OTD-3000

FREQUENCY AGILE
TELEVISION DEMODULATOR

INSTRUCTION MANUAL

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OTD-3000

AGILE DEMODULATOR

The OTD-3000 is a full feature agile demodulator that is available in four standards - NTSC, PAL B/G, PAL I and PAL D. The OTD-3000 will demodulate NTSC frequencies from 55.25MHz (ch. 2) to 801.25MHz (UHF ch. 69), and PAL carrier frequencies from 48.25MHz to 855.25MHz, including all cable channels. Frequency selection is by front panel DIP switches. The unit features external subcarrier output, two video outputs, rear panel selectable composite video outputs, and a 600 ohm balanced audio output. A multiplex audio output is also provided for stereo applications, along with an i.f. output port which allows the unit to be utilized as a frequency agile input tuner for processor applications.

APPLICATIONS

* On line applications where a monitor feature is required.

* Microwave applications requiring composite video outputs.

* Standby input tuner for processor applications.

* Sub-carrier output for broadcast stereo applications.

* Use in conjunction with OTM-3000 or OTM-3000-CV for processor applications.

OTD-3000
SPECIFICATIONS

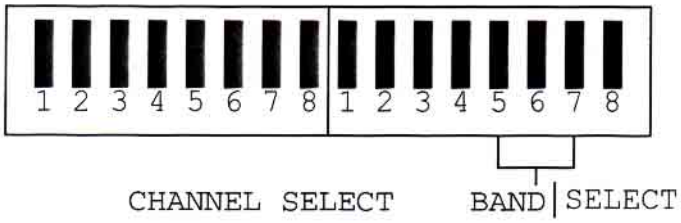
RF Input	NTSC 55.25MHz to 801.25MHz in 0.25MHz increments. All PAL Versions 48.25MHz to 855.25MHz in 1MHz increments. Can select HRC channels with internal jumper plugs.
RF Input Level	-10dBmV to +25dBmV off-air. -10dBmV to +10dBmV off-cable.
Video Outputs (two)	1V p-p (75Ù).
Composite Video	Rear panel selectable by slide switch.
Audio Output	500mV p-p (600Ω balanced) min.
MPX Audio Output (NTSC)	+40dBmV (75Ω unbalanced).
4.5MHz Output (NTSC)	+40dBmV (75Ω).
5.5MHz Output (PAL B/G)	+40dBmV (75Ω).
6.0MHz Output (PAL I)	+40dBmV (75W).
I.F. Output	75Ω, +20dBmV nominal @ 15dBmV input.
Front Panel Controls	On/off switch, channel/band select DIP switches.
Rear Panel Connectors	Type F RF input, (2) video outputs, external subcarrier output, MPX audio and I.F. audio outputs. Audio output screw terminals. 3-wire power cord - U.S.A. plug.
Power Requirements	NTSC — 115 VAC @ 60Hz, 10 watts maximum. PAL B/G, PAL D — 220 VAC @ 50Hz, 10 watts maximum. PAL I — 240 VAC @ 50Hz, 10 watts maximum.
Size	1.75"H x 19"W x 8" D. Standard rack mounting.

OPTIONAL

OTD-3000-S	Same features and specifications as OTD-3000 but with sub-band channel T-7 (7MHz) through channel YY (445.25MHz) input capabilities.

1) DEMODULATOR OPERATION

A) Input Channel selection - Remove the front panel plate on the "Input Channel Select" to expose the channel select and band select DIP switches.



The channel select switch is the first 12 positions on the left side of the opening. The next 3 positions are for band select and the last position is for AFC "On-Off" selection. The channel select codes for all standard input channels is attached to the DIP switch cover for operator's convenience and also appears on page 5 of this manual. To select an HRC input channel, utilize the HRC code page attached to the manual. To select a channel, follow the code sheet from left to right placing the DIP switch in either the up or down position as indicated by the code sheet. (0 = DOWN, 1 = UP)

The band select switch for the channel selected is as follows:

CHANNEL	BAND SELECT SWITCH POSITION 5 THRU 7 (Left to Right)		
2 to A-4 (54.00 to 97.25)	1	1	1
A-3 to 13 (97.50 to 211.25)	0	1	1
J to LL (211.50 to 367.25)	1	0	1
MM to UHF 69 (367.50 to 801.25)	1	1	0

This information is also included on the code cards attached to the cover plate.

