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overhaul manual

618T-1, 618T-2, and 618T-3 Airborne SSB Transceivers

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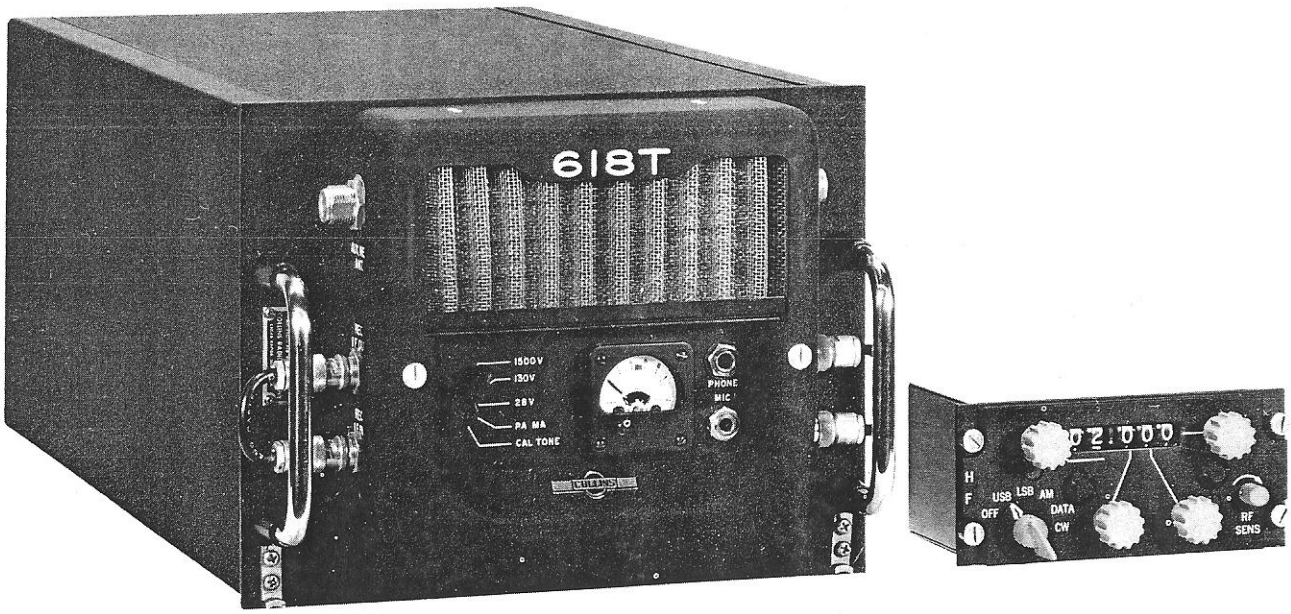


Airborne SSB Transceiver 618T-( ) and Control Unit 714E-3
Figure 1

AIRBORNE SSB TRANSCEIVER 618T-( ) - DESCRIPTION AND OPERATION

1. GENERAL.

This manual contains information regarding the disassembly, cleaning, inspection, repair, assembly, alignment, testing, adjustment, and trouble shooting of Airborne SSB Transceiver 618T-( ).

All procedures in this manual are to be performed in a maintenance shop with the proper test equipment.

2. PURPOSE OF EQUIPMENT.

Airborne SSB Transceiver 618T-( ) is used for voice, CW, or data communications in the high-frequency band from 2 to 30 megacycles.

3. DESCRIPTION OF EQUIPMENT.

A. Physical.

Airborne SSB Transceiver 618T-( ) is shown in figure 1. The 618T-( ) weighs 50 pounds and is contained in a standard 1 ATR case which is 22-3/16 inches deep, 7-5/8 inches high, and 10-1/8 inches wide. A PHONE jack, MIC jack, meter, and meter selector switch are located on the front panel of the 618T-( ). Four meter selector switch positions are used to check supply voltages in the 618T-( ). A fifth position, CAL TONE, is used to compare the frequency of the 618T-( ) with WWV. A 400-cycle blower also is located on the front panel to provide forced-air cooling. Antenna connections are made at the front of the 618T-( ). All other connections are made at a 60-pin connector at the rear of the 618T-( ). A separate grounding pin is located beside the 60-pin connector.

The 618T-( ) is composed of 11 plug-in modules, including an interchangeable internal power supply (see paragraph 3.C., this section). Each module is equipped with plug-in connectors and locating pins. The locating pins prevent improper location of the module on the chassis and align the connectors before engagement occurs to prevent damage to the connectors. There are no mechanical linkages (gear trains, etc.) between any of the 618T-( ) modules. The modular construction simplifies maintenance of the 618T-( ). Color-coded test points on the modules permit general trouble shooting without removing the modules from the chassis. Transistors are widely used in the 618T-( ) to increase reliability and reduce weight and power consumption.

The 618T-( ) is completely remote controlled from Control Unit 714E-( ), also shown in figure 1. Any one of 28,000 channels, spaced 1 kilocycle apart in the 2- to 30-megacycle range, can be directly selected at the control unit by rotating the four frequency control knobs until the operating frequency is displayed in the window on the front of the unit: The mode selector switch at the left front corner of the 714E-1/2 controls on-off, sideband selection, and AM operation. The 714E-3 (see figure 1) has two additional positions: DATA and CW. An r-f gain control, labeled RF SENS, is located on the right front of all three units.

Control Units 714E-1 and 714E-2 are similar but not interchangeable. Either the 714E-1 or 714E-2 may be used in new installations by using the proper interwiring. The 714E-1 cannot be used in retrofit installations. The 714E-3 is used in installations which include data equipment or which are to be operated in the CW mode. Additional equipment needed to transmit data can be activated by placing the mode selector switch in the DATA position. When the switch is in the CW position, the upper sideband filter is switched into the circuit, and the aircraft CW key line is connected to the 618T-( ) CW key line.

B. Electrical.

The operating frequency of the 618T-( ) is crystal controlled and stabilized to within 0.8 part per million per month. The 618T-( ) is capable of 400 watts PEP output in sideband operation and 100 watts carrier output into a 52-ohm load in AM or CW operation.

The tuned circuits and output circuit of the 618T-( ) are tuned automatically by an Auto-positioner* and a servo motor. The receiver portion of the transceiver is muted during tuning. The average tuning time, independent of an external antenna tuner, is 8 seconds.

A complete discussion of the principles of operation of the 618T-( ) is found in the 618T-( ) Maintenance Manual, Collins part number 520-5970004, chapter 23-10-0.

C. Model Differences.

There are three models of the 618T-( ). The three models differ only in the type of high-voltage power supply module used in each. The following paragraphs describe the three models.

(1) Airborne SSB Transceiver 618T-1.

The 618T-1 retrofits most 618S-( ) installations with no changes in the aircraft wiring. Power Supply 516H-1 is mounted in the same shockmount which contains Power Supply 416W-1. The primary power source for the 618T-1 is 27.5 volts d-c.

(2) Airborne SSB Transceiver 618T-2.

The 618T-2 has a completely self-contained high-voltage power supply for use with a 115-volt (line-to-neutral), 400-cycle, 3-phase primary power source.

(3) Airborne SSB Transceiver 618T-3.

The 618T-3 has a completely self-contained high-voltage power supply for use with a 27.5-volt d-c primary power source. The 618T-3 also may be retrofitted into some 618S-( ) installations. Retrofit installation data is contained in the 618T-( ) Installation Manual, Collins part number 520-5970006, chapter 23-10-0.

D. Equipment Supplied.

Table 1 lists all equipment supplied as part of the 618T-( ).

*Registered in U. S. Patent Office.

TABLE 1. EQUIPMENT SUPPLIED

ITEM	TYPE	OVER-ALL DIMENSIONS (inches)			WEIGHT (lb)	COLLINS PART NUMBER
		H	W	D		
Airborne SSB Transceiver	618T-1	7-5/8	10-1/8	22-3/16	50	522-1230-00
or						
Airborne SSB Transceiver	618T-2	7-5/8	10-1/8	22-3/16	52	522-1501-00
or						
Airborne SSB Transceiver	618T-3	7-5/8	10-1/8	22-3/16	50	522-1660-00
Module pullers (2)						546-6463-002

E. Equipment Required - Not Supplied.

Table 2 lists equipment required for new installations which is not furnished as part of the 618T-( ). Table 3 lists equipment required for retrofit installations.

TABLE 2. EQUIPMENT REQUIRED FOR NEW INSTALLATION - NOT SUPPLIED

ITEM	FUNCTION	COLLINS PART NUMBER
Control Unit 714E-1	Frequency and mode selection.	522-1261-00
or		
Control Unit 714E-2	Frequency and mode selection.	522-2213-00
or		
Control Unit 714E-3	Frequency and mode selection.	522-2457-00
Antenna Tuner 180L-( )	Match impedance of long-wire antenna to 50-ohm output of 618T-( ).	622-1199-004 (180L-2) 522-0092-004 (180L-3)

TABLE 2. EQUIPMENT REQUIRED FOR NEW INSTALLATION - NOT SUPPLIED (Cont)

ITEM	FUNCTION	COLLINS PART NUMBER
Antenna Coupler 180R-6	Match impedance of long-wire antenna to 50-ohm output of 618T-( ).	522-0998-004
Antenna Coupler Control 309A-2D	Required when 180R-6 is used.	522-2434-004
Antenna	Radiate in 2- to 30-mc band.	
Microphone	Supply audio input.	
Headphones, high-impedance	Monitor audio output.	
Shockmount 390J-1	Mount 618T-( ).	522-1658-00

TABLE 3. EQUIPMENT REQUIRED FOR 618S-( ) RETROFIT INSTALLATION - NOT SUPPLIED

ITEM	FUNCTION	COLLINS PART NUMBER
Retrofit Adapter 49T-3	Retrofits 618T-3 to 618S-( ) installation.	522-1645-00
or		
Retrofit Adapter 49T-4	Retrofits 618T-1 to 618S-( ) installation.	522-1697-00
Power Supply 516H-1	Replaces Power Supply 416W-1 in 618T-1 retrofit installation.	522-1204-00
Control Unit 714E-2	Replaces Control Unit 614C-2 in retrofit installations.	522-2213-00

F. Systems Designations.

Several of the many possible combinations of 618T-( ) transceivers and associated equipment have been designated high-frequency communications systems. Table 4 describes each of these systems. Refer to 618T-( ) Installation Manual, Collins part number 520-5970006, chapter 23-10-0, for installation and interconnection data for each of these systems.

TABLE 4. DESCRIPTION OF HIGH-FREQUENCY COMMUNICATIONS SYSTEMS

DESIGNATION	COLLINS PART NUMBER	COMPONENTS
High-Frequency Communications System HF-101	522-2426-00	Airborne SSB Transceiver 618T-1 Retrofit Adapter 49T-4 Control Unit 714E-2 Power Supply 516H-1
High-Frequency Communications System HF-102	522-2427-00	Airborne SSB Transceiver 618T-2 Control Unit 714E-2 or 714E-3 Shockmount 390J-1
High-Frequency Communications System HF-103	522-2428-00	Airborne SSB Transceiver 618T-3 Control Unit 714E-2 or 714E-3 Shockmount 390J-1
High-Frequency Communications System HF-104	522-2435-00	Airborne SSB Transceiver 618T-3 Retrofit Adapter 49T-3 Control Unit 714E-2

4. TECHNICAL DATA SUMMARY.

A. Specifications 618T-( ).

(1) General.

Ambient temperature range . . . . -40 to +55°C with 30 minutes operation at +70°C.

Ambient humidity range . . . . . Up to 95 percent relative humidity at 50°C for 48 hours.

Altitude range . . . . . Pressure equivalent of 30,000 feet with externally supplied cooling air.

Power requirements . . . . . 618T-1 with 516H-1

27.5 volts d-c, approximately 900 watts.

115 volts, 400 cps, 1-phase, approximately 150 watts.

618T-2:

115 volts (line to neutral), 3-phase, 400 cps, approximately 700 watts.

27.5 volts d-c, approximately 100 watts.

618T-3:

27.5 volts d-c, approximately 950 watts.

115 volts, 400 cps, 1-phase, approximately 100 watts.

Frequency range	2.000 to 29.999 megacycles.
Frequency channels	28,000.
Frequency stability	0.8 part per million per month.
Time required to change channels	8 seconds average (independent of external antenna tuner).

(2) Transmit Characteristics.

R-f power output	SSB: 400 watts PEP ±1 db. AM: 100 watts carrier. CW: 100 watts, locked key.
R-f output impedance	52 ohms.
Audio input impedance	100 ohms unbalanced and 600 ohms balanced.
Audio-frequency response	5-db peak-to-valley ratio from 300 to 3000 cps.
Distortion	SSB: Third-order distortion products down at least 30 db. AM: Less than 20 percent at 80 percent modulation.

(3) Receive Characteristics.

Sensitivity	SSB: 1 microvolt for 10-db S+N/N ratio. AM: 3 microvolts modulated 30 percent 1000 cps for a 6-db S+N/N ratio.
Selectivity	SSB: 2.85 kc, 6 db down. 6.0 kc, 60 db down. AM: 5.5 kc, 6 db down. 14.0 kc, 60 db down.
Agc characteristic	Maximum variation of audio output is 6 db for input signals from 10 to 100,000 microvolts. No overload below 1-volt signal input.
I-f and image rejection	80 db, minimum.

Audio output power	100 milliwatts into 300-ohm load.
Audio distortion	Less than 10 percent.
Audio-frequency response	5-db peak-to-valley ratio from 300 to 3000 cps.

B. Module Complement.

Table 5 lists the modules used in Airborne SSB Transceiver 618T-( ).

C. Transistor Complement.

Table 6 lists the transistors used in Airborne SSB Transceiver 618T-( ).

D. Vacuum-Tube Complement.

Table 7 lists the vacuum tubes used in Airborne SSB Transceiver 618T-( ).

E. Diode Complement.

Table 8 lists the diodes used in Airborne SSB Transceiver 618T-( ).

F. Relay Complement.

Table 9 lists the relays used in Airborne SSB Transceiver 618T-( ).

G. Motor Complement.

Table 10 lists the motors used in Airborne SSB Transceiver 618T-( ).

H. Crystal Complement.

Table 11 lists the crystal used in Airborne SSB Transceiver 618T-( ).

TABLE 5. 618T-( ) MODULE COMPLEMENT

MODULE	FUNCTION	COLLINS PART NUMBER
A1	Frequency divider	546-2142-005
A2	Radio-frequency oscillator	544-9285-005 (old) 528-0251-005 (new)
A3	I-f translator	544-9286-00
A4	Kilocycle-frequency stabilizer	544-9288-005 (old) 528-0112-005 (new)
A5	Low-voltage power supply	544-9292-00
A6	Electronic control amplifier	544-9290-005

TABLE 5. 618T-( ) MODULE COMPLEMENT (Cont)

MODULE	FUNCTION	COLLINS PART NUMBER
A7	Three-phase high-voltage power supply	544-9291-00
A8	27.5-volt d-c high-voltage power supply	545-4971-00
A9	AM/audio amplifier	544-9287-00 (old) 546-6053-00 (new)
A10	Megacycle-frequency stabilizer	544-9289-005 (old) 528-0329-005 (new)
A11	Power amplifier	544-9283-00
A12	R-f translator	544-9284-00 (old) 528-0113-00 (new)
A12A1	Autopositioner (submodule)	546-6873-005
A12A2	Variable-frequency oscillator (vfo) (submodule)	522-1380-003 (70K-3) 522-2424-004 (70K-5)
A13	Single-phase high-voltage power supply	545-5858-00
	Chassis	544-9293-00

TABLE 6. 618T-( ) TRANSISTOR COMPLEMENT

MODULE SYMBOL	LOCATION	TRANSISTOR SYMBOL	TRANSISTOR TYPE	FUNCTION	COLLINS PART NUMBER
A1	Frequency divider	Q1	2N1285	Emitter follower	352-0243-00
		Q2	2N1285	Locked oscillator	352-0243-00
		Q3	2N1285	Emitter follower	352-0243-00
		Q4	2N697	Locked oscillator	352-0197-00
		Q5	2N1285	Pulse inverter	352-0243-00
		Q6	2N697	Blocking oscillator	352-0197-00
		Q7	2N1285	Isolation amplifier	352-0243-00

TABLE 6. 618T-( ) TRANSISTOR COMPLEMENT (Cont)

MODULE SYMBOL	LOCATION	TRANSISTOR SYMBOL	TRANSISTOR TYPE	FUNCTION	COLLINS PART NUMBER
A1 (Cont)		Q8	2N1285	Locked oscillator	352-0243-00
		Q9	2N1285	Switch	352-0243-00
		Q10	2N491	Unijunction divider	352-0116-00
		Q11	2N1285	Pulse amplifier	352-0243-00
		Q12-Q13	2N404	1-kc keyer	352-0158-00
		Q14	2N1285	Keyed oscillator	352-0243-00
A2	R-f oscillator	Q1-Q3	- -	Temperature-compensated crystal oscillator	(Not replaceable)
		Q4	2N703	Locked oscillator	352-0316-00
		Q5	2N703	500-kc amplifier	352-0316-00
		Q6	2N703	500-kc amplifier	352-0316-00
		Q7	2N703	Emitter follower	352-0316-00
		Q8	2N703	Locked oscillator	352-0316-00
		Q9	2N703	100-kc amplifier	352-0316-00
A3	I-f translator	Q1	2N78	Alc amplifier	352-0032-00
		Q2-Q5	2N274	I-f amplifiers	352-0096-00

TABLE 6. 618T-( ) TRANSISTOR COMPLEMENT (Cont)

MODULE SYMBOL	LOCATION	TRANSISTOR SYMBOL	TRANSISTOR TYPE	FUNCTION	COLLINS PART NUMBER
A3 (Cont)		Q6	2N542	Tgc-adc amplifier	352-0221-00
A4	Kilocycle-frequency stabilizer	Q1	2N1285	Vfo isolation amplifier	352-0243-00
		Q2	2N1285	1st mixer	352-0243-00
		Q3	2N1285	2nd mixer	352-0243-00
		Q4	2N1285	Isolation amplifier	352-0243-00
		Q5-Q8	2N1285	Signal i-f amplifiers	352-0243-00
		Q9	2N332	10-kc keyer	352-0119-00
		Q10	2N706	10-kc keyer	352-0195-00
		Q11	2N128	Keyed oscillator	352-0269-00
		Q12	2N1285	Digit oscillator	352-0243-00
		Q14	2N1285	Isolation amplifier	352-0243-00
		Q15	2N1285	Reference mixer	352-0243-00
		Q16-Q19	2N1285	Reference i-f amplifiers	352-0243-00
A5	Low-voltage power supply	Q1	2N670	Transient blanker switch	352-0238-00
		Q2	2N458	Transient blanker switch	352-0238-00
		Q3	2N1131	Regulator amplifier	352-0219-00
		Q4	2N332	Regulator amplifier	352-0119-00
		Q5	2N550	Regulator controller	352-0393-00

TABLE 6. 618T-( ) TRANSISTOR COMPLEMENT (Cont)

MODULE SYMBOL	LOCATION	TRANSISTOR SYMBOL	TRANSISTOR TYPE	FUNCTION	COLLINS PART NUMBER
A6	Electronic control amplifier	Q1-Q4	2N651	Amplifiers	352-0194-00
		Q5	2N457	Driver	352-0134-00
		Q6-Q7	2N457	Push-pull output amplifiers	352-0134-00
A8	27.5-volt d-c high-voltage power supply	Q1-Q2	2N158A	Saturable-core oscillators	352-0041-00
		Q3-Q8	2N1100	Push-pull switches	352-0121-00
A9	AM/audio amplifier	Q1-Q2	2N158	Audio amplifiers	352-0055-00
		Q3-Q6	2N274	I-f amplifiers	352-0096-00
		Q7	2N274	Agc amplifier	352-0096-00
		Q8	2N651	Audio amplifier	352-0194-00
		Q9	2N651	Selcal audio amplifier	352-0194-00
A10	Megacycle-frequency stabilizer	Q1	2N706	Squaring amplifier	352-0195-00
		Q2	2N2218	Pulse generator	352-0433-00
		Q3-Q4	2N489	Automatic level detectors	352-0171-00
		A1Q1, A2Q1	2N1285	R-f amplifiers	352-0243-00
		A1Q2, A2Q2	2N706	R-f amplifiers	352-0195-00
		A1Q3 A2Q3	2N706	Mixers	352-0195-00
		A1Q4 A2Q4	2N1285	I-f amplifiers	352-0243-00

TABLE 6. 618T-( ) TRANSISTOR COMPLEMENT (Cont)

MODULE SYMBOL	LOCATION	TRANSISTOR SYMBOL	TRANSISTOR TYPE	FUNCTION	COLLINS PART NUMBER
A12A2	Vfo submodule	Q1	2N1196	Oscillator	352-0232-00
		Q2	2N2189	Amplifier	352-0412-00
		Q3	2N2189	Amplifier	352-0412-00
		Q4	2N2189	Amplifier	352-0412-00
516H-1	External power supply	Q1-Q2	2N458	Saturable-core oscillators	352-0151-00
		Q3-A8	2N1100	Push-pull switches	352-0121-00
--	Chassis	Q1	2N491	Time delay switch	352-0116-00

TABLE 7. 618T-( ) VACUUM-TUBE COMPLEMENT

MODULE SYMBOL	LOCATION	TUBE SYMBOL	TUBE TYPE	FUNCTION	COLLINS PART NUMBER
A12	R-f translator	V1	12AT7WA	Transmit l-f mixer	255-0218-00
		V2	12AT7WA	Transmit 17.5-mc mixer	255-0218-00
		V3	12AT7WA	Transmit h-f mixer	255-0218-00
		V4-V5	6DC6	R-f amplifiers	255-0226-00
		V6-V7	6CL6	Drivers	255-0216-00
		V8	6AH6WA	Receive l-f mixer	255-0344-00
		V9	6AH6WA	Receiver 17.5-mc mixer	255-0344-00
		V10	6AH6WA	17.5-mc oscillator	255-0344-00
		V11	6AH6WA	H-f oscillator	255-0344-00
		V12	12AT7WA	Receive h-f mixer	255-0218-00
A11	Power amplifier	V1-V2	Eimac 7204/ 4CX250F	Power amplifiers	256-0147-00

TABLE 8. 618T-( ) DIODE COMPLEMENT

MODULE SYMBOL	LOCATION	DIODE SYMBOL	DIODE TYPE	FUNCTION	COLLINS PART NUMBER
A1	Frequency divider	CR1	1N270	Blocking oscillator circuit (protects Q6)	353-2018-00
		CR2	1N198	Switch circuit	353-0160-00
		CR3, CR4	1N627	Unijunction divider circuit	353-2693-00
		CR5	1N627	Pulse amplifier circuit	353-2693-00
A3	I-f translator	CR1	1N252	Diode quad balanced modulator	353-2579-00
		CR3	HD2120	Protects Q2	353-2780-00
		CR4	HD2120	Protects Q3	353-2780-00
		CR5A/B	1N67	Product detector	353-0127-00
		CR6	HD2160	Transmit-receive switch	353-2006-00
		CR7	HD2120	Tgc gate	353-2780-00
A4	Kilocycle-frequency stabilizer	CR1, CR11	1N926	Frequency discriminator	353-2953-00
		CR3	1N457	Protects Q9	353-0204-00
		CR4, CR5	1N457	Protects Q10	353-0204-00
		CR6-CR8	1N2167A	Vfo bias (referenced breakdown)	353-2944-00
		CR9, CR10	1N926	Phase discriminator	353-2953-00
		CR12	1N645	Digit oscillator circuit	353-2607-00
		CR13	1N270	Keyed oscillator circuit	353-2018-00
		CR14, CR15	1N457	Keyed oscillator circuit	353-0204-00
		CR16	1N198	Keyed oscillator circuit	353-0160-00

TABLE 8. 618T-( ) DIODE COMPLEMENT (Cont)

MODULE SYMBOL	LOCATION	DIODE SYMBOL	DIODE TYPE	FUNCTION	COLLINS PART NUMBER
A5	Low-voltage power supply	CR1	1N3018A	Transient blanker circuit (breakdown)	353-1313-00
		CR2	1N2621A	Regulator circuit (reference breakdown)	353-2939-00
		CR3	1N1492	Half-wave rectifier	353-1661-00
A6	Electronic control amplifier	CR1, CR2	PS6903	Interstage isolation (breakdown)	353-2952-00
A7	Three-phase high-voltage power supply	CR1-CR36	1N1492	Full-wave rectifiers	353-1661-00
		CR37, CR38	1N1487	SSB tgc rectifiers	353-1662-00
A8	27.5-volt d-c high-voltage power supply	CR1-CR5	1N1487	Oscillator circuit	353-1662-00
		CR6-CR21	1N1492	Full-wave rectifiers	353-1661-00
		CR22, CR23	1N1487	SSB tgc gates	353-1662-00 353-5400-00
		CR24	1N2834B	Transient suppressor	353-1917-00
A9	AM/audio amplifier	CR1	1N645	SSB agc detector	353-2607-00
		CR2	HD2120	SSB agc detector	353-2780-00
		CR4	HD2120	AM audio detector	353-2780-00
		CR5, CR6	HD2120	AM agc detectors	353-2780-00
		CR7	HD2120	SSB agc detector	353-2780-00
		CR8-CR10	1N645	CW keying circuit	353-2607-00
		CR11	HD2120	Agc gate	353-2780-00
		CR12	1N645	Key line isolation	353-2607-00
		CR13	SZ885	Agc delay (breakdown)	353-3398-00
		CR14	1N645	1-kc tuned circuit switch	353-2607-00
A10	Megacycle-frequency stabilizer	A1CR1 A2CR1	1N198	R-f limiters	353-0160-00
		A1CR2 A2CR2	1N198	AM detectors	353-0160-00

TABLE 8. 618T-( ) DIODE COMPLEMENT (Cont)

MODULE SYMBOL	LOCATION	DIODE SYMBOL	DIODE TYPE	FUNCTION	COLLINS PART NUMBER
A11	Power amplifier	CR1	1N1491	Half-wave bias rectifier	353-1660-00
		CR2A/B	1N198	Phase discriminator	353-2025-00
		CR3	1N198	Adc rectifier	353-0160-00
		CR4	1N457	Adc gate	353-0160-00
		CR5	1N3004B	Bias stabilization (breakdown)	353-3073-00
		CR6	1N3020B	Tgc reference stabilization (breakdown)	353-3050-00
		CR7a, CR7b	10M20-0Z2	400-volt screen voltage stabilization (breakdown)	353-1145-00
A12	R-f translator	CR1	1N645	Capacity switch	353-2607-00
		CR5	1N645	Transient suppressor	353-2607-00
		CR6	1N67A	Agc rectifier	353-0147-00
		CR9	1N645	Switch suppressor	353-2607-00
A12A1	Autopositioner submodule	CR1	1N645	Transient suppressor	353-2607-00
		CR2	1N645	Isolation	353-2607-00
		CR3, CR4	1N645	Transient suppressors	353-2607-00
	Chassis	CR1, CR2	1N39B	Sidetone relay rectifiers	353-2014-00
		CR3	1N645	Isolation diode	353-2607-00
		CR4	1N647	400-cycle interlock relay rectifier	353-2596-00
		CR5	1N645	Transient suppressor	353-2607-00
		CR6	1N645	Transient suppressor	353-2607-00
A13	Single-phase high-voltage power supply	CR1-CR16	1N1492	Full-wave rectifiers	353-1661-00

TABLE 9. 618T-( ) RELAY COMPLEMENT

MODULE SYMBOL	LOCATION	RELAY SYMBOL	NUMBER OF TRANSFER SWITCHES	FUNCTION	COLLINS PART NUMBER
A3	I-f translator	K1	2	TR relay	974-0655-00
		K2	2	Sideband selector	974-0700-00
		K3	2	AM/SB relay	974-0655-00
		K4	2	AM/SB relay	974-0655-00
		K5	2	TR relay	974-0655-00
A7	Three-phase high-voltage power supply	K1	4	Plate contactor	972-1526-00
		K2	3	Step start	972-1527-00
		K3	2	Overload	972-1515-00
A8	27.5-volt d-c high-voltage power supply	K1	2	H-v on-off	972-1528-00
		K2	2	Overload	972-1515-00
A9	AM/audio amplifier	K1	2	CW keying relay	974-0720-00
		K2	2	CW keying relay	408-1098-00
A11	Power amplifier	K1	2	PA band-switch interlock relay	974-0559-00
		K2 (below MCN 4550)	1	Tune power relay	972-1465-00
		K3 (MCN 4550 and above)	1	Tune power relay	974-0875-00
A12	R-f translator	K1	2	TR relay	974-0559-00
		K2	2	TR relay	974-0669-00
		K3	2	Band-switch motor relay	974-0559-00
		K4	2	TR relay	974-0669-00
A12A1	Autopositioner submodule	K1	2	1-kc motor relay	974-0720-00
		K2	3	10-kc motor relay	546-6857-003

TABLE 9. 618T-( ) RELAY COMPLEMENT (Cont)

MODULE SYMBOL	LOCATION	RELAY SYMBOL	NUMBER OF TRANSFER SWITCHES	FUNCTION	COLLINS PART NUMBER
A13	Single-phase high-voltage power supply module	K1		H-v delay	
		K2		Overload	
	Chassis (relay compartment)	K1	2	On-off relay	972-1544-00
		K2	4	Keying relay	972-1335-00
		K3	4	Keying relay	972-1335-00
		K4	4	Recycle relay	972-1335-00
		K5	2	Antenna transfer relay	972-1531-00
		K6	2	Sidetone relay	974-0464-00
		K7	1	Time-delay relay	402-0302-00
		K8	2	18-volt delay relay	974-0711-00
		K9	2	400-cycle interlock relay	974-0712-00
		K10	2	27-volt interlock relay	974-0587-00

TABLE 10. 618T-( ) MOTOR COMPLEMENT

MODULE	SYMBOL	FUNCTION	COLLINS PART NUMBER
Power amplifier	B1	Band-switch motor	230-0303-00
	B2	Servo tuning motor	229-0222-00
R-f translator	B1	Band-switch motor	230-0303-00
Autopositioner	B1	1-kc motor	230-0303-00
	B2	10-kc and 100-kc motor	230-0303-00
Chassis	B1	Blower	009-1377-00

TABLE 11. DELETED

5. PRINCIPLES OF OPERATION.

A. General.

The following paragraphs contain a general explanation of Airborne SSB Transceiver 618T-( ). A detailed explanation of the 618T-( ) is contained in the 618T-( ) Maintenance Manual, Collins part number 520-5970004, chapter 23-10-0.

(1) Transmit Mode.

Refer to the upper part of figure 2. The audio output of the operator's microphone is fed through two audio amplifiers, A9Q1 and A9Q2. If the balanced audio input or CW tone input is used, an additional amplifier, A9Q8, is added. A sidetone output is provided from A9Q2 for monitoring the audio. The amplified audio is fed to a balanced modulator where it is combined with a 500-kc signal from the r-f oscillator. The balanced modulator output contains the upper and lower sidebands, one on each side of 500 kc. The two sidebands are fed to A3Q1, the automatic load control (alc) amplifier. The gain of the alc amplifier is controlled by a feedback signal from the grid of the power amplifier. If the grid of the power amplifier is overdriven, the gain of the alc amplifier is reduced.

The two sidebands are further amplified by A3Q2 and fed through one of two mechanical filters, A3FL1 or A3FL2. The selection of the desired filter is controlled by the mode selector switch on Control Unit 714E-( ). One filter passes only the upper sideband, and the other passes only the lower sideband. When the transceiver is operated in the AM mode, the upper sideband is passed, and a 500-kc carrier from the r-f oscillator is reinserted at the filter output.

The output of the mechanical filter is fed to 500-kc i-f amplifier A3Q4 through relay A3K5. The gain of A3Q4 is controlled by feedback signals from the plate of the power amplifier. If excessive plate current flows, the transmitter gain control (tgc) reduces the gain of A3Q4. If excessive r-f plate voltage swing occurs, the automatic drive control (adc) reduces the gain of A3Q4.

The 500-kc i-f output of A3Q4 is heterodyned by mixers A12V1, A12V2, and A12V3 to the selected operating frequency. The operating-frequency output of mixer A12V3 is fed through an r-f amplifier, A12V4 and A12V5, and then through a driver, A12V6 and A12V7. The driver output goes to the linear power amplifier, A11V1 and A11V2. The amplifier output network is automatically tuned by a servo loop and fed to a 52-ohm output.

(2) Receive Mode.

Refer to the lower part of figure 2. The antenna signal is coupled to an r-f amplifier, A12V4 and A12V5. The r-f output of the r-f amplifier is heterodyned by mixers A12V12, A12V9, and A12V8 to a 500-kc i-f. The 500-kc i-f output of mixer A12V8 is fed to both SSB and AM i-f amplifiers. The AM i-f amplifiers are operating in both the SSB and AM modes to provide a Selcal (selective calling) output in either mode.

In the SSB mode, the output of the 1-f mixer, A12V8, is fed to a 500-kc i-f amplifier, A3Q2, and then through one of two mechanical filters. Each filter has a bandwidth of 3 kc. One filter passes the upper sideband, and the other passes the lower sideband. The appropriate filter is selected at the mode selector switch on Control Unit 714E-( ). The filter output is amplified by i-f amplifiers A3Q3, A3Q4, and A3Q5. The output of A3Q5 is fed to a product detector which recovers the audio signal.

In the AM mode, the output of the 1-f mixer, A12V8, is fed to a 500-kc i-f amplifier, A9Q3, and through a mechanical filter. This filter has a bandwidth of 6 kc in order to pass both sidebands. The filter output is amplified by i-f amplifiers A9Q4, A9Q5, and A9Q6. The output of A9Q6 is fed to an AM detector which recovers the audio signal. Part of the output of the i-f amplifier A9Q5 is detected, amplified, filtered, and fed to i-f amplifiers A9Q3 and A9Q4 for agc.

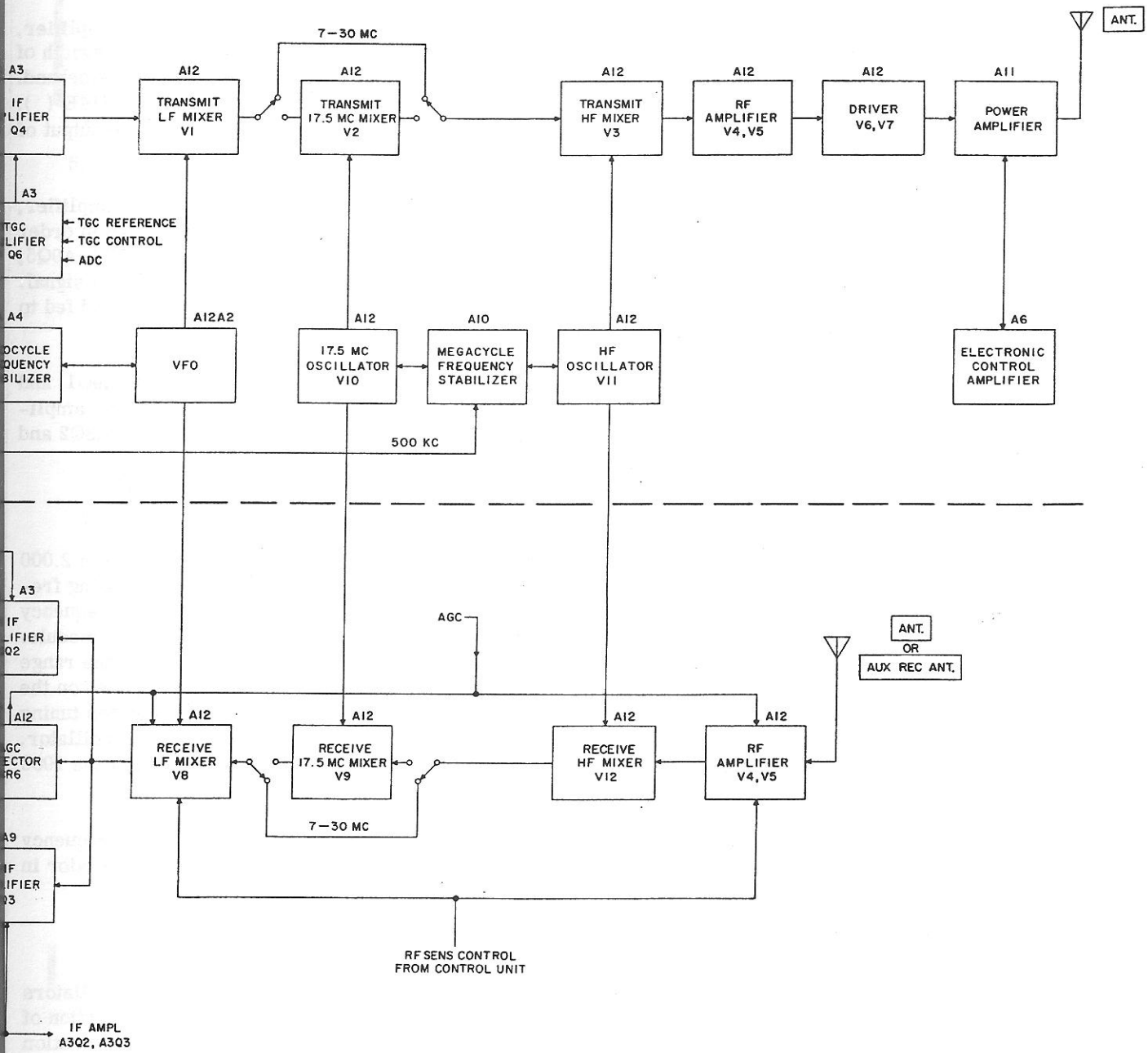
In either the SSB or AM mode, the detected audio is amplified by A9Q8, A9Q1, and A9Q2. Part of the output of audio amplifier A9Q2 is rectified and applied to r-f amplifier, A12V4 and A12V5, receive 1-f mixer, A12V12, and SSB i-f amplifiers A3Q2 and A3Q3 for agc. The output of A9Q2 is fed to the operator's headphones.

B. Frequency Generation and Stabilization.

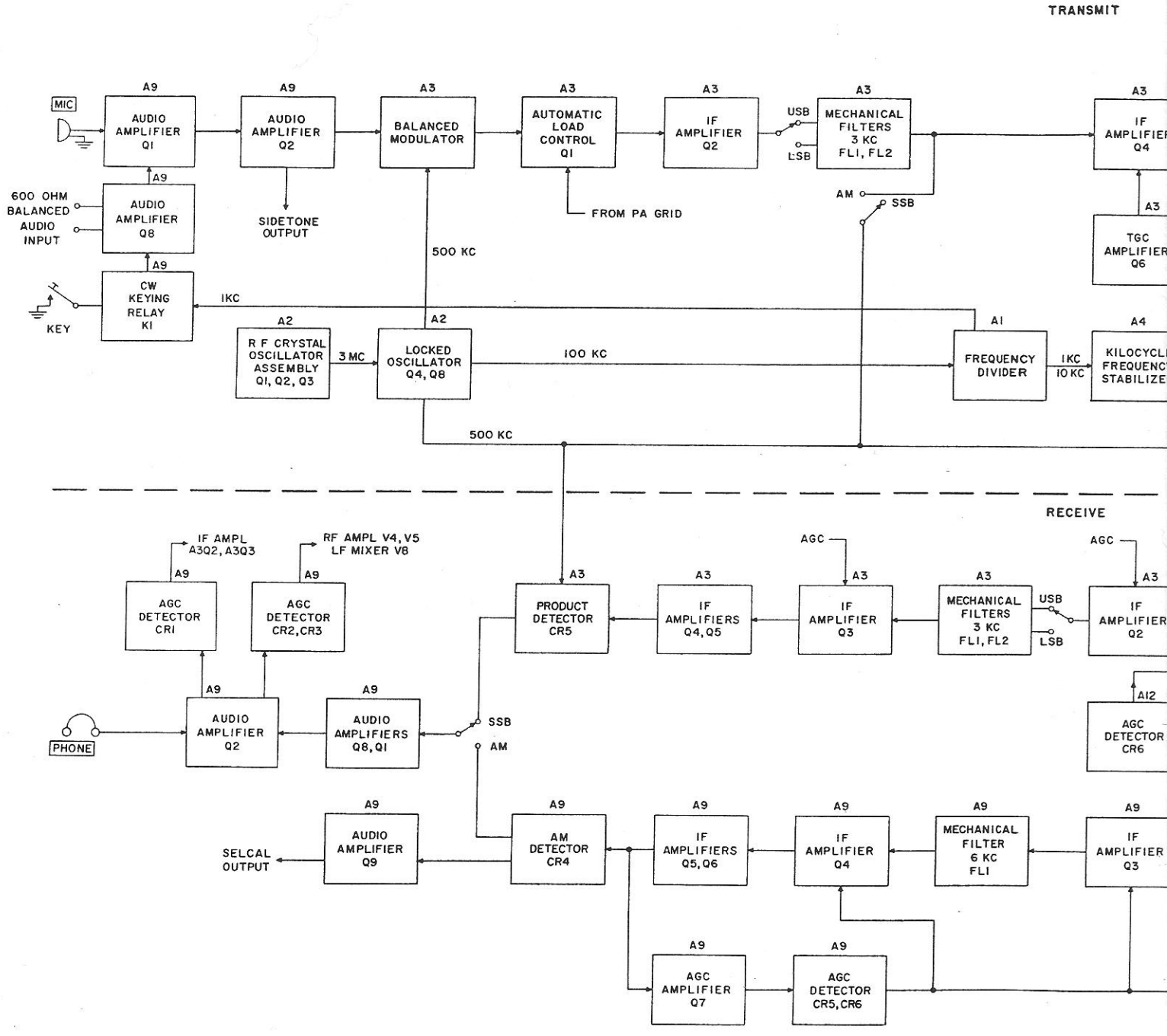
Airborne SSB Transceiver 618T-( ) transmits and receives on every 1-kc step from 2.000 to 29.999 mc. This provides 28,000 separate operating frequencies. The operating frequency is selected at Control Unit 714E-( ). The 100-kc, 10-kc, and 1-kc frequency selector knobs on the control unit control the Autopositioner in the r-f translator module. The Autopositioner mechanically tunes a vfo (variable frequency oscillator) over the range from 3.500 to 2.501 mc in 1000 1-kc steps. The megacycle-frequency selector knob on the control unit controls a motor in the r-f translator module. This motor switches tuning elements which tune an h-f oscillator to 28 frequencies, each 1 mc apart. The h-f oscillator, in conjunction with a 17.5-mc oscillator, provides 28 one-mc bands for each of the 1000 one-kc steps from the vfo. Thus, 28,000 steps are generated.

The high stability of the 618T-( ) operating frequency is obtained by basing the frequency scheme of the entire transceiver on the frequency of a very stable crystal oscillator in the r-f oscillator module.

The injection frequency sources of the heterodyning mixers (h-f and 17.5-mc oscillators and vfo) are phase locked to the crystal-generated reference frequency by the action of circuits in the kilocycle- and megacycle-frequency stabilizer modules. The i-f injection frequency also is derived from the crystal oscillator. Therefore, the 618T-( ) operating frequency is as stable as the crystal oscillator, which is accurate to within 0 8 part per million per month.



Airborne SSB Transceiver 618T-( ),
Block Diagram
Figure 2


TRANSMIT
MIC
A9
AUDIO AMPLIFIER Q1
A9
AUDIO AMPLIFIER Q2
A3
BALANCED MODULATOR
A3
AUTOMATIC LOAD CONTROL Q1
A3
IF AMPLIFIER Q2
USB
LSB
A3
MECHANICAL FILTERS 3 KC FL1, FL2
A3
IF AMPLIFIER Q4
600 OHM BALANCED AUDIO INPUT
A9
AUDIO AMPLIFIER Q8
SIDETONE OUTPUT
FROM PA GRID
AM
SSB
A3
TGC AMPLIFIER Q6
500 KC
KEY
A9
CW KEYING RELAY K1
IKC
A2
R F CRYSTAL OSCILLATOR ASSEMBLY Q1, Q2, Q3
3 MC
A2
LOCKED OSCILLATOR Q4, Q8
100 KC
A1
FREQUENCY DIVIDER
IKC
10 KC
A4
KILOCYCL FREQUENC STABILIZE
500 KC
RECEIVE
IF AMPL A3Q2, A3Q3
RF AMPL V4, V5 LF MIXER V8
A9
AGC DETECTOR CR1
A9
AGC DETECTOR CR2, CR3
A3
PRODUCT DETECTOR CR5
A3
IF AMPLIFIERS Q4, Q5
AGC
A3
IF AMPLIFIER Q3
A3
MECHANICAL FILTERS 3 KC FL1, FL2
USB
LSB
AGC
A3
IF AMPLIFIER Q2
A12
AGC DETECTOR CR6
PHONE
A9
AUDIO AMPLIFIER Q2
A9
AUDIO AMPLIFIERS Q8, Q1
SSB
AM
A9
AUDIO AMPLIFIER Q9
SELCAL OUTPUT
A9
AM DETECTOR CR4
A9
IF AMPLIFIERS Q5, Q6
A9
IF AMPLIFIER Q4
A9
MECHANICAL FILTER 6 KC FL1
A9
IF AMPLIFIER Q3
A9
AGC AMPLIFIER Q7
A9
AGC DETECTOR CR5, CR6

AIRBORNE SSB TRANSCEIVER 618T-( ) - DISASSEMBLY

1. GENERAL.

The disassembly procedures for Airborne SSB Transceiver 618T-( ), contained in this section, should be followed only when it is necessary to remove a part in order to repair or replace it. The 618T-( ) should not be disassembled completely as a routine part of the overhaul procedure.

2. GENERAL TECHNIQUES AND PRECAUTIONS IN DISASSEMBLY OF AIRBORNE SSB TRANSCEIVER 618T-( ).

Standard electrical disassembly techniques apply to Airborne SSB Transceiver 618T-( ). However, special attention should be given to the following techniques:

A. Removal of Electrical Wiring.

Tag or otherwise identify all disconnected electrical wiring. Make a note of color coding, placement of wires, and method of insulation (if any) before unsoldering or removing.

B. Removal of Transistors and Diodes.

When removing transistors or diodes, use long-nosed pliers to grasp the lead to which heat is applied between the solder joint and the component. This will bleed off some of the heat that conducts into the component from the soldering iron.

C. Removal of Printed Circuit Boards.

Printed circuit boards may be removed from the module chassis by removing the screws which fasten the boards to the spacers on the module chassis. Be careful when removing circuit boards to not damage any connecting wiring or components that are mounted on the board. Refer to the repair section for information regarding removal of components from printed circuit boards.

3. SPECIFIC DISASSEMBLY TECHNIQUES.

A. Removal of Side Covers, Front Panel Cover, and Front Panel.

(1) Modules may be exposed by removing the two side covers on the 618T-( ). To do this, loosen four screws, two on each side, at rear of transceiver. Side covers then may be lifted off.

(2) The front panel cover may be removed by turning the two Dzus fasteners on the cover and pulling cover forward. This will expose the blower filter, sidetone level adjusting screw, and audio level adjusting screw.

(3) To expose the components on the rear of the front panel and in the relay compartment on the front of the chassis, remove four screws at the four corners of the front panel. The front panel then may be moved to expose the components, but will remain attached to the main chassis by a wiring cable.

B. Removal of Module Covers and Modules.

(1) Module covers may be removed by pulling the one or two small handles that are riveted to the cover. It is not necessary to remove any screws to remove the module covers.

(2) Remove modules from the chassis by loosening the redheaded captive hold-down screws at the corners of the module and pulling straight out. Use module pullers, Collins part number 546-6463-002.

CAUTION: DO NOT TWIST OR PRY ON MODULE TO DISENGAGE MATING CONNECTORS, OR CONNECTORS MAY BE DAMAGED.

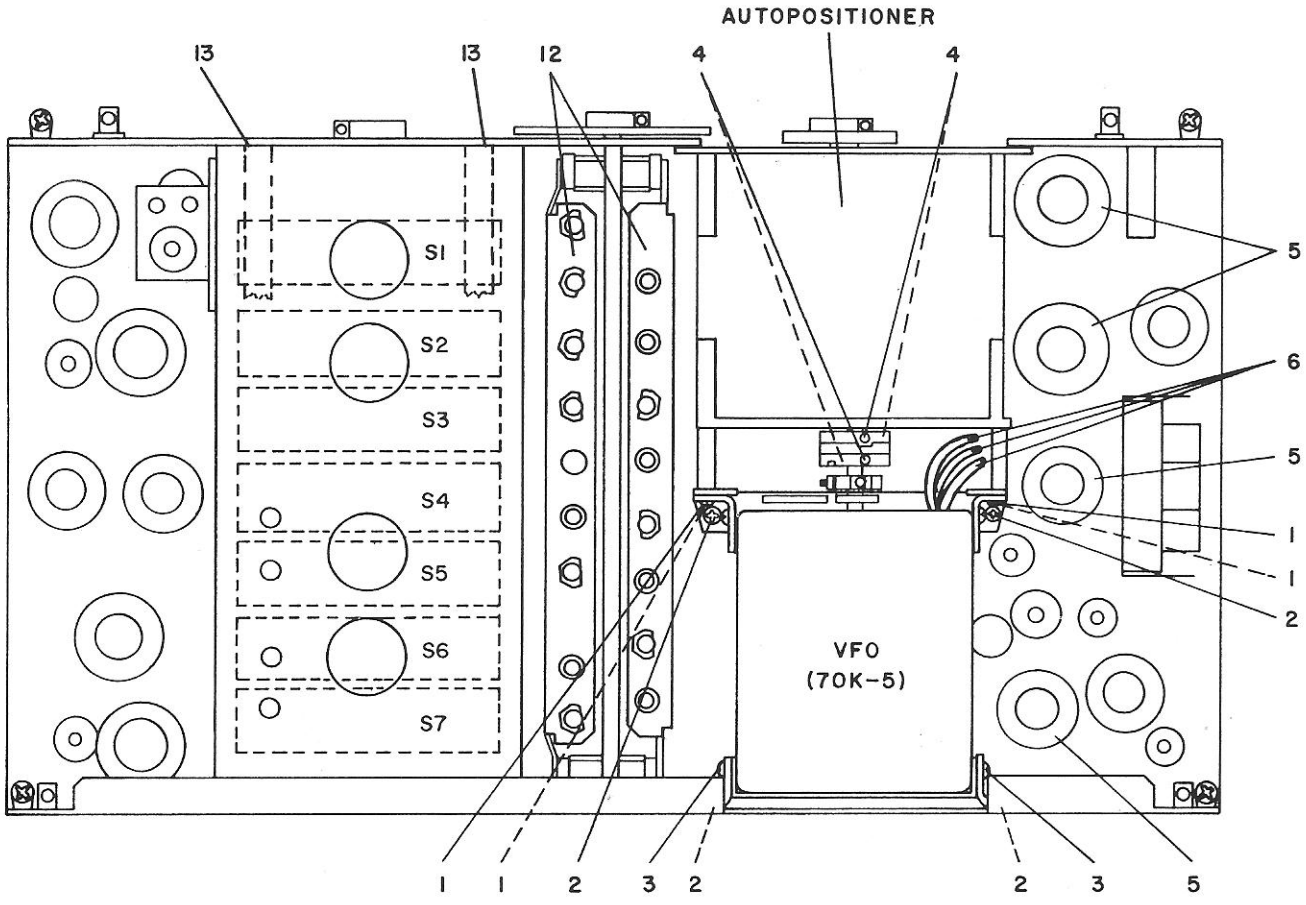
C. Removal of VFO and Autopositioner from R-F Translator Module.

(1) With r-f translator module in the chassis and power applied to the 618T-( ), position the vfo and Autopositioner to 500-kc position by setting frequency indicator on Control Unit 714E-( ) to 0.500 mc, any megacycle band.

(2) Remove r-f translator module from the 618T-( ) chassis.

(3) Remove top and bottom covers from r-f translator module.

(4) Refer to figure 101. Remove four screws (1) fastening vfo to the Autopositioner.



R-F Translator Module, Top View
Figure 101

(5) Remove four screws (2) fastening vfo brackets to r-f translator chassis and back plate.

(6) Loosen two screws (3) holding back brackets on vfo. Rotate brackets approximately 90 degrees in order to get room to move vfo.

(7) Loosen four setscrews (4) on coupler between vfo and Autopositioner.

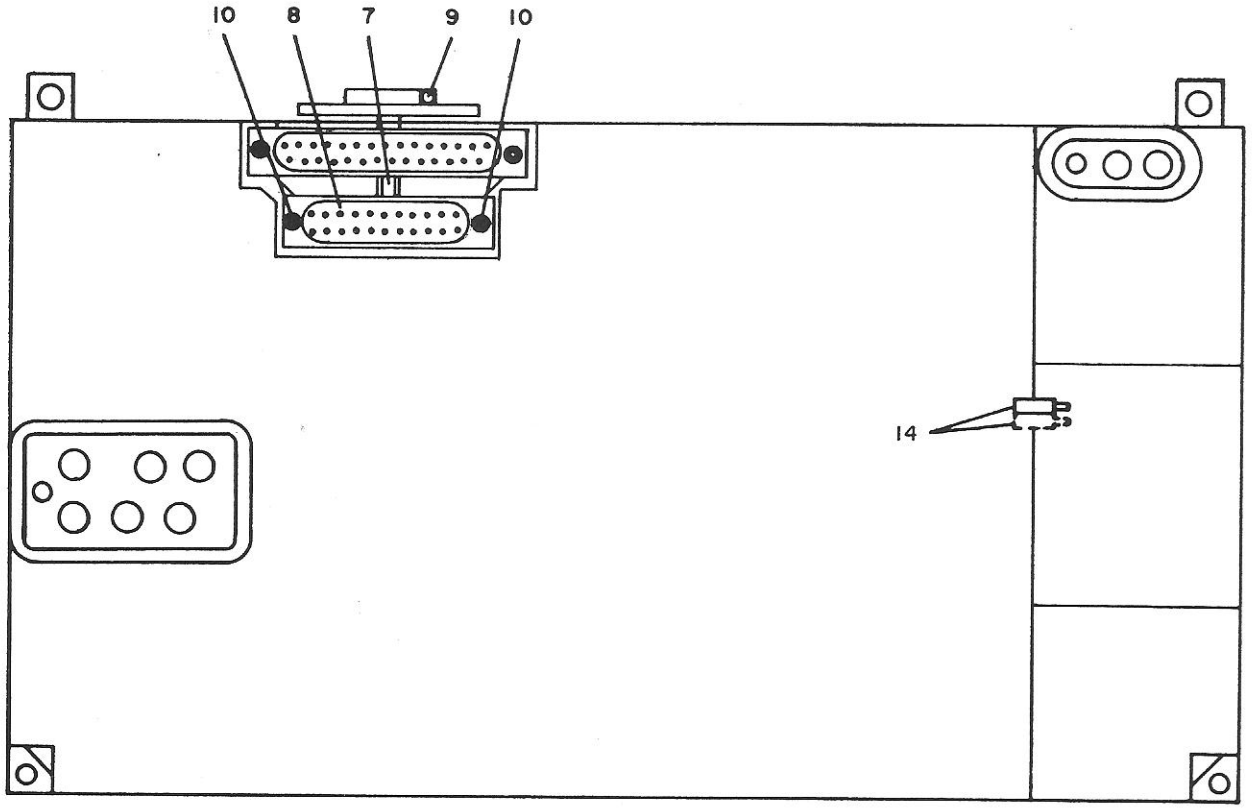
(8) Remove four tubes (5) adjacent to vfo and Autopositioner.

(9) To remove the vfo, tag and unsolder the three vfo leads (6) from connectors P6 and J32-31 and the other internal connections in the module. Note placement of these leads on r-f translator chassis. The vfo may then be lifted from r-f translator.

(10) Refer to figure 102. Remove 3/8-inch flatted shaft (7) directly above 25-pin connector (8) by loosening clamp (9) on gear that drives the shaft. Pull shaft out through gear.

(11) Remove two screws (10) holding 25-pin connector to bottom of r-f translator chassis.

(12) Remove idler gear which couples Autopositioner to slug rack gear. Idler gear is G9 in figure 103.



R-F Translator Module, Bottom View
Figure 102

(13) Refer to figure 103. Remove four screws (11) holding Autopositioner to gear plate.

(14) Carefully maneuver Autopositioner to free it from mounting plate. Remove Autopositioner by slowly lifting it from r-f translator chassis. Be careful to not damage 28-position switch wafers when pulling 25-pin connector up through chassis.

D. Disassembly of VFO.

The vfo is a potted assembly and cannot be disassembled in the field. Any attempt to disassemble or adjust the vfo will result in misalignment and loss of accuracy. If the source of trouble has been definitely traced to the vfo, the vfo should be returned to the factory and replaced with a new unit.

E. Disassembly of Autopositioner.

(1) Removal of Reversing Switch.

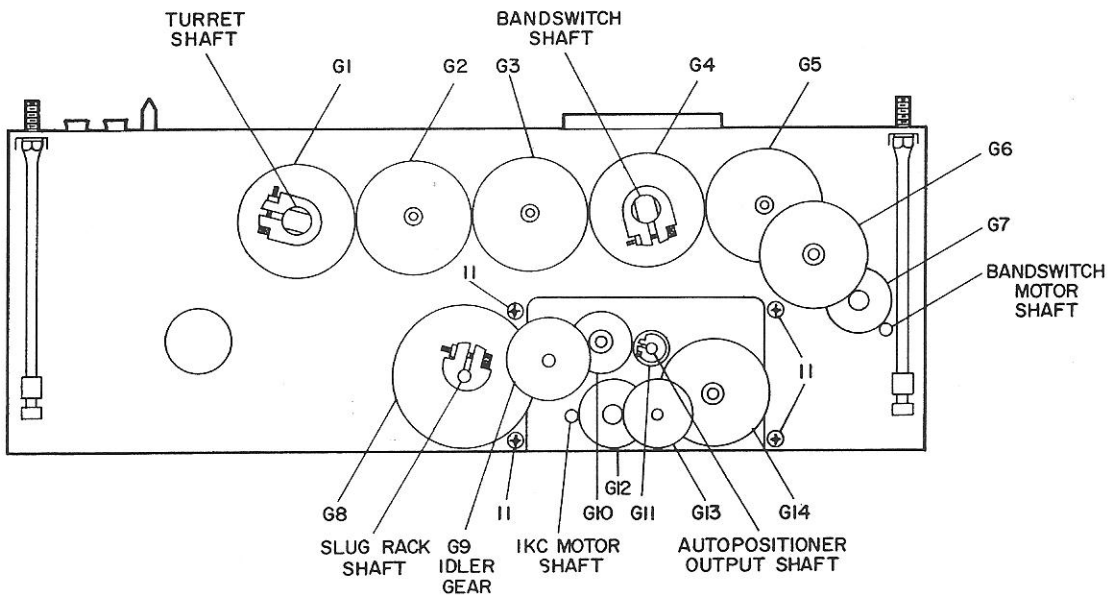
(a) Refer to figure 104. Rotate gear (1) or (5) by hand to position cam (32) so that cam follower (98) is as near camshaft (31) as possible.

CAUTION: ALWAYS TURN GEARS SO THAT CAM ROTATES IN COUNTER-CLOCKWISE DIRECTION AS VIEWED FROM GEAR-PLATE SIDE.

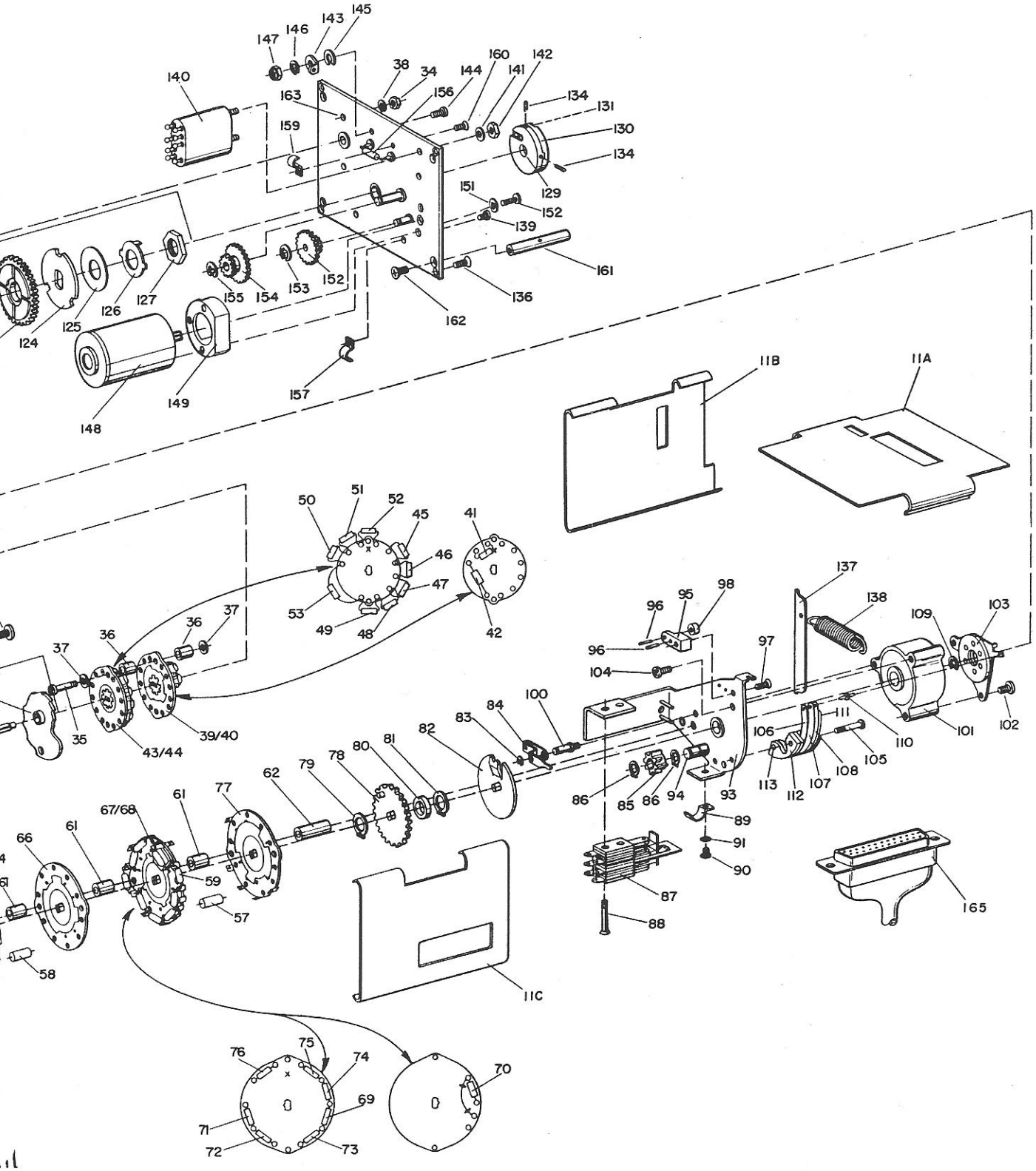
(b) Remove spring (138) by unhooking bar (137) that is held in slots on mounting posts (135). Do not stretch spring excessively while removing it.

(c) Remove cable clamp (21) by removing screw (26).

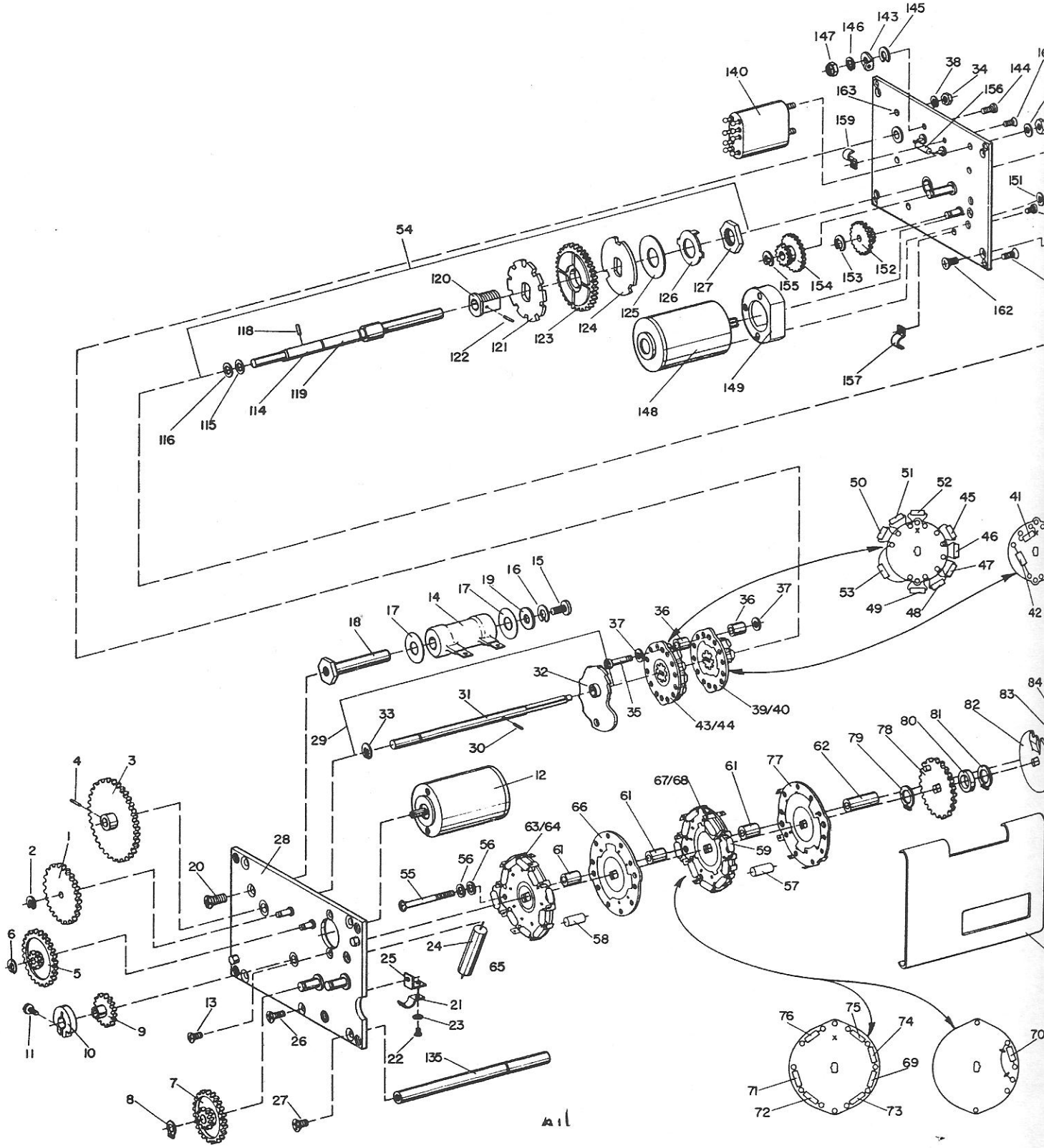
(d) Remove cable clamp (89) by removing screw (90) and washer (91). Lay cable back so that reversing switch (87) is accessible.



R-F Translator Module, Gear Plate
Figure 103



Autopositioner Submodule, Exploded View
Figure 104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(e) Remove two screws (88) holding switch to bracket (93). Remove reversing switch from bracket.

(f) Tag and unsolder the six wires connected to the switch. Reversing switch terminal identification is given in figure 105(A). The switch may now be removed.

(2) Removal of 1-Kc Switches.

(a) Refer to figure 104. Rotate gear (1) or (5) by hand to position cam (32) so that cam follower (98) is as near camshaft (31) as possible.

(b) Remove spring (138) by unhooking bar (137) that is held in slots on mounting posts (135).

(c) Remove vfo coupler (130) from output shaft (119) by loosening two setscrews (134).

(d) Remove two cable clamps (157) by removing two screws (139).

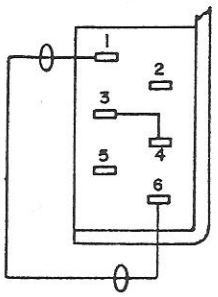
(e) Remove relay (140) from mounting plate (163) by removing two nuts (142) and two washers (141).

(f) Remove motor (148) and motor bracket (149) from mounting plate by removing two screws (151) and two washers (150).

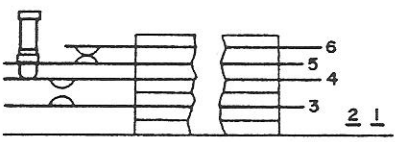
(g) Loosen mounting plate (163) by removing four screws (136). Lift plate straight up to clear output shaft (119) and 1-kc switch shaft (31).

(h) Remove 1-kc switch wafers (43/44, 39/40) from mounting plate by removing two screws (35). Be careful to not lose any of the small ceramic spacers (36) or fiber washers (37).

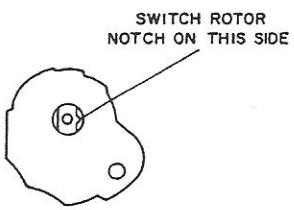
(i) Tag any leads before unsoldering from switch terminals. Refer to figure 106(B).



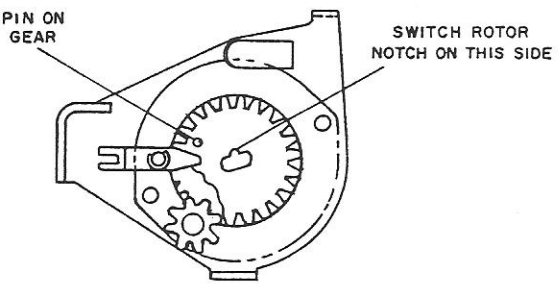
(A) REVERSING SWITCH TERMINAL IDENTIFICATION



(B) SOLENOID RELAY TERMINAL IDENTIFICATION

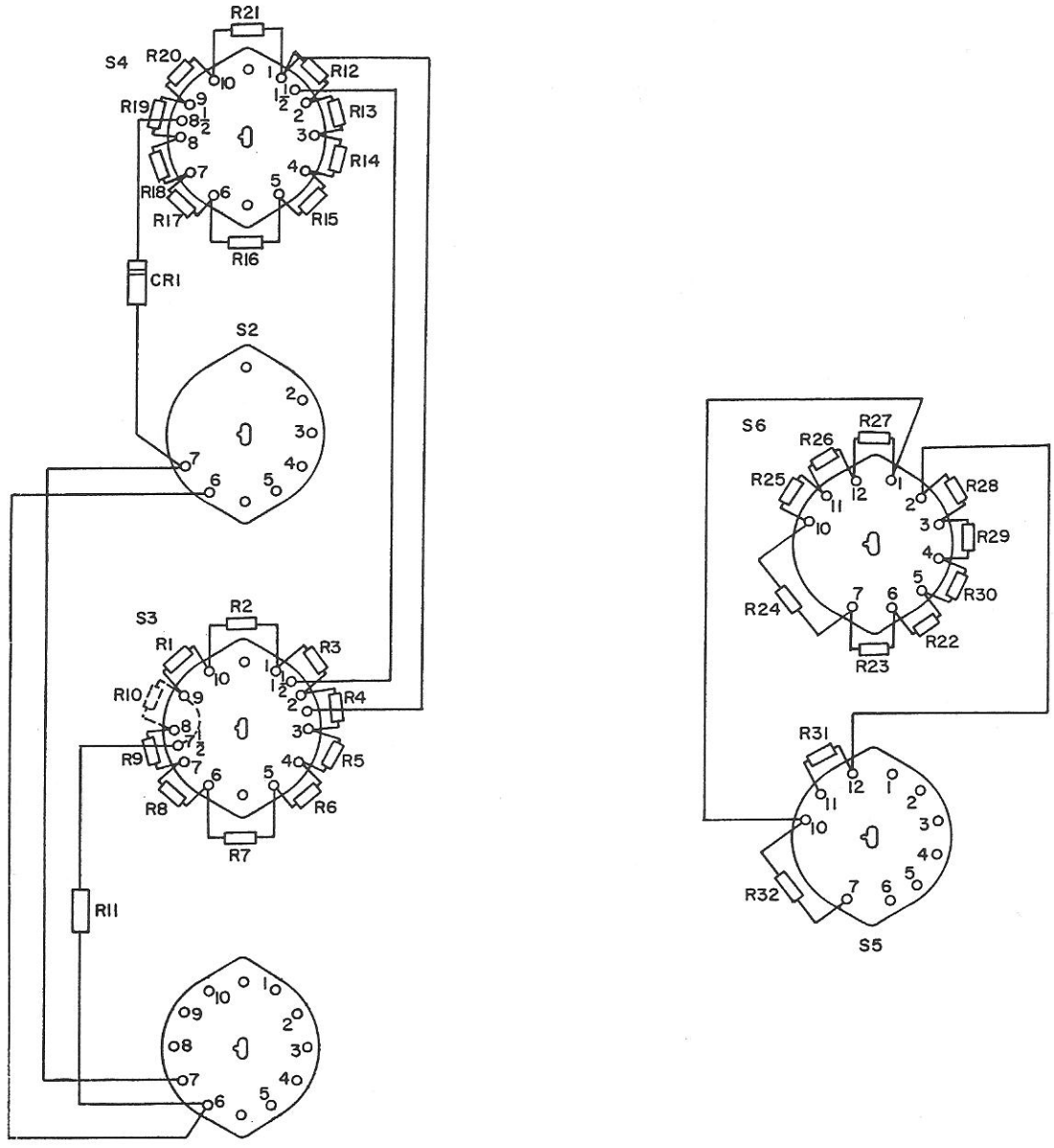


(C) 1 KC SWITCH ALIGNMENT



(D) 10 KC SWITCH ALIGNMENT

Autopositioner Alignment
Figure 105



Autopositioner Switch Identification
Figure 106

(3) Removal of 10-Kc and 100-Kc Switches.

(a) Perform steps (a) through (g) of paragraph 3.E.(2).

(b) Refer to figure 104. Rotate gear (1) or (5) by hand to position cam (32) so that screw (15) holding resistor (14) to gear plate (28) is accessible.

