



LCM-300-S

FREQUENCY AGILE

SUB-BAND TELEVISION MODULATOR

INSTRUCTION MANUAL

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LCM-300-S

Specifications

Output Frequency Range.....	Channel T-7 (7MHz) through Channel W (300MHz). Selectable by front panel DIP switch in 2MHz increments (250KHz internal adjustment)
F.C.C. Offset.....	+12.5KHz tunable by front panel adjustment
Output Power Level.....	+45dBmV typical, +40dBmV minimum per channel
Frequency Accuracy / Stability.....	<±5KHz of selected channel frequency
Video Performance.....	1V P-P input nominal for 87% modulation. Differential gain <5% Differential Phase <5°
Spurious Outputs.....	>60dB typical, >55dB minimum below output visual carrier level
Out-of-Band C/N.....	>76dB as measured in a 4.0MHz noise bandwidth
In-Band C/N.....	>60dB as measured in a 4.0MHz noise bandwidth
Audio / Video Ratio.....	Adjustable from 13dB to 20dB below video carrier
Audio Performance.....	500mV P-P for 25KHz deviation, front panel adjust- able. 10K input Z
Audio Inter-carrier Stability.....	4.5MHz within ±1KHz
BTSC Stereo / Mono.....	Internal defeat of audio pre-emphasis for BTSC baseband inputs. Shipped mono mode
Front Panel Controls.....	RF output adjust A/V ratio adjust Video & Audio modulation F.C.C. offset adjust Channel select DIP switches
Rear Panel Connectors.....	RCA type video/audio input Type F RF output
Power Requirements.....	5V @ 100mA, 10V @ 370mA and 24V @ 3mA
Chassis Size.....	7"D x 1.125"W x 1.75"H

LCM-300-S

Sub-band Frequency Agile –Television Modulator

1.) INTRODUCTION

The Olson Technology LCM-300-S is a sub-band frequency agile F.C.C. compatible modulator in a 7"D x 1 1/8"W x 1 3/4"H desktop chassis. The LCM-300-S may be operated at 45dBmV typical, +40dBmV guaranteed minimum. No IF loops are provided on this modulator.

The LCM-300-S modulator will operate on any sub-band, standard, or cable channel from 5MHz – 300MHz. All channels are selectable by front panel DIP switches and a front panel adjustment allows setting to F.C.C. offset frequencies, HRC frequencies are available.

The LCM-300-S is designed to be operated in the LCM-550-RKA rack assembly.

Note: The LCM-300-S is shipped with channel T7 selected.

The LCM-300-S offers the unique Olson Technology feature of >76dB out-of-band C/N ratio. SAW filtering is used for adjacent channel operation and provides 55dB of spurious free dynamic range.

The LCM-300-S has low power consumption for economical and reliable long-term operation.

2.) CHANNEL SELECTION

Channel frequencies are selected by setting the 10-position DIP switch (visible through the vertical slot in the front panel). The front panel is illustrated in figure 1.

