

TECHNICAL MANUAL

for

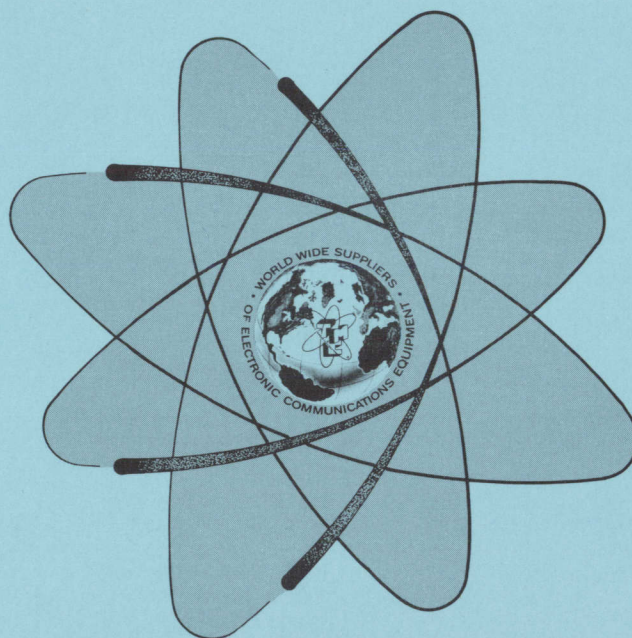
TRANSMITTER AND TRANSFER
SWITCH SYSTEM:

GENERAL PURPOSE TRANSMITTERS
MODEL GPTM-2.5KJ2

AND

TRANSFER RELAY CONTROL PANEL
MODEL TRCP-1

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MAMARONECK, N.Y.

