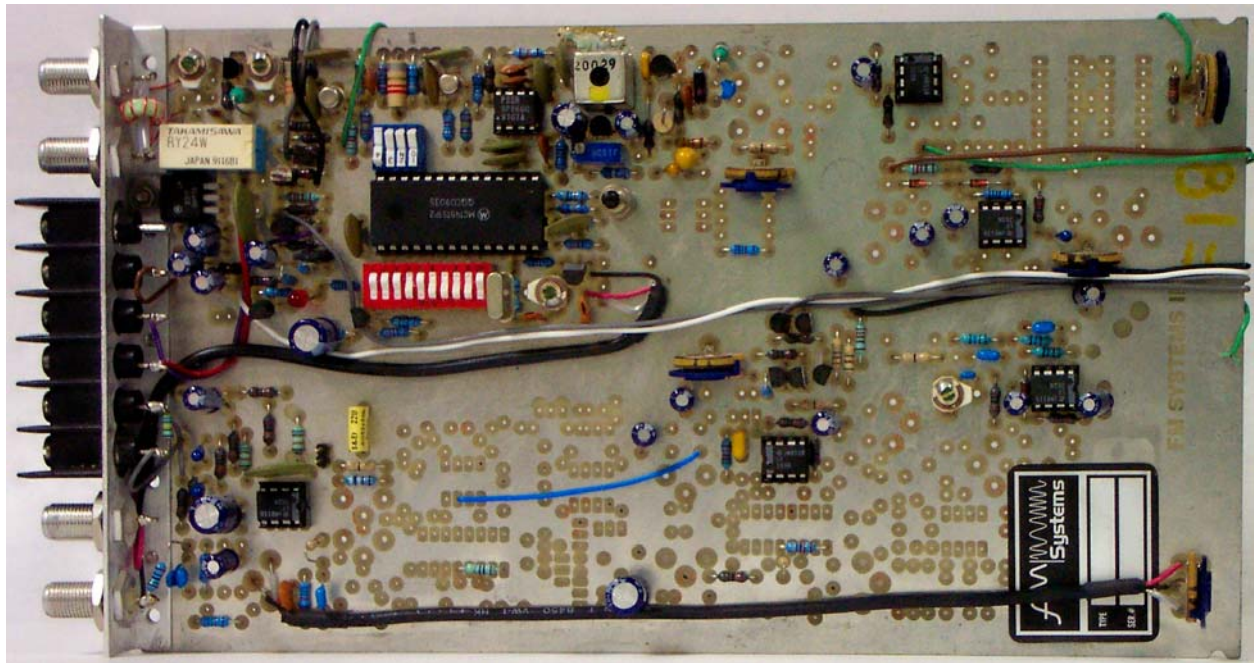


# FMT651CN



## FREQUENCY MODULATED TRANSMITTER

INSTRUCTION BOOK

IB1283-01

5-10-96

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## INTRODUCTION

The FMT651CN is a modulator which accepts program audio and delivers a frequency modulated (FM) carrier. The output frequency is adjustable in the field without changing crystals, a crystal controlled switch programmable phase lock loop (PLL) sets the output frequency precisely. Various configurations of the basic FMT651 are available, a letter suffix following the basic model number designates which options apply to any given unit, as coded on the cover sheet. The letters S, C, and Y designates the operating frequency band the unit.

## INSTALLATION

The FMT651CN is normally shipped already mounted into a PMS610 mainframe/power supply, if not refer to Appendix B for the installation procedure. Connect power to the mainframe.

## SET-UP AND CABLING

Connect the FM CHANNEL OUTPUT to the system input. Terminate the FM CHANNEL INPUT with 75 ohms, or the output from another modulator, which may be looped through the combiner in the FMT651CN. To turn the carrier on Pull out on the three position locking switch and move it to the desired position DO NOT FORCE THE SWITCH. The green CARRIER ON indicator will illuminate.

The FMT651CN is equipped with a RLY ACT terminal which, when grounded, can switch the carrier on when the CARRIER switch is in the REM (remote) position. The RLY ACT terminal normally is at a potential of -24 VDC through 10,000 ohms when the carrier is off, and at 0.0 VDC through 10,000 ohm when the carrier is on, permitting its use as a remote carrier status indicator as well as control.

