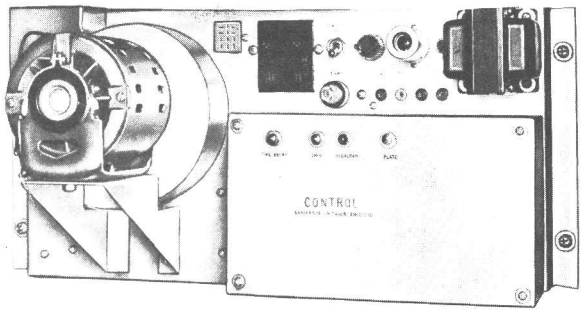
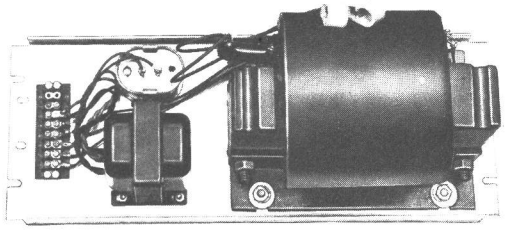
communications

MASTR Progress Line

HIGH POWER AMPLIFIER POWER SUPPLY MODEL 4EP6A1



MAIN CHASSIS FRONT VIEW



TRANSFORMER CHASSIS

SPECIFICATIONS *

Model Number	4EP6A1
FCC Type Number	EP-6-A
Used With	Power Amplifiers Type EF-4-A (25-54 MC), EF-5-A (132-174 MC), and EF-6-A (450-470 MC)
Power Input	117 VAC, ±10%, 50/60 cps Standby: 152 Watts Transmit: 890 Watts
Tube Complement	(2) 866A rectifiers (1) 12AU7
Output	2000 VDC @ 250 ma 6 VAC @ 2.75 amps 300 VDC @ 15 ma 120 VDC for antenna relay
Rated Duty Cycle	Continuous
Type of Circuit	Full-Wave Rectifier
Ambient Temperature Range	-30°C to +60°C (-22°F to +144°F)
Dimensions (H x W x D)	
Main Chassis	8-3/4" x 19" x 14-1/2"
Transformer	7" x 19" x 8-1/2"
Weight	
Main Chassis	41 pounds
Transformer	55 pounds

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Certified and Guaranteed Specification Sheet for the complete specifications.

GENERAL ELECTRIC

Maintenance Manual LBI-3631

EP-6-A

TABLE OF CONTENTS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

DESCRIPTION

General Electric Power Supply Model 4EP6A1 has been designed for use with Models 4EF4A1-3, 4EF5A1 or 4EF6A1 Power Amplifiers in standard 19-inch, rack-mounted installations. All connections to the Power Amplifier are made through plugs and terminal boards. No voltages are exposed on the front of the unit. No tool other than a screwdriver is necessary for removal of the unit for servicing. Jacks are provided for metering GRID current (J452), SCREEN voltage (J453), and FILament (J554). A ground jack GND (J455) is also provided. A 10-ampere circuit breaker (S451) protects the plate supply circuits while a 2.8-ampere slow-blowing fuse is used for protecting the control circuit.

Essentially the Power Supply consists of two GL-866A rectifier tubes in a full-wave circuit capable of delivering 2000 volts at 320 milliamperes. The Power Supply provides a regulated filament voltage, provides -120 VDC for the antenna relay and up to 300 volts DC at 15 milliamperes for the PA screen.

A blower motor is used in cooling the PA tube in the Power Amplifier. This blower is mounted on the front of the Power Supply chassis.

CIRCUIT ANALYSIS

AC INPUT

Unregulated

The high side of the 117-volt AC input to the Power Supply is connected to TB451-9 and -10 and the neutral side of the 117-volt AC input is connected to TB451-7 and -8.

Regulated

When using a voltage regulator*, the high side of the 117-volt AC input is connected to TB451-10 and the neutral side is connected to TB451-7 and -8. The high side of the unregulated 117-volt AC input (primary of the voltage regulator) is connected to TB451-9 and the neutral side connected to TB451-7 and -8.

*An optional 500 VA Voltage Regulator is available to regulate the voltages supplied in the cabinet with the exception of the final of the Power Amplifier.

POWER CIRCUITS

Filaments

With the CONTROL switch (S453) in the ON position, power is applied to the primary of the filament voltage regulator transformer T454 and the primary of T451 (filament transformer for the two GL-866A rectifier tubes). The secondary of the voltage regulator transformer T454 supplies a regulated voltage to the primary of the filament transformer T453. T453 supplies filament voltage for the PA tube in the Power Amplifier, and energizing voltage for the time delay relay K451.

Resistor R451 drops the filament voltage during standby so as to prolong filament life of the PA tube in the Power Amplifier. When the exciter is keyed, the antenna relay contacts K452-2R and 3R close, causing the filament dropping resistor to be shorted, allowing the full filament voltage to be applied to the PA tube filaments.

