

**VHF
COMMUNICATION
TRANSCEIVER**

618F-1(A) 1B

**AND
FIXED I-F, AUDIO, AND
POWER SUPPLY
427D-1**

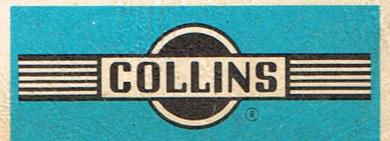
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I N S T R U C T I O N . B O O K



COLLINS RADIO COMPANY



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| 2. Serial number of equipment | 7. Aircraft FAA registration number |
| 3. Owner's name and address | 8. Date of installation |
| 4. Nature of trouble | 9. Installing agency |
| 5. Cause of trouble, if known | 10. Remarks |

VHF COMMUNICATION TRANSCEIVER

618F-1()

AND

FIXED I-F, AUDIO, AND

POWER SUPPLY

427D-1

INSTRUCTION BOOK

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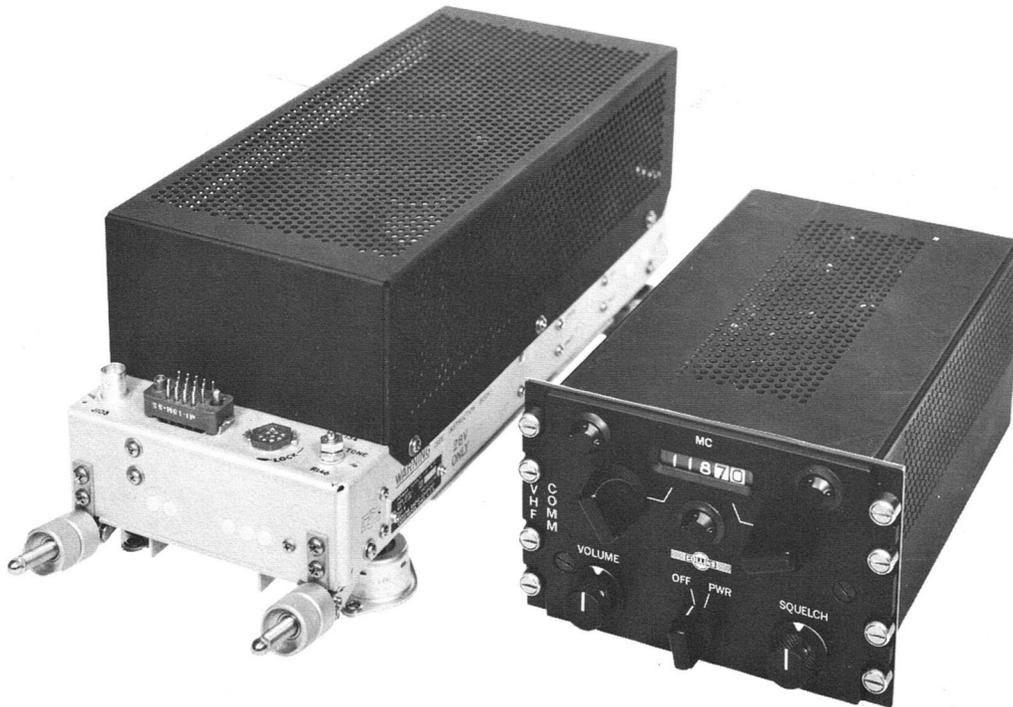


Figure 1-1. VHF Communication Transceiver 618F-1A/1B and Fixed I-F, Audio, and Power Supply 427D-1

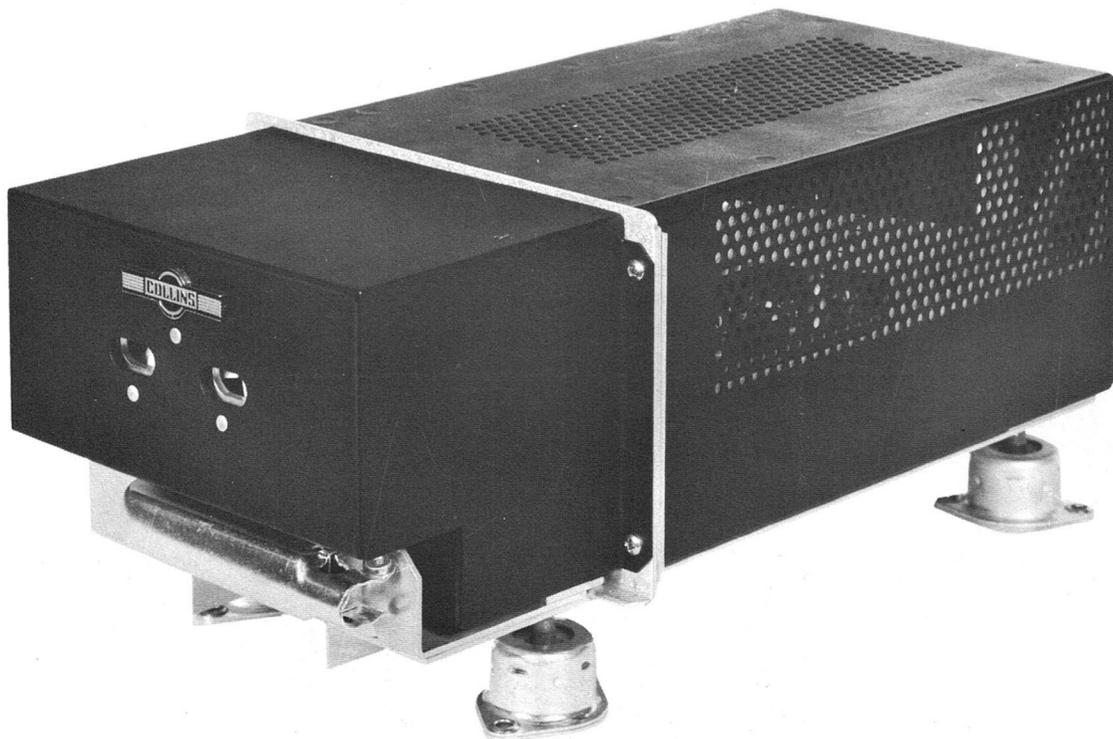


Figure 1-2. VHF Communication Transceiver 618F-1C/1D

SECTION I GENERAL DESCRIPTION

1.1 PURPOSE OF EQUIPMENT.

1.1.1 VHF COMMUNICATION TRANSCEIVER 618F-1A.

Collins VHF Communication Transceiver 618F-1A (right half of figure 1-1) is a small, compact AM transceiver designed for use in aircraft to effect radio transmission and reception in the frequency range of 118.00 to 135.95 mc. It is a 360-channel, crystal-controlled transceiver with manual tuning from the front panel. Each channel is spaced by 50 kc. The transmitter power output is 6 watts minimum when operated into a 52-ohm load. The receiver section has double conversion with a variable i-f stage between the first and second mixer. The receiver section also has carrier-operated squelch and avc. The r-f section of the 618F-1A can mount directly in the instrument panel of the aircraft or it may be mounted in a pedestal.

1.1.2 VHF COMMUNICATION TRANSCEIVER 618F-1B.

VHF Communication Transceiver 618F-1B is electrically and mechanically the same as the 618F-1A. The only difference between the two units is that the 618F-1B has a tuning range of 117.00 to 134.95 mc and the 618F-1A tunes from 118.00 to 135.95 mc. To provide this one-megacycle difference, a 64.74250-mc crystal has been inserted in the Y1 position and each crystal on the vhf oscillator switch has been moved one position clockwise from the position shown in figure 6-6. The 73.7425-mc crystal, designated Y18 in the 618F-1A, is not used in the 618F-1B. The Collins part number for the 64.74250-mc crystal is 289-1784-00.

Alignment and test procedures for the 618F-1B are the same as those for the 618F-1A except that 117 mc should be used when 118 mc is referred to, and 134 mc should be used when 135 mc is referred to. Figure 7-2 is the schematic diagram of the 618F-1B.

1.1.3 VHF COMMUNICATION TRANSCEIVER 618F-1C.

VHF Communication Transceiver 618F-1C (figure 1-2) is electrically the same as the 618F-1A. The 618F-1C has a mechanical positioner mounted in place of the knobs, front panel, and frequency indicator dials used on the 618F-1A. Figure 2-2 presents the outline and mounting dimensions of the 618F-1C/1D. The 618F-1C is mounted on a shockmount and remotely controlled.

Alignment and test procedures for the 618F-1C are the same as those for the 618F-1A except that additional instructions are included to cover alignment of the mechanical positioner. Figure 7-3 is the schematic diagram of the 618F-1C.

1.1.4 VHF COMMUNICATION TRANSCEIVER 618F-1D.

VHF Communication Transceiver 618F-1D is electrically the same as the 618F-1C. The only difference between the two units is that the 618F-1D has a tuning range of 117.00 to 134.95 mc and the 618F-1C tunes from 118.00 to 135.95 mc. The 618F-1D uses the same vhf oscillator crystals that are used in the 618F-1B (see paragraph 1.1.2). Figure 7-4 is the schematic diagram of the 618F-1D.

1.1.5 FIXED I-F, AUDIO, AND POWER SUPPLY 427D-1.

Fixed I-F, Audio, and Power Supply 427D-1 (left half of figure 1-1) is a dual purpose equipment on one chassis. It provides i-f, audio, power supply, squelch, and avc circuits for the 618F-1(). The 427D-1 also may be used as a speaker amplifier. Three external audio inputs are provided on the 427D-1 for this purpose. Figures 2-6 and 2-7 illustrate this connection. Fixed I-F, Audio, and Power Supply 427D-1 is shockmounted and may be fastened in any convenient location on the airframe.

1.2 DESCRIPTION OF MAJOR COMPONENTS.

1.2.1 VHF COMMUNICATION TRANSCEIVER 618F-1A/1B.

The 618F-1A/1B uses console-type construction. A one-piece dust cover slides over the frame and serves as a nonpressurized, protective case with ventilation obtained by free-air flow. Three rear-mounted connectors are used for power and r-f connections. The control panel is 5-3/4 inches wide by 3-3/4 inches high. The box in back of the control panel is 5 inches wide, 3-5/8 inches high, and 8 inches deep; the unit weighs 5.2 pounds. Located on the control panel are the OFF-PWR switch, the megacycle control switch, kilocycle control switch, the frequency indicator window marked "MC," the VOLUME control, the SQUELCH control, and three edge-lit dial lights.

1.2.2 VHF COMMUNICATION TRANSCEIVER 618F-1C/1D.

The 618F-1C/1D uses console-type construction. Front and rear dust covers slide over the frame and serve as a nonpressurized, protective case with

SECTION I
General Description

ventilation obtained by free-air flow. Three rear-mounted connectors are used for power and r-f connections. A connector is located on the front to provide electrical connections to the remotely installed frequency selector, and the power, volume, and squelch controls.

Channel selection is accomplished by separate megacycle and kilocycle Autopositioners* controlled by a frequency selector mounted on the aircraft instrument panel.

The 618F-1C/1D, including the shockmount, is 5-25/32 inches wide, 4-31/32 inches high, and 13-9/16 inches deep; it weighs 7.2 pounds.

*Registered in U. S. Patent Office.

1.2.3 FIXED I-F, AUDIO, AND POWER SUPPLY
427D-1.

Semienclosed chassis construction is used in the 427D-1 unit. A nonpressurized, protective case is used as a dust cover with ventilation by free-air flow. The 427D-1 unit is fastened to a base plate which is shockmounted to the airframe. The unit is held to the base plate by a flange on one end and two adjustable retainers on the other end. Three connectors located on the top side of the chassis are used for power and r-f connections. The unit, including the shockmount, is 5-1/8 inches wide, 5-5/8 inches high, 14-1/8 inches deep; it weighs 7.3 pounds.

TABLE 1-1. EQUIPMENT SUPPLIED

EQUIPMENT	COLLINS PART NUMBER	DIMENSIONS	WEIGHT
VHF Communication Transceiver 618F-1A including crystals, tubes, and dust cover	522-2458-011 (For 27.5-volt power source) or 522-2458-012 (For 13.75-volt power source)	Panel: 5-3/4 in. wide x 3-3/4 in. high. Box in back of panel: 5 in. wide x 3-5/8 in. high x 8 in. deep. Extension in front of panel: 1-3/16 in. max.	5.2 lb
VHF Communication Transceiver 618F-1B including crystals, tubes, and dust cover	522-2459-011 (For 27.5-volt power source) or 522-2459-012 (For 13.75-volt power source)	Panel: 5-3/4 in. wide x 3-3/4 in. high. Box in back of panel: 5 in. wide x 3-5/8 in. high x 8 in. deep. Extension in front of panel: 1-3/16 in. max.	5.2 lb
VHF Communication Transceiver 618F-1C including crystals, tubes, dust covers, and shockmount	522-2593-00 (For 27.5-volt power source only)	5-25/32 in. wide x 4-31/32 in. high x 13-9/16 in. deep including shockmount	7.2 lb
VHF Communication Transceiver 618F-1D including crystals, tubes, dust covers, and shockmount	522-2751-00 (For 27.5-volt power source only)	5-25/32 in. wide x 4-31/32 in. high x 13-9/16 in. deep including shockmount	7.2 lb
Modification Kit (converts a 618F-1A/1B to a 618F-1C/1D) Collins type 381F-1	522-2592-00		
Fixed I-F, Audio, and Power Supply 427D-1 including dust cover and shockmount	Included with 618F-1()	5-1/8 in. wide x 5-5/8 in. high x 14-1/8 in. deep including shockmount	7.3 lb
Shockmount	549-3896-00		
1 - Mating Connector: UG-913/U Industrial Products 85050 (mates J1 on 618F-1())	357-9169-00		

TABLE 1-1. EQUIPMENT SUPPLIED (Cont)

EQUIPMENT	COLLINS PART NUMBER	DIMENSIONS	WEIGHT
1 - Mating Connector: Industrial Products Co. 49225 (mates J2 on 618F-1())	357-9424-00		
1 - Mating Connector and Hood: Amphenol 100-3599-0 (mates J3 on 618F-1())	372-1846-00		
*1 - Mating Connector: Amphenol 57-10500-6 (mates J201 on 618F-1C/1D)	371-0280-00		
1 - Mating Connector: Amphenol 126-012 (mates J101 on 427D-1)	372-1538-00		
1 - Mating Connector: Winchester MRE-18S-G (mates J102 on 427D-1)	372-1049-00		
1 - Winchester MRE-18H Hood	372-1157-00		
1 - Winchester MRE-VL Lock Assembly	372-1727-00		
1 - Mating Connector: UG-88C/U (mates J103 on 427D-1)	357-9292-00		
1 - Tuning Tool	542-0380-00		
*Supplied only with 618F-1C/1D.			

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

ITEM	TYPE	FUNCTION	DESCRIPTION
Antenna	Collins type 37R-1, CPN 504-0543-004	Receive and radiate vhf com- munication signals	Vertically polarized, vhf 52-ohm impedance
Microphone	Carbon	Voice input	Low impedance type AR-10 or equivalent
Antenna cable	Coaxial	Couple 618F-1() to antenna	RG-58/U
Headset and/or speaker		Audio output	500-ohm headset or 8-ohm speaker
Connector cable		Interconnect 618F-1A/1B and 427D-1 and connect 618F-1A/1B and 427D-1 to aircraft	To be fabricated ac- cording to wiring dia- gram (figures 2-4 and 2-5)

SECTION I
General Description

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED (Cont)

ITEM	TYPE	FUNCTION	DESCRIPTION
Connector cable		Connect 500-kc signal from 618F-1() to 427D-1	RG-58/U
*Power on/off switch	Toggle	Apply power to 618F-1C/1D	Spst
*Frequency Control	Collins type 314U-10A, CPN 522-2730-004	Select operating frequency of 618F-1C/1D	2-1/4 in. wide x 3-9/16 in. high x 4-1/4 in. deep
or			
*Frequency Control	Collins type 313N-1, CPN 522-2446-004	Select operating frequency of 618F-1C/1D	2 in. wide x 3 in. high x 4 in deep. Extension in front of panel: 1-5/16 in. max. wgt: 0.4 lb
*Connector cable		Interconnect 618F-1C/1D, 427D-1, and controls	To be fabricated according to figures 2-6 and 2-7
*Volume and Squelch Controls	Accessory Kit CPN 549-4194-00		Contains two potentiometers, knobs and attaching hardware
Volume	10C Log taper potentiometer	Adjust audio output from 618F-1C/1D	50,000 ohms
Squelch	10CC Log taper potentiometer	Adjust squelch level of 618F-1C/1D	10,000 ohms
*Required only for use with 618F-1C/1D.			

1.3 VACUUM TUBE, TRANSISTOR, DIODE, AND LAMP COMPLEMENT.

TABLE 1-3. VACUUM TUBE, TRANSISTOR, DIODE, AND LAMP COMPLEMENT

ITEM	TYPE	FUNCTION
VHF COMMUNICATION TRANSCEIVER 618F-1()		
V1	5654	R-f amplifier (receiver)
V2	5654	First mixer
V3	5654	Variable i-f amplifier
V4A	1/2 5670	Second mixer
V4B	1/2 5670	H-f oscillator
V5A	1/2 5670	Vhf oscillator
V5B	1/2 5670	Vhf doubler

ITEM	TYPE	FUNCTION
VHF COMMUNICATION TRANSCEIVER 618F-1() (Cont)		
V6	5654	Transmitter mixer
V7	6688	R-f amplifier (transmitter)
V8	5686	Driver
V9	7551	Power amplifier
I ₁ *	27.5 volts or 13.75 volts	Panel light

TABLE 1-3. VACUUM TUBE, TRANSISTOR, DIODE, AND LAMP COMPLEMENT (Cont)

ITEM	TYPE	FUNCTION
VHF COMMUNICATION TRANSCEIVER 618F-1() (Cont)		
I ₂ *	27.5 volts or 13.75 volts	Panel light
I ₃ *	27.5 volts or 13.75 volts	Panel light
*Not used in 618F-1C/1D.		
FIXED I-F, AUDIO, AND POWER SUPPLY 427D-1		
V101	5749	I-f amplifier
V102	5749	I-f amplifier
V103	5749	I-f amplifier
V104A	1/2 7247	Squelch
V104B	1/2 7247	First audio amplifier
CR101	1N1084	Power supply rectifier
CR102	1N1084	Power supply rectifier

ITEM	TYPE	FUNCTION
FIXED I-F, AUDIO, AND POWER SUPPLY 427D-1 (Cont)		
CR103	1N1084	Power supply rectifier
CR104	1N1084	Power supply rectifier
CR105	1N461	Avc gate
CR106	1N461	Noise limiter
CR107	1N462	Signal and avc detector
Q101	2N677B	Power supply oscillator
Q102	2N677B	Power supply oscillator
Q103	2N677B	Power supply oscillator
Q104	2N677B	Power supply oscillator
Q105	2N158A	Audio driver
Q106	2N677B	Audio amplifier or modulator
Q107	2N677B	Audio amplifier or modulator

1.4 PERFORMANCE DATA AND SPECIFICATIONS.

1.4.1 VHF COMMUNICATION TRANSCEIVER 618F-1() AND FIXED I-F, AUDIO, AND POWER SUPPLY 427D-1.

- Ambient temperature range -40°C (-40°F) to +55°C (+131°F) operating;
-65°C (-85°F) to +70°C (+158°F) storage.
- Ambient humidity range 95 to 100 percent for 48 hours at 50°C ±3°C.
- Altitude Sea level to 30,000 feet.
- Vibration 10 to 55 cycles at 0.06 inch total excursion on 427D-1;
10 to 55 cycles at 0.02 inch total excursion on 618F-1().
Both units vibrated for 90 minutes in three mutually per-
pendicular planes.
- Shock 12 shocks of 15 g each operation. "Crash safety" test
of 30 g nonoperational.
- Power sources 27.5 or 13.75 volts d-c +10 percent -20 percent with nega-
tive lead grounded.

Power requirements	<u>27.5 VOLTS</u>	<u>13.75 VOLTS</u>
Transmit:	5 amp	10 amp
Receive:	3.2 amp	7.0 amp

SECTION I
General Description

- Power output 6 watts (CW) minimum when terminated in a 52-ohm resistive load connected directly to the antenna terminal on the transceiver. The power output will not be reduced to less than 80 percent of rated output when subjected to the following service conditions taken one at a time:
- a. The temperature is varied from -40°C to +55°C.
 - b. The humidity is varied from 10 to 95 percent at 50°C.
 - c. The pressure is varied from normal to that equivalent to an altitude of 30,000 feet.
 - d. The tubes are exchanged in a random manner with like tubes that are within ARINC specifications. (Minor re-alignment may be necessary to compensate for different interelectrode capacities.)
- Number of channels and how selected 360 channels with 50-kc separation. Each channel requires a combination of two crystals which are selected by switches controlled by front panel knobs. The time between selection of a new channel and the readiness of the 618F-1C/1D does not exceed 4 seconds.
- Transmitter
- Output impedance Unbalanced output into a 52-ohm load with a maximum standing-wave ratio of 2:1.
- Frequency range 118.00 to 135.95 mc in 50-kc steps.
- Frequency stability The resonant frequency does not deviate from the assigned channel frequency by more than ± 0.005 percent under the following conditions taken one at a time:
- a. The d-c input voltage is varied from 24 to 29 volts or 12 to 14.5 volts.
 - b. The ambient temperature is varied from +10°C to +55°C.
 - c. The humidity is varied from 10 to 95 percent at 50°C.
 - d. The pressure is varied from normal to that equivalent to an altitude of 30,000 feet.
 - e. The tubes are exchanged in a random manner with like tubes that are within ARINC specifications.
- The resonant frequency does not deviate from the assigned channel frequency by more than ± 0.007 percent when the ambient temperature is varied from -40°C to +10°C.
- Harmonic and other spurious radiation Harmonic and all other spurious emissions are down at least 43 db when terminated into a 52-ohm antenna.
- Sidetone Delivers 200 milliwatts minimum of audio sidetone into a 500-ohm line at 85 percent modulation
- Modulation characteristics 85 percent modulation over the entire r-f frequency range with a 0.13-volt rms, 1000-cps sine wave applied to the microphone input.
- Audio input 0.13-volt rms across 150 ohms.
- Audio-frequency response The over-all frequency response is within 6 db of the response at 1000 cps from 300 to 3750 cps.
- Audio-frequency distortion The over-all distortion with 1000 cps does not exceed 10 percent at 85 percent modulation.
- Noise level The over-all noise level is at least 35 db below the 85 percent modulation level.

Receiver

Frequency stability Same as the transmitter except that the receiver resonant frequency is defined as the center of the 6 db attenuation points in the pass band.

Intermediate frequencies Variable: 11.535 to 12.485 mc (first i-f);
Fixed: 0.5 mc (second i-f).

Selectivity Bandwidth is 40 kc minimum at 6 db down and 80 kc maximum at 60 db down. Cross modulation is at least 10 db less than rated output under the following conditions:

<u>DESIRED SIGNAL</u>	<u>UNDESIRED SIGNAL</u>	<u>KC OFF</u>
20 uv	1000 uv	±50
2000 uv	20,000 uv	±100

Sensitivity At least 6 db signal-plus-noise to noise for 3-uv signal (standard test signal supplied through 50 ohm, 6 db pad).

Spurious responses 60 db down or more at ±40 kc from carrier frequency when the input signal is varied over the range of 0.190 to 940 mc.

Undesired radiation Receiver meets the requirements of FCC Part 15 (1956) Incidental and Restricted Radiation Devices.

Squelch (carrier operated). The sensitivity control allows adjustment of the squelch operating level from no signal (noise) to more than 10 uv. The closing-to-opening signal level ratio is less than 3 db.

Avc Receiver output will vary not more than 5 db with signal inputs from 10 to 100,000 uv nor more than 2 db from 100,000 to 400,000 uv.

Input circuit. 52 ohms, unbalanced.

Output circuit Two outputs as follows:

- a. 200 mw minimum into 600 ohms
- b. 6 watts minimum into 8 ohms, 8 watts nominal

The above outputs are with a 4-uv input modulated 30 percent at 1000 cps.

Fidelity The audio output does not vary more than 6 db from 300 to 3750 cps with a 1000-uv, 30-percent modulated r-f signal.

Audio-frequency distortion Not more than 10 percent distortion at 30 percent modulation or 25 percent distortion at 85 percent modulation with rated audio output over the frequency range of 300 to 3750 cps.

SECTION II INSTALLATION

2.1 GENERAL.

This section contains information pertaining to unpacking, preinstallation testing, mounting, and cabling of VHF Communication Transceiver 618F-1() and Fixed I-F, Audio, and Power Supply 427D-1.

2.2 UNPACKING.

Unpack the equipment carefully. Remove the packing material, and lift the units out of their cartons. Mating connectors for interconnecting cables are furnished with the equipment and secured to the units in a shipping bag. Remove the 618F-1() and 427D-1 dust covers. Remove the 427D-1 base plate, and inspect all components and parts of both units for breakage or damage. Check control switches for proper mechanical operation. Any claim for damage should be filed promptly with the transportation company. If a claim is filed, the original packing carton and material must be preserved.

2.3 PREINSTALLATION CHECK.

The equipment has been completely tested before leaving the factory. To ensure that the equipment has not been damaged in shipment, it is suggested that the following preinstallation check be performed. A test harness is needed for the preinstallation check and for future routine checks and trouble shooting. Fabricate the test harness as directed in paragraph 5.2. The test equipments (or equivalents) listed in paragraph 5.3 are required to perform the following checks.

Perform the mechanical alignment check presented in steps a through g of paragraph 5.4. Replace the crystal covers and connect the equipment to the test harness. Apply power to the equipment, and observe tube filament operation in both the 618F-1() and the 427D-1. Ensure that 27.5 volts d-c is being supplied to the 427D-1, and allow 30 seconds for warmup. Connect an audio vtm across the 8-ohm SPEAKER LOAD (refer to figure 5-1). Turn the SQUELCH control fully clockwise. Rotate the VOLUME control and check for change in output voltage. With no input signal to the receiver, and with the VOLUME control fully clockwise, the audio vtm should indicate at least 5 volts.

The following tests will indicate if the receiver and transmitter sections of the 618F-1() are operating properly. The limits given in these tests are dependent on the procedure used, the test equipment used, and the voltage applied to the equipment. The limits given were obtained with 27.5 volts d-c applied to the 427D-1 and using the test harness shown in figure 5-1 and the test equipment listed in paragraph 5.3. In all preinstallation checks on a 618F-1B or

618F-1D use 117.00 and 134.95 instead of 118.00 and 135.95 respectively.

2.3.1 H-F AND VHF CRYSTAL OUTPUT CHECKS.

a. Insert the d-c probe of the vtm into J6 on the 618F-1(). The meter will now indicate the h-f oscillator drive level.

b. Rotate the kilocycle switch so that the entire range from 0.00 to 0.95 mc is covered. The meter should indicate at least 1.5 volts for each position of the kilocycle switch.

c. Insert the d-c probe of the vtm into J4 of the 618F-1(). The meter will now indicate the vhf oscillator drive level.

d. Rotate the megacycle switch so that the entire range from 118.00 to 135.00 mc is covered. The meter should indicate at least 2 volts for each position of the kilocycle switch.

2.3.2 SENSITIVITY AND NOISE LEVEL TEST.



When making tests or alignments, do not depress the push-to-talk button on the microphone.

This test will indicate the ability of the 618F-1() to receive, and convert into intelligence, weak signals obtained from the antenna. The measurement is made in terms of the signal-plus-noise to noise ratio, (S+N)/N.

a. Turn the SQUELCH control fully clockwise.
b. Adjust the r-f signal generator for 3 microvolts output, and connect it to the antenna terminal (J1) on the 618F-1().

c. Set the r-f signal generator at 118.00 mc, modulated 30 percent with 1000 cps.

d. Adjust the VOLUME control for 4 watts audio output as measured with the output meter. This is the signal-plus-noise power output.

e. Remove the 1000-cps modulation and note the db drop in audio output. The output meter now is measuring only the noise output. The drop, (S+N)/N ratio, should be at least 6 db.

f. Repeat steps a through e for each of the following frequencies:

118.00	128.50
120.10	130.60
122.20	132.70
124.30	134.80
126.40	135.95

SECTION II Installation

g. Set the r-f signal generator and the 618F-1() to 126.50 mc. Adjust the r-f signal generator for 1000 cps, 30 percent modulation.

h. Adjust the generator for 100 uv output.

i. Adjust the VOLUME control for 8 watts audio output.

j. Remove the modulation and note the db drop in audio output. This drop should be at least 25 db.

k. Repeat steps g through j with the r-f signal generator set for 20,000 uv output.

2.3.3 SQUELCH OPERATION TEST.

This test will indicate if the audio disable (squench) circuit in the receiver is operating. There should be no audio output with no r-f signal into the 618F-1().

a. Adjust the r-f signal generator for 3 uv output at 126.50 mc.

b. Connect the output meter across the 8-ohm SPEAKER LOAD.

c. Tune the 618F-1() to 126.50 mc and turn the SQUELCH control fully clockwise.

d. Turn the SQUELCH control counterclockwise until the output meter indicates a large drop in output (squench circuit closes).

e. Slowly increase the generator output until the squench just opens as indicated by an increase in output voltage. Note the db output of the r-f signal generator.

f. Slowly decrease the generator output until the squench just closes. The change in db output from the squench open condition to the squench closed condition should be not more than 3 db.

2.3.4 POWER OUTPUT TEST.

This test will indicate if the transmitter section of the 618F-1() is functioning properly.

a. Attach the r-f wattmeter to the antenna terminal (J1) of the 618F-1().

b. Connect the microphone to be used with the equipment to the MIKE INPUT jack on the test harness.

c. Adjust the 618F-1() to 118.00 mc.

NOTE

Use a blower during the following tests, or limit the transmit operation to one-minute periods spaced by one-minute intervals.

d. Depress the push-to-talk switch on the microphone. The r-f output should be at least 6 watts.

e. Vary the frequency in 1-mc steps over the range of 118.00 to 135.95 mc. At some point in the band, vary the frequency in 50-kc steps over a 1-mc range. The r-f output should be at least 6 watts for all frequencies.

2.3.5 EXTERNAL AUDIO INPUT TEST.

This test will indicate if the external audio input circuit is functioning properly.

a. Connect an audio oscillator to one of the external audio inputs on the test harness. Adjust the audio oscillator for 1000 cps.

b. Set the VOLUME control fully counterclockwise.

c. Supply sufficient audio generator output for a 4-watt output from the 618F-1().

d. Measure the output voltage of the audio generator. This voltage should be less than 2.5 volts.

e. Repeat steps a through d using the other two external audio inputs.

2.3.6 MODULATION CHECK.

MIKE GAIN control R147 is set at the factory to a value that should be acceptable for most microphones. It is suggested, however, that R147 be adjusted for the specific type of microphone to be used with the equipment. This may be done by the following procedure:

a. Connect the "sniffer" output of the sniffer-detector circuit shown in figure 5-4 to the vertical input of an oscilloscope.

b. Connect the r-f input of the sniffer-detector circuit to J1 on the 618F-1().

c. Connect the 50-ohm r-f load to the r-f output of the sniffer-detector circuit.

d. Connect the microphone to the microphone input jack.

e. Loosen the locking nut, and adjust R147 for a signal just below clipping (as indicated on the oscilloscope) while talking into the microphone at a normal voice level.

f. Tighten the locking nut on R147.

2.3.7 SIDETONE ADJUSTMENT.

This adjustment will ensure a comfortable level of sidetone power to the headphones while transmitting.

a. Insert the headphones into the headset jack of the test harness.

b. Talk into the microphone, and adjust the SIDE TONE control (R146) on the 427D-1 for a comfortable level.

NOTE

It may be desirable to set the SIDE TONE control to an audio level slightly louder than is comfortable since there may be a large amount of engine noise present when installed in the aircraft.

2.4 MOUNTING.

Refer to figures 2-1, 2-2, and 2-3 for complete outline and mounting dimensions. Mount the 618F-1A/1B

unit in the aircraft instrument panel or pedestal, and secure it with the Dzus fasteners on the 618F-1A/1B. Fastener strips for the Dzus fasteners are not supplied with the equipment and should be cut from stock material. This fastener strip material (type PR-3-1/2) may be obtained from most aircraft sales or ordered from Collins Radio Company, part number 012-2171-00. The 427D-1 and the 618F-1C/1D shockmounts can be mounted in any convenient location on the airframe. After mounting the 427D-1 and the 618F-1C/1D on the shockmounts, tighten and safety-wire the retaining fasteners.

2.5 CABLING.

2.5.1 GENERAL.

Figures 2-4 through 2-14 provide data on connectors, jacks, and wiring for proper cabling of the equipment. Wire lengths are determined by equipment location, but should be as short as possible. Sufficient slack should be allowed in the wires to permit removal of the equipment. Radius of curvature of connecting cables should be at least 3 inches. All shielded wire is the type with insulation covering the shield. Care should be taken when attaching connectors to shielded cables so that excessive lengths of wire are not left unshielded. Ground shielding only at the points indicated on the interconnecting cabling diagram. Keep shielded wires separated from a-c power wires. Refer to figure 2-4, 2-5, or 2-6 for suggested wire sizes.

CAUTION

The 427D-1 units are wired at the factory for either 13.75- or 27.5-volt operation, depending on the particular order. Extreme caution should be taken so that 27.5 volts is not applied to units wired for 13.75 volts. Compare TB104 (427D-1 unit) to figure 2-8 to determine if the equipment is wired for 27.5 or 13.75 volts. The equipment may be rewired for either power source by changing the jumpers on TB104. If the equipment is rewired, the pilot lamps must be replaced accordingly and the input line filter capacitors, C139 and C140, must be moved. Refer to paragraph 5-9 for conversion procedure.

2.5.2 TYPICAL INSTALLATIONS.

Figures 2-9, 2-10, and 2-11 show three typical 618F-1A/1B and 427D-1 installations. Figure 2-9 gives complete details for a single 618F-1A/1B and 427D-1 installation with audio switching. Figure 2-10 provides information needed to add Collins VHF Communications and Navigation Receiver 51X-3,

Modulator-Power Supply 427B-(), and Instrumentation Unit 344D-1 to this installation, thereby providing localizer and VOR signal reception while using the 618F-1A/1B and 427D-1 for communications. Figure 2-11 provides information needed to add Collins Marker Beacon Receiver 51Z-2. Transmitter 17L-8A (for standby), and an ADF unit to the installation shown in figure 2-10.

These installations are referred to as systems A, B, and C respectively.

Before installing the equipment in the aircraft, study the installation diagram, and determine which cables are to be fabricated. Wire size information is included on the diagrams. Table 2-1 lists the type and Collins part number of all mating connectors used in the three installations shown in this section. Table 2-2 presents the power requirements for the equipments.

2.6 POSTINSTALLATION CHECK.

2.6.1 OPERATIONAL CHECK.

After the equipment has been mounted in the aircraft and all cabling has been installed, an operational check should be made to determine if the installation has adversely affected the operation of the equipment. The following test should be performed to determine the operation of the equipment in the aircraft. This test must be made using the aircraft power supply and with the engine(s) running. The equipment should be checked for engine noise interference and sidetone level by contacting a control tower and noting the noise present during reception. For information pertaining to the other equipment shown in the installation diagrams, see the respective instruction books.

2.6.2 CHECK FOR EXCESSIVE HUM.

If the hum level is high, check the following:

- a. Check for excessive lengths of wire left unshielded where wire is stripped for connection to plug.
- b. Check that the shielding is connected to ground only at those points indicated on the interconnecting cabling diagram.
- c. Check that the lengths of shielded wire are kept as short as possible.
- d. Check that the shielded wire does not run close to, or is cabled with, wire carrying a-c power.
- e. If the audio output of the 427D-1 is fed into an external amplifier, hum may develop if the gain of the equipment is reduced to avoid overdriving the external amplifier. If the output of the 427D-1 overdrives the external amplifier, leave the volume of the 618F-1() (control panel) at its normal level, and adjust the input to the external amplifier with an attenuator between units.

TABLE 2-1. MATING CONNECTORS

CONNECTOR	TYPE	COLLINS PART NUMBER
618F-1() AND 427D-1		
P1	UG-913/U Industrial Products 85050	357-9169-00
P2	Industrial Products Co., 49225	357-9424-00
P3	Amphenol 100-3599-0	372-1846-00
*P201	Amphenol 57-10500-6	371-0280-00
P101	Amphenol 126-012 Amphenol 26-834 Head and Clamp	372-1538-00 372-1115-00
P102	Winchester MRE-18S-G Winchester MRE-18H Hood Winchester MRE-VL Lock Assembly	372-1049-00 372-1157-00 372-1727-00
P103	UG-88 C/U	357-9292-00
*Used with 618F-1C/1D.		
51X-3, 427B-1, AND 344D-1		
P401	Industrial Products Type 8500	357-9292-00
P402	Winchester MRE-18S-G	372-1049-00
P403	Industrial Products Type MB-44975	357-9231-00
P301	Industrial Products Type 8500	357-9292-00
P302	Viking VP7/2BB1 Plug Viking VS7/23C1 Hood	372-1687-00 372-1688-00
P303	Winchester MRE-18S-G	372-1049-00
P1	Cannon K03-16-10-S Cannon Clamp K08-16-3/8	371-0056-00 371-0142-00
327A-2		
P103	Cannon WK-6-23-3/8	371-0039-00
17L-8A		
P101	Industrials Products Co., Type MB-44975 Plug	357-9231-00
P102	UG-88/U Industrial Products Type 85000 Plug	357-9292-00
P103	Viking Type VP7/2BB1 Plug Viking Type VS7/23C1 Hood	372-1687-00 372-1688-00

TABLE 2-2. POWER REQUIRED BY SYSTEMS

POWER APPLIED TO	CURRENT REQUIREMENTS (amperes)		MAXIMUM TOTAL POWER (watts)
	13.75 VOLTS	27.5 VOLTS	
SYSTEM A			
618F-1() and 427D-1	10	5	138
SYSTEM B			
618F-1(), 427D-1, 51X-3, 427B-1, 344D-1	14.8	7.4	208
SYSTEM C			
618F-1(), 427D-1, 51X-3, 427B-1, 344D-1, 327A-2, 51Z-2, 17L-8A		8.4 (on main) 9.8 (on standby)	235 (on main) 275 (on standby)

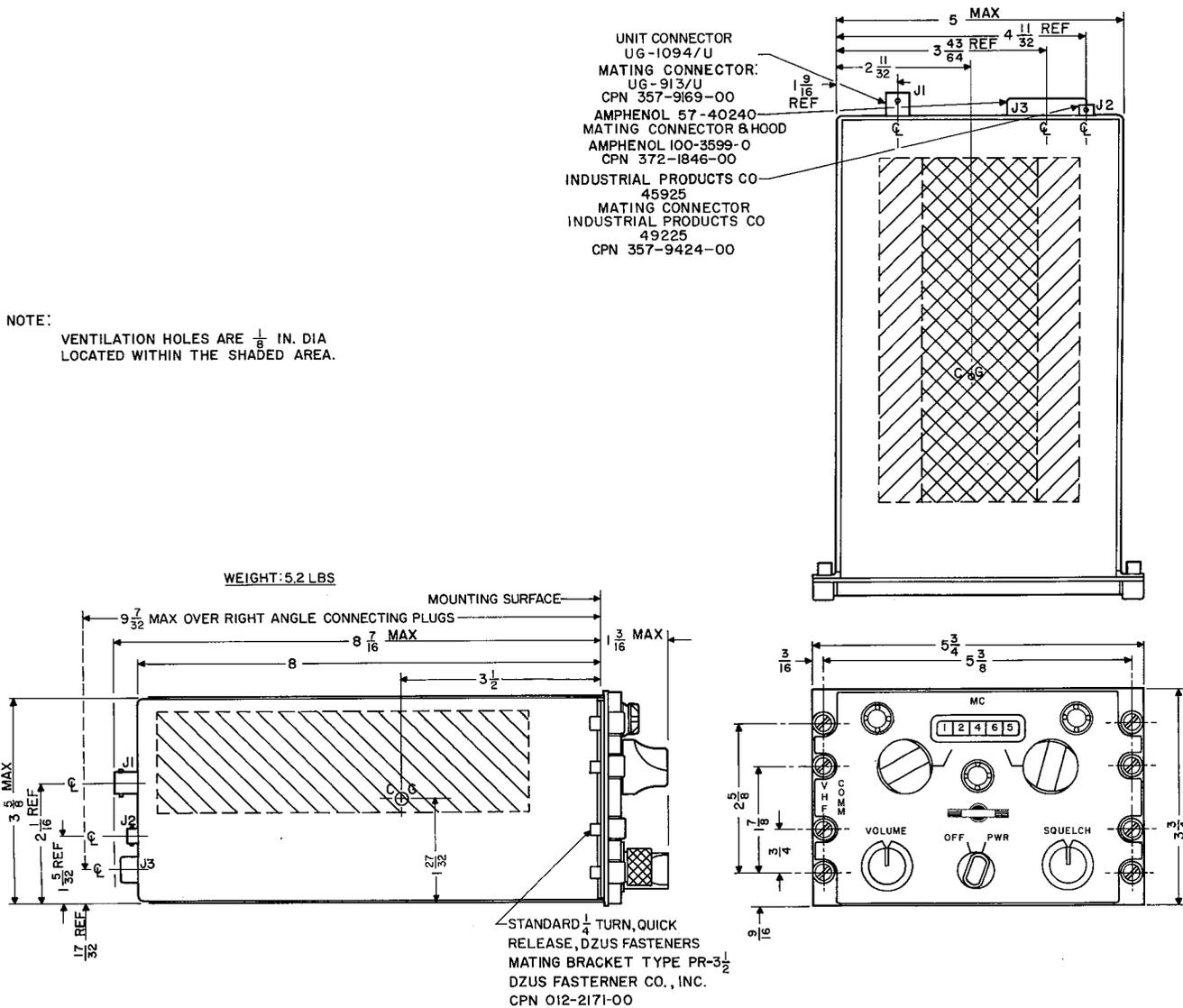


Figure 2-1. VHF Communication Transceiver 618F-1A/1B, Outline and Mounting Dimensions

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Installation

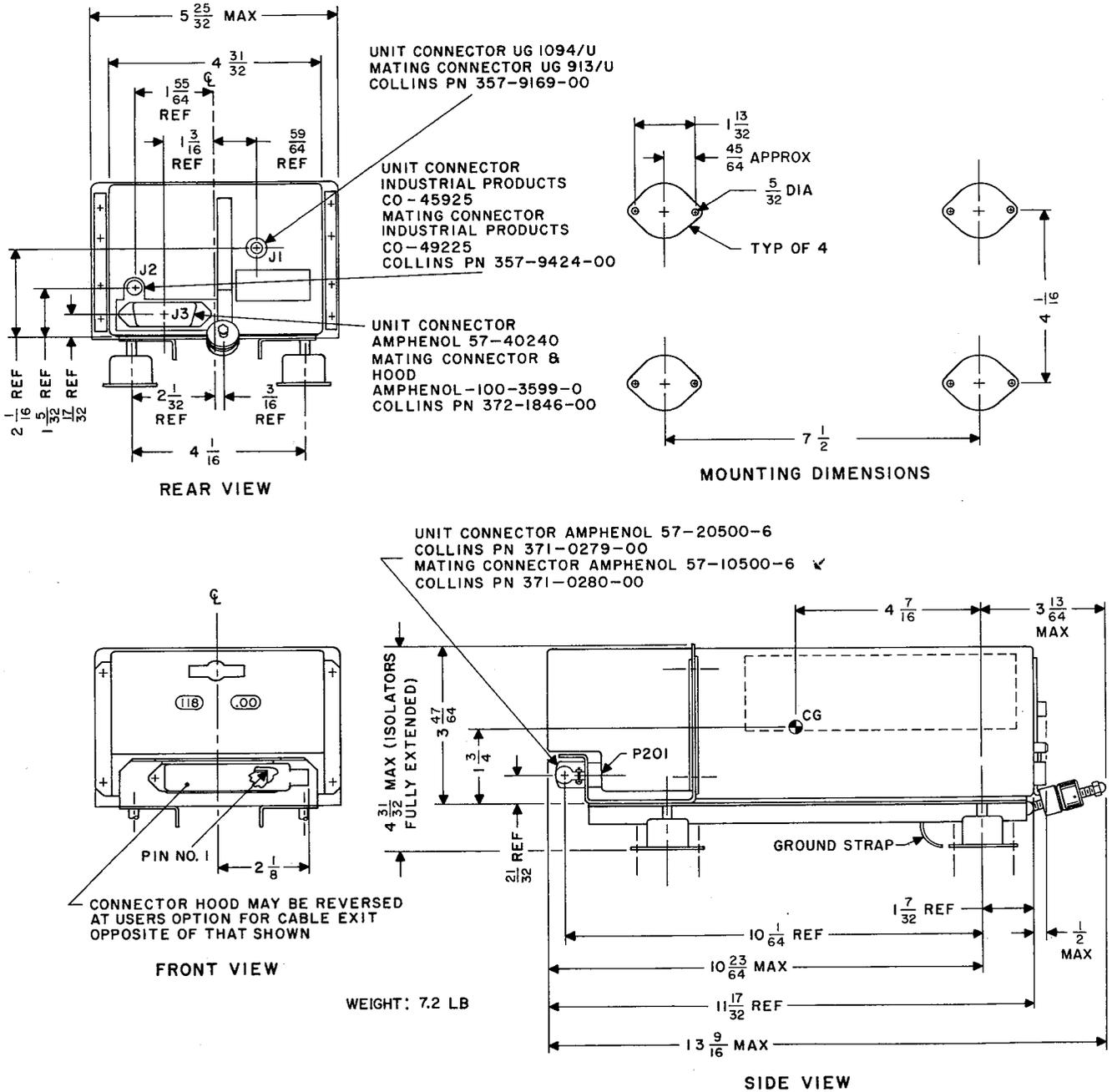
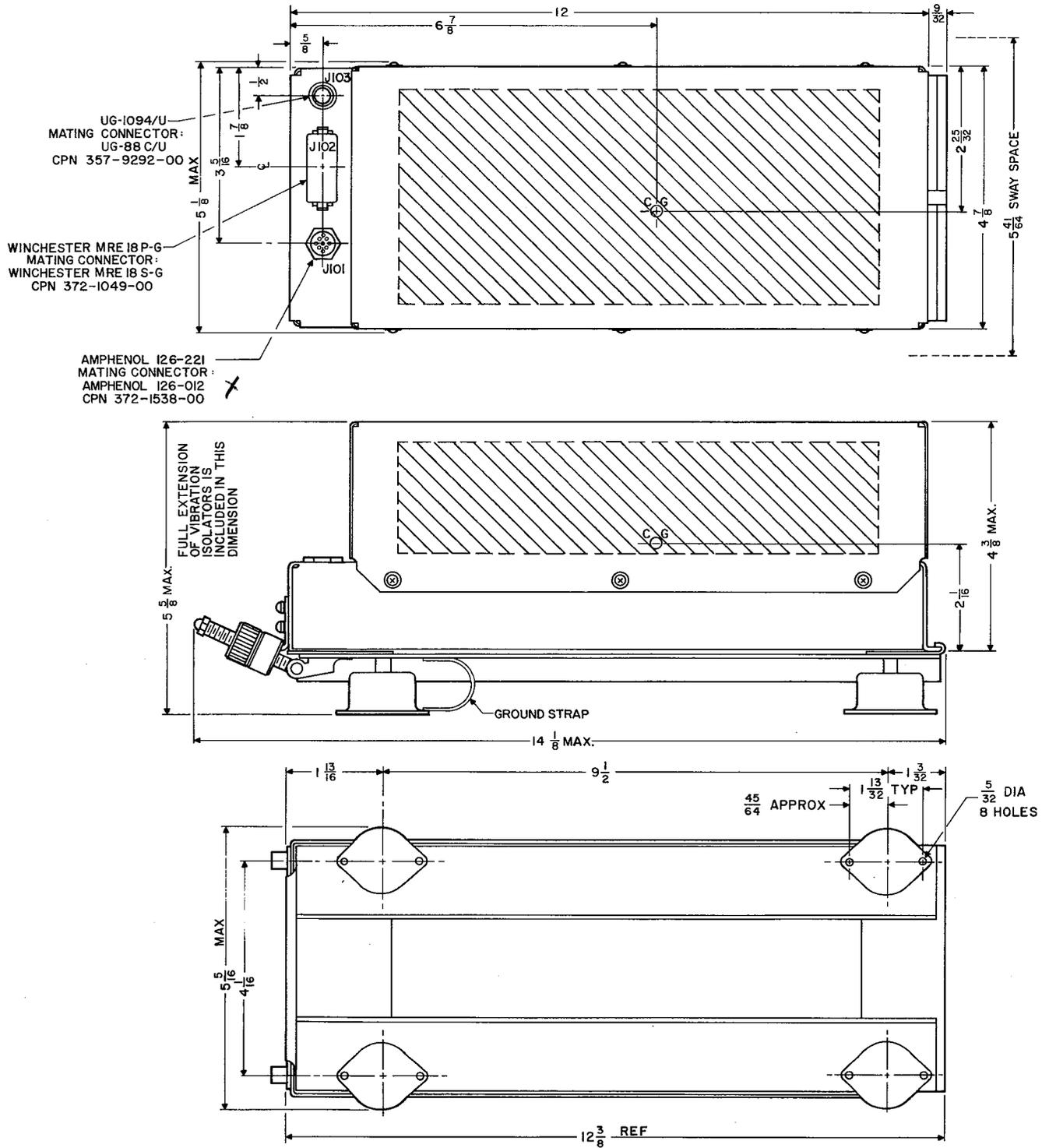


