



**Rockwell  
International**

**instruction book**

**Collins Telecommunications Products Division**

**Collins 516F-2  
AC Power Supply**

516F-2 AC POWER SUPPLY (522-1170-000)

SERVICE INFORMATION LETTER 1-76

## PREVENT FUSE BLOWING CAUSED BY ARCING IN THE VACUUM TUBE RECTIFIERS

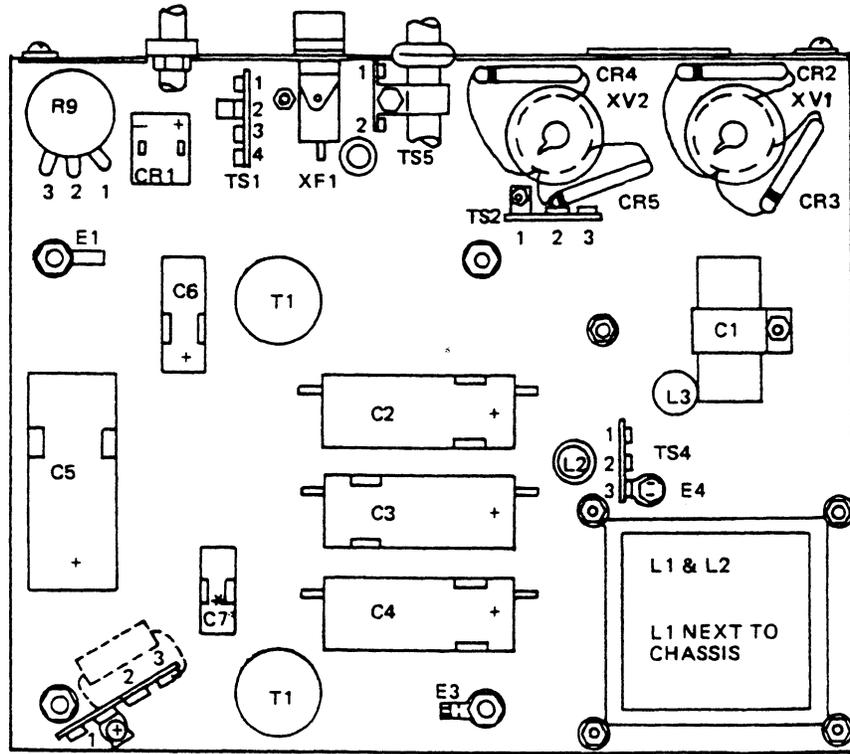
A few problems have been reported from the field concerning blown fuses in the 516F-2 power supply. Investigation has shown that the cause of the problem is arcing in rectifier tubes V1 (5R4GYA) and V2 (5U4GB). However, most of these tubes are performing satisfactorily so this service information letter is intended only for those power supplies that have a fuse blowing problem.

Vacuum tubes V1 and V2 should be removed and Semtech SCH-5000 solid state diodes (CPN 353-0425-010) should be installed as follows.

<u>DIODE</u>	<u>FROM</u>	<u>TO</u>
CR2	XV1-8 (cathode)	XV1-4
CR3	XV1-8 (cathode)	XV1-6
CR4	XV2-8 (cathode)	XV2-4
CR5	XV2-8 (cathode)	XV2-6

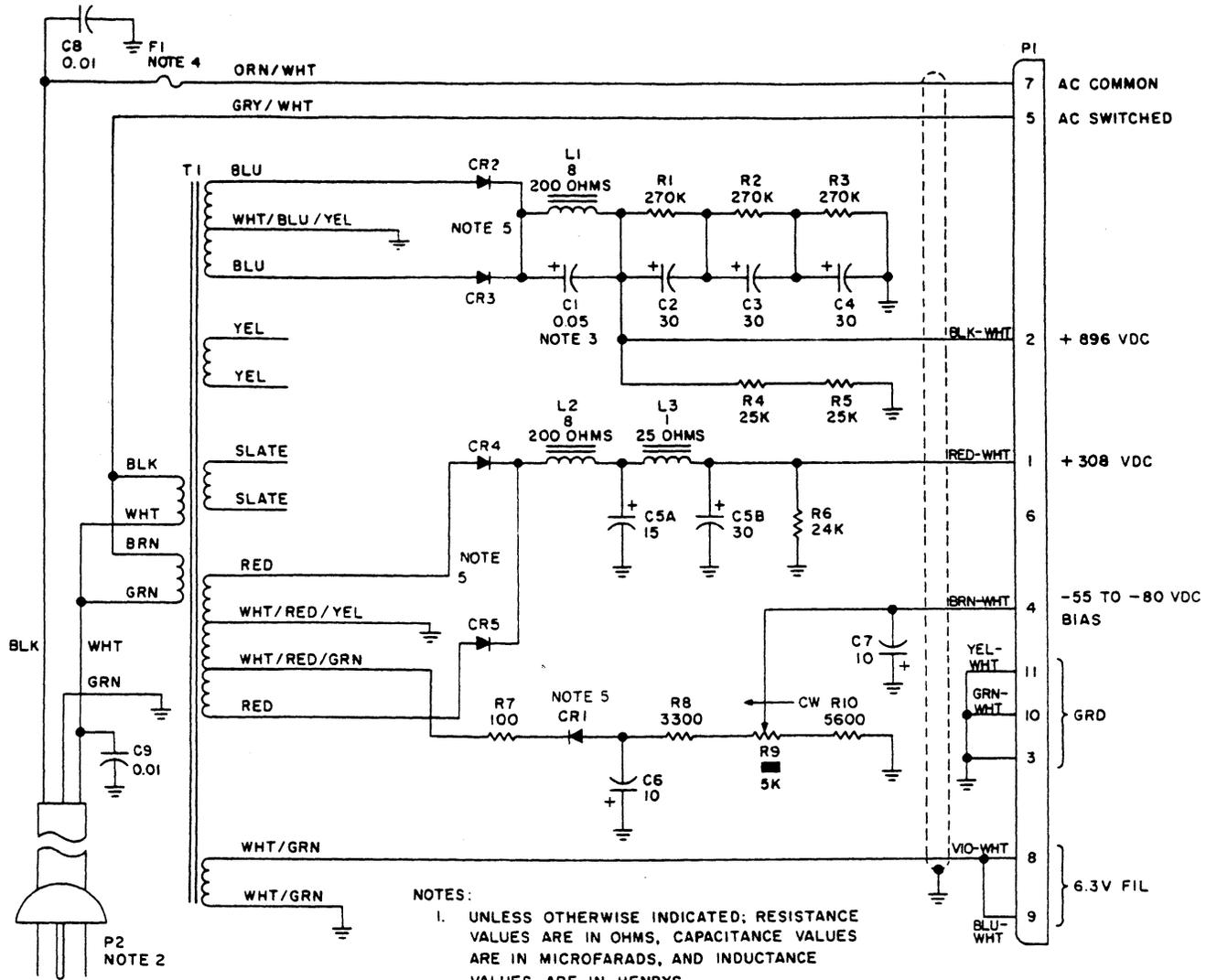
Figure 1 shows the diode locations pictorially and figure 2 shows the circuit change schematically.

This change will increase the output voltage to the KWM-2/2A and 32S-( ) transmitters by approximately 12 percent. The respective bias must be adjusted using the transmitter instruction books as a guide. It is recommended that the transmitter final amplifiers be kept at resonance at all times and that the swr always be less than 2:1.

