NAVSHIPS 91557

INSTRUCTION BOOK

for

POWER SUPPLY

PP-765/U

POWER EQUIPMENT COMPANY
DETROIT, MICHIGAN

BUREAU OF SHIPS NAVY DEPARTMENT

Contract: NObsr-52393 *Approved by BuShips: 13 NOV 1951*

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
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DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
Code 993-100
8 November 1951

From: Chief, Bureau of Ships
To: All Activities concerned with the Installation, Operation and Maintenance of the Subject Equipment

Subj: Instruction Book for Power Supply PP-765/U NAVSHIPS 91557

1. This is the instruction book for the subject equipment and is in effect upon receipt.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense Publications.

4. All Navy requests for NAVSHIPS Electronics publications should be directed to the nearest District Publications and Printing Office. When changes or revised books are distributed, notice will be included in the BuShips ELECTRON and in the Index of Bureau of Ships General and Electronics Publications, NAVSHIPS 250-020.

H. N. WALLIN
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

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GUARANTEE

The equipment, including all parts and spare parts, except vacuum tubes, batteries, rubber and material normally consumed in operation, is guaranteed for a period of one year from the date of delivery of the equipment to and acceptance by the Government with the understanding that all such items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f. o. b. any point within the continental limits of the United States designated by the Government, without delay and at no expense to the Government; provided that such guarantee will not obligate the Contractor to make repair or replacement of any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and the defect is not the result of normal expected shelf life deterioration.

To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design with the understanding that if ten percent (10%) or more of any such said item, but not less than two of any such item, of the total quantity comprising such item furnished under the contract, are found to be defective as to design, such item will be conclusively presumed to be of defective design and subject to one hundred percent (100%) correction or replacement by a suitably redesigned item.

All such defective items will be subject to ultimate return to the Contractor. In view of the fact that normal activities of the Naval Service may result in the use of equipment in such remote portions of the world or under such conditions as to preclude the return of the defective items for repair or replacement without jeopardizing the integrity of Naval communications, the exigencies of the Service, therefore, may necessitate expeditious repair of such items in order to prevent extended interruption of communications. In such cases the return of the defective items for examination by the Contractor prior to repair or replacement will not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure, will be acceptable as a basis for affecting expeditious adjustment under the provisions of this contractual guarantee.

The above one year period will not include any portion of time the equipment fails to perform satisfactorily due to any defects, and any items repaired or replaced by the Contractor will be guaranteed anew under this provision.

INSTALLATION RECORD

Contract Number NObsr-52393 Date of Contract, 13 Nov. 1951

Serial Number of equipment.....

Date of acceptance by the Navy.....

Date of delivery to contract destination.....

Date of completion of installation.....

Date placed in service.....

Blank spaces on this page shall be filled in at time of installation.

REPORT OF FAILURE

Report of failure of any part of this equipment, during its entire service life, shall be made to the Bureau of Ships in accordance with current regulations using form NAVSHIPS NBS 383 (revised) except for Marine Corps equipment, in which case the "Signal Equipment Failure Report" form shall be used and distributed in accordance with instructions pertaining thereto. The report shall cover all details of the failure and give the date of installation of the equipment. For procedure in reporting failures see Chapter 67 of the *Bureau of Ships Manual* or superseding instructions.

ORDERING PARTS

All requests or requisitions for replacement material should include the following data:

1. Federal stock number or, when ordering from a Marine Corps or Signal Corps supply depot, the Signal Corps stock number.
2. Name and short description of part.

If the appropriate stock number is not available the following shall be specified:

1. Equipment model or type designation, circuit symbol, and item number.
2. Name of part and complete description.
3. Manufacturer's designation.
4. Contractor's drawing and part number.
5. JAN or Navy type number.

SAFETY NOTICE

The attention of officers and operating personnel is directed to Chapter 67 of the of *Bureau of Ships Manual* or superseding instructions on the subject of radio-safety precautions to be observed.

This equipment employs voltage which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

While every practicable safety precaution has been incorporated in this equipment, the following rules must be strictly observed:

KEEP AWAY FROM LIVE CIRCUITS:

Operating personnel must at all time observe all safety regulations. Do not change tubes or make adjustments inside equipment with high voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors. To avoid casualties always remove power and discharge and ground circuits prior to touching them.

DON'T SERVICE OR ADJUST ALONE:

Under no circumstances should any person reach within or enter the enclosure for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

DON'T TAMPER WITH INTERLOCKS:

Do not depend upon door switches or interlocks for protection but always shut down motor generators or other power equipment. Under no circumstances should any access gate, door, or safety interlock switch be removed, short-circuited, or tampered with in any way, by other than authorized maintenance personnel, nor should reliance be placed upon the interlock switches for removing voltages from the equipment.

RESUSCITATION

AN APPROVED POSTER ILLUSTRATING THE RULES FOR RESUSCITATION BY THE PRONE PRESSURE METHOD SHALL BE PROMINENTLY DISPLAYED IN EACH RADIO, RADAR, OR SONAR ENCLOSURE. POSTERS MAY BE OBTAINED UPON REQUEST TO THE BUREAU OF MEDICINE AND SURGERY.

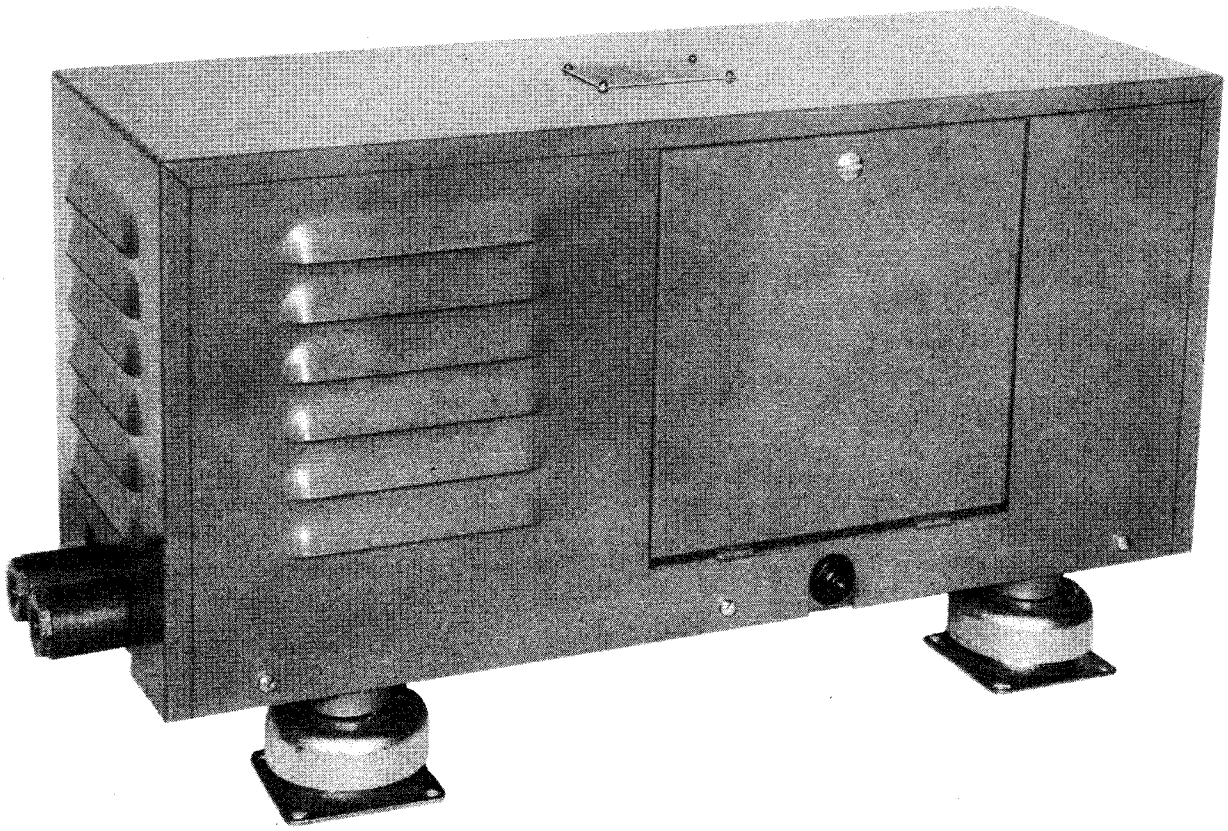


Figure 1-1 Power Supply PP-765/U Front View, Cover On, Door Closed.

SECTION 1
GENERAL DESCRIPTION

1. PURPOSE AND BASIC PRINCIPLES.

a. PURPOSE.--The Power Supply PP-765/U covered in this Instruction Book is designed to rectify AC current, as is usually available, changing it to DC current, for the purpose of furnishing power for the operation of Teletypewriter and converter equipment. It is intended for operation from any standard A.C. source of 115 or 230 volts, single phase, 50 or 60 cycle. It supplies a power output of 120 volts DC, plus or minus 1.5 volts from 0 to 1.0 ampere.

b. BASIC PRINCIPLES.--The Power Supply takes power from the supply line through a suitable input power transformer which, when properly connected, matches the unit to the available 115 or 230 volt line. From the transformer, current flows through a single phase center tap selenium rectifier which changes the alternating current to pulsating direct current. A self-saturating Reactor, in conjunction with suitable resistances, condensers, and a special four tube vacuum tube circuit, serves to smooth the DC output and regulates the voltage within

Figure 1-2 Power Supply PP-765/U Front View, Cover On, Door Open.

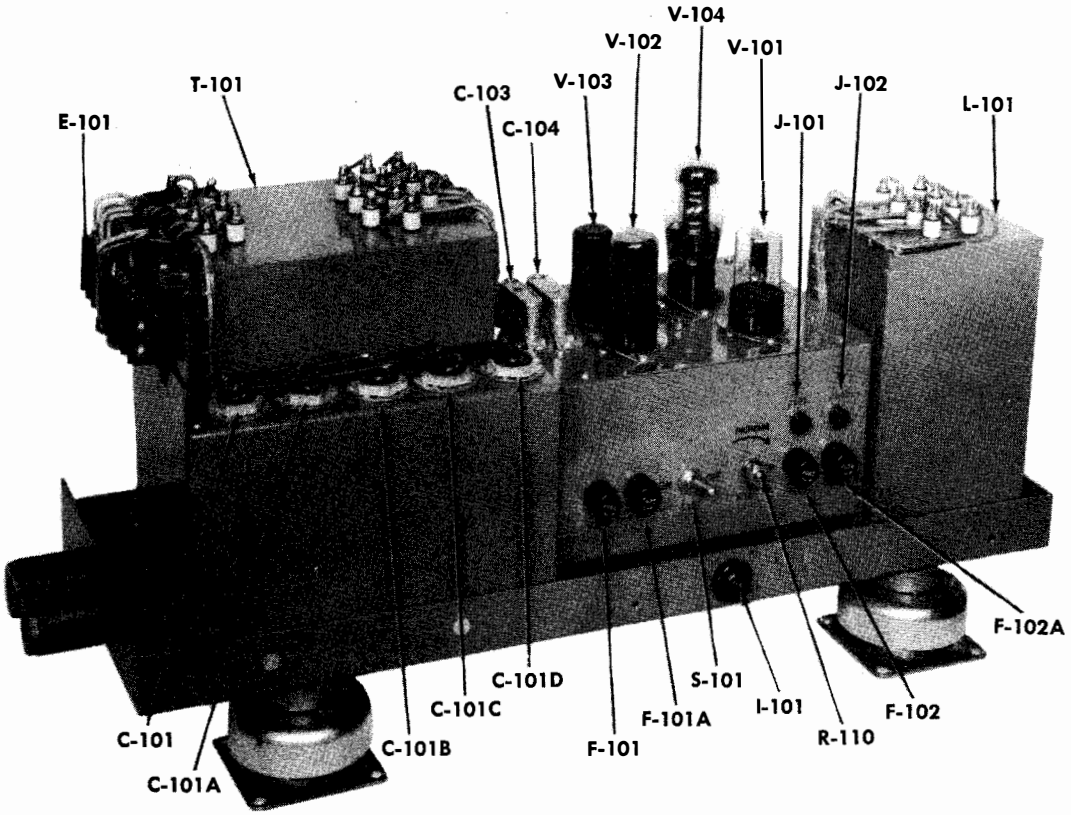


Figure 1-3 Power Supply PP-765/U Front View, Cover Off.