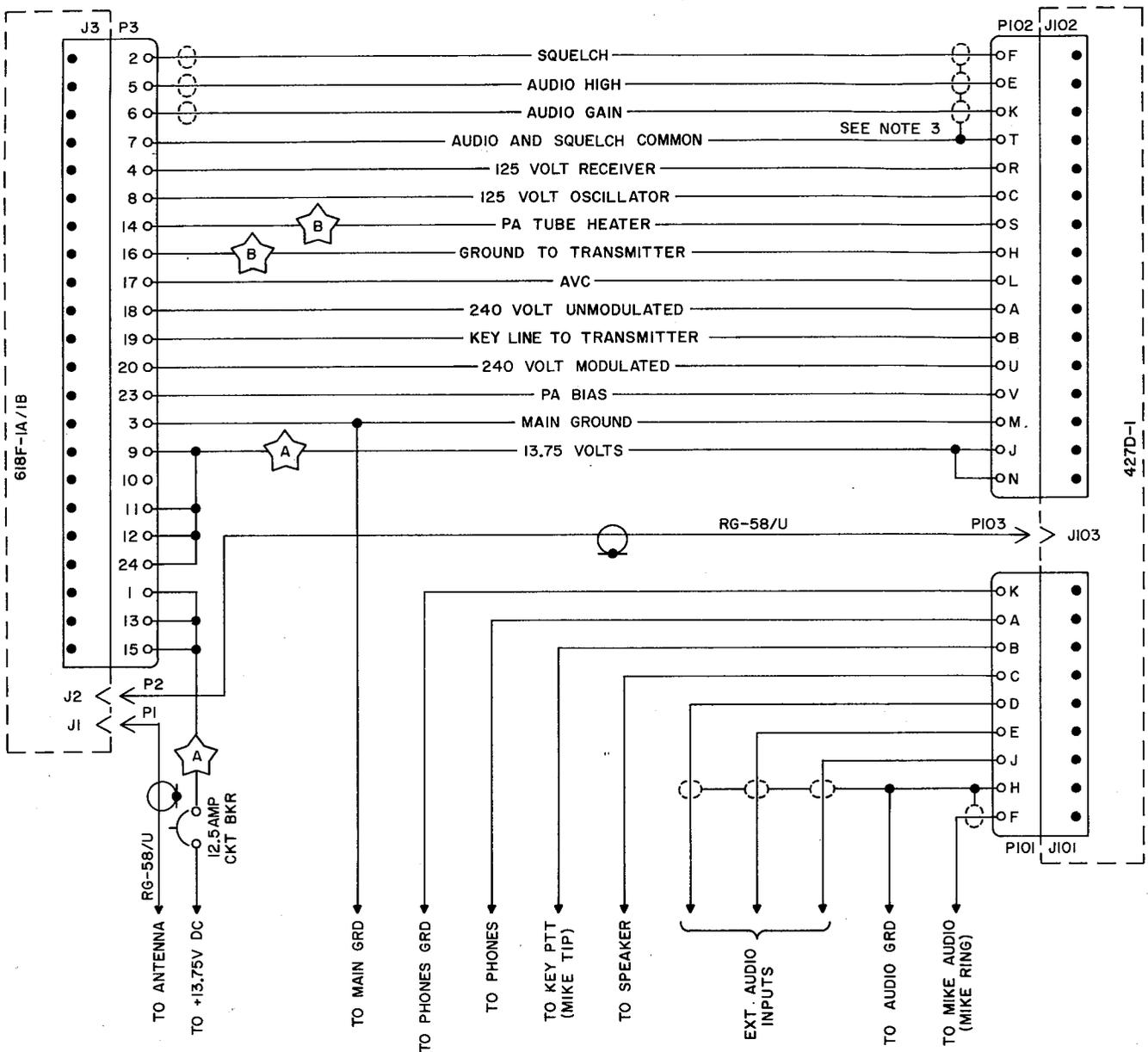
Figure 2-2. VHF Communication Transceiver 618F-1C/1D, Outline and Mounting Dimensions



NOTE :
VENTILATION HOLES ARE 1/8 IN. DIA
LOCATED WITHIN THE SHADED AREA.
WEIGHT: 7.3 LBS

Figure 2-3. Fixed I-F, Audio, and Power Supply 427D-1, Outline and Mounting Dimensions

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Installation



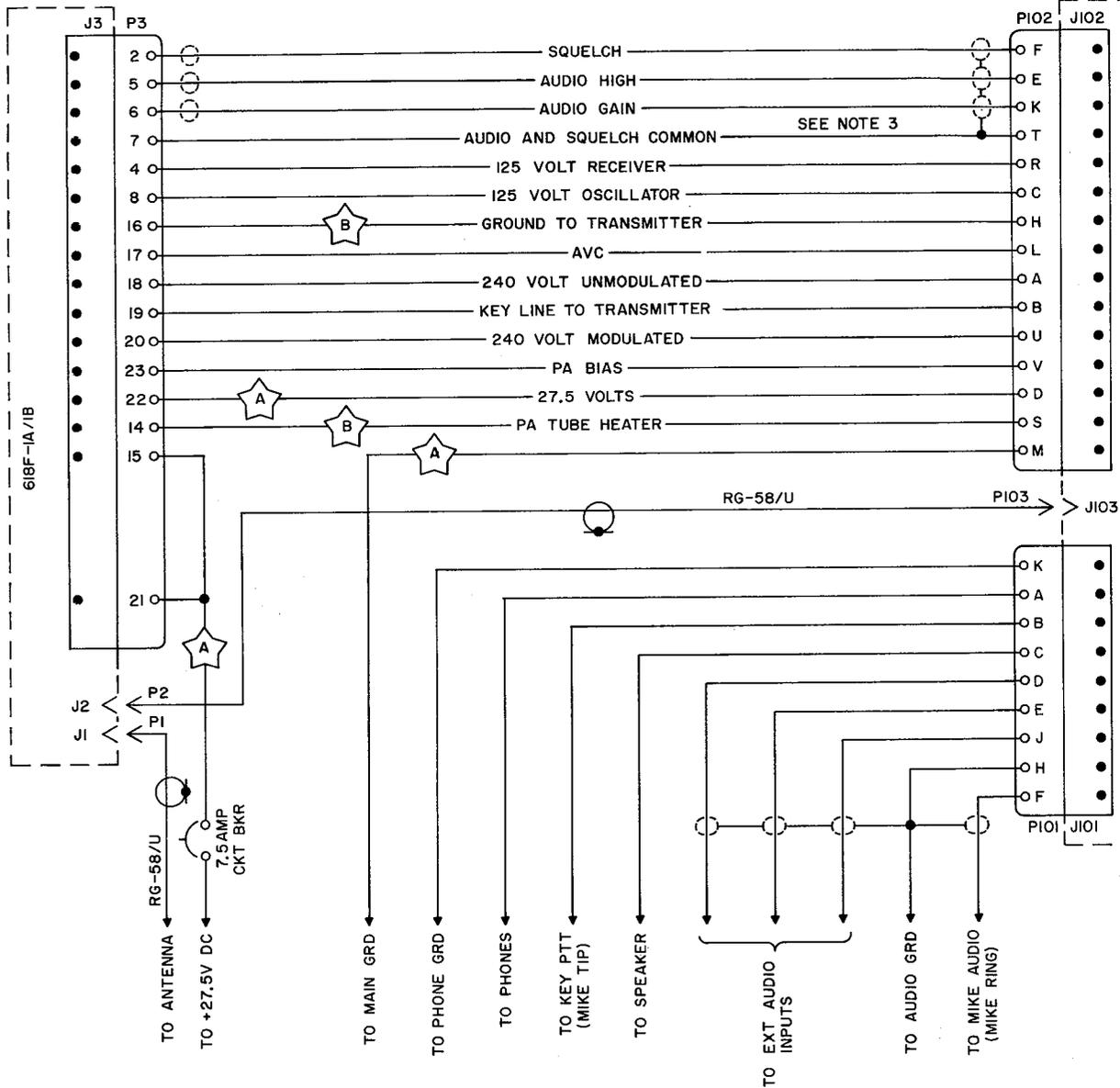
NOTES:

1. POWER REQUIREMENT: RECEIVE-7 AMP MAX, TRANSMIT-10 AMP MAX.
2. ALL WIRES SHOULD BE NO. 22 UNLESS OTHERWISE INDICATED. WIRES SHOULD BE SHIELDED AS INDICATED WITH AN INSULATING JACKET OVER THE SHIELD. ALL SHIELDS FOR A GIVEN CIRCUIT ARE TO BE GROUNDED AT ONE END ONLY AND TO THE SAME GROUND STUD.
3. PIN T OF PI02 IS GROUNDED INSIDE THE 427D-1. DO NOT GROUND ELSEWHERE.
4. THE FOLLOWING TABLE APPLIES TO WIRES DESIGNATED WITH A STAR.

WIRE	LENGTH	SIZE (AWG)
★ A	LESS THAN 18 INCHES	NO. 18
	MORE THAN 18 INCHES BUT LESS THAN 3 FEET	NO. 16
	MORE THAN 3 FEET BUT LESS THAN 5 FEET	NO. 14
	MORE THAN 5 FEET	NO. 12
★ B	LESS THAN 5 FEET	NO. 22
	MORE THAN 5 FEET BUT LESS THAN FEET	NO. 20
	MORE THAN 10 FEET	NO. 18

CONNECTOR PINS ARE MADE TO ACCEPT WIRE SIZE NO. 20 USE OF LARGER WIRE SIZES WILL NECESSITATE SPECIAL WIRING ARRANGEMENTS. IF WIRE WILL NOT FIT INTO SOLDER POT ON PIN, BUS TO A VACANT TERMINAL AND CONNECT WIRE TO BUS.

Figure 2-4. VHF Communication Transceiver 618F-1A/1B and Fixed I-F, Audio, and Power Supply 427D-1, Interconnecting and External Cabling Diagram for 13.75-Volt Operation



NOTES:

1. POWER REQUIREMENT: RECEIVE-3.2 AMP MAX, TRANSMIT-5 AMP MAX.
2. ALL WIRES SHOULD BE NO. 22 UNLESS OTHERWISE INDICATED. WIRES SHOULD BE SHIELDED AS INDICATED WITH AN INSULATING JACKET OVER THE SHIELD. ALL SHIELDS FOR A GIVEN CIRCUIT ARE TO BE GROUNDED AT ONE END ONLY AND TO THE SAME GROUND STUD.
3. PIN T OF P102 IS GROUNDED INSIDE THE 427D-I. DO NOT GROUND ELSEWHERE.
4. THE FOLLOWING TABLE APPLIES TO WIRES DESIGNATED WITH A STAR.

WIRE	LENGTH	SIZE (AWG)
★ A	LESS THAN 18 INCHES	NO. 18
	MORE THAN 18 INCHES BUT LESS THAN 3 FEET	NO. 16
	MORE THAN 3 FEET BUT LESS THAN 5 FEET	NO. 14
	MORE THAN 5 FEET	NO. 12
★ B	LESS THAN 5 FEET	NO. 22
	MORE THAN 5 FEET BUT LESS THAN 10 FEET	NO. 20
	MORE THAN 10 FEET	NO. 18

CONNECTOR PINS ARE MADE TO ACCEPT WIRE SIZE NO. 20 USE OF LARGER WIRE SIZES WILL NECESSITATE SPECIAL WIRING ARRANGEMENTS. IF WIRE WILL NOT FIT INTO SOLDER POT ON PIN, BUS TO A VACANT TERMINAL AND CONNECT WIRE TO BUS.

Fig

Figure 2-5. VHF Communication Transceiver 618F-1A/1B and Fixed I-F, Audio, and Power Supply 42 Interconnecting and External Cabling Diagram for 27.5-Volt Operation

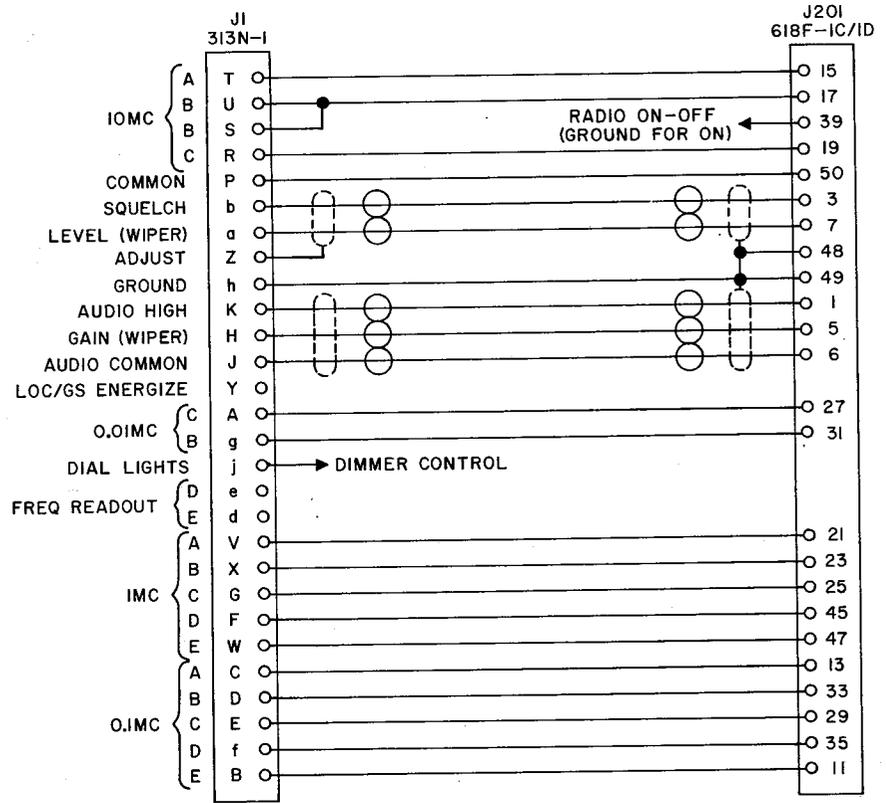


Figure 2-7. Interconnecting and External Cabling Diagram for Radio Set Control 313N-1

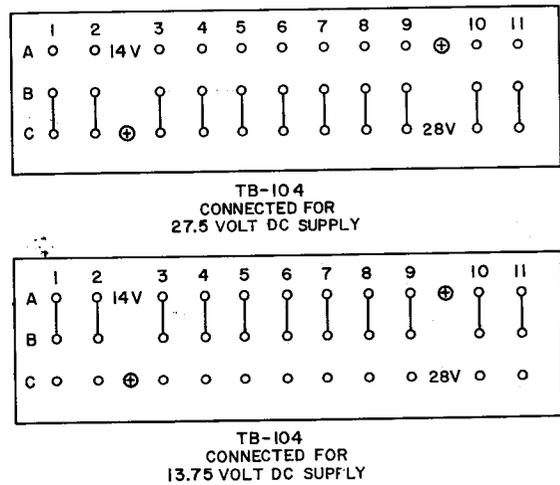
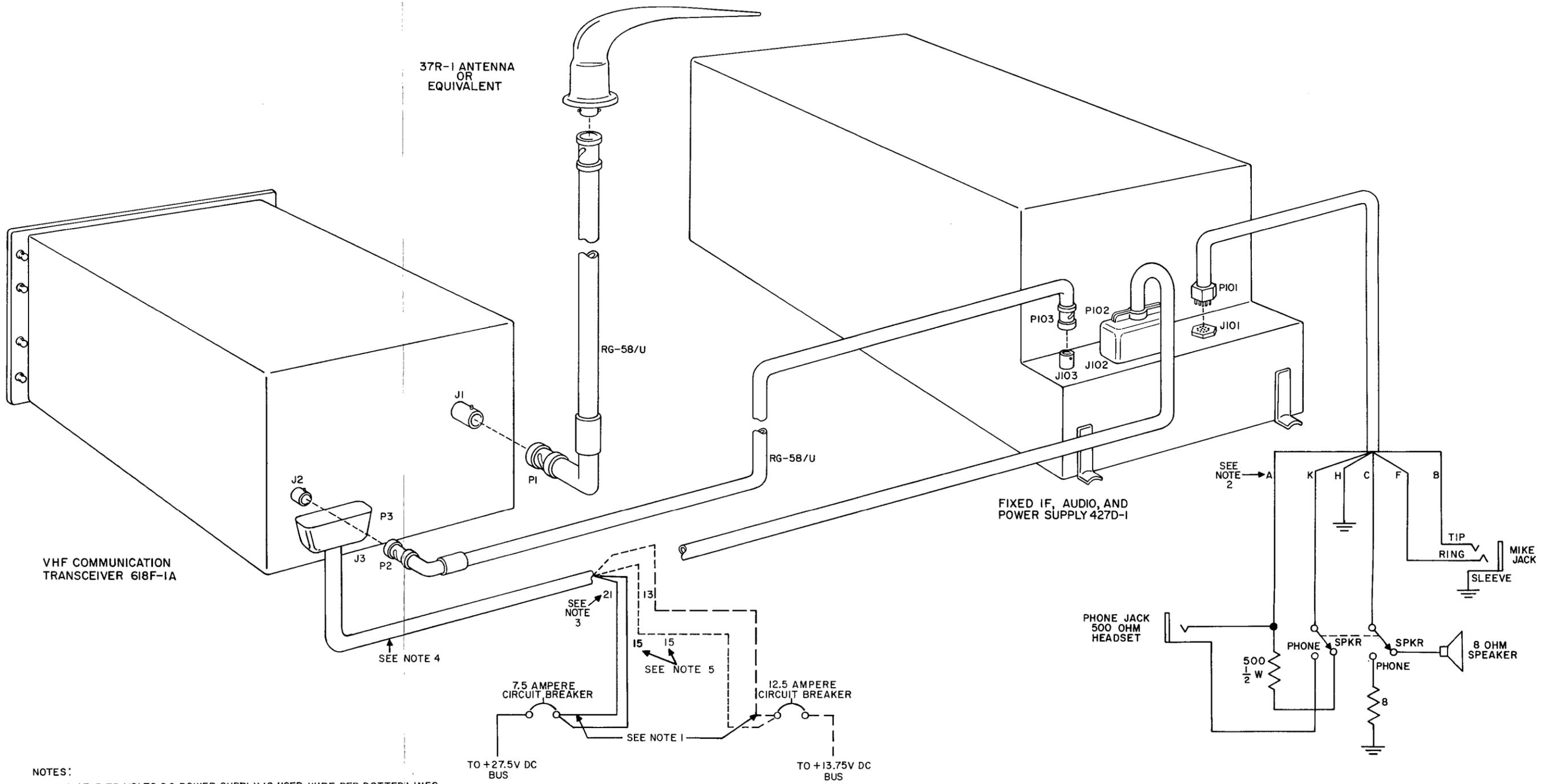


Figure 2-8. TB104 Wiring



NOTES:

1. IF 13.75 VOLTS DC POWER SUPPLY IS USED, WIRE PER DOTTED LINES, AND GROUND PIN 3 OF P3. IF 27.75 VOLTS DC POWER SUPPLY IS USED, WIRE PER SOLID LINE. REFER TO FIGURE 2-5 FOR TB 104 WIRING INFORMATION.
2. LETTERS ON LEADS INDICATE PINS ON PLUG PI01.
3. NUMBERS ON LEADS INDICATE PINS ON PLUG P3.
4. REFER TO FIGURE 2-3 OR 2-4 FOR CABLE FABRICATION DATA.
5. SELECT PANEL LAMPS TO MATCH LINE VOLTAGE.
6. KEEP ALL CABLES AS SHORT AS POSSIBLE.

Figure 2-9. Typical Installation of
618F-1A/1B and 427D-1

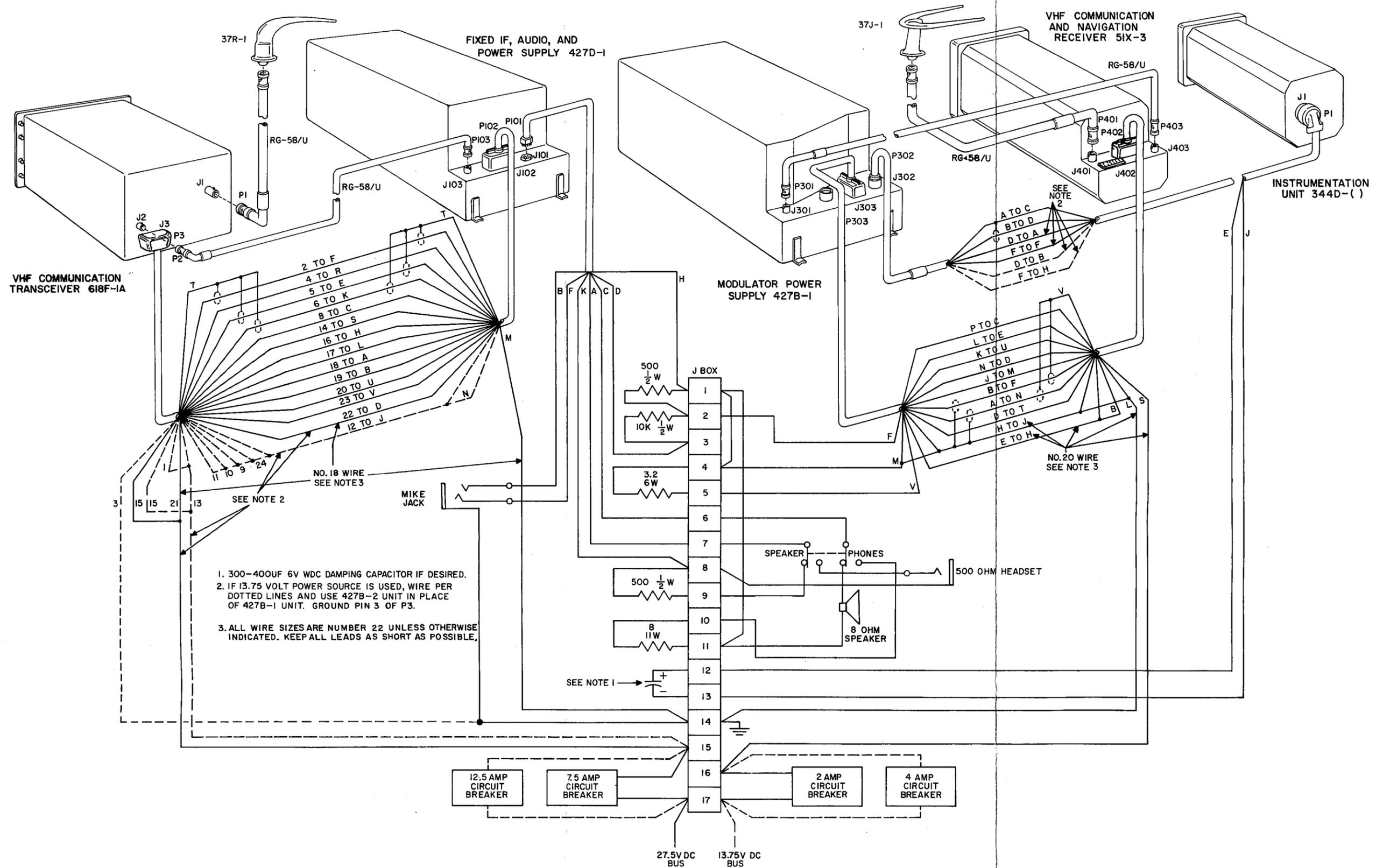


Figure 2-10. Typical Installation of 618F-1A/1B, 427D-1, 51X-3, 427B-1, and 344D-1

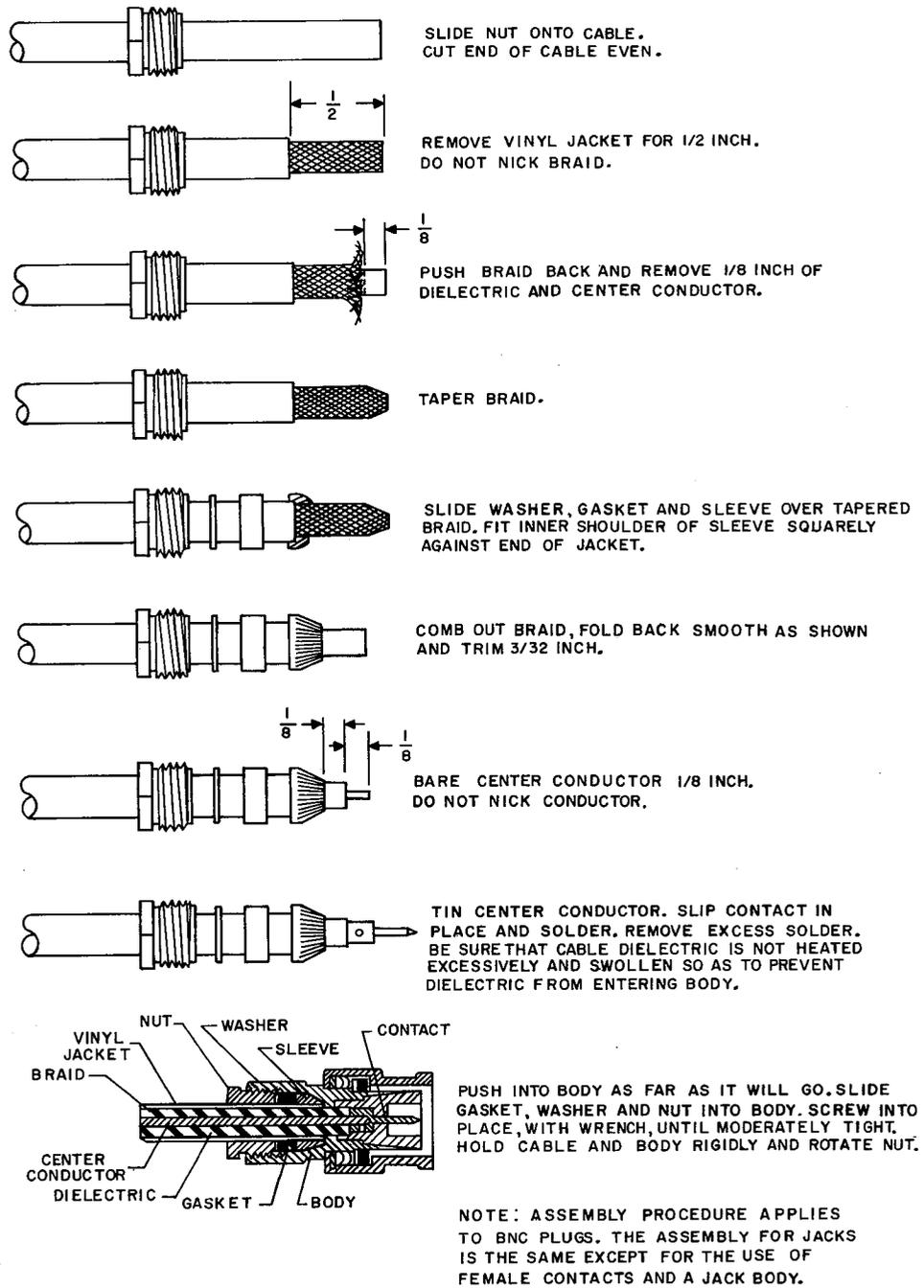


Figure 2-12. Assembly of Connector to RG-58/U Cable

SECTION II
Installation

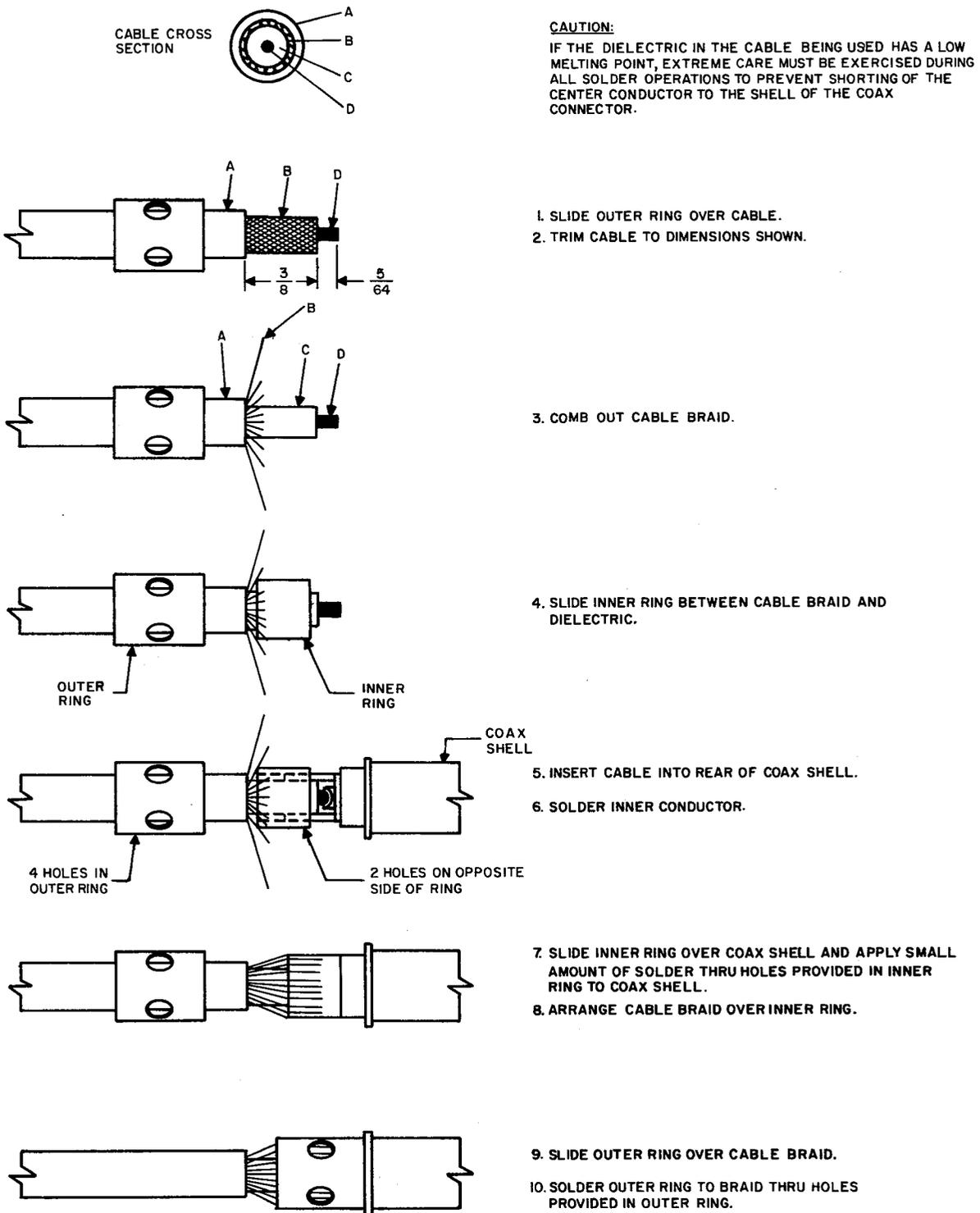
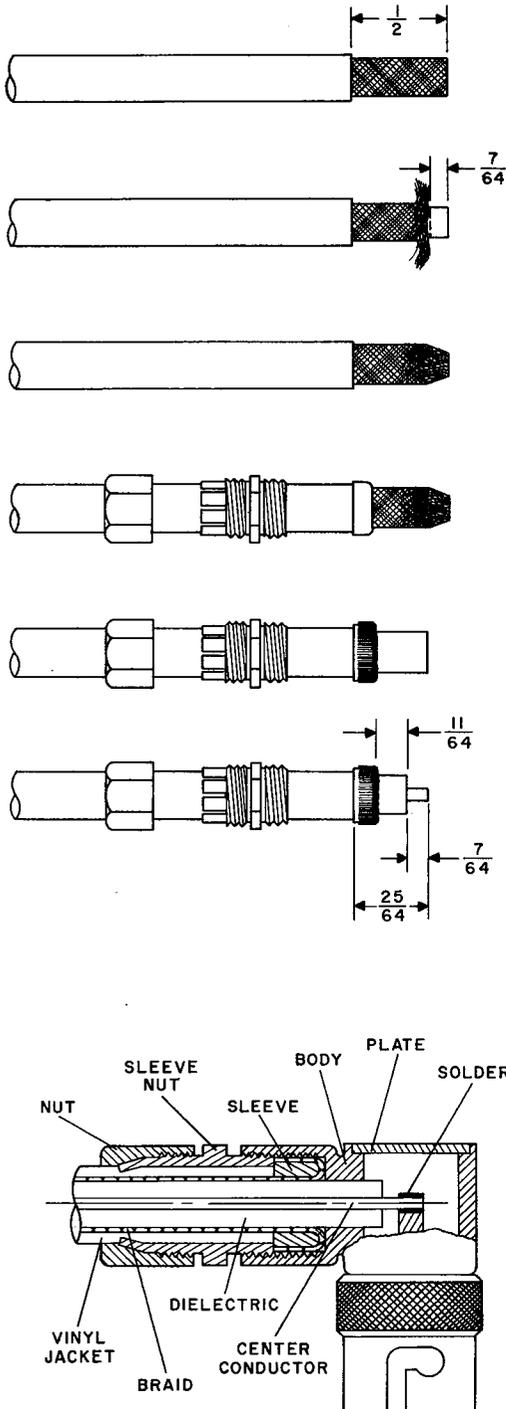


Figure 2-13. Preparation and Connection of RG-58/U or RG-141/U to Type DPA Contact



CUT END OF CABLE EVEN.
REMOVE VINYL JACKET FOR 1/2 INCH.
DO NOT NICK BRAID.

PUSH BRAID BACK AND REMOVE 7/64 INCH
OF DIELECTRIC AND CENTER CONDUCTOR.

TAPER BRAID.

SLIDE NUT, SLEEVE NUT, AND SLEEVE
OVER TAPERED BRAID. ENSURE SLEEVE
HAS SQUARED END FLUSH WITH END
OF JACKET.

COMB OUT BRAID, FOLD BACK SMOOTH
AS SHOWN AND TRIM TO 3/32 INCH.

BARE CENTER CONDUCTOR 7/64 INCH.
DO NOT NICK CONDUCTOR. TIN CENTER
CONDUCTOR.

PUSH INTO BODY. ENSURE CENTER CON-
DUCTOR IS IN SLOT. SCREW SLEEVE NUT
INTO BODY. TIGHTEN MODERATELY WITH
WRENCH. SCREW NUT ONTO SLEEVE NUT
WITH WRENCH UNTIL MODERATELY TIGHT.
SOLDER CENTER CONDUCTOR AS SHOWN.
SNAP PLATE INTO PLACE. APPLY A BEAD
OF SOLDER AROUND EDGE OF PLATE.

Figure 2-14. Preparation and Connection of RG-58/U to an MB Right Angle Plug

SECTION III
Operation

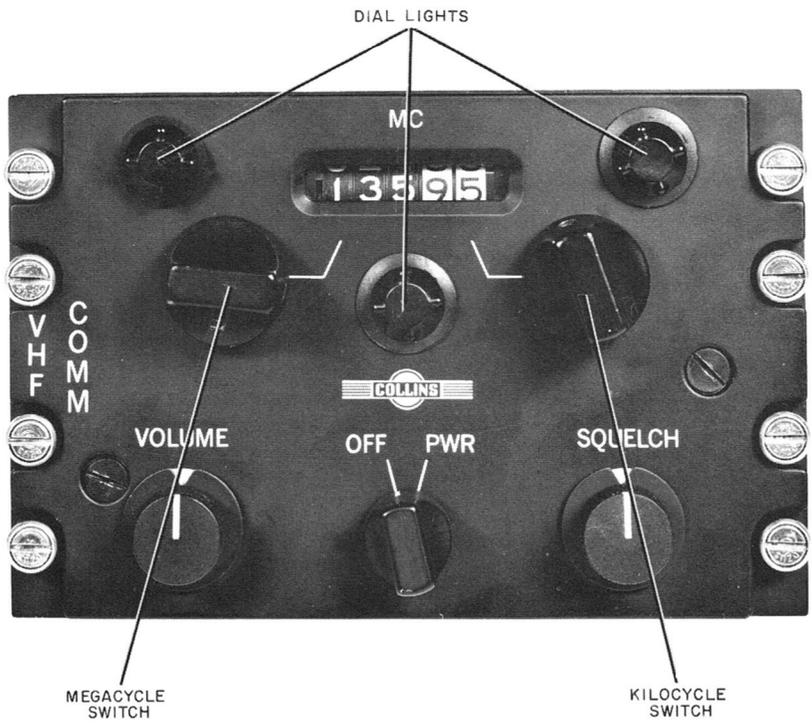


Figure 3-1. VHF Communication Transceiver 618F-1A, Operating Controls

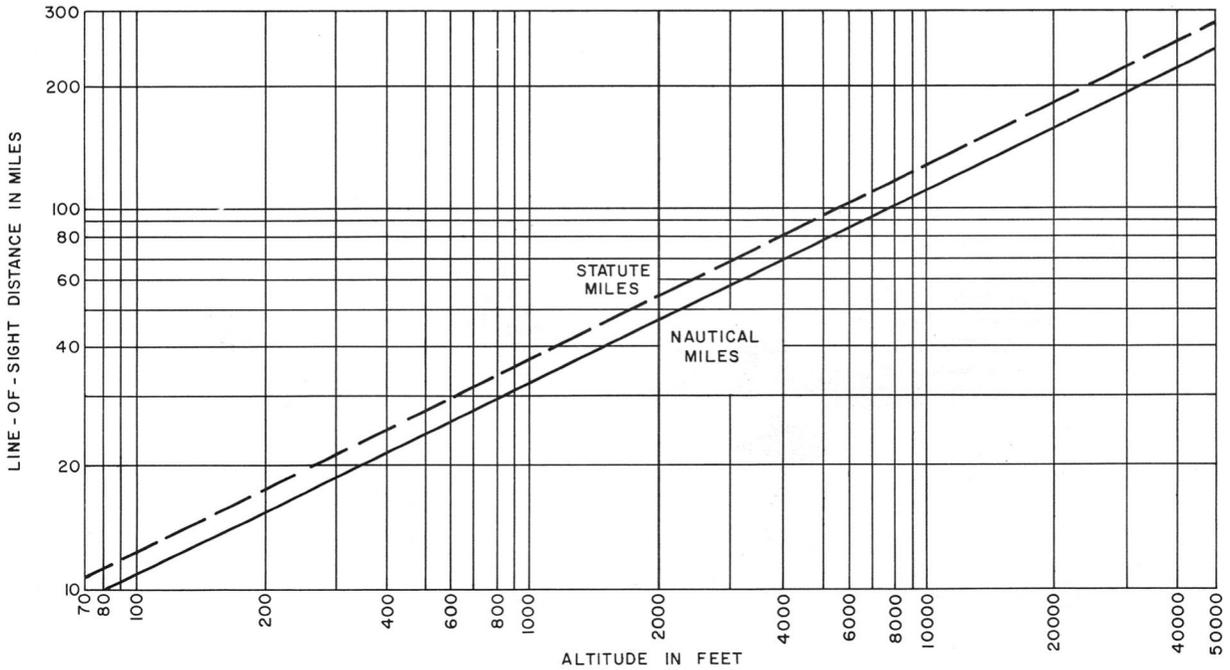


Figure 3-2. VHF Operating Range

SECTION III OPERATION

3.1 GENERAL.

VHF Communication Transceiver 618F-1() is operated by the pilot or other person having access to the instrument panel of the aircraft. Operation is simplified by the compactness of the control panel and the small number of operating controls. The transmitter power output is 6 watts minimum into a 52-ohm load. The receiver audio power output is 8 watts maximum into an 8-ohm load. The effective range will vary with the operational altitude (see figure 3-2).

Operation and functions of systems A, B, and C (refer to figures 2-9, 2-10, and 2-11) are presented on three tear-out pages at the end of this section. Air communication and navigation frequencies also are listed on these pages.

3.2 OPERATING CONTROLS.

Table 3-1 contains a listing of all 618F-1A/1B operating controls, their locations, and their functions. Figure 3-1 shows the location of the operating controls on the 618F-1A/1B. The 618F-1C/1D requires a remote control unit such as Collins 314U-10A or 313N-1. Refer to the applicable instruction book for operating instructions for these units. Fixed I-F, Audio, and Power Supply 427D-1 has no operating controls.

3.3 OPERATING PROCEDURE.

3.3.1 NORMAL OPERATING PROCEDURE.

CAUTION

Do not key the transmitter until filaments have been on for 30 seconds.

- a. Turn the master aircraft power switch to on.
- b. Turn the OFF-PWR switch to PWR. Allow 30 seconds for warmup.
- c. Set the digits in the channel selector window to the megacycles desired with the megacycle switch (left knob).
- d. Set the digits with the decimal point preceding them (hundredth megacycles) in the right portion of the channel selector window with the kilocycle switch (right knob).
- e. Turn SQUELCH control fully clockwise.
- f. Turn VOLUME control clockwise until strong noise signal is heard in headset or cabin speaker.
- g. Turn SQUELCH control counterclockwise until noise is barely audible or is just eliminated. (This

setting provides audio muting under no-signal input conditions.)

- h. Close keying switch (push-to-talk button) to transmit.)

TABLE 3-1
618F-1() OPERATING CONTROLS

CONTROL	LOCATION	FUNCTION
OFF-PWR switch	618F-1A/1B control panel	Switch applies 27.5 or 13.75 volts d-c to all 618F-1A/1B and 427D-1 circuits.
VOLUME control	618F-1A/1B control panel	Controls gain of receiver.
Megacycle switch	618F-1A/1B control panel	Changes frequency in 1-mc steps between 118 and 135 mc (117 and 134 for 618F-1B).
Kilocycle switch	618F-1A/1B control panel	Changes frequency in 50-kc steps from 0.00 to 0.95 mc.
SQUELCH control	618F-1A/1B control panel	Varies level at which the carrier signal or noise opens the squelch circuits.

3.3.2 ADJUSTMENT FOR WEAK SIGNAL RECEPTION.

With the equipment set as described in paragraph 3.3, weak signals may fail to open the squelch circuit and will not be heard. Reception of these signals will be ensured by advancing the SQUELCH control clockwise until noise is at a comfortable level. Maximum sensitivity is obtained when the SQUELCH control is set fully clockwise.

3.3.3 PREFLIGHT CHECK.

During the final check before departure, turn on the transceiver, and contact the control tower. Check for sidetone during transmission.

3.3.4 OPERATING PROCEDURES FOR SYSTEMS.

In system B, see figure 2-10, the 618F-1() functions as a transceiver and the 51X-3, 427B-1, and 344D-1

SECTION III Operation

function as a navigation system. The 51X-3 also functions as a standby communications receiver in this system. The receiver output of the 618F-1() is fed through the 427D-1 to the speaker or phones (depending on position of SPEAKER-PHONES switch). The output of the 51X-3 is fed to the 427B-1 and the ATCSS information is fed to the 344D-1. The phone output of the 427B-1 is fed to the external input of the 427D-1 and then to the speaker.

If the 618F-1() receiver fails in system B, the 51X-3 can be used as a communication receiver by switching from a navigation frequency to a communication frequency. The audio output of the 427B-1 is fed to the external input of the 427D-1 and then to the speaker or phones as desired. Navigation and communication channels can be monitored on an intermittent basis by switching between the navigation and communication channels.

If the 618F-1() transmitter fails, all receiver functions will operate normally. There is no standby transmitter. If any unit of the navigation system (51X-3, 427B-1, or 344D-1) fails, there is no navigation function possible since the 618F-1(), 427D-1 system does not include navigation operation. If only the 344D-1 fails, the 51X-3, 427B-1 can be used as a standby communications system as described above.

In normal operation, when the aircraft master power switch is turned on, aircraft power is applied to the "on-off" switches in the 618F-1() and 51X-3 and to the 618F-1() panel lights. When the 618F-1() OFF-PWR switch is moved to the PWR position, power is applied to the 427D-1 which in turn supplies power to the 618F-1(). When the 51X-3 VOL control is turned clockwise, power is applied to the 51X-3 panel lights and to the 427B-1 which in turn supplies power to the 51X-3 and the 344D-1.

In system C, see figure 2-11, the 618F-1(), 51X-3, 427B-1, and 344D-1 have the same functions as in system B. In addition system C has a 51Z-2 and a 327A-2 for marker beacon reception and indication and a 17L-8A for standby transmitter operation.

During transmit operation with the MAIN-STBY switch in the MAIN position and the SPEAKER switch in the ON position (refer to figure 2-11), the 618F-1() transmitter is operative and the 17L-8A transmitter is inoperative. In this condition the 618F-1() transmitter sidetone is fed through the 427B-1 to the speaker. (If headphones are plugged in, the sidetone will be heard in the phones.) R-f output of the 618F-1() is fed through the 17L-8A antenna relay. Any intelligence being fed through the 427D-1 is cut off during transmit. In the receive function, the 618F-1() receiver output is fed through the 427D-1 to the speaker and the 51X-3 output is fed through the 427B-1. The phone output of the 427B-1 is fed to the external input of the 427D-1 and then to the speaker. The ATCSS output from the 427B-1 is fed to the

344D-1. The 51Z-2 aural signal is fed to the external audio input of the 427B-1, through the 427D-1, and then to the speaker.

If an ADF unit is installed in the aircraft, the ADF audio is fed to the external audio input of the 427B-1 and to the 427D-1 through an isolation pad.

When the SPEAKER switch is placed in the OFF position, all functions described above are the same except the speaker is inoperative and all intelligence is fed to the headphones.

With the MAIN-STBY switch in the STBY position, the 17L-8A (standby transmitter) is operative and the 618F-1() receiver functions as a communications receiver. The 17L-8A sidetone and any other intelligence fed through the 427D-1 to the speaker will be present during transmit. Any intelligence being fed through the 427B-1 to the speaker will be cut off during transmit. If the 618F-1() transmitter fails, all receive functions are normal. There are no visual or aural indication of transmitter failure except that no replies to transmission are received. All transmit and receive functions will be normal if the 17L-8A is activated by moving the MAIN-STBY switch to STBY.

If the 618F-1() receiver fails, all transmit and navigation functions will be normal. The 618F-1() receiver can be checked to see if it is operating by turning the SQUELCH and VOLUME controls fully clockwise. No noise in the speaker indicates a defective receiver section. Low sensitivity of receiver will be indicated by low signal and high noise level. To obtain communication receiver function, the 51X-3 can be switched to the desired communication channel. During the time the 51X-3 is being used for communication, the 344D-1 will be inoperative. By switching the 51X-3 between communication and navigation frequencies, both functions can be maintained.

If the 427D-1 power supply fails, there will be complete loss of 618F-1() communications function and, depending on the type of power supply failure, loss of the 427D-1 audio amplifier system. If the 427D-1 audio system fails, ADF audio signals as well as the 51Z-2 aural signal will be heard through the 427B-1. (ADF and marker beacon visual aids will operate normally.) To obtain communications transmit and receive functions, the MAIN-STBY switch must be moved to STBY to make the 17L-8A operative. The 51X-3 frequency may then be switched between navigation and communication channels to maintain both functions.

Before installing the equipment in the aircraft, study the installation diagram, and determine which cables are to be fabricated. Wire size information is included on the diagrams. Table 2-1 lists the type and Collins part number of all mating connectors used in the three installations shown in this section. Table 2-2 presents the power requirements for the equipments.

OPERATION OF SYSTEM A

COMPONENTS:

VHF Communication Transceiver 618F-1()
 Fixed I-F, Audio, and Power Supply 427D-1
 Communication antenna for 118- to 135-mc range
 Microphone with push-to-talk switch
 Speaker and/or headphones

FUNCTIONS AVAILABLE:

Communications transmission and reception, SCS,
 in the frequency range of 118.00 to 135.95 mc.

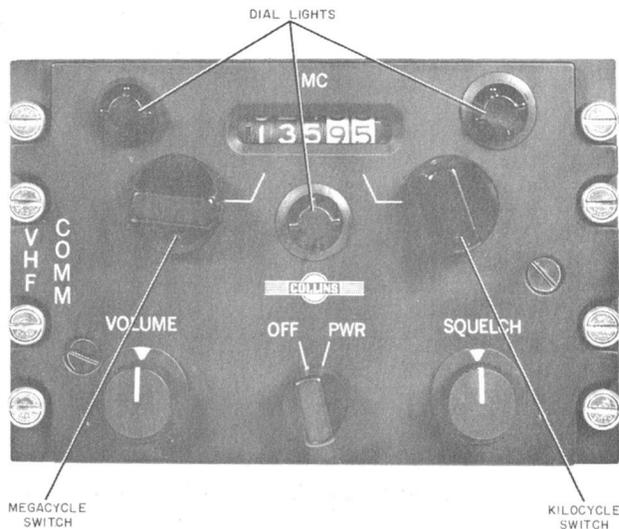
OPERATING PROCEDURES:

TRANSMIT:



Do not depress the push-to-talk button until the OFF-PWR switch has been in the PWR position for at least 30 seconds.

1. Turn aircraft master power switch to "on."
2. Turn the OFF-PWR switch to PWR. Allow 30 seconds for warmup.
3. Set the 3 digits in the MC window which have black backgrounds to the megacycles desired by turning the megacycle switch (left knob).
4. Set the 2 digits with white backgrounds to the desired decimal of a megacycle by turning the kilocycle switch (right knob).
5. Turn SQUELCH control all the way clockwise.
6. Turn the VOLUME control clockwise until loud noise is present in the headphones or speaker.



VHF Communication Transceiver 618F-1A

7. Turn the SQUELCH control counterclockwise until the noise is barely audible or is just eliminated.

NOTE

To receive very weak signals, leave SQUELCH control in fully clockwise position.

8. Depress the push-to-talk button on the microphone thereby energizing the transmitter. Speak directly into the microphone at a normal conversation level. The microphone should touch the upper lip.

RECEIVE:

The operating procedures for receive operation is the same as for transmit except that the push-to-talk button is not depressed.

EMERGENCY OPERATION:

If communications cannot be established by above procedures, attempt operation on different frequencies.

