

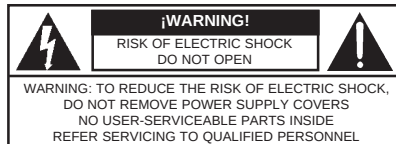


VM2860/VM2862
Commercial Video Modulator
(For use in NTSC systems)

Instruction Manual

DRAKE® is a registered trademark of the R.L. Drake Company

WARNING: TO PREVENT FIRE OR
ELECTRICAL SHOCK DO NOT
EXPOSE TO RAIN OR MOISTURE



An appliance and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the appliance and cart combination to overturn.



The lightning flash with arrow head symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. DO NOT OPEN THE CABINET, REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

CAUTION: TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR LES CHOCES ELECTRIQUES, NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

Important Safety Instructions

1. Read Instructions—All the safety and operating instructions should be read before the product is operated.

2. Retain Instructions—The safety and operating instructions should be retained for future reference.

3. Heed Warnings—All warnings on the product and in the operating instructions should be adhered to.

4. Follow Instructions—All operating and use instructions should be followed.

5. Cleaning—Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleansers. Use a damp cloth for cleaning.

6. Attachments—Do not use attachments that are not recommended by the product manufacturer as they may cause hazards.

7. Water and Moisture—Do not use this product near water—for example, near a bathtub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool; and the like.

8. Accessories—Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

9. A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.

10. Ventilation—Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or similar surface. This product should not be placed in a built-in installation such as bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

11. Power Sources—This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.

12. Grounding or Polarization—This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

Alternate Warnings—If this product is equipped with a three-wire grounding-type plug, a plug having a third (grounding) pin, the plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

12 a. Mise à la terre ou Polarisation—Cet appareil est équipé avec un cordon d'alimentation à trois fils. Il est à brancher sur une prise ayant un connecteur à la terre. Assurez-vous que la connection à la terre ne manque pas.

13. Power-Cord Protection—Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

14. Outdoor Antenna Grounding—If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure A.

15. Lightning—For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.

16. Power Lines—An outside antenna system should not be located in the vicinity of overhead power lines, other electric light or power circuits, where it can fall into such power lines or circuits.

17. Overloading—Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

18. Object and Liquid Entry—Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

19. Servicing—Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

20. Damage Requiring Service—Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

a. When the power-supply cord or plug is damaged,

b. If liquid has been spilled, or objects have fallen into the product,

c. If the product has been exposed to rain or water,

d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation,

e. If the product has been dropped or damaged in any way, and

f. When the product exhibits a distinct change in performance—this indicates a need for service.

21. Replacement Parts—When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutes may result in fire, electric shock or other hazards.

22. Safety Check—Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

23. Wall or Ceiling Mounting—The product should be mounted to a wall or ceiling only as recommended by the manufacturer.

24. Heat—The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

NOTE TO CATV SYSTEM INSTALLERS:

THIS REMINDER IS PROVIDED TO CALL THE CATV SYSTEM INSTALLER'S ATTENTION TO ARTICLE 820 - 40 OF THE NEC THAT PROVIDES GUIDELINES FOR PROPER GROUNDING AND, IN PARTICULAR, SPECIFIES THAT THE CABLE GROUND SHALL BE CONNECTED TO THE GROUNDING SYSTEM OF THE BUILDING, AS CLOSE TO THE POINT OF CABLE ENTRY AS PRACTICAL.

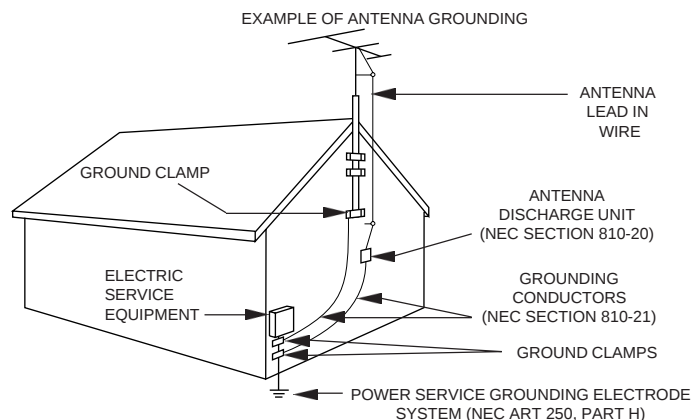
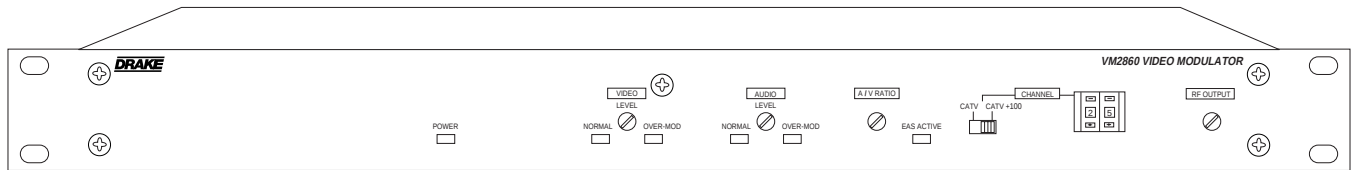