Adjust the CARRIER LEVEL with a small flat-blade screwdriver through right hole in the front panel to coordinate with your system standards. Note: Reversal of the FM CHAN OUTPUT-IN and OUT connections will result in a 20 dB output reduction due to the internal directional coupler. If the output frequency must be changed, refer to that section in this manual.

Connect the audio program input to the Tip and Ring (T & R) terminals. If the source is unbalanced, connect the Ring terminal to the shield of the input cable; the shield should be grounded at the program source end. The chassis of the FMT651CN/PMS610 should be grounded by the power supply cord, as well as the rack mount. Adjust the AUDIO INPUT control with your signal to cause the VU meter to read 0 VU.

FMT651Y suffix only: To set the DISPERSION switch to AUTO, pull out on the three position locking switch, DO NOT FORCE THE SWITCH and select auto. In this mode, the 3-3/4 Hz energy dispersion is automatically switched on when the audio level is low, and off when the audio level is high.

## OUTPUT FREQUENCY CHANGE

The RF output is controlled by a phase-lock-loop (PLL) automatic frequency control system,. When the average frequency of the FM carrier is correct (equal to the reference frequency) the red OFF FREQ L.E.D. on the circuit board will switch off. The change frequency complete these steps.

Look up the binary equivalent of the desired operating frequency in the attached frequency table and set the dip switches according to the table. When the new output frequency is set on the DIP switches, slowly tune L501 until the red OFF FREQ L.E.D. just extinguishes. Then press the push button SW501 located on the top of the PC Board while at the same time adjusting L501 to extinguish the OFF FREQ L.E.D. then release the button. The unit is now tuned to the new frequency and the AFC (Automatic Fine Tuning) is centered.

To tune the output filter connect a field strength meter to the FM channel output and terminate the IN connector with 75 ohms. Tune C515 and C516 for maximum output. The front panel RF output control should be midrange for this setting.

## MAINTENANCE

No routine maintenance is required. However, you may wish to check the output frequency and amplitude periodically to verify that the output is normal. It is recommended that the unit not be internally re-adjusted in the field, except for system changes of the R.F. output frequency and amplitude. All other adjustments require specialized test equipment. In the event of a malfunction of the unit, please contact the factory. Repairs can generally be completed within 24 hours. The factory will issue an R.M.A. (Return Material Authorization) for service of the equipment.