The FIL jack on the Power Supply is provided as an aid to servicing the equipment. In the diagnosis of operating difficulties, the jack may be used with an ordinary AC voltmeter to direct the presence of filament voltage from the filament transformer.

Since a stabilizing transformer is provided to insure long PA filament life, R451 seldom requires any adjustments. These adjustments are made at the factory. The correct operation of the filament circuit will provide voltages according to the following table.

Power Amplifier	Standby Fil	Operate
EF-4-A (25 - 50 MC)	5.5 Volts	6.0 Volts
EF-5-A (132-174 MC)	5.5 Volts	6.0 Volts
EF-6-A (450-470 MC)	5.5 Volts	**5.5-6.0 Volts

**If power drops because of emission limitations, increase the operate voltage toward 6.0 Volts.

After considerable hours of operation of the EF-6-A Power Amplifier, a reduction of power output may be noticed because of decreased emission of the Power Amplifier tube. Tap 2 (Operate) of R451 may be moved from its position adjacent to Tap 1 (Standby), in small steps, sufficient to raise the power output. When a new tube is installed, Tap 2 (Operate) should be returned to its position beside Tap 1 (Standby).

Grid Circuit

The grid circuit in the Power Supply chassis consists of the grid current relay K452, the metering resistor R457, and a clamper V453. Grid current can be measured at the GRID jack (J452) located on the front of the Power Supply chassis.

Self bias for the grid circuit is developed across the 5000-ohm grid current relay.

The plate of the clamper tube V453 is connected to the PA screen. The grid of the clamper tube is across the self-developed bias of the PA Amplifier grid. With no grid drive present, the clamper tube conducts, lowering its own plate voltage and the PA screen voltage. This action results in maintaining the PA plate current at a safe level. With grid drive present, the clamper tube cuts off and allows the screen to rise to its normal level.

Screen Circuit

Screen voltage is obtained for the PA tube in the Power Amplifier by use of a voltage divider in the Plate Supply circuit of the Power Supply. The voltage divider network R458, R459 and R460 also serves as a bleeder network. The screen voltage may be varied by adjusting the SCREEN control R460 located on the front of the Power Supply chassis. R464 and R465 are the voltage dividers for the metering jack J453.

The type of screen supply circuit used in the Power Supply (1) tends to maintain constant power output; (2) limits the screen current to a safe value; (3) will, for added protection, prevent the screen voltage from appearing at the PA tube if plate voltage is not present.

Plate Supply

Plate voltage is obtained by rectifying the AC voltage developed across the secondary winding of T452. Full-wave rectification is provided by two Type GL-866A mercury-vapor rectifiers and filtering by capacitor C451 and choke L451. The voltage divider network R461, R462 and R463 also serves as a bleeder network. R466 and R467 are current limiting resistors. Plate voltage is obtained at TB451-2 for the PA plate.

CONTROL CIRCUITS

Time Delay Relay

The time delay relay K451, which is actuated by the 6-volt filament circuit, provides a 45-second time delay before closing a set of contacts in the primary circuit of the plate supply (see Figure 1). This delay allows time for sufficient filament warmup before the AC plate voltage is applied to the GL-866A rectifiers.

Grid Current Relay

The grid current relay K452 is energized only when adequate current exists in the grid circuit. K452 is picking up, causes (1) the GRID current indicator lamp to light; (2) the filament voltage dropping resistor to be shorted out; (3) the PA screen to become un-grounded; (4) a set of contacts to close in series with the plate relay coil K455 (see Figure 1) and (5) the antenna relay to become energized.