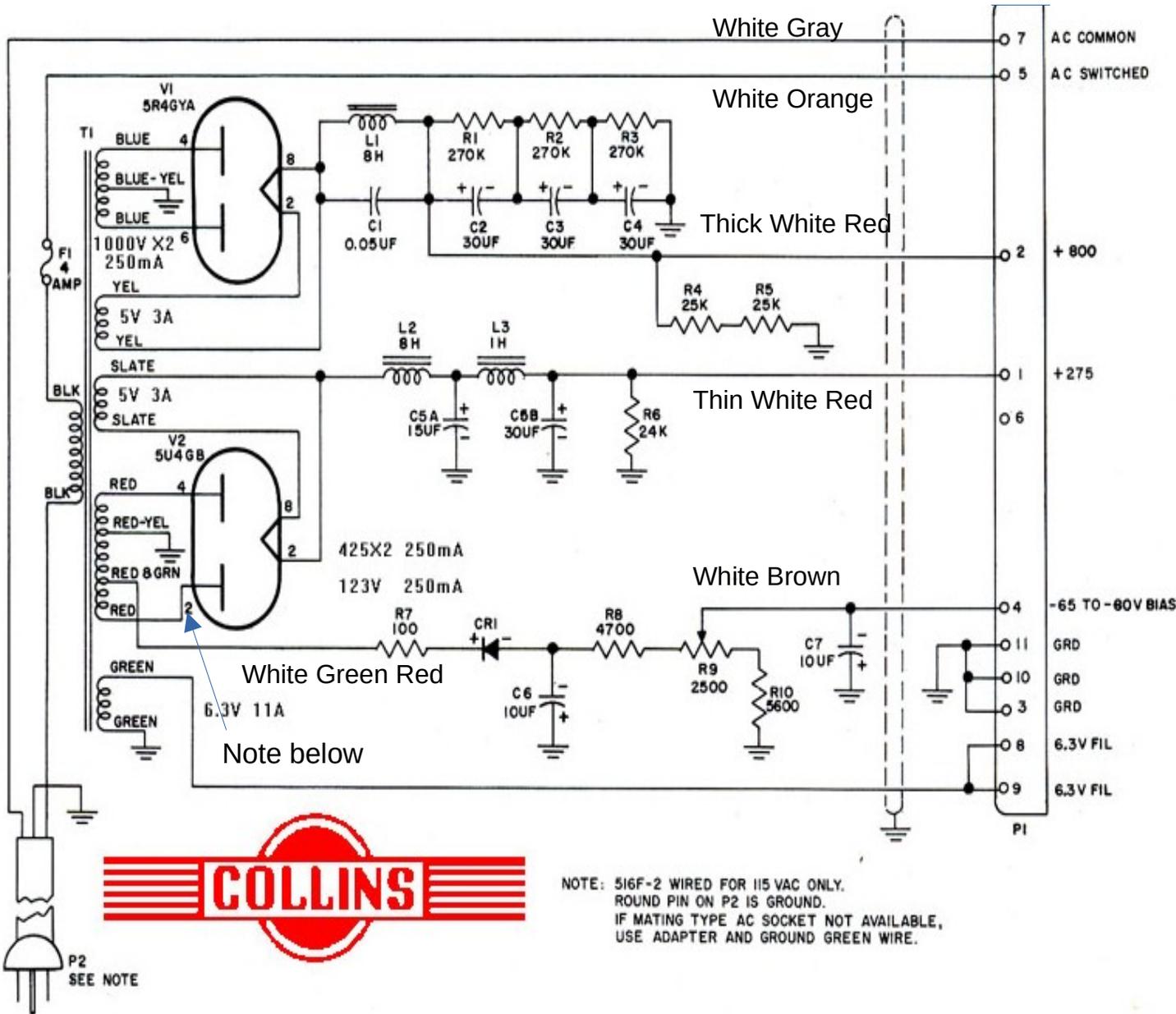


\*MOUNTING LOCATION OF C7 DEPENDS ON COMPONENT SIZE.

CR2, 3, 4, 5 Mounting Location  
Figure 1



516F-2 AC Power Supply, Schematic Diagram  
Figure 2



Note:  
 V2 Plate pin number is 6 not 2.

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**Rockwell  
International**

**instruction book**

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**Collins 516F-2  
AC Power Supply**

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**Collins Telecommunications  
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We welcome your comments concerning this instruction book. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the instruction book part number, the paragraph or figure number, and the page number.

Send your comments to: Publications Department  
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Products Division  
Rockwell ginternational  
Cedar Rapids, Iowa 52406

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# section **1**

## installation

### 1.1 UNPACKING

- a. Carefully remove the power supply and associated items (table 1-1) from the packing material and examine for visible damage. If the power supply has been damaged in shipment, save box and packing material and notify the transportation company. Fill out and mail the equipment registration card.
- b. Remove shipping blocks from the power supply (place fingers in hole drilled in block and pull straight out), then remove the rectifier tubes, V1 and V2 (table 1-1), from their cartons and place them in their respective sockets.
- c. Remove fuse F1, with cap of fuseholder (table 1-1), from shipping bag and place it in the fuseholder.
- d. To remove the 516F-2 from its cabinet for installation in the Collins 30S-1 Linear Power Amplifier, unscrew the two 6/32 by 1/2-inch Phillips-head screws securing the two rear rubber feet to the cabinet, as well as the two 6/32 by 3/8-inch Phillips-head screws directly behind the two front rubber feet. This will allow the chassis to slide out through the rear of the cabinet, providing access to the 516F-2 components.

**Note**

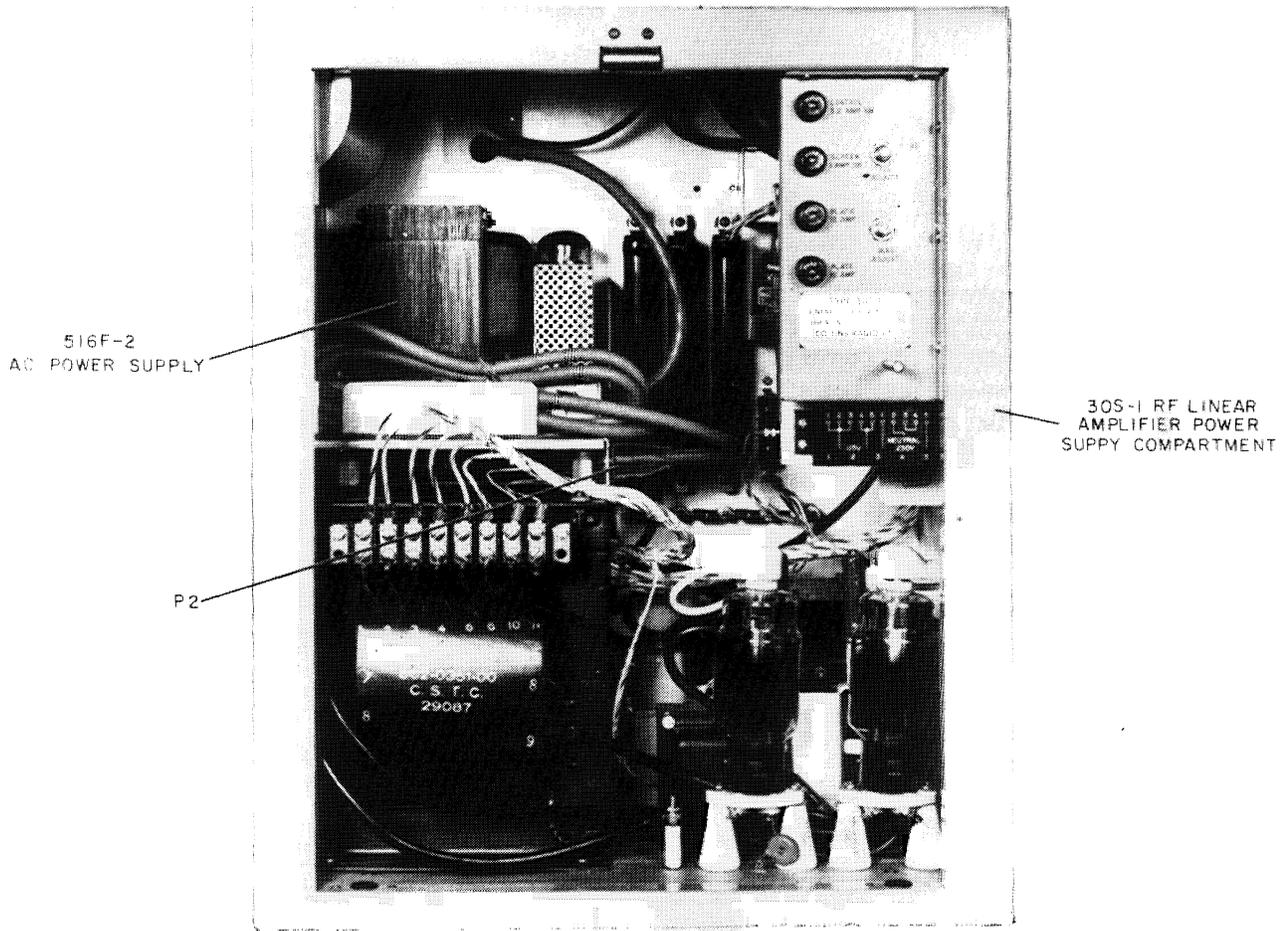
When the 516F-2 is mounted in the Collins 30S-1 Linear Power Amplifier (figure 1-1), an 8-ampere fuse is located directly behind the female receptacle for P2 on the exciter power supply shelf. This is in addition to fuse F1 on the 516F-2.

### 1.2 MOUNTING AND CABLING

- a. The 516F-2 is equipped with a ventilated cabinet having four rubber feet for table mounting. Provision is made for mounting the 516F-2 without its cabinet in the Collins 30S-1 Linear Power Amplifier as shown in figure 1-1 (refer to paragraph 1.1, step d for detailed instructions of 516F-2 cabinet removal). A power receptacle is included in the 30S-1 for mating with P2. P1 should be routed through the existing hole in the rear top side of the power supply compartment as shown. Secure the 516F-2 in place with four 3/8-inch #6 sheet-metal screws at the locations provided (two at the front and two at the rear of the existing shelf).