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DESCRIPTION

The R.L. Drake VM2860 and VM2862 Video Modulators are high quality, vestigial sideband units with synthesized visual and aural carriers. They are designed to accept NTSC video and audio baseband signals from a satellite receiver or similar equipment. Front panel video and audio level controls with accompanying modulation indicators permit easy setup of the proper modulation levels. The A/V ratio and RF output level controls are also provided on the front panel. A rear panel EAS alternate IF input is also provided. The VM2860 model is for applications with mono audio and the VM2862 model provides BTSC stereo encoded audio. If SAP is required, this option is available for the VM2862 model, and is field installable.

Synthesized operation provides complete frequency agility, allowing front panel selection of any standard CATV channel from 2 to 135 (54 to 862 MHz band). FCC required offsets for aeronautical channels are automatically provided for each channel that requires an offset. For special applications, IRC or HRC CATV frequencies or off-air broadcast frequencies can be selected after moving an internal jumper.

A high quality IF SAW filter with FCC predistortion eliminates adjacent channel interference and provides optimum delay characteristics.

An auto-switching alternate IF input, labeled EAS input, is provided for connection of an Emergency Alert System 44 MHz IF signal. When the EAS IF signal appears at the EAS input, the main video and audio modulated IF is replaced by the EAS input signal.

A 4.5 MHz video trap may be selected via an internal jumper (VM2862 has 4.5 MHz trap on as factory setting). This may be used to filter off a 4.5 MHz sound subcarrier or undesired video components to prevent interference to the stereo or SAP channels.

The RF section of the modulator contains bandpass filtering that divides the 54 to 862 MHz output range into four bands, each approximately 200 MHz wide. This filtering, in conjunction with the use of high level, low noise floor mixing, ensures very low broadband noise at the output. Thus a full complement of up to all 134 available channels from VM2860 or VM2862 modulators may be combined while maintaining an excellent C/N of each channel. All of the mentioned features, combined with a carefully designed low noise and low distortion output stage, provide reliable operation in a densely crowded SMATV or CATV environment.

The inclusion of a fan in the VM2860 and VM2862 permits rack mounting of this equipment without leaving the typical 1U air space between modulators.

SPECIFICATIONS - VM2860 / VM2862

RF	
Frequency Range:	54 MHz to 864 MHz. Standard CATV channels 2 to 135. Broadcast, HRC, and IRC channel plans available by internal jumper.
FCC Offsets:	Automatic, positive.
Output Level:	+60 dBmV minimum, 12 dB minimum adjustment range.
Amplitude Stability:	± 1 dB.
Output Impedance:	75 Ohms, 12 dB return loss within output filter passband.
A/V Ratio:	-12 dB to -25 dB.
Frequency Stability:	± 5 ppm. All oscillators locked to the same internal reference.
Spurious Outputs:	-60 dBc at +60 dBmV output level, 5 MHz to 1000 MHz, 15 dB A/V ratio.
Phase Noise:	-85 dBc at 10 kHz offset.
Output Filter Bands:	54 MHz to 258 MHz, 258 MHz to 462 MHz, 462 MHz to 660 MHz, 660 MHz to 864 MHz.
Broadband Noise:	-80 dBc, 4 MHz bandwidth, +60 dBmV output level, ±18 MHz offset within output filter passband, -90 dBc outside of output filter passband, output filtered into 4 approximately 200 MHz wide bands.
VIDEO	
Input Level:	1 Vp-p ± 3 dB, manual gain adjustment with modulation indicators.
Input Impedance:	75 Ohms, 25 dB return loss.
Frequency Response:	20 Hz to 4.2 MHz, ± 1 dB with 4.5 MHz trap off, 20 Hz to 4.1 MHz, ± 1 dB with 4.5 MHz trap on.
In-channel C/N:	65 dB.
L/C Delay:	±50 nS of FCC predistortion with 4.5 MHz trap off, -20 +80 nS of FCC predistortion with 4.5 MHz trap on.
Differential Gain:	± 3%.
Differential Phase:	± 3°.
MONO AUDIO	
Input Level:	250 mVrms to 2.5 Vrms, manual gain adjustment with LED modulation indicators.
Input Impedance:	10K Ohms, unbalanced.

