NAVSEA 0967-LP-427-5010

VOLUME I

TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS

RADIO SET AN/WRC-1B
ANTENNA COUPLER CU-937/UR

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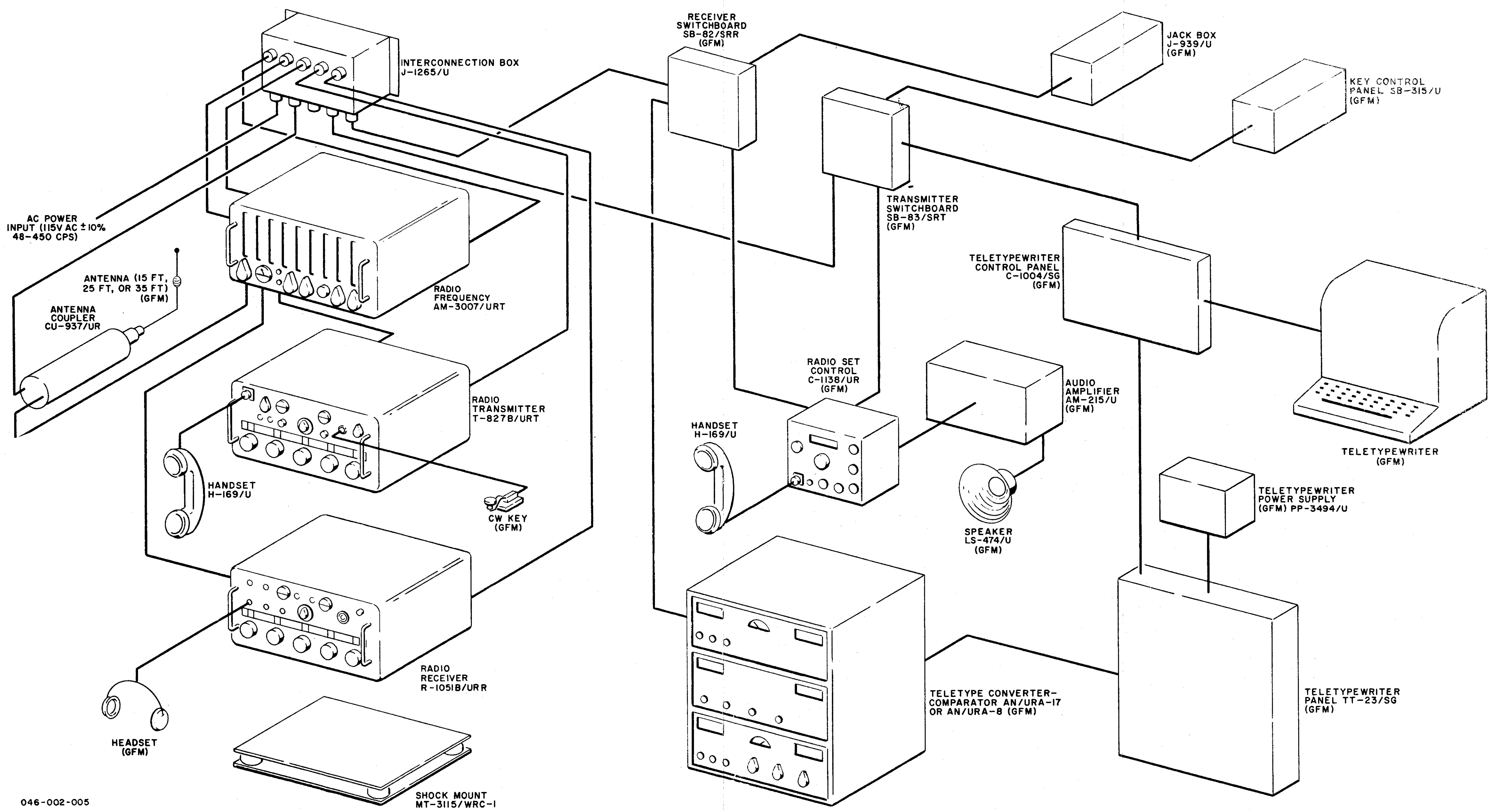


Figure 1-1. Radio Set AN/WRC-1B and Antenna Coupler CU-937/UR, Typical Unit Relationships

SECTION 1
GENERAL INFORMATION

1-1. SCOPE.

1-2. This Technical Manual is in effect upon receipt. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

1-3. Volume I of this Technical Manual describes Radio Set AN/WRC-1B (hereafter referred to as the radio set or AN/WRC-1B) and Antenna Coupler CU-937/UR (hereafter referred to as the antenna coupler or CU-937/UR) (figure 1-1) and covers installation, troubleshooting procedures, maintenance procedures, and a parts list for these equipments. Operating procedures are contained in Volume II of this Technical Manual, NAVSHIPS 0967-427-5020.

1-4. GENERAL DESCRIPTION.

1-5. The AN/WRC-1B is a single-sideband (SSB) radio set capable of transmitting on any one of 280,000 channels, spaced in 0.1-kHz increments in the 2.0- to 29.999-MHz frequency range. Vernier (continuous) tuning enables reception on any frequency in the 2.0- to 30.0-MHz frequency range. The CU-937/UR matches the rf output from the AN/WRC-1B (according to the frequency of the operating channel) to the antenna being used. The AN/WRC-1B is capable of transmitting and receiving upper sideband (USB), lower sideband (LSB) continuous wave (CW), compatible amplitude modulated (compatible AM), frequency shift keyed (FSK), and independent sideband (ISB) signals in either a simplex or duplex operation. The ISB mode of operation allows two different types of intelligence to be transmitted and received simultaneously. The FSK mode is obtained by using suitable ancillary equipment, such as Teletype Converter-Comparator AN/URA-17 or AN/URA-8. Tone-modulated continuous wave (MCW), standard amplitude modulated (AM), and facsimile (FAX) receptions may also be made with the AN/WRC-1B.

1-6. The AN/WRC-1B is intended primarily for use as a fixed radio link in a communication network. AN/WRC-1B may be stacked or rack mounted. The CU-937/UR is designed for surface ship or shore installations.

1-7. The AN/WRC-1B (figure 1-2) consists of Radio Receiver R-1051B/URR (hereafter also referred to as the receiver or R-1051B/URR), Radio Transmitter T-827B/URT (hereafter also referred to as the transmitter or T-827B/URT), Radio Frequency Amplifier AM-3007/URT (hereafter also referred to as the AM-3007/URT), and Interconnection Box J-1265/U (hereafter also referred to as the J-1265/U). The functional relationship of these units, the CU-937/UR, and associated GFM equipments is illustrated in figure 1-1.

1-8. REFERENCE DESIGNATIONS.

1-9. Table 1-1 lists the reference designations for all electronic assemblies and subassemblies contained in the units of the AN/WRC-1B system.

1-10. DESCRIPTION OF RADIO RECEIVER R-1051B/URR. (See Figures 1-3 and 1-4.)

1-11. FUNCTION. The function of the R-1051B/URR is to extract the intelligence from any USB, LSB, ISB, FSK, CW, or AM transmission in the 2.0- to 30.0-megahertz frequency range. The R-1051B/URR is also capable of receiving MCW, standard AM, and facsimile signals.

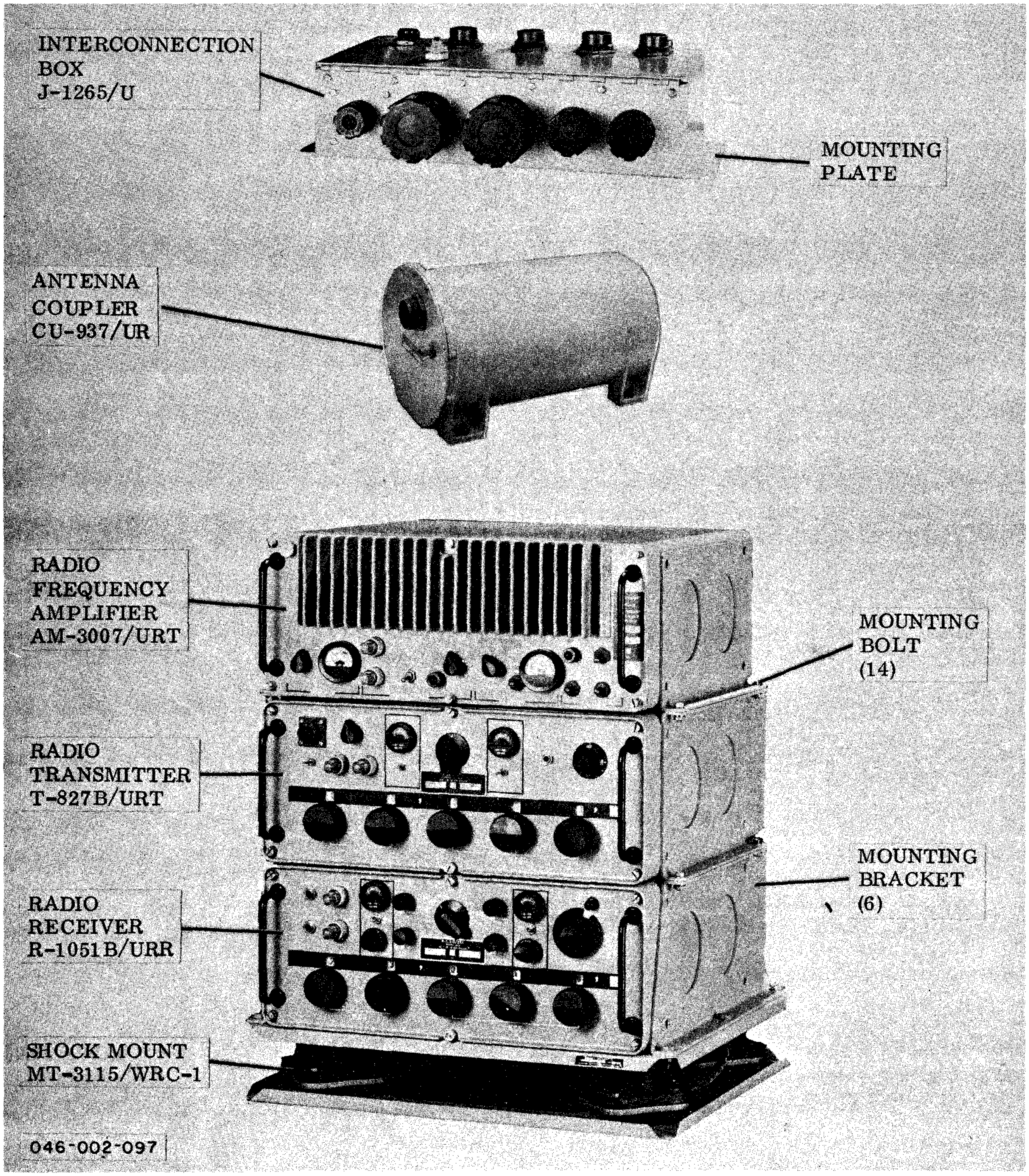


Figure 1-2. Radio Set AN/WRC-1B

TABLE 1-1. RADIO SET AN/WRC-1B, REFERENCE DESIGNATIONS

UNIT	ELECTRONIC ASSEMBLY OR SUBASSEMBLY	REFERENCE DESIGNATION
R-1051B/URR	Radio Receiver	1
R-1051B/URR	Case	1A1
R-1051B/URR	Filter Box Electronic Assembly	1A1A1
R-1051B/URR	Chassis and Front Panel	1A2
R-1051B/URR	Receiver Mode Selector Electronic Assembly	1A2A1
R-1051B/URR	Receiver IF./Audio Amplifier Electronic Assembly	1A2A2
R-1051B/URR	Receiver IF./Audio Amplifier Electronic Assembly	1A2A3
R-1051B/URR	RF Amplifier Electronic Assembly	1A2A4
R-1051B/URR	Frequency Standard Electronic Assembly	1A2A5
R-1051B/URR	Translator/Synthesizer Electronic Assembly	1A2A6
R-1051B/URR	MC Synthesizer Electronic Subassembly	1A2A6A1
R-1051B/URR	100 KC Synthesizer Electronic Subassembly	1A2A6A2
R-1051B/URR	1 and 10 KC Synthesizer Electronic Subassembly	1A2A6A3
R-1051B/URR	100 CPS Synthesizer Electronic Subassembly	1A2A6A4
R-1051B/URR	Spectrum Generator Electronic Subassembly	1A2A6A5
R-1051B/URR	RF Translator Electronic Subassembly	1A2A6A6
R-1051B/URR	Code Generator Electronic Assembly	1A2A7
R-1051B/URR	Power Supply Electronic Assembly	1A2A8
R-1051B/URR	Antenna Overload Electronic Assembly	1A2A9
R-1051B/URR	Light Panel Electronic Assembly	1A2A10
R-1051B/URR	4-VDC Power Supply and Vernier Control Electronic Assembly	1A2A11
T-827B/URT	Radio Transmitter	2
T-827B/URT	Case	2A1
T-827B/URT	Filter Box Electronic Assembly	2A1A1
T-827B/URT	Chassis and Front Panel	2A2
T-827B/URT	Transmitter Mode Selector Electronic Assembly	2A2A1
T-827B/URT	Transmitter Audio Amplifier Electronic Assembly	2A2A2
T-827B/URT	Transmitter Audio Amplifier Electronic Assembly	2A2A3
T-827B/URT	RF Amplifier Electronic Assembly	2A2A4
T-827B/URT	Frequency Standard Electronic Assembly	2A2A5
T-827B/URT	Translator/Synthesizer Electronic Assembly	2A2A6
T-827B/URT	MC Synthesizer Electronic Subassembly	2A2A6A1
T-827B/URT	100 KC Synthesizer Electronic Subassembly	2A2A6A2
T-827B/URT	1 and 10 KC Synthesizer Electronic Subassembly	2A2A6A3
T-827B/URT	100 CPS Synthesizer Electronic Subassembly	2A2A6A4
T-827B/URT	Spectrum Generator Electronic Subassembly	2A2A6A5
T-827B/URT	RF Translator Electronic Subassembly	2A2A6A6
T-827B/URT	Code Generator Electronic Assembly	2A2A7
T-827B/URT	Power Supply Electronic Assembly	2A2A8
T-827B/URT	FSK Tone Generator Electronic Assembly	2A2A9
T-827B/URT	Meter Amplifier Electronic Assembly	2A2A10
T-827B/URT	Meter Amplifier Electronic Assembly	2A2A11
T-827B/URT	Transmitter IF. Amplifier Electronic Assembly	2A2A12
T-827B/URT	Light Panel Electronic Assembly	2A2A13
T-827B/URT	Handset Filter Box Electronic Assembly	2A2A14
T-827B/URT	IF. Filter	2A2A15
T-827B/URT	4-VDC Power Supply Electronic Assembly	2A2A16

TABLE 1-1. RADIO SET AN/WRC-1B, REFERENCE DESIGNATIONS (Cont)

UNIT	ELECTRONIC ASSEMBLY OR SUBASSEMBLY	REFERENCE DESIGNATIONS
AM-3007/URT	Radio Frequency Amplifier	3
AM-3007/URT	Case	3A1
AM-3007/URT	Chassis	3A2
AM-3007/URT	Front Panel Electronic Assembly	3A2A1
AM-3007/URT	APC/PPC/Directional Coupler Electronic Assembly	3A2A2
AM-3007/URT	AC Power Supply Electronic Assembly	3A2A3
AM-3007/URT	Turret Electronic Assembly	3A2A4
AM-3007/URT	DC-to-DC Converter Electronic Assembly	3A2A5
J-1265/U	Interconnection Box	4
CU-937/UR	Antenna Coupler	5

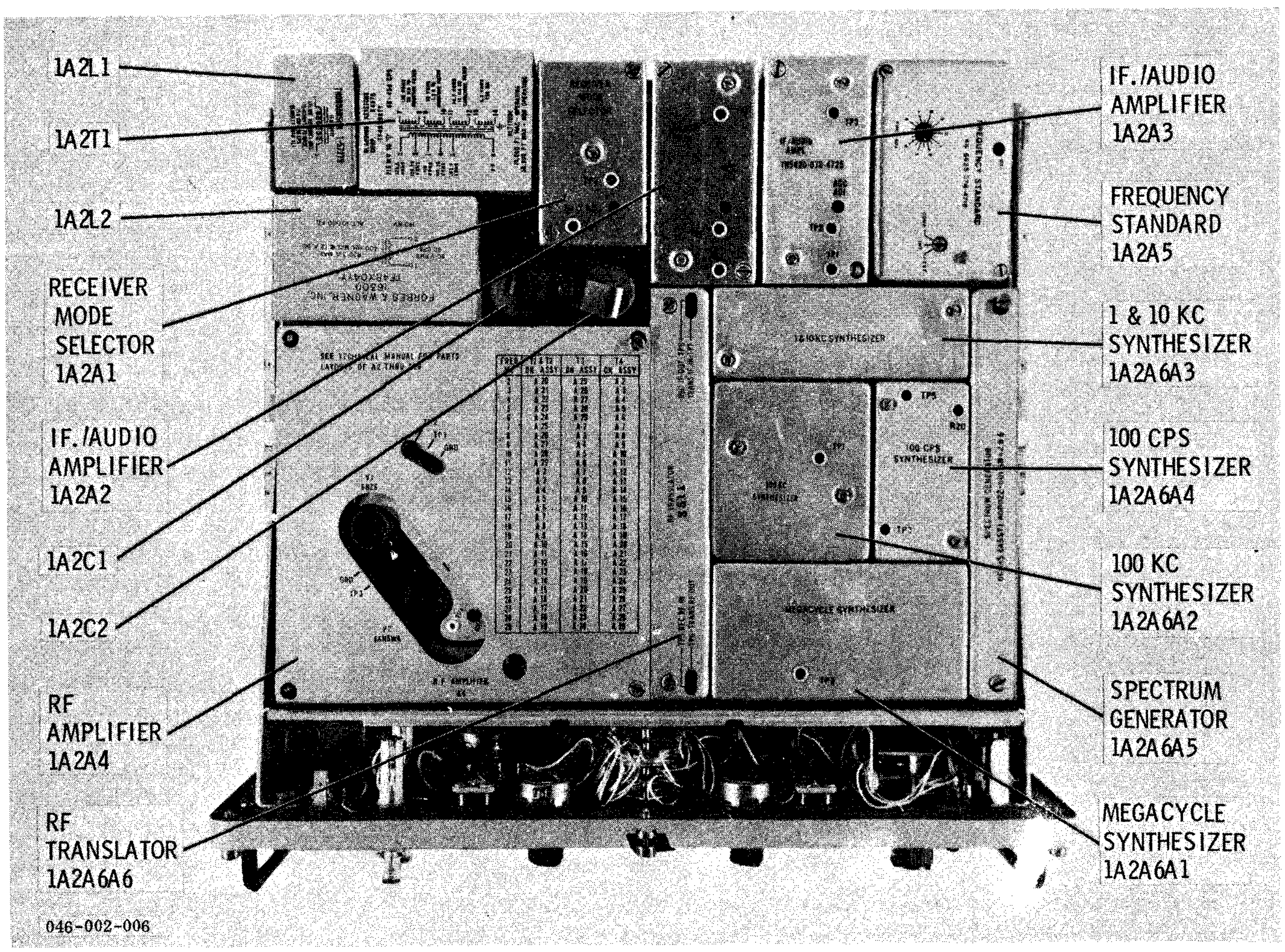


Figure 1-3. Radio Receiver R-1051B/URR, Top View, Case Removed

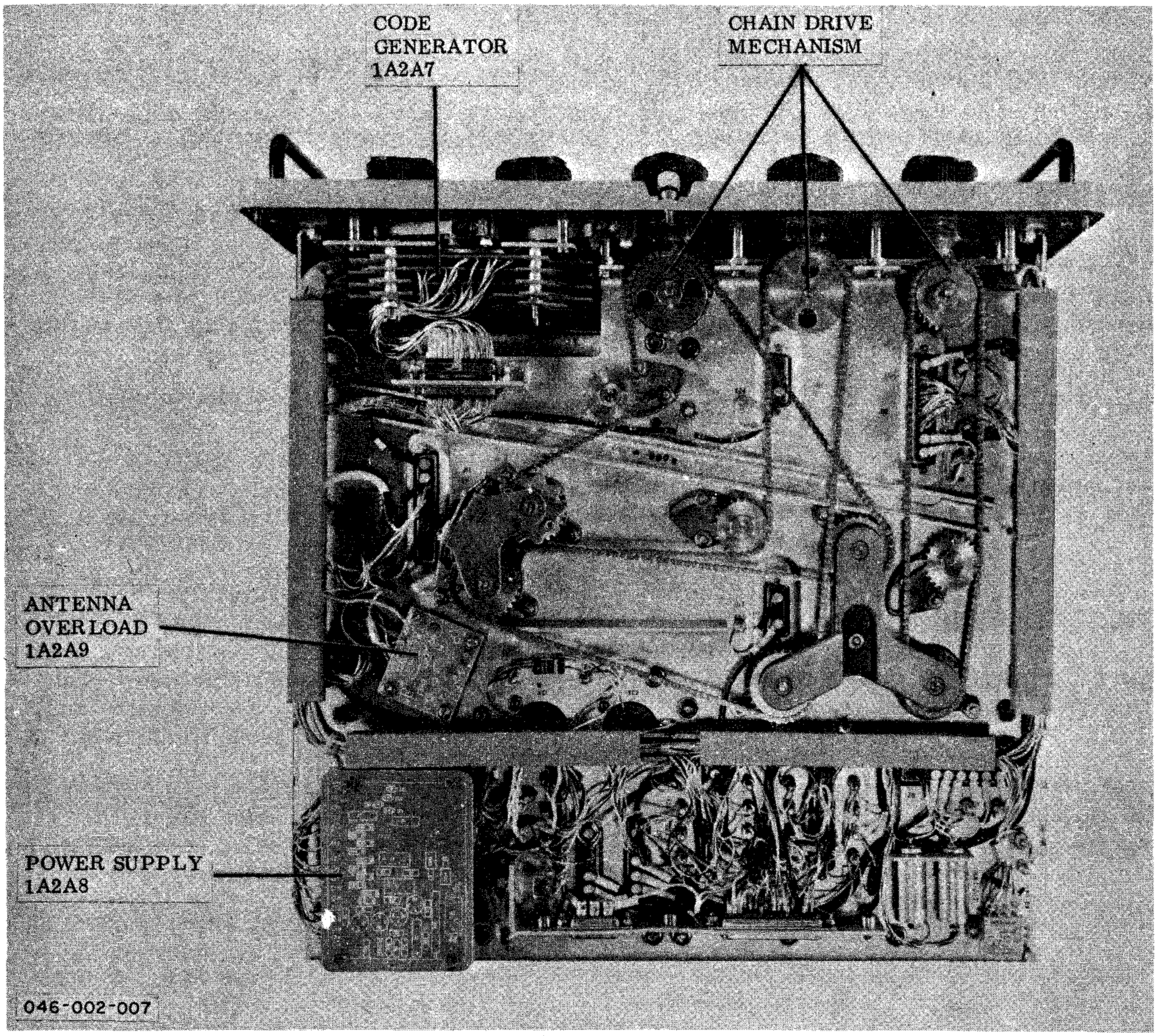


Figure 1-4. Radio Receiver R-1051B/URR, Bottom View, Case Removed

Suitable ancillary equipment, such as Teletype Converter-Comparator AN/URA-17 or AN/URA-8, must be used for FSK reception.

1-12. PHYSICAL CHARACTERISTICS. The R-1051B/URR is housed in a metal case. The front panel is secured to the case by six-captive screws. The chassis is mounted to the case on two roller-type slides (one on each side) to facilitate withdrawal from the case. When fully extended from the case, the chassis may be rotated at 90-degree angles for inspection or servicing. All operating controls and indicators are mounted on the front panel. Handles, one on each side, are secured to the front panel to facilitate the withdrawal of the chassis from the case and for transporting the equipment. The chassis contains the chain drive mechanism for tuning, the receptacles for connection of the plug-in electronic assemblies, and a power supply.

1-13. ELECTRICAL CHARACTERISTICS. The R-1051B/URR employs a digital tuning scheme for automatically tuning to any one of 280,000 operating channels. Additional vernier tuning provides continuous tuning throughout the frequency range. Since the R-1051B/URR contains its own power supply, it may be operated as an independent unit. All circuits of the R-1051B/URR (except two rf amplifier stages) utilize solid-state devices. These circuits are assembled into plug-in electronic assemblies, some of which are interchangeable between the T-827B/URT and the R-1051B/URR (refer to paragraph 4-51). The R-1051B/URR is a triple-conversion superheterodyne receiver. The frequency generation circuits, which are referenced to an ultrastable master frequency standard, provide a frequency stability of 1 part in 10^8 per day.

1-14. DESCRIPTION OF RADIO TRANSMITTER T-827B/URT. (See Figures 1-5 and 1-6.)

1-15. FUNCTION. The function of the T-827B/URT is to provide a USB, ISB, LSB, CW, FSK, or compatible AM rf signal of sufficient power to drive the AM-3007/URT. The operating frequency range of the T-827B/URT is from 2.0 to 29.9999 megahertz.

1-16. PHYSICAL CHARACTERISTICS. The physical characteristics of the T-827B/URT are the same as those for the R-1051B/URT (refer to paragraph 1-12).

1-17. ELECTRICAL CHARACTERISTICS. The T-827B/URT is a low-level transmitter, which produces a nominal 0.1-watt rf output, making it capable of driving the AM-3007/URT. Like the R-1051B/URR, the T-827B/URT employs a digital tuning scheme for automatically tuning to any one of 280,000 channels in 100-Hz steps. All circuits of the T-827B/URT (except two rf amplifier stages) utilize solid-state devices. These circuits are assembled into plug-in electronic assemblies, some of which are interchangeable between the R-1051B/URR and the T-827B/URT (refer to paragraph 4-51). The frequency generation circuits, which are referenced to an ultrastable master frequency standard with a stability better than 1 part in 10^8 per day, provide an extremely stable transmitter output.

1-18. DESCRIPTION OF RADIO FREQUENCY AMPLIFIER AM-3007/URT. (See Figures 1-7 and 1-8.)

1-19. FUNCTION. The function of the AM-3007/URT is to provide linear amplification of the low-level rf output from the T-827B/URT for application to a 50-ohm antenna system or through the CU-937/UR to a whip antenna for propagation.

1-20. PHYSICAL CHARACTERISTICS. Like the T-827B/URT and the R-1051B/URR, the AM-3007/URT is housed in a metal case with the chassis mounted on roller-type slides. All operating controls and indicators for the AM-3007/URT and the CU-937/UR are mounted on the front panel of the AM-3007/URT. The two amplifier tubes in the AM-3007/URT, used to amplify the low-level output from the T-827B/URT to a nominal 100 watts peak envelope power (PEP), are mounted on a heat sink that is part of the front panel. This heat sink conducts the heat propagated by these tubes to the fins on the front panel of the AM-3007/URT. All control and power supply circuits of the AM-3007/URT are composed of solid-state devices.

1-21. ELECTRICAL CHARACTERISTICS. The AM-3007/URT is a two-stage power amplifier. With an rf input of 0.1 to 0.25 watt, the AM-3007/URT will produce an output of 100 watts PEP SSB, 25 watts AM carrier, or 50 watts average CW or FSK into a 50-ohm load. In the AM and SSB modes, the AM-3007/URT is a linear amplifier. In the CW and FSK modes, the AM-3007/URT operates more nearly class C to increase efficiency. The AM-3007/URT is automatically tuned by a five-wire code from the T-827B/URT. This code controls a motor that positions a turret containing broadband coils. These broadband coils act as tuned interstage and output circuits for the two amplifier stages. Another code is generated in the AM-3007/URT to coarse-tune the CU-937/UR. An inverse feedback loop is used in the AM-3007/URT to improve linearity and decrease intermodulation distortion.

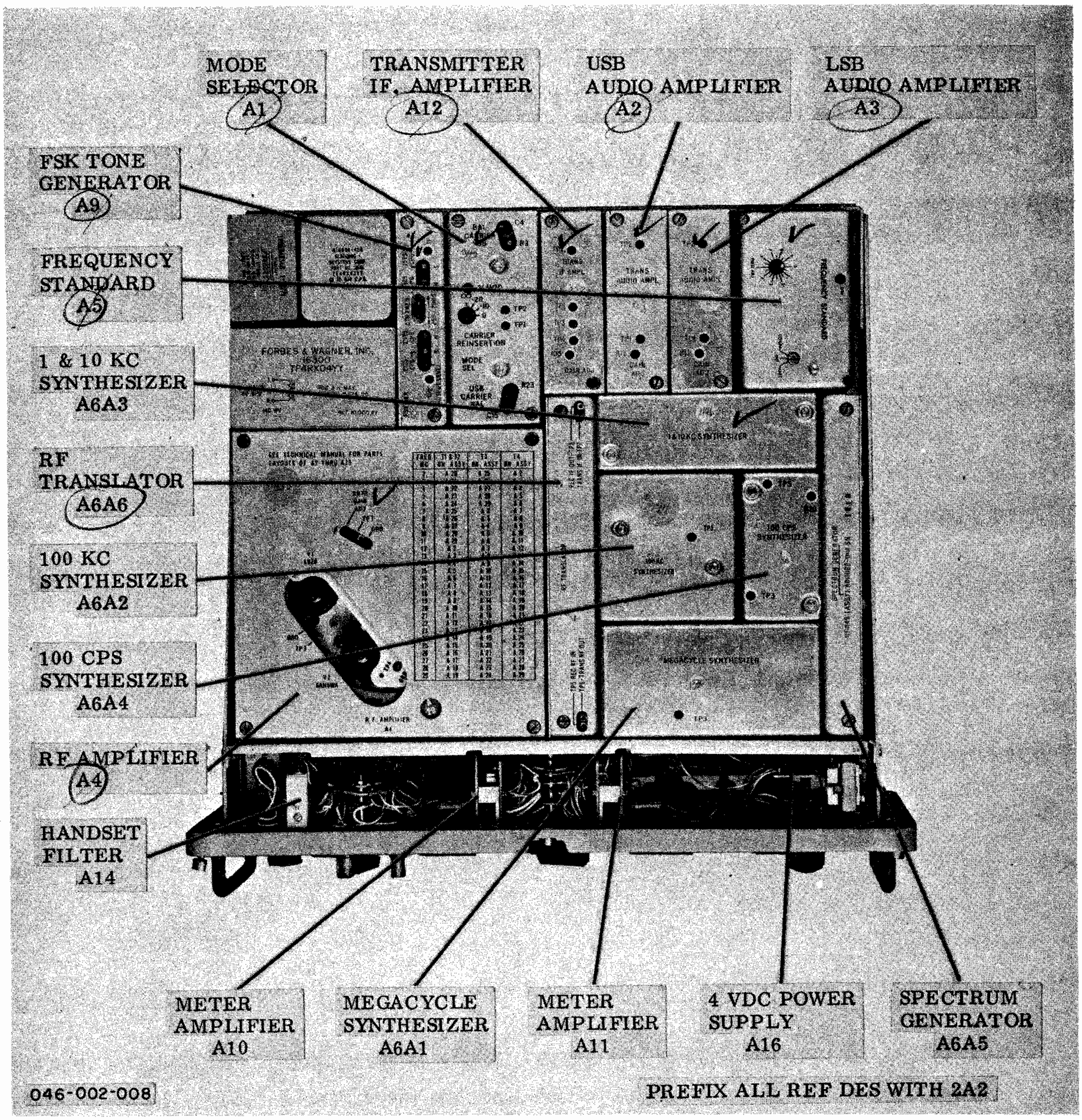


Figure 1-5. Radio Transmitter T-827B/URT, Top View, Case Removed

1-22. DESCRIPTION OF ANTENNA COUPLER CU-937/UR. (See Figure 1-9.)

1-23. FUNCTION. The function of the CU-937/UR is to match the system antenna (15-foot, 25-foot, or 35-foot whip antenna) to the 50-ohm rf output of the AM-3007/URT. The CU-937/UR is not used with submarine, multicoupler, or 50-ohm antenna systems.

1-24. PHYSICAL CHARACTERISTICS. The CU-937/UR is housed in a hermetically sealed, weatherproof, cylindrical case. The case has four brackets to allow mounting close to the system antenna.

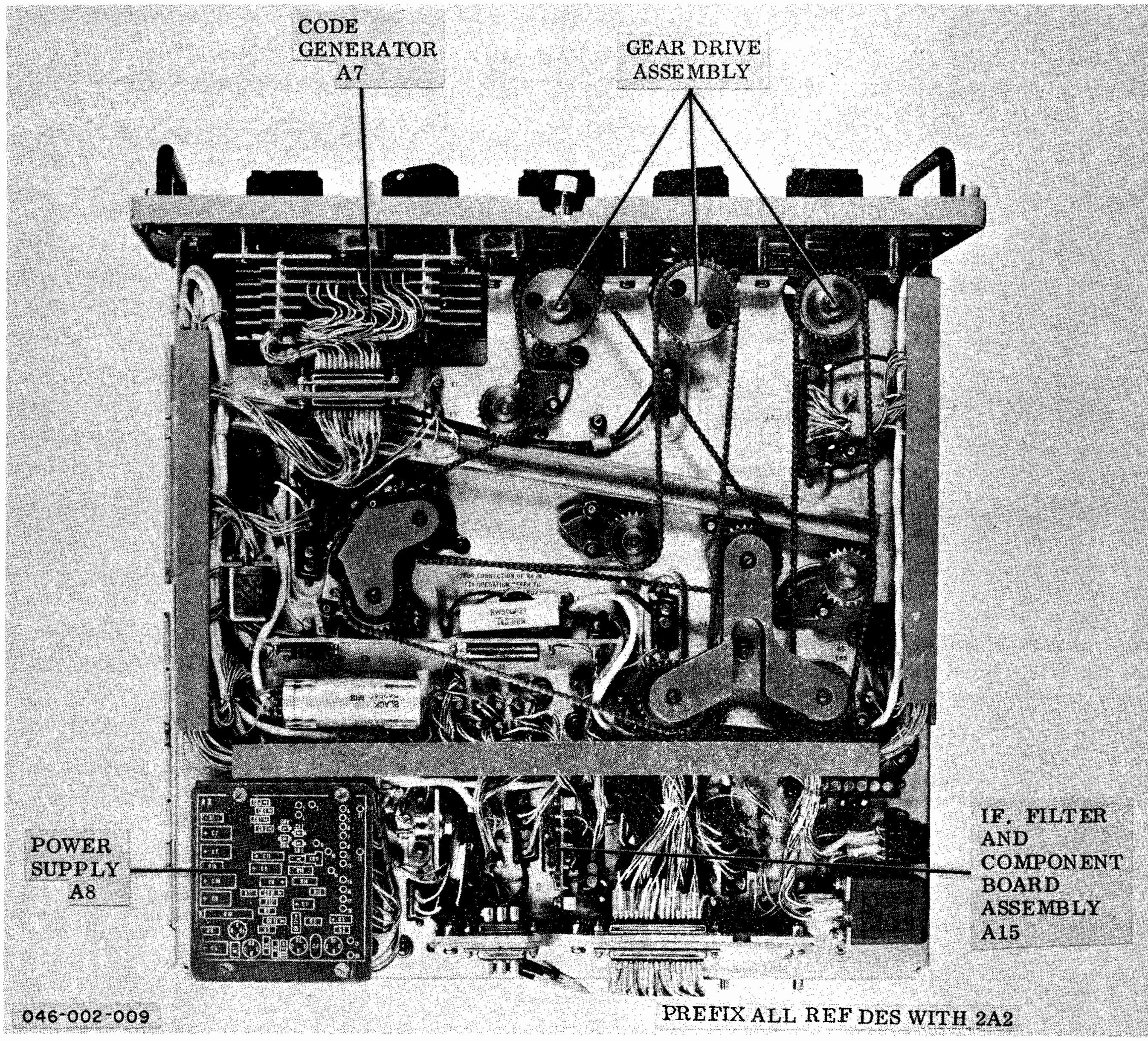


Figure 1-6. Radio Transmitter T-827B/URT, Bottom View, Case Removed

When so mounted, the CU-937/UR maintains minimum power loss.

1-25. ELECTRICAL CHARACTERISTICS. The CU-937/UR operates at power levels up to 100 watts PEP, while maintaining a 50-ohm input impedance and a better than 1.5:1 voltage standing wave ratio (Vswr) over the 2.0- to 30.0-megahertz frequency range. The CU-937/UR is tuned entirely from the AM-3007/URT. A tuning code is generated in the AM-3007/URT to coarse-tune the CU-937/UR. Final fine tuning to bring the Vswr to better than 1.5:1 is then accomplished with controls on the front panel of the AM-3007/URT. The Vswr is indicated by the RF OUTPUT meter on the AM-3007/URT front panel.

1-26. DESCRIPTION OF INTERCONNECTION BOX J-1265/U. (See Figure 1-10.)

1-27. FUNCTION. The function of the J-1265/U is to interconnect the major units of the AN/WRC-1B, the CU-937/UR, and the various ancillary equipments of the shipboard or shore installations. The J-1265/U also preprograms the CU-937/UR

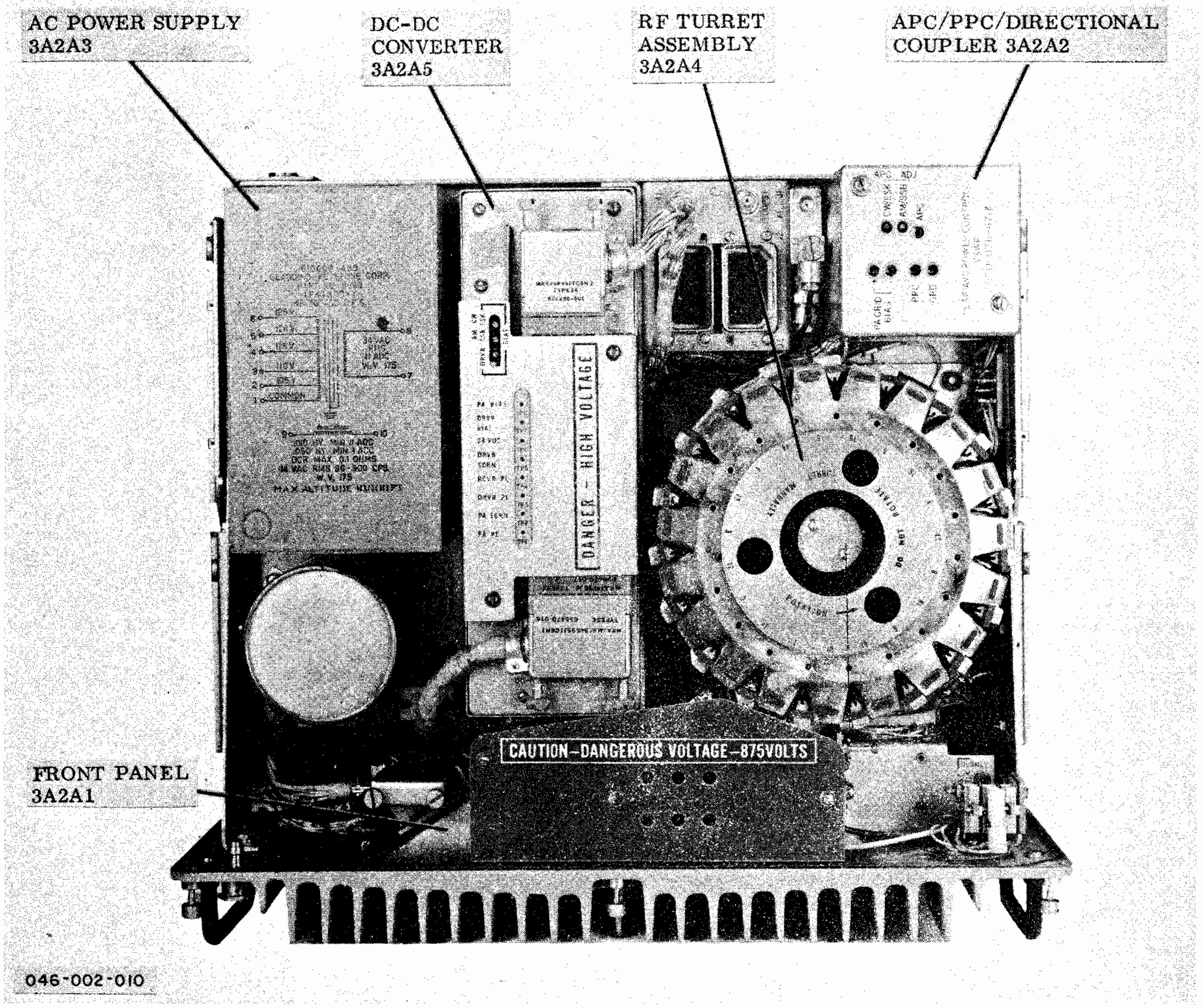


Figure 1-7. Radio Frequency Amplifier AM-3007/URT, Top View, Case Removed

for either the 15-, 25-, or 35-foot whip antenna.

1-28. PHYSICAL CHARACTERISTICS. The J-1265/U is a box structure with the necessary connectors for interconnections between the units of AN/WRC-1B mounted on the front panel. Interconnections are made by running cables through five stuffing tubes and joining appropriate circuits at terminal boards. The front panel is hinged for easy access. A mounting plate is provided for the J-1265/U that may be bolted into place for installation.

1-29. ELECTRICAL CHARACTERISTICS. The J-1265/U furnishes the physical interconnection components for the system. Programming for the CU-937/UR is accomplished by jumpering various terminals on two of the seven terminal boards in the J-1265/U.

1-30. RADIO SET AN/WRC-1B REFERENCE DATA.

1-31. The following data are the electrical characteristics of Radio Set AN/WRC-1B:

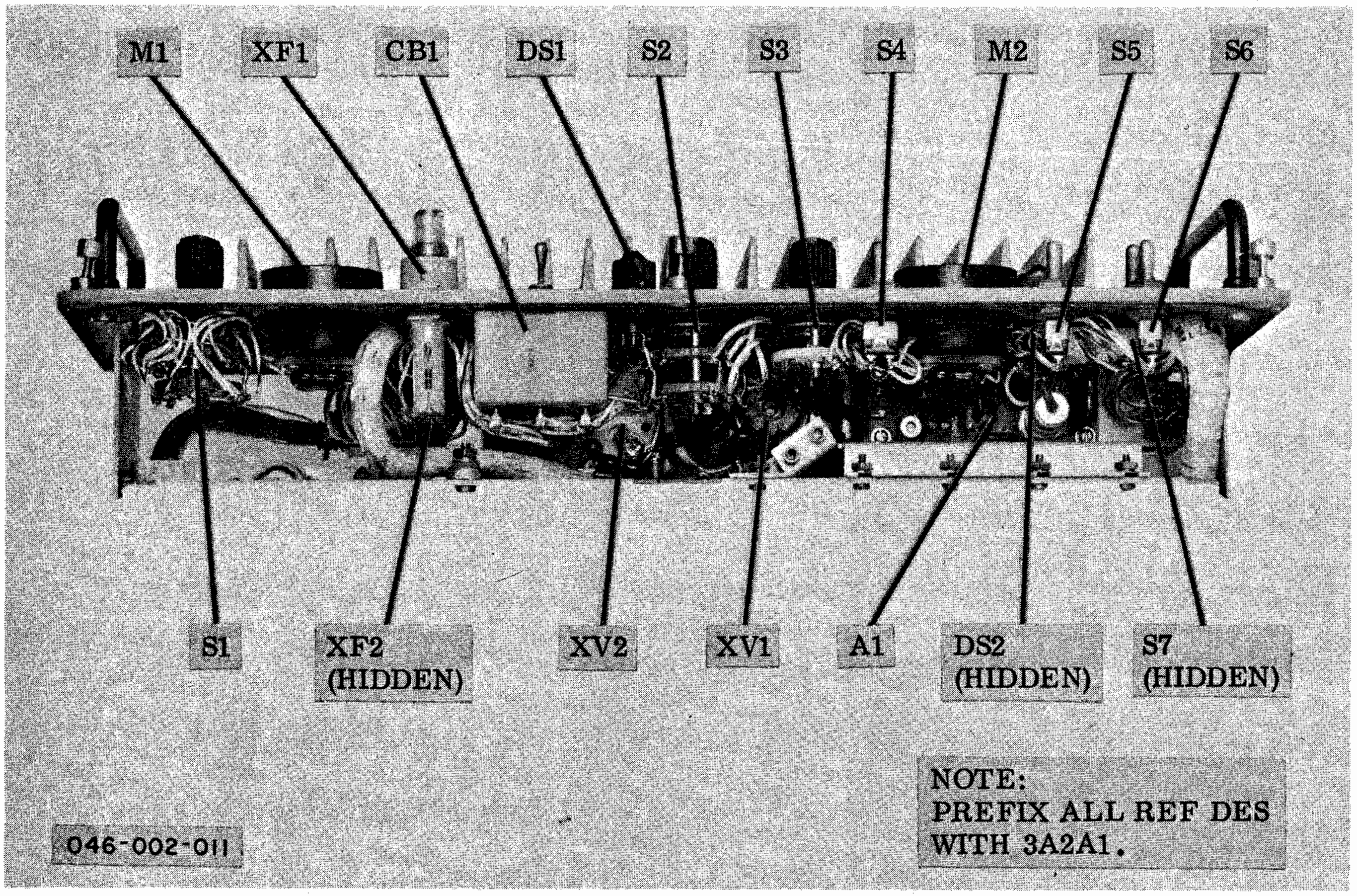


Figure 1-8. Radio Frequency Amplifier AM-3007/URT, Front Panel, Bottom and Rear View

a. Frequency range: transmit, 2.0 to 29.999 MHz, in 0.1-kHz increments; receive, 2.0 to 29.9999 MHz, in 0.1-kHz increments plus 2.0- to 30.0-MHz continuous coverage with vernier control between 0.1-kHz increments.

b. Frequency stability: 1 part in 10^8 per day.

c. Modes of operation: USB, LSB, ISB, FSK, CW, and compatible AM.

d. Type of frequency control: crystal-controlled synthesizers referenced to a 5-MHz internal or external frequency standard, both transmit and receive.

e. Receiver if. rejection: -75 dB.

f. Receiver image rejection: -80 dB.

g. Receiver audio output: 60 mW (minimum) into 600 ohms, balanced or unbalanced remote output load; 15 mW (minimum) into 600 ohms, unbalanced load (local headset).

h. Receiver audio distortion: less than 3 percent.

i. Receiver type: superheterodyne.

j. Receiver if. frequency: first, 20 or 30 MHz; second, 2.85 MHz; third, 500 kHz.

k. Receiver power consumption: 55 watts.

l. Receiver primary power requirements: 115 Vac ±10 percent, single-phase, 48 to 450 Hz.

m. Receiver sensitivity: 1 microvolt for 10 dB $\frac{S+N}{N}$ for SSB; 2 microvolts for CW, FSK; and 4 microvolts for compatible AM.

n. Receiver bandwidth: 3.2 kHz, SSB; 7 kHz, AM and CW.

o. Transmitter intermodulation distortion: -35 dB maximum.

p. Transmitter carrier suppression: -50 dB.

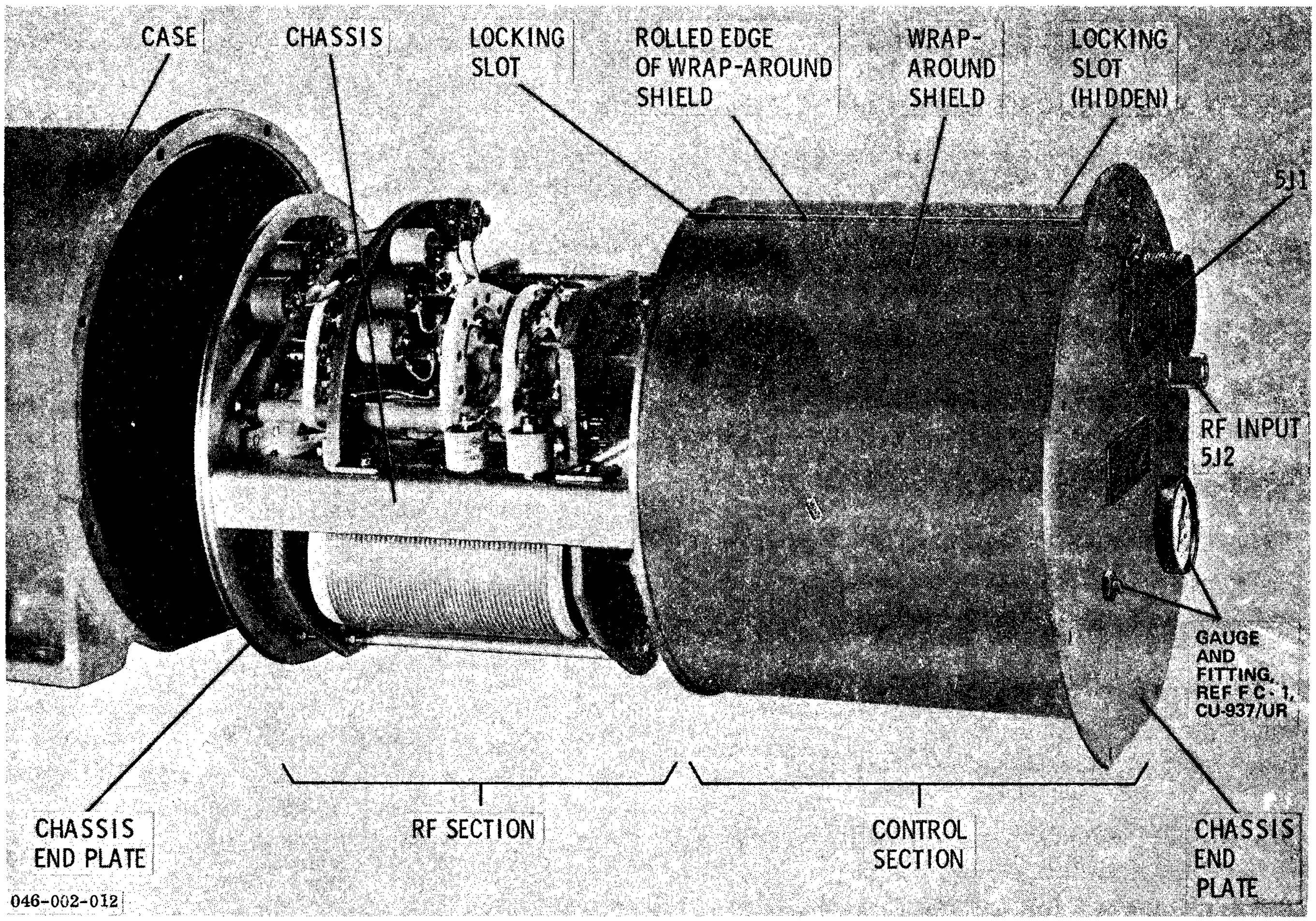


Figure 1-9. Antenna Coupler CU-937/UR, Side View, Case Removed

q. Transmitter power output: 0.1 watt to 0.25 watt nominal.

r. Transmitter power consumption: 65 watts.

s. Transmitter CW mode: on carrier.

t. Transmitter FSK mode: 850-Hz total shift on a selectable center frequency (2000 or 2550 Hz) - normal operation is 2550 Hz.

u. Transmitter primary power requirements: 115 Vac ±10 percent, single-phase, 48 to 450 Hz.

v. Rf amplifier power output: 100 watts PEP, SSB; 25 watts carrier power, compatible AM; 50 watts, CW and FSK.

w. Rf amplifier output impedance: 50 ohms.

x. Rf amplifier spurious radiation: 50 dB below PEP output.

y. Rf amplifier power consumption: 375 watts.

z. Rf amplifier primary power requirements: 115 Vac ±10 percent, single-phase, 48 to 450 Hz.

1-32. ANTENNA COUPLER CU-937/UR REFERENCE DATA.

1-33. The following performance data are the electrical characteristics for the CU-937/UR:

a. Primary power requirements: 28 Vdc, 1.5 amperes dc (nominal).

b. Frequency range: 2.0 to 30.0 MHz.

c. Vswr: 1.5:1.

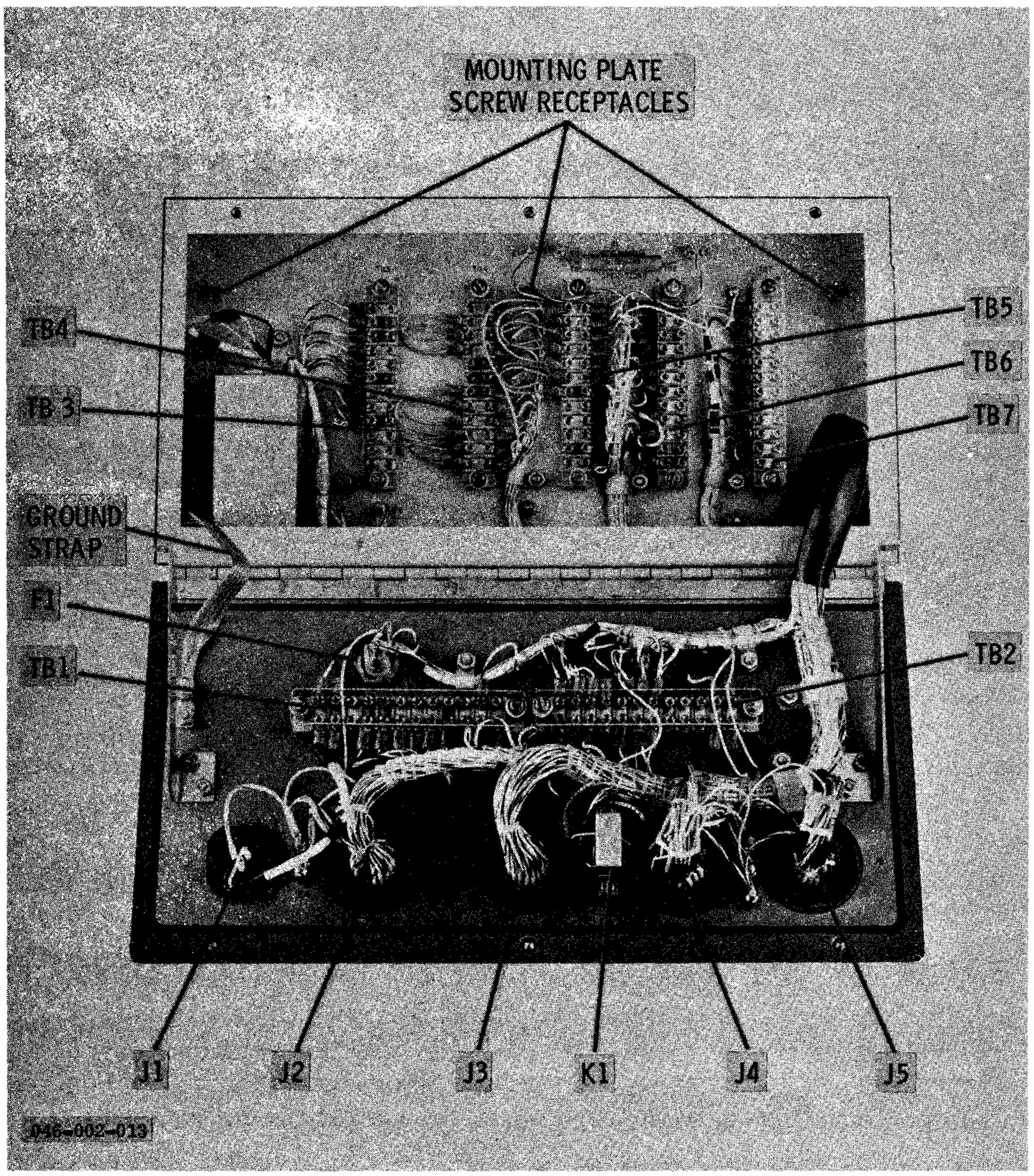


Figure 1-10. Interconnection Box J-1265/U, Top View, Front Panel Open

d. Tuning time: 60 seconds maximum.

e. Input impedance: 50 ohms.

f. Rf power input: 100 PEP watts maximum.

g. Recommended antenna: 35-foot whip, (15-foot whip or 25-foot ship, alternately).

1-34. TRANSMITTER T-837B/URT CRYSTAL COMPLEMENT.

1-35. Table 1-2 lists the crystal complement of the T-827B/URT. Refer to NAVSHIPS 0967-427-4010 for crystal complement of the R-1051B/URR. The AM-3007/URT contains no crystals.

1-36. EQUIPMENT SUPPLIED.

1-37. The equipment supplied with the AN/WRC-1B and the CU-937/UR is listed in table 1-3.

1-38. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED.

1-39. The equipment and publications required but not supplied with the AN/WRC-1B and the CU-937/UR are listed in table 1-4.

1-40. EXTENDER TEST CABLE DATA.

1-41. Table 1-5 is a list of pertinent extender test cable data for the AN/WRC-1B. Similar data for the R-1051B/URR are contained in table 1-6.

1-42. FIELD CHANGES.

1-43. Table 1-7 lists the field changes for the AN/WRC-1B and the CU-937/UR.

1-44. EQUIPMENT SIMILARITIES.

1-45. Technical information for the AN/WRC-1B and CU-937/UR is fully covered in this manual.

1-46. PREPARATION FOR RESHIPMENT.

1-47. To prepare the units of the AN/WRC-1B for reshipment, proceed as follows:

a. Ensure that all electronic assemblies are firmly seated.

b. Ensure that all vacuum tubes are mounted properly using vibration-proof shields provided.

c. Set transmitter and receiver Mode Selector switches at OFF.

d. Set rf amplifier PRIMARY POWER circuit breaker at OFF.

e. For reshipment, use containers and packing materials similar to those originally used to ship the units.

TABLE 1-2. RADIO TRANSMITTER T-827B/URT, CRYSTAL COMPLEMENT

REF DES	TYPE OF CUT	CRYSTAL OSC FREQ (MHz)	OPERATING TEMP RANGE	TOLERANCE (PERCENT)
2A2A5A3Y1	AT	5.000000	84.5° C to 85.5° C	0.001
2A2A6A1Y1	AT	2.499850	0° C to 75° C	0.003
2A2A6A1Y2	AT	3.499720	0° C to 75° C	0.003
2A2A6A1Y3	AT	4.499640	0° C to 75° C	0.003
2A2A6A1Y4	AT	5.499560	0° C to 75° C	0.003
2A2A6A1Y5	AT	7.499400	0° C to 75° C	0.003
2A2A6A1Y6	AT	8.499320	0° C to 75° C	0.003
2A2A6A1Y7	AT	9.499240	0° C to 75° C	0.003
2A2A6A1Y8	AT	10.499160	0° C to 75° C	0.003
2A2A6A1Y9	AT	11.499080	0° C to 75° C	0.003
2A2A6A1Y10	AT	12.499000	0° C to 75° C	0.003
2A2A6A1Y11	AT	14.498840	0° C to 75° C	0.003
2A2A6A1Y12	AT	15.498760	0° C to 75° C	0.003
2A2A6A1Y13	AT	16.498680	0° C to 75° C	0.003
2A2A6A1Y14	AT	17.498600	0° C to 75° C	0.003
2A2A6A1Y15	AT	18.498440	0° C to 75° C	0.003
2A2A6A1Y16	AT	20.498360	0° C to 75° C	0.003
2A2A6A1Y17	AT	23.498120	0° C to 75° C	0.003
2A2A6A2Y1	AT	4.553	0° C to 75° C	0.003
2A2A6A2Y2	AT	4.653	0° C to 75° C	0.003
2A2A6A2Y3	AT	4.753	0° C to 75° C	0.003
2A2A6A2Y4	AT	4.853	0° C to 75° C	0.003
2A2A6A2Y5	AT	4.953	0° C to 75° C	0.003

TABLE 1-2. RADIO TRANSMITTER T-827B/URT, CRYSTAL COMPLEMENT (Cont)

REF DES	TYPE OF CUT	CRYSTAL OSC FREQ (MHz)	OPERATING TEMP RANGE	TOLERANCE (PERCENT)
2A2A6A2Y6	AT	5.053	0° C to 75° C	0.003
2A2A6A2Y7	AT	5.153	0° C to 75° C	0.003
2A2A6A2Y8	AT	5.253	0° C to 75° C	0.003
2A2A6A2Y9	AT	5.353	0° C to 75° C	0.003
2A2A6A2Y10	AT	5.453	0° C to 75° C	0.003
2A2A6A3Y1	AT	5.25	0° C to 75° C	0.003
2A2A6A3Y2	AT	5.24	0° C to 75° C	0.003
2A2A6A3Y3	AT	5.23	0° C to 75° C	0.003
2A2A6A3Y4	AT	5.22	0° C to 75° C	0.003
2A2A6A3Y5	AT	5.21	0° C to 75° C	0.003
2A2A6A3Y6	AT	5.20	0° C to 75° C	0.003
2A2A6A3Y7	AT	5.19	0° C to 75° C	0.003
2A2A6A3Y8	AT	5.18	0° C to 75° C	0.003
2A2A6A3Y9	AT	5.17	0° C to 75° C	0.003
2A2A6A3Y10	AT	5.16	0° C to 75° C	0.003
2A2A6A3Y11	AT	1.850	0° C to 75° C	0.003
2A2A6A3Y12	AT	1.851	0° C to 75° C	0.003
2A2A6A3Y13	AT	1.852	0° C to 75° C	0.003
2A2A6A3Y14	AT	1.853	0° C to 75° C	0.003
2A2A6A3Y15	AT	1.854	0° C to 75° C	0.003
2A2A6A3Y16	AT	1.855	0° C to 75° C	0.003
2A2A6A3Y17	AT	1.856	0° C to 75° C	0.003
2A2A6A3Y18	AT	1.857	0° C to 75° C	0.003
2A2A6A3Y19	AT	1.858	0° C to 75° C	0.003
2A2A6A3Y20	AT	1.859	0° C to 75° C	0.003

TABLE 1-3. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT SUPPLIED

QTY PER EQPT	NOMENCLATURE NAME	NOMENCLATURE DESIGNATION	UNIT NO.	*OVERALL DIMENSIONS (IN.) HEIGHT	WIDTH	DEPTH	VOLUME (FT^3)	WEIGHT (LB)
1	Radio Receiver	R-1051B/URR	1	7.0	17.38	18.9	1.33	70
1	Radio Transmitter	T-827B/URT	2	7.0	17.38	18.9	1.33	70
1	Radio Frequency Amplifier	AM-3007/URT	3	7.0	17.37	17.0	1.20	78
1	Interconnection Box	J-1265/U	4	4.0	17.40	9.78	0.40	19
1	Antenna Coupler	CU-937/UR	5	-	9.48 (diameter)	20.08	0.82	26
1	Shock Mount	MT-3115/ WRC-1		4.25	19.7	16.66	0.81	16
1	Handset (including cord and plug assembly)	H-169/U (with CX-1846A/U)						
1	Kit, T-827B/ URT Mating Connectors consisting of: 1 ea, MS3106E10SL-4S 1 ea, MS3106E16S-5S 2 ea, MS3106E14S-2S							
1	Kit, R-1051B/ URR Mating Connectors consisting of: 1 ea, MS3106E16S-5S 2 ea, MS3106E10SL-4S							
1	Kit, AM-3007/ URT Mating Connectors consisting of: 1 ea, UG-941B/U							
1	Kit, CU-937/U Mating Connectors consisting of: 1 ea, UG-941B/U 1 ea, MR0628-12S-14A66							

*Includes mounting materials

TABLE 1-3. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT SUPPLIED (Cont)

QTY PER EQPT	NOMENCLATURE NAME	NOMENCLATURE DESIGNATION	UNIT NO.	*OVERALL DIMENSIONS (IN.) HEIGHT	WIDTH	DEPTH	VOLUME (FT3)	WEIGHT (LB)
1	Kit, Interconnecting Cables consisting of: 7W1, 7W2, 7W3, 7W4, 7W5, 7W6, and 7W7							
1	Installation Instruction Sheet for Antenna Coupler CU-937/UR							
2	Technical Manual for Radio Set AN/WRC-1B and Antenna Coupler CU-937/UR, Volume I	NAVSHIPS 0967-427-5010						
2	Operator's Manual for Radio Set AN/WRC-1B and Antenna Coupler CU-937/URR, Volume II	NAVSHIPS 0967-427-5020						
2	Technical Manual for Radio Receiver R-1051B/URR, Volume I	NAVSHIPS 0967-427-4010						
2	Operator's Manual for Radio Receiver R-1051B/URR, Volume II	NAVSHIPS 0967-427-4020						

*Includes mounting materials

TABLE 1-3. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT SUPPLIED (Cont)

QTY PER EQPT	NOMENCLATURE		UNIT NO.	*OVERALL DIMENSIONS (IN.)			VOLUME (FT^3)	WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
1	Maintenance Standards Book for Radio Set AN/WRC-1B and Antenna Coupler CU-937/UR	NAVSHIPS 0967-427-5030						
1	Maintenance Standards Book for Radio Receiver R-1051B/URR	NAVSHIPS 0967-427-4030						
1	Performance Standards Sheet for Radio Set AN/WRC-1B and Antenna Coupler CU-937/UR	NAVSHIPS 0967-427-5040						
1	Performance Standards Sheet for Radio Receiver R-1051B/URR	NAVSHIPS 0967-427-4040						

*Includes mounting materials

TABLE 1-4. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED

QTY PER EQPT	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Antenna (15-, 25-, or 35-foot whip)		Reception and propagation of rf signals	
1	Cables	(See figure 5-8)	Radio Set AN/WRC-1B interconnection	
1	CW Key		Local keying of Radio Set AN/WRC-1B for CW operation	
1	Headset		Receive operation	
1	Teletype Converter-Comparator	AN/URA-8 or AN/URA-17 (or equiv)	FSK reception	
1	Teletypewriter Panel	TT-23/SG (or equiv)	FSK operation	
1	Teletypewriter Control Panel	C-1004/SG (or equiv)	FSK operation	
1	Teletypewriter Power Supply	PP-3494/U (or equiv)	FSK operation	
1	Radio Remote Control	C-1138/UR (or equiv)	Shipboard remote control operation	
1	Audio Amplifier	AM-215/U (or equiv)	Speaker amplifier	
1	Speaker	LS-474/U (or equiv)	Audio monitoring	
1	Key Control Panel	SB-315/U (or equiv)	Keying for CW operation	
1	Jack Box	J-939/U (or equiv)	Interconnection	

TABLE 1-4. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED (Cont)

QTY PER EQPT	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Multimeter	AN/PSM-4( ) (or equiv)	Troubleshooting and maintenance procedures	Ranges: 0 to 1000 Vdc, 9 ranges, 20,000 ohms/volt 0 to 250 Vac, 8 ranges, 5,000 ohms/volt 0 to 20 MΩ, 5 ranges Accuracy: ±2 percent
1	Multimeter, Electronic	AN/USM-116 with T-connector (or equiv)	Troubleshooting and maintenance procedures	Frequency range: 2 to 30 MHz Input impedance: 100,000 ohms/volt Accuracy: ±2 percent Ranges: 0 to 10 volts 0 to 30 volts 0 to 100 volts
1	Multimeter, Electronic	CCVO-91CA (or equiv)	Troubleshooting and maintenance procedures	Input impedance: 20,000 ohms/volt at 500 kHz Ranges: 0 to 1 mV 0 to 10 mV 0 to 100 mV 0 to 300 mV 0 to 1000 mV 0 to 3000 mV
1	Multimeter, Electronic	ME-6( )/U (or equiv)	Troubleshooting and maintenance procedures	Frequency: 20 Hz to 5 kHz Input impedance: 100,000 ohms/volt Ranges: 0 to 0.1 volt 0 to 0.3 volt

TABLE 1-4. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED (Cont)

QTY PER EQPT	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	RF Signal Generator	CAQ1-606A (or equiv)	Troubleshooting and maintenance procedures	Output impedance: 50 ohms Frequency range: 2 to 30 MHz Output: 0 to 3 volts
1	Frequency Standard	AN/URQ-9 (or equiv)	Troubleshooting and maintenance procedures	Outputs: 100 kHz, 500 kHz, and 5 MHz Stability: 1 part in 10^8 Output: 0.5 volt
1	Oscilloscope	AN/USM-140 (or equiv)	Troubleshooting and maintenance procedures	Frequency: Dc to 15 MHz Frequency response: 100 kHz Ranges: 0.5V peak-to-peak 3V peak-to-peak 10V peak-to-peak 2500V peak-to-peak Sensitivity: 2 to 10Vdc
1	Electrical Dummy Load	DA-91A/U (or equiv)	Troubleshooting and maintenance procedures	Impedance: 50 ohms Range: 0 to 100 watts
1	Analyzer Test Set	TS-1379A/U	Troubleshooting and maintenance procedures	Frequency: 2 to 30 MHz Resolution: 100 Hz Sensitivity: 2 μV full scale Sweep width: 7 kHz
	Spectrum Analyzer	TS-1379A/U		
	Tuning Head	CPN-REC-1		
	Two-Tone Audio Signal Generator	SG-376A/U (or equiv)		
1	Frequency Meter	AN/USM-207 (or equiv)	Troubleshooting and maintenance procedures	Frequency range: 0 to 30 MHz Accuracy: ±1 Hz

TABLE 1-4. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED (Cont)

QTY PER EQPT	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Audio Signal Generator	AN/URM-127 (or equiv) T.O. 33A1-8-176-14	Troubleshooting and maintenance procedures	Frequency: 20 Hz to 5 kHz Output: 0 to 10 volts Output impedance: 600 ohms
1*	Test Set, Amplifier	TS-2132/WRC-1	Testing RF Amplifier Electronic Assembly	Simulates actual operating conditions
1*	Test Set, Translator/ Synthesizer	TS-2133/WRC-1	Testing Translator/ Synthesizer Electronic Assembly	Simulates actual operating conditions
1*	Test Set, Frequency Standard	TS-2134/WRC-1	Testing Frequency Standard Electronic Assembly	Simulates actual operating conditions
1*	Test Set, Electronic Circuit Plug-In Unit	TS-2135/WRC-1	Testing common electronic assemblies	Simulates actual operating conditions
1	Base, Molded (Driver)	GD/E-666230-282	Troubleshooting and maintenance procedures	Completes turret connections
1	Base, Molded (Output)	GD/E-666230-280	Troubleshooting and maintenance procedures	Completes turret connections
1	Coaxial T-Connector	UG-274A/U	Troubleshooting and maintenance procedures	50 ohms
1	Resistor	RC42GF501J (or equiv)	Troubleshooting and maintenance	51 ohms, ±5 percent, 2 watts, noninductive
1*	Repair Book for AN/WRC-1B and R-1051B/ URR 2N Modules	NAVSHIPS 0967-034-2000	Troubleshooting and maintenance procedures	
1	AN/PSM-4( ) Technical Manual	NAVSHIPS 0967-911-6010	Troubleshooting and maintenance procedures	

*Depot repair only

TABLE 1-4. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED (Cont)

QTY PER EQPT	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	AN/USM-116B Technical Manual	NAVSHIPS 0967-871-3370	Troubleshooting and maintenance procedures	
1	CCVO-91CA Technical Manual	NAVSHIPS 0281-071-7200	Troubleshooting and maintenance procedures	
1	ME-6C/U Technical Manual	NAVSHIPS 0280-183-2000	Troubleshooting and maintenance procedures	
1	AN/USM-281 Technical Manual	NAVSHIPS 0969-244-3010	Troubleshooting and maintenance procedures	
1	DA-91A/U Technical Manual	NAVSHIPS 0969-231-0010	Troubleshooting and maintenance procedures	
1	TS-1379/U CPN-REC-1 SG-376/U Technical Manual	NAVSHIPS 0969-246-4010	Troubleshooting and maintenance procedures	
1	AN/USM-207 Technical Manual	NAVSHIPS 0969-028-4010 and-4020	Troubleshooting and maintenance procedures	
1	AN/URM-127 Technical Manual	Air Force T. O. 33A1-8-176-14	Troubleshooting and maintenance procedures	
1	CAQI-606A Technical Manual	NAVSHIPS 0967-186-6010	Troubleshooting and maintenance procedures	
1	AN/URQ-9 Technical Manual	NAVSHIPS 0967-077-8010	Troubleshooting and maintenance procedures	
1*	TS-2132/WRC-1 Test Data Booklet	NAVSHIPS 0967-004-2000	Testing RF Amplifier Electronic Assembly	

*Depot repair only.

NAVSHIPS 0967-427-5010

TABLE 1-4. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED (Cont)

QTY PER EQPT	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1*	TS-2133/WRC-1 Test Data Booklet	NAVSHIPS 0967-004-3000	Testing Translator/ Synthesizer Electronic Assembly	
1*	TS-2134/WRC-1 Test Data Booklet	NAVSHIPS 0967-004-4000	Testing Frequency Standard Electronic Assembly	
1*	TS-2135/WRC-1 Test Data Booklet	NAVSHIPS 0967-004-5000	Testing Common Electronic Assemblies	

*Depot repair only.

TABLE 1-5. RADIO SET AN/WRC-1B, EXTENDER TEST CABLE DATA

REF DES	NAME	MATES WITH
W1	Cable Assembly	P2 on Transmitter Mode Selector Electronic Assembly 2A2A1 and 2A2J17.
W2	Cable Assembly	P1 on Transmitter Mode Selector Electronic Assembly 2A2A1 and 2A2J16.
W3	Cable Assembly	P1 on Transmitter Audio Electronic Assembly 2A2A2 or 2A2A3 and 2A2J18 or 2A2J19.
W4	Cable Assembly	P1 on Transmitter IF. Amplifier Electronic Assembly 2A2A12 and 2A2J15.
W5	Cable Assembly	P1 on Transmitter FSK Tone Generator Electronic Assembly 2A2A9 and 2A2J20.
W6	Cable Assembly	P1 on APC/PPC/Directional Coupler Assembly 3A2A2 and 3A2J9.
W7	Cable Assembly	J1 and J2 on APC/PPC Directional Coupler Assembly 3A2A2 and 3A2J5 and 3A2J9.
W8	Cable Assembly	J1 on DC-to-DC Converter Electronic Assembly 3A2A5 and 3A2P1.
W9	Cable Assembly	J2 on DC-to-DC Converter Electronic Assembly 3A2A5 and 3A2J2.
W10	Cable Assembly	P1 on AC POWER Electronic Assembly 3A2A3 and 3A2J10.

TABLE 1-6. RADIO RECEIVER R-1051B/URR, EXTENDED TEST CABLE DATA

REF DES	NAME	MATES WITH
W1	Cable Assembly PN 66243-070 (FSCM 12436)	P1 on Receiver IF./Audio Amplifier Electronic Assembly 1A2A2 and 1A2A3
W2	Cable Assembly PN 66243-071 (FSCM 12436)	P1 on Receiver Mode Selector Electronic Assembly 1A2A1
W3	Cable Assembly PN 66243-072 (FSCM 12436)	P2 on Receiver Mode Selector Electronic Assembly 1A2A1

TABLE 1-7. FIELD CHANGES

FIELD CHANGE NUMBER	FIELD CHANGE TITLE AND PURPOSE	EQUIPMENTS AFFECTED	INDICATION OF ACCOMPLISHMENT
1-AN/WRC-1B	Improved Antenna Overload Protection Circuitry	All AN/WRC-1B	On R-1051B/URR unit: Four diodes mounted on underside of Antenna Overload Assembly A2A9A2.
2-AN/WRC-1B	Elimination of Diode 3A2A1CR2 to Prevent Burnout of Resistor 2A2A15R1	All AN/WRC-1B	On AM-3007/URT unit: Diode 3A2A1CR2 on Front Panel Assembly is not installed.
3-AN/WRC-1B	Installation of Standby and Emitting Status Monitoring Relays	Only those equipments designated by NAVSHIPS	On J-1265/U unit: Presence of two additional relays in upper-left corner of Interconnection Box.
4-AN/WRC-1B	Improve Reliability of Audio Amplifiers Q9 and Q10	All AN/WRC-1B	On R-1051B/URR unit: Transistors Q9 and Q10 on A2A2A2 and A2A2A3 PCB changed from 2N1183A to 2N1131.
5-AN/WRC-1B	Improve Low Voltage Power Supply A2A8	All AN/WRC-1B	On R-1051B/URR and T-827B/URT units: Diodes A2A8CR5-CR8 have been changed to type 1N5199.
6-AN/WRC-1B	Modification to FSK Circuitry	Refer to EIB Number 820	On T-827/URT unit: A 51,000 ohm, 1/2-watt resistor added from base of A2A9A1Q2 to terminal A2A9A1E5 in FSK Tone Generator A2A9.
7-AN/WRC-1B	4-VDC Power Supply Modification	Refer to EIB Number 824	Refer to EIB Number 824.
1-CU-937/UR	Pressurization of Antenna Coupler CU-937/UR	All CU-937/UR	Presence of pressure gauge on front of antenna coupler.

SECTION 2
OPERATION

NOTE

This section is bound as Volume II. Refer to Volume II, Operation Manual for Radio Set AN/WRC-1B and Antenna Coupler CU-937/UR, NAVSHIPS 0967-427-5020, for operation of this equipment.

SECTION 3
FUNCTIONAL DESCRIPTION

3-1. RADIO SET AN/WRC-1B AND ANTENNA COUPLER CU-937/UR, OVERALL FUNCTIONAL DESCRIPTION. (See Figure 3-1.)

3-2. GENERAL. Radio Set AN/WRC-1B is a multimode system capable of transmitting on any one of 280,000 channels, spaced in 0.1-kHz increments in the 2.0- to 29.9999-MHz range. Vernier (continuous) tuning enables reception on any frequency in the 2.0- to 30.0-MHz frequency range. Intelligence may be transmitted and received in continuous wave (CW), compatible amplitude modulation (compatible AM), frequency shift keyed (FSK), upper sideband (USB), lower sideband (LSB), independent sideband (ISB), and ISB/FSK modes. The ISB/FSK mode provides radio teletype in the upper sideband and an audio intelligence for the lower sideband. Tone-modulated continuous wave (MCW) and facsimile transmissions may also be made with the AN/WRC-1B. The AN/WRC-1B consists of Radio Transmitter T-827B/URT (exciter), Radio Receiver R-1051B, Radio Frequency Amplifier AM-3007/URT (linear amplifier), Interconnection Box J-1265/U, and Handset H-169/U. Antenna Coupler CU-937/UR matches the rf output from the AN/WRC-1B to the antenna being used, according to the frequency of the operating channel. Figure 3-1 illustrates the functional relationship of the AN/WRC-1B together with the CU-937/UR.

3-3. RADIO TRANSMITTER T-827B/URT. The T-827B/URT accepts audio or coded intelligence and converts it to any one of 280,000 rf channels in the 2.0- to 29.9999-MHz range. The T-827B/URT is capable of furnishing excitation of 250-mW peak envelope power (PEP) in the USB or LSB mode, 250-mW total PEP in the ISB mode, 125-mW carrier in the CW and FSK modes, and 62.5-mW carrier in the AM mode. Tuning is accomplished digitally by means of five control knobs (MCS and KCS) and a CPS switch. The frequency control knobs are located on the front panel. The rf channel may be changed in 0.1-kHz increments. The T-827B/URT is designed to be used with the AN/WRC-1( ), AN/URT-23( ), and AN/URT-24( ) transmit systems. In the AN/WRC-1B system, the T-827B/URT furnishes the nominally required 100-mW excitation to the AM-3007/URT linear power amplifier.

3-4. In the AM and SSB transmit modes of operation, audio intelligence is applied to the T-827B/URT. The audio is amplified and used to modulate a 500-kHz control carrier. The resulting double-sideband signal is filtered according to the mode of operation, amplified, and converted by a triple-conversion process to the desired rf channel as selected from the front panel. This operating channel is then amplified to a nominal 100-mW level and applied to the AM-3007/URT. In the CW mode, the 500-kHz local carrier is inserted directly into the if. amplifiers at a coded rate. The signal is further processed in the same manner as the audio signal in the AM or SSB modes of operation. The CW signal used to excite the AM-3007/URT is at the same frequency as the setting of the front-panel tuning controls. In FSK operation, the coded application of teletypewriter (tty) loop current is converted to audio frequencies representing marks and spaces. These audio signals are applied to the upper sideband audio amplifier of the T-827B/URT. Thereafter, these signals are processed in the same manner as other audio signals in the AM or USB modes. Tuning the T-827B/URT to an operating frequency also generates a tuning code within the T-827B/URT which is used externally to tune the

AM-3007/URT to the same operating channel. The AM-3007/URT feeds dc average power control (APC) and peak power control (PPC) level signals back to the T-827B/URT to maintain the system power output at the predetermined level.

3-5. The T-827B/URT consists of the case (2A1) and the chassis and front panel (2A2). The case houses the slide-out chassis and front panel, and also contains one electronic assembly and several connectors. The chassis and front panel contains 15 electronic assemblies, front-panel controls and indicators, and miscellaneous electronic components.

3-6. RADIO FREQUENCY AMPLIFIER AM-3007/URT. The AM-3007/URT is the final power output unit of the AN/WRC-1B. The AM-3007/URT amplifies the 100-mW driving power from the T-827B/URT to 100-watt PEP in the single-sideband (SSB) modes, 25-watt AM carrier, or 50 watts in the CW or FSK modes. APC and PPC signals are developed in the AM-3007/URT and applied to the T-827B/URT to maintain system level control. The AM-3007/URT uses fixed-tuned interstage, input, and output circuits. These circuits are switched to the selected channel under the control of a code applied from the T-827B/URT. The power output of the AM-3007/URT is transferred through the CU-937/UR to the antenna. The AM-3007/URT consists of the case (3A1) and the chassis (3A2). The chassis contains five electronic assemblies, none of which are plug-in assemblies.

3-7. RADIO RECEIVER R-1051B/URR. The R-1051B/URR amplifies the received rf signals to a level suitable for conversion to a 500-kHz intermediate frequency by a triple-conversion heterodyning process. The 500-kHz if. is amplified, demodulated and audio amplified in the R-1051B/URR. The resulting audio intelligence is then routed to suitable ancillary receiver terminal equipment for monitoring or printout.

NOTE

Refer to the Technical Manual for Radio Receiver R-1051B/URR (NAVSHIPS 0967-427-4010) for functional descriptions, circuit description, test data, and schematic diagram coverage of the R-1051B/URR.

3-8. INTERCONNECTION BOX J-1265/U. The J-1265/U interconnects the major units of the AN/WRC-1B and ancillary equipments of the system, preprograms the CU-937/UR antenna coupler, and distributes the inter-unit control information and power.

3-9. ANTENNA COUPLER CU-937/UR. The CU-937/UR consists of three tuned coils and associated circuits for semi-automatic tuning and loading. The CU-937/UR is used for transmitting and receiving for all modes of AN/WRC-1B operation, by matching the AN/WRC-1B system to the 15-foot, 25-foot, or 35-foot whip antenna for transmit or receive functions. A code from the AM-3007/URT automatically tunes the antenna coupler to one of 11 networks. Fine tuning is accomplished from the ANT CPLR TUNE and LOAD controls on the AM-3007/URT to the antenna. In the receive function, the rf signals from the antenna are applied through the CU-937/UR to the transmit/receive relay in the AM-3007/URT and to the R-1051B/URR.

3-10. <u>RADIO TRANSMITTER T-827B/URT, OVERALL FUNCTIONAL DESCRIPTION.</u> (See Figure 3-2.)

NOTE

The T-827B/URT is unit 2 in Radio Set AN/WRC-1B. In this and other paragraphs describing the T-827B/URT, prefix all reference designations with "2" to obtain the complete designation.

3-11. GENERAL. The T 827B/URT is a 2- to 29.9999-MHz transr tter (exciter), capable of furnishing a nominal 0.1-watt driving power to an rf power amplifier such

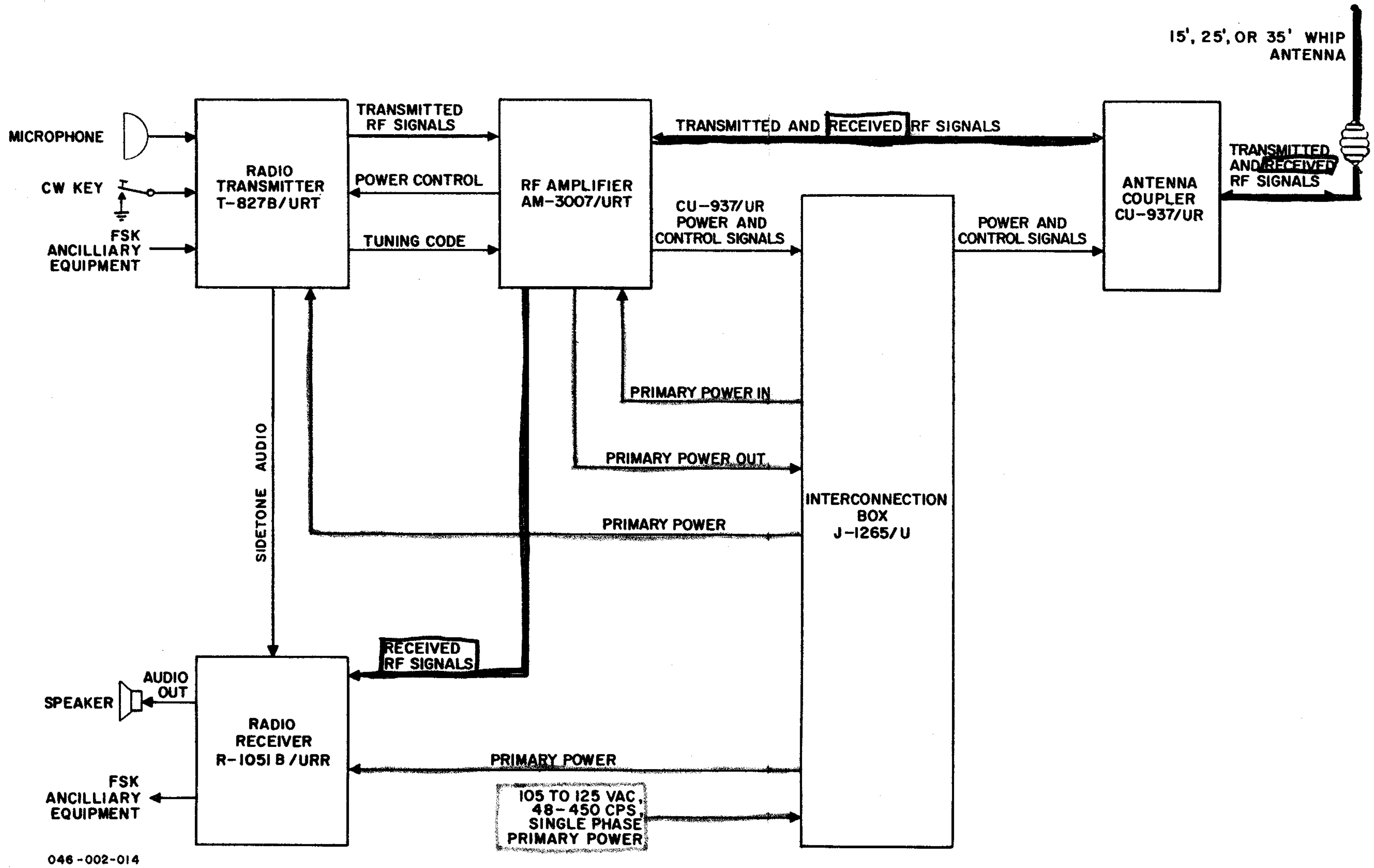


Figure 3-1. Radio Set AN/WRC-1B, Functional Block Diagram

as the AM-3007/URT. The T-827B/URT accepts audio or coded intelligence and converts it to one of 280,000 possible rf frequencies in the 2- to 29.9999-MHz range.

3-12. The T-827B/URT is capable of operating in LSB (lower sideband), USB (upper sideband), ISB (independent sideband), CW (continuous wave), FSK (frequency shift keyed), compatible AM (amplitude modulated), and ISB/FSK modes of operation. Tone-modulated continuous wave (MCW) and facsimile (FAX) may also be transmitted.

3-13. Tuning of the transmitter is accomplished digitally in 0.1-kHz increments by means of five frequency controls (MCS and KCS) and a switch (CPS) located on the front panel. Tuning the T-827B/URT to an operating frequency also generates a tuning code which is used externally to tune the associated rf power amplifier automatically to the same operating channel as the transmitter. Figure 3-2 illustrates the functiona groups composing Radio Transmitter T-827B/URT.

3-14. MAIN SIGNAL FLOW (Figure 3-2). The main signal flow in the T-827B/URT originates in Frequency Standard Electronic Assembly A2A5. An oven-mounted 5-MHz frequency standard within this assembly produces an accurate, stable, reference frequency upon which all frequencies in the T-827B/URT are based. An external 5-MHz standard may also be used. Either the internal or the external 5 MHz is converted to frequencies of 500 kHz, 1 MHz, and 10 MHz for use in the mixing processes used in the rf conversion process. The 500-kHz output from the multiplier-divider also serves as the local carrier for the T-827B/URT.

5-15. The 500-kHz local carrier output from the frequency standard is applied to Transmitter Mode Selector Electronic Assembly A2A1. The two 500-kHz if. amplifiers in the mode selector amplify the 500-kHz local carrier to a level suitable for use in the balanced modulators. The two balanced modulators are identical except for output filtering. The USB balanced modulator is used in the USB, FSK, AM, and ISB modes of operation. The LSB balanced modulator is used in the LSB and ISB modes of operation. Neither balanced modulator is used in the CW mode. The appropriate audio intelligence from Transmitter Audio Amplifier Electronic Assembly A2A2 or A2A3 is routed to the balanced modulators to modulate the 500-kHz local carrier, resulting in a double-sideband signal without a carrier. This signal is filtered according to the mode of operation to remove either the USB or the LSB portion of the signal. The control gates/sidetone oscillator circuitry provides the appropriate signal routing, carrier reinsertion for the AM and CW modes, and tones for use by the operator in monitoring.

3-16. The modulated 500-kHz local carrier from the mode selector is applied to Transmitter IF. Amplifier Electronic Assembly A2A12. The if. amplifiers in this assembly provide a level suitable for use in the low-, mid-, and high-frequency mixers of RF Translator Electronic Subassembly A2A6A6. Carrier reinsertion from the if. amplifier is held to a predetermined level by the injection of APC and PPC signals from the AM-3007/URT.

3-17. The output from the if. amplifier is applied to RF Translator Electronic Subassembly A2A6A6. The rf translator is comprised of the low-, mid-, and high-frequency mixers which convert the 500-kHz if. to the desired rf frequency by a triple-conversion process.

3-18. The rf output from the rf translator is applied to RF Amplifier Electronic Assembly A2A4. This assembly tunes the rf signal according to the channel of operation and provides suitable amplification to drive a power amplifier such as the AM-3007/URT. The rf amplifier is automatically tuned by a tuning code generated by the front-panel digital tuning knobs.

3-19. AUDIO SIGNAL FLOW (Figure 3-2). The intelligence applied to the T-827B/URT is either the coded keying for CW, the coded keying for FSK, or the audio for all other modes of operation. The coded CW keying turns a gating circuit on and off in the control gates sidetone oscillator circuit. Each time the key is depressed, the gate is turned on, allowing the 500-kHz local carrier to pass from the 500-kHz amplifiers to the if. amplifiers. Also, each time the CW key is depressed, the output of a sidetone oscillator is gated through to the sidetone line. This sidetone signal is applied to the R-1051B/URR receiver enabling the operator to monitor the CW keying. The audio output from a microphone is applied to Transmitter Aduio Amplifier Electronic Assemblies A2A2 and A2A3. When operating in the USB, ISB, AM, or FSK mode of operation, the audio input is amplified by assembly A2A2 and is applied to the appropriate balanced modulator. When operating in the LSB and ISB modes of operation, the audio input is amplified by assembly A2A3 and is applied to the appropriate balanced modulator. A gate for each audio assembly is turned on in the control gates sidetone oscillator when the corresponding assembly is turned on. This gate allows the audio to pass as a sidetone signal to the R-1051B/URR, enabling the operator to monitor the respective transmission. When operating in the FSK mode of operation, the coded tty input is applied to the tty generator in FSK Tone Generator Electronic Assembly A2A9, which produces the required mark and space frequencies and applies them to Transmitter Audio Amplifier Electronic Assembly A2A2. The gate for reinserting the 500-kHz carrier into the if. signal during AM operation is also contained in the control gates sidetone oscillator circuit. This circuit also has a switched attenuator network for reinserting a pilot local carrier into the if. signal during LSB, USB, or ISB operation. The pilot carrier is used when operating with radio sets less stable than the AN/WRC-1B.

3-20. FREQUENCY GENERATION (Figure 3-2). The injection frequencies used in the first frequency conversion in the mixer circuits are generated within 1 and 10 KC Synthesizer Electronic Subassembly A2A6A3. This circuit consists of two crystal oscillators, each of which has 10 possible output frequencies. The output from the 1-kHz oscillator (1.850 to 1.859 MHz in 1-kHz steps) is determined by the setting of the front-panel 1 KCS control, and the output from the 10-kHz oscillator (5.25 to 5.16 MHz in 10-kHz steps) is determined by the setting of the front-panel 10 KCS control. The outputs from the two oscillators are subtractively mixed to produce one of 100 possible frequencies spaced at 1-kHz intervals between 3.301 and 3.400 MHz. The output is applied to the low-frequency mixer.

3-21. The injection frequencies used in the second frequency conversion in the mixers circuit are generated within 100 KC Synthesizer Electronic Subassembly A2A6A2. This circuit consists of a crystal oscillator having an output which is one of 10 frequencies spaced at 100-kHz intervals between 4.553 and 5.453 MHz. The output frequency is determined by the setting of the front-panel 100 KCS control. If a lo-band injection frequency is required, the 17.847-MHz output from the 17.847-MHz mixer is additively mixed in the lo-band mixer with the output from the 100-kHz oscillator (4.553 to 5.453 MHz in 100-kHz steps) to provide a frequency in the 22.4- to 23.3-MHz range. If a hi-band injection is required, the 27.847-MHz output from the 27.847-MHz mixer is additively mixed in the hi-band mixer with the output from the 100-kHz oscillator (4.553 to 5.453 MHz in 100-kHz steps) to provide a frequency in the 32.4- to 33.3-MHz range. In either case, the resultant frequency is applied to the mid-frequency mixer.

3-22. The injection frequencies used in the third frequency conversion in the mixers circuit are generated within MC Synthesizer Electronic Subassembly A2A6A1. This circuit consists of a phase-locked crystal oscillator that is automatically tuned to produce one of 17 frequencies between 2.5 and 23.5 MHz. The output is applied to the high-frequency mixer. The output frequency is determined by the setting of the front-panel MCS controls.

3-23. ERROR CANCELLATION (Figure 3-2). A combination of error-cancelling loops and phase-locked loops is used in the frequency synthesizer circuits of the T-827B/URT to ensure that the injection frequencies applied to the mixers are correct. The MC Synthesizer Electronic Subassembly A2A6A1 employs a phase-locked loop to ensure the accuracy of the 1-MHz injection frequencies. The 1-MHz output from the multiplier-divider in Frequency Standard Electronic Assembly A2A5 is applied to the spectrum generator in the MC Synthesizer to produce a spectrum of frequencies spaced at 1-MHz intervals between 1 and 25 MHz. The output from the spectrum generator and the output from the 1-MHz oscillator are mixed. Any error in output from the 1-MHz oscillator is detected and an error voltage is produced. This error signal is applied to the 1-MHz oscillator to lock it to the correct frequency. The accuracy of the oscillator output is the same as that of the 5-MHz frequency standard.

3-24. The 100 KC Synthesizer Electronic Subassembly A2A6A2 employs an error-canceling loop to ensure the accuracy of the 100-kHz injection frequencies. The 500-kHz output from the multiplier-divider in Frequency Standard Electronic Assembly A2A5 is applied to the 100-kHz spectrum generator to produce a spectrum of frequencies spaced at 100-kHz intervals between 15.3 and 16.2 MHz. The output from the 100-kHz oscillator (4.553 to 5.453 MHz in 100-kHz steps) is applied to the 10.747-MHz mixer, where it is mixed with that spectrum point of the 100-kHz spectrum which will result in an output of 10.747-MHz. This output is additively mixed with the 7.1-MHz output from the 7.1-MHz mixer in 100 MC Synthesizer Electronic Subassembly A2A6A4 to produce a 17.847-MHz signal which is used in one of two mixing processes. It is mixed with the 100-kHz oscillator output to cancel any oscillator frequency error and produce the lo-band injection frequencies, or it is mixed with the 10-MHz output from the multiplier-divider in the frequency standard. This mixing produces a 27.847-MHz signal, which is mixed with the 100-kHz oscillator output to cancel any oscillator frequency error and produce the hi-band injection frequencies. The hi or lo band of injection frequencies is determined by the voltage level on the hi-/lo-band control line output from Code Generator Electronic Assembly A2A7.

3-25. Any error present in the 100-kHz oscillator output would be canceled in this mixing scheme. This is accomplished as follows. Assume that the output from the oscillator should be 4.553 MHz but is 200 Hz high (4.5532 MHz), and that the desired frequency output is 22.4 MHz (in the lo band). The subtractive mixing of the oscillator output with the 100-kHz spectrum point (15.3 MHz) results in a 10.7468-MHz output (15.3 MHz - 4.5532 = 10.7468 MHz), which is as close as possible to 10.747 MHz. This signal is then additively mixed with the 7.1-MHz signal, producing a 17.8468-MHz output. This 17.8468-MHz signal is then additively mixed with the oscillator output (17.8468 MHz + 4.5532 MHz = 22.4 MHz), resulting in the desired 22.4-MHz output. Assume that the output from the oscillator should be 4.953 MHz but is 300 Hz low (4.9527 MHz), and that the desired frequency output should be 32.8 MHz (in the hi band). Subtractively mixing the 100-kHz spectrum point (15.7 MHz) with the 4.9527-MHz signal results in an output of 10.7473 MHz. This signal is then mixed with the 7.1-MHz signal, resulting in a frequency of 17.8473 MHz. The 17.8473-MHz signal is further mixed with the 10-MHz signal to obtain a frequency of 27.8473 MHz, which is then additively mixed with the 4.9527-MHz output from the oscillator to obtain the required 32.8-MHz hi-band output. Therefore, it can be seen that any error existing in the output from the 100-kHz oscillator will be canceled, resulting in the exact 100-kHz injection frequency required.

3-26. Any error existing in the 1- and 10-kHz oscillators is canceled in the following manner. The 100-kHz pulses from the 100-kHz spectrum generator are applied to the 10-kHz spectrum generator, producing an output from 3.82 to 3.91 MHz in 10-kHz increments. The 10-kHz spectrum generator also produces 10-kHz pulses which are applied to the 1-kHz spectrum generator to produce a spectrum of frequncies spaced at 1-kHz intervals between 0.122 and 0.131 MHz. The output from the 10-kHz oscillator (5.25 to 5.16 MHz in 10-kHz steps) is additively mixed with whichever spectrum point of the 10-kHz spectrum will result in a frequency of 9.07 MHz. The output from the 1-kHz oscillator (1.850 to 1.859 MHz in 1-kHz steps) is additively mixed with whichever spectrum point of the 1-kHz spectrum will result in a frequency of 1.981 MHz. The 1.981- and 9.07-MHz signals are then subtractively mixed, producing the 7.089-MHz signal which contains the errors of both oscillators. The 1-kHz spectrum generator also produces 1-kHz pulses which are applied to the 1-kHz pulse inverter. The 1-kHz pulse output from the inverter is, in turn, applied to the phase detector to derive the control voltage for phase-locking the 100-Hz oscillator.

3-27. For the purpose of the error-cancellation discussion, assume that the front panel CPS switch is in the 000 position; the output of the 100-Hz phase-locked oscillator then is 110 kHz. This 110-kHz signal is divided by 10 and applied to the 7.1-MHz mixer, where it is additively mixed with the 7.089-MHz output from the 7.089-MHz mixer. The resulting 7.1-MHz signal is then applied to the error loop of 100 KC Synthesizer Electronic Subassembly A2A6A2. Therefore, if an error exists in the 1- or 10-kHz oscillators, the same error will exist in the 100-kHz injection frequencies. This error is then canceled in the low- and mid-frequency mixers of the mixers circuit in the following manner. Assume that the output from the 10-kHz oscillator should be 5.25 MHz but is actually 5.2502 MHz. Also, assume that the output from the 1-kHz oscillator should be 1.852 MHz but is actually 1.8521 MHz. Subtractively mixing these two frequncies results in an injection frequency to the low-frequency mixer of 3.3981 MHz rather than the desired 3.3980 MHz. Therefore, a 100-Hz error exists in the injection signal. The additive mixing of the 5.2502-MHz signal and the 10-kHz spectrum point (3.82 MHz) results in a frequency of 9.0702 MHz. The additive mixing of the 1.8521-MHz signal and the 1-kHz spectrum point (0.129 MHz) results in a frequency of 1.9811 MHz. Subtractively mixing the 9.0702- and the 1.9811-MHz signals results in a frequency of 7.0891 MHz. The 7.0891-MHz signal is mixed with the 11-kHz signal from the divide-by-ten circuits. This results in a frequency of 7.1001 MHz, which is mixed with the 10.747-MHz signal to produce a frequency of 17.8471 MHz. If the output from the 100-kHz oscillator is assumed to be 4.553 MHz, then the 100-kHz injection frequency would be 22.4001 MHz. The 100-kHz injection is then also 100 Hz high. Therefore when the 1- and 10-kHz injection frequency of 3.3981 MHz (which is 100 Hz high) is subtractively mixed in the low-frequency mixer with the output from the mid-frequency mixer (which is 100 Hz high), the error will be canceled. Therefore, since any error that existed in the 1- and 10-kHz injection also exists in the 100-kHz injection, the error is canceled during the translation process.

3-28. The T-827B/URT can be tuned in 0.1-kHz increments. The phase-locked oscillator in 100 CPS Synthesizer Electronic Subassembly A2A6A4 uses a preset divider in the feedback loop along with a binary phase detector. This oscillator is locked from 110 to 119 kHz in 1-kHz increments. with the divider preset to divide by a factor of 110 to 119, respectively. The output from the preset divider is therefore 1 kHz, which is then compared in the binary phase detector with the 1-kHz pulses from Spectrum Generator Electronic Subassembly A2A6A5. The voltage from the phase detector is filtered and used as the control to maintain the oscillator locked in for the desired preset division ratio. The output of the 100-Hz oscillator is divided by 10 and mixed with the 7.089-MHz error frequency from 1 and 10 KC Synthesizer Electronic Subassembly A2A6A3 before being sent on to 100 KC Synthesizer Electronic Subassembly A2 A6A2. Since the 100-Hz step displacements in the resulting nominal 7.1-MHz error frequency signal are injected (unlike the errors in the 1- and 10-kHz oscillators) into only one path of the error-canellation loop previously described, no cancellation of the 100-Hz displacements takes place, thus permitting tuning of the T-827B/URT in 100-Hz increments.

3-29. The 500-kHz if. is converted to the desired rf as follows. Assume that the front-panel controls are set for a frequency output of 13,492,500 Hz. (See figure 3-3 for the frequency translation scheme for the T-827B/URT.) The 1- and 10-kHz injection is that frequency of the 10-kHz oscillator corresponding to the 10-kHz digit (9) minus that frequency of the 1-kHz oscillator corresponding to the 1-kHz digit (2). As shown in figure 3-3, this results in an injection frequency (5.16 MHz minus 1.852 MHz) of 3.308 MHz. The 3.308 MHz is subtractively mixed with the 500-kHz if. in the low-frequency mixer, producing a second if. of 2.808 MHz. This signal is filtered and applied to the mid-frequency mixer to be subtractively mixed with the 100-kHz injection frequency. To determine the 100-kHz injection frequency, first note whether the MHz digit to be used results in a high or low frequency. In this case, the selected MHz digits (13) are in the hi band; therefore, the 100-kHz injection frequency must correspond. It also must be noted that the CPS switch is in the 500 position. Therefore, the correct 100-kHz injection frequency is 32.8005 MHz. When the 2.808 MHz is subtractively mixed with the 32.8005 MHz in the mid-frequency mixer, the resulting third if. is 29.9925 MHz. This frequency is filtered and applied to the high-frequency mixer, where it is subtractively mixed with the MHz injection corresponding to the selected MHz digits (13). This results in the desired output frequency of 13.4925 MHz (29.9925 MHz - 16.5 MHz = 13.4925 MHz). Similarly, the 500-kHz if. can be translated to any one of the possible 280,000 operating channels.

