



OTM-3000-CV

FREQUENCY AGILE - F.C.C. COMPATIBLE

TELEVISION MODULATOR

INSTRUCTION MANUAL

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OTM-3000 CV

FREQUENCY AGILE - F.C.C. COMPATIBLE TELEVISION MODULATOR

1) INTRODUCTION

The OTM-3000 CV is a frequency agile F.C.C. compatible television modulator with an output frequency range of 55.25MHz through 445.25MHz (channel 2 through cable channel YY). All channels are selectable by front panel DIP switches, including F.C.C. offsets of +12.5KHz and +25KHz.

The OTM-3000 CV offers high output level, typically +60dBmV. This unit has a very high out-of-band carrier to noise ratio (>80dB) and uses SAW I.F. filtering, which allows virtually an unlimited number of modulators to be combined without the need for external bandpass filters. The OTM-3000 CV has low power consumption (12 watts @ 115 VAC) for reliable long term operation.

The OTM-3000 CV will perform with separate baseband audio and video input or a composite video (CV) input or an external 4.5MHz input.

The unit is shipped for operation in the CV modes. An internal toggle switch controls separate baseband video and audio inputs and composite (CV) operation. The toggle switch is located on the center divider internal to the chassis.

- 1) For CV operation, the switch should be in the position toward the front of the chassis.
- 2) For standard operation, the switch should be toward the rear of the chassis.

For composite video application, connect the composite video source to the “composite video input” jack. Cable the “video only” output to the “video” input. The unit will automatically construct the 4.5MHz carrier if the 4.5MHz carrier is present with the video. Adjust the video modulation level with the front panel video modulation control. The audio modulation control is inoperable in the CV mode.

For external 4.5MHz operation, connect the 4.5MHz source to the “composite video input”. Terminate the “video only” output. Connect the baseband video source to the “video input”.

2) CHANNEL/F.C.C. OFFSET SELECTION

Channel selection is made by properly setting the two 8-position switches to the corresponding channel code. Select the desired channel/offset code from Figure #1 or the code card attached to the “Channel Select” cover plate, then set the DIP switches from left to right. The 13 left-most switches are channel select.

Figure 1

OTM-3000-CV
CHANNEL SELECT CHART

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0 = Switch in DOWN Position
1 = Switch in UP Position

SW 1 SW 2

0 0 1 1 1 0 0 1	0 1 0 0 0 0 1 1
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CHANNEL SELECT

0KHz
OFFSET SELECT 12.5KHz
 25.0KHz

(Example shown above is for Ch. 2.)

0KHz = 0 1 1
12.5KHz = 1 0 1
25.0KHz = 1 1 0

OFFSET SELECT INFORMATION

- 1) Channels A, B, C, L to W, AA to EE & GG to QQ = 12.5KHz.
- 2) Channels A-2, A-1 & FF = 25.0KHz.
- 3) All other channels = 0KHz.