FM BAND  
TUNING TABLE  
10.240/8192/.0125  
88-108 MHz BAND

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<u>FREQUENCY MHz</u>	10	9	8	7	6	5	4	3	2	1		4	3	2	1
88.0	-	X	X	-	X	X	X	-	-	-		-	-	-	-
88.1	-	X	X	-	X	X	X	-	-	-		X	-	-	-
88.2	-	X	X	-	X	X	X	-	-	X		-	-	-	-
88.3	-	X	X	-	X	X	X	-	-	X		X	-	-	-
88.4	-	X	X	-	X	X	X	-	X	-		-	-	-	-
88.5	-	X	X	-	X	X	X	-	X	-		X	-	-	-
88.6	-	X	X	-	X	X	X	-	X	X		-	-	-	-
88.7	-	X	X	-	X	X	X	-	X	X		X	-	-	-
88.8	-	X	X	-	X	X	X	X	-	-		-	-	-	-
88.9	-	X	X	-	X	X	X	X	-	-		X	-	-	-
89.0	-	X	X	-	X	X	X	X	-	X		-	-	-	-
89.1	-	X	X	-	X	X	X	X	-	X		X	-	-	-
89.2	-	X	X	-	X	X	X	X	X	-		-	-	-	-
89.3	-	X	X	-	X	X	X	X	X	-		X	-	-	-
89.4	-	X	X	-	X	X	X	X	X	X		-	-	-	-
89.5	-	X	X	-	X	X	X	X	X	X		X	-	-	-
89.6	-	X	X	X	-	-	-	-	-	-		-	-	-	-
89.7	-	X	X	X	-	-	-	-	-	-		X	-	-	-
89.8	-	X	X	X	-	-	-	-	-	X		-	-	-	-
89.9	-	X	X	X	-	-	-	-	-	X		X	-	-	-
90.0	-	X	X	X	-	-	-	-	X	-		-	-	-	-
90.1	-	X	X	X	-	-	-	-	X	-		X	-	-	-
90.2	-	X	X	X	-	-	-	-	X	X		-	-	-	-
90.3	-	X	X	X	-	-	-	-	X	X		X	-	-	-
90.4	-	X	X	X	-	-	-	X	-	-		-	-	-	-
90.5	-	X	X	X	-	-	-	X	-	-		X	-	-	-
90.6	-	X	X	X	-	-	-	X	-	X		-	-	-	-
90.7	-	X	X	X	-	-	-	X	-	X		X	-	-	-
90.8	-	X	X	X	-	-	-	X	X	-		-	-	-	-
90.9	-	X	X	X	-	-	-	X	X	-		X	-	-	-
91.0	-	X	X	X	-	-	-	X	X	X		-	-	-	-
91.1	-	X	X	X	-	-	-	X	X	X		X	-	-	-
91.2	-	X	X	X	-	-	X	-	-	-		-	-	-	-
91.3	-	X	X	X	-	-	X	-	-	-		X	-	-	-
91.4	-	X	X	X	-	-	X	-	-	X		-	-	-	-
91.5	-	X	X	X	-	-	X	-	-	X		X	-	-	-
91.6	-	X	X	X	-	-	X	-	X	-		-	-	-	-
91.7	-	X	X	X	-	-	X	-	X	-		X	-	-	-
91.8	-	X	X	X	-	-	X	-	X	X		-	-	-	-
91.9	-	X	X	X	-	-	X	-	X	X		X	-	-	-

**FM BAND  
TUNING TABLE  
10.240/8192/.0125  
88-108 MHz BAND**

AN X INDICATES NUMBER SIDE OF ROCKER SWITCH IS UP. SET SWITCHES TO THE DISIRED FREQUENCY AND FOLLOW THE DIRECTIONS IN THE INSTRUCTION BOOK.

<u>FREQUENCY MHz</u>	10	9	8	7	6	5	4	3	2	1		4	3	2	1
92.0	-	X	X	X	-	-	X	X	-	-		-	-	-	-
92.1	-	X	X	X	-	-	X	X	-	-		X	-	-	-
92.2	-	X	X	X	-	-	X	X	-	X		-	-	-	-
92.3	-	X	X	X	-	-	X	X	-	X		X	-	-	-
92.4	-	X	X	X	-	-	X	X	X	-		-	-	-	-
92.5	-	X	X	X	-	-	X	X	X	-		X	-	-	-
92.6	-	X	X	X	-	-	X	X	X	X		-	-	-	-
92.7	-	X	X	X	-	-	X	X	X	X		X	-	-	-
92.8	-	X	X	X	-	X	-	-	-	-		-	-	-	-
92.9	-	X	X	X	-	X	-	-	-	-		X	-	-	-
93.0	-	X	X	X	-	X	-	-	-	X		-	-	-	-
93.1	-	X	X	X	-	X	-	-	-	X		X	-	-	-
93.2	-	X	X	X	-	X	-	-	X	-		-	-	-	-
93.3	-	X	X	X	-	X	-	-	X	-		X	-	-	-
93.4	-	X	X	X	-	X	-	-	X	X		-	-	-	-
93.5	-	X	X	X	-	X	-	-	X	X		X	-	-	-
93.6	-	X	X	X	-	X	-	X	-	-		-	-	-	-
93.7	-	X	X	X	-	X	-	X	-	-		X	-	-	-
93.8	-	X	X	X	-	X	-	X	-	X		-	-	-	-
93.9	-	X	X	X	-	X	-	X	-	X		X	-	-	-
94.0	-	X	X	X	-	X	-	X	X	-		-	-	-	-
94.1	-	X	X	X	-	X	-	X	X	-		X	-	-	-
94.2	-	X	X	X	-	X	-	X	X	X		-	-	-	-
94.3	-	X	X	X	-	X	-	X	X	X		X	-	-	-
94.4	-	X	X	X	-	X	X	-	-	-		-	-	-	-
94.5	-	X	X	X	-	X	X	-	-	-		X	-	-	-
94.6	-	X	X	X	-	X	X	-	-	X		-	-	-	-
94.7	-	X	X	X	-	X	X	-	-	X		X	-	-	-
94.8	-	X	X	X	-	X	X	-	X	-		-	-	-	-
94.9	-	X	X	X	-	X	X	-	X	-		X	-	-	-
95.0	-	X	X	X	-	X	X	-	X	X		-	-	-	-
95.1	-	X	X	X	-	X	X	-	X	X		X	-	-	-
95.2	-	X	X	X	-	X	X	X	-	-		-	-	-	-
95.3	-	X	X	X	-	X	X	X	-	-		X	-	-	-
95.4	-	X	X	X	-	X	X	X	-	X		-	-	-	-
95.5	-	X	X	X	-	X	X	X	-	X		X	-	-	-
95.6	-	X	X	X	-	X	X	X	X	-		-	-	-	-
95.7	-	X	X	X	-	X	X	X	X	-		X	-	-	-
95.8	-	X	X	X	-	X	X	X	X	X		-	-	-	-
95.9	-	X	X	X	-	X	X	X	X	X		X	-	-	-