*Table 1-1. Equipment Furnished With 516F-2.*

QUANTITY	DESCRIPTION	FUNCTION	COLLINS PART NUMBER
1	Electron tube, 5R4GYA, V1	Rectifier	257-0142-000
1	Electron tube, 5U4GB, V2	Rectifier	257-0109-000
3	Fuses, 4-ampere	Protective devices (2) spare	264-0217-000
1	Cap, fuseholder	P/o fuseholder	265-1002-000
1	Adapter, connector	3-prong ac power adapter	368-0138-000
1	Instruction book	Instructions	523-0765629



*516F-2 AC Power Supply, Placement in  
30S-1 Linear Power Amplifier  
Figure 1-1*

**Caution**

Possible damage to associated equipment can result if the keyway of power plug P1 is not aligned with the keyway of its associated mating connector. To avoid possible damage to the equipment, always disconnect ac power plug P2 when joining P1 with its respective mating connector. Always check for keyway alignment before applying power, and be sure power transformer

primaries are correctly connected for the line voltage to be used. Refer to figure 1-2 for proper transformer connections.

- b. Plug power connector P1 into its mating connector, making sure that the above caution has been observed.
- c. Plug line cord connector P2 into an ac output. If the ac outlet is not fitted with mating connector, use the adapter furnished (table 1-1) and ground the green wire.





# section 2

## operation

### 2.1 GENERAL

The 516F-2 AC Power Supply provides all operating voltages for the Collins KWM-2/2A Transceivers and 32S-( ) Transmitters. It operates from a 115- or 230-volt, 50- to 400-Hz power source to provide high-voltage dc, low-voltage dc, variable dc bias, and an ac filament supply. The provided voltages are connected to the associated equipment by a 60-inch cable, and are terminated in an 11-pin female cable connector that mates with a male power receptacle located on the Collins KWM-2/2A Transceivers and 32S-( ) Transmitters. As supplied, the 516F-2 is factory-wired for 115-volt operation.

**Note**

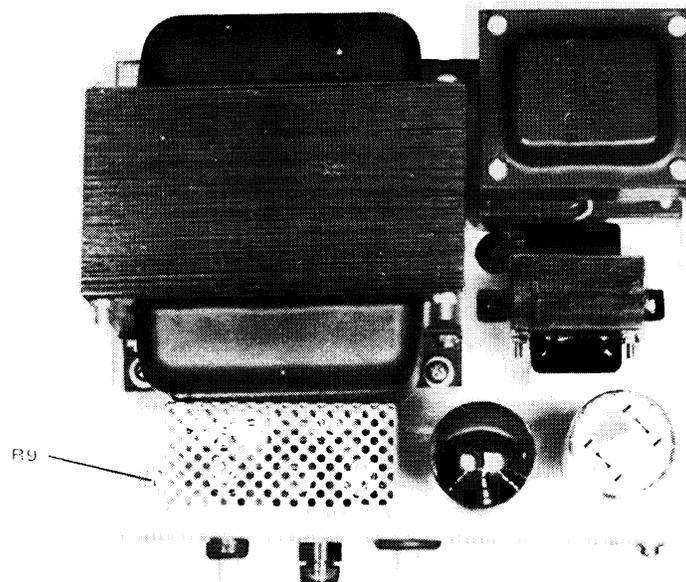
When using power source frequency higher than 60 Hz, remove capacitor C1.

Always make sure there is adequate ventilation for the heat generating components of the power supply.

### 2.2 CONTROL

Operation of the 516F2 is controlled completely by switches and relays located in the associated equipment. The only adjustment provided in the 516F-2 is the -55- to -80-volt dc variable bias supply. This is a screwdriver adjustment accessible at the rear of the unit (refer to figure 2-1). The bias adjustment will be dependent on the type of equipment used with the 516F-2 (refer to appropriate paragraphs in the KWM-2/2A or 32S-( ) instruction books).

To apply power to the 516F-2, two pins on the 11-pin female cable connector, P2-7 and P2-5, are connected together in the external equipment. In the case of the Collins KWM-2/2A Transceivers, this function is provided whenever the transceiver function switch is



TP3 1085 017

516F-2 AC Power Supply, Bias Adjustment  
Figure 2-1

set to ON, NB, or CAL, while in the case of the 32S-( ) Transmitters, this function is provided whenever the FREQ CONTROL switch is set to REC VFO, TRANS VFO, or SYNC.

### **2.3 OPERATING**

Turn on the associated equipment, wait 2 minutes, then adjust BIAS ADJUST potentiometer R9 (accessible at the rear of the 516F-2 (figure 2-1) without the cover removed) to the desired bias level. The 516F-2 is now ready for use. When using the Collins KWM-2/2A or 32S-( ) equipment, proceed as follows:

- a. Set the MIC GAIN control fully counterclockwise.
- b. Set the EMISSION switch to LOCK (in the KWM-2/2A) or LOCK KEY (in the 32S-( ) equipment).
- c. Set the meter switch to PA PLATE. Turn the function switch of the KWM-2/2A to ON or the FREQ CONTROL switch of the 32S-( ) equipment to TRANS VFO.
- d. After the 2-minute warmup period, the no-signal pa plate current, as monitored on the meter, should be approximately 40 mA. If it is not 40 mA, adjust BIAS ADJUST potentiometer R9 at the rear of the 516F-2 until a 40-mA reading is obtained.

# section 3

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## circuit description

### 3.1 GENERAL

Figure 7-1 shows a complete schematic of the 516F-2 AC Power Supply. Power transformer T1 supplies all voltages and current for the power supply outputs. T1 consists of two primary windings and five secondary windings. The two primary windings may be connected in parallel or series (figure 1-2) to accommodate either 115- or 230-volt primary power sources. Two of the secondary windings provide filament power to tubes V1 and V2; another supplies 6.3 volts ac to output power plug P1; a fourth winding supplies power to the 800-volt dc high-voltage rectifier circuit; and a fifth winding supplies power to the 275-volt dc low-voltage and -55- to -80-volt dc variable bias supplies.

### 3.2 HIGH-VOLTAGE CIRCUIT

The 800-volt dc high-voltage circuit consists of full-wave rectifier tube V1 and the choke input filter circuit consisting of L1, C2, C3, and C4. Resistors R1, R2, and R3 serve as voltage equalizing components, distributing equal voltages across C2, C3, and C4 respectively. Resistors R4 and R5 function as an output bleeder resistance to discharge capacitors C2, C3, and C4 when the power supply is turned off.

#### 3.2.1 High-Voltage Regulation

The parallel combination of L1 and C1 improves the regulation of the 800-volt dc output by automatically adjusting the effective filter network impedance as the load current changes. Under no-load conditions, the L1-C1 combination resonates at a frequency of 120 Hz, presenting a relatively large impedance to the 120-Hz ripple voltage. As the load current increases, the current through L1 increases, decreasing the apparent inductance of L1 and therefore changing the resonant frequency of the L1-C1 combination. The higher the load current, the smaller the apparent inductance of L1 will be, causing an upward shift of the resonant frequency of the L1-C1 combination. This provides a lower effective impedance to the 120-Hz

ripple voltage. With less 120-Hz ripple voltage dropped across the L1-C1 combination, more ripple voltage is delivered to the filter capacitor network (C2, C3, and C4), in turn developing more average dc output to the load. Capacitor C1 is removed when using a line frequency higher than 60 Hz.

### 3.3 LOW-VOLTAGE CIRCUIT

The 275-volt dc low-voltage rectifier consists of V2 and the choke input filter system consisting of L2, L3, C5A, and C5B. Resistor R6 functions as a bleeder resistor to discharge capacitors C5A and C5B when the power supply is turned off.

### 3.4 BIAS VOLTAGE CIRCUIT

The ac voltage for the -55- to -80-volt dc variable bias supply is obtained from the same secondary as the 275-volt dc low-voltage supply. The ac voltage is rectified by diode rectifier CR1 and filtered by C6, C7, R8, R9, and R10. Resistor R7 acts as a current-limiting resistor to protect diode CR1 during line voltage fluctuations and voltage spikes due to transients. BIAS ADJUST potentiometer R9 (a screw-driver adjustment) varies the dc output level as desired.

### 3.5 POWER INPUT/OUTPUT

The outputs of the power supply and the primary switching leads are connected to pins of 11-pin female cable connector P1. This connector mates with the power plug on the associated piece of equipment. The ac line cord furnished with the 516F-2 is a 3-wire cord fitted with a 3-pin male plug for connection to the ac source. The round pin of the plug is connected to the power supply ground, providing protection for the operator in the case of possible component breakdown. If a 3-circuit outlet is not available, use the adapter plug (table 1-1) furnished with the power supply, and ground the green wire that extends from the adapter.



