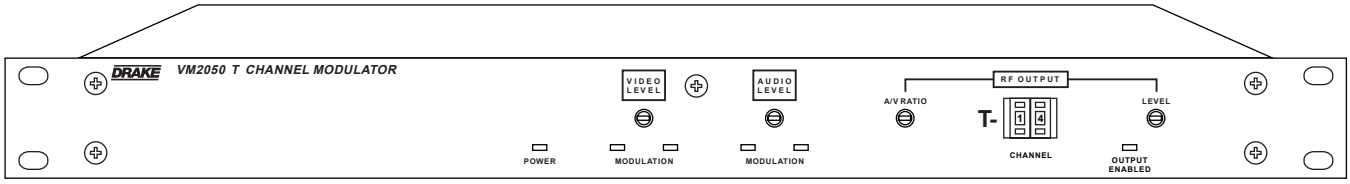
VM2050 Commercial T Channel Video Modulator



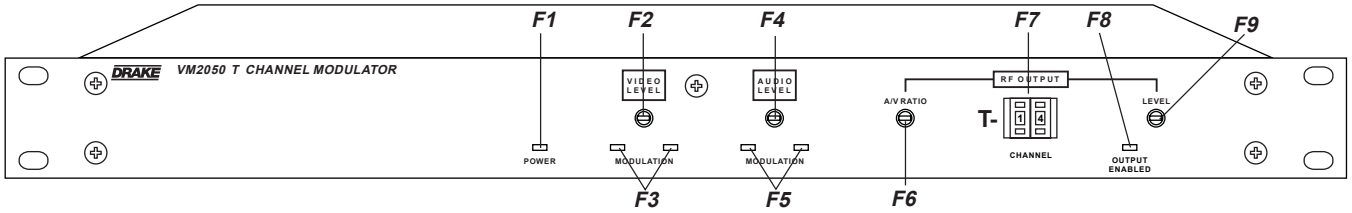
DESCRIPTION

The R.L. Drake VM2050 Video Modulator is a high quality, vestigial sideband unit with synthesized visual and audio carriers. The VM2050 is designed to accept video and audio baseband signals from a camera, VCR, or similar equipment for the purpose of sending remote source information back to the headend of a SMATV or cable distribution system. Front panel video and audio level controls with accompanying modulation indicators permit setting the proper modulation levels. The A/V ratio and RF output level controls are also provided on the front panel. Composite video/audio IF input and output is also provided. Synthesized operation provides complete frequency agility, allowing front panel selection of any standard T Channel from T7 through T14.

The modulator accepts standard (sync negative) polarity video at a 0.7 - 1.5 Vp-p level. A high quality IF SAW filter eliminates adjacent channel interference.

IF loop-thru capability in the VM2050 supplies a padded IF output prior to channel conversion. This feature provides the capability to replace the standard internally generated IF output with an alternate source of composite IF, or allows insertion of IF scrambling equipment. All of the mentioned features, combined with a carefully designed low intermodulation output stage, permits adjacent channel operation so that multiple T channel signals can be combined and sent to the headend of a SMATV or cable distribution system.

FRONT PANEL CONTROLS and INDICATORS



F1 - POWER Indicator
Lights when the unit is connected to a source of AC power.

F2 - VIDEO LEVEL Control
The setting of this screwdriver adjustment determines the video modulation level. Clockwise rotation increases the depth of modulation. After installing the unit, and with a nominal 1 Vp-p video source connected, adjust the VIDEO LEVEL control to a point where the red LED modulation indicator (see item F3) just remains off (87.5% depth of modulation). It is normal for the green modulation indicator to be on with only sync level video input.

F3 - MODULATION Indicators (Video)
The green LED will be turned on continuously with sync level or higher video input. An overmodulation condition is noted with the red LED turned on continuously. The VIDEO LEVEL control should be set to a point where the red LED just remains off (see item F2).

F4 - AUDIO LEVEL Control
The setting of this screwdriver adjustment determines the audio deviation level. Clockwise rotation increases the level. After installing the unit and with a nominal 250 mV RMS (approximately -10 dBu) audio source connected, adjust the AUDIO LEVEL control to a point where the green LED is turned on continuously and the red LED just remains off (25 kHz peak deviation).

F5 - MODULATION Indicators (Audio)
The green LED will be turned on continuously for peak deviations of approximately 2.5 kHz (10% of 25 kHz maximum) or greater. An overmodulation condition is noted with the red LED turned on continuously. The AUDIO LEVEL control should be set to a point where the red LED just remains off (see item F4).

F6 - A/V RATIO Control
This screwdriver adjustment varies the level of the aural carrier over a range from 10 to 20 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.

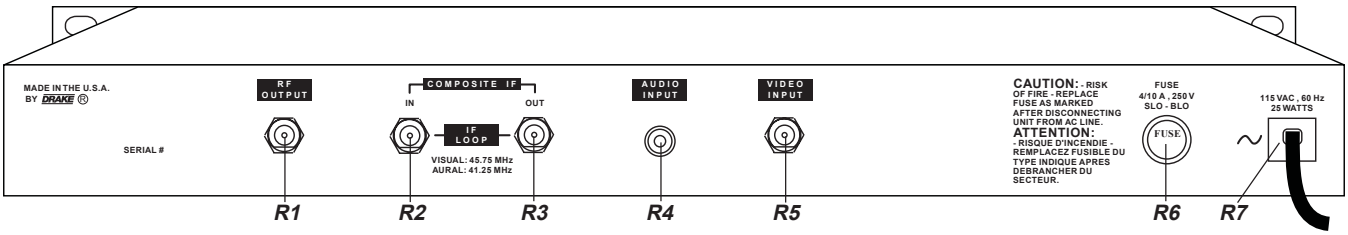
F7 - CHANNEL Switch
These pushwheel switches allow the selection of the desired operating channel from T07 to T14. See Table 1 - CHANNEL ASSIGNMENTS for the list of corresponding operating frequency for each channel number.

