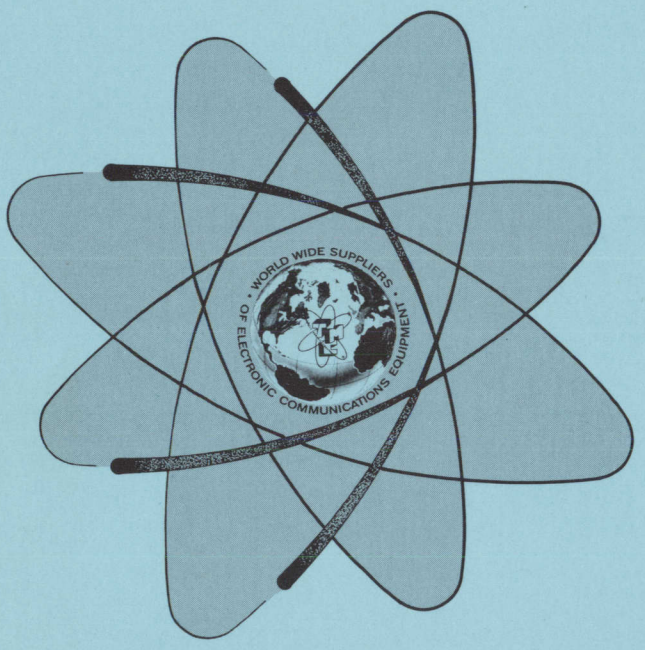
OPERATORS MANUAL

for

LINEAR POWER AMPLIFIER

MODEL TMA-350



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

Printed in U.S.A.

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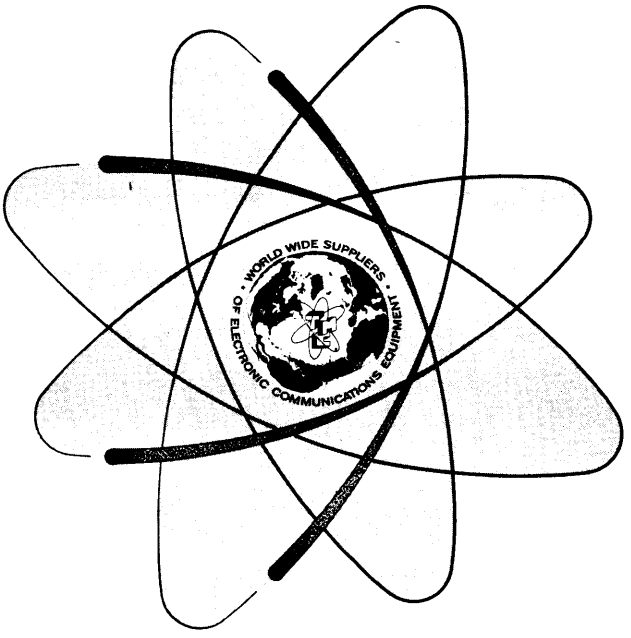

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NOTICE

THE CONTENTS AND INFORMATION CONTAINED IN THIS INSTRUCTION MANUAL IS PROPRIETARY TO THE TECHNICAL MATERIEL CORPORATION TO BE USED AS A GUIDE TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR WHICH THE MANUAL IS ISSUED AND MAY NOT BE DUPLICATED EITHER IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER WITHOUT THE WRITTEN CONSENT OF THE TECHNICAL MATERIEL CORPORATION.

THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

SECTION 1

GENERAL INFORMATION

1-1. GENERAL INFORMATION

The TMC Model TMA-350 (Figure 1-1) is a channelized, High Frequency Linear Power Amplifier. When used with its companion transceiver TMC Model TM125 or a suitable exciter, the TMA-350 provides 350 watts PEP or 175 watts average throughout the frequency range of 2 to 26 mhz. This amplifier may be used to increase the power capabilities of an existing small transmitting system. Its small size and light weight make it readily adaptable for shipboard, land or mobile van installations.

