TECHNICAL MANUAL

for

BROADCAST TRANSMITTER

MODEL BCTR-10KYA

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, CANADA

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SECTION 1

GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION.

The Broadcast Transmitter, Model BCT-10KYA (figure 1-1) is a mid frequency transmitter designed to operate from 400 Kc to 515 Kc, providing rapid freqency selection with a minimum of time and effort. The transmitter is capable of 15 Kw in the MCW mode, or 10,000 watts average power through the frequency range of 400 Kc to 515 Kc. Designed features provide full remote operation of the BCT-10 K's frequency selection, plate voltage ON/OFF and mode of emission desired.

The operating modes of the transmitter are:

1. CW (carrier wave)
2. MCW (modulated carrier wave).

1-2. PHYSICAL DESCRIPTION.

a. GENERAL. The BCT-10KA transmitter is a single rack configuration, divided into six individual sections. The rack is 65 inches high, 32 inches wide, and 35 inches deep, and weighs 1274 pounds. The individual sections are the power supply with a spare fuse panel located on the front panel, a main power panel assembly, a driver drawer, an exciter drawer, a power amplifier section and a meter assembly panel. Two of the sections are slide out drawers; they are the driver drawer and the exciter drawer. The exciter drawer contains the exciter unit SPE-1F3 which is a self contained unit. The power supply main power panel assembly, and part of the power amplifier sections internal components are accessible by the removal of the fastening screws holding the front panels to the main chassis.

The transmitter is equipped with interlocks and overload circuits throughout, to protect operating and maintenance personnel as well as the equipment. An added protective feature is an audible alarm which energizes when high voltage is lost.

All operating controls and meters are readily accessible on the front panel, with exhaust fan outlets on top and rear. The antenna output is coupled to the flange on top of the transmitter. For maintenance and repair, removal of either side or rear skins will expose internal components. The transmitter has remote control capabilities in the following functions; HV off/on, frequency selection, MODE of emission and CW keying.

1) METER PANEL ASSEMBLY

The meter panel located at the top of the transmitter contains five meters. They monitor PA plate voltage, PA screen current, PA plate current, forward and reflected power.

2) POWER AMPLIFIER

The 10 kw PA section contains the 10 kw PA tube, its associated tuned circuits, and an exhaust fan. The front panel contains a plexiglas window, which is located on the front panel of the PA section. Main power and high voltage indicators are located on this front panel.

3) EXCITER DRAWER

The exciter drawer houses the exciter unit model SPE-1F3 which is a modular type unit that can be easily installed or removed from the transmitter. The exciter drawer also contains a 28vdc supply for a remote HV indicator lamp. The front panel of the exciter drawer contains a high voltage circuit breaker and the interlock monitoring switch.

4) DRIVER DRAWER

The driver drawer contains four solid state power supplies; they are the IPA, Filament, Interlock and Bias supplies with two IPA stages, which provide driving power to the final power amplifier. The overload protect circuitry is located in this drawer with the overload adjust resistors and indicators on the front panel. The front panel also contains the IPA plate current meter, the meter function switch, an audible alarm and its on-off switch. The driver and PA bias adjust resistors can

be set from the front panel, with fuses for bias, low voltage, filament, blower, interlock and 24vdc regulated, located close by.

5) MAIN POWER PANEL

The main power panel contains the main power circuit breaker, fuses for main blower unit, PA filament and fan, a filament time and plate time meter and an exciter on-off switch.

On the underside of the main power panel is located the external interlock terminal boards and PA monitor jack. These jacks are accessible when the power supply front panel is removed.

6) POWER SUPPLY

The high Voltage Power Supply Section contains the line filters, a H.V. contactor which controls 3Ø primary power to the High Voltage Power Supply transformer, and the solid state High Voltage Rectifier. In the rear portion of the power supply section is the main PA blower unit providing forced air cooling.

1-3. TECHNICAL CHARACTERISTICS.

FREQUENCY RANGE:	400 KC - 515 KC
MODES OF OPERATION:	CW, MCW
POWER OUTPUT:	10,000 watt carrier power plus 15 KW in the MCW mode.
OUTPUT IMPEDANCE:	50 ohms unbalanced. Designed to match any antenna with a VSWR of less than 2:1.
TUNING SYSTEM:	Local/Remote control to 3 fixed frequency.
VSWR PROTECTION:	Automatic protection against mis-match exceeding 2 to 1 is provided. A high VSWR can be tolerated with reduced power output.
HARMONIC RADIATION	75 db minimum.
HEAT DISSIPATION:	Approximately 20,000 watts.
METERING:	Front panel meters provide indications of the operation of all critical circuits.

ENVIRONMENTAL CONDITIONS:	Designed to operate in any ambient temperature between 0° C and 55° C, and any value of humidity up to 95%.
STORAGE CONDITIONS:	Equipment will not be materially affected under storage of -30° C to +75° C and humidity of o to 95%.
ALTITUDE:	The transmitter is designed to provide full output at an altitude of 10,000 feet.
COOLING:	Air cooled.
SAFETY FEATURES:	Safety interlocks are provided in all high voltage areas. Whenever an interlock is actuated, high voltage is immediately grounded.
INSTALLATION DATA:	Weight: 1,274 pounds. Size: 65 inches High x 32 ½ inches Wide x 35 inches Deep.
PRIMARY POWER:	208 three phase, 60 Hz. The primary of the transformer may be connected to either delta or "wye" input.
POWER REQUIREMENTS:	Under steady state conditions, with full output, transmitter requires approximately 35 KW.
COMPONENTS & CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.

APPENDIX A

SECTION 2

INSTALLATION

2-1. EQUIPMENT INSPECTION.

The BCT-10K Transmitter has been assembled, calibrated, and tested at the factory before shipment. Inspect all packages for possible damage during transit. Carefully unpack each crate as indicated by the packing list provided with transmitter shipment. Inspect all packing materials for parts that may have been shipped as loose items.

With respect to equipment damage for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. EQUIPMENT PACKAGING.

The equipment is shipped in boxes as shown by figure 2-1. The box number and contents are stenciled on the outside of each box.

2-3. PRIMARY POWER.

The BCT-10K requries a three phase source voltage of 208vac at 50/60 cps.

2-4. PRIMARY POWER AND GROUND CONNECTIONS.

Refer to figure 2-2 and 2-3. Primary power cables and the station ground cable enter the transmitter through an access hole located in the bottom of the high voltage power supply compartment.

To connect the primary power and the ground to their respective lugs and jacks, remove the front panel of the Power Supply compartment.

The primary power connections are located below line filter coils L1000, L1001, and L1002. The input cables are connected as follows. Phase 1 connects to L1000, phase 2 connects to L1001, and phase 3 connects to L1002.

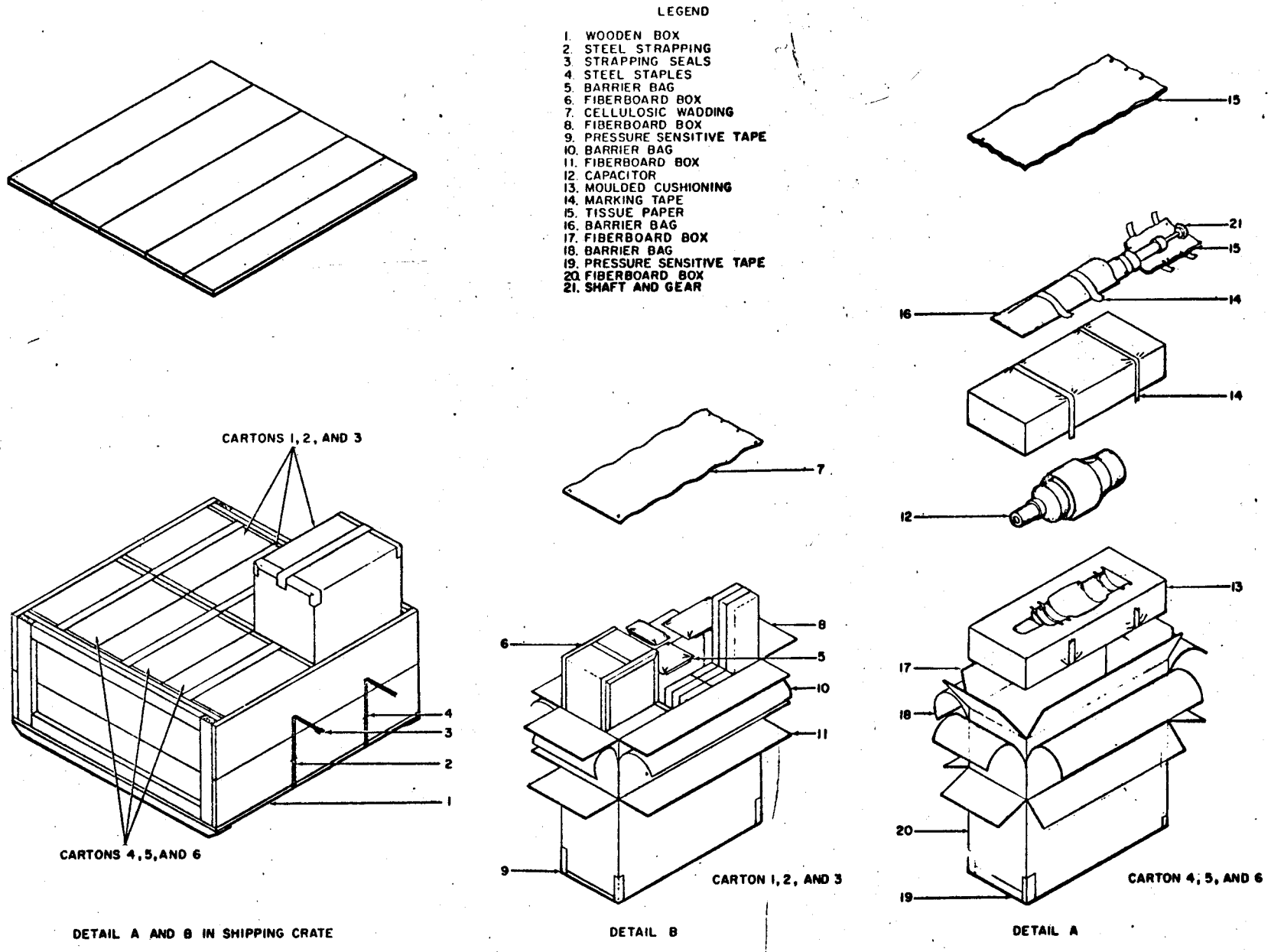

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Figure 2-1. Typical Equipment Packaging

NOTE

Two (2) access holes have been provided for the convenience of installing primary power input cables. One (1) access hole is located at the bottom left side of the transmitter frame. Also, another access hole is located in the rear bottom left corner of the transmitter frame.

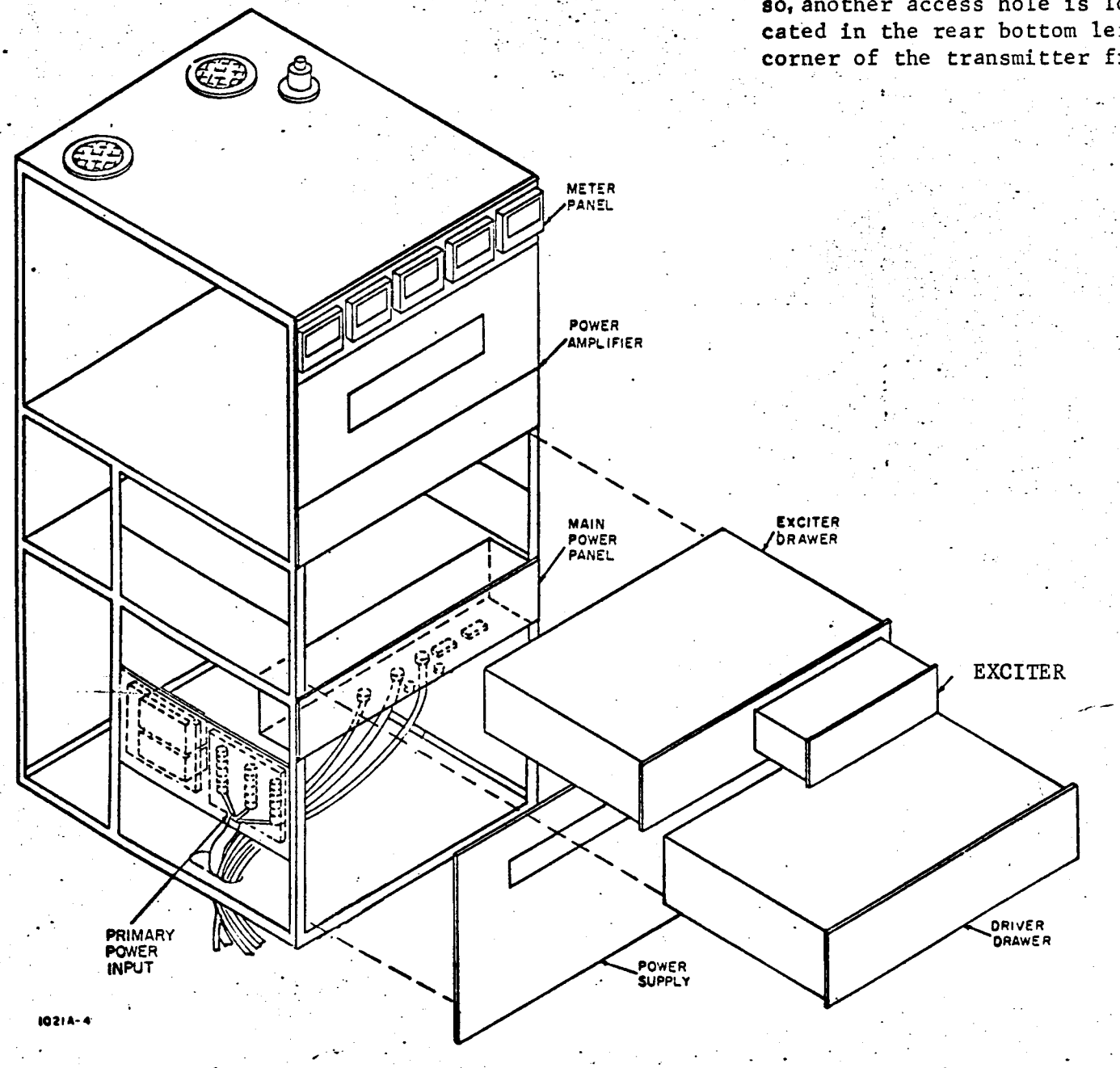
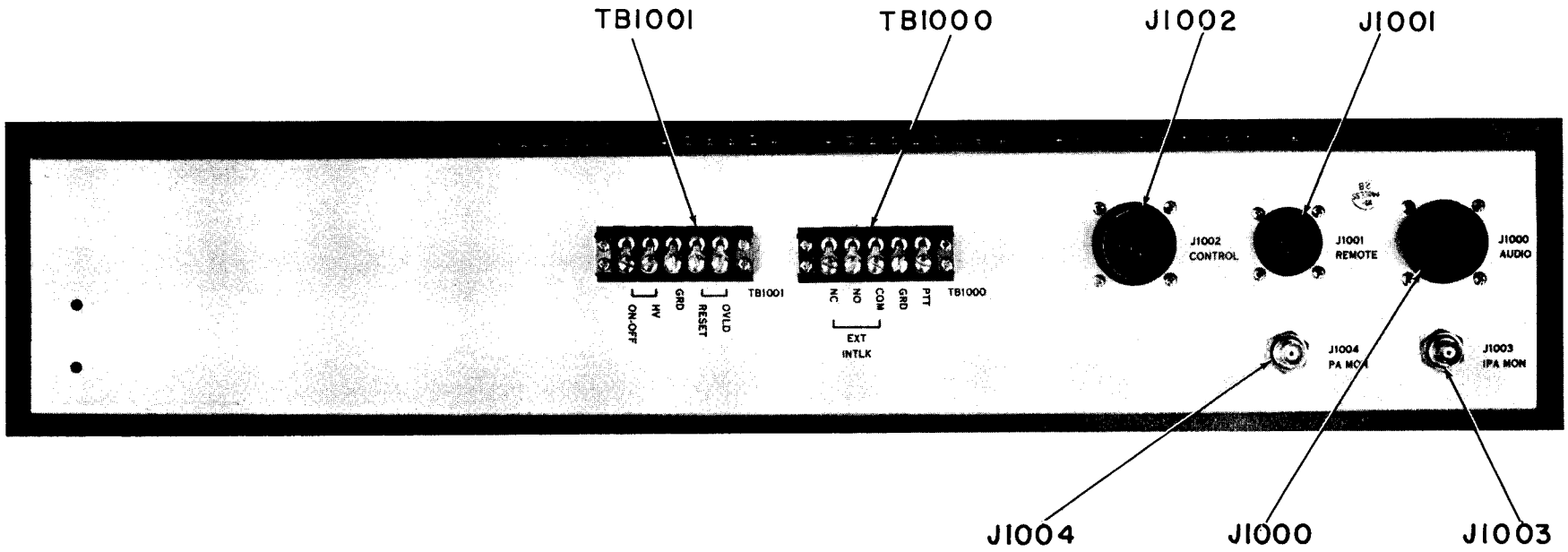