F8 - OUTPUT ENABLED Indicator
Lights to indicate a valid channel is selected. The RF output is switched off for any invalid channel settings or other conditions that would cause the unit to operate on an invalid frequency.

F9 - RF OUTPUT LEVEL Control
This screwdriver adjustment varies the RF OUTPUT level. Clockwise rotation increases the level.

Rear Panel Connections / Specifications

REAR PANEL CONNECTIONS



R1 - RF OUTPUT
This is the modulator output.

R2 - COMPOSITE IF IN Connector
This is the composite IF input to the synthesizer circuits. The composite IF has both the aural and visual IF combined. This connection is normally cabled directly to the "COMPOSITE IF OUT" connector (see item R3). This external IF loop allows the use of accessories such as scramblers or alternate video sources. Note that accessory equipment must also have the visual carrier at 45.75 MHz and the aural carrier at 41.25 MHz. Both input carriers must be at their nominally specified levels.

R3 - COMPOSITE IF OUT Connector
This is the composite IF output from the IF circuits. The composite IF provides a vestigial sideband filtered visual carrier at 45.75 MHz combined with a level controlled (15 dBc typical) aural carrier at 41.25 MHz. This connection is normally cabled directly to the "COMPOSITE IF IN" connector (see item R2).

R4 - AUDIO INPUT Connector
This is an unbalanced audio input to the IF circuits. This "RCA" (phono) connector input accepts baseband through 15 kHz audio at a nominal level of 250 mV RMS (approximately -10 dBu).

R5 - VIDEO INPUT Connector
This is the baseband input to the IF circuits. This input accepts baseband through 4.2 MHz video at levels from 0.7 Vp-p to 1.5 Vp-p.

R6 - FUSE
Always replace this fuse with one of the same type and rating: 4/10 Amp, 250 V SLO-BLO®, 5 x 20 mm type.

F7 - LINE CORD
This is a three-wire power cable. When the cable is connected to a properly wired AC power line outlet, this cable grounds the instrument cabinet. Connect to a nominal 115 VAC ±10%, 60 Hz source. Do not defeat the safety purpose of the attached line cord plug.

SPECIFICATIONS

RF

Frequency Range:	T Channels T7 - T14, (5.75 - 53.75 MHz).
Output Level:	+60 dBmV, (adjustable +50 to +60 dBmV).
Output Impedance:	75 Ohms.
A/V Ratio:	Audio carrier -20 to -10 dB referenced to video carrier, adjustable.
Frequency Stability:	± 10 PPM.
Intercarrier Frequency:	4.5 MHz ± 10 PPM.
Spurious Outputs:	-60 dBc typical; -58 dBc minimum, measured at -15 dB A/V ratio and with modulator output level of +60 dBmV.
In-Channel C/N:	65 dB typical.
Broadband Noise:	-75 dBc typical, referenced to video carrier. (4 MHz BW @ ±12 MHz offset).

VIDEO

Input Level for 87.5%:	1 Vp-p ±3 dB manual gain adjustment and front panel modulation indicators.
Input Impedance:	75 Ohms, return loss of 26 dB minimum.
Frequency Response:	20 Hz to 4.2 MHz, ± 1.0 dB
Video S/N:	60 dB minimum, luminance weighted.
L/C Delay:	Within 50 nSec of 0 nSec L/C delay (complies with FCC rules, 76.605).
Differential Gain:	Less than ± 3% (10 to 90% APL).
Differential Phase:	Less than ± 3^0 (10 to 90% APL).

AUDIO

Input Level for 25 kHz Peak Deviation:	-10 to +10 dBu manual gain adjustment and front panel modulation indicators.
Input Impedance:	10K Ohms, unbalanced.
Pre-emphasis:	75 µSec.
Frequency Response:	50 Hz to 15 kHz, ±1dB
Total Harmonic Distortion:	0.5% maximum.
Hum and Noise:	-60 dB minimum, referenced to 25 kHz peak deviation.

COMPOSITE IF LOOP

Output Level (V carrier):	+28 dBmV ± 2 dB.
Spurious Outputs:	-60 dBc minimum.
Input Level (V carrier):	+28 dBmV Nominal. +30 dBmV Maximum.
IF Input Impedance:	75 Ohms, return loss greater than 20 dB.
IF Output Impedance:	75 Ohms, return loss greater than 15 dB.
Isolation:	Greater than 60 dB.

GENERAL

AC Power Input:	115 VAC, ±10%, 60 Hz, 25 Watts.
Operating Temperature Range:	0^0 to $+50^0$ C, ambient.
Size:	19" (481 mm) W x 1.75" (44 mm) H x 8.75" (222 mm) D.
Weight:	6.8 lbs. (3.1 Kg).
Connectors:	Video input, IF loop and RF output are all type F. Audio input is RCA phono.