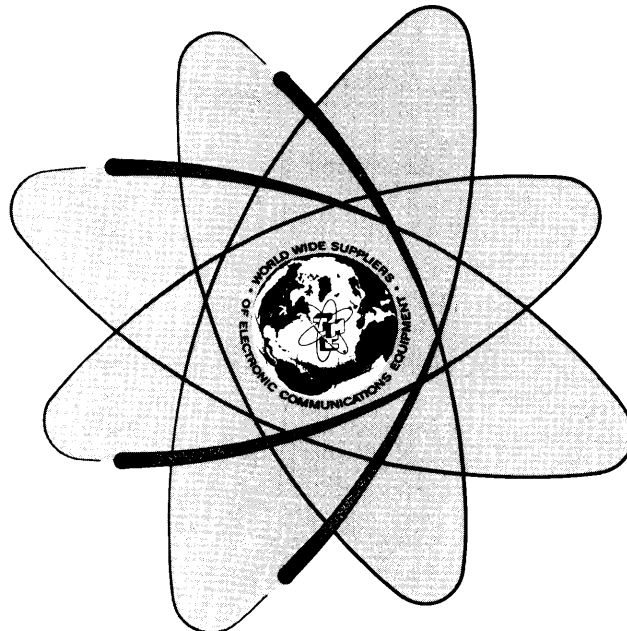




OPERATORS MANUAL  
for  
SIDEBAND TRANSCEIVER  
MODEL TM125( )



THE TECHNICAL MATERIEL CORPORATION  
MAMARONECK, N.Y. OTTAWA, ONTARIO

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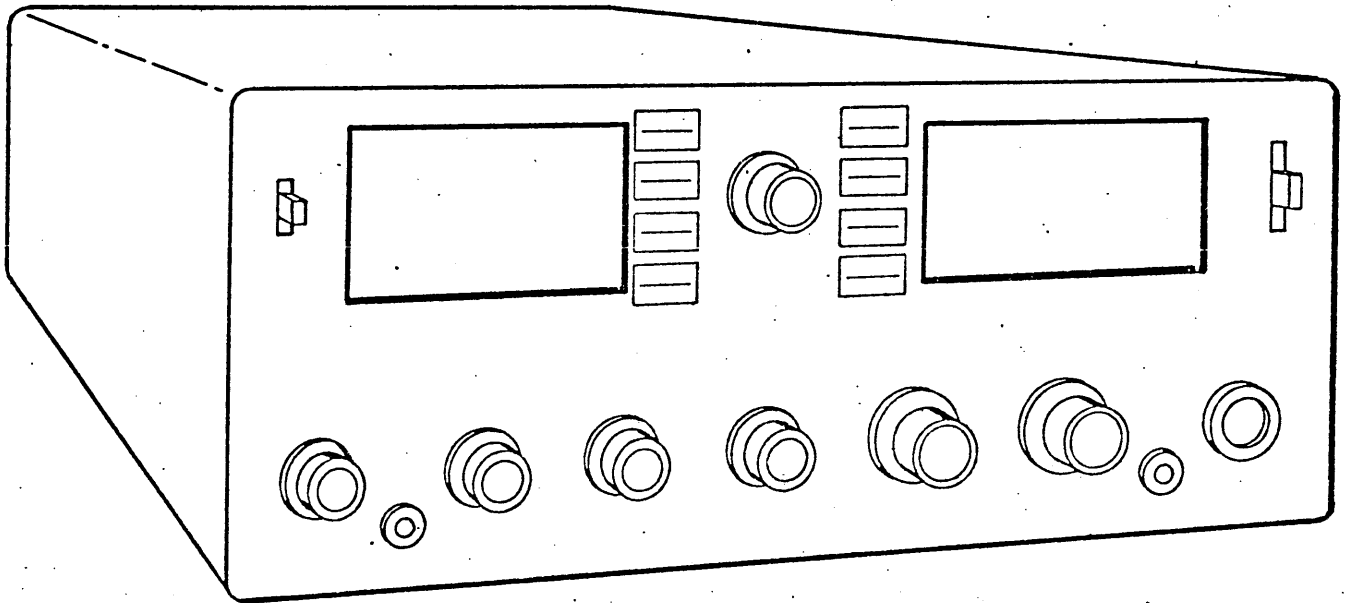