Figure- 2-2 Typical Installation Drawing



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2-3

Figure 2-4. Audio Input Panel

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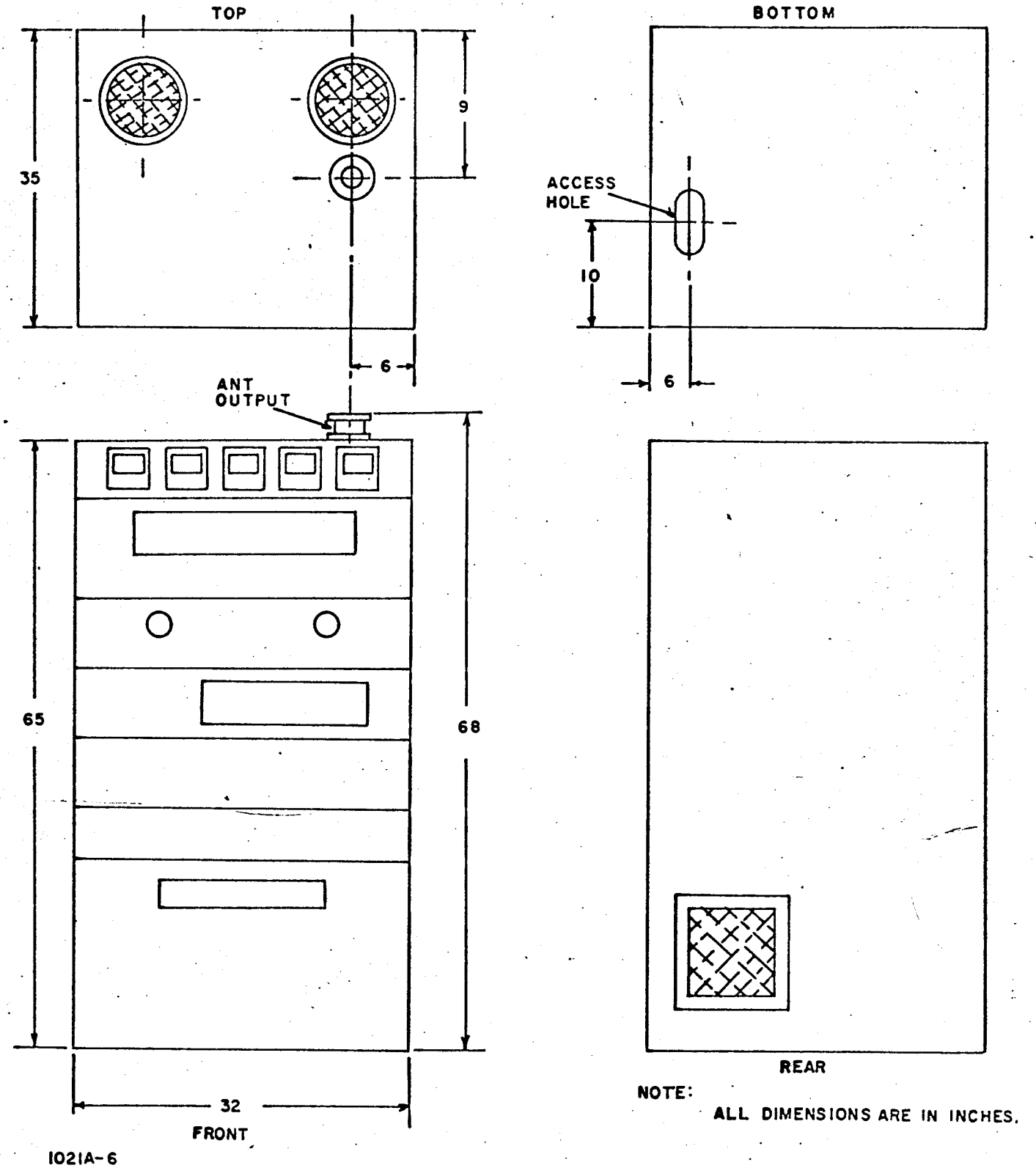

Figure 2-4 Outline Dimensional Drawing

The station ground should be connected to the bolt, below the HV Contactor K800, which fastens the H.V. Contactor to the frame of the transmitter. After all the connections have been completed replace the power supply front panel.

2-5. LOCATION OF TRANSMITTER.

Before attempting to install the BCT-10K ensure that adequate power is available at the selected site or location. Refer to dimensional outline drawing (figure 2-4) when choosing the operating location. The room (or van in which the BCT-10K is located) must have a ceiling height of at least 7 feet. Adequate ventilation must be provided. Operation of the transmitter in a poorly ventilated room will cause the surrounding temperature to become too high. Also a clearance of about 2 feet in the rear is needed for removal of rear skin for maintenance purposes.

SECTION 3

OPERATOR'S SECTION

3-1. GENERAL.

The BCT-10K Transmitter is relatively easy to tune since there is a minimum of controls. The operator still should familiarize himself thoroughly with the controls and operation of the transmitter before attempting to tune. Tuning instructions and Operating Controls and Indicators in Table 3-1 on page 3- 6-9 are provided in this Section to aid in operating the transmitter.

CAUTION

It is highly important to tune up a High power BCT-10K on a careful precise step by step basis. Furthermore, to avoid damage to the transmitter it is important to operate it within rated loads. Operating the transmitter beyond its rated capacities is not recommended because it is hazardous to the equipment and may cause excessive distortion. It is good operating practice to allow the BCT-10K at least a 1/4 hour warm up period.

3-2. IPA-PA PRELIMINARY CHECK (refer to figure 3-1).

NOTE

Before performing following, exciter unit must have level controls and output controls at MAX CCW.

1. Place Main Power Breaker ON.
2. Place HIGH VOLTAGE circuit breaker (11) at ON.
3. Turn METER FUNCTION switch (35) to each IPA position, and read indication on IPA meter (34).

IPA meter should have the following readings:

a) Driver 25 = 100 ma plate current.

b) IPA A 25 = 100 ma plate current.

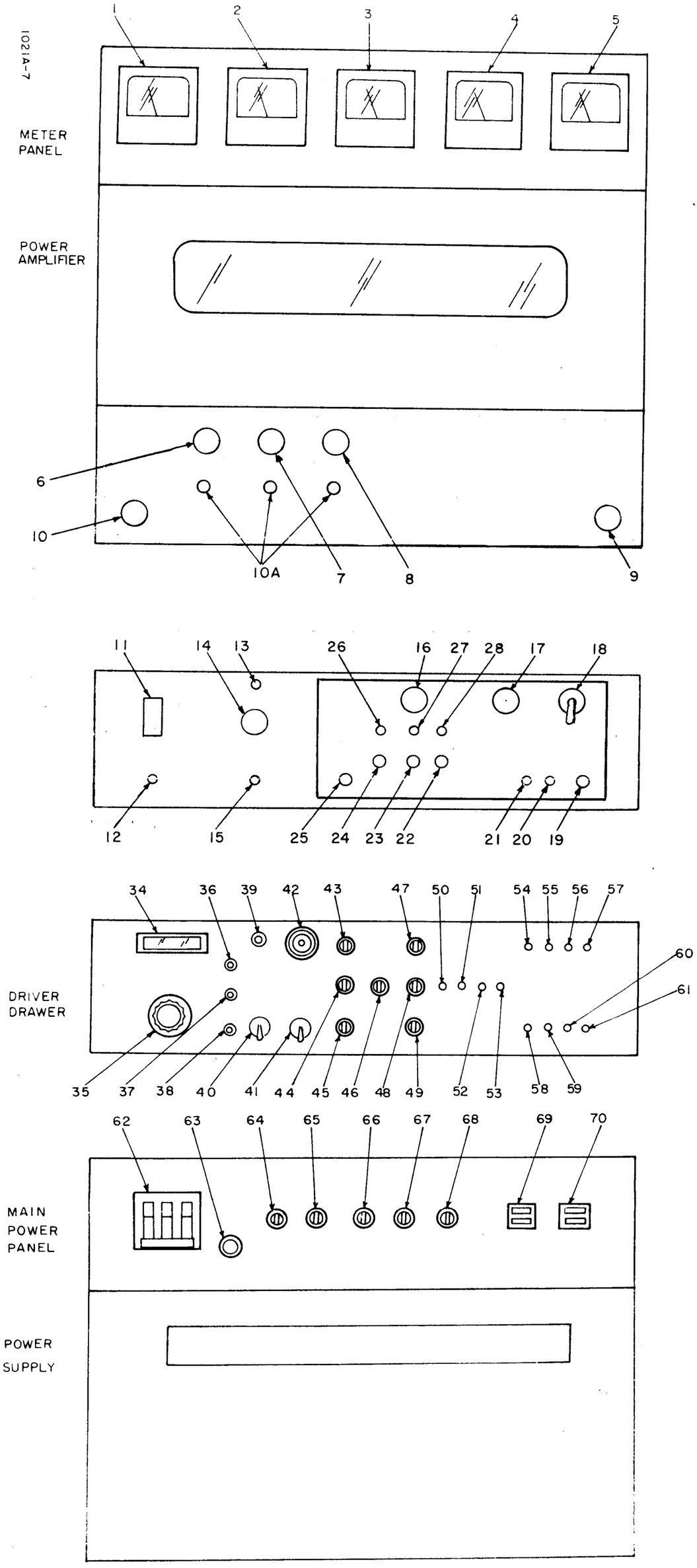

Figure 3-1. Controls and Indicators

c) IPA B 25 = 100 ma plate current.

d) IPA TOTAL 25 = 200 ma plate current.

e) PA Plate current = 2 Amperes.

CAUTION

Before tuning transmitter make sure either a Dummy Load or an antenna is properly connected to the transmitter output connector.

3-3. OPERATING PROCEDURE FOR LOCAL CW.

1. Set MAIN POWER circuit breaker (62) at ON. Blowers should start running.

2. Set Exciter Power Switch (63) to ON. Power lamp must light on exciter.

3. Set EMISSION switch (17) at CW. CW indicator must light. Place Test Key in ON position.

4. Select the desired operating frequency with the FREQUENCY SELECTION switch (16). Light indicator on exciter and transmitter will light, indicating same frequency.

NOTE

Turn OUTPUT control (25) fully CW and Level controls CCW (26, 27, 28) before selecting different frequencies.

5. Check Interlock circuitry by turning interlock Monitor switch (14) in the following sequence PA AIR, IPA DRAWER, EXCITER DRAWER, REAR PANELS, EXTERNAL, FRONT PANELS, TIMER, BANDSWITCH HEAT OVERLOAD, and OFF.

When interlock circuit is functioning properly indicator (13) will light. When lamp does not light, check for an open or inoperative interlock in the area indicated by switch (14).

6. Set High Voltage circuit breaker (11) at ON.

7. Increase Level control for frequency selected (26, 27, or 28, depending on desired frequency) until PA PLATE CURRENT meter (3) reads 3 amperes.

8. Turn TUNE control indicated by frequency indicating lamp until forward power meter (4) gives resonance indication.

9. Increase Level control of the selected frequency to desired output Level as read on output meter.

10. Check reflected power reading by throwing on REFLECTED POWER monitor switch (40). REFLECTED POWER meter should not exceed a 3:1 VSWR.

11. Set ALARM switch (41) to ON.

12. After transmitter has been properly tuned for the desired frequency and output level, CW keying can be accomplished at the transmitter with the Test Key (18).

NOTE

In the event the transmitter shuts down due to an overload, PRESS OVLD RESET button (12) and retune transmitter.

3-4. OPERATING PROCEDURE, LOCAL MODULATED CARRIER WAVE (MCW).

1. First two steps are the same as those described for CW operation.

2. Set EMISSION switch to the MCW position.

3. Follow procedures described in steps 4 thru 11 for CW operation, with one exception; deactivate Test Key.

3-5. OPERATING PROCEDURE, REMOTE CW.

NOTE

Before performing remote transmitter operation, RF output and level controls must be preset to desired output level. Refer to Paragraph 3-3 for output and level adjustments.

1. Place frequency selector switch to the remote position.

2. Deactivate Test Key.

3. Place High Voltage breaker in the ON position.

NOTE

Transmitter from this point will be controlled by remote unit, TMC Model RTPR-1Y.

3-6. REMOTE MCW (MODULATED CONTINUOUS WAVE).

Controls must be in position indicated in Paragraph 3-5.

NOTE

When operating in a remote condition, all switches and controls on the exciter unit SPEIF-3 are superseded by the remote unit. Frequency selection, high voltage on and off and mode of emission are therefore accomplished automatically by the remote unit RTPR-1Y.

TABLE 3-1. BCT-10K OPERATING CONTROLS AND INDICATORS

NUMBER DESIGNATION	PANEL DESIGNATION	FUNCTION
1	PA PLATE VOLTAGE meter	Indicates plate voltage (dc) of 10-kw power amplifier tube.
2	PA SCREEN CURRENT meter	Indicates screen current of 10-kw power amplifier tube.
3	PA PLATE CURRENT meter	Indicates plate current of 10-kw power amplifier tube.
4	FORWARD POWER meter	Indicates power output of transmitter.
5	REFLECTED POWER meter	Indicates VSWR of Transmitter.
6	#1 500-kc Tuning Control	Tunes 10-kw PA to 500-kc.
7	#2 476-kc Tuning Control	Tunes 10-kw PA to 476-kc.
8	#3 442-kc Tuning Control	Tunes 10-kw PA to 442-kc.
9	HIGH VOLTAGE lamp	When lit, indicates, that high voltage is on in the transmitter.
10	AC Power Lamp	When lit, indicates, that Primary AC Power is applied to transmitter.
11	HIGH VOLTAGE circuit breaker	Allows application of high voltage to IPA stage.
12	OVLD RESET SWITCH push-button	When depressed after an overload occurs, resets relay in IPA drawer.
13	INTERLOCK INDICATOR lamp	Lights when a particular interlock circuit being monitored, is functioning properly.
14	INTERLOCK MONITOR switch	Allows monitoring of interlock circuits throughout transmitter.
15	NOT USED.	
16	Frequency Selection switch	Selects frequency of exciter and programs PA Tuning CKT of frequency selected.
17	Emission switch	Selects exciter mode of emission CW or MCW.

TABLE 3-1. BCT-10K OPERATING CONTROLS AND INDICATORS (Cont)

NUMBER DESIGNATION	PANEL DESIGNATION	FUNCTION
18	Test Key	Provides CW keying at transmitter.
19	Power lamp	Indicates AC power applied to exciter.
20	CW emission indicator	Indicates CW mode of emission has been selected.
21	MCW emission indicator	Indicates MCW mode of emission has been selected.
22	442 Kc (#3) indicator	Indicates PA tuning Capacitor for 442 Kc is in the PA tuning CKT.
23	476 Kc (#2) indicator	Indicates PA tuning Capacitor for 476 Kc is in the PA tuning. CKT.
24	500 Kc (#1) indicator	Indicates PA tuning Capacitor for 500 Kc is in PA tuning CKT.
25	RF output control	Adjust overall Exciter RF output.
26	500 Kc (#1) Level adjustment control.	Adjusts level of 500 Kc exciter output.
27	476 Kc (#2) Level adjustment control.	Adjust level of 476 Kc exciter output.
28	442 Kc (#3) Level adjustment control.	Adjust level of 442 Kc exciter output.
29 thru 33	NOT USED	
34	IPA PLATE CURRENT meter	Indicates plate current of IPA stages.
35	METER FUNCTION switch	Selects IPA stage, plate current of which is indicated by IPA plate current meter.
36	IPA DRIVER control	Sets bias level of first IPA tube.
37	IPA A BIAS control	Sets bias level of first IPA "A" tube.
38	IPA B BIAS control	Sets bias level of second IPA "B" tube.

TABLE 3-1. BCT-10K OPERATING CONTROLS AND INDICATORS (Cont)

NUMBER DESIGNATION	PANEL DESIGNATION	FUNCTION
39	PA BIAS control	Sets bias level of 10-kw power amplifier.
40	REFLECTED POWER switch	In meter position directs VSWR to Reflected power meter.
41	ALARM switch	In on position closes circuit to audible alarm.
42	ALARM speaker	Speaker for alarm circuit, which sounds when high voltage fails in transmitter.
43	LV fuse	Protects low voltage power supply.
44	FILAMENT fuse	Protects filament power supply.
45	BLOWER fuse	Protects blower B301 in IPA.
46	Bias fuse	Protects bias rectifier circuit.
47	FILAMENT fuse	Protects filament recifier circuit.
48	INTERLOCK fuse	Protects Interlock rectifier circuit.
49	24 VDC	Protects 24 vdc circuit.
50	PA bias control	Sets operating level of PA bias overload.
51	IPA VOLTAGE ADJ control	Sets operating level of IPA voltage overload.
52	PA BIAS OVLD ADJ control	Sets operating point of silicon controlled rectifier in PA bias overload circuit.
53	PA PLATE OVLD AJD control	Sets operating point of silicon controlled rectifier in PA plate overload circuit.
54	DRIVER PLATE OVLD lamp	When lit indicates that an overload has occurred in plate circuit to IPA.
55	IPA PLATE OVLD lamp	When lit, indicates that an overload has occurred in plate circuit of IPA.

TABLE 3-1. BCT-10K OPERATING CONTROLS AND INDICATORS (Cont)

NUMBER DESIGNATION	PANEL DESIGNATION	FUNCTION
56	IPA PLATE OVLD lamp	When lit, indicates that an overload has occured in plate circuit to IPA.
57	IPA VOLTAGE OVLD lamp	When lit, indicates that an overloa has occurred in PA screen circuit.
58	PA BIAS OVLD lamp	When lit, indicates that an overloa has occurred in bias circuit of PA tube.
59	PA PLATE OVLD lamp	When lit, indicates that an overloa has occurred in plate circuit of PA tube.
60	PA SCREEN OVLD lamp	When lit, indicates that an overloa has occurred in screen circuit of PA tube.
61	SWR OVLD lamp	When lit indicates that an overload has occurred as a result of excessive VSWR.
62	MAIN POWER circuit breaker	In on position applies primary powe to transmitter.
63	EXCITER on-off switch	Applies AC power to exciter unit, SPE-1F3.
64 65 66	PH1, PH2, PH3, fuses	Protect PA tube blower B800 in High voltage power supply compartment.
67	PA FILAMENT fuse	Protects PA filament circuit transformer.
68	FAN fuse	Protects fan B900 in PA compartment.
69	FILAMENT TIME meter	Indicates total operating time of filament circuit of 10-kw PA.
70	PLATE TIME meter	Indicates operating time of 10-kw plate circuit.
71 and 72	Exciter fuse	Protects AC input circuit.

SECTION 4

PRINCIPLES OF OPERATION

4-1. GENERAL.

The MCT-10K transmitter is a single rack configuration, comprised of individual sections coupled together to form a 10-kw transmitter system.

The exciter unit SPE-1[redacted] is a compact transistorized modular type unit, and has been designed for full remote operation when used with TMC model RTPR-1Y (remote unit) and the TMC model RDCR-1Y (decoder unit).

4-2. BLOCK DIAGRAM DESCRIPTION.

The Remote programmed information from the RTPR-1Y (Remote Unit) is fed to the MCT-10K[redacted] transmitter's exciter, via the decoder Model RDCR-1Y. This information received by the exciter provides the correct exciter frequency selection, mode of emission, and PA resonant circuit selection. Three pre-tuned vacuum variable capaciters are electronically switched in and out of the Power Amplifier section and the SPE-1[redacted] exciter's frequency determines which PA resonant circuit is selected and the antenna tuner positioning for the correct band-pass and frequency rejection of the antenna tuner. The rf output of the exciter unit is then extended to the intermediate power amplifier stage.

