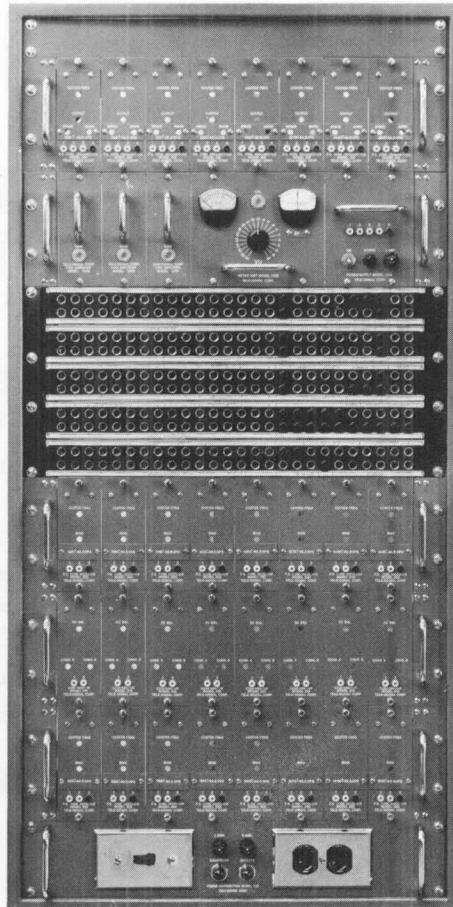




## TECHNICAL BULLETIN NUMBER 5009

### Tone Telegraph Terminal TMC Model TTM-2( )



The TMC Model TTM-2 Tone Telegraph System is a completely transistorized telegraph and data tone transmission system providing up to 16 send and receive teletypewriter channels at speeds up to 75 bauds (approximately 100 words per minute) in either the National or CCITT International Standard Channel Spacing.

Frequency, space, or polarization diversity reception facilities are provided with electronic selection of the best of 2 tone channels. By continuous comparison of the signal quality of both receiving channels, operated in diversity, the signal having the poorest quality is suppressed with the better channel controlling the output keyer.

All channels are "delay compensated" as a built in feature, to provide no more than 250 microsecond variation in keying time from any one channel to any other channel throughout the send and receive system. This factor is important in data transmission or any other type of synchronous transmission.

Signal control, monitoring, and complete DC signal patching facilities, both send and receive, are incorporated within this cabinet. Power supplies to operate the individual send and receive tone shelves are provided from a 12 volt DC source.

## TMC Model TTM-2-( )

Functionally this system will provide the same facilities as the AN/FGC-60(V) in half the space.

### TECHNICAL SPECIFICATIONS FOR TTM-2-( )

#### Transmitting Section

AUDIO OUTPUT:	+3 dbm max per channel. Aggregate tone level controlled by line attenuator. With line amplifier, maximum tone level is +10 dbm.
AUDIO OUTPUT IMPEDANCE:	600 ohms, balanced.
MARK/SPACE TONE UNBALANCE:	1.5 db maximum.
MARK/SPACE TONE FREQUENCY STABILITY:	$\pm 3$ cps for $\pm 10\%$ line voltage variation or $\pm 25^\circ$ C temperature variation from $25^\circ$ C.
INPUT TELEGRAPH SIGNAL:	<ol style="list-style-type: none"><li>1. Dry contact keying.</li><li>2. Neutral negative keying 1 ma (minimum) into 2200 ohm internal load.</li><li>3. Polar direct or inverted keying <math>\pm 1</math> ma into 2200 ohm internal load.</li><li>4. Neutral positive or negative 40 to 65 ma into 220 ohm internal load.</li><li>5. Polar keying, direct or inverted <math>\pm 30</math> ma into 220 ohm load.</li><li>6. 50 micro-amps keying (Offered as an optional attachment.)</li></ol>

#### Receiving Section

AUDIO INPUT LEVEL: (for each diversity channel)	Nominal 0 to -10 dbm per channel. -35 dbm min., +5 dbm maximum.
DYNAMIC RANGE:	40 db per individual channel signal.
AUDIO INPUT IMPEDANCE: (Aggregate tones)	600 ohms, balanced.
DC SIGNAL OUTPUT:	Neutral 65 ma, maximum into 2,000 ohm load.
DIVERSITY SIGNAL SELECTOR:	Power law combination in narrow range, where signal amplitudes are almost equal. Weaker signal is suppressed approximately 30 db when difference between diversity channels exceed 1 db.
DIVERSITY SELECTION SPEED:	Approximately 50 micro-seconds.