AIR COMMUNICATIONS FREQUENCY :

119.9 mc	Approach Control
121.5 mc	Emergency
121.7, 121.9 mc	Ground Control
122.8 mc	Unicom (No Tower on Field)
123.0 mc	Unicom (Tower on Field)
126.7 mc	Flight Service Stations

NOTE

The above frequencies are all SCS (transmit and receive on the same frequency). It is also possible to transmit to towers on 122.5 mc while receiving on the tower frequency and to transmit to Flight Service Stations on 122.1 mc while receiving on the VOR frequency.

OPERATING CONTROLS	FUNCTION
OFF-PWR switch VOLUME control Megacycle switch Kilocycle switch SQUELCH control SPEAKER-PHONES switch	Apply aircraft power to the 618F-1() and 427D-1. NOTE: The 618F-1A/1B panel lights are not controlled by this switch, but are lighted when the aircraft master power switch is in the "on" position. Control gain of the receiver. Change frequency in 1-mc steps between 118 and 135 mc. Change frequency in 50-kc steps between 0.00 and 0.95 mc. Vary level at which noise or the carrier signal opens the squelch circuit. Select headphones or speaker audio output.

OPERATION OF SYSTEM B

COMPONENTS:

VHF Communication Transceiver 618F-1()
Fixed I-F, Audio, and Power Supply 427D-1
Communication antenna for 118-135 mc range
Microphone with push-to-talk switch
Speaker and/or headphones
Receiver 51X-3
Modulator Power Supply 427B-1
Instrumentation Unit 344D-1
Navigation Antenna

FUNCTIONS AVAILABLE:

Primary communications transmission and reception, SCS, in the frequency range of 118.00 to 135.95 mc. Standby communications reception in the frequency range of 118.0 to 126.9 mc. VOR and localizer reception in the frequency range of 108.0 to 118.0 mc. Visual display of navigation signal information (VOR and localizer).

OPERATING PROCEDURES:

TRANSMIT:

CAUTION

Do not depress the push-to-talk button until the OFF-PWR switch has been in the PWR position for at least 30 seconds.

1. Turn aircraft master power switch to "on."
2. Turn the 618F-1() OFF-PWR switch to PWR. Allow 30 seconds for warmup.
3. Set the 3 digits in the 618F-1A/1B MC window have black backgrounds to the megacycles desired by turning the megacycle switch (left knob).
4. Set the 2 digits with white backgrounds to the desired decimal of a megacycle by turning the kilocycle switch (right knob).

5. Turn the 618F-() SQUELCH control fully clockwise.

6. Turn the 618F-1() VOLUME control clockwise until loud noise is present in the headphones or speaker.

7. Turn the 618F-1() SQUELCH control counterclockwise until the noise is just eliminated.

NOTE

To receive very weak signals, leave the SQUELCH control in the fully clockwise position.

8. Depress push-to-talk button on the microphone. Speak directly into the microphone at a normal conversation level. The microphone should touch the upper lip.

RECEIVE:

The operating procedures for receive operation with the 618F-1() is the same as for transmit except that the push-to-talk button is not depressed.

NAVIGATE:

1. Turn the 51X-3 VOL switch clockwise. Allow 30 seconds for warmup.
2. Set the 3 digits in the 51X-3 MC window which have black backgrounds to the megacycles of the desired navigation channel by turning the 51X-3 megacycle switch.
3. Set the digit in the 51X-3 MC window which has a white background to the tenth-megacycle of the desired navigation channel.
4. Turn the 51X-3 SQUELCH control fully clockwise.
5. Turn the 51X-3 VOL control clockwise until loud noise is present in the headphones or speaker.

6. Turn the SQUELCH control counterclockwise until the noise is just eliminated.

NOTE

To receive very weak signals, leave the SQUELCH control in the clockwise position.

EMERGENCY OPERATION:

If communications cannot be established by the above procedures, attempt operation on different frequencies. If this procedure does not establish receive operation, tune the 51X-3 to the desired communication frequency. Monitor navigation and communication channels on an intermittent basis switching the 51X-3 between navigation and communication channels.

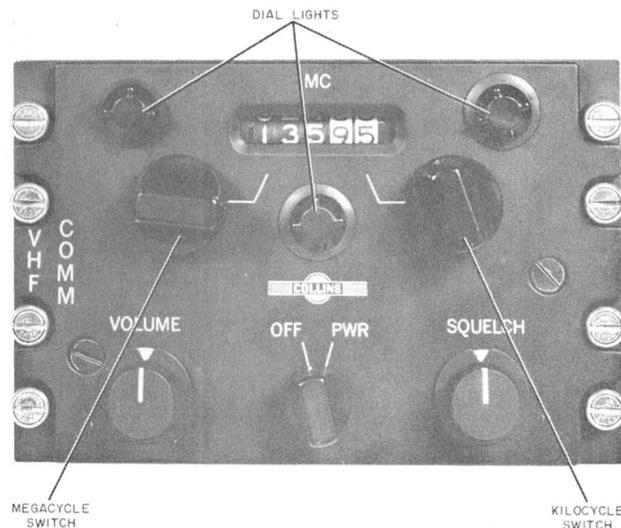
AIR COMMUNICATIONS FREQUENCY:

119.9 mc	Approach Control
121.5 mc	Emergency
121.7, 121.9 mc	Ground Control
122.8 mc	Unicom (No Tower on Field)
123.0 mc	Unicom (Tower on Field)
126.7 mc	Flight Service Stations

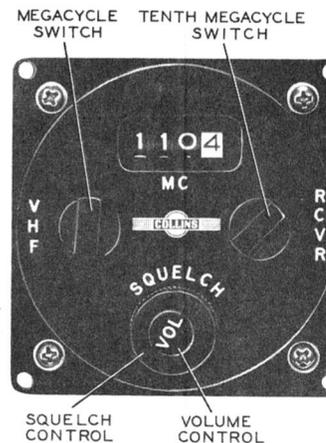
NOTE

The above frequencies are all SCS (transmit and receive on the same frequency). It is also possible to transmit to towers on 122.5 mc while receiving on the tower frequency and to transmit to Flight Service Stations on 122.1 mc while receiving on the VOR frequency.

OPERATING CONTROLS	FUNCTION
618F-1() OFF-PWR switch	Apply aircraft power to the 618F-1() and 427D-1. NOTE: The 618F-1A/1B panel lights are not controlled by this switch, but are lighted when the aircraft master power switch is in the "on" position.
618F-1() VOLUME control	Control gain of the 618F-1() receiver.
618F-1() megacycle switch	Change 618F-1() frequency in 1-mc steps between 118 and 135 mc.
618F-1() kilocycle switch	Change 618F-1() frequency in 50-kc steps between 0.00 and 0.95 mc.
618F-1() SQUELCH control	Vary level at which noise or carrier signal opens the squelch circuit in the 618F-1().
SPEAKER-PHONES switch	Select headphones or speaker audio output.
51X-3 VOL control	Control gain of 51X-3, turn on dial light (if instrument panel lights are on), and apply power to the 51X-3 and 427B-1.
51X-3 megacycle switch	Change 51X-3 channels in 1-mc steps between 108 and 126 mc.
51X-3 tenth-megacycle switch	Change 51X-3 channels in 0.1-mc steps from 0.0 to 0.9 mc.
51X-3 SQUELCH control	Vary level at which noise or the carrier signal opens the squelch circuits in the 51X-3.



VHF Communication Transceiver 618F-1A



Receiver 51X-3

OPERATION OF SYSTEM C

COMPONENTS:

VHF Communication Transceiver 618F-1()
Fixed I-F, Audio, and Power Supply 427D-1
Communication antenna for 118- to 135-mc range
Microphone with push-to-talk switch
Speaker and/or headphones
Receiver 51X-3
Modulator Power Supply 427B-1
Instrumentation Unit 344D-1
Navigation Antenna
Marker Beacon Receiver 51Z-2
Marker Beacon Indicator 327A-2
Transmitter 17L-8A
Marker Beacon Antenna

FUNCTIONS AVAILABLE:

Primary communications transmission and reception, SCS, in the frequency range of 118.00 to 135.95 mc. Standby communications transmission and reception in the frequency range of 118.0 to 126.9 mc. VOR and localizer reception in the frequency range of 108.0 to 118.0 mc. Visual display of navigation signal information (VOR and localizer). Marker beacon reception and visual display.

OPERATING PROCEDURES:

TRANSMIT:

CAUTION

Do not depress the push-to-talk button until the OFF-PWR switch has been in the PWR position for at least 30 seconds.

1. Turn aircraft master power switch to "on."
2. Turn the 618F-1() OFF-PWR switch to PWR. Allow 30 seconds for warmup.
3. Set the 3 digits in the 618F-1A/1B MC window which have black backgrounds to the megacycles desired by turning the megacycle switch (left knob).

4. Set the 2 digits with white backgrounds to the desired decimal of a megacycle by turning the kilocycle switch (right knob).

5. Turn the 618F-1() SQUELCH control fully clockwise.

6. Turn the 618F-1() VOLUME control clockwise until loud noise is present in the headphones or speaker.

7. Turn the 618F-1(), SQUELCH control counterclockwise until the noise is just eliminated.

NOTE

To receive very weak signals, leave the SQUELCH control in the fully clockwise position.

8. Depress the push-to-talk button on the microphone. Speak directly into the microphone at normal conversation level. The microphone should touch the upper lip.

RECEIVE:

The operating procedures for receive operation with the 618F-1() is the same as for transmit except that the push-to-talk button is not depressed.

NAVIGATE:

1. Turn the 51X-3 VOL switch clockwise. Allow 30 seconds for warmup.
2. Set the 3 digits in the 51X-3 MC window which have black backgrounds to the megacycles of the desired navigation channel by turning the 51X-3 megacycle switch.
3. Set the digit in the 51X-3 MC window which has a white background to the tenth-megacycle of the desired navigation channel.
4. Turn the 51X-3 SQUELCH control fully clockwise.

5. Turn the 51X-3 VOL control clockwise until loud noise is present in the headphones or speaker.

6. Turn the SQUELCH control counterclockwise until the noise is just eliminated.

NOTE

To receive very weak signals, leave the SQUELCH control in the clockwise position.

EMERGENCY OPERATION:

If communications cannot be established by the above procedures, attempt operation on different frequencies. If this procedure does not establish receive operation, tune the 51X-3 to the desired communication frequency. Monitor navigation and communication channels on an intermittent basis switching the 51X-3 between navigation and communication channels. If transmit operation cannot be established, move the MAIN-STBY switch to the STBY position, and tune the 17L-8A to the desired transmit frequency.

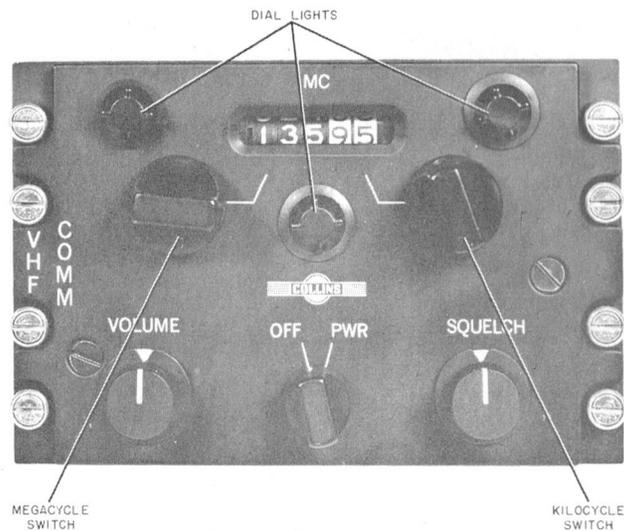
AIR COMMUNICATIONS FREQUENCY:

119.9 mc	Approach Control
121.5 mc	Emergency
121.7, 121.9 mc	Ground Control
122.8 mc	Unicom (No Tower on Field)
123.0 mc	Unicom (Tower on Field)
126.7 mc	Flight Service Stations

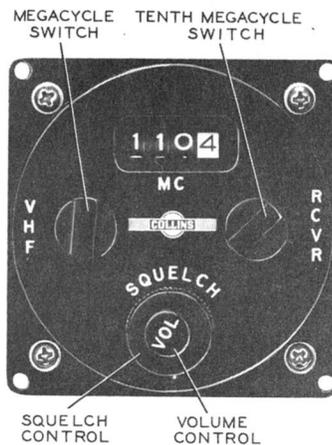
NOTE

The above frequencies are all SCS (transmit and receive on the same frequency). It is also possible to transmit to towers on 122.5 mc while receiving on the tower frequency and to transmit to Flight Service Stations on 122.1 mc while receiving on the VOR frequency.

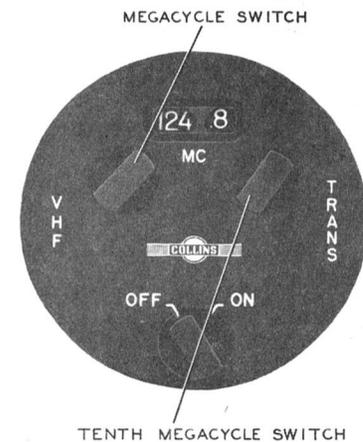
OPERATING CONTROLS	FUNCTION
<p>618F-1() OFF-PWR switch</p> <p>618F-1() VOLUME control</p> <p>618F-1() megacycle switch</p> <p>618F-1() kilocycle switch</p> <p>618F-1() SQUELCH control</p> <p>SPEAKER-PHONES switch</p> <p>51X-3 VOL control</p> <p>51X-3 megacycle switch</p> <p>51X-3 tenth-megacycle switch</p> <p>51X-3 SQUELCH control</p> <p>HI-LO sensitivity switch</p> <p>17L-8A ON-OFF switch</p> <p>17L-8A megacycle switch</p> <p>17L-8A tenth-megacycle switch</p> <p>MAIN-STBY switch</p>	<p>Apply aircraft power to the 618F-1() and 427D-1.</p> <p>NOTE: The 618F-1A/1B panel lights are not controlled by this switch, but are lighted when the aircraft master power switch is in the "on" position.</p> <p>Control gain of the 618F-1() receiver.</p> <p>Change 618F-1() channels in 1 mc steps between 118 and 135 mc.</p> <p>Change 618F-1() channels in 50 kc steps between 0.00 and 0.95 mc.</p> <p>Vary level at which noise or the carrier signal opens the squelch circuit in the 618F-1().</p> <p>Select headphones or speaker audio output.</p> <p>Control gain of 51X-3, turn on dial light (if instrument panel lights are on). If the 17L-8A is off, this control applies power to the 51X-3 427B-1, and 17L-8A.</p> <p>Change 51X-3 channels in 1-mc steps between 108 and 126 mc.</p> <p>Change 51X-3 channels in 0.1-mc steps from 0.0 to 0.9 mc.</p> <p>Vary level at which noise or the carrier signal opens the squelch circuits in the 51X-3.</p> <p>Select high or low sensitivity of the 51Z-2.</p> <p>Turn on dial light (if instrument panel lights are on). If the 51X-3 is off, the switch applies aircraft power to the 17L-8A, 51X-3, and 427B-1.</p> <p>Change 17L-8A channels in 1-mc steps between 118 and 126 mc.</p> <p>Change 17L-8A channels in 0.1-mc steps from 0.0 to 0.9 mc.</p> <p>Choose main.(618F-1()) or standby (17L-8A) transmitter.</p>



VHF Communication Transceiver 618F-1A



Receiver 51X-3



Transmitter 17L-8A

SECTION IV PRINCIPLES OF OPERATION

4.1 GENERAL.

This section contains the principles of operation of VHF Communication Transceiver 618F-1() and Fixed I-F, Audio, and Power Supply 427D-1. An over-all picture of signal path is presented by a block diagram shown in figure 4-1. Description of the circuitry is based on this block diagram. Figures 7-1 through 7-5 are over-all schematic diagrams of the 618F-1() and 427D-1.

4.2 VHF COMMUNICATION TRANSCEIVER 618F-1()

4.2.1 TRANSMITTER R-F SECTION.

4.2.1.1 VHF OSCILLATOR AND DOUBLER. Dual-triode tube type 5670, V5, functions as a crystal-controlled oscillator and doubler circuit. The plate circuit of V5A is tuned by one of 18 inductors, L11 through L28, in parallel with C33 and capacitor C71.

Any one of the 18 inductors is selected by a ganged section of the megacycle switch, S1. The frequency of the oscillator is controlled by one of 18 crystals (Y1 through Y18) and switched into the cathode circuit by another ganged section of the megacycle switch, S5. These crystals provide a frequency range of 65.2425 to 73.7425 mc (64.7425 to 73.2425 mc for 618F-1B and 618F-1D). The output of V5A is applied to the grid to V5B through capacitor C34. C35, L30, and L31 make up the tuned portion of the plate circuit of V5B which is resonant to the second harmonic of the selected crystal frequency. Variable inductor L31 is ganged to the megacycle switch and tracks with S1 and S5. C35 and L30 serve as alignment trimmers for the low and high end of the frequency spectrum respectively. The output of V5B, 130.485 through 147.485 mc (129.485 through 146.485 mc for 618F-1B and 618F-1D) in

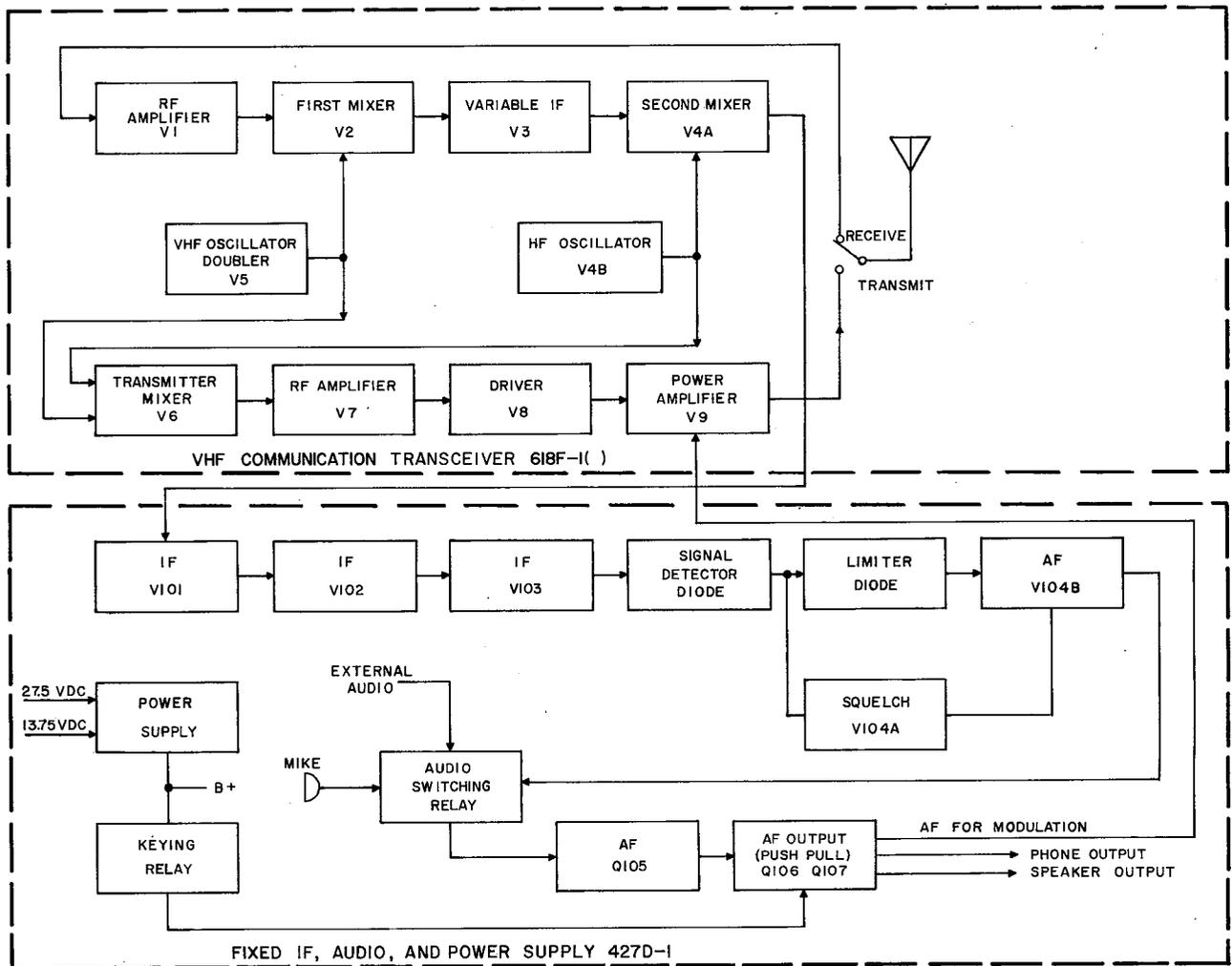


Figure 4-1. VHF Communication Transceiver 618F-1() and Fixed I-F, Audio, and Power Supply 427D-1, Block Diagram

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steps of 1 mc, is coupled to the cathode of the transmitter mixer, V6, through C66.

4.2.1.2 H-F OSCILLATOR. One half of dual-triode tube V4B, type 5670, serves as a crystal-controlled oscillator. The crystals (Y19 through Y38), controlling the frequency of the oscillator, range in frequency from 11.535 to 12.485 mc and are spaced 50 kc apart. The proper crystal is selected by a section of the kilocycle switch, S3, and the movable contact of relay K3. During transmit, relay K3 is energized (see paragraph 4.4). The h-f oscillator signal voltage is developed across cathode inductor L32 and is coupled to the grid of transmitter mixer V6 through C39.

4.2.1.3 TRANSMITTER MIXER. Refer to frequency scheme, figure 4-2. The transmitter mixer, V6, uses a pentode tube, type 5654. The vhf and h-f oscillator output signals are applied to the cathode and control grid respectively. These two injection signals are beat together in the transmitter mixer and produce sum and difference frequencies. The mixer output tank circuit is capacitively tuned to the difference frequency by C42A which is ganged to the megacycle and kilocycle control knobs. Tracking accuracy is maintained by trimmer capacitor C43 and inductor L33 at the high and low ends of the frequency range respectively. The mixer plate circuit will pass 118.00 to 135.95 mc (117.00 to 134.95 mc for 618F-1B and 618F-1D) by varying C42A with the megacycle or kilocycle control knobs. This frequency range includes all possible difference frequencies produced by combining any vhf oscillator output frequency with any h-f oscillator output frequency. The mixer output covers the entire frequency range of the transceiver and requires no further

frequency multiplication. The mixer output is coupled to the control grid of the r-f amplifier, V7. The following example illustrates the frequency development of the transceiver during transmit. With the megacycle knob and the kilocycle knob set to indicate 118.50 mc (117.50 mc for 618F-1B and 618F-1D) in the control panel window (refer to the main schematic, figure 7-1), switches S1, S3, and S5 are in the positions shown. Since relay K3 is energized during transmit, crystal Y28 is placed in the h-f oscillator grid circuit thus causing the h-f oscillator to work at 11.985 mc. Inductor L11 and crystal Y1 are selected in the vhf oscillator stage thereby providing an output of 65.2425 mc (64.7425 mc for 618F-1B and 618F-1D) from V5A. This output is doubled in V5B giving 130.485 mc (129.485 mc for 618F-1B and 618F-1D). When beat together in the transmitter mixer, the difference of the h-f and vhf frequencies is the desired frequency, 118.50 mc (117.50 mc for 618F-1B and 618F-1D).

4.2.1.4 R-F AMPLIFIER AND DRIVER. The r-f amplifier, V7, and the driver, V8, use 6688 and 5686 type tubes respectively. The transmitter mixer output is applied to the r-f amplifier control grid where it is amplified and coupled to the driver control grid. In the driver stage, the signal is further amplified and coupled to the control grid of the next stage. The r-f amplifier and driver outputs are capacitively tuned by C42B and C42C respectively. These two variable capacitors are ganged and are also controlled by the megacycle and kilocycle control knobs. Trimmer capacitors C47 and C53 and inductors L34 and L36 provide a means for tracking alignment at the high and low ends of the frequency range respectively. The driver

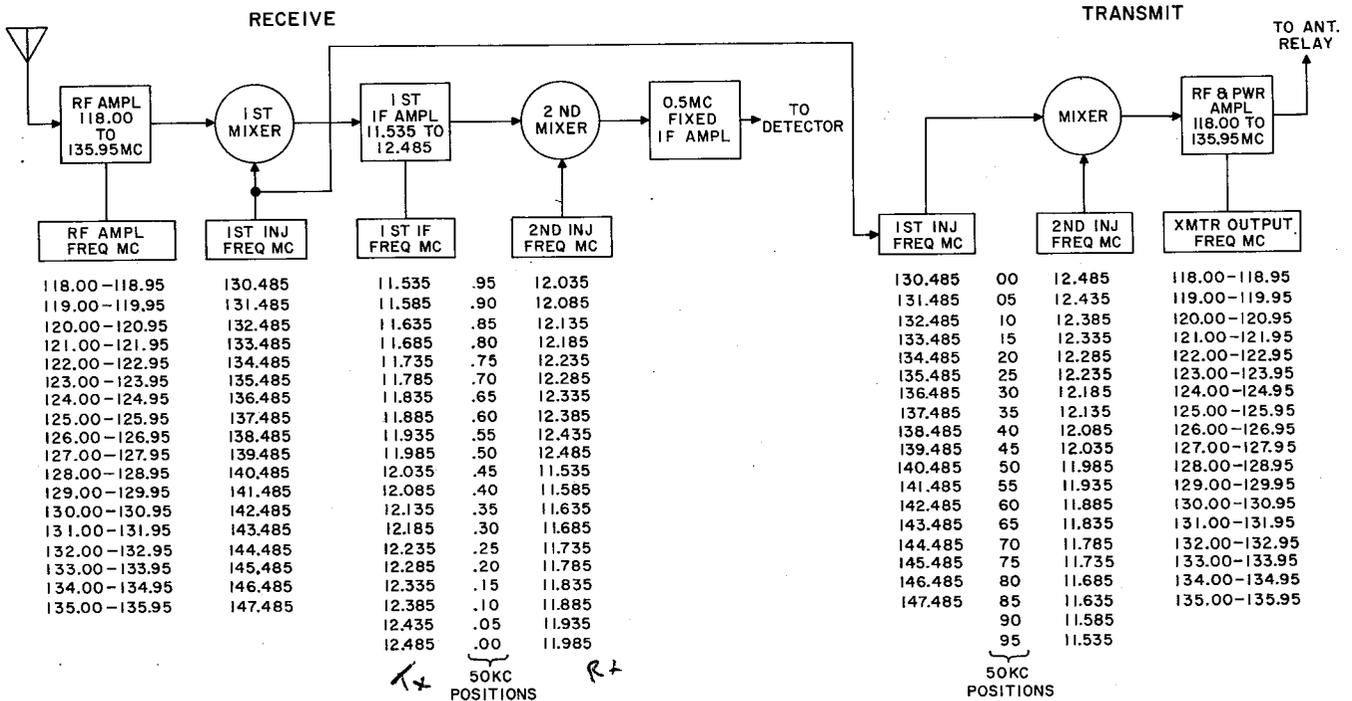


Figure 4-2. VHF Communication Transceiver 618F-1A/1C and Fixed I-F, Audio, and Power Supply 427D-1, Over-all Frequency Scheme

is shunt fed with its output coupled to the power amplifier control grid.

4.2.1.5 POWER AMPLIFIER. The power amplifier stage, V9, uses a pentode tube, type 7551. This stage amplifies the carrier to 6 watts minimum. A modulated voltage (240 volts) is applied through pin 20 of J3 to the plate (pin 6) and the screen grid (pin 3) of the power amplifier from the 427D-1 unit. Power amplifier bias is obtained through pin 23 of J3 from the 427D-1 unit. The output tank circuit is capacitively tuned by C42D. C42D is ganged to the tuning capacitors of V6, V7, and V8 and controlled by the megacycle and kilocycle control switches. Trimmer capacitor C59 and inductor L39 can be adjusted for tracking alignment. The power amplifier output is inductively coupled to the antenna through L40 and the contact arm of the antenna switching relay, K1. Loop trimmer capacitor C60 adjusts the antenna circuit for maximum power output at the high end of the frequency range, 135.95 mc (134.95 mc for 618F-1B and 618F-1D).

4.2.2 RECEIVER R-F AND CONVERSION CIRCUITS.

4.2.2.1 R-F AMPLIFIER. The r-f energy received by the antenna is fed to the control grid of r-f amplifier V1 through J1 and the relaxed contact of K1. The r-f amplifier stage is a tuned voltage amplifier which uses a 5654 type tube. The input and output tank circuits of V1 are capacitively tuned by ganged capacitors C1A and C1B. These capacitors are controlled by the megacycle and kilocycle control knobs. Trimmer capacitors C2, C8, and C10 and inductors L1, L3, and L4 can be adjusted for tracking alignment. Avc voltage is applied to the control grid of V1 from Fixed I-F, Audio, and Power Supply 427D-1 through pin 17 of J3. From the output of the r-f amplifier, the signal is coupled to the first mixer control grid.

4.2.2.2 VHF OSCILLATOR AND FIRST MIXER. The vhf oscillator, V5, functions on receive exactly the same as on transmit. The output frequency from doubler section V5B is applied to the cathode of the first mixer, V2. The mixer stage uses a 5654 type tube with a tuned input and output. The input tank circuit is capacitively tuned by C1C and the output tank circuit is inductively tuned with L5 (primary of T2). C1C is ganged to the r-f amplifier tuning capacitors and controlled by the megacycle and kilocycle control knobs, but L5 is controlled by only the kilocycle knob. Trimmer capacitors C10 and C15 and inductors L4 and L5 are adjusted for alignment purposes. The received signal and the vhf oscillator frequency beat together in the first mixer. The difference frequency is selected by the tuned primary and secondary of T2 and applied to the control grid of variable i-f stage V3. The following example will illustrate the frequency conversion in the first mixer. With the megacycle knob and the kilocycle knob set to indicate 118.50 mc (117.50 mc for 618F-1B and 618F-1D) in the control panel window (refer to the main schematic diagram), switches S1 and S5 are in the position shown. Crystal Y1 is selected in the vhf oscillator stage thus giving a 130.485-mc (129.485-mc for 618F-1B and 618F-1D) output from V5B. This oscillator frequency beats with the 118.50-mc (117.50-mc for 618F-1B and 618F-1D)

incoming signal and produces an 11.985-mc difference frequency. The difference frequency is applied to the control grid of variable i-f stage V3.

4.2.2.3 VARIABLE I-F. The variable i-f stage, V3, uses a 5654 type tube with a tuned input and output. Both the input and output are inductively tuned with L6 and L7 respectively (secondary of T2 and primary of T3). The tuning slugs are controlled by the kilocycle control knob. This tunes the variable i-f tank circuits to the correct difference frequency which can vary from 12.485 mc to 11.535 mc, depending on the setting of the kilocycle control knob. Tracking alignment can be accomplished by adjusting trimmer capacitors C17 and C24 and inductors L6 and L7. The avc voltage from pin 17 of J3 is applied to the control grid. The selected difference frequency is fed from the variable i-f stage to the control grid of the second mixer, V4A.

4.2.2.4 H-F OSCILLATOR AND SECOND MIXER. The h-f oscillator, V4B, functions the same during receive as it does during transmit with the exception of relay K3. This relay is de-energized during receive, thereby allowing the movable contact arm to select a crystal that will give the correct injection frequency for the second mixer (see paragraph 4.4). The second mixer, V4A, uses the left half of dual-triode tube type 5670 and has both tuned input and output. The input tank circuit is inductively tuned by L8 (secondary of T3) and controlled by the kilocycle control knob. Tracking alignment is maintained by adjusting L8 and trimmer C26. The output circuit is fixed tuned to 500 kc (primary of T1). The 500-kc i-f signal is coupled across T1 and through J2 to Fixed I-F, Audio, and Power Supply 427D-1. The following example illustrates the frequency conversion in the second mixer, V4A. With an 11.985-mc signal applied to the control grid of V4A and a 12.485-mc h-f oscillator signal applied to the cathode of V4A (switches are in position shown in figure 7-1), the difference frequency is 500 kc. This 500-kc difference frequency is selected by tuned transformer T1 and fed to the next stage.

4.3 FIXED I-F, AUDIO, AND POWER SUPPLY 427D-1.

4.3.1 FIXED I-F CIRCUITS.

The 500-kc i-f signal is fed from the 618F-1() through J103, across tuned transformer T101, and to the first fixed i-f amplifier control grid. The three i-f amplifiers, V101, V102, and V103, use type 5749 tubes which are coupled with transformers tuned to 500 kc. The avc voltage is applied to the control grids of V101 and V102. The cathodes of the first two i-f amplifiers, V101 and V102, are grounded through squelch control R103. This potentiometer adjusts the threshold of carrier or noise which will open the squelch circuit (see paragraph 4.3.3). The third i-f amplifier output is coupled by transformer T104 to the signal and avc detectors.

4.3.2 SIGNAL AND AVC DETECTORS.

The i-f signal developed across the secondary of transformer T104 is rectified by the signal detector

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diode, CR107, and filtered by the associated RC network. The detected audio signal is fed through the noise limiter diode, CR106, to the control grid of the first audio amplifier, V104B.

The avc diode, CR105, is biased off under weak signal conditions by the d-c reference (or delay) voltage developed across R111. The bias is dropped to zero and driven negative at the junction of R112 and C115 by a sufficiently large i-f signal across the secondary of transformer T104. This causes the avc diode to conduct and develop an avc voltage across R113. The avc voltage is applied to the control grids of the first two fixed i-f stages, V101 and V102, and through pin L of J102 to the r-f amplifier, V1, and the variable i-f amplifier, V3.

4.3.3 NOISE LIMITER, SQUELCH CIRCUITS, AND FIRST AUDIO AMPLIFIER.

The resistance and capacitance network associated with noise limiter diode CR106 forms the noise limiter circuit. Under normal signal and noise levels, the diode conducts, and the audio signal is applied to the control grid of the first audio amplifier, V104B. The resistor network associated with CR106 allows the d-c bias to follow the input carrier level so that under normal conditions the audio will not be affected by limiter diode CR106. When a large noise peak appears across the secondary of T104, diode CR106 clips off most of the positive peaks and detector diode CR107 clips the negative peaks.

R13 (located on 618F-1() unit) adjusts the signal noise level which will open the squelch circuit. This potentiometer is electrically located in the first two fixed i-f amplifier cathodes. When no signal, or a signal below the squelch threshold is being received, squelch tube V104A is conducting. When V104A conducts, the grid of V104B is driven in a negative direction, cutting it off. No audio output is available under these conditions. As signal or noise input increases, the control grid of the squelch tube V104A becomes more negative until the tube cuts off. At this time, V104B conducts, giving audio output. The output of the first audio amplifier, V104B, is coupled through pin E of J102 and through pin 5 of J3 to audio gain control R23 (located on the 618F-1() unit).

4.3.4 DUAL-PURPOSE AUDIO AND MODULATOR CIRCUITS.

During receive, the audio from audio gain control R23 is applied to the upper primary winding of transformer T106 through pin K of J102 and contacts 9 and 8 of relay K102. The signal is transformer coupled to the base element of a PNP type 2N158A transistor, Q105, which is used as an audio driver. The amplified output of this stage is coupled by audio transformer T107 to the base elements of push-pull audio output transistors Q106 and Q107. From the output of Q106 and Q107, the audio signal is coupled by output transformer T108 (middle secondary winding) to pin C of J101 for speaker operation. The audio signal also is coupled through contacts 11 and 12 of K102 to pin A of J101 for a headset connection (lower secondary winding).

The same basic circuits described above also serve as modulation and sidetone circuits during transmit. The microphone input to pin F of J101 is applied across R147, through pins 4 and 5 of energized relay K102 (see paragraph 4.4), and to the bottom primary winding of audio transformer T106. Transistor Q105 now functions as the modulator driver and the push-pull arrangement as a modulator. Pin 5 of transformer T108 is connected through contacts 10 and 11 of relay K101 to 240 volts B+. Pin 4 of transformer T108 is connected through pin U of J102 to the transmitter power amplifier screen grid and plate. This provides modulation power for the transmitter. During transmit, contacts 10 and 11 of relay K102 are making contact. This provides sidetone from the wiper arm of R146 to the headset connection, pin A of J101. R156 adjusts the sidetone level.

4.3.5 POWER SUPPLY.

Refer to figure 4-3. The power supply is a d-c to d-c converter consisting of four transistors (Q101, Q102, Q103, and Q104) in an oscillator arrangement. A saturable core transformer, T105, and a diode bridge rectifier completes the power supply. Type 2N677B transistors are used in the oscillator arrangement. Current flows alternately through the primary of T105, simulating a square wave. This is accomplished in the following manner: Arbitrarily starting with Q101, current flows through Q101, the primary of T105, and through Q104. Q103 and Q102 are biased off at this time by the voltage induced into S2 and S3 from the primary windings. When T105 saturates, no voltage is induced into S2 and S3 thereby allowing Q103 and Q102 to conduct. Current then flows through Q103, the primary of T105, and Q102. At this time Q101 and Q104 are biased off by the voltage induced into S2 and S4. T105 again saturates, and the sequence starts again. This oscillating action sets up voltage alternations in the primary of T105 that are stepped up to the required level in the secondary.

A conventional full-wave bridge rectifier completes the power supply. The bridge supplies B+ power to the receiver section through contacts 3 and 2 of relay K101. The transmitter section obtains B+ through contacts 8 and 7 of K101, and modulated B+ through contacts 11 and 10 of K101. The oscillators obtain B+ power directly from the bridge without going through K101. The negative voltage developed across R139 is applied to the power amplifier control grid thereby reducing the PA plate current under no-signal conditions.

4.4 CONTROL CIRCUITS.

4.4.1 VHF COMMUNICATION TRANSCEIVER 618F-1A/1B.

All operating controls are located on the front panel of the 618F-1A/1B. The OFF-PWR switch, S4, applies 27.5 volts (or 13.75 volts) d-c to the filaments, the power supply, and all relay circuits. Relays K101, K102, and K3 are energized by completing their circuits to ground through the push-to-talk line. Relay K101 removes B+ from the receive section while transmitting. The dial lights are supplied directly from the aircraft power line and are not controlled by the 618F-1A/1B OFF-PWR switch.

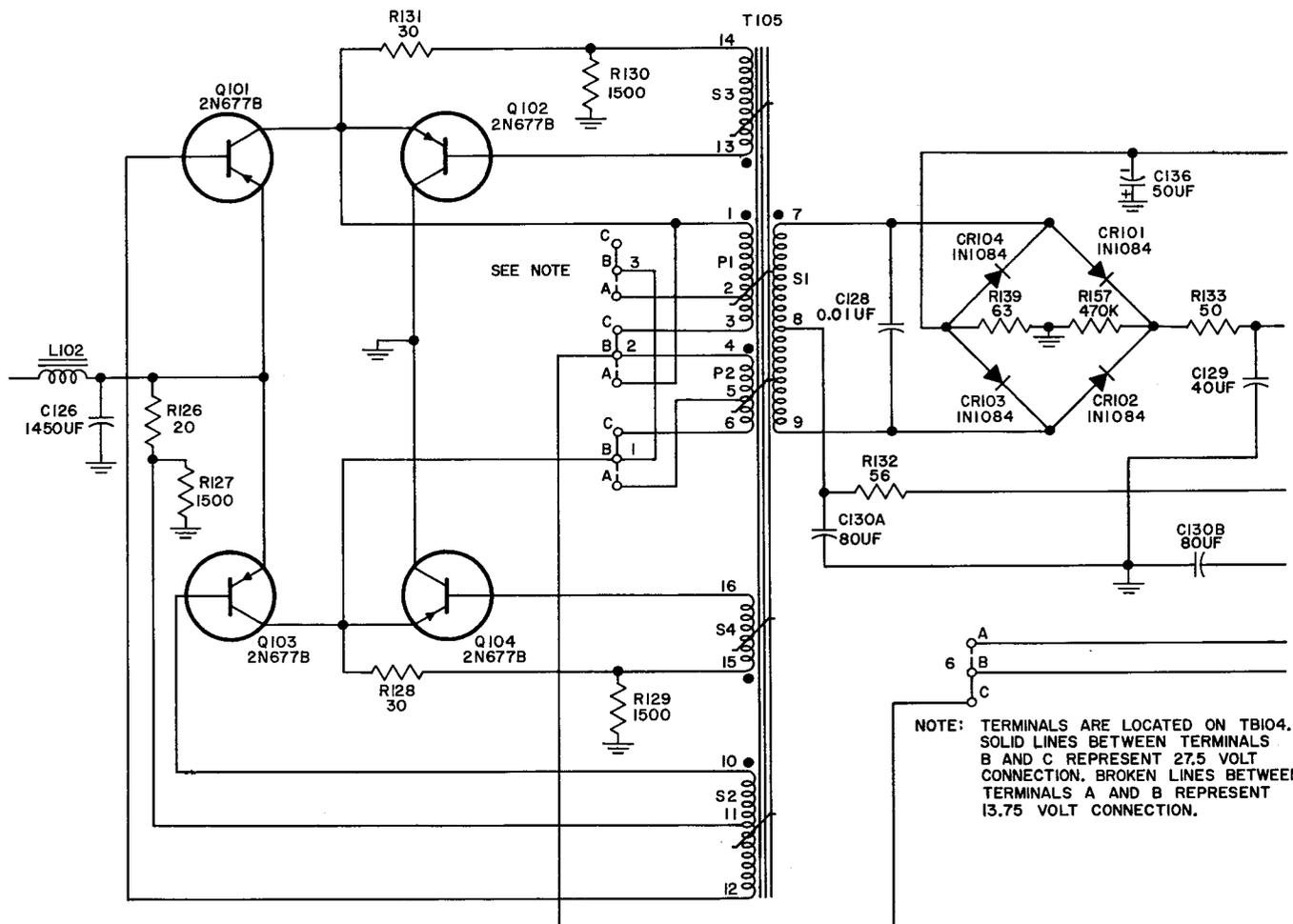


Figure 4-3. Power Supply Circuits

Squelch and volume are controlled by potentiometers mounted on the 618F-1A/1B front panel. Frequency selection is controlled by tuning elements and switches located in the 618F-1A/1B. These twenty elements and switches are gear driven when the frequency selector knobs on the 618F-1A/1B front panel are manually rotated.

4.4.2 VHF COMMUNICATION TRANSCEIVER 618F-1C/1D.

4.4.2.1 POWER, VOLUME, AND SQUELCH CONTROL CIRCUITS. Power to the filaments, relays, and power supply of the 618F-1C/1D is controlled by a remotely located switch. This switch may be located anywhere on the aircraft instrument panel. See paragraph 4.4.2.3.

Volume and squelch are controlled by remotely located potentiometers. These controls may be located on Radio Set Control 313N-1 or may be located elsewhere on the aircraft instrument panel. If they are located on the 313N-1, the knobs that control the volume and squelch are concentric with the frequency selector knobs.

4.4.2.2 FREQUENCY CONTROL CIRCUITS. Frequency selection for the 618F-1C/1D is controlled by

a remotely located Radio Set Control 313N-1. Switches in the 313N-1 supply grounds to various pins of P201 on the 618F-1C/1D. These grounds energize an Auto-positioner motor, B201, in the 618F-1C/1D. This motor drives the tuning elements and switches of the 618F-1C/1D to the positions associated with the frequency selected. The switches in the Auto-positioner section of the 618F-1C/1D then open the circuit to motor B201.

4.4.2.3 RELAY CONTROL CIRCUITS. Relays K101, K102, and K3 are energized by completing their circuits to ground through the push-to-talk line. Relay K101 removes B+ from the receiver section of the 618F-1C/1D when transmitting.

Relay K202 is energized by a remotely located power on-off switch. When K202 is energized it supplies the power to the filament, relay, and power supply circuits of the 618F-1C/1D. When either relay K203 or relay K204 is energized, Auto-positioner motor B201 will run. Relays K203 and K204 are energized when there is a path to ground provided by switch S201, S202, or S203. Refer to paragraph 3.5.10 for more information on frequency selection.

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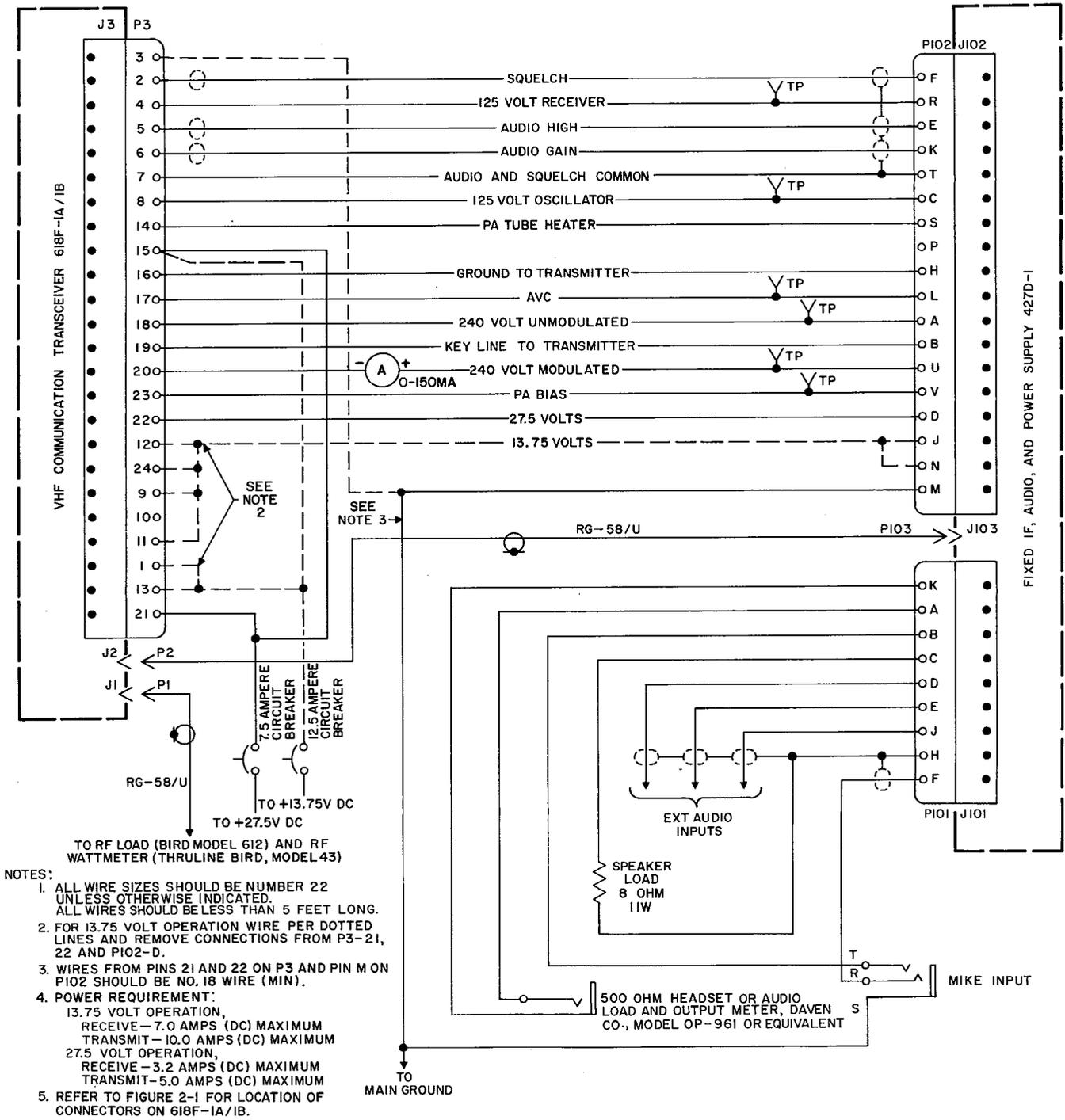


Figure 5-1. Test Harness, Schematic Diagram

SECTION V MAINTENANCE

5.1 GENERAL.

Voltage and resistance measurements on tube pins, transistor elements, and check points as well as gain-per-stage data are located on the main schematic diagrams, figures 7-1 through 7-5. Refer to the notes on the schematic diagrams for conditions under which the measurements were made.

5.2 TEST HARNESS.

Fabricate a test harness according to figure 5-1. The test harness is to be used with table 5-1 and all alignment adjustment and trouble-shooting procedures on the 618F-1A/1B and 427D-1 units.

CAUTION

The 618F-1() and 427D-1 units are wired at the factory for either 13.75- or 27.5-volt operation, depending on the particular order. Extreme caution should be taken not to apply 27.5 volts to units wired for 13.75 volts. Compare TB104 (427D-1 unit) to figure 2-8 to determine if the equipment is wired for 27.5 or 13.75 volts. The equipment may be rewired for either power source by changing the jumpers on TB104. If the equipment is rewired, the pilot lamps must be changed accordingly and the input line filter capacitors, C139 and C140, must be moved. Refer to paragraph 5-8 for conversion procedures.

5.3 TEST EQUIPMENT.

The following test equipment, or its equivalent, is required to perform the bench test, table 5-1, and all alignment and adjustment procedures on the 618F-1() and 427D-1 units.

- a. Vacuum-Tube Voltmeter, Hewlett-Packard 410B.
- b. Signal Generator, Hewlett-Packard 608D.
- c. Audio Load and Output Meter, Daven Co., Model OP-961.
- d. Cathode-Ray Oscilloscope, DuMont, Type 208-B.
- e. R-F Load (50-ohms), Bird, Model 612.
- f. Signal Generator, Measurements Corp., Model 65-B.
- g. Grid-Dip Meter, Measurements Corp., Model 59.
- h. R-F Wattmeter, Thruline Bird, Model 43.
- i. 6-Db Pad, Measurements Corp., Model 80-ZH-3.
- j. Audio Vacuum-Tube Voltmeter, Hewlett-Packard 400D.