3-30. POWER SUPPLY (Figure 3-2). The operating voltages for all circuits in the T-827B/URT are produced by Power Supply Electronic Assembly A2A8. The 105- to 125-Vac primary power is converted to 110 Vdc (rf amplifier tubes plate and screen supply), and 28 Vdc (general use). The 28 Vdc is also regulated to 20 Vdc. The 20 Vdc is used for operating voltages in the semiconductor circuits of the T-827B/URT. In addition, 4-Vdc Power Supply Electronic Assembly A2A16 provides a positive 4-volt source for 100 CPS Synthesizer Electronic Subassembly A2A6A4.

3-31. RADIO TRANSMITTER T-827B/URT, FUNCTIONAL SECTION DESCRIPTION.

3-32. GENERAL. The T-827B/URT comprises six principal functional sections. These sections are described below in the following order: main signal flow, audio signal flow, frequency synthesization, dc power supply, digital tuning, and main frame and control switching.

3-33. MAIN SIGNAL FLOW SECTION (Figure 3-4). The main signal flow begins in Frequency Standard Electronic Assembly A2A5, which generates the 500-kHz local carrier. Transmitter Mode Selector Electronic Assembly A2A1 processes the intelligence to be transmitted and modulates the local carrier, and Transmitter IF. Amplifier Electronic Assembly A2A12 amplifies the modulated 500-kHz signal to a level suitable for translation to an rf signal. An APC and a PPC loop are inserted into the if. amplifiers from the AM-3007/URT high-power amplifier to control the overall system power output. RF Translator Electronic Subassembly A2A6A6 converts the modulated 500-kHz signal to the rf output frequency selected by the frequency knobs on the front panel. RF Amplifier Electronic Assembly A2A4 amplifies the selected rf channel to a level suitable for driving the AM-3007/URT. The main signal flow section is described sequentially by function in the paragraphs below.

3-34. Frequency Standard Electronic Assembly A2A5 produces accurate, stable, reference frequencies upon which all frequencies within the system are based. The outputs of this assembly are 500 kHz, 1 MHz, and 10 MHz. The 500 kHz is routed to Transmitter Mode Selector Electronic Assembly A2A1 for use as the local carrier, and to Spectrum Generator Electronic Subassembly A2A6A5 for use in the frequency synthesizing process. The 1 MHz is routed to MC Synthesizer Electronic Subassembly A2A6A1, which generates the 2.5- to 23.5-MHz injections for the high-frequency translator-mixer. The 10-MHz output from the frequency standard is sent to 100 KC Synthesizer Electronic Subassembly A2A6A2, which generates the injections to the mid-frequency translator-mixer. The frequency standard consists of four basic circuits: 5-MHz frequency standard, oven-control, multiplier-divider, and comparator circuits.

3-35. The 5-MHz frequency standard consists of a 5-MHz oscillator and buffer amplifier. The oscillator crystal is in an evacuated holder, which results in a higher Q for the crystal because of the reduction of acoustical damping. The 5-MHz oscillator and its circuitry are enclosed within a temperature-controlled oven structure.

3-36. The oven-control circuit maintains the oven at a fixed temperature at 85°C with a maximum variation of ±0.05°C. Since the temperature coefficient of the crystal is ±0.2 ppm per degree Celsius, an ultimate stability of 1 part in 10^8 per day is obtained.

3-37. The multiplier-divider circuits receive an input from the 5-MHz oscillator and provide the 500-MHz, 1-MHz, and 10-MHz outputs to the synthesizer, and a 500-kHz output to the mode selector for use as the local carrier. The accuracy of each of these outputs is the same as that of the 5-MHz oscillator.

3-38. The comparator circuit enables the 5-MHz oscillator to be compared with an external standard such as the AN/URQ-10. The comparator has a lamp which will indicate whether there is a difference in frequency between the internal and external 5-MHz standards.

3-39. Transmitter Mode Selector Electronic Assembly A2A1 processes and routes the local carrier and the intelligence to be transmitted. This is accomplished by: balanced modulation and filtering in the single-sideband (SSB), FSK, and AM modes; carrier reinsertion in the CW and AM modes; carrier reinsertion in the SSB modes when desired; and provision for sidetone monitoring of intelligence by the operator. The mode selector requires two input sources: audio from the audio amplifier(s) and the 500-kHz local carrier signal from the frequency standard.

3-40. The signal path through the mode selector is shown in figure 4-5. The balanced modulators function to create the sidebands and suppress the carrier. Operating voltages from the mode selector switch on the front panel are used for gating. Thus, the USB balanced modulator and its associated amplifiers and filters function in the USB, AM, FSK, and ISB modes. The LSB balanced modulator is gated on in the LSB and ISB modes only. Neither balanced modulator is operative in the CW mode. The 500-kHz local carrier from the frequency standard is gated to both balanced mdoulators in all modes except CW.

3-41. The output of each balanced modulator is a double-sideband signal. This signal is fed through an isolation amplifier to the appropriate mechanical filter, which removes the unwanted sideband. The output of the balanced modulator circuit is sent to the if. amplifier for amplification. In the AM mode, the 500-kHz carrier is sent to the if. amplifier for reinsertion into the USB signal. The mode selector also contains circuitry to permit pilot carrier to be transmitted in the SSB modes.

3-42. The mode selector also provides a gating function for operator monitoring. The LSB intelligence can be monitored via the LSB sidetone line. The USB, AM, and FSK intelligence can be moniored via the USB sidetone line. In the CW mode, a CW sidetone oscillator is gated on and routed via the USB sidetone line for operator monitoring.

3-43. Transmitter IF. Amplifier Electronic Assembly A2A12 amplifies the inputs from the mode selector to a level suitable for translation to an rf frequency. One of its principal functions is to provide a convenient place in the exciter circuitry to control the system peak and average power outputs automatically. There are four inputs to this assembly; the if. input and the 500-kHz local carrier from the mode selector, and the APC and the PPC from a high-power amplifier such as the AM-3007/URT.

3-44. The controlled if. output is applied to RF Translator Electronic Subassembly A2A6A6, where it is mixed with the injection signals from the synthesizer and translated to the selected rf channel. Two controlled if. stages are employed in the if. amplifier. One stage is controlled by a PPC level from a high-power amplifier, while the other is controlled by an APC

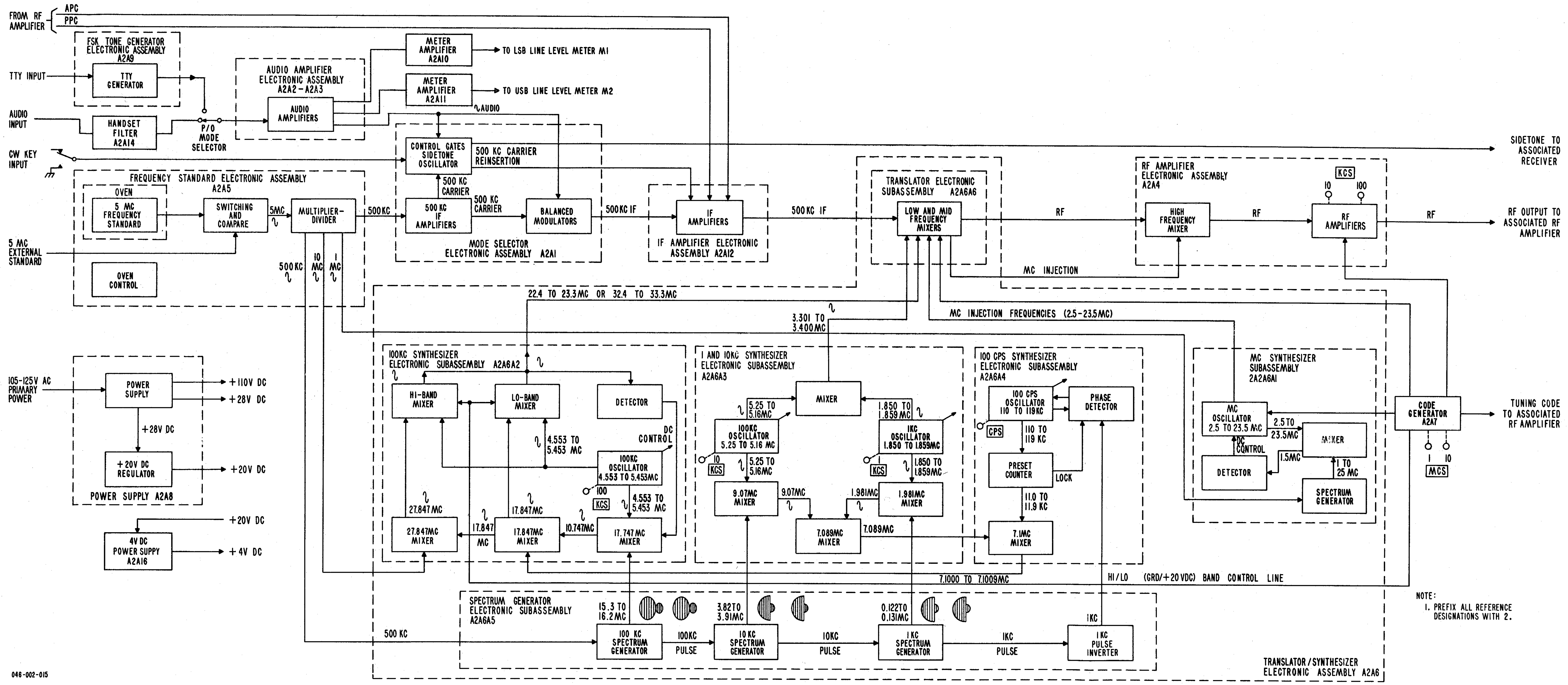
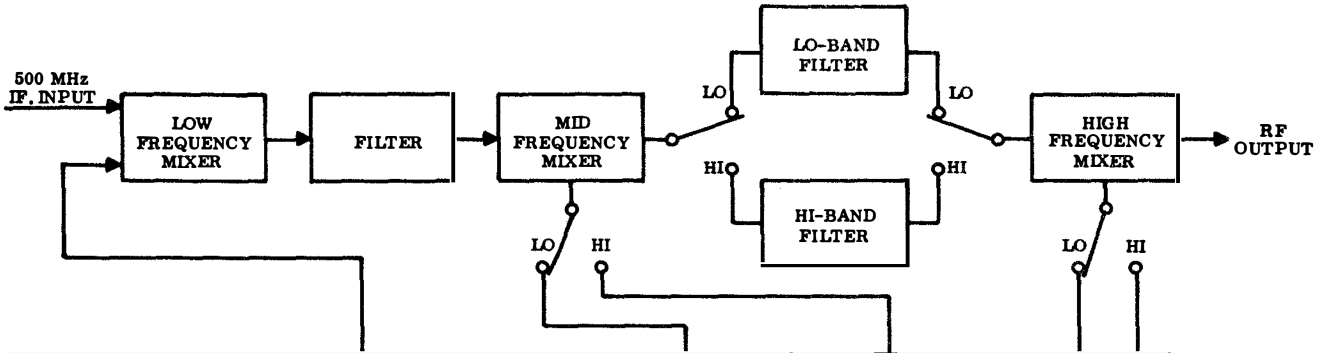


Figure 3-2. Radio Transmitter T-827B/URT, Functional Block Diagram



1 KCS	1 kHz OSC	10 KCS	10 kHz OSC	1 AND 10 kHz INJECTION	100 KCS	100 kHz OSC	LO 000 Hz TO 900 Hz IN 100 Hz STEPS	HI 000 Hz TO 900 Hz IN 100 Hz STEPS	MCS	LO	HI
0	1.850	0	5.25	3.400 TO 3.391	0	4.553	22.4000 TO 22.4009	32.4000 TO 32.4009	2	17.5	
1	1.851	1	5.24	3.390 TO 3.381	1	4.653	22.5000 TO 22.5009	32.5000 TO 32.5009	3	16.5	
2	1.852	2	5.23	3.380 TO 3.371	2	4.753	22.6000 TO 22.6009	32.6000 TO 32.6009	4	15.5	
3	1.853	3	5.22	3.370 TO 3.361	3	4.853	22.7000 TO 22.7009	32.7000 TO 32.7009	5	14.5	
4	1.854	4	5.21	3.360 TO 3.351	4	4.953	22.8000 TO 22.8009	32.8000 TO 32.8009	6		23.5
5	1.855	5	5.20	3.350 TO 3.341	5	5.053	22.9000 TO 22.9009	32.9000 TO 32.9009	7	12.5	
6	1.856	6	5.19	3.340 TO 3.331	6	5.153	23.0000 TO 23.0009	33.0000 TO 33.0009	8	11.5	
7	1.857	7	5.18	3.330 TO 3.321	7	5.253	23.1000 TO 23.1009	33.1000 TO 33.1009	9		20.5
8	1.858	8	5.17	3.320 TO 3.311	8	5.353	23.2000 TO 23.2009	33.2000 TO 33.2009	10		19.5
9	1.859	9	5.16	3.310 TO 3.301	9	5.453	23.3000 TO 23.3009	33.3000 TO 33.3009	11	8.5	
									12	7.5	
									13		16.5
									14	5.5	
									15	4.5	
									16	3.5	
									17		12.5
									18		11.5
									19		10.5
									20		9.5
									21		8.5
									22	2.5	
									23	3.5	
									24		5.5
									25		4.5
									26		3.5
									27	7.5	
									28	8.5	
									29	9.5	

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Figure 3-3. T-827B/URT, Frequency Translation, Functional Block Diagram

level. In addition, the 500-kHz carrier reinsertion signal is applied to the if. signal in the AM and CW modes automatically, and a pilot carrier can be reinserted in the SSB modes if desired.

3-45. RF Translator Electronic Subassembly A2A6A6 accepts the modulated 500-kHz signal from the if. amplifier and converts it to one of the 280,000 rf channels selected by the tuning knobs on the front panel of the T-827B/URT. Three mixers are employed in the translator to accomplish the triple-conversion frequency scheme.

3-46. The low-frequency mixer mixes the 500-kHz signal with an injection frequency selected by the 1 and 10 KC front-panel controls to produce a second if. between 2.8 and 2.9 MHz. The 1- and 10-MHz injection comes from 1 and 10 KC Synthesizer Electronic Subassembly A2A6A3.

3-47. The mid-frequency mixer mixes the signal from the low frequency mixer with an injection from 100 KC Synthesizer Electronic Subassembly A2A6A2 to produce a third if. in either one of two bands: 19.5 to 20.5 MHz (low band) or 29.5 to 30.5 MHz (hi band).

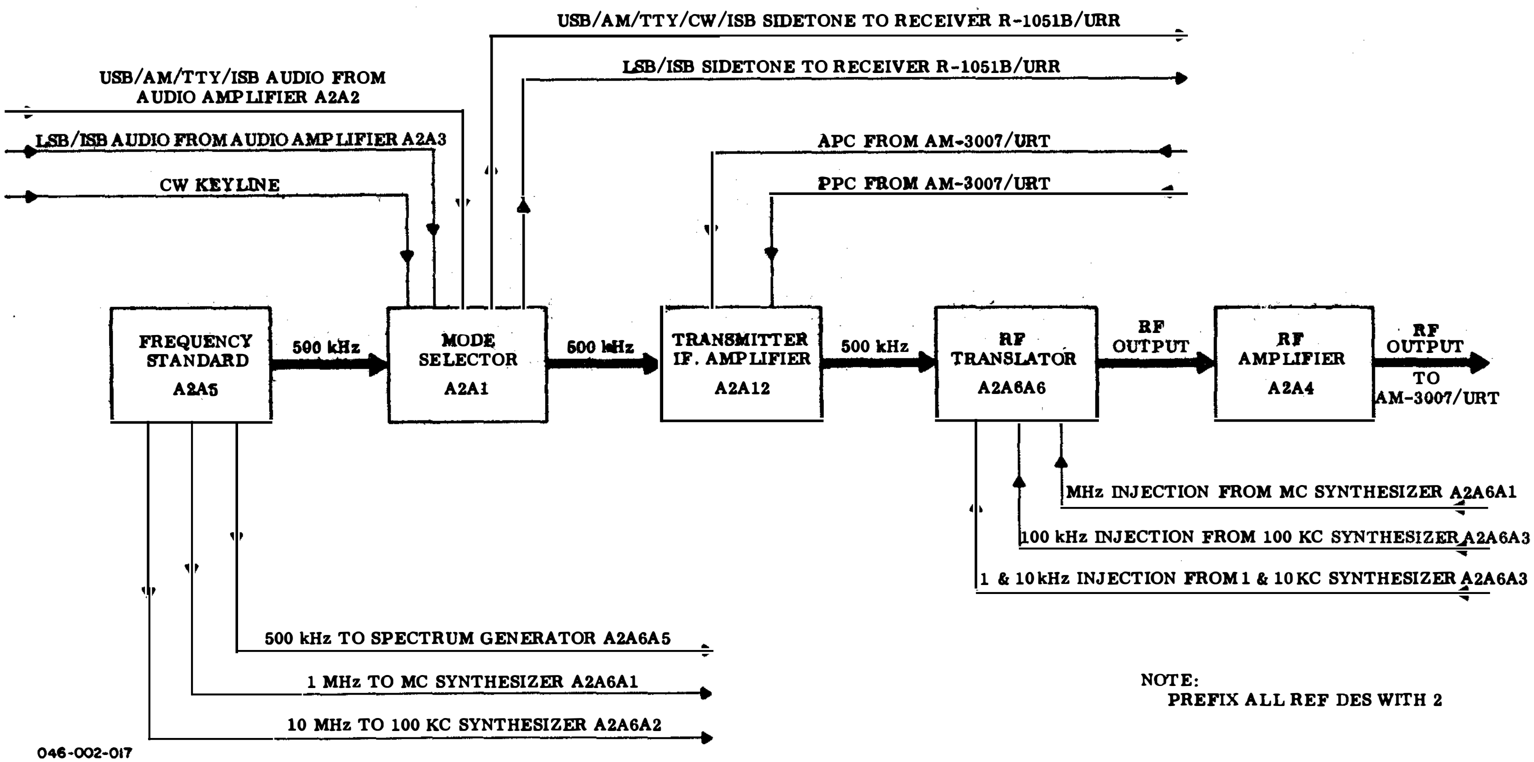


Figure 3-4. T-827B/URT, Main Signal Flow Section, Functional Block Diagram

The frequency band is determined by the MCS controls on the front panel.

3-48. The high-frequency mixer accepts the input from the mid-frequency mixer and mixes it with an injection from MC Synthesizer Electronic Subassembly A2A6A1 to produce the final rf channel to be transmitted. The injection frequency from the MC synthesizer is selected by the MCS controls on the front panel.

3-49. RF Amplifier Electronic Assembly A2A4 amplifies the output of the rf translator to a level suitable to drive a high-power linear amplifier, such as the AM-3007/URT. The rf amplifier consists basically of a solid-state preamplifier and two vacuum-tube amplifier stages. All stages in the rf amplifier are digitally tuned by the tuning knobs on the front panel of the T-827B/URT. The front-panel knobs electromechanically position the input, interstage, and output tuning circuitry which allows the rf amplifier to function as a linear amplifier at the selected dial frequency. The output from the rf amplifier is applied to an rf connector on the rear of the T-827B/URT for connection to a high-power amplifier, such as the AM-3007/URT.

3-50. AUDIO SIGNAL FLOW SECTION (Figure 3-5). The purpose of the audio signal flow section is to accept the intelligence to be transmitted and route it to the mode selector to modulate the 500-kHz local carrier. The audio signal flow section consists of Transmitter Audio Amplifier Electronic Assemblies A2A2 and A2A3, FSK Tone Generator Electronic Assembly A2A9, and the associated switching and metering circuits.

3-51. The audio amplifiers amplify the audio intelligence to be transmitted to the input level required by the balanced modulators in the mode selector. The two amplifiers are identical. The USB audio amplifier (A2A2) is employed in the USB, AM, and FSK modes. The LSB audio amplifier (A2A3) is used in the LSB mode. Both audio amplifiers are used in the ISB and ISB/FSK modes, but neither is used in the CW mode.

3-52. The FSK tone generator converts the mark and space tty impulses into audio mark and space tones. These tones are amplified by the USB audio amplifier and then routed to the USB balanced modulator in the mode selector to modulate the 500-kHz local carrier.

3-53. Two audio line-level meters are used in the T-827B/URT. These line-level meters, located on the front panel, monitor the audio signal levels to the USB and LSB audio amplifiers. A2M1 is the LSB line-level meter and A2M2 is the USB line-level meter.

3-54. FREQUENCY SYNTHESIZATION SECTION (Figure 3-6). The frequency synthesization section (included primarily within Translator/Synthesizer Assembly A2A6) generates three injection frequencies to the rf translator. These three injections are selected by the front-panel tuning knobs of the T-827B/URT. The injections are applied into the low-, mid-, and high-frequency mixers of the rf translator to convert the 500-kHz if. into the selected rf output channel. The inputs to the frequency synthesizer are 500 kHz, 1 MHz, and 10 MHz from the frequency standard, The five principal circuits involved in the frequency synthesization process are the Spectrum Generator Electronic Subassembly A2A6A5, 1 and 10 KC Synthesizer Electronic Subassembly A2A6A3, 100 KC Synthesizer Electronic Subassembly A2A6A2, MC Synthesizer Electronic Subassembly A2A6A1, and 100 CPS Synthesizer Electronic Subassembly A2A6A4.

3-55. The spectrum generator provides a highly accurate signal burst to each of the synthesizers for use as a reference in error-cancellation scheme. The input to the spectrum generator is the 500 kHz from the frequency standard. The outputs are:

a. 15.3 to 16.2 MHz (in 100-kHz increments) to the 100 KC Synthesizer.

b. 3.82 to 3.91 MHz (in 10-kHz increments) to the 1 and 10 KC Synthesizer.

c. 0.122 to 0.131 MHz (in 1-kHz increments) to the 1 and 10 KC Synthesizer.

d. 1-kHz reference pulse to the 100 CPS synthesizer.

3-56. The 1 and 10 KC synthesizer generates two output signals. One output is the 3.301- to 3.400-MHz injection band to the low-frequency mixer in the rf translator. The injection frequency is dependent upon the setting of the 1 and 10 KC controls on the front panel. The injection signal is a combined signal for both digits. The second output from the 1 and 10 KC synthesizer is the 7.089-MHz error-cancelling loop signal to the 100 CPS synthesizer.

3-57. The 100 KC synthesizer generates the injection frequency for the mid-frequency mixer in the rf translator. The injection frequency is dependent upon the setting of the 100 KCS control on the front panel. The output frequency of the 100 KC synthesizer is in either one of two bands: 2.4 to 23.3 MHz (lo band) or 32.4 to 33.3 MHz (hi band). The hi- or the lo-band injection frequency is determined by the setting of the MCS controls on the front panel. The two inputs to the 100 KC synthesizer are the 15.3 to 16.2 MHz from the spectrum generator and the 7.1000 to 7.1009 MHz from the 100 CPS synthesizer.

3-58. The MC synthesizer furnishes the injection frequency to the high-frequency mixer in the rf translator. The injection range is 2.3 to 23.5 MHz in 1-MHz intervals. The injection frequency is selected by the setting of the MCS controls on the front panel. The input to the MC synthesizer is the 1-MHz output from the frequency standard.

3-59. The 100 CPS synthesizer generates a 7.000- to 7.0009-MHz signal to the 100 KC synthesizer. The signal frequency is determined by the setting of the CPS switch on the front panel. The 100-Hz displacement of the 7.1-MHz signal is injected into the 100 KC synthesizer to allow the T-827B/URT to be tuned in 100-Hz increments by the CPS switch.

3-60. DC POWER SUPPLY SECTION (Figure 3-7). The dc power supply section furnishes all of the operating dc voltages required by the T-827B/URT. Power Supply Electronic Assembly A2A8 (figure 4-4) consists of the positive 110-Vdc supply, the positive 28-Vdc supply, and the regulated positive 20-Vdc supply.

3-61. The positive 110-Vdc supply furnishes plate and screen voltage to the vacuum tubes in RF Amplifier Electronic Assembly A2A4.

3-62. The positive 28-Vdc supply furnishes the voltage for the rf amplifier turret motor, the MC synthesizer tuning motor, the 5-MHz oscillator and oven-heater circuit in the frequency standard, and all relays except the push-to-talk (ptt) relay. The positive 28 Vdc is also used with a zener diode circuit to furnish a positive 12 Vdc for the handset and the ptt relay when the T-827B/URT is operated by a local operator.

3-63. The regulated positive 20-Vdc supply furnishes gating and supply voltages for the semiconductor circuitry used in the equipment. It is also used with a zener diode circuit in 4-VDC Power Supply Electronic Assembly A2A16 to furnish positive 4 Vdc to the 100 CPS synthesizer.

3-64. DIGITAL TUNING SECTION (Figure 3-8). The digital tuning section tunes the T-827B/URT to the selected rf output channel via a set of front-panel controls arranged on a one-knob-per-digit basis. The digital tuning controls also tune the associated rf power amplifier (such as the AM-3007/URT) to the T-827B/URT output frequency.

3-65. The digital tuning of the T-827B/URT uses an electromechancial positioning scheme. The 100 KCS, 10 KCS, and 1 KCS controls are mechanical, while the 10 MCS, 1 MCS, knobs and CPS controls are electromechanical. The MCS controls function through Code Generator Electronic Assembly A2A7. Turning the MCS controls initiates the five-wire ground-seeking circuitry in the code generator. The turret motors are energized by a ground, and rotate until they reach a no-ground condition.

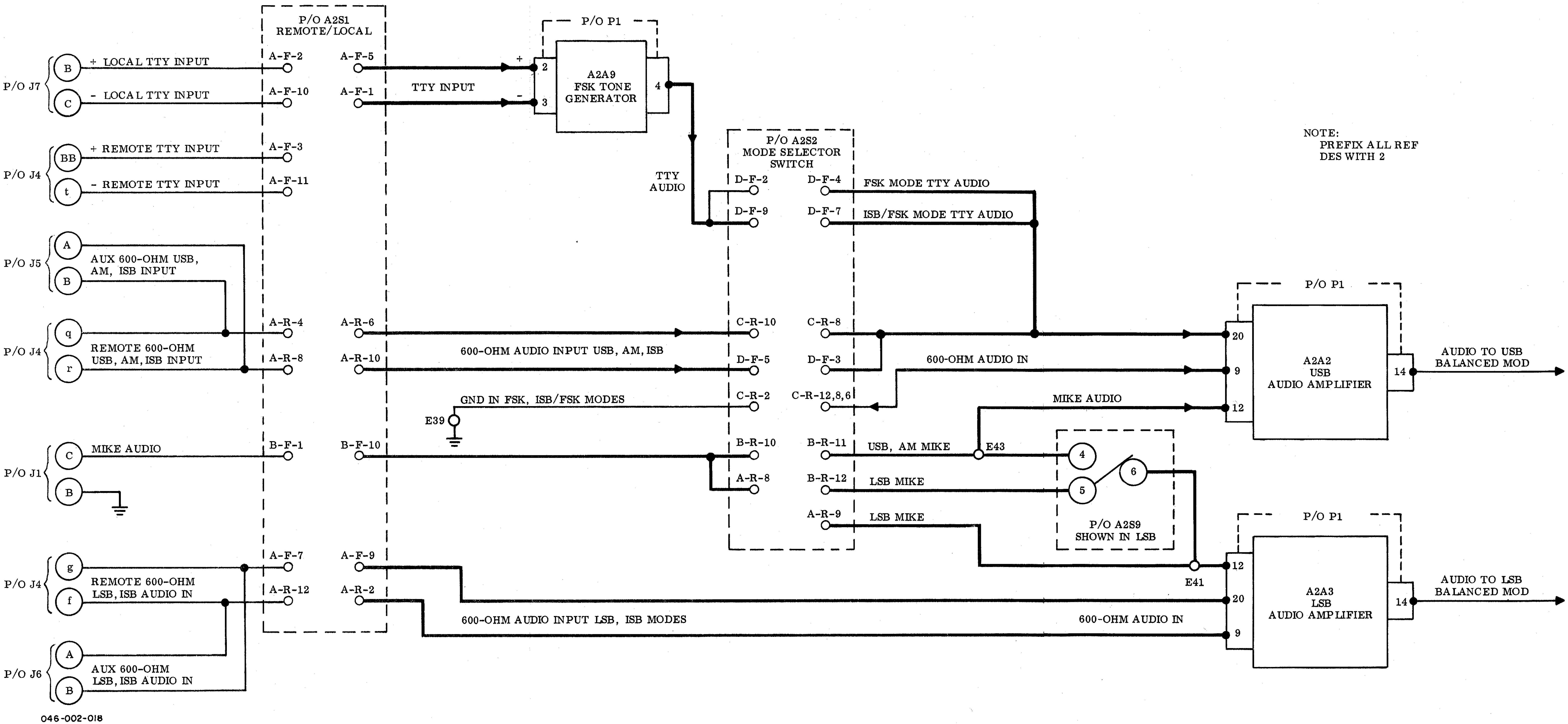


Figure 3-5. T-827B/URT, Audio Signal Flow Section, Simplified Block Diagram

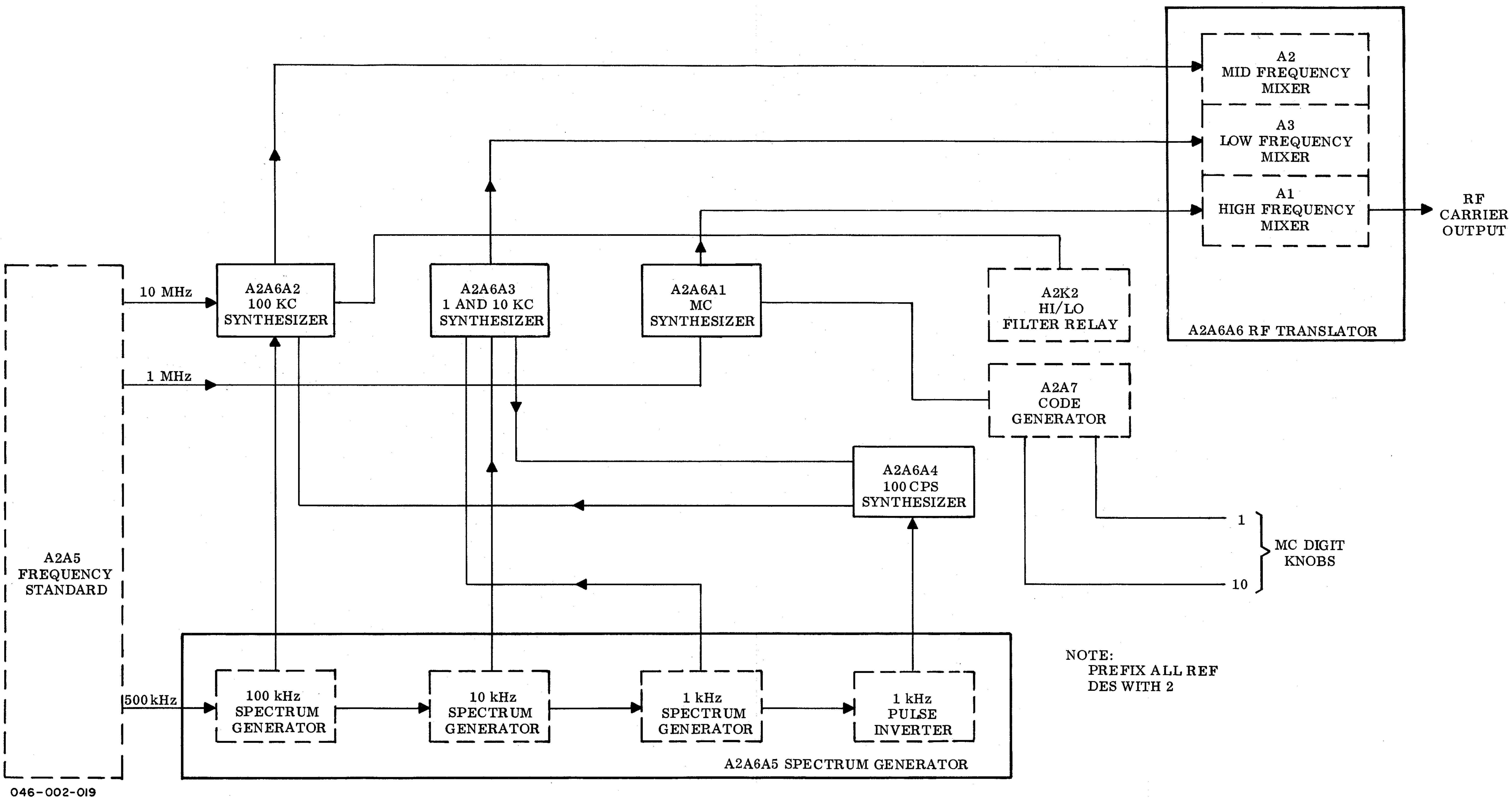


Figure 3-6. T-827B/URT, Frequency Synthesization Section, Simplified Block Diagram

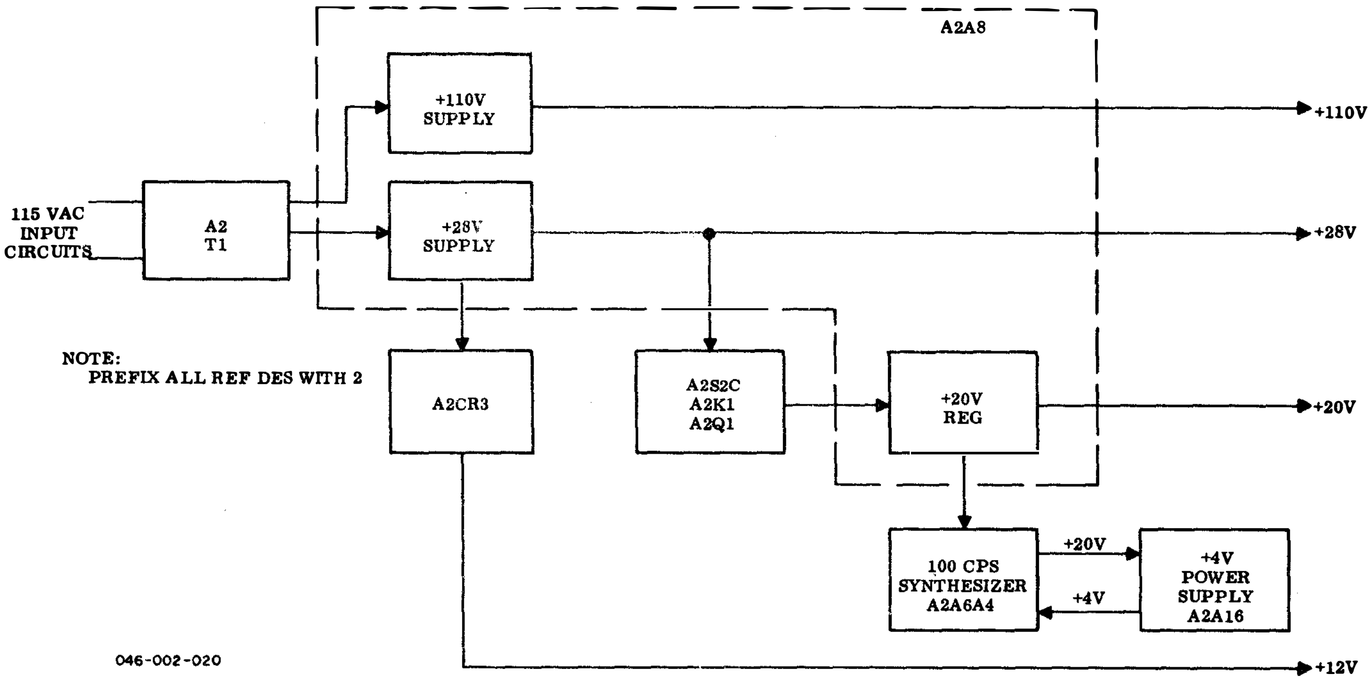


Figure 3-7. T-827/URT, DC Power Supply, Simplified Block Diagram

3-66. The MCS controls are mechanically linked to the code generator. Rotation of either one or both of the controls can result in four tuning codes being initiated by the code generator. One code causes the rf amplifier turret motor to select the MHz strip corresponding to the new frequency. A second code causes the tuning motor in the MC synthesizer to select automatically the correct crystal for use in the tuning scheme. The third code positions the tuning turret in the rf power amplifier (such as the AM-3007/URT). The fourth code switches the hi-/lo-band control line to correspond to whether a hi- or a lo-band injection is required into the rf translator from the 100 KC synthesizer. The T-827B/URT will be disabled if the MCS controls are set to 00 or 01; either setting causes tune relay A2K1 to energize and remove the input to the positive regulated 20-Vdc supply.

3-67. Rotation of the 100 KC control selects one of 10 crystals in the 100 KC synthesizer, and fine-tunes the rf amplifier MHz strips in accordance with the digital tuning scheme. Rotation of the 10 KCS control selects the crystal for the 10-kHz oscillator to be used in the 1 and 10 KC synthesizer rf amplifier. The 1 KC digit control selects the 1-kHz oscillator crystal to be used in the 1 and 10 KC synthesizer for the digital tuning scheme selected. The CPS switch initiates the tune-control voltage into the 100 CPS synthesizer to allow the T-827B/URT to be tuned in 100-Hz increments by the CPS vernier control.

3-68. MAIN FRAME AND CONTROL SWITCHING SECTION. The main frame and control switching section consists of switches and relays mounted on the T-827B/URT main frame. This section includes relays A2K1, A2K3, A2K4, A2K5, and A2K6, and switches A2S1, A2S2, A2S7, and A2S8; these are shown as part of the overall schematic diagram of the T-827B/URT (figure 5-13). These relays and switches energize and key the circuits required for each mode of operation.

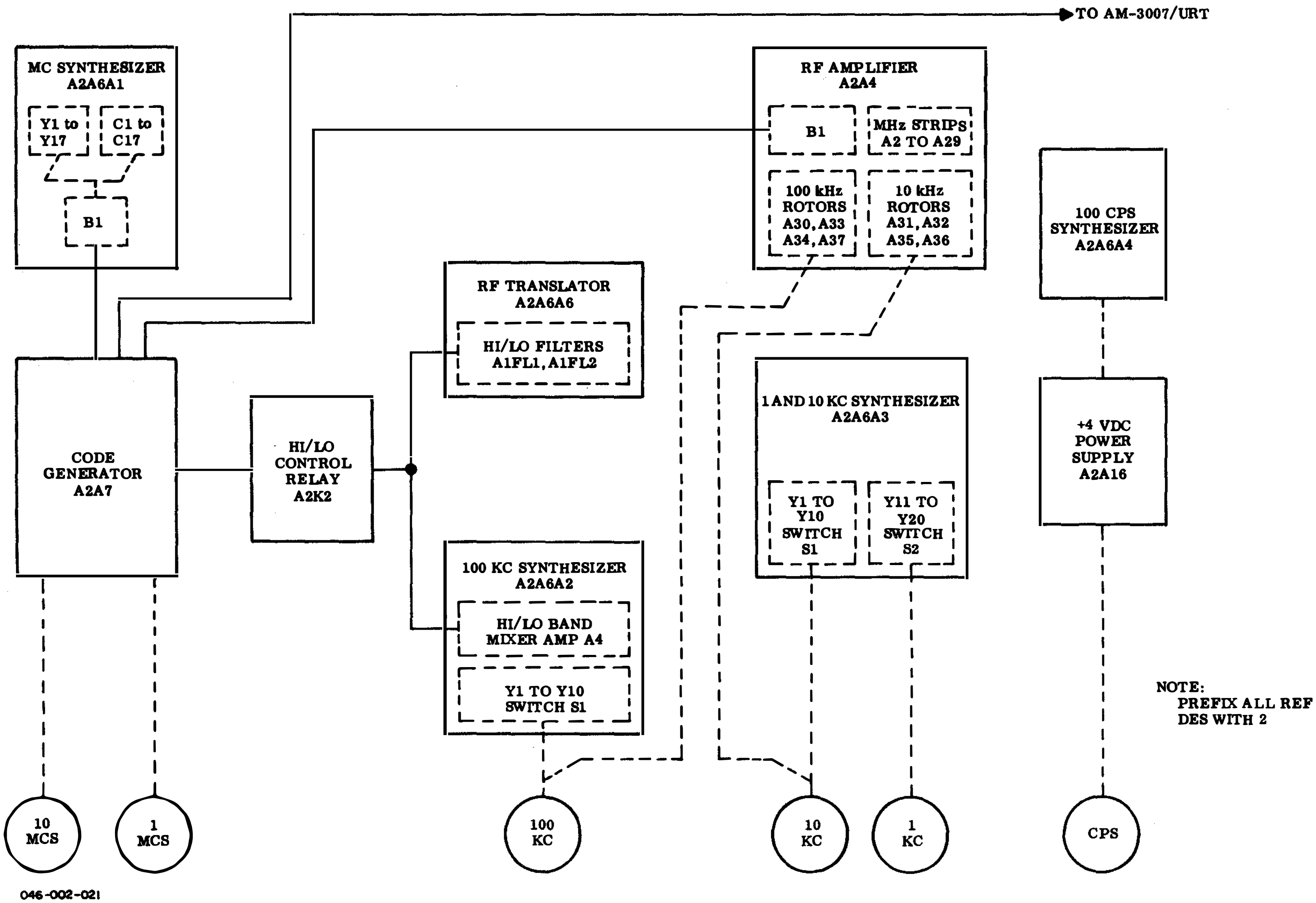


Figure 3-8. T-827B/URT, Digital Tuning, Simplified Block Diagram

3-69. RADIO TRANSMITTER T-827B/URT, MAIN SIGNAL FLOW CIRCUIT DESCRIPTION. (See Figure 3-4.)

3-70. FREQUENCY STANDARD ELECTRONIC ASSEMBLY A2A5 (Figure 5-17). This assembly is the heart of the T-827B/URT, as it provides the highly accurate frequencies upon which the digital tuning scheme is based. Four circuits are required to produce the 5-MHz, 1-MHz, 10-MHz, and 500-kHz outputs required for operation of the AN/WRC-1B. These are the 5-MHz oscillator, oven-control, comparator, and multiplier-divider circuits.

3-71. 5-MHz Oscillator. A typical 5-MHz oscillator (figure 3-9) consists of Pierce oscillator Q101 and buffer amplifiers Q102 and Q103. These circuits provide an accurate 5,000,000-Hz signal used as a standard throughout the T-827B/URT. The crystal-oscillator assembly is housed in an oven maintained at a temperature selected in the range 74°C ±4°C for optimum operation of the crystal. The 5-MHz oscillator circuit is used during all modes of operation.

3-72. The 5-MHz frequency of oscillator Q101 is obtained from a Pierce configuration. Capacitor C103 is for coarse adjustment and capacitor C102 is for fine adjustment of the oscillator frequency. The signal from oscillator Q101 is amplified by amplifier stages Q102 and Q103. These amplifiers not only increase the signal level of oscillator Q101, but also isolate it from the useful load to increase stability. Conventional bias circuits are used for oscillator Q101 and isolation amplifier Q102. Base bias for amplifier Q103 is developed across resistor R111 in series with diode CR102 as a result of the rf excitation from the collector of isolation amplifier Q102.

3-73. Operating voltage for the oscillator and amplifiers is obtained by dropping the 20-Vdc supply to 10 Vdc, using zener diode CR101 and resistor R109. Filtering is provided by capacitor C107. The oscillator-amplifier circuits are resistance-capacitance coupled throughout to avoid frequency drifts generally produced by transformer coupling.

3-74. Oven Control. A typical oven-control circuit (figure 3-10) consists of a bridge circuit, differential amplifier Q201 and Q202, Darlington amplifier Q203 and Q204, and dc power amplifier Q205. These circuits maintain the 5-MHz crystal oven at a constant temperature in the range of 74°C ±4°C for optimum frequency stability of the crystal. The oven-control circuit is used during all modes of operation.

3-75. Resistors R201 through R205 form a bridge circuit, with temperature-sensitive resistor R203 in one of the arms. This resistor, with a well-defined temperature characteristic, is attached to the oven wall, sensing its temperature. Any variation in temperature will unbalance the bridge, giving a dc voltage differential between the bases of transistors Q201 and Q202. This voltage differential is sensed and amplified by differential amplifier Q201 and Q202, and is further amplified by transistors Q203 and Q204, which are connected in cascade (Darlington configuration) to increase stability, gain, and input impedance. This amplified dc voltage controls amplifier transistor Q205, increasing or decreasing the current flow and the power dissipation in oven-heater resistor R211. The increase or decrease in temperature thus obtained will be sensed by temperature-sensitive resistor R203, driving the input bridge toward balance and maintaining the required temperature for proper oscillator operation.

3-76. Potentiometer R204 (part of one arm of the bridge) is set by trial and error to obtain the optimum oven temperature for the specific crystal that is installed. Resistor R213 is in a feedback loop. This increases the stability of the differential amplifier.

3-77. The bridge circuit and transistors Q201, Q202, and Q203 operate from the same 10-Vdc supply used for the oscillator and amplifier circuits. Transistor Q204 operates from the 20-Vdc supply, and power transistor Q205 and oven-heater resistor Q211 operate from a 28-Vdc supply.

3-78. Comparator. A typical comparator (figure 3-11) consists of mixer Q301 and

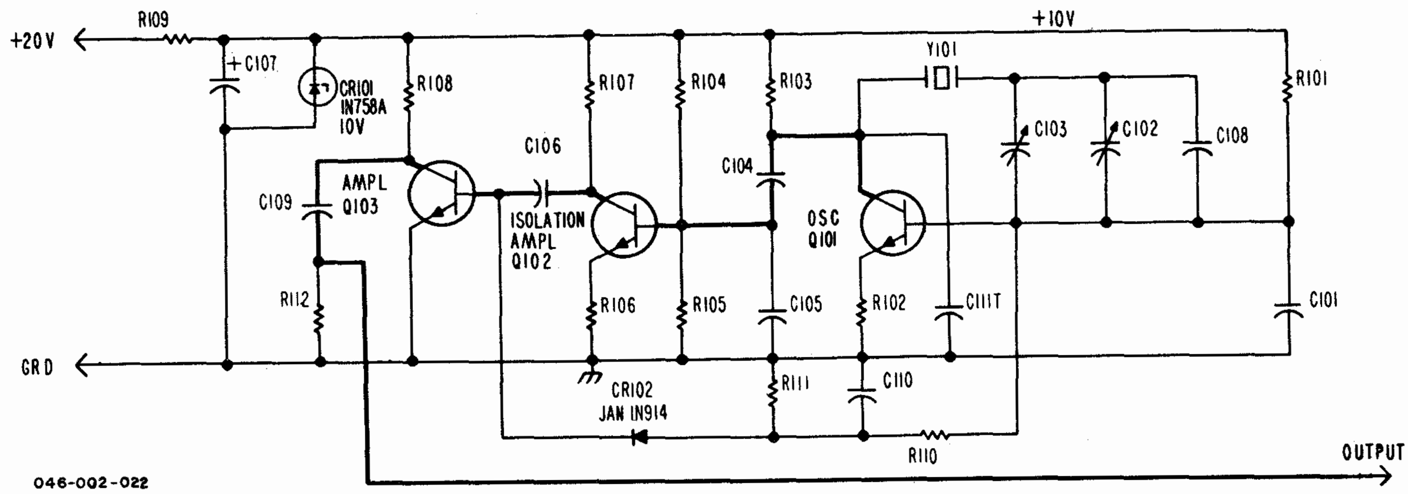


Figure 3-9. T-827B/URT, Typical 5-MHz Oscillator, Simplified Schematic Diagram

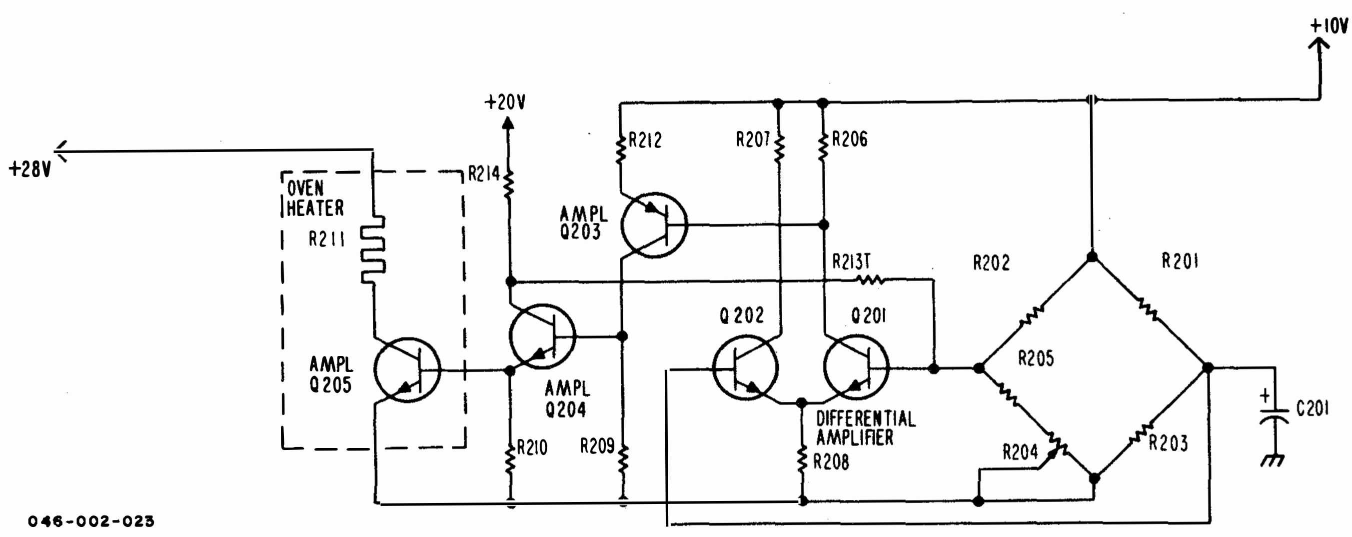


Figure 3-10. T-827B/URT, Typical Oven Control, Simplified Schematic Diagram

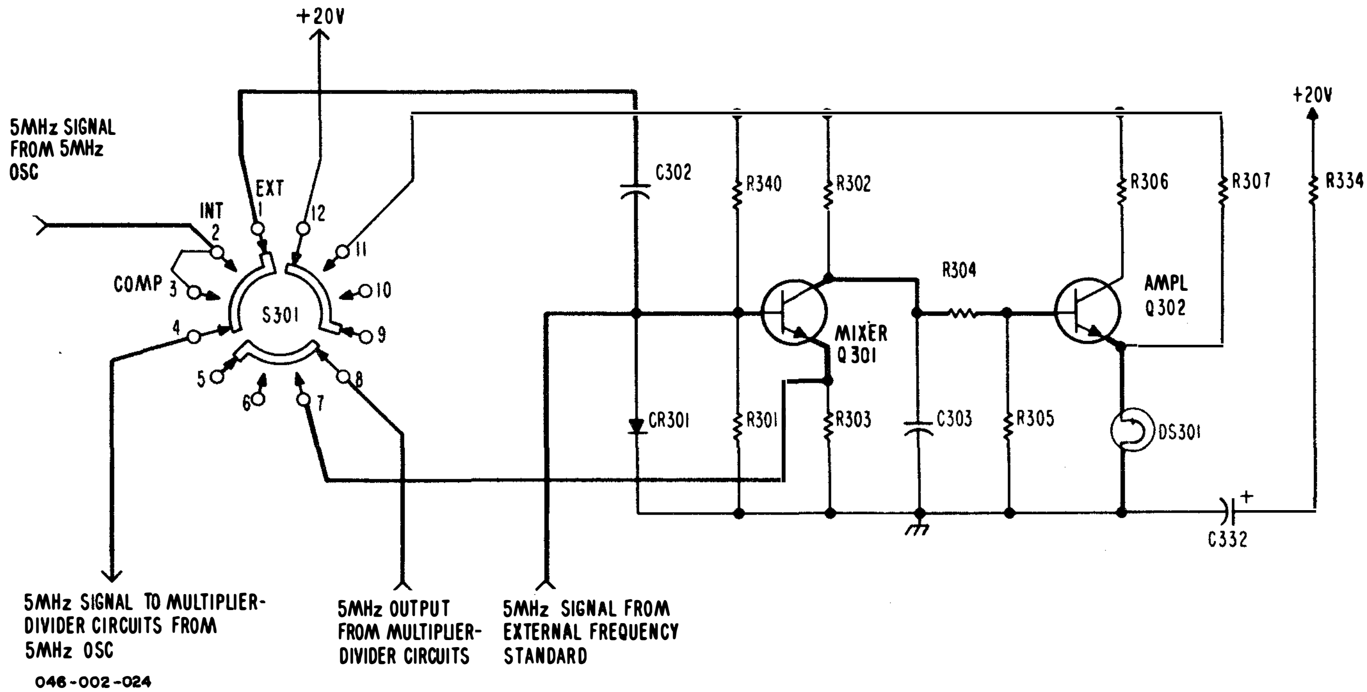


Figure 3-11. T-827B/URT, Typical Comparator, Simplified Schematic Diagram

amplifier Q302. These circuits are used to compare the signal from the 5-MHz oscillator circuit with an accurate external 5-MHz signal. This function is required to determine and maintain the accuracy of the internal 5-MHz frequency standard signal.

3-79. In the INT position of switch S301, any externally applied signal is completely disconnected from the system, and only the 5-MHz signal from the internal 5-MHz oscillator is used. This signal is applied through contacts 2 and 3 on switch S301 and is directed to the regenerative multipliers and dividers via contact 4.

3-80. In the COMP position of switch S301, the 5-MHz signal generated by the 5-MHz oscillator is applied through switch contacts 3 and 4 to the multiplier-divider circuits. The 5-MHz output from the multiplier-divider circuits is then applied through switch contacts 8 and 7 to the emitter of mixer Q301. Resistor R303 acts as the emitter load. A 5-MHz signal (from a highly stable source) is applied to the base of mixer Q301. Diode CR301 acts as a limiter and temperature-compensation element. The difference frequency between the internally generated 5-MHz error signal and the highly stable external 5-MHz signal is filtered by the combination of resistor R302 and capacitor C303, and applied to the base of amplifier Q302 through resistor R304. The emitter load of amplifier Q302 is lamp DS301, which will light on and off at a rate determined by the previously mentioned frequency error (difference). When both signals are at the same frequency lamp DS301 will not light. This comparator circuit allows an operator in the field to adjust the frequency to roughly 5 MHz by adjusting capacitor C102 on the oscillator (figure 3-9). Power for operation of the comparator circuit is obtained through contacts 12 and 11 of switch S301. In any other position of the switch (INT and EXT), no power is available for the comparator operation.

3-81. In the EXT position of switch S301, the internally generated 5-MHz signal is completely disconnected from the system and is not used. The external 5-MHz signal is used instead via C302 and contacts 1 and 4 of switch S301. From here it is directed to the regenerative multipliers and dividers.

3-82. Multiplier-Divider. A typical multiplier-divider circuit is shown in figure 3-12. The purpose of these circuits is to provide the 10-MHz, 1-MHz, and 500-kHz signals to be used in the triple-conversion mixing process in the translator/synthesizer. The 500-kHz signal is also routed to the mode selector, where it serves as the 500-kHz if.

3-83. The 10-MHz signal is derived from multiplier circuit Q4. The collector load for this transistor is tuned to the second harmonic of the 5-MHz standard. The 1-MHz signal is derived from the regenerative divide-by-five circuit, consisting of transistors Q2 and Q3. At the instant power is applied, noise is produced in the tuned outputs of Q2 and Q3. The tuned output of Q3 allows only the 1-MHz portion of the noise to pass. This low-level 1-MHz signal is applied to 4-MHz amplifier Q2, which is biased in a nonlinear condition so that only the fourth harmonic of the 1-MHz signal is amplified. The 4 MHz is mixed with the 5-MHz input, providing a 1-MHz input to Q3. This 1 MHz is amplified and applied to amplifier Q2. This flywheel effect is repeated until a stable 1-MHz signal is produced, which is locked to the 5 MHz from the internal or external frequency standard. The 500-kHz signal is generated by the locked frequency divider Q1. The feedback of this stage is adjusted to just below the point of self-oscillation. When the 1-MHz trigger is applied from transformer T3, the stage oscillates at 500 kHz, locking itself to every second cycle of the 1-MHz trigger.

3-84. MODE SELECTOR ELECTRONIC ASSEMBLY A2A1. Mode Selector Electronic Assembly A2A1 processes and routes the intelligence to be transmitted by Radio Set AN/WRC-1B. This is accomplished by: balanced modulation and filtering in the SSB, FSK, and AM modes; carrier reinsertion in the CW and AM modes; carrier reinsertion in the SSB modes when desired; and provision for sidetone monitoring of intelligence by the operator. Eight basic circuits are employed in the intelligence processing by the mode selector: the 500-kHz gate and if. amplifiers, balanced modulator, isolation amplifiers/filters, CW carrier reinsertion gate, AM carrier reinsertion gate, SSB carrier reinsertion level control, audio sidetone gate, and CW sidetone oscillator/gate.

3-85. 500-kHz Gate and IF. Amplifiers (Figure 3-13). The 500-kHz gate and if. amplifiers circuit consists of gating diode A2A1A4CR11 and amplifiers Q6 and Q7. These circuits amplify the 500-kHz output from the 1-MHz divide-by-two circuit in Frequency Standard Electronic Assembly A2A5 to a level suitable for use in balanced modulators A2A1A1 and A2A1A2. The gating circuit prevents application of the 500-kHz signal to the amplifiers during CW operation. Amplifier A2A1A4Q6 is used during the USB, AM, and FSK modes of operation, and amplifier Q7 is used during the LSB mode of operation. Both amplifiers are used during the ISB mode of operation.

3-86. In ISB operation, the 500-kHz signal is coupled to the anode of gating diode CR11 by capacitor C26. This gate is forward-biased as a result of the positive 18 Vdc on the anode and the positive 10 Vdc on the cathode. The two biases are instantaneous voltages developed for all modes of operation, except CW, by voltage dividers R53, R54, and R55, R56. Positive 20 Vdc is applied to the dividers from the front-panel mode selector switch. Since gate CR11 is forward-biased, it will conduct, allowing the 500-kHz signal to pass and be coupled by capacitors C27 and C30 to the bases of amplifiers Q6 and Q7, respectively. Operating voltage for amplifier Q6 is developed from the positive 20 Vdc applied to voltage divider R57, R58, and emitter resistor R59 from the mode selector switch. The 500-kHz signal is coupled to balanced modulator

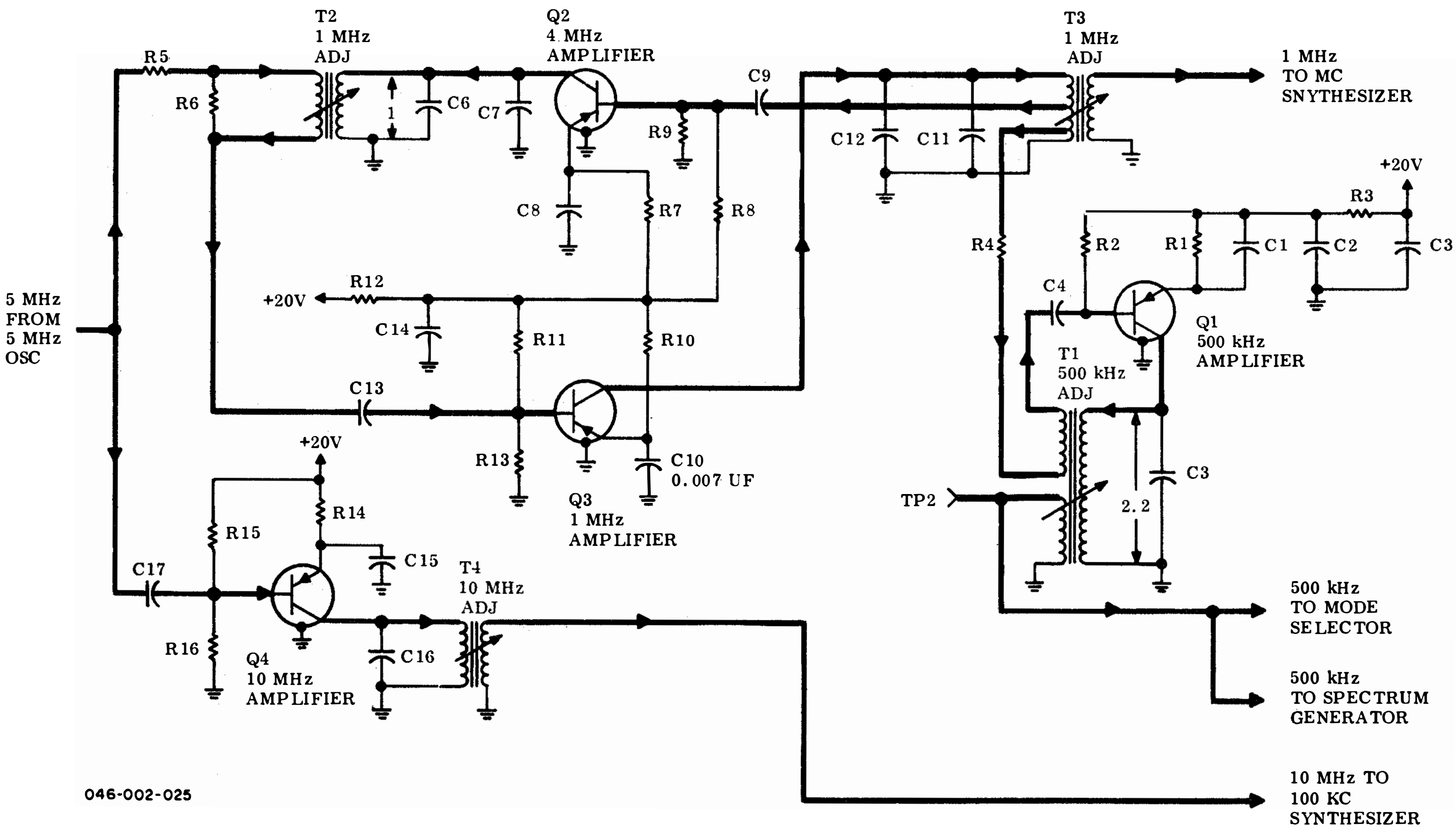


Figure 3-12. T-827B/URT, Typical Multiplier-Divider,
Simplified Schematic Diagram

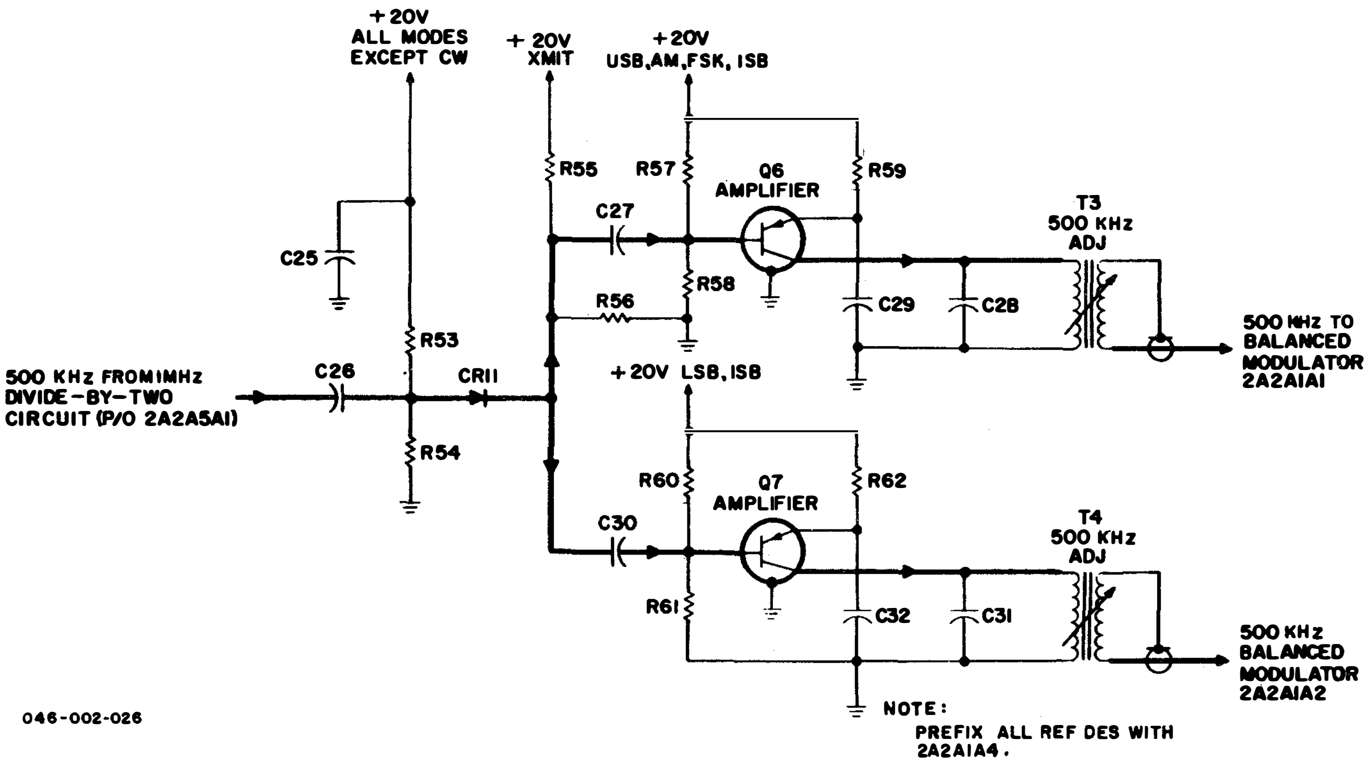


Figure 3-13. T-827B/URT, 500-kHz Amplifiers, Simplified Schematic Diagram

A2A1A1 by transformer A2A1A4T3. Operating voltage for amplifier Q7 is developed from the positive 20 Vdc applied to voltage divider R60, R61, and emitter resistor R62 from the mode selector switch. The 500-kHz signal is coupled to balanced modulator A2A1A2 by transformer A2A1A4T4. When the mode selector switch on the front panel is set to the USB, AM, or FSK position, the positive 20-Vdc operating voltage for Q7 is removed. When the mode selector switch is set to the LSB position, the positive 20-Vdc operating voltage for amplifier Q6 is removed. When the mode selector switch is set to the CW position, the operating voltage for the amplifiers and the anode bias for gate CR11 are removed. The 10-Vdc cathode bias on CR11 is still applied. Therefore, CR11 will be reverse-biased.

3-87. Balanced Modulator (Figure 3-14). Two balanced modulator circuits are used. Balanced modulator A2A1A1 is identical to balanced modulator A2A1A2 (figure 5-14). These circuits modulate the 500-kHz if. carrier with the desired intelligence. A balanced modulator is a device for obtaining the sideband components of modulation without passing the carrier. Balanced modulator A2A1A1 is used during the USB, AM, and FSK modes of operation. Balanced modulator A2A1A2 is used during the LSB mode of operation. Both balanced modulators are used during the ISB mode of operation. Since their operation is the same, only balanced modulator A2A1A1 will be discussed. The balanced modulator (figure 3-14) consists of a balanced, resistive, input network, A2A1A1R21 through R25; a diode bridge, CR5 through CR8; and a balanced output network, C13 through C17, and R31 through R34.

3-88. The 500-kHz output from the 500-kHz amplifier is applied to the center of the balanced, resistive, input network. Balancing potentiometer R23 is adjusted to compensate for the tolerance of fixed resistors R21, R22, R24, and R25. Proper

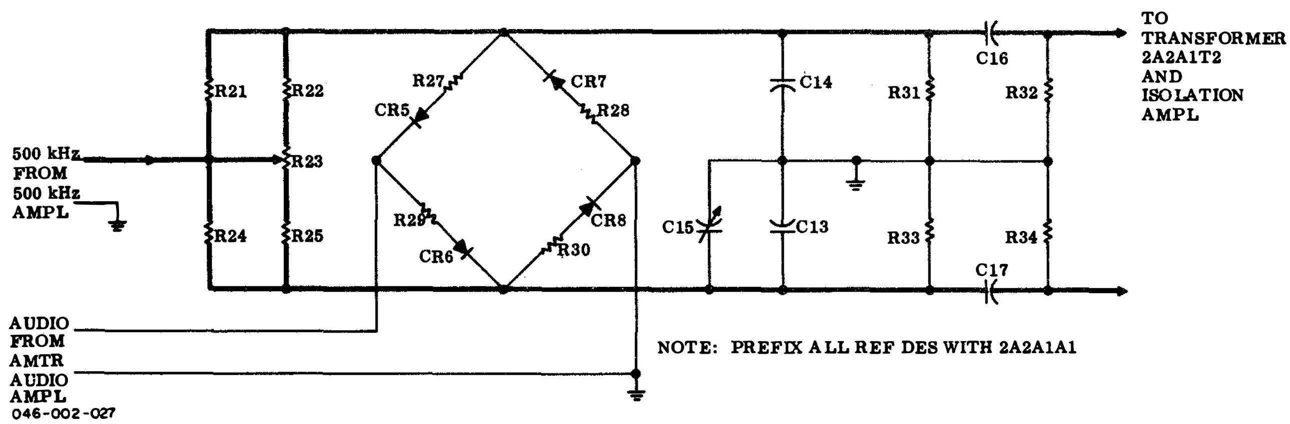


Figure 3-14. T-827B/URT, Balanced Modulator, Simplified Schematic Diagram

adjustment of R23 ensures that the resistance from the center to either side of the resistive input network will be equal (balanced). The output from this network is applied to one side of the diode bridge and the intelligence is applied to the other side. Each arm of the diode bridge has a 100-ohm precision resistor in series with the respective diode. Since the forward resistance of the diode is small, the resistance of each arm will be effectively 100 ohms, thereby balancing the bridge.

3-89. The audio voltage across the bridge varies in frequency and amplitude. When the instantaneous polarity of the audio signal is positive, diode CR6 conducts; when the audio signal goes instantaneously negative, diode CR5 conducts. Therefore, the output from the diode bridge will consist of two sidebands with a suppressed carrier. Resistors R31, R32, R33, and R34 provide resistive balance from the center to either side of the output of the balanced modulator circuit. Balancing potentiometer R23 and tuning capacitor C15 provide resistive and reactive balance in the balanced modulator circuit, ensuring a high degree of carrier suppression.

3-90. Isolation Amplifiers/Filters (Figure 3-15). The output from balanced modulator A2A1A1 is coupled to the base of isolation amplifier A2A1A2Q2 by capacitor C18. Operating voltage for amplifier Q2 is developed from the 20 Vdc applied by the mode selector switch on the front panel (USB, ISB, AM, and FSK positions). Unbypassed emitter resistor R39 provides a small amount of degeneration to improve the stability of the circuit. Isolation amplifier Q2 amplifies the double-sideband output from the balanced modulator. This amplification is required because of the insertion loss of the filter. The output from isolation amplifier Q2 is coupled to the input of filter A2A1FL2.

3-91. Filter A2A1FL2 is a mechanical filter that passes only the upper-sideband portion of the double-sideband output of isolation amplifier A2A1A3Q2. During FSK operation, the square wave used to modulate the 500-kHz carrier is filtered so that only that portion of the if. that is modulated by the fundamental frequency of the square wave passes. Coupling capacitor C21 is selected to provide a 500-kHz series-resonant input circuit for the filter.

3-92. Isolation amplifier A2A1A3Q2 is applied only during the LSB or ISB modes of operation. The 500-kHz output from balanced modulator A2A1A2 is applied to isolation amplifier A2A1A3Q1, which provides the amplification required to drive filter A2A1FL1. Filter A2A1FL1 passes only the lower-sideband portion of the double-sideband output from isolation amplifier A2A1A3Q1. The output from filter

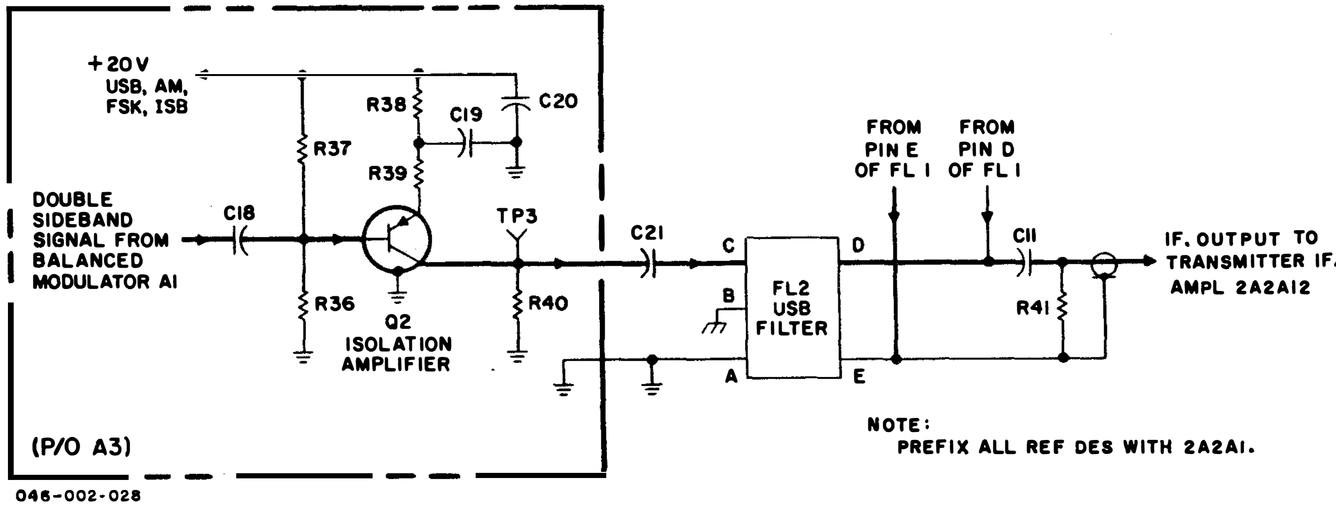


Figure 3-15. T-827B/URT, Isolation Amplifier/Filter, Simplified Schematic Diagram

A2A1FL1 or FL2, or from both filters, is coupled to the if. amplifiers in Transmitter IF. Amplifier Electronic Assembly A2A12 by capacitor A2A1C11. Resistor A2A1R41 provides the necessary resistive termination for the two filters.

3-93. CW Carrier Reinsertion Gate (Figure 3-16). The CW carrier reinsertion gate consists of three gating circuits, A2A1A4CR16, CR17, and CR18. These circuits gate the 500-kHz local carrier to the if. amplifiers for reinsertion during the CW mode of operation. In all modes of operation except CW, gate CR18 is biased on to prevent any leakage from this circuit. Gate CR17 controls the bias on gate CR16 each time the transmitter is keyed during the CW mode of operation.

3-94. The 500-kHz signal is coupled to the anode of gate CR16. A positive 13.3-Vdc anode bias is developed on gate CR16 by voltage divider R85, R87 from the positive 20 Vdc applied when the mode selector switch is set to CW. The cathode of diode CR16 is biased at approximately 17 Vdc until the transmitter is keyed. A ground is then applied through diode CR17 to resistor R89. This reduces the cathode bias instantaneously to 9.9 Vdc as a result of the voltage-divider action of resistors R115, R90, R89, and R88. When a gate is conducting, both biases are approximately the same; the difference is the voltage drop caused by the forward resistance of the diode. Thus, when the transmitter is keyed gate CR16 is forward-biased and conducts, allowing the 500-kHz signal to pass.

3-95. In each mode of operation, except when the transmitter is keyed in the CW mode, the cathode of gate CR16 is biased at approximately 17 Vdc. This is also the anode bias for gate CR18. The cathode of gate CR18 is also biased at approximately 17 Vdc. This bias is developed by voltage dividers R115, R92, and R93 from the 20 Vdc applied from the mode selector switch. Therefore, gate CR18 will be forward-biased and will conduct, effectively shorting gate CR16 to ground capacitor C45. This ensures that any leakage through gate CR16 will be bypassed to ground when the transmitter is not being keyed in the CW mode of operation. When the transmitter is keyed, the cathode bias of gate CR16 drops instantaneously to 9.9 Vdc; consequently, the anode bias of gate CR18 is at the same level. Since the cathode of gate CR18 is still biased at approximately 17 Vdc, gate CR18 is now reverse-biased, removing the effective short from gate CR16.

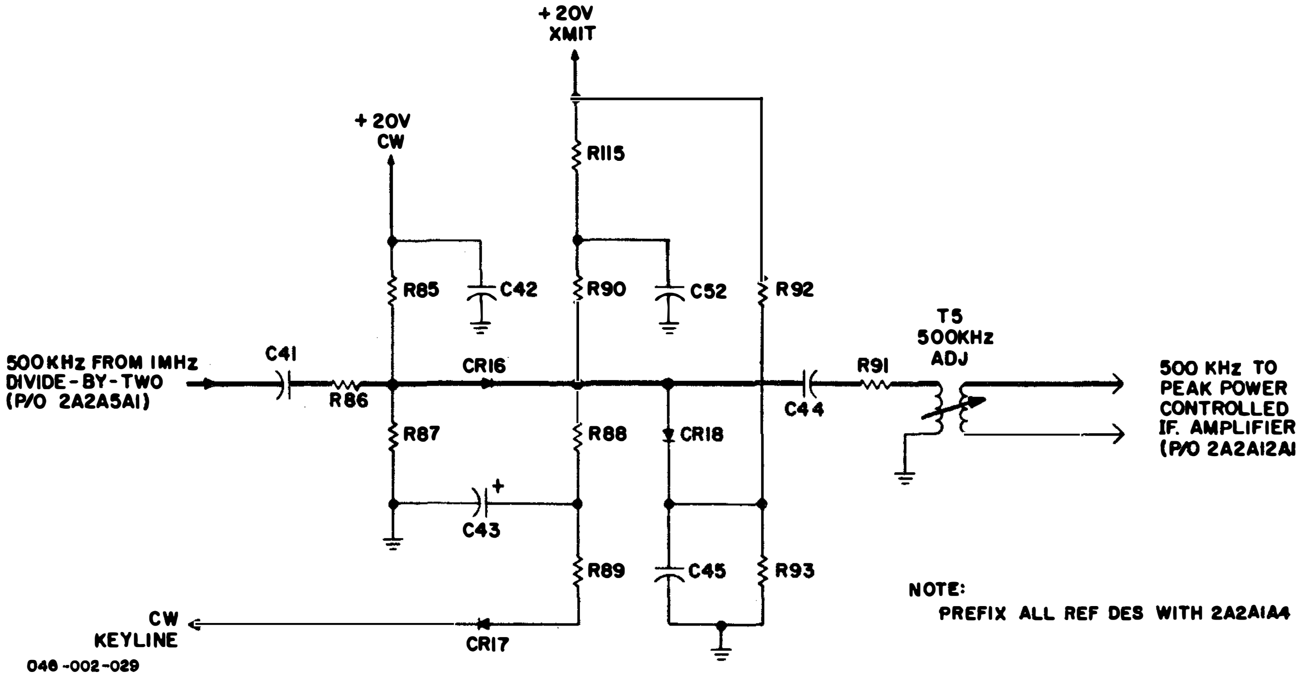


Figure 3-16. T-827B/URT, CW Carrier Reinsertion Gate, Simplified Schematic Diagram

3-96. AM Carrier Reinsertion Gate (Figure 3-17). The AM Carrier reinsertion gate circuit consists of three gating circuits, A2A1A4CR19, CR20, and CR21. These circuits gate the 500-kHz local carrier into the PPC if. amplifier circuit for reinsertion into the if. signal during the AM mode of operation. Gate CR20 is biased on in all modes of operation except AM. This prevents any leakage from this circuit when it is not being used. Gate CR21 provides dc isolation between the two 20-Vdc lines when gate CR20 is biased on.

3-97. The 500-kHz signal from the 1-MHz divide-by-two circuit is applied to potentiometer R101. This potentiometer sets the percentage of modulation of the AM signal. The output from the potentiometer is coupled to voltage divider R95, R96 by capacitor C46. Gate CR19 is forward-biased during AM operation, with an anode bias of 16.7 Vdc and a cathode bias of 13.3 Vdc. These two biases are instantaneous voltages which are developed from the positive 20 Vdc applied from the mode selector switch. When a gate is conducting, both biases are approximately equal. The difference in biases is the voltage drop caused by the forward resistance of the diode. Since gate CR19 is forward-biased, it will conduct, allowing the 500-kHz signal to pass. The 500-kHz signal is coupled to the PPC if. amplifiers for reinsertion into the if. signal.

3-98. In each mode of operation, the cathode of gate CR19 is biased at 13.3 Vdc. This bias also serves as the anode bias for gate CR20. Since gate CR21 is forward-biased only in AM operation, the anode will be open during the other modes of operation. Therefore, the cathode of gate CR20 is at zero voltage. As a result, gate CR20 will be forward-biased and will conduct, effectively shorting gate CR19 to ground through capacitor C49. This ensures that any leakage through gate CR19 will be bypassed to ground whenever the transmitter is not being operated in the AM mode. When the transmitter is placed in the AM mode of operation, the anode of gate CR21 is biased at 20 Vdc applied from the mode selector switch. Since there is no voltage on the cathode, gate CR21 is forward-biased and

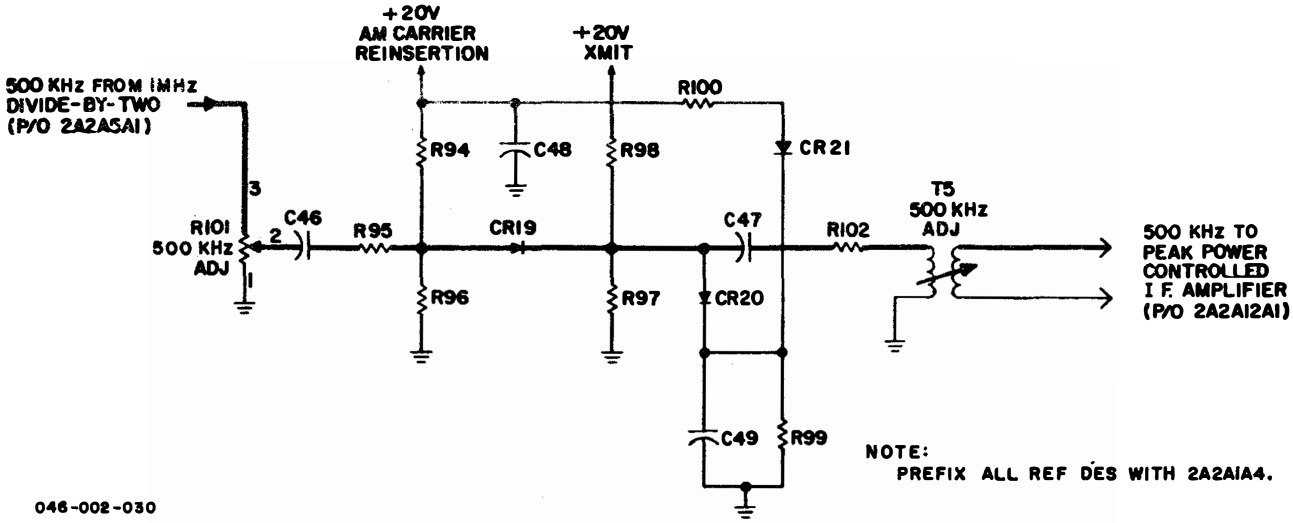


Figure 3-17. T-827B/URT, AM Carrier Reinsertion Gate, Simplified Schematic Diagram

thus conducts. When gate CR21 conducts, the cathode of gate CR20 is biased at 16.5 Vdc. This bias is developed by voltage divider R99, R100 from the positive 20 Vdc applied from the mode selector switch. Since the anode of gate CR20 is biased at 13.3 Vdc, CR20 will be reverse-biased and prevent the 500-kHz signal from being shunted to ground.

3-99. SSB Carrier Reinsertion Level Control (Figure 3-18). The carrier reinsertion level control consists of a gating circuit using A2A1A4CR100 and a variable attenuator circuit using CARRIER REINSERTION switch A2A1S1. These circuits provide a pilot carrier for reinsertion into the if. signal, to enable other radio sets with less stability than the AN/WRC-1B to receive transmissions from the T-827B/URT. This carrier is used in these radio receivers for frequency-locking and demodulating. For normal use of the T-827B/URT, the carrier is fully suppressed. These circuits provide a pilot carrier when required, for the LSB, ISB, or USB modes of operation.

3-100. The 500-kHz signal is coupled from potentiometer A2A1A4R101 to voltage divider R110, R112 by capacitor C50. Potentiometer R101 is set so that the carrier is the same magnitude as the sideband when CARRIER REINSERTION switch A2A1S1 is placed in the zero-suppression position. The voltage divider limits the level of the 500-kHz signal that is applied to the anode of gate A2A1A4CR100. During the USB, ISB, or LSB modes of operation, gate CR100 is forward-biased by the positive 16.7-Vdc anode bias and the positive 13.3-Vdc cathode bias. The two biases are instantaneous voltages, which are developed by voltage dividiers R110, R111 and R108, R109 for the positive 20 Vdc applied through contacts 11 and 10, 9, or 8 of switch A2A1S1. When gate A2A1A4CR100 is conducting, both biases are approximately equal. The difference in biases is the voltage drop caused by the forward resistance of the diode. Since gate CR100 is forward-biased, it will conduct, allowing the 500-kHz signal to pass.

3-101. The output from gate CR100 is coupled to one of three attenuator circuits by capacitor C51. The attenuator circuit used depends upon the position of CARRIER REINSERTION switch A2A1S1. When this switch is set at the 0 DB SUPPR, 10 DB SUPPR, or 20 DB SUPPR position, the 500-kHz signal is applied through the respective attenuator network and switch contacts 2, 3, or 4 and 5. Transformer A2A1A4T5 couples the 500-kHz signal to the PPC if. amplifier for reinsertion into the if. signal.

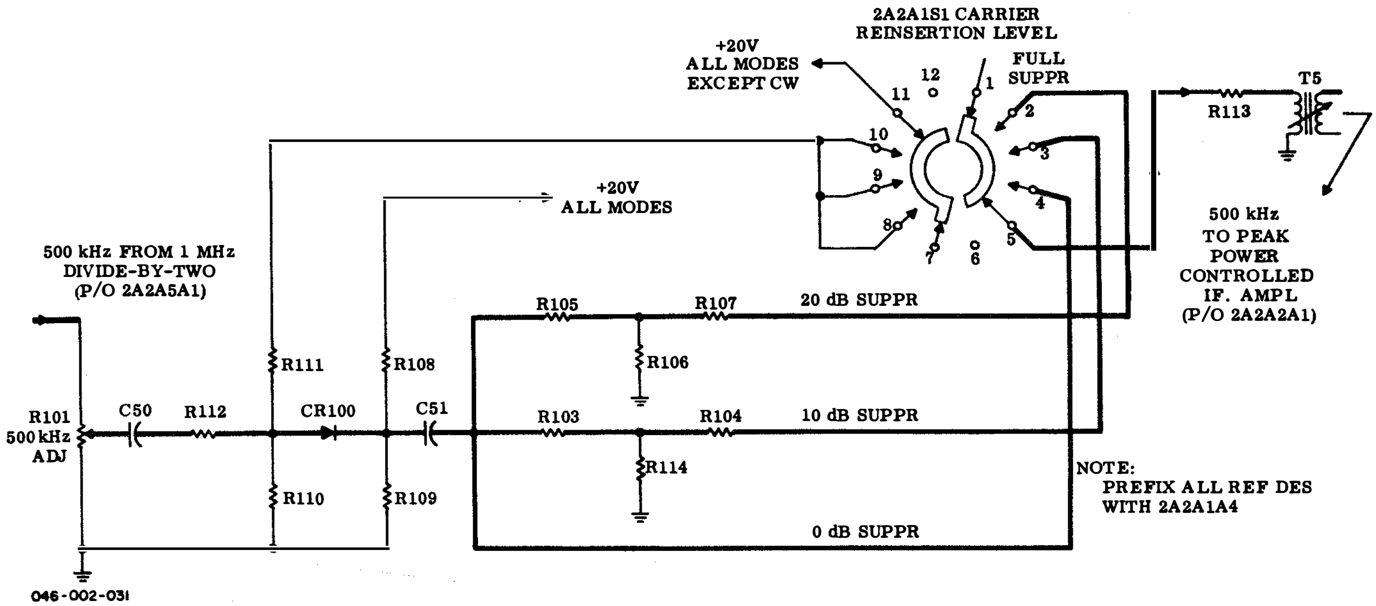


Figure 3-18. T-827B/URT, SSB Carrier Reinsertion Level Control, Simplified Schematic Diagram

3-102. Audio Sidetone Gate (Figure 3-19). Audio sidetone gate A2A1A4CR14 gets the audio intelligence to the receiver, enabling the operator to monitor the transmissions. Gate CR14 is used during the USB, AM, and FSK modes of operation.

3-103. Audio applied to balanced modulator A2A1A1, from Transmitter Audio Amplifier Electronic Assembly A2A2, is coupled to the anode of gate A2A1A4CR14. This gate will be forward-biased in the USB, AM, FSK, or ISB modes of operation by the positive 16.7 Vdc on the anode and the positive 10 Vdc on the cathode. The two biases are instantaneous voltages which are developed from the positive 20 Vdc applied by the mode selector switch. When gate CR14 is conducting, both biases are approximately equal. The difference in biases is the voltage drop caused by the forward resistance of the diode. The gate is forward-biased and will conduct, allowing the audio to pass. This audio is applied to the receiver, where it is amplified by the audio amplifier and applied to the headset and the USB 600-ohm audio output line. This tone allows the operator to monitor the audio intelligence being transmitted.

3-104. Sidetone gate CR15 is identical to sidetone gate CR14 (figure 5-14). This gate is biased on during the LSB and ISB modes of operation. The audio to be gated by CR15 is applied from balanced modulator A2A1A2. The output to the receiver is amplified and applied to the headset and the LSB 600-ohm audio output line for monitoring.

3-105. CW Sidetone Oscillator/Gate (Figure 3-20). The CW sidetone oscillator/gate consists of phase-shift oscillator A2A1A4Q8 and gating diode CR13. These circuits produce an audio tone that is applied to the associated receiver, enabling the operator to monitor the keying in the CW mode of operation.

3-106. Since the signal between base and collector is reversed 180 degrees in phase in a common emitter phase-shift oscillator, an additional 180-degree phase shift is necessary to keep the feedback signal (from output to input) positive. The phase shift occurs in an RC network consisting of three sections, each contributing a 60-degree phase shift at the frequency of oscillation. In figure 3-20, the three RC

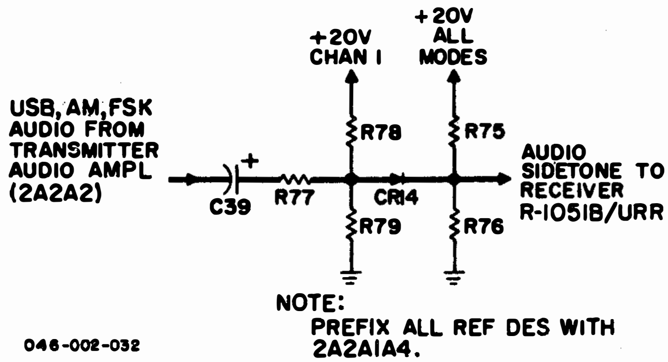


Figure 3-19. T-827B/URT, Sidetone Gate, Simplified Schematic Diagram

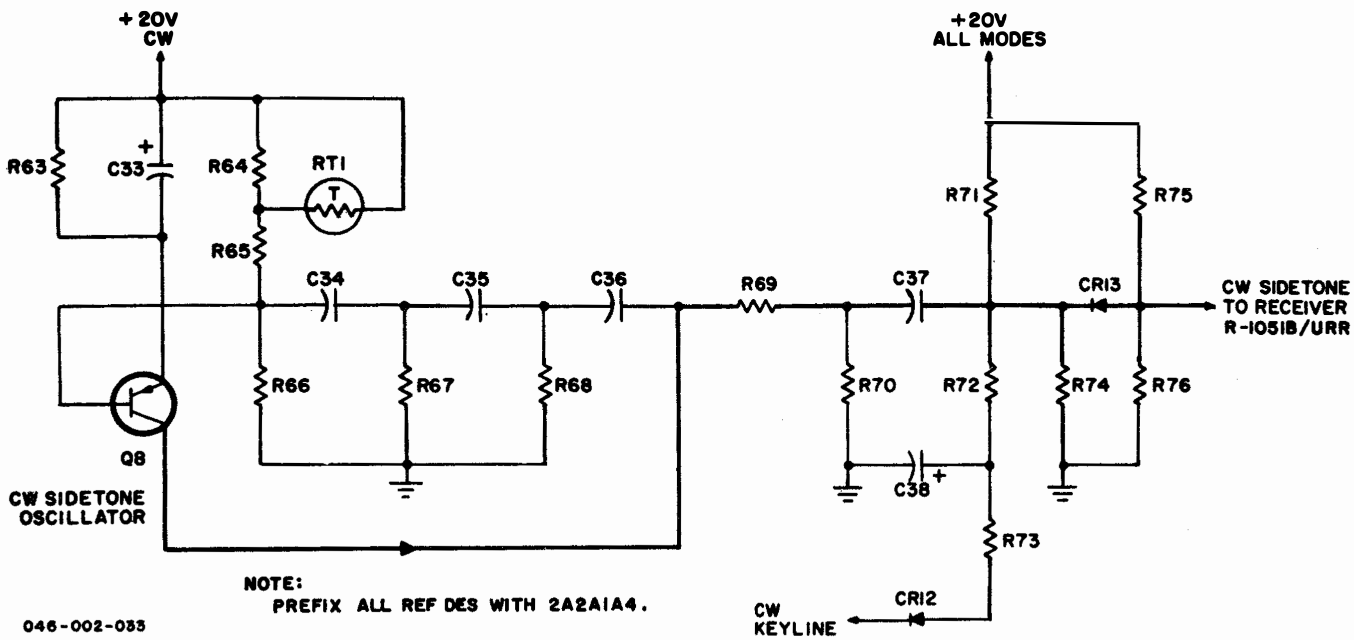


Figure 3-20. T-827B/URT, CW Sidetone Oscillator/Gate, Simplified Schematic Diagram

sections are R68 and C36, R67 and C35, and R66 and C34. When operating in the CW mode, operating voltage for this circuit is developed from the 20 Vdc applied from the mode selector switch. Thermistor RT1 stabilizes the circuit for any ambient temperature changes. Voltage divider R69, R70 determines the level of the audio tone (approximately 1 kHz) produced by phase-shift oscillator Q8 and coupled to the cathode of gate CR13.

3-107. When the transmitter is not keyed for CW operation, gate CR13 is reverse-biased. Each time the CW key is depressed, ground is applied through diode CR12 to resistor R73. This causes the cathode bias to drop to 8.3 Vdc. This instantaneous bias voltage is developed by the new voltage divider, consisting of R71 and the parallel combination of R72, R73, and R74. Since the anode of the diode is still biased at 10 Vdc, gate CR12 becomes forward-biased. The audio tone is applied to the receiver, where it is amplified and applied to the headset and the USB 600-ohm audio output line.

3-108. TRANSMITTER IF. AMPLIFIER ELECTRONIC ASSEMBLY A2A12 (Figure 5-27). Transmitter IF. Amplifier Electronic Assembly A2A12 amplifies the modulated 500-kHz signal from Transmitter Mode Selector Electronic Assembly A2A1 to a level suitable for translation to the modulated carrier frequency. Two controlled stages are employed.

3-109. Peak-Power-Controlled (PPC) IF. Amplifier (Figure 3-21). The PPC if. amplifier consists of emitter follower A2A12A1Q1 and if. amplifier Q2. These circuits prevent the peak power of the if. amplifier from exceeding a predetermined level, and thereby limit the peak power of the AM-3007/URT.

3-110. The if. signal from the isolation amplifier/filter circuit in the mode selector is coupled through capacitor C1 to the base of if. amplifier Q2. The base for if. amplifier Q2 is provided by 20 Vdc applied to voltage divider R2, R10, and R12. Since resistor R12 is also in the emitter circuit of emitter follower Q1, any increase in the emitter current of Q1 increases the voltage across resistor R12. This increases the base voltage on Q2, which decreases the forward bias from emitter to base of Q2, thereby decreasing the gain of the stage. Emitter current in emitter follower Q1 will flow when approximately 5 Vdc is received at the PPC input. This voltage is supplied by the PPC circuit in the associated rf power amplifier. The PPC voltage is applied to the base of Q1, forward-biasing the transistor and causing emitter current to charge capacitor C3. This action raises the voltage level on the base of if. amplifier Q2, decreasing its forward bias and the gain of the stage. The output from Q2 is developed across a 500-kHz tuned circuit consisting of the primary of transformer T1 and capacitor C5.

3-111. When the T-827B/URT is operating in the compatible AM or CW mode, a 500-kHz carrier signal from the carrier-reinsertion circuits in the mode selector is reinserted into the if. signal at the collector of if. amplifier Q2. The pilot carrier, when used, is also applied to the collector of if. amplifier Q2 for reinsertion.

3-112. Average-Power-Controlled (APC) IF. Amplifier (Figure 3-22). This circuit consists of emitter follower A2A12A1Q4 and if. amplifier Q3. These circuits control the amplitude of the 500-kHz if. signal in accordance with the average power of the output signal of the AM-3007/URT.

3-113. The if. signal from PPC if. amplifier Q2 is applied to the base of if. amplifier Q3 through transformer T1. The base bias for Q3 is provided by 20 Vdc applied to voltage divider R6, R15, R13, and R17. The bias may be manually adjusted with potentiometer R15. The emitter current in emitter follower Q4 will flow when approximately +5 Vdc is received at the APC input. This voltage is supplied by the APC circuit in the associated rf power amplifier. The APC voltage is applied to the base of Q4, forward-biasing the transistor and causing emitter current to flow through resistor R14.

3-114. The APC input signal will not affect if. amplifier Q3 until the magnitude of the

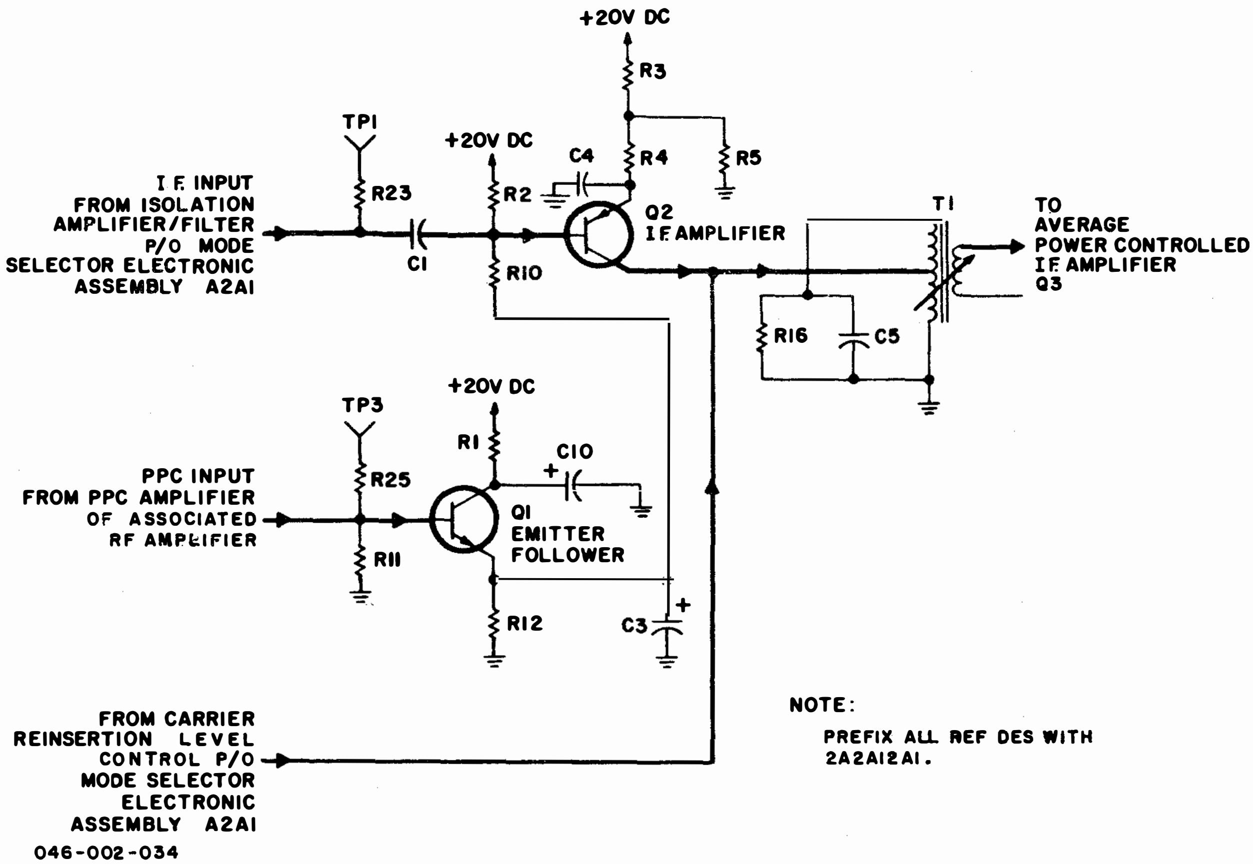


Figure 3-21. T-827B/URT, Peak-Power-Controlled IF. Amplifier, Simplified Schematic Diagram

signal becomes sufficient to produce enough emitter current so that the voltage across resistor R14 will exceed the voltage across resistor R17. This condition will forward-bias diode CR1, causing the voltage across R17 to rise to nearly the same level as the voltage across R14. Raising the voltage across R17 causes the base-bias voltage on if. amplifier Q3 to rise, thereby reducing the base-to-emitter forward bias, resulting in a decrease in gain for the stage. The output from if. amplifier Q3 is developed across the 500-kHz tuned circuit consisting of the primary of transformer T2 and capacitor C8.

3-115. RF TRANSLATOR ELECTRONIC SUBASSEMBLY A2A6A6 (Figure 3-23). RF Translator Electronic Subassembly A2A6A6 is a subassembly of Translator/Synthesizer Electronic Assembly A2A6. The rf translator accepts the modulated 500-kHz signal from the Transmitter IF. Amplifier Electronic Assembly A2A12, and converts it to one of the 280,000 rf channels selected by the T-827B/URT tuning knobs. Low-, mid-, and high-frequency mixers are used to convert the modulated 500-kHz signal input to the desired rf output channel.

3-116. Low-frequency mixer A2A6A6A3 mixes the modulated 500-kHz if. signal from the if. amplifier with the 1- and 10-kHz injection signal from 1 and 10 KC synthesizer A2A6A3, to produce a second if. between 2.8 and 2.9 MHz. This band of frequencies is obtained by subtractive mixing of the 500-kHz signal and an injection frequency between 3.301 and 3.400 MHz as selected by the 1 and 10 KC controls on the front panel.