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<u>FREQUENCY MHz</u>	10	9	8	7	6	5	4	3	2	1		4	3	2	1
96.0	-	X	X	X	X	-	-	-	-	-		-	-	-	-
96.1	-	X	X	X	X	-	-	-	-	-		X	-	-	-
96.2	-	X	X	X	X	-	-	-	-	X		-	-	-	-
96.3	-	X	X	X	X	-	-	-	-	X		X	-	-	-
96.4	-	X	X	X	X	-	-	-	X	-		-	-	-	-
96.5	-	X	X	X	X	-	-	-	X	-		X	-	-	-
96.6	-	X	X	X	X	-	-	-	X	X		-	-	-	-
96.7	-	X	X	X	X	-	-	-	X	X		X	-	-	-
96.8	-	X	X	X	X	-	-	X	-	-		-	-	-	-
96.9	-	X	X	X	X	-	-	X	-	-		X	-	-	-
97.0	-	X	X	X	X	-	-	X	-	X		-	-	-	-
97.1	-	X	X	X	X	-	-	X	-	X		X	-	-	-
97.2	-	X	X	X	X	-	-	X	X	-		-	-	-	-
97.3	-	X	X	X	X	-	-	X	X	-		X	-	-	-
97.4	-	X	X	X	X	-	-	X	X	X		-	-	-	-
97.5	-	X	X	X	X	-	-	X	X	X		X	-	-	-
97.6	-	X	X	X	X	-	X	-	-	-		-	-	-	-
97.7	-	X	X	X	X	-	X	-	-	-		X	-	-	-
97.8	-	X	X	X	X	-	X	-	-	X		-	-	-	-
97.9	-	X	X	X	X	-	X	-	-	X		X	-	-	-
98.0	-	X	X	X	X	-	X	-	X	-		-	-	-	-
98.1	-	X	X	X	X	-	X	-	X	-		X	-	-	-
98.2	-	X	X	X	X	-	X	-	X	X		-	-	-	-
98.3	-	X	X	X	X	-	X	-	X	X		X	-	-	-
98.4	-	X	X	X	X	-	X	X	-	-		-	-	-	-
98.5	-	X	X	X	X	-	X	X	-	-		X	-	-	-
98.6	-	X	X	X	X	-	X	X	-	X		-	-	-	-
98.7	-	X	X	X	X	-	X	X	-	X		X	-	-	-
98.8	-	X	X	X	X	-	X	X	X	-		-	-	-	-
98.9	-	X	X	X	X	-	X	X	X	-		X	-	-	-
99.0	-	X	X	X	X	-	X	X	X	X		-	-	-	-
99.1	-	X	X	X	X	-	X	X	X	X		X	-	-	-
99.2	-	X	X	X	X	X	-	-	-	-		-	-	-	-
99.3	-	X	X	X	X	X	-	-	-	-		X	-	-	-
99.4	-	X	X	X	X	X	-	-	-	X		-	-	-	-
99.5	-	X	X	X	X	X	-	-	-	X		X	-	-	-
99.6	-	X	X	X	X	X	-	-	X	-		-	-	-	-
99.7	-	X	X	X	X	X	-	-	X	-		X	-	-	-
99.8	-	X	X	X	X	X	-	-	X	X		-	-	-	-
99.9	-	X	X	X	X	X	-	-	X	X		X	-	-	-