(c) Remove screw (15) holding resistor (14) to gear plate. Note placement of resistor leads. Do not lose washers at the ends of this resistor.

(d) Remove cable clamp (21) by removing screw (26).

(e) Remove output shaft gear (9) by loosening setscrew (11) in clamp (10) and pulling straight off.

(f) Pull output shaft out of the hole in the gear plate. Be careful to not lose the shim washers (if any) between the output shaft and the gear plate. The switch assembly is now free of the Autopositioner chassis.

(g) Remove cable clamp (89) by removing screw (90) and washer (91).

(h) Remove reversing switch (87) by removing two screws (88).

(i) Tag and unsolder the six wires connected to the solenoid (101) and solenoid relay terminals (112). Solenoid relay terminal identification is given in figure 105(B).

(j) Remove two screws (55) and washers (56) holding switch wafers (63/64, 66, 67/68, 77) to bracket (93). Switch wafers may now be removed. Tag any leads before unsoldering from switch terminals. Refer to figure 106(A).

(4) Disassembly of Clutch Assembly.

(a) Perform steps (a) through (f) of paragraph 3.E.(3).

(b) Refer to figure 104. Bend down tabs on washer (126) under nut (127). Remove nut (127), washer (126), and spring washer (125).

(c) Remove clutch disc (124) and clutch gear (123).

CAUTION: DO NOT TOUCH CLUTCH SURFACES WITH FINGERS. KEEP SURFACES FREE OF DUST, DIRT, AND LUBRICANTS OF ANY KIND.

(5) Removal of Solenoid.

(a) Perform steps (a) through (j) of paragraph 3.E.(3) and steps (b) and (c) of paragraph 3.E.(4).

(b) Refer to figure 104. Remove pin (122) through hub (120) and shaft (119) with a punch. Slide hub (120) and attached notched wheel (121) off shaft.

(c) Remove pawl plate (103) from solenoid (101) by removing two screws (102). Be careful not to lose small fiber actuator (110) that separates pawl plate (103) from solenoid relay contacts (108).

(d) Remove retaining ring (109) from shaft (119).

(e) Unsolder the insulated jumper wire from terminal 2 of solenoid. See figure 105(B).

(f) Remove solenoid (101) from the bracket (93) by removing two screws (104) and post (100).

F. Removal of Turrets from R-F Translator Module.

(1) With r-f translator module in the chassis and power applied to the 618T-( ), position turrets to the 2-megacycle position by setting frequency indicator on Control Unit 714E-( ) to 2.000 mc.

(2) Remove r-f translator module from 618T-( ) chassis.

(3) Remove top and bottom covers from r-f translator module.

(4) Remove turret cover by removing 14 screws on cover.

(5) Refer to figure 101. Remove two phenolic aligning posts (13) by removing two screws on rear of module. Slide rods out through gear plate.

(6) Remove turret shaft by loosening clamp on gear that drives the shaft. Pull shaft out through gear.

(7) Remove turrets at bottom of r-f translator by pushing them from top of module. Use care to avoid catching spring contacts, extending from the turret faces, in the shaft holes.

G. Disassembly of Power Amplifier Module.

(1) Refer to figure 107. Remove seven screws (S) from gear plate.

(2) Remove top cover plate from module by loosening 17 screws on cover, sliding it toward the gear plate, and lifting it off.

(3) Remove square plate on end of module opposite gear plate by removing eight screws.

(4) Remove two nylon screws and washers holding roller coil assembly to bracket at end of roller coil nearest tubes. Push the screen bypass capacitor out of the way to get at these screws.

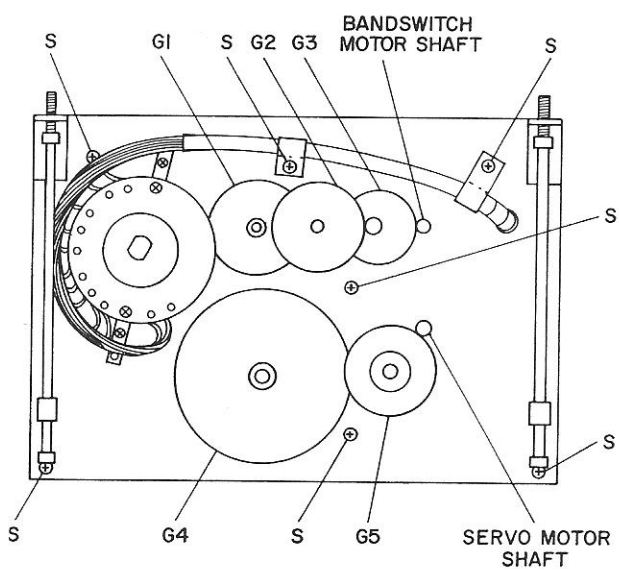
(5) Remove one screw and washer holding end of the large silver-plated coil to bracket on roller coil assembly.

(6) Loosen one screw holding lower strap on roller coil assembly.

(7) Pull gear plate out from chassis. Be careful to pull straight out because band-switch shaft comes out with gear plate. Gear plate will remain connected to module chassis by wiring cable.

(8) To remove power amplifier tubes, remove tube cover plate from end of module opposite gear plate by removing six screws. Loosen straps around tubes. Remove tubes with tube pullers supplied in Maintenance Kit 678Y-1.

NOTE: Short plate straps to chassis with an insulated-handle screwdriver before removing tubes.



Power Amplifier Module, Gear Plate
Figure 107

H. Removal of Crystal from R-F Oscillator Module.

(1) Remove r-f oscillator module from 618T-( ) chassis.

(2) Remove dust cover from module.

(3) Remove triangular-shaped cover plate from top of module by removing four screws.

(4) Remove two hold-down screws on the foam-insulated end of module.

(5) Remove foam plug from top of module. Pull wire cable so that it is outside insulation.

(6) Tilt insulating foam so that the bottom of foam is exposed.

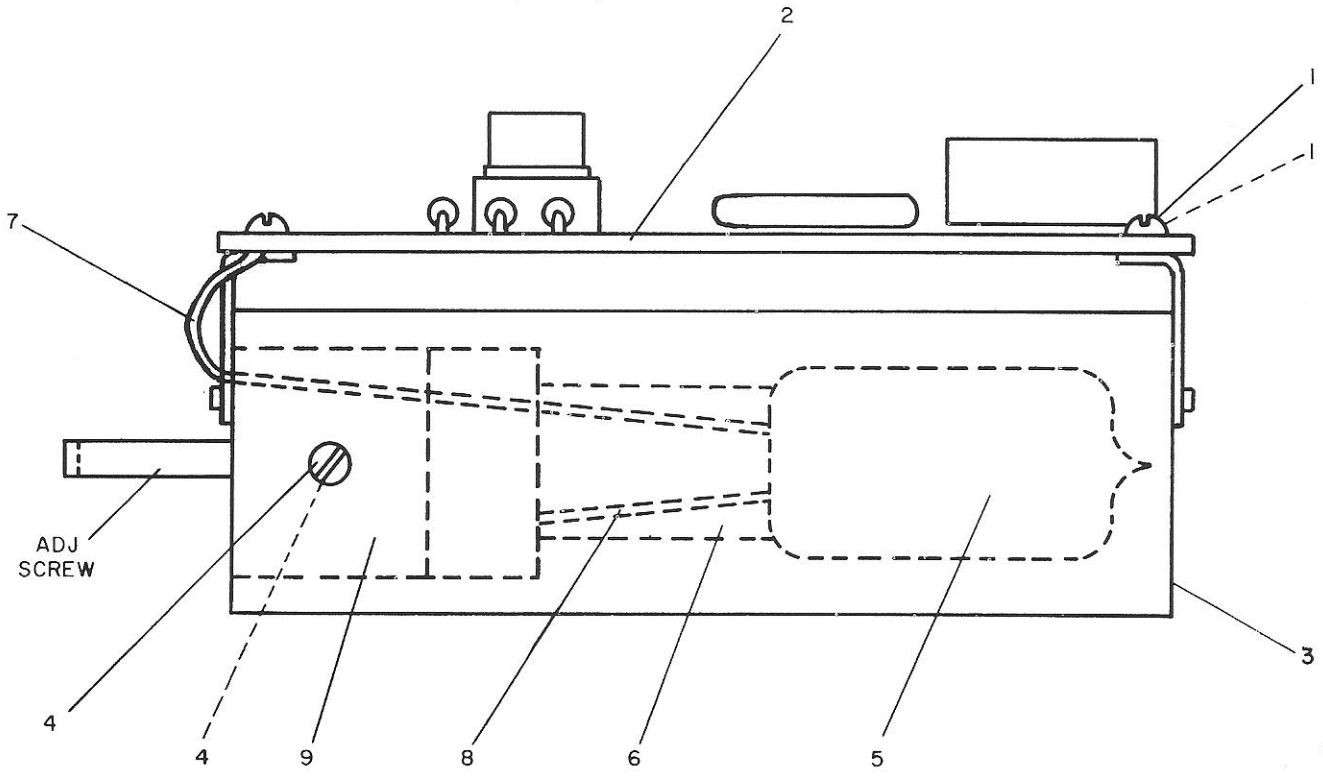
(7) Remove foam plug from bottom of module. Pull wire cable so that it is outside foam.

(8) With a finger, push oven and crystal oscillator assembly up through foam. Do not use a tool to push oven out of foam, or oven may be damaged.

(9) Refer to figure 108. Remove two screws (1) from circuit board (2) to loosen oven assembly (3).

(10) Remove two screws (4) from opposite sides of oven.

(11) Hold circuit board in one hand, and remove oven to expose crystal (5).



Oven and Crystal Oscillator Assembly, R-F Oscillator Module
Figure 108

(12) Remove all grease (6) from around crystal. Wipe all grease from crystal. Do not get grease on circuit board.

(13) Unsolder green crystal lead (7) from circuit board.

(14) Unsolder blue crystal lead (8) from C1 (9). Crystal may now be removed.

AIRBORNE SSB TRANSCEIVER 618T-( ) - CLEANING

1. GENERAL.

This section contains instructions and procedures for cleaning Airborne SSB Transceiver 618T-( ).

2. CLEANING AGENTS.

The word "solvent" in this section shall mean a mixture composed of 25 percent methylene chloride, 5 percent perchloroethylene, and 70 percent dry-cleaning solvent, Federal Spec P-S-661a. All percentages are by volume.

References to an air jet in this section refer to a hand-operated air nozzle supplied with clean, dry, compressed air at a maximum pressure of 28 psi. All cleaning materials are listed in table 201.

WARNING: PERFORM ALL OPERATIONS INVOLVING CLEANING SOLVENT IN A VENTILATED HOOD. AVOID BREATHING SOLVENT VAPOR; WEAR A SUITABLE MASK WHEN NECESSARY. AVOID CONTINUOUS CONTACT WITH THE SOLVENT. USE GOGGLES, GLOVES, AND AN APRON TO PREVENT IRRITATION DUE TO PROLONGED CONTACT. CHANGE CLOTHING WHICH HAS BECOME SATURATED WITH SOLVENT. OBSERVE ALL FIRE PRECAUTIONS FOR FLAMMABLE MATERIALS. THESE MATERIALS SHOULD BE USED IN A HOOD PROVIDED WITH EXPLOSION-PROOF ELECTRICAL EQUIPMENT AND AN EXHAUST FAN WITH SPARKPROOF BLADES. WEAR GOGGLES WHEN BLOWING DUST OR DIRT FROM EQUIPMENT PARTS WITH AIR JET. OTHER PERSONS SHOULD BE WARNED AWAY FROM HAZARDOUS AREA OR WORKING ENCLOSURE.

TABLE 201. CLEANING MATERIALS

MATERIAL	SPECIFICATION	ASO STOCK NO.
Solvent:		
A mixture (by volume) of Methylene chloride, 25% Perchloroethylene, 5% Dry-cleaning solvent, 70%	ANA Spec. AN-M-37 Fed. Spec. 0-T-236 Fed. Spec. P-S-661a	R51-M-950-20 R51-T-4459-200 R51-C-1326-75
Alcohol	MIL-A-6091A	
Chamois skin		
Cloth, cotton, lintless		
Detergent, powder		
Burnishing tool		
Tissue paper		
Brush, small, soft-bristled (camel's hair)		

3. CLEANING PROCEDURES.

A. Chassis and Modules.

(1) Remove dust and dirt from all surfaces, including wiring and small parts, with a soft-bristled brush and air jet.

NOTE: When it is necessary to distrub dress of wiring and cables, restore them to their proper position when cleaning is completed.

(2) Wipe all finished surfaces with a solvent-moistened, lintless cloth. Dry and polish these surfaces with a dry, clean, lintless cloth.

(3) Make touch-up repairs, if required, to minor damages of the finish.

B. Connectors and Receptacles.

(1) Wipe dust and dirt from bodies, shells, and cable clamps with a solvent-moistened, lintless cloth. Wipe dry with clean, dry lintless cloth.

(2) Remove dust from inserts with soft-bristled brush and air jet.

(3) Wash dirt and any traces of lubricant from insert, insulation, and contacts with solvent. Apply solvent sparingly with small camel's-hair brush.

CAUTION: DO NOT ALLOW SOLVENT TO RUN INTO SLEEVES (OR CONDUIT) COVERING ANY WIRES OR CABLES CONNECTED TO CONTACT TERMINALS OF THE INSERT. DO NOT USE METAL TOOLS TO REMOVE FOREIGN MATTER FROM THESE CONTACTS.

(4) Dry inserts with air jet.

C. Shockmounts and Dust Covers.

(1) Blow dust from surfaces with air jet.

(2) Wipe away any remaining dust or grease with a solvent-moistened, lintless cloth.

(3) Make up a washing bath by dissolving two ounces of detergent powder per gallon of warm water. Immerse mount or cover in bath and agitate for several minutes.

(4) Rinse mounts in warm water, drain, and dry with air jet.

D. Relay Contacts.

(1) Clean dirty (not pitted or burned) contacts with a burnishing tool. Before using tool, clean its surface with alcohol. Do not touch this surface with fingers before using tool.

CAUTION: CONTACT SUPPORTING MEMBERS SHOULD NOT BE BENT OR FORCED BEYOND THEIR NORMAL OPERATING LIMITS WHILE BURNISHING CONTACTS.

(2) Remove dust and dirt with soft-bristled brush and air jet. Operate relay armature manually while blowing on contacts.

(3) Wash all surfaces of contacts with alcohol applied with a clean camel's-hair brush.

(4) Dry contacts with air jet, then remove any whitish film residue by passing small strips of clean white paper back and forth between each pair of contacts while holding them closed with light finger pressure.

E. Rotary Switch Contacts.

(1) Remove all dust with air jet, turning switch rotor back and forth several times while blowing.

(2) Wash all contacts and insulation with alcohol. Apply lightly with small camel's-hair brush.

(3) Dry with air jet, then repeat wash, using clean alcohol, and rotating switch rotor several times during this wash.

(4) Dry gently but thoroughly with air jet.

F. Mechanical Metal Parts (Including Teflon Gears).

(1) Remove bulk of any surface grease with rags.

(2) Blow dust from surfaces, holes, and recesses with air jet.

(3) Immerse the part in a washing bath of solvent, and scrub until clean. Clean all surfaces and recesses with a nonmetallic brush.

(4) Raise from the bath and drain.

(5) Immerse in a rinsing bath of clean solvent. Raise from bath and position to drain dry.

G. Printed Circuit Boards.

(1) Use an air jet and camel's hair brush to blow and brush dust and dirt from surfaces, holes, and crevices.

(2) Wipe clean with a lintless cloth which has been slightly moistened with solvent.

CAUTION: THE MOISTURE SEALANT ON THE PRINTED CIRCUIT BOARDS WILL SOFTEN IF SOLVENT IS APPLIED FOR TOO LONG OR IF TOO MUCH SOLVENT IS USED. BE CAREFUL WHEN CLEANING CIRCUIT BOARDS TO DRY THEM WITH A CLEAN, LINTLESS CLOTH IMMEDIATELY AFTER CLEANING WITH SOLVENT-MOISTENED CLOTH.

H. Blower Filter.

The blower filter should be cleaned regularly. Always clean filter before air-outlet side becomes dirty.

(1) Slowly immerse filter, dirty side up, in cool water to which a mild detergent has been added. This will float out dirt and lint. A slight up-and-down motion will remove any remaining particles. If it is impossible to immerse filter, pass a fine spray of water through it in the direction opposite that of air flow.

(2) Shake filter to remove excess water. Allow to drain dry.

(3) Before replacing cleaned, dry filter, lightly coat all filter surfaces with Air-Maze Filterkote "M" Water Soluble Oil, Collins part number 005-0609-00.

AIRBORNE SSB TRANSCEIVER 618T-( ) - INSPECTION/CHECK

1. GENERAL.

This section gives inspection procedures for the disassembled and cleaned equipment. Any portion of the equipment which does not pass inspection should be noted for repair or replacement.

2. DUST COVER.

Examine dust cover for deformations, punctures, deep dents, and badly worn surfaces. Also check for damaged fastening devices or handles. Examine for corrosion and damage to finish.

3. CHASSIS.

Check for physical damage and deformation. Also check for corrosion and any damage which would require replating or refinishing.

CAUTION: CHECK TO SEE THAT ALL GASKETS ON THE CHASSIS PLENUM COVER AND R-F TRANSLATOR AND POWER AMPLIFIER MODULES ARE IN PLACE AND IN GOOD CONDITION. THE PRESENCE AND PROPER CONDITION OF THESE GASKETS ARE VITAL TO PROPER COOLING-AIR FLOW.

4. SHOCKMOUNT.

A. Place a 618T-( ) on the shockmount under inspection.

B. Check equipment in its normal loaded position. Check for any noticeable sagging of any of resilient mounts.

C. Depress equipment until resilient mounts are at a bottom position. Resilient mounts should permit a minimum travel of 1/16 inch.

D. Lift up on equipment until mounts are at an upward position. Resilient mounts should permit a minimum travel of 1/16 inch.

5. CONNECTORS.

Examine connector for cracked or broken insulation and for contacts which are broken, deformed, or out of alignment. Check also for corroded or damaged plating or contacts and for loose, poorly soldered, broken, or corroded terminal connections.

6. RECEPTACLES.

Examine receptacles for cracked, broken, or charred insulation. Also check for damage to parts, loose or bent contacts, corrosion, and other abnormal conditions.

7. BALL BEARINGS.

A. Check for blue or purple discoloration of any part of bearing due to burning.

B. Check for tarnished external surfaces. This is indicated by a light discoloration of the highly finished surfaces.

C. Check for rust.

D. Check for flat bearing balls, broken ball separators, flaking or spalling of load-carrying surfaces, and other abnormal conditions by noise inspection.

8. GEARS.

A. Inspect all gears visually. Presence of a sharp burr on one side of gear at edges of teeth indicates tooth wear. A change in face width due to this burr means that replacement is necessary.

B. Inspect all gears for broken, chipped, or badly worn teeth.

C. Inspect gear bodies for cracks and deformation.

D. Inspect gear bore for excessive wear.

E. Inspect surfaces for corrosion or other abnormal conditions.

9. PRINTED CIRCUIT BOARDS.

A. Inspect for loose, broken, corroded, or poorly soldered terminal connections.

B. Inspect printed circuits for any evidence of damage, such as burned, broken, cracked, or corroded plating.

C. Inspect for complete moisture sealant coating of printed circuit boards.

10. RELAYS (OPEN).

A. Examine relay contacts for burned or pitted areas, welds, misalignment, and improper separation.

B. Check contact support members for deformation causing a defect, misalignment, or improper contact operation.

C. With the finger, test movable contacts for sluggish action or sticking at any point of travel in either direction. Examine for physical damage to armature. Also check for foreign matter between end of pole piece and armature.

D. Examine for loose coil, corrosion, loose leads or terminals, and for cuts and damage to coil.

E. Examine for loose, broken, brittle, or charred insulation on coil or leads, between contact support members, and between terminals on relay.

F. Examine for bent, loose, or broken terminals.

G. Check relay mountings and mechanical parts for looseness and physical damage or corrosion.

11. FIXED-COMPOSITION AND WIRE-WOUND RESISTORS.

Examine these resistors for cracked, broken, blistered, or charred bodies and loose, broken, poorly soldered, or corroded terminal connections.

12. VARIABLE RESISTORS.

Examine variable resistors for corrosion of shafts, cases, and other visible parts; loose mountings; and physical damage. Some variable resistors used in the 618T-( ) have shafts mounted on friction clutches to prevent damage to the resistor if shaft is forced. Therefore, if resistor is forced against the end stop, the shaft will continue to rotate in clicks. This is normal and not cause for replacement.

13. R-F COILS.

Inspect r-f coils for broken leads; loose, poorly soldered, or broken terminal connections; and loose mountings. Also check for crushed, scratched, cut, bruised, or charred windings; for corrosion on windings, leads, terminals, and connections; and for physical damage to forms and tuning-slug adjustment screws.

14. TUBE SOCKETS.

A. Examine for loose, broken, missing, or improperly seated mounting rings. Also check for cracked, broken, or charred insulation.

B. Examine for broken, deformed, or corroded contacts and loose, poorly soldered, broken, or corroded terminal connections.

15. SOLDERED TERMINAL CONNECTIONS.

A. Examine for cold-soldered or resin joints. These joints appear rough, porous, or dull. Check for strength of bond with the point of a tool.

B. Examine for excess solder, protrusions from joints, pieces adhering to adjacent insulation, and particles lodged between joints, conductors, or other parts.

16. ROTARY SWITCHES.

A. Inspect insulation for cracks, breaks, or charring.

B. Check movable and stationary contacts for deformation, breakage, and wear and for burning, pitting, and corrosion.

C. Inspect terminals for loose, poorly soldered, broken, or corroded connections.

D. Examine mechanical parts for damage or corrosion and for irregular or rough action.

17. TRANSFORMERS AND REACTORS.

Examine these parts for signs of excessive heating, physical damage to case, cracked or broken insulators, and other abnormal conditions. Also check for corroded, poorly soldered, or loose terminals and loose, broken, or missing mounting hardware.

18. VACUUM TUBES.

A. Examine envelope for cracked glass or dented metal, separation from base, and obliterated markings.

B. Check base for cracked, chipped, or broken body or key and for charring of base between contacts.

AIRBORNE SSB TRANSCEIVER 618T-( ) - REPAIR

1. GENERAL.

The repair or replacement of defective parts involves standard repair techniques. The following precautions, however, should be observed.

2. CHASSIS REPAIR.

Whenever maintenance is performed upon chassis cabling in the 618T-( ), check cabling after maintenance to assure that cable is still wired correctly. This may be done by performing a continuity check. A chassis cabling continuity chart is given in the assembly section of this manual.

3. REPLACEMENT OF PARTS.

If a part in the 618T-( ) must be replaced, refer to the Illustrated Parts Catalog, Collins part number 520-5970005, to determine the description of the part that is to be replaced. Always replace parts with the same type that was removed. To order replacement parts from Collins Radio Company, refer to the paragraph about how to order replacement parts on the inside front cover of this manual.

4. PRINTED CIRCUIT BOARD REPAIR.

Parts mounted on printed circuit boards are bonded to the boards to protect them from damage due to humidity and moisture. This bonding, or postcoating, also protects the parts against excessive vibration while the equipment is in service. The following procedure gives instructions for postcoating a circuit board after a part has been removed, installed, or replaced.

A. Remove the part from the printed circuit board by melting the postcoating with a hot soldering iron; then unsolder the part, and lift it off the board with a pair of long-nosed pliers.

CAUTION: DO NOT USE SOLDERING IRONS RATED ABOVE 40 WATTS ON BOARDS BEARING TRANSISTORS, DIODES, CERAFIL CAPACITORS, OR OTHER HEAT-SENSITIVE COMPONENTS. ALSO, BE CAREFUL WHEN REMOVING COMPONENTS FROM PRINTED CIRCUIT BOARDS NOT TO DAMAGE THE CIRCUITRY ON THE BOARDS.

B. If necessary, remove excess solder from the joint with the soldering iron.

C. Insert new wire or component into correct tubelet, and clinch wire over tubelet.

D. Apply solder and soldering iron to joint, melting solder and heating joint at the same time. Do not keep iron on joint longer than necessary to complete solder flow throughout joint.

CAUTION: USE SOLDER WITH RESIN-CORE FLUX. ANY RESIN FLUX SOLDER APPROVED UNDER QQ-S-571 MAY BE USED. DO NOT USE SOLDER THAT HAS A CORE OF HYDRAZINE, ACID, OR OTHER UNAPPROVED FLUX.

E. Clean joint with a stiff-bristle brush and a small amount of organic solvent, such as trichloroethylene, toluol, or proprietary solvents such as Freon TMC. Remove excess solvent and dissolved flux with absorbent material. Use solvent sparingly since the postcoating may also be dissolved. Apply a small amount of solvent to area of solder joint only.

F. Obtain a 1-ounce bottle of Dennis 1169A liquid and a 2-ounce bottle of Dennis 1169B liquid (Collins part number 821-0166-00). Mix these two liquids together by pouring the contents of the small bottle into the larger bottle. Replace lid and mix by shaking. Small amounts of coating material may be used by measuring equal portions of 1169A and 1169B into a paper cup. Use a separate measuring spoon for each item. Mix thoroughly with a stirring stick.

G. Apply the Dennis 1169 mixture to the newly soldered joint (or joints), covering all areas where the original postcoating was damaged and any new components that were added. Use a soft-bristle brush to apply the coating. The brush may be cleaned in an organic solvent before the coating hardens.

H. Allow the newly coated boards to dry to a tack-free condition (approximately 2 hours) before reassembling the module. The final cure will take about 7 days at room temperature or one hour at 60°C. The equipment may be operated during the curing period.

AIRBORNE SSB TRANSCEIVER 618T-( ) - ASSEMBLY

1. GENERAL.

Components that were removed during disassembly should be repaired or replaced as required and reassembled according to the following procedures.

2. GENERAL TECHNIQUES AND PRECAUTIONS IN ASSEMBLY OF AIRBORNE SSB TRANSCEIVER 618T-( ).

A. All wires should be secured to terminals mechanically before soldering. All soldering, except that on printed circuit boards, is to be per MIL-S-6872, using resin-core solder per QQ-S-571, composition SN60.

B. All screws and fasteners not secured with a locking device should be secured with blue varnish, Collins part number 005-0133-00.

C. When installing a transistor or diode, use long-nosed pliers to grasp the lead to which heat is being applied between the solder joint and the component. This will bleed off some of the heat that conducts into the component from the soldering iron. Make sure that wires being soldered to the component are pretinned properly so the connection can be made quickly. Excessive heat will damage a transistor or diode permanently.

D. Replaced electrical leads should be of the same wire size and color coding as those installed at the factory.

E. Tie electrical cabling on both sides of breakouts and at approximately one-half-inch intervals with tape. Secure all ties with blue varnish.

3. SPECIFIC ASSEMBLY TECHNIQUES.

A. Replacement of Crystal in R-F Oscillator Module.

(1) Position crystal (5) as shown in figure 108.

(2) Solder blue crystal lead (8) to C1 (9). Make connection quickly to avoid overheating crystal.

(3) Solder green crystal lead (7) to circuit board (2). Make connection quickly to avoid overheating crystal.

(4) Repack grease (6), Collins part number 005-0201-00, around base of crystal.

(5) Place oven (3) over crystal and C1.

(6) Replace two screws (4) on opposite sides of oven.

(7) Replace two screws (1) that fasten oven to circuit board.

(8) Replace oven and crystal oscillator assembly in foam.

(9) Replace wires extending from bottom of foam, and replace foam plug at bottom.

(10) Replace wires extending from top of foam, and replace foam plug at top.

(11) Replace foam in module chassis.

(12) Replace two hold-down screws.

(13) Replace cover plate.

(14) Replace dust cover.

(15) Replace module in 618T-( ) chassis.

B. Assembly of Power Amplifier Module.

(1) Replace gear plate by sliding band-switch shaft through the switch. Be sure that lower strap is inserted under the securing screw washers when gear plate is pushed into place.

NOTE: If shaft is not chamfered on end, chamfer slightly before replacing.

(2) Tighten screw securing lower strap to roller coil assembly.

(3) Replace screw and washer holding the large silver-plated coil to roller coil assembly. Use hole nearest gear plate.

(4) Replace two nylon screws and washers holding the roller coil assembly to bracket near tubes. Damage will result if screws are secured too tightly.

CAUTION: BEND SCREEN BYPASS CAPACITOR DOWN TO COVER SCREWS JUST REPLACED. IF CAPACITOR IS NOT POSITIONED CORRECTLY, PLATE STRAP WILL ARC TO CAPACITOR.

(5) Replace square plate on rear of module using eight screws.

(6) Replace top cover plate by laying it in position, pushing it toward rear of module, and tightening 17 screws.

(7) Replace seven screws (S) on gear plate. Refer to figure 107.

C. Replacement of Turrets in R-F Translator Module.

(1) Insert turrets from bottom of module so that all color-coded dots on turrets are in line at top of module.

NOTE: Each turret is marked with two color-code dots: one white and one a standard color-code color. The white dot always is nearest the gear plate. Turrets are color coded so that turret S1 is nearest gear plate. Therefore, color-code dots should be (from the gear plate): white, brown, white, red, white, orange, etc. When inserting a turret, orient it so that spring contacts which project from the faces of the turret will not fall into the shaft holes when turret is being positioned.

(2) When all seven turrets are in place, replace turret shaft through gear that turns shaft. Before tightening shaft clamp, refer to paragraph 7.B. in this section for turret alignment procedure.

(3) Refer to figure 101. Replace two aligning rods (13) by inserting through gear plate. Secure rods with two screws through rear plate.

D. Assembly of Autopositioner Submodule.

(1) Replacement of Solenoid.

(a) Replace solenoid (101), Collins part number 546-6857-003, on bracket (93) using two screws (104) and post (100). Be sure post (100) holding reversing switch lever (84) is in correct hole. Align solenoid (101) so that its shaft hole is lined up with shaft hole in bracket (93) before tightening screws.

(b) Solder insulated jumper from solenoid relay terminal 6 to solenoid terminal 2. See figure 105(B).

(c) Replace retaining ring (109) on shaft (119).

(d) Replace pawl plate (103) in solenoid (101) using two screws (102).

NOTE: Be sure these two screws (102) are the same as those removed during disassembly. If screws are lost, they must be replaced with screws having the same color code.

(e) Replace hub (120) and notched wheel (121) on shaft (119). Replace pin (122) through hole in nut and shaft.

(f) Replace small fiber actuator (110) between pawl plate (103) and solenoid relay contacts. See figure 105(B) for proper placement of actuator.

(g) Perform steps (a) through (c) of paragraph 3.D.(2).

(2) Assembly of Clutch Assembly.

(a) Replace clutch gear (123) and clutch disc (124).

CAUTION: DO NOT LUBRICATE OR CLEAN CLUTCH SURFACES ON 121, 123, OR 124. WIPE ONLY WITH DRY, CLEAN, LINTLESS CLOTH. DO NOT TOUCH CLUTCH SURFACES WITH FINGERS.

(b) Replace spring washer (125) with concave side against disc (124). Replace washer (126) and nut (127).

(c) Tighten nut (127) until 30 to 40 in. oz of torque is needed to slip clutch gear (123). This torque can be measured with a Waters Torque Watch, Model 651C3, or equivalent. Attach torque watch to end of shaft (119). Hold gear (123) stationary and rotate watch. Adjust nut (127) until proper torque is indicated on watch. Bend two tabs on washer (126) against flats on nut (127) when clutch is torqued properly.

(d) Perform steps (a) through (j) of paragraph 3.D.(4).

(3) Replacement of Switch Wafers.

Because of problems encountered in replacing individual resistors on the switch wafers, the entire switch wafer assembly, which includes resistors on the wafer, should be replaced if one or more of the resistors is defective. Collins part numbers for all switch wafer assemblies are given in table 501. Refer to figure 106 for identification of these wafers and connecting wiring between wafers.

(4) Replacement of 10-Kc and 100-Kc Switches.

(a) Position switch wafers on shaft so that they are oriented as shown in figure 105(D).

(b) Resolder any cable leads that were unsoldered during disassembly. Use figure 106(A) as a guide when replacing wires which connect switch wafers.

(c) Replace all metal spacers (61, 62) between switch wafers. Fasten wafers together and to bracket (93) with two screws (55) and washers (56).

TABLE 501
AUTOPOSITIONER SWITCH ASSEMBLIES

SWITCH WAFER	COLLINS PART NUMBER
S1	269-2190-00
S2	269-2190-00
S3	546-6865-003
S4	546-6862-002
S5	546-6861-002
S6	546-6860-002

(d) Place the six solenoid leads, which were unsoldered earlier, through hole in bracket (93). Resolder these six wires to solenoid (101) and solenoid relay terminals (112). See figure 105(B). Retie these wires.

(e) Replace reversing switch (87) using two screws (88). Be sure switch leaf is in slot in reversing switch lever (84).

(f) Replace cable clamp (89) using screw (90) and washer (91).

(g) Place switch assembly in Autopositioner chassis. Be sure to place all shim washers (if any), which were removed earlier, over shaft before inserting shaft through gear plate. Be sure clutch gear (123) meshes with gear (154).

(h) Replace cable clamp (21) using screw (26).

(i) Replace resistor (14) on gear plate using screw (15) and washers (16, 17, 19). Position resistor terminals so that they are parallel to long sides of gear plate.

(j) Perform steps (a) through (j) of paragraph 3.D.(5).

(5) Replacement of 1-Kc Switches.

(a) Resolder any cable wires or wires connecting wafers that were removed during disassembly. Use figure 106(B) as a guide.

(b) Replace all ceramic spacers (36) and fiber washers (37) between switch wafers. Fasten wafers together and to mounting plate with two screws (35).

(c) Rotate gear (1) or (5) by hand to position cam (32) so that cam follower (98) is as near camshaft (31) as possible.

(d) Place mounting plate (163) in position at ends of mounting posts (135). When sliding camshaft (31) through 1-kc switch wafers, be sure both wafers are aligned as shown in figure 105(C). Tighten mounting plate using four screws (136).

(e) Replace motor (148) and motor bracket (149) on mounting plate using two screws (151) and two washers (150).

(f) Replace relay (140) on mounting plate using two nuts (142) and two washers (141).

(g) Replace two cable clamps (157) using two screws (139).

(h) Replace vfo coupler (130) on output shaft (119) by tightening two setscrews (134).

(i) Replace output shaft gear (9) using setscrew (11) in clamp (10). Be sure this gear has maximum face-width engagement with gear (57).

(j) Replace spring (138) by hooking bar (137) in slots on mounting posts (135). Hook free end of spring first.

(k) Refer to paragraph 7.A. for Autopositioner alignment, and check procedure before replacing submodule in r-f translator module.

(6) Replacement of Reversing Switch.

(a) Resolder the six wires connected to the switch (87), Collins part number 266-0096-00. Refer to figure 105(A).

NOTE: Be sure switch leads are positioned so there is clearance for switch assembly to rotate.

(b) Replace switch in bracket (93). The brass-plate side should be against the bracket. Be sure switch leaf is in slot in reversing switch lever (84).

NOTE: On some units, a spring clip is mounted with a finger between the reversing switch and the bracket.

(c) Replace two screws (88) through switch. When the spring clip is used, tighten the screws so that the switch leaf is the same distance from the center of the hole in the bracket in both positions.

(d) Replace cable clamp (89) using screws (90) and washer (91).

(e) Replace cable clamp (21) using screw (26).

(f) Replace spring (138) by hooking bar (137) in slots on mounting posts (135). Hook free end of spring in place first.

NOTE: Check again to see that switch leads are positioned so that there is clearance for switch assembly to rotate.

E. Replacement of Autopositioner and VFO in R-F Translator Module.

NOTE: Be sure Autopositioner is positioned to 500 kc before installing in r-f translator module.

(1) Refer to figures 101, 102, and 103. Carefully maneuver Autopositioner into place under gear plate. Place 25-pin connector (8) through 28-position switch to its position at bottom of module. Be careful not to damage switch wafers when placing connector through switch.

(2) Replace four screws (11) holding Autopositioner to gear plate. Leave screws one-half turn loose.

(3) Position the two slug racks (12) at equal height above the chassis.

CAUTION: MAKE CERTAIN THAT THE TWO SLUG RACKS ARE EQUAL IN HEIGHT ABOVE THE CHASSIS. THE SLUG RACK HAS NO STOPS. THEREFORE, IF RACKS ARE NOT POSITIONED CORRECTLY AT 500 KC, AUTO-POSITIONER COULD RUN RACK BEYOND ITS DESIGN RANGE, STRETCHING AND RUINING THE TAPES.

With slug racks in this position, position clamp on slug rack gear so that it is facing top of module.

(4) Replace idler gear (G9) that couples Autopositioner gears to slug rack gear.

(5) Position Autopositioner in oversize mounting holes to remove as much backlash as possible in idler gear drive. Tighten four Autopositioner mounting screws (11).

(6) Fasten 25-pin connector (8) to bottom of r-f translator chassis with two screws (10).

(7) Replace 3/8-inch flatted shaft (7) above 25-pin connector by placing it through gear that turns shaft.

(8) Tighten clamp (9) that holds shaft.

(9) Position vfo shaft midway between end stops by positioning stop mechanism as shown in figure 504.

(10) Place vfo in its position under Autopositioner. Run three vfo leads (6) through holes in r-f translator chassis, and solder to connectors P6 and J32-31 and internal connections in module.

(11) Replace four tubes (5) adjacent to vfo and Autopositioner.

(12) Rotate rear brackets (3) on vfo so that they can be fastened to rear plate.

(13) Replace four screws (2) fastening vfo brackets to rear plate and r-f translator chassis.

(14) Tighten two setscrews in coupler on Autopositioner output shaft. Refer to paragraph 7.C., this section, for slug rack alignment. Refer to paragraph 6.P. in the testing section for vfo alignment.

F. Replacement of Modules and Module Covers.

(1) Replace modules on chassis by carefully engaging aligning pins and connectors on bottom of module and tightening redheaded captive hold-down screws.

CAUTION: BE CERTAIN THAT ALL CONNECTORS ARE SEATED PROPERLY BEFORE TIGHTENING HOLD-DOWN SCREWS. CONNECTORS MAY BE DAMAGED IF CONNECTORS ARE NOT MATED PROPERLY. BE CERTAIN THAT GASKETS ON J25, J26, AND J29 (SEE FIGURE 502) ARE IN PLACE BEFORE MODULES ARE FASTENED ON CHASSIS.

(2) Replace module covers by placing them over modules and pushing toward chassis. Covers are held in place without screws.

G. Replacement of Front Panel, Front Panel Cover, and Side Covers.

(1) Replace front panel by tightening four screws at each corner of panel.

(2) Replace front panel cover by placing cover over front panel and turning two Dzus fasteners on cover.

(3) Replace side covers by placing covers in slots at front of chassis and tightening four screws at rear of chassis.

4. CHASSIS CABLING CHECK.

Table 503 is a continuity check which may be performed to establish the correctness of chassis cabling and wiring. The test should be performed with no power applied to the 618T-( ). The response in all cases should be zero ohm except if noted otherwise in parentheses. Use a vom, such as a Triplett 630A. Table 502 gives chassis connector information. Refer to figures 501 and 502 for front panel and chassis component identification.

5. VISUAL CHECKS.

After replacing all modules in chassis, check that each module is secure and seated properly. Inspect each module for loose parts, broken wires and hardware, and loose plugs and connectors.

6. LUBRICATION.

The following lubrication procedure should be followed to lubricate the 618T-( ) after it has been reassembled. Table 504 lists lubricants to be used.

TABLE 502. CHASSIS CONNECTORS

NO.	PURPOSE	MATES WITH
J1	PHONE	Headphone jack
J2	MIC	Microphone jack
J3	AUX RCVR ANT.	Auxiliary receive antenna jack
J4	ANT.	Antenna jack
J5	RCVR IF. OUT	Jumper
J6	RCVR IF. IN	Jumper
J7	500 KC STD	Jumper
J8	500 KC REF	Jumper
J9	Low-voltage power supply connector	A5P1
J10-A1	100 KC OUT	A2P2-A1
J10-A2	500 KC (LOW) OUT	A2P2-A2
J10-A3	500 KC (HI) OUT	A2P2-A3
J11	R-f oscillator connector	A2P1
J12	Kc stabilizer connector	A4P1

TABLE 502. CHASSIS CONNECTORS (Cont)

NO.	PURPOSE	MATES WITH
J12-A1	VFO IN/VFO DC CONTROL OUT	A4P1-A1
J12-A2	10 KC PRF IN	A4P1-A2
J12-A3	1 KC SPECTRUM IN	A4P1-A3
J14	Mc stabilizer connector	A10P1
J14-A1	17.5 MC IN/HF OSC. DC CONTROL OUT	A10P1-A1
J14-A2	HF OSC. IN/17.5 MC OSC DC CONTROL OUT	A10P1-A2
J14-A3	500 KC (LOW) IN	A10P1-A3
J15	Frequency divider connector	A1P1
J15-A1	1 KC SPECTRUM OUT	A1P1-A1
J15-A2	100 KC IN	A1P1-A2
J15-A3	10 KC PRF OUT	A1P1-A3
J16	500 KC RECEIVE IN	A9P1
J17	AM/audio amplifier connector	A9P2
J18	500 KC RECEIVE IN	A3P1
J19	500 KC TRANSMIT OUT	A3P2
J20	500 KC REFERENCE IN	A3P3
J21	I-f translator connector	A3P4
J22	Electronic control amplifier connector	A6P1
J23	HV DC OUT	A7P2 or A8P2 or A13P2
J24	High-voltage power supply connector	A7P1 or A8P1 or A13P1
J25	RF OUT	A11P5
J26	FEEDBACK OUT	A11P1
J27	HV DC IN	A11P3
J28	Power amplifier connector	A11P4
J29	GRID INPUT	A11P2
J30	FEEDBACK IN	A12P3
J31	RF OUT	A12P2
J32	R-f translator connector	A12P9
J33	R-f translator connector (Autopositioner)	A12A1P1
J34	500 KC TRANSMIT IN	A12P1

TABLE 502. CHASSIS CONNECTORS (Cont)

NO.	PURPOSE	MATES WITH
J35	VFO OUT/VFO DC CONTROL IN	A12P6
J36	17.5 MC OSC OUT/HF OSC DC CONTROL IN	A12P7
J37	RECEIVE ANT	A12P5
J38	500 KC RECEIVE OUT	A12P4
J39	HF OSC OUT/17.5 MC OSC DC CONTROL IN	A12P8
P40	60-pin rear connector (male)	Cable connector (female)
P41	Chassis ground	Ground cable

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK

+27.5 V D-C BUS	115 V, 400 CPS BUS	+18 V D-C BUS	+130 V D-C BUS	KEY LINE
E25	J9-8	J9-1	E7	J2-2
J9-4	J24-33	J9-2	E8	J17-22
J17-21	J28-19	J11-5	J9-14	K4-7
J21-14	K1-6	J11-9	J32-18	P40-55
J24-17	K3-12	J12-2*	TB1-2	
J28-12	K7-2	J12-8		KEY LINE*
J32-17	P40-11	J14-1		J21-25
J33-14	T1-4	J14-2*		J24-13
K1-4		J15-2		J32-16
K3-2		J17-5*		K2-1
K4-2		J17-11**		K3-1
K5-2		J21-5*		K4-8
K6-7		J21-11**		K5-1
P40-56		J32-28		
TB1-3		K2-4**		
		K2-5		
		K4-4		
		K4-5*		
		K10-8		

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
J1-1	K6-4, P40-58
2	J17-3, P40-57, R9B "C", R10B "C"
J2-1	K2-7, P40-54
2	Key line
3	Chassis
J3	J37, K5-7
J4	K5-4
J5	J38
J6	J16, J18
J7	J10-A3
J8	J20
J9-1	+18 v d-c bus
2	+18 v d-c bus
3	Chassis
4	+27.5 v d-c bus
5	J11-1, K1-7
6	NC***
7	Chassis
8	115 v, 400 cps bus
9	NC
10	C7-3, J17-6, J22-3, L2-1
11	NC
12	NC
13	NC
14	E7, E8, J32-18, TB1-2
15	NC

FROM	TO
J10-A1	J15-A2
A2	J14-A3
A3	J7
J11-1	J9-5, K1-7
2	NC
3	Chassis
4	NC
5	+18 v d-c bus
6	NC
7	Chassis
8	NC
9	+18 v d-c bus
J12-1	J33-19
2	J14-2, K10-3
3	Chassis
4	J33-4
5	J33-20
6	E10
7	J32-31
8	+18 v d-c bus
9	E9, J33-18
10	J33-3
A1	J35
A2	J15-A3
A3	J15-A1

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
J14-1	+18 v d-c bus
2	J12-2, K10-3
3	NC
4	NC
5	Chassis
6	NC
7	NC
8	NC
9	NC
10	NC
A1	J36
A2	J39
A3	J10-A2
J15-1	Chassis
2	+18 v d-c bus
3	NC
4	NC
5	NC
6	J17-25, S1-10-1/2
7	NC
8	NC
9	NC
10	NC
A1	J12-A3
A2	J10-A1
J15-A3	J12-A2
J16	J6, J18
J17-1	Chassis
2	K3-4
3	J1-2, P40-57, R9B "C", R10B "C"
4	K2-6
5	J21-5, K4-5
6	C7-3, J9-10, J22-3, L2-1
7	J21-7
8	J32-15
9	P40-42
10	J21-10
11	J21-11, K2-4
12	P40-60
13	K2-11
14	J21-9, K2-10
15	P40-53
16	P40-37
17	NC
18	NC
19	NC
20	J21-4, S1-7
21	+27.5 v d-c bus
22	Key line

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK(Cont)

FROM	TO
J17-23	E19, J28-18, P40-10
24	P40-31
25	J15-6, S1-10-1/2
J18	J6, J16
J19	J34
J20	J8
J21-1	Chassis
2	NC
3	NC
4	J17-20, S1-7
5	J17-5, K4-5
6	E18, P40-25
7	J17-7
8	J28-22
9	J17-14, K2-10
10	J17-10
11	J17-11, K2-4
12	J28-23
13	P40-24
14	+27.5 v d-c bus
15	NC
16	NC
17	J24-14
18	J28-21
19	E17, J24-15, K2-12, TB1-4
J21-20	J28-16
21	NC
22	NC
23	NC
24	NC
25	Key line
J22-1	Chassis
2	J28-14
3	C7-3, J9-10, J17-6, L2-1
4	Chassis
5	Shield (J22-9)
6	J28-15
7	K3-10
8	NC
9	J29-25
J23	J27
J24-1	J28-9, J32-9
2	NC
3	NC
4	Chassis
5	NC
6	Chassis
7	P41
8	P41
9	P41

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
J24-10	P41
11	P41
12	P41
13	Key line*
14	J21-17
15	E17, J21-19, K2-12, TB1-4
16	J28-10
17	+27.5 v d-c bus
18	K2-2, K7-7
19	P40-7
20	J32-10
21	J32-12
22	J32-11
23	J32-13
24	NC
25	P40-17
26	P40-1
27	P40-13
28	P40-14
29	P40-2
30	P40-3
31	P40-15
32	K1-8, K10-4, L2-2
33	115 v, 400 cps bus
34	NC
J24-35	TB1-1
36	J32-19
37	J28-17
J25	K5-3
J26	J30
J27	J23
J28-1	J32-1
2	J32-2
3	J32-3
4	J32-4
5	J32-5
6	J32-6
7	J32-7
8	J32-8
9	J24-1, J32-9
10	J24-16
11	J32-27, K4-1
12	+27.5 v d-c bus
13	Shield (J28-25)
14	J22-2
15	J22-6
16	J21-20
17	J24-37
18	E19, J17-23, P40-10
19	115 v, 400 cps bus

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
J28-20	NC
21	J21-18
22	J21-8
23	J21-12
24	Chassis
25	J22-9
J29	J31
J30	J26
J31	J29
J32-1	J28-1
2	J28-2
3	J28-3
4	J28-4
5	J28-5
6	J28-6
7	J28-7
8	J28-8
9	J24-1, J28-9
10	J24-20
11	J24-22
12	J24-21
13	J24-23
14	P40-30
15	J17-8
16	Key line*

FROM	TO
J32-17	+27.5 v d-c bus
18	E7, E8, J9-14, TB1-2
19	J24-36
20	P40-36
21	P40-35
22	P40-34
23	P40-33
24	P40-32
25	NC
26	Chassis
27	J28-11, K4-1
28	+18 v d-c bus
29	J33-21
30	NC
31	J12-7
32	NC
33	NC
34	NC
35	NC
36	NC
37	NC
J33-1	Chassis
2	NC
3	J12-10
4	J12-4

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
J33-5	NC
6	P40-38
7	P40-39
8	P40-40
9	P40-41
10	P40-49
11	P40-50
12	P40-51
13	P40-52
14	+27.5 v d-c bus
15	NC
16	NC
17	NC
18	E9, J12-9
19	J12-1
20	J12-5
21	J32-29
22	P40-45
23	P40-46
24	P40-47
25	P40-48
J34	J19
J35	J12-A1
J36	J14-A1
J37	J3, K5-7
J38	J5
J39	J14-A2
P40-1	J24-26
2	J24-29
3	J24-30
4	K1-2, K1-3, P40-16
5	K7-1
6	NC
7	J24-19
8	NC
9	K3-6
10	E19, J17-23, J28-18
11	115 v, 400 cps bus
12	E22, K1-5
13	J24-27
14	J24-28
15	J24-31
16	K1-2, K1-3, P40-4
17	J24-25
18	Chassis
19	NC
20	NC
21	NC
22	NC
23	NC

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
P40-24	J21-13
25	E18, J21-6
26	K4-9
27	Chassis
28	NC
29	NC
30	J32-14
31	J17-24
32	J32-24
33	J32-23
34	J32-22
35	J32-21
36	J32-20
37	J17-16
38	J33-6
39	J33-7
40	J33-8
41	J33-9
42	J17-9
43	NC
44	NC
45	J33-22
46	J33-23
47	J33-24
48	J33-25
P40-49	J33-10
50	J33-11
51	J33-12
52	J33-13
53	J17-15
54	J2-1, K2-7
55	Key line
56	+27.5 v d-c bus
57	J1-2, J17-3, R9B "C", R10B "C"
58	J1-1, K6-4
59	K9-4
60	J17-12
P41	J24-7 through 12
K1-1	K9-7
2	K1-3, P40-4, P40-16
3	K1-2, P40-4, P40-16
4	+27.5 v d-c bus
5	E22, P40-12
6	115 v, 400 cps bus
7	J9-5, J11-1
8	J24-32, K10-4 L2-2
K2-1	Key line*
2	J24-18, K7-7
3	Chassis
4	J17-11, J21-11

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
K2-5	+18 v d-c bus
6	J17-4
7	J2-1, P40-54
8	NC
9	Chassis (thru 5.6K)
10	J17-14, J21-9
11	J17-13
12	E17, J21-19, J24-15, TB1-4
13	K6-1
14	NC
K3-1	Key line*
2	+27.5 v d-c bus
3	R9A "in"
4	J17-2
5	R10A "in"
6	P40-9
7	Chassis
8	NC
9	TB1-10
10	J22-7
11	NC
12	115 v, 400 cps bus
13	B1-T1
14	T1-3
K4-1	J28-11, J32-27
K4-2	+27.5 v d-c bus
3	NC
4	+18 v d-c bus
5	J17-5, J21-5
6	NC
7	Key line
8	Key line*
9	P40-26
10	Chassis
11	K8-1
12	NC
13	NC
14	NC
K5-1	Key line*
2	+27.5 v d-c bus
3	J25
4	J4
5	S2
6	Chassis
7	J3, J37
8	S2
K6-1	K2-13
2	E1
3	R10A "out"
4	J1-1, P40-58

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

FROM	TO
K6-5	C2, K6-6
6	C2, K6-5
7	+27.5 v d-c bus
8	C5 (+)
K7-1	P40-5
2	115 v, 400 cps bus
3	Chassis
4	NC
5	NC
6	NC
7	J14-28, K2-2
8	NC
K8-1	K4-11
2	NC
3	NC
4	Chassis
5	E11
6	TB2-2
7	K10-5, TB2-3
8	NC
K9-1	Chassis
2	NC
3	NC
4	P40-59
5	E21, E23
K9-6	NC
7	K1-1
8	NC
K10-1	TB2-4
2	NC
3	J12-2. J14-2
4	J24-32, K1-8, L2-2
5	K8-7, TB2-3
6	TB2-9
7	TB2-1
8	+18 v d-c bus
TB-1	J24-35
2	E7, E8, J9-14, J32-18
3	+27.5 v d-c bus
4	E17, J21-9, J24-15, K2-12
5	L3-2
6	S1-3
7	S1-4
8	S1-5
9	S1-12
10	K3-9
TB2-1	K10-7
2	K8-6
3	K8-7, K10-5
4	K10-1

TABLE 503. 618T-( ) CHASSIS CONTINUITY CHECK (Cont)

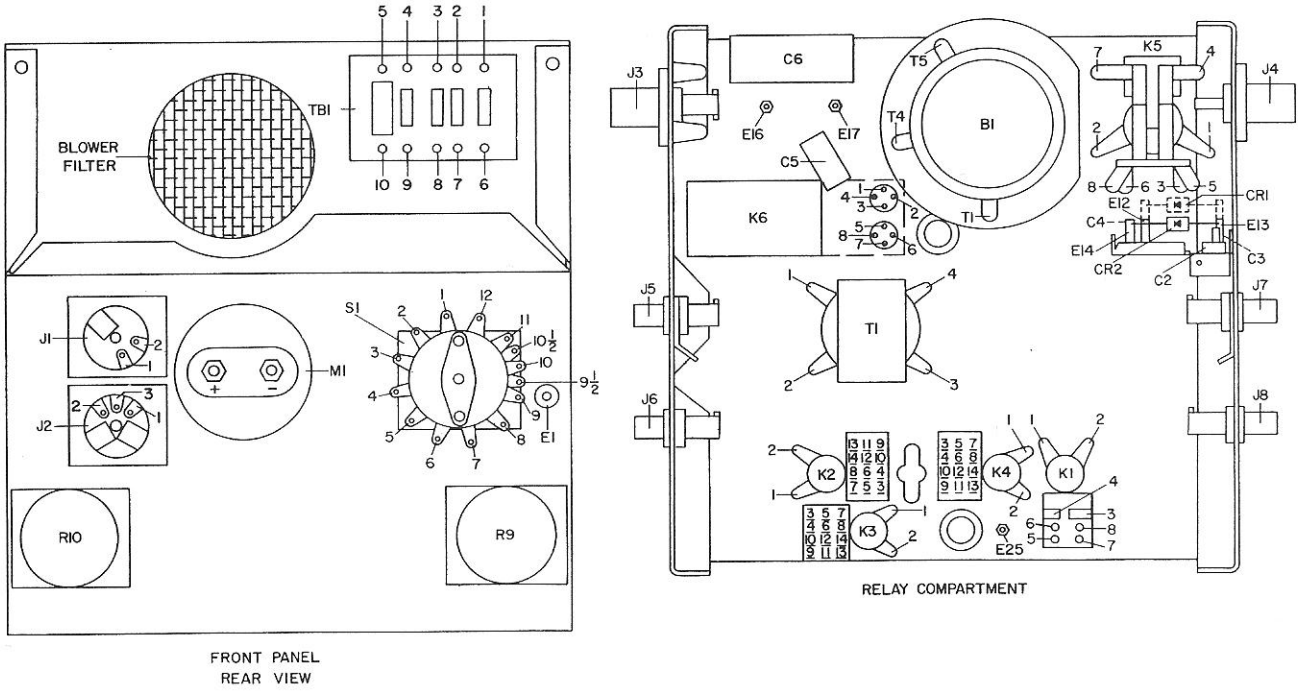
FROM	TO
TB2-5	--
6	--
7	--
8	--
9	K10-6
10.	--
M1 (+)	S1-2
(-)	S1-8
S1-1	NC
2	M1 (+)
3	TB1-6
4	TB1-7
5	TB1-8
6	Chassis
7	J17-20, J21-4, S1-9-1/2 (thru 8.2K)
8	M1 (-)
9	Chassis
9-1/2	S1-07 (thru 8.2K)
10	Chassis
10-1/2	J15-6, J17-25
11	Chassis
12	TB1-9
T1-1	Chassis
2	L3-1
3	K3-14
4	115 v, 400 cps bus

FROM	TO
E1	K6-2
2	NU****
3	NU
4	NU
5	NU
6	NU
7	E8, J9-14, J32-18, TB1-2
8	E7, J9-14, J32-18, TB1-2
9	J12-9, J33-18
10	J12-6
11	K8-5
12	--
13	--
14	--
15	Chassis
16	Chassis
17	J21-19, J24-15, K2-12, TB1-4
18	J21-6
19	J17-23, J28-18, P40-10
20	--
21	E23, K9-5
22	K1-5, P40-12
23	E21, K9-5
24	Chassis
25	+27.5 v d-c bus
26	K4-11
27	NU

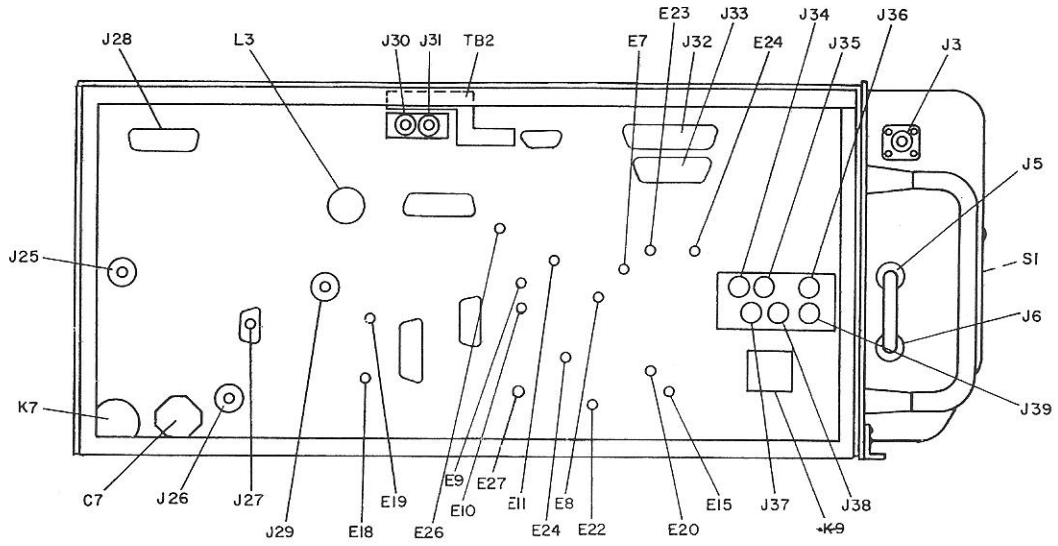
* Interrupted during recycle.
** Interrupted during transmit.
*** NC - No connection.
**** NU - Not used.

TABLE 504. LUBRICANTS

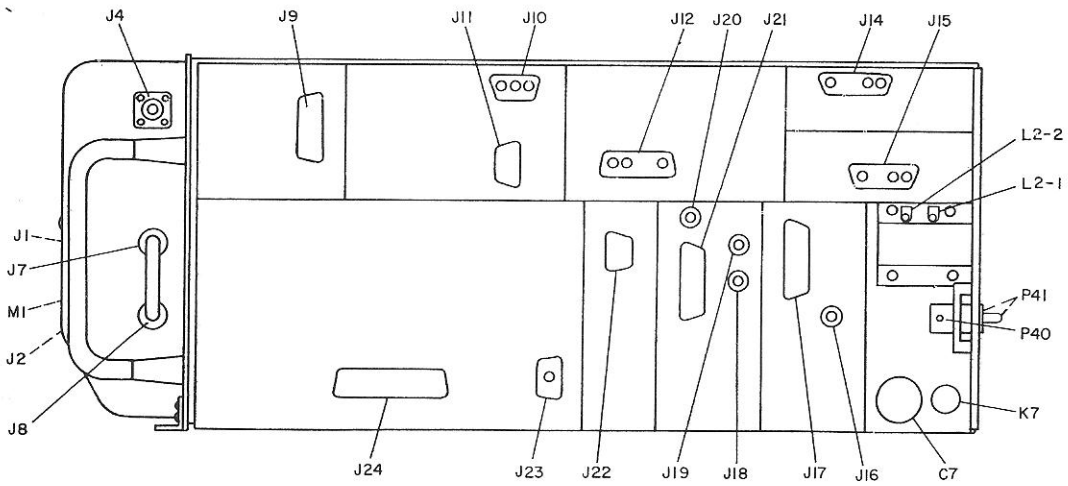
LUBRICANT	TYPE	MILITARY SPECIFICATION
Oil	Esso Univis P-38	MIL-L-6084
Grease	Beacon 325	MIL-G-3278



Airborne SSB Transceiver 618T-( ), Front Panel (Rear View) and Relay Compartment
Figure 501



LEFT SIDE



RIGHT SIDE

Airborne SSB Transceiver 618T-( ), Left and Right Side Views (Modules Removed)
Figure 502

A. Autopositioner.

(1) Refer to figure 104. Lubricate gears (152) and (154) with grease. Apply grease sparingly and only on gear teeth.

(2) Apply grease very sparingly on all switches. Lubricate contact surfaces of clips and rotors.

(3) Apply grease sparingly to inside of gear (123).

NOTE: Do not get grease on clutch surfaces on this gear.

(4) Lubricate all bearings, except gear (123), with oil.

B. R-F Translator.

Lubricate all bearings with oil.

C. Power Amplifier.

Lubricate all bearings on gear plate with oil.

7. ALIGNMENT AND ADJUSTMENT PROCEDURES.

A. Autopositioner Alignment and Check.

The following procedure is to be performed with Autopositioner submodule fastened to r-f translator module extender which is supplied with Maintenance Kit 678Y-1. Use special attachment in this kit to fasten Autopositioner to extender. Set the 714E-( ) mode selector switch to OFF.

(1) Check to see that actuating leaf or reversing switch is visible in both operating positions through hole in switch mounting bracket.

(2) Refer to figure 105B. Check that gap between contacts 3 and 4 on solenoid relay (with pawl in notch) is at least 0.015 inch.

(3) Check that contacts 3 and 4 on solenoid relay are closed when pawl engages notched wheel by at least 0.005 inch.

(4) Check that gap between contacts 5 and 6 on solenoid.relay (with back of pawl against solenoid housing) is at least 0.015 inch.

(5) Rotate the 1-kc cam by hand until hole in cam is adjacent to cam follower. Set frequency to 0.000 mc, any megacycle band. Momentarily switch mode selector switch on control unit to USB, then back to OFF. While doing this, observe the direction of rotation of the camshaft from the gear-plate side. When viewed from this side, the shaft must rotate counterclockwise.

CAUTION: CAM WILL BE DAMAGED IF IT ROTATES CLOCKWISE.

(6) Push the actuating leaf of reversing switch toward cam. Momentarily switch the 714E-( ) mode selector to USB, then back to OFF. Clutch gear should rotate clockwise as viewed from gear-plate side. With leaf in opposite position, clutch gear rotation should be in opposite direction. If directions of rotation are improper, rewire reversing switch as shown in figure 105(A).

(7) Attach calibrated disc and pointer supplied in Maintenance Kit 678Y-1 to Autopositioner output shaft. Check that disc rotates one position for each 1-kc change in frequency, 10 positions for each 10-kc change, and one revolution for each 100-kc change.

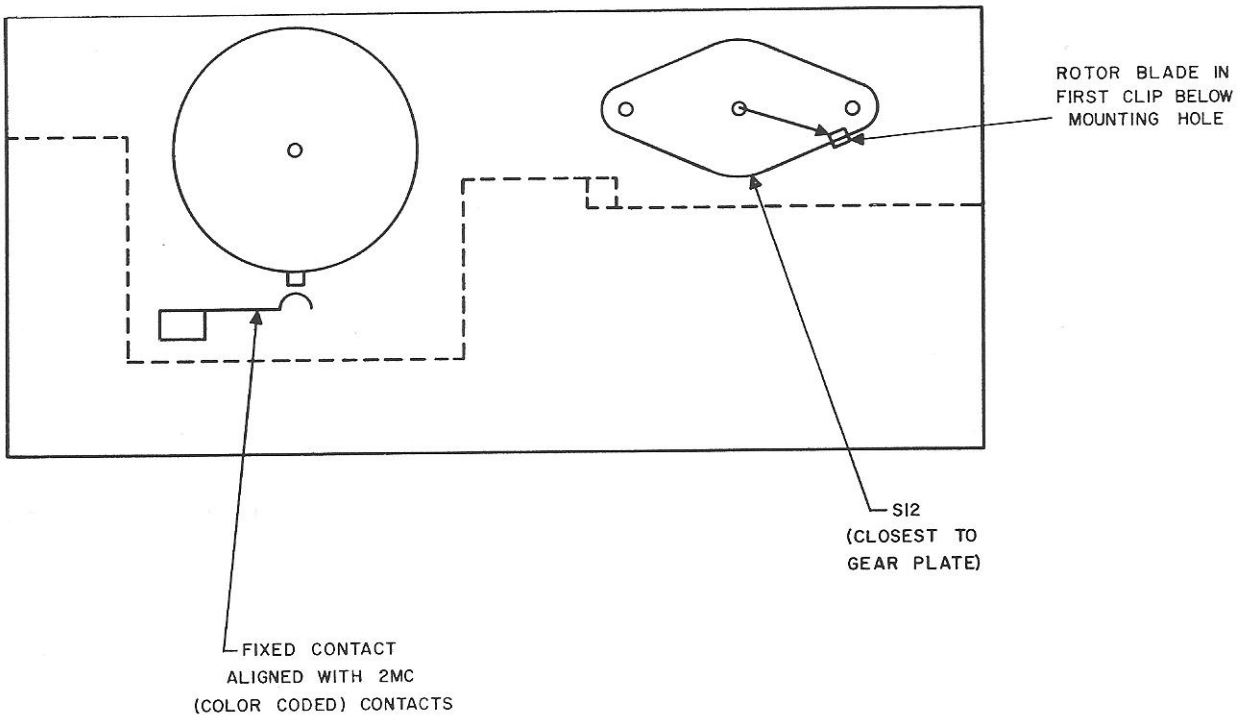
B. R-F Translator Turret and Switch Alignment.

(1) Refer to figure 5-3. With frequency selector positioned to 2.000 mc, adjust turret drive shaft so that 2-mc turret contacts (identified by color coding) are centered on fixed contacts. Tighten clamp screw.

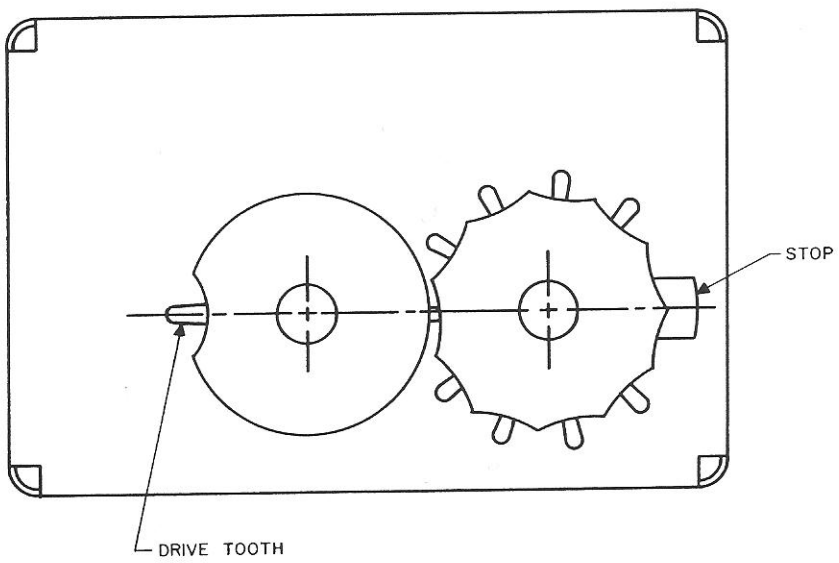
(2) Adjust band-switch shaft until clip is positioned as shown in figure 503. Tighten clamp screw.

(3) Recycle the Autopositioner to 2.000 mc and recheck the turret contacts and band-switch clip positions. Readjust if necessary.

(4) Early models of r-f translator modules have a 28-position switch in place of turrets. To align this switch, remove the module covers, place the r-f translator module on the module extender supplied with Maintenance Kit 678Y-1, and apply power to the 618T-( ). Set the frequency to 22.000 mc. View the band switch from the bottom of the module. (The switch will be on the right side when viewed from the bottom of the module.) Inspect the fifth switch wafer from the gear plate. The tooth on the rotor should be in the center of the 22-mc clip, which is the 8th clip clockwise from the left-hand mounting hole on the switch wafer. This clip can be identified by the fact that the wiring to the first seven clips goes to the left, and the wiring to the eighth to fourteenth clips goes to the right side as viewed from the bottom of the module. If the tooth on the rotor is not centered in the clip, loosen clamp on the gear mounted on the switch shaft, and rotate shaft until rotor tooth is centered in the switch clip. Reposition r-f translator to 22.000 mc, and again check to see that the rotor tooth is centered in the 22-mc clip position. Repeat this procedure if necessary.



Turret and Switch Alignment, R-F Translator Module
Figure 503



VFO in 500-Kc Position
Figure 504

AIRBORNE SSB TRANSCEIVER 618T-( ) - TESTING

1. GENERAL.

This testing section is divided into four main divisions. These divisions, and a brief description of what each division contains, are listed below.

A. Operational Check.

The operational check is a simple, go-no go check that is performed while the 618T-( ) is operating in its normal installation. It requires no test equipment except a microphone and headphones. If this check shows that the 618T-( ) is not operating properly, remove it to a test bench, and perform the unit performance check.

B. Unit Performance Check.

The unit performance check is a detailed "black-box" check that is performed at a test bench equipped with a variety of regular and special 618T-( ) test equipment. This check indicates if the 618T-( ) performance meets the standards of the equipment specifications. A data sheet is included with this check so that test data can be analyzed and definite trouble symptoms determined more quickly. If this check indicates that the 618T-( ) is not operating properly, refer to the unit trouble-shooting portion of the trouble-shooting section to isolate trouble within the unit to a particular module or group of modules.

The unit performance check may also be used as a preinstallation bench check for the 618T-( ).

C. Unit Adjustments.

The unit adjustments are adjustments that are affected by module replacement. This requires that these adjustments be performed on the unit level.

D. Module Checks and Adjustments.

The module checks and adjustments contain detailed procedures for checking and adjusting each of the individual 618T-( ) modules. The adjustments in these procedures are not affected by module replacement. If these adjustments cannot return the module to proper operating condition, refer to the module trouble-shooting portion of the trouble-shooting section to isolate trouble within a module to a particular stage or group of stages.

2. TEST EQUIPMENT.

A. Regular Test Equipment.

The following regular test equipment, or equivalent, is required to perform the checks and adjustments in this section.

(1) Triplett 630-NA voltohmmeter.

(2) Hewlett-Packard 410B voltmeter with 455A probe "T" connector.

(3) Ballantine 310A voltmeter.

(4) Boonton 91-C voltmeter.

(5) Fluke 801B voltmeter.

(6) Hewlett-Packard 606A signal generator with Measurements Corp. 80-ZH3 6-db attenuator.*

(7) Hewlett-Packard 200AB audio oscillator.

(8) Tektronix 541 oscilloscope with type K plug-in head.

(9) Hewlett-Packard 524D frequency counter with type 525A frequency converter.

(10) Collins 51S-1 Communications Receiver.

(11) Bird 82C dummy r-f load.

(12) Headphones.

(13) Microphone.

B. Special Test Equipment.

The following special 618T-( ) test equipment is required to perform the checks and adjustments in this section.

(1) Test Harness 689P-1, Collins part number 547-3914-00.

(2) Maintenance Kit 678Y-1, Collins part number 547-3915-00.

(3) Function Test Set 678Z-1, Collins part number 548-8001-005.

This special test equipment is described in detail in the special tools, fixtures, and equipment section of this manual, page 1001.

C. Transistor Test Equipment.

Transistor damage from test equipment usually results because too much current or voltage is applied to the transistor elements. Observe the following precautions regarding test equipment when testing transistor circuits.

(1) If a transformerless power supply is used, connect an isolation transformer in the power line.

(2) Do not use battery-eliminator power supplies because the regulation of these devices is poor at the current values drawn by transistor circuits.

(3) Connect a ground wire from the chassis of the test equipment to the chassis of the equipment being tested before making any other connections.

*If a signal generator with a 52-ohm output, such as the HP-606A, is used, connect a 52-ohm, 6-db attenuator in series with the generator output. If the signal generator has a low-impedance output, such as Measurements Corp. 65B, connect a 52-ohm load in series with the generator output. Such a load is furnished in Maintenance Kit 678Y-1.

(4) Use at least 20,000-ohm-per-volt meters or vacuum-tube voltmeters for making all measurements.

(5) Use test prods that are clean and sharp. It is good practice to cover all of the exposed prod, except about 1/8 inch on the end, with plastic tape or some other insulating material.

(6) Before using an ohmmeter to make transistor resistance measurements, check the ohmmeter on all scales by placing an external, low-resistance milliammeter in series with the ohmmeter leads. If the ohmmeter draws more than one milliampere on any range, do not use this range on circuits containing small transistors.

(7) When using an ohmmeter to make transistor resistance measurements, remember that these components are polarity and voltage conscious; therefore, be sure that the correct polarity is applied to the circuit by the ohmmeter.

3. OPERATIONAL CHECK.

A. Test Equipment.

A microphone and headphones are the only test equipment required to perform the operational check.

B. Equipment Setup.

The 618T-( ) should be operating in its normal installation while performing the operational check procedure.

C. Procedure.

(1) Connect the microphone and headphones to the MIC and PHONE jacks at the front of the 618T-( ).

(2) Apply power to the 618T-( ) by setting Control Unit 714E-( ) mode selector switch to USB, LSB, or AM.