3-117. Assuming a dial frequency of 16.3713 MHz, then the 1 KC control is set to 1 and the 10 KC control is set to 7. The chart in figure 3-3 shows the 1- and 10-kHz injection to be 3.329 MHz (5.180 MHz - 1.851 MHz). The 3.329-MHz injection

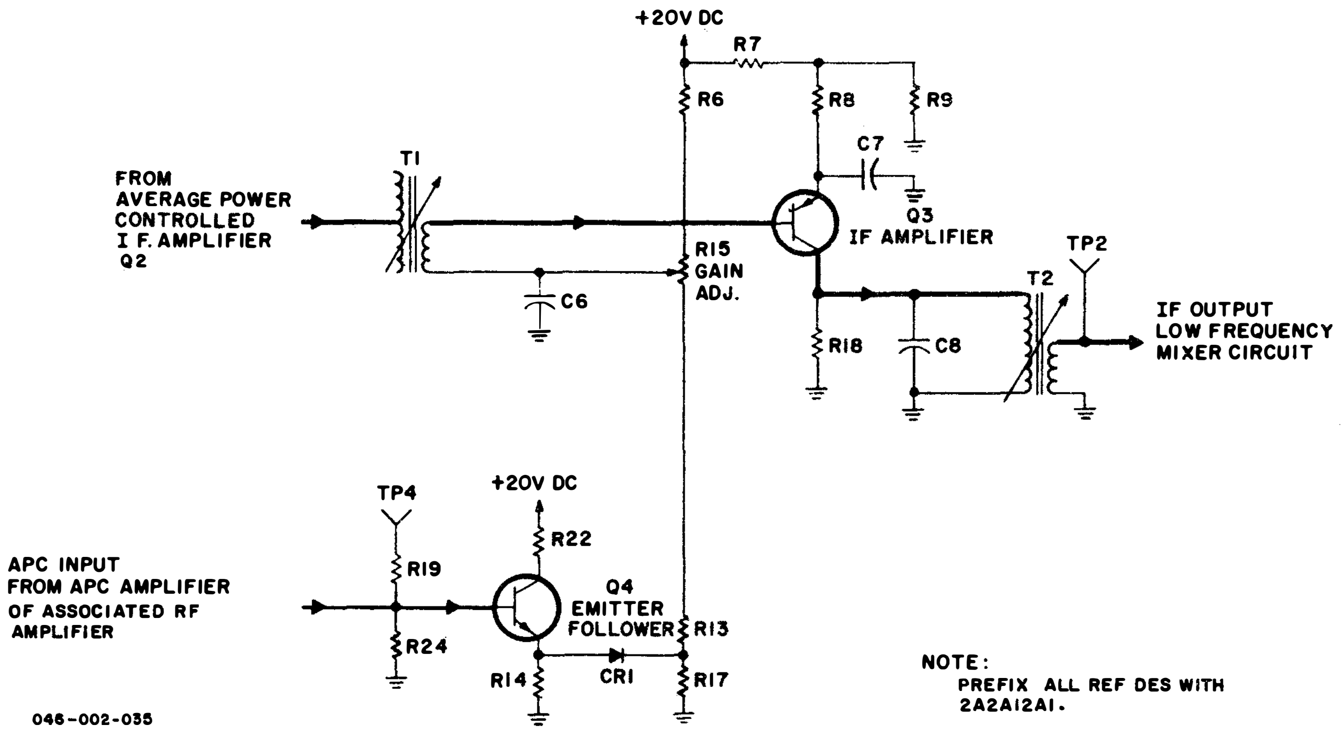


Figure 3-22. T-827B/URT, Average-Power-Controlled IF. Amplifier, Simplified Schematic Diagram

is subtractively mixed with the 500-kHz signal to produce a second if. of 2.829 MHz. This output from mixer A2A6A6A3 is then filtered by 2.8- to 2.9-MHz filter FL3. Filter FL3 has a bandwidth of 100 kHz from 2.8 to 2.9 MHz. This filter will reject all the products from the low-frequency mixer except the desired difference frequency. The 2.8- to 2.9-MHz difference products are coupled to the mid-frequency mixer.

3-118. Mid-frequency mixer A2A6A6A2 mixes the signal from the low-frequency mixer with the injection from 100 KC synthesizer A2A6A2. This injection frequency is dependent upon the settings of the 100 KC control and the CPS switch on the front panel. The output range of the 100 KC synthesizer is in two bands, 22.4 to 23.3 MHz (lo band) and 32.4 to 33.3 MHz (hi band). The hi- or lo-band injection determined by the setting of the MCS control on the front panel.

3-119. The dial frequency selected in paragraph 3-117 was 16.3713 MHz. Figure 3-3 shows 16 MHz to be a lo-band frequency selection of the MCS controls. The lo-band injection for a 100 KC control setting of 3 and a CPS switch setting of 3 is 22.7003 MHz. This 22.7003-MHz injection is subtractively mixed with the 2.829 MHz from the low-frequency mixer to produce an output of 19.8713 MHz from the mid-frequency mixer. This 19.8713 MHz second if. signal is routed through lo-band filter FL1 to high-frequency mixer A2A6A6A1.

3-120. The output circuit of the mid-frequency mixer is either lo-band filter FL1 or hi-band filter FL2. FL1 or FL2 is selected by the setting of the MCS controls on the front panel. The MCS controls cause hi-/lo-filter relay A2K2 to be energized or deenergized by selecting the appropriate code through code generator A2A7. When relay A2K2 is energized, a ground is applied to the hi-/lo-control line to select hi-band filter FL2. When relay A2K2 is deenergized, +20 Vdc is applied to the hi-/lo-control line which selects lo-band filter FL1. The bandwidth of FL1 is 19.5 to 20.5 MHz. FL2 has a bandwidth of 29.5 to 30.5 MHz. The 1-MHz bandwidth of FL1 and FL2 rejects all mixing products from the mid-frequency mixer except the desired difference frequency.

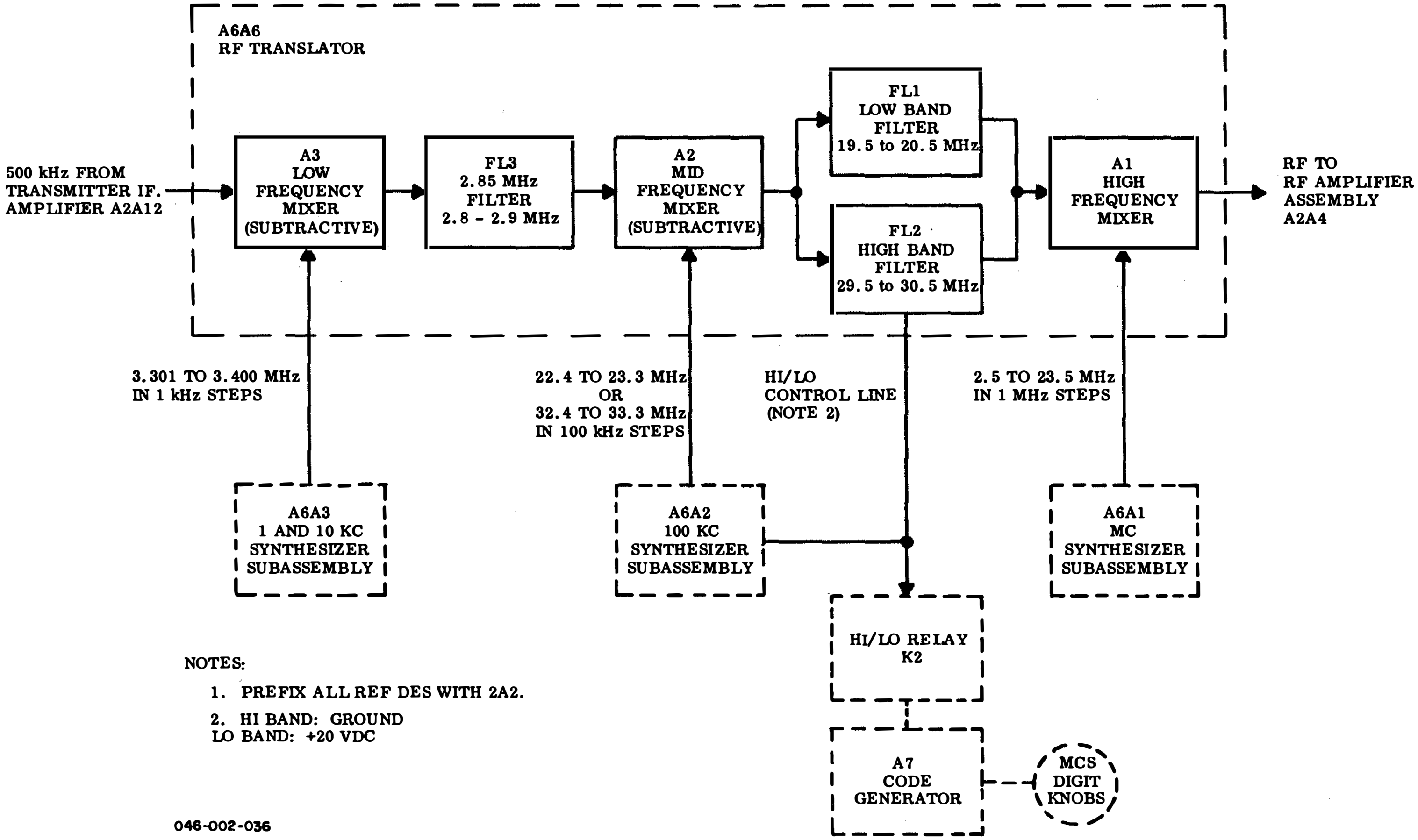


Figure 3-23. T-827B/URT, RF Translator, Simplified Block Diagram

3-121. High-frequency mixer A2A6A6A1 mixes the signal from the hi-band or lo-band filter with an injection signal from MC synthesizer A2A6A1. The example frequency is 19.8713 MHz. A setting of 16 on the MCS controls on the T-827B/URT generates an injection frequency of 3.5 MHz (figure 3-3). This 3.5-MHz injection frequency is subtractively mixed with the 19.8713-MHz signal from the mid-frequency mixer via the lo-band filter. The resulting output is the carrier channel - the 16.3713-MHz setting of the controls and the CPS switch on the front panel.

3-122. RF AMPLIFIER ELECTRONIC ASSEMBLY A2A4 (Figure 3-24). RF Amplifier Electronic Assembly A2A4 receives the output of the rf translator, containing the rf output channel and the intelligence to be transmitted. One transistorized circuit and two vacuum-tube circuits are used to amplify this signal to a level suitable to drive a high-power linear amplifier such as the AM-3007/URT. All circuits in the rf amplifier are digitally tuned by the MCS, 100 KC, and 10 KC controls on the front panel on the T-827B/URT. The three basic circuits used are:

a. Mixer/amplifier subassembly A2A4A38.

b. Rf amplifier A2A4V1..

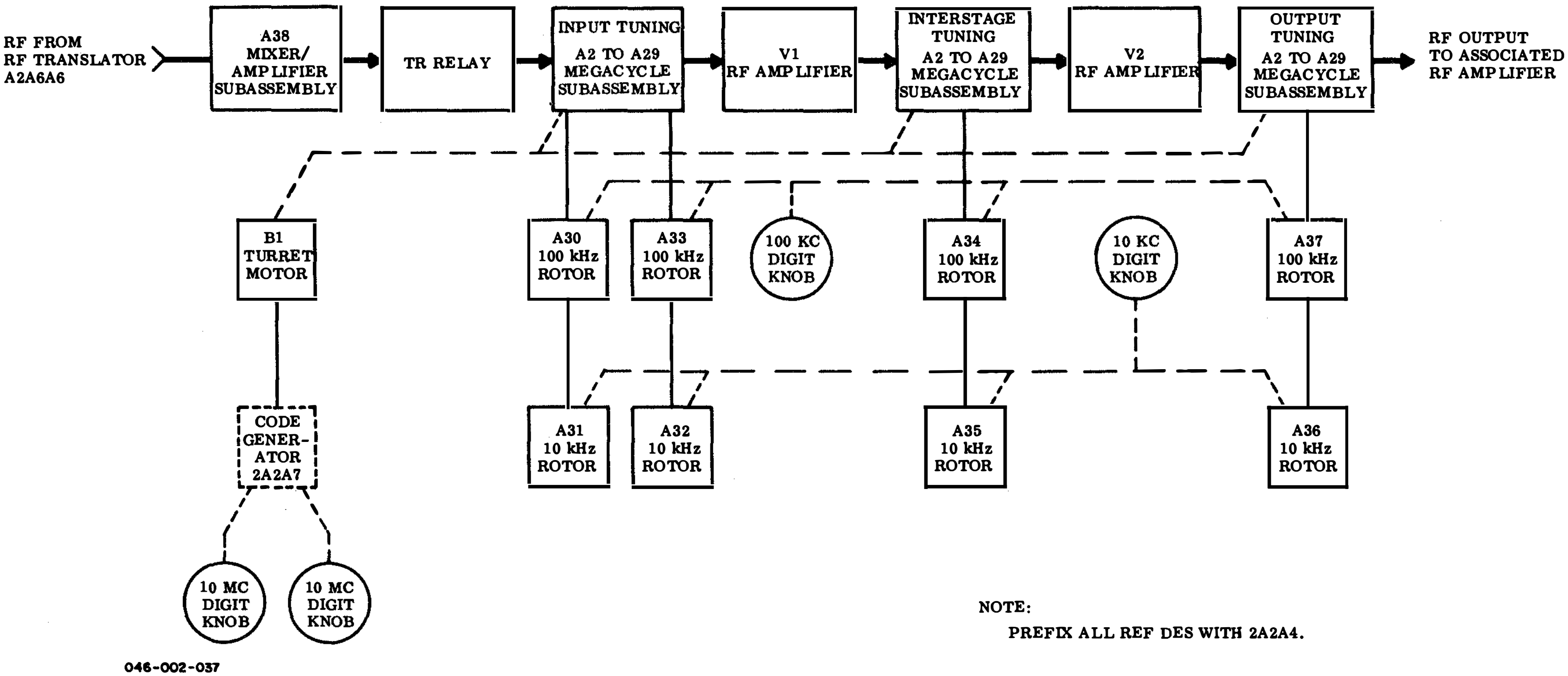
c. Rf amplifier A2A4V2.

3-123. Mixer/Amplifier A2A4A38 (Figure 3-25). This subassembly amplifies the rf signal from the high-frequency mixer in the rf translator for application to rf amplifier A2A4V1. The input signal from the high-frequency mixer enters the mixer/amplifier at A5 of A2A4P2 and is coupled to the base of A2A4A38Q1. Q1 is designed to perform as a dual-function stage. To maintain interchangeability, Q1 may be used as a mixer stage. It functions as an amplifier in the T-827B/URT. Potentiometer R6 in the collector circuit of Q1 is adjusted to compensate for gain variations in the T-827B/URT. Transistors Q2 and Q3 are cascade-amplifier stages. The mixer/amplifier is enabled (keyed) by transmit/receive relay A2K3 on the main frame of the T-827B/URT, and by transmit/receive relay A2A4A38K1.

3-124. RF Amplifier A2A4V1 (Figure 3-26). This digitally tuned circuit amplifies the input from the mixer/amplifier for application to rf amplifier V2. The signal from the mixer/amplifier is applied through contacts 2 and 5 of relay A38K1 to the MC subassembly and then to the grid of V1. The positive 110-Vdc plate and screen voltage for V1 is applied through decoupling resistor A1R4 from Power Supply Assembly A2A8. The cathode bias for V1 is developed across A2A4R2 and A2A4A1R3.

3-125. When the T-827B/URT is keyed, a momentary -30-Vdc bias from the high-power rf amplifier (AM-3007/URT) keeps V1 cut off to prevent large bursts of excitation from the T-827B/URT at the instant of turnon. This controlled build-up of excitation matches the response time of the system power controlling apc feedback loop. The momentary -30-Vdc bias network consists of A2A8R13 and A2A8C7 in the power supply assembly. When transmit/receive relay A2K3 is energized (keyed), the negative lead of capacitor A2A8C7 is connected through A2A8R13 and contacts 13 and 5 of the relay to the -30-Vdc supply in the AM-3007/URT. At this instant, A2A8C7 acts a short circuit (due to no charge being present) and permits the -30-Vdc bias to be applied to the grid of V1. As the charge on A2A8C7 builds up through A2A8R12 and A2A8R13, the dc voltage on the grid of V1 will approach zero, and permit the stage to function.

3-126. The input and output circuits of A2A4V1 are digitally tuned from the front panel of the T-827B/URT. Megacycle subassemblies A2A4A2 through A2A4A29 are automatically switched into the circuit for each setting of the MCS controls (2 through 29 MHz). The tuning transformers for the MCS controls are physically located 120 degrees apart on the rf turret assembly for a given MCS dial setting to prevent undesirable interaction. See the chart on the cover of the A2A4 assembly for the location of each transformer. Chart C in figure 5-16 shows the capacitance values used for



NOTE:
PREFIX ALL REF DES WITH 2A2A4.

Figure 3-24. T-827B/URT, RF Amplifier, Simplified Block Diagram

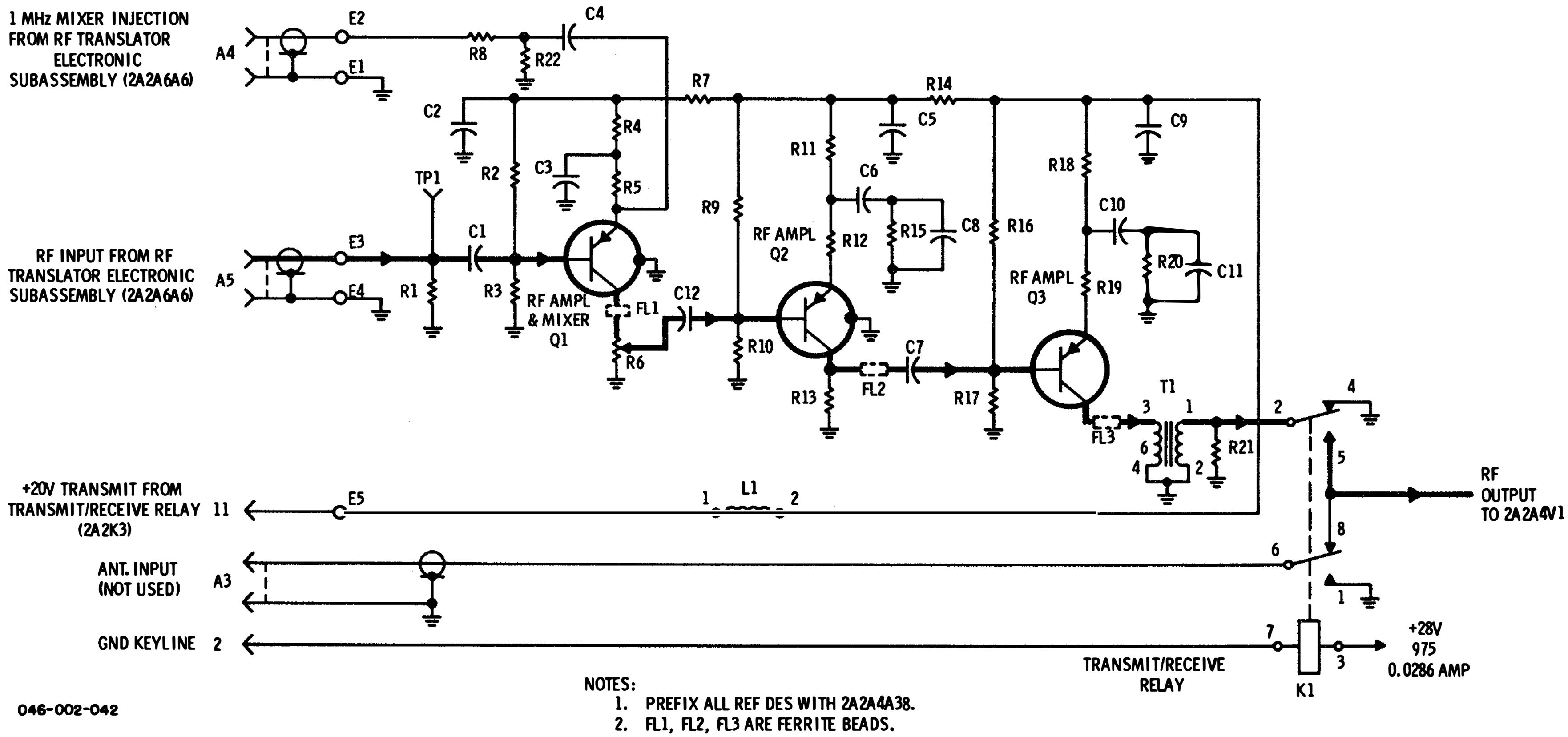


Figure 3-25. T-827B/URT, Mixer/Amplifier, Simplified Schematic Diagram

the transformer circuits at each setting of the MCS controls.

3-127. The tuning capacitors in 100-kHz rotor subassemblies A30, A33, and A34 are selected by the setting of the front-panel 100 KCS control. The tuning capacitors for the 10-kHz rotor subassemblies A31, A32, and A35 are selected by the setting of the front-panel 10 KCS control. Charts A and B in figure 5-16 show the capacitance values for each setting of the 100 KCS and the 10 KCS controls.

3-128. RF Amplifier A2A4V2 (Figure 3-27). This circuit amplifies the signal from A2A4V1 to a level of 100 to 25 mV, suitable for driving a high-power rf amplifier such as the AM-3007/URT. Screen and plate voltages for V2 are applied through decoupling resistor A1R6. Cathode bias is developed across A1R5. The momentary -30-Vdc bias is applied to the grid of V2 through R3 and R4. Refer to paragraph 3-125 for the operation of this circuit.

3-129. The output of V2 is digitally tuned from the front panel of the T-827B/URT. Megacycle subassemblies A2A4A2 through A2A4A29 are automatically switched into the circuit for each setting of the MCS controls on the front panel (2 to 29 MHz). See the chart on the cover of the A2A4 assembly for the location of each megacycle subassembly. Chart C in figure 5-16 shows the capacitance values for each MC subassembly.

3-130. The tuning capacitors in 100-kHz rotor subassembly A37 are selected by the setting of the 100 KCS control on the front panel. The capacitors in 10-kHz rotor subassembly A36 are selected by the 10 KCS control. Charts A and B in figure 5-16 show the capacitance values for each setting of the 100 and 10 KCS controls on the front panel of the T-827B/URT.

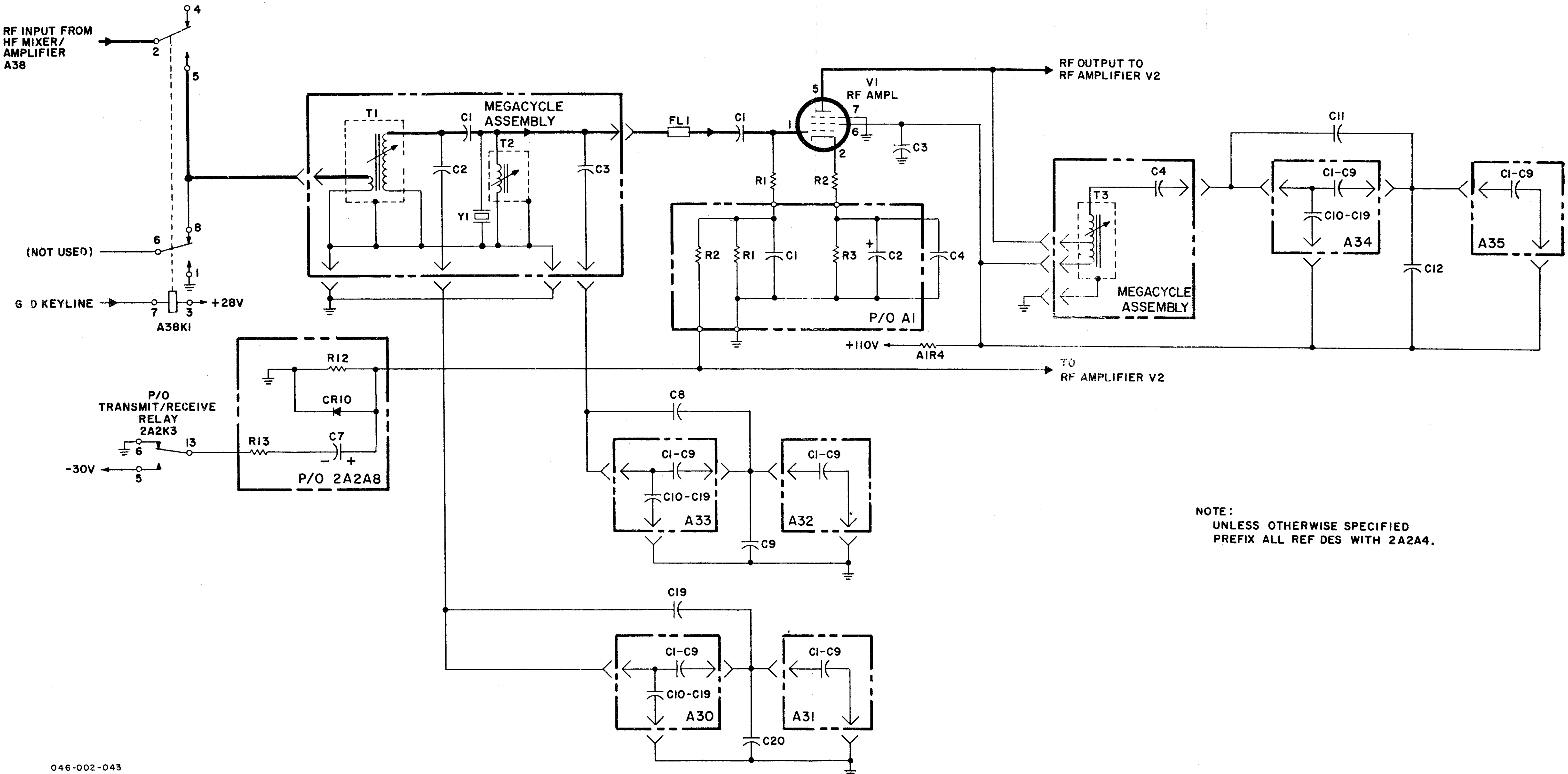
3-131. <u>RADIO TRANSMITTER T-827B/URT, AUDIO SIGNAL FLOW CIRCUIT DESCRIPTION</u> (See Figure 3-5.)

3-132. GENERAL. The purpose of the audio signal flow section is to accept the intelligence to be transmitted and route it to Transmitter Mode Selector Electronic Assembly A2A1 to modulate the 500-kHz local carrier. The audio signal flow section consists of Handset Filter Box Electronic Assembly A2A14, Transmitter Audio Amplifier Electronic Assemblies A2A2 and A2A3, Meter Amplifier Electronic Assemblies A2A10 and A2A11, FSK Tone Generator Electronic Assembly A2A9, and associated switching circuits.

3-133. HANDSET FILTER BOX ELECTRONIC ASSEMBLY A2A14 (Figure 5-13). The local microphone audio input to the audio amplifier A2A2 is through Handset Filter Box Electronic Assembly A2A14. The handset filter box consists of a capacitor input filter A2A14C1 and C2, which makes up a low-pass filter for the audio input. Another section of the handset filter box contains the decoupling networks C3 and C4 for the +12 Vdc which is applied via connector A2J1. Zener diode A2CR8 develops the +12 Vdc for the handset during voice modes of operation.

3-134. TRANSMITTER AUDIO AMPLIFIER ELECTRONIC ASSEMBLIES A2A2 AND A2A3 (Figure 3-28). Audio amplifier assemblies A2A2 and A2A3 are used to amplify the intelligence applied to the T-827B/URT in all modes except CW. The two audio amplifiers are physically identical; however, their functional applications are different. The USB audio amplifier A2A2 is used in the USB, AM, FSK, and ISB modes, while the LSB audio amplifier A2A3 is used in the LSB and ISB modes. Neither is used in the CW mode. In this discussion, all reference designations are understood to be prefixed by either A2A2 or A2A3.

3-135. Each of the audio amplifiers consists of two audio-amplification circuits, Q1 and Q4; two emitter-follower circuits, Q3 and Q5; and a speech-compression circuit, T2, Q2, CR1, RV1, and RV2. These circuits provide a constant audio level output suitable for use in the balanced modulators. The speech-compression circuit reduces the peak-to-average ratio of voice signals to maintain a constant average percentage of modulation above 60 percent. The emitter followers are used for isolation and impedance matching.



NOTE:
UNLESS OTHERWISE SPECIFIED PREFIX ALL REF DES WITH 2A2A4.

Figure 3-26. T-827B/URT, RF Amplifier V1, Simplified Schematic Diagram

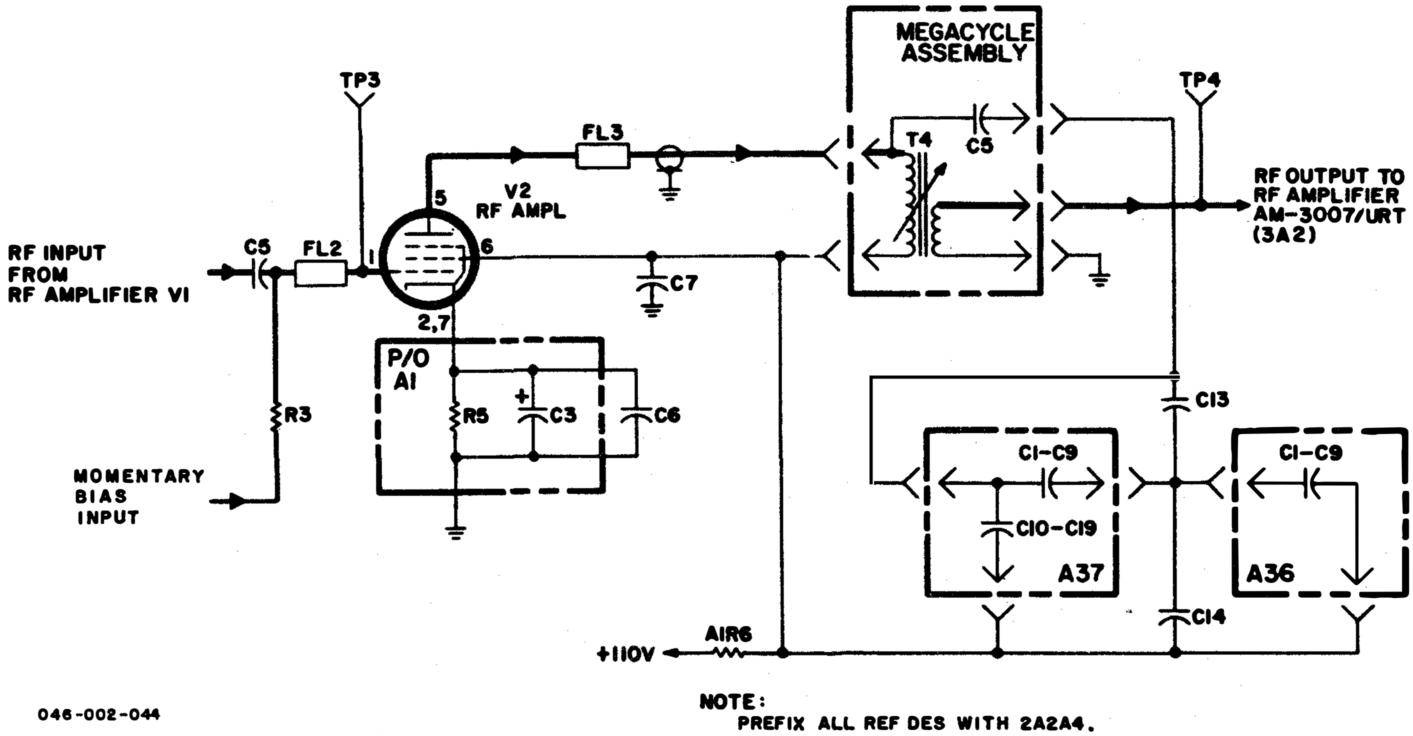


Figure 3-27. T-827B/URT, RF Amplifier V2, Simplified Schematic Diagram

3-136. The remote audio signals are applied to transformer T1, which has a balanced (grounded center tap) or an unbalanced (open center tap) 600-ohm input. Audio signals from the local handset are applied to the secondary of transformer T1, which has an unbalanced input. Level adjust potentiometer R11 establishes the level of the audio signal applied to audio amplifier Q1. The audio is also coupled to the USB or LSB LINE LEVEL meter switch for application to the corresponding meter-amplifier circuit. The parallel-series combination of resistors R1, R11, and R12 provides an approximate 600-ohm termination for transformer T1. Resistor R15 in Power Supply Electronic Assembly A2A8 limits the current through the microphone.

3-137. Automatic gain control (agc) amplifier Q2 is basically a compression circuit which uses varistors RV1 and RV2 to furnish voltage regulation. Two varistors are used in this circuit to control the audio level delivered to the balanced modulators. The varistor is a semiconductor device which acts as a voltage-sensitive resistor. As the applied voltage increases, the current through the varistor no longer obeys Ohm's law. For example, the current may increase four times when the voltage is doubled. This indicates the resistance of the device is changing with the applied voltage. As the voltage is increased, the resistance of the varistor decreases; and as the voltage decreases, the resistance increases. This action suggests the use of the varistor as a limiting device. As the input voltage increases, the varistor load resistance decreases and thereby decreases the load voltage. The great advantage to be gained from the use of varistors as an audio agc device is that the distortion, under all conditions, is less than 1 percent.

3-138. The circuit in the audio amplifiers is such that the rise time of the dc voltage is less than 1 ms, while the decay time is approximately 800 ms. In this way the peak-to-average speech power is preserved so that negligible audio distortion is introduced into the T-827B/URT.

3-139. The audio voltage is detected by agc amplifier Q2, and the resultant dc voltage is developed across resistor R16 and varistors RV1 and RV2. Diode CR1 protects Q2 against excessive reverse bias. The resistance of RV1 and RV2 will decrease with increasing voltage and will increase with decreasing voltage. The varistors are in series with the rectified dc voltage, but are effectively in parallel across the audio signal path. The varistors form a voltage divider, or pad. Since the resistance of R15 remains constant, the audio voltage at the junction of the pad must decrease with an increase in audio voltage; the converse is also true. This constitutes the voltage-regulation feature of the agc amplifier circuit.

3-140. METER AMPLIFIER ELECTRONIC ASSEMBLIES A2A10 and A2A11 (Figure 3-29). Meter amplifiers A2A10 (LSB) and A2A11 (USB) are physically identical. Their purpose is to drive LSB LINE LEVEL meter A2M1 and USB LINE LEVEL meter A2M2, respectively. The purpose of these meters is to monitor the audio signal input levels to the LSB and USB audio amplifiers A2A3 and A2A2, respectively. Figure 3-29 is a simplified schematic diagram of the USB line level meter circuit, which is identical to the LSB line level meter circuit.

3-141. The basic meter movement of A2M2 requires 775 mV (1 mW at 600 ohms) across its terminals to indicate 0 dB. Meter amplifier A2A11 has a voltage gain of 10 dB. Therefore, when USB LINE LEVEL switch A2S11 is in the -10DB position, an input of 240 mV is required to cause 0-dB deflection on meter A2M2 (240 mV is 10 dB below 775 mV). The audio input level required for the proper operation of the T-827B/URT is 150 mV. This level can be set by using meter A2M2. The 150 mV is 14 dB below the 0-dB reference of 775 mV (4 dB below 240 mV). Thus if switch A2S11 is set to the -10DB position and the input signal is adjusted to read -4 dB on the meter scale, the voltage at the audio input terminals of the input transformer A2A2T1 is 150 mV.

3-142. In the +10DB position of switch A2S11, an input of 2.4 Vdc is required to cause meter A2M2 to indicate 0 dB. The 2.4 Vdc is routed by contacts 5 and 1 of switch A2S11 to the 20-dB pad (A2A11R1, R2, and R3), where it is attenuated to 240 mV. The attenuated signal is then fed via contacts 6 and 2 of switch A2S11 to the 10-dB gain amplifier A2A11Q1, which feeds 775 mV to meter A2M2 for a 0-dB indication.

3-143. The +20-Vdc input provides operating voltage for the base of amplifier A2A11Q1, via voltage divider R5 and R7. The line level meter is connected across the emitter-collector output circuit of amplifier Q1 through capacitors C2 and C3. These capacitors prevent the dc operating voltages of the transistor from being applied to the meter.

3-144. FSK TONE GENERATOR ELECTRONIC ASSEMBLY A2A9 (Figure 5-26). FSK Tone Generator Electronic Assembly A2A9 furnishes the mark and space signals to the USB audio amplifier, for teletypewriter (tty) operation. The assembly consists of four circuits: tty mark generator A2A9A1Q1; tty pulse generator Q2, Q3 and Q4; tty frequency divider Q5 and Q6; and tty pulse shaper Q7. The FSK tone generator is coded by a mark signal from the teletype loop of 5 to 75 mA dc; and by a space signal of 0 mA.

3-145. TTY Mark Generator A2A9A1Q1 (Figure 3-30). This circuit consists of a modified Colpitts oscillator and a polarity-protection diode. This circuit provides a signal burst to initiate a tty mark. The input to this circuit is either a space (0 mA) or a mark (5 to 75 mA). In order for this circuit to operate, the positive output from the teletype loop must be connected to the anode of CR1. When a mark is applied to the input of the mark generator, the voltage used to produce the mark is held at a constant 18-Vdc level by zener diode CR2. When higher loop currents (up to 75 mA) are required for local tty operation, resistor A2R4 on the main frame must be shunted across the input terminals. For remote

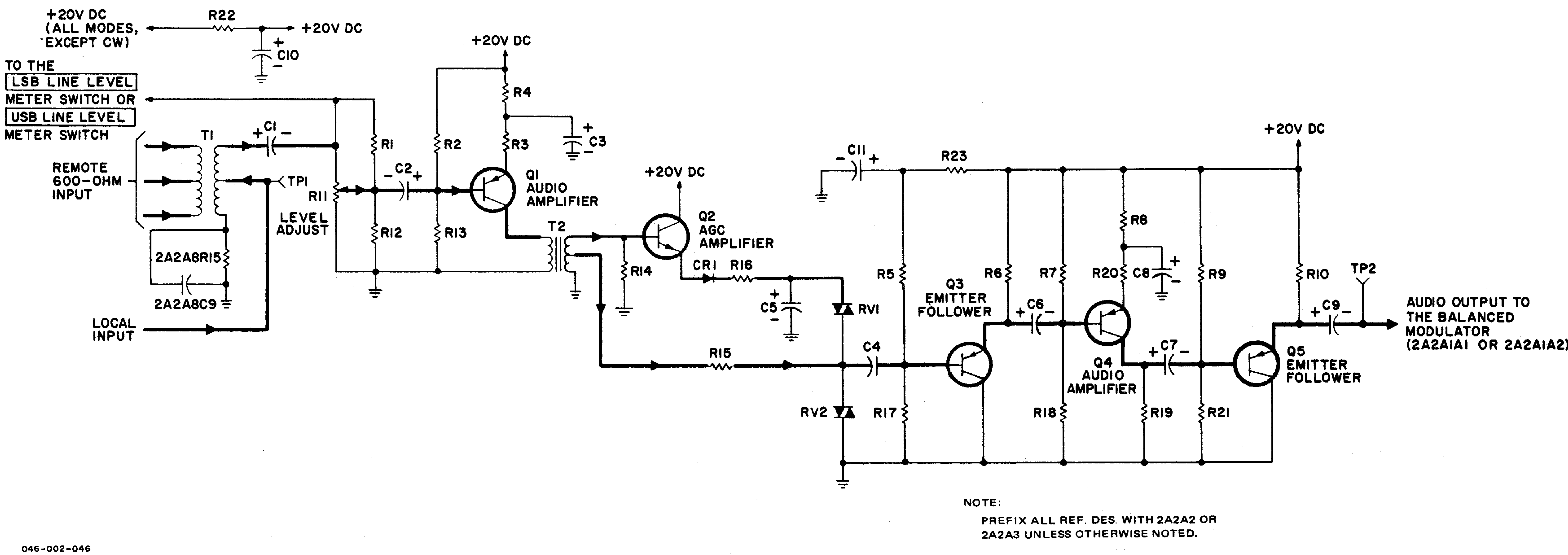


Figure 3-28. T-827B/URT, Audio Amplifier,
Simplified Schematic Diagram

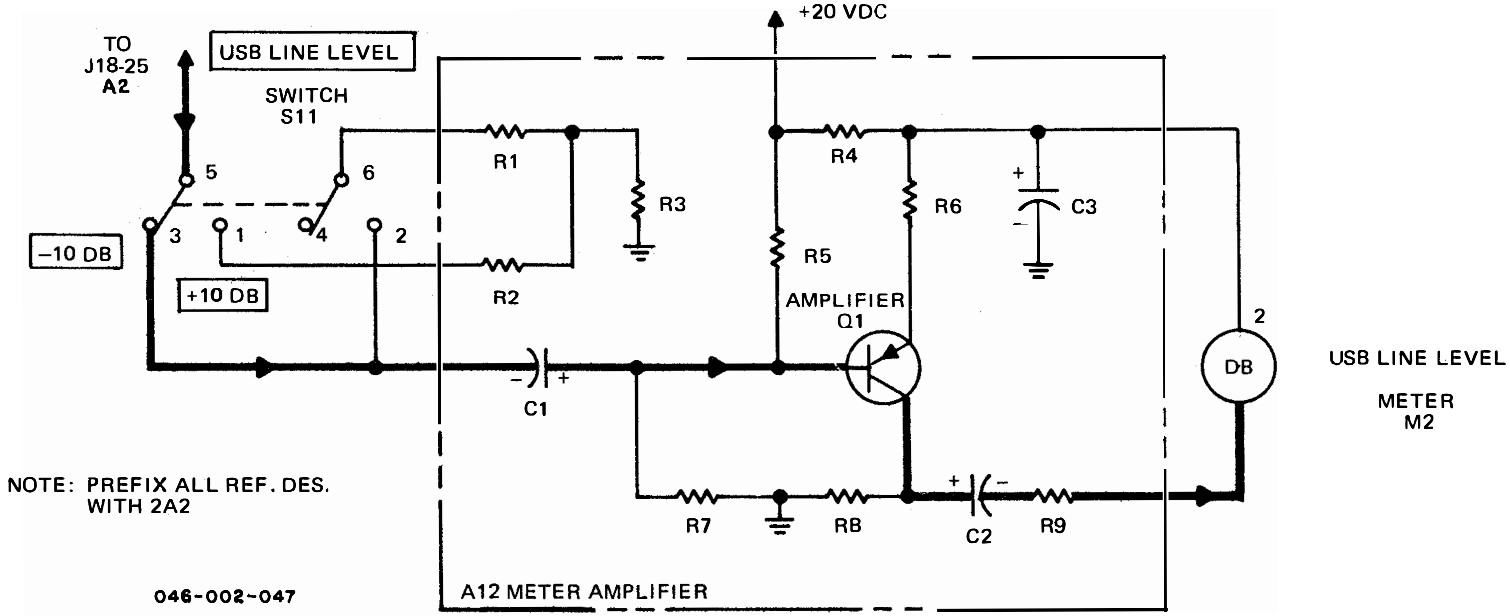
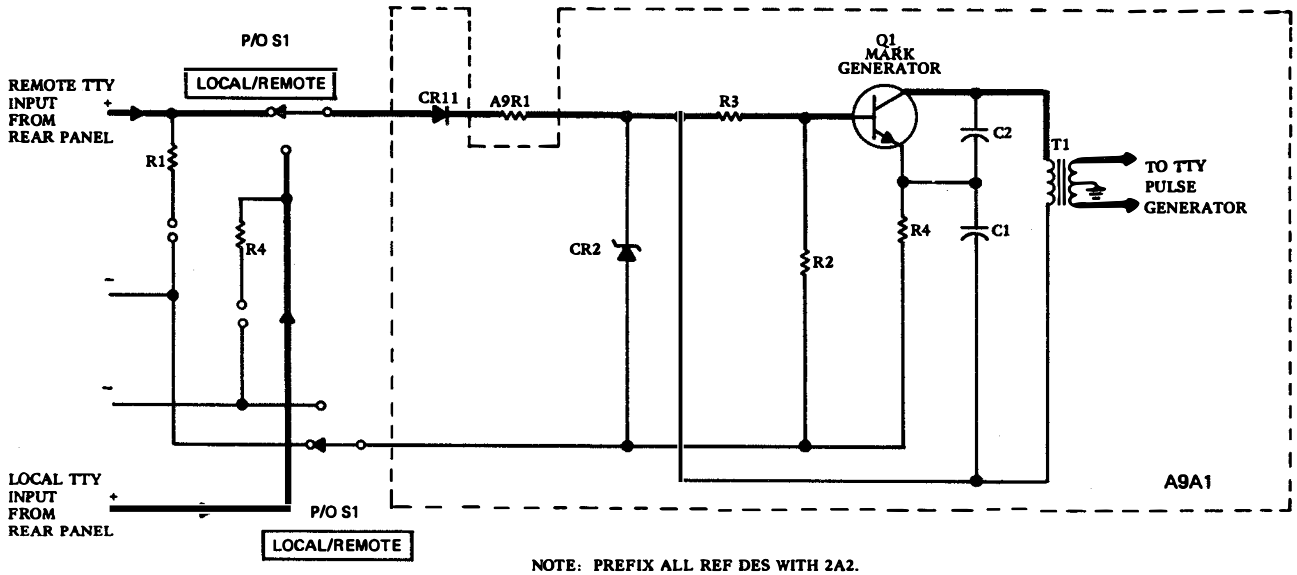


Figure 3-29. T-827B/URT, USB Audio Line Level Meter Circuit, Simplified Schematic Diagram



NOTE: PREFIX ALL REF DES WITH 2A2.

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Figure 3-30. T-827B/URT, TTY Mark Generator, Simplified Schematic Diagram operation with higher currents, an external resistor must be shunted across the input terminals.

3-146. The regulated 10-Vdc input from zener diode A2A9A1 is applied to voltage-divider network R2, R3 which develops the base-bias voltage to turn on oscillator Q1. The mark signal turns Q1 on, allowing the tank circuit (consisting of C1, C2, and the primary of T1) to oscillate at a 50- to 80-kHz frequency. This signal is fed to the tty pulse generator by the secondary of T1. The positive feedback (collector to emitter), required to sustain oscillation in Q1 for the period during which mark signal is present at the input terminals, is developed by voltage-divider network C1, C2. When a space signal (0 mA) is present at the tty input, transistor Q1 is turned off.

3-147. TTY Pulse Generator A2A9A1Q2, Q3, and Q4 (Figure 3-31). This circuit, consisting of switch Q2 and relaxation oscillator Q3, Q4, produces two series of trigger pulses to the tty frequency-divider circuit. The repetition rates of these two series of pulses are representative of either a space or a mark. Each series is generated around a 2000- or a 2550-Hz discrete center frequency. The +20-Vdc FSK from Mode Selector switch A2S1 is regulated to 18 Vdc by zener diode A2A9A1CR5. Voltage divider R16, R17 develops the base bias for pulse generator Q3 from this regulated 18-Vdc output. Divider R14, R15 develops the base bias for pulse generator Q4.

3-148. With S1 in the 2550-Hz position, relaxation oscillator Q3, Q4 is free running at the space repetition rate of 4250 pps. When Q3 is conducting, Q4 is also conducting; charging capacitor C5 until the voltage across it equals the base voltage of Q3. At this time, Q3 is back-biased and turns off. When Q3 turns off, the base voltage on Q4 will increase to the same level as the voltage on the emitter, turning it off. With both Q3 and Q4 turned off, capacitor C5 discharges through resistors R13 and R11. When the voltage across C5 decreases to less than the base voltage of transistor Q3, transistor Q3 will turn back on. When Q3 turns back on, the voltage on the base of Q4 will decrease to less than the emitter voltage, and it will turn on. The output at the collector of Q4 is applied to the base of Q3 through voltage divider R17, R18. Therefore, this turnon/turnoff procedure is sustained at the desired 4250-pps rate.

3-149. When a mark is applied to the input at T1, it is rectified by either diode CR3 or CR4, and the resulting dc is developed across resistor R5. Capacitor C3 filters this dc voltage. The dc developed across R5 is applied to voltage divider R28, R7; which develops the base bias for switch Q2. This voltage forward-biases Q2, and causes it to conduct, grounding R12. Resistors R12 and R13 are not in parallel; and the resultant change in the discharge time constant for capacitor C5 shifts the repetition rate of relaxation oscillator Q3, Q4 to 5950 pps. As soon as the mark is removed from Q2, the frequency of Q3, Q4 returns to the space repetition rate of 4250 pps.

3-150. With S1 in the 2000-Hz position, the space repetition rate of Q3, Q4 is 3150 pps. The mark repetition rate is 4850 pps. The negative sawtooth pulses present at the collector of Q4 are coupled to the tty frequency-divider circuit by capacitor C6.

3-151. TTY Frequency Divider A2A9A1Q5, Q6 (Figure 3-32). This circuit divides the output from the tty pulse generator by two, producing a series of pulses having a 50-percent duty cycle. The 50-percent duty cycle is required to ensure that even harmonics are not generated in the FSK tone output.

3-152. The output from the tty pulse generator is coupled to steering diodes CR7 and CR8 by capacitor C6. Assuming that transistor Q6 is turned on and transistor Q5 is turned off, the negative portion of the input pulse applied to the base of transistor Q6 (through diode CR8, resistor

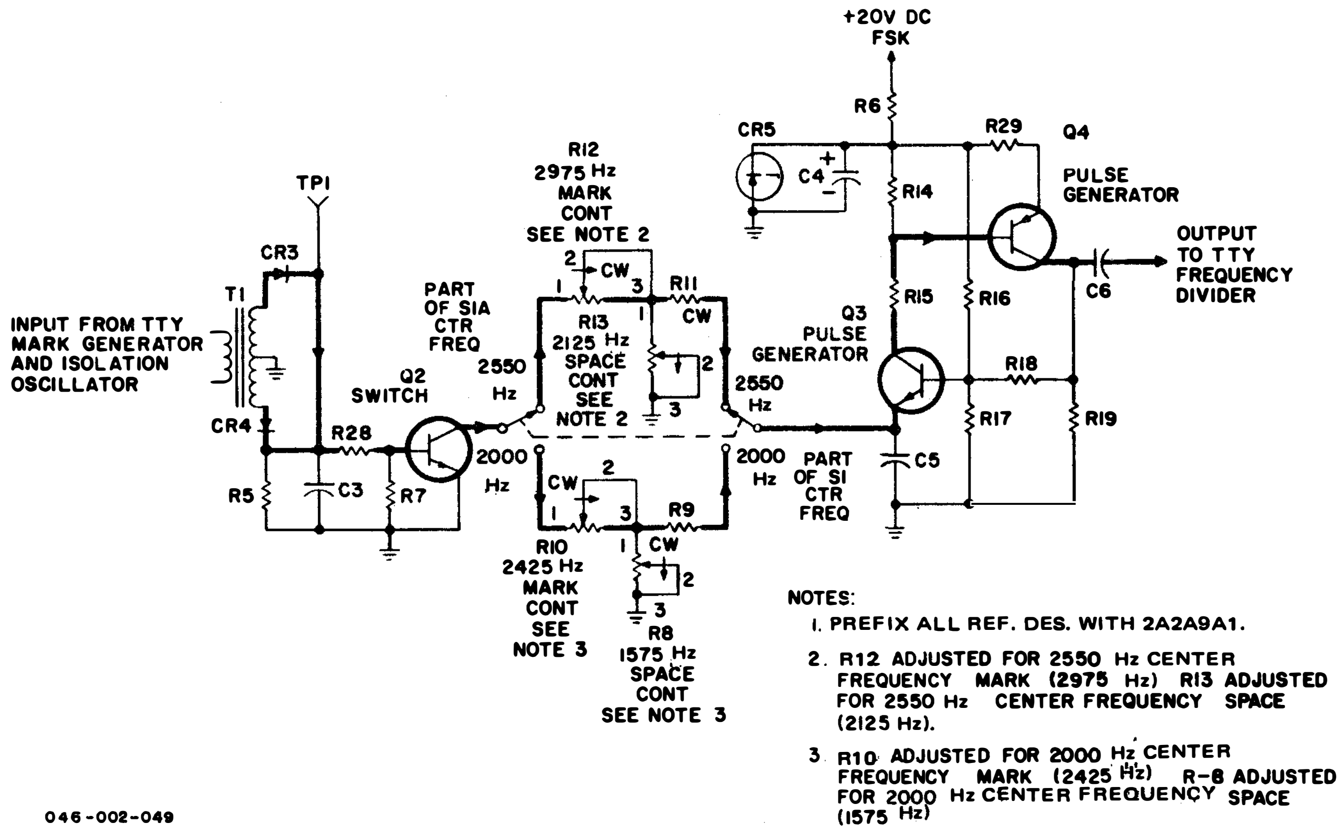

Figure 3-31. T-827B/URT, TTY Pulse Generator, Simplified Schematic Diagram

R24, and capacitor C8) will turn off transistor Q6. With transistor Q6 turned off, the voltage on the base of transistor Q5 becomes more positive, thus turning on transistor Q5. Capacitor C7 discharges through diodes CR7 and CR6. When the next negative pulse is applied, it is coupled through diode CR7, resistor R21, and capacitor C7 to the base of transistor Q5, turning the transistor off. Capacitor C8 will now discharge through diodes CR8 and CR6. Therefore, transistor Q5 provides one output pulse for every two pulses applied to the input on the tty frequency divider. The pulsed output at the collector of transistor Q5, which has a 50-percent duty cycle, is coupled to tty pulse shaper by capacitor C11. Diode CR6 aids recovery of the circuit by providing a low-resistance path through which capacitors C7 and C8 can discharge. The diode also prevents loading of the input pulses.

3-153. TTY Pulse Shapter A2A9A1Q7 (Figure 3-33). This circuit shapes the pulsed output from the tty frequency divider to form a good square-wave output. When the output from the tty frequency divider is coupled to the base of squaring amplifier Q7 by capacitor C11, amplifier Q7 is driven into saturation, thus producing a square-wave output. The amplitude of the square-wave is controlled by the setting of potentiometer R26. The base bias for squaring amplifier Q7 is applied from the tty frequency square-wave output.

3-154. The tty pulse shaper output is coupled by capacitor C10 to the Mode Selector switch on the front panel. The square-wave output is applied through the Mode Selector switch to Transmitter Audio Amplifier Electronic Assembly A2A2 to modulate the 500-kHz carrier during the FSK mode of operation. The odd harmonics are

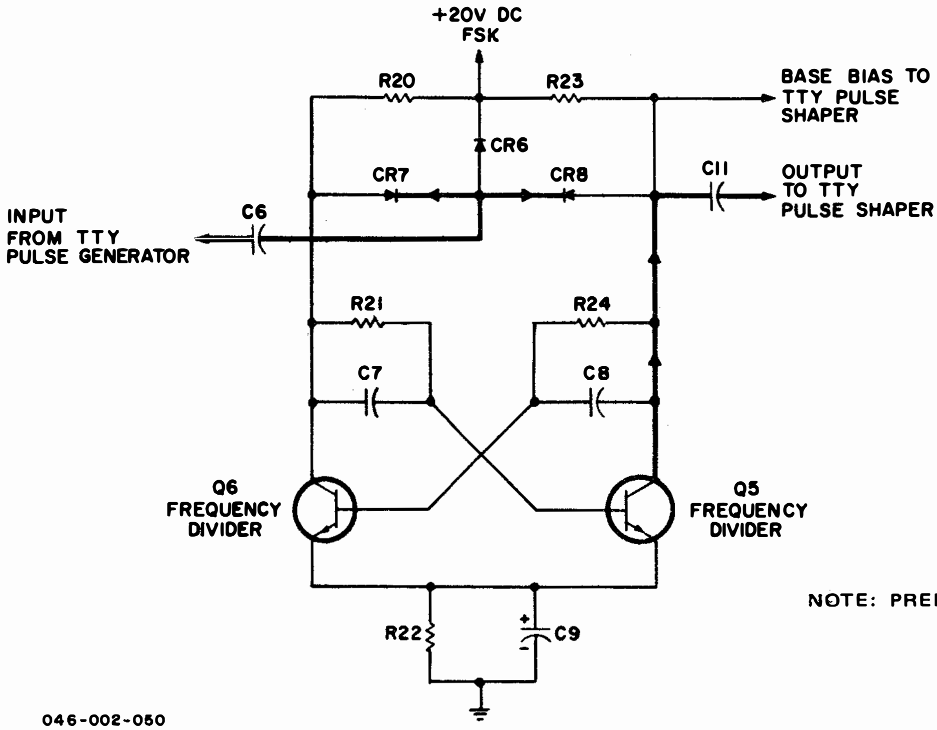

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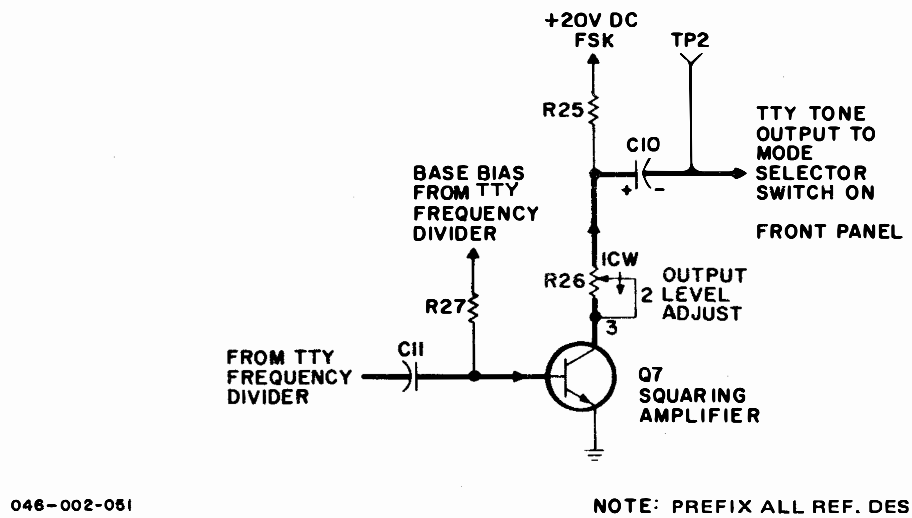
Figure 3-32. T-827B/URT, TTY Frequency Divider, Simplified Schematic Diagram



NOTE: PREFIX ALL REF. DES; WITH 2A2A9A1.

Figure 3-33. T-827B/URT, TTY Pulse Shaper, Simplified Schematic Diagram eliminated from the FSK tone output by the sideband filter in the mode selector.

3-155. The REMOTE/LOCAL switch A2S1 and the Mode Selector switch A2S2 are shown in simplified form in figure 3-51. The diagram shows how CW and audio intelligences are introduced into the T-827B/URT from either a local or a remote source. Figure 5-13 is the detailed schematic diagram for these switches.

3-156. RADIO TRANSMITTER T-827B/URT, FREQUENCY SYNTHESIZATION CIRCUIT DESCRIPTION.

3-157. GENERAL. The frequency synthesization section (figure 3-6) generates three injection frequencies for use in RF Translator Electronic Subassembly A2A6A6. These three injections are selected by the front-panel tuning controls of the T-827B/URT. The injections are applied to the low-, mid-, and high-frequency mixers of the rf translator to convert the 500-kHz if. into the digitally dialed rf output channel. The inputs to the frequency synthesization section are the 500 kHz, 1 MHz, and 10 MHz from Frequency Standard Electronic Assembly A2A5.

3-158. The frequency synthesization section is contained largely within Translator/Synthesizer Electronic Assembly A2A6. It consists of five subassemblies:

a. Spectrum Generator Electronic Subassembly A2A6A5.

b. 1 and 10 KC Synthesizer Electronic Subassembly A2A6A3.

c. MC Synthesizer Electronic Subassembly A2A6A1.

d. 100 KC Synthesizer Electronic Subassembly A2A6A2.

e. 100 CPS Synthesizer Electronic Subassembly A2A6A4.

3-159. SPECTRUM GENERATOR ELECTRONIC SUBASSEMBLY A2A6A5 (Figure 5-23). The Spectrum Generator Electronic Subassembly A2A6A5 provides four signal bursts locked to the 500-kHz input from Frequency Standard Electronic Assembly A2A5. The four outputs from the spectrum generator are:

a. 15.3 to 16.2 MHz (in 100-kHz increments) to the 100 KC synthesizer

b. 3.82 to 3.90 MHz (in 10-kHz increments) to the 1 and 10 KC synthesizer

c. 0.122 to 0.131 MHz (in 1-kHz increments to the 1 and 10 KC synthesizer

d. 1-kHz reference pulse to the 100 CPS synthesizer.

Four circuits are employed in the spectrum generator to produce the precisely spaced, accurate, and stable spectrum points required to perform the frequency synthesization function in the T-827B/URT. The four circuits are the 100-, 10-, and 1-kHz spectrum generators A1 through A3 and the 1-kHz pulse inverter A4.

3-160. 100-kHz Spectrum Generator A2A6A5A1 (Figure 3-34). This circuit consists of trigger amplifier Q1, divide-by-five multivibrator Q2 and Q3, gate amplifier Q4, keyed oscillator Q5, amplifier Q6, and double-tuned filter L5 and T2. This circuit produces the 15.3- to 16.2-MHz spectrum (in 100-kHz increments) to the 100 KC synthesizer A2A6A2 and the 100-kHz trigger pulses to the 10-kHz spectrum generator A2A6A5A2.

3-161. The input to the 100-kHz spectrum generator is a sinusoidal 500 kHz from the frequency standard. This signal is applied to autotransformer A2A6A5A1T2, where it is stepped up and coupled to the base of trigger amplifier Q1. The negative halves of the 500-kHz signal are of sufficient amplitude to drive Q1 into saturation. The positive output pulses from Q1 are differentiated and applied to divide-by-five multivibrator Q2, Q3 as a series of 500-kHz positive and negative triggers. Divide-by-five multivibrator Q2, Q3 is an astable multivibrator, which is locked at a 500-kHz rate. The output is exactly one fifth of the 500-kHz input trigger pulse. The 100-kHz output is applied to the 10-kHz spectrum generator and to gate amplifier Q4.

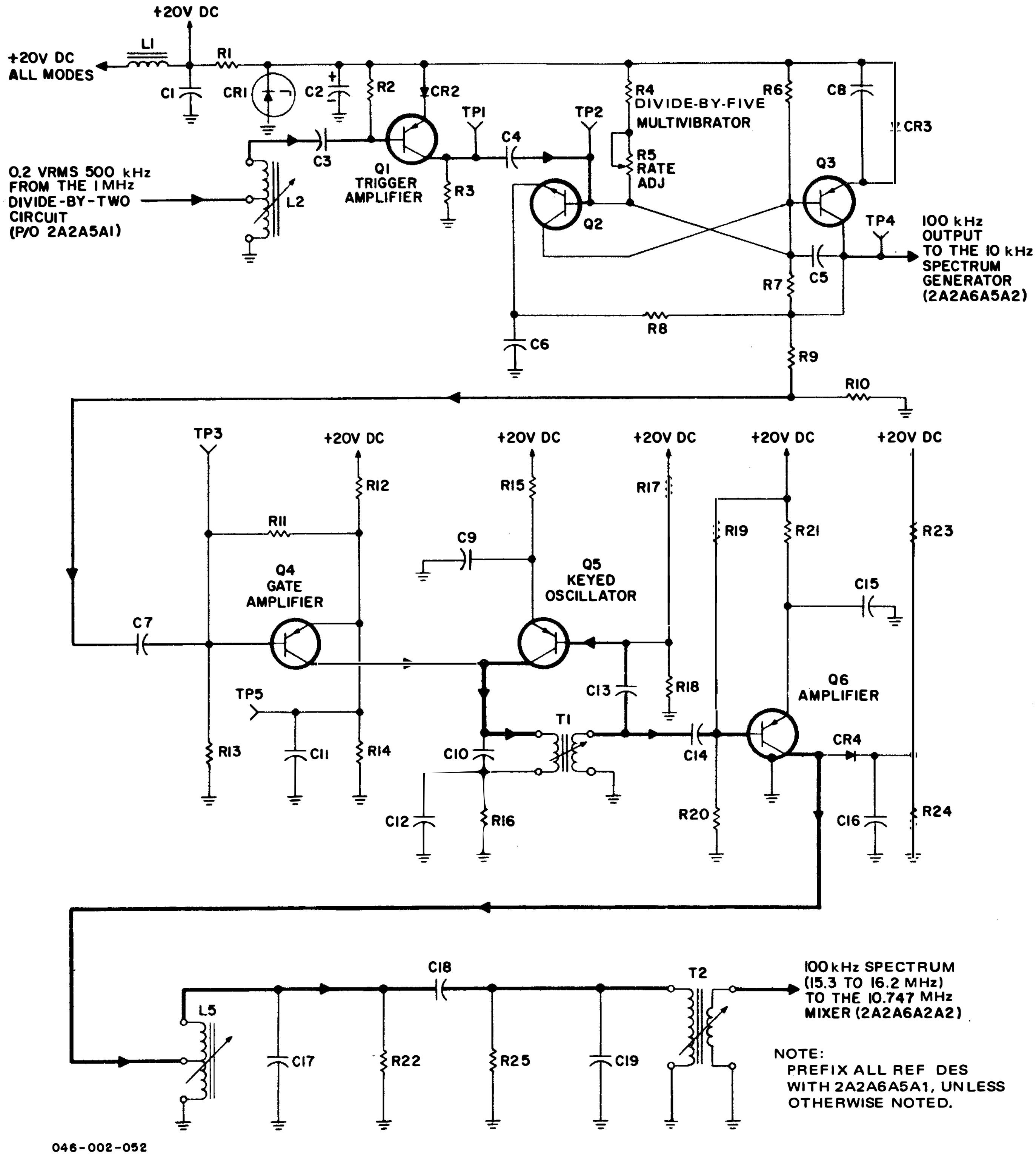


Figure 3-34. T-827B/URT, 100-kHz Spectrum Generator, Simplified Schematic Diagram

3-162. During the off time of multivibrator Q2, Q3, gate amplifier Q4 is forward-biased and in saturation. The saturation current of Q4 heavily loads the tank circuit of keyed oscillator Q5, preventing regeneration. When a positive pulse is coupled to the base of Q4, it is reverse-biased and cut off for the duration of the pulse. This removes the load from keyed oscillator Q5 and permits it to oscillate at its natural frequency.

3-163. The output of keyed oscillator Q5 is a 0.8-μs sinusoidal burst of frequencies centered around the free-running frequency of Q5. The desired spectrum consists of 10 spectrum points separated by the 100-kHz keying rate. The spectrum output is amplified by amplifiter Q6 and coupled to the double-tuned filter circuit L5, T2. The passband of this tuned filter is sufficient to pass the desired 15.3- to 16.2-MHz spectrum, but has sufficient selectivity to reject the undesired harmonics and products of keyed oscillator Q5.

3-164. 10-kHz Spectrum Generator A2A6A5A2 (Figure 3- 35). This circuit consists of divide-by-two multivibrator Q1 and Q2, divide-by-five multivibrator Q3 and Q4, gate amplifier Q5, and keyed oscillator Q6. These circuits produce a spectrum of frequencies between 3.82 and 3.81 MHz to the 1 and 10 KC synthesizer A2A6A3, and a 10-kHz trigger to the 1-kHz spectrum generator A2A6A5A3.

3-165. The input to the 10-kHz spectrum generator is the 100-kHz pulsed output from the 100-kHz spectrum generator. Divide-by-two multivibrator A2A6A5A2Q1, Q2 is a conventional bistable circuit that produces one output pulse for every two input pulses. The 50-kHz square-wave output from Q1, Q2 is differentiated, and the positive pulses are used to trigger divide-by-five multivibrator Q3, Q4.

3-166. The 10-kHz output of divide-by-five multivibrator Q3, Q4 is applied to the 1-kHz spectrum generator and to the gate amplifier Q5. Gate amplifier Q5 and keyed oscillator Q6 are identical to the gate amplifier and keyed oscillator in the 100-kHz spectrum generator (see paragraph 3-162). The output of keyed oscillator Q6 is a 0.7-μs sinusoidal burst of frequencies with a 10-kHz repetition rate. This results in a 3.82- to 3.91-MHz frequency spectrum with a 10-kHz separation between spectrum points.

3-167. 1-kHz Spectrum Generator A2A6A5A3 (Figure 3-36). This circuit consists of divide-by-two multivibrator Q1 and Q2, divide-by-five multivibrator Q3 and Q4, gate amplifier Q5, and keyed oscillator Q6. These circuits produce a spectrum of frequencies between 0.122 and 0.131 MHz (in 1-kHz intervals) to the 1 and 10 KC synthesizer A2A6A3, and a 1-kHz trigger to the 1-kHz pulse inverter A2A6A5A4.

3-168. The input to the 1-kHz spectrum generator is the pulse output from the 10-kHz spectrum generator. The divide-by-two multivibrator A2A6A5A3Q1, Q2 output is fed to the divide-by-five multivibrator Q3, Q4. The result is a 1-kHz output to the 1-kHz pulse inverter and an output to gate amplifier Q5. Gate amplifier Q5 and keyed oscillator Q6 are identical to the gate amplifier and keyed oscillator in the 100-kHz spectrum generator (see paragraph 3-162). The output of keyed oscillator Q6 is a 10-μs sinusoidal burst of frequencies filtered by L2 and C17. This results in a 0.122- to 0.131-MHz spectrum with a 1-kHz separation between spectrum points.

3-169. 1-kHz Pulse Inverter A2A6A5A4 (Figure 3-37). This circuit consists of inverter transistor Q1. This amplifier supplies the accurate 1-kHz reference pulse required to phase-lock the 100-Hz oscillator A2A6A4A2.

3-170. The input to the 1-kHz pulse inverter is the 1-kHz pulse from the divide-by-five multivibrator in the 1-kHz spectrum generator A2A6A5A3. The 1-kHz pulses are coupled to the base of inverter transistor A2A6A5A4Q1 through isolating resistor R4, to reduce the loading on the divide-by-five multivibrator. Resistors R2 and R3 form a voltage-divider network to furnish a low,

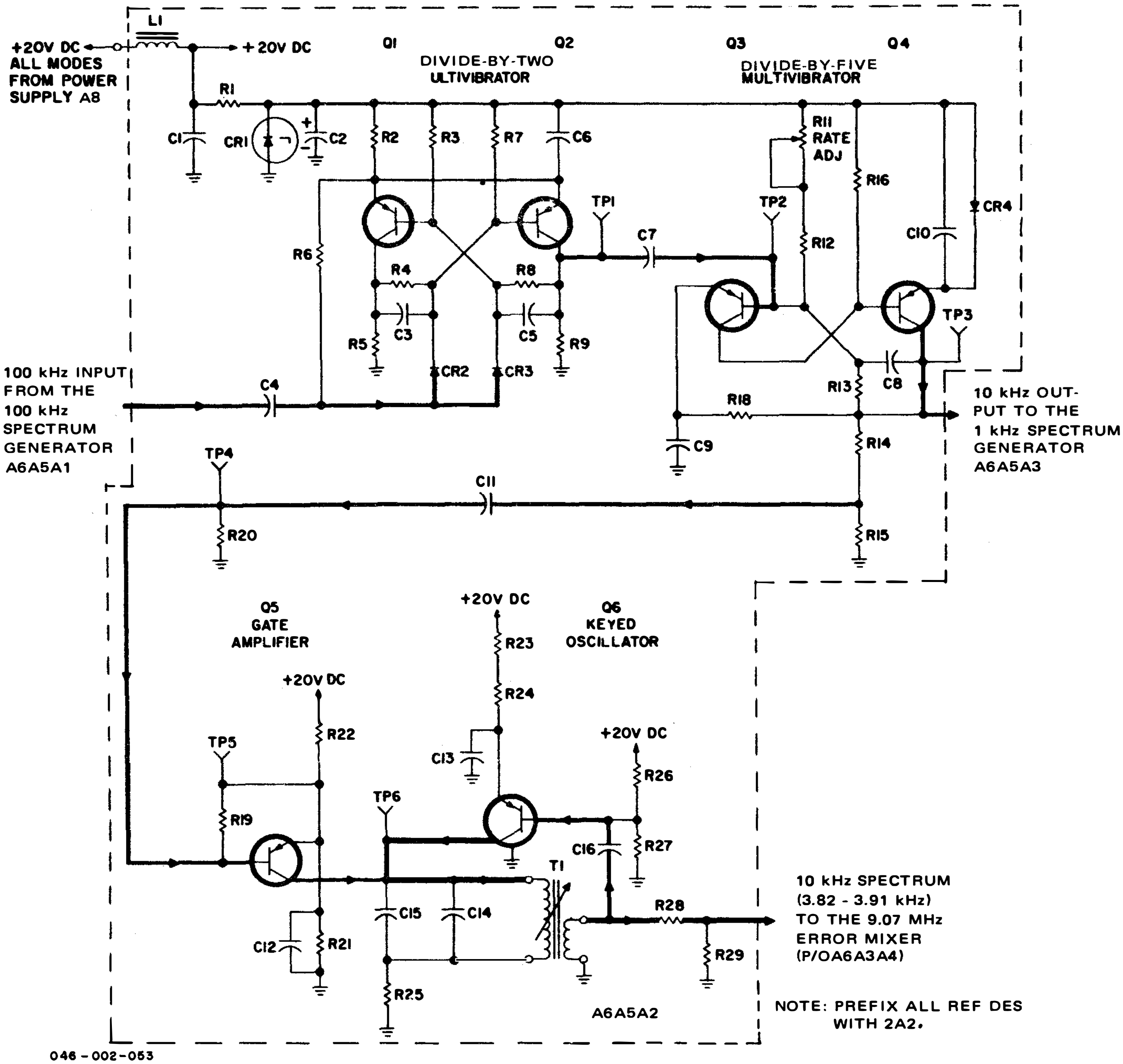


Figure 3-35. T-827B/URT, 10-kHz Spectrum Generator, Simplified Schematic Diagram

semiregulated collector voltage for Q1 to ensure that it is always driven to saturation.

3-171. 1 AND 10 KC SYNTHESIZER ELECTRONIC SUBASSEMBLY A2A6A3 (Figure 5-21). 1 and 10 KC Synthesizer Electronic Subassembly provides the injection signals to the low-frequency mixer A3 in RF Translator Electronic Subassembly A2A6A6. The frequency range of the injection signals is from 3.301 to 3.400 MHz in 1-kHz increments. The exact frequency selected corresponds to the setting of the 1 KC and 10 KC controls on the front panel. An additional output of a 7.089-MHz

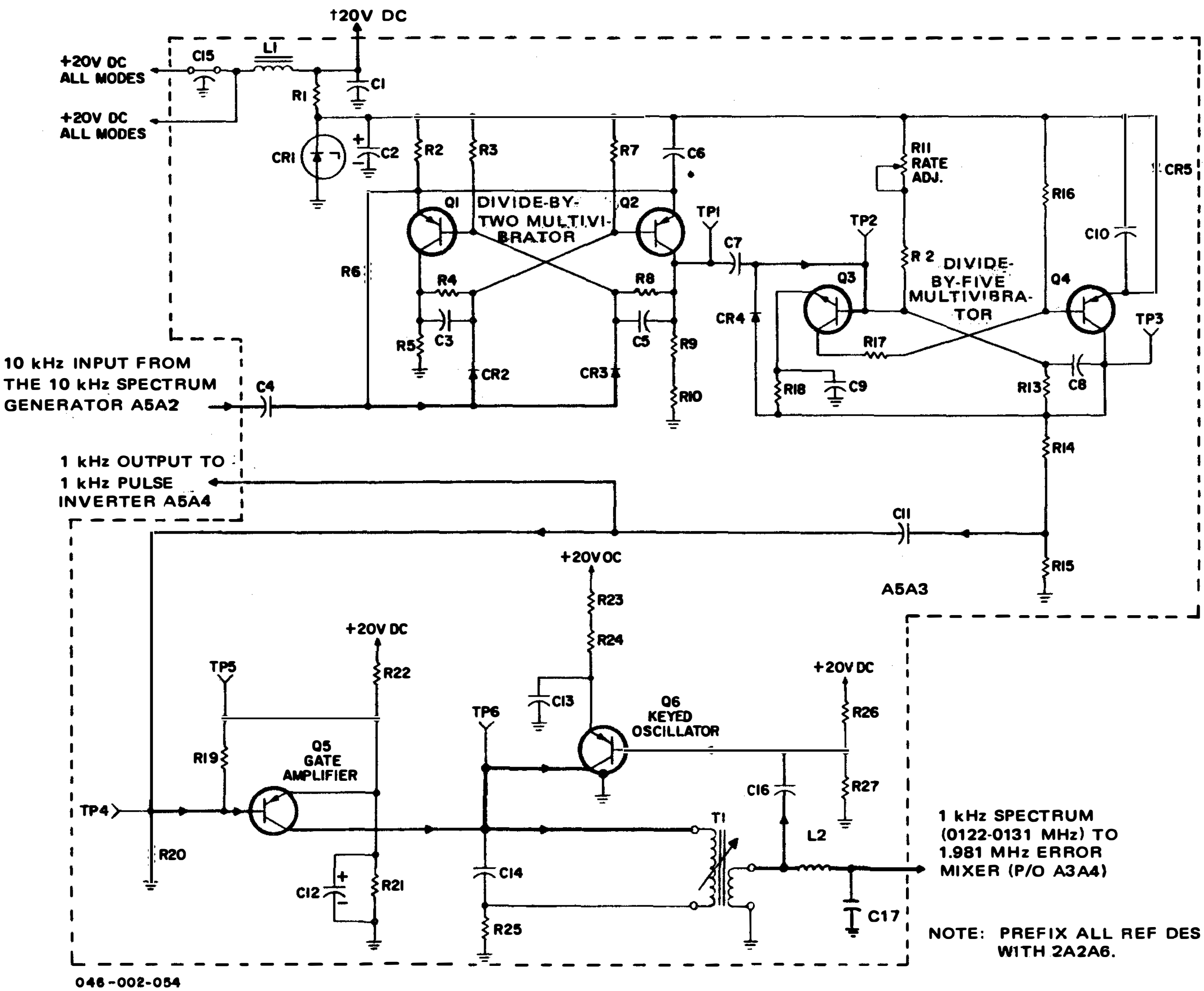


Figure 3-36. T-827B/URT, 1-kHz Spectrum Generator, Simplified Schematic Diagram

error signal is provided to 100 CPS Synthesizer Electronic Subassembly A2A6A4 for use in the error-cancellation loop. Four circuit groups make up the 1 and 10 KC synthesizer: 5.16- to 5.25-MHz oscillator A1, 1.850- to 1.859- MHz oscillator A2, 1- and 10-kHz output and blanker A3, and 1- and 10-kHz error mixer A4.

3-172. 5.16- to 5.25-MHz Oscillator A2A6A3A1 (Figure 3-38). This circuit consists of oscillator Q1 and buffer amplifier Q2, which, in conjunction with 10-kHz crystal switch A2A6A3S1, produce on of 10 outputs in 10-kHz steps in the range from 5.16 to 5.25 MHz, for use in the 1- and 10-kHz output and blanker A2A6A3A3. The exact frequency selected is according to the setting of the 10 KC control on the front panel.

3-173. Oscillator A2A6A3A1Q1 is controlled by any one of 10 crystals A2A6A3Y1 through Y10, selected by switch A2A6A3S1. The oscillator is a modified Colpitts (Pierce) circuit. Capacitor A2A6A3A1C1 is

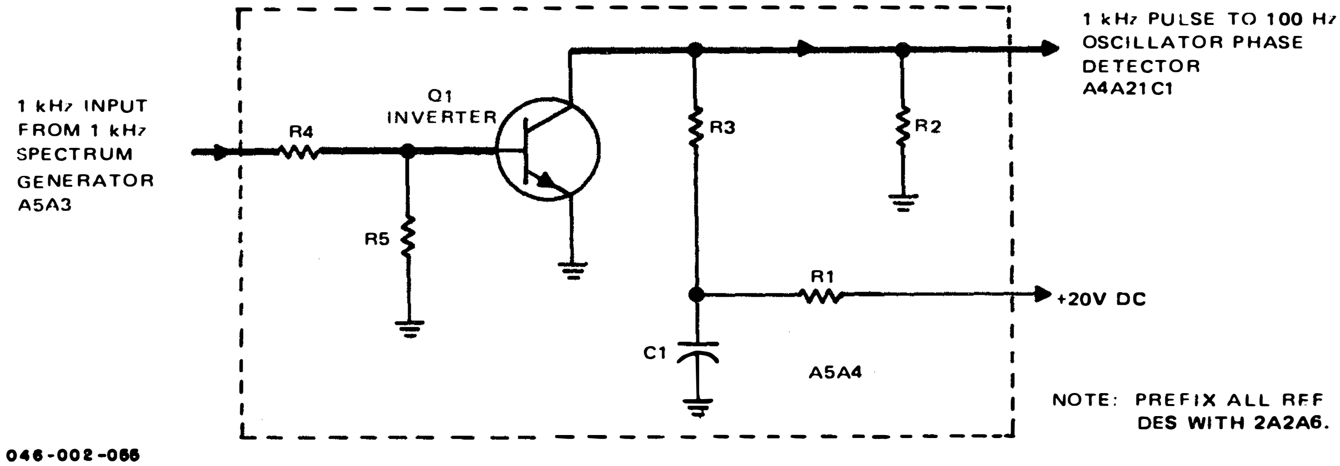


Figure 3-37. T-827B/URT, 1-kHz Pulse Inverter, Simplified Schematic Diagram

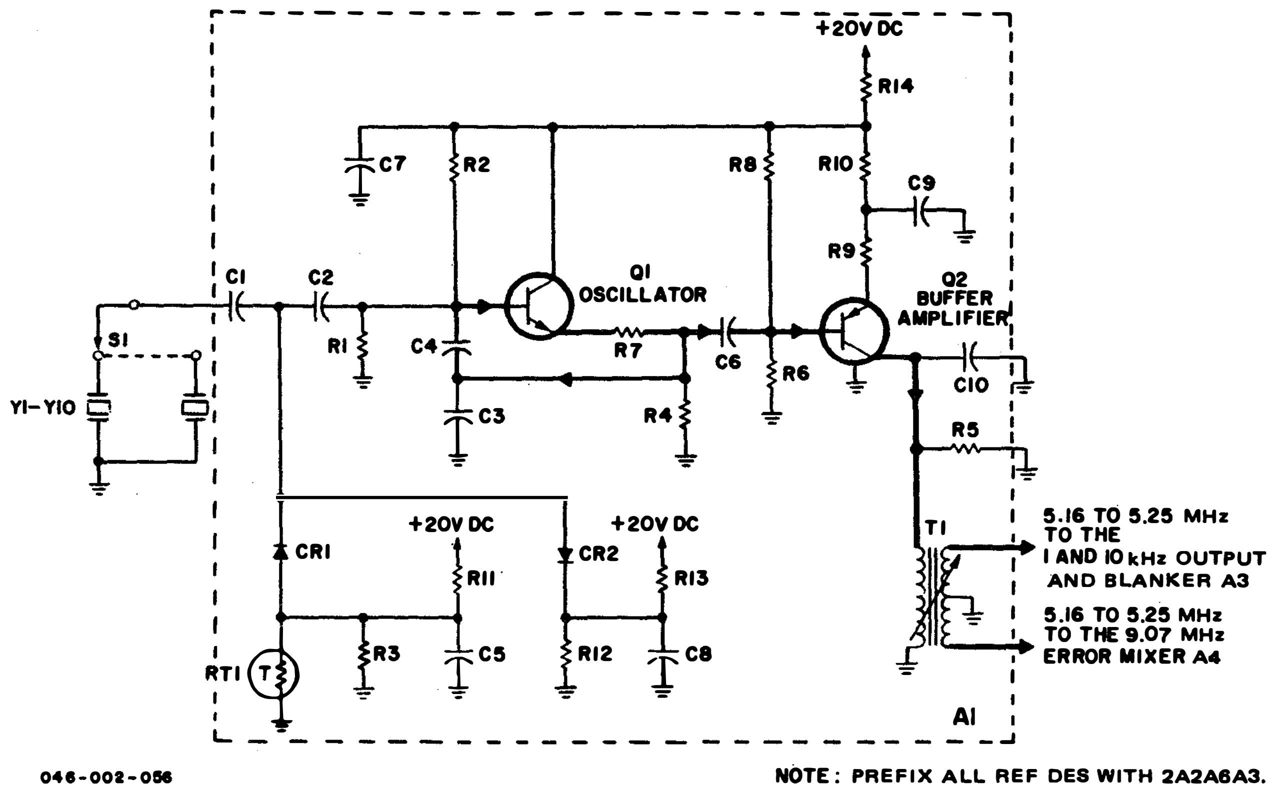


Figure 3-38. T-827B/URT, 5.16- to 5.25-MHz Oscillator, Simplified Schematic Diagram

a temperature-compensating device that is used to compensate the frequency over the temperature range. Diodes CR1 and CR2 limit the amplitude of the oscillator, and thermistor RT1 provides temperature compensation for these diodes. Resistor R9 provides degenerative feedback to buffer amplifier Q2, to stabilize the gain of the stage and increase its input impedance, providing isolation to the oscillator. Resistor R5 provides uniform gain for the output frequency range.

3-174. 1.850- to 1.859-MHz Oscillator A2A6A3A2 (Figure 3-39). Oscillator Q1 and buffer amplifier Q2, together with the 1-kHz crystal switch A2A6A3S2, produce one of 10 outputs in 1-kHz steps between 1.850 and 1.859 MHz for use in the 1- and 10-kHz output and blanker A2A6A3A3 and the 1- and 10-kHz error mixer A2A6A3A4. The setting of the 1 KC control on the front panel determines the exact frequency to be generated. The operation of the 1.850- to 1.859-MHz oscillator is identical to that of the 5.16- to 5.25-MHz oscillator. Refer to paragraph 3-172.

3-175. 1- and 10-kHz Output and Blanker A2A6A3A3 (Figure 3-40). This circuit consists of mixer transistor Q11 and four-section filter C48-L5, C49-L6, C51-L7, and T3. Noise blanker circuit Q12 is also included, but is not used in the T-827B/URT. These circuits subtractively mix the signal from the 1.850- to 1.859-MHz oscillator and the input from the 5.16- to 5.25-MHz oscillator to produce the 1- and 10-kHz injection for use in the low-frequency mixer in the rf translator. The low-frequency injection is 3.301 to 3.400 MHz in 1-kHz steps.

3-176. The four-section filter in the output of Q11 is designed in such a way that the bandwidth is about 100 kHz, and the skirts are steep enough to provide a stop band to the undesired mixer products.

3-177. 1- and 10-kHz Error Mixer A2A6A3A4 (Figure 3-41). This circuit generates a 7.089-MHz error signal for injection into the 100 CPS synthesizer A2A6A4. This 7.089-MHz error signal contains the error of the 1- and 10-kHz oscillators, and is eventually used in a closed error loop to cancel error and drift of the crystals. The inputs to this assembly are provided by the 1-kHz spectrum generator A2A6A5A3, the 10-kHz spectrum generator A2A6A5A2, the 1.850- to 1.859-MHz oscillator A2A6A3A2, and the 5.16- to 5.25-MHz oscillator A2A6A3A1.

3-178. The error mixer consists of five transistors. Transistors A2A6A3A4Z3Q6 and Z2Q7 are employed in isolation-amplifier circuits to isolate the oscillator inputs from the spectrum and mixer products present in the mixer stages. Transistors Q8, Q9, and Z1Q10 perform the mixing required to produce the error-signal output.

3-179. The 1-kHz spectrum (0.122 to 0.131 MHz) is mixed with the 1.850- to 1.859-MHz oscillator injection in mixer stage Z1Q10. The output results in, among other things, the sum product of the oscillator frequency and the 1-kHz spectrum. This output drives crystal filter FL2, whose center frequency is 1.891 MHz and whose bandwidth is about 200 Hz. This filter selects the desired product (1.891 MHz) and provides about 60 dB of attenuation to the adjacent products. The output of this filter is coupled into 7.089-MHz mixer Q9.

3-180. In the same manner, the 10-kHz spectrum (3.82 to 3.91 MHz) is mixed with the input from the 10-kHz oscillator injection (5.16 to 5.25 MHz) in mixer stage Q8. The output results in, among other things, the sum product of the two inputs. This drives crystal filter FL1, whose center frequency is 9.07 MHz and whose bandwidth is about 800 Hz. This filter selects the desired product (9.07 MHz) and provides about 60 dB attenuation to the adjacent products. The output of this filter is also coupled into 7.089-MHz mixer Q9.

3-181. The output of 7.089-MHz mixer Q9 is 7.089 MHz, plus or minus the error of the crystals in the 1- and 10-kHz oscillators. This output is used in the error-cancellation loop in the T-827B/URT.

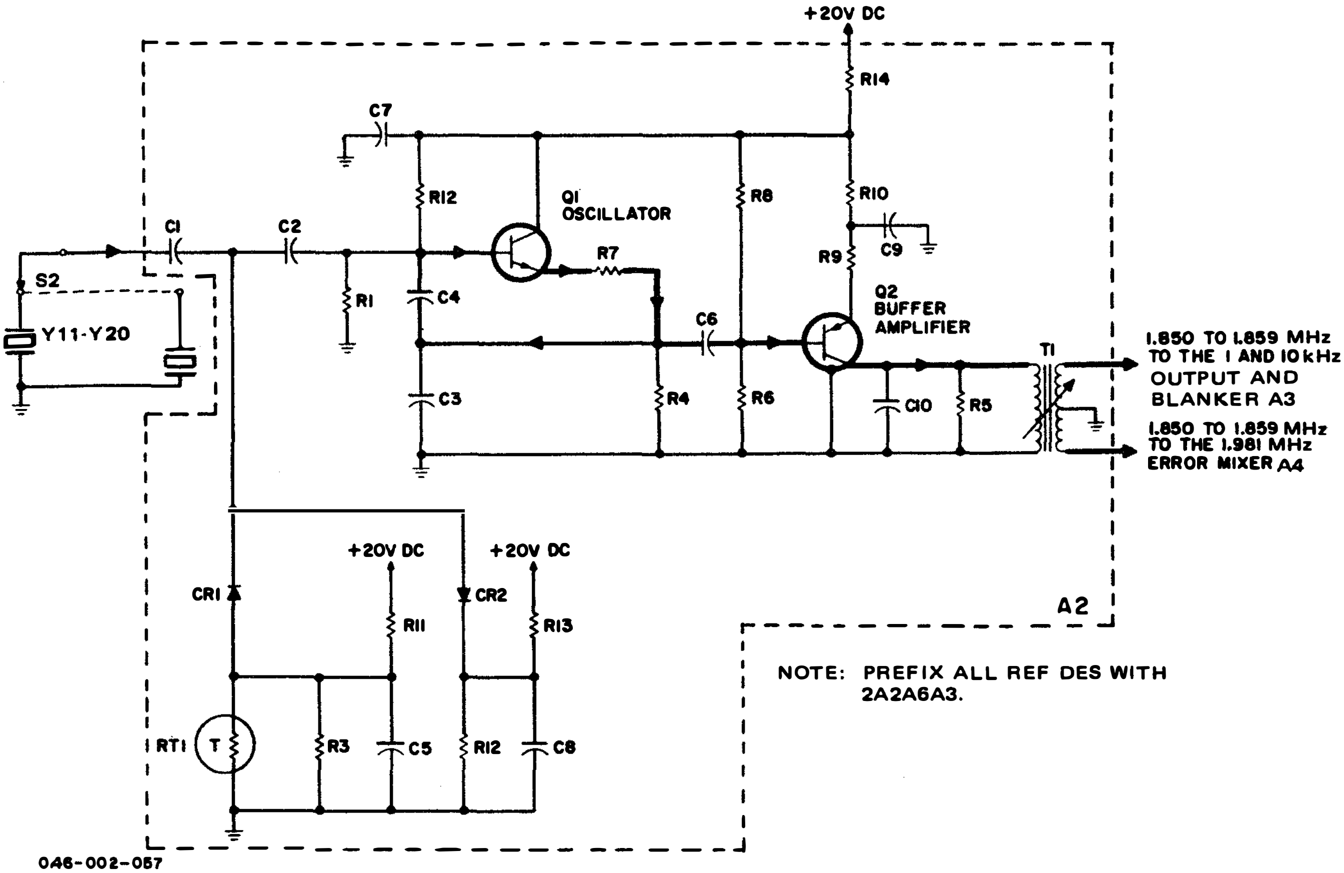


Figure 3-39. T-827B/URT, 1.850- to 1.859-MHz Oscillator, Simplified Schematic Diagram

3-182. MC SYNTHESIZER ELECTRONIC SUBASSEMBLY A2A6A1 (Figure 5-19). MC Synthesizer Electronic Subassembly A2A6A1 provides the injection to the high-frequency mixer in RF Translator Electronic Subassembly A2A6A6 to perform the last of the conversions needed to convert the 500-kHz if. to the rf output channel. Seventeen possible injections are generated by the MC synthesizer in the 2.5- to 23.5-MHz range (in 1-MHz increments). Seventeen loose-tolerance crystals are used, and are switched into the oscillator circuit according to the frequency selected by the MCS controls on the front panel of the T-827B/URT. Since some crystals are used more than once, only 17 are required to handle the 28 MCS digits. The equipment is designed so that the crystal error is always on the low-frequency side, so that phase-lock arrangement can pull the crystal into agreement with the frequency standard. This subassembly employs three basic circuits: MHz oscillator A1, spectrum generator/mixer A3, and MHz oscillator agc A2.

3-183. MHz Oscillator A2A6A1A1 (Figure 3-42). This circuit consists of oscillator Q1, broadband amplifier Q2, and emitter followers Q3 and Q4. Oscillator A2A6A1A1Q1 is a modified Colpitts (Pierce) circuit that employs one of 17 crystals. The crystal to be used is selected by motor-driven switch A2A6A1S1. Motor A2A6A1B1 is driven by a five-wire tune code selected by the MCS controls on the front panel. The output of the oscillator is 2.5 to 23.5 MHz, in 17 discrete 1-MHz steps. The crystals (A2A6A1Y1 to Y17), along with capacitors in the feedback loop (A2A6A1C1 to C17), are arranged in a switch stack. Since the oscillator covers such a wide frequency range, it is necessary to select a capacitor in the feedback network for each crystal, and thus provide a more uniform output level.

3-184. Diode A2A6A1A1CR3 is a voltage-variable capacitor that provides the pull-in range for one phase-locked loop. Capacitor C21 is a temperature-compensating capacitor that is used to compensate the oscillator's frequency over the temperature range. Since the oscillator is locked to the frequency standard, this capacitor permits the locking voltage to remain essentially constant over the temperature range. Since C21 is in the oscillator feedback loop, its coefficient will affect the output amplitude. To compensate for this slight variation, temperature-compensating capacitor C24 is used. Thermistor RT1 provides temperature compensation for amplitude-limiting diodes CR1 and CR2. Transistor Q2 is a broadband amplifier with a voltage gain of about 1.5 Vdc. This stage drives the cascade emitter followers Q3 and Q4. The 2.5- to 23.5-MHz output is routed to the high-frequency mixer in the rf translator A2A6A6 and to the Spectrum Generator Mixer A2A6A1A3 for injection into the phase-lock loop.

3-185. Spectrum Generator/Mixer A2A6A1A3 (Figure 3-43). This circuit compares the 1-MHz input from the frequency standard A2A5 to the output of the MHz oscillator A2A6A1A1, and generates an error signal. The error signal is fed to the MHz oscillator agc A2A6A1A2 to initiate a dc correction voltage to phase-lock the MHz oscillator.

3-186. The 1-MHz input from the frequency standard is stepped up by autotransformer A2A6A1A3L2. Clipper CR3, R5 removes the positive portion of the sine wave, and the remaining negative portion is used to drive shaper amplifier Q1 into saturation. The output of Q1 is a positive-going waveform with a fast rise time. This waveform is used to saturate shaper amplifier Q2, whose output is a negative pulse. The waveform on the base of shaper amplifier Q3 is a differentiated negative pulse which saturate Q3. The output from Q3 is basically an LR differentiating network (R15, L3), with the output taken across the inductor. A positive pulse is formed at the collector of Q3, and the output of L3 consists of a positive- and a negative-going waveform. The network CR5, R17, R22 selects only the positive portion of the waveform developed across L3. This output is a positive pulse of about 0.02-μs duration, providing a uniform spectrum from 1 to 25 MHz. This output is used to drive the base of mixer Q4.

3-187. The emitter of mixer Q4 is driven by the output of the MHz oscillator through isolation amplifier Q5 and emitter follower Q6. The output of mixer Q4 is double-tuned by L4 and T1. The center frequency is 1.5 MHz. The 1.5-MHz signal and MHz oscillator error are fed to the MHz oscillator agc board, where it is detected, amplified, and fed to the MHz oscillator to phase-lock the oscillator to the frequency standard.

3-188. MHz Oscillator AGC Circuit A2A6A1A2 (Figure 3-44). This circuit consists of if. amplifier Q1 and Q2, detector CR1, and dc amplifier Q3. Potentiometer R6 is adjusted to control the gain of the error loop. After detection by CR1, the error signal is filtered by the constant k- and m-derived filters in the emitter of Q3. Thermistor RT1 is a temperature-compensating resistor for Q2. The correction signal dc output is fed to the MHz oscillator to phase-lock the oscillator.

3-189. 100 KC SYNTHESIZER ELECTRONIC SUBASSEMBLY A2A6A2 (Figure 5-20). 100 KC Synthesizer Electronic Subassembly A2A6A2 furnishes the injection signals to the mid-frequency mixer in RF Translator Electronic Subassembly A2A6A6. It also contains an error-cancellation loop to compensate for cyrstal errors. The 100 KC Synthesizer output is in one of two frequency bands. The hi band is between 32.4 and 33.3 MHz (in 100-kHz increments). The lo band is between 22.4 and 23.3 MHz (in 100-kHz increments). The hi-/lo-relay A2K2 on the main frame controls whether the hi band or the lo band is used. The output frequency of the 100 KC synthesizer is determined by the 100 KC control and the CPS control on the front panel. Figure 3-45 is a simplified block diagram of the 100 KC synthesizer, which should be used as an aid to a clear

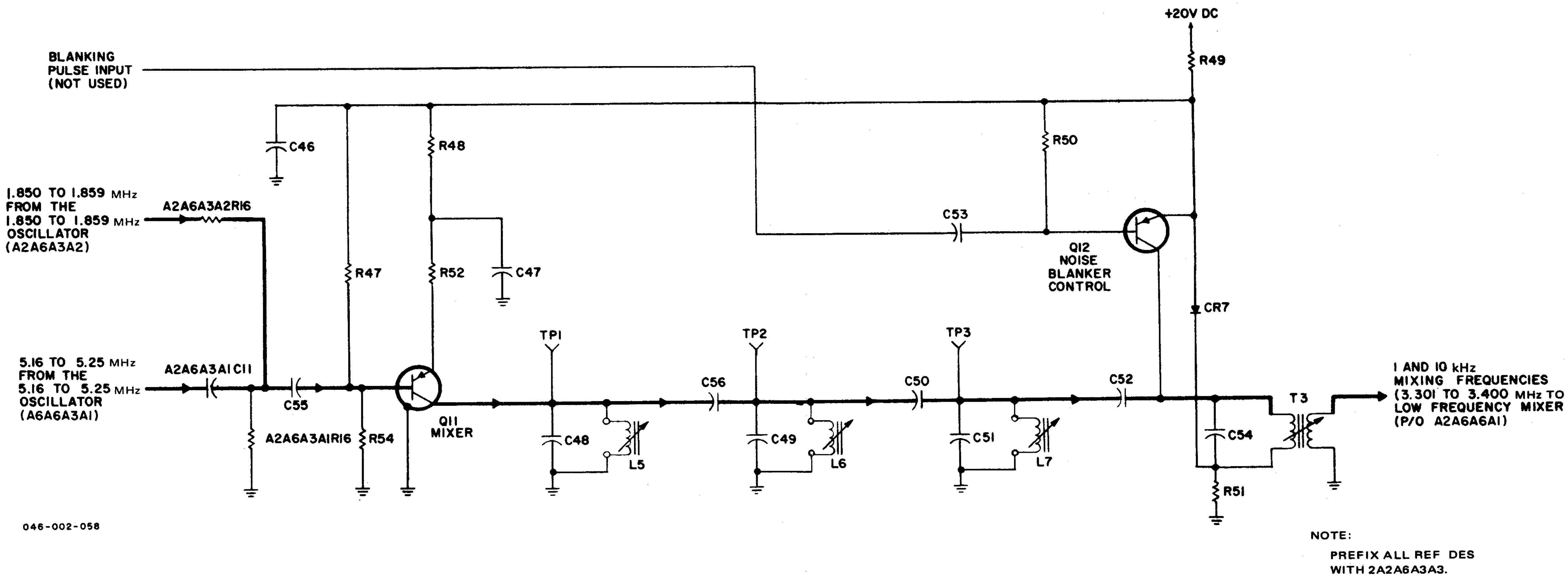


Figure 3-40. T-827B/URT, 1-and 10-kHz Output and Blanker, Simplified Schematic Diagram

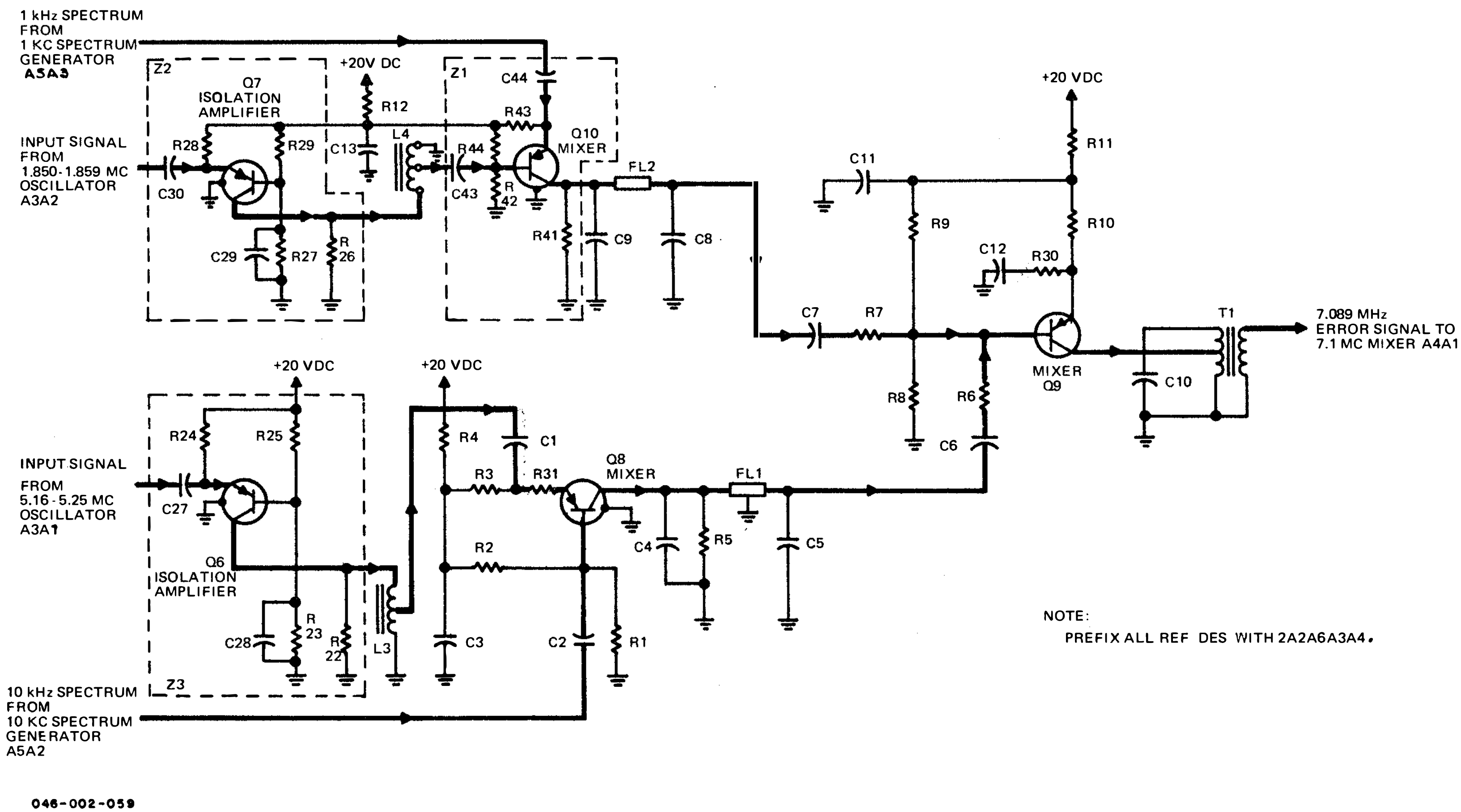


Figure 3-41. T-827B/URT, 1- and 10-kHz Error Mixer, Simplified Schematic Diagram

understanding of the interrelated feedback loops in this subassembly.

