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**Rockwell  
International**

**instruction book**

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

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**Collins Telecommunications  
Products Division  
Electronic Systems Group  
Rockwell International  
Cedar Rapids, Iowa 52406**

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*Printed in the United States of America*

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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**

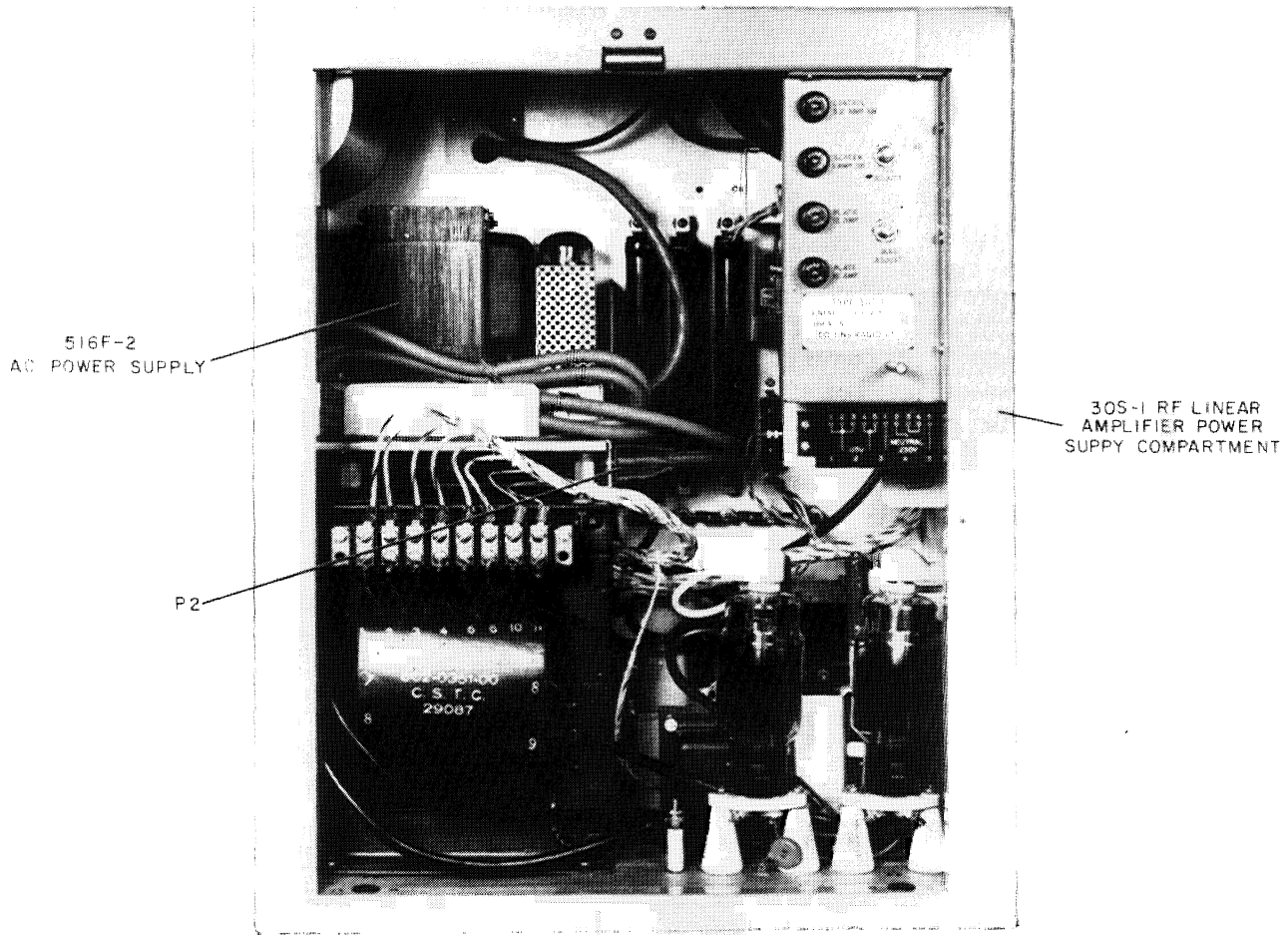
When the 516F-2 is mounted in the Collins 30S-1 Linear Power Amplifier (figure 1-1), an 8-ampere fuse is located directly behind the female receptacle for P2 on the exciter power supply shelf. This is in addition to fuse F1 on the 516F-2.

