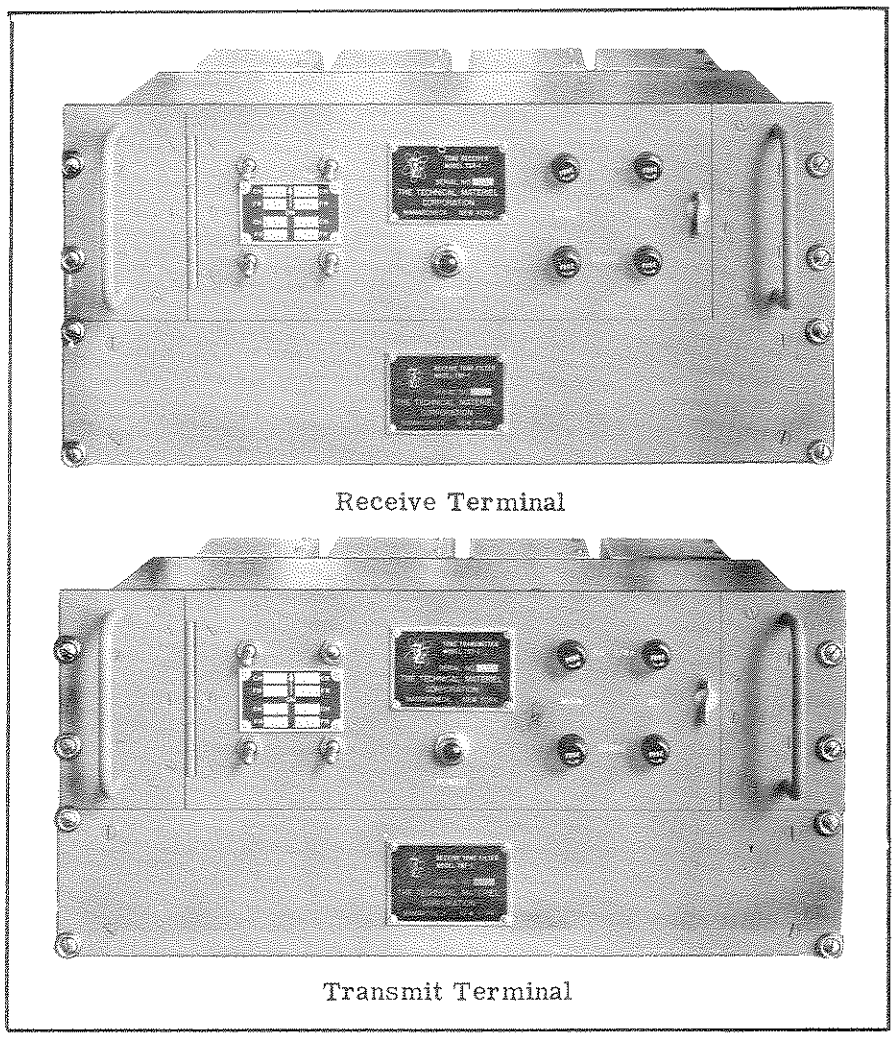


Receive Terminal

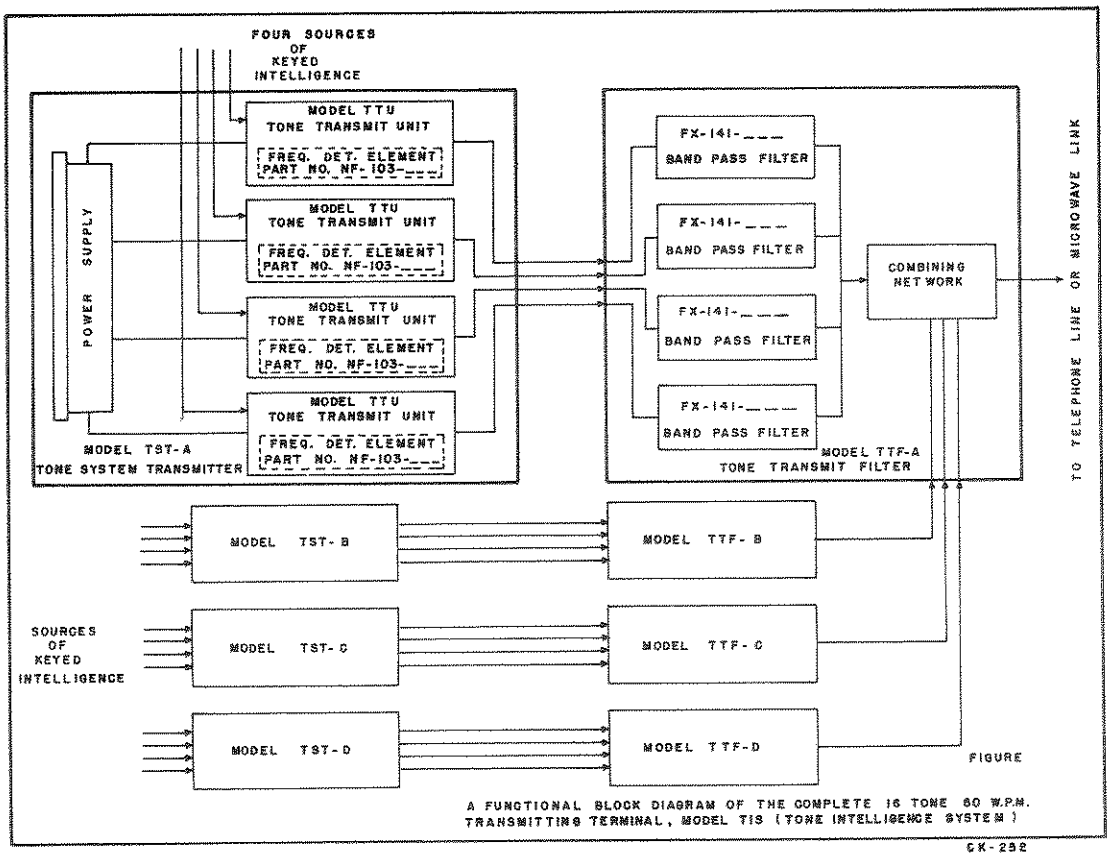
Transmit Terminal

Figure 1. Illustration of Complete Four-Channel System.

The TMC Tone Intelligence System, Model TIS, is a multi-channel voice telegraph system for use on wire lines, radio or microwave links. The system has been designed around a basic building block of four complete tone channels. Four such blocks can be combined to provide sixteen discrete channels. The equipment provides maximum flexibility with ease of operation. Design features such as master power supplies, common tone transmitter-chassis with plug-in frequency determining elements, common tone receiver chassis, master filter panels from which filters can be easily removed and changed, provide easy maintenance and a simplified logistics program.

The System is designed to be used with any type of terminal equipment which provides intelligence in an on-off form. This on-off keyed information is converted into tones and combined into a single composite for transmission over a single telephone line or a single voice channel in a microwave link. At the receiving end of the System the composite tones are restored to their original form, and the on-off intelligence is made available for use with the proper terminal equipment with a minimum compromise of quality.

Prior to designing the TIS System, the TMC Engineering Department made a survey of voice telegraph equipment users. This survey indicated it was of paramount im-



FIGURE

A FUNCTIONAL BLOCK DIAGRAM OF THE COMPLETE 16 TONE 60 W.P.M. TRANSMITTING TERMINAL, MODEL TTS (TONE INTELLIGENCE SYSTEM)