OTTAWA, ONTARIO

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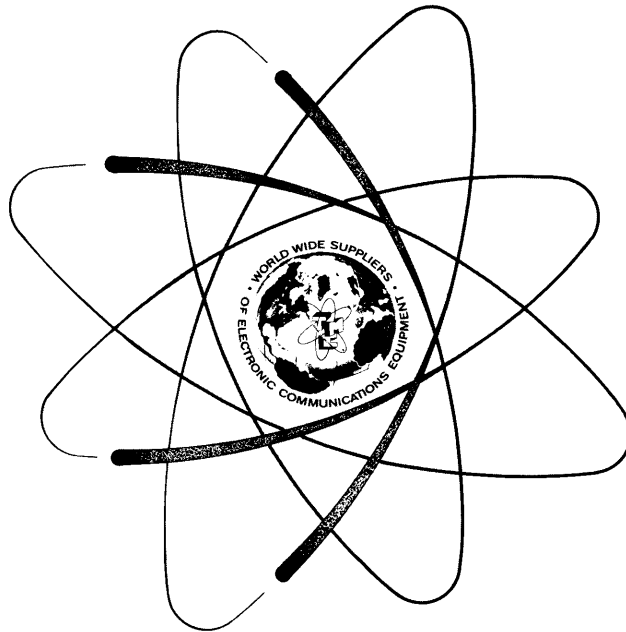
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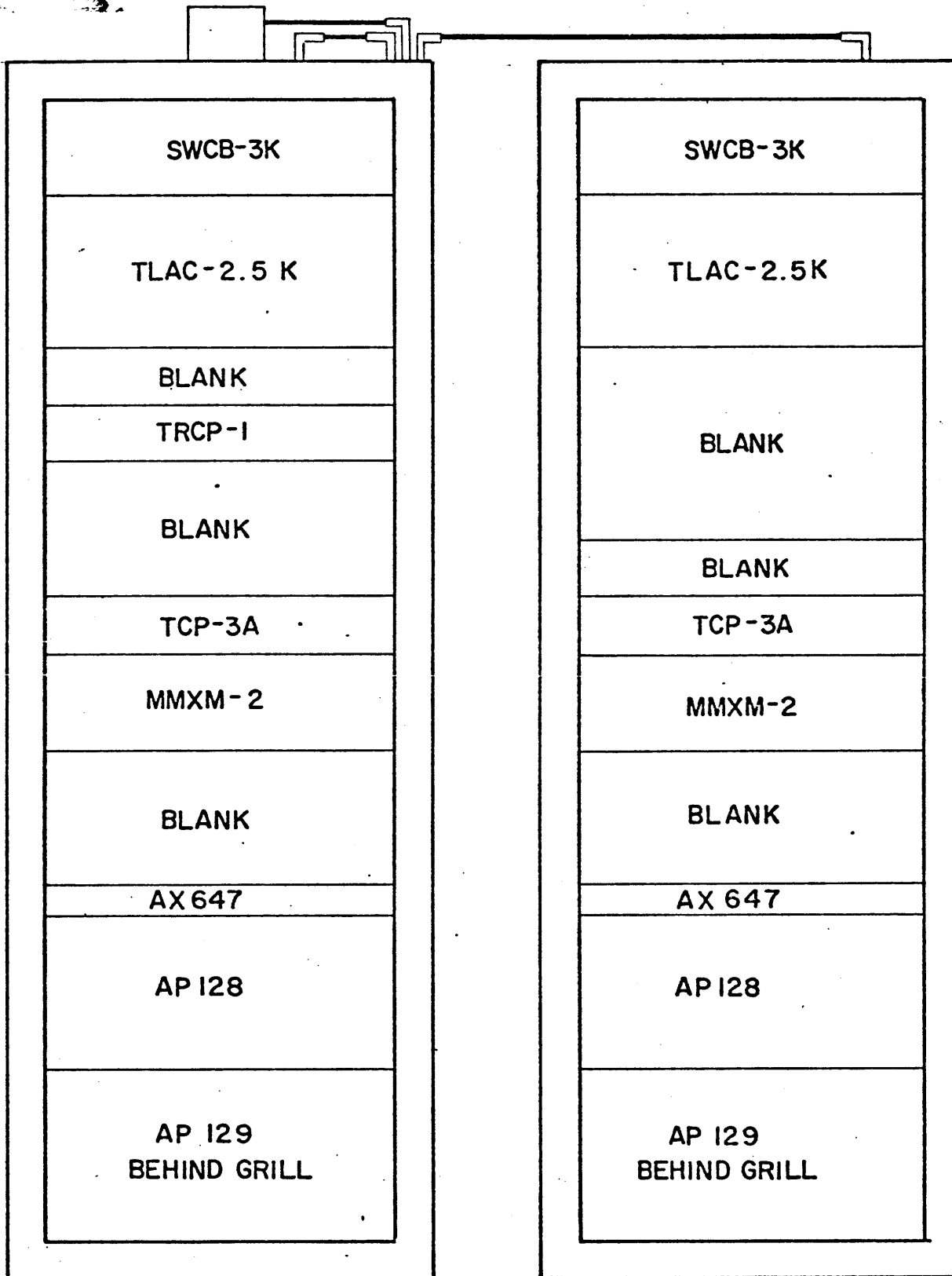


Figure 1-1. Transmitter and Transfer Switch System

SECTION 1
GENERAL INFORMATION

1-1. INTRODUCTION

The Transmitter and Transfer Switch System is comprised of two General Purpose Transmitters, Model GPTM-2.5KJ2 and a Transfer Relay Control Panel, Model TRCP-1. This system is intended for use at a facility which requires both a primary and standby transmitter for continuous, uninterrupted operation. Both transmitters are capable of providing independent rf outputs of 2.5 kilowatts PEP over the frequency range of 2.0 to 29.9999 mhz. In normal operation the output of the primary transmitter is routed to the antenna. In the event of primary transmitter failure, the Transfer Relay Control Panel, TRCP-1 will automatically activate and switch the rf output of the standby transmitter to the antenna. The automatic switching is accomplished in less than 50 milliseconds, which provides continuous operation.

