



LCM-600

TRIPLE TELEVISION MODULATOR

INSTRUCTION MANUAL

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LCM-600

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

1) INTRODUCTION

The Olson Technology LCM-600 consists of three frequency agile F.C.C. compatible television modulators in a single 1-3/4" rack-mount chassis. The three modulator outputs are internally combined and amplified. The LCM-600 has a single RF output and each channel may be operated at +53 dBmV typical, +50 dBmV guaranteed minimum. A high level (+36dBmV) combined visual/aural i.f. loop is provided for each of the three modulators.

Each of the three modulators will operate on any standard or cable channel from 54MHz to 450MHz (VHF channels 2 through 13 and cable channels A through YY). All channels are selectable by front panel DIP switches and a front panel adjustment allows setting to F.C.C. offset frequencies.

The RF output from each of the three modulators may be turned off to facilitate trouble shooting or to allow channel change without inadvertently interfering with other operating channels.

The LCM-600 offers the unique Olson Technology feature of >72dB out-of-band carrier to noise ratio (from the common output with all three channels operating). This unit uses SAW filtering for adjacent channel operation, and it provides 60dB of spurious free dynamic range. These features allow virtually unlimited numbers of LCM-600's to be combined without the need for external bandpass filters.

The LCM-600 has low power consumption (7.5 watts per channel @ 115 VAC) for economical and reliable long term operation.

2) RF OUTPUT SHUTDOWN

If the output level control (marked "RF" on the front panel) for a modulator is rotated fully CCW, the output of that modulator will be switched completely off. This feature may be used to facilitate trouble shooting or to shut down an individual channel for any other desired reason.

It is suggested that this feature be used when changing channels on a unit whose output is connected to an operating system. This will prevent the possibility of interfering with other channels as the channel select switches are moved to their new settings.

After turning the RF control back up to switch the channel back on, the output level for that channel must be reset to the proper value for your application.

3) CHANNEL SELECTION

Remove the small cover plate from the front panel to expose the channel select switches and the F.C.C. offset adjustment control for the desired modulator. This switch and control is illustrated in Figure #1.

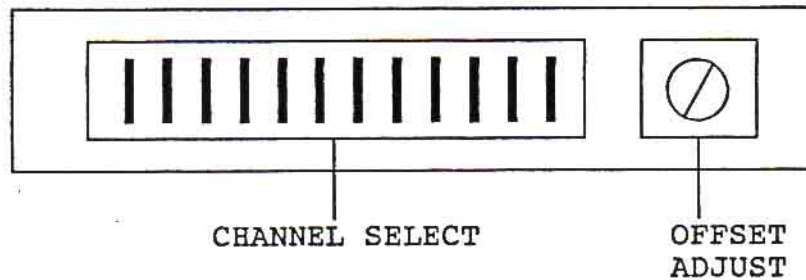


Figure #1 - CHANNEL SELECT/OFFSET ADJUST

Channel selection is made by properly setting the 12-position DIP switches to the corresponding channel code. Channel codes are shown in Figure #2 and on the code card attached to the CENTER cover plate. Set the DIP switches from left to right. For example, if channel 11 is desired, its corresponding channel code is:



4) F.C.C. OFFSET ADJUSTMENT

F.C.C. offset frequencies are shown in Table 1 and summarized on the card attached to the CENTER cover plate. To adjust the frequency of a selected channel to provide the correct F.C.C. offset, look up its offset frequency in Table 1 (or use the summary attached to the center cover plate). Remove the video input from the modulator to be adjusted and connect a counter to the RF output of the LCM-600. Shut down the RF output of the other two channels as described in (2) above. Use the offset adjust control (marked OA) behind the cover plate of the modulator to be adjusted to set the output frequency to the correct value.



