



**OTD-3000-DC**

**FREQUENCY AGILE  
TELEVISION DEMODULATOR**

**PAL-D (China) STANDARD**

**INSTRUCTION MANUAL**

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# OTM-3000 DC

## FREQUENCY AGILE PAL D TELEVISION MODULATOR

### 1) INTRODUCTION

The OTM-3000 DC is a frequency agile television modulator with an output frequency range of 48.25MHz through 450.00MHz. All channels are selectable by front panel DIP switches in .25MHz increments.

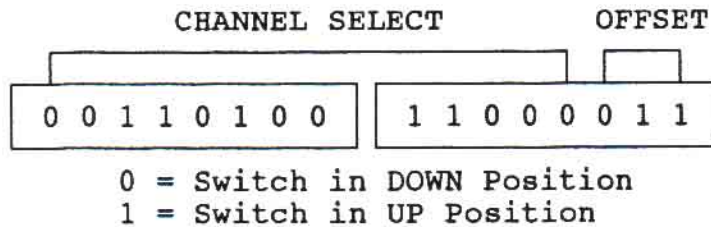
The OTM-3000 DC offers high output level, typically +60dBmV. This unit has a very high out-of-band carrier to noise ratio (>80dB) and uses SAW I.F. filtering, which allows virtually an unlimited number of modulators to be combined without the need for external bandpass filters. The OTM-3000 DC has low power consumption (typically 12 watts @ 220 VAC) for reliable long term operation.

### 2) CHANNEL SELECTION

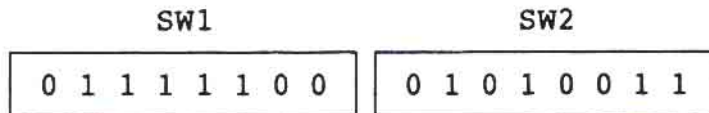
Output frequency selection is made by properly setting the two 8-position DIP switches SW1 and SW2 which are located behind the small cover plate on the front panel.

Refer to Table 1 to determine the proper switch settings for various PAL D China channels. Set the switches from left to right as shown in Table 1.

**Figure 1 - SW1, SW2 Switch Functions**



For example, if 49.75MHz is desired, the DIP switches would be positioned as follows:



### 3) SELECTION OF NON-STANDARD OUTPUT FREQUENCIES

Refer to the following paragraphs if you need to set the switches for non- standard assignments.

Each of the switches has a weighted value as indicated in Figure 2. The switches are either UP = OFF = (value) or are DOWN = ON = 0.

**Figure 2 - SW1/SW2 Switch Values**

SW 1							
1	2	3	4	5	6	7	8
1	2	4	8	16	32	64	128
0	0	0	0	0	0	0	0

SW 2							
1	2	3	4	5	6	7	8
256	512	1024	2048	4096	OFFSET		
0	0	0	0	0			

The selected video carrier frequency may be any frequency within the 48 to 450MHz band providing the selected frequency (+) 605.75 is evenly divisible by .25. The procedure is as follows:

COMPUTING SWITCH SETTINGS FOR NON-STANDARD FREQUENCIES

- A) Decide on the required frequency and check that it is evenly divisible by .25 (answer must end in .00).
- B) Compute the total weighted switch value required.
- C) Set the DIP switches to equal the total weighted value.

EXAMPLE:

If X is the required frequency in MHz and Y is the total weighted value of the switch settings, then  $(X + 605.75)$  divided by  $.25 = Y$ .

To illustrate: If the desired frequency is 49.75.

$$Y = (49.75 + 605.75) \text{ divided by } .25 = 2622$$

Refer to Figure 2 and compute which switch positions must be moved UP so their total value = 2622. This would yield switch settings of:

<b>SW1</b>	<b>SW2</b>
0 1 1 1 1 1 0 0	0 1 0 1 0 0 1 1

**Figure 3 - Example of settings for 49.75MHz.**

#### 4) OFFSET OPERATION

The last 3 positions of the right hand DIP switch, SW2, are used to select offset operation with certain versions of the OTM-3000. On the OTM-3000 DC, the last 3 switch positions should be left set as shown above.

#### 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.
- 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 or spectrum analyzer, set the video carrier to the desired level with the RF output level adjust control.
- B) Tune the field strength meter or analyzer to the aural carrier (6.5MHz 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) 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 DC will not perform properly.
- B) If a scrambling unit is utilized with the OTM-3000 DC, 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.
- C) This unit is equipped with a 0.25A slo-blo fuse. For continued safety and to maintain proper performance of the unit, please replace only with an equivalent fuse.
- D) A -20dB test point (type F connector) is provided on 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										
	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

OTM-3000 DC

STANDARD CHINA PAL D CHANNELS

Table 1

<u>CHANNEL</u>	<u>VIDEO FREQ.</u>	<u>DIP SWITCH SETTINGS</u>			
		<u>SW1</u>		<u>SW2</u>	
DS-1	49.750	0111	1100	0101	0011
DS-2	57.750	0111	1010	0101	0011
DS-3	65.750	0111	1110	0101	0011
DS-4	77.250	0011	0101	0101	0011
DS-5	85.250	0011	0011	0101	0011
Z1	112.250	0001	1100	1101	0011
Z2	120.250	0001	1010	1101	0011
Z3	128.250	0001	1110	1101	0011
Z4	136.250	0001	1001	1101	0011
Z5	144.250	0001	1101	1101	0011
Z6	152.250	0001	1011	1101	0011
Z7	160.250	0001	1111	1101	0011
DS-6	168.250	0001	1000	0011	0011
DS-7	176.250	0001	1100	0011	0011
DS-8	184.250	0001	1010	0011	0011
DS-9	192.250	0001	1110	0011	0011
DS-10	200.250	0001	1001	0011	0011
DS-11	208.250	0001	1101	0011	0011
DS-12	216.250	0001	1011	0011	0011
Z8	224.250	0001	1111	0011	0011
Z9	232.250	0001	1000	1011	0011
Z10	240.250	0001	1100	1011	0011
Z11	248.250	0001	1010	1011	0011
Z12	256.250	0001	1110	1011	0011
Z13	264.250	0001	1001	1011	0011
Z14	272.250	0001	1101	1011	0011
Z15	280.250	0001	1011	1011	0011
Z16	288.250	0001	1111	1011	0011
	296.250	0001	1000	0111	0011
	304.250	0001	1100	0111	0011
	312.250	0001	1010	0111	0011
	320.250	0001	1110	0111	0011
	328.250	0001	1001	0111	0011
	336.250	0001	1101	0111	0011
	344.250	0001	1011	0111	0011
	352.250	0001	1111	0111	0011
	360.250	0001	1000	1111	0011

OTM-3000-DC STANDARD CHANNELS (continued)

<u>CHANNEL</u>	<u>VIDEO FREQ.</u>	<u>DIP SWITCH SETTINGS</u>			
		<u>SW1</u>		<u>SW2</u>	
	368.250	0001	1100	1111	0011
	376.250	0001	1010	1111	0011
	384.250	0001	1110	1111	0011
	392.250	0001	1001	1111	0011
	400.250	0001	1101	1111	0011
	408.250	0001	1011	1111	0011
	416.250	0001	1111	1111	0011
	424.250	0001	1000	0000	1011
	432.250	0001	1100	0000	1011
	440.250	0001	1010	0000	1011
	448.250	0001	1110	0000	1011