MONO AUDIO, cont'd.

Pre-emphasis: 75 µS.
Frequency Response: 50 Hz to 15 kHz, ±1 dB.
THD: 0.5% maximum.
S/N: 65 dB.

BTSC STEREO AUDIO (VM2862 only)

Input Level: 250 mVrms to 2.5 Vrms, manual gain adjustment with LED modulation indicators.
Input Impedance: 10K Ohms, unbalanced.
Separation: 30 db, 50 Hz to 12.5 kHz; 25 dB, 12.5 kHz to 14 kHz.
Frequency Response: ± 0.5 dB, 50 Hz to 14 kHz.
THD: 0.5% maximum.
S/N: 65 dB.

SAP AUDIO Option (VM2862 only)

Input Level: 250 mVrms to 2.5 Vrms, manual gain adjustment with over-modulation indicator.
Input Impedance: 10K Ohm, unbalanced.
Frequency Response: ± 2 dB, 50 Hz to 10 kHz.
THD: 1% maximum.
S/N: 80 dB.

EAS INPUT

Level: +30 dBmV, ±1 dB (visual carrier).
Impedance: 75 Ohm, 20 dB return loss.
Isolation: 60 dB.
Auto Switching Level: +20 dBmV.

GENERAL

AC Power: 115 VAC ± 10%, 60 Hz,
23 Watts (VM2860), 28 Watts (VM2862).
Fuse: 1/2 Amp Slo-Blo 5 X 20 mm.
Temperature Range: 0° to 50° C.
Cooling: Internal 1.85 CFM fan allows operation in the rack without air spaces between units.
Radiated Emissions: FCC Part 15.
Size: 11.25" D x 1.75" H x 19" W
Weight: 8 lbs. 8 oz.

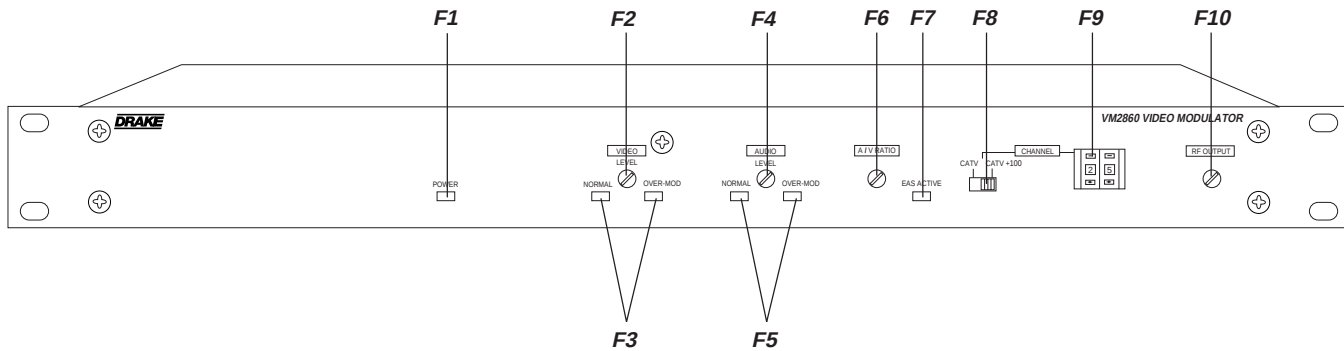


Figure 1 - FRONT PANEL

F1 - POWER Indicator

This LED lights when the unit is connected to a source of AC power. The LED flashes when on an invalid channel or if there is a synthesizer error.

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 the 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 12 to 25 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 - EAS ACTIVE Indicator

This indicator lights when a signal is present at the EAS input (R2) indicating that the modulator has switched to the EAS signal.

F8 - CATV, CATV +100 CHANNEL Switch

This two position switch allows selection of the desired operating channel from 02 to 99 (when the switch is in the CATV position) and channels 100 to 135 (when the switch is in the CATV +100 position). See the CHANNEL ASSIGNMENTS section for a list of the corresponding operating frequency, and offset, if any, for each channel number.

F9 - CHANNEL Switch

These pushwheel switches allow the selection of the desired operating channel from 01 to 135. See the CHANNEL ASSIGNMENTS section for a list of the corresponding operating frequency, and offset, if any, for each channel number.

F10 - RF OUTPUT LEVEL Control

This screwdriver adjustment varies the RF OUTPUT level. Clockwise rotation increases the level.