B) AFC selection - Most off air TV stations are usually very close to the specified carrier frequency such that the AFC function need not be used. However, some UHF stations have a tendency to drift so it is best to utilize the AFC function. Simply put the AFC switch (last switch on the right) in the down position for automatic frequency control.

C) Off cable processing should not require AFC but make sure the proper code sheet (standard channel or HRC) is utilized.

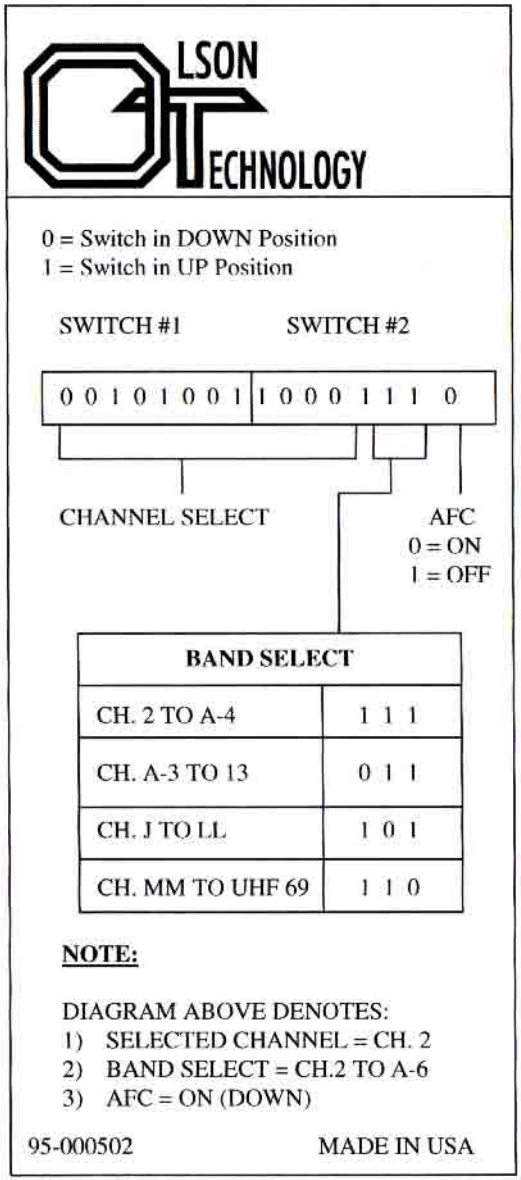
D) After an input channel has been selected, connect an antenna or cable source to the "VHF/UHF" terminal. For optimum video quality, the input signal level should be -10dBmV to +25dBmV for off-air and -10dBmV to +10dBmV for off-cable signals. Although the unit will function with input signals as low as -20dBmV, levels below -20dBmV will be squelched in the output video amplifier by the internal squelch circuit. Two baseband video output ports are provided - one of which can be utilized for on-line application where a monitor feature is required. Baseband video will include composite audio subcarrier if the "composite switch" on the rear panel is in the ON position. Baseband audio will appear at the audio output screw terminals. A multiplex (MPX) output terminal is provided for broadcast stereo applications along with an i.f. (45.75) output port which allows the unit to be used as a frequency agile input tuner for processor application. The OTD-3000 also provides a 4.5MHz audio output port which can be utilized when using a modulator with 4.5MHz audio carrier input capabilities, such as the Olson Model OTM-3000-CV.

E) The baseband video output is internally set for lV p-p video output (±10%) with a 75 ohm termination.

The baseband audio output is internally set for 500mV p-p at standard broadcast deviation. The Audio Output termination can be as low as 600 ohms.

The MPX Output is 75 ohms and need not be terminated.

F) The Demodulator Delayed AGC Adjustment is factory set and provides the best signal-to-noise ratio for low-level off-air signals and for adjacent channel rejection with cable operation.



