PM-2 Lightweight A-C Power Supply

COLLINS

instruction sheet

Cedar Rapids Division | Collins Radio Company, Cedar Rapids, Iowa

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1. General Description. (Refer to figure 1.)

The PM-2 Lightweight A-C Power Supply is part of a complete high-frequency single-sideband station in a suitcase-sized carrying case. The complete station consists of the KWM-2/2A Transceiver, PM-2 Power Supply, and the CC-2 Carrying Case. Either the power supply, the KWM-2/2A, or the carrying case may be purchased separately, or as a group. The power supply converts 110- or 220-volt a-c power to suitable voltage and current values for operation of the KWM-2/2A. It clamps to the rear of KWM-2/2A so that both transceiver and power supply may be packed in the lightweight carrying case for portability. The assembled combination may be lifted together from the CC-2; set on desk or table; connected to an a-c power source, suitable antenna, microphone, and key; and operated as a portable station. Microphone, key, and antenna are not furnished. A small speaker is included in the PM-2. A short r-f extension cable, for extending the antenna connection under the PM-2, is included in a plastic bag with the necessary hardware for PM-2 - KWM-2/2A assembly. Adequate space is included in the CC-2 Carrying Case for small station accessories (not furnished). The entire package weighs approximately 50 pounds.

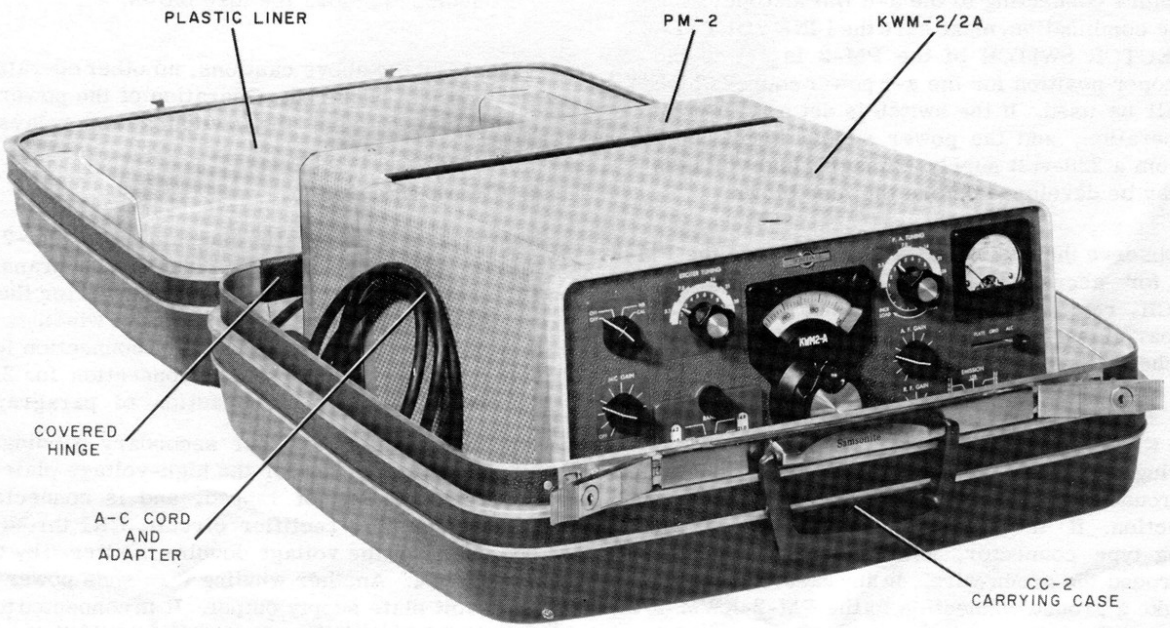

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Figure 1. PM-2 and KWM-2/2A Packed in CC-2 Carrying Case

2. Installation. (Refer to figures 2, 3, 4 and 7.)

If the KWM-2/2A has been fitted for use with the 351D-2 Mobile Mount, no changes are necessary for use with the PM-2 Power Supply. The guide rails used with the 351D-2 Mobile Mount will not interfere with the PM-2 slide bars, but are not required for use with the PM-2. If the KWM-2/2A is not already fitted for such use, proceed as follows:

a. Remove the KWM-2/2A from its case.

b. Install the two large chassis nuts in the holes of the KWM-2/2A chassis side walls as shown in figure 2 and figure 7.

c. With the KWM-2/2A and PM-2 positioned as shown in figure 3, make the necessary phono jack connections. Use the end of cables with the right-angle connectors at the KWM-2/2A connections. Run the shielded cables downward through the cord channels in the mating face of the PM-2 and underneath the power supply. Power cables for the 399C-1 or the 312B-5 may be run through the large holes in the front and back sides of the PM-2.

d. Push the PM-2 and the KWM-2/2A together, and tighten the thumb screws in the chassis nuts to hold the two together. Be sure the power plug, P2, mates correctly with the corresponding jack in the KWM-2/2A. Figure 4 shows the complete assembly.