Figure 1-1. TM125 Overall Front View

## SECTION 1

### GENERAL INFORMATION

#### 1-1. FUNCTIONAL DESCRIPTION

a. GENERAL. The Sideband Transceiver, Model TM125 (Figure 1-1), is an eight channel transceiver covering the frequency range of 1.6 mhz to 26 mhz and having the capability of simplex or half duplex operation. The TM125 contains both a transistorized receiver section and a transistorized exciter coupled with a 12HG7 that functions as a broadband amplifier and two 6146B final output tubes in parallel to provide up to 125 watts peak output. Operating potentials for the TM125 are provided by built-in power supply circuitry.

Operating frequencies for the exciter and receiver sections of the TM125 are obtained from fixed tuned crystal controlled oscillators. Various combinations of transmit and receive crystal oscillators may be used to provide frequency coverage in accordance with operating frequency requirements.

The TM125 is designed so that an operator can transmit or receive on the same channel frequency (simplex) or transmit on one frequency and receive on a different frequency (half duplex\*).

b. RECEIVER SECTION. The TM125 is capable of receiving single sideband (SSB), amplitude modulated equivalent (AME) and continuous wave (CW) transmissions.

The receiver section uses either eight selectable, fixed-tuned crystal oscillators for simplex operation or a 8 channel oscillator board for half duplex operation. Features of the receiver section include:

- (1) High sensitivity for good reception under weak signal conditions.
- (2) A sharp cutoff bandpass filter for optimum selectivity.
- (3) Single conversion from 1.6 mhz to 8 mhz and dual conversion from 8 to 26 mhz.
- (4) Manual selection of LSB, USB, AME, or CW operation.
- (5) Built-in 4 ohm loudspeaker and adjustable RF and AF gain controls.
- (6) Noise limiter circuit to eliminate noise pulses.
- (7) Built-in "S" meter that indicates received signal strength.
- (8) Provisions for 600 ohm audio output lines.

\*Optional

012721075

1-1

c. EXCITER SECTION. The TM125 has the capability of transmitting amplitude modulated equivalent (AME), single sideband (USB, LSB) and continuous wave (CW) transmissions. The exciter section uses one of eight selectable crystal controlled oscillators together with a broadband amplifier coupled to the final output tubes. The final output tubes are two 6146B tubes in parallel.

The exciter section is designed to accept a wide variety of audio inputs including high impedance microphone, low impedance microphone, 600 ohm balanced or unbalanced line. It also includes an audio side tone oscillator that can be externally keyed for CW transmissions. Features of the exciter section include:

- (1) Manual selection of either USB, LSB, AME or CW transmissions.
- (2) A built-in meter for monitoring the linear amplifier plate current and rf output.
- (3) Selectable CW keying or push-to-talk operation of the exciter with automatic disabling of the receiver section while transmitting.
- (4) Manual channel selection of up to 8 pre-tuned simplex channel frequencies, or 4 pre-tuned half duplex channel frequencies.

#### 1-2. PHYSICAL DESCRIPTION

The TM125 is a single, compact unit measuring 5-1/2 inches high x 14-1/2 inches wide x 16 inches deep. It may be mounted in a desk top cabinet, or transit carrying case. Overall weight is approximately 39 pounds. The majority of electronic components which constitute the TM125 are mounted on printed circuit boards which plug into chassis mounted connectors. In addition, an extender card is included, which mates with the respective printed circuit boards and chassis connectors, thereby facilitating ease of maintenance. Operating controls and indicators are situated on the front panel and include MODE switch, REC/PTT/CW switch, CHANNEL switch, MONITOR meter, built-in SPEAKER, AF and RF GAIN controls, CLARIFIER (HFO) and SQUELCH control. The rear panel connections include power terminals for 12 vdc operation, antenna jack, remote socket and power socket.

