VOLUME II

CONTAINS ADDITIONAL

MAINTENCE INSTRUCTIONS

for

TMC PART NUMBERS

TRANSMITTING SET, RADIO,

MODEL GPT-10K

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, CANADA

VOLUME II

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MAMARONECK, N.Y. **OTTAWA, CANADA**

IN-316

Issue Date: 1 May 1964
Rev. Date: 1 May 1965

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

Warranty

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

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

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

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

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

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

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

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

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

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

PROCEDURE FOR ORDERING REPLACEMENT PARTS

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

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

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

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

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

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

CHANGE NO. 8

INSTRUCTION BOOK CHANGE NOTICE

Date 6/13/67

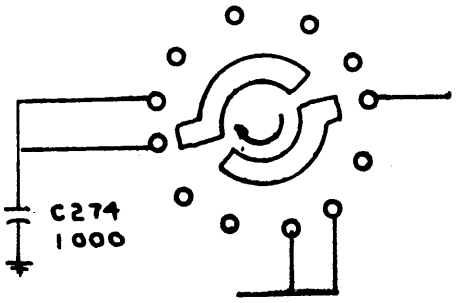
Manual affected: Maintence Instructions For Transmitting Set Radio Model GPT 10K IN 316

Vol ll Issue Date: May 1 1964
Rev. Date: May 1 1965

All reference to RFC-1 should be changed to RFC-1B

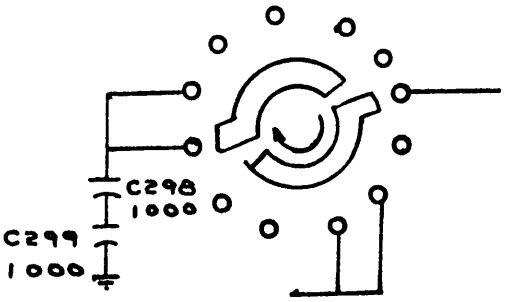
Page 6-1/ 6-2 Schematic Diagram change symbol of C247 to C299 and change circuitry for same as shown:

WAS



S203

NOW



S203

Parts List pages 5-5 thru 5-13 should be replaced with new printed Parts List provided with this change notice.

SHOULD ADDITIONAL COPIES OF THIS CHANGE NOTICE BE REQUIRED, PLEASE CONTACT:
THE TECHNICAL MATERIEL CORP., 700 Fenimore Road, Mamaroneck, New York
Attn.: Director of Eng. Services.

Addendum #3 to
GPT-10K Maintenance
Manual (IN-316)

MODIFICATION OF

POWER-INPUT CIRCUITS

Power-input circuits of the GPT-10K transmitter have been modified to accept high-voltage or low-voltage, 50 or 60, cps input power.

When the items listed below are incorporated in text, the GPT-10K instruction manual (IN-316) will apply as written.

1. Because Elapsed Time Meter M700 located on the relay panel is a 60 cps device, it is only 83-1/3% accurate when the transmitter is operated on 50 cps power. In order to calculate the correct elapsed time for 50 cps power, multiply the time indicated on meter M7601 by 6/5.

2. Page 1-1. Table 1-1.

   Change entry for high voltage rectifier to read:

   High Voltage Rectifier AX-103
   or
   High Voltage Rectifier, Model HVRC-2

3. Page 1-2.

   Change to read:

   (5) 10-kw High Voltage Rectifier. - The 10-kw high voltage rectifier, slide-mounted below the main power panel, provides +7500 vdc for the plate of the 10-kw PA tube. The unit also provides half-wave rectification for the 3200-volt section of the main power supply. Either a gaseous-tube unit (High Voltage Rectifier AX-103) or a solid-state unit (High Voltage Rectifier, Model HVRC-2) is supplied. Heavy

insulated button connectors at the rear of the unit provide quick disconnection for drawer removal.

4. Page 1-3. TECHNICAL CHARACTERISTICS (Cont'd)

Change to read:

Primary power requirements (including exciter)	3-phase, 195-240/ 390-480v, 50-60 cps, 50/25 amperes/phase

5. Tables 1-2 (ELECTRON TUBE COMPLEMENT), 1-3 (DIODE COMPLEMENT), and 1-4 (FUSE COMPLEMENT) on page 1-3 should be changed as indicated below:

a. Table 1-2.
Add asterisk (*) adjacent V600-V605

b. Table 1-4.
Add asterisk (*) adjacent F600-F605

c. Table 1-3.
Add:

REFERENCE SYMBOL	TYPE
*CR1501, CR1502, CR1503	DD117

d. Add footnote on bottom of page 1-3.

*Tubes V600-V605 and Fuses F600-F605 are part of High Voltage Rectifier AX-103. Diode assemblies CR1501-CR1503 are part of High Voltage Rectifier, Model HVRC-2.

6. Page 2-0. 2-1. OVERALL BLOCK DIAGRAM ANALYSIS

The third paragraph should be changed to read:

The 10-kw high voltage rectifier functions together with Main Power Panel AX-504 and Main Power Supply AX-138 to produce high d-c voltages required by the 1-kw IPA and 10-kw PA.

7. Page 2-1.

Remove page 2-1 of the manual and replace with page 2-1 provided with this addendum.

8. Page 2-18.

The title of paragraph 2-10 should be changed to read:

10-KW HIGH VOLTAGE RECTIFIER AND MAIN POWER SUPPLY.

9. Page 2-18. a. POWER INPUT CIRCUITS.

The first and second sub-paragraphs should be changed to read:

Three-phase a-c power enters the main frame of the transmitter via auto transformer T802. The output of T802 (230 vac) is routed to MAIN POWER circuit breaker CB1000. Phase-2 and phase-3 voltages from T802 are routed to the auxiliary frame. Both of these power distribution lines have pi-type r-f filters.

In the auxiliary frame, AUXILIARY FRAME MAIN POWER circuit breaker CB3000 applies the 230-volt output of T802 to a step-down transformer. In synthesized transmitters, an auto transformer T3002 is supplied; in non-synthesized transmitters, a regulating transformer T3000 is supplied. The output of the step-down transformer (115 vac) is routed to the exciter units. This 115 vac power is also routed to Front Fan B3000 via FRONT FAN fuse F3000. Capacitor C3018 is used for starting the fan motor.

10. Page 2-20. b. HIGH VOLTAGE RECTIFIER CIRCUIT.

The first and second sub-paragraphs should be changed to read:

The 10-kw high voltage rectifier contains a 3-phase bridge circuit that provides +7500 vdc output. Either a gaseous-tube or solid-state rectifier is supplied. (Refer to applicable equipment manual.)

The high-voltage rectifier also provides half-wave rectification for the 3200-volt circuit. This output is taken from the neutral terminal of transformer T800. Three-phase high voltage input to the high-voltage rectifier is via terminals E1004, E1005, and E1006. Output from the rectifier is via terminals E1001 and E1007. When a gaseous-tube rectifier is used, filament primary voltage is routed via terminals E1002 and E1003.

11. Page 2-21.

The following note should be added to figure 2-12.

NOTE

For the schematic diagram of the solid-state rectifier, refer to the HVRC-2 instruction manual.

12. Page 3-12. Table 3-4.

The "NOTE" contained in table 3-4 (page 3-12) should be changed to read:

NOTE

Make the following short-circuit tests on High-Voltage Rectifier AX-103 only. For troubleshooting information pertaining to the solid-state power supply, refer to the HVRC-2 instruction manual.

13. Page 3-23. Paragraph 3-8 (HIGH VOLTAGE RECTIFIER AX-103 AND MAIN POWER SUPPLY)

The following note should be added to paragraph 3-8:

NOTE

Troubleshooting information pertaining to the solid-state power supply is contained in the HVRC-2 manual.

14. Page 3-27.

Figure 3-7 should be changed in accordance with information contained in figure 3-7A provided with this addendum.

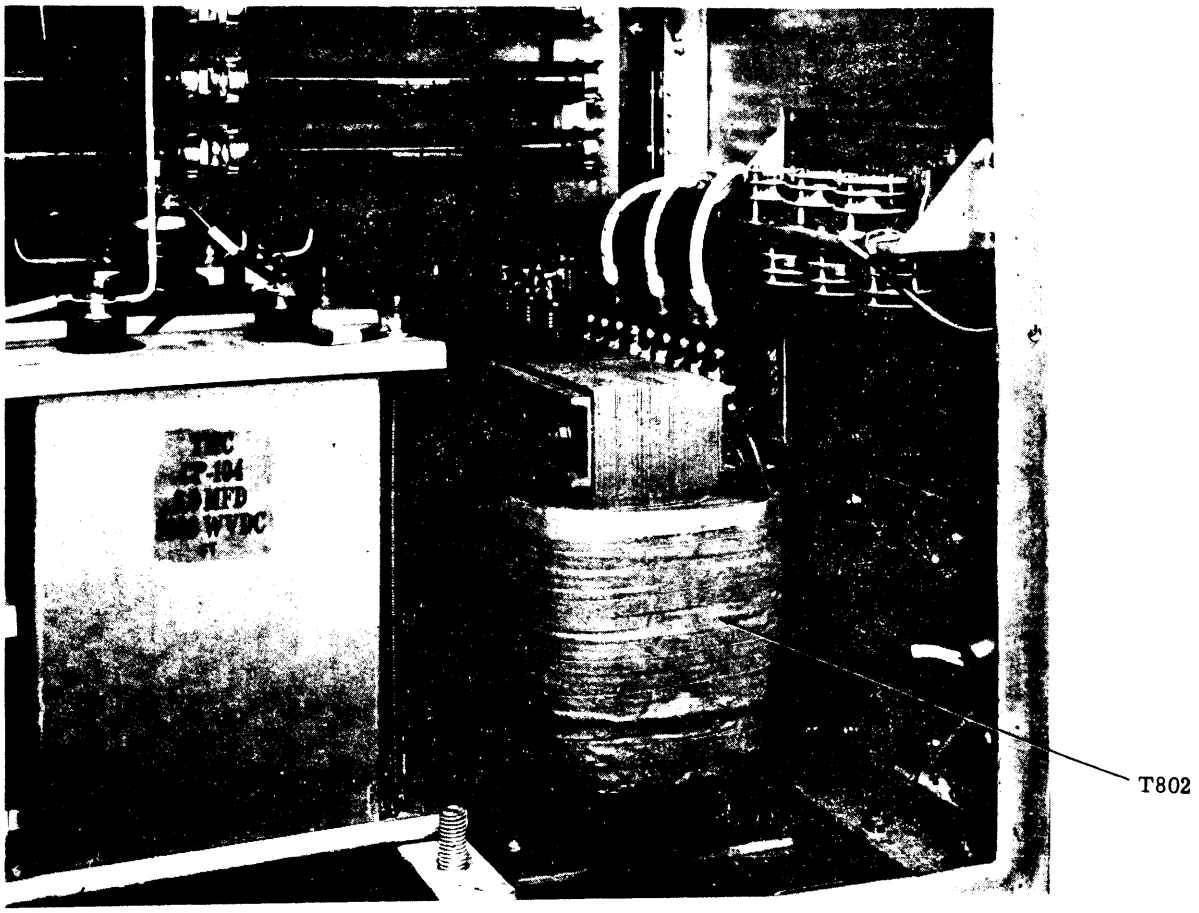


Figure 3-7A

15. Add to Parts List, Section Five:

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
T802	AUTOTRANSFORMER, POWER, FIXED: input- 480, 450, 430, 410, 390 VAC, 50/60 cps, 3 phase; current rated at 40 amps-RMS each phase; windings taped at 200 volts; breakdown test voltage 2,000 volts ac; output- 230 V line to line terminals, 40 amps; open frame case.	TF336

16. Page 5-18. Parts List

Change TMC part No. for B800 from BL111-1 to BL111-50.

17. Page 6-7/6-8. Schematic Diagram (sheet 4 of 4)

Remove Page 6-7/6-8 from manual and replace with page 6-7/6-8 provided with this addendum.

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By
Addendum #1	(For GPT-10KRF)	Superseded by Addendum #3 1/67	
Addendum #2	(For GPT-40KEK DRIVER)	Superseded by Addendum #3 1/67	
1	6/2/64	Incorporated in manual.	5/65
2	6/8/64	Incorporated in manual.	5/65
3	6/26/64	Incorporated in manual.	5/65
4	7/29/64	Incorporated in manual.	5/65
5	8/25/64	Incorporated in manual.	5/65
6	12/9/64	Incorporated in manual.	5/65

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

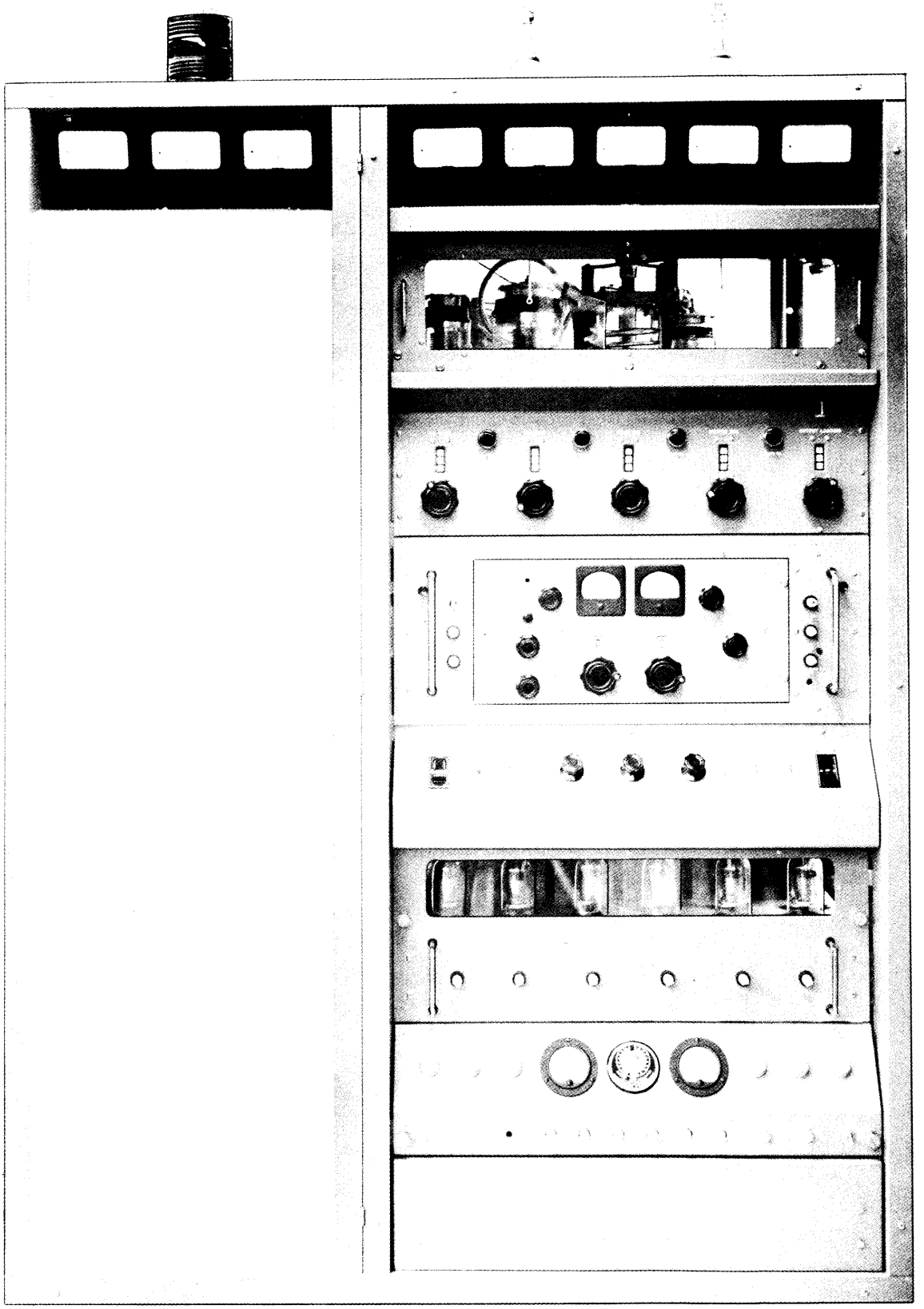
LIST OF ILLUSTRATIONS (CONT)

LIST OF TABLES

FOREWORD

This instruction manual covers the theory and maintenance of the GPT-10K Transmitter, less the exciter units. Operating instructions for the transmitter and maintenance instructions for the exciter units are covered in the following TMC publications:

ITEM	PUBLICATION
Operating Procedures for Synthesized GPT-10K Transmitter	Operating Instructions for Synthesized GPT-10K Transmitter
Maintenance of Synthesized Exciter	Technical Manual for Synthesized Exciter
Maintenance of Unsynthesized Exciter	Technical Manual for Unsynthesized Exciter



316-1

Figure 1-1. GPT-10K Transmitter, Overall View

SECTION 1
GENERAL INFORMATION

1-1. PURPOSE OF EQUIPMENT.

The GPT-10K Transmitter (figure 1-1) is a conservatively-rated general purpose transmitter which delivers 10,000 watts peak envelope power (PEP), or 5,000 watts average power throughout the 2- to 28-mc range. The transmitter provides many types of operating modes, as follows:

(1) Single sideband (SSB) with suppressed or any degree of carrier.

(2) AM operation.

(3) Independent sideband (ISB) (separate intelligence on each sideband) with suppressed or any degree of carrier.

(4) Frequency-shift telegraphy (FSK).

(5) CW keying (telegraphy).

(6) Facsimile (FAX).

1-2. EQUIPMENT MAKE-UP.

Table 1-1 lists the major components of the transmitter (less the exciter units). Where assigned, corresponding official military designations are also indicated.

1-3. DESCRIPTION OF EQUIPMENT.

a. GENERAL. As shown in figure 1-1, the transmitter consists of an auxiliary frame and a main frame which are bolted together and to a common base assembly. The two frames house all the components of the transmitter and are equipped with protective front doors. Primary power connections are made through the base assembly. Two antenna bowl assemblies, used for balanced antenna operation, are provided at the top of the main frame. For unbalanced antenna operation, a connector must be mounted in the opening located in the side of the main frame.

b. AUXILIARY FRAME. The auxiliary frame houses the exciter components of the transmitter. The frame is divided into a front and rear section by a partition which supports miscellaneous controls, connectors, and terminal boards. An AUXILIARY FRAME MAIN POWER contactor, located on the rear of the inner partition, controls the application of primary power to the auxiliary frame. When it is turned on, ac power is applied to a transformer bolted to the rear base of the auxiliary frame. When used with synthesized exciters, an auto-transformer is supplied; a voltage regulating transformer is used with unsynthesized exciters. The transformer delivers ac voltage to an ac power strip positioned vertically within the auxiliary frame. The ac power cords of

TABLE 1-1. MAJOR COMPONENTS

TMC DESIGNATION	MILITARY DESIGNATION
Auxiliary Frame Assembly AX-575	
Auxiliary Meter Panel AX-107	
Standing Wave Control Unit SWCU	
Main Frame Assembly AX-557	
Main Meter Panel AM-122	
Power Amplifier Section AX-509	
RF Amplifier RFC-1A with Power Supply AX-104	AM-2103A/URT
Main Power Panel AX-504	
High Voltage Rectifier AX-103	
Relay Panel AR-161	
Main Power Supply AX-138	

the exciter units, plugged into the strip, thus receive primary power. A fan at the upper front portion of the auxiliary frame provides forced air cooling of the exciter components. A red lamp on the roof of the auxiliary frame lights when high voltage is applied to the transmitter.

Auxiliary Meter Panel AX-107, factory mounted at the top of the auxiliary frame, contains three meters. These monitor the 10-kw PA screen grid voltage, PA grid bias voltage, and PA plate voltage.

Standing Wave Control Unit Model SWCU is rack-mounted at the rear of the auxiliary frame. This unit contains an SWR overload relay, a dc amplifier and a power supply. During unbalanced output operation of the transmitter, SWR on the transmission line is monitored. When the SWCU detects excessive SWR, the overload relay operates, removing high voltage from the transmitter.

c. MAIN FRAME. The main frame houses a two-stage rf voltage amplifier, the 1-kw IPA and 10-kw PA, and associated power supply and power control circuits. The rf components are distributed through the upper portion of the frame; heavy power supply components are bolted to the base channels of the frame.

(1) Main Meter Panel AM-122. The main meter panel, factory mounted at the top of the main frame, contains five meters. These monitor the PA filament voltage, PA screen grid voltage, PA plate current, rf plate voltage, and kw output. The power output meter is calibrated in kilowatts (PEP) and contains a second scale for measuring SWR.

(2) Power Amplifier Section AX-509. The power amplifier section is factory mounted below the main meter panel. It contains the PA tube and its associated tuned circuits. A blower motor, which provides forced-air cooling of the 10-kw power amplifier tube, is mounted directly under the power amplifier tube. The front panel of the power amplifier contains a plexiglass window, the power amplifier tuning and loading controls and their associated counter-type dials, and indicator lamps.

(3) RF Amplifier RFC-1A and Power Supply AX-104. The rf amplifier and power supply is slide-mounted below the 10-kw power amplifier and serves as the intermediate (1-kw) power amplifier between the exciter and the power amplifier. The inner section of the unit contains all rf amplifier parts; the outer section houses the power supply components. The final tube (1-kw amplifier) of the 3-stage amplifier is air-cooled by a self-contained blower in the rf section. The front panel of the inner rf section contains tuning and loading controls for the 1-kw amplifier, band-switches to cover the 2- to 28-mc rf range, and a monitoring meter and associated meter switch. All major dc and rf voltages in the rf amplifier may be conveniently monitored with this arrangement.

(4) Main Power Panel AX-504. The main power panel, a factory-mounted unit, controls the application of plate, screen grid, and filament voltages to the 10-kw power amplifier and monitors all interlock circuits contained in the main frame. This panel also controls the primary ac power input to the main frame. Other front panel controls include a reset pushbutton associated with the protective relays in the main frame, an automatic load and drive control switch and level adjustment, and an SWR switch associated with the dual purpose output and SWR meter.

(5) High Voltage Rectifier AX-103. The high voltage rectifier, rack-mounted below the power panel, contains the high-voltage rectifier tubes and their corresponding filament transformers. Operating as the high-voltage rectifier deck associated with the main power supply, this unit generates 7500 volts dc for the plate of the 10-kw power amplifier tube. A plexiglass window on the front panel of the high voltage rectifier permits observation of the rectifier tubes. Button connectors at the rear of the unit provide connection for the 3-phase input voltage and the dc output voltage. (These provide a quick disconnection for high voltage rectifier removal.)

(6) Relay Panel AR-161. The relay panel is rack-mounted at the bottom of the main frame. This panel contains nine relays which protect the GPT-10K transmitter circuits against overloads. The relays and their associated terminal boards are mounted under a front panel cover plate for quick accessibility. The upper portion of the relay panel contains filament and plate time meters, an automatic reset timer, and overload indicator lamps. All 1-kw and 10-kw amplifier overload adjustments are also brought out on the relay panel for ease of adjustment.

1-4. TECHNICAL CHARACTERISTICS.

Frequency range	2 to 28 mc, bandswitched
Output power	10,000 watts PEP, 5,000 watts average. 3rd order distortion products down at least 35 db from either tone of a standard 2-tone test at full PEP.
Operating modes	SSB, ISB, AME, FSK, FAX, CW, and AM
Output impedance	
Balanced	600 ohms
Unbalanced	50 or 70 ohms

1-4. TECHNICAL CHARACTERISTICS (C nt).

Harmonic suppression	Second harmonic down at least 50 db from PEP; third harmonic down at least 65 db from PEP.
Primary power requirements (including exciter)	3-phase, 190-250 volts, 50-60 cps, 50 amperes per leg.
Safety features	Mechanical and electrical interlocks.
Cooling	Forced air.
Operating temperature	Between $0^{o}C$ ($32^{o}F$) and $50^{o}C$ ($112^{o}F$) for humidity as high as 90%.

1-5. ELECTRON TUBE, DIODE, AND FUSE COM - PLEMENT.

The electron tubes, diodes, and fuses contained in the transmitter are listed in tables 1-2 through 1-4, respectively.

TABLE 1-2. ELECTRON TUBE COMPLEMENT

REFERENCE SYMBOL	TYPE	FUNCTION
V101	12AT7	DC amplifier
V201	6CL6	RF amplifier
V202	6146	RF amplifier
V203	PL172	Power amplifier
V600-V605	872A	High voltage rectifier
V900	4CX5000A	Power amplifier
V2000	5R4	High voltage rectifier
V2001	6X4	Bias rectifier
V2002, V2003	OA2	Voltage regulator

TABLE 1-3. DIODE COMPLEMENT

REFERENCE SYMBOL	TYPE
CR101	
CR102, CR103	
CR201, CR202	1N67
CR203, CR204, CR205 CR900, CR901	1N303

TABLE 1-4. FUSE COMPLEMENT

REFERENCE SYMBOL	TYPE
F101, F103 F600-F605, F704	MDL 1
F102	MDL 1/8
F700-F702	MDL 10
F703, F705, F3000	MDL 5
F2000	MDL 1/4
F2002, F2003	MDL 2
F2004	MDL 3

SECTION 2
PRINCIPLES OF OPERATION

2-1. OVERALL BLOCK DIAGRAM ANALYSIS. (See figure 2-1.)

An rf signal from the exciter circuits in the auxiliary frame is applied to the input of RF Amplifier RFC, the IPA. The rf input signal must be within the frequency range of 2 to 28 mc and may be modulated or unmodulated. A sample of exciter rf is also applied to Auxiliary Power Panel APP in the auxiliary frame for monitoring purposes. The rf amplifier circuits accommodate single sideband, double sideband, independent sideband, frequency shift, facsimile, or cw signals. The linear stages of the RFC raise the level of the input signals as high as 1-kw PEP. This signal is applied to the 10-kw power amplifier in Power Amplifier Section AX-509. A sample of IPA rf is also routed to Auxiliary Power Panel APP in the auxiliary frame for monitoring purposes.

The 10-kw linear power amplifier, operating class AB1, raises the rf level to 10-kw PEP. Either balanced (600 ohms) or unbalanced (50 or 70 ohms) rf output may be used by the customer, depending on the antenna to be used. A sample of 10-kw power amplifier output is also routed to the APP for convenient monitoring. A portion of the high level rf output is rectified and applied to an automatic load and drive control (ALDC) circuit. When this circuit is switched on, a control voltage is applied to the exciter whenever any preset rf signal level is exceeded. This control circuit limits high drive peaks which can be developed during multiple signal transmission and suppresses unwanted transmission products. When operating into an unbalanced antenna, an indication of SWR on the transmission line is applied to the SWCU in the auxiliary frame. When a preset level of SWR is exceeded, an SWR overload signal from the SWCU automatically removes high voltage from the transmitter opening up external interlocks line.

High Voltage Rectifier AX-103 functions together with Main Power Panel AX-504 and Main Power Supply AX-138 to produce the high dc voltages required by the 1-kw IPA and 10-kw PA.

Relay Panel AR-161 contains overload coils that open interlocks cutting off high voltages to the 1-kw IPA and 10-kw PA stages when preset overload levels are exceeded. The protective circuits sample the IPA and PA plate and screen currents, bias supply voltages, and the current in a voltage regulating diode assembly in the main power supply. When any of these currents is excessive, or if a voltage is deficient, the associated protective relay operates and removes high voltage.

An interlock circuit is provided in the transmitter for personnel and equipment safety. When one of these interlocks opens, power is removed from the transmitter, interlocks are opened, HV switch is turned off automatically, and deadman solenoid shorts out high voltage capacitors. Interlock circuits are provided for drawers in which voltages greater than 500 volts are present. Important cooling air ducts are also interlocked for equipment safety.

2-2. RF AMPLIFIER RFC AND POWER SUPPLY AX-104, BLOCK DIAGRAM ANALYSIS. (See figure 2-2.)

The RFC is capable of amplifying rf signals within the frequency range of 2 to 28 mc with a bandwidth of 20 kc. It contains three amplifier stages: V201, V202, and V203. A modulated rf or cw signal is applied to rf amplifier V201, which operates class A. The amplified output of V201 is coupled to driver V202 through wafer A of DRIVER BAND switch S201. This switch selects a tuned circuit in accordance with the signal frequency. Five tuned circuits are available to cover the frequency range of 2 to 28 mc.

Driver V202, which also operates class A, further amplifies the modulated rf or cw signal and its output is coupled to intermediate power amplifier V203 through wafer B of DRIVER BAND switch S201. This switch wafer selects the tuned circuit at the output of V202.

Intermediate power amplifier V203 operates class AB1, and produces a 1-kw output signal. IPA BAND switch S202 connects a tuned circuit in the V203 output circuit in accordance with the signal frequency. This switch covers the 2 to 28 mc range in nine steps. IPA LOADING switch S203 connects additional capacitance to the V203 output circuit when the signal frequency is between 2 and 16 mc. The output signal from V203 is coupled to the 10-kw power amplifier for further amplification.

A portion of the V203 output signal is fed back to driver V202. In V202, this feedback signal is opposite in phase to the input signal, thus providing degenerative (negative) feedback. This negative feedback signal ensures linear amplification of stages V202 and V203.

Except for intermediate power amplifier V203 plate supply voltage, Power Supply AX-104 furnishes all ac and dc voltages required for operation of the RFC. Transformer T2001 in the power supply provides the filament supply voltage. The transformer receives 230 volts ac and produces a 6.0-

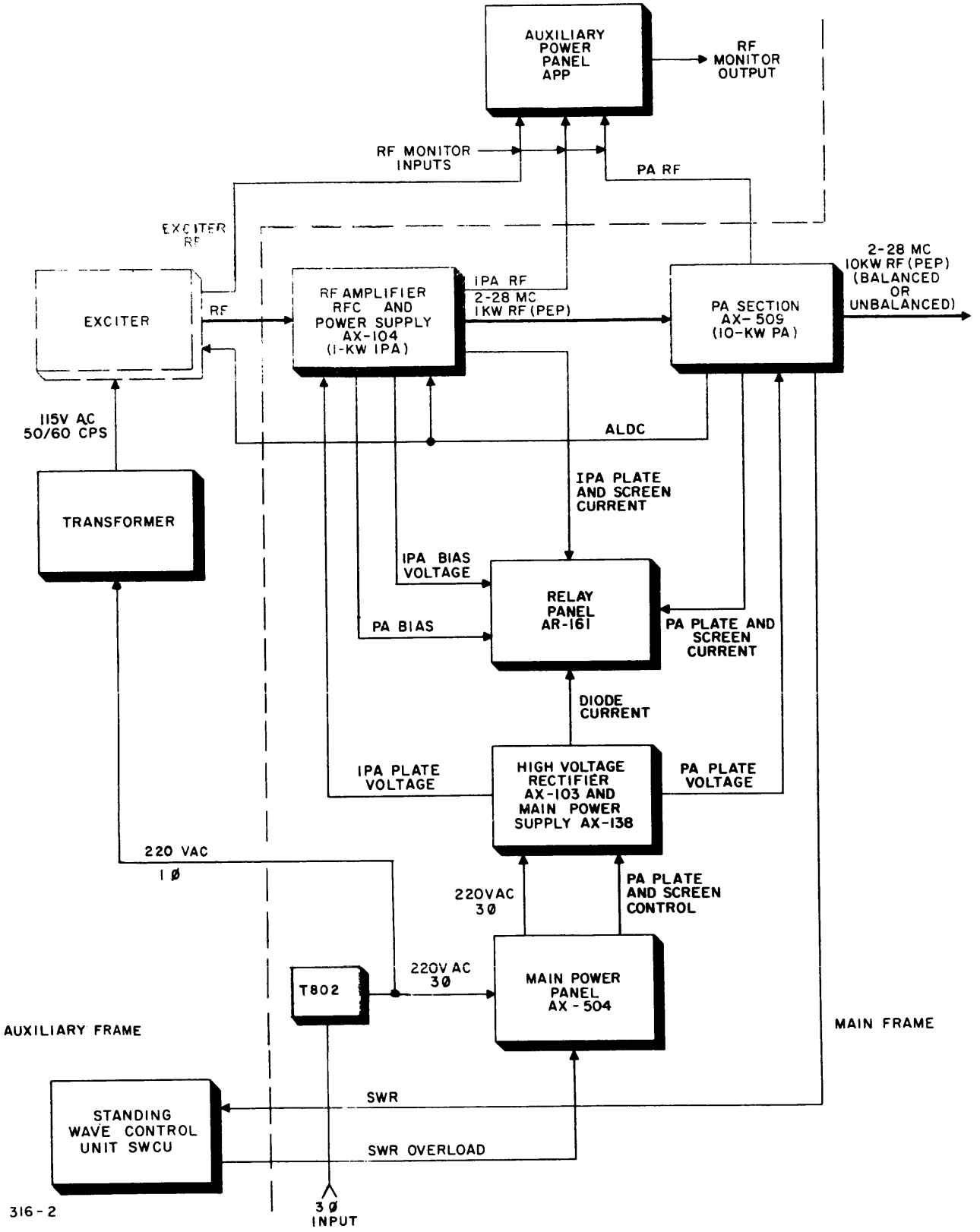


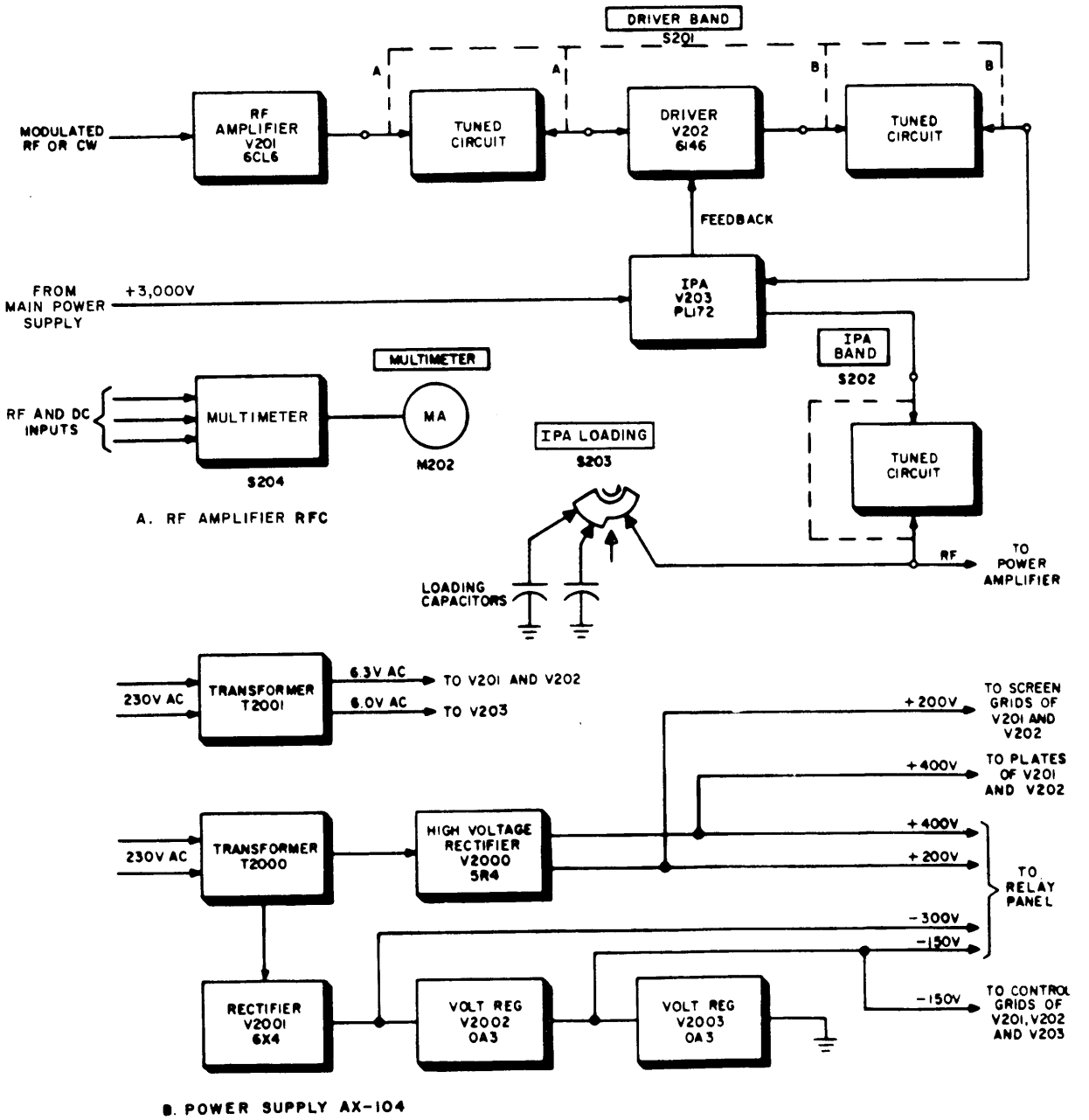
Figure 2-1. GPT-10K Transmitter, Block Diagram

and a 6.3-volt ac output. The 6.3-volt output is applied to the filaments of V201 and V202. The 6.0-volt output is applied to the filament of V203.

The plate of V203 receives +3,000 volts dc from Main Power Supply AX-138. Two rectifiers in the AX-104 provide the remaining dc voltages required by the RFC. High-voltage rectifier V2000 produces outputs of +400 and +200 volts which are used as the plate and screen supply voltages, respectively, for V201 and V202. Rectifier V2001 in conjunction with voltage regulators V2002 and V2003 produces outputs of -300 and -150 volts. The -150-volt output provides the bias voltage for the three amplifier stages. Transformer T2000, which receives 230 volts ac, furnishes the ac operating voltages for the two rectifiers.

The four dc output voltages of the AX-104 are also applied to Relay Panel AR-161. In the relay panel, the two negative voltages are fed to two protective relay circuits K700 and K708. The -300-volt dc output of the power supply is also applied to a voltage divider in the relay panel, the output of which is supplied as a bias supply voltage to the 10-kw power amplifier.

Another relay (K705) in the relay panel returns either the +200- or +400-volt dc output of the AX-104 to the screen of V203. The +200 volts is used as the screen supply voltage when the transmitter is being tuned. The +400 volts dc is the normal operating screen supply voltage.



316-3

Figure 2-2. RF Amplifier RFC and Power Supply AX-104, Block Diagram

MULTIMETER meter M202, in conjunction with MULTIMETER switch S204, provides the means for measuring dc and rf voltages throughout the RFC and AX-104.

2-3. RFC, DETAILED CIRCUIT ANALYSIS.

a. RF AMPLIFIER V201. (See figures 2-3 and 2-4.)

The rf signal supplied at input jack J201 is developed across input resistor R203 and is coupled to the grid of first amplifier V201 through capacitor C211 and resistor R207. Bias for V201 is obtained from a voltage divider across the -150-volt dc output of the AX-104. The bias voltage developed across R202 is applied to the grid of V201 through decoupling Filter elements R204 and C210, rf filter elements L206, L205, C208, and C207, and resistor R206. When Keyer Monitor Control Unit KMCU is used in the transmitter, the ground return at the bias divider is made through relay contacts in the KMCU. When the transmitter is not keyed, the bias divider is ungrounded, and V201 is cut-off. If the KMCU is not used, the bias divider is permanently grounded at terminal board E3001 or connector P3054 in the auxiliary frame. An additional bias, called automatic load and drive control (aldc), can be supplied to V201 through rf choke L242. In the GPT-10K transmitter, the aldc voltage is derived from the power amplifier section. When the 1-kw output of the RFC is fed directly to an antenna, the aldc voltage can be supplied from intermediate power amplifier V203. A jumper wire on terminal block E201 normally connects L242 to the aldc circuit in the power amplifier section.

Screen voltage for amplifier V201 is furnished by +200-volt dc output of the AX-104 through feedthrough capacitor C212 and screen dropping resistor R235. Resistor R235 and capacitor C206 form a decoupling filter which bypasses rf signals from screen to ground. Filament voltage is obtained from the 6.3-volt ac line. Rf choke L207 and capacitor C221 isolates the 6.3-volt ac line from rf voltages.

Plate voltage is applied to amplifier V201 from the +400 volt dc output of the AX-104.

Capacitor C205 couples the amplified rf signal from the plate of V201 to DRIVER BAND switch S201.

Wafer Y of DRIVER BAND switch S201A (figure 2-4) connects the rf signal from V201 to a parallel resonant circuit consisting of variable capacitors C202 and C203, connected in parallel, and one of five inductors: L201, L202, L209, L210, or L211. The inductor selected by S201A depends upon the frequency of the rf signal: L201 is selected for frequencies from 2 to 4 mc (position 1), L202 for 4 to 8 mc (position 2), I209 for 8 to 16 mc (position 3), L210 for 16 to 20 mc (position 4), and L211 for 20 to 28 mc (position 5). The rear portion of DRIVER BAND switch S201A shorts out the four inductors not in use. Capacitor C201 and resistor R208, connected in parallel between the parallel resonant circuit and ground, provide a low impedance which is used in the neutralization circuit of driver V202.

Capacitor C203, which is ganged with capacitor C232 in driver stage V202, is geared to the 1ST AMPL TUNING knob on the front panel and provides means for tuning V201. Capacitor C202 is a trimmer for capacitor C203.

Wafer X of switch S201A connects the rf signal from a tap on the selected inductor to capacitor C214. Capacitor C214 couples the rf signal to the grid of driver V202.

b. DRIVER V202. (See figures 2-4 and 2-5.)

As previously described, the rf signal from the tap on the selected inductor is coupled to the grid of driver V202 figure 2-5 through capacitor C214 and parasitic suppressor resistor R212. Bias for V202 is obtained from a voltage divider across the -150-volt dc output of the AX-104. The bias voltage is developed across series-connected resistors R202 and R205, and is applied to the grid of V202 through feedthrough capacitor C215, rf filter L212 and C213, and grid resistor R232. The rf signal input is also applied to a meter circuit through capacitor C216.

Screen voltage for driver V202 is furnished by the +200-volt dc output of the AX-104 through inductors L249 and L217. Filament voltage for V202, filtered by C221 and L221, is obtained from the 6.3-volt ac line.

Plate voltage is applied to driver V202 from the +400-volt dc output of the AX-104 through inductors L250, L216, and L218 and parasitic suppressor PS202. Inductors L250 and L216 function together with capacitors C224 and C227 to isolate the +400-volt bus from the rf voltages present in the plate load impedance for V202.

The rf signal at the plate of V202 is coupled through parasitic suppressor PS202 and capacitor C230 to DRIVER BAND switch S201B and through variable capacitor C229 to the grid circuit of driver V202. The rf voltage applied through C229 is developed across resistor R208 and capacitor C201, and coupled to the grid through the tap on the selected inductor. Capacitor C229 is adjusted so that the rf voltage developed across R208 and C201 cancels the rf voltage fed back to the grid through the plate-to-grid capacitance. This circuit is included to suppress parasitics.

Wafer Y of DRIVER BAND switch S201B figure 2-4 connects the signal from the plate of V202 to a parallel resonant circuit consisting of variable capacitors C231 and C232, connected in parallel, and one of five inductors: L219, L220, L223, L224, or L225. The inductor selected by switch S201B depends upon the signal frequency: L219 is selected for frequencies from 2 to 4 mc (position 1), L220 for 4 to 8 mc (position 2), L223 for 8 to 16 mc (position 3), L224 for 16 to 20 ma (position 4), and L225 for 20 to 28 mc (position 5). The rear portion of switch S201B

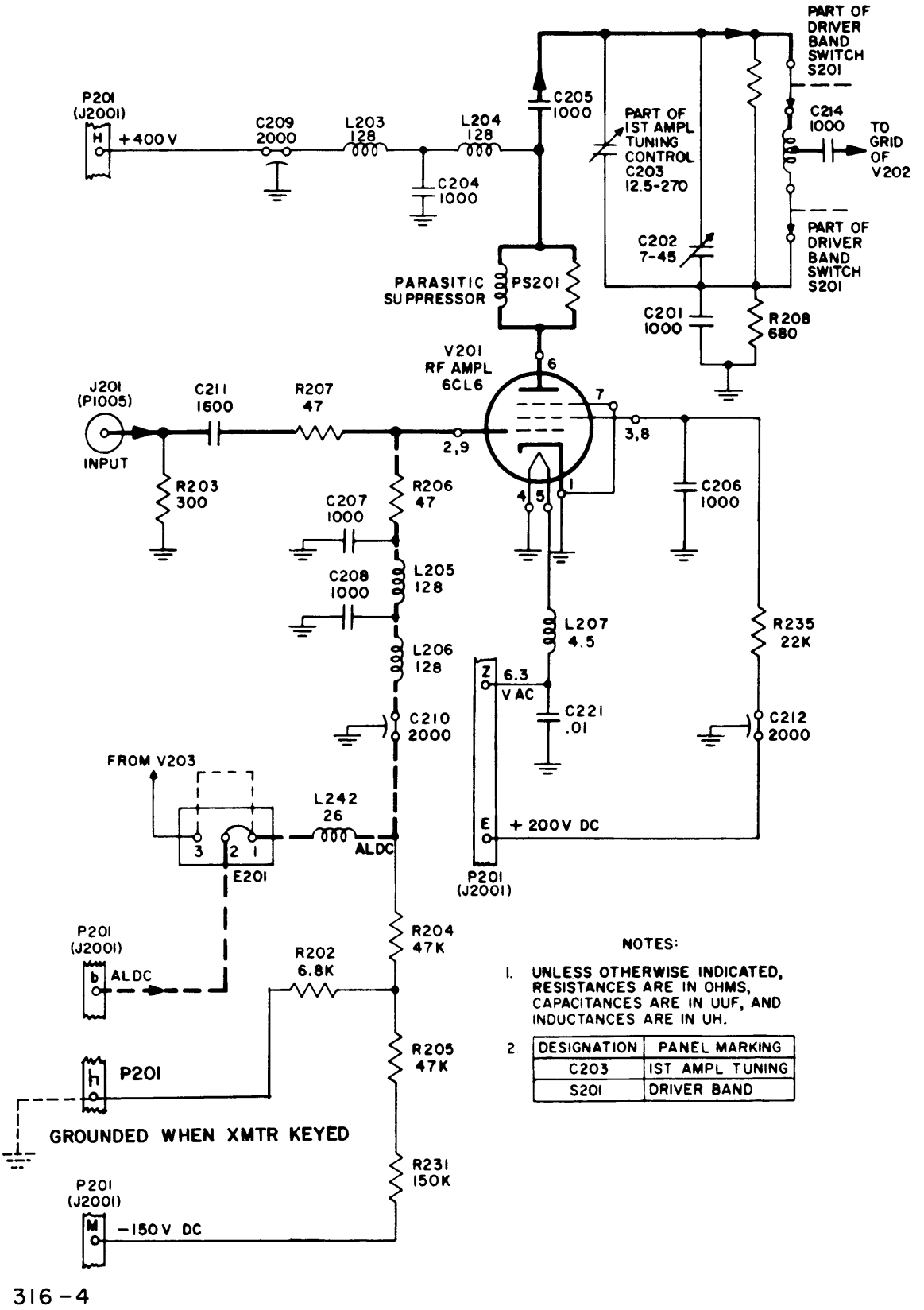


Figure 2-3. RF Amplifier V201, Simplified Schematic

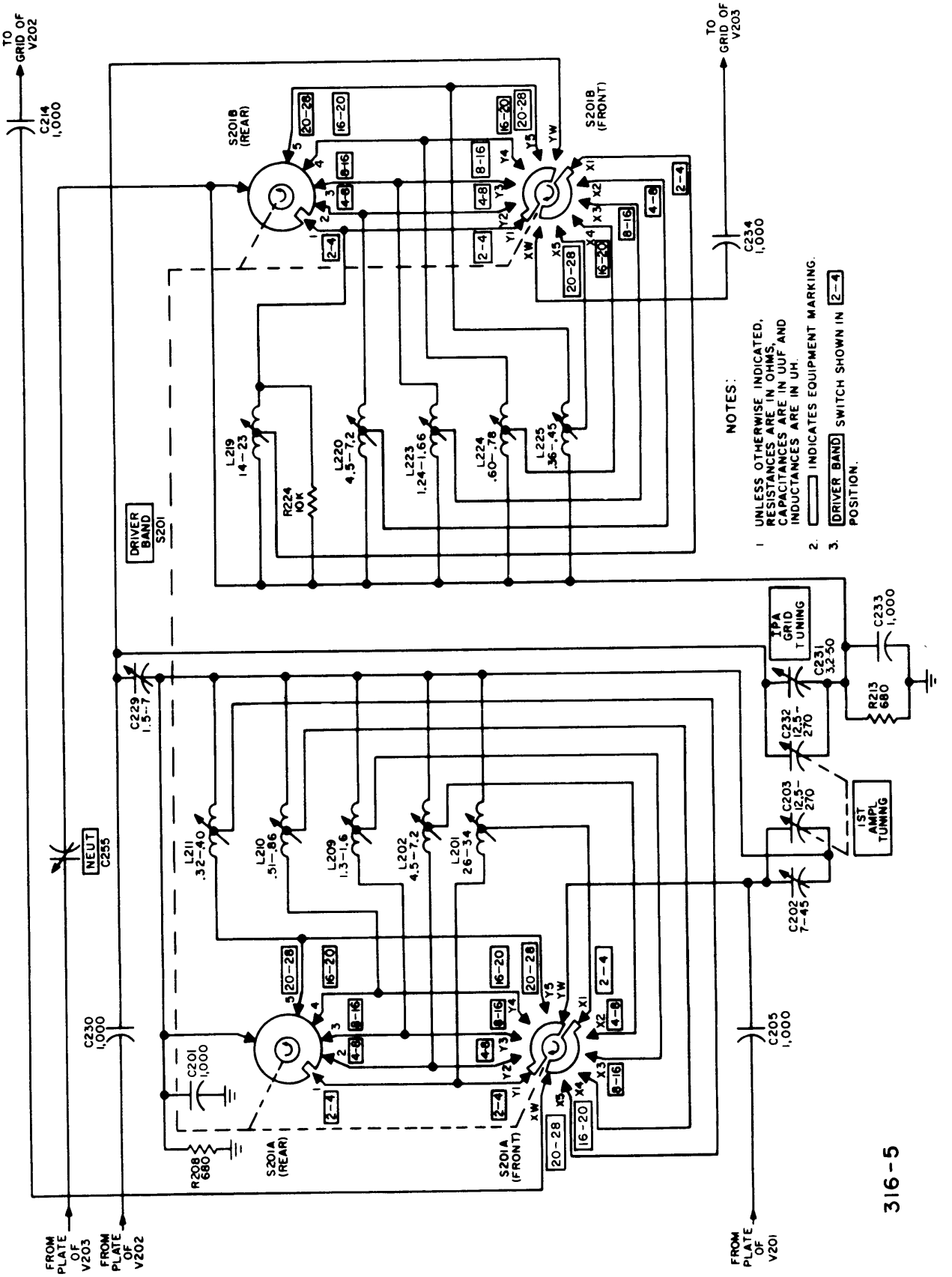


Figure 2-4. DRIVER BAND Switch S201, Simplified Schematic

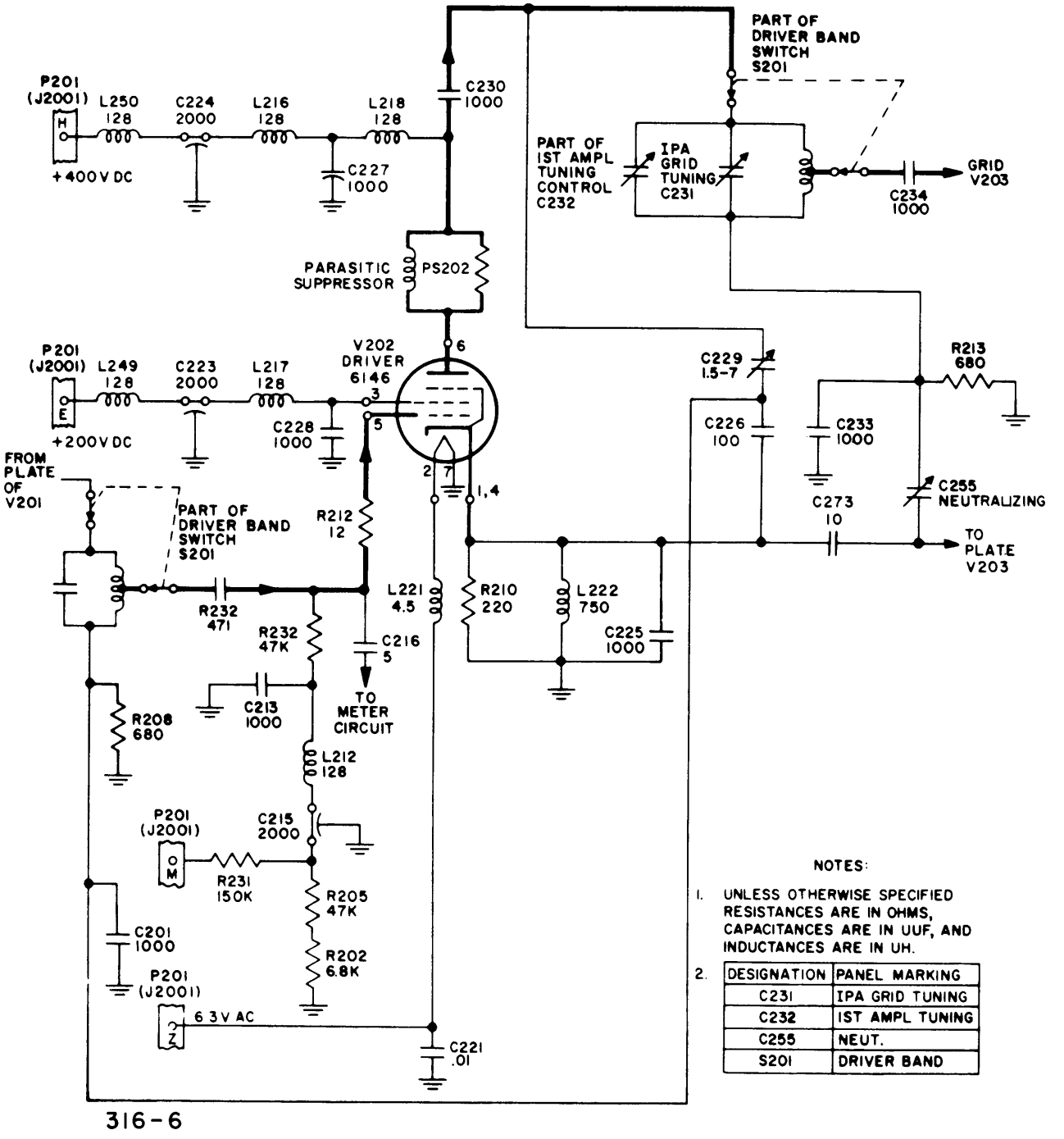


Figure 2-5. RF Amplifier V202, Simplified Schematic

shorts out the four inductors not in use. Capacitor C233 and resistor R213, connected in parallel between the resonant circuit and ground, provide a low impedance which is used in the neutralization circuit of intermediate power amplifier V203. Resistor R224 shunts inductor L219, to provide the required bandwidth at 2 to 4 mc.