1-2. SYSTEM CONFIGURATION

The Transmitter and Transfer Switch System as shown in figure 1-1 consists of the two equipment racks for the GPTM-2.5KJ2 transmitters. The TRCP-1, its associated coaxial relay, and an adapter box for 7/8 EIA antenna connection are housed in one of the transmitter racks.

1-3. TECHNICAL SPECIFICATIONS

Technical specifications for the Transmitter and Transfer Switch System are relative to the technical specifications of the modular units which comprise the system. These specifications are listed in Sections 1 of the individual modular technical manuals which comprise this system technical manual.

1-4. TECHNICAL DOCUMENTATION

The Transmitter and Transfer Switch System is comprised of standard commercial units and supported by individual technical manuals on these units: Technical Manual for Transfer Relay Control Panel, Model TRCP-1 and Technical Manual for General Purpose Transmitter, Model GPTM-2.5KJ2, which includes the Technical Manual for Linear Power Amplifier, Model PALA-2.5K and the Technical Manual for Multi-Mode Exciter, Model MMX(M)-2.

This system technical manual includes information which is peculiar when the aforementioned units are connected as a system. Section 2 of this system manual contains installation information peculiar to this system and which should be used to supplement installation information contained in the modular manuals. Section 3 of this system manual contains an operating procedure which is peculiar to this system and which should be used in lieu of the operating procedures contained in the modular manuals. Theory of operation, maintenance, schematic, and parts list information is not included in this system manual, since it is covered in detail in the individual modular manuals.

SECTION 2
INSTALLATION

2-1. GENERAL

This system installation procedure will provide information for the installation of the two transmitter equipment racks, the mounting of the coaxial relay, dc control cable connections and rf output cable terminations. The installation of modular units removed from the transmitter equipment racks for shipment is outlined in Section 2 of the technical manual for the GPTM-2.5KJ2. The procedures outlined in the GPTM-2.5KJ2 technical manual should be utilized for the primary and standby transmitter portions of this system. That portion of the installation will only be referenced in this section. The installation procedures which are peculiar to this system only are included in the paragraphs which follow. Table 2-1 is a listing of Loose items supplied for system interconnection.

TABLE 2-1. INSTALLATION MATERIALS SUPPLIED (Loose Items)

<u>Quantity</u>	<u>TMC Part Number</u>	<u>Purpose</u>
1	CA480-138-6.000	RF connection from XMTR 1 output to coaxial relay.
1	CA480-138-28.000	RF connection from XMTR 2 output to coaxial relay.
1	AX406-1/with CA582-4, PM710-2 and PM822 attached	RF connection from EIA adapter plate to coaxial relay.
1	RL177/ with 2 each MS5018 and TM105-14AR attached	Coaxial relay, provides antenna connection to XMTR 1 and XMTR 2.

2-2. EQUIPMENT LOCATION

The two transmitter equipment racks must be permanently installed side by side as close to one another as possible to permit interconnection between the transmitters. The individual modular units should not be installed until the proper rack positions have been determined in the following manner:

(1) Remove equipment racks from the crates, and place the two equipment racks adjacent to one another in the approximate positions for their desired permanent locations. Remove coaxial antenna relay (RL177) from loose items box, and place it in mounting hole provided on the top of transmitter rack, with rf connectors facing up. (Mount antenna relay in transmitter with TRCP-1 installed, XMTR 1).

(2) Remove rf output cable CA480-138-28.000 from loose items box and loosely connect one end to coaxial relay (relay connector number 3) on transmitter 1, and loosely connect the other end to adjacent transmitter output connector located on top of its rack. If cable does not reach, move the racks closer to one another until the cable can be secured tightly.

(3) Once the equipment racks are in position with output cable connected, use chalk or some suitable marker to mark the base outlines of both transmitters.