CH	FREQ	DIP SWITCH SET	BAND
2	55.25	0010 1001 1000	111
3	61.25	0011 0101 1000	111
4	67.25	0010 0011 1000	111
5	77.25	0011 0111 1000	111
6	83.25	0010 0000 0100	111
7	175.25	0010 1110 1100	011
8	181.25	0011 0001 1100	011
9	187.25	0010 0101 1100	011
10	193.25	0011 1101 1100	011
11	199.25	0010 1011 1100	011
12	205.25	0011 0111 1100	011
13	211.25	0010 0000 0010	011
14 (A)	121.25	0011 1001 0100	011
15 (B)	127.25	0010 1101 0100	011
16 (C)	133.25	0011 0011 0100	011
17 (D)	139.25	0010 0111 0100	011
18 (E)	145.25	0011 1111 0100	011
19 (F)	151.25	0010 1000 1100	011
20 (G)	157.25	0011 0100 1100	011
21 (H)	163.25	0010 0010 1100	011
22 (I)	169.25	0011 1010 1100	011
23(J)	217.25	0011 1000 0010	101
24 (K)	223.25	0010 1100 0010	101
25 (L)	229.25	0011 0010 0010	101
26 (M)	235.25	0010 0110 0010	101
27 (N)	241.25	0011 1110 0010	101
28 (O)	247.25	0010 1001 0010	101
29 (P)	253.25	0011 0101 0010	101
30 (Q)	259.25	0010 0011 0010	101
31 (R)	265.25	0011 1011 0010	101
32 (S)	271.25	0010 1111 0010	101
33 (T)	277.25	0011 0000 1010	101
34 (U)	283.25	0010 0100 1010	101
35 (V)	289.25	0011 1100 1010	101
36 (W)	295.25	0010 1010 1010	101

CH	FREQ	DIP SWITCH SET	BAND
37 (AA)	301.25	0011 0110 1010	101
38 (BB)	307.25	0010 0001 1010	101
39 (CC)	313.25	0011 1001 1010	101
40 (DD)	319.25	0010 1101 1010	101
41 (EE)	325.25	0011 0011 1010	101
42 (FF)	331.25	0010 0111 1010	101
43 (GG)	337.25	0011 1111 1010	101
44 (HH)	343.25	0010 1000 0110	101
45 (II)	349.25	0011 0100 0110	101
46 (JJ)	355.25	0010 0010 0110	101
47 (KK)	361.25	0011 1010 0110	101
48 (LL)	367.25	0010 1110 0110	101
49(MM)	373.25	0011 0001 0110	110
50 (NN)	379.25	0010 0101 0110	110
51 (OO)	385.25	0011 1101 0110	110
52 (PP)	391.25	0010 1011 0110	110
53 (QQ)	397.25	0011 0111 0110	110
54 (A-8)	73.25	0011 1011 1000	111
55 (A-7)	79.25	0010 1111 1000	111
56 (A-6)	85.25	0011 0000 0100	111
57 (A-5)	91.25	0010 0100 0100	111
58 (A-4)	97.25	0011 1100 0100	111
59 (A-3)	103.25	0010 1010 0100	011
60 (A-2)	109.25	0011 0110 0100	011
61 (A-1)	115.25	0010 0001 0100	011
62 (RR)	403.25	0010 0000 1110	110
63 (SS)	409.25	0011 1000 1110	110
64 (TT)	415.25	0010 1100 1110	110
65 (UU)	421.25	0011 0010 1110	110
66 (VV)	427.25	0010 0110 1110	110
67(WW)	433.25	0011 1110 1110	110
68 (XX)	439.25	0010 1001 1110	110
69 (YY)	445.25	0011 0101 1110	110
70 (ZZ)	451.25	0010 0011 1110	110
71	457.25	0011 1011 1110	110