### 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



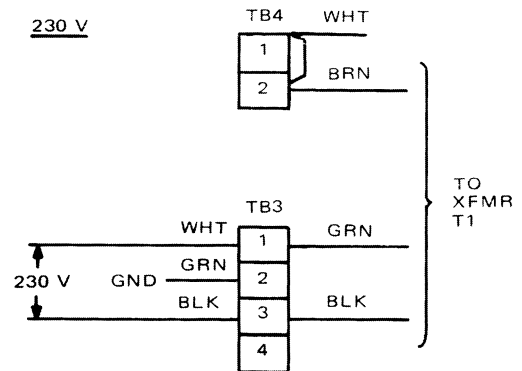
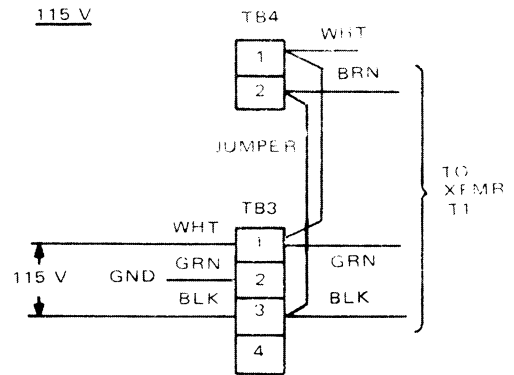
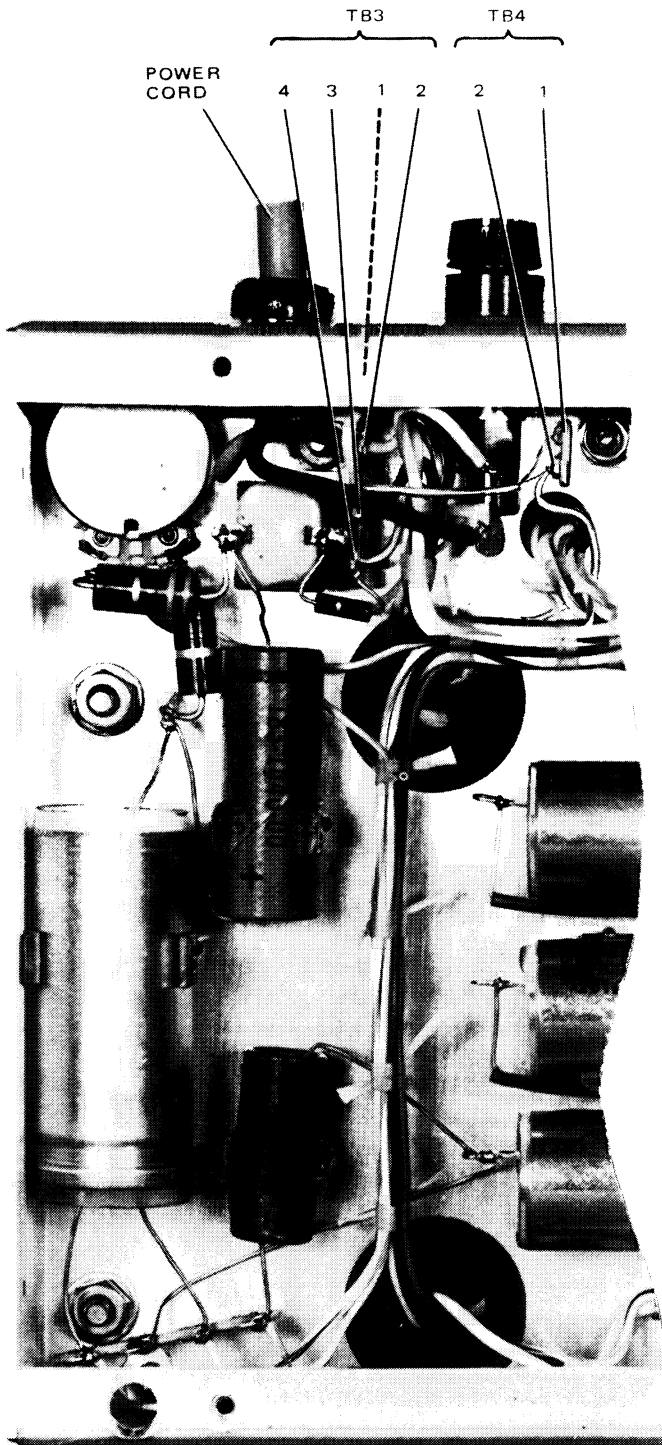
*516F-2 AC Power Supply, Placement in  
30S-1 Linear Power Amplifier  
Figure 1-1*

**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.



NOTE:  
FOR 230 V, F1 SHOULD  
BE RATED AT 2 AMPERES.

TP3 1078-017

516F-2 AC Power Supply, Power Transformer Connections  
Figure 1-2





# 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**

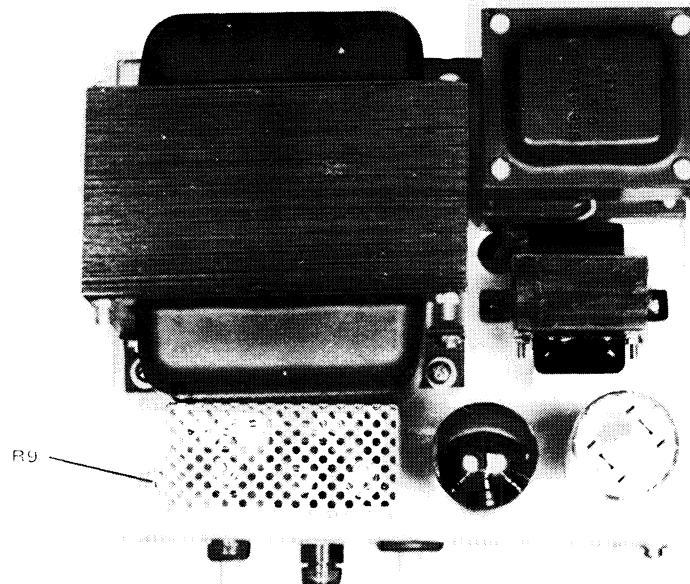
When using power source frequency higher than 60 Hz, remove capacitor C1.

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



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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.

### 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.