1-2. PHYSICAL DESCRIPTION

As shown in Figure 1-1, the TMA-350 is housed in a single desk top cabinet. The TMA-350 consists of a single power amplifier tube and its associated power supply and overload control circuitry. Provisions have been made for installation of a ledex driven switch (customer option), which provides automatic channel selection. The power amplifier tube is an 8875 triode used in an rf grounded grid configuration. The tube is air cooled by a blower within the cabinet. The front panel meter and its associated switch provide constant monitoring of the amplifier plate current and rf output power.

The TMA-350 overall dimensions are 5-1/4 inches high x-14 inches wide x 15 inches deep. The total weight is approximately 20 pounds. All operating controls are located on the front panel for ease of operation. All connector jacks are mounted on the rear panel.

1-3. TECHNICAL SPECIFICATIONS

Table 1-1 lists the technical specifications for the TMA-350 amplifier.

TABLE 1-1. TECHNICAL SPECIFICATIONS

Frequency Range:	1.6 mhz to 26 mhz
Operating Modes:	CW, AM, AME, USB, LSB, ISB
Input Signal Level:	Approx. 20 watts
Output Power:	350 watts PEP, 175 watts average
Output Impedance:	50 ohms nominal
VSWR Rating:	Will match up to 2:1 VSWR
Tuning:	8 channel manually controlled

TABLE 1-1. TECHNICAL SPECIFICATIONS (cont)

Metering:	Indications of relative output power and PA plate current.
Intermodulation Distortion:	Minimum 30 db below either tone of a standard two tone test at rated PEP output.
Harmonic Suppression:	Second Harmonic Minimum 40 db below full PEP output. For Third order and higher harmonics. Minimum 50 db below full PEP output.
Hum and Noise:	Minimum 40 db below full PEP output.
Operating Conditions:	0 to +50°C, up to 90% relative humidity
Cooling:	Fan
Primary Power:	115/230 vac, 50/60 hz single phase
Size and Weight:	5-1/4 inches high x 14 inches wide x 15 inches deep. Approx. 20 pounds.
Optional Accessories:	Model ATU-350 Antenna Tuner, Model TM125, Mulit Channel Sideband Transceiver.