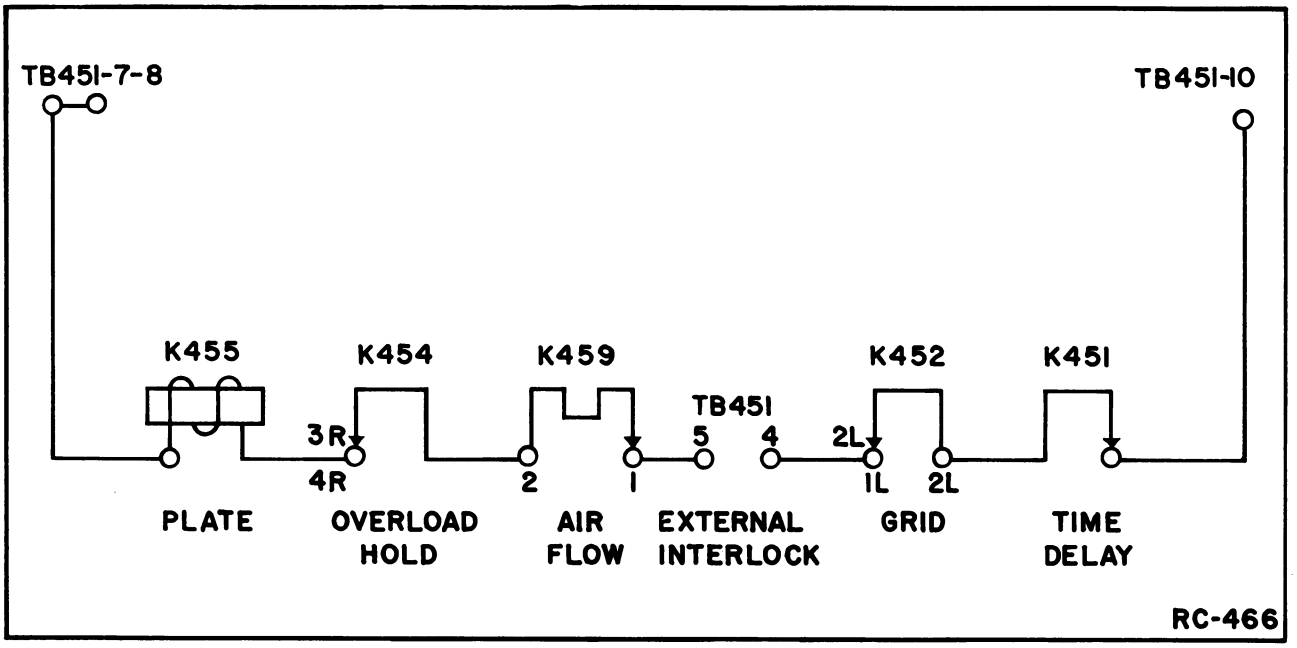


Figure 1 - Plate Relay String

External Interlock

The cabinet safety interlock switch S906 is mounted on the rear of the equipment cabinet and is connected to TB451-4 and -5 on the Power Supply chassis. Opening the cabinet rear door opens S906 causing K455 to de-energize and open the primary of the plate supply (see Figure 1).

Air Flow Switch

The air flow switch K459 (thermostat) and R452 are located in the air duct of the blower mounted on the Power Supply chassis. If the air fails and the thermostat temperature exceeds 200 degrees F because of the resistor proximity, K459-1 and -2 open, causing K455, the plate relay, to de-energize and open the primary of the plate supply (see Figure 1).

Primary Overload and Overload Hold

The primary overload relay K456 is a dashpot overload sensing device in the primary of the plate supply. K456, while not affected by small transients, protects the plate supply and Power Amplifier against damaging overloads. A set of contacts on the overload relay K456 close whenever an overload occurs, energizing the overload hold relay K454. The trip level of the overload relay circuit is adjustable through R468.

When energized, the overload hold relay K454 locks itself in by closing a set of normally open contacts. A set of normally closed contacts on the relay, open, de-energizing the plate relay K452 which opens the primary of the plate supply (see Figure 1).

Plate Blower Control

The plate blower control K457 is a motor starting relay that is current actuated. The normally open contacts, closed by the inrush of starting current, place the start winding across the "run" winding. When the motor comes up speed, current in the line drops, the relay de-energizes and drops out the start winding.

Cabinet Blower Thermostat

The thermostat for the cabinet blower is located on the bottom of the rectifier tube chassis. A lead from the thermostat is brought out to TB451-6 for connecting to the cabinet blower. The high side of the thermostat connects to the line through the fuse F452. Whenever the temperature inside the cabinet exceeds 120 degrees F, the thermostat cuts in, allowing the blower to operate. When the temperature in the cabinet drops to 100 degrees F, the thermostat cuts off, causing the blower to stop.

INDICATORS

Plate

The PLATE indicator lamp I454 indicates that the high voltage supply circuit is operating.

Grid

The GRID indicator lamp I452 indicates that the proper grid bias is present at the PA grid of the Power Amplifier tube.

Overload

The OVERLOAD indicator lamp I453 indicates that an overload condition exists. This indicator is normally off.

Time Delay

The TIME DELAY indicator lamp I451 indicates that the time delay relay is picked up.

METERING

PA Plate Voltage

The PA PLATE VOLTAGE meter M910 is mounted on the front of the station cabinet and connects to TB451-1 and -2 on the Power Supply chassis. R461 is the metering resistor for M910.

Screen

To measure screen voltage, insert the meter probe from one of the TUNING METERS (located on the front of the station cabinet) into the SCREEN jack J453 on the Power Supply chassis. R464 and R465 are the metering resistors for J453.

Grid

To measure grid voltage, insert the probe from one of the TUNING METERS (located on the front of the station cabinet) into the GRID jack J452 on the Power Supply chassis. R457 is the metering resistor for J452.

Fil

To check filament voltage, insert the meter probe from a voltmeter into the FIL jack J454 and connect the ground lead to the GND jack J455 on the Power Supply chassis.