STANDARD CHANNEL CODES FOR OTD-3000

CH	FREQ	DIP SWITCH SET	BAND
72	463.25	0010 1111 1110	110
73	469.25	0011 0000 0001	110
74	475.25	0010 0100 0001	110
75	481.25	0011 1100 0001	110
76	487.25	0010 1010 0001	110
77	493.25	0011 0110 0001	110
78	499.25	0010 0001 0001	110
79	505.25	0011 1001 0001	110
80	511.25	0010 1101 0001	110
81	517.25	0011 0011 0001	110
82	523.25	0010 0111 0001	110
83	529.25	0011 1111 0001	110
84	535.25	0010 1000 1001	110
85	541.25	0011 0100 1001	110
86	547.25	0010 0010 1001	110
87	553.25	0011 1010 1001	110
88	559.25	0010 1110 1001	110
89	565.25	0011 0001 1001	110
90	571.25	0010 0101 1001	110
91	577.25	0011 1101 1001	110
92	583.25	0010 1011 1001	110
93	589.25	0011 0111 1001	110
94	595.25	0010 0000 0101	110
95	601.25	0011 1000 0101	110
96	607.25	0010 1100 0101	110
97	613.25	0011 0010 0101	110
98	619.25	0010 0110 0101	110
99	625.25	0011 1110 0101	110
100	631.25	0010 1001 0101	110
101	637.25	0011 0101 0101	110
102	643.25	0010 0011 0101	110
103	649.25	0011 1011 0101	110
104	655.25	0010 1111 0101	110
105	661.25	0011 0000 1101	110
106	667.25	0010 0100 1101	110
107	673.25	0011 1100 1101	110

CH	FREQ	DIP SWITCH SET	BAND
108	679.25	0010 1010 1101	110
109	685.25	0011 0110 1101	110
110	691.25	0010 0001 1101	110
111	697.25	0011 1001 1101	110
112	703.25	0010 1101 1101	110
113	709.25	0011 0011 1101	110
114	715.25	0010 0111 1101	110
115	721.25	0011 1111 1101	110
116	727.25	0010 1000 0011	110
117	733.25	0011 0100 0011	110
118	739.25	0010 0010 0011	110
119	745.25	0011 1010 0011	110
120	751.25	0010 1110 0011	110
121	757.25	0011 0001 0011	110
122	763.25	0010 0101 0011	110
123	769.25	0011 1101 0011	110
124	775.25	0010 1011 0011	110
125	781.25	0011 0111 0011	110
126	787.25	0010 0000 1011	110
127	793.25	0011 1000 1011	110
128	799.25	0010 1100 1011	110
129	805.25	0011 0010 1011	110

UHF OFF-AIR CHANNELS

14	471.25	0010 1000 0001	110
15	477.25	0011 0100 0001	110
16	483.25	0010 0010 0001	110
17	489.25	0011 1010 0001	110
18	495.25	0010 1110 0001	110
19	501.25	0011 0001 0001	110
20	507.25	0010 0101 0001	110
21	513.25	0011 1101 0001	110
22	519.25	0010 1011 0001	110
23	525.25	0011 0111 0001	110
24	531.25	0010 0000 1001	110
25	537.25	0011 1000 1001	110
26	543.25	0010 1100 1001	110

CH	FREQ	DIP SWITCH SET	BAND
27	549.25	0011 0010 1001	110
28	555.25	0010 0110 1001	110
29	561.25	0011 1110 1001	110
30	567.25	0010 1001 1001	110
31	573.25	0011 0101 1001	110
32	579.25	0010 0011 1001	110
33	585.25	0011 1011 1001	110
34	591.25	0010 1111 1001	110
35	597.25	0011 0000 0101	110
36	603.25	0010 0100 0101	110
37	609.25	0011 1100 0101	110
38	615.25	0010 1010 0101	110
39	621.25	0011 0110 0101	110
40	627.25	0010 0001 0101	110
41	633.25	0011 1001 0101	110
42	639.25	0010 1101 0101	110
43	645.25	0011 0011 0101	110
44	651.25	0010 0111 0101	110
45	657.25	0011 1111 0101	110
46	663.25	0010 1000 1101	110
47	669.25	0011 0100 1101	110
48	675.25	0010 0010 1101	110
49	681.25	0011 1010 1101	110
50	687.25	0010 1110 1101	110
51	693.25	0011 0001 1101	110
52	699.25	0010 0101 1101	110
53	705.25	0011 1101 1101	110
54	711.25	0010 1011 1101	110
55	717.25	0011 0111 1101	110
56	723.25	0010 0000 0011	110
57	729.25	0011 1000 0011	110
58	735.25	0010 1100 0011	110
59	741.25	0011 0010 0011	110
60	747.25	0010 0110 0011	110
61	753.25	0011 1110 0011	110
62	759.25	0010 1001 0011	110