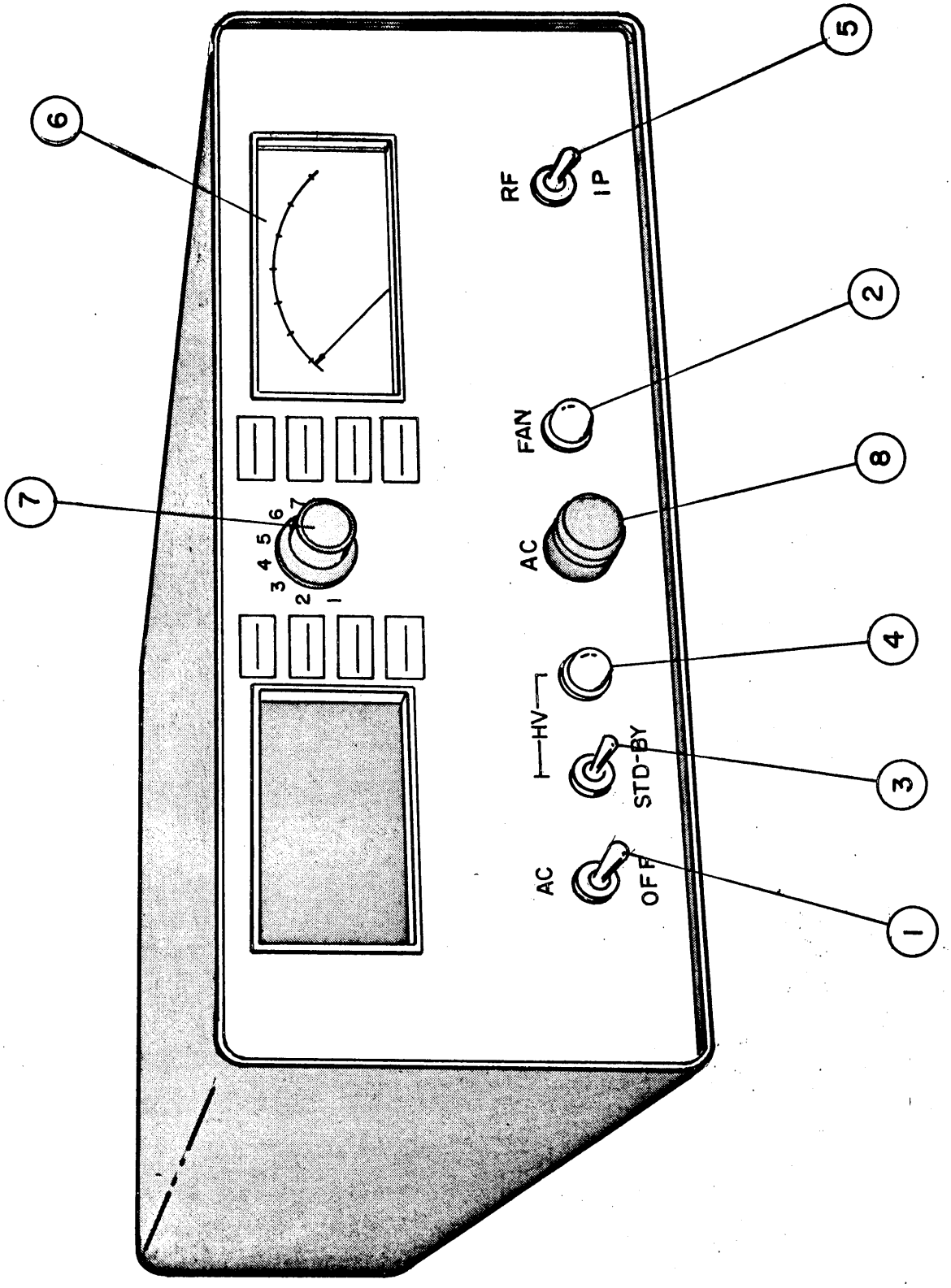

Figure 1-1. TMA-350 Linear Power Amplifier

SECTION 2

OPERATORS SECTION

2-1. INTRODUCTION

This section provides detailed operating instructions for the TMA-350 Linear Power Amplifier. The operator should first become familiar with the location and function of all controls and indicators on the TMA-350. For location of controls and indicators refer to Figure 1-1; for control and indicator functions refer to Table 2-1.

TABLE 2-1. CONTROL AND INDICATOR FUNCTIONS

Item No.	Panel Designation	Function
1	AC/OFF switch	When set to AC position applies primary voltage to power transformer T1, 115 vac to fan F1 and filament voltage to power amplifier tube V1.
2	FAN indicator	When illuminated indicates voltage applied to fan and V1 filaments.
3	HV/STD-BY switch	In HV position applies primary voltage to high voltage transformer T2. Transformer T2 provide plate voltage for V1 and +24 vdc for control relays (K1 and K2), ovld circuit, and for external ledex control.
4	HV indicator	Lights to indicate primary voltage applied to HV transformer T2.
5	RF/IP meter switch	Selects amplifier circuit to be monitored by front panel meter. (RF output or power amplifier plate current)
6	Meter	Provides an indication of amplifier plate current or amplifier RF output. as follows: IP position: 40 to 60 ma RF position: (1) CW operation: 90 to 100 (2) PTT operation: must not exceed 110 on peaks
7	CHANNEL switch	Selects channel for operation
8	AC fuse	Protective fuse for input transformer T1, lights to indicate defective fuse and primary voltage removed from T1 and T2.

2-2. PRELIMINARY OPERATION

Prior to operation of the TMA-350, the controls should be set as outlined in Table 2-2.