5.4 BENCH TEST AND TROUBLE-SHOOTING PROCEDURE.

NOTE

In all maintenance procedures on a 618F-1B or 618F-1D, use 117.00 and 134.95 mc instead of 118.00 and 135.95 mc respectively.

Perform the following check of the mechanical alignment before applying power to the equipment:

- a. Remove the dust cover(s) from the 618F-1().
- b. Remove the two crystal covers. The one on top is black plastic and slips off. The cover on the bottom is metal and secured by 4 screws.
- c. Set the 618F-1() at 118.00 mc.
- d. Check that the transmitter rotor arm (refer to figure 5-5) of the h-f oscillator crystal switch is selecting the 12.485-mc crystal.
- e. Turn the 618F-1() over, and check that the rotor arm of the vhf oscillator crystal switch is selecting the 65.2425-mc crystal (Y1). See figures 5-6 and 6-7.
- f. Check that the leading edge of the rotors of variable capacitors C1 and C42 (see figure 6-6) are advanced approximately 2 degrees from full mesh.

NOTE

Leading edges of rotors are determined by turning the megacycle knob clockwise and noting the direction of C1 and C42 rotation. The 2-degree advance may be approximated by noting that each step of the megacycle switch moves the rotor 9 degrees.

g. Set the last two digits of the frequency counter at 50, check that the slug rack links, MP46 and MP47, (refer to figure 6-1) are approximately level. Set the kilocycle switch so that the last two digits in the MC window are 00. Turn the kilocycle switch clockwise, and observe that the slug rack bar (MP48) moves with each step of the switch, and when stepped from 95 to 00, the bar returns to the original position.

h. If any of the steps a through g do not check normal, perform the mechanical alignment procedure (paragraph 5.7) before proceeding.

Remove 427D-1 dust cover and bottom plate and connect 618F-1() and 427D-1 units with the harness.

NOTE

Allow a ten-minute warmup time before attempting any electrical test, alignment, or adjustment procedure.

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The procedure in table 5-1 is provided as a complete check of VHF Communication Transceiver 618F-1() and Fixed I-F, Audio, and Power Supply 427D-1.



Follow each step in the procedure carefully because transistor circuits can be damaged easily by improper testing techniques. When bench testing or aligning the transmitter

section, use a blower to keep the transmitter tubes cool. This allows a longer operation period.

Table 5-1 must be followed in the sequence given.

NOTE

The voltage at the input terminals of the 427D-1 must be 27.5 or 13.75 volts d-c to obtain the indications presented in table 5-1.

TABLE 5-1. 618F-1() AND 427D-1 BENCH TEST AND TROUBLE-SHOOTING PROCEDURE

STEP	TEST EQUIPMENT	CONTROL SETTING	TEST POINT AND INSTRUCTIONS	NORMAL INDICATIONS	PROBABLE CAUSE OF TROUBLE
BENCH TEST					
1	Test harness, vtvm, and r-f load (both units connected to test harness).	618F-1() OFF-PWR switch to PWR. Allow warmup period.	Make visual check of tube filaments.	Tubes lighted. Proceed to step 2 if normal.	Tubes or filament circuit.
2	Same as step 1.	Same as step 1.	Check receiver and oscillator B+ with vtvm at jacks in test harness.	125 volts d-c. Proceed to step 3 if normal.	Check circuit breakers. Proceed to power supply trouble shooting.
3	Same as step 1.	Same as step 1. Key transmitter.	Check transmitter B+ (modulated and unmodulated) at jacks in test harness.	240 volts d-c. Proceed to step 4 if normal.	Relay K101 (on 427D-1).
4	Test harness, signal generator in series with 6-db pad connected to antenna terminal, J1, and audio load and output meter connected to the speaker output line on test harness (both units connected to the test harness).	SQUELCH control to maximum. Set signal generator for 3-uv output modulated 30 percent with 1000 cps. Set signal generator at same frequency as 618F-1(), and tune the signal generator for maximum avc indication (on vtvm) at J104 (on 427D-1 unit). Adjust VOLUME control for 8 to 9 watts of audio output. Perform test on the following frequencies:	Remove the 1000-cps modulation, and observe the drop in audio output, i.e., the (S+N)/N ratio.	At least 6-db (S+N)/N ratio. NOTE Set squelch threshold according to paragraph 5.5.2.2. after step 4 has been completed.	If no output on any one frequency, check crystals used on that frequency. If low or no output on all frequencies, proceed to steps 8 and 9. This will eliminate or confirm the possibility of a bad a-f section. If the a-f section proves to be normal, proceed to step 6. This will check out the possibility of a bad h-f or vhf oscillator stage.
	<p>Do not key transmitter with signal generator connected to antenna.</p>	118.00 mc 120.10 mc 122.20 mc 124.30 mc 126.40 mc 128.50 mc 130.60 mc 132.70 mc 134.80 mc 135.95 mc			

TABLE 5-1. 618F-1() AND 427D-1 BENCH TEST AND TROUBLE-SHOOTING PROCEDURE (Cont)

STEP	TEST EQUIPMENT	CONTROL SETTING	TEST POINT AND INSTRUCTIONS	NORMAL INDICATIONS	PROBABLE CAUSE OF TROUBLE
BENCH TEST (Cont)					
5	Same as step 4 plus a vtvm connected to avc line, J104 (on 427D-1 unit).	Same as step 4, except adjust signal generator for 10-uv output, 30 percent modulated at 1000 cps; tune for maximum avc at 126.50 mc. Adjust the VOLUME control for 20-mw output.	Adjust the signal generator output to 100K and 400K microvolts, and note the db change in output level using the output of 20 mw as a zero reference.	Not more than 5 db from the zero reference with 100K microvolt input. Not more than 6 db from the 100K microvolt level with 400K microvolt input.	AVC diode, CR105, or associated circuitry.
6	Test harness and r-f load wattmeter (both units connected to test harness).	Same as step 1. Key transmitter. Step megacycle knob through entire range. Step kilocycle control knob through entire range.	Check power output on r-f wattmeter at antenna jack J1 for each step of megacycle and kilocycle control knobs.	Not less than 6 watts. Proceed to step 7 if normal.	If both transmitter and receiver outputs are bad, check h-f and vhf oscillator voltages at J6 and J5 respectively. Correct voltage readings are given in figures 7-1 through 7-4. NOTE If voltage at J5 is abnormal, check vhf oscillator alignment (paragraph 5.5.1.1). If only transmitter checked bad, proceed to transmitter trouble-shooting section.
7	Test harness, audio oscillator, oscilloscope and "sniffer-detector" circuit (both units connected to test harness). NOTE A suggested "sniffer-detector" circuit is shown in figure 5-4.	Same as step 1. Set 618F-1() to 118.00 mc. Apply 1000 cps to microphone input. Connect oscilloscope vertical input to "sniffer-detector" circuit as indicated in figure 5-4. Set R147 (on 427D-1) fully clockwise.	Increase audio oscillator output until 85 percent modulation is observed on the oscilloscope. Repeat for frequencies of 126.50 mc and 135.95 mc.	Audio oscillator output should be no more than 0.13 volt rms. NOTE After test, reset R147 according to paragraph 5.5.2.3. Proceed to step 8 if normal.	If step 4 was normal, check the microphone circuit. If no output in step 4, proceed to a-f and modulator trouble-shooting section.

TABLE 5-1. 618F-1() AND 427D-1 BENCH TEST AND TROUBLE-SHOOTING PROCEDURE (Cont)

STEP	TEST EQUIPMENT	CONTROL SETTING	TEST POINT AND INSTRUCTIONS	NORMAL INDICATIONS	PROBABLE CAUSE OF TROUBLE
BENCH TEST (Cont)					
8	Test harness, audio oscillator, and audio load and output meter (both units connected to test harness).	Same as step 1. Audio oscillator setting the same as that for 85 percent modulation in step 7. Set R146 (on 427D-1) fully clockwise.	500-ohm audio load and output meter to headset output line.	Not less than 200 milli-watts. NOTE Set sidetone level after the equipment has been installed in the aircraft according to paragraph 2.6.2. Bench test complete.	If step 7 was normal, check the headset circuit.
RECEIVER TROUBLE-SHOOTING PROCEDURE					
1	Test harness, vtm, audio oscillator, and audio load and output meter (both units connected to test harness).	Set 618F-1() OFF-PWR switch to PWR. Set VOLUME control fully clockwise. Set audio oscillator at 1000-cps, 0.082-volt output.	Apply signal to pin 7 of first audio stage V104B. Check power output at speaker output line.	4 watts output. Proceed to step 2 if normal.	First audio stage V104B. Make voltage checks according to figure 7-5.
2	Test harness, vtm, signal generator, and audio load and output meter (both units connected to test harness). NOTE Install probe in signal generator lead (see figure 5-2).	Set signal generator at 500-kc, 0.31-volt output, 30 percent modulated at 1000 cps. 618F-1() power on, VOLUME fully clockwise, and SQUELCH fully clockwise.	Apply signal to pin 1 of i-f stage V103.	-2 volt avc output at J104. Proceed to step 3 if normal.	Signal detector CR107, noise limiter CR106, squelch stage V104A, i-f stage V103, or i-f transformer T104. Make voltage check using values given in figure 7-5 as a reference.
3	Same as step 2.	Same as step 2, except decrease signal generator output to 6700 uv.	Apply signal to pin 1 of i-f stage V102.	-2 volt avc output at J104. Proceed to step 4 if normal.	I-f stage V102 or i-f transformer T103. Make voltage checks using values given in figure 7-5 as a reference.
4	Same as step 2.	Same as step 2, except decrease signal generator output to 220 uv.	Apply signal to pin 1 of i-f stage V101.	-2 volt avc output at J104. Proceed to step 5 if normal.	I-f stage V101 or i-f transformer T102. Make voltage checks using values given in figure 7-5 as a reference.

TABLE 5-1. 618F-1() AND 427D-1 BENCH TEST AND TROUBLE-SHOOTING PROCEDURE (Cont)

STEP	TEST EQUIPMENT	CONTROL SETTING	TEST POINT AND INSTRUCTIONS	NORMAL INDICATIONS	PROBABLE CAUSE OF TROUBLE
RECEIVER TROUBLE-SHOOTING PROCEDURE (Cont)					
5	Same as step 2.	Same as step 2, except set signal generator output to 11.985-mc, 13,000-uv output. Set 618F-1() at 126.50 mc.	Apply signal to pin 7 of second mixer stage V4A.	-3 volt avc output at J104. Proceed to step 6 if normal.	Second mixer stage V4A, i-f transformer T1, i-f transformer T101, or interconnecting line from J2 to J103. Make voltage checks using values given in figures 7-1 through 7-4.
6	Same as step 2.	Same as step 2, except set signal generator at 11.985-mc, 45-uv output.	Apply signal to pin 1 of variable i-f stage V3.	-3 volts avc output at J104. Proceed to step 7 if normal.	Variable i-f stage V3 or circuitry between V3 and V4A.
7	Same as step 2.	Same as step 2, except decrease signal generator to 25-uv output.	Apply signal to pin 1 of V2.	-3 volts avc output at J104. Proceed to step 8 if normal.	First mixer V2 or circuitry between V2 and V3.
8	Same as step 2.	Same as step 2, except set signal generator at 126.00-mc, 3.1-uv output. Set 618F-1() at 126.00 mc.	Apply signal to antenna jack J1 through 6-db pad.	-3 volts avc output at J104.	Relay K1, r-f amplifier V1, or circuitry between V1 and V2.
NOTE					
If sensitivity is low in any or all r-f and i-f stages and there is no apparent trouble, check alignment (paragraphs 5.5.1.2 and 5.5.1.4).					
TRANSMITTER TROUBLE-SHOOTING PROCEDURE					
1	Test harness, vtvm, and r-f load wattmeter (both units connected to test harness).	Set 618F-1() at 126.00 mc. Set OFF-PWR switch to PWR. Key transmitter.	Measure d-c voltage J4.	-4.0 volts. Proceed to step 2 if normal.	Circuitry from output of vhf oscillator to transmitter mixer V6.
2	Same as step 1.	Same as step 1.	Measure d-c voltage at pin 2 of r-f amplifier V7.	-3.7 volts. Proceed to step 3 if normal.	Transmitter mixer V6. Make voltage checks using values given in figures 7-1 through 7-4 as a reference.
3	Same as step 1.	Same as step 1.	Measure d-c voltage at pin 2 of driver V8.	-7.1 volts. Proceed to step 4 if normal.	R-f amplifier V7. Make voltage checks using values given in figures 7-1 through 7-4 as a reference.

TABLE 5-1. 618F-1() AND 427D-1 BENCH TEST AND TROUBLE-SHOOTING PROCEDURE (Cont)

STEP	TEST EQUIPMENT	CONTROL SETTING	TEST POINT AND INSTRUCTIONS	NORMAL INDICATIONS	PROBABLE CAUSE OF TROUBLE
TRANSMITTER TROUBLE-SHOOTING PROCEDURE (Cont)					
4	Same as step 1.	Same as step 1.	Measure d-c voltage at E21 (refer to figure 6-6).	-46 volts. Proceed to step 5 if normal.	Driver stage V8. Make voltage checks using values given in figures 7-1 through 7-4 as a reference.
5	Same as step 1.	Same as step 1.	Check PA plate current with meter in test harness.	Not more than 85 ma.	If PA plate current is excessive, check output tank circuit for tuning and alignment. If no or low PA plate current, check PA stage. Make voltage checks using values given in figures 7-1 through 7-4 as a reference. NOTE If power output is low, grid voltages are low, and plate voltages are high in any or all of the transmitter stages, check alignment (paragraph 5.5.1.5).
A-F AND MODULATOR TROUBLE-SHOOTING PROCEDURE					
1	Test harness, audio oscillator, vtm, audio load, and output meter. Connect output meter to speaker output line (both units connected to test harness).	618F-1() OFF-PWR switch to PWR. Set audio oscillator at 1000-cps 2.34-volt output. Set 618F-1A audio gain (VOLUME) at maximum clockwise position.	Apply signal to collector of Q105.	4 watts output on output meter. Proceed to step 2 if normal.	Push-pull audio stage Q106 and Q107 or audio transformers T107 and T108. Make voltage checks using values given in figure 7-5 as a reference. Check continuity of transformer windings with power off.
2	Same as step 1.	Same as step 1, except decrease audio oscillator output to 1.54 volts.	Apply signal to pin 6 of V104B.	4 watts output on output meter.	Audio gain R13B, audio driver Q105, or audio transformer T106. Make voltage checks using values given in figure 7-5 as a reference. Check continuity of transformer windings with power off.

TABLE 5-1. 618F-1() AND 427D-1 BENCH TEST AND TROUBLE-SHOOTING PROCEDURE (Cont)

STEP	TEST EQUIPMENT	CONTROL SETTING	TEST POINT AND INSTRUCTIONS	NORMAL INDICATIONS	PROBABLE CAUSE OF TROUBLE
POWER SUPPLY TROUBLE-SHOOTING PROCEDURE					
1	Test harness, vtvm, and oscilloscope (both units connected to test harness).	618F-1() OFF-PWR switch to PWR.	Connect the oscilloscope across R129 (or any of the biasing resistors), and observe the waveform.	Approximately a square wave. Also, a high-pitch audio frequency may be heard. If normal, proceed to step 2.	If waveform simulates a sawtooth rather than a square wave, one transistor is probably defective. If no square-wave output, remove diodes from bridge circuit. If square-wave output appears with diodes out, transistors are normal. Check diodes or bridge circuitry. If square wave does not appear with diodes out, check transistors. Make voltage checks using values given in figure 7-5 as a reference. A suspected defective transistor may be removed and checked according to paragraph 5.8.
2	Same as step 1.	618F-1() OFF-PWR switch to OFF.	Check resistance of T105 secondary winding.	Transformer secondary winding is not open. If normal, proceed to step 3.	Defective transformer T105.
3	Same as step 1.	Same as step 2.	Replace diodes CR101, CR102, CR103, and CR104, and turn OFF-PWR switch to PWR.	Normal B+ at test harness test jacks. Diode(s) defective.	Diode(s) not defective. Check circuitry.

5.5 ALIGNMENT AND ADJUSTMENT.

The following procedures are performed using the test equipment named in paragraph 5.3. In each procedure, VHF Communication Transceiver 618F-1() and Fixed I-F, Audio, and Power Supply 427D-1 are used connected with the test harness shown in figure 5-1. The procedures are intended to be performed by a technician who is thoroughly familiar with test equipment and must be performed in the sequence indicated. Refer to the photographs in section VI for component and test point locations.

5.5.1 VHF COMMUNICATION TRANSCEIVER 618F-1().**5.5.1.1 VHF OSCILLATOR AND DOUBLER ALIGNMENT.**

- a. Set the 618F-1() OFF-PWR switch to PWR.
- b. Insert the d-c probe of the vtvm into J5 of the 618F-1().
- c. Set the frequency of the 618F-1() at 118.00 mc.
- d. Adjust the brass core in the coil associated with 118.00 mc (L11) for the maximum voltage indication on the vtvm.

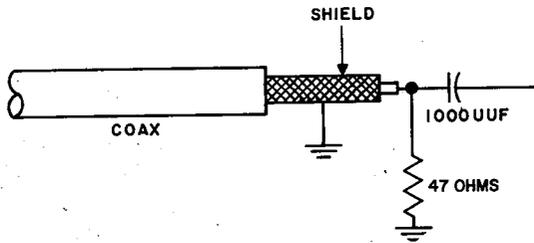


Figure 5-2. Signal Generator Probe

e. Repeat steps c and d for the frequencies and coils indicated below:

FREQUENCY	COIL	FREQUENCY	COIL
118.00 mc	L11	127.00 mc	L20
119.00 mc	L12	128.00 mc	L21
120.00 mc	L13	129.00 mc	L22
121.00 mc	L14	130.00 mc	L23
122.00 mc	L15	131.00 mc	L24
123.00 mc	L16	132.00 mc	L25
124.00 mc	L17	133.00 mc	L26
125.00 mc	L18	134.00 mc	L27
126.00 mc	L19	135.00 mc	L28

f. Set the frequency selector of the 618F-1() to 135.00 mc.

g. Adjust L30 for the maximum output at J4 on the vtm.

h. Set frequency selector at 118.00 mc.

- i. Adjust C35 for maximum output at J4.
- j. Repeat steps f through i until optimum tracking is obtained.

5.5.1.2 500-KC I-F TRANSFORMER ALIGNMENT.

a. Insert the vtm d-c probe into the avc test jack, J104 (on 427D-1 unit).

b. Couple a 500-kc signal from the signal generator into the grid, pin 7, of the second mixer stage, V4A, through a 1000-uuf capacitor with a 47-ohm resistor in shunt to ground on the generator side of the capacitor. (See figure 5-2.)

c. Using the tuning tool supplied with the 427D-1 (clipped inside the chassis), tune both the primary and secondary of T1 for maximum avc reading on the vtm. Refer to figure 5-3 for tuning slug arrangement.

5.5.1.3 VARIABLE I-F AMPLIFIER ALIGNMENT.

a. Insert the vtm d-c probe into the avc test jack, J104, on the 427D-1.

b. Set the frequency selector of the 618F-1() at 122.95 mc.

c. Couple an 11.535-mc signal from the signal generator through the probe shown in figure 5-2 into the grid, pin 1, of the first mixer stage, V2, of sufficient level to produce an avc reading on the vtm.

d. Adjust the slugs of T2 and T3 for the maximum avc reading on the vtm. These slugs are accessible from the bottom of the 618F-1().

e. Set the 618F-1() frequency selector at 122.00 mc.

f. Couple a 12.485-mc signal from the signal generator into the grid, pin 1, of the first mixer, V2.

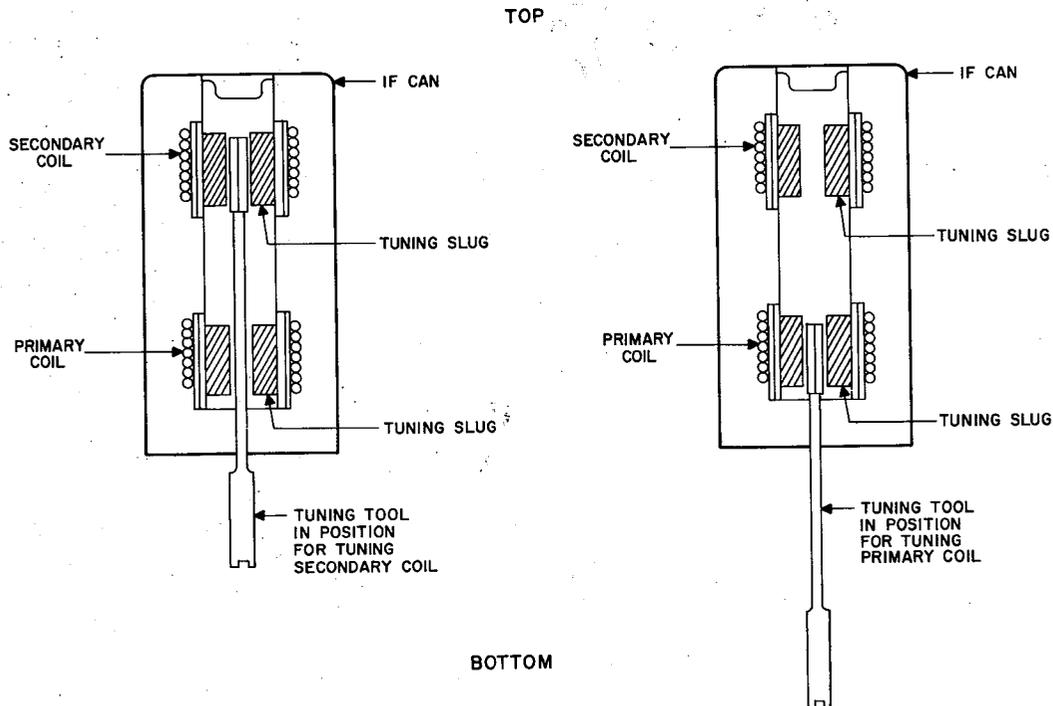


Figure 5-3. Tuning Slug Arrangement

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5-11
201

g. Adjust the trimmer capacitors of T2 and T3 for the maximum avc reading on the vtvm. The trimmers are accessible from the top of the 618F-1().

h. Repeat steps a through g until no further improvement can be made.

5.5.1.4 R-F ALIGNMENT - RECEIVER SECTION.

a. Set the 618F-1() frequency selector at 135.95 mc.

b. Couple a 135.95-mc signal from the signal generator through the 6-db pad into the antenna jack, J1, on the 618F-1().

c. Adjust C2, C8, and C10 for the maximum avc reading on the vtvm.

NOTE

Keep the signal input level such that the avc is approximately 3 volts.

d. Set the 618F-1() frequency selector at 118.00 mc.

e. Adjust the signal generator to 118.00 mc.

f. Adjust the slugs associated with L1, L3, and L4 for the maximum avc reading on the vtvm.

g. Repeat steps a through f until no further improvement can be made.

5.5.1.5 R-F ALIGNMENT - TRANSMITTER SECTION.

The mixer and voltage amplifier section of the transmitter consists of V6, V7, V8 and the associated circuitry. The ability of this section to provide voltage amplification at the desired frequency is indicated by the drive level at the control grid of V9. This drive level can be determined by measuring the d-c bias from the V9 control grid to ground. Plate modulated power amplifier V9 drives a tuned circuit and, depending on the coupling of L39 and L40, furnishes r-f power to the antenna load.

It may be noticed that some of the air variable capacitors, C42, in this section have rotor blades that are flared. This bending is done at the factory to achieve proper tracking. This procedure is necessary since each configuration of coils, shields, and wiring differ by a small amount from one unit to another. When replacing a tube, or other circuit element, it will not be necessary to bend any rotor blades as the trimmer capacitor and coil slug will be capable of compensating for whatever change in capacitance or inductance there may be.

When adjusting the trimmer capacitors and the slugs of the air wound coils to track a piece of equipment, the inward drive (clockwise) causes an increase in capacitance and a decrease in inductance, respectively, in the tuned circuit associated with the components being adjusted. If the loading (impedance to a certain frequency) is small before tracking, some loading effect may be noted between tuned circuits, through the intermediate tube. The trimmer capacitors in the r-f section do not exhibit the same capacity vs rotation curve when rotated in a clockwise direction as they do when rotated counterclockwise. The difference is small, but may be noticed when tracking.

If it becomes necessary to replace one of the air wound coils (L33, L34, L36, L39, or L40) in the r-f

section, it may be necessary to use a grid-dip meter, tuned to the same frequency as the 618F-1A, to set the trimmer capacitors (C43, C47, C53, C59, and C60) initially. This is best accomplished using the following procedure:

a. Disconnect the power from 618F-1() and 427D-1.

b. Remove the transmitter r-f cover by removing the 6 screws that secure it.

c. Adjust L33, L34, and L37 so that the leading edges of the slugs are approximately in the centers of the coils as viewed from above.

d. Adjust C43, C47, C53, and C59 so that the heads of the tuning screws are about halfway between the inside of the chassis and the head of the locking nuts. Adjust C60 for full mesh.

e. Set the 618F-1() at 126.00 mc.

f. Set the grid-dip meter to CW and tune to 126 mc.

g. Short out the coils that precede and follow the one to be adjusted. This can be done with a screwdriver or jumper clip.

h. Vary the frequency setting on the grid-dip meter. The meter should dip at 126.00 mc. If it dips at a frequency above 126 mc, compress the coil being adjusted until the meter dips at 126 mc. If the meter dips at a frequency below 126 mc, spread the turns of the coil until proper indication is achieved.

i. Repeat steps f through h for each of the 4 coils.

j. Replace the transmitter r-f cover.

k. The recommended r-f alignment for the transmitter is as follows:

l. Disconnect the signal generator from the antenna jack, J1, and replace it with the r-f wattmeter load.

m. Set the 618F-1() frequency selector at 135.95 mc.

n. Connect the vtvm d-c probe to the grid side of the PA grid resistor, R36 (E20).

o. Activate the push-to-talk button, and observe the PA plate current and r-f power output. PA plate current should not exceed 90 ma.

p. Adjust trimmers C43, C47, and C53 for a maximum drive indication on the vtvm. Nominal drive for normal power is 40 to 50 volts negative.

q. Adjust C59 for maximum power as indicated on the wattmeter.

r. Adjust loop trimmer C60 for maximum power.

s. Readjust C59 for minimum PA plate current without loss of power output.

NOTE

The output coupling loop (L40) position may have to be adjusted at this time to provide optimum coupling should the power output be less than 6 watts. Increase or decrease the distance between L40 and L39.

t. Set the 618F-1() frequency selector at 118.00 mc.

u. Adjust the slugs in L33, L34, and L36 for maximum drive as indicated on the vtvm.

v. Repeat steps l through u until optimum tracking at the end points is achieved.

5.5.2 FIXED I-F, AUDIO, AND POWER SUPPLY.

5.5.2.1 FIXED I-F ALIGNMENT. Initially each slug in the overcoupled transformer T102, T103, and T104 should be located about 3/16 inch from the respective

top and bottom of the slug containers. Each slug in the undercoupled transformer, T101, should be approximately 1/8 inch from the top and bottom of the container. When observing the 427D-1 unit from the bottom, the primary slug is located in a tube plate circuit, and the secondary slug is located in a grid circuit. A tuning tool is supplied with the 427D-1 unit (clipped inside chassis). All tuning is done from the bottom of the unit unless otherwise indicated. (See figure 5-3.)

- a. Set OFF-PWR switch to PWR.
- b. Insert vtvm d-c probe into avc test jack J104 on the 427D-1.
- c. Couple a 500-kc signal from the signal generator into J103. The signal input should be of sufficient strength to obtain an avc reading on the vtvm of not less than 0.5 volt and not more than 2 volts.
- d. Tune transformer T101, on the secondary side first, for the maximum avc reading on the vtvm, making sure that the tuning takes place while driving the slug into the core at the first peak. This should occur while turning the tool counterclockwise.
- e. Tune the primary side of T101 for the maximum avc reading on the vtvm, making sure that the tuning takes place while driving the slug into the core at the first peak. This should occur while turning the tool clockwise.
- f. Swamp the primary of transformer T102 by connecting a 2700-ohm resistor between pins 1 and 2 of T102. Tune the secondary of T102 for the maximum avc reading on the vtvm.
- g. Remove the 2700-ohm resistor from the primary of T102, and swamp the secondary by connecting the 2700-ohm resistor between pins 3 and 4. Tune the primary of T102 for the maximum avc reading on the vtvm.
- h. Repeat steps f and g for transformer T103. (Remove swamping resistor when tuning is completed.)

NOTE

By using a secondary to primary order of tuning, the tuning tool is worked out of the transformers in a manner such that the slugs already tuned will not be disturbed. (See figure 5-3.)

i. Detune the secondary of transformer T104 until a 1000-uv signal from the signal generator will give approximately 1 volt of avc on the vtvm. (This provides swamping for the secondary.)

j. Tune the primary of T104 for the maximum avc reading on the vtvm.

k. Swamp the primary winding of T104 with a 2700-ohm resistor, and tune the secondary from the top of the transformer for the maximum avc reading on the vtvm. (Remove the swamping resistor when tuning is completed.)

1. Repeat steps a through k until no change is noted.

5.5.2.2 SQUELCH THRESHOLD ADJUSTMENT.

a. Connect the output meter across the 8-ohm speaker load of the test harness.

b. Insert vtvm d-c probe into avc jack J104 on the 427D-1.

c. Set the 618F-1() at 118.00 mc.

d. Turn SQUELCH control fully counterclockwise.

e. Couple a 118.00-mc, 10-uv signal from the signal generator to the antenna jack, J1.

f. Tune the signal generator for the maximum avc reading on the vtvm.

g. Loosen locking nut on SQUELCH control R103, and adjust it so that the squelch circuit just opens (indication on output meter).

h. Tighten the locking nut on R103.

5.5.2.3 MODULATION ADJUSTMENT. MIKE GAIN

control R147 is set at its midposition at the factory. This setting should be acceptable for most microphones. It is suggested, however, that R147 be adjusted for the type of microphone to be used with the equipment. This can be done by the following procedure:

a. Connect the vertical input of an oscilloscope to the sniffer output of the sniffer-detector circuit as indicated in figure 5-4. Connect the sniffer circuit to the 618F-1() (J1) and to the r-f load.

b. Connect the microphone to the microphone input.

c. Loosen the locking nut, and adjust R147 for a signal just below clipping while talking into the microphone at a normal voice level.

d. Tighten the locking nut on R147.

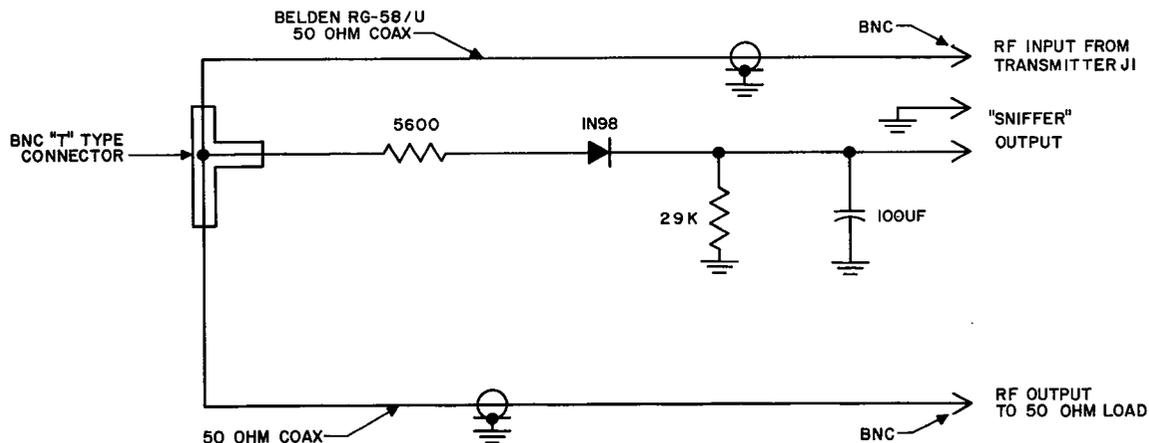


Figure 5-4. Sniffer-Detector Circuit

5.6 DISASSEMBLY PROCEDURES FOR 618F-1A/1B.**5.6.1 VHF OSCILLATOR CRYSTALS OR CRYSTAL BOARD AND SWITCH.**

- a. Remove the 618F-1A/1B dust cover.
- b. Remove the vhf oscillator crystal cover by removing the 4 securing screws.
- c. Unsolder the wires to the 3 terminals on the top side of the crystal board making sure that the wires are marked as they are removed.
- d. Remove the 4 long spacer nuts that hold the crystal board in place.
- e. Lift the crystal board out.
- f. Reassemble in reverse order.
- g. Perform vhf oscillator and doubler alignment as directed in paragraph 5.5.1.1.

5.6.2 VHF OSCILLATOR COIL BOARD AND SWITCH.

- a. Perform steps a through e of paragraph 5.6.1.
- b. Remove the 4 spacers on top of the coil board.
- c. Carefully lift the coil board out, and unsolder the wire attached. Mark the wire to ensure correct replacement.

CAUTION

Note the relation between the crystal switch and the coil switch when removing them to avoid 180-degree ambiguity of rotors during reassembly.

- d. Replace coil board and switch, and reassemble in reverse order.
- e. Perform vhf oscillator and doubler alignment as directed in paragraph 5.5.1.1.

5.6.3 H-F OSCILLATOR CRYSTALS OR CRYSTAL BOARD AND SWITCH.

- a. Remove 618F-1A/1B dust cover.
- b. Remove plastic crystal cover.
- c. Unsolder the wires to the two terminals on the top side of the crystal board, making sure that the wires are marked as they are removed.
- d. Remove the 4 nuts that hold the crystal board in place.
- e. Lift the crystal board out.
- f. Reassemble in reverse order.

5.6.4 FRONT PLATE REMOVAL.

- a. Remove 618F-1A/1B dust cover.
- b. Remove dial lights, knobs, and bushings under knobs on control panel.
- c. Remove plastic control panel.
- d. Remove the following Phillips screws from front plate: 3 screws along left edge, 2 screws along right edge, and 2 screws closest to center dial light.
- e. Place thumbs on ends of megacycle and kilocycle control shafts, and grasp the left and right edge of the front plate with fingers. While holding megacycle and kilocycle shafts in, carefully work off front plate, and swing it around to the right. Be careful not to pull on attached wires.

CAUTION

If the shafts are not held in place and gear mesh is lost while removing front plate, perform preliminary check of mechanical alignment (paragraph 5.4).

- f. Reassemble in reverse order.
- g. Perform alignment procedures as given in paragraphs 5.5.1.3, 5.5.1.4, and 5.5.1.5.

5.6.5 FREQUENCY COUNTER REMOVAL. (Refer to figure 6-1.)

- a. Remove front plate according to paragraph 5.6.4.
- b. Loosen setscrews on collar H9.
- c. Remove retaining ring (near gear MP2), gear MP2, washers, and gear MP3.
- d. While holding wheels from spreading, remove counter from bracket.
- e. Reassemble in reverse order.
- f. Align counter according to steps c and d of paragraph 5.7.

CAUTION

If the shafts are not held in place and gear mesh is lost while removing front plate, perform preliminary check of mechanical alignment (paragraph 5.4).

- g. Perform alignment procedures as given in paragraphs 5.5.1.3, 5.5.1.4, and 5.5.1.5.

5.6.6 SLUG TUNING RACK REMOVAL. (Refer to figure 6-1.)

- a. Remove dial lights, knobs, bushings, and plastic control panel.
- b. Loosen setscrews on collar H15.
- c. Remove spring H16.
- d. Pull shaft MP45 forward, and remove retaining rings on MP48, link MP46, bar MP48, and link MP47.
- e. Reassemble in reverse order.
- f. Reset slug rack links according to step i of paragraph 5.7.
- g. Perform alignment procedure given in paragraph 5.5.1.3.

5.6.7 TRANSFORMER T1 REPLACEMENT.

Special care should be taken when replacing transformer T1. Before mounting transformer T1, the nuts securing the shield-can (top of shield-can) should be loosened at least 1/16 inch or completely removed to allow the bottom plate of the transformer to seat against the mounting deck. Shield-can nuts should then be retightened enough to ground the bottom of the shield-can, but care should be taken not to collapse the can. Perform alignment procedure given in paragraph 5.5.1.2.

SECTION V
Maintenance

5.6.8 TRANSFORMER T2 AND T3 DISASSEMBLY.

- a. Remove two nuts on top of transformer.
- b. Remove two Phillips screws on bottom of transformer mounting plate.

NOTE

These two screws lie on a line perpendicular to the sides of the 618F-1A/1B unit. Capacitors C16 (T2) and C25 (T3) may have to be moved aside or removed when removing the screws.

- c. Lift transformer shield out of the unit.
- d. Replace in reverse order.
- e. Perform alignment procedure given in paragraph 5.5.1.3.

5.6.9 AIR VARIABLE CAPACITOR C1 AND C42 AND LOADING GEAR.

Variable capacitors C1 and C42 or the coupler between them should require very little if any maintenance or replacement. If the replacement of either C1 or C42 is required, the unit should be returned to the factory. The mechanical alignment between C1 and C42 is set at the factory. If loading gear (MP41) must be removed, the following procedure must be used when remounting it (refer to figure 6-1):

- a. Loosen setscrews on gear MP22. Remove gear MP41.
- b. Set rotors of C42 to a position 90 degrees \pm 5 degrees clockwise (viewed from the front) from fully meshed.
- c. Mount spring (H20) and gear (MP41) (in free position), shaft (MP49), bearing (MP40), washer (H3), and screw (H21) to frame of C42.
- d. Gear mesh shall be adjusted for freedom of rotation without excessive backlash.
- e. Perform steps g and h of paragraph 5.7 and observe note in step g of that paragraph.
- f. Perform alignment procedures given in paragraphs 5.5.1.3, 5.5.1.4, and 5.5.1.5.

5.7 MECHANICAL ADJUSTMENT FOR 618F-1A/1B.

The following procedure will completely align and synchronize the 618F-1A/1B tuning mechanism. This procedure should be performed in the order given with reference to figure 6-1 for location of adjustments.

All adjustments can be reached only with the dust cover and crystal covers removed. Perform electrical alignment indicated in paragraph 5.5 after mechanical alignment.

- a. Remove the 618F-1A/1B dust cover, the h-f oscillator crystal cover, and the vhf oscillator crystal cover.
- b. Loosen the setscrews on cam (MP16), and set the cam to its related detent so that cam follower (MP19) is as far in from the dropoff point as possible but still permits complete drop to its lowest point on the next detent position. Tighten the setscrews.
- c. With the megacycle control knob at its full counterclockwise position (against stop), loosen the

setscrews on collar (H8) of gear (MP15), and set the first three digits of the frequency counter at 118. Adjust gear (MP15) axially for 0.002- to 0.005-inch end play. Tighten the setscrews so that they bear against a solid part of the gear hub.

d. With the kilocycle control knob set so that cam follower (MP19) has just dropped to its lowest point on cam (MP16), loosen the setscrews on collar (H8) of gear (MP14), and set the last two digits of the frequency counter at 00. Adjust gear (MP14) axially for 0.002- to 0.005-inch end play. Tighten the setscrews so that they bear against a solid part of the gear hub.

e. With the 618F-1A/1B set at 118.00 mc, loosen the setscrews on collar (H8) of bevel gear (MP32), and adjust the h-f oscillator crystal switch so that the transmitter rotor arm is selecting the highest value crystal (12.485 mc). (See figure 5-5.) Adjust bevel gear (MP32) axially for good mesh, and tighten the setscrews so that they bear against a solid part of the gear hub. Turn crystal switch through entire range (cw and ccw), and check that contact is made in every position.

f. With the 618F-1A/1B set at 118.00 mc, loosen the setscrews on collar (H8) of bevel gear (MP31), and adjust the vhf oscillator crystal switch so that the rotor arm on the visible side of the switch is selecting the lowest value crystal (65.2425 mc). (See figure 5-6.) Adjust the bevel gear axially for good mesh, and tighten the setscrews so that they bear against a solid part of the gear hub. Turn crystal switch through entire range (cw and ccw), and check that contact is made in every position.

g. With the 618F-1A/1B set at 118.00 mc, loosen the setscrews on collar (H8) of gear (MP22), and set the rotors of variable capacitor C1 so that they are fully meshed and coplanar (use leading edge of rotors as reference) driven clockwise (viewed from the front) from free position. Tighten the setscrews so that they bear against a solid part of the gear hub.

NOTE

C1 must be meshed in the clockwise direction. This clockwise rotation winds up torsion spring (H20) in the proper direction to eliminate backlash in the gear train.

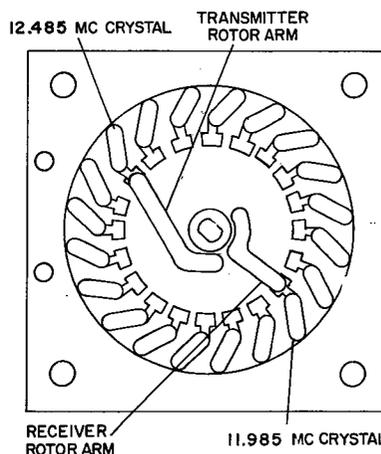


Figure 5-5. H-F Oscillator Switch

h. With the 618F-1A/1B set at 118.00 mc, loosen the setscrews on collar (H8) of gear (MP22), and reset both variable capacitors (C42 and C1) so that the leading edge of their rotors are advanced approximately 2 degrees with respect to frequency.

NOTE

C1 must be meshed in the clockwise direction. When advancing the rotors by 2 degrees, the leading edge of C1 and C42 rotors will move out of mesh clockwise. A 2-degree movement may be approximated by noting that each step of the megacycle control knob moves the rotors 9 degrees.

i. Set the last two digits of the frequency counter to 45 or 50. Loosen the setscrews on collar H15, and set slug rack links MP46 and MP47 approximately level. Tighten the setscrews on H15 so that they bear against a solid part of the gear hub.

j. Set the frequency counter stop (MP44) for the best-frequency presentation. If (MP44) is adjusted, gears MP3 and MP14 must also be reset in order to align numerals.

5.8 MECHANICAL ADJUSTMENT FOR 618F-1C/1D.

The following procedure will completely align and synchronize the 618F-1C/1D tuning mechanism. This procedure must be performed in the sequence presented. Refer to figure 6-2 for identification of components requiring adjustment. Upon completion of the mechanical adjustment, perform the electrical alignment as directed in paragraph 5.5. Remove both dust covers and both crystal covers before starting adjustment procedure.

a. Connect the 618F-1C/1D to a control unit such as Collins 614U-10A or 313N-1. (Figure 2-7 presents interconnection information.)

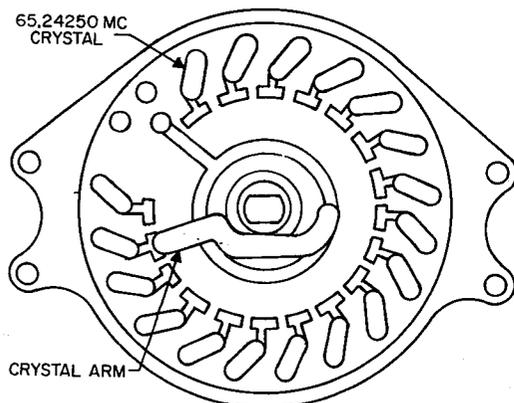


Figure 5-6. VHF Oscillator Switch

b. Channel the 618F-1C/1D to 118.00 mc (117.00 mc for the 618F-1D). The 618F-1C/1D should remain at this frequency during the adjustment procedure.

c. Check that the vhf oscillator switch (S5), rotor is selecting the 65.24250-mc crystal (64.74250-mc crystal for the 618F-1D). Refer to figure 5-6. If the rotor arm is not centered on the correct pad, rotate gear MP26 (see figure 6-2). Approach the final setting while rotating the gear (MP26) clockwise as viewed from the frequency indicating dials end of the 618F-1C/1D.

d. Check the position of main tuning capacitors (C1 and C42). They should be advanced from full mesh by approximately 4.5 degrees, about half the amount of movement for a frequency change of one megacycle. If the capacitors (C1 and C42) are not approximately positioned as described, loosen the two setscrews in the collar (H8) of tuning capacitor gear MP22 and rotate the capacitor to the 4.5-degree setting. Retighten the setscrews.

e. Check that the h-f oscillator switch (S3) is selecting the 12.485-mc crystal as shown in figure 5-5. If the rotor arm is not centered on the correct pad, loosen the setscrews in coupler MP201 (see figure 6-2) and rotate the shaft. Approach the final setting while rotating the shaft clockwise as viewed from the frequency indicating dials end of the 618F-1C/1D. Tighten the setscrews in coupler MP201.

f. Channel the 618F-1C/1D through the entire frequency range in 1-mc steps. The vhf oscillator switch rotor should center on each contact pad of crystal switch S1. If it does not, adjust MP26 as directed in step c.

g. Channel the 618F-1C/1D from 127.00 to 127.95 mc in 0.05-mc steps. The h-f oscillator switch rotor should center on each contact pad of crystal switch S3. If it does not, adjust MP201 as directed in step e.

5.9 VOLTAGE CONVERSION PROCEDURE.

Perform the following steps if it is desired to convert a 618F-1() wired for 27.5-volt operation to operate on 13.75 volts.

a. Remove the three 27.5-volt panel lamps from the 618F-1A/1B and replace them with 13.75-volt lamps, Collins part number 262-0309-00.

b. Remove the existing jumper wires from TB104 of the 427D-1.

c. Install jumpers on TB104 in the 13.75-volt position. (Compare with figure 2-8 for correct wiring of TB104.)

d. Remove the screws that secure connector J102 to the 427D-1. Remove both wires (one brown, one white) from terminal E129. Fold ends of these wires and tape or slide sleeving over them.

e. Remove the white and black wire connected to pin J of J102. Connect this wire to terminal E129.

f. Add a new white and black wire from E129 to pin J of J102. Keep this wire as short as possible. Replace connector J102.

g. Remove the nameplate from the side of the 427D-1 and install so that it covers the 28 V ONLY silk screening and exposes the 14 V ONLY. If it is desired to

convert a 618F-1() wired for 13.75-volt operation to operate on 27.5 volts perform the following steps.

h. Remove the three 13.75-volt panel lamps from the 618F-1A/1B and replace with 27.5-volt lamps, Collins part number 262-0179-00.

i. Remove the existing jumper wires from TB104 of the 427D-1.

j. Install jumpers on TB104 in the 27.5-volt position. (Compare with figure 2-8 for correct wiring of TB104.)

k. Remove the screws that secure connector J102 to the 427D-1. Remove the white and black wire connected between pin J of J102 and terminal E129.

l. Remove the other white and black wire connected to E129 and connect it to pin J of J102.

m. Remove the tape or sleeving from the brown and white wires near J102 and connect both of them to E129. Replace connector J102.

n. Remove the nameplate from the side of the 427D-1 and install so that it covers the 28V ONLY silk screening and exposes the 14 V ONLY.

5.10 FREQUENCY CONVERSION PROCEDURE.

The conversion of a 618F-1A to a 618F-1B or a 618F-1C to a 618F-1D consists of replacing one crystal and adjusting the frequency indicator dial to read correctly. Perform the following steps if this conversion is desired.

a. Remove the metal plate that covers the vhf oscillator switch, S5.

b. Remove the vhf crystal board and switch as directed in paragraph 5.6.1.

NOTE

Do not move the rotor on the crystal board or change the frequency setting of the unit while the switch, S5, is removed.

c. Unsolder and remove the 73.7425-mc crystal, Y18. Refer to figure 6-8 for location of this crystal.

d. Unsolder Y17 and move it one position clockwise, to the position previously occupied by Y18, and solder it in place.

e. Repeat the procedure described in step d for each of the remaining crystals.

f. Solder a 64.7425 megacycle crystal, Collins part no. 289-1784-00, in the Y1 position. Refer to figure 6-8 for location of this crystal.

g. Replace the crystal board and secure with four screws. Resolder the wires removed during disassembly.

h. Rotate the megacycle selector knob to the maximum counterclockwise position. Loosen the setscrews in the collar on the megacycle side of the frequency indicator and rotate the megacycle indicator drum to 117. Tighten the setscrew.

i. Perform the alignment procedures as directed in paragraph 5.5.1.

5.11 SERVICING TRANSISTOR CIRCUITS.

5.11.1 GENERAL.

Servicing procedures and test equipments that have been used in the past with other types of electronic equipment, for the most part, may be used with transistor circuits. Some special precautions which must be used are listed below. If the equipment under test contains transistors, even though they may not be in the circuits under test, the precautions should be observed because of the possibility of accidentally contacting a transistor circuit.

5.11.2 SERVICING PRACTICES.

5.11.2.1 HEAT SINK WHEN SOLDERING. When installing or removing a soldered-in transistor, grasp the lead to which heat is being applied, between the solder joint and the transistor, with long-nosed pliers to bleed off some of the heat that conducts into the transistor from the soldering iron. Make sure the wires that are being soldered to transistor terminals are properly pretinned so that the connection can be made quickly. Excessive heat will damage a transistor permanently.

5.11.2.2 REMOVAL OF TRANSISTORS FROM OPERATING CIRCUITS. Never remove or replace a plug-in transistor when the supply voltage is turned on. Transients thus produced may damage the transistor or others remaining in the circuit. If a transistor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the transistor than normally is used in the circuit from which it came.

5.11.2.3 PLUG-IN TRANSISTORS. When servicing equipment that uses plug-in transistors, it is good practice to remove the transistors from their sockets and reinsert them to break down any film of corrosion or dirt that may have formed.