CH	FREQ	DIP SWITCH SET	BAND
63	765.25	0011 0101 0011	110
64	771.25	0010 0011 0011	110
65	777.25	0011 1011 0011	110
66	783.25	0010 1111 0011	110
67	789.25	0011 0000 1011	110
68	795.25	0010 0100 1011	110
69	801.25	0011 1100 1011	110

STANDARD CHANNEL CODES FOR OTD-3000 (continued)

HRC CHANNEL CODES FOR OTD-3000

CH	FREQ	DIP SWITCH SET	BAND
2	54.00	1111 0001 1000	111
3	60.00	1110 0101 1000	111
4	66.00	1111 1101 1000	111
5	78.00	1111 0111 1000	111
6	84.00	1110 0000 0100	111
7	174.00	1111 0110 1100	011
8	180.00	1110 0001 1100	011
9	186.00	1111 1001 1100	011
10	192.00	1110 1101 1100	011
11	198.00	1111 0011 1100	011
12	204.00	1110 0111 1100	011
13	210.00	1111 1111 1100	011
14(A)	120.00	1110 1001 0100	011
15(B)	126.00	1111 0101 0100	011
16(C)	132.00	1110 0011 0100	011
17 D)	138.00	1111 1011 0100	011
18(E)	144.00	1110 1111 0100	011
19(F)	150.00	1111 0000 1100	011
20(G)	156.00	1110 0100 1100	011
21(H)	162.00	1111 1100 1100	011
22(I)	168.00	1110 1010 1100	011
23(J)	216.00	1110 1000 0010	101
24(K)	222.00	1111 0100 0010	101
25(L)	228.00	1110 0010 0010	101
26(M)	234.00	1111 1010 0010	101
27(N)	240.00	1110 1110 0010	101
28(O)	246.00	1111 0001 0010	101
29(P)	252.00	1110 0101 0010	101
30(Q)	258.00	1111 1101 0010	101
31(R)	264.00	1110 1011 0010	101
32(S)	270.00	1111 0111 0010	101
33(T)	276.00	1110 0000 1010	101
34(U)	282.00	1111 1000 1010	101

CH	FREQ	DIP SWITCH SET	BAND
35(V)	288.00	1110 1100 1010	101
36(W)	294.00	1111 0010 1010	101
37(AA)	300.00	1110 0110 1010	101
38(BB)	306.00	1111 1110 1010	101
39(CC)	312.00	1110 1001 1010	101
40(DD)	318.00	1111 0101 1010	101
41(EE)	324.00	1110 0011 1010	101
42(FF)	330.00	1111 1011 1010	101
43(GG)	336.00	1110 1111 1010	101
44(HH)	342.00	1111 0000 0110	101
45(II)	348.00	1110 0100 0110	101
46(JJ)	354.00	1111 1100 0110	101
47(KK)	360.00	1110 1010 0110	101
48(LL)	366.00	1111 0110 0110	101
49(MM)	372.00	1110 0001 0110	110
50(NN)	378.00	1111 1001 0110	110
51(OO)	384.00	1110 1101 0110	110
52(PP)	390.00	1111 0011 0110	110
53(QQ)	396.00	1110 0111 0110	110
54(A-8)	72.00	1110 1011 1000	111
55(A-7)	78.00	1111 0111 1000	111
56(A-6)	84.00	1110 0000 0100	111
57(A-5)	90.00	1111 1000 0100	111
58(A-4)	96.00	1110 1100 0100	111
59(A-3)	102.00	1111 0010 0100	011
60(A-2)	108.00	1110 0110 0100	011
61(A-1)	114.00	1111 1110 0100	011
62(RR)	402.00	1111 1111 0110	110
63(SS)	408.00	1110 1000 1110	110
64(TT)	414.00	1111 0100 1110	110
65(UU)	420.00	1110 0010 1110	110
66(VV)	426.00	1111 1010 1110	110
67(WW)	432.00	1110 1110 1110	110
68(XX)	438.00	1111 0001 1110	110

