

**THREE YEAR LIMITED WARRANTY**

R.L. DRAKE HOLDINGS, LLC 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, R.L. DRAKE HOLDINGS, LLC 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 HOLDINGS, LLC 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 R.L. DRAKE HOLDINGS, LLC 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 R.L. DRAKE HOLDINGS, LLC 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 HOLDINGS, LLC 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.

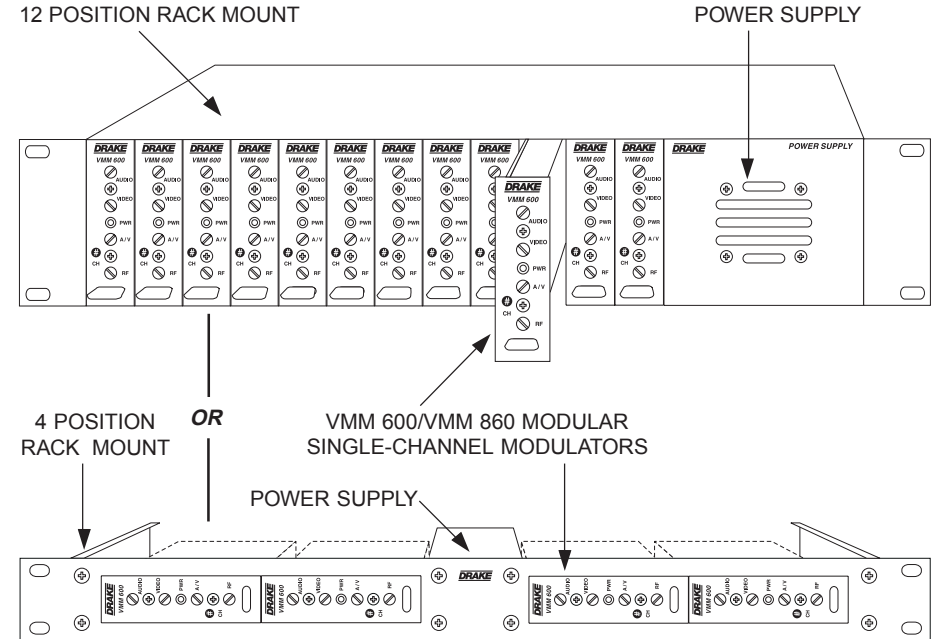
The foregoing constitutes R.L. DRAKE HOLDINGS, LLC'S entire obligation with respect to this product, and the original purchaser shall have no other remedy and no claim for incidental or consequential damages, losses or expenses. Some states do not allow limitations on how long an implied warranty lasts 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.

**SPECIFICATIONS**

RF	VIDEO (continued)
Frequency Range: VMM600- 54-600 MHz. Factory set to one of the following channels: Cable Channels 1-86, 95-99 or UHF-TV Channels 14-35.	Differential Gain: $\pm 3\%$ (10 to 90% APL). Differential Phase: $\pm 3$ degrees (10 to 90% APL). C/L Delay: Within 50 nSec. of 0 nSec. (standard), or FCC pre-distortion, (option).
VMM860- 600-864 MHz. Factory set to one of the following channels: Cable Channels 87-135 or UHF-TV Channels 36-69.	
Output Level: +45 dBmV, minimum. Adjustable over a 12 dB range.	<b>AUDIO</b> Input Level for 25 kHz Peak Deviation: 100 mV to 2.5 Vrms; manual gain adjustment with front panel control. Input Impedance: 10 K Ohms, unbalanced. Pre-Emphasis: 75 $\mu$ S. (Defeatable via jumper setting for BTSC baseband stereo compatibility).
Output Impedance: 75 Ohms, return loss of 12 dB. A/V Ratio: referenced to video carrier, adjustable.	Frequency Response: 40 Hz to 15 kHz, $\pm 1.0$ dB referenced to 75 $\mu$ S pre-emphasis curve. (40 Hz-100 kHz $\pm 0.5$ dB if pre-emphasis is defeated).
Frequency Stability: $\pm 5$ kHz (Visual Carrier). Inter-carrier Frequency: 4.5 MHz, $\pm 50$ Hz. FCC Frequency Offsets: All aeronautical channels are offset positive.	4.5 MHz Inter-carrier Stability: $\pm 50$ Hz, frequency synthesized.
Spurious Outputs: -65 dBc, measured at -15 dB A/V ratio and with modulator output level of +45 dBmV.	Total Harmonic Distortion: 0.5% Maximum. Hum and Noise: -65 dB minimum, referenced to 25 kHz peak deviation.
Broadband Noise: -95 dBc, referenced to video carrier. (4 MHz BW and $\pm 36$ MHz offset).	
<b>VIDEO</b> Input level for 87.5% modulation: 1 Vp-p $\pm 3$ dB, manual gain adjust with front panel control. Input Impedance: 75 Ohms, return loss of 18 dB minimum. Frequency Response: 20 Hz to 4.2 MHz, $\pm 1$ dB. Video S/N: 65 dB minimum, luminance weighted.	<b>GENERAL</b> DC Power Input: +12 VDC @ 150 to 220 mA, channel dependant. Operating Temperature: +5 VDC @ 75 to 100 mA, channel dependant. Size: 0°C to +50°C. Weight: 1"W x 3.5" H x 7.5"D. 11 oz.