Capacitor C232 is ganged with capacitor C203 in the rf amplifier stage, and is geared to the 1ST AMPL TUNING knob on the front panel. Thus, when rf amplifier stage V201 is tuned, driver stage V202 is also tuned. Capacitor C231, which is geared to the IPA GRID TUNING knob on the front panel, provides fine tuning.

Wafer X of switch S201B connects the rf signal from the tap on the selected inductor to the grid of intermediate power amplifier V203 through capacitor figure 2-4 and 2-5. Two signals are returned from the plate of V203. One signal is coupled through neutralizing capacitor C255 to the parallel-connected circuit elements R213 and C233; the other signal is coupled through capacitor C273 to the cathode of driver V202 figure 2-5. This latter signal provides degenerative (negative) feedback from V203 to V202. The feedbaek signal for V202 appears across capacitor C225, inductor L222, and resistor R219. Capacitor C226, connected between the driver neutralizing circuit and the driver cathode, provides grid-to-cathode neutralization.

c. 1-KW INTERMEDIATE POWER AMPLIFIER V203. (See figure 2-6.)

Intermediate power amplifier V203 uses, type PL172 pentode, operates class AB1 to amplify the output from driver V202. The 1000-watt (PEP) output of V203 can be applied directly to an antenna for emergency operation, or as in the GPT-10K, can be supplied to a power amplifier for additional power gain.

The rf signal from the tap on the selected inductor in the plate circuit of V202 is applied to the grid of V203 through capacitor C234, and also to (position 6) on MULTIMETER switch S204 through a rectifier circuit. When MULTIMETER switch S204 is placed in its RF IPA EG X1 position (position 6), MULTIMETER M202 indicates the amplitude of the rf signal supplied to the grid of V203.

The -100-volt dc output of the AX-104 furnishes the bias voltage for V203. This voltage is also routed to position 1 on MULTIMETER switch S204 through resistor R225.

The cathode of V203 is maintained at rf ground by capacitors C290 through C295 connected in parallel between the cathode and ground. Inductors L252 and L251 and IPA PLATE CURRENT meter M201 provide a dc path from the cathode to pin c of P201 and J2001. From this pin, the cathode is connected to ground through a protective relay circuit in the relay panel. Capacitors C288 and C289, together with inductors L252 and L251 isolate the protective relay circuit and the meter from rf voltages. IPA PLATE CURRENT meter M201 measures V203 plate current.

The protective relay circuit consists of IPA PLATE OVLD relay K707 which is paralleled by resistor R710 in series with IPA PLATE OVLD ADJ control R711. The overload coil of relay K707 samples the V203 cathode current. When the current exceeds the operating limit, the relay is energized, causing the high voltage rectifier to shut down. IPA PLATE OVLD ADJ control R711 sets the operating limits of this protective relay circuit.

Screen voltage for V203 is supplied by the +200- or +400-volt dc output of the AX-104. The +400-volt dc output is the normal operating supply voltage. The +200-volt dc output is used when the GPT-10K is being tuned. Thus, when the cathode current increases during tune-up of the electrical equipment cabinet, the overload circuit does not operate because of the reduced cathode current.

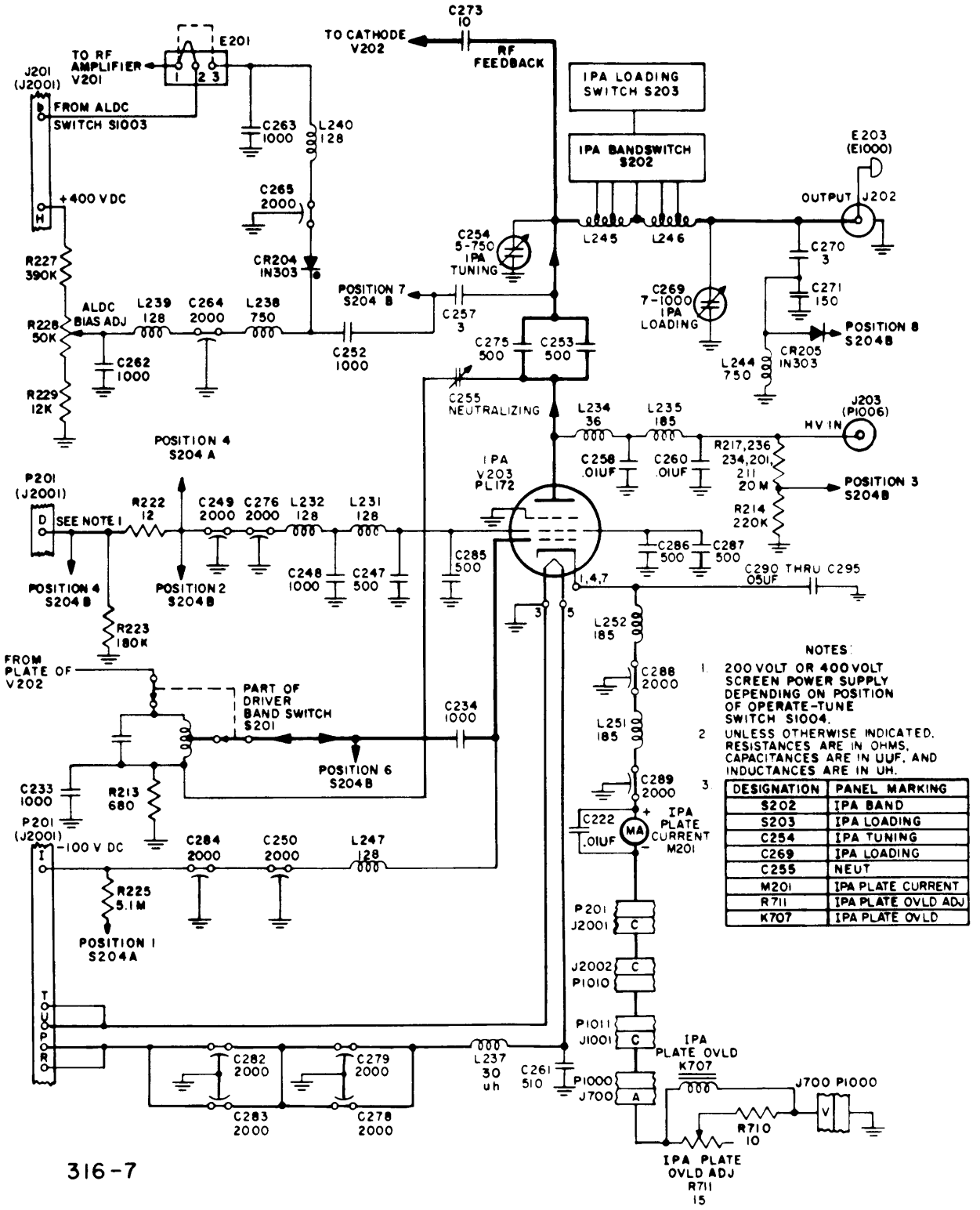
The screen supply voltage appears across resistor R223 and is applied to the screen through resistors R222 and inductors L232 and L231. Capacitors C249, C276, C248, C247, C285, C286, and C287 provide screen bypassing. The dc screen current is measured by MULTIMETER meter M202 when MULTIMETER switch S204 is in its DC IPA ISG X1 position (position 4). The voltage drop across resistor R222 is used for this purpose. The dc voltage applied to the screen is measured when switch S204 is in position 2.

Plate voltage for 1-kw amplifier V203 is obtained from the +3,000-volt output of the main power supply and is applied to the plate through jack J203 and inductors L234 and L235. Inductor L235 and capacitors C258 and C260 form a pi filter which isolates the main power supply from the rf signal appearing across plate load L234. A voltage divider consisting of resistors R217, R236, R234, R201, R211, and R214, all connected in series, provides means for measuring the plate supply voltage. The voltage across R214 is connected to switch S204B (position 3). When the switch is in this position, MULTIMETER meter M202 indicates the amplitude of this supply voltage.

The rf signal at the plate of V203 is coupled back through NEUT capacitor C255 to R213 and C233 in the return of the input tank circuit. Adjustment of capacitor C255 is performed at the front panel of the RFC.

The output signal from V203 is coupled through parallel capacitors C275 and C253 to a pi bandpass filter and to the cathode of driver V202 through capacitor C273. Although the signal fed back to the cathode of V202 causes the gain of stages V202 and V203 to decrease, it ensures an approximate equal signal output at the plate of V203 for all frequencies from 2 to 28 mc.

IPA BAND switch S202 and IPA LOADING switch S203 select the inductors and capacitors which comprise the pi tuning network in the V203 output circuit. IPA BAND switch S202 has nine positions: (1) 2.0-2.5 mc, (2) 2.5-3 mc, (3) 3-4 mc, (4) 4-6 mc, (5) 6-8 mc, (6) 8-12 mc, (7) 12-16 mc, (8) 16-20 mc, and (9) 20-28 mc. When switch S202 is in position 1 (figure 6-1), the pi tuning network in the V203 output circuit consists of IPA TUNING capacitor C254, inductors L245 and L246 connected in series, and IPA LOADING capacitor C269 paralleled by capacitor C259. Capacitor C259 is connected in parallel with capacitor C269 by wafer B of switch S202 in positions 1 through 4 (2 to 6 mc). When switch S202 is in positions 1 through 7 (2 to 16 mc), IPA LOADING switch S203 can connect capacitors C274 and C272 in parallel with capacitor C269. When switch S203 is in (position 1), both capacitors are connected. In (position 2), switch S203 connects only capacitor C274 in parallel with



NOTES:

1. 200 VOLT OR 400 VOLT SCREEN POWER SUPPLY DEPENDING ON POSITION OF OPERATE-TUNE SWITCH S1004.
2. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UUF, AND INDUCTANCES ARE IN UH.

DESIGNATION	PANEL MARKING
S202	IPA BAND
S203	IPA LOADING
C254	IPA TUNING
C269	IPA LOADING
C255	NEUT
M201	IPA PLATE CURRENT
R711	IPA PLATE OVLD ADJ
K707	IPA PLATE OVLD

Figure 2-6. Intermediate Power Amplifier V203, Simplified Schematic

capacitor C269. Both capacitors are disconnected from the output circuit when S203 is in position 3. When switch S202 is in positions 8 or 9, switch S203 is disconnected and therefore performs no function.

Wafer A of IPA BAND switch S202, in positions 2 through 6, shorts out successively larger portions of inductor L246; in position 7, all of inductor L246 is shorted out. In the remaining two positions, this wafer shorts out inductor L246 as well as successively larger portions of inductor L245. The output signal of V203 is connected from the wiper of switch S202, wafer A, to jack J202 and connector E203. Jack J202 may be used to connect the output of the driver to an antenna; connector E203 connects the output of the driver to the 10-kw power amplifier.

The rf signal at both ends of the pi tuning network can be monitored figure 2-6. The signal from the plate end is coupled through capacitor C257 and a rectifier circuit to position 7 of switch S204. When the switch is in the RF IPA EP X100 position (position 7), MULTIMETER meter M202 indicates the rf signal at the plate. When the switch is in the RF PA EG X10 position (position 8), the meter indicates the amplitude of the signal at the output end of the bandpass filter. This signal is coupled to the switch through capacitor voltage divider C270 and C271 and a rectifier circuit including diode CR205 and inductor L244.

In addition to amplifying the rf signal, intermediate power amplifier V203 may be used to develop an automatic load and drive control (aldc) voltage. Diode CR204 is used for this purpose. Back bias for diode CR204 is taken from the arm of potentiometer R228. This potentiometer is connected in series with resistors R227 and R229 all of which are across the +400-volt dc output of the power supply. The back bias voltage is applied to the diode cathode through inductors L239 and L238. Rf voltage is coupled to inductor L238 from the plate of V203 through capacitors C253, C275, C257, and C252. When the negative portion of the rf signal at the junction of inductor L238 and diode CR204 exceeds in amplitude the back bias of the diode, the diode conducts and a negative dc voltage proportional to the rf voltage peak amplitude is developed at terminal 3 of terminal block E201. This negative dc voltage is filtered by a pi filter consisting of inductor L240 and capacitors C263 and C265. When the output of V203 is fed to an antenna, terminals 1 and 3 on E201 are strapped together and this aldc voltage is applied to rf amplifier V201. In the GPT-10K, terminal 3 of E201 is open ended and the aldc voltage from diode CR204 is not used. Instead, the aldc voltage from the 10-kw power amplifier is connected to V201 through ALDC switch S1015 by a jumper strapped between terminals 1 and 2 of E201.

d. METER SWITCHING. (See figure 2-7.)

MULTIMETER M202, functioning together with MULTIMETER switch S204, provides the means for monitoring various dc and rf voltages and one dc current in the RFC and the AX-104. This facility aids in troubleshooting and is also used for tuning the RFC.

Figure 2-7 shows the eight circuits that can be monitored on MULTIMETER M202 and indicates how MULTIMETER switch S204 connects the multimeter to the circuit in each position. When switch S204 is in position 1, the positive terminal of M202 is connected to ground and the negative terminal is connected to the -100-volt dc output of the AX-104 through multiplier resistor R225. Since this voltage is derived from a voltage divider across the -150-volt dc output of the power supply, if the voltage monitored with switch S204 in position 1 is normal, it can be assumed that the -150-volt dc output of the AX-104 is also normal. The -100 volts dc is applied to the grid of intermediate power amplifier V203 through feed-through capacitors C250 and C284 and inductor L247.

The dc voltage applied to the screen grid of V203 is measured when switch S204 is in position 2. This voltage is derived from the +200- or +400-volt output of the AX-104 as determined by the setting of TUNE-OPERATE switch S1004. The supply voltage is developed across resistor R223 and is applied to the screen grid through resistor R222 and inductors L232 and L231. The supply voltage is coupled to the meter through multiplier resistor R221.

With switch S204 in position 3, MULTIMETER M202 indicates the amplitude of the V203 dc plate voltage. The voltage at jack J203 is applied to the meter through a voltage divider network. Resistor R214 shunts the meter. The dc voltage is applied to the V203 plate through inductors L235 and L234.

The V203 screen current is measured when MULTIMETER switch S204 is turned to position 4. Except for the omission of resistor R221 and the addition of resistor R225, the same parts are used for measuring V203 screen current as are used for measuring V203 screen voltage. In this position, the screen supply voltage (+200- or +400-volts dc) is connected to the positive terminal of MULTIMETER M202 and the voltage at the junction of resistors R220 and R225 is connected to the negative terminal of the meter.

The remaining four positions of switch S204 are used when monitoring rf signals. In each of these positions, the rf voltage to be monitored is rectified and filtered before being applied to the meter. The rf signal at the output of V201 (or the input of V202) is coupled to its rectifier circuit through a capacitive voltage divider consisting of capacitors C216 and C217 (position 5, figure 2-7). During the positive half cycle, diode CR201 conducts, charging capacitor C240. The dc voltage is filtered by the double pi network and is applied to meter M202 through resistor R209.

MULTIMETER M202 indicates the amplitude of the rf voltage at the input of V203 when switch S204 is turned to position 6. This voltage is coupled to its rectifier circuit through inductor L227 and capacitor C242, and is developed across parallel connected capacitor C241, inductor L248, and resistor R219. Diode CR202 rectifies this voltage, and the rectified output voltage is filtered and applied to meter M202 through resistor R233.

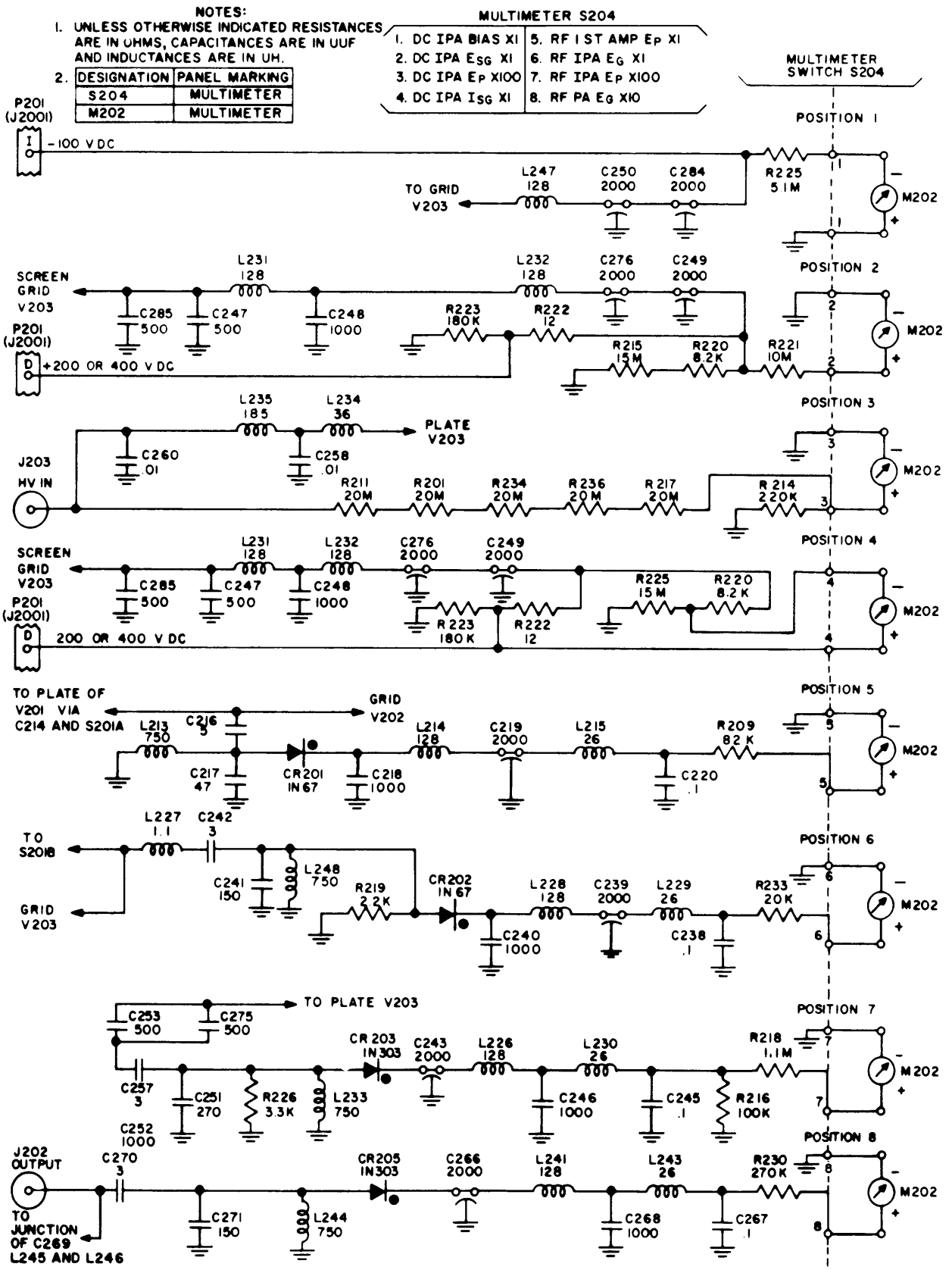


Figure 2-7. MULTIMETER Switch S204, Circuits

The rf voltage at the plate of power amplifier V203 is monitored when MULTIMETER switch S204 is set in position 7. From the V203 plate, rf voltage passes through parallel-connected capacitors C253, and C275 and through capacitor C257 to a parallel network consisting of capacitor C251, inductor L233, and resistor R226. Diode CR203 rectifies the voltage developed across this network and the rectified voltage is filtered and applied to meter M202 through resistor R218.

A dc current proportional to the rf signal amplitude at the output of the RFC flows through MULTIMETER M202 when switch S204 is in position 8. The rf signal at the output of the power amplifier pi filter is voltage divided across capacitor C271, rectified by diode CR205, filtered, and applied to meter M202 through resistor R230.

2-4. AX-104, DETAILED CIRCUIT ANALYSIS.

(See figure 2-14.)

Except for the high voltage supplied to the plate of 1-kw power amplifier V203, a self-contained power supply in the AX-104 furnishes all ac and dc voltages required for operation of the RFC amplifier stages. The AX-104 contains two rectifier tubes: a type 5R4 used as a full-wave rectifier for the plate and screen supply voltages, and a type 6X4 used as a half-wave rectifier for bias supply voltages. Two type OA2 tubes are connected in series at the output of the half-wave rectifier circuit. These tubes regulate the bias voltages. A transformer steps down the input ac voltage to supply voltages required by the filaments of the amplifier stages. The AX-104 also contains miscellaneous components which function with circuits external to the power supply.

a. HALF-WAVE RECTIFIER CIRCUIT.

(1) Three-phase 230 volts ac is applied to the AX-104. The phase 1 to phase 3 voltage is applied to the primary of transformer T2000 through LV 3A fuse F2004. Capacitors C2015 and C2016, connected at each end of the T2000 primary are rf bypass elements. High-voltage ac is connected from terminal 13 of transformer T2000 to the cathode of V2001. Rectifier V2001 converts this ac voltage into a negative pulsating dc voltage. IPA BIAS fuse F2001, in the plate circuit of V2001, protects the tube and transformer from an overload.

(2) The negative pulsating dc voltage at the plates of V2001 is filtered by an LC pi filter. Resistor R2005 functions as a bleeder resistor. Resistor R2004 and voltage regulators V2002 and V2003 form a voltage divider across resistor R2005. The voltage developed across V2003, -150 volts dc regulated, is used as the bias supply for rf amplifiers V201 and V202. In addition, the regulated -150 volts dc is applied across a voltage divider consisting of resistors R2008 and R2010 and IPA BIAS ADJ control R2009. The control is adjusted so that -100 volts dc is applied as the bias supply for 1-kw power amplifier V203.

(3) The voltage available at the junction of resistor R2004 and the cathode of V2002, -300 volts dc regulated, is used in the 10-kw power amplifier bias circuit.

b. FULL-WAVE RECTIFIER CIRCUIT.

(1) Filament voltage for full-wave rectifier V2000 is supplied by terminals 10 and 11 of transformer T2000. Plate voltage for V2000 is supplied by the high-voltage secondary winding at terminals 14 and 16 of T2000. The center tap of this winding, terminal 15, is grounded. Rectifier V2000 converts this ac voltage into a positive pulsating dc voltage. B+ fuse F2000 protects this tube and the associated windings of transformer T2000 from an overload.

(2) The 400-volt dc output of V2000 is filtered by an LC pi filter, then coupled out of the power supply through pin U of connectors J2000 and P2000 and pin J of J2002. The dc voltage at the output of the pi filter is also fed to another filter and to a voltage divider. The voltage divider consists of resistors R2002 and R2003, with +200 volts dc developed across resistor R2003. This voltage is filtered by capacitor C2001B, and is routed to the screen circuits of V201 and V202 through pin N of J2000 and P2000 and pin E of J2001. The +200 volts is also routed to the relay panel through pin K of J2002.

(3) As previously described, the output of the pi filter is applied to another filter consisting of resistors R2000 and R2001 and capacitors C2000 and C2001A. The voltage across the capacitors, +400-volts dc, is applied to the plate circuits of amplifier stages V201 and V202 through pin R of connectors J2000 and P2000 and pin H of J2001.

c. FILAMENT CIRCUIT.

(1) Transformer T2001 steps down the input ac voltage to the voltages required by the filaments of the amplifier tubes. The phase 2 to phase 3 voltage is applied to the primary of T2001 through IPA FIL fuse F2003.

(2) High-frequency components which may be present in the ac input of T2001 are bypassed to ground by capacitors C2019 and C2020. Transformer T2001 provides two output voltages: 6.0 and 6.3-volts ac. The 6.0-volt output is developed between terminals 6 and 7 and coupled to the filament of V203 through pins P and R of J2001. Capacitor C2017 bypasses this winding.

(3) The 6.3-volt output of T2001 is coupled to the filaments of V201 and V202 through pin Z of J2001. This voltage is developed between terminals 5 and 7 of transformer T2001. Capacitor C2018 bypasses this winding.

2-5. 10-KW POWER AMPLIFIER.

a. GENERAL.

Power amplifier V900 uses a type 4CX5000A tetrode, operating class AB1, to amplify the output of RF

Amplifier RFC. The input to V900 is approximately 1,000 watts; the output is 10,000 watts (PEP). Provisions are included to match the output to either a 600-ohm balanced or to a 50- or 70-ohm unbalanced transmission line.

b. DETAILED CIRCUIT ANALYSIS. (See figure 2-15.)

The signal to be amplified by power amplifier V900 is applied to its cathode via DRIVE INPUT jack J901. MONITOR jack J902 provides means for monitoring this signal. The signal is coupled to jack J902 through an RC voltage-divider network consisting of capacitors C941 and C942 and resistors R908 and R910.

Filament power at 7.5-volts, 75 amperes, is supplied to V900 through transformer T801. FIL ADJ switch S1002 in the primary circuit of T801 provides means for adjusting the filament voltage. This voltage is applied to the tube through terminals 9 and 11 of T801 and rf choke L915. Rf choke L915 is the load impedance for the rf input signal applied to V900. Capacitors C946 and C947 maintain the return ends of L915 at rf ground potential. The dc path from cathode to ground is through L915, the secondary of T801, PA PLATE CURRENT meter M1002, a meter rf filter network, and a relay-protective circuit. PA PLATE OVLD relay K701, paralleled by resistor R704 in series with PA PLATE OVLD ADJ control R705, comprises the relay protective circuit. Relay K701 samples the V900 cathode current. When the current tends to exceed the operating limits, the relay is energized causing high voltage to be removed from the transmitter. Control R705 sets the sensitivity of the relay.

Bias for V900 is obtained from Power Supply AX-104. This supply voltage, -300 volts dc, is applied across a voltage divider and a protective relay circuit which includes relay K700 and resistor R700. The relay removes high voltage from the transmitter when the -300-volt dc level is not present. The voltage divider consists of resistor R702 in series with PA BIAS ADJ control R703. The control is adjusted so that 0.5 amperes of plate current flows through V900 with no input signal applied (approximately -240-volts at the grid).

The plate output circuit for V900 is a pi network consisting of inductors L902 and L903, PA BAND switch S900, and variable capacitors C927 and C928. Switch S900 has nine positions which successively short out larger portions of the two inductors as the signal frequency is increased. PA TUNE capacitor C927 in the input side of the pi network and PA LOAD capacitor C928 in the output side of the pi network provide fine tuning and loading, respectively, for the power amplifier output circuit.

Plate voltage for V900 is provided by High Voltage Rectifier AX-103. The high voltage rectifier supplies 7.5-kw to the plate of V900 through inductors L914, L911, L906, L903, and L902. Capacitors C930, C939, and C940 are rf bypass capacitors.

Negative feedback is provided from the plate to grid of V900. Capacitor C929, in series with capacitors C933 through C936, forms an rf voltage divider for this feedback. The negative feedback circuit ensures more linear amplification by power amplifier V900.

The rf voltage developed at the plate of V900 is coupled through capacitor C909 to three circuits: a monitor circuit, a plate rf meter circuit, and an automatic load and drive control (aldc) circuit. The aldc circuit receives a sample of the V900 output signal through a capacitive voltage divider consisting of C909 and C906, with the voltage across C906 and C904. The rf voltage developed across C904 is applied to the cathode of diode CR900. The diode is biased by a positive de voltage taken from the wiper arm of ALDC ADJ control R1004. Control R1004 is connected in series with resistor R1003 across the 400-volt dc bus.

When the amplitude of the negative portion of the rf signal applied to diode CR900 exceeds the bias voltage of the diode, the diode conducts. The diode output, a negative voltage proportional to the amplitude of the rf signal peaks, is filtered by a two-section pi filter and is coupled to ALDC switch S1003. When switch S1003 is in its ON position, this negative dc voltage can be used as an addition bias in rf amplifier V201 in the RFC-1. Switch S1003 also coupled this negative voltage through J1008 to the exciter which supplies the input signal to the RFC-1. When switch S1003 is in the OFF position, the output voltage of diode CR900 is open ended.

The plate monitor circuit consists of two successive voltage dividers with the output of the second voltage divider coupled to PA MONITOR jack J900. The rf signal at the plate of V900 is applied through capacitor C909 to a voltage divider consisting of capacitors C908 and C910. The voltage across C910 is also developed across series-connected resistors R902 and R903. Resistor R903 develops the rf signal to be monitored at PA MONITOR jack J900.

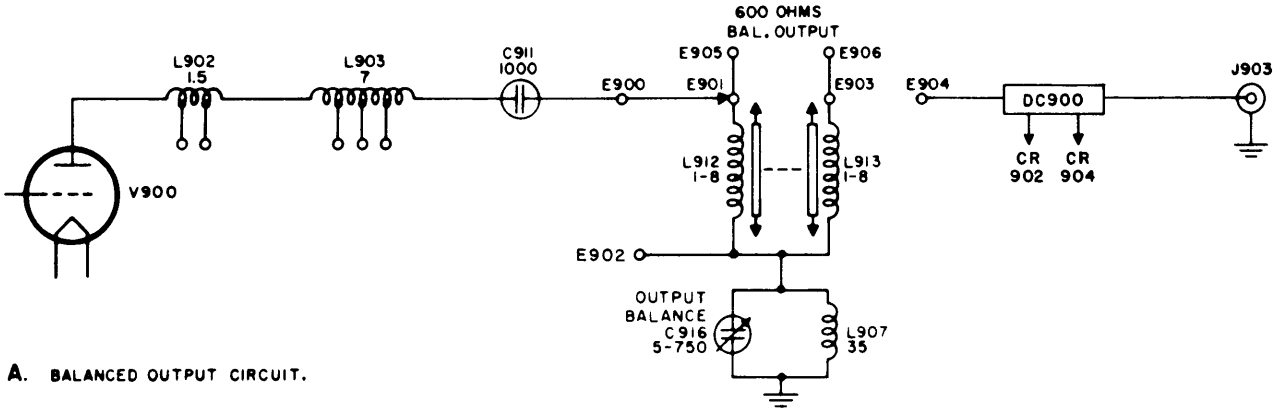
Screen voltage is supplied to V900 from the 600- or 1,200-volt bus. The 600-volt bus is used when the TUNE-OPERATE switch on the main power panel is in the TUNE position. When the switch is in the OPERATE position, the 1,200-volt bus is used. The selected voltage is applied to the screen of V900 through PA SCREEN CURRENT meter M1001 and inductor L909. Inductor L909 and its associated capacitors isolate the meter and selected bus from any rf voltages present in the V900 screen. Capacitor C1022 bypasses meter M1001. Resistors R914 and R915, connected in series, form a bleeder circuit which discharges the capacitors in this screen circuit.

Provisions are included to match the output of the pi network in the plate circuit of V900 to a 600-ohm balanced or to a 50-ohm unbalanced transmission line. For balanced output, the rf signal from the pi network is coupled by capacitor C911 to a modified T-network consisting of variable inductors L912 and L913 and variable capacitor C916 paralleled with

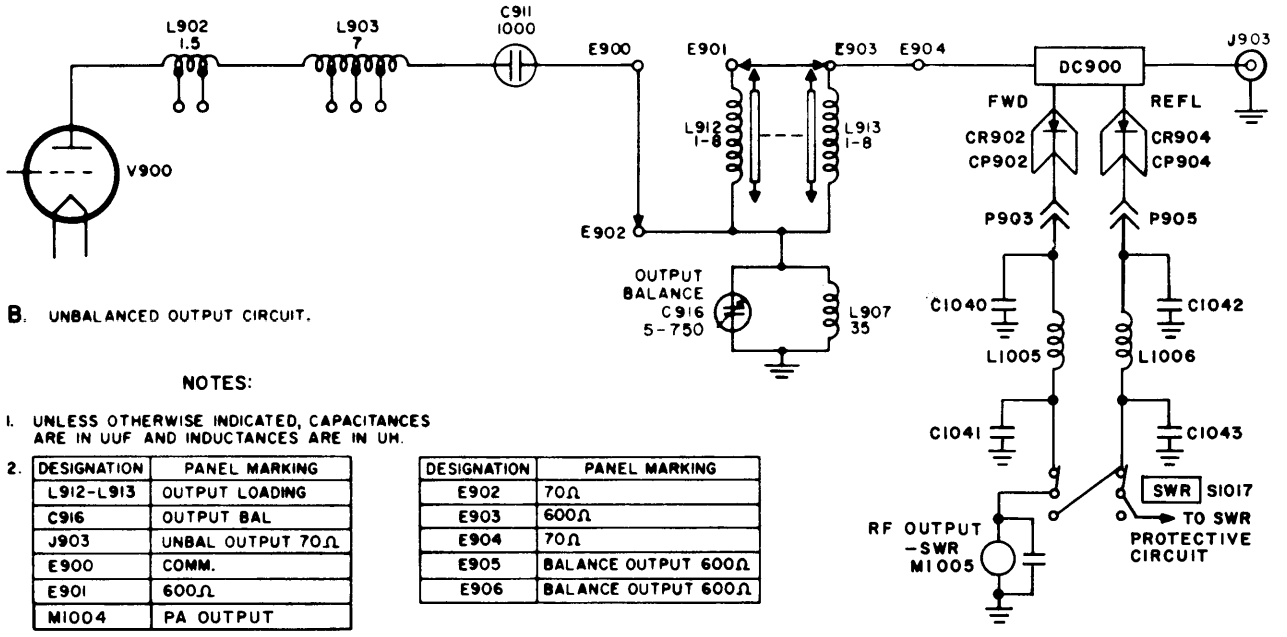
inductor L907 (A, figure 2-8). Inductors L912 and L913 are geared to the OUTPUT LOADING knob on the front panel and C916 is geared to the OUTPUT BAL control on the front panel. These variable elements are adjusted to produce a 180-degree phase displacement between the two currents supplied at 600-ohm terminals E901 and E903.

For unbalanced output, the output of the pi network is fed through capacitor C911 to an L network (B, figure 2-8). One leg of the L network consists of OUTPUT BAL capacitor C916 paralleled with inductor L907, and the other leg consists of inductors L912 and L913 now connected in parallel. The output signal is then coupled through directional coupler DC900 to jack J903. Directional coupler DC900 provides the means for measuring the output power of the transmitter and SWR of the transmission line on meter M1005. Forward power from DC900 is rectified by diode CR902, filtered by pi-filter elements C1040, L005, and C1041, and normally applied through spring-loaded contacts of SWR switch S1017 to meter M1005. The meter provides an indication of transmitter output power in kilowatts PEP. Reflected power from DC900 is rectified by diode CR904, filtered by pi-filter elements C1042, L1006, and C1043, and is normally applied through contacts on SWR meter S1017 to an SWR protective circuit. (Refer to paragraph 2-9.) When the switch is depressed, input to the protective circuit is opened and meter M1005 reads SWR.

Since meter M1005 is not used when the output is connected for balanced operation, two rf ammeters must be connected between the inculators at the top of the transmitter and the balanced transmission line to measure the output current.



A. BALANCED OUTPUT CIRCUIT.



B. UNBALANCED OUTPUT CIRCUIT.

NOTES:

1. UNLESS OTHERWISE INDICATED, CAPACITANCES ARE IN UUF AND INDUCTANCES ARE IN UH.
2.

DESIGNATION	PANEL MARKING
L912-L913	OUTPUT LOADING
C916	OUTPUT BAL
J903	UNBAL OUTPUT 70Ω
E900	COMM.
E901	600Ω
M1004	PA OUTPUT

DESIGNATION	PANEL MARKING
E902	70Ω
E903	600Ω
E904	70Ω
E905	BALANCE OUTPUT 600Ω
E906	BALANCE OUTPUT 600Ω

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Figure 2-8. Balanced and Unbalanced Output Circuits, Simplified Schematic

FILAMENT PRIMARY meter M1000 (figure 2-15) is connected between the 230 V tap (terminal 3) and the 0 V tap (terminal 8) on the primary of transformer T801. Primary power is applied to transformer T801 through FIL ADJ switch S1002. This switch has seven contacts each of which connects to a different tap on the primary of T801 with a bypass capacitor (C803 through C809) connected from each tap to ground. Input voltages from 190 to 250 volts, in increments of 10 volts, can be selected in this manner. The capacitor connected by switch S1002 and capacitor C810 bypass to ground any high-frequency components present in the transformer primary. The primary of transformer T801 also functions as an autotransformer to produce an output of 230 volts which is applied to FILAMENT PRIMARY meter M1000, to Power Supply AX-104, and to the high voltage rectifier. Switch S1002 is adjusted so that meter M1000 indicates 230 volts.

The amplitude of rf voltage developed at the plate of V900 is measured by PA PLATE RF meter M1003. Rf voltage is coupled from the plate of V900 by capacitor C902 to a rectifier circuit, the dc output of which is applied to the meter. From capacitor C909, the rf signal passes through capacitor C905 and inductor L905 and is applied to the cathode of diode CR901. The dc output of the diode is filtered and applied to meter M1003 which provides a reading of power amplifier rf plate voltage.

2-6. EMERGENCY POWER AMPLIFIER OPERATION. (See figure 2-9.)

Although the nominal output of the GPT-10K transmitter is 10-kw PEP, it can be readily adapted for emergency 1-kw PEP operation. Figure 2-9 compares the balanced and unbalanced connections for normal and emergency operation.

For normal balanced operation (A, figure 2-9), the output of the 10-kw power amplifier pi filter (including PA LOAD capacitor C928) is coupled through C911 to inductors L912 and L913, and OUTPUT BAL capacitor C916, as previously described. For emergency operation (C, figure 2-9), the connections from the output pi filter are removed, and the output cable from the 1-kw amplifier V203 in the RFC is connected to C911, completely bypassing the 10-kw amplifier. Thus, the 1-kw PEP output of V203 is coupled to the balanced output circuit for application to the balanced antenna.

Since the GPT-10K is normally set up for either balanced or unbalanced output operation (as determined by the strapping made on the antenna tuner terminal board), the changes made from normal unbalanced output operation (B, figure 2-9) to emergency unbalanced operation (D, figure 2-9) are the same as for balanced operation. In this case, the 1-kw PEP output of V203 is coupled to the unbalanced output circuit, again bypassing the 10-kw power amplifier.

2-7. RELAY PANEL PROTECTIVE RELAY CIRCUITS. (See figures 2-16 and 2-17.)

Seven relays in Relay Panel AR-161 sample five currents and two voltages in the GPT-10K Transmitter. During normal operation, contacts on these seven relays form a series circuit, as shown in figure 2-16. This series circuit permits two contactors to be energized. These contactors, K3000 and K3001, control the application of power to the high voltage rectifier. When one of these seven relays senses an excessive current or a deficient voltage, the relay operates and opens the series circuit. This action deenergizes the two contactors which then removes power from the high voltage rectifier. (Power control circuits are described in later paragraphs.)

Relay K700 is energized when the -300-volt dc output from Power Supply AX-104 is present. (See A, figure 2-17.) Since this voltage is used to supply bias for power amplifier V900, this relay is called the PA BIAS relay. The relay coil is connected in series with resistor R700 across the -300-volt level which enters the relay panel at pin S of J700. The relay has four sets of contacts, three of which are connected in parallel. When the relay is energized, the three parallel sets of contacts form part of the series circuit which energizes the two contactors. At this time, the fourth set of contacts is open.

If the -300-volt output of the AX-104 should fail, relay K700 is deenergized. This action opens the three parallel sets of contacts, deenergizing the two contactors. The fourth set of contacts (connected to terminals 5 and 6 of E700) now connects ac voltage to PA BIAS indicator lamp I700, which lights to indicate that the power amplifier bias supply circuit is faulty.

PA PLATE OVLD relay K701 also has four sets of contacts, three of which are connected in parallel and form part of the series circuit which energizes contactors K3000 and K3001. (See B, figure 2-17.) The fourth set of contacts on relay K701 (connected to terminals 7 and 8 of E700) controls PA PLATE OVLD indicator I701.

Relay K701 has two coils; an overload coil and a reset coil. As previously described, the cathode current in power amplifier V900 divides between the overload coil of relay K701 and the series circuit consisting of resistor R704 and PA PLATE OVLD ADJ control R705. Setting the control determines the relative amount of current in the coil and therefore the sensitivity of the circuit. When the cathode current is normal, the relay is in the reset state. At this time, its three parallel sets of contacts are closed and its fourth set of contacts is open.

When the PA cathode current in power amplifier V900 exceeds its normal operating limit, relay K701 switches to its overload state. In this state, the three parallel sets of contacts open, breaking the series circuit (figure 2-16) and contactors K3000 and K3001 are deenergized. The fourth set of contacts in relay K701 close, connecting voltage to PA PLATE OVLD indicator lamp I701. This indicates that a plate current overload has occurred in the 10-kw PA. (Although the cathode current is the sum of the plate and screen currents, PA SCREEN OVLD indicator I702 would go on if only the screen current was excessive. Therefore, this cathode overload circuit is called the plate overload circuit.)

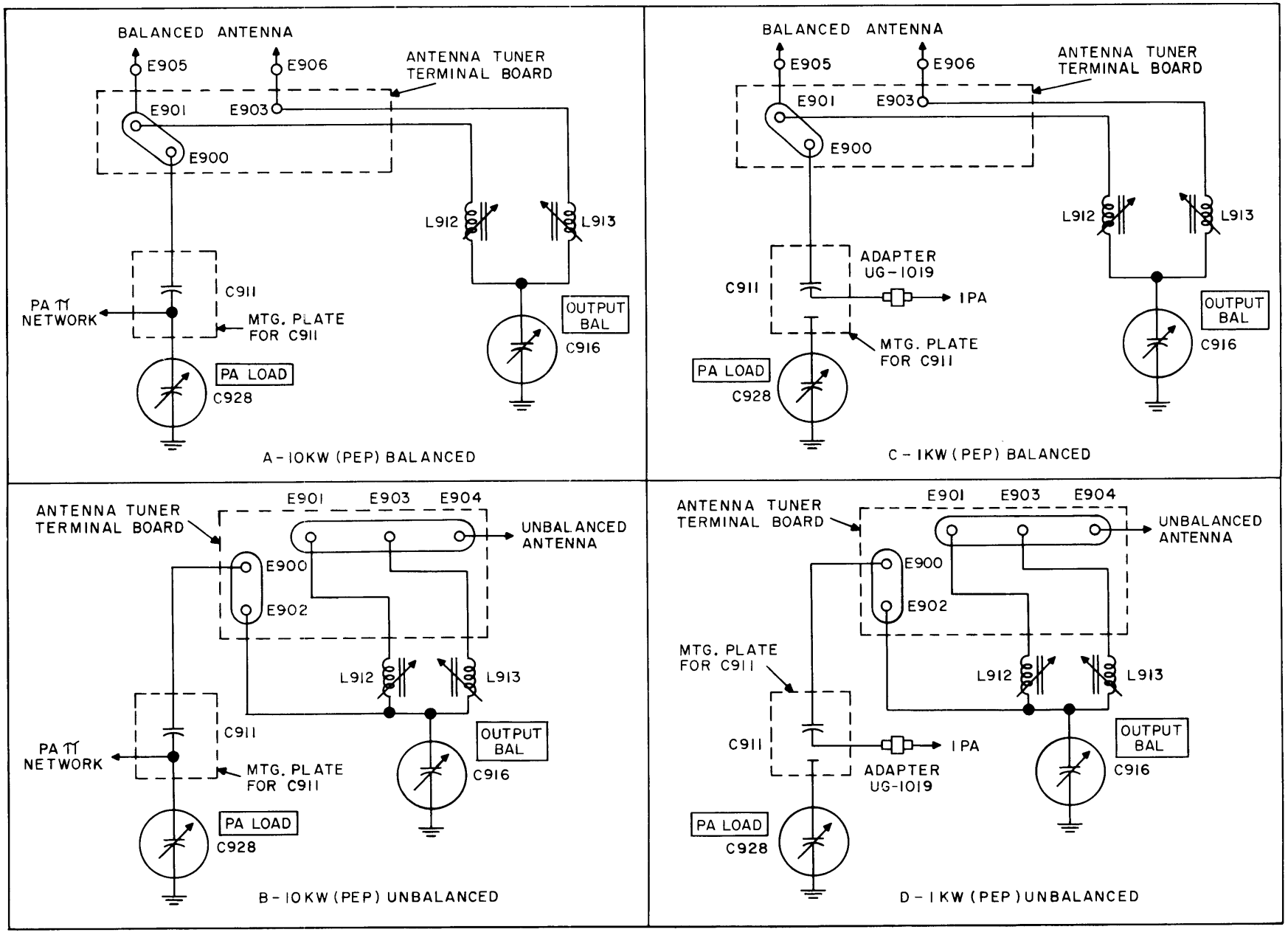


Figure 2-9. 10-kw VS 1-kw Balanced and Unbalanced Output Operation

To return relay K701 to its reset state after an overload has occurred, OVERLOAD RESET pushbutton switch S1000 on the main power panel must be operated. This action causes ac voltage to be applied across the relay reset coil. The relay then switches to its reset state and remains in this state after the pushbutton switch is released until another overload condition is detected.

Except for the sampling current and the associated indicator lamp, PA SCREEN OVLD relay K702 functions in the same manner as PA PLATE OVLD relay K701 (See C, figure 2-17.) PA SCREEN OVLD indicator lamp I702 lights when relay K702 detects excessive screen current in power amplifier V900.

The screen current of power amplifier V900 enters the Relay Panel at pin A of J701. This current passes through E708 and a set of contacts of relay K703 to E706. From E706, this current divides into two paths. One path is through the overload coil of relay K702; the other path is through resistor R706 in series with PA SCREEN OVLD ADJ control R707. This control determines the relative division of screen current in these two paths. The screen current returns to either the 1,200-volt or 600-volt dc output of the main power supply through relay K705. (Relays K703 and K705 are described in later paragraphs.)

Current flow in the screen voltage regulator of the main power supply is sampled by the overload coil of ZENER DIODE PROTECT relay K704. (See D, figure 2-17). The relay coil is paralleled by R701 in the ground return path of this supply voltage. When excessive current flows in this regulator circuit, due to one or more diodes short circuiting, relay K704 switches to its overload state and a set of contacts in the series energizing circuit of contactors, K3000 and K3001 opens. This relay has four sets of contacts, but the remaining three sets of contacts are not used. After the relay is in the overload state, it is necessary to operate the OVERLOAD RESET pushbutton switch on the main power panel to return the relay to its reset state. The reset coil of relay K704 is connected in parallel with the reset coils of relays K701, K702, K706, and K707. When OVERLOAD RESET pushbutton switch S1000 is operated, all these relays remain in or return to the reset state.

IPA SCREEN OVLD relay K706 and IPA PLATE OVLD relay K707 function in a similar manner to that described for PA PLATE OVLD relay K701. The current sampling circuit of IPA PLATE OVLD relay K707 is described in paragraph 2-3c. When relay K707 detects an overload, contacts on this relay apply ac voltage to IPA PLATE OVLD indicator lamp I704. (See E, figure 2-17.)

The screen current of 1-kw power amplifier V203 enters the relay panel at pin B of J700. (See F, figure 2-17.) In the relay panel, the screen current divides between the overload coil of relay K706 and the series combination of resistor R708 and IPA SCREEN OVLD ADJ control R709. This control determines the relative division of screen current in these two paths. The total screen current is then applied to contacts on TUNE-OPERATE relay K705. Relay K705 connects the screen current to the +400- or +200-volt output of Power Supply AX-104.

Relay K706 switches to its overload state when the screen current of intermediate power amplifier V203 rises above 30 ma. When the relay is in the overload state, its three parallel sets of contacts open the series-energizing path for contactors K3000 and K3001 and the fourth set of contacts connects ac voltage to IPA SCREEN OVLD indicator lamp I703.

The coil of IPA BIAS relay K708 is connected in series with resistor R712 across the -150-volt dc regulated output of the AX-104 applied at pin M of connector J700. (See G, figure 2-17.) When the -150-volt input is present, relay K708 is energized and three of its four sets of contacts form part of the series circuit which energizes contactors K3000 and K3001. The fourth set of contacts opens when the relay is energized. When the -150-volt input is not present, relay K708 is deenergized. The three sets of contacts now open the energizing circuit of the contactor, causing the high voltage rectifier to shut down.

2-8. CONTROL RELAY CIRCUITS. (See figure 2-10.)

Two control relays are included in the relay panel. Relay K703 controls the application of voltage to the screen circuit of 10-kw power amplifier V900, and relay K705 determines the amplitude of the dc voltage supplied to this screen circuit and to the screen circuit of 1-kw power amplifier V203.

To apply voltage to the screen of power amplifier V900, PA SCREEN switch S1005 must be set to ON. This switch then connects the ac phase 2 voltage to one end of the coil of PA SCREEN ON-OFF relay K703. The other end of the coil connects to the phase 3 voltage through REAR FAN 5 AMP fuse F703. This phase 2 to phase 3 ac voltage energizes relay K703, and its single set of operative contacts close, completing the dc path between the V900 screen and its supply voltage. (The REAR FAN fuse is included in this circuit as further protection for the 10-kw power amplifier screen, since the rear fan normally cools the screen regulating diode assembly on TB800. If the fuse opens, relay K705 is deenergized and screen voltage is removed from V900.)

Either the +1,200- or the +600-volt output of the main power supply is used as the screen supply voltage for V900, and either the +400- or the +200-volt output of Power Supply AX-104 is used as the screen supply voltage for 1-kw power amplifier V203. The voltage connected to each of these screens is determined by TUNE-OPERATE relay K705, the status of which is controlled by TUNE-OPERATE switch S1004.

The lower voltages are supplied to these screen circuits when switch S1004 is set to TUNE. In this position, the switch connects the phase 2 voltage to one side of TUNE indicator lamp I1001 through

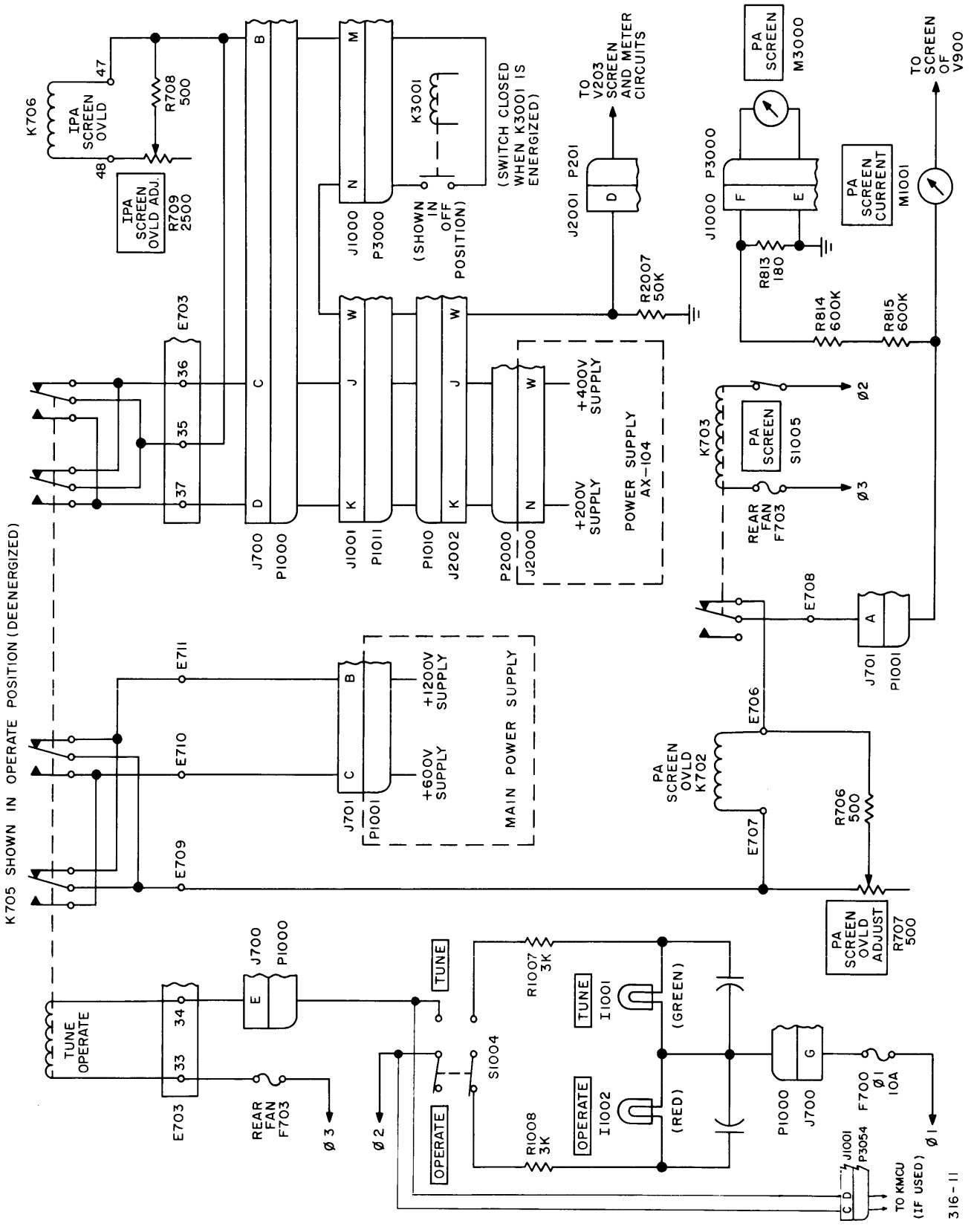


Figure 2-10. Screen Supply and Control Circuits, Simplified Schematic

Resistor R1007, and to one end of the relay K705 coil through pin E of connectors P1000 and J700. The other end of the relay coil connects to the phase 3 voltage through REAR FAN fuse F703. With relay K705 energized, its normally open contacts connect the screen circuits of V203 and V900 to the lower dc voltages. When switch S1004 is turned to OPERATE, the phase 2 voltage is connected to OPERATE lamp I1002 through resistor R1008 and is removed from TUNE lamp I1001 and relay K705. With relay K705 deenergized, its normally closed contacts connect the higher voltages to the screen circuits of V203 and V900. When Keyer Monitor Control Unit KMCU is used in the transmitter, the relay control contacts of TUNE/OPERATE switch S1004 are parallel wired to relay contacts in the KMCU. TUNE/OPERATE relay K705 is energized (placing the 1 Kw IPA and 10 Kw PA in tune condition) during no-keying periods.

For purposes of completeness, the complete screen supply circuits for power amplifiers V203 and V900 are shown in figure 2-10. Note that for V900, the selected screen voltage (either 1200 volts or 600 volts) from the main power supply is routed through contacts on K705, through PA SCREEN OVLD relay K702, contacts on K703, and PA SCREEN CURRENT meter M1001 to the screen grid circuit of V900. The dc voltage at the input of M1001 is also applied to PA SCREEN VOLTAGE meter M3000 through voltage divider elements R813 through R815.