#### 1-3. TECHNICAL SPECIFICATIONS

Table 1-1 presents a listing of technical specifications for the TM125 transceiver.

TABLE 1-1. TECHNICAL SPECIFICATIONS

Frequency Range:	1.6 to 26 mhz
Stability:	one part per million/°C
Control:	high frequency crystal oscillators

TABLE 1-1. TECHNICAL SPECIFICATIONS (cont)

Operating Modes:	CW(A1), AME(A3H), SSB(A3J)
Channels:	up to eight simplex channels optional: ovenized crystal oscillators
Tuning:	front panel selection of pre-tuned channels
Power Output:	125 watts PEP (PTT operation)
Output Impedance:	50 ohms unbalanced

RECEIVER SECTION

Sensitivity:	1.0 uv over range for 10db (S+N)/N
Selectivity:	+3db at 3 khz, -60db at 11 khz
Automatic Gain Control:	Internal circuits insure a less than 10db change in output for an 80db change in RF over 1V at the antenna input
Output Level:	One watt PEP into internal speaker, 0dbm into 600 ohm balanced line.
Input Impedance:	50 ohms nominal unbalanced

EXCITER SECTION

Signal/Distortion Ratio:	Nominal 30db below full PEP output
Unwanted Sideband Rejection:	Minimum 50db below full PEP output
Noise Level:	Better than 40db below full PEP output
Spurious Emission:	Minimum 40db down from mean power
Audio Response:	300-3000hz, +2db
Audio Inputs:	600 ohm line balanced or unbalanced, high or low impedance microphone w/PTT

ENVIRONMENTAL AND INSTALLATION

Operating Conditions:	0 to +50°C; up to 95% relative humidity.
Primary Power:	*12 vdc, 115/230 vac, 50/60 hz single phase
Size and weight:	5-1/2 inches high x 14-1/2 inches wide x 16 inches deep, approximately 39 pounds.
	* +12vdc negative ground.



TABLE 1-1. TECHNICAL SPECIFICATIONS (cont)

OPTIONAL ACCESSORIES

VTA Transmitting Antennas suitable for both receiving and transmitting,  
18 or 35 foot aluminum or fiberglass whips.

HP-1 Headphone

MK-1 Microphone

Model KY-1 Telegraph Key

SECTION 2  
OPERATORS SECTION

2-1. GENERAL

The TM125 has been designed to provide ease of operation as well as maximum performance. Where possible, functionally-related controls have been placed near one another in a logical operating sequence. Operating controls are all located on the front panel. The controls and indicators for operation are identified in Table 2-4. Before attempting to operate the TM125 the operator should become familiar with the controls and indicators listed in Table 2-4. These are shown on Figure 2-1. For specific operating procedures refer to paragraph 2-3.

2-2. PRELIMINARY CHECKOUT PROCEDURE

The procedure outlined in Table 2-1 should be performed upon initial installation of the TM125 and after any lengthy period of transmitter downtime, or after repairs, alignment etc.

TABLE 2-1. PRELIMINARY CHECKOUT PROCEDURE

<u>Step</u>	<u>Operation</u>
1	Rotate CHANNEL selector switch to active channel position 1 thru 8.
2	Set MODE switch to USB.
3	Set METER switch to Ip position to monitor final plate current. Set REC/PTT/CW switch to PTT and activate PTT via microphone button or remote terminal on rear panel. Meter should indicate 50 ma quiescent current.
<u>NOTE</u>	
If the meter does not indicate 50 ma, insure that no audio intelligence is present on audio input line and adjust bias control on rear panel until meter indicates 50 ma quiescent current.	
4	Open PTT line (release mike button or open remote PTT line ) and observe that Ip meter indicates "0" ma.

TABLE 2-1. PRELIMINARY CHECKOUT PROCEDURE (cont)

<u>Step</u>	<u>Operation</u>
5	Observe a received signal or background noise on built-in loudspeaker or headphones plugged into phone jack when PTT line is opened.