(4) Refer to installation section in the GPTM-2.5KJ2 manual and follow assembly instructions provided in paragraph 2-1 thru 2-4. After transmitter is completely assembled, insure that the side door adjacent to transmitter 2 is secured to equipment rack. Assemble transmitter 2 in the same manner as transmitter 1.

2-3. TRANSFER SWITCH CONTROL CABLE CONNECTION

The cables that supply the control voltage for automatic switching of primary and standby transmitters are located in the bottom of the transmitter rack in which the TRCP-1 control panel is installed. To connect these cables proceed as follows:

- (1) Locate cable (CA1731-14F) with connector plug marked J8004 in bottom of transmitter rack. Note that the leads terminated with spade lugs are tie wrapped together with the connector plug.
- (2) Route cable with connector through the rear cable access hole located on the base of the transmitter rack (if necessary remove access hole cover).
- (3) Carefully pull cable through access hole of transmitter 1 and route cable through rear cable access hole on transmitter 2. Note the rectangular junction box on left wall of rack as viewed from rear of transmitter. Locate jack J8004 and terminal block marked E8006. Connect cable plug to jack J8004 and connect the three leads terminated with spade lugs to E8006 terminal block terminals (11), (4) and (9).

NOTE

Each lead is marked to indicate the correct connection on E8006. If necessary, refer to transmitter 1 junction box which is preconnected before shipment.

- (4) Check to insure that control cable connections are correct and tight. Plastic cable tie wraps are provided and should be used to make a neat installation after control cables are connected.

2-4. COAXIAL ANTENNA RELAY INSTALLATION (Refer to Figure 2-1)

The coaxial antenna relay is used to provide rf output switching between transmitter 1 and transmitter 2 and should be installed as follows:

NOTE

Antenna relay should already be in mounting hole on top of transmitter as per rack installation instruction in paragraph 2-2.

- (1) Observe marking adjacent to coax connector on top of coaxial antenna relay and rotate relay placing connector marked 1 toward front of transmitter 1.

Carefully align the four mounting holes on the plate attached to antenna relay with the four mounting holes on top of the transmitter, and secure mounting plate using mounting hardware provided.

(2) Connect loose end of antenna relay cable (cable which is connected to 14-terminal barrier strip) to terminal block marked E8008. Terminal block E8008 is located in the left upper portion of the transmitter rack as viewed from the rear. Terminal block E8008 connections should be terminals 1 thru 13. Terminal 14 should not be connected.

2-5. RF OUTPUT AND ANTENNA CONNECTION (Refer to Figure 2-1)

Transmitter output cables must be connected from each transmitter output connector to the coaxial antenna relay, and from the coaxial relay terminal to the EIA adapter box. To make these connections proceed as follows:

(1) Remove the following items from the loose items box:

2 each coaxial feed-thru connectors, TMC Part No. UG259/U.

1 each 7/8 EIA adapter, TMC Part No. AX406-1, with cable and box attached.

1 each rf output cable, (for connection to relay and transmitter 2), TMC Part No. CA480-138-6.000.

(2) Install EIA adapter box on top of transmitter 1 rack and bolt to rack mounting holes.

(3) Install coaxial feed-thru connectors through top of each transmitter cabinet (feed-thru holes provided).

(4) Connect rf output cable from transmitter 2 output connector to coaxial antenna relay connector number 3. Connect rf output cable from transmitter 1 output connection to coaxial antenna relay connector number 1. Connect rf cable from number 2 connector on coaxial antenna relay to EIA adapter box.

NOTE

Insure that EIA center conductor (bullet) is connected between relay cable and EIA connector.

(5) On transmitter 1 and transmitter 2, note cables marked J8304, located in rear of each transmitter rack, and connect cables to coaxial feed-thru connectors mounted on racks in step 3.

(6) Connect antenna transmission cable to EIA connector output. Check that all rf cable connections are tight and correctly made.