TABLE 2-1. PRELIMINARY CONTROL SETTINGS

Control	Setting
AC switch	OFF position
HV switch	STD-BY position
RF/IP switch	IP position
Channel Select switch	Desired channel(1 thru 8)

Insure that the following input connections and requirements are provided prior to operating the TMA-350:

(1)	Primary Power	115 vac at 4.5 amperes 230 vac at 2.5 amperes
(2)	RF Input: to jack J1 (2 to 26 mhz frequency range)	Modulated SSB, AM, AME, or CW signal at a drive level sufficient to provide 350 watts PEP output from the TMA-350 (approx. 20 watts)
(3)	PTT closure: to jack J2 2 (PTT line) 3 (ground)	Provide push-to-talk ground closure line to jack J2 pins 2 and 3 or connect TM125 external PTT line to J2 pins 2 and 3 TMA-350.
(4)	Output load connection: at J3	Antenna or dummy load connection is made securely at output connector J3.

2-3. OPERATING PROCEDURE

The TMA-350 Linear Amplifier is capable of providing up to 350 watts PEP output into a 50 ohm impedance, when driven by an external exciter which provides a minimum of 20 watts and operates in the frequency range of 2 to 26 mhz.

The operating procedures for the TMA-350 are outlined in Table 2-2.

NOTE

The TMA-350 is designed for push-to-talk or CW operation only. Do not operate this unit on a continuous duty basis (locked key-down, close PTT line with unmodulated tone input).

TABLE 2-2. OPERATING PROCEDURE

Step	Operation	Front Panel Indication
1	Set AC switch to AC position	FAN lamp illuminates to indicate: (1) Primary power output applied to power transformer T1. (2) Filament voltage (6 vac) applied to power amplifier V1. (3) Fan is operating.
2	Set RF/IP switch to IP position	No indications
3	Set Channel Select switch to desired operating channel (1 thru 8)	No front panel indication, amplifier resonant components in circuit for channel selected.
4	Set HV/STD-BY switch to HV position	HV lamp illuminates to indicate: (1) Primary power applied to high voltage transformer T2. (2) High voltage applied to power amplifier plate circuit. (approx. 1350 vdc) (3) +24 vdc applied to control circuitry.
5	Insure that rf input channel frequency and TMA-350 channel frequency are the same.	
6	Close PTT line by providing a closure (switch or push-button) between pins 2 and 3 on rear panel jack J2.	Front panel meter should indicate between 40 ma and 60 ma power amplifier quiescent current.

NOTE

When the TMA-350 is interfaced with the TM125 transceiver, the PTT line of the TM125 and the TMA-350 are connected; therefore, to close the PTT line the PTT microphone or close CW key on the TM125 transceiver should be activated.

7	Set RF/IP meter switch to the RF position and modulate rf input source.	Front panel meter should indicate relative power output as follows: (1) CW operation - 90 to 100 (2) SSB operation - up to 100 on modulation peaks.

NOTE

The TMA-350 is equipped with an overload circuit which protects the power amplifier against excessive plate dissapation. If the front panel meter does not indicate, refer to paragraph 2-4 for information concerning the overload circuitry.

2-4. OVERLOAD RESET

The TMA-350 features overload circuitry to portect the power amplifier tube against excessive plate current or excessive modulation. An overload condition is indicated by the following:

(1) Meter face lights up

(2) Meter indicates zero IP and RF positions of meter switch

(3) RF input is routed directly to the output connector bypassing the amplifier chain.

To reset an overload condition proceed as follows:

(1) Remove modulating input if in SSB, AM or AME modes, or open CW key if in CW mode.

(2) Set HV/STD-BY switch to STD-BY position and reset the same switch to HV position again. (The meter overload lamp should go out)

(3) Close PTT line via microphone button or CW key. (The front panel meter should indicate 40 to 60 ma IP)

(4) Operate CW key or modulate RF input.