CK-252

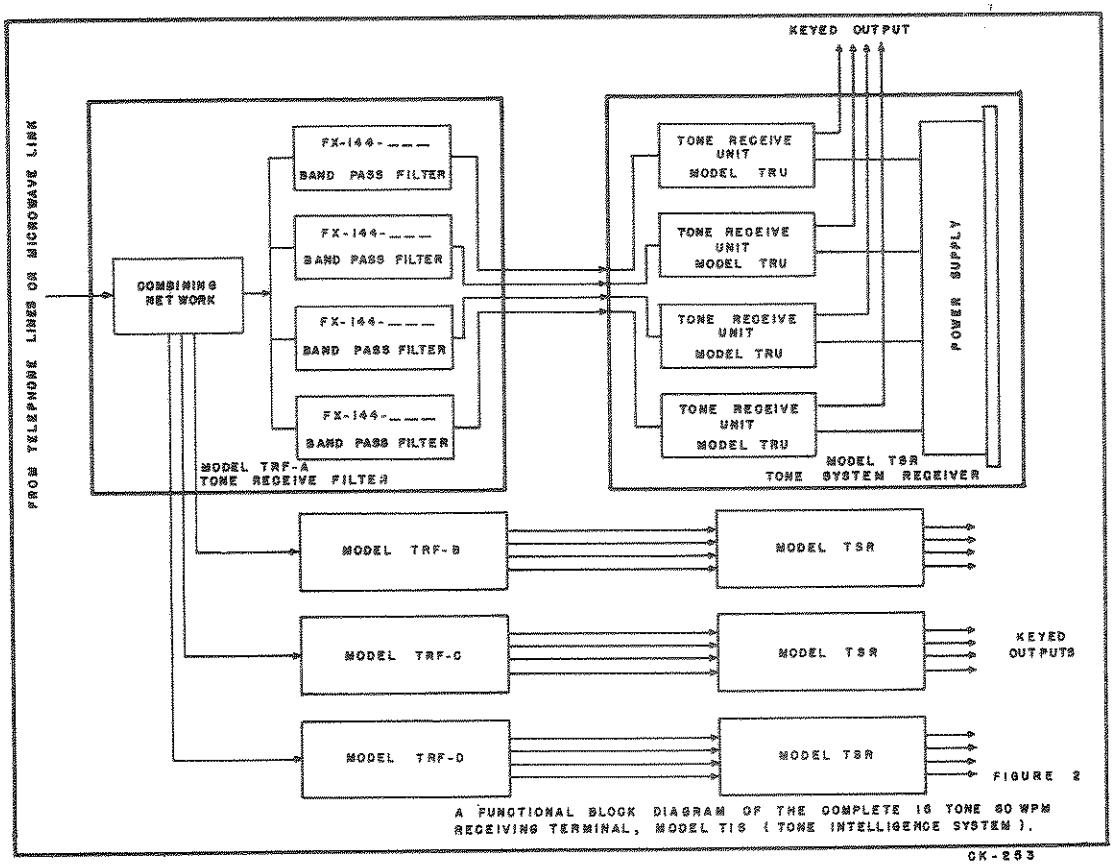


FIGURE 2

A FUNCTIONAL BLOCK DIAGRAM OF THE COMPLETE 16 TONE 60 WPM RECEIVING TERMINAL, MODEL TTS (TONE INTELLIGENCE SYSTEM).

CK-253

portance that any new tone system be capable of handling the various speeds now being produced by the multitude of terminal equipments in use. This capability has been built into the TIS System. By means of proper tones, frequency allocation, and selection of filters, the System will provide the following conventional tele-printer channels or the telegraph equivalent:

At 60 wpm or less:	Up to 16 channels
At 150 wpm or less:	Up to 8 channels.
At 250 wpm or less:	Up to 4 channels.

The block diagrams shown on preceding page illustrate a complete 16 channel send/receive system. The units outlined in heavy black are the basic building blocks. It should be noted that each basic building block of four channels is completely independent of the balance of the System, and is specially designed for combination with one