Specifications subject to change without notice or obligation.



The R.L. Drake VMM 600/VMM 860 Video Modulator System is a professional quality modular headend system designed to optimize rack space. Up to 12 VMM 600 and/or VMM 860 modulators can be racked alongside a single power supply in the Drake 12 position rack mount or up to 4 modulators can be racked in the 4 position rack mount. Either model is a high quality, fixed channel heterodyne audio/video modulator.

The VMM 600 provides a modulated visual and RF carrier output on any single VHF channel 2-13; Lowband channel A8; Midband channel A-I and A5-A1; Superband channel J-W; Hyperband channel AA-ZZ and AAA-XXX (CATV 63-86) or UHF channel 14-35. Aeronautical channels are offset positive with a tolerance of  $\pm 5$  kHz as required by FCC rules.

The VMM 860 provides a modulated visual and RF carrier output on any single Hyperband channel 87-135 or UHF channel 36-69.

The heterodyne conversion system, in conjunction with the use of a SAW filter, insures optimum vestigial selectivity for adjacent channel headends.

The modulators are designed to accept any standard audio/video source such as NTSC video and audio baseband signals from a satellite receiver, TV camera, videotape recorder, TV demodulator, or similar signal source.

The modulators accept standard (sync negative) polarity video at a 0.7 to 2.5 Vp-p level. All level controls are located on the front panel for ease of operation. Output level of +45 dBmV is typical and is adjustable from +30 to +45 dBmV.

Field-defeatable audio pre-emphasis enables passing of BTSC encoded standard baseband stereo audio signals. The Drake model MMTS20 stereo encoder may be used with the VMM when stereo audio is required.

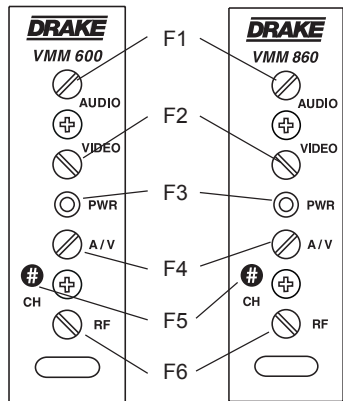


Figure 1

**F1 - AUDIO Level Control**

The setting of this screwdriver adjustment determines the peak aural carrier deviation. Clockwise rotation increases the carrier deviation.

**F2 - VIDEO Level Control**

The setting of this screwdriver adjustment determines the video modulation level. Clockwise rotation increases the modulation depth.

**F3 - POWER Indicator**

Lights when the unit is connected to the required source of DC power via the rear panel DC INPUT connector.

**F4 - A/V Ratio Control**

This screwdriver adjustment varies the level of the aural carrier over a range from 12 to 19 dB below the visual carrier. The aural carrier should be adjusted to approximately 15 dB below the visual carrier (normal operation). Clockwise rotation increases the aural carrier level and thus decreases the A/V ratio.

**F5 - "CH#" (Channel)**

The modulator is factory aligned to the channel number indicated.

**F6 - RF Output Level**

This screwdriver adjustment permits decreasing the RF output level approximately 12 dB below its specified output level as the control is rotated counterclockwise. The maximum output level is set with the adjustment fully clockwise.