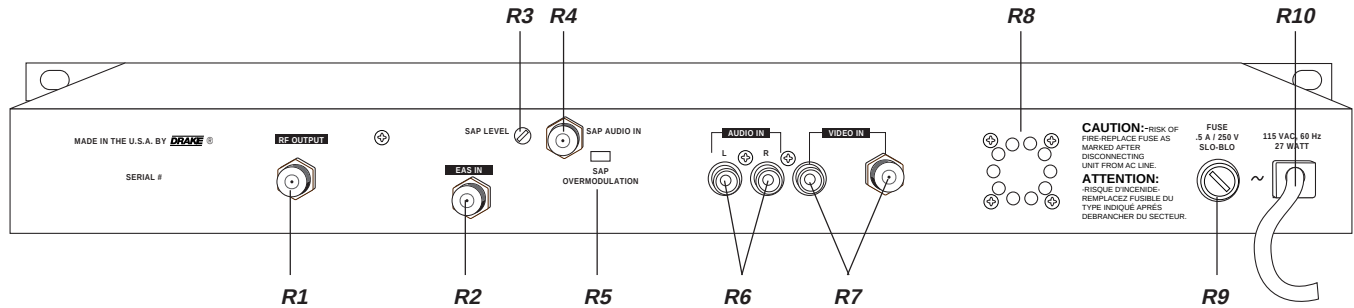


Figure 2 - REAR PANEL

R1 - RF OUTPUT

This is the modulator output, 54 to 864 MHz.

R2 - EAS IN Connector

Apply a 44 MHz (45.75 MHz video carrier) signal at 30 dBmV to this input from an EAS IF modulator. Any level above +20 dBmV will activate the auto switching circuitry.

R3 - SAP Level *

Adjusts the modulation level of the SAP subcarrier. Advance level until indicator R5 just illuminates.

R4 - SAP AUDIO IN *

Apply the audio program for the SAP audio channel to this input.

R5 - SAP OVERMODULATION *

Indicates overmodulation of the SAP audio channel. Adjust audio with SAP level control, R3.

R6 - AUDIO IN, L/R

These are unbalanced audio inputs to the IF circuits. These "RCA" (phono) connector inputs accept baseband through 15 kHz audio at a nominal level of 250 mV RMS (approximately -10 dBu).

R7 - VIDEO INPUT ("RCA" type or "F" type)

These are used as the baseband input to the IF circuits. Use ONE of these inputs (either the "RCA" or "F" type) which accepts baseband through 4.2 MHz video at levels from 0.7 Vp-p to 1.5 Vp-p.

R8 - Fan Vents

To ensure proper cooling of the unit, do not block these vents for the cooling fan.

R9 - FUSE

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

R10 - 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 $\pm 10\%$, 60 Hz source. Do not defeat the safety purpose of the center ground prong on the attached line cord plug.

* SAP option must be installed in the VM2862.

The SAP option may be field installed, by a qualified technician, into a VM2862. For purchase information, call Drake Customer Service at 1 (937) 746-6990.