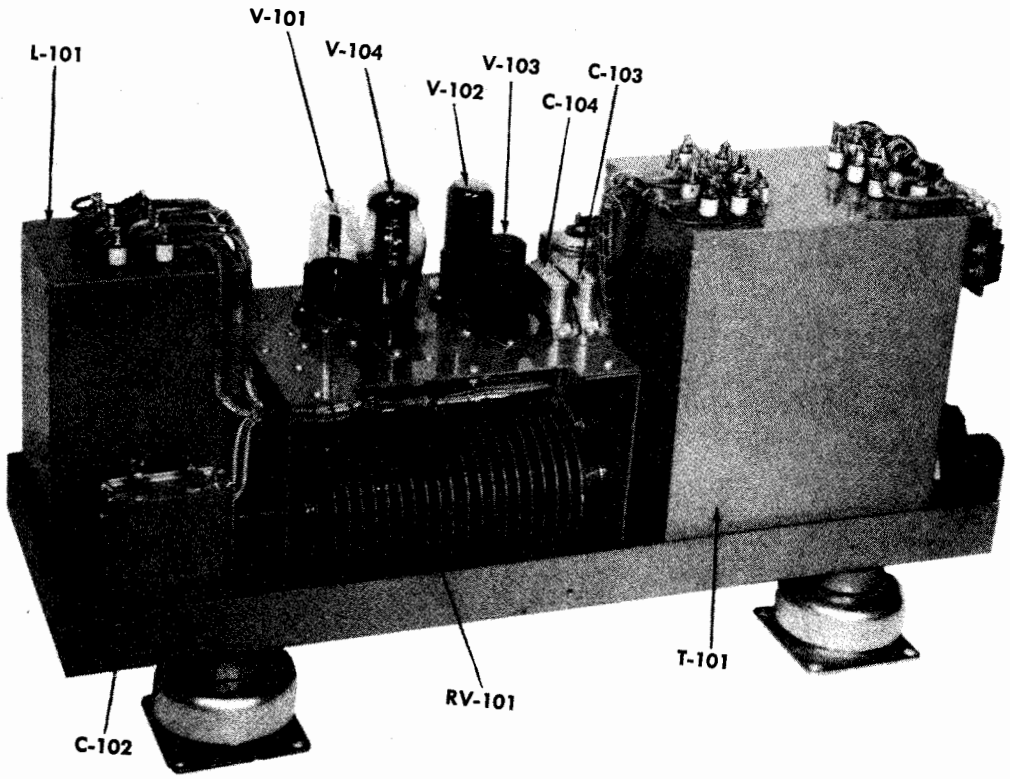


Figure 1-4 Power Supply PP-765/U Rear View, Cover Off.

the close limits required. The circuit and design is such that the output remains steady and regulated within specified limits even though AC input voltage may fluctuate over a comparatively wide range.

2. DESCRIPTION OF UNIT.

a. CABINET AND SUB-BASE.--The components of the Power Supply PP-765/U, are housed in a drip-proof rectangular steel cabinet. (See figure (1-1). Openings through the sub-base in conjunction with louvres in the ends and sides of the cover provide ventilation for heat dissipation. An access door which drops down in the front allows operator to reach the on-off switch, fuses and potentiometer control. (See figure 1-2). An on-off pilot light is provided in the front to indicate whether or not the unit is turned on. The sub-base, made of stamped sheet steel, supports the main components, brackets, and mounting plates required. The entire Power Supply is supported on four rubber shock mounts, each one with mounting flange drilled with four holes for permanent attachment to deck, table, shelf or other horizontal supporting surface.

b. MAIN RECTIFYING SECTION.--The components of the main rectifying section include the power transformer T-101, selenium rectifier RV-101, Reactor L-101, filter condensers C-101 to C-101D, and other associated parts.

c. CONTROL SECTION.--The components of the control section include the same power transformer T-101, certain windings of the Reactor L-101, a rectifier tube V-101, an amplifier tube V-102, an amplifier tube V-103, a voltage regulator tube V-104, a selenium rectifier RV-102 used to supply a bias voltage for tube V-102 and a plate voltage for tube V-103 together with resistors, condensers and other associated parts.

d. GENERAL LAYOUT.--With the cabinet cover removed from the sub-base, the general layout of the entire unit can be observed.

(1) FRONT VIEW. (See figure 1-3)

(a) The transformer T-101 is located to the left. The input output terminal block E-101 is mounted on the top left end of the transformer. The filter condensers C-101, C-101A, C-101B, C-101C, and C-101D are mounted in front of the transformer.

(b) The control section in the center is assembled on a mounting plate, which is fastened to a bracket by eight mounting screws.

(c) The control section tubes V-101, V-102, V-103, V-104, and the condensers C-103 and C-104 are located on top of the mounting plate.

(d) The two input fuses F-101 and F-101A, the two output fuses F-102 and F-102A, the on-off switch S-101, the output voltage control potentiometer R-110, and two DC output pin jacks J-101 and J-102 which may be used for an external voltmeter connection, are located on the front of the mounting plate.

(e) The on-off pilot light I-101 is located on the front of the sub-base near the center.

(f) The saturable reactor L-101 is located at the right side of the unit.

(2) REAR VIEW. (See figure 1-4)

(a) The main selenium rectifier RV-101 is mounted on the sub-base just below the control section.

(b) The condenser C-102 is mounted to the left of the unit on the sub-base.

(3) TOP VIEW. (See figure 1-5)

(a) The general layout of the Power Supply can be observed in this view. Terminal Block E-101 is at the left. Transformer Terminals 1 through 20 are shown on top of Transformer T-101 on the left. The control section tubes V-101, V-102, V-103, and V-104 are in the center. Reactor Terminals 1 through 8 are shown to the right on top of the Reactor L-101.

(4) BENEATH MOUNTING PLATE. (See figure 1-6)

(a) The selenium rectifier RV-102 with resistor R-109 nearby is located beneath the mounting plate.

(b) The resistors R-103B, R-103C, R-104, R-104A, R-105 and R-108 are located beneath the mounting plate and are connected into their respective circuits around the turret socket XV-102 holding tube V-102.

(c) The resistors R-103 and R-103A are located beneath the mounting plate and are connected into their respective circuits around the turret socket XV-101 holding tube V-101.

(d) The resistors R-102 and R-102A are

mounted on the underside of mounting plate between the turret socket holding tube V-101 and the socket holding tube V-104.

(e) The resistors R-106 and R-107 are located beneath the mounting plate and are connected into their respective circuits around the socket XV-104 holding tube V-104.

(f) The resistor R-101 is located mounted on the underside of plate midway between socket XV-104 holding tube V-104 and socket XV-103 holding tube V-103.

(5) END VIEW. (See figure 1-7)

(a) This view of left end of Power Supply Unit shows input terminals A and C, junction terminals 1, 2 and 3, output terminals plus and minus, and ground terminal GD. Input-output cable connecting terminal tubes O-107 and O-107A are shown.

3. REFERENCE DATA.

a. Nomenclature PP-765/U - Power Supply

b. Contract number and date NObsr 52393, May 9, 1951

c. Contractor - Power Equipment Co., Detroit 2, Michigan

d. Cognizant Naval Inspector - Inspector of Naval Material, Cleveland, Ohio

e. Equipment Shipped - One Crate per shipment of equipment.

f. Cubic Contents -

Uncrated, total cubic contents are 1.5 cubic feet.

Crated, total cubic contents are 19.6 cubic feet.

g. Weight -

Per shipment total crated weight is 375 pounds. Total uncrated weight is 123 pounds. Equipment spares are included.

h. Power Supply Required -

(1) 3.5 amperes, 105-125 volts AC
(115 volt nominal)
225 watts 0.56 power factor
105 watts heat dissipation

(2) 1.75 amperes, 210-250 volts AC
(230 volt nominal)
225 watts 0.56 power factor
105 watts heat dissipation

i. Rectifier Output -

120 watts 120V $\pm$ 1.5 volts DC @ 0-1.0 ampere.

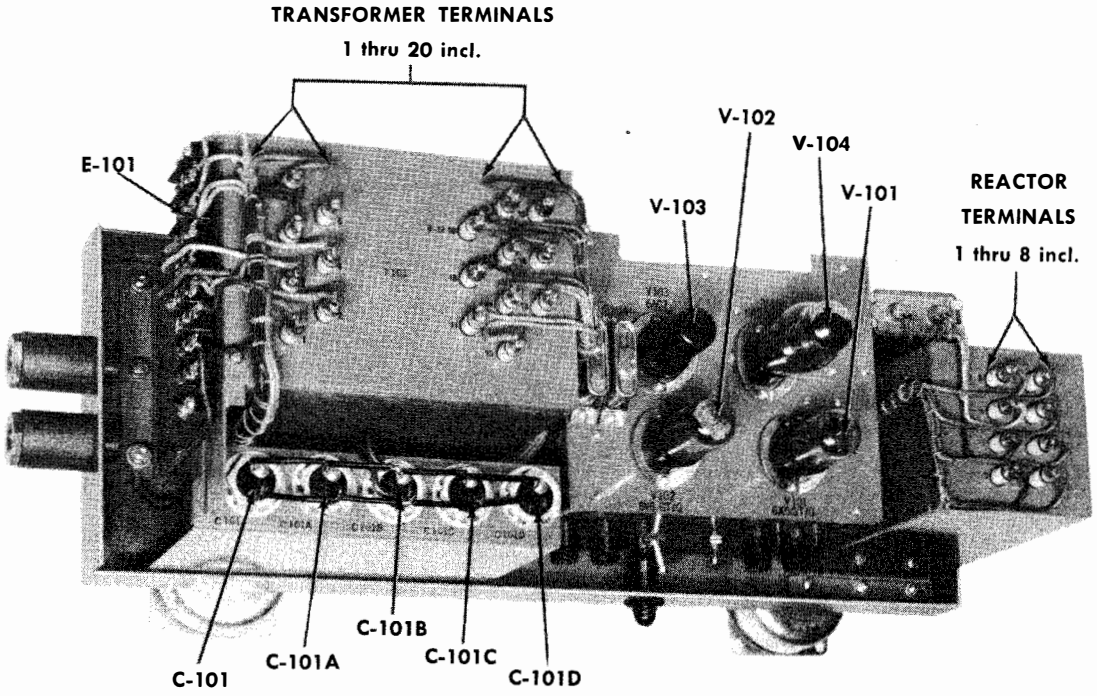


Figure 1-5 Power Supply PP-765/U Top View, Cover Off.

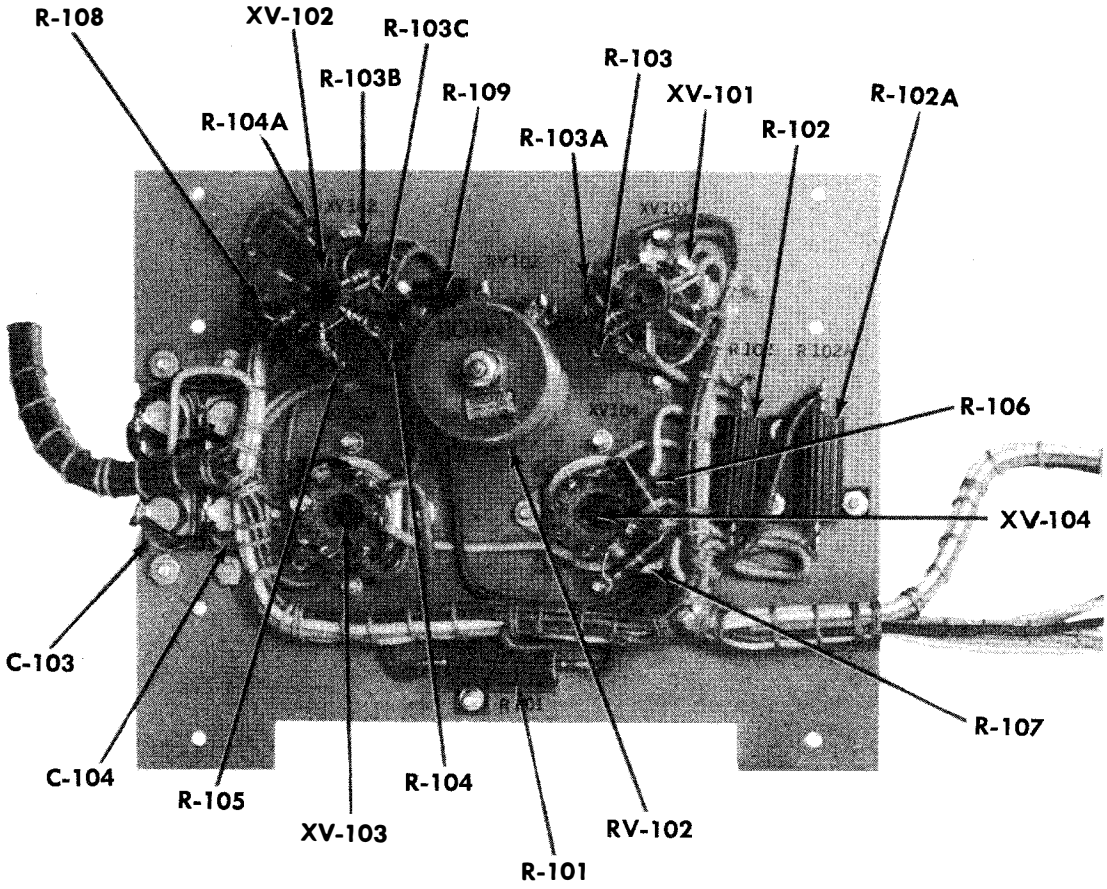


Figure 1-6 Power Supply PP-765/U Tube Mounting Plate (underside).

