UNCLASSIFIED

TECHNICAL MANUAL

for

POWER SUPPLY MODEL HFP-1

(PP-3341/FRR-60V)

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

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IN-3001G

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NOTICE

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

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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Figure 1-1. Power Supply, Model HFP-1

SECTION 1
GENERAL DESCRIPTION

1-1. FUNCTIONAL DESCRIPTION

Power Supply, Model HFP-1 (figure 1-1) is a dual, regulated power supply that provides regulated B+, regulated bias, and filament voltages. In addition, primary a-c voltage is extended through the unit and made available at the rear panel for use with other equipment such as low-power consumption supplies in associated system units; this type of primary power take-off allows deactivation of the HFP and associated units with one main control switch (i. e. the MAIN POWER switch on the rear panel). The HFP has universal application; it is used in sideband exciter systems, 4-channel AGC receiving systems, and in many of the DDR series of receivers.

1-2. PHYSICAL DESCRIPTION

The HFP weighs 67 lbs. and is designed for mounting on non-tilt slides in a 19-inch wide rack. It requires 5-1/4 inches of height and 18 inches of depth in the rack. Indicating lights and indicator type fuses are located on the front panel; additional indicator type fuses are located on the top side of the equipment. All input and output connectors and the MAIN POWER switch are located on the rear of the chassis.

1-3. MILITARY NOMENCLATURE

Commercial and military nomenclature for the HFP is as follows:

Commercial	Military
Power Supply, Model HFP-1	Power Supply, 115/230V 1 Ø 50/60~ PP-3341/FRR-60(V)

1-4. REFERENCE DATA

The crated dimensions of the HFP are 31-1/4 by 22-3/4 by 10-3/4 inches. It weighs 128 pounds gross, crated for shipment. Tables 1-1 and 1-2 contain additional reference data.

TABLE 1-1. ELECTRICAL CHARACTERISTICS, HFP

	CHARACTERISTICS
Output voltages:	Four 6.3 vac sources at 1.5 amp each Two 6.3 vac sources at 5.5 amp each Two 6.8 vac sources at 17 amp each Two +200 vdc sources, regulated, at .75 amp each (±1% from no load to full load and 10% line voltage variation) -105 vdc, 20 ma maximum, ripple not to exceed 5 millivolts 115/230 vac extension
Input power requirements:	115/230 volts, 48 to 62 cps, 1 phase 15 amps at 115 vac 8 amps at 230 vac
Fusing:	All voltage outputs (except 6.3 vac outputs) are separately fused using indicator type holders. Both sides of a-c line are fused.
Connectors:	Six TMC No. JJ-200 quick-disconnect multi-conductor jacks (outputs) Three TMC No. JJ-235 female, three-prong, twist-lock, a-c outlets (outputs) One TMC No. JJ-175 male two-prong, twist-lock, a-c plug (input)

TABLE 1-2. VACUUM TUBE AND DIODE COMPLEMENT

REFERENCE DESIGNATION SYMBOL	TYPE	FUNCTION
V8001	6336A	Series Regulator
V8002	6AH6	D-C Amplifier
V8003	6336A	Series Regulator
V8004	6AH6	D-C Amplifier
CR8001	1N547	P/o Full Wave Rectifier
CR8002	1N547	P/o Full Wave Rectifier
CR8003	1N547	P/o Full Wave Rectifier
CR8004	1N547	P/o Full Wave Rectifier

SECTION 2

INSTALLATION

2-1. INITIAL INSPECTION

Each HFP has been calibrated and tested at the factory before shipment. When it arrives at the operating site, inspect the packing case and its contents for possible damage. Unpack the equipment carefully. Inspect all packing material for parts which may have been shipped as "loose items". With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. 115- VS. 230-VOLT LINE SUPPLY

Although the HFP is designed for 115- or 230-volt, 50- or 60-cps single phase power, it is factory wired for 115 volts. If 230-volt operation is required, minor wiring changes should be made at T8001, T8002, T8003, T8004, T8005, and T8006 transformer primaries. Figure 2-1 shows a typical transformer primary and the wiring arrangements for 115- and 230-line voltages. For 230-volt operation, replace fuses F8001 through F8005 located on the top side of the chassis (see figure 3-1) with fuses with half the amp ratings of those for 115 volt operation.

2-3. INSTALLATION

Install the HFP in a 19-inch wide rack or other housing as desired. The unit mounts on a set of non-tilt slides that are supplied with the equipment. Mating plugs and cables for the connectors located on the rear of the unit are included in the rack shipment and directions for installing these are included in the technical manual describing the system. Figure 2-2 shows the dimensional outline of the HFP and includes mounting dimensions. Figure 2-3 is a rear view of the HFP showing locations of connectors.

3001G-2

Figure 2-1. 115 VS. 230 Line Voltage Transformer Wiring

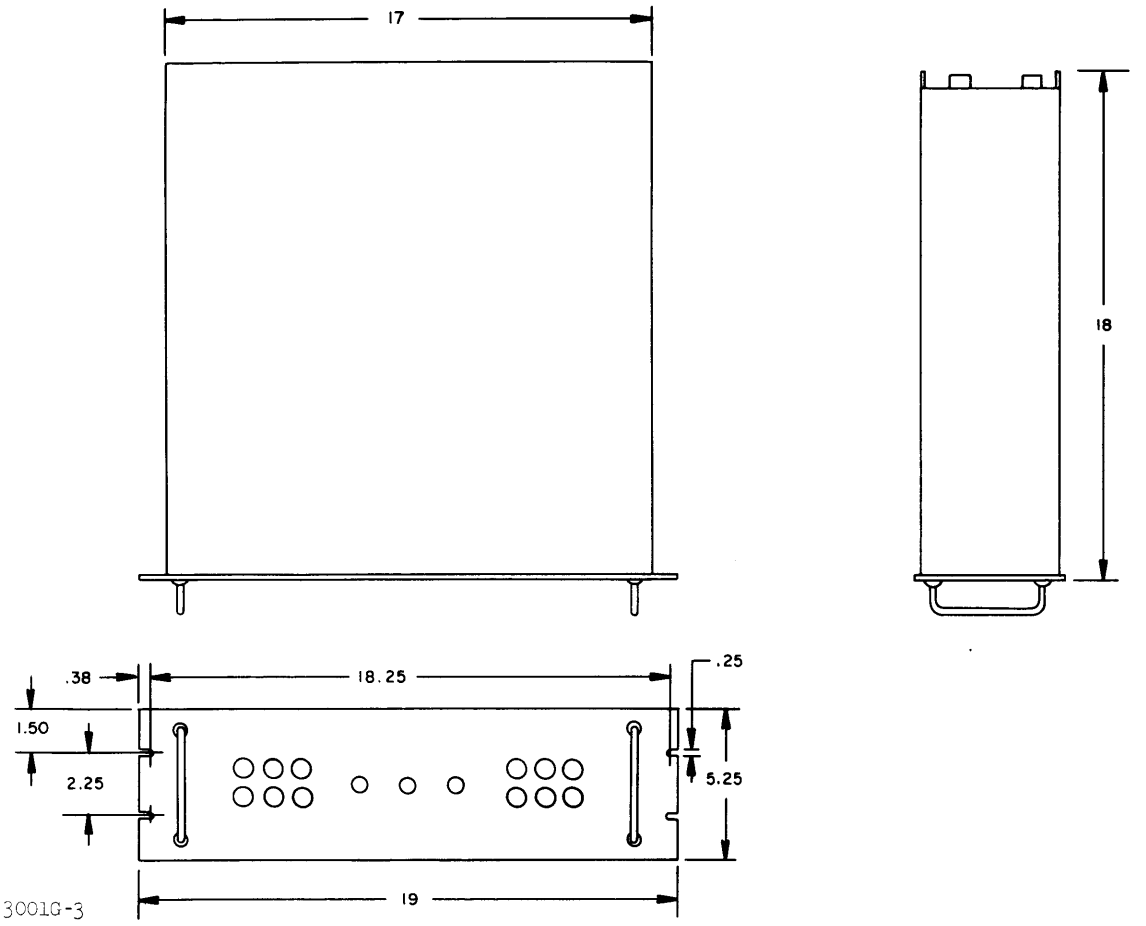


Figure 2-2. Outline Dimensional Drawing, HFP Power Supply

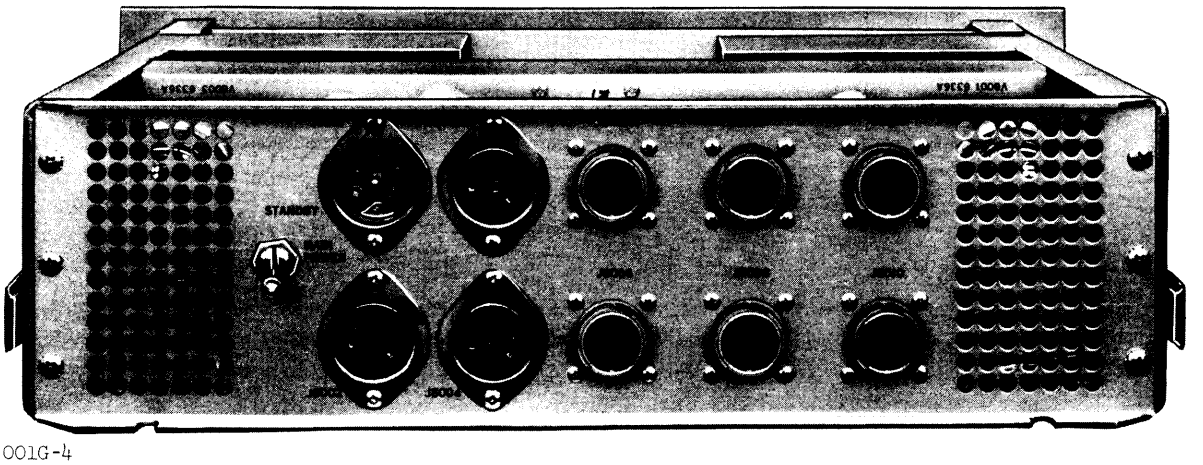


Figure 2-3. Power Supply, Model HFP, Rear View

SECTION 3

OPERATOR'S SECTION

3-1. OPERATION OF UNIT

a. CONTROL FUNCTIONS. The front panel of the HFP, visible to the operator, contains no controls for the unit. On the panel are indicator lights and indicator type fuses. Additional indicator type fuses are located on the top side of the chassis directly behind the front panel. The MAIN POWER switch is located on the rear of the unit (see figure 2-3). Figure 3-1 shows the front panel and the top chassis fuse panel with indicator lights and indicator type fuses. Table 3-1 and 3-2 provide information concerning the location and function for all indicator lamps and fuses, and for the MAIN POWER switch.

TABLE 3-1. CONTROL AND INDICATOR FUNCTIONS, HFP

ITEM NO. (Figure 3-1)	PANEL DESIGNATION	FUNCTION
15	STANDBY lamp	Indicates HFP is in standby condition (i. e. HFP is sending power to oscillator ovens and frequency standard in system units).
16	TIME DELAY lamp	Indicates HFP is going through time delay stage between standby and operate conditions.
17	OPERATE lamp	Indicates HFP is in operate condition (sending power to all units of the system).
	MAIN POWER switch on rear of unit	STANDBY position sends power to frequency standard and oscillator ovens; OFF position disconnects main line voltage input to HFP.