# **section 4**

---

## **maintenance**

### **4.1 GENERAL**

Maintenance of the 516F-2 AC Power Supply consists of checking and replacing the electrolytic capacitors and tubes as needed, periodic voltage and current checks against those listed in the following specifications (section 5), and removing dust from the

equipment when needed. When replacing electrolytic capacitors, observe the proper polarity as indicated in the schematic diagram.

### **4.2 CABINET REMOVAL**

For cabinet removal, refer to paragraph 1.1, step d.



# section 5

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## specifications

### 5.1 SPECIFICATIONS

Size (overall dimensions) ..... 196.85 mm (7-3/4 in) high,  
250.83 mm (9-7/8 in) wide,  
292.10 mm (11-1/2 in) deep.

Weight ..... 13.62 kg (30 lb).

Ambient temperature range ..... 0 to +50 °C.

Input requirements ..... 115 or 230 volts, 50 to 400 Hz, 4 or 2 amperes.  
(Remove capacitor C1 when using a line frequency higher than 60 Hz.)

### Output voltages

Heater power ..... 6.3 ±0.3 volts ac.

Low-voltage B+ ..... 275 volts dc. Transmit  
NLT 250 volts dc; receive  
NMT 310 volts dc.

High-voltage B+ ..... 800 volts dc. Transmit  
NLT 690 volts dc; receive  
NMT 970 volts dc.

Bias voltage ..... -55 to -80 volts, adjustable.



# section 6

## parts list

### 6.1 INTRODUCTION

#### 6.1.1 General

The purpose of this parts list is for identification, requisition, and issuance of parts.

Part numbers listed in this parts list meet critical equipment design specification requirements. Use only the part numbers specified in this parts list for replacement of parts.

#### 6.1.2 Group Assembly Parts List

FIG - ITEM Column — Digits preceding the dash refer to the figure number. Digits following the dash are the item numbers assigned in sequence to correspond with the item numbers on the illustration.

PART NO Column — Listed are MIL standard, vendor, or Collins Radio Company part numbers. Collins part numbering system consists of 10 digits as follows: a 3-digit family number, a 4-digit serial number, and a 3-digit dash number.

INDENT Column — Items are coded 1, 2, 3, etc, to indicate the relationship to the next higher assembly.

DESCRIPTION Column — Lists the noun name, modifier, required descriptive information, federal manufacturer code, reference designation, attaching part (AP), reference to other figures, and effectivities.

Attaching parts are identified by (AP) following the part or parts they attach.

Effectivities are identified by the following methods: MCN (Manufacturer Control Number) 101 and up, CI (Configuration Identifier) 5-digit number, REV (Revision Identifier) dash (-) de-

notes original, letter A first change, letter B second change, etc. One of the above identifiers is listed on each chassis and/or replaceable assembly. Service Bulletins are identified by SB-1, SB-2, etc.

USABLE ON CODE Column — Part variations within the groups of equipment are indicated by a letter code (A, B, C, etc). The absence of the code indicates parts apply to all models.

UNITS PER ASSY Column — Quantities specified are per item number. The letters AR denote the selection of parts as required. The letters RF refer to an assembly completely assembled on a preceding figure and illustration.

#### 6.1.3 Numerical Index

PART NUMBER Column — Part numbers are listed in alphanumeric sequence.

FIG - ITEM Column — Digits preceding the dash refer to the figure number. Digits following the dash are the item numbers.

TTL REQ Column — Listed is the total quantity of parts or assemblies covered in the group assembly parts list.

#### 6.1.4 Reference Designation Index

REFERENCE DESIGNATION Column — Reference designations are listed in alphanumeric sequence.

FIG - ITEM Column — Digits preceding the dash refer to the figure number. Digits following the dash are the item numbers.

PART NUMBER Column — Part numbers listed are for items that have reference designations assigned.

## HOW TO USE THIS PARTS LIST

1. FIND PAGE NO. IN LIST OF ILLUSTRATIONS

5. FIND PART NO. IN NUMERICAL INDEX

2. FIND PART AND ITS ITEM NO.

7. LOCATE PART ON ILLUSTRATION

The diagram illustrates the process of finding a part number and its location on an illustration. It consists of four main components:

- Reference Designation Index:** A table listing various part numbers and their corresponding reference designations. An arrow points from a specific part number in this index to the Numerical Index.
- Numerical Index:** A table listing part numbers in numerical order. An arrow points from a specific part number in this index to the Group Assembly Parts List.
- Group Assembly Parts List:** A detailed list of parts for a specific assembly, including part numbers, descriptions, and quantities. An arrow points from a specific part number in this list to the illustration.
- Illustration:** A technical drawing of a mechanical assembly with numbered callouts (1 through 11) indicating the location of various parts. An arrow points from a callout number back to the Numerical Index.

Arrows labeled 1 through 7 indicate the sequence of steps: 1. Find page no. in list of illustrations; 2. Find part and its item no.; 3. Locate item no. on group assembly part list; 4. Locate reference designation; 5. Find part no. in numerical index; 6. Turn to figure and item no.; 7. Locate part on illustration.

HOW TO FIND THE PART NUMBER IF THE SECTION OR SYSTEM OF THE EQUIPMENT IN WHICH THE PART IS USED IS KNOWN:

HOW TO FIND THE ILLUSTRATION FOR A PART IF THE PART NUMBER IS KNOWN:

(1) Refer to the List of Illustrations and find the page number for the Major Assembly or System in which the part is used.

(5) Refer to the Numerical Index and find the part number.

(2) Locate the part item number and/or reference designation on the illustration.

(6) Turn to the Group Assembly Parts List and find the first figure and item number indicated in the Numerical Index for that part. If this figure shows the part in a section or system of the equipment other than the one desired, refer to the other figure numbers listed in the Numerical Index.

(3) Find the item number on the Group Assembly Parts List page to determine complete description.

(7) On the illustration, find item number determined in step (6).

(4) If only the reference designation is known, refer to the Reference Designation Index to find the part number.

6.1.5 *Manufacturer's Code, Name, and Address*

CODE	MANUFACTURER'S NAME AND ADDRESS	CODE	MANUFACTURER'S NAME AND ADDRESS
A1334	Toyner Corp Ocoess, MN	49671	RCA Corp. 30 Rockefeller Plaza New York, NY 10020
02660	Bunker-Ramo Corp., The Amphenol Connector Div. 2801 S. 25th Ave. Broadview, IL 60153	56289	Sprague Electric Co. North Adams, MA 01247
04222	Aerovox Corp. Aerovox Rd. Myrtle Beach, SC 29577	70494	New Britain Div. of Emhart Corp. 102 Washington St. New Britain, CT 06050
08556	Bell Electric Co. 2600 W. 50th St. Chicago, IL 60632	70674	ADC Products Div. of Magnetic Controls Co. 4900 W. 78th St. Minneapolis, MN 55435
09922	Burndy Corp. Richards Ave. Norwalk, CT 06852	70903	Belden Corp. 415 S. Kilpatrick Chicago, IL 60644
12014	Chicago Rivet and Machine Co. 950 S. 25th Ave. Bellwood, IL 60104	71400	Bussman Mfg. Div. of McGraw-Edison Co. 2536 W. University St. St. Louis, MO 63107
28520	Heyman Mfg. Co. 147 N. Michigan Ave. Kenilworth, NJ 07033	71450	CTS Corp. 1142 W. Beardsley Ave. Elkhart, IN 46514
33173	General Electric Co. Tube Dept. 316 E. 9th St. Owensboro, KY 42301	71590	Centralab - Electronics Div. of Globe Union, Inc. 5757 N. Green Bay Ave. Milwaukee, WI 53201
37942	Mallory, P. R., and Co., Inc. 3029 E. Washington St. Indianapolis, IN 46206	71785	TRW Electronic Components Cinch Connector Operations 1501 Morse Ave. Elk Grove Village, IL 60007
44655	Ohmite Mfg. Co. 3601 W. Howard St. Skokie, IL 60026	73386	Freed Transformer Co., Inc. 1736 Weirfield St. Brooklyn, NY 11227
45722	U.S.M. Corp. Parker-Kalon Fastener Div. 1 Peekay Dr. Clifton, NJ 07014	75543	Lavelle Rubber Co. 424 N. Wood Chicago, IL 60622
46384	Penn Engineering and Mfg. Corp. Old Easton Hwy. Doylestown, PA 18901		