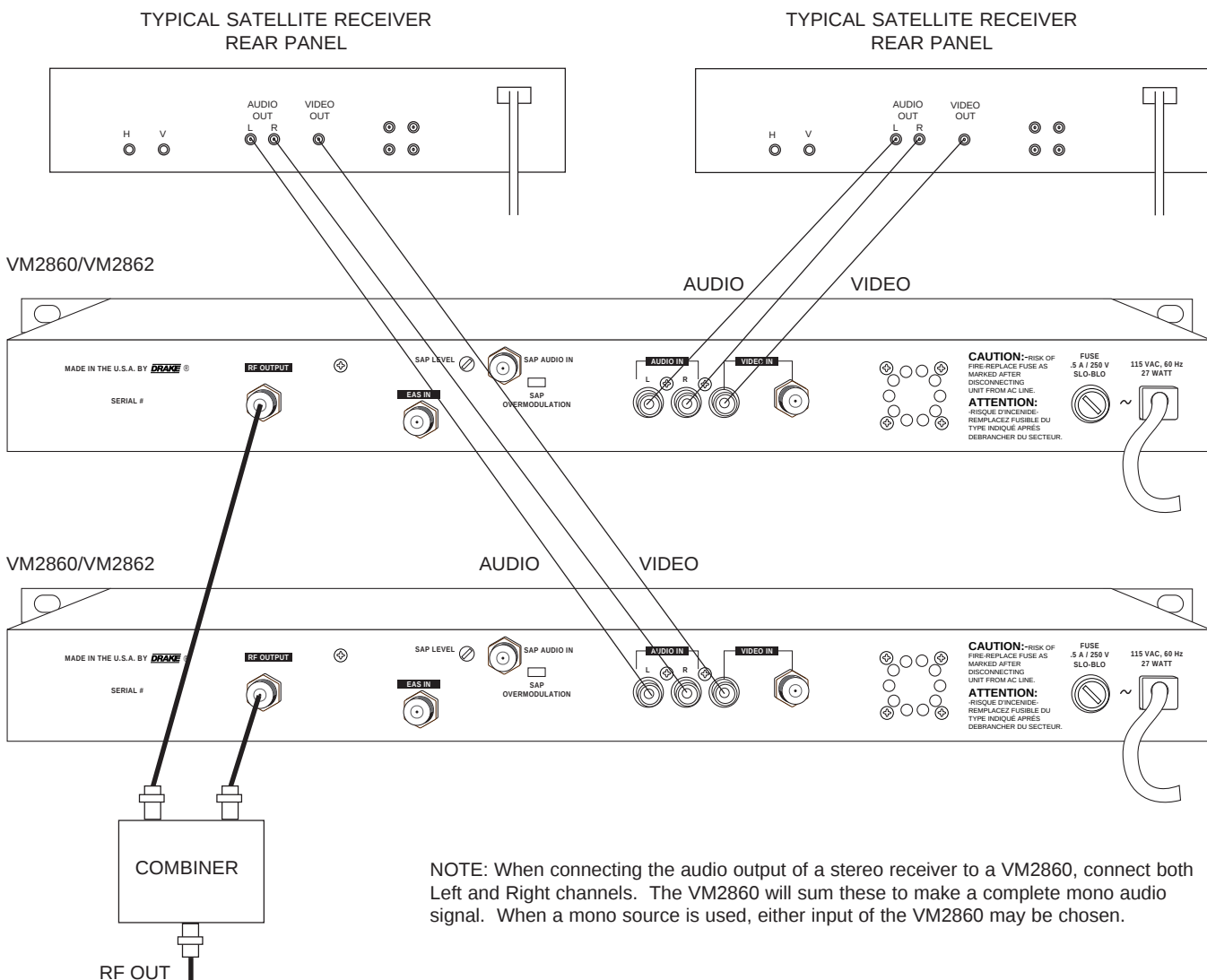
CONNECTIONS AND CONTROLS - All connections to and from the VM2860/VM2862 are made through the rear panel. **Figure 3** shows a typical two channel installation using a typical satellite receiver as a signal source. Additional channels can be added by using additional VM2860/VM2862 modulators and either 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 Level' and 'A/V Ratio' controls are used respectively to make these adjustments. If an output level of less than +50 dBmV is required from the VM2860/VM2862, add an attenuator of the appropriate value to the modulator output.

Example: For an output level of +45 dBmV, add a 12 dB attenuator pad to the modulator output and set the VM2860/VM2862 output level to +57 dBmV ahead of the pad.

RACK MOUNTING - Adequate ventilation is very important in multichannel 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.

FCC PART 76.612 - The VM2860/VM2862 synthesizer has been programmed to comply with FCC requirements for offsets on cable channel frequencies assigned to aviation and navigation communications. The programmed offset for each channel is listed in the following chart.



NOTE: When connecting the audio output of a stereo receiver to a VM2860, connect both Left and Right channels. The VM2860 will sum these to make a complete mono audio signal. When a mono source is used, either input of the VM2860 may be chosen.

Figure 3 - TYPICAL MULTIPLE MODULATOR INSTALLATION

TABLE 1: CATV

EIA CH# / Output Channel Switch Setting	Visual Carrier Frequency (MHz)		HRC
	STD	IRC	
01	N/A	73.25	72.00
02	55.25		54.00
03	61.25		60.00
04	67.25	79.25	66.00
05	77.25	85.25	78.00
06	83.25		84.00
07	175.25		174.00
08	181.25		180.00
09	187.25		186.00
10	193.25		192.00
11	199.25		198.00
12	205.25		204.00
13	211.25		210.00
14	121.2625		120.00
15	127.2625		126.00
16	133.2625		132.00
17	139.25		138.00
18	145.25		144.00
19	151.25		150.00
20	157.25		156.00
21	163.25		162.00
22	169.25		168.00
23	217.25		216.00
24	223.2625		222.00
25	229.2625		228.00
26	235.2625		234.00
27	241.2625		240.00
28	247.2625		246.00
29	253.2625		252.00
30	259.2625		258.00
31	265.2625		264.00
32	271.2625		270.00
33	277.2625		276.00
34	283.2625		282.00
35	289.2625		288.00
36	295.2625		294.00
37	301.2625		300.00
38	307.2625		306.00
39	313.2625		312.00
40	319.2625		318.00
41	325.2625		324.00
42	331.275		330.00
43	337.2625		336.00
44	343.2625		342.00
45	349.2625		348.00
46	355.2625		354.00
47	361.2625		360.00
48	367.2625		366.00
49	373.2625		372.00
50	379.2625		378.00
51	385.2625		384.00
52	391.2625		390.00
53	397.2625		396.00
54	403.25		402.00
55	409.25		408.00
56	415.25		414.00
57	421.25		420.00
58	427.25		426.00
59	433.25		432.00
60	439.25		438.00
61	445.25		444.00
62	451.25		450.00
63	457.25		456.00
64	463.25		462.00
65	469.25		468.00
66	475.25		474.00
67	481.25		480.00
68	487.25		486.00