TABLE 3-2. FUSE LOCATIONS AND FUNCTIONS, HFP

ITEM NO. (Figure 3-1)	PANEL DESIGNATION	CIRCUIT PROTECTED	SYMBOL (Figure 8-1)
1	F8003 4A/115V 2A/230V	Line voltage supply to J8009 and J8010; 6.3 vac supply to J8005 and time delay circuit in HFP.	F8003
2	F8004 4A/115V 2A/230V	Line voltage supply to J8009 and J8010; 6.3 vac supply to J8005; time delay and filament circuits in HFP.	F8004
3	F8007 .750 A	Input to section "A" B+ regulator in HFP.	F8007
4	F8005 2A/115V 1A/230V	Line voltage supply to J8004.	F8005
5	F8008 .750 A	Input to section "B" B+ regulator in HFP.	F8008

TABLE 3-2. FUSE LOCATIONS AND FUNCTIONS, HFP (CONT)

ITEM NO. (Figure 3-1)	PANEL DESIGNATION	CIRCUIT PROTECTED	SYMBOL (Figure 8-1)
6	F8006 1/10 A	Input to bias supply in HFP.	F8006
7	F8001 15A/115V 8A/230V	Main line voltage input and line voltage output to J8002.	F8001
8	F8002 15A/115V 8A/230V		F8002
9	B+ LINE .375 A	Section "A" B+ output to J8005.	F8019
10	B+ LINE .375 A	Section "A" B+ output to J8007.	F8012
11	B- LINE .125 A	Section "B" B- output to J8006.	F8010
12	FIL LINE 4 A	6.8 vac output to J8006.	F8009
13	FIL LINE 5 A	6.8 vac output to J8009.	F8015
14	FIL LINE 15 A	6.8 vac output to J8007.	F8011
18	B+ LINE .250 A	Section "B" B+ output to J8005 and J8008.	F8016
19	B- LINE .125 A	Section "B" B- output to J8008.	F8014
20	B- LINE .250 A	Section "B" B- output to J8010.	F8018
21	FIL LINE 10 A	6.8 vac output to J8005.	F8020
22	FIL LINE 10 A	6.8 vac output to J8008.	F8013
23	FIL LINE	6.8 vac output to J8010.	F8017

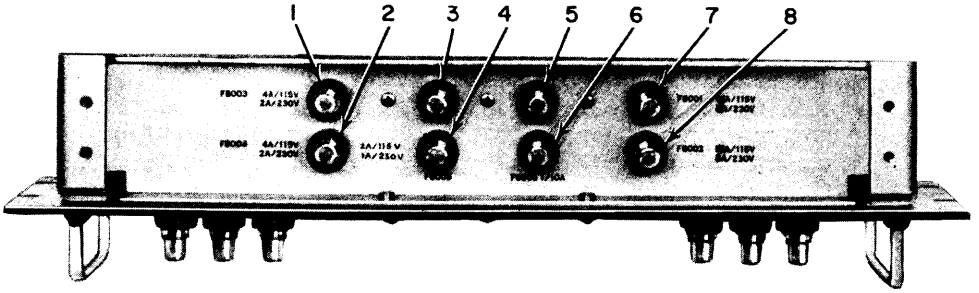
b. TURN-ON PROCEDURE.

(1) Set MAIN POWER switch at STANDBY. Refer to the applicable system manual for required warm-up period for frequency standard and oscillator ovens, before proceeding to next step.

(2) Set system STANDBY-ON switch at ON. STANDBY lamp will go out; TIME DELAY lamp will light. After approximately one minute, TIME DELAY lamp will go out, and OPERATE lamp will light.

NOTE

System STANDBY-ON switch activates relays in the HFP which automatically bring HFP through TIME DELAY stage to OPERATE condition. TIME DELAY step is necessary to allow series regulator and d-c amplifier tubes in B- circuits to obtain a sufficient cathode warm-up before plate voltage is applied.



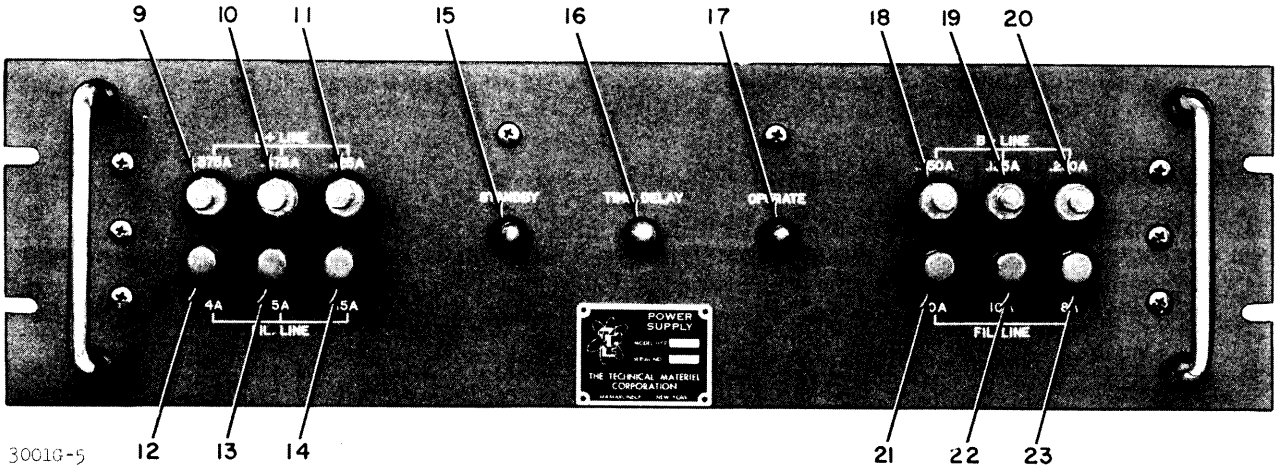


Figure 3-1. Indicator Light and Fuse Locations, HFP

SECTION 4

PRINCIPLES OF OPERATION

4-1. INTRODUCTION

The overall schematic wiring for the HFP is shown in figure 8-1. As shown in figure 4-1, block diagram, primary line voltage is converted into 6.3 vac, regulated -105 vdc, and regulated +200 vdc for use in associated system equipments. In addition, line voltage is routed to jacks J8002, J8003, J8004, J8009, and J8010. In the +200 vdc supplies, the series regulator, comparator, and d-c amplifier work as a closed loop to maintain the B+ outputs to within ±1%. This voltage regulation is maintained against line variations between 105 and 125 volts at full load and load current variations from zero to full. In the -105 vdc bias supply branch, the output of T8005 is sent through a full wave rectifier, an LC filter, and a Zener diode shunt regulator. The -105 vdc output from the regulator contains a maximum ripple of 5 millivolts under conditions of constant line voltage and constant load. The output is maintained to within a 1 volt variance through line voltages of 105 to 125 vac and load currents of 0 to 20 milliamperes. The regulated -105 vdc is also sent to the voltage reference diode (CR8012) to supply it with a voltage reference for an adjustment of the +200 vdc circuit (see par. 4-4).

4-2. SEQUENCE OF OPERATION (Figure 4-2)

a. STANDBY CONDITION. With line voltage applied to J8001, setting the MAIN POWER switch at STANDBY will place the HFP in a standby condition. In this condition, a-c line voltage is applied to utility outlet J8002, terminals A and B of jacks J8009 and J8010, and to the primary of transformer T8001. The secondary of T8001 supplies 6.3 vac to pins C and D of J8005 and to STANDBY lamp DS8001. The 6.3 vac at J8005 and the line voltage at J8009 and J8010 are used to maintain oscillator-oven temperature and similar applications in associated system units. Therefore, no long warm-up is required if the system is kept in a standby condition in this manner.

b. TIME DELAY STEP. The TIME DELAY step is necessary to allow the series regulator and d-c amplifier tubes a sufficient cathode warm-up period. The nominal duration of the TIME DELAY step (before the unit will automatically switch to OPERATE condition) is one minute. When the operator wishes to place the system in OPERATE condition from STANDBY condition, he sets the STANDBY-ON switch, located on an associated system unit, at ON. This action shorts pins U and P of J8005 (pin C of J8005 is returned to ground in the system equipment), completing the 6.3 vac circuit to the coil of relay K8001. The energized K8001 turns off STANDBY lamp DS8001 and lights TIME DELAY lamp DS8002 through contacts of relay K8002. The 6.3 vac is also applied to the heater of time delay relay K8003. Line voltage is connected to filament transformers T8003 and T8004 through the contacts of energized relay K8001. The secondaries of T8003 and T8004 supply filament voltage to series regulator and d-c amplifier tubes V8001, V8002, V8003, and V8004. These tubes are thus given a pre-heating period.

c. OPERATE CONDITION. After a nominal period of one minute, time delay relay K8003 will close and complete the operate path for relay K8002. The energized relay K8002 turns off TIME DELAY lamp DS8002. Heater voltage is maintained on K8003 to insure instantaneous re-cycling if a momentary loss of line voltage is encountered. A loss of line voltage in excess of approximately 30 seconds will cause K8003 to open and thus insure a time delay on re-cycle. Primary line voltage is applied to transformers T8002, T8005, and T8006 through the contacts of energized relay K8002.