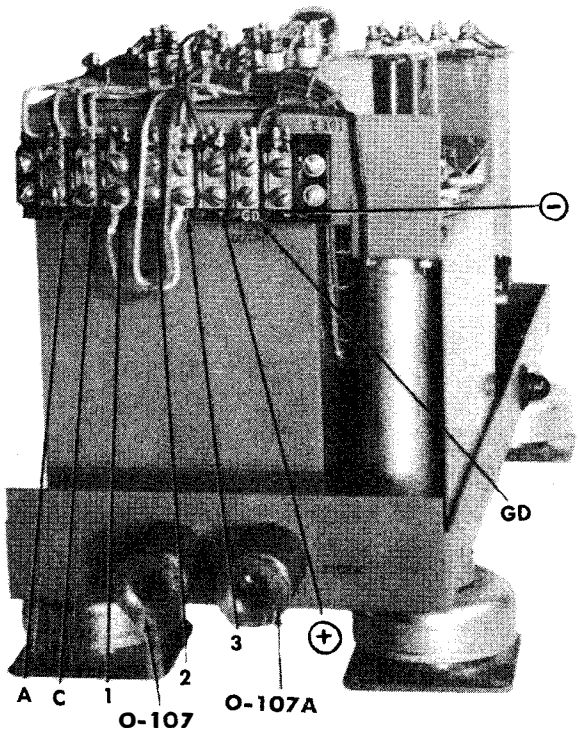


Figure 1-7 Power Supply PP-765/U End View - Terminal Block.

TABLE 1-1. EQUIPMENT SUPPLIED

Quan. per Crate	Name of Item	Navy Type Design-ation	Overall Dimensions	Vol-ume	Weight
1	Power Supply	PP-765/U	22" Lg. 12 1/8" hx8" wide	1.2 cu.ft.	72 lbs.
1	Electron Tube	JAN-6x5 GT/G	1.32 dia 3.32 high		
1	Electron Tube	JAN-6AC7	1.32 dia 2.63 high		
1	Electron Tube	JAN-6V6 GT/G	1.32 dia 3.32 high		
1	Electron Tube	JAN-OA3/ VR 75	1 3/16" dia 4 1/8" high		
2	Instruction Book			.3 cu.ft.	51 lbs.
1	Set Equipment Spares				

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

Quan. per Equip.	Name of Unit	Required Characteristics
1	Power Source	105-125 volts AC (115 volts nominal) or 210-250 volts AC (230 volts nominal, 50-60 cycle, single phase
1	Input Power Wiring (AC)	2-conductor, 125 volts 3.5 ampere minimum or 250 volt 1.75 ampere minimum. Length to suit
1	Output Power Wiring (DC)	2-conductor 120 volts 1.25 amp minimum. Length to suit
1	Ground Cable	Ground DC common and cabinet to available ground.

TABLE 1-3. SHIPPING DATA

Ship-ping Box No.	Contents		Over-All Dimensions			Vol-ume	Weight
	Name	Designation	H	W	D		
1	Power Supply & equipment spares	PP-765/U	26-1/4	24-1/8	34-3/8	19.6 cu. ft.	375 lbs.

TABLE 1-4. VACUUM TUBE COMPLEMENT

	Number of Tubes of Type Indicated			
	6AC7	6V6GT/G	6x5GT/G	OA3/VR75
PP-765/U Power Supply	1	1	1	1

NOTES

1. ALL VALUES EXPRESSED IN MICROFARADS, HENRIES AND OHMS UNLESS OTHERWISE INDICATED.
2. RESISTANCE OF COIL WINDINGS MEASURED AT 25° C.

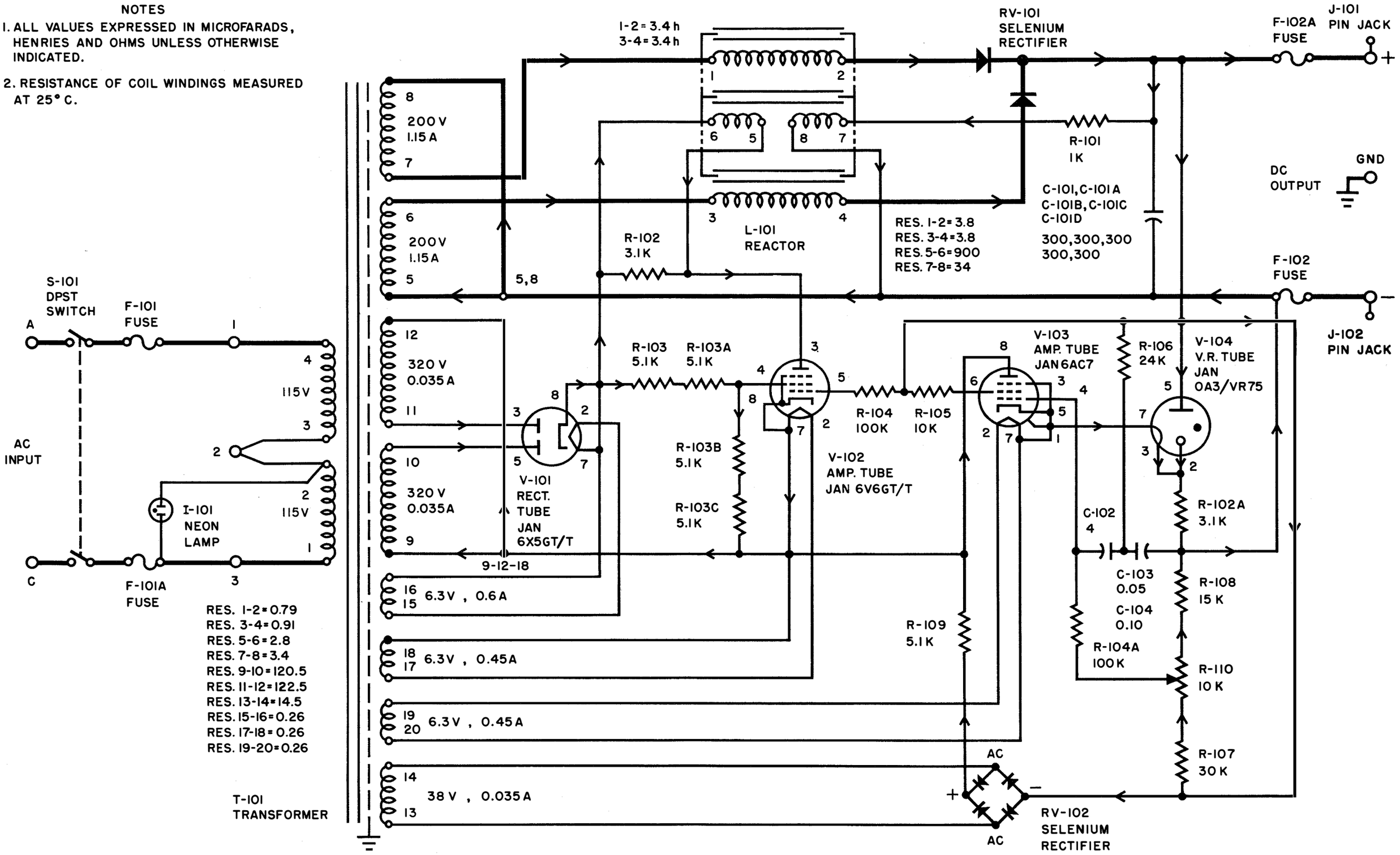
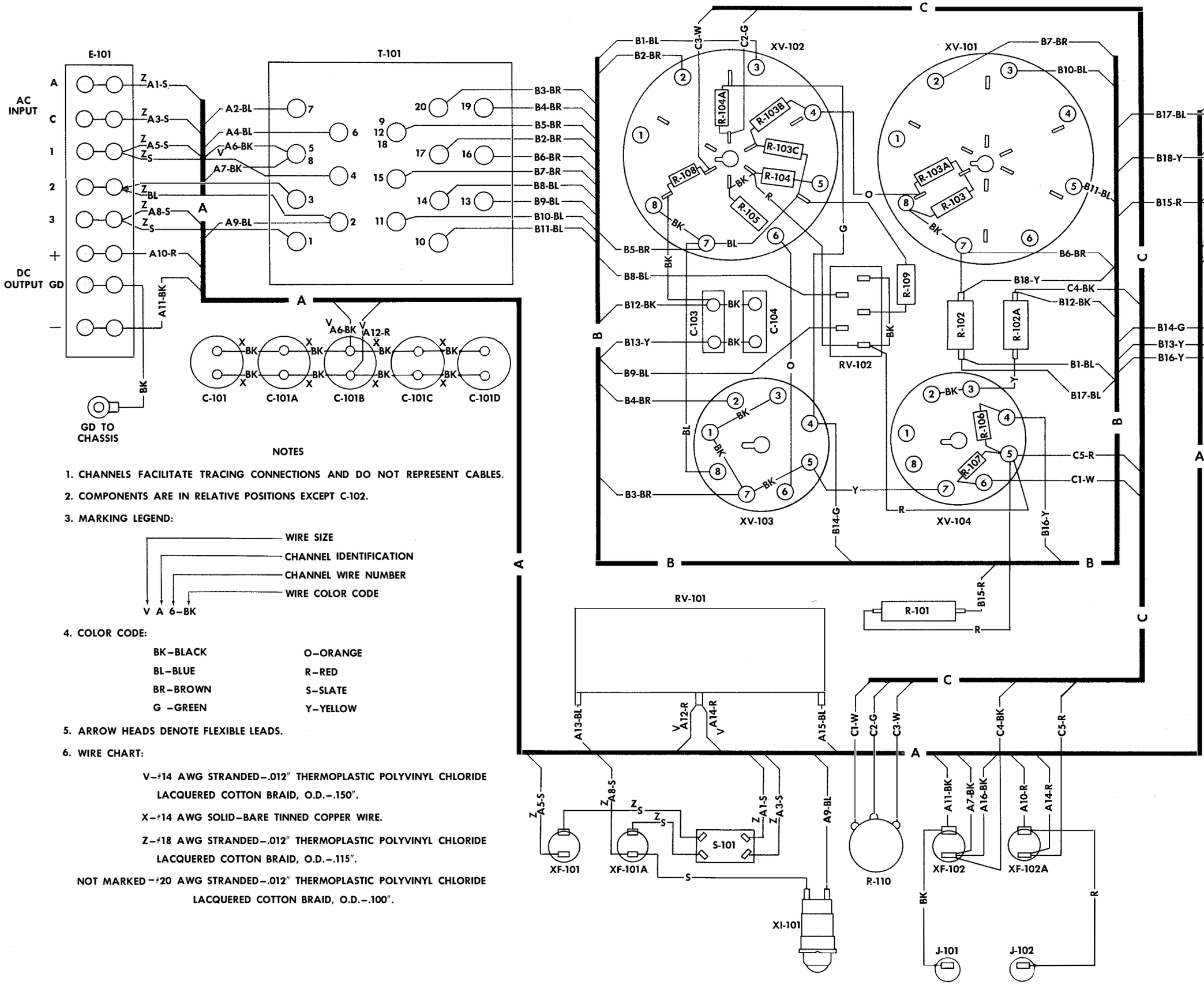


Figure 2-1 Power Supply PP-765/U Schematic Wiring Diagram



NOTES

1. CHANNELS FACILITATE TRACING CONNECTIONS AND DO NOT REPRESENT CABLES.
2. COMPONENTS ARE IN RELATIVE POSITIONS EXCEPT C-102.
3. MARKING LEGEND:

4. COLOR CODE:

BK–BLACK	O–ORANGE
BL–BLUE	R–RED
BR–BROWN	S–SLATE
G –GREEN	Y–YELLOW

5. ARROW HEADS DENOTE FLEXIBLE LEADS.
6. WIRE CHART:

V–#14 AWG STRANDED–.012″ THERMOPLASTIC POLYVINYL CHLORIDE LACQUERED COTTON BRAID, O.D.–.150″.

X–#14 AWG SOLID–BARE TINNED COPPER WIRE.

Z–#18 AWG STRANDED–.012″ THERMOPLASTIC POLYVINYL CHLORIDE LACQUERED COTTON BRAID, O.D.–.115″.

NOT MARKED–#20 AWG STRANDED–.012″ THERMOPLASTIC POLYVINYL CHLORIDE LACQUERED COTTON BRAID, O.D.–.100″.

Figure 2-2 Power Supply PP-765/U Actual Wiring Diagram

SECTION 2
THEORY OF OPERATION

1. MECHANICAL ARRANGEMENT.

a. Power Supply PP-765/U is capable of delivering 120V±1.5 volts DC @ 0-1.0 ampere, for operating Teletypewriter and converter Equipment.

b. Ventilation is provided by a rectangular opening in the sub-base directly below the selenium rectifier RV-101 in conjunction with louvres in the ends and sides of the cabinet cover.

c. The input and output Terminal Block E-101 is made accessible by removing the cabinet cover.