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CHANNEL SELECT		
CH	SW1	SW2
2	0 0 1 1 1 0 0 1	0 1 0 0 0
3	0 1 0 0 0 1 0 1	0 1 0 0 0
4	0 0 0 1 0 1 0 1	0 1 0 0 0
5	0 1 0 0 1 1 0 1	0 1 0 0 0
6	0 0 0 1 1 1 0 1	0 1 0 0 0
A-5	0 0 0 0 0 0 1 1	0 1 0 0 0
A-4	0 1 1 0 0 0 1 1	0 1 0 0 0
A-3	0 0 1 1 0 0 1 1	0 1 0 0 0
A-2	0 1 0 0 1 0 1 1	0 1 0 0 0
A-1	0 0 0 1 1 0 1 1	0 1 0 0 0
7	0 0 1 0 1 0 0 0	1 1 0 0 0
8	0 1 0 1 1 0 0 0	1 1 0 0 0
9	0 0 0 0 0 1 0 0	1 1 0 0 0
10	0 1 1 0 0 1 0 0	1 1 0 0 0
11	0 0 1 1 0 1 0 0	1 1 0 0 0
12	0 1 0 0 1 1 0 0	1 1 0 0 0
13	0 0 0 1 1 1 0 0	1 1 0 0 0
A 14	0 1 1 1 0 1 1	0 1 0 0 0
B 15	0 0 1 0 0 1 1 1	0 1 0 0 0
C 16	0 1 0 1 0 1 1 1	0 1 0 0 0
D 17	0 0 0 0 1 1 1 1	0 1 0 0 0
E 18	0 1 1 0 1 1 1 1	0 1 0 0 0
F 19	0 0 1 1 1 1 1 1	0 1 0 0 0
G 20	0 1 0 0 0 0 0 0	1 1 0 0 0
H 21	0 0 0 1 0 0 0 0	1 1 0 0 0
I 22	0 1 1 1 0 0 0 0	1 1 0 0 0
J 23	0 1 1 1 1 1 0 0	1 1 0 0 0
K 24	0 0 1 0 0 0 1 0	1 1 0 0 0
L 25	0 1 0 1 0 0 1 0	1 1 0 0 0
M 26	0 0 0 0 1 0 1 0	1 1 0 0 0
N 27	0 1 1 0 1 0 1 0	1 1 0 0 0
O 28	0 0 1 1 1 0 1 0	1 1 0 0 0
P 29	0 1 0 0 0 1 1 0	1 1 0 0 0
Q 30	0 0 0 1 0 1 1 0	1 1 0 0 0
R 31	0 1 1 1 0 1 1 0	1 1 0 0 0
S 32	0 0 1 0 1 1 1 0	1 1 0 0 0
T 33	0 1 0 1 1 1 1 0	1 1 0 0 0
U 34	0 0 0 0 0 0 0 1	1 1 0 0 0
V 35	0 1 1 0 0 0 0 1	1 1 0 0 0
W 36	0 0 1 1 0 0 0 1	1 1 0 0 0
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CHANNEL SELECT		
CH	SW1	SW2
AA	0 1 0 0 1 0 0 1	1 1 0 0 0
BB	0 0 0 1 1 0 0 1	1 1 0 0 0
CC	0 1 1 1 1 0 0 1	1 1 0 0 0
DD	0 0 1 0 0 1 0 1	1 1 0 0 0
EE	0 1 0 1 0 1 0 1	1 1 0 0 0
FF	0 0 0 0 1 1 0 1	1 1 0 0 0
GG	0 1 1 0 1 1 0 1	1 1 0 0 0
HH	0 0 1 1 1 1 0 1	1 1 0 0 0
II	0 1 0 0 0 0 1 1	1 1 0 0 0
JJ	0 0 0 1 0 0 1 1	1 1 0 0 0
KK	0 1 1 1 0 0 1 1	1 1 0 0 0
LL	0 0 1 0 1 0 1 1	1 1 0 0 0
MM	0 1 0 1 1 0 1 1	1 1 0 0 0
NN	0 0 0 0 0 1 1 1	1 1 0 0 0
OO	0 1 1 0 0 1 1 1	1 1 0 0 0
PP	0 0 1 1 0 1 1 1	1 1 0 0 0
QQ	0 1 0 0 1 1 1 1	1 1 0 0 0
RR	0 0 0 1 1 1 1 1	1 1 0 0 0
SS	0 1 1 1 1 1 1 1	1 1 0 0 0
TT	0 0 1 0 0 0 0 0	0 0 1 0 0
UU	0 1 0 1 0 0 0 0	0 0 1 0 0
VV	0 0 0 0 1 0 0 0	0 0 1 0 0
WW	0 1 1 0 1 0 0 0	0 0 1 0 0
XX	0 0 1 1 1 0 0 0	0 0 1 0 0
YY	0 1 0 0 0 1 0 0	0 0 1 0 0
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4) F.C.C. OFFSET FREQUENCIES

<u>Channel #</u>	<u>F.C. C. Offset-KHz</u>	<u>Channel Frequency (incl. Offset) - MHz</u>
A-2	25.0	109.2750
A-1	25.0	115.2750
A	12.5	121.2625
B	12.5	127.2625
C	12.5	133.2625
L	12.5	229.2625
M	12.5	235.2625
N	12.5	241.2625
O	12.5	247.2625
P	12.5	253.2625
Q	12.5	259.2625
R	12.5	265.2625
S	12.5	271.2625
T	12.5	277.2625
U	12.5	283.2625
V	12.5	289.2625
W	12.5	295.2625
AA	12.5	301.2625
BB	12.5	307.2625
CC	12.5	313.2625
DD	12.5	319.2625
EE	12.5	325.2625
FF	25.0	331.2750
GG	12.5	337.2625
HH	12.5	343.2625
II	12.5	349.2625
JJ	12.5	355.2625
KK	12.5	361.2625
LL	12.5	367.2625
MM	12.5	373.2625
NN	12.5	379.2625
OO	12.5	385.2625
PP	12.5	391.2625
QQ	12.5	397.2625

5) VIDEO MODULATION ADJUSTMENT

- A) Connect a video source of approximately 1V p-p to the video input connector (75 ohms input Z) on the rear panel. The video should be of a reasonably bright scene (commercials are usually excellent).
- B) Rotate the video modulation level adjust control slowly clockwise until the video overmodulation LED just turns on. The light may blink with differences in average picture level. **CAUTION:** If the modulation is set too high, compression or lack of contrast will occur during high intensity scenes.