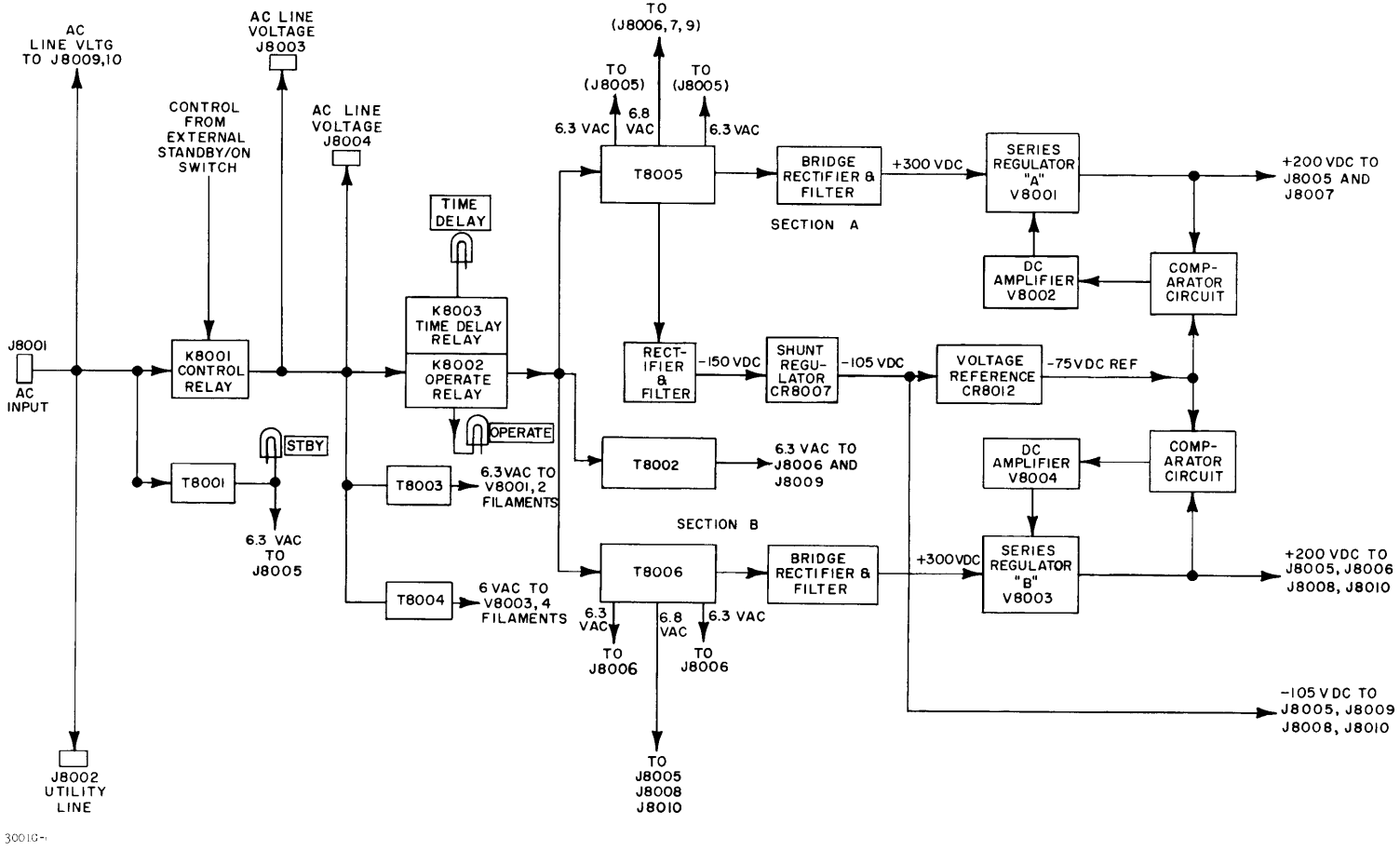


Figure 4-1. Functional Block Diagram, HFP

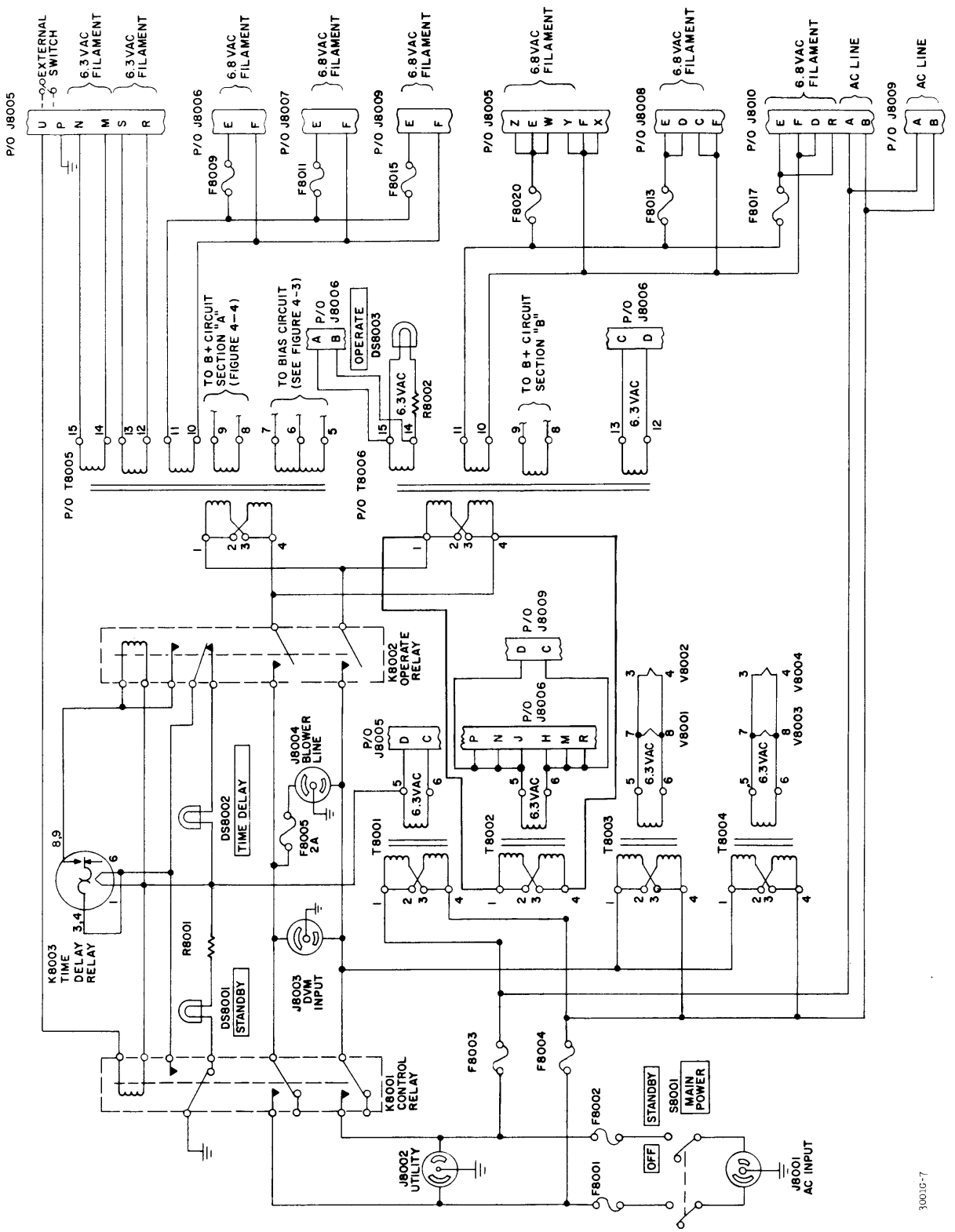


Figure 4-2. Simplified Schematic, Sequential Relay Section, HFP

4-3. BIAS SUPPLY CIRCUIT (Figure 4-3)

The bias supply circuit consists of a full-wave rectifier, an LC filter, and a Zener diode-controlled, shunt regulator. It has a -105 VDC regulated output. The negative output voltage of the filter appears across capacitor C8003 and is approximately -150 volts. The shunt regulator consists of Zener diode CR8007 and resistor R8008. Input voltage and load current variations are absorbed by the Zener diode, which has a nominal breakdown voltage of -105 volts. The diode regulator maintains this voltage by adjusting its Zener current to vary the IR drop across R8008. As a result of this characteristic, diode dissipation will be maximum at minimum load (about 7 watts).

4-4. B+ SUPPLY CIRCUIT (Figure 4-4)

The B+ supply is comprised of two separate sections "A" and "B", each containing a full-wave bridge rectifier, a filter capacitor, and a voltage regulator. Both sections are operationally identical and, although the following description refers to the "A" section of the supply, symbols can easily be exchanged for reference to the "B" section.

The d-c output voltage from the filter appears across capacitor C8001 and is a nominal +300 volts at full load. This voltage will exceed 400 volts under no-load conditions. The regulator section is comprised of four sub-sections: a series regulator or passing tube (V8001), a d-c amplifier tube (V8002), a voltage reference, CR8012 (Zener shunt regulator); and a comparator network of R8013, R8014 and R8015. The voltage between TP8001 and ground is B+ and is the difference between the voltage across C8001 and the voltage drop across V8001. V8001 acts as a variable resistor, controlled by its grid potential. The plate of V8002 is directly coupled to the grids of V8001 through parasitic suppressors R8006 and R8007. It can be seen that a change in V8002 plate voltage will change the resistance of V8001. The comparator network of R8013, R8014 and R8015 is connected between TP8001 and CR8012. The arm of potentiometer R8014 is direct coupled through parasitic suppressor R8028 to the control grid of V8002. The difference between the voltage at the arm of R8014 and the cathode of V8002 is the bias voltage for V8002 and hence will determine the quiescent point of the tube. The plate voltage at this point will determine the grid voltage of V8001 and hence the output voltage at TP8001. The output voltage at TP8001 can be adjusted by changing the position of the arm of R8014; R8014 is adjusted for +200 VDC. If the voltage across CR8012 is a constant, then any change in output voltage at TP8001 will produce a change of grid bias on V8002 and a resultant change in the resistance of V8001. The change in this resistance and the resultant IR drop across V8001 will compensate for the original change at TP8001 and maintain the output voltage at TP8001 a constant. The circuit operates as a closed loop system for line voltage variations with constant load current and for load current variations with constant line voltage.