MAINTENANCE

To obtain optimum performance from the equipment, a program of regular preventive maintenance should be followed. This preventive maintenance should include the following:

1. A mechanical inspection of the unit for loose, broken or damaged components.

2. A check of the input voltage.

3. Measurement of PA PLATE voltage (M910), PLATE current (M909), GRID current (J452), SCREEN voltage (J453), and FILament (J454). A log should be kept of these readings when the equipment is first installed so that tube or component failures can be anticipated and the defect corrected before trouble becomes serious.

4. Blower and relay maintenance as described in the sections below:

Blower

The blower which is installed on the Power Supply and used for cooling the PA tube on the Power Amplifier should be cleaned periodically to maintain its efficiency. The motor bearings must be oiled with the proper lubricant (see Power Supply Parts List, listed in Table of Contents) every 2000 hours. Do not allow oil to get on to the impeller blades. If the impeller blades have become coated with oil, they should be removed, washed in a grease solvent and hot water, then replaced.

Relays

The relays in these units require little care. However, they should be inspected periodically to assure maximum operating efficiency. If the contacts become pitted, they should be cleaned with a burnishing tool to smooth out any metallic deposits. When relay contacts carry little or no current, the contacts do not clean themselves and an insulating coating is apt to form. This coating may be removed by cleaning the contacts with a burnishing tool. Do not oil the relay bearings. When relays are in dusty locations, lubricated bearings will collect dust and grit and

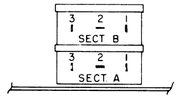
will wear more rapidly than non-lubricated bearings. Some of the relays used are of the multiple-contact type and, in the unenergized position, should have contact spacings of approximately .1625 to .125 inch. More important, the contact spacings on any multiple-contact relay should be equal so that the contact pressures will be equal when the relay is energized. The back pressure of the antenna relay should be at least 15 grams. Low back pressure will shorten the life of contacts, due to excessive arcing, and may also cause noise in the receiver, due to chatter of the antenna relay contact under vibration.

Overload Relay

If either premature or retarded tripping of the overload relay occurs, R468 can be adjusted to return the overload relay to the proper operating range. R468 is located on the right, inside the control box. Adjust the sliders on R468 so that primary plate current of 300 ma is maintained and that a primary plate current of 375 ma will cause the relay to trip within 6 seconds. The 300 ma and 375 ma of plate current can be obtained by detuning the PA PLATE control, while observing the PA PLATE meter.

CAUTION

Do not adjust R468 without first turning OFF the PLATE and CONTROL switches.



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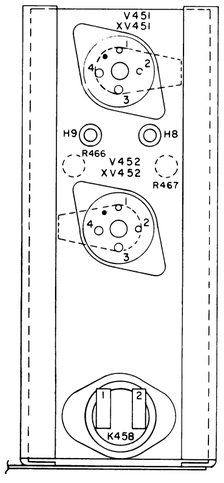

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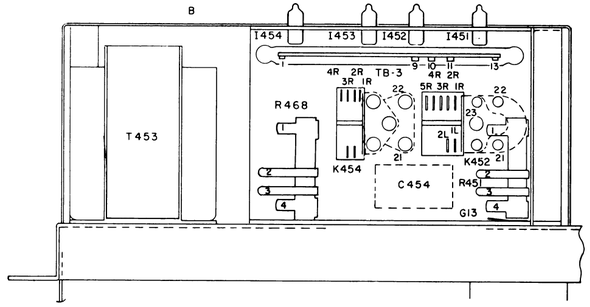
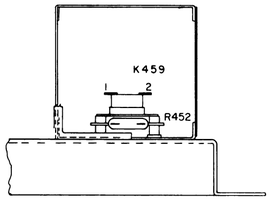
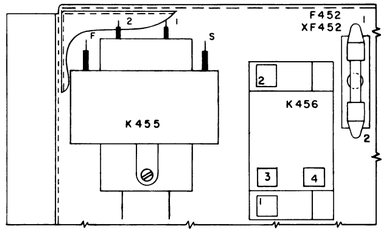
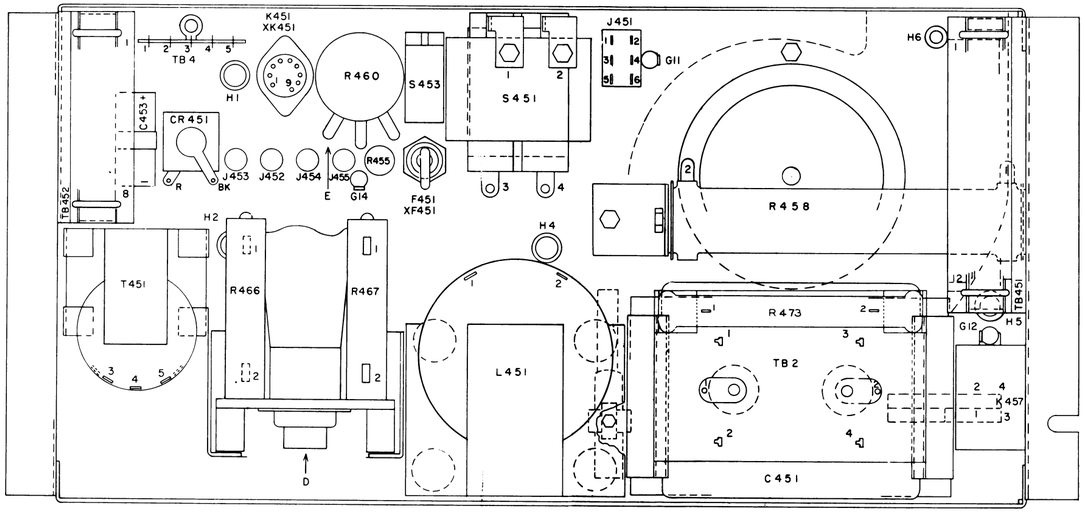
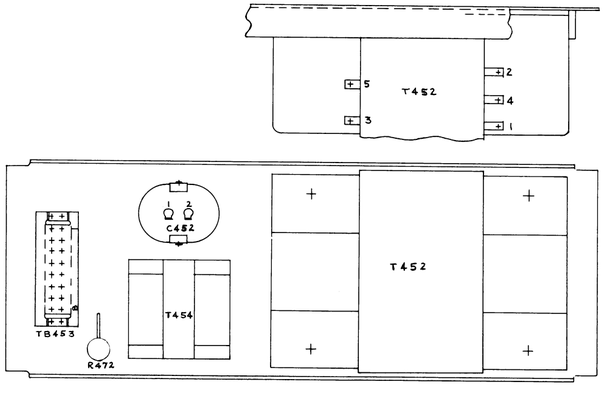