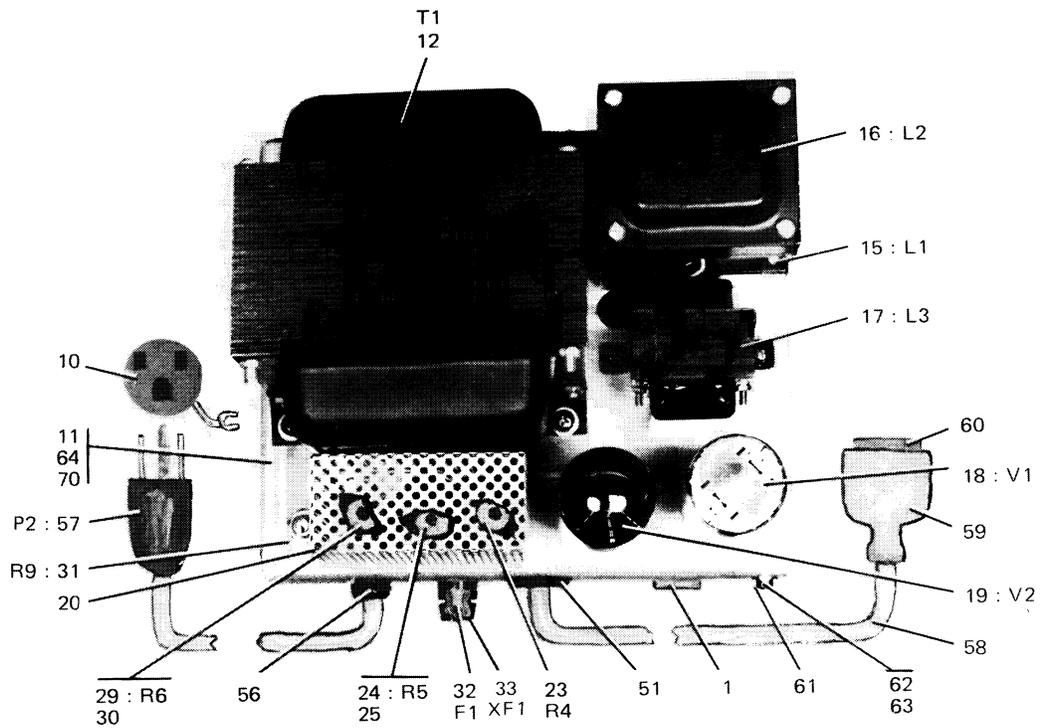
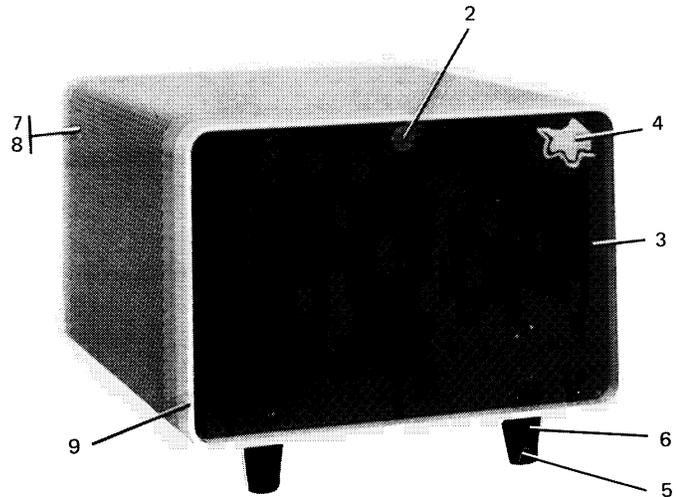
*section 6*  
*parts list*

**6.1.6 Configuration Identifiers**

The following CI's were used in compiling data for this manual:

CODE	MANUFACTURER'S NAME AND ADDRESS	<u>CI</u>	<u>UNIT PART NUMBER</u>	<u>FIG-ITEM</u>
77147	Patton-MacGuyer Co. Div. of Avid Corp. 17 Virginia Ave. Providence, RI 02905			
77250	Pheoll Mfg. Co. Div of Allied Products Corp. 5700 W. Roosevelt Rd. Chicago, IL 60650	72292 72292 74343 71514 65013	522-1170-000 544-2868-005 544-2856-000 544-2855-000 544-2864-003	1- 1-7 1-11 1-58 1-64
78189	Illinois Tool Works, Inc. Shakeproof Div. St. Charles Rd. Elgin, IL 60126			
78553	Linnerman Products, Inc. 8700 Brookpark Rd. Cleveland, OH 44129			
79807	Wrought Washer Mfg. Co. 2100 S. Bay St. Milwaukee, WI 53207			
80008	Electro Engineering Works, Inc. 401 Preda St. San Leandro, CA 94577			
80033	Prestole Everlock, Inc. 1345 Miami St. Toledo, OH 43605			
81349	Military Specifications			
84970	Sarkes Tarzian, Inc. Broadcast Eqpt. Div. E. Hillside Dr. Bloomington, IN 47401			
92825	Whitso, Inc. 9330 Byron St. Schiller Park, IL 60176			
96906	Military Standards			

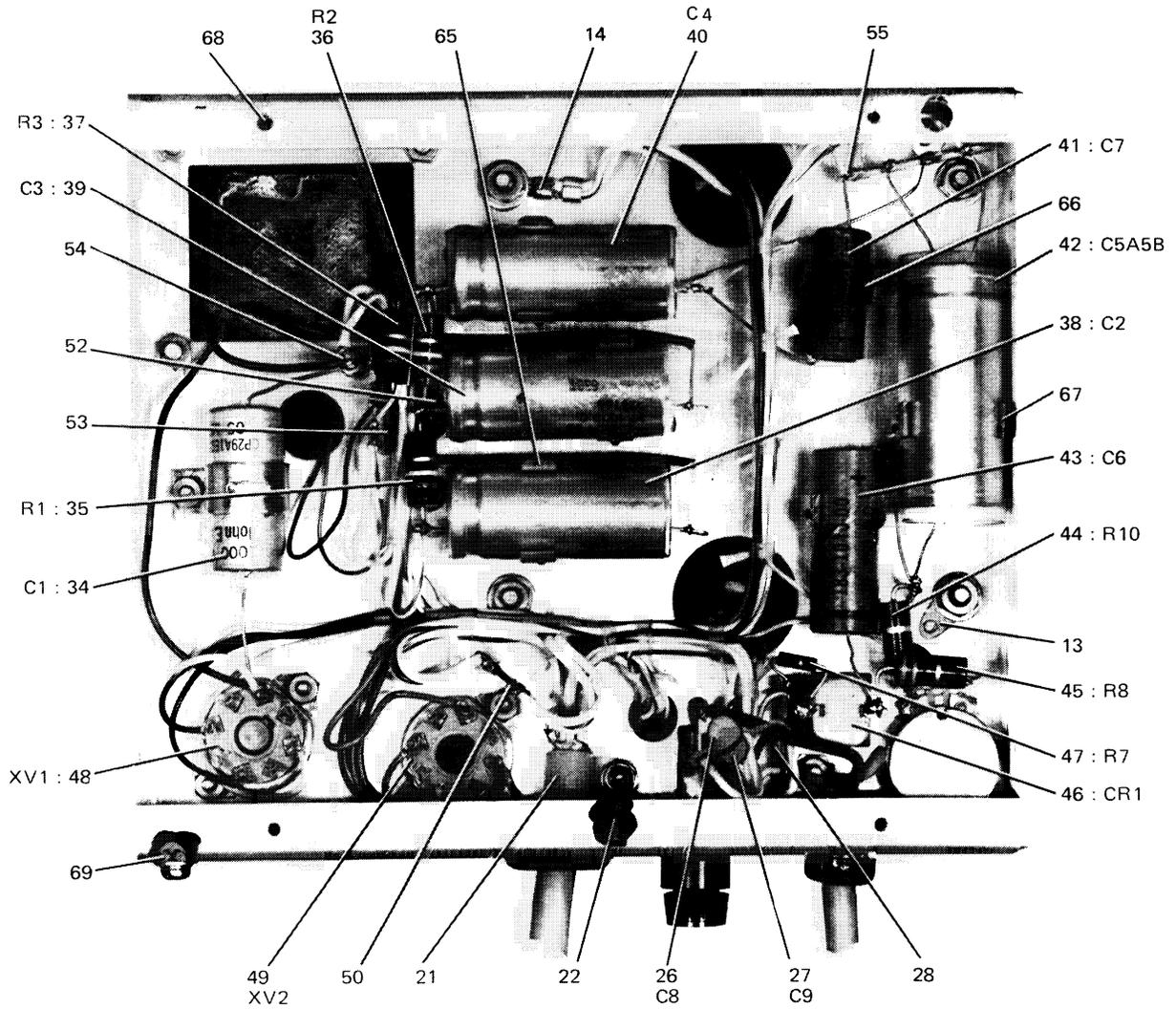
6.2 GROUP ASSEMBLY PARTS LIST



TP4-0553-027

516F-2 AC Power Supply  
Figure 6-1 (Sheet 1 of 2)

GROUP ASSEMBLY PARTS LIST



TP4-0553-027

516F-2 AC Power Supply  
Figure 6-1 (Sheet 2)