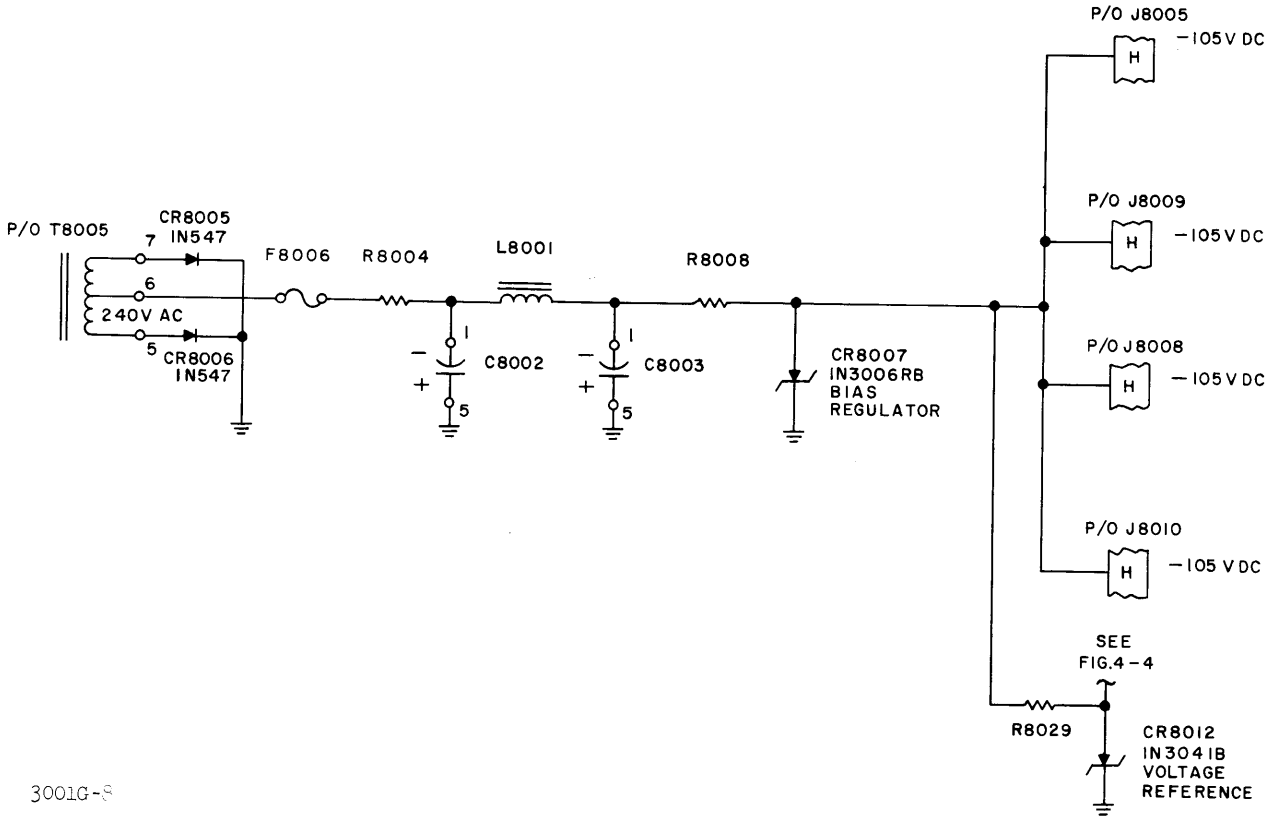


Figure 4-3. Simplified Schematic, Bias Supply, HFP

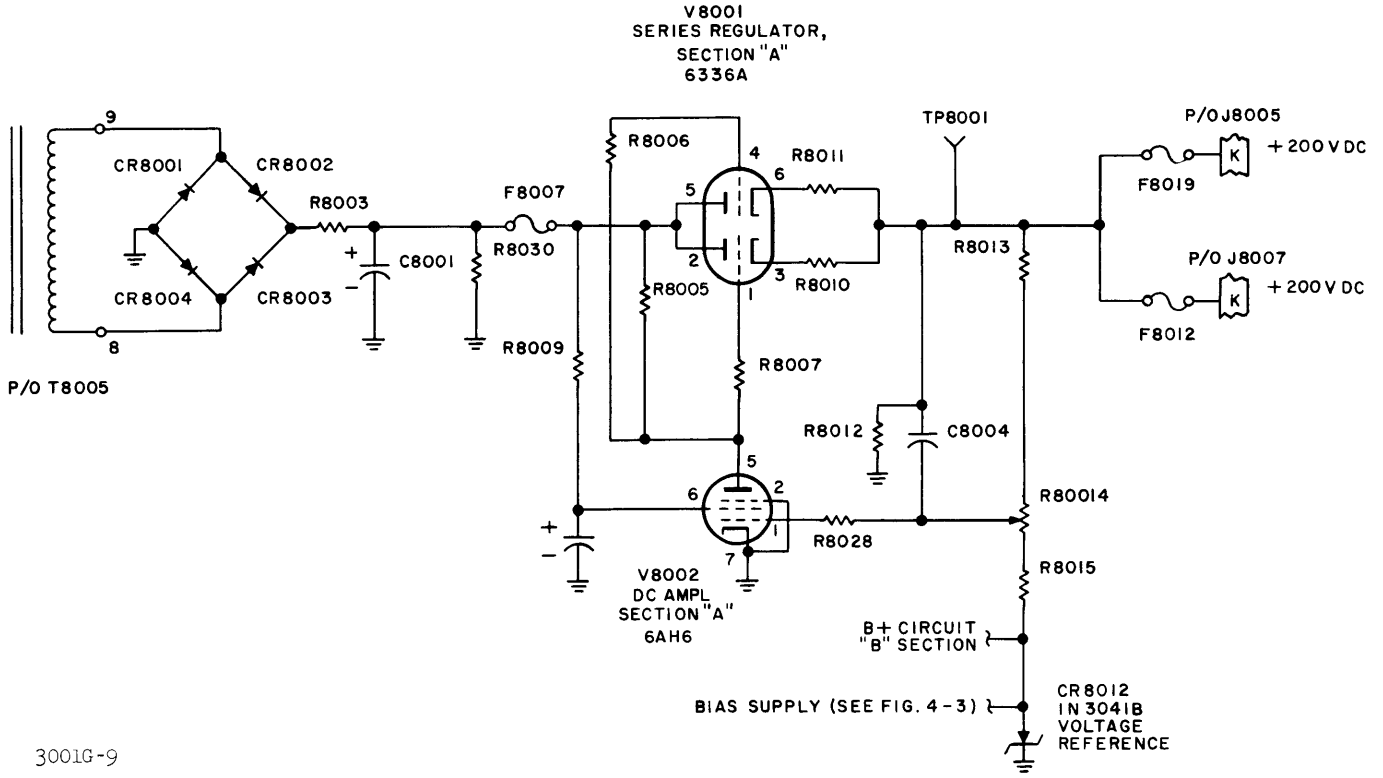


Figure 4-4. Simplified Schematic, B+ Supply Circuit

4-5. INTERCONNECTING WIRING

As shown in figure 8-1, interconnections between various units of the system are accomplished through the HFP. The specific interconnect functions are dependent upon the particular system in which the HFP is used. Refer to the applicable system technical manual for further description of these interconnections.

SECTION 5

TROUBLESHOOTING

5-1. GENERAL

Troubleshooting is the art of locating and diagnosing equipment troubles and maladjustments; the information necessary to remedy the equipment troubles and maladjustments is reserved for section 6 of the manual under the heading "Maintenance".

5-2. TROUBLESHOOTING SHORT-CUTS

When a piece of equipment has been working satisfactorily and suddenly fails, the cause of failure may be apparent either because of circumstances occurring at the time of failure or because of symptoms analogous to past failures. In these cases, it is unnecessary to follow a lengthy and orderly course of troubleshooting in order to localize and isolate the faulty part.

A second short-cut in troubleshooting is to ascertain that all tubes and fuses are in proper working order; also that the equipment receives proper supply voltages. Many times this eliminates further investigation.

A third short-cut is to examine the equipment section by section for burned out elements, charring, corrosion, arcing, excessive heat, dirt, dampness, etc.

It is important to recognize that defective elements may have become defective due to their own weaknesses or to some contributing cause beyond their control.

5-3. POWER SUPPLY, HFP

a. GENERAL. Figures 5-1 and 5-2 are top and bottom views, respectively, of the HFP showing locations of major components. All test points are located on the top side of the equipment, most of them at terminal boards TB8001 and TB8002, since tube socket terminals are not easily accessible. Figures 5-3, 5-4 and 5-5 are enlargements of the test point areas showing location of points.

WARNING

High voltages (up to 400 volts) are present on some of the exposed terminals in this area. Use care in taking measurements.

VOLTAGE ADJ. A and VOLTAGE ADJ. B potentiometer (see figure 5-4) are set at the factory for a B+ output of a regulated +200 VDC at 25°C ambient temperature and should not be readjusted unless component replacement makes it necessary. Adjustment of VOLTAGE ADJ. A and B potentiometers, are described in Section 6 (Maintenance). It should be noted that removing the HFP unit from the rack results in a loss of forced-air cooling and a consequent rising of the B+ value over +200 VDC.

b. VOLTAGE MEASUREMENTS. Tables 5-1, 5-2, 5-3, and 5-4, associated with figures 5-3, 5-4 and 5-5, contain normal voltages to be expected during proper operation at no-load and full-load conditions with the line voltage at 115 volts. Tables 5-1 and 5-4 also contain nominal d-c resistances to ground with line voltage input disconnected. All d-c voltages are measured to chassis ground with a 20,000-ohms-per-volt voltmeter. All a-c voltages (ripple voltages) are measured with a Daven model 170 VTVM or equivalent. The load is the equipment normally connected at HFP outputs and with the associated system tuned and in operation. Any large deviation from the values given in the tables will indicate the general area of trouble. Test points appear on figure 8-1 schematic wiring diagram. Figures 5-6, 5-7, 5-8 and 5-9, referenced in table 5-2, are curves showing variations of test point voltage values to be expected in a normal unit due to other fluctuating values (i.e.: line voltage, load current, etc.).

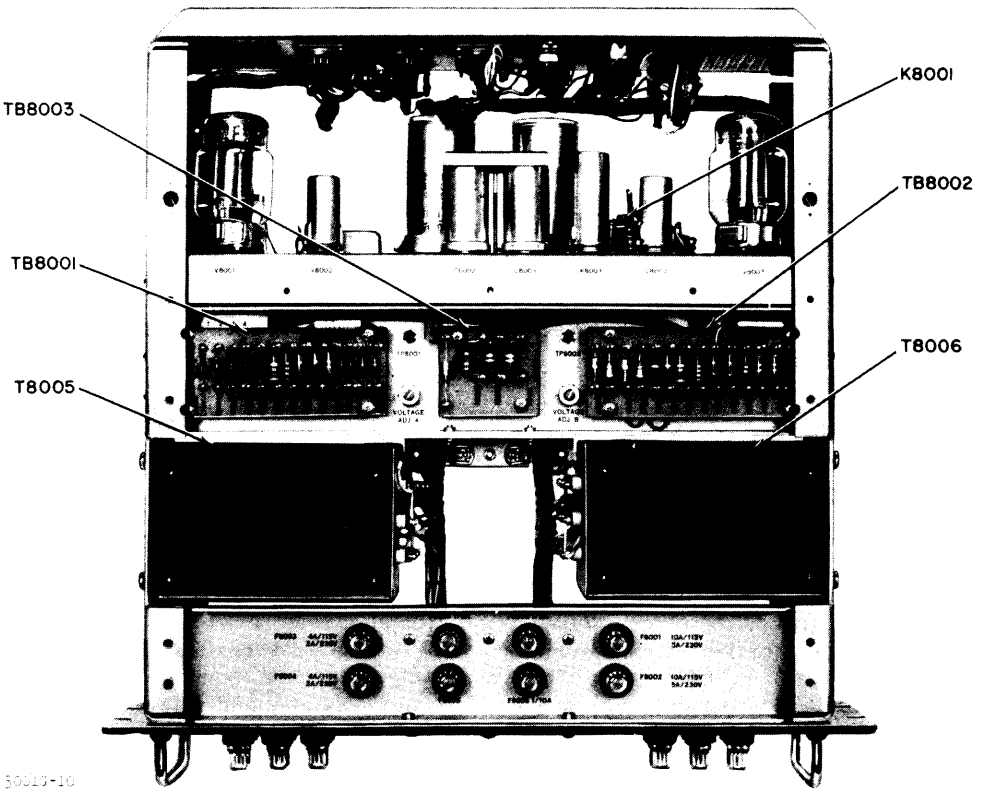


Figure 5-1. Location Diagram of Major Electronic Equipment Components, Top View, HFP