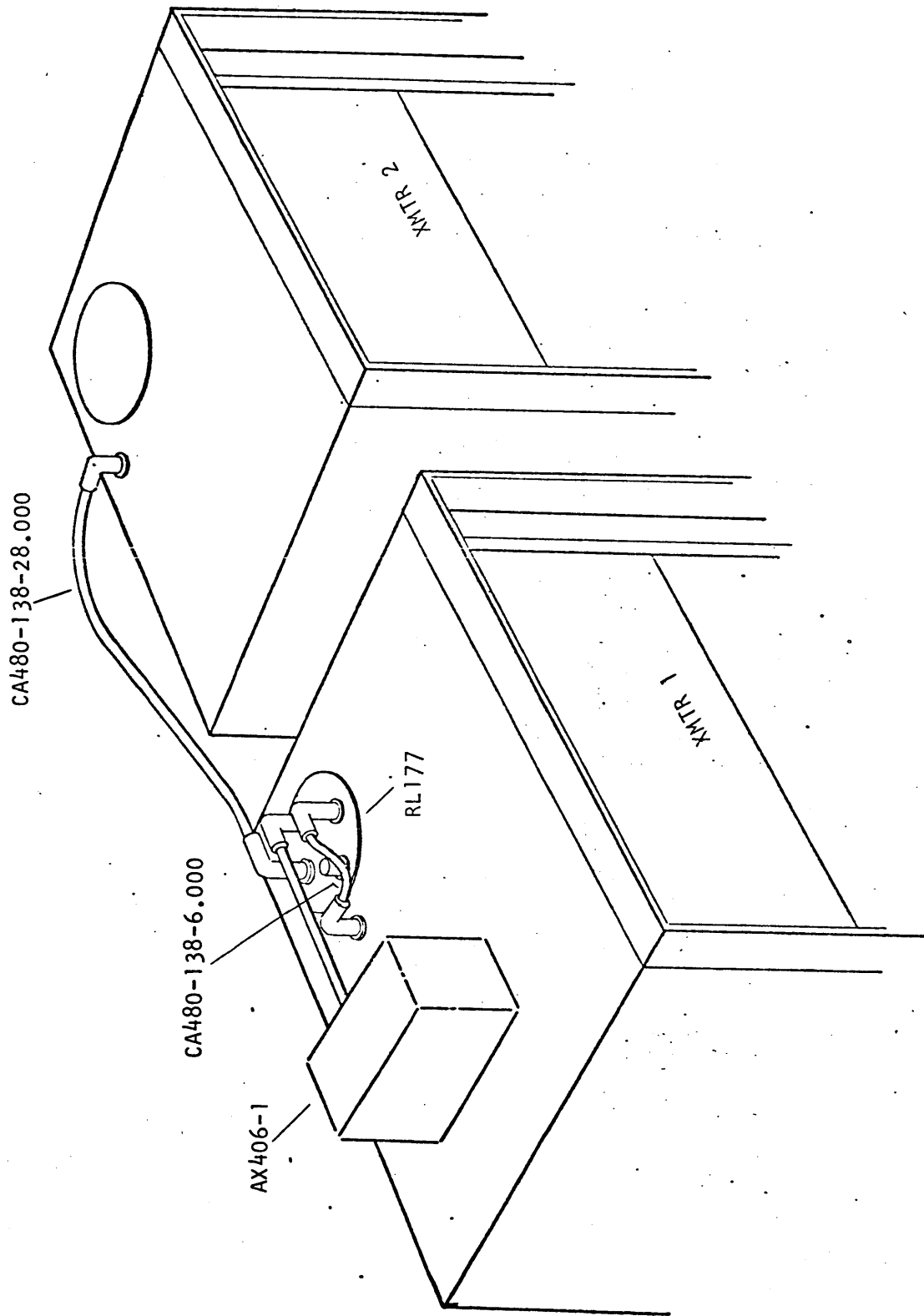


Figure 2-1. RF Output Cable Connections

SECTION 3
OPERATOR'S SECTION

3-1. GENERAL

The transmitting system comprised of the TRCP-1 and two each GPTM-2.5KJ2 transmitters 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.