5.11.2.4 RESISTANCE MEASUREMENTS IN TRANSISTOR CIRCUITS. When measuring resistances of circuits containing transistors or mineral diodes, remember that these components are polarity and voltage conscious; therefore, follow directions of the notes that are given on the resistance tables or drawings to be sure that the correct polarity and range is applied to the circuit from the ohmmeter. Any capacitors used in transistor circuits are usually of large values (especially in audio, servo, or power circuits) and it takes time to charge these capacitors when an ohmmeter is connected to a circuit in which they appear. Thus, any reading obtained is subject to error if the capacitor is not allowed time to charge fully. In some cases, it may be best to isolate the components in question and measure them individually.

5.11.2.5 POWER TRANSISTOR HEAT SINKS. In some cases, power transistors are mounted on heat sinks

that are designed to carry heat away from them. In some power circuits, the transistor also must be insulated from ground. This insulating is done by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers, treat them with a film of silicone fluid, Collins part number 005-0273-00, or equivalent. This treatment helps in the transfer of heat. After the transistor is mounted and before making any connections to it, check from the case to ground with an ohmmeter to see that the insulation is effective.

5.11.2.6 TEST PRODS. Test prods should be clean and sharp. Because many of the resistors used in transistorized equipments have low values, any additional resistance produced by a dirty test prod will make a good resistor appear to be out of tolerance.

In miniaturized equipment, the clearance between socket terminals, wires, and other components is usually very small. It is a good practice to cover all of the exposed tip of the test prod, except about one-eighth inch, with plastic tape or other insulation.

5.11.3 TROUBLE SHOOTING.

The usual trouble-shooting practices apply to transistors. Be sure the test equipment and tools meet the requirements outlined in the above paragraphs. It is recommended that transistor testers be used to evaluate the transistor.

5.11.3.1 OHMMETER TEST OF TRANSISTORS. If a transistor tester is not available, a good ohmmeter may be used for testing. Be sure the ohmmeter meets the requirements as set forth in the paragraph on test equipment, above. To check a PNP transistor, connect the positive lead of the ohmmeter to the base and the negative lead to the emitter. (The red lead is not necessarily the positive lead on all ohmmeters.) Generally a resistance reading of 50,000

ohms or more should be obtained. Connect the negative lead to the collector; again a reading of 50,000 ohms or more should be obtained. Reconnect the circuit with the negative lead of the ohmmeter to the base. With the positive lead connected to the emitter, a value of resistance in the order of 500 ohms or less should be obtained. Likewise, with the positive lead connected to the collector, a value of 500 ohms or less should be obtained.

Similar tests made on an NPN transistor produce results as follows: With the negative ohmmeter lead connected to the base, the value of resistance between the base and the emitter and between the base and the collector should be high. With the positive lead of the ohmmeter connected to the base, the value of resistance between the base and the emitter and between the base and collector should be low. If the readings do not check out as indicated, the transistor probably is defective and should be replaced.



CAUTION

If a defective transistor is found, make sure the circuit is in good operating order before inserting the replacement transistor. If a short circuit exists in the circuit, plugging in another transistor will likely result in another burned-out transistor. Do not depend upon fuses to protect transistors.

Make sure the value of the bias resistors in series with the various transistor elements are as shown on the schematic diagram. The transistor is very sensitive to improper bias voltages; therefore, a short or open circuit in the bias resistors may damage the transistor. For this reason, do not trouble shoot by shorting various points in the circuit to ground and listening for clicks.

SECTION VI
PARTS LISTVHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER
	VHF COMMUNICATION TRANSCEIVER 618F-1A AND VHF COMMUNICATION TRANSCEIVER 618F-1B	522-2458-00 522-2459-00
C1A, B, C	CAPACITOR, VARIABLE, AIR: 3 sections; 4.4 uuf to 10.8 uuf	921-0016-00
C2	CAPACITOR, VARIABLE, CERAMIC: 0.5 uuf to 4.5 uuf; 500 vdcw	917-1125-00
C3	CAPACITOR, FIXED, CERAMIC: 10 uuf ±1/2 uuf; 500 vdcw	916-0138-00
C4	CAPACITOR, FIXED, CERAMIC: 1000 uuf +100% -20%; 500 vdcw	913-1186-00
C5	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C6	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C7	CAPACITOR, FIXED, CERAMIC: 22.0 uuf ±2%, 500 v dc	916-0678-00
C8	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C9	CAPACITOR, FIXED, CERAMIC: 0.12 uuf ±10%, 500 vdcw; Stackpole part no. GA-.12uuf ±10%	913-3001-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C11	CAPACITOR, FIXED, CERAMIC: 5 uuf ±1/2 uuf; 500 vdcw	916-0118-00
C12	CAPACITOR, FIXED, MICA: 75 uuf ±2%, 500 v dc	912-2806-00
C13	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C14	CAPACITOR, FIXED, CERAMIC: 4 uuf ±1/2 uuf; 500 vdcw	916-0114-00
C15	CAPACITOR, VARIABLE, AIR: 0.7 to 11.5 uuf ±10%, 1000 vdcw	922-0416-00
C16	CAPACITOR, FIXED, CERAMIC: 1.5 uuf ±5%, 500 v dc	913-2981-00
C17	CAPACITOR, VARIABLE, AIR: same as C15	922-0416-00
C18	CAPACITOR, FIXED, MICA: 86 uuf ±1%, 500 v dc	912-3535-00
C19	CAPACITOR, FIXED, MICA: 100 uuf ±2%, 500 vdcw	912-2815-00
C20	CAPACITOR, FIXED, CERAMIC: 4700 uuf +100% -20%, 500 vdcw	913-1187-00
C21	CAPACITOR, FIXED, CERAMIC: 3300 uuf +100% -20%; 500 vdcw	913-1193-00
C22	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C23	CAPACITOR, FIXED, MICA: same as C18	912-3535-00
C24	CAPACITOR, VARIABLE, AIR: same as C15	922-0416-00
C25	CAPACITOR, FIXED, CERAMIC: same as C16	913-2981-00
C26	CAPACITOR, VARIABLE, AIR: same as C15	922-0416-00
C27	CAPACITOR, FIXED, MICA: same as C18	912-3535-00
C28	CAPACITOR: p/o T1	
C29	CAPACITOR, FIXED, CERAMIC: 10,000 uuf +100% -20%; 500 vdcw	913-1188-00
C30	CAPACITOR, FIXED, MICA: 560 uuf ±2%, 500 vdcw	912-2982-00
C31	CAPACITOR, FIXED, MICA: 6800 uuf ±2%, 500 vdcw	912-2722-00
C32	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C33	CAPACITOR, FIXED, CERAMIC: 5 uuf ±10% 500 vdcw (p/o S1)	913-0041-00
C34	CAPACITOR, FIXED, MICA: same as C19	912-2815-00
C35	CAPACITOR, VARIABLE, GLASS: 0.8 to 8 uuf ±10%, 1000 vdcw	922-0414-00
C36	CAPACITOR: p/o L31	
C37	CAPACITOR, FIXED, CERAMIC: same as C29	913-1188-00
C38	CAPACITOR, FIXED, MICA: 10 uuf ±5%, 500 vdcw	912-2753-00
C39	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C40	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C41	CAPACITOR, FIXED, MICA: 1000 uuf ±20%; 500 vdcw	912-0938-00
C42A, B, C, D	CAPACITOR, VARIABLE, AIR: 4 sections; sec- tions 1, 2, & 4 identical, 4.4 uuf to 12.2 uuf, section three, 4.8 uuf to 16.2 uuf	548-3884-002
C43	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C44	CAPACITOR, FIXED, CERAMIC: 20.0 uuf ±5%, 500 v dc	916-0677-00
C45	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C46	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C47	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C48	CAPACITOR, FIXED, CERAMIC: same as C44	916-0677-00
C49	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C50	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C51	CAPACITOR, FIXED, MICA: 51 uuf ±2%; 500 vdcw	912-0472-00
C52	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C53	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C54	CAPACITOR, FIXED, MICA: 100 uuf ±5%, 500 vdcw	912-2816-00
C55	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C56	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C57	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C58	CAPACITOR, FIXED, MICA: same as C30	912-2982-00
C59	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C60	CAPACITOR, VARIABLE, AIR: plate meshing type; single section; 14 plates; 3.6 uuf min. 31.5 uuf max	922-0454-00
C61	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C62	CAPACITOR, FIXED, MICA: same as C19	912-2815-00
C63	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C64	CAPACITOR, FIXED, MICA: 100 uuf, ±2%, 500 v dc	912-2815-00
C65	CAPACITOR, FIXED, CERAMIC: same as C20	913-1187-00
C66	CAPACITOR, FIXED, CERAMIC: 2.7 uuf, ±5%, 500 vdcw; Stackpole part no. GA-2.7uuf ±5%	913-2987-00
C67	CAPACITOR, TUBULAR, CERAMIC: 6 uuf ±1/2 uuf; 500 vdcw	916-0122-00
C68	CAPACITOR, TUBULAR, CERAMIC: same as C67	916-0122-00
C69	CAPACITOR, FIXED, CERAMIC: 8 uuf ±1/2 uuf; 500 vdcw	916-0130-00
C70	CAPACITOR, FIXED, MICA: same as C38	912-2753-00
C71	CAPACITOR, FIXED, CERAMIC: 5 uuf ±1/2 uuf 500 vdcw	916-0117-00
C72	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C73	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C74	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C75	CAPACITOR, FIXED, MICA: 82 uuf ±5%, 500 vdcw; Electro Motive part no. DM15F820J01	912-2810-00
C76	CAPACITOR, FIXED, CERAMIC: 0.02 uf +100% -20%; 500 vdcw	913-2142-00
C77	CAPACITOR, FIXED, MICA: same as C38	912-2753-00
C78	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C79	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C80	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C81	CAPACITOR, FIXED, MICA: same as C19	912-2815-00
DS1	COUNTER, FREQUENCY: five figure 0.188 in. h; wheels #1, #2, #3 white figures on black back- ground; wheels #4 & #5 black figures on white background; nonresetting, 3/4 in. dia by 2-1/2 in. lg	015-0868-00
E1	TERMINAL, FEEDTHRU, INSULATED: brass w/teflon insulation, single type, 0.172 in. od, 0.350 in. lg	306-0324-00
E2 thru E8	TERMINAL, FEEDTHRU, INSULATED: brass w/teflon insulation; 0.172 in. dia by 0.515 in. lg	306-0323-00
E9	TERMINAL, FEEDTHRU, INSULATED: same as E1	306-0324-00
E10	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E11	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E12	TERMINAL, FEEDTHRU, INSULATED: same as E1	306-0324-00
E13	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E14 thru E17	TERMINAL, FEEDTHRU, INSULATED: same as E1	306-0324-00
E18 thru E23	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E24 thru E27	TERMINAL, FEEDTHRU, INSULATED: brass w/teflon insulation, 0.218 in. od, 0.489 in. lg	306-0322-00
E28	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E29 thru E36	TERMINAL, FEEDTHRU, INSULATED: same as E1	306-0324-00
E37	NOT USED	
E38	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E39	TERMINAL, FEEDTHRU, INSULATED: same as E1	306-0324-00
E40	NOT USED	
E41	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E42	TERMINAL, FEEDTHRU, INSULATED: same as E1	306-0324-00
E43	TERMINAL, FEEDTHRU, INSULATED: same as E1	306-0324-00

SECTION VI

Parts List

VHF Communication Transceiver 618F-1 () and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER	ITEM	DESCRIPTION	COLLINS PART NUMBER
E44	INSULATOR, STANDOFF: double turret type miniature insulated terminal, brass, precious metal plated, 4-40 mtg, stud, 1/4 in. across hex by 25/32 in. lg	306-0961-00	L2	COIL, RADIO FREQUENCY: single layer wound, enamel or formvar insulation; 1.5 uh, 800 max cur; phenolic coil form	240-0063-00
E45	TERMINAL, STUD: brass; standoff type; screw mtg; steatite insulation	306-0389-00	L3	COIL, RADIO FREQUENCY: no. 2, #18 AWG magnet wire; 0.0415 in. dia max; 3 turns; 9 32 in. id by 15/16 in. lg overall incl inside bend one end	545-4878-002
E46 thru E49	SHIELD, ELECTRON TUBE: 7 pin miniature; brass; incl copper insert and hold-down spring	541-6550-003	L4	COIL, RADIO FREQUENCY: no. 3, #18 AWG magnet wire; 0.0415 in. dia max; 3 turns; 9 32 in. id by 19/32 in. lg overall incl inside bend one end	545-4879-002
E50 thru E54	SHIELD, ELECTRON TUBE: 9 pin noval; brass; incl copper insert and hold-down spring	541-6553-003	L5	COIL, RADIO FREQUENCY: 24 turns single layer wound, single conductor magnet copper wire; #32 AWG; formica form, incl 2 retaining rings	548-2830-00
E55 thru E58	STUD, SLUG, SOLDERED: c/o powdered iron tuning core w/0.043 in. dia bronze shafting insert soldered to brass slug screw; slotted one end; 1-7/8 in. lg overall	545-4807-002	L6	COIL, RADIO FREQUENCY: same as L5	548-2830-00
E59 thru E62	ELECTRON TUBE SOCKET LINER: for 7 pin tube; copper; 0.005 in. by 13/32 in. by 2-5/16 in.; 7 tabs bent to 40° angle	541-6532-003	L7	COIL, RADIO FREQUENCY: same as L5	548-2830-00
E63 thru E68	ELECTRON TUBE SOCKET LINER: for 9 pin tube; cadmium plated copper; 0.005 in. by 13/32 in. by 2-25/32 in.; 8 tabs bent to 40° angle	541-6533-003	L8	COIL, RADIO FREQUENCY: same as L5	548-2830-00
H1	SPRING, LOCKING: CRES wire; 0.030 in. dia; 0.030 in. by 0.224 in. by 0.310 in.	502-6005-002	L9	COIL: p/o T1	
H2	STUD, CONTINUOUS: brass; 8-32 NC-2 thd; 13/16 in. lg	503-4934-001	L10	COIL: p/o T1	
H3	WASHER, FLAT: CRES: 0.120 in. id, 0.250 in. od, 0.0156 in. thk	506-5906-003	L11	COIL: p/o S1	
H4	NOT USED		L29	COIL, RADIO FREQUENCY: single layer wound 0.47 uh, 0.09 ohms dc resistance; 1600 ma	240-0060-00
H5	WASHER, FLAT: steel; 0.197 in. id, 0.375 in. od, 0.0156 in. thk	506-5910-003	L30	COIL, VHF, OSC: #18 AWG magnet wire; 0.0415 in. dia max; 3-1/2 turns; 3/16 in. id	545-4884-002
H6	SCREW, SPECIAL: CRES; 9/16 in. lg, 0.312 in. dia head, 6-32 NC-2A thd 3/8 in.	540-6383-002	L31	STEP TUNER: riveted; c/o 1.312 in. by 2.727 in. glass board, 7 tubelets, rotor, 2 stators, 2 contact arms, and 2 spacers (incl C36)	545-4912-004
H7	WASHER, FLAT: brass; 0.116 in. id, 1/4 in. od, 0.025 in. thk	542-7470-003	L32	COIL, RADIO FREQUENCY: 570 ma cur; 0.16 ohms; 12.0 ±10% uh; 3/16 in. dia, 3-7/16 in. lg overall	240-0150-00
H8	COLLAR, 1/4 BORE: 0.170 in. w by 0.468 in. dia; 6-40 NF-2B, 2 holes, 90° apart	542-6624-002	L33	COIL, RADIO FREQUENCY: no. 4; #18 AWG magnet wire; 0.0415 in. dia max; 3 turns; 9/32 in. id by 1/32 in. lg overall	545-4880-002
H9	COLLAR: CRES; 0.406 in. od by 0.187 in. id by 0.170 in. w; two 6-40 NF-2B thd holes	545-4766-002	L34	COIL, RADIO FREQUENCY: no. 5; #18 AWG magnet wire; 0.0415 in. dia max; 3 turns; 9/32 in. id by 1/2 in. lg overall incl inside bend one end	545-4881-002
H10	PIN, SHOULDER, HEADLESS: CRES; 0.170 in. od undercut to 0.1248 in. od; 0.093 in. id; 0.145 in. lg	545-4819-002	L35	COIL, RADIO FREQUENCY: single layer wound; magnet wire w/enamel or formvar insulation; 2.20 uh, 1.10 ohms resistance, 550 ma current	240-0064-00
H11	BUSHING, SLEEVE: aluminum; 0.1875 in. id by 0.250 in. od by 7/16 in. lg; 1/64 in. w/slot full lg	545-4778-002	L36	COIL, RADIO FREQUENCY: no. 6; #18 AWG magnet wire; 0.0415 in. dia max; 2-1/2 turns; 9/32 in. id by 5/8 in. lg overall incl inside bend one end	545-4882-002
H12	SPRING, HELICAL, EXTENSION: music wire; 0.016 in. dia; 30 turns rh wound; 1/8 in. id by 5/32 in. od by 0.746 in. free lg	545-4794-002	L37	COIL, RADIO FREQUENCY: same as L35	240-0064-00
H13	SPRING, HELICAL, EXTENSION: music wire; 0.016 in. dia; 37 turns rh wound; 1/8 in. id by 5/32 in. od by 0.858 in. free lg	545-4795-002	L38	COIL, RADIO FREQUENCY: same as L35	240-0064-00
H14	PIN, GROOVED, HEADLESS: CRES; 0.124 in. COLLAR: CRES; 0.531 in. od by 0.312 in. id by 0.170 in. w; two 6-40 NF-2B thd holes	545-4796-002	L39	COIL, P.A.: #14 AWG magnet wire, 0.0660 in. dia max; 2-1/2 turns; 3/8 in. id by 5/8 in. lg excl inside bend one end	545-4883-002
H15	SPRING, HELICAL, COMPRESSION: CRES wire; 0.025 in. dia; 9 turns rh or lh wound; 0.193 in. id by 0.243 in. od by 0.537 in. free lg	545-4805-002	L40	LOOP, COUPLING: #14 AWG magnet wire w/teflon insulation sleeve; 3/8 in. id by 1/2 in. lg by 7/8 in. w overall	545-4885-002
H16	SPRING, SLUG, LOCKING: music wire; 0.033 in. dia; 0.786 in. lg	545-4806-002	L41	COIL, RADIO FREQUENCY: same as L35	240-0064-00
H17	SPRING, HELICAL, EXTENSION: music wire; 0.016 in. dia; 15 turns, right hand wound; 5/32 in. od by 0.506 in. free lg	545-4854-002	L42	COIL, RADIO FREQUENCY: same as L2	240-0063-00
H18	NOT USED		L43	COIL, RADIO FREQUENCY: single layer wound solenoid, enamel or formvar copper magnet wire; 0.33 uh	240-0068-00
H19	NOT USED		L44	COIL, RADIO FREQUENCY: same as L35	240-0064-00
H20	NOT USED		L45	COIL, RADIO FREQUENCY: same as L35	240-0064-00
H21	SCREW, MACHINE: brass; hex head; 4-40 NC-2A 3/4 in. lg	325-0098-00	L46	COIL, RADIO FREQUENCY: single layer wound solenoid, enamel or formvar copper magnet wire; 0.22 uh, 0.04 ohms, 2000 ma	240-0067-00
H22	RING, RETAINING: copper; type E; 0.145 in. id, 0.025 in. thk	340-0253-00	L47	COIL, RADIO FREQUENCY: same as L35	240-0064-00
H23	NOT USED		L48	COIL, RADIO FREQUENCY: same as L2	240-0063-00
11, 2, 3	LAMP, INCANDESCENT: 28 v, 0.04 amp; 5/8 in. lg overall	262-0179-00	MP1	COUPLING, HALF: shaft pressed, 0.656 in. dia by 0.343 in. lg	548-3887-002
OR			MP2	GEAR, HELICAL: spiral tooth type; plain; aluminum, anodized; 13 teeth, 20° pressure angle, 45° rh helix angle; 0.383 in. pitch dia; 5/32 in. w face; stepped & grooved	545-4762-002
11, 2, 3	LAMP, INCANDESCENT: 14 v, 1.12 w, 0.08 amp; 5/8 in. lg overall	262-0309-00	MP3	GEAR, HELICAL: spiral tooth type; plain; aluminum, anodized; 13 teeth, 20° pressure angle, 45° rh helix angle; 0.383 in. pitch dia; 5/32 in. w face; stepped; slotted hub	545-4763-002
J1	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 rd, female contact; panel mtg	357-9183-00	MP4	BEARING, SLEEVE: cylindrical w/flange, porous bronze; 15/32 in. dia by 11/64 in. lg	309-0079-00
J2	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 rd male contact; 500 v dc; straight shape	357-9215-00	MP5	BEARING, SLEEVE: same as MP4	309-0079-00
J3	CONNECTOR, RECEPTACLE, ELECTRICAL: 24 female contacts; 5 amps; 700 v dc; panel mtg	372-1847-00	MP6	BEARING, SLEEVE: porous bronze; 15/32 in. od by 11/64 in. lg	309-0086-00
J4	JACK, TIP: accommodates std, phone tip; 1250 v ac, 5 amps	360-0087-00	MP7	BEARING, SLEEVE: bronze; 0.1885 in. id by 0.3595 in. od by 0.130 in. lg; 0.4787 in. dia by 0.0337 in. w flange	309-0125-00
J5	JACK, TIP: same as J4	360-0087-00	MP8	BEARING, SLEEVE: same as MP4	309-0079-00
J6	JACK, TIP: same as J4	360-0087-00	MP9	BEARING, SLEEVE: same as MP4	309-0079-00
K1	RELAY, ARMATURE: 1C; 1 amp RF, max voltage 17 v dc, 75 ohms resistance	972-1461-00	MP10	INSERT, FLEXIBLE COUPLING: 0.656 in. dia by 0.125 in. lg	548-3885-002
K2	NOT USED		MP11	BEARING, SLEEVE: same as MP7	309-0125-00
K3	RELAY, ARMATURE: 2C; 30 mv at 30 ua; 13 v dc nom; 146 ohms dc resistance; continuous duty cycle	974-0657-00	MP12	BEARING, SLEEVE: same as MP7	309-0125-00
L1	COIL, RADIO FREQUENCY: no. 1; #18 AWG magnet wire; 0.0415 in. dia max; 3 turns; 9/32 in. id by 1/2 in. lg overall	545-4877-002			

VHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER	ITEM	DESCRIPTION	COLLINS PART NUMBER
MP13	PLATE, BEARING: pressed; aluminum; irregular shape; incl 0.251 in. by 0.3595 in. by 0.171 in. bearing	545-4775-002	MP45	SHAFT, SLUG RACK: 0.249 in. dia; flatted to 0.2182 in. dia by 6-11/16 in.; 7-11/16 in. lg overall	545-4802-002
MP14	GEAR, HELICAL: spiral tooth type; plain; aluminum, anodized; 26 teeth, 20° pressure angle 45° rh helix angle; 0.383 in. pitch dia; 0.172 in. w face; slotted hub	545-4780-002	MP46	LINK, SLUG RACK: aluminum; 0.063 in. thk by 7/16 in. w by 1.06175 in. lg	545-4803-002
MP15	GEAR, HELICAL: same as MP14	545-4780-002	MP47	LINK, SLUG RACK: same as MP46	545-4803-002
MP16	CAM, SLUG RACK: soldered; brass cam, CRES hub; irregular shape; 0.170 in. w face of hub; 0.265 in. w overall	545-4783-002	MP48	BAR, SLUG RACK: aluminum; 1/4 in. by 1/4 in. by 2.466 in. lg overall; undercut and grooved ea end	545-4804-002
MP17	SHAFT, KC: pinned; CRES; c/o 20 position detent wheel assembly and 0.187 in. dia shaft; 1.062 in. dia by 2-31/32 in. lg overall	545-4787-002	MP49	SHAFT: CRES; 0.128 in. id by 0.1870 in. od by 0.636 in. lg; two 0.005 in. deep by 3/16 in. lg undercut	545-4867-002
MP18	NOT USED		MP50	NOT USED	
MP19	ROLLER: CRES; 0.1250 in. id by 0.187 in. od by 0.093 in. w	545-4797-002	MP51	NOT USED	
MP20	SHAFT, STUB: CRES; 0.1867 in. od by 4-40 NC-2B by 3/16 in. min full depth thd; 0.500 in. lg	545-4865-002	MP52	PLATE, SUB: aluminum; 0.090 in. thk by 3.375 in. w by 4.718 in. lg; irregular shape	545-4903-003
MP21	GEAR, SPUR: aluminum; 50 teeth, 20° pressure angle; 1.0416 in. pitch dia; 0.147 in. w face by 0.1875 in. id	545-4811-002	MP53	ARM, DETENT: CRES type 304; shape sivate finish; 1-1/4 in. lg approx	548-3898-002
MP22	GEAR, SPUR: aluminum; 33 teeth; 20° pressure angle; 0.6875 in. pitch dia; 0.093 in. w face by 0.1872 in. id; slotted	545-4812-002	MP54	ARM, DETENT: staked; CRES; c/o arm, hub, roller and roller post; 0.210 in. h by 1-1/4 in. lg overall	545-4792-002
MP23	GEARSHAFT, SPUR: aluminum; c/o 17 tooth gear, 0.226 in. w face by 0.1875 in. id by 0.360 in. lg and 34 tooth gear, 0.0900 in. w face by 0.3437 in. id; 20° pressure angle ea gear	545-4815-002	MP55	SHAFT, IDLER: CRES; 0.1870 in. dia by 1.132 in. lg; 4-40 NC-2B by 1/4 in. deep full thd both ends	545-4826-002
MP24	GEARSHAFT, SPUR: c/o aluminum gear, 33 teeth, 0.6875 in. pitch dia, 0.187 in. w face and CRES shaft, 0.1870 in. dia by 1.328 in. lg	545-4818-002	MP56	SHAFT, IDLER: same as MP55	545-4826-002
MP25	WHEEL, DETENT: MC; staked; CRES; c/o detent wheel assembly, 20 positions, and 0.125 in. dia stop pin; 1.062 in. dia by 0.265 in. lg o/a; two 6-40 NF-2B holes in hub	545-4822-002	MP57	NOT USED	
MP26	GEARSHAFT, SPUR: pressed; c/o aluminum gear, 33 teeth, 0.187 in. w face and CRES shaft, 0.1870 in. dia by 1-31/32 in. lg	545-4824-002	MP58	ARM, ROCKER: staked; c/o aluminum rocker arm (MP59) and CRES hut, 0.093 in. w face; irregular shape; 1-1/8 in. by 1.285 in. by 0.4245 in. o/a	545-4800-002
MP27	GEAR, SPUR: aluminum; 46 teeth; 20° pressure angle, 0.9583 in. pitch dia; 0.109 in. w face by 0.1875 in. id	545-4825-002	MP59	ARM, ROCKER: aluminum; bent at 47° angle; 0.032 in. thk by 1-1/8 in. w by 1.285 in. approx h; 0.375 in. dia center hole	545-4798-002
MP28	GEAR, SPUR: same as MP27	545-4825-002	MP60	FRAME, DIFFERENTIAL, STAKED: c/o aluminum frame, 0.063 in. thk and CRES hub, 0.230 in. w face; 0.334 in. w by 1.645 in. lg overall	545-4810-002
MP29	GEARSHAFT, SPUR: pressed c/o aluminum gear, 33 teeth, 0.080 in. w face and CRES shaft, 0.1865 in. dia by 1-19/32 in. lg	545-4829-002	O1	KNOB: setscrew type; black body; 15/16 in. max od by 3/4 in. thk overall	281-0095-00
MP30	BLOCK, BEARING: pressed; aluminum; c/o 0.187 in. by 0.1885 in. by 0.3145 in. bearing and 0.187 in. by 1/2 in. by 0.687 in. block; two 4-40 NC-2B by 1/4 in. deep holes	545-4831-002	O2	KNOB: same as O1	281-0095-00
MP31	GEAR, BEVEL: brass; 21 teeth, 20° pressure angle, 0.467 in. od, 0.4375 in. pitch dia, 0.093 in. w face, 0.281125 in. lg o/a; 45° pitch angle, 0.1875 in. id	545-4832-002	O3	KNOB; OFF/PWR: aluminum; black lusterless enamel; 5/8 in. dia by 11/16 in. lg	542-3083-002
MP32	GEAR, BEVEL: same as MP31	545-4832-002	O4	KNOB, VOLUME: aluminum; black lusterless enamel; 1/2 in. w by 5/8 in. lg	541-9231-002
MP33	GEARSHAFT, BEVEL: pinned; c/o brass bevel gear, 21 teeth, 0.093 in. w face, 45° pitch angle and plastic shaft, 0.248 in. dia by 25/32 in. lg; 1/4 in. flatted both sides of one end	545-4835-002	O5	KNOB, SQUELCH: same as O4	541-9231-002
MP34	GEARSHAFT, BEVEL: pinned; c/o brass bevel gear, 21 teeth, 0.093 in. w face, 45° pitch angle and plastic shaft, 0.248 in. dia by 1/2 in. lg; 1/4 in. flatted both sides of one end	545-4839-002	P1	CONNECTOR, PLUG, ELECTRICAL: 1 male contact; 90° angle	357-9169-00
MP35	BEARING, SLEEVE: porous bronze; 0.251 in. id by 15/32 in. od by 0.125 in. lg	309-0124-00	P2	CONNECTOR, PLUG, ELECTRICAL: brass body; one male contact; right angle shape; for u/w RG-55, 58, 142/U and similar sized cables	357-9424-00
MP36	NOT USED		P3	CONNECTOR, PLUG, ELECTRICAL: 24 male contacts; 5 amp, 700 v dc; miniature ribbon type w/side cable entry	372-1846-00
MP37	NOT USED		R1	RESISTOR, FIXED, COMPOSITION: 0.10 meg-ohm ±10%; 1/4 w	745-0821-00
MP38	NOT USED		R2	RESISTOR, FIXED, COMPOSITION: 120 ohms ±10%; 1/4 w	745-0716-00
MP39	NOT USED		R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%; 1/2 w	745-1352-00
MP40	BEARING, SLEEVE: porous bronze; 0.1885 in. by 0.3145 in. by 0.125 in.	545-4868-002	R4	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
MP41	GEAR, 30 TOOTH: pressed; c/o bronze sleeve bearing, 0.1885 in. by 0.3145 in. by 0.500 in. and 30 tooth aluminum spur gear, 0.625 in. pitch dia	545-4870-002	R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
MP42	BEARING, SLUG RACK: aluminum, chromate dip; 0.734 in. w by 0.937 in. h by 1.140 in. lg	545-4904-003	R6	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%; 1/4 w	745-0809-00
MP43	NOT USED		R7	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
MP44	STOP, COUNTER: aluminum, chromate dip; 0.032 in. by 1/2 in. by 7/8 in. overall; two centrally located slots	545-4765-002	R8	RESISTOR, FIXED, COMPOSITION: 220 ohms ±10%; 1/4 w	745-0725-00
			R9	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%; 1/4 w	745-0785-00
			R10	RESISTOR, FIXED, COMPOSITION: 2700 ohms ±10%; 1/2 w	745-1370-00
			R11	RESISTOR, FIXED, COMPOSITION: 10 ohms ±10%; 1/2 w	745-1268-00
			R12	RESISTOR, FIXED, COMPOSITION: same as R6	745-0809-00
			R13	RESISTOR, VARIABLE: composition; 10,000 ohms, ±20%, 1 w	380-0797-00
			R14	RESISTOR, FIXED, WIRE WOUND: 8,000 ohms ±5%; 3 w	747-9613-00
			R15	RESISTOR, FIXED, COMPOSITION: 270 ohms ±10%; 1/4 w	745-0728-00
			R16	RESISTOR, FIXED, COMPOSITION: same as R15	745-0728-00
			R17	RESISTOR, FIXED, COMPOSITION: 0.47 meg-ohm ±10%; 1/4 w	745-0845-00

SECTION VI

Parts List

VHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER
R18	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
R19	RESISTOR, FIXED, COMPOSITION: same as R10	745-1370-00
R20	RESISTOR, FIXED, COMPOSITION: same as R17	745-0845-00
R21	RESISTOR, FIXED, COMPOSITION: same as R17	745-0845-00
R22	RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, 1/4 w	745-0797-00
R23	RESISTOR, VARIABLE: composition; 50,000 ohms, ±20%, 1 w	380-0798-00
R24	RESISTOR, FIXED, WIRE WOUND: 150 ohms ±5%; 3 w	710-2868-00
R25	RESISTOR, FIXED, COMPOSITION: 22 ohms ±10%, 1/2 w	745-1282-00
R26	RESISTOR, FIXED, COMPOSITION: same as R17	745-0845-00
R27	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
R28	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 1/2 w	745-1436-00
R29	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 1/2 w	745-1422-00
R30	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
R31	RESISTOR, FIXED, COMPOSITION: 33,000 ohms ±10%, 1/4 w	745-0803-00
R32	RESISTOR, FIXED, WIRE WOUND: 3900 ohms ±5%, 3 w	747-9603-00
R33	RESISTOR, FIXED, COMPOSITION: same as R9	745-0785-00
R34	RESISTOR, FIXED, COMPOSITION: 150 ohms ±10%, 1 w	745-3317-00
R35	RESISTOR, FIXED, COMPOSITION: 560 ohms ±10%, 1/4 w	745-0740-00
R36	RESISTOR, FIXED, COMPOSITION: 18,000 ohms ±10%, 1/2 w	745-1405-00
R37	RESISTOR, FIXED, COMPOSITION: 5600 ohms ±10%, 1/2 w	745-1384-00
R38	RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, 1/2 w	745-1401-00
R39	RESISTOR, FIXED, COMPOSITION: 120 ohms ±10%, 1 w	745-3314-00
R40	RESISTOR, FIXED, COMPOSITION: same as R22	745-0797-00
R41	RESISTOR, FIXED, WIRE WOUND: 2 ohms ±5%; 5 w	710-3030-00
R42	RESISTOR, FIXED, WIRE WOUND: 75 ohms ±5%; 5 w	710-3037-00
R43	RESISTOR, FIXED, WIRE WOUND: 1 ohm ±5%; 3 w	710-2863-00
R44	NOT USED	
R45	NOT USED	
S1	SWITCH, COIL: glass base epoxy; c/o 18 oscil- lating coils and 18 tuning cores; four contact arms (incls C33, L11 thru L28)	548-2829-00
S2	NOT USED	
S3	SWITCH, CRYSTAL: c/o 20 crystals, 41 tubelets and four contact arms; (incl Y19 thru Y38)	547-3387-00
S4	SWITCH, ROTARY: dpst; 2.5 amp at 28 v dc; 5 amp at 12 v dc; 1 moving and 4 fixed contacts	260-2701-00
S5	SWITCH, CRYSTAL: c/o 18 crystals, 36 tubelets and two double contact arms; (incl Y1 thru Y18)	547-3386-00
T1	TRANSFORMER, INTERMEDIATE FREQUENCY: resonates at 1 mc with Q of 78 ±3 using 310 ±10 uuf capacitor; shielded; 1 adjustable iron core for tuning; 23/32 in. by 23/32 in. by 1-7/8 in. o/a	544-9889-003
T2	TRANSFORMER, INTERMEDIATE FREQUENCY: shielded; 1 winding pri, one winding sec; 1.020 in. by 1.113 in. incl 4 feedthru term (incl C17, C18, C15, L5, L6)	548-2828-00
T3	TRANSFORMER, INTERMEDIATE FREQUENCY: shielded; 1 winding pri, one winding sec; 1.020 in. by 1.113 in.; incl 4 feedthru term. (incl L7, L8, C23, C27, C24, C26)	548-2827-00
V1	ELECTRON TUBE: arinc type 5654	253-0001-00
V2	ELECTRON TUBE: same as V1	253-0001-00
V3	ELECTRON TUBE: same as V1	253-0001-00
V4	ELECTRON TUBE: arinc type 5670	253-0002-00
V5	ELECTRON TUBE: same as V4	253-0002-00
V6	ELECTRON TUBE: same as V1	253-0001-00
V7	ELECTRON TUBE: arinc type 6688	255-0338-00
V8	ELECTRON TUBE: arinc type 5686	253-0009-00
V9	ELECTRON TUBE: arinc type 7551	257-0178-00
X11	LAMPHOLDER RECEPTACLE: 1/2 in. lg by 0.553 in. dia; accommodates midget flange base bulb	262-0234-00
X12	LAMPHOLDER RECEPTACLE: same as X11	262-0234-00
X13	LAMPHOLDER RECEPTACLE: same as X11	262-0234-00
X14	LIGHT, INDICATOR: for u/w T-3/4 midget flange base bulb; incl red filter; 9/16 in. dia by 3/4 in. lg overall	262-0335-00
X15	LIGHT, INDICATOR: same as X14	262-0335-00
X16	LIGHT, INDICATOR: same as X14	262-0335-00
XV1	SOCKET, ELECTRON TUBE: 7 contact miniature; two 0.125 in. dia mtg holes spaced 0.875 in. c to c	220-1273-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1273-00
XV3	SOCKET, ELECTRON TUBE: same as XV1	220-1273-00
XV4	SOCKET, ELECTRON TUBE: 9 contact miniature; copper nonmagnetic alloy contacts, plated; phenolic insulation	220-1244-00
XV5	SOCKET, ELECTRON TUBE: same as XV4	220-1244-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1273-00
XV7	SOCKET, ELECTRON TUBE: same as XV4	220-1244-00
XV8	SOCKET, ELECTRON TUBE: 9 contacts, bottom mtg UHF type tube socket w/o center shield	220-1453-00
XV9	SOCKET, ELECTRON TUBE: same as XV4	220-1244-00
*Y1	CRYSTAL UNIT, QUARTZ: 64.74250 mc frequency	289-1784-00
**Y1	CRYSTAL UNIT, QUARTZ: 65.24250 mc frequency	289-1766-00
*Y2	CRYSTAL UNIT, QUARTZ: 65.24250 mc frequency	289-1766-00
**Y2	CRYSTAL UNIT, QUARTZ: 65.74250 mc frequency	289-1767-00
*Y3	CRYSTAL UNIT, QUARTZ: 65.74250 mc frequency	289-1767-00
**Y3	CRYSTAL UNIT, QUARTZ: 66.24250 mc frequency	289-1768-00
*Y4	CRYSTAL UNIT, QUARTZ: 66.24250 mc frequency	289-1768-00
**Y4	CRYSTAL UNIT, QUARTZ: 66.74250 mc frequency	289-1769-00
*Y5	CRYSTAL UNIT, QUARTZ: 66.74250 mc frequency	289-1769-00
**Y5	CRYSTAL UNIT, QUARTZ: 67.24250 mc frequency	289-1770-00
*Y6	CRYSTAL UNIT, QUARTZ: 67.24250 mc frequency	289-1770-00
**Y6	CRYSTAL UNIT, QUARTZ: 67.74250 mc frequency	290-1771-00
*Y7	CRYSTAL UNIT, QUARTZ: 67.74250 mc frequency	289-1771-00
**Y7	CRYSTAL UNIT, QUARTZ: 68.24250 mc frequency	289-1772-00
*Y8	CRYSTAL UNIT, QUARTZ: 68.24250 mc frequency	289-1772-00
**Y8	CRYSTAL UNIT, QUARTZ: 68.74250 mc frequency	289-1773-00
*Y9	CRYSTAL UNIT, QUARTZ: 68.74250 mc frequency	289-1773-00
**Y9	CRYSTAL UNIT, QUARTZ: 69.24250 mc frequency	289-1774-00
*Y10	CRYSTAL UNIT, QUARTZ: 69.24250 mc frequency	289-1774-00
**Y10	CRYSTAL UNIT, QUARTZ: 69.74250 mc frequency	289-1775-00
*Y11	CRYSTAL UNIT, QUARTZ: 69.74250 mc frequency	289-1775-00
**Y11	CRYSTAL UNIT, QUARTZ: 70.24250 mc frequency	289-1776-00
*Y12	CRYSTAL UNIT, QUARTZ: 70.24250 mc frequency	289-1776-00
**Y12	CRYSTAL UNIT, QUARTZ: 70.74250 mc frequency	289-1777-00
*Y13	CRYSTAL UNIT, QUARTZ: 70.74250 mc frequency	289-1777-00
**Y13	CRYSTAL UNIT, QUARTZ: 71.24250 mc frequency	289-1778-00
*Y14	CRYSTAL UNIT, QUARTZ: 71.24250 mc frequency	289-1778-00
**Y14	CRYSTAL UNIT, QUARTZ: 71.74250 mc frequency	289-1779-00
*Y15	CRYSTAL UNIT, QUARTZ: 71.74250 mc frequency	289-1779-00
**Y15	CRYSTAL UNIT, QUARTZ: 72.24250 mc frequency	289-1780-00
*Y16	CRYSTAL UNIT, QUARTZ: 72.24250 mc frequency	289-1780-00
**Y16	CRYSTAL UNIT, QUARTZ: 72.74250 mc frequency	289-1781-00
*Y17	CRYSTAL UNIT, QUARTZ: 72.74250 mc frequency	289-1781-00
**Y17	CRYSTAL UNIT, QUARTZ: 73.24250 mc frequency	289-1782-00
*Y18	CRYSTAL UNIT, QUARTZ: 73.24250 mc frequency	289-1782-00
**Y18	CRYSTAL UNIT, QUARTZ: 73.74250 mc frequency	289-1783-00
Y19	CRYSTAL UNIT, QUARTZ: 11535.000 kc frequency	289-1791-00
Y20	CRYSTAL UNIT, QUARTZ: 11585.000 kc frequency	289-1792-00
Y21	CRYSTAL UNIT, QUARTZ: 11635.000 kc frequency	289-1793-00
Y22	CRYSTAL UNIT, QUARTZ: 11685.000 kc frequency	289-1794-00
Y23	CRYSTAL UNIT, QUARTZ: 11735.00 kc frequency	289-1795-00
Y24	CRYSTAL UNIT, QUARTZ: 11785.00 kc frequency	289-1796-00
Y25	CRYSTAL UNIT, QUARTZ: 11835.00 kc frequency	289-1797-00
Y26	CRYSTAL UNIT, QUARTZ: 11885.00 kc frequency	289-1798-00
Y27	CRYSTAL UNIT, QUARTZ: 11935.00 kc frequency	289-1799-00
Y28	CRYSTAL UNIT, QUARTZ: 11985.00 kc frequency	289-1800-00
Y29	CRYSTAL UNIT, QUARTZ: 12035.00 kc frequency	289-1801-00
Y30	CRYSTAL UNIT, QUARTZ: 12085.00 kc frequency	289-1802-00
Y31	CRYSTAL UNIT, QUARTZ: 12135.00 kc frequency	289-1803-00
Y32	CRYSTAL UNIT, QUARTZ: 12185.00 kc frequency	289-1804-00
Y33	CRYSTAL UNIT, QUARTZ: 12235.00 kc frequency	289-1805-00
Y34	CRYSTAL UNIT, QUARTZ: 12285.00 kc frequency	289-1806-00
Y35	CRYSTAL UNIT, QUARTZ: 12335.00 kc frequency	289-1807-00
Y36	CRYSTAL UNIT, QUARTZ: 12385.00 kc frequency	289-1808-00
Y37	CRYSTAL UNIT, QUARTZ: 12435.00 kc frequency	289-1809-00
Y38	CRYSTAL UNIT, QUARTZ: 12485.00 kc frequency	289-1810-00
FIXED I-F, AUDIO, AND POWER SUPPLY 427D-1		522-1192-00
C101	CAPACITOR, FIXED, MICA: 560 uuf ±2%; 500 vdcw	912-2982-00
C102	CAPACITOR, FIXED, MICA: 6800 uuf ±2%; 500 vdcw	912-2722-00
C103	CAPACITOR, FIXED, CERAMIC: 0.02 uf +100% -20%; 500 vdcw	913-2142-00
C104	CAPACITOR, FIXED, MICA: same as C101	912-2982-00
C105	CAPACITOR, FIXED, CERAMIC: 4700 uuf +100% -20%; 500 vdcw	913-1187-00
C106	CAPACITOR, FIXED, CERAMIC: same as C103	913-2142-00
C107	NOT USED	
C108	CAPACITOR, FIXED, MICA: same as C101	912-2982-00
C109	CAPACITOR, FIXED, CERAMIC: same as C103	913-2142-00
*Used in 618F-1B, Collins part no. 522-2459-00		
**Used in 618F-1A, Collins part no. 522-2458-00		

VHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER	ITEM	DESCRIPTION	COLLINS PART NUMBER
C110	CAPACITOR, FIXED, CERAMIC: same as C103	913-2142-00	E115	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00
C111	CAPACITOR, FIXED, CERAMIC: same as C105	913-1187-00	E116	NOT USED	
C112	CAPACITOR, FIXED, CERAMIC: same as C103	913-2142-00	E117	NOT USED	
C113	CAPACITOR, FIXED, CERAMIC: same as C105	913-1187-00	E118	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00
C114	CAPACITOR, FIXED, CERAMIC: 10,000 uuf +100% -20%; 500 vdcw	913-1188-00	E122		
C115	CAPACITOR, FIXED, PAPER: 0.22 uf \pm 20%; 100 vdcw	931-5652-00	E123	TERMINAL, STUD: same as E103	306-0915-00
C116	CAPACITOR, FIXED, CERAMIC: same as C103	913-2142-00	E124	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00
C117	CAPACITOR, FIXED, MICA: 270 uuf \pm 5%; 500 vdcw	912-0524-00	E127		
C118	CAPACITOR, FIXED, PAPER: 0.1 uf \pm 20%; 100 vdcw	931-4488-00	E128	ELECTRON TUBE SOCKET LINER: for 7 pin tube; copper; 0.005 in. by 13/32 in. by 2-5/16 in.; 7 tabs bent to 40° angle	541-6532-002
C119	NOT USED		E130		
C120	NOT USED		E131	ELECTRON TUBE SOCKET LINER: for 9 pin tube; cadmium plated copper; 0.005 in. by 13/32 in. by 2-25/32 in.; 8 tabs bent to 40° angle	541-6533-003
C121	CAPACITOR, FIXED, CERAMIC: same as C105	913-1187-00	E132	SHIELD, ELECTRON TUBE: 7 pin medium; brass; incl copper insert and hold-down spring	541-6551-003
C122	CAPACITOR, FIXED, CERAMIC: same as C103	913-2142-00	E134		
C123	CAPACITOR, FIXED, MICA: 3300 uuf \pm 2%; 500 vdcw	912-3353-00	E135	SHIELD, ELECTRON TUBE: 9 pin medium; cylindrical with flared end; open top; brass; 0.95 in. by 1.065 in.; incl beryllium copper insert	541-6554-003
C124	CAPACITOR, FIXED, CERAMIC: same as C114	913-1188-00	H101	WASHER, FLAT: round; CRES; 0.018 in. thk; 0.120 in. id. 0.375 in. od	504-0730-003
C125	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -0% +100%; 50 vdcw	183-1368-00	H102	WASHER, NONMETALLIC: plastic; 0.258 in. id, 0.312 in. od, 0.042 in. thk	541-1241-003
C126	CAPACITOR, FIXED, ELECTROLYTIC: 1450 uf +100% -10%; 50 vdcw	183-0245-00	H103	SCREW, TRANSISTOR: chemical polished copper; 3/8 in. lg w/0.051 in. w slot in head; 1/4-28 UNF-2A full thd, to 1/16 in. of head	542-1348-002
C127	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf -0% +100%; 25 vdcw	183-1379-00	H104	WASHER, FLAT: copper; 9/32 in. id, 5/8 in. od, 0.032 in. thk	542-1581-003
C128	CAPACITOR, FIXED, CERAMIC: 0.01 uf +100% -20%; 1000 vdcw	913-3183-00	H105	INSULATOR, WASHER: mica; 0.265 in. id, 11/16 in. od, 0.002/0.004 in. thk	542-1582-003
C129	CAPACITOR, FIXED, ELECTROLYTIC: 40 uf +50% -10%	183-0238-00	H106	SPACER, SLEEVE: aluminum; 0.120 in. id, 0.156 in. od, 0.375 in. lg	541-5970-002
C130	CAPACITOR, FIXED, ELECTROLYTIC: dual section; 80 uf -10% +100%; 150 vdcw ea section; Sprague Electric part no. D27473	183-0336-00	H107	ALIGNMENT TOOL, ELECTRONIC EQUIPMENT: plastic; 3/16 in. dia by 3-1/4 in. lg shouldered; one end 0.073 in. hex, other end 0.050 in. slot	542-0380-002
A & B			H108	STRAP: phosphor bronze; 0.010 in. thk, 1/2 in. w, 4 in. lg	200-0782-00
C131	NOT USED		J101	CONNECTOR, RECEPTACLE, ELECTRICAL: 9 female contacts; 5 amps; 1500 v dc; straight shape	372-1539-00
C132	CAPACITOR, FIXED, ELECTROLYTIC: 45 uf \pm 20%; 3.75 vdcw	184-7045-00	J102	CONNECTOR, RECEPTACLE, ELECTRICAL: 18 male contacts; 3 amps; straight shape	372-1050-00
C133	CAPACITOR, FIXED, ELECTROLYTIC: 280 uf +100% -10%; 40 vdcw	183-0234-00	J103	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 rd female contact; panel mtg	357-9183-00
C134	CAPACITOR, FIXED, ELECTROLYTIC: 500 uf +100% -10%; 15 vdcw	183-0236-00	J104	JACK, TIP: accommodates std, phone tip; 1250 v ac, 5 amps	360-0087-00
C135	CAPACITOR, FIXED, ELECTROLYTIC: same as C127	183-1379-00	K101	RELAY, ARMATURE: 4C contact arrangement; 3 amp at 30 v dc or 115 v ac; 12 to 15 v dc nom; 75 ohms coil resistance; continuous duty cycle	972-1463-00
C136	CAPACITOR, FIXED, ELECTROLYTIC: same as C127	183-1379-00	K102	RELAY, ARMATURE: same as K101	972-1463-00
C137	CAPACITOR, FIXED, CERAMIC: 4700 uuf \pm 5%; 300 v dc	912-3052-00	L101	REACTOR: 0.11 by inductance; 150 ma dc, 7.5 ohms dc at 25°C, 500 v rms	668-0294-00
C138	CAPACITOR, FIXED, CERAMIC: same as C114	913-1188-00	L102	COIL, RADIO FREQUENCY: 50 turns #18 AWG multiple layer wound; 25 uh, 0.05 ohm resistance; powdered iron core; #16 AWG tinned copper leads	545-3954-002
C139	CAPACITOR, FIXED, ELECTROLYTIC: 35 uf -10% +100%; 50 v dc	183-1381-00	L103	COIL, RADIO FREQUENCY: 3 pi, universal wound; #38 AWG, 1 mh inductance, 60 ma	240-0313-00
C140	CAPACITOR, FIXED, ELECTROLYTIC: same as C139	183-1381-00	MP101	RETAINER: c/o CRES shaft and 1/4-28 NF-2A thd, 5/16 in. dia by 2.031 in. lg and hardware	541-6510-002
C141	CAPACITOR, FIXED, ELECTROLYTIC: same as C139	183-1381-00	MP102	RETAINER: same as MP101	541-6510-002
CR101 thru CR104	SEMICONDUCTOR DEVICE, DIODE: silicon; Jetec type 1N1084	353-1567-00	MP103	MOUNT, RESILIENT: 1.25 to 2.1 lb load rating; 0.075 in. deflection at max load	200-0992-00
CR105	SEMICONDUCTOR DEVICE, DIODE: silicon; Hughes Aircraft type 1N461	353-0200-00	MP106		
CR106	SEMICONDUCTOR DEVICE, DIODE: same as CR105	353-0200-00	P101	CONNECTOR, RECEPTACLE, ELECTRICAL: 9 male contacts, 5 amps, 1500 v dc; straight shape	372-1538-00
CR107	SEMICONDUCTOR DEVICE, DIODE: silicon; Hughes Aircraft type 1N462	353-0197-00	P102	CONNECTOR, RECEPTACLE, ELECTRICAL: 18 female contacts, 7.5 amps; straight shape	372-1049-00
E101	TERMINAL, FEEDTHRU, INSULATED: brass w/Teflon insulation 0.218 in. od, 0.489 in. lg	306-0322-00	P103	CONNECTOR, PLUG, ELECTRICAL: 1 rd male contact; straight shape; brass, silver pl; 1 in. by 19/32 in. dia	357-9292-00
E102	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00	Q101	TRANSISTOR: germanium; Bendix part no 2N677B	352-0133-00
E103	TERMINAL, STUD: brass conductor, silver plated finish, 0.218 in. dia, 0.583 in. lg, Teflon insulation	306-0915-00	Q104		
E104	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00	Q105	TRANSISTOR: germanium; CBS-Hytron type 2N158A	352-0041-00
E105	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00	Q106	TRANSISTOR: same as Q101	352-0133-00
E106	TERMINAL, STUD: same as E103	306-0915-00	Q107	TRANSISTOR: same as Q101	352-0133-00
E107	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00	R101	RESISTOR, FIXED, COMPOSITION: 330,000 ohms \pm 10%, 1/2 w	745-1457-00
E108	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00	R102	RESISTOR, FIXED, COMPOSITION: 68 ohms \pm 10%, 1/2 w	745-1303-00
E109	TERMINAL, STUD: same as E103	306-0915-00			
E110	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00			
E111	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00			
E112	TERMINAL, STUD: same as E103	306-0915-00			
E113	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00			
E114	TERMINAL, FEEDTHRU, INSULATED: same as E101	306-0322-00			