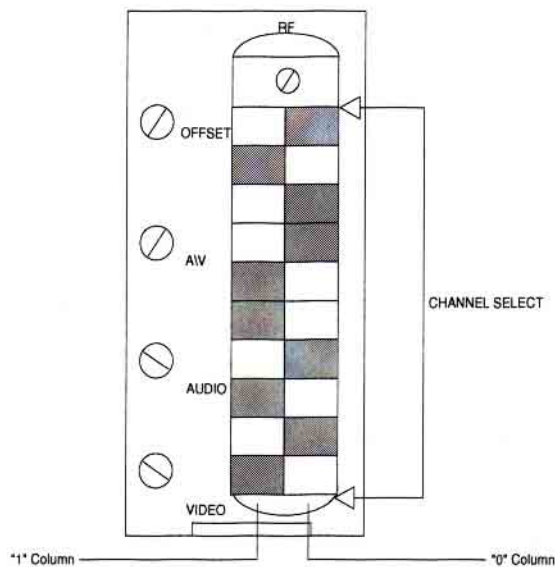


Figure 1 – LCM-300-S Front Panel

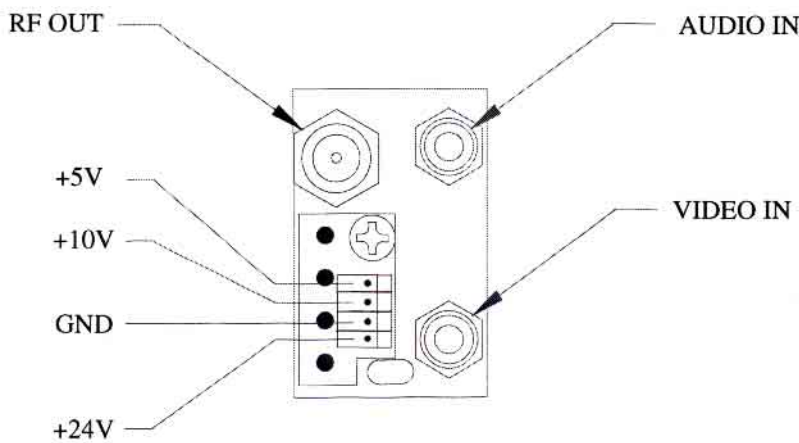
Switch-setting codes for sub-band channels are shown in Table 1. Switch-setting codes for standard channel frequencies can be found in Table 2 in this manual, HRC code settings are shown on Table 3. The front panel illustration in Figure 1 shows a switch properly set for sub-band channel T7.

3.) F.C.C. OFFSET ADJUSTMENT

F.C.C. Offset frequencies are shown in Table 4. To adjust the frequency of a selected channel to provide the correct F.C.C. offset, look up its offset frequency in Table 4. Remove the video input and connect a counter to the RF output of the LCM-300-S. Use the front panel offset adjust control to set the output frequency to the correct value.

4.) REAR PANEL

The rear panel of each module has its audio and video inputs and its RF output. The audio and video inputs are RCA type phono jacks and the RF output is a type “F”.



5.) VIDEO MODULATION ADJUSTMENT (Each modulator).

LCM-300-S modulator modules are preset at the factory for 85% depth of modulation with a 1V P-P pulse and bar test signal. If the video modulation needs to be adjusted, follow the procedure below.

Connect the video source (to be used at approximately 1V P-P) to the video input phono jack. The video should be of a reasonably bright scene (commercials are usually excellent).

Adjust the video modulation control on the front panel to obtain approximately 85% depth-of modulation as measured on a spectrum analyzer or other test equipment capable of this measurement.

If the video modulation control needs to be set and there is no test equipment available, it can be set fairly close by comparison. View a video signal on a properly adjusted television receiver or receiver/monitor. Apply the same signal if possible, or one of equivalent brightness and contrast to the modulator that needs to be set. View the output of this modulator on the same receiver and adjust the video modulation control for brightness and contrast equivalent to the directly viewed picture. Use caution and do not set this control too high.

6.) AUDIO MODULATION ADJUSTMENT (Each modulator).

Connect the audio source (to be used at approximately 500mV P-P) to the audio input phono jack.

Monitor the audio on a television receiver and adjust the audio modulation control for proper loudness as compared with some channel known to be modulating at the correct level (such as a broadcast station).

The two sources of audio should be very similar in their content and should be near maximum loudness as compared to the average level of their program. In other words, compare a loud passage with a loud passage and set the audio modulation control with this program material. Use caution and do not set this control too high.

7.) OPERATION WITH COMPOSITE BASEBAND BTSC AUDIO INPUT

The LCM-300-S modulators are compatible with a composite baseband BTSC audio input. An internal jumper must be changed to remove audio pre-emphasis as required for this application.

To remove audio pre-emphasis, remove cover screws (top, sides, and front), disconnect and remove the LCM-300-S module from the chassis and remove its left side cover. Locate the small trace to the rear of, and slightly above U16, which runs up and down just to the rear of C116. Note that this trace is connected to the rear side of C116. Cut this vertical trace.

Replace the module cover, replace the module in the chassis, and set the audio deviation per the instructions for the BTSC generator being used.

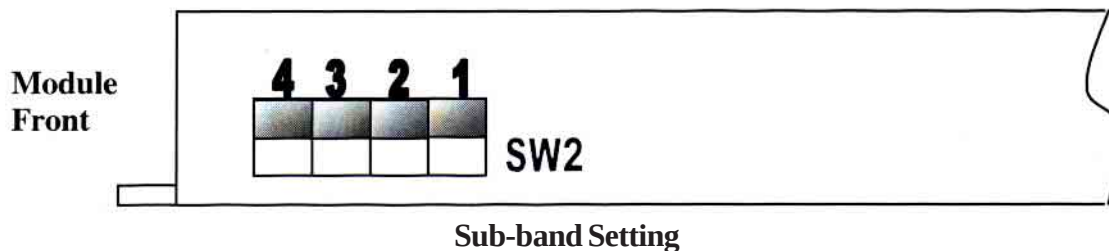
8.) RF OUTPUT AND AURAL CARRIER LEVEL ADJUSTMENT (Each modulator)

- A) Using a field strength meter or spectrum analyzer, set the video carrier to the desired level with the output level (RF) control (typically +40 to +45dBmV).
- 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 aural \ visual carrier ratio to less than 15dB can result in high out-of-band spurious signals on adjacent channels.