CAUTION: CHECK TO BE SURE THAT THE 618T-( ) BLOWER OPERATES WHEN POWER IS APPLIED TO THE UNIT. IF IT DOES NOT, SET THE 714E-( ) MODE SELECTOR SWITCH TO OFF IMMEDIATELY.

(3) With the 618T-( ) unkeyed, set the front panel meter selector switch to 28V and 130V. The front panel meter should indicate in the red area at both switch positions.

(4) Set the 618T-( ) operating frequency to a frequency of WWV. WWV transmits on 2.500, 5.000, 10.000, 15.000, 20.000, and 25.000 mc.

(5) Adjust the 714E-( ) RF SENS control for a comfortable listening level.

(6) At a time when WWV is making a voice transmission, switch the 618T-( ) between USB and LSB. The voice quality should be equally good in both USB and LSB.

(7) Set the 618T-( ) operating frequency to one on which transmissions may be made.

(8) Key the 618T-( ).

CAUTION: THE 618T-( ) BLOWER SPEED SHOULD INCREASE WHEN THE 618T-( ) IS KEYED. THIS IS INDICATED BY HIGHER-PITCHED BLOWER NOISE. IF THE SPEED DOES NOT INCREASE, UNKEY THE 618T-( ) IMMEDIATELY.

(9) Set the front panel meter selector switch to 1500V, 130V, and 28V. The front panel meter should indicate in the red area at each of these switch positions.

(10) Set the front panel meter selector switch to PA MA. Disconnect the coaxial jumper from the 500 KC STD. connector at the right front of the 618T-( ), and note the front panel meter indication. It should be 300 ma (3 on the meter scale). Reconnect the coaxial jumper.

(11) Make test transmissions in the USB, LSB, and AM modes. Note that sidetone is present in all modes. Note the quality of the sidetone audio.

(12) If possible, establish two-way communications with another station. Obtain signal quality reports from the other station, and note received signal quality.

NOTE: If any of the preceding checks indicate that the 618T-( ) is not operating properly, remove the 618T-( ) to a test bench and perform the 618T-( ) unit performance check.

4. UNIT PERFORMANCE CHECK.

A. Test Equipment.

The following test equipment, or equivalent, is required to perform the 618T-( ) unit performance check.

(1) 115-volt, 400-cps, 3-phase power source.

(2) +28-volt power source.

(3) Test Harness 678P-1 with 714E-( ) Control Unit.

(4) Maintenance Kit 678Y-1.

(5) Function Test Set 678Z-1.

(6) HP-606A signal generator with 80-ZH3 attenuator.

(7) HP-200AB audio oscillator.

(8) HP-410B vtvm with 455A probe "T" CONNECTOR.

(9) Ballantine 310A vtvm.

(10) Bird 82C dummy load.

B. Equipment Setup.

(1) Place the 618T-( ) on the test fixture supplied in Maintenance Kit 678Y-1. Leave all 618T-( ) dust covers in place.

(2) Set Test Harness 678P-1 controls as listed in the chart at the right.

CONTROL	SETTING
KEY INTLK	BYPASS
AC	OFF
DC POWER	OFF
300 Ω AUDIO LOAD	IN
CW KEY	center (off) position
KEY	center (off) position
WATTS	FORWARD, 200

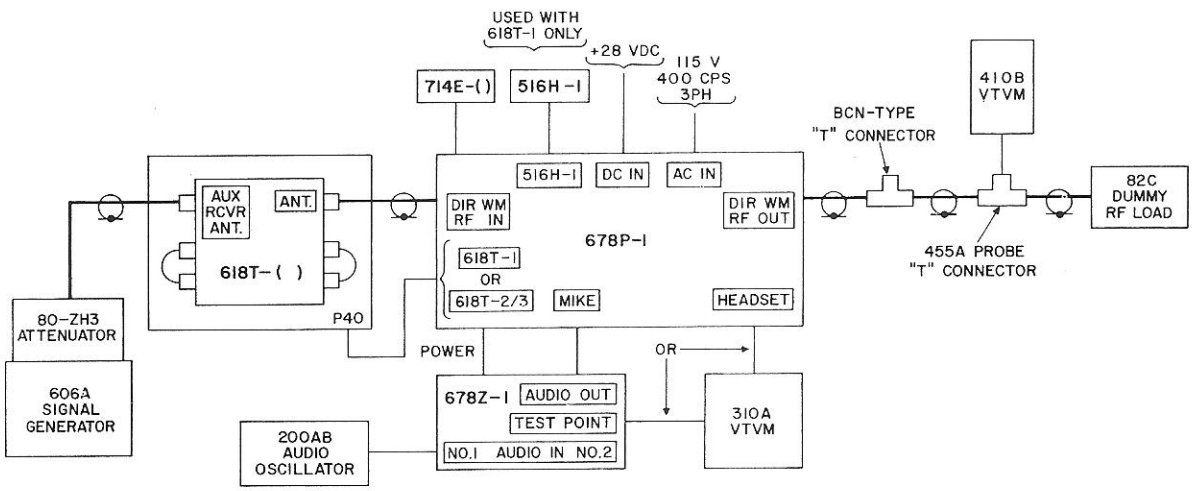
(3) Connect P40 (the 60-pin connector) at the rear of the 618T-( ) to the 618T-1 or 618T-2/3 connector on the top of the 678P-1, depending on the type of 618T-( ) being connected. Use the pendant cable supplied with the 678P-1. Set the 618T-2/618T-3 switch on the 678P-1 to the applicable position. If a 618T-1 is being checked, set this switch to OFF.

(4) If a 618T-1 is being checked, connect Power Supply 516H-1 to the 516H-1 connector on the top of the 678P-1.

(5) Connect Control Unit 714E-( ) in place in the 678P-1. Set the 714E-1/714E-2/3 switch to the applicable position.

(6) Connect the 115-volt, 400-cps and +28-volt power supplies to the 678P-1 AC IN and DC IN connectors respectively.

(7) Refer to figure 701. Connect the other test equipment as shown in this figure.



NOTES:

1. SET 678P-1 CONTROLS AS FOLLOWS:
   KEY INTLK ——— BY PASS
   618T-2/OFF/618T-3 ——— AS REQUIRED (SET TO OFF FOR 618T-1)
   WATTS ——— FORWARD, 200
   300Ω AUDIO LOAD ——— IN
   714E-1/714E-2/3 ——— AS REQUIRED
2. SET "ANT JUMPER" TOGGLE SWITCH UNDER 618T-( ) FRONT PANEL TO "OUT".
3. SET "AUDIO" CONTROL ON 618T-( ) FRONT PANEL AND 714E-( ) "RF SENS" CONTROL FULLY CLOCKWISE.

618T-( ) Test Setup Diagram
Figure 701

(8) Set the ANT JUMPER toggle switch in the 618T-( ) antenna transfer relay compartment to OUT. This switch is accessible by removing the front meter panel from the 618T-( ). After setting this switch, replace the meter panel and filter.

(9) Set the AUDIO control, R10 on the 618T-( ) front panel, fully clockwise.

(10) Check that the four fuses on the top of the 678P-1 are good and have the proper rating.

(11) Set the 678P-1 AC and DC POWER switches to ON.

(12) Set the 714E-( ) mode selector switch to USB, LSB, or AM.

CAUTION: CHECK TO BE SURE THAT THE 618T-( ) BLOWER OPERATES WHEN PRIMARY POWER IS APPLIED TO THE 618T-( ), SO THAT COOLING AIR IS SUPPLIED TO THE UNIT WHILE IT IS BEING CHECKED AND ADJUSTED.

C. Procedures.

NOTE: Table 702 is the data sheet for recording unit performance check data.

(1) Frequency Checks.

(a) Connect the HP-524D frequency counter, through the 2- to 8-mc capacity voltage divider supplied in Maintenance Kit 678Y-1, to the 618T-( ) r-f output.

(b) Set the 618T-( ) to AM.

(c) Check the r-f output frequency at each of the frequencies between 2.000-mc and 2.999-mc listed on the data sheet. Limits are given on the data sheet.

(d) Replace the 2- to 8-mc capacity voltage divider with the 8- to 30-mc divider.

(e) Repeat the frequency checks between 29.000 mc and 29.999 mc. Limits are on the data sheet.

(2) Receive Checks.

(a) Receive Gain/Sensitivity Check (USB and LSB).

Check the USB and LSB receive gain and sensitivity at each of the 28 frequencies listed on the data sheet as follows:

1. Set the 618T-( ) to the listed operating frequency, USB.
2. Set the 606A signal generator output to the same 618T-( ) operating frequency as in the preceding step, 3 uv, cw. Tune the signal generator slightly (about 1 kc) above the 618T-( ) operating frequency to peak the voltage at the 678P-1 HEADSET jack. Record the voltage at the HEADSET jack in the GAIN - USB column on the data sheet.
3. Detune the signal generator at least 10 kc, and note the decrease (in db) in voltage at the HEADSET jack from the voltage noted in the preceding step. Record the db voltage decrease in the SENSITIVITY - USB column on the data sheet.

4. Repeat the above procedure for LSB. To do this, set the 618T-( ) to LSB, and tune the signal generator below the 618T-( ) operating frequency to peak the voltage at the HEADSET jack.

(b) Receive Gain/Sensitivity Check (AM).

Check the AM receive gain and sensitivity at each of the 28 frequencies listed on the data sheet as follows:

1. Set the 618T-( ) to the listed operating frequency, AM.

2. Set the 606A signal generator output to the same 618T-( ) operating frequency as in the preceding step, 5 uv, 30-percent modulated with 1000 cps. Tune the signal generator slightly to peak the voltage at the 678P-1 HEADSET jack. Record the voltage at the HEADSET jack in the GAIN - AM column on the data sheet.

3. Turn off the signal generator modulation, and note the decrease (in db) in voltage at the HEADSET jack from the voltage noted in the preceding step. Record the db voltage decrease in the SENSITIVITY - AM column on the data sheet.

(c) AGC Characteristics.

1. Set the 618T-( ) to 7.300 mc, AM.

2. Set the 606A signal generator output to 7.300 mc, 10 uv, 30-percent modulated with 1000 cps. Tune the signal generator slightly around 7.300 mc to peak the voltage at the 678P-1 HEADSET jack.

3. Note the voltage at the HEADSET jack.

4. Increase the signal generator output level to 100,000 uv. Note the increase (in db) in voltage at the HEADSET jack from the voltage noted in the preceding step. This increase should be not more than 6 db.

5. Set the 618T-( ) to 7.300 mc, USB.

6. Set the 606A signal generator output to 7.300 mc, 10 uv, cw. Tune the signal generator slightly (about 1 kc) above 7.300 mc to peak the voltage at the HEADSET jack.

7. Note the voltage at the HEADSET jack.

8. Increase the signal generator output level to 100,000 uv. Note the increase (in db) in voltage at the HEADSET jack from the voltage noted in the preceding step. This increase should be not more than 6 db.

(3) Transmit Checks.

(a) Power Amplifier Static Plate Current Tube Balance Check.

1. Disconnect the coaxial jumper between the 500 KC STD and 500 KC REF connectors at the right front of the 618T-( ). This removes power amplifier drive, permitting static plate current measurements to be made.

2. Set the front panel meter selector switch to PA MA.

3. Key the 618T-( ). The front panel meter should indicate 300 ma (3 on the meter scale).

4. Unkey the 618T-( ). Press switch S4 in the power amplifier module with the eraser end of a pencil. Key the 618T-( ). The meter should indicate 80 to 120 ma less than the indication in step 3.

5. Repeat step 4. with S5 in the power amplifier module pressed. The meter indication should again be 80 to 120 ma less than the indication in step 3.

6. Reconnect the coaxial jumper at the front of the 618T-( ).

(b) Output Power/Residual Noise Check.

Check the 618T-( ) r-f output power and residual noise at each of the 28 frequencies listed on the data sheet as follows:

1. Set the 618T-( ) to AM.

2. Set the 618T-( ) operating frequency to each of the frequencies listed on the data sheet.

3. Key the 618T-( ). Allow tuning to complete. Record the 618T-( ) r-f output voltage on the data sheet. Unkey the 618T-( ).

4. Disconnect all audio inputs to the 618T-( ).

5. Set the 618T-( ) to USB. Key the 618T-( ). Record the 618T-( ) r-f output voltage on the data sheet. Unkey the 618T-( ).

6. Set the 618T-( ) to LSB. Key the 618T-( ). Record the 618T-( ) r-f output voltage on the data sheet. Unkey the 618T-( ).

(c) CW Output Check.

1. Set te 618T-( ) to CW, any frequency.

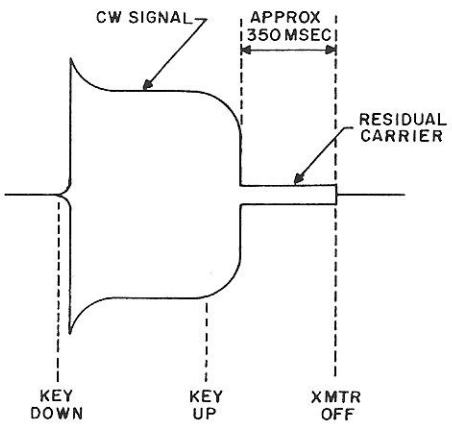
2. Rapidly operate the CW KEY switch on the 678P-1. The 618T-( ) r-f output waveform should be as shown in figure 702, and the r-f output voltage should be between 70 and 90 volts rms when the transmitter is keyed.

(d) AM Modulation Check.

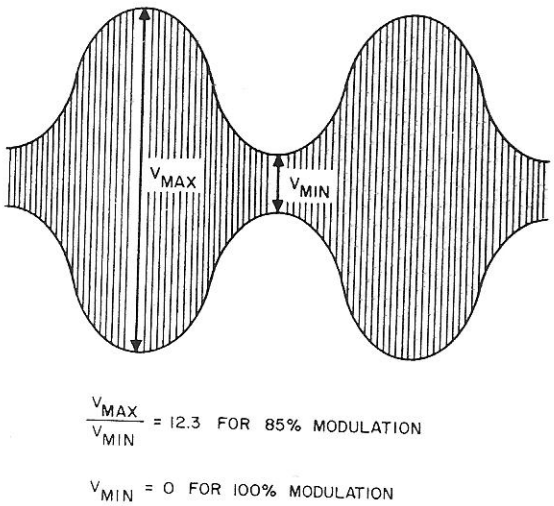
1. Set the 618T-( ) to 7.300 mc, AM.

2. Set the 200AB audio oscillator output to 2000 cps.

3. Key the 618T-( ). Increase the audio oscillator output level until the oscilloscope connected to the 618T-( ) r-f output indicates 100-percent modulation, or, if 100-percent modulation cannot be reached, until the voltage at the 678Z-1 TEST POINT is 0.25 volt rms. The oscilloscope should indicate at least 85-percent modulation, as shown in figure 703.



CW Output Waveform
Figure 702



AM Modulation Waveform
Figure 703

(e) Sidetone Check.

1. Connect a microphone and headset to the 618T-( ) MIC and PHONE jacks.
2. Key the 618T-( ) at any frequency.
3. Monitor the transmitter sidetone while speaking into the microphone. Note the sidetone audio quality.

(4) Antenna Coupler Power/Control Checks.

Refer to table 701 for checks of 618T-( ) outputs and inputs associated with antenna coupler control functions. These checks are made at pins of the 618T-1 or 618T-2/3 connector on the top of Test Harness 678P-1. Use the connector which is not being used for connection to the 618T-( ). Use the 410B vtvm to make these checks.

TABLE 701. ANTENNA COUPLER POWER/CONTROL TEST POINT AT P41, 618T-( )

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
P40-5	Transmitter key interlock	678P-1 KEY INTLK switch at NORMAL	0 volts
		678P-1 KEY INTLK switch at BY PASS	+28 volts
P40-7	+260-volt output	Power on	+260 volts
P40-9	Chopper enable	Receive	∞ ohms
		Transmit	0 ohm
P40-10	Tune power enable	Normal operation	∞ ohms
		678P-1 TUNE POWER button pressed	0 ohm

TABLE 701. ANTENNA COUPLER POWER/CONTROL TEST POINT AT P41, 618T-( ) (Cont)

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
P40-11	115-volt, 400-cps output	Power on	115 volts rms
P40-26	Recycle line	Normal operation	∞ ohms
		618T-( ) recycling	0 ohm
P40-55	Key line	Receive	∞ ohms
		Transmit	0 ohm
P40-56	+28-volt output	Power on	+28 volts
NOTE: All continuity measurements made between indicated point and 618T-( ) chassis.			

5. UNIT ADJUSTMENTS.

The audio and sidetone level adjustments should be performed before returning the 618T-( ) from the test bench to its installation.

The driver plate tuning, power amplifier static plate current, and tgc adjustments should be performed whenever the r-f translator or power amplifier modules in the 618T-( ) are replaced.

After performing these adjustments and before returning the 618T-( ) to its installation, repeat the unit performance check to ensure that the 618T-( ) is operating properly.

Refer to figure 704 for the location of the 618T-( ) unit adjustments.

A. Test Equipment.

The test equipment required to perform the unit adjustments is the same as that required for the unit performance check, paragraph 4.A.

B. Equipment Setup.

The equipment setup for the unit adjustments is the same as for the unit performance check, paragraph 4.B. In addition, remove the 618T-( ) front panel cover and side dust covers.

C. Procedure.

(1) Receive Audio Output Level Adjustment.

(a) Connect the 310A vtvm to the 678P-1 HEADSET jack.

(b) Set the 618T-( ) to 7.300 mc, AM. Set the 714E-( ) RF SENS control fully clockwise.

(c) Set the 606A signal generator output to 7.300 mc, 1000 uv, 30-percent modulated with 1000 cps. Tune the signal generator slightly around 7.300 mc to peak the voltage at the HEADSET jack.

(d) Adjust the AUDIO level control, R10 on the 618T-( ) front panel, for 5.5 volts rms at the HEADSET jack.

TABLE 702. 618T-( ) UNIT PERFORMANCE CHECK DATA SHEET

FREQUENCY CHECKS

714E-( ) FREQ SETTING (mc)	618T-( ) R-F OUTPUT FREQ (cps)	LIMIT
2.000		714E-( ) freq setting ±3 cps
2.111		
2.222		
2.333		
2.444		
2.555		
2.666		
2.777		
2.888		
2.999		
29.000		714E-( ) freq setting ±24 cps
29.111		
29.222		
29.333		
29.444		
29.555		
29.666		
29.777		
29.888		
29.999		

RECEIVE CHECKS

GAIN/SENSITIVITY

618T-( ) OPERATING FREQUENCY (mc)	GAIN (audio output volts)			SENSITIVITY (db)		
	USB	LSB	AM	USB	LSB	AM
2.100						
3.100						
4.100						
5.100						
6.100						
7.100						
8.100						
9.100						
10.100						
11.100						
12.100						
13.100						
14.100						
15.100						
16.100						
17.100						
18.100						
19.100						
20.100						
21.100						
22.100						
23.100						
24.100						
25.100						
26.100						
27.100						
28.100						
29.100						
	Limit: 2.4 volts rms min with 1-uv r-f input, CW		Limit: 2.4 volts rms min with 3-uv r-f input, 30 percent modulated with 1000 cps	Limit: 10 db min with 1-uv r-f input, CW		Limit: 6 db min with 3-uv r-f input, 30 percent modulated with 1000 cps

AGC characteristics_____Check

TRANSMIT CHECKS

OUTPUT POWER/RESIDUAL NOISE

618T-( ) OPERATING FREQUENCY (mc)	OUTPUT POWER (r-f output volts)	RESIDUAL NOISE (r-f output volts)	
	AM	USB	LSB
2.100			
3.100			
4.100			
5.100			
6.100			
7.100			
8.100			
9.100			
10.100			
11.100			
12.100			
13.100			
14.100			
15.100			
16.100			
17.100			
18.100			
19.100			
20.100			
21.100			
22.100			
23.100			
24.100			
25.100			
26.100			
27.100			
28.100			
29.100			
	Limit: 70 to 90 volts rms AM carrier	Limit: 25 volts rms max with no audio input	

Power amplifier static plate current/tube balance _____ Check

CW output _____ Check

AM modulation _____ Check

Sidetone _____ Check

618T-( ) SERIAL NO. _____

DATE _____

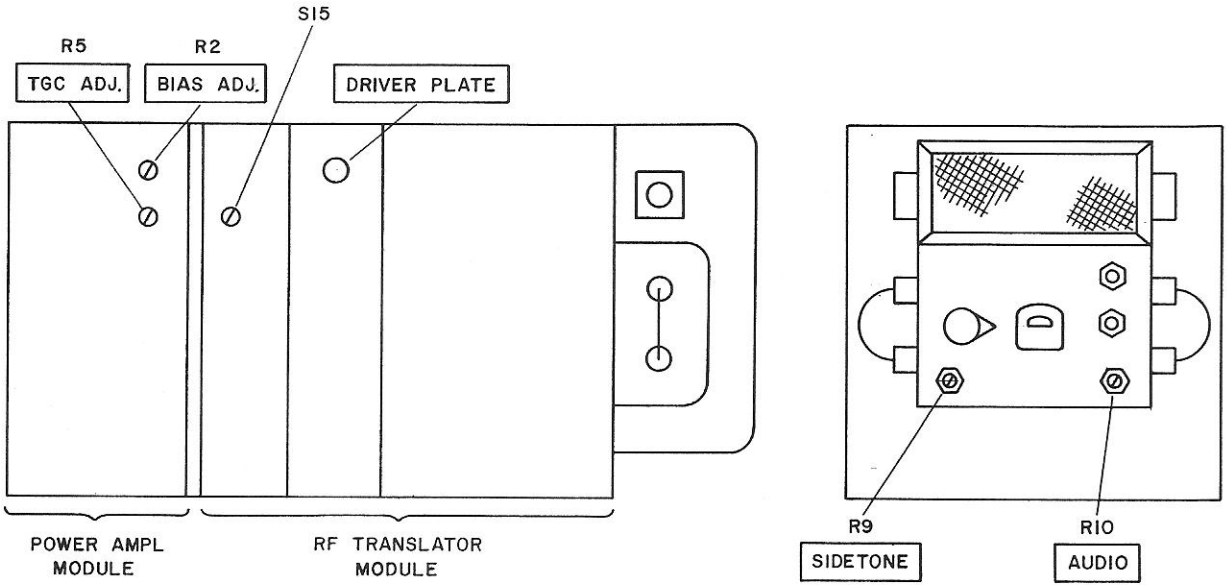
ANTENNA COUPLER POWER/CONTROL CHECKS

POWER

+260 volts	_____	Check
115 volts a-c	_____	Check
+28 volts	_____	Check

CONTROL

Transmitter key interlock	_____	Check
Chopper enable	_____	Check
Tune power enable	_____	Check
Recycle line	_____	Check
Key line	_____	Check



618T-( ) Unit Adjustments
Figure 704

(2) Sidetone Output Level Adjustment.

(a) Connect the Ballantine 310A vtvm to the 678Z-1 TEST POINT.

(b) Key the 618T-( ).

(c) Set the HP-200AB audio oscillator output to 2000 cps, 0.25 volt rms as measured at the TEST POINT.

(d) Connect the 310A vtvm to the 678P-1 HEADSET jack.

(e) Adjust the SIDETONE level control, R9 on the 618T-( ) front panel, for 5.5 volts rms at the HEADSET jack.

(3) Driver Plate Tuning Adjustment.

(a) Connect the HP-410B vtvm a-c probe to the 618T-( ) r-f output.

(b) Connect the red jack on the 678Z-1 labeled J2-FREQ DIV to J2 (red) in the frequency divider module.

(c) Connect the white jack on the 678Z-1 labeled J2-IF TRANS to J2 (red) in the if translator module.

(d) Connect the black jack on the 678Z-1 labeled GRND to the 618T-( ) chassis.

(e) Set the 678Z-1 TGC & CAPTURE RANGE control, R3, fully counterclockwise.

(f) Set the 678Z-1 FUNCTION SELECTOR switch to TGC OVERRIDE.

(g) Set S15 in the r-f translator module counterclockwise to OFF.

(h) Set the 618T-( ) to 29.000 mc, AM.

(i) Key the 618T-( ). Adjust the 678Z-1 TGC & CAPTURE RANGE control, R3, to give a 618T-( ) r-f output voltage of about 50 volts rms.

(j) Adjust the DRIVER PLATE coil in the r-f translator module to peak the r-f output voltage.

(k) Set the 618T-( ) operating frequency to 28.000 mc, 27.000 mc, etc., through 3.000 mc. At each frequency setting, adjust the DRIVER PLATE coil to peak the r-f output voltage. Keep the r-f output voltage at about 50 volts rms by adjusting the 678Z-1 TGC & CAPTURE RANGE control, R3.

NOTE: There is no DRIVER PLATE adjustment at 2.000 mc.

(l) When the DRIVER plate coils have been adjusted on all bands, return S15 in the r-f translator module to ON.

(4) Static Plate Current Adjustment.

(a) Disconnect the coaxial jumper between the 500 KC STD and 500 KC REF connectors at the right front of the 618T-( ).

(b) Set the front panel meter selector switch to PA MA.

(c) Key the 618T-( ).

(d) Adjust R2 in the power amplifier module, the BIAS ADJ. control, until the front panel meter indicates 300 ma (3 on the meter scale).

(e) Unkey the 618T-( ). Reconnect the coaxial jumper at the front of the 618T-( ).

(5) TGC Adjustment.

(a) Set the 618T-( ) to 29.900 mc, AM.

(b) Key the 618T-( ).

(c) Adjust the TGC ADJ control, R5 in the power amplifier module, to give 72 volts rms at the 618T-( ) r-f output.

6. MODULE CHECKS AND ADJUSTMENTS.

Figures 705 through 717 contain module check and adjustment procedures. All of these procedures are performed with the modules connected to an operating 618T-( ) unit.

Refer to table 703 for the figure number corresponding to each 618T-( ) module.

TABLE 703. MODULE CHECK AND ADJUSTMENT FIGURES

MODULE	COLLINS PART NUMBER	FIGURE
Low-voltage power supply	544-9292-00	705
High-voltage power supply	545-5858-00, 544-9291-00, or 545-4971-00	706
AM/audio amplifier	546-6053-00	707
I-f translator	544-9286-00	708
R-f translator	528-0113-00 or 544-9284-00	709
Power amplifier	544-9283-00	710
Electronic control amplifier	544-9290-00	711
R-f oscillator	528-0251-005	712
Frequency divider	546-2142-005	713
Kilocycle-frequency stabilizer	528-0112-005 or 544-9288-005	714
Megacycle-frequency stabilizer	528-0239-005	715
R-f oscillator	544-9285-005	716
Megacycle-frequency stabilizer	544-9289-005	717

1. LOW-VOLTAGE POWER SUPPLY MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	Blanker trigger	J1 ungrounded	+18 volts at J3
		J1 grounded	0 volt at J3
J2	Blanker input voltage	Power on	+28 volts
J3	Regulator output voltage	Power on	+18 volts

2. LOW-VOLTAGE POWER SUPPLY MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the low-voltage power supply module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) Function Test Set 678Z-1.

(4) HP-410B vtvm.

(5) Variable d-c voltage source (+25 to +35 volts).

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the low-voltage power supply module to the 618T-( ) chassis through the module extender supplied in Maintenance Kit 678Y-1. Leave all other modules in place on the chassis.

C. Procedure.

(1) Blanker Adjustment.

(a) Connect the low-voltage power supply module to its module extender, but do not connect the extender to the 618T-( ) chassis.

(b) Connect the variable d-c voltage source to TP4 on the module extender. Set the voltage to +28 volts.

(c) Connect the 410B vtvm d-c probe to TP5 on the module extender.

(d) Increase the variable d-c voltage slowly until the voltage at TP5 abruptly drops to 0. Note the variable d-c voltage at this point. It should be +32 ±0.5 volts. If it is not, set the variable d-c voltage to +32 ±0.5 volts and adjust R5 until the voltage at TP5 drops to 0. Then repeat steps (a) through (d).

(2) +18 Volt Regulator Adjustment.

(a) Connect the red jack on the 678Z-1 labeled J2-FREQ DIV to J2 in the frequency divider module.

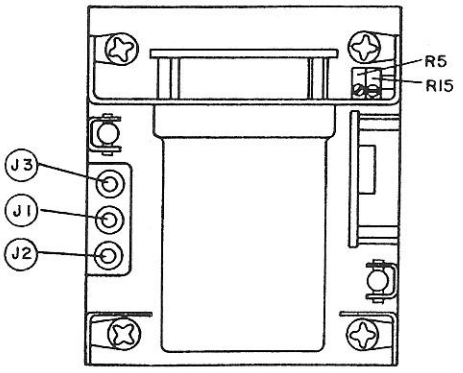
(b) Connect the black jack on the 678Z-1 labeled GRND to the 618T-( ) chassis.

(c) Set the 678Z-1 FUNCTION SELECTOR switch to SET LEVEL. Adjust the LEVEL SET control, R1, until the FUNCTION METER indicates +10. Do not use the X10 METER SENSITIVITY switch.

(d) Set the 678Z-1 FUNCTION SELECTOR switch to +18V. The FUNCTION METER should indicate 0 ±1 scale division when the X10 METER SENSITIVITY switch is operated several times. If it does not, adjust R15 for the proper indication.

(3) +130-Volt Supply Check.

Set the 618T-( ) front panel meter selector switch to 130V. The front panel meter should indicate in the red area. If it does not, check components in the +130-volt supply circuit in the low-voltage power supply module.



Low-Voltage Power Supply Module,
Checks and Adjustments
Figure 705

1. HIGH-VOLTAGE POWER SUPPLY MODULE CHECKS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check the high-voltage power supply module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) HP-410B vtvm.

(4) Triplett 630-NA vom.

(5) Bird 82C dummy load.

B. Equipment Setup.

Leave the high-voltage power supply module and all other modules, except the r-f translator, connected to the 618T-( ) chassis. Connect the r-f translator module to the 618T-( ) chassis through the module extender supplied in Maintenance Kit 678Y-1.

C. Procedure.

(1) Set the front panel meter selector switch to 1500V.

(2) Key the 618T-( ). The front panel meter should indicate in the red area.

(3) Connect the HP-410B vtvm d-c probe to TP19 (J32) on the r-f translator module extender.

(4) Key the 618T-( ). The voltage at TP19 should be +260 ±26 volts.

NOTE: There are no adjustments in the high-voltage power supply module. If the preceding checks indicate that the module outputs are abnormal, remove the module from the 618T-( ), and use an ohmmeter to check for faulty diodes, transformer winding continuity, and proper relay operation. Refer to the module schematic diagram.

High-Voltage Power Supply Module, Checks
Figure 706

1. AM/AUDIO AMPLIFIER MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	I-f agc voltage	Used for alignment only	
J2	AM detector output	Used for alignment only	
J3	Audio amplifier input	Used for alignment only	
J4	Audio amplifier output	Used for alignment only	
J5	R-f agc voltage	Used for alignment only	
J6	Selcal audio output	Used for alignment only	

2. AM/AUDIO AMPLIFIER MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the AM/audio amplifier module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) Function Test Set 678Z-1.

(4) HP-410B vtvm.

(5) Ballantine 310A vtvm.

(6) HP-606A signal generator with 80-ZH3 attenuator.

(7) HP-200AB audio oscillator.

(8) Bird 82C dummy load.

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the AM/audio amplifier module to the 618T-( ) chassis through the module extender supplied in Maintenance Kit 678Y-1. Leave all other modules in place on the chassis. Remove the AM/audio amplifier module dust cover.

C. Procedure.

(1) Audio Amplifier Gain Adjustment.

(a) Connect the 310A vtvm to J4.

(b) Key the 618T-( ). Set the 200AB audio oscillator output to 1000 cps, 0.25 volt rms as measured at the 678Z-1 TEST POINT.

(c) Note the voltage at J4. It should be 8 volts rms (or 12 volts rms if the module MCN is below 3508). If it is not, adjust R6 for 8 (or 12) volts rms at J4. Recheck the voltage at the 678Z-1 TEST POINT to be sure that it is 0.25 volt rms with 8 (or 12) volts rms at J4.

(d) Connect the 200AB audio oscillator directly to the 678P-1 600 Ω BAL AUDIO IN jack. Connect the oscillator for a balanced output.

(e) Key the 618T-( ). Set the 200AB audio oscillator output to 1000 cps, 0.78 volt rms.

(f) Note the voltage at J4. It should be 8 (or 12) volts rms. If it is not, adjust R5 for 8 (or 12) volts rms at J4. Recheck the audio oscillator output voltage to be sure that it is 0.78 volt rms with 8 (or 12) volts rms at J4.

(2) AM Receive I-F Alignment.

(a) Set the 618T-( ) to AM.

(b) Disconnect the coaxial jumper from the RCVR IF. IN connector at the left front of the 618T-( ). Connect the 606A signal generator output, through the 80-ZH3 attenuator, to this connector.

(c) Set the signal generator output to 500 kc. 30 percent modulated with 1000 cps. Adjust the signal generator output level to give 2 to 3 volts rms at the 678P-1 HEADSET jack.

(d) Adjust C18, C19, L2, L3, and T2 to peak the voltage at the HEADSET jack.

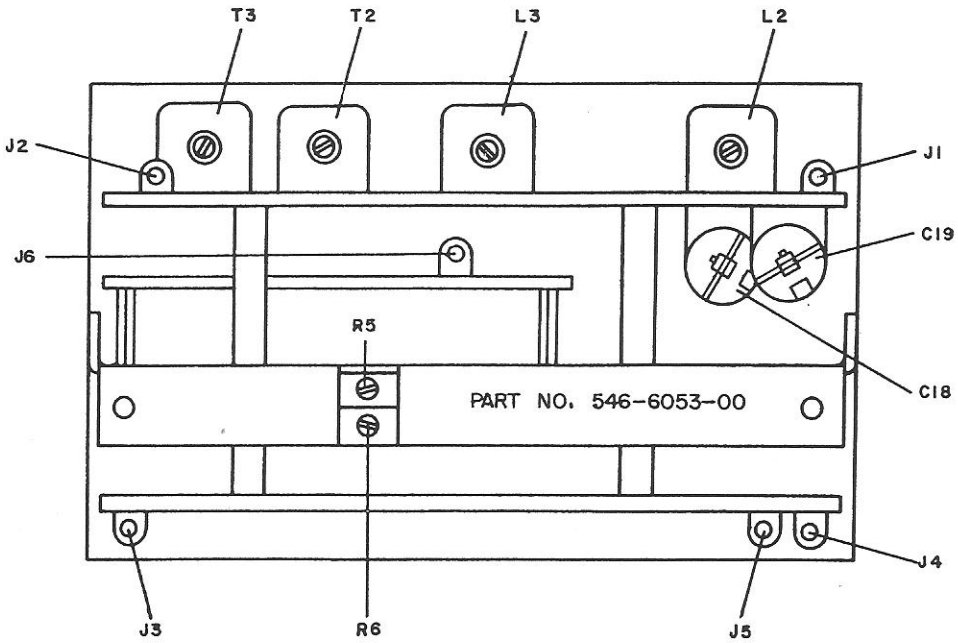
(e) Increase the signal generator output level to 300 uv.

(f) Adjust T3 to null the voltage at the HEADSET jack.

(g) Adjust the signal generator output level for 5 volts rms at the HEADSET jack.

(h) Note the signal generator output level. It should be between 100 and 200 uv. If it is not, replace R56 with a value of resistance that will give the proper indication.

(i) Disconnect the signal generator from the RCVR IF. IN connector. Reconnect the coaxial jumper to this connector.



AM/Audio Amplifier Module,
Checks and Adjustments
Figure 707

1. I-F TRANSLATOR MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	I-f agc voltage	Used for alignment only	
J2	Tgc voltage		+10 to +14 volts
J3	Audio input to balanced modulator	Used for alignment only	
J4	500-kc carrier input to balance modulator		1.5 volt rms

2. I-F TRANSLATOR MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the i-f translator module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) Function Test Set 678Z-1.

(4) HP-410B vtvm.

(5) Ballantine 310A vtvm.

(6) Boonton 91-C vtvm.

(7) HP-606A signal generator with 80-ZH3 attenautor.

(8) Bird 82C dummy load.

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the i-f translator module to the 618T-( ) chassis through the module extender supplied in Maintenance Kit 678Y-1. Leave all other modules in place on the chassis. Remove the i-f translator module dust cover.

C. Procedure.

(1) SSB Receive I-F Alignment.

(a) Connect the IF OUTPUT coaxial connector on the module extender to the unmarked coaxial connector on the extender with the coaxial jumper.

(b) Set the 618T-( ) to USB.

(c) Disconnect the coaxial jumper from the RCVR IF. IN connector at the left front of the 618T-( ). Connect the 606A signal generator output, through the 80-ZH3 attenuator, to this connector.

(d) Tune the signal generator to 500.3 kc, CW. Adjust the signal generator output level for 2 to 3 volts rms at the 678P-1 HEADSET jack.

(e) Adjust L4, L5, and T2 to peak the voltage at the HEADSET jack. If necessary, reduce the signal generator output level during this peaking procedure to keep the voltage at the HEADSET jack below 5 volts rms.

(f) Tune the signal generator to 501 kc.

(g) Adjust C25 and C29 to peak the voltage at the HEADSET jack. Again keep this voltage below 5 volts rms during the peaking procedure.

(h) Set the 618T-( ) to LSB.

(i) Tune the signal generator to 499.0 kc.

(j) Adjust C27 and C32 to peak the voltage at the HEADSET jack.

(k) Determine the lower-gain sideband by keeping the signal generator output level constant while switching between LSB (with signal generator tuned to 499.0 kc) and USB (with signal generator tuned to 501.0 kc). The voltage at the HEADSET jack will be lower in the lower-gain sideband.

(l) Set the 618T-( ) to the lower-gain sideband. Adjust the signal generator output level for 5 volts rms at the HEADSET jack.

(m) Note the signal generator output level. It should be between 40 and 100 uv. If it is not, replace R5 with a value of resistance that will give the proper indication.

(n) Disconnect the signal generator from the RCVR IF. IN connector. Reconnect the coaxial jumper to this connector.

(2) SSB/AM Transmit I-F Alignment.

NOTE: Perform the SSB receive i-f alignment procedure before performing this procedure.

(a) Connect the RF LOAD coaxial connector on the module extender to the unmarked coaxial connector on the extender with the coaxial jumper.

(b) Connect the 91-C vtvm to the RF test point on the module extender.

(c) Set the 618T-( ) to USB.

(d) Short C9.

(e) Key the 618T-( ). Adjust T1 and L2 to peak the voltage at the RF test point.

(f) Remove the short from C9.

(g) Set the 618T-( ) to AM.

(h) Note the voltage at the RF test point. It should be between 0.24 and 0.38 volt rms. If it is not, replace R42 with a value of resistance that will give the proper voltage at the RF test point.

(i) Set the 200AB audio oscillator output to 1000 cps, 0.25 volt as measured at the 678Z-1 TEST POINT.

(j) Determine the lower-gain sideband by keying the 618T-( ) and switching between LSB and USB. The setting that gives the lower voltage at the RF test point is the lower-gain sideband.

(k) Set the 618T-( ) to the lower-gain sideband. Note the voltage at the RF test point. It should be between 0.31 and 0.39 volt rms. If it is not, replace R2 with a value of resistance that will give the proper voltage at the RF test point.

(l) Set the 618T-( ) to the higher-gain sideband. The voltage at the RF test point should be within 2 db of the voltage noted in the preceding step. If it is not, replace R45 with a value of resistance that will give the proper voltage at the RF test point.

(3) Carrier Balance Adjustment.

(a) Connect the RF LOAD coaxial connector on the module extender to the unmarked coaxial connector on the extender with the coaxial jumper.

(b) Connect the 91-C vtvm to the RF test point on the module extender.

(c) Set the 618T-( ) to USB.

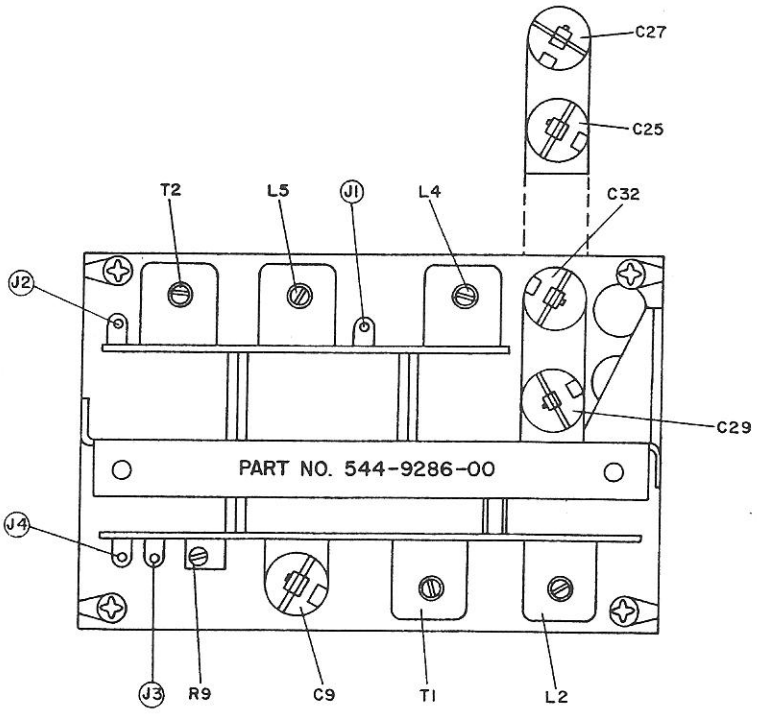
(d) Key the 618T-( ). Adjust first R9, then C9, to null the voltage at the RF test point.

(e) Set the 618T-( ) to LSB.

(f) Key the 618T-( ). Adjust first R9, then C9, to null the voltage at the RF test point.

(g) Repeat steps (c) through (f) until the null voltage is USB and LSB are approximately equal. This voltage at the null should be about 0.35 volt rms.

NOTE: This procedure is not recommended for accurate carrier balance. For best results, use a spectrum analyzer, override the tgc, and adjust the r-f output voltage to 72 volts rms in AM. Then switch to USB and LSB and adjust R9 and C9 to null the carrier.



I-F Translator Module, Checks and Adjustments
Figure 708

(9) Tektronix 541 oscilloscope.

(10) Communications Receiver 51S-1.

B. Equipment Setup.

All r-f translator module checks and adjustments except the r-f and i-f circuits alignment, neutralization adjustments, and h-f mixer balance should be performed with the r-f translator module connected in place on the 618T-( ) chassis. Connect the 618T-( ) and test equipment as shown in figure 701. Remove the r-f translator module top cover plate.

For the i-f and r-f circuits alignment, neutralization adjustments, and h-f mixer balance procedures, the test setup, unless otherwise stated in the procedure, is as follows.

(1) Connect the r-f translator module to the 618T-( ) chassis through the module extender supplied in the 678Y-1.

(2) Disconnect the coaxial jumper at J34 on the module extender. Connect the 606A signal generator output, through the 80-ZH3 attenuator, to the module input at J34 on the module extender. Tune the signal generator to 500 kc.

(3) Remove the small block that holds J31 and J30 on the module extender. These jacks mate with plugs P2 and P3 on the r-f translator module.

(4) Connect the RF TRANSLATOR LOAD, supplied in Maintenance Kit 678Y-1, to P2 and P3. Make this connection so that the blue test point on the RF TRANSLATOR LOAD is on the same side as P2.

(5) Connect the 410B vtvm a-c probe to the blue test point on the RF TRANSLATOR LOAD.

C. Procedure.

(1) VFO Phase-Locking Check and Alignment.

(a) Couple the 51S-1 receiver to the vfo output by placing the receiver antenna wire near the vfo case.

(b) Set the 618T-( ) operating frequency to each of the frequencies listed in the chart below. Tune the 51S-1 receiver to the vfo frequency corresponding to the 618T-( ) operating frequency. Note that the vfo frequency is correct.

(c) To check for vfo phase lock, ground TP5 in the kilocycle-frequency stabilizer module. This will unlock the vfo and cause the vfo frequency to vary slightly from the locked frequency. When TP5 is ungrounded, the vfo should relock at the original locked frequency.

NOTE: If the preceding check indicates that the vfo is not phase locking properly, perform the following alignment procedure.

1. R-F TRANSLATOR MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	17.5-mc oscillator output	Power on Operating frequency from 2.000 to 29.999 mc.	0.9 volt rms minimum
J2	Band-pass filter (l-f end)	2.100 mc, AM, transmit	0.05 to 0.35 volt rms
J3	R-f amplifier grid voltage	2.100 mc, AM, transmit	0.05 to 0.2 volt rms
J4	Driver grid voltage	2.100 mc, AM, transmit	2.0 to 4.5 volts rms
J5	Vfo output	Power on	0.8 volt rms minimum
J6	Band-pass filter (h-f end)	Used for alignment only	
J7	H-f oscillator output	Power on	0.8 volt rms minimum
J8	Recycle line	Normal operation	Open
		Recycle condition	Ground
J9	Transmit l-f mixer grid voltage	Used for alignment only	

2. R-F TRANSLATOR MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the r-f translator module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) Function Test Set 678Z-1.

(4) HP-410B vtvm.

(5) Boonton 91-C vtvm.

(6) HP-606A signal generator with 80-ZH3 attenuator.

(7) HP-524D frequency counter.

(8) Bird 82C dummy load.

R-F Translator Module, Checks and Adjustments (Sheet 1 of 3)
Figure 709

618T-( ) OPERATING FREQUENCY (mc)	VFO FREQUENCY (mc)
X.000	3.500
X.111	3.389
X.222	3.278
X.333	3.167
X.444	3.056
X.555	2.945
X.666	2.834
X.777	2.723
X.888	2.612
X.999	2.501

(d) Adjust the vfo bias as instructed in the kilocycle-frequency stabilizer module adjustment procedure.

(e) Ground TP5 in the kilocycle-frequency stabilizer module.

(f) Connect the 524D frequency counter to J5. Drive the counter through the 541 oscilloscope vertical amplifier. Use the red-barreled test probe with BNC-type connector supplied in Maintenance Kit 678Y-1.

(g) Refer to the vfo case. Note that there are five CALIBRATION SETUP POINTS marked on the vfo case--two on top of the case, and three on the side. These values are the factory-measured deviations from the ideal vfo frequencies for that particular vfo at each of the five points. These deviations are given in cycles per second. Three of these CALIBRATION SETUP POINTS will be needed during the vfo alignment procedure--those at 2.5 mc, 3.0 mc, and 3.5 mc.

(h) Set the 618T-( ) operating frequency to X.500 mc. The frequency counter should indicate 3,000,000 cps ± the value of the 3.0-mc CALIBRATION SETUP POINT ±300 cps. If it does not, loosen the vfo coupling between the vfo and Autopositioner and turn the vfo shaft until the counter indicates the proper frequency. Then tighten the coupling just tight enough to turn the shaft without slipping; further adjustment may be required. Check to see that the Autopositioner shaft coupling is tightened securely.

(i) Set the 618T-( ) operating frequency to X.999 mc. The frequency counter should indicate 2,501,000 cps ± the value of the 2.5-mc CALIBRATION SETUP POINT ±300 cps. If it does not, loosen the vfo coupling and turn the vfo shaft until the counter indicates the proper frequency. Tighten the coupling just tight enough to turn the shaft without slipping.

(j) Set the 618T-( ) operating frequency to X.000 mc. The frequency counter should indicate 3,500,000 cps ± the value of the 3.5-mc CALIBRATION SETUP POINT ±300 cps. If it does not, unscrew the plug from the top of the vfo case and adjust L1 in the vfo until the counter indicates the proper frequency. Replace the plug.

(k) Repeat steps (f) and (g) as many times as necessary to obtain proper frequency indications at both ends of the vfo range. When this has been done, tighten the vfo coupling securely.

(l) Unground TP5 in the kilocycle-frequency stabilizer module.

(m) Repeat the phase-locking check in steps (a) through (c).

NOTE: If the preceding alignment procedure fails to restore vfo phase lock, refer to the kilocycle-frequency stabilizer module and frequency divider module checks and adjustments.

(2) 17.5-Mc Oscillator Phase-Locking Check and Adjustment.

(a) Couple the 51S-1 receiver to the 17.5-mc oscillator output by placing the receiver antenna wire near the oscillator tube, V10.

(b) Set the 618T-( ) operating frequency to any frequency between 2.000 mc and 6.999 mc.

(c) Tune the 51S-1 receiver to 17.500 mc.

(d) To check for oscillator phase lock, ground J3 in the megacycle-frequency stabilizer module. This will unlock the oscillator and cause the oscillator frequency to vary slightly from the locked frequency. When J3 is ungrounded, the oscillator should relock at the original locked frequency.

NOTE: If the preceding check indicates that the 17.5 mc oscillator is not phase locking properly, perform the following adjustment procedure.

(e) Connect the 410B vtvm d-c probe to J3 in the megacycle-frequency stabilizer module.

(f) Adjust L90 until the oscillator locks at 17.500 mc. Continue to adjust L90 slowly until the voltage at J3 in the megacycle-frequency stabilizer module is +7.0 ±0.5 volts.

(g) Connect the 91-C vtvm to J1.

(h) Adjust T4 to peak the voltage at J1.

(i) Repeat the oscillator phase-locking check in steps (a) through (d).

NOTE: If the preceding adjustments fail to restore oscillator phase locking, refer to the megacycle-frequency stabilizer module checks and adjustments.

(3) H-F Oscillator Phase-Locking Check and Adjustment.

(a) Couple the 51S-1 receiver to the h-f oscillator output by placing the receiver antenna wire near the oscillator tube, V11.

(b) Set the 618T-( ) operating frequency to each of the frequencies listed in the chart below. Tune the 51S-1 receiver to the oscillator frequency corresponding to the 618T-( ) operating frequency.

(c) To check for oscillator phase lock, ground J1 in the megacycle-frequency stabilizer module. This will unlock the oscillator and cause the oscillator frequency to vary slightly from the locked frequency. When J1 is ungrounded, the oscillator should relock at the original locked frequency.

NOTE: If the preceding check indicates that the h-f oscillator is unlocked only on some of the bands, perform the following adjustment procedure. If the oscillator is unlocked on all bands, refer to the megacycle-frequency stabilizer module checks and adjustments.

The following adjustments are made at coil block Z5. Coils in this block may be adjusted through holes in the r-f translator module side plate opposite the gear plate. Refer to the silk screening above the adjustment holes for the number and location of each coil in the block.

(d) Connect the 410B vtvm d-c probe to J1 in the megacycle-frequency stabilizer module.

(e) Set the 618T-( ) operating frequency to the frequency at which the oscillator is unlocked.

(f) Refer to the following chart. Adjust the proper coil in Z5 until the oscillator locks at the correct frequency. Continue to slowly adjust the coil until the voltage at J1 in the megacycle-frequency stabilizer module is +7.0 ±0.5 volts. If, on any band, the coil core adjustment range is insufficient to lock the oscillator, set that core flush with the block surface, then adjust the common (C) coil for proper lock.

NOTE: Whenever the core in the common (C) coil is repositioned, all individual band coils must be readjusted.

618T-( ) OPERATING FREQUENCY (mc)	H-F OSCILLATOR FREQUENCY (mc)	ADJUST
2.XXX	12.500	Z5-2
3.XXX	11.500	Z5-3
4.XXX	10.500	Z5-4
5.XXX	9.500	Z5-5
6.XXX	8.500	Z5-6
7.XXX	10.000	Z5-7
8.XXX	11.000	Z5-8
9.XXX	12.000	Z5-9
10.XXX	13.000	Z5-10
11.XXX	14.000	Z5-11
12.XXX	15.000	Z5-12
13.XXX	16.000	Z5-13
14.XXX	17.000	Z5-14
15.XXX	18.000	Z5-15
16.XXX	19.000	Z5-16
17.XXX	20.000	Z5-17
18.XXX	21.000	Z5-18
19.XXX	22.000	Z5-19
20.XXX	23.000	Z5-20
21.XXX	24.000	Z5-21
22.XXX	25.000	Z5-22
23.XXX	26.000	Z5-23
24.XXX	27.000	Z5-24
25.XXX	28.000	Z5-25
26.XXX	29.000	Z5-26
27.XXX	30.000	Z5-27
28.XXX	31.000	Z5-28
29.XXX	32.000	Z5-29

(g) Connect the 91-C vtvm to J7.

(h) Set the 618T-( ) operating frequency to 6.XXX mc. Adjust the bottom core in T5 to peak the voltage at J7.

(i) Set the 618T-( ) operating frequency to 14.XXX mc. Adjust the top core in T5 to peak the voltage at J7.

(j) Set the 618T-( ) operating frequency to 29.XXX mc. Adjust C187 to peak the voltage at J7.

(k) Repeat steps (h) through (j) once.

(l) Repeat the oscillator phase-locking check in steps (a) through (c).

NOTE: If the preceding adjustments fail to restore oscillator phase locking, refer to the megacycle-frequency stabilizer module checks and adjustments.

(4) Receive Output Adjustment.

(a) Set the 618T-( ) operating frequency to 9.990 mc, AM.

(b) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to the AUX RCVR ANT. connector at the left front of the 618T-( ). Set the signal generator output to 9.990 mc, 30 percent modulated with 1000 cps. Tune the signal generator around 9.990 to peak the voltage at the 678P-1 HEADSET jack. Adjust the signal generator output level to give 3 volts rms at the HEADSET jack.

(c) Adjust T3 to peak the voltage at the HEADSET jack. Keep the voltage at the HEADSET jack below 5 volts rms while making this adjustment by reducing the signal generator output level.

(5) Variable/Band-Pass I-F Alignment Check.

(a) Connect the 410B vtvm a-c probe to J2.

(b) Key the 618T-( ).

(c) Note the voltage at J2 as the 618T-( ) operating frequency is varied from 6.000 mc to 6.999 mc in 100-kc steps. Adjust the 606A signal generator output level for 0.5 volt rms at J2 at 6.000 mc, then leave the signal generator output level constant across the frequency range. If the maximum-to-minimum voltage at J2 is more than 2-to-1 across the frequency range, perform step (d). If the variation is within the specified limits, both the variable and band-pass i-f circuits are aligned properly.

(d) Note the voltage at J2 as the 618T-( ) operating frequency is varied from 8.000 mc to 8.999 mc in 100-kc steps. Adjust the 606A signal generator output level for 0.5 volt rms at J2 at 8.000 mc, then leave the signal generator output level constant across the frequency range. If the maximum-to-minimum voltage at J2 is more than 2-to-1 across the frequency range, perform the variable i-f alignment procedure. If the variation is within the specified limits, perform the band-pass i-f filter alignment procedure.

(6) Variable I-F Alignment.

(a) Ground J3.

(b) Replace the h-f oscillator tube, V11, with a 6AH6WA with pin 1 cut off.

(c) Connect the 410B vtvm a-c probe to J2.

(d) Set the 618T-( ) operating frequency to 8.999 mc.

(e) Key the 618T-( ). Adjust the signal generator output level for 0.5 volt rms at J2.

NOTE: While making the following adjustments, keep the voltage at J2 constant by varying the signal generator output level.

(f) Adjust L2, L3, L4, and L130 to peak the voltage at J2. L130 may be adjusted to give two peaks. Adjust for the peak that gives the highest voltage at J2.

NOTE: If the r-f translator module MCN is below 1508, capacitor C273 replaces L130. The adjustment pocedure is the same.

(g) Set the 618T-( ) operating frequency to 8.000 mc.

(h) Adjust C7, C10, and C13 to peak the voltage at J2.

(i) Repeat steps (e) through (h) until no further improvement can be noted.

NOTE: At this point, repeat the variable/band-pass i-f alignment check. If the check indicates that the variable i-f circuits are still not aligned properly, continue with this procedure.

(j) Set the 618T-( ) operating frequency to X.500 mc.

(k) Check to see that both slug racks are equally high above the chassis (within 1/32 inch). If they are not, loosen the setscrews in the slug rack gear and position the racks properly. Then tighten the setscrews.

(l) Set the 618T-( ) operating frequency to X.600 mc, then back to X.500 mc. Again check to see that the racks are positioned at the same height. If they are not, repeat step (k).

(m) Set the 618T-( ) operating frequency to X.000 mc.

(n) Remove the r-f translator module from its module extender and remove the bottom cover plate from the module. Examine, from the bottom of the module, the slugs and capacitor driven by the slug rack. The bottom of the slugs and capacitor should be the following distances from the bottoms of the coil and capacitor forms.

L6	1/4 inch	C139	1/8 inch
L37	1/4 inch	L59	11/32 inch
L40	1/4 inch		

If these dimensions are not correct, make adjustments from the top of the module to correct them. Use the no. 8 Bristo wrench supplied in Maintenance Kit 678Y-1.

NOTE: If any of the preceding mechanical alignments are made in the r-f translator module, repeat the electrical alignment procedures in steps (a) through (i) of this procedure.

(7) Band-Pass I-F Alignment.

NOTE: Before performing this procedure, perform the variable/band-pass i-f alignment check to determine if the following alignment procedure is required.

(a) Ground J3.

(b) Connect the 410B vtvm a-c probe to J2.

(c) Set the 618T-( ) operating frequency to 6.500 mc.

(d) Key the 618T-( ). Adjust the signal generator output level for 0.5 volt rms at J2.

NOTE: Keep the voltage at J2 constant while making the following adjustments by varying the signal generator output level.

(e) Adjust first L123, then L128, to peak the voltage at J2. These adjustments are made through holes in the module end plate nearest filter FL1.

NOTE: At this point, repeat the variable/band-pass i-f alignment check. If this check still indicates that the band-pass i-f filter is not aligned properly, continue with this procedure.

(f) Replace the 17.5-mc oscillator tube, V10, with a 6AH6WA with pin 1 cut off.

(g) Connect tube V2 to the r-f translator module chassis through the 9-pin tube extender supplied in Maintenance Kit 678Y-1.

(h) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to pin 2 of V2. Tune the signal generator to 15.000 mc.

(i) Connect the 410B vtvm a-c probe to pin 1 of 6 of V2.

(j) Set the 618T-( ) operating frequency to 6.500 mc.

(k) Key the 618T-( ). Adjust the signal generator output level until the 410B vtvm indicates about 0.5 volt rms.

NOTE: The following test points and adjustments are accessible through the r-f translator end plate nearest filter FL1. Refer to the silk screen near the adjustment holes for the location of specific test points and adjustments.

(l) Ground test point 1.

(m) Adjust L123 to peak the 410B vtvm indication.

(n) Unground test point 1. Ground test point 2.

(o) Adjust L125 to null the 410B vtvm indication.

(p) Ungound test point 2. Ground test point 3.

R-F Translator Module, Checks and Adjustments (Sheet 2 of 3)
Figure 709

(q) Adjust L126 to peak the 410B vtvm indication.

(r) Unground test point 3. Ground test point 4.

(s) Adjust L127 to null the 410B vtvm indication.

(t) Unground test point 4.

(u) Adjust L128 to peak the 410B vtvm indication.

(v) Disconnect the signal generator from V2. Replace the good V10.

(w) Repeat the variable/band-pass i-f alignment check.

(8) R-F Circuits Alignment.

(a) Remove the turret cover plate.

(b) Set the 618T-( ) operating frequency to 2.XXX mc.

(c) Check the turrets (S1 through S7) from the top of the module to see that the turret contacts in line with the color-code dots on the turrets are making contact with the fixed contacts on the module chassis. If they are not, loosen the clamp on the turret shaft gear, insert a screwdriver into the slot in the end of the turret shaft, and rotate the turrets counterclockwise until they are aligned properly. Then tighten the clamp on the turret shaft gear.

(d) Set the 618T-( ) operating frequency to 3.XXX mc, then back to 2.XXX mc. If the turret contacts do not return to the proper alignment position, repeat step (c).

(e) Couple the 51S-1 receiver to the r-f translator module r-f output by placing the receiver antenna lead wire near driver tubes V6 and V7. Observe the receiver S-meter peaking indication to determine that the r-f adjustments in the following procedure are being made at the proper frequency.

(f) Set the 618T-( ) operating frequency to 29.900 mc.

(g) Key the 618T-( ). Adjust the signal generator output level to give about 30 volts rms at the RF TRANSLATOR LOAD test point.

CAUTION: KEEP THE VOLTAGE AT THE RF TRANSLATOR LOAD TEST POINT BELOW 40 VOLTS RMS WHILE MAKING THE FOLLOWING ADJUSTMENTS. THIS CAN BE DONE BY REDUCING THE SIGNAL GENERATOR OUTPUT LEVEL.

(h) Adjust C27, C65, and C103 to peak the voltage at the RF TRANSLATOR LOAD test point.

(i) Set the 618T-( ) operating frequency to 29.000 mc.

(j) Adjust the 29-mc MIXER PLATE, RF AMP GRID, and RF AMP PLATE coils in the turrets to peak the voltage at the RF TRANSLATOR LOAD test point.

(k) Repeat steps (g) through (k) until no further improvement can be noted.

(l) Set the 618T-( ) operating frequency to 2.900 mc.

(m) Adjust L7, L38. and L42 to peak the voltage at the RF TRANSLATOR LOAD test point.

(n) Set the 618T-( ) operating frequency to 2.000 mc.

(o) Adjust the 2-mc MIXER PLATE, RF AMP GRID, and RF AMP PLATE coils in the turrets to peak the voltage at the RF TRANSLATOR LOAD test point.

(p) Repeat steps (l) through (o) until no further improvement can be noted.

(q) Replace the turret cover plate.

(r) Set the 618T-( ) operating frequency to 2.000 mc, 3.000 mc, 4.000 mc, etc., through 29.000 mc. At each frequency, adjust the MIXER PLATE, RF AMP GRID, RF AMP PLATE. and DRIVE PLATE coils, through the holes in the turret cover plate, to peak the voltage at the RF TRANSLATOR LOAD test point.

(9) Neutralization Adjustments.

NOTE: This procedure need be performed only if either or both of the driver tubes, V6 and V7. are replaced.

(a) Disconnect the 606A signal generator from the module input at J34 on the module extender. Do not make any other connections to J34.

(b) Reverse the RF TRANSLATOR LOAD connections to P2 and P3 so that the blue test point on the load is on the same side as P3. Connect the 606A signal generator output. through the 80-ZH3 attenuator, to the coaxial connector next to the test point on the RF TRANSLATOR LOAD.

(c) Connect the leads of the NEUTRALIZING DETECTOR, supplied in Maintenance Kit 678Y-1 to pins 1 and 2 of tube V6 or V7. Use the 9-pin tube extender, also supplied in the 678Y-1, to make these connections. Connect the 630-NA vom to the NEUTRALIZING DETECTOR output. Set the vom to the 60-ua, d-c scale.

(d) Replace the h-f and 17.5-mc oscillator tubes, V11 and V12, with 6AH6WA's with pin 1 cut off.

(e) Ground J3.

(f) Set the 618T-( ) operating frequency to 28.000 mc.

(g) Set the signal generator output to 28.000 mc, 3 volts. Tune the signal generator slightly around 28.000 mc to peak the vom indication.

NOTE: If the circuit is neutralized, there will not be a noticeable peak.

(h) Adjust C128 to null the vom indication.

(i) Leaving the signal generator connected to the RF TRANSLATOR LOAD, reverse the load connections to P2 and P3 so that the blue test point is again on the same side as P2.

(j) Ground the RF TRANSLATOR LOAD test point.

(k) Set the feedback switch. S15, to ON (clockwise).

(l) Key the 618T-( ). Adjust C127 to null the vom indication. When making this adjustment, the signal generator output should still be set to 28.000 mc, 3 volts.

(m) Disconnect the signal generator and NEUTRALIZING DETECTOR. Replace V11 and V12 with good tubes. Unground J3.

(10) H-F Mixer Balance Adjustment.

(a) Disconnect any connections to the module input at J34 on the module extender.

(b) Set the 618T-( ) operating frequency to 29.900 mc.

(c) Adjust C256 to null the voltage at the RF TRANSLATOR LOAD test point. The voltage at the null should be less than 1.0 volt rms.

(11) Receive/Transmit Gain Balance Check.

NOTE: Leave the r-f translator module connected to the 618T-( ) chassis while performing this procedure. Remove the r-f translator module top cover plate.

(a) Connect the white jack on the 678Z-1 labeled J2-IF TRANS to J2 in the i-f translator module.

(b) Connect the red jack on the 678Z-1 labeled J2-FREQ DIV to J2 in the frequency divider module.

(c) Connect the black jack on the 678Z-1 labeled GRND to the 618T-( ) chassis.

(d) Set the 678Z-1 FUNCTION SELECTOR switch to TGC OVERIDE. Set the 678Z-1 TGC & CAPTURE RANGE control, R3, fully counterclockwise.

(e) Set the 618T-( ) to 29.000 mc, AM.

(f) Key the 618T-( ). Turn the 678Z-1 TGC & CAPTURE RANGE control, R3, clockwise until the 618T-( ) r-f output voltage is about 30 volts rms.

(g) Adjust the RF AM PLATE coil to peak the 618T-( ) r-f output voltage.

(h) Unkey the 618T-( ). Set the 714E-( ) RF SENS control fully clockwise. Set the AUDIO control, R10 under the 618T-( ) front panel cover, fully clockwise.

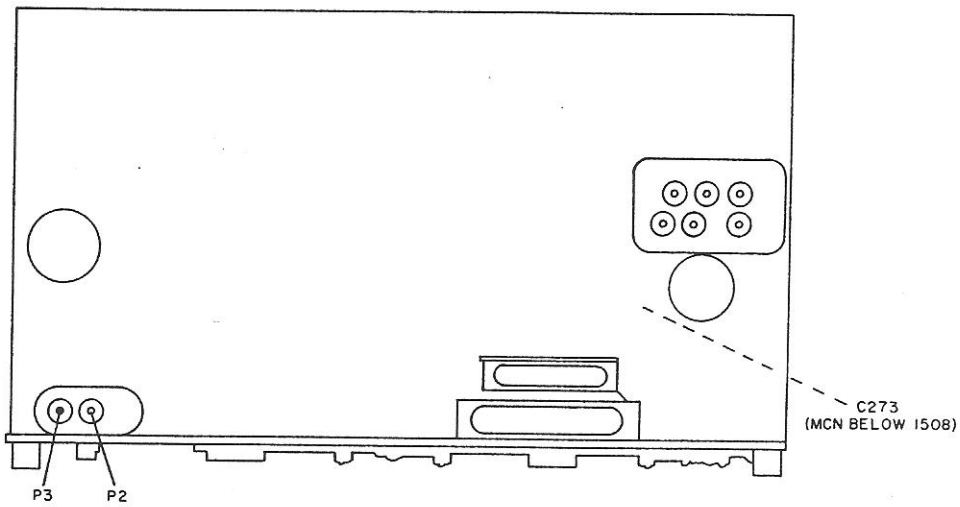
(i) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to the AUX RVCR ANT. connector at the left front of the 618T-( ). Set the signal generator output to 29.000 mc, 30 percent modulated with 1000 cps.

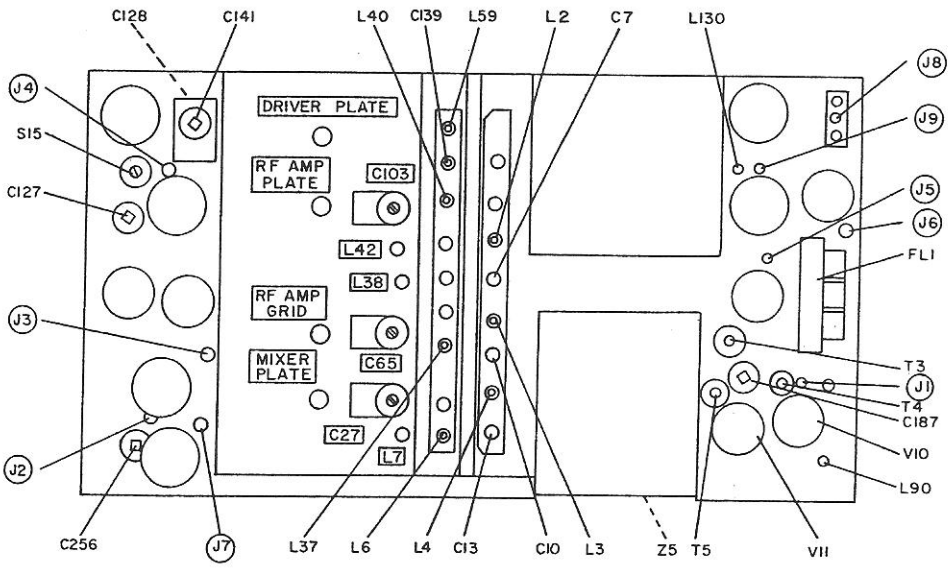
(j) Tune the signal generator slightly around 29.000 mc to peak the voltage at the 678P-1 HEADSET jack. Adjust the signal generator output level for 3.0 volts rms at the HEADSET jack.

(k) Readjust the RF AMP PLATE coil to peak the voltage at the HEADSET jack. If this adjustment causes the voltage at the HEADSET jack to exceed 3.8 volts rms, replace C61 with a value of capacitance that will keep the voltage at the HEADSET jack within the proper limits. C61 is located in the driver compartment, and is accessible from the bottom of the module.

(l) If C61 is replaced, repeat this procedure.

NOTE: After performing this procedure, readjust the AUDIO control, R10 under the 618T-( ) front panel cover, as instructed in the unit adjustments.





R-F Translator Module, Checks and Adjustments (Sheet 3 of 3)
Figure 709

1. POWER AMPLIFIER MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	Power amplifier grid voltage	AM transmit	-55 to -85 volts
J2	Tgc reference voltage	AM transmit	-5 to -7 volts
J3	Power amplifier screen voltage	AM transmit	+360 to +440 volts
J4	Bias supply voltage	AM transmit	Approximately 1.5 volts d-c less than at J1
J5	Adc voltage	AM transmit	-4.75 volts

2. POWER AMPLIFIER MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the power amplifier module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) Function Test Set 678Z-1.

(4) HP-410B vtvm.

(5) Bird 82C dummy load.

B. Equipment Setup.

Leave the power amplifier module and all other modules connected to the 618T-( ) chassis.

C. Procedure.

(1) Static Plate Current Adjustment.

Refer to the unit adjustments, paragraph 5, for this adjustment.

(2) TGC Adjustment.

Refer to the unit adjustments, paragraph 5, for this adjustment.

(3) ADC Adjustment.

(a) Set the 618T-( ) to AM, 2.900 mc.

(b) Remove the plug at the upper left of the power amplifier module.

(c) Connect the 410B vtvm d-c probe to J5.

(d) Key the 618T-( ). Adjust R20 to give -4.75 volts at J5.

CAUTION: MAKE THIS ADJUSTMENT QUICKLY TO AVOID DAMAGE TO THE MODULE DUE TO LACK OF COOLING AIR. REPLACE THE PLUG AS SOON AS THE ADJUSTMENT IS MADE.

(4) PEP Limiter Adjustment.

(a) Connect the white jack on the 678Z-1 labeled J2-IF TRANS to J2 in the i-f translator module.

(b) Connect the red jack on the 678Z-1 labeled J2-FREQ DIV to J2 in the frequency divider module.

(c) Connect the black jack on the 678Z-1 labeled GRND to the 618T-( ) chassis.

(d) Set the 678Z-1 TGC & CAPTURE RANGE control, R3, fully counterclockwise.

(e) Set the 678Z-1 FUNCTION SELECTOR switch to TGC OVERIDE.

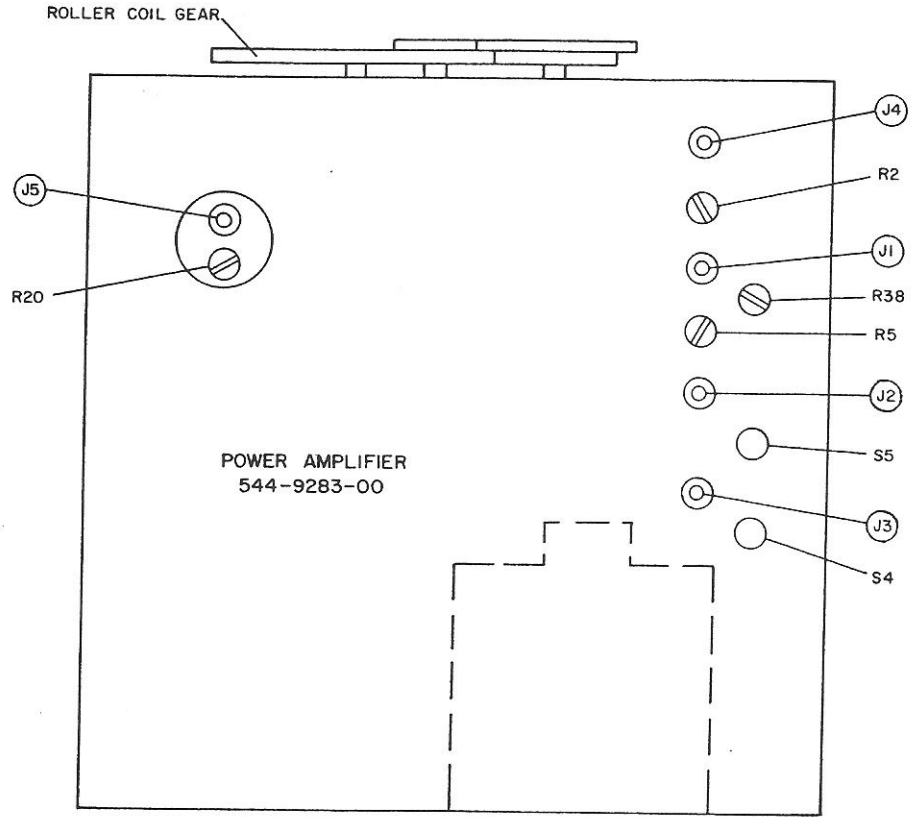
(f) Set the 618T-( ) operating frequency to 7.300 mc, USB.