CH	FREQ	DIP SWITCH SET	BAND
69(YY)	444.00	1110 0101 1110	110
70(ZZ)	450.00	1111 1101 1110	110
71	456.00	1110 1011 1110	110
72	462.00	1111 0111 1110	110
73	468.00	1110 0000 0001	110
74	474.00	1111 1000 0001	110
75	480.00	1110 1100 0001	110
76	486.00	1111 0010 0001	110
77	492.00	1110 0110 0001	110
78	498.00	1111 1110 0001	110
79	504.00	1110 1001 0001	110
80	510.00	1111 0101 0001	110
81	516.00	1110 0011 0001	110
82	522.00	1111 1011 0001	110
83	528.00	1110 1111 0001	110
84	534.00	1111 0000 1001	110
85	540.00	1110 0100 1001	110
86	546.00	1111 1100 1001	110
87	552.00	1110 1010 1001	110
88	558.00	1111 0110 1001	110
89	564.00	1110 0001 1001	110
90	570.00	1111 1001 1001	110
91	576.00	1110 1101 1001	110
92	582.00	1111 0011 1001	110
93	588.00	1110 0111 1001	110
94	594.00	1111 1111 1001	110
95	600.00	1110 1000 0101	110
96	606.00	1111 0100 0101	110
97	612.00	1110 0010 0101	110
98	618.00	1111 1010 0101	110
99	624.00	1110 1110 0101	110
100	630.00	1111 0001 0101	110
101	636.00	1110 0101 0101	110
102	642.00	1111 1101 0101	110

CH	FREQ	DIP SWITCH SET	BAND
103	648.00	1110 1011 0101	110
104	654.00	1111 0111 0101	110
105	660.00	1110 0000 1101	110
106	666.00	1111 1000 1101	110
107	672.00	1110 1100 1101	110
108	678.00	1111 0010 1101	110
109	684.00	1110 0110 1101	110
110	690.00	1111 1110 1101	110
111	696.00	1110 1001 1101	110
112	702.00	1111 0101 1101	110
113	708.00	1110 0011 1101	110
114	714.00	1111 1011 1101	110
115	720.00	1110 1111 1101	110
116	726.00	1111 0000 0011	110
117	732.00	1110 0100 0011	110
118	738.00	1111 1100 0011	110
119	744.00	1110 1010 0011	110
120	750.00	1111 0110 0011	110
121	756.00	1110 0001 0011	110
122	762.00	1111 1001 0011	110
123	768.00	1110 1101 0011	110
124	774.00	1111 0011 0011	110
125	780.00	1110 0111 0011	110
126	786.00	1111 1111 0011	110
127	792.00	1110 1000 1011	110
128	798.00	1111 0100 1011	110
129	804.00	1110 0010 1011	110

H R C CODES FOR OTD-3000 DEMODULATOR

OTD-3000 DEMODULATOR CODES
FOR
NON-STANDARD CHANNELS

FM - 1, A-5 Video Carrier	91.250MHz	0 0 1 0 0 1 0 0 0 1 0 0
FM - 2, A-4 Video Carrier	97.250MHz	0 0 1 1 1 1 0 0 0 1 0 0
FM - 3, A-3 Video Carrier	103.250MHz	0 0 1 0 1 0 1 0 0 1 0 0
A-2 Video Carrier	109.250MHz	0 0 1 1 0 1 1 0 0 1 0 0
A-1 Video Carrier	115.250MHz	0 0 1 0 0 0 0 1 0 1 0 0

COMPUTING SWITCH SETTINGS FOR NON-STANDARD FREQUENCIES

The OTD-3000 can be set for any frequency between 54.00 and 801.25MHz in .25MHz steps.

Positions 1 through 8 of the left switch and positions 1 through 4 of the right switch each have decimal values as shown in figure 2 below.

	LEFT SWITCH								RIGHT SWITCH							
Switch position	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Decimal Number	1	2	4	8	16	32	64	128	256	512	1024	2048	BAND SWITCH			AFC
Binary Number	1	1	1	1	1	1	1	0	0	1	0	0				

The Binary number shown is for 114.00MHz.

FIGURE 2 - DIP SWITCH VALUES

A) Decide on the desired frequency yyy.xx.

B) Compute the L.O. frequency required by adding 45.75 to the desired frequency.

C) Divide the L.O. frequency by the step size, .25 to obtain “divide by N”.