VOLTAGES & RESISTANCE MEASUREMENTS

NUMBER		VOLTAGE 10%	RESISTANCE 20%	FUNCTION
TB451	1	0	0	GROUND
	2	0	430 K	PLATE VOLTAGE
	3	0/150 TO 300V*	0	SCREEN GROUNDING
	4	117 AC	——	CABINET INTERLOCK
	5	117 AC	——	CABINET INTERLOCK
	6	117 AC **	——	CABINET INTERLOCK
	7	117AC NEUTRAL	——	——
	8	117AC NEUTRAL	——	——
	9	117 AC HIGH	——	UNREGULATED PLATE SOURCE
	10	117 AC HIGH	——	REGULATED CONTROL
	11	——	——	——
	12	——	——	——
TB452	1	117 AC NEUTRAL	——	PLATE TRANSFORMER PRIMARY
	2	117 AC HIGH	——	PLATE TRANSFORMER PRIMARY
	3	0	0	PLATE TRANSFORMER CT
	4	117 AC HIGH	——	——
	5	117 AC HIGH	——	FILAMENT TRANSFORMER
	6	117 AC NEUTRAL	——	——
	7	117 AC NEUTRAL	——	——
	8	0/-120 V	——	ANTENNA RELAY
J451	1	0	0	GROUND
	2	5.5 TO 6.0 AC	0	FILAMENT
	3	-35 TO -125	5100	GRID
	4	150 TO 300V *	5K TO 50K	SCREEN VOLTAGE
C451	1	2000 V DC	85K TO 135K	HIGH VOLTAGE

* DETERMINED BY THE SETTING OF R460 - SCREEN ADJ.

** OPERATE ABOVE 50°C.

METERING JACK		1 VOLT DEFLECTION ON A 20,000 OHM-PER VOLT VOLTMETER EQUALS	AVERAGE READINGS	REFERENCE
GRID CURRENT	J452	10 MA	-7 TO -25 MA	SEE SECTION ON ADJUSTMENT, OPERATION AND MAINTENANCE (LISTED IN TABLE OF CONTENTS)
SCREEN VOLTAGE	J453	100 VOLTS	150 TO 300V	
FILAMENT	J454	SEE INSTRUCTION BOOK TEXT		
GROUND	J455	——	——	