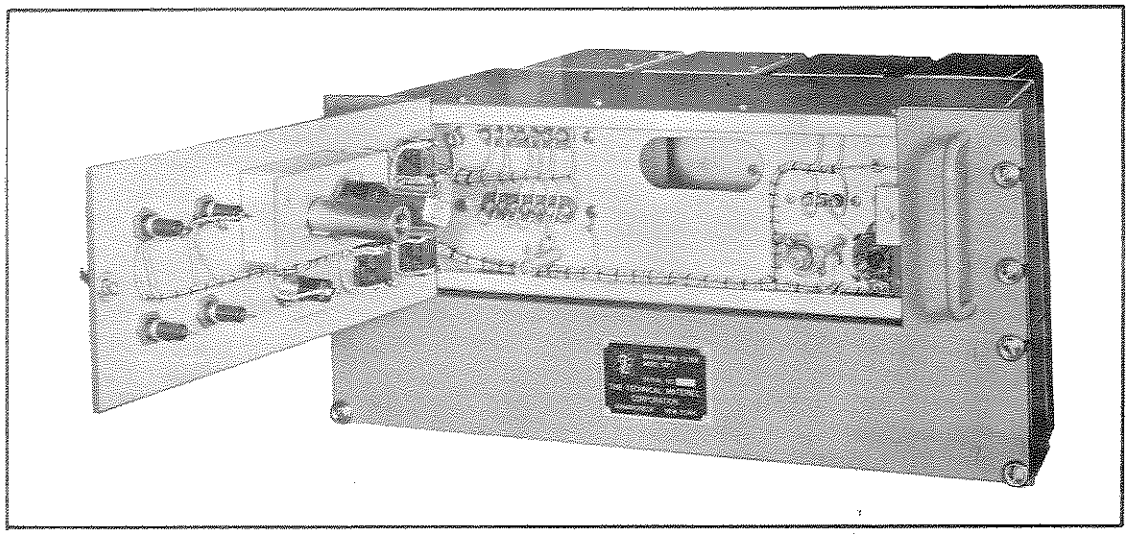


Figure 2. Interior Front View, Model TSR.

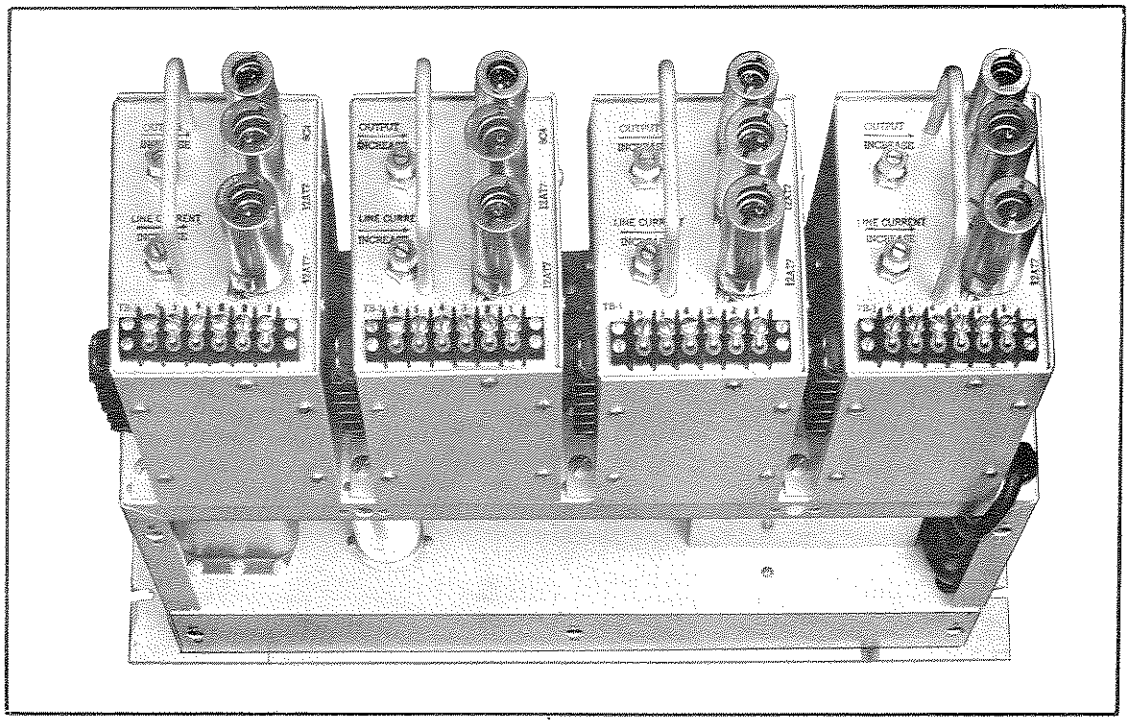


Figure 3. Rear View, Model TSR (or TST), Showing Plug-In Models TTU.