2-3. OPERATING PROCEDURES

Table 2-2 provides complete instructions for SSB and AME operation of the TM125 and Table 2-3 provides complete instructions for CW operation.

TABLE 2-2. OPERATING PROCEDURE FOR SSB AND AME

<u>Step</u>	<u>Operation</u>	<u>Normal Indications</u>
1	Set operating controls as follows: REC/PTT/CW - PTT MODE - USB, LSB or AME as desired CHANNEL selector - set to desired active channel. METER switch - Ip	1) Meter will indicate 50 ma final quiescent current in PTT position when PTT line is closed.

NOTE

For transmit operation PTT line must be closed via mike or remote connection on rear panel. (CW keyer must be open)

2	Set METER switch to RF and modulate exciter either via 600 ohm audio input line or microphone.	Meter will indicate RF output (Meter is used for a reference indication of RF voltage into a 50 ohm load).
3	Adjust RF GAIN control fully clockwise and AF GAIN for normal receiver operation.	
4	Adjust CLARIFIER control for maximum voice clarity.	
5	Adjust SQUELCH control for proper operation.	

TABLE 2-3. OPERATING PROCEDURE FOR CW

<u>Step</u>	<u>Operation</u>	<u>Normal Indications</u>
<u>NOTE</u>		
Insure that remote PTT line is opened when operating CW key.		
1	Set operating controls as follows: REC/PTT/CW - CW CHANNEL selector - set to desired active channel.  MODE switch - CW METER switch - 1p	1) Meter will indicate "0" ma when keyline is open. 2) Received signal or background noise will be heard on built-in loudspeaker.
2	Set METER switch RF and operate CW keying device.	Meter will indicate RF and the operator will hear audio side tone at CW rate.

NOTE

Upon completion of CW keying, the TM125 will automatically go into the receive mode after a short time delay.

- 3 Adjust receiver controls (AF, RF GAIN, CLARIFIER, SQUELCH) for maximum keying clarity as in Table 2-2 steps 3 thru 5.

TABLE 2-4. CONTROL AND INDICATOR FUNCTION

<u>Item No.</u> (See Fig. 2-1)	<u>Control</u>	<u>Function</u>
1	CHANNEL selector switch	Selects one to eight pre-set channel frequencies for transmit or receive.
2	MODE switch	Establishes one of four operating modes: USB, LSB, AME & CW.
3	REC/PTT/CW switch	Four position switch that determines operational function as follows:

TABLE 2-4. CONTROL AND INDICATOR FUNCTION (cont)

<u>Item No.</u> (See Fig. 2-1)	<u>Control</u>	<u>Function</u>
3	REC/PTT/CW switch (cont)	<p>OFF position - Remove primary power input AC and DC.</p> <p>REC position - Applies power to receiver portion only.</p> <p>PTT position - Sets transceiver for push-to-talk mode of operation.</p> <p>Exciter is OFF until PTT line is closed. When PTT line is open receiver is ON.</p> <p>CW position - Sets transceiver for CW mode of operation.</p>
4	METER	Multimeter that monitors circuit function selected by meter switch.
5	METER switch	Selects circuits in TM125 to be monitored by METER. (Three positions: RF, Ip, REC).
6	RF GAIN control	Adjusts the gain of receiver RF amplifiers. Generally set to maximum clockwise position.
7	AF GAIN control	Adjusts the audio level applied to audio amplifier and controls audio output applied to internal speaker or headset.
8	PHONE jack	Headset jack.
9	CLARIFIER (HFO)	Adjusts HFO oscillator side tone for CW keying and sideband reception.
10	SQUELCH control	Adjust SQUELCH for proper operation.
11	ANL ON/OFF switch	ON position inserts noise limiter circuit to eliminate noise pulses.
12	LOUDSPEAKER	Built-in loudspeaker that monitors received signals and audio side tone at CW rate.
13	KEY	Accepts dry contact keyer input used for CW operation.
14	MIKE	Accepts low impedance or high impedance microphone.