9.) MISCELLANEOUS

- A) The front panel adjustments (RF, OFFSET, etc.) are small, and somewhat delicate. Use CAUTION and an adjustment tool that is a proper fit when adjusting these controls.
- B) The LCM-300-S 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, see section 7 of this manual.

For SUB-BAND operation internal switch SW2 must be set as illustrated below.
 (Shipped from factory in Sub-Band mode)
 Right Side – Cover Removed
 (Internal Module)



Front Panel Dip Switch Settings (Sub-Band)

0=Switch in RIGHT Position
 1=Switch in LEFT Position

	RF	POSITION
O OFFSET	0	1
O A/V	1	2
	0	3
O AUDIO	0	4
	1	5
O VIDEO	1	6
	0	7
	1	8
	0	9
	1	10

CH FREQ SWITCH SETTING

T7	7.00	01001 10101
T8	13.00	01001 11000
T9	19.00	01001 11011
T10	25.00	01001 11110
T11	31.00	01010 00001
T12	37.00	01010 00100
T13	43.00	01010 00111

- 1) ABOVE DIP SWITCH SETTING DENOTES T7
- 2) TO SELECT DESIRED CHANNEL, SET THE CHANNEL SELECT SWITCHES PER ATTACHED CODE CARDS
- 3) TO SELECT F.C.C. OFFSET VALUE FOR A DESIRED CHANNEL, DISCONNECT THE VIDEO INPUT SIGNAL AND CONNECT A COUNTER TO THE R.F. OUTPUT. THEN ADJUST THE F.C.C. OFFSET CONTROL POT UNTIL COUNTER READS CHANNEL FREQUENCY PLUS OFFSET.
- 4) REFER TO MANUAL FOR HRC SETTINGS

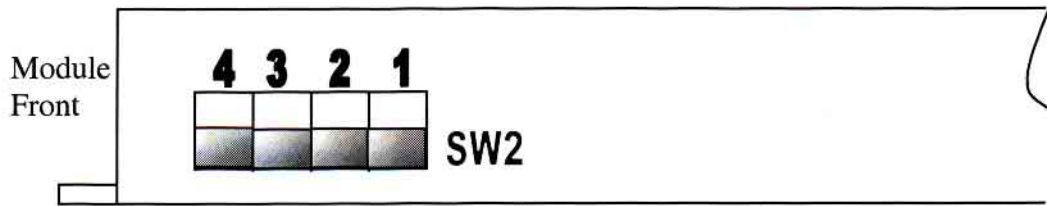
OFFSET VALUE INFORMATION

- 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

MADE IN U.S.A.

Table 1 - SUB-BAND SWITCH SETTING CODES

Standard channel switch settings
Right Side – Cover Removed
(Internal Module)



Standard Setting

0=Switch in RIGHT Position
1=Switch in LEFT Position

	RF	
O OFFSET	0	POSITION
	1	
O A/V	0	2
	1	3
O AUDIO	0	4
	1	5
O VIDEO	0	6
	1	7
	1	8
	1	9
	0	10

- 5) ABOVE DIP SWITCH SETTING DENOTES CH 3
- 6) TO SELECT DESIRED CHANNEL, SET THE CHANNEL SELECT SWITCHES PER ATTACHED CODE CARDS
- 7) TO SELECT F.C.C. OFFSET VALUE FOR A DESIRED CHANNEL, DISSCONNECT THE VIDEO INPUT SIGNAL AND CONNECT A COUNTER TO THE R.F. OUTPUT. THEN ADJUST THE F.C.C. OFFSET CONTROL POT UNTIL COUNTER READS CHANNEL FREQUENCY PLUS OFFSET.
- 8) REFER TO MANUAL FOR HRC SETTINGS

OFFSET VALUE INFORMATION

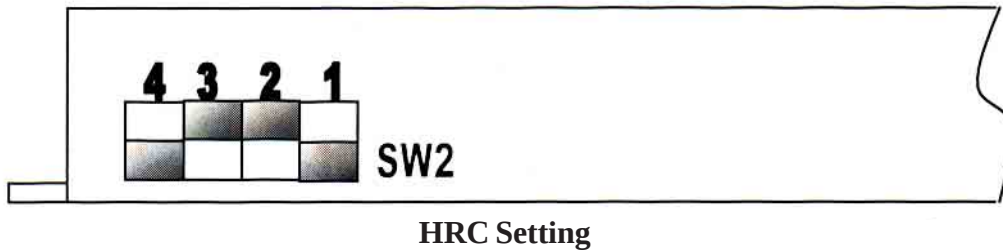
- 4) Channels A, B, C, L to W, AA to EE & GG to QQ=12.5kHz.
- 5) Channels A-2, A-1 & FF = 25kHz
- 6) All others = 0kHz

MADE IN U.S.A.