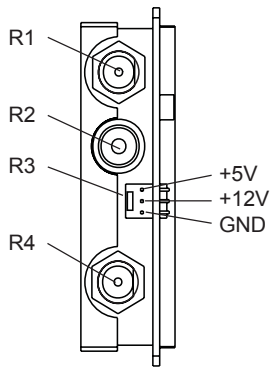


Figure 2

**R1 - VIDEO INPUT Connector**

This is the baseband video input to the IF circuits. This input accepts baseband input thru 4.2 MHz video at levels from 0.7 Vp-p to 1.5 Vp-p.

**R2 - AUDIO INPUT Connector**

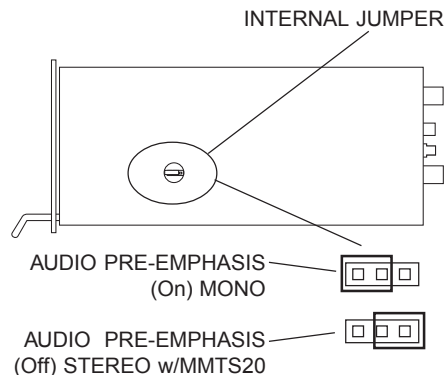
This is an unbalanced audio input to the IF circuits. This "RCA" (phono) connector input accepts baseband thru 15 kHz audio at a nominal level of 250 mV RMS (approximately 0 dBm). NOTE: An externally accessible test point jumper defeats the audio pre-emphasis for stereo capability.

**R3 - DC INPUT Connector**

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

**R4 - RF OUTPUT Connector**

This is the modulator output.



**CONNECTIONS AND CONTROLS**

All connections to and from each modulator are made through the rear panel. Figure 3 illustrates an installation with 12 modulator units combined through a passive signal combiner. Additional channels can be added by using additional VMM 600 or VMM 860 modulators and either multi-port combiners or combinations of two-port combiners.

**INSTALLATION NOTES**

Level adjustment provides optimum performance in multi-channel installations. The modulator outputs should be checked periodically with a spectrum analyzer to maintain a  $\pm 1$  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 multi-channel installations. Units should be spaced apart by at least one panel height wherever possible, and some air movement is advisable in enclosed rack cabinets. Excessive heat will shorten component life and modulator performance will be degraded without proper cooling.

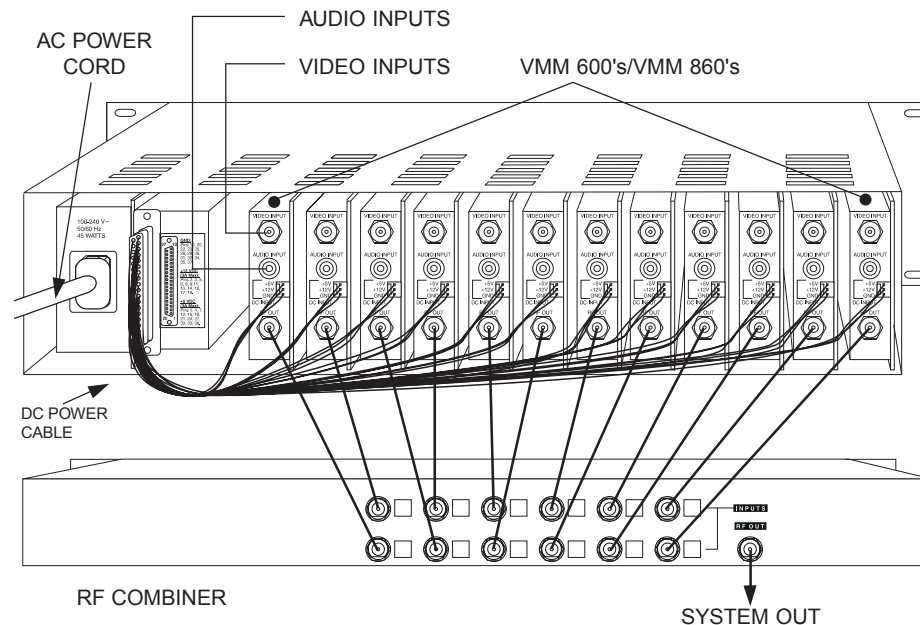


Figure 3



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