The intermediate power amplifier, consisting of two stages of amplification, accepts the r-f signal from the exciter unit on the grid of the first IPA tube. The signal is then transformer coupled to the grids of the following two tubes, which are operated in push-pull with a final output rated at 160 volts.

The output of the IPA is coupled to the grid of the 10-kw linear power amplifier where it is raised to an r-f level of 10-kw. The 10-kw output signal is then fed through a harmonic rejection filter to a 50 ohm unbalanced antenna.

The IPA drawer also houses four separate power supplies: the intermediate power amplifier, the plate supply which provides plate voltage for the three IPA stages, a bias supply which provides a regulated negative bias voltage for the IPA and final

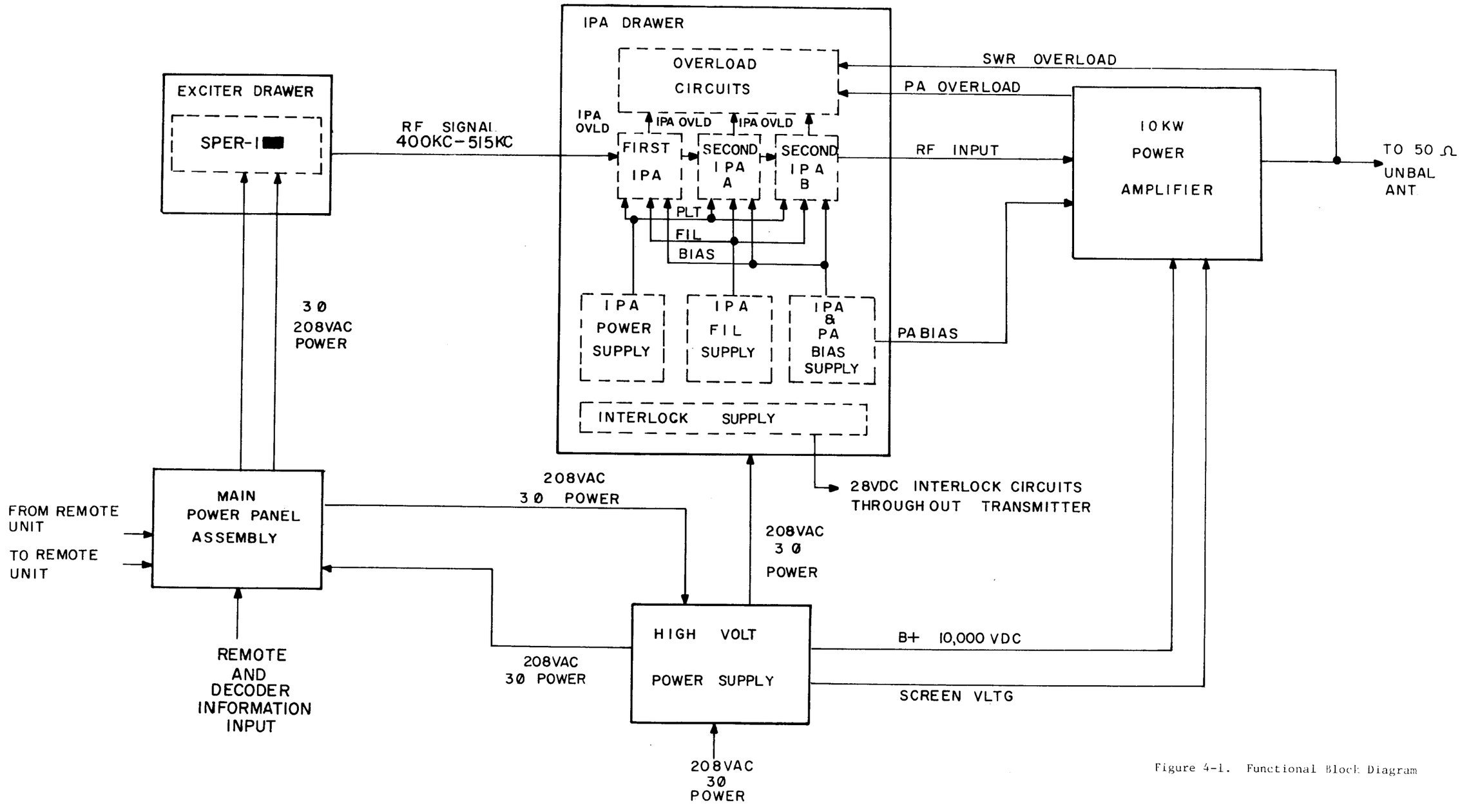

Figure 4-1. Functional Block Diagram

PA stages, a filament supply which provides DC voltage for the three tube filaments in the IPA stages, and an interlock supply providing 28vdc to operate the interlock circuitry, with a regulated 24 vdc tapped off for the overload reset function.

The IPA drawer also contains the transistorized overload circuitry that opens the interlock circuitry cutting off high voltage to the transmitter. The protective circuits sample the IPA and PA plate and screen currents and bias supply voltages. When any of these currents is excessive, or if a voltage is deficient, the overload relay operates and removes high voltage.

The High Voltage Power Supply provides the final PA with 10,000 volts DC plate voltage as well as a highly regulated screen voltage.

4-3. INTERMEDIATE POWER AMPLIFIER CIRCUIT ANALYSIS (refer to figure 7-2 Sh 1&2).

The intermediate power amplifier consists of two stages of amplification operating class AB1. The first stage V301 receives a minimum of 250mw on the grid, from the low frequency exciter unit LFE. The amplified signal is then transformer coupled through T303 to the grids of the second amplifier "A" stage V302, and "B" stage V303 operating in push pull. A 160 volt output through transformer T304 is coupled to the grid of the final Power Amplifier tube V900 by passing through IPA connector J304.

Both stages employ fixed bias type of operation, which is preset by first amplifier bias adjust resistor R329 and second stage "A" and "B" amplifier bias adjust resistors R332 and R330.

The first IPA stage receives 1000vdc on its plate, and the second stage "A" and "B" amplifiers receive 2000 vdc on each plate.

A front panel switch S303 and its associated meter M301 measure the cathode current of each IPA tube.

4-4. IPA HIGH VOLTAGE POWER SUPPLY.

With reference to the interlock circuit analysis it can be seen that the IPA

High Voltage Power Supply will not operate until High Voltage Contactor K301 is activated. When K301 is activated a ground is placed on the coil of PLATES ON relay K306 energizing it and allowing phase 1 and 2 to pass through to the terminals of High Voltage Power Supply Transformer T302. The delta wye input transformer receives 208 vac on each leg and builds it up to 2000 volts output on the secondary wye section, before applying it to the solid state rectifier CR307. The IPA employs a full wave bridge rectifier consisting of a total of six rectifier cells. In this type of arrangement two half wave rectifiers are connected in series across each leg of the transformer. The rectified output of the power supply passes through several filtering components before being applied to the plates of V302 and V303.

Transformer T302 also supplies 2000 vdc plate voltage for the first IPA stage and a regulated screen voltage for both stages of the IPA, by tapping the common point of all three legs of the secondary wye section T302.

The screen voltage is developed by voltage divider network R339, R340, R341, R343, and R342, and voltage regulated by two OA2 tubes V307 and V308, and an OB2 tube V309 before being applied to the screen of each tube.

4-5. BIAS SUPPLY, FILAMENT SUPPLY 28VDC SUPPLY (refer to figure 7-2 Sh 1&2).

The Bias supply, the IPA filament supply and the 28vdc interlock and overload circuit supply are all delta wye input transformer configurations. The 208VAC delta portion of the input transformer T301 receives three phase primary power and transfers it to the bias, filament and interlock supply wye sections producing 500 volts, 12vdc, and 28vdc, respectively. The rectifier portion of the three supplies are all full wave bridge circuits, using a total of six rectifier cells in each circuit. In this type of arrangement two half wave rectifiers are connected in series across each leg of the transformer.

The rectified output of the bias supply passes through choke input filter L304, dropping resistor R337, capacitor C318, and resistor R338, smoothing output ac ripple before it can reach the amplifier circuits. After filtering the rectified output.

the voltage is regulated by three gas filled OA2 voltage regulator tubes before being applied to the voltage divider networks and bias adjust resistors in the IPA and PA tube circuits.

When PTT relay K303 is de-activated the PA tube V900 is cut-off. When relay K303 is energized a ground is applied to the bias circuit of V900 and it is able to operate.

The filament supply provides 12vdc to each IPA tube. The circuit is protected by a 4 amp fuse.

The 28vdc interlock and overload supply circuit provides 28vdc to interlock switches and relays.

The 28vdc internal supply circuit is protected by 2 amp fuse F309; the 24vdc has an additional 1 1/2 amp fuse F304 for protection.

4-6. 10KW PA and ANTENNA TUNING UNIT (Refer to figure 7-1).

GENERAL. The 10-kw Power Amplifier tube V900 (a 4CX35000 tetrode) is operated class AB1 and amplifies the output of the two stage intermediate power amplifier. The output of V900 is 10,000 watts average power. The antenna tuning unit in the output circuit is designed for unbalanced operation.

a. CIRCUIT ANALYSIS. The r-f output of the third IPA is 160 volts applied to the grid of PA tube V900. Filament power at 10 volts, 300 amperes is supplied to the directly heated cathode of V900 from filament transformer T801. The center tap from T801 goes to PA PLATE CURRENT meter M902. By-passing the r-f signal to ground through capacitors C805, C811, C810, and C808 places the cathode of V900 at r-f ground potential.

The -320 volt level of grid bias is controlled by final bias adjust potentiometer R311. The resistor can be adjusted from the front panel of the IPA Drawer.

The PA screen voltage is tapped off of High Voltage Power Supply Transformer T800 and is highly regulated by a series of six zener diodes and seven resistors. Meter M901 placed in the screen circuit monitors the PA SCREEN current.

The amplified signal from the plate of V900 passes through the output tuning network

consisting of tuning capacitors C915, C916, C917 and inductor L901. This network is designed to match the impedance of a 50 OHM UNBALANCED load to the impedance of the PA tube plate for maximum transfer of power.

The HARMONIC SUPPRESSION FILTER in the PA output circuit is designed to suppress all harmonics of the fundamental frequency range of the transmitter (400kc - 515kc) thus meeting and exceeding FCC requirements.

The DIRECTIONAL COUPLER DC900 directs the r-f output signal to the antenna as well as directing the reflected power to the SWR overload circuitry, and the forward power to forward power meter M903. DC900 provides the means of measuring the output power on the Forward Power Meter of the transmitter, and the SWR of the transmission line on the Reflected Power Meter, M904. Forward Power from DC900 is rectified by diode CR900 and applied to M903. Reflected power from DC900 is rectified by diode CR901 and applied to SWR protective circuit or rectified power meter M904 depending on the position of switch S301. When switch S301 is in the meter position, input to the protective circuit is opened and meter M904 reads the SWR. When S-301 is placed in the monitor position the input to the protective circuit is closed.

4-7. HIGH VOLTAGE POWER SUPPLY (refer to figure 7-1).

The High Voltage Power Supply provides the required plate voltage for the 10-kw power amplifier. The three phase primary ac input is connected to delta wye transformer T800. The transformer builds up the 208vac input to 4500 volts on each leg before it is applied to the full wave bridge circuit using a total of six rectifier cells. In this arrangement, two half wave rectifiers are connected in series across each leg of the high voltage transformer, and has an extremely small percentage of ripple and a very low ratio of peak to average voltage.

The 10,000vdc output of the three phase full wave bridge rectifier is applied to a choke input type filter consisting of inductor L800 and capacitor C800; before being applied to the plate of power amplifier tube V900 it again passes through a series of filter components.

The high voltage level is measured by PA PLATE VOLTAGE meter M900.

4-8. THREE PHASE PRIMARY VOLTAGE CIRCUITS (refer to figure 4-2).

Three phase primary power enters the transmitter through the access hole in the bottom of the high voltage power supply compartment.

There is 208vac per leg, two legs 02 and 03 are tapped off the AC power to exciter unit SPE-1[redacted]. When main power circuit breaker CB800 is closed main power indicator DS900 located on the front panel of the transmitter will light. At this time PA tube blower B800 in the high voltage power supply compartment and B900 in the PA compartment are energized, providing forced air cooling. The air pressure from B800 also forces the air vane of switch S801 to close, and allows phase 1 to flow to the driver drawer. High voltage contactor K800 and high voltage transformer T800 remains de-energized along with shorting relay K801.

Phase 1 and 2 is applied to blower motor B301 in the IPA compartment. The forced air from B301 then closes air vane S305 whcih allows phase 1 to flow to the coil of relay K305 activating the relay and enabling phase 1 and 2 to pass to transformer T301. With 3 phase power applied to the delta portion of T301, the Bias, Filament and Interlock Supplies are energized.

Phase 1 and 2 also energize Final Filament on relay K308 and Final Filament Interlock relay K302. With K308 in an energized state phase 3 is able to pass through its contacts and go to one side of the Timer M302; phase 1 is applied to the other side of the timer energizing it.

Phase 3 is also applied to one side of Filament Transformer T801.

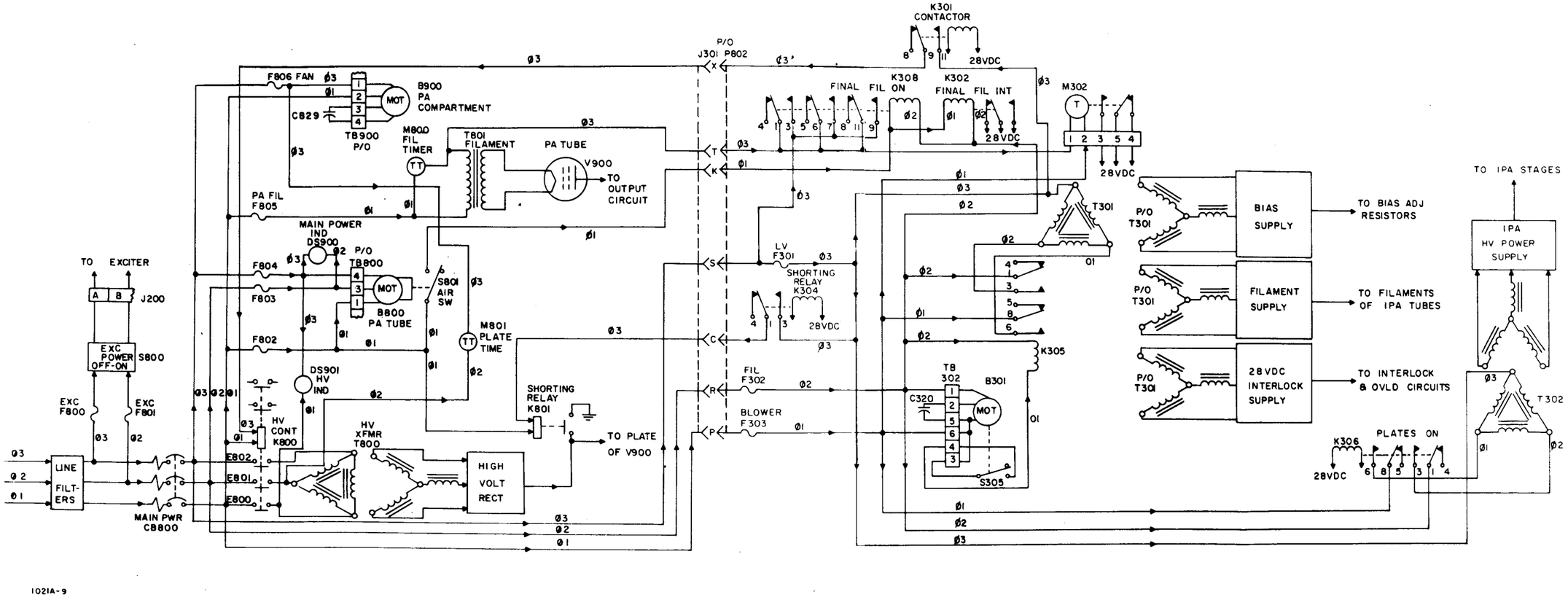

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Figure 4-2. Simplified Schematic of AC Power Distribution

When plates On Relay K306 is energized by 28vdc, phase 1 and 2 are able to pass through its contacts and flow to High Voltage Transformer T302. Phase 3 is applied directly to Transformer T302.

When High Voltage Contactor K301 is energized by 28vdc, plates ON relay becomes energized and phase 3 is allowed to flow back to one side of the coil of High Voltage Contactor K800; phase 1 is applied to the other side and the contactor becomes energized. With the application of primary power to the High Voltage Power Supply, High Voltage Indicator DS901 located on the front panel lights and three phase power is able to flow to High Voltage Transformer T800 enabling the High Voltage rectifier to function.

4-9. OVERLOAD CIRCUITS (refer to figure 7-3).

The MCT-10K Transmitter is protected by eight solid state overload circuits. They are the power amplifier plate, bias, and screen, the IPA driver, IPA "A", and "B" and IPA voltage overload, and SWR overload circuits. The circuits are designed to shut off the Power Amplifier and Intermediate Power Amplifier High Voltage Power supplies should an overload condition exist in any of the prenamed areas.

All overload control circuits ultimately trigger overload relay 2K301. They are isolated by Diodes 2CR301, 2CR302, 2CR303, 3CR304, 2CR305, 2CR306, 2CR307, and 2CR308 which prevent the signal from an activated overload circuit from interacting with the other integrated overload circuits. With the contacts of relay 2K301 in the energized state, the 28vdc supply circuit to High Voltage contactor K301 is cut off deactivating it; this in turn de-energizes Plates On relay K306 that controls the IPA High Voltage Power Supply transformer T301. The 28vdc supply voltage to shorting relay K304 is also cut off when overload relay 2K301 is energized. The phase 3 power to shorting relay K801 is cut off and shorts out the the High Voltage Power Supply.

a. PA BIAS OVERLOAD - The PA Bias Overload adjust resistor 2R302 is connected to the PA Bias supply circuit of PA tube V900. The PA Bias voltage is from -320 to

-500vdc. Under normal conditions the value of resistor 2R304 is set by PA Bias overload resistor 2R302 for a 0- negative voltage. The 24 volt supply passes through 2R302, 2R303, and 2R304 to ground.