For 1-kw amplifier V203, the selected screen voltage (either 400 volts or 200 volts) from Power Supply AX-104 is routed through contacts on relay K705, through IPA SCREEN OVLD relay K706, and normally open contacts on contactor K3001 to the screen grid circuit of V203. It should be noted that screen voltage can be applied to V203 only after high voltage is applied to the transmitter. If high voltage is automatically removed as a result of an overload in any of the protective circuits, screen voltage is simultaneously removed from 1-kw power amplifier V203.

2-9. SWR PROTECTIVE RELAY CIRCUIT.

As shown in figure 2-8, reflected power on the unbalanced transmission line of the transmitter is coupled from directional coupler DC900 to diode CR904 and a pi filter consisting of C1042, L1006, and C1043. The resulting rectified positive filtered output voltage is applied through connectors J1009, P3050, and P3051 to input connector J105 on the SWCU. (See figure 2-11.) In the SWCU, the SWR-derived dc input voltage is applied through pi filter elements C108, L103, and C109 to the coil of relay K102. This relay becomes energized at a dc current of 50 microamperes. Switch S102 permits relay K102 to become energized at either a 2-to-1 or 3-to-1 SWR by switching in an appropriate series resistor.

Dc amplifier V101 controls the operation of SWR overload relay K101. During normal operation (when relay K102 is deenergized), V101A is slightly biased by the cathode voltage developed across R106. As a result, plate current in V101A is high and plate voltage is low. Since the plate of V101A is dc-coupled to the grid of V101B through R114, the grid voltage of V101B is low. The cathode of V101B is maintained positive by a voltage divider network consisting of R105, SWR OVLD ADJ control R104, and resistor R107. The combination of low grid voltage and fixed positive voltage at the cathode of V101B prevents the plate current of V101B from energizing the overload coil of the SWR relay.

The dc output of the full wave rectifier power supply is applied to Zener diode CR101 through R108. The fixed positive 3-volt level developed across CR101 is applied to a normally open contact on relay K102. When the SWR-derived voltage at input connector J105 is sufficiently high, relay K102 is energized. The 3-volt level across the Zener diode is then applied to the cathode of V101A. The resulting plate voltage rise at V101A is coupled through R114 to the grid of V101B, causing the plate current in V101B to rise. This action energizes the overload winding of SWR relay K101.

With K101 energized, phase 3 voltage is routed from J102-B, through OVLD LIGHT fuse F101 to SWR OVLD lamp I705 in the relay panel, lighting the lamp. Simultaneously, phase 2 voltage is applied to the interlock switch circuit, turning off transmitter high voltage. (Refer to paragraph 2-11.) Relay K101 remains in the overload position until OVERLOAD RESET switch S1000 on the main power panel is depressed. This action energizes the reset winding of K101, resetting the relay.

2-10. HIGH VOLTAGE RECTIFIER AX-103 AND MAIN POWER SUPPLY AX-138.

The high voltage rectifier and main power supply function together to produce dc output voltages of +7, 500, +3, 000 +1, 200 and +600 volts. The latter two voltages are regulated.

a. POWER INPUT CIRCUITS.

Three-phase ac power enters the main frame of the GPT-10K transmitter at terminals E1008, E1009 and E1010. (See figure 2-18.) After being filtered by a pi line rf filter in each of the three lines, the three-phase power is applied to MAIN POWER circuit breaker CB1000. The phase 2 and phase 3 input voltages are also applied to the auxiliary frame through similar pi line filters.

In the auxiliary frame, AUXILIARY FRAME MAIN POWER circuit breaker CB3000 applies this ac voltage to the primary of voltage-regulating transformer T3000. The T3000 secondary voltage, 110 volts ac regulated, is made available at eight power receptacles (J3007 through J3014), and applied to front fan B3000 through FRONT FAN fuse F3000. Capacitor C3018 is used for starting the fan motor.

After passing through MAIN POWER circuit breaker CB1000, the primary three-phase power is distributed throughout the main frame. The three-phase primary power is applied to the primary of three-phase transformer T800 through contactors K3000 and K3001. Each contactor has four pairs of contacts, three of which are connected in series with the primary power lines. Voltage dropping resistors R3000, R3001, and R3002 shunt these three pairs of contacts in contactor K3000.

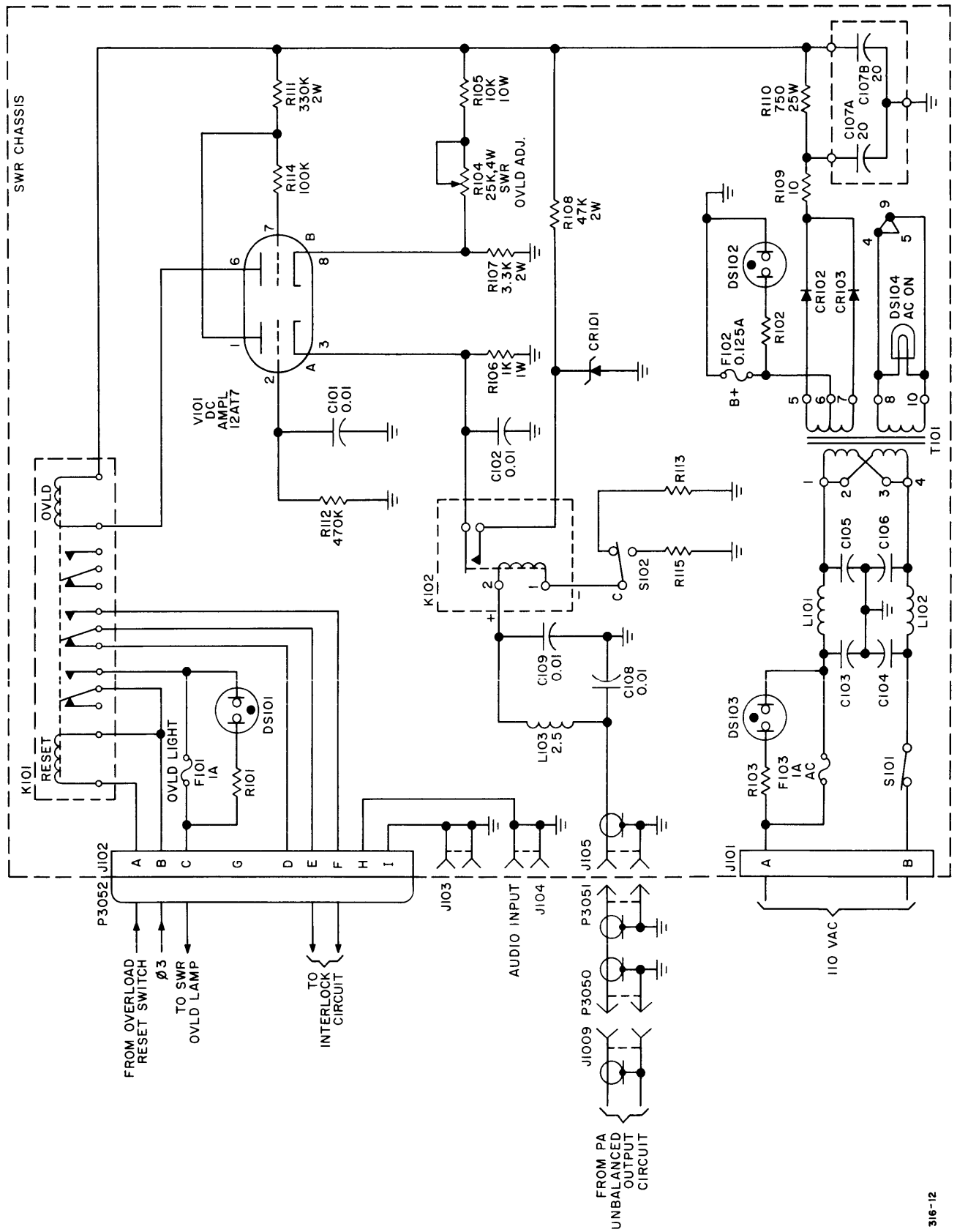


Figure 2-11. Standing Wave Control Unit SWCU, Schematic Diagram

The coil of contactor K3001 is connected between the phase 1 and phase 2 lines. The phase 1 line is connected to one end of the K3000 coil through HIGH VOLTAGE circuit breaker CB1001, and the phase 2 line is connected to the other side of the coil through the interlock and protective relay circuits. As long as all interlock and protective relay circuits are closed and MAIN POWER circuit breaker CB1000 and HIGH VOLTAGE circuit breaker CB1001 are ON, contactor K3001 is energized. The fourth contact pair in this contactor then completes the path for intermediate power amplifier V203 screen current, as previously described.

The coil of contactor K3000 is connected in parallel with the K3001 coil when the switch on timer M3003 is closed. The timer is also connected in parallel with the K3001 coil and provides a 20-second delay between the energizing of contactors K3001 and K3000. During this 20-second interval, the three-phase ac input voltage is applied to the primary of three-phase transformer T800 through voltage dropping resistors R3000, R3001, and R3002 and three contact pairs of K3001. Approximately two-thirds of the input voltage is dropped across these three resistors. When the 20-second delay expires, contactor K3000 is energized and three of its four contact pairs short out resistors R3000, R3001, and R3002. At this time, the full ac input voltage is applied to the primary of T800.

The fourth pair of contacts in contactor K3000 is used in an alarm circuit. If ALARM switch S700 is set to ON, an audible alarm is energized through these contacts whenever high voltage is removed from the main power supply.

When contactors K3000 and K3001 are both energized, primary power is applied to three-phase transformer T800. HV ON lamp I3000 and PLATE ON lamp I1003 are connected across two of the primary windings of T800. When K3001 is energized, these lamps light dimly. At the end of the high voltage time delay, full voltage is applied to these lamps, causing them to light brightly. PLATE TIME meter M702 comes on at this time and records total time that high voltage is applied.

Each primary winding of T800 has five taps which match the windings to input voltages from 210 to 250 volts in increments of 10 volts. The high-voltage secondary of three-phase, delta-wye transformer T800 connects to the high voltage rectifier through pressure terminals E1004 through E1006.

b. HIGH VOLTAGE RECTIFIER CIRCUIT.

The high voltage rectifier uses six type 872A mercury vapor rectifier tubes to produce an output of +7,500 volts dc. This output voltage is filtered by the main power supply which also uses this high voltage to develop outputs of +3,000, +1,200, and +600 volts.

Three-phase ac voltage is supplied to the high voltage rectifier from the secondary of transformer T800. This voltage enters the high voltage rectifier at terminals E611, E610, and E609, and in applied to rectifier V600 through V605 which form a three-phase bridge rectifier circuit. (See figure 2-12.) Filament voltage is applied to these six tubes by filament transformers T600 through T605, respectively. Primary voltage is supplied to these transformers from filament transformer T801 through terminals E607, and E608, and fuses F600 through F605.

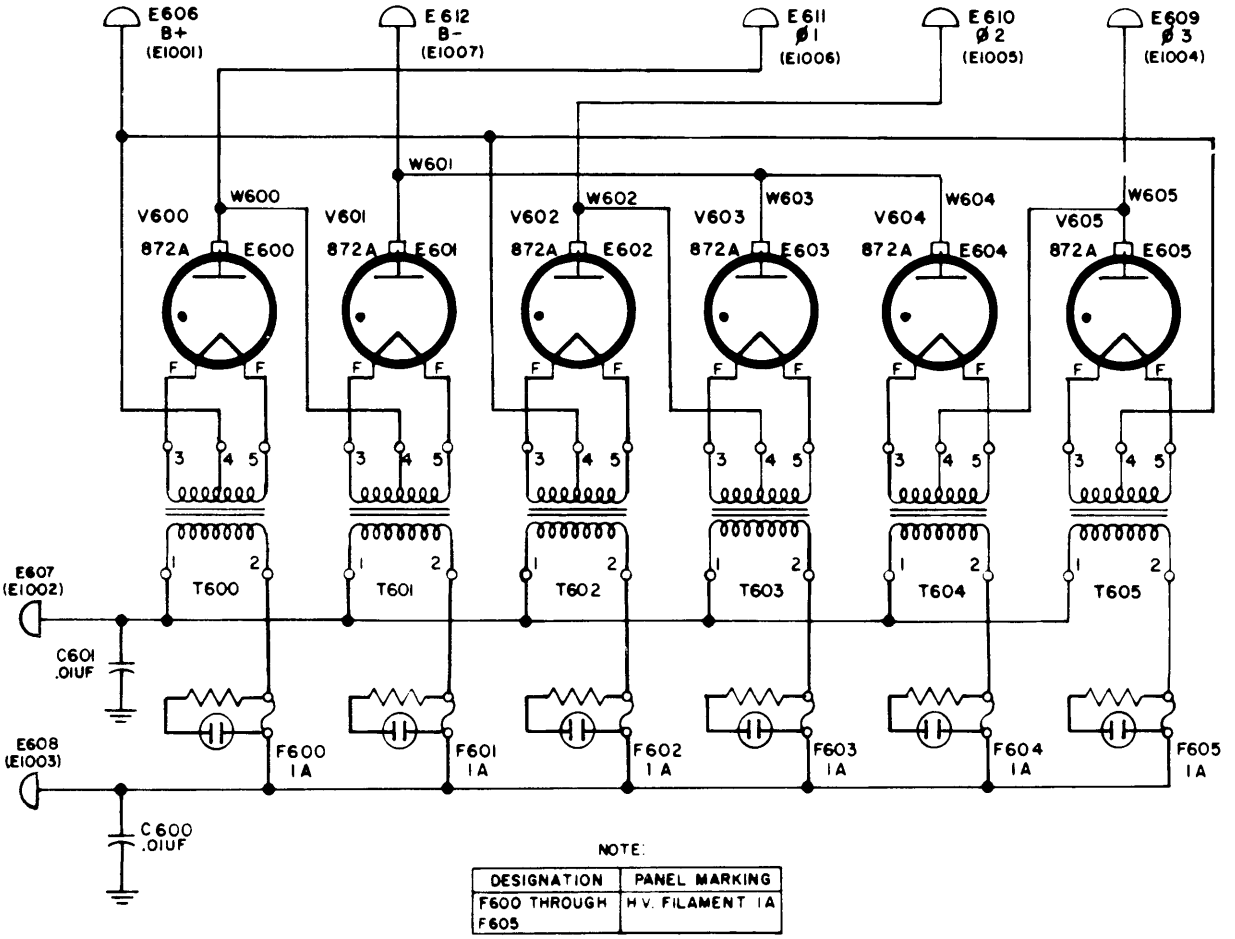
The dc output of the full-wave bridge circuit is developed across filter capacitor C800 through filter choke L800, external to the high voltage rectifier circuit. (See figure 2-13.) The +7,500-volt output across C800 is supplied to the plate circuit of power amplifier V900. Series resistors R804 through R809, connected across capacitor C800, function as a bleeder. Also connected across C800 are series resistors R810, R811, and R812. These three resistors form a voltage divider with the voltage across R812 applied through pin C of J1000 to PA PLATE meter M3002.

Capacitor C801 in the main power supply is effectively connected between the neutral of the T800 secondary and rectifiers V601, V603, and V604, in a half-wave bridge configuration. The +3,000-volt output developed across capacitor C801, is routed to the plate circuit of power amplifier V203.

A voltage divider (resistors R802 and R803 and diode assembly CR800) across the +3,000-volt output provides regulated output voltages of +1,200 and +600 volts. The +1,200-volt output is developed across the diode assembly which consists of six Zener diodes, CR800A through CR800F, and six current-limiting resistors, R802 through R827. Capacitor C802 filters the +1,200-volt output and resistor R821 is a bleeder for this capacitor. Zener diode CR800A returns to ground through pin X of P1000 and a previously described protective relay circuit in the relay panel.

The +1,200- and the +600-volt outputs of the main power supply also are connected to the relay panel as described in previous paragraphs. The +600 volts is applied to the relay panel through resistor R818 and pin C of P1001; the +1,200-volts is applied to the relay panel through pin B of P1001.

A high voltage shorting circuit is included in the main frame for personnel safety. The +3000-volt line is connected to terminal E802 and the +7,5000-volt line is connected to terminal E801 through resistor R817 for this purpose. When the high voltage is off, high voltage shorting coil L802 is de-energized and a shorting bar controlled by L802 shorts terminals E801 and E802 to ground. During normal operation, L802 is energized and the short is removed. High voltage shorting coil L802 also operates switch S801. This switch, in the energizing path for contactors K3000 and K3001, is described in connection with the interlock circuits in later paragraphs.



316-13

Figure 2-12. High Voltage Rectifier AX-103, Schematic

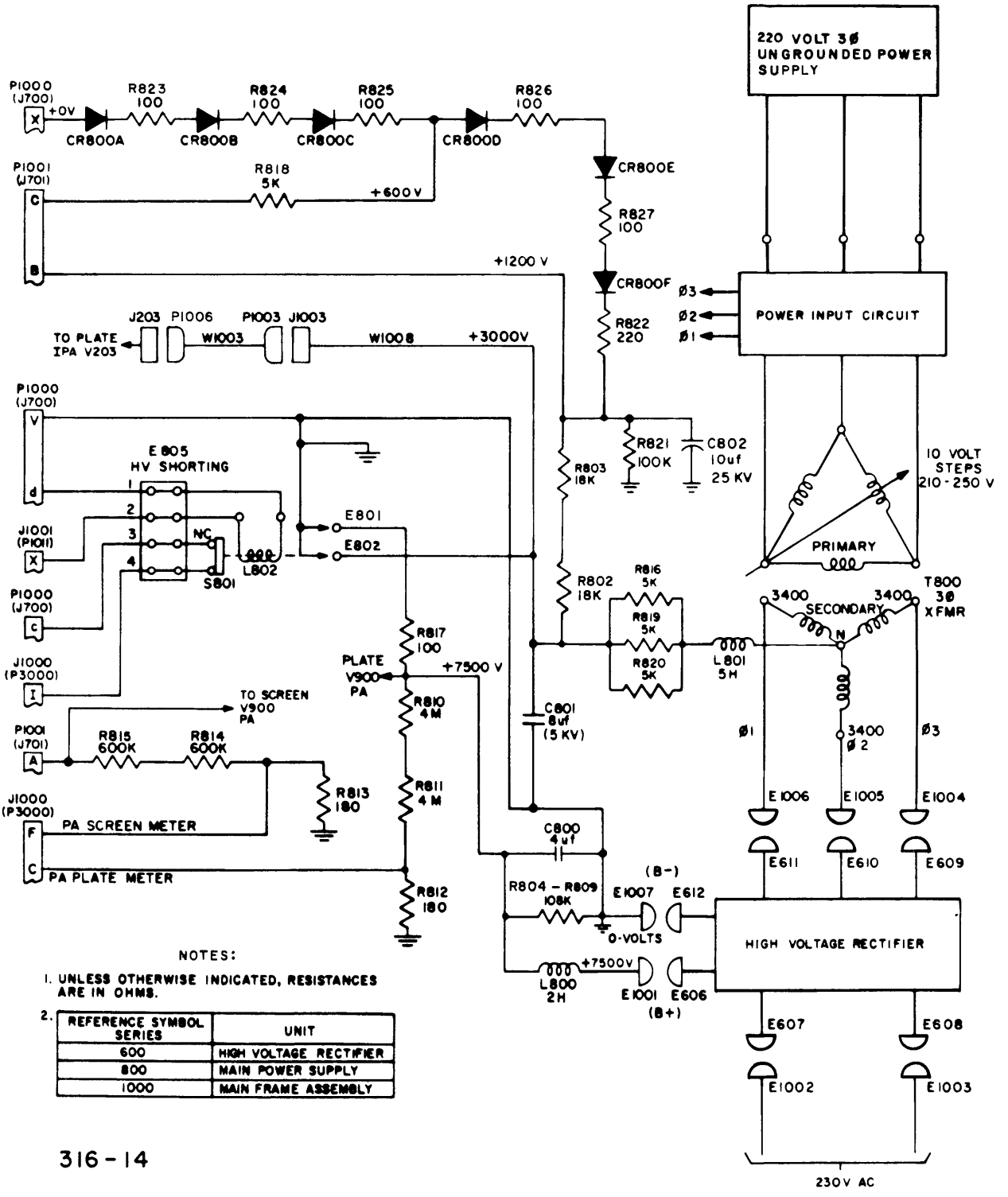
2-11. INTERLOCK CIRCUITS. (See figure 2-19.)

Ten interlock switch circuits are distributed throughout the GPT-10K transmitter for the safety of both equipment and personal. The interlock switch circuits function together with the protective relay circuits for this purpose. When any of the interlock switch or protective circuits are open, power cannot be supplied to the high voltage rectifier. Interlock switches in the right side and rear door are included primarily for personnel safety.

As shown in figure 2-19, the ten interlock switches are connected in series. Two of these switches, pa air switch S800 and air switch S206, ensure that blower B201 in the RFC and main blower B800 in the main power supply, respectively, are functioning. The other eight interlock switches check that bandswitches, doors, and equipment are in their normal operating positions. For example, bandswitch interlocks S205 and S901 are operated by the detents on IPA BAND switch S202 and PA BAND switch S900, respectively, and ensure that these switches are in operating positions and not between positions.

The interlock switch circuits and the protective circuits provide a series circuit which connects phase 2 voltage to one end of high-voltage shorting coil L802. The control path is through switches S205 and S206, external interlock jumper E3000-8 and E3000-10, switches S1006, S800, S1007, S1008, S1009, S1010, and S1011 to the relay panel through pin a of P1000. In the relay panel, the switch on TIME DELAY meter M701 connects this ac voltage to pin d of connector P1000. One end of coil L802 connects to this pin through terminal 1 in terminal block E805. The other end of L802 connects to the phase 1 voltage through terminal 2 of E805. This phase 1 to phase 2 voltage energizes L802.

With L802 energized, switch S801 is closed. The phase 2 voltage at pin d of P1000 is then coupled through series contacts of protective relays K700, K701, K702, K704, K706, K707, and K708 in the relay panel, then to one end of the coils of contactors K3000 and K3001 and timer M3003 through now-closed switch S801. The other end of the coils of contactors K3000 and K3001 and timer M3005 connects to the phase 1 voltage through pin A of J1000 and HIGH VOLTAGE circuit breaker CR1001.



NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS.
2.

REFERENCE SYMBOL SERIES	UNIT
600	HIGH VOLTAGE RECTIFIER
800	MAIN POWER SUPPLY
1000	MAIN FRAME ASSEMBLY

Figure 2-13. Main Power Supply, Simplified Schematic

When the interlock switches and the switch on TIME DELAY meter M701 are in their normal operating positions, INTERLOCK INDICATOR lamp L1004 lights. The phase 1 voltage is applied directly to the lamp, while the phase 2 voltage at pin d of P1000 connects to the lamp through terminals 12 and W of INTERLOCK switch S1001 (rear) and resistor R1005.

When one of the interlock switches is not in its normal operating position, the phase 2 voltage path to contactors K3000 and K3001, coil L802, and INTERLOCK INDICATOR lamp I1004 is open. At this time, the lamp is off and the contactors and coil are deenergized. When high-voltage shorting coil L802 is deenergized, two contacts operated by L802 short the +7,500- and +3,000-volt dc lines in the main power supply to ground. This action discharges the filter capacitors in the +7,500- and +3,000-volt lines, providing a personnel safety feature. In addition, the phase 2 voltage is applied to HIGH VOLTAGE circuit breaker CB1001 through the normally open contact of the open interlock switch and resistors R1000 and R1001, tripping the circuit breaker.

The phase 1 to phase 2 voltage is also applied to circuit breaker CB1001 during the warm-up time provided by meter M701. During this time, the phase 2 voltage is connected to the circuit breaker through contacts C and 2 of M701, contacts 2 on the interlock switches, and resistors R1000 and R1001. If circuit breaker CB1001 is set to ON during this warm-up time, this voltage causes the circuit breaker to trip. This feature prevents the premature application of high voltage to the GPT-10K transmitter.

When the GPT-10K is shut down because of the operation of an interlock switch, INTERLOCK switch S1001 and INTERLOCK INDICATOR lamp I1004 can be used to rapidly localize the trouble to a particular interlock switch circuit. When switch S1001 is rotated clockwise from the NORMAL position, indicator I1004 lights for all positions up to the open circuit and is off for all other positions. For example, assume BAND SW switch S900 is not in a normal operating position (between positions). This causes contacts C and 1 of pa band switch S901 to open and contacts c and 2 to close. With INTERLOCK switch S1001 in the IPA BAND SW position (position 1), the phase 2 voltage is applied to the indicator through switch S205, contacts 1 and W of the front section of S1001 and resistor R1005. When switch S1001 is in the IPA AIR SW position, the phase 2 voltage is connected to the indicator through switches S205 and S206, contacts 2 and W of S1001, and resistor R1005. In the EXTERNAL position (position 3), the jumper between terminals 8 and 10 of terminal block E3000 is added to the switches to complete the lamp circuit. Similarily, in the REAR DOOR position (position 4), switch S1006 is added to this circuit, and in the PA AIR SW and PA DECK positions, switches S800 and S1007 are successively added in series with the previously mentioned switches. However, when switch S1001 is turned to the PA BAND SW position (position 7), the indicator lamp does not light because switch S901 interrupts the lamp circuit. The lamp does not light for the succeeding positions of S1001 for the same reason.

Another interlock indicator, DRAWER INTERLOCK indicator lamp I2000, is located on the front panel of Power Supply AX-104. This lamp lights when IPA DRAWER interlock switch S1009 is not in its normal operating position. This lamp is included because switches S1009 and S1010 are both added to the series circuit for INTERLOCK INDICATOR lamp I1004 when switch S1001 is turned from the RIGHT SIDE position (position 8) to the HV DECK position (position 9). Thus, if lamp I1004 goes on with switch S1001 in the RIGHT SIDE position and goes off with S1001 in the HV DECK position, either interlock switch S1009 or S1010 could be open. However, if DRAWER INTERLOCK lamp I2002 is now on, switch S1009 is open; if lamp I2002 is now off, switch S1010 is open.

Normally open contacts of relay K101 in the SWCU are connected between the phase 2 voltage source at E3000-8 and the number 2 contacts on the interlock switches. During unbalanced output operation, relay K101 is energized when SWR becomes excessive. As a result, phase 2 voltage is applied to HIGH VOLTAGE circuit breaker CB1001, through resistors R1000 and R1001, tripping it. This action automatically turns off the transmitter when a predetermined degree of SWR is exceeded.

2-12. AC POWER DISTRIBUTION. (See figure 2-20.)

Three-phase power is supplied to the GPT-10K Transmitter at terminals E1010, E1009 and E1008 in the main frame. An rf line filter connects the three phase power to MAIN POWER circuit breaker CB1000; phase 2 and phase 3 lines are rated to AUXILIARY FRAME MAIN POWER circuit breaker CB3000 through another filter. With circuit breaker CB3000 closed, power is supplied to transformer T3000. Transformer T3000 is a self-regulating transformer which produces an output of 110-volts ac. This voltage is supplied directly to eight power receptacles and through FRONT FAN fuse F3000 to blower B3000. Power receptacles J3007 through J3014 are used to connect primary power to the exciter units in the auxiliary frame.

Except for voltage supplied to transformer T800, the three-phase voltage is distributed throughout the main frame when MAIN POWER circuit breaker CB1000 is closed. The three-phase voltage from CB1000 is applied to main blower B800 through separately fused lines. AC POWER indicator lamp I1000 is connected in series with resistor R1006 between the phase 1 and phase 2 lines. The phase 1 and phase 3 voltages are also supplied to blower B3001 through REAR FAN fuse F703. Fluorescent lamp I3001 and its associated circuit receives the phase 1 to phase 2 voltage from the circuit breaker. This voltage also activates FILAMENT TIME meter M700 which indicates the total time filament power has been supplied to the filaments of V900 and V600 through V605. Phase 2 voltage is also fed to transformer T801, FILAMENT PRIMARY meter M1000, fluorescent lamps I1005 and I1006 and their associated circuit, and LIGHT switch S1014 and lamp I1007. The lamp circuits also connect to the phase 1 voltage at pin G of P1000. The phase 3 voltage is supplied to transformer T801 through FIL ADJ switch

S1002. This switch provides means for matching the phase 2 to phase 3 voltage to the primary of transformer T801. When this switch is in the proper position, FILAMENT PRIMARY meter M1000 indicates 230 volts (red line).

The 230 volts across meter M1000 is supplied to the high voltage rectifier through terminals E1003 and E1002. The phase 3 voltage at the 230-volt tap of T801 is applied to transformers T2000 and T2001 in Power Supply AX-104. Transformer T2001 supplies filament voltage for V201, V202 and V203. The phase 2 voltage at the primary of T2001 is also coupled to blower B201 which also receives the phase 3 voltage.

Transformer T2000 receives the phase 1 voltage from CB1000. The output of transformer T2000 is applied to the +400-, +200-, -300- and -150-volt power supplies in the AX-104.

As previously described, the 230 volts across FILAMENT PRIMARY meter M1000 is applied to the high voltage rectifier through terminals E1003 and E1002 which mate with terminals E608 and E607, respectively. In the high voltage rectifier, this voltage is applied to six filament transformers. Although filament voltage is supplied to these six tubes, plate voltage is withheld from these tubes until a switch on TIME DELAY meter M701 operates. Since the high voltage rectifier provides plate and screen voltage for power amplifier V900, TIME DELAY meter M701 provides a warm-up time for that stage. Filament voltage is supplied to 10-kw Amplifier V900 by T801.

TIME DELAY meter M701 receives the phase 2 to phase 3 voltage from MAIN POWER circuit breaker CB1000. When the preset time expires, the switch on TIMER meter M701 closes, completing the energizing path for high-voltage shorting coil L802. Coil L802 is energized by the phase 1 to phase 2 voltage as previously described through the closed contacts of the interlock switches. Since one of the conditions for applying voltage to transformer T800 is the closing of switch S801 which is operated by L802, voltage is not supplied to T800 if fuse F2003, F2004 or one of the 10 interlock switches is open.

Another condition for applying voltage to transformer T800 is the closing of HIGH VOLTAGE circuit breaker CB1001. With both circuit breaker CB1001 and switch S801 closed, contractor K3001 and time delay meter M3003 are energized by the phase 1 to phase 2 voltage. The phase 2 voltage at the switch of M701 is coupled to K3001 and M3003 through contacts of seven protective relays, K700, K701, K702, K704, K706, K707 and K708, pin c of J700 and P1000, switch S801 and pin I of J1000 and P3000.

With contactor K3001 energized, its contacts couple the three-phase voltage from MAIN POWER circuit breaker CB1000 to transformer T800 through resistors R3000, R3001 and R3002. These three resistors reduce the three-phase voltage supplied to T800 and thus the voltage supplied to the high voltage rectifier. At this time, the output voltage of the rectifier circuit is approximately +2,500 volts.

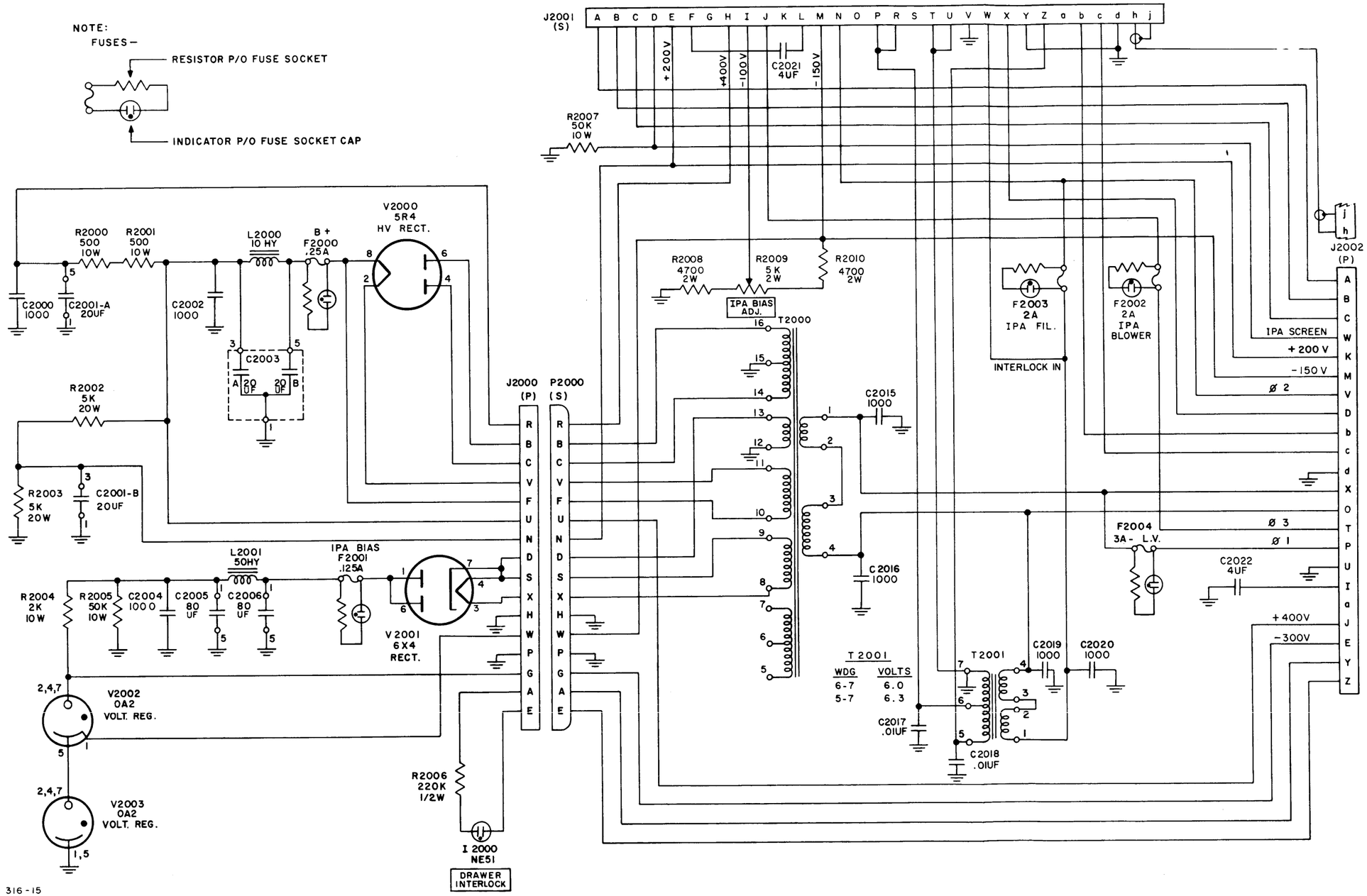
The switch on time delay meter M3003 closes 20 seconds after M3003 is energized. This switch then energizes the contactor K3000 coil. Resistors R3000, R3001 and R3002 are shorted out by the contactor contacts, and full voltage is supplied to T800. The output of the high voltage rectifier is now increased to 7,500 volts.

It should be noted that the interlock switches and jumper and fuses F2003 and F2004 and the protective relay contacts form a series circuit which, when open, deenergizes contactor K3001 thereby removing voltage from transformer T800 and also removing power from the high voltage rectifier. HV ON indicator I3000 and PLATE ON indicator I1003 light when voltage is supplied to transformer T800. PLATE TIME meter M702 is also energized at this time. This meter indicates the total time plate voltage has been supplied to 10-kw power amplifier V900.

2-13. DC POWER DISTRIBUTION. (See figure 2-21.)

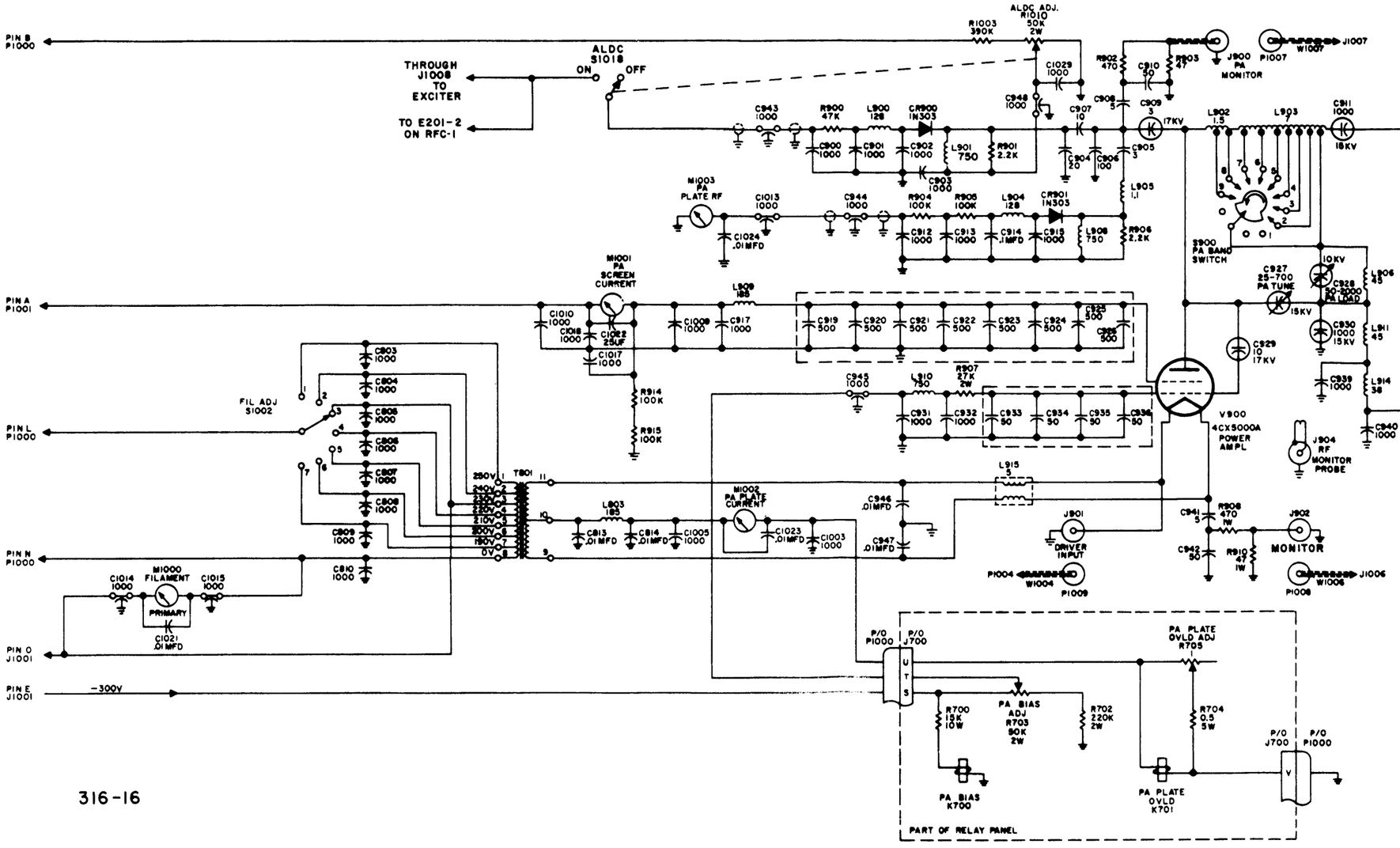
Power Supply AX-104 supplies four dc output voltages at J2000 which are used as bias and plate and screen supply voltages in the RFC and as bias voltage for power amplifier V900. The high voltage rectifier and the main power supply function together to produce four high dc voltages. One of two of these voltages is used as the V900 screen supply voltage. Two voltages are used because the screen voltage is reduced when tuning the transmitter. Another output voltage is used for the plate of final amplifier stage V203 in the RFC. The remaining output voltage is supplied to the plate of power amplifier V900. In addition, the dc voltages are supplied to monitor meters and to protective relay circuits which cause the transmitter to shut down when one of these relay circuits detects an abnormal voltage or current.

All dc voltage distribution is shown in figure 2-21. The path of each dc voltage can easily be traced through the transmitter. The principles of operation underlying the power supplies, protective relay circuits, and screen voltage switching have been described in detail in preceding paragraphs.



316-15

Figure 2-14. Power Supply AX-104, Schematic Diagram



316-16

NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UUF AND INDUCTANCES ARE IN UH.
2. REFERENCE

SYMBOL SERIES	UNIT
700	RELAY PANEL
800	MAIN POWER SUPPLY
900	POWER AMPLIFIER
1000	MAIN POWER PANEL AND MAIN METER PANEL

3.

DESIGNATION	PANEL MARKING
S1000	FIL ADJ
S1003	ALDC
M1000	FILAMENT PRIMARY
M1001	PA SCREEN CURRENT
M1002	PA PLATE CURRENT
M1003	PA PLATE RF
R1004	ALDC ADJ
S900	BAND SW
C927	PA TUNE
C928	PA LOAD
J900	PA MONITOR
J901	DRIVE INPUT
J902	IPA MONITOR
K700	PA BIAS
K701	PA PLATE OVLD
R703	PA BIAS ADJ
R705	PA PLATE OVLD ADJ

4. BAND SW SWITCH S900 SHOWN IN 2-3 MC POSITION

Figure 2-15. Power Amplifier V900, Simplified Schematic

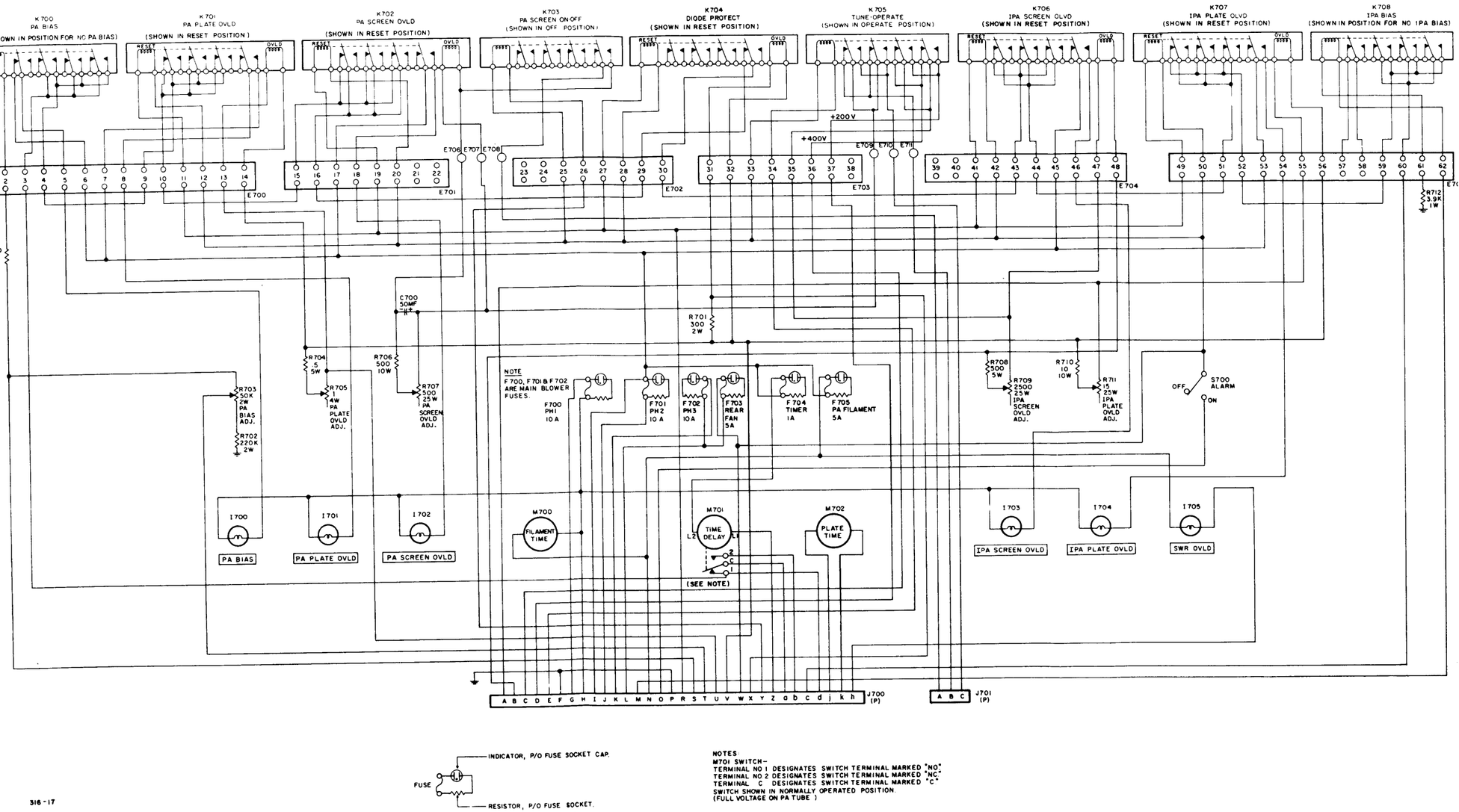
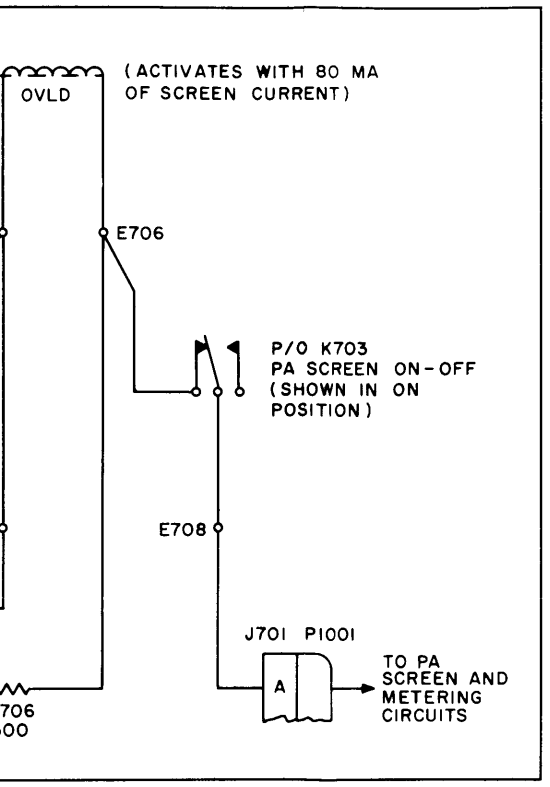
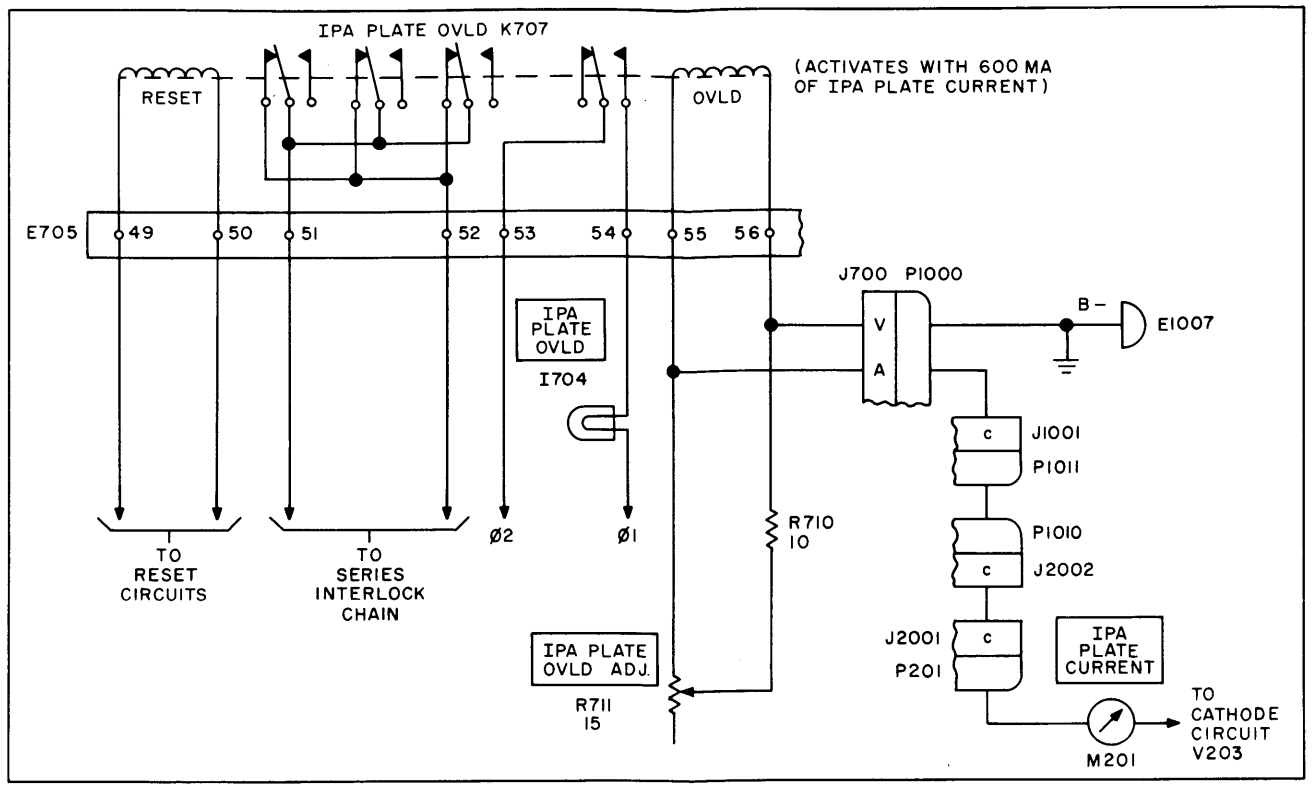
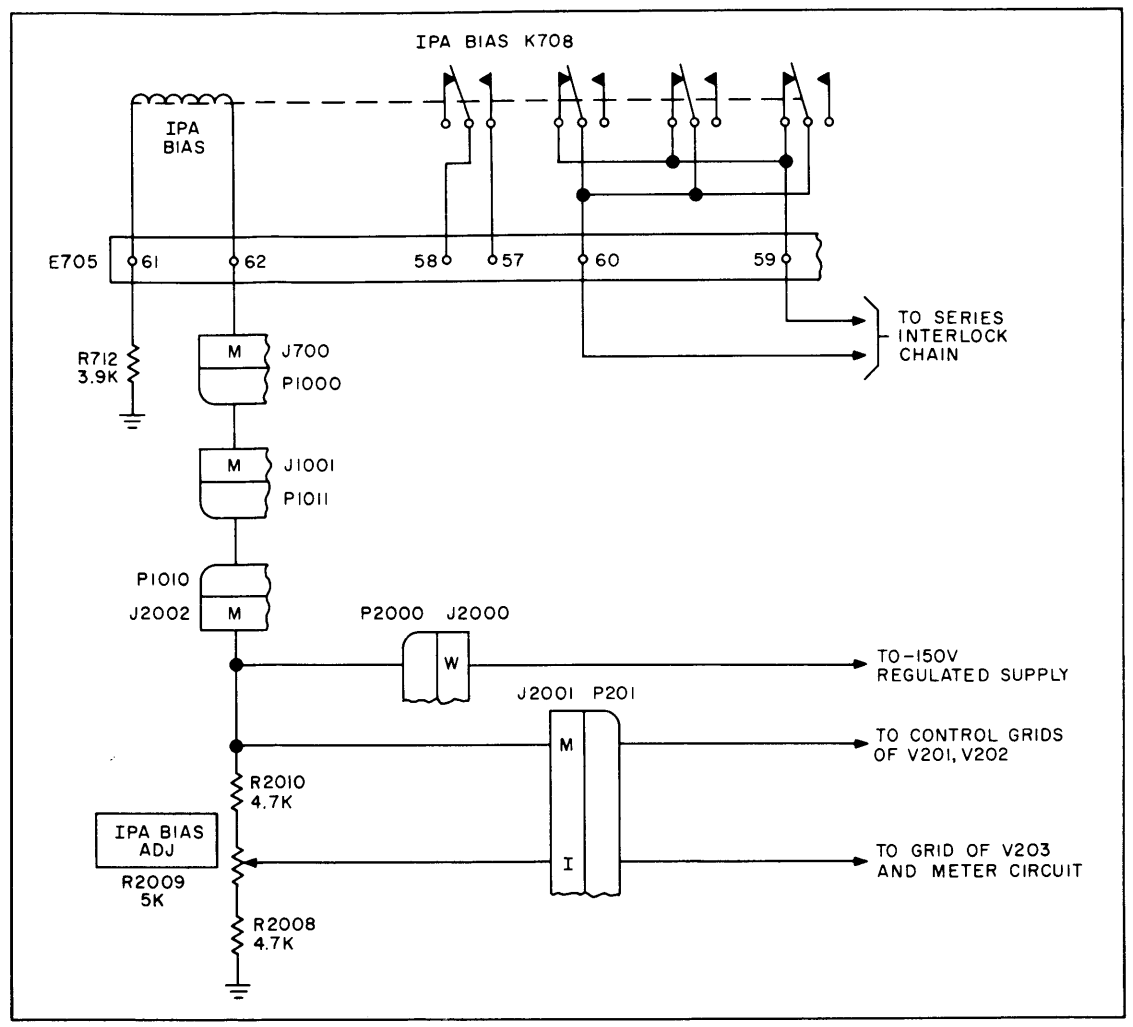