(g) Connect the 630-NA vom between J1(+) and J4(-). The voltage between these two points should be about 1.5 volts d-c.

(h) Set the outputs of the two 200AB audio oscillators to 900 cps, 0.1 volt rms, and 2800 cps, 0.1 volt rms. Check the audio oscillators' output levels at the 678Z-1 TEST POINT with the 310A vtvm.

(i) Turn the 678Z-1 TGC & CAPTURE RANGE control, R3, clockwise until the d-c voltage between J1 and J4 just begins to decrease. Note the 618T-( ) r-f output voltage at this point. It should be 161 volts rms maximum. If it is greater than 161 volts rms, adjust R38 to limit the maximum r-f output voltage to 161 volts rms.

CAUTION: DO NOT KEEP THE 618T-( ) R-F OUTPUT VOLTAGE AT ITS MAXIMUM VALUE ANY LONGER THAN NECESSARY TO NOTE THE MAXIMUM INDICATION. SET THE 678Z-1 TGC & CAPTURE RANGE CONTROL FULLY COUNTERCLOCKWISE AFTER NOTING THIS VOLTAGE.



Power Amplifier Module, Checks and Adjustments
Figure 710

1. ELECTRONIC CONTROL AMPLIFIER MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	Q1 output/Q2 input voltage	Power on	+6.4
J2	Q4 output voltage	Power on	+5.6
J3 J4	Amplifier output	Power on	+0.15

2. ELECTRONIC CONTROL AMPLIFIER MODULE CHECKS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check the electronic control amplifier module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) HP-410B vtvm.

(4) Ballantine 310A vtvm.

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the electronic control amplifier module to the 618T-( ) chassis through the module extender supplied in the 678Y-1. Leave all other modules in place on the chassis. Remove the electronic control amplifier module dust cover.

C. Procedure.

(1) Amplifier Gain Check.

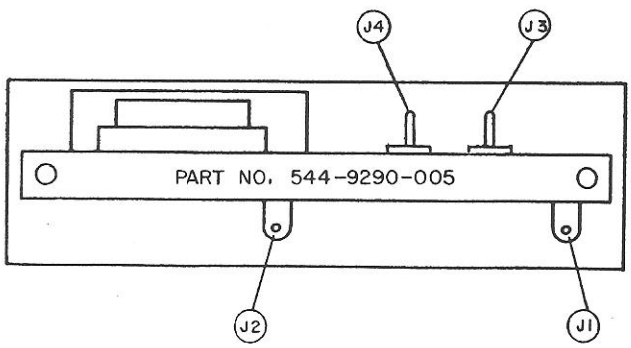
(a) Set the 618T-( ) to AM, any frequency.

(b) Connect the 410B vtvm d-c probe to TP9 on the module extender.

(c) Connect the 310A vtvm between J3 and J4.

(d) Key the 618T-( ). Rotate the large roller coil gear on the top of the power amplifier module in either direction until the amplifier input voltage at TP5 is ±0.2 volt.

(e) Note the amplifier output voltage between J3 and J4. It should be between 18 and 30 volts rms. If it is not, perform a stage-by-stage check of the amplifier to isolate the faulty stage.



Electronic Control Amplifier Module Checks
Figure 711

1. R-F OSCILLATOR MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	100-kc reference output to frequency divider	Power on	0.4 volt rms min
J2	Transistor supply voltage	Power on	+16 volts
J3	500-kc reference output to megacycle-frequency stabilizer	Power on	1.1 ±0.1 volts rms
J4	500-kc carrrier output to balanced modulator	Power on	1.7 ±0.1 volts rms

2. R-F OSCILLATOR MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the r-f oscillator module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) HP-410B vtvm.

(4) HP-606A signal generator with 80-ZH3 attenuator.

(5) Boonton 91-C vtvm.

(6) Tektronix 541 oscilloscope.

(7) HP-524D frequency counter.

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the r-f oscillator module to the 618T-( ) chassis through the module extender supplied in the 678Y-1. Leave all other modules in place on the chassis. Remove the r-f oscillator module dust cover.

C. Procedure.

(1) Reference Oscillator Frequency Adjustment.

NOTE: The r-f oscillator module ambient temperature should be between +25°C and +30°C while making this adjustment.

(a) Connect a receive antenna to the AUX RCVR ANT. connector at the left front of the 618T-( ). The antenna should be located in a low-noise area.

(b) Set the 618T-( ) to USB.

(c) Set the 618T-( ) operating frequency 1 kc below the frequency of WWV.

NOTE: WWV transmits on 2.500 mc, 5.000 mc, 10.000 mc, 15.000 mc, 20.000 mc, and 25.000 mc. Select a frequency that gives a good signal with little fading.

(d) Connect the 541 oscilloscope to the 678P-1 HEADSET jack.

(e) At a time when WWV is not transmitting a tone, observe the 1000-cps signal on the oscilloscope. This signal represents the carrier of WWV.

(f) Hold the 618T-( ) front panel meter selector switch in the CAL TONE position. This connects a 1000-cps reference output from the frequency divider module to the audio output.

(g) Adjust the 714E-( ) RF SENS control until both 1000-cps signals observed on the oscilloscope are approximately the same amplitude.

(h) Adjust the FREQUENCY ADJUST control for 0 phase drift between the two 1000-cps signals.

(2) Reference Oscillator Board Check.

(a) Check for +18 volts at the +18-volt test point.

(b) Check for 3 mc, 0.4 to 0.6 volt rms at the reference oscillator output test point.

(c) If the +18 volts is present, but the 3-mc signal amplitude is improper, return the oscillator board to Collins for repair. Unsolder one coaxial cable and two wires from the bottom of the board in order to remove it from the module.

(3) Divider Bandwidth and Output Check.

(a) Unsolder the coaxial cable from point (1). Connect the 606A signal generator output, through the 80-ZH3 attenuator and a 1000-pf capacitor, to point (1). Set the generator output to 3 mc, 0.5 volt rms.

(b) Connect the oscilloscope vertical input to point (1). Connect the horizontal input to J3.

(c) While observing the 6-to-1 Lissajous pattern on the oscilloscope, tune the signal generator from 2.9 mc to 3.1 mc. The Lissajous pattern should remain stable (not fuzzy) as the generator is tuned across this range. If it does not remain stable replace C14 with a value of capacitance that will give the proper indication.

(d) Set the signal generator output to 3.0 mc, 0.5 volt rms. Connect the 91-C vtvm to J3. The voltage at J3 should be 1.1 ±0.1 volts rms. If it is not, select a value for C20 that peaks the voltage at J3, then select a value of R44 that gives the proper voltage at J3.

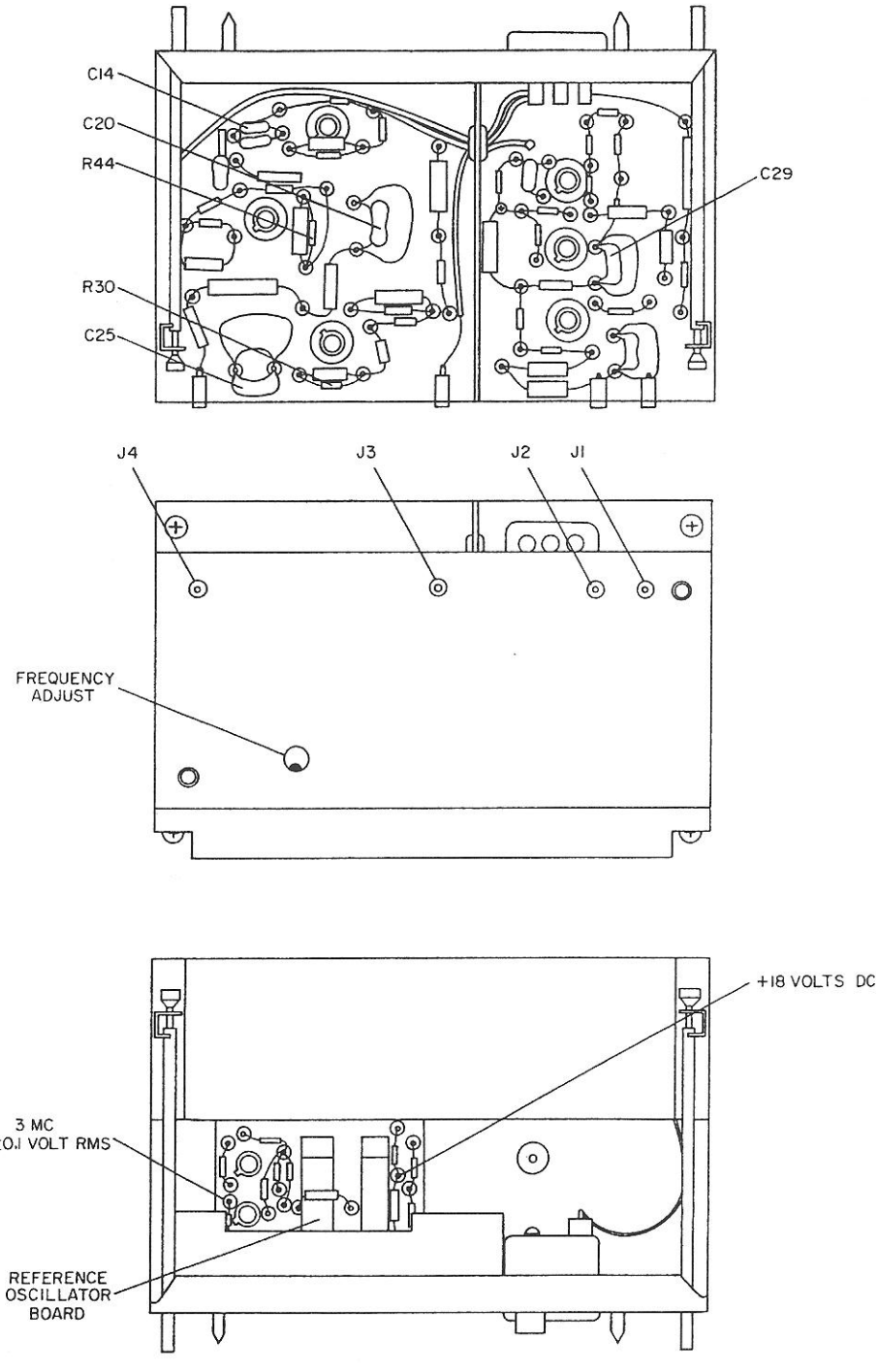
(e) Connect the 91-C vtvm to J4. The voltage at J4 should be 1.7 ±0.2 volts rms. If it is not, select a value for C25 that peaks the voltage at J4, then select a value for R30 that gives the proper voltage at J4.

(f) Unsolder the coaxial cable from point (2) . Connect the signal generator output, through the 80-ZH3 attenuator and a 1000-pf capacitor, to point (2) . Set the generator output to 500 kc, 0.5 volt rms.

(g) Connect the oscilloscope vertical input to point (2) . Connect the horizontal input to J1.

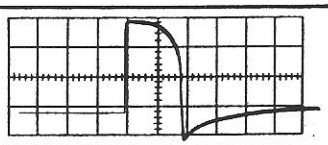
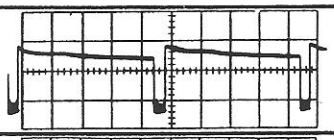
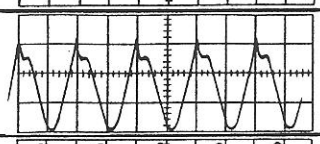
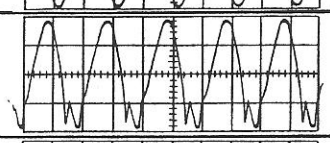
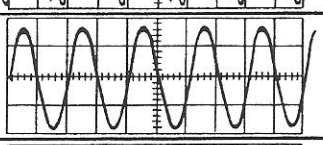
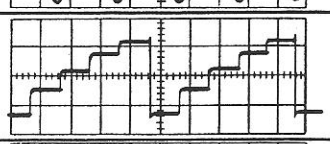
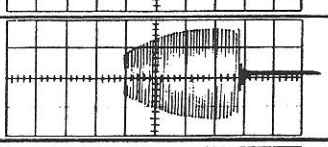
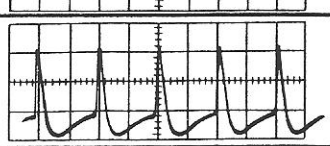
(h) While observing the 5-to-1 Lissajous pattern on the oscilloscope, tune the signal generator from 485 kc to 515 kc. The Lissajous pattern should remain stable (not fuzzy) as the generator is tuned across this range. If it does not remain stable, replace C29 with a value of capacitance that will give the proper indication.

(i) Resolder the coaxial cables to points (1) and (2) .



R-F Oscillator Module Checks and Adjustments
Figure 712

1. FREQUENCY DIVIDER MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	10-kc reference pulse output	Oscilloscope set for: 2 volts/cm 1 usec/cm	
J2	Transistor supply voltage	Power on	+18 volts
J3	Keyer output	Oscilloscope set for: 5 volts/cm 200 usec/cm	
TP1	50-kc locked oscillator output	Oscilloscope set for: 0.5 volt/cm 10 usec/cm	
TP2	10-kc locked oscillator output	Oscilloscope set for: 0.5 volt/cm 50 usec/cm	
TP3	5-kc locked oscillator output	Oscilloscope set for: 1.5 volts/cm 100 usec/cm	
TP4	1-kc unijunction divider output	Oscilloscope set for: 0.5 volts/cm (d-c) 200 usec/cm	
TP5	Keyed oscillator output	Oscilloscope set for: 2 volts/cm 25 usec/cm	
TP6 (module extender)	1-kc cal tone output	Oscilloscope set for: 0.5 volt/cm 500 usec/cm	

2. FREQUENCY DIVIDER MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the frequency divider module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) HP-410B vtvm.

(4) HP-606A signal generator with 80-ZH3 attenuator.

(5) Tektronix 541 oscilloscope.

B. Equipment Setup.

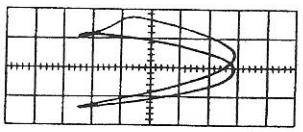
Connect the 618T-( ) and test equipment as shown in figure 701. Connect the frequency divider module to the 618T-( ) chassis through the module extender supplied in the 678Y-1. Leave all other modules in place on the chassis. Remove the frequency divider module dust cover.

C. Procedure.

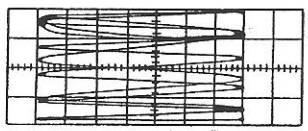
(1) Divider Bandwidth Adjustment.

(a) Disconnect the coaxial jumper at A2 on the module extender. Connect the 606A signal generator output, through the 80-ZH3 attenuator, to the module input at A2 on the module extender. Also connect the signal generator output to the oscilloscope horizontal input. Set the signal generator output to 100 kc, 0.5 volt.

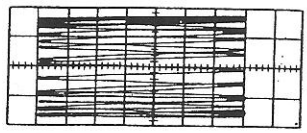
(b) Connect the oscilloscope vertical input to TP1, TP2, and TP3 in that order. Check the bandwidth at each of these three points as follows. Observe the Lissajous pattern on the oscilloscope (see below) while tuning the signal generator on both sides of 100 kc until the Lissajous pattern becomes unstable (fuzzy). The frequency at which this occurs is the edge of the band. The bandwidth at all three test points should be centered at 100 ±1 kc and should extend at least 4 kc on both sides of the center frequency. Bandwidths at TP1, TP2, and TP3 can be centered by adjusting L1, L2, and L4 respectively.



TP1
2-to-1 Lissajous



TP2
10-to-1 Lissajous



TP3
20-to-1 Lissajous

(c) Disconnect the signal generator. Replace the coaxial jumper on the module extender.

(2) Keyed Oscillator Output Adjustment.

(a) Connect the kilocycle-frequency stabilizer module to the 618T-( ) chassis through the module extender supplied in the 678Y-1.

(b) Set the 618T-( ) operating frequency to X.XX0 mc.

(c) Connect the 541 oscilloscope to J8 in the kilocycle-frequency stabilizer module.

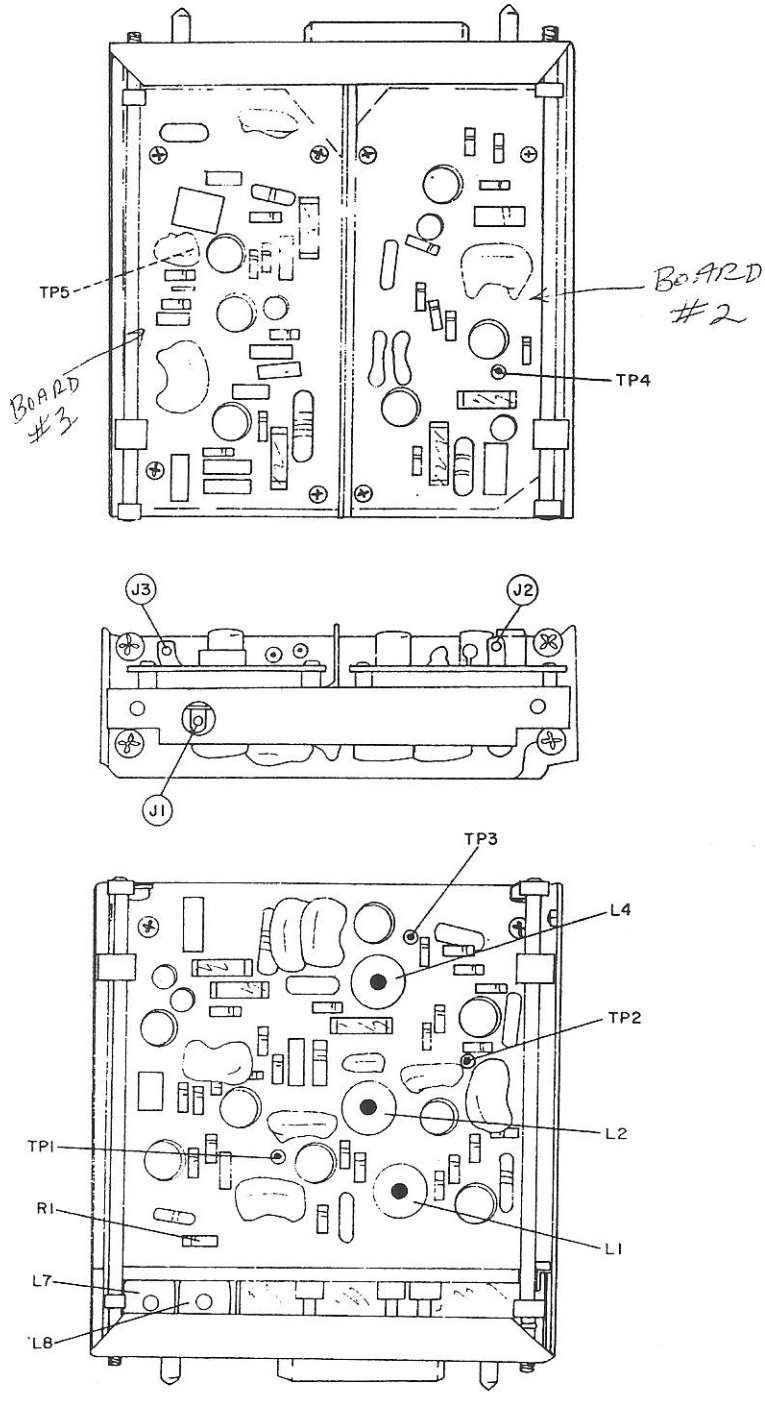
(d) Adjust L7 and L8 to peak the signal amplitude at J8 in the kilocycle-frequency stabilizer module.

(3) Calibration Tone Output Level Check.

Observe the waveform at TP6. It should be as shown in the test point data chart. The pulse amplitude should be from 1.0 to 1.5 volts peak-to-peak. If it is not, replace R48 with a value of resistance that will give the proper indication.

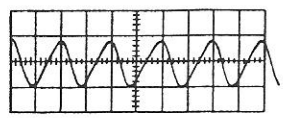
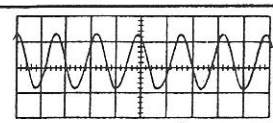
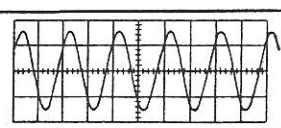
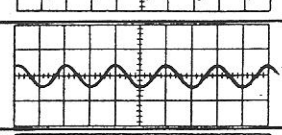
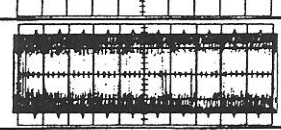
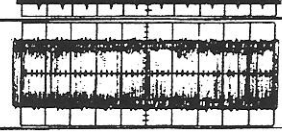
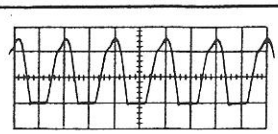
(4) Unijunction Divider Output Check.

Observe the waveform at TP4. It should be as shown in the test point data chart. The firing voltage should be at +0.45 volt above the 5th step. If it is not, replace C22 and C45 with values of capacitance that will give the proper indication.



Frequency Divider Module, Checks and Adjustments
Figure 713

1. KILOCYCLE-FREQUENCY STABILIZER MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	Vfo r-f input/vfo d-c tuning voltage output	Oscilloscope set for: 0.5 volt/cm 0.2 usec/cm	
J2	Transistor supply voltage	Power on	+18 volts
J3	Vfo bias voltage	Measure bias voltage between J3(+) and J1(-) with TP5 grounded	±10.00 ±0.01 volts
J4	Keyed oscillator d-c tuning voltage	Operating frequency= X.000 mc	+20.00 ±0.2 volts
		Operating frequency = X.999 mc	Approx +4 volts
J5	Digit oscillator isolation amplifier output	Oscilloscope set for: 2 volts/cm 2 usec/cm	
J6	Digit oscillator d-c tuning voltage	Operating frequency = X.XX5 mc	Approx +23 volts
		Operating frequency = X.XX6 mc	Approx +7 volts
J7	Signal channel i-f input	Oscilloscope set for: 50 mv/cm 2 usec/cm	
J8	Reference channel i-f input	Oscilloscope set for: 50 mv/cm 2 usec/cm	
TP1	1st signal mixer input	Oscilloscope set for: 50 mv/cm 100 usec/cm	
TP2	2nd signal mixer input	Oscilloscope set for: 100 mv/cm 100 usec/cm	
TP3	FL1 output/Q5 input	Used for adjustment only	
TP4	Q6 output/Q7 input	Oscilloscope set for: 1 volt/cm 2 usec/cm	

Kilocycle-Frequency Stabilizer Module, Checks and Adjustments (Sheet 1 of 2)
Figure 714

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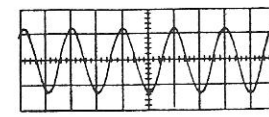
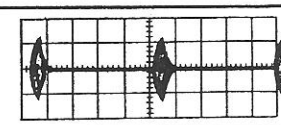
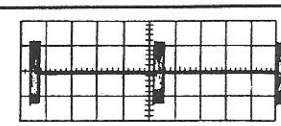
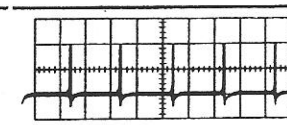
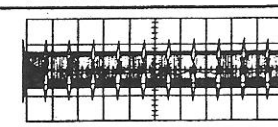
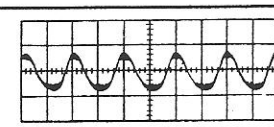
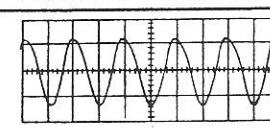
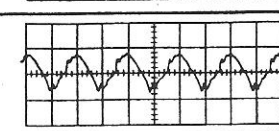
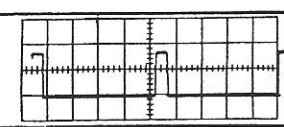
1. KILOCYCLE-FREQUENCY STABILIZER MODULE TEST POINT DATA. (Cont)

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
TP5	Q8 output/signal input to phase discriminator	Oscilloscope set for: 5 volts/cm 2 usec/cm	
TP6	Omitted	--	--
TP7	Frequency discriminator d-c output	250,000 ±5 cps, 40 mv at J7, TP15 grounded	0 +5 mv d-c
TP8	Spectrum generator output	Oscilloscope set for: 50 mv/cm 20 usec/cm	
TP9	Keyer/keyed oscillator supply voltage	Power on	+18 volts
TP10	Keyed oscillator output	Oscilloscope set for: 2 volts/cm 20 usec/cm	
TP11	10-kc pulse input from frequency divider module	Oscilloscope set for: 100 mv/cm 1 ms/cm	
TP12	Reference mixer input	Oscilloscope set for: 100 mv/cm 1 mc/cm	
TP13	FL2 output/Q16 input	Used for adjustment only	
TP14	Q17 output/Q18 input	Oscilloscope set for: 50 mv/cm 2 usec/cm	
TP15	Q19 output/reference input to phase discriminator	Oscilloscope set for: 1 volt/cm 2 usec/cm	
TP16	Signal input to phase discriminator	Oscilloscope set for: 5 volts/cm 2 usec/cm	
TP17 TP18	Phase discriminator d-c output	TP5 and TP15 grounded	0 ±5 mv d-c
TP19	Keyer output	Oscilloscope set for: 5 volts/cm 20 usec/cm	

2. KILOCYCLE-FREQUENCY STABILIZER MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the kilocycle-frequency stabilizer module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) Function Test Set 678Z-1.

(4) HP-410B vtvm.

(5) HP-606A signal generator with 80-ZH3 attenuator.

(6) Tektronix 541 oscilloscope.

(7) HP-524D frequency counter.

(8) Temperature box (range from -50°C to +80°C).

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the kilocycle-frequency stabilizer module to the 618T-( ) chassis through the module extender supplied in the 678Y-1. Leave all other modules in place on the chassis. Remove the kilocycle-frequency stabilizer module dust cover.

C. Procedure.

(1) VFO Bias Adjustment.

(a) Connect the brown jack on the 678Z-1 labeled J1-KC STAB to J1.

(b) Connect the orange jack on the 678Z-1 labeled J3-KC STAB to J3.

(c) Connect the black jack on the 678Z-1 labeled GRND to the 618T-( ) chassis.

(d) Ground TP5.

(e) Set the 678Z-1 FUNCTION SELECTOR switch to SET LEVEL. Adjust the LEVEL SET control, R1, until the FUNCTION METER indicates +10. Do not use the X10 METER SENSITIVITY switch.

(f) Set the 678Z-1 FUNCTION SELECTOR switch to OFF-SET ADJUST. Adjust the OFF-SET ADJUST control, R2, until the FUNCTION METER indicates 0 when the X10 METER SENSITIVITY switch is operated several times.

(g) Set the 678Z-1 FUNCTION SELECTOR switch to 70K-5 VFO BIAS. The FUNCTION METER should indicate 0 when the X10 METER SENSITIVITY switch is operated several times. If it does not, adjust R62 for the proper indication.

(h) Unground TP5.

(i) Disconnect the test leads from J1 and J3.

NOTE: The preceding procedure applies only to kilocycle-frequency stabilizer modules with Collins part number 528-0112-005. If the module part number is 544-9288-005, make the following changes in the above procedure:

1. Omit steps (b), (f).

2. Change switch setting in step (g) from 70K-5 VFO BIAS to 70K-3 VFO BIAS.

(2) Keyed Oscillator Adjustment.

(a) Connect the yellow jack on the 678Z-1 labeled J4-KC STAB to J4.

(b) Connect the black jack on the 678Z-1 labeled GRND to the 618T-( ) chassis.

(c) Set the 678Z-1 FUNCTION SELECTOR switch to SET LEVEL. Adjust the LEVEL SET control, R1, until the FUNCTION METER indicates +10. Do not use the X10 METER SENSITIVITY switch.

(d) Set the 618T-( ) operating frequency to X.000 mc.

(e) Set the 678Z-1 FUNCTION SELECTOR switch to 10KC CONTROL BIAS (+20V). The FUNCTION METER should indicate 0 when the X10 METER SENSITIVITY switch is operated several times. If it does not, adjust R63 for the proper indication.

(f) Disconnect the test lead from J4. Connect the 410B vtvm d-c probe to J4.

(g) Reset the 618T-( ) operating frequency to X.111 mc, X.222 mc, etc., through X.999 mc. The voltage at J4 should decrease in continuous steps from +20 volts at X.000 mc to about +4 volts at X.999 mc. If it does not, check resistors R1 through R21 and switches S3 and S4 in the Autopositioner.

(h) Connect the 541 oscilloscope to J7.

(i) Set the 618T-( ) operating frequency to X.000 mc.

(j) Adjust C54 and C55 to peak the voltage at J7.

(k) Set the 618T-( ) operating frequency to X.999 mc.

(l) Adjust T2-P and T2-S to peak the voltage at J7.

(3) Digit Oscillator Adjustment.

(a) Connect the 410B vtvm d-c probe to J6.

(b) Set the 618T-( ) operating frequency to X.XX5 mc, X.XX4 mc, etc., through X.XX6 mc. The voltage at J6 should decrease in continuous steps from about +23 volts at X.XX5 mc to about +6 volts at X.XX6 mc. If it does not, check resistors R22 through R32 and switch S6 in the Autopositioner.

(c) Connect the frequency counter to J5. Use the red test probe with BNC-type connector supplied in the 678Y-1. Drive the frequency counter through the oscilloscope vertical amplifier.

(d) Set the 618T-( ) operating frequency to X.XX6 mc. The counter should indicate 296,000 ±5 cps. If it does not, adjust R59 for the proper indication.

(e) Set the 618T-( ) operating frequency to X.XX5 mc. The counter should indicate 305,000 ±5 cps. If it does not, adjust L14 for the proper indication.

(f) Reset the 618T-( ) operating frequency to X.XX6 mc. The counter should still indicate 296,000 ±5 cps. If necessary, readjust R59 and L14 until proper frequency indications are obtained at both the X.XX6-mc and X.XX5-mc settings.

(g) Check the digit oscillator frequency at each of the 10 digits. The frequency at each digit setting is listed in the following table. At each setting, the frequency error limit is +20 cps from the listed frequency.

618T-( ) OPERATING FREQUENCY (mc)	DIGIT OSCILLATOR FREQUENCY (cps)
X.XX6	296,000
X.XX7	297,000
X.XX8	298,000
X.XX9	299,000
X.XX0	300,000
X.XX1	301,000
X.XX2	302,000
X.XX3	303,000
X.XX4	304,000
X.XX5	305,000

(h) If the frequency at each digit setting is not within ±20 cps of the frequencies listed in the above table, replace C64 and C125 with values of capacitance that will give the proper frequency at each digit setting. A change of +5 pf will raise the frequency at the X.XX1-mc setting about 10 cps. Leave a minimum capacitance of 20 pf in the circuit.

(i) Connect the kilocycle-frequency stabilizer module to the 618T-( ) chassis with an 18-inch pendant cable. Place the module in the temperature box. Repeat step (h) at module temperatures of -55, -5, +5, +50, and +80°C. If the frequency at each digit setting is not within ±200 cps of the frequencies listed in the above table at all temperatures, replace C64 and C125 with capacitors having the same value of capacitance, but with different temperature coefficients to bring the frequencies within ±200 cps of the listed frequencies over the temperature range from -55°C to +80°C.

(4) Signal Channel Input Adjustment.

(a) Connect the 541 oscilloscope to J7.

(b) Set the 618T-( ) operating frequency to X.XX0 mc.

(c) Adjust L2, L3, C18, and C19 to peak the voltage at J7.

NOTE: Check for two tuning points on each capacitor to be sure they are at resonance.

(5) Signal Channel I-F/Frequency Discriminator Adjustment.

(a) Disconnect the module extender from the 618T-( ) chassis, but leave the module connected to the extender.

(b) Connect a no. 22 wire from pin 2 of chassis connector J12 to TP2 on the module extender. Make no other connections between the 618T-( ) chassis and the module or module extender.

NOTE: Some of the following test points and adjustments are located on circuit board E2. This board is located behind board E6. To make test points and adjustments on E2 accessible, remove E6 and the metal divider between E6 and E2 by removing five screws from E6.

(c) Connect the 541 oscilloscope to TP16.

(d) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to J7. Connect the 524D frequency counter in parallel with the signal generator output to measure the signal generator frequency.

(e) Set the signal generator output to 250,000 ±30 cps, level below that required to saturate the i-f amplifiers.

(f) Adjust L7 and T1 to peak the voltage at TP15. If necessary, reduce the signal generator output level during the peaking procedure to prevent amplifier saturation.

(g) Connect the Fluke 801B d-c vtvm between TP7 and ground.

(h) Adjust L8 for 0 ±5 mv d-c between TP7 and ground.

NOTE: The following steps need be performed only if a component on board E2 has been replaced.

(i) Place the module in the temperature box. Leave the oscilloscope and d-c vtvm connected to the module.

(j) Lower the module temperature to -55°C. Tune the signal generator to produce a null indication on the d-c vtvm. Note the signal generator output frequency. Note the signal level at TP16.

NOTE: Leave the signal generator output level constant while performing the following steps.

(k) Raise the module temperature to +80°C. Tune the signal generator to produce a null indication on the d-c vtvm. Note the signal generator output frequency. Note the signal level at TP16.

(l) If either (or both) of the signal generator frequencies noted in the two preceding steps is more than ±70 cps from 250,000 cps, replace parallel capacitors C37 and C124 with capacitors having the same total capacitance, but with different temperature coefficients that will bring the frequencies within the proper limits at the temperature extremes.

(m) If the signal amplitude at TP16 varies more than 3 db between the temperature extremes, replace parallel capacitors C33 and C123 with capacitors having the same total capacitance, but with different temperature coefficients that will bring the amplitude within the proper limits at the temperature extremes.

(n) Remove the module from the temperature box. Disconnect the oscilloscope and d-c vtvm from the module, and reassemble the module.

(6) Reference Channel Input Adjustment.

(a) Connect the 541 oscilloscope to J8.

(b) Set the 618T-( ) operating frequency to X.XX0 mc.

(c) Adjust L17, C85, and C86 to peak the voltage at J8.

NOTE: Check for two tuning points on each capacitor to be sure they are at resonance.

(d) Set the 618T-( ) operating frequency to X.XX6 mc.

(e) Adjust L8 in the frequency divider module to peak the voltage at J8.

(f) Set the 618T-( ) operating frequency to X.XX1 mc.

(g) Adjust L7 in the frequency divider module to peak the voltage at J8.

(7) Reference Channel I-F Adjustment.

(a) Disconnect the module extender from the 618T-( ) chassis, but leave the module connected to the extender.

(b) Connect a no. 22 wire from pin 8 of chassis connector J12 to TP8 on the module extender. Make no other connections between the 618T-( ) chassis and the module or module extender.

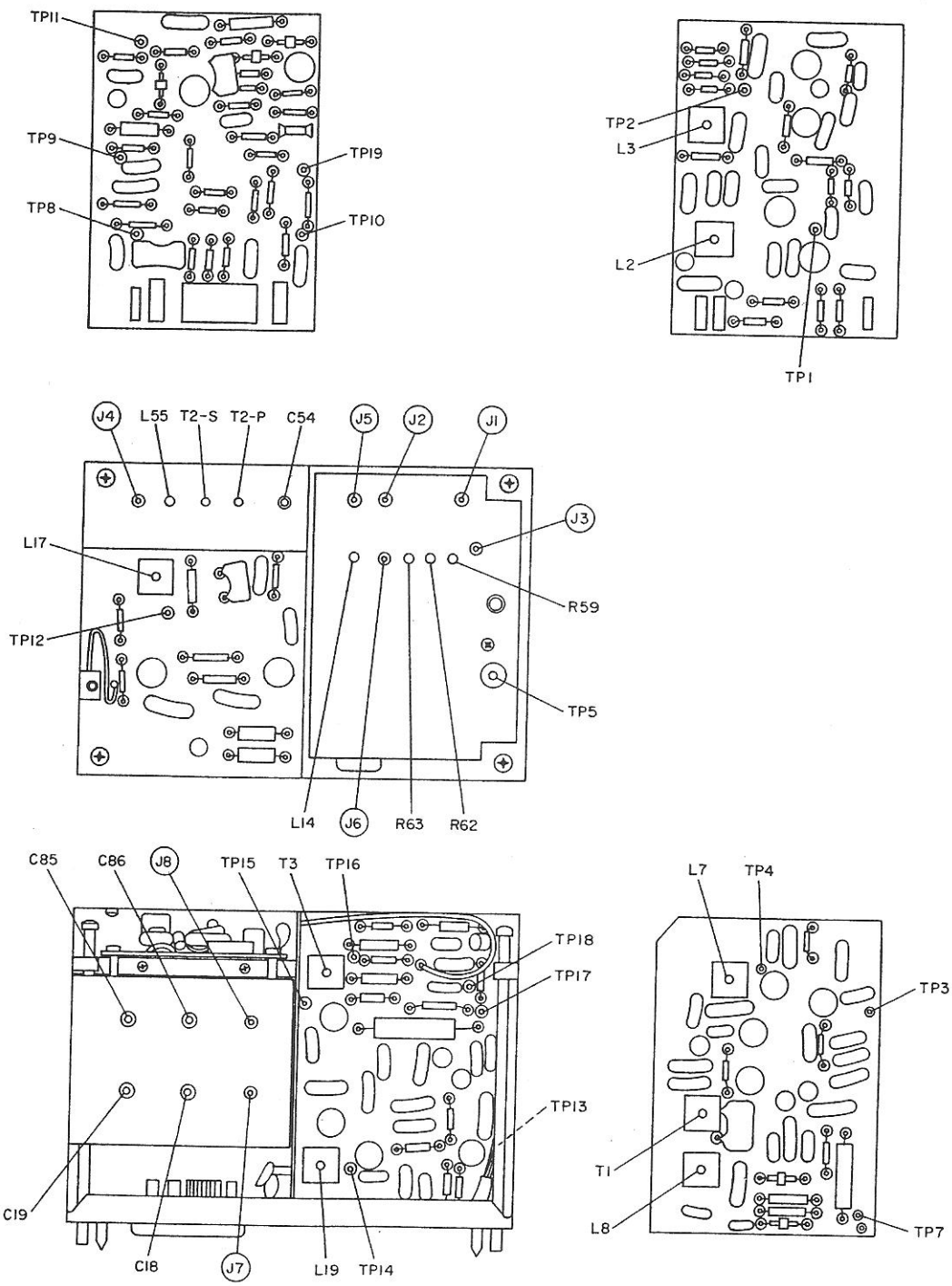
(c) Connect the 541 oscilloscope to TP15.

(d) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to J8. Connect the 524D frequency counter in parallel with the signal generator output to measure the signal generator output frequency.

(e) Set the signal generator output to 250,000 +30 cps, level below that required to saturate the i-f amplifiers.

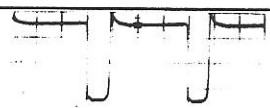
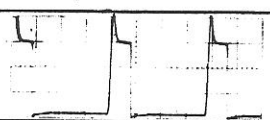
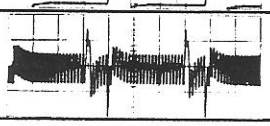
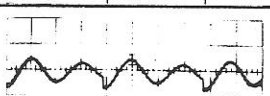
(f) Adjust L19 and T3 to peak the voltage at TP15. If necessary, reduce the signal generator output level during the peaking procedure to prevent amplifier saturation.

(g) Disconnect the oscilloscope and signal generator from the module.



Kilocycle-Frequency Stabilizer Module, Checks and Adjustments (Sheet 2 of 2)
Figure 714

1. MEGACYCLE-FREQUENCY STABILIZER MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	H-f oscillator d-c tuning voltage output	Power on	+7.0 ±0.5 volts
J2	Transistor supply voltage	Power on	+18 volts
J3	17.5-mc oscillator d-c tuning voltage output	Power on Operating frequency from 2.000 mc to 6.999 mc	+7.0 ±0.5 volts
J4	H-f oscillator r-f input	Power on	80 mv rms minimum
J5	17.5-mc oscillator r-f input	Power on	80 mv rms minimum
TP1	Squaring amplifier output	Oscilloscope set for: 0.5 volt/cm 5 usec/cm	
TP2	Pulse generator output	Oscilloscope set for: 5 volts/cm 5 usec/cm	
TP3	Mixer input	Oscilloscope set for: 0.5 volt/cm 5 usec/cm	
TP4	Mixer output/i-f amplifier input	Oscilloscope set for: 0.5 volt/cm 5 usec/cm	

2. MEGACYCLE-FREQUENCY STABILIZER MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the megacycle-frequency stabilizer module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) HP-410B vtvm.

(4) Boonton 91-C vtvm.

(5) HP-606A signal generator with 80-ZH3 attenuator.

(6) Tektronix 541 oscilloscope.

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the megacycle-frequency stabilizer module to the 618T-( ) chassis through the module extender supplied

in the 678Y-1. Leave all other modules in place on the chassis. Remove the megacycle-frequency stabilizer module dust cover.

C. Procedure.

(1) Reference Spectrum Level Adjustment.

(a) Ground J4 and J5.

(b) Connect the 410B vtvm d-c probe to J1. The voltage at this point should be +6.5 ±0.5 volts. If it is not, adjust R6 for the proper voltage at J1.

(c) Connect the 410B vtvm d-c probe to J3. The voltage at this point should be +6.5 ±0.5 volts. If it is not, adjust R5 for the proper voltage at J3.

(d) Recheck the voltage at J1 to be sure it is as specified in step (b). If necessary, readjust R6 and R5 until the voltage at both J1 and J3 is +6.5 ±0.5 volts.

(e) Unground J4 and J5.

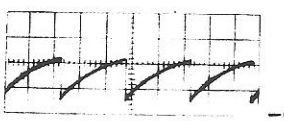
(2) Recycle Check.

(a) Disconnect the two coaxial jumpers on the module extender.

(b) Connect the 606A signal generator, through the 80-ZH3 attenuator, to the module input at A1 on the module extender. Tune the signal generator to 17.503 mc.

(c) Connect the 91-C vtvm to J5. Adjust the signal generator output level for 80 mv rms at J5.

(d) Connect the 541 oscilloscope to J3. Set the oscilloscope for 5 volts/cm, d-c, 5 msec/cm. The waveform at J3 should be as shown below.

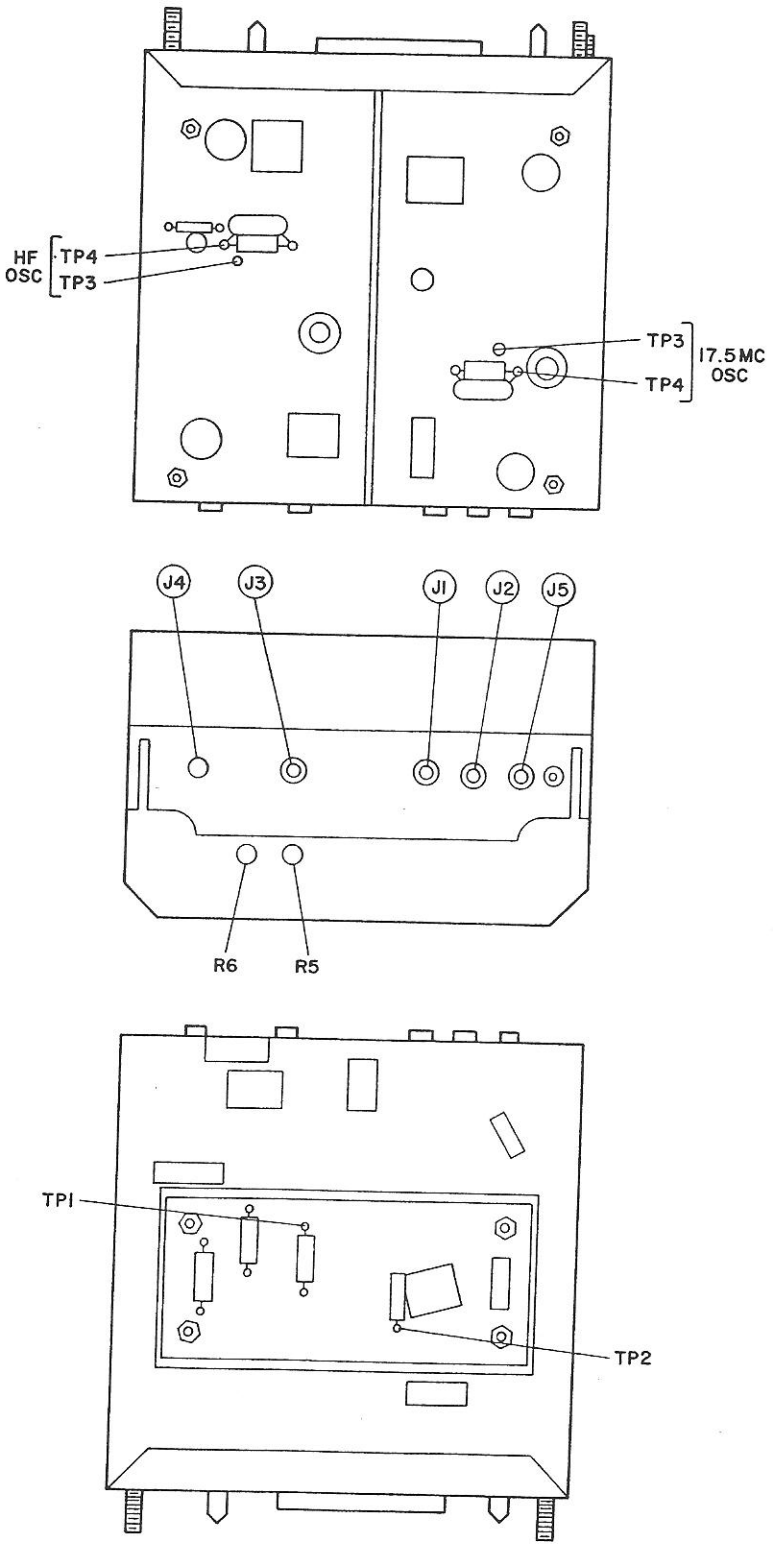


The sawtooth peak value should be +9 to +12 volts, the minimum value should be 0 to +4 volts, and the period should be 5 to 10 msec. If the waveform at J1 is improper, trouble is in recycle stage Q3 or associated components.

(e) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to the module input at A2 on the module extender. Tune the signal generator to 8.003 mc.

(f) Connect the 91-C vtvm to J4. Adjust the signal generator output level for 80 mv rms at J4.

(g) Connect the 54 oscilloscope to J1. Set the oscilloscope for 5 volts/cm, d-c, 5 msec/cm. The waveform at J1 should be the same as the one specified in step (d). If it is not, trouble is in recycle stage Q4 or associated components.



Megacycle-Frequency Stabilizer Module Checks and Adjustments
Figure 715

1. R-F OSCILLATOR MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	100-kc reference output to frequency divider	Power on	0.4 volt rms min
J2	Transistor supply voltage	Power on	+18 volts
J3	500-kc rference output to megacycle-frequency stabilizer	Power on	1.1 ±0.1 volts rms
J4	500-kc carrier output to balanced modulator	Power on	2.0 volts rms min
J5	Transistor supply voltage	Power on	+18 volts
J6	3-mc reference oscillator output	Power on	Approx 70 mv

2. R-F OSCILLATOR MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the r-f oscillator module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) HP-410B vtvm.

(4) HP-606A signal generator with 80-ZH3 attenuator.

(5) Boonton 91-C vtvm.

(6) Tektronix 541 oscilloscope.

(7) HP-524D frequency counter.

(8) Ballantine 310A vtvm.

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the r-f oscillator module to the 618T-( ) chassis through the module extender supplied in the 678Y-1. Leave all other modules in place on the chassis. Remove the r-f oscillator module dust cover.

C. Procedure.

(1) Reference Oscillator Frequency Adjustment.

(a) Connect a receive antenna to the AUX RCVR ANT. connector at the left front of the 618T-( ). The antenna should be located in a low-noise area.

(b) Set the 618T-( ) to USB.

(c) Set the 618T-( ) operating frequency 1 kc below the frequency of WWV.

NOTE: WWV transmits on 2.500 mc, 5.000 mc, 10.000 mc, 15.000 mc, 20.000 mc, and 25.000 mc. Select a frequency that gives a good signal with little fading.

(d) Connect the 541 oscilloscope to the 678P-1 HEADSET jack.

(e) At a time when WWV is not transmitting a tone, observe the 1000-cps signal on the oscilloscope. This signal represents the carrier of WWV.

(f) Hold the 618T-( ) front panel meter selector switch in the CAL TONE position. This connects a 1000-cps reference output from the frequency divider module to the audio output.

(g) Adjust the 714E-( ) RF SENS control until both 1000-cps signals are approximately the same amplitude.

(h) Adjust the FREQ ADJ control for 0 phase drift between the two 1000-cps signals.

(2) Divider Bandwidth Adjustments.

(a) Disconnect the reference oscillator from the dividers by unsoldering the jumper wire.

(b) Connect the 606A signal generator output to J6 and also to the oscilloscope vertical input. Set the signal generator output to 3.000 mc, 50 mv rms

(c) Connect the oscilloscope horizontal input to J4.

(d) Observe the 6-to-1 Lissajous pattern on the oscilloscope. This pattern should be stable (no instantaneous phase changes or fuzziness) as the signal generator is tuned from 2.92 mc to 3.08 mc. If pattern is not stable across this frequency range, adjust C10 and C14 to correct the bandwidth. C10 adjusts bandwidth above 3 mc; C14 adjusts bandwidth below 3 mc.

(e) Increase the signal generator output level to 150 mv rms, and repeat step (d).

(f) Connect the oscilloscope horizontal input to J4, and vertical input to J1. Set the signal generator output to 3.000 mc, 50 mv rms.

(g) Observe the 5-to-1 Lissajous pattern on the oscilloscope. This pattern should be stable as the signal generator is tuned from 2.92 mc to 3.08 mc. If it is not, adjust C29 and C34 to correct the bandwidth. C29 adjusts the bandwidth above 3 mc; C34 adjusts the bandwidth below 3 mc.

(h) Increase the signal generator output level to 150 mv rms, and repeat step (g).

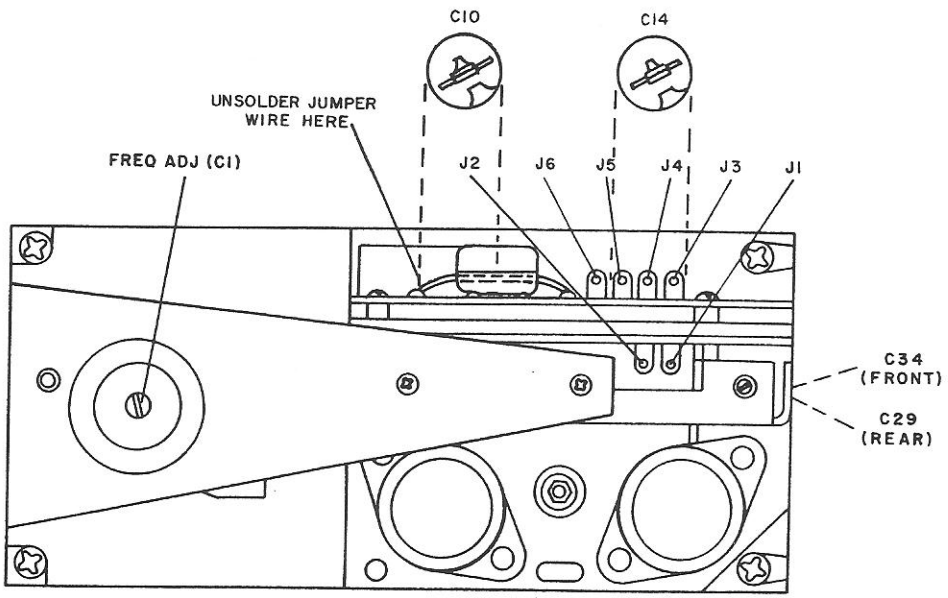
(i) Resolder the jumper wire that was unsoldered in step (a).

(3) Oven Check.

(a) Measure the a-c voltage between terminals 1 and 3 of transformer T3 using the 310A vtvm. Record this value. This voltage, V_{out}, should be several volts.

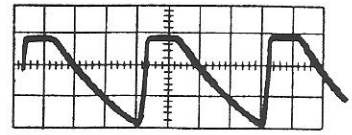
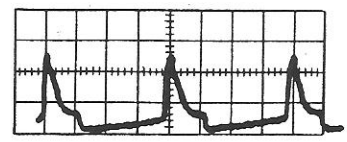
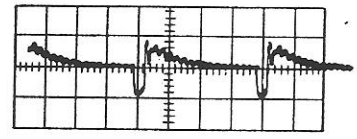
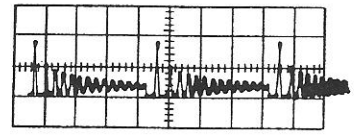
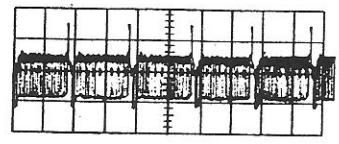
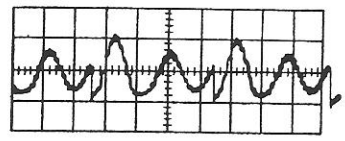
(b) Measure the a-c voltage across diode CR1 using the 310A vtvm. Record this value. This voltage, V_{in}, should be several hundred microvolts.

(c) Compute V_{out}/V_{in}. This quotient should be approximately 6000. If it is less than 6000, oven amplifier has insufficient gain, and Q12 through Q15 and associated circuits should be checked.



R-F Oscillator Module (Early Model) Checks and Adjustments
Figure 716

1. MEGACYCLE-FREQUENCY STABILIZER MODULE TEST POINT DATA.

TEST POINT	QUANTITY BEING TESTED	TEST CONDITIONS	NORMAL INDICATION
J1	H-f oscillator d-c tuning voltage output	Power on	+7.0 ±0.5 volts
J2	Transistor supply voltage	Power on	+18 volts
J3	17.5-mc oscillator d-c tuning voltage output	Power on Operating frequency from 2.000 mc to 6.999 mc	+7.0 ±0.5 volts
J4	H-f oscillator r-f input	Power on	80 mv rms min
J5	17.5-mc oscillator r-f input	Power on	80 mv rms min
J6	500-kc reference input	Power on	Approx 1.0 volt rms
TP1	Squaring amplifier (A1) output at junction of R4 and C7	Oscilloscope set for: 3 volts/cm 0.5 usec/cm	
TP2	Pulse amplifier (Q2) input at junction of of C7 and R5	Oscilloscope set for: 0.5 volt/cm 0.5 usec/cm	
TP3	Spectrum generator (Q3) input at junction of of R6 and R7	Oscilloscope set for: 5 volts/cm 0.5 usec/cm	
TP4	Spectrum generator (Q3) output at junction of L4 and CR1	Oscilloscope set for: 50 volts/cm 0.5 usec/cm	
TP5	Mixer (A1Q3 or A2Q3) input at junction of A1C5 and A1R7 (or A2C5-A2C7)	Oscilloscope set for: 0.5 volt/cm 1 usec/cm	
TP6	Mixer output/i-f amplifier (A1Q4 or A2Q4) input at junction of A1C7 and A1L2 (or A2C7-A2L2)	Oscilloscope set for: 0.5 volt/cm 0.5 usec/cm	

2. MEGACYCLE-FREQUENCY STABILIZER MODULE CHECKS AND ADJUSTMENTS.

A. Test Equipment.

The following test equipment, or equivalent, is required to check and adjust the megacycle-frequency stabilizer module.

(1) Test Harness 678P-1.

(2) Maintenance Kit 678Y-1.

(3) HP-410B vtvm.

(4) Boonton 91-C vtvm.

(5) HP-606A signal generator with 80-ZH3 attenuator.

(6) Tektronix 541 oscilloscope.

B. Equipment Setup.

Connect the 618T-( ) and test equipment as shown in figure 701. Connect the megacycle-frequency stabilizer module to the 618T-( ) chassis through the module extender supplied in the 678Y-1. Leave all other modules in place on the chassis. Remove the megacycle-frequency stabilizer module dust cover.

C. Procedure.

(1) Reference Spectrum Level Adjustment.

(a) Ground J4 and J5.

(b) Connect the 410B vtvm d-c probe to J1. The voltage at this point should be +6.5 ±0.5 volts. If it is not, adjust R7 for the proper voltage at J1.

NOTE: Adjust R7 through the hold in the spectrum-generator board cover.

(c) Connect the 410B vtvm d-c probe to J3. The voltage at this point should be +6.5 ±0.5 volts. If it is not, adjust R7 for the proper voltage at J3.

(d) Recheck the voltage at J1 to be sure it is as specified in step (b). If necessary, readjust R7 until the voltage at both J1 and J3 is +6.5 ±0.5 volts.

(e) Unground J4 and J5.

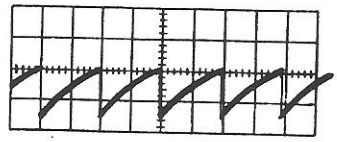
(2) Recycle Check.

(a) Disconnect the two coaxial jumpers on the module extender.

(b) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to the module input at A1 on the module extender. Time the signal generator to 17.503 mc.

(c) Connect the 91-C vtvm to J5. Adjust the signal generator output level for 80 mv rms at J5.

(d) Connect the 541 oscilloscope to J3. Set the oscilloscope for 5 volts 1 cm, d-c, 2 msec/cm. The waveform at J3 should be as shown below.

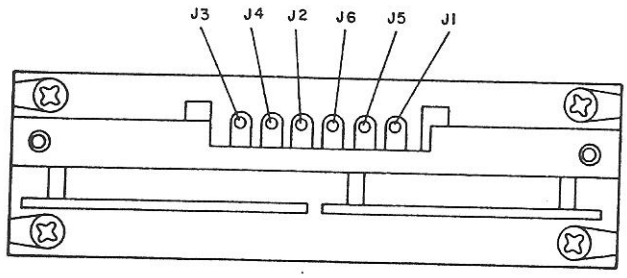


The sawtooth peak value should be +10 to +12 volts, the minimum value should be 0 to +4 volts, and the period should be 2 to 8 msec. If the waveform is improper, trouble is in recycle stage Q4 or associated components.

(e) Connect the 606A signal generator output, through the 80-ZH3 attenuator, to the module input at A2 on the module extender. Tune the signal generator to 8.003 mc.

(f) Connect the 91-C vtvm to J4. Adjust the signal generator output level for 80 mv rms at J4.

(g) Connect the 541 oscilloscope to J1. Set the oscilloscope for 5 volts/cm, d-c, 2 msec/cm. The waveform at J1 should be the same as the one specified in step (d). If it is not, trouble is in recycle stage Q5 or associated components.



Megacycle-Frequency Stabilizer Module (Early Model) Checks and Adjustments
Figure 717

AIRBORNE SSB TRANSCEIVER 618T-( ) - TROUBLE SHOOTING

1. GENERAL.

This section is divided into two main divisions. These divisions, and a brief description of what each division contains, are listed below.

A. Unit Trouble Shooting.

The unit trouble-shooting division contains information that is to be used, after performing the unit performance check in the testing section, to isolate trouble to a particular module or group of modules.

B. Module Trouble Shooting.

The module trouble-shooting division contains information that aids in isolating trouble within a module to a particular stage or group of stages. This information should be referred to if the module checks and adjustments in the testing section fail to restore a module to proper operation.

2. UNIT TROUBLE SHOOTING.

Refer to tables 801 through 805 for 618T-( ) unit trouble-shooting data.

TABLE 801. GENERAL TROUBLE-SHOOTING DATA

SYMPTOM	ACTION
618T-( ) dead. Power not applied.	Check primary power sources (both a-c and d-c). Check circuit breaker and fuses in Test Harness 678P-1. Check control unit mode selector switch to see that power-enabling ground is being supplied to pin 59 of 618T-( ) connector P40. If all of above checks are positive, check 618T-( ) chassis relays K1 and K9.

TABLE 802. FREQUENCY TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
618T-( ) r-f output frequency abnormal below 7.000 mc, but normal above 7.000 mc.	Perform 17.5-mc oscillator phase-locking check (r-f translator module).

TABLE 802. FREQUENCY TROUBLE-SHOOTING CHART (Cont)

SYMPTOM	ACTION
618T-( ) r-f output frequency abnormal both above and below 7.000 mc.	Perform vfo and h-f oscillator phase-locking checks (r-f translator module). Perform the reference oscillator frequency adjustment (r-f oscillator module).
618T-( ) r-f output frequency varies from the desired frequency by an integral number of kilocycles.	Remove the kilocycle-frequency stabilizer module from the 618T-( ) chassis. Connect the 410B vtvm d-c probe to pin 2 of chassis connector J12. The voltage at this point should be +18 volts. Rechannel the 618T-( ). The voltage at J12-2 should drop to 0 during the time that the 618T-( ) is mechanically tuning. There should be a discernible delay (1/2 to 1 second) between the time that mechanical tuning is completed and +18 volts returns to J12-2. If there is not, check chassis relays K8 and K10 and components on chassis terminal board TB2.

TABLE 803. RECEIVE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Gain abnormal, but sensitivity normal.	Perform audio amplifier gain adjustment (AM/audio amplifier module).
Sensitivity abnormal, but gain normal.	Perform receive i-f output adjustment, variable/band-pass i-f alignment check, and r-f circuits alignment (r-f translator module).
Gain abnormal in USB and LSB, but normal in AM.	Perform SSB receive i-f alignment (i-f translator module).
Gain abnormal in AM, but normal in USB and LSB.	Perform AM receive i-f alignment (AM/audio amplifier module).

TABLE 804. TRANSMIT TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Transmit output power abnormal.	Perform tgc adjustment and driver plate tuning adjustments (unit adjustments). Perform SSB/AM transmit i-f alignment (i-f translator module).

TABLE 804. TRANSMIT TROUBLE-SHOOTING CHART (Cont)

SYMPTOM	ACTION
Transmit output power abnormal (Cont).	Perform r-f circuits alignment and variable/band-pass i-f alignment check (r-f translator module.
	Perform neutralization adjustments (r-f translator module).
Transmit residual noise abnormal.	Perform carrier balance adjustment (i-f translator module).
	Perform transmit h-f mixer balance adjustment (r-f translator module).
Power amplifier static plate current abnormal.	Perform static plate current adjustment (unit adjustments).
Power amplifier tube balance abnormal.	Replace power amplifier tubes. Repeat check.
CW output abnormal.	Check CW keying circuits in AM/audio amplifier module.
AM modulation abnormal.	Perform audio amplifier gain adjustment (AM/audio amplifier module).
Sidetone abnormal.	Check chassis relay K6.

TABLE 805. ANTENNA COUPLER POWER/CONTROL TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
+260-volt output abnormal.	Check high-voltage power supply module.
115-volt a-c output abnormal.	Check chassis relays K1 and K9.
+28-volt output abnormal.	Check chassis relays K1 and K9.
Transmitter key interlock abnormal.	Check chassis relay K7.
Chopper enable abnormal.	Check chassis relay K3.
Tune power enable.	Check keying and SSB/AM transfer relays.
Recycle line abnormal.	Check chassis relay K4.
Key line abnormal.	Check chassis relays K2, K3, and K5.

3. MODULE TROUBLE SHOOTING.

Refer to tables 806 through 817 for 618T-( ) module trouble-shooting data.

TABLE 806. MODULE SUPPLY VOLTAGE DATA

MODULE	TEST POINT (MODULE EXTENDER)	SUPPLY VOLTAGE	
Low-voltage power supply	TP4	+28 volts	
	TP8	115 volts rms	
	TP10	+25 volts	
AM/audio amplifier	TP5	+18 volts	
	TP6	+25 volts	
	TP11	+18 volts (receive only)	
	TP21	+28 volts	
I-f translator	TP5	+18 volts	
	TP11	+18 volts (receive only)	
	TP14	+28 volts	
R-f translator	J32	618T-1/2	618T-3
	TP9	>6.3 volts rms	0
	TP10	>6.3 volts rms	+6.3 volts
	TP11	>6.3 volts rms	+12.6 volts
	TP12	>6.3 volts rms	+18.9 volts
	TP13		+25.2 volts
	TP17	+28 volts	
	TP18	+130 volts	
	TP19	+260 volts (transmit only)	
	TP28	+18 volts	
	TP31	Approx +10.3 volts	
	TP14 (J33)	+28 volts d-c	

TABLE 806. MODULE SUPPLY VOLTAGE DATA (Cont)

MODULE	TEST POINT (MODULE EXTENDER)	SUPPLY VOLTAGE
Electronic control amplifier	TP3	+25 volts
	TP7	6.3 volts rms
R-f oscillator	TP5	+18 volts
Frequency divider	TP2	+18 volts
Kilocycle-frequency stabilizer	TP2	+18 volts (interrupted during recycle)
	TP8	+18 volts
Megacycle-frequency stabilizer	J2 (in module)	+18 volts

TABLE 807. LOW-VOLTAGE POWER SUPPLY MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1.	Replace Q2. Repeat check.
Abnormal indication at J2.	Check +28-volt power source.
Abnormal indication at J3.	Perform +18-volt regulator adjustment (low-voltage power supply module).

TABLE 808. HIGH-VOLTAGE POWER SUPPLY MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
+1500-volt or +260-volt output abnormal.	Check all diodes and capacitors in the high-voltage power supply module with an ohmmeter. Also check transformer continuity.

TABLE 809. AM/AUDIO AMPLIFIER MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1. Normal indication at J2.	Check Q7 and associated circuit.
Abnormal indication at J2. Normal indication at J1.	Check envelope detector diode CR4.
Abnormal indication at J3.	Check microphone.
Abnormal indication at J4. Normal indication at J3.	Check Q1, Q2, and associated circuits.
Abnormal indication at J5. Normal indication at J4.	Check CR2, CR7, CR13, and associated circuits.
Abnormal indication at J6. Normal indication at J2.	Check Q9 and associated circuit.

TABLE 810. I-F TRANSLATOR MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1.	Check indication at J1 in AM/audio amplifier module. Should be same.
Abnormal indication at J2.	Check Q6 and associated circuit.
Abnormal indication at J3.	Check indication at J4 in AM/audio amplifier module.
Abnormal indication at J4.	Check indication at J4 in r-f oscillator module.

TABLE 811. R-F TRANSLATOR MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1.	Check V10 and associated circuit.
Abnormal indication at J2. Normal indication at J9.	Check V1, V2, V3, V10, and associated circuits.

TABLE 811. R-F TRANSLATOR MODULE TROUBLE-SHOOTING CHART (Cont)

SYMPTOM	ACTION
Abnormal indication at J3. Normal indication at J2.	Check V3, V11, and associated circuits.
Abnormal indication at J4. Normal indication at J3.	Check V4, V5, and associated circuits.
Abnormal indication at J5.	Check vfo.
Abnormal indication at J6. Normal indication at J2.	Check band-pass i-f filter.
Abnormal indication at J7.	Check V11 and associated circuit.
Abnormal indication at J8.	Check relay K3.
Abnormal indication at J9.	Check transmit i-f output of i-f translator module.

TABLE 812. POWER AMPLIFIER MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1. Normal indication at J4.	Check resistor R1.
Abnormal indication at J2. Normal indication at J4.	Check R4, R5, CR6.
Abnormal indication at J3. PA B+ normal.	Check R29 through R34, C38, C45, C51, and C52.
Abnormal indication at J4. Normal indication at J2.	Check R16, R9, R2, R15, and CR5.
Abnormal indication at J5.	Check adc circuit.

TABLE 813. ELECTRONIC CONTROL AMPLIFIER MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1.	Check G1, Q1, and associated circuits.
Abnormal indication at J2. Normal indication at J1.	Check Q2, Q3, Q4, and associated circuits.
Abnormal indication at J3 and J4. Normal indication at J2.	Check Q5, Q6, Q7, and associated circuits.

TABLE 814. R-F OSCILLATOR MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1. Normal indication at J3.	Check Q7, Q8, Q9, and associated circuits.
Abnormal indication at J2.	Check supply voltage at J3 in low-voltage power supply.
Abnormal indication at J3. Normal indication at 3-mc test point.	Check Q4, Q5, and associated circuits.
Abnormal indication at J4. Normal indication at J3.	Check Q6 and associated circuit.
Abnormal indication at 3-mc test point. Normal indication at +18-volt d-c test point.	Replace temperature-compensated crystal

TABLE 815. FREQUENCY DIVIDER MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1. Normal indication at TP2.	Check Q5, Q6, and associated circuits.
Abnormal indication at J2.	Check supply voltage at J3 in low-voltage power supply.
Abnormal indication at J3. Normal indication at TP4.	Check Q11, Q12, Q13, and associated circuits.
Abnormal indication at TP1.	Check 100-kc output at J1 in r-f oscillator. Check Q1, Q2, and associated circuits.
Abnormal indication at TP2. Normal indication at TP1.	Check Q3, Q4, and associated circuits.
Abnormal indication at TP3. Normal indication at TP2.	Check Q7, Q8, and associated circuits.
Abnormal indication at TP4. Normal indication at TP3.	Check Q9 and associated circuit.

TABLE 816. KILOCYCLE-FREQUENCY STABILIZER MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1.	Check vfo output at J5 in r-f translator.
Abnormal indication at J2.	Check supply voltage at J3 in low-voltage power supply.
Abnormal indication at J3.	Check R62.
Abnormal indication at J4.	Check resistors R1 through R20 and switches S3 and S4 in the Autopositioner.
Abnormal indication at J5. Normal indication at J6.	Check Q4, Q12, and associated circuits.
Abnormal indication at J6.	Check resistors R22 through R32 and switch S6 in the Autopositioner.
Abnormal indication at J7. Normal indication at TP2.	Check Q3, FL1, and associated circuits.
Abnormal indication at J8. Normal indication at TP12.	Check Q15, FL2, and associated circuits.
Abnormal indication at TP1. Normal indication at J1.	Check Q1 and associated circuit.
Abnormal indication at TP2. Normal indication at TP1.	Check Q2 and associated circuit.
Abnormal indication at TP4. Normal indication at J7.	Check Q5, Q6, and associated circuits.
Abnormal indication at TP5. Normal indication at TP4.	Check Q7, Q8, and associated circuits.
Abnormal indication at TP7. Normal indication at TP5.	Check frequency discriminator circuit.
Abnormal indication at TP8. Normal indication at TP10.	Check T2.
Abnormal indication at TP9.	Check supply voltage at J3 in low-voltage power supply.
Abnormal indication at TP10. Normal indication at TP19.	Check Q11 and associated circuit.
Abnormal indication at TP11.	Check 10-kc pulse output at J1 in frequency divider.

TABLE 816. KILOCYCLE-FREQUENCY STABILIZER MODULE TROUBLE-SHOOTING CHART (Cont)

SYMPTOM	ACTION
Abnormal indication at TP12. Normal indication at J5.	Check keyed oscillator output at J3 in frequency divider.
Abnormal indication at TP14. Normal indication at J8.	Check Q16, Q17, and associated circuits.
Abnormal indication at TP15. Normal indication at TP14.	Check Q18, Q19, and associated circuits.
Abnormal indication at TP16. Normal indication at TP5.	Check T1.
Abnormal indication at TP17/TP18.	Check phase discriminator circuit.
Abnormal indication at TP19. Normal indication at TP11.	Check Q9, Q10, and associated circuits.

TABLE 817. MEGACYCLE-FREQUENCY STABILIZER MODULE TROUBLE-SHOOTING CHART

SYMPTOM	ACTION
Abnormal indication at J1. Normal indication at J4.	Check amplifier/detector board A2.
Abnormal indication at J2.	Check supply voltage at J3 in low-voltage power supply.
Abnormal indication at J3. Normal indication at J5.	Check amplifier/detector board A1.
Abnormal indications at J1 and J3.	Check spectrum generator subassembly.
Abnormal indication at J4.	Check V11 in r-f translator module.
Abnormal indication at J5.	Check V10 in r-f translator module.

AIRBORNE SSB TRANSCEIVER 618T-( ) - STORAGE INSTRUCTIONS

1. GENERAL.

Airborne SSB Transceiver 618T-( ) should be stored in the original shipping carton. The dust cover should be in place.

Temperature and humidity conditions in the storage area should not be subject to wide variation.

AIRBORNE SSB TRANSCEIVER 618T-( ) - SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. GENERAL.

This section contains information regarding special tools and test equipment required to align, test, or trouble shoot Airborne SSB Transceiver 618T-( ).

2. TEST HARNESS 678P-1.

A. General.

Test Harness 678P-1, Collins part number 547-3914-00, furnishes a means of connecting and controlling Transceiver 618T-1, 618T-2, or 618T-3 while it is being tested and adjusted. Control Unit 714E-1, 714E-2, or 714E-3 may be plugged into Test Harness 678P-1 to control the 618T-( ). The control unit is not furnished as part of the 678P-1.

Test Harness 678P-1 is 8-1/2 inches wide, 9-9/16 inches high, and 16 inches deep. It weighs approximately 25 pounds, including connecting cables which are furnished with the 678P-1. All operating controls are located on a sloping front panel for convenient operation. All power connectors and protective components are located on a horizontal rear deck.