2. ELECTRICAL CIRCUITS. (See figure 2-1, 2-2)

a. Input Power is supplied by a 115, or 230 volt, 50-60 cycle, single phase, AC source. Two leads from this source carry power to the two AC input terminals marked A & C on Terminal Block E-101.

b. The input voltage is applied through the AC on-off switch to the input AC fuses. It is then applied through the fuses to Terminal No. 1 and No. 3 of the Terminal Block. Terminal No. 1 and No. 3 of the Terminal Block are connected to Terminal No. 4 and No. 1 respectively of Transformer T-101.

c. For 115 volt input, Terminal No. 3 of the transformer is connected to Terminal No. 3 of the terminal block and Terminal No. 2 of the transformer is connected to Terminal No. 1 of the Terminal Block. (See figure 3-2)

d. For 230 volt input, Terminals No. 2 and No. 3 of transformer are connected to Terminal No. 2 of the Terminal Block.

e. Stated another way, the two primary windings of the input transformer are connected in parallel for 115 volt operation, and in series for 230 volt operation.

f. DC output voltmeter connection points are available at the Red Pin Jack J-101, and at the Black Pin Jack J-102 located on the fuse panel. The Red Pin Jack is the positive side of output and the Black Pin Jack is negative.

3. FUNCTION OF PARTS.

The rectification of the Power Supply PP-765/U is obtained by use of a selenium rectifier RV-101 which is connected in a single phase center tap hookup. AC is applied to the selenium rectifier through Transformer T-101 from Terminals 5, 6, 7 and 8.

a. FILTER NETWORK.--The output voltage of the selenium rectifier is applied to the filter section which consists of condensers C-101 to C-101D. This filter network along with action of Reactor L-101 reduces the ripple content to less than 1 volt r.m.s. or .83% of the output voltage.

b. REGULATION

(1) The regulation is obtained by the Reactor L-101 and its associated control components. This Reactor may be considered as a variable impedence.

(2) Coil 1-2 and coil 3-4 of the Reactor are called series windings. Coil 7-8 is called a shunt winding and coil 5-6 is called a control or bias winding.

(3) The two amplifier tubes V-103 and V-102 amplify output voltage changes and thus control the current through the resistor R-102. The voltage of this resistor determines the saturating current through the control winding 6-5 of Reactor L-101. A change in the saturation of the Reactor will increase or decrease its impedence which in turn will decrease or increase the voltage output. In other words, as impedence increases voltage decreases.

(4) A voltage divider network consisting of resistor R-101 and the shunt winding 7-8 of the Reactor also tends to regulate the output voltage. If the output voltage increases or

decreases the voltage and hence the current of the shunt winding 7-8 will vary. The change in current will increase or decrease the saturation of the coil and thus increase or decrease the output voltage.

(5) A voltage divider network consisting of fixed resistors R-107 and R-108 and variable resistor R-110 is connected across the 120 volt output. Therefore the voltage at the center tap of the adjustable potentiometer R-110 varies in proportion to the voltage variation across the divider.

(6) Another voltage divider network consisting of the voltage regulator tube V-104 and resistor R-102A is connected across the 120 volts output. Here, the voltage across R-102A will vary directly as the output voltage varies. This voltage is compared with the voltage at the center tap of potentiometer R-110 and the difference of the two is applied to the grid of the amplifier tube V-103. With a change of output voltage the voltage across R-102A has greater change than the voltage of R-110 and thus controls the output voltage. By this change of voltage being impressed on the amplifier tube V-103 and subsequently amplified by the beam power tube V-102, the resulting change voltage across R-102 is great enough to change the voltage across and thus the current through Reactor control winding 6-5 which results in regulation of the output voltage.

(7) The capacitors C-102, C-103, C-104 and resistor R-106 permit feeding back certain voltages into the regulating circuit in such phase that they prevent the entire circuit from hunting.

4. TUBE POWER SUPPLY.

a. Plate and bias voltage for the beam power tube V-102 is supplied by the rectifier tube V-101 as it draws from terminals 9, 10, 11 and 12 of transformer T-101.

b. Output voltage from selenium rectifier RV-102 in conjunction with the voltage across the voltage regulator tube V-104 supplies the plate voltage for amplifier tube V-103.

c. Selenium rectifier RV-102, connected in a bridge circuit, draws from terminals 13-14 of transformer T-101.

SECTION 3
INSTALLATION

1. UNPACKING

Each Power Supply PP-765/U is individually packed with equipment spares for shipment. Each package will contain the tubes of the circuit as listed in Section 1, paragraph 4, as well as equipment spares. The following steps should be taken for unpacking:

a. Clip metal bands that bind shipping box.
b. Pull out nails and remove top cover.
c. Equipment -
   (1) Cut open heavy waterproof paper bag.
   (2) Remove excelsior pads from top and sides of carton
   (3) Lift out carton with unit inside
   (4) Cut off carton
   (5) Cut open vaporproof bag
   (6) Cut off carton
   (7) Remove wood protective frame from top and side of unit
   (8) Remove bolts holding unit to base board
d. Equipment Spare Parts -
   (1) Cut open heavy waterproof paper bag
   (2) Remove excelsior pads from top and sides of carton
   (3) Lift out carton with unit inside
   *
   (4) Cut off carton
   (5) Pull out nails and remove top cover of box
   (6) Remove spare parts from box
   *
   (7) Cut off individual vaporproof bag
   (8) Remove cartons

* Denotes spare may be stored at this stage of packing.

2. INSTALLATION

a. The Power Supply can be located on any shelf, table, bench, deck or other horizontal surface within reasonable distance of the equipment it is to supply with power. The unit should be situated where normal temperatures and humidity do not exceed that required for

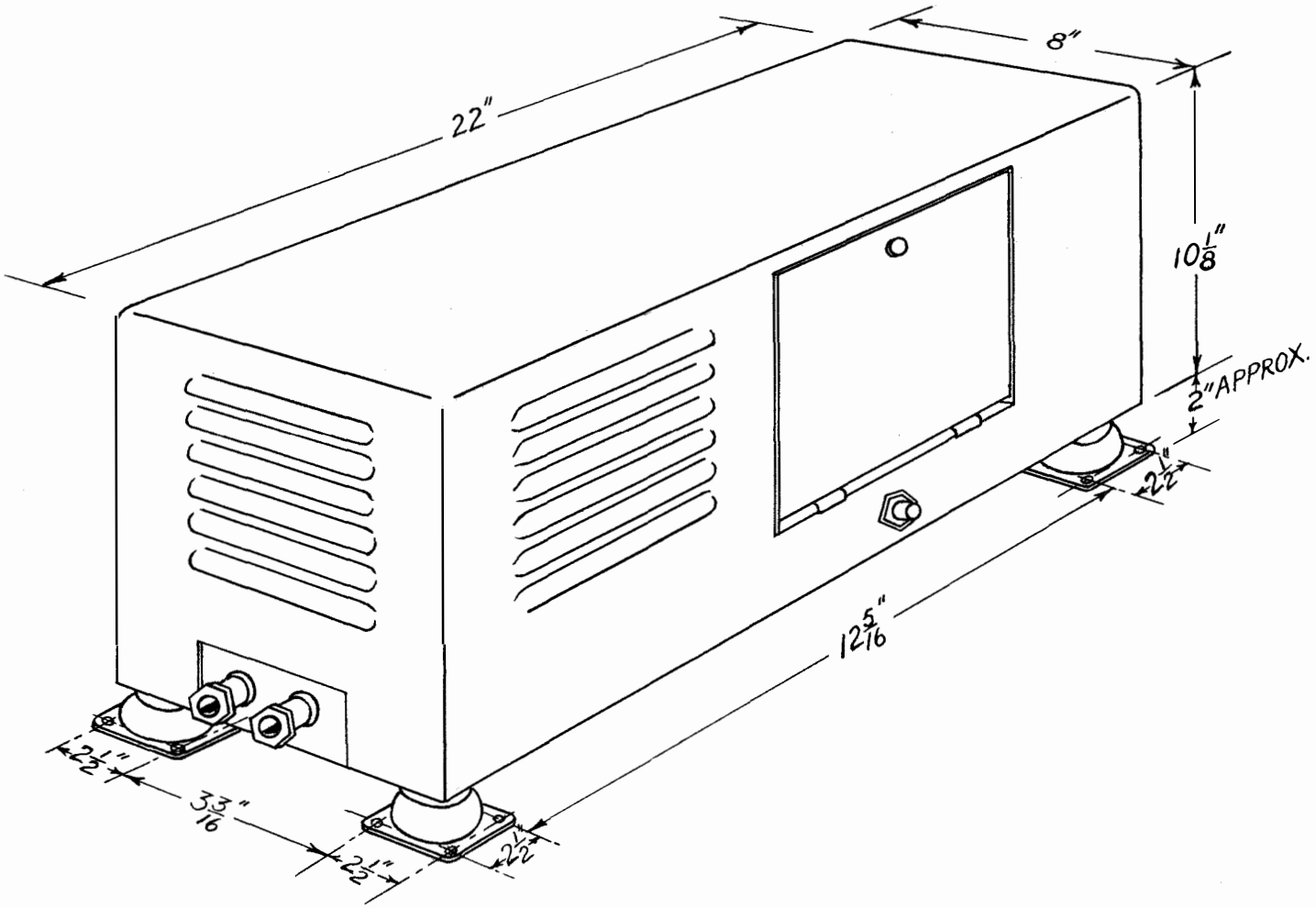


Figure 3-1 Power Supply PP-765/U Installation Base Plan Drawing.

comfort by personnel. A dry, well-ventilated location is preferable, and care should be exercised to avoid cutting off air circulation through the unit by stacking other equipment on, about, or too close beside the unit.

b. Four shock mounts O-106 are provided with drilled mounting flanges for attaching to the supporting surface. Suitable mounting holes may be drilled following the dimensions shown in the Installation Drawing. (See figure 3-1.) While these mounts are designed to absorb any ordinary, normal or occasional vibration

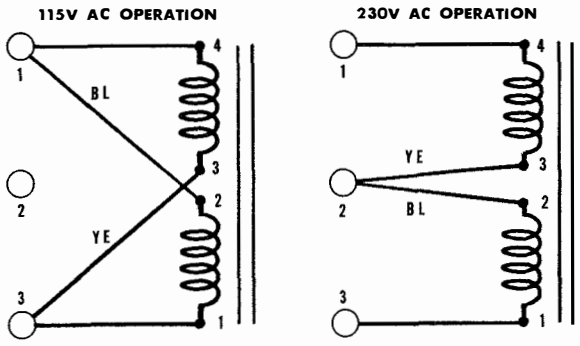


Figure 3-2 Power Supply PP-765/U Input Terminal Connection for 230 or 115 Volt Operation.

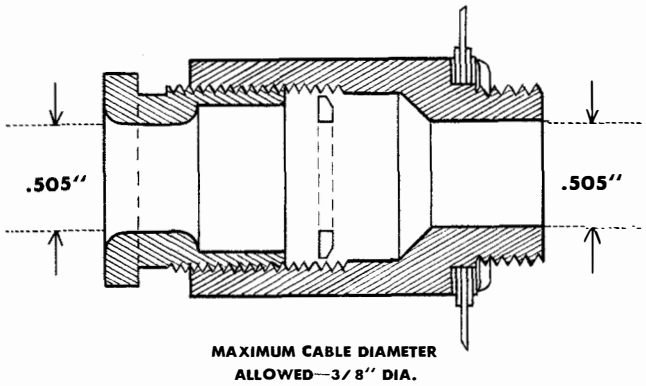


Figure 3-3 Power Supply PP-765/U Terminal Stuffing Tubes.

encountered, it is best to select as stable a mounting surface as possible.

c. Occasional servicing and adjusting requirements may make it necessary to remove the cabinet cover. Twelve inches will be required for removal. Keep in mind the space necessary for this operation so as not to locate the unit too close to an overhanging shelf or other interfering equipment which might be above the desired location.

3. ELECTRIC POWER SOURCE.

The Power Supply Unit requires Alternating Current input for its operation. Provided proper preliminary adjustment and hook-up is made as described in paragraph 4 a, following, the unit may be connected to either one of two sources:

Nominal 115 volt AC, 50-60 cycle, single phase capable of supplying a minimum of 3.5 amperes. It is permissable for input voltage to swing from 105-125 volts.

Nominal 230 volt AC, 50-60 cycle, single phase capable of supplying a minimum of 1.75 amperes. It is permissable for input voltage to swing from 210-250 volts.

4. PRELIMINARY HOOK-UP

a. First determine from known authority or by test which of the two specified power sources is available. Then on terminal block of Power Supply make the correct hook-up as described below: (See figure 3-2)

(1) For 230 volt operation place yellow and black leads on Terminal No. 2 on the Terminal Block E-101.