Figure 2-16. Relay Panel AR-161, Simplified Schematic

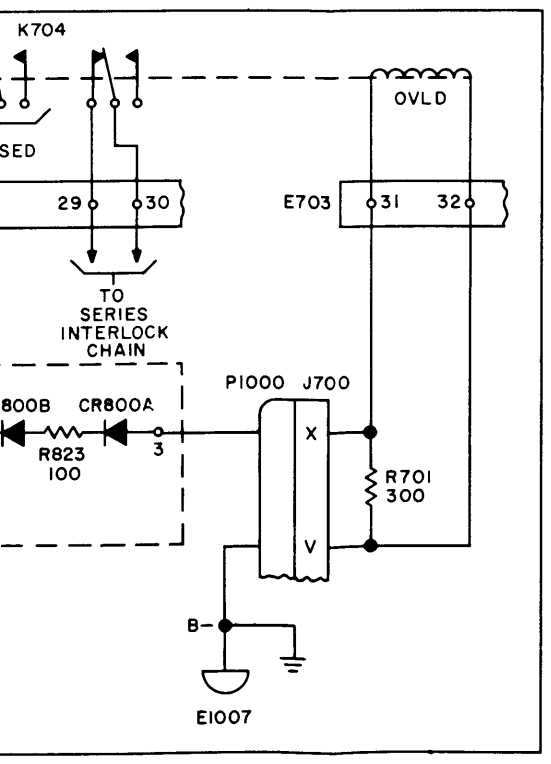


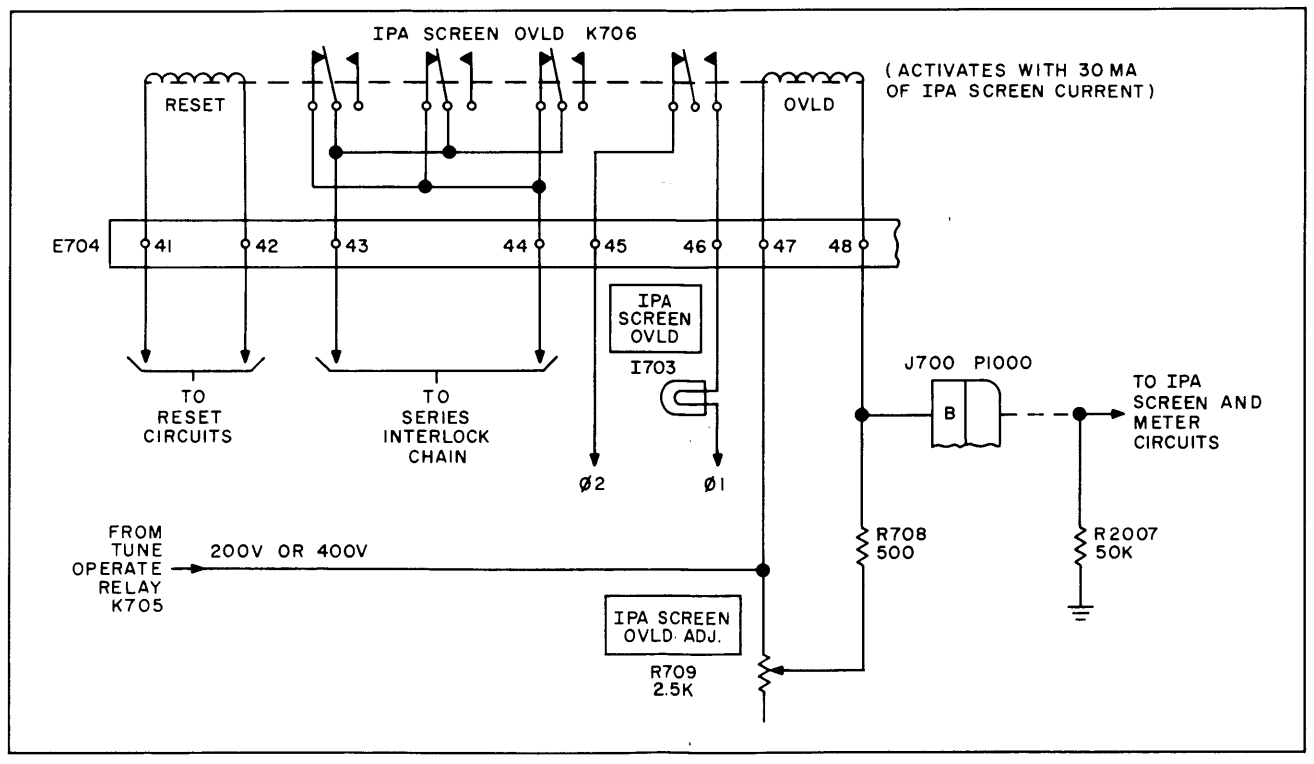


E – IPA PLATE OVERLOAD RELAY, NO OVERLOAD POSITION



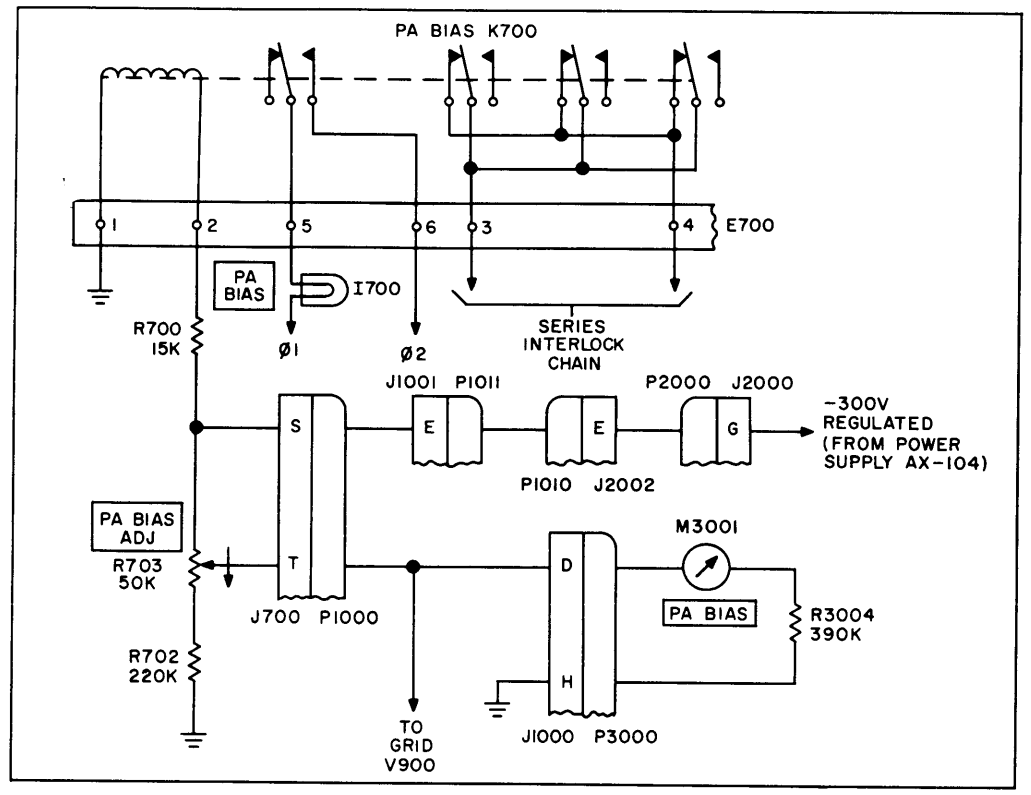
G – IPA BIAS RELAY, NORMAL BIAS POSITION



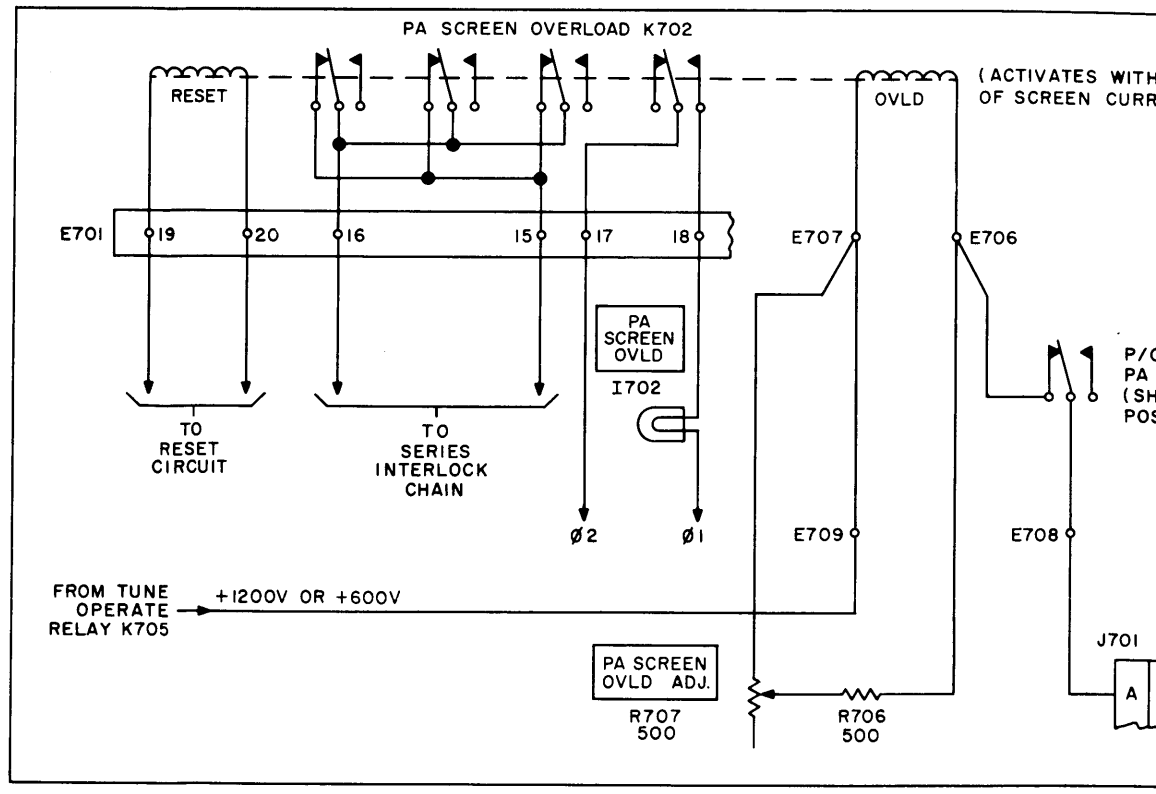


F – IPA SCREEN OVERLOAD RELAY, NO OVERLOAD POSITION

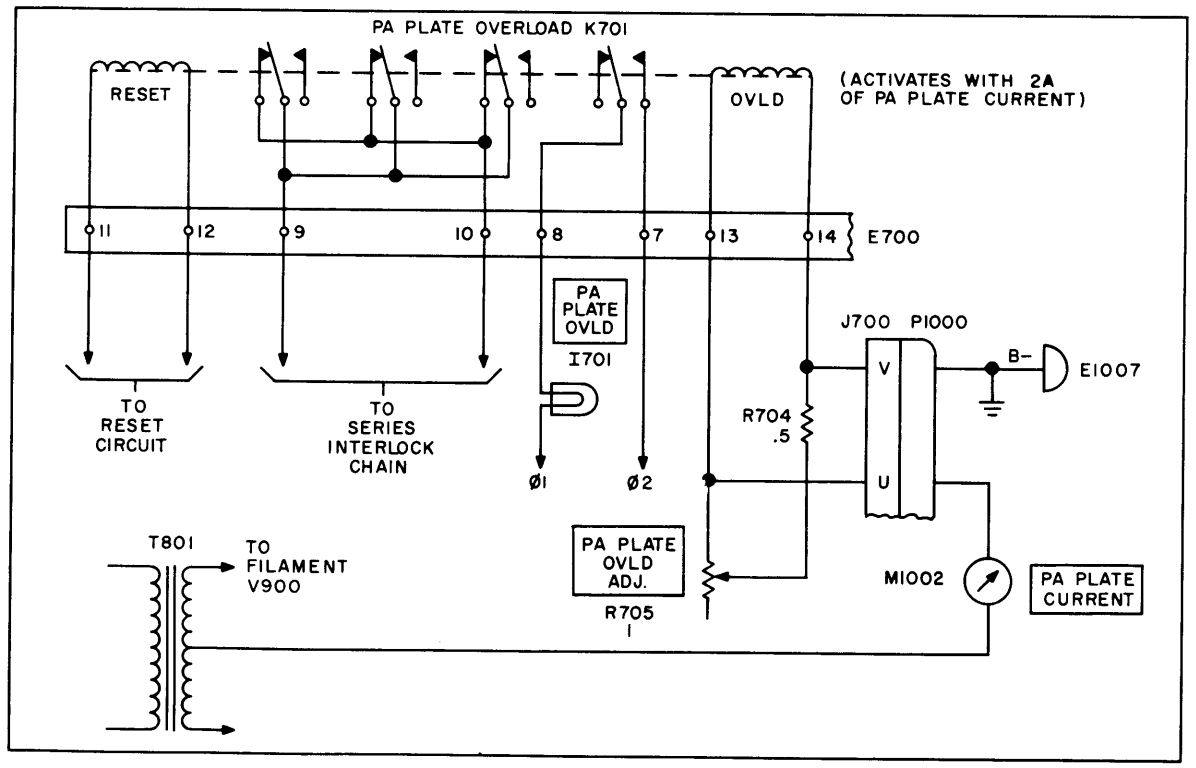
Figure 2-17. Relay Panel Protective Relay Circuits. Simplified Schematic



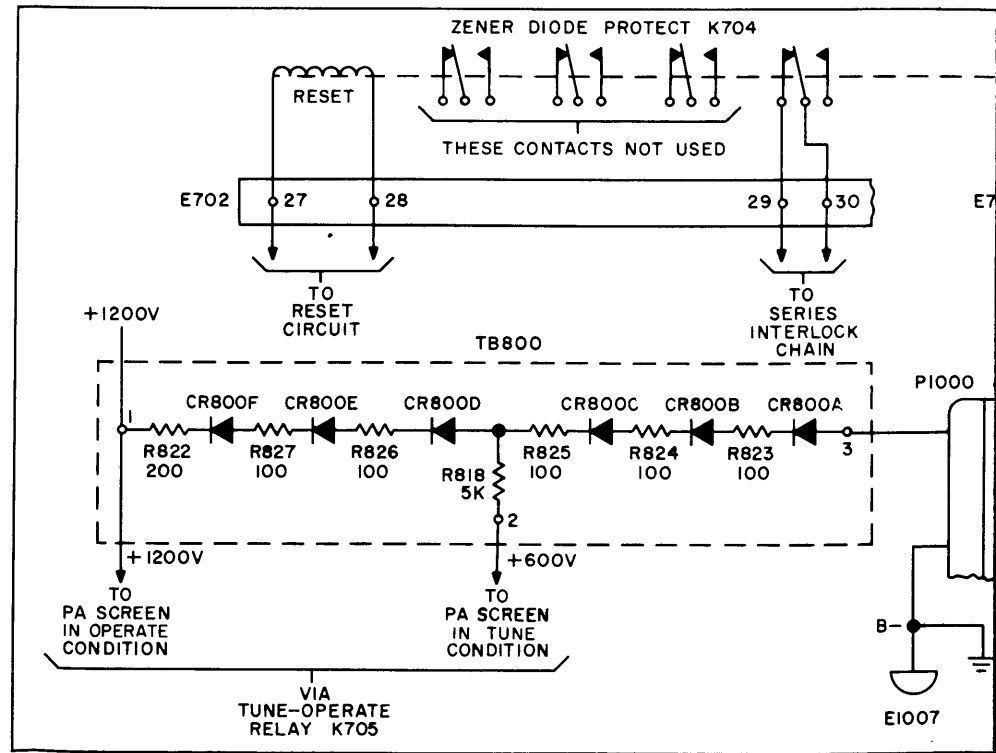
A – PA BIAS RELAY, NORMAL BIAS POSITION



C – PA SCREEN OVERLOAD RELAY, NO OVERLOAD POSITION



B – PA PLATE OVERLOAD RELAY, NO OVERLOAD POSITION



D – DIODE PROTECT RELAY, NORMAL DIODE CURRENT POSITION

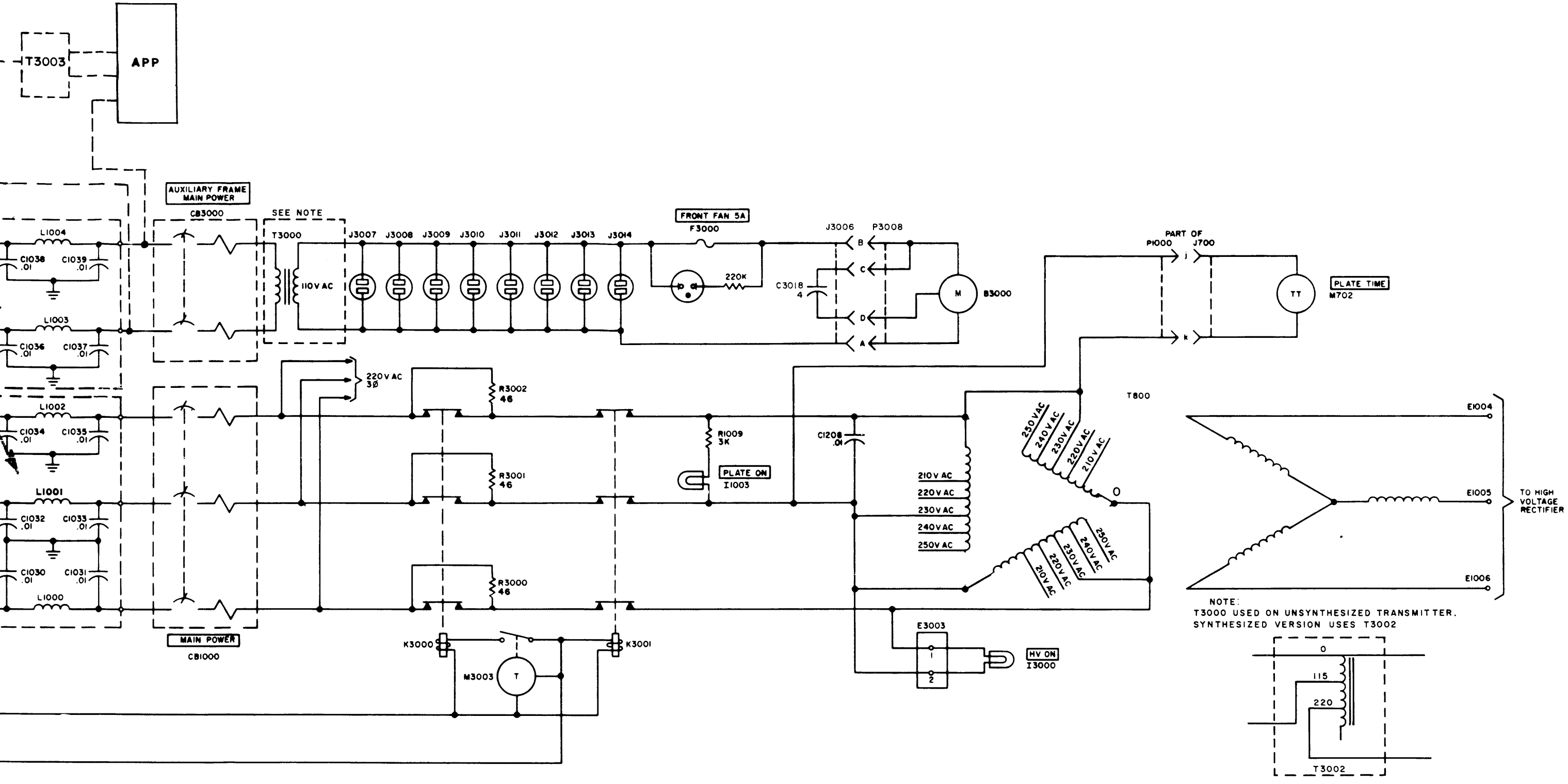
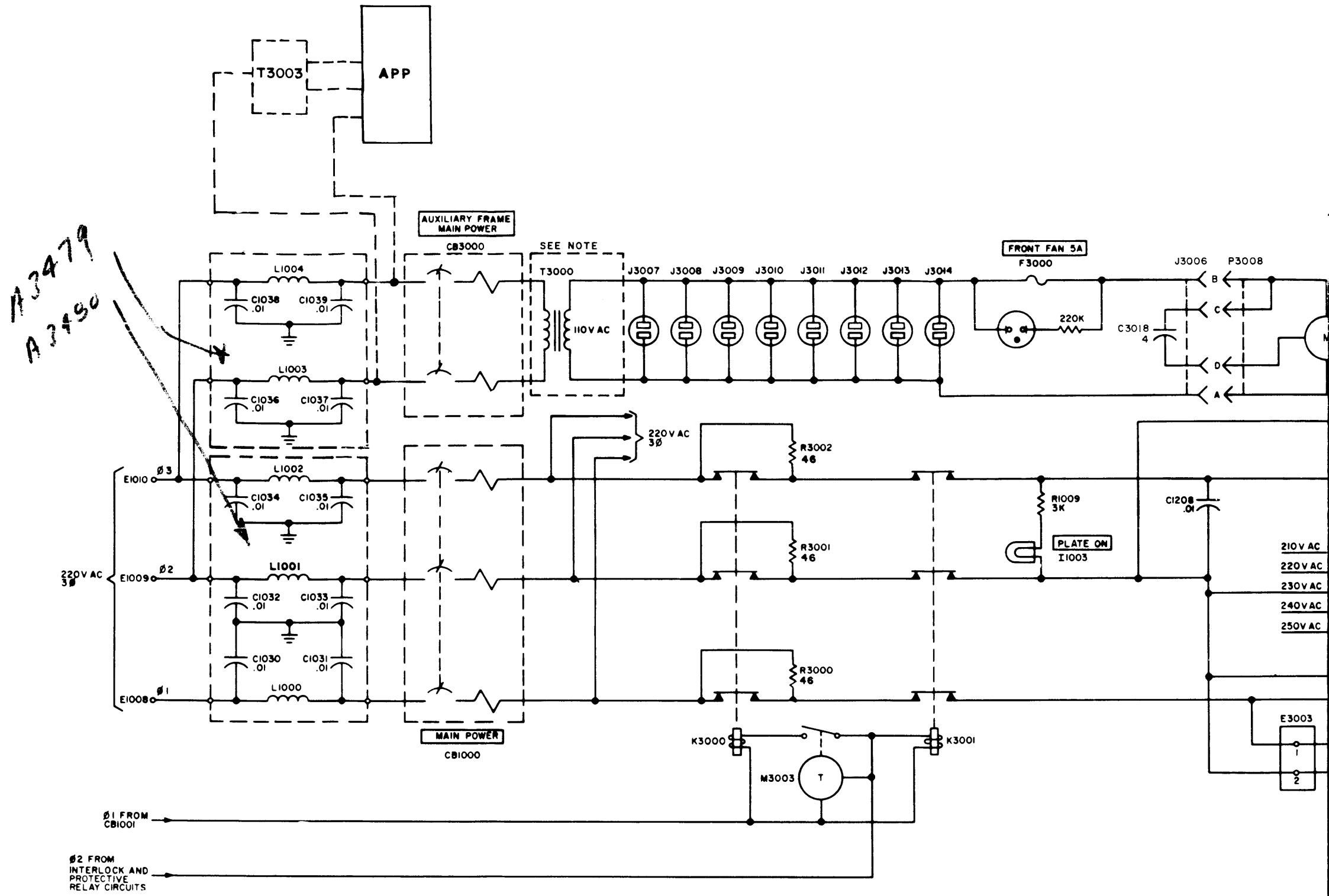


Figure 2-18. Power Input Circuit, Simplified Schematic



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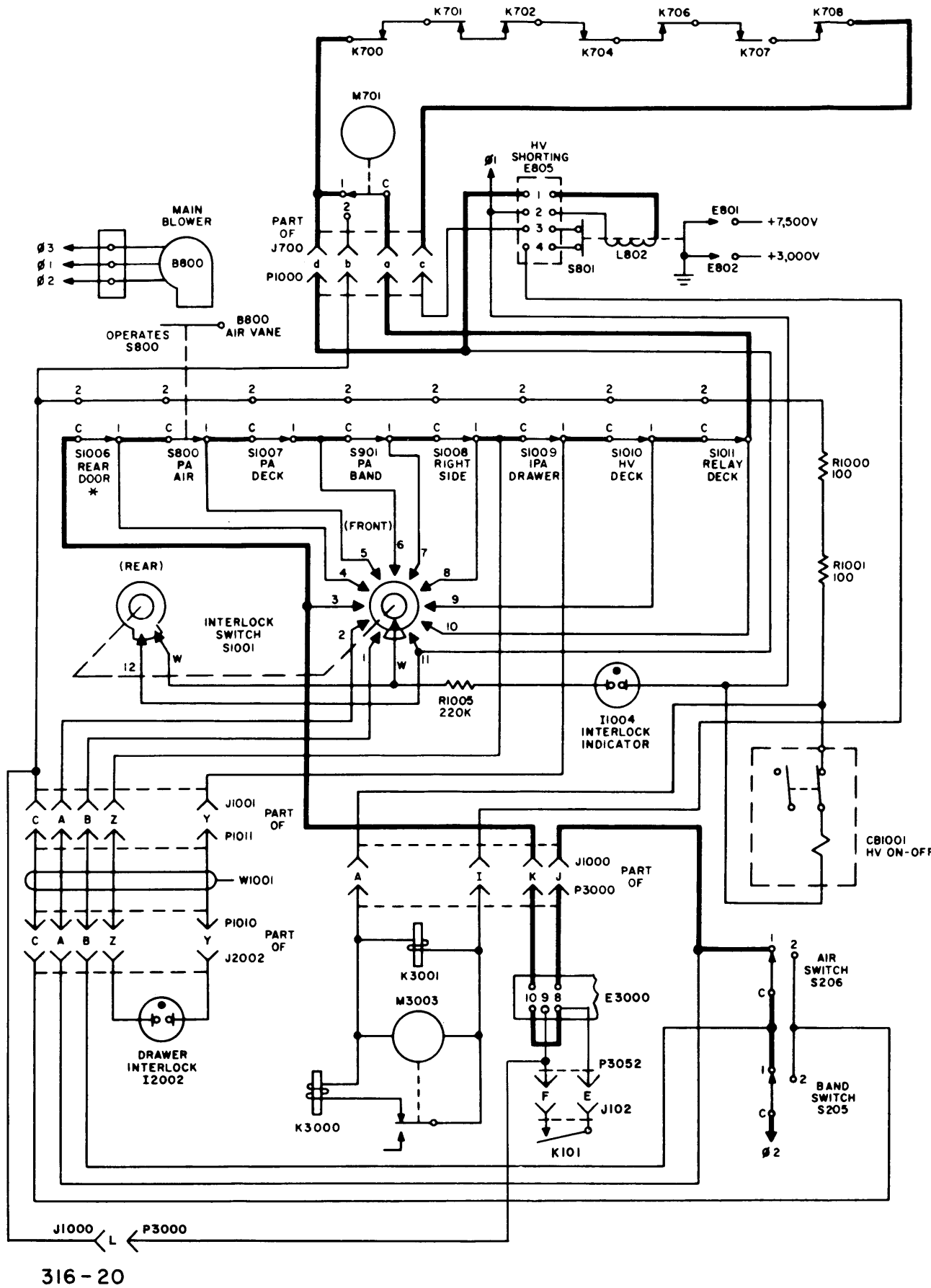


NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS AND CAPACITANCES ARE IN UUF.

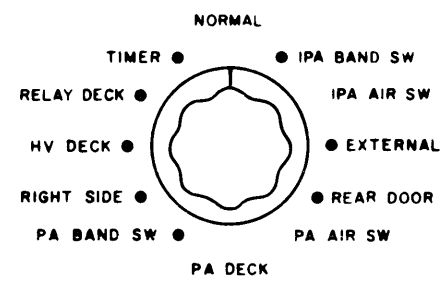
2.

REFERENCE SYMBOL SERIES	UNIT
200	RF AMPLIFIER DRIVER
700	RELAY PANEL
800	MAIN POWER SUPPLY
900	POWER AMPLIFIER
1000	MAIN POWER PANEL
3000	AUXILIARY FRAME

3.

DESIGNATION	PANEL MARKING
S1001	INTERLOCK
I1004	INTERLOCK INDICATOR
CB1001	HIGH VOLTAGE
M701	TIME DELAY

4. INTERLOCK SWITCH S1001 IS IN NORMAL POSITION AS SHOWN BELOW.



* ACTUALLY REAR RF SHIELD.

Figure 2-19. Interlock Circuits, Simplified Schematic

NOTE

REFERENCE SYMBOL	
SERIES	UNIT
200	RF AMPLIFIER DRIVER
600	HIGH VOLTAGE RECTIFIER
700	RELAY PANEL
800	MAIN POWER SUPPLY
900	POWER AMPLIFIER
1000	MAIN POWER PANEL, MAIN FRAME ASSEMBLY AND METER BOX ASSEMBLY
2000	CHASSIS ASSEMBLY
3000	AUXILIARY ASSEMBLY

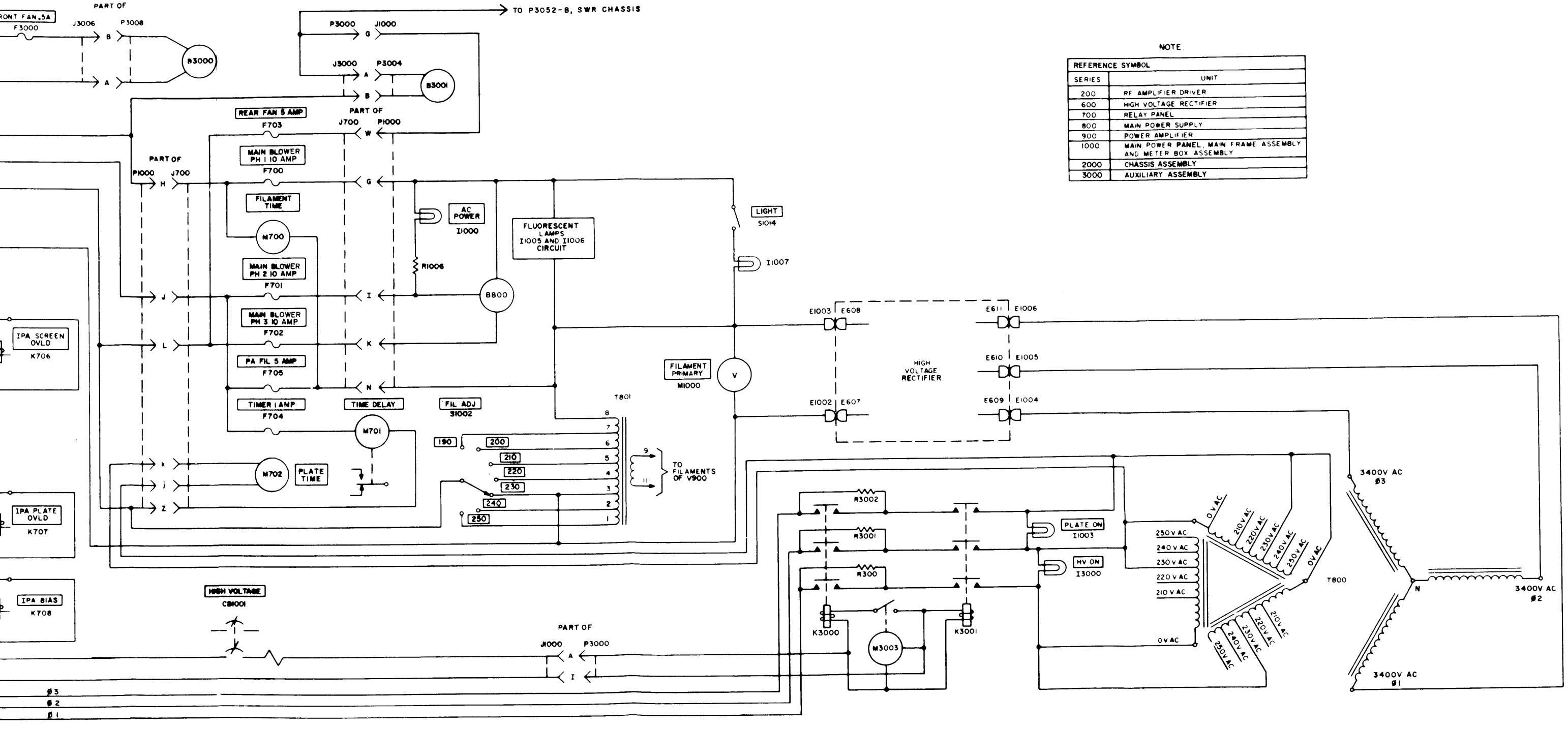
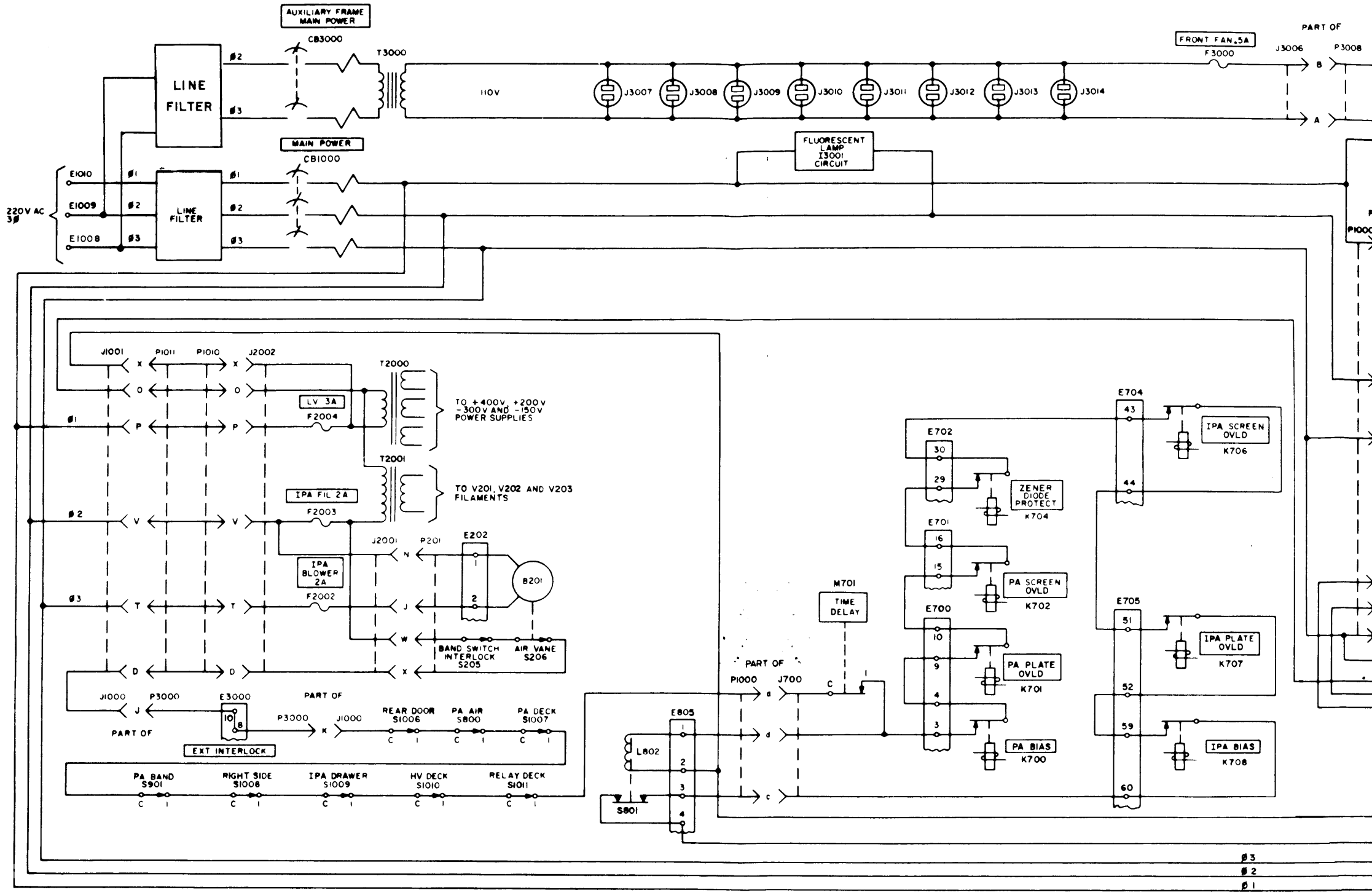


Figure 2-20. AC Power Distribution, Simplified Schematic


AUXILIARY FRAME MAIN POWER
CB3000
T3000
LINE FILTER
110V
J3007
J3008
J3009
J3010
J3011
J3012
J3013
J3014
FRONT FAN, 5A
F3000
PART OF
J3006
P3008
FLUORESCENT LAMP I3001 CIRCUIT
MAIN POWER
CB1000
E1010
E1009
E1008
220V AC 3Ø
LINE FILTER
J1001
P1011
P1010
J2002
T2000
LV 3A
F2004
TO +400V, +200V -300V AND -150V POWER SUPPLIES
T2001
IPA FIL 2A
F2003
TO V201, V202 AND V203 FILAMENTS
J2001
P201
E202
IPA BLOWER 2A
F2002
B201
BAND SWITCH INTERLOCK S205
AIR VANE S206
J1000
P3000
E3000
PART OF
EXT INTERLOCK
REAR DOOR S1006
PA AIR S800
PA DECK S1007
PA BAND S901
RIGHT SIDE S1008
IPA DRAWER S1009
HV DECK S1010
RELAY DECK S1011
E704
IPA SCREEN OVLD
K706
E702
ZENER DIODE PROTECT
K704
E701
PA SCREEN OVLD
K702
M701
TIME DELAY
E700
PA PLATE OVLD
K701
PA BIAS
K700
E705
IPA PLATE OVLD
K707
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K708
P1000
J700
E805
L802
S801
Ø3
Ø2
Ø1

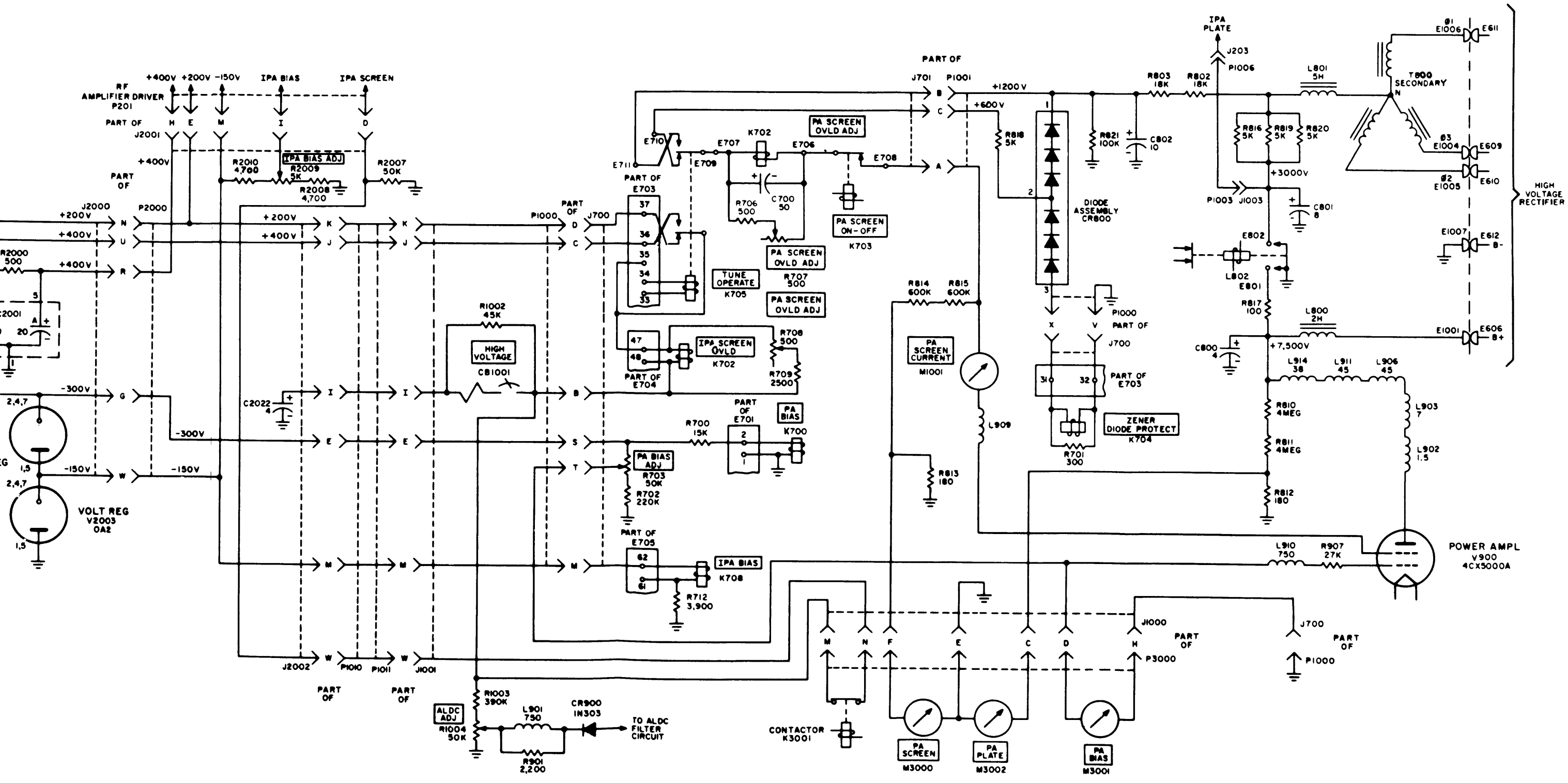
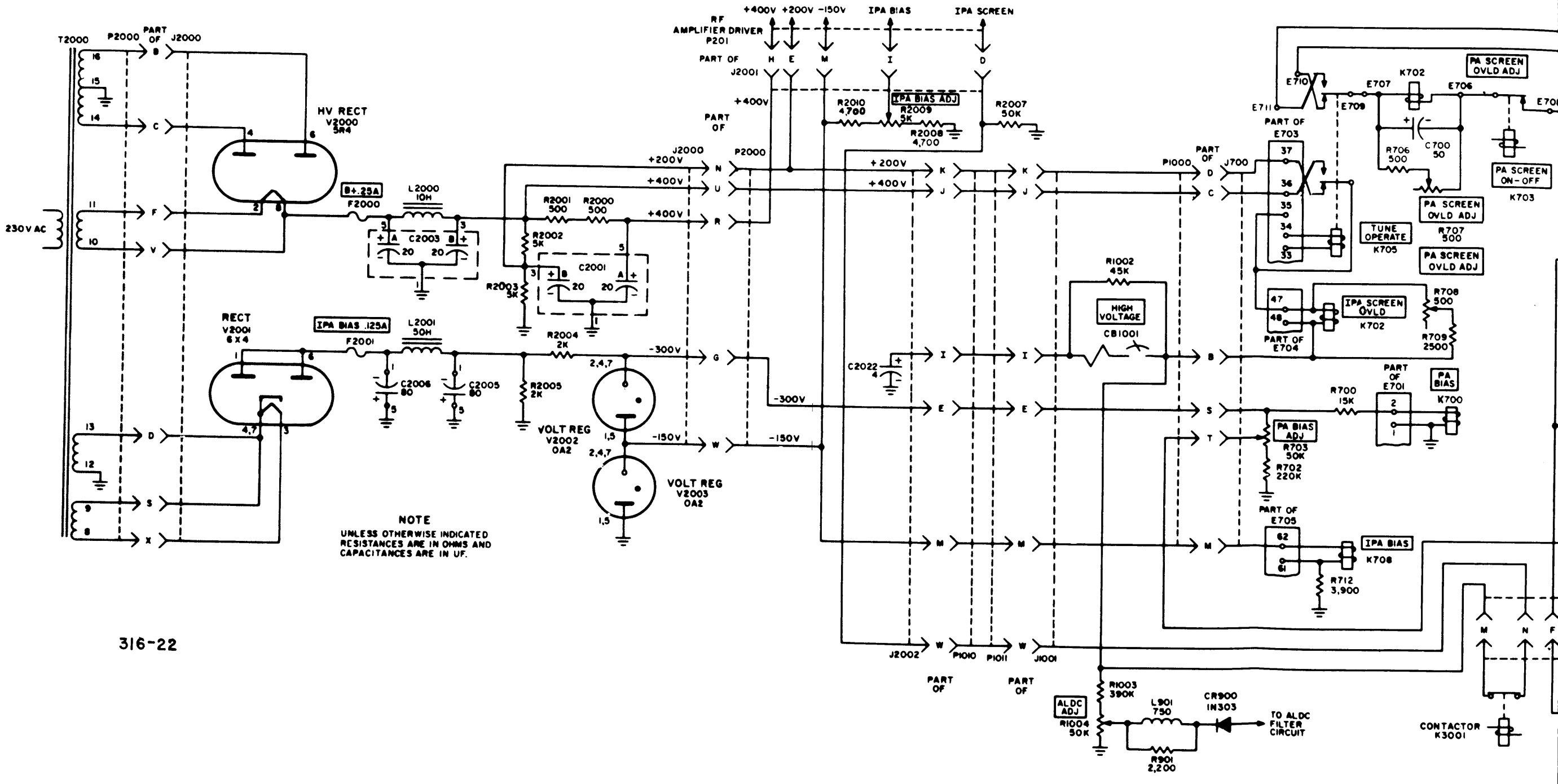


Figure 2-21. DC Power Distribution, Simplified Schematic



NOTE
UNLESS OTHERWISE INDICATED RESISTANCES ARE IN OHMS AND CAPACITANCES ARE IN UF.

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SECTION 3
TROUBLESHOOTING

3-1. INTRODUCTION.

This section contains detailed troubleshooting techniques and reference data which 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 and a system troubleshooting chart, table 3-3. An overall short circuit test procedure is included in table 3-4. The combined data of tables 3-1 through 3-4 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, for the trouble symptoms listed, the troubles are produced by a malfunction 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, retuning, and reloading. 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. EQUIPMENT PERFORMANCE CHECK.

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

NOTE

Parenthesized numerical designations identify locations of operating controls and indicators. Refer to transmitter operating instructions manual for front panel location diagrams.

3-3. SYSTEM TROUBLESHOOTING.

Table 3-3 provides additional troubleshooting data based on specific transmitter trouble symptoms. When a trouble has been sectionalized to a specific unit or circuit, refer to the applicable paragraph in this section which applies to that unit for additional troubleshooting data.

3-4. SHORT CIRCUIT TEST.

Table 3-4 provides the means to quickly check the transmitter power input circuits and high voltage circuits for the presence of short circuits. Perform this test when a short circuit is suspected. Prepare for this test as follows:

a. Set AUXILIARY FRAME MAIN POWER and MAIN POWER contactors to OFF.

b. Disconnect the following plugs from their mating jacks:

P3000 from J100
P1000 from J700
P1001 from J701
P1010 from J2002
P1006 from J203
P1004 from J1004

3-5. RF AMPLIFIER RFC AND POWER SUPPLY AX-104.

When system troubleshooting (tables 3-2 and 3-3) indicates that a trouble exists in the RFC or its associated AX-104, use table 3-5 to isolate the trouble to a specific stage or part in these units. Make all checks with the RFC and AX-104 installed and connected in the main frame. When trouble has been isolated to a stage, use the voltage and resistance data in table 3-6 in conjunction with the overall schematic diagram in Section 6 to locate the defective part. For wire routing information for the internal cable harnesses in these units, refer to tables 3-7 through 3-9. Parts location is shown in figure 3-1.

3-6. POWER AMPLIFIER SECTION AX-509.

Troubleshooting procedures for the power amplifier are included in tables 3-2 and 3-3. Use the PA meters on the auxiliary and main frame meter panels to take voltage and current measurements; compare voltage readings with those shown in table 3-10. If voltage readings are abnormal, take resistance readings to isolate open and short circuits. Use the overall schematic diagram in Section 6 in conjunction with the parts location photographs, figures 3-2 and 3-3, to circuit trace the power amplifier.

WARNING

Voltages as high as 7,500 are present in the transmitter. Before making resistance measurements, make sure that the HIGH VOLTAGE and MAIN POWER circuit breakers on the main power panel are OFF and use the shorting rod to discharge all filter capacitors in the main power supply. When taking voltage readings, make sure hands are dry, use test prods insulated for at least 10,000 volts and take care to keep free hand and body away from electrical ground and clear of equipment.

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 top or 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

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.		
2	Set AUXILIARY FRAME MAIN POWER circuit breaker to ON.	Auxiliary frame blower motor (top front) starts. Power lamps on individual exciter units light when their associated switches are turned on.	If exciter units are powered, but blower unit fails to operate, FRONT FAN fuse F3000 is open or blower is defective. If none of exciter units can be powered, voltage regulator transformer T3000 (unsynthesized transmitter) or autotransformer T3002 (synthesized transmitter) is defective. If an individual exciter unit cannot be powered, it is defective. (Refer to appropriate modular-unit manual for maintenance data.)
3	Remove P3001 from J3001 and terminal J3001 with a 50-ohm load. Tune up exciter units at some carrier frequency within the 2- to 28-mc range.	Normal rf output (up to 1 watt PEP) is obtained at EXCITER OUTPUT connector J3001 in auxiliary frame.	Defective unit in exciter. Refer to appropriate volume for maintenance data on unsynthesized or synthesized exciter.

NOTE

At conclusion of step 3, set rf output of exciter to minimum, remove 50-ohm load, and reconnect P3001 to J3001.

TABLE 3-2. EQUIPMENT PERFORMANCE CHECK (CONT)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF ABNORMAL INDICATION
4	Set all tuning controls on main frame to positions specified in transmitter tuning chart, then set switches as follows: PA SCREEN (140) OFF TUNE-OPERATE (139) TUNE HIGH VOLTAGE (141) OFF ALDC (137) OFF INTERLOCK (135) NORMAL		
5	Set TIME DELAY control (143) to 5 minutes, then set MAIN POWER circuit breaker (132) to ON.	Main frame blower motor B800 operates.	Open MAIN BLOWER fuse on relay panel or defective blower unit.
		TUNE lamp (107) lights.	Open resistor R1007.
		PA BIAS lamp (145) lights. After a few seconds. it goes off.	Defective circuit in Power Supply AX-104.
		PA BIAS meter (2) reads 300 volts.	Incorrect setting of PA BIAS ADJ control (145).
		FILAMENT PRIMARY meter (101) reads 230 volts ac.	Incorrect setting of FIL ADJ switch (136).
		All tubes in high voltage rectifier light (Filaments).	Defective rectifier tube.
		After 5 minutes, INTERLOCK INDICATOR lamp (134) lights.	Open interlock circuit.
6	Set MULTIMETER switch (122) to DC IPA BIAS.	MULTIMETER (120) reads 100 volts.	Incorrect setting of IPA BIAS ADJ control on Power Supply AX-104.
7	Set MULTIMETER switch (122) to RF 1ST AMPL EP position. Turn up rf drive slightly then tune 1ST AMPL TUNING control (123) for peak on MULTIMETER (120).	A peak is obtained.	Defective rf amplifier V201 in RF Amplifier RFC; defective rectifier V2000 in AX-104.

TABLE 3-2. EQUIPMENT PERFORMANCE CHECK (CONT)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF ABNORMAL INDICATION
8	Set MULTIMETER switch (122) to RF IPA EG position and tune IPA GRID TUNING control (123) for peak on MULTIMETER (120).	A peak is obtained.	Defective rf amplifier V202 in RFC.
		NOTE	
	At conclusion of step 8, return rf drive to minimum.		
9	Depress OVERLOAD RESET pushbutton (133), then set HIGH VOLTAGE circuit breaker (141) to ON position.	The red indicator lamp on the roof of the auxiliary frame and PLATE ON lamp (109) glow dimly.	Defective contactor K3001 in auxiliary frame.
		All high voltage rectifier tubes glow dull purple.	Defective rectifier tube.
		After 20 seconds, above lamps glow brightly and high voltage rectifier tubes glow bright purple.	Defective contactor K3000 or defective timer M3003.
		PA PLATE meter (3) indicates plate voltage.	Defective main power supply.
10	Set MULTIMETER switch (122) to DC IPA ISG position.	MULTIMETER (120) reads 200 volts dc.	Defective switch on contactor K3001.
11	Increase drive slightly, then adjust IPA TUNING control (128) for dip on IPA PLATE CURRENT meter (121).	A dip is obtained.	Defective amplifier V203 in RFC.
		NOTE	
	At conclusion of step 11, return rf drive to minimum.		
12	Set PA SCREEN switch (140) to ON.	PA SCREEN meter (1) indicates screen voltage.	Defective relay K703 or K705 in relay panel.
13	Turn up rf drive slightly until some increase is noted on PA PLATE CURRENT meter (102), then tune PA TUNE control (115) for dip on PA PLATE CURRENT meter (102).	A dip is obtained.	Defect in power amplifier V900.

TABLE 3-2. EQUIPMENT PERFORMANCE CHECK (CONT)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF ABNORMAL INDICATION
14	Reduce rf drive to minimum, then set TUNE - OPERATE switch (139) to OPERATE position.	PA PLATE CURRENT meter (103) reads approximately 500 ma.	Defect in power amplifier V900.
		IPA PLATE CURRENT meter (121) reads approximately 200 ma.	Defect in amplifier V203 in RFC.
15	Tune and load amplifiers V203 and V900 until full PEP is obtained.	Full PEP is obtained.	Improper tuning and/or loading or defect in PA circuit.

TABLE 3-3. SYSTEM TROUBLESHOOTING

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURES
1	AUXILIARY FRAME MAIN POWER circuit breaker trips continually.	Short circuit in 110-volt ac circuit of auxiliary frame.	Disconnect all exciter unit power plugs from ac power strip in auxiliary frame. If circuit breaker continues to trip, check voltage regulator transformer T3000. If trouble disappears when any one power plug is disconnected, associated exciter unit is defective. Refer to appropriate manual for that unit.
2	FRONT FAN fuse F3000 (at rear of auxiliary frame) opens continuously.	Blower motor B3000 is defective.	Check B3000 and associated wiring.
3	Front fan in auxiliary frame does not operate but all exciter units are on.	Blower motor B3000 is defective.	Check B3000 and associated wiring.
4	None of exciter units can be powered. Front fan does not operate.	Defect in auxiliary frame power input circuit.	Check circuit breaker CB300 and associated wiring.
5	MAIN POWER circuit breaker (132) trips continually.	Short circuit in 220-volt ac input circuit.	Disconnect P1000 from J700 and P1010 from J2002. If circuit breaker still trips, check for overload in ac input circuit and main power supply. If circuit breaker can now be set ON, connect P1010 to J2002. If the circuit breaker trips, check the RFC and AX-104 for shorts. If the circuit breaker remains on, check for a short in the relay panel.

TABLE 3-3. SYSTEM TROUBLESHOOTING (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURES
6	With MAIN POWER circuit breaker (132) set to ON and HIGH VOLTAGE circuit breaker (141) set to OFF, all lamps on main frame are off and FILAMENT TIME meter (142) does not record elapsed time.	220-volt ac input circuit is defective.	Check circuit breaker CB1000 and associated wiring.
7	The fluorescent lamp in the main frame does not light but FILAMENT TIME meter (142) on relay panel records elapsed time.	Fluorescent lamp circuit in main frame is defective.	Check lamps I1005 and I1006 and associated starters and ballasts.
8	MAIN BLOWER fuse on relay panel opens continuously.	Blower motor B800 is defective.	Check for short circuit in blower motor B800 and associated wiring.
9	Blower motor in main frame does not operate, but FILAMENT TIME meter (142) on relay panel records elapsed time.	Blower motor B800 is defective.	Check for open circuit in blower motor B800 and associated wiring.
10	REAR FAN fuse on relay panel open continually.	Blower motor B3001 is defective.	Check for short circuit in B3001 and associated wiring.
11	TIMER fuse on relay panel opens continually.	TIME DELAY meter M701 is defective.	Check for short circuit in TIME DELAY meter and associated wiring.
12	PA FIL fuse on relay panel open continually.	Filament transformer T801 is defective.	Check for short circuit in T801.
		Short in filament circuit of V900.	Check for short circuit in V900.
		FILAMENT TIME meter M700 is defective.	Check for short circuit in FILAMENT TIME meter M700 and associated wiring.
13	FILAMENT TIME meter (142) does not record elapsed time but FILAMENT PRIMARY meter (101) indicates 230 volts (red line).	FILAMENT TIME meter M700 is defective.	Check M700 and associated wiring.
14	TIME DELAY meter (143) does not operate but FILAMENT TIME meter (142) records elapsed time.	TIME DELAY meter M701 is defective.	Check M701 and associated wiring.
15	On Power Supply AX-104, B+ fuse, IPA BIAS fuse, IPA BLOWER fuse, IPA FIL fuse, or LV fuse opens continually.	Power Supply AX-104 is defective.	Refer to table 3-5.
		RF Amplifier RFC is defective.	Refer to table 3-5.