When an overload occurs by a positive going voltage, .5to.7 volts is developed across the divider circuit causing SCRQ1 to trigger. With Q1 conducting, front panel overload lamp 2I301 lights and transistor Q12 goes into conduction, activating overload relay 2K301.

b. PA PLATE OVERLOAD - The PA plate overload adjust resistor 2R308 set at a pre-determined level is connected to the cathode circuit of the PA tube to measure the plate current. If an excessive plate current should exist, the level of the plate overload adjust potentiometer is affected and produces a positive voltage high enough to exceed the forward breaker voltage of SCR Q2. When Q2 conducts, a plate overload condition is indicated by the front panel indicator lamp 2I302 and transistor Q12 conducts, activating overload relay 2K301, which opens the 28vdc supply line causing the High Voltage to be removed from the transmitter.

c. SCREEN OVERLOAD - The PA Screen overload adjust 2R312 is connected to the screen circuit of PA tube V900. During normal operation transistor Q4 conducts, creating a small voltage drop from collector to emitter. When the screen current rises excessively the voltage drop across overload adjust potentiometer 2R312 decreases. The base of Q4 sees this as a negative change and conducts less. At this point the collector to emitter voltage increases sufficiently to trigger SCR Q3. Front panel indicator lamp for screen overload lights this time and transistor Q12 is activated causing overload relay 2K301 to energize and remove High Voltage from transmitter.

d. DRIVER, IPA "A", IPA "B" OVERLOAD CIRCUITS - Since all three overload circuits operate the same they will be discussed together. The Driver, IPA "A", and IPA "B" overload adjust resistors 2R315, 2R318, 2R321, set at a pre-determined level are connected to the cathode circuit of the first IPA amplifier stage, the 2nd IPA "A" and 2nd IPA "B" stages to measure the plate current. If an excessive plate

current should exist the level of the associated overload adjust potentiometer is affected, and produces a positive voltage high enough to exceed the forward breaker voltage of the SCR in the effected circuit either Q5, Q6 or Q7. When any one of the SCR's go into conduction, an overload condition is indicated by the front panel lamp either 2I304, 2I305, or 2I306, depending upon which stage of the IPA caused the overload. When the related SCR is conducting, transistor Q12 conducts energizing overload relay 2K301 which opens the 28vdc supply line, removing the high voltage from the transmitter.

e. IPA VOLTAGE OVERLOAD CIRCUIT - The IPA voltage overload adjust resistor 2R324 is connected to the voltage divider network which develops screen voltage for the IPA stages. During normal operation transistor Q9 conducts creating a small voltage drop from collector to emitter. When the screen current rises excessively the voltage drop across overload adjust potentiometer 2R324 decreases. The base of Q9 sees this as a negative change and conducts less. At this point the collector to emitter voltage increases sufficiently to trigger Q8. Front panel indicator 21307, the IPA overload indicator, lights at this time and transistor Q12 is activated, causing overload relay 2K307 to energize and remove High Voltage from the transmitter.

f. SWR OVERLOAD - Transistor Q11 is connected in the SWR circuit to SWR relay K307. When the transmitter is operating normally Q11 is non-conducting and the 24vdc passes to ground. When an SWR greater than 3:1 is felt, SWR relay K307 energizes, and a +6 volts is applied to the base of transistor Q11 causing it to conduct and trigger SCR Q10, which lights front panel overload indicator 2I308 and also energizes transistor Q12 which energizes overload relay 2K301 removing High Voltage from the transmitter.

4-10. OVERLOAD RESET AND ALARM CIRCUIT (refer to figure 7-4).

In the event of an overload, High Voltage contactor K301 de-energizes and removes high voltage from the transmitter. If desired, an audible alarm will go off by having

the alarm switch S302 in the closed position and allowing the 24vdc to complete the alarm circuit to ground through the contacts of the de-energized High Voltage Contactor.

The regulated 24vdc also flows through the overload reset switch S201, through the associated circuitry to the contacts of overload Delay relay K309. As described in the interlock circuit description, relay K309 delays the 24vdc from reaching the overload circuits for just an instant until after the high voltage is applied to the transmitter. Relay K309 then energizes and the overload circuits receive the regulated 24vdc supply voltage.

When an overload occurs, overload relay 2K301 will energize. To reset overload relay, depress overload reset button; this opens the 24vdc line to the coil of the overload relay and returns it to its normal deenergized position.

4-11. 28VDC AND INTERLOCK CIRCUITRY.

The MCT-10K Transmitter has a network of interlock switches and protective devices through out the unit to protect the operating and maintenance personnel as well as the equipment. The circuit is comprised of switches, relays and a timer designed to disable high voltage in the event an interlock is open. There is a total of 12 interlock switches. In order to locate an open or faulty interlock, switch S202 is provided on the front panel of the exciter drawer. Turning the switch through each of nine positions and observing when indicator lamp DS200 lights will indicate the interlock circuit is functioning properly. In the event indicator lamp DS200 does not light, the position that switch S202 is then at will be the area of an open or faulty interlock.

The 28vdc interlock and overload circuitry is actuated by the application of 3Ø phase power to PA Tube Blower B800. Blower B800 applies air pressure to close the air vane on switch S801. Filament on relay K308 and Final Filament Interlock relay K302 in series with switch S801 are then energized by phase 1 and 2.

The delta wye configured 28vdc interlock supply transformer T301 is also energized by 3 phase primary power and the 28vdc interlock supply is able to function.

a. SERIES INTERLOCK CIRCUIT (Refer to figure 4-3).

When all interlock switches are closed the 28vdc supply voltage will take the following path. It will first pass through the closed contacts of Final Filament Interlock Relay K302. It then takes two paths, one path to contact 1 of switch S202, and another path through switch S304, to contact 2 of switch S202 and also through switch S200 to contact 3 of interlock switch S202. The 28vdc Interlock Voltage then goes out terminal b of jack J200 passing through the PA rear and PS rear interlock switches, through the External interlocks which are in parallel and passing to the Fuse and Window panel interlocks to the closed contacts of Timer M302. The 28vdc then takes two paths: one path will go through the coil of shorting relay K304, energizing it. The second path is through terminal h of Jack 301 to remote high voltage on-off switches which are in parallel, and then passes through PA Load and PA Band switch interlocks. It then continues through terminal 6 of TB900, going through Heat Overload switch S904. The 28vdc then flows out terminal 8 of TB900 to pin j of jack J301. After passing through jack J301 it takes two paths; one path goes to the coil of Overload Delay Relay K309, and its delay circuit capacitor C315 and Resistor R318. (After a momentary delay, K309 enables the 24 vdc supply voltage to flow to overload circuit board). The other path goes through pin 18 of jack J302, through the closed contacts of Overload Relay 2K301 in the de-energized condition, passing out terminal y of jack J203 to the coil of High Voltage Contactor K301. When High Voltage circuit breaker CB200 is placed in the on position a ground is applied to the coil of the HV Contactor energizing it. When H.V. Contactor K301 is energized a ground is applied to the coil of Plates on Relay K306 energizing it.

Diode CR301 and CR302 prevent the series interlock circuit from feeding back to the shorting relay K304, when the H.V. Circuit Breaker CB200 is in an open position.

1. When the 28vdc is supplied to the interlock circuitry the interlock circuits can be monitored by switch S202.

2. By placing switch S202 in PA air switch position, switch S801 can be monitored. Since filament on relay is in series with PA switch S801 the activation of filament on relay indicates that S801 is closed. When final filament interlock relay K302 is energized it allows 28vdc to flow through switch S202 to indicator lamp DS200.

3. By placing switch S202 in the IPA drawer position the interlock switch 304 can be monitored. If interlock switch 304 is in the normally open position it allows 28 vdc to light the indicator lamp DS200. If the interlock switch S304 is in the normally closed position the HV Circuit Breaker CB200 will open and shut off the High Voltage.

4. By placing switch S202 to the exciter drawer position, switch S200 can be monitored. Indicator DS200 will light if S200 is in the normally open position. If the switch is in the normally closed position the interlock supply voltage will flow through HV circuit breaker CB200, opening up the switch and shutting off high voltage.

5. By placing switch S202 in rear panels position, PA rear switches can be monitored. If the switches are in the normally open position they allow 28vdc to flow to indicator lamp DS200. In the normally closed position the switches will allow the 28vdc to open H.V. Circuit Breaker CB200, and shut off the high voltage.

6. By placing switch S202 in the external position the external interlocks can be monitored.

7. By placing switch S202 in front panel position the fuse and window panel switches can be monitored. If the switches are in the normally open position indicator lamp DS200 will light. If the switches are in the normally closed position, the High Voltage Circuit Breaker CB200 will open and shut off the high voltage.

WARNING

To monitor the following positions, Bandswitch, Heat Overload, and Timer the following sequence must be adhered to or switch S202 will give a misleading

indication and could cause needless maintenance.

The positions should be monitored Timer, Bandswitch, and Heat Overload.

8. In the PA Bandswitch position the interlock supply voltage passes through the Timer contacts and the High Voltage on-off positions before being applied to PA Band and PA Load switches. The PA Band and PA Load switches are then in the normally closed position and will light indicator DS200. If they should be in the normally open position the transmitter High Voltage Contactor will be deenergized and shut off the high voltage.

9. In the Heat Overload position the indicator lamp DS200 will light as long as the Heat Overload switch is in the normally closed position. If the switch is tripped to the normally open position by excessive heat, the High Voltage circuit CB200 will open and shut off the high voltage.

4-12. LOCAL OPERATION.

It is assumed in this section that the trouble symptoms listed are produced by malfunctions rather than by improper operating procedures. Thus, if an overload lamp lights, it is assumed that the operator cannot clear the trouble by normal operating procedures such as reducing the drive, and returning. Also, the results of defective front-panel indicator lamps and meters and the remedial measures concerned are obvious and are not covered in this section.

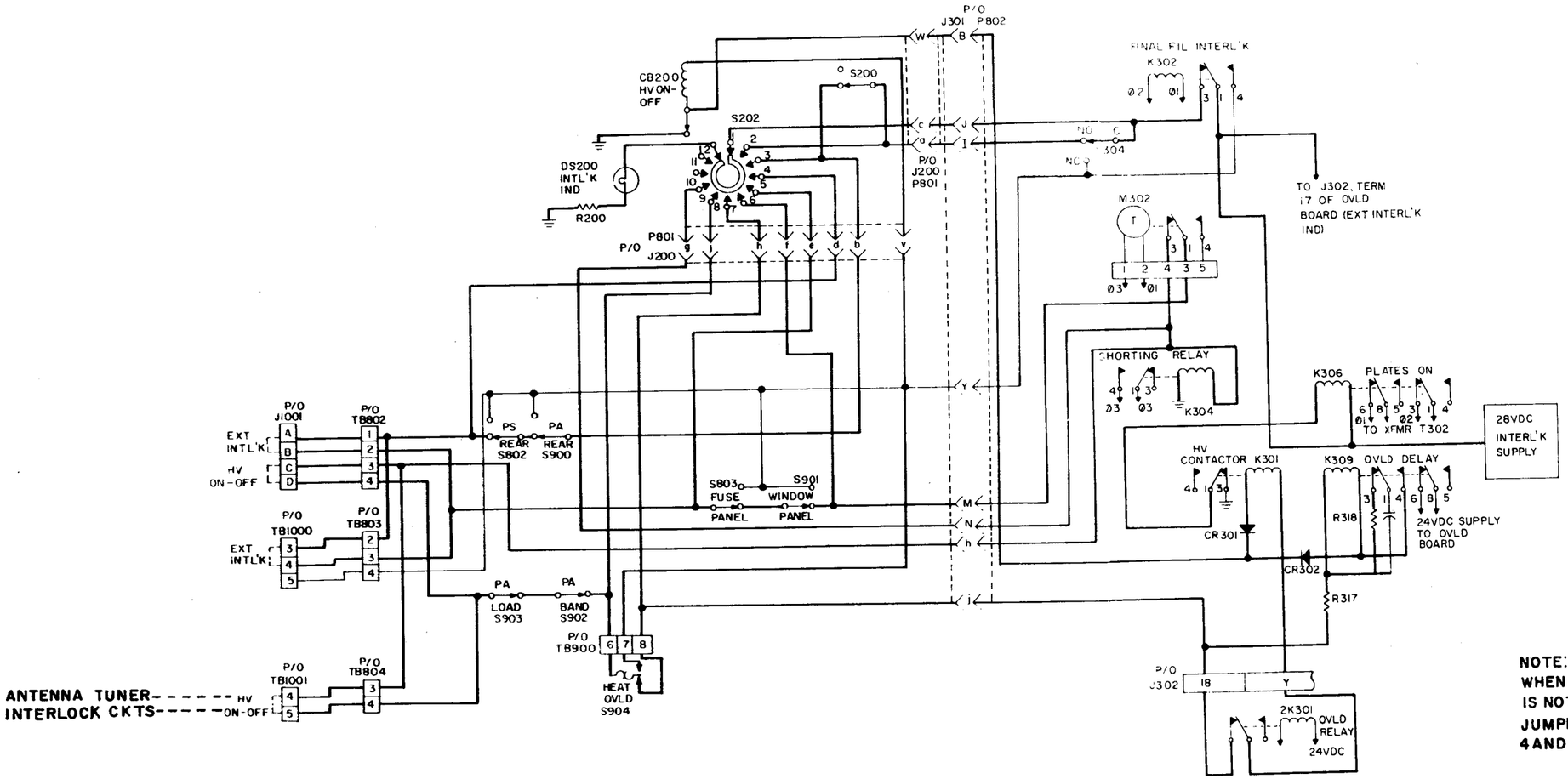

Figure 4-3. Simplified Schematic of Interlock Circuits

Appendix A

Section 3 - Maintenance

SECTION 5

MAINTENANCE

3-1. GENERAL.

Maintenance is divided into three categories: operator's maintenance, preventive maintenance, and corrective maintenance. The operator's maintenance, performed by the operator as he works with the equipment, is confined to visual inspection, cleaning, and fuse replacement.

This section also contains detailed troubleshooting techniques and reference data that should be used to quickly locate malfunctions in the transmitter. A preliminary inspection procedure, table 3-1 is included as a visual aid to determine obvious conditions which may have caused equipment breakdown. This is followed by an equipment performance check, table 3-2. The combined data of tables will permit sectionalization of troubles to specific drawers in the transmitter and in many instances, to specific stages and parts.

NOTE

It is assumed in this section that the trouble symptoms listed are produced by malfunctions rather than by improper operating procedures. Thus, if an overload lamp lights, it is assumed that the operator cannot clear the trouble by normal operating procedures such as reducing the drive and retuning. Also, the results of defective front-panel indicator lamps and meters, and the remedial measures concerned are obvious and are not covered in this section.

3-2. PREVENTIVE MAINTENANCE.

Preventive maintenance is maintenance that detects and corrects trouble-producing conditions before they become serious enough to affect equipment operation. Common causes of trouble are dirt and grime, contact erosion, improper contact pressure, lack of proper lubrication, improper relay adjust-

ment, dirty air filters, overheating unstable power supplies, vacuum tubes with poor emission, and loose parts (due to vibration). Recommended schedules for preventive maintenance are presented below.

a. ONCE EACH SHIFT DURING AN "ON THE AIR" PERIOD. - Check the operator's performance record for irregularities and possible sources of future trouble. Make minor adjustments of tuning controls to verify proper tuning. Observe all electrical quantities measurable with built-in meters and compare observations with established standards. Observe indicator lights for abnormal color and signs of internal flashing.

b. DAILY DURING AN "OFF THE AIR" PERIOD. - Visually and manually inspect all parts in the transmitter for overheating and damage. Inspect all sliding or moving coil contacts. Feel blower and fan motors for overheating and observe rotating parts for wear. Note deposits of dust and dirt. Inspect condition of relay contacts. Check operation of all door interlocks.

c. MONTHLY DURING "OFF THE AIR" PERIOD. - Recondition rotary and switch contacts as necessary. Use crocus cloth and trichlorethylene or ethylendichloride for cleaning. Inspect and clean the transmitter. Check the condition of air filters. Replace or clean dirty filters. Inspect the equipment for loose solder connections or screws, especially in those areas in which appreciable vibration occurs. Gear trains showing signs of becoming dry should be lubricated with a drop or two of any high quality, light machine lubricant. Check the condition of all tubes.

3-3. EQUIPMENT PERFORMANCE CHECK.

Table 3-2 is a procedure that systematically checks equipment performance in terms of operating procedures. Perform each step in the order given.

N O T E

Numbers in parentheses identify locations of operating controls and indicators. Refer to the operator's section for front panel location diagrams. Normal, proper, or correct meter indications are those given in the BCT-10K tuning chart.

TABLE 3-1. PRELIMINARY INSPECTION PROCEDURE

WHAT TO INSPECT	DEFECTS TO LOOK FOR	REMEDY
All electrical connections at rear of main and auxiliary frames.	Open connections, dirt, frayed cables.	Tighten, replace or clean as necessary.
Antenna connections at side of main frame.	Loose connections, dirt, frayed cables.	Tighten, replace or clean as necessary.
Knobs, screws, connectors.	Loose or missing hardware.	Tighten or replace.
Wiring	Loose or frayed wires.	Resolder or rewire.
Resistors	Cracks, chipping, blistering, discoloration, and other signs of overheating.	Replace as necessary.
Capacitors	Leaks, bulges, discoloration.	Replace as necessary.
Tubes	Poor seating.	Secure firmly in place.
Meters	Bent needle, cracked case, broken glass.	Replace as necessary.

TABLE 3-2. EQUIPMENT PERFORMANCE CHECK (LOCAL OPERATION)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF ABNORMAL INDICATION
1	Connect antenna or dummy load to transmitter, and check that all doors, covers and components are secured.		

TABLE 3-2 EQUIPMENT PERFORMANCE CHECK (CONT)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF ABNORMAL INDICATION
2	1. H.V. circuit (11) to OFF. 2. Power 3. ALARM switch (41) to OFF.	Power lamp on Exciter should light. Frequency Selection lamp should light on exciter, decoder and remote unit. Emission Indicator should light in either MCW or CW.	
3	Set MAIN POWER circuit breaker (62) to ON.	MAIN POWER lamp (7) lights. PA Tube blower B800 operates. PA compartment B900 operates. FILAMENT TIME meter (69) operates. IPA BLOWER operates	Open line fuses to BLOWERS and main power lamp. Blower motors defective. Filament on relay K302 or Air switch S801 defective.
	NOTE Turn RF OUTPUT on exciter control fully counter clockwise before performing next steps of operation.		
4	Turn Interlock monitor switch (14) through each position.	Interlock Indicator lamp(13) lights.	Open Interlock switch.