(2) For 115 volt operation place yellow lead on Terminal No. 3, and place black lead on Terminal No. 1 on Terminal Block E-101.

CAUTION

Always ascertain nature of power source and make necessary change in Terminal Block hook-up before installing new Power Supply. Do the same when transferring used unit from one power source to another unknown source. Failure to make these checks can result in damage to the Power Supply.

5. WIRING

a. Double conductor supply and output cables, of capacity suitable to handle the rated current, and of a suitable length should be provided. Screw type terminal block permits use of ordinary spade or lug type soldered connectors on supply and output cable ends. Screw type terminal tubes are provided in the end of the sub-base just below the terminal block for introducing cables to interior of cabinet.

b. Install supply and output cables, passing them through terminal tubes in sub-base (See figure 3-3) and up to Terminal Block, attaching input leads to Terminal A and Terminal C, and attaching output leads to Terminal plus and Terminal minus. Either the plus terminal or the minus terminal can be connected to ground depending on which is grounded in the load system.

6. INITIAL ADJUSTMENT.

a. The factory setting of the potentiometer R-110, which regulates output voltage, will usually be satisfactory. However, as a precaution, check to determine output voltage as follows:

(1) Provide a standard DC voltmeter, preferably 1000 ohms per volt, with scale reading not more than three times the rated output voltage of 120 volts.

(2) Connect test voltmeter to output in Jacks J-101 and J-102.

(3) Start Power Supply by snapping on-off switch to "on" position. With load (not more than 16 teletypewriters at 0.060 amperes each or not more than 48 teletypewriters at 0.020 amperes each) operating, voltage should not vary more than 1.5 volts above or below 120 volts.

b. Should output voltage, as checked above, be at wider variance, loosen potentiometer shaft lock nut, and with screw driver turn shaft to adjust either way as required.

(1) Once the Power Supply is set for proper voltage output, the test voltmeter may be disconnected.

(2) As Power Supply is operated over a period of time, the selenium rectifier tends to "age" and minor readjustment, as above, may be required from time to time, depending on the number of hours, operating conditions, and other variable factors.

SECTION 4
OPERATION

1. PURPOSE AND BASIC PRINCIPLES.

a. PURPOSE.--The Power Supply PP-765/U covered in this Instruction Book is designed to rectify AC current, as is usually available, changing it to DC current, for the purpose of furnishing power for the operation of Teletypewriter equipment. It is intended for operation from any standard AC source of 115 or 230 volts, single phase, 50 or 60 cycle. It supplies a power output of 120 volts DC, plus or minus 1.5 volts from 0 to 1.0 ampere.

2. STARTING

a. With the Power Supply properly wired to its Alternating Current Source and its Direct Current Load and with initial adjustment completed as in Section 3, Paragraph 6, it may be started by snapping the on-off switch S-101 to the "on" position.

(1) With switch in "on" position pilot lamp should light up, indicating that AC current is available to the Power Supply, and DC Load should be operative, indicating that the Power Supply is functioning.

(2) Should Power Supply fail to function, make a check of the input and output fuses replacing any found to appear defective.

(3) If fuses burn out again as quickly as replaced, further search for trouble will be necessary as described in Section 7, paragraph 2,7.

(4) Potentiometer R-110 should be adjusted to give 120V $\pm$ 1.5V at the voltmeter connection jacks J-101 and J-102. An external meter should be used.

3. STOPPING

a. The Power Supply may be shut down by snapping the on-off switch S-101 to the "off" position. No other operation or special precaution is necessary.

(1) Keeping the Power Supply shut down, except when need of power is anticipated, will prolong its life, and is suggested as a good general practice. However, rating is such that, when required, Power Supply may be operated continuously.

4. ADJUSTMENT.

a. The factory setting of the potentiometer R-110, which regulates output voltage, will usually be satisfactory. However, as a precaution, check to determine output voltage as follows:

(1) Provide a standard DC voltmeter, preferably 1000 ohms per volt, with scale reading not more than three times the rated output voltage of 120 volts.

(2) Connect test voltmeter to output in Jacks J-101 and J-102.

(3) Start Power Supply by snapping on-off switch to "on" position. With load (not more than 16 teletypewriters at 0.060 amperes each or not more than 48 teletypewriters at 0.020 amperes each) operating, voltage should not vary more than 1.5 volts above or below 120 volts.

b. Should output voltage, as checked above, be at wider variance, loosen potentiometer shaft lock nut, and with screw driver turn shaft to adjust either way as required.

(1) Once the Power Supply is set for proper voltage output, the test voltmeter may be disconnected.

(2) As Power Supply is operated over a period of time, the selenium rectifier tends to "age" and minor readjustment, as above, may be required from time to time, depending on the number of hours, operating conditions, and other variable factors.

SECTION 5
OPERATOR'S MAINTENANCE

1. EMERGENCY MAINTENANCE.

a. FUSES.--If Power Supply does not turn on when on-off switch is snapped to "on" position, as indicated by failure of Pilot Light to light or failure of load (Teletypewriter) equipment to perform as it should, then it is most probable that difficulty can be corrected by replacement of one or more of the fuses.

(1) Fuses F-101 and F-101A are input fuses, rated at 5 amperes, and are held in fuseholders immediately to the left of the on-off switch.

(2) Turn black, knurled cap marked "FUSE" in direction of arrow and remove fuses one at a time. A defective or burned out fuse will usually show up as a black smudge in the glass tube or a visible break in the lead colored fuse element inside the tube.

(3) If apparently burned out or defective fuse is found on input side, replace it with one of equal capacity. If new fuse burns out immediately upon replacement further check becomes necessary. Refer to Section 7, paragraph 2.

(4) Fuses F-102 and F-102A, are output fuses, rated at 2 amperes, and are held in fuseholders immediately to the right of the on-off switch.

(5) Turn black, knurled cap marked "FUSE" in direction of arrow and remove fuses one at a time. A defective or burned out fuse will usually show up as a black smudge in the glass tube or a visible break in the lead colored fuse element inside the tube.

(6) If apparently burned out or defective fuse is found on output side, replace it with one of equal capacity. If new fuse burns out immediately upon replacement further check becomes necessary. Refer to Section 7, paragraph 7.

CAUTION

Never replace a fuse with one of higher rating unless continued operation of the equipment is more important than probable damage. If correct size fuse burns out immediately after replacement, do not replace it a second time until the cause has been corrected.

b. PILOT LIGHT.--If Power Supply functions after fuse replacement, but pilot light remains out, it is likely that the pilot light is burned out and requires replacement.

(1) Pilot Lamp I-101 is neon type with regular "bayonet" type base. Pilot Lamp Lens is mounted in a threaded type ring - turn counterclockwise to remove. Press in on bulb, turn counterclockwise and withdraw, making replacement with same type of lamp.

NOTE

Replacement of Pilot Lamp need not be considered as an emergency necessity, as its operation in no way effects the function of the Power Supply. Replacement can be made at operator's convenience as Pilot Lamp serves only as an indicator of whether or not the Unit is on or off.

c. TUBES.--If replacement of fuses fails to place Power Supply in correct operation, and fuses do not burn out again, consider replacement of vacuum tubes as possible corrective measure.

(1) With on-off switch in "off" position, remove cabinet cover to gain access to tubes.

(2) Remove old tube and install a new tube or one known to be good of same type in socket. Snap switch to "on" position, and note if unit starts to function.

(3) Continue to replace tubes as above, one

at a time, so that if unit starts to function, it will be known which tube was defective.

NOTE

Emergency spare tubes that are known to be in good condition should be kept on hand for replacement. If standard tube tester is not available, check spare tubes by trying them in a Power Supply Unit known to be functioning properly.

(4) If defective tube is found and replacement makes unit function again, cabinet cover may be installed.

(5) If no defective tube is found, and unit remains inoperative, further search for trouble must be made. Refer to Section 7, paragraph 2.

SECTION 6

PREVENTIVE MAINTENANCE

1. ROUTINE MAINTENANCE CHECKS.

a. Keep Power Supply Unit in the clear. Avoid placing other objects around or on top of unit as they may cut off circulation of air, causing overheating.

b. Every month check input and output lines for condition noting any deterieration, damage or broken connector plugs.

c. With cover off and unit disconnected from AC source, once a month check terminals for presence of foreign objects, dust, or dirt. Wherever warm air circulates, dirt will eventually accumulate.

d. Test all tubes every (3) months using a standard tube tester.

e. Every month check output voltage for proper regulation (120 + 1 1/2 volts DC) and ripple voltage (1 volt AC maximum).

SECTION 7
CORRECTIVE MAINTENANCE

1. OPERATORS MAINTENANCE FROM SECTION 5.

When Power Supply PP-765/U becomes inoperative, and fuses and vacuum tubes have beer checked according to operators maintenance given in Section 5 without restoring operation, it then becomes necessary to make more detailed tests to determine the cause of failure.

2. INPUT FUSES BURN OUT.

a. When input fuse replacement fails to restore the unit to service, check for probable trouble as follows:

(1) Check nominal input voltage. (115V-230V) Note if transformer leads are connected to right terminals to properly match unit to available supply voltage. (See Section 3, paragraph 4)

(2) Make a thorough visual inspection for shorted terminals, leads or broken wires. Tube mounting plate may be removed and tilted up for close inspection of lower side.

(3) Check main filter condenser bank C-101 to C-101D on left side of unit for shorts or opens. (See Table 7-1)

(4) Check resistance R-101, for open, short, or improper value. (See Table 7-2)

(5) Check main transformer T-101 for open, shorted or grounded windings.

(6) Check regulator L-101 for open, shorted or grounded windings.

(7) Check main selenium rectifier RV-101 for shorted condition.

(8) Check Continuity of remaining circuits for possible shorts or grounds.

3. ALL TUBES FAIL TO LIGHT.

a. When Power Supply becomes inoperative, and all tubes fail to light, check as follows

FAILURE REPORTS

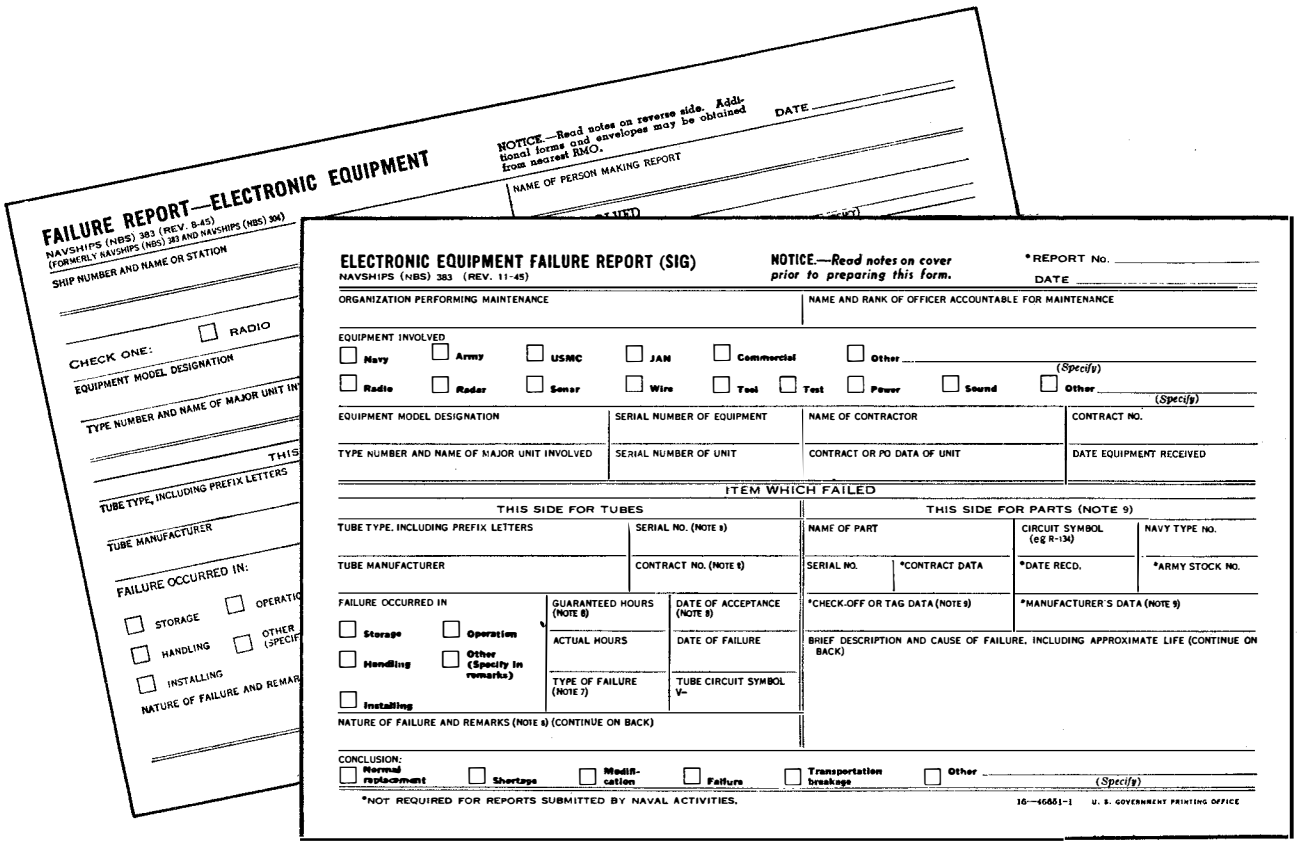
A FAILURE REPORT must be filled out for the failure of any part of the equipment whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NBS-383, which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS in the franked envelope which is provided. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example, under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as T-803, in the case of a transformer, or R-207, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of failure and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from any Electronics Officer.