TABLE 3-3. SYSTEM TROUBLESHOOTING (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURES
16	Blower motor B201 in RFC does not operate.	B201 is defective.	Check B201 and associated wiring.
17	PA BIAS lamp (145) remains on after MAIN POWER circuit breaker (132) is turned on.	Bias rectifier circuit in AX-104 is defective.	Refer to table 3-5.
18	PA BIAS lamp (145) is on and incorrect reading appears on PA BIAS meter (2).	The bias rectifier circuit in AX-104 is defective.	Refer to table 3-5.
19	PA BIAS lamp (145) is on but a correct indication is obtained on PA BIAS meter (2).	Relay panel AR-161 is defective.	Check PA BIAS relay K700, R700 and associated wiring.
20	An incorrect indication is obtained on PA BIAS meter (2) but PA BIAS lamp (145) is off.	Relay panel AR-161 is defective.	Check PA BIAS ADJ control R703, R702, and associated wiring.
21	On RFC, an incorrect indication is obtained on MULTIMETER (120) when MULTIMETER switch (122) is set to IPA BIAS.	RFC or AX-104 is defective.	Refer to table 3-5.
22	Transmitter remains on although VSWR meter reading is excessive.	SWCU is defective.	Refer to table 3-14.
23	An incorrect indication is obtained on FILAMENT PRIMARY meter (101) and filaments of V600 through V605 do not glow, but FILAMENT TIME meter (142) records elapsed time.	FIL ADJ switch (136) is defective. Transformer T801 is defective.	Check S1002 and associated wiring. Check transformer T801.
24	On high voltage rectifier, and HV FILAMENT fuse opens continually.	High voltage rectifier is defective.	Check the associated rectifier tube, transformer and wiring.
25	One of the tube filaments in the high voltage rectifier does not glow.	High voltage rectifier is defective.	Check the tube and associated fuse and transformer.
26	With INTERLOCK switch (135) set to NORMAL, INTERLOCK INDICATOR lamp (134) does not light although the time delay provided by TIME DELAY meter (143) has expired.	A panel or component is improperly positioned. Defective interlock switch circuit.	Check that all panels and components are firmly secured in position. Rotate INTERLOCK switch clockwise from the IPA BAND SW position. The INTERLOCK INDICATOR lamp will go out when the switch is turned to the position corresponding to the open interlock. If this occurs, check switches as follows:

TABLE 3-3. SYSTEM TROUBLESHOOTING (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURES	
26 (cont)			Interlock Switch Position	Check Interlock Switch (figure 3-8)
			IPA BAND SW	S205 (operates from S202 in RFC)
			IPA AIR SW	S206 (operates from blower B201 in RFC)
			EXTERNAL	Jumper between terminals 8 and 10, E3000
			REAR DOCR	S1006
			PA AIR SW	S800 (operates from main blower B800)
			PA DECK	S1007
			PA BAND SW	S901 (operates from S900)
			RIGHT SIDE	S1008
			HV DECK	If DRAWER INTERLOCK lamp is lit, check ipa drawer switch S1009. If lamp is off, check hv dec interlock switch S1010.
			RELAY DECK	S1011
			TIMER	Switch on TIME DELAY meter M701.
27	HIGH VOLTAGE circuit breaker (141) trips continually.	An interlock switch is open.	Refer to item 26 above.	
		Contactor K3000 or K3001, or timer M3003 is defective.	Check for a short circuit in K3000, K3001, or M3003.	
28	With HIGH VOLTAGE circuit breaker (141) set to ON, the high voltage lamp on the roof of the auxiliary frame and PLATE ON lamp (109) do not light, but the six lamps on the relay panel are all off.	DIODE PROTECT relay K704 has detected an overload.	On the relay panel, measure ac voltage between terminals 29 and 30 of E702. If no voltage, relay K704 did not detect an overload. If 230 volts ac is measured, check relay K704 and R701. If necessary, check the +3000-volt circuit.	
		High voltage shorting coil L802 is defective.	Check L802 and associated wiring.	
		AC power input circuit is defective.	Check contactors K3000 and K3001, and timer M3003.	

TABLE 3-3. SYSTEM TROUBLESHOOTING (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURES
29	PA PLATE OVLD lamp (146) lights, but a correct indication appears on PA BIAS meter (2).	Relay panel is misaligned or defective.	Adjust PA PLATE OVLD ADJ control R705. Check relay K701, potentiometer R705, and R704.
		Power amplifier is is defective.	Check 10-kw PA V900.
		Rf amplifier RFC is defective.	Check for shorted or leaky capacitors C253 and C275.
30	PA SCREEN OVLD lamp (147) lights.	Relay panel is misaligned or defective.	Adjust PA SCREEN OVLD ADJ control R707. Check relay K702, PA SCREEN OVLD ADJ control R707, and R706.
		Power amplifier is defective.	Check 10-kw PA V900.
31	IPA SCREEN OVLD lamp (148) lights.	Relay panel is misaligned or defective.	Adjust IPA SCREEN OVLD ADJ control R709. Check relay K706, IPA SCREEN OVLD ADJ control R709, and R708.
		RFC is defective.	Check V203 and check for short in screen circuit of V203.
32	IPA PLATE OVLD lamp (149) lights.	Relay panel is misaligned or defective.	Adjust IPA PLATE OVLD ADJ control R711. Check relay K707, IPA PLATE OVLD ADJ control R711, and R710.
		RFC is defective.	Check amplifier V203.
33	SWR OVLD lamp (150) lights.	SWCU is misaligned or defective.	Adjust SWR OVLD ADJ control R104 on SWCU. Check relay K102 and amplifier V101 in SWCU.
34	PLATE ON lamp (109) and high voltage lamp on roof of auxiliary frame are on, but high voltage rectifier tubes do not glow purple.	Main power supply is defective.	Check transformer T800 circuits in main power supply.
35	PLATE ON lamp (109) is on, but PLATE TIME meter (144) does not record elapsed time.	Meter is defective.	Check meter M702.
36	A correct reading appears on PA SCREEN meter (1), but incorrect reading appears on PA PLATE meter (3).	Main power supply is defective.	Check resistors R810, R811, and R812.
37	A correct reading appears on PA PLATE meter (3), but improper readings are obtained on PA SCREEN meter (2) and on PA SCREEN CURRENT meter (102).	Relay K703 is defective.	Check relay K703.
		Main power supply is defective.	Check the 1200- and 600-volt circuit in the main power supply.
		PA SCREEN switch (140) is defective.	Check switch S1005.

TABLE 3-3. SYSTEM TROUBLESHOOTING (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURES
38	PA SCREEN CURRENT meter (102) reads normally, but PA SCREEN meter (1) produces abnormal reading.	Main power supply is defective.	Check resistors R813, R814, and R815.
39	A correct indication is obtained on PA SCREEN meter (1), but reading on PA SCREEN CURRENT meter (102) is abnormal.	10-kw PA is defective.	Check screen circuit of PA V900.
40	PA SCREEN meter (1) indicates 1200 volts when TUNE-OPERATE switch (139) is in the TUNE position. The TUNE lamp (107) is on.	Relay K705 is defective.	Check relay K705.
41	Correct readings are obtained on PA PLATE CURRENT and PA OUTPUT meter (103 and 105), but reading on PA PLATE RF meter (104) is abnormal.	Meter rectifier circuit is defective.	Check the meter rectifier circuit associated with the PA PLATE RF meter.
42	With ALDC switch (137) set to ON, output power of transmitter does not decrease as ALDC control is rotated clockwise.	ALDC circuit associated with 10-kw PA is defective.	Check ALDC rectifier circuit elements.
		ALDC switch (137) is defective.	Check ALDC switch and associated wiring.
43	With SWR switch (138) depressed and transmitter connected into unbalanced antenna, no indication appears on PA OUTPUT meter SWR IND (105).	Reflected power output circuit element (CR904, C1042, L1006, C1043, or S1017) is defective.	Check circuit elements in reflected power output channel of DC900.

TABLE 3-4. SHORT CIRCUIT TEST

POINT OF MEASUREMENT	NORMAL INDICATION	ISOLATING PROCEDURE
From either terminal of resistor R3000 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the phase 1 input wiring. Check for a shorted or leaky bypass capacitor C3016, a shorted buzzer DS3000, and short-circuited wiring from the phase 1 input line to ground.
From either terminal of resistor R3001 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the phase 2 input wiring. Check for a shorted or leaky bypass capacitor C3013, and for short-circuited wiring in the phase 2 input line.

TABLE 3-4. SHORT CIRCUIT TEST (CONT)

POINT OF MEASUREMENT	NORMAL INDICATION	ISOLATING PROCEDURE
From either terminal of resistor R3002 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the phase 3 input wiring. Check for a shorted or leaky bypass capacitor (C803 through C810, C1014, or C1015) and for short-circuited wiring in the phase 3 input wiring.
From pin G of P1000 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the phase 1 wiring. Check for a shorted or leaky bypass capacitor C1016, a short circuit in blower motor B800, and for short-circuited wiring in the phase 1 line.
From terminal E1006 to ground. NOTE: Terminal E1006 normally makes with E611 on the high voltage rectifier.	Resistance reading of approximately 1, 700 ohms.	If resistance is low, check for short circuit to ground in transformer T800 or associated wiring. If resistance is high, check for an open resistor (R820, R819, and R816), an open choke L801, and an open contact from E802 on the high-voltage shorting coil to ground.
From plate of V900 to ground.	Resistance reading of approximately 100 ohms.	If resistance is low, check for a shorted capacitor (C940, C939, C930, and C911) and for short-circuited wiring in the V900 plate circuit. If resistance is high, check for an open inductor (L902, L903, L906, L911, or L914), and an open circuit from the E801 contact to ground.
From screen of V900 to ground.	Resistance reading of approximately 170, 000 ohms.	If resistance is low, check for a shorted or leaky capacitor (C1009, C1010, C1018, C1017, C1009, C917, or C919 through C926) and for short-circuited wiring in the V900 screen circuit. If resistance is high, check for an open circuit in resistors R914 or R915, R813, R814, R815, or inductor L909.
From control grid of V900 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the V900 grid circuit. Check for a shorted or leaky capacitor, (C931 through C935 and C945) and for short-circuited wiring in the V900 grid circuit.
From pin U of P1000 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the V900 filament circuit. Check for a shorted or leaky capacitor, (C813, C814, C1005, C1003, C946, C947, or C941), a short circuit to ground in the secondary of transformer T801, and for short-circuited wiring in the V900 filament circuit.

NOTE

Disconnect the high-voltage shorting contact from E801 and E802 on the high-voltage shorting coil for the next two measurements.

TABLE 3-4. SHORT CIRCUIT TEST (CONT)

POINT OF MEASUREMENT	NORMAL INDICATION	ISOLATING PROCEDURE
From E801 to ground.	Resistance reading of approximately 8 megohms.	If resistance is low, check for a shorted or leaky capacitor, (C800, C940, C939, C930, or C911), and for short-circuited wiring in the +7, 500-volt dc line. If resistance is high, check for an open resistor (R810, R811, or R812).
From E802 to ground.	Resistance reading of approximately 138, 000 ohms.	If resistance is low, check for a shorted or leaky capacitor, C801 or C802, and for short-circuited wiring in the +3, 000-volt or the +1, 200-volt dc lines.
	NOTE	
Make the following short-circuit tests on the High Voltage Rectifier.		
From E600 to ground.	Infinite resistance.	If finite resistance indicates a short circuit in transformer T601 secondary or in the phase 1 wiring.
From E610 to ground.	Infinite resistance.	If finite resistance indicates a short circuit in transformer T603 secondary or in the phase 2 wiring.
From E609 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in transformer T604 secondary or in the phase 3 wiring.
From E606 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the B+ output circuit of the High Voltage Rectifier. Check for a short circuit in the secondaries of transformers T600, T602, and T605, and for short-circuited wiring in the B+ output circuit.
From E607 to ground.	Infinite resistance.	A finite resistance indicates a short circuit in the filament circuit. Check for a shorted or leaky bypass capacitor (C600 and C601) a short circuit to ground in the primaries of transformers T600 through T605, and for short-circuited wiring in these transformer circuits.

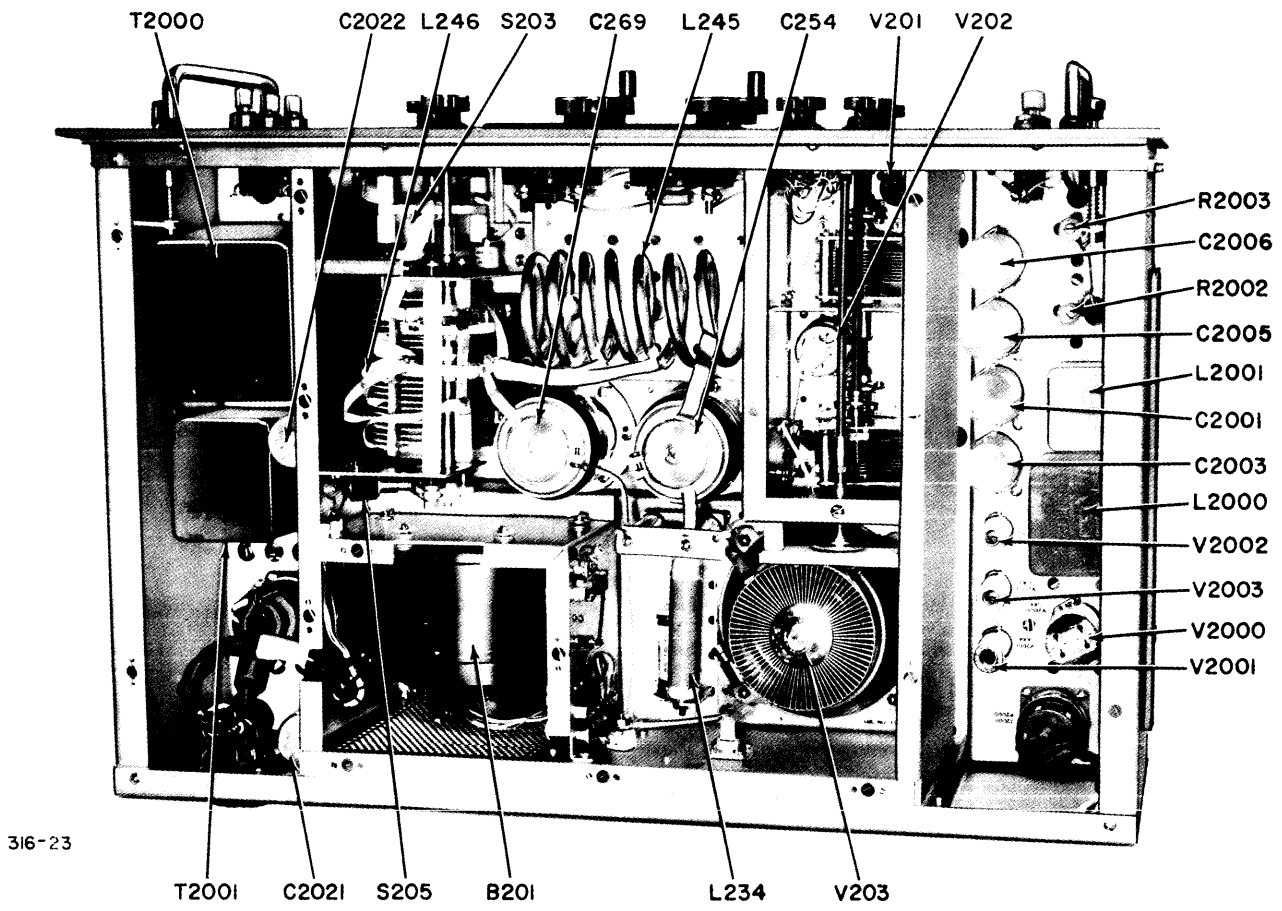


Figure 3-1. RF Amplifier RFC and Power Supply AX-104, Top View

TABLE 3-5. TROUBLESHOOTING, RFC AND AX-104

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURE
1	Filaments of the rf amplifiers do not glow in RFC.	Defective transformer T2001.	Check transformer T2001.
		IPA FIL fuse F2003 open.	Check fuse F2003.
2	Filaments of V2000 and V2001 do not glow.	LV fuse F2004 open.	Check fuse F2004.
		Defective transformer T2000.	Check transformer T2000.
3	Filament of V2000 or V2001 only does not glow.	Defective transformer T2000.	Check transformer T2000.
		Defective rectifier tube.	Check tube.
4	On relay panel, the PA BIAS and IPA BIAS indicator lamps light. (145 and 150, respectively)	Rectifier V2001 defective.	Check tube V2001.
		IPA BIAS fuse F2001 open.	Check fuse F2001.
		Filter circuit defective.	Check inductor L2001, capacitors C2004 through C2007, and resistor R2004.
		Transformer T2000 defective.	Check transformer T2000.
		Short in -300-volt circuit.	Check for short.
5	On relay panel, only the IPA BIAS indicator lamp (150) lights.	Defective voltage regulator tube V2002 or V2003.	Check tubes V2002 and V2003.
		Short in -150-volt circuit.	Check for short circuit.
6	With MULTIMETER switch (122) set to DC IPA BIAS, a subnormal indication is observed on the MULTIMETER (120). Indication on IPA PLATE CURRENT meter (121) is excessive.	Bias rectifier circuit defective.	Refer to itsm 4 and 5 above.
		Defective voltage divider.	Check resistors R2008 and R2010 and potentiometer R2009.
		Shorted or leaky bypass capacitors.	Check capacitors C284 and C250.
		Defective amplifier.	Check amplifier V203.
7	With MULTIMETER switch (122) set to DC IPA BIAS, an incorrect indication is observed on the MULTIMETER (120). Indication on IPA PLATE CURRENT meter (121) is normal.	Defective rectifier V2000.	Check resistor R225.

TABLE 3-5. TROUBLESHOOTING, RFC AND AX-104 (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURE
8	Correct indications are obtained on MULTIMETER (120) when MULTIMETER switch (122) is set to DC IPA BIAS or DC IPA Ep, but incorrect indications are obtained for all other settings of the MULTIMETER switch.	Defective rectifier V2000.	Check tube V2000.
		Short in +400-volt circuit.	Check for short circuit.
		B+ fuse F2000 open.	Check fuse F2000.
		Filter circuit defective.	Check inductor L2000, capacitors C2002, C2003A, C2003B, C2001A and C2000; and resistor R2000 and R2001.
		Transformer T2000 defective.	Check transformer T2000.
9	With MULTIMETER switch (122) set to DC IPA ESG, an incorrect indication is observed on the MULTIMETER (120) when the TUNE-OPERATE switch (139) on the main power panel is set to TUNE but a correct indication is obtained when the TUNE-OPERATE switch is set to OPERATE.	Defective voltage divider or filter capacitor.	Check resistors R2002 and R2003 and capacitor C2001B.
		Short in +200-volt circuit.	Check for short circuit.
10	With multimeter switch set (122) to DC IPA ESG, an incorrect indication is observed on MULTIMETER (120) but a correct indication is obtained when the MULTIMETER switch is set to RF 1ST AMPL Ep.	Defective resistor R221 or R222.	Check resistors R221 and R222.
11	With MULTIMETER switch (122) set to DC IPA Ep an incorrect indication is observed on MULTIMETER (120). Indication on IPA PLATE CURRENT motor is abnormal.	Short in V203 plate circuit.	Check for short circuit.
		Defective amplifier tube.	Check V203.
12	With MULTIMETER switch (122) set to DC IPA Ep, an incorrect indication is observed on MULTIMETER (120). Indication on IPA PLATE CURRENT meter (121) is normal.	Defective voltage divider.	Check resistors R211, R201, R234, R236, R217 and R214.
13	B+ fuse opens continually.	Short in +400- or +200-volt circuit.	Check for short circuit.
14	IPA BIAS fuse opens continually.	Short in -300- or -150-volt circuit.	Check for short circuit.

TABLE 3-5. TROUBLESHOOTING, RFC AND AX-104 (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURE
15	IPA BLOWER fuse opens continually.	Shorted blower motor.	Check blower motor B201.
		Shorted or leaky capacitor C2021.	Check capacitor C2021.
16	IPA FIL fuse opens continually.	Shorted transformer T2001.	Check transformer T2001.
		Shorted bypass capacitor.	Check bypass capacitors C2017 and C2018.
		Short in RF Amplifier RFC filament circuits.	Check for short circuit.
17	LV fuse opens continually.	Shorted transformer T2000.	Check transformer T2000.
		Defective tube.	Check tubes V2000 and V2001 by substitution.
18	With MULTIMETER switch (122) set to RF 1ST AMPL Ep, incorrect indications are observed on MULTIMETER (120) when operating at any frequency.	DRIVER BAND switch S201A defective.	Check continuity of DRIVER BAND switch S201A.
		Rf amplifier stage defective.	Check tube V201 by substitution.
		Meter filter circuit defective.	Check meter filter circuit elements.
		Capacitor C202 misaligned.	Realign unit.
19	With MULTIMETER switch (122) set to RF 1ST AMPL Ep, incorrect indications are observed on MULTIMETER (120) when operating within one frequency band.	DRIVER BAND switch S201 defective.	Check continuity of DRIVER BAND switch S201.
		Tuned circuit defective.	Check tuned circuit associated with nonoperative frequency band.
		Variable inductor associated with inoperative frequency band misaligned.	Realign inductor associated with inoperative band.
20	With MULTIMETER switch (122) set to RF IPA E_G, incorrect indications are observed on the MULTIMETER (120) when operating at any frequency.	DRIVER BAND S201B defective.	Check continuity of DRIVER BAND switch S201B.
		Driver stage defective.	Check tube V202 by substitution.
		Meter filter circuit defective.	Check filter components associated with switch position.
		Capacitor C231 misaligned.	Realign unit.

TABLE 3-5. TROUBLESHOOTING, RFC AND AX-104 (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURE
21	With MULTIMETER switch (122) set to RF IPA E_G, incorrect indications are observed on MULTIMETER (120) when operating within one frequency band.	DRIVER BAND switch S201B defective.	Check continuity of DRIVER BAND switch S201B.
		Tuned circuit defective.	Check tuned circuit associated with nonoperative frequency band.
		Variable inductor associated with inoperative frequency band misaligned.	Realign inductor.
22	With MULTIMETER switch (122) set to RF IPA E_p, incorrect indications are observed on MULTIMETER when operating any frequency.	Intermediate power amplifier stage defective.	Check tube V203. Make voltage and resistance checks.
		Meter filter circuit defective.	Check filter components associated with MULTIMETER switch position.
23	With MULTIMETER switch (122) set to RF PA E_G, incorrect indications are observed on MULTIMETER (120) when operating at any frequency.	IPA BAND switch S202 defective.	Check continuity of IPA BAND switch S202.
		IPA LOADING switch S203 defective.	Check continuity of IPA LOADING switch S203.
		IPA TUNING and IPA LOADING circuit defection.	Check components of IPA TUNING and IPA LOADING circuit.
		NEUT capacitor C255 misaligned.	Realign C255.
		Meter filter circuit defective.	Check filter components associated with MULTIMETER switch position.
24	With MULTIMETER switch (122) set to RF PA E_g, incorrect indications are observed on the MULTIMETER (120) when operating within one frequency band.	IPA BAND switch S202 defective.	Check continuity of IPA BAND switch S202.
		IPA LOADING switch S203 defective.	Check continuity of IPA LOADING switch S203.
		Rf Amplifier RFC misaligned.	Realign RFC.
25	No reading on MULTIMETER (120) in only one position of MULTIMETER switch (122).	MULTIMETER switch defective.	Check continuity of MULTIMETER switch S204.
		Meter filter circuit associated with particular position of MULTIMETER switch defective.	Check filter elements associated with particular position of MULTIMETER switch.
26	No indication is observed on MULTIMETER meter (120) with MULTIMETER switch (122) in any position. Indication on IPA PLATE CURRENT meter (121) is correct.	MULTIMETER switch S204 defective.	Check continuity of MULTIMETER switch S204.
		MULTIMETER M202 defective.	Check MULTIMETER M202.
		Meter bypass capacitor C237 shorted or leaky.	Check capacitor C237.

TABLE 3-5. TROUBLESHOOTING, RFC AND AX-104 (CONT)

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURE
27	No indication is observed on IPA PLATE CURRENT meter (121) MULTIMETER indications are correct for every position of MULTIMETER switch (122).	IPA PLATE CURRENT meter defective.	Check PA PLATE CURRENT meter M201.
		Meter bypass capacitor C222 shorted or leaky.	Check capacitor C222.
28	Blower motor B201 does not operate but all tube filaments light.	Blower motor defective.	Check blower motor.
		IPA BLOWER fuse F2003 open.	Check fuse F2003.
		Capacitor C2021 defective.	Check capacitor C2021.
29	INTERLOCK INDICATOR lamp (134) on the main power panel goes off when INTERLOCK switch (135) is set to IPA BAND SW.	Bandswitch interlock switch S205 defective.	Check switch S205.
		IPA BAND switch not properly set in detent.	Set IPA BAND switch in detent.
30	DRAWER INTERLOCK indicator lamp (157) does not light when RFC is extended from the rack.	Defective indicator lamp.	Check indicator lamp I2000 by substitution.
		Defective resistor R2006.	Check resistor R2006.

TABLE 3-6. VOLTAGE AND RESISTANCE MEASUREMENTS, RFC AND AX-104

DC VOLTAGES (MAIN POWER ON AND TUNE-OPERATE SWITCH IN OPERATE)

	PIN NO.										
TUBE	1	2	3	4	5	6	7	8	9	PLATE	SC. GRID
V201	0	-5	150	FIL	FIL	400	0	150	-5	-	-
V202	0	FIL	200	-	-38	-	FIL	-	-	400	-
V203	0	-100	FIL	0	FIL	-100	0	-	-	3000	400
V2000	-	(400) FIL	-	375VAC	-	375VAC	-	(400) FIL	-	-	-
V2001	-300	-	(-300) FIL	(-300) FIL	-	-300	275VAC	-	-	-	-
V2002	-150	-300	-	-300	-150	-	-300	-	-	-	-
V2003	0	-150	-	-150	0	-	-150	-	-	-	-

TABLE 3-6. VOLTAGE AND RESISTANCE MEASUREMENTS, RFC AND AX-104 (CONT)

RESISTANCES (MAIN POWER OFF)

TUBE	PIN										
	1	2	3	4	5	6	7	8	9	PLATE	SC. GRID
V201	0	55K	27K	0	0.5	11K	0	27K	55K	-	-
V202	16	0.5	5K	-	92K	-	0	-	-	11K	-
V203	INF	10K	0	INF	0.5	10K	INF	-	-	INF	50K
V2000	-	10K	-	40	-	40	-	10K	-	-	-
V2001	50K	-	200	200	-	50K	180	-	-	-	-
V2002	15K	50K	-	50K	15K	-	50K	-	-	-	-
V2003	0	15K	-	15K	0	-	15K	-	-	-	-

TABLE 3-7. WIRE RUNNING LIST, CABLE W2002 (CA-422), PART OF AX-104

FROM	TO	COLOR
P2000-R	J2001-H	BLUE
P2000-B	T2000-16	WH/BLUE
P2000-C	T2000-14	WH/BLUE
P2000-V	T2000-10	YELLOW
P2000-F	T2000-10	YELLOW
P2000-U	J2002-J	WH/RED
P2000-N	J2001-E	RED
P2000-D	T2000-13	WHITE
P2000-S	T2000-9	WH/BROWN
P2000-X	T2000-8	WH/BROWN
P2000-G	J2002-E	WH/YELLOW
P2000-W	R2010	ORANGE
P2000-H	T2000-12	WH/BLACK
P2000-P	J2001-d	BLACK
P2000-A	J2002-Y	LIGHT BLUE
P2000-E	J2002-Z	WH/ORANGE
R2010	J2001-M	ORANGE
R2010	J2002-M	ORANGE
R2009	J2001-I	WHITE
T2000-12	J2002-U	WH/BLACK
T2000-12	GRD	WH/BLACK
J2001-Y	J2002-d	BLACK
T2001-5	C2018	GREEN
J2001-h	J2002-h	(COAX)

FROM	TO	COLOR
T2000-1	F2004	WH/BLACK
T2000-1	J2002-X	WH/BLACK
T2000-4	T2001-4	GREY
J2002-T	F2002	GREY
T2001-1	F2003	BROWN
T2001-1	J2001-W	BROWN
F2004	J2002-P	WHITE
J2001-J	F2002	WH/GREY
F2003	J2002-V	VIOLET
F2003	C2020	VIOLET
T2001-4	J2002-O	YELLOW
J2001-F	C2021	YELLOW
J2001-L	C2021	WH/YELLOW
T2001-1	J2002-a	BROWN
J2002-A	J2001-A	WH/GREY
J2002-B	J2001-B	PINK
J2002-C	J2001-C	WH/BROWN
J2002-D	J2001-X	WH/VIOLET
J2002-W	R2007	LIGHT RED
J2002-b	J2001-b	RED/SHIELD
J2002-c	J2001-c	WH/BLUE
R2007	J2001-D	LIGHT RED
C2022	J2002-I	WH/RED

TABLE 3-8. WIRE RUNNING LIST, CABLE W2001 (CA-420), PART OF AX-104

FROM	TO	COLOR
C2006-5	C2005-5	WH/BLACK
C2006-5	V299305	WH/BLACK
C2006-5	J2000-H	WH/BLACK
J2000-W	V2002-5	ORANGE
V2003-2	R2004	WH/YELLOW
R2004	J2000-G	WH/YELLOW
C2005-1	L2001	ORANGE
L2001	C2006-1	WH/ORANGE
C2006-1	F2001	WH/ORANGE
F2001	V2001-6	ORANGE
J2000-D	V2001-7	WHITE
V2001-4	J2000-3	WH/BROWN
J2000-X	V2001-3	WH/BROWN
J2000-B	V2000-6	WH/BLUE
J2000-C	V2000-4	WH/BLUE
J2000-V	V2000-2	YELLOW
J2000-F	V2000-8	YELLOW
F2000	V2000-8	WH/YELLOW
C2003-5	F2000	WH/RED
L2000	C2000-3	WH/RED
L2000	C2003-3	RED
R2001	C2003-3	RED
R2000	C2001-5	BLUE
C2001-5	L2000	BLUE
J2000-I	R2002	WH/RED
R2002	R2001	WH/RED
J2000-N	R2003	RED
J2000-P	GRD	BLACK
J2000-A	R2006	LIGHT BLUE
I2000	J2000-E	WH/ORANGE
R2005	C2005-1	ORANGE
R2005	C2005-5	WH/BLACK

TABLE 3-9. WIRE RUNNING LIST, CABLE W201 (CA-419), PART OF RFC

FROM	TO	COLOR
P201-P, R	C282, C283	WHITE
C263	E201-3	YELLOW
P201-T, U	GRD	BLACK
C280	C236	VIOLET
R203	J201	(COAX)
P201-N	E201-1	WH/GREEN
P201-M	P231	BLUE
P201-L	E202-2	WH/BR
P201-a, w	C256	BROWN
P201-B	C236	VIOLET
P201-D	R223	YELLOW
P201-E	C212	WH/RED
P201-F	E202-4	WH/DR
S204-3B	R215	WH/BLUE
P201-H	L250	RED
P201-I	C284	ORANGE
P201-j	E202-3	WH/YELLOW
P201-d	E201-4	WH/VIOLET
P201-A, X	C281	WH/GRAY
P201-4	GRD	BLACK
P201-2	L221	WHITE
P201-C	C256	PINK
P201-b	E201-2	GREEN
P201-c	M201	WH/BLACK
C244	C256	PINK
P201-h	R202	(COAX)
S204-5B	R209	WH/GREEN
S204-1A	R225	BROWN
S204-6B	R233	WH/ORANGE
S204-7B	R218	YELLOW
S204-8B	R230	BLUE
S204-2B	R221	WHITE
S204-4A	R220	WH/BROWN
S204-4B	R222	WH/RED
L242	E201-1	SHIELDED
L242	C210	SHIELDED
L312	C213	--
C209	R227	--
C219	L215	--
C215	R205	--
C223	L249	--
C224	L250	--
R225	C284	ORANGE
C249	R221/P201-M	RED
L229	C239	YELLOW
L230	C246	RED
R228	C262	BROWN
L243	C265	WH/YELLOW
R227	R228	VIOLET
R229	R228	GREY
M201 (+)	C289	PINK

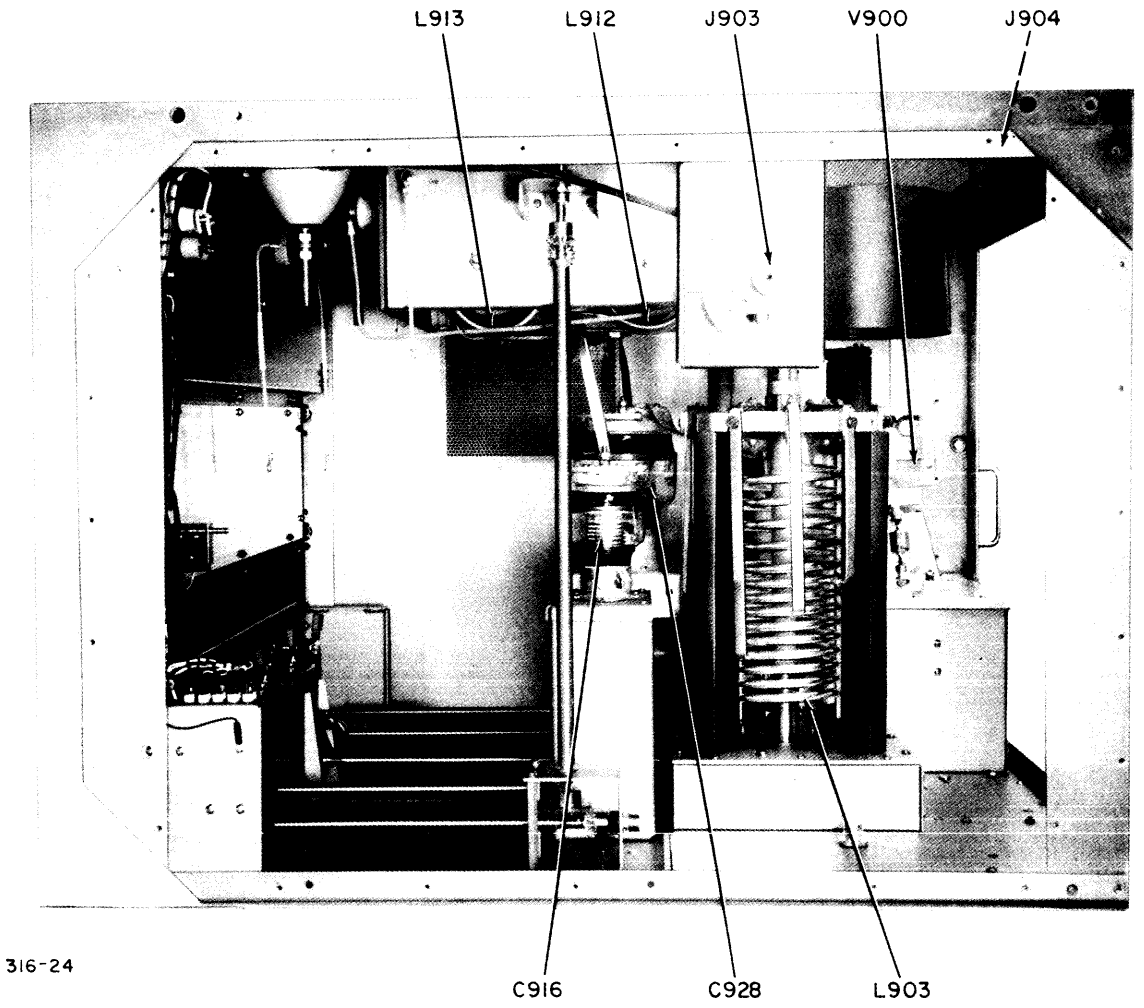


Figure 3-2. Power Amplifier Section AX-509, Side View

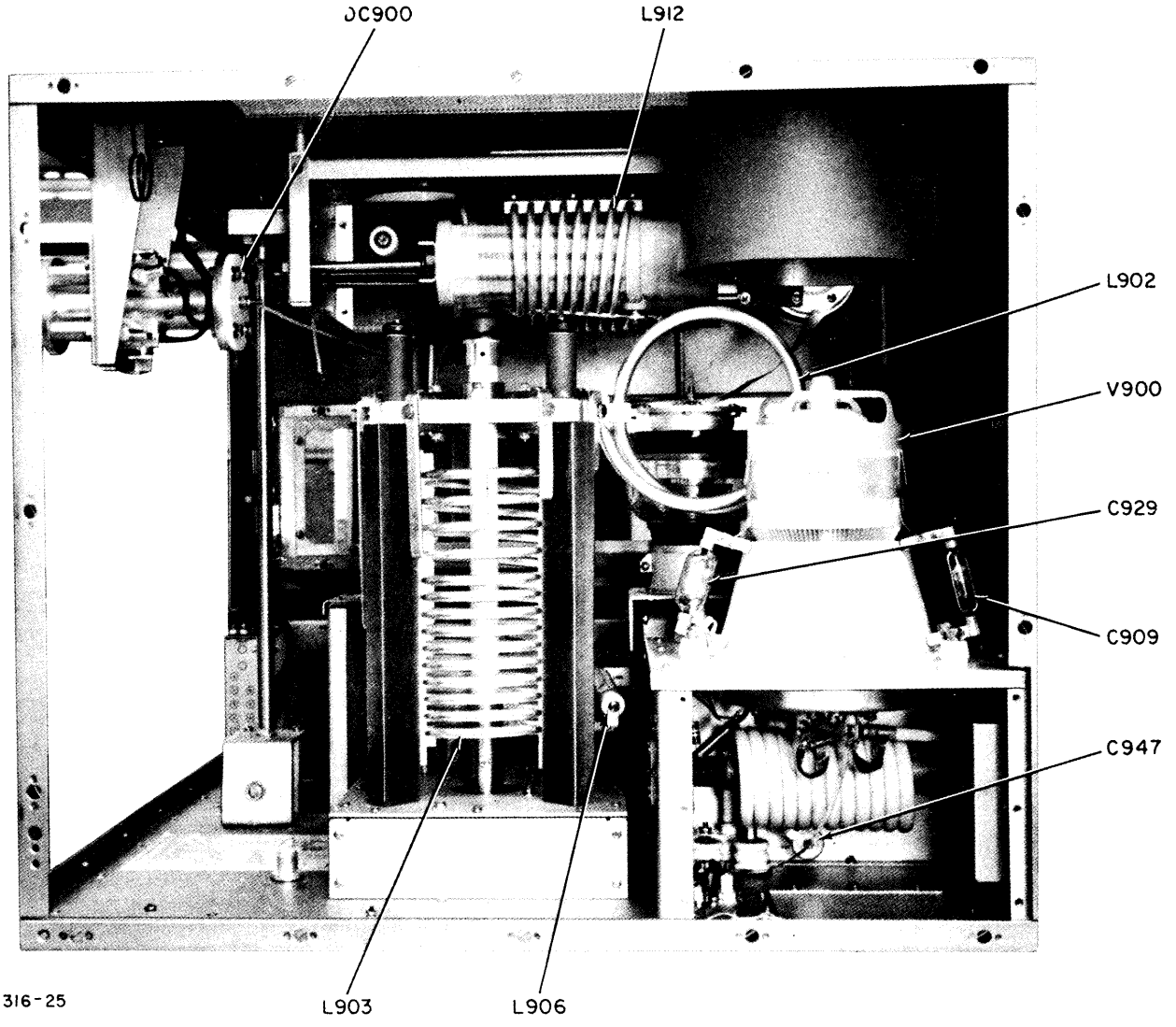


Figure 3-3. Power Amplifier Section AX-509, Rear View

TABLE 3-10. POWER AMPLIFIER V900, VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE ELEMENT	VOLTAGE	RESISTANCE
Plate	+7500	100
Screen grid	+1200*	170K
Control grid	-300**	250K**
Filament	7.5 AC***	1***

*TUNE-OPERATE switch set to OPERATE position.
**Varies with setting of PA BIAS ADJ control.
***Measured across both filaments.

3-7. RELAY PANEL AR-161.

Troubleshooting procedures for the relay panel are included in tables 3-2 and 3-3. When trouble has been sectionalized to a particular circuit in the relay panel, use the resistance data of table 3-11 in conjunction with the overall schematic diagram (figure 6-1) to isolate the trouble to a part. Parts location is shown in figure 3-4.

3-8. HIGH VOLTAGE RECTIFIER AX-103 AND MAIN POWER SUPPLY AR-138.

Troubleshooting procedures for the high voltage rectifier and main power supply are included in tables 3-2 and 3-3. Short circuit testing is given in table 3-4. When troubles have been sectionalized to a particular circuit, use the resistance data in table 3-12 in conjunction with the overall schematic diagram (figure 6-1) to isolate the trouble to a part. Parts location is shown in figures 3-5, 3-6, and 3-7. SEE WARNING, PARAGRAPH 3-3.

3-9. MAIN FRAME AND MAIN POWER PANEL.

Troubleshooting procedures for the main frame circuits are included in tables 3-2 and 3-3. Use the overall schematic in section 6 to circuit trace and isolate the faulty part.

3-10. AUXILIARY FRAME.

Troubleshooting procedures for the auxiliary frame proper are covered in tables 3-2 and 3-3. The dc resistances of the transformer and contactor coils in the auxiliary frame are listed in table 3-13. Use the auxiliary frame interconnection diagram in the appropriate exciter maintenance manual to circuit trace and isolate the faulty part. Parts location is shown in figure 3-9.

3-11. STANDING WAVE CONTROL UNIT SWCU.

When system troubleshooting (tables 3-2 and 3-3) indicates that a trouble exists in the SWCU, use table 3-14 to isolate the trouble to a specific part in this chassis. Use the voltage and resistance data in table 3-15 in conjunction with the SWCU schematic diagram (figure 2-11) to locate the defective part. Parts location is shown in figure 3-10.

TABLE 3-11. RELAY COIL RESISTANCES

RELAY	TERMINAL	RESISTANCE
K700	1-2	11,000
K701	11-12	1,100
	13-14	1
K702	19-20	1,100
	E706-E707	11,500
K703	25-26	1,800
K704	27-28	1,100
	31-32	200
K705	33-34	11,000
K706	41-42	1,100
	47-48	10,000
K707	49-50	11,000
	55-56	43
K708	61-62	11,000

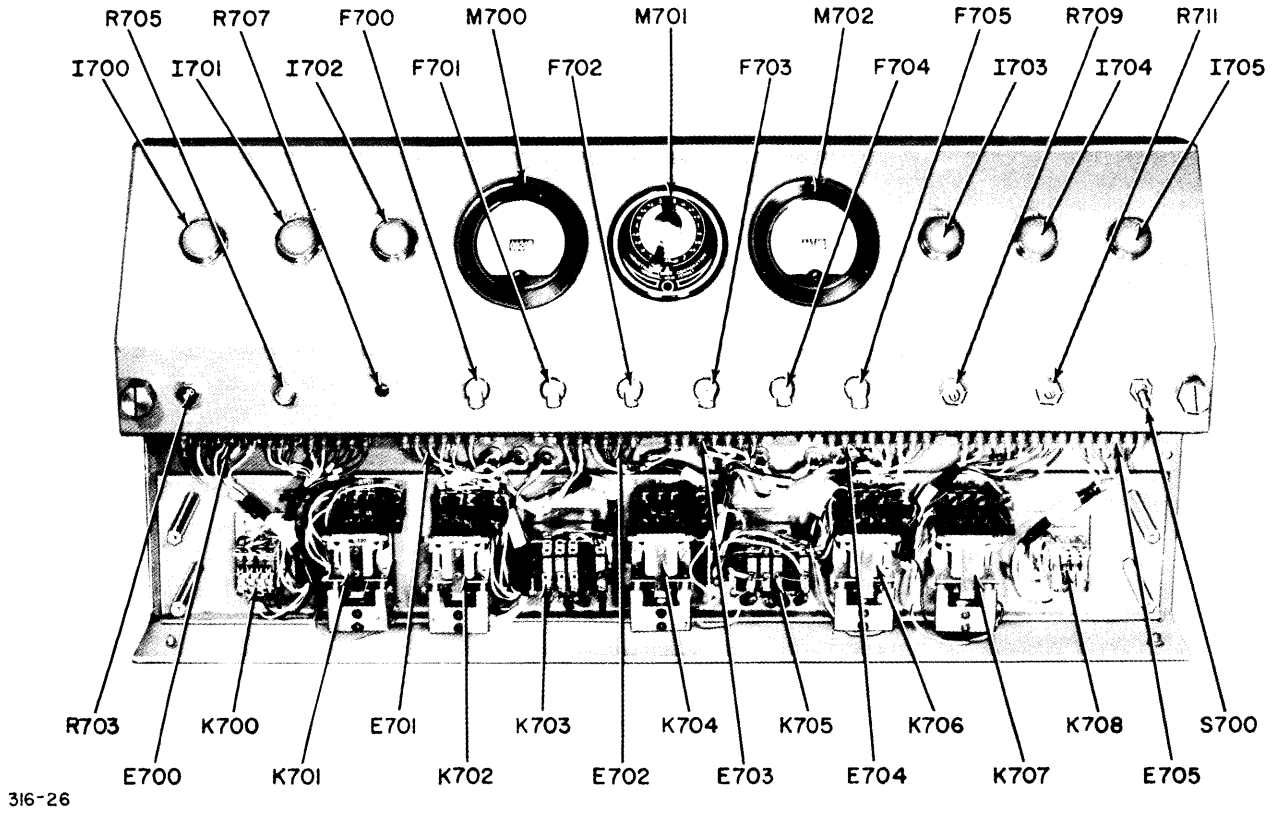
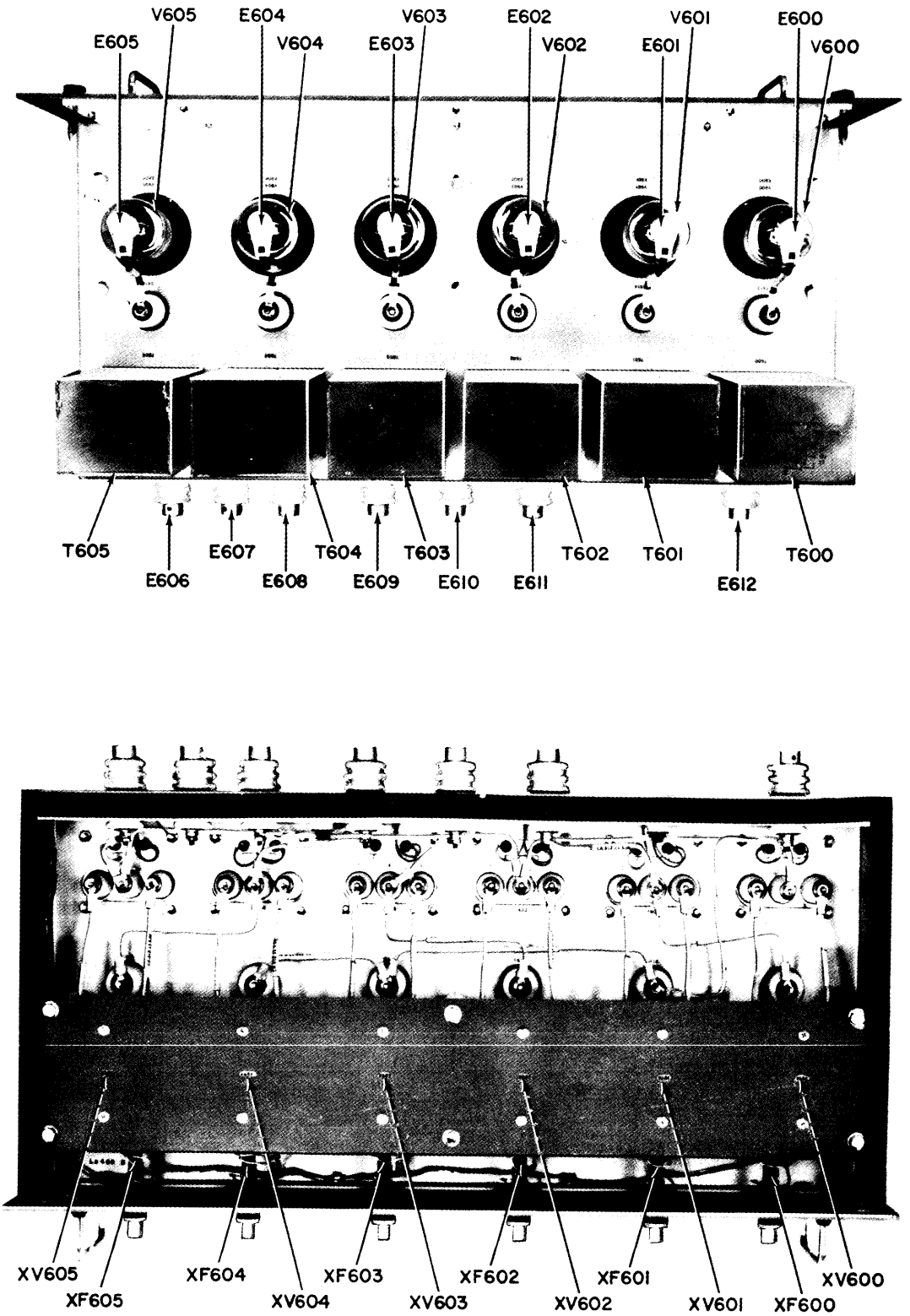
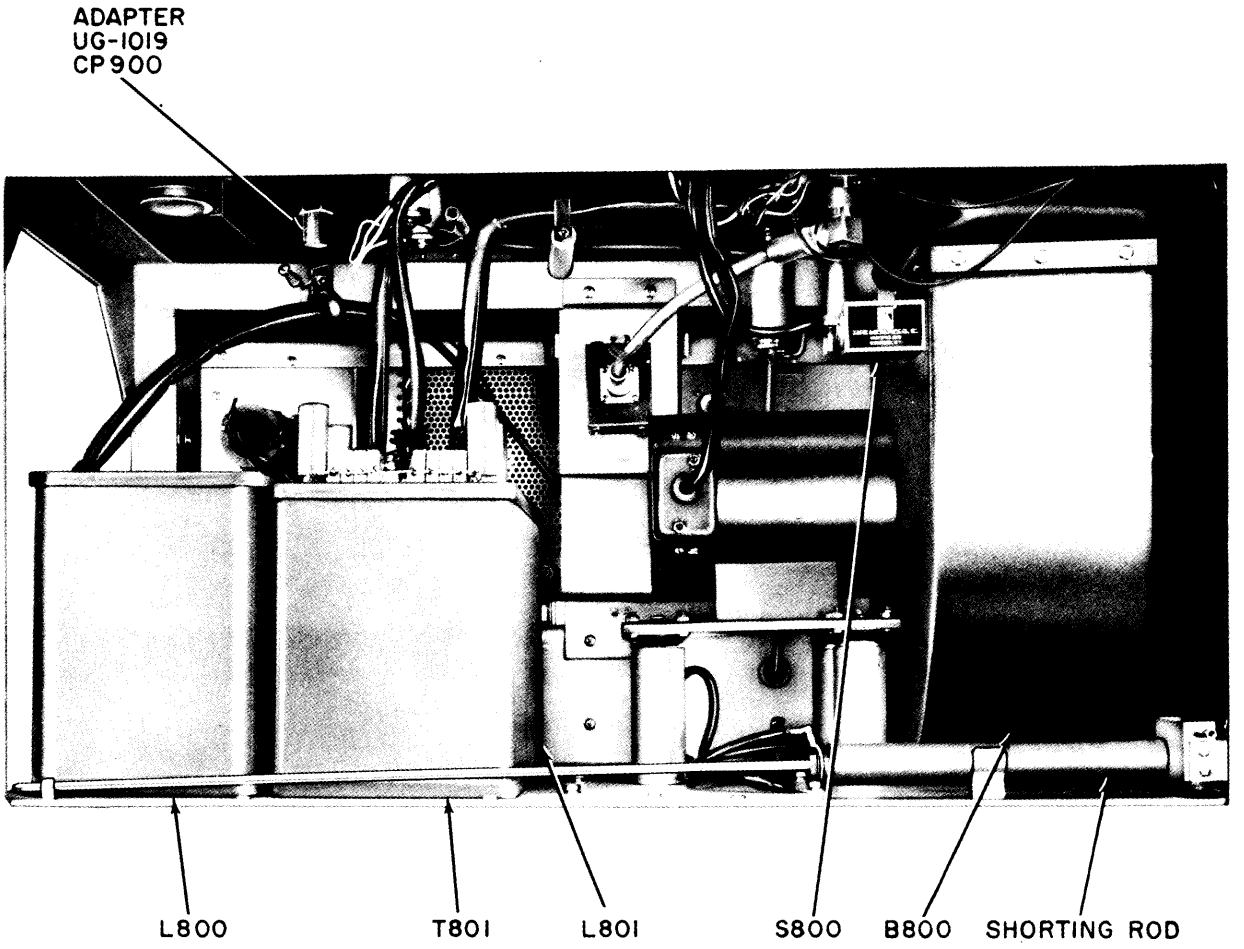