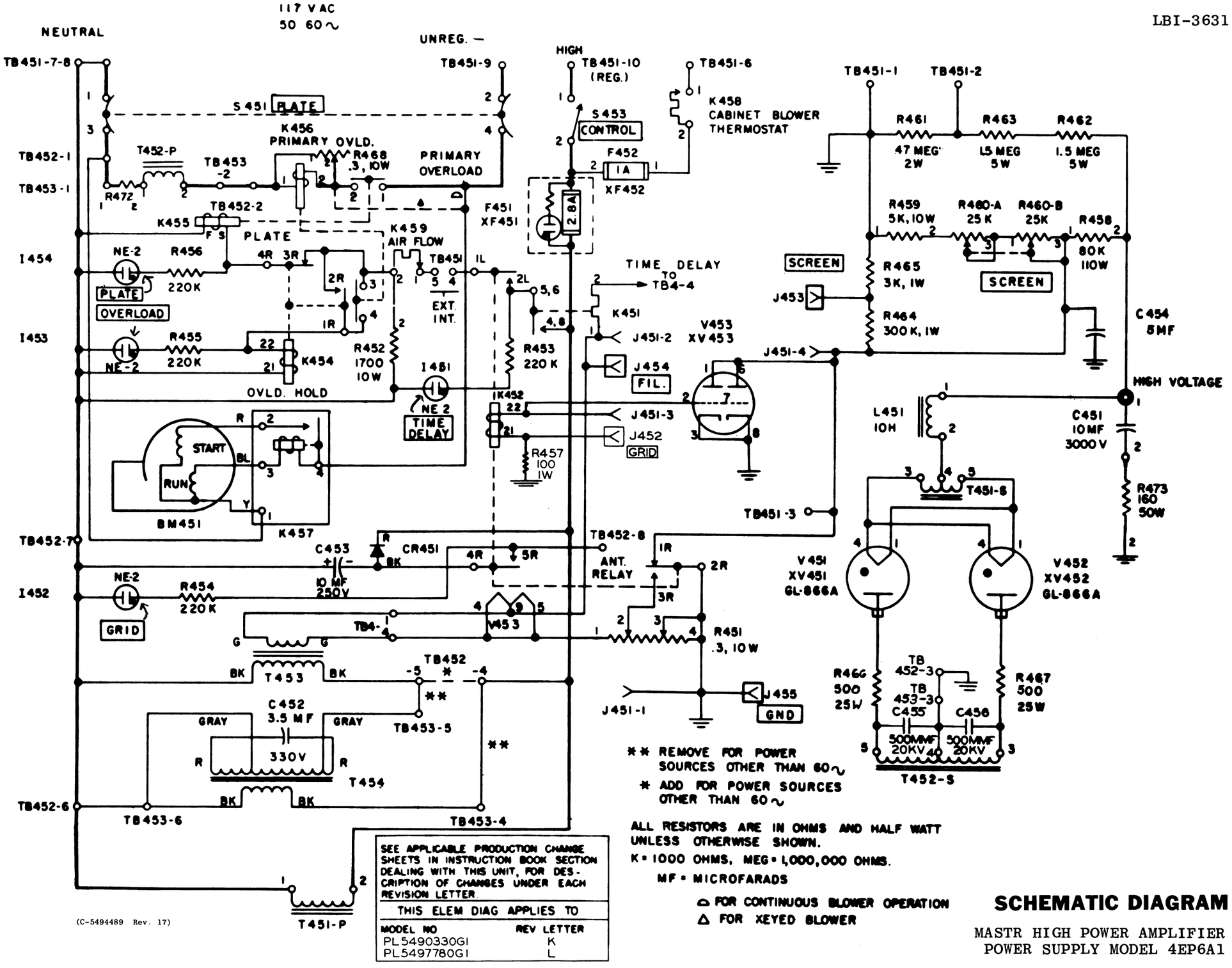
CONDITIONS OF MEASUREMENT:

1. ALL MEASUREMENTS MADE FROM INDICATED POINT TO CHASSIS WITH ALL CABLES DISCONNECTED FROM UNIT.
2. VOLTAGES ARE TYPICAL READINGS ON A 20,000 OHM-PER-VOLT DC METER, UNLESS OTHERWISE NOTED.

   A - WHERE TWO VOLTAGES ARE GIVEN FOR ONE POINT (I.E. 0/6.0 V), FIRST READING IS FOR "STANDBY" AND SECOND IS FOR "TRANSMIT."
3. ALL MEASUREMENTS MADE WITH A METER RANGE THAT GIVES ONE-THIRD TO FULL SCALE DEFLECTION OF THE METER.
4. ALL DC VOLTAGES ARE POSITIVE WITH RESPECT TO CHASSIS, UNLESS MARKED " — " FOR NEGATIVE.
5. RESISTANCES ARE TYPICAL READINGS WITH ALL VOLTAGES REMOVED

OUTLINE DIAGRAM

MASTR HIGH POWER AMPLIFIER
POWER SUPPLY MODEL 4EP6A1



** REMOVE FOR POWER SOURCES OTHER THAN 60 ~

* ADD FOR POWER SOURCES OTHER THAN 60 ~

ALL RESISTORS ARE IN OHMS AND HALF WATT UNLESS OTHERWISE SHOWN.

K = 1000 OHMS, MEG = 1,000,000 OHMS.