EIA CH# / Output Channel Switch Setting	Visual Carrier Frequency (MHz)		HRC
	STD	IRC	
69	493.25		492.00
70	499.25		498.00
71	505.25		504.00
72	511.25		510.00
73	517.25		516.00
74	523.25		522.00
75	529.25		528.00
76	535.25		534.00
77	541.25		540.00
78	547.25		546.00
79	553.25		552.00
80	559.25		558.00
81	565.25		564.00
82	571.25		570.00
83	577.25		576.00
84	583.25		582.00
85	589.25		588.00
86	595.25		594.00
87	601.25		600.00
88	607.25		606.00
89	613.25		612.00
90	619.25		618.00
91	625.25		624.00
92	631.25		630.00
93	637.25		636.00
94	643.25		642.00
95	91.25		90.00
96	97.25		96.00
97	103.25		102.00
98	109.275		108.00
99	115.275		114.00
100	649.25		648.00
101	655.25		654.00
102	661.25		660.00
103	667.25		666.00
104	673.25		672.00
105	679.25		678.00
106	685.25		684.00
107	691.25		690.00
108	697.25		696.00
109	703.25		702.00
110	709.25		708.00
111	715.25		714.00
112	721.25		720.00
113	727.25		726.00
114	733.25		732.00
115	739.25		738.00
116	745.25		744.00
117	751.25		750.00
118	757.25		756.00
119	763.25		762.00
120	769.25		768.00
121	775.25		774.00
122	781.25		780.00
123	787.25		786.00
124	793.25		792.00
125	799.25		798.00
126	805.25		804.00
127	811.25		810.00
128	817.25		816.00
129	823.25		822.00
130	829.25		828.00
131	835.25		834.00
132	841.25		842.00
133	847.25		848.00
134	853.25		854.00
135	859.25		860.00

TABLE 2: BROADCAST TV

VHF BROADCAST CHANNELS	
Channel Number	Visual Carrier Frequency (MHz)
2	55.25
3	61.25
4	67.25
5	77.25
6	83.25
7	175.25
8	181.25
9	187.25
10	193.25
11	199.25
12	205.25
13	211.25

UHF BROADCAST CHANNELS	
Channel Number	Visual Carrier Frequency (MHz)
14	471.25
15	477.25
16	483.24
17	489.25
18	495.25
19	501.25
20	507.25
21	513.25
22	519.25
23	525.25
24	531.25
25	537.25
26	543.25
27	549.25
28	555.25
29	561.25
30	567.25
31	573.25
32	579.25
33	585.25
34	591.25
35	597.25
36	603.25
37	609.25
38	615.25
39	621.25
40	627.25
41	633.25

UHF BROADCAST CHANNELS	
Channel Number	Visual Carrier Frequency (MHz)
42	639.25
43	645.25
44	651.25
45	657.25
46	663.25
47	669.25
48	675.25
49	681.25
50	687.25
51	693.25
52	699.25
53	705.25
54	711.25
55	717.25
56	723.25
57	729.25
58	735.25
59	741.25
60	747.25
61	753.25
62	759.25
63	765.25
64	771.25
65	777.25
66	783.25
67	789.25
68	795.25
69	801.25