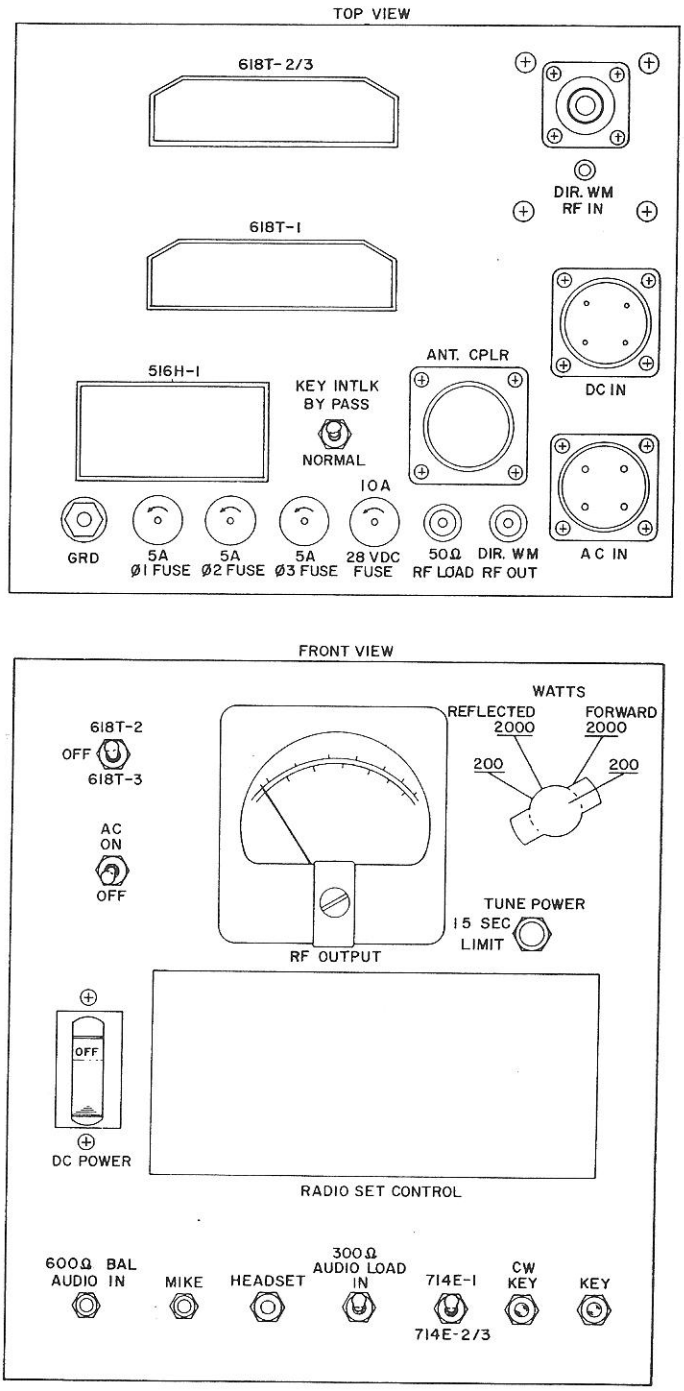
Table 1001 lists the equipment supplied as part of Test Harness 678P-1. Table 1002 lists equipment required but not supplied.

B. Functions.

Refer to figure 1001. Test Harness 678P-1 has switches that control the power, both a-c and d-c, which is supplied to the 618T-( ) being tested. All power inputs are fused. There are switches for keying the 618T-( ), including CW keying. A directional r-f wattmeter is provided for measuring both forward and reflected power. Jacks are provided for connecting audio inputs and monitoring the audio output. The KEY INTLK switch provides for use of Test Harness 678P-1 either with or without an antenna coupler. The TUNE POWER button grounds the 618T-( ) tune power line. Figure 1002 is a schematic diagram of Test Harness 678P-1.

TABLE 1001
TEST HARNESS 678P-1, COLLINS PART NUMBER 547-3914-00, EQUIPMENT SUPPLIED

ITEM	COLLINS PART NUMBER
Test harness assembly	548-8292-005
618T-1/2/3 pendant cable	548-8002-004
516H-1 pendant cable	548-8003-004
27.5-volt d-c power cable	548-8023-003
115-volt, 3-phase, 400-cps power cable	548-8025-003
714E-1/2 pendant cable	548-8029-004
714E-3 pendant cable	548-8284-004
180L-2/3 pendant cable	548-8287-004
309A-2D pendant cable	548-8286-004
309A-1 pendant cable	548-8285-004
CU-351 pendant cable	554-2915-004
Coaxial cable	549-4334-002
R-f adapter connectors (2)	357-9291-00



Test Harness 678P-1, Front Panel and Top View
Figure 1001

TABLE 1002. TEST HARNESS 678P-1, EQUIPMENT REQUIRED BUT NOT SUPPLIED

ITEM	COLLINS PART NUMBER
Control Unit 714E-1 or Control Unit 714E-2 or Control Unit 714E-3	522-1261-00 522-2313-00 522-2457-00

C. Cable Data.

Table 1003 lists cable continuity data for the 10 power and pendant cables supplied with Test Harness 678P-1.

TABLE 1003. 678P-1 CABLE CONTINUITY DATA

CABLE	PIN OF 678P-1 CONNECTOR	PIN OF EQUIPMENT CONNECTOR
618T-1/2/3 pendant cable NOTE: Wires connecting pins 54 and pins 60 are shielded. Wire connecting pins 37 and 53, pins 57 and 58 are shielded twisted pairs.	1 thru 60	1 thru 60
516H-1 pendant cable	1 2 3 6 8 10 11 13	1 2 3 6 8 10 11 13

TABLE 1003. 678P-1 CABLE CONTINUITY DATA (Cont)

CABLE	PIN OF 678P-1 CONNECTOR	PIN OF EQUIPMENT CONNECTOR
516H-1 pendant cable (Cont)	14 16 17 19 21 22 23	14 16 17 19 21 22 23
27.5-volt d-c power cable	A B C D	-d-c source voltage +d-c source voltage
115-volt, 3-phase, 400-cps power cable powe	A B C D	3-phase source source ground
714E-1/2 pendant cable NOTE: Pins k and p of the connector at the 678P-1 end of the cable are jumped.	A B C D E F G H J K L M N P R S T U V W X Y Z a b	U T S R K Y M L G P J F C N H E D Z f e l k v a m

TABLE 1003. 678P-1 CABLE CONTINUITY DATA (Cont)

CABLE	PIN OF 678P-1 CONNECTOR	PIN OF EQUIPMENT CONNECTOR
714E-1/2 pendant cable (Cont)	c d f g h i j m q r	b A j h g w d x c B
714E-3 pendant cable	A B C D E F G H J K L M N P R S T U V W X Y Z a b c d e f g h i j k	A B C D E F G H J K L M N P R S T U V W X Y Z a b c d e h g f i j k

TABLE 1003. 678P-1 CABLE CONTINUITY DATA (Cont)

CABLE	PIN OF 678P-1 CONNECTOR	PIN OF EQUIPMENT CONNECTOR
714E-2 pendant cable (Cont)	m	m
	n	n
	p	p
	q	q
	r	r
180L-2/3 pendant cable	A	14
	K	10
	R	9
	T	8
	X	12
	Z	3
	f	1
	i	7
	j	15
	k	4
	m	2
	r	13
	s	11
309A-2D pendant cable	B	B
	C	C
	D	D
	E	Z
	K	T
	N	V
	R	R
	S	b
	T	a
	U	c
	V	Y
	W	S
	X	E
	Y	P
	Z	N
	a	F
	b	U
	d	J
	e	H
	f	X
	g	K
	h	A
	j	G
	k	W
	m	M
	t	L

TABLE 1003. 678P-1 CABLE CONTINUITY DATA (Cont)

CABLE	PIN OF 678P-1 CONNECTOR	PIN OF EQUIPMENT CONNECTOR
309A-1 pendant cable	B	25
	C	24
	D	23
	E	4
	F	34
	G	35
	H	32
	J	6
	K	10
	M	33
	N	8
	P	12
	R	2
	T	3
	U	1
	V	5
	W	11
	X	27
	Y	13
	Z	14
	b	9
	c	31
	d	18
	e	19
	f	16
	g	17
	h	26
	j	20
	k	7
	m	15
	q	30
	r	29
	s	28
CU-351 pendant cable	A	A
	K	N
	R	R
	T	B
	X	F
	Z	S
	f	T
	i	C
	j	G
	k	M
	m	K
	r	D
	s	E

3. MAINTENANCE KIT 678Y-1.

Maintenance Kit 678Y-1, Collins part number 547-3915-00, is composed of assorted items which aid in aligning, testing, and trouble shooting Transceiver 618T-( ). These items are contained in a cabinet that is supplied as part of the kit.

The 678Y-1 includes module extenders for most of the 618T-( ) modules. These extenders permit modules to be extended outside the 618T-( ) chassis while they are operating. This makes the modules more accessible for testing or trouble shooting. Test points on the extenders bring some of the pins on the module plugs out to test jacks so that the voltages at these pins may be measured easily.

Maintenance Kit 678Y-1 also includes a number of special test probes, test cables, and tuning or alignment tools which facilitate 618T-( ) maintenance procedures.

Figures 1003 and 1004 shows the 678Y-1 cabinet and components. Table 1004 lists the Collins part number of each of the kit components.

TABLE 1004. MAINTENANCE KIT 678Y-1, COLLINS PART NUMBER 547-3915-00, EQUIPMENT SUPPLIED

ITEM	COLLINS PART NUMBER
Cabinet	554-4851-005
Radio set test fixture	549-0990-004
Extender, r-f translator	548-3452-00
Extender, r-f oscillator	548-3463-00
Extender, megacycle-frequency stabilizer	548-3501-004
Extender, frequency divider	548-3502-004
Extender, AM/audio amplifier	548-3461-004
Extender, i-f translator	548-3505-00
Extender, electronic control amplifier	548-3453-004
Extender, low-voltage power supply	548-3455-004
Extender, kilocycle-frequency stabilizer	548-3459-004
Autopositioner frame	548-8014-003
Dial	548-3530-002
Setscrews, 4-40 (2)	328-0048-00
Machine screws 4-40 x 1/4 (3)	343-0133-00

TABLE 1004. MAINTENANCE KIT 678Y-1, COLLINS PART NUMBER 547-3915-00, EQUIPMENT SUPPLIED (Cont)

ITEM	COLLINS PART NUMBER
Pointer	549-0974-002
Capacity divider, 2 to 8 mc	548-3525-002
Capacity divider, 8 to 30 mc	548-3528-002
R-f translator load	549-0989-003
Neutralizing detector	548-3533-003
50-ohm signal generator load	548-3522-002
Test probe no. 1	548-3486-002
Test probe no. 2	548-3484-002
Test probe no. 3	548-3499-002
Phone cable	548-3489-002
Mike cable	548-3490-002
Coaxial jumper cables (6)	546-7321-002
BNC T-adapter (UG-274A/U)	357-9314-00
BNC straight adapter (UG-914/U)	357-9329-00
BNC straight adapter (UG-491/U)	357-9337-00
Shielded-cap double banana plug (2)	361-0154-00
7-pin tube extender	220-1461-00
9-pin tube extender	220-1463-00
PA tube extractor	024-0307-00 or 024-0345-00
Tuning tool	547-2796-002
Alignment tool no. 1	024-0295-00
Alignment tool no. 2	024-0309-00
Bristo wrench, no. 8	024-0019-00
Bristo wrench, no. 4	024-2900-00

TABLE 1004. MAINTENANCE KIT 678Y-1, COLLINS PART NUMBER 547-3915-00, EQUIPMENT SUPPLIED (Cont)

ITEM	COLLINS PART NUMBER
Bristo wrench no. 8 (with handle)	024-2700-00
Phillips screwdriver, no. 2	024-0310-00
Printed circuit repair kit	549-0637-00
R-f cable	549-4334-002

4. FUNCTION TEST SET 678Z-1.

A. General.

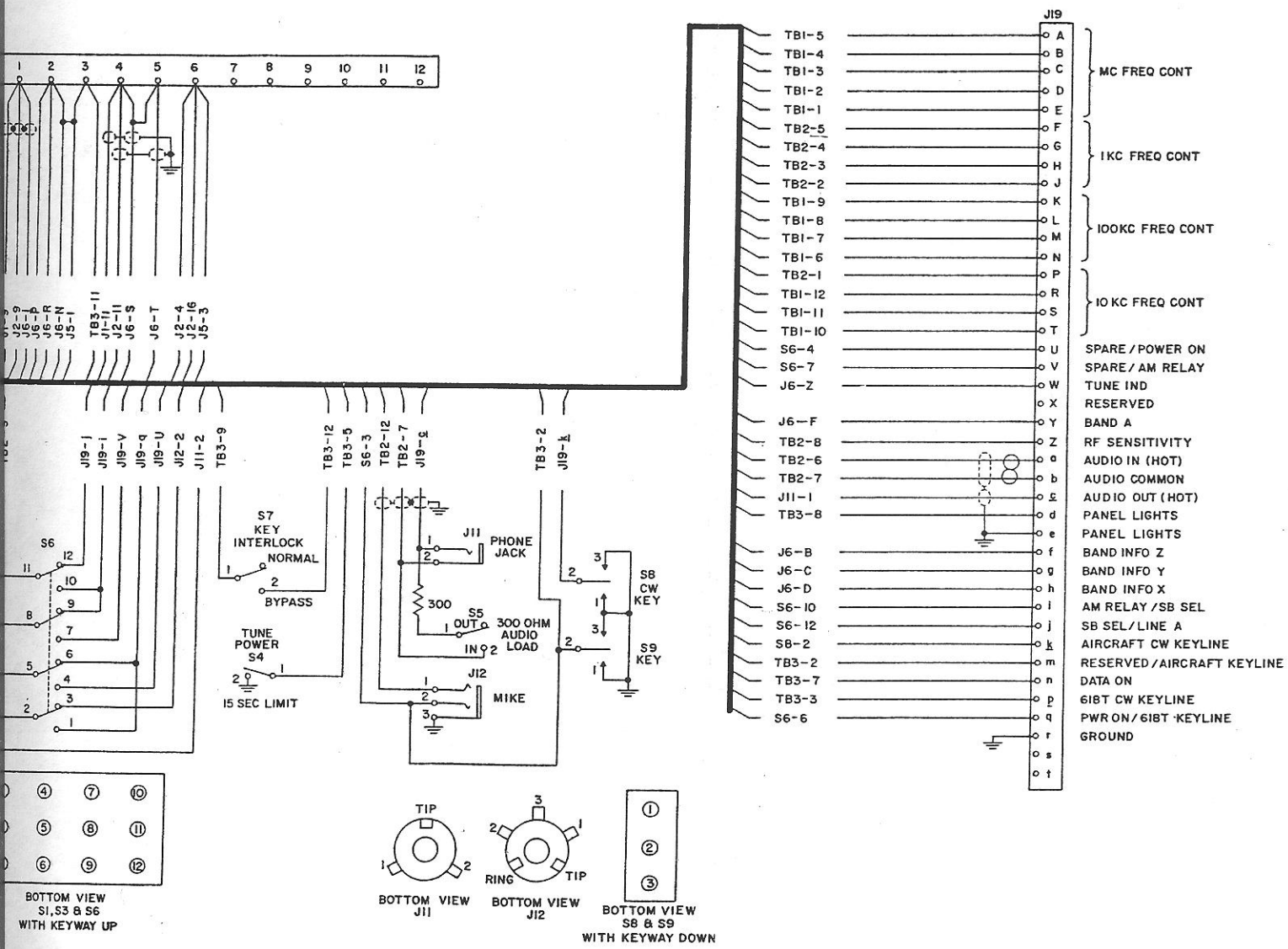
Function Test Set 678Z-1, Collins part number 548-8001-005, performs several test functions used in unit and module testing and adjusting of the 618T-( ). The 678Z-1 can act as an accurate voltage comparator which may be used to set some of the voltages in the 618T-( ). It may also be used as a variable voltage source with three different source impedances. In addition, Function Test Set 678Z-1 contains a dummy microphone which is used to connect audio tone inputs to the 618T-( ).

The operations that are performed by the 678Z-1 with the FUNCTION SELECTOR switch on the front panel set to its various positions are listed at each switch position.

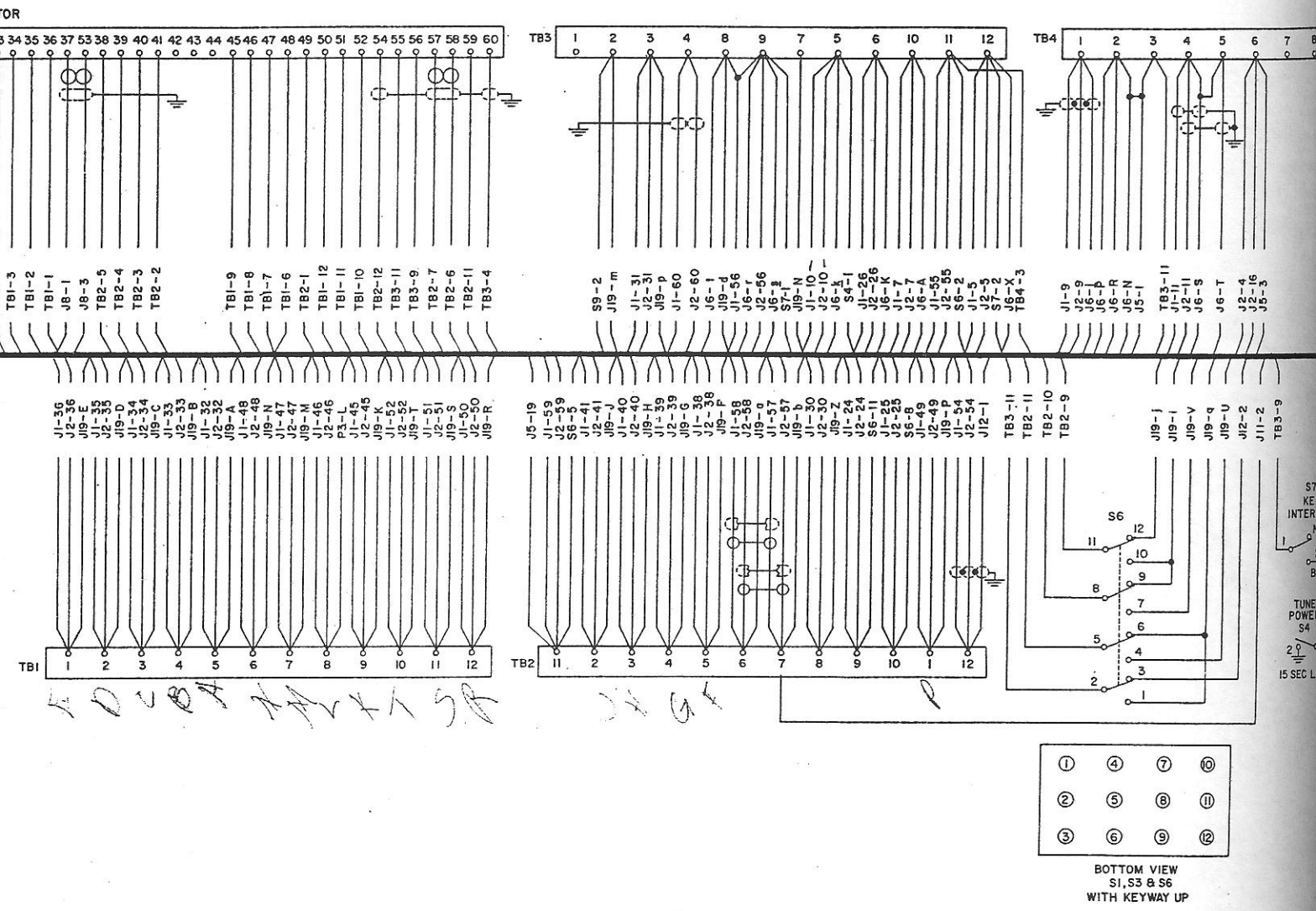
Figure 1005 is an over-all view of Function Test Set 678Z-1. Figure 1006 is a schematic diagram of the 678Z-1. Table 1005 lists equipment supplied as part of the 678Z-1.

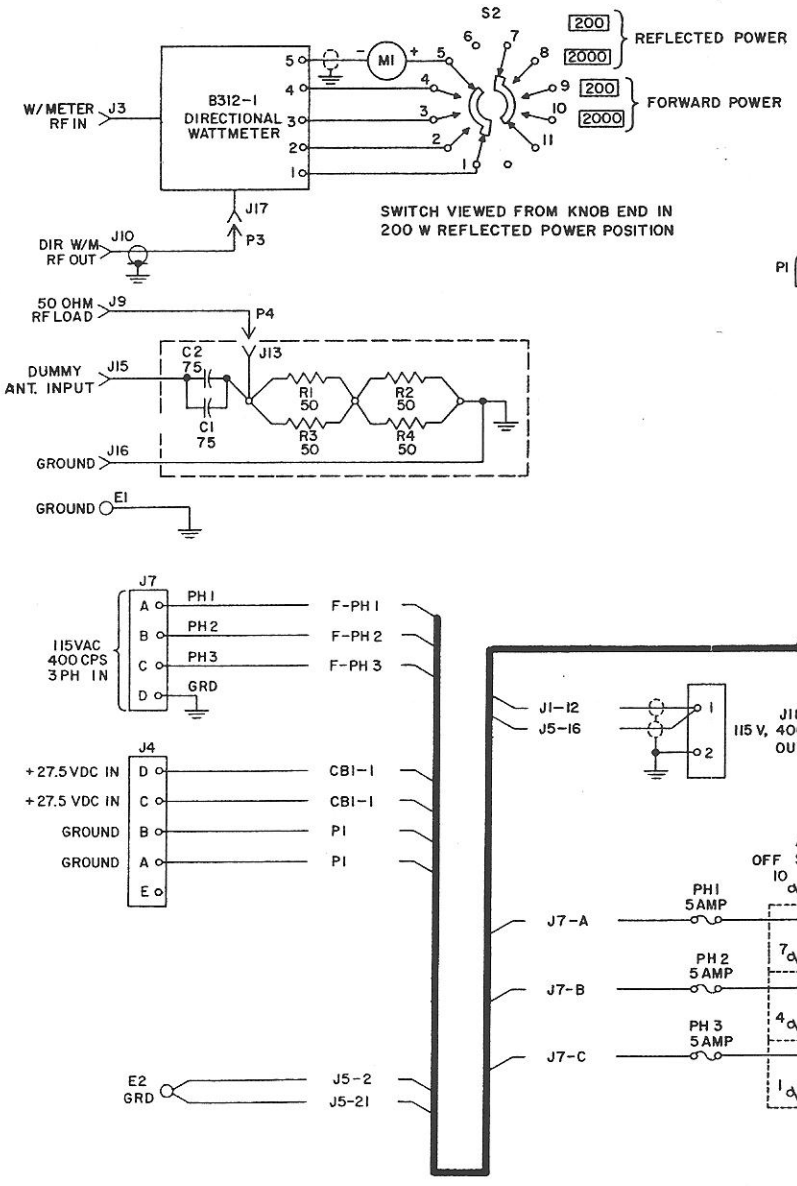
TABLE 1005. FUNCTION TEST SET 678Z-1, EQUIPMENT SUPPLIED

ITEM	COLLINS PART NUMBER
Function test set 678Z-1	548-8001-005
Test lead no. 1 (orange jacks)	549-1006-003
Test lead no. 2 (white jacks)	549-1007-003
Test lead no. 3 (brown jacks)	549-1008-003
Test lead no. 4 (red jacks)	549-1009-003
Test lead no. 5 (yellow jacks)	549-1010-003
Test lead (black jack)	549-1005-002
Test lead bag	024-0252-00
Power cable	548-3539-002

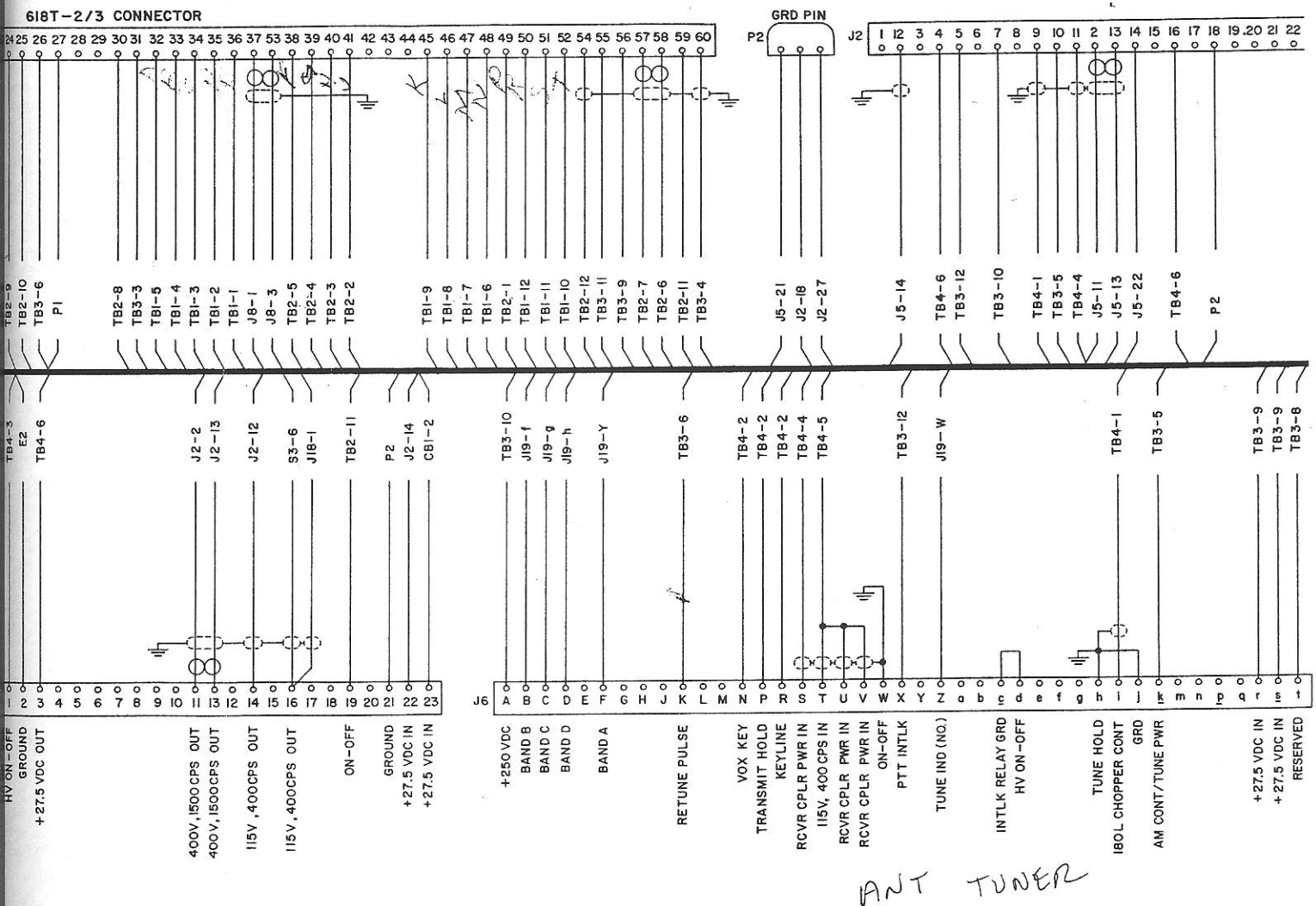


Test Harness 678P-1, Schematic Diagram
(Sheet 1 of 2)
Figure 1002

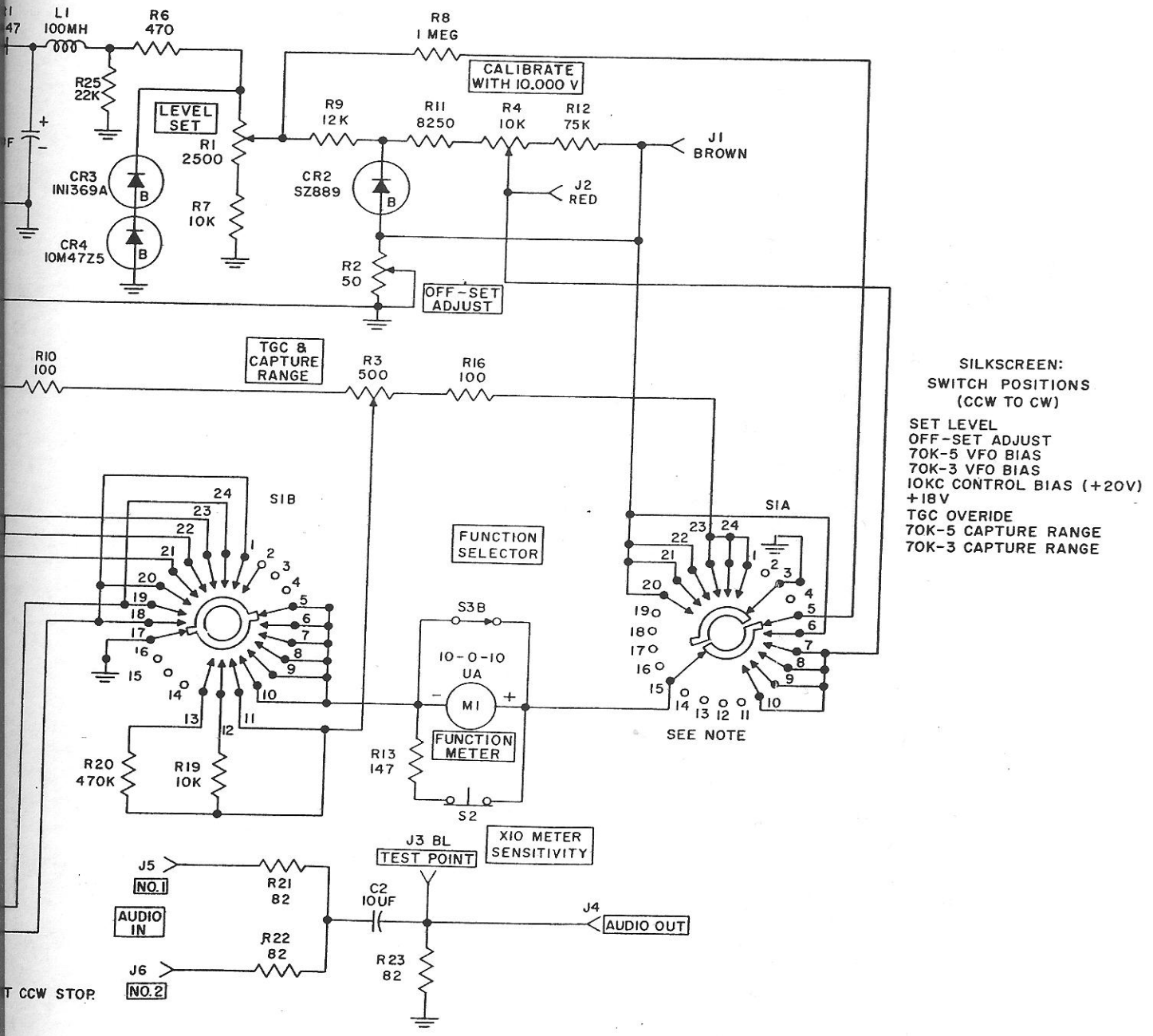

TOR
TB3
TB4
TB1
TB2
S6
BOTTOM VIEW
S1, S3 & S6
WITH KEYWAY UP


S2
200
2000
REFLECTED POWER
FORWARD POWER
MI
W/METER RF IN J3
B312-1 DIRECTIONAL WATTMETER
J17
P3
DIR W/M RF OUT J10
SWITCH VIEWED FROM KNOB END IN 200 W REFLECTED POWER POSITION
50 OHM RF LOAD J9
P4
J13
DUMMY ANT. INPUT J15
C2 75
C1 75
R1 50
R2 50
R3 50
R4 50
GROUND J16
GROUND E1

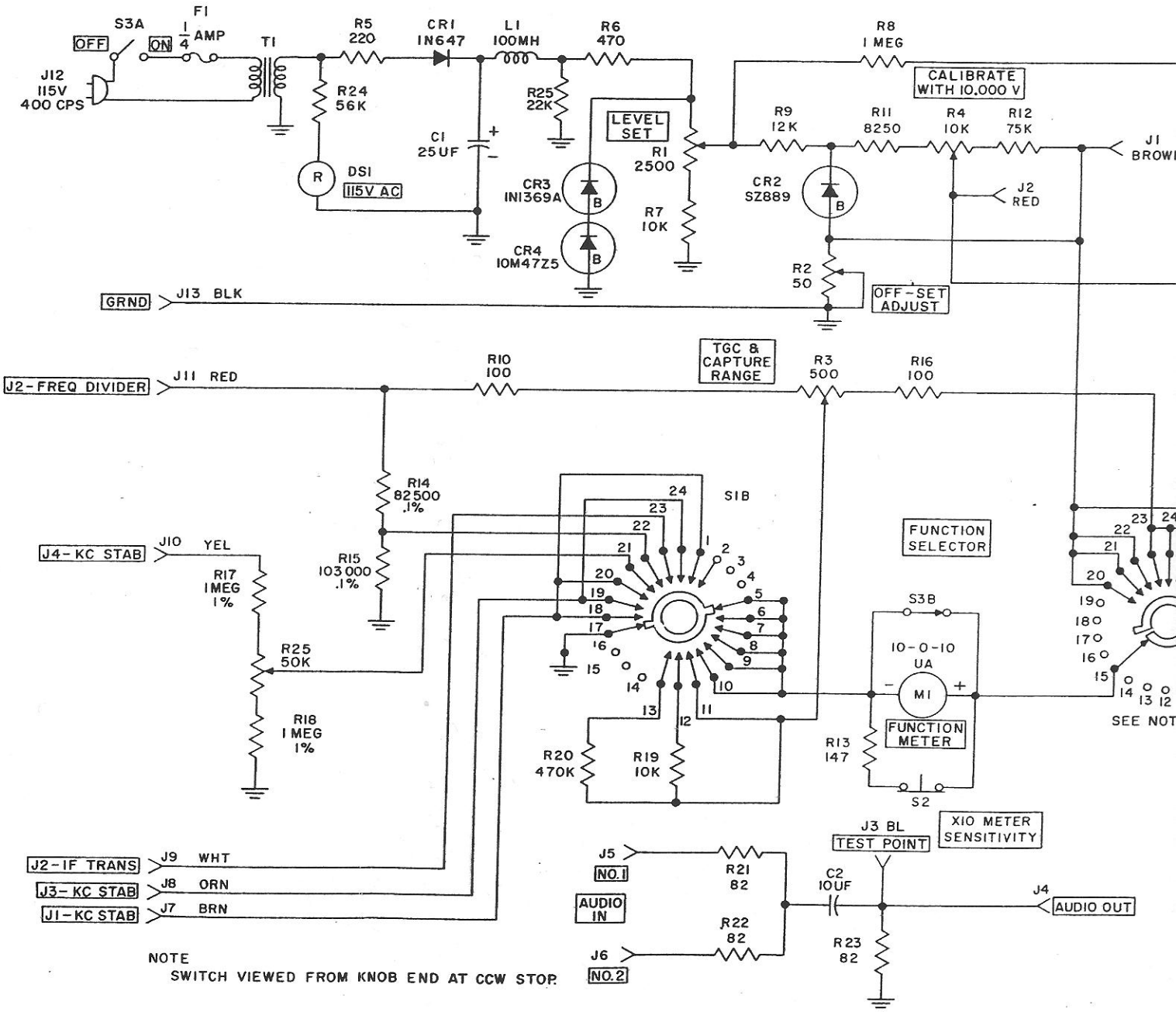
GRD PIN
P1
J1
618T-
J4-A
J4-B
J1-18
J1-27
S1-11
S1-8
S1-5
XF4-2
TB3-12
TB3-10
TB4-1
TB3-5
TB4-4
J18-1
S1-11
S1-8
S1-5
XF4-2
S1-2
P1
TB2-9
TB2-10
TB3-6
P1
J7
115VAC 400 CPS 3PH IN
PH1
PH2
PH3
GRD
F-PH1
F-PH2
F-PH3
J4
+27.5VDC IN
+27.5 VDC IN
GROUND
GROUND
CB1-1
CB1-1
P1
P1
E2
GRD
J5-2
J5-21
J1-12
J5-16
J18
115 V, 400 CPS OUT
CB1-2
J1-1
J1-13
J1-2
J1-14
J1-4
J1-16
J1-3
J1-15
J1-17
J5-16
J4-C
J4-D
S1-10
J5-23
TB4-3
E2
TB4-6
AC
OFF S3 ON
618T-2
S1
618T-3
PH1 5AMP
PH2 5AMP
PH3 5AMP
J7-A
J7-B
J7-C
F4 10 AMP
CB1 35 AMP
DC ON-OFF
J5
HV ON-OFF
GROUND
+27.5 VDC OUT



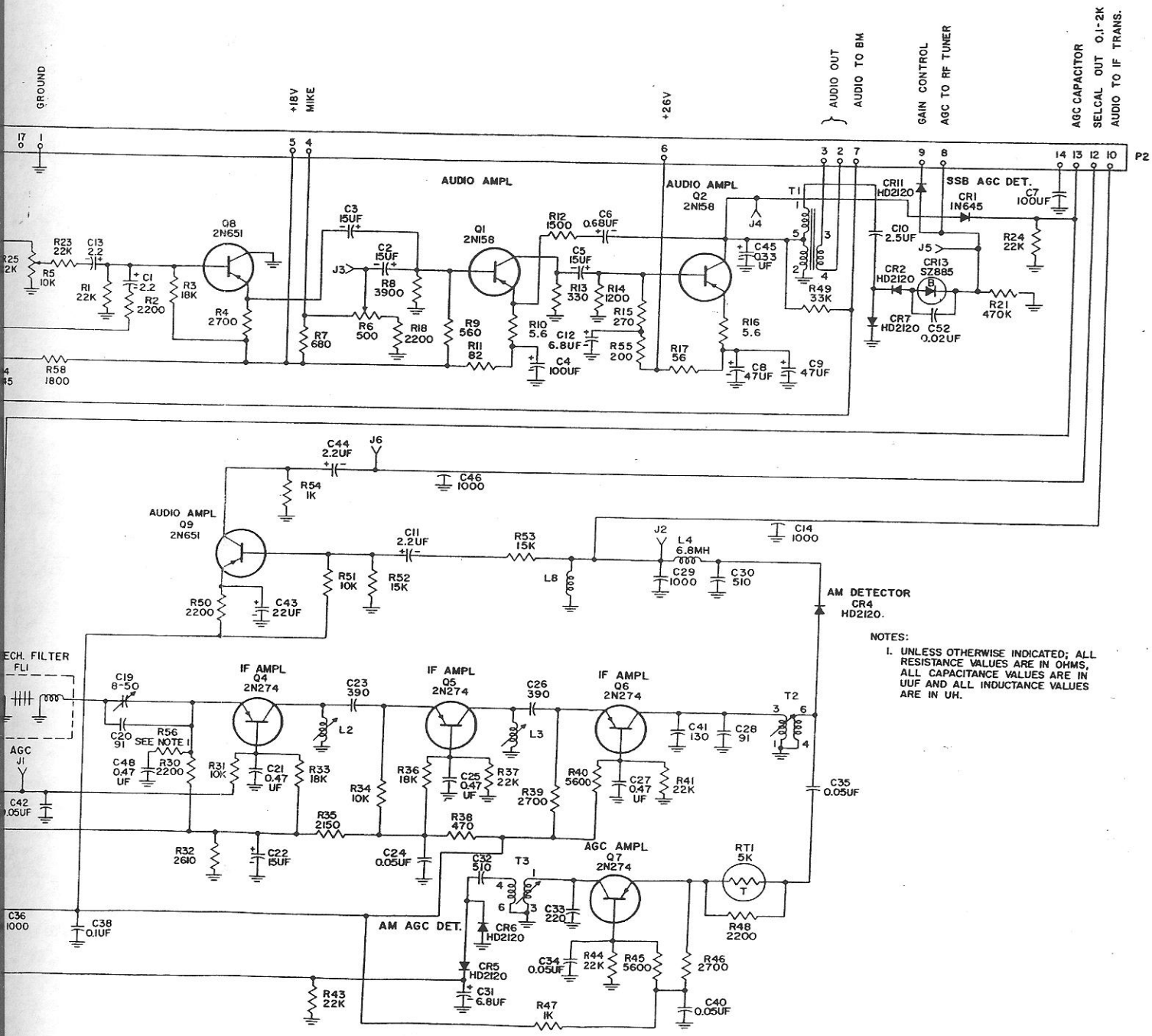
Test Harness 678P-1, Schematic Diagram
(Sheet 2 of 2)
Figure 1002



Function Test Set 678Z-1, Schematic Diagram
Figure 1006

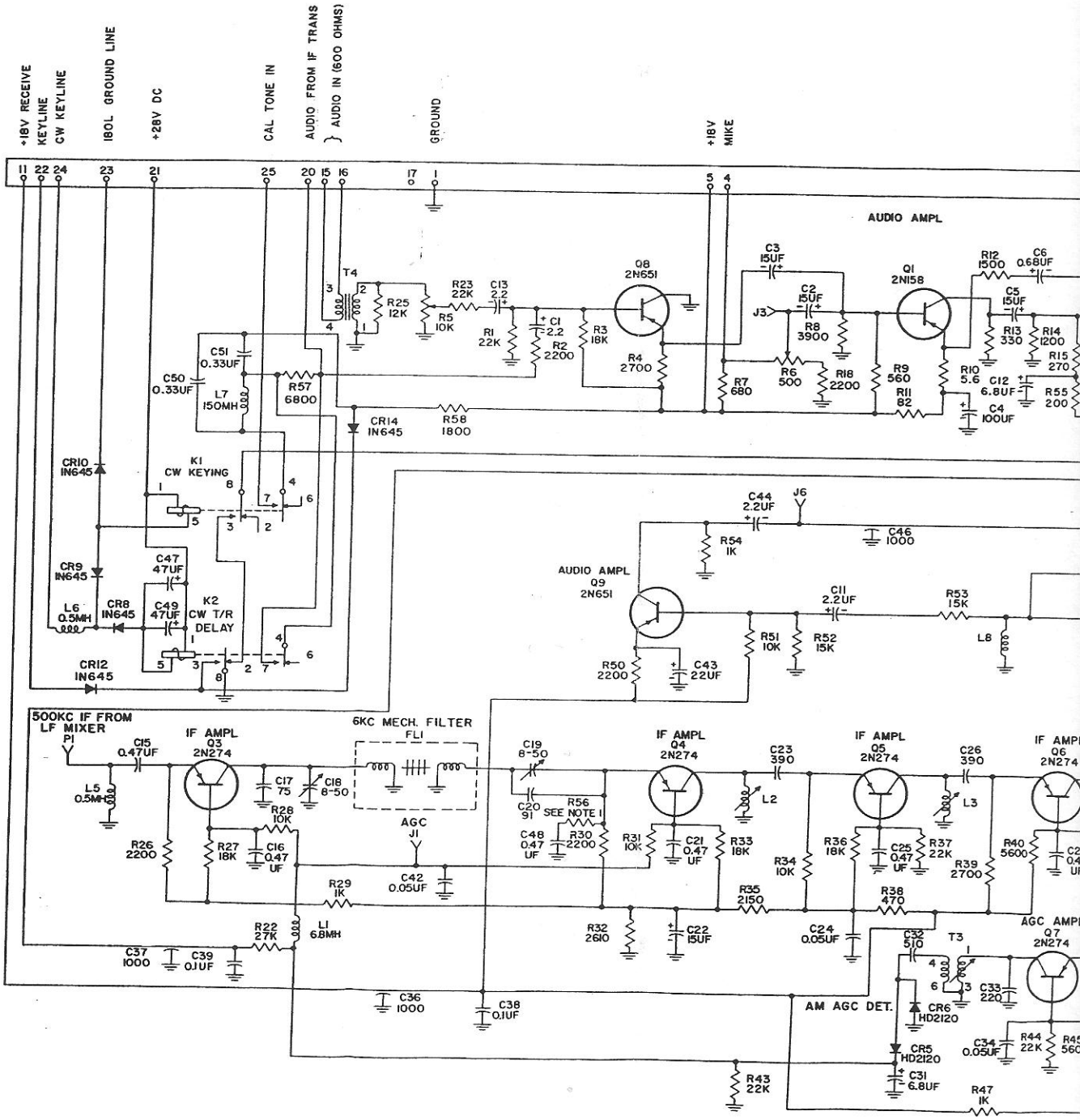

S3A
OFF
ON
F1
1/4 AMP
J12
115V
400 CPS
T1
R5
220
CR1
IN647
L1
100MH
R6
470
R8
1 MEG
CALIBRATE
WITH 10,000 V
R24
56K
R25
22K
LEVEL
SET
R9
12K
R11
8250
R4
10K
R12
75K
J1
BROWN
C1
25UF
R
DS1
115V AC
CR3
IN1369A
R1
2500
CR2
SZ889
J2
RED
R7
10K
CR4
10M47Z5
R2
50
OFF-SET
ADJUST
GRND
J13 BLK
J2-FREQ DIVIDER
J11 RED
R10
100
TGC &
CAPTURE
RANGE
R3
500
R16
100
R14
82500
.1%
S1B
FUNCTION
SELECTOR
J4-KC STAB
J10 YEL
R17
1MEG
1%
R15
103000
.1%
S3B
10-0-10
UA
M1
FUNCTION
METER
R25
50K
R18
1 MEG
1%
R20
470K
R19
10K
R13
147
S2
SEE NOT
J2-IF TRANS
J9 WHT
J3-KC STAB
J8 ORN
J1-KC STAB
J7 BRN
J3 BL
TEST POINT
X10 METER
SENSITIVITY
J5
NO.1
AUDIO
IN
J6
NO.2
R21
82
R22
82
C2
10UF
R23
82
J4
AUDIO OUT
NOTE
SWITCH VIEWED FROM KNOB END AT CCW STOP

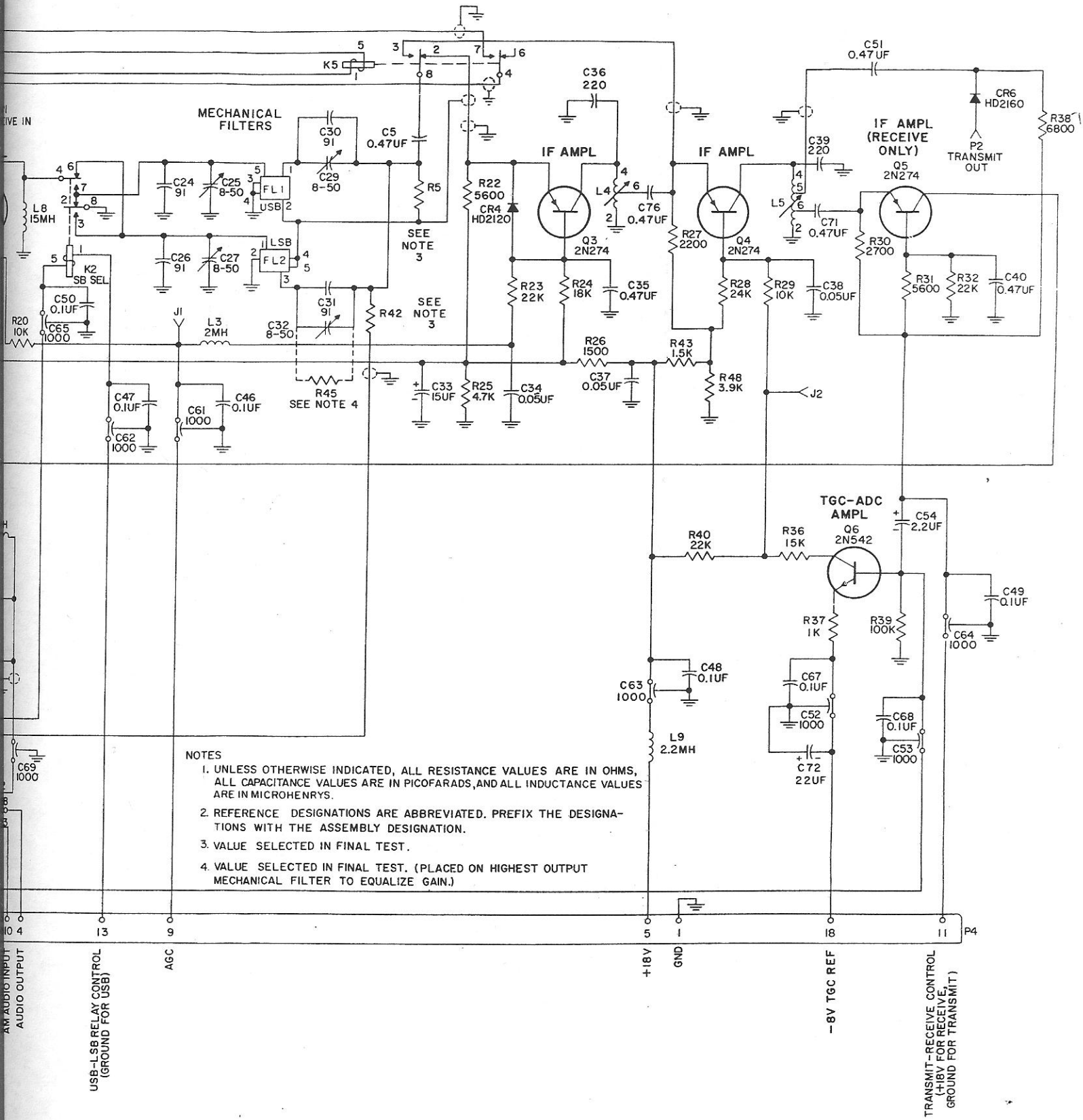
AIRBORNE SSB TRANSCEIVER 618T-( ) - ILLUSTRATIONS



AM/Audio Amplifier Module, Schematic Diagram
Figure 1101

AIRBORNE SSB TRANSCE

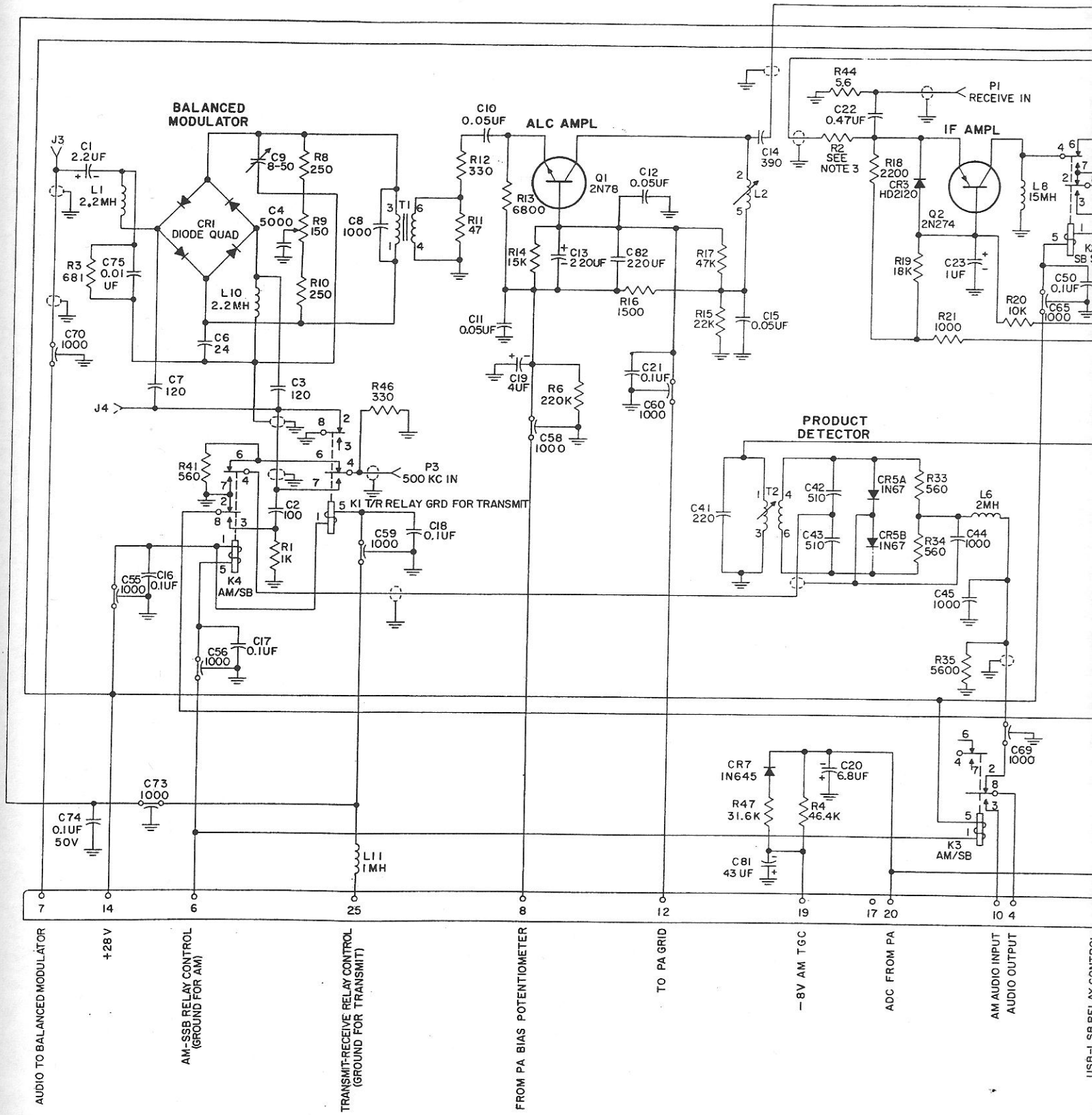


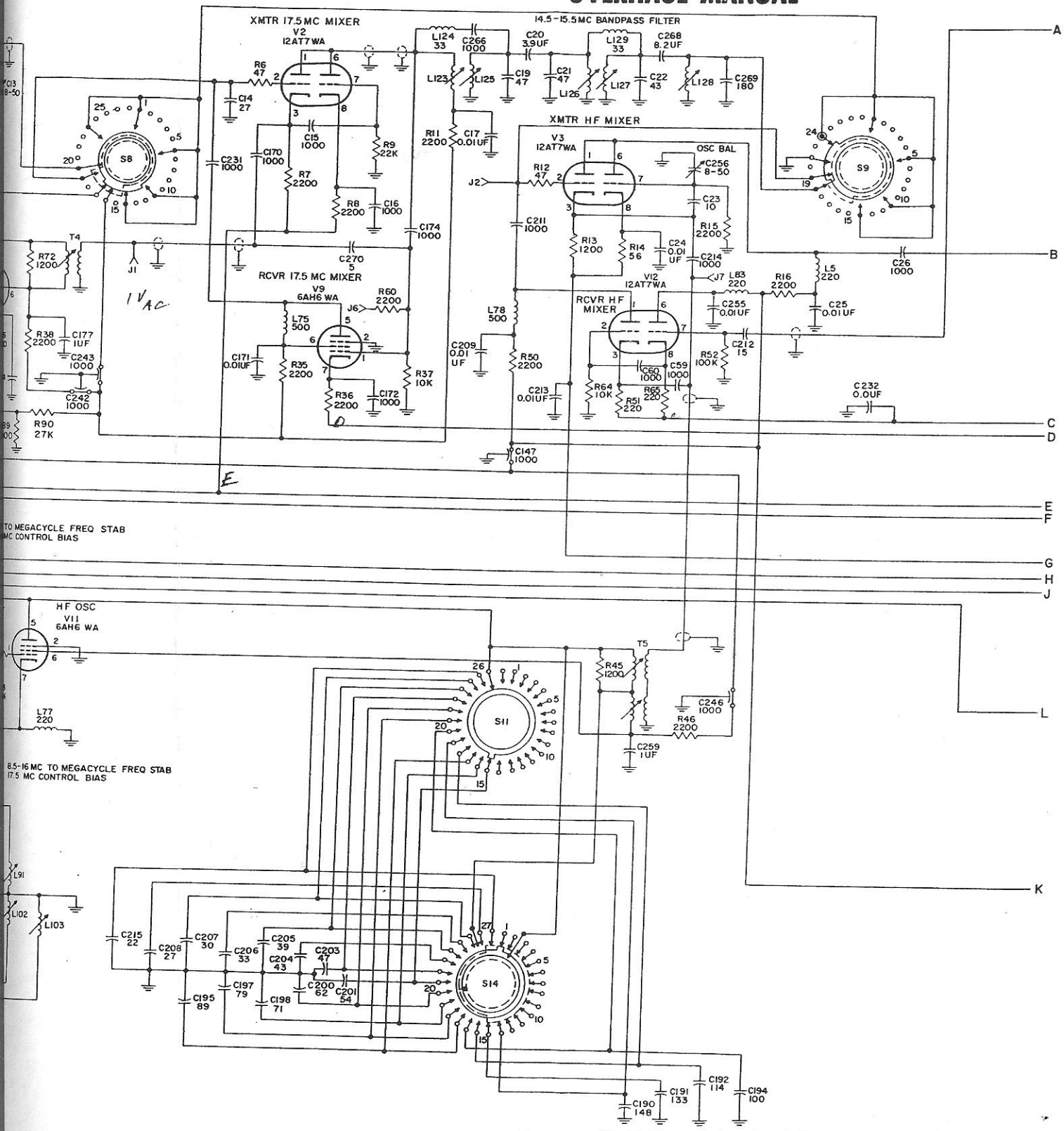


NOTES

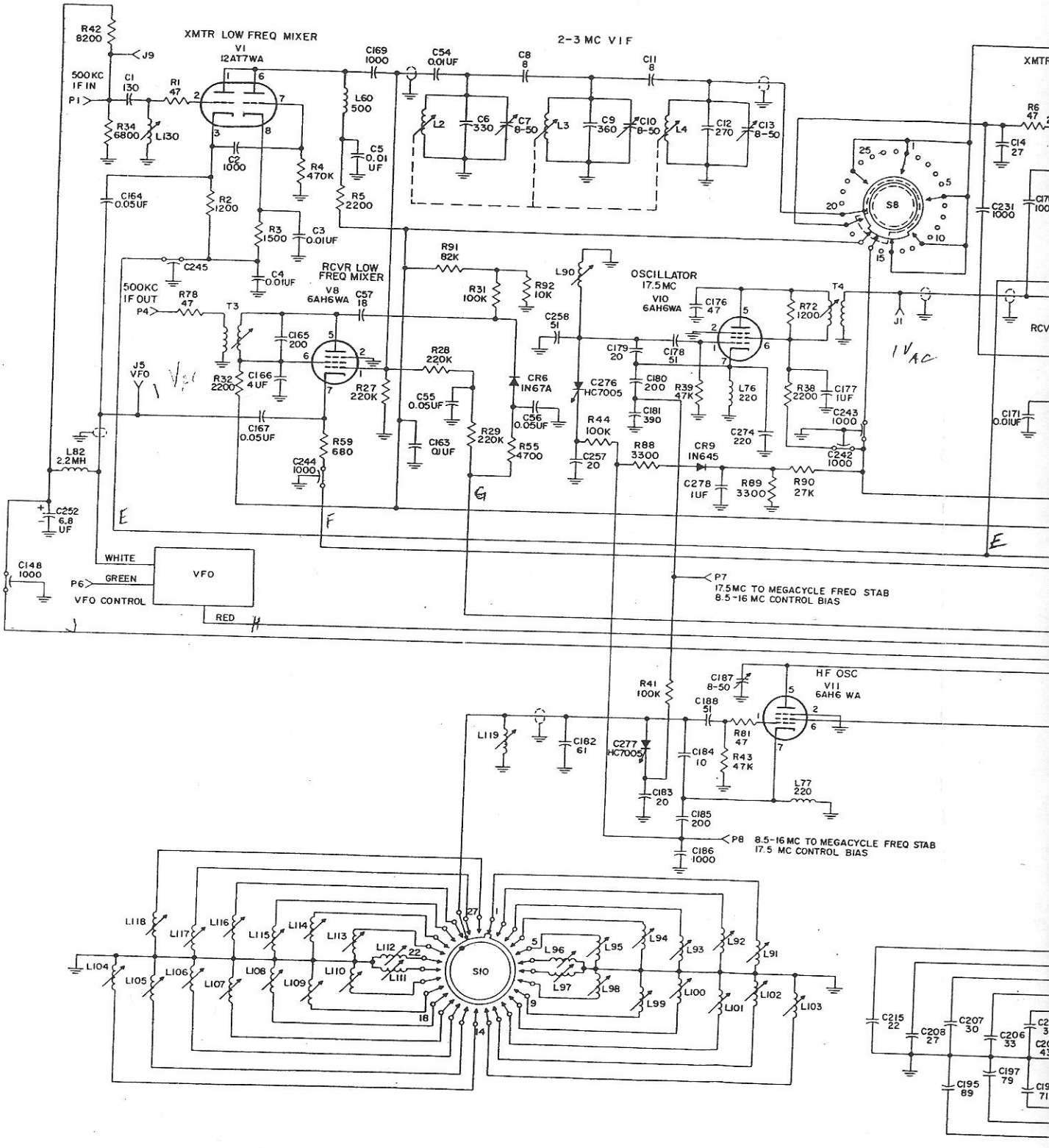
1. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
2. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION.
3. VALUE SELECTED IN FINAL TEST.
4. VALUE SELECTED IN FINAL TEST. (PLACED ON HIGHEST OUTPUT MECHANICAL FILTER TO EQUALIZE GAIN.)

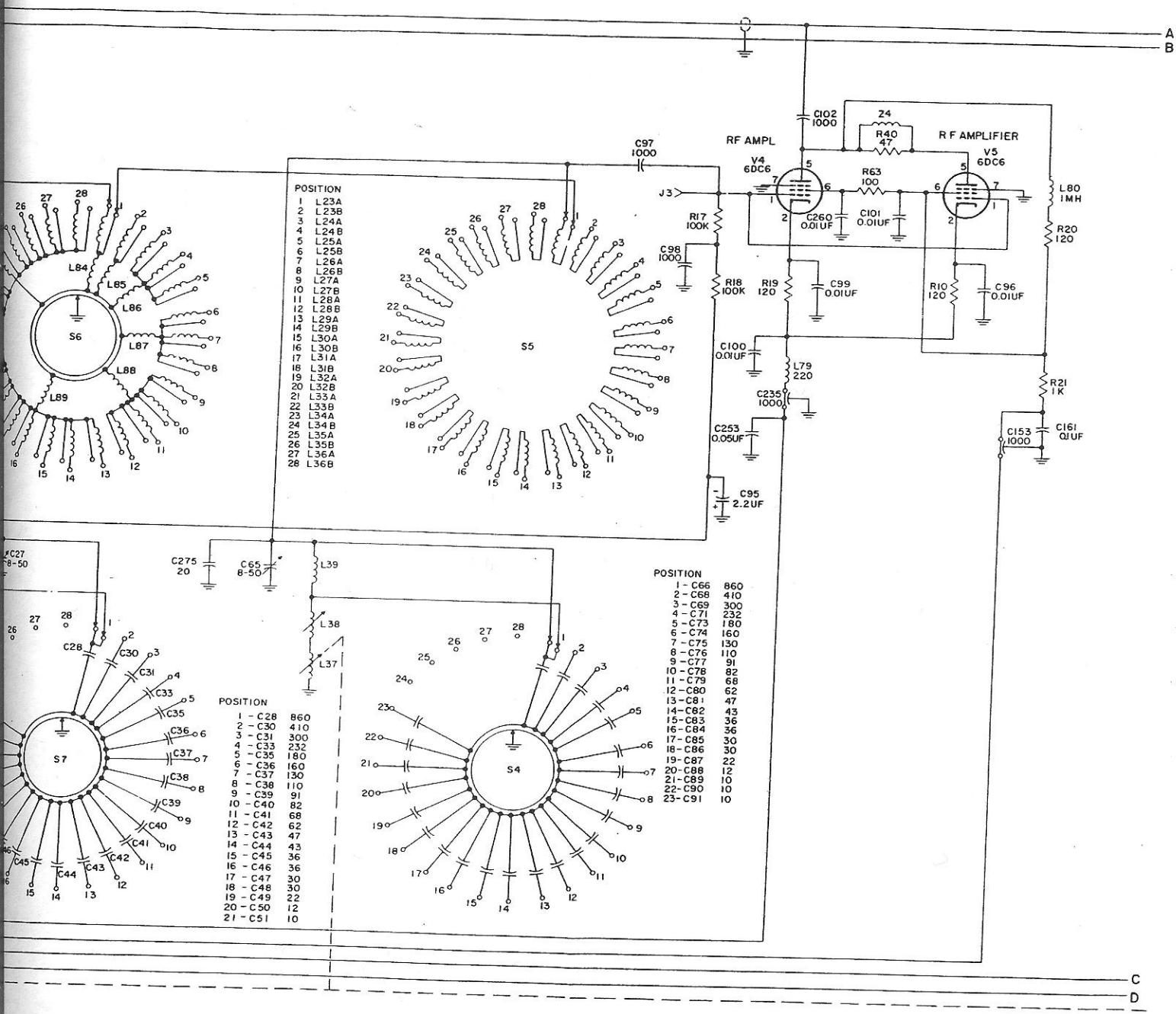
I-F Translator Module, Schematic Diagram
Figure 1102


BALANCED MODULATOR
ALC AMPL
IF AMPL
PRODUCT DETECTOR
J3
C1 2.2UF
L1 2.2MH
R3 681
C75 0.01 UF
C70 1000
CR1 DIODE QUAD
C9 8-50
R8 250
C4 5000
R9 150
R10 250
L10 2.2MH
C6 24
C8 1000
T1
R11 47
C10 0.05UF
R12 330
R13 6800
Q1 2N78
C12 0.05UF
C11 0.05UF
R14 15K
C13 220UF
C82 220UF
R16 1500
R17 47K
R15 22K
C15 0.05UF
C14 390
L2
C19 4UF
R6 220K
C58 1000
C21 0.1UF
C60 1000
J4
C7 120
C3 120
R46 330
P3 500 KC IN
K1 T/R RELAY GRD FOR TRANSMIT
R41 560
C2 100
R1 1K
C59 1000
C18 0.1UF
K4 AM/SB
C55 1000
C16 0.1UF
C56 1000
C17 0.1UF
R44 5.6
C22 0.47UF
P1 RECEIVE IN
R2 SEE NOTE 3
R18 2200
CR3 HD2120
Q2 2N274
L8 15MH
R19 18K
C23 1UF
R20 10K
R21 1000
C50 0.1UF
C65 1000
C41 220
T2
C42 510
C43 510
CR5A IN67
CR5B IN67
R33 560
R34 560
L6 2MH
C44 1000
C45 1000
R35 5600
C69 1000
CR7 IN645
C20 6.8UF
R47 31.6K
R4 46.4K
C81 43 UF
K3 AM/SB
C73 1000
C74 0.1UF 50V
L11 1MH
7
14
6
25
8
12
19
17 20
10 4
AUDIO TO BALANCED MODULATOR
+28 V
AM-SSB RELAY CONTROL (GROUND FOR AM)
TRANSMIT-RECEIVE RELAY CONTROL (GROUND FOR TRANSMIT)
FROM PA BIAS POTENTIOMETER
TO PA GRID
-8V AM TGC
ADC FROM PA
AM AUDIO INPUT
AUDIO OUTPUT

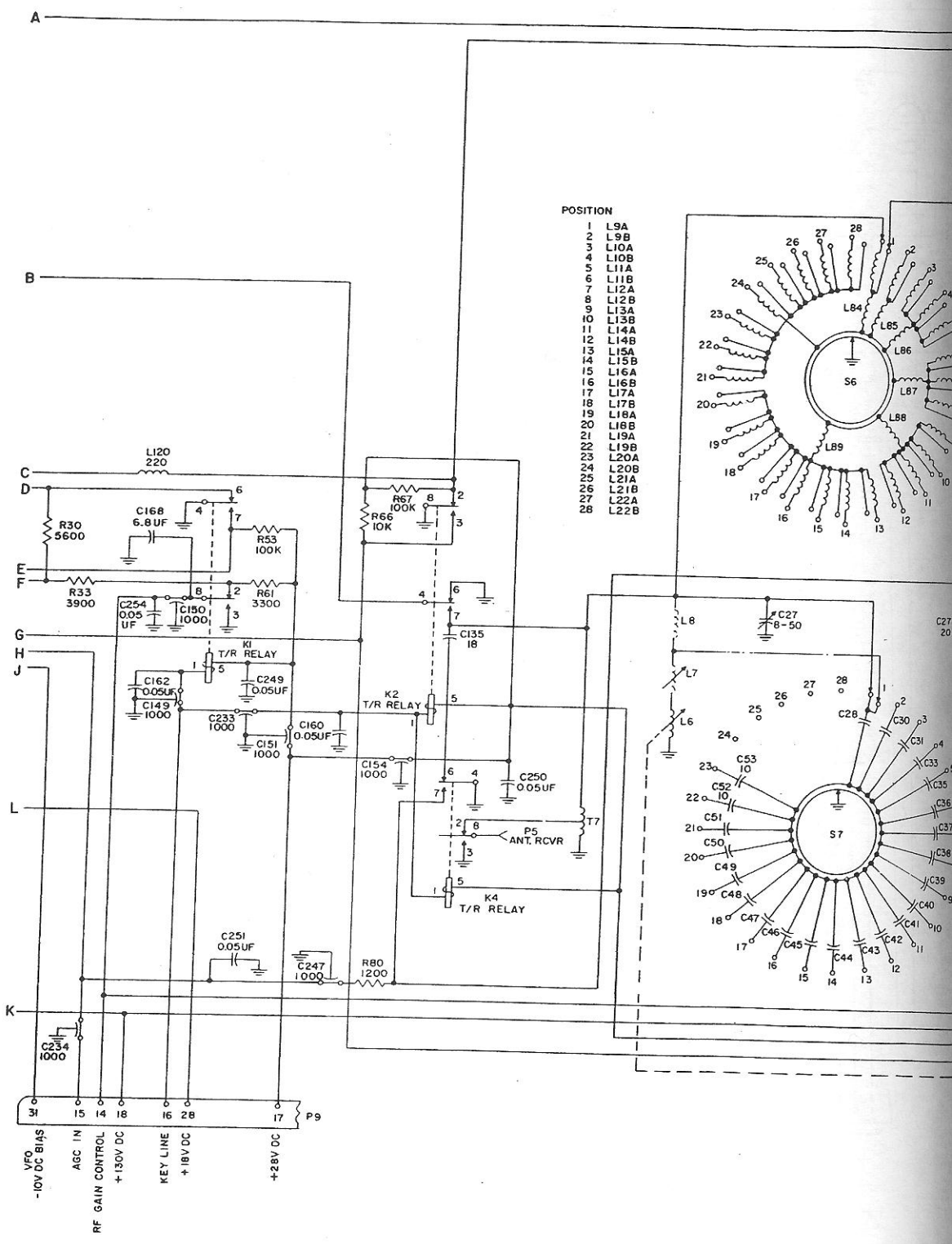


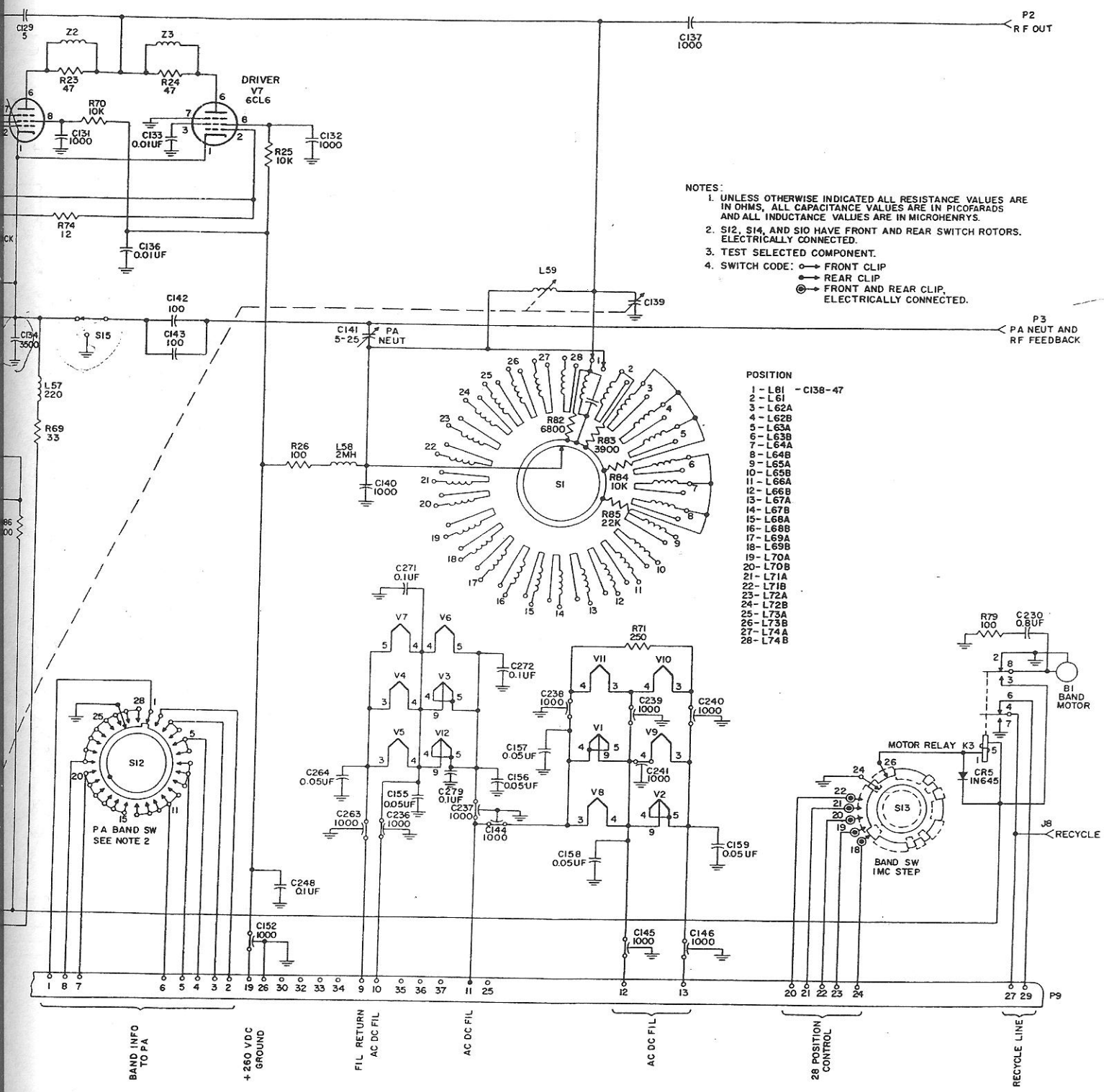
R-F Translator Module, Schematic Diagram
(Sheet 1 of 3)
Figure 1103