or more of the remaining three quadruple tone blocks. A combining network is provided in each send and receive filter panel. By means of proper strapping, the System will present a 600 ohm termination to the line. This feature permits the user to combine 16 tones on one line, eight tones on one line and eight tones on another line. In addition, from the point of view of the small station user, he may purchase a single four channel system and feel secure that future additions can be made to his system with a minimum of effort with an increase of traffic requirements.

The mechanical design features of the System components are shown in figures 2, 3, and 4. These photographs show the unit construction, the plug-in features, the master power supplies and filter panels. The transmitter and receiving units plug into the rear of the master power supplies and snap into place by means of Dzus fasteners. Any one transmitter or receiver can easily be removed for servicing without disturbing its neighbor physically or interrupting operation. All tubes, except those in the power supplies, are readily accessible from the rear. Power supply tubes are mounted on a hinged front panel and are simply removed. The balance of the power supply can be maintained in the rack by means of this access door.

The basic System equipment consists of four major components: the Model TST Tone System Transmitter, the Model TTF Tone Transmit Filter, the Model TRF Tone Receive Filter, and the Model TSR Tone System Receiver. A brief description of each major component follows:

a. Model TST, Tone System Transmitter

The Model TST, Tone System Transmitter, is a four channel tone keyer mounted on a 5-1/4 inch standard 19 inch rack panel. Incorporated in this unit are a master power supply and four individual tone keyers, Model TTU. Each Model TTU is identical and interchangeable, with the exception of the frequency determining element. These frequency determining elements are self-contained, encapsulated, extremely stable plug-in devices which may be transferred from one transmitting unit to another or maintained in stock for future system changes. Electronically, the Model TTU converts on-off current or contact pulses into equivalent tones. The resultant envelope is free from transients, and the steepness of the original modulating retangular pulse is retained.

b. Model TTF, Tone Transmit Filter

The Model TTF, Tone Transmit Filter, is a standard filter panel which occupies 3-1/2 inches of rack space and contains four transmitting filters and a combining network. By means of this network, up to four Model TTF's can be patched together in any one of the units.

c. Model TRF, Tone Receive Filter

The Model TRF, Tone Receive Filter panel is identical to the Model TTF described above with the exception of the individual filter characteristics. The filters used in this unit are specifically designed to be used at the receiving end of the System.

NOTE: All of the filters used in the TIS System have been especially designed and are manufactured by THE TECHNICAL MATERIEL CORPORATION for use in the System. These filters feature excellent electrical and mechanical stability, are physically interchangeable, and are potted with a specially formulated compound in hermetically sealed metal cases.

d. Model TSR, Tone System Receiver

The Model TSR, Tone System Receiver, resembles the Model TST unit physically and contains all of the packaging advantages, the master power supply, the hinged access door and the plug-in feature. Each Model TSR contains four identical and interchangeable Tone Receive Units, Model TRU. Electronically, the Model TRU