D) Convert “N” to reversed binary (least significant bit on the left) using chart.

E) Select the proper input tuner band and set the switches 5, 6 and 7 of the right side switch per chart on page 4.

EXAMPLE:

A) Example frequency of 114.00MHz is desired.

B) N = (114.00 + 45.75) / .25 = 639, the total switch value required.

C) Consult the chart above and locate the largest decimal number that is less than or equal to 639. This would be 512. Place a "1" below 512.

Subtract this number from 639 to obtain the remainder for the next step. The remaining number will be 127. (639-512=127)

D) Consult the chart and locate the largest number that is less than or equal to 127. This is 64. Place a "1" below 64.

Subtract 64 from 127 to obtain the remainder (127-64=63)

E) Continue in this manner until the remainder is zero.

F) Place a "0" below all other decimal numbers that did not receive a "1".

The resulting reversed binary number is:
1111 1110 0100

G) Consult the bandswitch chart on page 4 and 114.00MHz is between 97.50 and 211.25. Set the bandswitch to: 011

OTD-3000

TROUBLESHOOTING ADDENDUM

Troubleshooting:

1) This unit has a restricted AFC range. This is done to eliminate a problem inherent in many low cost modulators incorporating AFC. That problem occurs when the desired off-air channel goes off the air and the AFC has a wide enough range to pull in an adjacent channel. In most cases the AFC holds the undesired channel when the desired channel returns to the air.

2) However, many independent UHF broadcast stations and translators operate out of specification with regard to F.C.C. rules. We have found some in excess of 1MHz from their specified channel allocations. Fortunately your demodulator is capable of selecting the L.O. frequency in 0.25MHz increments. This will allow you to select an L.O. frequency to compensate for your UHF station error.

3) Make sure that the DIP switches for Channel Select are in the correct position according to the channel select chart. Ensure that the Band Select Switches are in the proper position. Put the AFC switch in the "Off" or up position.

   If you hear audio but no video is present, your input level to the UHF input is either too low (-20dBmV or below) which triggers an internal squelch circuit or the UHF transmitter may be off frequency. An off frequency input will cause the unit to act like a low level input signal because it will run the video carrier down the rejection slope of the IF SAW filter.

   If a field strength meter is available, measure the UHF input level for the channel of interest. If it is below -10dBmV, a preamplifier is recommended. If possible, view the UHF signal on a TV set and ensure that you have an adequate picture. If properly set-up, the OTD-3000 should produce a picture of comparable video quality.

   View the video output on a suitable composite video monitor. If it is of comparable quality to the off-air signal, the unit and the TV station are both operating properly.

   If the picture is of inferior quality or there is no picture, begin changing the L.O. frequency by the following procedure:

1) The first two DIP switches as viewed from left to right are always in the down position and the third switch is always in the up position for <u>standard</u> frequency allocations.

2) Moving the first switch to the UP position will increase the L.O. by 0.25MHz. If the picture improves significantly, move the 2nd DIP switch to the UP position, and the first switch back to the DOWN position. This increases the L.O. by 0.50MHz. If the picture quality is not as good as with 0.25MHz offset, return to the 0.25 offset position (lst switch UP) and activate the AFC switch (DOWN position).

3) If the picture quality gets worse in step (2) above by increasing the L.O., the following procedure should be implemented.

Move the lst and 2nd DIP switch to the UP position and the 3rd DIP switch to the DOWN position. This moves the L.O. down by 0.25MHz. If the picture quality improves, try putting the lst position in the DOWN position, leaving the 2nd switch in the UP position and the 3rd switch in the DOWN position. Determine which position gives better quality and activate the AFC switch.

EXAMPLES: Channel 14 (UHF)

No offset (From std. chart)	0	0	1	0	1	0	0	0	0	0	0	1
+0.25mHz offset	1	0	1	0	1	0	0	0	0	0	0	1
+0.50mHz offset	0	1	1	0	1	0	0	0	0	0	0	1
-0.25mHz offset	1	1	0	0	1	0	0	0	0	0	0	1
-0.50mHz offset	0	1	0	0	1	0	0	0	0	0	0	1

If this procedure does not yield any improvement, please consult the factory.