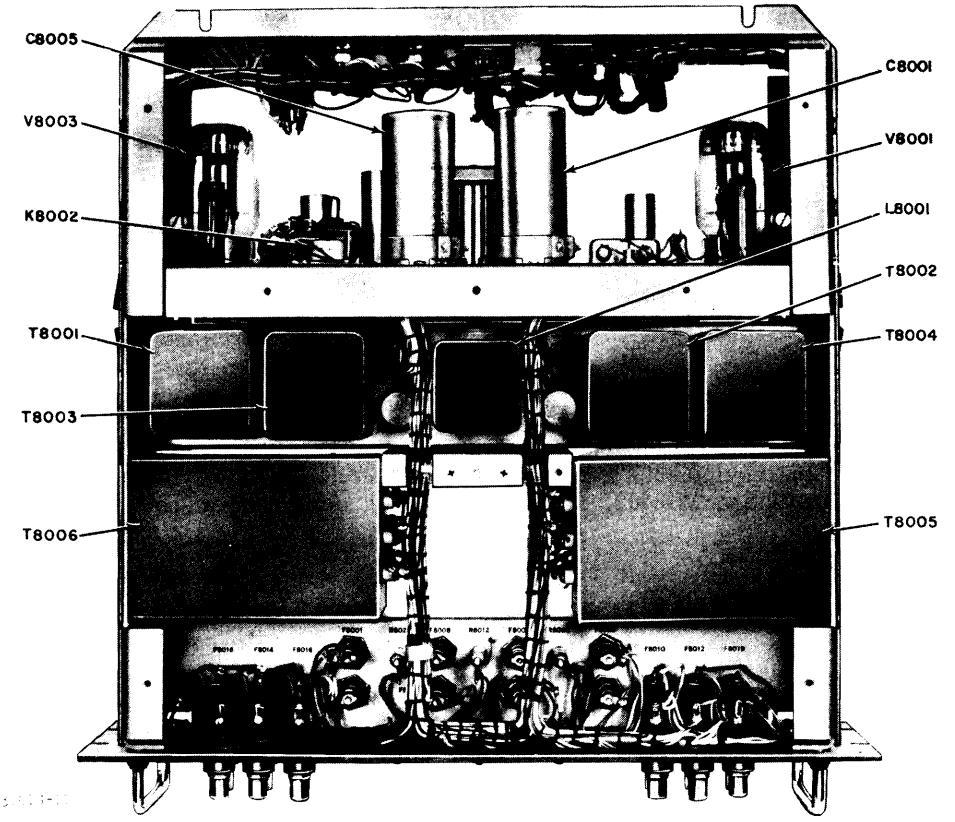


Figure 5-2. Location Diagram of Major Electronic Equipment Components, Bottom View, HFP

TABLE 5-1. DC VOLTAGE MEASUREMENTS FOR TB8001

TEST POINT NUMBER (Fig. 5-3)	NOMINAL DC VOLTAGE			NOMINAL DC RESISTANCE*
	NO LOAD	FULL LOAD	REPRESENTS	
1	+380	+290	D-c input to B+ regulator "A"	15K 150K
2	+200	+205		10K 10K
3	+200	+205		10K 10K
4	+130	+195		100K 200K
5	+130	+195		200K 100K
6	-5.4	-5.7	Bias on V8002	50K 30K
7	+130	+195		100K 200K
8	+320	+270		100K 180K

*Due to the presence of semiconductor components in some instances, two difference resistances may be read, depending on the polarity of the ohmmeter. It is suggested that both resistances be checked in these cases.

TABLE 5-2. DC VOLTAGE MEASUREMENTS FOR TB8003, TP8001 AND TP8002

TEST POINT NUMBER (Fig. 5-4)	NOMINAL D.C. VOLTAGE	
	VOLTAGE	REPRESENTS
9	+200 (See figures 5-6 and 5-7)	Regulator "A" output voltage.
10	-75	Voltage reference for B+ regulator section.
11	See figure 5-9	Voltage across C8001.
12	See figure 5-9	Voltage across C8005.
13	+200 (See figures 5-6 and 5-7)	Regulator "B" output voltage.
14	-105 (See figure 5-8)	Output voltage of negative bias supply.

TABLE 5-3. AC VOLTAGE MEASUREMENTS FOR TB 8003, TP8001 AND TP8002

TEST POINT NUMBER (Fig. 5-4)	AC VOLTAGE	REPRESENTS
9	100 mv, RMS, maximum	Ripple output of B+ regulator "A".
13	100 mv, RMS, maximum	Ripple output of B+ regulator "B".
14	5 mv, RMS, maximum	Ripple output of bias supply.

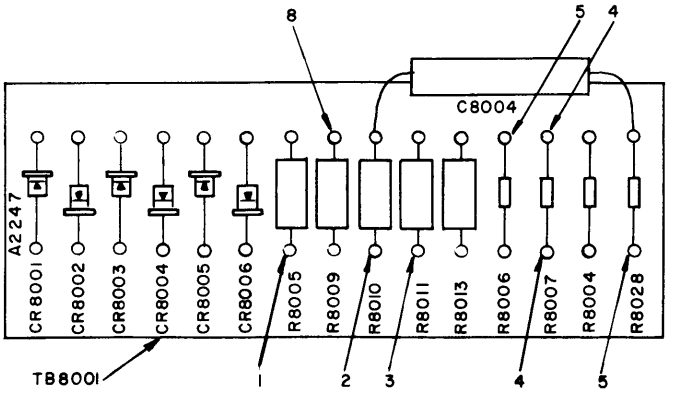


Figure 5-3. Test Point Locations, 1 through 8

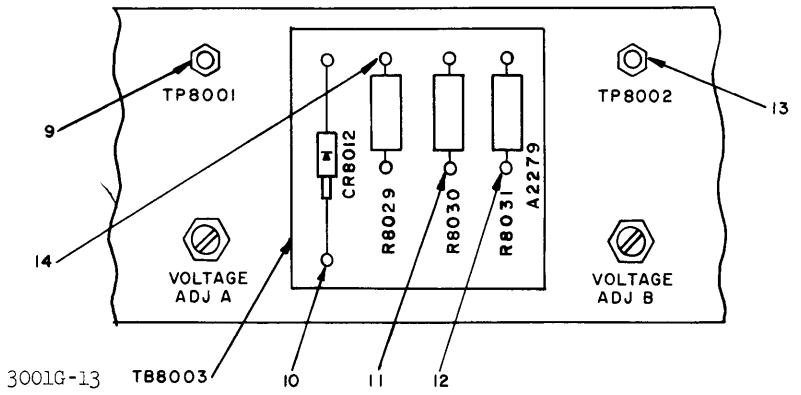


Figure 5-4. Test Point Locations, 9 through 14

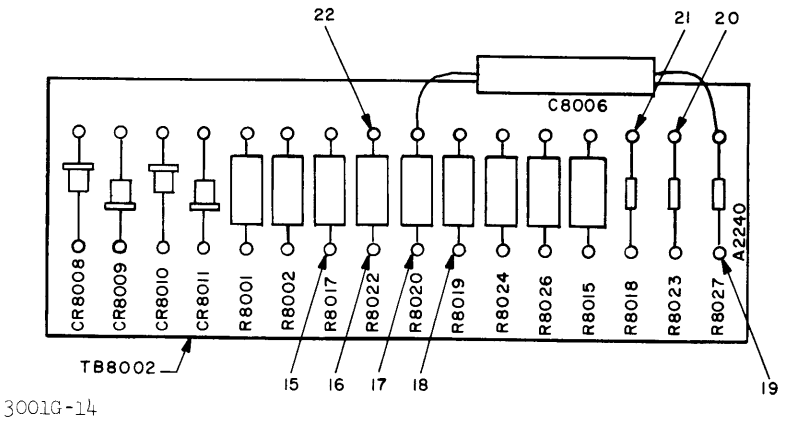


Figure 5-5. Test Point Locations, 15 through 22

TABLE 5-4. DC VOLTAGE AND RESISTANCE MEASUREMENTS, TB8002

TEST POINT NUMBER (Fig. 5-5)	NOMINAL DC VOLTAGE			NOMINAL DC RESISTANCE*
	NO LOAD	FULL LOAD	REPRESENTS	
15	+130	+195		100K 200K
16	+320	+270		100K 180K
17	+200	+205		10K 10K
18	+200	+205		10K 10K
19	-5.4	-5.7	Bias on V8004	50K 30K
20	+130	+195		100K 200K
21	+130	+195		200K 100K
22	+380	+290	D-c input to B+ regulator "B"	15K 150K

*Due to the presence of semiconductor components in some instances, two difference resistances may be read, depending on the polarity of the ohmmeter. It is suggested that both resistances be checked, in these cases.