3-190. Switch A2A6A2S1 controls which one of 10 loose-tolerance crystals is switched into crystal oscillator A1Q1. The crystal frequencies are in steps of 100 kHz from 4.553 to 5.453 MHz. Diodes A1CR1 and A1CR2 are biased so that they limit the amplitude of the oscillator. Thermistor A1RT1 varies the bias on A1CR1 in correspondence to temperature changes. The output to the oscillator is fed to two points. One output feeds lo-band mixer IC1 and hi-band mixer IC2; the other output goes to isolation amplifier A2Q2.

3-191. The output of the isolation amplifier goes to the emitter of mixer A2Q1. The 15.3- to 16.2-MHz spectrum from the 100 KC spectrum generator is also fed into this mixer. The mixer products pass into crystal lattice filter A1FL1, which is tuned to 10.747 MHz and eliminates all other mixer products. The gain of mixer A2Q1 is controlled by an agc voltage that is applied to the emitter of mixer A2Q1, changing the bias on the transistor.

3-192. The output of the 10.747-MHz filter is applied to the base of mixer A3Q1. A 7.1-MHz signal containing the errors from the 1 and 10 KC synthesizer oscillators and the 100 CPS synthesizer information is applied to the emitter of A3Q1. These mixer products are passed to crystal filter A3Y1. This filter is tuned to 17.847 MHz, and eliminates all other products from mixer A3Q1. The output of the 17.847-MHz filter is applied to mixer IC1 in lo band and to the base of mixer A3Q2 in hi band.

3-193. The lo-band path is as follows. The 17.847 MHz from A3Y1 is mixed with the output of the 4.553 to 5.453 MHz from A1Q1 in lo-band mixer IC2. One of the additive mixer products will contain the desired frequency lying in the band from 22.4 to 23.3 MHz. This frequency, as selected by the 100 KC control and the CPS switch, will contain the 1 and 10 KC synthesizer errors and the CPS information; but will not have any A1Q1 oscillator error due to loop cancellation. This output is fed to the triple-tuned filter T2, T3, and T4. This filter is tuned to the band from 22.4 to 23.3 MHz. All other products except a small 17.847-MHz component are eliminated by this filter. Trap amplifier A4Q1 is degenerative at 17.847 MHz; it amplifies the desired frequency and eliminates the 17.847-MHz component. The desired frequency is coupled to emitter follower A5Q1, and thence to the mid-frequency mixer in the rf translator.

3-194. In the hi-band path, the 17.847-MHz filter output is mixed with a 10.0-MHz signal from the frequency standard to generate a 27.847-MHz injection to the hi-band mixer IC2. The 27.847 MHz is mixed with the 4.553- to 5.453-MHz output of oscillator A1Q1. The desired frequency is then in the 32.4- to 33.3-MHz range. The desired frequency, like the lo-band frequency, contains the 1 and 10 KC synthesizer oscillator errors and the CPS synthesizer information; but 100-kHz oscillator error is cancelled. This hi-band output is then routed through filter T8, T9 and T10 and trap amplifier A4Q2 to the emitter follower A5Q1, and thence to the output.

3-195. The agc output from emitter follower A5Q1 is fed to amplifier A5Q2, which is designed to flatten the frequency response and control the gain. Inductor L2 is used to peak the frequency response at 33.0 MHz, so that the amplifier has slightly higher gain at 33.0 MHz (hi band) than it does at 22.0 MHz (lo band). Variable resistor R13 in the emitter of amplifier A5Q3 enables this stage to be set at the required level to adjust the output of the 100 KC synthesizer. A5L3 in the base of agc detector A5Q4 provides a higher impedance to 33.0 MHz than it does to 22.0 MHz; therefore, a more uniform gain in either hi band or lo band is provided. Diode A5CR1 in the base bias circuit of the agc detector is used to temperature-compensate the detector stage. The agc output is fed to the emitter of mixer A2Q1 where it controls the gain of this mixer and, therefore, the synthesizer output.

3-196. The frequency-selection scheme in the T-827B/URT requires the use of either

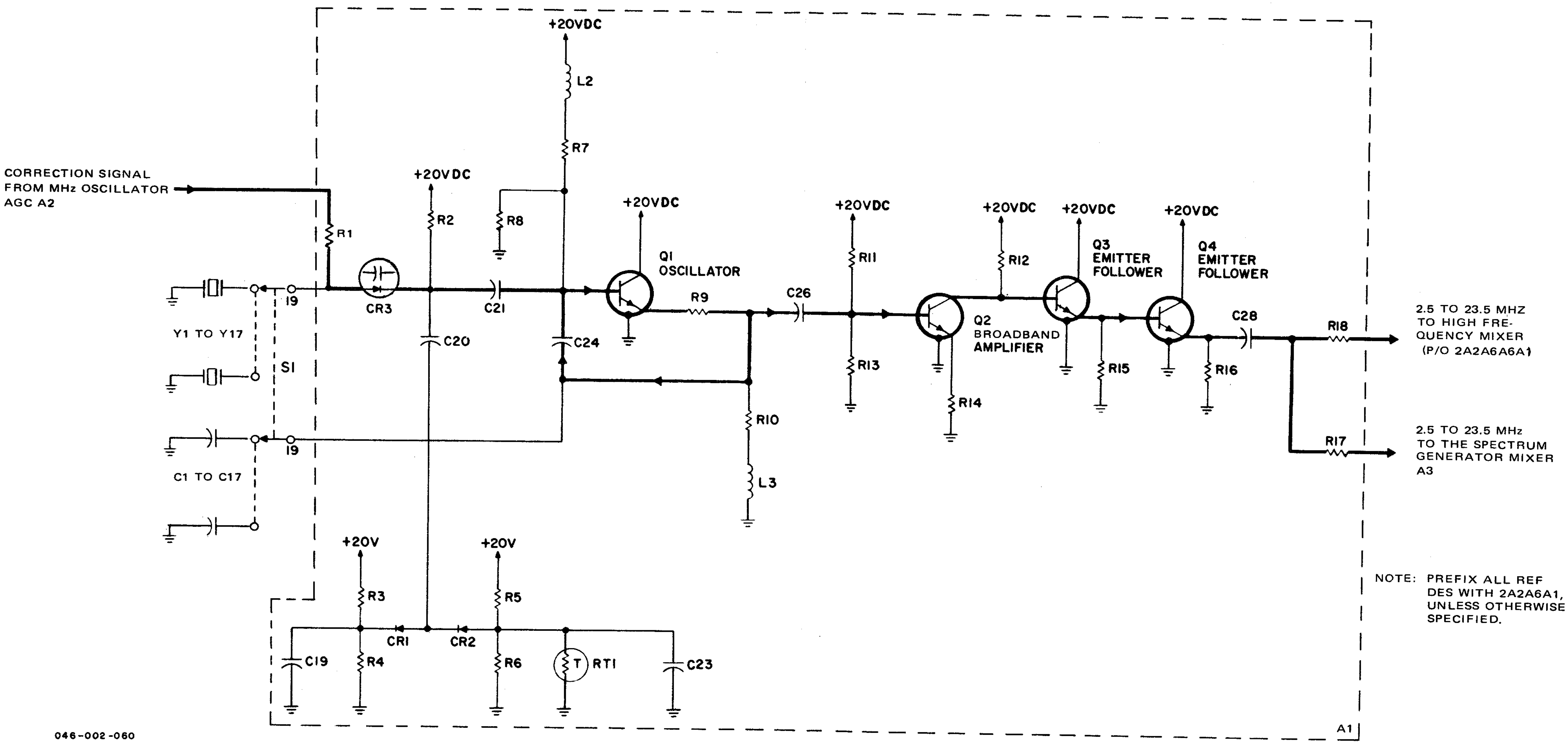


Figure 3-42. T-827B/URT, MHz Oscillator, Simplified Schematic Diagram

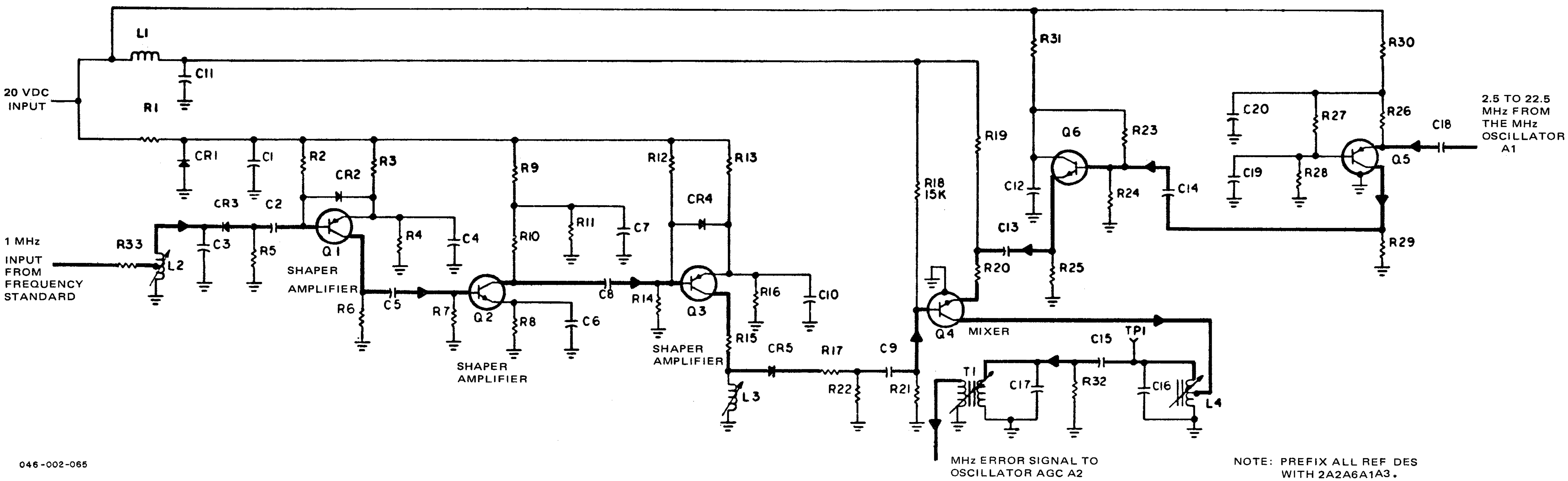


Figure 3-43. T-827B/URT, Spectrum Generator/Mixer, Simplified Schematic Diagram

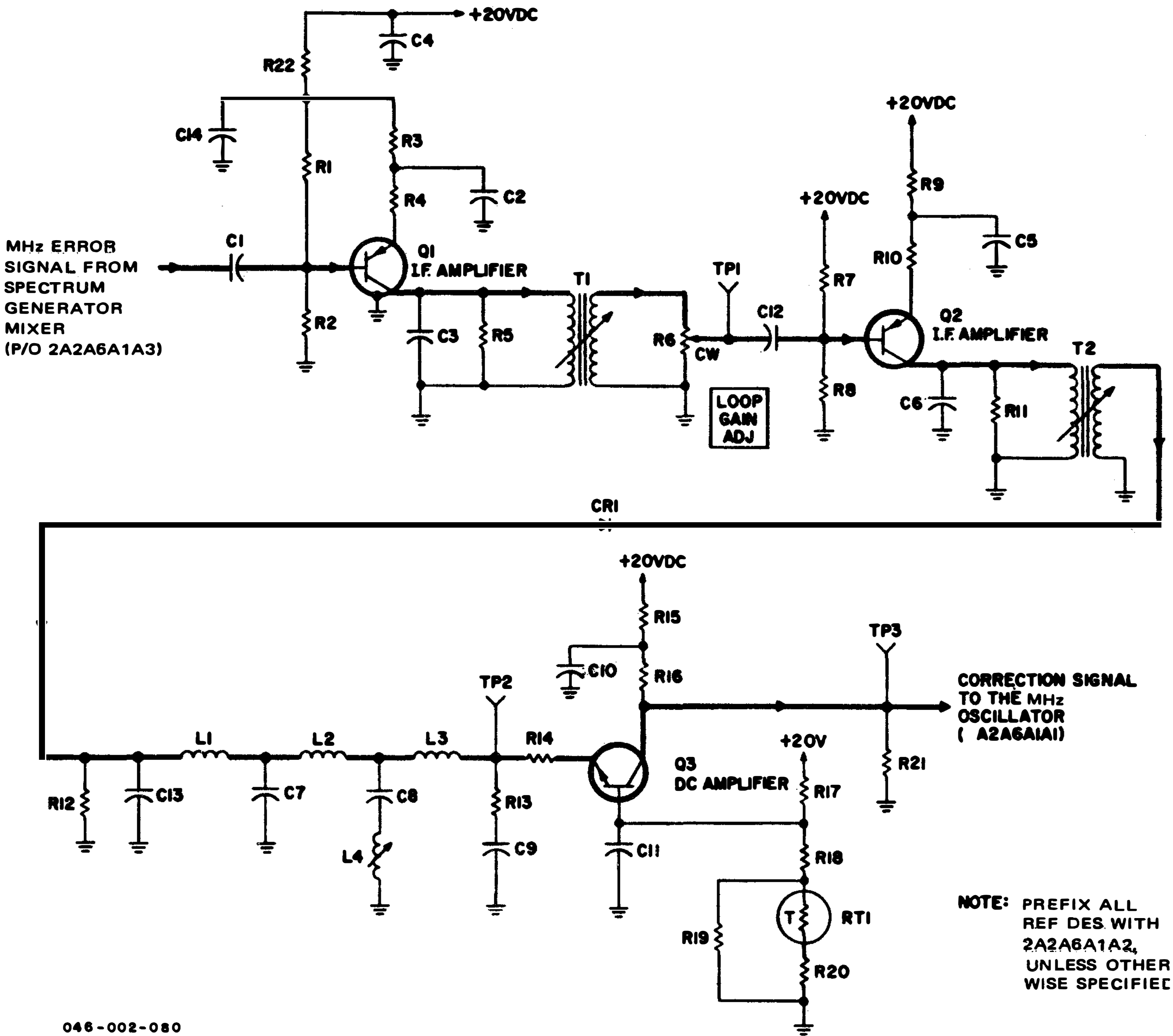


Figure 3-44. T-827B/URT, MHz Oscillator AGC, Simplified Schematic Diagram

one of two mixer-filter-amplfier channels on the hi band/lo band mixer amplifier board A4 (figure 5-20). The switch line is used to activate the appropriate channel as required by the frequency selected by the MCS controls on the front panel, which energize (or deenergize) hi-lo-band relay A2K2 on the main frame. A2K2 provides 20 Vdc to select the lo-band channel (IC1, Q1), or a ground to select the hi-band mixer-filter-amplifier channel (IC2, Q2).

The 20 Vdc (lo band) enables the IC1, Q1 path, and shunts the 10-MHz input to ground. The ground (hi band) enables the IC2, Q2 path, and routes the 10-MHz signal through A3CR1 to mixer A3Q2.

3-197. 100 CPS SYNTHESIZER ELECTRONIC SUBASSEMBLY A2A6A4 (Figure 5-22). 100 CPS Synthesizer Electronic Subassembly A2A6A4 is used to provide locked 0.1-kHz tuning steps in the

T-827B/URT. The 0.1-kHz increments are selected by the CPS switch A2S6 on the front panel. The output of the 100 CPS synthesizer is a frequency of 7.000 to 7.009 MHz The exact frequency is selected by the 000 to 900 positions of the CPS switch. The 7.000- to 7.009-MHz signal is fed to the 100 KC Synthesizer for use as a mixer injection. This output signal contains the error signal from the oscillators in the 1 and 10 KC syntheszier. The CPS Synthesizer is made up of three principal circuits: 100-Hz oscillator A2, preset counter A1, and 7.1-MHz mixer A3.

3-198. 100-Hz Oscillator A2A6A4A2 (Figure 3-46). This circuit consists of modified Colpitts (Clapp) oscillator Q2, dc amplifier Q1, buffer amplifier Q3, and phase detector (integrated circuit) IC1. The 100-Hz oscillator generates the 100-Hz tuning increments. Tuning of the oscillator 110 to 119 kHz in 1-kHz steps is accomplished by a reactance-control circuit using voltage-variable capacitors CR7, CR8, and CR9. Phase detector IC1 furnishes the desired frequency control voltages for the locked steps.

3-199. The tank circuit of oscillator A2A6A4A2Q2 consists of capacitors C9, C10, C11, C13, C14, C15, and C5, and voltage-variable capacitors CR7, CR8, and CR9. Capacitor C14 is selected to adjust the initial frequency of oscillator Q2. Voltage-variable capacitors CR7, CR8, and CR9 provide the required pulling range for the phase-lock loop. Capacitor C15 has a negative temperature coefficient to compensate for temperature changes in oscillator Q2. The oscillator produces an output of 110 to 119 kHz, depending upon the setting of the CPS switch.

3-200. The 1-kHz pulse output of the spectrum generator A2A6A5 is coupled directly to phase detector A2A6A4A2IC1. A reset pulse from preset counter A2A6A4A1 is also coupled directly to phase detector A2A6A4A2IC1. The output voltage from phase detector IC1 is applied to amplifier Q1. The output of amplifier Q1 is filtered and then applied to the voltage-variable capacitors to control the frequency of oscillator Q2. In the feedback loop, filter network FL1 is designed to have a low-pass characteristic with a cut-off frequency at about 250 Hz, well above the loop cut-off frequency. Consequently, the oscillator capture range is equal to its hold-in range.

3-201. Assume that the output of the oscillator is 110.2 kHz. The desired oscillator frequency is 110 kHz. The oscillator output of 110.2 kHz is coupled to the pulse-shaper circuit of the preset counter. This output is then coupled to the preset dividers and divided down by a factor of 110 to a frequency of 1.02 kHz. This output is coupled directly to phase detector IC1. A 1-kHz pulse from the spectrum generator also is coupled directly to the phase detector. The two inputs of 1 and 1.02 kHz are compared, and an ac voltage (sawtooth waveform) is developed. This ac output is coupled to amplifier Q1 and filtered in filter network FL1. The voltage is then applied to voltage-variable capacitors CR7, CR8, and CR9, thus sweeping the oscillator frequency. Since the feedback loop is closed, this frequency decreases with time due to the decrease of the oscillator output frequency as it is being swept. After this sweep frequency has been decreased to a frequency within the pull-in range of the oscillator, the oscillator pulls in and locks at the desired 110 kHz. At this time, the output of the phase detector is the dc reference level. If the phase of the oscillator begins to drift, the phase difference is detected by the phase-detector circuit, and the dc output is shifted accordingly to correct the oscillator frequency.

3-202. The 100 CPS synthesizer, when employed in a receiver, may be tuned in vernier. The vernier control varies the oscillator in the unlocked frequency range from 108 to 211 kHz. In vernier (receive), phase detector IC1 and preset dividers IC2 through IC4 are disabled by removing their supply voltage. The vernier function is never used in the T-827B/URT.

3-203. Preset Counter A2A6A4A1 (Figure 3-47). This circuit consists of pulse

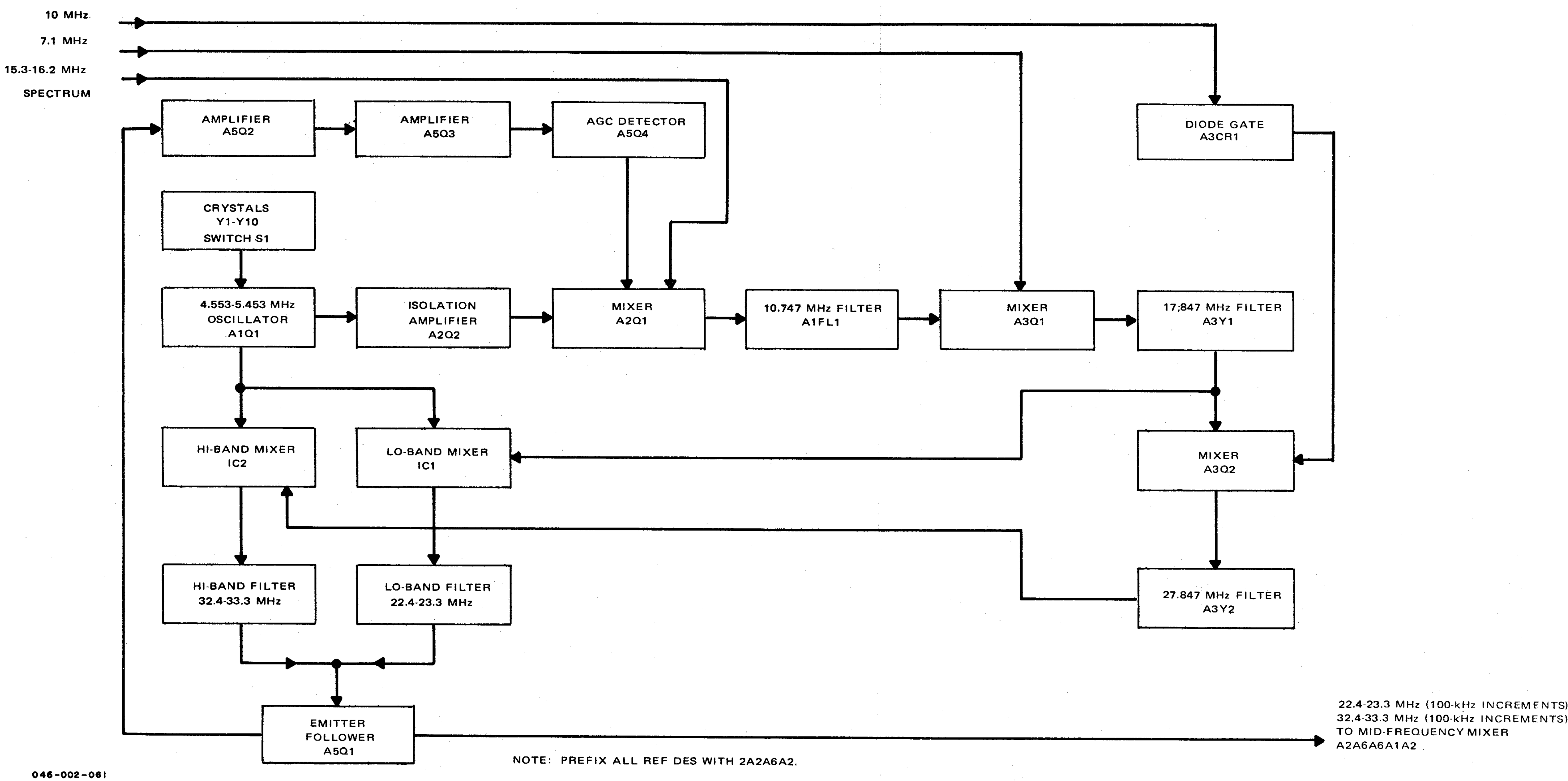
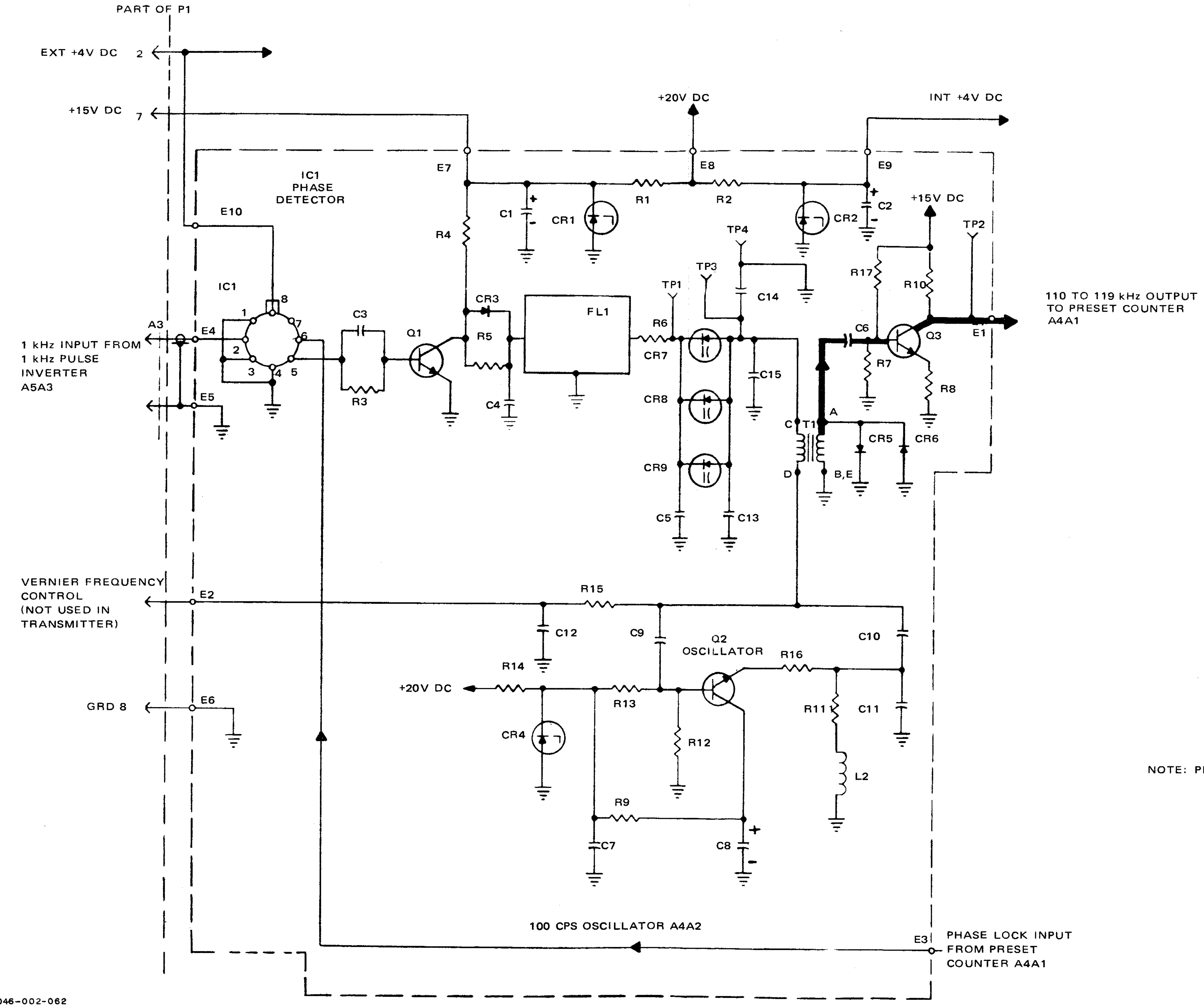


Figure 3-45. T-827B/URT, 100-KC Synthesizer, Simplified Schematic Diagram



NOTE: PREFIX ALL REF DES WITH 2A2A6.

Figure 3-46. T-827B/URT, 100-Hz Oscillator, Simplified Schematic Diagram

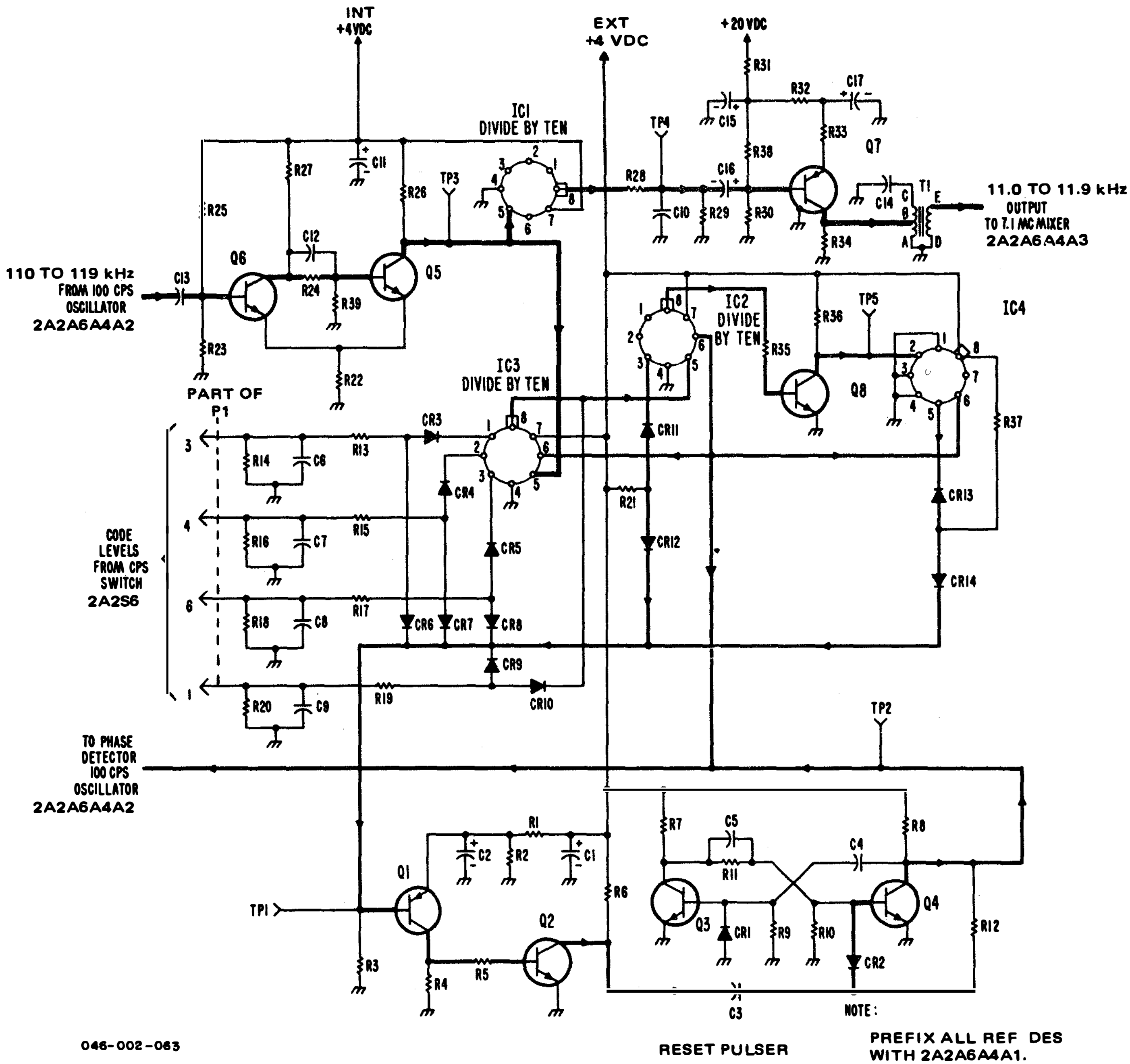


Figure 3-47. T-827B/URT, Preset Counter, Simplified Schematic Diagram

shaper Q5 and Q6; decade dividers IC1, IC2, and IC3; inverter Q8; flip-flop IC4; reset pulser Q1, Q2, Q3, and Q4; amplifier Q7; and emitter follower Q9. These circuits provide two functions: they divide the 110- to 119-kHz output from the 100-Hz oscillator by 10 to provide the 11- to 11.9-kHz signal required for mixing in 7.1-MHz mixer A2A6A4A3, and they generate a reset pulse, the frequency of which dictates whether any oscillator frequency error exists from that which is preselected. This reset pulse is coupled to phase detector A2A6A4A2IC1 for comparison to the 1-kHz standard frequency.

3-204. Pulse shaper A2A6A4A1Q5 and Q6 is a Schmitt-trigger circuit which receives the locked 110- to 119-kHz sinusoidal output from the 100-Hz oscillator. This input signal is developed into a negative output pulse with a sharp leading edge for each cycle of the oscillator output frequency. The pulse shaper output is coupled directly to decade divider and to decade divider IC3 of the preset divider group.

3-205. Operating voltage for decade divider IC1 is applied from the external 4-Vdc supply. The divider provides one output pulse for every ten input pulses applied from the pulse shaper. The 11- to 11.9-kHz output from divider IC1 is coupled to amplifier Q7. The amplifier output signals from amplifier Q7 are developed across a tuned circuit consisting of capacitor C14 and the primary of transformer T1. Resistor R34 increases the bandwidth of the tuned circuit. The sinusoidal output is applied to 7.1-MHz mixer A2A6A4A3.

3-206. The preset divider is a digital device composed of integrated circuits IC2 through IC4 and coding from the CPS switch on the front panel. When a preselected count is reached, a coincidence gate triggers a circuit which resets the dividers. The preset dividers are reset to 0 and a count is initiated by the pulses derived from the oscillator A2A6A4A2Q2. This count continues until coincidence is reached at some digitally preselected count from the front-panel CPS switch, and then a reset is generated. The reset-to-zero time of the counter must be shorter than the time between incoming pulses. When the counter is reset, a trigger is also generated in binary phase detector A2A6A4A2IC1. (This frequency is divided by 10 for the desired 100-Hz increments.) If the oscillator frequency is precisely the frequency for which the preset divider is coded, the reset circuitry output will be exactly 1 kHz. If, however, there is a 0.5-percent error in oscillator frequency, the reset trigger output frequency to the phase detector will contain the same percent of error, or 5 Hz. When this signal is compared in the phase detector against the 1 kHz, derived from the frequency standard, a phase-detector correction voltage is generated. This voltage, by means of A2A6A4A2CR7 through A2CR9, corrects the oscillator frequency so that the divider output is 1 kHz, thus maintaining the oscillator in lock with the frequency standard.

3-207. Integrated circuits A2A6A4A1IC2 through IC4 and transistor Q8 form a preset divider which may be coded to divide by any number between 110 and 119. Therefore, any oscillator frequency between 110 and 119 kHz may be divided down to 1 kHz for phase comparison in phase detector A2A6A4A2IC1 with the standard 1-kHz reference pulse. This produces 1-kHz increments from 110 to 119 kHz. The preset divider chain is used to provide a coded count that is representative of the corresponding frequency digit.

3-208. Decade divider A2A6A4A1IC3 is designed to divide by a maximum of 10, but it may be programmed by the CPS switch to reset at any integer count less than 10. The four flip-flops in the decade divider are arranged to generate a binary code. This is accomplished by diode-coding gates CR3 through CR10 which, when energized, contribute to the generation of a reset pulse. The absence of coding voltage on any of the four gates effectively removes the flip-flop corresponding to that gate from the coincidence circuit. Be selectively energizing 0, 1, 2, or 3 lines per decade, the coding from 0 to 9 is accomplished.

3-209. The output of the decade divider is fed to integrated circuits IC2 and IC4, which are programmed by gates CR11 through CR14 to divide by 11. Amplifier Q8 functions as a buffer-inverter between IC2 and IC4. The gate outputs from the decade and the divide-by-eleven counters are summed to provide control voltage for the reset pulser. When the entire programmed count is reached, the disappearance of control voltage on the output gates (junction of diodes CR6 through CR9) initiates a reset pulse.

3-210. The reset pulser consists of overdriven amplifiers Q1 and Q2, which shape a pulse suitable to trigger the 7-μs delay multivibrator Q3 and Q4, which generates a 7-μs negative pulse which is applied through emitter follower Q9 to the reset circuit (pin 6) of all the integrated circuits in the preset divider group. The count is now complete.

3-211. 7.1-MHz Mixer A2A6A4A3 (Figure 3-48). This circuit consists of amplifier Q4, mixer Q2 emitter followers Q1 and Q3, and 7.1-MHz crystal filter FL2. These circuits mix the 11- to 11.9-kHz output from preset counter A2A6A4A1 with the 7.089-MHz output from 7.089-MHz mixer A2A6A3A4 to produce a nominal 7.1-MHz output with a level suitable for use in 17.847/27.847-MHz mixer A2A6A2A3. These circuits are used in all modes of operation.

3-212. Emitter follower A2A6A4A3Q1 provides a low-impedance source for mixer Q2. The output from emitter follower Q1 is developed across resistor R4 and coupled to the emitter of mixer Q2 by capacitor C2. Due to the large difference in frequency between the two inputs, resistor R6 develops a small amount of degeneration to increase the stability of mixer Q2. The 7.089-MHz output from 7.089-MHz mixer A2A6A3A4 is coupled to the base of mixer A2A6A4A3Q2 by capacitor C5. Transistor Q2 mixes the 11- to 11.9-kHz signal with the 7.089-MHz signal to provide one of 10 fixed outputs, depending upon the position of the CPS control on the front panel. If 11 kHz is used (front-panel CPS control at 000 setting), the mixing products are 11 kHz, 7.089 MHz, 7.078 MHz, and 7.1 MHz. If 11.9 kHz is used (front-panel CPS control at 900 setting), the mixing products are 11.9 kHz, 7.089 MHz, 7.0771 MHz, and 7.1009 MHz. One of these two groups of mixing products is developed across resistor R9. The signals developed across resistor R9 are applied to filter FL2. Filter FL2 is very selective, allowing only the 7.1000- to 7.1009-MHz signals to pass. Capacitor C7 and resistor R9, and capacitor C8 and resistor R10 form the input and output terminations, respectively, for crystal filter FL2. The output from filter FL2 is coupled to the base of emitter follower Q3 by capacitor C16.

3-213. The operating voltage for emitter follower Q3 is developed from the positive 20-Vdc supply line by voltage divider R11, R12 and emitter resistor R15. Resistor R13 and capacitor C11 provide decoupling to prevent interaction with the other circuits connected to the positive 20-Vdc supply line. Emitter follower Q3 isolates filter FL2 to prevent it from being adversely loaded by amplifier Q4. The output from emitter follower Q3 is developed across resistor R15 and is coupled to the base of amplifier Q4 by capacitor C10. The operating voltage for amplifier Q4 is developed by voltage divider R16, R18 and emitter resistor R19. Resistor R17 and capacitor C11 provide decoupling to prevent interaction with the other circuits connected to the positive 20-Vdc supply line. Capacitor C14 is the emitter-bypass capacitor. The amount of gain provided by amplifier Q4 is controlled by adjusting the amount of degeneration developed by potentiometer R20. The amplified output from amplifier Q4 is developed across the tuned circuit consisting of capacitor C13 and the primary of transformer T1, and is applied to 17.847/27.847-MHz mixer A2A6A2A3.

3-214. <u>RADIO TRANSMITTER T-827B/URT, DC POWER SUPPLY CIRCUIT DESCRIPTION.</u> (See Figure 3-49.)

3-215. POWER SUPPLY ELECTRONIC ASSEMBLY A2A8. Power Supply Electronic Assembly A2A8 consists of the positive 110-Vdc supply, the positive 28-Vdc supply, and the positive 20-Vdc regulated supply. These circuits supply operating voltages to all the circuits in the T-827B/URT.

3-216. All power is derived from the nominal 115-Vac line, which is applied through switches A2S7, A2S8, and A2S2, and fuses A2F1, A2F2, to the primary of power transformer A2T1. Indicator lamps A2DS1 and A2DS2 will light if respective fuses, A2F1 and A2F2, open. The primary of transformer A2T1 is tapped so that in locations where line voltages differ slightly from the normal 115 Vac on a reasonably permanent basis. the difference can be compensated by reconnecting to a new tap. The 6.3 Vac from terminals 13 and 14 on the secondary of transformer A2T1 powers the filament of rf amplifiers V1 and V2 in RF Amplifier Electronic Assembly A2A4.

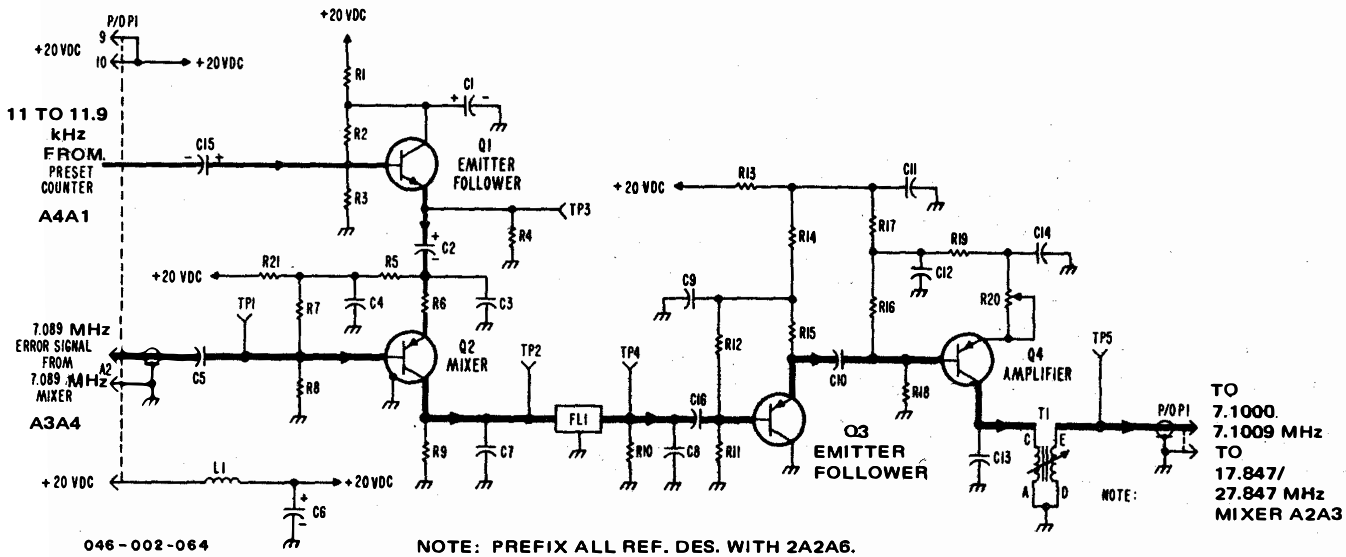


Figure 3-48. T-827B/URT, 7.1-MHz Mixer, Simplified Schematic Diagram

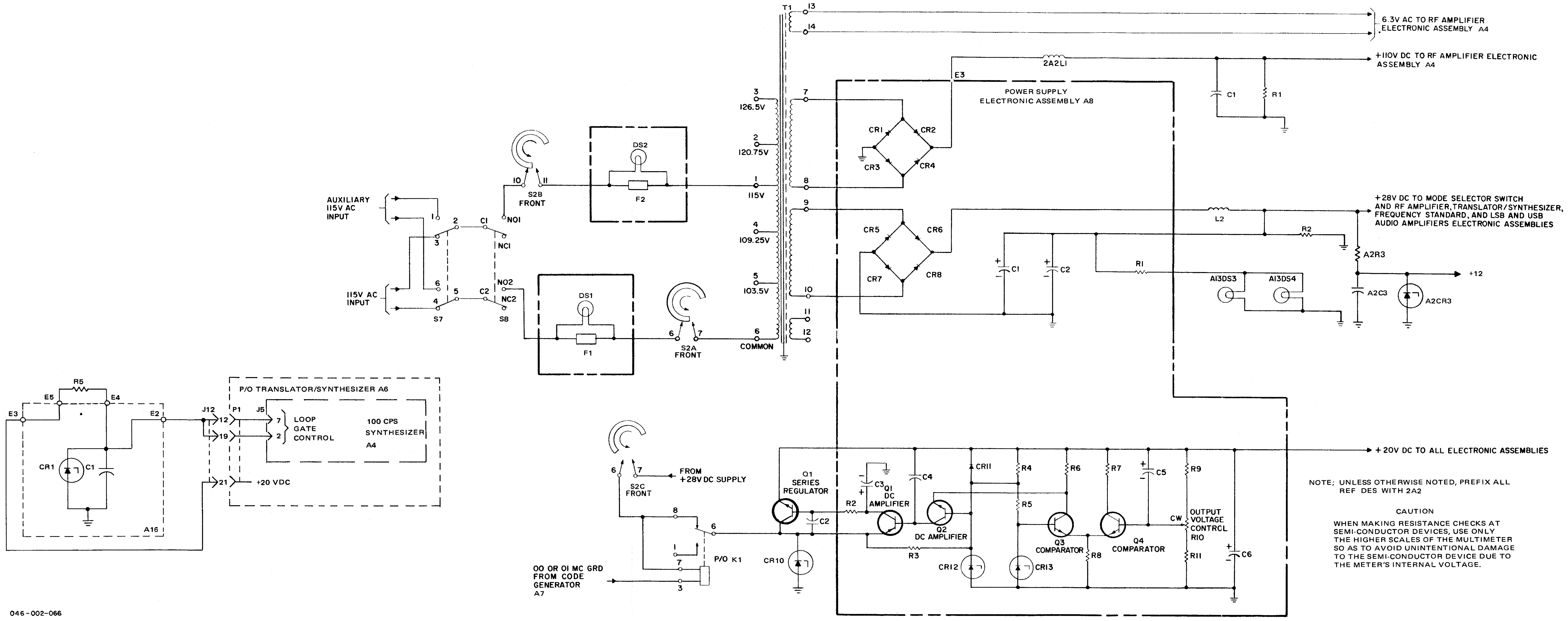


Figure 3-49. T-827B/URT, Power Supply, Simplified Schematic Diagram

The output from terminals 7 and 8 of Transformer A2T1 is applied to bridge rectifier consisting of diodes A2A8CR1 through CR4. The rectifier output is applied to a choke input filter consisting of choke A2L1 and capacitor A2C1. The output from the choke input filter (+110 Vdc) is used as the plate and screen voltage supply in RF Amplifier Electronic Assembly A2A4. Resistor A2R1 is a bleeder load for the +110 Vdc. The output from terminals 9 and 10 of transformer A2T1 is applied to a bridge rectifier, consisting of diodes A2A8CR5 through CR8. The rectifier output is applied to a choke input filter consisting of choke A2L2 and capacitors A2A8C1 and C2. The output from the choke input filter (+28 Vdc) is used in the RF Amplifier, Frequency Standard, and Translator/Synthesizer Electronic Assemblies A2A4, A2A5, and A2A6. The regulated +20-Vdc supply is derived from the +28-Vdc source. Resistor A2R2 is the bleeder load for the +28 Vdc.

3-217. The regulated +20-Vdc supply consists of series regulator A2Q1, dc amplifiers A2A8Q1 and Q2, comparators Q3 and Q4, 12-Vdc zener diode CR12, and 4.7-Vdc zener diode CR13. This circuit provides a constant +20 Vdc regardless of the load. The input voltage of +28 Vdc is applied to the collector of series regulator A2Q1 through contact 7 and 6 on front of section C of Mode Selector switch A2S2 (set to any position other than OFF or STD BY) and contacts 8 and 6 of relay A2K1. If the MCS controls are set to the 00 or 01 position, a ground is applied to relay A2K1. The relay is energized and thereby inhibits the output of the regulated 20-Vdc supply unless the operating frequency is 2.0 to 30.0 MHz. The collector-to-emitter resistance is inversely proportional to the amount of base-to-emitter current. The +20-Vdc output voltage is selected by adjusting output voltage control A2A8R10, which controls the bias voltage on comparator Q4. The bias voltage determines the amount of emitter current flow, thereby determining the voltage across the emitter resistor R8. Since the bias voltage on the base of comparator Q3 is held constant by zener diode CR13, the collector current flow will be determined by the emitter voltage. The emitter of comparator Q3 is connected to the emitter of comparator Q4; therefore, the collector current of comparator Q3 will be controlled by the bias voltage on comparator Q4. The collector current flow of dc amplifier Q2 is controlled by the collector voltage on comparator Q3 since the base voltage is held constant by zener diode CR12. The collector current of dc amplifier Q1 is controlled by the collector current of dc amplifier Q2. The collector current through resistor R2 determines the bias voltage on the base of series regulator A2Q1 which determines the emitter-to-collector resistance.

3-218. To understand fully the operation of the regulated +20-Vdc supply, assume that some of the load on the +20 Vdc has been removed. This condition causes the +20 Vdc to rise. This rise increases the base-bias voltage of comparator A2A8Q4, thereby increasing the voltage across resistor R8. This increase results in a decrease in the base-to-emitter voltage of comparator Q3, thereby causing an increase in collector voltage. Since the emitter of dc amplifier Q2 is connected to the collector of comparator Q3, and the base voltage is held constant by zener diode CR12, the increase in collector voltage in comparator Q3 causes the collector current to decrease in dc amplifier Q2. Since the collector of dc amplifier Q2 is connected to the base of dc amplifier Q1, the decrease in collector current in dc amplifier Q2 causes a decrease in collector current in dc amplifier Q1. Since the collector of dc amplifier Q1 is connected to the base of series regulator A2Q1 through resistor A2A8R2, a decrease in collector current in dc amplifier Q1 causes the collector-to-emitter resistance to increase, thereby causing the voltage to fall back to +20 Vdc. Resistor R2 acts as a parasitic suppressor. Diode CR11 provides circuit protection in the event the +20-Vdc line becomes grounded. Normally, diode CR11 is back-biased due to the +20 Vdc on its anode and +12 Vdc on its cathode. If the +20-Vdc line becomes grounded, the diode will become forward-biased, dropping the base of dc amplifier Q2 to ground potential and preventing damaging current flow in dc amplifiers Q1 and Q2.

3-219. 4-VDC POWER SUPPLY ELECTRONIC ASSEMBLY A2A16 (Figure 3-49).

The 4-VDC Power Supply A2A16 provides a positive 4-volt source to 100 CPS Synthesizer Electronic Subassembly A2A6A4. This voltage is received from the main power supply, A2A8. The 20 Vdc is applied at terminal E3 of the A2A16 board. This input is interlocked through the 100 CPS synthesizer such that it is removed when the assembly is removed from the equipment. This prevents excessive drain from the 20-Vdc source. Zener diode A2A16CR1 regulates the input down to 4 Vdc, which is applied to terminal E2.

3-220. RADIO TRANSMITTER T-827B/URT, DIGITAL TUNING CIRCUITS. (See Figure 3-8.)

3-221. GENERAL. The digital tuning circuits tune the T-827B/URT to the selected rf output channel, using a set of front-panel controls arranged on a one-knob-per-digit basis. The digital tuning controls also tune the high-power amplifier AM-3007/URT to the T-827B/URT output frequency. In addition, the MCS controls automatically coarse-tune the CU-937/UR antenna coupler.

3-222. The 100, 10, and 1 KC controls are mechanically linked to their respective circuitry by a chain-drive mechanism, and requre no detailed functional circuit description. The 10 and 1 MCS controls are mechanically linked to the Code Generator Electronic Assembly A2A7. The functional circuit description of the MCS tuning circuit is given in the following paragraphs.

3-223. MCS TUNING CIRCUIT (Figure 3-50). The MCS tuning circuit consists of Code Generator Electronic Assembly A2A7; switch S1, motor B1, and relay K1 in RF Amplifier Electronic Assembly A2A4; switch S1, motor B1, and relay K1 in MC Synthesizer Subassembly A2A6A1; and hi-/lo-filter relay A2K2 on the main frame on the T-827B/URT.

3-224. The code generator consists of switches A2A7S3 and S4, which comprise three parallel, open-seeking, tuning circuits, each employing a five-wire coding scheme. Two of these tuning circuits generate a tuning code for positioning the turret assembly in RF Amplifier Electronic Assembly A2A4 and the crystal switch in MC Synthesizer Electronic Subassembly A2A6A1. The third tuning circuit generates a tuning code for positioning the turret assembly in the rf power amplifier, AM-3007/URT.

3-225. Switches A2A7S3 and S4 are controlled by the 10 and 1 MCS controls on the front panel. These two switches are analogously represented (figure 3-50) by sections A, B, C, D, and E, of which sections A and C form two 28-position images. For the actual schematic diagram representation of these switches, see figure 5-25. Section A establishes the tuning code for turret switch S1 in RF Amplifier Electronic Assembly A2A4 and section C establishes the tuning code for crystal switch S1 in MC Synthesizer Electronic Subassembly A2A6A1. The tuning code generated by section A is one of 28 series of opens and grounds, each series representative of one of the 28 tuning positions of turret switch S1 (refer to table 3-1). The tuning code generated by section C, although also a 28-position switch, is one of 17 series of opens and grounds, each series representative of one of the 17 positions of crystal switch S1. (Refer to table 3-1). Section A (master) applies the coded information to turret switch S1-A (master). A ground path is thus established through the common contact of S1-A to pin 7 of turret motor relay K1, causing it to energize, since positive 28 Vdc is applied to pin 3. When turret motor relay K1 energizes, turret motor B1 is energized by the application of a positive 20 Vdc through contacts 5 and 2 of turret motor relay K1. When energized, motor B1 rotates, rotating turret switch S1 until the complement of the code on section A (master) is reflected by turret motor switch S1-A (master). When the codes on the two masters are complementary, the ground path to turret motor relay K1 is broken, causing it to deenergize. Similarly section C generates a code to crystal switch S1 to energize its respective motor to rotate crystal switch S1 to the correct position established by the position of the

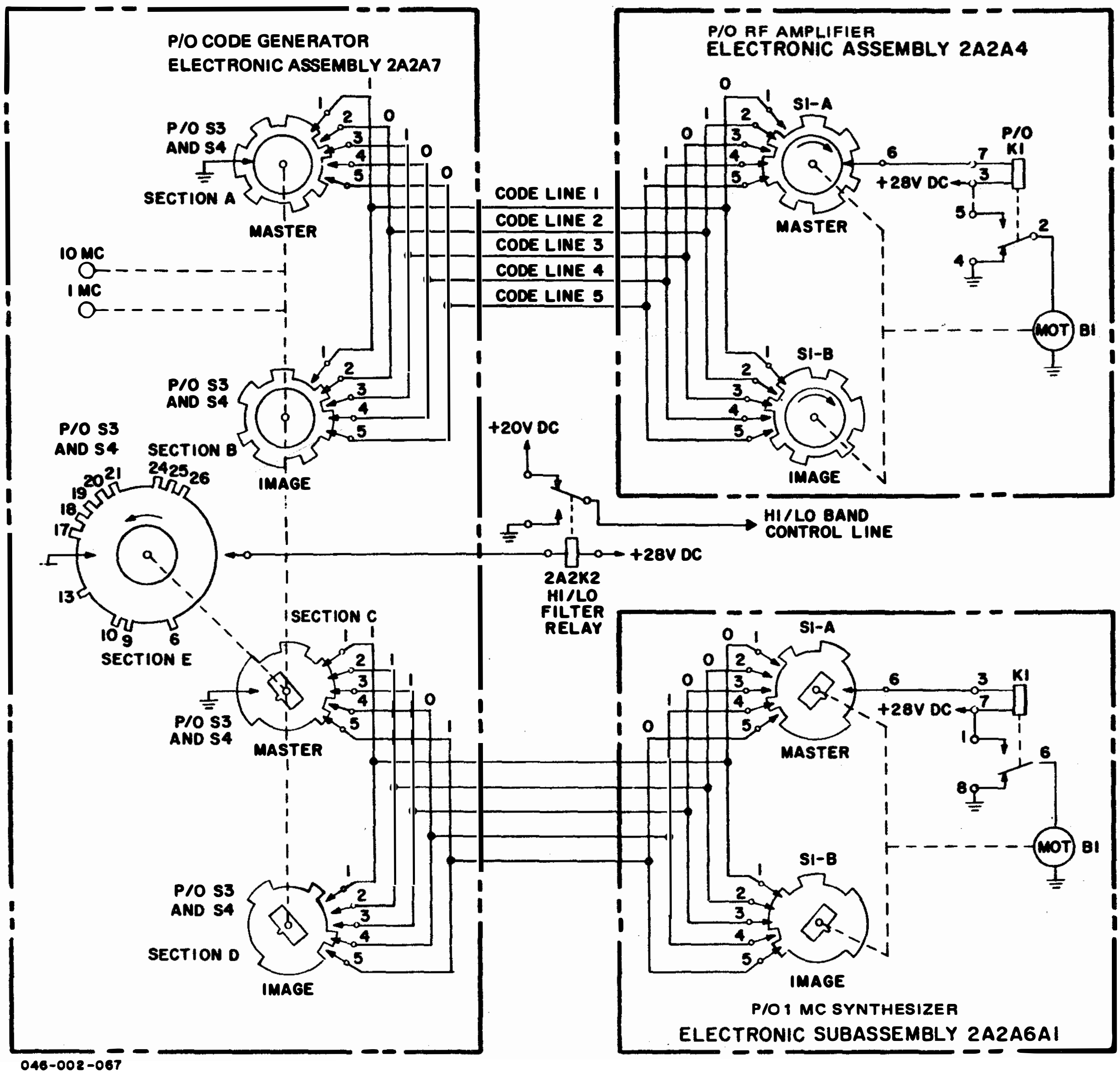


Figure 3-50. T-827B/URT, MCS Tuning Circuit, Simplified Schematic Diagram

1 and 10 MCS controls on the front panel.

3-226. The image switches in the code generator, sections B and D, turret switch S1-B, and crystal switch S1-B, always have the complementary code of their respective masters. This ensures that the ground (grounds) will be applied to the masters whenever a new code is selected. This is accomplished by the cut of the wafer, which is the exact mirror image of the respective master. All contacts appearing as opens or grounds at the master appear as grounds or opens, respectively, at the image.

3-227. As shown in figure 3-50, sections A and B are positioned to represent the code 10100 (x2.xxx MHz). If the MCS controls on the front panel were set at x3.xxx MHz, sections A and B would be

TABLE 3-1. TUNING CODE CHART

T-827B/URT											ASSOCIATED RF POWER AMPLIFIER					
MCS AND 100 KCS CONTROLS SETTING	A2A4 CODE LINES					A2A6A1 CODE LINES					PASS BAND	CODE LINES				
	1	2	3	4	5	1	2	3	4	5		1	2	3	4	5
2	1	0	1	0	0	1	1	1	0	1	2.0 - 2.4995	0	0	0	0	1
2.5											2.5 - 2.9995	0	0	0	1	1
3	0	1	0	0	0	1	0	1	1	1	3.0 - 3.4995	0	0	1	1	1
3.5											3.5 - 3.9995	0	1	1	1	1
4	1	0	0	0	1	1	1	0	1	1	4.0 - 4.9995	1	1	1	1	0
5	0	0	0	1	1	0	1	1	0	1	5.0 - 5.9995	1	1	1	0	1
6	0	0	1	1	0	0	1	0	0	0	6.0 - 6.9995	1	1	0	1	1
7	0	1	1	0	1	1	0	0	1	1	7.0 - 7.9995	1	0	1	1	1
8	1	1	0	1	1	1	1	0	0	1	8.0 - 9.9995	0	1	1	1	0
9	1	0	1	1	0	1	0	1	0	0						
10	0	1	1	0	0	1	1	0	1	0	10.0 - 11.9995	1	1	1	0	0
11	1	1	0	0	0	0	0	1	1	1						
12	1	0	0	0	0	0	0	0	1	1	12.0 - 13.9995	1	1	0	0	1
13	0	0	0	0	1	1	0	1	1	1						
14	0	0	0	1	0	0	1	1	1	0	14.0 - 15.9995	1	0	0	1	0
15	0	0	1	0	1	0	0	1	1	0						
16	0	1	0	1	1	1	1	1	1	0	16.0 - 17.9995	0	0	1	0	0
17	1	0	1	1	1	1	0	0	1	1						
18	0	1	1	1	1	1	1	0	0	1	18.0 - 19.9995	0	1	0	0	1
19	1	1	1	1	0	1	1	1	0	0						
20	1	1	1	0	0	0	1	1	1	1	20.0 - 21.9995	1	0	0	1	1
21	1	1	0	0	1	0	0	1	1	1						
22	1	0	0	1	0	0	0	0	0	1	22.0 - 23.9995	0	0	1	1	0
23	0	0	1	0	0	1	1	1	1	0						
24	0	1	0	0	1	0	1	1	1	0	24.0 - 25.9995	0	1	1	0	0
25	1	0	0	1	1	0	0	1	1	0						
26	0	0	1	1	1	1	1	1	1	0	26.0 - 27.9995	1	1	0	0	0
27	0	1	1	1	0	0	0	0	1	1						
28	1	1	1	0	1	0	0	1	1	1	28.0 - 29.9995	1	0	0	0	0
29	1	1	0	1	0	0	1	1	1	1						

0 indicates open

1 indicates ground

rotated one position counterclockwise, creating a new code of 01000. (Refer to table 3-1.) A ground path would be established to pin 7 of turret motor switch S1-A. This energizes turret motor relay K1, which, in turn, energizes turret motor B1, rotating turret motor switch S1 until the image code 10111 is reflected by turret motor switch S1-A. At this time, the ground path is broken, causing turret motor relay K1 to deenergize. Ground is then applied through contacts 2 and 4 of turret motor relay K1 to turret motor B1. This dynamically brakes turret motor B1. If the MCS controls on the front panel were set at 22.xxx MHz rather than x2.xxx MHz, the code generated by section A would have been 10000. As shown in figure 3-50, there is no ground path directly between the two masters. This time, the ground path would be through code line 1 to turret motor switch S1-B (image), code line 3 to section B (image), and code line 2 to turret motor switch S1-A (master). Therefore, the ground path to turret motor relay K1 is established using the images. In a similar manner, any code can be traced and the tuning of turret switch S1 will be accomplished for any code shown in table 3-1. Similarly, the codes shown in table 3-1 can be used to energize crystal switch motor relay K1 to tune crystal switch S1 to the correct position established by the MCS controls on the front panel.

3-228. Section E of the code generator switches generates the hi-/lo-band control line codes. The wiper of section E remains open until it is placed in an MHz position that has a tab. At this time, ground is applied to hi-/lo-filter relay A2K2, causing it to energize. When the relay is energized, ground is placed on the hi-/lo-band control line. When hi-/lo-filter relay A2K2 is deenergized, a positive 20 Vdc is applied to the hi-/lo-band control line.

3-229. RADIO TRANSMITTER T-827B/URT, MAIN FRAME AND CONTROL SWITCHING. (See Figures 3-51 and 5-13).

3-230. The main frame and control switching circuits consist of switch A2S1, S2, S7, and S8, and relays K1, K3, K4, K5, and K6, mounted on the T-827B main frame. These circuits energize and key the circuits required for each mode of operation.

3-231. When operating as part of a radio set such as the AN/WRC-1B, primary power (115 Vac) for the T-827B/URT is normally received, via the associated rf amplifier (such as the AM-3007/URT) or interconnection box, at pins R and S at connector A1A1J4 at the rear of the unit. In the NORM position of AUX/NORM switch A2S7, the 115 Vac is routed to interlock switch A2S8. When the T-827B/URT is operating independently, primary power is routed directly by setting the AUX/NORM switch to the AUX position and connecting the primary power to pins A and C of connector A1A1J3 on the rear of the unit, thus bypassing the associated power amplifier and/or the interconnection box. From A2S8 the A1A1J4-S side of the line passes through fuse A2F1, and from there goes to contact 6 on the front part of section A of Mode Selector switch A2S2, which is an open circuit in the OFF position. The other side of the 115-Vac line (A1A1J4-R) is routed from interlock switch A2S8 to contact 10 on the front part of Section B of the Mode Selector switch, which is also an open circuit in the OFF position.

3-232. In the STD BY position of the Mode Selector switch, the one side of the 115-Vac line (A1A1J4-S) is routed to terminal 6 of power transformer A2T1. The other side of the 115-Vac line, which is switched through section B of switch A2S2, is routed from contact 11 through fuse A2F2 and to terminal 1 of transformer A2T1, thus completing the power input circuit of the T-827B/URT and energizing transformer A2T1.

3-233. In the following positions of the Mode Selector switch, the T-827B/URT is energized and ready for operation. In any operational position of switch A2S2, such as USB or CW, one side of the 115-Vac line is routed through contact 10 and 12 of the front part of section B of switch A2S2 to contact 10 of the rear part of section B of LOCAL/REMOTE switch A2S1, and also to pin n of connector A1A1J4 on the rear of the T-827B/URT. The 115-Vac signal at pin n of connector A1A1J4 may be used, if required, to turn on operate circuits in associated equipment such as the rf power amplifier. In the REMOTE position of LOCAL/REMOTE switch A2S1, the 115 Vac is routed through contact 8 to pin U of connector A1A1J4 on the rear of the T-827B/URT, where it may be used, if required, to turn on remote control equipment.

CAUTION

Do not use pins n or U as sources to provide operating power for associated equipment with high-current requirement, since exceeding the current limitations (maximum 1 ampere) of the associated T-827B/URT switches may cause damage to the T-827B/URT.

3-234. In the STD BY position of the Mode Selector switch, the 6.3-Vac, 100-Vdc, and 28-Vdc power supplies are energized. The +28 Vdc is routed to ground pulse relay A2K6 and to contacts 1, 4, 7, and 9 on the front part of section C of switch S2. Ground pulse relay A2K6 provides a ground signal at pin P of connector A1A1J4 on the rear of the T-827B/URT whenever the tuning frequency is changed from one power amplifier band to another.

3-235. In the OFF and STD BY positions of A2S2, the +28 Vdc is not switched; however, in the operational positions of switch A2S2, the 28 Vdc is routed to the remaining 28-Vdc relays and also to contact 8 of tune relay A2K1. When tune relay A2K1 is de-energized, the 28 Vdc is fed via contacts 8 and 6 to the 20-Vdc regulator, which produces the 20-Vdc B+ supply used in most of the electronic assemblies. Tune relay A2K1 is energized by placing a ground on pin 3. The purpose of this relay is twofold. If either the motor in RF Amplifier Electronic Assembly A2A4 or the motor in MC Synthesizer Electronic Subassembly A2A6A1 is energized, indicating a frequency change, a ground is applied to pin 3 of tune relay A2K1 from the energized motor relay. This energizes the relay, removing the 28 Vdc from the regulator circuit and consequently removing the +20 Vdc from the electronic assemblies. The ground key line is also routed through normally closed contacts 4 and 2 of tune relay A2K1. These contacts are broken during the tuning time, so that transmit/receive relay A2K3 cannot be energized while the motors are tuning. If the MCS controls are set for 00 or 01 MHz Code Generator Electronic Assembly A2A8 applies a ground to pin 3, energizing tune relay A2K1, making the T-827B/URT inoperative.

3-236. From the power supply, the 6.3-Vac line is routed directly to RF Amplifier Electronic Assembly A2A4, where it is used as heater voltage for rf amplifier tubes V1 and V2. The +110-Vdc power supply is used as a plate supply for rf amplifier tubes V1 and V2 in RF Amplifier Electronic Assembly A2A4, and is routed through contacts 14 and 7 of transmit/receive relay A2K3, which is energized, when the T-827B/URT is keyed from any of the various key lines, by grounding pin 9. The circuitry of transmit/receive relay A2K3 is designed to operate normally via an interlock circuit which ties in associated equipment such as a receiver or an antenna coupler. Thus, 28 Vdc is applied to transmit/receive relay A2K3 via pin J of connector A1A1J4 on the rear of the T-827B/URT. In the simplex mode of operation, a transmit/receive relay in the associated receiver can be used to mute the receiver during transmit periods. Transmit/receive relay A2K3 is energized by a ground signal at pin 9 whenever the T-827B/URT is keyed from any of the various lines. If the associated antenna coupler is disconnected, the power source for transmit/receive relay A2K3 is broken, and the relay cannot operate. This feature prevents accidental keying of the T-827B/URT without a tuned load terminating the associated rf power amplifier. (When the AM-3007/URT is used, the interlock circuit for transmit/receive relay A2K3 may be disabled when it is desired to operate the system into a 50-ohm load or directly into a 50-ohm antenna. In this case, the 28 Vdc is provided at pin J of connector A1A1J4 when the antenna interlock/override

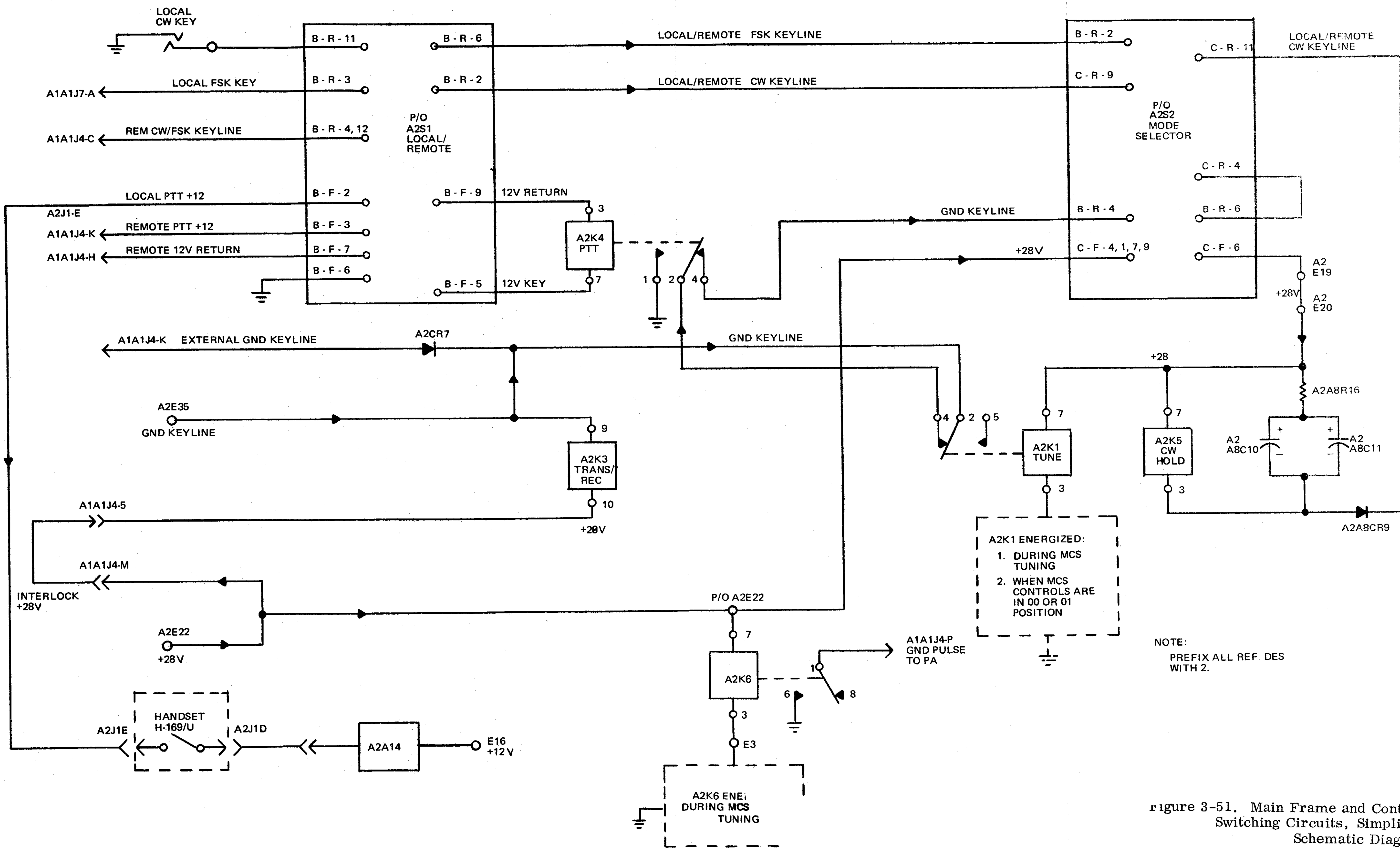


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Figure 3-51. Main Frame and Control Switching Circuits, Simplified Schematic Diagram switch in the AM-3007/URT is set at override.)

3-237. In addition to switching the positive 110-Vdc to RF Amplifier Electronic Assembly A2A4, transmit/receive relay A2K3 also switches 20 Vdc to Translator/ Synthesizer Electronic Assembly A2A6 in the key down position. This 20 Vdc is routed via contacts 4 and 12 to pin 16 of connector A1J12, placing the various circuits in the translator/synthesizer in the transmit mode. This transmit-control 20 Vdc is also routed from contact 12 of transmit/receive relay A2K3 to RF Amplifier Electronic Assembly A2A4 and Transmitter Mode Selector Electronic Assembly A2A1 to energize diode gates and other circuits used only when the T-827B/URT is keyed.

3-238. Press-to-talk (ptt) relay A2K4 is a 12-Vdc relay. In remote operation, the relay is energized from a remote 12-Vdc source. When the T-827B/URT is operated using a handset plugged into A2J1 on the front panel, the 12-Vdc source for the handset is derived from the zener diode regulator circuit A2R3 and A2CR8. This 12-Vdc circuit has an input from the positive 28-Vdc supply through section S2C (front) of the Mode Selector switch A2A2. (See figure 5-13.)

3-239. The CW hold relay A2K5 is energized in the CW mode by applying a ground to terminal 3 via the CW keyline. Capacitors A2A8C10 and A2A8C11 provide a hold circuit for the armature of A2K5. The hold circuit maintains all T-827B/URT and AM-3007/URT circuitry in a keyed condition for about 500 ms, so that the system transmit/receive relays are not operated each time the CW key is depressed. The CW key, after initial turnon, then turns only the carrier and sidetone on and off.

3-240. The hi-/lo-band relay A2K2 is functionally described with the rf translator and the 100 KC synthesizer.

3-241. Table 3-2 contains information on the switching functions for LOCAL/REMOTE switch A2S1 in the LOCAL position. Table 3-3 contains information on the switching functions for A2S1 in the REMOTE position.

NOTE

A2S1 switch parts are abbreviated in the tables; for example, S1-A-F means the front part of section A of switch A2S1 and S1-B-R means the rear part of section B of switch A2S1.

3-242. Detailed circuitry for Mode Selector switch A2S2 is presented in paragraphs 3-230 through 3-236.

3-243. RADIO FREQUENCY AMPLIFIER AM-3007/URT, OVERALL FUNCTIONAL DESCRIPTION.

3-244. Radio Frequency Amplifier AM-3007/URT is the high-level power amplifier in the Radio Set AN/WRC-1B transmitting system. The AM-3007/URT amplifies the nominal 100-mW signal from Radio Transmitter T-827B/URT to 100 watts peak envelope power (PEP) in SSB modes, 25 watts AM carrier in compatible AM (50 watts average with modulation), and 50 watts average power in the CW and FSK modes. Average-power-control (APC) and peak-power-control (PPC) signals are developed in the AM-3007/URT and fed back to the T-827B/URT for transmission-level control. Interstage and output tuning of the two vacuum-tube amplifier stages in the AM-3007/URT is accomplished by the use of 19 selectable channels. These circuits are switched to the selected channel by a coded input from the T-827B/URT. The high-power output of the AM-3007/URT is transferred to Antenna Coupler CU-937/UR for proper impedance matching to the antenna. In the receive function, the signal from the antenna may be applied directly through the CU-937/UR and the transmit/ receive relay in the AM-3007/URT to Radio Receiver R-1051B/URR.

TABLE 3-2. LOCAL/REMOTE SWITCH A2S1, LOCAL POSITION

FUNCTION	FROM	THROUGH SWITCH	THROUGH CONTACTS	TO
Local tty input (+)	A1A1J7-B	A2S1-A-F	2 and 5	A2J20-2
Local tty input (-)	A1A1J7-C	A2S1-A-F	10 and 1	A2J20-3
+12-Vdc keyline	A2J1-E	A2S1-B-F	2 and 5	A2K4-7
Microphone audio	A2J1-C	A2S1-B-F	1 and 10	A2S2-B-R-10 and A2S2-A-R-8
Local FSK key	A1A1J7-A	A2S1-B-R	3 and 6	A2S2-B-R-2
CW key	A2J2-3	A2S1-B-R	11 and 2	A2S2-C-R-9

TABLE 3-3. LOCAL/REMOTE SWITCH A2S1, REMOTE POSITION

FUNCTION	FROM	THROUGH SWITCH	THROUGH CONTACTS	TO
Tty input (+)	A1A1J4-BB	A2S1-A-F	3 and 5	A2J20-2
Tty input (-)	A1A1J4-t	A2S1-A-F	11 and 1	A2J20-3
600-ohm LSB/ ISB input	A1A1J4-g	A2S1-A-F	7 and 9	A2J19-20
600-ohm LSB/ ISB input	A1A1J4-f	A2S1-A-R	12 and 2	A2J19-9
600-ohm USB/ AM/ISB input	A1A1J4-q	A2S1-A-R	4 and 6	A2S2-C-R-10
600-ohm USB/ AM/ISB input	A1A1J4-r	A2S1-A-R	8 and 10	A2S2-D-F-5 and 6
Ptt +12-Vdc keyline	A1A1J4-k	A2S1-B-F	3 and 5	A2K4-7
CW/FSK keyline	A1A1J4-c	A2S1-B-R	4 and 6	A2S2-B-R-2
			12 and 2	A2S2-C-R-9
Remote 115 Vac	A1A1J4-U	A2S1-B-R	8 and 10	A2S2-B-F-12

3-245. RADIO FREQUENCY AMPLIFIER AM-3007/URT, FUNCTIONAL SECTION DESCRIPTION. (See Figure 3-52.)

NOTE

The AM-3007/URT is unit 3 in Radio Set AN/WRC-1B. In this and other paragraphs describing the AM-3007/URT, prefix all reference designations with "3" to obtain the complete designation.

3-246. GENERAL. A functional block diagram of the AM-3007/URT is given in figure 3-52. The four primary functional sections of the AM-3007/URT are main signal flow, APC and PPC generation, frequency programming, and power supply.

3-247. MAIN SIGNAL FLOW. The rf output from the T-827B/URT is applied to the rf input bridge A2A1A1 in the AM-3007/URT. Here, the input rf is algebraically added to a feedback signal that is 180 degrees out of phase with the input. The feedback loop keeps unit intermodulation distortion at a minimum and keeps the overall gain and sensitivity of the AM-3007/URT relatively constant, regardless of changes in power input or frequency. Since the feedback level is approximately 12 dB, the output of the rf input bridge is essentially the input rf minus the12-dB feedback. This signal is applied to driver amplifier A2A1V1, which is a linear amplifier for all modes of operation. The amplified output of driver amplifier A2A1V1 is applied to the tuned interstage circuit, which is part of the turret assembly. The tuned output circuit for driver amplifier A2A1V1 is one of 19 transformer assemblies that are automatically switched into the circuit according to the operating frequency by a tuning code generated in the T-827B/URT. The transformer assembly connected into the circuit will be resonant in the band in which the operating frequency falls. The rf signal applied to the transformer assembly is coupled to the grid of finalpower amplifier A2A1V2.

3-248. Final power amplifier A2A1V2 is also a linear amplifier in AM or SSB operation, but is a class C amplifier in CW or FSK operation. Conversion is accomplished by changing operating voltages when switching from one mode to another. The amplified output of final power amplifier A2A1V2 is applied to a tuned output circuit on the turret assembly. This tuned output circuit is, like that for driver A2A1V1, one of 19 available filter assemblies that are automatically switched into the circuit according to the operating frequency. The rf signal is coupled through directional coupler wattmeter A2A2MP1 to the antenna transfer relay A2K1. When the AN/WRC-1B is keyed, the antenna transfer relay is energized, and the rf output is connected to the antenna coupler. When the AN/WRC-1B is not keyed, the antenna transfer relay is deenergized, and any rf signal received is connected from the antenna coupler to the R-1051B/URR. In APC/PPC/Directional Coupler Electronic Assembly A2A2, the forward and reverse rf current flow is tapped and applied to RF OUTPUT meter A2A1M2 to provide indication of the voltage standing wave ratio (vswr).

3-249. APC AND PPC GENERATION. An average-power-control (APC) signal and a peak-power-control (PPC) signal are developed in the AM-3007/URT and applied to the T-827B/URT to limit the average and peak power outputs of the T-827B/URT to a safe level. Both of these control signals are dependent on the operation of final power amplifier A2A1V2. The control grid bias supply for final power amplifier A2A1V2 passes through the primary of a transformer in the PPC amplifier circuit. Whenever grid current is drawn, the positive peaks are coupled to the PPC amplifier circuit. This input is amplified, clipped, and filtered, and the resultant dc level, which is representative of the peak power output of the AM-3007/URT, limits the output of the peak-power-controlled if. amplifier in the Transmitter IF. Amplifier Electronic Assembly of the T-827B/URT. The rf output of final power amplifier A2A1V2 is applied to the APC detector circuit, where the positive half is envelope-detected and applied to one of the two APC amplifier circuits.

3-250. In AM or SSB operation, the detected output of the APC detector is applied to APC amplifier A2A2A1Q2; in CW or FSK operation, the detected signal is applied to APC amplifier A2A2A1Q1. The output of the APC amplifier A2A2A1Q2 is applied, through a modulation wiper circuit which produces a small peak sawtooth output, to output amplifier A2A2A1Q3. The output of the APC amplifier A2A2A1Q1 is applied directly to the output amplifier. The output of the output amplifier is filtered, and the resultant dc level, which is representative of the avergae power output of the AM-3007/URT, limits the output of the average-power-controlled if. amplifier in the Transmitter IF. Amplifier Electronic Assembly of the T-827B/URT.

3-251. FREQUENCY PROGRAMMING. When an operating frequency is selected at the T-827B/URT, a five-wire, open-seeking code is generated and applied to the AM-3007/URT. When this code is applied, a ground will be applied to energize a series of relays. These relays will apply +28 Vdc to the positive side of turret motor A2A4B1, which will begin to rotate the turret. When the turret is properly positioned, the code will be satisfied, the grounds will be removed from the relays, the relays will be deenergized, and a ground will be applied to the positive side of the turret motor. Grounding the motor provide dynamic braking to keep the turret from overshooting. At the same time, another code will be generated by the encoder portion of decode/encode switch A2A4S1 and applied to the antenna coupler (through the J-1265/U) to rough-tune the CU-937/UR to the new frequency. Two terminal boards in the J-1265/U provide for preprogramming the CU-937/UR.

3-252. POWER SUPPLY. The nominal 115-Vac primary power is applied to AC Power Supply Electronic Assembly A2A3. From here, it is routed back to the J-1265/U for use in other units. The ac power supply produces the +28-Vdc output, which is used to power DC-to-DC Converter Electronic Assembly A2A5, turret motor A2A4B1, and some of the relays in the rf amplifier. DC-to-DC Converter Electronic Assembly A2A5 is powered by positive 28 Vdc from AC Power Supply Electronic Assembly A2A3, or from an external source. This +28 Vdc is converted to square-wave ac, transformer-coupled to various rectifiers, and rectified to produce the following dc voltages:

a. +950 Vdc, 3A2A1V2 plate supply

b. +375 Vdc, 3A2A1V2 screen supply

c. -30 Vdc, shaper pulse for 2A2A4V1, V2 in T-827B/URT

d. +180 Vdc, 3A2A1V1 plate and screen supply

e. +6.75 Vdc, 3A2A1V1 filament supply

f. -60 Vdc, 3A2A1V2 grid bias supply

g. +130 Vdc, receiver plate supply (not used in AN/WRC-1B)

h. +13.5 Vdc, remote control supply.

3-253. <u>RADIO FREQUENCY AMPLIFIER AM-3007/URT, FUNCTIONAL CIRCUIT DESCRIPTION.</u> (See Figure 5-28.)

3-254. GENERAL. Physically, the AM-3007/URT is composed of case A1, which includes Filter Box Electronic Assemblies A1A1 through A1A3, and chassis and front panel A2, which includes five electronic assemblies:

a. Front Panel Electronic Assembly A2A1

b. APC/PPC/ Directional Coupler Electronic Assembly A2A2

c. AC Power Supply Electronic Assembly A2A3

d. Turret Electronic Assembly A2A4

e. DC-to-DC Converter Electronic Assembly A2A5.

Each of these will be discussed in the following paragraphs. Antenna transfer relay A2K1, which is physically part of the chassis and front panel, is discussed together with DC-to-DC Converter Electronic Assembly

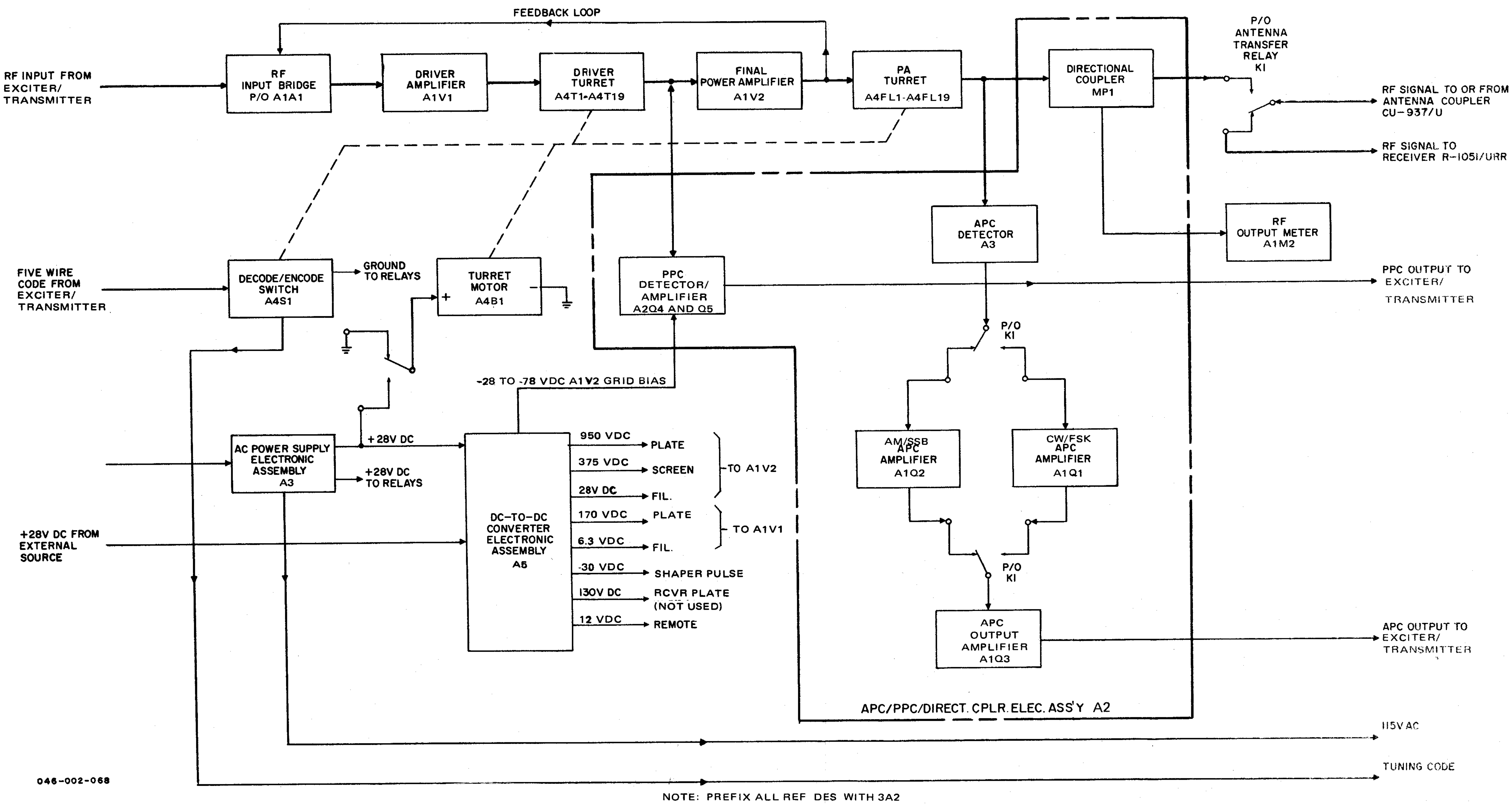


Figure 3-52. Radio Frequency Amplifier AM-3007/URT, Functional Block Diagram

A2A5, because of its close functional relationship with this assembly. The filter box assemblies and control are not discussed, as they consist simply of connectors and filtering capacitors.

3-255. FRONT PANEL ELECTRONIC ASSEMBLY A2A1 (Figure 5-28). Front Panel Electronic Assembly A2A1, in addition to housing the front-panel controls and indicators for the AM-3007/URT, contains the rf input bridge A2A1A1, driver amplifier A2A1V1, final power amplifier A2A1V2, and RF OUTPUT meter A2A1M2, all of which play an important role in the main signal flow within the AM-3007/URT.

3-256. RF Input Bridge A2A1A1 (Figure 3-53). The rf input bridge A2A1A1 furnishes a dynamic 50-ohm termination for the T-827B/URT and maintains the gain characteristics of the AM-3007/URT and the AN/WRC-1B transmitting system relatively constant over the 2.0- to 29.9999-MHz frequency range. The rf input bridge algebraically sums the rf input from the T-827B/URT with an inverse feedback signal that is proportional to the output of the AM-3007/URT output stage, final power amplifier A2A1V2.

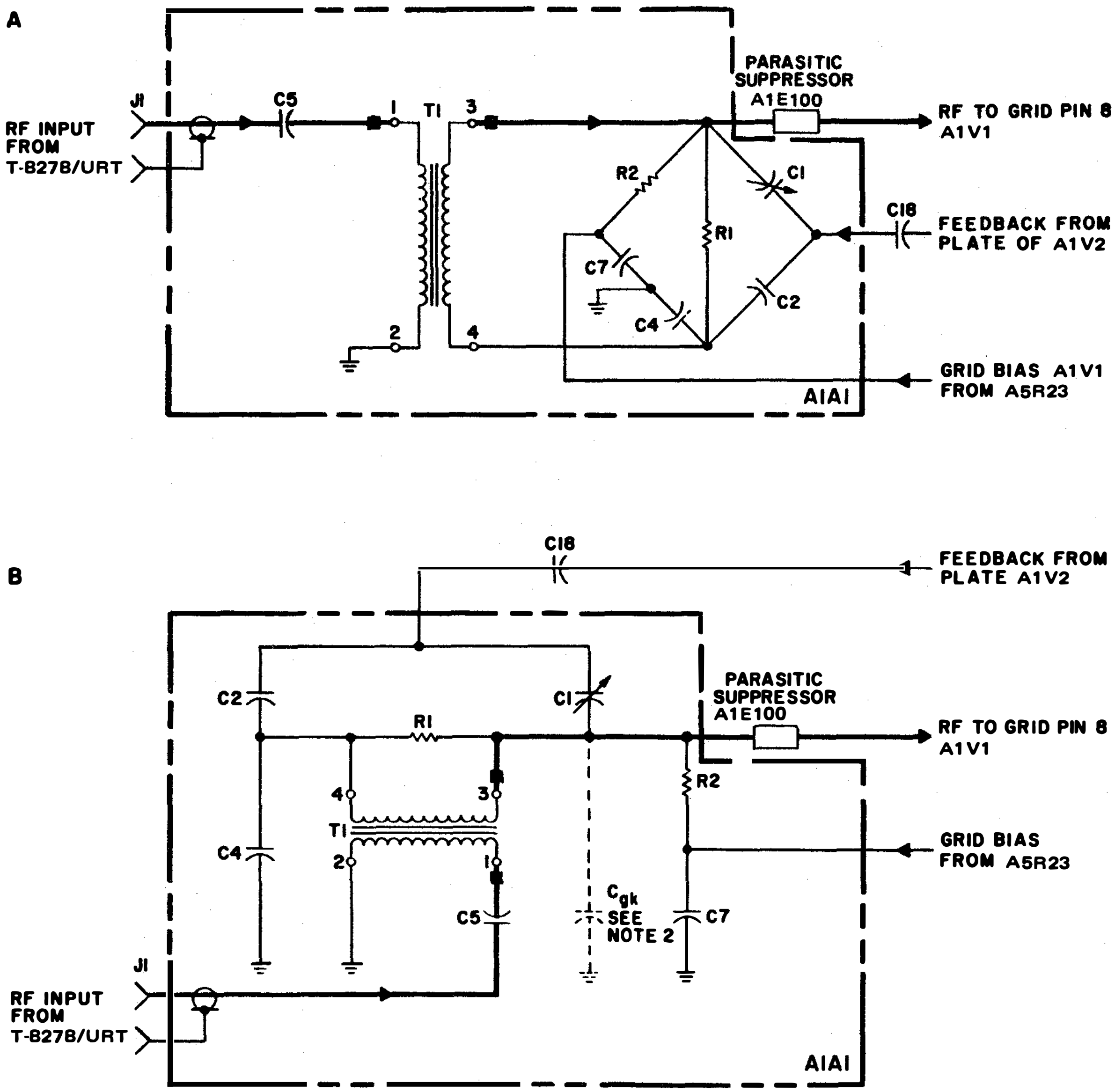
3-257. The rf input from the T-827B/URT is applied to connector A2A1A1J1 on the rf input bridge. Resistor R1, across the secondary of T1, provides proper termination of the input signal and maintains a low vswr on the line.

3-258. The feedback signal from the plate of final power amplifier A2A1V2 is coupled to the junction of capacitors A2A1A1C1 and C2. Normally, this feedback signal is 180 degrees out of phase with the rf input from the T-827B/URT. The feedback signal is divided by the two capacitive-divider arms of the bridge C2, C4, C1, and C_{gk} (B, figure 3-53). When the bridge is balanced, a very small portion of the feedback signal appears across the secondary of T1. However, the low reactance of C4 causes the input signal at the secondary of T1 to appear between the grid of driver amplifier A2A1V1 and ground. This input signal is algebraically summed with the feedback signal appearing across bridge arm A2A1A1C_{gk}. The resultant signal (the net difference) is applied to the grid of driver amplifier A2A1V1. It is also evident that this change, will, in effect, minimize the original change in the feedback signal. This minimization is due to the fact that the feedback signal is directly related, by the gain factor of the AM-3007/URT, to the input signal. Therefore, moderate changes in supply voltages, or in tube or component characteristics, that would normally have great effect on the overall gain and linearity will be minimized.

3-259. Driver Amplifier A2A1V1 (Figure 3-54). Driver amplifier A2A1V1 amplifies the signal from the rf input bridge A2A1A1 and applies it to the final power amplifier A2A1V2. The driver amplifier circuit consists of vacuum-tube amplifier A2A1V1, the interstage tuning circuits A2A4T1 through T19, and the various operating voltage networks.

3-260. When the AN/WRC-1B is keyed, transmit/receive relay A2A5K7 is energized, and operating voltages from DC-to-DC Converter Assembly A2A5 are supplied through the relay contacts to the control grid, screen grid, and plate of the driver amplifier A2A1V1. DRVR BIAS potentiometer A2A5R23, physically located on the dc-to-dc converter, is used to set the idling current of the driver amplifier stage.

3-261. The driver amplifier tube is operated class A; the operating point is established by the negative grid-to-cathode bias. When plate and screen voltages are applied to the tube, cathode-follower action causes current flow through resistors A2A1R4, A2A1R5, and A2A1R6. The drip across these resistors makes the cathode somewhat more positive than the grid. A small amount of degenerative feedback is developed by the unbypassed current flow through A2A1R5 and A2A1R6. A portion of the cathode current is directed through resistor A2A1R3 and AMPLIFIER selector switch A2A1S1 (in the DR CATH position) to AMPLIFIER meter A2A1M1, to provide a means of monitoring the operation of the driver amplifier A2A1V1 and of adjusting



NOTES:
1. PREFIX ALL REF DES WITH 3A2.
2. C_{gk} REPRESENTS THE GRID-TO-CATHODE CAPACITANCE OF DRIVER 3A2V1 AND THE STRAY CIRCUIT CAPACITANCE.

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Figure 3-53. AM-3007/URT, RF Input Bridge, Simplified Schematic Diagram

the operating point of the tube without external test equipment.

3-262. The tuned rf load for the stage is whichever transformer (3A2A4T1 through T19) is connected to the circuit. The particular transformer used is determined by the operating frequency corresponding to a code initiated by the T-827B/URT. Each of the transformers is a potted module. Each potted module also contains a variable trimmer capacitor (A2A4C1 through C19), which is adjusted to compensate for variations in winding and core parameters; and a swamping resistor (A2A4R1 through R19). Driver-plate tune capacitor A2A1C3 compensates for variations in the output capacitance of the driver circuit. PA grid tune capacitor A2A1C15 compensates for variations in the input capacitance of the final amplifier A2A1V2. Resistor A2A1R20 provides an alternate path for the grid bias to final amplifier A2A1V2 while the rf turret assembly is rotating.

3-263. When the AN/WRC-1B is in the receive function or is in standby, transmit/ receive relay A2A5K7 is deenergized, the operating voltages are removed, and the stage does not function.

3-264. Final Power Amplifier A2A1V2 (Figure 3-55). Final power amplifier A2A1V1 amplifies the output from driver amplifier A2A1V1 and applies it to the APC/PPC/Directional Coupler Electronic Assembly A2A2. The final power amplifier stage consists of vacuum tube A2A1V2, a double-tuned output circuit A2A4FL1 through FL19, and a portion of the AMPLIFIER meter circuit A2A1M1.

3-265. When the AN/WRC-1B is keyed in the transmit function in the AM or SSB modes, transmit/receive relay A2A5K7 is energized and CW/FSK relay A2A5K5 remains deenergized. Positive 375-Vdc screen voltage is now applied to the final amplifier tube from DC-to-DC Converter Electronic Assembly A2A5 through the relay contacts. When the AN/WRC-1B is transmitting in the CW or FSK mode, transmit/receive relay A2A5K7 and CW/ FSK relay A2A5K5 are both energized. In this case, the +375 Vdc is applied through contacts 4, 15, 2, and 14 of relay A2A5K7 to screen-dropping resistor A2A5R12. Also, +180 Vdc from the dc-to-dc converter is applied through contacts 8, 16, 6 and 16 of relay A2A5K7, resistor A2A1R13, and contacts 4 and 11 of relay A2A5K5 to the other side of resistor A2A5R12. Resistors A2A5R12 and A2A5R13 act as a voltage divider to drop the voltage applied to the screens of the final amplifier to approximately +300 Vdc in CW or FSK operation. The CW/FSK relay, in effect, causes the final power amplifier to operate at approximately class C in the CW and FSK modes, instead of linear operation in the AM and SSB modes.

3-266. From the dc-to-dc converter, +950 Vdc is applied, through inductor A2A1L5 and the primary of whichever filter is connected to the output circuit, to the plates of final power amplifier A2A1V2. Bias for the control grids of final power amplifier A2A1V2 is developed from the -135 Vdc supplied from the dc-to-dc converter. In AM or SSB operation, approximately -50 to -60 Vdc is taken from AM/ SSB bias potentiometer A2A5R30. In CW or FSK operation, approximately -65 to -75 Vdc is taken from CW/FSK bias potentiometer A2A5R31. From the potentiometer, the bias is applied through CW/FSK relay A2A5K5 (contacts 7 and 14 in AM/SSB, or contacts 8 and 14 in CW/FSK), through the primary of transformer A2A2T1, resistor A2A2R13, and the secondary of whichever interstage transformer is connected to the output circuit for driver amplifier A2A1V1, to the control grids of final power amplifier A2A1V2.

3-267. The amplified rf signals appearing at the parallel-connected plates are applied to the primary of whichever filter (A2A4FL1 through FL19) is connected to the plate circuit. The particular filter used is determined by the operating frequency. Each of these filters is a double-tuned rf transformer. The proper fixed capacitors for the primary and secondary are automatically selected and connected to the circuit. PA plate tune capacitor A2A1C20 compensates for variations in the output capacitance of A2A1V2 and for variations in stray capacitance in the output circuit. Capacitors A2A1C21, C22, C26, C27, and C28 are also switched into the output circuit, depending on the operating frequency. Capacitors A2A1C24 and C25, connected in shunt with the secondary of the output filter, compensate for intercomponent and stray capacitance in the secondary circuit. The rf output signals are taken from low-impedance points in the secondary of the filter.

3-268. A portion of the rf signal at the plates of power amplifier A2A1V2 is fed back to rf input bridge A2A1A1 to be algebraically added to the rf input signal from the T-827B/URT.

3-269. When the AN/WRC-1B is receiving or is in standby, transmit/receive relay A2A5K7 is deenergized, and the screen voltage supply is disconnected. Therefore, the power amplifier does not function while the AN/WRC-1B is being used to receive or is in a standby condition.

3-270. Resistor A2A4R6 is in the return path for the plate current drawn by final power amplifier A2A1V2. The voltage developed across this resistor is representative of the amount of plate current drawn. This voltage is applied to AMPLIFIER meter A2A1M1 to provide a means of monitoring the operation of final power amplifier A2A1V2, and a means of adjusting the idling current of the tube without the use of the external test equipment.

3-271. RF Output Meter A2A1M2 (Figure 3-56). The rf output meter circuit consists of standing wave detector element A2A2MP1, RF OUTPUT selector switch A2A1S3, and RF OUTPUT meter A2A1M2. The standing wave detector element is an in-line directional coupler which is part of the APC/PPC Directional Coupler Assembly A2A2. This circuit provides an indication of forward and reflected power at the output of the AM-3007/URT. The following paragraphs describe the operation of this circuit in detail.

3-272. The rf output from final power amplifier A2A1V2 is applied to connector A2A3J1 on the standing wave detector element, passes through the element, and goes out connector A2A3J2, to antenna transfer relay A2K1. The rf currents flowing in each direction are detected by dual standing wave-detector elements. The resulting dc level proportional to the forward power is available at contact D; the resulting dc level proportional to the reflected power is available at contact C.

3-273. With the RF OUTPUT selector switch A2A1S3 in the 30W REFL position, the dc voltages at contact C are applied, through pins 4 and 6 of switch A2A1S3, to the positive side of RF OUTPUT meter A2A1M2. The meter return line passes through contacts A and B of the standing-wave-detector element A2A2MP1. Since the basic RF OUTPUT meter circuit indicates 30 watts full scale, an external series-multiplying resistor is used to extend the range to 100 watts, reflected, Resistor A2A2R24 absorbs a sufficient portion of the applied voltage to bring the indication within the meter range. In this case, the path to the meter passes through pins 3 and 6 of switch A2A1S3 (in the 100W REFL position) to the meter. The meter return line follows the same path as that for the 30-watt reading. With switch A2A1S3 in the 100W FWD position, the dc voltage at contact D is applied, through pins 5 and 6 of RF OUTPUT selector switch A2A1S3, to the positive side of the meter. An internal series resistor is used in this case to drop the applied voltage. The meter return line is again the same.

3-274. APC/PPC/DIRECTIONAL COUPLER ELECTRONIC ASSEMBLY A2A2 (Figure 5-30). APC/PPC/Directional Coupler Electronic Assembly A2A2 consists of three subassemblies: APC detector A3, PPC amplifier A2, and APC amplifier A1. These circuits accept the rf output from final power amplifier A2A1V2, and perform three basic functions:

a. Provide a detected dc voltage to the front-panel RF OUTPUT meter A2A1M2 to indicate forward and reflected power.

b. Develop a peak-power-control (PPC) dc voltage which limits the peak power excursions of the system to a safe value.

c. Develop an average-power-control (APC) dc voltage which limits the average power output of the T-827B/URT to a predetermined level.

The first function is discussed with the RF OUTPUT meter in Front Panel Electronic Assembly A2A1 (paragraph 3-271). The other two functions are discussed below.