TABLE 3-2. EQUIPMENT PERFORMANCE CHECK (CONT)

5	Set High Voltage Circuit Breaker (11) ON. With the freqeuncy level controls preset as per para. 3-3.	High Voltage lamp (9) lights PA PLATE TIME meter (79) operates. PA H.V. Power Supply is energized. 1PA H.V. Power Supply is energized. PA PLATE volt meter should read approx. 10 KV vdc.	Overload condition switch Defective shorting relay K304. Defective H.V. contactor K800. Defective shorting relay K801. Defective Plates On relay K306.
6	Increase OUTPUT control (16) until 3 amperes is indicated on PLATE Current Meter (3).	PA PLATE current meter (3) should have 3 amperes indication.	Defective PA PLATE current meter Low PA plate voltage. PA bias not functioning properly or not set properly. Excessive screen current.
7	Turn TUNE control indicated by the numbered and colored lamp corresponding to the desired output freq. (8) until forward power meter indicates resonance.	Resonance Indication by forward power meter.	Defect in power amplifier V900. Defect in Tuning central-wrong tuning control selected for tuning.
8	Increase RF OUTPUT. (16) to desired output level reading on forward power meter (4).	Forward Power meter (4) should read output level desired.	Improper tuning or loading; or defect in P.A. circuit. Defective Direct-Coupler DC900. Improper Antenna.
9	Throw REFLECTED power switch (40) to REFLECTED power position.	REFLECTED POWER meter should not exceed a 3:1 VSWR.	Defective Transmission line.

3-3A. Remote same except for: Exciter freqeuncy switch must be in Remote. In remote Emission Switch, frequency indicator are by-passed.

3-4. PROCEDURE FOR REPLACEMENT OF PA TUBE

WARNING

Extremely high voltages are present in the transmitter. Before replacing PA TUBE make sure the HIGH VOLTAGE and MAIN POWER circuit breakers are set at OFF. Use the shorting rod provided to discharge all capacitors to ground.

1) Remove rear skin of transmitter.

2) Remove one-half of PA TUBE AIR DUCT by unfastening dzus fasteners and screws.

3) Remove metal band around PA tube by unfastening take-up screw, and sliding off band from tube.

4) Turn WING nut in a clockwise direction to raise tube in its holder.

5) The PA tube weighs approximately 60 pounds; lift tube from its holder being careful not to injure personnel or other components on removal.

6) Carefully replace new tube in holder.

7) Slowly turn knurled head on bottom of tube holder until tube seats correctly.

8) Turn WING nut in a counter-clockwise direction and lower tube into socket.

9) Replace other parts in the reverse order from when they were removed.

3-5. FRONT PANEL REMOVAL OF PA TUBE

The following procedure is presented to facilitate replacement of the power Amplifier tube when it is only accessible by removal of the front panel of the transmitter, for example in a van, an airplane or any area where lack of space limits removal of sides or rear skins.

To replace PA tube proceed as follows:

WARNING

Extremely high voltages are present in the transmitter. Before replacing PA tube make sure the HIGH VOLTAGE and MAIN POWER circuit breakers are set at OFF. Use the shorting rod provided to discharge all capacitors to ground.

1) Remove EXCITER DRAWER (1) from transmitter.

2) Remove DRIVER DRAWER (2) from transmitter.

3) Remove WINDOW PANEL (3) from transmitter.

4) Remove SCREWS and washers (8) holding copper strap to standoff.

5) Remove metal band (9) around PA tube by unfastening take up screw, and sliding off band from tube.

6) Remove one half of PA Tube AIR DUCT (10) by unfastening dzus fasteners and screws.

7) Remover rear SHIELD (11) of EXCITER DRAWER compartment by unfastening screws holding SHIELD.

8) Turn WING NUT (12) in clockwise direction to raise tube in holder.

9) The PA Tube (13) weighs approximately 60 pounds; lift tube from its holder being careful not to injure personnel, or other components on removal.

10) Carefully place new tube in holder.

11) Slowly turn knurled head (14) on bottom of tube holder until tube seats correctly.

12) Turn WING nut (12) in a counter-clockwise direction and lower tube into socket.

13) Replace other parts in the reverse order from when they were removed.

3-6. REPLACING BEARING ON PA FAN MOTOR B900 (See figure 3-6).

1) Loosen two setscrews (91-12-1) on fan hub and slide fan (68-25-7) from shaft.

2) Remove four bolts (9-10-17), four washers (92-5), and four nuts (94-2-1) from motor housing.

3) Remove front end cap (3102B101) and rotor assembly (4102B153-1) from motor housing.

4) Remove front end cap (3102B101) from rotor assembly (4102B153-1).

NOTE

If any shim washers should adhere to front bearing, be sure to put them back into end cap. All shim washers and loading springs (83-10) must be positioned in their original order for reassembly.

5) Press off bearings from shaft (one at a time) by supporting bearing and applying pressure to center of shaft. Take care not to damage shaft. Discard old bearings.

6) Press new bearing (47-3-31) on shaft by applying pressure to inner race only. DO NOTE APPLY PRESSURE TO OUTER RACE OF BEARING.

7) Replace rotor assembly (4102B153-1) in front end cap (3102B101), then place rotor assembly with front end cap in motor housing. Secure front end cap to motor housing using four screws (91-10-17), four washers (92-5), and four nuts (94-2-1).

8) Slide fan (68-25-7) on shaft. The two set-screws (91-12-1) should line up with flats on shaft to prevent raising a burr which would interfere with future disassembly. Tighten setscrews and stake with Glyptol.

3-7. REPLACING BEARING ON MAIN BLOWER MOTOR B800 (See figure 3-7).

1) Remove six screws (91-18-18) and six washers (92-8), then remove inlet ring (67-729-IN-2).

2) Loosen two setscrews (91-91-1) on blower wheel (68-3-45) and slide off shaft.

3) Remove four screws (91-82-2) and four washers (92-26) holding blower housing (67-729-1CC-1) to motor with air retainer (64-30-7).

4) Remove air retainer (64-30-7) from front end cap and remove four nuts (94-1), four washers (92-3), and four screws (69-60-1).

5) Remove front end cap (3645B7-1).

6) Remove rotor assembly (414B5-1) from motor.

NOTE

If any shim washers should adhere to rear bearing, be sure to put them back into rear bearing bore of the end cap. All shim washers and loading springs (83-48) must be positioned in their original order when reassembling motor.

7) Press off old bearings from shaft (one at a time), by supporting bearings and applying pressure to centers in shaft end. Take care not to damage shaft. Discard old bearings.

8) Press new bearing (47-41-1) on shaft by applying pressure to inner race only, keeping bearing square with shaft. DO NOT APPLY PRESSURE TO OUTER RACE OF BEARINGS.

9) Replace rotor assembly (4145B6-1) in motor housing. Replace front end cap (3645B7-1) and secure in place with four washers (92-3), four nuts (94-1), and four screws (69-60-1).

10) Replace air retainer (64-30-7) to front end cap and attach motor to blower housing (67-729-1CC-1) with four screws (91-83-2) and four washers (92-26).

11) Slide blower wheel (68-3-45) on shaft. The two setscrews (91-91-1) should line up with flats on shaft to prevent raising burr on shaft which would interfere with future dissambly. Tighten setscrews.

12) Attach inlet ring (67-720-IN-2) to blower using four screws (91-18-18) and six washers (92-8).

3-8. IPA DRAWER BLOWER (B301)

The bearings in blower B301 are non-replacable items. Only the motor, or blower housing may be replaced. See parts list for numbers.

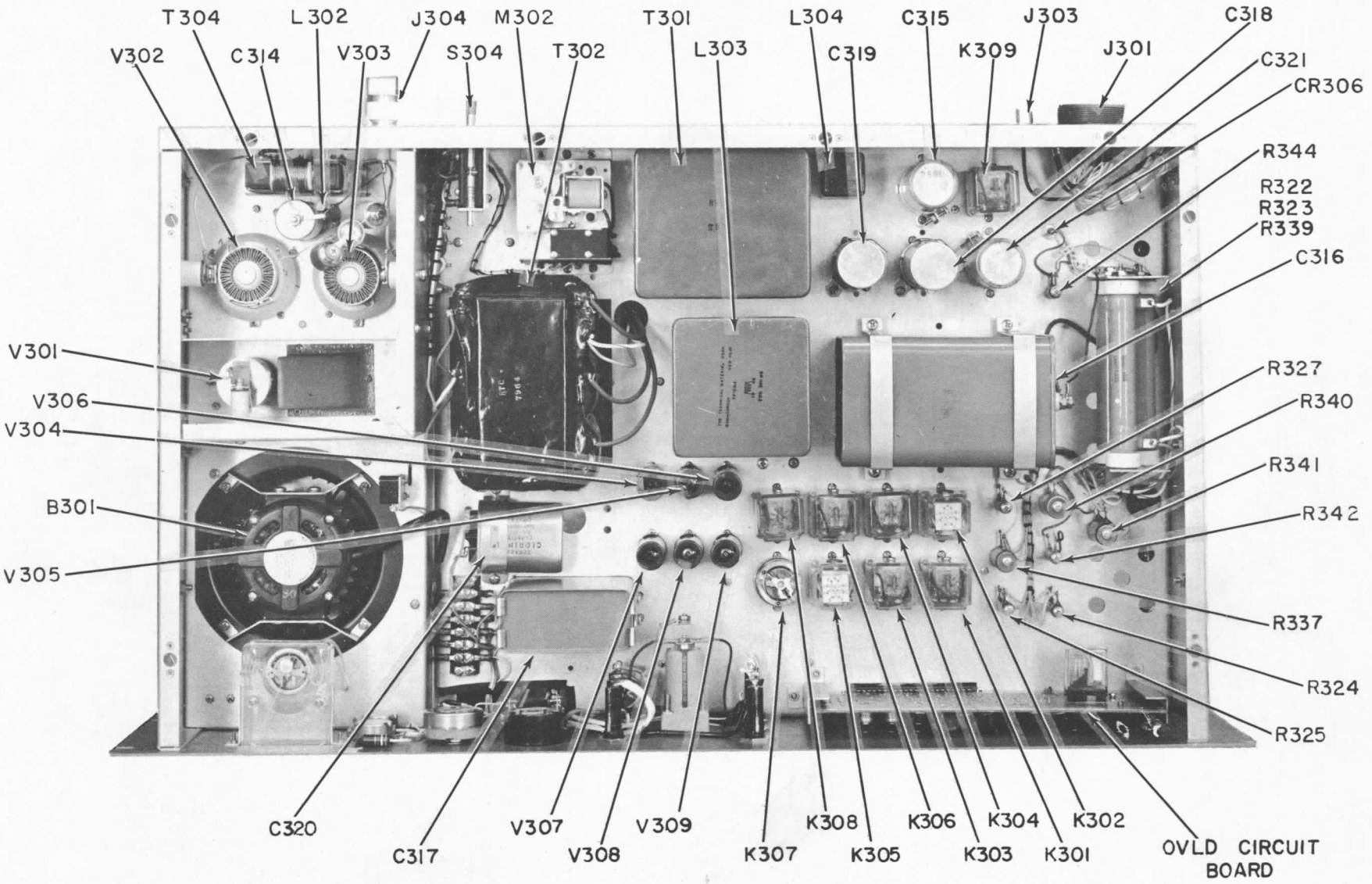

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Figure 5-6. Top View of Driver Drawer

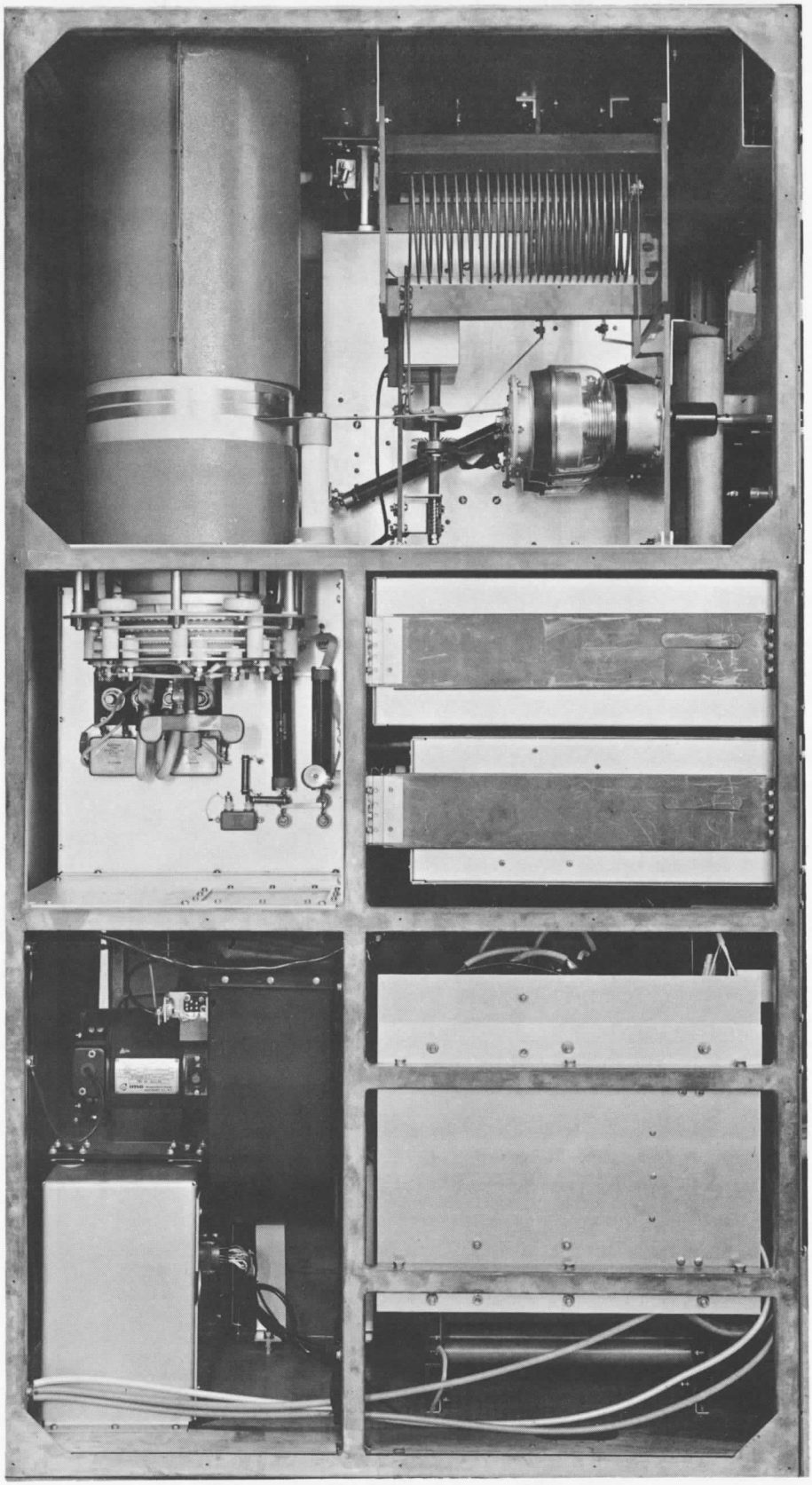
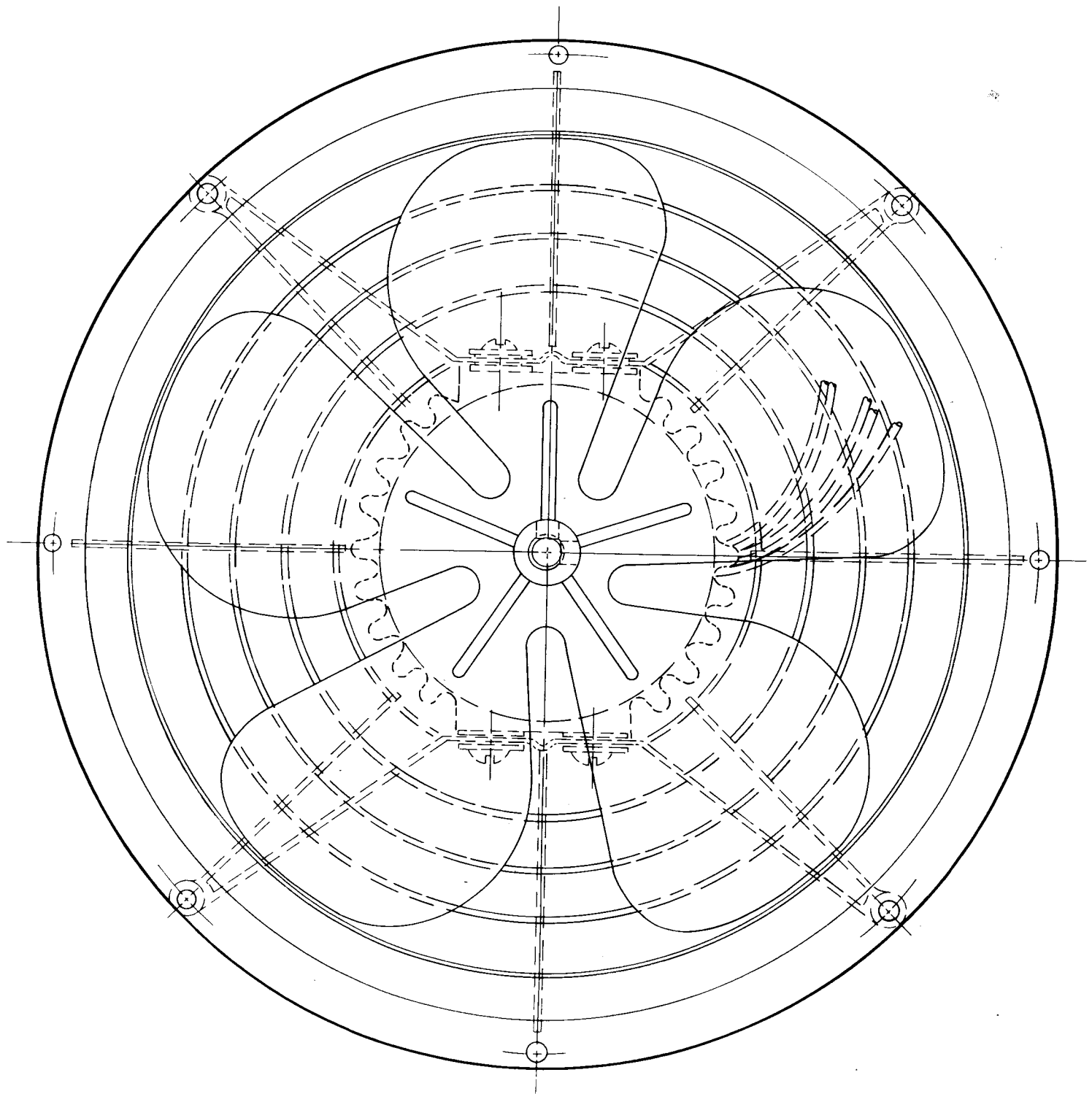