CAUTION

When using an extension cable such as the 440F-1, possible damage may result to the KWM-2/2A unless care is taken to properly align the key on the extension plug with the shallow keyway in power connector P2.

Before connecting to the a-c line and operating the combination, make sure the LINE VOLT SELECTOR SWITCH of the PM-2 is set to the proper position for the a-c power source which will be used. If the switch is set for 110-volt operation, and the power supply is operated from a 220-volt supply, damaging high voltages may be developed before the fuse blows.

e. Observe the caution above. To remove the PM-2 case for access to the LINE VOLT SELECTOR SWITCH, remove the two Phillips-head screws from the rear (fuse side). Pull the PM-2 from its case, and check the LINE VOLT SELECTOR SWITCH to make sure it is set for the line voltage which will be used. Replace power supply in case, and reassemble to the KWM-2/2A.

f. Plug the line cord connector into the a-c outlet. The round pin of the a-c connector is the ground connection. If the a-c outlet is not fitted with a mating-type connector, use the adapter furnished, and ground the green wire. In any case, it is desirable to make a ground connection to the PM-2-KWM-2/2A combination, and the 3-wire a-c cord offers the most convenient arrangement.

g. Set the KWM-2/2A MIC GAIN control full counterclockwise until the switch clicks. Set the OFF-ON-NB-CAL switch to ON position. Set the meter switch to PLATE, and EMISSION switch to LOCK. The transceiver is in receive condition during warmup, so the meter will read full scale until filaments have come to operating temperature. This is normal S-meter action. When the S-meter falls back to zero, the circuits will have switched to transmit condition, and the meter will indicate PA plate current. Read the no-signal PA plate current. It should be approximately 40 ma. If plate current is other than 40 ma, adjust the BIAS ADJUST potentiometer, R8, on the rear (fuse side) of the PM-2 to set plate current to 40 ma. This is the proper idling plate current value for the KWM-2/2A power amplifier tubes for linear operation. The PM-2-KWM-2/2A combination now is ready for use.

3. Operation.

Do not operate the power supply and transceiver inside the carrying case with the cover closed. Make sure there is adequate ventilation for the heat-generating components of the equipment. Output is adequate for maximum KWM-2/2A ratings in LOCK key under intermittent conditions. DO NOT operate in LOCK key or TUNE position under continuous keydown conditions.

CAUTION

Make certain the 110/220 selector switch on the PM-2 Power Supply is set to the proper position before plugging into the a-c source. It is fused for 4-ampere primary current on 110 volts a-c and for 2-ampere primary current on 220 volts a-c. If the switch is set to the 110-volt position, and the power supply is operated from a 220-volt a-c supply, damaging high voltages may be developed before the fuse blows.

Except for the above cautions, no other operating procedures are required. Operation of the power supply is controlled from the switches and relays in the KWM-2/2A.

4. Circuit Description.

Figure 8 is a schematic diagram of the PM-2 Lightweight A-C Power Supply. The power transformer T1 furnishes all voltages and current for the power supply outputs. It has two primary windings so that they may be switched to parallel connection for 110-volt operation and to series connection for 220-volt operation. Observe the caution of paragraph 3.

The transformer has four secondary windings. One furnishes the power for the high-voltage plate supply rectifiers. It is not tapped, and is connected to a voltage-doubling rectifier circuit, CR1 through CR4. The output of the voltage doubler is filtered by C1, C2, C3, and C4. Another winding furnishes power for the +275-volt plate supply output. It is connected to a full-wave bridge rectifier consisting of CR5 through CR8. The output is filtered by the pi-section filter consisting

of C7A, C7B, and L1. A third winding furnishes voltage for the adjustable bias supply rectifier, CR9. This is a half-wave rectifier, the output from which is filtered by C5, C6, R7, and part of R8. Resistor R8 is adjustable and, with R7 and R9, forms a voltage divider from which the adjustable bias voltage output is taken. All rectifiers are the small, silicon type 1N1492 units. The rectifier cells are stacked in series in each leg of the high-voltage doubler supply in order to limit the voltage across each unit to that which is safely within its limits of tolerance. In the low-voltage and bias supplies, a surge-suppressing resistor is inserted to limit the peak current through the rectifiers. In the high-voltage power supply, the transformer winding offers enough resistance that no surge-suppressing resistor is needed. The fourth winding furnishes filament power for the KWM-2/2A.