3-275. PPC Amplifier A2A2A2 (Figure 3-57). The PPC amplifier circuit A2A2A2 consists of input transformer T1, emitter follower Q4 and PPC rectifier Q5. The PPC amplifier provides a dc output which increases above its nominal +4.5-Vdc level whenever the positive signal peaks applied

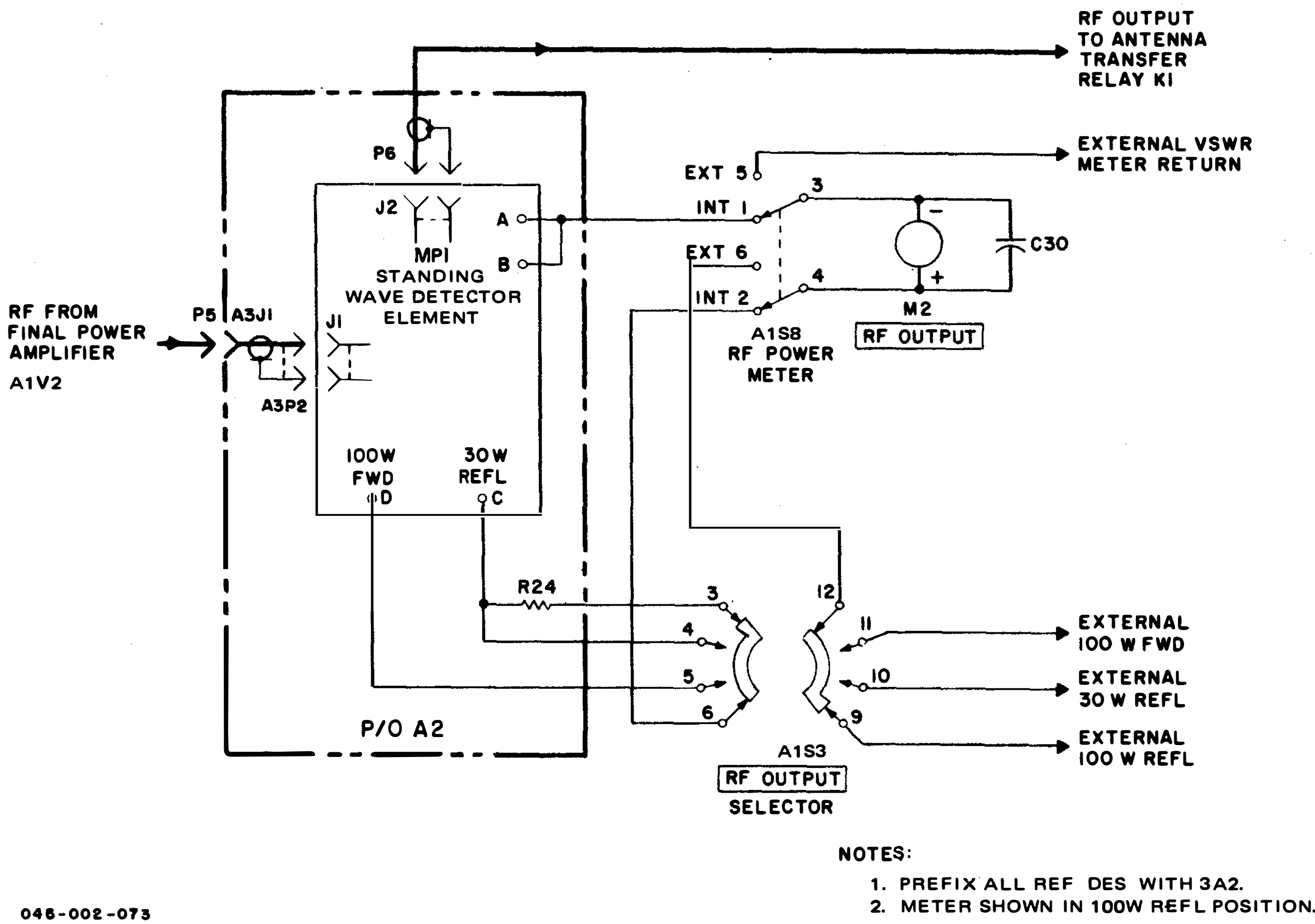


Figure 3-56. AM-3007/URT, RF Output Meter Circuit, Simplified Schematic Diagram

to the grid of final power amplifier A2A1V2 exceed its negative bias. The dc output is applied as negative feedback to a PPC if. amplifier strip in the T-827B/URT, in order to hold the maximum peak power to a safe level.

3-276. The primary winding of transformer A2A2A2 is in the series circuit with the secondary of interstage transformers A2A4T1 through T19, which apply bias voltage to final power amplifier A2A1V2. When the positive peaks of the rf drive signal for stage A2A1V2 exceed the negative grid bias, causing an ac grid current to flow through the primary of A2A2A2T1, the resulting ac voltage developed across the secondary is applied directly to the base of stage Q4. Capacitor C6 removes any rf that may be present. The signal applied to emitter follower Q4 appears across resistor R15, and is coupled to the base of PPC rectifier Q5 by RC network C7, R16. Stage Q5 is biased by the voltage divider R19, R14, and R16. Stage Q5 base bias sets the nominal PPC output at +4.5 Vdc. The signal applied to stage Q5 from Q4 causes the +4.5 Vdc to increase proportionally. Capacitor C8 charges to the peak value and tends to maintain the level of charge over many cycles, due to the relatively high time constant of its discharge path through resistor R18. The dc level thus established at the emitter of stage Q5 is the PPC signal which is fed back to the PPC if. amplifier stage in the T-827B/URT. When the signal is established at a new level, the charge on capacitor C8 responds by adjusting to a new

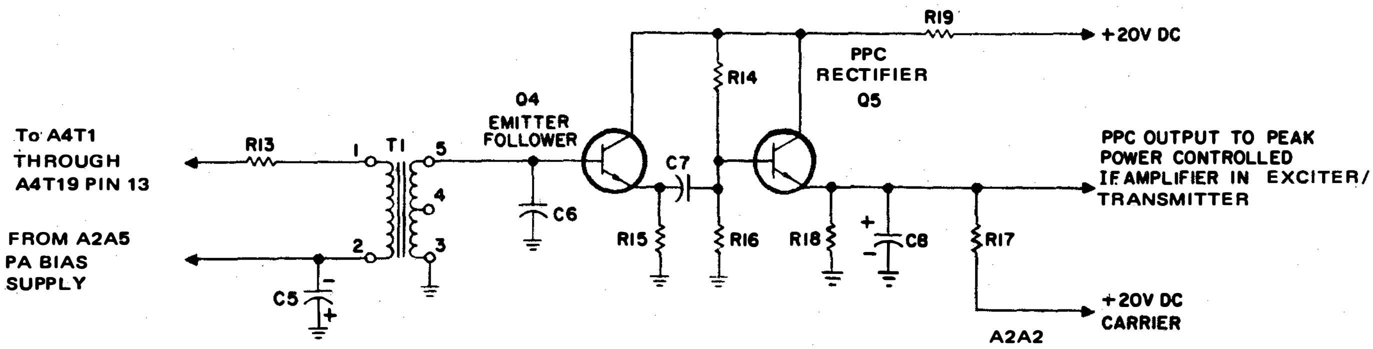


Figure 3-57. AM-3007/URT, PPC Amplifier, Simplified Schematic Diagram

value, thus providing an adjusted PPC output signal.

3-277. Whenever RF OUTPUT switch A2A1S4 is in the TUNE position, a steady +10 Vdc appears on the PPC line. This +10 Vdc is developed from carrier +20 Vdc by voltage divider R17, R18. This +10 Vdc will completely cut off the audio or sideband information channel, and remove all modulation from the 25-watt carrier during tuning.

3-278. APC Amplifier A2A2A1 (Figure 3-58). The APC amplifier circuit A2A2A1 consists of APC detector A2A2A3CR2 and CR3, relay A2A2A1K1, APC emitter followers A2A2A1Q1 and Q2, modulation wiper A2A2A1CR1, R8, and output amplifier A2A2A1Q3. The APC amplifier circuit develops a dc control signal to be applied to the controlled if. amplifier stages of the T-827B/URT. This dc control signal is used to prevent the average power output of the T-827B/URT from exceeding a predetermined level for a given type of signal over the entire tuning range. The APC loop compensates for wide variations in overall system gain. The following paragraphs describe the operation of this circuit in detail.

3-279. The rf output from power amplifier A2A1V2 is attenuated by resistors A2A2A3R21 and R22 and capacitor C12 before it is applied to the detector. Diodes CR2 and CR3 detect the positive-going half of the envelope of the applied rf signal. The combination of capacitor C12 in parallel with resistor R22, and resistor R21 in parallel with the capacitance of the detector circuit, constitutes a compensated attenuator used to provide a flat frequency response over the entire range of transmitted frequencies. The output from diodes CR2 and CR3 appears across capacitor A2A2C14 and the series combination of resistor A2A2A1R11 and either resistors R1 and R20 or resistors R2 and R12, depending on relay K1.

3-280. When the transmitter is operating in the AM or SSB mode, relay A2A2A1K1 is deenergized. The rectified output of the detector is developed across resistors R20, R1, and R11, and is applied to the base of APC emitter follower Q2. When the transmitter is operating in the CW or FSK mode, relay K1 is energized. The rectified output of the detector is deveoped across resistors R12, R2, and R11, and is applied to the base of APC emitter follower. Separate APC channels are employed for AM/SSB and CW/FSK operation, so that the operator may properly adjust the average power level for the two modes. In addition, separate channels provide proper shaping of the APC signal for the two modes. Potentiometers R1 and R2 are adjusted to apply a predetermined portion of the detector output signal to the bases of Q2 and Q1, respectively.

3-281. Collector voltage for emitter follower Q2 is developed from the regulated +28 Vdc by resistor R6, which is a

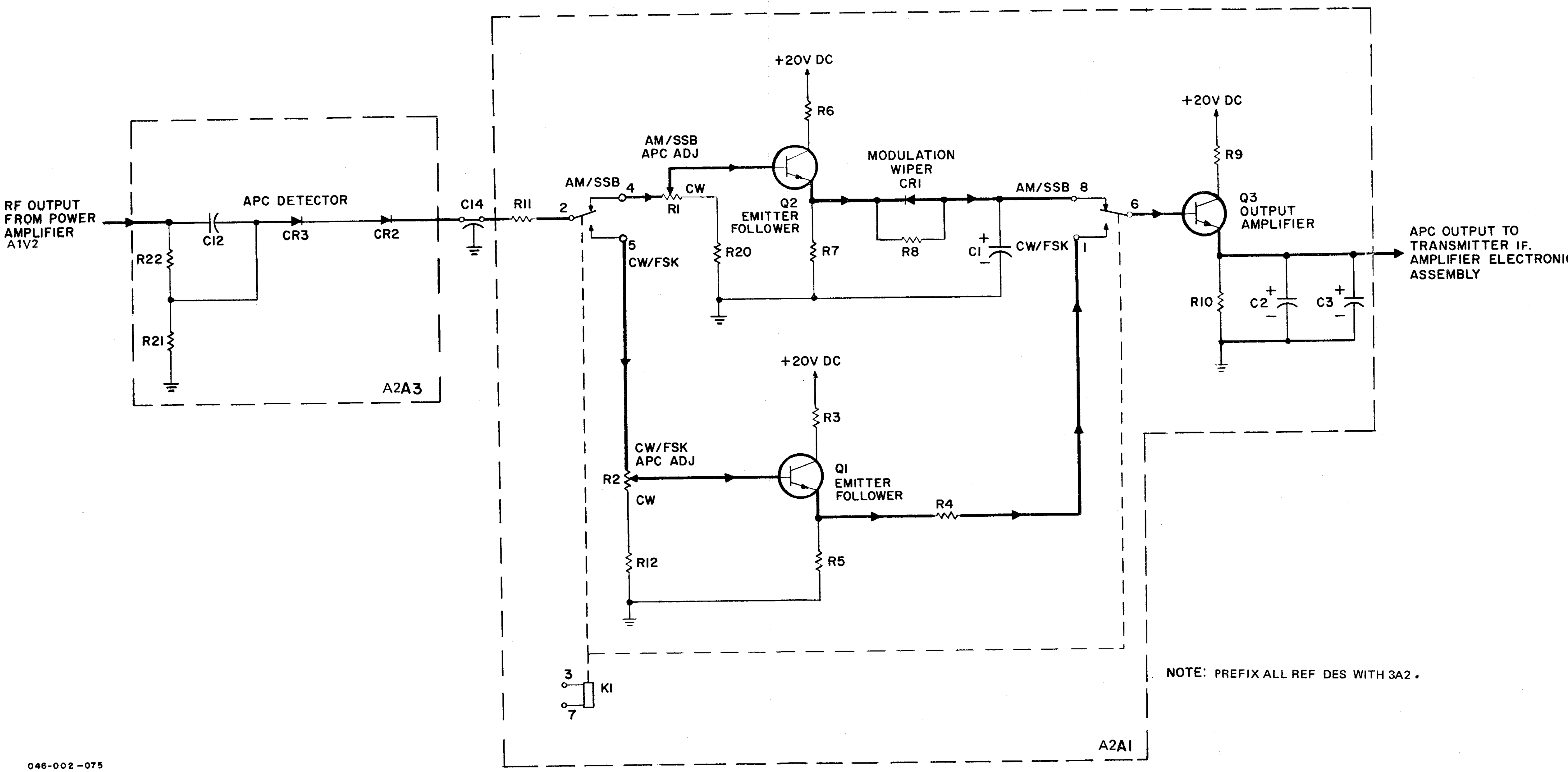


Figure 3-58. AM-3007/URT, APC Amplifier, Simplified Schematic Diagram

current-limiting resistor to protect the circuit during high-signal input. The detector output signals applied to the base of emitter follower Q2 are developed across resistor R7. Because of the large RC charge-time constant of R8, C1, the voltage at C1 will assume the characteristics of a ramp function. Should the base of emitter follower Q2 become negative with respect to the emitter, capacitor C1 will discharge through diode CR1 and resistor R7. Since the RC discharge-time constant is much smaller than the charge-time constant, the discharge slope will be steeper than the charge slope. Therefore, the signal applied through contacts 8 and 6 of relay K1 to the base of output amplifier Q3 is essentially a sawtooth. Collector voltage for output amplifier Q3 is developed by resistor R9 from the regulated +28 Vdc. The signals applied to the base of output amplifier Q3 are developed across output circuit R10, C2, and C3. Since the capacitance of capacitors C2 and C3 is extremely large, the output has a large RC time constant, and the output is a dc level. This dc level, which is proportional to the average power output of the AM-3007/URT, is applied to the controlled if. amplifier stages in the companion T-827B/URT.

3-282. Collector voltage for APC emitter follower Q1 is developed by resistor R3 from the positive 20 Vdc applied during CW or FSK operation. Resistor R3 acts as a collector current limiter during high-input signals. The detector output signals applied to the base of APC emitter follower Q1 are developed across resistor R5 and applied, through contacts 1 and 6 of relay K1, to the base of emitter follower Q3. Resistor R4 limits the base current of emitter follower Q3 to a safe level. The signals applied to the base of emitter follower Q3 are developed across output circuit R10, C2, and C3, which will produce a dc level output. The dc level is applied to the controlled if. amplifier stages in the T-827B/URT.

3-283. AC POWER SUPPLY ELECTRONIC ASSEMBLY A2A3 (Figure 5-31). AC Power Supply Electronic Assembly A2A3 produces the +28 Vdc used to power DC-to-DC Converter Electronic Assembly A2A5. This +28 Vdc is also used for the relays in the AM-3007/URT, and as filament voltage for the PA tube A2A1V2.

3-284. See figure 3-59 for a simplified schematic diagram of the ac power supply circuits. The primary -115 Vac power is applied to the ac power supply through PRIMARY POWER circuit breaker A2CB1, PRIMARY POWER fuses A1F1 and A1F2, and interlock switch A1S10.

3-285. The nominal 115-Vac primary power is applied across part of the primary of power transformer A2A3T1 (pins 4 and 1 with 115 Vac in) if interlock switch S10 is closed and PRIMARY POWER circuit breaker A1CB1 is in the ON position. The primary of transformer A2A3T1 is tapped to allow compensation, in five fixed steps, for line-voltage variations. Protection for the main power line entering the AM-3007/URT is provided by PRIMARY POWER fuses A1F1 and A1F2, which also protect the power line to the other units of the AN/WRC-1B. The diode bridge, consisting of diodes A2A3A1CR5 through CR8 and resistor R1, rectifies the input line voltage and applies the resultant dc voltage, which is representative of the ac line voltage, through PRIMARY POWER selector switch A2S2 (pins 8 and 10 of both wafers) to AMPLIFIER meter A1M1. Resistor A2A3A1R2 is the series-dropping resistor for the meter. The output from pins 7 and 8 of power transformer A2A3T1 is rectified by the diode bridge composed of diodes CR1 through CR4. The output of the bridge is filtered by LC combination L1, C1. Bleeder resistors 3A1R1 and 3A1R2 provide a minimum load for the +28-Vdc output. The +28 Vdc is applied, through PRIMARY POWER selector switch A2S2, PRIMARY POWER circuit breaker A1CB1, and main power relay A2A5K1, to DC-to-DC Converter Electronic Assembly A2A5.

3-286. The +28 Vdc is also applied to over-voltage protection circuit A2A3A1. Zener diode A2A3A1CR9 regulates the reference voltage applied to the emitter of dc amplififer Q1 at approximately 7 Vdc. Current through diode CR9 is limited to a safe value by resistor R6. The +28 Vdc is applied to the top of voltage divider R3, R7, R5, and a predetermined voltage is taken from potentiometer R7. This voltage, approximately 6.9 Vdc, is applied to the base of dc amplifier Q1 through resistor R4. Capacitor C2 and resistor R4 form an RC network to prevent random circuit noise from energizing the overvoltage trip relay. Normally, dc amplifier Q1 is reverse-biased and does not conduct. Should the +28-Vdc output exceed a preset value, the base voltage on dc amplifier Q1 will increase overcoming the reverse bias, and the stage will conduct heavily. When this occurs, enough current is drawn through the coil of relay K1 to energize the relay. When relay K1 energizes, the +28 Vdc is applied through contacts 6 and 1 of the relay to light OVERVOLTAGE TRIP indicator A2A3DS1. Also, the ground to one side of the coil of main power relay A2A5K1 is removed when relay A2A3A1K1 energizes. Main power relay A2A5K1 will deenergize, removing the +28 Vdc from, and preventing damage to, DC-to-DC Converter Electronic Assembly A2A5. Diode A2A3A1CR10 is a limiter to prevent high reverse voltages from damaging dc amplifier A2A3A1Q1.

3-287. TURRET ELECTRONIC ASSEMBLY A2A4 (Figure 5-28). Turret Electronic Assembly A2A4 is a 19-position rotor which automatically tunes the AM-3007/URT to a frequency band corresponding to the frequency setting of the T-827B/URT. Each of the 19 positions contains two fixed-tuned circuits, which provide interstage and output tuning for the driver and final amplifier vacuum-tube stages. Interstage transformers T1 through T19 and final amplifier output filters FL1 through FL19 are selected by turret motor B1. These circuits are discussed together with Front Panel Electronic Assembly A2A1 (paragraph 3-255).

3-288. DC-TO-DC CONVERTER ELECTRONIC ASSEMBLY A2A5 (Figure 5-32). DC-to-DC Converter Electronic Assembly A2A5 performs two functions in the AM-3007/URT:

a. Converts the +28 Vdc into +950, +375, +180 and +6.5 Vdc for the AM-3007/URT; +130 Vdc receiver plate and screen voltage (not used in AN/WRC-1B); +12.5 Vdc remote microphone voltage; and a -30 Vdc shaper pulse for the T-827B/URT. This power-conversion process is accomplished by a power transistor switch circuit, a saturable core transformer, and six semiconductor diode full-wave rectifier circuits.

b. Furnishes power sequence and control for operation of the AN/WRC-1B in the transmit function. The power sequence and control operation is performed by seven relays.

3-289. DC Power Conversion. The dc-to-dc converter is a special application of power transistors to convert the +28-Vdc supply voltage to the high, medium, and low voltages necessary to operate the AM-3007/URT. The combination of the push-pull oscillator and bridge rectifiers results in a power supply with relatively high efficiency. The oscillator circuit consisting of A2A5Q1 and A2A5Q2 and transformer A2A5T1 operates most efficiently as a square-wave generator, with the transistors functioning as high-speed switching elements. The oscillator is a form of free-running power multivibrator. The action can be compared to the switching action of a mechanical vibrator. The oscillator circuit is a saturable-core square-wave oscillator, with an operating frequency of approximately 1300 Hz.

3-290. Power Sequence and Control. The relay circuits which provide the power sequence and control function for the AN/WRC-1B transmit operation are shown in figure 3-60, and are described in the following paragraphs. In addition to the relays in the dc-to-dc converter, these circuits include the overvoltage trip relay A2A3A1K1, APC relay A2A2A1K1, and antenna transfer relay A2K1.

3-291. Main Power Relay A2A5K1 and Overvoltage Trip Relay A2A3A1K1. The main power relay A2A5K1 (I, figure 3-60) switches the +28 Vdc from the AC Power Supply Electronic Assembly A2A3 to DC-to-DC Converter Electronic Assembly A2A5. The overvoltage trip relay A2A3A1K1 (A, figure 3-60) protects the AM-3007/URT by

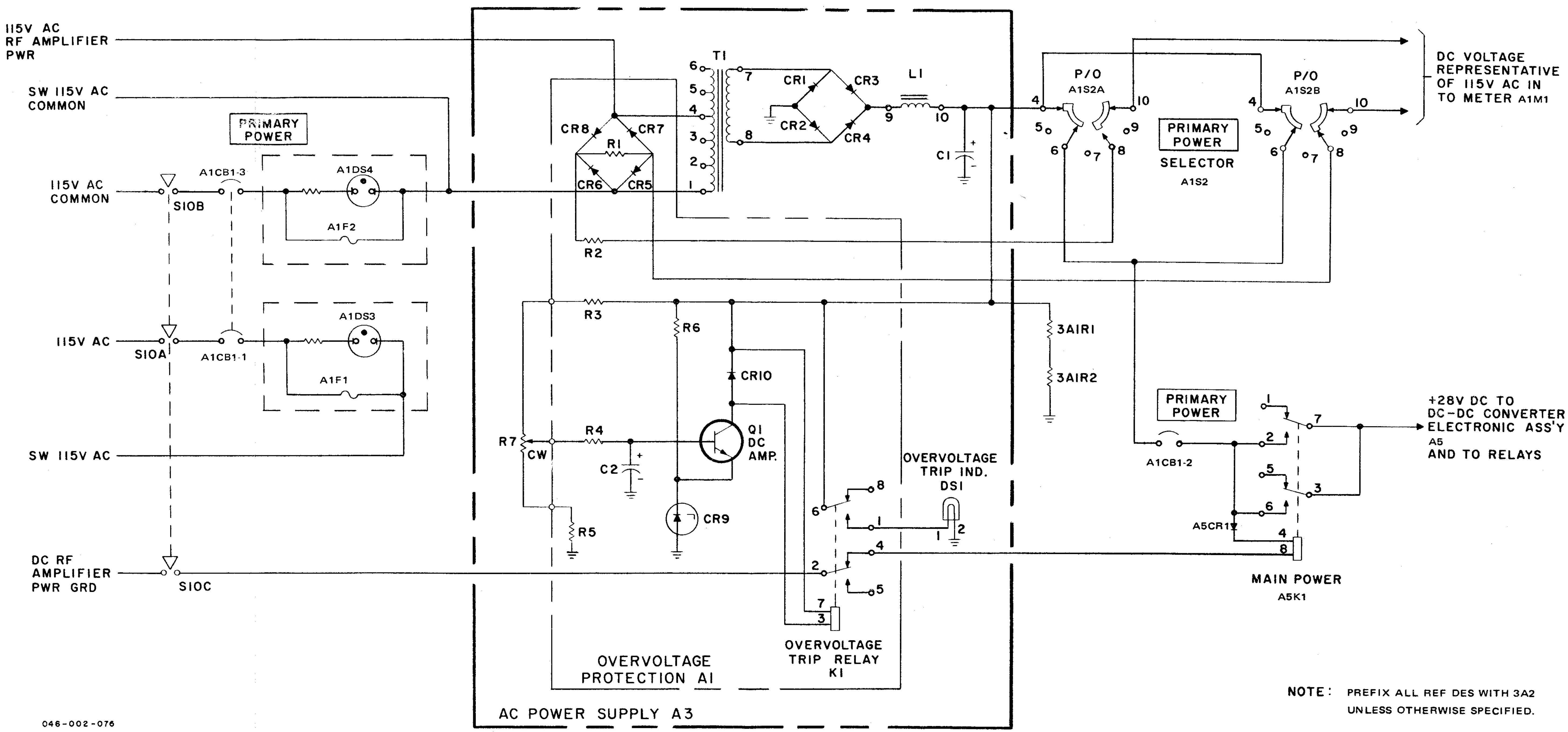


Figure 3-59. AM-3007/URT, AC Power Supply, Simplified Schematic Diagram

locking out the ground return of the main power relay if the nominal +28-Vdc output of the ac power supply is greater than +32 Vdc. The main power relay A2A5K1 is located in DC-to-DC Converter Electronic Assembly A2A5 and the overvoltage relay A2A3A1K1 is located in AC Power Supply Electronic Assembly A2A3.

3-292. When 115-Vac primary power is applied to the ac power supply, the +28-Vdc output of the assembly is applied through PRIMARY POWER selector switch A2S2 and diode A2A5CR1 to pin 4 of main power relay A2A5K1. The dc rf amplifier ground return is supplied to pin 8 of relay A2A5K1 through contacts 2 and 4 of overvoltage trip relay A2A3A1K1; therefore, relay A2A5K1 will energize. When relay A2A5K1 energizes, the switched +28 Vdc is applied through contacts 2 and 7 and contacts 6 and 3 to the dc-to-dc converter and to various other relays in the AM-3007/URT. Should overvoltage trip relay A2A3A1K1 energize, the ground return path is removed from main power relay A2A5K1. Main power relay A2A5K1 is now deenergized, and removes the +28 Vdc from the dc-to-dc converter, which renders the AM-3007/URT inoperative until the overvoltage condition is repaired. OVER-VOLTAGE TRIP indicator A2A3DS1 will light to indicate an overvoltage condition. If, for any reason, the polarity of the voltage at pin 4 of relay A2A5K1 is reversed, diode A2A5CR1 will block current flow to the relay, and thus prevent energizing of the relay. The +28 Vdc at pin 4 of relay A2A5K1 is also applied, through resistor A2A1R25, to AMPLIFIER meter A2M1, to monitor the 28-Vdc supply when PRIMARY POWER selector switch A2S2 is in the EXT DC position. Capacitor A2A5C17 is a bypass capacitor, and capacitor A2A5C1 filters the 28 Vdc applied to the dc-to-dc converter.

3-293. PA Filament Relay A2A5K2. The PA filament relay A2A5K2 (B, figure 3-60) applies +6.75-Vdc filament voltage to the driver amplifier A2A1V1 and +28-Vdc filament voltage to the final power amplifier A2A1V2. The relay also applies +28 Vdc to the time delay lockout relay A2A5K3 and the time delay relay A2A5K4. The PA filament relay 3A2A5K2 is located in the DC-to-DC Converter Electronic Assembly A2A5.

3-294. When main power relay is energized, +28 Vdc is applied to pins 5 and 7 of PA filament relay A2A5K2. When the rf amplifier dc filament ground line is applied to pin 3 of relay A2A5K2, the relay is energized; +28 Vdc is then applied through contacts 5 and 2 of the relay and through LC filter A2A5L3, C14 to the filaments of final power amplifier tube A2A1V2. At the same time, +6.75 Vdc from the dc-to-dc converter is applied through contacts 1 and 6 of the relay and through LC filter A2A5L1, C9 to the filaments of driver amplifier tube A2A1V1. The negative side of the 6.75-Vdc supply is connected through LC filter A2A5L2, C10 to the other side of the filaments. The +28 Vdc is also applied to pin 6 of time delay relay A2A5K4 and to contact 6 of time delay lockout relay A2A5K3.

3-295. Time Delay Lockout Relay A2A5K3 and Time Delay Relay A2A5K4. Time delay lockout relay A2A5K3 and time delay relay A2A5K4 (C, figure 3-60) form a time-delay circuit to allow a 40-second warmup time for the filaments of driver amplifier A2A1V1 and the final power amplifier A2A1V2. Relay A2A5K4 energizes 40 seconds after the filament voltage is applied. Positive 28 Vac is then applied to relay A2A5K3, through A2A5K4. Relay A2A5K3 then applied +28 Vdc to the external circuits and A2A5K4 is bypassed. Relay A2A5K4 then deenergizes, and A2A5K3 is latched via its own contacts. These relays are located in DC-to-DC Converter Electronic Assembly A2A5.

3-296. When PA filament relay A2A5K2 is energized, +28 Vdc is applied, through contacts 6 and 8 of time delay lockout relay A2A5K3, to the heater element (pin 3) of time delay relay A2A5K4. The +28 Vdc is also applied to pin 6 of time delay relay A2A5K4. After approximately 40 seconds, thermal operation of time delay relay A2A5K4 will close contacts 5 and 6. This will apply +28 Vdc through time delay relay A2A5K4 (contacts 5 and 6) to the coil (pin 3) of relay A2A5K3. Since pin 7 of relay A2A5K3 is at ground, the relay will energize. Once relay A2A5K3 is energized, it is held energized by the +28 Vdc which is applied through its contacts 6 and 1 to its coil. Energizing relay A2A5K3 removes the +28 Vdc from the heating element of relay A2A5K4, which will then cool and open its contacts 5 and 6 again. When relay A2A5K3 is energized, the keying line will be completed through contacts 2 and 5 of relay A2A5K3. The 40-second delay ensures that the radio set cannot be keyed until the filaments of tubes A2A1V1 and A2A1V2 in the AM-3007/URT have reached operating temperature. At this time, the +28 Vdc is also applied to CW/FSK relay A2A5K5 and to APC relay A2A2A1K1.

3-297. CW/FSK Relay A2A5K5 and APC Relay A2A2A1K1. The CW/FSK relay A2A5K5 and the APC relay A2A2A1K1 (D, figure 3-60) are energized only in the CW or FSK modes of operation of the AN/WRC-1B. Relay A2A5K5, when energized in the CW or FSK mode, permits class C operation of the final power amplifier A2A1V2 by shifting the control grid bias and screen voltage supplied to the tube. APC relay A2A2A1K1 changes the path of the average-power-control (APC) circuit to provide more efficient shaping for the class C operation. Both relays are deenergized in the AM and SSB modes of operation. The CW/FSK relay is located in DC-to-DC Converter Electronic Assembly A2A5 and the APC relay is located in the APC/PPC/Directional Coupler Electronic Assembly A2A2.

3-298. As soon as the 40-second delay has elapsed, +28 Vdc is applied, through contacts 6 and 1 of time delay lockout relay A2A5K3, to pin 9 of CW/FSK relay A2A5K5 and to pin 7 of APC relay A2A2A1K1. While the AN/WRC-1B is operating in AM or SSB, both of these relays remain deenergized. While relay A2A2A1K1 is deenergized, the output from the APC detector circuit is applied, through series resistor A2A2A1R11 and contacts 2 and 4 of the relay, to APC emitter follower A2A2A1Q2. While CW/FSK relay A2A5K5 is deenergized, control grid bias for final power amplifier A2A1V2 is taken from potentiometer A2A5R30 and applied through contacts 7 and 14 of the relay. When the AM-3007/URT is keyed in AM or SSB, the screen voltage for final power amplifier A2A1V2 is taken directly from the +375 Vdc supplied by the dc-to-dc converter, and is applied through relay A2A5K7 and contacts 1, 10, 3, and 11 of relay A2A5K5. When the AN/WRC-1B is operating in the CW or FSK mode of operation, a ground return line is applied to pin 12 of CW/FSK relay A2A5K5 and to pin 3 of APC relay A2A2A1K1. Since the +28 Vdc is always applied to both relays (after the 40-second delay), the relays will energize. In the CW or FSK mode, the output from the APC detector is applied, through series resistor A2A2A1R11 and contacts 2 and 5 of relay A2A2A1K1, to APC amplifier A2A2A1Q1. When relay A5K5 is energized, control grid bias for the final power amplifier is taken from potentiometer A2A5R31 and applied through contacts 8 and 14 of relay A2A5K5. In CW or FSK operation, the screen voltage for the final power amplifier is developed from the +375 Vdc applied from contact 1 of the relay and the +170 Vdc applied through contacts 4 and 11 of the relay. These two voltages are applied to opposite ends of voltage divider A2A1R12, R13, and the resultant voltage (approximately 300 volts) is used as the screen supply. The change in bias and screen voltage will change the class of operation of final power amplifier A2A1V2 to a modified class C and increase the plate efficiency during CW or FSK operation. When the AN/WRC-1B is returned to AM or SSB operation, the ground return line is removed from the two relays. This deenergizes the relays, and the APC and A2A1V2 screen circuits return to the original condition.

3-299. PA Turret Relay A2A5K6. The PA turret relay A2A5K6 (E, figure 3-60) controls the PA turret motor in the AM-3007/URT. The PA turret motor rotates the PA turret. The turret relay is controlled by a ground-return signal from a set of decoding switches that are operated by the rotation of the turret. This ground return is developed whenever a discrepancy exists between the actual turret position and the position dictated by the operating frequency of the T-827B/URT. The PA turret relay is located in DC-to-DC Converter Electronic Assembly A2A5.

3-300. While relay A2A5K6 is deenergized the ground key line is completed through contacts 3 and 14 of relay A2A5K6 to pin 13 (coil) of transmit/receive relay A2A5K7. The antenna coupler interlock +28 Vdc is applied to pin 17 (coil) of relay A2A5K7, so that relay A2A5K7 operates while relay A2A5K6 is deenergized. The negative side of turret motor A2A4B1 is connected to ground; and, whenever relay A2A5K6 is deenergized, the positive side is connected to ground through contacts 5 and 7 of the relay. This direct short across the motor provides immediate dynamic braking if the motor has been turning, and ensures that the motor will not turn until +28 Vdc is applied to it. When the operating frequency of the T-827B/URT is changed sufficiently, a code is generated and applied to the AM-3007/URT. The ground return is applied from switch A2A4S1-C to pin 6 of relay A2A5K6. With antenna interlock +28 Vdc applied to pin 12, relay A2A5K6 will energize.

3-301. When relay A2A5K6 is energized, the ground key line through contacts 3 and 14 is broken; therefore, if relay A2A5K6 is energized, it will be deenergized at this time. As long as relay A2A5K6 is energized, relay A2A5K7 cannot be energized, and the AM-3007/URT is disabled. With relay A2A5K6 energized and relay A2A5K7 deenergized, the switched +28 Vdc is applied, through contacts 13 and 10 of relay A2A5K6, contacts 11 and 20 of relay A2A5K7, contacts 8 and 5 of relay A2A5K6, and filter A2FL20, to turret motor A2A4B1. When the turret is properly repositioned, the ground return signal from the common terminal of switch A2A4S1-C will be removed from pin 6 of relay A2A5K6, deenergizing the relay. At this time, the +28 Vdc is removed from the turret motor, and ground is applied to the positive side of the turret motor through contacts 5 and 7 of relay A2A5K6. The ground key line will again be completed through contacts 3 and 14 of relay A2A5K6. If relay A2A5K6 is deenergized, the CU-937/UR code common ground return line is connected to ground through contacts 11 and 1 of relay A2A5K6. However, if relay A2A5K6 is energized, this line is open (contacts 11 and 2) to prevent CU-937/UR reprogramming while the turret is rotating.

3-302. Transmit/Receive Relay A2A5K7. The transmit/receive relay A2A5K7 (F, figure 3-60) keys the driver-amplifier and the final-amplifier stages of the AM-3007/URT. Keying the AN/WRC-1B energizes the relay, and the plate and screen grid voltage supplies to driver amplifier A2A1V1 and the screen voltage supply to final power amplifier A2A1V2 are enabled. When the AN/WRC-1B is unkeyed and the transmit/receive relay is not energized, A2A1V1 and A2A1V2 are disabled. Relay A2A5K7 is located in DC-to-DC Converter Electronic Assembly A2A5.

3-303. When transmit/receive relay A2A5K7 is deenergized, the plate and screen of driver amplifier A2A1V1 and the screens of final power amplifier A2A1V2 are all at ground potential, thereby rendering the AM-3007/URT inoperative. The CU-937/UR bypass-ground signal is applied, through contacts 9 and 19 of relay A2A5K7, to antenna-bypass relay K1 in the CU-937/UR. In this way, the action of the antenna-bypass relay, which bypasses the network elements in the coupler during reception, is interlocked to the action of relay A2A5K7 in the AM-3007/URT. When relay A2A5K7 is energized (during transmission), the antenna coupler bypass-ground signal will be removed, and the network elements in the CU-937/UR will be connected to the antenna. When the AM-3007/URT is keyed, the keyline ground is applied through contacts 3 and 14 of PA turret relay A2A5K6 to pin 13 of transmit/receive relay A2A5K7. Since either the switched +28 Vdc or the coupler interlock +28 Vdc is always applied to pin 17 of relay A2A5K7, the relay will be energized.

3-304. When relay A2A5K7 is energized, the ground path to the antenna-bypass relay K1 in the CU-937/UR is opened, causing that relay to deenergize. The rf output of the AM-3007/URT will pass through the selected coupler networks to the antenna. A ground is applied, through contacts 12 and 20 of relay A2A5K7, to contact 8 of PA turret motor relay A2A5K6 to prevent rotation of the PA turret. While relay A2A5K7 is energized, the grid bias, plate, and screen voltage supply for driver amplifier A2A1V1 (+170 Vdc) is connected through contacts 8, 18, 6, and 16 of the relay. The double-contact arrangement is used to minimize voltage breakdown in the relay. Also, a +375-Vdc supply is connected through contacts 4, 15, 2, and 14 to relay A2A5K5 as the screen supply for final power amplifier A2A1V1. When PA turret motor relay A2A5K6 is energized, or the ground key line is removed from pin 13 of relay A2A5K7, relay A2A5K7 is deenergized, placing the AM-3007/URT in standby.

3-305. Antenna Transfer Relay A2K1. The antenna transfer relay A2K1 (G, figure 3-60) is energized when the AN/WRC-1B is keyed, and connects the output of the AM-3007/URT to Antenna Coupler CU-937/UR. When the AN/WRC-1B is unkeyed, the antenna transfer relay is deenergized and the input to the R-1051B/URR is connected to the antenna coupler. The antenna transfer relay is located at the rear of the AM-3007/URT chassis.

3-306. When the AM-3007/URT is keyed, the key-line ground applied to relay A2A5K7 is simultaneously applied to pin 2 of coaxial antenna transfer relay A2K1. Since the same switched +28 Vdc or coupler interlock +28 Vdc is also simultaneously applied to both relays, antenna transfer relay A2K1 will energize at the same time that transmit/receive relay A2A5K7 energizes. This will connect the output from the 50-ohm tap on the selected output filter (A2A4FL1 through FL19) to RF OUTPUT connector A1J8 on the rear of the AM-3007/URT. When the AM-3007/URT is unkeyed, antenna transfer relay A2K1 will be deenergized, and the antenna transmission line connected to A1J8 will be connected through relay A2K1 to RECEIVER ANTENNA connector A1J7.

3-307. ANTENNA COUPLER CU-937/UR, OVERALL FUNCTIONAL DESCRIPTION.

3-308. The CU-937/UR is used for both transmitting and receiving in all modes of communication system operation. The CU-937/UR matches a 15-, 25-, or a 35-foot whip antenna to the 50-ohm coaxial transmission line from Radio Frequency Amplifier AM-3007/URT for all frequencies in the 2- to 30-MHz frequency range. A code from the AM-3007/URT automatically rough-tunes the CU-937/UR to one of 11 different channels. Fine tuning is accomplished by the ANT CPLR TUNE and LOAD switches on the AM-3007/URT front panel. During transmission, the CU-937/UR couples the high-level output of the AM-3007/URT to the antenna. During reception the signal from the antenna is applied directly through the CU-937/UR and AM-3007/URT to the companion receiver.

3-309. ANTENNA COUPLER CU-937/UR, FUNCTIONAL CIRCUIT DESCRIPTION. (See Figure 5-33.)

NOTE

> The CU-937/UR is unit 5 in the Radio Set AN/WRC-1B System. In this and other paragraphs describing the CU-937/UR, prefix all reference designations with "5" to obtain the complete designation.

3-310. The CU-937/UR consists of tuned inductors L1, L2, and L3, and the associated circuits for remote tuning and loading. The CU-937/UR matches a 15-, 25-, or 35-foot whip antenna to the 50-ohm coaxial transmission line from the AM-3007/URT for all frequencies in the 2- to 30-MHz frequency range. Internal connections on the CU-937/UR terminal board TB1 and coupler network connections to the system program the CU-937/UR for the antenna to be used. A code from the AM-3007/URT automatically rough-tunes the antenna coupler to one of 11 different networks. Optimum antenna tuning and loading conditions are achieved by use of the ANT CPLR TUNE and LOAD switches on the AM-3007/URT front panel. The CU-937/UR is used for both receiption and transmission in all modes of operation. The ANT CPLR BYPASS/NORMAL switch on the front panel of the AM-3007/URT connects the antenna

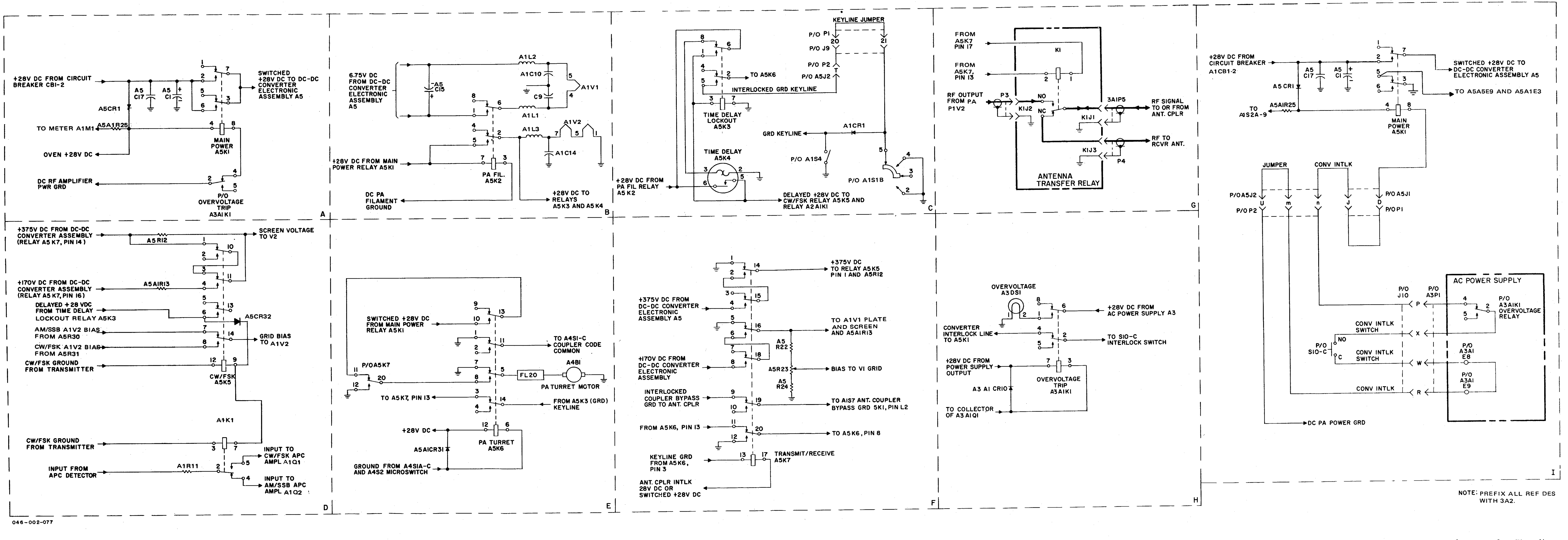


Figure 3-60. AM-3007/URT, Relay Circuits, Simplified Schematic Diagram

directly to the transmission line through relay K1, bypassing the CU-937/UR impedance matching network during the reception of weak signals, or during duplex operation when the system exciter/transmitter and receiver are not tuned to the same frequency. (Tuning of the CU-937/UR is controlled by the AM-3007/URT; therefore, the CU-937/UR is always tuned to the transmitting frequency.)

3-311. Figure 3-61 shows typical network configurations for the 11 programmed rough-tuned positions of the CU-937/UR. During transmission, rf signals are received from the AM-3007/URT through the connector J2. These signals are applied to coils L1 and L2 (or L1, L2, and L3) through contacts 2 and 3 of antenna-bypass relay K1. During transmission, relay K1 is always deenergized. Coil L1 acts as a loading inductance connected between the transmission line and ground. The rf signals pass through the series inductance of coil L2 to the center wiper contact (contact 2) of section 3 of switch S5. The position of switch S5 determines which of the network configurations represented in figure 3-61 is used. The rf signal is then applied through the respective contact of section 2 of switch S5 to contact 2 (center wiper) of section 2 of switch S5. From the center wiper (contact 2) of section 2 of switch S5, the rf signal is applied through terminals 5 and 6 of relay K1 to the antenna connection on the case of the CU-937/UR.

3-312. During the reception of rf signals, rf energy from the antenna is applied to terminal 5 of relay K1 through the antenna on the CU-937/UR case. If the ANT CPLR BYPASS/NORMAL switch on the AM-3007/URT front panel is set at BYPASS, a ground is applied to pin L2 of relay K1. Since 28 Vdc is present on terminal L1, relay K1 is energized, and the signals from the antenna are connected directly to connector J2 and the 50-ohm output coaxial transmission line of the AM-3007/URT through terminals 5 and 4 of relay K1. If the ANT CPLR BYPASS/NORMAL switch on the AM-3007/URT front panel is set at NORMAL, relay K1 is deenergized, and the rf signals from the antenna are applied to the antenna coupler network through terminals 5 and 6 of relay K1. The signal flow for reception is, then, the reverse of the signal flow as described during transmission.

3-313. Rough tuning of the CU-937/UR is controlled by the programming of the connections on terminal board TB1 inside the CU-937/UR, and the connections between the CU-937/UR and the AM-3007/URT at their junction point. When a frequency change that changes the AM-3007/URT turret position is made, a ground pulse appears on one of the closed contacts of section 1 of switch S4. This ground is applied through common contact 24 of section 1 of switch S4 to pin 14 of relay K7. Since 28 Vdc is available on pin 13 of relay K7, the relay becomes energized, causing the following:

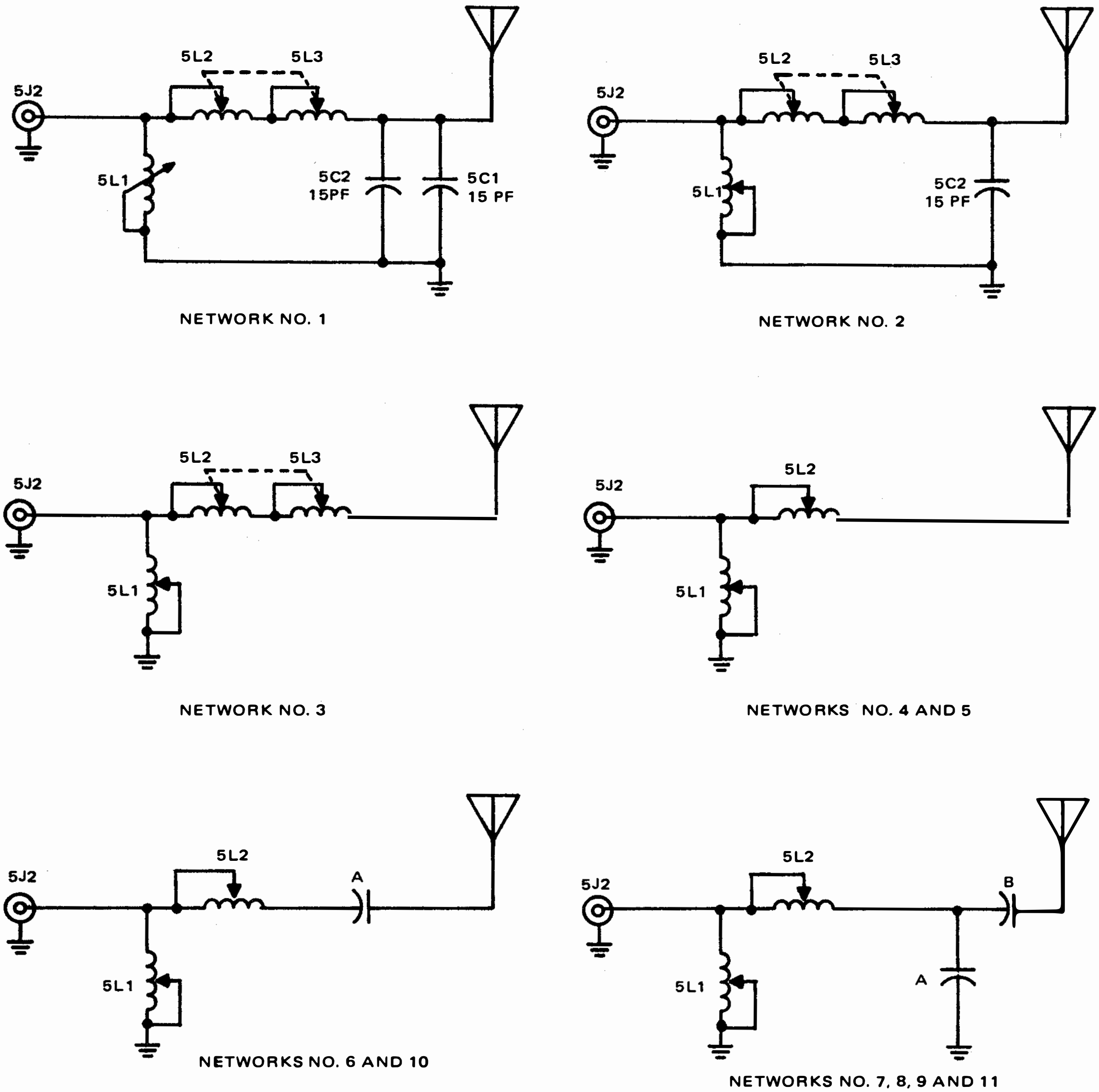
a. The interlocked 28 Vdc is interrupted (normally closed circuits 5 and 1 of relay K7 are opened).

b. Relay K6 is energized by applying the switched 28 Vdc through normally open contacts 6 and 1 of relay K7.

c. Actuator B3 is energized by applying the switched 28 Vdc through normally open contacts 2 and 8 of relay K7.

d. The 28 Vdc applied for energizing relay K6 is also applied through diode CR8 to the ANT CPLR TUNE indicator on the AM-3007/URT, lighting it.

3-314. When actuator B3 is energized, it steps switches S4 and S5 until the notch in the wiper of section 1 of switch S4 is aligned with that contact to which the ground was applied from the AM-3007/URT. This action breaks the ground path to relay K7, deenergizing it. When relay K6 was energized, ground was applied through contacts 5 and 2 and diode CR10 to common contact 24 of section 2 of switch S4. This action applies a ground through terminal board TB1 to the terminals on the front and rear of switch S3. A path is then established either through switch S3 (front) to pin 3 of relay K4 or through switch S3 (rear) to pin



NETWORK	A POSITION CAPACITOR NUMBER	A POSITION CAPACITOR VALUE	B POSITION CAPACITOR NUMBER	B POSITION CAPACITOR VALUE
6	5C3	500 PF		
10	5C7	15 PF		
7	5C9	20 PF	5C4	40 PF
8	5C10	40 PF	5C5	15 PF
9	5C11	50 PF	5C6	50 PF
11	5C12	20 PF	5C8	100 PF

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Figure 3-61. Antenna Coupler CU-937/UR, Basic Network Configuration

3 of relay K5. Since 28 Vdc is always present on pin 7 of relays K4 and K5, either relay K4 or relay K5 will energize. The 28 Vdc is then applied through contacts 5 and 2 of the energized relay, contacts 2, 4, 6, and 8 of the unenergized relay, and contacts 6 and 1 of relay K6 to pin 7 of relay K6. This holds relay K6 energized after relay K7 deenergizes.

3-315. After relay K7 deenergizes, 28 Vdc is applied from contact 4 of the deenergized relay (K4 or K5) to the positive side of motor B1 or through contacts 4 and 11 of relay K7 to the negative side of motor B2. A ground path for the side of motor B1 that does not receive 28 Vdc is established either through contacts 6 and 1 when relay K4 is energized, or contacts 11 and 4 of deenergized relay K7 and contacts 6 and 1 of relay K5 when it is energized, through diode CR11 and contacts 2 and 5 of energized relay K6. Therefore, motor B2 is energized, thus rotating switch S3 and inductors L2 and L3, until the ground path to either relay K4 or relay K5 is broken.

3-316. Simultaneously with the energizing of relay K6, ground is applied through contacts 5 and 2 of relay K6 and diode CR9 to pin 3 of relay K3, energizing relay K3. When relay K3 energizes, 28 Vdc is applied through its contacts 5 and 2 and contacts 2 and 4 of relay K2 to the negative side of motor B1. A ground path from the positive side of motor B1 is established through contacts 6 and 1 of relay K3, diode CR11, and contacts 5 and 2 of relay K6. Thus, motor B1 is energized and rotates until inductor L1 is tuned to its maximum inductance. At this time, ground is applied through switch S1 and filter FL4 to terminal 3 of relay K2, energizing it. Therefore, relays K2 and K3 are both energized, breaking the 28-Vdc path to motor B1 and thereby deenergizing it. Since both relays K2 and K3 are energized and relays K4 and K5 are deenergized, the 28-Vdc path to relay K6 is broken, deenergizing it. Therefore, the rough tuning is completed and the ANT CPLR TUNE indicator on the AM-3007/URT will go out.

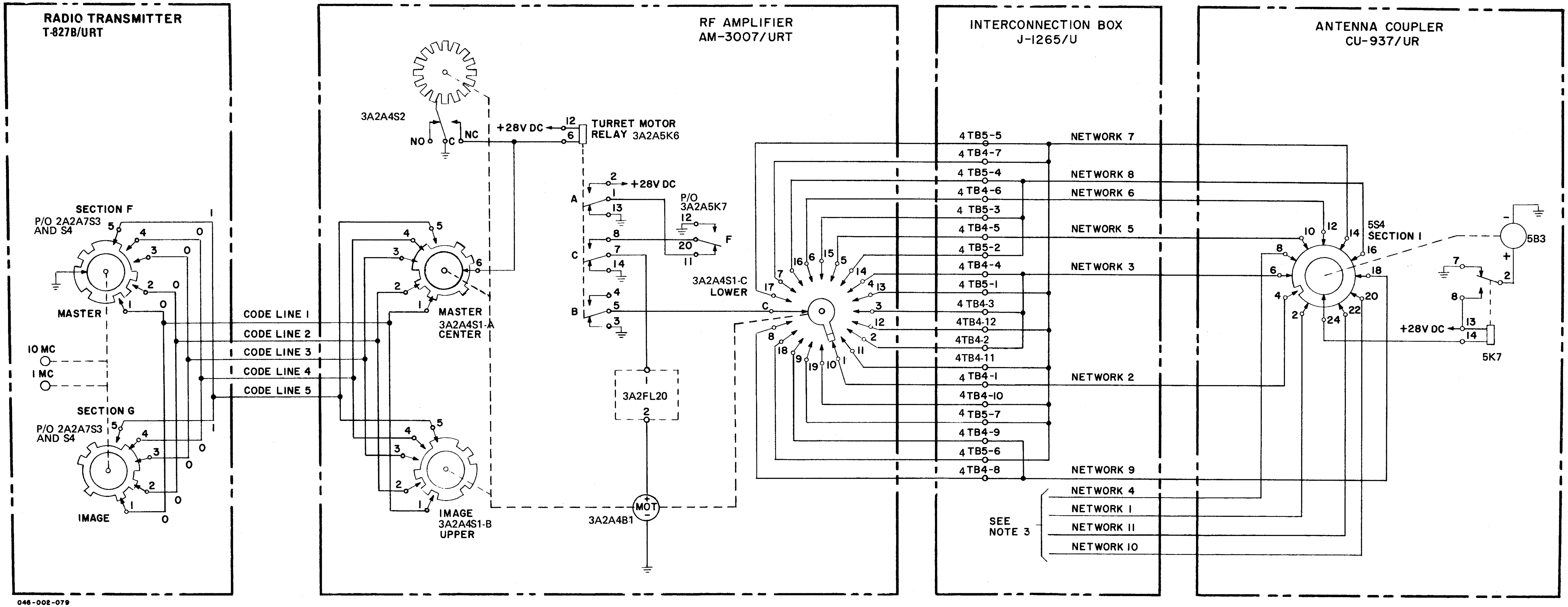
3-317. The rough-tuning position of the CU-937/UR should be considered as a reference starting point for fine-tuning the CU-937/UR. For fine tuning of the CU-937/UR, the ANT CPLR TUNE and the LOAD switches on the front panel of the AM-3007/URT are used. Holding the ANT CPLR TUNE switch at HI places a ground on pin 3 of relay K5, energizing relay K5 and causing tune motor B2 to be energized, as previously explained, and turn counterclockwise when viewed from the motor end. If the ANT CPLR TUNE switch is held at LO, a ground is placed on pin 3 of relay K4, energizing relay K4 and causing tune motor B2 to energize, as previously explained, and turn clockwise. Sensitive switch S7 is operated by a cam on the shaft of motor B2. As motor B2 turns, the action of the cam on sensitive switch S7 causes the ANT CPLR TUNE indicator on the rf amplifier to flash once for each revolution of coil L2. The flashing light is due to the application of 28 Vdc from contact 8 of the deenergized relay (K4 or K5) through sensitive switch S7 (when the NC controls mate) and the NC contacts of sensitive switch S6. Tables 2-2, 2-3, and 2-4 provide the operator with information concerning the direction (HI or LO) and the number of flashes required to fine-tune the CU-937/UR for any given frequency. If the ANT CPLR TUNE switch is held at either HI or LO for a long period of time, motor B2 will tune coil L2 to its extreme. When this happens, the coil roller comes in contact with the contact of limit switch S2, and a ground is placed upon the deenergized relay (K4 or K5 through either filter FL5 or filter FL6, respectively), energizing the relay. With both relays energized, there is no voltage supplied to the motor, and the motor stops. The load coil is tuned in the same manner as the tune coil, using the ANT CPLR LOAD switch on the front panel of the AM-3007/URT to energize either relay K2 or K3.

3-318. For final adjustments, adjust the AM-3007/URT ANT CPLR TUNE and LOAD switches which control the CU-937/UR tune and load coils, while observing the RF OUTPUT meter on the front panel of the AM-3007/URT and adjusting for maximum forward and minimum reflected power.

3-319. OVERALL SYSTEM TUNING OPERATION. (See Figure 3-62.)

3-320. The tuning circuits for the AM-3007/URT and CU-937/UR (figure 3-62) consist of turret switch A2A4S1, switch A2A4S2, relay A2A5K6, part of relay A2A5K7, and motor A2A4B1 in the AM-3007/URT; and section 1 of switch S4, relay K7, and actuator B3 in the CU-937/UR.

3-321. When an operating frequency is selected (from the companion exciter/transmitter), a five-wire open-seeking code is generated and applied to the AM-3007/URT as a ground to energize a series of relays. These relays apply +28 Vdc to the positive side of turret motor A2A4B1, which begins to rotate the turret. When the turret is properly positioned, the code is satisfied and the grounds are removed from the relays. The relays are deenergized and a ground is applied to the positive side of turret motor A2A4B1. Grounding the motor provides dynamic braking to keep the turret from overshooting. At the same time, another code is generated by the encoder portion of decode/encode switch A2A4S1 and applied to rough-tune the CU-937/UR to the new frequency.



NOTES:

1. AS SHOWN, UNITS ARE TUNED FOR 2.0 TO 2.499 MHz.
2. 5TB4 AND 5TB5 IN CU-937/UR ARE SHOWN PROGRAMMED FOR 35-FOOT WHIP ANTENNA.
3. USED ONLY WHEN PROGRAMMED FOR 15- OR 25-FOOT WHIP ANTENNA.

Figure 3-62. System Tuning Circuits, Simplified Schematic Diagram

SECTION 4
TROUBLESHOOTING

4-1. LOGICAL TROUBLESHOOTING.

4-2. Troubleshooting is the logical procedure used to locate and correct a fault in an equipment. It is based on a thorough knowledge of the equipment's operational characteristics and electronic circuit fundamentals. Comprehensive general information on electronic circuit fundamentals and communication equipment troubleshooting is given in the communications section of the Electronics Installation and Maintenance Book (EIMB), NAVSHIPS 0967-000-0010.

4-3. PROCEDURE FOR TROUBLESHOOTING RADIO SET AN/WRC-1B.

4-4. RECOMMENDED PLAN. The recommended plan for troubleshooting Radio Set AN/WRC-1B includes the following steps:

a. Carefully inspect for obvious troubles such as loose connections, damaged cables, broken parts, signs of overheating, etc. Investigate all such defects before proceeding.

b. Perform the AN/WRC-1B overall turnon and checkout procedure to isolate the fault to either the AM-3007/URT, CU-937/UR, or the T-827B/URT.

c. Perform the checkout procedure for the suspected unit to isolate the malfunction to an assembly, or circuit group.

d. Perform the assembly isolation procedure for the suspected assembly to determine whether the assembly or related circuitry is at fault.

4-5. When troubleshooting the AN/WRC-1B, first perform the overall turnon and checkout procedures. These troubleshooting procedures cover the most likely, as well as the easiest to check, malfunctions. When the troubleshooting procedure for only one unit or assembly is performed, it must be presumed that previous examination has revealed the trouble to be in that unit assembly.

NOTE

Some circuits which measure out of tolerance can be adjusted to a correct reading by using the circuit adjustment procedure in Section 5. In performing the circuit check, perform any applicable adjustments contained in Section 5 to attempt to bring the measurements to the required values. If proper adjustment cannot be made, consider the circuit faulty. While departures from tolerances should be noted for later correction, proceed elsewhere to isolate faults; for example, if no signal is present at the output, a small voltage discrepancy is not likely to be the cause.

4-6. OVERALL TURNON AND CHECKOUT PROCEDURE. The procedure in table 4-1 requires observations to be made with the AN/WRC-1B controls in various positions to determine which circuits appear normal. This procedure exercises every unit, assembly, and control circuit in the equipment; and minimizes the number of mental decisions necessary to isolate the malfunction. The tests become more meaningful when performed on an operational AN/WRC-1B. Following every key procedure, a course of action is suggested to aid in determining the cause of trouble.

No corrective action should be taken because of a minor deviation from the normal indication. Two or more no-go symptoms should be obtained where possible, to avoid premature conclusions regarding the source of trouble. The following test equipment is required to perform the overall turnon and checkout procedure:

a. Multimeter AN/PSM-4( )

b. Electronic Multimeter CCVO-91CA

NOTE

The technician must be thoroughly familiar with the operation of all primary or alternate test equipment used in these procedures. For example, if an oscilloscope is used for rf and audio voltage measurements, the peak-to-peak oscilloscope readings will be approximately 2.8 times the rms meter indications.

TABLE 4-1. RADIO SET AN/WRC-1B,TURNON AND CHECKOUT

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Preliminary control settings: AM-3007/URT: PRIMARY POWER selector switch 3A2A1S2 set to AC/INT.BAT. RF OUTPUT meter switch 3A2A1S3 set to 100W FWD PRIMARY POWER circuit breaker 3A2A1CB1 set to OFF ANT INTLK switch 3A2A1S9 set to NORMAL.		
	NOTE The ANT INTLK switch is located on top right of chassis behind the front panel. After setting switch, push AM-3007/URT into case and secure.		
	T-827B/URT: AUX/NORM switch 2A2S7 set to NORM		
	NOTE The AUX/NORM switch is located on top left of chassis behind the front panel. After setting switch, push T-827B/URT into case and secure.		

TABLE 4-1. RADIO SET AN/WRC-1B, TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1 (Cont)	Mode Selector switch 2A2S2 set to AM USB LINE LEVEL switch 2A2S11 and LSB LINE LEVEL switch 2A2S10 set to -10DB LOCAL/REMOTE switch 2A2S1 set to LOCAL MCS and KCS controls set to 8.0000 MHz or to an assigned frequency for test or operation.		
2	Set the AM-3007/URT PRIMARY POWER circuit breaker 3A2A1CB1 to ON.	AMPLIFIER meter 3A2A1M1 indicates at NOM LINE.	Check 115-Vac primary power input circuit and PA power control relay 4K1 in Interconnection Box J-1265/U.
		PRIMARY POWER indicator 3A2A1DS1 lights.	Check ac power supply 3A2A3 output at 3A2A3TP1, (figure 4-19) and 28-Vdc distribution in AM-3007/URT (figure 5-11). If overvoltage trip indicator 3A2A3DS1 has lighted, check input to dc-to-dc converter at 3A2A5TP6.
	WARNING Dangerous voltages up to 1000 volts exist in the AM-3007/URT.		
3	Set AMPLIFIER meter switch 3A2A1S1 to DR CATH position and then to PA PL position.	AMPLIFIER meter 3A2A1M1 indicates at DR SET mark (DR CATH position). AMPLIFIER meter 3A2A1M1 indicates at PA SET mark (PA PL position).	Tilt chassis to vertical position and observe whether filaments of driver 3A2A1V1 and power amplifier 3A2A1V2 are lit. If V2 is not lit, check its +28-Vdc filament circuit (figure 5-11). If V1 is not lit,

TABLE 4-1. RADIO SET AN/WRC-1B, TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
3 (Cont)			check its 6.3-Vdc filament circuit and dc-to-dc converter 3A2A5 (figure 4-20). If tube replacement is required, refer to paragraph 5-121 or 5-123. If readings require adjustment, refer to paragraph 5-105.
4	Key AN/WRC-1B with AM-3007/URT RF OUTPUT TUNE/ OPERATE switch 3A2A1S4. While keying, set AMPLIFIER meter switch at PA PL position and observe deflection on the AMPLIFIER meter.	Meter reading is 45 to 75 mA. (1/2- to 3/4- full scale.	If meter indicates near maximum or is pegged, final amplifier stage is mismatched or the tube is defective. Troubleshoot rf turret 3A2A4, and driver and final amplifier stages V1 and V2. If meter does not deflect from PA SET mark when keyed, check for exciter output at test point 2A2A4TP4 on the rf amplifier assembly in the T-827B/URT.
	NOTE Connect Electronic Voltmeter CCVO-91CA from test point 2A2A4TP4 to ground. Key the AN/WRC-1B with the AM-3007/URT RF TUNE/OPERATE switch and adjust rf gain potentiometer A2A4A38R6 for an indication of 1.0 volt on the voltmeter. If this 1.0-volt excitation is not obtained, troubleshoot the T-827B/URT (table 4-3 and figure 4-4).		
5	Key AN/WRC-1B with RF OUTPUT TUNE/ OPERATE switch 3A2A1S4. Observe reading on RF OUTPUT meter 3A2A1M2 with RF OUTPUT meter switch 3A2A1S3 in 100W FWD position.	RF OUTPUT meter indicates 18 to 30 watts in 100W FWD position of meter switch and indicates in the black area (minimum reading) in the 30W REFL position.	If no output is indicated on RF OUTPUT meter, troubleshoot apc/ppc/ directional coupler 3A2A2 (figure 4 8) and RF OUTPUT meter circuit (figure 4-17).

TABLE 4-1. RADIO SET AN/WRC-1B,TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
5 (Cont)	Observe key-down indication with RF OUTPUT meter switch in 30W REFL position.	The vswr indicated by these readings is 1.5 (or less) to 1.	Go to next step to troubleshoot and/or tune antenna coupler CU-937/UR.
	NOTE The following steps are intended to check out Antenna Coupler CU-937/UR. It is assumed that the preceding steps in this table have been performed satisfactorily and all indicated malfunctions have been corrected in the AM-3007/URT and T-827B/URT.		
6	Set AN/WRC-1B controls as indicated in step 1 of this table. Set MCS digit knobs on T-827B/URT front panel to 2, 12, 22, and 29 MHz, and then back to test frequency.	ANT CPLR TUNE indicator 3A2A1DS2 lights for a few seconds at each frequency change and then extinguishes.	If indicator remains lit, check for undesired ground in network programming lines to the CU-937/UR. See the schematic diagram for Interconnection Box J-1265/U in figure 5-8. If indicator does not light, check +28-Vdc distribution to CU-937/UR (figure 5-11). If indicator lights at only one MCS dial change, check for defective 5B3 actuator motor circuit or motor (figure 4-21).
7	Set RF OUTPUT meter switch 3A2A1S3 to 30W REFL. Simultaneously, place RF OUTPUT TUNE/OPERATE switch in the TUNE position and place ANT CPLR TUNE switch 3A2A1S6 in the LO position for 4 or 5 seconds. Place ANT CPLR TUNE switch in the HI position for 4 or 5 seconds. Release all switches.	ANT CPLR TUNE indicator 3A2A1DS2 flashes once for each revolution of the tuning coil and the loading coil in the CU-927/UR (about one flash per second) in both the HI and the LO switch positions.	Troubleshoot tuning coil and/or loading coil drive circuits in the CU-937/UR (figure 4-21).

TABLE 4-1. RADIO SET AN/WRC-1B, TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
7 (Cont)	Repeat this procedure using the RF OUTPUT TUNE/OPERATE switch and ANT CPLR LOAD switch 3A2A1S5.	Indication on RF OUTPUT meter increases or decreases as tuning coil and loading coil are turned.	
	CAUTION Do not key Radio Set AN/WRC-1B longer than 1.0 seconds at a time while tuning (with a high Vswr).		

4-7. RADIO TRANSMITTER T-827B/URT, OVERALL PERFORMANCE AND CHECKOUT PROCEDURE.

NOTE

In all subsequent paragraphs in this section describing the T-827B/URT, prefix all reference designations with "2A2" to obtain the complete designation for all transmitter components.

4-8. REFERENCE DATA. Table 4-2 lists the functional areas of the T-827B/URT is alphabetical order, with cross-references to the appropriate paragraphs and illustrations to be used in troubleshooting the T-827B/URT. Figure 4-4 is the T-827B/URT overall servicing block diagram for the transmitter.

4-9. TURNON AND CHECKOUT PROCEDURE. The overall turnon and checkout procedure in table 4-3 requires observations to be made with the equipment controls in various positions to determine which circuits appear normal. This procedure exercises every functional section, assembly, and control circuit in the equipment; and minimizes the number of mental decisions necessary to isolate the malfunction. The tests become more meaningful when performed previously on an operational T-827B/URT. Following every key procedure a course of action is suggested as to aid in determining the cause of trouble. No corrective action should be taken because of a minor deviation from the normal indication. Two or more abnormal no-go symptoms should be obtained where possible to avoid premature conclusions regarding the source of trouble.

4-10. The following test equipment is required to perform the overall turnon and checkout procedure:

a. Multimeter AN/PSM-4( )

b. Dummy Load DA-412A/U

c. Adapter, BNC-to-N, UG-349A/U

d. Electronic Multimeter AN/USM-116B

e. Frequency Meter AN/USM-207.

NOTE

The technician must be thoroughly familiar with the operation of all primary or alternate test equipment used in these procedures. For example, if an oscilloscope is used for rf and audio voltage measurements, the peak-to-peak oscilloscope readings will be approximately 2.8 times the rms meter indications.

TABLE 4-2. REFERENCE DATA FOR TROUBLESHOOTING RADIO TRANSMITTER T-827B/URT

FUNCTIONAL AREA	TROUBLE-SHOOTING PARAGRAPH	SERVICING BLOCK DIAGRAM FIGURE	FUNCTIONAL DESCRIPTION PARAGRAPH	SCHEMATIC DIAGRAM FIGURE
Audio Amplifiers	4-35	4-6	3-134	5-15
Audio Signal Flow	4-24	3-5	3-50 3-131	-
Code Generator	4-49	-	-	5-25
Digital Tuning	4-14	-	3-64 3-220	-
Frequency Standard	4-43	4-8	3-70	5-17
FSK Tone Generator	-	4-15	3-144	5-26
Frequency Synthesizer	4-27	-	3-54 3-156	-
IF. Amplifier	-	4-16	3-108	5-27
Keying Circuit	4-18	-	3-41	5-9
Main Signal Flow	4-21	-	3-33 3-69	-
Mode Selector	4-30	4-5	3-84	5-14
Power Supply	4-11 4-52	4-4	3-30 3-60 3-214	5-13
Radio Transmitter T-827B/URT	4-7	4-4	3-10 3-229	5-13
RF Amplifier	4-40	4-7	3-122	5-16
Translator/ Synthesizer	4-46	4-9 through 4-14	3-115	5-18 through 5-24

TABLE 4-3. RADIO TRANSMITTER T-827B/URT, TURNON AND CHECKOUT

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Set T-827B/URT front-panel controls as follows: Mode Selector switch S2 to OFF. LOCAL/REMOTE switch S1 to LOCAL. LSB LINE LEVEL switch S10 to -10DB. USB LINE LEVEL switch S11 to -10DB. MCS and KCS controls to 8.000 MHz.		
2	Loosen front-panel captive screws and slide T-827B/URT to locked-out position.		
3	Set AUX/NORM switch S7 to NORM.		
4	Pull chassis interlock switch S8 upward to a locked position.		
5	Set the AM-3007/URT PRIMARY POWER circuit breaker to ON.		
	NOTE Wait 40 seconds for the AM-3007/URT time delay to operate.		
6	Set T-827B/URT Mode Selector switch S2 to AM.	Ac line FUSE indicators on front panel do not light.	Replace blown fuse or fuses. If either fuse blows more than once, remove all assemblies and replace fuse. If fuse now blows, trouble is in main frame. If fuse does not blow, replace assemblies one at a time until fuse blows. Troubleshoot last assembly replaced.

TABLE 4-3. RADIO TRANSMITTER T-827B/URT, TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
6 (Cont)		Filaments of the two vacuum tubes in rf amplifier A4 light. Front-panel MCS and KCS indicators light.	Troubleshoot primary power distribution (figure 5-10) before attempting to replace pilot lamps or tubes.
	CAUTION Carefully check the power supply as described in step 7. A malfunction of the positive 20-volt regulator circuit may allow the 20-volt supply to rise to 28 volts and damage all assemblies in the T-827B/URT.		
7	Tilt chassis to vertical locked-out position. Using the AN/PSM-4( ), measure voltages at indicated terminals on bottom of chassis. See figure 5-36 for location of terminals.	+25 to +31 Vdc at E22 +19 to +21 Vdc at E24 +100 to +120 Vdc at E9 +11 to +12 Vdc at E16	Troubleshoot power supply function (table 4-4).
8	Place chassis in horizontal position.		
	NOTE The following step is applicable only if an external 5-MHz source is connected to EXT 5 MC IN jack 2A1J25 at rear of T-827B/URT.		
9	Set COMP/INT/EXT switch on top of frequency standard A5 to COMP position. Observe indicator lamp DS1 on top of the frequency standard. The lamp flickers at some visible rate equal to the error in frequency between the internal and the external standards.	DS1 fades and lights not more than once in 20 seconds (max through min to max, or min through max to min).	If DS1 flickers rapidly or stays on longer than 4 minutes, refer to paragraph 5-16 for adjustment procedure. If lamp does not light, troubleshoot frequency standard assembly (refer to paragraph 4-43).

TABLE 4-3. RADIO TRANSMITTER T-827B/URT, TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
10	Set MCS controls on front panel to 9, then 29, then back to 8 MHz.	A8, then A9, then A29, and then A8 are visible in window on top front of rf amplifier A4. The crystal turret motor in the 1 MC synthesizer operates (rotates) and stops. Operation of this motor is audible.	Rock MCS controls to left and right of their detented (center) position. If this causes turrets to turn, refer to paragraph 5-96. If rocking of the MCS controls is not successful, troubleshoot the digital tuning function (table 4-5).
11	Set Mode Selector switch S2 to LSB and then to USB. While switch is in each mode, key T-827B/URT with handset and speak directly into handset microphone.	LSB LINE LEVEL meter on front panel will deflect at least 1/3 of full scale on voice peaks in LSB mode. USB LINE LEVEL meter will deflect at least 1/3 of full scale on voice peaks in USB mode.	If no deflection occurs in either USB or LSB, troubleshoot handset, handset filter A14, and keying circuit (table 4-7). If no deflection occurs in USB mode only, troubleshoot USB audio amplifier input circuit and USB LINE LEVEL meter circuitry. If no deflection in LSB mode only, troubleshoot LSB audio amplifier input circuit and LSB LINE LEVEL meter circuitry.
12	Rotate 100 KCS control and 10 KCS control on front panel to 9 and then back to 0. Observe the two rotor board assemblies visible just inboard and between the two tubes in rf amplifier A4.	Top rotor board turns when 100 KCS control is rotated. Bottom rotor board turns when 10 KCS control is rotated.	Perform adjustments described in paragraph 5-95, if necessary.
13	Set the AM-3007/URT PRIMARY POWER circuit breaker to OFF. Slide AM-3007/URT to the locked-out position. Pull chassis interlock switch 3A2A1S10 to the up position. Tilt chassis to the vertical locked position.		

TABLE 4-3. RADIO TRANSMITTER T-827B/URT, TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
13 (Cont)	Disconnect BNC-connected cable to rf input bridge 3A1A1 (located at right side of AM-3007/URT near front panel). At the T-827B/URT, connect a 50-ohm, 2-watt resistor from TP4 to ground on the rf amplifier assembly.		
14	Connect AN/USM-116B to TP4 on rf amplifier A4. Set to 10-Vac scale.		
15	Set Mode Selector switch S2 to LSB. Key T-827B/URT with handset and speak directly into handset microphone, with MCS and KCS digit controls at 8.0000 MHz.	At least 1.75 volts on AN/USM-116B on voice peaks.	Continue check.
16	Set Mode Selector switch S2 to USB. Key T-827B/ and speak directly into microphone.	At least 1.75 volts on voice peaks on AN/USM-116B.	Continue check.
17	Set Mode Selector switch S2 to CW. Key T-827B/URT at CW KEY jack J2.	At least 2.0 volts on AN/USM-116B.	Continue check.
18	Set front-panel digit controls to 9.0000 MHz. Repeat steps 15, 16, and 17.	At least 2 volts on AN/USM-116B.	Troubleshoot main signal flow (table 4-8), if malfunction is in one or more modes.
19	Set LOCAL/REMOTE switch S1 to REMOTE. Key T-827B/URT in USB, LSB, and CW.	AN/USM-116B indicates at least 1.75 volts on USB and LSB voice peaks and at least 2.0 volts in CW.	Troubleshoot LOCAL/REMOTE switch S1 and associated circuitry (figures 5-10 and 5-13).

TABLE 4-3. RADIO TRANSMITTER T-827B/URT, TURNON AND CHECKOUT (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
20	Set Mode Selector switch S2 to FSK. Leave REMOTE/LOCAL switch S1 in REMOTE. Patch a tty signal and keying into the T-827B/URT.	At least 2.0 volts on AN/USM-116B.	If remote keying was verified in step 19, troubleshoot FSK tone generator assembly.
21	Leave Mode Selector switch S2 at FSK, and LOCAL/REMOTE switch S1 at REMOTE. Set front-panel digit controls to 8.0000 MHz. Set CTR FREQ switch on FSK tone generator A9 to 2550. Connect Frequency Meter AN/USM-207 to TP4 on rf amplifier A4.	AN/USM-207 indicates 8.002975 MHz ±121 Hz for a mark signal; and 8.002125 MHz ±78 Hz for a space signal.	See figure 4-15 and paragraph 5-62 for troubleshooting and adjustment of FSK tone generator assembly.
22	Connect Frequency Meter AN/USM-207 to TP4 on rf amplifier A4. Set Mode Selector switch S2 to CW. Set front-panel digit controls to 9.6660 MHz. With LOCAL/REMOTE switch S1 still in LOCAL, key T-827B/URT in CW.	9.6660 MHz ±2.0 Hz on AN/USM-207.	Troubleshoot frequency synthesizer section (table 4-10).
23	With same setup as step 22, vary CPS switch from 000 to 900.	9.6660 through 9.6669 MHz ±2.0 Hz on AN/USM-207.	Troubleshoot frequency synthesizer section (table 4-10).

4-11. T-827B/URT POWER SUPPLY FUNCTION TROUBLESHOOTING.

4-12. Table 4-4 lists the procedures for troubleshooting the ac and dc voltages required for operation of the T-827B/URT. These procedures isolate power malfunctions to the ac power input circuit, power supply A8, and the dc power supply distribution circuit.

4-13. Multimeter AN/PSM-4( ) is required to troubleshoot the power supply function. See the T-827B/URT overall schematic diagram (figure 5-13) and the primary power distribution diagram (figure 5-10). while performing steps in table 4-4.

4-14. T-827B/URT, DIGITAL TUNING FUNCTION TROUBLESHOOTING.

4-15. The digital tuning function troubleshooting procedures in table 4-5 consist of two parts. The first part is to electrically isolate a fault to code generator A7. The second part is to determine if a mechanical misalignment of the 100, 10, and 1 KCS drive mechanism(s) has occurred.

TABLE 4-4. T-827B/URT, POWER SUPPLY FUNCTION TROUBLESHOOTING

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Preliminary control settings: T-827B/URT chassis pulled to locked-out position. Interlock switch S8 pulled up. AUX/NORM switch S7 set to NORM. Mode Selector switch S2 set to OFF. MCS and KCS controls set to 8.0000 MHz.		
2	Set Mode Selector switch S2 to LSB.	FUSE indicator lamps do not light.	If either FUSE indicator lamp lights, refer to step 6 of table 4-3.
3	To determine if ac power is present, remove one of the fuses and insert the indicator lamp back into the socket.	FUSE indicator lamp lights.	Troubleshoot ac primary power circuit through S2, S7, S8, and then back toward the bulkhead distribution panel. (figures 5-10 and 5-12).
4	Measure the ac power input to power supply A8. See figure 5-50 for location of test points.	131 Vac across terminals A8E1 and A8E2.	Troubleshoot power transformer T1.
		35 Vac across terminals A8E7 and A8E8.	Troubleshoot power transformer T1.
5	Measure the dc outputs from power supply A8. See figure 5-36. Test points are stencilled on chassis.	+25 to +31 Vdc at E22. +100 to +120 Vdc at E9.	Troubleshoot power supply A8 and the +28-Vdc and +110-Vdc filter circuits (figure 5-13).
		+19 to +21 Vdc at E24.	Troubleshoot Q1 and the 20-Vdc regulator circuit (figure 5-13).
6	Measure +28-Vdc and +20-Vdc distribution. See figure 5-36. Test points are stencilled on chassis.	+25 to +31 Vdc at E46, E19, and E20.	Troubleshoot continuity of of 28-Vdc distribution wiring and Mode Selector switch S2 (figure 5-13).
		+19 to +21 Vdc at E13 and E17 when T-827B/URT is keyed. +19 to +21 Vdc at E45.	Troubleshoot Mode Selector switch S2 (figure 5-13) and keying circuits (table 4-7).

4-16. CPS switch S6 and the CPS control assembly A16 are part of the digital tuning function. However, troubleshooting procedures are contained in the translator/ synthesizer A6 isolation tests, paragraph 4-46.

4-17. Multimeter AN/PSM-4( ) is required to troubleshoot the digital tuning function. Refer to the functional circuit description for digital tuning, paragraph 3-64, and the T-827B/URT overall schematic diagram (figure 5-13) as necessary.

TABLE 4-5. T-827B/URT, DIGITAL TUNING FUNCTION TROUBLESHOOTING

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Set MCS and KCS controls on the T-827B/ URT to 0.0000. Set Mode Selector switch S2 to OFF.		
2	Remove rf amplifier A4 and translator/ synthesizer A6.		
3	Set Multimeter AN/ PSM-4( ) to measure +28 Vdc. Connect the positive lead to pin 7 of J10 (A4P1). See figure 4-1. Connect the negative lead to chassis ground. Set Mode Selector switch S2 to LSB.	AN/PSM-4( ) indicates +26 to +31 Vdc.	Troubleshoot +28-Vdc distribution.
4	Connect positive lead of AN/PSM-4( ) to pin 7 of J12 (A6P1).	AN/PSM-4( ) indicates +26 to +31 Vdc.	Troubleshoot +28-Vdc distribution.
5	Set Mode Selector switch S1 to OFF.		
6	Locate pins 1 through 5 on J10 (A4P1) and pins 1 through 5 on J12 (A6P1). (See figure 4-1.)		
	NOTE RF amplifier A4 uses terminals 1 through 5 on J10 (A4P1) as turret control-line terminals. These terminals receive a binary code from A7P8 (J8) terminals 1 through 5 of the code generator to correspond to the setting of the KCS controls on the T-827B/URT. Translator/synthesizer A6 receives at J12 (A6P1) a corresponding code from terminals 21 through 25 of A7P8 (J8.		

TABLE 4-5. T-827B/URT, DIGITAL TUNING FUNCTION TROUBLESHOOTING (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
7	Set multimeter to Rx1 scale and connect test leads between chassis ground and terminal 1 of A4P1. Normal indication is listed in table 4-6. Repeat this procedure for each of the five-wire code terminals at A4P1 and at A6P1.		
8	Repeat this procedure for each MCS control setting from 00 through 29. For each MCS setting, refer to table 4-6 for the correct code reading. Also check that at each MCS setting, all open circuits on each connector are wired together. For example; with MCS controls set at 10, check that terminals 1, 4, and 5 of A4P1 are open to ground but connected together. Also at 10 MCS, check that terminals 3 and 5 of A6P1 are open to ground and connected together.		
9	Locate connector J21 on rear of T-827B/URT chassis. Loosen three captive screws securing P1 and P2 to rear of the chassis. Drop P1 and P2 to expose pin terminals of J21. Repeat above checkout procedure using pins 35, 33, 31, 28, and 26 on J21 as code lines 1 through 5, respectively, in table 4-6.	All code lines correspond to table 4-6.	If any code lines are abnormal, disconnect code generator connector A7P8 from chassis receptacle J8. (See figure 4-1.) Troubleshoot code line wiring from J8 to A4P1, A6P1, and J21. Look for continuity and no ground from J8 to A4P1, A6P1, and J21. If wiring is good, replace code generator A7.

TABLE 4-5. T-827B/URT, DIGITAL TUNING FUNCTION TROUBLESHOOTING (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
9 (Cont)		+28 Vdc is present at pin 7 of A4P1 and A6P1 (in LSB).	If code generator is repaired or replaced and +28 Vdc is available at pin 7 of A4P1 and pin 7 of A6P1, troubleshoot rf amplifier A4 (figure 4-7 and paragraph 4-40) and translator/synthesizer A6 (figures 4-9 through 4-14 and paragraph 4-46).

TABLE 4-6. T-827B/URT, CODE GENERATOR A7 CONTINUITY TABLE

MCS CONTROLS	J10 (A4P1)					J12 (A6P1)					J21				
	1	2	3	4	5	1	2	3	4	5	35	33	31	28	26
00	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
01	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
02	S	O	S	O	O	S	S	S	O	S	O	O	O	O	S
03	O	S	O	O	O	S	O	S	S	S	O	O	S	S	S
04	S	O	O	O	S	S	S	O	S	S	S	S	S	S	O
05	O	O	O	S	S	O	S	S	O	S	S	S	S	O	S
06	O	O	S	S	O	O	S	O	O	O	S	S	O	S	S
07	O	S	S	O	S	S	O	O	S	S	S	O	S	S	S
08	S	S	O	S	S	S	S	O	O	S	O	S	S	S	O
09	S	O	S	S	O	S	O	S	O	O	O	S	S	S	O
10	O	S	S	O	O	S	S	O	S	O	S	S	S	O	O
11	S	S	O	O	O	O	O	S	S	S	S	S	S	O	O
12	S	O	O	O	O	O	O	O	S	S	S	S	O	O	S
13	O	O	O	O	S	S	O	S	S	S	S	S	O	O	S
14	O	O	O	S	O	O	S	S	S	O	S	O	O	S	O
15	O	O	S	O	S	O	O	S	S	O	S	O	O	S	O
16	O	S	O	S	S	S	S	S	S	O	O	O	S	O	O
17	S	O	S	S	S	S	O	O	S	S	O	O	S	O	O
18	O	S	S	S	S	S	S	O	O	S	O	S	O	O	S
19	S	S	S	S	O	S	S	S	O	O	O	S	O	O	S
20	S	S	S	O	O	O	S	S	S	S	S	O	O	S	S
21	S	S	O	O	S	O	O	S	S	S	S	O	O	S	S

TABLE 4-6. T-827B/URT, CODE GENERATOR A7 CONTINUITY TABLE (Cont)

MCS CONTROLS	J10 (A4P1) 1	2	3	4	5	J12 (A6P1) 1	2	3	4	5	J21 35	33	31	28	26
22	S	O	O	S	O	O	O	O	O	S	O	O	S	S	O
23	O	O	S	O	O	S	S	S	S	O	O	O	S	S	O
24	O	S	O	O	S	O	S	S	S	O	O	S	S	O	O
25	S	O	O	S	S	O	O	S	S	O	O	S	S	O	O
26	O	O	S	S	S	S	S	S	S	O	S	S	O	O	O
27	O	S	S	S	O	O	O	O	S	S	S	S	O	O	O
28	S	S	S	O	S	O	O	S	S	S	S	O	O	O	O
29	S	S	O	S	O	O	S	S	S	S	S	O	O	O	O

NOTE: S = Shorted (less than 5 ohms)
O = Open (high resistance).

4-18. T-827B/URT, KEYING CIRCUIT TROUBLESHOOTING.

4-19. Keying circuit malfunctions usually produce no output in one or more modes of operation. Steps 1 through 7 of table 4-3 should be completed and faults corrected before troubleshooting the keying circuits. The keying circuit is an essential part of the main frame and control function in the T-827B/URT. Troubleshooting procedures for REMOTE/LOCAL switch S1, Mode Selector switch S2, and relays K2 and K6 of the main frame are presented in other functional section troubleshooting checks, as they are required to support those functions.

4-20. Multimeter AN/PSM-4( ) is required to troubleshoot the keying circuit (table 4-7).

4-21. T-827B/URT, MAIN SIGNAL FLOW FUNCTION TROUBLESHOOTING.

4-22. The main signal flow function troubleshooting procedures in table 4-8 consist of point-to-point signal tracing to isolate a signal flow fault to the defective assembly. Steps 1 through 18 of table 4-3 should be completed. After all faults are corrected, if a nominal no-output indication is obtained in step 19, proceed to table 4-8.

4-23. Electronic Multimeter CCVO-91CA is required to troubleshoot the main signal flow function. Refer to the T-827B/URT functional block diagram (figure 3-2) and the main signal flow simplified block diagram (figure 3-4) as necessay.

4-24. T-827B/URT, AUDIO SIGNAL FLOW FUNCTION TROUBLESHOOTING.

4-25. The audio signal flow function troubleshooting procedure in table 4-9 consists of point-to-point signal tracing to isolate a signal flow fault to the defective assembly.

4-26. Multimeter AN/PSM-4( ) is required to troubleshoot the audio signal flow function. Refer to the T-827B/URT functional block diagram (figure 3-2) as necessary.

4-27. T-827B/URT, FREQUENCY SYNTHESIZER FUNCTION TROUBLESHOOTING.

4-28. The frequency synthesizer function troubleshooting procedure in table 4-10 consists of point-to-point signal tracing to isolate a fault to the defective assembly. Steps 1 through 21 of table 4-3 should be completed before performing this procedure. After all faults have been corrected and a malfunction is indicated in steps 22 and 23, proceed to table 4-10.

4-29. Electronic Multimeter CCVO-91CA and Frequency Meter AN/USM-207 are required to troubleshoot the frequency synthesizer function.

TABLE 4-7. T-827B/URT, KEYING CIRCUIT TROUBLESHOOTING

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Preliminary control settings: Mode Selector switch S2 set to AM. LOCAL/REMOTE switch S1 set to LOCAL. MCS and KCS controls set to 8.0000 MHz. Chassis tilted to vertical locked position (S8 locked in up position).		
2	Set Multimeter AN/PSM-4( ) to measure 28 Vdc. With T-827B/URT not keyed, connect positive lead of multimeter to E35 (figure 5-36) and negative lead to chassis ground.	Multimeter indicates +25 to +31 Vdc.	If approximately +28 Vdc is not present, troubleshoot 28-Vdc distribution.
3	Key T-827B/URT by depressing push-to-talk (ptt) button on the handset.	Voltage at E35 decreases to zero.	Troubleshoot ptt relay K4 and transmit/receive relay K3 circuitry (figure 5-9).
4	Set Mode Selector switch S2 to CW. Key T-827B/URT at CW key jack J2 on front panel.	+28 Vdc at E35 drops to zero when T-827B/URT is keyed.	Troubleshoot CW/FSK keyline and CW hold relay K5 (figure 5- 9).
5	Set Mode Selector switch S2 to FSK. Key T-827B/URT by shorting pins A and D of 2A1A1J7 at rear of case.	+28 Vdc at E35 drops to zero when T-827B/URT is keyed.	Troubleshoot FSK keyline (figure 5-9).
6	Lock-key the T-827B/URT in FSK mode. Rotate MCS controls on front panel to 01 and 00, and then back to 08 MHz.	0 volt at E35 rises to +28 Vdc while T-827B/URT is tuning.	Troubleshoot tune relay K1 and its associated circuitry.
7	Set LOCAL/REMOTE switch S1 to REMOTE and perform steps 2,3,4,and 5 to verify remote control operation.		

TABLE 4-8. T-827B/URT, MAIN SIGNAL FLOW FUNCTION TROUBLESHOOTING

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Preliminary control settings: T-827B/URT chassis in locked-out position. Interlock switch S8 pulled up. AUX/NORM switch S7 set to NORM. MCS and KCS controls set to 8.0000 MHz. Mode Selector switch S2 set to LSB. LOCAL/REMOTE switch S1 set to LOCAL. T-827B/URT terminated in 50-ohm load.		
2	Measure output of transmitter if. amplifier A12. Set CCVO-91CA to 100-mV scale and connect from TP2 on top of transmitter if. amplifier A12 to chassis ground. Key T-827B/URT in LSB, AM, USB modes with handset. While keying in each mode, speak or whistle directly into the microphone. Key T-827B/URT in CW mode at CW KEY jack J2.	15 to 40 mV on voice peaks in LSB, AM and USB. 15 to 40 mV in CW.	If all outputs are normal proceed to step 5. If no output is obtained in any mode, proceed to next step. If output is normal in some modes and no output is obtained in others, troubleshoot mode selector A1 (figure 4-5).
3	Measure 500-kHz input to if. amplifier A12. Remove if. amplifier assembly. Locate pin A2 on connector J15 (figure 4-1). Connect CCVO-91CA from A2 to chassis ground and set to 10-mV scale. Key T-827B/URT in CW mode.	4 to 10 mV.	If indication is normal, troubleshoot if. amplifier A12 (figure 4-16). If indication is not normal, proceed to step 4.

TABLE 4-8. T-827B/URT, MAIN SIGNAL FLOW FUNCTION TROUBLESHOOTING (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
4	Measure 500-kHz input into mode selector A1. Replace if. amplifier assembly in chassis. Remove mode selector assembly. Locate pin A3 on connector J17 (figure 4-1). Connect CCVO-91CA from A3 to chassis ground and set to 300-mV scale.	150 to 300 mV.	If indication is normal, troubleshoot mode selector A1. If indication is not normal, troubleshoot frequency standard A5 (figure 4-8 and paragraph 4-43).
5	Measure 500-kHz input to rf translator A6A6. Set CCVO-91CA to 100-mV scale and connect from TP7 to chassis ground. Key T-827B/URT in CW mode at CW KEY jack J2.	15 to 40 mV.	If indication is not normal, check cabling between if. amplifier A12 and rf translator A6A6. If indication is normal, proceed to step 6.
6	Measure output of rf translator A6A6.	15 to 40 mV.	
	Set the CCVO-91CA to 100-mV scale and connect from TP6 on rf translator A6A6 to chassis ground. Lock-key T-827B/URT in CW mode. Set MCS and KCS controls to each of the frequencies listed below and observe indication on CCVO-91CA (LO refers to a lo-band frequency and HI refers to a hi-band frequency): LO 2.010 HI 13.010 LO 3.010 LO 12.010 LO 4.222 LO 11.989 LO 5.333 HI 10.898 LO 6.444 HI 20.010 LO 7.555 HI 21.010 LO 8.666 LO 22.010 HI 9.777 LO 23.010 HI 19.010 HI 24.010 HI 18.010 HI 25.010	15 to 40 mV.	If only a hi-band output or a lo-band output is observed, troubleshoot hi-lo-band relay circuit. If all outputs are normal, proceed to step 7. If no output is observed at any frequency, troubleshoot translator/synthesizer A6 (figures 4-9 through 4-14 and paragraph 4-46).

TABLE 4-8. T-827B/URT, MAIN SIGNAL FLOW FUNCTION TROUBLESHOOTING (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
6 (Cont)	HI 17.010 HI 26.010 LO 16.010 LO 27.010 LO 15.010 LO 28.010 LO 14.010 LO 29.010		
7	Measure input to rf amplifier A4. Set the CCVO-91CA to 100-mV scale and connect from TP1 on rf amplifier A4 to chassis ground. Key T-827B/URT in CW mode.	10 to 40 mV.	If input is normal, troubleshoot rf amplifier (figure 4-7 and paragraph 4-40).

TABLE 4-9. T-827B/URT, AUDIO SIGNAL FLOW FUNCTION TROUBLESHOOTING

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Preliminary control settings: T-827B/URT chassis in locked-out position. Interlock switch S8 pulled up. AUX/NORM switch S7 set to NORM. MCS and KCS controls set to 8.0000 MHz. Mode Selector switch S2 set to LSB. LOCAL/REMOTE switch S2 set to LOCAL. T-827B/URT terminated in 50-ohm load.		
	NOTE The USB and LSB audio amplifiers are identical. LSB amplifier A3 is located adjacent to the frequency standard A5 and USB amplifier A2 is located to the left of LSB audio amplifier. See figure 1-5 for location of assemblies in the T-827B/URT.		

TABLE 4-9. T-827B/URT, AUDIO SIGNAL FLOW FUNCTION TROUBLESHOOTING (Cont)

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
2	Connect multimeter from TP1 of LSB audio amplifier A3 to chassis ground. Key handset and speak directly into the microphone.	Multimeter indicates 100 to 300 mV on voice peaks.	Troubleshoot handset and LSB audio input circuits.
3	Connect multimeter from TP2 of LSB audio amplifier A3 to chassis ground. Key handset and speak directly into microphone.	Multimeter indicates 100 to 300 mV on voice peaks.	Troubleshoot LSB audio amplifier A3.
4	Set Mode Selector switch S2 to USB and perform steps 2 and 3 for USB audio amplifier A2. Indications and probable troubles will be the same except that references will now be to USB audio amplifier A2.		
5	Set Mode Selector switch S2 to FSK. Set REMOTE/LOCAL switch S1 to REMOTE. Patch a tty signal and keying into the T-827B/URT. Connect multimeter from TP2 of FSK tone generator A9 to chassis ground.	Multimeter indicates 150 to 350 mV.	Troubleshoot tty audio lines and FSK tone generator A9 (paragraph 4-35 and figure 4-15).
6	With tty signal and keying still patched, connect multimeter from TP2 of USB audio amplifier A2 to chassis ground.	Multimeter indicates 150 to 350 mV.	Troubleshoot input circuit of USB audio amplifier A2 (paragraph 4-35 and figure 4-6).
7	Connect multimeter from TP2 of LSB audio amplifier to chassis ground. Set Mode Selector switch S2 to LSB. Patch a handset into the LSB line. Key the handset and speak directly into the microphone.	Multimeter indicates 100 to 300 mV.	Troubleshoot remote audio line and input circuit of LSB audio amplifier A3 (figure 5- 13 and paragraph 4-35).

TABLE 4-10. T-827B/URT, FREQUENCY SYNTHESIZER FUNCTION TROUBLESHOOTING

STEP	ACTION OR CONDITION	NORMAL INDICATION	MALFUNCTION REFERENCE
1	Preliminary control settings: T-827B/URT chassis in locked-out position. Interlock switch S8 pulled up. AUX/NORM switch S7 set to NORM. MCS and KCS controls set to 8.0000 MHz. Mode Selector switch S2 set to LSB. LOCAL/REMOTE switch S1 set to LOCAL. T-827B/URT terminated in 50-ohm load.		
2	Use the CCVO-91CA and AN/USM-207 to measure the amplitude and frequency of the 500-kHz, 1.0-MHz, and 10.0-MHz inputs to translator/synthesizer A6. Remove the translator/synthesizer assembly from the chassis. Locate rf pins A1, A2, and A3 on J12 (A6P1) of the T-827B/URT chassis (figure 4-1).	10.0000000 MHz ±1.0 Hz and 50 to 100 mV at A1. 1.0000000 MHz ±0.1 Hz and 50 to 100 mV at A2. 500.0000 kHz ±0.1 Hz and 150 to 300 mV at A3.	If any or all indicated signals are not present, troubleshoot frequency standard A5 (figure 4-8 and paragraph 4-43). If correct inputs to A1, A2, and A3 are present, troubleshoot translator/synthesizer A6 (figures 4-9 through 4-14 and paragraph 4-46).

4-30. T-827B/URT, MODE SELECTOR A1, TROUBLESHOOTING.

4-31. GENERAL. The first step in troubleshooting mode selector A1 is to isolate the malfunction to the assembly. First determine that the frequency standard A5 is functioning and 500 kHz is available at the mode selector assembly. The USB and LSB audio amplifiers A2 and A3 and FSK tone generator A9 must be operable for the mode selector to operate in all modes. Refer to the equipment Allowance Parts List (APL) maintenance code to determine whether the mode selector assembly is depot-repairable or ship- or station-repairable. If the assembly is depot-repairable, perform the isolation test. If the isolation test indicates a defect, replace the assembly with a spare.

4-32. ISOLATION PROCEDURE. Proceed as follows:

a. Slide T-827B/URT chassis to locked-out position.

b. Set Mode Selector switch S2 to OFF.

c. Set the MCS and KCS controls to 8.0000 MHz.

d. Pull interlock switch S8 to the up position.

e. Set AUX/NORM switch S7 to NORM.

f. Unfasten two corner hold-down screws and remove the mode selector assembly from T-827B/URT chassis.

g. Set Multimeter AN/PSM-4( ) to measure +20 Vdc, and connect negative lead to ground.

h. Connect positive lead of multimeter to each connector pin listed in table 4-11. See figure 4-1 for pin locations of mode selector assembly mating connectors J16(A1P1) and J17(A1P2). Rotate Mode Selector switch S2 to each mode listed in table 4-11, key the T-827B/URT, and measure pin voltage.

i. If voltage indication at each pin is normal, as indicated in table 4-11, continue to troubleshoot the mode selector assembly (paragraphs 4-33 and 4-34).

4-33. TEST EQUIPMENT REQUIRED. The following test equipment is required to perform the signal fault isolation measurements and the followup dc voltage checks:

a. Mode selector chassis extender cables 666243-070 and 666243-076.

TABLE 4-11. T-827B/URT, MODE SELECTOR A1, VOLTAGE CHECK

CONNECTOR	MODE							IF INDICATION IS ABNORMAL
	LSB	FSK	AM	CW	USB	ISB	ISB/FSK	
J16-2	20	--	--	--	--	20	20	Troubleshoot C5, power supply A8, and chassis wiring.
J16-5	--	20	20	--	20	20	20	Troubleshoot K3, power supply A8, and chassis wiring.
J17-2	20	--	--	--	--	20	20	Troubleshoot K3, power supply A8, and chassis wiring.
J17-4	--	--	20	--	--	--	--	Troubleshoot chassis wiring.
J17-7	20	20	20	--	20	20	20	Troubleshoot K3, power supply A8, and chassis wiring.
J17-8	--	20	20	--	20	20	20	Troubleshoot K3, power supply A8, and chassis wiring.
J17-9	20	20	20	20	20	20	20	Troubleshoot power supply A8 and wiring chassis.
J17-10	--	--	--	20	--	--	--	Troubleshoot K3, power supply A8, and chassis wiring.
J17-20	20	20	20	20	20	20	20	Troubleshoot K3, power supply A8, and chassis wiring.

b. Electronic Voltmeter CCVO-91CA (rf voltmeter)

c. Audio Signal Generator AN/URM-127

d. Electronic Voltmeter ME-6C/U (ac voltmeter)

e. Multimeter AN/PSM-4( ).

4-34. PERFORMANCE CHECKS. Use the following procedure to troubleshoot the mode selector A1:

a. Use the mode selector assembly servicing block diagram (figure 4-5) and schematic diagram (figure 5-14) while troubleshooting the assembly.

b. Use a 1000-Hz tone at a 50-mV level from the signal generator as the audio input for signal tracing. Inject the signal from HANDSET jack J1, pin C, to chassis ground. With the T-827B/URT keyed in AM or LSB, set the correct level using the ME-6C/U.

c. Use preliminary control settings for the T-827B/URT as indicated in paragraph 4-37.

d. Key the T-827B/URT in the appropriate mode to make either an ac or a dc voltage measurement.

4-35. T-827B/URT, AUDIO AMPLIFIERS A2 (USB) AND A3 (LSB) TROUBLESHOOTING.

4-36. GENERAL. The first step in troubleshooting audio amplifiers A2 and A3 is to determine which assembly appears to be defective. USB audio amplifier A2, the left-hand assembly, functions in the AM, USB, FSK, ISB, and ISB/FSK modes only. LSB audio amplifier A3 functions in the LSB, ISB, and ISB/FSK modes only. Refer to the equipment Allowance Parts List (APL) maintenance code to determine whether the audio amplifier assemblies are depot-repairable, or ship- or station-repairable. If the assemblies are depot-repairable, perform the isolation test. If the isolation test indicates an inoperable assembly, replace the defective assembly with a spare.

