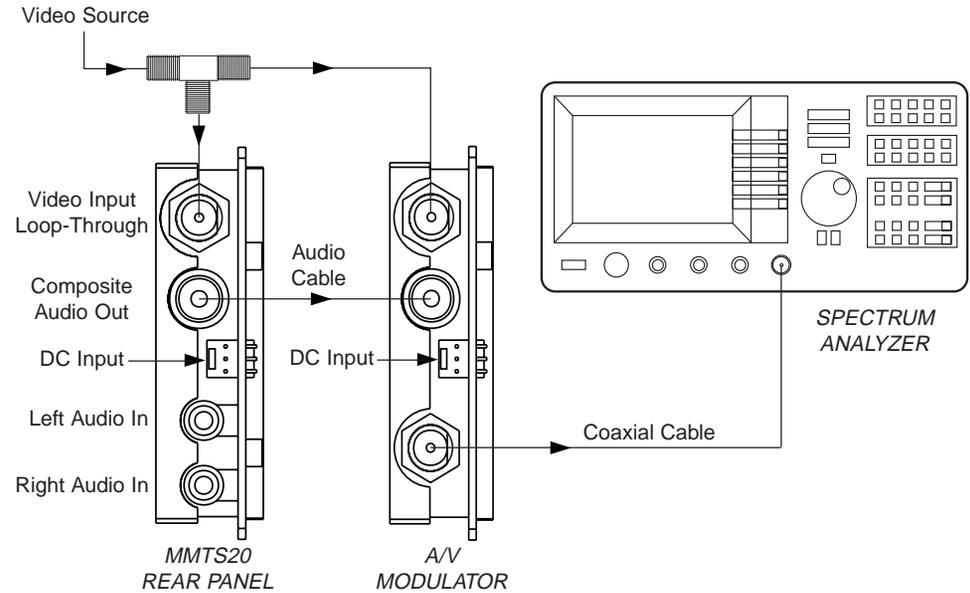


Figure 3

METHOD 1:

Connect the MMTS20, Audio/Video Modulator, compatible DC power source, video source signal and test equipment as shown.

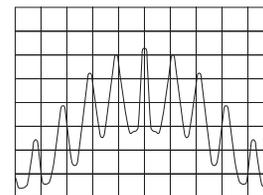
Make certain that the audio response of the A/V modulator is set for 'FLAT' (pre-emphasis defeated).



1) Set the 'Test Tone' switch on the front panel of the MMTS20 to the 'ON' position.

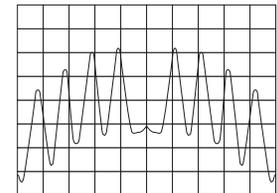
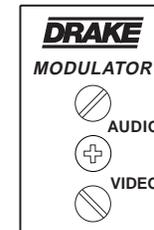


2) Using the connected spectrum analyzer, tune the aural carrier to the center of the screen. Spectrum Analyzer Settings:
SPAN: 100 kHz.
Res BW: 1 kHz.
SWEEP: 300 mSec.
VBW: 1 kHz.



Aural Carrier Centered

3) Adjust the 'Audio Level' control on the front panel of the connected A/V modulator for a setting that nulls the aural carrier. If more than one null is found, use the lowest audio gain setting that produces a null of the aural carrier.



Aural Carrier Null