XMTR LOW FREQ MIXER
V1
12AT7WA
2-3 MC VIF
500KC IF IN
P1
J9
R42 8200
C1 130
R1 47
R34 6800
L130
C2 1000
R4 470K
C164 0.05UF
R2 1200
R3 1500
C3 0.01UF
C4 0.01UF
C245
C169 1000
C54 0.01UF
C8 8
C11 8
L60 500
C5 0.01 UF
R5 2200
L2
C6 330
C7 8-50
L3
C9 360
C10 8-50
L4
C12 270
C13 8-50
S8
C14 27
C231 1000
R6 47
RCVR LOW FREQ MIXER
V8
6AH6WA
500KC IF OUT
P4
R78 47
T3
C165 200
C166 4UF
C167 0.05UF
R32 2200
J5 VFO
R28 220K
R27 220K
R59 680
C244 1000
C55 0.05UF
C163 0.1UF
R29 220K
R55 4700
C56 0.05UF
CR6 IN67A
R91 82K
R31 100K
R92 10K
L90
C57 18
C258 51
OSCILLATOR
17.5MC
V10
6AH6WA
C176 47
C179 20
C178 51
C276 HC7005
C180 200
C181 390
R39 47K
L76 220
C274 220
R72 1200
T4
J1
R38 2200
C177 1UF
C243 1000
C242 1000
C171 0.01UF
1VAC
R44 100K
C257 20
R88 3300
CR9 IN645
C278 1UF
R89 3300
R90 27K
L82 2.2MH
C252 6.8 UF
C148 1000
P6
WHITE
GREEN
VFO CONTROL
RED
VFO
P7
17.5MC TO MEGACYCLE FREQ STAB
8.5-16 MC CONTROL BIAS
HF OSC
V11
6AH6 WA
R41 100K
C187 8-50
C188 51
R81 47
L119
C182 61
C277 HC7005
C184 10
R43 47K
C183 20
L77 220
C185 200
C186 1000
P8
8.5-16 MC TO MEGACYCLE FREQ STAB
17.5 MC CONTROL BIAS
S10
L118
L117
L116
L115
L114
L113
L112
L111
L110
L109
L108
L107
L106
L105
L104
L96
L95
L94
L93
L92
L91
L97
L98
L99
L100
L101
L102
L103
C215 22
C208 27
C207 30
C206 33
C197 79
C195 89

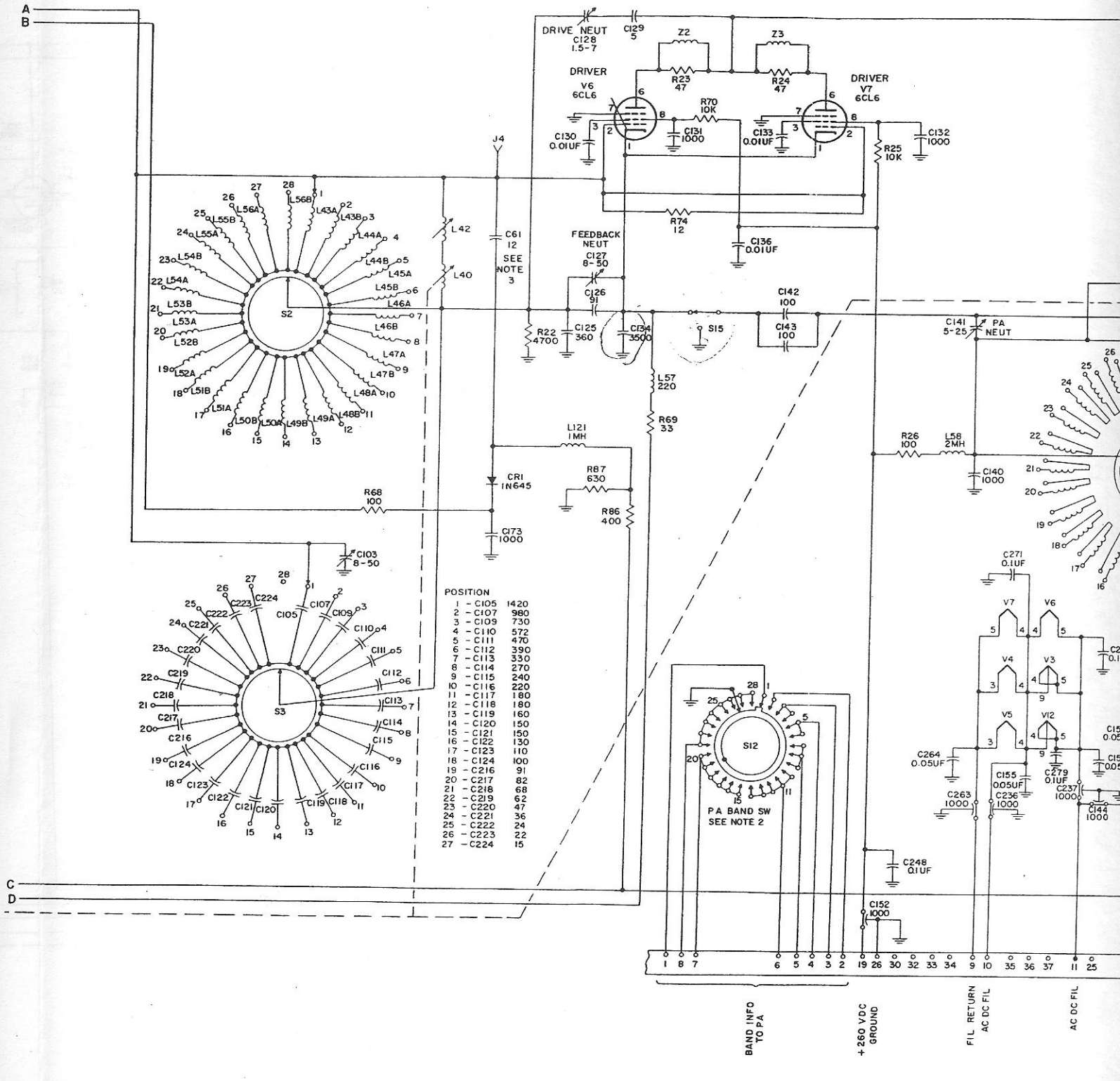


R-F Translator Module, Schematic Diagram
(Sheet 2 of 3)
Figure 1103

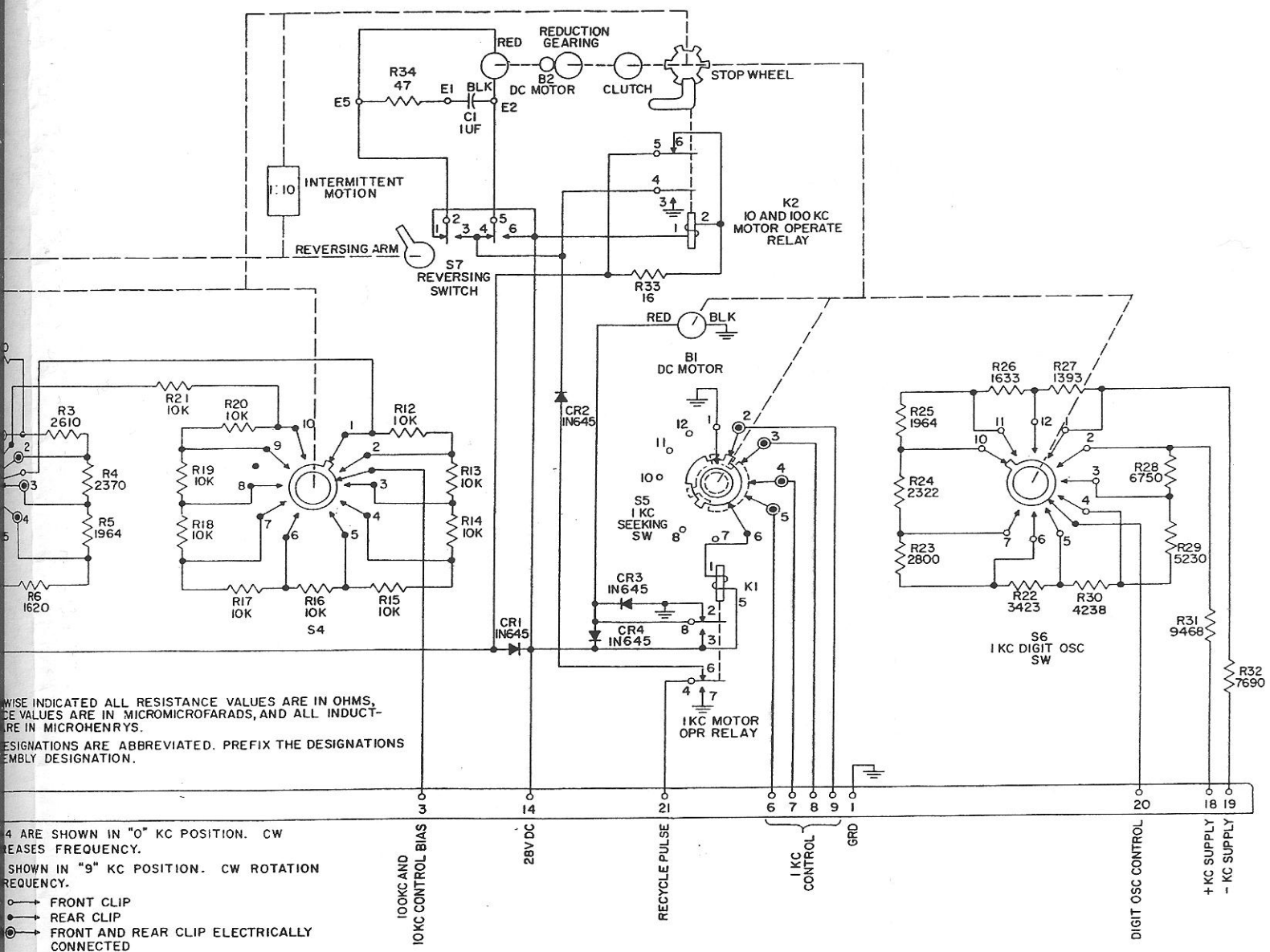

POSITION
1 L9A
2 L9B
3 L10A
4 L10B
5 L11A
6 L11B
7 L12A
8 L12B
9 L13A
10 L13B
11 L14A
12 L14B
13 L15A
14 L15B
15 L16A
16 L16B
17 L17A
18 L17B
19 L18A
20 L18B
21 L19A
22 L19B
23 L20A
24 L20B
25 L21A
26 L21B
27 L22A
28 L22B
S6
L84
L85
L86
L87
L88
L89
S7
L120 220
R30 5600
C168 6.8UF
R53 100K
R33 3900
R61 3300
C254 .005 UF
C150 1000
R67 100K
R66 10K
K1 T/R RELAY
C162 0.05UF
C149 1000
C249 0.05UF
C233 1000
C151 1000
C160 0.05UF
K2 T/R RELAY
C154 1000
C135 18
C250 0.05UF
P5 ANT. RCVR
T7
K4 T/R RELAY
C251 0.05UF
C247 1000
R80 1200
C234 1000
L8
C27 8-50
L7
L6
C28
C30
C31
C33
C35
C36
C37
C38
C39
C40
C41
C42
C43
C44
C45
C46
C47
C48
C49
C50
C51
C52 10
C53 10
31
15
14
18
16
28
17
P9
VFO -10V DC BIAS
AGC IN
RF GAIN CONTROL
+13.5V DC
KEY LINE
+18V DC
+28V DC



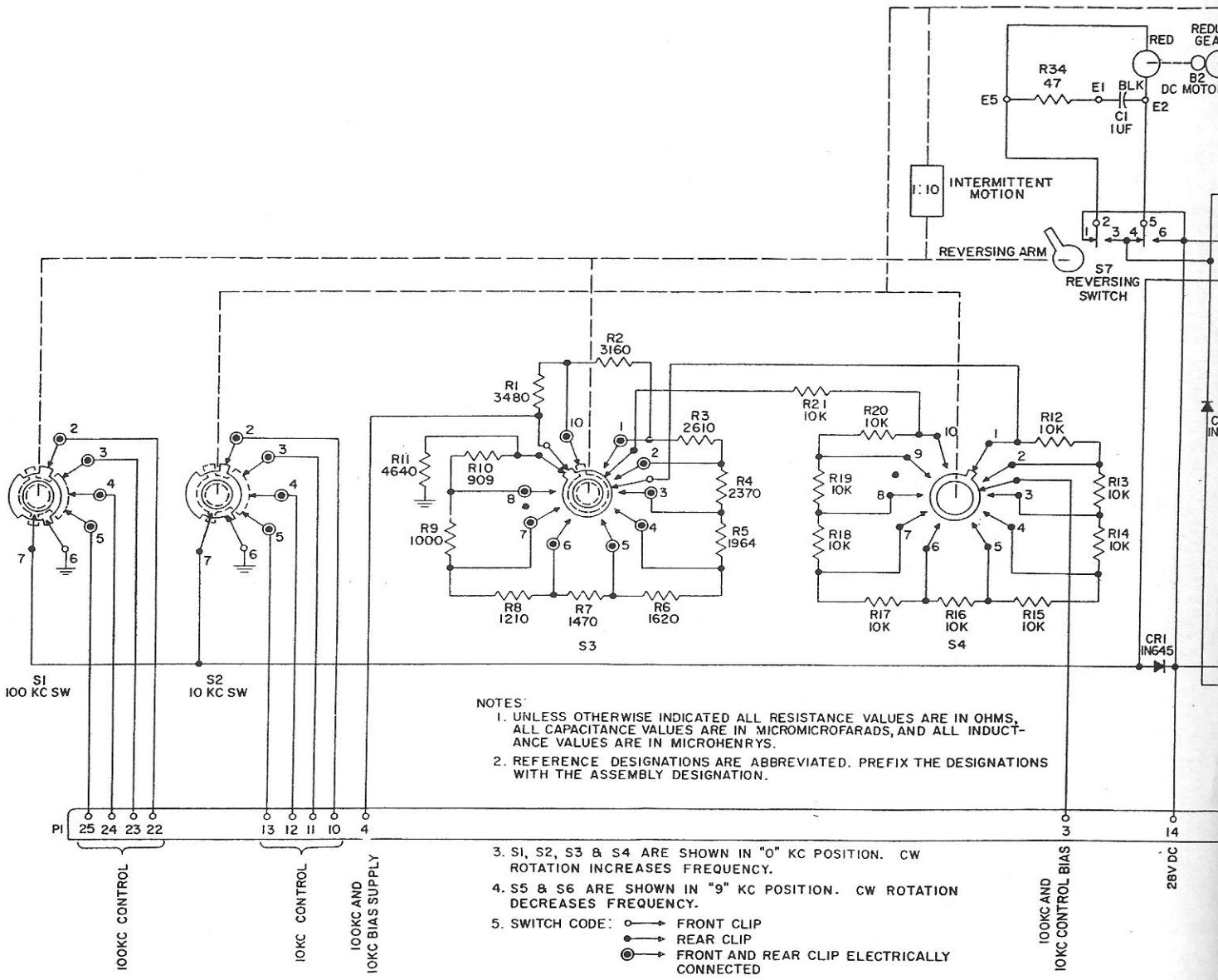
R-F Translator Module, Schematic Diagram
(Sheet 3 of 3)
Figure 1103



POSITION		
1	C105	1420
2	C107	980
3	C109	730
4	C110	572
5	C111	470
6	C112	390
7	C113	330
8	C114	270
9	C115	240
10	C116	220
11	C117	180
12	C118	180
13	C119	160
14	C120	150
15	C121	150
16	C122	130
17	C123	110
18	C124	100
19	C216	91
20	C217	82
21	C218	68
22	C219	62
23	C220	47
24	C221	36
25	C222	24
26	C223	22
27	C224	15

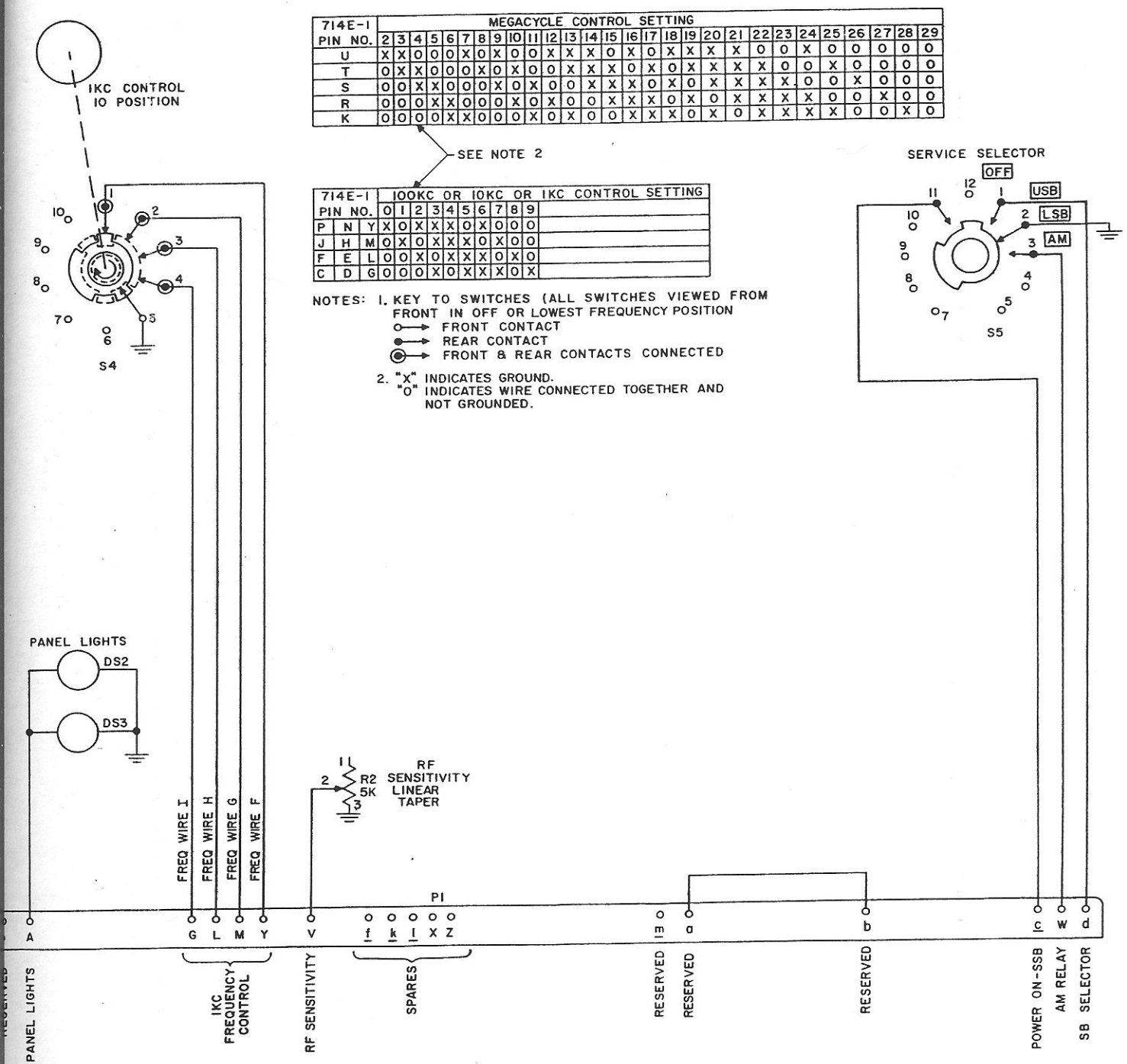


Autopositioner Submodule, Schematic Diagram
Figure 1104



NOTES:

1. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
2. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION.
3. S1, S2, S3 & S4 ARE SHOWN IN "0" KC POSITION. CW ROTATION INCREASES FREQUENCY.
4. S5 & S6 ARE SHOWN IN "9" KC POSITION. CW ROTATION DECREASES FREQUENCY.
5. SWITCH CODE: ○→ FRONT CLIP
   ●→ REAR CLIP
   ◉→ FRONT AND REAR CLIP ELECTRICALLY CONNECTED



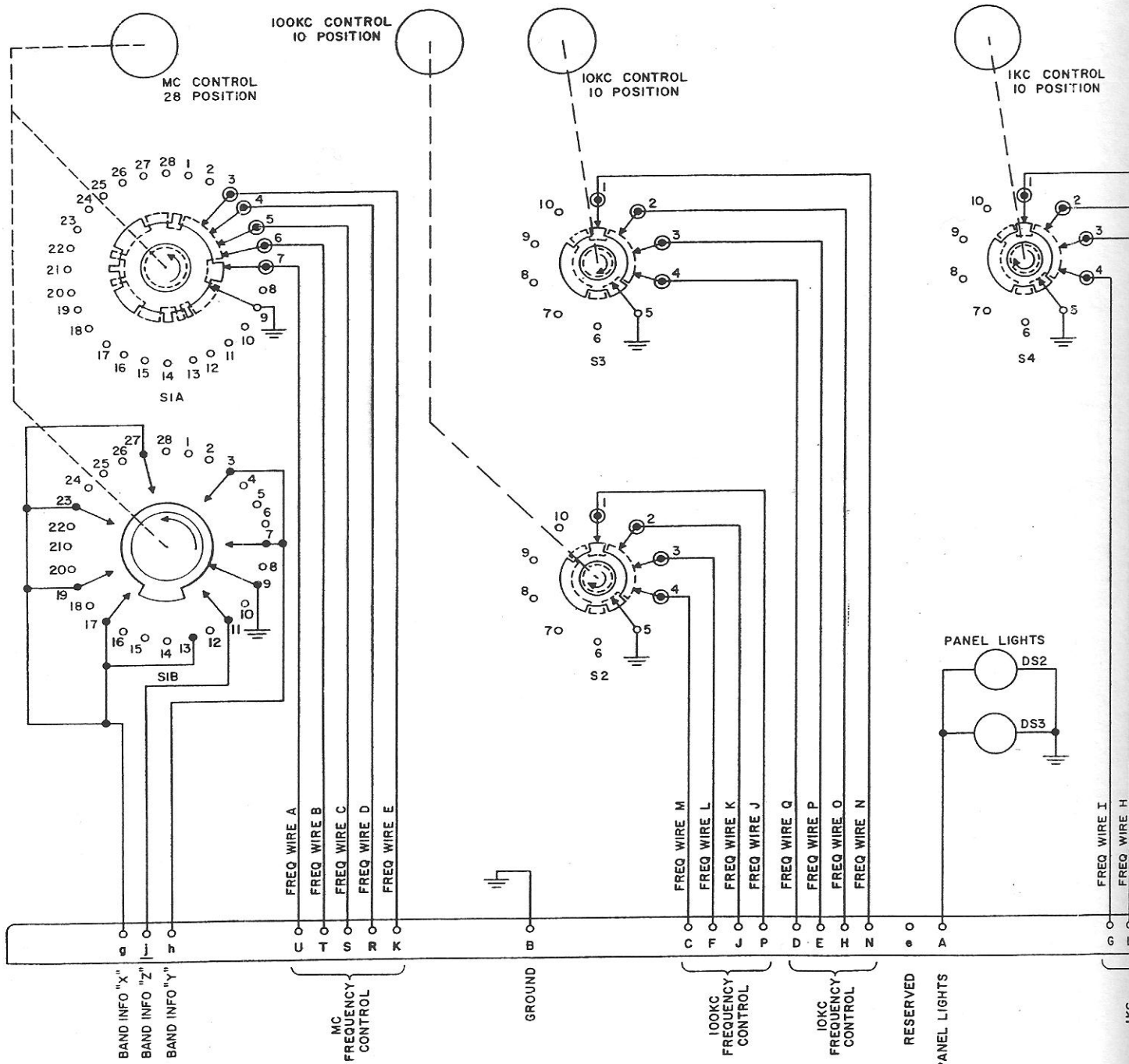
714E-1 PIN NO.	MEGACYCLE CONTROL SETTING																										
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
U	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O	O	O	O	O
T	O	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O	O	O	O
S	O	O	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O	O	O
R	O	O	O	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O	O
K	O	O	O	O	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O

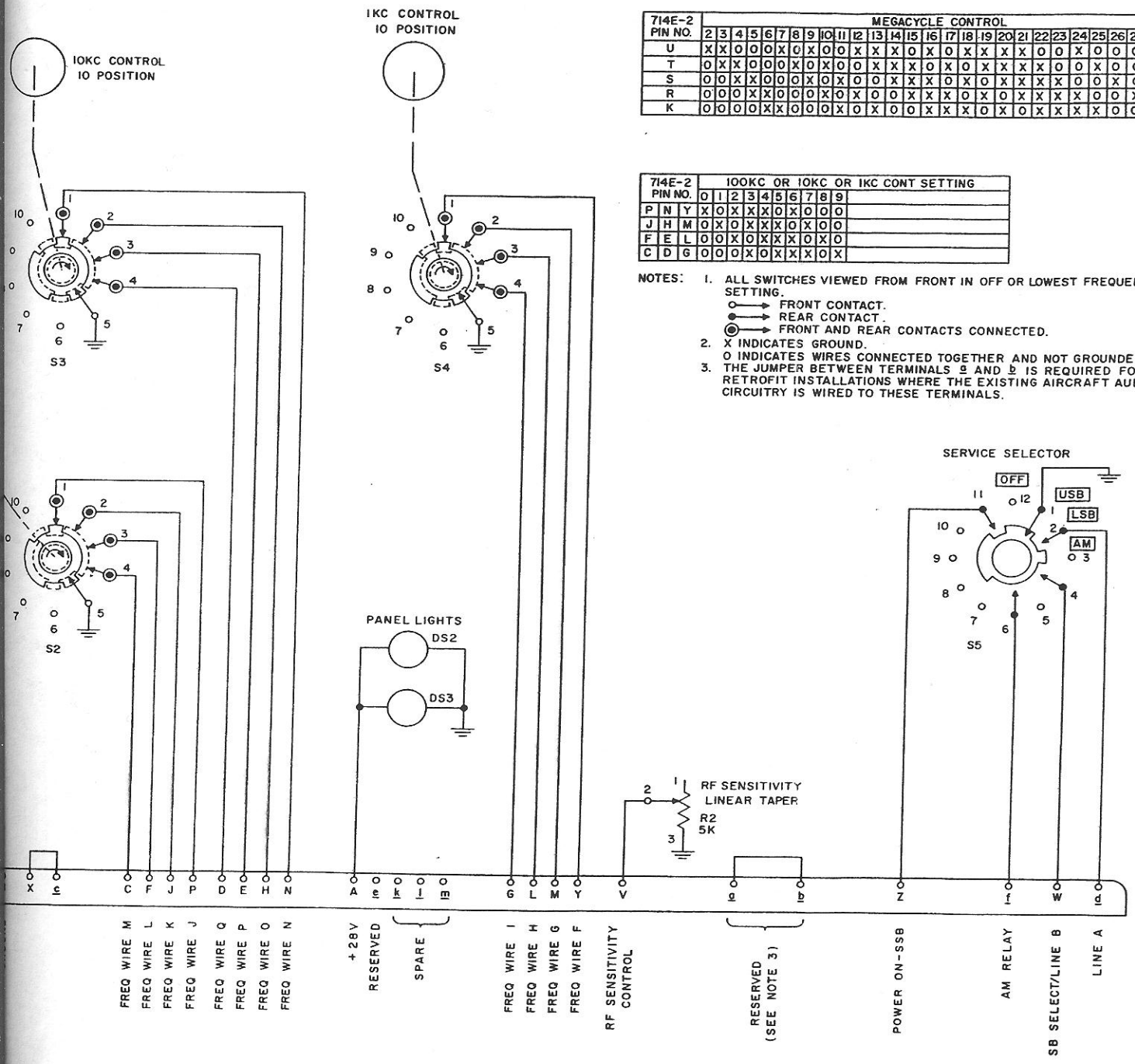
714E-1 PIN NO.			IOOKC OR IOKC OR IKC CONTROL SETTING										
			0	1	2	3	4	5	6	7	8	9	
P	N	Y	X	O	X	X	X	O	X	O	O	O	
J	H	M	O	X	O	X	X	X	O	X	O	O	
F	E	L	O	O	X	O	X	X	X	O	X	O	
C	D	G	O	O	O	X	O	X	X	X	O	X	

NOTES: 1. KEY TO SWITCHES (ALL SWITCHES VIEWED FROM FRONT IN OFF OR LOWEST FREQUENCY POSITION
- o→ FRONT CONTACT
- ●→ REAR CONTACT
- ◉→ FRONT & REAR CONTACTS CONNECTED

2. "X" INDICATES GROUND.
"O" INDICATES WIRE CONNECTED TOGETHER AND NOT GROUNDED.

Control Unit 714E-1, Schematic Diagram
Figure 1105


100KC CONTROL
10 POSITION
MC CONTROL
28 POSITION
10KC CONTROL
10 POSITION
1KC CONTROL
10 POSITION
S1A
S1B
S2
S3
S4
PANEL LIGHTS
DS2
DS3
FREQ WIRE A
FREQ WIRE B
FREQ WIRE C
FREQ WIRE D
FREQ WIRE E
FREQ WIRE M
FREQ WIRE L
FREQ WIRE K
FREQ WIRE J
FREQ WIRE Q
FREQ WIRE P
FREQ WIRE O
FREQ WIRE N
FREQ WIRE I
g
j
h
U
T
S
R
K
B
C
F
J
P
D
E
H
N
e
A
G
BAND INFO "X"
BAND INFO "Z"
BAND INFO "Y"
MC FREQUENCY CONTROL
GROUND
100KC FREQUENCY CONTROL
10KC FREQUENCY CONTROL
RESERVED
PANEL LIGHTS

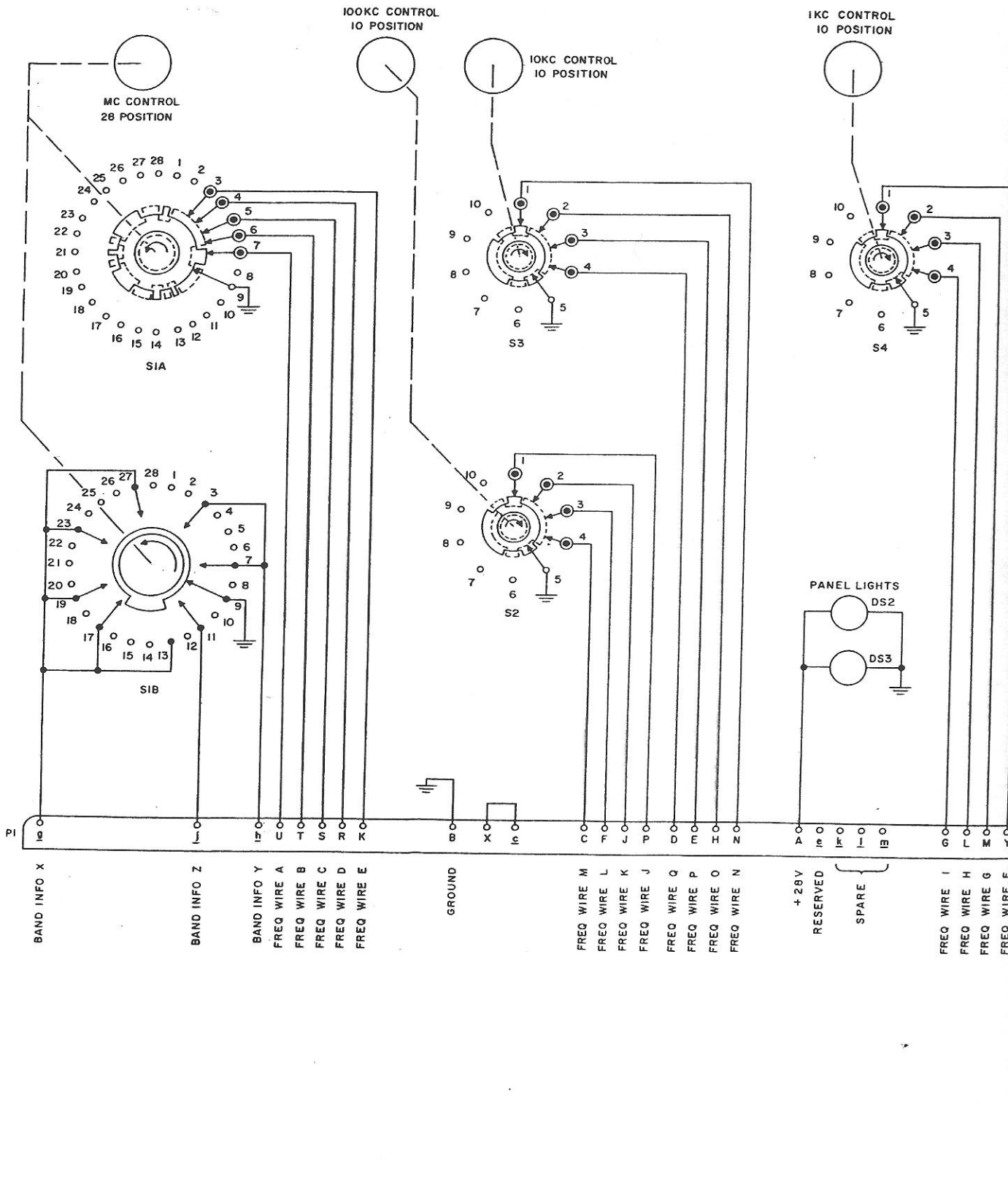


714E-2 PIN NO.	MEGACYCLE CONTROL																										
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
U	X	X	O	O	O	X	O	X	O	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O	O	O	O
T	O	X	X	O	O	O	X	O	X	O	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O	O	O
S	O	O	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	X	O	O	X	O	O
R	O	O	O	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	X	O	O	X	O
K	O	O	O	O	X	X	O	O	O	X	O	X	O	O	X	X	X	O	X	O	X	X	X	X	O	O	X	O

714E-2 PIN NO.	100KC OR 10KC OR 1KC CONT SETTING									
	0	1	2	3	4	5	6	7	8	9
P N Y	X	O	X	X	X	O	X	O	O	O
J H M	O	X	O	X	X	X	O	X	O	O
F E L	O	O	X	O	X	X	X	O	X	O
C D G	O	O	O	X	O	X	X	X	O	X

NOTES:
1. ALL SWITCHES VIEWED FROM FRONT IN OFF OR LOWEST FREQUENCY SETTING.
   - ○—→ FRONT CONTACT.
   - ●—→ REAR CONTACT.
   - ◉—→ FRONT AND REAR CONTACTS CONNECTED.
2. X INDICATES GROUND.
   O INDICATES WIRES CONNECTED TOGETHER AND NOT GROUNDED.
3. THE JUMPER BETWEEN TERMINALS a AND b IS REQUIRED FOR RETROFIT INSTALLATIONS WHERE THE EXISTING AIRCRAFT AUDIO CIRCUITRY IS WIRED TO THESE TERMINALS.

Control Unit 714E-2, Schematic Diagram
Figure 1106


100KC CONTROL
10 POSITION
MC CONTROL
28 POSITION
10KC CONTROL
10 POSITION
1KC CONTROL
10 POSITION
S1A
S1B
S2
S3
S4
PANEL LIGHTS
DS2
DS3
P1
BAND INFO X
BAND INFO Z
BAND INFO Y
FREQ WIRE A
FREQ WIRE B
FREQ WIRE C
FREQ WIRE D
FREQ WIRE E
GROUND
FREQ WIRE M
FREQ WIRE L
FREQ WIRE K
FREQ WIRE J
FREQ WIRE Q
FREQ WIRE P
FREQ WIRE O
FREQ WIRE N
+28V
RESERVED
SPARE
FREQ WIRE I
FREQ WIRE H
FREQ WIRE G

IN OFF OR LOWEST FREQUENCY SETTING.)

ED.

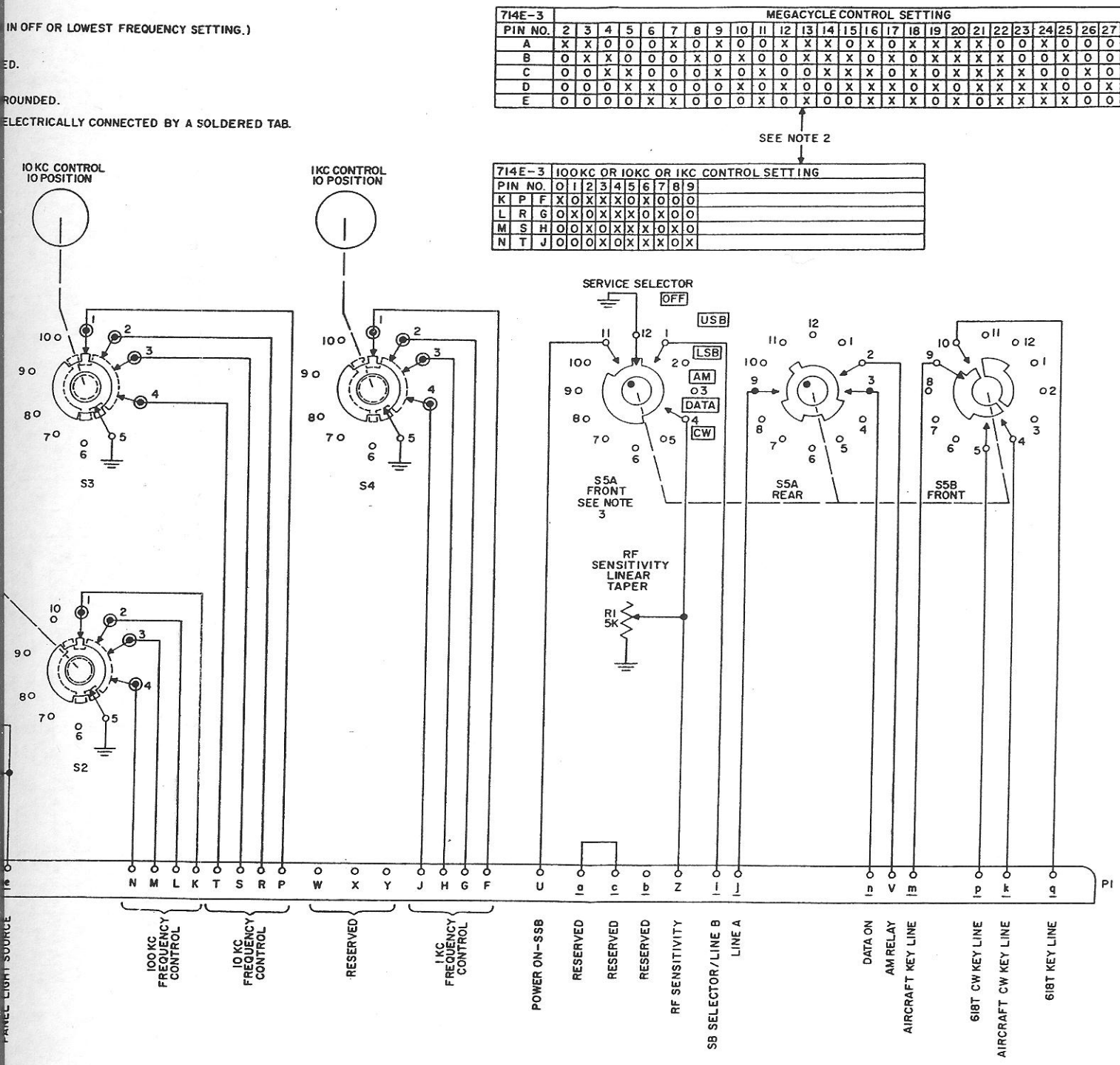
ROUNDED.

ELECTRICALLY CONNECTED BY A SOLDERED TAB.

714E-3	MEGACYCLE CONTROL SETTING																										
PIN NO.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
A	X	X	0	0	0	X	0	X	0	0	X	X	X	0	X	0	X	X	X	X	0	0	X	0	0	0	0	0
B	0	X	X	0	0	0	X	0	X	0	0	X	X	X	0	X	0	X	X	X	X	0	0	X	0	0	0	0
C	0	0	X	X	0	0	0	X	0	X	0	0	X	X	X	0	X	0	X	X	X	X	0	0	X	0	0	0
D	0	0	0	X	X	0	0	0	X	0	X	0	0	X	X	X	0	X	0	X	X	X	X	0	0	X	0	0
E	0	0	0	0	X	X	0	0	0	X	0	X	0	0	X	X	X	0	X	0	X	X	X	X	0	0	X	0

SEE NOTE 2

714E-3			100KC OR 10KC OR 1KC CONTROL SETTING									
PIN NO.			0	1	2	3	4	5	6	7	8	9
K	P	F	X	0	X	X	X	0	X	0	0	0
L	R	G	0	X	0	X	X	X	0	X	0	0
M	S	H	0	0	X	0	X	X	X	0	X	0
N	T	J	0	0	0	X	0	X	X	X	0	X



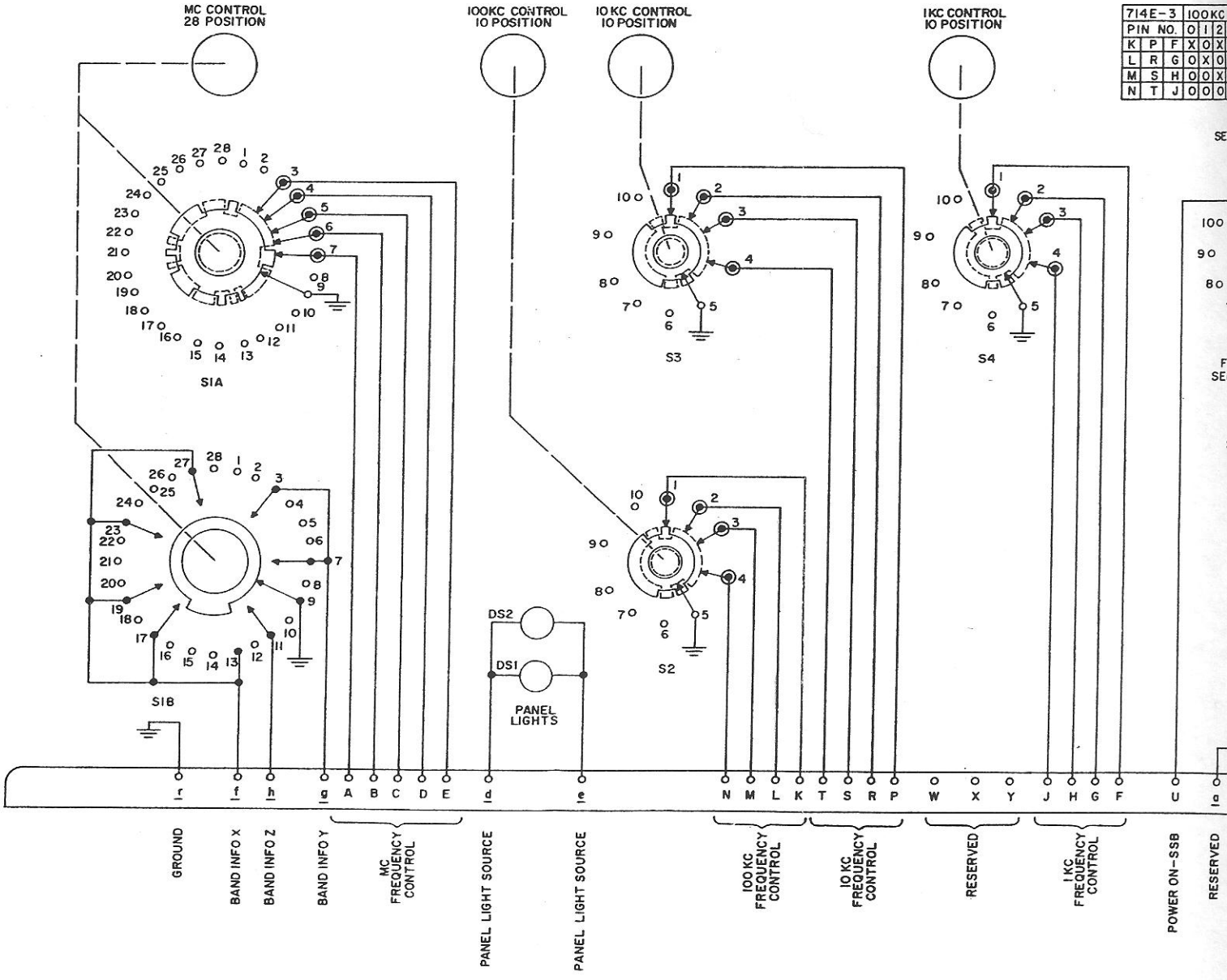
Control Unit 714E-3, Schematic Diagram
Figure 1107

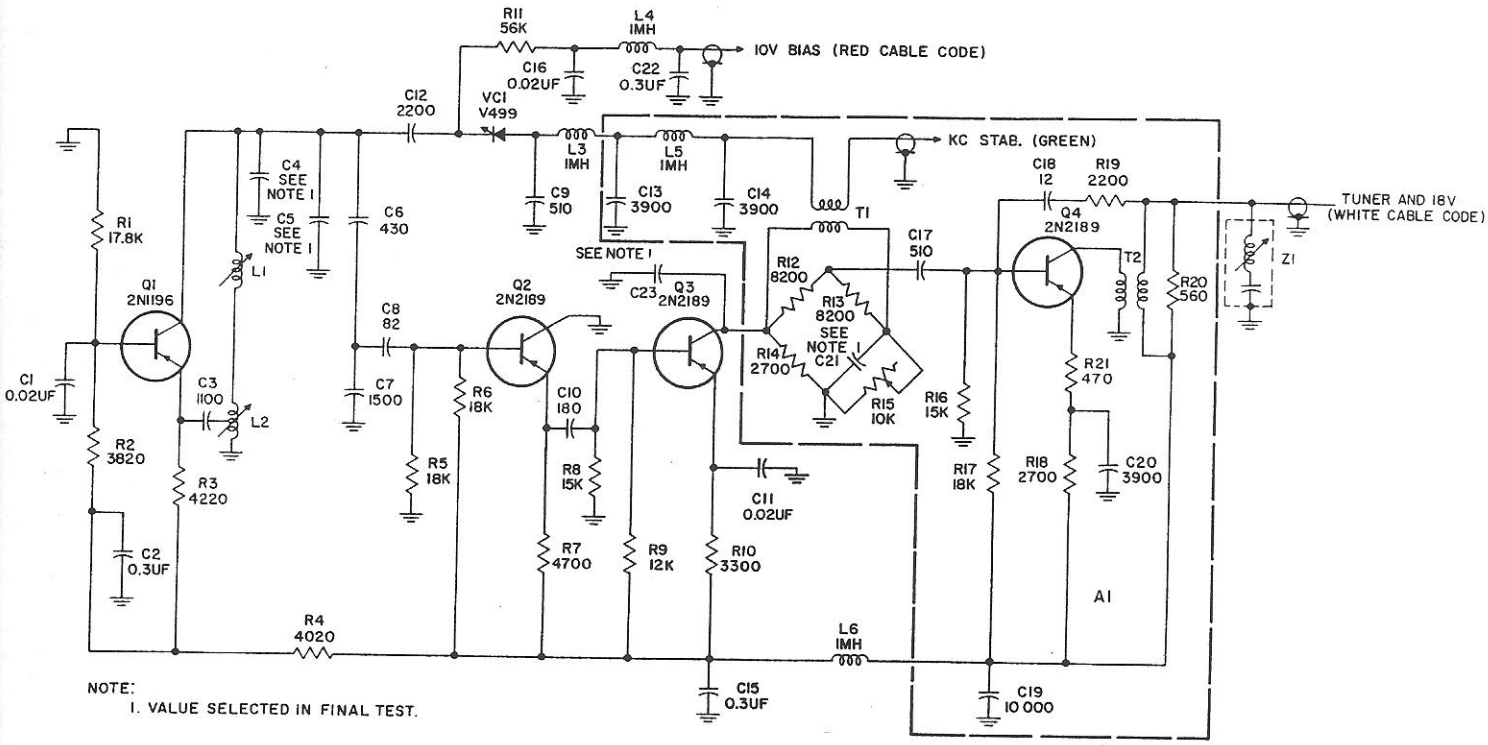
NOTES:

1. KEY TO SWITCHES, (ALL SWITCHES VIEWED FROM FRONT IN OFF OR LOWEST FREQUENCY SETTING.)
   - ○→ INDICATES FRONT CONTACT.
   - ●→ INDICATES REAR CONTACT.
   - ◉→ INDICATES FRONT AND REAR CONTACTS CONNECTED.
2. "X" INDICATES GROUND.
   "O" INDICATES WIRES CONNECTED TOGETHER AND NOT GROUNDED.
3. FRONT AND REAR ROTORS ON THE "A" WAFER OF S5 ARE ELECTRICALLY CONNECTED BY A SOLDERED TAB.

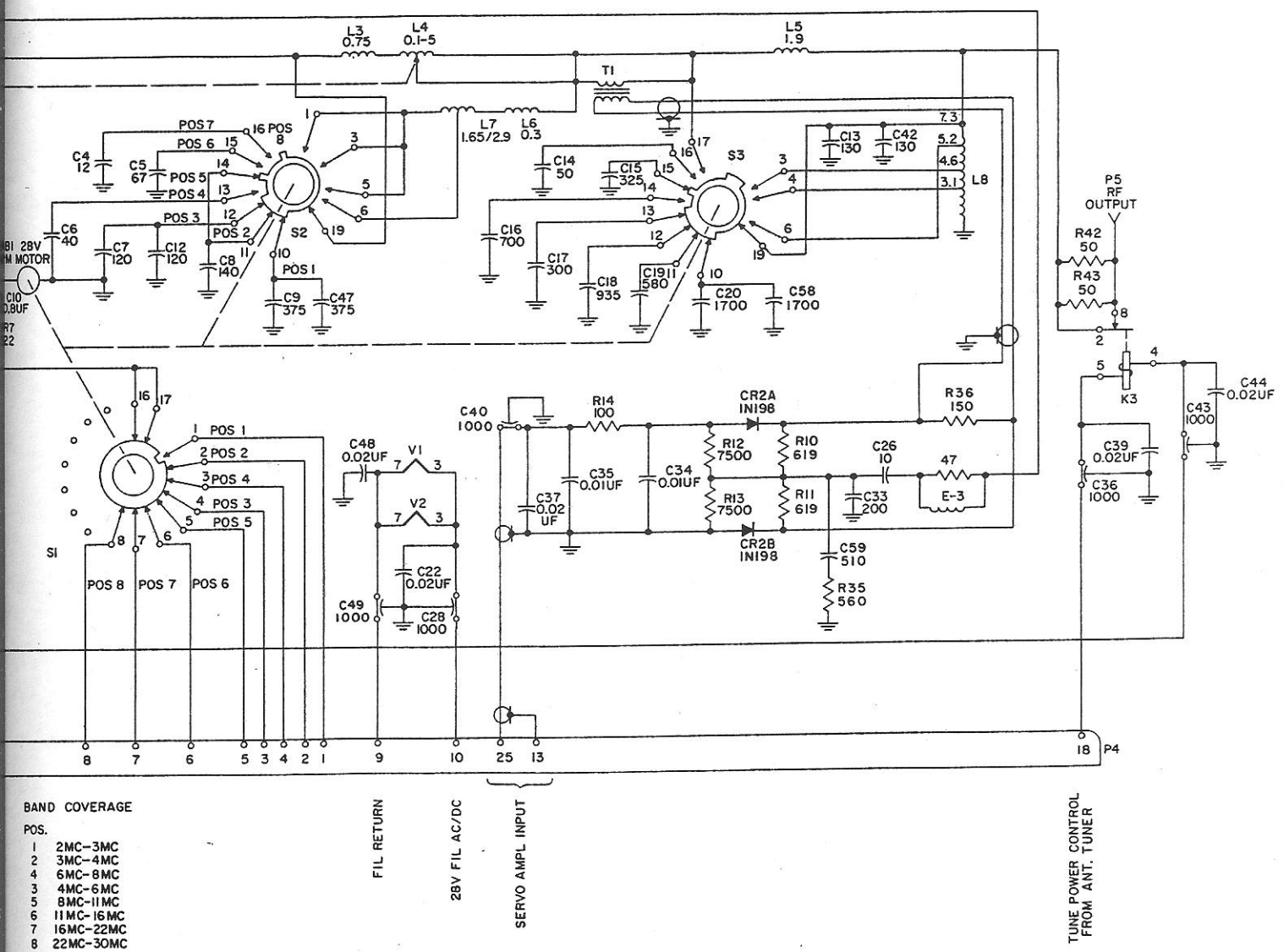
714E-3		
PIN NO.	2	3
A	X	X
B	O	X
C	O	O
D	O	O
E	O	O

714E-3			100KC		
PIN NO.			O	1	2
K	P	F	X	O	X
L	R	G	O	X	O
M	S	H	O	O	X
N	T	J	O	O	O





VFO Submodule, Model 70K-5, Schematic Diagram
Figure 1108



BAND COVERAGE

POS.

1	2MC–3MC
2	3MC–4MC
4	6MC–8MC
3	4MC–6MC
5	8MC–11MC
6	11MC–16MC
7	16MC–22MC
8	22MC–30MC

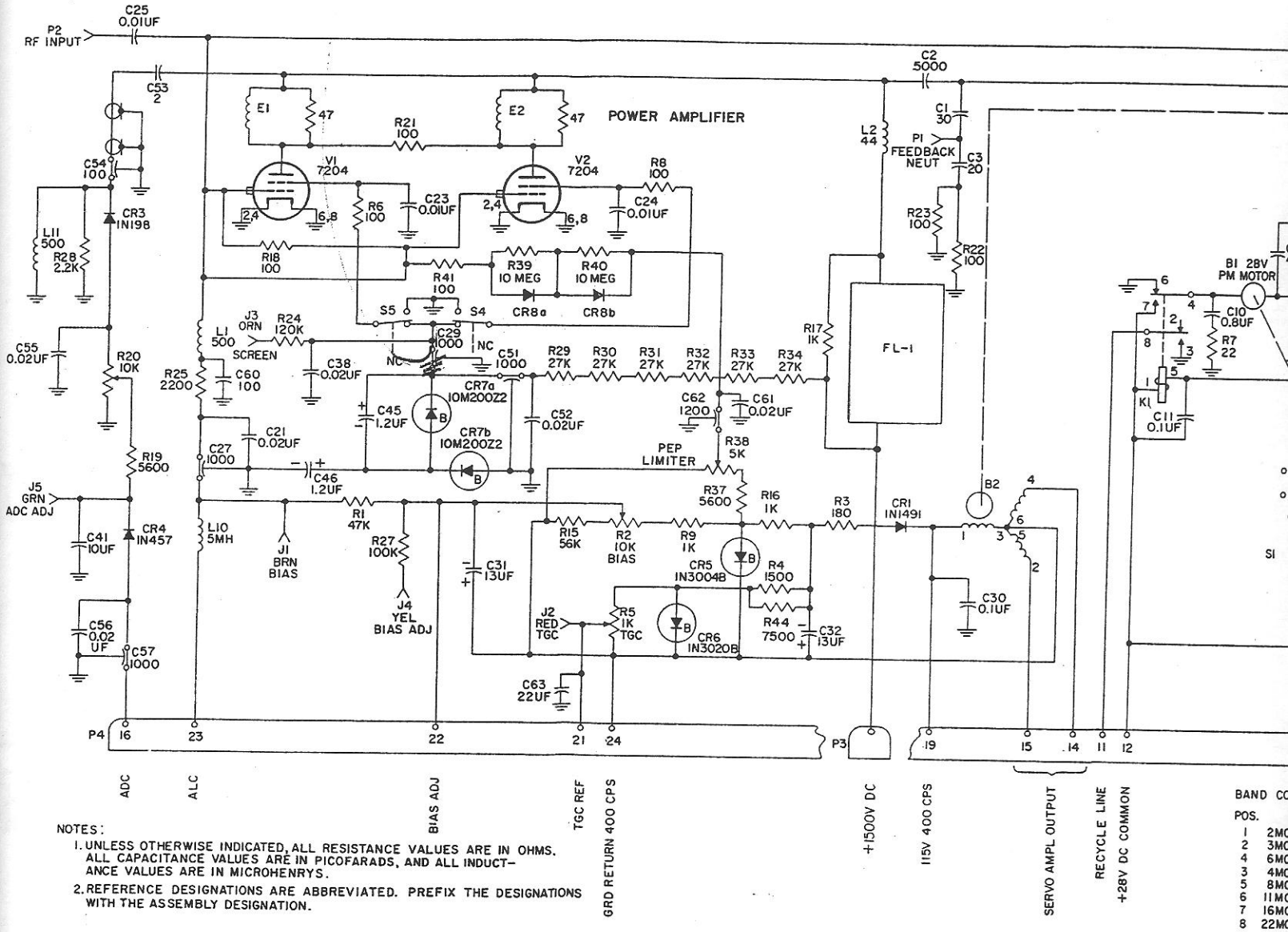
FIL RETURN

28V FIL AC/DC

SERVO AMPL INPUT

TUNE POWER CONTROL FROM ANT. TUNER

Power Amplifier Module, Schematic Diagram
Figure 1109



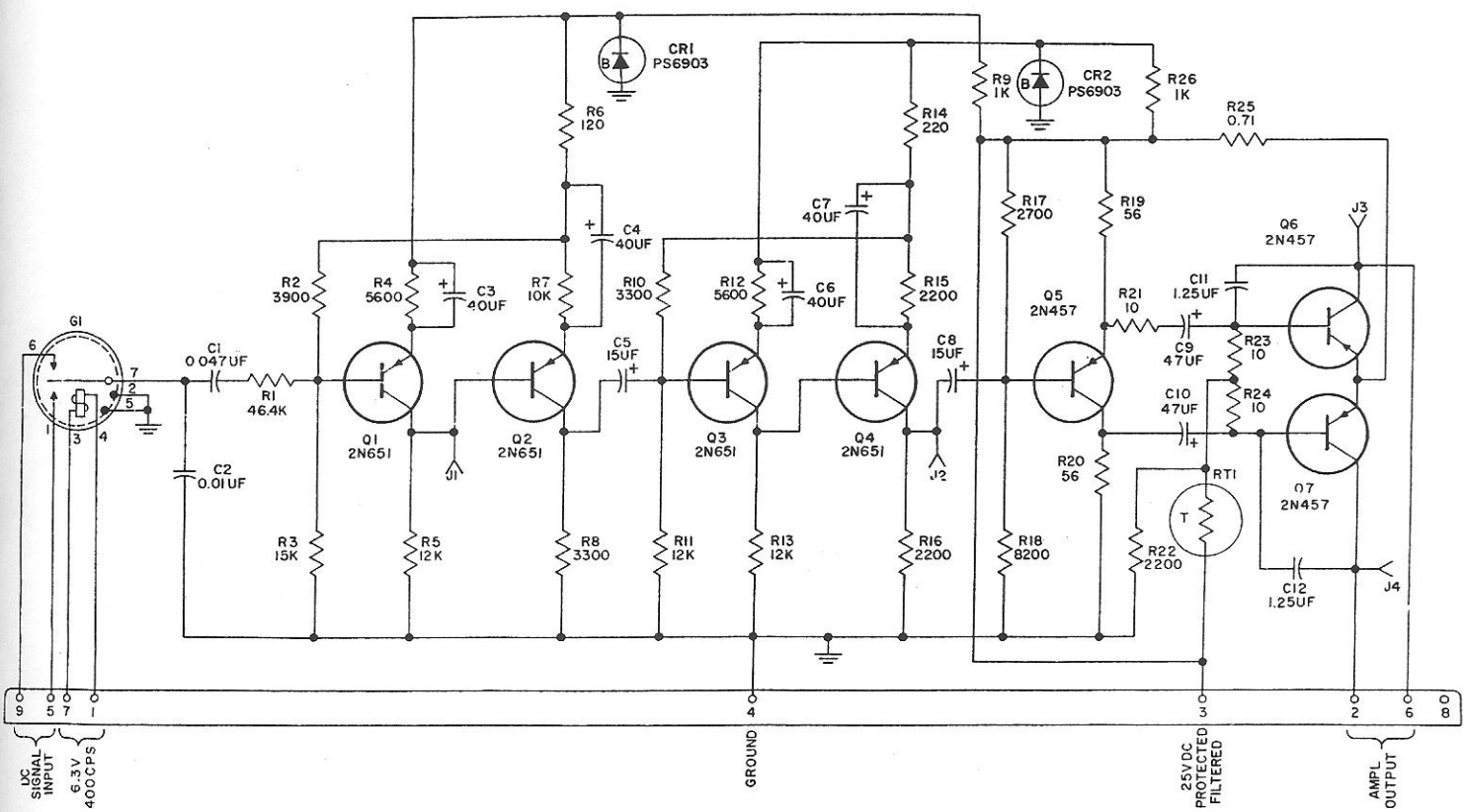
NOTES:

1. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS. ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
2. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION.

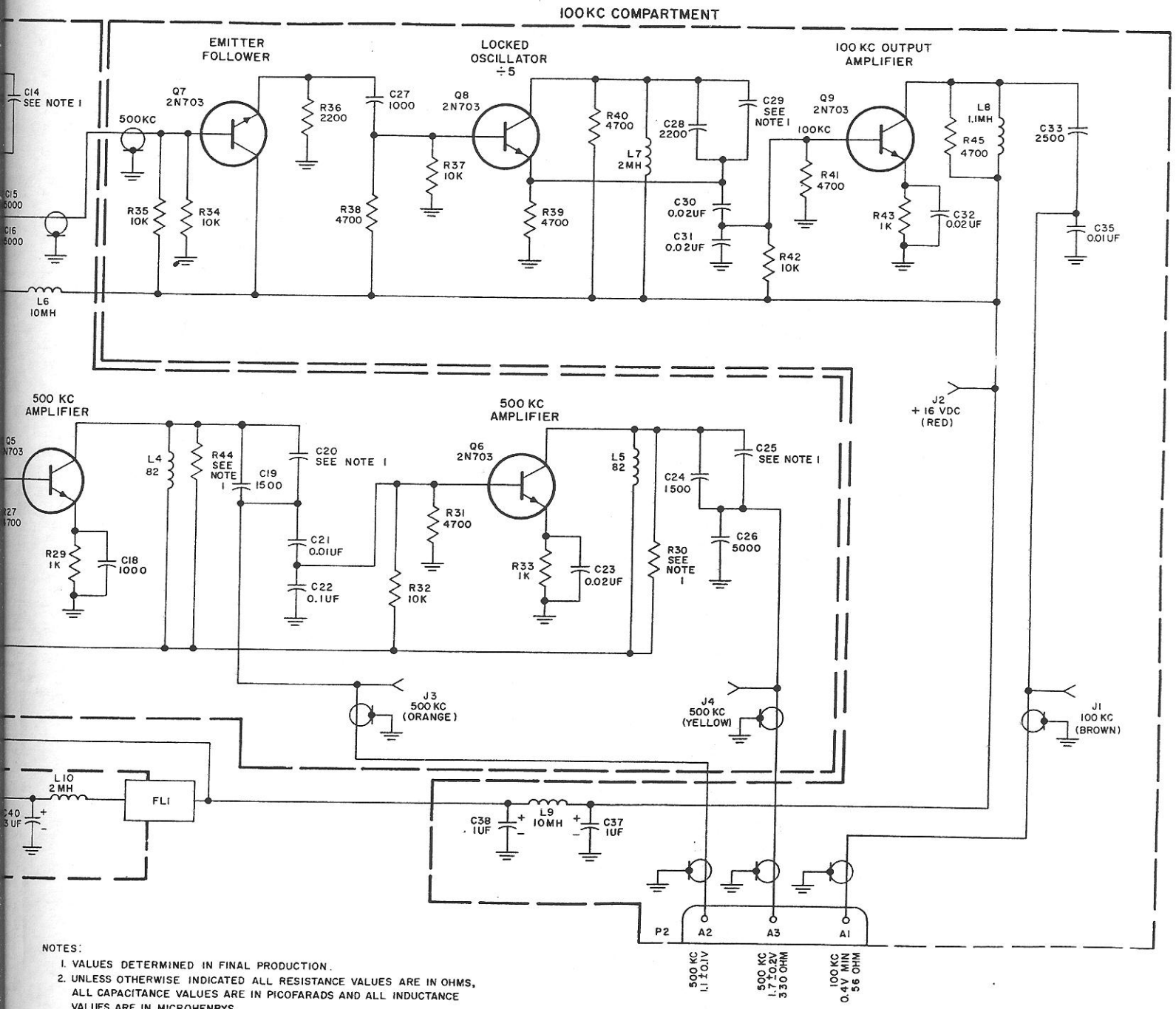
BAND CO

POS.