4-37. ISOLATION PROCEDURE. Proceed as follows:

a. Slide T-827B/URT chassis to locked-out position.

b. Pull interlock switch S8 to up position.

c. Set AUX/NORM switch S7 to NORM.

d. Set Mode Selector switch S2 to ISB.

e. Set MCS and KCS controls to 8.0000 MHz.

f. Set LOCAL/REMOTE switch S1 to LOCAL.

g. Remove suspected LSB or USB audio amplifier assembly from chassis.

h. Set Multimeter AN/PSM-4( ) to measure +20 Vdc. Connect positive lead to pin 17 of chassis receptacle J18(A2P1) or J19(A3P1). (See figure 4-1 for pin location.)

i. Rotate Mode Selector switch S2 through all operate modes. Multimeter will indicate as follows:

1. If J18(A2P1) is measured, +20 ±1 Vdc in AM, USB, ISB, and ISB/FSK.

2. If J19(A3P1) is measured, +20 ±1 Vdc in LSB, ISB, and ISB/FSK.

j. Set Mode Selector switch S2 to OFF and connect the multimeter to pin 12. Set Mode Selector switch S2 to LSB, AM, and USB modes. Multimeter will indicate as follows:

1. If J18(A2P1) is measured, +12 ±1 Vdc in AM and USB.

2. If J19(A3P1) is measured, +20 ±1 Vdc in LSB.

k. Set Mode Selector switch S2 to OFF. Remove suspected defective audio amplifier assembly. Set USB or LSB LINE LEVEL switch to +10 DB. Use the AN/PSM-4( ) make the appropriate resistance checks listed in tables 4-12, 4-13, and 4-14.

l. If all preceding indications are normal, troubleshoot the malfunctioning audio amplifier assembly.

4-38. TEST EQUIPMENT REQUIRED. The following test equipment is required.

a. Audio amplifier chassis extender cable 666243-074

b. Audio Signal Generator AN/URM-127

c. Electronic Voltmeter ME-6C/U (ac voltmeter)

d. Multimeter AN/PSM-4( ).

4-39. PERFORMANCE CHECKS. Use the audio amplifier assembly servicing block diagram (figure 4-6), and schematic diagram (figure 5-15) while troubleshooting the assembly.

TABLE 4-12. T-827B/URT AUDIO AMPLIFIER A2 OR A3, RESISTANCE CHECK

MULTIMETER LEADS BETWEEN	INDICATION	IF INDICATION IS ABNORMAL
J19-14 and J17-1	Short circuit	Troubleshoot chassis wiring.
J18-14 and J17-11	Short circuit	Troubleshoot chassis wiring.

TABLE 4-13. T-827B/URT AUDIO AMPLIFIER A2 OR A3, RESISTANCE CHECK (LINE LEVEL SWITCHES AT +10DB)

MULTIMETER LEADS BETWEEN	INDICATION	IF INDICATION IS ABNORMAL
J18-25 and A11-5	Short circuit	Troubleshoot chassis wiring.
A11-5 and A11-1	3700 ±200 ohms	Troubleshoot meter amplifier A11.
J19-25 and A10-5	Short circuit	Troubleshoot chassis wiring.
A10-5 and A10-1	3700 ±200 ohms	Troubleshoot meter amplifier A10.

TABLE 4-14. T-827B/URT AUDIO AMPLIFIER A2 OR A3, RESISTANCE CHECK (LINE LEVEL SWITCHES AT -10DB)

MULTIMETER LEADS BETWEEN	INDICATION	IF INDICATION IS ABNORMAL
J18-25 and A11-5	Open circuit	Troubleshoot chassis wiring.
J18-25 and A11-6	Short circuit	Troubleshoot chassis wiring.
A11-6 and A11-2	Open circuit	Troubleshoot meter amplifier A11.

TABLE 4-14. T-827B/URT AUDIO AMPLIFIER A2 OR A3, RESISTANCE CHECK (LINE LEVEL SWITCHES AT -10DB) (Cont)

MULTIMETER LEADS BETWEEN	INDICATION	IF INDICATION IS ABNORMAL
A11-6 and ground	Open circuit	Troubleshoot meter amplifier A11.
J19-25 and A10-5	Open circuit	Troubleshoot chassis wiring.
J19-25 and A10-6	Short circuit	Troubleshoot chassis wiring.
A10-6 and A10-2	Open circuit	Troubleshoot meter amplifier A10.
A10-6 and ground	Open circuit	Troubleshoot meter amplifier A10.

4-40. T-827B/URT, RF AMPLIFIER A4, ISOLATION TEST.

4-41. OPERATING CONDITIONS AND CONTROL SETTINGS. Set the following switches as indicated:

a. Place T-827B/URT in full operation, chassis pulled out of case, interlock defeated, AUX/NORM switch S7 set to NORM.

b. Set Mode Selector switch S2 to OFF.

c. Set MCS and KCS controls to 8.0000 MHz.

4-42. PROCEDURE. Proceed as follows:

a. Remove rf amplifier A4 (refer to paragraph 5-40 through 5-42).

b. Set Mode Selector switch S2 to USB. Connect Multimeter AN/PSM-4( )(250-Vdc scale) between pin 12 of J11(A4P2) and ground. Key T-827B/URT. Normal indication is 103 Vdc minimum. If indication is abnormal, troubleshoot K3, L1, R1, C1, and power supply A8 (see figure 5-13).

c. Connect multimeter between pin 7 of J10(A4P1) and ground. Normal indication is between +25 and +31 Vdc. If indication is abnormal, troubleshoot A8 (see figure 5-13).

d. Set Mode Selector switch S2 to OFF. Connect multimeter between RF OUT 50-ohm jack 2A1J23 on rear of T-827B/URT and A4P2, pin A1. Multimeter should indicate a short circuit (less than 5 ohms). If indication is abnormal, check cable between RF OUT 50-ohm jack 2A1J23 and A4P2, pin A1.

e. If steps a through d produce normal indications, and rf amplifier A4 performance check produced one or more abnormal indications, proceed to translator/synthesizer A6 performance check (paragraph 4-46). If translator/synthesizer A6 performance check and isolation test produce all normal indications and rf amplifier A4 performance check produced abnormal indications, rf amplifier A4 is defective. Further troubleshooting of this assembly should be accomplished only at a depot repair facility (refer to paragraph 5-38).

4-43. T-827B/URT, FREQUENCY STANDARD A5, ISOLATION TEST.

4-44. OPERATING CONDITIONS AND CONTROL SETTINGS. Set the following switches as indicated:

a. Place T-827B/URT in full operation, chassis pulled out of case, interlock defeated, and AUX/NORM switch S7 set to NORM.

b. Set Mode Selector switch S2 to OFF.

c. Set MCS and KCS controls to 8.0000 MHz.

4-45. PROCEDURE. Proceed as follows:

a. Remove frequency standard A5. Set Mode Selector switch S2 to USB and connect Multimeter AN/PSM-4( )(50-Vdc scale) between pin 3 of J9(A5P1) and ground. Normal indication is 28 ±4 Vdc. If indication is abnormal, troubleshoot L2, C4, and A8 (power supply check in paragraph 4-52).

b. Connect multimeter between pin 1 of J9(A5P1) and ground. Normal indication is 20.0 ±0.5 Vdc. If indication is abnormal, troubleshoot C5 and A8 (power supply check in paragraph 4-52).

c. Check to see that all rf connector inserts to A5 are fully seated and that rf cables between J9 and J12 are not defective.

d. If steps a and b produce normal indications, but frequency standard A5 performance check indications do not fall within tolerance, frequency standard A5 is defective. Further troubleshooting of this assembly must be accomplished only at a depot facility (refer to paragraph 5-43).

e. Replace frequency standard A5 in T-827B/URT chassis.

4-46. <u>T-827B/URT, TRANSLATOR/SYNTHESIZER A6, ISOLATION TEST.</u>

4-47. OPERATING CONDITIONS AND CONTROL SETTINGS. Set the following switches as indicated:

a. Place T-827B/URT in full operation, chassis pulled out of case and rotated to expose underside of chassis, interlock defeated, and AUX/NORM switch S7 set to NORM.

b. Set Mode Selector switch S2 to AM.

c. Set MCS and KCS controls to 8.0000 MHz.

d. Set CPS switch to 000 Hz.

e. Set LOCAL/REMOTE switch S1 to LOCAL.

4-48. PROCEDURE. Proceed as follows:

a. Connect Multimeter AN/PSM-4( ) between terminals listed in table 4-15 and ground. Rotate CPS switch from positions 000 through 900 and perform tests listed in table 4-15.

NOTE

Pin location diagrams for the T-827B/URT chassis module connectors are shown in figure 4-1.

b. Reposition chassis to horizontal position and remove translator/synthesizer A6 from T-827B/URT.

c. Connect multimeter between terminals listed in table 4-16 and ground. Rotate Mode Selector switch S2 through all operating modes and observe if voltages are within tolerance limits listed in table 4-16.

d. Replace translator/synthesizer A6. Set Mode Selector switch S2 to USB. Using multimeter, perform dc voltage measurements in table 4-17 between terminals listed and ground.

NOTE

See figure 4-1 for location of the listed terminals.

e. If steps a through d produce normal indications and translator/synthesizer A6 performance check produced one or more abnormal indications, translator/synthesizer A6 is defective and further troubleshooting of this assembly must be accomplished only at a depot repair facility (refer to paragraph 5-47).

4-49. <u>T-827B/URT, CODE GENERATOR A7, TROUBLESHOOTING.</u>

4-50. The code generator A7 is not supported by piece parts for repair. Troubleshoot

TABLE 4-15. T-827B/URT TRANSLATOR/SYNTHESIZER A6, 100 CPS TUNING CIRCUIT VOLTAGE CHECK

CONNECTOR	CPS SWITCH AT	NORMAL INDICATION	IF INDICATION IS ABNORMAL
J12-11	000, 200, 400, 600, and 800	0 Vdc	Troubleshoot S6 and CPS control circuit.
	100, 300, 500, 700, and 900	4.7 ±0.3 Vdc	
J12-12 and 19	All positions	4.7 ±0.3 Vdc	Troubleshoot S6 and CPS control circuit.
J12-13	000 through 300, 800, and 900	0 Vdc	Troubleshoot S6 and CPS control circuit.
	400 through 700	4.7 ±0.3 Vdc	
J12-15	000 through 700	0 Vdc	Troubleshoot S6 and CPS control circuit.
	800 and 900	4.7 ±0. 3 Vdc	
J12-17	000, 100, 400, 500, 800, and 900	0 Vdc	Troubleshoot S6 and CPS control circuit.
	200, 300, 600, and 700	4.7 ±0.3 Vdc	

TABLE 4-16. T-827B/URT TRANSLATOR/SYNTHESIZER A6, ABOVE-CHASSIS VOLTAGE CHECK

CONNECTOR	NORMAL INDICATION	IF INDICATION IS ABNORMAL
J12-7	28 ±4 Vdc	Troubleshoot main frame.
J12-18	20 ±0.5 Vdc receive, 0 Vdc transmit	Troubleshoot K3, C5, and power supply A8.
J12-6	28 ±4 Vdc (0 Vdc when MCS controls and rf amplifier turret are turning)	Troubleshoot code generator A7 and rf amplifier A4.
J12-10	20.0 ±0.5 Vdc	Troubleshoot C5 and power supply A8.
J12-20	Keyed 20.0 ±0.5 Vdc when MCS controls are rotated to 05, and 0 Vdc when rotated to 06	Troubleshoot K2 and power supply A8.

TABLE 4-17. T-827B/URT TRANSLATOR/SYNTHESIZER A6, REAR- OR FRONT-PANEL VOLTAGE CHECK

TERMINAL	NORMAL INDICATION	IF INDICATION IS ABNORMAL
A16A1E2	4.7 ±0.5 Vdc	Check A16A1CR1, R1.
A16A1E3	20.0 ±0.5 Vdc	Check A16A1CR1, R1. If these components are good, translator/synthesizer A6 is defective. Further troubleshooting of this assembly must be accomplished only at a depot repair facility.

this assembly to determine if the cause of malfunction is within the assembly and not in the 1 or 10 MCS digit detent assembly adjustment. When the malfunction is isolated to the code generator, and the failure is an open contact within the switch on a specific board, attempt to locate the point of malfunction. Usually, only a slight pressure added to one finger contact spring on a switch rotor will be required to eliminate malfunction. Figures 4-2, 4-3, 5-25, and table 4-18 will aid in isolating malfunction. If contact is badly damaged, replace the assembly.

4-51. A five-deck printed circuit board assembly is supplied and required in the T-827B/URT. In Radio Set AN/WRC-1B, the Receiver is normally supplied with a four-deck printed circuit board assembly. The receiver will operate normally with either type assembly. However, the T-827B/URT will operate only with the five-deck printed circuit board assembly. The removal and replacement procedure for the code generator assembly is described in paragraph 5-52.

4-52. T-827B/URT, POWER SUPPLY A8, CHECKOUT.

4-53. OPERATING CONDITIONS AND CONTROL SETTINGS. Set the following switches as indicated:

a. Set Mode Selector switch S2 to USB.

b. Set MCS and KCS controls to 8.0000 MHz.

c. Place T-827B/URT in full operation, chassis pulled out of case, interlock defeated, and AUX/NORM switch S7 set to NORM.

4-54. PROCEDURE. Proceed as follows:

a. Tilt chassis 90 degrees to expose bottom.

b. Connect Multimeter AN/PSM-4( ) (50-Vdc scale), between chassis test point E24 (+) and ground. Multimeter should indicate 20.0 ±0.5 Vdc. If indication is abnormal, perform 20-volt regulator circuit adjustment (paragraph 5-11). If adjustment does not bring indicated voltage within tolerance, troubleshoot power supply A8 (figure 5-13). If necessary, use the AN/PSM-4( ) to check terminal resistance measurements as indicated in table 4-19.

NOTE

If indications in this step and steps c and d below, are not within tolerance, check ac line voltage and setting of power transformer T1 primary winding tap (see figure 5-13).

c. Disconnect multimeter from E24 and connect to chassis test point E22 (+). If

TABLE 4-18. T-827B/URT, CODE GENERATOR A7, WIRING LIST

WIRE NO.	COLOR	FROM	TO	WIRE NO.	COLOR	FROM	TO
1	BARE	A1E1	A1E12	*30	BARE	A3E9	A4E5
2	BARE	A1E2	A2E13	*31	BARE	A3E10	A4E6
3	BARE	A1E3	A2E14	*32	BARE	A3E12	A4E7
4	BARE	A1E4	A2E15	33	BARE	A4E7	A5E5
5	BARE	A1E5	A2E16	34	WHT-BLK-BRN	P1-1	A1E10
6	BARE	A1E6	A2E17	35	WHT-BLK-RED	P1-2	A1E11
*7	BARE	A2E1	A3E1	36	WHT-BLK-ORN	P1-3	A1E8
*8	BARE	A2E2	A3E2	37	WHT-BLK-YEL	P1-4	A1E9
*9	BARE	A2E3	A3E3	38	WHT-BLK-GRN	P1-5	A2E22
*10	BARE	A2E4	A3E4	39	WHT-BLK-BLU	P1-6	A2E19
*11	BARE	A2E5	A3E5	40	WHT-BLK-VIO	P1-7	A5E1
*12	BARE	A2E6	A3E6	41	WHT-BLK-GRY	P1-8	A5E2
*13	BARE	A2E7	A3E6	42	WHT-BRN-RED	P1-9	A5E3
*14	BARE	A2E8	A3E8	*43	WHT-BRN-ORN	P1-10	A3E14
*15	BARE	A2E9	A3E9	44	WHT-BRN-YEL	P1-11	A5E4
*16	BARE	A2E10	A3E10	*45	WHT-BRN-GRN	P1-12	A3E15
*17	BARE	A2E11	A3E11	*46	WHT-BRN-BLU	P1-13	A3E17
*18	BARE	A2E12	A3E12	*47	WHT-BRN-VIO	P1-14	A3E16
**19	BARE	A2E5	A4E1	*48	WHT-BRN-GRY	P1-15	A3E19
**20	BARE	A2E6	A4E2	*49	WHT-RED-ORN	P1-16	A3E18
**21	BARE	A2E7	A4E3	50	WHT-RED-YRL	P1-17	A2E21
**22	BARE	A2E8	A4E4	*51	WHT-RED-GRN	P1-18	A3E13
**23	BARE	A2E9	A4E5	52	WHT-RED-BLU	P1-19	A1E7
**24	BARE	A2E10	A4E6	53	WHT-RED-VIO	P1-20	A2E18
**25	BARE	A2E12	A4E7	54	WHT-RED-GRY	P1-21	A2E20
*26	BARE	A3E5	A4E1	55	WHT-ORN-YEL	P1-22	A5E9
*27	BARE	A3E6	A4E2	56	WHT-ORN-GRN	P1-23	A4E8
*28	BARE	A3E7	A4E3	57	WHT-ORN-BLU	P1-24	A4E11
*29	BARE	A3E8	A4E4	58	WHT-ORN-VIO	P1-25	A4E10

NOTE: 1. Wire AWG No. 22
2. When 5-deck assy (A3) is used * applies.
When 4-deck assy is used ** applies.
Refer to paragraph 4-51.

voltage is not between +25 and +31 Vdc, troubleshoot power supply A8 (table 4-19 and figure 5-13).

d. Set multimeter to 250-Vdc scale. Measure voltage at chassis test point E9 (positive end of capacitor C1). Multimeter should indicate between +103 and +117 Vdc. If indication is abnormal, troubleshoot power supply (table 4-19 and figure 5-13).

4-55. SERVICING BLOCK DIAGRAMS.

4-56. Figures 4-4 through 4-21, placed at the end of this section, are servicing block diagrams of the overall T-827B/URT and AM-3007/URT, and of each electronic assembly and subassembly. The diagrams are arranged in order by reference designation.

TABLE 4-19. T-827B/URT, POWER SUPPLY A8, RESISTANCE CHECK

TERMINAL	RESISTANCE (OHMS)	TERMINAL	RESISTANCE (OHMS)
A8E1	200k	A8E11	500k
A8E2	200k	A8E12	0 ground
A8E3	13k	A8E13	150
A8E4	50	A8E14	800
A8E5	70	A8E15	80
A8E6	80	A8E18	0
A8E7	600	A8E17	250
A8E8	600	A8E18	80
A8E9	80	A8E19	600
A8E10	900	A8E20	120

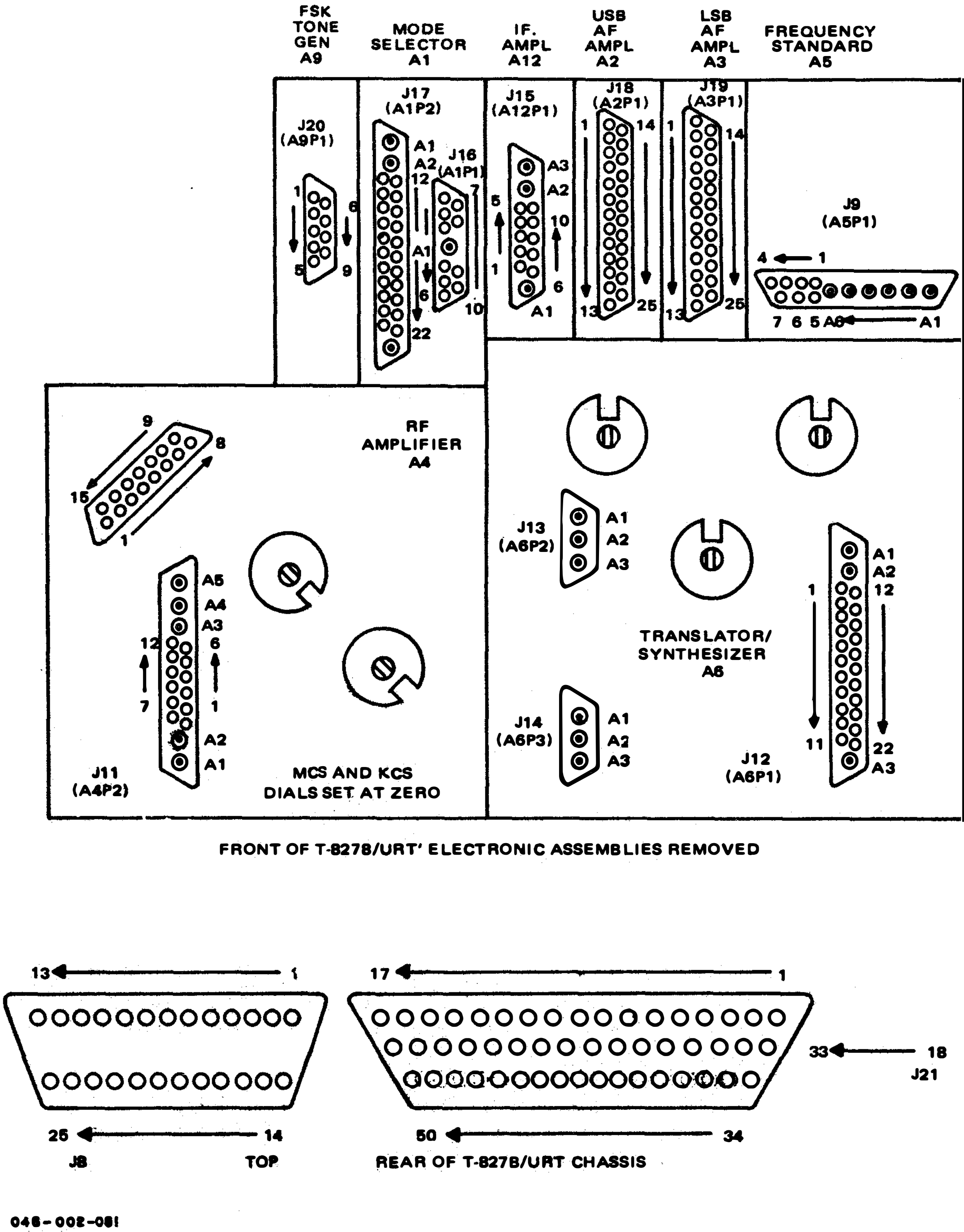
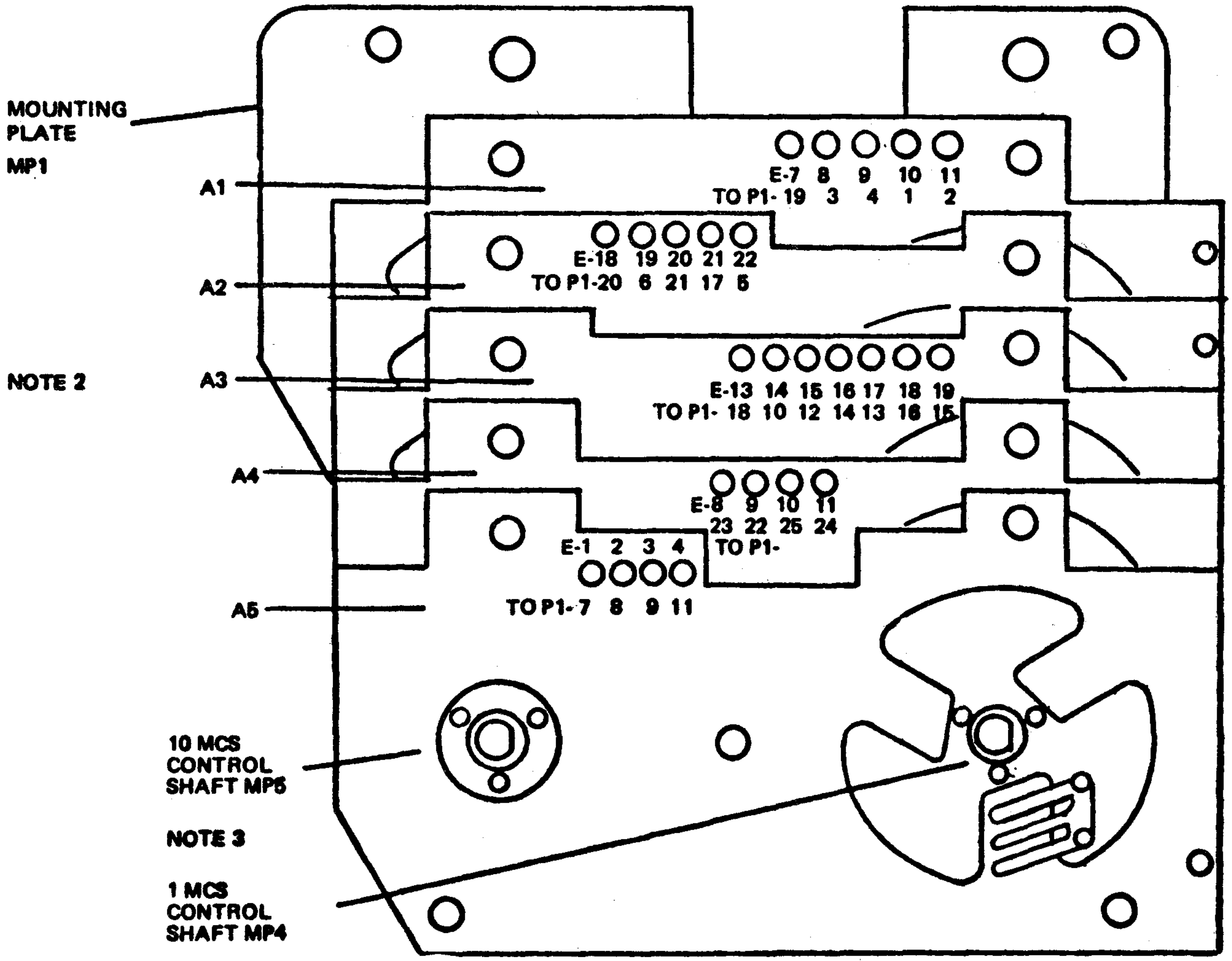


Figure 4-1. T-827B/URT, Main Frame Connector Pin Location Diagram



NOTES:

1. PREFIX ALL REF DES WITH A2A7
2. REFERENCE DIAGRAM IS FOR A FIVE-DECK PCB CODE GENERATOR, WHICH MAY BE USED IN RECEIVER OR EXCITER, HOWEVER, CENTER PCB (A3) IS NOT UTILIZED IN RECEIVER. IN MOST RECEIVERS, ONLY A1, A2, A4 AND A5 WILL BE PRESENT. REFER TO TABLE 4-18 FOR WIRING.
3. SHAFTS OF 1 MCS AND 10 MCS CONTROLS SHOWN IN ZERO POSITION. AS VIEWED, ROTATION IS CCW BY 30 DEGREE DETENTS. 1-MCS CONTROL HAS THREE POSITIONS AND 1 MCS CONTROL HAS TEN POSITIONS BETWEEN END STOPS.

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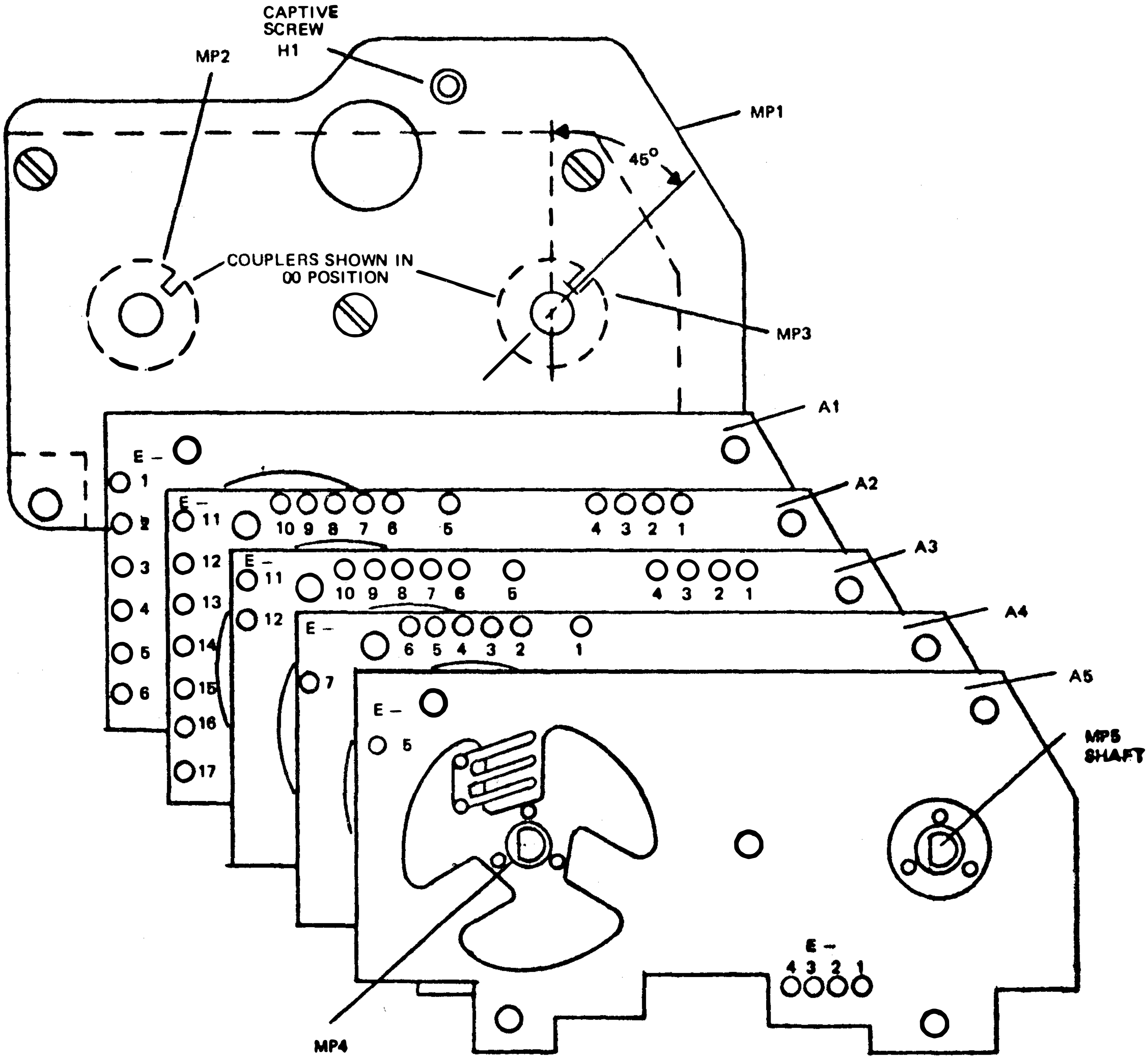
Figure 4-2. T-827B/URT, Code Generator Assembly 2A2A7, Bottom Rear View, Test Point Locations



NOTES:

1. PREFIX ALL REF DES WITH A2A7
2. REFERENCE DIAGRAM IS FOR A FIVE-DECK PCB CODE GENERATOR, WHICH MAY BE USED IN RECEIVER OR EXCITER, HOWEVER, CENTER PCB (A3) IS NOT UTILIZED IN RECEIVER. IN MOST RECEIVERS, ONLY A1, A2, A4 AND A5 WILL BE PRESENT. REFER TO TABLE 4-18 FOR WIRING.
3. SHAFTS OF 1 MCS AND 10 MCS CONTROLS SHOWN IN ZERO POSITION. AS VIEWED, ROTATION IS CCW BY 30 DEGREE DETENTS. 1-MCS CONTROL HAS THREE POSITIONS AND 1 MCS CONTROL HAS TEN POSITIONS BETWEEN END STOPS.

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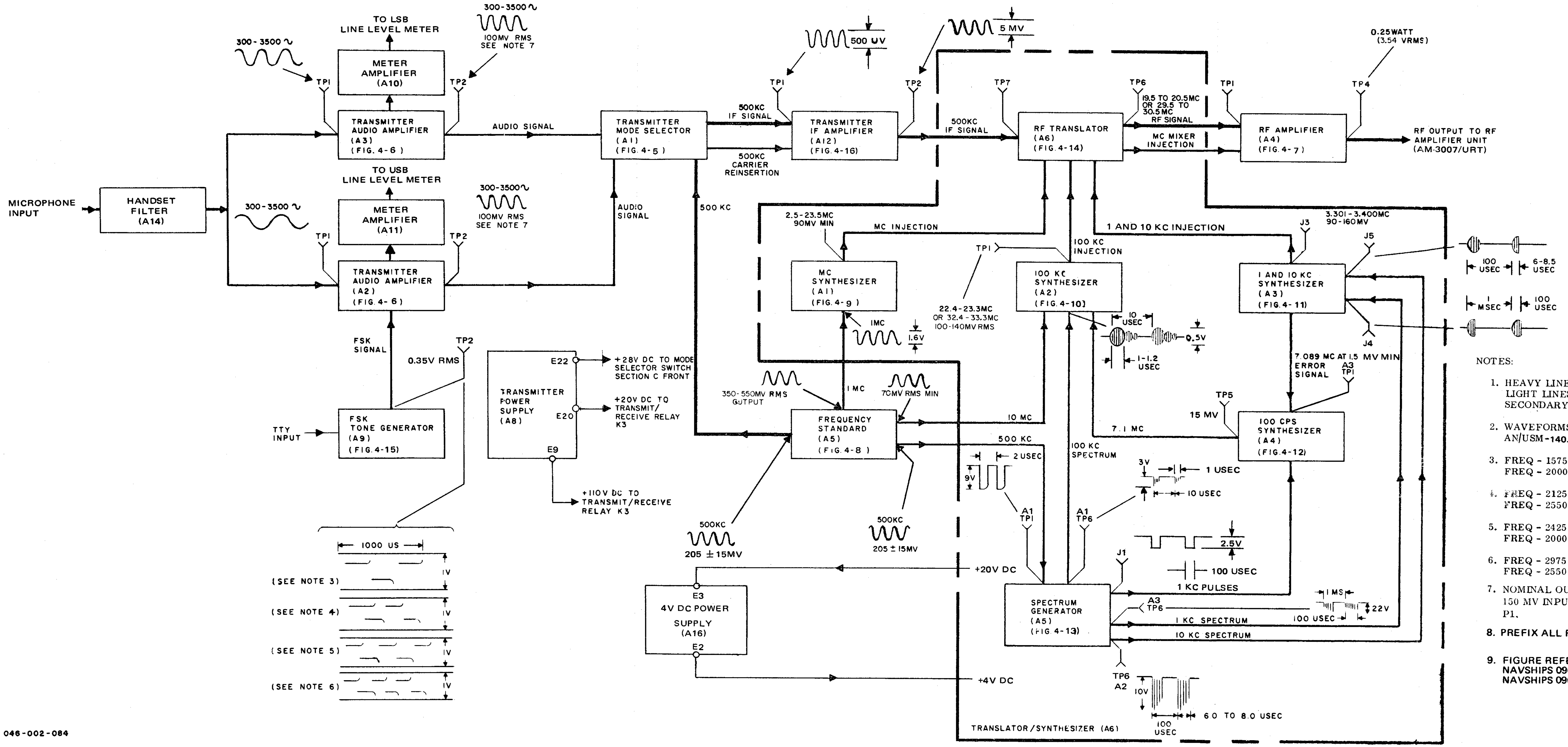
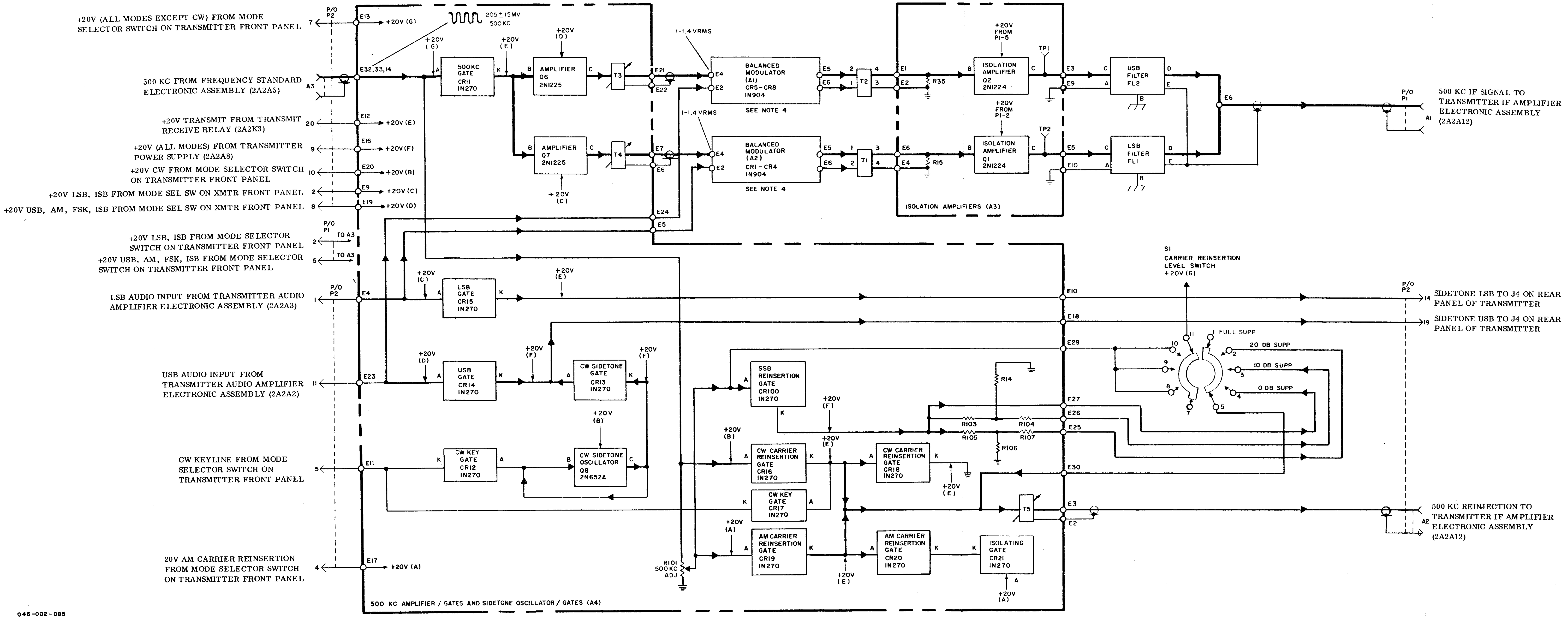
Figure 4-3. T-827B/URT, Code Generator Assembly 2A2A7, Top Rear View, Test Point Locations



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. WAVEFORMS RECORDED ON OSCILLOSCOPE AN/USM-140.
3. FREQ - 1575 CPS, FUNCTION - SPACE, CENTER FREQ - 2000 CPS.
4. FREQ - 2125 CPS, FUNCTION - SPACE, CENTER FREQ - 2550 CPS.
5. FREQ - 2425 CPS, FUNCTION - MARK, CENTER FREQ - 2000 CPS.
6. FREQ - 2975 CPS, FUNCTION - MARK, CENTER FREQ - 2550 CPS.
7. NOMINAL OUTPUT 100MV RMS - SINGLE TONE 150 MV INPUT AT PINS 20 AND 9 OF CONNECTOR P1.
8. PREFIX ALL REF DES WITH 2A2.
9. FIGURE REFERENCES APPLICABLE TO BOTH NAVSHIPS 0967-200-3010 AND NAVSHIPS 0967-427-5010.

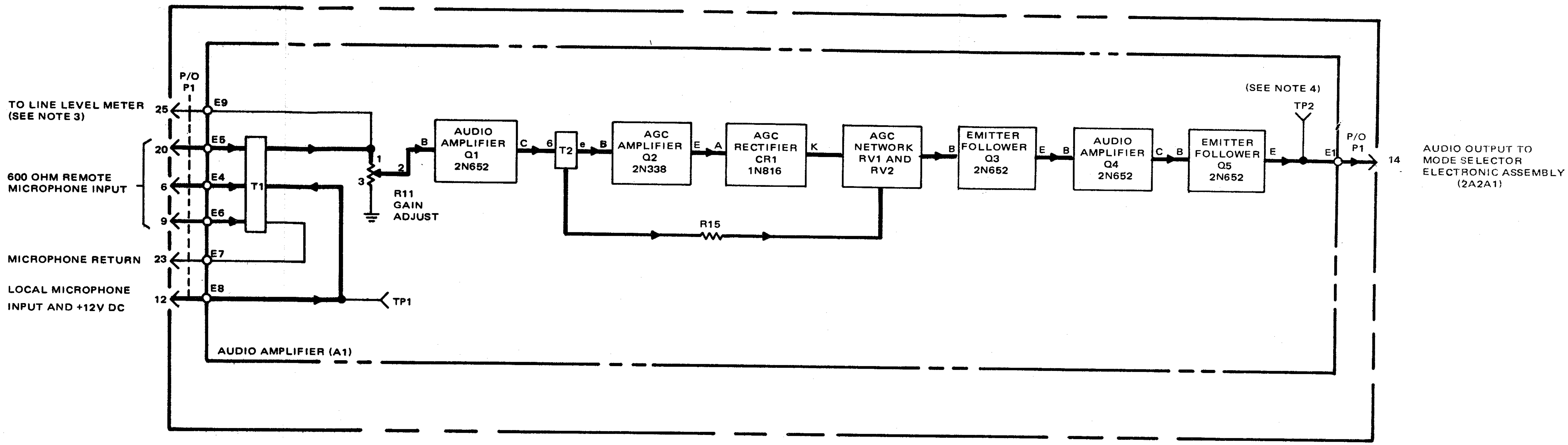
Figure 4-4. Radio Transmitter T-827B/URT, Overall Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS. NUMBERS ON TRANSFORMERS INDICATE TERMINAL NUMBERS.
3. THE INPUT AT P1-2, 5 AND P2-2, 4, 7, 8, 9, 10, AND 20 ARE GATE CONTROL SIGNALS. THE APPLICATIONS OF THESE ARE INDICATED ON THIS DIAGRAM BY →
4. SEE FIGURE 5-5 IN NAVSHIPS 0967-200-3010 SEE FIGURE 5-14 IN NAVSHIPS 0967-427-5010 FOR A DETAILED SCHEMATIC OF BALANCED MODULATOR.
5. ALL VOLTAGES ARE DC UNLESS OTHERWISE SPECIFIED.
6. PREFIX ALL REF DES WITH 2A2A1.

Figure 4-5. Transmitter Mode Selector Assembly 2A2A1, Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS. NUMBERS ON TRANSFORMERS INDICATE TERMINAL NUMBERS.
3. DURING LSB OPERATION THE AUDIO LEVEL AT P1-25 IS OBSERVED ON THE LSB LINE LEVEL METER (M1). DURING USB OPERATION THE AUDIO LEVEL AT P1-25 IS OBSERVED ON THE USB LINE LEVEL METER (M2).
4. NOMINAL OUTPUT 100 MV RMS - SINGLE TONE 150 MV INPUT AT PINS 20 AND 9 OF CONNECTOR P1 OR 44 MV AT A2J1-C TO GROUND.
5. PREFIX ALL REF DES WITH 2A2A2 (USB) OR 2A2A3 (LSB).

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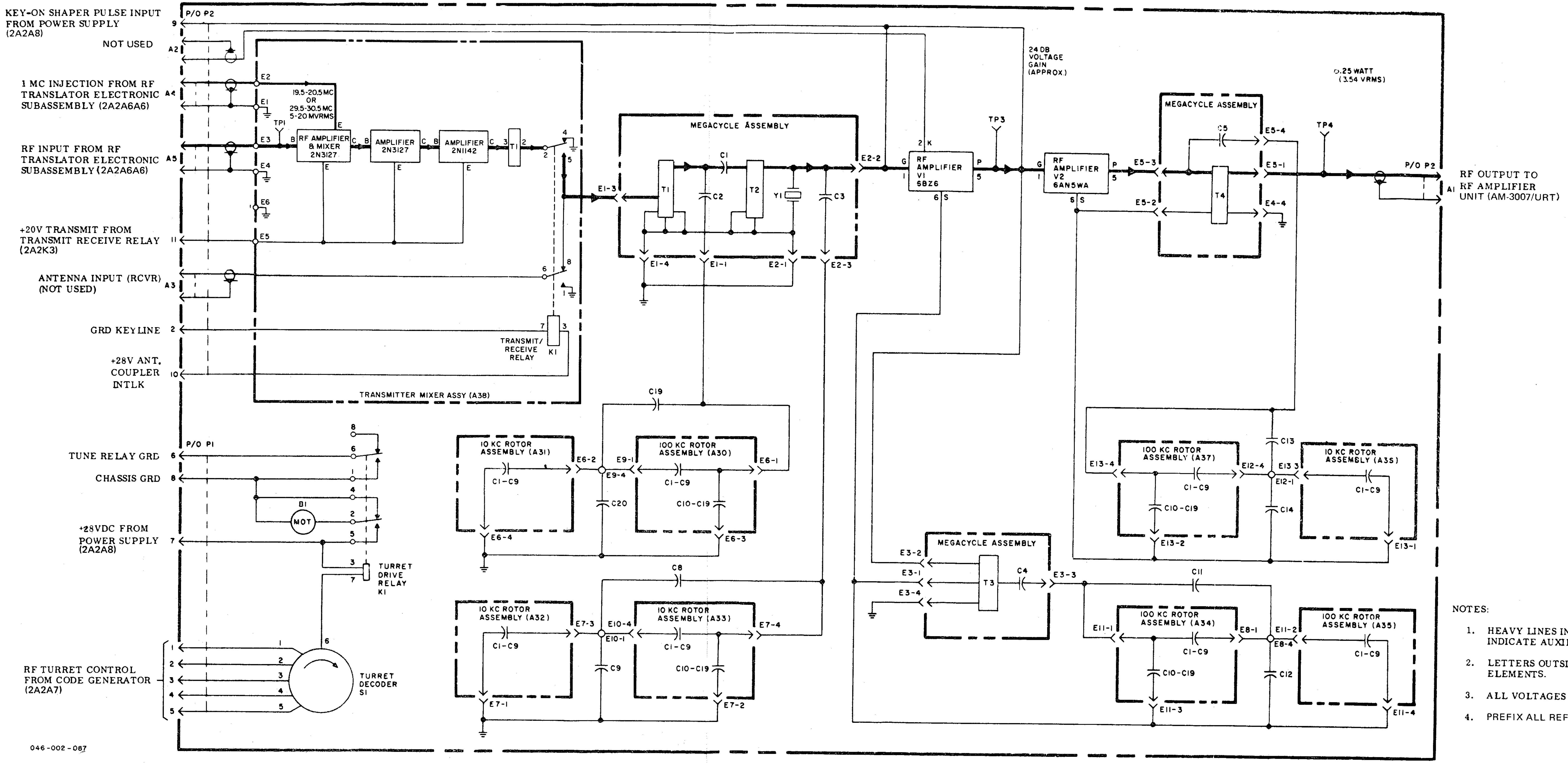
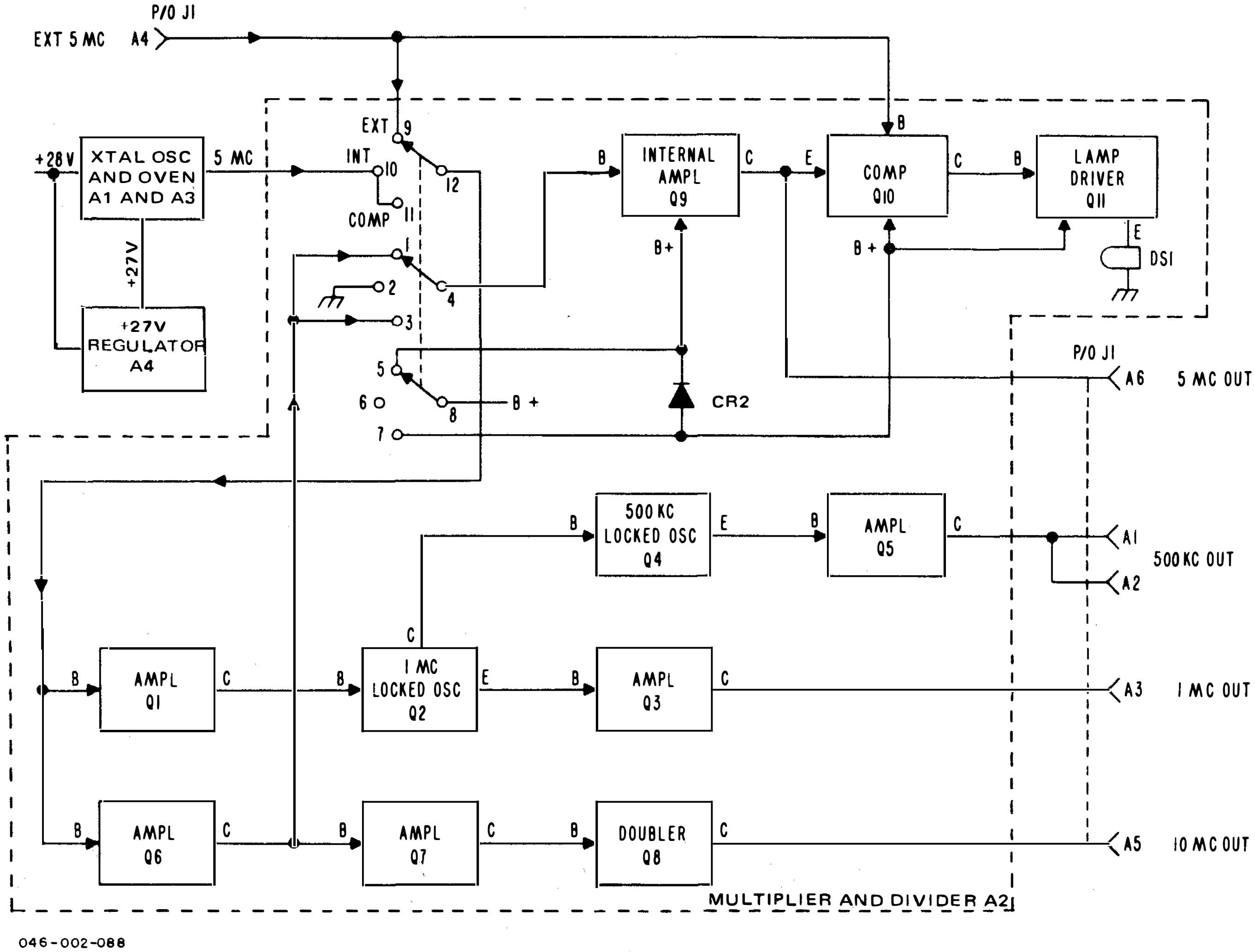
Figure 4-6. Transmitter Audio Amplifier Assemblies 2A2A2 or 2A2A3, Servicing Block Diagram



NOTES:

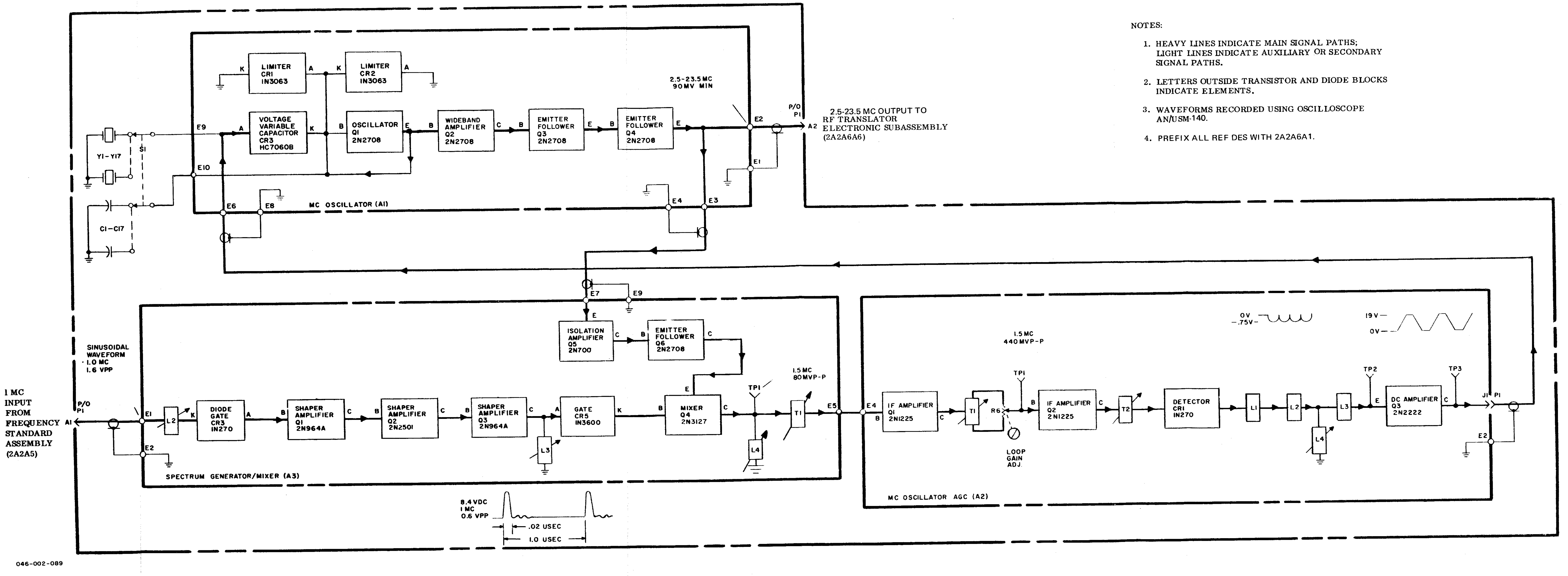
1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND TUBE BLOCKS INDICATE ELEMENTS.
3. ALL VOLTAGES ARE DC UNLESS OTHERWISE SPECIFIED.
4. PREFIX ALL REF DES WITH 2A2A4.

Figure 4-7. RF Amplifier Assembly 2A2A4, Servicing Block Diagram



NOTE: PREFIX ALL REF DES WITH 2A2A5.

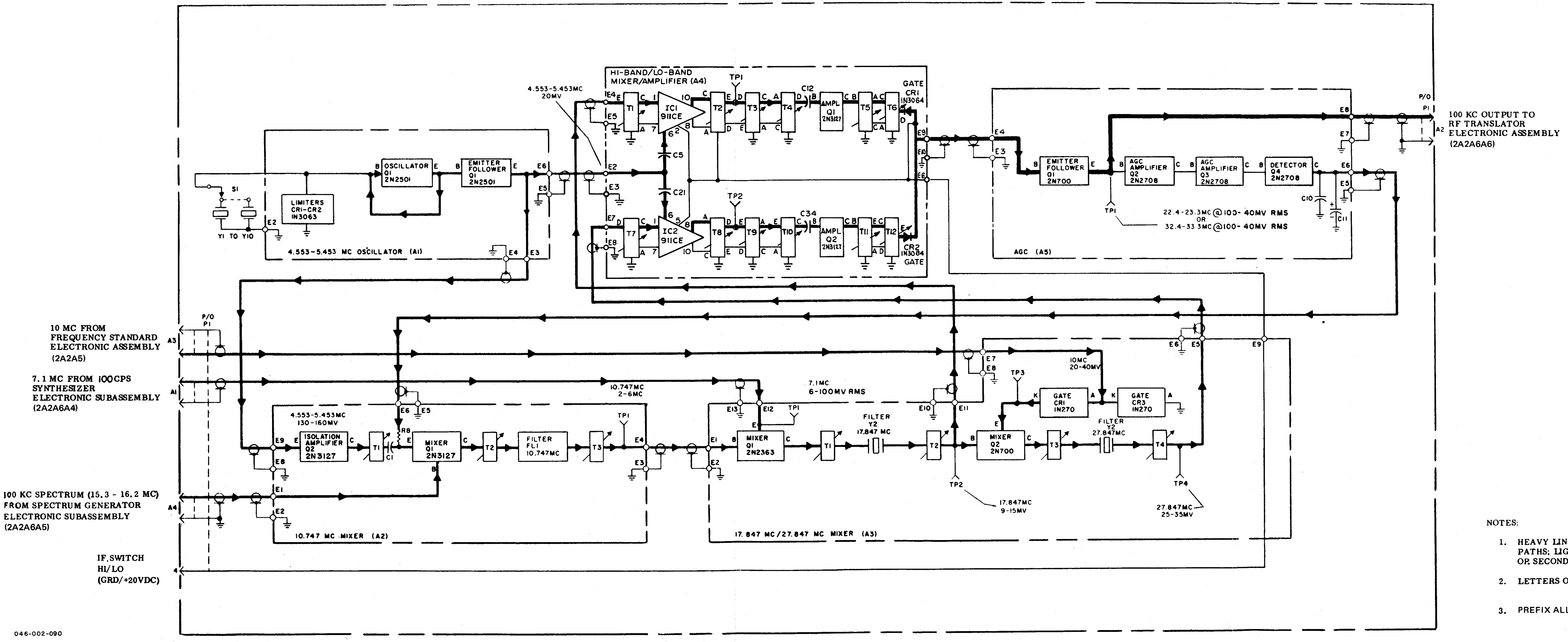
Figure 4-8. Frequency Standard Assembly 2A2A5, Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS.
3. WAVEFORMS RECORDED USING OSCILLOSCOPE AN/USM-140.
4. PREFIX ALL REF DES WITH 2A2A6A1.

Figure 4-9. MC Synthesizer Subassembly 2A2A6A1, Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE
3. PREFIX ALL REF DES WITH 2A2A6A2.

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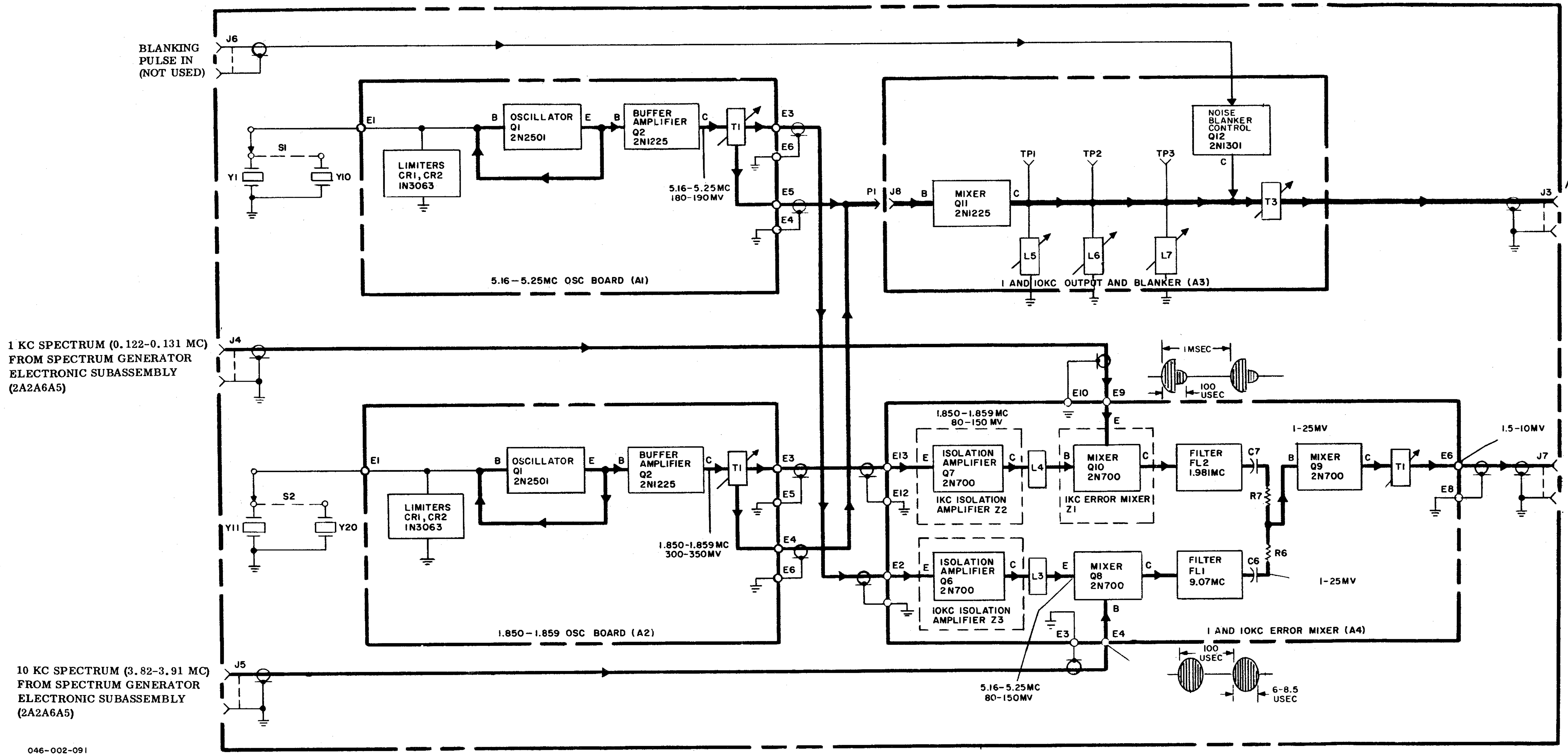
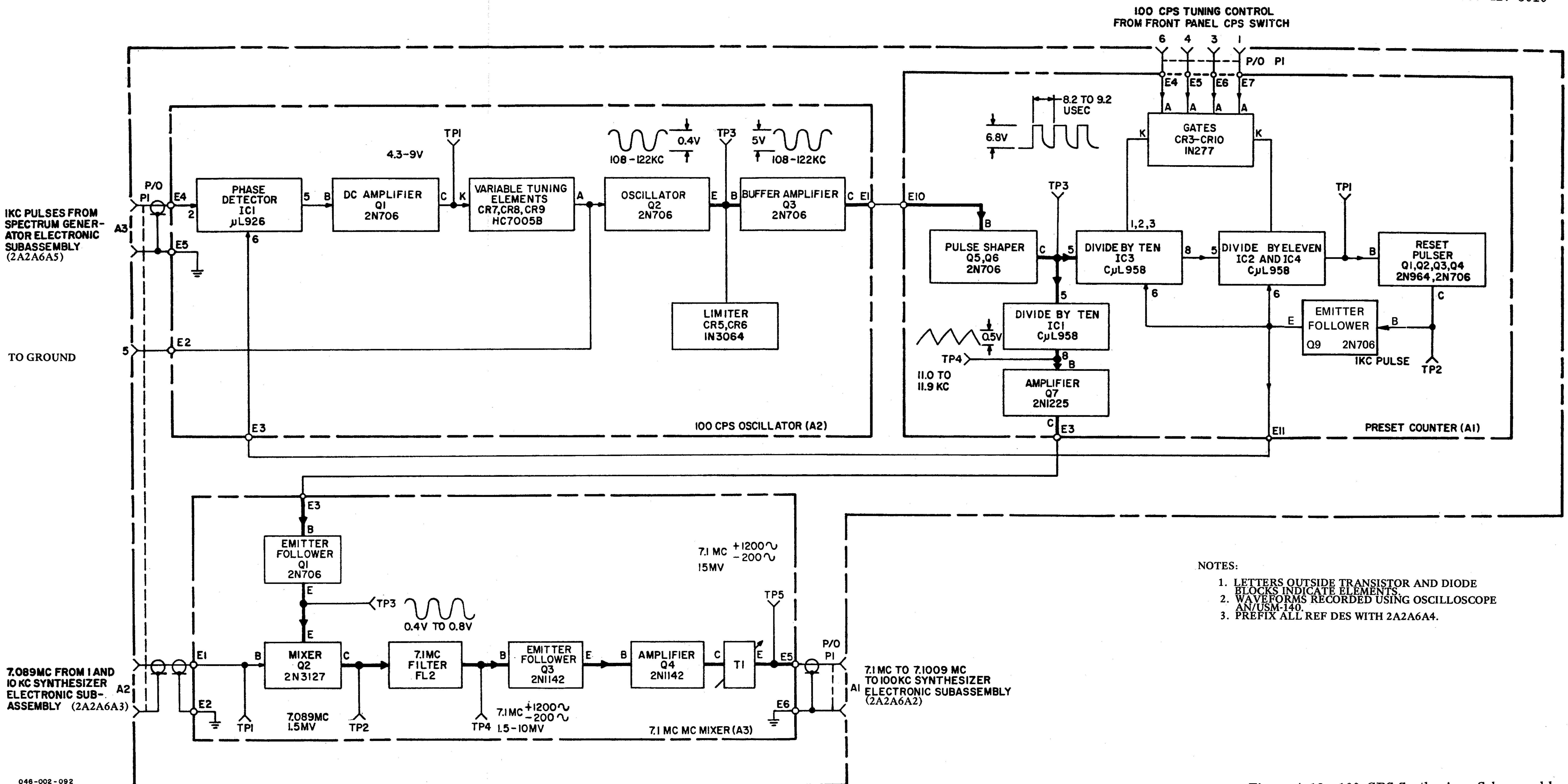
Figure 4-10. 100 KC Synthesizer Subassembly 2A2A6A2, Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS. NUMBERS ON TRANSFORMERS INDICATE TERMINAL NUMBERS.
3. PREFIX ALL REF DES WITH 2A2A6A3.

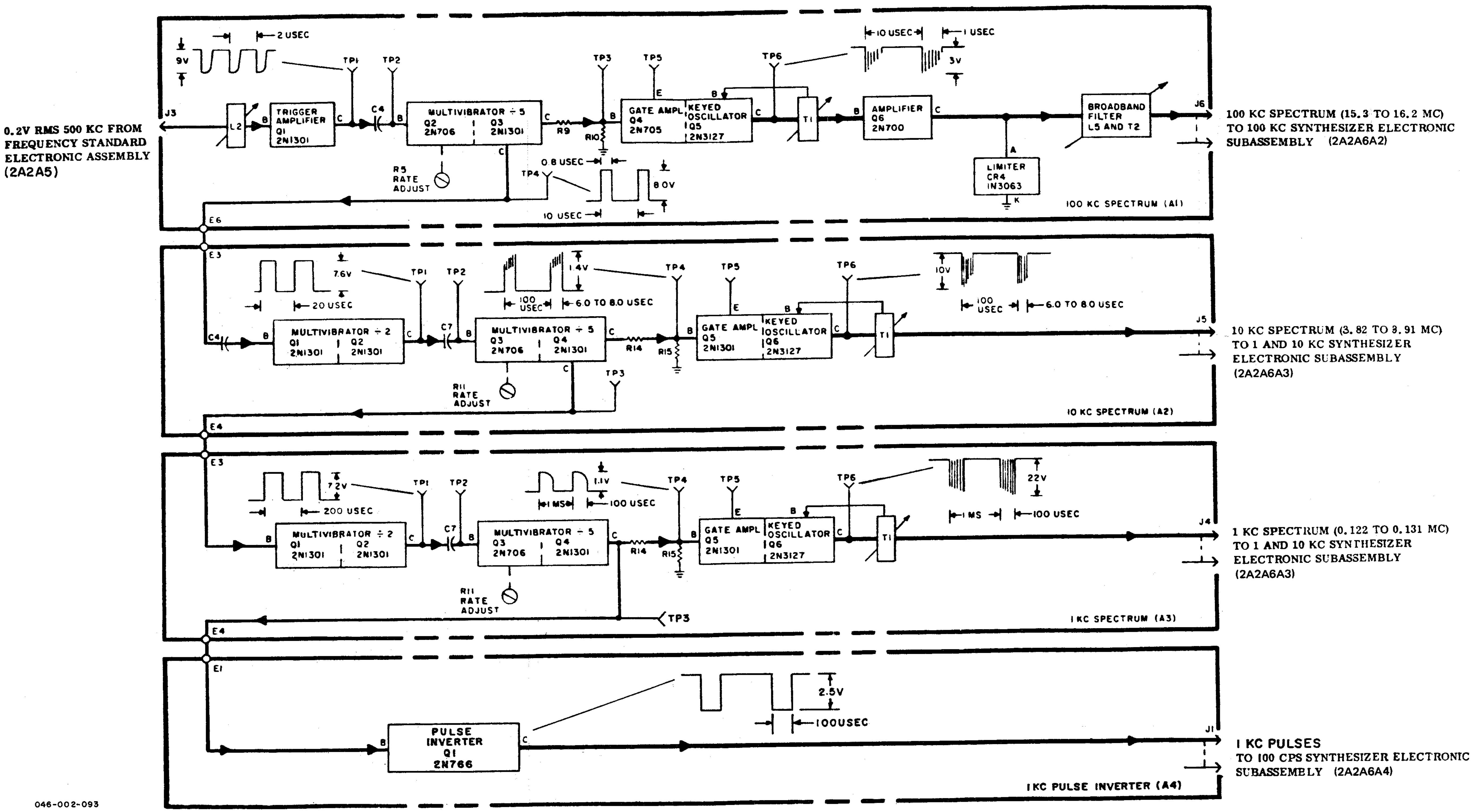
Figure 4-11. 1- and 10-KC Synthesizer Subassembly 2A2A6A3, Servicing Block Diagram



NOTES:

1. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS.
2. WAVEFORMS RECORDED USING OSCILLOSCOPE AN/USM-140.
3. PREFIX ALL REF DES WITH 2A2A6A4.

Figure 4-12. 100-CPS Synthesizer Subassembly 2A2A6A4, Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCK INDICATE ELEMENTS.
3. WAVEFORMS RECORDED USING OSCILLOSCOPE AN USM- 140.
4. PREFIX ALL REF DES WITH 2A2A6A5.

Figure 4-13. Spectrum Generator Subassembly 2A2A6A5, Servicing Block Diagram

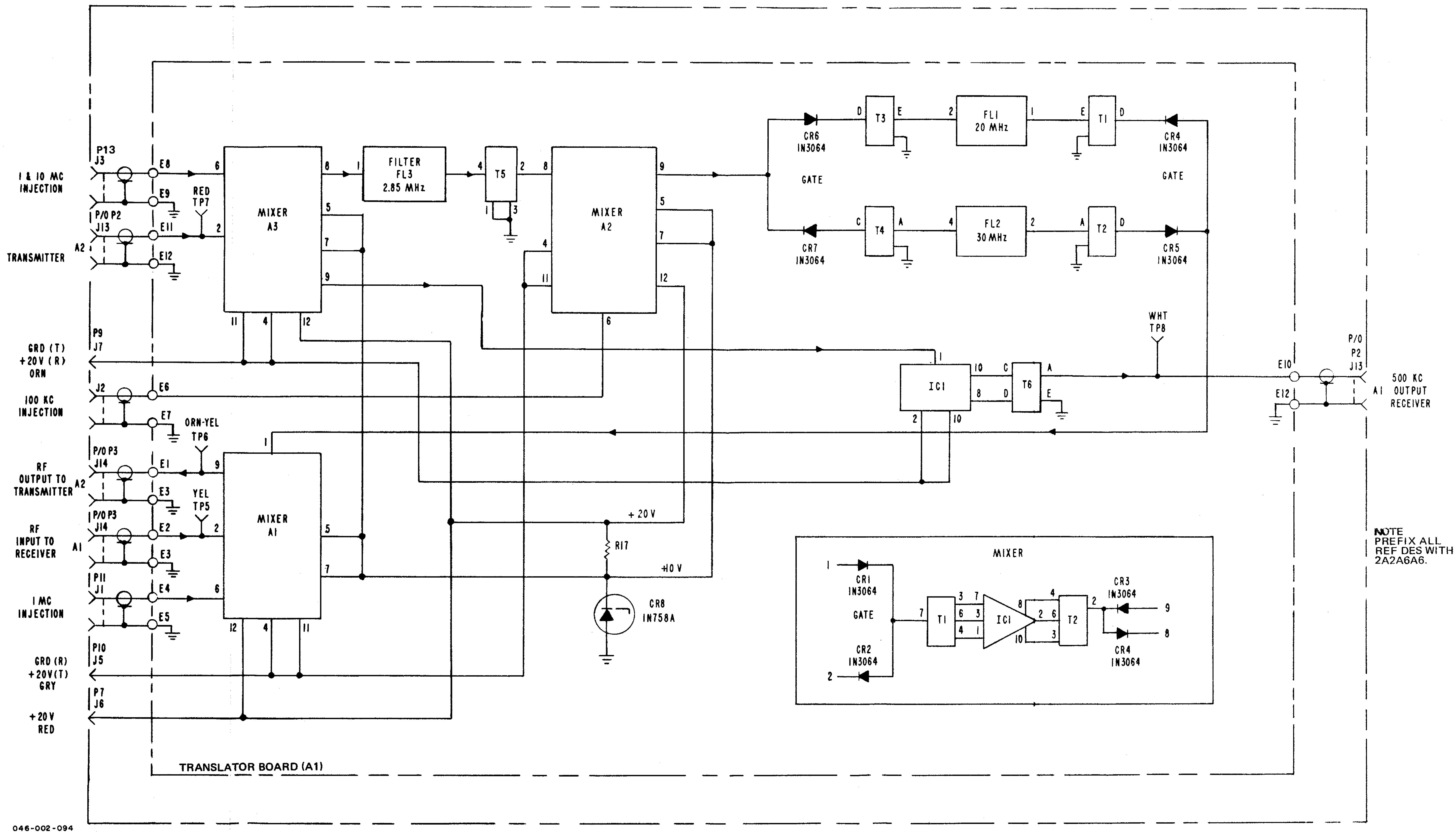
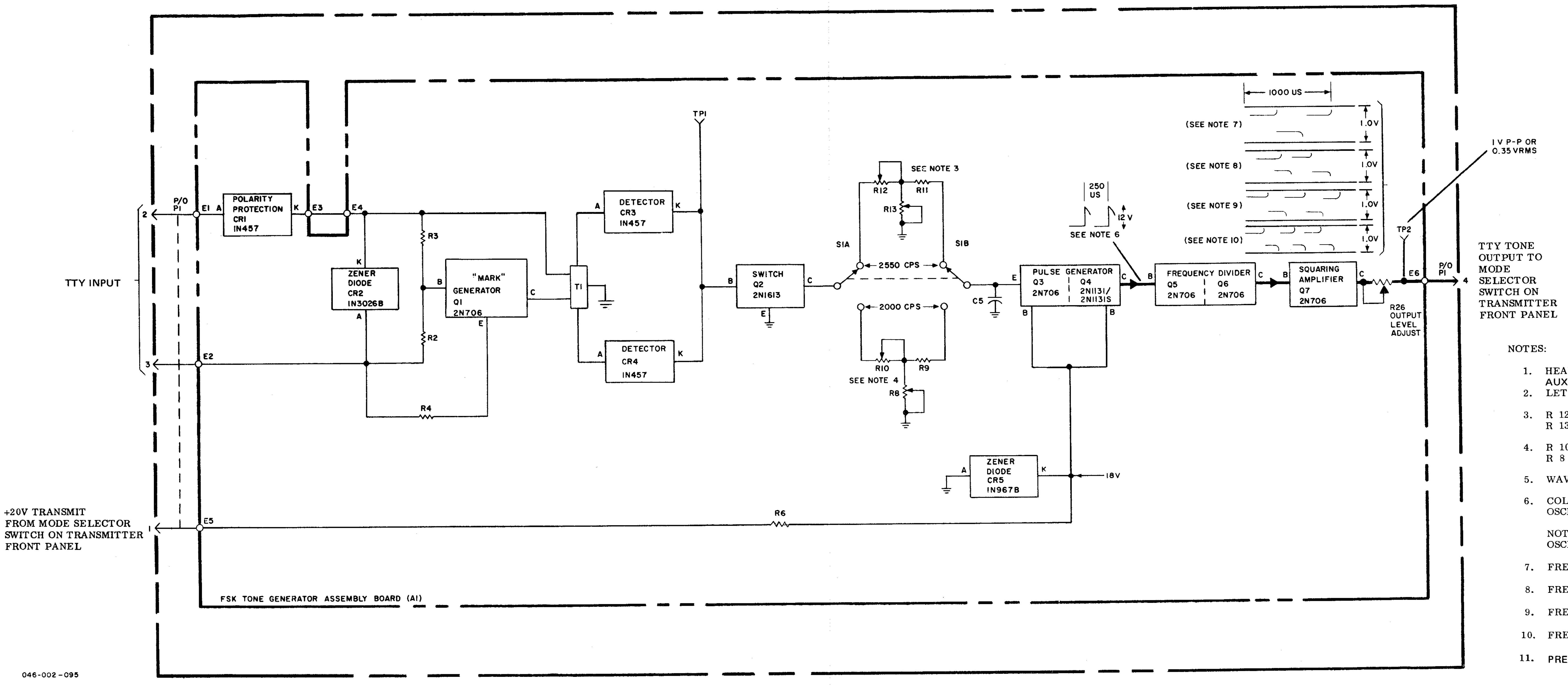


Figure 4-14. RF Translator Subassembly 2A2A6A6, Servicing Block Diagram

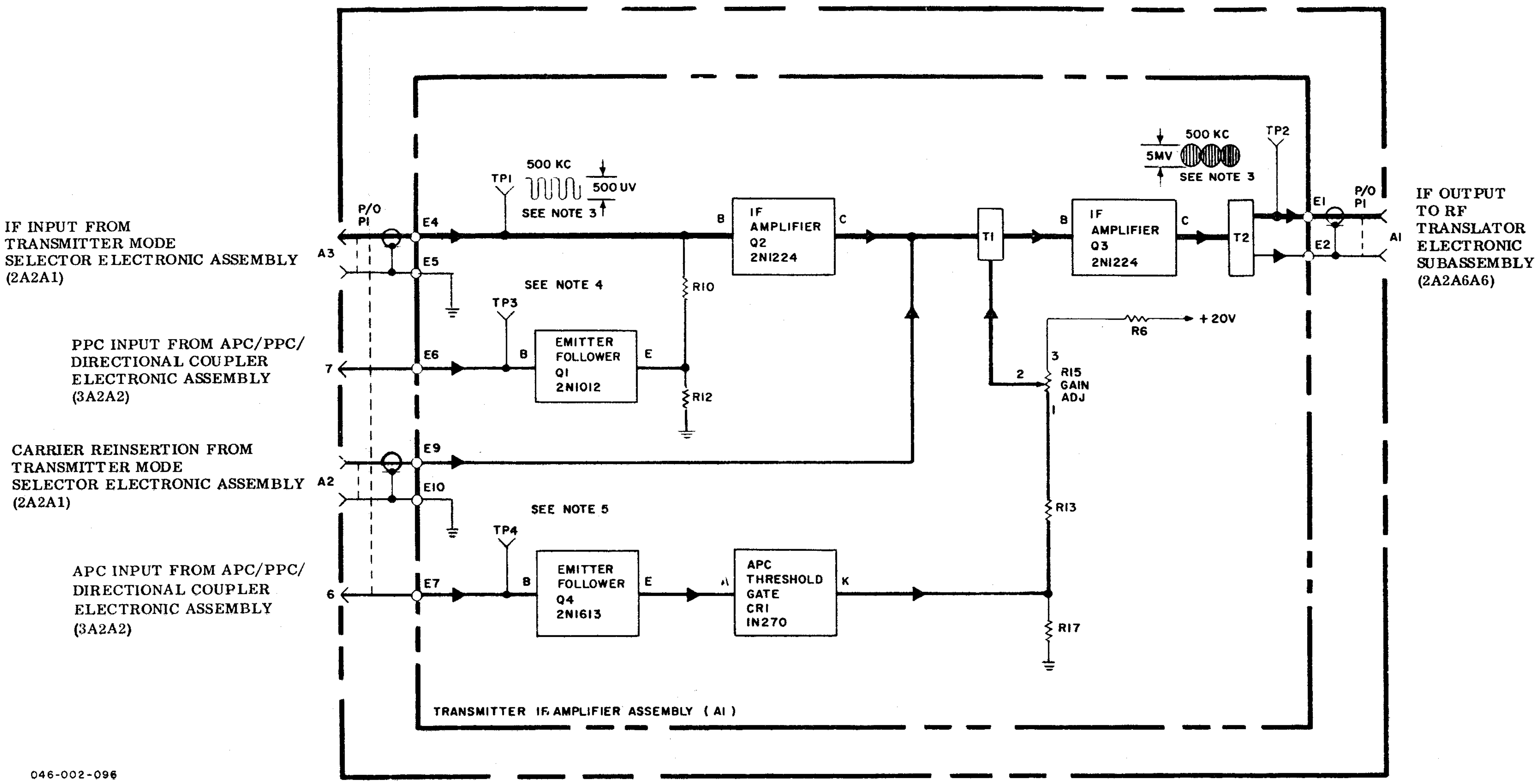


NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE OF TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS.
3. R 12 ADJUSTED FOR 2550 CPS CENTER FREQ "MARK" (2975 CPS)
   R 13 ADJUSTED FOR 2550 CPS CENTER FREQ "SPACE" (2125 CPS).
4. R 10 ADJUSTED FOR 2000 CPS CENTER FREQ "MARK" (2425 CPS)
   R 8 ADJUSTED FOR 2000 CPS CENTER FREQ "SPACE" (1575 CPS).
5. WAVEFORMS RECORDED ON OSCILLOSCOPE AN/USM-281.
6. COLLECTOR OF Q4 TTY FUNCTION: SPACE
   OSCILLOSCOPE SETTING: 0.5 V/CM X 10, 100 USEC/CM.

   NOTES 7, 8, 9, 10 APPLY TO WAVEFORM AT TP2.
   OSCILLOSCOPE SETTING: 0.5V/CM X 10, 100 USEC/CM.
7. FREQ - 1575 CPS, FUNCTION - SPACE, CENTER FREQ - 2000 CPS.
8. FREQ - 2125 CPS, FUNCTION - SPACE, CENTER FREQ - 2550 CPS.
9. FREQ - 2425 CPS, FUNCTION - MARK, CENTER FREQ - 2000 CPS.
10. FREQ - 2975 CPS, FUNCTION - MARK, CENTER FREQ - 2550 CPS.
11. PREFIX ALL REF DES WITH 2A2A9.

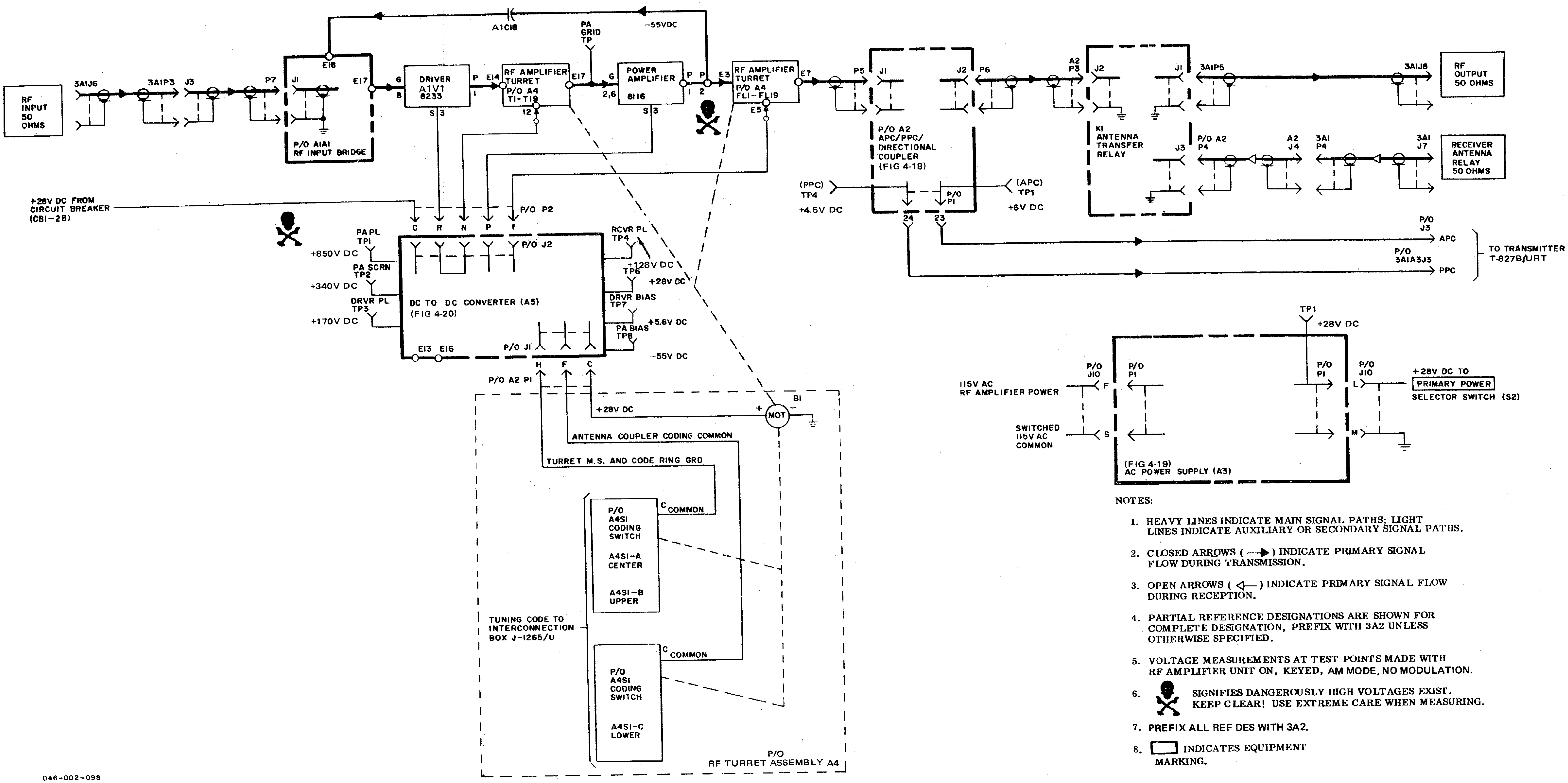
Figure 4-15. FSK Tone Generator Assembly 2A2A9, Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS.
3. AM MODE, CARRIER, WITH SINGLE TONE MODULATION.
4. VOLTAGE AT THIS POINT (TP3) IS A FUNCTION OF THE DRIVE LEVEL TO THE OUTPUT STAGE OF THE AM-3007/URT. UNDER CONDITION OF NO DRIVE OR INSUFFICIENT DRIVE TO DRAW GRID CURRENT IN THE FINAL STAGE, (TP3) IS NOMINALLY AT 5V DC. APPLICATION OF MODULATION TO THE FINAL STAGE, OF SUFFICIENT AMPLITUDE TO DRAW GRID CURRENT, WILL SUPERIMPOSE GRID CURRENT PULSES ON THE LINE.
5. TP4 WILL SHOW 0V DC UNLESS AM-3007/URT HAS RF OUTPUT. IN AM MODE, WITH 25W RF OUTPUT FROM AM-3007/URT, TP4 WILL SHOW +5.2 TO +5.8V DC.
6. WAVEFORMS RECORDED USING OSCILLOSCOPE AN/USM-140.
7. ALL VOLTAGES DC UNLESS OTHERWISE SPECIFIED.
8. PREFIX ALL REF DES WITH 2A2A12.

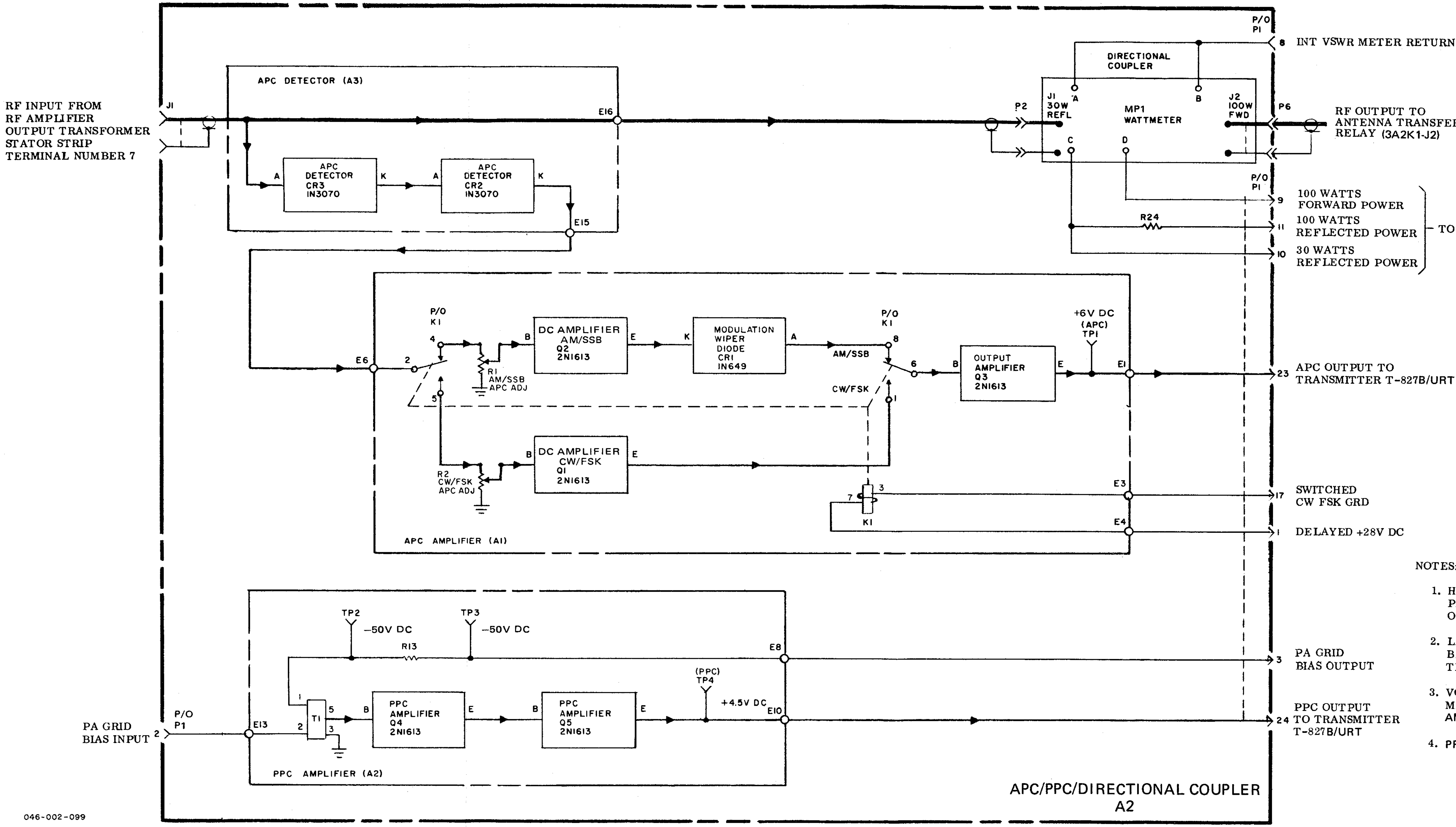
Figure 4-16. Transmitter IF. Amplifier Assembly 2A2A12, Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. CLOSED ARROWS (—▶) INDICATE PRIMARY SIGNAL FLOW DURING TRANSMISSION.
3. OPEN ARROWS (◁—) INDICATE PRIMARY SIGNAL FLOW DURING RECEPTION.
4. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR COMPLETE DESIGNATION, PREFIX WITH 3A2 UNLESS OTHERWISE SPECIFIED.
5. VOLTAGE MEASUREMENTS AT TEST POINTS MADE WITH RF AMPLIFIER UNIT ON, KEYED, AM MODE, NO MODULATION.
6. SIGNIFIES DANGEROUSLY HIGH VOLTAGES EXIST. KEEP CLEAR! USE EXTREME CARE WHEN MEASURING.
7. PREFIX ALL REF DES WITH 3A2.
8. INDICATES EQUIPMENT MARKING.

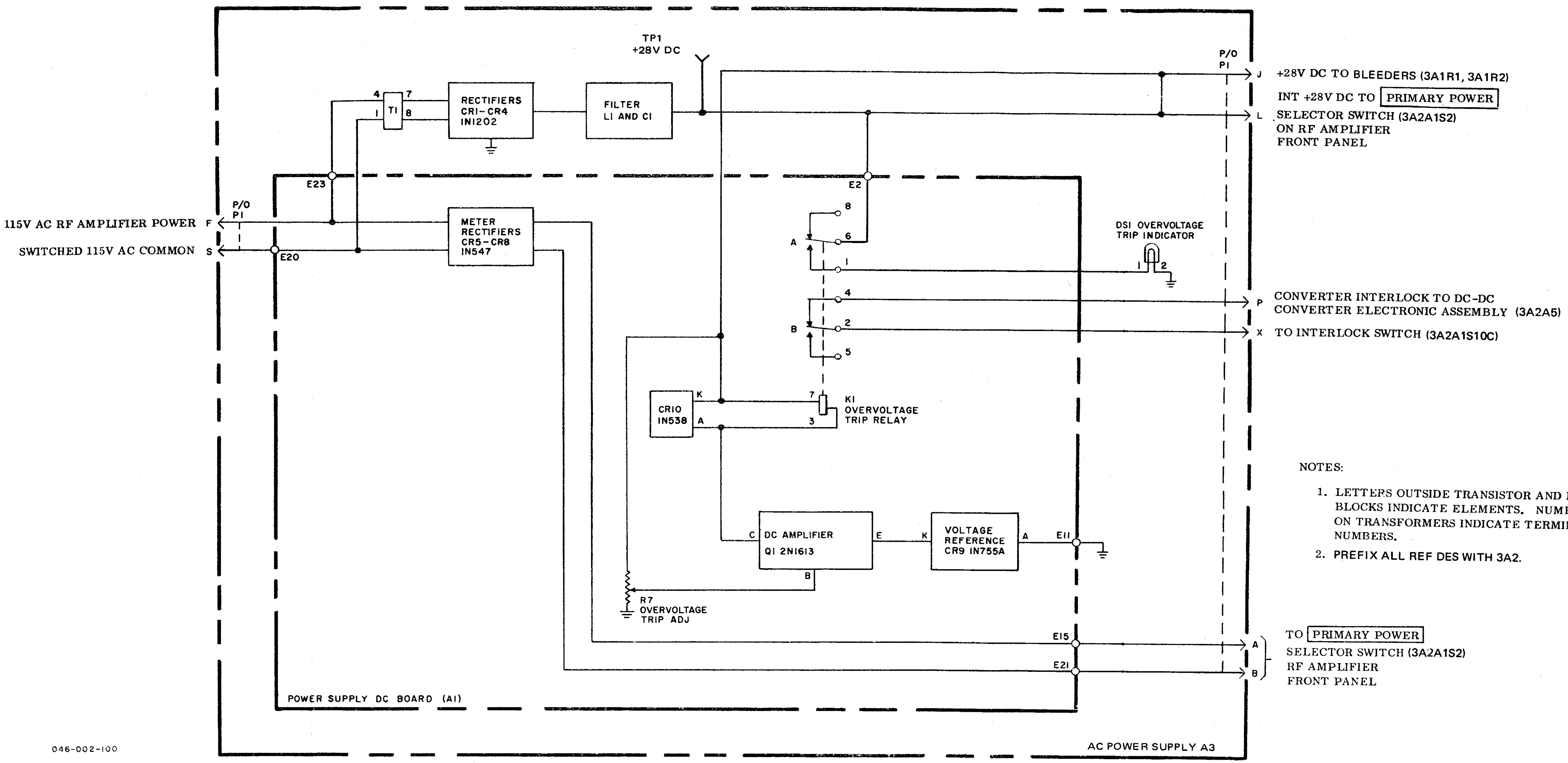
Figure 4-17. RF Amplifier AM-3007/URT, Overall Servicing Block Diagram



NOTES:

1. HEAVY LINES INDICATE MAIN SIGNAL PATHS; LIGHT LINES INDICATE AUXILIARY OR SECONDARY SIGNAL PATHS.
2. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS, NUMBERS ON TRANSFORMERS INDICATE TERMINAL NUMBERS.
3. VOLTAGE MEASUREMENTS AT TEST POINTS MADE WITH RF AMPLIFIER UNIT ON; KEYED, AM MODE, NO MODULATION.
4. PREFIX ALL REF DES WITH 3A2.

Figure 4-18. APC/PPC/Directional Coupler Assembly 3A2A2, Servicing Block Diagram



NOTES:

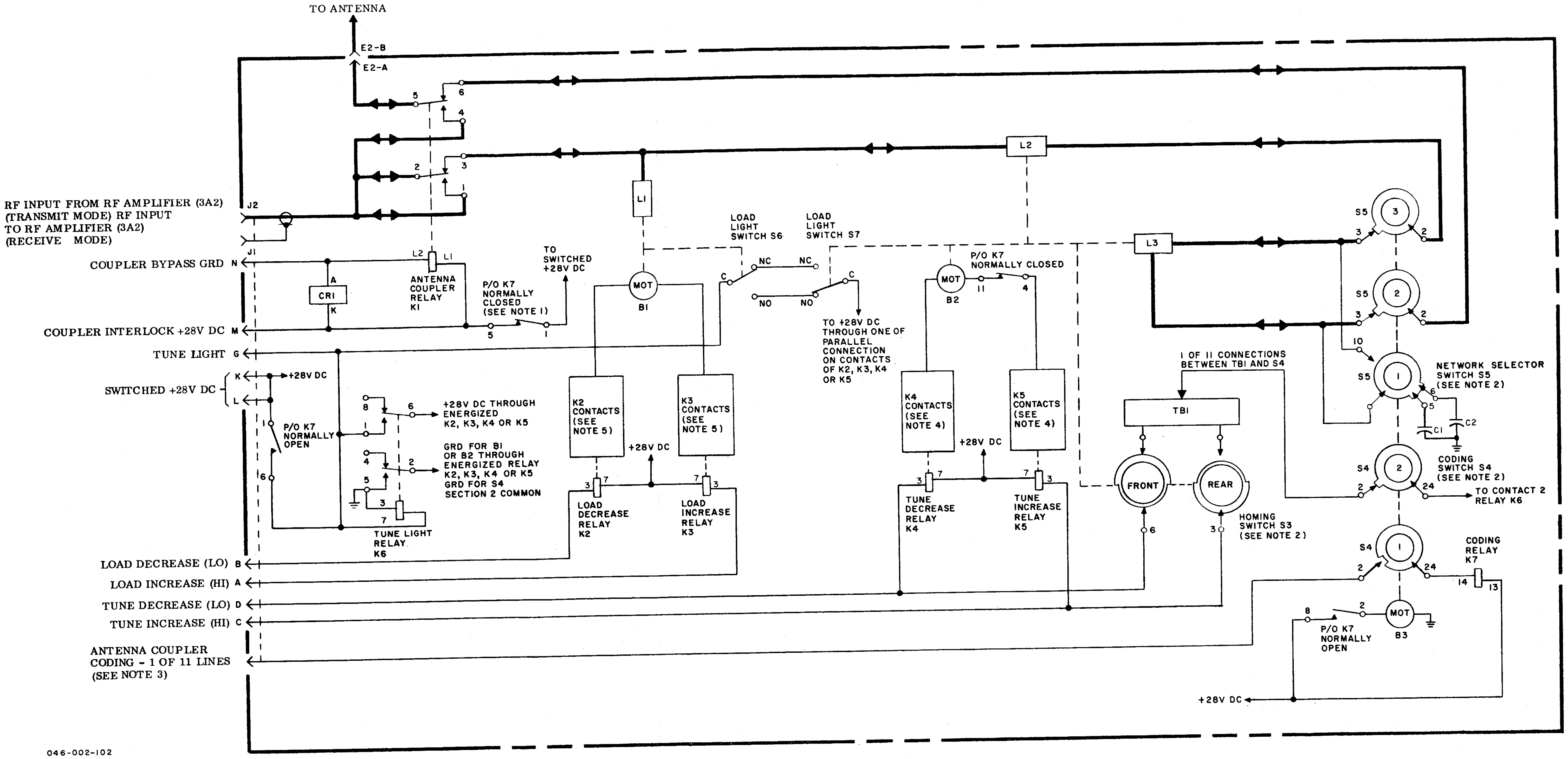
1. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS. NUMBERS ON TRANSFORMERS INDICATE TERMINAL NUMBERS.
2. PREFIX ALL REF DES WITH 3A2.

Figure 4-19. AC Power Supply Assembly 3A2A3, Servicing Block Diagram

NOTES:

1. LETTERS OUTSIDE TRANSISTOR AND DIODE BLOCKS INDICATE ELEMENTS. NUMBERS ON TRANSFORMERS INDICATE TERMINAL NUMBERS.
2. VOLTAGE MEASUREMENTS AT TEST POINTS MADE WITH RF AMPLIFIER UNIT ON, KEYED, AM MODE, NO MODULATION.
3. WAVEFORMS RECORDED ON OSCILLOSCOPE AN/USM-281.
4. INDICATES POLARITY.
5. SIGNIFIES DANGEROUSLY HIGH VOLTAGES EXIST. KEEP CLEAR! USE EXTREME CARE WHEN MEASURING.
6. PREFIX ALL REF DES WITH A3A2A5.

Figure 4-20. DC-to-DC Converter Assembly 3A2A5, Servicing Block Diagram



NOTES:

1. WHEN K7 ENERGIZES INTERLOCKED +28V IS INTERRUPTED TO PREVENT ACCIDENTAL KEYING OF TRANSMITTER WHEN COUPLER IS TUNING.
2. ON SWITCHES S3, S4 AND S5 ONLY 1 REPRESENTATIVE CONTACT SHOWN FOR CLARITY. NONE OF THE CAPACITORS SWITCHED INTO L2 CIRCUIT BY S5 SHOWN.
3. RELAY K7 ENERGIZED TO START TUNE CYCLE WHEN GROUND PULSE IS RECEIVED OVER 1 OF THE ELEVEN COUPLER CODING WIRES, FROM THE RF AMPLIFIER THROUGH SECTION 1 OF CODING SWITCH S4.
4. CONTACTS OF RELAYS K4 AND K5 SUPPLY VOLTAGE TO MOTOR B2 WHEN MOTOR B2 OPERATES, ONE RELAY (EITHER K4 OR K5) WILL BE ENERGIZED, SUPPLYING VOLTAGE FROM +28V LINE TO MOTOR, THE OTHER RELAY WILL BE DE-ENERGIZED PROVIDING GROUND RETURN FOR MOTOR.
5. RELAYS K2 AND K3 OPERATE IN THE SAME MANNER AS RELAYS K4 AND K5 FOR MOTOR B1.
6. HEAVY LINES INDICATE SIGNAL FLOW FOR TRANSMIT AND RECEIVE MODE OF OPERATION.
7. PREFIX ALL REF DES WITH 5.

Figure 4-21. Antenna Coupler CU-937/UR, Overall Servicing Block Diagram

SECTION 5
MAINTENANCE

5-1. GENERAL INFORMATION.

5-2. FAILURE REPORTS AND PERFORMANCE AND OPERATIONAL REPORTS. The requirement for submission of failure reports no longer exists for all electronic equipment. Failure reports and performance and operational reports are to be completed for designated equipments only to the extent required by existing directives. Refer to the Electronics Installation and Maintenance Book (EIMB), NAVSHIPS 0967-000-1020. All failures shall be reported for those equipments which require the use of failure reports.

5-3. STANDARDS FOR MAINTENANCE. For information on reference standards and periodic schedule charts, refer to the Maintenance Standards Book, NAVSHIPS 0967-427-5030, and the Planned Maintenance System (PMS) requirements.

5-4. REFERENCE DATA. Included at the end of this section are interconnection and power distribution diagrams, schematic diagrams and parts location illustrations. This data covers the T-827B/URT and AM-3007/URT units of Radio Set AN/WRC-1B and the CU-937/UR antenna coupler. Interconnection wire tables for the T-827B/URT are included with the maintenance data for that unit.

5-5. MAINTENANCE PROCEDURES. Maintenance procedures are provided for the T-827B/URT, AM-3007/URT, and CU-937/UR units. Alignment and adjustment procedures and shipboard repair procedures are provided for each unit.

5-6. Alignment and Adjustment. Alignment and adjustment procedures describes the test equipment setup and the necessary adjustments to ensure proper equipment performance. When performing the overall alignment and adjustment, the procedures must be performed in the order given in this section. When only one procedure is performed, it is assumed that all other sections of the equipment are properly adjusted. DO NOT ATTEMPT ALIGNMENT AND ADJUSTMENT AS A SUBSTITUTE FOR TROUBLESHOOTING. Alignment and adjustment should be attempted only after a repair is made to the equipment or after performance tests or troubleshooting procedures.

5-7. Shipboard Repair. The repair procedures outline the methods for disassembly, cleaning, repairing, and reassembly steps used to replace a faulty assembly or component.

5-8. RADIO TRANSMITTER T-827B/URT ALIGNMENT AND ADJUSTMENT.