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<u>FREQUENCY MHz</u>	10	9	8	7	6	5	4	3	2	1		4	3	2	1
100.0	-	X	X	X	X	X	-	X	-	-		-	-	-	-
100.1	-	X	X	X	X	X	-	X	-	-		X	-	-	-
100.2	-	X	X	X	X	X	-	X	-	X		-	-	-	-
100.3	-	X	X	X	X	X	-	X	-	X		X	-	-	-
100.4	-	X	X	X	X	X	-	X	X	-		-	-	-	-
100.5	-	X	X	X	X	X	-	X	X	-		X	-	-	-
100.6	-	X	X	X	X	X	-	X	X	X		-	-	-	-
100.7	-	X	X	X	X	X	-	X	X	X		X	-	-	-
100.8	-	X	X	X	X	X	X	-	-	-		-	-	-	-
100.9	-	X	X	X	X	X	X	-	-	-		X	-	-	-
101.0	-	X	X	X	X	X	X	-	-	X		-	-	-	-
101.1	-	X	X	X	X	X	X	-	-	X		X	-	-	-
101.2	-	X	X	X	X	X	X	-	X	-		-	-	-	-
101.3	-	X	X	X	X	X	X	-	X	-		X	-	-	-
101.4	-	X	X	X	X	X	X	-	X	X		-	-	-	-
101.5	-	X	X	X	X	X	X	-	X	X		X	-	-	-
101.6	-	X	X	X	X	X	X	X	-	-		-	-	-	-
101.7	-	X	X	X	X	X	X	X	-	-		X	-	-	-
101.8	-	X	X	X	X	X	X	X	-	X		-	-	-	-
101.9	-	X	X	X	X	X	X	X	-	X		X	-	-	-
102.0	-	X	X	X	X	X	X	X	X	-		-	-	-	-
102.1	-	X	X	X	X	X	X	X	X	-		X	-	-	-
102.2	-	X	X	X	X	X	X	X	X	X		-	-	-	-
102.3	-	X	X	X	X	X	X	X	X	X		X	-	-	-
102.4	X	-	-	-	-	-	-	-	-	-		-	-	-	-
102.5	X	-	-	-	-	-	-	-	-	-		X	-	-	-
102.6	X	-	-	-	-	-	-	-	-	X		-	-	-	-
102.7	X	-	-	-	-	-	-	-	-	X		X	-	-	-
102.8	X	-	-	-	-	-	-	-	X	-		-	-	-	-
102.9	X	-	-	-	-	-	-	-	X	-		X	-	-	-
103.0	X	-	-	-	-	-	-	-	X	X		-	-	-	-
103.1	X	-	-	-	-	-	-	-	X	X		X	-	-	-
103.2	X	-	-	-	-	-	-	X	-	-		-	-	-	-
103.3	X	-	-	-	-	-	-	X	-	-		X	-	-	-
103.4	X	-	-	-	-	-	-	X	-	X		-	-	-	-
103.5	X	-	-	-	-	-	-	X	-	X		X	-	-	-
103.6	X	-	-	-	-	-	-	X	X	-		-	-	-	-
103.7	X	-	-	-	-	-	-	X	X	-		X	-	-	-
103.8	X	-	-	-	-	-	-	X	X	X		-	-	-	-
103.9	X	-	-	-	-	-	-	X	X	X		X	-	-	-