CH	FREQ	SWITCH	SETTING
2	55.25	01010	01110
3	61.25	01010	10001
4	67.25	01010	10100
5	77.25	01010	11001
6	83.25	01010	11100
95	91.25	01011	00000
96	97.25	01011	00011
97	103.25	01011	00110
98	109.25	01011	01001
99	115.25	01011	01100
7	175.25	01100	01010
8	181.25	01100	01101
9	187.25	01100	10000
10	193.25	01100	10011
11	199.25	01100	10110
12	205.25	01100	11001
13	211.25	01100	11100
14	121.25	01011	01111
15	127.25	01011	10010
16	133.25	01011	10101
17	139.25	01011	11000
18	145.25	01011	11011
19	151.25	01011	11110
20	157.25	01100	00001
21	163.25	01100	00100
22	169.25	01100	00111
23	217.25	01100	11111
24	223.25	01101	00010
25	229.25	01101	00101
26	235.25	01101	01000
27	241.25	01101	01011
28	247.25	01101	01110
29	253.25	01101	10001
30	259.25	01101	10100
31	265.25	01101	10111
32	271.25	01101	11010
33	277.25	01101	11101
34	283.25	01110	00000
35	289.25	01110	00011
36	295.25	01110	00110

Table 2 - STANDARD SWITCH SETTING CODES

Right Side – Cover Removed
(Internal Switch)



HRC CHANNEL CODES

FREQUENCY MHz	HISTORIC CHANNEL	FRONT PANEL DIP SWITCH									
		1	2	3	4	5	6	7	8	9	10
54.00	2	0	1	0	1	0	0	1	1	0	1
60.00	3	0	1	0	1	0	1	0	0	0	0
66.00	4	0	1	0	1	0	1	0	0	1	1
78.00	5	0	1	0	1	0	1	1	0	0	1
84.00	6	0	1	0	1	0	1	1	1	0	0
174.00	7	0	1	1	0	0	0	1	0	0	1
180.00	8	0	1	1	0	0	0	1	1	0	0
186.00	9	0	1	1	0	0	0	1	1	1	1
192.00	10	0	1	1	0	0	1	0	0	1	0
198.00	11	0	1	1	0	0	1	0	1	0	1
204.00	12	0	1	1	0	0	1	1	0	0	0
210.00	13	0	1	1	0	0	1	1	0	1	1
120.00	A	0	1	0	1	1	0	1	1	1	0
126.00	B	0	1	0	1	1	1	0	0	0	1
132.00	C	0	1	0	1	1	1	0	1	0	0
138.00	D	0	1	0	1	1	1	0	1	1	1
144.00	E	0	1	0	1	1	1	1	0	1	0
150.00	F	0	1	0	1	1	1	1	1	0	1
156.00	G	0	1	1	0	0	0	0	0	0	0
162.00	H	0	1	1	0	0	0	0	0	1	1
168.00	I	0	1	1	0	0	0	0	1	1	0
216.00	J	0	1	1	0	0	1	1	1	1	0
222.00	K	0	1	1	0	1	0	0	0	0	1
228.00	L	0	1	1	0	1	0	0	1	0	0
234.00	M	0	1	1	0	1	0	0	1	1	1
240.00	N	0	1	1	0	1	0	1	0	1	0
246.00	O	0	1	1	0	1	0	1	1	0	1
252.00	P	0	1	1	0	1	1	0	0	0	0
258.00	Q	0	1	1	0	1	1	0	0	1	1
264.00	R	0	1	1	0	1	1	0	1	1	0
270.00	S	0	1	1	0	1	1	1	0	0	1
276.00	T	0	1	1	0	1	1	1	1	0	0
282.00	U	0	1	1	0	1	1	1	1	1	1
288.00	V	0	1	1	1	0	0	0	0	1	0
294.00	W	0	1	1	1	0	0	0	1	0	1
300.00	AA	0	1	1	1	0	0	1	0	0	0

F.C.C. OFFSET FREQUENCIES

EIA CHANNEL	HISTORIC CHANNEL	F.C.C. OFFSET KHz	CHANNEL FREQUENCY INCL. OFFSET MHz
98	A-2	25.0	109.2750
99	A-1	25.0	115.2750
14	A	12.5	121.2625
15	B	12.5	127.2625
16	C	12.5	133.2625
25	L	12.5	229.2625
26	M	12.5	235.2625
27	N	12.5	241.2625
28	O	12.5	247.2625
29	P	12.5	253.2625
30	Q	12.5	259.2625
31	R	12.5	265.2625
32	S	12.5	271.2625
33	T	12.5	277.2625
34	U	12.5	283.2625
35	V	12.5	289.2625
36	W	12.5	295.2625
37	AA	12.5	301.2625

Table 4 - F.C.C. OFFSETS