SECTION VI

Parts List

VHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER
R103	RESISTOR, VARIABLE: composition; 10,000 ohms $\pm 20\%$; 1/2 w	380-6292-00
R104	RESISTOR, FIXED, COMPOSITION: 1800 ohms $\pm 10\%$; 1/2 w	745-1363-00
R105	RESISTOR, FIXED, COMPOSITION: same as R101	745-1457-00
R106	RESISTOR, FIXED, COMPOSITION: same as R102	745-1303-00
R107	RESISTOR, FIXED, COMPOSITION: same as R104	745-1363-00
R108	RESISTOR, FIXED, COMPOSITION: 180 ohms $\pm 10\%$; 1/2 w	745-1321-00
R109	RESISTOR, FIXED, COMPOSITION: 1800 ohms $\pm 10\%$; 1 w	745-3363-00
R110	RESISTOR, FIXED, COMPOSITION: 51,000 ohms $\pm 5\%$; 1/2 w	745-1424-00
R111	RESISTOR, FIXED, COMPOSITION: 6800 ohms $\pm 5\%$; 1/2 w	745-1386-00
R112	RESISTOR, FIXED, COMPOSITION: same as R101	745-1457-00
R113	RESISTOR, FIXED, COMPOSITION: 1 megohm $\pm 10\%$; 1/2 w	745-1478-00
R114	RESISTOR, FIXED, COMPOSITION: 0.22 megohm $\pm 10\%$; 1/2 w	745-1450-00
R115	RESISTOR, FIXED, COMPOSITION: same as R114	745-1450-00
R116	RESISTOR, FIXED, COMPOSITION: 0.15 megohm $\pm 10\%$; 1/2 w	745-1443-00
R117	RESISTOR, FIXED, COMPOSITION: 47,000 ohms $\pm 10\%$; 1/2 w	745-1422-00
R118	RESISTOR, FIXED, COMPOSITION: same as R117	745-1408-00
R119	RESISTOR, FIXED, COMPOSITION: same as R101	745-1457-00
R120	RESISTOR, FIXED, COMPOSITION: 27,000 ohms $\pm 5\%$; 1 w	745-3411-00
R121	RESISTOR, FIXED, COMPOSITION: 0.47 megohm $\pm 10\%$; 1/2 w	745-1464-00
R122	RESISTOR, FIXED, COMPOSITION: same as R121	745-1464-00
R123	RESISTOR, FIXED, COMPOSITION: 150 ohms $\pm 5\%$; 1/2 w	745-1316-00
R124	RESISTOR, FIXED, COMPOSITION: 3900 ohms $\pm 5\%$; 1/2 w	745-1376-00
R125	RESISTOR, FIXED, COMPOSITION: 1200 ohms $\pm 5\%$; 1/2 w	745-1355-00
R126	RESISTOR, FIXED, WIRE WOUND: 20 ohms $\pm 5\%$; 5 w	710-3035-00
R127	RESISTOR, FIXED, WIRE WOUND: 1500 ohms $\pm 5\%$; 5 w	710-3038-00
R128	RESISTOR, FIXED, WIRE WOUND: 30 ohms $\pm 3\%$; 5 w	747-9407-00
R129	RESISTOR, FIXED, COMPOSITION: 1500 ohms $\pm 10\%$; 1 w	745-3359-00
R130	RESISTOR, FIXED, COMPOSITION: same as R129	745-3359-00
R131	RESISTOR, FIXED, WIRE WOUND: same as R128	747-9407-00
R132	RESISTOR, FIXED, COMPOSITION: 56 ohms $\pm 1\%$; 2 w	745-5600-00
R133	RESISTOR, FIXED, WIRE WOUND: 50 ohms $\pm 5\%$; 3 w	710-2866-00
R134	RESISTOR, FIXED, COMPOSITION: 2.7 ohms $\pm 5\%$; 1 w	745-3533-00
R135	RESISTOR, FIXED, COMPOSITION: 33 ohms $\pm 10\%$; 1/2 w	745-1289-00
R136	RESISTOR, FIXED, COMPOSITION: 680 ohms $\pm 5\%$; 1/2 w	745-1344-00
R137	RESISTOR, FIXED, COMPOSITION: 3300 ohms $\pm 5\%$; 1/2 w	745-1372-00
R138	RESISTOR, FIXED, COMPOSITION: 220 ohms $\pm 10\%$; 1/2 w	745-1324-00
R139	RESISTOR, FIXED, WIRE WOUND: 63 ohms $\pm 5\%$; 5 w	747-5436-00
R140	RESISTOR, FIXED, COMPOSITION: 1000 ohms $\pm 10\%$; 1/2 w	745-1352-00
R141	RESISTOR, FIXED, COMPOSITION: 1500 ohms $\pm 10\%$; 1/2 w	745-1359-00
R142	RESISTOR, FIXED, WIRE WOUND: 5 ohms $\pm 5\%$; 3 w	710-2856-00
R143	RESISTOR, FIXED, COMPOSITION: 330 ohms $\pm 5\%$; 1/2 w	745-1330-00
R144	RESISTOR, FIXED, WIRE WOUND: 0.5 ohm $\pm 10\%$; 5 w	710-3034-00
R145	NOT USED	
R146	RESISTOR, VARIABLE: composition; 2500 ohms $\pm 20\%$; 1/2 w	380-6286-00
R147	RESISTOR, VARIABLE: composition; 1000 ohms $\pm 20\%$; 1/2 w	380-6291-00
R148	RESISTOR, FIXED, COMPOSITION: same as R137	745-1372-00
R149	RESISTOR, FIXED, COMPOSITION: same as R137	745-1372-00
R150	RESISTOR, FIXED, COMPOSITION: same as R137	745-1372-00
R151	RESISTOR, FIXED, WIRE WOUND: 6.88 ohms $\pm 1\%$; 3 w	747-9688-00
R152	RESISTOR, FIXED, WIRE WOUND: 2 ohms $\pm 3\%$; 5 w	747-9424-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R153	RESISTOR, FIXED, COMPOSITION: same as R121	745-1464-00
R154	RESISTOR, FIXED, WIRE WOUND: 40 ohms $\pm 5\%$; 11 w	746-6052-00
R155	NOT USED	
R156	NOT USED	
R157	RESISTOR, FIXED, COMPOSITION: same as R121	745-1464-00
R158	RESISTOR, FIXED, COMPOSITION: same as R117	745-1422-00
R159	RESISTOR, FIXED, COMPOSITION: 33,000 ohms $\pm 10\%$; 1, 2 w	745-1415-00
R160	RESISTOR, FIXED, COMPOSITION: 0.22 megohm $\pm 10\%$; 1/4 w	745-0833-00
R161	RESISTOR, FIXED, COMPOSITION: same as R160	745-0833-00
R162	RESISTOR, FIXED, COMPOSITION: same as R160	745-0833-00
R163	RESISTOR, FIXED, COMPOSITION: same as R102	745-1303-00
T101	TRANSFORMER, INTERMEDIATE FREQUENCY: resonance at 1 mc w. Q of 78 ± 3 using 310 ± 10 uuf capacitor; shielded; 1 adjustable iron core for tuning; 23/32 in. by 23/32 in. over-all dim.	544-9889-003
T102	TRANSFORMER, INTERMEDIATE FREQUENCY: resonance at 500 kc w. Q of 78 ± 3 using 310 ± 10 uuf capacitor; shielded; 1 adjustable iron core for tuning; 23/32 in. by 23/32 in. by 1-7/8 in. over-all dim.	544-9888-003
T103	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T102	544-9888-003
T104	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T102	544-9888-003
T105	TRANSFORMER, POWER, STEP-DOWN, STEP-UP: two 13.5 v primaries; sec #1, 265 v at 150 ma; sec #2, 130 v at 30 ma; sec #3, 13 v at 2 amp; continuous duty cycle	664-1013-00
T106	TRANSFORMER, AUDIO FREQUENCY: pri #1 20,000 ohms, pri #2 100 ohms; sec 200 ohms	667-0288-00
T107	TRANSFORMER, AUDIO FREQUENCY: pri 300 ohms, 100 ma; sec 200 ohms, CT	667-0428-00
T108	TRANSFORMER, AUDIO FREQUENCY: pri 22 ohms, CT, 50 ma; sec #1, 2800 ohms, 85 ma; sec #2, 8 ohms; sec #3, 500 ohms; continuous duty cycle	667-0429-00
TB101	BOARD-RESISTOR, NO. 1, SOLDERED: plastic; 3/32 in. thk by 1 in. w by 4-15/16 in. lg; incl 14 terminals, 1 capacitor and 8 resistors	545-3961-004
TB102	BOARD-RESISTOR, NO. 2, SOLDERED: plastic; 3/32 in. thk by 1-5/16 in. w by 3-17/32 in. lg; incl 20 terminals, diode, 2 capacitors, and 12 resistors	545-3969-005
TB103	BOARD-RESISTOR, NO. 3, SOLDERED: plastic; 3/32 in. thk by 1-5/16 in. w by 3-17/32 in. lg; incl 20 terminals, 1 capacitor and 10 resistors	545-3970-005
TB104	TERMINAL BOARD: plastic; 3/32 in. thk by 1-1/8 in. w by 3-1/2 in. lg; incl 33 feedthru terminals	545-3957-003
V101	ELECTRON TUBE: glass envelope; pentode; arinc type 5749	253-0005-00
V102	ELECTRON TUBE: same as V101	253-0005-00
V103	ELECTRON TUBE: same as V101	253-0005-00
V104	ELECTRON TUBE: glass envelope; twin triode; arinc type 7247	255-0368-00
XCR101	HOLDER, SEMICONDUCTOR DEVICE: solder-lug terminals; 2 in. lg overall	265-1057-00
XCR104		
XV101	SOCKET, ELECTRON TUBE: 7 contact miniature; two 0.125 in. dia mtg holes spaced 0.875 in. c to c	220-1273-00
XV102	SOCKET, ELECTRON TUBE: same as XV101	220-1273-00
XV103	SOCKET, ELECTRON TUBE: same as XV101	220-1273-00
XV104	SOCKET, ELECTRON TUBE: 9 contact miniature; copper nonmagnetic alloy contacts, plated; phenolic insulation	220-1244-00
	The following items are secured to the unit in a shipping bag:	
	CONNECTOR (P101)	372-1538-00
	CONNECTOR (P102)	372-1049-00
	CONNECTOR (P103)	372-9292-00
	COVER, CONNECTOR	372-1157-00
	HOOD, CONNECTOR	372-1115-00
	LOCK, ASSEMBLY	372-1727-00
	VHF COMMUNICATION TRANSCEIVER 618F-1C AND VHF COMMUNICATION TRANSCEIVER 618F-1D	522-2593-00 522-2751-00
C1	CAPACITOR, VARIABLE, ATR: 3 section; 4.4 uuf min, 5.50 uuf max; 300 v rms, 60 cps; Radio Condenser Co. part no. CN-800512	921-0016-00
C2	CAPACITOR, VARIABLE, CERAMIC: rotary type; single section; 0.5 uuf min, 4.5 uuf max, 500 vdcw; Cambridge Thermionic part no. CST-6	917-1125-00

VHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER
C3	CAPACITOR, FIXED, CERAMIC: un-insulated; 10 uuf ±1/2 uuf, 500 vdcw	916-0138-00
C4	CAPACITOR, FIXED, CERAMIC: 1000 uuf ±20%; 500 vdcw	913-1186-00
C5	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C6	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C7	CAPACITOR, FIXED, CERAMIC: un-insulated; 22 uuf ±1/2 uuf, 500 vdcw	916-0678-00
C8	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C9	CAPACITOR, FIXED, CERAMIC: 0.12 uuf ±10%; 500 vdcw; Stackpole Carbon Co. part no. GA-.12 uuf ±10%	913-3001-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C11	CAPACITOR, FIXED, CERAMIC: un-insulated; 5 uuf ±1/2 uuf, 500 vdcw	916-0118-00
C12	CAPACITOR, FIXED, MICA: 75 uuf ±2%, 500 vdcw; Electro Motive part no. DM15F750G01	912-2806-00
C13	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C14	CAPACITOR, FIXED, CERAMIC: un-insulated; 4 uuf ±1/2 uuf, 500 vdcw	916-0114-00
C15	CAPACITOR, VARIABLE, GLASS: tubular, piston type, 0.7 uuf min, 12 uuf max, 1000 vdcw; J. F. D. Electronics part no. VC22G; p/o T2	922-0416-00
C16	CAPACITOR, FIXED, CERAMIC: 1.5 uuf ±5%; 500 vdcw; Stackpole Carbon Co. part no. GA-1.5 uuf ±5%	913-2981-00
C17	CAPACITOR, VARIABLE, GLASS: same as C15; p/o T2	922-0416-00
C18	CAPACITOR, FIXED, MICA: 86 uuf ±2%; 500 vdcw; Electro Motive part no. DM15F860G; p/o T2	912-3535-00
C19	CAPACITOR, FIXED, MICA: 100 uuf ±5%; 500 vdcw; Electro Motive part no. DM15F101J01	912-2816-00
C20	CAPACITOR, FIXED, CERAMIC: 4700 uuf ±20%; 500 vdcw	913-1187-00
C21	CAPACITOR, FIXED, CERAMIC: 3300 uuf ±20%; 500 vdcw	913-1193-00
C22	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C23	CAPACITOR, FIXED, MICA: same as C18; p/o T3	912-3535-00
C24	CAPACITOR, VARIABLE, GLASS: same as C15; p/o T3	922-0416-00
C25	CAPACITOR, FIXED, CERAMIC: same as C16	913-2981-00
C26	CAPACITOR, VARIABLE, GLASS: same as C15; p/o T3	922-0416-00
C27	CAPACITOR, FIXED, MICA: same as C18; p/o T3	912-3535-00
C28	NOT USED	
C29	CAPACITOR, FIXED, CERAMIC: 10,000 uuf ±20%; 500 vdcw	913-1188-00
C30	CAPACITOR, FIXED, MICA: 560 uuf ±2%; 500 vdcw; Electro Motive part no. DM19F561G	912-2982-00
C31	CAPACITOR, FIXED, MICA: 6800 uuf ±2%; 500 vdcw; Electro Motive part no. DM30F682G01	912-2722-00
C32	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C33	CAPACITOR, FIXED, CERAMIC: 5 uuf ±0.5 uuf, -1200 ±15% temp coef, 500 vdcw; p/o S1	913-0041-00
C34	CAPACITOR, FIXED, MICA: 100 uuf ±2%; 500 vdcw; Electro Motive part no. DM15F101G01	912-2815-00
C35	CAPACITOR, VARIABLE, GLASS: tubular, piston-type, 0.8 uuf min to 8.5 uuf max, 1000 vdcw; J. F. D. Electronics part no. VC20G	922-0414-00
C36	CAPACITOR, FIXED, CERAMIC: same as C4; p/o L31	913-1186-00
C37	CAPACITOR, FIXED, CERAMIC: same as C29	913-1188-00
C38	CAPACITOR, FIXED, MICA: 10 uuf ±5%; 500 vdcw; Electro Motive part no. DM15F100J01	912-2753-00
C39	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C40	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C41	CAPACITOR, FIXED, MICA: 1000 uuf ±20%; 500 vdcw; Erie Resistor Corp. part no. 661-03 1000	912-0938-00
C42A, B, C, D	CAPACITOR, VARIABLE, AIR: 4 gang; section 1, 2, 4, 4.4 uuf min, 5.50 uuf max ±5%; section 3, 4.8 uuf min, 5.8 uuf max ±5%; 300 v rms, 60 cps	921-0019-00
C43	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C44	CAPACITOR, FIXED, CERAMIC: un-insulated; 20.0 uuf ±5%; 500 vdcw	916-0677-00
C45	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C46	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C47	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C48	CAPACITOR, FIXED, CERAMIC: same as C44	916-0677-00
C49	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C50	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C51	CAPACITOR, FIXED, MICA: 51 uuf ±5%; 500 vdcw; Electro Motive part no. DM15F510J01	912-2795-00
C52	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C53	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C54	CAPACITOR, FIXED, MICA: same as C19	912-2816-00
C55	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C56	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C57	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C58	CAPACITOR, FIXED, MICA: same as C30	912-2892-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C59	CAPACITOR, VARIABLE, CERAMIC: same as C2	917-1125-00
C60	CAPACITOR, VARIABLE, AIR: midget, single section, 3.6 uuf min, 31.5 uuf max, 600 v rms, 60 cps; E. F. Johnson Co., part no. 148-3-4	922-0454-00
C61	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C62	CAPACITOR, FIXED, MICA: same as C34	912-2815-00
C63	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C64	CAPACITOR, FIXED, MICA: same as C34	912-2815-00
C65	CAPACITOR, FIXED, CERAMIC: same as C20	913-1187-00
C66	CAPACITOR, FIXED, CERAMIC: 2.7 uuf ±5%; 500 vdcw; Stackpole Carbon Co. part no. GA-2.7 uuf ±5%	913-2987-00
C67	CAPACITOR, FIXED, CERAMIC: un-insulated; 6.0 uuf ±1/2 uuf, 500 vdcw	916-0122-00
C68	CAPACITOR, FIXED, CERAMIC: same as C67	916-0122-00
C69	CAPACITOR, FIXED, CERAMIC: un-insulated; 8.0 uuf ±1/2 uuf, 500 vdcw	916-0130-00
C70	CAPACITOR, FIXED, MICA: same as C38	912-2753-00
C71	CAPACITOR, FIXED, CERAMIC: un-insulated; 5.0 uuf ±1/4 uuf, 500 vdcw	916-0117-00
C72	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C73	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C74	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C75	CAPACITOR, FIXED, MICA: 82 uuf ±5%, 500 vdcw; Electro Motive part no. DM15E82J01	912-2810-00
C76	CAPACITOR, FIXED, CERAMIC: 0.02 uf +100% -20%, 500 vdcw; Sprague Electric Co. part no. 33C2	913-2142-00
C77	CAPACITOR, FIXED, MICA: same as C38	912-2753-00
C78	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C79	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C80	CAPACITOR, FIXED, CERAMIC: same as C4	913-1186-00
C81	CAPACITOR, FIXED, CERAMIC: same as C19	912-2816-00
E1	TERMINAL, STUD: brass, Teflon insulation; 0.172 in. dia by 0.350 in. lg; Sealectro Corp. part no. ST-SM-1	306-0324-00
E2	TERMINAL, FEEDTHRU, INSULATED: brass; Teflon insulation; 0.172 in. dia by 0.515 in. lg; Sealectro Corp. part no. FT-SM-1	306-0323-00
E3	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E4	NOT USED	
E5	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
thru E8		
E9	NOT USED	
E10	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E11	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E12	TERMINAL, STUD: same as E1	306-0324-00
E13	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E14 thru E17	TERMINAL, STUD: same as E1	306-0324-00
E18 thru E23	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00
E24	TERMINAL, STUD: brass, silver plated; 0.218 in. dia by 0.489 in. lg overall; Sealectro Corp. part no. RST-1	306-0322-00
E25	TERMINAL, STUD: same as E24	306-0322-00
E26	TERMINAL, STUD: same as E24	306-0322-00
E27	TERMINAL, STUD: same as E24	306-0322-00
E28	TERMINAL, FEEDTHRU, INSULATED: same as as E2	306-0323-00
E29 thru E35	TERMINAL, STUD: same as E1	306-0324-00
E36	NOT USED	
E37	TERMINAL, STUD: same as E1	306-0324-00
E38	NOT USED	
E39	TERMINAL, STUD: same as E1	306-0324-00
E40	NOT USED	
E41	NOT USED	
E42	TERMINAL, STUD: same as E1	306-0324-00
E43	TERMINAL, STUD: same as E1	306-0324-00
E44	TERMINAL, STUD: double turret type; brass terminal, ceramic insulation; brass, cadmium plated; 4-40 thd mtg stud; 1/4 in. hex by 25/32 in. lg overall; Cambridge Thermionic part no. X2045-X	306-0961-00
E45	TERMINAL, STUD: brass, standoff type; screw mtg; steatite insulation; Cambridge Thermionic part no. X1942-X	306-0389-00
E46 thru E53	TERMINAL, FEEDTHRU, INSULATED: same as E2	306-0323-00

SECTION VI
Parts List

VHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER
E54	NOT USED	
E55	STUD, SLUG, SOLDERED: c/o powdered iron core, 10 to 12 mc freq range & brass screw; 1-3/4 in. lg overall	545-4807-002
E56	STUD, SLUG, SOLDERED: same as E55	545-4807-002
E57	STUD, SLUG, SOLDERED: same as E55	545-4807-002
E58	STUD, SLUG, SOLDERED: same as E55	545-4807-002
H1	RING, RETAINING: copper, 0.015 in. thk, 0.094 in. id, Waldes-Kohinoor part no. 5133-12-C	340-0250-00
H2	MOUNT, RESILIENT: 1.25 to 2.1 lg load rating; 0.075 in. deflection at max load; Lord Mfg. part no. J-6677-3	200-0992-00
H3	MOUNT, RESILIENT: 0.9 to 1.5 lb load rating; 0.075 in. deflection at max load; Lord Mfg. part no. J-6677-1	200-0990-00
H4	NOT USED	
H5	WASHER, FLAT: CRES, 0.0156 in. thk, 0.197 in. id, 3/8 in. od	506-5910-003
H6	NOT USED	
H7	WASHER, FLAT: brass; 0.116 in. id, 1/4 in. od, 0.025 in. thk	542-7470-003
H8	COLLAR, 1/4 BORE: CRES, 0.170 in. w by 0.468 in. dia; 6-40 NF-2B, 2 holes, 90° apart	542-6624-002
H9	NOT USED	
H10	NOT USED	
H11	COLLAR, SHAFT: CRES; 0.280 in. w, 0.1875 in. id, 13/32 in. od	548-6762-002
H12	STUD, SLUG, SOLDERED: c/o powdered iron core, 10 to 12 mc freq range & brass screw; 1-5/8 in. lg overall	548-2831-002
H13	TERMINAL, LUG: bent soldering lug w/shake-proof locking hole, #4 screw size; 5/16 in. by 41/64 in., Shakeproof, Inc. Div. of Illinois Tool Works part no. 2104-04-01-2520	304-0317-00
H14	PIN: CRES; 0.1245 in. dia by 0.257 in. lg; 2 grooves 0.017 in. w, 0.030 in. from ea end	545-4796-002
H15	COLLAR, CRES; 0.531 in. od by 0.321 in. id by 0.170 in. 2; two 6-40 NF-2B thd holes	545-4801-002
H16	SPRING, HELICAL, COMPRESSION: CRES wire; 0.025 in. dia; 9 turns rh or lh wound; 0.193 in. id by -.243 in. od by 0.537 in. free lg	545-4805-002
H17	SPRING, SLUG LOCKING: tinned music wire 0.033 in. dia, 0.786 in. lg approx.	545-4806-002
H18	SPRING, EXTENSION: tinned music wire 5/32 in. 0.506 in. free length; 15 coils right hand wound	545-4854-002
H19	POST, ANCHOR: aluminum; 0.250 in. square by 0.531 in. lg; tapped for 4-40 NC-2B thread	545-4788-002
H20	COLLAR, SHAFT: CRES, 0.170 in. w by 0.1875 in. id, 0.406 in. od	548-6761-002
H21	NOT USED	
H22	RING, RETAINING: copper, type E, 0.145 in. id, 0.025 in. thk; Waldes-Kohinoor part no. 5133-18-C	340-0253-00
J1	CONNECTOR, RECEPTACLE, ELECTRICAL: brass silver plated; 1 contact; RF Products Co. part no. 87075	357-9183-00
J2	CONNECTOR, RECEPTACLE, ELECTRICAL: 1 contact, 1 mating end; Industrial Products Co. part no. 53475	357-9215-00
J3	CONNECTOR, RECEPTACLE, ELECTRICAL: 24 female contacts, 5 amp; Amphenol part no. 57-40240	372-1847-00
J4	JACK, TIP: for use w/0.090 in. dia male contact; 5.5 amp; Sealectro Corp. part no. SKT-2-BC	360-0087-00
J5	JACK, TIP: same as J4	306-0087-00
K1	RELAY, ARMATURE: 1C; 1 amp, 17 v dc max voltage, 75 ohms resistance; RBM Manufacturing, Div. Essex Wire part no. GX8982C	972-1461-00
K2	NOT USED	
K3	RELAY, ARMATURE: 2C 30 mv at 30 ua; 13 v dc nom; 146 ohms dc resistance; continuous duty; General Electric Co. part no. 3S2791G201F6	974-0657-00
L1	COIL, RADIO FREQUENCY, NO. 1: silver plated soft drawn #18 AWG copper wire, 9/32 in. id, 5/8 in. h; 1/2 in. lg overall	545-4877-002
L2	COIL, RADIO FREQUENCY: 1.50 uh ±20%, 0.50 ohms max dc resistance, 650 ma current; Jeffers Electronics part no. 10100-129	240-0063-00
L3	COIL, RADIO FREQUENCY, NO. 2: silver plated soft drawn #18 AWG copper wire, 9/32 in. id, 7/16 in. h, 0.9375 in. lg overall	545-4878-002
L4	COIL, RADIO FREQUENCY, NO. 3: silver plated soft drawn #18 AWG copper wire; 9/32 in. id, 7/16 in. h by 19/32 in. lg overall	545-4879-002
L5	COIL, INTERMEDIATE FREQUENCY: c/o formica coil form 1.359 in. lg and 2 silver plated copper retaining rings; p/o T2	548-2830-003
L6	COIL, INTERMEDIATE FREQUENCY: same as L5; p/o T2	548-2830-003

ITEM	DESCRIPTION	COLLINS PART NUMBER
L7	COIL, INTERMEDIATE FREQUENCY: same as L5; p/o T3	548-2830-003
L8	COIL, INTERMEDIATE FREQUENCY: same as L5; p/o T3	548-2830-003
L9	p/o T1	
L10	p/o T1	
L11	p/o S1	
L28		
L29	COIL, RADIO FREQUENCY: 0.47 uh ±20%, 0.09 ohm max dc resistance; 1600 ma dc; Jeffers Electronics part no. 10100-126	240-0060-00
L30	COIL, VHF, OSC.: silver plated soft drawn #18 AWG copper wire; 3/16 in. id, 2-1/2 turns at 8 turns per inch; flatten end to 0.027 in. w	545-4884-002
L31	STEP, TUNER: glass base epoxy, 1.156 in. w by 2.687 in. lg overall; includes front and rear circuitry and C36	545-4912-004
L32	COIL, RADIO FREQUENCY: 550 ma current; 1 ohm; 12.0 ±10% uh; 3/16 in. dia, 7/16 in. lg overall; Jeffers Electronics part no. 10102-34	240-0150-00
L33	COIL, RADIO FREQUENCY, NO. 4: silver plated soft drawn #18 AWG copper wire, 9/32 in. id, 3 turns at 11 turns per inch	545-4880-002
L34	COIL, RADIO FREQUENCY, NO. 5: silver plated soft drawn #18 AWG copper wire; 9/32 in. id, 3 turns at 9 turns per inch	545-4881-002
L35	COIL, RADIO FREQUENCY: single layer wound, 2.20 uh inductance, 1.10 ohm dc resistance, 450 ma dc current; Jeffers Electronics part no. 10100-130	240-0064-00
L36	COIL, RADIO FREQUENCY, NO. 6: silver plated soft drawn #18 AWG copper wire; 9/32 in. id, 2-1/4 turns at 11 turns per inch	545-4882-002
L37	COIL, RADIO FREQUENCY: same as L35	240-0064-00
L38	COIL, RADIO FREQUENCY: same as L35	240-0064-00
L39	COIL, POWER AMPLIFIER: silver plated #14 AWG soft drawn copper wire; 3/8 in. id, 7/8 in. h; 2-1/4 turns at 5 turns per inch	545-4883-002
L40	LOOP, COUPLING: silver plated #14 AWG soft drawn copper wire w/Teflon insulation; 3/8 in. id, 1 turn at 5 turns per inch	545-4885-002
L41	COIL, RADIO FREQUENCY: same as L35	240-0064-00
L42	COIL, RADIO FREQUENCY: same as L2	240-0063-00
L43	COIL, RADIO FREQUENCY: single layer wound, 0.33 uh nom inductance, 0.07 ohm dc resistance, 1700 ma current rating; Jeffers Electronics part no. 10100-125	240-0068-00
L44	COIL, RADIO FREQUENCY: same as L35	240-0064-00
L45	COIL, RADIO FREQUENCY: same as L35	240-0064-00
L46	COIL, RADIO FREQUENCY: 0.22 uh, 0.04 ohm dc resistance, 2200 ma dc current rating; Jeffers Electronics part no. 10100-124	240-0067-00
L47	COIL, RADIO FREQUENCY: same as L35	240-0064-00
L48	COIL, RADIO FREQUENCY: same as L2	240-0063-00
MP1	COUPLING, HALF-SHAFT, PRESSED: c/o aluminum 0.187 in. w by 0.656 in. dia shaft and two steel headless pins 0.0928 in. dia by 0.250 in. lg	548-3887-002
MP2	SHAFT: CRES, 0.187 in. dia by 2-31/32 in. lg	545-4779-002
MP3	GEAR CLUSTER, SPUR: c/o 2 aluminum gears one w/34 teeth, other w/17 teeth, both w/20° pressure angle and diametral pitch of 48; 17 tooth gear w/0.3541 in. std pitch dia, 0.360 in. lg; 0.226 in. w face; 34 tooth gear w/0.7083 in. std pitch dia, 0.0900 in. w face	545-4815-002
MP4	GEARSHAFT, SPUR: c/o CRES shaft 0.1870 in. dia by 1.328 in. lg; and aluminum gear w/33 teeth, 20° pressure angle, diametral pitch 48, 0.6875 in. std pitch dia, 0.187 in. w overall	548-6763-002
MP5	GEARSHAFT, BEVEL, VHF OSC: pinned; c/o glass epoxy shaft 0.248 in. dia by 1-1/32 in. lg; and brass bevel gear w/21 teeth, diametral pitch 48, 20° pressure angle, 0.4375 in. std pitch dia, 0.093 in. w face	545-4835-002
MP6	GEARSHAFT, BEVEL, HF OSC PINNED: plastic paper base shaft 0.248 in. dia by 1/2 in. lg; and 21 tooth bevel gear w/diametral pitch of 48, 20° pressure angle, 0.4375 in. std pitch dia; 0.093 in. w face	545-4839-002
MP7	SHAFT: CRES, 0.1870 in. dia by 0.636 in. lg; undercut 0.005, 3/16 in. lg	545-4867-002
MP8	COUPLING, SHAFT, FLEXIBLE: brass hubs, nylon insulator; 2 setscrew holes 90° apart ea hub; Renbrandt, Inc, part no. A-201-4(Mod)	015-1410-00
MP9	COUPLING, SHAFT, FLEXIBLE: same as MP8	015-1410-00
MP10	INSERT, FLEXIBLE, COUPLING: CRES; 0.125 in. w by 0.656 in. dia, 4 notches 0.0930 in. w	548-3885-002

VHF Communication Transceiver 618F-1 () and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER	ITEM	DESCRIPTION	COLLINS PART NUMBER
MP11	BEARING, SLEEVE: flanged, porous bronze, 15/32 in. dia by 0.125 in. lg; Oilite-Chrysler part no. F-347-4	309-0125-00	P2	CONNECTOR, PLUG, ELECTRICAL: brass body; copper contact, right-angle shape for use w/ RG-55, 58, 142/U and similar sized cables; Industrial Products part no. 49225	357-9424-00
MP12	BEARING, SLEEVE: same as MP11	309-0125-00	P3	CONNECTOR, PLUG, ELECTRICAL: 24 male contacts; 5 amp, 700 v dc; Amphenol part no. 100X3599-0	372-1846-00
MP13	BEARING, SLEEVE: flanged, porous bronze, 15/32 in. dia by 11/64 in. lg; Oilite-Chrysler part no. F-347	309-0079-00	R1	RESISTOR, FIXED, COMPOSITION: 0.10 megohm $\pm 10\%$, 1/4 w	745-0821-00
MP14	BEARING, SLEEVE: same as MP13	309-0079-00	R2	RESISTOR, FIXED, COMPOSITION: 120 ohms $\pm 10\%$, 1/4 w	745-0716-00
MP15	PLATE, GEAR, PRESSED: c/o aluminum gear plate 0.090 in. by 3.375 in. by 4.718 in. w/two steel posts, and 4 flanged bronze bearings	548-3889-002	R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms $\pm 10\%$, 1/2 w	745-1352-00
MP16	CAM, SLUG RACK, SOLDERED: brass cam 0.064 in. thk, irregular shape; and steel hub, 0.265 in. w, 0.170 in. w face of hub, 13/32 in. dia; undercut to 0.312 in. dia	545-4783-002	R4	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
MP17	SHAFT: CRES, 0.187 in. dia by 2-31/32 in. lg	545-4779-002	R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
MP18	PLATE, BEARING, AUX PRESSED: aluminum plate 0.063 in. by 1.130 in. by 1.910 in. approx and flanged bronze bearing	545-4775-002	R6	RESISTOR, FIXED, COMPOSITION: 47,000 ohms $\pm 10\%$, 1/4 w	745-0809-00
MP19	ROLLER: CRES, 0.093 in. w, 0.1250 in. id, 0.187 in. od	545-4797-002	R7	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
MP20	SHAFT, STUD: CRES, 0.1867 in. dia, 0.500 in. lg; undercut and grooved	545-4865-002	R8	RESISTOR, FIXED, COMPOSITION: 220 ohms $\pm 10\%$, 1/4 w	745-0725-00
MP21	GEAR, SPUR: aluminum, 50 teeth, diametral pitch 48, 20° pressure angle, 1.0416 in. std pitch dia; 0.147 in. w face, 0.177 in. lg overall	545-4811-002	R9	RESISTOR, FIXED, COMPOSITION: 10,000 ohms $\pm 10\%$, 1/4 w	745-0785-00
MP22	GEAR, SPUR: aluminum; 33 teeth, diametral pitch 48, 20° pressure angle, 0.6875 in. std pitch dia, 0.093 in. w face, 0.2805 in. lg overall	545-4812-002	R10	RESISTOR, FIXED, COMPOSITION: 2700 ohms $\pm 10\%$, 1/2 w	745-1370-00
MP23	GEAR, BEVEL: brass, 21 teeth, diametral pitch 48, 20° pressure angle, 0.4375 in. std pitch dia, 0.467 in. od of gear, 0.093 in. w face, 0.28125 in. lg approx	545-4832-002	R11	RESISTOR, FIXED, COMPOSITION: 10 ohms $\pm 10\%$, 1/2 w	745-1268-00
MP24	PLATE, GEAR, PRESSED: same as MP15	548-3889-002	R12	RESISTOR, FIXED, COMPOSITION: same as R6	745-0809-00
MP25	GEAR, BEVEL: same as MP23	545-4832-002	R13	NOT USED	
MP26	NOT USED		R14	RESISTOR, FIXED, WIRE WOUND: 8000 ohms $\pm 5\%$, 3 w; Sprague Electric part no. 242E8025	747-9613-00
MP27	GEAR, SPUR: aluminum, 46 teeth, 48 diametral pitch, 20° pressure angle, 0.9583 in. std pitch dia, 0.109 in. w face, 0.1875 in. w overall	545-4825-002	R15	RESISTOR, FIXED, COMPOSITION: 270 ohms $\pm 10\%$, 1/4 w	745-0728-00
MP28	GEAR, SPUR: same as MP27	545-4825-002	R16	RESISTOR, FIXED, COMPOSITION: same as R15	745-0728-00
MP29	GEARSHAFT, SPUR, VHF, OSC DRIVE, PRESSED: c/o steel shaft 0.1925 in. dia after knurling; 1-19/32 in. lg and 33 tooth aluminum spur gear w/ diametral pitch of 48, 20° pressure angle, 0.6875 in. std pitch dia, 0.080 in. w face	545-4829-002	R17	RESISTOR, FIXED, COMPOSITION: 0.47 megohm $\pm 10\%$, 1/4 w	745-0845-00
MP30	BLOCK, BEARING, PRESSED: bronze oilite bearing 0.1885 in. id, 0.3145 in. od, and aluminum block 1/2 in. w by 0.687 in. lg	545-4831-002	R18	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
MP31 thru MP41	NOT USED		R19	RESISTOR, FIXED, COMPOSITION: same as R10	745-1370-00
MP42	BEARING, SLUG RACK: aluminum casting alloy, 0.738 in. by 0.819 in. by 1.165 in. approx	545-4904-003	R20	RESISTOR, FIXED, COMPOSITION: same as R17	745-0845-00
MP43	SHAFT, SLUG RACK: glass bonded mica, 0.249 in. dia by 7-11/16 in. lg	545-4802-002	R21	RESISTOR, FIXED, COMPOSITION: same as R17	745-0845-00
MP44	NOT USED		R22	RESISTOR, FIXED, COMPOSITION: 22,000 ohms $\pm 10\%$, 1/4 w	745-0797-00
MP45	NOT USED		R23	NOT USED	
MP46	LINK, SLUG RACK: aluminum, 0.063 in. thk, 7/16 in. w by 1.061 in. lg overall	545-4803-002	R24	RESISTOR, FIXED, WIRE WOUND: 150 ohms $\pm 5\%$, 3 w	710-2868-00
MP47	LINK, SLUG RACK: same as MP46	545-4803-002	R25	RESISTOR, FIXED, COMPOSITION: 22 ohms $\pm 10\%$, 1/2 w	745-1282-00
MP48	BAR, SLUG RACK: aluminum, 0.250 in. by 0.250 in., 2.446 in. lg overall; undercut and grooved ea end	545-4804-002	R26	RESISTOR, FIXED, COMPOSITION: same as R17	745-0845-00
MP49	NOT USED		R27	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
MP50	GEARSHAFT, SPUR, PRESSED: c/o steel shaft, 0.1870 in. dia by 1-31/32 in. lg and 33 tooth aluminum spur gear w/ diametral pitch of 48, 20° pressure angle, 0.6875 in. std pitch dia; 0.187 in. w face	545-4824-002	R28	RESISTOR, FIXED, COMPOSITION: 0.10 megohm $\pm 10\%$, 1/2 w	745-1436-00
MP51	NOT USED		R29	RESISTOR, FIXED, COMPOSITION: 47,000 ohms $\pm 10\%$, 1/2 w	745-1422-00
MP52	PLATE, SUB: aluminum 0.090 in. thk, 3.375 in. w by 4.718 in. lg; irregular shape	545-4903-003	R30	RESISTOR, FIXED, COMPOSITION: same as R1	745-0821-00
MP53	NOT USED		R31	RESISTOR, FIXED, COMPOSITION: 33,000 ohms $\pm 10\%$, 1/4 w	745-0803-00
MP54	NOT USED		R32	RESISTOR, FIXED, WIRE WOUND: 3900 ohms $\pm 5\%$, 3 w; Sprague Electric part no. 242E3925	747-9603-00
MP55	SHAFT, IDLER: CRES; 0.1870 in. dia, 1.132 in. lg overall; thd 4-40 NC-2B, 1/4 in. lg both ends	545-4826-002	R33	RESISTOR, FIXED, COMPOSITION: same as R9	745-0785-00
MP56	SHAFT, IDLER: same as MP55	545-4826-002	R34	RESISTOR, FIXED, COMPOSITION: 150 ohms $\pm 10\%$, 1 w	745-3317-00
MP57	NOT USED		R35	RESISTOR, FIXED, COMPOSITION: 560 ohms $\pm 10\%$, 1/4 w	745-0740-00
MP58	NOT USED		R36	RESISTOR, FIXED, COMPOSITION: 18,000 ohms $\pm 10\%$, 1/2 w	745-1405-00
MP59	ARM, ROCKER: aluminum, 0.032 in. thk, irregular shape; bent at 47° angle	545-4798-002	R37	RESISTOR, FIXED, COMPOSITION: 5600 ohms $\pm 10\%$, 1/2 w	745-1384-00
MP60	FRAME, DIFFERENTIAL, STAKED: c/o 0.063 in. thk aluminum frame, 3/4 in. w by 1.645 in. lg and steel hub 0.230 in. w face, 0.334 in. w overall by 0.406 in. dia, undercut	545-4810-002	R38	RESISTOR, FIXED, COMPOSITION: 15,000 ohms $\pm 10\%$, 1/2 w	745-1401-00
P1	CONNECTOR, PLUG, ELECTRICAL: 1 male contact, 50 ohms; Industrial Products part no. 85050	357-9169-00	R39	RESISTOR, FIXED, COMPOSITION: 120 ohms $\pm 10\%$, 1 w	745-3314-00
			R40	RESISTOR, FIXED, COMPOSITION: same as R22; p/o S1	745-0797-00
			R41	RESISTOR, FIXED, WIRE WOUND: 2 ohms $\pm 5\%$; 5 w	710-3030-00
			R42	RESISTOR, FIXED, WIRE WOUND: 75 ohms $\pm 5\%$; 5 w	710-3037-00
			S1	SWITCH, COIL, FLARED: c/o 43 tubelets, one glass base epoxy stator, one rotor, 4 contact arms, front and rear circuitry, 18 coils, 18 tuning cores and assorted hardware; includes C33, L11 thru L28 and R40	548-2829-00
			S2	NOT USED	
			S3	SWITCH, HF CRYSTAL, FLARED: c/o 41 tubelets, 4 contact arms, 2 glass base epoxy stators, one rotor and assorted hardware	545-4918-004
			S4	NOT USED	

SECTION VI

Parts List

VHF Communication Transceiver 618F-1() and
Fixed I-F, Audio, and Power Supply 427D-1

ITEM	DESCRIPTION	COLLINS PART NUMBER
S5	SWITCH, CRYSTAL, FLARED: c/o 36 tubelets, one glass base epoxy star, one rotor, 2 contact arms, front and rear circuitry and assorted hardware	545-4916-004
T1	TRANSFORMER, INTERMEDIATE FREQUENCY: 23/32 in. by 23/32 in. by 1-7/8 in. overall; includes one 560 uuf ±1 uuf capacitor, two 62 uuf capacitors and L9 and L10	544-9889-003
T2	COIL ASSEMBLY, INTERMEDIATE FREQUENCY: incls two coils ea wound w/7 strand no. 44 Litz wire; includes C15, C17, C18 and L5, L6	548-2828-00
T3	COIL ASSEMBLY, INTERMEDIATE FREQUENCY: includes two coils, ea wound w/7 strand no. 44 Litz wire; includes C23, C24, C26, C27 and L7, L8	548-2827-00
V1	ELECTRON TUBE: ARINC vacuum tube type 5654	253-0001-00
V2	ELECTRON TUBE: same as V1	253-0001-00
V3	ELECTRON TUBE: same as V1	253-0001-00
V4	ELECTRON TUBE: ARINC vacuum tube type 5670	253-0002-00
V5	ELECTRON TUBE: same as V4	253-0002-00
V6	ELECTRON TUBE: same as V1	253-0001-00
V7	ELECTRON TUBE: pentode; Amperex type 6688	255-0338-00
V8	ELECTRON TUBE: ARINC vacuum tube type 5686	253-0009-00
V9	ELECTRON TUBE: beam power; RCA type 7551	257-0178-00
XV1	SOCKET, ELECTRON TUBE: 7 contact, top mtg, miniature; 1 amp; Sylvania part no. V24-6034	220-1273-00
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1273-00
XV3	SOCKET, ELECTRON TUBE: same as XV1	220-1273-00
XV4	SOCKET, ELECTRON TUBE: 9 contact, miniature, tube socket for UHF application; phenolic insulation; Sylvania part no. 7490-0100	220-1244-00
XV5	SOCKET, ELECTRON TUBE: same as XV4	220-1244-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1273-00
XV7	SOCKET, ELECTRON TUBE: same as XV4	220-1244-00
XV8	SOCKET, ELECTRON TUBE: 9 contact, bottom mtg, UHF w/o a center shield; phenolic insulation; Elco Corp. part no. BR512S-BC	220-1453-00
XV9	SOCKET, ELECTRON TUBE: same as XV4	220-1244-00
*Y1	CRYSTAL UNIT, QUARTZ: 65.24250 mc frequency	289-1766-00
*Y2	CRYSTAL UNIT, QUARTZ: 65.74250 mc frequency	289-1767-00
*Y3	CRYSTAL UNIT, QUARTZ: 66.24250 mc frequency	289-1768-00
*Y4	CRYSTAL UNIT, QUARTZ: 66.74250 mc frequency	289-1769-00
*Y5	CRYSTAL UNIT, QUARTZ: 67.24250 mc frequency	289-1770-00
*Y6	CRYSTAL UNIT, QUARTZ: 67.74250 mc frequency	289-1771-00
*Y7	CRYSTAL UNIT, QUARTZ: 68.24250 mc frequency	289-1772-00
*Y8	CRYSTAL UNIT, QUARTZ: 68.74250 mc frequency	289-1773-00
*Y9	CRYSTAL UNIT, QUARTZ: 69.24250 mc frequency	289-1774-00
*Y10	CRYSTAL UNIT, QUARTZ: 69.74250 mc frequency	289-1775-00
*Y11	CRYSTAL UNIT, QUARTZ: 70.24250 mc frequency	289-1776-00
*Y12	CRYSTAL UNIT, QUARTZ: 70.74250 mc frequency	289-1777-00
*Y13	CRYSTAL UNIT, QUARTZ: 71.24250 mc frequency	289-1778-00
*Y14	CRYSTAL UNIT, QUARTZ: 71.74250 mc frequency	289-1779-00
*Y15	CRYSTAL UNIT, QUARTZ: 72.24250 mc frequency	289-1780-00
*Y16	CRYSTAL UNIT, QUARTZ: 72.74250 mc frequency	289-1781-00
*Y17	CRYSTAL UNIT, QUARTZ: 73.24250 mc frequency	289-1782-00
*Y18	CRYSTAL UNIT, QUARTZ: 73.74250 mc frequency	289-1783-00
*Y19	CRYSTAL UNIT, QUARTZ: 11.535000 mc frequency	289-1791-00
*Y20	CRYSTAL UNIT, QUARTZ: 11.585000 mc frequency	289-1792-00
*Y21	CRYSTAL UNIT, QUARTZ: 11.635000 mc frequency	289-1793-00
*Y22	CRYSTAL UNIT, QUARTZ: 11.685000 mc frequency	289-1794-00
*Y23	CRYSTAL UNIT, QUARTZ: 11.735000 mc frequency	289-1795-00
*Y24	CRYSTAL UNIT, QUARTZ: 11.785000 mc frequency	289-1796-00

*Used on 618F-1C only.