The outputs of the power supply and the primary switching leads are connected to pins of an 11-pin female cable connector, P2. This connector mates with the power plug on the rear of the KWM-2/2A. The a-c line cord furnished with the PM-2 is a three-wire cord, fitted with a three-pin male plug for connection to the a-c source. The round pin of the plug is connected to the power supply ground, and, when plugged into the proper a-c outlet, returns the KWM-2/2A ground to earth through the a-c supply. If no such proper a-c outlet is available, use the adapter plug furnished with the power supply, and ground the green wire which extends from the adapter. This arrangement automatically provides a ground for the power supply and the KWM-2/2A.

5. Maintenance.

Maintenance of the PM-2 Power Supply consists of checking and replacing the silicon rectifiers and checking and replacing the electrolytic capacitors. Silicon rectifiers may be checked with an ohmmeter. Forward resistance is less than 3 ohms, and reverse resistance is higher than 1 megohm. When replacing rectifiers, be certain to observe proper polarity. Also, when replacing electrolytic capacitors in the filters, make certain to observe the proper polarity as indicated in the schematic diagram.

6. Specifications.

Input requirements . .	110 or 220 volts, 50 to 400 cps, 4 or 2 amperes.
Output (nominal)	
Heater power	6.0 to 6.3 volts a-c at 11.0 amperes.
Low-voltage B+ . . .	275 volts at 175 ma. 260 volts at 210 ma.
High-voltage B+ . . .	700 volts at 230 ma (Key down intermittent.)
Bias voltage	-50 to -90 volts, no current requirement.
Size	7-3/4 inches high, 14-3/4 inches wide, 4 inches deep. The depth dimension is the total extension behind the KWM-2/2A.
Weight	
PM-2	13.5 pounds.
Case, KWM-2/2A and PM-2	49.5 pounds.

7. Parts List.

Following is a parts list of the PM-2 Lightweight A-C Power Supply. Figures 5 and 6 show parts location. Figure 8 is a schematic diagram of the PM-2.

ITEM	DESCRIPTION	COLLINS PART NUMBER
	PM-2 A-C POWER SUPPLY	522-2639-004
C1	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf -10% +100%, 350 v d-c; Sprague Electric Co. type DEE	183-1576-00
C2	CAPACITOR, FIXED, ELECTROLYTIC: same as C1	183-1576-00
C3	CAPACITOR, FIXED, ELECTROLYTIC: same as C1	183-1576-00
C4	CAPACITOR, FIXED, ELECTROLYTIC: same as C1	183-1576-00
C5	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -10% +100%, 150 v d-c; P. R. Mallory & Co., Inc. part no. TC42	183-1040-00
C6	CAPACITOR, FIXED, ELECTROLYTIC: same as C5	183-1040-00
C7	CAPACITOR, FIXED, ELECTROLYTIC: 2 section; 450 v d-c; 40 uf ea section; Sprague Electric part no. EL-240	183-1009-00
CR1	SEMICONDUCTOR DEVICE, DIODE: silicon; hermetically sealed; General Electric part no. 1N1492	353-1661-00
CR2 thru CR9	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1661-00
F1	FUSE CARTRIDGE: 4 amp, 250 v, glass enclosed, brass ferrules, 0.250 in. dia by 1-1/4 in. lg; Bussmann type 3AG	264-0449-00
F2	FUSE, CARTRIDGE: glass enclosed, 2.0 amp, 250 v max, 0.07 ohm resistance; Littlefuse Inc. part no. 312002	264-4070-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
H1	POST, SPACING: aluminum; tapped 6-32, 3/8 in. deep both ends; 1/4 in. hex by 3 in. lg o/a	540-9241-003
H2	POST, SPACING: aluminum; tapped 6-32 thd, 3/8 in. deep each end; 5/16 in. by 1-1/4 in. lg	540-9464-003
L1	REACTOR: 3 hy at 10 v rms; 0.210 d-c amp; 50 ohms; continuous duty cycle; Ballastran part no. BC2951	668-0005-00
LS1	LOUDSPEAKER, PERMANENT MAGNET: 3.2 ohms, voice coil impedance; 9/16 in. voice coil dia; Quam-Nichols Co. part no. 3A07X024	271-0232-00
P1	CABLE ASSEMBLY, POWER, ELECTRICAL: 10 amp current rating, 125 v rms; no. 18 AWG wire; 6 ft. lg approx; Belden Mfg. Co.	426-5175-00
P2	CONNECTOR, RECEPTACLE, ELECTRICAL: 11 female contacts, 5 amp	545-7705-003
P3	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 2 conductors, no. 20 AWG wire; 18 in. lg approx; Switchcraft part no. 4C-1664	426-5160-00
R1	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 2 w; Allen-Bradley type HB	745-5736-00
R2	NOT USED	
R3	RESISTOR, FIXED, COMPOSITION: 0.27 megohm ±10%, 1 w; Allen-Bradley type GB	745-3454-00
R4	RESISTOR, FIXED, COMPOSITION: same as R3	745-3454-00
R5	RESISTOR, FIXED, WIREWOUND: 20 ohms, ±5%, 5 w; Dale Products part no. RSM5/20R00H	747-5426-00
R6	RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%, 1 w; Allen-Bradley type GB	745-3296-00
R7	RESISTOR, FIXED, COMPOSITION: 3900 ohms ±10%, 1 w; Allen-Bradley type GB	745-3377-00
R8	RESISTOR, VARIABLE, WIREWOUND: 5,000 ohms ±10%, 2 w; Chicago Telephone Supply type 252	377-0310-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R9	RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, 1 w; Allen-Bradley type GB	745-3380-00
R10	RESISTOR, FIXED, COMPOSITION: same as R3	745-3454-00
R11	RESISTOR, FIXED, COMPOSITION: same as R3	745-3454-00
S1	SWITCH, TOGGLE: dpdt; 25 v d-c, 0.5 amp; 220 a-c, 9 amp maintained position; 6 amp momentary position; Cutler-Hammer TA	266-3060-00
T1	TRANSFORMER, POWER, STEP-UP AND STEP-DOWN: 115 v/230 v, 50 to 60 cps, 1 phase, primary; 325 v @ 0.230 amp, 230 v @ 0.370 amp, 110 v @ 0.030 amp, 6.3 v, 10.000 amp secondary; Ballastran part no. BC-2950A	662-0033-00
TB1	TERMINAL BOARD: plastic, cotton fabric, base; 2-1/4 in. by 8-1/2 in; includes 30 terminals	548-9446-003