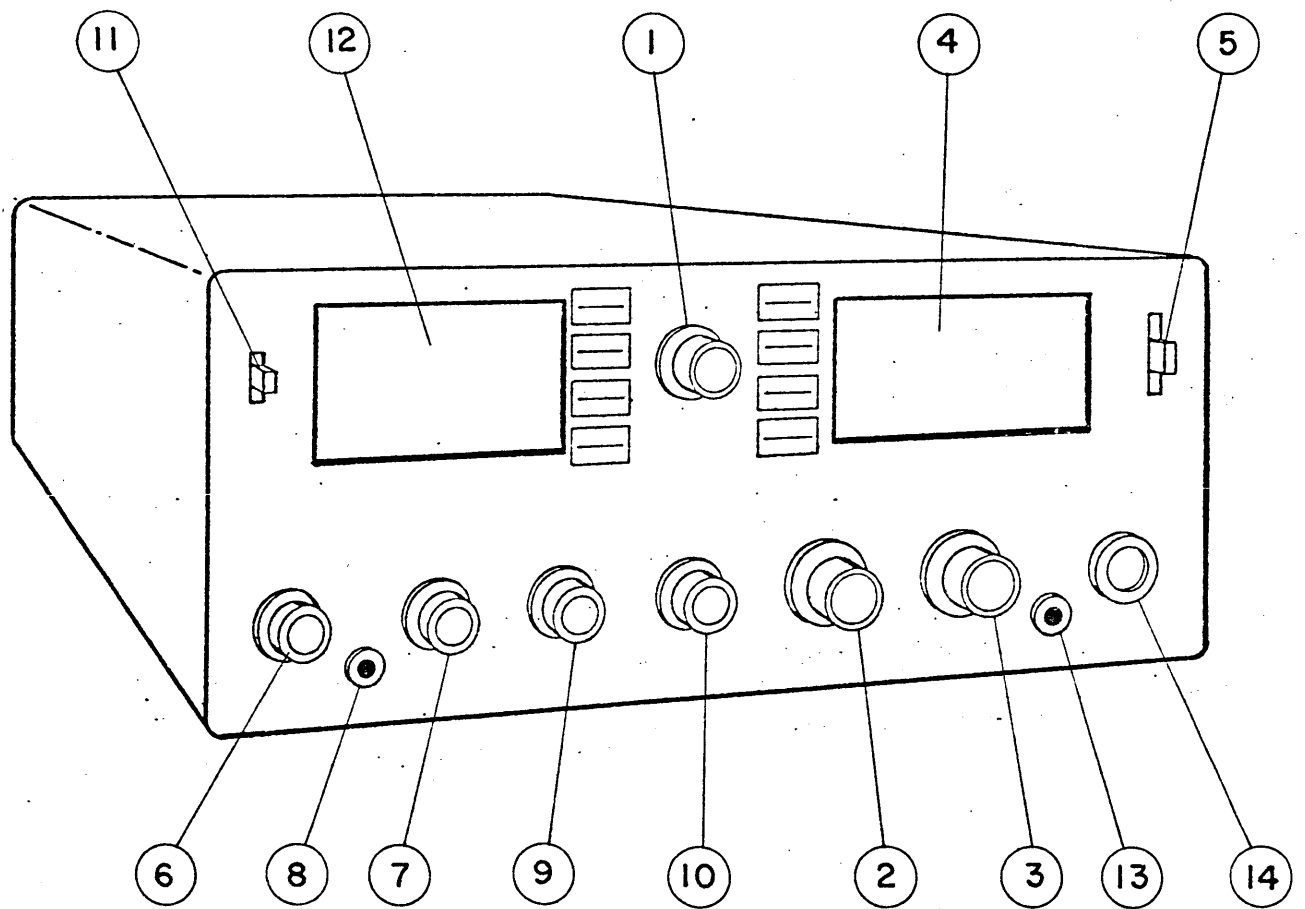


Figure 2-1. Front Panel Controls and Indicators