#### Over-all System Requirements:

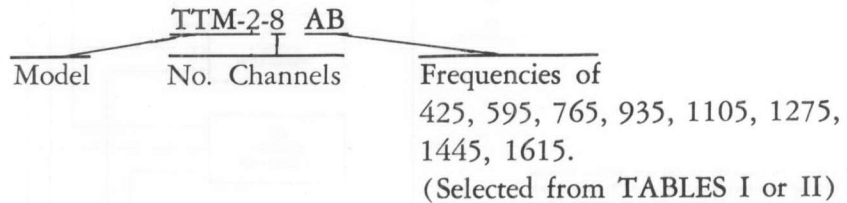
SYSTEM KEYING DELAY:	All tone channel keying delay compensated to within 250 micro-seconds throughout the system.
POWER REQUIREMENTS:	115/230 volts 50/60 cycles $\pm 10\%$ , 1 Phase 120 watts.
OPERATING TEMPERATURE:	0 to $50^\circ$ C.

## Tone Telegraph Terminal

STORAGE TEMPERATURE:	-15 to +65° C.
PHYSICAL DIMENSIONS:	TTM-2-8, 1 cabinet, 38" high, 22 $\frac{5}{8}$ " deep, 22" wide. TTM-2-16, 1 cabinet, 84" high, 24" deep, 22" wide.
INSTALLED WEIGHT: (Approx.)	TTM-2-8 475 lbs.      TTM-2-16 650 lbs.
SHIPPING WEIGHT AND CUBE (Approx.):	TTM-2-8 800 lbs. 45 cu. ft. TTM-2-16 950 lbs. 58 cu. ft.

### ORDERING INFORMATION

When ordering TMC Models TTM, the selected system configuration, number of channel and frequencies are indicated as shown in the following example:



### STANDARD FREQUENCY DETERMINING NETWORKS

75 baud (100 WPM) channel frequencies for those applications where less than the total available frequencies are utilized, are grouped as follows:

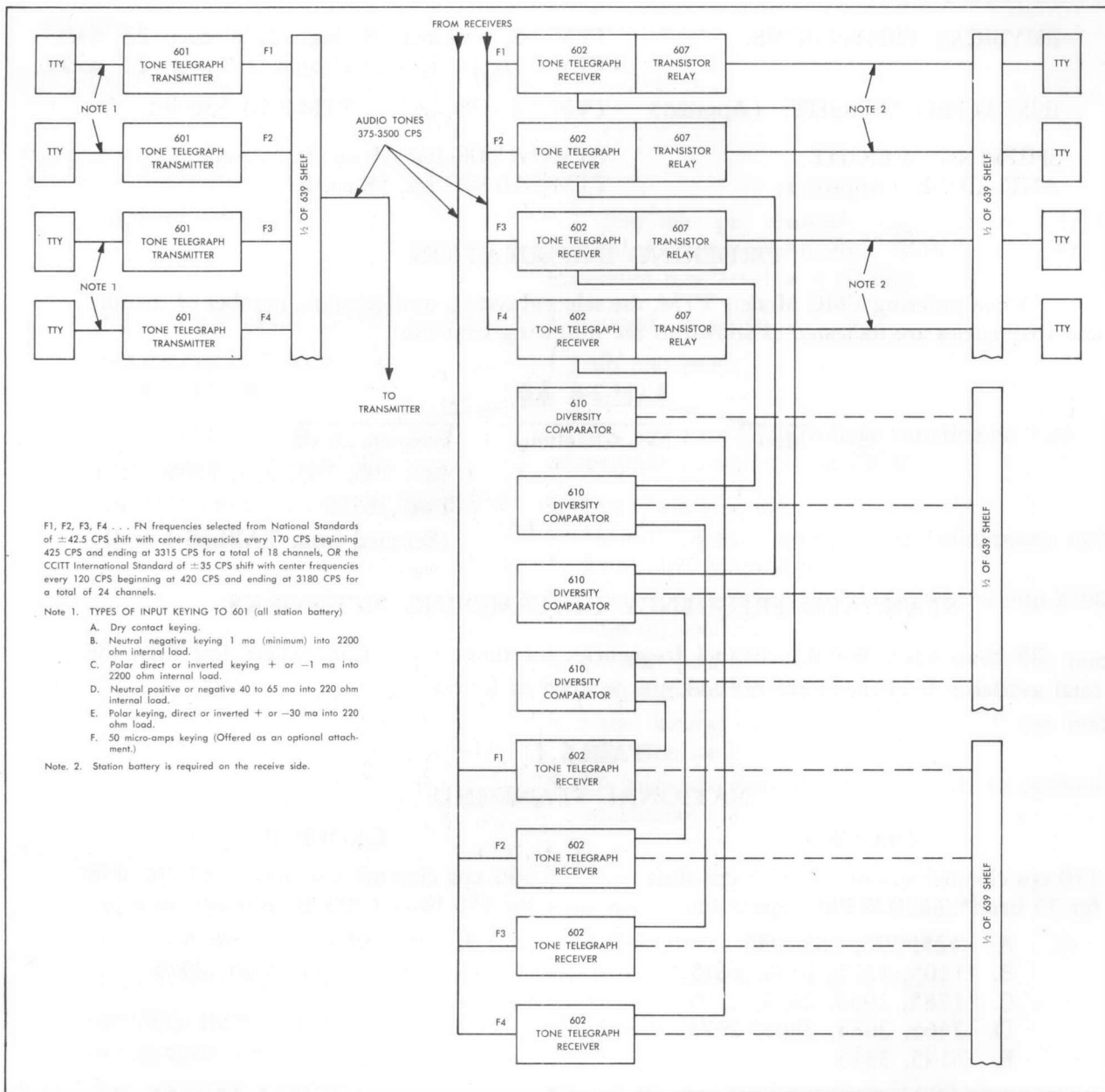
**TABLE I  
NATIONAL STANDARD**

GROUP I	GROUP II
170 cps channel spacing $\pm$ 42.5 cps shift for 75 baud* (100 WPM) operation.	340 cps channel spacing $\pm$ 85 cps shift for 150 baud (200 WPM) operation.
A. 425, 595, 765, 935 B. 1105, 1275, 1445, 1615 C. 1785, 1955, 2125, 2295 D. 2465, 2635, 2805, 2975 E. 3145, 3315	F. 595, 935, 1275, 1615 G. 1955, 2295, 2635, 2975

**TABLE II  
CCITT STANDARD**

GROUP III	GROUP IV
120 cps channel spacing $\pm$ 30 or 35 cps shift for 75 baud* (100 WPM) operation.	240 cps channel spacing $\pm$ 60 or 70 cps shift for 150 baud (200 WPM) operation.
M. 420, 540, 660, 780 N. 900, 1020, 1140, 1260 O. 1380, 1500, 1620, 1740 P. 1860, 1980, 2100, 2220 Q. 2340, 2460, 2580, 2700 R. 2820, 2940, 3060, 3180	S. 540, 780, 1020, 1260 T. 1500, 1740, 1980, 2200 U. 2460, 2700, 2940, 3180

\*100 baud operation can be provided at a slight increase in cost.



TTM-2-( ) BLOCK DIAGRAM

Designed and manufactured for the  
 TECHNICAL MATERIEL CORPORATION by the Tele-Signal Corporation

COPYRIGHT 1962  
 THE TECHNICAL MATERIEL CORP.

P



# THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N. Y.

AND ITS SUBSIDIARIES . . .  
 TMC (Canada), Ltd., Ottawa, Canada  
 TMC Industrial Corp., Mamaroneck, N. Y.  
 TMC Systems, Inc., Alexandria, Va.  
 TMC Systems, (Texas), Inc., Garland, Texas

TMC Systems, (Calif.), Inc., Oxnard, Calif.  
 TMC Systems, (Florida), Inc., Pompano Beach, Fla.  
 TMC Power Distribution, Inc., Alexandria, Va.  
 TMC Systems, A. G., Luzern, Switzerland  
 TMC Research Inc., San Luis Obispo, Calif.

CABLE TWX  
 TEPEI 914-835-3782