MF = MICROFARADS

⌓ FOR CONTINUOUS BLOWER OPERATION

△ FOR KEYED BLOWER

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PL5490330G1	K
PL5497780G1	L

SCHEMATIC DIAGRAM

MASTR HIGH POWER AMPLIFIER
POWER SUPPLY MODEL 4EP6A1

PARTS LIST

EBI-41674H
POWER SUPPLY
MODEL 4EP6A1
PL-5497780-G1, REV.L
PL-5490330-G1, REV.K

SYMBOL	G-E PART NO.	DESCRIPTION
		MOTOR
BM-451	5490269-P1	Split phase, rated 115 v ±20% 60/50 cycles, 1.05/1.25 amp. 3450/2850 rpm, 1/20 hp, CW rotation, current relay starting, continuous duty. G-E Model 5KH14EG44. Relay (B-5490225) not furnished with motor.
		CAPACITORS
C451*	5495580-P2	Fixed paper, 10.0 uf ±10%, 3000 VDCW. G-E 28F637. (Changed by Rev. E and H).
C452		3.5 mfd ±6% 330 VAC. Part of T454. (Included in transformer chassis asm. PL-5490330-G1).
C453	7774786-P72	Electrolytic, insulated, tubular; 10 mfd +100% -0%, 250 VDCW, includes mtg strap. Sim to P.R. Mallory TC-52.
C454	3R121-P8	Fixed paper: 0.50 uf ±10%, 600 VDCW. G-E #23F870.
C455* and C456*	5490306-P2	(Fixed ceramic), high voltage; 500 pf +50% -20%, 20K VDCW. Sim to Sprague Electric 20DKT5. (Added by Rev. K). (Part of T452). (Included in Transformer Chassis Asm. PL-5490330-G1.
CR451	7487775-P7	Selenium.
		FUSES
F451	7487942-P29	Slow blowing, Type 3AG; 2.8 amps at 125 v. Sim to Bussman MDL-2.8.
F452	7487942-P5	Slow blowing, Type 3AG; 1 amp at 250 v. Sim to Bussman MDL-1.
		INDICATING DEVICES
I451 and I452	4029824-P2	NE-2E lamp 1/25 w, encapsulated in molded transparent modified styrene; lens color amber. Sim to E-Lite 1B-#1024.
I453	4029824-P3	NE-2E lamp 1/25 w, encapsulated in molded transparent modified styrene; lens color red. Sim to E-Lite 1B-#1024.
I454	4029824-P2	NE-2E lamp 1/25 w, encapsulated in molded transparent modified styrene; lens color amber. Sim to E-Lite 1B-#1024.
		JACKS AND RECEPTACLES
J451	7473192-P4	Connector socket, 6 female contacts, with angle brackets. Sim to HB Jones S-306-AB.
J452	7150763-P4	Test point jack, stake in molded nylon. Sim to Alden Products 110BC1-green.
J453	7150763-P2	Test point jack; stake in molded nylon. Sim to Alden Products 110BC1-red.
J454	7150763-P8	Test point jack, stake in molded nylon. Sim to Alden Products 110BC1-orange.
J455	7150763-P1	Test point jack, stake in molded nylon. Sim to Alden Products 110BC1-black.
		RELAYS
K451	5490322-P2	Thermal relay, time delay, spdt; 45 sec delay ±25%, heater voltage 6.3. Sim to Curtis Wright 6.3-45-G.
K452*	5495776-P1	Long telephone type, DC operated; resistance 5000 ohms ±10%, pick up 5 ma or less, dropout 1 ma or more, silver contacts, R.H. twin 1-form A, 1-form C, tungsten contacts; L.H. 1-form A, contact pressure 20 gms, includes cover guide installed. Changed by Rev. F.
K454	5494523-P3	Quick acting A-C telephone type; twin 1 form A, 1 form B contacts, res 500 ohms ±10%, pick-up 90 v or less, nominal operation 115 VAC, contact rating 4 amps 150 w. Sim to C.P. Clare J.
K455*	5490694-P1	Mercury plunger, coil res 700 ohms ±10% at 25°C, operates on 117 VAC ±20%, N.O. contacts, mercury to mercury contacts, rated 30 amp 110 v, 5 amp DC at 110 v non-inductive picks up at 70 milli sec max, Sim to Adams and Westlake 1140-45-101. Changed by Rev. C.
K456	5490298-P2	Overload relay; temp range of -30° to +80°, coil rating 7 amps a-c, 1 form A contacts, non-inductive rating 3 amps at 120 VAC 1.5 amps at 250 VAC, 1 amp at 50 VDC .5 amp at 120 VDC. Sim to Heinemann CC1617AXX.
K457	5490225-P1	Motor starting relay; contacts N.O. pickup 2.35 amps max, dropout 2.0 amps min, 10 amps inductive, operating v range 117 VAC ±20%, 50/60 cycles. Sim to R.B.M. Cat. #91252-184, used with G-E motor 5KH14DG17-1/2 hp.
K458	5490221-P1	Thermostat, enclosed disc type, non-adjustable; spst N.O. contacts; 25 amp at 120/240 VAC, 12 amp at 30 VDC, 1 amp at 125 v d-c, temp range closed 120°F ±5°, open 100°F ±5°. Sim to Spencer Thermostat Klixon 20201.