The operating procedures outlined in this system technical manual take precedence over the operating procedures outlined in the individual modular manuals for components of the system. Before attempting system operation, however, the operator should familiarize himself with the operating controls and indicators of the individual components of the system. These controls and indicators are outlined in the following sections of the modular manuals:

TRCP-1	paragraph 2-2, table 2-1, figure 2-1
GPTM-2.5KJ2	
PALA-2.5K	paragraph 3-1, table 3-1, figure 3-1
MMX(M)-2	paragraph 3-2, table 3-1, figure 3-1

3-2. OPERATING PROCEDURES

Table 3-1 provides operating instructions for the system comprised of the Transfer Relay Control Panel, model TRCP-1 and two each General Purpose Transmitters, model GPTM-2.5KJ2.

TABLE 3-1. SYSTEM OPERATING PROCEDURE

STEP	UNIT	OPERATION
------	------	-----------

NOTE

The procedure which follows should be performed on both primary and standby transmitters unless otherwise specified.

1	TCP-3A	Set MAIN POWER circuit breakers to the ON positions. The Technimatic lights must come on, and PA blowers and top fans must start running in both transmitters.
2	TRCP-1	Set power ON switch to ON position; POWER indicator will illuminate. Set MANUAL OVERRIDE/AUTO TRIP switch to the MANUAL OVERRIDE position.
3	TRCP-1	Set PRIMARY XMTR SELECT switch to XMTR 1 position. Set *OVERRIDE XMTR SELECT

*Indicates momentary spring loaded switch; set to position indicated in procedure, and release switch.

TABLE 3-1. SYSTEM OPERATING PROCEDURE Continued

STEP	UNIT	OPERATION
3 continued	TRCP-1	switch to XMTR 1 position, and observe the following indications: (a) XMTR 1 ON LINE lamp will illuminate (green). (b) XMTR 2 STANDBY lamp will illuminate (amber).
4	TCP-3A	Set BANDSWITCH AUTO/MANUAL switch to AUTO position.
5	MMX(M)-2	Set the ON/STANDBY switch to the ON position; POWER indicator will illuminate. Set the CARRIER control fully clockwise and the RF OUTPUT control fully counterclockwise. Set the MODE switch to the USB position and the frequency selectors to the desired operating frequency (transmitter bandswitches will automatically rotate to a band that includes the operating frequency),
6	API28A	Set the LOW VOLTAGE circuit breaker to the ON position; set the MODE switch to the SSB position.
NOTE		
(This note applies to Primary transmitter 1 only). At this time, it is advisable to check the plate currents of the first and second rf amplifier tubes. They should be checked in the following manner: (1) Set the MULTIMETER switch to the 1ST AMPL Ip position and observe a reading of "10" on the MULTIMETER. Should the meter reading indicate some other value, adjust the 1ST AMPL BIAS ADJ on the API28A for a reading of "10" on the MULTIMETER. (2) Place the MUTIMETER switch to the 2ND AMPL Ip position and observe a reading of "12" on the MULTIMETER. Should the meter reading indicate some other value, adjust the 2ND AMPL BIAS ADJ on the API28A for a reading of "12" on the MULTIMETER.		
7	SWCB-3K	Set the RF GAIN control to its extreme counterclockwise position.
8	MMX(M)-2	Set the METER switch to the RF position, and adjust the RF OUTPUT for a reading of "2" on the METER (approximately 100 milliwatts output).