GROUP ASSEMBLY PARTS LIST

FIG - ITEM	PART NO	INDENT	DESCRIPTION	USABLE ON CODE	UNITS PER ASSY
6-1	522-1170-000	1	AC POWER SUPPLY, 516F-2		1
1	757-4779-000	2	PLATE, IDENT		1
2	280-2972-000	2	INSIGNIA 280-2972-000 (EFF TO CI 68113)		1
2	280-3423-00 C13388SS010	2	INSIGNIA (VA1334) 280-3423-000 (EFF CI 68113, 2 PUSH ON NUT (V78553) 334-1331-000 (AP)		1
3	544-2861-003	2	PANEL, FRONT		1
4	544-2860-003 MS35649-264	2	PAD, POWER SUPPLY 2 NUT,PLAIN,HEX, SST, 6-32 (V96906) 313-0002-000 (AP FOR 3-4)		1
	310-6360-000	2	WASHER,FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP FOR 3-4)		4
	P330-2420-000	2	SCREW,MACH, BRS, 6-32 X 3/8 (V77250) 330-2420-000 (AP FOR 3-4)		4
5	543-8101-002	2	FOOT, CABINET		2
6	747RBLACK MS35649-264	2	BUMPER,RBR (V75543) 200-5010-000 2 NUT,PLAIN,HEX, SST, 6-32 (V96906) 313-0002-000 (AP FOR 5-6)		4
	310-6360-000	2	WASHER,FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP FOR 5-6)		2
	310-0055-000	2	WASHER,FLAT, BRS, 0.147 ID X 0.312 OD (V79807) 310-0055-000 (AP FOR 5-6)		4
	MS51957-31	2	SCREW,MACH, SST, 6-32 X 5/8 (V96906) 343-0173-000 (AP FOR 5-6)		2
	MS51957-35	2	SCREW,MACH, SST, 6-32 X 1-1/4 (V96906) 343-0178-000 (AP FOR 5-6)		2
7	544-2868-005 MS35649-264	2	CABINET, POWER SUPPLY 2 NUT,PLAIN,HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		1
	310-6360-000	2	WASHER,FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP)		2
	MS35338-136	2	WASHER,LOCK, SST, 0.141 ID X 0.250 OD (V96906) 310-0282-000 (AP)		4
	543-8116-002 MS51957-28	2	SCREW, MACHINE (AP) 2 SCREW,MACH, SST, 6-32 X 3/8 (V96906) 343-0169-000 (AP)		2
8	544-2867-005	3	WRAPRD		2
9	609-0580-001	3	FRAME, STYLE (EFF TO CI 72292)		1
9	609-1251-001	3	FRAME, STYLE (EFF CI 72292)		1
10	350	2	ADAPTER,CONN (V08556) 368-0138-000		1
11	544-2856-000	2	CHASSIS, ASSY		1
12	38578 MS35650-304	3	TRANSFORMER,PWR (V73386) 662-0249-010 T1 3 NUT,PLAIN,HEX, SST, 10-32 (V96906) 313-0019-000 (AP)		1
	310-0049-000	3	WASHER,FLAT, SST, 0.203 ID X 0.500 OD (V79807) 310-0049-000 (AP)		4
	MS35338-138	3	WASHER,LOCK, SST, 0.194 ID X 0.334 OD (V96906) 310-0284-000 (AP)		8
	MS51958-64	3	SCREW,MACH, SST, 10-32 X 5/8 (V96906) 343-0229-000 (AP)		4
13	4035-12	3	TERMINAL,LUG (V77147) 304-0084-000		1
14	2041-10-032HT	3	TERMINAL,LUG (V77147) 304-1300-000		1
15	E13662	3	REACTOR,DUAL, 8H (V80008) 668-0300-000 L1		1
16	E13662 MS35649-284	3	REACTOR,DUAL, 8H (V80008) 668-0300-000 L2 3 NUT,PLAIN,HEX, SST, 8-32 (V96906) 313-0017-000 (AP)		1
	MS35338-137	3	WASHER,LOCK, SST, 0.168 ID X 0.296 OD (V96906) 310-0072-000 (AP)		4
	310-0048-000	3	WASHER,FLAT, SST, 0.172 ID X 0.437 OD (V79807) 310-0048-000 (AP)		4
17	A15390 MS35649-264	3	INDUCTOR, 0.92H (V70674) 668-0322-000 L3 3 NUT,PLAIN,HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		1
	310-6360-000	3	WASHER,FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP)		2
					1

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parts list

GROUP ASSEMBLY PARTS LIST

FIG - ITEM	PART NO	INDENT	DESCRIPTION	USABLE ON CODE	UNITS PER ASSY
6-1	MS35338-136	3	WASHER, LOCK, SST, 0.141 ID X 0.250 OD (V96906) 310-0282-000 (AP)		2
	MS51957-28	3	SCREW, MACH, SST, 6-32 X 3/8 (V96906) 343-0169-000 (AP)		2
18	5R4GYA	3	ELECTRON TUBE (V33173) 257-0142-000 V1		1
19	5U4GB	3	ELECTRON TUBE (V49671) 257-0109-000 V2		1
20	544-2862-003	3	SHIELD, HIGH VOLTAGE		1
	MS35649-264	3	NUT, PLAIN, HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		2
	MS35333-71	3	WASHER, LOCK, SST, 0.150 ID X 0.285 OD (V96906) 373-0001-000 (AP)		2
21	HP6N	3	CLAMP, LOOP (V09922) 150-1543-000		1
22	18A18697	3	TERMINAL BOARD (V71785) 306-0168-000		1
	MS35649-264	3	NUT, PLAIN, HEX, SST, 6-32 (V96906) 313-0002-000 (AP FOR 21-22)		1
	310-6360-000	3	WASHER, FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP FOR 21-22)		1
23	0219	3	RESISTOR, FXD, WW 25K, 5%, 25W (V44655) 710-4783-000 R4		1
	MS35649-264	3	NUT, PLAIN, HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		2
	310-6360-000	3	WASHER, FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP)		1
	1210	3	WASHER, SHLDR, GRA FBR, 0.195 ID X 0.243 OD (V70494) 302-0216-000 (AP)		2
	544-2858-002	3	STUD (AP)		1
24	0219	3	RESISTOR, FXD, WW 25K, 5%, 25W (V44655) 710-4783-000 R5		1
	MS35649-264	3	NUT, PLAIN, HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		2
	310-6360-000	3	WASHER, FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP)		1
	1210	3	WASHER, SHLDR, GRA FBR, 0.195 ID X 0.243 OD (V70494) 302-0216-000 (AP)		2
	P312-0062-000	3	STUD, CONT THD, BRS, 6-32 X 3 (V77250) 312-0062-000 (AP)		1
25	544-2857-002	3	PIN, LOCATING		1
26	2DDH63N103M	3	CAPACITOR, FXD, CER DIEL, 10000PF, 20%, 1000V (V71590) 913-3922-000 C8		1
27	2DDH63N103M	3	CAPACITOR, FXD, CER DIEL, 10000PF, 20%, 1000V (V71590) 913-3922-000 C9		1
28	1532A	3	TERMINAL BOARD (V71785) 306-9032-000		1
	MS35649-264	3	NUT, PLAIN, HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		1
	MS35338-136	3	WASHER, LOCK, SST, 0.141 ID X 0.250 OD (V96906) 310-0282-000 (AP)		1
29	2K40F24KPORM5PCT	3	RESISTOR, FXD, WW 24K, 5%, 25W (V44655) 710-0374-000 R6		1
	MS35649-264	3	NUT, PLAIN, HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		4
	310-6360-000	3	WASHER, FLAT, SST, 0.147 ID X 0.375 OD (V79807) 310-6360-000 (AP)		2
	1210	3	WASHER, SHLDR, GRA FBR, 0.195 ID X 0.243 OD (V70494) 302-0216-000 (AP)		2
	544-2858-002	3	STUD (AP)		1
30	4021	3	TERMINAL, LUG (V77147) 304-0087-000		1
31	LQ8338	3	RESISTOR, VAR, 5K, 10%, 2W (V71450) 376-2376-000 R9		1
	P334-4120-00	3	NUT, PLAIN, HEX, SST, 3/8-32 (V77250) 334-4120-000 (AP)		1
	1220-02	3	WASHER, LOCK, CD PL STL, 0.391 ID X 0.507 OD (V78189) 373-0081-000 (AP)		1
32	MDX4	3	FUSE, CRTG (V71400) 264-0217-000 F1		1