Figure 3-4. Relay Panel AR-161, Front View



316-27

Figure 3-5. High Voltage Rectifier AX-103, Top and Bottom Views



316-28

Figure 3-6. Main Power Supply AX-138, Upper Shelf

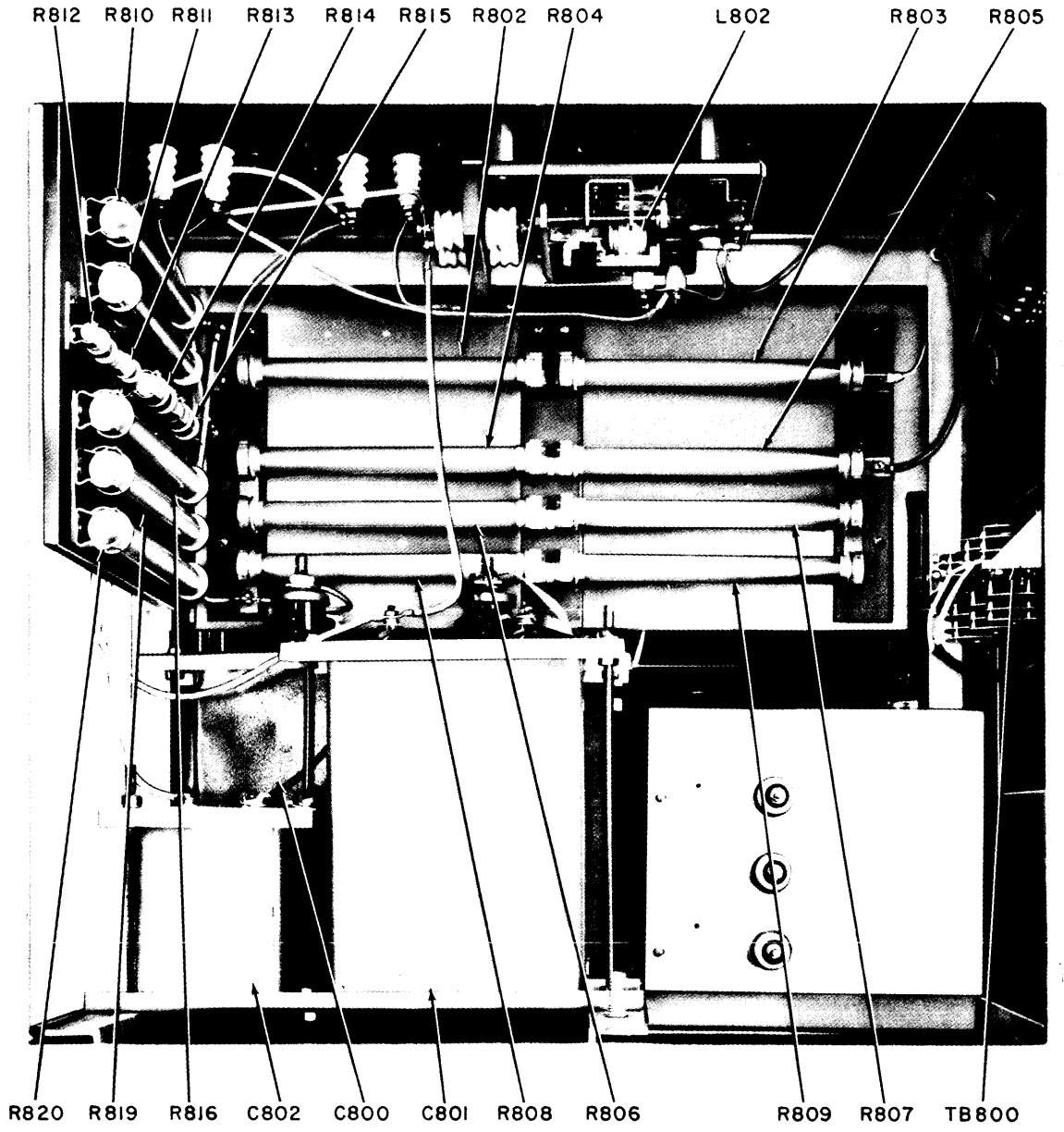


Figure 3-7. Main Power Supply AX-138, Lower Shelf

TABLE 3-12. HIGH VOLTAGE RECTIFIER AND MAIN POWER SUPPLY TRANSFORMER AND COIL RESISTANCES

TRANSFORMER OR COIL	TERMINALS	RESISTANCE
T600 through T605	1-2	8
	3-4	Less than 1
	4-5	Less than 1
T800----------	Primary	5
	Secondary	15
T801----------	1-2	Less than 1
	2-3	Less than 1
	3-4	Less than 1
	4-5	Less than 1
	5-6	Less than 1
	6-7	Less than 1
	7-8	6
	9-10	Less than 1
	10-11	Less than 1
L800----------	---------	9
L801----------	---------	23
L802----------	---------	80
L803----------	---------	Less than 1

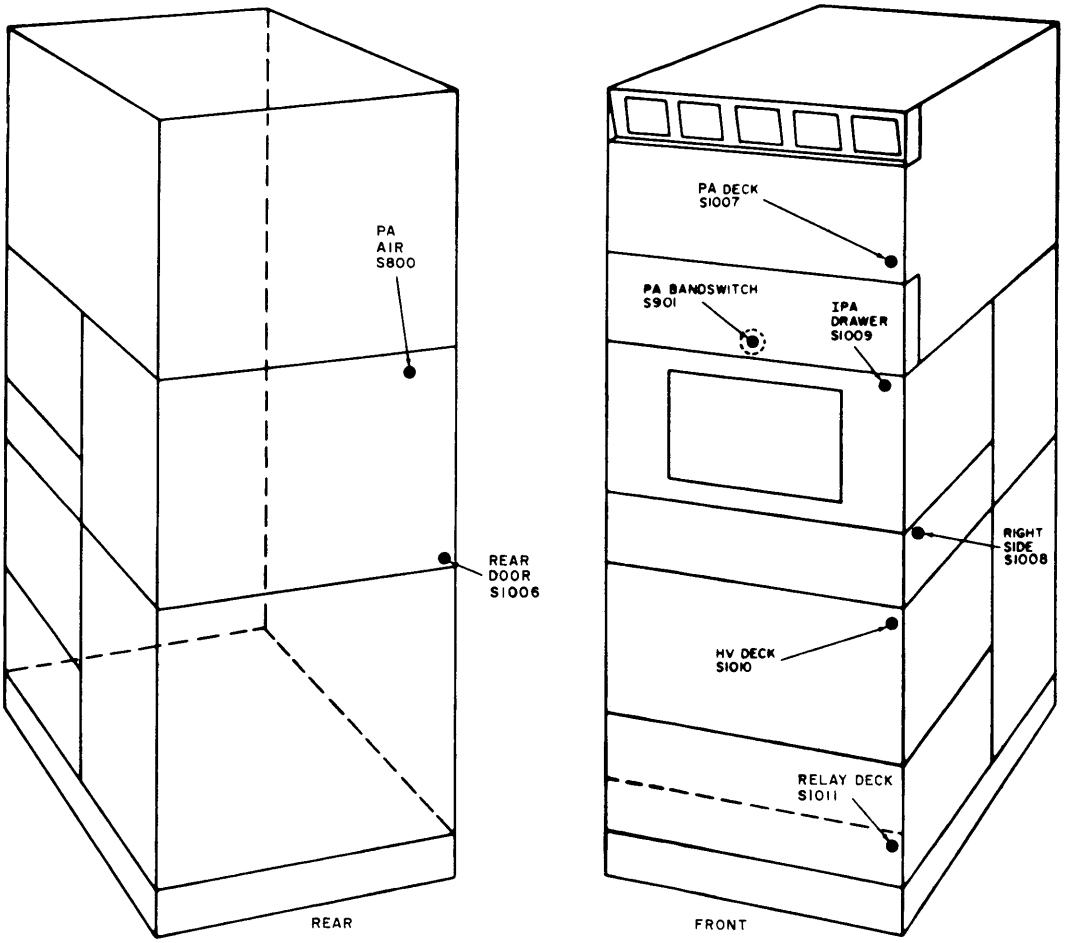


Figure 3-8. Location of Interlock Switches

TABLE 3-13. AUXILIARY FRAME, COIL RESISTANCES

TRANSFORMER OR COIL	TERMINALS	RESISTANCES
T3000 (unsynth)	Primary	0
	Secondary	0.5
K3000	-	70
K3001	-	70
T3002 (Synth)	0-220	
	0-115	

TABLE 3-14. STANDING WAVE CONTROL UNIT SWCU, TROUBLESHOOTING

ITEM	INDICATION	PROBABLE TROUBLE	PROCEDURE
1	AC fuse F103 opens continually.	Short in power transformer T101.	Check T101 for short.
2	B+ fuse F102 opens continually.	Short in B+ line.	Check filter capacitors C107A and C107B for shorts.
3	Overload relay K101 trips at incorrect SWR level.	Relay K102 or associated current limiting resistor is defective.	Check K102 and R115 or R113, as applicable.
4	Overload relay K101 trips with no PA power output.	SWR OVLD ADJ control R104 is misadjusted.	Adjust R104. (Refer to paragraph 4-6.)
		DC amplifier V101 is defective.	Check V101.
5	Overload relay K101 does not trip at any SWR level.	SWR OVLD ADJ control R104 is misadjusted.	Adjust R104. (Refer to paragraph 4-6.)
		Power supply element is open.	Check rectifiers CR102 and CR103, and filter capacitors C107A and C107B for open circuits.
		Relay K102 or associated current limiting resistor is open.	Check K102 and R115 or R113, as applicable, for open circuit.
		Overload relay K101 is defective.	Check K101 for open overload coil.

TABLE 3-15. VOLTAGE AND RESISTANCE MEASUREMENTS, SWCU

V101 PIN NO.	VOLTAGE (DC)	RESISTANCE (OHMS)
1		At least 330,000
2		470,000
3		1,000
4	6.3 VAC*	-
5	6.3 VAC*	-
6		At least 13,000
7		At least 430,000
8		3,000
9	6.3 VAC*	-

*Measured across pins 4 (or 5) and 9

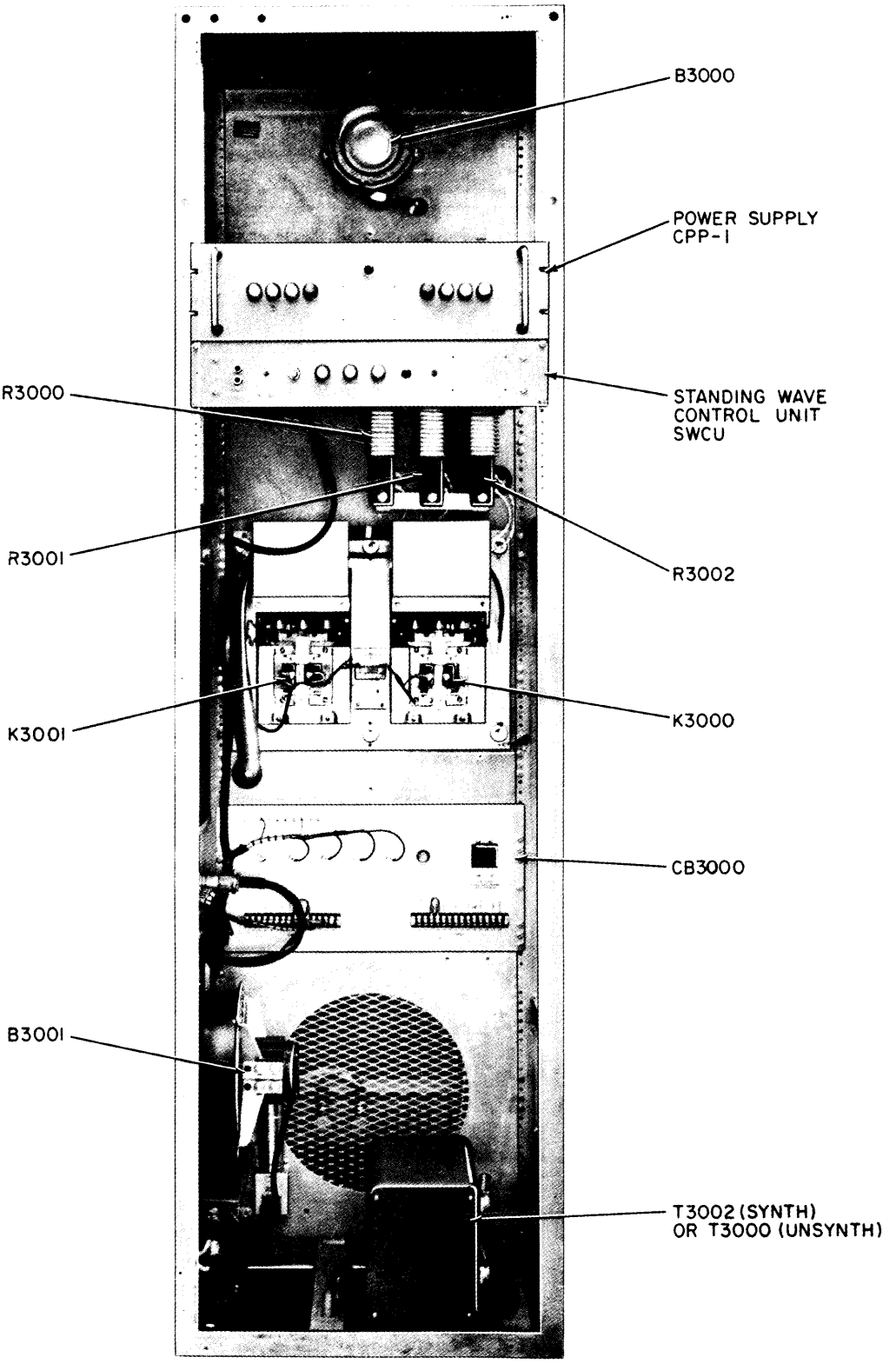


Figure 3-9. Auxiliary Frame, Rear View

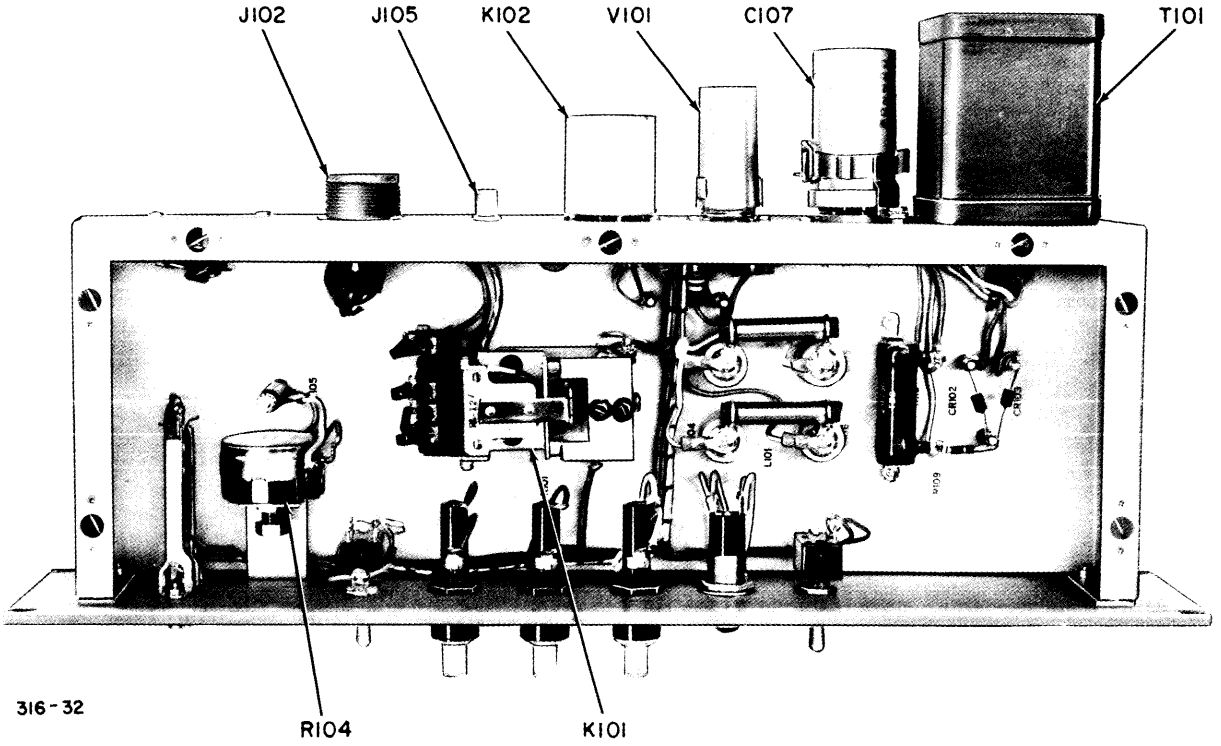


Figure 3-10. Standing Wave Control Unit SWCU, Top View

SECTION 4
MAINTENANCE

4-1. GENERAL.

Maintenance is divided into three categories: operator's maintenance, preventive maintenance, and corrective maintenance. The operator's maintenance, normally performed by the operator as he works with the equipment, is confined to visual inspection, cleaning, and fuse replacement. Operator's maintenance for the GPT-10K transmitter is included in the associated operating manual. Preventive and corrective maintenance procedures are given in this section.

4-2. PREVENTIVE MAINTENANCE.

Preventive maintenance is maintenance that detects and corrects trouble-producing conditions before they become serious enough to affect equipment operation. Some trouble-producing conditions are dirt and grime, contact erosion, improper contact pressure, lack of proper lubrication, improper relay adjustment, 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 for irregularities. Observe indicator lights and rectifier tubes 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" PERIODS. Recondition rotary and switch contacts as necessary. Use crocus cloth and trichlorethylene or ethylene-dichloride for cleaning. Inspect and clean the transmitter. Check the condition of the 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. Note the condition of gear trains; those 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.

4-3. CORRECTIVE MAINTENANCE.

The corrective maintenance procedures are essentially factory alignment procedures modified for use in the field. Alignment procedures are presented in the following paragraphs.

4-4. ALIGNMENT OF RF AMPLIFIER RFC. (See figure 4-1.)

a. PRELIMINARY PROCEDURE.

(1) Pull RF Amplifier RFC and Power Supply AX-104 out on its slides, then remove top and bottom covers. Set PA SCREEN switch (140) on main power panel to OFF, and disable IPA drawer interlock switch S1009.

(2) Apply power to auxiliary frame and tune exciter to 2 mc at an rf output level of 1 volt.

(3) Preset tuning controls on RFC to 2 mc, as indicated on transmitter tuning chart.

(4) Apply primary power to main frame, then set MULTIMETER SWITCH (122) to IPA BIAS and adjust IPA BIAS ADJ control for an indication of 100 volts on MULTIMETER (120).

(5) Set MULTIMETER switch to RF 1ST AMPL EP and tune 1ST AMPL TUNING control (124) for a peak reading on MULTIMETER.

(6) Set MULTIMETER switch to RF IPA EG and tune IPA GRID TUNING control (123) for a peak reading on MULTIMETER. Replace top and bottom covers and close the RFC and AX-104 drawer.

(7) Reduce rf drive to minimum, then apply high voltage to transmitter.

(8) Adjust output level of the exciter for a reading of 220 milliamperes on IPA PLATE CURRENT meter (121).

(9) Tune IPA TUNING control for a pronounced dip on IPA PLATE CURRENT meter.

(10) Adjust IPA LOADING control until the reading on IPA PLATE CURRENT meter rises.

(11) Set the HIGH VOLTAGE circuit breaker on main power panel to OFF.

b. ALIGNMENT OF 2- TO 4-MC FREQUENCY BAND.

(1) Check that exciter is tuned to 2-mc.

(2) Set DRIVER BAND switch (125) to 2-4 and adjust capacitor C202 to approximately one-half capacity.

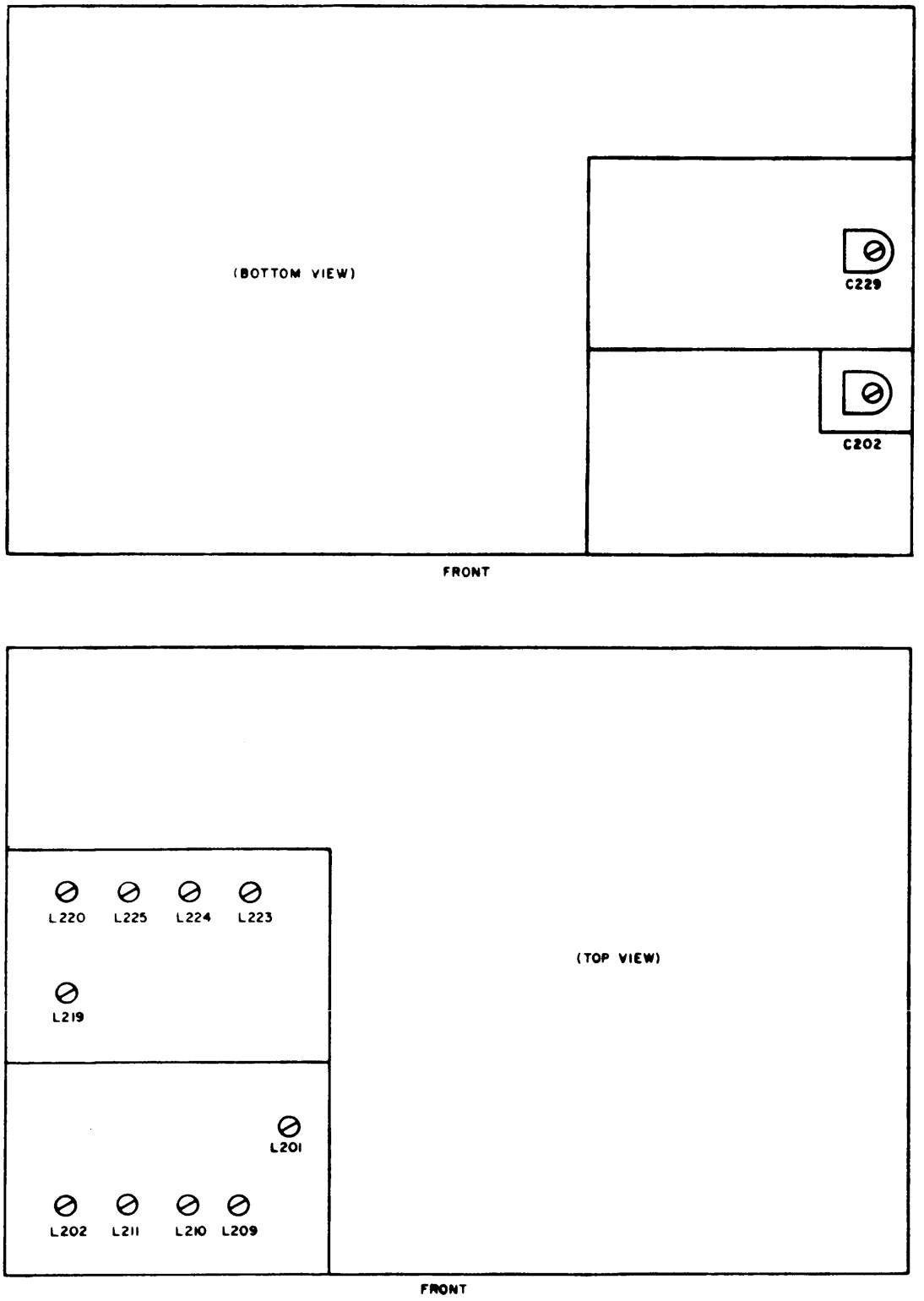


Figure 4-1. RF Amplifier RFC, Alignment Controls

(3) Position 1ST AMPL TUNING control (124) to 0.5.

(4) Set MUTLIMETER switch (122) to RF 1ST AMPL and adjust the OUTPUT control on the exciter for an indication of 7 on MULTIMETER (120).

(5) Tune inductor L301 for maximum deflection on MULTIMETER.

(6) Turn the MULTIMETER switch to the RF IPA EG position and set the IPA GRID TUNING control (123) to 1.

(7) Tune inductor L219 for maximum deflection of MULTIMETER. Return MULTIMETER switch to the RF 1ST AMPL EP position.

(8) Retune exciter to 4-mc. Position the 1ST AMPL TUNING control to 9, and tune capacitor C202 for maximum deflection on MULTIMETER.

(9) Set the MULTIMETER switch to the RF IPA EG position, and tune IPA GRID TUNING capacitor C231 for maximum deflection of the MULTIMETER.

(10) The control knob of the IPA GRID TUNING control should now point to 9. If the IPA GRID TUNING control does not point to 9, return to (1) above and retune the 2-mc band using a slightly different setting for the 1ST AMPL TUNING control, (3) above.

(11) Check high end of band again, and if it is not yet satisfactory, repeat all the above steps until the 2- to 4-mc frequency band is tracking correctly.

c. ALIGNMENT OF 4- TO 8-MC FREQUENCY BAND.

(1) Tune the exciter to 4-mc.

(2) Set the DRIVER BAND switch to the 4-8 position and adjust neutralizing capacitor C229 to approximately one-quarter capacity.

(3) Position the 1ST AMPL TUNING control to 0.5, and set the MULTIMETER switch to the RF 1ST AMPL EP position; adjust the OUTPUT control of the exciter for an indication of 7 on the MULTIMETER.

(4) Tune inductor L202 for maximum deflection on the MULTIMETER.

(5) Turn the MULTIMETER switch to the RF IPA EG position and set the IPA GRID TUNING control to 0.5; tune inductor L220 for maximum deflection on the MULTIMETER. Return the MULTIMETER switch to the RF 1ST AMPL EP position.

(6) Set the output frequency of the exciter to 8-mc, and tune the 1ST AMPL TUNING control for maximum deflection of the MULTIMETER.

(7) Set the MULTIMETER switch to the RF IPA EG position, and tune the IPA GRID TUNING control for maximum deflection of the MULTIMETER.

(8) The control knobs of both the 1ST AMPL TUNING capacitor and the IPA GRID TUNING capacitor should now point to 9. If they both do not point to 9, return to (1) above and retune the 4-mc band using a slightly different setting of the 1ST AMPL TUNING control (3) above.

(9) Check the high end of the band again; if it is not yet satisfactory, repeat all of the above steps until the 4-8-mc frequency band is tracking correctly.

d. ALIGNMENT OF 8- TO 16-MC FREQUENCY BAND.

(1) Tune exciter to 8-mc.

(2) Set the DRIVER BAND switch to the 8-16 position.

(3) Position the 1ST AMPL TUNING control to 0.5, and set the MULTIMETER switch to the RF 1ST AMPL EP position; adjust the OUTPUT control to the exciter for an indication of 7 on the MULTIMETER.

(4) Tune inductor L209 for maximum deflection on the MULTIMETER.

(5) Turn the MULTIMETER switch to the RF IPA EG position and set the PA GRID TUNING control to 0.5; tune inductor L223 for maximum deflection on the MULTIMETER. Return the MULTIMETER switch to the RF 1ST AMPL EP position.

(6) Set the output frequency of the exciter to 16-mc, and tune the 1ST AMPL TUNING control for maximum deflection of the MULTIMETER.

(7) Set the MULTIMETER switch to the RF IPA EG position, and tune the IPA GRID TUNING control for maximum deflection of the MULTIMETER.

(8) The control knobs of both the 1ST AMPL TUNING capacitor and the IPA GRID TUNING capacitor should now point to 8. If they both do not point to 8, return to (1) above and retune the 8-mc band using a slightly different setting of the 1ST AMPL TUNING control, (3) above.

(9) Check the high end of the band again; if it is not yet satisfactory, repeat all of the above steps until 8-16-mc frequency band is tracking correctly.

e. ALIGNMENT OF 16- TO 20-MC FREQUENCY BAND.

(1) Tune exciter to 16-mc.

(2) Set the DRIVER BAND switch to the 16-20 position.

(3) Position the 1ST AMPL TUNING control to 4, and set the MULTIMETER switch to the RF 1ST AMPL EP position; adjust the OUTPUT control of the exciter for an indication of 7 on the MULTIMETER.

(4) Tune inductor L210 for maximum deflection of the MULTIMETER.

(5) Turn the MULTIMETER switch to the RF IPA EG position and set the IPA GRID TUNING control to 3; tune inductor L224 for maximum deflection on the MULTIMETER. Return the MULTIMETER switch to the RF 1ST AMPL EP position.

(6) Set the output frequency of the exciter to 20-mc, and tune the 1ST AMPL TUNING control for maximum deflection of the MULTIMETER.

(7) Set the MULTIMETER switch to the RF IPA EG position, and tune the IPA GRID TUNING control for maximum deflection of the MULTIMETER.

(8) The control knobs of both the 1ST AMPL TUNING capacitor and the PA GRID TUNING capacitor should now point to 8. If they both do not point to 8, return to (1) above and retune the 16-mc band using a slightly different setting of the 1ST AMPL TUNING control, (3) above.

(9) Check the high end of the band again; if it is not yet satisfactory, repeat all of the above steps until the 16-20-mc frequency band is tracking correctly.

f. ALIGNMENT OF 20- TO 28-MC FREQUENCY BAND.

(1) Tune the exciter to 20-mc.

(2) Set the DRIVER BAND switch to the 20-28 position.

(3) Position the 1ST AMPL TUNING control to 4, and set the MULTIMETER switch to the RF 1ST AMPL EP position; adjust the OUTPUT control of the exciter for an indication of 7 on the MULTIMETER.

(4) Tune inductor L211 for maximum deflection of the MULTIMETER.

(5) Turn the MULTIMETER switch to the RF IPA EG position and set the IPA GRID TUNING control to 7; tune inductor L225 for maximum deflection on the MULTIMETER. Return the MULTIMETER switch to the RF 1ST AMPL EP position.

(6) Set the output frequency of the exciter to 28-mc, and tune the 1ST AMPL TUNING control for maximum deflection of the MULTIMETER.

(7) Set the MULTIMETER switch to the RF IPA EG position, and tune the IPA GRID TUNING control for maximum deflection of the MULTIMETER.

(8) The control knobs of both the 1ST AMPL TUNING capacitor and the PA GRID TUNING capacitor should now point to 8. If they both do not point to 8, return to (1) above and retune the 22-mc band using a slightly different setting of the 1ST AMPL TUNING control, (3) above.

(9) Check the high end of the band again; if it is not yet satisfactory, repeat all of the above steps until the 20-28-mc frequency band is tracking correctly.

g. NEUTRALIZATION.

(1) Set DRIVER BAND switch to 8-16 position and the IPA BAND switch to 8-12 position.

(2) Tune the exciter to 8-mc.

(3) Position MULTIMETER switch to RF 1ST AMPL EP, and adjust the OUTPUT control of the exciter for an indication of 1.4 on the MULTIMETER.

(4) Rotate 1ST AMPL TUNING control until a peak reading is obtained on the MULTIMETER.

(5) Set MULTIMETER switch to the RF IPA EG position, and rotate IPA GRID TUNING control until a peak reading is obtained on the MULTIMETER.

(6) Reduce the output level of the exciter to zero.

(7) Set the IPA TUNING control, the IPA LOADING control, and the IPA LOADING switch to 8-mc as indicated in the equipment tuning chart.

(8) Set the HIGH VOLTAGE circuit breaker (141) on the main power panel to ON.

(9) Slowly increase the output level of the exciter until the reading on the IPA PLATE CURRENT meter is approximately 220 milliamperes.

(10) Rotate the IPA TUNING control until a maximum reading is produced on the IPA PLATE CURRENT meter.

(11) Increase the setting of the IPA LOADING control until the reading on the IPA PLATE CURRENT meter rises.

(12) Repeat (10) and (11) above increasing the excitation until the reading on the IPA PLATE CURRENT meter is approximately 300 milliamperes.

(13) Set MULTIMETER switch to RF PA EG position and note the indication on the MULTIMETER.

(14) Set the HIGH VOLTAGE circuit breaker on the main power panel to OFF.

(15) Adjust NEUT control for a minimum reading on the MULTIMETER.

(16) Set the output frequency of the exciter to 28-mc and repeat (3), (4), (5), and (8) through (15) above using the following control and switch positions.

CONTROL OR SWITCH	POSITION
DRIVER BAND	20-28
IPA BAND	20-28
IPA LOADING	(See tuning chart for 28-mc setting.)
IPA LOADING	(See tuning chart for 28-mc setting.)
IPA TUNING	(See tuning chart for 28-mc setting.)

(17) If the setting of the NEUT control is not the same for the 8-mc and the 28-mc frequencies, return to (15) above and readjust the NEUT control in both frequency ranges until a compromise setting, which will keep the MULTIMETER meter indication at a minimum for both frequencies, is reached.

h. AUTOMATIC LOAD AND DRIVE CONTROL (ALDC) ALIGNMENT. To adjust the aldc circuit in the rf amplifier, proceed as follows:

(1) Connect a jumper between terminals 1 and 3 of E201.

(2) Set the front panel switches and controls as listed below:

CONTROL OR SWITCH	POSITION
DRIVER BAND	2-4
IPA BAND	2-2.5
IPA LOADING	(See tuning chart for 2-mc setting.)
MULTIMETER	RF 1ST AMPL EP
IPA LOADING	(See tuning chart for 2-mc setting.)
IPA TUNING	(See tuning chart for 2-mc setting.)
ALDC	Fully counterclockwise.

(3) Set potentiometer R228 on the rear of the rf amplifier fully counterclockwise.

(4) Set output frequency of the exciter to 2 mc, and adjust output level for an indication of 1.4 on the MULTIMETER.

(5) Rotate the 1ST AMPL TUNING control until a peak reading is obtained on the MULTIMETER.

(6) Set the MULTIMETER switch to the RF PA EG position. Rotate the IPA GRID TUNING control until a peak reading is obtained on the MULTIMETER.

(7) Rotate the OUTPUT control on the exciter to its maximum counterclockwise position.

(8) Set the HIGH VOLTAGE circuit breaker on the main power panel to ON.

(9) Slowly increase the setting of the OUTPUT control on the exciter until the reading on the IPA PLATE CURRENT meter is approximately 220 milliamperes.

(10) Rotate the IPA TUNING control until a minimum reading is produced on the IPA PLATE CURRENT meter.

(11) Adjust the setting of the IPA LOADING control until the reading on the IPA PLATE CURRENT meter rises.

(12) Readjust the setting of the OUTPUT control on the exciter until the reading on the IPA PLATE CURRENT meter is restored to 220 milliamperes.

(13) Set the MULTIMETER switch to the RF PA EG position and note the level of rf output.

(14) Repeat (10) through (13) above, increasing the excitation until the desired power output is obtained. Full-rated power output should be obtained with approximately 300 milliamperes of plate current.

(15) Turn potentiometer R228 clockwise until the MULTIMETER indicates a slight decrease in voltage.

4-5. ALIGNMENT OF OVERLOAD RELAYS IN RELAY PANEL.

The plate and screen overload relays for intermediate power amplifier V203 and power amplifier V900 may be aligned with the relay panel in place in the main frame. In each case, the pertinent OVLD ADJ control is adjusted so that the associated protective relay operates at the designated plate or screen current level of the amplifier.

a. ALIGNMENT OF IPA PLATE OVLD RELAY K707.

(1) Set IPA PLATE OVLD ADJ control (155) to fully clockwise position.

(2) Tune exciter and IPA to any carrier frequency.

(3) Tune and load IPA until IPA PLATE CURRENT meter (121) reads 300 to 400 ma.

(4) Detune IPA TUNING control (128) until IPA PLATE CURRENT meter (121) reads 600 ma, then turn IPA PLATE OVLD ADJ control (155) counterclockwise until overload circuit is energized (IPA PLATE OVLD lamp (149) lights.

b. ALIGNMENT OF IPA SCREEN OVLD RELAY K707.

(1) Set IPA SCREEN OVLD ADJ control (154) to fully clockwise position.

(2) Tune exciter and IPA to any carrier frequency.

(3) Set MULTIMETER switch (122) to DC IPA SG position. With IPA tuned and loaded, MULTIMETER (120) should read approximately 15 ma.

(4) Unload IPA until MULTIMETER reads 30 ma, then turn IPA SCREEN OVLD ADJ control counterclockwise until overload circuit is energized. (IPA SCREEN OVLD lamp (148) lights.)

c. ALIGNMENT OF PA PLATE OVLD RELAY K701.

(1) Set PA PLATE OVLD ADJ control (152) to fully clockwise position.

(2) Tune transmitter to full PEP at any carrier frequency.

(3) Detune PA TUNE control (115) until PA PLATE CURRENT meter (103) reads 2 amperes, then turn PA PLATE OVLD ADJ control counterclockwise until overload circuit is energized (PA PLATE OVLD lamp (146) lights).

d. ALIGNMENT OF PA SCREEN OVLD RELAY K702.

(1) Set PA SCREEN OVLD ADJ control (153) to fully clockwise position.

(2) Tune transmitter to full PEP at any carrier frequency.

(3) Unload PA until PA SCREEN CURRENT meter (102) reads 80 ma, then turn PA SCREEN OVLD ADJ control counterclockwise until overload circuit is energized (PA SCREEN OVLD lamp (147) lights).

4-6. ALIGNMENT OF SWR OVERLOAD RELAY.

The SWR overload relay in the SWCU must be aligned with the SWR chassis in place at the rear of the auxiliary frame. Perform this alignment as follows:

a. Plate ratio switch S102 on SWR chassis in 2:1 position.

b. Rotate reflected power diode CR904 at reflected power output terminal of directional coupler DC900 so that it reads forward power. (Arrow on diode should point to load.)

c. With transmitter terminated in 50-ohm load, apply power to transmitter and tune output to any frequency.

d. Hold SWR switch (138) in depressed position and increase drive until lower (SWR) scale of PA OUTPUT meter (105) r ads 2. This corresponds to an rf output of 540 watts.

e. Release SWR switch (138) and adjust SWR OVLD ADJ control R104 until the HIGH VOLTAGE circuit breaker (141) trips.

f. Reduce rf drive to minimum and reset SWR overload relay by depressing OVERLOAD RESET pushbutton (133).

g. Remove power from transmitter. then restore reflected power diode CR904 to its normal (reflected) position.

4-7. BLOWER AND FAN MOTOR BEARING REPLACEMENT.

The following procedures are presented to facilitate replacement of motor bearings on the blowers and fans used in the transmitter.

a. REPLACING BEARINGS ON RFC BLOWER MOTOR (B201). (See figure 4-2.)

(1) Remove four screws (91-10-10) from inlet ring (67-508-2N-1) on blower housing. These screws hold motor mounting brackets to blower housing.

(2) Loosen two setscrews (91-2-1) on blower wheel hub and remove blower wheel (68-2-14) with inlet ring.

(3) Remove four washers (92-6) and four nuts (94-2-1) from four through bolts (91-10-17) on motor.

(4) Remove front end cap (3102B101).

(5) Remove rotor assembly (4102B167-1) from motor housing.

NOTE

If any shim washers should adhere to rear bearing, be sure to put them back into rear end cap (3102B105-1). All shim washers and loading spring (83-10) must be positioned in their original order when reassembling motor.

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

(7) Press two new bearings (47-3-31) on shaft by applying pressure to inner race of bearing only, keeping bearing square with shaft. DO NOT APPLY PRESSURE TO OUTER RACES.

(8) Replace rotor assembly (4102B167-1) in rear end cap (3102B105-1), checking that shim washers and loading spring are in their original order.

(9) Attach front end cap (3102B101) and secure in place with four bolts (91-10-12), four washers (92-6), and four nuts (94-2-1).

(10) Place inlet ring (67-508-2N-1) on shaft, then slide blower wheel (68-2-14) on shaft. The two setscrews (91-12-1) should line up with flats on shaft to prevent raising a burr which would interfere with future disassembly.

(11) Insert blower wheel in blower housing (67-508-2C-4). Line up inlet ring and motor mounting brackets with proper holes in blower housing. Secure using four screws (91-10-10) and four washers (92-6).

(12) Center blower wheel (68-2-14) in blower housing and tighten two setscrews (91-12-1).

b. REPLACING BEARINGS ON AUXILIARY FRAME FAN MOTORS (B3000 AND B3001). (See figure 4-3.)

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

(2) Remove four bolts (91-10-17), 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 spring (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 bearings (47-3-31) on shaft by applying pressure to inner race only. DO NOT 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 setscrews (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.

c. REPLACING BEARINGS ON MAIN FRAME BLOWER MOTOR (B800). (See figure 4-4.)

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

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

(3) Remove four screws (91-83-2) 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 (4145B5-1) 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.

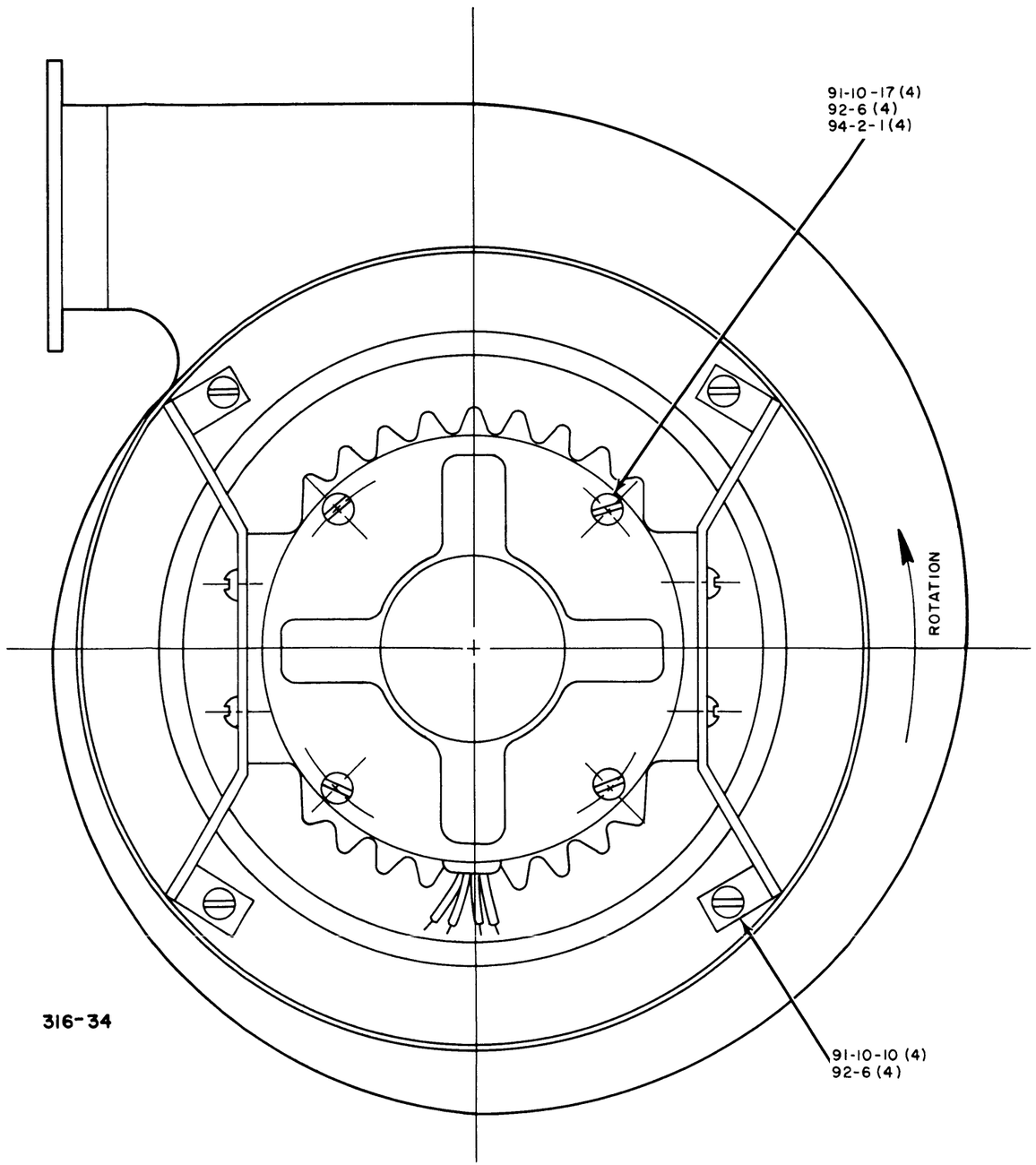
(8) Press new bearing (47-41-1) on shaft by applying pressure to inner race only, keeping bearings square with shaft. DO NOT APPLY PRESSURE TO OUTER RACE OF BEARINGS.

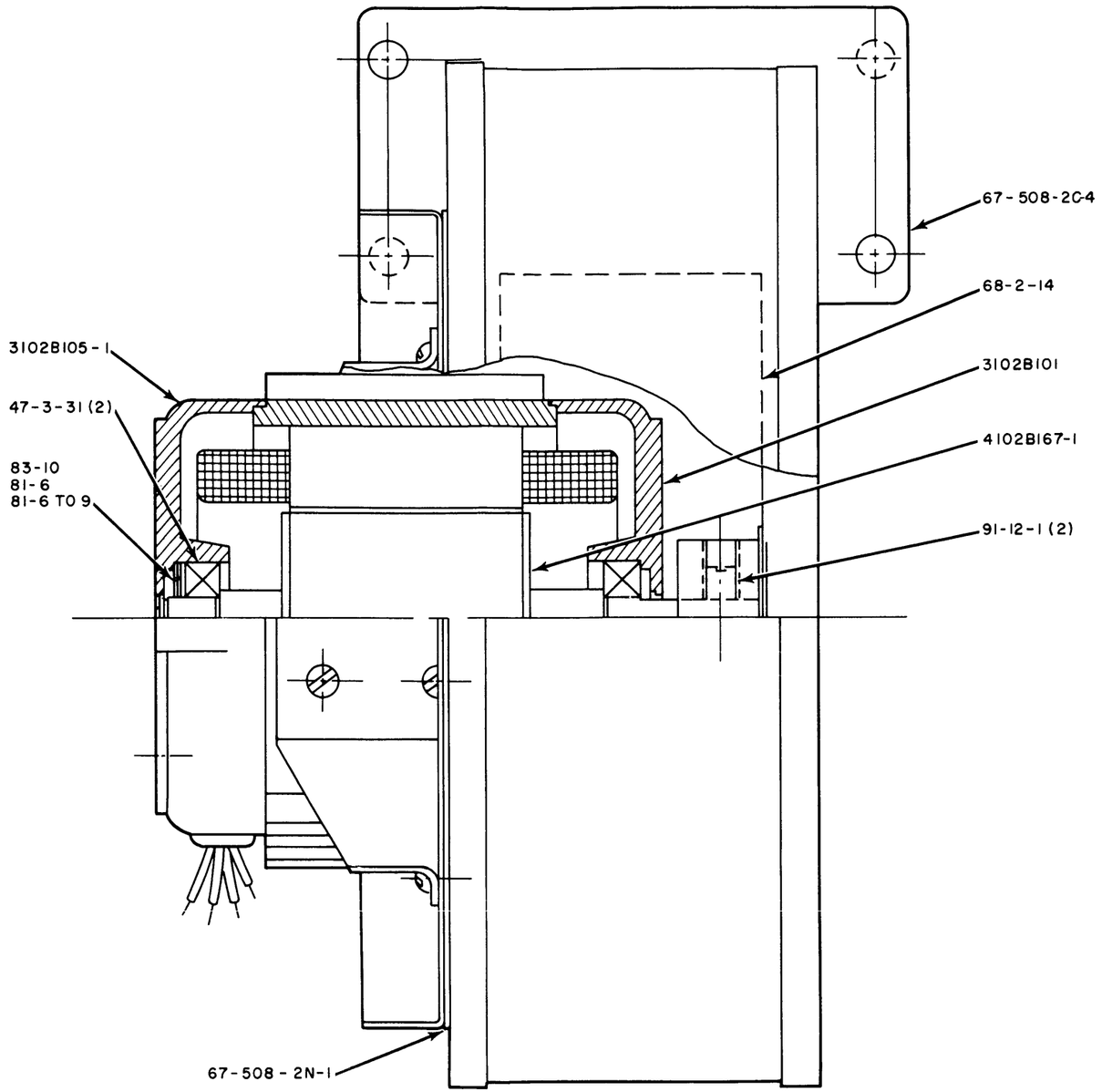
(9) Replace rotor assembly (4145B6-1) in motor housing. Replace front end cap (3645B7-1) and secure in place with four washers (92-3), four nuts (94-1), and four screws (69-60-1).

(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 disassembly. Tighten setscrews.

(12) Attach inlet ring (67-720-1N-2) to blower housing using four screws (91-18-18) and six washers (92-8).





BL-103

RFC

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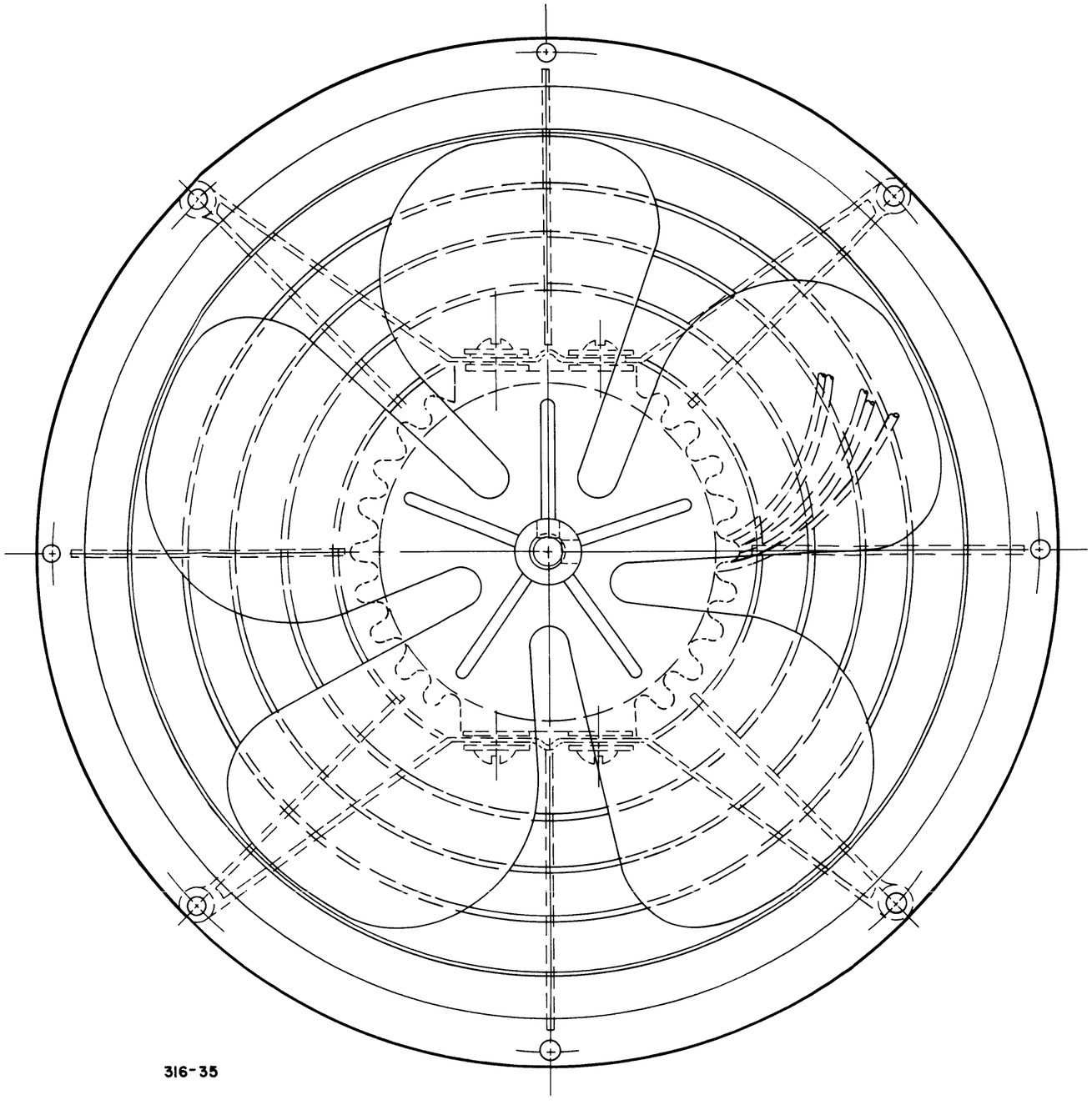
Figure 4-2. Blower Motor, RFC



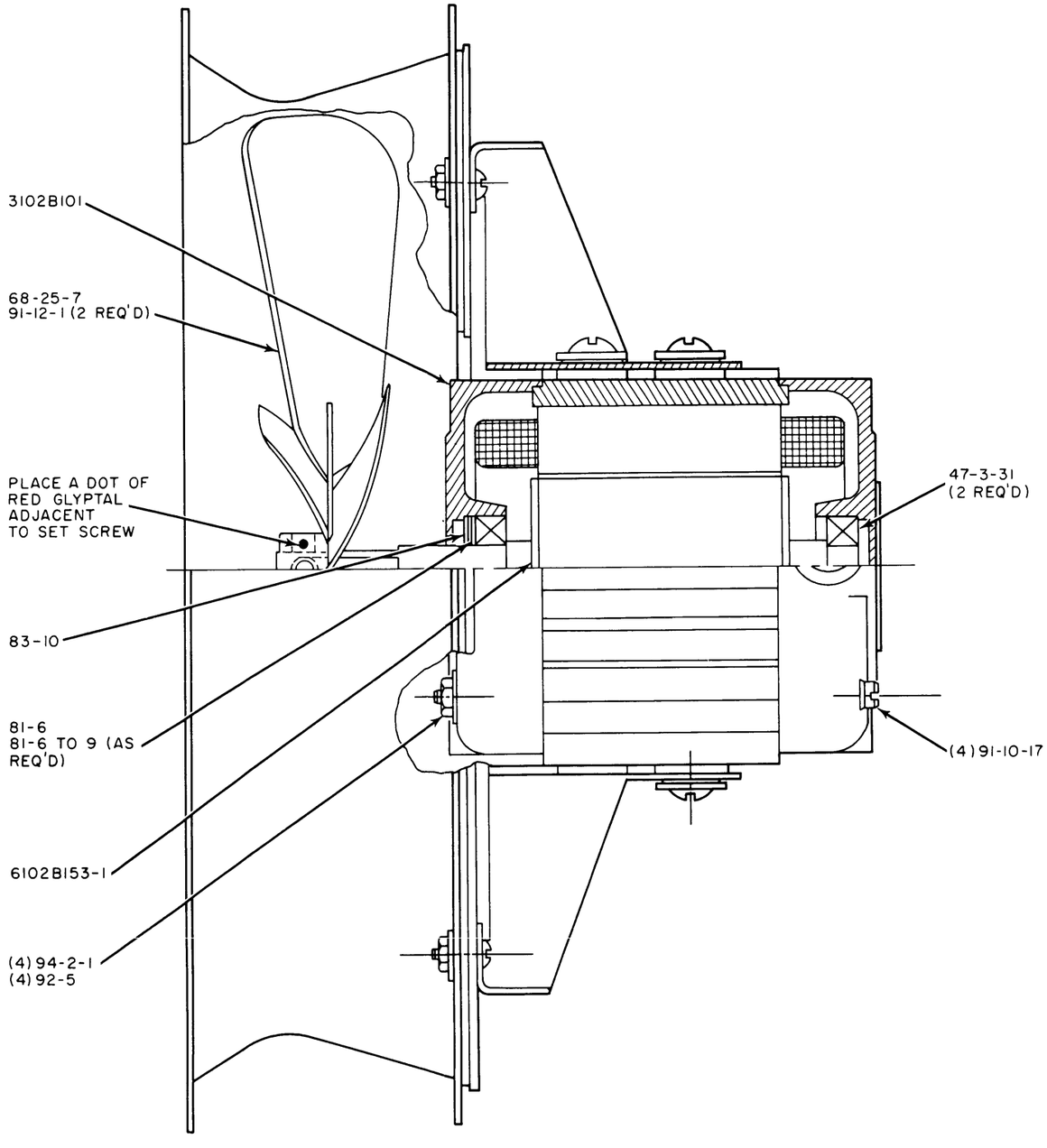


Figure 4-3. Auxiliary Frame Fan Motor

SECTION 5
PARTS LIST

5-1. INTRODUCTION.