ITEM	DESCRIPTION	COLLINS PART NUMBER
*Y25	CRYSTAL UNIT, QUARTZ: 11.835000 mc frequency	289-1797-00
*Y26	CRYSTAL UNIT, QUARTZ: 11.885000 mc frequency	289-1798-00
*Y27	CRYSTAL UNIT, QUARTZ: 11.935000 mc frequency	289-1799-00
*Y28	CRYSTAL UNIT, QUARTZ: 11.985000 mc frequency	289-1800-00
*Y29	CRYSTAL UNIT, QUARTZ: 12.035000 mc frequency	289-1801-00
*Y30	CRYSTAL UNIT, QUARTZ: 12.085000 mc frequency	289-1802-00
*Y31	CRYSTAL UNIT, QUARTZ: 12.135000 mc frequency	289-1803-00
*Y32	CRYSTAL UNIT, QUARTZ: 12.185000 mc frequency	289-1804-00
*Y33	CRYSTAL UNIT, QUARTZ: 12.235000 mc frequency	289-1805-00
*Y34	CRYSTAL UNIT, QUARTZ: 12.285000 mc frequency	289-1806-00
*Y35	CRYSTAL UNIT, QUARTZ: 12.335000 mc frequency	289-1807-00
*Y36	CRYSTAL UNIT, QUARTZ: 12.385000 mc frequency	289-1808-00
*Y37	CRYSTAL UNIT, QUARTZ: 12.435000 mc frequency	289-1809-00
*Y38	CRYSTAL UNIT, QUARTZ: 12.485000 mc frequency	289-1810-00
**Y1	CRYSTAL UNIT, QUARTZ: 64.74250 mc frequency	289-1784-00
**Y2	CRYSTAL UNIT, QUARTZ: 65.24250 mc frequency	289-1766-00
**Y3	CRYSTAL UNIT, QUARTZ: 65.74250 mc frequency	289-1767-00
**Y4	CRYSTAL UNIT, QUARTZ: 66.24250 mc frequency	289-1768-00
**Y5	CRYSTAL UNIT, QUARTZ: 66.74250 mc frequency	289-1769-00
**Y6	CRYSTAL UNIT, QUARTZ: 67.24250 mc frequency	289-1770-00
**Y7	CRYSTAL UNIT, QUARTZ: 67.74250 mc frequency	289-1771-00
**Y8	CRYSTAL UNIT, QUARTZ: 68.24250 mc frequency	289-1772-00
**Y9	CRYSTAL UNIT, QUARTZ: 68.74250 mc frequency	289-1773-00
**Y10	CRYSTAL UNIT, QUARTZ: 69.24250 mc frequency	289-1774-00
**Y11	CRYSTAL UNIT, QUARTZ: 69.74250 mc frequency	289-1775-00
**Y12	CRYSTAL UNIT, QUARTZ: 70.24250 mc frequency	289-1776-00
**Y13	CRYSTAL UNIT, QUARTZ: 70.74250 mc frequency	289-1777-00
**Y14	CRYSTAL UNIT, QUARTZ: 71.24250 mc frequency	289-1778-00
**Y15	CRYSTAL UNIT, QUARTZ: 71.74250 mc frequency	289-1779-00
**Y16	CRYSTAL UNIT, QUARTZ: 72.24250 mc frequency	289-1780-00
**Y17	CRYSTAL UNIT, QUARTZ: 72.74250 mc frequency	289-1781-00
**Y18	CRYSTAL UNIT, QUARTZ: 73.24250 mc frequency	289-1782-00
**Y19	CRYSTAL UNIT, QUARTZ: 73.74250 mc frequency	289-1783-00
**Y20	CRYSTAL UNIT, QUARTZ: 11.585000 mc frequency	289-1792-00
**Y21	CRYSTAL UNIT, QUARTZ: 11.635000 mc frequency	289-1793-00
**Y22	CRYSTAL UNIT, QUARTZ: 11.685000 mc frequency	289-1794-00
**Y23	CRYSTAL UNIT, QUARTZ: 11.735000 mc frequency	289-1795-00
**Y24	CRYSTAL UNIT, QUARTZ: 11.785000 mc frequency	289-1796-00
**Y25	CRYSTAL UNIT, QUARTZ: 11.835000 mc frequency	289-1797-00
**Y26	CRYSTAL UNIT, QUARTZ: 11.885000 mc frequency	289-1798-00
**Y27	CRYSTAL UNIT, QUARTZ: 11.935000 mc frequency	289-1799-00
**Y28	CRYSTAL UNIT, QUARTZ: 11.985000 mc frequency	289-1800-00
**Y29	CRYSTAL UNIT, QUARTZ: 12.035000 mc frequency	289-1801-00
**Y30	CRYSTAL UNIT, QUARTZ: 12.085000 mc frequency	289-1802-00
**Y31	CRYSTAL UNIT, QUARTZ: 12.135000 mc frequency	289-1803-00
**Y32	CRYSTAL UNIT, QUARTZ: 12.185000 mc frequency	289-1804-00
**Y33	CRYSTAL UNIT, QUARTZ: 12.235000 mc frequency	289-1805-00
**Y34	CRYSTAL UNIT, QUARTZ: 12.285000 mc frequency	289-1806-00
**Y35	CRYSTAL UNIT, QUARTZ: 12.335000 mc frequency	289-1807-00
**Y36	CRYSTAL UNIT, QUARTZ: 12.385000 mc frequency	289-1808-00
**Y37	CRYSTAL UNIT, QUARTZ: 12.435000 mc frequency	289-1809-00
**Y38	CRYSTAL UNIT, QUARTZ: 12.485000 mc frequency	289-1810-00
	The following items are secured to the unit in a shipping bag:	
	CONNECTOR (P1)	357-9169-00
	CONNECTOR (P2)	357-9424-00
	CONNECTOR (P3)	372-1846-00

*Used on 618F-1C only.

**Used on 618F-1D only.

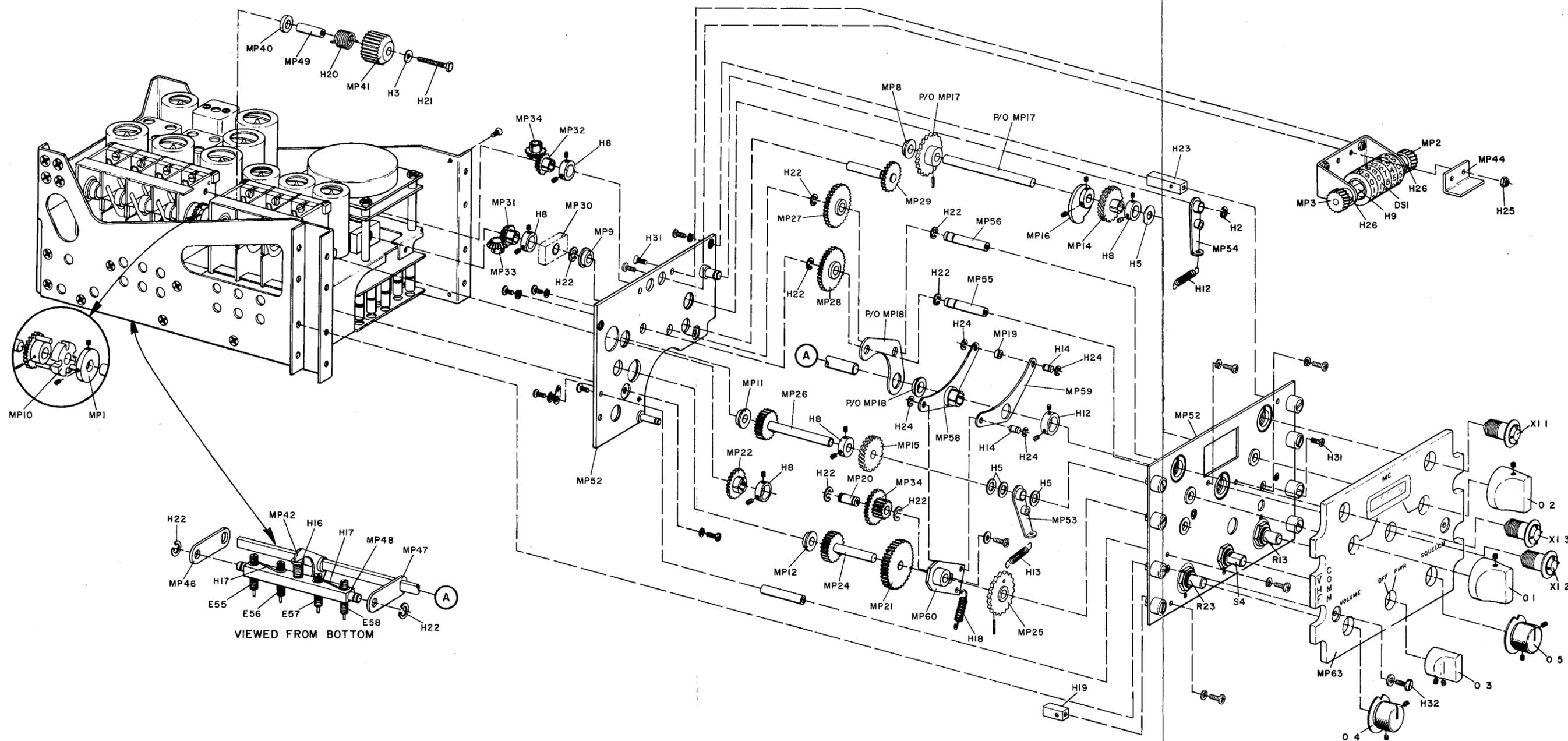


Figure 6-1. VHF Communication Transceiver
618F-1A/1B Tuning Mechanism, Exploded View

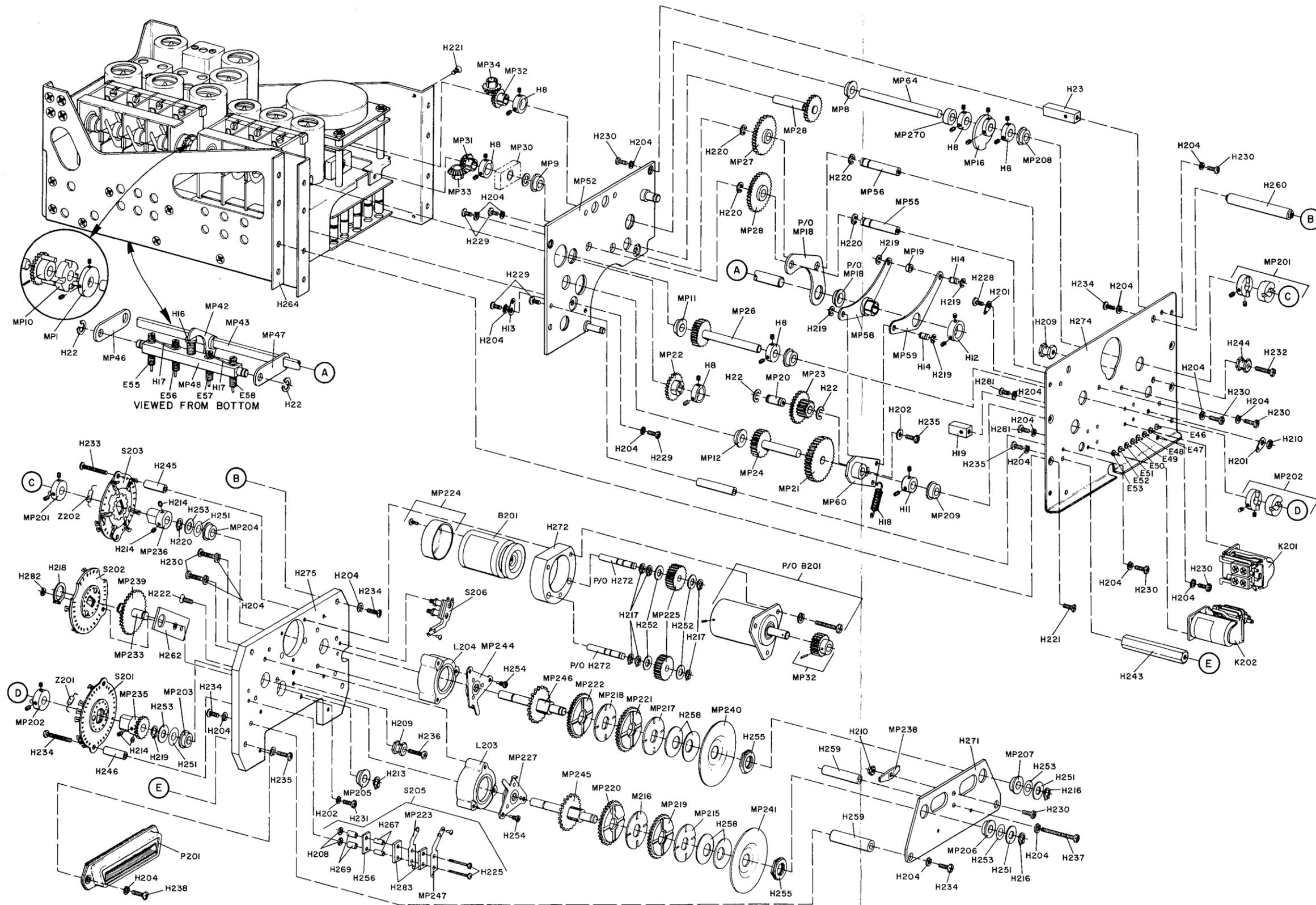


Figure 6-2. VHF Communication Transceiver
618F-1C/1D Tuning Mechanism,
Exploded View

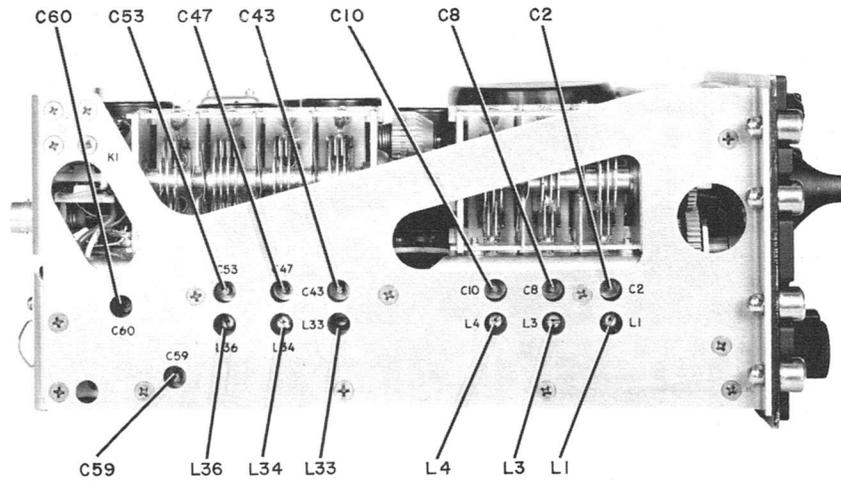


Figure 6-3. VHF Communication Transceiver 618F-1A/1B,
Case Removed, Left Side View

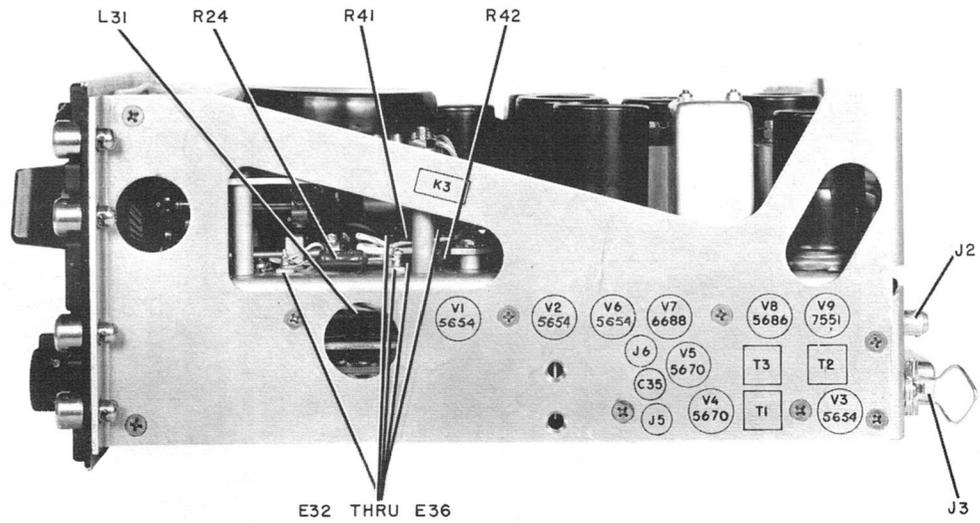


Figure 6-4. VHF Communication Transceiver 618F-1A/1B,
Case Removed, Right Side View

SECTION VI
Parts List

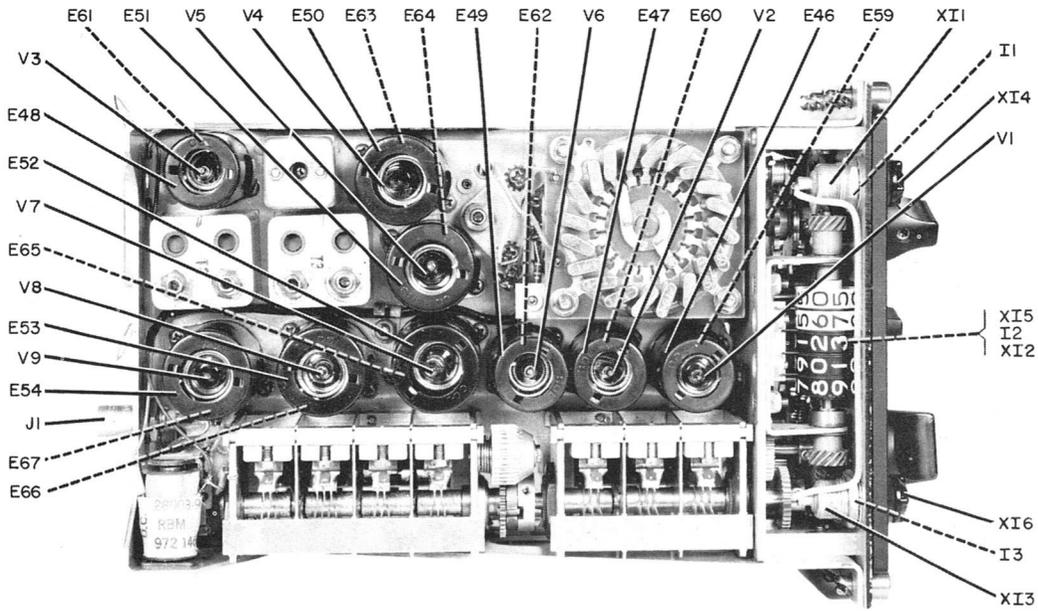


Figure 6-5. VHF Communication Transceiver 618F-1A/1B, Case Removed, Top View

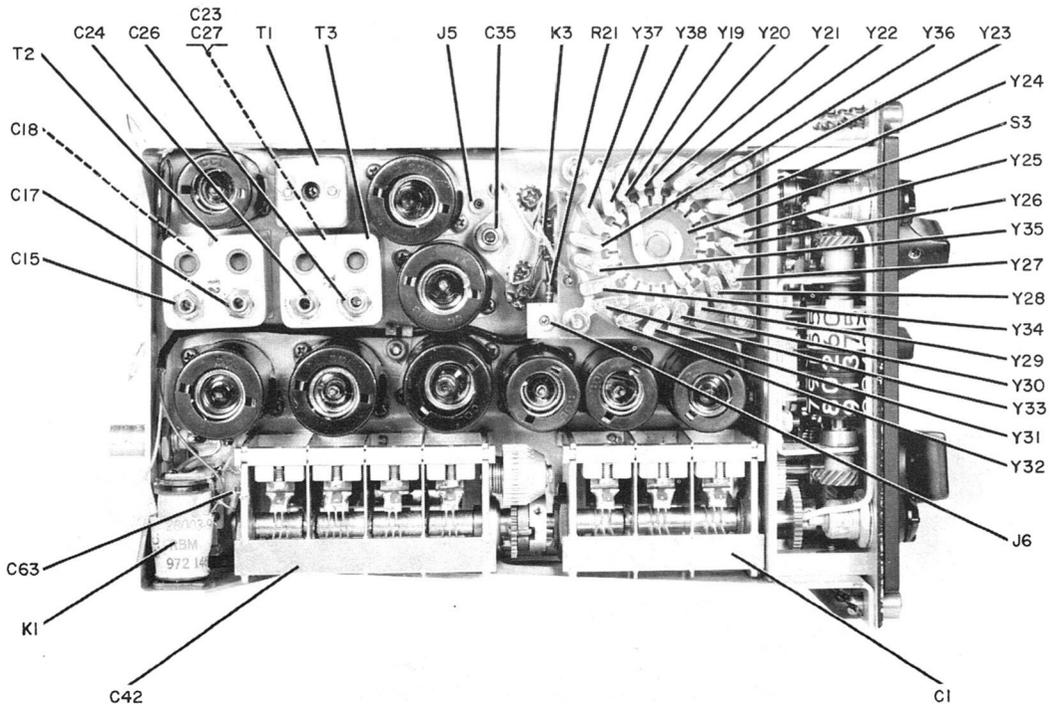


Figure 6-6. VHF Communication Transceiver 618F-1A/1B, Case Removed, Top View

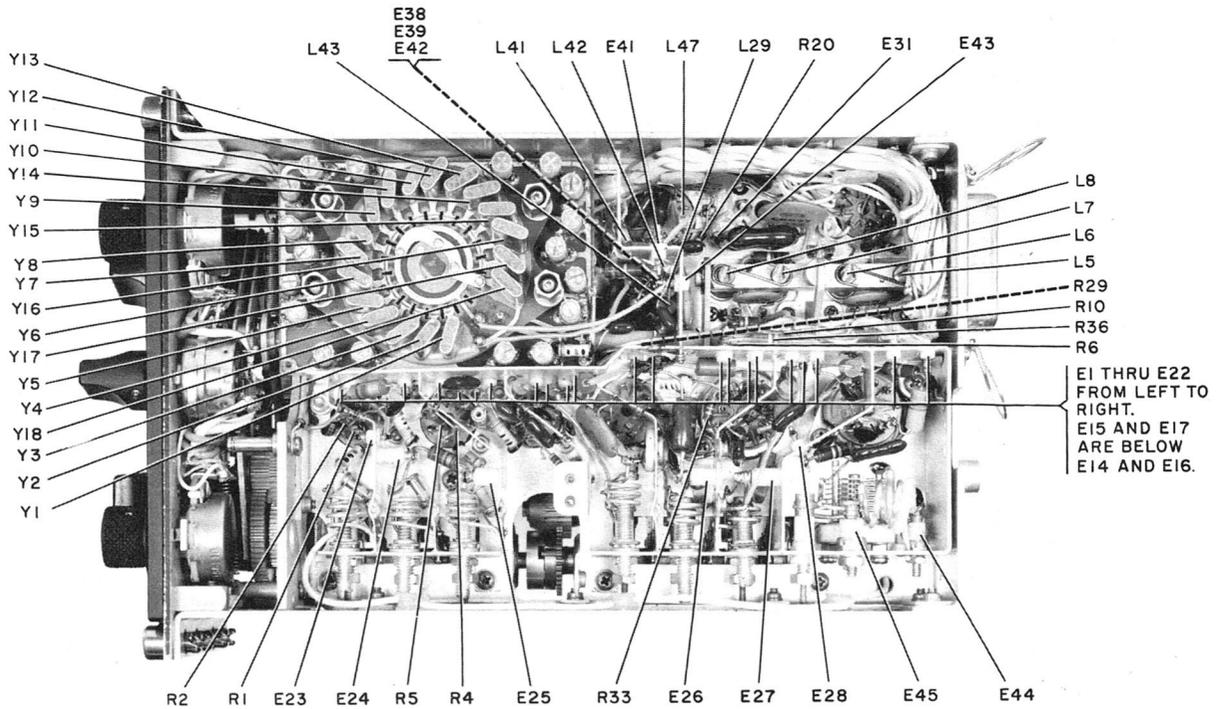


Figure 6-7. VHF Communication Transceiver 618F-1A/1B, Case Removed, Bottom View

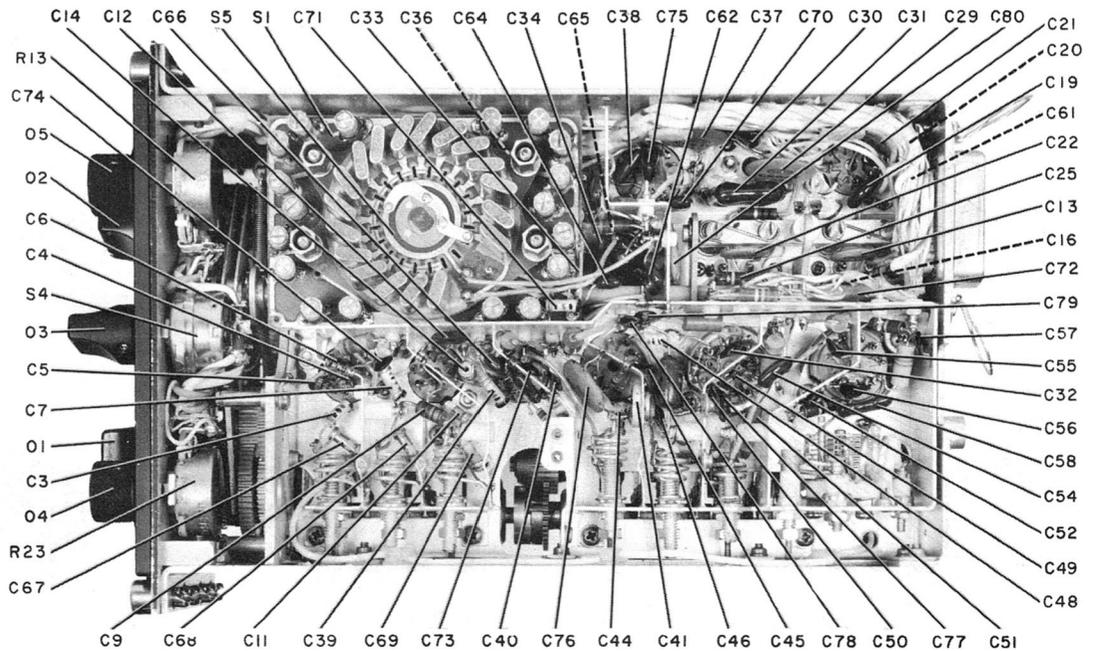


Figure 6-8. VHF Communication Transceiver 618F-1A/1B, Case Removed, Bottom View

SECTION VI
Parts List

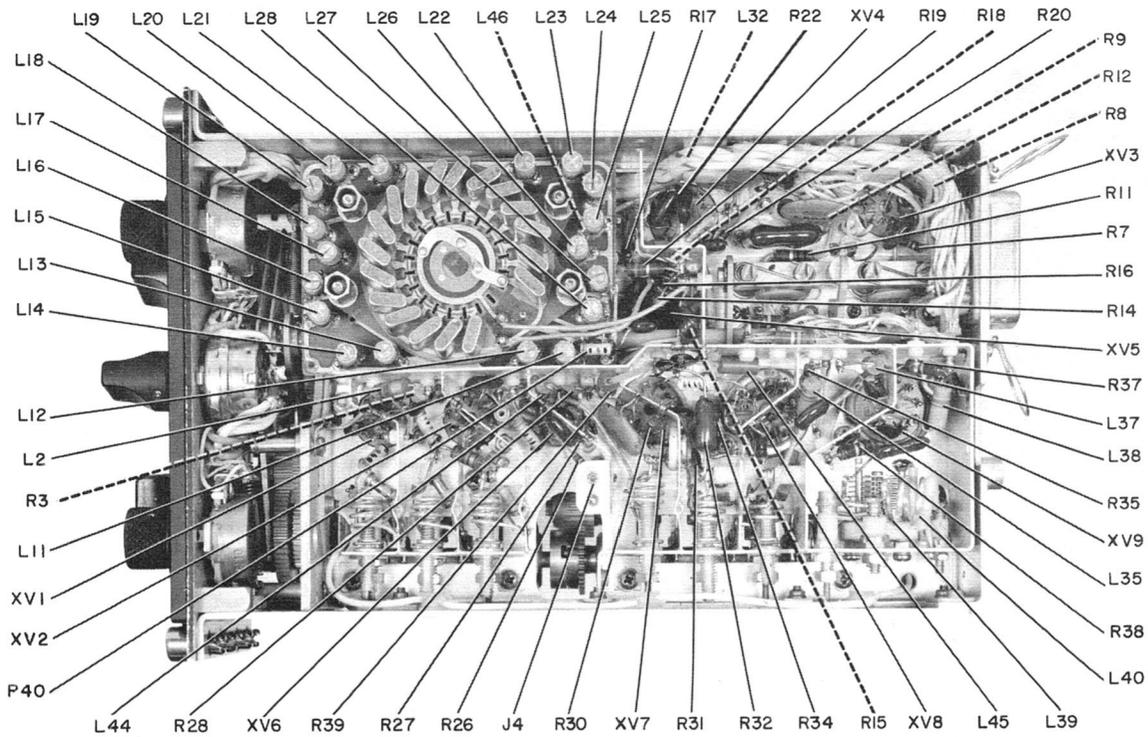


Figure 6-9. VHF Communication Transceiver 618F-1A/1B, Case Removed, Bottom View

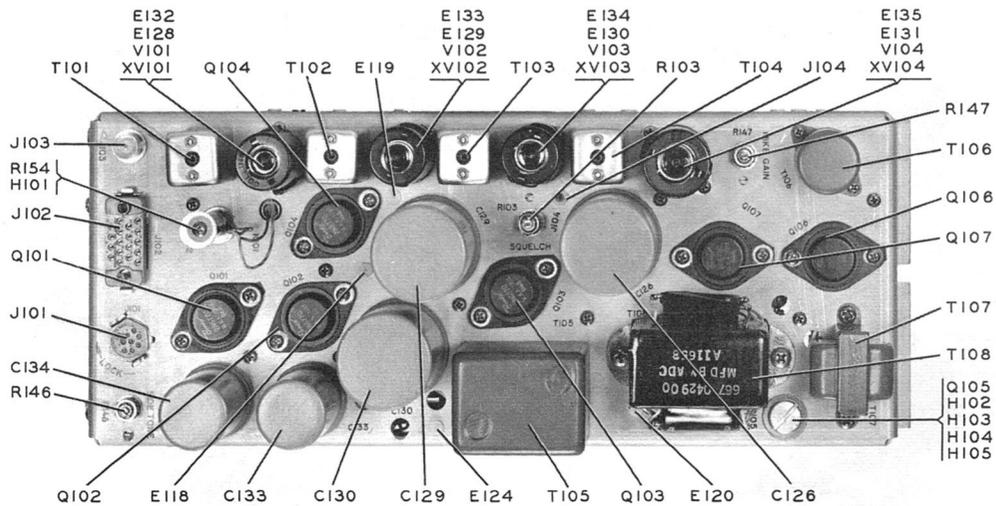


Figure 6-10. Fixed I-F, Audio, and Power Supply 427D-1, Cover Removed, Top View

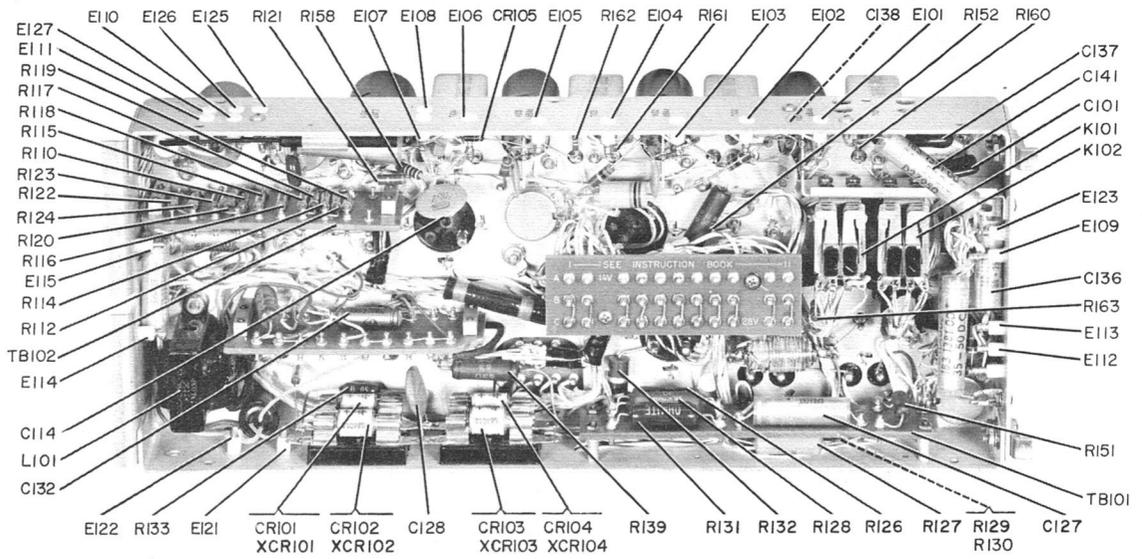


Figure 6-11. Fixed I-F, Audio, and Power Supply 427D-1, Bottom Plate Removed, Bottom View

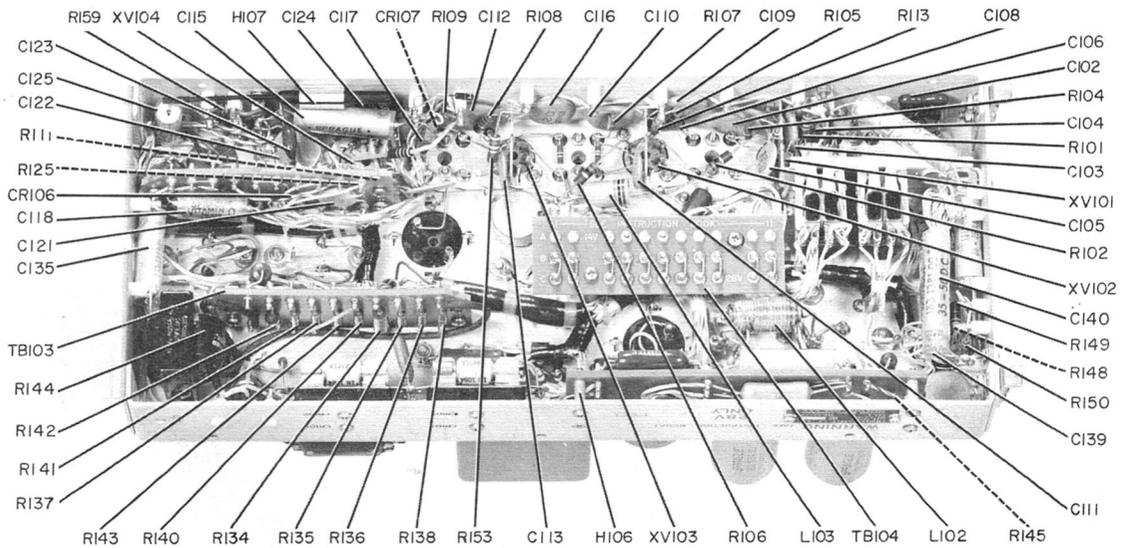


Figure 6-12. Fixed I-F, Audio, and Power Supply 427D-1, Bottom Plate Removed, Bottom View

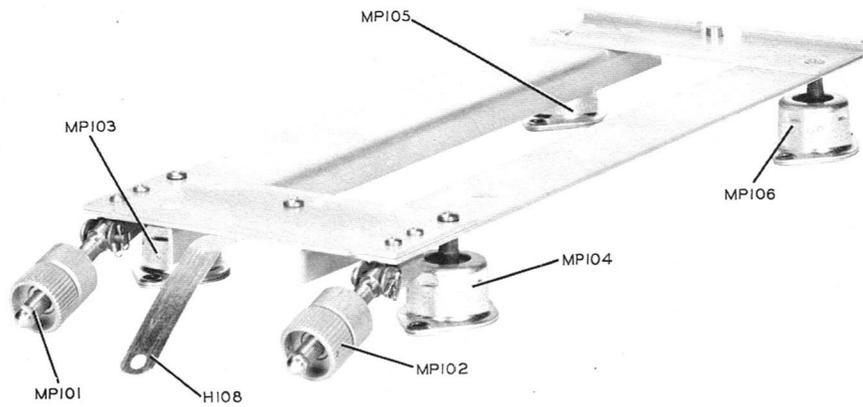


Figure 6-13. Fixed I-F, Audio, and Power Supply 427D-1 Shockmount

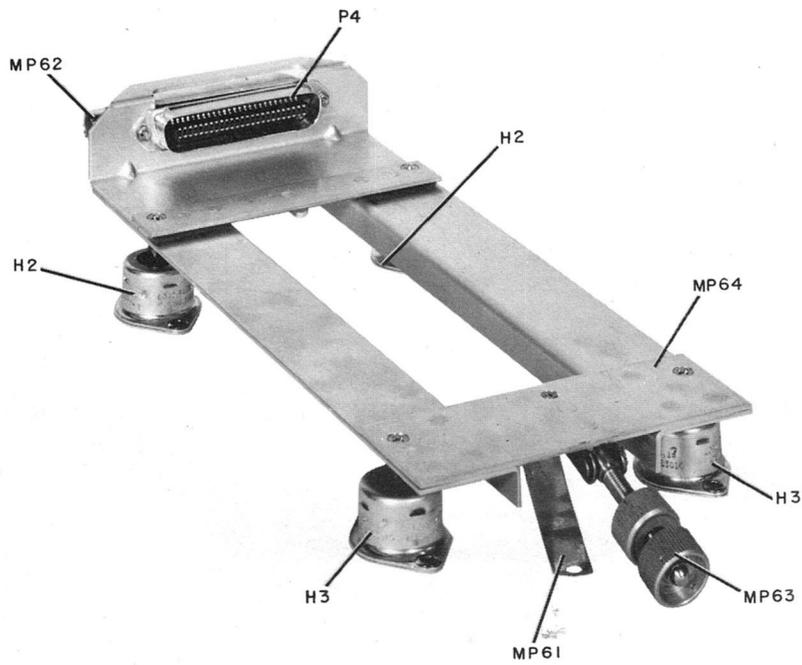
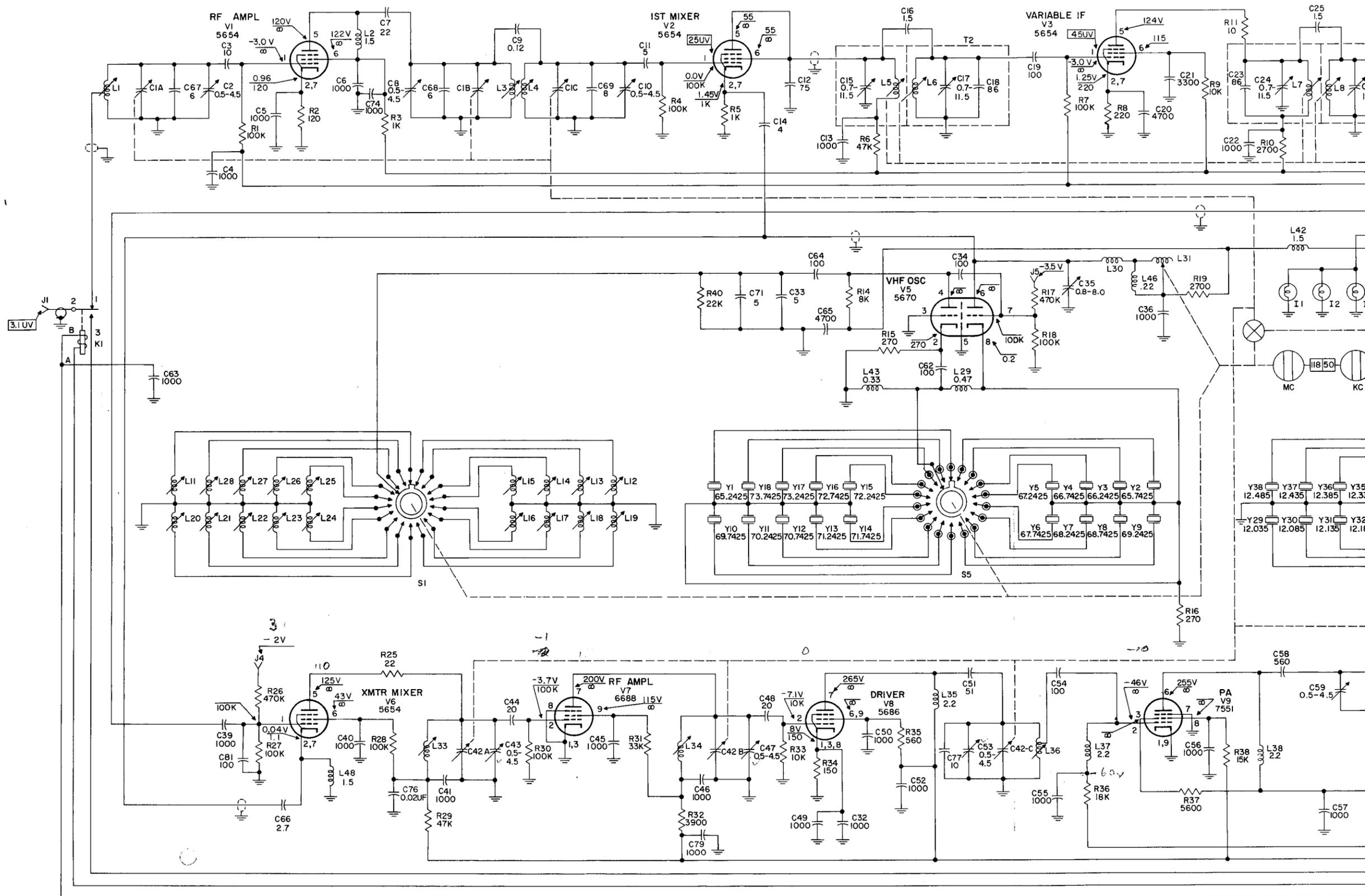
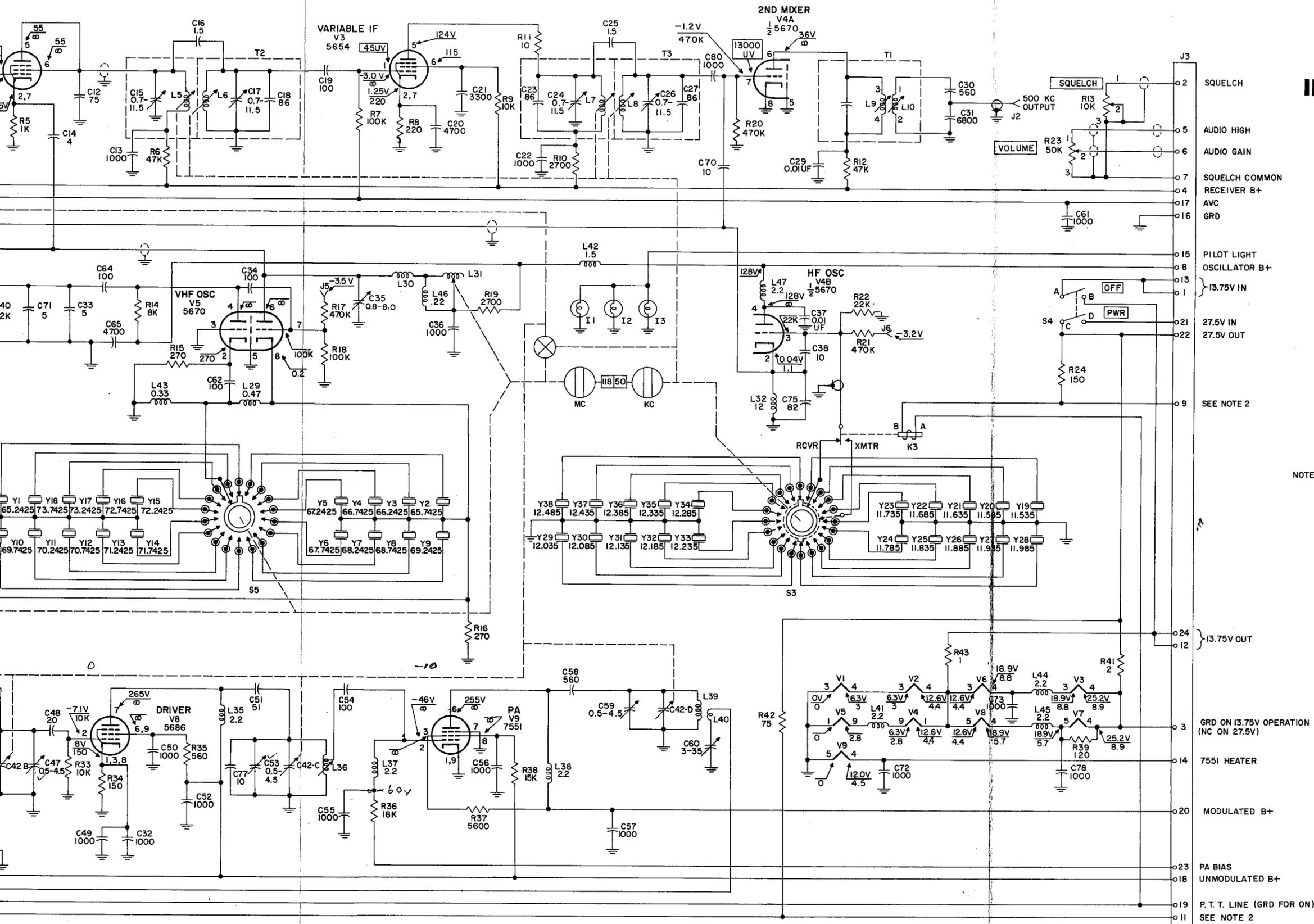