5-9. GENERAL. The alignment and adjustment procedures for the T-827B/URT are described in paragraphs 5-10 through 5-25. In these paragraphs, prefix all chassis reference designations with "2A2" to obtain the complete designation for all transmitter components.

5-10. TEST EQUIPMENT AND SPECIAL TOOLS REQUIRED. Table 5-1 lists the test equipment, special tools, and cables required to perform the alignment and adjustment procedures for the T-827B/URT.

5-11. 20-VDC REGULATOR ADJUSTMENT. Power Supply Assembly A8 (figure 5-13) provides a regulated positive 20-Vdc output that must be adjusted if the voltage varies ±2.0 volts above or below.

5-12. Test Equipment Required. Multimeter AN/PSM-4( ) is required to perform this adjustment.

TABLE 5-1. TEST EQUIPMENT AND SPECIAL TOOLS REQUIRED FOR MAINTENANCE OF RADIO TRANSMITTER T-827B/URT

NAME	DESIGNATION
Multimeter	AN/PSM-4( )
Electronic Multimeter	AN/USM-116
Electronic Multimeter (rf voltmeter)	CCVO-91CA
Electronic Multimeter (ac voltmeter)	ME-6C/U
RF Signal Generator	CAQI-606A
Frequency Standard	AN/URQ-9
Spectrum Analyzer	TS-1379A/U
Two-Tone Generator	SG-376A/U
Oscilloscope	AN/USM-281
Frequency Counter	AN/USM-207
Extender Cable	666243-070
Extender Cable	666243-071
Extender Cable	666243-076
Extender Cable	666243-079
BNC-to-N Adapter	UG-349B/U
Coaxial Adapter	UG-491A/U
RF Insert Extraction Tool	CET-C6B

5-13. Preliminary Control Settings. Prior to adjusting the 20-Vdc regulator circuit, set the T-827B/URT controls as follows.

a. Mode Selector switch to STD BY.

b. MCS and KCS controls to 8.0000 MHz.

c. LOCAL/REMOTE switch to LOCAL.

d. CPS switch to 000.

5-14. Test Setup. Connect equipment as follows.

a. Loosen front panel screws on T-827B/URT and slide chassis to locked-out position. Tilt chassis 90 degrees to expose bottom.

b. Pull Interlock switch up.

c. Set AM-3007/URT PRIMARY POWER circuit breaker to ON.

d. Set multimeter to indicate 50-Vdc full scale.

e. Connect positive lead of multimeter to A8E20 on underside of T-827B/URT chassis (figure 5-36). Connect negative lead to chassis ground.

5-15. Procedure. To adjust 20-Vdc regulator, proceed as follows.

a. Set Mode Selector switch to AM.

b. Key T-827B/URT. Adjust A8R10 (figure 5-36) for 20 ±0.1 Vdc on multimeter.

c. Unkey T-827B/URT. Set Mode Selector switch to OFF.

d. Disconnect multimeter. Set AM-3007/URT PRIMARY POWER circuit breaker to OFF.

e. Tilt T-827B/URT chassis up to horizontal, slide chassis into case, and tighten front panel screws.

5-16. 5-MHz OSCILLATOR CIRCUIT ADJUSTMENT. The 5-MHz oscillator circuit in Frequency Standard Assembly A5 must be adjusted properly to ensure accurate development of frequencies in the T-827B/URT. The adjustment must not be made until it has been determined that the 5-MHz output frequency is in error. Unnecessary adjustment will cause poor equipment operation that is difficult to correct and requires lengthy maintenance time.

5-17. Test Equipment Required. An external frequency standard such as the AN/URQ-9 is required to perform this adjustment.

5-18. Preliminary Control Settings. Set Mode Selector switch to STD BY. Allow at least a three-day warmup period before proceeding with final adjustment. If immediate adjustment is necessary, continue with this procedure but recheck after the required warmup period.

5-19. Test Setup. Connect the equipment as follows.

a. Connect 5 MC OUTPUT jack on Frequency Standard AN/URQ-9 to EXT 5 MC IN jack J25 at rear of T-827B/URT.

b. Loosen front panel screws on T-827B/URT and slide chassis to locked-out position. Pull Interlock switch up.

5-20. Procedure. To adjust the 5-MHz oscillator, proceed as follows.

a. Using a small screwdriver, rotate COMP/INT/EXT switch on top of frequency standard A5 to COMP (figure 5-34).

b. Set T-827B/URT Mode Selector switch to AM. Observe lamp DS1 on top of frequency standard assembly. Lamp will flicker at a rate equal to the error frequency. Time the flicker cycle from time when lamp is just visibly increasing in brilliance. Make frequency standard adjustment ONLY if time measured is less than 20 seconds.

NOTE

Lamp DS1 remaining on indicates that either no external 5 MHz is present or that there is a wide difference in frequencies. Lamp DS1 remaining out indicates a malfunction within Frequency Standard Assembly A5.

CAUTION

In step c, below, less than one-quarter turn will correct for most frequency errors. Do not force adjustment.

c. If adjustment is required, adjust FREQ ADJ control on top of Frequency Standard Assembly A5 until lamp DS1 changes in brilliance as slowly as possible.

d. Wait five minutes and repeat this adjustment procedure.

e. Rotate COMP/INT/EXT switch to required position.

f. Tilt T-827B/URT chassis up to horizontal, slide chassis into case and tighten front panel screws.

5-21. OVERALL T-827B/URT ALIGNMENT. The following alignment procedures ensures that the T-827B/URT is delivering the proper drive levels to excite the AM-3007/URT in an AN/WRC-1B system. The procedures should be performed in their entirety as part of an installation checkout or when Frequency Standard Assembly A5 or Mode Selector Assembly A1 are replaced.

5-22. Test Equipment Required. The following test equipment is required to perform the overall alignment.

a. Spectrum Analyzer TS-1379A/U

b. Two-Tone Generator SG-376A/U

c. Electronic Voltmeter ME-6C/U

d. Electronic Multimeter CCVO-91CA

e. Extender Cable 666243-070

f. Extender Cable 666243-076

g. BNC-to-N Adapter UG-349B/U

h. Resistor, 50 ohms, 2 watts, type RC42GF500J or equivalent.

5-23. Preliminary Control Settings. Disable the APC and PPC feedback sources while performing the overall alignment of the T-827B/URT. Terminate the T-827B/URT as follows.

a. Set AM-3007/URT PRIMARY POWER circuit breaker to OFF.

b. Loosen front panel screws and slide AM-3007/URT to locked-out position. Pull interlock switch 3A2A1S10 up. Tilt chassis to vertical locked position.

c. Disconnect BNC-connected cable to RF Input Bridge Subassembly 3A2A1A1 (located at right side of AM-3007/URT near front panel).

d. Slide AM-3007/URT back into the case.

e. Loosen front panel screws and slide T-827B/URT to locked-out position.

f. Pull Interlock switch up.

g. Connect 50-ohm, 2-watt resistor from TP4 on RF Amplifier Assembly A4 to ground.

h. Set AM-3007/URT PRIMARY POWER circuit breaker to ON.

i. Set T-827B/URT Mode Selector switch to STD BY. Set LOCAL/REMOTE switch to LOCAL.

j. Set MCS and KCS controls to 5.5550 MHz.

5-24. Test Setup. Connect the equipment as follows.

a. Connect SG-376/U and ME-6C/U in parallel from T-827B/URT HANDSET connector J1, pin C, to chassis ground. Set tone A on the SG-376A/U to 1000 Hz, 44 mV. Set tone B to 1700 Hz, 44 mV.

b. Set T-827B/URT Mode Selector switch to LSB. Key T-827B/URT and adjust tone A for 44 mV, and tone B for 44 mV. Set the SG-376/U to AB-two tone.

5-25. Procedure. To align the T-827B/URT proceed as follows. (See figure 5-34.)

a. Connect the ME-6C/U from TP2 on LSB audio amplifier A3 (right-hand amplifier) to chassis ground. Adjust GAIN ADJ A3R11 on top of assembly for 100 ±3 mV.

b. Set Mode Selector switch to USB. Connect ME-6C/U from TP2 and USB audio amplifier to chassis ground. Adjust GAIN ADJ A2R11 for 100 ±3 mV.

c. Unkey T-827B/URT. Connect ME-6C/U to measure output of SG-376A/U from J1, pin C, to ground. Connect CCVO-91CA from TP4 on rf amplifier to chassis ground.

d. Set Mode Selector switch to CW. Set LOCAL/REMOTE switch to LOCAL. Key T-827B/URT at CW KEY jack. Adjust XMTR GAIN ADJ on top of rf amplifier for 2.25 ±0.10 volts. Unkey T-827B/URT.

e. Remove rf voltmeter from TP4 of RF Amplifier Assembly and connect spectrum analyzer to TP4. Set SG-376A/U to tone A output and check for 1000 Hz, 44 mV, output on ME-6C/U. Set Mode Selector switch to USB. Key T-827B/URT. Observe analyzer display and adjust USB CARRIER BAL R23 on top of Mode Selector A1, if necessary, to ensure that carrier level is at least 50 dB down from the 100-Hz component of the signal.

f. Set Mode Selector switch to LSB and adjust LSB CARRIER BA' R3 on assembly, if necessary, to ensure at carrier level is at least 50 dB down from the 1000-Hz component of the signal.

g. Set Mode Selector switch to AM. Check that SG-376A/U is on tone A, 44 mV, 1000 Hz. Key T-827B/URT. Observe spectrum analyzer display and adjust % MOD A4R101 on Mode Selector Assembly to set carrier level equal to level of the 1000-Hz tone. Unkey T-827B/URT.

h. Remove tone inputs. Set Mode Selector Switch to AM. Connect rf voltmeter from TP2 on if. amplifier A12 to chassis ground. Key the T-827B/URT and adjust GAIN ADJ A2A12R15 for 7 mV on rf voltmeter. Unkey and set Mode Selector to STD BY.

i. Set Mode Selector Switch to USB. Key T-827B/URT and recheck tone A and tone B for an amplitude of 44 mV. Set signal to AB two-tone. Connect rf voltmeter from TP4 on rf amplifier A4 and chassis ground and adjust A4A38R6 for 2.25 ±0.10 volt.

j. Remove rf voltmeter from TP4 and connect spectrum analyzer to TP4. Set Mode Selector switch to LSB and check the amplitude of each of the two tones. Adjust LSB GAIN ADJ A3R11 (right-hand audio amplifier) to set the USB and LSB tones to equal amplitude.

k. Set Mode Selector switch to FSK. Key T-827B/URT from a remote position or from the local position by shorting pins A and D of LOCAL FSK IN jack J7 on rear of the case. Adjust OUTPUT LEVEL R26 on FSK Tone Generator Assembly for 20 mV at TP2 on IF. Amplifier Assembly.

l. Unkey T-827B/URT and set Mode Selector switch to STD BY.

5-26. <u>RADIO TRANSMITTER T-827B/URT SHIPBOARD REPAIR</u>.

5-27. GENERAL. The repair procedures for the T-827B/URT are described in paragraphs 5-28 through 5-97. In these paragraphs, prefix all chassis reference designations with "2A2" and prefix all case reference designations with "2A1" to obtain complete designation for all transmitter components.

5-28. MODE SELECTOR ASSEMBLY A1. Before attempting a repair to the Mode Selector Assembly A1, consult the maintenance code in the equipment Allowance Parts List (APL) to determine whether the Mode Selector Assembly is depot-repairable or organizational level (ship or station)-repairable. If the assembly is depot-repairable and a spare is available, remove and replace the assembly.

5-29. Removal and Replacement. Loosen front panel screws and slide T-827B/URT to the locked-out position. The Mode Selector Assembly is located at center rear of chassis. Loosen two corner fastening screws and lift assembly from chassis. Plug new assembly into chassis and tighten two fastening screws. Set the CARRIER REINSERTION switch A1S1 to the ∞ position.

NOTE

When the Mode Selector Assembly is replaced, the overall alignment procedure for the T-827B/URT (paragraph 5-21) must be performed to ensure proper setting of carrier and modulation levels.

5-30. Repair Procedure. To repair the Mode Selector Assembly proceed as follows.

a. Remove two screws from top of Mode Selector Assembly and lift off dust cover.

b. Clean assembly of dust and foreign matter. Inspect entire assembly for broken or burned components, frayed or broken wiring, and loose connections or connectors.

c. Before attempting parts replacement in the mode selector, read all notes on the Mode Selector Assembly schematic diagram, figure 5-14. Do not remove a defective or suspected defective component from this assembly until a replacement component is available for installation.

5-31. Test Equipment Required for Adjustment. Extender cables 666243-070 and 666243-076, and RF Voltmeter CCVO-91CA are required to adjust the Mode Selector Assembly after repair or replacement.

5-32. Post Repair and Adjustment. After repair, replace all connections removed.

Inspect for poor connections, and for loose connectors and inserts. After repair is completed, adjust Mode Selector Assembly A1, as follows.

NOTE

The following procedures for adjustment of tunable transformers A1A4T3, T4, and T5 should not be attempted unless actual repairs were affected to their respective circuitry. The tuning cups are fragile and break easily.

a. Connect extender cables 666243-070 and 666243-076 to J17 and J16, respectively, on T-827B/URT chassis.

b. Connect extender cable 666243-070 to P2 on bottom of Mode Selector Assembly. Connect extender cable 666243-076 to P1 on the assembly.

c. Apply power to the T-827B/URT. Set the Mode Selector switch to ISB. Set the LOCAL/REMOTE switch to LOCAL.

d. Connect rf voltmeter to terminal A4E21 (high side) and A4E22. Key T-827B/URT by shorting pins D and E of HANDSET jack, and tune transformer A4T3 for peak indication on the rf voltmeter.

e. Connect rf voltmeter to terminal A4E6 (high side) and A4E7. Key T-827B/URT and tune transformer A4T4 for peak indication on the voltmeter.

f. Unkey T-827B/URT. Set Mode Selector switch to AM.

g. Connect rf voltmeter to terminal A4E2 (high side) and A4E3. Key T-827B/URT and tune transformer A4T5 for peak indication on the voltmeter.

h. Set Mode Selector switch to STD BY. Disconnect rf voltmeter. Remove extender cables from chassis and assembly. Replace dust cover on Mode Selector Assembly. Plug assembly into chassis and tighten fastening screws.

i. To ensure proper carrier reinsertion and modulation levels, perform the overall alignment of the T-827B/URT after each repair or replacement of Mode Selector Assembly A1.

5-33. AUDIO AMPLIFIER ASSEMBLIES A2 (USB) and A3 (LSB). The two audio amplifiers are plug-in electronic assemblies and are mounted on the right rear of the T-827B/URT chassis. The two assemblies are identical and interchangeable. The left-hand assembly is USB audio amplifier A2 and the right-hand assembly is LSB audio amplifier A3. When the equipment malfunction is isolated to either A2 or A3, the "good" assembly may be substituted for the malfunctioning assembly to verify the conclusion reached in the troubleshooting procedures.

EMERGENCY OPERATION

The T-827B/URT may be operated in any mode except the ISB or ISB/FSK modes with only one of the audio amplifier assemblies functioning. The A2 (left-hand) assembly functions in the AM, FSK, and USB modes. The A3 (right-hand) assembly funcfions in the LSB mode. Neither assembly is required for operation in CW.

Before attempting to repair an audio amplifier assembly, refer to the maintenance code in the equipment Allowance Parts List (APL) to determine whether the audio amplifier assembly(s) is depot-repairable or organizational level (ship or station)-repairable.

5-34. Removal and Replacement. Loosen two corner screws and unplug assembly from chassis. Plug a new assembly into chassis and tighten fastening screws.

5-35. Repair Procedure. Unlatch Dzus fasteners on either side of assembly and remove dust covers. Proceed as follows.

a. Clean assembly of dust and foreign matter. Inspect for broken or burned components, frayed or broken wiring, and loose connections or connectors.

b. Before attempting parts replacement in any audio amplifier assembly, make sure a replacement part is available for installation.

5-36. Test Equipment Required for Adjustment. Two-Tone Generator SG-376A/U and Electronic Voltmeter ME-6C/U are required to adjust an Audio Amplifier Assembly after repair or replacement.

5-37. Post Repair and Adjustment. After repair, replace all connections removed. Inspect for poor connections and for loose connectors. Replace dust covers and plug assembly into chassis. After repair and reinstallation is completed, adjust the Audio Amplifier Assembly as follows.

a. Connect two-tone audio generator from HANDSET jack J1, pin C, to ground.

b. Connect ac voltmeter to measure output of two-tone audio generator.

c. Set Mode Selector switch to USB if audio amplifier A2 is to be adjusted, or to LSB if audio amplifier A3 is to be adjusted.

d. To avoid excitation output from the T-827B/URT, unscrew two fastening screws at the corners of IF. Amplifier Assembly A12 and unplug the assembly from the chassis for the duration of this adjustment.

e. Key T-827B/URT by shorting pins D and E at HANDSET jack J1. Adjust two-tone audio generator for 1000 Hz, 44 mV, on tone A. Adjust output of tone B for 1700 Hz, 44 mV. Set to AB two-tone.

f. Connect ac voltmeter to TP2 of the assembly to be adjusted. Adjust GAIN ADJ R11 on top of assembly for 100 ±3 mV on ac voltmeter.

g. Plug IF. Amplifier Assembly into chassis and tighten fastening screws. Remove test equipment and keying short. Push T-827B/URT back into case and tighten front panel screws.

5-38. RF AMPLIFIER ASSEMBLY A4. RF Amplifier Assembly A4 is depot-repairable. The only repair authorized at organizational (ship or station)-level is the replacement of two electron tubes A4V1 and A4V2.

5-39. Replacement of Electron Tubes. To replace a defective electron tube, proceed as follows.

a. Remove power from T-827B/URT.

b. Loosen front panel screws and slide chassis to locked-out position.

c. Withdraw tube shield by bail handle. Replace defective tube, and reinstall tube shield.

d. Slide T-827B/URT chassis into case and tighten front panel screws.

e. Apply power and verify operation of the T-827B/URT.

5-40. Removal and Replacement of Assembly. If RF Amplifier Assembly A4 is defective, replace the assembly using the following procedure.

a. Set Mode Selector switch to OFF.

b. Set KCS controls on front panel to 111.

c. Loosen front panel screws and slide T-827B/URT to locked-out position.

d. Loosen four screws at the corners of the RF Amplifier Assembly and lift assembly from chassis. Check position of coupler slots on chassis. Slots should be perpendicular to the front panel. If slots are not aligned properly, refer to paragraph 5-95 for alignment procedure.

e. Before plugging in spare assembly, position both shaft couplers on bottom of assembly to 1 position (coupler index pins pointing toward the T-827B/URT front panel when assembly is in its normal installed position).

f. Plug assembly into chassis and press down firmly on top of assembly to ensure positive seating into connectors.

g. Rotate the 100 KCS control and the 10 KCS control to 9 and then back to 0. Observe two rotor board assemblies visible just inboard and between the two tubes in the rf amplifier. Rotating the 100 KCS control should cause top rotor board to turn. Rotating the 10 KCS control should cause bottom rotor board to turn.

h. Tighten four screws at the assembly corners.

5-41. Test Equipment for Adjustment. Electronic Voltmeter CCVO-91CA is required to adjust the RF Amplifier Assembly after repair or replacement.

5-42. Adjustment. After repair and reinstallation is completed, adjust the RF Amplifier Assembly as follows.

a. Terminate T-827B/URT as described in step g. of paragraph 5-23. Connect rf voltmeter from TP4 on RF Amplifier Assembly to chassis ground.

b. Apply power to T-827B/URT. Set Mode Selector switch on T-827B/URT to CW. Set MCS and KCS controls to 5.5550 MHz.

c. Key T-827B/URT at CW KEY jack. Adjust XMTR GAIN ADJ on top of rf amplifier for 2.25 volts on the rf voltmeter.

d. Set Mode Selector switch to OFF. Remove 50-ohm terminating resistor. Replace rf connector to AM-3007/URT.

5-43. FREQUENCY STANDARD ASSEMBLY A5. Frequency Standard Assembly A5 is depot-repairable. Aboard ship, if the Frequency Standard Assembly is found defective, replace it with a spare assembly. Perform the overall alignment of the T-827B/URT after the Frequency Standard Assembly is replaced. The alignment of the system may be affected by the change in amplitude of the 500-kHz signal fed to the Mode Selector Assembly to be used as the modulated local carrier in all modes of operation.

EMERGENCY OPERATION

If the malfunction to the Frequency Standard Assembly is caused by failure of the 5-MHz oscillator, the T-827B/URT can be operated by setting the COMP/INT/EXT switch on top of the assembly to EXT and connecting an external 5-MHz source to EXT 5 MC IN jack J25 at the rear of the T-827B/URT case.

5-44. Removel and Replacement. If Frequency Standard Assembly A5 is defective, replace the assembly using the following procedure.

a. Set Mode Selector switch to OFF. Loosen front panel screws and slide T-827B/URT chassis to locked-out position.

b. The Frequency Standard Assembly is located at right rear of chassis. Loosen two corner screws on top of assembly and lift assembly from the chassis.

c. Align guide pin holes on base of spare Frequency Standard Assembly with T-827B/URT chassis guide pins, and plug assembly into J9.

d. Tighten two corner fastening screws to secure assembly.

5-45. Test Equipment Required for Adjustment. Frequency Standard AN/URQ-9 is required to adjust the Frequency Standard Assembly after replacement.

5-46. Adjustment. Perform the 5-MHz oscillator adjustment procedure described in paragraph 5-16.

5-47. TRANSLATOR/SYNTHESIZER ASSEMBLY A6. Translator/Synthesizer Assembly A6 is depot-repairable. Aboard ship, if the assembly is found defective, replace it with a spare assembly. Perform the overall alignment of the T-827B/URT after the Translator/Synthesizer Assembly is replaced. The output amplitude of the T-827B/URT may be affected after a replacement

Translator/Synthesizer Assembly is installed due to the change in excitation to RF Amplifier Assembly A4 from Translator Subassembly A6A6 in the replacement assembly.

5-48. Removal and Replacement. To replace the Translator/Synthesizer Assembly with a new assembly, proceed as follows.

a. Set Mode Selector switch to OFF. Loosen front panel and slide T-827B/URT chassis to locked-out position.

b. Loosen four screws at corners of Translator/Synthesizer Assembly.

c. Rotate KCS controls on front panel to 111. Carefully lift out Translator/Synthesizer Assembly. Rotate KCS controls to 000. Check to see that slots in chassis couplers point toward, and are perpendicular to, rear chassis panel. If slots are not aligned properly, refer to paragraph 5-95 for alignment procedure.

d. Rotate couplers on bottom of replacement Translator/Synthesizer Assembly so that numeral 0 is aligned with arrow index on bottom of assembly. Plug assembly into chassis.

e. Apply slight finger pressure to top of assembly and rotate KCS controls to 0 and then back to 0. Tighten four screws at corners of Translator/Synthesizer Assembly.

5-49. Test Equipment Required for Adjustment. Electronic Voltmeter CCVO-91CA is required to adjust the Translator/Synthesizer Assembly after replacement.

5-50. Adjustment. After replacement of the Translator/Synthesizer Assembly is completed, adjust the T-827B/URT as follows.

a. Terminate T-827B/URT as described in step g. of paragraph 5-23. Connect rf voltmeter from TP4 on RF Amplifier Assembly to chassis ground.

b. Apply power to T-827B/URT. Set Mode Selector switch to CW. Set MCS and KCS controls to 5.5555 MHz.

c. Key T-827B/URT at CW KEY jack. Adjust XMTR GAIN ADJ on top of rf amplifier for 2.25 volts on the rf voltmeter.

d. Turn Mode Selector switch to OFF. Remove 50-ohm terminating resistor and reconnect the system for normal operation. Perform the alignment procedure for the AM-3007/URT.

5-51. CODE GENERATOR ASSEMBLY A7. The Code Generator Assembly A7 furnished with the T-827B/URT is a five-deck printed circuit board assembly. This assembly may be used in the R-1051B/URR receiver. When a five deck assembly is used in the receiver, the center printed circuit board (A7A3) is not utilized.

5-52. Removal and Replacement. If Code Generator Assembly is defective, replace assembly using the following procedure.

a. Remove power from T-827B/URT.

b. Rotate Mode Selector switch to OFF. Set MCS controls to 11.

c. Loosen front panel screws and slide T-827B/URT chassis to locked-out position.

d. Remove RF Amplifier A4 and Translator/Synthesizer A6 Assemblies from chassis.

e. On each side of chassis, remove two screws which secure rear protective bracket (see figure 5-35).

f. Move protective bracket slightly away from front panel and chassis. Do not remove cable clamps from bracket.

g. From bottom of chassis, remove nuts that secure plug A7P1 to receptacle J8 and separate these connectors.

h. From bottom of chassis, remove two screws that secure Code Generator Assembly A7 to chassis.

i. At top of chassis, carefully pull and hold rear protective bracket away from front panel, and remove partially hidden captive screw A7H1 (figure 5-49) which still secures assembly A7 to chassis.

j. On spare Code Generator Assembly, set couplers to approximately mate with key pins on MHz detent wheel.

k. Install spare Code Generator Assembly into mounting position and rock MCS controls until both couplers are mated.

l. Complete replacement procedure by reversing removal sequence.

5-53. Repair Procedure. Code Generator Assembly A7 is not supported by piece parts. If the assembly cannot be repaired without replacement of parts (except connector), replace the assembly. Since most malfunctions will consist of open spring-finger contacts, this assembly can usually be repaired. Refer to paragraph 4-49 for troubleshooting procedure and fault isolation data. When the malfunction is isolated, repair defect.

CAUTION

Ensure that each finger of rotor contact makes contact at the same degree of rotation (imaginary line drawn through center of shaft and two or three fingers of rotor contact). When reassembling, ensure that all spacers and washers are replaced.

5-54. DC POWER SUPPLY (A8 AND ASSOCIATED COMPONENTS). Power Supply Assembly A8 is mounted at the bottom left rear corner of the T-827B/URT chassis. This assembly is a printed circuit board which is bolted to the chassis and soldered to the external circuitry. The T-827B/URT requires +110 Vdc, +28 Vdc, +20 Vdc, +12 Vdc, and +4 Vdc to operate. In addition to the A8 assembly, the components needed to produce these operating voltages are:

a. Series regulator transistor Q1, located just inboard of the A8 assembly board (figure 5-50).

b. AC primary power transformer T1, +110Vdc filter L1, and +28-Vdc filter L2 located at the top left rear corner of the chassis (figure 5-35).

c. The +110-Vdc bleeder resistor R1, filter capacitor C1, and the +28-Vdc bleeder resistor, R2, located on the bottom of the chassis (figure 5-36).

d. The +12-Vdc microphone supply circuit, R3, C3, and CR8, located on the bottom of the chassis (figure 5-36).

e. The 4-Vdc Power Supply Assembly A16 is located behind the front panel (figure 5-40). This assembly contains diode A16CR1 and capacitor A16C1. Voltage dropping resistor R5 for this supply is mounted on the rear protective bracket behind and to the left of A16. Repair procedures for this Power Supply Assembly are described in paragraph 5-81.

5-55. Removal and Replacement. Repair of the power supply printed circuit boards and components usually will consist of parts replacement. If either printed circuit board is damaged, the entire board may require replacing. Do not disconnect either board until a replacement is available.

CAUTION

Series regulator transistor Q1 is insulated from the chassis. Do not discard the insulated washers and bushings which are needed to insulate the transistor when Q1 is replaced.

5-56. Test Equipment Required for Adjustment. Multimeter AN/PSM-4( ) is required to adjust the dc power supply after a repair is completed.

5-57. Adjustment. After repairs to the power supply circuits, perform the 20-Vdc regulator adjustment procedure described in paragraph 5-11.

5-58. FSK TONE GENERATOR ASSEMBLY A9. Before attempting to repair the FSK Tone Generator Assembly A9, consult the maintenance code in the Allowance Parts List (APL) to determine whether the assembly is depot-repairable or ship- or station-repairable. If the assembly is depot-repairable and a spare is available, remove and replace the defective assembly.

5-59. Removal and Replacement. Loosen front panel screws and slide T-827B/URT chassis to the locked-out position. The FSK tone generator is located at the left rear of chassis. Loosen two corner fastening screws and unplug assembly from chassis. Plug in new assembly and tighten two fastening screws.

5-60. Repair Procedure. Place FSK Tone Generator Assembly A9 on its side, remove three dust cover screws, and lift off dust cover. Clean assembly of dust and foreign matter. Inspect for defective components, frayed wiring, burned components, and loose connections or connectors. (see figures 5-51 and 5-52 for component location.)

5-61. Test Equipment Required for Adjustment. Oscilloscope AN/USM-281 and Frequency Counter AN/USM-207 are required to adjust the FSK tone generator after replacement.

5-62. Post Repair and Adjustment. After repair, replace any connections removed and replace dust cover. Plug assembly into chassis and tighten fastening screws. Then adjust the FSK Tone Generator Assembly as follows.

a. Terminate T-827B/URT as described in step g. of paragraph 5-23.

b. Apply power to T-827B/URT controls as follows.

1. Mode Selector switch to FSK

2. USB LINE LEVEL switch +10 DB

3. MCS and KCS controls to 8.0000 MHz

4. LOCAL/REMOTE switch to REMOTE

5. Interlock switch pulled up

6. AUX/NORM switch to NORM.

c. Patch a tty signal to the equipment. Energize tty loop.

d. Connect oscilloscope to OUTPUT LEVEL test point TP2 on top of FSK Tone Generator Assembly. Adjust OUTPUT LEVEL potentiometer R26 on top of assembly for a 1.0-volt peak-to-peak on oscilloscope. Disconnect oscilloscope from TP2.

e. Connect frequency counter to TP4 on RF Amplifier Assembly A4 (T-827B/URT output).

f. Set CRT FREQ switch S1 on FSK Tone Generator Assembly to 2000. Set tty equipment for a "MARK" condition.

g. Adjust 2425 CPS potentiometer R10 for 8.002425 MHz ±121 Hz on frequency counter.

h. Set tty equipment for a space signal. Adjust 1575 CPS potentiometer R8 for an indication of 8.001575 MHz ±78 Hz on frequency counter.

i. Set CRT FREQ switch S1 on FSK Tone Generator Assembly to 2550. Adjust 2125 CPS potentiometer R13 for 8.002125 MHz ±106 Hz on frequency counter.

j. Set tty equipment for a mark signal. Adjust 2925 CPS potentiometer R12 for 8.002975 MHz ±148 Hz on frequency counter.

k. Disconnect test equipment and reconnect system for normal operation.

5-63. METER AMPLIFIER ASSEMBLIES A10 (LSB) AND A11 (USB). Meter Amplifier Assemblies A10 and A11 (figure 5-40) are bracket-mounted in the rear of the T-827B/URT front panel just inboard of the LINE LEVEL meters. These assemblies are identical. The left-hand printed circuit board is LSB meter amplifier A10. The right-hand board is USB meter amplifier A11. Consult the Allowance Parts List (APL) to determine whether these assemblies are supported at the board level or at the component level. Do not attempt repairs unless replacement parts are available. Remove and replace the entire board if a spare board is available.

5-64. Removal and Replacement. To replace the entire board or a component proceed as follows.

a. Set KCS controls on T-827B/URT front panel to 555. Set T-827B/URT Mode Selector switch to OFF. Tuen AM-3007/URT PRIMARY POWER circuit breaker to OFF.

WARNING

Remove all power from the T-827B/URT. When removing and replacing the Meter Amplifier Assemblies the technician may contact the Mode Selector switch. 115 Vac is applied to all positions of this switch when power is applied to the T-827B/URT.

b. Loosen front panel screws and slide T-827B/URT chassis to locked-out position.

c. Remove RF Amplifier Assembly A4 and Translator/Synthesizer Assembly A6 by loosening four fastening screws on each assembly and lifting assembly from chassis.

d. On each side of chassis, remove two screws which secure rear protective bracket (see figure 5-35). Move bracket back to obtain access to meter amplifier mounting bolts.

e. Each meter amplifier mounting bracket is mounted to the front panel with two screws. Remove meter amplifier printed circuit board cover for access to hex nuts which fasten assembly support brackets. Remove hex nuts and washers and move meter amplifier back for component or board replacement.

NOTE

After repair, or after substituting a spare board, carefully check all wiring before proceeding.

f. Reinstall assembly mounting bracket and board. Replace nex nuts and washers removed in e. above, and tighten nuts to mounting bolts.

g. Reinstall cover.

h. Move rear protective bracket in place, and replace and tighten mounting screws.

i. Reinstall RF Amplifier and Translator/Synthesizer Assemblies.

5-65. Repair Procedure. The cover of each meter amplifier printed circuit board illustrates the location of component parts. If the entire board is to be replaced, tag all wires as they are removed. Refer to table 5-2 to check wiring after repair or replacement and before reassembly.

5-66. Test Equipment Required for Checkout. Two-Tone Generator SG-376A/U and Electronic Voltmeter ME-6C/U are required to checkout the Meter Amplifier Assembly after repair or replacement.

5-67. Checkout Procedure. Check the operation of a repaired or replaced Meter Amplifier Assembly as follows.

a. Turn AM-3007/URT PRIMARY POWER circuit breaker to ON. Set T-827B/URT Mode Selector switch to USB or LSB (depending upon which Meter Amplifier Assembly is to be checked out. Set LOCAL/REMOTE switch to REMOTE.

b. Connect two-tone audio generator to USB or LSB AUDIO IN 600 OHM jack, J5 or J6, on the rear of T-827B/URT. Connect ac voltmeter to measure output of two-tone audio generator.

c. Key T-827B/URT. Adjust two-tone audio generator for 1000 Hz, 190 mV on tone A. Set tone B for 1700 Hz at 190 mV. Set to AB two-tone, and adjust for 240 mV output.

d. Set LSB and USB LINE LEVEL switches to -10 DB, and check to see that LINE LEVEL meter of amplifier being checked indicates 0 ±1 dB.

e. Adjust two-tone audio generator for 150-mV output. Check to see that LINE LEVEL meter indicates -4 ±1 dB.

NOTE

The 150-mV (-4 dB) input is the standard two-tone audio input to the T-827B/URT.

f. Remove test equipment and restore system to normal operation.

5-68. IF. AMPLIFIER ASSEMBLY A12. IF. Amplifier Assembly A12 is mounted at the rear center of the T-827B/URT chassis. Before attempting a repair, refer to the equipment Allowance Parts List (APL) to determine whether the assembly is depot-repairable or ship-or-station-repairable. If the assembly is depot-repairable and a spare is available, remove and replace the defective assembly.

5-69. Removal and Replacement. Loosen front panel screws and slide T-827B/URT chassis to locked-out position. Loosen the two corner fastening screws and unplug IF. Amplifier Assembly from chassis. Plug in new assembly and tighten fastening screws.

NOTE

After the IF. Amplifier Assembly is repaired or replaced, the overall alignment procedure for the T-827B/URT (paragraph 5-21) to ensure proper setting of if. amplifier GAIN ADJ A12R15.

5-70. Repair Procedure. Unlatch Dzus fasteners on either side of assembly and remove dust covers. Clean assembly of dust and other foreign matter. Inspect for broken or burned components, frayed or broken wiring, and loose connections or connectors. Do not remove a suspected defective component until a replacement component is available for installation.

5-71. Test Equipment Required for Adjustment. The following test equipment is required to adjust the IF. Amplifier Assembly after repair or replacement.

a. Electronic Voltmeter CCVO-91CA

b. Frequency Counter AN/USM-207

c. RF Signal Generator CAQI-606A

d. Extender Cable 666243-071

5-72. Post Repair and Adjustment. After repair, replace all connections removed and inspect for poor connections and loose connectors and inserts. The following adjustment and alignment procedure need not be performed if the entire IF. Amplifier Assembly is replaced. The procedure is necessary to ensure correct alignment only after repairs to a component or components.

a. Loosen two corner fastening screws and unplug Mode Selector Assembly A1.

b. Terminate the T-827B/URT as described in step g. of paragraph 5-23.

c. Pull Interlock switch up. Set Mode Selector switch to CW. Set LOCAL/REMOTE switch to LOCAL. Set AM-3007/URT PRIMARY POWER circuit breaker to ON. Set T-827B/URT front panel controls to 8.0000 MHz.

d. Set frequency of rf signal generator to 500 kHz. Lock-key the T-827B/URT at CW KEY jack.

e. Adjust rf signal generator output to 3.0 mV, using rf voltmeter as an indicator.

f. Connect rf voltmeter to TP2 on IF. Amplifier Assembly. Adjust GAIN ADJ R15 on top of assembly for 20 mV. Tune rf signal generator for maximum on rf voltmeter.

g. Connect rf voltmeter to TP4 on RF Amplifier Assembly A4, and adjust XMTR GAIN ADJ on A4 for 2.25 volts output from T-827B/URT.

h. Disconnect rf voltmeter from TP4 on RF Amplifier Assembly and connect frequency counter to TP4. Adjust rf signal generator to obtain 8.0000 MHz ±100 Hz on frequency counter.

i. Connect rf voltmeter to TP2 on IF. Amplifier Assembly. Note reading on dB scale. This reading will be the 0-dB reference reading in the following steps.

j. Increase frequency of rf signal generator until reading on rf voltmeter drops 3 dB. Record frequency indicated on frequency counter.

k. Decrease rf signal generator frequency until indication on rf voltmeter increases to reference reading and then drops off 3 dB. Record frequency indicated on frequency counter.

l. Add readings recorded in steps j. and k., and divide by two. The result should be 8.0000 MHz ±100 Hz.

m. Subtract reading (k.) from reading (j.). The result should be between 20 kHz and 40 kHz.

NOTE

If satisfactory results were obtained in steps (l.) and (m.) above, the IF. Amplifier Assembly is properly aligned. If satisfactory results were not obtained, alignment is needed. Proceed to next step.

n. Loosen two corner fastening screws and unplug IF. Amplifier Assembly from T-827B/URT chassis. Connect assembly to the chassis receptacle J15 using extender cable 666243-071. Unlatch Dzus fasteners and remove dust covers. Position assembly with component side up.

o. Set rf signal generator frequency as close to 500 kHz as possible by observing the 8.000000 MHz output on the frequency counter at TP4 of the RF Amplifier Assembly. (An output of 8.000000 MHz indicates that rf signal generator frequency is exactly 500 kHz.)

p. Connect rf voltmeter to TP2 on IF. Amplifier Assembly. Adjust GAIN ADJ R15 on top of assembly for 10 mV.

q. Tune transformers T1 and T2 on the if. amplifier printed circuit board for maximum on rf voltmeter. After adjustment of T1 and T2 is completed, readjust GAIN ADJ R15 for 20 mV.

r. Turn T-827B/URT Mode Selector switch OFF. Remove extender cable and plug IF. Amplifier and Mode Selector Assemblies back into T-827B/URT chassis.

s. Remove test equipment and reconnect system for normal operation.

5-73. LIGHT PANEL ASSEMBLY A13. Light Panel Assembly A13 is attached to the rear of the T-827B/URT front panel just above the MCS and KCS controls. The light panel contains the sockets and lamps to illuminate the MCS and KCS digit indicator windows. Since the high internal resistance lamps are connected in parallel, if one lamp burns out the other lamp will operate at a brighter level. To prevent the remaining lamp from burning out shortly after the first failure, replace defective lamps as soon as possible.

5-74. Replacement of Right Panel Lamp. The right panel lamp is located between the 1 KCS and the 10 KCS controls. Replace this lamp as follows.

a. Disconnect power to equipment at bulkhead distribution panel.

WARNING

Remove power to the T-827B/URT to prevent the technician from contacting 115-Vac primary power.

b. Loosen front panel screws and slide T-827B/URT chassis to locked-out position.

c. Set front panel MCS and KCS controls to 15.555 MHz.

d. Loosen four fastening screws on Translator/Synthesizer Assembly and unplug assembly from chassis.

e. Replace the defective panel lamp. Make sure lamp is tight in socket.

f. Reinstall Translator/Synthesizer Assembly.

g. Slide chassis back into the case and tighten front panel screws.

h. Restore power to equipment and check for normal operation.

5-75. Replacement of Left Panel Lamp. The left panel lamp is located between the 1 MCS and 10 MCS controls. Replace this lamp as follows.

a. Disconnect power to equipment at bulkhead distribution panel.

b. Loosen front panel screws and slide T-827B/URT chassis to locked-out position.

c. Set front panel MCS and KCS knobs to 15.555 MHz.

d. Loosen four fastening screws on Translator/Synthesizer Assembly and on RF Amplifier Assembly. Unplug both assemblies from chassis.

e. Remove Code Generator Assembly A7 (refer to paragraph 5-52).

f. Replace defective panel lamp. Make sure lamp is tight in socket.

g. Reinstall the Code Generator Assembly, RF Amplifier Assembly, and Translator/Synthesizer Assembly.

h. Slide chassis back into case and tighten front panel screws.

i. Restore power to equipment and check for normal operation.

5-76. HANDSET FILTER ASSEMBLY A14. Handset Filter Assembly A14 (figure 5-40) is mounted at the left rear of the T-827B/URT front panel behind HANDSET jack J1. External wire connections are soldered to the assembly. Consult the equipment Allowance Parts List (APL) to determine whether the entire assembly or a component part is available as a replacement.

5-77. Removal and Replacement. The Handset Filter Assembly is made accessible for replacement of the entire assembly or component parts as follows.

a. Turn T-827B/URT Mode Selector switch to OFF.

b. Loosen front panel screws and slide T-827B/URT chassis to locked-out position.

c. Remove two screws on right side of HANDSET jack mounting plate. These screws also support the handset filter assembly. Observe which screw is longer than the other.

d. Lift the Handset Filter Assembly up to make it accessible for replacement or repair.

e. After repairs are completed, position the assembly in place and check to see that no wires are pinched.

f. Replace mounting screws according to correct lengths. Tighten screws.

g. Slide chassis back into case and tighten front panel screws.

h. Apply power to T-827B/URT and check for normal operation.

5-78. IF. FILTER ASSEMBLY A15. IF. Filter Assembly A15 is located at the rear center under the T-827B/URT chassis (figure 5-36). The assembly is mounted perpendicular to the chassis on two standoffs. External wire connections are soldered to the assembly. Consult the equipment Allowance Parts List (APL) to determine whether this assembly is supported at the assembly or at the component level.

5-79. Removal and Replacement. The IF. Filter Assembly is made accessible for repair or replacement by removing two screws, one at either end, which secure the assembly. The assembly can then be moved outward away from the chassis. To replace the assembly, set in place, check that no wires are pinched, and replace two mounting screws.

5-80. Repair Procedure. The IF. Filter Assembly is repaired or replaced as follows.

a. Turn T-827B/URT Mode Selector switch to OFF.

b. Loosen front panel screws and slide T-827B/URT chassis to the fully-extended position. Tilt chassis perpendicular to expose bottom.

c. See figure 5-57 for component locations on the board. The schematic diagram of the assembly is shown in figure 5-13. Connections to the board are listed in table 5-2.

d. After repair is completed and assembly is replaced, slide chassis back into case and tighten front panel screws.

e. Apply power to T-827B/URT and check for normal operation.

5-81. 4-Vdc POWER SUPPLY ASSEMBLY A16. The 4-Vdc Power Supply Assembly A16 is mounted at the right rear of the T-827B/URT front panel (figure 5-40). The assembly is attached to the CPS switch by two screws which fasten the board to two standoffs. Zener diode A16CR1, and filter capacitor A16C1 are mounted on the board. Resistor R5, part of this circuit, is heat sink-mounted to the rear protective support bracket just to the left and behind A16.

NOTE

In early models of the T-827B/URT, resistor R5 is not used. Instead, this resistor is mounted on the 4-Vdc Power Supply Assembly, and is designated A16R1.

5-82. Removal and Replacement. The rear protective support bracket upon which R5 is mounted must be unfastened to permit access to the A16 assembly and to resistor R5. Proceed as follows.

WARNING

Remove power to the equipment at the bulkhead distribution panel to prevent contact with the 115 Vac at the front panel and at the interlock switch.

a. Loosen front panel screws and slide T-827B/URT chassis to the fully-extended position.

b. Set front panel MCS and KCS controls to 15.555 MHz.

c. Loosen four corner fastening screws on RF Amplifier Assembly A4 and Translator/Synthesizer Assembly A6 and remove assemblies from chassis.

d. On each side of chassis, remove two screws which secure rear protective bracket (see figure 5-35). Move bracket back to obtain access to the 4-Vdc Power Supply Assembly or to R5.

NOTE

If only R5 is replaced, proceed to step h. below.

e. Remove two screws and washers which attach the A16 assembly to the CPS switch. The assembly is now available for replacement or repair.

f. After repairs are completed, the A16 assembly in place and check to see that no wires are pinched.

g. Reinstall A16 assembly and tighten mounting screws.

h. Move rear protective bracket in place and replace and tighten mounting screws.

i. Reinstall RF Amplifier and Translator/Synthesizer Assemblies.

5-83. Repair Procedure. Inspect the assembly for cracked conductors and frayed or broken wiring. Replace either the printed circuit board or the defective component as supported by the Allowance Parts List (APL).

5-84. Test Equipment Required for Checkout. Multimeter AN/PSM-4( ) is required to checkout the 4-Vdc Power Supply Assembly after repair or replacement.

5-85. Checkout Procedure. Check the operation of a repaired or replaced 4-Vdc Power Supply Assembly as follows.

a. Turn primary power on. Set T-827B/URT Mode Selector switch to LSB.

b. Use multimeter to measure voltage at either end of R5. The left terminal should measure +20 Vdc. The right terminal should measure +4 Vdc.

5-86. T-827B/URT CASE. The case houses the T-827B/URT chassis and contains all wiring, connectors, and components necessary to interconnect the chassis to its external power, signal, and control circuitry. The T-827B/URT case contains Filter Box Assembly A1; connectors A1J3, A1J4, A1J5, A1J6 and A1J7; connectors J23, J24, and J25; and connectors P1 and P2 (see figures 5-38 and 5-37). The Filter Box Assembly, cable harness, and all case connectors are wired together and must be removed as a unit to affect a repair or a replacement to these components. All connectors except P1 and P2 are visible at the rear of the T-827B/URT case. P1 and P2 are on the end of the cable harness which connects to the chassis (figure 5-37).

5-87. Removal and Replacement. To repair any of the case connectors, filter box capacitors, or defective wiring proceed as follows.

a. Disconnect equipment primary power at bulkhead distribution panel.

b. Loosen front panel screws, slide T-827B/URT chassis to locked-out position, and tilt to vertical position.

c. At rear of chassis, loosen three screws which fasten support plate for connectors P1 and P2. Unplug connectors from chassis. Remove cable harness support strap at rear of chassis.

d. Unlatch T-827B/URT chassis from left-hand and right-hand slides. Slide chassis out and set aside.

e. Unscrew eight hex nuts and washers and remove cable harness retaining channel located at inside top of case.

f. Unscrew holddown nuts for cable harness retaining brackets to free cable harness. The cable harness is fastened by eight nylon straps around its perimeter and by three 3/4-inch nylon hex nuts and a nylon cable guide near the right front of case.

g. At rear of case, remove retaining nuts and washers for connectors A1J3, A1J4, A1J5, A1J6, A1J7, J23, J24, and J25.

h. Remove cable harness and Filter Box Assembly.

i. To gain access to receptacles and filter feedthrough capacitors, remove 14 screws which fasten cover to filter box. Location of capacitors and connectors is marked on the Filter Box Assembly cover.

5-88. Repair Procedure. Refer to wiring table 5-2 for the Filter Box Assembly and to table 5-3 for the cable harness when repairing or replacing a component or wire.

5-89. Post Repair Procedure. After repair is completed, place equipment into operation as follows.

a. Reinstall Filter Box Assembly, cable harness, and connectors.

b. Reinstall cable harness retaining channel to inside top of case.

c. Position T-827B/URT chassis in case slides and slide chassis into latched vertical position. Plug P1 and P2 into chassis. Reinstall cable harness support strap at rear (bottom) of chassis.

d. Tilt chassis to horizontal and slide chassis back into case. Tighten front panel screws.

e. Reconnect equipment primary power and check T-827B/URT operation in mode desired.

5-90. KCS DIGITAL TUNE SYSTEM REPAIR AND ADJUSTMENT. This paragraph describes the procedure for removing the drive chains and for removing and disassembling the sprocket assemblies on the bottom of the T-827B/URT chassis. Removal of these components can be accomplished with the chassis in place on the slide mechanisms.

5-91. Removal Procedure. To remove the drive chains and sprocket assemblies, see figure 5-36, and proceed as follows.

a. Remove power from T-827B/URT. Loosen front panel screws and slide T-827B/URT chassis to locked-out position.

b. Remove RF Amplifier Assembly A4 and Translator/Synthesizer Assembly A6 from chassis.

c. Tilt chassis 90 degrees to expose bottom. Remove drive chains. Loosen three chain-tension idler gears and slide away from chains. Locate keeper clip on each drive chain. Carefully remove keeper clips and unthread chains.

d. Remove four nuts securing dual- and triple-sprocket assemblies to chassis and lift off sprocket assemblies.

e. To disassemble sprocket assemblies, remove two retaining rings located inside assembly housing and secured around shaft. Loosen coupler hub-clamp setscrews and punch out shaft from end opposite coupler. Separate sprocket assembly parts as they clear shaft.

5-92. Repair Procedure. To repair a defective sprocket assembly, proceed as follows.

a. Wipe all disassembled parts with dry, lint-free cloth. Inspect all parts for damage.

b. Replace worn parts. If metal springs no longer provide proper tension between associated parts, replace springs.

c. If shaft is scored, replace both coupler and shaft.

d. If detent springs are bent so that too much or too little tension results, replace detent springs.

e. If it was evident that proper clamping action was not maintained during equipment operation, replace hub clamp.

5-93. Reassembly Procedure. To reassemble sprocket assemblies, and to install sprocket assemblies and drive chains onto bottom of chassis after repair, proceed as follows.

a. Reassembly sprocket assemblies using new retaining rings in place of those removed. Do not tighten hub-clamp setscrews.

b. Secure sprocket assemblies in their respective positions on chassis with four nuts.

c. Thread drive chains onto gears. Fasten ends of each chain together with keeper clip.

5-94. Drive Chain Adjustment. After reassembly, the drive chain mechanism must be adjusted to assure proper relationship between front panel KCS controls, couplers, and the respective detent spring position in the sprocket assemblies. Loosen five hub-clamps on the dual- and triple-sprocket assemblies if entire system is being aligned. Loosen both 10 KCS coupler hub-clamps for 100-kHz alignment. Loosen 1 KCS coupler hub-clamp for 1-kHz alignment. To obtain proper positioning of front panel KCS controls with respect to the fully seated position of detent spring, adjust position of drive chain as follows.

a. Replace RF Amplifier Assembly A4 and Translator/Synthesizer Assembly A6. Make sure that all couplers are engaged properly.

b. For each KCS control, take slack out of associated drive chain by holding associated chain-tension idler gear against chain. If digit is centered in window, tighten chain-tension idler gear in that position and proceed to step d.

c. If digit is not centered in window, release chain-tension idler gear and slide gear away from chain. Lift drive chain away from gears and shift entire chain to position where front panel KCS control and digit above control remain fairly stationary when chain is tightened. Use trial - and - error method to determine proper chain position. When drive chain is positioned properly, tighten chain-tension idler gear securely against chain.

d. The dual sprocket assembly (MP9, figure 5-36) provides a means for making fine adjustment for 100 KCS and 10 KCS controls. Rotate 100 KCS and 10 KCS controls and observe detent action of dual sprocket assembly. Proper detent action is displayed by relatively smooth rotation of controls with full-seating detent action. If necessary, remove spacer under detent spring to increase spring tension, or add spacer to reduce spring tension.

e. If digit is still not centered in window when detent spring is fully seated, loosen two hex-head screws on wheel index engaged with detent spring. Wheel index provides seating position for detent spring. Press firmly on detent spring above roller. Do not allow wheel index to rotate. Rotate front panel KCS control until digit is exactly centered in window as desired. Release front panel control and detent spring. If digit moves from center of window, repeat procedure until digit is centered exactly in window. Finally, tighten hex-head screws on wheel index.

5-95. Coupler Adjustment. Once the drive chains have been adjusted to provide optimum detent positioning, the sprocket assembly couplers, which are operated by the KCS controls, must be adjusted for proper electromechanical alignment between the electronic assemblies and the drive chain mechanism. To adjust the couplers, proceed as follows.

a. Remove RF Amplifier Assembly A4 and Translator/Synthesizer Assembly A6 from chassis.

b. Set 100 KCS and 10 KCS controls to 1. Insert screwdriver in coupler adjustments in dual-sprocket assembly (figure 5-36) and rotate couplers so that slot in each coupler points toward, and is perpendicular to, front panel.

c. Tighten hub-clamp setscrews on dual sprocket assembly.

d. Set 100 KCS, 10 KCS, and 1 KCS controls to 0. Insert screwdriver in respective coupler adjustments in triple-sprocket assembly MP8 (figure 5-36), and rotate couplers so that each coupler slot points toward, and is perpendicular to, rear panel.

e. Tighten hub-clamp setscrews on triple-sprocket assembly.

f. Set KCS controls to 1. Replace RF Amplifier Assembly A4 and Translator/Synthesizer Assembly A6.

g. Loosen associated hub coupler on dual-sprocket assembly and move coupler to allow full insertion of rod. Tighten hub clamp.

h. Restore T-827B/URT to normal operating condition.

5-96. MCS DIGITAL TUNE SYSTEM MECHANICAL ADJUSTMENT. The MCS digital tune system is adjusted to provide adequate detent pressure and switch contact positioning to the two MCS controls. Proceed as follows.

a. To adjust detent pressure on either of the MCS controls, loosen two screws mounting the detent spring. Loosen two nuts on top of the detent spring mounting block. Adjust angle of block for required detent pressure and tighten two nuts. If necessary, add or remove spring spacers.

b. To adjust positioning of the detent, set MCS control to 0 and tighten detent spring while ensuring that digit stays in center of window. Turn Mode Selector switch to an operate mode and set MCS controls to 02 through 29 to ensure that the rf amplifier turret rotates to the same frequency.

c. If any frequency does not set up properly, apply slight pressure on each MCS control in each direction to note if correct frequency setup is obtained.

d. If correct frequency setup is obtained, loosen that detent spring and readjust spring position to correct condition.

e. If proper frequency setup cannot be obtained, repeat steps a., b., and c.

5-97. CHASSIS AND FRONT PANEL COMPONENT REPLACEMENT. Table 5-2 lists the wire run for all components on the chassis and front panel of the T-827B/URT. Table 5-3 lists the wire run for the cable harness from the T-827B/URT case to chassis. Refer to these tables and to the terminal connections shown in figure 5-13, sheet 2 when replacing the following components

a. All relays, K1 through K6.

b. LSB and USB LINE LEVEL meters M1 and M2.

c. REMOTE/LOCAL switch S1.

d. Mode Selector switch S2.

e. CPS switch S6.

f. Local ISB HANDSET switch S9, LSB LINE LEVEL switch S10, and USB LINE LEVEL switch S11.

g. Fuseholders XF1 and XF2.

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
1	32	BARE	S2-A-1F	S2-A-12F	
2	32	BARE	S2-A-1F	S2-A-3F	
3	70	WHT-VIO-GRY	S2-A-12F	E13	
4	32	BARE	S2-A-3F	S2-A-3R	
5	32	BARE	S2-A-3R	S2-A-6R	
6	35	WHT-BLK-BRN	S2-A-2F	J17-10	
7	32	BARE	S2-A-5F	S2-A-10F	
8	69	WHT-BLU-GRY	S2-A-10F	J20-1	
9	33	20 SHLD 101	S2-A-6F	XF1-2	
10	71	WHITE	SHLD OF 9	SHLD OF 11	At S2
11	33	20 SHLD 102	S2-A-7F	T1-6	
12	68	WHT-BLU-VIO	S2-A-11F	E15	
13	36	WHT-BLK-RED	S2-A-2R	E17	
14	37	WHT-BLK-ORN	S2-A-4R	J17-7	
15	38	WHT-BLK-YEL	S2-A-5R	E18	
16	32	BARE	S2-A-8R	S2-B-10R	
17	16	COAX 1	S2-A-9R	E41	
18	71	WHITE	SHLD OF 17	SHLD OF 48	At S2
19	32	BARE	S2-D-2F	S2-D-9F	
20	16	COAX 2	S2-D-2F	J20-4	
21	71	WHITE	SHLD OF 20	SHLD OF 22	At S2
22	16	COAX 3	S2-D-3F	J18-20	
23	71	WHITE	SHLD OF 22	SHLD OF 30	At S2
24	71	WHITE	SHLD OF 22	SHLD OF 66	At J18
25	71	WHITE	SHLD OF 22	SHLD OF 126	At J18
26	32	BARE	S2-D-3F	S2-D-4F	
27	32	BARE	S2-D-4F	S2-D-7F	
28	32	BARE	S2-D-7F	S2-D-8F	
29	32	BARE	S2-D-5F	S2-D-6F	
30	16	COAX 4	S2-D-6F	S1-1-10R	
31	71	WHITE	SHLD OF 30	SHLD OF 92	At S1
32	33	20 SHLD 103	S2-B-10F	S8-1NO	

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
33	71	WHITE	SHLD OF 32	SHLD OF 36	At S2
34	71	WHITE	SHLD OF 32	SHLD OF 135	At S8
35	71	WHITE	SHLD OF 32	SHLD OF 160	At S8
36	33	20 SHLD 104	S2-B-11F	XF2-1	
37	71	WHITE	SHLD OF 36	SHLD OF 41	At S2
38	71	WHITE	SHLD OF 36	SHLD OF 132	At XF2
39	52	WHT-RED-GRN	S1-B-7F	J21-39	
40	35	WHT-BLK-BRN	E11	E23	
41	33	20 SHLD 106	S2-B-12F	J21-41	
42	71	WHITE	SHLD OF 41	SHLD OF 43	At S2
43	33	20 SHLD 107	S2-B-12F	S1-B-10R	
44	71	WHITE	SHLD OF 43	SHLD OF 103	At S1
45	39	WHT-BLK-GRN	S2-B-2R	S1-B-6R	
46	40	WHT-BLK-BLU	S2-B-4R	K4-4	
47	32	BARE	S2-B-6R	S2-C-4R	
48	16	COAX 5	S2-B-10R	S1-B-10F	
49	71	WHITE	SHLD OF 48	SHLD OF 52	At S2
50	16	COAX 6	S2-B-11R	E43	
51	71	WHITE	SHLD OF 50	SHLD OF 150	At E43
52	16	COAX 7	S2-B-12R	S9-5	
53	32	BARE	S2-C-1F	S2-C-4F	
54	32	BARE	S2-C-4F	S2-C-7F	
55	32	BARE	S2-C-7F	S2-C-9F	
56	67	WHT-GRN-GRY	S2-C-9F	E22	
57	32	BARE	S2-C-3F	S2-C-11F	
58	41	WHT-BLK-VIO	S2-C-3F	E23	
59	42	WHT-BLK-GRY	S1-B-9F	K4-3	
60	43	WHT-BRN-RED	S2-C-6F	E19	
61	44	WHT-BRN-ORN	S2-C-2R	E39	
62	45	WHT-BRN-YEL	S2-C-3R	K5-6	
63	46	WHT-BRN-GRN	S2-C-3R	J21-20	

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
64	32	BARE	S2-C-6R	S2-C-8R	
65	32	BARE	S2-C-8R	S2-C-12R	
66	16	COAX 8	S2-C-12R	J18-9	
67	71	WHITE	SHLD OF 66	SHLD OF 70	At S2
68	71	WHITE	SHLD OF 66	SHLD OF 150	At J18
69	66	WHT-GRN-VIO	S2-C-9R	S1-2-2R	
70	16	COAX 9	S2-C-10R	S1-1-6R	
71	71	WHITE	SHLD OF 70	SHLD OF 91	At S1
72	65	WHT-GRN-BLU	S2-C-11R	A8-11	
73	34	WHITE TP1	S1-A-1F	J20-3	
74	34	BLACK TP1	S1-A-5F	J20-2	
75	71	WHITE	SHLD OF 73 and 74	SHLD OF 77 and 78	At S1
76	71	WHITE	SHLD OF 73 and 74	E33	At J20
77	34	BLACK TP2	S1-A-2F	E6	
78	34	WHITE TP2	S1-A-10F	E4	
79	71	WHITE	SHLD OF 77 and 78	SHLD OF 81 and 82	At S1
80	71	WHITE	SHLD OF 77 and 78	SHLD OF 309 and 310	At E6 and E4
81	34	BLACK TP3	S1-A-3F	J21-38	
82	34	WHITE TP3	S1-A-11F	J21-22	
83	16	COAX 10	S1-A-7F	J21-8	
84	71	WHITE	SHLD OF 83	SHLD OF 85	At S1
85	16	COAX 11	S1-A-9F	J19-20	
86	71	WHITE	SHLD OF 85	SHLD OF 115	At J19
87	71	WHITE	SHLD OF 85	SHLD OF 88	At J19
88	16	COAX 12	S1-A-2R	J19-9	
89	71	WHITE	SHLD OF 88	E37	At J19
90	71	WHITE	SHLD OF 88	SHLD OF 93	At S1
91	16	COAX 13	S1-A-4R	J21-34	
92	16	COAX 14	S1-A-8R	J21-10	

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
93	16	COAX 15	S1-A-12R	J21-11	
94	16	COAX 16	S1-B-1F	A14-C2-2	DIRECT
95	71	WHITE	SHLD OF 94	SHLD OF 48	At S1
96	47	WHT-BRN-BLU	S1-B-2F	J1-E	
97	48	WHT-BRN-VIO	S1-B-3F	J21-5	
98	49	WHT-BRN-GRY	S1-B-5F	K4-7	
99	50	WHT-RED-ORN	S1-B-6F	E40	
100	51	WHT-RED-YEL	S1-B-3R	J21-47	
101	32	BARE	S1-B-4R	S1-B-12R	
102	52	WHT-RED-GRN	S1-B-4R	J21-19	
103	33	20 SHLD 108	S1-B-8R	J21-45	
104	53	WHT-RED-BLU	S1-B-11R	J2-3	
105	46	WHT-BRN-GRN	A16(A)-2	S6-2R	
106	55	WHT-RED-GRY	J12-21	A16(A)-3	
107	54	WHT-RED-VIO	J12-17	S6-5R	
108	56	WHT-ORN-YEL	A16(A)-1	J12-14	
109	57	WHT-ORN-GRN	S6-8F	J12-13	
110	58	WHT-ORN-BLU	A16(A)-1	E42	DIRECT
111	59	WHT-ORN-VIO	S10-4	A10-6	DIRECT
112	32	BARE	S10-4	S10-3	
113	60	WHT-ORN-GRY	S10-1	A10-5	DIRECT
114	61	WHT-YEL-GRN	S10-5	A10-1	DIRECT
115	16	COAX 17	S10-2	J19-25	
116	69	WHT-BLU-GRY	J12-15	S6-10F	
117	62	WHT-YEL-BLU	A10-2	E24	
118	63	WHT-YEL-VIO	A10-2	A11-2	
119	64	WHT-YEL-GRY	M1-2	A10-4	DIRECT
120	35	WHT-BLK-BRN	M1-2	E40	DIRECT
121	36	WHT-BLK-RED	M1-1	A10-3	DIRECT
122	37	WHT-BLK-ORN	S11-4	A11-6	DIRECT
123	32	BARE	S11-4	S11-3	
124	38	WHT-BLK-YEL	S11-1	A11-5	DIRECT

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
125	39	WHT-BLK-GRN	S11-5	A11-1	DIRECT
126	16	COAX 18	S11-2	J18-25	
127	71	WHITE	SHLD OF 126	SHLD OF 272	At J18
128	47	WHT-BRN-BLU	A11-2	J17-9	
129	48	WHT-BRN-VIO	M2-2	A11-4	DIRECT
130	49	WHT-BRN-GRY	M2-2	E39	DIRECT
131	50	WHT-RED-ORN	M2-1	A11-3	
132	33	20 SHLD 109	XF2-2	T1-1	
133	71	WHITE	SHLD OF 132	SHLD OF 11	At T1
134	71	WHITE	SHLD OF 132	E32	At T1
135	33	20 SHLD 110	XF1-1	S8-2-NO	
136	71	WHITE	SHLD OF 135	SHLD OF 9	At XF1
137	16	COAX 19	J1-A	J21-9	
138	71	WHITE	SHLD OF 137	E38	At J1
139	40	WHT-BLK-BLU	J1-B	E38	DIRECT
140	41	WHT-BLK-VIO	J1-C	A14-1	DIRECT
141	42	WHT-BLK-GRY	J1-D	A14-C1-1	DIRECT
142	59	WHT-ORN-VIO	A14-C1-2	E16	
143	16	COAX 20	S9-1	J21-21	
144	71	WHITE	SHLD OF 143	SHLD OF 145	At S9
145	16	COAX 21	S9-2	J21-37	
146	71	WHITE	SHLD OF 145	SHLD OF 147	At S9
147	16	COAX 22	S9-3	J21-7	
148	43	WHT-BRN-RED	S9-6	E41	DIRECT
149	44	WHT-BRN-ORN	S9-4	E43	DIRECT
150	16	COAX 23	E43	J18-12	
151	71	WHITE	SHLD OF 150	E27	At J18
152	16	COAX 24	E41	J19-12	
153	71	WHITE	SHLD OF 152	SHLD OF 266	At J19
154	51	WHT-RED-YEL	J2-1	E42	DIRECT
155	55	WHT-RED-GRY	S5-10F	E39	
156	53	WHT-RED-BLU	S5-9R	J21-26	

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
157	56	WHT-ORN-YEL	S5-11F	E3	
158	64	WHT-YEL-GRY	A13-4	A8-4	
159	58	WHT-ORN-BLU	A13-1	E42	
160	34	BLACK TP4	S7-2	S8-1C	
161	34	WHITE TP4	S7-5	S8-2C	
162	71	WHITE	SHLD OF 160 and 161	SHLD OF 163 and 164	At S7
163	34	BLACK TP5	S7-3	J21-46	
164	34	WHITE TP5	S7-4	J21-43	
165	34	BLACK TP6	S7-1	J21-2	
166	34	WHITE TP6	S7-6	J21-1	
167	71	WHITE	SHLD OF 163 and 164	SHLD OF 165 and 166	
168	60	WHT-ORN-GRY	S5-3R	J8-10	
169	61	WHT-YEL-GRN	S5-5R	J8-12	
170	35	WHT-BLK-BRN	J8-1	J10-1	
171	36	WHT-BLK-RED	J8-2	J10-2	
172	37	WHT-BLK-ORN	J8-3	J10-3	
173	38	WHT-BLK-YEL	J8-4	J10-4	
174	39	WHT-BLK-GRN	J8-5	J10-5	
175	41	WHT-BLK-VIO	J8-6	K2-4	
176	42	WHT-BLK-GRY	J8-7	E14	
177	43	WHT-BRN-RED	K1-2	E35	DIRECT
178	44	WHT-BRN-ORN	J8-9	E1	DIRECT
179	56	WHT-ORN-YEL	J8-11	E3	
180	45	WHT-BRN-YEL	J8-13	J21-35	
181	47	WHT-BRN-BLU	J8-14	J21-33	
182	49	WHT-BRN-GRY	J8-15	J21-31	
183	50	WHT-RED-ORN	J8-16	J21-28	
184	53	WHT-RED-BLU	J8-17	S5-9R	
185	54	WHT-RED-VIO	J8-18	J21-23	
186	66	WHT-GRN-VIO	J8-21	J12-1	
187	67	WHT-GRN-GRY	J8-22	J12-2	

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
188	68	WHT-BLU-VIO	J8-23	J12-3	
189	69	WHT-BLU-GRY	J8-24	J12-4	
190	70	WHT-VIO-GRY	J8-25	J12-5	
191	35	WHT-BLK-BRN	K2-7	K1-6	
192	36	WHT-BLK-RED	K2-1	E5	DIRECT
193	44	WHT-BRN-ORN	K2-6	J12-20	
194	36	WHT-BLK-RED	K2-8	E13	
195	37	WHT-BLK-ORN	K4-1	E5	DIRECT
196					
197	38	WHT-BLK-YEL	K4-2	K1-4	
198	70	WHT-VIO-GRY	J11-1	E5	
199	68	WHT-BLU-VIO	J11-2	E35	
200	34	BLACK TP7	J11-7	T1-13	
201	34	WHITE TP7	J11-8	T1-14	
202	71	WHITE	SHLD OF 200 and 201	E5	At J11
203	37	WHT-BLK-ORN	J11-9	A8-17	
204	69	WHT-BLU-GRY	J11-10	K3-10	
205	68	WHT-BLU-VIO	J11-11	E13	
206	67	WHT-GRN-GRY	J11-12	K3-7	
207	40	WHT-BLK-BLU	J10-6	E14	
208	41	WHT-BLK-VIO	J10-7	E19	
209	42	WHT-BLK-GRY	J10-8	E5	DIRECT
210	67	WHT-GRN-GRY	E10	E5	DIRECT
211	66	WHT-GRN-VIO	C1-MINUS	E10	DIRECT
212	42	WHT-BLK-GRY	C1-PLUS	E9	DIRECT
213	43	WHT-BRN-RED	E9	L1-2	
214	58	WHT-ORN-BLU	J12-6	E14	
215	55	WHT-RED-GRY	J12-7	E19	
216	62	WHT-YEL-BLU	J12-8	E2	DIRECT
217	42	WHT-BLK-GRY	J12-10	K3-1	
218	45	WHT-BRN-YEL	J12-16	E13	

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
219	44	WHT-BRN-ORN	J12-18	K3-11	
220	46	WHT-BRN-GRN	J12-19	A16(A)-2	
221	35	WHT-BLK-BRN	K5-1	E21	DIRECT
222	43	WHT-BRN-RED	K5-7	E20	
223	46	WHT-BRN-GRN	K5-3	A8-10	
224	44	WHT-BRN-ORN	E45	E24	
225	70	WHT-VIO-GRY	J9-2	E29	DIRECT
226	46	WHT-BRN-GRN	E46	E22	
227	47	WHT-BRN-BLU	K1-3	E14	
228	35	WHT-BLK-BRN	K1-6	Q1-C	
229	41	WHT-BLK-VIO	K1-7	E20	
230	32	BARE	K1-7	K1-8	
231	55	WHT-RED-GRY	K6-1	J21-3	
232	57	WHT-ORN-GRN	K6-3	E3	
233	56	WHT-ORN-YEL	K6-3	A8-14	
234	36	WHT-BLK-RED	K6-6	E29	DIRECT
235	42	WHT-BLK-GRY	K6-7	E22	
236	60	WHT-ORN-GRY	K6-7	A8-15	
237	32	BARE	K3-1	K3-4	
238	50	WHT-RED-ORN	K3-4	E24	
239	36	WHT-BLK-RED	K3-5	J21-36	
240	64	WHT-YEL-GRY	K3-6	E29	DIRECT
241	68	WHT-BLU-VIO	K3-9	E35	DIRECT
242	37	WHT-BLK-ORN	K3-10	J21-16	
243	39	WHT-BLK-GRN	K3-12	E13	
244	40	WHT-BLK-BLU	K3-13	A8-16	
245	41	WHT-BLK-VIO	K3-14	L1-2	
246	35	WHT-BLK-BRN	A8-1	T1-7	DIRECT
247	36	WHT-BLK-RED	A8-2	T1-8	DIRECT
248	37	WHT-BLK-ORN	A8-3	L1-1	DIRECT
249	38	WHT-BLK-YEL	A8-5	L2-2	DIRECT
250	40	WHT-BLK-BLU	L2-2	R2-1	DIRECT

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
251	45	WHT-BRN-YEL	L2-2	E22	
252	47	WHT-BRN-BLU	R2-2	E32	DIRECT
253	48	WHT-BRN-VIO	A8-6	L2-1	DIRECT
254	49	WHT-BRN-GRY	A8-7	T1-10	DIRECT
255	50	WHT-RED-ORN	A8-8	T1-9	DIRECT
256	51	WHT-RED-YEL	A8-9	E20	
257	52	WHT-RED-GRN	A8-12	E33	DIRECT
258	53	WHT-RED-BLU	A8-13	J19-23	
259	57	WHT-ORN-GRN	A8-13	J18-23	
260	54	WHT-RED-VIO	A8-18	Q1-C	
261	55	WHT-RED-GRY	A8-19	Q1-B	
262	58	WHT-ORN-BLU	A8-20	Q1-E	
263	61	WHT-YEL-GRN	A8-20	E24	
264	27	BRAID	A8-21	E26	DIRECT
265	50	WHT-RED-ORN	J20-5	E33	DIRECT
266	16	COAX 25	J17-1	J19-14	
267	48	WHT-BRN-VIO	J17-2	E17	
268	49	WHT-BRN-GRY	J17-4	E15	
269	62	WHT-YEL-BLU	J17-5	A8-11	
270	38	WHT-BLK-YEL	J17-6	E34	DIRECT
271	52	WHT-RED-GRN	J17-8	E18	
272	16	COAX 26	J17-11	J18-14	
273	16	COAX 27	J17-14	J21-32	
274	16	COAX 28	J17-19	J21-17	
275	71	WHITE	SHLD OF 273	SHLD OF 274	At J17
276	71	WHITE	SHLD OF 274	E34	At J17
277	53	WHT-RED-BLU	J17-20	E13	
278	70	WHT-VIO-GRY	J17-22	E34	DIRECT
279	69	WHT-BLU-GRY	J16-1	E28	DIRECT
280	57	WHT-ORN-GRN	J16-2	E17	
281	60	WHT-ORN-GRY	J16-5	E18	
282	70	WHT-VIO-GRY	J16-6	E28	DIRECT

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
283	69	WHT-BLU-GRY	J16-7	E30	DIRECT
284	68	WHT-BLU-VIO	J16-10	E30	DIRECT
285	65	WHT-GRN-BLU	A15-2	K3-2	
286	32	BARE	K3-2	K3-3	
287	64	WHT-YEL-GRY	A15-3	E24	
288	16	COAX 29	A15-4	J21-15	
289	71	WHITE	SHLD OF 288	SHLD OF 290	At A15
290	16	COAX 30	A15-5	J21-14	
291	71	WHITE	SHLD OF 290	E27	At A15
292	70	WHT-VIO-GRY	A15-8	J15-10	DIRECT
293	69	WHT-BLU-GRY	A15-9	J15-6	DIRECT
294	68	WHT-BLU-VIO	A15-10	J15-7	DIRECT
295	67	WHT-GRN-GRY	J15-8	E27	DIRECT
296	63	WHT-YEL-VIO	J18-17	E18	
297	70	WHT-VIO-GRY	J18-3	E27	DIRECT
298	70	WHT-VIO-GRY	J19-3	E37	DIRECT
299	69	WHT-BLU-GRY	J18-6	E36	DIRECT
300	67	WHT-GRN-GRY	J19-6	E31	
301	51	WHT-RED-YEL	J19-17	E17	
302	55	WHT-RED-GRY	J21-12	S2-D-12R	
303	69	WHT-BLU-GRY	J21-13	E27	DIRECT
304	68	WHT-BLU-VIO	J21-44	E37	DIRECT
305	67	WHT-GRN-GRY	J21-6	E37	DIRECT
306	65	WHT-GRN-BLU	J21-4	E24	
307	39	WHT-BLK-GRN	J21-25	E16	
308	66	WHT-GRN-VIO	J21-24	E22	
309	34	BLACK TP8	J21-48	E6	
310	34	WHITE TP8	J21-49	E4	
311	62	WHT-YEL-BLU	J21-40	E15	
312	68	WHT-BLU-VIO	J21-27	E37	DIRECT
313	67	WHT-GRN-GRY	J21-50	E37	DIRECT
314	71	WHITE	SHLD OF 266	E29	At J19

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TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
315	71	WHITE	SHLD OF 147	E38	At S9
316	71	WHITE	SHLD OF 17	SHLD OF 152	At E41
317	71	WHITE	SHLD OF 52	SHLD OF 17	At S2
318	35	WHT-BLK-BRN	E12	E16	DIRECT
319	36	WHT-BLK-RED	CR8-CATH	E16	DIRECT
320	46	WHT-BRN-GRN	A16-E4	R5	DIRECT
321	35	WHT-BLK-BRN	A15-7	E27	
322	32	BARE	E19	E20	
323	55	WHT-RED-GRY	A16-E5	R5	DIRECT
324	16	COAX 31	J14-A2	J11-A5	
325	16	COAX 32	J14-A3	J11-A4	
326	16	COAX 33	J11-A1	J22-A3	DIRECT
327	16	COAX 34	J12-A1	J9-A5	
328	16	COAX 35	J12-A2	J9-A3	
329	16	COAX 36	J12-A3	J9-A1	
330	16	COAX 37	J13-A2	J15-A1	DIRECT
331	16	COAX 38	J9-A6	J22-A2	DIRECT
332	16	COAX 39	J9-A4	J22-A1	DIRECT
333	16	COAX 40	J9-A2	J17-A3	DIRECT
334	16	COAX 41	J16-A1	J15-A3	DIRECT
335	16	COAX 42	J17-A1	J15-A2	
336	32	BARE	CONTACT J11-A2	SHELL J11-A2	SHORTING BAR
337	55	WHT-RED-GRY	S2-D-11R	E35	
338	32	BARE	S2-D-11R	S2-D-10R	
339	32	BARE	S2-D-10R	S2-D-9R	
340	32	BARE	S2-D-9R	S2-D-5R	
341	32	BARE	S2-D-5R	S2-D-3R	
342	32	BARE	S2-D-3R	S2-D-2R	
343	32	BARE	K2-1	K2-5	
344	32	BARE	CONTACT PIN J13-A3	SHELL J13-A3	SHORTING

TABLE 5-2. T-827B/URT CHASSIS AND FRONT PANEL, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
345	70	WHT-VIO-GRY	J12-11	S6-11R	
346	32	BARE	S6-8F	S6-6F	
347	32	BARE	S6-5R	S6-4R	
348	32	BARE	S6-1R	S6-3R	
349	32	BARE	S6-11R	S6-1R	
350	32	BARE	S6-11R	S6-9R	
351					
352	36	WHT-BLK-RED	J9-1	E45	DIRECT
353	40	WHT-BLK-BLU	J9-3	E46	DIRECT
354	46	WHT-BRN-GRN	S6-2F	J12-12	

NOTES:
1. Wire item no. 16 is cable, coax, double shielded, no. 28 AWG.
2. Wire item no. 27 is braid, 1/8 in.
3. Wire item no. 32 is wire, bare, no. 24 AWG.
4. Wire item no. 33 is wire, shielded, no. 20 AWG.
5. Wire item no. 34 is wire, twisted pair, shielded, no. 20 AWG.
6. Wire item no. 35 through 71 is wire, hookup, no. 24 AWG.

TABLE 5-3. T-827B/URT CASE TO CHASSIS CABLE HARNESS, WIRING LIST

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
1	17	WHITE TP1	C1	P1-1	
2	17	BLACK TP1	C2	P1-2	
3	20	WHITE	SHLD OF 1 & 2	C6	DIRECT At FB
4	20	WHITE	SHLD OF 1 & 2	P1-6	DIRECT At P1
5	19	WHT-BLK-BRN	C3	P1-3	
6	19	WHT-BLK-RED	C4	P1-4	
7	19	WHT-BLK-ORN	C5	P1-5	
8	19	WHT-BLK-YEL	C7	P1-7	
9	19	WHT-BLK-GRN	C8	P1-8	
10	19	WHT-BLK-BLU	C9	P1-9	

TABLE 5-3. T-827B/URT CASE TO CHASSIS CABLE HARNESS, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
11	19	WHT-BLK-VIO	C10	P1-10	
12	19	WHT-BLK-GRY	C11	P1-11	
13	19	WHT-BRN-RED	C12	P1-12	
14	18	20S 101	C14	P1-14	
15	19	WHITE	SHLD OF 14	SHLD OF 16	At FB
16	18	20S 102	C15	P1-15	
17	19	WHITE	SHLD OF 16	C13	DIRECT At FB
18	20	WHITE	SHLD OF 14	SHLD OF 16	At P1
19	20	WHITE	SHLD OF 16	P1-13	At P1
20	19	WHT-BRN-ORN	C16	P1-16	
21	19	WHT-BRN-YEL	C17	P1-17	
22	19	WHT-BRN-GRN	C18	P1-18	
23	19	WHT-BRN-BLU	C19	P1-19	
24	19	WHT-BRN-VIO	C20	P1-20	
25	19	WHT-BRN-GRY	C21	P1-21	
26	19	WHT-RED-ORN	C22	P1-22	
27	19	WHT-RED-YEL	C23	P1-23	
28	19	WHT-RED-GRN	C24	P1-24	
29	19	WHT-RED-BLU	C25	P1-25	
30	16	COAX 1	J23	P2-A3	
31	16	COAX 2	J24	P2-A2	
32	16	COAX 3	J25	P2-A1	
33	19	WHT-RED-VIO	C26	P1-26	
34	19	WHT-RED-GRY	C27	P1-27	
35	19	WHT-ORN-YEL	C28	P1-28	
36	19	WHT-ORN-GRN	C29	P1-29	
37	19	WHT-ORN-BLU	C30	P1-30	
38	19	WHT-ORN-VIO	C31	P1-31	
39	19	WHT-ORN-GRY	C32	P1-32	
40	19	WHT-YEL-GRN	C33	P1-33	
41	10	WHT-YEL-BLU	C34	P1-34	
42	19	WHT-YEL-VIO	C35	P1-35	
43	19	WHT-YEL-GRY	C36	P1-36	

TABLE 5-3. T-827B/URT CASE TO CHASSIS CABLE HARNESS, WIRING LIST (Continued)

WIRE NO.	WIRE ITEM NO.	COLOR	FROM	TO	REMARKS
44	19	WHT-GRN-BLU	C37	P1-37	
45	19	WHT-GRN-VIO	C38	P1-38	
46	19	WHT-BLU-VIO	C39	P1-39	
47	19	WHT-BLU-GRY	C40	P1-40	
48	17	WHITE TP2	C41	P1-41	
49	17	BLACK TP2	C42	P1-42	
50	20	WHITE	SHLD OF 48 & 49	SHLD OF 52 & 53	DIRECT At FB
51	20	WHITE	SHLD OF 48 & 49	SHLD OF 52 & 53	At P1
52	17	WHITE TP3	C43	P1-43	
53	17	BLACK TP3	C46	P1-46	
54	20	WHITE	SHLD OF 52 & 53	SHLD OF 56	At FB
55	20	WHITE	SHLD OF 52 & 53	SHLD OF 56	At P1
56	18	20S 103	C45	P1-45	
57	20	WHITE	SHLD OF 56	C44	DIRECT At FB
58	20	WHITE	SHLD OF 56	P1-44	DIRECT At P1
59	19	WHT-VIO-GRY	C47	P1-47	
60	19	WHT-BLK-BRN	C48	P1-48	
61	19	WHT-BLK-RED	C49	P1-49	
62	19	WHT-BLK-ORN	C50	P1-50	

NOTES:
1. Wire item no. 16 is cable, coax, RG-196A/U.
2. Wire item no. 17 is wire, twisted pair, shielded, no. 20 AWG.
3. Wire item no. 18 is wire, shielded, no. 20 AWG.
4. Wire item no. 19 is wire, hookup, no. 20 AWG.
5. Wire item no. 20 is wire, hookup, no. 22 AWG.
6. FB = Filter Box.

5-98. RADIO FREQUENCY AMPLIFIER AM-3007/URT ALIGNMENT AND ADJUSTMENT.

5-99. GENERAL. The alignment and adjustment procedures for the AM-3007/URT are described in paragraphs 5-100 through 5-118. In these paragraphs, prefix all chassis reference designations with "3A2" to obtain the complete designation for all AM-3007/URT components.

5-100. Successful servicing of the AM-3007/URT must be accomplished with a minimum of error when performing critical rf alignment procedures. Since all components of the AM-3007/URT are fixed in character (coils, tubes, mica tuning capacitors, circuit stray capacitances, etc.), the complete rf alignment must be performed using four primary tuning capacitors. Tuning capacitors C3 (driver plate), C15 (pa grid), C20 (pa plate) and C24 (rf output) are factory adjusted and will require adjustment only after repairs are made to the rf circuitry.

NOTE

If the following alignment procedures cannot be accomplished, the AM-3007/URT will operate satisfactorily (with only a small performance loss at band edges) after new tubes are installed. Never attempt to adjust trimmer capacitors indiscriminately.

5-101. TEST EQUIPMENT AND SPECIAL TOOLS REQUIRED. Table 5-4 lists the test equipment, special tools, and cables required to perform the alignment and adjustment procedures for the AM-3007/URT.

5-102. APC VOLTAGE ADJUSTMENT. Perform the apc voltage adjustment as indicated in the following paragraphs.

5-103. Test Equipment Required. Electronic Multimeter AN/USM-116 (with tee-probe) and Electrical Dummy Load DA-91A/U are required for the apc adjustment.

5-104. Adjustment Procedure. Proceed as follows:

a. Loosen front panel screws on AM-3007/URT and slide chassis to locked-out position. Pull Interlock switch up.

b. Disconnect rf output cable from J8 on rear of AM-3007/URT and connect dummy load to J8 through tee probe. Connect electronic multimeter to tee probe.

c. Set electronic multimeter to 100-Vac range.

d. Turn on AM-3007/URT and set up system for local operation as follows:

1. LOCAL/REMOTE switch (on T-827B/URT) to LOCAL.

TABLE 5-4. TEST EQUIPMENT AND SPECIAL TOOLS REQUIRED FOR MAINTENANCE OF RADIO FREQUENCY AMPLIFIER AM-3007/URT

NAME	DESIGNATION
Multimeter	AN/PSM-4( )
Electronic Multimeter (with tee-probe)	AN/USM-116
Electronic Multimeter (rf voltmeter)	CCVO-91CA
Electronic Multimeter (ac voltmeter)	ME-6C/U
RF Signal Generator	CAQI-606A
Electrical Dummy Load	DA-91A/U
Extender Cable	666243-079
BNC-to-N Adapter	UG-201A/U
Coaxial Adapter	UG-491A/U
RF Insert Extraction Tool	CET-C6B

2. Operating mode: AM.

3. Operating frequency: 29.000 MHz.

e. Key transmitter using RF OUTPUT TUNE/OPERATE switch.

f. Electronic multimeter should indicate between 31.5 and 42 volts. If not, readjust AM/SSB APC ADJ (figure 5-59) until correct indication is obtained.

g. Change frequency to 02.000 MHz, and repeat steps e. and f.

h. If necessary, repeat steps e. through g. until desired results are obtained at both frequencies.

i. Set up system for local operation as follows:

1. Operating mode: CW.

2. Operating frequency: 29.000 MHz.

j. Key transmitter at CW KEY jack.

k. Adjust CW/FSK APC ADJ (figure 5-59) until electronic multimeter indicates between 44.5 and 59.5 volts.

l. Tune transmitter to 02.000 MHz. Electronic multimeter should indicate between 44.5 to 59.5 volts. If not, readjust CW/FSK APC ADJ.

m. If necessary, repeat steps k. and l. until desired results are obtained at both frequencies.

n. With equipment still set up for adjusting apc in CW mode of operation, key the transmitter and read voltage on electronic multimeter.

o. Substitute this voltage and 50-ohm impedance of dummy load in formula $P = E^2/R$ to compute actual power output of AM-3007/URT.

p. Compare computed output, in watts, with indicated output, in watts, read on RF OUTPUT meter.

q. Repeat steps n. through p. at several different frequencies.

r. Change operating mode to USB.

s. Connect electronic multimeter from PPC test point to GRD test point on APC/PPC Directional Coupler Electronic Assembly A2. Set multimeter to indicate 10-Vdc full scale.

t. Connect local handset. Key transmitter, and create excessive modulation peaks by whistling or speaking sharply into microphone.

u. Observe electronic multimeter. Proper operation of ppc circuit will be represented by 0.5- to 1.5-volt increase above the constant nominal voltage (when keyed with a steady tone audio input) of approximately 4.5 Vdc.

v. Disconnect all test equipment and reconnect AM-3007/URT for normal operation.

5-105. DC-TO-DC CONVERTER ADJUSTMENT. Perform the dc-to-dc converter adjustment as follows. No test equipment is required.

a. Set system in standby.

b. Loosen front panel screws on AM-3007/URT and slide chassis to locked-out position.

c. Set controls as follows.

1. PRIMARY POWER ON-OFF circuit breaker: ON.

2. Interlock switch: Pulled up.

3. ANT CPLR BYPASS/NORMAL switch: BYPASS.

4. RF OUTPUT meter switch: 100W FWD.

WARNING

High voltage exists in areas near AM-3007/URT tube V2.

d. Set system for local operation.

e. Set AMPLIFIER meter switch at PA PL. Check PA plate current on AMPLIFIER meter. AMPLIFIER meter should indicate at PA SET mark (45 mA). If not, adjust AM/SSB BIAS A5R30 (figure 5-59).

f. Set AMPLIFIER meter switch at DR CATH. Check driver cathode current on AMPLIFIER meter. AMPLIFIER meter should indicate at DR SET mark (55 mA). If not, adjust DRVR BIAS A5R23 (figure 5-59).

NOTE

PA plate and driver cathode current readings depend on tube characteristics. These characteristics will vary during use.

g. Return equipment to normal operation.

5-106. RF INPUT BRIDGE BALANCE CAPACITOR A1A1C1 ADJUSTMENT. Perform the bridge balance adjustment as indicated in the following paragraphs.

5-107. Test Equipment and Special Tools Required. The following test equipment and special tools are required for the bridge balance adjustment.

a. RF Signal Generator CAQI-606A.

b. Electronic Multimeter (rf voltmeter) CCVO-91CA with 50-ohm probe.

c. BNC-to-Type N Adapter UG-201A/U.

d. Coaxial Adapter UG-491A/U.

5-108. Test Setup and Procedure. Set up the equipment as shown in figure 5-1. Perform the bridge balance adjustment as follows.

WARNING

High voltage exists in the vicinity of this control. Use extreme caution to avoid bodily contact with the equipment when making this adjustment.

a. Loosen front panel screws on AM-3007/URT and slide chassis to locked-out position. Tilt chassis to expose underside. Pull Interlock switch up.

b. Adjust rf signal generator for continuous wave output at 29 MHz ±2 kHz, 3 volts rms.

c. Set up transmit system for standby operation on 29 MHz, and key AM-3007/URT from AMPLIFIER meter switch.

d. Adjust A1A1C1 (figure 5-64) for dip indication on rf voltmeter.

5-109. SECONDARY CAPACITOR A1C24 ADJUSTMENT. Perform the secondary capacitor adjustment as indicated in the following paragraphs.

5-110. Test Equipment and Special Tools Required. The following test equipment and special tools are required for the secondary capacitor adjustment.

a. RF Signal Generator CAQI-606A.

b. Electronic Multimeter (rf voltmeter) CCVO-91CA with 50-ohm probe.

c. BNC-to-Type N Adapter UG-201A/U.

d. Coaxial Adapter UG-491A/U.

e. Resistor, 22,000 ohms, 1/2 watt (probe resistor).

WARNING

Primary power for the AM-3007/URT must be switched off at the bulkhead distribution panel for this procedure.

5-111. Test Setup and Procedure. Set up the equipment as shown in figure 5-2. Perform the secondary capacitor adjustment as follows:

a. Pull chassis from case to locked-out position and pull Interlock switch up.

b. With AM-3007/URT primary power switched off at bulkhead distribution panel, set up transmit system for standby operation on 29 MHz.

c. Remove high-voltage shield A1MP14 (figure 5-59).

CAUTION

In preparing the following connections, observe existing lead dress and keep all other leads away from capacitors A1C24 and A1C25 (figure 5-60).

d. Use piece of bus wire to short-circuit capacitor A1C20 to capacitor A1C23 (figure 5-60).

e. Connect 1/4-inch lead end of probe resistor to capacitor A1C25 by tacking in place with spot of solder. Connect ground clip to front panel of AM-3007/URT.

f. Adjust rf signal generator for continuous wave output at 29 MHz ±2 kHz, 3 volts rms.

g. Manually depress AM-3007/URT antenna coaxial relay and adjust capacitor A1C24 (figure 5-60) for peak indication on rf voltmeter.

h. Disconnect probe resistor lead and remove bus wire jumper from capacitors A1C20 and A1C23.

5-112. POWER OUTPUT PLATE TRIMMER CAPACITOR A1C20 ADJUSTMENT. Perform this trimmer capacitor adjustment as indicated in the following paragraphs.

5-113. Test Equipment and Special Tools Required. The following test equipment and special tools are required for this trimmer capacitor adjustment.

a. RF Signal Generator CAQI-606A.

b. Electronic Multimeter AN/USM-116 (with tee-probe).

c. Electrical Dummy Load DA-91A/U.

5-114. Special Equipment Required. To adjust plate trimmer capacitor A1C20 successfully, a capacitance shield must be fabricated which simulates the capacitance that would normally be present with the chassis operating in the case. Fabricate the capacitance shield as follows.

a. Obtain following materials: sheet of 1/16-inch thick aluminum, 17-1/2 inches long, 5-1/4 inches wide, and three number 10-32 threaded inserts.

b. Cut aluminum stock to size as shown in figure 5-3.

c. Bend metal to 90-degree angle as shown.

d. Drill three holes in back of shield. Press threaded inserts into three holes on shield back.

e. Cut rectangular notch in back of shield.

f. Drill inspection hole in top of shield.

5-115. Test Setup and Procedure. Set up the equipment as shown in figure 5-4. Perform the power output plate trimmer capacitor adjustment as follows.

a. Loosen front panel screws on AM-3007/URT and slide chassis to locked-out position. Pull Interlock switch up.

b. Install specially fabricated capacitance shield to back of front panel with surface A (figure 5-3) extending over chassis and surface B flush with back surface of front panel and extending downward.

c. Set up over-all transmit system for local AM operation on 29 MHz and key AM-3007/URT using AMPLIFIER meter switch.

d. Adjust rf signal generator for continuous wave output at 29 MHz ±2 kHz, 30 volts rms.

e. Carefully adjust capacitor A1C20 (figure 5-60) for dip in plate current.

f. Switch off power.

g. Remove capacitance shield.

5-116. DRIVER PLATE TRIMMER CAPACITOR A1C3 AND PA GRID TRIMMER CAPACITOR A1C15 ADJUSTMENT. These trimmer capacitors are adjusted simultaneously as indicated in the following paragraphs.

5-117. Test Equipment and Special Tools Required. The following test equipment and special tools are required for these trimmer capacitor adjustments.

a. RF Signal Generator CAQI-606A.

b. Electronic Multimeter AN/USM-116 (with tee-probe).

c. Electrical Dummy Load DA-91A/U.

5-118. Test Setup and Procedure. Set up the equipment as shown in figure 5-3. Perform the driver plate and pa grid trimmer capacitor adjustments as follows.

a. Loosen front panel screws on AM-3007/URT and slide chassis to locked-out position. Remove high-voltage shield A1MP14 (figure 5-59).

b. With all power off, connect piece of bus wire as short circuit from A1E33 to ground. A1E33 is located beneath capacitor A1C20 (figure 5-60).

c. Pull Interlock switch up.

d. Rotate A1C3 (figure 5-64) out all the way; then rotate A1C3 in about five turns (approximately midway).

e. Set up over-all transmit system for local AM operation on 29 MHz and key AM-3007/URT using AMPLIFIER meter switch.

f. Adjust rf signal generator for continuous wave output at 29 MHz ±2 kHz, 30 volts rms.

WARNING

Lethal voltages are present in the area of the next adjustment.

g. Adjust trimmer capacitor A1C15 (figure 5-64) for peak rf output indication on electronic multimeter.

h. If peak rf output cannot be obtained within range of rotation of A1C15, readjust A1C3 slightly in or out as required; then continue to adjust A1C15.

i. Switch off power at bulkhead distribution panel and remove bus wire jumper from A1E33 to ground.

5-119. RADIO FREQUENCY AMPLIFIER AN-3007/URT SHIPBOARD REPAIR.

5-120. GENERAL. Procedures for tube replacement and for repair and adjustment of the electronic assemblies and turret assembly in the AM-3007/URT are described in paragraphs 5-121 through 5-152. In these paragraphs, prefix all chassis reference designations with "3A2" to obtain the complete designation for all AM-3007/URT components.

WARNING

Lethal voltages are present when the AM-3007/URT is in operation. Removal or replacement of major assemblies should be attempted only with the primary power turned off.

5-121. DRIVER TUBE A1V1 REPLACEMENT. The driver tube is a 9-pin oversized glass envelope type which is seated in a chassis heat sink well as shown in figure 5-60. A thermal bond between the glass wall of the tube and the chassis well walls is ensured by the use of two corrugated metal shields which conduct heat from the tube to the chassis heat sink.

5-122. To remove the driver tube, remove high-voltage shield A1MP14 (figure 5-59) which covers both the driver and power output tubes. Then, use the eraser of a new unsharpened pencil to push the tube up out of its socket from the bottom (see figures 5-60 and 5-64). Be sure to catch the unseated tube at the top to avoid possible breakage. If the corrugated metal thermal bond comes up with the tube, set it aside for use during replacement. To replace a tube, simply insert from the top observing the key system which is similar to that for a 9-pin miniature tube. If the corrugated metal thermal bond was removed with the old tube, be sure to wrap the two sections evenly around the new tube on replacement.

5-123. POWER OUTPUT TUBE A1V2 REPLACEMENT. The power output tube is an oversize 7-pin glass envelope type with two plate pins protruding through the glass envelope at the top. A finned twin-element heat sink unit is seated over the plate pins at the top of tube. Plate voltage is applied to the tube through a plate connector which is coupled through the finned heat sink. The tube and its finned heat sink are seated in a chassis heat sink well with a single corrugated metal thermal bond between the tube and the chassis well wall (figure 5-60).

5-124. To remove the power output tube, remove high-voltage shield A1MP14 (figure 5-59) which covers both the driver and power output tubes. Then, disconnect the tube plate connector at the finned heat sink, back off two Allen screws, and remove the finned heat sink. Set the heat sink aside for reuse on replacing the tube since new tubes are supplied without the heat sink. At the underside of the chassis, use a screwdriver to push against pin 4 (cathode) of the tube to release the tube from its socket. Remove the tube from the top. To replace a tube, simply insert into the socket observing the key system. A green keying arrow is marked on the top of some tube envelopes to aid in aligning the tube and socket before insertion. If the corrugated metal thermal bond was removed with the old tube, be sure to reinstall it in the well before replacing the tube. (See figures 5-60 and 5-64.)

5-125. APC/DIRECTIONAL COUPLER ASSEMBLY A2 (Figure 5-59). The following paragraphs describe the removal, cleaning, and repair of the APC/PPC Directional Coupler Assembly A2.

5-126. Test Equipment Required. The following test equipment is required to repair the APC/PPC Directional Coupler Assembly and to perform and adjustments necessary after repair.

a. Electronic Multimeter AN/USM-116 (with tee-probe).

b. Electrical Dummy Load DA-91A/U.

c. Multimeter AN/PSM-4( ).

5-127. Removal Procedure. To remove the APC/PPC Directional Coupler Assembly, proceed as follows.

a. Loosen front panel screws on AM-3007/URT and slide chassis to locked-out position.

b. Reach under right rear corner of chassis and disconnect two coaxial connectors P5 and P6 (figure 5-60).

c. Remove three mounting screws from bottom of main chassis and lift assembly out.

d. Loosen two captive screws on top of APC/PPC Directional Coupler Assembly and remove dust cover.

5-128. Repair Procedure. Clean dust and foreign matter out of assembly with compressed air. Inspect entire assembly for defective components, frayed wiring, burned electrical components, and loose connections or connectors. See figures 5-66 through 5-70 for component locations.

5-129. Reassembly. After repair, replace any component board that was removed. Replace dust cover over the APC/PPC Directional Coupler and reinstall in chassis.

5-130. Adjustment. If electrical components were replaced in the assembly, it will be necessary to check the circuits after repair. Perform preventive maintenance checks.

5-131. AC POWER SUPPLY ASSEMBLY A3 (Figure 5-59). The following paragraphs describe the removal, cleaning, and repair of the AC Power Supply Assembly A3.

5-132. Test Equipment Required. The following test equipment is required to repair the AC Power Supply Assembly and to perform any adjustments necessary after repair.

a. Multimeter AN/PSM-4( ).

b. Electronic Multimeter ME-6C/U.

c. Extender Cable 666243-079.

5-133. Removal Procedure. To remove the AC Power Supply Assembly, proceed as follows.

CAUTION

AC Power Supply Assembly A3 is very heavy and is unevenly weighted. Use extreme care when removing to avoid dropping.

a. Disconnect plug A3P1 (figure 5-59) from connector J10 on top of chassis directly behind front panel.

b. Remove six mounting screws from bottom of main chassis, maintain in horizontal position, and lift assembly out.

5-134. Repair Procedure. Clean dust and foreign matter out of assembly with compressed air. Inspect entire assembly for defective components, frayed wiring, burned electrical components, loose connections, or broken mounting studs and terminations. See figures 5-71 and 5-72 for component locations.

5-135. Reassembly. After repair, return or replace all components or connections removed from the assembly.

5-136. Voltage Adjustments. As part of routine preventive maintenance, voltage measurements should be made at the input and output of the assembly whenever the AC Power Supply Assembly is removed from the chassis. Proceed as follows.

a. Reconnect AC Power Supply Assembly to chassis using extender cable 666243-079.

WARNING

Lethal voltages will be present in the AM-3007/URT during the following tests.

b. Set Multimeter AN/PSM-4( ) to indicate 50-Vac full scale, and connect multimeter across terminals 7 and 8 of transformer/inductor A3T1L1 (figure 5-71).

c. Set PRIMARY POWER ON-OFF circuit breaker to ON. Check to see that multimeter indicates 34 Vac.

NOTE

The tapped primary of A3T1L1 allows input compensation for primary ac voltages from 105 to 125 Vac. If the voltage at terminals 7 and 8 of A3T1L1 is not 34 Vac, check to see if a unique condition has not changed ac line voltage at the equipment power source. Compensate for an abnormal line voltage, and adjust the input of A3T1L1 by moving the tap on the primary until 34 Vac is measured at secondary terminals 7 and 8.

CAUTION

Turn off all power before moving the primary tap.

d. Set PRIMARY POWER ON-OFF circuit breaker to OFF. Disconnect multimeter from A3T1L1.

e. Set multimeter to indicate 50-Vdc full scale and connect it across capacitor A3C1. Be sure that leads are well insulated and not shorting to chassis or other terminations.

f. Set PRIMARY POWER ON-OFF circuit breaker to ON.

g. Check to see that multimeter indicates +28 Vdc.

h. Set PRIMARY POWER ON-OFF circuit breaker to OFF.

i. Disconnect multimeter from capacitor.

j. Connect Electronic Multimeter ME-6C/U across capacitor A3C1.

k. Set PRIMARY POWER ON-OFF circuit breaker to ON.

l. Measure ripple voltage present on 28-Vdc line. RMS measurement, with AM-3007/URT on and in standby condition should be approximately 95 mV.

m. Set PRIMARY POWER ON-OFF circuit breaker to OFF.

n. Disconnect electronic multimeter. Remove extender cable 666243-079 and reinstall AC Power Supply Assembly in chassis.

o. Push chassis back into case and tighten front panel screws. Reconnect AM-3007/URT for normal operation.

5-137. Overvoltage Trip Relay Adjustment. Under normal conditions, the overvoltage trip relay on the AC Power Supply Assembly should not require attention. Overvoltage trip adjust A3R7 (figure 5-59) is adjusted and sealed with Glyptol during factory assembly. If replacement of any overvoltage trip circuit components should require that this circuit be readjusted, proceed as follows.

a. Interrupt primary ac line voltage circuit to AM-3007/URT at convenient point, and install variable transformer so that ac input voltage to primary of transformer/inductor A3T1L1 can be varied.

b. Set Multimeter AN/PSM-4( ) to indicate 50-Vdc full scale, and connect it from A3TP1 to ground.

c. Set PRIMARY POWER ON-OFF circuit breaker to ON.

d. Slowly advance variable transformer in ac input circuit until multimeter indicates 32 Vdc.

e. After 10 seconds, if overvoltage trip relay has not energized, break Glyptol seal on overvoltage trip adjust A3R7 and adjust slowly counterclockwise until overvoltage trip indicator A3DS1 lights to indicate that trip action has occurred.