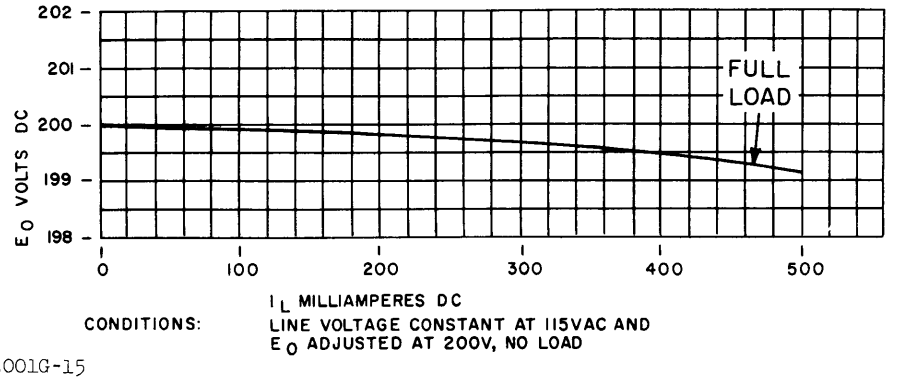


Figure 5-6. B+ Output Voltage (Eo) Vs. Load Current with Constant Line Voltage

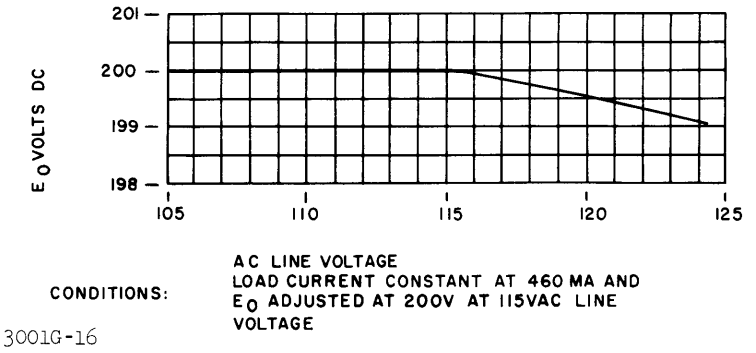


Figure 5-7. B+ Output Voltage (Eo) Vs. Line Voltage with Constant Load

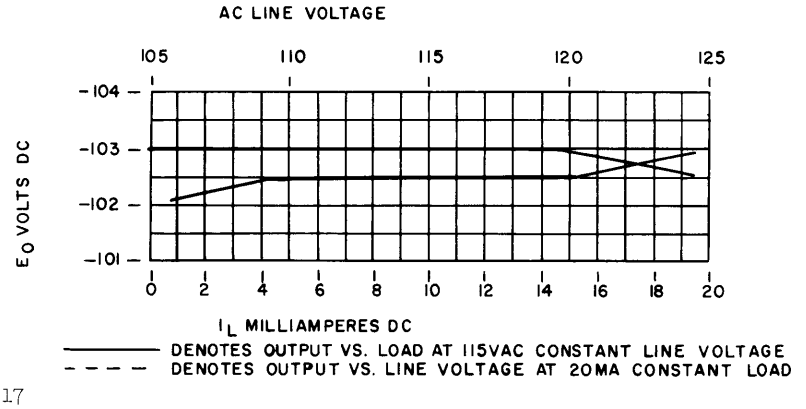
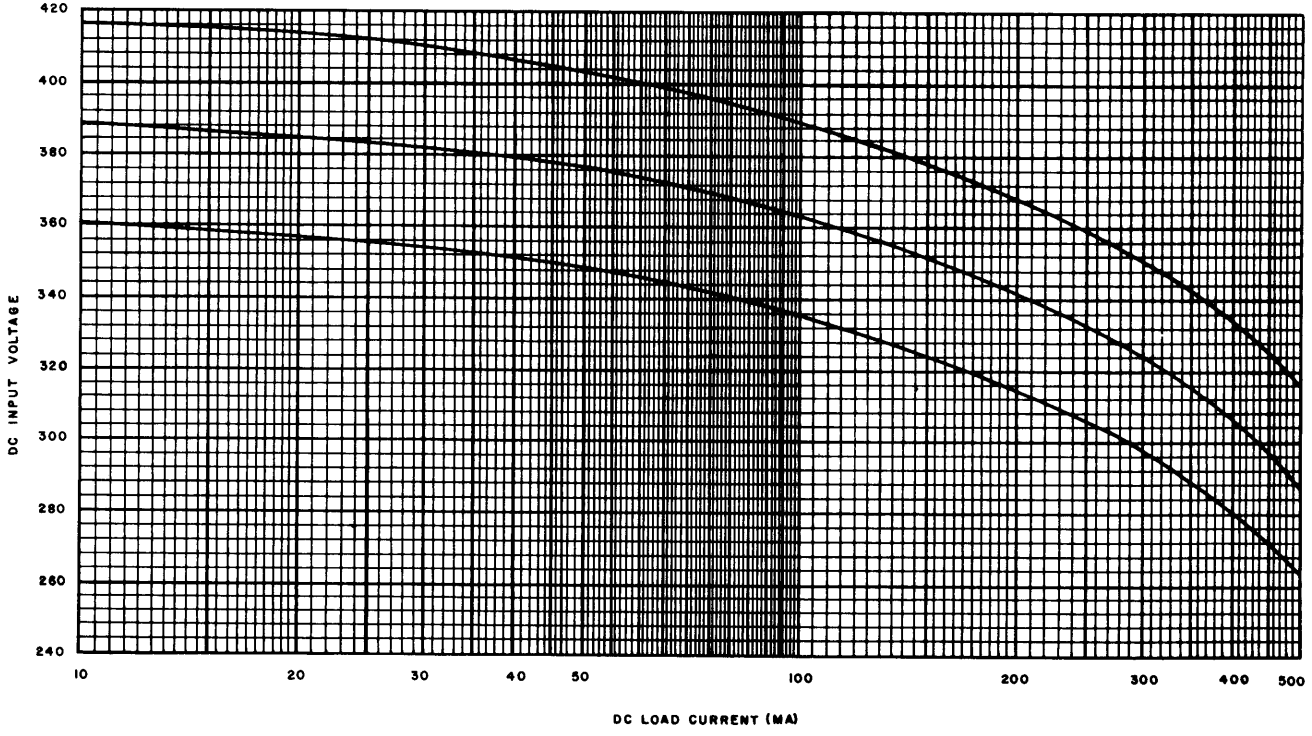


Figure 5-8. Bias Output (Eo) Vs. Line Voltage and Load Current



NOTES:
1. DC INPUT VOLTAGE MEASURED FROM (+) TERMINAL OF C8001 AND C8005 FOR REGULATOR "A" AND REGULATOR "B" RESPECTIVELY.
2. LOAD CURRENT IS THE TOTAL CURRENT THROUGH THE SERIES REGULATOR TUBE V8003.
3. AMBIENT TEMPERATURE IS 25°C.

3001G-18

Figure 5-9. DC Input to Regulator "A" or "B" VS. Load Current

SECTION 6

MAINTENANCE

6-1. GENERAL

Maintenance may be divided into three categories: operator's maintenance, preventive maintenance and corrective maintenance. Operator's maintenance for this unit is described in Section 3. Preventive maintenance is included in Section 6. Corrective maintenance is sometimes considered as consisting of information useful in locating and diagnosing equipment troubles and maladjustments, existing and/or pending, and information necessary to remedy the equipment troubles and maladjustments. For reasons stated in Section 5, the remedial type of information is presented under corrective maintenance (Section 6) while the diagnosis of trouble is presented under troubleshooting (Section 5).

The HFP has been designed to provide long-term trouble-free operation under continuous duty conditions. It is recommended that any necessary maintenance be done by a competent maintenance technician familiar with radio techniques. Otherwise, advantage may be taken of the required specialized test equipment and personnel trained in its use in the test department of Technical Materiel Corporation. If trouble develops which cannot be corrected by the procedures outlined in the following paragraphs, it is recommended that the instrument be returned to Technical Materiel Corporation for servicing. To expedite the return of the serviced equipment to you, it is recommended that the equipment be shipped to us by Air Freight and that we be authorized to return it the same way.

6-2. PREVENTIVE MAINTENANCE

a. GENERAL. In order to prevent failure of the equipment due to corrosion, tube failure, dust, or other destructive elements, it is suggested that a schedule of preventive maintenance be set up and adhered to.

b. AT PERIODIC INTERVALS. At periods of at least every six months, the equipment should be removed from the rack for cleaning and inspection. All accessible covers should be removed and the wiring and all components inspected for dirt, corrosion, charring, discoloring or grease; in particular, the tube sockets should be carefully inspected for deterioration. Dust may be removed with a soft brush or a vacuum cleaner, if one is available. Remove dirt or grease from electrical parts with trichloroethylene or ethylenedichloride. Remove dirt or grease from other parts with any good dry cleaning fluid.

WARNING

When using trichlorethylene or carbon tetrachloride, make sure that adequate ventilation exists. These are toxic substances. Avoid prolonged contact with skin.

c. TUBE CHECK. While unit is out of the rack and with covers removed, it is advisable to check the tubes.

d. LOOSE PARTS. Carefully inspect for loose solder connections or screws, especially those on solder lugs. Recommended time interval is every 6 to 12 months, depending on the amount of vibration encountered in service.

6-3. CORRECTIVE MAINTENANCE

a. GENERAL. Replacement of components and re-adjustments to chassis-mounted variable components are included under the category of corrective maintenance. Replacement of components, as described here, is confined to special considerations to be taken when replacing particular components.

b. REPLACEMENT OF COMPONENTS. Replacement of any of the components in the B+ supply circuits requires a re-adjustment of either VOLTAGE ADJ. A or VOLTAGE ADJ. B potentiometer, as applies. Such re-adjustment is described in paragraph 6-3c. When replacing CR8012 (1N3041B) diode, a long-nosed pliers or similar tool must be used to hold the lead wire being soldered in order to transfer heat away from the diode junction.

c. READJUSTMENT OF VOLTAGE ADJ. A AND B.

(1) With unit mounted in rack and connected to the system, pull unit out on slides.

(2) Set MAIN POWER switch on the rear of the HFP chassis at STANDBY.

(3) Set POWER switch in external equipment at ON (see paragraph 4-2b).

(4) After OPERATE indicator (on HFP) lights, place a d-c voltmeter between TP8001 (or TP8002) and ground and observe the d-c voltage. Adjust R8014 VOLTAGE ADJ. A potentiometer (or R8025 VOLTAGE ADJ. B potentiometer) with screwdriver from top of chassis to obtain +197 volts.

NOTE

Voltage is adjusted for 197 volts instead of 200 volts to allow for voltage creep experienced when unit warms up under normal load.

(5) Push HFP back into rack. Allow about 30 minutes for HFP to reach normal operating temperatures (with rack blower on). Then pull HFP out of rack and readjust VOLTAGE ADJ A and B potentiometers to +200 volts.

SECTION 7

PARTS LIST

7-1. INTRODUCTION

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

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

a. Generic name.
b. Reference designation.
c. TMC part number.
d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

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

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

PARTS LIST

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
C8001	CAPACITOR, FIXED, electrolytic; 250 uf; surge 525; 450 wvdc, polarized, tubular case, bracket mtg.	Filter	CE-112-1
C8002	CAPACITOR, FIXED: electrolytic; 45 uf; 450 wvdc; polarized, tubular case, octal plug-in type.	Filter	CE51C450P
C8003	Same as C8002.	Filter	
C8004	CAPACITOR, FIXED: mylar dielectric; 0.1 uf ±10%; 400 wvdc.	Bypass	CN-105E104K
C8005	Same as C8001.	Filter	
C8006	Same as C8004.	Bypass	
C8007	CAPACITOR, FIXED: paper dielectric; dual section; 0.1 uf ±15% each section; 600 wvdc; hermetically sealed bathtub metal case.	Bypass	CP53B6EF104K 1YY
CR8001	SEMICONDUCTOR DEVICE, DIODE: silicon, 600V max peak inverse volts; 0.75 max d-c forward amperes at 150°C.	Rectifier	1N547
CR8002	Same as CR8001.	Rectifier	1N547
CR8003	Same as CR8001.	Rectifier	1N547
CR8004	Same as CR8001.	Rectifier	1N547
CR8005	Same as CR8001.	Rectifier	1N547
CR8006	Same as CR8001.	Rectifier	1N547
CR8007	SEMICONDUCTOR DEVICE, DIODE: silicon; 105V, 10 watts non-inductive; cathode grounded to case.	Shunt Regulator	1N3006RB
CR8008	Same as CR8001.	Rectifier	
CR8009	Same as CR8001.	Rectifier	
CR8010	Same as CR8001.	Rectifier	
CR8011	Same as CR8001.	Rectifier	
CR8012	SEMICONDUCTOR DEVICE: DIODE: silicon; 75V, 1 watt non-inductive; cathode ground to case.	Voltage reference	1N3041B
DS8001	LAMP, INCANDESCENT: 6.3 V a-c or d-c, .20 amp; T-3-1/4 single contact; midget flange.	STANDBY indicator	BI-110-8

PARTS LIST (CONT)

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
DS8002	Same as DS8001.	TIME DELAY indicator	
DS8003	Same as DS8001	OPERATE indicator	
DS8004	LAMP, INCANDESCENT: integral part of XF8009.	F8009 indicator	
DS8005	LAMP, INCANDESCENT: integral part of XF8011.	F8011 indicator	
DA8006	LAMP, INCANDESCENT: integral part of XF8013.	F8013 indicator	
DS8007	LAMP, INCANDESCENT: integral part of XF8015.	F8015 indicator	
DS8008	LAMP, INCANDESCENT: integral part of XF8017	F8017 indicator	
DS8009	LAMP, INCANDESCENT: integral part of XF8020	F8020 indicator	
DS8010	LAMP, NEON: integral part of XF8001.	F8001 indicator	
DS8011	LAMP, NEON: integral part of XF8002.	F8002 indicator	
DS8012	LAMP, NEON: integral part of XF8003.	F8003 indicator	
DS8013	LAMP, NEON: integral part of XF8004.	F8004 indicator	
DS8014	LAMP, NEON: integral part of XF8005.	F8005 indicator	
DS8015	LAMP, NEON: integral part of XF8006.	F8006 indicator	
DS8016	LAMP, NEON: integral part of XF8007.	F8007 indicator	
DS8017	LAMP, NEON: integral part of XF8008.	F8008 indicator	
DS8018	LAMP, NEON: integral part of XF8010.	F8010 indicator	
DS8019	LAMP, NEON: integral part of XF8012.	F8012 indicator	
DS8020	LAMP, NEON: integral part of XF8014.	F8014 indicator	
DS8021	LAMP, NEON: integral part of XF8016.	F8016 indicator	