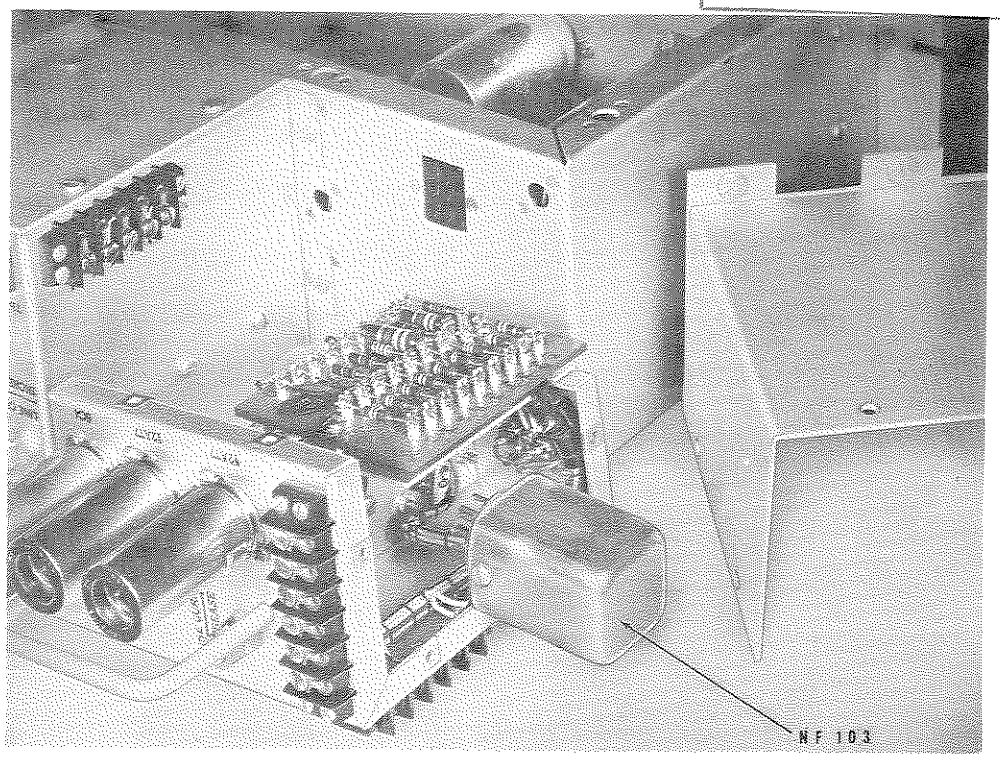


Figure 4. Inside View, Model TTU, Showing Plug-In Frequency-Determining Network, Model NF-103.

accepts the filtered tones presented to them and transforms them into on/off pulses of almost square wave shape. This is accomplished with a minimum of bias distortion even though the composite amplitude level may be varying over a wide range. The Model TRU can be used in conjunction with any conventional terminal device. Where local battery is not provided within the terminal device, it is suggested that the TMC Model PSP, Power Supply be used. The Model PSP is described in SALES SERVICE BULLETIN NUMBER 121.

TECHNICAL SPECIFICATIONS

TONE SYSTEM TRANSMITTER, MODEL TST:

Keying Speeds:	Up to 500 wpm, depending upon tone frequency used.
Keying Inputs:	a. Polar or neutral either side grounded. b. Contact keying to ground.
Input Impedance:	330 to 2800 ohms, adjustable.
Tone Carrier Frequencies:	Standard 170 cycle separation, 425 cps to 2975 cps. (By means of plug-in frequency determining elements) Part NF-103.
Number of Output Tone Channels:	Four, by means of plug-in Tone Keyer, Models TTU.
Frequency Stability:	Virtually no drift over normal operating conditions.

Output Level:	Continuously adjustable from 0 volts to plus 6 dbm.
Controls:	a. Power switch. b. Output control. c. Input Loop control.
Dimensions:	5-1/4'' high x 15'' deep x 19'' wide.
Weight:	31 lbs. net (with four Model TTU's).
Power Requirements:	110/220 volts, 50/60 cycles, 80 watts.

TRANSMIT AND RECEIVE FILTER PANEL, MODELS TTF AND TRF:

Tone Carrier Frequencies:	Any standard tone frequency within the band 425 to 2975 cps.
Keying Speeds:	60 - 150 or 250 wpm.
Line Terminations:	A special matching network, adjustable by straps, to accommodate up to four complete filter panels in a single system.
Number of Channels:	Four, by means of easily demountable, wire-in filter elements.
Dimensions:	3-1/2'' high x 10'' deep x 19'' wide.
Weight:	9 lbs. net.