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<u>FREQUENCY MHz</u>	10	9	8	7	6	5	4	3	2	1		4	3	2	1
104.0	X	-	-	-	-	-	X	-	-	-		-	-	-	-
104.1	X	-	-	-	-	-	X	-	-	-		X	-	-	-
104.2	X	-	-	-	-	-	X	-	-	X		-	-	-	-
104.3	X	-	-	-	-	-	X	-	-	X		X	-	-	-
104.4	X	-	-	-	-	-	X	-	X	-		-	-	-	-
104.5	X	-	-	-	-	-	X	-	X	-		X	-	-	-
104.6	X	-	-	-	-	-	X	-	X	X		-	-	-	-
104.7	X	-	-	-	-	-	X	-	X	X		X	-	-	-
104.8	X	-	-	-	-	-	X	X	-	-		-	-	-	-
104.9	X	-	-	-	-	-	X	X	-	-		X	-	-	-
105.0	X	-	-	-	-	-	X	X	-	X		-	-	-	-
105.1	X	-	-	-	-	-	X	X	-	X		X	-	-	-
105.2	X	-	-	-	-	-	X	X	X	-		-	-	-	-
105.3	X	-	-	-	-	-	X	X	X	-		X	-	-	-
105.4	X	-	-	-	-	-	X	X	X	X		-	-	-	-
105.5	X	-	-	-	-	-	X	X	X	X		X	-	-	-
105.6	X	-	-	-	-	X	-	-	-	-		-	-	-	-
105.7	X	-	-	-	-	X	-	-	-	-		X	-	-	-
105.8	X	-	-	-	-	X	-	-	-	X		-	-	-	-
105.9	X	-	-	-	-	X	-	-	-	X		X	-	-	-
106.0	X	-	-	-	-	X	-	-	X	-		-	-	-	-
106.1	X	-	-	-	-	X	-	-	X	-		X	-	-	-
106.2	X	-	-	-	-	X	-	-	X	X		-	-	-	-
106.3	X	-	-	-	-	X	-	-	X	X		X	-	-	-
106.4	X	-	-	-	-	X	-	X	-	-		-	-	-	-
106.5	X	-	-	-	-	X	-	X	-	-		X	-	-	-
106.6	X	-	-	-	-	X	-	X	-	X		-	-	-	-
106.7	X	-	-	-	-	X	-	X	-	X		X	-	-	-
106.8	X	-	-	-	-	X	-	X	X	-		-	-	-	-
106.9	X	-	-	-	-	X	-	X	X	-		X	-	-	-
107.0	X	-	-	-	-	X	-	X	X	X		-	-	-	-
107.1	X	-	-	-	-	X	-	X	X	X		X	-	-	-
107.2	X	-	-	-	-	X	X	-	-	-		-	-	-	-
107.3	X	-	-	-	-	X	X	-	-	-		X	-	-	-
107.4	X	-	-	-	-	X	X	-	-	X		-	-	-	-
107.5	X	-	-	-	-	X	X	-	-	X		X	-	-	-
107.6	X	-	-	-	-	X	X	-	X	-		-	-	-	-
107.7	X	-	-	-	-	X	X	-	X	-		X	-	-	-
107.8	X	-	-	-	-	X	X	-	X	X		-	-	-	-
107.9	X	-	-	-	-	X	X	-	X	X		X	-	-	-
108.0	X	-	-	-	-	X	X	X	-	-		-	-	-	-

To calculate switch settings for any frequency not in the table, simply add the MHz value of switches that total to the desired frequency. Start with the switch position with the highest frequency that is still less than the desired operating frequency, then add the frequency of progressively lower numbered switches that do not cause a total larger than the desired frequency, until the total equals the desired frequency. The selected switch positions equal the required code.

Or select a frequency that is as close to the final frequency but less than the desired frequency, program the 10 position switch, then calculate the remaining frequency in KHz needed to reach the frequency you want. Then set the 4 position dip switch accordingly. The smallest division available is 1.25 KHz steps, on switch #1 of the 4 position dip switch. See table below.

(1	2	3	4)	1	2	3	4	5	6	7	8	9	0
1.25	2.5	5	10	20	40	80	160	320	640	1.28	2.56	5.12	10.24
KHz	K	K	K	K	K	K	K	K	K	MHz	M	M	M

**EXAMPLE**

$$4.35 \text{ MHz} = \frac{8}{2.56} + \frac{7}{1.28} + \frac{5}{.32} + \frac{4}{.16} + \frac{1}{.02} + \frac{(4)}{.01}$$