K459*	4031303-P1	Thermostat, enclosed disc type, non-adjustable; 6000 ohms 10 amp 110 v a-c, temp range open 200°F ±5°, closed 175°F ±10°. Sim to Spencer Thermostat Klixon 20100L8-14. (Made from G-E Dwg. and Part No. A-4029615-P1). Changed by REV. A.
		INDUCTORS
L451	5490244-P1	Reactor; ind 10 h at 0.34 amp, DC res 100 ohms max, operating v 2000 VDC.
		RESISTORS
R451	7102116-P9	Wirewound, adjustable; 0.3 ohms ±10%, 10 w, B coating. IRC 1-3/4 AA. Supply with 2-sliders.
R452	5490297-P1	Wirewound, 1700 ohms ±10%, 10 w.
R453 thru R456	3R77-P224K	Composition, 0.22 megohm ±10%, 1/2 w.
R457	3R78-P101J	Composition, 100 ohms ±5%, 1 w.
R458	2R19-P120	Wirewound 80,000 ohms ±5%, 110 w. Sim to Ward Leonard K41391-2.
R459	2R12-P38	Wirewound, 5000 ohms ±5%, 10 w. Sim to Ward Leonard 10F5000.
R460	5490213-P1	Potentiometer, wirewound; dual, 25,000 ohms ±10% front and rear sections, 4 w, linear taper. Sim to Chicago Telephone Sjpply 25.
R461	3R79-P474K	Composition, 0.47 megohm ±10%, 2 w.
R462 and R463	7128135-P2	Fixed, precision, uninsulated; 1.5 megohm ±1%, 5 w.
R464	3R77-P304J	Composition, 0.30 megohm ±5%, 1/2 w.
R465	3R77-P302J	Composition, 3000 ohms ±5%, 1/2 w.
R466 and R467	2R14-P28	Wirewound, 500 ohms ±5%, 25 w. Sim to Ward Leonard K41383-1.
R468	7102116-P9	Wirewound, adjustable; 0.3 ohms ±10% 10 w. B coating. Sim to IRC 1-3/4AA. Supplied with 2-sliders. Changed by Rev. A.
R469 and R470	3R79-P432J	Composition, 4300 ohms ±5%, 2 w. Added by Rev. C. Deleted by Rev. L.
R471	3R79-P682K	Composition, 6800 ohms ±10%, 2 w. Added by Rev. C. Deleted by Rev. L.
R472*	7487452-P1	Corrugated, ribbon wound, 0.50 ohms ±10%, 100 w. Added by Rev. D. (Included in Transformer chassis asm. PL-5490330-G1).
R473*	7486548-P4	Wirewound, 160 ohms ±5%, 50 w. Added by Rev. G.
		SWITCHES
S451*	4033337-P1	Circuit Breaker; 20 amp, DPST, sim to Trumbull TQL2120. Changed by Rev. A.
S453	4033337-P1	Circuit Breaker; 20 amp, DPST; sim to Trumbull TQL2120.
		TRANSFORMERS
T451	5490255-P1	Filament, single phase. Pri: 117 v, 50/60 cycles; Sec: 2.5/1.25 v, 10 amp.
T452	5490157-P1	Power transformer, single phase. Pri: 117 v, 50/60 cycles; Sec. #1: 5094/2547 v, 0.245 amp. (Included in Transformer chassis asm. PL-5490330-G1).
T453	5490266-P1	Filament, single phase. Pri: 115 v, 50/60 cycles; Sec: 6.15 v, 3.25 amp.
T454	5490332-P1	Regulator; includes matched capacitor and transformer. Pri: 94-140 v, 60 cycles Sec: 115 v, 2 amp. Sim to Sola Electric CVE 80129. Capacitor; 3.5 mfd ±6%, 330 VAC, Sim to Sola Electric Co.#2417. (Included in Transformer chassis asm. PL-5490330-G1).
		TUBES
V451 and V452		Tubes. Type GL866A.
V453*		Type 12AU7. Added by Rev. A.
		SOCKETS
XF451	7141874-P1	Fuse holder; indicating type, clear cap, 100 to 250 v, black body. Sim to Bussman HKL.
XF452	7141008-P1	Fuse holder. Sim to Littelfuse 350118, except XXX bakelite base.
XK451	7480532-P8	Tube socket; 9 pin miniature, mica filled phenolic 4 ground lugs.
XV451 and XV452	1R14-P21	Tube socket; mica filled phenolic, 4 contacts. Sim to Amphenol MIP-4T.
XV453*	7480532-P8	Tube socket; 9-pin miniature, mica-filled phenolic 4-ground lugs. Added by Rev. A.
		SUB-ASSEMBLY
	PL-5490330-G1	Transformer Chassis Assembly, includes the following components; C452, C455, C456, R472, T452, T454.
		MISCELLANEOUS PARTS
	4029416-P1	Oil can with removable cover.
		Oil (D6B14A1); electric motor and generator, low viscosity. Gulfcrest A (WCR).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and G-E Part Number.

Service parts may be obtained from Authorized G.E. Communication Equipment Service Stations or through any G-E Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. G-E Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MAINTENANCE MANUAL

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