FAILURE REPORT—ELECTRONIC EQUIPMENT
NAVSHIPS (NBS) 383 (REV. 8-45)
(FORMERLY NAVSHIPS (NBS) 383 AND NAVSHIPS (NBS) 304)
SHIP NUMBER AND NAME OR STATION
CHECK ONE: RADIO
EQUIPMENT MODEL DESIGNATION
TYPE NUMBER AND NAME OF MAJOR UNIT IN
TUBE TYPE, INCLUDING PREFIX LETTERS
TUBE MANUFACTURER
FAILURE OCCURRED IN:
STORAGE
HANDLING
INSTALLING
NATURE OF FAILURE AND REMAR
NOTICE.—Read notes on reverse side. Additional forms and envelopes may be obtained from nearest RMO.
DATE
NAME OF PERSON MAKING REPORT

ELECTRONIC EQUIPMENT FAILURE REPORT (SIG)
NAVSHIPS (NBS) 383 (REV. 11-45)
NOTICE.—Read notes on cover prior to preparing this form.
*REPORT No.
DATE
ORGANIZATION PERFORMING MAINTENANCE
NAME AND RANK OF OFFICER ACCOUNTABLE FOR MAINTENANCE
EQUIPMENT INVOLVED
Navy Army USMC JAN Commercial Other (Specify)
Radio Radar Sonar Wire Tool Test Power Sound Other (Specify)
EQUIPMENT MODEL DESIGNATION
SERIAL NUMBER OF EQUIPMENT
NAME OF CONTRACTOR
CONTRACT NO.
TYPE NUMBER AND NAME OF MAJOR UNIT INVOLVED
SERIAL NUMBER OF UNIT
CONTRACT OR PO DATA OF UNIT
DATE EQUIPMENT RECEIVED
ITEM WHICH FAILED
THIS SIDE FOR TUBES
TUBE TYPE, INCLUDING PREFIX LETTERS
SERIAL NO. (NOTE 8)
TUBE MANUFACTURER
CONTRACT NO. (NOTE 8)
FAILURE OCCURRED IN
Storage Operation Handling Other (Specify in remarks) Installing
GUARANTEED HOURS (NOTE 8)
DATE OF ACCEPTANCE (NOTE 8)
ACTUAL HOURS
DATE OF FAILURE
TYPE OF FAILURE (NOTE 7)
TUBE CIRCUIT SYMBOL V–
NATURE OF FAILURE AND REMARKS (NOTE 8) (CONTINUE ON BACK)
THIS SIDE FOR PARTS (NOTE 9)
NAME OF PART
CIRCUIT SYMBOL (eg R-134)
NAVY TYPE NO.
SERIAL NO.
*CONTRACT DATA
*DATE RECD.
*ARMY STOCK NO.
*CHECK-OFF OR TAG DATA (NOTE 9)
*MANUFACTURER'S DATA (NOTE 9)
BRIEF DESCRIPTION AND CAUSE OF FAILURE, INCLUDING APPROXIMATE LIFE (CONTINUE ON BACK)
CONCLUSION:
Normal replacement Shortage Modification Failure Transportation breakage Other (Specify)
*NOT REQUIRED FOR REPORTS SUBMITTED BY NAVAL ACTIVITIES.
16—46681-1 U. S. GOVERNMENT PRINTING OFFICE

Figure 7-1 Failure Report, Sample Form

for probable cause of trouble:

(1) Check availability and proper value (115-230 volts) of input voltage, and determine that input fuses are still good.

(2) Check main transformer heater windings for open or shorted condition.

(3) Check continuity of wiring circuits to tube heaters.

4. TUBE FAILS TO LIGHT.

When Power Supply becomes inoperative, and one tube fails to light, check it in a standard tube tester, or replace it with tube known to be in good condition.

5. VOLTAGE OR CURRENT OUTPUT DROPS.

When voltage or current output drops below standard, (120 volts 0-1 ampere) check as follows for probable cause:

(1) Check adjustment of R-110 to bring voltage to proper level.

(2) Check voltages at terminals 5-6 and 7-8 of T-101. (See Table 7-3)

(3) Check voltage at Reactor terminals 2-4. (See Table 7-3)

(4) Check all components, condensers and resistors in control section.

6. VOLTAGE REGULATION FAILS.

a. If voltage regulation fails to keep the output voltage within the proper limits of 120 plus or minus 1-1/2 volts, check all components, condensers and resistors in control section, as indicated under paragraph 5 above.

b. Check conditions of RV-102 by measuring its input and output voltage. If input voltage is approximately 38 volts AC and output at DC side of selenium rectifier is approximately 36 volts DC selenium rectifier RV-102 is operating correctly.

7. OUTPUT FUSES BURN OUT.

The probable cause of output fuses burning out usually lies outside the Power Supply Unit on the output side. Check output cables, connectors and terminals for tightness. Check Teletypewriters and associated equipment for shorts, or excessive current demand.

TABLE 7-1

CAPACITOR SPECIFICATIONS			
Circuit Symbol	Capacity	Tolerance Plus or Minus	D.C. Voltage Rating
C-101	300 MFD	10%	150V
C-101A	300 MFD	10%	150V
C-101B	300 MFD	10%	150V
C-101C	300 MFD	10%	150V
C-101D	300 MFD	10%	150V
C-102	4 MFD	10%	600V
C-103	0.05 MFD	10%	600V
C-104	0.10 MFD	10%	600V

TABLE 7-2

RESISTOR SPECIFICATIONS			
Circuit Symbol	Ohms	Tolerance Plus or Minus	Wattage
R-101	1,000	3%	25W
R-102	3,100	3%	25W
R-102A	3,100	3%	25W
R-103	5,100	5%	2W
R-103A	5,100	5%	2W
R-103B	5,100	5%	2W
R-103C	5,100	5%	2W
R-104	100,000	5%	1W
R-104A	100,000	5%	1W
R-105	10,000	10%	2W
R-106	24,000	5%	2W
R-107	30,000	5%	1W
R-108	15,000	10%	1W
R-109	51,000	5%	1W
R-110	10,000	10%	2W

TABLE 7-3. NOMINAL OPERATING VOLTAGES
(All Tube Voltages Measured From Cathode)

T-101 Transformer	
Between Terminals	Voltage
1-2	115 AC
3-4	115 AC
5-6	200 AC
7-8	200 AC
9-10	320 AC
11-12	320 AC
13-14	38 AC
15-16	6.3 AC
17-18	6.3 AC
19-20	6.3 AC

L-101 Reactor	
Between Terminals	Voltage
2-4	260 AC

RV-102 Selenium Rectifier	
Input	38 AC
Output	36 DC

V-101 Tube Terminals	
8-5	270 V DC
8-3	270 V DC
V-102 Tube Terminals	
8-3	250 DC
8-4	135 DC
8-5	-15 DC
V-103 Tube Terminals	
5-4	-2.5 DC
5-6	73 DC
5-8	87 DC
V-104 Tube Terminals	
1-5	75 DC
Across Resistors	
R-101	125 DC
R-102	15 DC
R-102A	50 DC
R-110	25 DC

TABLE 7-4. TUBE CHARACTERISTICS

Tube Type	Heater Voltage (V)	Heater Current (V)	Plate Voltage (V)	Grid Bias (V)	Screen Voltage (V)	Plate Current Min. Signal (MA)	Screen Current Min. Signal (MA)	AC Plate Resistance (Ohms)	Voltage Amplification Factor (MU)	Transconductance (Microhmos)	
										Normal	Min.
OA3VR/75			75			5					
6V6GT/G	6.3	0.45	250	-12.5	250	45	4.5	52000		4100	3000
6x5GT/G	6.3	0.6	1250			210					
6AC7	6.3	0.45	300	0	150	10	2.5	1 meg		9000	7000

TABLE 7-5. TUBE OPERATING VOLTAGES

Tube	Function	Plate	Screen	Supp.	Cathode	Grid	Heater (AC)
6AC7	Amplifier	87	73	0	0	-2.5	6.3
6V6	Amplifier	250	135	0	0	-15	6.3
6X5	Rectifier	270	-	-	0	-	6.3
OA3/VR75	Voltage Reg.	75	-	-	0	-	-

TABLE 8—1. LIST OF MAJOR UNITS

SYMBOL GROUP	115 230V 1 PHASE 60 CYCLE	NAME	NAVY TYPE	STANDARD NAVY STOCK NUMBER
100-110	1	Power Supply	PP-765/U	F16-P-68415-7562

TABLE 8—2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
C-101	N16-C-20564-1751	CAPACITOR, FIXED, DRY ELECTROLYTIC: one section; 300 mf; 150V DC; working temp range minus 40^{o}C to plus 85^{o}C; hermetically sealed metal case, 4-1/4 in. lg, 1-3/8 in. dia; 2 solder lug type term, 7/16 in. high, located on top, 1/2 in. C to C; phenolic insulation; terminals insulated from can; mounted by threaded 7/8-16 stud, 1/2 in. lg. located on top; Spec JAN-C-62; JAN type CE41C301J; mfr CSF/CE41C301J; contr CAIU/C202.	located in front of T-101; reduces output ripple
C-101A	N16-C-20564-1751	SAME AS C-101	located in front of T-101; reduces output ripple
C-101B	N16-C-20564-1751	SAME AS C-101	located in front of T-101; reduces output ripple
C-101C	N16-C-20564-1751	SAME AS C-101	located in front of T-101; reduces output ripple
C-101D	N16-C-20564-1751	SAME AS C-101	located in front of T-101; reduces output ripple
C-102	N16-C-49957-5953	CAPACITOR, FIXED, PAPER DIELECTRIC: one section; 4 mf $\pm$ 10% 600 V DC; hermetically sealed metal case, 2-1/2 in. lg, 1-3/16 in. wide, 3-1/2 in. high excluding term; 2 solder lug type term, 3/4 in. high, located on top, spaced 1-1/8 in. C to C, on rubber pillars; Dykanol "G" synthetic oil impregnated; no internal ground connections; single hole mtg clamps spaced 3 in. C to C; Spec JAN-C-25; JAN type CP70B1FF405K; mfr CG/22F5; contr CAIU/C17D.	located behind L-101; part of anti-hunt network

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
C-103	N16-C-44257-2900	CAPACITOR, FIXED, PAPER DIELECTRIC: one section; 0.05 mf ± 10% 600V DC; hermetically sealed metal case, 1-3/4 in. lg, 41/64 in. wide, 1-1/16 in. high excluding term; 2 solder lug type term, 3/4 in. high, located on bottom, on rubber pillars; Dykanol "G" synthetic oil impregnated; no internal ground connections; two integral mtg ears spaced 2-1/8 in. C to C; Spec JAN-C-25; JAN type CP69B1EF503K; mfr CG/24F180; contr CAIU/C259.	located on tube mounting plate; part of anti-hunt network
C-104	N16-C-45777-2863	CAPACITOR, FIXED, PAPER DIELECTRIC: one section; 0.1 mf ± 10% 600V DC; hermetically sealed metal case, 1-3/4 in. lg, 41/64 in. wide, 1-1/16 in. high excluding term; 2 solder lug type term, 3/4 in. high, located on bottom, on rubber pillars; Dykanol "G" synthetic oil impregnated; no internal ground connections; two integral mtg ears spaced 2-1/8 in. C to C; Spec JAN-C-25; JAN type CP69B1EF104K; mfr CG/24F181; contr CAIU/C260.	located on tube mounting plate; part of anti-hunt network
E-101	N17-B-77844-7154	TERMINAL BOARD: molded phenolic; 8 terminals, combined screw and solder lug type; barrier type; 8-5/8 in. lg, 1-5/16 in. wide, 1/2 in. thick; four .209 in. dia mtg holes on 1/2 in. by 5-1/16 in. mtg centers; mfr CJC/8-142-3/4W; contr CAIU/TB22J.	located on side of T-101; connection for primary input and DC output leads
E-102*	N17-B-77844-7151	INSULATOR, PLATE: grade XP black bakelite; rectangular, flat; 5-1/2 in. lg, 1-1/2 in. wide, 1/32 in. thick; four 7/32 in. dia mtg holes on 1/2 in. by 5-1/16 in. mtg centers; contr CAIU/IN26J.	located under E-101; insulates E-101 from ground
F-101	N17-F-16302-140	FUSE, CARTRIDGE: 5 amps, 250V; one time; glass body; ferrule; 1-1/4 in. lg by 1/4 in. dia; mfr CFA/MTH5; contr CAIU/F41.	located behind door; input protection against shorts
F-101A	N17-F-16302-140	SAME AS F-101	located behind door; input protection against shorts
F-102	N17-F-16302-100	FUSE, CARTRIDGE: Navy Type (28032-2); 2 amps, 250V; one time; glass body; ferrule; 1-1/4 in. lg by 1/4 in. dia; mfr CFA/AGC2; contr CAIU/F32.	located behind door; output protection against short

* NOT FURNISHED AS A MAINTENANCE PART. IF FAILURE OCCURS DO NOT REQUEST REPLACEMENT UNLESS ITEM CANNOT BE REPAIRED OR FABRICATED.