PARTS LIST (CONT)

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
DS8022	LAMP, NEON: integral part of XF8018.	F8018 indicator	
DS8023	LAMP, NEON: integral part of XF8019.	F8019 indicator	
	NOTE: FOR 230V OPERATION, THE FOLLOWING FUSES ARE SUPPLIED.		
F8001	FUSE, CARTRIDGE: 250V, 8 amp; 1-1/4 in. long by 1/4 in. dia.; medium time lag. (For 230V operation)	Line Fuse	FU-103-8
F8001	FUSE, CARTRIDGE: 15 amp; 1-1/4 in. long by 1/4 in. dia.; medium time lag.	Line Fuse	FU-103-15
F8002	Same as F8001.	Line Fuse	
F8002	Same as F8001	Line Fuse	
F8003	FUSE, CARTRIDGE: 250V, 2 amp; 1-1/4 in. long by 1/4 in. dia.; medium time lag. (For 230V operation)	Line Fuse	FU-103-2
F8003	FUSE, CARTRIDGE: 4 amp; 1-1/4 in. long by 1/4 in. dia.; quick acting.	Line Fuse	FU-100-4
F8004	Same as F8003	Line Fuse	
F8005	FUSE, CARTRIDGE: 250V, 1 amp; 1-1/4 in. long by 1/4 in. dia.; medium time lag. (For 250V operation)	Line Fuse	FU-103-1
F8005	FUSE, CARTRIDGE: 2 amp; 1-1/4 in. long by 1/4 in. dia.; medium time lag.	Auxiliary Line Voltage fuse	FU-103-2
F8006	FUSE, CARTRIDGE: 1/10 amp. 1-1/4 in. long by 1/4 in. dia.; slow blow.	Bias supply	FU-102-.1
F8007	FUSE, CARTRIDGE: 3/4 amp; 1-1/4 in. long by 1/4 in. dia.; slow blow.	B+ supply	FU-102-.750
F8008	Same as F8007.	B+ supply	
F8009	FUSE, CARTRIDGE: 4 amp; 1-1/4 in. long by 1/4 in. dia.; slow blow.	Filament supply	FU-102-4

PARTS LIST (CONT)

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
F8010	FUSE, CARTRIDGE: 1/8 amp; 1-1/4 in. long by 1/4 in. dia.; slow blow.	B+ supply	FU-102-.125
F8011	FUSE, CARTRIDGE: 15 amp; 1-1/4 in. long by 1/4 in. dia.; medium time lag.	Filament supply	FU-103-15
F8012	FUSE, CARTRIDGE: 3/8 amp; 1-1/4 in. long by 1/4 in. dia.; slow blow.	B+ supply	FU-102-.375
F8013	FUSE, CARTRIDGE: 10 amp; 1-1/4 in. long by 1/4 in. dia.; medium	Filament supply	FU-103-10
F8014	Same as F8010.	B+ supply	
F8015	FUSE, CARTRIDGE: 5 amp; 1-1/4 in. long by 1/4 in. dia.; slow blow.	Filament supply	FU-102-5
F8016	FUSE, CARTRIDGE: 1/4 amp; 1-1/4 in. long by 1/4 in. dia.; slow blow.	B+ supply	FU-102-.250
F8017	FUSE, CARTRIDGE: 8 amp; 1-1/4 in.long by 1/4 in. dia.; medium time lag.	Filament supply	FU-103-8
F8018	Same as F8016.	B+ supply	
F8019	Same as F8012.	B+ supply	
F8020	Same as F8013.	Filament supply	
J8001	CONNECTOR, RECEPTACLE: a-c power; male; 2 contacts; twist lock; polarized; 250V at 10 amps, 125V at 15 amps.	AC input	JJ-175
J8002	CONNECTOR, RECEPTACLE: a-c power; female; 2 contacts; 250V at 10 amps, 125V at 15 amps.	AC output	JJ-235
J8003	Same as J8002.	AC output	
J8004	Same as J8002.	AC output	
J8005	CONNECTOR, RECEPTACLE: female; 24 #20 contacts; 7.5 amps per contact.	Power output	JJ-200-3
J8006	CONNECTOR, RECEPTACLE: female; 14 #16 contacts; 17 amps per contact.	Power output	JJ-200-1
J8007	Same as J8006.	Power output	

PARTS LIST (CONT)

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
J8008	Same as J8006.	Power output	
J8009	Same as J8006.	Power output	
J8010	Same as J8006.	Power output	
K8001	RELAY, ARMATURE: 6 VAC coil operating voltage; contacts rated 115V, 10 amps non-inductive; 3 PDT.	Control relay	RL-144-1
K8002	Same as K8001.	Operate relay	
K8003	RELAY, THERMAL: delay type, 60 sec., ±12 sec., SPST, normally open; 6.3 VAC heater voltage; contact rating, 115 VAC 2 amps or 220 VAC, 1 amp non-inductive 1000V contact to contact breakdown, 1500V heater to contact breakdown; temp. range -55 to +70°C; glass case, miniature 9-pin type base.	Time delay relay	RL-111-6N060T
L8001	REACTOR: 10 henries; d-c resistance 280 ohms; 70 ma; insulated for 1500V RMS; hermetically sealed metal case.	Filter	TF-5006
R8001	RESISTOR, FIXED: composition; 22 ohms ±10%; 2 watts.	Voltage dropping	RC42GF220K
R8002	Same as R8001.	Voltage dropping	
R8003	RESISTOR, FIXED: wirewound; 50 ohms ±5%, 25 watts; with solder lug type terminals.	Surge resistor	RW-111-7
R8004	RESISTOR, FIXED: composition; 10 ohms ±10%, 1/2 watt.	Surge resistor	RC20GF100K
R8005	RESISTOR, FIXED: composition; 47,000 ohms ±10%; 2 watts.	Plate load	RC42GF473K
R8006	RESISTOR, FIXED: composition; 1,000 ohms ±5%, 1/2 watt.	Parasitic suppressor	RC20GF102J
R8007	Same as R8006.	Parasitic suppressor	
R8008	RESISTOR, FIXED: wirewound; 1,000 ohms ±5%, 10 watts; with solder lug type terminals.	Series dropping for bias shunt regulator	RW-109-24
R8009	RESISTOR, FIXED: composition, 33,000 ohms ±5%; 2 watts.	Voltage dropping	RC42GF333J
R8010	RESISTOR, FIXED: composition; 18 ohms ±5%, 2 watts.	Cathode bias	RC42GF180J

PARTS LIST (CONT)

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
R8011	Same as R8010.	Cathode bias	
R8012	RESISTOR, FIXED: wirewound; 10,000 ohms ±5%; 10 watts; with solder lug type terminals.	Regulator	RW-109-34
R8013	RESISTOR, FIXED: composition; 68,000 ohms ±5%; 2 watts.	P/o voltage divider	RC42GF683J
R8014	RESISTOR, VARIABLE: composition; 10,000 ohms ±10%; taper A; 2 watts.	P/o voltage divider	RV4LAYSA103A
R8015	RESISTOR, FIXED: composition; 22,000 ohms ±5%, 2 watts.	P/o voltage divider	RC42GF223J
R8016	Same as R8003.	Surge resistor	
R8017	Same as R8005.	Plate load	
R8018	Same as R8006.	Parasitic suppressor	
R8019	Same as R8010.	Cathode bias	
R8020	Same as R8010.	Cathode bias	
R8021	Same as R8012.	Regulator bleeder	
R8022	Same as R8009.	Voltage dropping	
R8023	Same as R8006.	Parasitic suppressor	
R8024	Same as R8013.	P/o voltage divider	
R8025	Same as R8014.	P/o voltage divider	
R8026	Same as R8015.	P/o voltage divider	
R8027	RESISTOR, FIXED: composition; 100 ohms ±10%, 1/2 watt.	Parasitic suppressor	RC20GF101K
R8028	Same as R8027	Parasitic suppressor	
R8029	RESISTOR, FIXED: composition; 3,300 ohms ±5%, 2 watts.	Series dropping	RC42GF332J
R8030	RESISTOR, FIXED: composition; 150,000 ohms ±10%, 2 watts.	Bleeder	RC42GF154K
R8031	Same as R8030.	Bleeder	

PARTS LIST (CONT)

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
R8032	RESISTOR, FIXED: composition; 220,000 ohms (integral part of XF8001).	Voltage dropping	
R8033	Same as R8032 (integral part of XF8002).	Voltage dropping	
R8034	Same as R8032 (integral part of XF8003).	Voltage dropping	
R8035	Same as R8032 (integral part of XF8004).	Voltage dropping	
R8036	Same as R8032 (integral part of XF8005).	Voltage dropping	
R8037	Same as R8032 (integral part of XF8006).	Voltage dropping	
R8038	Same as R8032 (integral part of XF8007).	Voltage dropping	
R8039	Same as R8032 (integral part of XF8008).	Voltage dropping	
R8040	Same as R8032 (integral part of XF8010).	Voltage dropping	
R8041	Same as R8032 (integral part of XF8012).	Voltage dropping	
R8042	Same as R8032 (integral part of XF8014).	Voltage dropping	
R8043	Same as R8032 (integral part of XF8016).	Voltage dropping	
R8044	Same as R8032 (integral part of XF8018).	Voltage dropping	
R8045	Same as R8032 (integral part of XF8019).	Voltage dropping	
R8046	RESISTOR, FIXED: composition; 15 ohms (integral part of XF8009).	Voltage dropping	
R8047	Same as R8046 (integral part of XF8011).	Voltage dropping	
R8048	Same as R8046 (integral part of XF8013).	Voltage dropping	
R8049	Same as R8046 (integral part of XF8015).	Voltage dropping	
R8050	Same as R8046 (integral part of XF8017).	Voltage dropping	
R8051	Same as R8046 (integral part of XF8020).	Voltage dropping	