1	2MC
2	3MC
4	6MC
3	4MC
5	8MC
6	11MC
7	16MC
8	22MC

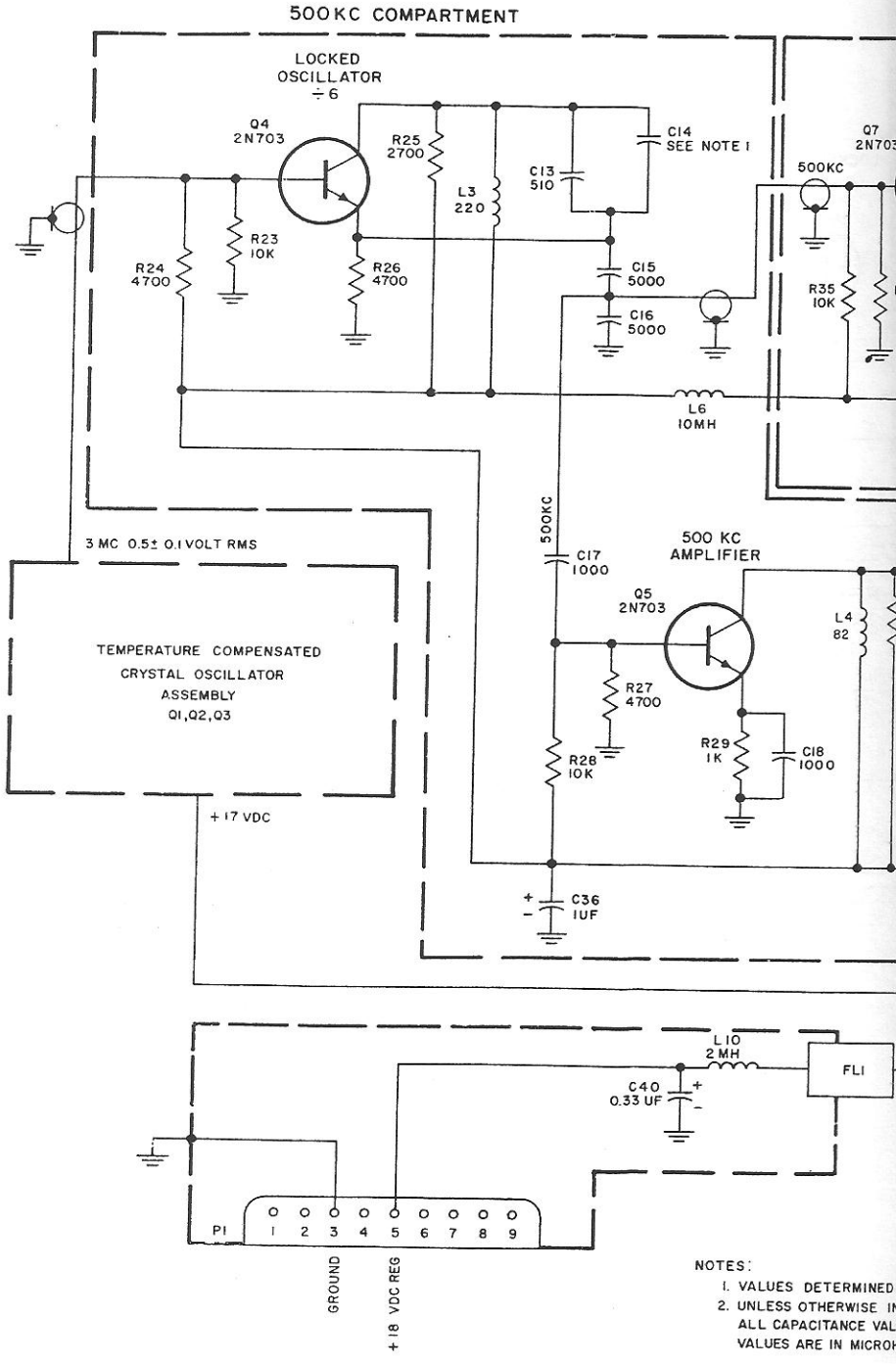


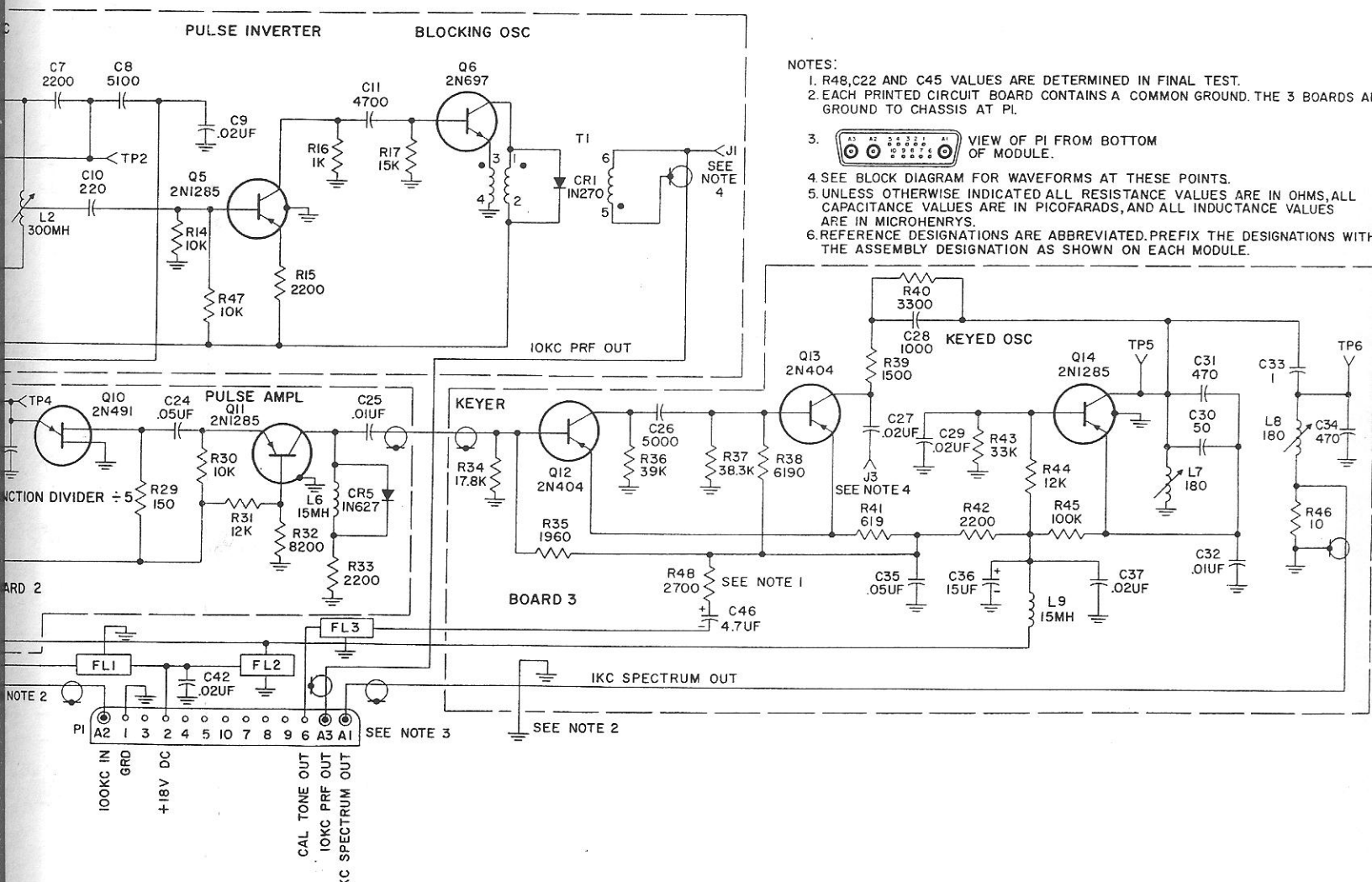
Electronic Control Amplifier Module,
Schematic Diagram
Figure 1110



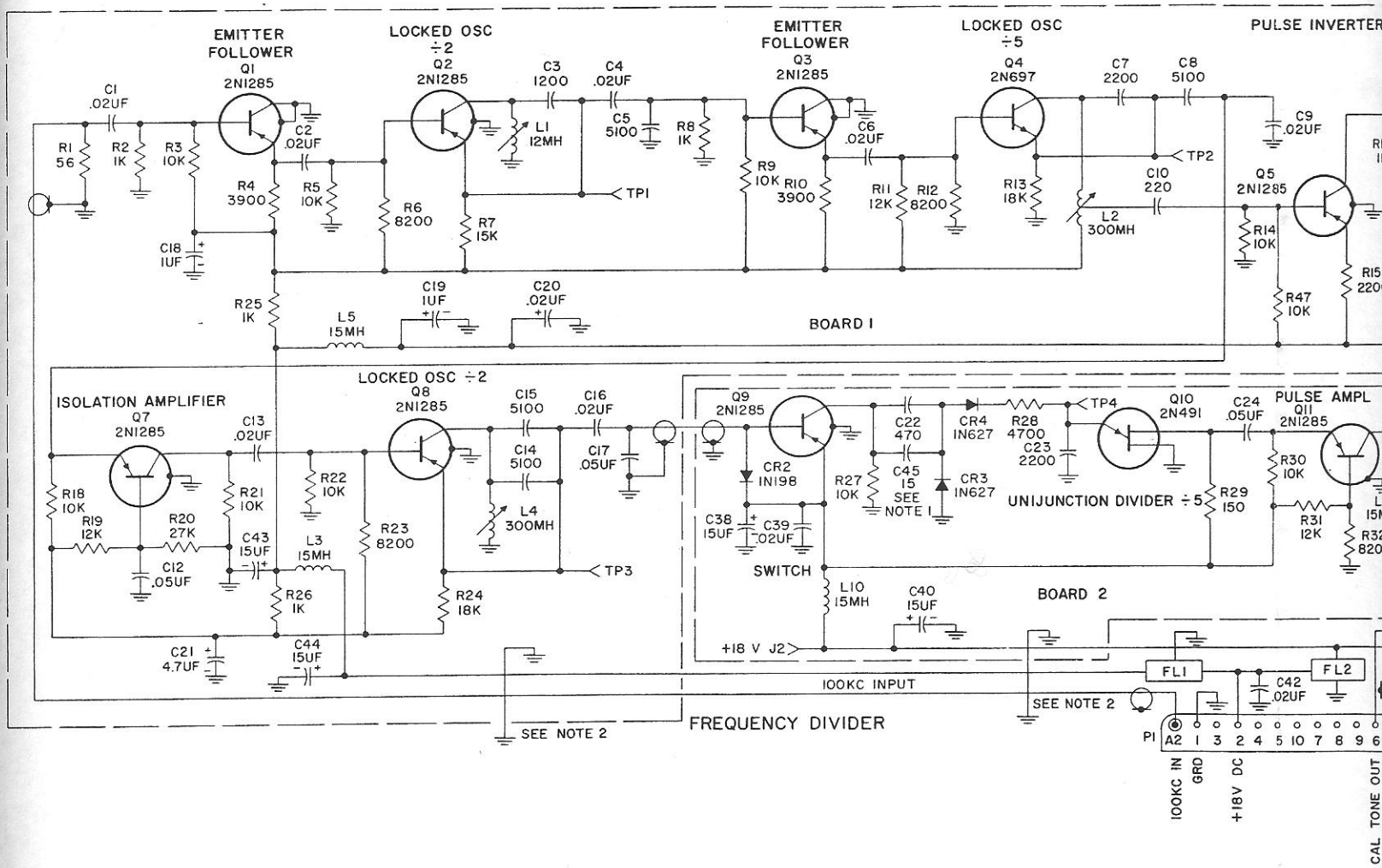
NOTES:
1. VALUES DETERMINED IN FINAL PRODUCTION.
2. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

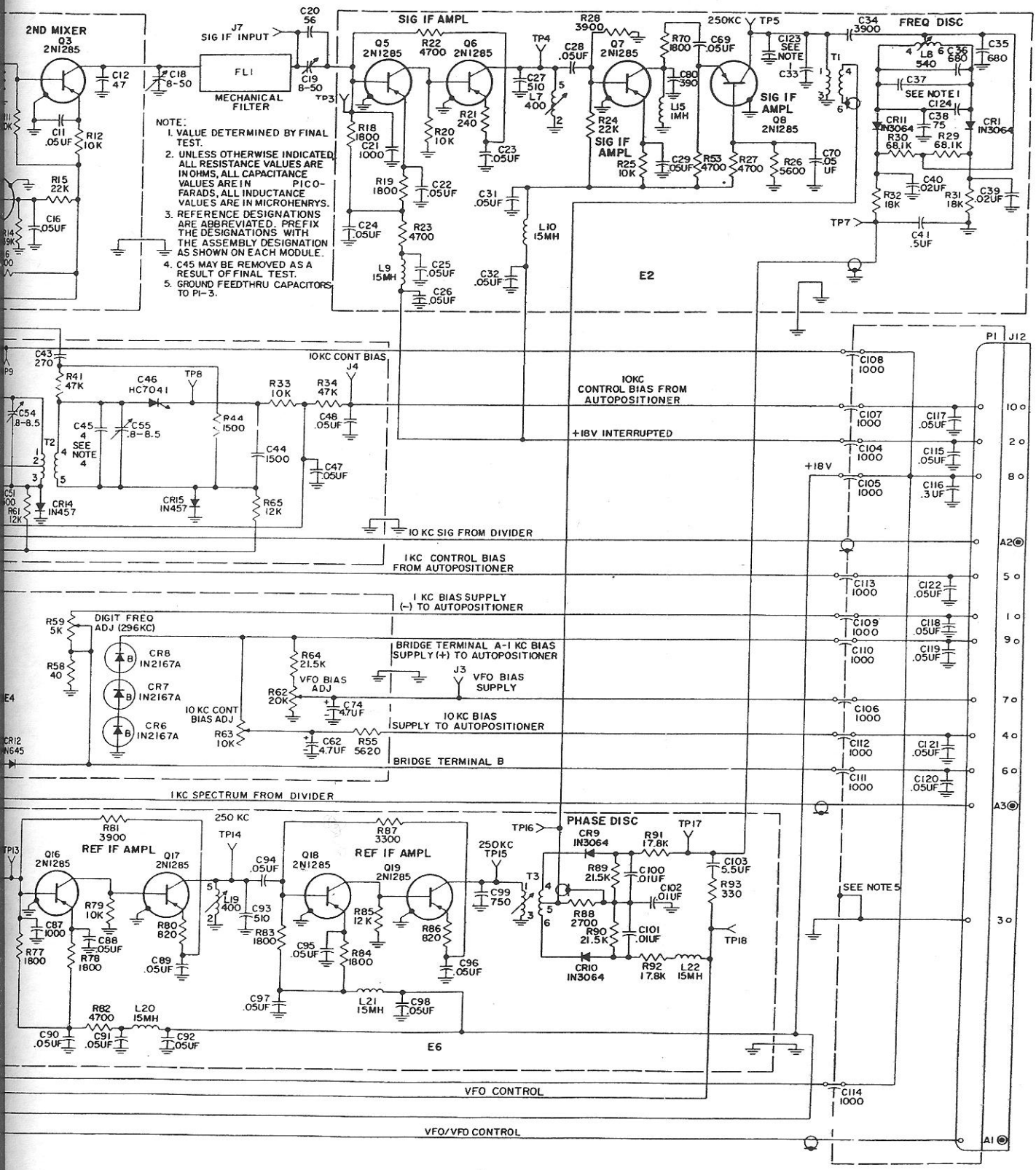
R-F Oscillator Module, Schematic Diagram
Figure 1111


500 KC COMPARTMENT
LOCKED OSCILLATOR ÷6
Q4 2N703
R25 2700
L3 220
C13 510
C14 SEE NOTE 1
R23 10K
R24 4700
R26 4700
C15 5000
C16 5000
L6 10MH
500KC
R35 10K
3 MC 0.5± 0.1 VOLT RMS
TEMPERATURE COMPENSATED CRYSTAL OSCILLATOR ASSEMBLY Q1,Q2,Q3
+17 VDC
C17 1000
500 KC AMPLIFIER
Q5 2N703
L4 82
R27 4700
R28 10K
R29 1K
C18 1000
C36 1UF
L10 2 MH
C40 0.33 UF
FL1
P1
1 2 3 4 5 6 7 8 9
GROUND
+18 VDC REG
NOTES:
1. VALUES DETERMINED
2. UNLESS OTHERWISE IN
ALL CAPACITANCE VAL
VALUES ARE IN MICROH

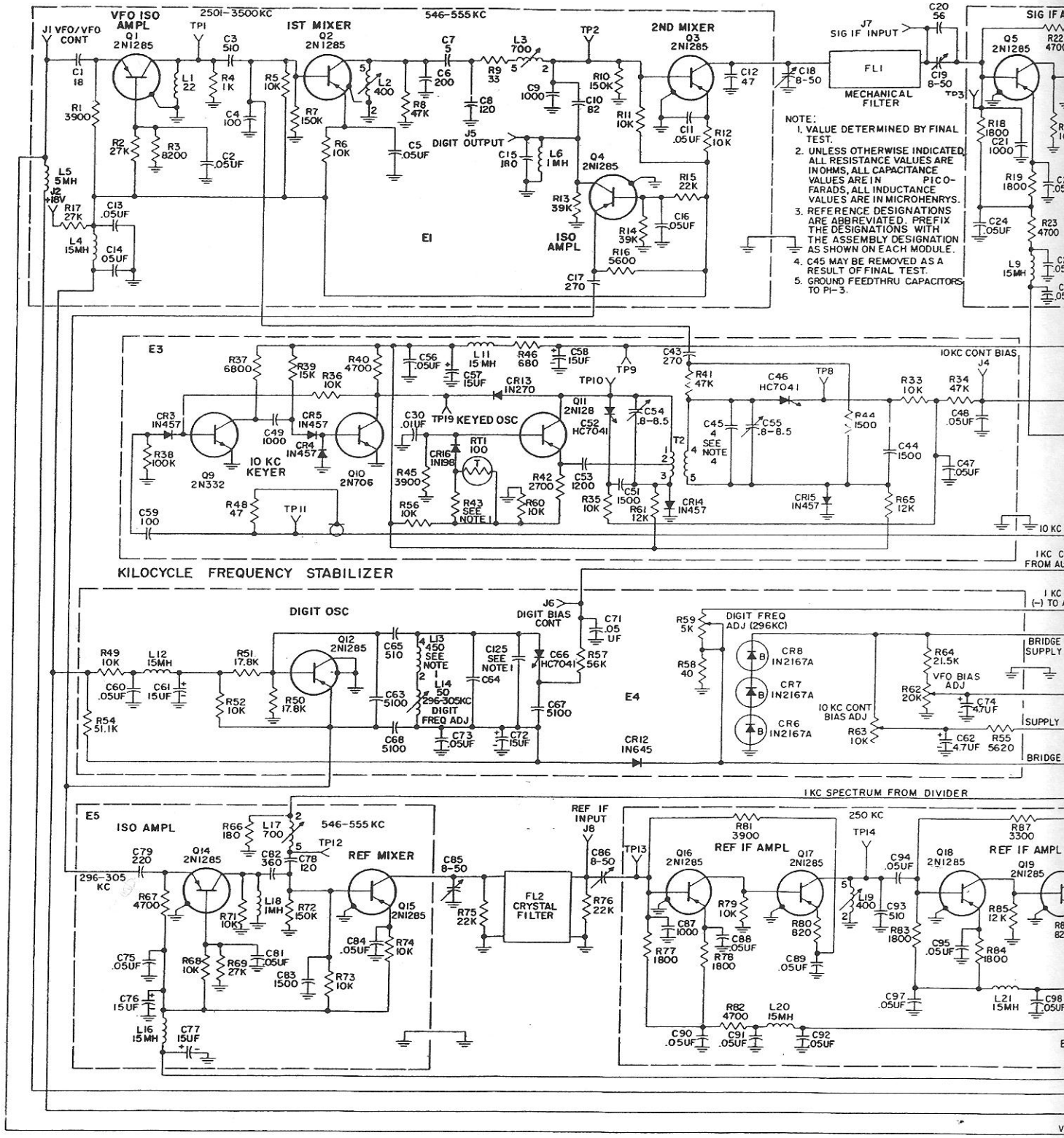


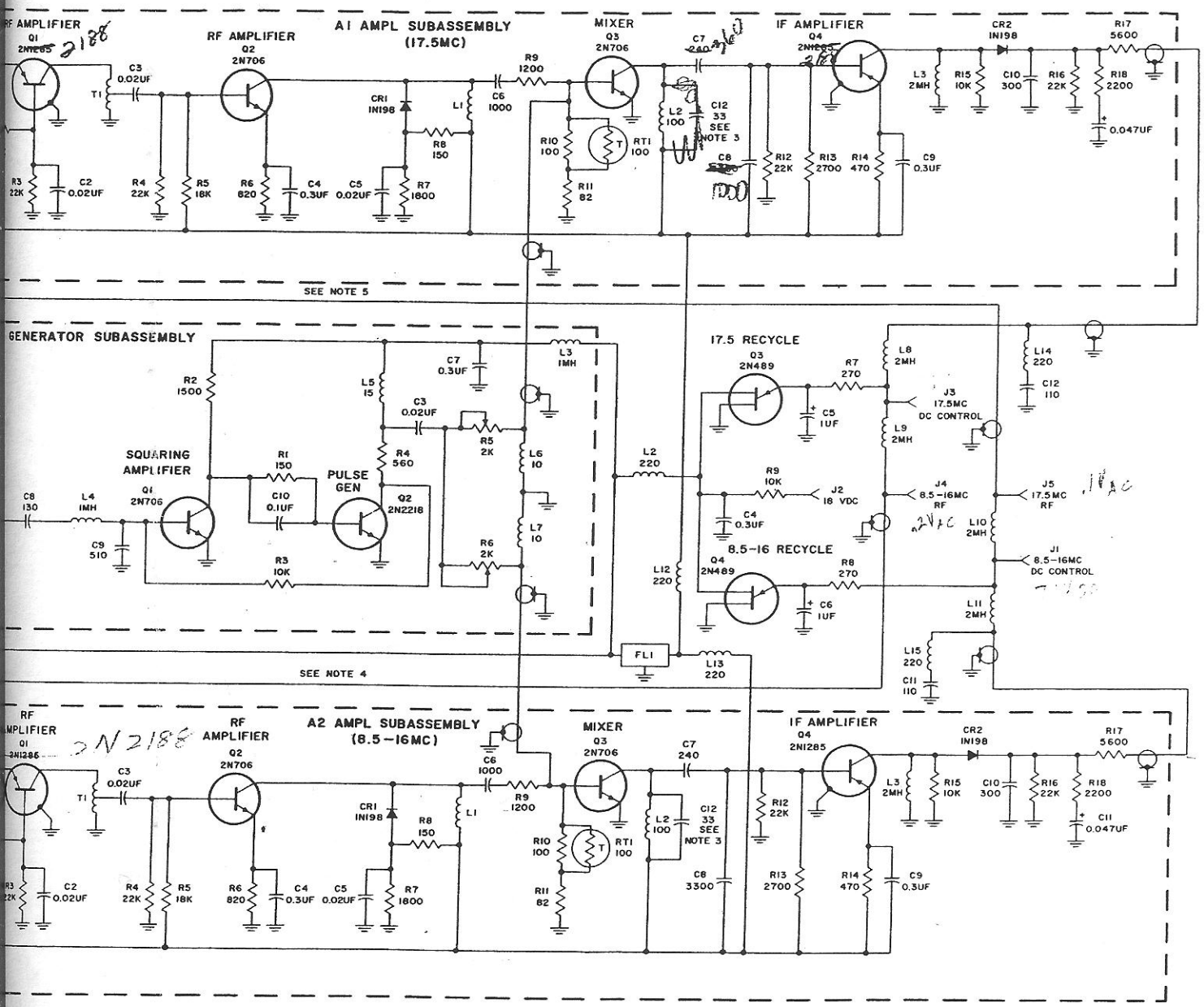
Frequency Divider Module, Schematic Diagram
Figure 1112


EMITTER FOLLOWER
Q1 2N1285
LOCKED OSC ÷2
Q2 2N1285
EMITTER FOLLOWER
Q3 2N1285
LOCKED OSC ÷5
Q4 2N697
PULSE INVERTER
Q5 2N1285
C1 .02UF
C2 .02UF
C3 1200
C4 .02UF
C5 5100
C6 .02UF
C7 2200
C8 5100
C9 .02UF
C10 220
R1 56
R2 1K
R3 10K
R4 3900
R5 10K
R6 8200
R7 15K
R8 1K
R9 10K
R10 3900
R11 12K
R12 8200
R13 18K
R14 10K
R15 220
R47 10K
L1 12MH
L2 300MH
TP1
TP2
C18 1UF
C19 1UF
C20 .02UF
R25 1K
L5 15MH
BOARD 1
ISOLATION AMPLIFIER
Q7 2N1285
LOCKED OSC ÷2
Q8 2N1285
C13 .02UF
C14 5100
C15 5100
C16 .02UF
C17 .05UF
R18 10K
R19 12K
R20 27K
R21 10K
R22 10K
R23 8200
R24 18K
R26 1K
C12 .05UF
C21 4.7UF
C43 15UF
C44 15UF
L3 15MH
L4 300MH
TP3
SEE NOTE 2
Q9 2N1285
CR2 1N198
C22 470
CR4 1N627
R28 4700
TP4
Q10 2N491
C24 .05UF
PULSE AMPL Q11 2N1285
C23 2200
R27 10K
C45 15 SEE NOTE 1
CR3 1N627
UNIJUNCTION DIVIDER ÷5
R29 150
R30 10K
R31 12K
C38 15UF
C39 .02UF
SWITCH
L10 15MH
C40 15UF
BOARD 2
+18 V J2
100KC INPUT
FL1
FL2
C42 .02UF
SEE NOTE 2
FREQUENCY DIVIDER
P1
A2 1 3 2 4 5 10 7 8 9 6
100KC IN
GRD
+18V DC
CAL TONE OUT



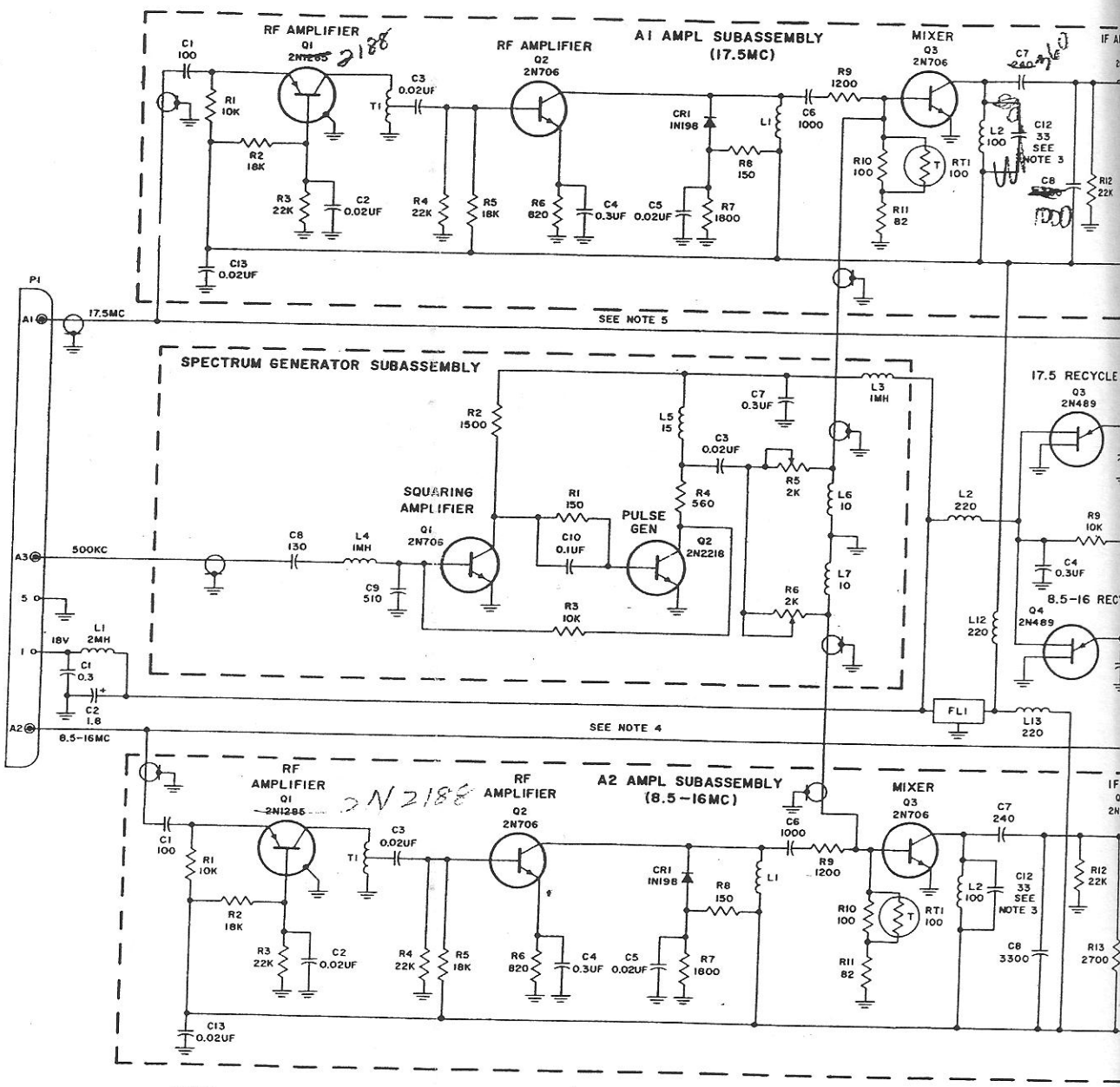
Kilocycle-Frequency Stabilizer Module,
Schematic Diagram
Figure 1113


VFO ISO AMPL
250I-3500KC
546-555KC
IST MIXER
2ND MIXER
J1 VFO/VFO CONT
Q1 2N1285
Q2 2N1285
Q3 2N1285
TP1
TP2
J7 SIG IF INPUT
FL1 MECHANICAL FILTER
SIG IF A
Q5 2N1285
J5 DIGIT OUTPUT
Q4 2N1285
ISO AMPL
E1
NOTE:
1. VALUE DETERMINED BY FINAL TEST.
2. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICO-FARADS, ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
3. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION AS SHOWN ON EACH MODULE.
4. C45 MAY BE REMOVED AS A RESULT OF FINAL TEST.
5. GROUND FEEDTHRU CAPACITORS TO PI-3.
E3
10KC CONT BIAS
Q9 2N332
10 KC KEYER
Q10 2N706
TP19 KEYED OSC
Q11 2N1281
CR13 IN270
CR16 IN198
RT1 100
CR3 IN457
CR4 IN457
CR5 IN457
CR14 IN457
CR15 IN457
C46 HC7041
C52 HC7041
10 KC
1KC C
FROM AU
KILOCYCLE FREQUENCY STABILIZER
DIGIT OSC
Q12 2N1285
DIGIT BIAS CONT
DIGIT FREQ ADJ (296KC)
CR8 IN2167A
CR7 IN2167A
CR6 IN2167A
CR12 IN645
E4
10 KC CONT BIAS ADJ
VFO BIAS ADJ
BRIDGE SUPPLY
1KC SPECTRUM FROM DIVIDER
E5
ISO AMPL
546-555 KC
296-305 KC
REF MIXER
Q14 2N1285
Q15 2N1285
FL2 CRYSTAL FILTER
REF IF INPUT J8
250 KC
REF IF AMPL
Q16 2N1285
Q17 2N1285
Q18 2N1285
Q19 2N1285



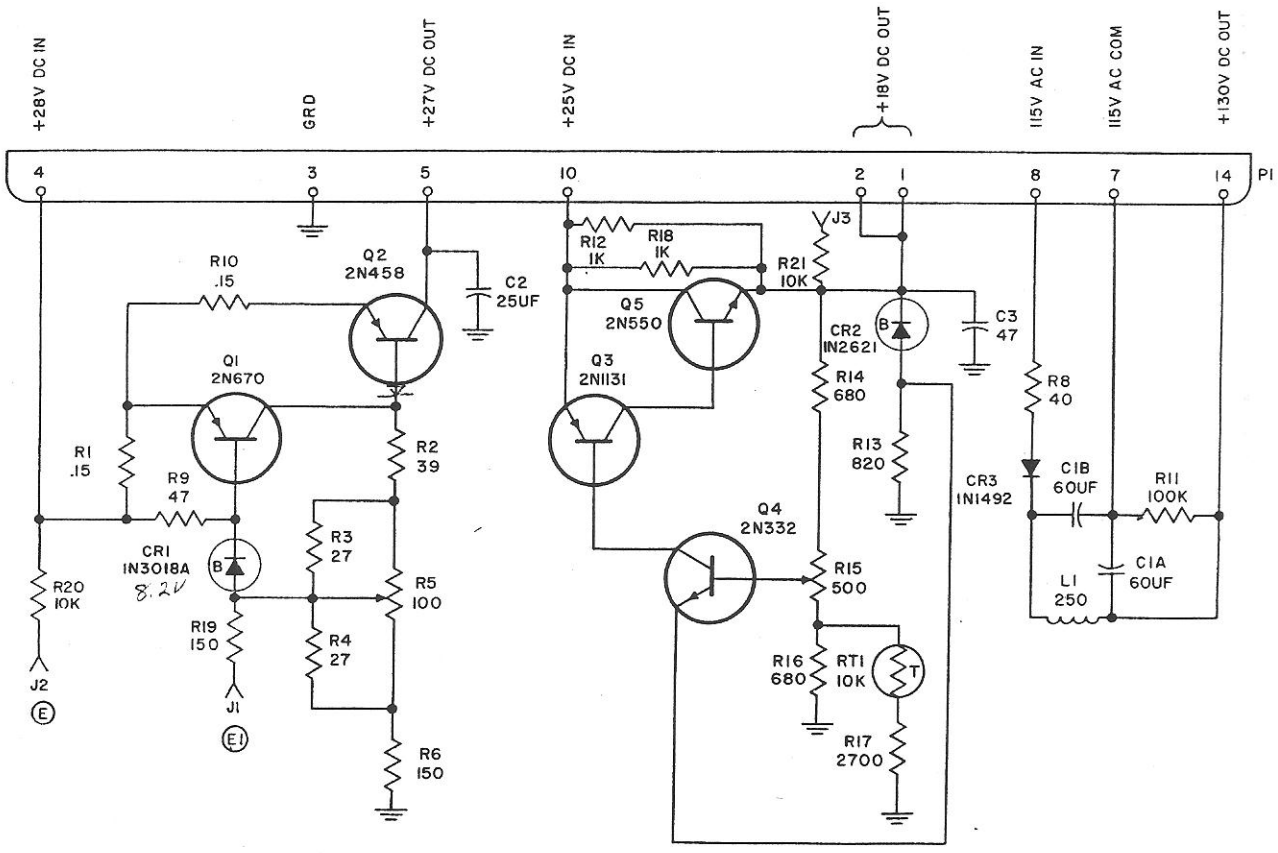
OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, INDUCTANCE VALUES ARE IN MICROHENRYS.
CE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION AS SHOWN MODULE.
VALUE SELECTED DURING TEST.
C CONTROL IS RETURNED TO RF TUNER BY 8.5-16MC RF LINE.
DC CONTROL IS RETURNED TO RF TUNER BY 17.5MC RF LINE.

Megacycle-Frequency Stabilizer Module,
Schematic Diagram
Figure 1114

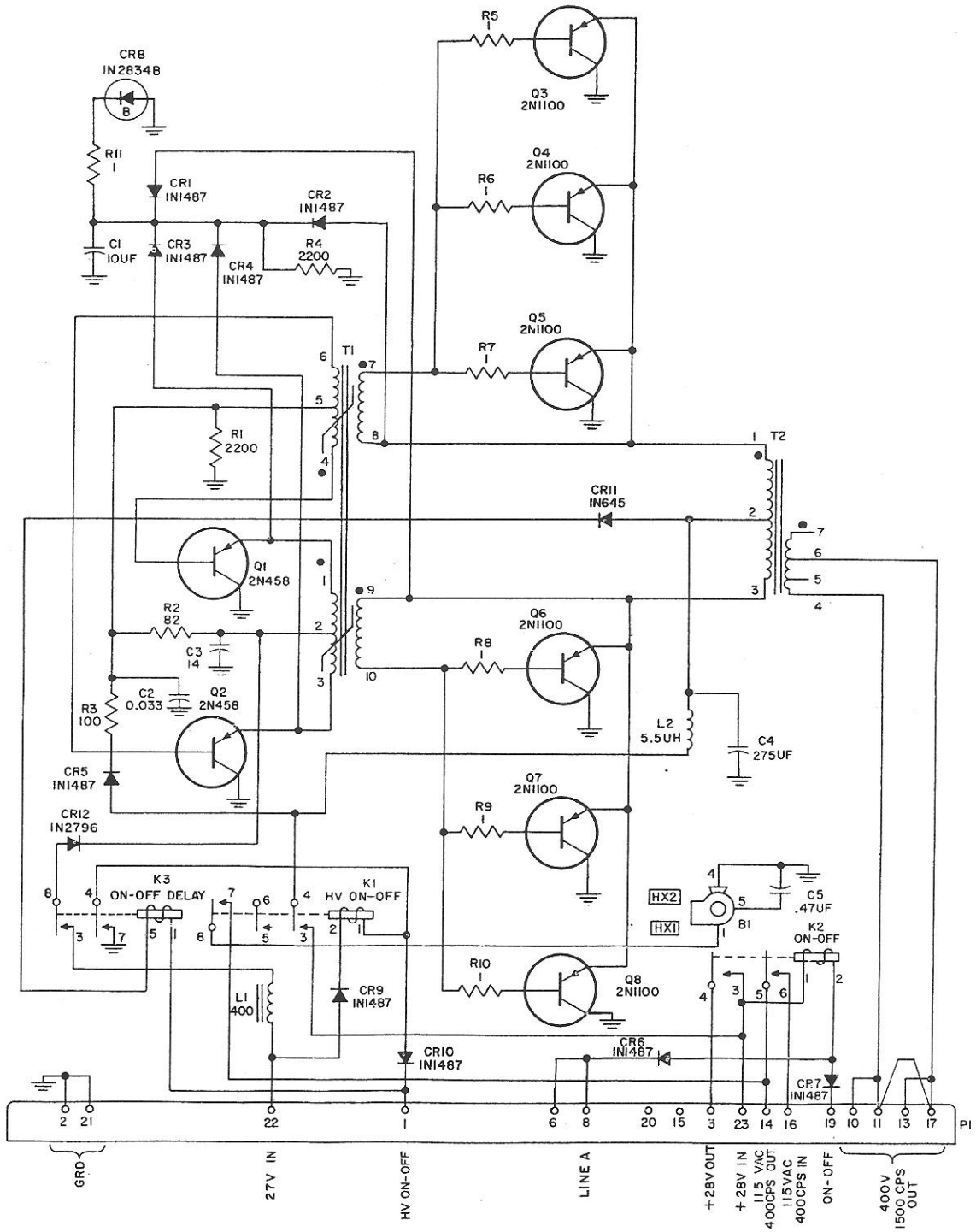


NOTES:

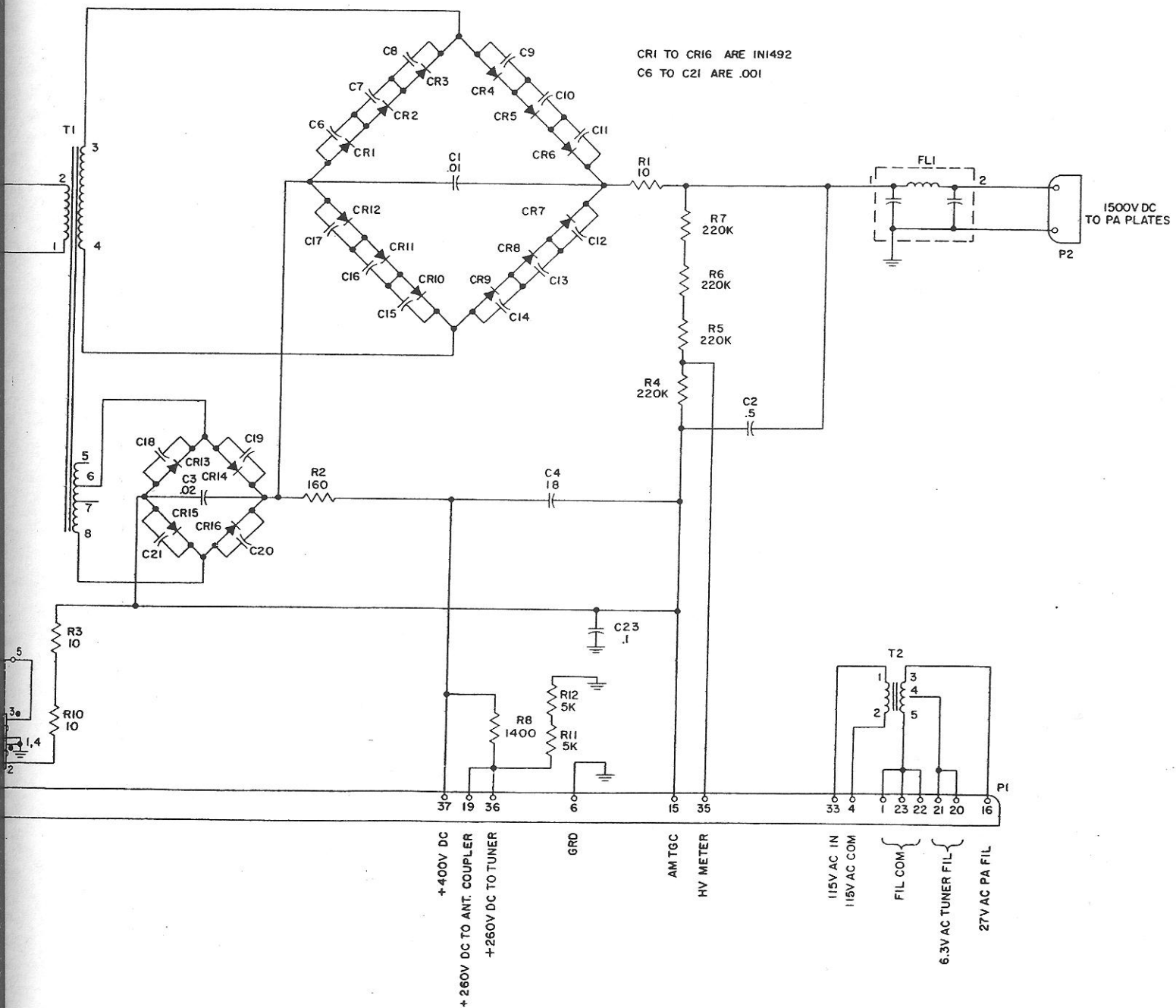
1. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
2. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION AS SHOWN ON EACH MODULE.
3. NOMINAL VALUE SELECTED DURING TEST.
4. 17.5MC DC CONTROL IS RETURNED TO RF TUNER BY 8.5-16MC RF LINE.
5. 8.5-16MC DC CONTROL IS RETURNED TO RF TUNER BY 17.5MC RF LINE.



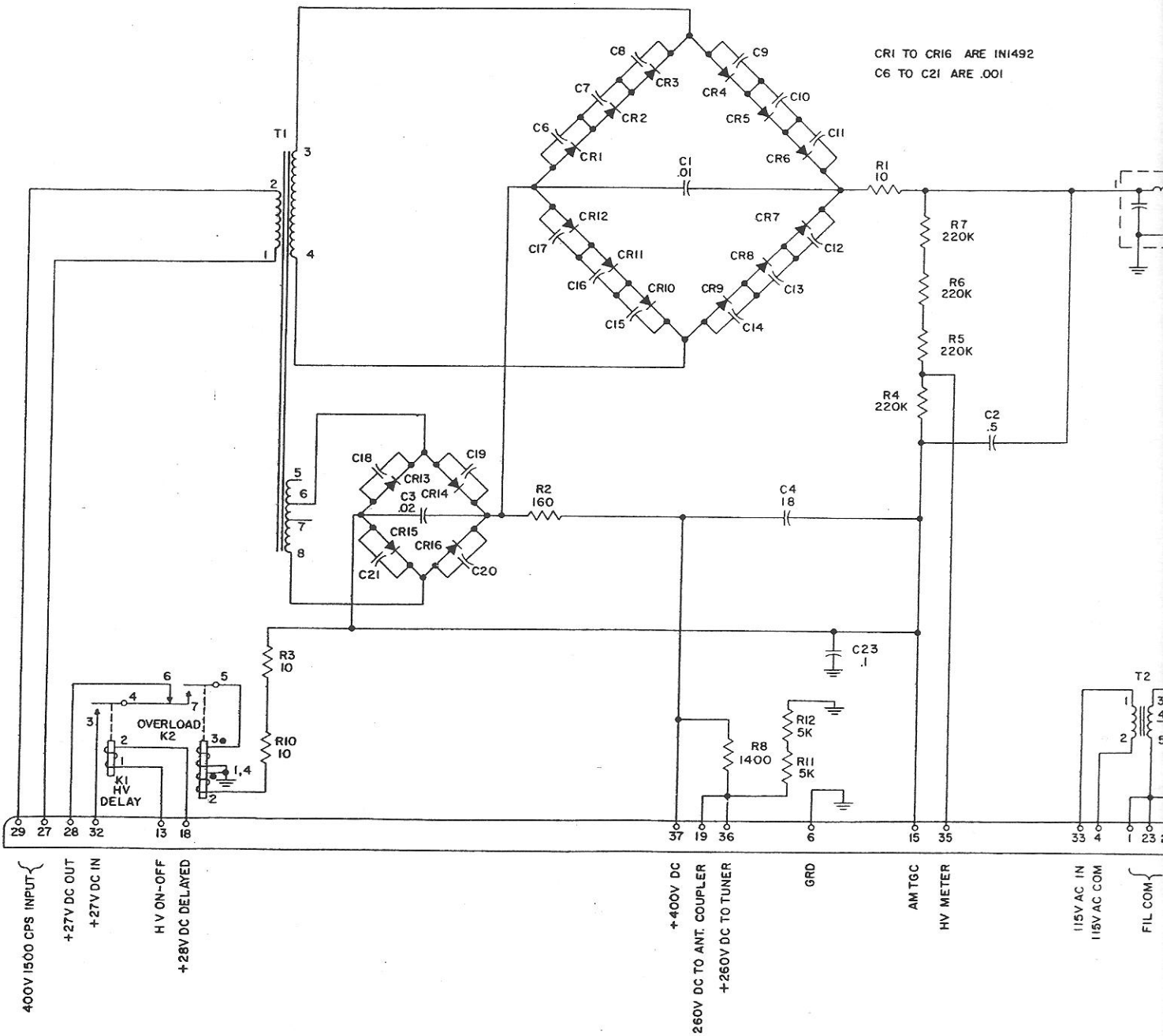
Low-Voltage Power Supply Module, Schematic Diagram
Figure 1115



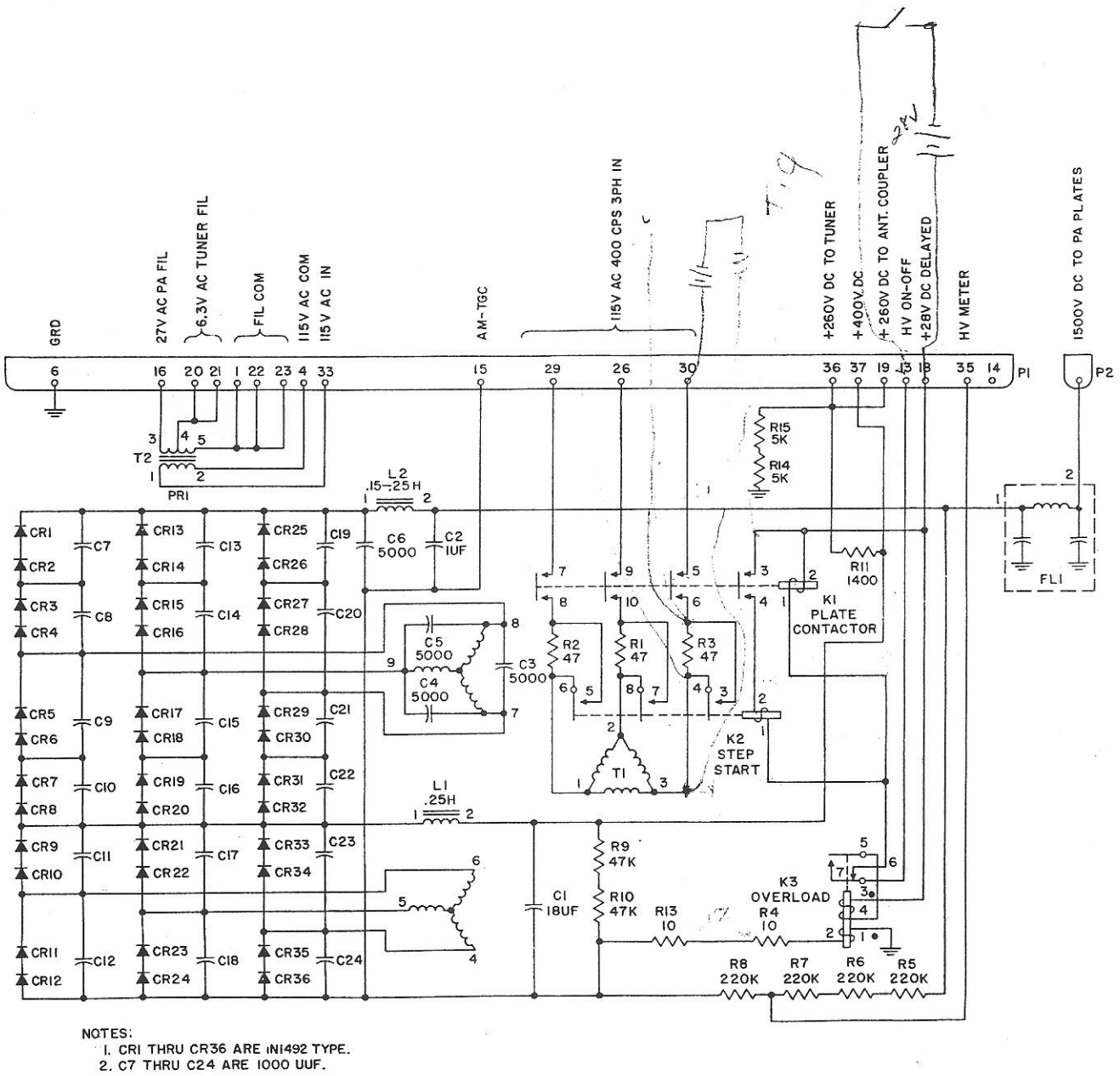
Power Supply 516H-1, Schematic Diagram
Figure 1116



Single-Phase High-Voltage Power Supply Module,
Schematic Diagram
Figure 1117

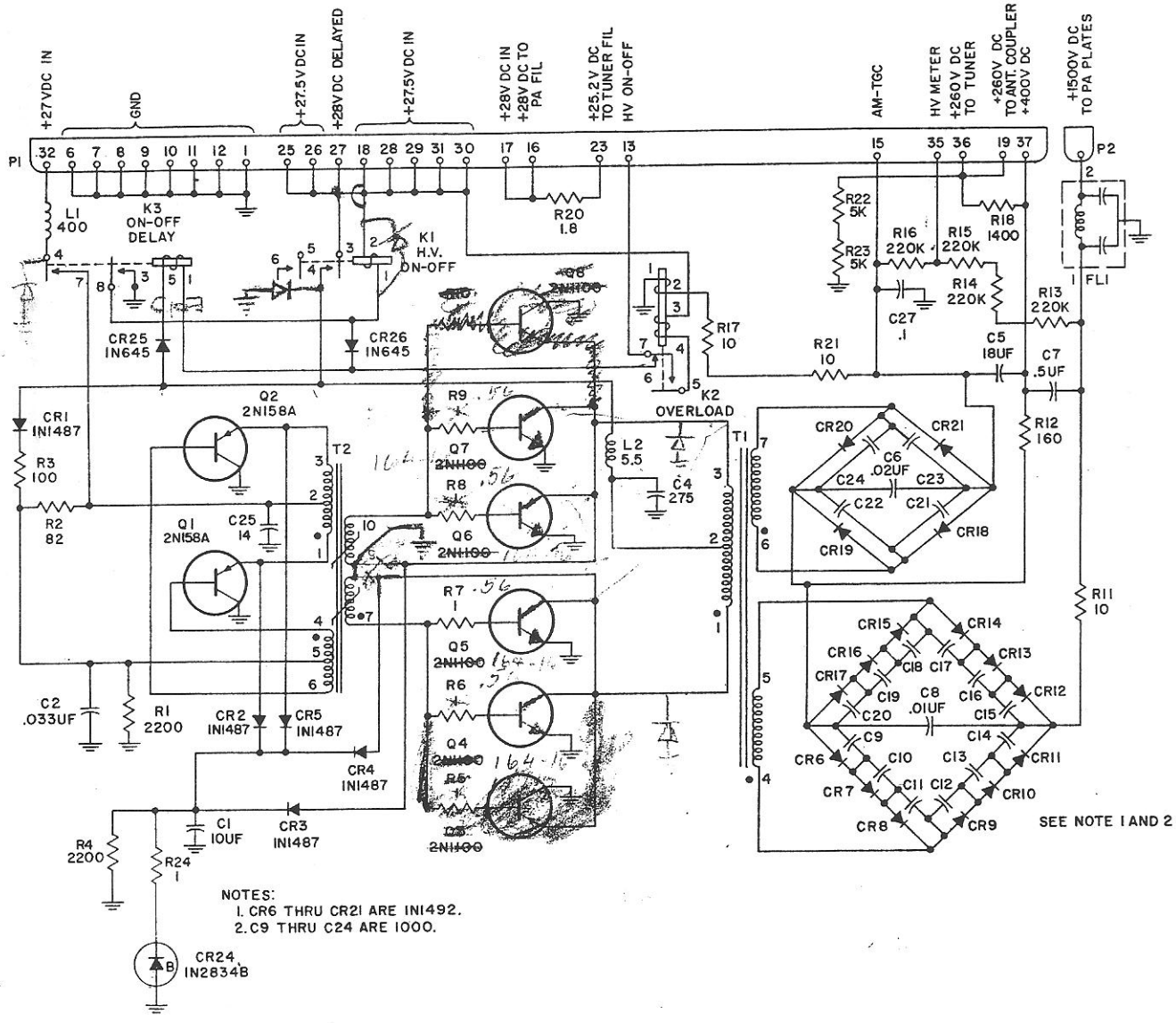


Single-Phase High-Volta
Schematic
Figure

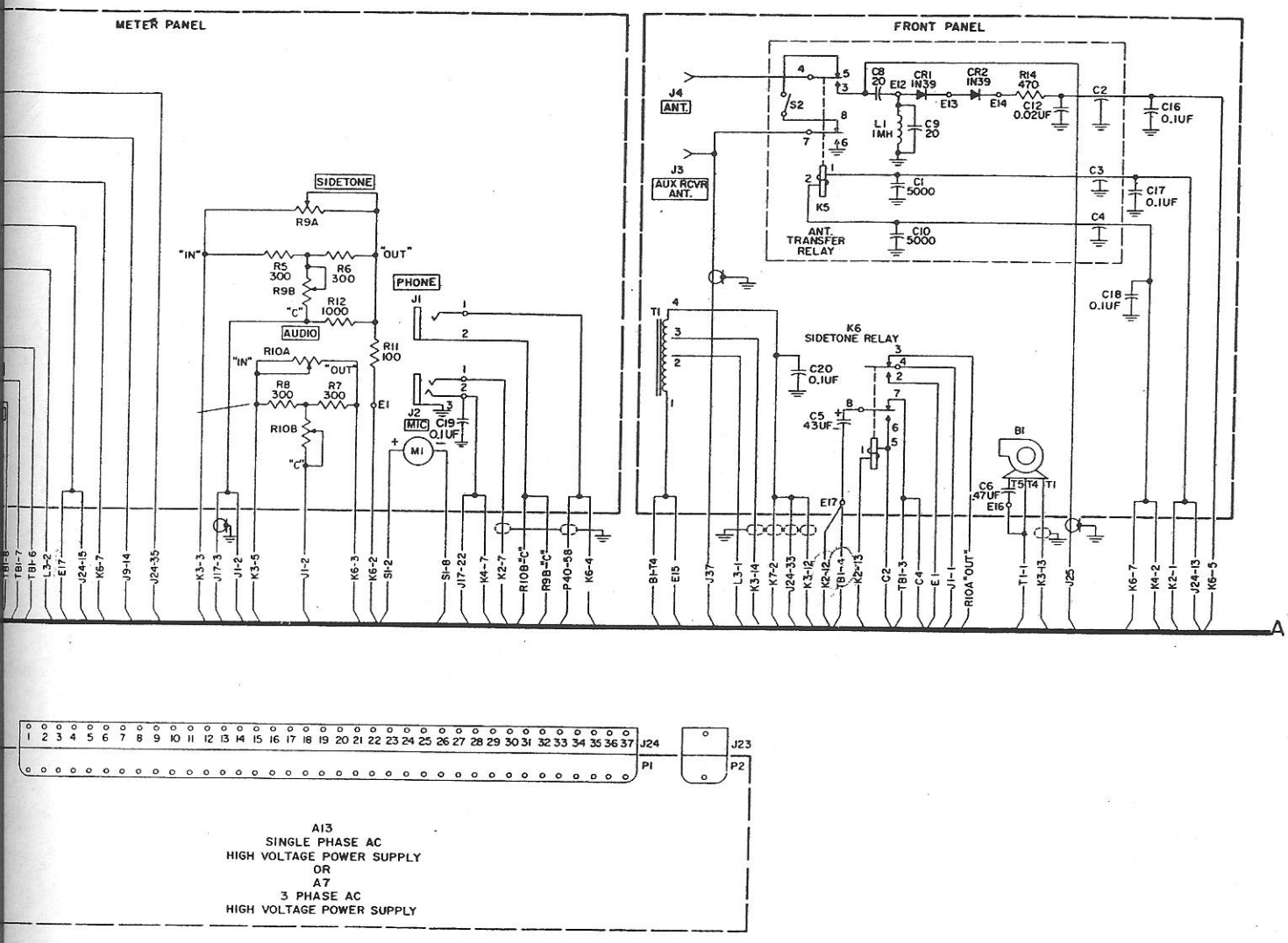


NOTES:
1. CR1 THRU CR36 ARE 1N1492 TYPE.
2. C7 THRU C24 ARE 1000 UUF.

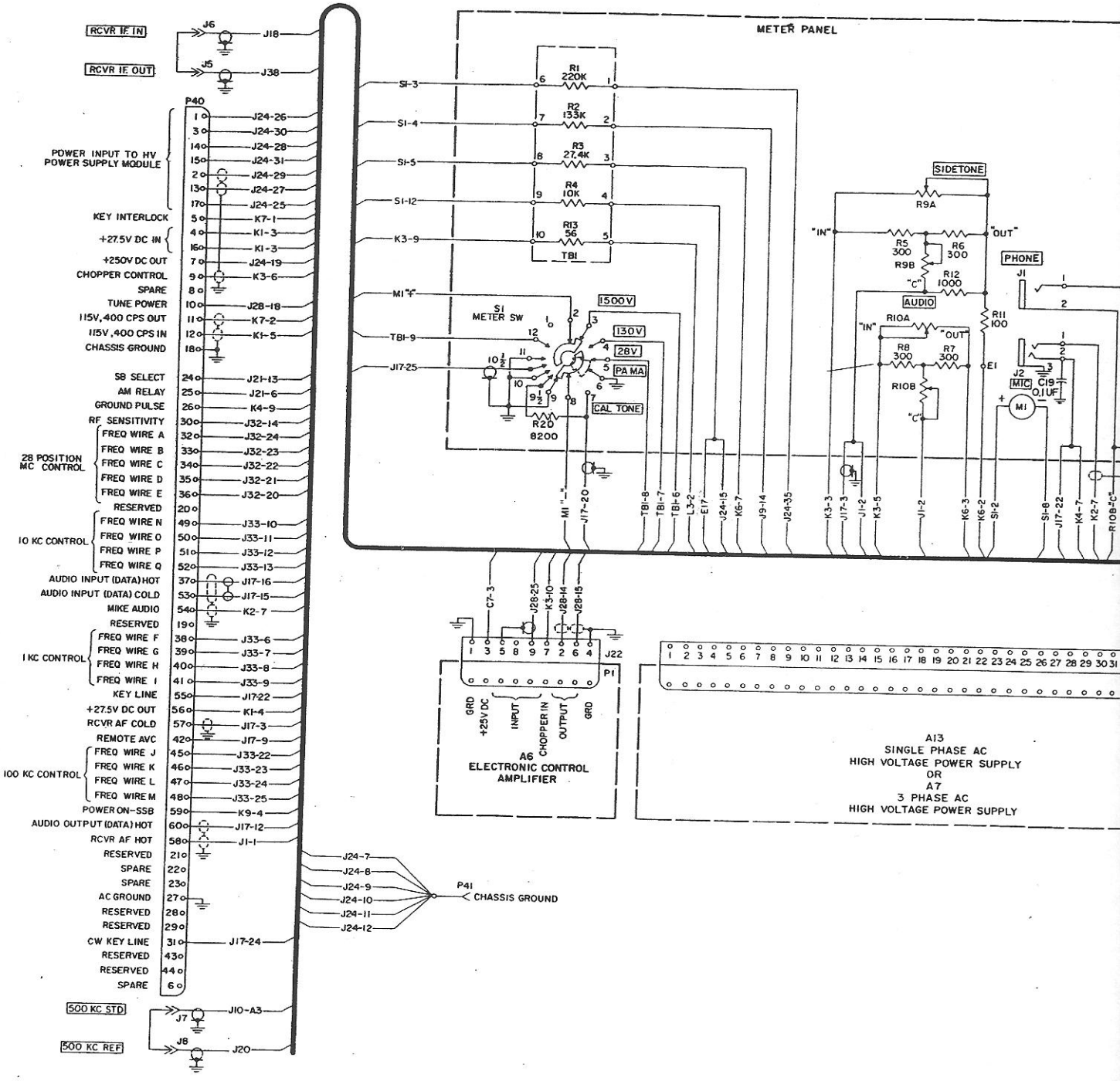
Three-Phase High-Voltage Power Supply Module, Schematic Diagram
Figure 1118

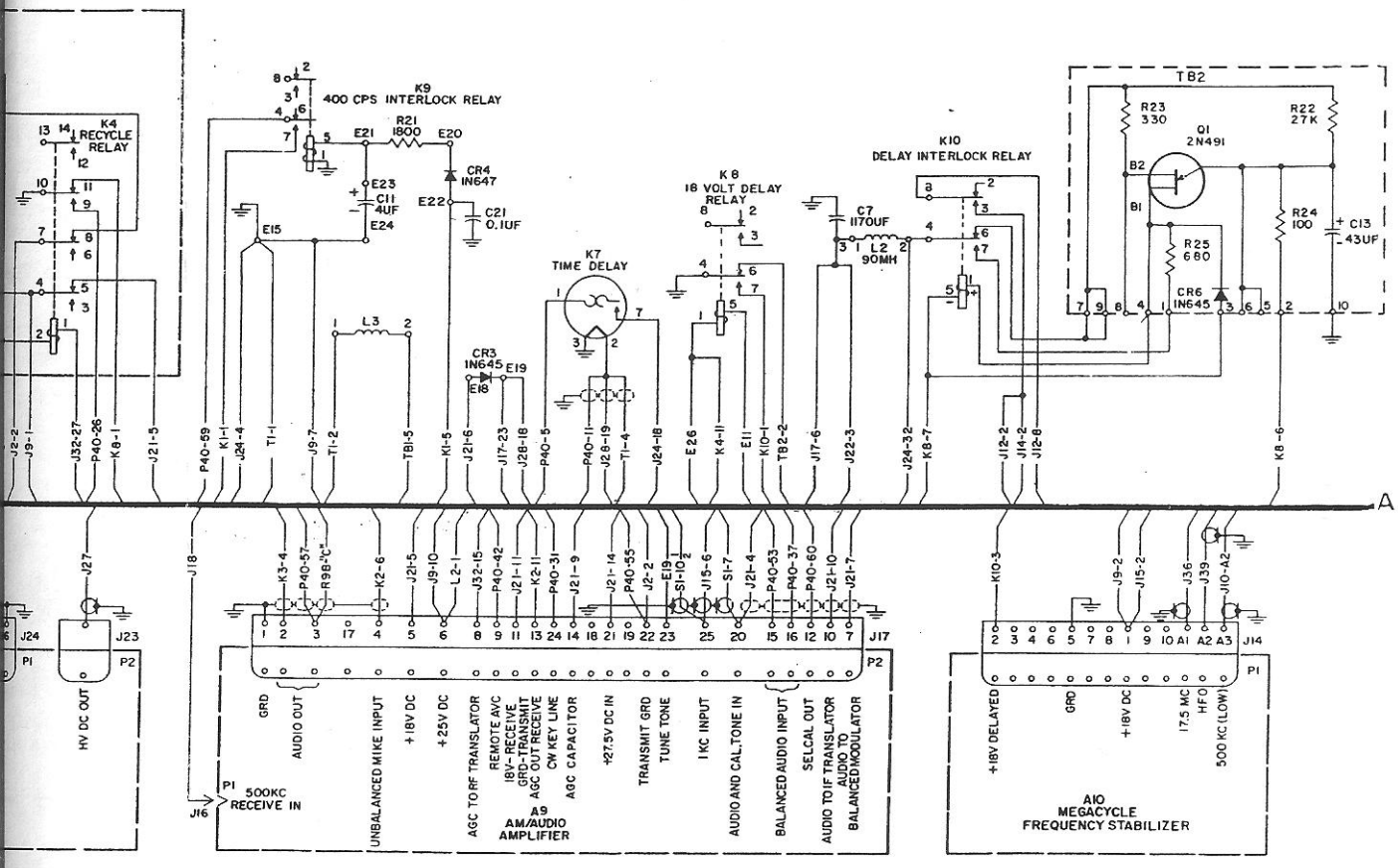


27.5-Volt D-C High-Voltage Power Supply Module, Schematic Diagram
Figure 1119

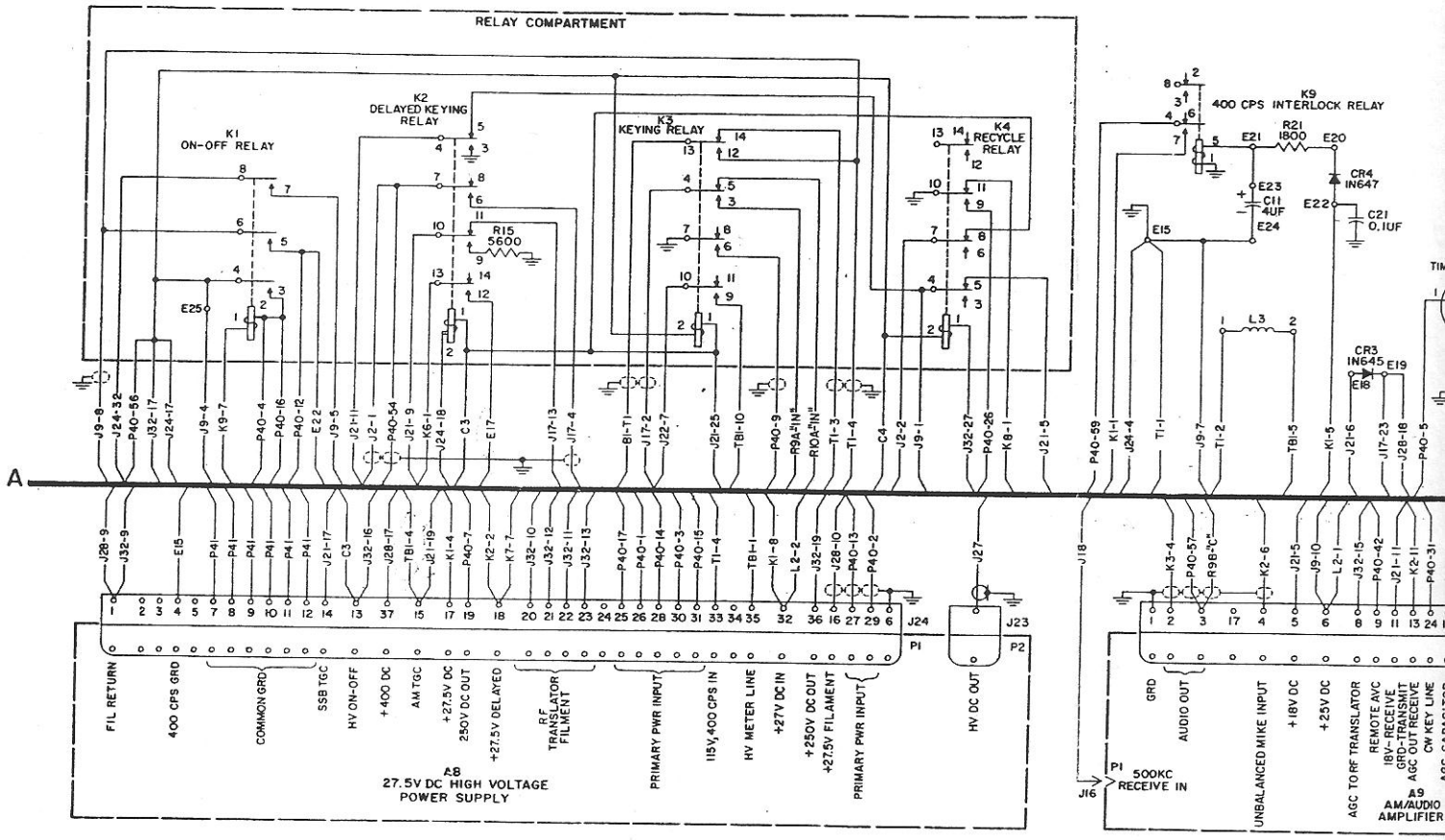


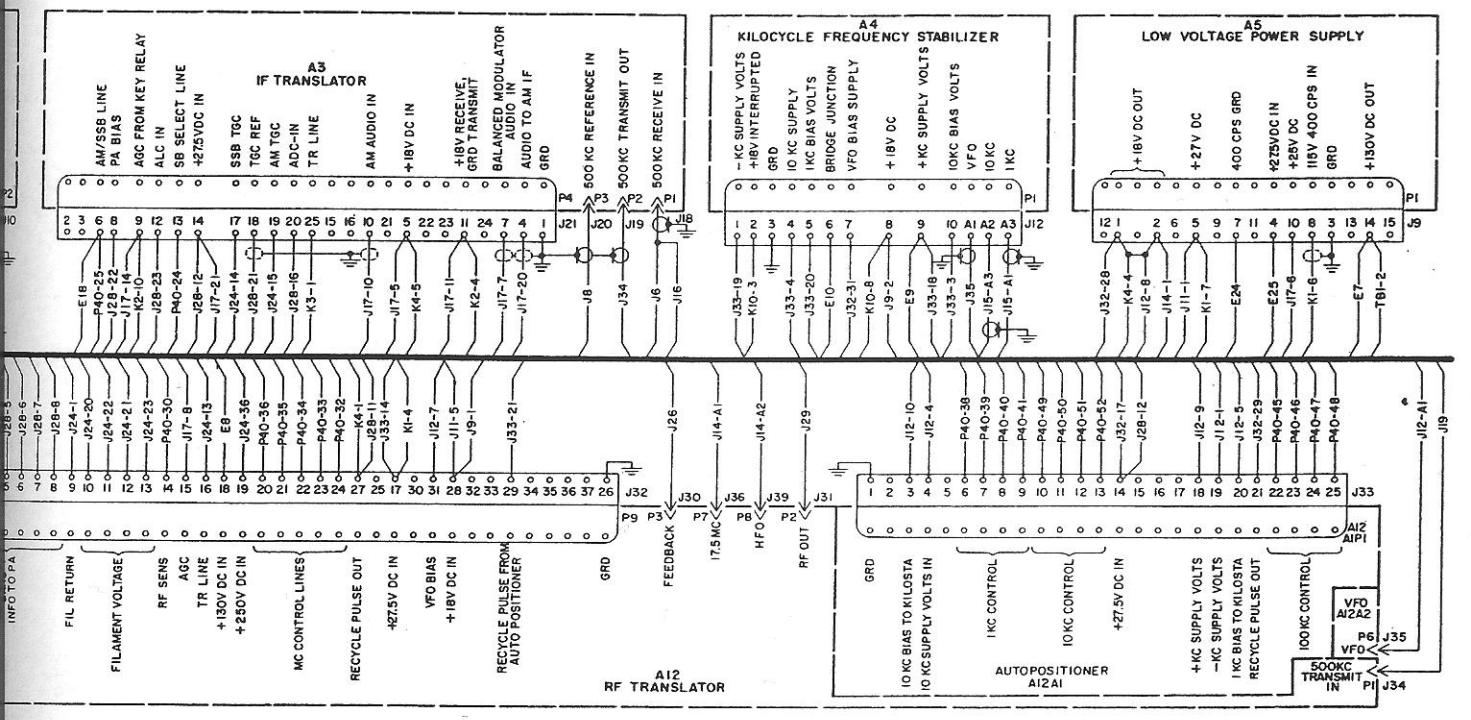
Airborne SSB Transceiver 618T-1( ),
Chassis Wiring Diagram (Sheet 1 of 3)
Figure 1120


METER PANEL
RCVR IF IN
J6
J18
RCVR IF OUT
J5
J38
P40
POWER INPUT TO HV POWER SUPPLY MODULE
J24-26
J24-30
J24-28
J24-31
J24-29
J24-27
J24-25
KEY INTERLOCK
K7-1
+27.5V DC IN
K1-3
K1-3
+250V DC OUT
J24-19
CHOPPER CONTROL
K3-6
SPARE
TUNE POWER
J28-18
115V,400 CPS OUT
K7-2
115V,400 CPS IN
K1-5
CHASSIS GROUND
SB SELECT
J21-13
AM RELAY
J21-6
GROUND PULSE
K4-9
RF SENSITIVITY
J32-14
28 POSITION MC CONTROL
FREQ WIRE A
FREQ WIRE B
FREQ WIRE C
FREQ WIRE D
FREQ WIRE E
J32-24
J32-23
J32-22
J32-21
J32-20
RESERVED
10 KC CONTROL
FREQ WIRE N
FREQ WIRE O
FREQ WIRE P
FREQ WIRE Q
J33-10
J33-11
J33-12
J33-13
AUDIO INPUT (DATA) HOT
J17-16
AUDIO INPUT (DATA) COLD
J17-15
MIKE AUDIO
K2-7
RESERVED
1 KC CONTROL
FREQ WIRE F
FREQ WIRE G
FREQ WIRE H
FREQ WIRE I
J33-6
J33-7
J33-8
J33-9
KEY LINE
J17-22
+27.5V DC OUT
K1-4
RCVR AF COLD
J17-3
REMOTE AVC
J17-9
100 KC CONTROL
FREQ WIRE J
FREQ WIRE K
FREQ WIRE L
FREQ WIRE M
J33-22
J33-23
J33-24
J33-25
POWER ON-SSB
K9-4
AUDIO OUTPUT (DATA) HOT
J17-12
RCVR AF HOT
J1-1
RESERVED
SPARE
SPARE
AC GROUND
RESERVED
RESERVED
CW KEY LINE
J17-24
RESERVED
RESERVED
SPARE
500 KC STD
J7
J10-A3
500 KC REF
J8
J20
J24-7
J24-8
J24-9
J24-10
J24-11
J24-12
P41
CHASSIS GROUND
SI-3
SI-4
SI-5
SI-12
K3-9
R1 220K
R2 133K
R3 27.4K
R4 10K
R13 56
TBI
MI "+"
TBI-9
J17-25
S1 METER SW
1500V
130V
28V
PA MA
CAL TONE
R20 8200
SIDETONE
R9A
"IN"
"OUT"
R5 300
R6 300
R9B
"C"
R12 1000
AUDIO
R10A
R11 100
R8 300
R7 300
R10B
PHONE
J1
J2
MIC
C19 0.1UF
MI
MI "-"
J17-20
TBI-8
TBI-7
TBI-6
L3-2
E17
J24-15
K6-7
J9-14
J24-35
K3-3
J17-3
J1-2
K3-5
J1-2
K6-3
K6-2
SI-2
SI-8
J17-22
K4-7
K2-7
R10B "C"
C7-3
J28-25
K3-10
J28-14
J28-15
J22
P1
GRD
+25V DC
INPUT
CHOPPER IN
OUTPUT
GRD
A6
ELECTRONIC CONTROL AMPLIFIER
A13
SINGLE PHASE AC
HIGH VOLTAGE POWER SUPPLY
OR
A7
3 PHASE AC
HIGH VOLTAGE POWER SUPPLY

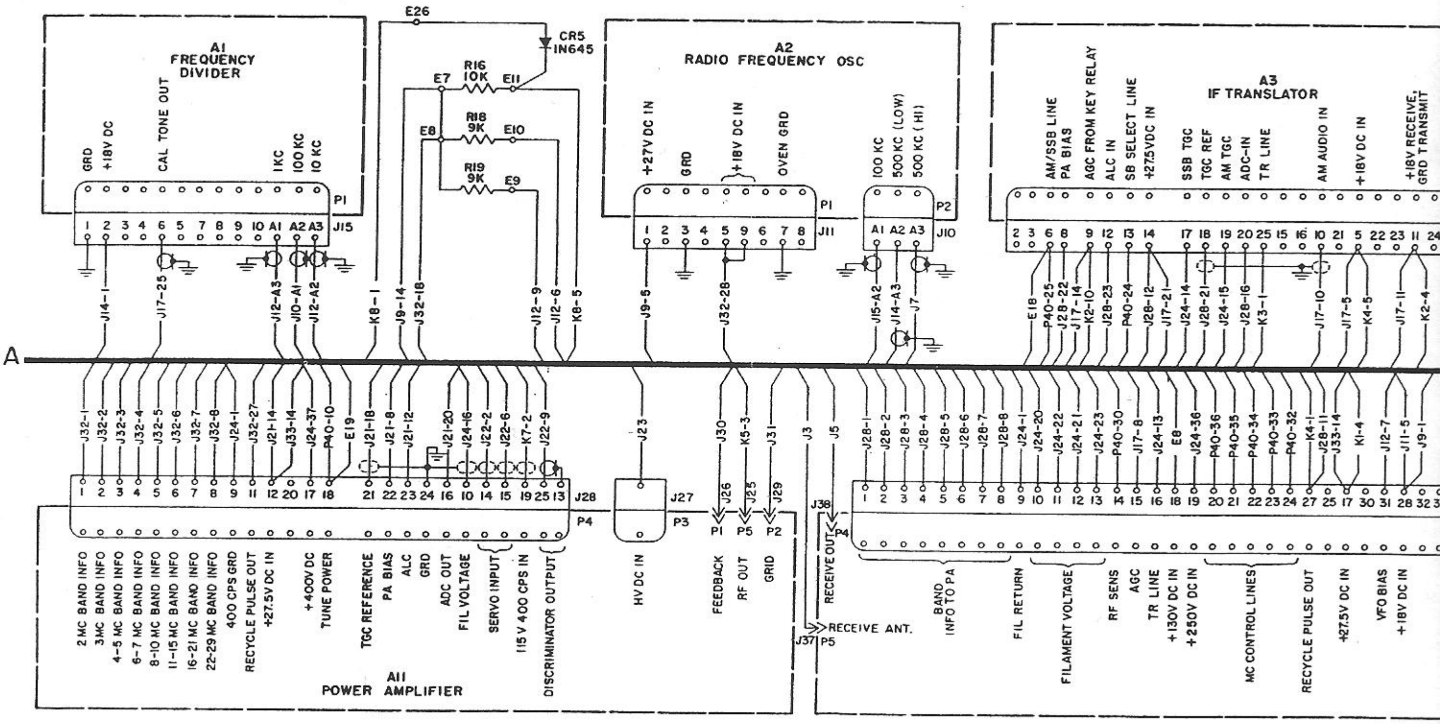


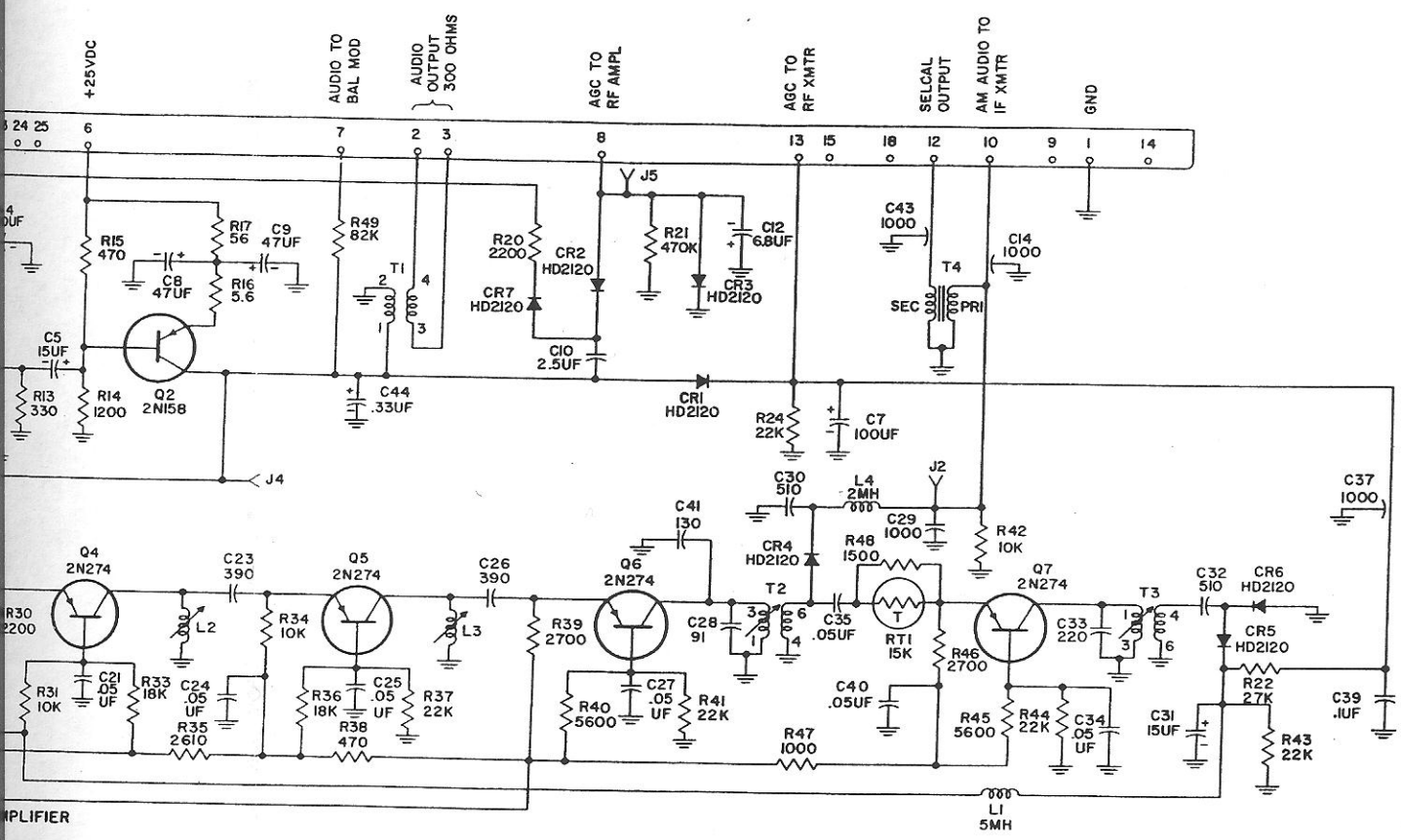
Airborne SSB Transceiver 618T-1( ),
Chassis Wiring Diagram (Sheet 2 of 3)
Figure 1120


RELAY COMPARTMENT
K1
ON-OFF RELAY
K2
DELAYED KEYING
RELAY
K3
KEYING RELAY
K4
RECYCLE
RELAY
K9
400 CPS INTERLOCK RELAY
R15
5600
R21
1800
C11
4UF
C21
0.1UF
CR4
IN647
CR3
IN645
L3
E25
E15
E18
E19
E20
E21
E22
E23
E24
A
J24
J23
P1
P2
FIL RETURN
400 CPS GRD
COMMON GRD
SSB TGC
HV ON-OFF
+400 DC
AM TGC
+27.5V DC
250V DC OUT
+27.5V DELAYED
R.F.
TRANSLATOR
FILMENT
PRIMARY PWR INPUT
115V, 400 CPS IN
HV METER LINE
+27V DC IN
+250V DC OUT
+27.5V FILAMENT
PRIMARY PWR INPUT
HV DC OUT
A8
27.5V DC HIGH VOLTAGE
POWER SUPPLY
J18
J16
P1
500KC
RECEIVE IN
GRD
AUDIO OUT
UNBALANCED MIKE INPUT
+18V DC
+25V DC
AGC TO RF TRANSLATOR
REMOTE AVC
18V-RECEIVE
GRD-TRANSMIT
AGC OUT RECEIVE
CW KEY LINE
A9
AM/AUDIO
AMPLIFIER



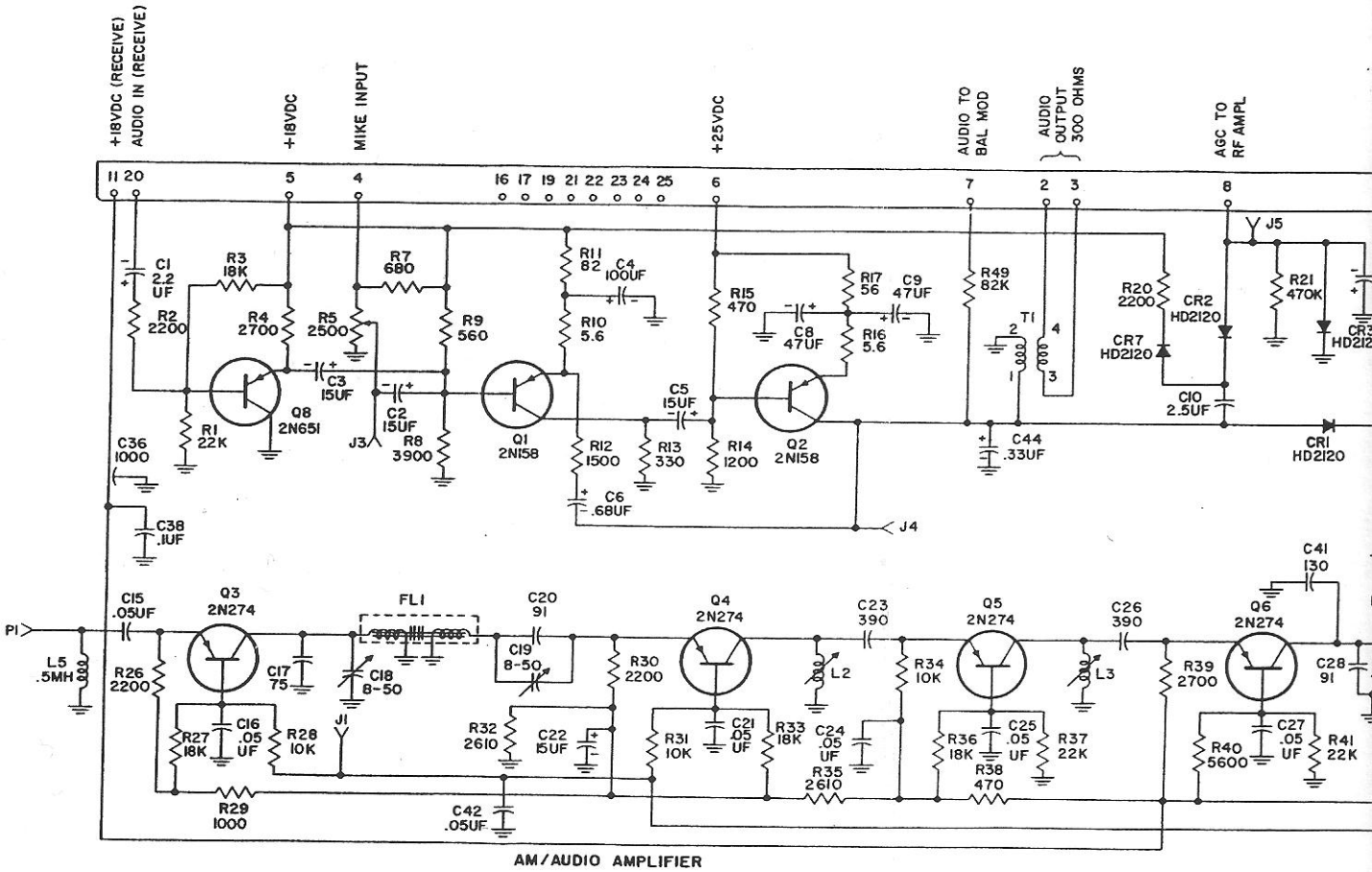
Airborne SSB Transceiver 618T-1( ),
Chassis Wiring Diagram (Sheet 3 of 3)
Figure 1120


A1
FREQUENCY
DIVIDER
A2
RADIO FREQUENCY OSC
A3
IF TRANSLATOR
A11
POWER AMPLIFIER
CR5
1N645
R16
10K
R18
9K
R19
9K
RECEIVE ANT.