GROUP ASSEMBLY PARTS LIST

FIG - ITEM	PART NO	INDENT	DESCRIPTION	USABLE ON CODE	UNITS PER ASSY
6-1	33		3 FUSEHOLDER (V71400) 265-1002-000 XF1		1
	34		3 CAPACITOR,FXD, PPR DIEL, 0.05UF, 10%, 1000V (V81349) 961-4646-000 C1		1
	35		3 RESISTOR,FXD, CMPSN, 0.27MEGO, 10%, 2W (V81349) 745-5754-000 R1		1
	36		3 RESISTOR,FXD, CMPSN, 0.27MEGO, 10%, 2W (V81349) 745-5754-000 R2		1
	37		3 RESISTOR,FXD, CMPSN, 0.27MEGO, 10%, 2W (V81349) 745-5754-000 R3		1
	38		3 CAPACITOR,FXD, ELCTLT, 30UF, M10%P50%, 400V (V56289) 183-1771-000 C2		1
	39		3 CAPACITOR,FXD, ELCTLT, 30UF, M10%P50%, 400V (V56289) 183-1771-000 C3		1
	40		3 CAPACITOR,FXD, ELCTLT, 30UF, M10%P50%, 400V (V56289) 183-1771-000 C4		1
	41		3 CAPACITOR,FXD, ELCTLT, 10UF, M10%P100%, 150V (V04222) 183-1040-000 C7		1
	42		3 CAPACITOR,FXD, ELCTLT, 15UF,30UF, M10%P100%, 400V, 2 SECT (V56289) 183-1781-000 C5A5B		1
	43		3 CAPACITOR,FXD, ELCTLT, 10UF, M15%P50%, 250V (V37942) 183-1046-000 C6		1
	44		3 RESISTOR,FXD, CMPSN, 5.6K, 10%, 2W (V81349) 745-5684-000 R10		1
	45		3 RESISTOR,FXD, CMPSN, 3.3K, 10%, 2W (V81349) 745-5673-000 R8		1
	46		3 RECTIFIER,MTLC (V84970) 353-0153-000 CR1		1
		MS35649-264	3 NUT,PLAIN,HEX, SST, 6-32 (V96906) 313-0002-000 (AP)		1
		MS35338-136	3 WASHER,LOCK, SST, 0.141 ID X 0.250 OD (V96906) 310-0282-000 (AP)		1
	47		3 RESISTOR,FXD, CMPSN, 100 OHMS, 10%, 1/2W (V81349) 745-1310-000 R7		1
	48		3 SOCKET,ELECTRON (V02660) 220-1155-000 XV1		1
	49		3 SOCKET,ELECTRON (V02660) 220-1155-000 XV2		1
	50		3 TERMINAL BOARD (V71785) 306-0587-000		1
		MS35649-264	3 NUT,PLAIN,HEX, SST, 6-32 (V96906) 313-0002-000 (AP FOR 48-50)		4
		MS35338-136	3 WASHER,LOCK, SST, 0.141 ID X 0.250 OD (V96906) 310-0282-000 (AP FOR 48-50)		4
		MS51959-28	3 SCREW,MACH, SST, 6-32 X 3/8 (V96906) 342-0062-000 (AP FOR 48-50)		4
	51		3 GROMMET,RBR (V96906) 201-0024-000		1
	52		3 GROMMET,RBR (V96906) 201-0020-000		1
	53		3 TERMINAL BOARD (V71785) 306-0001-000		1
	54		3 TERMINAL STDF (V92825) 306-0233-000		1
		MS35649-244	3 NUT,PLAIN,HEX, SST, 4-40 (V96906) 313-0043-000 (AP FOR 53-54)		1
		MS35338-135	3 WASHER,LOCK, SST, 0.115 ID X 0.209 OD (V96906) 310-0279-000 (AP FOR 53-54)		1
		P343-0287-000	3 SCREW,MACH, NP BRS, 4-40 X 3/8 (V77250) 343-0287-000 (AP FOR 53-54)		1
	55		3 TERMINAL BOARD (V71785) 306-9032-000		1
		330-0735-000	3 SCREW,TPG,THD, CD PL STL, 6-20 X 1/4 (V45722) 330-0735-000 (AP)		1
	56		3 BUSHING,STRAIN (V28520) 150-0050-000		1
	57		3 CABLE ASSY,PWR (V70903) 426-1464-000 P2		1
	58		3 CABLE ASSY		1
	59		4 SHELL, SOCKET		1
	60		4 SOCKET,TUBE (V02660) 372-1952-000		1
	61		3 SCREW,MACH, NP BRS, 8-32 X 1/2 (V77250) 343-0311-000		1

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parts list

GROUP ASSEMBLY PARTS LIST

FIG - ITEM	PART NO	INDENT	DESCRIPTION	USABLE ON CODE	UNITS PER ASSY
6-1	62	310-0058-000	3 WASHER,FLAT, BRS, 0.172 ID X 0.437 OD (V79807) 310-0058-000		1
	63	MS35338-99	3 WASHER,LOCK, BRZ, 0.168 ID X 0.296 OD (V96906) 310-0079-000		1
	64	544-2864-003	3 CHASSIS, PRSD		1
	65	E50007-041	4 RETAINER,CAP (V80033) 139-0089-000		3
	66	E50003-041	4 RETAINER,CAP (V80033) 139-0087-000		2
	67	E50008-041	4 RETAINER,CAP (V80033) 139-0090-000		1
		R3307X1-8CADPL	4 RIVET TUBULAR, CD PL STL, 1/8 DIA X 1/8 (V12014) 305-2012-000 (AP)		6
	68	CL632-2C	4 NUT,PLAIN, CD PL STL, 6-32 (V46384) 334-0066-000		4
	69	CL832-2C	4 NUT,PLAIN, CD PL STL, 8-32 (V46384) 334-0559-000		1
	70	544-2865-004	4 CHASSIS, POWER SUPPLY		1

6.3 NUMERICAL INDEX

PART NUMBER	FIG - ITEM	TTL REQ	PART NUMBER	FIG - ITEM	TTL REQ
A15390	6-1-17	1	R3307X1-8CADPL	6-1-67	6
CL632-2C	6-1-68	4	SR6P4	6-1-56	1
CL832-2C	6-1-69	1	TC52	6-1-43	1
CP29A1EG503K	6-1-34	1	0219	6-1-23	1
C13388SS010	6-1-2	1		6-1-24	1
D28166	6-1-38	1	1210	6-1-23	2
	6-1-39	1		6-1-24	2
	6-1-40	1		6-1-29	2
D28167	6-1-42	1	1220-02	6-1-31	1
E13662	6-1-15	1	1529A	6-1-50	1
	6-1-16	1	1532A	6-1-28	1
E26A817	6-1-41	1		6-1-55	1
E50003-041	6-1-66	2	168-013-1000	6-1-48	1
E50007-041	6-1-65	3		6-1-49	1
E50008-041	6-1-67	1	18A18697	6-1-22	1
HKP1 1-4X1-4	6-1-33	1	2B1DB12	6-1-54	1
HP6N	6-1-21	1	2DDH63N103M	6-1-26	1
KH3491	6-1-57	1		6-1-27	1
LQ8338	6-1-31	1	2K40F24KPORM5PCT	6-1-29	1
MDX4	6-1-32	1	2041-10-032HT	6-1-14	1
MS35333-71	6-1-20	2	280-2972-000	6-1-2	1
MS35338-135	6-1-54	1	280-3423-00	6-1-2	1
MS35338-136	6-1-7	2	310-0048-000	6-1-16	4
	6-1-17	2	310-0049-000	6-1-12	8
	6-1-28	1	310-0055-000	6-1-6	4
	6-1-46	1	310-0058-000	6-1-62	1
	6-1-50	4	310-6360-000	6-1-4	4
MS35338-137	6-1-16	4		6-1-6	2
MS35338-138	6-1-12	4		6-1-7	4
MS35338-99	6-1-63	1		6-1-17	1
MS35489-35	6-1-52	1		6-1-22	1
MS35489-43	6-1-51	1		6-1-23	1
MS35649-244	6-1-54	1		6-1-24	1
MS35649-264	6-1-4	4		6-1-29	2
	6-1-6	2	330-0735-000	6-1-55	1
	6-1-7	2	332-1403-165	6-1-53	1
	6-1-17	2	350	6-1-10	1
	6-1-20	2	38578	6-1-12	1
	6-1-22	1	4021	6-1-30	1
	6-1-23	2	4035-12	6-1-13	1
	6-1-24	2	5R4GYA	6-1-18	1
	6-1-28	1	5U4GB	6-1-19	1
	6-1-29	4	50	6-1-46	1
	6-1-46	1	522-1170-000	6-1-	1
	6-1-50	4	543-8101-002	6-1-5	2
MS35649-284	6-1-16	4	543-8116-002	6-1-7	2
MS35650-304	6-1-12	4	544-2855-000	6-1-58	1
MS51957-28	6-1-7	2	544-2856-000	6-1-11	1
	6-1-17	2	544-2857-002	6-1-25	1
MS51957-31	6-1-6	2	544-2858-002	6-1-23	1
MS51957-35	6-1-6	2		6-1-29	1
MS51958-64	6-1-12	4	544-2860-003	6-1-4	1
MS51959-28	6-1-50	4	544-2861-003	6-1-3	1
P312-0062-000	6-1-24	1	544-2862-003	6-1-20	1
P330-2420-000	6-1-4	4	544-2864-003	6-1-64	1
P334-4120-00	6-1-31	1	544-2865-004	6-1-70	1
P343-0287-000	6-1-54	1	544-2867-005	6-1-8	1
P343-0311-000	6-1-61	1	544-2868-005	6-1-7	1
RCR20G101KS	6-1-47	1	609-0580-001	6-1-9	1
RCR42G274KS	6-1-35	1	609-1251-001	6-1-9	1
	6-1-36	1	609-1608-001	6-1-60	1
	6-1-37	1	747RBLACK	6-1-6	4
RCR42G332KS	6-1-45	1	757-4779-000	6-1-1	1
RCR42G562KS	6-1-44	1	78S11M1005	6-1-59	1