Figure 3-5. Broadcast Transmitter, Overall
Left Side View



1021A-19

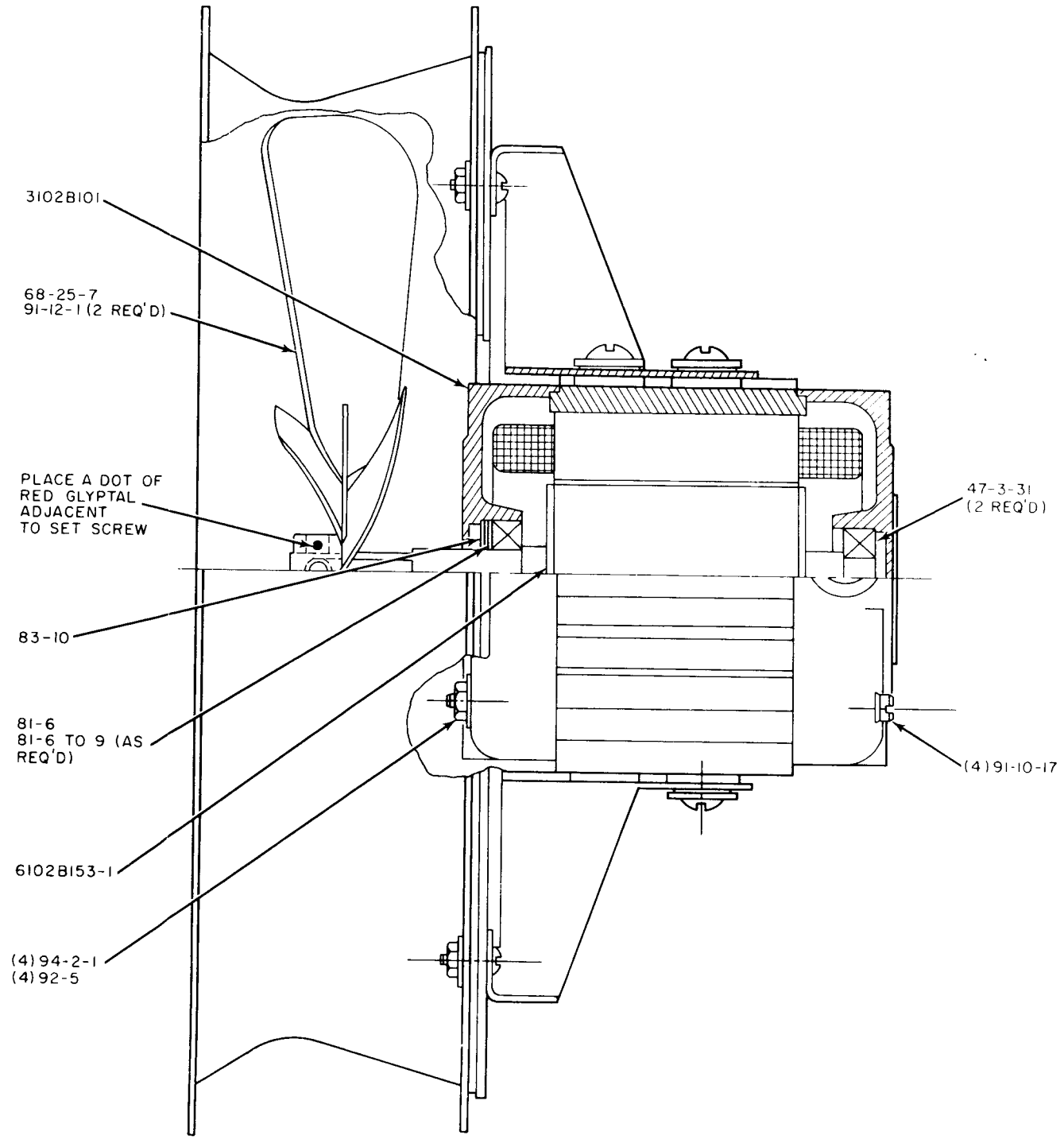


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Figure 5-9. PA Fan Motor

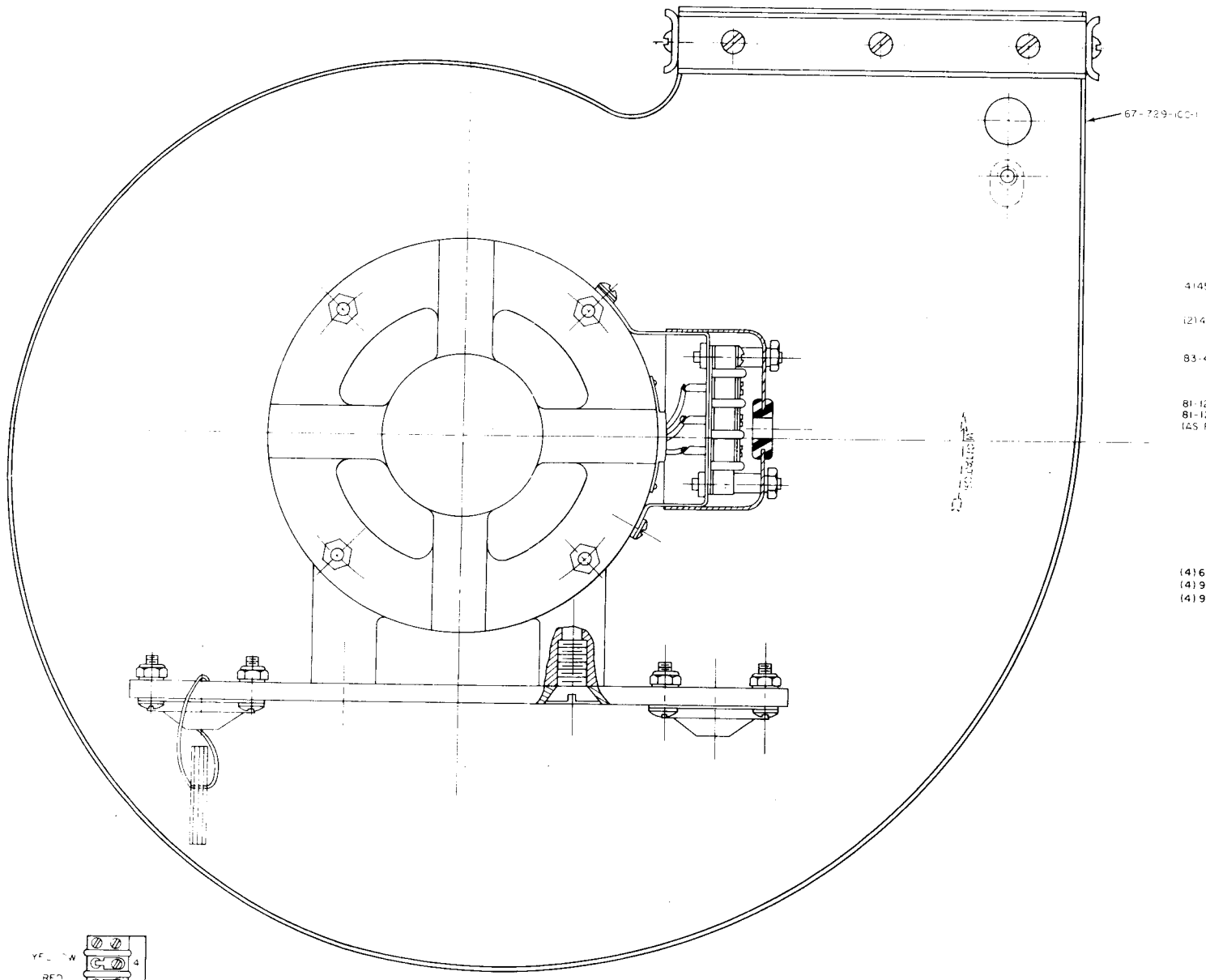

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Figure 5-7. Power Supply Blower

5-16
5-19/5-20

SECTION 6

PARTS LIST

6-1. INTRODUCTION

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on a schematic diagram are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

a. Reference symbol.

b. Description as indicated in parts list.

c. TMC part number.

d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

ASSEMBLY OR SUB-ASSEMBLY — PAGE

ASSEMBLY OR SUB-ASSEMBLY (CONT) PAGE

BMA 212

TUBE COMPARTMENT

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C802	CAPACITOR, FIXED, Film Dielectric 0.1 uf, ±20%, 2KVDC	CP117-2
C803	CAPACITOR, FIXED: CERAMIC 1000 uuf, +20%, 5000 WVDC	CC109-38
C804	Capacitor, FIXED, CERAMIC, 6800 uuf, +40-20%, 3500 WVDC	CC115-2-6800
C805	Same as C804	
C806	Same as C804	
C807	Same as C804	
C808	CAPACITOR, FIXED: .01 uf, ±10%, 300 WVDC	CM35F103F03
C809	Same as C808	
C810	CAPACITOR, FIXED, PAPER, 15 mfd, ±10%, 50 WVDC	CP116
C811	Same as C810	
C812	Same as C803	
C813	Same as C803	
C814	Same as C803	
C815	Same as C803	
C816	Same as C802	
C817	CAPACITOR, FIXED: CERAMIC Feed-Thru 1000 uuf, +20%, 1000 WVDC	CC108-4P1000M
C818	CAPACITOR, FIXED: CERAMIC, 5 uuf, ±10%, 5000 WVDC	CC109-3
C819	Same as C803	
C830	CAPACITOR, FIXED: "TRYLAR", .01 uf, ±10%, 8000 WVDC	CX102J103M
J800	CONNECTOR, COAXIAL: FEMALE CONTACT, BNC type,	UG625/U
L802	COIL, RF: FIXED, 185 uh	CL178
L803	Same as L802	
L804	Same as L802	

TUBE COMPARTMENT

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
L805	Same as L802	
R807	RESISTOR, FIXED: COMPOSITION, 47 ohms, ±5%, 1 watt	RC32GF470J
R808	RESISTOR, FIXED, COMPOSITION, 1500 ohms, ± 10%	RR134-152
R809	Same as R808	
R811	RESISTOR, FIXED, WIREWOUND, 10000 ohms, 20 Watts	RW110-43
R812	Same as R811	
XV900	SOCKET, ELECTRON TUBE	TS188

AX681

POWER SUPPLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
B800	BLOWER/FAN: 220 v, 50/60 Hz, 3 Phase,	BL111-60
C800	CAPACITOR, FIXED, PAPER, 4 uf, ±10%, 10,000 WVDC	CP103
C801	CAPACITOR, FIXED, PAPER, 10 uf, ±10%, 2500 WVDC	CP105
C810	CAPACITOR, FIXED, PAPER, 15 uf, ±10%, 50 WVDC	CP116
C811	Same as C810	
C820	CAPACITOR, FIXED, MICA, 10000 uuf, ±5%, 300 WVDC	CM35B103J03
C821	Same as C820	
C822	CAPACITOR, FIXED, CERAMIC, 10000 uuf, GMV; 500 WVDC	CC100-16
C823	CAPACITOR, FIXED, ELECTROLYTIC, 50 mfd, ±2%	CE63C500G
C824	CAPACITOR, FIXED, CERAMIC	CC109-38
C825	Same as C824	
C826	Same as C824	
C827	CAPACITOR, FIXED, MICA, 5 uuf, ±20%, 500 WVDC	CM15B050M03
C828	CAPACITOR, FIXED, MICA, 2000 uuf, ±2%, 500 WVDC	CM30B202G03
C829	CAPACITOR, FIXED, PAPER, 4.0 uuf, ±10%, 500 WVDC	CP41B1FF405K
C1031	Same as C824	
C1033	Same as C824	
C1035	Same as C824	
CR800A	RECTIFIER, SEMICONDUCTOR DEVICE,	DD128-3
CR800B	Same as CR800A	
CR800C	Same as CR800A	
CR800D	Same as CR800A	
CR800E	Same as CR800A	
CR800F	Same as CR800A	

POWER SUPPLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR801A	SEMICONDUCTOR DEVICE, DIODE (matched set), Tot ±5%	VR100S/8-1600-5
CR801B	Same as CR801A	
CR801C	Same as CR801A	
CR801D	Same as CR801A	
CR801E	Same as CR801A	
CR801F	Same as CR801A	
CR901G	Same as CR801A	
CR801H	Same as CR801A	
E803	INSULATOR, FEED THRU.	NS107
K800	RELAY, CONTACTOR, 3 phase, 220 vac, 60 Hz, 150 amp	RL138
K801	SWITCH, VACUUM SOLENOID, 15 KV PK TEST, 60 Hz switch rating 100 amps.	RL179
L800	FILTER CHOKE: inductance 1.4 hy,	TF280
L801	COIL, DECOUPLING PLATE, 2.5 mHz	CK426-1
L806	COIL, RF, FIXED, 185 uhy	CL178
R800	RESISTOR, FIXED, WIREWOUND, 50000 ohms, 140 watts	RW118F503
R801	Same as R800	
R802	Same as R800	
R803	Same as R800	
R804	RESISTOR, FIXED, WIREWOUND, 1.0 ohms, ±.5%, 14 watts	RW119G1R0
R805	RESISTOR, FIXED, WIREWOUND, 35000 ohms, 140 watts	RW118F353
R806	RESISTOR, FIXED, WIREWOUND, 18000 ohms, 140 watts	RW118F183
R810	RESISTOR, FIXED, WIREWOUND, 1 ohm, 25 watts	RW111-1
R813	RESISTOR, FIXED, COMPOSITION, 47 ohms, ±5%, 1 watt	RC32GF470J
R818	RESISTOR, FIXED, WIREWOUND, 250 ohms, 5 watts	RW107-23

POWER SUPPLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R821	RESISTOR, FIXED, WIREWOUND, 10000 ohms, 20 watts	RW110-43
R822	RESISTOR, FIXED, COMPOSITION, 100 ohms, ±5%, 2 watts	RC42GF101J
R823	Same as R822	
R824	Same as R822	
R825	Same as R822	
R826	Same as R822	
R827	Same as R822	
R828	Same as R822	
R829	RESISTOR, FIXED, COMPOSITION, 220 ohms, ±5%, 2 watts	RC42GF221J
S802	SWITCH, MICRO, SPDT, 15 amp, 125 vac.	SW260
T800	TRANSFORMER, POWER, STEP UP, 208 vac, 60 Hz	TF364
T801	TRANSFORMER, POWER, STEP DOWN, 208 vac, 60 Hz	TF365
TB806	TERMINAL STRIP, BARRIER TYPE, plastic, 2 terminals	TM102-2

PANEL ASSEMBLY METER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C900	CAPACITOR, FIXED: Ceramic; .1 UF +80-20%, 500 WVDC	CC100-32
C903	Same as C900	
C904	Same as C900	
C905	Same as C900	
M900	METER VOLT, DC: 0-20 Kilovolts	MR133
M901	METER, PA Screen Current 0-100 Milliamps, DC	MR116
M902	METER, Volt DC: 0-10 VDC	MR129
M903	METER, 0-100 Micro Amps	MR199
M904	METER, 0-50 Micro Amps,	MR200
R900	RESISTOR, FIXED: Composition 56 ohms ±5%, 2 Watt	RC42GF560J

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
B301	FAN CENTRIFUGAL: 230 V, 50/60 Hz, Single Phase:	BL126
C301	CAPACITOR, FIXED: CERAMIC 100,000 PF ± 80%-20%, 100 WVDC	CC100-28
C302	CAPACITOR, FIXED, CERAMIC 1.1 uf +80-20%, 500 WVDC	CC100-32
C304	CAPACITOR, FIXED, ELECTROLYTIC: 200 mfd, 15 WVDC	CE105-200-15
C305	Same as C302	
C306	CAPACITOR, FIXED, Mica 10,000 PF ±5% 1200 WVDC	CM50B103J03
C307 thru C309	Same as C302	
C310	Same as C304	
C311	Same as C302	
C312	Same as C304	
C313	Same as C302	
C314	CAPACITOR, FIXED: PLASTIC .01 MF, ±5% 4000 WVDC	CX102J103M
C315	CAPACITOR, FIXED: ELECTROLYTIC, 2600 mfd, -10+100%, 50 WVDC	CE112-6
C316	CAPACITOR, FIXED: PAPER, 10mf, ±10% 2500 WVDC	CP105
C317	CAPACITOR FIXED: PAPER; 10uf, ±10% 1000 WVDC	CP70B1FG106K
C318	CAPACITOR, FIXED, ELECTROLYTIC: 850 mfd, 450 WVDC	CE51C800R
C319	Same as C318	
C320	CAPACITOR, FIXED PAPER: 4 mF ± 10%, 350 WVDC	CP113-1
C321	Same as C315	
C322	CAPACITOR FIXED: Ceramic 2000 PF, ± 20%	CK70AW202M
C323	Same as C322	

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C324 thru C330	Same as C322	
C331 thru C336	Same as C302	
CR301	SEMI CONDUCTOR DEVICE: Diode Silicon	IN2984
CR302	Same as CR301	
CR303	RECTIFIER, SEMI CONDUCTOR DEVICE: 3 Phase	DD124
CR304	RECTIFIER, SEMI CONDUCTOR DEVICE:	DD141
CR305	Same as CR304	
CR306	SEMI CONDUCTOR DEVICE: Diode	IN2986B
CR307	RECTIFIER, SEMI CONDUCTOR DEVICE: 3 Phase	DD129
DS301	BUZZER: AUDIBLE SIGNAL; Operating Voltage 6 to 28 VDC:	BZ101-2
E301	Terminal Turret	
E302	Same as E301	
E303 thru E310	Same as E301	
E311	TERMINAL, Slotted TE101-3	
E312	Same as E311	
E313	Same as E301	
F301	FUSE CARTRIDGE: 4 Amps, Time Lag	FU102-4
F302	Same as F301	
F303	Same as F301	
F304	FUSE CARTRIDGE: 1 1/2 Amps Time Lag	FU102-1.5
F305	FUSE CARTRIDGE: 1/4 Amps Time Lag	FU104R25