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
F-102A	N17-F-16302-100	SAME AS F-102	located behind door; output protection against short
I-101	N17-L-6806-130	LAMP, GLOW: 115V, 1/25W; miniature bayonet base; clear T3-1/4 type bulb, white light; 2 type P-3 electrodes; 1-5/8 in. lg; over 12000 hrs life; burn any position; neon gas; external resistor required, 200,000 ohms; mfr CG/NE51; contr CAIU/LP11	located in front of unit; shows power to input terminals
I-102	N17-L-250610-455	LENS, INDICATOR LIGHT: red, round, frosted, glass lens, 7/16 in. lg, 5/8 in. dia; bezel mounted; brass, black nickle finish, threaded mtg, 9/16 in. dia, 3/16 in. lg; mfr CAYZ/81621; contr CAIU/PT6R.	lens for I-101
J-101	N17-C-73108-1186	CONNECTOR, RECEPTACLE: single round female contact; straight banana type; black phenolic head; cylindrical steel body, 23/32 in. lg, 7/16 in. dia; one 1/4-32 mtg stud, 3/4 in. lg; one 1/4-32 coupling nut; mfr CYB/406B; contr CAIU/PJ17B.	located behind door; connection for plus external voltmeter lead
J-102	N17-C-73108-1184	CONNECTOR, RECEPTACLE: single round female contact; straight banana type; red phenolic head; cylindrical steel body, 23/32 in. lg, 7/16 in. dia; one 1/4-32 mtg stud, 3/4 in lg; one 1/4-32 coupling nut; mfr CYB/406R; contr CAIU/PJ17R.	located behind door; connector for minus external voltmeter lead
L-101	N16-R-29887-2806	REACTOR: saturable; swinging choke; 4 sections; series winding term (1) and (2) - 3.54 henries max inductance, .258 henries min inductance, 3.8 ohms; series winding term (3) and (4) - 3.54 henries max inductance, .258 henries min inductance, 3.8 ohms; control winding term (5) and (6) - 0.25 to 15.2 ma DC operating current, 900 ohms; shunt winding term (7) and (8) 0.120 amp DC operating current, 34 ohms; 1500 V AC insulation test; hermetically sealed steel case, 5 in. lg, 4 in. wide, 7-1/4 in. high; two integral mtg ft spaced 4-1/2 in. C to C, each mtg ft has three 1/4 in. dia holes spaced 1-1/2 in. C to C; 8 pillar type term, located on top; contr CAIU/RR150.	located on right side of unit; varies voltage applied to RV-101

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
0-101	N17-C-814138-971	CLAMP, ELECTRICAL: steel, cadmium plated; holds phenolic base of tube by crimping action on two sides; 1-13/16 in. OD, 1.3 in. ID, 0.015 in. thick; mounted by 2 mtg holes 0.144 in. dia spaced 1-1/2 in. C to C; holds tube with 1.275 in. dia; mfr CMG/8599-P24; contr CAIU/CC88.	located on tube mounting plate; holds V-101
0-102	N17-C-814138-971	SAME AS 0-101	located on tube mounting plate; holds V-102
0-103	N17-C-814138-971	SAME AS 0-101	located on tube mounting plate; holds V-103
0-104	N17-C-814138-976	CLAMP, ELECTRICAL: steel, cadmium plated; holds phenolic base of tube by crimping action on two sides; 1-13/16 in. OD, 1.187 in. ID, 0.015 in. thick; mounted by 2 mtg holes 0.144 in. dia spaced 1-1/2 in. C to C; holds tube with 1.165 in. dia base; mfr CMG/8548-P24; contr CAIU/CC39.	located on tube mounting plate; holds V-104
0-105	N16-M-61142-2801	MOUNTING: capacitor; steel, zinc chromate plate; holds one side of capacitor by 2 hooks spaced 3/8 in. apart; mounts to flat surface by 3/16 in. dia hole; two required; contr CAIU/BK1203	holds C-102
0-106	N17-M-75466-1001	MOUNTING: shock; rubber, steel enclosed; steel cadmium plated; holds power supply PP-765/U at one corner by 3/8-16 bolt; four 0.266 in. dia mtg holes on 2-1/2 in. by 2-1/2 in. centers; four mounts required; mfr CAYU/C-2090-B6; contr CAIU/FT22.	located under unit
0-107	N17-S-49233-8276	STUFFING TUBE: feed through type; one packing chamber, straight sides; 2-1/8 in. 1-1/4 in. dia excluding packing nut; .505 in. min bore dia; 1-3/8 in. lg packing chamber, 1-12 female thread, 1 in. lg; mounted by 5/8 in. lg; c/o one steel gland tube body 1 steel gland ring, 1 brass gland nut, 2 steel mtg washers, 2 fiber mtg washers, 1 steel mtg nut; gland tube body, gland ring, gland nut marked "B", steel components zinc plated; mfr Penn El Service Co, part no. 2320B; contr CAIU/CN39	located on side of unit; for ac input leads
0-107A	N17-S-49233-8276	SAME AS J-103	located on end of unit; for dc output leads

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
R-101	N16-R-64105-6074	RESISTOR, FIXED, WIRE WOUND: inductive winding; 1000 ohms ± 3% 25W at 275°C max continuous operating temp; 1-1/16 in. lg, 1/2 in. wide, 9/16 in. high excluding term; anodized aluminum enclosed, silicone varnish finish; resistant to humidity and salt water immersion; two axial solder lug term 1/16 in. dia, 3/8 in. lg; panel mounted; two 1/18 in. mtg holes on 23/32 in. by 25/32 in. centers; must be mounted to metal panel to carry off excess heat; mfr Tomore Electric Corp, Type M; contr CAIU/R102X-8.	located under tube mounting plate; current limiting resistor for bias coil of L-101
R-102	N16-R-64123-5675	RESISTOR, FIXED, WIRE WOUND: inductive winding; 3100 ohms ± 3% 25W at 275°C max continuous operating temp; 1-1/16 in. lg, 1/2 in. wide, 9/16 in. high excluding term; anodized aluminum enclosed, silicone varnish finish; resistant to humidity and salt water immersion; two axial solder lug term 1/16 in. dia, 3/8 in. lg; panel mounted, two 1/8 in. mtg holes on 23/32 in. by 25/32 in. centers; must be mounted to metal panel to carry off excess heat; mfr Tomore Electric Corp, Type M; contr CAIU/R312X-3.	located under tube mounting plate; plate loading for V-102
R-102A	N16-R-64123-5675	SAME AS R-102	located under tube mounting plate; output voltage divider with V-104
R-103	N16-R-50147-186	RESISTOR, FIXED, COMPOSITIONS: 5100 ohms ± 5% 2W; E characteristic; 1.41 in. lg, 0.405 in. dia; insulated, resistant to humidity and salt water; two axial wire lead term; Spec JAN-R-11; JAN type RC40BF512J; mfr CBZ/HB5125; contr CAIU/R5125D.	located on XV-101; cathode loading of V-101
R-103A	N16-R-50147-186	SAME AS R-103	located on XV-101; cathode loading of V-101
R-103B	N16-R-50147-186	SAME AS R-103	located on XV-102; screen bias for V-102
R-103C	N16-R-50147-186	SAME AS R-103	located on XV-102; screen bias for V-102

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
R-104	N16-R-50632-766	RESISTOR, FIXED, COMPOSITION: 100,000 ohms ± 5% 1W; E characteristic; 0.75 in. lg. 0.280 in. dia; insulated, resistant to humidity and salt water; two axial wire lead term; Spec JAN-R-11; JAN type RC30BF104J; mfr CBZ/GB1045; contr CAIU/R1045C.	located on XV-102; grid limiting of V-102
R-104A	N16-R-50632-766	SAME AS R-104	located on XV-102; grid limiting of V-103
R-105	N16-R-50283-566	RESISTOR, FIXED, COMPOSITION: Navy Type (63474-103); 10,000 ohms ± 10% 2W; E characteristic; 1.41 in. lg, 0.405 in. dia; insulated, resistant to humidity and salt water; two axial wire lead term; Spec JAN-R-11; JAN type RC40BF103K; mfr CBZ/HB1031; contr CAIU/R1031D.	located on XV-102; screen bias for V-103
R-106	N16-R-50381-186	RESISTOR, FIXED, COMPOSITION; 24,000 ohms ± 5% 2W; E characteristic; 1.41 in. lg, 0.405 in. dia; insulated, resistant to humidity and salt water; two axial wire lead term; Spec JAN-R-11; JAN type RC40BF243J; mfr CBZ/HB2435; contr CAIU/R2435D.	located on XV-104; part of anti-hunt circuit
R-107	N16-R-50407-766	RESISTOR, FIXED, COMPOSITION: Navy Type (63291-303); 30,000 ohms ± 5% 1W; E characteristic; 0.75 in. lg, 0.280 in. dia; insulated, resistant to humidity and salt water; two axial wire lead term; Spec JAN-R-11; JAN type RC30BF303J; mfr CBZ/GB3035; contr CAIU/R3035C.	located on XV-104; output voltage divider network
R-108	N16-R-50337-246	RESISTOR, FIXED, COMPOSITION: Navy Type (63288-153); 15,000 ohms ± 10% 1W; E characteristic; 0.75 in. lg, 0.280 in. dia; insulated, resistant to humidity and salt water; two axial wire lead term; Spec JAN-R-11; JAN type RC30BF153K; mfr CBZ/GB1531; contr CAIU/R1531C.	located on XV-102; output voltage divider network
R-109	N16-R-50497-766	RESISTOR, FIXED, COMPOSITION: Navy Type (63291-513); 51,000 ohms ± 1W; E characteristic; 0.75 in. lg, 0.280 in. dia; insulated, resistant to humidity and salt water; two axial wire lead term; Spec JAN-R-11; JAN type RC30BF513J; mfr CBZ/GB5135; contr CAIU/R5135C.	located on XV-102; plate loading for V-103

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
R-110	N16-R-87679-4540	RESISTOR, VARIABLE: Navy type (635897-L10); composition; 10,000 ohms ± 10%; 2 W at 100°C max continuous operation; 3 solder lug term; enclosed molded phenolic case, 1-1/16 in. dia, 9/16 in. deep; slotted metal shaft 1/4 in. dia, 5/8 in. lg from mtg surface; U taper; insulated contact arm; normal torque; lock bushing, 3/8-32 dia by 1/2 in. lg; non-turn device located on 17/32 in. radius at 3 o'clock; mfr CBZ/JU1031; contr CAIU/RH10E.	located behind door; varies output voltage
RV-101	N17-R-51294-2101	RECTIFIER, METALLIC: selenium; designed for single phase full wave center tap circuit; 227V AC single phase input; 180V DC, 2.4 amp max output; full wave rectification; cylindrical shape, 7-3/4 in. lg, 3-3/8 in. dia; mounted by through bolt on ea end; 4 solder lug term, located on side; resistant to salt spray and high humidity; mfr CATD/BF191T; contr CAIU/RS218.	located between L-101 and T-101: rectifies ac input to dc output
RV-102	N17-R-51112-1001	RECTIFIER, METALLIC: selenium; designed for single phase full wave bridge circuit; 45.4V AC single phase input; 36V DC, 0.3 amp max output; full wave rectification; cylindrical shape, 2-11/32 in. lg, 1-3/8 in. dia; mounted by through bolt on one end; 4 solder lug term, located on side; resistant to salt spray and high humidity; mfr CATD/BC049T; contr CAIU/RS219.	located under tube mounting plate; plate supply for V-103
S-101	N17-S-72828-2596	SWITCH, TOGGLE: DPST; 9 Amp, 250 volt; phenolic body, 1-21/64 in. lg, 49/64 in. wide, 3/4 in. high; bat type handle 11/16 in. lg; locking action; four screw type terminals, located on back; single hole mounting; 15/32 in. dia bushing, 32 threads per in. 15/32 in. lg; Spec JAN-S-23, JAN type ST50K, mfr CAE/8822K7ST50K; contr CAIU/SW25J.	
T-101	N17-T-75703-9916	TRANSFORMER, POWER, STEP DOWN AND STEP UP: hermetically sealed steel case, 6-3/4 in. lg, 5 in. wide, 8-5/16 in. high; 115/230V AC, 50 to 60 cycles, single phase input; 6 output windings: no. one 400 V, 1.26 amps; no. two 660V 0.07 amp; no. three 38V, 0.05 amp; no. four 6.3V, 0.6 amp; no. five 6.3V, 0.45 amp; no. six 6.3V, 0.45 amp; no. one and two center tapped; 1500V insulation test; impregnated with clear baking varnish and potted with	located on left side of unit supplies ac power