Figure 6-14. VHF Communication Transceiver 618F-1C/1D Shockmount

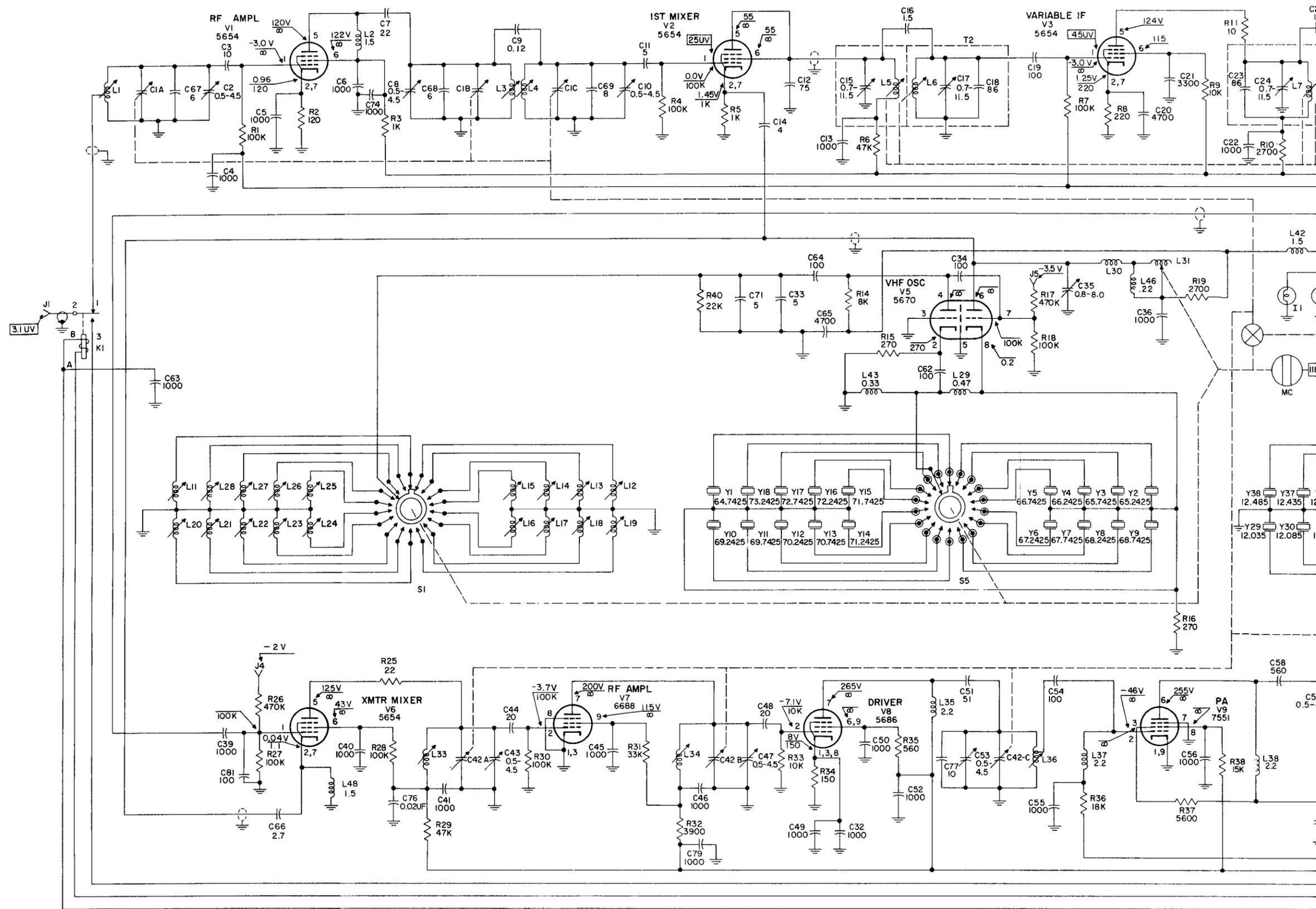


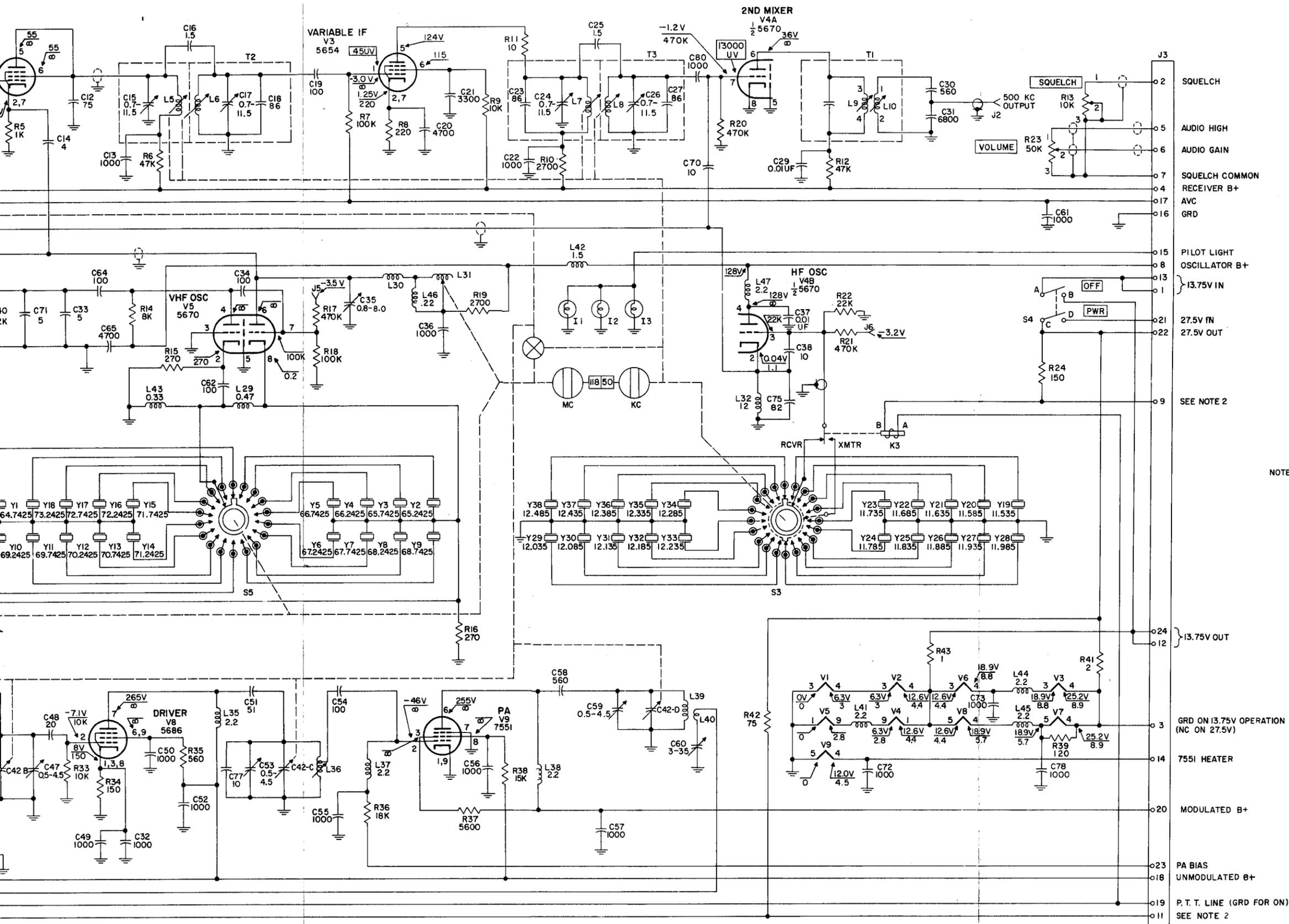
SECTION VII ILLUSTRATIONS



- VOLTAGE, RESISTANCE, AND GAIN MEASUREMENT CONDITIONS:**
- VOLTAGE MEASUREMENTS ON V1, V2, V3, AND V4 MADE WITH A 125.00MC SIGNAL INPUT THROUGH A 6DB PAD AT J1. INPUT AMPLITUDE SUFFICIENT TO PRODUCE -3VOLTS AVC.
 - VOLTAGE MEASUREMENTS ON V5, V6, V7, V8, AND V9 MADE WITH TRANSMITTER KEYED.
 - RESISTANCE MEASUREMENTS MADE WITH CABLES DISCONNECTED. RIO3, RI46, AND RI47 SET MAXIMUM CCW. ON READINGS OTHER THAN FILAMENT PINS, TUBES ARE REMOVED FROM SOCKETS.
 - GAIN MEASUREMENTS FOR RECEIVER SHOW AMPLITUDE OF INJECTION NEEDED AT THAT POINT TO PRODUCE -3 VOLTS AVC AT J104 (427D-1). ALL INJECTION SIGNALS EXCEPT ANTENNA APPLIED THROUGH PROBE IN FIGURES 5-2. ANTENNA INJECTION SIGNAL APPLIED THROUGH 6DB PAD.
- NOTES:**
- S1, S3 AND S5 ARE SHOWN IN 118.50MC POSITION.
 - PINS 9 AND 11 JUMPED ON 13.75V OPERATION ONLY AND TIED TO PINS 12 AND 24.
 - ALL VOLTAGE, RESISTANCE AND GAIN MEASUREMENTS WITH HEWLETT PACKARD MODEL 410B VT VM. SUPPLY VOLTAGE 27.5 VOLTS TOLERANCE ± 15 PER CENT.
 - VOLTAGE MEASUREMENTS ARE ABOVE LINE. RESISTANCE MEASUREMENTS ARE BELOW LINE. GAIN MEASUREMENTS ARE SHOWN IN BOX.
 - UNLESS OTHERWISE SPECIFIED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

Figure 7-1. VHF Communication Transceiver 618F-1A, Schematic Diagram





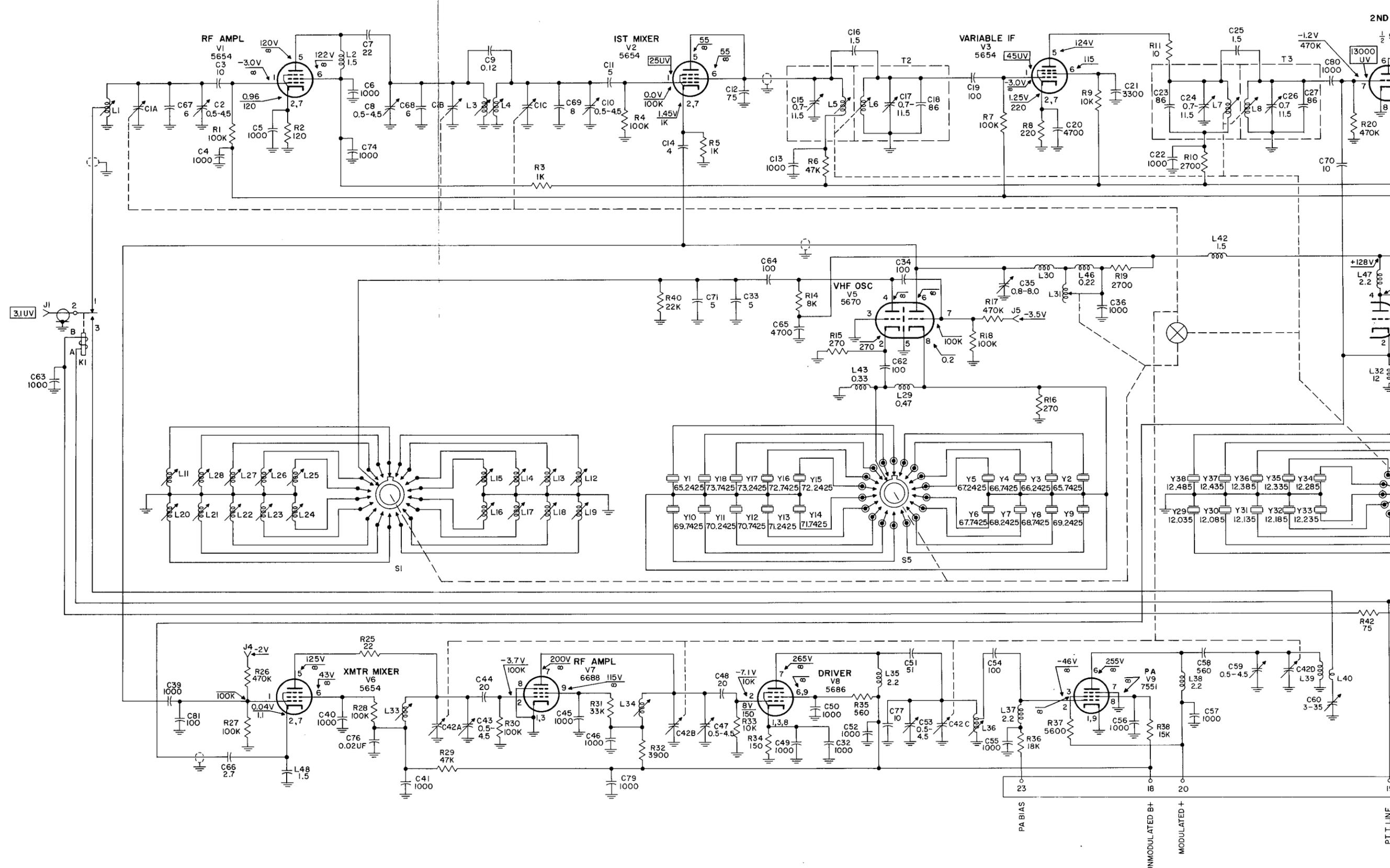
VOLTAGE, RESISTANCE, AND GAIN MEASUREMENT CONDITIONS:

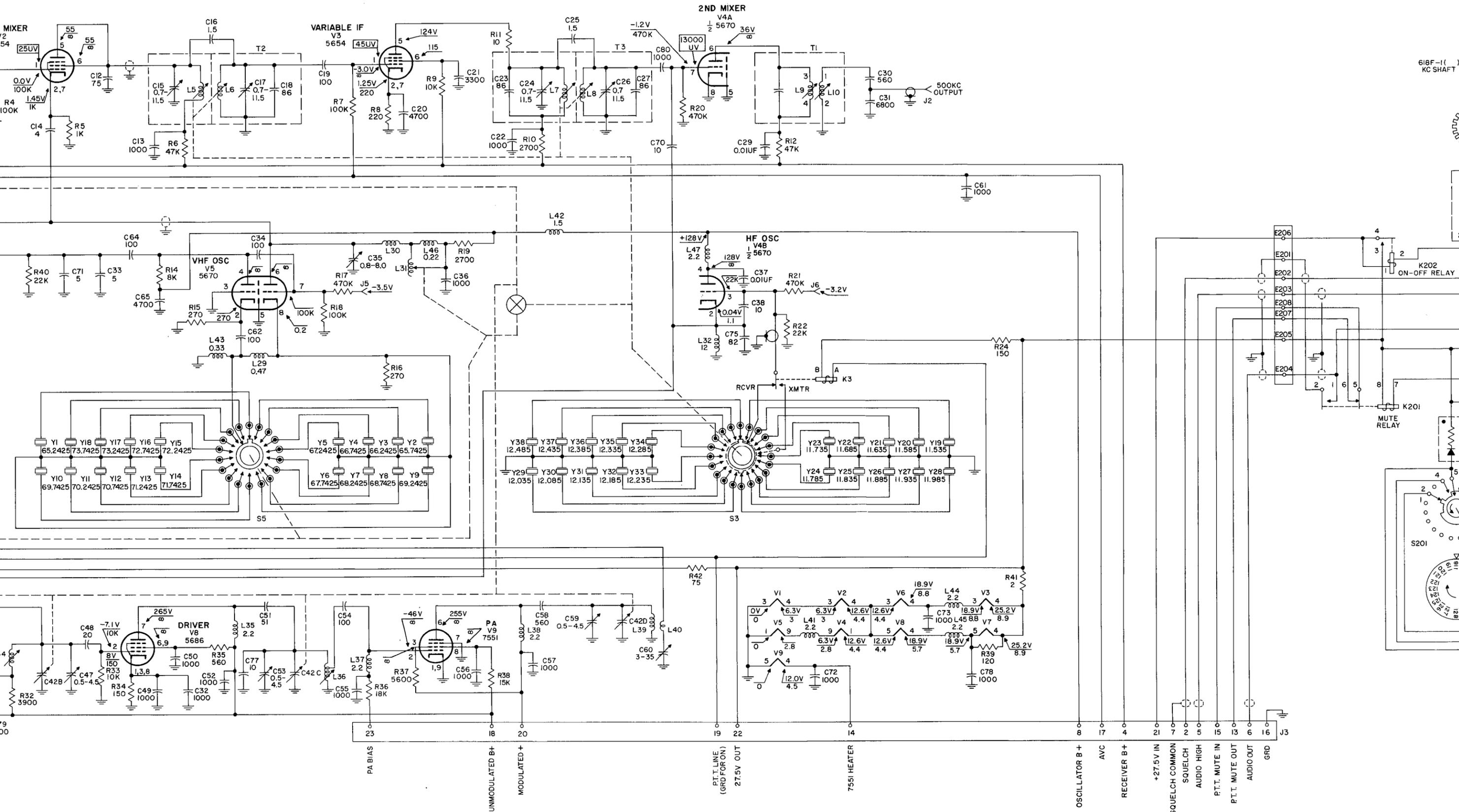
1. VOLTAGE MEASUREMENTS ON V1, V2, V3, AND V4 MADE WITH A 126.00MC SIGNAL INPUT THROUGH A 6DB PAD AT J1. INPUT AMPLITUDE SUFFICIENT TO PRODUCE -3VOLTS AVC.
2. VOLTAGE MEASUREMENTS ON V5, V6, V7, V8, AND V9 MADE WITH TRANSMITTER KEYED.
3. RESISTANCE MEASUREMENTS MADE WITH CABLES DISCONNECTED. R103, R146 AND R147 SET MAXIMUM C.C.W. ON READINGS OTHER THAN FILAMENT PINS, TUBES ARE REMOVED FROM SOCKETS.
4. GAIN MEASUREMENTS FOR RECEIVER SHOW AMPLITUDE OF INJECTION NEEDED AT THAT POINT TO PRODUCE -3 VOLTS AVC AT J104 (427D-1). ALL INJECTION SIGNALS EXCEPT ANTENNA APPLIED THROUGH PROBE IN FIGURE 5-2. ANTENNA INJECTION SIGNAL APPLIED THROUGH 6DB PAD.

NOTES:

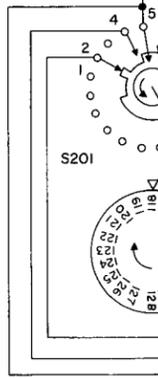
1. S1, S3 AND S5 ARE SHOWN IN 117.50MC POSITION.
2. PINS 9 AND 11 JUMPERED ON 13.75V OPERATION ONLY AND TIED TO PINS 12 AND 24.
3. ALL VOLTAGE, RESISTANCE AND GAIN MEASUREMENTS WITH HEWLETT PACKARD MODEL 410B VTVM. SUPPLY VOLTAGE 27.5 VOLTS TOLERANCE ± 15 PER CENT.
4. VOLTAGE MEASUREMENTS ARE ABOVE LINE. RESISTANCE MEASUREMENTS ARE BELOW LINE. GAIN MEASUREMENTS ARE SHOWN IN BOX.
5. UNLESS OTHERWISE SPECIFIED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICO FARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

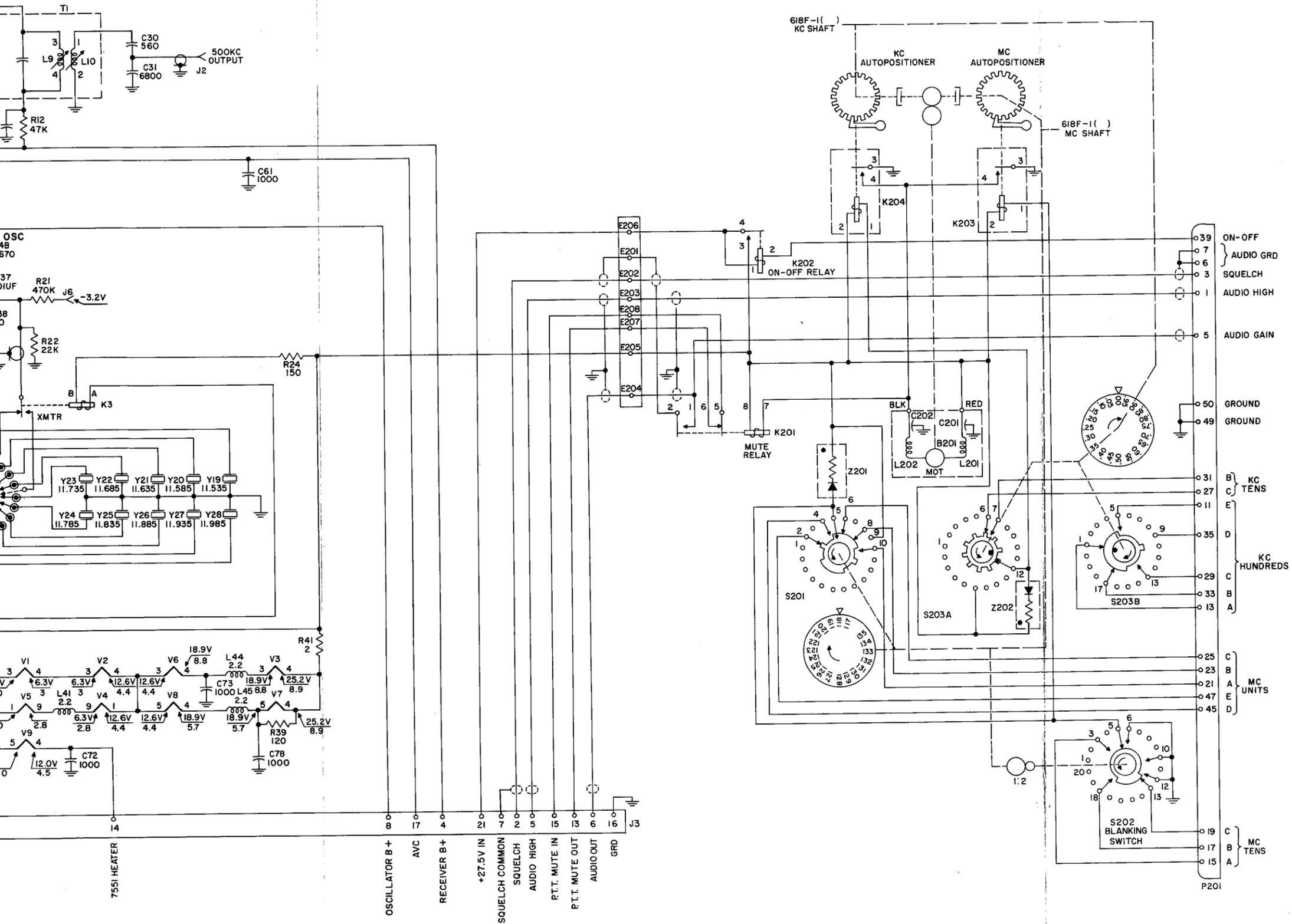
Figure 7-2. VHF Communication Transceiver 618F-1B, Schematic Diagram





618F-()
 KC SHAFT

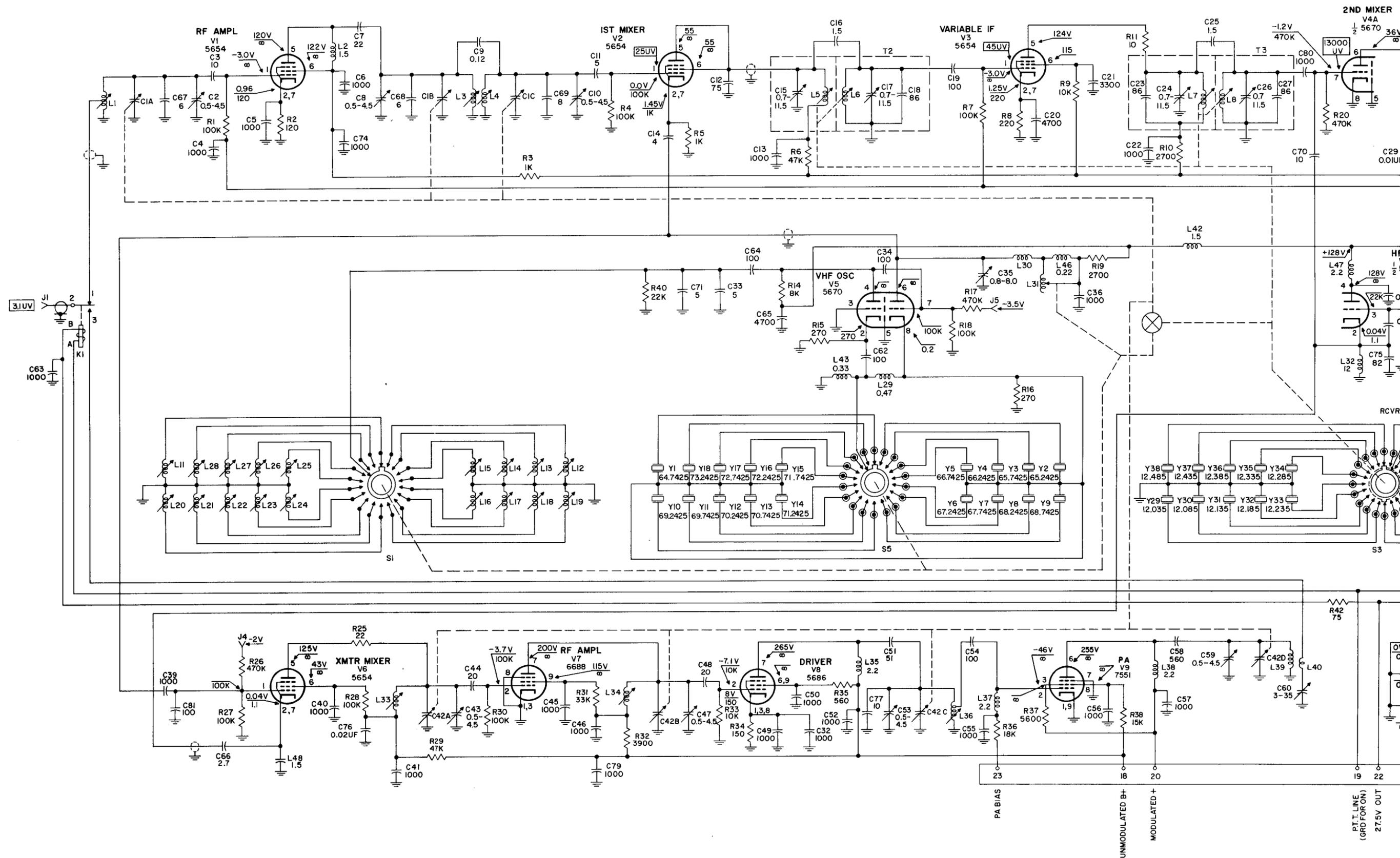


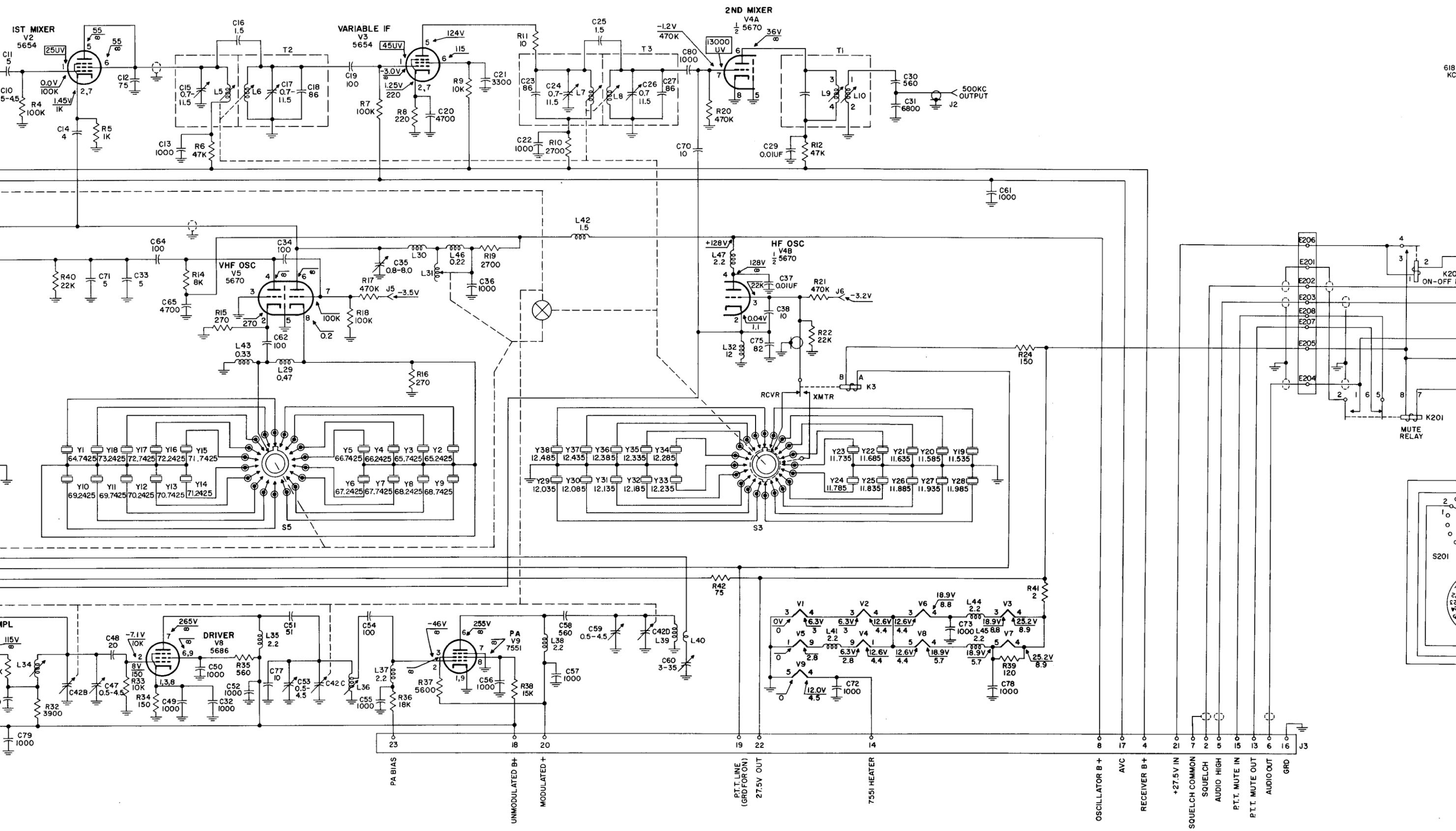


- VOLTAGE, RESISTANCE, AND GAIN MEASUREMENT CONDITIONS:**
1. VOLTAGE MEASUREMENTS ON V1, V2, V3, AND V4 MADE WITH A 126.00 MC SIGNAL INPUT THROUGH A 6DB PAD AT J1. INPUT AMPLITUDE SUFFICIENT TO PRODUCE -3 VOLTS AVC.
 2. VOLTAGE MEASUREMENTS ON V5, V6, V7, V8, AND V9 MADE WITH TRANSMITTER KEYED.
 3. RESISTANCE MEASUREMENTS MADE WITH CABLES DISCONNECTED. R103, R146, AND R147 SET MAXIMUM CCW. ON READINGS OTHER THAN FILAMENT PINS, TUBES ARE REMOVED FROM SOCKETS.
 4. GAIN MEASUREMENTS FOR RECEIVER SHOW AMPLITUDE OF INJECTION NEEDED AT THAT POINT TO PRODUCE -3 VOLTS AVC AT J104 (427D-1). ALL INJECTION SIGNALS EXCEPT ANTENNA APPLIED THROUGH PROBE SHOWN IN FIGURE 5-2. ANTENNA INJECTION SIGNAL APPLIED THROUGH 6DB PAD.

- NOTES:**
1. S1, S3, S5, S201, S202, AND S203 ARE SHOWN IN 118.50 MC POSITION.
 2. ALL VOLTAGE, RESISTANCE AND GAIN MEASUREMENTS WITH HEWLETT-PACKARD MODEL 410B VTVM. SUPPLY VOLTAGE 27.5 VOLTS TOLERANCE ± 15 PER CENT.
 3. VOLTAGE MEASUREMENTS ARE ABOVE LINE. RESISTANCE MEASUREMENTS ARE BELOW LINE. GAIN MEASUREMENTS ARE SHOWN IN BOX.
 4. UNLESS OTHERWISE SPECIFIED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

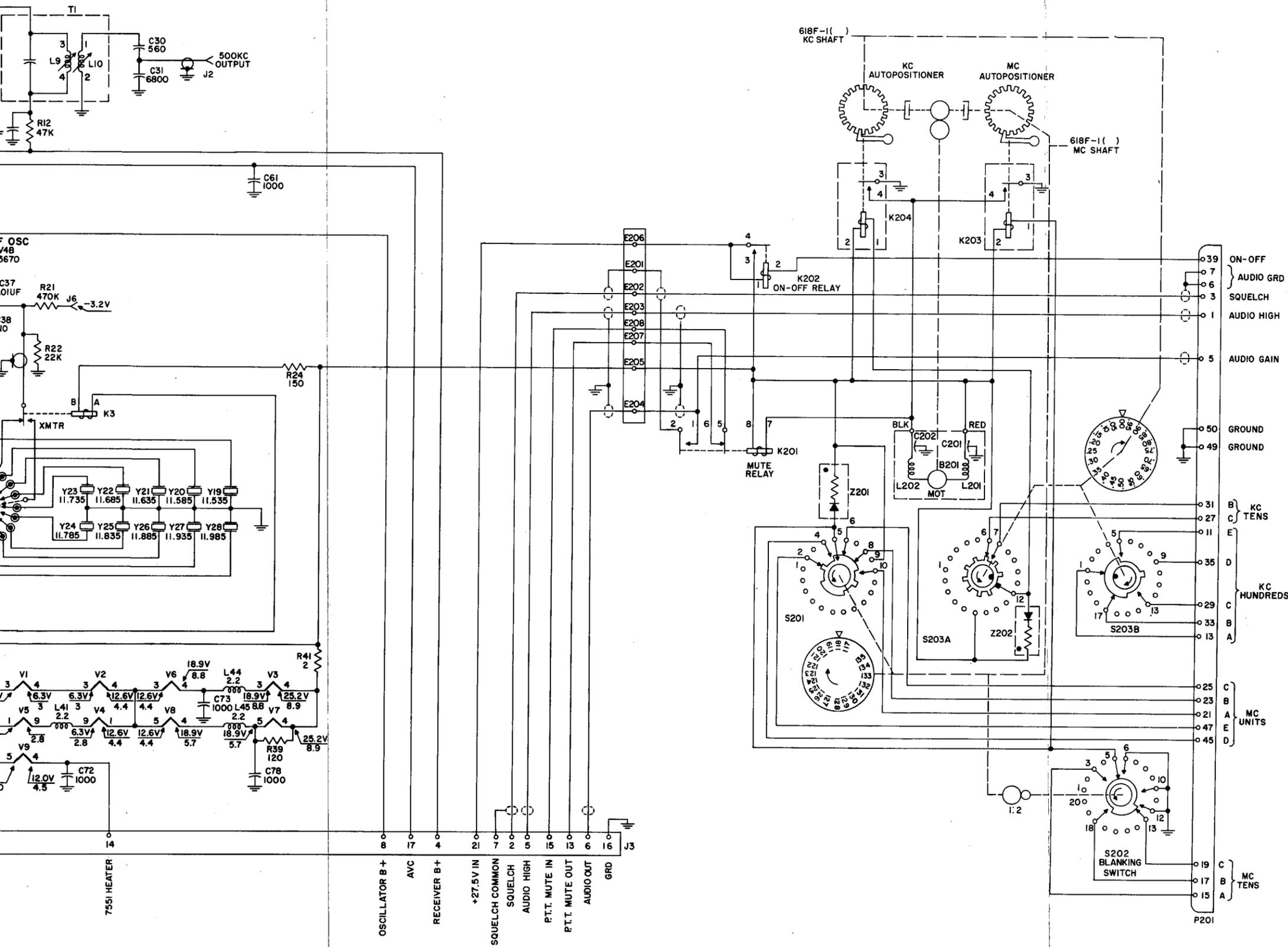
Figure 7-3. VHF Communication Transceiver 618F-1C, Schematic Diagram





618F
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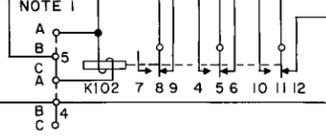
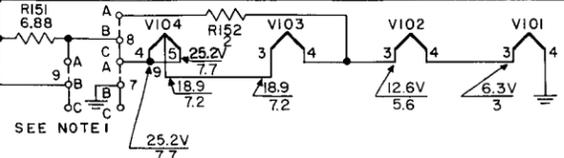
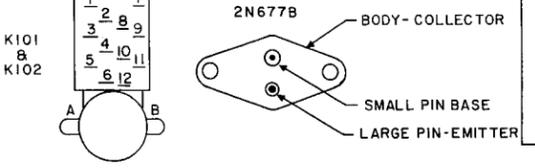
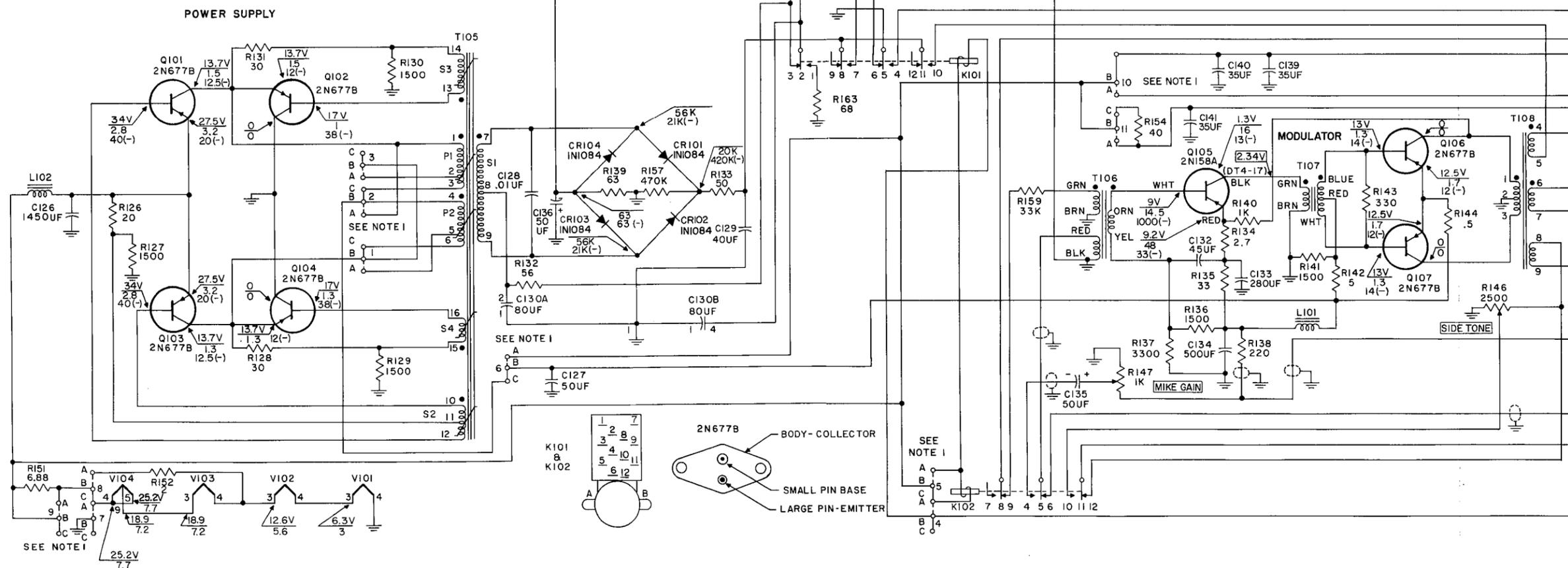
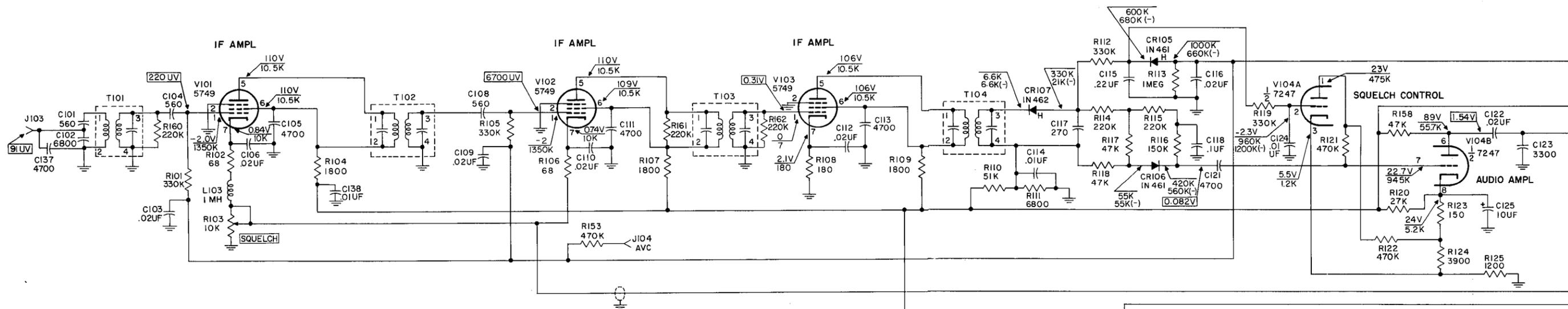
S201

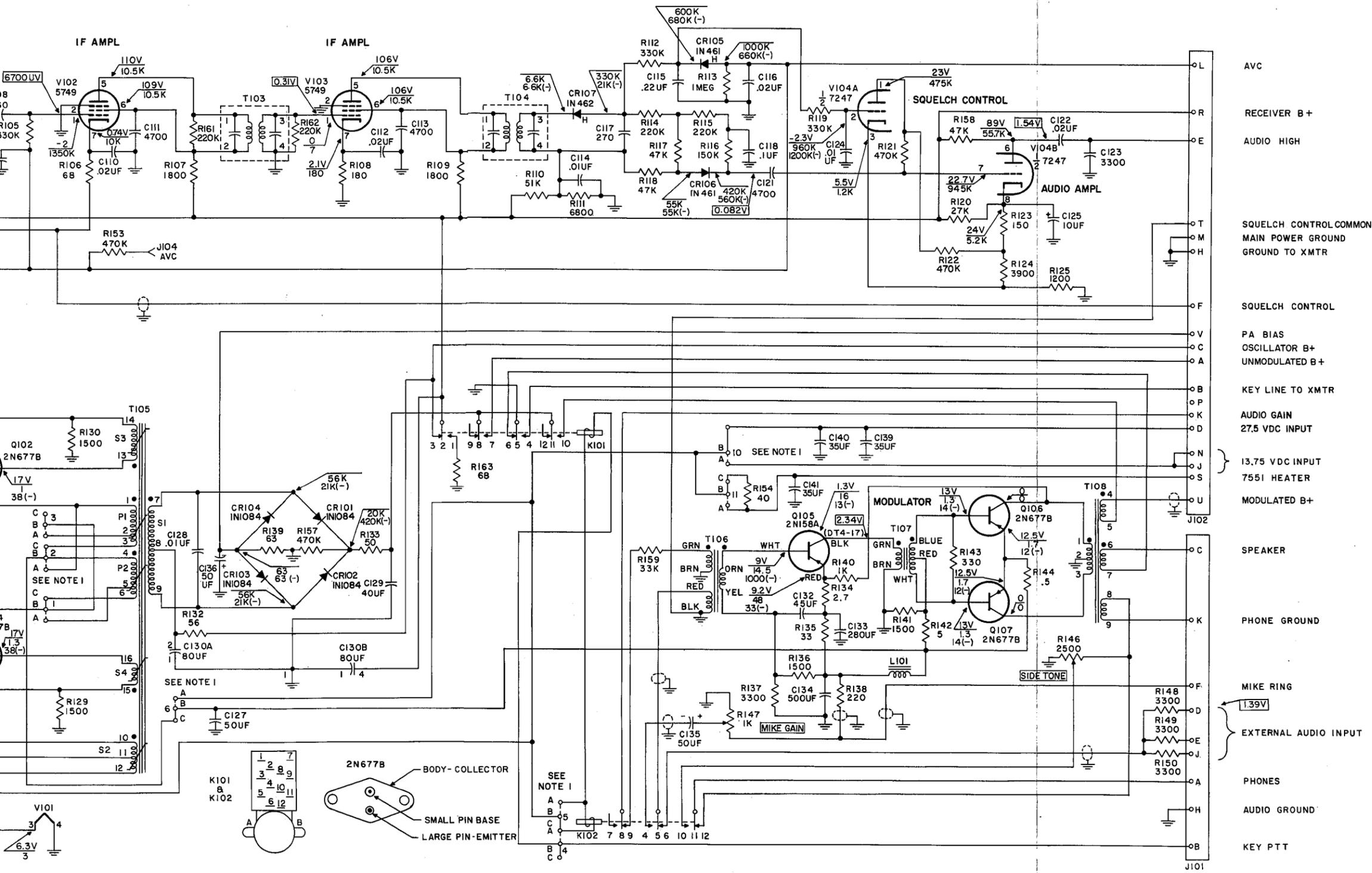


- VOLTAGE, RESISTANCE, AND GAIN MEASUREMENT CONDITIONS:**
1. VOLTAGE MEASUREMENTS ON V1, V2, V3, AND V4 MADE WITH A 126.00 MC SIGNAL INPUT THROUGH A 6DB PAD AT J1. INPUT AMPLITUDE SUFFICIENT TO PRODUCE -3 VOLTS AVC.
 2. VOLTAGE MEASUREMENTS ON V5, V6, V7, V8, AND V9 MADE WITH TRANSMITTER KEYPED.
 3. RESISTANCE MEASUREMENTS MADE WITH CABLES DISCONNECTED. R103, R146, AND R147 SET MAXIMUM CCW. ON READINGS OTHER THAN FILAMENT PINS, TUBES ARE REMOVED FROM SOCKETS.
 4. GAIN MEASUREMENTS FOR RECEIVER SHOW AMPLITUDE OF INJECTION NEEDED AT THAT POINT TO PRODUCE -3 VOLTS AVC AT J104 (427D-1). ALL INJECTION SIGNALS EXCEPT ANTENNA APPLIED THROUGH PROBE SHOWN IN FIGURE 5-2. ANTENNA INJECTION SIGNAL APPLIED THROUGH 6DB PAD.

- NOTES:**
1. S1, S3, S5, S201, S202, AND S203 ARE SHOWN IN 117.50 MC POSITION.
 2. ALL VOLTAGE, RESISTANCE AND GAIN MEASUREMENTS WITH HEWLETT-PACKARD MODEL 410B VTVM. SUPPLY VOLTAGE 27.5 VOLTS TOLERANCE ± 15 PER CENT.
 3. VOLTAGE MEASUREMENTS ARE ABOVE LINE. RESISTANCE MEASUREMENTS ARE BELOW LINE. GAIN MEASUREMENTS ARE SHOWN IN BOX.
 4. UNLESS OTHERWISE SPECIFIED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

Figure 7-4. VHF Communication Transceiver 618F-1D, Schematic Diagram





- VOLTAGE, RESISTANCE, AND GAIN MEASUREMENT CONDITIONS:
- VOLTAGE, RESISTANCE, AND GAIN MEASUREMENTS MADE WITH HEWLETT PACKARD MODEL 410B VTVM. SUPPLY VOLTAGE 27.5 VOLTS. TOLERANCE ± 15 PER CENT EXCEPT TRANSISTOR RESISTANCE VALUES WHICH ARE ± 20 PER CENT.
 - VOLTAGE MEASUREMENTS ABOVE LINE. RESISTANCE MEASUREMENTS BELOW LINE. GAIN MEASUREMENTS IN BOX.
 - VOLTAGE MEASUREMENTS ON V101, V102, V103, AND V104 AND TRANSISTORS Q105, Q106 AND Q107 MADE WITH A 126.00 MC SIGNAL INPUT THROUGH A 6 DB PAD AT J1 618P-1A. INPUT AMPLITUDE SUFFICIENT TO PRODUCE -2 VOLTS AVC AT J104 (427D-1).
 - VOLTAGE MEASUREMENTS ON TRANSISTORS Q101, Q102, Q103 AND Q104 MADE WITH TRANSMITTER KEYED.
 - RESISTANCE MEASUREMENTS MADE WITH CABLES DISCONNECTED. R103, R146, AND R147 SET MAXIMUM CCW. READINGS OTHER THAN FILAMENT PINS MADE WITH TUBES REMOVED. ALL RESISTANCE MEASUREMENTS MADE WITH COMMON LEAD GROUNDED UNLESS MARKED (-). THOSE MARKED (-) MADE WITH OHMS LEAD GROUNDED.
 - GAIN MEASUREMENTS FOR IF CIRCUITS SHOW AMPLITUDE OF INJECTED SIGNAL NEEDED AT THAT POINT TO PRODUCE -2 VOLTS AVC AT J104 (427D-1). ALL INJECTION SIGNALS FOR IF APPLIED THROUGH PROBE IN FIGURE 5-2.
 - GAIN MEASUREMENTS FOR AUDIO CIRCUITS SHOW AMPLITUDE OF 1000 CPS SIGNAL NEEDED AT THAT POINT TO PRODUCE 4WATT OUTPUT.
- NOTES:
- TERMINALS ARE LOCATED ON TB104. SOLID LINES BETWEEN TERMINALS B AND C REPRESENT 27.5 VOLT CONNECTION. DOTTED LINES BETWEEN TERMINALS A AND B REPRESENTS 13.75 VOLT CONNECTION.
 - UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

Figure 7-5. Fixed I-F, Audio, and Power Supply 427D-1, Schematic Diagram

ELECTRICAL WIRE CODE

EXAMPLES

UNSHIELDED WIRE, MIL TYPE B #22 AWG, WHITE WITH RED AND GREEN TRACERS:

D
Type of Wire
A
Size of Wire
9
Color of Body
25
Color of Tracers
4-1/4
Length of Wire in Inches
(Includes Stripping & Tinning)

SHIELDED WIRE (SINGLE), MIL TYPE C, #15 AWG, WHITE WITH RED AND GREEN TRACERS:

R
Type of Wire
D
Size of Wire
S
Shielded
9
Color of Body
25
Color of Tracers
4-1/4
Length of Wire in Inches
(Includes Stripping & Tinning)

SHIELDED WIRE (MULTIPLE), MIL TYPE B, #22 AWG, WHITE, AND WHITE WITH RED TRACER:

D
Type of Wire
A
Size of Wire
S
Shielded
(9)
First Conductor
(92)
Second Conductor
4-1/4
Length of Wire in Inches
(Includes Stripping & Tinning)

TYPE OF WIRE CODE			SIZE OF WIRE CODE		COLOR CODE	
LETTER	TYPE OF WIRE	FAMILY USUALLY FOUND IN	LETTER	SIZE	NUMBER OR LETTER	COLOR
A	Cotton Braid Over Plastic (Formerly AN-J-C-48)	440 Plain 443 Shielded	A	#22 AWG	0	Black
B	Busbar, Round Tinned	421	B	#20	1	Brown
C	MIL-W-16878 Type B (#20 and Larger) (600 Volts)	439	C	#18	2	Red
D	Miniature Wire, MIL-W-16878 Type B (#22 & Smaller)	439-7000 Series	D	#16	3	Orange
E	Extra Flexible Varnished Cambric	423	E	#14	4	Yellow
F	Extra Flexible Varnished Cambric	423	F	#12	5	Green
G	Kel-F (Monochloro-trifluoroethylene)	422	G	#10	6	Blue
H	Kel-F (Monochloro-trifluoroethylene)	422	H	#8	7	Violet
J	Neon Sign Cable (15,000 Volts)	423 0004 00	J	#6	8	Gray (Slate)
K	Neon Sign Cable (15,000 Volts)	423 0004 00	K	#4	9	White
L	Silicone	425 0942 00	L	#2	a	Clear
M	Single Conductor Stranded (Not Rubber Covered)	422	M	#1	b	Tan
N	Single Conductor Stranded (Not Rubber Covered)	422	N	#0	c	Pink
P	Single Conductor Stranded (Rubber Covered)	423	P	#00	d	Maroon
Q	MIL-W-16878 Type C (1000 Volts)	439 1000 Series	Q	#000	e	Light Green
R	MIL-W-16878 Type C (1000 Volts)	439 1000 Series	R	#0000	f	Light Blue
T	Teflon, MIL-W-16878 Type E (600 Volts)	439 4000 Series	T	#28		
V	MIL-W-16878 Type D (3000 Volts)	439 3000 Series	V	#26		
W	Teflon, MIL-W-16878 Type EE (1000 Volts)	439 0000 Series	W	#24		
X	Acetate Yarn Telephone Type	428	X	#19		
Y	Acetate Yarn Telephone Type	428	Y	#30		
Z	Acetate Yarn Telephone Type	428	Z			

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