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
F306	Same as F301	
F307	FUSE CARTRIDGE: 2 Amps Time Lag	FU102-2
J302	CONNECTOR, RECEPTACLE ELECTRICAL: 44 Female Contacts	JJ319-22DTE
J304	CONNECTOR, RECEPTACLE: Female Teflon Insulated	UG560-U
K301	RELAY ARMATURE: 3 PDT 24 VDC	RL168-3C10-24DC
K302	RELAY ARMATURE: DPDT 220 VAC,	RL/168-2C10-220AC
K303	RELAY ARMATURE: DPDT 24 VDC,	RL168-2C10-24DC
K304	Same as K303	
K305	Same as K302	
K306	Same as K303	
K307	RELAY, HI_SEN: Insulated for 400 VDC or 300 VAC:	RL158
K308	RELAY ARMATURE: 3 PDT: 220 VAC	RL168-3C10-20AC
K309	Same as K308	
L301	Coil, Radio Frequency Fixed 1,000 uh, ±5%, 1,600 Ohms DC	CL275-102
L302	Coil, Radio Frequency	CL405-1
L303	REACTOR: 7hy at 350 MA: DC Resistance 55 ohms	TF5013
L304	REACTOR: 5hy at 25 MA: DC Resistance 375 ohms	TF5028
L305	COIL RADIO FREQUENCY: Fixed, 50 mh, ±5%, 110 ohms DC Resistance: 75 MA Current Rating	CL226-5
L306 thru L309	Same as L305	
M301	METER: Full Scale Deflection 0 to 100 UA	MR191-3

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
M302	TIME INTERVAL: Adjustable Range Setting 30 Sec Minimum, 5 min. Max. SPDT Current Rating 10 Amps at 60 Hz	T1105
R301	Resistor, Fixed, Composition 33 ohms, ±5% 1/2 watt	RC20GF330J
R302	Resistor, Fixed, Composition: 47 ohms, ±5%, 2 watt	RC42GF331J
R303 thru R309	Same as R302	
R310	Resistor, Fixed, Composition: 47 ohms, ±5%, 1/2 watt	RC20GF470J
R311	Resistor, Fixed, Composition: 10000 ohms, ±5%, 1/2 watt	RC20GF103J
R312	Resistor, Fixed, Composition: 10 ohms, ±5%, 1 watt	RC32GF100J
R313	Reistor, Fixed, Composition: 2000 ohms, ±5%, 1 watt	RC32GF202K
R314	Resistor, Fixed, Composition: 10 ohms, ±5%, 2 watt	RC42GF100J
R315	Same as R314	
R316	Same as R313	
R317	Resistor, Fixed, Composition: 150 ohms, ±5%, 2 watt	RC42GF151J
R318	Resistor, Fixed, Composition: 47 ohms, ±5%, 2 watt	RC42GF470J
R319	Resistor, Fixed, Composition, 39000 ohms, ±5%, 1/2 watt	RC07GF393J
R320	Same as R319	
R321	Same as R319	
R322	Resistor, Fixed, Wire Wound 8000 ohms, 50 Watts	RW105-48
R323	Same as R322	
R324	Resistor, Fixed, Wire Wound 15000 ohms, 10 Watt	RW-109-36
R325	Same as R324	
R326	Resistor, Variable, Wire Wound, 25000 ohms, ±5%, 4 watts	RA30NASD253A

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R327	Resistor, Fixed, Wire Wound 2500 ohms, ±5%, 10 watt	RW109-29
R328	Resistor, Fixed, Composition, 3900 ohms, ±5%, 2 watt	RC42GF392J
R329	Resistor, Variable, Composition, 25000 ohms, ±10% 2 watts	RV4LAYSA253A
R330	Resistor, Fixed, Composition, 33000 ohms, ±5%, 2watt	RC42GF333J
R331	Same as R330	
R332	Same as R329	
R333	Same as R328	
R334	Same as R328	
R335	Same as R329	
R336	Same as R330	
R337	Resistor, Fixed, Wire Wound, 1500 ohms, ±5%, 10 watt	RW109-26
R338	Resistor, Fixed, Composition, 470000 ohms, ±5%, 2 watt	RC42GF474J
R339	Resistor, Fixed, Wire Wound, 10000 ohms, 50 watts	RW105-29
R340	Resistor, Fixed, Wire Wound, 50,000 ohms, 20 watts	RW110-39
R341	Resistor, Fixed, Wire Wound, 5000 ohms, ±5% 20 watt	RW110-30
R342	Resistor, Fixed, Wire Wound, 300 ohm, 10 watt	RW109-15
R343	Resistor, Fixed, Composition, 100000 ohms, ±5%, 2 watt	RC42GF104J
R344	Resistor, Fixed, Composition, 82000 ohms, ±5%, 2 watt	RC42GF823J
R345	Resistor, Fixed, Wire Wound, 50 ohms, 5 watt	RW107-16
R346	Same as R319	
R347	Same as R319	
R348	Resistor, Fixed, Composition, 100 ohms, ±5%, 1/2watt	RC20GF101J
R349	Resistor, Fixed, Composition, 47 ohms, ±5%, 2 watt	RC42GF470J

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R350	Resistor, Fixed, Composition,, 100 ohms, ±5%, 2 watt	RC42GF101J
S301	Switch, toggle, SPDT	ST103-5-62
S302	Switch, toggle, SPDT	ST103-11-62
S303	Switch, rotary, 1 Sec, 4 positions: 60° Angle of Throw	SW464
S304	Switch, Interlock	SW230
S305	Switch, Rotary, SPDT	SW252
T301	Transformer, Power, Step-up	TF366
T302	Transformer, Plate, Step-up	TF371
T303	Transformer, Interstage Valve, Information not avail.	TR191
T304	Transformer, Output Valve, Information not avail.	TR190
TB301	Terminal Board, Assembly	A4705-4
TB302	Terminal Board-Barrier, 6 Terminals	TM102-6
V301	Electron Tube Tetrode, 11 Pin Contact	8121
V302	Electron Tube	4CX350A
V303	Same as V302	
V304	Electron Tube	0A2
V305	Same as V304	
V306	Same as V304	
V307	Same as V304	
V308	Same as V304	
V309	Electron Tube	0B2
XC318	Socket, Electron Tube	TS101P01
XC319	Same as XC318	

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
XF301	Fuse Holder, Lamp Indicating 90 to 250V, 20 Amps	FH104-3
XF302	Same as XF301	
XF303	Same as XF301	
XF304	Fuse Holder, Lamp Indicating 22 to 33 V, 20 Amps	FH104-11
XF305	Fuse Holder, Lamp Indicating 500 V, 30 Amps	FH106
XF306	Same as XF304	
XF307	Same as XF304	
XK301	Socket, Electron Tube	TS100-6
X302	Socket, Electron Tube	TS101P01
XK303 thru XK306	Same as XK302	
XK307	Socket, Electron Tube, 9 pin contact	TS100-7
XK308	Same as XK301	
XK309	Same as XK301	
XV301	Socket, Electron Tube, 11 pin contact	TS170-1
XV302	Socket, Electron Tube, 9 pin contact	TS132-2
XV303	Same as XV302	
XV304	Socket, Electron Tube	TS102P01
XV305 thru XV309	Same as XV304	

OVERLOAD BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
2C301	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 200,000 uuf, +80-20%, 25 WVDC	CC100-33
2C302	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80-20%, 100 WVDC	CC100-28
2C303 thru 2C316	Same as 2C302	
2C317	Same as 2C301	
2C318	Same as 2C302	
2CR301	SEMICONDUCTOR, GERMANIUM, DIODE	IN270
2CR302 thru 2CR309	Same as 2CR301	
2CR310	SEMICONDUCTOR, ZENER DIODE	IN3022B
2DS301	LAMP, INCANDESCENT: 5 to 6 Volts, 0.063 Amps: Bulb	BI-114-2
2DS302 thru 2DS308	Same as 2DS301	
3K301	Relay, Armature: 4PDT: 24 VDC	RL156-8
2Q301	SEMICONDUCTOR DIODE, SILICON	2N1595
2Q302	Same as 2Q301	
2Q303	Same as 2Q301	
2Q304	TRANSISTOR: NPN, SILICON	2N697
2Q305 thru 2Q308	Same as 2Q301	
2Q309	TRANSISTOR, GERMANIUM	2N1308
2Q310	Same as 2Q301	
2Q311	Same as 2Q304	

OVERLOAD BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
2Q312	Same as 2Q304	
2R301	RESISTOR, FIXED COMPOSITION, 1,000 ohms, ±5%, 1/2 watt	RC20GF102J
2R302	RESISTOR, VARIABLE COMPOSITION, 5000 ohms, ±10% 1/4 watt	RV111U502A
2R303	RESISTOR, FIXED COMPOSITION, 47000 ohms, ±5%, 1/2 watt	RC20GF473J
2R304	Same as 2R301	
2R305	RESISTOR, FIXED, COMPOSITION 1 Meg ohms, ±5%, 1/2 watt	RC20GF105J
2R306	Same as 2R301	
2R307	Same as 2R301	
2R308	RESISTOR, VARIABLE COMPOSITION, 100 ohms, 10%, 1/4 watt	RV111U101A
2R309	Same as 2R301	
2R310	Same as 2R301	
2R311	RESISTOR, FIXED, COMPOSITION, 2700 ohms, ±5%, 1/2 watt	RC07GF272J
2R312	RESISTOR, VARIABLE, COMPOSITION, 1000 ohms, ±10%, 1/4 watt	RV111U102A
2R313	Same as 2R301 .	
2R314	Same as 2R301	
2R315	Same as 2R308	
2R316	Same as 2R301	
2R317	Same as 2R301	
2R318	Same as 2R308	
2R319	Same as 2R301	
2R320	Same as 2R301	

OVERLOAD BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
2R321	Same as 2R308	
2R322	Same as 2R301	
2R323	Same as 2R301	
2R324	Same as 2R302	
2R325	Same as 2R211	
2R326	Same as 2R301	
2R327	RESISTOR, FIXED, COMPOSITION, 620 ohms, ±5%, 1/2 watt	RC20GF621J
2R328	RESISTOR, FIXED, COMPOSITION, 120 ohms, ±5%, 1/2 watt	RC20GF121J
2R329	RESISTOR, FIXED, COMPOSITION, 470000 ohms, ±5%, 1/2 watt	RC20GF474J
2R330	RESISTOR, FIXED, COMPOSITION, 15000 ohms, ±5%, 1/2 watt	RC20GF153J
2R331	RESISTOR, FIXED, COMPOSITION, 100000 ohms, ±5%, 1/2 watt	RC20GF104J
2R332	RESISTOR, FIXED, COMPOSITION, 680 ohms, ±5%, 2 watt	RC42GF681J
2R333	Same as 2R331	
2R334	RESISTOR, FIXED, COMPOSITION, 1800 ohms, ±5%, 1/2 watt	RC20GF182J
2R335	RESISTOR, FIXED, COMPOSITION, 560 ohms, ±5%, 1/2 watt	RC20GF561J
XK301	Socket, Relay, 12 Contacts	TS171-4

EXCITER DRAWER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CB200	CIRCUIT BREAKER, SINGLE POLE 20 VAC, current rating 50 Max	SW418-1
C200	CAPACITOR, FIXED, CERAMIC, FEED THRU, 2000 uuf, ±20%, 500 WVDC	CK70AW202M
C201 thru C212	Same as C200	
C215	CAPACITOR, FIXED, CERAMIC, .1 uf, +80-20%, 500 WVDC	CC100-32
C217	Same as C215	
C218	CAPACITOR, FIXED, MICA: .01 uf, ±10%, 200 WVDC	CM35F103F03
C219 thru C230	Same as C218	
C231	CAPACITOR, FIXED, ELECTROLYTIC, 200 mfd, 50 WVDC Polarized	CE116-8VN
C232	Same as C231	
CR200	SEMICONDUCTOR DEVICE, DIODE, SILICONE	IN2484
CR201	SEMICONDUCTOR, RECTIFIER,	DD130-200-300
DS200	LAMP, INDICATOR,	B1116-1-5
E200	TERMINAL, FEED-THRU	TE114-2
E201	Same as E200	
E202	Same as E200	
F200	FUSE, CARTRIDGE TYPE 3/4 Amp: Time Delay	FU102-.750
J200	CONNECTOR, RECEPTACLE MALE	MS3102A28-21P
J202	JACK BULKHEAD: Series BNC	JJ172
K204	RELAY, MERCURY, WETTED CONTACT, 2 Amps Max. 500 V	RL167-1
P200	PLUG, TWIST LOCK: FEMALE POLARIZED,	PL176

EXCITER DRAWER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
P201	CONNECTOR, PLUG, CRIMP TYPE	PL244-1
P202	Same as P201	
R200	RESISTOR, FIXED, COMOSITION, 470 ohms, ±5%, 2 watt	RC42GF471J
R201	RESISTOR, VARIABLE, COMPOSITION 50000 ohms, ±10%	RV4NCYSD503AYY
R202	RESISTANCE, FIXED, WIRE WOUND, 10 ohms, ±5%, 5 watt	RR114-10W
R203	Same as R202	
R204	RESISTOR, FIXED COMPOSITION, 1500 ohms, ±5%, 2 watt	RC42GF152J
R209	RESISTOR, FIXED, COMPOSITION, 5600 ohms, ±5%, 1/2 watt	RC20GF562J
R210	RESISTOR, FIXED, COMPOSITION, 270 ohms, ±5%, 1/2 watt	RC20GF271J
R211	RESISTOR, FIXED, COMPOSITION, 5600 ohms, ±5%, 1/2 watt	RC20GF562J
T200	TRANSFORMER, POWER ISOLATION STEP DOWN	TF269
S200	SWITCH, INTERLOCK, Push, 15 Amp, 120/250 VAC	SW230
S201	SWITCH, PUSH BUTTON, 250 MA, 30 watt	SW291-1
S202	SWITCH ROTARY, 1 Section 12 Positions	SW250
S203	Part of R201	
XF200	FUSE HOLDER, BAYONET BASE	FH104-11

PANEL ASSEMBLY, MAIN POWER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CB800	CIRCUIT BREAKER, 3 PST, 240 VAC	SW462
C1000	CAPACITOR, FIXED, MICA: .01 uf, ±5%, 300 WVDC	CM35F103F03
C1001 thru C1006	Same as C1000	
C1007	CAPACITOR, FIXED, MICA: 1000 uuf, ±10%, 500 WVDC	CM30F102F03
C1008	Same as C1007	
C1009 thru C1012	Same as C1000	
C1013	Same as C1007	
C1014 thru C1024	Same as C1000	
F800	FUSE CARTRIDGE: TIME LAG, 1 amp	FU102-1
F801	Same as F800	
F802	FUSE, CARTRIDGE, TIME DELAY, 5 amps	FU102-5
F803 and F804	Same as F802	
F805	FUSE CARTRIDGE, TIME DELAY, 15 amps	FU102-15
F806	Same as F800	
J1000	CONNECTOR, RECEPTICALE, FEMALE	MS3102A20-27S
J1001	CONNECTOR, RECEPTICALE	MS3102A16S-1S
J1002	CONNECTOR, RECEPTICALE, FEMALE	MS3102A20-29S
M800	INDICATOR, ELAPSED TIME 220 VAC: 60 HZ	MR198-1
M801	Same as M800	
R811	RESISTOR, FIXED, WIRE WOUND	RW107-34

PANEL ASSEMBLY, MAIN POWER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R812	Same as R811	
S800	SWITCH ROTARY, 1 section 2 positions, 30° Angle of Throw	SW255
S803	SWITCH INTERLOCK: PUSH TYPE, 15 amp 120/250 VAC	SW230
TB801	TERM, BOARD, BARR	TM100-10
TB802	TERM, BOARD, BARR	TM100-7
TB803	TERM, BOARD, BARR	TM100-4
TB804	Same as TB803	
TB805	TERM, BOARD, BARR	TM100-12
TB1000	TERM, BOARD, BARR	TM100-5
TB1001	Same as TB1000	
SF800	FUSE HOLDER, BAYONET BASE 100/250V Neon Lamp	FH104-3
XF801 thru XF806	Same as XF800	

AX5033

MAIN FRAME SUBASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
J1003	CONNECTOR RECEPTICAL BNC	JJ172
J1004	Same as J1003	
P800	CONNECTOR PLUG BNC	PL244-1
P801	CONNECTOR PLUG FEMALE	MS3106B28-21S
P802	CONNECTOR PLUG FEMALE	MS3106B32-7S
P900	CONNECTOR PLUG	PL254
P901	Same as P900	