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
S8001	SWITCH, TOGGLE: DPST; 250V, 20 amp; ball lever.	Line switch	ST-104
T8001	TRANSFORMER, POWER: step-down; primary 115/230V, 50/60 CPS, single phase; secondary 6.3 VAC at 5.5 amps; electrostatic shield; hermetically sealed metal case.	Power transformer	TF-239
T8002	Same as T8001.	Power transformer	
T8003	Same as T8001.	Power transformer	
T8004	Same as T8001.	Power transformer	
T8005	TRANSFORMER, POWER: step-down and step-up; primary 115V/230V, 50/60 CPS, single phase; secondary #1, 6.8 VAC 17 amps; secondary #2, 6.3 VAC, 1/5 amps; secondary #3, 6.3 VAC, 1.5 amps; secondary #4, 240 VAC, .07 amp center tapped; secondary #5, 270 VAC, 0.5 amp; electrostatic shield, hermetically sealed metal case.	Power transformer	TF-240
T8006	Same as T8005.	Power transformer	
TP8001	JACK, TIP: 1 female contact, phosper bronze, silver plated; rated 10 amps, 5000 VDC: nylon body with brass nickel plated jacket; body color red.	Test point	JJ-114-2
TP8002	Same as TP8001.	Test point	
V8001	TUBE, ELECTRON: twin power triode; octal base.	Series regulator	6336A
V8002	TUBE, ELECTRON: sharp-cutoff pentode; 7-pin miniature.	Series regulator	6AH6
V8003	Same as V8001.	D-c amplifier	
V8004	Same as V8002.	D-c amplifier	
W8001	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of various lengths and colors of MIL type MWC cable.	Transformer Power	CA-879

PARTS LIST (CONT)

REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
W8002	CABLE ASSEMBLY, POWER ELECTRICAL: consists of 6 connectors; 5 symbol no's., J8006, J8007, J8008, J8009, J8010; 1 symbol no. J8005; 14 terminal lugs and various lengths and colors of MIL type MWC insulated cable.	Main Power	CA-878
XC8001	NOT USED		
XC8002	SOCKET, ELECTRON TUBE: octal type.	Socket for C8002	TS101P01
XC8003	Same as XC8002.	Socket for C8003	
XDS8001	LIGHT, INDICATOR: for T-3-1/4 single contact midget flange lamp; green transparent lens.	Socket for DS8001	TS-153-2
XDS8002	LIGHT, INDICATOR: for T-3-1/4 single contact midget flange lamp; amber transparent lens.	Socket for DS8002	TS-153-3
XDS8003	LIGHT, INDICATOR: for T-3-1/4 single contact midget flange lamp; red transparent lens.	Socket for DS8003	TS-153-1
XF8001	FUSEHOLDER: extractor post type for 1-1/4 in. long by 1/4 in. dia. fuse cartridge; with neon indicator lamp and 220K ohms resistor, clear octagonal lens; 100-250 volts, 20 amps. Consists of holder, DS8010 and R8032.	Socket for F8001	FH-104-2
XF8002	Same as XF8001. Consists of holder, DS8011 and R8033.	Socket for F8002	
XF8003	Same as XF8001. Consists of holder, DS8012 and R8034.	Socket for F8003	
XF8004	Same as XF8001. Consists of holder DS8013 and R8035.	Socket for F8004.	
XF8005	Same as XF8001. Consists of holder, DS8014 and R8036.	Socket for F8005	
XF8006	Same as XF8001. Consists of holder, DS8015 and R8037.	Socket for F8006	
XF8007	Same as XF8001. Consists of holder, DS8016 and R8038.	Socket for F8007	

PARTS LIST (CONT)

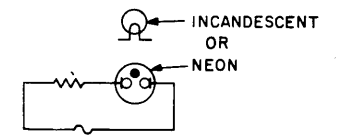
REF SYM	DESCRIPTION	FUNCTION	TMC PART NO.
XF8008	Same as XF8001. Consists of holder, DS8017 and R8039.	Socket for F8008	
XF8009	FUSEHOLDER: extractor post type for 1-1/4 in. long by 1/4 in. dia. fuse cartridge; with incandescent indicator and 15-ohm resistor; red octagonal lens; 4-6 volts, 20 amps. Consists of holder, DS8004 and R8046.	Socket for F8009	FH-104-6
XF8010	Same as XF8001. Consists of holder, DS8018 and R8040.	Socket for F8010	
XF8011	Same as XF8009. Consists of holder, DS8005 and R8047.	Socket for F8011	
XF8012	Same as XF8001. Consists of holder, DS8019 and R8041.	Socket for F8012	
XF8013	Same as XF8009. Consists of holder, DS8006 and R8048.	Socket for F8013	
XF8014	Same as XF8001. Consists of holder, DS8020 and R8042.	Socket for F8014	
XF8015	Same as XF8009. Consists of holder, DS8007 and R8049.	Socket for F8015	
XF8016	Same as XF8001. Consists of holder, DS8021 and R8043.	Socket for F8016	
XF8017	Same as XF8009. Consists of holder, DS8008 and R8050.	Socket for F8017	
XF8018	Same as XF8001. Consists of holder, DS8022 and R8044.	Socket for F8018	
XF8019	Same as XF8001. Consists of holder, DS8023 and R8045.	Socket for F8019	
XF8020	Same as XF8009. Consists of holder, DS8009 and R8051.	Socket for F8020	
XK001	NOT USED		
XK002	NOT USED		
XK003	SOCKET, ELECTRON TUBE: 9 pin miniature.	Socket for K8003	TS103P01
XV8001	SOCKET, ELECTRON TUBE: octal type.	Socket for V8001	TS165P01
XV8002	SOCKET, ELECTRON TUBE: 7 pin miniature.	Socket for V8002	TS102P01
XV8003	Same as XV8001.	Socket for V8003	
XV8004	Same as XV8002.	Socket for V8004	

SECTION 8

SCHEMATIC DIAGRAMS

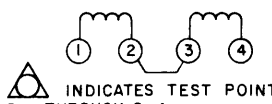
FUSE	RESISTOR		INDICATOR	
SYM	SYM	VALUE	SYM	TYPE
F8001	R8032	220K	DS8010	NEON
2	R8033	220K	DS8011	NEON
3	R8034	220K	DS8012	NEON
4	R8035	220K	DS8013	NEON
5	R8036	220K	DS8014	NEON
6	R8037	220K	DS8015	NEON
7	R8038	220K	DS8016	NEON
8	R8039	220K	DS8017	NEON
9	R8046	15Ω	DS8004	INCANDESCENT
10	R8040	220K	DS8018	NEON
11	R8047	15Ω	DS8005	INCANDESCENT
12	R8041	220K	DS8019	NEON
13	R8048	15Ω	DS8006	INCANDESCENT
14	R8042	220K	DS8020	NEON
15	R8049	15Ω	DS8007	INCANDESCENT
16	R8043	220K	DS8021	NEON
17	R8050	15Ω	DS8008	INCANDESCENT
18	R8044	220K	DS8022	NEON
19	R8045	220K	DS8023	NEON
F8020	R8051	15Ω	DS8009	INCANDESCENT

ALL FUSES ARE OF THE INDICATOR TYPE AS PER CHART AND DETAIL



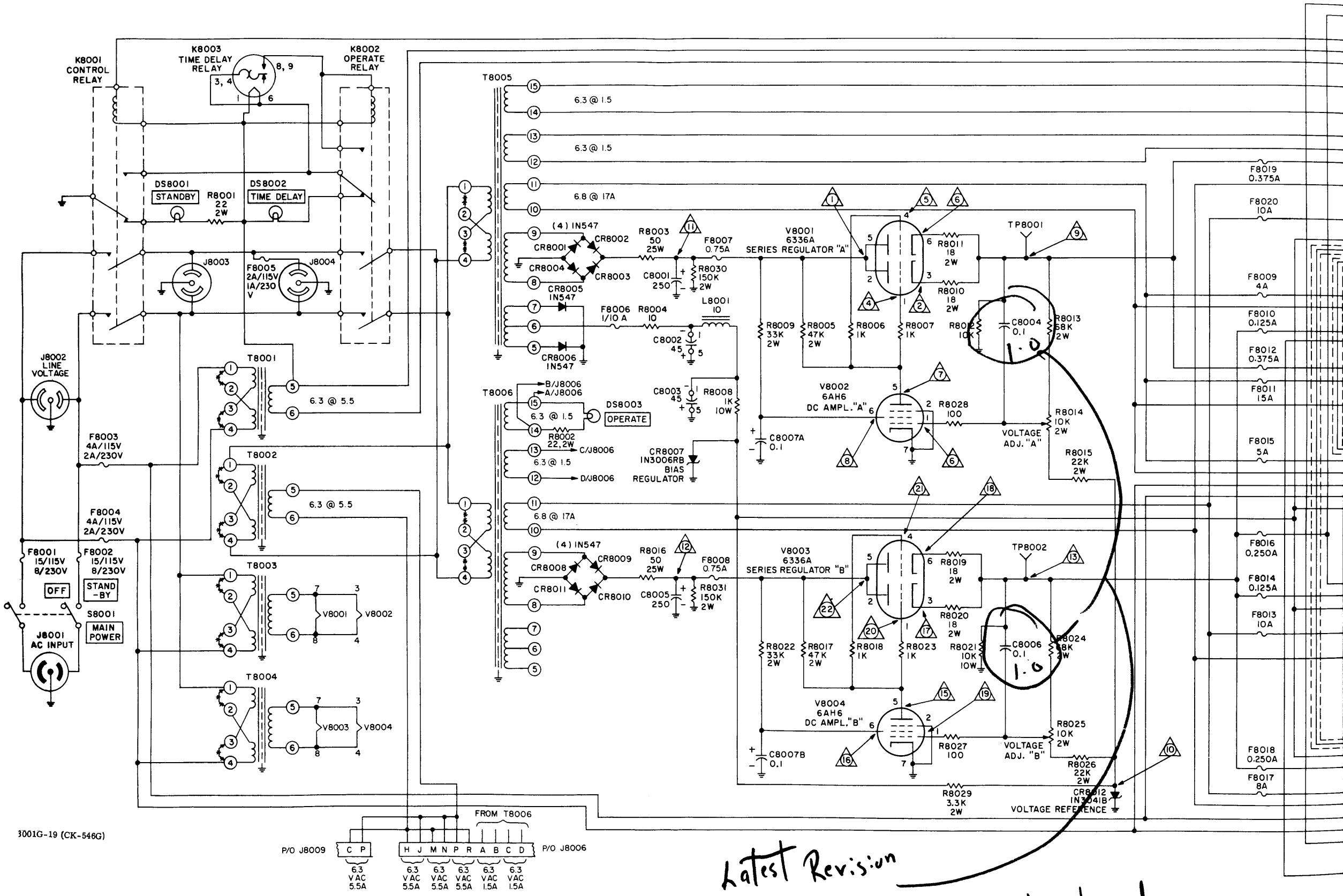
NOTES:

1. UNLESS OTHERWISE SPECIFIED
   CAPACITANCE VALUES ARE MFD
   INDUCTANCE VALUES ARE HENRIES
   RESISTANCE VALUES ARE OHMS, 1/2 WATT
2. 115V OPERATION SHOWN. FOR 230V OPERATION, REMOVE JUMPERS MARK *** FROM TERMINALS ON ALL TRANSFORMERS AND CONNECT AS SHOWN:



3. △ INDICATES TEST POINTS IN TABLES 5-1 THROUGH 5-4

Figure 8-1. Schematic Diagram, Power Supply, HFP



3001G-19 (CK-546G)

110653001G

Latest Revision
"H" C8004 + C8006 value changed