6) AUDIO MODULATION ADJUSTMENT

- A) Connect an audio source of 300mV p-p (minimum) to the balanced audio input connector (600 ohms input Z) on the rear panel. The source should be typical of the program material to be carried.
- B) Rotate the audio modulation level adjust control slowly clockwise until the audio overmodulation LED just begins to blink. CAUTION: Overmodulation can result in severe distortion in some TV sets. Set this control at peak program levels.

7) RF AND AURAL CARRIER LEVEL ADJUSTMENT

- A) Using a field strength meter, set the video carrier to the desired level with the RF output level adjust control.
- B) Tune the field strength meter to the aural carrier (4.5MHz above the video carrier).
- C) Adjust the aural carrier level control to the desired level, typically 15dB below the video carrier. CAUTION: Reducing the visual/aural carrier ratio to less than 15dB can result in high out-of-band spurious signals in adjacent channels.

8) MISCELLANEOUS

- A) The OTM-3000 CV is BTSC stereo compatible. It is shipped in the “mono” mode. To defeat pre-emphasis, in order to use a composite BTSC baseband input signal, move the internal jumper plug from W2 “PRE” to W2 “BY”. This plug is located in the left front area of the circuit board.
- B) This unit is equipped with video and audio I.F. loops. Both loops are connected with two type F short jumpers. If these become disconnected or misplaced, then the OTM-3000 CV will not perform properly.
- C) If a scrambling unit is utilized with the OTM-3000, follow the instructions associated with the scrambler. The video I.F. output level is +40dBmV, and the audio carrier level is determined by the aural carrier level adjustment - typically +17dBmV @ 15dB A/V ratio.
- D) This unit is equipped with a 0.5A slo-blo fuse. For continued safety and to maintain proper performance of the unit, please replace only with an equivalent fuse.
- E) A -20dB test point (type F connector) is provided in the rear panel.

MODULATOR SWITCH SETTING CALCULATION

The output frequency select switches may tune a unit in either 1MHz or 250KHz steps depending on the factory presetting of step size. To calculate the switch settings for a unit, the formula is as follows:

$$N = \frac{\text{OUTPUT FREQUENCY} + 2\text{ND IF FREQUENCY}}{\text{STEP SIZE IN MHz}} \quad \frac{2\text{ND IF FREQUENCY}}{\text{ALL NTSC} = 612.75}$$

$$\text{ALL PAL} = 605.75$$

OR FOR 1MHz STEP SIZE

$$N = \frac{\text{OUTPUT FREQUENCY} + 612.75}{1}$$

OR FOR .25MHz STEP SIZE

$$N = \frac{\text{OUTPUT FREQUENCY} + 612.75}{0.25}$$

Convert the number "N" to binary with the least significant bit on the left, (not the right as is customary). This binary number represents the switch settings with 1 = UP, 0 = DOWN.

BINARY CONVERSION WITH LEAST BIT ON LEFT.

EXAMPLE: CALCULATE 437 IN BINARY

- STEP 1) CONSULT CHART FOR LARGEST NUMBER LESS THAN OR EQUAL TO 437. (256)
- STEP 2) CONSULT CHART TO FIND NEXT LARGEST NUMBER WHICH ADDED TO 256 IS LESS THAN OR EQUAL TO 437. (128 + 256 = 384)
- STEP 3) CONSULT CHART TO FIND NEXT LARGEST NUMBER WHICH ADDED TO 384 IS LESS THAN OR EQUAL TO 437. (384 + 32 = 416)
- STEP 4) CONSULT CHART TO FIND NEXT LARGEST NUMBER WHICH ADDED TO 416 IS LESS THAN OR EQUAL TO 437. (416 + 16 = 432)
- STEP 5) CONSULT CHART TO FIND NEXT LARGEST NUMBER WHICH ADDED TO 432 IS LESS THAN OR EQUAL TO 437. (432 + 4 = 436)
- STEP 6) CONSULT CHART TO FIND NEXT LARGEST NUMBER WHICH ADDED TO 436 IS LESS THAN OR EQUAL TO 437. (436 + 1 = 437)
- STEP 7) EACH NUMBER CHOSEN = CODE 1 AND EACH NUMBER NOT CHOSEN = CODE 0.

	X	X		X	X		X		X										
	1	2	4	8	16	32	64	128	256	512	1024	2048	4096	8192					
437 =	1	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0