TABLE 3-1. SYSTEM OPERATING PROCEDURE Continued

STEP	UNIT	OPERATION
NOTE		
Steps 9 thru 18 apply to Primary Transmitter 1 only.		
9	TLAC-2.5K	Set the MULTIMETER switch to the 2ND AMP Ep position.
10	SWCB-3K	Adjust the RF GAIN control for a slight indication on the MULTIMETER.
11	TLAC-2.5K	Adjust 2ND TUNING control for a peak indication on the MULTIMETER.
12	SWCB-3K	Reduce the rf output by adjusting the RF GAIN control to its extreme counter-clockwise position. The MULTIMETER should indicate 0.
13	TCP-3A	Set HIGH VOLTAGE circuit breaker to ON position. HIGH VOLTAGE indicator light must light, PLATE CURRENT meter should indicate 450 ma. (Should some other value be noted, adjust the PA BIAS ADJ for a reading of 450 ma on the PLATE CURRENT meter.
14	SWCB-3K	Advance the RF GAIN control to a point where the PA plate current increases.
15	TLAC-2.5K	Adjust the TUNE control until a resonant dip is obtained on the PLATE CURRENT meter.
16	TLAC-2.5K	Adjust the LOAD control until the PA is properly loaded. After each change in loading, the TUNE control must be returned to resonance. Proper loading will occur when maximum output is obtained on output power meter. At a power level of 2.5 kilowatts, the PLATE CURRENT meter should read between 0.6 and 0.85 amperes, depending upon the frequency. The RF GAIN control on the SWCB-3K should be advanced gradually to achieve output power as the transmitter is being tuned and loaded.

TABLE 3-1. SYSTEM OPERATING PROCEDURE Continued

STEP	UNIT	OPERATION
17	TLAC-2.5K	At this point the desired output level should be determined and the transmitter ALDC adjusted for that level. With the RF GAIN control on the SWCB-3K set the output power to the desired level. Slowly adjust ALDC ADJ control until the output power level, as indicated on the output power meter, just commences to decrease. The ALDC ADJ control should be backed off just beyond this point. The RF GAIN control should now be reduced to minimum and advanced slowly until it is noted that the output power indication perceptively slows or fails to increase at the desired output level.
18	TRCP-1	Set * OVERRIDE XMTR SELECT switch to XMTR 2 position. The following indications should be observed: <ul style="list-style-type: none"> (a) XMTR 1 STANDBY lamp will illuminate. (b) XMTR 2 ON LINE lamp will illuminate. (c) Transmitter 1 output power meter and PLATE CURRENT meter indications will drop to 0.
19	XMTR 2	Perform instructions outlined in the note preceding step 7 and steps 9 thru 17 on XMTR 2 in the same manner as performed on XMTR 1.
20	TRCP-1	Determine the transmitter which will be selected as primary (transmitter 1 or transmitter 2). Set PRIMARY XMTR SELECT switch to transmitter selected as primary (XMTR 1 or XMTR 2).
21	TRCP-1	Set the *OVERRIDE XMTR SELECT switch to the same transmitter position selected in step 20.

* Indicates momentary spring loaded switch; set to position indicated in procedure, and release switch.

TABLE 3-1. SYSTEM OPERATING PROCEDURE Continued

STEP	UNIT	OPERATION
21	TRCP-1 continued	<p>The following indications should be observed:</p> <ul style="list-style-type: none">(a) The transmitter selected as primary should indicate rf output on its output power meter and plate current on its PLATE CURRENT meter.(b) The transmitter selected as standby should indicate no output power and no plate current.(c) On the TRCP-1 the ON LINE lamp for the transmitter selected as primary should be illuminated. The STANDBY lamp for the selected standby transmitter should be illuminated.
22	TRCP-1	Set MANUAL OVERRIDE/AUTO TRIP switch to the AUTO/TRIP position.
23	AX647	Set ALARM switch on both transmitters to the ON position. With the transmitters initially tuned and the controls set in the prescribed manner, failure of the primary transmitter will cause the standby transmitter to be automatically switched from standby to on line status. The aural alarm on the transmitter selected as primary will sound to indicate a primary transmitter failure.
24	MMX(M)-2	For intelligence operation of the transmitter refer to Section 3 of the technical manual for the MMX(M)-2, and modulate the exciter as required.

NOTE

IF CW operation is required, set MODE switch on AP128 to CW position.