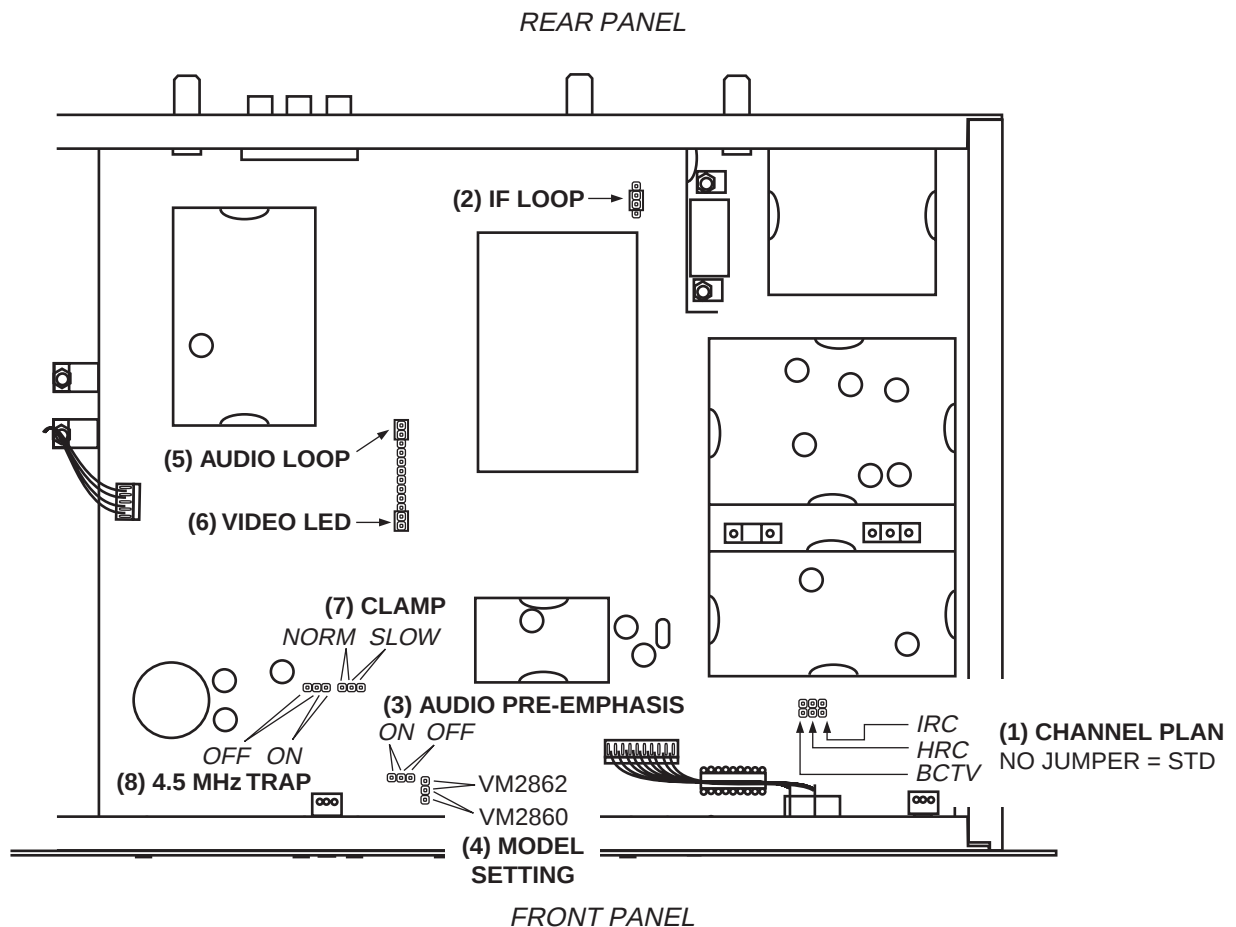


Figure 4 - INTERNAL JUMPER SETTINGS

There are a number of internal jumpers that may be programmed to change certain parameters from the factory default settings. Some of these jumpers should not be changed in the field. In most cases, the factory default settings should prevail.

(1) - CHANNEL PLAN JUMPER - The factory setting for this configuration is to have no jumper. This provides a standard EIA CATV plan. If IRC frequencies are required, add a shorting jumper across the two pins pointed out by the IRC arrow in Figure 4. For HRC, use the two pins indicated for HRC. If broadcast frequency assignments are needed, jumper the two pins indicated by the BCTV arrow.
NOTE: Never install more than one shorting jumper at a time at this block of headers.

(2) IF LOOP JUMPER - The factory setting is shown in Figure 4. If this jumper is removed, the 44 MHz IF loop will be opened and the modulator output will go away. This is used for special applications and will not normally be changed.

(3) AUDIO PRE-EMPHASIS JUMPER - This jumper should normally be in the ON position to enable the 75 μ Sec audio pre-emphasis. ON is the correct setting for both the VM2860 and VM2862 models. If the VM2860 model is used with an external stereo encoder that provides the

pre-emphasis, VM2860 pre-emphasis may be defeated by moving this jumper to OFF. The VM2862 internal stereo encoder requires this setting to be ON.

(4) MODEL SETTING - This jumper must be set to match the model number of this modulator.