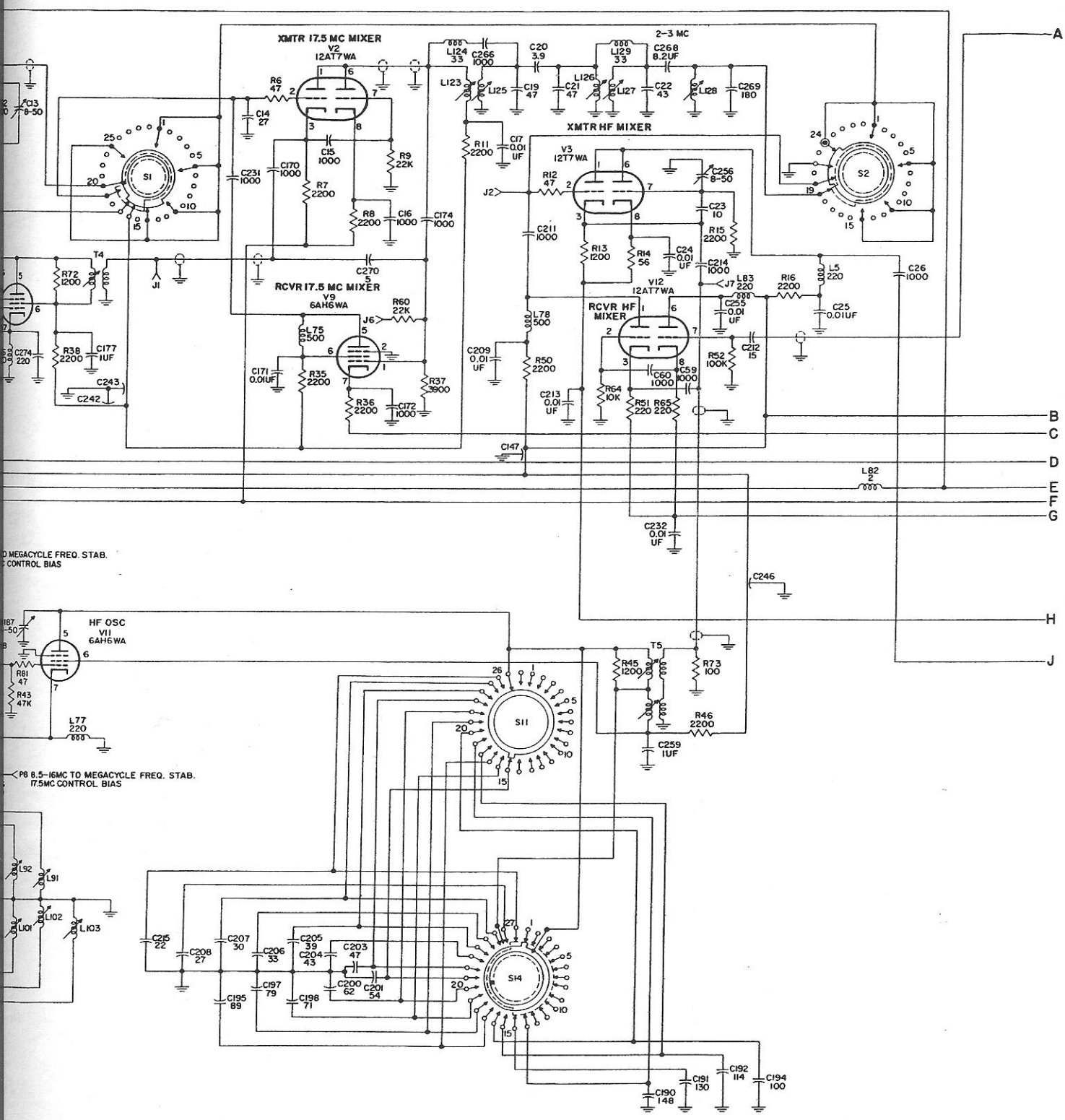
LUES ARE IN OHMS, CAPACITANCE VALUES
ALUES ARE IN MICROHENRYS.
PREFIX THE DESIGNATIONS WITH THE
OTH.

AM/Audio Amplifier Module (Early Model)
Schematic Diagram
Figure 1121

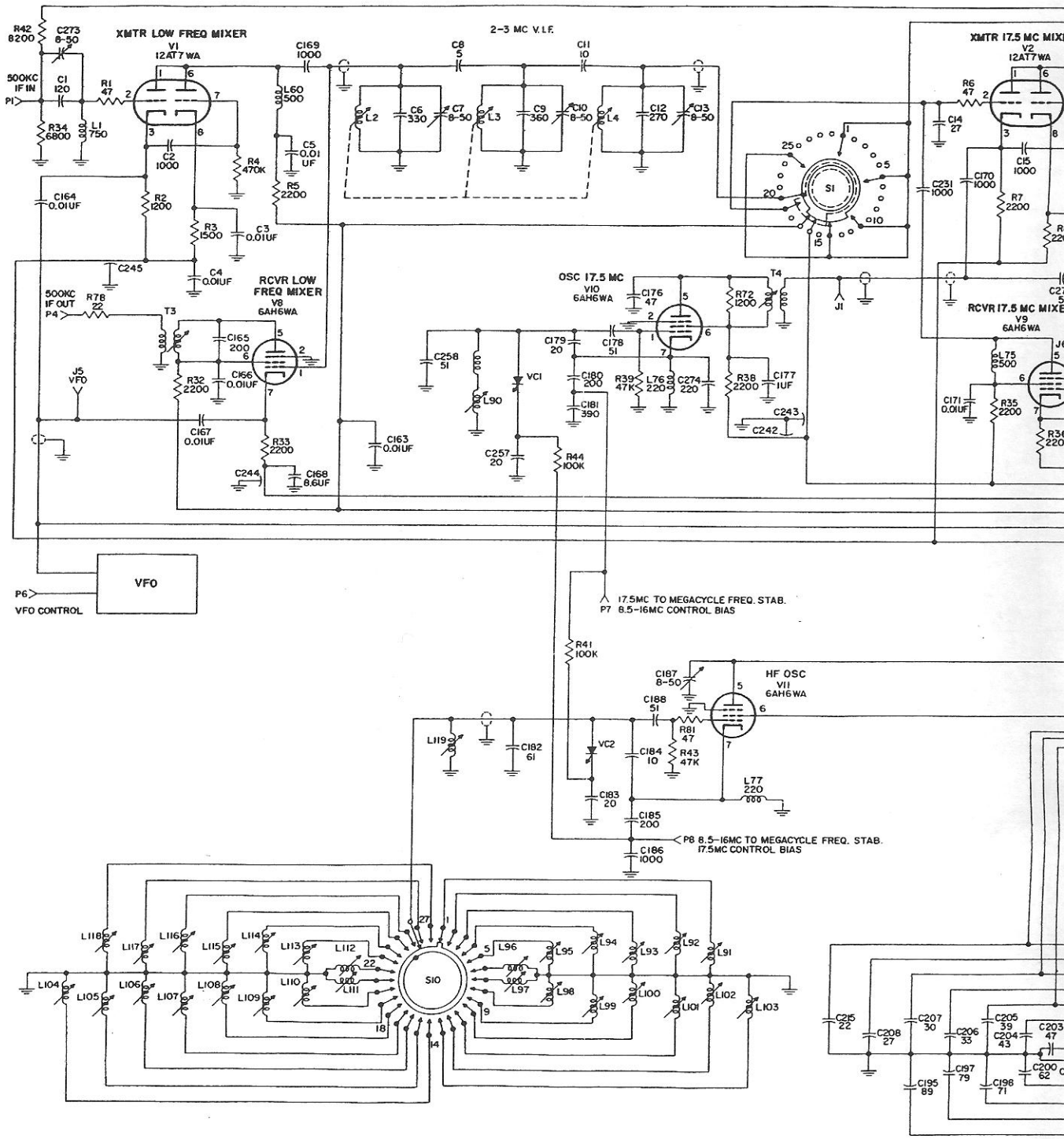


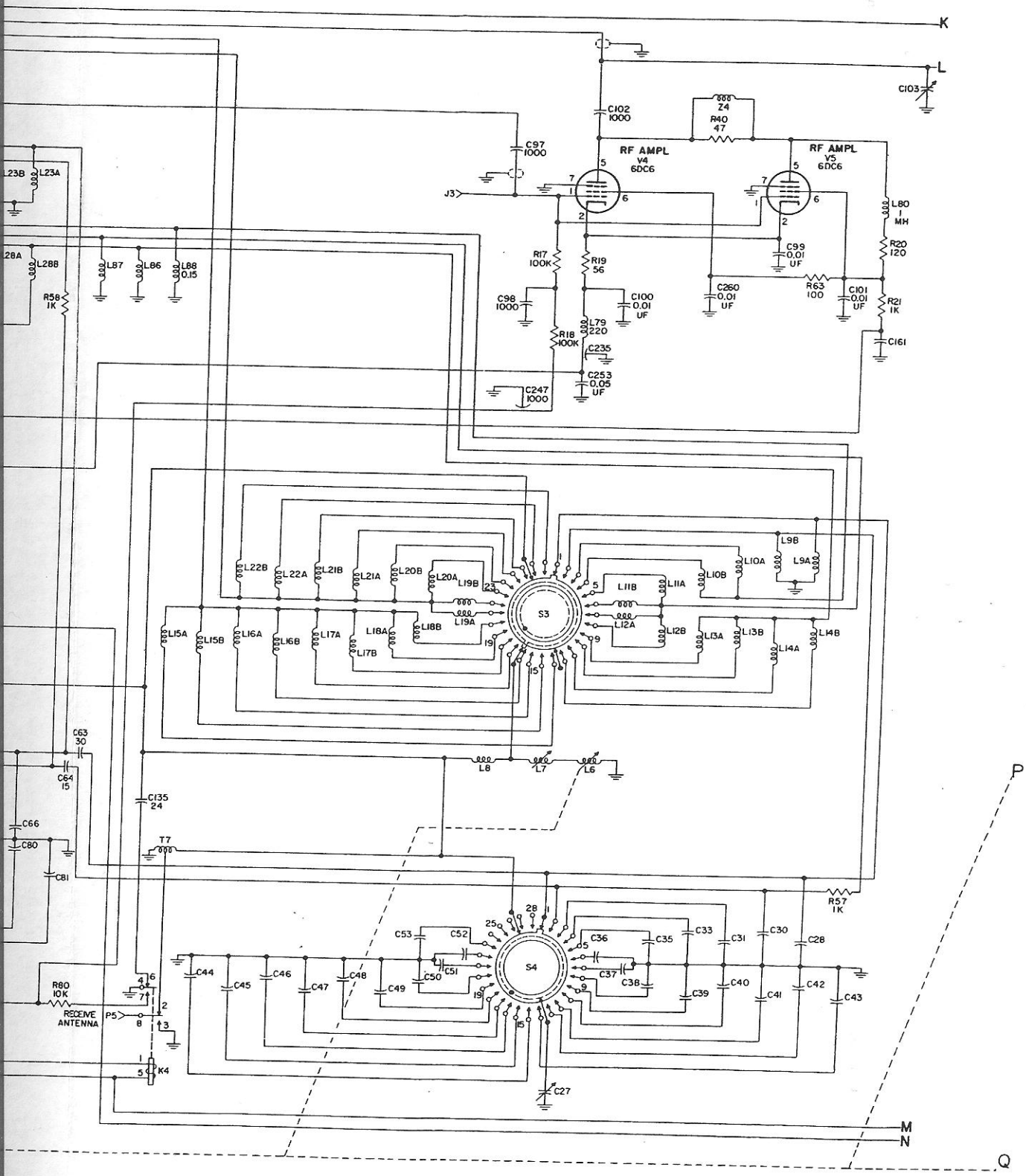
AM/AUDIO AMPLIFIER

NOTES:
1. UNLESS OTHERWISE INDICATED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROMICROFARADS, AND INDUCTANCE VALUES ARE IN MICROHENRYS.
2. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

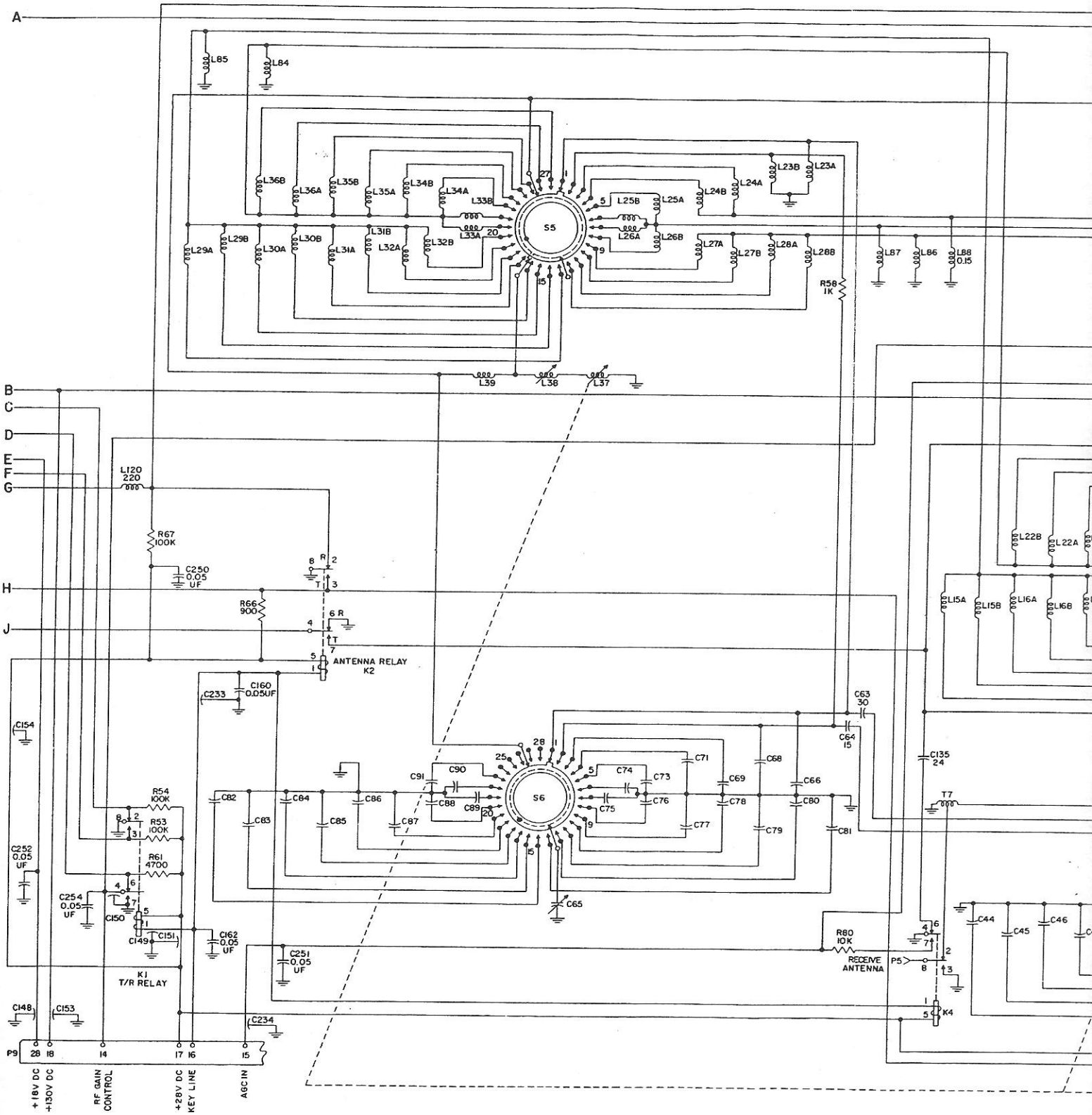


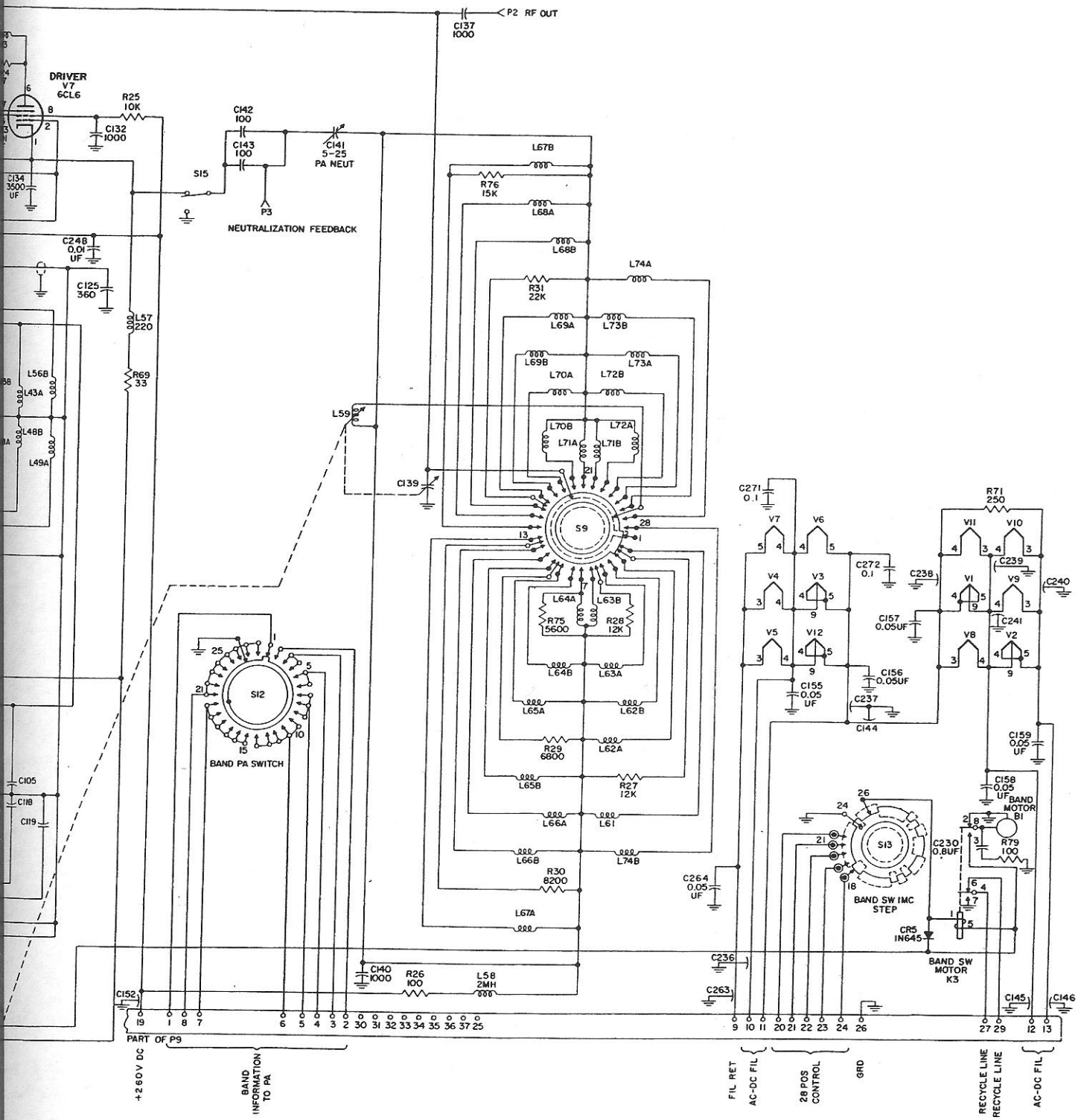
R-F Translator Module (Early Model),
Schematic Diagram (Sheet 1 of 3)
Figure 1122


XMTR LOW FREQ MIXER
V1
12AT7WA
2-3 MC V.L.F.
XMTR 17.5 MC MIXE
V2
12AT7WA
500KC IF IN
P1
R42 8200
C273 6-50
C1 120
R1 47
L1 750
R34 6800
C2 1000
R4 470K
R5 2200
C5 0.01 UF
C169 1000
L60 500
C8 5
C11 10
L2
C6 330
C7 8-50
L3
C9 360
C10 8-50
L4
C12 270
C13 8-50
S1
R6 47
C14 27
C15 1000
C231 1000
C170 1000
R7 2200
C164 0.01UF
R2 1200
R3 1500
C3 0.01UF
C245
C4 0.01UF
RCVR LOW FREQ MIXER
V8
6AH6WA
500KC IF OUT
P4
R78 22
T3
C165 200
C166 0.01UF
R32 2200
J5 VFO
C167 0.01UF
R33 2200
C244
C168 8.6UF
C163 0.01UF
OSC 17.5 MC
V10
6AH6WA
C176 47
R72 1200
T4
J1
C179 20
C178 51
C258 51
L90
VC1
C180 200
C181 390
R39 47K
L76 220
C274 220
R38 2200
C177 1UF
C243
C242
C257 20
R44 100K
RCVR 17.5 MC MIXE
V9
6AH6WA
L75 500
C171 0.01UF
R35 2200
VFO
P6
VFO CONTROL
17.5MC TO MEGACYCLE FREQ. STAB.
P7 8.5-16MC CONTROL BIAS
R41 100K
HF OSC
V11
6AH6WA
C187 8-50
C188 51
R81 47
L119
C182 61
VC2
C184 10
R43 47K
L77 220
C183 20
C185 200
C186 1000
P8 8.5-16MC TO MEGACYCLE FREQ. STAB.
17.5MC CONTROL BIAS
L118
L117
L116
L115
L114
L113
L112
L111
L110
L109
L108
L107
L106
L105
L104
S10
L96
L95
L94
L93
L92
L91
L97
L98
L99
L100
L101
L102
L103
C215 22
C208 27
C207 30
C206 33
C205 39
C204 43
C203 47
C197 79
C195 89
C198 71
C200 62

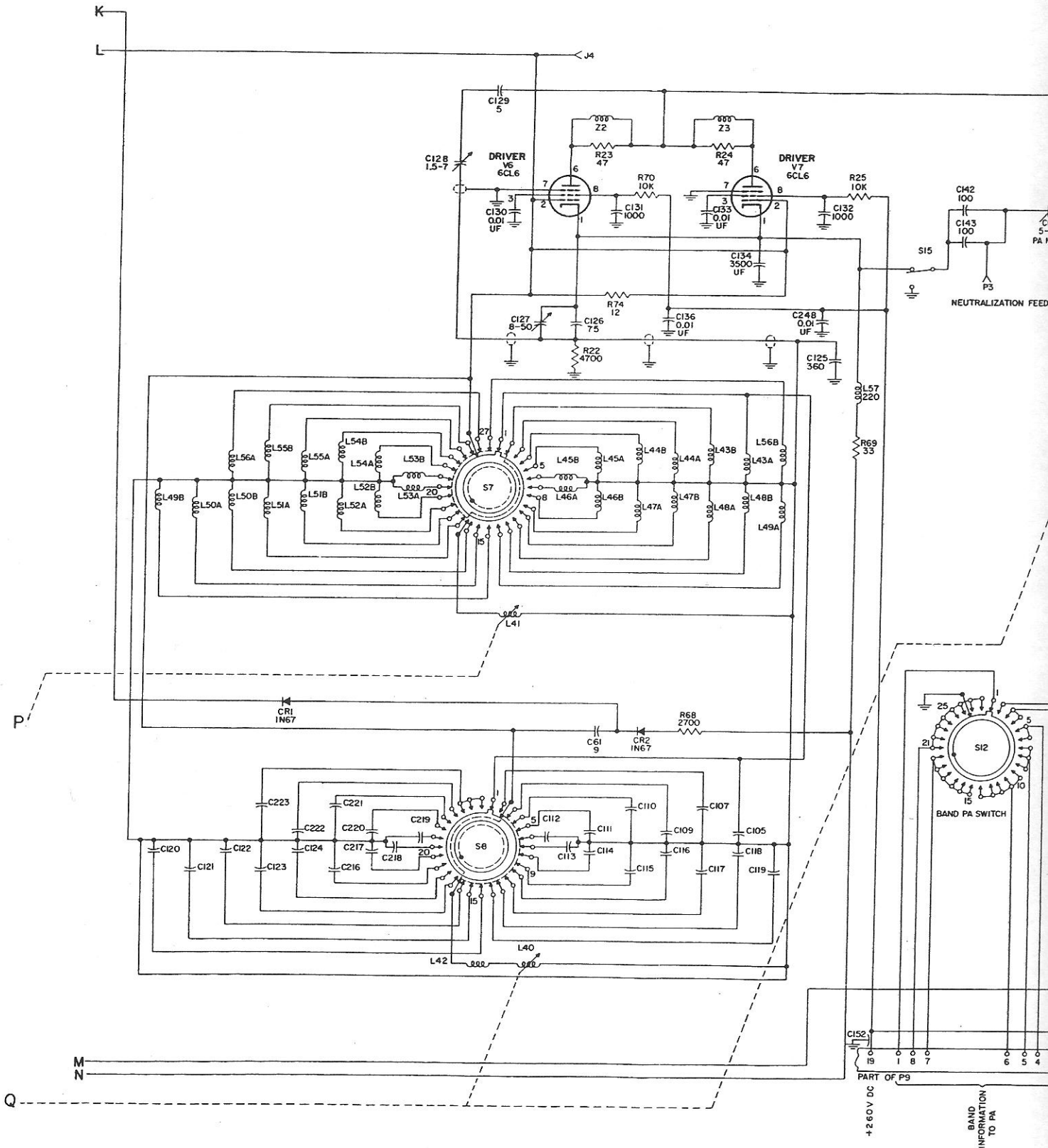


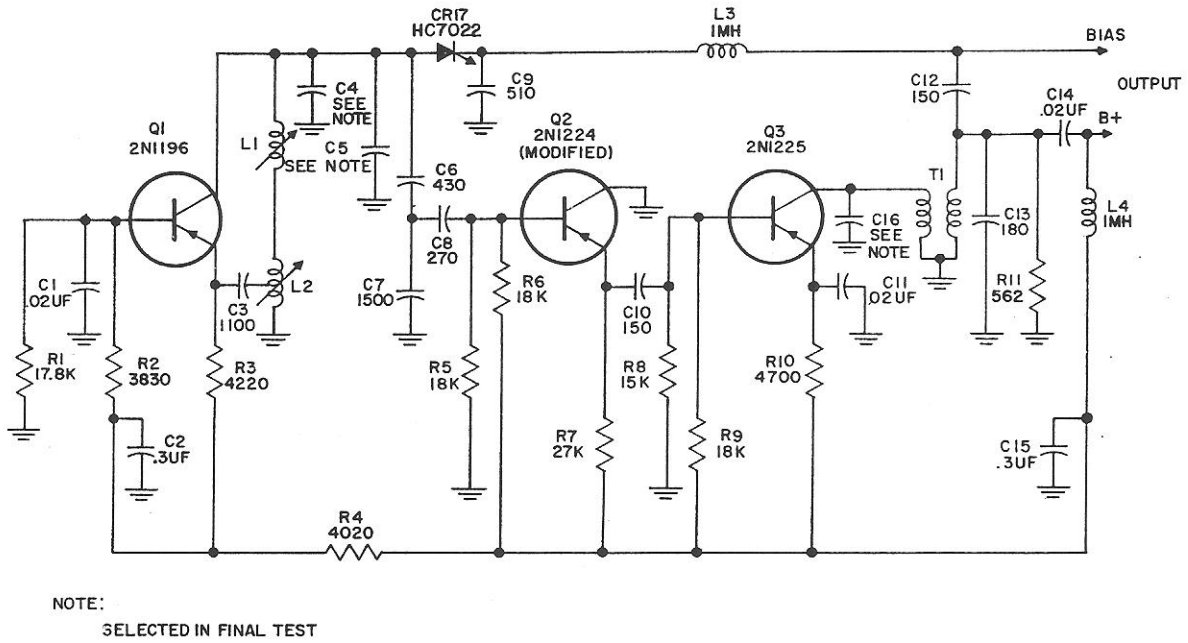
R-F Translator Module (Early Model),
Schematic Diagram (Sheet 2 of 3)
Figure 1122


A
B
C
D
E
F
G
H
J
L85
L84
L36B
L36A
L35B
L35A
L34B
L34A
L33B
L33A
S5
L23B
L23A
L25B
L25A
L24B
L24A
L26A
L26B
L29A
L29B
L30A
L30B
L31A
L31B
L32A
L32B
L27A
L27B
L28A
L28B
L87
L86
L88
0.15
R58
1K
L39
L38
L37
L120
220
R67
100K
C250
0.05
UF
R66
900
ANTENNA RELAY
K2
C160
0.05UF
C233
C154
R54
100K
R53
100K
R61
4700
C252
0.05
UF
C254
0.05
UF
C150
C149
C151
C162
0.05
UF
C251
0.05
UF
K1
T/R RELAY
C148
C153
C234
P9
28
18
14
17
16
15
+18V DC
+130V DC
RF GAIN
CONTROL
+28V DC
KEY LINE
AGCIN
C91
C90
C88
C89
S6
C74
C73
C71
C68
C69
C66
C82
C83
C84
C85
C86
C87
C75
C76
C78
C77
C79
C80
C81
C65
C63
30
C64
15
C135
24
T7
L22B
L22A
LI5A
LI5B
LI6A
LI6B
C44
C45
C46
R80
10K
RECEIVE
ANTENNA
P5
K4



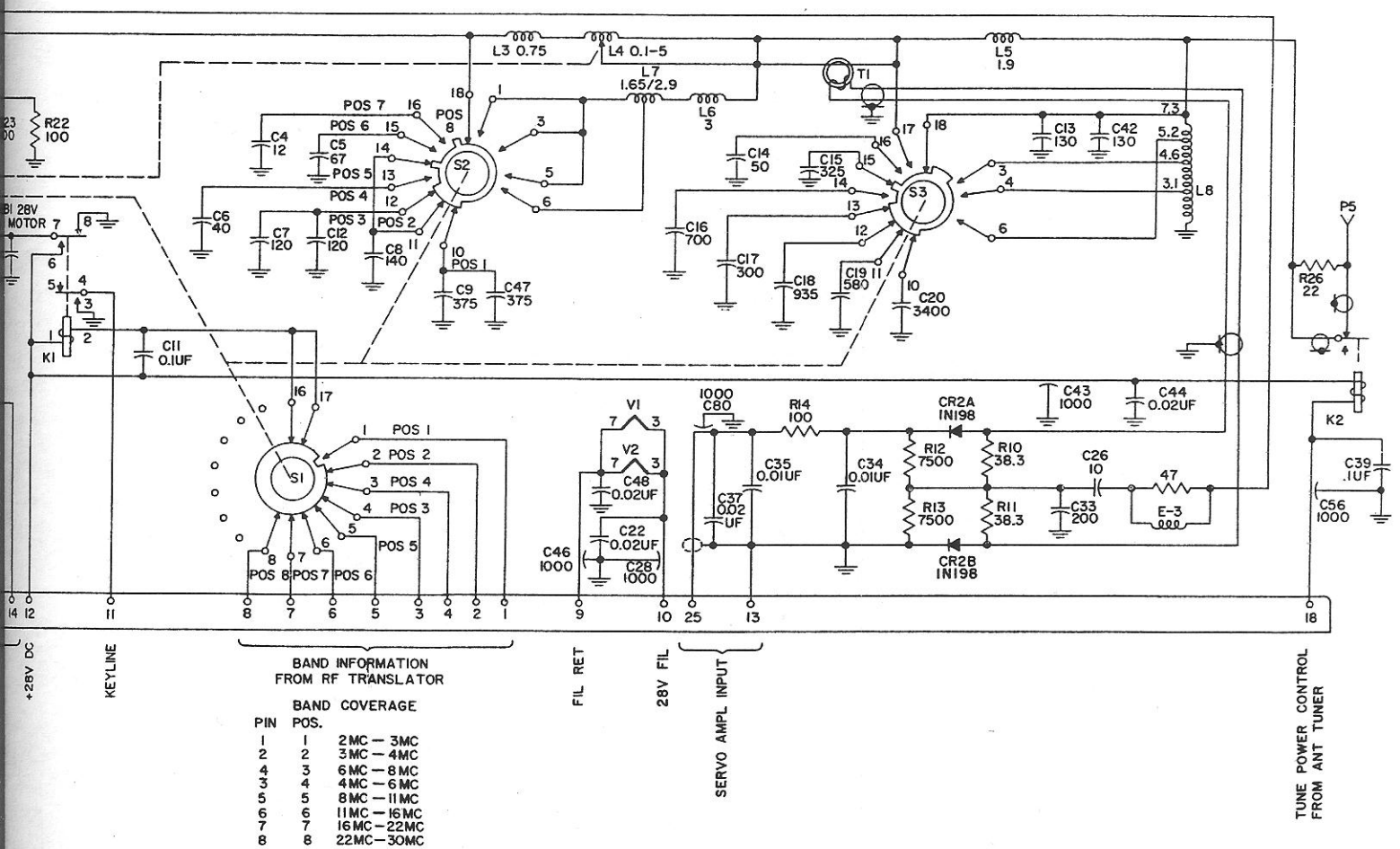
R-F Translator Module (Early Model),
Schematic Diagram (Sheet 3 of 3)
Figure 1122


K
L
J4
C129
5
Z2
Z3
C128
1.5-7
DRIVER
V6
6CL6
R23
47
R24
47
DRIVER
V7
6CL6
R70
10K
R25
10K
C130
0.01
UF
C131
1000
C133
0.01
UF
C132
1000
C142
100
C143
100
S15
P3
NEUTRALIZATION FEED
C134
3500
UF
R74
12
C127
8-50
C126
75
C136
0.01
UF
C248
0.01
UF
R22
4700
C125
360
L57
220
R69
33
L56A
L55B
L55A
L54B
L54A
L53B
L53A
L52B
L52A
L51B
L51A
L50B
L50A
L49B
S7
L45B
L45A
L46A
L46B
L44B
L44A
L47A
L47B
L43B
L43A
L48A
L48B
L56B
L49A
L41
P
CR1
IN67
C61
9
CR2
IN67
R68
2700
C223
C221
C222
C220
C219
C217
C218
C216
C120
C121
C122
C123
C124
S8
C112
C113
C111
C114
C110
C109
C116
C115
C107
C105
C118
C117
C119
L42
L40
S12
BAND PA SWITCH
M
N
Q
C152
PART OF P9
+260V DC
BAND INFORMATION TO PA



NOTE:
SELECTED IN FINAL TEST

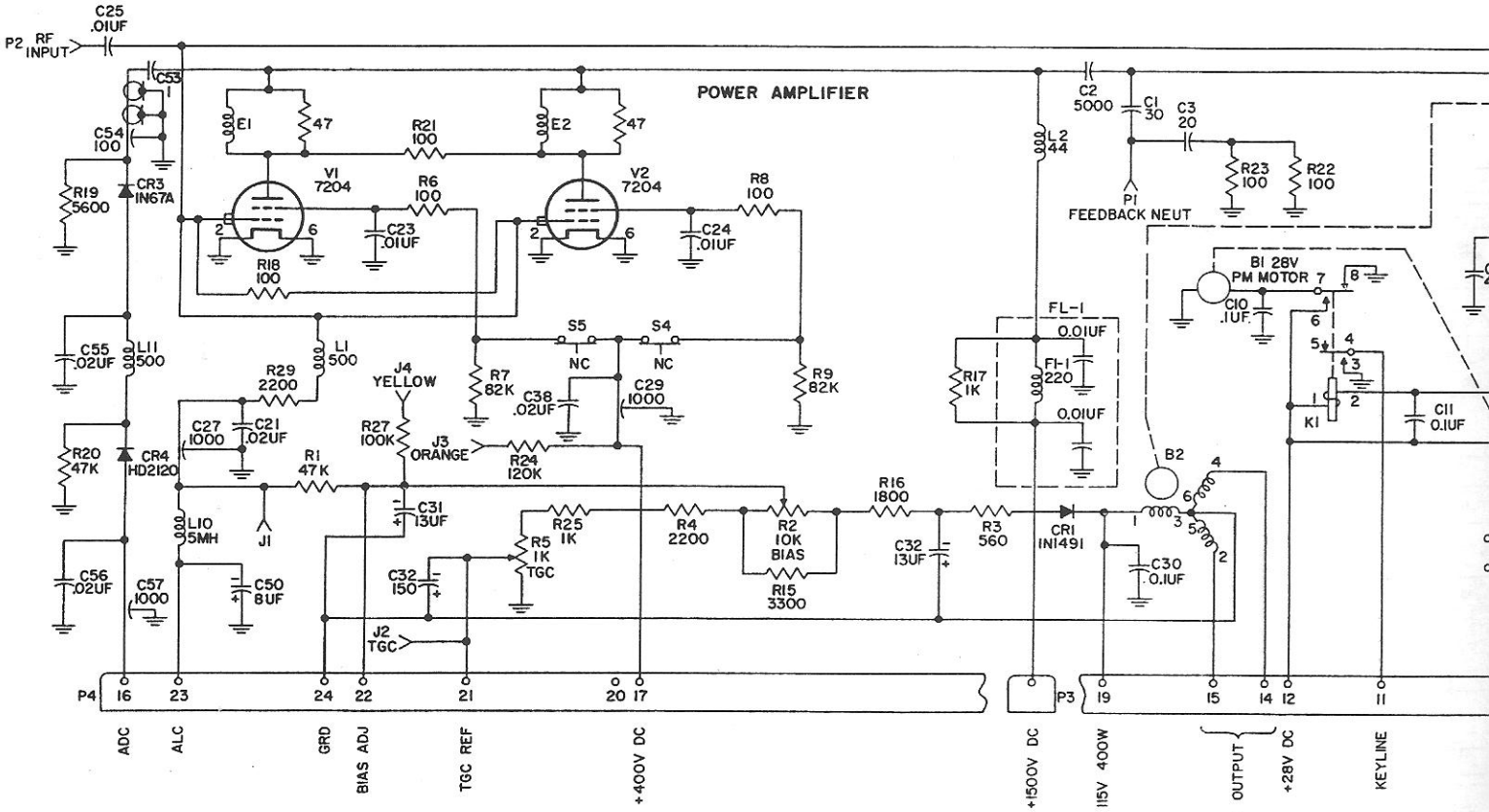
VFO Submodule, Model 70K-3, Schematic Diagram
Figure 1123



BAND COVERAGE

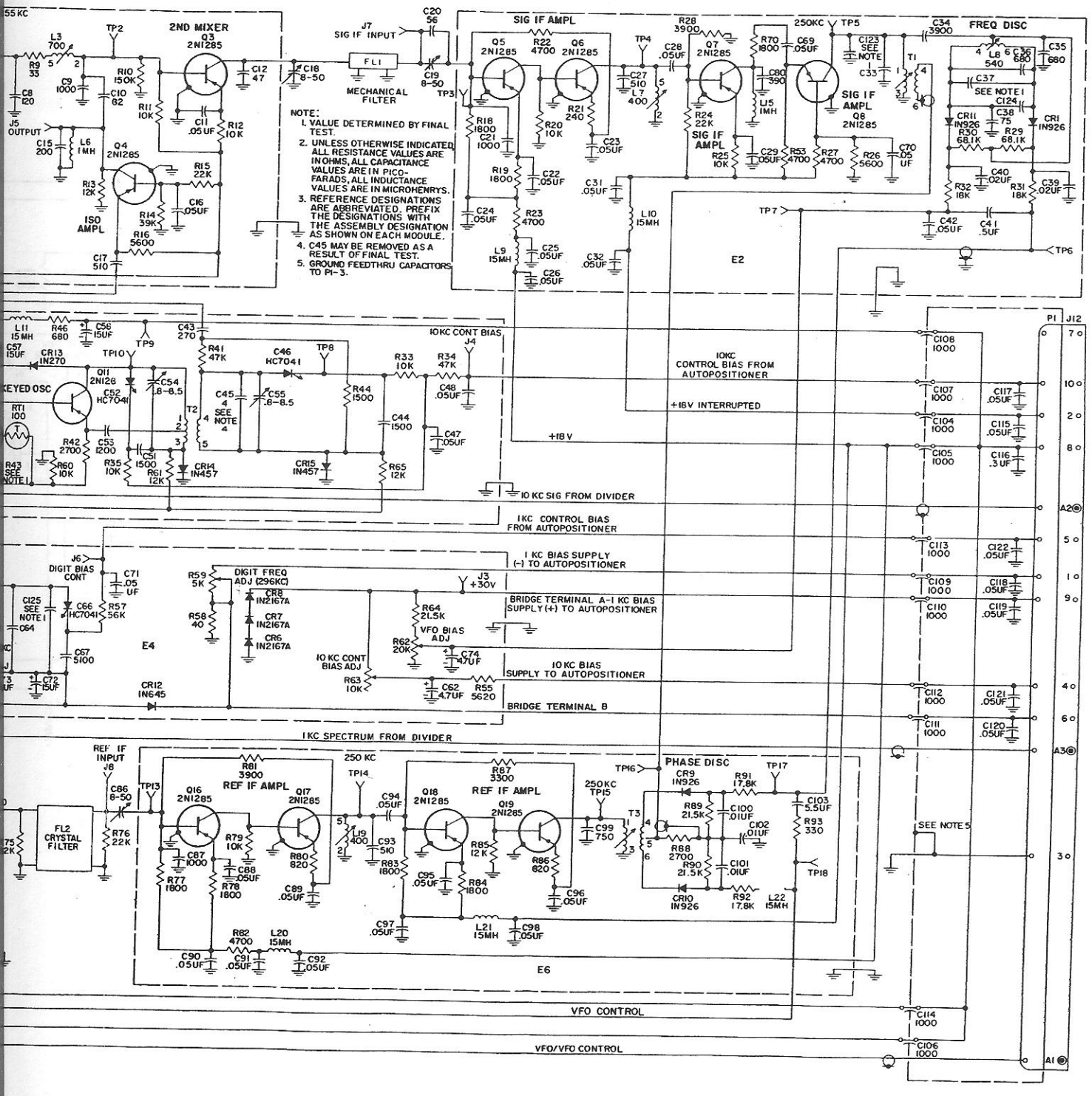
PIN	POS.	
1	1	2MC — 3MC
2	2	3MC — 4MC
4	3	6MC — 8MC
3	4	4MC — 6MC
5	5	8MC — 11MC
6	6	11MC — 16MC
7	7	16MC — 22MC
8	8	22MC — 30MC

Power Amplifier Module (Early Model), Schematic Diagram
Figure 1124

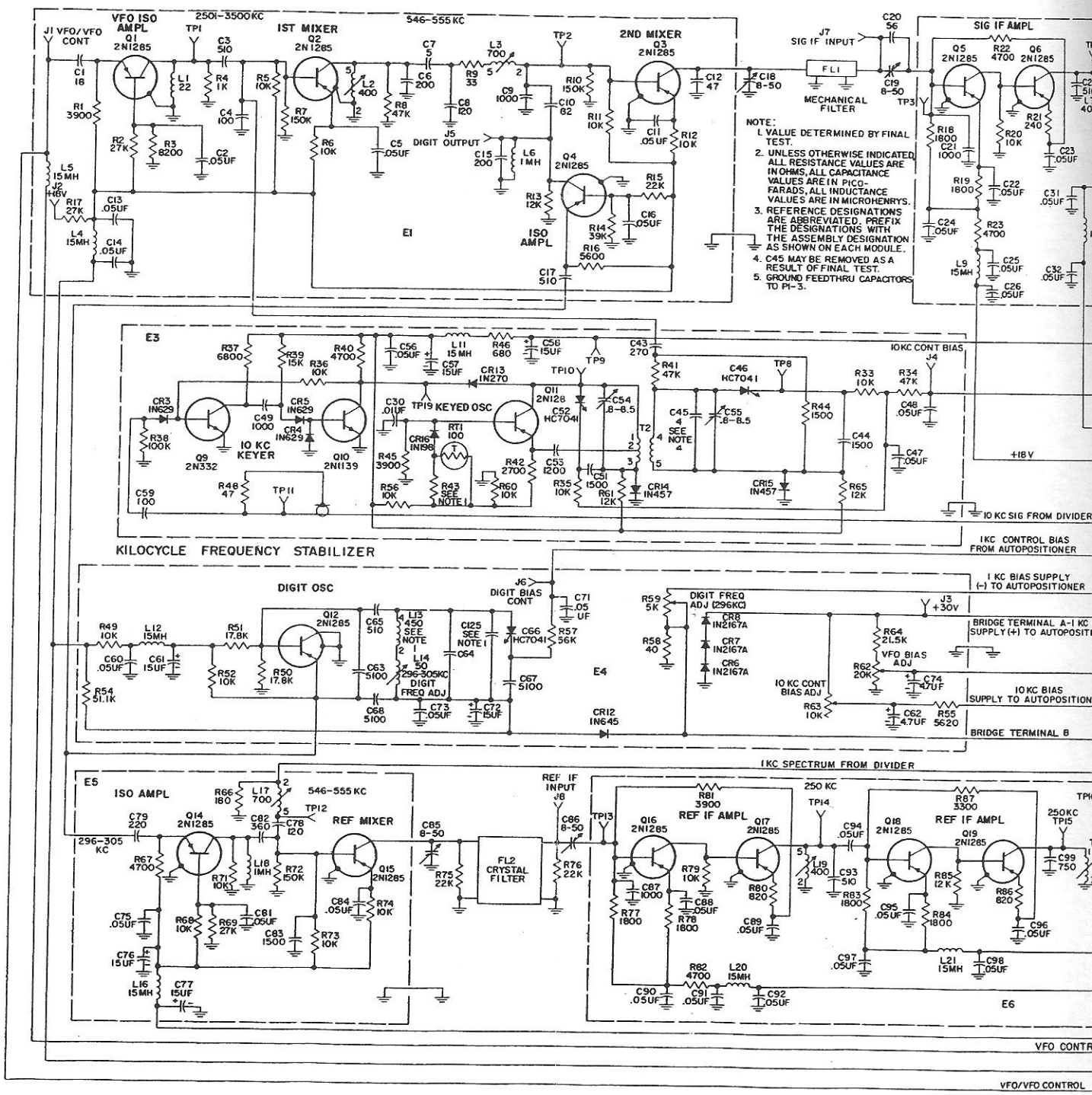


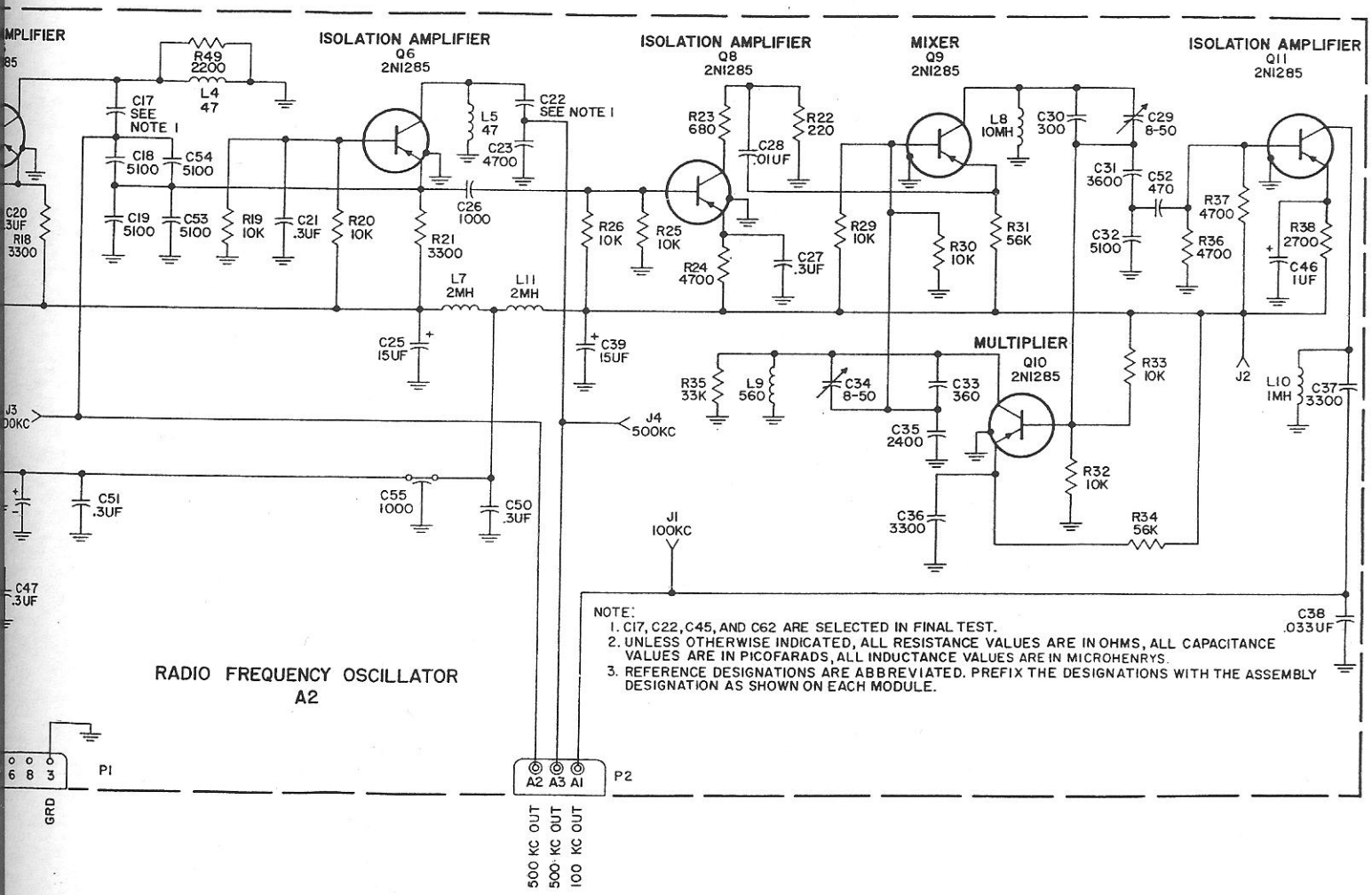
NOTES:

1. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACTANCE VALUES ARE IN MICROMICROFAHRADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
2. PREFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION.

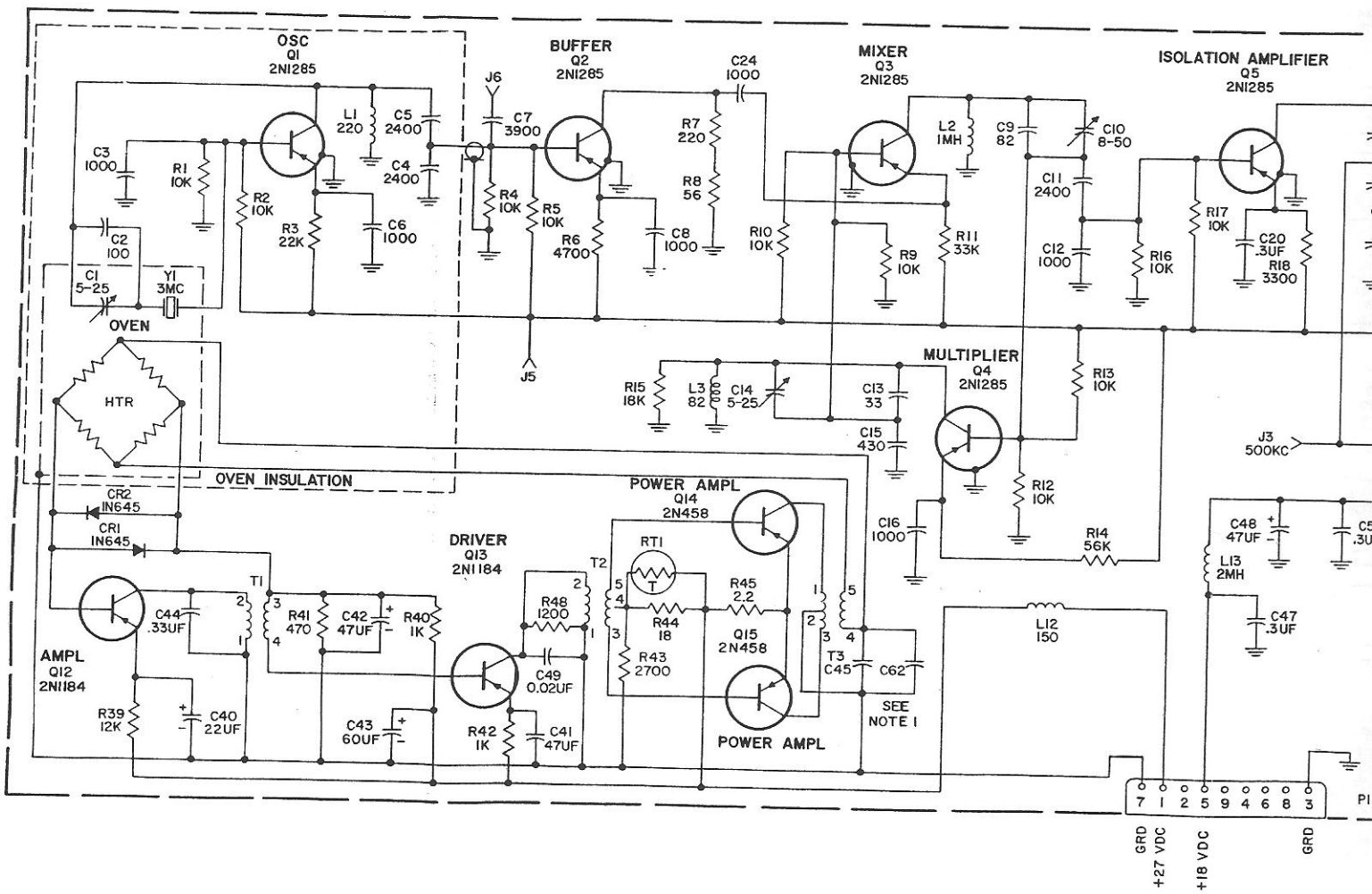


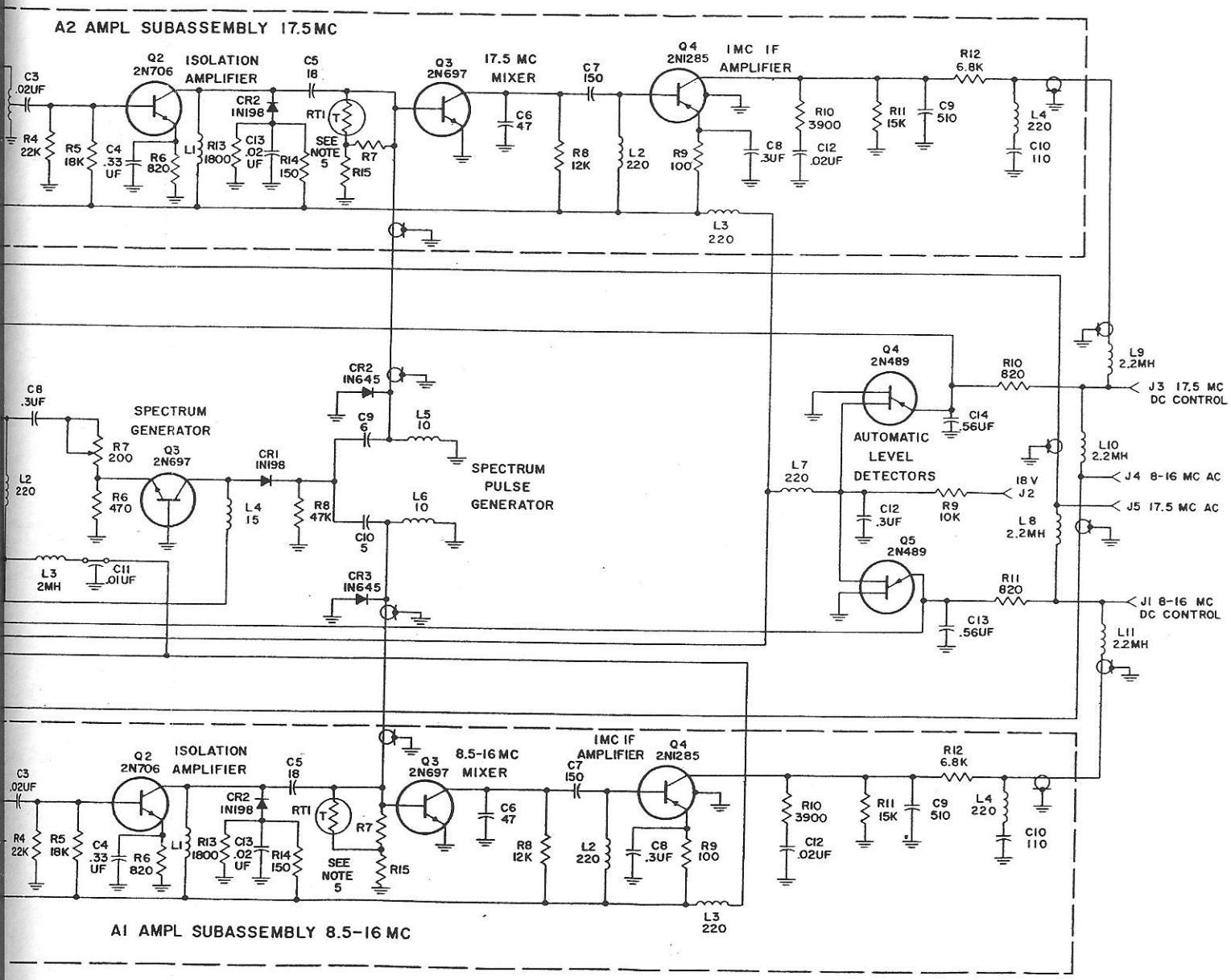
Kilocycle-Frequency Stabilizer Module (Early Model), Schematic Diagram
Figure 1125


KILOCYCLE FREQUENCY STABILIZER
VFO ISO AMPL
IST MIXER
2ND MIXER
SIG IF AMPL
MECHANICAL FILTER
ISO AMPL
10 KC KEYER
KEYED OSC
DIGIT OSC
DIGIT OUTPUT
DIGIT FREQ ADJ (296KC)
DIGIT BIAS CONT
10 KC CONT BIAS
10 KC SIG FROM DIVIDER
1KC CONTROL BIAS FROM AUTOPOSITIONER
1 KC BIAS SUPPLY (-) TO AUTOPOSITIONER
BRIDGE TERMINAL A-1 KC SUPPLY (+) TO AUTOPOSITIONER
10 KC BIAS SUPPLY TO AUTOPOSITIONER
BRIDGE TERMINAL B
1KC SPECTRUM FROM DIVIDER
REF MIXER
REF IF AMPL
REF IF INPUT
FL2 CRYSTAL FILTER
VFO CONTROL
NOTE:
1. VALUE DETERMINED BY FINAL TEST.
2. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICO-FARADS, ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
3. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION AS SHOWN ON EACH MODULE.
4. C45 MAY BE REMOVED AS A RESULT OF FINAL TEST.
5. GROUND FEEDTHRU CAPACITORS TO PI-3.



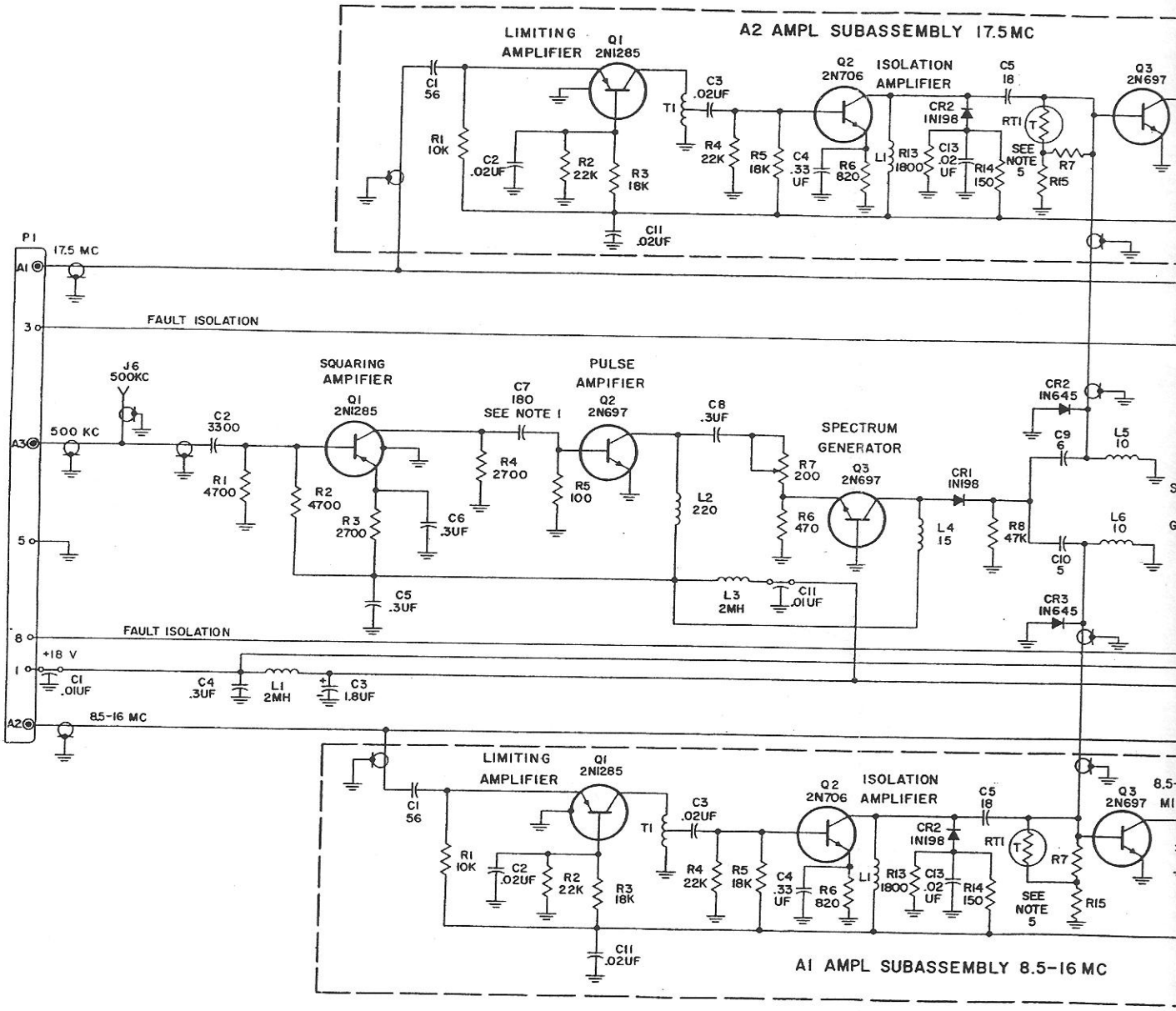
R-F Oscillator Module (Early Model) Schematic Diagram
Figure 1126


OSC
Q1
2N1285
BUFFER
Q2
2N1285
MIXER
Q3
2N1285
ISOLATION AMPLIFIER
Q5
2N1285
MULTIPLIER
Q4
2N1285
OVEN
HTR
OVEN INSULATION
DRIVER
Q13
2N1184
POWER AMPL
Q14
2N458
POWER AMPL
Q15
2N458
AMPL
Q12
2N1184
SEE NOTE 1
GRD
+27 VDC
+18 VDC
GRD



D DURING TEST.
STANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES
VALUES ARE IN MICROHENRYS.
ATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY
E.
E 2N1224 TRANSISTORS IN PLACE OF 2N1285.
LLEL COMBINATION OF RTI, R7 AND RI5 AT ROOM TEMPERATURE
DURING TEST.

Megacycle-Frequency Stabilizer Module
(Early Model), Schematic Diagram
Figure 1127



NOTES:

1. NOMINAL VALUE; PROPER VALUE SELECTED DURING TEST.
2. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS, AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.
3. PREFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE ASSEMBLY DESIGNATION AS SHOWN ON EACH MODULE.
4. EARLIER SERIAL NUMBERED MODULES USE 2N1224 TRANSISTORS IN PLACE OF 2N1285.
5. THE NOMINAL VALUE OF THE SERIES PARALLEL COMBINATION OF RTI, R7 AND RI5 AT ROOM TEMPERATURE IS 250 OHMS. PROPER VALUES SELECTED DURING TEST.

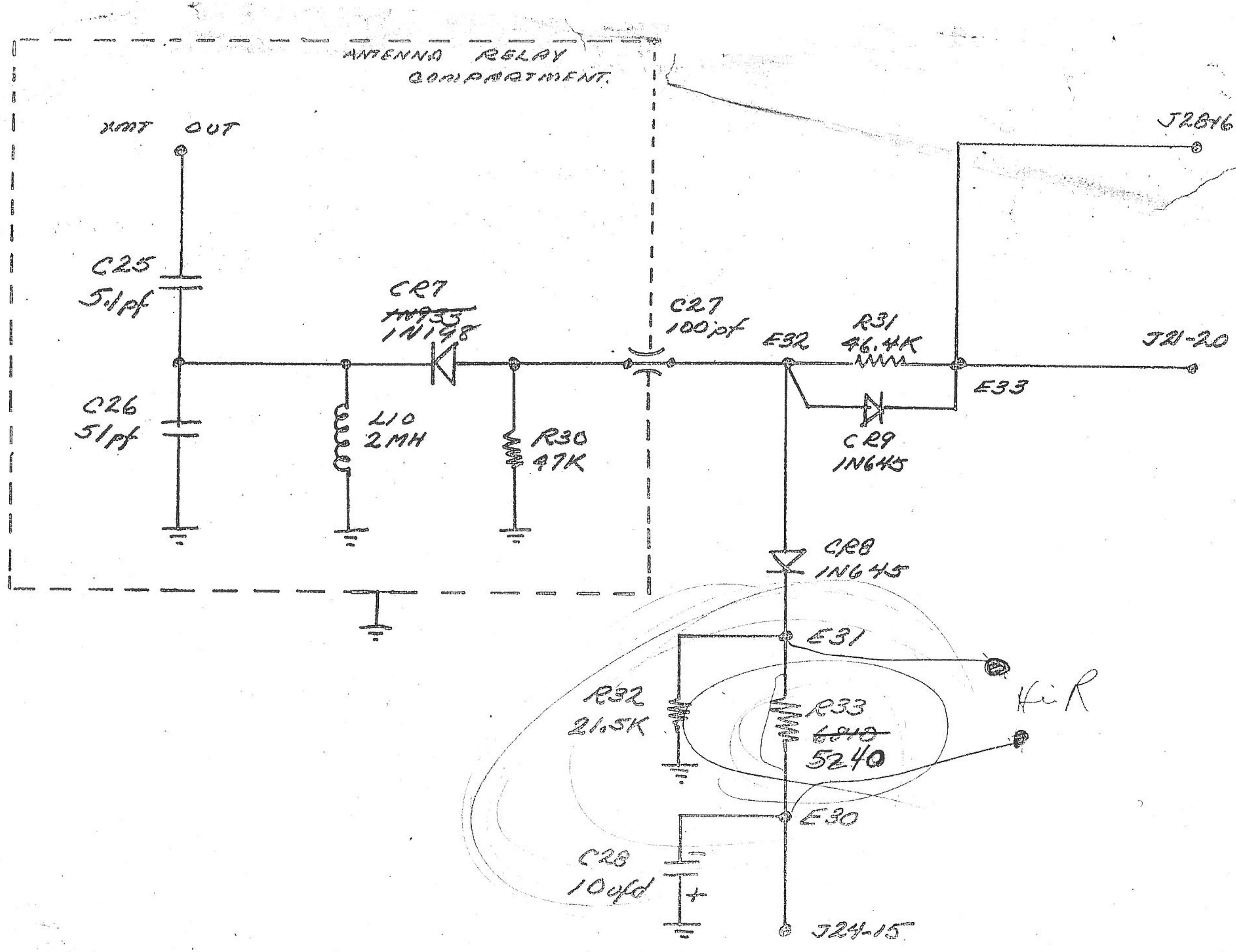


FIGURE 6, 618T TGC CIRCUIT REVISION

F. J. K.