Reference designations have been assigned to identify all electrical parts of the equipment. These designations are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams and the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, capacitor, transistor, etc. The number differentiates between parts of the same generic group. Sockets associated with a particular plug-in device, such as transistor or fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for crystal Y501 is designated XY501. To expedite delivery, when ordering replacement parts, specify the TMC part number and the model number of the equipment.

AUXILIARY POWER PANEL

SYM	DESCRIPTION	TMC PART NO.
CB1	CIRCUIT BREAKER: DPST; 15 amp, 120/240 VAC: 1 pole	SW381-2
CB2	Same as CB1	
CP1	ADAPTER: cable to connector. Part of W2	UG175*/U
E1	TERMINAL BOARD, BARRIER: 5 terminals; 4 screws 6-32 x 1/4"; bakelite base	TM102-5
J1	ADAPTER, CONNECTOR, RECEPTACLE: RF QDS to UHF	JJ147
J2	JACK, TELEPHONE: silver alloy contacts	JJ116-2
J3	Same as J2	
J4	CONNECTOR, RECEPTACLE, ELECTRICAL: U-shape grounding type; 3 female contacts; straight type	JJ173
J5	Same as J4	
P1	CONNECTOR, PLUG, ELECTRICAL: female; quick disconnect type; for use with RG59/U cable. (Supplied as a Loose Item)	PL157
P2	CONNECTOR, PLUG, ELECTRICAL: AC; polarized; 3 prong, with removable ground connection. (Supplied as a Loose Item)	PL218

AUXILIARY POWER PANEL

SYM	DESCRIPTION	TMC PART NO.
P3	Same as P2. (Supplied as a Loose Item)	
P4	Not Used	
P5	Not Used	
P6	CONNECTOR, PLUG, ELECTRICAL: coaxial; UHF type; one contact, 500 VDC peak; mica insulation. Part of W2	PL259A-TEF
P7	CONNECTOR, PLUG, ELECTRICAL: coaxial; male contact; BNC type. Part of W2	UG88E/U
S1	SWITCH, ROTARY: RF; coaxial; type BNC; 5 connectors, 100 watts, non-shorting contacts	SW239
W1	Not Used	
W2	CABLE ASSEMBLY: RF; 50 ohm; RG58C/U type cable; consists of cable adapter CP1 and two connectors, P6, P7	CA480-109-8

STANDING WAVE CONTROL UNIT

SYM	DESCRIPTION	TMC PART NO.
C101	CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 uuf, ±10%; 300 wvdc; Char. B	CM35B103K
C102	Same as C101	
C103	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1000 uuf, ±20%; 5000 wvdc; 6-32 tapped studs each end; 13/16" dia. x 7/8" lg. o/a	CC109-38
C104 thru C106	Same as C103	
C107A, B	CAPACITOR, FIXED, ELECTROLYTIC: dual section ; 20 uf each section; 450 wvdc; polarized; tubular cases; octal plug-in type	CE52C200R
C108	Same as C101	
C109	Same as C101	
CR101	SEMICONDUCTOR DEVICE, DIODE: silicon; nom. operating voltage 4.7 V; max. dissipation .40 W at 25°C; rated at 20 ma; max. impedance 19 ohms; max. operating temperature 175°C	1N750A
CR102	SEMICONDUCTOR DEVICE, DIODE: rectifier; max. operating voltage 600 V; current rated at 1.2 amps DC at 25°C; surge peak 20 amps at 25°C; forward voltage drop 1.0 V, .80 amps at 100°C; .22" dia. x .375" lg. o/a	1N2071A
CR103	Same as CR102	
DS101	Non-replaceable item. Part of XF101	

STANDING WAVE CONTROL UNIT

SYM	DESCRIPTION	TMC PART NO.
DS102	Non-replaceable item. Part of XF102.	
DS103	Non-replaceable item. Part of XF103	
DS104	LAMP, INCANDESCENT: 6-8 volts; 0.25 amps; bayonet base; for T-3-1/4 bulb	BI101-44
EV101	SHIELD, ELECTRON TUBE: 9 pin miniature; 2-3/8" high x 1.065" base dia	TS103U03
F101	FUSE, CARTRIDGE: 1 amp; time lag	FU102-1
F102	FUSE, CARTRIDGE: 1/8 amp; 1-1/4" lg. x 1/4" dia.; slow blow	FU102-.125
F103	Same as F101	
J101	CONNECTOR, RECEPTACLE, ELECTRICAL: male; 14 contacts, pin type. P/O W101	MS3102A20-27P
J102	CONNECTOR, RECEPTACLE, ELECTRICAL: 2 male contacts; twist lock; polarized; 250 V at 10 amps, 125 V at 15 amps	JJ175
J103	JACK, TELEPHONE: silver alloy contacts	JJ116-2
J104	Same as J103	
J105	CONNECTOR RECEPTACLE, ELECTRICAL: RF; 1 round female contact; 52 ohms; series BNC to BNC	UG625*/U
K101	RELAY ARMATURE: coil-latch, 1000 ohms, ±10%; 4PDT; silver contacts rated at 20 amps non-inductive load; latch operate 220 V, 60 CPS AC or less	RL127
K102	RELAY, HI-SEN: insulated for 400 VDC or 300 VAC; calibrated at 77°F; 9 male contacts, open 51 ua, closed 50 ua; 2700 ohms resistance; corrosion resistant aluminum	RL158
L101	COIL, RF: fixed; 35 uh, ±5%; 1 ohm DC resistance	CL292
L102	Same as L101	
L103	COIL, RF: fixed; 2.5 uh, ±10%; 26 ohms DC resistance, 100 ma current rating; molded case	CL140-1
R101	Non-replaceable item. Part of XF101	
R102	Non-replaceable item. Part of XF102	
R103	Non-replaceable item. Part of XF103	
R104	RESISTOR, VARIABLE, WIREWOUND: 25,000 ohms, ±10%; 4 watts; linear taper	RA106ASXA253A
R105	RESISTOR, FIXED, WIREWOUND: 10,000 ohms, ±5%; 10 watts	RW109-34
R106	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, ±10%; 1 watt	RC32GF102K

STANDING WAVE CONTROL UNIT

SYM	DESCRIPTION	TMC PART NO.
R107	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, ±10%; 2 watts.	RC42GF332K
R108	RESISTOR, FIXED, COMPOSITION: 47,000 ohms, ±10%; 2 watts.	RC42GF473K
R109	RESISTOR, FIXED, COMPOSITION: 10 ohms, ±10%, 1/2 watt.	RC20GF100K
R110	RESISTOR, FIXED, WIREWOUND: 750 ohms, current rating 180 ma; 25 watts.	RW111-18
R111	RESISTOR, FIXED, COMPOSITION: 330,000 ohms, ±10%; 2 watts.	RC42GF334K
R112	RESISTOR, FIXED, COMPOSITION: 470,000 ohms, ±10%; 1/2 watt.	RC20GF474K
R113	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, ±5%; 1/2 watt.	RC20GF222J
R114	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, ±10%; 2 watts.	RC42GF104K
R115	RESISTOR, FIXED, COMPOSITION: 15,000 ohms, ±5%; 1/2 watt.	RC20GF153J
S101	SWITCH, TOGGLE: SPST, 6 amps; 125 VAC: 28^{o} angle of throw, solder lug terminals.	ST12A
S102	SWITCH, TOGGLE: DPDT, 6 amps; 250 V, (one pole unused).	ST22N
T101	TRANSFORMER, POWER: primary - 110/220 volts, 50/60 CPS - single phase; secondary #1 - 250-0-250 volts RMS, 35 ma DC operating into a 4 mfd capacity input filter; secondary #2 - 6.3 volts center tapped at 3 amps; insulated for 1000 V; hermetically sealed metal can.	TF126
V101	TUBE, ELECTRON: duo-triode; 9 pin miniature.	12AT7
W101	WIRING HARNESS, BRANCHED: consists of various MIL type RG-174/U and MWC wire; 1 connector symbol J101 and insulation sleeving.	CA824
XC107A, B	SOCKET, ELECTRON TUBE: octal; high crown.	TS101P01
XDS104	LIGHT, INDICATOR: with red frosted lens; for miniature bayonet base, T-3-1/4 bulb.	TS106-1
XF101	FUSEHOLDER, LAMP INDICATING: accommodates cartridge fuse 1-1/4" long x 1/4" dia.; 90 to 300 V, 20 amps; neon lamp type with a 220 ohm lamp resistor; transparent clear flat sided knob; black body. Consists of DS101, R101.	FH104-3
XF102	Same as XF101. Consists of DS102, R102.	
XF103	Same as XF101. Consists of DS103, R103.	
XK102	SOCKET, ELECTRON TUBE: 9 cadmium plated pin contacts; rated at 1250 V RMS, 3 amps; phenolic body.	TS100-7
XV101	SOCKET, ELECTRON TUBE: 9 pin miniature.	TS103P01

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
B201	BLOWER, motor and fan: 115/230v, 50/60 cps, single phase; 3200 RPM; 4 ufd capacitance; clockwise rotation from shaft end of motor	BL103
C201	CAPACITOR, fixed: mica; button type; 1000 uufd, ±10%, 300 wvdc, char. W	CB21QW102K
C202	CAPACITOR, variable: ceramic; 7-45 uufd, char. C	CV11C450
C203	CAPACITOR, variable: air dielectric; 12.5-270 uufd; one section	CB139-1
C204	Same as C201	
C205	CAPACITOR, fixed: mica; 1000 uufd, ±2%, 500 wvdc	CM20F102G03
C206 thru C208	Same as C201	
C209	CAPACITOR, fixed: ceramic; feedthru type; 2000 uufd, ±20%, char. A, 500 wvdc	CK70AW202M
C210	Same as C209	
C211	CAPACITOR, fixed: mica; 1600 uufd, ±2%, 500 wvdc	CM100-11
C212	Same as C209	
C213	Same as C201	
C214	Same as C205	
C215	Same as C209	
C216	CAPACITOR, fixed: mica; 5 uufd, ±10%, char. C, 300 wvdc	CM15C050J03YY
C217	CAPACITOR, fixed: mica, 47 uufd, ±10%, char. B, 300 wvdc	CM15C470J03
C218	Same as C201	
C219	Same as C209	
C220	CAPACITOR, fixed: mylar; .1 ufd, ±5%, 200 wvdc	CN108C104J
C221	CAPACITOR, fixed: mica; 10,000 uufd, ±1%, 300 wvdc	CM35F103F03
C222	Same as C221	
C223	Same as C209	
C224	Same as C209	
C225	Same as C201	
C226	CAPACITOR, fixed: mica; 100 uufd, ±2%, 500 wvdc	CM15F101G03
C227	CAPACITOR, fixed, mica dielectric: 1,000 uuf, ±5%, 500 wvdc	CM45B102J03
C228	Same as C201	
C229	CAPACITOR, variable: ceramic, 1.5-7 uuf, char. A	CV11A070
C230	Same as C205	
C231	CAPACITOR, variable: air dielectric; 3.2-50 uufd, 1 section, 14 plates; 500 wvdc	CT104-1
C232	CAPACITOR, variable: air dielectric; 12.5-270 uuf; single section	CB139-3
C233	Same as C201	
C234	Same as C205	

RF AMPLIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C235	Deleted	
C236	Deleted	
C237	Same as C221	
C238	Same as C220	
C239	Same as C209	
C240	Same as C201	
C241	CAPACITOR, fixed: mica; button type; 150 uufd, ±10%, 300 wvdc, char. W	CB21QW151K
C242	CAPACITOR, fixed: ceramic; 3 uufd, ±0.25 uufd, char. SL, 500 wvdc	CC21SL030C
C243	Same as C209	
C244	Deleted	
C245	Same as C220	
C246	Same as C201	
C247	CAPACITOR, fixed: ceramic; 500 uuf, ±20%, 5,000 wvdc, 6-32 tapped studs each end. Part of XV203	CC109-36
C248	Same as C201	
C249	Same as C209	
C250	Same as C209	
C251	CAPACITOR, fixed: mica; button type; 270 uufd, ±10%, char. W, 300 wvdc	CB21QW271K
C252	Same as C205	
C253	CAPACITOR, fixed: trylar; 500 ufd, ±10%, 8000 wvdc	CX102K501P
C254	CAPACITOR ASSEMBLY, vacuum: variable; 5-750 uuf, 42 amps RMS, with bevel gear	AM111
C255	KIT, capacitor: replacement; consisting of 1 each - stator plate assy., and rotor assy	AC113
C256	Deleted	
C257	CAPACITOR, fixed: ceramic; 3 uufd, ±10%, 5000 wvdc	CC109-1
C258	CAPACITOR, fixed: trylar; .01 ufd, ±5%, 4000 wvdc	CX102J103M
C259	CAPACITOR, fixed: ceramic; 1000 uuf, ±10%, 5000 wvdc	CC109-38
C260	Same as C258	
C261	CAPACITOR, fixed: mica; 510 uufd, ±2%, 500 wvdc	CM15F511G03
C262	Same as C201	
C263	Same as C201	
C264 thru C266	Same as C209	
C267	Same as C220	

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C268	Same as C201	
C269	CAPACITOR ASSEMBLY, vacuum: variable; 7-1000 uufd, w/bevel gear	AM100
C270	Same as C257	
C271	Same as C241	
C272	Same as C259	
C273	CAPACITOR, fixed: ceramic; 10 uufd, ±10%, 5000 wvdc	CC109-8
C274	Same as C259	
C275	Same as C253	
C276	Same as C209	
C277	Deleted	
C278	Same as C209	
C279	Same as C209	
C280	Deleted	
C281	Deleted	
C282 thru C284	Same as C209	
C285 thru C287	Same as C247, part of XV203	
C288	Same as C209	
C289	Same as C209	
C290 thru C295	Same as C221	
C296	CAPACITOR, FIXED,PORCELAIN DIELECTRIC: 2,000 uuf, ±5%, 500 wvdc	CC113-2-202J
C297	Same as C296	
C298	CAPACITOR, FIXED, PORCELAIN DIELECTRIC: 1,000 uuf, ±5%, 500 wvdc	CC113-1-102J
C299	Same as C298	
C300	Same as C296	
C301	Same as C296	
CR201	DIODE, germanium: .140 dia. x .350 lg; 1" lg. wire leads	1N67
CR202	Same as CR201	
CR203	DIODE, bonded silicon: .265 x .155 x .255 o/a; 1" lg. wire leads	1N303
CR204	Same as CR203	
CR205	Same as CR203	
E201	TERMINAL STRIP, barrier lug type: 3 terminals, 6-32 screws on front, solder lugs in rear; black phenolic body	TM100-3

RF AMPLIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
E202	TERMINAL STRIP, barrier lug type: 4 terminals, 6-32 screws on front, solder lugs in rear; black phenolic body	TM100-4
E203	CONTACT, electrical: consists of 1 brass nickel plated button contact with 10-32 threaded rod; 2 ceramic insulators; 1 teflon gland; 2 fiber washers; 1 neoprene washer; 1 flat washer; 1 lockwasher; and 1 hex nut	AX241
EV201	SHIELD, ELECTRON TUBE	TS128-6
J201	CONNNECTOR, receptacle: series UHF, teflon dielectric	SO239A-TEF
J202	CONNECTOR, receptacle: female; teflon insulation	UG560*/U
J203	CONNECTOR, receptacle: male; pin type	MS3102A18-16P
J204	Deleted	
L201	COIL, R.F.: tuned; 2-4 mc, Q = 60 at 2.5 mc	CL181
L202	COIL, R.F.: tuned; 4-8 mc, 4.5 to 7.5 uhy	CL150
L203	COIL, R.F.: fixed; 128 uhy, ±10% Q = 100	CL177
L204	Same as L203	
L205	Same as L203	
L206	Same as L203	
L207	COIL, R.F.: fixed; 4.5 uhy	CL134-1
L208	Not used	
L209	COIL, R.F.: tuned; 8-16 mc; 1.3 to 1.6 uhy	CL175
L210	COIL, R.F.: tuned; 16-20 mc	CL145
L211	COIL, R.F.: tuned; 20-28 mc; .32 to .45 uhy	CL144
L212	Same as L203	
L213	COIL, R.F.: 750 uhy, ±20%, 100 ma max. current; DC res. approx. 17 ohms, bakelite body	CL100-5
L214	Same as L203	
L215	COIL, R.F.: fixed; 26 uhy	CL180
L216 thru L218	Same as L203	
L219	COIL, R.F.: tuned; 2-4 mc; L = 10 uhy, Q = 40	CL173
L220	COIL, R.F.: tuned; 4-8 mc	CL159
L221	Same as L207	
L222	Same as L213	
L223	COIL, R.F.: tuned; 8-16 mc	CL146
L224	COIL, R.F.: tuned; 16-20 mc	CL147
L225	COIL, R.F.: tuned; 20-28 mc	CL148
L226	Same as L203	

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
L227	COIL, R.F.: fixed; 1.1 uhy	CL139
L228	Same as L203	
L229	Same as L215	
L230	Same as L215	
L231	Same as L203	
L232	Same as L203	
L233	Same as L213	
L234	COIL, R.F.: fixed; 36 uhy	CL152
L235	COIL, R.F.: fixed; 185 uhy	CL178
L236	Deleted	
L237	COIL, filament: fixed; L-Nom. 3.0 (2.9-3.1), Q greater than 35; F - 2 mc	CL171
L238	Same as L213	
L239 thru L241	Same as L203	
L242	Same as L215	
L243	Same as L215	
L244	Same as L213	
L245	COIL, R.F.: IPA tank, 12-28 mc	CL143
L246	COIL, R.F.: IPA tank, single layer, wound type, 23 turns CW	CL174
L247	Same as L203	
L248	Same as L213	
L249	Same as L203	
L250	Same as L203	
L251	Same as L235	
L252	Same as L235	
M201	METER, DC: 0-750 milliamps	MR110-750S
M202	METER, DC: 0-5, 0-25; -20 +30 ma scales	MR124
P201	CONNECTOR, receptacle: male	MS3106B32-7P
PS201	SUPPRESSOR, parasitic	AX163
PS202	SUPPRESSOR, parasitic	AX164
R201	RESISTOR, fixed: composition, 20 megohms, ±5%, 2 watts	RC42GF206J
R202	RESISTOR, fixed: composition, 6800 ohms, ±5%, 1 watt	RC32GF682J

RF AMPLIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R203	RESISTOR, fixed: composition; 300 ohms, ±5%, 2 watts	RC42GF301J
R204	RESISTOR, fixed: composition; 47,000 ohms, ±5%, 1 watt	RC32GF473J
R205	Same as R204	
R206	RESISTOR, fixed: composition; 47 ohms, ±5%, 1/2 watt	RC20GF470J
R207	Same as R206	
R208	RESISTOR, fixed: composition; 680 ohms, ±5%, 1/2 watt	RC20GF681J
R209	RESISTOR, fixed: composition; 82,000 ohms, ±5%, 1/2 watt	RC20GF823J
R210	RESISTOR, fixed: composition; 220 ohms, ±5%, 1/2 watt	RC20GF221J
R211	Same as R201	
R212	RESISTOR, fixed: composition; 12 ohms, ±5%, 1/2 watt	RC20GF120J
R213	Same as R208	
R214	RESISTOR, fixed: composition; 220,000 ohms, ±5%, 2 watts	RC42GF224J
R215	RESISTOR, fixed: composition; 15 megs, ±5%, 1/2 watt	RC20GF156J
R216	RESISTOR, fixed: composition; 100,000 ohms, ±5%, 1/2 watt	RC20GF104J
R217	Same as R201	
R218	RESISTOR, fixed: composition; 1.1 megs, ±5%, 1/2 watt	RC20GF115J
R219	RESISTOR, fixed: composition; 2200 ohms, ±5%, 1/2 watt	RC20GF222J
R220	RESISTOR, fixed: composition; 8200 ohms, ±5%; 1 watt	RC32GF822J
R221	RESISTOR, fixed: composition; 10 megs, ±5%, 1/2 watt	RC20GF106J
R222	RESISTOR, fixed: composition; 12 ohms, ±5%; 2 watts	RC42GF120J
R223	RESISTOR, fixed: composition; 180,000 ohms, ±5%, 1 watt	RC32GF184J
R224	RESISTOR, fixed: composition; 10,000 ohms, ±5%, 2 watts	RC42GF103J
R225	RESISTOR, fixed: composition; 5.1 megs, ±5%, 1/2 watt	RC20GF515J

RF AMPLIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R226	RESISTOR, fixed: composition; 3300 ohms, ±5%, 1/2 watt	RC20GF332J
R227	RESISTOR, fixed: composition; 390,000 ohms, ±5%, 1/2 watt	RC20GF394J
R228	RESISTOR, variable: composition; 50,000 ohms, ±10%, 2 watts, with locking bushing	RV4LAYSA503A
R229	RESISTOR, fixed: composition; 12,000 ohms, ±5%, 1/2 watt	RC20GF123J
R230	RESISTOR, fixed: composition; 270,000 ohms, ±5%, 1/2 watt	RC20GF274J
R231	RESISTOR, fixed: composition; 150,000 ohms, ±5%, 1 watt	RC32GF154J
R232	RESISTOR, fixed: composition; 47,000 ohms, ±5%, 1/2 watt	RC20GF473J
R233	RESISTOR, fixed: composition; 39,000 ohms, ±5%, 1/2 watt	RC20GF393J
R234	Same as R201	
R235	RESISTOR, fixed: composition; 22,000 ohms, ±5%, 2 watts	RC42GF223J
R236	Same as R201	
S201A, B, C, D	SWITCH, rotary: 2 sections, 5 positions; 30° angle of throw; micalex insulation, silver plated contacts	SW258
S202	SWITCH ASSEMBLY, rotary: dual section; 9 positions, 1 pole each section, steatite insulation, nickel silver shaft	AS118
S203	SWITCH, rotary: 8 contacts, 30° angle of throw, steatite insulation, nickel silver shaft	AS101
S204	SWITCH, rotary: 2 sections; 8 positions, 30° angle of throw, micalex insulation, silver plated contacts	SW245
S205	SWITCH,push button: momentary contacts, NC, SPST; 15 amp at 125, 250 or 460 VAC; 1/2 amp at 125 VDC, 1/4 amp at 250 VDC	SW169
S206	SWITCH, rotary: low torque microswitch; counterclockwise direction of rotation; SPDT, 5 amp, 125 or 250 VAC	SW252
V201	TUBE, electron: power pentode; miniature 9 pin	6CL6
V202	TUBE, electron: beam power pentode; octal	6146
V203	TUBE, electron: power tetrode	TV100

RF AMPLIFIER

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
XV201	SOCKET, tube; miniature 9 pin	TS103P01
XV202	SOCKET, tube; octal	TS101P01
XV203	SOCKET: consists of C247, 285, 286, 287 built in	TS142
MP201	CLIP, electrical: white ceramic; phosphor bronze spring clip to fit a 3/8" dia. tube cap; 1-1/8" lg x 5/8" o/d x 9/16" high o/a	HB102-2
MP202	Not Used	
MP203	GEAR, miter: 600" pitch dia., 20 pitch, 12 teeth; for 1/4" shaft, steel	GR116
MP204	Same as MP203	
MP205	GEAR, miter: 600" pitch dia., 20 pitch, 12 teeth; for 1/8" shaft, steel	GR139
MP206	Same as MP205	
MP207	Not Used	
MP208	GEAR, bevel: 1.750" pitch dia., 12 pitch, 21 teeth; for 1/2" shaft, steel	GR140
MP209	Same as MP208	
MP210	COUPLING, fixed: 7/16" dia. x 3/4" lg; for 1/4" shaft; four 6-32 Allen head screws, brass	MC102
MP211 thru MP213	Same as MP210	
MP214	COUPLING, flexible: non-insulated; 1-1/4" dia. x 13/16" lg.; for 1/4" shaft; four 6-32 x 3/16" lg. Allen head screws	MC124
MP215	Same as MP214	
MP216	Same as MP214	
MP217	INSULATOR, pillar type, round; white glazed steatite	NS3W0206
MP218 thru MP221	Same as MP217	
MP222 thru MP224	Not Used	
MP225	INSULATOR, pillar type, round: white glazed steatite	NS3W0308
MP226	Same as MP225	

RF AMPLIFIER

SYM	DESCRIPTION	TMC PART NO.
MP217	INSULATOR, pillar type, round; white glazed steatite	NS3W0206
MP218 thru MP221	Same as MP217	
MP222 thru MP224	Not Used	
MP225	INSULATOR, pillar type, round: white glazed steatite	NS3W0308
MP226	Same as MP225	
MP227	Same as MP225	
MP228 thru MP232	Not used	
MP233	INSULATOR, pillar type, round: white glazed steatite	NS3W0312

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HIGH VOLTAGE RECTIFIER ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
C600	CAPACITOR, fixed: mica; .01 ufd, ±10%, 300 wvdc, char. B	CM35B103K
C601	Same as C600	
C602 thru C613	Not used	
DS600	Not a replaceable item. Part of XF600	
DS601	Not a replaceable item. Part of XF601	
DS602	Not a replaceable item. Part of XF602	
DS603	Not a replaceable item. Part of XF603	
DS604	Not a replaceable item. Part of XF604	
DS605	Not a replaceable item. Part of XF605	
E600	Not a replaceable item, see W600	
E601	Not a replaceable item, see W601	
E602	Not a replaceable item, see W602	
E603	Not a replaceable item, see W603	
E604	Not a replaceable item, see W604	
E605	Not a replaceable item, see W605	
E606	CONTACT ASSY., brass, nickel plate; 7/8" dia. x 1/2" long button; w/threaded shaft, 1/4-20 thds	AX172

HIGH VOLTAGE RECTIFIER ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
E607 thru E612	Same as E606	
E613	INSULATOR: FEED-THRU	AX152
E614 thru E618	Same as E613	
F600	FUSE, cartridge: time lag; 1 amp	FU102-1
F601 thru F605	Same as F600	
MP600	INSULATOR, pillar type: round; white glazed steatite; 1" lg. x 3/4" dia.; tapped 10-32 x 3/8 deep each end	NS3W0308
MP601	Same as MP600	
MP602 thru MP607	INSULATOR, pillar type: round; white glazed steatite; 2" lg. x 1" dia., tapped 1/4-20 x 1/2" deep each end	NS3W0432
MP608	WINDOW, front panel	PX440
R600	Not a replaceable item. Part of XF600	
R601	Not a replaceable item. Part of XF601	
R602	Not a replaceable item. Part of XF602	
R603	Not a replaceable item. Part of XF603	
R604	Not a replaceable item. Part of XF604	
R605	Not a replaceable item. Part of XF605	
T600	TRANSFORMER, power: step down; primary - 230 v, 50/60 cps, single phase; secdy - 5 v, 10A, CT; insulated for 2500 V primary and 15 Kv secondary; hermetically sealed rectangular steel case	TF201
T601 thru T605	Same as T600	
V600	TUBE, electron: mercury vapor, half wave rectifier; 4 pin base	872A
V601 thru V605	Same as V600	
W600	CABLE ASSEMBLY, consists of plate cap on one end, terminal lug on other end. #18 stranded single conductor, rubber insulation	CA409-15-4.75
W601 thru W605	Same as W600	
W606	LEAD, ELECTRICAL	CA412-11-1.75
W607	LEAD, ELECTRICAL	CA412-11-2.50

HIGH VOLTAGE RECTIFIER ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
W608	LEAD, ELECTRICAL	CA412-11-4.00
W609	LEAD, ELECTRICAL	CA412-11-5.00
W610 thru W616	Same as W609	
W617	LEAD, ELECTRICAL	CA412-11-7.00
W618 thru W625	Same as W617	
W626	LEAD, ELECTRICAL	CA412-11-10.00
W627	LEAD, ELECTRICAL	CA412-11-11.00
W628	LEAD, ELECTRICAL	CA412-11-15.50
W629	LEAD, ELECTRICAL	CA412-11-9.00
W630	WIRING HARNESS, BRANCHED, ELECTRICAL	CA413
XF600	FUSE HOLDER, bayonet base: 100/250 v, neon lamp, clear knob, black plastic, 13/16 x 2-13/16 o/a. Consists of DS600, R600	FH104-3
XF601	Same as XF600. Consists of DS601, R601	
XF602	Same as XF600. Consists of DS602, R602	
XF603	Same as XF600. Consists of DS603, R603	
XF604	Same as XF600. Consists of DS604, R604	
XF605	Same as XF600. Consists of DS605, R605	
XV600	SOCKET, tube: 4 pin base; twist lock	TS123-211-100
XV601 thru XV605	Same as XV600	

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RELAY PANEL

SYM	DESCRIPTION	TMC PART NO.
C700	CAPACITOR, FIXED, ELECTROLYTIC: 50 ufd, ±2%, char. C	CE63C500G
E700	TERMINAL BOARD: barrier type; 14, 6-32 binding head machine screws, phenolic body	TM100-14
E701	TERMINAL BOARD: barrier type; 8, 6-32 binding head machine screws, phenolic body	TM100-8
E702	Same as E701	
E703	Same as E701	

RELAY PANEL

SYM	DESCRIPTION	TMC PART NO.
E704	TERMINAL BOARD: barrier type; 10, 6-32 binding head machine screws, phenolic body	TM100-10
E705	Same as E700	
E706	CONNECTOR, FEEDTHRU: 3/8" dia. x 1-1/8" long, ceramic body, 6-32 threads	TE175
E707 thru E711	Same as E706	
F700	FUSE CARTRIDGE: time delay; 5 amps	FU102-5
F701 thru F703	Same as F700	
F704	FUSE CARTRIDGE: time delay; 1 amp	FU102-1
F705	Same as F700	
I700	LAMP, GLOW: neon; double candlebra; 110 volts, 1/4 watt; T-4-1/2 clear bulb; bayonet base	BI103-2
I701 thru I705	Same as I700	
J700	CONNECTOR, RECEPTACLE, ELECTRICAL: male; 35 contacts	MS3102A32-7P
J701	CONNECTOR, RECEPTACLE, ELECTRICAL: male; 3 contacts	MS3102A22-9P
K700	RELAY ASSEMBLY, P. A. Bias; consists of armature relay with cabling. Coil - 11, 000 ohms, ±10%, four form pile up: contacts - silver cadmium rated at 10 amps 125 VAC resistive: operate .010 amps, non-operate .009 amps	AR105
K701	RELAY ASSEMBLY, P. A. Plate Overload; consists of armature relay with cabling. Contacts - silver cadmium rated at 25 amps, 125 VAC resistive: latch relay - 1100 ohms, ±10%; unlatch relay 0-93 ohms, ±10%: latch operate 220 V, 60 cps AC or less	AR100
K702	RELAY ASSEMBLY, P. A. Screen Overload; consists of armature relay with cabling. Contacts - silver cadmium rated at 25 amps, 125 VAC resistive: latch relay - 1100 ohms, ±10%; unlatch relay 1500 ohms, ±10%: latch operate 220 V, 60 cps AC or less	AR108
K703	RELAY ASSEMBLY, P. A. Screen ON-OFF; consists of armature relay with cabling. Contacts - silver cadmium rated at 25 amps; coil - 1800 ohms, ±10%; operate 220 V, 50/60 cps	AR102
K704	RELAY ASSEMBLY, Diode Protect; consists of armature relay with cabling. Coil - latch 1100 ohms, ±10%; trip - 170 ohms, ±10%; 4 PDT; contacts - silver rated at 20 amps non-inductive: operate latch - 220 V, 60 cps or less	AR104

RELAY PANEL

SYM	DESCRIPTION	TMC PART NO.
K705	RELAY ASSEMBLY, Tune-Operate; consists of armature relay with cabling. Contacts - silver cadmium rated at 25 amps; coil - 1800 ohms, ±10%; operate 220 V, 50/60 cps	AR103
K706	RELAY ASSEMBLY, IPA Screen Overload; consists of armature relay with cabling. Coil - latch 1100 ohms, ±10%; trip - 10,000 ohms, ±10%; 4 PDT; contacts - silver rated at 25 amps non-inductive load: latch operate 220 V, 60 cps AC or less	AR107
K707	RELAY ASSEMBLY, IPA Plate Overload; consists of armature relay with cabling. Coil-latch relay - 1100 ohms, ±10%, unlatch relay 43 ohms, ±10%; 4 PDT; contacts - silver cadmium rated at 20 amps, 125 VAC resistive; latch operate 220 V, 60 cps or less	AR101
K708	RELAY ASSEMBLY, IPA Bias; consists of armature relay with cabling. Coil - 11,000 ohms, ±10%, four form pile up; contacts - silver cadmium rated at 10 amps 125 VAC resistive: operate .010 amps, non-operate .009 amps	AR106
M700	METER: elapsed time; 240 volts, 60 cps: std. ASA/MIL 3-1/2" (MR-36) mounting	MR125-2
M701	TIMER, INTERVAL: time delay; 3" dia. panel mtg. bakelite case: contacts rated at 10 amps: time cycle - 5 min.: dial division: - 5 seconds	TI101-5
M702	Same as M700	
R700	RESISTOR, FIXED, COMPOSITION: 15,000 ohms, ±10%, 2 watts	RC42GF153K
R701	RESISTOR, FIXED, COMPOSITION: 300 ohms, ±10%, 2 watts	RC42GF301K
R702	RESISTOR, FIXED, COMPOSITION: 220,000 ohms, ±10%, 2 watts	RC42GF224K
R703	RESISTOR, VARIABLE, COMPOSITION: 50,000 ohms, ±10%, 2 watts	RV4LAYSA503A
R704	RESISTOR, FIXED, WIREWOUND: 0.5 ohms, 5 watts	RW107-54
R705	RESISTOR, VARIABLE, WIREWOUND: 1 ohm, 4 watts, linear taper	RA107TXA1R0A
R706	RESISTOR, FIXED, WIREWOUND: 500 ohms, 142 ma, 10 watts	RW109-19
R707	RESISTOR, VARIABLE, WIREWOUND: 500 ohms, ±10%, 25 watts	RA75ASA501AK25
R708	RESISTOR, FIXED, WIREWOUND: 500 ohms, 100 ma dc, 5 watts	RW107-28
R709	RESISTOR, VARIABLE, WIREWOUND: 2500 ohms, ±10%, 25 watts, linear taper	RA75AXC252AK25
R710	RESISTOR, FIXED, WIREWOUND: 10 ohms, 1000 ma dc, 10 watts	RW109-4

RELAY PANEL

SYM	DESCRIPTION	TMC PART NO.
R711	RESISTOR, VARIABLE, WIREWOUND: 15 ohms, ±10%, 25 watts, linear taper	RA75AXA150AK25
R712	RESISTOR, FIXED, COMPOSITION: 3900 ohms, ±10%, 1 watt	RC32GF392K
S700	SWITCH, TOGGLE: DPST; 6 amp at 250 V, bat type toggle	ST22K
XF700	FUSEHOLDER: cartridge type; 100/250 volts; neon lamp, clear knob, black phenolic body	FH104-3
XF701 thru XF705	Same as XF700	
XI700	LIGHT, INDICATOR: lamp; bayonet base; 105/125 volts, w/white frosted lens	TS137-7FB4
XI701 thru XI705	Same as XI700	

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MAIN POWER SUPPLY

SYM	DESCRIPTION	TMC PART NO.
B800	BLOWER/FAN: 220 v, 50/60 cps, 3 phase; ccw rotation; 3250 RPM nom.; 2320 watts full load; 6.1 line amps	BL111
C800	CAPACITOR, fixed: paper; 4 mf, ±10%, 10,000 wvdc; 16" h x 13-1/2" w x 5-1/8" thk. o/a	CP103
C801	CAPACITOR, fixed: paper; 8 mf, ±10%, 5000 wvdc; 12-3/4" h x 8" w x 4-1/16" thk. o/a	CP104
C802	CAPACITOR, fixed: paper; 10 mf, ±10%, 2500 wvdc; 6-7/8" h x 4-9/16" w x 3-3/4" thk. o/a	CP105
C803	CAPACITOR, fixed: mica; 1000 mmf, ±10%, 500 wvdc	CM30B102K
C804 thru C810	Same as C803	
C811	Deleted	
C812	Deleted	
C813	CAPACITOR, fixed: plastic; .01 mf, ±5%, 4000 wvdc; 1-1/8" dia. x 2-7/8" lg. o/a	CX102J103M
C814	Same as C813	
C815	CAPACITOR, fixed: paper dielectric; 0.25 uf, ±10%, 3000 wvdc; hermetically sealed metal case	CP70E1FL254K
CR800 A, B, C, D, E, F	SEMICONDUCTOR DEVICES: Not replaceable, part of TB800, TMC p/n AX-126	

SYM	DESCRIPTION	TMC PART NO.
E800	Deleted	
E801	BUSHING, feedthru: steatite insulators, neoprene gland, not tinned brass stud, 1/4-20 threads, 1-1/8" dia. x 3" lg. o/a	AX150
E802	Same as E801	
E803	Deleted	
E804	Deleted	
E805	TERMINAL STRIP, barrier type: plastic; 4 terminals	TM102-4
L800	REACTOR, filter: 2 henry at 1.6 amps; 10" h x 7-7/16" w x 5-31/32" d o/a	TF200
L801	REACTOR, filter: 5 henry at 1 amp; 10" h x 7-1/16" w x 5-31/32" d o/a	TF199
L802	SOLENOID, relay: w/plunger; 230 v, 60 cps, 0.2 amps; continuous duty cycle	SZ100
L803	COIL, R.F.: fixed; 185 uhy	CL178
R800	Deleted	
R801	Deleted	
R802	RESISTOR, fixed: wire wound; 18,000 ohms, 140 watts, char. F	RW118F-183
R803 thru R809	Same as R802	
R810	RESISTOR, fixed: wire wound; 4 megohms, ±0.5%	RW122-1-405
R811	Same as R810	
R812	RESISTOR, fixed: wire wound; 180 ohms, ±0.5%, 40 watts, char. G	RW119G-181
R813	Same as R812	
R814	RESISTOR, fixed: wire wound; 600,000 ohms, ±0.5%, 6 watts	RW122-3-604
R815	Same as R814	
R816	RESISTOR, fixed: wire wound; 5000 ohms, 140 watts, char. F	RW118F-502
R817	Deleted	
R818	RESISTOR, fixed: wire wound; 5000 ohms, ±5%, 10 watts. Also part of Semiconductor Device Set, TB800, TMC p/n AX-126	RW109-32
R819	Same as R816	

MAIN POWER SUPPLY

SYM	DESCRIPTION	TMC PART NO.
R820	Same as R816	
R821	RESISTOR, fixed: wire wound; 20 watts, resistance 100,000 ohms (rated at 7 watts), 8.5 ma current. Also part of Semiconductor Device Set, TB800, TMC p/n AX-126	RW110-43
R822	RESISTOR, fixed: composition; 220 ohms, ±10%, 2 watts. Also part of Semiconductor Device Set, TB800, TMC p/n AX-126	RC42GF221K
R823	RESISTOR, fixed: composition, 100 ohms, ±10%; 2 watts. Also part of Semiconductor Device Set, TB800, TMC p/n AX-126	RC42GF101K
R824 thru R827	Same as R823. Also part of Semiconductor Device Set, TB800, TMC p/n AX-126	
S800	SWITCH, air	SW243-1
S801	SWITCH, push button: momentary contact; SPST, 15 amps at 125, 250, 460 VAC, 1/2 watt, at 125 VDC, 1/4 amp at 250 VDC	SW169
T800	TRANSFORMER, main power: 210, 220, 230, 250 v, 50/60 cps ac, 3 phase delta primary; 3400 VAC each; 1.6 amp wye secondary; 26" lg. x 116" w x 16" h o/a	TF203
T801	TRANSFORMER, filament: 230 volt w/taps primary; 8.5 volts, 7.5 amp CT secondary; 8-3/4" h x 6-1/8" w x 5-5/16" d o/a	TF197
TB800	SEMICONDUCTOR DEVICE SET: consisting of CR800A, B, C, D, E, F, R818, R821, R822, R823, R824, R825, R826, R827	AX126

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2-28 MC POWER AMPLIFIER

SYM	DESCRIPTION	TMC PART NO.
A901	ASSEMBLY, tuning slug	AX120
A902	Same as A901	
A903	FINAL COIL/SWITCH ASSEMBLY	AS119
A904	SWITCH WAFER AND CONTACT ASSEMBLY: 8 sets of short contacts, 1 set long contacts	AX280
C900	CAPACITOR, FIXED, MICA DIELECTRIC: button, 1000 uuf, ±5%, 300 wvdc	CB21PD102J
C901 thru C903	Same as C900	
C904	CAPACITOR, FIXED, MICA DIELECTRIC: 20 uuf, ±2%, 500 wvdc	CM20C200G

SYM	DESCRIPTION	TMC PART NO.
C905	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 3 uuf, ±.25 uuf, 500 wvdc	CC21SL030C
C906	CAPACITOR, FIXED, MICA DIELECTRIC: 100 uuf, ±5%, 500 wvdc, char. C	CM20C101J
C907	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10 uuf, ±5%, 500 wvdc	CC21SL100D
C908	CAPACITOR, FIXED, MICA DIELECTRIC: 5 uuf, ±20%, 500 wvdc	CM20C050M
C909	CAPACITOR, FIXED, VACUUM: 3 uuf, 17,000 volts peak; 7 amp current rating; 1-1/16: dia. x 3-1/4" lg	CO102-3
C910	Deleted	
C911	CAPACITOR, FIXED, VACUUM: 1000 uuf, 15,000 wvdc	CO101-1000-15C
C912	Same as C900	
C913	Same as C900	
C914	CAPACITOR, FIXED, PLASTIC DIELECTRIC: mylar; .1 uf, ±5%, 700 wvdc	CN108C1003J
C915	Same as C900	
C916	CAPACITOR ASSEMBLY, VARIABLE, VACUUM: 5-750 uuf, 5000 volts peak; clockwise rotation decreases capacity; 3-1/4" dia. x 7-3/4" lg. o/a, with bevel gear	AM103
C917	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1000 uuf, ±20%, 5000 wvdc; 6-32 tapped studs each end; 13/16" dia. x 7/8" lg. o/a	CC109-38
C918	Not used	
C919	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 500 uuf, ±20%, 5000 wvdc, 6-32 tapped studs each end, 13/16" dia. x 7/8" lg. o/a. Part of XV900	CC109-36
C920 thru C926	Same as C919. Part of XV900	
C927	CAPACITOR ASSEMBLY, VARIABLE VACUUM: 25-700 uuf, 15,000 volts peak; clockwise rotation decreases capacity; 3-3/4" dia. x 16-1/2" lg. o/a, with bevel gear	AM113
C928	CAPACITOR ASSEMBLY, VARIABLE VACUUM: 50-2000 uuf, 10,000 volts peak; clockwise rotation decreases capacity; 5-1/8" dia. x 16-1/2" lg. o/a, with bevel gear	AM114
C929	CAPACITOR, FIXED, VACUUM: 10 uuf, 17,000 volts peak; 1-1/16" dia. x 3-1/8" lg. o/a	CO104-2
C930	Same as C911	
C931	CAPACITOR, FIXED, MICA DIELECTRIC: 1000 uuf, ±10%, 500 wvdc, char. C	CM20C102K

2-28 MC POWER AMPLIFIER

SYM	DESCRIPTION	TMC PART NO.
C932	Same as C931	
C933	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 50 uuf, ±10%, 7500 wvdc, 6-32 tapped studs each end, 13/16" dia. x 7/8" lg. o/a. Part of XV900	CC109-19
C934 thru C936	Same as C933. Part of XV900	
C937	Not Used	
C938	Not Used	
C939	CAPACITOR, FIXED, PLASTIC DIELECTRIC: trylar; 1000 uuf, ±10%, 14, 000 wvdc	CX102K102T
C940	Same as C939	
C941	CAPACITOR, FIXED, MICA DIELECTRIC: 5 uuf, ±20%, 300 wvdc	CM15C050M
C942	CAPACITOR, FIXED, MICA DIELECTRIC: 50 uuf, ±5%, 500 wvdc	CM20B500J
C943	CAPACITOR, FIXED, CERAMIC DIELECTRIC: feed-thru; 1000 uuf, ±20%, 500 wvdc	CK70AW102M
C944	Same as C943	
C945	Same as C943	
C946	CAPACITOR, FIXED, PLASTIC DIELECTRIC: trylar; 10, 000 uuf, ±10%, 4000 wvdc	CX102J103M
C947	Same as C946	
C948	Same as C943	
C949 thru C953	Not Used	
C954	CAPACITOR, FIXED, MICA DIELECTRIC: 20 uuf, ±5%, 500 wvdc; char. C	CM15C200J
CP900	ADAPTER, connector	UG1091/U
CP901	Not Used	
CR900	SEMICONDUCTOR DEVICE, DIODE: germanium	1N303
CR901	Same as CR900	
CR902	Not Used	
CR903	Not Used	
CR904	DETECTING ELEMENT, DIRECTIONAL COUPLER: frequency range, 2-30 MC; 1 KW full scale; calibrated to be within ±5% at 500 watts	DD109-2

2-28 MC POWER AMPLIFIER

SYM	DESCRIPTION	TMC PART NO.
CR905	DETECTING ELEMENT, DIRECTIONAL COUPLER: frequency range, 2-30 MC; 10 KW full scale; calibrated to be within ±5% at 5 KW	DD109-1
DC900	COUPLER, DIRECTIONAL: 50 ohm impedance; forward power, 10 KW; frequency, 2-30 MC	DC104
E900	FEEDTHRU, insulated	AX152
E901 thru E904	Same as E900	
E905	Not Used	
E906	Not Used	
E907	CONTACT ASSEMBLY, short	AX129
E908 thru E911	Same as E907	
E912	CONTACT ASSEMBLY, long	AX128
E913 thru E915	Same as E907	
E916 thru E919	Not Used	
E920	ROTOR PLATE: brass, rhodium plate; 1-1/4" x 4-1/2" o/a	AX158
J900	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 female contact; 52 ohms, BNC type	UG625B/U
J901	CONNECTOR, RECEPTACLE, ELECTRICAL: female; teflon insulated; mtg. dim. four 1/8" holes on 29/32" mtg. centers	UG560*/U
J902	Same as J900	
J903	Not Used	
J904	RF CONNECTOR PROBE ASSEMBLY	AJ100
L900	CHOKE, RADIO FREQUENCY: 128 uhy, ±10%	CL177
L901	COIL, RADIO FREQUENCY: 750 uhy, ±20%, 100 ma max. current, approx. 17 ohms dc resistance	CL100-5
L902	COIL, H.F.: L - 1.5 uh; 2.5 mc	CL170
L903	FINAL COIL: not a replaceable item, part of A903	
L904	Same as L900	
L905	COIL, RADIO FREQUENCY: 1.1 uhy; 7.9 mc; 3/16" dia. x 5/8" lg. body	CL139
L906	COIL, RADIO FREQUENCY: fixed; plate decoupling, L - .3 millihenries; F - 790 Kc test frequency	CL154

2-28 MC POWER AMPLIFIER

SYM	DESCRIPTION	TMC PART NO.
L907	CHOKE, static: L - 35 uhy; F - 2.5 mc	CL166
L908	Same as L901	
L909	COIL, RADIO FREQUENCY: fixed; 185 uhy, ±10 uhy	CL178
L910	Same as L901	
L911	Same as L906	
L912	COIL, antenna tuning	AC102
L913	Same as L912	
L914	CHOKE, RADIO FREQUENCY: fixed; 38 uhy, ±5%	CL179
L915	COIL, RADIO FREQUENCY: filament; 5 uhy each coil; inside coil completely insulated from outside coil; 3-1/4" o/d x 6-1/2" lg	CL160
L916	Not Used	
L917	Not Used	
MP900	COUNTER: rotating; 3 wheel, 0 to 9 each wheel	CY105
MP901 thru MP903	Same as MP900	
MP904	COUNTER: bandswitch; rotating; 3 wheel, 2-28 mc, plain bearing type, non-reset; black figures, white wheels, rotation is clockwise; 9 positions	AC124
P902	CONNECTOR, PLUG, ELECTRICAL: coaxial; HN type; 50 ohms, 5000 volts peak. Part of W901	PL222
P903	CONNECTOR, PLUG, ELECTRICAL: right angle type. Part of W902	PL192
P904	Same as P903	
R900	RESISTOR, FIXED, COMPOSITION: 47,000 ohms, ±10%, 1/2 watt	RC20GF473K
R901	RESISTOR, FIXED, COMPOSITION: 2200 ohms, ±10%, 1/2 watt	RC20GF222K
R902	RESISTOR, FIXED, COMPOSITION: 470 ohms, ±10%, 1 watt	RC32GF471K
R903	Deleted	
R904	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, ±10%, 1/2 watt	RC20GF104K

SYM	DESCRIPTION	TMC PART NO.
R905	Same as R904	
R906	Same as R901	
R907	RESISTOR, FIXED, COMPOSITION: 27,000 ohms, ±10%, 2 watts	RC42GF273K
R908	Same as R902	
R909	Not Used	
R910	RESISTOR, FIXED, COMPOSITION: 47 ohms, ±10%, 1 watt	RC32GF470K
R911 thru R913	Not Used	
R914	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, ±10%, 2 watts	RC42GF104K
R915	Same as R914	
R916	Not Used	
R917	RESISTOR, FIXED, COMPOSITION: 120 ohms, ±10%, 1/2 watt	RC20GF121K
S900	Not used	
S901	SWITCH: micro; plug; 10 amp at 125/250 VAC: 1/2 amp at 125 VDC	SW189
TC900	Not Used	
V900	ELECTRON TUBE: power amplifier; ceramic tetrode. (Shipped as a loose item)	4CX5000A
W901	CABLE, RADIO FREQUENCY: RG-165/U, 1 Kw, emergency output. Consists of P902. Supplied as Loose Item	CA582-1
W902	WIRING HARNESS, BRANCHED: consists of 2 connectors - P903, P904; 60" MWC cables, two 80" lengths RC-58/U cable	CA829
XV900	SOCKET, ELECTRON TUBE: consists of socket and capacitors C919 thru C926 and C933 thru C936	AX130

MAIN FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
C1000 thru C1002	Not Used	
C1003	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1000 uuf, ±20%, 5000 wvdc	CC109-38
C1004	Not Used	
C1005	Same as C1003	
C1006 thru C1008	Not Used	
C1009	Same as C1003	
C1010	Same as C1003	
C1011	CAPACITOR, FIXED, MICA DIELECTRIC: .01 uf, ±10%, 500 wvdc, char. B	CM35B103K
C1012	Not Used	
C1013	CAPACITOR, FIXED, CERAMIC DIELECTRIC: feed-thru type; 1000 uuf; ±20%, 500 wvdc	CK70AW102M
C1014 thru C1018	Same as C1013	
C1019	Not Used	
C1020	Not Used	
C1021	Same as C1011	
C1022	CAPACITOR, FIXED, ELECTROLYTIC: 25 uuf, 50 wvdc	CE105-25-50
C1023 thru C1028	Same as C1011	
C1029	CAPACITOR, FIXED, MICA DIELECTRIC: 1000 uufd, ±10%, 500 wvdc char. B	CM20B102K
C1030 thru C1039	Same as C1003	
C1040	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10, 000 uuf, GMV; 500 wvdc	CC100-16
C1041 thru C1043	Same as C1040	
CB1000	CIRCUIT BREAKER: 230 VAC; 50 amp, 3 pole	SW240
CB1001	Not Used	
CB1002	CIRCUIT BREAKER: 230 VAC, 350 ma, 1 pole	SW297
E1000	CONTACT, ELECTRICAL: spring loaded; silver plated, beryllium copper; 3/4" x 1-1/8" x 3/4" o/a	AX154

SYM	DESCRIPTION	TMC PART NO.
E1001	CONTACT, ELECTRICAL: spring loaded; nickel plated beryllium copper; 2-1/4" x 1-1/4" x 1" o/a	AX153
E1002 thru E1007	Same as E1001	
E1008	INSULATOR, FEEDTHRU: consists of 2 ribbed steatite insulators; 1 brass, nickel plated 1/4-20 threaded rod, 4" lg.; 2 neoprene gaskets; 2 fiber washers; 2 flat washers; 2 hex nuts; and 2 external tooth lockwashers; 1-1/4" dia. x 4" lg. o/a	AX261
E1009	Same as E1008	
E1010	Same as E1008	
I1000	LAMP, INCANDESCENT: screw type base; 230 volts, 10 watts	BI105-1
I1001 thru I1003	Same as I1000	
I1004	LAMP, NEON: miniature; 110 V, 1/25 watt; type T-3-1/4 clear bulb, bayonet base	BI100-51
I1005	LAMP, FLUORESCENT: standard cool white; 1/2" dia. x 11-1/4" lg	BI107
I1006	Same as I1005	
I1007	LAMP, INCANDESCENT: frosted; 230-250 volts, 25 watts, standard screw base; 4" x 1-7/8" o/a	BI106-2
J1000	CONNECTOR, RECEPTACLE, ELECTRICAL: female; AN pin type. Part of W1009	MS3102A20-29S
J1001	CONNECTOR, RECEPTACLE, ELECTRICAL: female; 35 contacts. Part of W1009	MS3102A32-7S
J1002	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 round female contact; straight type, series BNC to BNC. Part of W1009	JJ172
J1003	CONNECTOR, RECEPTACLE, ELECTRICAL: socket type, 1 contact	MS3102A18-16S
J1004	CONNECTOR, RECEPTACLE, ELECTRICAL: female; teflon insulated	UG560*/U
J1005	Same as J1002. Part of W1009	
J1006	Same as J1002	
J1007	Same as J1002	
J1008	Same as J1002. Part of W1009	
J1009	Same as J1002. Part of W1009	
J1010	CONNECTOR, RECEPTACLE, ELECTRICAL: female. Part of W1009	MS3102A2027S