ITEM	DESCRIPTION	COLLINS PART NUMBER
TB2	TERMINAL BOARD: phenolic, 3 solder lug terminals; 11/16 in. w by 1-1/8 in. lg; Cinch Mfg. Corp. part no. 1529-A	306-0587-00
TB3	TERMINAL BOARD: phenolic; with 3 solder lug terminals; 11/16 in. w by 1-1/8 in. lg; Cinch Mfg. Corp. part no. 1525A	306-0001-00
TB4	TERMINAL BOARD: 4 solder lug terminals; brass; 3/8 in. by 1-1/2 in. o/a; Cinch Mfg. Corp. type 1545-D	306-0698-00
TB5	TERMINAL BOARD: same as TB2	306-0587-00
XF1	FUSEHOLDER: extractor post type; 125 v, 5 amp; accommodates 3AG cartridge fuse; Bussmann Mfg. Co. part no. HKP1-16	265-1002-00
XF2	FUSEHOLDER: same as XF1	265-1002-00

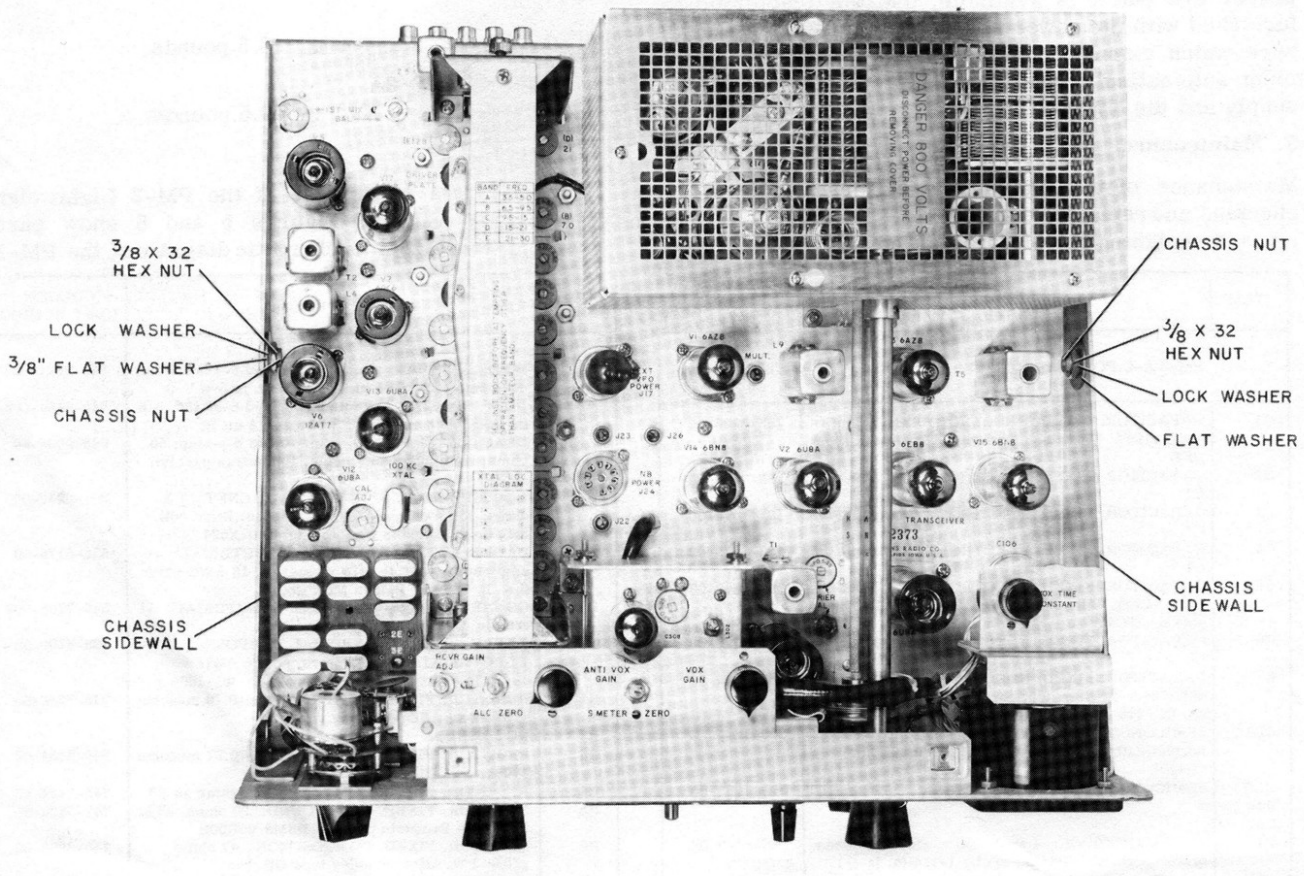

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Figure 2. Installation of Chassis Nuts

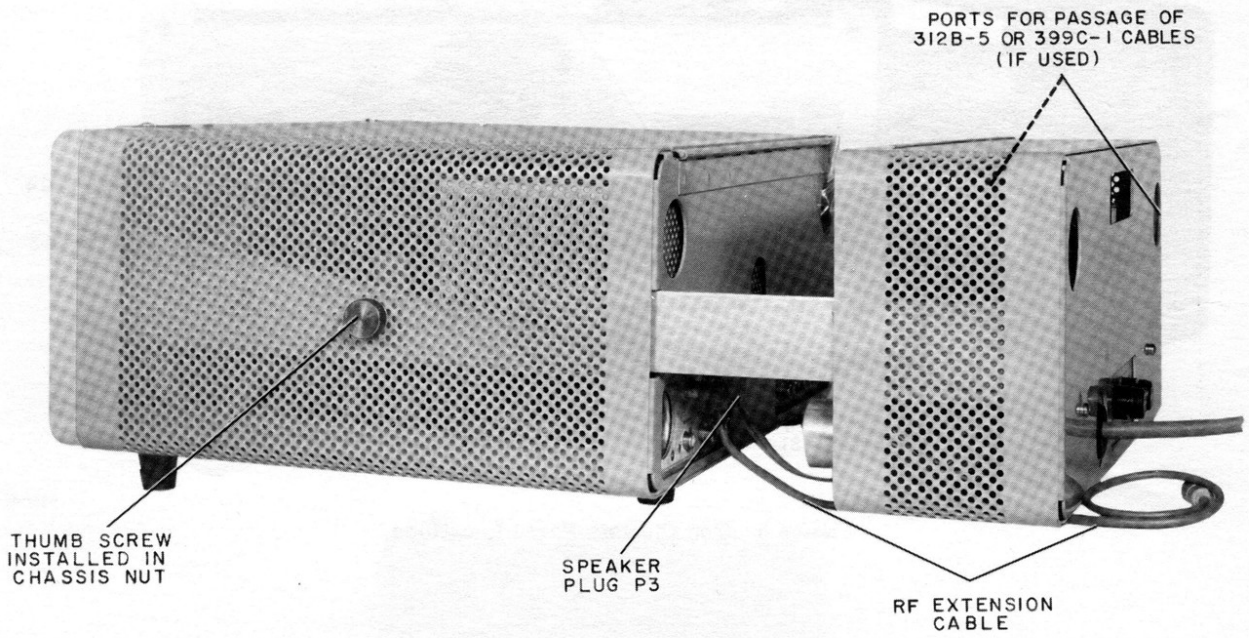

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Figure 3. Phono Jack Assembly During Assembly