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
		asphalt potting compound; 17 pillar type terminals located on top; four 9/32 in. dia mtg holes located on 4 in. by 7-3/4 in. mtg centers; internally shielded; mfr CAIU/T1136.	
V-101	N16-T-56907	ELECTRON TUBE: diode; full wave rectifier; JAN6X5GT; contr CAIU/RT43J.	located on tube mounting plate: supply for V-102
V-102	N16-T-56758	ELECTRON TUBE: pentode; beam power amplifier; JAN6V6GT; contr CAIU/RT31J	located on tube mounting plate: control circuit amplifier
V-103	N16-T-56138	ELECTRON TUBE: pentode: sharp cut-off RF amplifier; JAN 6AC7; contr CAIU/RT38J.	located on tube mounting plate: control circuit amplifier
V-104	N16-T-53030	ELECTRON TUBE: glow discharge; voltage regulator; JAN OA3; contr CAIU/RT45J.	located on tube mounting plate: voltage reference tube
XF-101	N17-F-74266-9072	FUSEHOLDER: extractor post type; rated at 250V, 9 amp; accommodates 1 cartridge type fuse 1-1/4 in. dia; phenolic body; pressure type brass contacts; 2 in. lg, 11/16 in. dia; 2 solder lug type term; 1/2 in. mtg stud; mfr CFA/HKP-QL; contr CAIU/CP34.	located beneath tube mounting plate; holds F-101
XF-101A	N17-F-74266-9072	SAME AS XF-101	located beneath tube mounting plate; holds F-101A
XF-102	N17-F-74266-9072	SAME AS XF-101	located beneath tube mounting plate; holds F-102
XF-102A	N17-F-74266-9072	SAME AS XF-101	located beneath tube mounting plate; holds F-102A
XI-101	N17-L-76652-1301	LIGHT, INDICATOR: without lens; accommodates 5/8 in. dia lens; accommodates T-3 bulb, miniature bayonet base; brass shell, black nickle finish, enclosed, 1-13/16 in. lg by 15/16 in. dia; one 11/16 in. mtg stud, used on panel up to 1/4 in.; lamp replaceable from front; two solder lug term, located on rear, insulated from frame; one 200,000 ohm integral resistor enclosed; mfr CAYZ/81408; contr CAIU/PT5A.	located in front of unit; holds I-101

TABLE 8-2. TABLE OF REPLACEABLE PARTS

REFERENCE DESIGNATION	STANDARD NAVY STOCK NUMBER	NAME AND DESCRIPTION OF PART	LOCATING FUNCTION
XV-101	N16-S-63515-6873	SOCKET, ELECTRON TUBE: 8 beryllium copper contacts, silver plated; octal body, round shape; 1-7/32 in. dia, 1/2 in. high, mica filled bakelite; once piece saddle mtg, one in. chassis hole required for mtg; two mtg holes 5/32 in. dia spaced 1-1/2 in. C to C; turret tube connected on bottom, 1-5/8 in. lg, 1/2 in. dia, 1/16 in. thick wall, grade XXXP laminated phenolic; two groups of 6 terminals each set in tube, groups spaced 1 in. apart, brass plated with 60-40 lead-tin alloy; mfr Vector Electronic Co part no. 8-0-12 JG; CAIU/SK49B.	located under tube mounting plate; holds V-101
XV-102	N16-S-63515-6873	SAME AS XV-101	located under tube mounting plate; holds V-102
XV-103	N17-S-63515-1938	SOCKET, ELECTRON TUBE: 8 beryllium copper contacts, silver plated; octal body, round shape; 1-7/32 in. dia by 1/2 in. high; mica filled bakelite body; mounted by one piece saddle; 1-1/4 in. chassis hole required, 2 mtg holes 5/32 in. dia spaced 1-1/2 in. C to C; mfr CMG/51B13416; contr CAIU/SK53.	located under tube mounting plate; holds V-103
XV-104	N16-S-63515-1938	SAME AS XV-101	located under tube mounting plate; holds V-104

TABLE 8-3. MAINTENANCE PARTS KIT

KEY DESIGNATION	QUANTITY	KEY DESIGNATION	QUANTITY
L-101	1	RV-101	1
R-101	1	RV-102	1
R-102	1	T-101	1

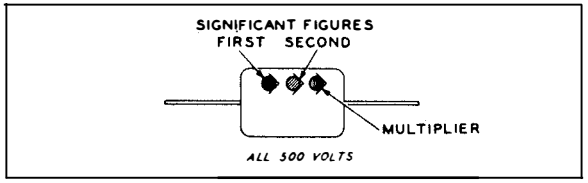
TABLE 8-4. CROSS REFERENCE PARTS LIST

JAN (OR AWS) DESIGNATION	KEY SYMBOL
CP69B1EF104K	C-104
CP69B1EF503K	C-103
CP70B1FF405K	C-102
RC30BF104J	R-104
RC30BF153K	R-108
RC30BF303J	R-107
RC30BF513J	R-109
RC40BF103K	R-105
RC40BF243J	R-106
RC40BF512J	R-103
ST50K	S-101
6AC7	V-103
6V6GT	V-102
6X5GT	V-101
OA3	V-104
NAVY TYPE	**KEY SYMBOL**
28032-2	F-102
63288-153	R-108
63291-301	R-107
63474-103	R-105
635897-L10	R-110
FEDERAL STOCK NO.	**KEY SYMBOL**
N16-C-20564-1751	C-101
N16-C-44257-2900	C-103
N16-C-45777-2863	C-104
N16-C-49957-5953	C-102
N16-M-61142-2801	O-105
N16-R-29887-2806	L-101
N16-R-50147-186	R-103
N16-R-50283-566	R-105
N16-R-50337-246	R-108
N16-R-50381-186	R-106
N16-R-50407-766	R-107
N16-R-50497-766	R-109
N16-R-50632-766	R-104
N16-R-64105-6074	R-101
N16-R-64123-5675	R-102
N16-R-87679-4540	R-110
N16-S-63515-6873	XV-101
N16-T-53030	V-104
N16-T-56138	V-103
N16-T-56758	V-102
N16-T-56907	V-101
N17-B-77844-7151	E-102
N17-B-77844-7154	E-101
N17-C-73108-1184	J-102
N17-C-73108-1186	J-101
N17-C-814138-971	O-101
N17-C-814138-976	O-104
N17-F-16302-100	F-102
N17-F-16302-140	F-101
N17-F-74266-9072	XF-101
N17-L-250610-455	I-102
N17-L-6806-130	I-101
N17-L-76652-1301	XI-101
N17-M-75466-1001	O-106
N17-R-51112-1001	RV-102
N17-R-51294-2101	RV-101
N17-S-49233-8276	O-107
N17-S-63515-1938	XV-103
N17-S-72828-2596	S-101
N17-T-75703-9916	T-101

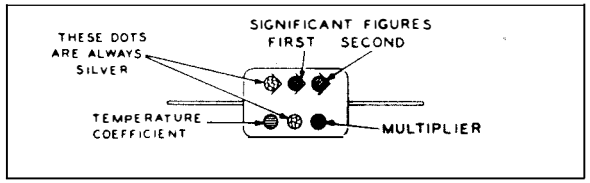
TABLE 8-5. APPLICABLE COLOR CODES AND MISCELLANEOUS DATA

CAPACITOR COLOR CODES

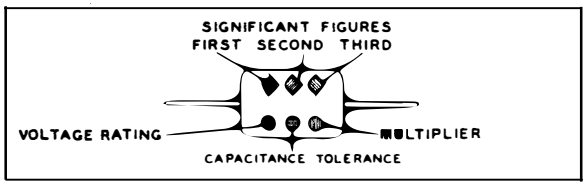
RMA 3-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



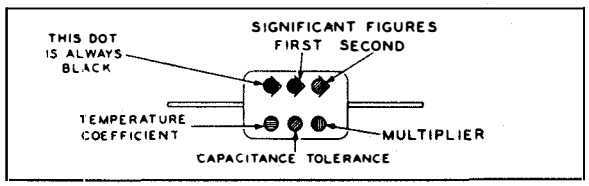
JAN 6-DOT COLOR CODE FOR PAPER-DIELECTRIC CAPACITORS



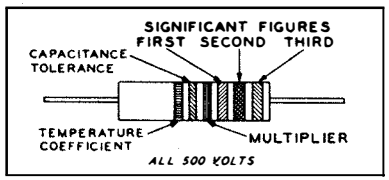
RMA 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



JAN 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS

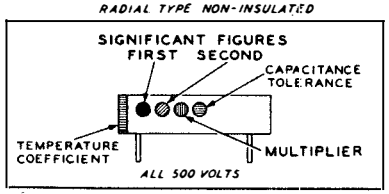


RMA COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS



JAN COLOR CODE FOR FIXED CERAMIC-DIELECTRIC CAPACITORS

RADIAL TYPE NON-INSULATED



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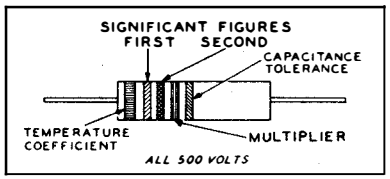


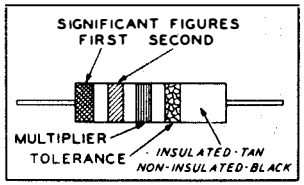
RMA: RADIO MANUFACTURERS ASSOCIATION
JAN: JOINT ARMY-NAVY

RESISTORS				CAPACITORS				
				MULTIPLIER				
TOLERANCE	MULTIPLIER	SIGNIFICANT FIGURE	COLOR	RMA MICA AND CERAMIC-DIELECTRIC	JAN MICA AND PAPER-DIELECTRIC	JAN CERAMIC DIELECTRIC	VOLTAGE RATING	TEMPERATURE COEFFICIENT
	1	0	BLACK	1	1	1		A
	10	1	BROWN	10	10	10	100	B
	100	2	RED	100	100	100	200	C
	1,000	3	ORANGE	1,000	1000	1000	300	D
	10,000	4	YELLOW	10,000			400	E
	100,000	5	GREEN	100,000			500	F
	1,000,000	6	BLUE	1,000,000			600	G
	10,000,000	7	VIOLET	10,000,000			700	
	100,000,000	8	GRAY	100,000,000		0.01	800	
	1,000,000,000	9	WHITE	1,000,000,000		0.1	900	
5	0.1		GOLD	0.1	0.1		1000	
10	0.01		SILVER	0.01	0.01		2000	
20			NO COLOR				500	

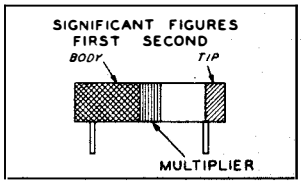
RESISTOR COLOR CODES

RMA COLOR CODE FOR FIXED COMPOSITION RESISTORS

AXIAL TYPE

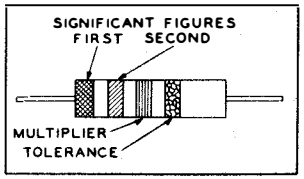


RADIAL TYPE



JAN COLOR CODE FOR FIXED COMPOSITION RESISTORS

AXIAL TYPE INSULATED



RADIAL TYPE NON-INSULATED

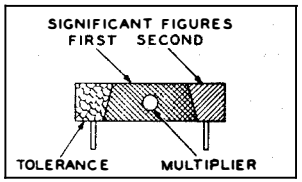


TABLE 8-6. LIST OF MANUFACTURERS

PREFIX	NAME	ADDRESS
CBZ	Allen Bradley Co.	Milwaukee, Wisconsin
CAYU	L. N. Barry Corp.	Watertown, Massachusetts
CYB	Birnback Radio Co.	New York, N. Y.
CFA	Bussman Manufacturing Co.	St. Louis, Missouri
CMG	Cinch Manufacturing Co.	Chicago, Illinois
CAE	Cutler-Hammer Inc.	Milwaukee, Wisconsin
CAYZ	Dial Light Co. of America	New York, N. Y.
CATD	Fansteel Metallurgical Corp.	North Chicago, Illinois
CG	General Electric Co.	Schnectady, N. Y.
CJC	H. B. Jones Co.	Chicago, Illinois
----	Penn El Service Co.	Philadelphia, Pennsylvania
CAIU	Power Equipment Co.	Detroit, Michigan
CSF	Sprague Specialties Co.	North Adams, Massachusetts
----	Tomore Electric Corp.	Rochester, N. Y.
----	Vector Electronics Co.	Los Angeles, California
CRC	R.C.A. Manufacturing Co.	Harrison, N. J.