TONE SYSTEM RECEIVER, MODEL TSR:

Keying Speeds:	Up to 500 wpm.
Input Level:	Minus 40 dbm to 0 dbm, adjustable.
Input Impedance:	High impedance, fed from Model TTF.
Output :	Electronic Keyer, neutral one side grounded.
Number of Channels:	Four by means of four plug-in Tone Receiver Units, Model TRU.
Controls:	a. Power Switch. b. Output Loop Control.
Dimensions:	5-1/4'' high x 15'' deep x 19'' wide.
Weight:	31 lbs net, with 4 each Model TRU.
Power Requirements:	110/220 volts, 50/60 cycles, 100 watts.
Overall System Mounting:	Standard WE Relay Rack.
Components and Construction:	Equipment is manufactured in accordance with JAN/MIL specifications wherever practicable.

ORDERING INFORMATION

In order to facilitate ordering procedures in connection with this system, the equipment has been assigned part numbers and nomenclature to allow build-up to suit your particular requirements. The component equipments are designated as follows:

Model TST-1(A)

Equipt Sym — Series — Combination

As the basic equipments are supplied in increments of four, combinations have been assigned to accommodate the various speeds and tones of the system as follows:

FOR SPEEDS UP TO 60 WPM:

Combination	Channel Frequencies, cps			
A	425	595	765	935
B	1105	1275	1445	1616
C	1785	1955	2125	2295
D	2465	2635	2805	2975

FOR SPEEDS UP TO 150 WPM:

E	595	935	1275	1615
F	1955	2295	2635	2975

FOR SPEEDS UP TO 250 WPM:

G	935	1445	1955	2465

Frequency determining elements and filters may be ordered as separate items. The part numbers are indicated in the chart below.

CHART OF REMOVABLE COMPONENTS BY PART NUMBER

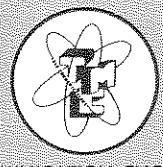
CHANNEL FREQ. CPS	FREQUENCY DETERMINING ELEMENT (P/O MODEL TTU)	BAND PASS FILTERS					
		TRANSMIT (FOR MODEL TTF)			RECEIVE (FOR MODEL TRF)		
		60 WPM	150 WPM	250 WPM	60 WPM	150 WPM	250 WPM
425	NF-103-425	FX-141-425			FX-144-425		
595	NF-103-595	FX-141-595	FX-142-595		FX-144-595	FX-145-595	
765	NF-103-765	FX-141-765			FX-144-765		
935	NF-103-935	FX-141-935	FX-142-935	FX-143-935	FX-144-935	FX-145-935	FX-146-935
1105	NF-103-1105	FX-141-1105			FX-144-1105		
1275	NF-103-1275	FX-141-1275	FX-142-1275		FX-144-1275	FX-145-1275	
1445	NF-103-1445	FX-141-1445		FX-143-1445	FX-144-1445		FX-146-1445
1615	NF-103-1615	FX-141-1615	FX-142-1615		FX-144-1615	FX-145-1615	
1785	NF-103-1785	FX-141-1785			FX-144-1785		
1955	NF-103-1955	FX-141-1955	FX-142-1955	FX-143-1955	FX-144-1955	FX-145-1955	FX-146-1955
2125	NF-103-2125	FX-141-2125			FX-144-2125		
2295	NF-103-2295	FX-141-2295	FX-142-2295		FX-144-2295	FX-145-2295	
2465	NF-103-2465	FX-141-2465		FX-143-2465	FX-144-2465		FX-146-2465
2635	NF-103-2635	FX-141-2635	FX-142-2635		FX-144-2635	FX-145-2635	
2805	NF-103-2805	FX-141-2805			FX-144-2805		
2975	NF-103-2975	FX-141-2975	FX-142-2975		FX-144-2975	FX-145-2975	

CH-126

THE TECHNICAL MATERIEL CORPORATION

700 FENIMORE ROAD MAMARONECK, NEW YORK

CABLE
TEPEI
MAMARONECK, N.Y.



COMMUNICATION ENGINEERS

IN CANADA:
TMC (CANADA) LTD.
OTTAWA, ONTARIO