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

0 0 0 1 1 1 0 1 0 1 0 0

CHANNEL SELECT SWITCH P.C.C. OFFSET

NOTE

- 1) ABOVE DIP SWITCH POSITION DENOTES CHANNEL #
- 2) TO SELECT DESIRED CHANNEL, SET THE CHANNEL SELECT SWITCHES PER ATTACHED CODE CARDS
- 3) TO SELECT P.C.C. OFFSET VALUE FOR A DESIRED CHANNEL, DISCONNECT THE VIDEO INPUT SIGNAL AND CONNECT A COUNTER TO THE RF OUTPUT. THEN ADJUST THE P.C.C. OFFSET CONTROL POT UNTIL COUNTER READS CHANNEL FREQUENCY PLUS OFFSET.

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 = 25kHz
- 3) All others = 0kHz

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

<u>CHANNEL</u>	<u>F.C.C. OFFSET</u>	<u>CHANNEL FREQUENCY</u> (including offset)
A-2	25KHz	109.275MHz
A-1	25KHz	115.275MHz
A	12.5KHz	121.2625MHz
B	12.5KHz	127.2625MHz
C	12.5KHz	133.2625MHz
L	12.5KHz	229.2625MHz
M	12.5KHz	235.2625MHz
N	12.5KHz	241.2625MHz
O	12.5KHz	247.2625MHz
P	12.5KHz	253.2625MHz
Q	12.5KHz	259.2625MHz
R	12.5KHz	265.2625MHz
S	12.5KHz	271.2625MHz
T	12.5KHz	277.2625MHz
U	12.5KHz	283.2625MHz
V	12.5KHz	289.2625MHz
W	12.5KHz	295.2625MHz
AA	12.5KHz	301.2625MHz
BB	12.5KHz	307.2625MHz
CC	12.5KHz	313.2625MHz
DD	12.5KHz	319.2625MHz
EE	12.5KHz	325.2625MHz
FF	25KHz	331.275MHz
GG	12.5KHz	337.2625MHz
HH	12.5KHz	343.2625MHz
II	12.5KHz	349.2625MHz
JJ	12.5KHz	355.2625MHz
KK	12.5KHz	361.2625MHz
LL	12.5KHz	367.2625MHz
MM	12.5KHz	373.2625MHz
NN	12.5KHz	379.2625MHz
OO	12.5KHz	385.2625MHz
PP	12.5KHz	391.2625MHz
QQ	12.5KHz	397.2625MHz

Table 1. F.C.C. OFFSET FREQUENCIES

5) REAR PANEL

The rear panel has a video and audio input and a combined visual/aural IF loop for each of the three contained modulators. The three modulator outputs are combined to the single RF output connector.

6) VIDEO MODULATION ADJUSTMENT (For each of the three modulators)

- 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 control (MOD) slowly clockwise until the video overmodulation light (O/M) 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.

7) AUDIO MODULATION ADJUSTMENT (For each of the three modulators)

- A) Connect an audio source of 300mv p-p (minimum) to the input connector (10K ohms input Z) on the rear panel.
- B) Rotate the audio modulation (MOD) control slowly clockwise until the audio overmodulation light (O/M) just begins to blink. CAUTION: Overmodulation can result in severe distortion in some TV sets. Set this control at peak program levels.

8) RF OUTPUT AND AURAL CARRIER LEVEL ADJUSTMENT (For each of the three modulators)

- A) Using a field strength meter or spectrum analyzer, set the video carrier to the desired level with the output level (RF) control,(typically +50 to +53dBmV).
- B) Tune the field strength meter to the aural carrier, which is located 4.5MHz above the video carrier.
- C) Adjust the aural carrier level control (A/V) 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.

9) MISCELLANEOUS

- A) The LCM-600 is BTSC stereo compatible. Each modulator is shipped in the “mono” mode. To defeat the pre-emphasis in order to use a composite baseband BTSC input signal, move the internal jumper plug in the desired modulator from W-1 to W-2. This plug is located in the left rear area of the modulator P.C. board.
- B) The LCM-600 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.
- C) When installing the LCM-600 in an equipment rack, it is best to leave an empty rack space above and below the unit to allow for optimum air circulation.