6.4 REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIG - ITEM	PART NUMBER	REFERENCE DESIGNATION	FIG - ITEM	PART NUMBER
CR1	6-1-46	50			
C1	6-1-34	CP29A1EG503K			
C2	6-1-38	D28166			
C3	6-1-39	D28166			
C4	6-1-40	D28166			
C5A5B	6-1-42	D28167			
C6	6-1-43	TC52			
C7	6-1-41	E26A817			
C8	6-1-26	2DDH63N103M			
C9	6-1-27	2DDH63N103M			
F1	6-1-32	MDX4			
L1	6-1-15	E13662			
L2	6-1-16	E13662			
L3	6-1-17	A15390			
P2	6-1-57	K83491			
R1	6-1-35	RCR42G274KS			
R10	6-1-44	RCR42G562KS			
R2	6-1-36	RCR42G274KS			
R3	6-1-37	RCR42G274KS			
R4	6-1-23	0219			
R5	6-1-24	0219			
R6	6-1-29	2K40F24KPORM5PCT			
R7	6-1-47	RCR20G101KS			
R8	6-1-45	RCR42G332KS			
R9	6-1-31	LQ8338			
T1	6-1-12	38578			
V1	6-1-18	5R4GYA			
V2	6-1-19	5U4GB			
XF1	6-1-33	HKP1 1-4X1-4			
XV1	6-1-48	168-013-1000			
XV2	6-1-49	168-013-1000			

# section 7

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## illustrations

### Note

The period covered by this instruction book is February 1968 to the date on the book title page.

Each equipment circuit change made during the period of time covered by this instruction book has the changes identified on the schematic diagram and in the parts list. Circuit changes are flagged on the schematic with a change identifier



pointed at the component, group of compo-

nents, or a circuit enclosed by a broken line. The identifier indicates that the component or circuit has been changed, and the number in the identifier indexes the specific change. If several components are affected by the same equipment change, there may be more than one identifier with the same index number.

The indexed changes are listed on schematic changes and equipment differences sheets inserted in front of the schematic sheet to which they are indexed.

The identifier-description describes the differences and reasons for changes and includes a

recommendation as to what action should be followed during repair or maintenance.

The reason for identifying changes in this manner is that the manufacturer has "scrambled" serial numbers on his amateur products during the period covered by this instruction book. Therefore, changes cannot be identified by conventional methods.

### Caution

None of the changes have been made because the equipment has failed to meet the equipment specifications; the changes are not recommended for all units. Equipment changes have been made to improve performance or reliability of radios that are built using different fabrication processes.

The change identifier number is also used in the parts list section of this instruction book. However, in the parts list the identifier is enclosed in slashes (for example, /6/) instead of the



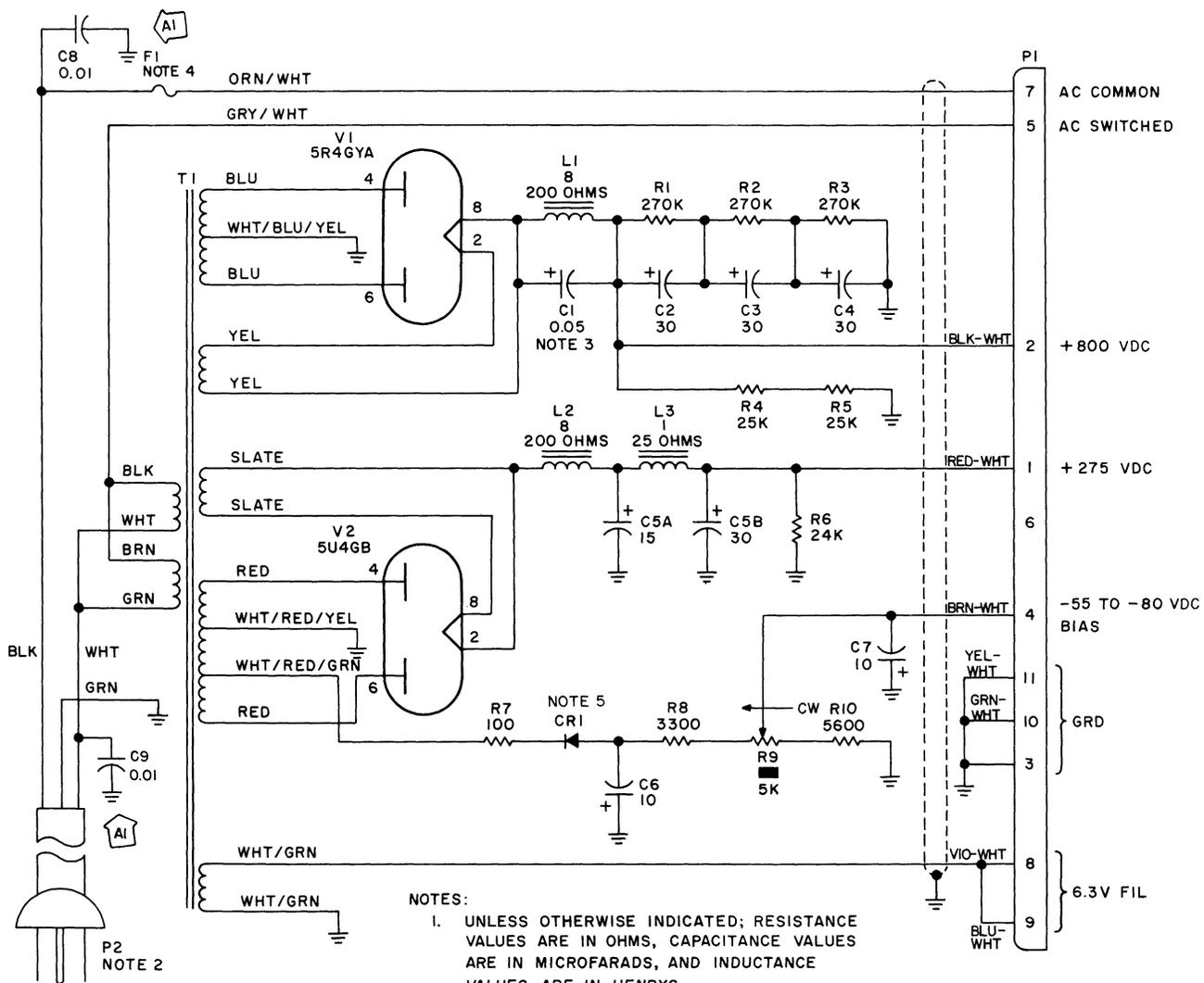
symbol.

No service bulletins have been written against the 516F-2 AC Power Supply.

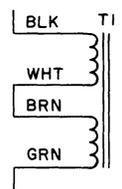
SCHMATIC CHANGES AND EQUIPMENT DIFFERENCES

IDENTIFIER	DESCRIPTION
A1	Capacitors C8 and C9, 0.01 $\mu$ F, were installed on the power supply ac input lines for rf filtering.

516F-2 AC Power Supply, Schematic Diagram  
Figure 7-1 (Sheet A)



- NOTES:
1. UNLESS OTHERWISE INDICATED; RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, AND INDUCTANCE VALUES ARE IN HENRYS.
  2. SHOWN WIRED FOR 115 VAC. ROUND PIN ON P2 IS GROUND. IF MATING TYPE AC SOCKET NOT AVAILABLE, USE ADAPTER AND GROUND GREEN WIRE.
  3. REMOVE C1 WHEN USING A LINE FREQUENCY HIGHER THAN 60 HZ.
  4. FI IS 4 AMPERES FOR 115 VAC INPUT, FOR 230 VAC INPUT, CHANGE FI TO 2 AMPERES AND CONNECT PRIMARIES IN SERIES AS FOLLOWS:



5. CRI IS SARKES-TARZIAN MODEL 50.

516F-2 AC Power Supply, Schematic Diagram  
Figure 7-1

TP2-1307-014