MAIN FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
L1000	COIL, RADIO FREQUENCY: line filter; L - nominal 177 uh (175-179) Q greater than 10; F - 2 mc.	CL155
L1001 thru L1004	Same as L1000	
L1005	COIL, RADIO FREQUENCY: fixed; 2.5 mh, ±10%, 100 ma current carrying capacity; molded case	CL140-1
L1006	Same as L1005	
M1000	VOLTMETER, FILAMENT PRIMARY: 0-300 volts, red marker at 230 V; 4-1/2" square case	MR118
M1001	AMMETER: P.A.; screen current; 0-100 ma, DC, 4-1/2" square case	MR116
M1002	AMMETER: P.A.; plate current; 0-3 amps, DC, 4-1/2" square case	MR117
M1003	VOLTMETER: P.A.; plate R.F.; 0-10 Kv R.F. scale, 200 micro-amps DC movement, 4-1/2" square case	MR120
M1004	Not Used	
M1005	Part of KIT-113	
M1006	METER, SWR, KILOWATTS: 0-10/0-5 Kw scale, 0-100 microamps, ±2% dc movement; 4-1/2" sq. case	MR170
MP1000 thru MP1004	Not Used	
MP1005	KNOB: instrument type; no skirt; 3/4" x 2-3/8" o/a	MP110
MP1006	Same as MP1005	
MP1007	KNOB: instrument, slip type	MP113
MP1008	Same as MP1007	
MP1009	Same as MP1007	
P1000	CONNECTOR, RECEPTACLE, ELECTRICAL: male, socket type. Part of W1009	MS3106B32-7S
P1001	CONNECTOR, RECEPTACLE, ELECTRICAL: socket type. Part of W1009	MS3106B22-9S
P1002	CONNECTOR, PLUG, ELECTRICAL: coaxial	PL169
P1003	CONNECTOR, PLUG, ELECTRICAL: pin type; 1 contact	MS3106B18-16P
P1004	CONNECTOR, PLUG, ELECTRICAL: coaxial; HN type; 50 ohms, 5000 volts peak	PL222
P1005	Same as P1002	
P1006	CONNECTOR, PLUG, ELECTRICAL: socket type; 1 contact	MS3106B18-16S

SYM	DESCRIPTION	TMC PART NO.
P1007	Same as P1002	
P1008	Same as P1002	
P1009	Same as P1004	
P1010	Same as P1000	
P1011	CONNECTOR, RECEPTACLE, ELECTRICAL: male, pin type	MS3106B32-7P
R1000	RESISTOR, FIXED, WIREWOUND: 100 ohms, 55 watts	RW115-101-55
R1001	Same as R1000	
R1002	RESISTOR, FIXED, WIREWOUND: 45,000 ohms, 10 watts	RW109-42
R1003	RESISTOR, FIXED, COMPOSITION: 390,000 ohms, ±5%, 1/2 watt	RC20GF394J
R1004	Not Used	
R1005	RESISTOR, FIXED, COMPOSITION: 220,000 ohms, ±5%, 1 watt	RC32GF224J
R1006	RESISTOR, FIXED, WIREWOUND: 3000 ohms, ±5%, 10 watts	RW109-30
R1007 thru R1009	Same as R1006	
R1010	RESISTOR, VARIABLE, COMPOSITION: 50,000 ohms, ±20%; 2 watts	RV4CTSD503B
S1000	SWITCH, PUSH BUTTON: SPST; momentary contact; 1 amp, 250 V; 3 amps, 125 V; solder type lugs	SW168SPST-2-NOBR
S1001	SWITCH, ROTARY: 1 section; 12 positions, 30° angle of throw	SW250
S1002	SWITCH, ROTARY: tap; 7 taps, 180° total rotation; 10 amps, 150 VAC	SW167-7
S1003	Not Used	
S1004	SWITCH, TOGGLE: DPDT; 6 amps, 125 VAC; 28° angle of throw, solder lug terminals	ST22N
S1005	SWITCH, TOGGLE: SPST; 6 amps, 125 VAC; 28° angle of throw, solder lug terminals	ST12A
S1006 ✓	SWITCH, INTERLOCK: push to operate; total travel app. 0.312"; 15 amp, 120, 250 VAC; 2 amps resistive at 250 VDC	SW230
S1007 thru S1011	Same as S1006	
S1012	STARTER, FLUORESCENT LAMP: 8 watts; 13/16" dia. x 1-1/2" lg	PO170
S1013	Same as S1012	

MAIN FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
S1014	Same as S1005	
S1015	SWITCH, MICRO: push type; 1/2 amp 125 VDC; 1/4 amp 250 VDC, solder type lugs	SW189
S1016	Same as S1015	
S1017	SWITCH, TOGGLE: DPDT; momentary contact; 3 amp 250 VAC; 6 amp 125 VAC; 2 position ON/ON, normally closed	ST105
S1018	Part of R1010	
T1000	BALLAST, FLUORESCENT LAMP: 8 watt, 118 volts, 0.17 amp, 60 cps	PO169
T1001	Same as T1000	
W1000	Not Used	
W1001	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of 2 connectors, symbol nos. P1010, P1011; 35" of MWC wire rubber covered.	CA431
W1002	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 42" of RF cable, 2 connectors, symbol nos. P1002, P1005	CA503-42.00
W1003	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of 39-1/4" high voltage cable; 2 connectors, symbol nos. P1003, P1006	CA460
W1004	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 15.25" of RF cable, RG-165/U; and 2 connectors, symbol nos. P1004, P1009	CA480-105-15.25
W1005	Not Used	
W1006	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 2 RF cables, RG-174/U; one 39", one 42"; 2 connectors, symbol nos. J1006, J1007; rubber jacket covering both cables	CA462
W1007	Same as W1006	
W1008	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of 10-1/2" of 14 AWG cable; 1 connector, symbol no. J1003; 1 terminal lug	CA466
W1009	WIRING HARNESS, BRANCHED: consists of various lengths and colors of MWC, HWC and RG MIL type conductors; 8 connectors, symbol nos. J1002, J1005, J1008, J1009, J1000, J1001, J1010, P1000, P1001	CA1040
XI1000	LIGHT, INDICATOR: w/frosted amber lens; screw type socket	TS136-3FS
XI1001	LIGHT, INDICATOR: w/frosted green lens; screw type socket	TS136-2FS
XI1002	LIGHT, INDICATOR: w/frosted red lens; screw type socket	TS136-1FS

MAIN FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
XI1003	LIGHT, INDICATOR: w/frosted blue lens, screw type socket	TS136-4FS
XI1004	LIGHT, INDICATOR: w/clear lens for miniature bayonet base T-3-1/4 bulb.	TS106-2
XI1005 A & B	SOCKET, FLUORESCENT LAMP: 75 watts, 250 volts	TS141
XI1006 A & B	Same as XI1005 A, B	
XI1007	SOCKET, LAMP: screw type socket	TS143
XS1012	SOCKET, STARTER, FLUORESCENT: 60 watt, 250 volt	TS140
XS1013	Same as XS1012	

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RF AMPLIFIER POWER SUPPLY ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
C2000	CAPACITOR, fixed: mica; .001 ufd; ±2%, 500 wvdc, char. F	CM20F102G
C2001 A & B	CAPACITOR, fixed: dry electrolytic; 2 sections, 20 ufd, 450 wvdc each section	CE52C200R
C2002	Same as C2000	
C2003 A & B	Same as C2001 A, B	
C2004	Same as C2000	
C2005	CAPACITOR, fixed: dry electrolytic; polarized; 80 ufd, 450 wvdc	CE51C800R
C2006	Same as C2005	
C2007 thru C2014	DELETED	
C2015	Same as C2000	
C2016	Same as C2000	
C2017	CAPACITOR, fixed: mica; .01 ufd, ±1%, 300 wvdc, char. F	CM35F103F
C2018	Same as C2017	
C2019	Same as C2000	
C2020	Same as C2000	
C2021	CAPACITOR, fixed: paper; 4 ufd; ±10%, char. F; 600 wvdc	CP41B1FF405K
C2022	Same as C2021	

RF AMPLIFIER POWER SUPPLY ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
F2000	FUSE, cartridge type: 1/4 amp; time delay	FU102-.250
F2001	FUSE, cartridge type: 1/8 amp; time delay	FU102-.125
F2002	FUSE, cartridge type: 2 amp; time delay	FU102-2
F2003	Same as F2002	
F2004	FUSE, cartridge type: 1-1/2 amp; time delay	FU102-1.5
I2000	LAMP, neon: 110 v; 1/25 watt, T-3-1/4 clear bulb; bayonet base	BI100-51
J2000	CONNECTOR, receptacle: male; 22 contacts	MS3102A28-11P
J2001	CONNECTOR, receptacle: female; 35 contacts	MS3102A32-7S
J2002	CONNECTOR, receptacle: male; 35 contacts	MS3102A32-7P
L2000	REACTOR, filter: 10 henries, 125 ma DC, 1000 volts RMS test	TF5001
L2001	REACTOR, filter: 50 henries, 30 ma DC, approx. 800 ohms DC resistance; 1500 volts RMS test	TF166
P2000	CONNECTOR, receptacle: female; 22 contacts	MS3106B28-11S
R2000	RESISTOR, fixed: wire wound; 500 ohms, ±5%, 10 watts	RW109-19
R2001	Same as R2000	
R2002	RESISTOR, fixed: wire wound; 5000 ohms, ±5%, 20 watts	RW110-30
R2003	Same as R2002	
R2004	RESISTOR, fixed: wire wound; 2000 ohms, ±5% 10 watts	RW109-28
R2005	RESISTOR, fixed: wire wound; 50,000 ohms, ±5%, 10 watts	RW109-43
R2006	RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt	RC20GF224K
R2007	Same as R2005	
R2008	RESISTOR, fixed: composition; 4700 ohms, ±10%, 2 watts	RC42GF472K
R2009	RESISTOR, variable: composition; 5000 ohms, ±10%, 2 watts	RV4LAYSA502A
R2010	Same as R2008	
T2000	TRANSFORMER, power: step up and step down; primary - 115/230 v, 50/60 cps, single phase; section 1 - 350 v at 200 ma CT, section 2 - 375 v at 50 ma; section 3 - 5 v at 2 amps; section 4 - 6.3 v at 1.2 amps; section 5 - 6.3 v at 3 amps CT; hermetically sealed rectangular steel case	TF198
T2001	TRANSFORMER, power: step down; primary - 115/230 vac, 50/60 cps, single phase; secondary - 6.3 v at 2 amps and 6 v at 14 amps; hermetically sealed rectangular steel case	TF202
V2000	TUBE, electron: duo-diode rectifier, octal	5R4

RF AMPLIFIER POWER SUPPLY ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
V2001	TUBE, electron: full wave rectifier, 7 pin miniature	6X4
V2002	TUBE, electron: voltage regulator, 7 pin miniature	OA2
V2003	Same as V2002	
W2001	CABLE ASSEMBLY	CA420
W2002	CABLE ASSEMBLY, INTERCONNECT	CA422
XC2001	SOCKET, tube: octal; high crown	TS101P01
XC2002	Not Used	
XC2003	Same as XC2001	
XC2004	Not Used	
XC2005	Same as XC2001	
XC2006	Same as XC2001	
XF2000	FUSE HOLDER, bayonet base; 90/300 V, neon lamp, clear knob, black plastic body, 13/16" x 2-13/16" o/a	FH104-3
XF2001 thru XF2004	Same as XF2000	
XI2000	LIGHT, INDICATOR: w/clear white lens, for T-3-1/4 bulb.	TS106-2
XV2000	Same as XC2001	
XV2001	SOCKET, tube: 7 pin miniature	TS102P01
XV2002	Same as XV2001	
XV2003	Same as XV2001	

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AUXILIARY FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
B3000	FAN, AXIAL: (CCW); single phase; 115/230 V, 50/60 cps; capacitance 4 uf; nominal RPM 3400; insulation class B; 100 watts full load	BL105
B3001	Same as B3000	
C3000 thru C3009	Not Used	
C3010	CAPACITOR, FIXED, CERAMIC DIELECTRIC: feed-thru; 1000 uuf, ±20%, 500 wvdc	CK70AW102M
C3011 thru C3016	Same as C3010	

AUXILIARY FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
C3017	CAPACITOR, FIXED, PAPER DIELECTRIC: 4 uf, ±10%, 600 wvdc	CP41B1FF504K
C3018	Same as C3017	
C3019	CAPACITOR, FIXED, MICA DIELECTRIC: 1000 uuf, ±10%, 500 wvdc, char. B	CM20B102K
C3020 thru C3038	Same as C3019	
CB3000	CIRCUIT BREAKER: 110/230 VAC, 10 amps, double pole	SW251-2
CP3000	Not Used	
CP3001	ADAPTER: BNC connector type	UG274*/U
DS3000	BUZZER: 230 VAC; 5-1/2 mtg. centers	BZ100
E3000	TERMINAL BOARD: barrier type; plastic; 14 terminals, screw w/feed thru solder lug type	TM100-14
E3001	TERMINAL BOARD, BARRIER: 8 terminals	TM100-8
E3002	Same as E3000	
E3003	TERMINAL BOARD: barrier type; 2 terminals, black bakelite	TM102-2
E3004 thru E3006	CONTACT SET, ELECTRICAL: relay; for K3000, TMC p/n RL130; consisting of 3 each moveable contacts, 3 each line contacts, 3 each load contacts	AX176
E3007 thru E3009	Same as E3004, E3005, E3006	
E3010	TERMINAL, FEED-THRU: insulated	TE114-2
E3011 thru E3019	Same as E3010	
F3000	FUSE, CARTRIDGE: 1/2 amp; time lag	FU102-.5
I3000	LAMP, INCANDESCENT: clear; 230/250 volts, 40 watts; standard screw base; 4" x 1-7/8" o/a	BI106-1
I3001	LAMP, FLUORESCENT: standard, cool white; 1/2" dia. 11-1/4" lg	BI107
J3000	CONNECTOR, RECEPTACLE, ELECTRICAL: female, 4 contacts. J3000 used on Cable, W3006	MS3102A14S-2S
J3001	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 round female contact; straight type; series BNC to BNC. J3001 used on Cable, W3001	JJ172
J3002	ADAPTER, CONNECTOR: BNC type. Used on Cable, W3001	UG492*/U
J3003	Same as J3001. J3003 used on Cable, W3001	

SYM	DESCRIPTION	TMC PART NO.
J3004	Same as J3001. J3004 used on Cable, W3001	
J3005	Not Used	
J3006	Same as J3000	
J3007	CONNECTOR, RECEPTACLE, ELECTRICAL: twistlock; female; brown bakelite	JJ170
J3008 thru J3014	Same as J3007	
J3015	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 female contact; 52 ohms; BNC type	UG625B/U
J3016	Same as J3015	
J3017	Same as J3001. J3017 used on Cable, W3001	
K3000	CONTACTOR, RELAY: 220 V, 60 cps coil; auxiliary switch mounted on right side of panel; normally closed contacts	RL130-1
K3001	CONTACTOR, RELAY: 220 V, 60 cps coil; auxiliary switch mounted on left side of panel; normally open contacts	RL130-2
M3000	VOLTMETER: P.A.; screen; 0-1500 volt scale; 1 ma dc scale; 4-1/2" square case	MR119
M3001	VOLTMETER: P.A.; bias; 0-400 meg. volt scale; 1 ma dc movement; 4-1/2" square case	MR122
M3002	VOLTMETER: P.A.; plate; 0-10 kilovolt scale; 1 ma dc movement; 4-1/2" square case	MR121
M3003	TIME DELAY: 20 seconds; quick make, quick break, 250 V, 5 amp, switches	TI100
MP3000	FILTER, AIR CONDITIONING: single pad; 16" lg. x 16" wide x 1/2" thk	AD103-4
MP3001	FILTER, AIR CONDITIONING: single pad; 11-3/8" lg. x 10-1/8" wide x 1/2" thk	AD103-2
MP3002	Same as MP3001	
MP3003	RETRACTOR, CABLE: stainless steel spring	SP137-1
MP3004	Same as MP3003	
P3000	CONNECTOR, PLUG, ELECTRICAL: male; pin type. P3000 used on Cable, W3006	MS3106B20-29P
P3001	CONNECTOR, PLUG, ELECTRICAL: coaxial. P3001 used on Cable, W3006	PL169
P3002	Same as P3001. P3002 used on Cable, W3006	
P3003	Same as P3001. P3003 used on Cable, W3006	
P3004	CONNECTOR, RECEPTACLE, ELECTRICAL: male	MS3106A14S-2P

AUXILIARY FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
P3005 thru P3007	Same as P3001. Used on Cable, W3006	
P3008	Same as P3004	
P3009 thru P3036	Same as P3001. Used on Cable, W3001	
P3037	Not Used	
P3038	CONNECTOR, PLUG, ELECTRICAL: male; pin type. P3038 used on Cable, W3002	MS3106B20-27P
P3039	CONNECTOR, PLUG, ELECTRICAL: female; angle type; 16 contacts, brass silver plated. P3039 used on Cable, W3002	PL186
P3040	Same as P3039. P3040 used on Cable, W3003	
P3041	CONNECTOR, PLUG, ELECTRICAL: male; angle type, 16 contacts, brass silver plated. P3041 used on Cable, W3003	PL187
P3042	Same as P3039. P3042 used on Cable, W3004	
P3043	Same as P3041. P3043 used on Cable, W3004	
P3044	Same as P3039. P3044 used on Cable, W3005	
P3045	Same as P3041. P3045 used on Cable, W3005	
P3046	Same as P3001. P3046 used on Cable, W3001	
P3047	Same as P3001. P3047 used on Cable, W3001	
P3048	Same as P3001. P3048 used on Cable, W3006	
P3049	Same as P3001. P3049 used on Cable, W3006	
P3050	Same as P3001. P3050 used on Cable, W3001	
P3051	Same as P3001. P3051 used on Cable, W3006	
P3052	Same as P3001. P3052 used on Cable, W3006	
P3053	CONNECTOR, PLUG, ELECTRICAL: 14 number 16 female contacts; straight type.	MS3106B20-27S
P3054	Same as P3038. P3054 used on Cable, W3006	
P3055 thru P3057	Same as P3001. P3055 thru P3057 used on Cable, W3001	
P3058	CONNECTOR, PLUG, ELECTRICAL: female. Used on Cable, W3006	MS3106A14S2S
P3059	CONNECTOR, PLUG, ELECTRICAL: male. Used on Cable, W3001	PL105-1
R3000	HEATING ELEMENT, ELECTRICAL: finstrip; 12 ohms, 1250 watts; 15-1/4" lg. x 2" wide x 1-3/8" high o/a	RR127-1

SYM	DESCRIPTION	TMC PART NO.
R3001	Same as R3000	
R3002	Same as R3000	
R3003	RESISTOR, FIXED, WIREWOUND: 600 ohms, 25 watts; mtg. brackets mount on 2-5/8" centers	RW102
R3004	RESISTOR, FIXED, COMPOSITION: 390,000 ohms, ±10%, 2 watts	RC42GF394K
R3005	RESISTOR, FIXED, COMPOSITION: 33 ohms, ±10%, 2 watts	RC42GF330K
R3006	Same as R3005	
R3007	RESISTOR, FIXED, COMPOSITION: 47 ohms, ±10%, 2 watts	RC42GF470K
S3000	STARTER, FLUORESCENT LAMP: 8 watts; 3/16" dia. x 1-1/2" lg. o/a	PO170
T3000	Not Used	
T3001	BALLAST, FLUORESCENT LAMP: 8 watts; 118 volts, 0.17 amps 60 cps; 1-1/8" wide x 7/8" high x 5-15/16" lg. o/a; 5-1/2" leads	PO169
T3002	TRANSFORMER, AUDIO FREQUENCY: input 95-250 volts; output 115 volts; 50/60 cps; rectangular steel case	TF275
W3000	Not Used	
W3001	CABLE ASSEMBLY, SPECIAL PURPOSE, BRANCHED, ELECTRICAL: consists of various MIL type RG-174/U and MCW wire, 36 connectors, J3001 thru J3004, J3017, P3009 thru P3036, P3046, P3047, P3050, P3055, P3056, P3057, P3059 and various terminal lugs	CA1007
W3002	CABLE ASSEMBLY, POWER, ELECTRICAL: 13 conductors, length 6 feet. Consists of P3038, P3039	CA576-6-0
W3003	CABLE ASSEMBLY, POWER, ELECTRICAL: 16 conductors, length 8 feet 5 inches. Consists of P3040, P3041	CA551-5
W3004	CABLE ASSEMBLY, POWER, ELECTRICAL: 16 conductors, length 9 feet 5 inches. Consists of P3042, P3043	CA551-6
W3005	CABLE ASSEMBLY, POWER, ELECTRICAL: 16 conductors, length 6 feet 5 inches. Consists of P3044, P3045	CA551-4
W3006	WIRING HARNESS, BRANCHED, ELECTRICAL: consisting of various MIL type RG-174/U and MCW wire; 13 connectors, J3000, P3000 thru P3003, P3005 thru P3007, P3048, P3049, P3051 thru P3054, P3058 and various terminal lugs	CA1041
W3007	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of 60" lengths of insulated wire rubber covered	CA452
W3008	CABLE ASSEMBLY, POWER, BRANCHED ELECTRICAL: consisting of various types of HWC wire and insulated terminal lugs	CA680

AUXILIARY FRAME ASSEMBLY

SYM	DESCRIPTION	TMC PART NO.
W3009	CABLE ASSEMBLY, POWER, ELECTRICAL: consisting of 3 MIL type HWC wire; rubber jacket covered	CA683
XF3000	FUSEHOLDER: 100-250 volt, 20 amp, neon bulb indicator, 220 K ohm resistor	FH104-3
XI3000	LIGHT, INDICATOR: lamp, with red lens; 230 volts; 50/60 cps; lamp BI106-1	AX124
XI3001A	SOCKET, FLUORESCENT LAMP: 75 watts, 250 volts; 1-1/32" high x 5/8" wide x 5/16" thk o/a; 6" leads	TS141
XI3001B	Same as XI3001A	
XS3000	SOCKET, STARTER, FLUORESCENT: 660 watts, 250 volts; 1-13/16" lg. x 1-11/16" wide x 7/16" deep o/a; 8-3/4" leads	TS140

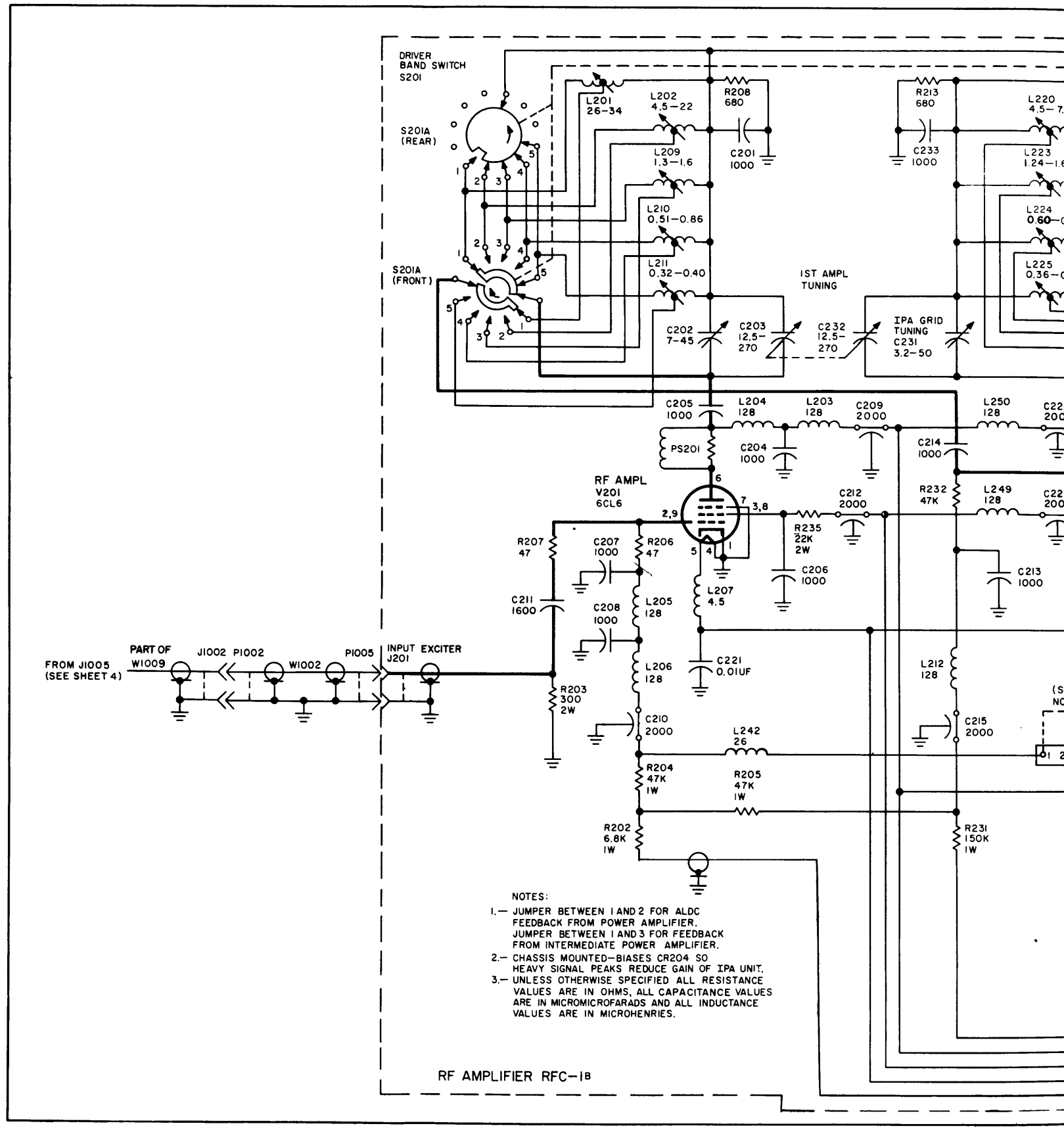
SECTION 6
SCHEMATIC DIAGRAM

DRIVER BAND SWITCH S201	
POS	FUNCTION
1	2-4 MC
2	4-8 MC
3	8-16 MC
4	16-20 MC
5	20-28 MC

IPA BAND SWITCH S202	
POS	FUNCTION
1	2.0-2.5 MC
2	2.5-3 MC
3	3-4 MC
4	4-6 MC
5	6-8 MC
6	8-12 MC
7	12-16 MC
8	16-20 MC
9	20-28 MC

MULTIMETER SWITCH S204	
POS	FUNCTION
1	IPA BIAS X 10V DC
2	IPA ESG X 10V DC
3	IPA EP X 100V DC
4	IPA ISG X 1MA DC
5	1ST AMPL EP X 1V RF
6	IPA EG X 1V RF
7	IPA EP X 100V RF
8	PA EG X 10V RF

Figure 6-1. GPT-10K Transmitter, Overall Schematic Diagram (Sheet 1 of 4)


DRIVER BAND SWITCH S201
S201A (REAR)
S201A (FRONT)
L201 26-34
L202 4.5-22
L209 1.3-1.6
L210 0.51-0.86
L211 0.32-0.40
R208 680
C201 1000
C202 7-45
C203 12.5-270
1ST AMPL TUNING
C232 12.5-270
IPA GRID TUNING C231 3.2-50
R213 680
C233 1000
L220 4.5-7.
L223 1.24-1.6
L224 0.60-
L225 0.36-
C205 1000
L204 128
L203 128
C209 2000
L250 128
C22 200
PS201
C204 1000
C214 1000
RF AMPL V201 6CL6
R232 47K
L249 128
C22 200
C212 2000
R235 22K 2W
C206 1000
C213 1000
R207 47
C207 1000
R206 47
C211 1600
C208 1000
L205 128
L207 4.5
C221 0.01UF
L206 128
L212 128
C215 2000
L242 26
R203 300 2W
C210 2000
R204 47K 1W
R205 47K 1W
R202 6.8K 1W
R231 150K 1W
PART OF W1009
J1002 P1002
W1002
P1005
INPUT EXCITER J201
FROM J1005 (SEE SHEET 4)
NOTES:
1.— JUMPER BETWEEN 1 AND 2 FOR ALDC FEEDBACK FROM POWER AMPLIFIER. JUMPER BETWEEN 1 AND 3 FOR FEEDBACK FROM INTERMEDIATE POWER AMPLIFIER.
2.— CHASSIS MOUNTED—BIASES CR204 SO HEAVY SIGNAL PEAKS REDUCE GAIN OF IPA UNIT.
3.— UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRIES.
RF AMPLIFIER RFC-18

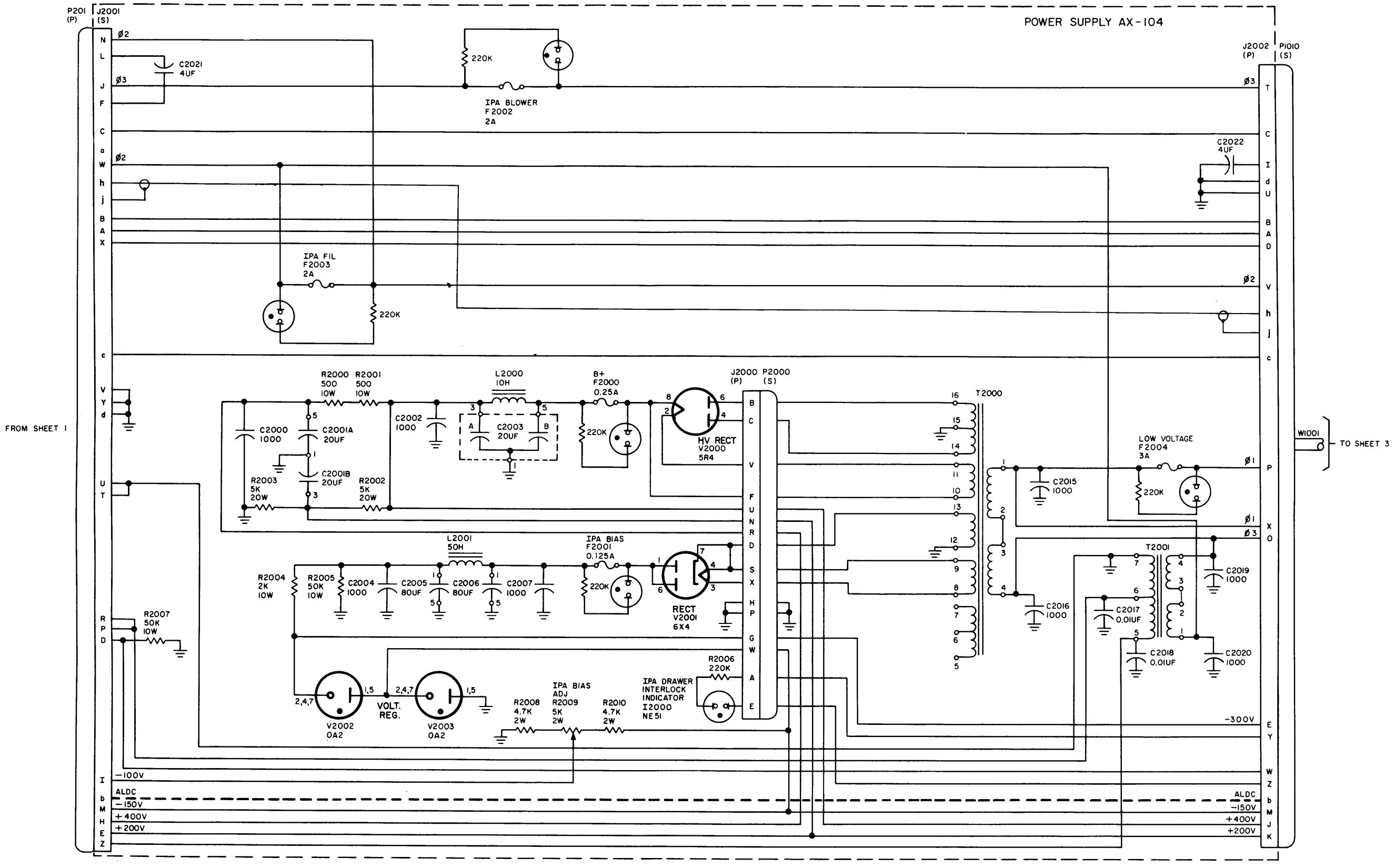


Figure 6-1. GPT-10K Transmitter, Overall Schematic Diagram (Sheet 2 of 4)

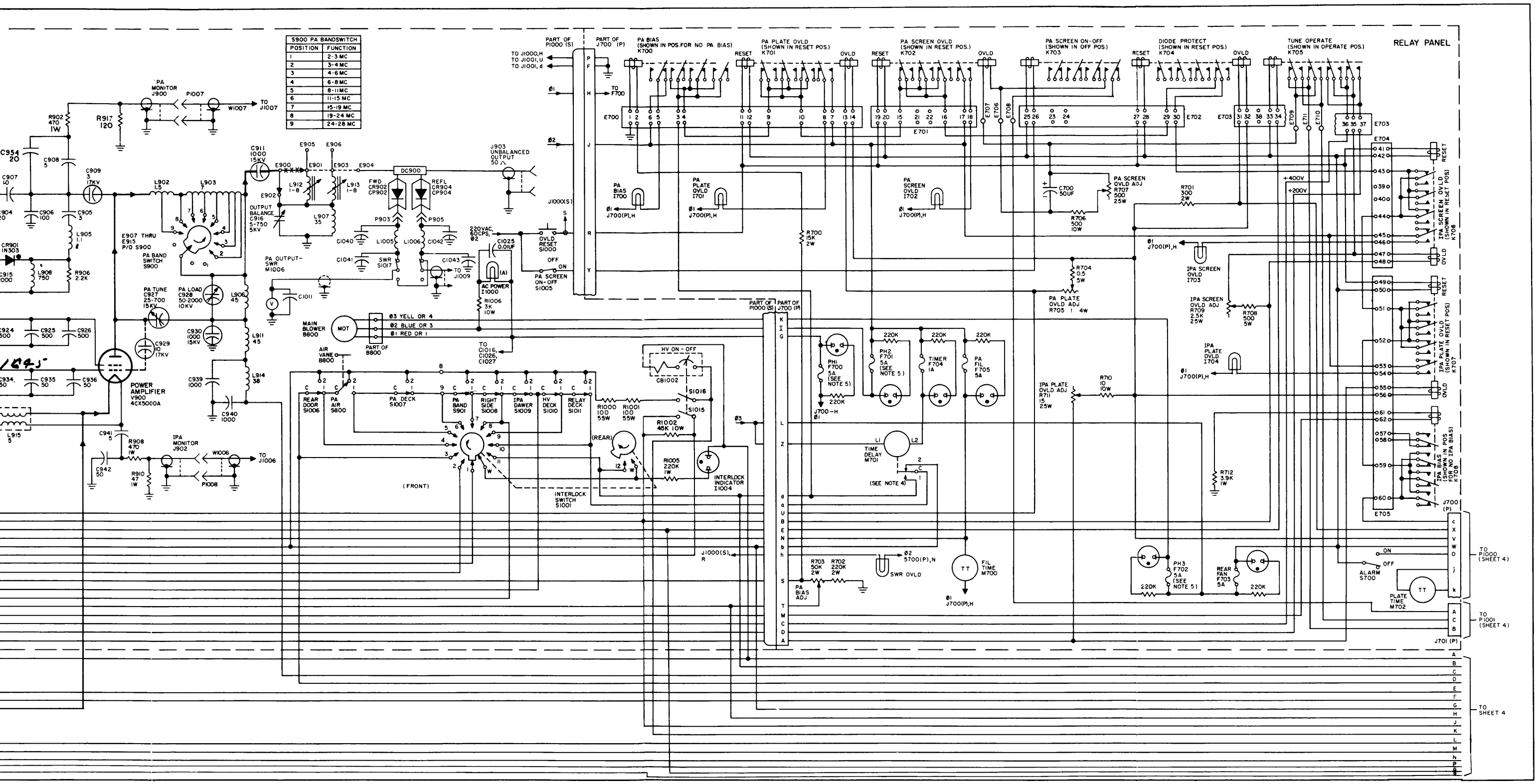
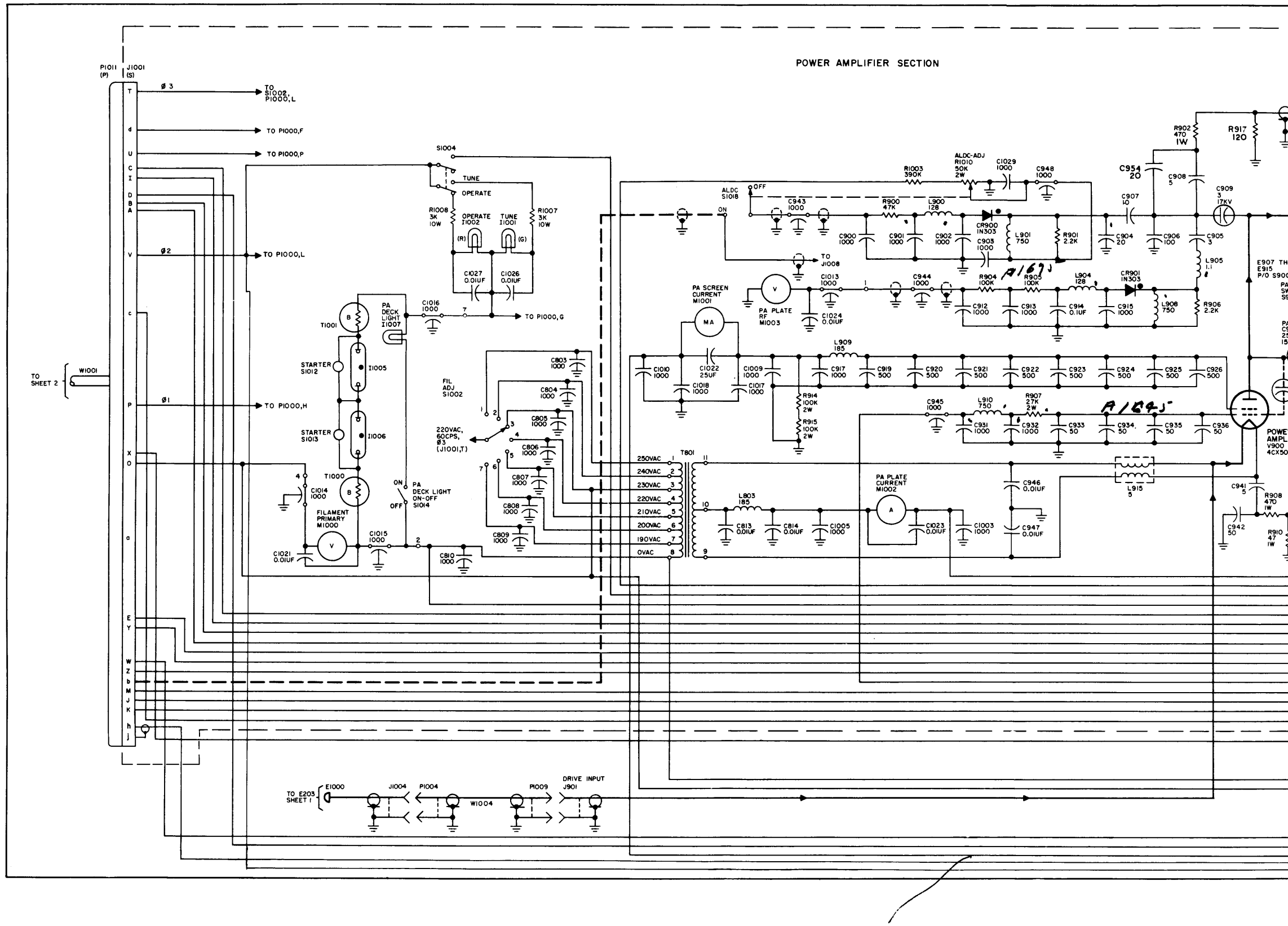
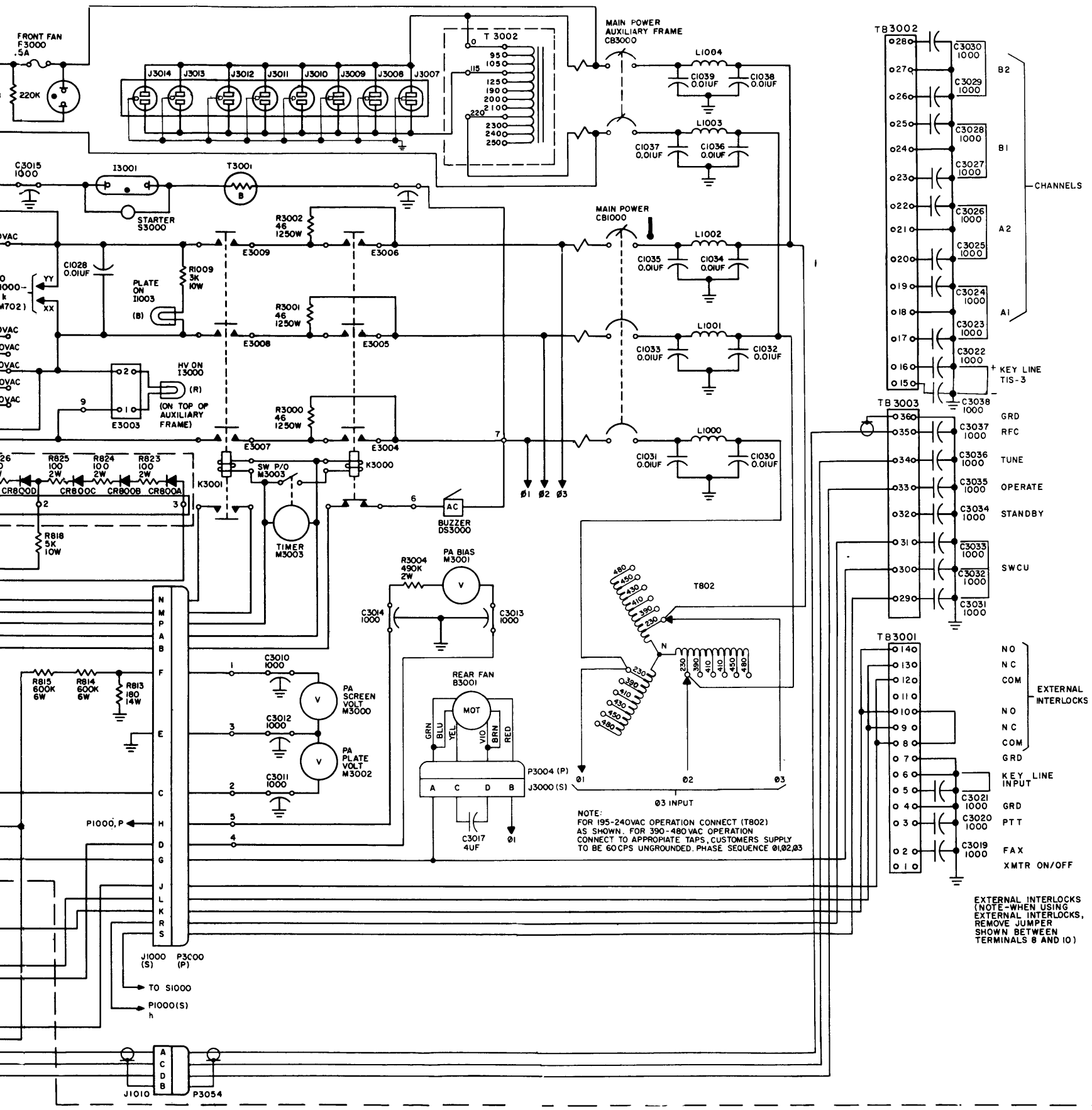
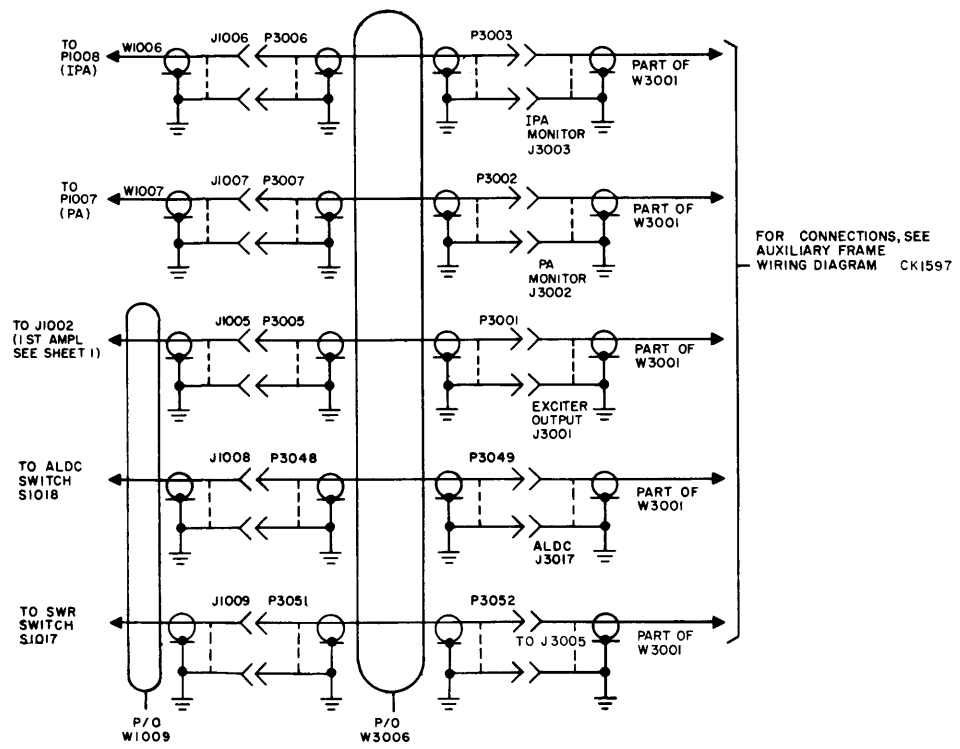


Figure 6-1. GPT-10K Transmitter, Overall Schematic Diagram (Sheet 3 of 4)


POWER AMPLIFIER SECTION
P1011 (P) J1001 (S)
TO SHEET 2
W1001
TO S1002, P1000,L
TO P1000,F
TO P1000,P
TO P1000,L
TO P1000,H
TO P1000,G
Ø3
Ø2
Ø1
S1004
TUNE
OPERATE
R1008 5K 10W
R1007 5K 10W
OPERATE I1002
TUNE I1001
C1027 0.01UF
C1026 0.01UF
C1016 1000
PA DECK LIGHT I1007
T1001
STARTER S1012
I1005
STARTER S1013
I1006
T1000
C1014 1000
FILAMENT PRIMARY M1000
C1015 1000
C1021 0.01UF
C810 1000
FIL ADJ S1002
220VAC, 60CPS, Ø3 (J1001,T)
C803 1000
C804 1000
C805 1000
C806 1000
C807 1000
C808 1000
C809 1000
ON OFF
PA DECK LIGHT ON-OFF S1014
T801
250VAC
240VAC
230VAC
220VAC
210VAC
200VAC
190VAC
0VAC
L803 185
C813 0.01UF
C814 0.01UF
C1005 1000
PA PLATE CURRENT M1002
C1023 0.01UF
C1003 1000
C946 0.01UF
C947 0.01UF
L915 5
C941 5
R908 470 1W
C942 50
R910 47 1W
ALDC S1018
ON
OFF
TO J1008
C943 1000
R1003 390K
ALDC-ADJ R1010 50K 2W
C1029 1000
C948 1000
R900 47K
L900 126
CR900 IN303
L901 750
R901 2.2K
C900 1000
C901 1000
C902 1000
C903 1000
C904 20
C905 3
C906 100
C907 10
C908 5
C909 3 17KV
C954 20
R902 470 1W
R917 120
A1621
PA SCREEN CURRENT M1001
PA PLATE RF M1003
C1013 1000
C1024 0.01UF
C944 1000
R904 100K
R905 100K
L904 128
CR901 IN303
C912 1000
C913 1000
C914 0.1UF
C915 1000
L908 750
R906 2.2K
L905 1.1
C1010 1000
C1022 25UF
C1018 1000
C1009 1000
C1017 1000
L909 185
C917 1000
C919 500
C920 500
C921 500
C922 500
C923 500
C924 500
C925 500
C926 500
R914 100K 2W
R915 100K 2W
R907 27K 3W
C945 1000
L910 750
C931 1000
C932 1000
C933 50
C934 50
C935 50
C936 50
A1624
POWE AMPL V900 4CX50
E907 TH E915 P/O S900
PA SW S9
TO E203 SHEET 1
E1000
J1004
P1004
W1004
P1009
DRIVE INPUT J901

CK1600A





NOTES:

1. UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS, 1/2 WATT, ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS AND ALL INDUCTORS ARE IN MICROHENRIES.
2. FOR CONNECTIONS SEE AUXILIARY FRAME WIRING DIAGRAM (AS PER COMBINATION CHART)
3. FUSES F700, F701, F702, ARE MAIN BLOWER FUSES.
4. ON M701, S205, 206, 800, 901, 1006, 1007, 1007, 1008, 1009, 1010, AND 1011 OF INTERLOCK CIRCUIT;
   TERMINAL NO.1 DESIGNATES SWITCH TERMINAL MARKED "NO"
   TERMINAL NO.2 DESIGNATES SWITCH TERMINAL MARKED "NC"
   TERMINAL NO.C DESIGNATES SWITCH TERMINAL MARKED " C "
5. FUSES

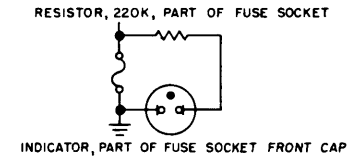
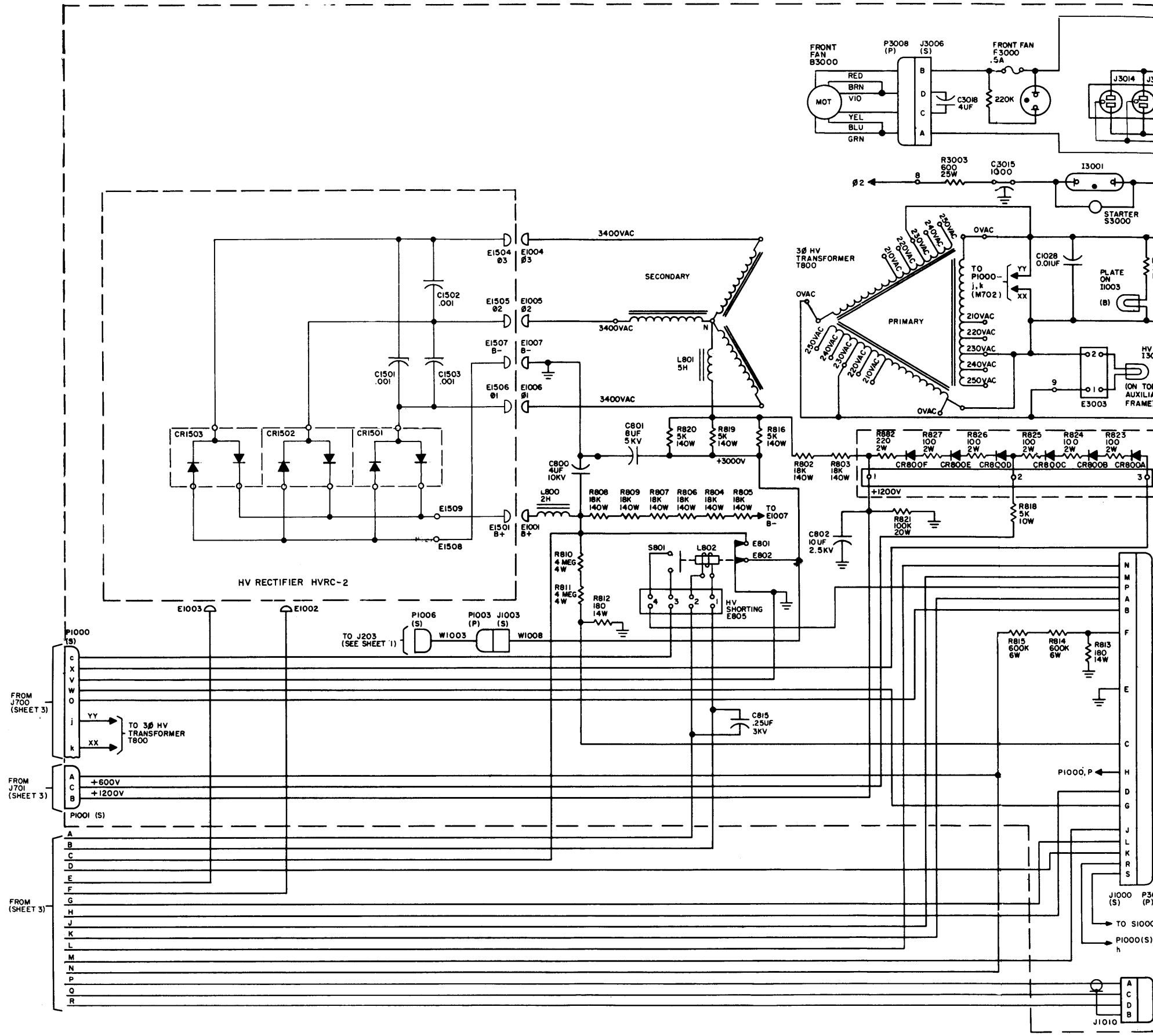


Figure 6-1. GPT-10K Transmitter, Overall Schematic Diagram (Sheet 4 of 4)


FRONT FAN B3000
MOT
RED
BRN
VIO
YEL
BLU
GRN
P3008 (P)
J3006 (S)
FRONT FAN F3000 .5A
C3018 4UF
220K
J3014
R3003 600 25W
C3015 1000
I3001
STARTER S3000
Ø2
3Ø HV TRANSFORMER T800
PRIMARY
SECONDARY
TO P1000-j,k (M702)
C1028 0.01UF
PLATE ON I1003 (B)
E3003
HV I3
(ON TO AUXILIA FRAME
210VAC
220VAC
230VAC
240VAC
250VAC
OVAC
3400VAC
L801 5H
C1501 .001
C1502 .001
C1503 .001
CR1503
CR1502
CR1501
E1504 Ø3
E1505 Ø2
E1507 B-
E1506 Ø1
E1509
E1508
E1501 B+
E1004 Ø3
E1005 Ø2
E1007 B-
E1006 Ø1
E1001 B+
HV RECTIFIER HVRC-2
C801 8UF 5KV
R820 5K 140W
R819 5K 140W
R816 5K 140W
+3000V
C800 4UF 10KV
L800 2H
R808 18K 140W
R809 18K 140W
R807 18K 140W
R806 18K 140W
R804 18K 140W
R805 18K 140W
TO E1007 B-
R802 18K 140W
R803 18K 140W
R882 220 2W
R827 100 2W
R826 100 2W
R825 100 2W
R824 100 2W
R823 100 2W
CR800F
CR800E
CR800D
CR800C
CR800B
CR800A
+1200V
R818 5K 10W
R821 100K 20W
C802 10UF 2.5KV
R810 4 MEG 4W
R811 4 MEG 4W
R812 180 14W
S801
L802
E801
E802
HV SHORTING E805
C815 .25UF 3KV
R815 600K 6W
R814 600K 6W
R813 180 14W
E1003
E1002
P1000 (S)
P1006 (S)
P1003 J1003 (P) (S)
W1003
W1008
TO J203 (SEE SHEET 1)
FROM J700 (SHEET 3)
YY
XX
TO 3Ø HV TRANSFORMER T800
FROM J701 (SHEET 3)
+600V
+1200V
P1001 (S)
FROM (SHEET 3)
P1000, P
J1000 (S)
P3 (P)
TO S1000
P1000(S) h
J1010

CK1600A