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Figure 4. PM-2 Assembled to KWM-2

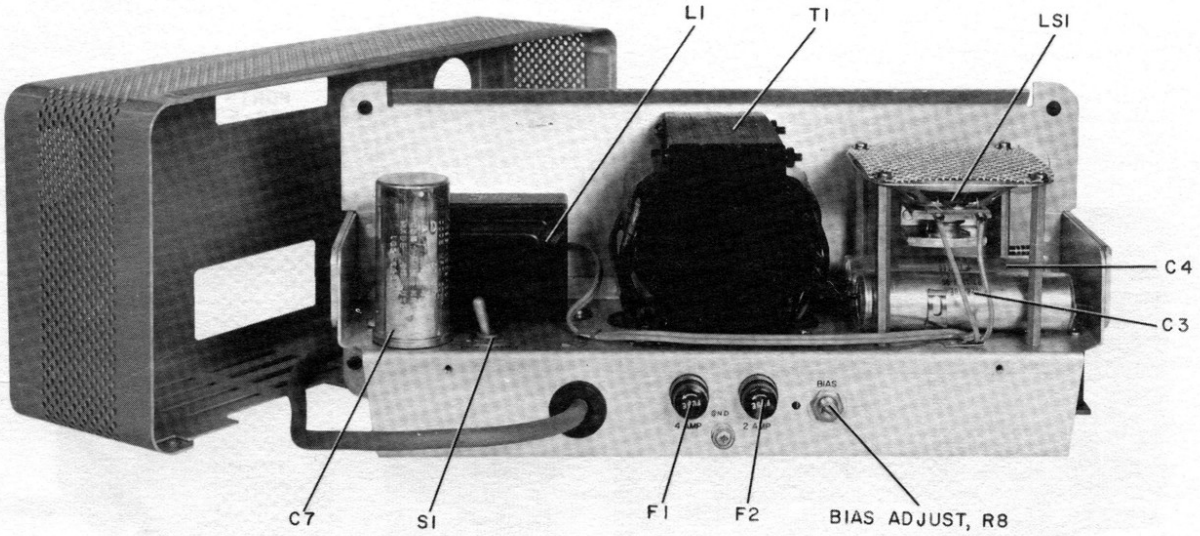


Figure 5. Top Chassis Parts Locations

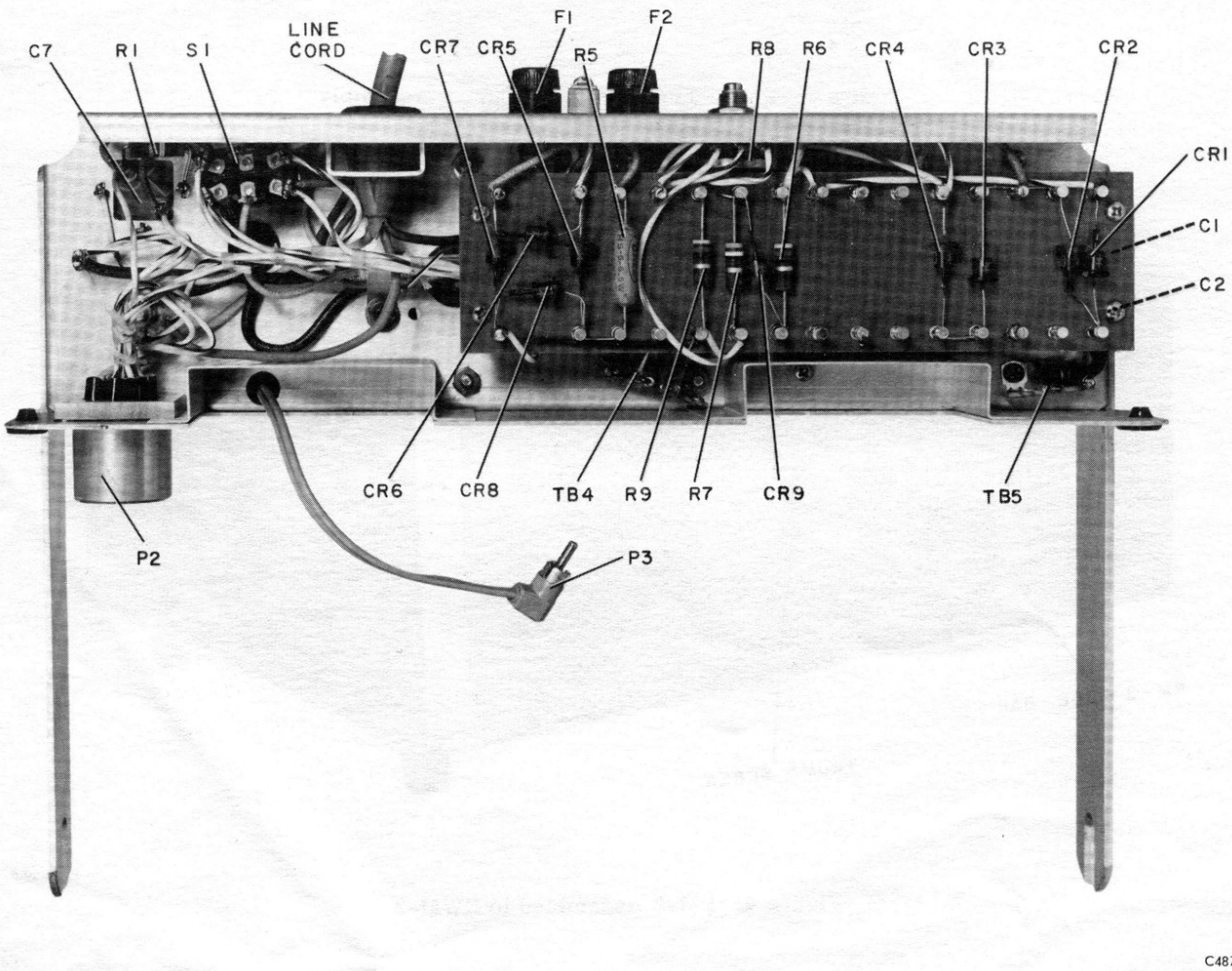
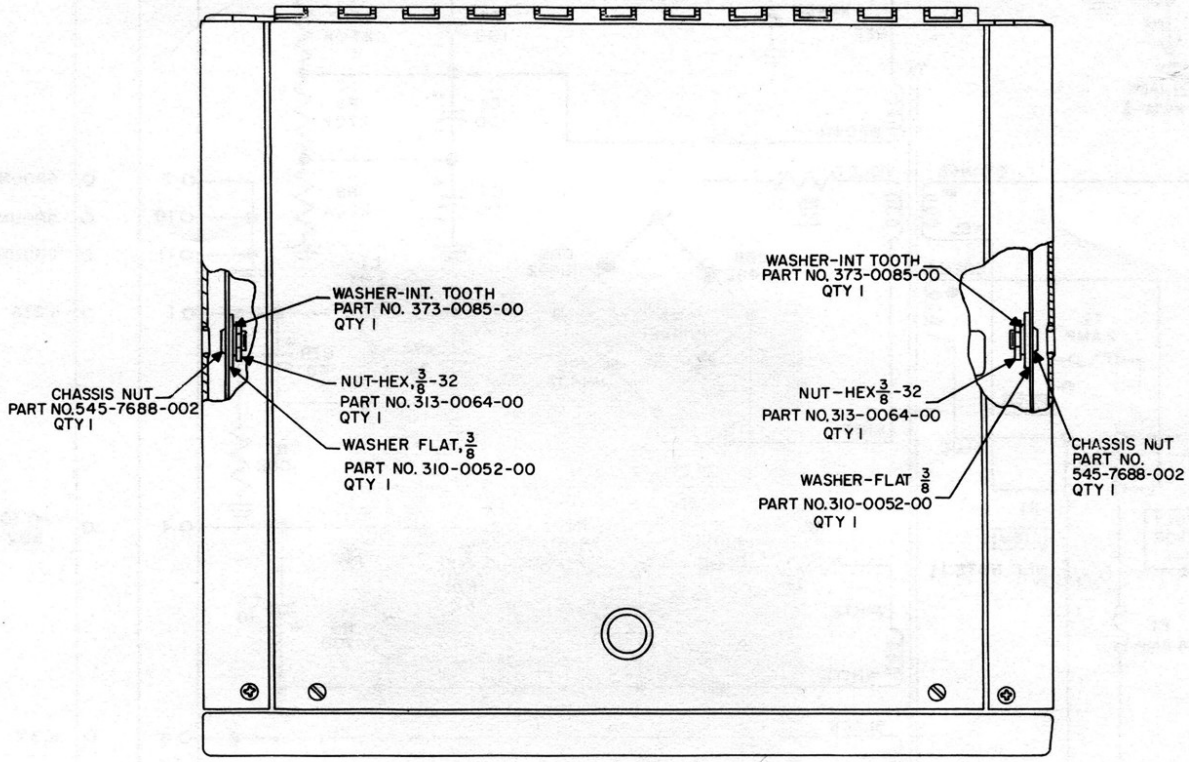


Figure 6. Bottom Chassis Parts Locations



TOP VIEW OF KWM-2/2A

NOTES:

1. REMOVE CHASSIS FROM CABINET.
2. INSTALL THE CHASSIS NUTS AND STIFFENER PADS IN THE FLAT SIDED HOLES IN THE SIDE WALLS OF THE CHASSIS. USE THE 3/8-32 HEX NUTS AND THE INTERNAL TOOTH WASHERS FOR MOUNTING HARDWARE, AS SHOWN IN THE TOP VIEW.
3. REASSEMBLE CHASSIS INTO CABINET.