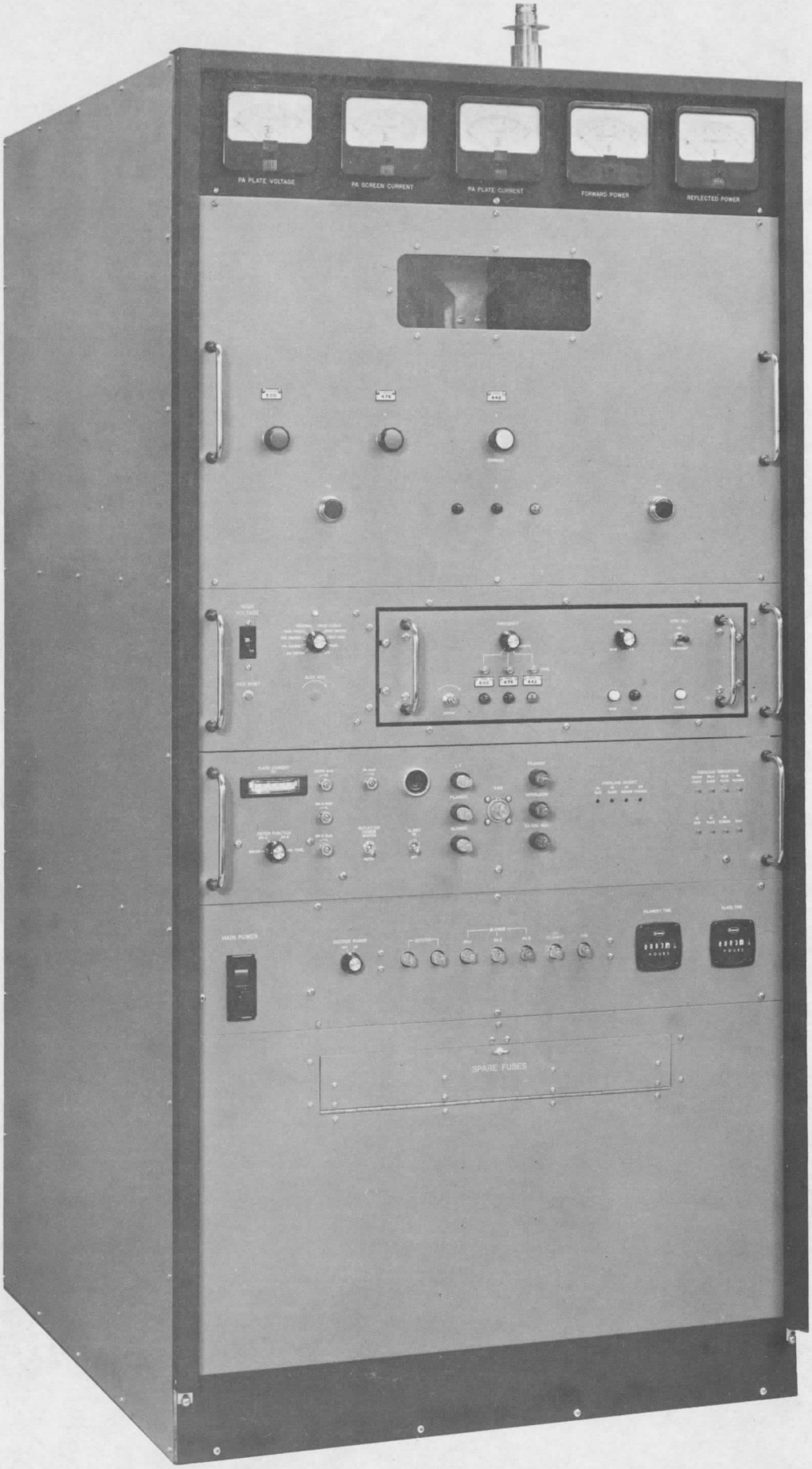
REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C913	CAPACITOR, FIXED, VACC0102-3	
C915	Same as C913	

ALDC NETWORK ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAP, FXD, CER, 100000 uuf, +80-20%, 100 WVDC	CC100-28
C2	Same as C1	
C3	Same as C1	
CR1	DIODE,	IN303
L1	COIL, RF FIXED, 128 uh	CL177
L2	COIL, RF, 750 uh, ±10%, molded case	CL100-5
R1	RES, FXD, COMP, 10000 ohms, ±5%, 1/2 watt	RC20GF103J
R2	RES, FXD, COMP, 2200 ohms, ±5%, 1/2 watt	RC20GF222J

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
B900	FAN, AXIAL	BL105
C901	CAP., FXD, PLSTC.	CX109-5
C902	SAME AS C906	
C906	CAP., FXD, PLSTC	CX108-2
C907	SAME AS C906	
C908	SAME AS C906	
C909	SAME AS C906	
C910	SAME AS C906	
C911	SAME AS C906	
C912	CAP., FXD	C109-3
C914	SAME AS C906	
C915	CAP., VAR. VAC	CB155
C916	CAP., VAR. VAC	CB155
C917	CAP., VAR. VAC	CB155
CR900	SCOND DEV, DIODE	DD119-7
CR901	SCOND DEV, DIODE	DD119-8
DC900	COUP., DIR	DC104-2
E804	INS, FDTHRU	NS107
L900	COIL	CL427
L901	COIL, RF ASSY	AX5077
S900	SW, PUSH-PULL	SW203
S903	SW, SENS-SPDT	SW260
S904	LOAD ASSY, PA	AX700
V900	TUBE, EL	4CX35000C

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
XDS900	LAMP ASSY - BLUE	TS136-4FS
XDS901	LAMP ASSY - RED	TS136-1FS
XDS902	LAMP ASSY - AMBER	TS153-3
XDS903	LAMP ASSY - RED	TS153-1
XDS904	LAMP ASSY - GREEN	TS153-2
	FILTER, ASSY	
	SOLENOID ASSY	
	TUNE, CAP., ASSY	


PA PLATE VOLTAGE
PA SCREEN CURRENT
PA PLATE CURRENT
FORWARD POWER
REFLECTED POWER
SPARE FUSES

SECTION 7
SCHEMATIC DIAGRAMS

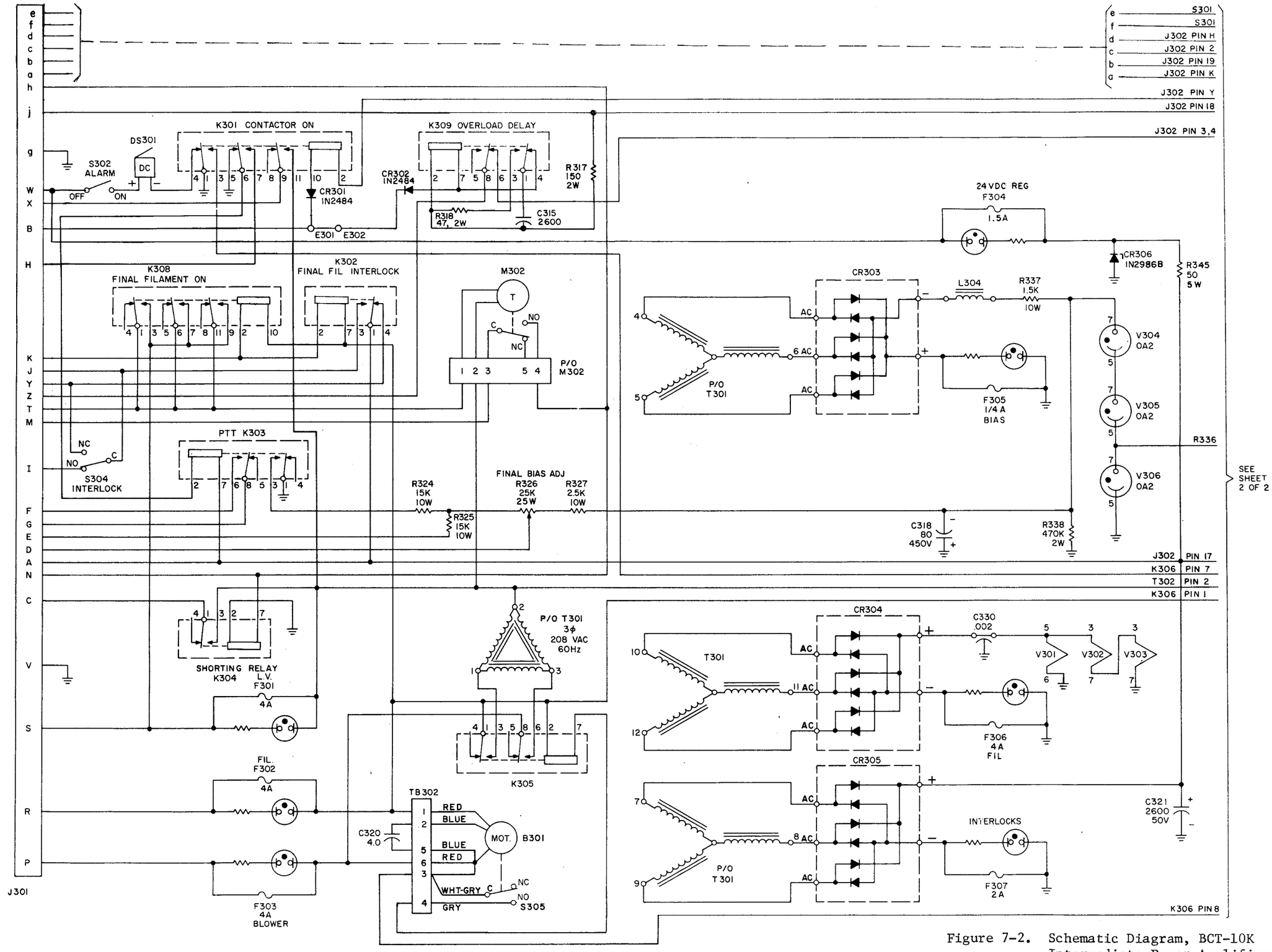
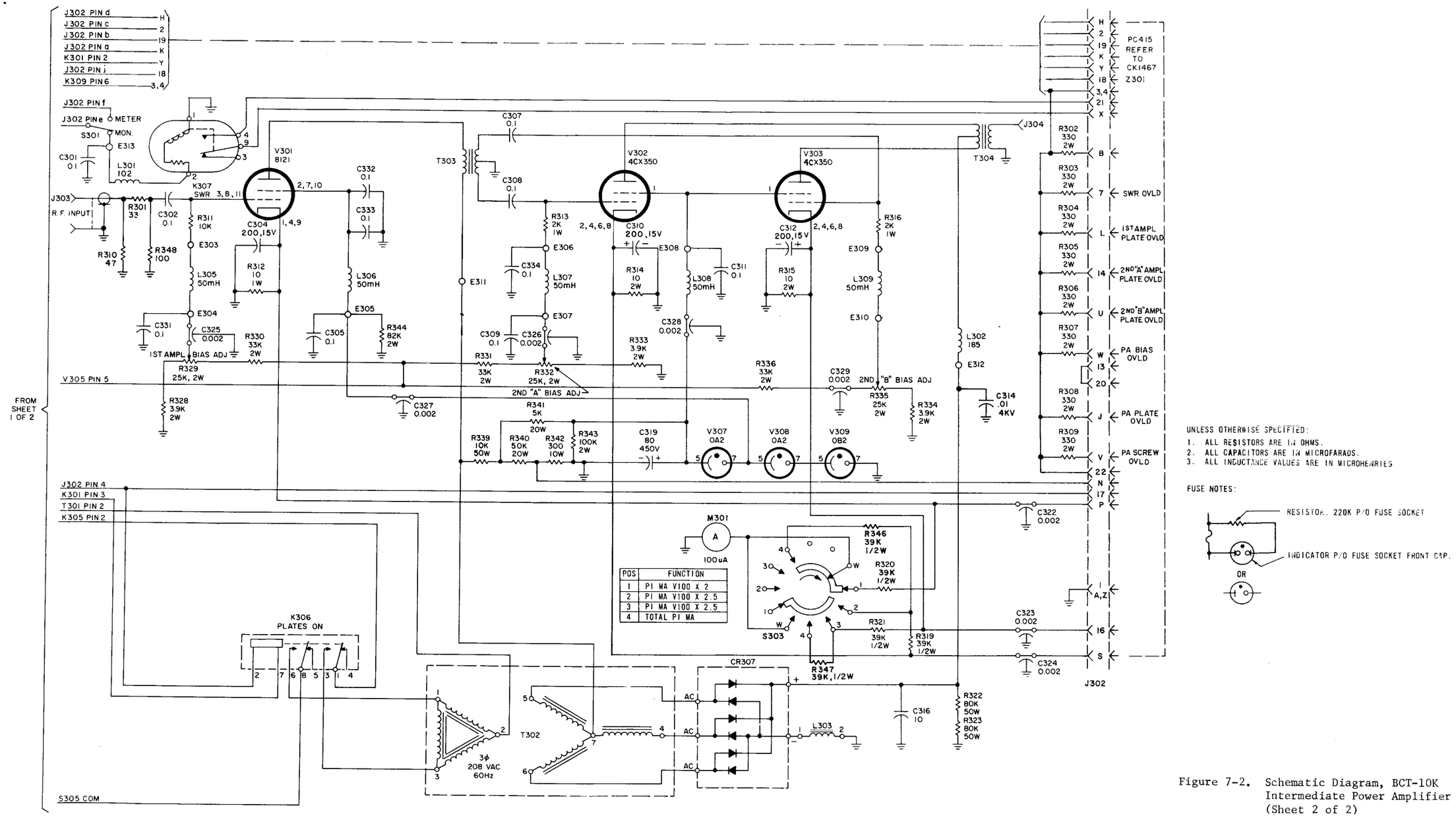


Figure 7-2. Schematic Diagram, BCT-10K Intermediate Power Amplifier (Sheet 1 of 2)

CK1466



CK1466

UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE IN OHMS.
2. ALL CAPACITORS ARE IN MICROFARADS.
3. ALL INDUCTANCE VALUES ARE IN MICROHENRIES

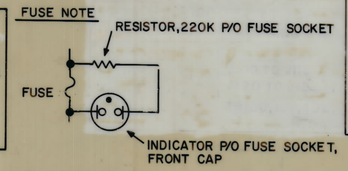
FUSE NOTES:

Figure 7-2. Schematic Diagram, BCT-10K Intermediate Power Amplifier (Sheet 2 of 2)

REVISIONS							
ZONE	LTR	DESCRIPTION	DATE	E.M.N.NO	DRAFT	CHKD	APPD
	X	EXP. RELEASE	11-3-68				
		ORIGINAL RELEASE FOR PRODUCTION	11-7-68				
	A	Z201 ADDED	1/8/69	19108			
	B	ADDED WIRE FROM P200 8 TO J200 P	4/23/69	19393			

200 SERIES	
LAST SYM	MISSING SYM
C230	
CB200	
CR200	
DS200	
E201	
F200	
J203	
K200	
P200	
Q200	
R209	
S203	
T200	
Z201	

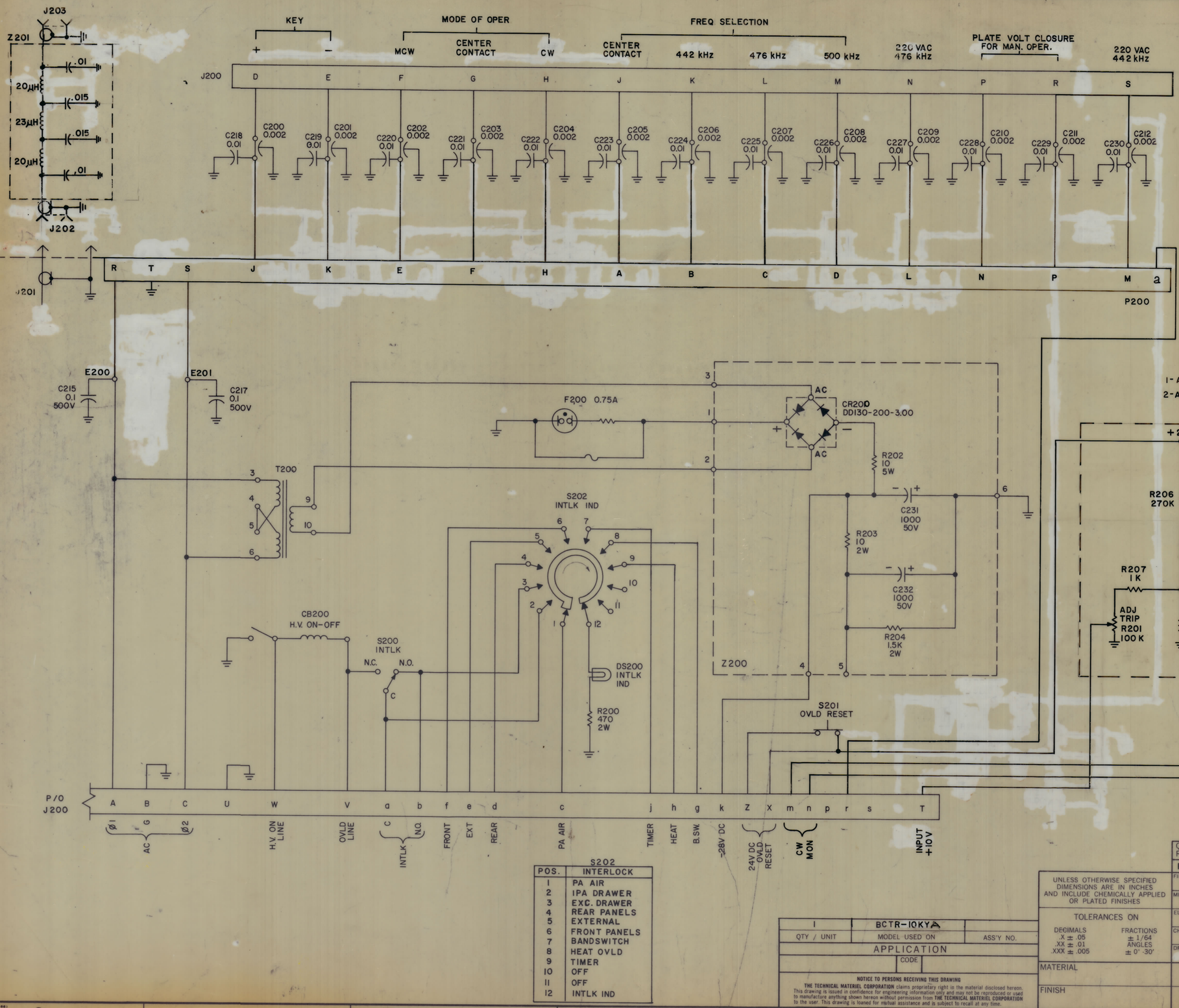
FUSE NOTE



UNLESS OTHERWISE SPECIFIED

1- ALL RESISTANCE VALUES ARE IN OHMS

2- ALL CAPACITANCE VALUES ARE IN MICROFARADS



S202	
POS.	INTERLOCK
1	PA AIR
2	IPA DRAWER
3	EXC. DRAWER
4	REAR PANELS
5	EXTERNAL
6	FRONT PANELS
7	BANDSWITCH
8	HEAT OVLD
9	TIMER
10	OFF
11	OFF
12	INTLK IND

QTY. REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL
F. BUDETTI			LIST OF MATERIAL	

FINAL APPROVAL		DATE 11/6/68
MECH. DES.	E-P	DATE 11/6/68
ELECT. DES.	T.T.	DATE 11/6/68
CHECKED		DATE 11/6/68
DRAWN	HD	DATE 11.5.68

THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK

DIAGRAM, SCHEMATIC
EXCITER DRAWER

SIZE	CODE IDENT. NO.	DWG NO.	ISSUE
D	82679	CK 1592	B

SCALE —— SHEET OF

QTY / UNIT	MODEL USED ON	ASS'Y NO.
1	BCTR-10KYA	

APPLICATION

CODE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

TOLERANCES ON

DECIMALS	FRACTIONS
.X ± .05	± 1/64
.XX ± .01	ANGLES
.XXX ± .005	± 0° 30'

MATERIAL

FINISH

FCI-10-170 (10-68)