(5 & 6) AUDIO LOOP and VIDEO LED - These jumpers must be present in the VM2860. They are not present in the VM2862.

(7) CLAMP JUMPER - This jumper affects the time constant of the video clamp. The factory setting is NORM.

(8) 4.5 MHz TRAP - The factory settings are OFF for the VM2860 and ON for the VM2862. When set to ON, a 4.5 MHz notch filter is inserted in the video input path to prevent any possible 4.5 MHz energy in the video from interfering with the stereo or SAP performance. A slight degradation in video response and LC delay is incurred. The VM2862 thus requires an ON setting for the jumper. Mono operation is less critical and the default setting for the VM2860 is OFF. If audio interference from the video source is observed on the VM2860, move this jumper to the ON position. See the Specifications section for details of the jumper's affect on performance.

SERVICE INFORMATION

You may contact the R.L. DRAKE Service Department for additional information or assistance by calling +1 (937) 746-6990, Monday through Friday, between 8:00 A.M. and 4:00 P.M. Eastern Time, except on holidays.

You may also contact the R.L. DRAKE Service Department by E-mail at the following address:
TechSupport@rldrake.com
or by Telefax:
+1 (937) 743-4576.

Should you want to return your unit for service, package the unit carefully using the original carton or other suitable container.

Write your return address clearly on the shipping carton and on an enclosed cover letter describing the service required, symptoms or problems. Also include your daytime telephone number and a copy of your proof of purchase.

The unit will be serviced under the terms of the R.L. DRAKE COMPANY Limited Warranty and returned to you.

IF YOU NEED TO CALL FOR HELP

Call our Customer Service/Technical Support line at +1 (937) 746-6990 between 8:00 A.M. and 4:00 P.M. Eastern Time, weekdays. Please have the unit's serial number available. We will also need to know the specifics of any other equipment connected to the unit. When calling, please have the unit up and running, near the phone if possible. Our technician(s) will likely ask certain questions to aid in diagnosis of the problem. Also, have a voltmeter handy, if possible.

R.L. DRAKE also provides technical assistance by e-mail: TechSupport@rldrake.com
or by Telefax: +1 (937) 743-4576.

Many of the products that are sent to us for repair are in perfect working order when we receive them. For these units, there is a standard checkout fee that you will be charged. Please perform whatever steps are applicable from the installation sections of the Owner's Manual before calling or writing—this could save unnecessary phone charges. Please do not return the unit without contacting R.L. DRAKE first: it is preferred to help troubleshoot the problem over the phone (or by mail) first, saving you both time and money.

Inside the carton, enclose a note with your name, address, daytime phone number, and a description of the unit's problem.

The unit must be sent to the following address:

**Service Department
R.L. DRAKE COMPANY
230 Industrial Drive
Franklin, Ohio 45005 U.S.A.**

Be sure to include your street address which will be needed for UPS return. UPS Surface (Brown Label) takes 7-10 days to reach us depending on your location, Blue takes 2-3 days.

Red is an overnight service. Send the unit in a way that it can be traced if we can't verify receipt of shipment. We suggest UPS or insured postal shipment.

If the unit is still under the original owner's warranty, R.L. DRAKE will pay the cost of the return shipment to you. Our return shipping policy is that we will return it UPS Brown if received Brown or by US Mail, it will be returned Blue if received Blue or Red—or it will be returned however you prefer if you furnish the return cost for the method you select.

If the unit is out of warranty, use one of the following methods for return shipment:

- 1) You designate billing to American ExPress, VISA, MasterCard or Discover card;
- 2) You prepay the service charges with a personal check, or
- 3) You specify some other method of return and payment.

When calling, the technician can estimate the repair charges for you over the phone. This is another good reason to call before sending a unit in for repair.

Typically, equipment is repaired in five to ten working days after it arrives at R.L. DRAKE if we have all the facts. If we must call you, it may take longer. R.L. DRAKE is not responsible for damage caused by lightning, nonprofessional alterations, "acts of God", shipping damage, poor storage/handling, etc. R.L. DRAKE will make note of any shipping damage upon receipt.

You will need to send proof of purchase to receive warranty service. Typically, a copy of the invoice from an R.L. DRAKE dealer will suffice. The warranty is for the original owner only and is not transferable.

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 a 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 important 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.

For Service, contact:

R.L. DRAKE COMPANY
 230 Industrial Drive
 Franklin, Ohio 45005 U.S.A.
Customer Service and Parts Telephone: +1 (937) 746-6990
Telefax: +1 (937) 743-4576
World Wide Web Site: <http://www.rldrake.com>



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