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Figure 7. Diagram, Hardware Installation

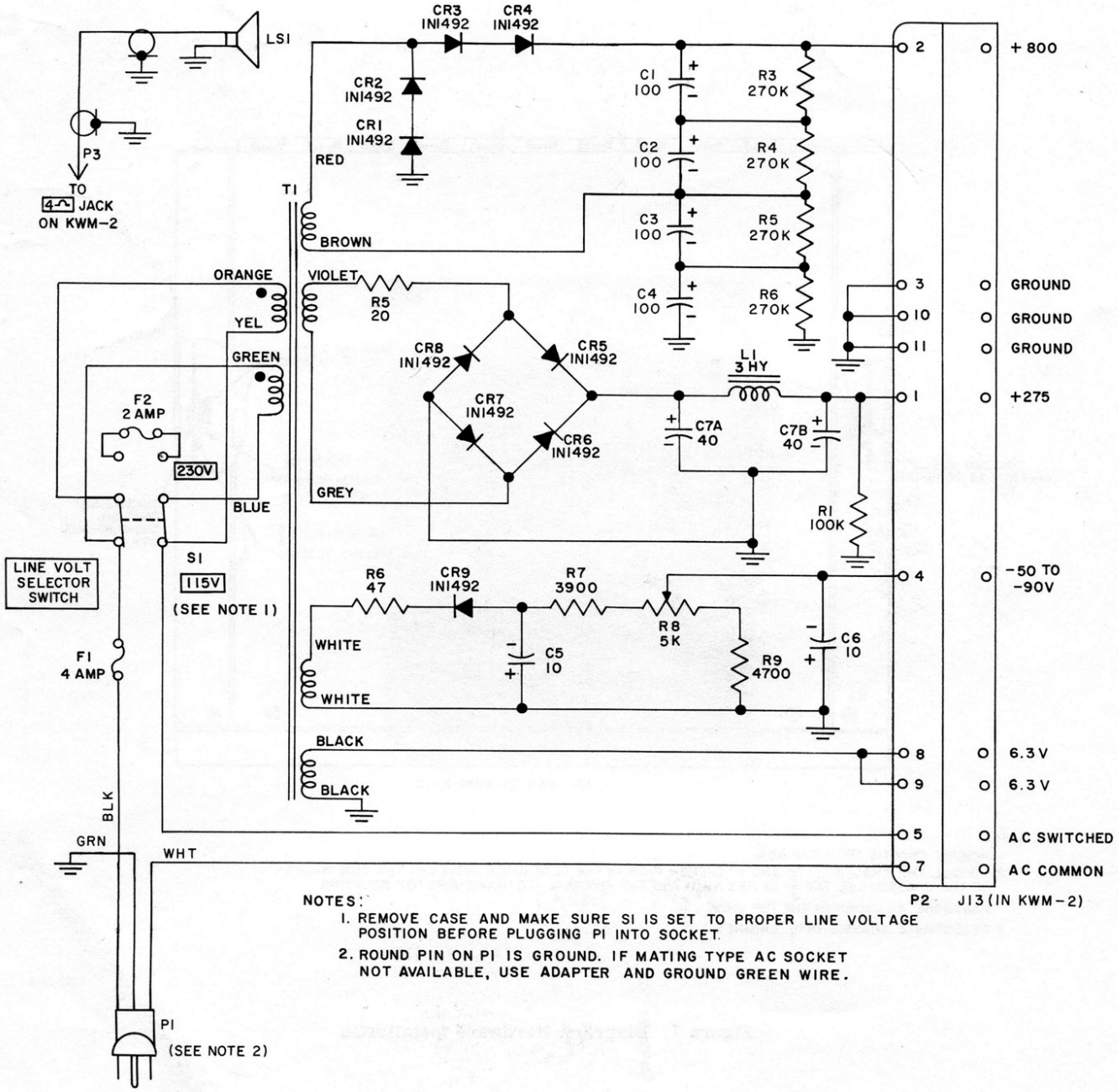

Figure 8. PM-2 Lightweight A-C Power Supply, Schematic Diagram