NOTE

Due to the time constant involved in the overvoltage trip circuit, a slight delay may occur before the overvoltage trip relay energizes or deenergizes. An attempt should be made to center the setting of A3R7 approximately between relay pull-in and drop-out points. Allow 10 seconds between control adjustments for circuit stabilization.

f. If overvoltage trip indicator lights before input voltage can be adjusted to 32 Vdc, finish adjusting voltage. Break Glyptol seal and rotate overvoltage trip adjust A3R7 slowly clockwise until overvoltage trip indicator A3DS1 goes out to indicate that circuit has reset.

g. With dc voltage carefully maintained at 32 Vdc, make circuit trip and reset several times by rotating overvoltage trip adjust A3R7 first clockwise and then counterclockwise. Set potentiometer at point halfway between trip and reset positions, as indicated by indicator A3DS1.

h. Secure A3R7 by applying drop of Glyptol to adjustment screw.

i. Set PRIMARY POWER ON-OFF circuit breaker to OFF.

j. Disconnect all test equipment and reconnect AM-3007/URT for normal operation.

5-138. DC-TO-DC CONVERTER ASSEMBLY A5 (Figure 5-59). The following paragraphs contain the necessary information for the removal, cleaning, and repair of the DC-to-DC Converter Assembly A5.

5-139. Test Equipment Required. The following test equipment is required to repair the DC-to-DC Converter Assembly and to perform any adjustments necessary after repair.

a. Multimeter AN/PSM-4( ).

b. Electronic Multimeter ME-6C/U.

5-140. Removal Procedure. To remove the DC-to-DC Converter Assembly proceed as follows.

CAUTION

The DC-to-DC Converter Assembly is very heavy. Use extreme care when removing to avoid dropping.

a. Disconnect two chassis cable plugs P1 and P2 and top of DC-to-DC Converter Assembly (figure 5-60)..

b. Remove four screws that secure assembly to chassis and lift out assembly.

c. Remove two small screws on top of assembly and lift off dust cover.

5-141. Repair Procedure. Clean dust and foreign matter out of assembly. Inspect entire assembly for defective components, frayed wiring, burned electrical components, loose connections, or broken mounting studs and terminations. See figures 5-74 through 5-83 for component locations.

5-142. Reassembly. After repair, return or replace all components or connections removed from the assembly. Replace any component board that was removed.

5-143. Adjustment. As part of routine preventive maintenance, the various output voltages of the DC-to-DC Converter Assembly should be measured. Refer to monthly tests M2 through M4 in Maintenance Standards Book for Radio Frequency Amplifier AM-3007/URT and Antenna Coupler CU-937/UR, NAVSHIPS 0967-878-6050.

5-144. TURRET ASSEMBLY A4 (Figure 5-59). The following paragraphs described the procedures for dismantling the Turret Assembly A4 for repairs and cleaning. An exploded view of the Turret Assembly is shown in figure 5-73. All numbers in parentheses in the procedure below refer to the index number for the part in the exploded view.

5-145. Test Equipment. The operation of the Turret Assembly is dependent upon signals received from the main chassis and the companion exciter/transmitter. No external test equipment is needed for removal, repair, or reassembly of the Turret Assembly.

5-146. Removal and Disassembly. To remove the Turret Assembly from the chassis and to disassemble it, proceed as follows (figure 5-73).

a. Loosen front panel screws on AM-3007/URT and slide chassis to locked-out position. Disconnect all cables from rear of chassis. Release chassis slide retaining catches, remove chassis from slides, and place on bench.

b. Loosen three captive screws (1) by inserting screwdriver through holes in top of turret (5).

c. Carefully rotate turret a few degrees until turret terminals disengage from stator lugs. Cautiously lift Turret Assembly up and away from chassis, making sure switch actuator is out of way. While lifting, do not allow turret to turn or come in contact with stator lugs, or sensitive switch assembly will damage terminals on output filter strips.

CAUTION

To avoid damage to the Turret Assembly, do not attempt to rotate the turret until all three screws are fully disengaged.

d. Remove turret output filters (7) through (25) and rf transformers (26) through (44) by carefully springing lip of upper (6) or lower (73) retainer plate until it clears strip retaining lugs so that strip can be tipped out of turret.

e. Remove three captive screws (1) by removing retaining ring (2).

f. Unsolder wires on Turret Subassembly from two stators (45) and (46), from sensitive switch (78), and from terminals E1 and E2.

NOTE

As each wire is unsoldered, be sure to tag the wire with the appropriate terminal number to ensure proper replacement.

g. Remove five machine screws, eight lockwashers, five flat washers, and five hexagonal nuts that secure stator plate (47) to support bracket (48).

h. Remove four bolts that secure turret base (49) to main chassis. Carefully work Turret Base Assembly out from chassis. Hold stator plate (47) to one side to avoid damage to contact lugs.

i. Set chassis aside and place Turret Base Assembly on work bench.

j. Remove three screws and three flat washers securing stator (45) to collar (50). Carefully pull stator (45) away from selector discs and remove it. Pick up three spacer washers directly beneath it.

k. Remove six screws, six flat washers, and six insulated bushings (52) from top of upper selector disc (51) that secures Selector Disc Assembly to turret mount (53).

NOTE

To aid in reassembly, carefully note the position of the guide pin (62) through the parts of the Selector Disc Assembly, and tag each selector disc as it is removed.

l. Remove parts of Selector Disc Assembly in following order.

1. Lift off upper selector disc (51).
2. Lift off insulated spacer (54).
3. Lift off center selector disc (55) and pick up six spacer washers (81).
4. Lift off lower selector disc (56).
5. Lift off insulated spacer top of turret mount (53).

m. Remove four machine screws and four washers securing stator (46) to collar (50), and pick up seven spacer washers (82) located between stator and collar.

NOTE

Three of seven washers located beneath stator (46) are for three mounting screws for stator (45). These three screws pass through stator (46).

n. Tip turret base (49) on its side and remove six machine screws securing collar (50) from bottom. Remove collar from turret base and set turret base aside.

o. Remove six machine screws from turret mount collar (58), and remove turret mount collar (58), bearing (59), and collar (50) from turret mount (53).

p. Remove internal-tooth gear (60) from turret mount (53) by using hammer on block of wood to gently tap gear.

NOTE

Insert pins (61) are pressed into the turret mount and should not be removed unless absolutely necessary.

q. Remove machine screw and lockwasher that secure wiring clamp(65) to turret base (49) and remove clamp.

r. Remove four machine screws and four flat washers that secure dc motor (66) to the motor mount (68). Remove dc motor.

s. From bottom of turret base, remove four machine screws that secure motor mount (68) to turret base (49). Lift off motor mount.

t. Loosen setscrew securing idler gear (70) to idler shaft (72).

u. Gently tap idler shaft out of motor mount. Slide out idler gear and top (69) and bottom (71) idler shaft bushings.

v. Remove two slotted machine screws, two internal-tooth lockwashers, and two plate hex nuts from sensitive switch (78).

w. Remove sensitive switch (78), switch actuator (74), and nut plate (75) from double-angle bracket (76).

x. Remove two machine screws, two lockwashers, and two flat washers securing double-angle bracket (76) to turret base (49). Remove double-angle bracket.

y. Remove two machine screws, two lockwashers, and two flat washers that secure support bracket (48) to turret base (49). Remove support bracket.

5-147. Cleaning. This paragraph gives procedures for cleaning the dismantled Turret Assembly (figure 5-73). Clean all dismantled parts as follows.

a. Clean turret (5) and its associated parts, output filters (7) through (25), rf transformers (26) through (44), and two retainer plates (6) and (73). Use vacuum cleaner to remove all dust. Use small brush and soft lintless cloth to remove any remaining foreign material.

b. Clean two insulated spacers (54) and (57) and three selector discs (51), (55), and (56) with soft lintless cloth.

c. Clean two stators (45) and (46) by gently brushing with small brush.

d. Clean all remaining parts of Turret Assembly with approved cleaning solvent.

5-148. Inspection. Carefully inspect all parts after cleaning. Inspect for broken or damaged contacts, out-of-round shafts, excessive wear, broken insulators, and damaged rf transformers or output filters.

5-149. Repair or Replacement of Parts. After inspection, replace any parts found damaged. Refer to Section 6, Parts List, for part numbers. Broken or damaged contacts on stators (45) and (46) may be repaired. The long and short contacts used on these stators are Oak type DH, and the eyelets are Oak No. 5774. To replace these contacts, proceed as follows.

a. Carefully drill out old contact.

b. Place new contact in position, insert eyelets from underside, and clinch eyelets until snug.

CAUTION

When clinching eyelets into place, do not exert excessive pressure. Slowly increase pressure until the eyelet secures the contact snugly to the contact assembly. Excessive pressure may crush the contact or damage the contact mounting ring.

5-150. Lubrication. This paragraph describes the procedures for lubricating dismantled turret mechanical parts. Only those parts indicated should be lubricated. All numbers in parentheses refer to the index numbers in figure 5-73. To lubricate the necessary parts, proceed as follows.

a. Lubricate bearings (59) with grease, Military Specification MIL-G-3278.

b. Lubricate selector discs (51), (55), and (56) lightly with silicone lubricant.

c. Lubricate gears (60), (67), and (70) lightly with silicone lubricant.

5-151. Reassembly. The reassembly procedure for the Turret Assembly is essentially the reverse of the removal procedure. Refer to paragraph 5-146 and perform the procedures in reverse. While doing so, carefully observe the following.

a. Do not install motor mount (68) until selector discs (51), (55), and (56) and stators (45) and (46) have been installed. Check contact meshing and clearance by rotating selector disc at least one full turn inside the outside contact assembly.

b. When upper selector disc (51) is placed in position and secured, torque machine screws to 45 inch-ounces.

c. When reassembling motor mount (68), idler gear (70), and internal-tooth gear (60), be sure that gears mesh properly without excessive backlash.

CAUTION

Because of the gear ratio inside the dc motor, after the motor is mounted and the drive gears are meshed do not attempt to rotate the Turret Assembly manually. This may damage the drive gears.

d. When reassembling turret (5), be careful to return each output filter and rf transformer to its correct relative position on turret by matching channel numbers with channel numbers on top of turret.

e. Check bottom of turret and top of turret mount (53) for relative positions of guide pin and guide pin slot before returning turret to assembly.

f. Adjust support bracket (48) and sensitive switch double-angle bracket (76) to outer limits of mounting slots so that they do not touch turret.

5-152. Test Procedure. This paragraph gives procedures for testing the Turret Assembly after reassembly (figure 5-73). Proceed as follows.

a. After Turret Assembly has been reinstalled on chassis and chassis has been returned to its case, leave chassis in locked-out position, and pull Interlock switch up.

WARNING

Lethal voltages are present in the AM-3007/URT during normal operation.

b. Set up T-827B/URT for USB operation.

c. Set PRIMARY POWER ON-OFF circuit breaker to ON.

d. Tune T-827B/URT to 2.000 MHz.

e. Check that AM-3007/URT turret rotates and comes to rest with channel 1 contacts approximately in line with stator contacts.

f. Change T-827B/URT frequency at random while observing position of turret contacts and start contacts as turret rotates. It may be necessary, for more accurate check of alignment, to reset stator bracket to reduce clearance between rotor contacts and stator contacts.

g. When vertical alignment of stator contacts appears approximately correct, and there are no bent rotor or stator contacts, proceed as follows.

CAUTION

Remember that the turret cannot be rotated by hand, and that programmed changes in turret position are not easily interrupted. Any severe misalignment between contacts will damage either the contacts or the turret drive mechanism.

1. Loosen support bracket (48) and position stator contacts to engage rotor contacts. See figure 5-5 for illustration of proper contact orientation. Tighten support bracket securely.

2. Loosen double-angle bracket (76) and position sensitive switch (78) against turret cam so that switch is actuated by cam.

3. By random rotation of T-827B/URT frequency controls, actuate turret drive mechanism. Observe that turret and stator contacts mesh properly. Observe that switch actuator (74) is positioned so that switch opens just before turret contacts disengage from stator contacts.

h. Tune T-827B/URT to frequency within limits of each successive channel listed in table 5-5, and check to see that AM-3007/URT correctly programs for each channel. In each position, check alignment of contacts and action of sensitive switch.

TABLE 5-5. RADIO FREQUENCY AMPLIFIER AM-3007/URT, FREQUENCY CHART

TURRET CHANNEL	FREQUENCY BAND (MHz)
1	02.000 - 02.499
2	02.500 - 02.999
3	03.000 - 03.499
4	03.500 - 03.999
5	04.000 - 04.999
6	05.000 - 05.999
7	06.000 - 06.999
8	07.000 - 07.999
9	08.000 - 09.999
10	10.000 - 11.999
11	12.000 - 13.999
12	14.000 - 15.999
13	16.000 - 17.999
14	18.000 - 19.999
15	20.000 - 21.999
16	22.000 - 23.999
17	24.000 - 25.999
18	26.000 - 27.999
19	28.000 - 29.999

i. Slide chassis into case, and tighten front panel screws.

5-153. ANTENNA COUPLER CU-937/UR ALIGNMENT AND ADJUSTMENT.

5-154. GENERAL. The alignment and adjustment procedures for the CU-937/UR are described in paragraphs 5-155 through 5-161. In these paragraphs, prefix all reference designations with "5" to obtain the complete designation for all CU-937/UR components.

NOTE

After alignment and adjustment is completed, refer to paragraph 5-178 to return the CU-937/UR to system operation.

5-155. SPECIAL TEST CABLE REQUIRED. A special test cable must be fabricated, as shown in figure 5-6, for use in adjusting the CU-937/UR. Materials required are an MS-3106A28-12S connector, an MS-3116J20-39P connector, and 20 ten-foot lengths of AWG number 20 wire. Wire the connectors as shown in figure 5-6.

5-156. TEST EQUIPMENT REQUIRED. Multimeter AN/PSM-4( ) is required to adjust the CU-937/UR.

5-157. REMOVAL OF CU-937/UR FROM CASE. For alignment and adjustment, remove the CU-937/UR from its case using the following procedure.

a. Disconnect cables from connectors J1 and J2 on CU-937/UR (figure 5-86).

b. Remove eight screws and washers from end plate.

c. Carefully slide CU-937/UR chassis out of case.

d. Place CU-937/UR on bench with wraparound shield to right.

e. Remove wraparound shield from chassis by rotating chassis until rolled edge of wraparound shield is at top. Place palm of right hand on rolled edge of wraparound shield. Steady chassis with left hand. Press down on rolled edge and slide rolled edge forward until it clears lock slots. Pull rolled edge forward until wraparound shield is removed completely.

5-158. ALIGNMENT OF SWITCH S3 (Figure 5-85). If switch S3 or coils L2 or L3 are removed or replaced, the proper programming procedure for the CU-937/UR must be reestablished by the following procedure.

a. Loosen two hex-head screws holding switch S3 center shaft bearing block on center bulkhead.

b. Loosen four mounting screws on switch S3 assembly and disengage switch S3 from gear train.

c. Loosen four mounting screws from motor B2 mounting clamp and slide motor back to disengage it from gear train.

d. Turn coil L2 by hand until coil roller is against limit switch and at end of winding against soldered connection on geared end of coil.

e. Observe that coil L3 roller is also at end of winding against soldered connection on geared end of coil.

f. If coil L3 roller does not arrive at soldered connection or if coil rollers on both coils are not against soldered coil termination, loosen L2 coil bracket mounting enough to disengage L2 drive gear, and rotate L2 and L3 until they index properly. Tighten L2 coil mounting.

g. Place switch S3 in position shown in figure 5-7 by rotating S3 assembly drive gear.

h. With switch S3 assembly and motor B2 disengaged from gear train, connect short clip lead between TB1-1 and chassis ground.

i. Connect special test cable from J1 on CU-937/UR to 3A1A3J4 on AM-3007/URT, and set PRIMARY POWER ON-OFF circuit breaker to ON.

j. Observe that motor B2 rotates in clockwise direction when viewed from end opposite geared end of motor.

k. Turn drive gear on switch S3 assembly clockwise (when viewed from switch S3 side of gear) until motor B2 stops rotating. Then turn gear counterclockwise approximately one-third turn. Motor will rotate again.

l. Set PRIMARY POWER ON-OFF circuit breaker to OFF.

m. Engage motor B2 into gear train and tighten clamp screws.

n. Engage switch S3 assembly into gear train carefully so that setting of drive gear is not disturbed.

o. Check and tighten all mounting gears on switch S3, motor B2, and coils L2 and L3, including S3 center shaft mounting block on center bulkhead.

p. Remove clip lead connected between TB1-1 and chassis ground.

q. Set PRIMARY POWER ON-OFF circuit breaker to ON. Observe that motor B2 operates and coil rollers on coils L2 and L3 advance until coils are in endstop position.

5-159. ALIGNMENT OF SWITCH S5 (Figure 5-86). To align switch S5 with switch S4, use the following procedure.

a. Note all terminal connections to TB1 (refer to table 5-6). Remove one wire at a

TABLE 5-6. ANTENNA COUPLER CU-937/UR, ANTENNA PROGRAMMING CHART

TB1	15-FOOT WHIP ANTENNA WIRE NUMBER	25-FOOT WHIP ANTENNA WIRE NUMBER	35-FOOT WHIP ANTENNA WIRE NUMBER
1	4	4	4
2	Blank	Blank	Blank
3	Blank	Blank	Blank
4	1	1	1
5	2	2	Blank
6	5, 9	Blank	9
7	Blank	5	2, 6
8	3, 6	3, 6	5, 7
9	7, 8	7, 9	3, 8
10	10	10	10
11	11	8, 11	11

time and label it with number of terminal from which it was removed. Now reconnect all wires so that wires 1 through 11 connect to correspondingly numbered terminals 1 through 11.

b. Connect special test cable from J1 on CU-937/UR to 3A1A3J4 on AM-3007/URT.

c. Apply power to communications system set up for USB operation. Tune transmitter to 02.000 MHz.

NOTE

Switch S4 is now set to network 1 position.

d. Turn off all power and remove special test cable.

e. Loosen universal coupling clamp so coupling will turn on shaft of switch S4.

f. Carefully rotate shaft of switch S5 to position listed in table 5-7.

g. Tighten universal coupling clamp while ensuring present position of switches S4 and S5 is not disturbed.

5-160. ALIGNMENT OF LIMITING SWITCHES (Figure 5-86). To align limiting switch S1 on coil L1 and limiting switch S2 on coil L2, proceed as follows.

a. Connect special test cable from J1 on CU-937/UR to 3A1A3J4 on AM-3007/URT, and set PRIMARY POWER ON-OFF circuit breaker to ON.

b. Loosen adjusting screw on limit switch at front coil bracket of coil L1 until switch contact is well away from coil roller. Operate ANT CPLR LOAD switch on AM-3007/URT until coil roller is one-quarter to one-half inch from end of coil winding at front end of coil.

c. Connect Multimeter AN/PSM-4( ) leads between roller shaft connection and switch contact termination on front coil bracket.

d. Set multimeter on low resistance range.

CAUTION

Do not attempt to rotate coil while multimeter is connected. During motor operation, dc voltage at limit switch contacts will damage meter.

TABLE 5-7. COMPONENT REFERENCE POINTS FOR NETWORK 1

COMPONENT	REFERENCE POINT
S3 (top view)	One clip made (figure 5-7).
S4 (section 1 next to actuator B3)	Only one clip open - one position clockwise from wiper.
S4 (section 2)	Only one clip shorted - one position clockwise from wiper.
S5 (section 1)	Rotor wipers on terminals 5 and 6 connected to capacitors C1 and C2.
S5 (section 2)	Rotor wiper on terminal 3.
S5 (section 3)	Rotor wiper on terminal 3.
L1, L2, and L3	All rollers approximately 1/2 inch from end of coil wire, next to drive mechanism.

e. Carefully adjust adjusting screw until multimeter indicates that contact is touching roller.

f. Remove multimeter from circuit.

g. Operate ANT CPLR LOAD switch to rotate coil L1 and check that proper action of limit switch causes motor to stop when roller is within one-quarter to one-half inch from end of winding.

h. Follow procedure in steps b. and g. to adjust limit switch contact on low end of coil L1.

NOTE

During adjustment of adjusting screw, connect multimeter between roller shaft termination on front bracket and rear limiting switch contact termination on rear bracket.

i. Follow procedure in steps b. through h. to adjust contacts of limit switch S2 on coil L2. Rotate L2 by using ANT CPLR TUNE switch.

5-161. NETWORK PROGRAMMING OF ANTENNA COUPLER. The following procedure will establish that the CU-937/UR is programming correctly for each of the eleven networks.

NOTE

This procedure is a complete performance check to be used before any parts replacement, after all adjustments included in paragraphs 5-158, 5-159 and 5-160.

a. Check that TB1 is wired properly. (Refer to paragraph 5-159, step a.)

b. Connect special test cable from J1 on CU-937/UR to 3A1A3J4 on AM-3007/URT.

c. Set PRIMARY POWER ON-OFF circuit breaker to ON.

d. Set transmitter for USB operation and 02.000 MHz.

e. Observe that CU-937/UR programs immediately to network 1 position.

NOTE

If the CU-937/UR is already established in Network 1 position, nothing will happen. Refer to table 5-7 for relative switch contact and coil positions.

f. Tune transmitter to 03.000 MHz. CU-937/UR should program immediately to network 2 position. Switches S4 and S5 should step one position clockwise and coils L2 and L3 should rotate until coil roller on L2 is two turns from geared end. ANT CPLR TUNE indicator on AM-3007/URT will be continuously lit while coil L2 is programming.

g. Hold ANT CPLR TUNE switch at HI. Count number of times that ANT CPLR TUNE indicates flashes (should be four times). Coil L2 roller should be against limit switch contact at geared end of coil.

h. Follow procedure in steps d. through g. to program CU-937/UR from network 3 position through network 11 position. Obtain frequencies and coil conditions for each network position from table 5-8. In each case observe the following.

1. ANT CPLR TUNE indicator remains lit while coils L2 and L3 are programming. Note also that indicator flashes proper number of times when coil L2 is returned to high inductance end of winding (next to gears) while ANT CPLR TUNE switch is held at HI.

2. Switches S4 and S5 should advance one position for each successive network position setting. Coils L2 and L3 should advance proportional distance from geared end of coils until, at network 11 position, roller of coil L2 is approximately 1-1/2 inches from opposite end of coil winding and roller of coil L3 is approximately two turns from end.

i. Check operation of loading coil L1 by using ANT CPLR LOAD switch. Observe the following.

1. Note that, while coil is rotating, ANT CPLR TUNE indicator flashes once for each coil revolution.

2. Note that if CU-937/UR is programmed with load coil L1 roller in any other position, motor B2 is activated to return coil roller to limit switch contact on motor end of coil.

TABLE 5-8. ANTENNA COUPLER CU-937/UR, NETWORK POSITIONS*

NETWORK	TRANSMITTER FREQUENCY (MHz)	LIGHT FLASHES	APPROXIMATE TURNS ROLLER IS ADVANCED FROM GEARED END OF COIL	
			L2	L3
**1	2.000	--	1/2	1/2
2	3.000	4	2	5
3	4.000	8	4	9
4	6.000	12	6	13
5	8.000	16	7	18
6	10.000	20	9	22
7	14.000	24	11	27
8	18.000	28	12	31
9	22.000	32	14	36
10	26.000	36	16	40
11	28.000	40	last turn	2 turns from end

* The transmitter frequencies and network positions in this chart are dependent upon the use of special test cable fabricated in paragraph 5-155, and with TB1 in the CU-937/UR wired according to step a. of paragraph 5-159.

** For the positions of all switches and coils in network 1 position, refer to table 5-6.

5-162. ANTENNA COUPLER CU-937/UR SHIPBOARD REPAIR

5-163. GENERAL. The repair procedures for the CU-937/UR are described in paragraphs 5-164 through 5-177. In these paragraphs, prefix all reference designations with "5" to obtain the complete designation for all CU-937/UR components.

5-164. DISASSEMBLY. It is not necessary to completely disassemble the CU-937/UR. The following paragraphs describe the procedures for removing those components for which the removal procedure is not obvious, and also describe the cleaning, inspection, parts replacement and reassembly procedures for the CU-937/UR.

5-165. REMOVAL OF CU-937/UR FROM CASE. For repair, remove the CU-937/UR from its case using the following procedure.

a. Disconnect cables from connectors J1 and J2 on CU-937/UR.

b. Remove eight screws and washers from end plate.

c. Carefully slide CU-937/UR chassis out of case.

d. Place CU-937/UR on bench with wrapaground shield to right.

e. Remove wraparound shield from chassis by rotating chassis until rolled edge of wraparound shield is at top. Place palm of right hand on rolled edge of wraparound shield. Steady chassis with left hand. Press down on rolled edge and slide rolled edge forward until it clears lock slots. Pull rolled edge forward until wraparound shield is removed completely.

f. Before removing any components, establish reference setting for all coils and switches as follows:

1. Note all terminal connections to TB1 (refer to table 5-6). Remove one wire at a time and label it with number of terminal from which it was removed. Now reconnect all wires so that wires 1 through 11 connect to correspondingly numbered terminals 1 through 11.

2. Connect special test cable from J1 on CU-937/UR to 3A1A3J4 on AM-3007/URT.

3. Apply power to communications system set up for USB operation. Tune transmitter to 02.000 MHz.

4. Hold ANT CPLR LOAD switch at HI until rotor of coil L1 is against limit switch nearest motor B1 and coil L1 stops rotating. Release ANT CPLR LOAD switch.

5. Hold ANT CPLR TUNE switch at HI until coils L2 and L3 stop rotating with rotor of coil L3 resting against limit switch nearest gear.

6. Refer to table 5-7 and note reference points for switches and coils listed.

7. Turn off all power. Disconnect special test cable.

NOTE

After repair is completed, refer to paragraph 5-178 to return the CU-937/UR to system operation.

5-166. REMOVAL OF MOTOR B1 OR B2. To remove motor B1 or motor B2, proceed as follows:

a. Unsolder motor leads at rear of motor housing, and tag each lead with polarity.

NOTE

Observing lead polarity is important since motors B1 and B2 are dc motors.

b. Loosen four screws on motor clamp until motor is free to rotate.

c. Carefully rotate motor by hand until setscrew in coupling (for B1) of motor drive shaft gear (for B2) is accessible. Loosen setscrew.

d. Again carefully rotate motor by hand until roll pin in coupling (for B1) or in motor drive shaft gear (for B2) is accessible. Drive out roll pin.

e. Remove four screws loosened previously and remove motor clamp.

f. Disengage motor by sliding it away from gear train or coupling, and lift out motor.

5-167. REMOVAL OF ACTUATOR B3. To remove actuator B3, proceed as follows.

a. Unsolder and tag leads at rear of actuator housing.

NOTE

The actuator is dc-operated. Observing lead polarity is important.

b. Loosen two hex-head screws on bearing block located on front plate of switch S.

c. Remove four screws, eight washers, and four nuts located at corners of actuator housing.

d. Disengage actuator drive gear from switch shaft spur gear, and lift out actuator.

5-168. REMOVAL OF LOADING COIL L1. To remove loading coil L1, proceed as follows.

a. Connect special test cable from J1 on CU-937/UR to 3A1A3J4 on AM-3007/URT and set PRIMARY POWER ON-OFF circuit breaker to ON.

b. Operate ANT CPLR LOAD control until roll pin in nylon drive coupling is accessible.

c. Turn off AM-3007/URT and disconnect special test cable from CU-937/UR.

d. Drive roll pin out of coupling.

NOTE

Carefully note position of end of coil winding in relation to cam on the nylon drive coupling. The coil must be reassembled in the same phase relationship to the cam.

e. Loosen four screws on motor clamp. Carefully slide motor away from coil assembly to disengage drive coupling.

f. Disconnect leads from limit switch contacts on each end of coil assembly by removing nut, lockwasher, and solder terminal from end of contact mounting bolt.

NOTE

When possible, disconnect wire terminations by removing solder terminal from its mounting rather than by unsoldering the wire. Removing and resoldering a wire repeatedly may damage the wire enough to require its replacement.

g. Disconnect terminal connection between coil L1 and vacuum relay K1 by removing nut, lockwasher, and solder terminal from coil L1.

h. Remove coil assembly from chassis by removing four bolts and four flat washers, and gently easing grounding lug on each end bracket out of way.

i. Remove coil from end brackets as follows.

1. Remove nut, lockwasher, and ground strap from front end of coil roller shaft.

2. Remove spring retainers from ends of coil roller shaft.

3. Remove coil roller by sliding roller shaft out through bearing in coil end bracket.

4. Remove each end bracket from coil by removing mounting bracket and hexhead screw holding coil contact strip. Pull end bracket away from coil shaft.

5-169. REMOVAL OF TUNING COIL L2. To remove tuning coil L2, proceed as follows.

CAUTION

If the mechanical coupling between the three assemblies (switch S3, coil L2, and coil L3) is disturbed in any manner, proper programming of the CU-937/UR tuning must be reestablished by following the alignment procedures in paragraphs 5-158, 5-159, and 5-160.

a. Remove limit switch connections by removing outer nut, lockwasher, and terminal lug from limit switch mounting bolt on each coil end bracket.

b. Remove wire leading to switch S5 by removing nut, lockwasher, and solder lug from bolt on rear coil mounting bracket.

c. Remove wire leading to relay K1 by removing nut, lockwasher, and solder lug from end of coil roller shaft.

CAUTION

Do not allow coil roller shaft to rotate while removing nut from shaft end, or retainer springs will be damaged.

d. Note position of coil roller in relation to end of coil winding.

e. Remove coil assembly by removing four bolts, four lockwashers, and four flat washers, and gently easing grounding lug on each end bracket out of way.

f. Remove coil drive gear by loosening setscrew and driving out roll pin.

g. Remove roller shaft as follows.

1. Remove nut, lockwasher, and terminal strap from front end of shaft.

2. Remove retaining springs from each end of shaft.

3. Slide shaft out through one of coil end brackets.

h. Remove each end bracket from coil by removing two screws from mounting bracket, and removing hexhead screw holding coil contact strip. Pull end bracket away from coil shaft.

5-170. REMOVAL OF TUNING COIL L3. To remove tuning coil L3, proceed as follows.

CAUTION

If the mechanical coupling between the three assemblies (switch S3, coil L2, and coil L3) is disturbed in any manner, proper programming of the CU-937/UR tuning must be reestablished by following the alignment procedures in paragraphs 5-158, 5-159, and 5-160.

a. Note position of coil roller in relation to end of coil winding.

b. Unsolder and tag wire leading to front coil contact from switch S5 terminal.

c. Unsolder lead from rear coil contact of L3.

d. Remove nut and lockwasher from rear bracket supporting stud located on rear chassis bulkhead.

e. Remove coil assembly by removing four bolts, four lockwashers, and four flat washers from coil end bracket.

f. Remove drive gear by loosening setscrew and driving out roll pin.

g. Remove coil roller and shaft as follows.

1. Remove terminal strap from front end of shaft by removing nut and lockwasher.

CAUTION

Do not allow coil roller shaft to rotate while removing nut, or retainer springs will be damaged.

2. Remove coil roller shaft retainer spring.

3. Slide shaft out through end bracket.

h. Remove each end bracket from coil by removing three screws and one washer from mounting bracket and removing hex-head screw holding coil contact strip. Pull end bracket away from coil shaft.

5-171. REMOVAL OF SWITCH S3. To remove switch S3, proceed as follows.

CAUTION

If the mechanical coupling between the three assemblies (switch S3, coil L2, and coil L3) is disturbed in any manner, proper programming of the CU-937/UR tuning must be reestablished by following the alignment procedures in paragraphs 5-158, 5-159, and 5-160.

a. Remove four screws, four lockwashers, and four flat washers that hold TB2 to top of switch S3 assembly.

b. Disconnect terminal lugs from TB1.

c. Remove cable clamp on rear of S3 mounting bracket.

d. Carefully bend cable to move TB2 out of way.

e. Tag and unsolder four wires to wafer of switch S3 from cable on side of switch next to motor B2.

f. Loosen S3 drive shaft bearing block by loosening two hex-head screws on chassis center bulkhead.

g. Remove switch S3 assembly by removing four screws, four lockwashers, and four flat washers, and sliding assembly away from center bulkhead to disengage shaft end.

h. Remove TB1 from switch S3 assembly by removing four mounting screws and four lockwashers, then tagging and unsoldering terminal connections at S3 wafer.

i. Invert switch S3 assembly and remove two screws from switch wafer supporting posts. Lift off switch end plate and two support post spacers. Carefully slide switch wafer off center shaft. Be sure to note which is top and which is bottom side of wafer as it is removed.

5-172. REMOVAL OF SWITCH S4. To remove switch S4, proceed as follows.

a. Note position of rotor contacts on switches S4 and S5. They should be positioned as indicated in table 5-6.

b. Unsolder and tag all top wires on switch S4 wafer contacts.

c. Remove two screws, two lockwashers, and two flat washers from mounting bracket of motor B3.

d. Remove two screws, two lockwashers, and two flat washers from mounting bracket of switch S4.

e. Slide motor and switch assembly away from center chassis bulkhead to disengage universal coupling between switches S4 and S5.

f. Tip switch S4 assembly sideways and unsolder and tag all remaining wires to wafter switch.

g. Remove switch assembly from motor assembly by removing two hex-head bolts, two flat washers, and two lockwashers on switch mounting plate.

h. Remove switch universal coupling from center shaft by loosening allen-head screw and sliding coupling off.

i. Remove spur gear from center shaft by driving out roll pin.

j. Loosen switch end plate by removing two long screws, four flat washers, and four spacers.

k. Remove switch end plate and switch wafers by sliding off center shaft. Be sure to note which is top and which is bottom side of each wafer as it is removed.

5-173. REMOVAL OF SWITCH S5. To remove switch S5, proceed as follows.

a. Remove connections from switch S5 to capacitors C1 and C2 by removing screw and solder lug from top of C1 and C2.

b. Unsolder and tag switch terminal connection to front and rear of coil L3.

c. Unsolder and tag switch terminal connection to relay K1.

d. Remove switch terminal connection to coil L2 by removing nut on L2 rear bracket termination.

e. Loosen mounting brackets of actuator B3 and switch S4 and slide B3 and S4 away from center bulkhead as far as possible to disengage universal coupling on S5 center shaft.

f. Remove rear bulkhead-mounted capacitors C9, C10, C11, and C12 by removing one screw and one lockwasher from each end.

g. Remove two screws, two flat washers, two lockwashers, and two nuts from rear bulkhead mount.

h. Remove switch S5 assembly from chassis by removing four screws, four lockwashers, and four flat washers.

i. Remove capacitors C3, C4, C5, C6, C7, and C8 from switch center bracket by removing screw and lockwasher from each end.

j. Remove universal coupling from shaft end by loosening setscrew and driving out roll pin.

5-174. CLEANING. This paragraph gives procedures for cleaning the CU-937/UR. Each dismantled section of the CU-937/UR should be cleaned thoroughly before reassembly. Clean all parts as follows.

a. Clean CU-937/UR chassis and all of its associated parts using vacuum cleaner, soft lint free cloth, and small brush. Use vacuum cleaner to remove all dust and foreign material. Use brush and cloth to remove any remaining foreign material.

b. Clean three coils with lint-free cloth.

WARNING

Exercise caution when using trichloroethylene. Avoid inhaling fumes where possible. Keep away from eyes and open cuts. Immediately after using, wash hands thoroughly.

CAUTION

Do not use trichloroethylene on any oilite self-lubricating type bearing.

5-175. INSPECTION. After cleaning carefully inspect all parts as follows.

a. Inspect all metal parts for signs of corrosion and salt contamination.

b. Inspection contact strips on rear of rear chassis bulkhead.

c. Check center pin on rear bulkhead for signs of arcing which indicate poor contact with mating antenna termination.

d. Inspect neoprene gasket on front and rear chassis bulkhead.

e. Inspect all switches as follows.

1. Check for signs of cracked or broken wafers.

2. Check switches for broken or badly worn contacts.

3. Check each contact for signs of arcing.

4. Carefully inspect each insulated part of switch for any contamination that could cause arcing.

f. Inspect all coils as follows.

1. Check for signs of damage to coil form.

2. Rotate coil in end brackets to check bearings.

3. Make sure that spacing between coil turns remains uniform.

4. Check coil roller and coil winding for signs of excessive wear. If silver plating has been worn off coil, replace coil.

g. Check motors for signs of overheating.

h. Inspect all gears and bearings in gear assemblies for signs of excessive wear.

i. Check lead dress of all solid wire connections between switch S5 and coils and capacitors during assembly. Check for signs of arcing where these wires pass close to chassis.

j. Check all capacitors and relays for signs of damage or arcing.

k. Inspect nylon shaft couplings between motor B1 and coil L1 and between switches S4 and S5.

l. Inspect cams and actuators of sensitive switches S6 and S7 for signs of excessive wear.

5-176. REPLACEMENT OF PARTS. After inspection, replace any parts found damaged. Refer to the parts list in Section 6 for part numbers. Carefully follow any procedures for parts dismantling, and for coupler reorientation after parts replacement.

5-177. REASSEMBLY. Each item removed from CU-937/UR is replaced or reassembled by reversing the procedures described in paragraphs 5-166 through 5-173. No lubrication is required. During the assembly process, take careful note of the following.

a. To avoid damage to coil drive mechanisms, reset limit switch contacts on coils L1 and L2 if positioning of contacts has been disturbed or if coil has been replaced.

b. During assembly of switch S4, align center contact with outer contact by positioning two switch assembly bolts and two hex-head end plate mounting bolts in their slots.

5-178. ANTENNA COUPLER CU-937/UR, RETURNING TO SYSTEM OPERATION.

5-179. After alignment, adjustment, or repair of the CU-937/UR, proceed as follows.

a. Check to see that any loosened mounting hardware is properly tightened.

b. Check lead dress of all bare wires on coil and switch assemblies.

NOTE

If CU-937/UR is connected to an AM-3007/URT for below-deck test prior to installation, and no antenna is available, fabricate a 35-foot antenna simulator in accordance with BUSHIPS plan RE66C2154. Refer to table 5-6 to ensure that the CU-937/UR is programmed for a 35-foot whip antenna.

c. Rewire TB1 to meet configuration requirements of antenna to be used in communication system. Refer to table 5-6 for additional information.

d. Replace wraparound shield on front section of CU-937/UR.

e. Return CU-937/UR to its case and reposition case at base of system antenna.

f. Connect antenna and system cables to CU-937/UR.

g. Reconnect system cable connector P4 to J4 on AM-3007/URT.

h. Follow proper operating procedures described in Section 2 (Volume II), NAVSHIPS 0967-427-5020, to select frequency and energize system. Check to see that CU-937/UR properly tunes and loads antenna at that frequency by observing forward and reflected power indications on RF OUTPUT meter on AM-3007/URT.

5-180. DIAGRAMS.

5-181. Following the test setup and associated diagrams (figure 5-1 through 5-7) are interconnection, power distribution, schematic, and component location diagrams as listed in the following chart.

FIGURES	DIAGRAMS
5-8 through 5-12	Interconnection and Power Distribution Diagrams
5-13 through 5-27	T-827B/URT Schematic Diagrams
5-28 through 5-32	AM-3007/URT Schematic Diagrams
5-33	CU-937/UR Schematic Diagram
5-34 through 5-58	T-827B/URT Component Location Diagrams
5-59 through 5-83	AM-3007/URT Component Location Diagrams
5-84	J-1265/U Component Location Diagram
5-85 and 5-86	CU-927/UR Component Location Diagrams

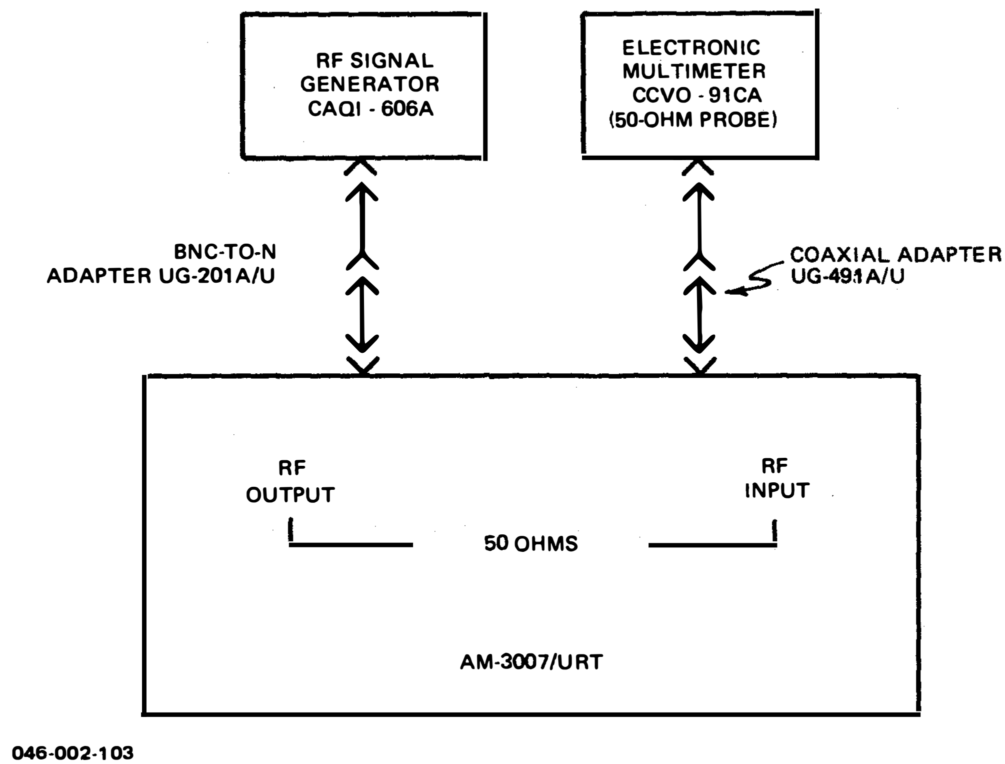


Figure 5-1. AM-3007/URT Bridge Balance Adjustment, Test Setup

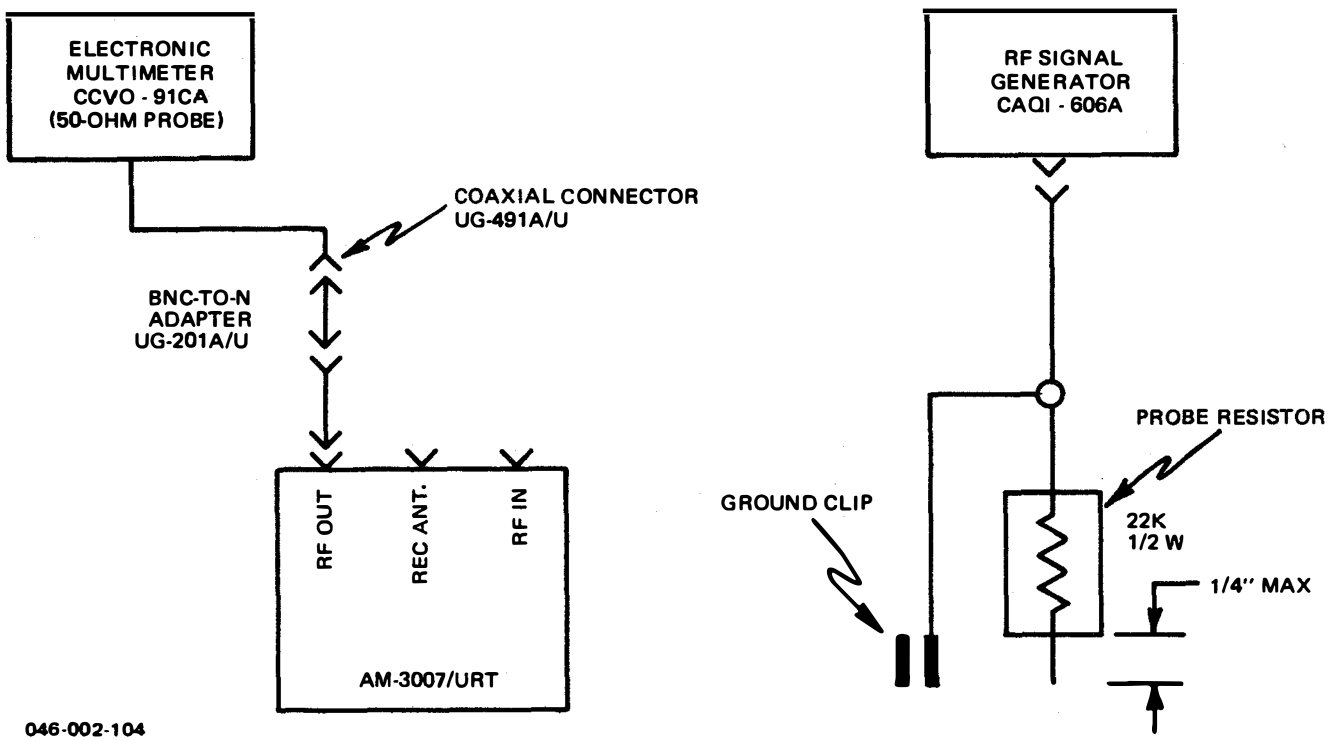


Figure 5-2. AM-3007/URT Secondary Capacitance Adjustment, Test Setup

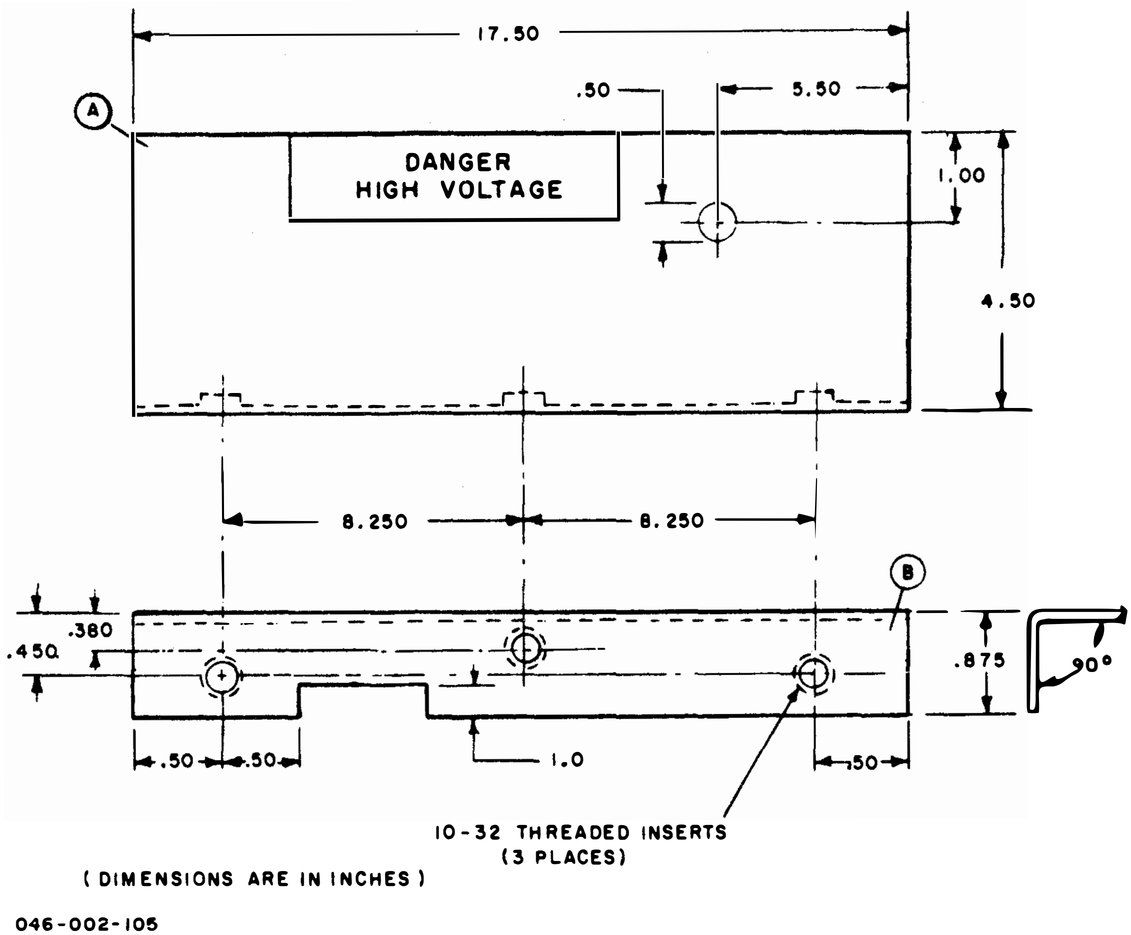


Figure 5-3. Special Capacitance Shield for AM-3007/URT

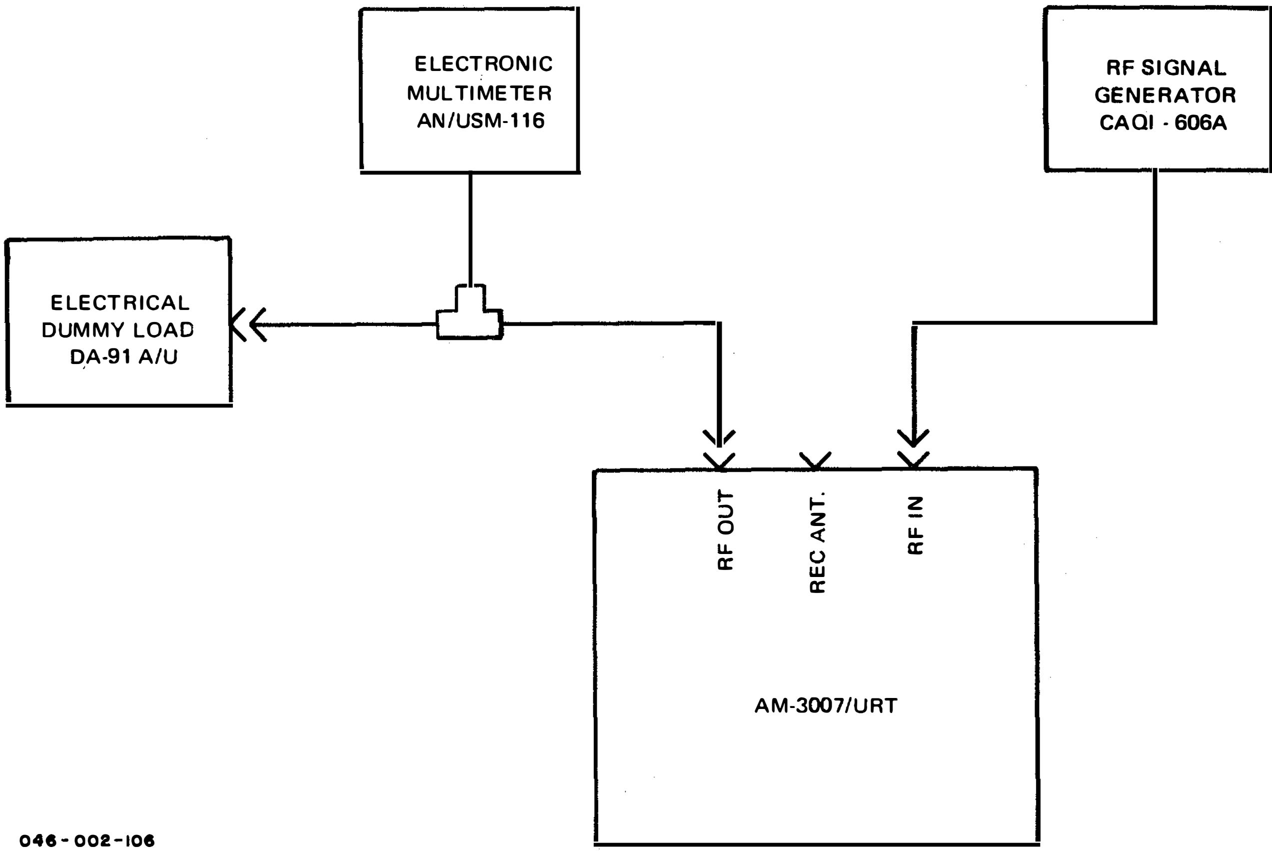


Figure 5-4. AM-3007/URT Plate Trimmer Adjustment, Test Setup

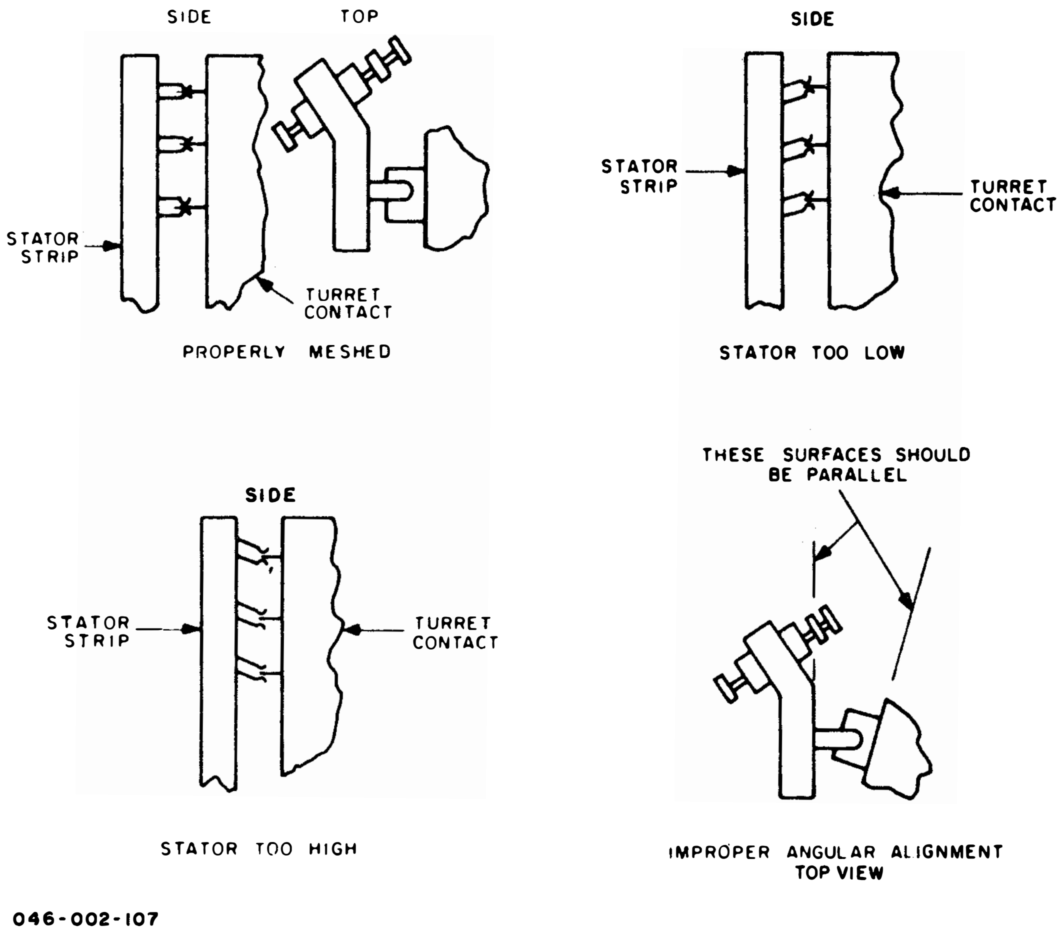


Figure 5-5. AM-3007/URT Turret Stator Contact Alignment

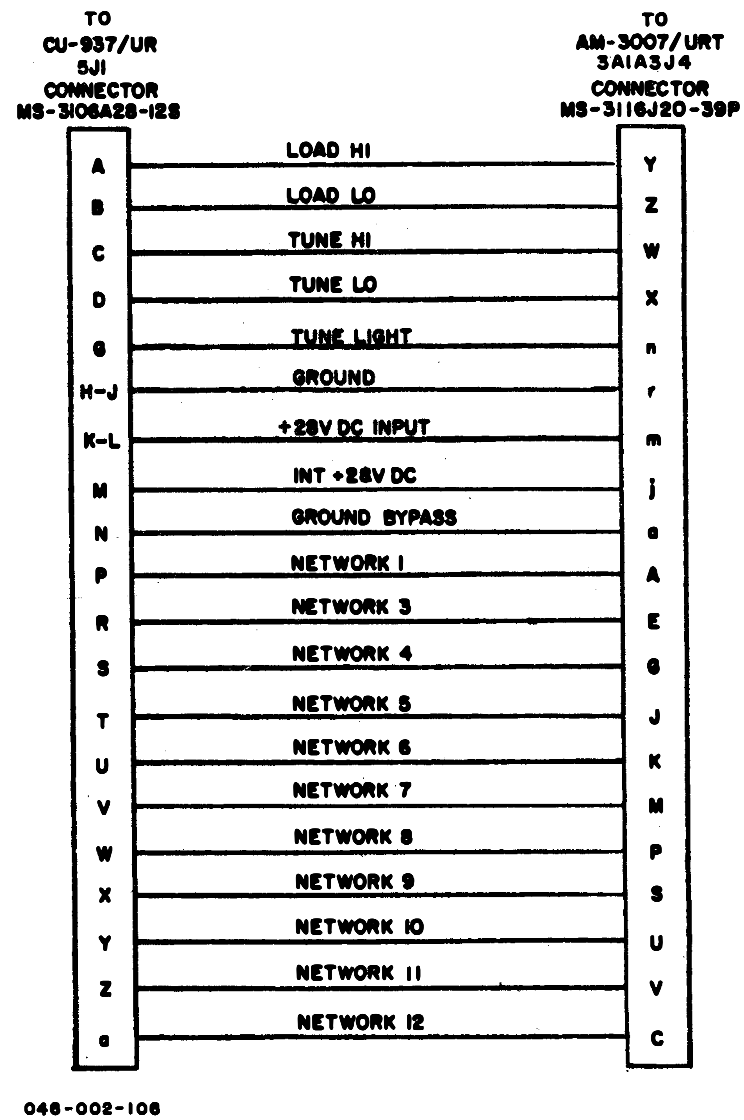


Figure 5-6. Special Test Cable, CU-937/UR-to-AM-3007/URT

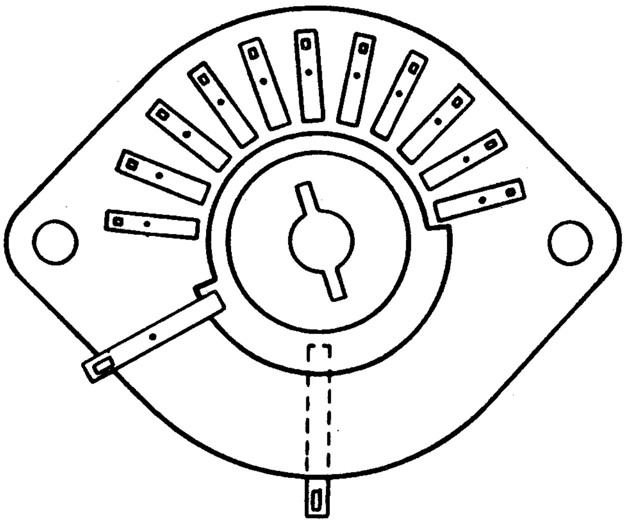
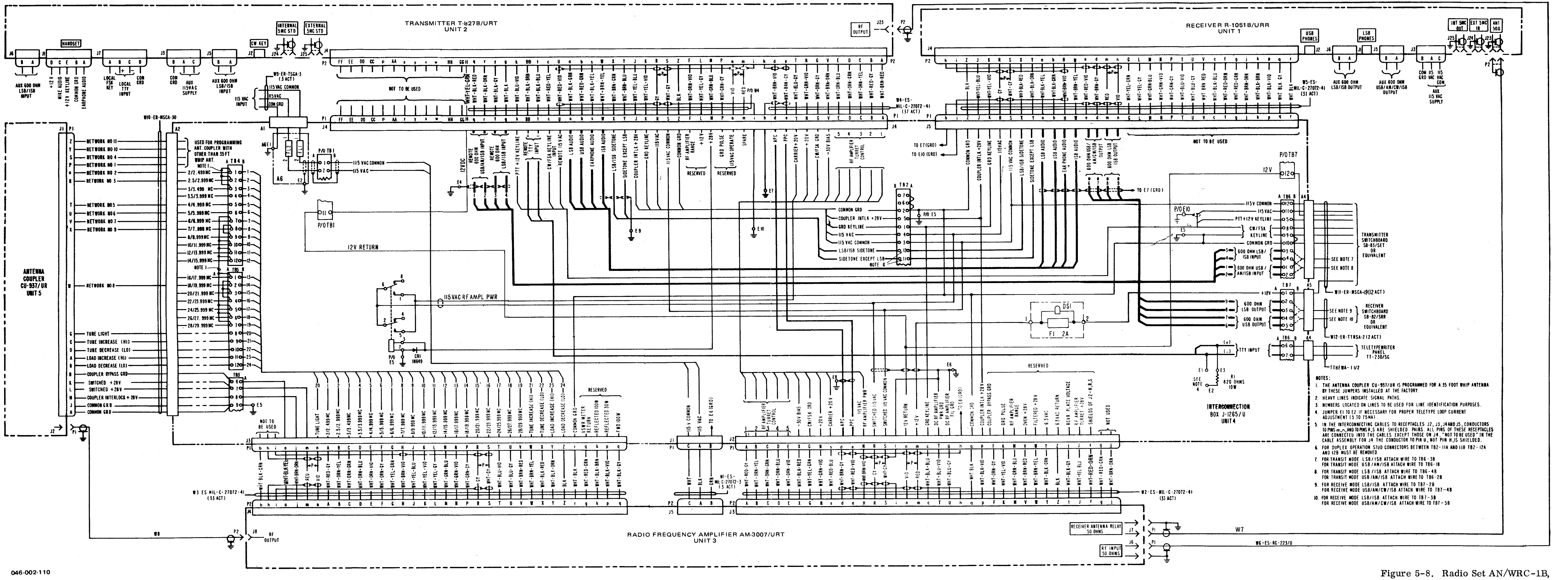


Figure 5-7. CU-937/UR Switch S3 Alignment



046-002-110

Figure 5-8. Radio Set AN/WRC-1B, Interconnecting Diagram

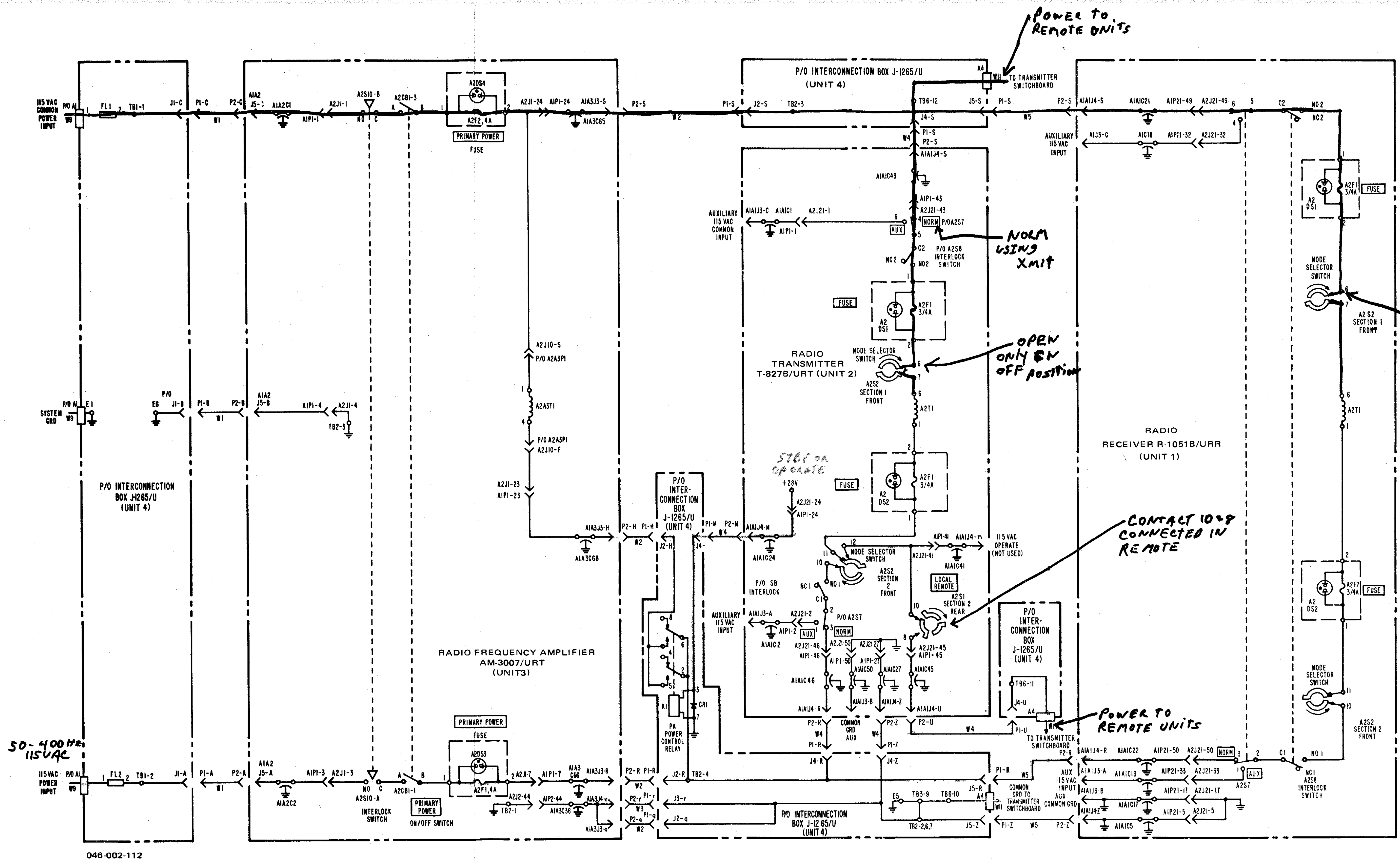
CAUTION

WHEN MAKING RESISTANCE CHECKS AT SEMI-CONDUCTOR DEVICES, USE ONLY THE HIGHER SCALES OF THE MULTIMETER SO AS TO AVOID UNINTENTIONAL DAMAGE TO THE SEMI-CONDUCTOR DEVICE DUE TO THE METER'S INTERNAL VOLTAGE.

NOTE:

PREFIX ALL REF DES IN THE T-827B/URT WITH 2A2, AND IN THE AM-3007/URT WITH 3A2.

Figure 5-9. Radio Set AN/WRC-1B, System Keying Diagram



NOTES:
1. PREFIX ALL REFERENCE DESIGNATIONS WITH THE APPLICABLE UNIT NUMBER.
2. ALL FEED-THROUGH CAPACITORS ARE 0.001 UF.
3. ALL SWITCHES ARE SHOWN IN THE OFF OR EXTREME CCW POSITION UNLESS OTHERWISE INDICATED.
4. POWER REQUIREMENTS-AN-WRC-1 B:
   a. VOLTAGE-115VAC ± 10% SINGLE PHASE
   b. FREQUENCY-48 TO 450 CPS
   c. POWER-STAND-BY (ALL UNITS) 140 WATTS ON AND KEYED, 50 WATTS OUTPUT (CW)-375 WATTS
5. [ ] INDICATES EQUIPMENT OPERATION MARKINGS (FRONT PANEL CONTROL)

OPEN only in OFF position

Figure 5-10. Radio Set AN/WRC-1B Primary Power Distribution Diagram

Figure 5-11. Radio Set AN/WRC-1B, System 28-Vdc Power Distribution

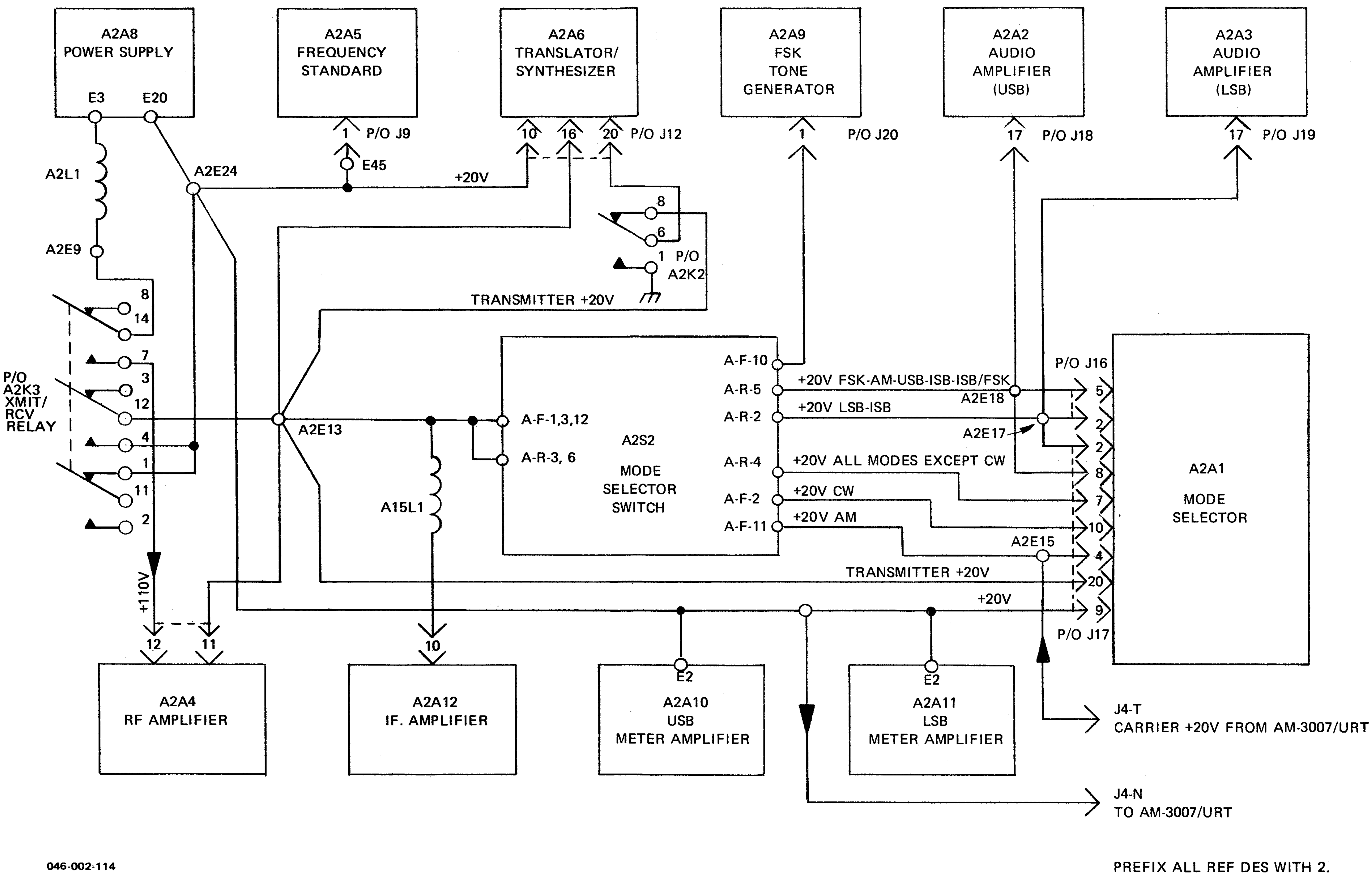


Figure 5-12. Radio Transmitter T-827B/URT, +110-Vdc and +20-Vdc Distribution Diagram

PARTS LOCATION INDEX FOR 2A1

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
A1C14	20G	A1C29	5G	A1C44	5G
A1C15	20G	A1C30	5G	A1C45	14G
A1C16	4G	A1C31	3G	A1C46	20G
A1C17	19G	A1C32	19G	A1C47	12G
A1C18	5G	A1C33	2G	A1C48	13G
A1C19	12G	A1C34	14G	A1C49	13G
A1C20	16G	A1C34-1	13G	A1C50	19G
A1C21	15G	A1C35	2G	A1J3	19G
A1C22	14G	A1C36	4G	A1J4	2G, 12G, 17G, 20G
A1C23	3G	A1C37	15G	A1J5	13G
A1C24	12G	A1C38	14G	A1J6	13G
A1C25	12G	A1C39	5G	A1J7	12G
A1C26	3G	A1C40	19G	J23	10C
A1C27	19G	A1C41	18G	J24	11C
A1C27-1	13G	A1C42	6G	J25	11C
A1C28	3G	A1C43	20G	P1	2F, 20F

PARTS LOCATION INDEX FOR 2A2

A8R13	7F	C3	10F	E45	9B
A8R14	7E	C4	10B	E46	9B
A8R15	8E	C5	9B	F1	19E
A8R16	15D	CR1	7F	F2	17D
A9	12A	CR2	3D	J1	11F
A9P1	12B	CR3	4E	J2	10F
A10	14C	CR4	11D	J8	2B
A10C1	21C	CR5	15D	J9	11B
A10C2	22C	CR6	7E	J10	3B
A10C3	22C	CR7	19D	J11	4B
A10Q1	21C	CR8	10F	J12	7B
A10R1	21C	CR9	3D	J13	7A
A10R2	21C	DS1	19E	J14	5A
A10R3	21C	DS2	17D	J15	20B
A10R4	21C	E1	2C	J16	17B
A10R5	21C	E2	6B	J17	19B
A10R6	22C	E3	6E	J18	16B
A10R7	21C	E4	13F	J19	14B
A10R8	21C	E5	2C, 3B, 9C, 11D	J20	13B
A10R9	22C	E6	13F	J21	2F
A11	16C	E7	13F	J22	10C
A11C1	21C	E8	10F	K1	7F
A11C2	22C	E9	9C	K2	2D
A11C3	22C	E10	9C	K3	4E
A11Q1	21C	E11	10E	K4	11D
A11R1	21C	E12	10F	K5	16D
A11R2	21C	E13	5C, 18C	K6	7E
A11R3	21C	E14	5D	L1	8C
A11R4	21C	E15	19D	L2	9D
A11R5	21C	E16	10F	M1	15C
A11R6	22C	E17	18B	M2	17C
A11R7	21C	E18	18B	Q1	7E
A11R8	21C	E19	16E	R1	9C
A11R9	22C	E20	16E	R2	9D
A12	20A	E21	16D	R3	10F
A12P1	20B	E22	9D	R4	13F
A13	9D	E23	10E	R5	5D
A13DS3	9D	E24	10E	S1-1-F	14D
A13DS4	9D	E26	9C	S1-1-R	14E
A14	11F	E27	5C, 5F, 15B, 20B,	S1-2-F	14D
A14C1	11E		20D	S1-2-R	14E
A14C2	11E	E28	16B	S2-1-F	18D
A14C3	11F	E29	3D, 7E, 8B, 13C,	S2-1-R	18E
A14C4	11F		18B	S2-2-F	17D
A14L1	11F	E30	16B	S2-2-R	17E
A15	4C, 20C	E31	13C	S2-3-F	16D
A15C1	20C	E32	9D	S2-3-R	16E
A15C2	20C	E33	9C, 11E, 12B	S2-4-F	19C
A15C3	20C	E34	17B	S2-4-R	19D
A15L1	19C	E35	4E	S3	1F, 1G
A15L2	20C	E36	15C	S4	1F, 1G
A15L3	20C	E37	5F, 13B, 15C, 19F	S5	1G, 5E, 6E
A15R1	4C	E38	12F, 15F	S6	1G, 6C, 6D
A16	5D	E39	5E, 14B, 16E, 17C	S7	19F
A16C1	5D	E40	15C	S8	20E
A16CR1	5D	E41	15F	S9	15F
C1	9C	E42	9D, 10F	S10	14C
C2	7E	E43	15F	S11	15C
		E44	9C	T1	7C

FROM (-30VDC) AM-3007

TO REMOTE HANDSET

GOES TO INTERCONNECTION K1 TO APPLY PRIMARY POWER

Figure 5-13. Radio Transmitter T-827B/URT, Overall Schematic Diagram (Sheet 1 of 2)

GREEN +28VDC
BLUE +20VDC

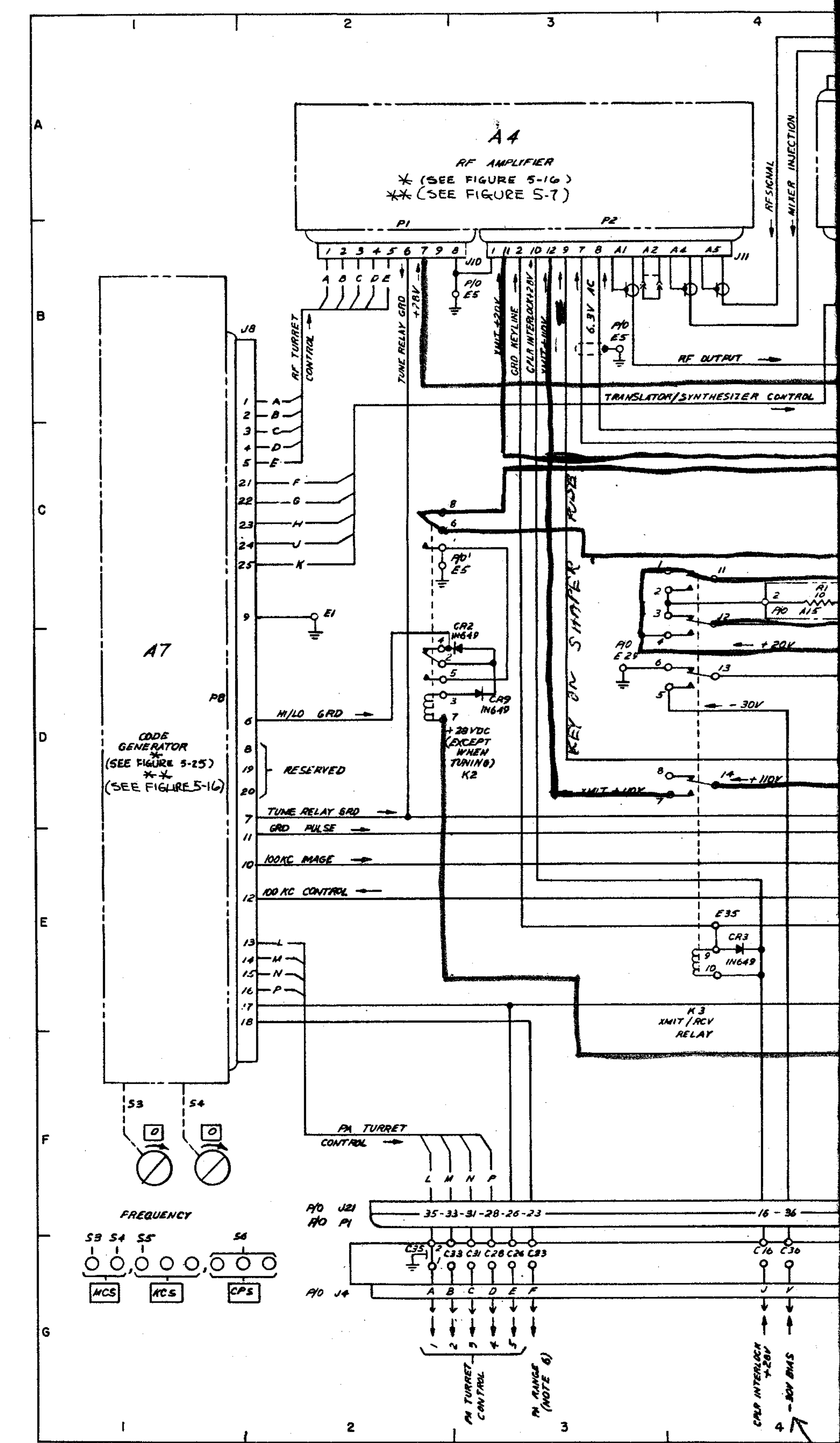
Violet +110VDC

PARTS LOCATION INDEX FOR 2A1

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
A1C1	19G	A1C14	20G	A1C29	5G	A1C44	5G
A1C2	19G	A1C15	20G	A1C30	5G	A1C45	14G
A1C3	6G	A1C16	4G	A1C31	3G	A1C46	20G
A1C4	12G	A1C17	19G	A1C32	19G	A1C47	12G
A1C5	12G	A1C18	5G	A1C33	2G	A1C48	13G
A1C6	5G	A1C19	12G	A1C34	14G	A1C49	13G
A1C7	15G	A1C20	16G	A1C34-1	13G	A1C50	19G
A1C8	15G	A1C21	15G	A1C35	2G	A1J3	19G
A1C8-1	13G	A1C22	14G	A1C36	4G	A1J4	2G, 12G, 17G, 20G
A1C9	12G	A1C23	3G	A1C37	15G	A1J5	13G
A1C10	14G	A1C24	12G	A1C38	14G	A1J6	13G
A1C10-1	13G	A1C25	12G	A1C39	5G	A1J7	12G
A1C11	15G	A1C26	3G	A1C40	19G	J23	10C
A1C11-1	13G	A1C27	19G	A1C41	18G	J24	11C
A1C12	18G	A1C27-1	13G	A1C42	6G	J25	11C
A1C13	4G	A1C28	3G	A1C43	20G	P1	2F, 20F

PARTS LOCATION INDEX FOR 2A2

A1	17A	A8R13	7F	C3	10F	E45	9B
A1P1	16B	A8R14	7E	C4	10B	E46	9B
A1P2	18B	A8R15	8E	C5	9B	F1	19E
A2	15A	A8R16	15D	CR1	7F	F2	17D
A2P1	15B	A9	12A	CR2	3D	J1	11F
A3	13A	A9P1	12B	CR3	4E	J2	10F
A3P1	13B	A10	14C	CR4	11D	J8	2B
A4	3A	A10C1	21C	CR5	15D	J9	11B
A4P1	2B	A10C2	22C	CR6	7E	J10	3B
A4P2	3B	A10C3	22C	CR7	19D	J11	4B
A5	9A	A10Q1	21C	CR8	10F	J12	7B
A5P1	9B	A10R1	21C	CR9	3D	J13	7A
A6	5A	A10R2	21C	DS1	19E	J14	5A
A6P1	6B	A10R3	21C	DS2	17D	J15	20B
A6P2	6A	A10R4	21C	E1	2C	J16	17B
A6P3	5A	A10R5	21C	E2	6B	J17	19B
A7	1D	A10R6	22C	E3	6E	J18	16B
A7P8	1D	A10R7	21C	E4	13F	J19	14B
A8	8C, 15D	A10R8	21C	E5	2C, 3B, 9C, 11D	J20	13B
A8C1	8D	A10R9	22C	E6	13F	J21	2F
A8C2	8D	A11	16C	E7	13F	J22	10C
A8C3	7E	A11C1	21C	E8	10F	K1	7F
A8C4	8E	A11C2	22C	E9	9C	K2	2D
A8C5	9E	A11C3	22C	E10	9C	K3	4E
A8C6	9E	A11Q1	21C	E11	10E	K4	11D
A8C7	7F	A11R1	21C	E12	10F	K5	16D
A8C8	8E	A11R2	21C	E13	5C, 18C	K6	7E
A8C9	8E	A11R3	21C	E14	5D	L1	8C
A8C10	15D	A11R4	21C	E15	19D	L2	9D
A8C11	15D	A11R5	21C	E16	10F	M1	15C
A8CR1	7C	A11R6	22C	E17	18B	M2	17C
A8CR2	8C	A11R7	21C	E18	18B	Q1	7E
A8CR3	7C	A11R8	21C	E19	16E	R1	9C
A8CR4	8C	A11R9	22C	E20	16E	R2	9D
A8CR5	7D	A12	20A	E21	16D	R3	10F
A8CR6	8D	A12P1	20B	E22	9D	R4	13F
A8CR7	7D	A13	9D	E23	10E	R5	5D
A8CR8	8D	A13DS3	9D	E24	10E	S1-1-F	14D
A8CR9	15D	A13DS4	9D	E26	9C	S1-1-R	14E
A8CR10	8F	A14	11F	E27	5C, 5F, 15B, 20B,	S1-2-F	14D
A8CR11	8E	A14C1	11E		20D	S1-2-R	14E
A8CR12	8F	A14C2	11E	E28	16B	S2-1-F	18D
A8CR13	8F	A14C3	11F	E29	3D, 7E, 8B, 13C,	S2-1-R	18E
A8Q1	7E	A14C4	11F		18B	S2-2-F	17D
A8Q2	8E	A14L1	11F	E30	16B	S2-2-R	17E
A8Q3	8E	A15	4C, 20C	E31	13C	S2-3-F	16D
A8Q4	8E	A15C1	20C	E32	9D	S2-3-R	16E
A8R1	8D	A15C2	20C	E33	9C, 11E, 12B	S2-4-F	19C
A8R2	7E	A15C3	20C	E34	17B	S2-4-R	19D
A8R3	8F	A15L1	19C	E35	4E	S3	1F, 1G
A8R4	8E	A15L2	20C	E36	15C	S4	1F, 1G
A8R5	8E	A15L3	20C	E37	5F, 13B, 15C, 19F	S5	1G, 5E, 6E
A8R6	8E	A15R1	4C	E38	12F, 15F	S6	1G, 6C, 6D
A8R7	8E	A16	5D	E39	5E, 14B, 16E, 17C	S7	19F
A8R8	8F	A16C1	5D	E40	15C	S8	20E
A8R9	9E	A16CR1	5D	E41	15F	S9	15F
A8R10	9E	C1	9C	E42	9D, 10F	S10	14C
A8R11	9F	C2	7E	E43	15F	S11	15C
A8R12	8F			E44	9C	T1	7C



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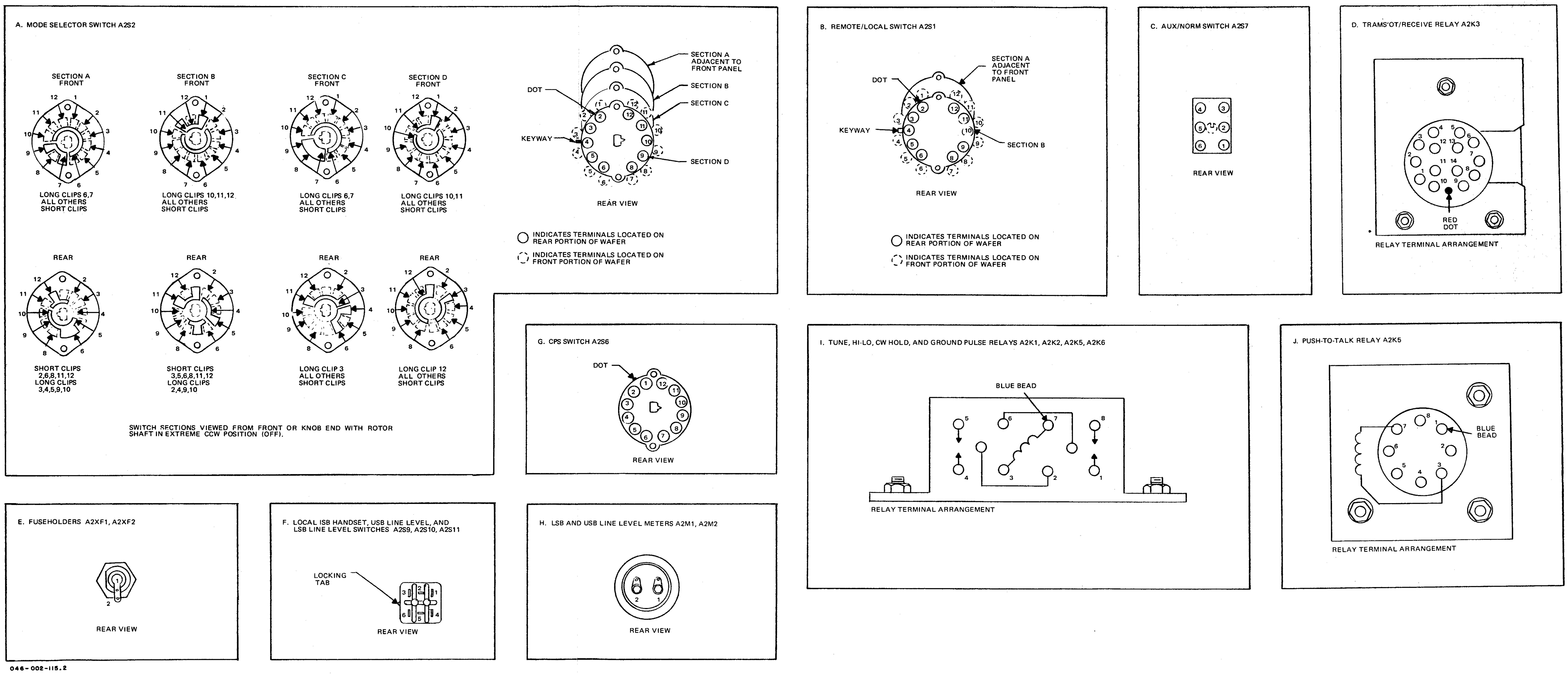
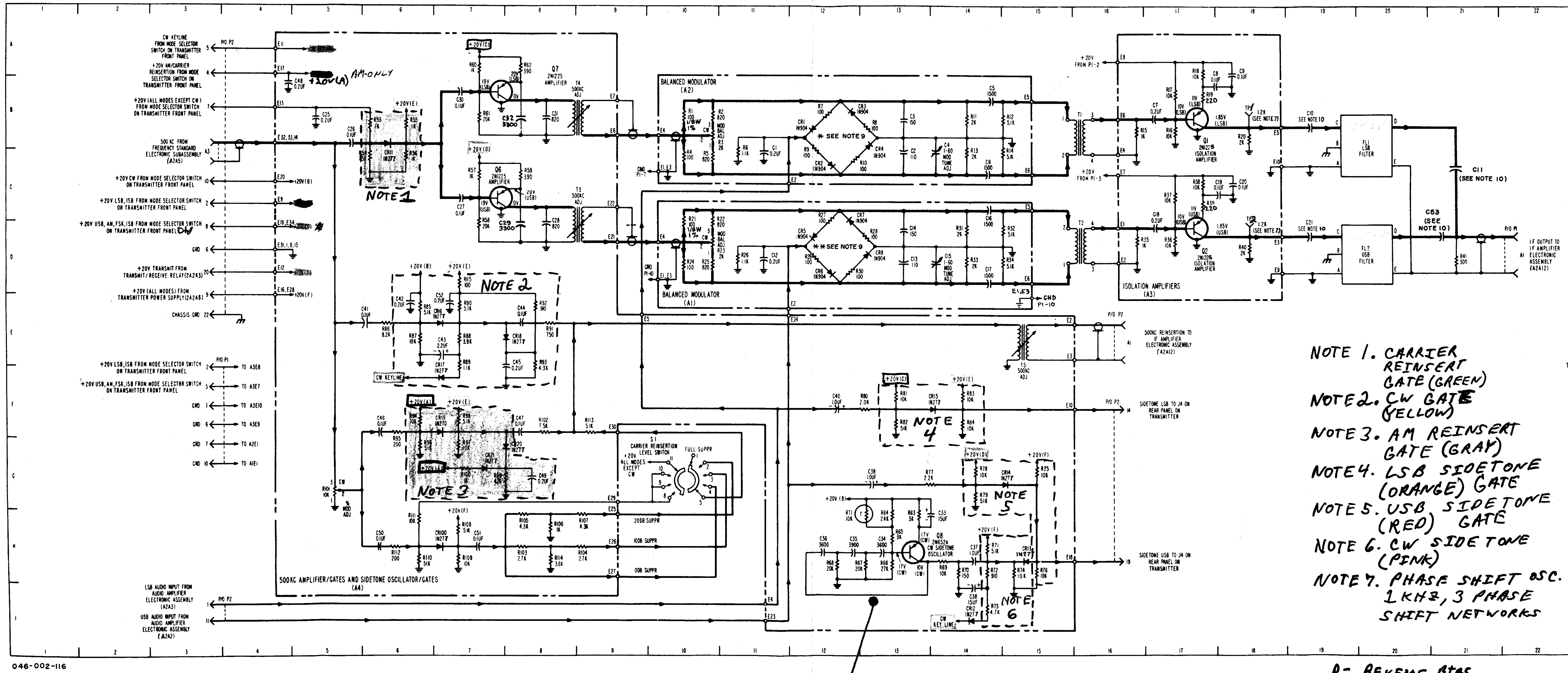


NOTE: SEE TABLE 5-2 FOR WIRING INFORMATION ON ALL COMPONENTS.

Figure 5-13. Radio Transmitter T-827B/URT, Overall Schematic Diagram (Sheet 2 of 2)

PART LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
C10	19B	A2R2	10B	A4C38	14I	A4R71	14H
C11	21D	A2R3	10B	A4C39	13G	A4R72	14H
C21	19D	A2R4	10C	A4C40	12F	A4R73	14I
FL1	20B	A2R5	10C	A4C41	6E	A4R74	15H
FL2	20D	A2R6	11B	A4C42	6E	A4R75	15G
P1	3F, 3G, 16E	A2R7	12B	A4C43	7E	A4R76	15H
P2	3A, 3B, 3C,	A2R8	13B	A4C44	8E	A4R77	13G
	3D, 3E, 3I	A2R9	12B	A4C45	8E	A4R78	14G
	16F, 16H, 22D	A2R10	12C	A4C46	6F	A4R79	14G
R41	21D	A2R11	14B	A4C47	8F	A4R80	13F
S1	10G	A2R12	15B	A4C48	4B	A4R81	13F
T1	16B	A2R13	14B	A4C49	8G	A4R82	13F
T2	16D	A2R14	15B	A4C50	6H	A4R83	14F
A1C12	11D	A3C7	17B	A4C51	7H	A4R84	14F
A1C13	13D	A3C8	18B	A4C52	7E	A4R85	6E
A1C14	13D	A3C9	18A	A4CR11	5B	A4R86	6E
A1C15	14D	A3C18	17D	A4CR12	14I	A4R87	6E
A1C16	14C	A3C19	18C	A4CR13	15H	A4R88	7E
A1C17	14D	A3C20	18C	A4CR14	15G	A4R89	7E
A1CR5	12D	A3Q1	17B	A4CR15	14F	A4R90	7E
A1CR6	12D	A3Q2	17D	A4CR16	7E	A4R91	8E
A1CR7	12C	A3R15	16B	A4CR17	7F	A4R92	8E
A1CR8	13D	A3R16	17B	A4CR18	8E	A4R93	8E
A1R21	10C	A3R17	17B	A4CR19	7F	A4R94	6F
A1R22	10C	A3R18	17A	A4CR20	8G	A4R95	6F
A1R23	10D	A3R19	17B	A4CR21	7G	A4R96	6G
A1R24	10D	A3R20	18B	A4CR100	7H	A4R97	7G
A1R25	10D	A3R35	16D	A4Q6	7C	A4R98	7F
A1R26	11D	A3R36	17D	A4Q7	7B	A4R99	8G
A1R27	12C	A3R37	17C	A4Q8	13H	A4R100	7G
A1R28	13D	A3R38	17C	A4R53	6B	A4R101	5G
A1R29	12D	A3R39	17C	A4R54	6C	A4R102	8F
A1R30	12D	A3R40	18D	A4R55	6B	A4R103	8H
A1R31	14D	A3TP2	18B	A4R56	6C	A4R104	9H
A1R32	15D	A3TP3	18D	A4R57	7C	A4R105	8H
A1R33	14D	A4C25	5B	A4R58	7D	A4R106	8H
A1R34	15D	A4C26	5B	A4R59	8C	A4R107	9H
A2C1	11C	A4C27	7C	A4R60	7A	A4R108	7H
A2C2	13B	A4C28	8C	A4R61	7B	A4R109	7H
A2C3	13B	A4C29	8C	A4R62	8A	A4R110	6H
A2C4	14B	A4C30	7B	A4R63	13H	A4R111	6H
A2C5	14B	A4C31	8B	A4R64	13H	A4R112	6H
A2C6	14C	A4C32	8A	A4R65	13H	A4R113	9F
A2CR1	12B	A4C33	14H	A4R66	13H	A4R114	8H
A2CR2	12C	A4C34	13H	A4R67	13H	A4R115	7D
A2CR3	12B	A4C35	12H	A4R68	12H	A4RT1	13H
A2CR4	13B	A4C36	12H	A4R69	14H	A4RT3	9C, 9D
A2R1	10B	A4C37	14H	A4R70	14H	A4T3	9D
						A4T4	9B
						A4T5	15E



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NOTES:

1. PREFIX ALL REF DES WITH 2A2A1.
2. UNLESS OTHERWISE SPECIFIED
   a. ALL RESISTANCE VALUES ARE IN OHMS. K - INDICATES THOUSANDS OF OHMS.
   b. ALL RESISTORS ARE 1/4 WATT, ±5% TOL.
   c. ALL CAPACITANCE VALUES ARE IN PICOFARADS, UF INDICATES MICROFARADS.
3. S1 SHOWN IN FULL SUPPRESSION POSITION VIEWED FROM THE WIRED END.
4. NUMBERS ADJACENT TO WINDINGS AND TEST POINTS INDICATE DC RESISTANCE (VALUES LESS THAN ONE OHM ARE NOT SHOWN)
5. CW ON ALL POTENTIOMETERS INDICATE DIRECTION OF ROTATION WHEN VIEWED FROM SHAFT END.
6. UNLESS OTHERWISE INDICATED ALL VOLTAGES ARE DC TAKEN WITH MULTIMETER AN/PSM-4A.
7. RESISTANCE VALUES AT SIGNIFICANT TEST POINTS ARE TO CHASSIS WITH ALL UNITS INTERCONNECTED, BUT EQUIPMENT DE-ENERGIZED.
8. REFER TO APPLICABLE PRINTED CIRCUIT BOARD ILLUSTRATION FOR TRANSFORMER CIRCUIT ORIENTATION.
9. * CR1, CR2, CR3, CR4 MATCHED SET.
   ** CR5, CR6, CR7, CR8 MATCHED SET.
10. CAPACITANCE SELECTED ACCORDING TO COLOR CODE DOT ON FILTER:

ORANGE = 130 PF ±2%
YELLOW = 142 PF ±2%
GREEN = 150 PF ±2%

NOTE 1. CARRIER REINSERT GATE (GREEN)
NOTE 2. CW GATE (YELLOW)
NOTE 3. AM REINSERT GATE (GRAY)
NOTE 4. LSB SIDETONE GATE (ORANGE)
NOTE 5. USB SIDETONE (RED) GATE
NOTE 6. CW SIDE TONE (PINK)
NOTE 7. PHASE SHIFT OSC. 1KHZ, 3 PHASE SHIFT NETWORKS

CR	USB	LSB	FSK	AM	CW	ISB	ISB/FSK
11					R		
12	R	R	R	R		R	R
13	R	R	R	R		R	R
14		R			R		
15	R		R	R	R		R
16	R	R	R	R		R	R
17	R	R	R	R		R	R
18					R		
19	R	R	R		R	R	R
20				R			
21	R	R	R		R	R	R
100	R	R	R	R	R	R	R

NOTE 7.

R= REVERSE BIAS

Figure 5-14. Mode Selector Assembly 2A2A1, Schematic Diagram

Note 1. R-3 unbipassed To enable degeneration T1 Increases stabilily
Note 2. varisistors
E↑ R↓ I↑
Note 3. Speach compassion Reduces the peak to average ration of voice signals in order to maintain an average of 60 % modulation
Note 4. Remote Audio or FSK
Note 5. Ground
Note 6. Not used

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN
P1	2A, 2B, 2C	A1R6	9C
	2D, 2E, 12D	A1R7	10C
A1C1	3C	A1R8	10B
A1C2	4C	A1R9	11C
A1C3	6C	A1R10	11C
A1C4	8D	A1R11	3C
A1C5	8D	A1R12	4D
A1C6	9D	A1R13	5D
A1C7	10D	A1R14	6D
A1C8	10C	A1R15	7D
A1C9	12D	A1R16	7D
A1C10	3B	A1R17	9D
A1C11	9C	A1R18	10D
A1CR1	7D	A1R19	10D
A1Q1	5C	A1R20	10C
A1Q2	6D	A1R21	11D
A1Q3	9D	A1R22	3A
A1Q4	10D	A1R23	9B
A1Q5	11D	A1RV1	7D
A1R1	4C	A1RV2	7D
A1R2	4C	A1T1	3C
A1R3	5C	A1T2	5D
A1R4	5C	A1TP1	3C
A1R5	9C	A1TP2	12C

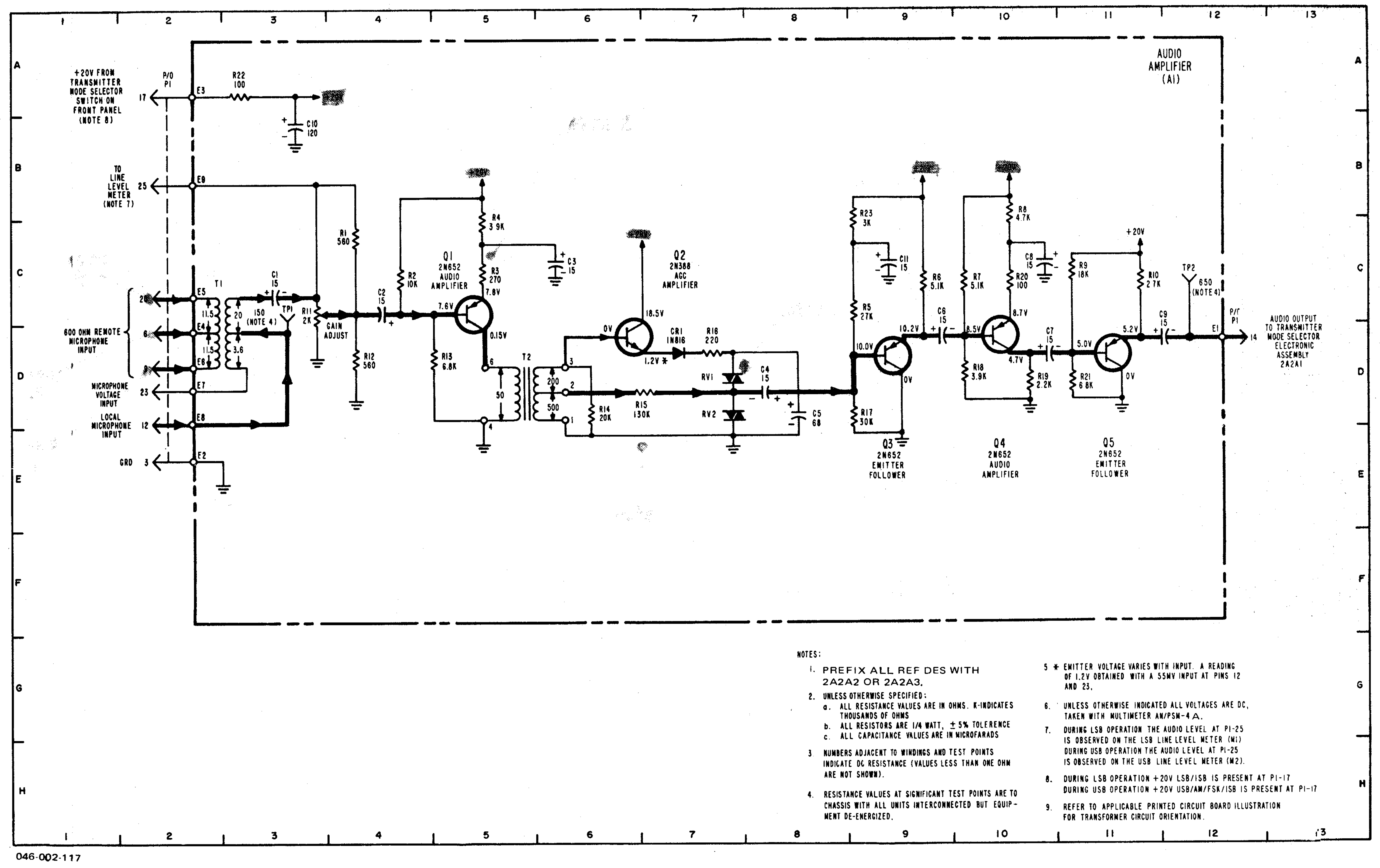

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Figure 5-15. Transmitter Audio Amplifier Assembly 2A2A2 or 2A2A3, Schematic Diagram

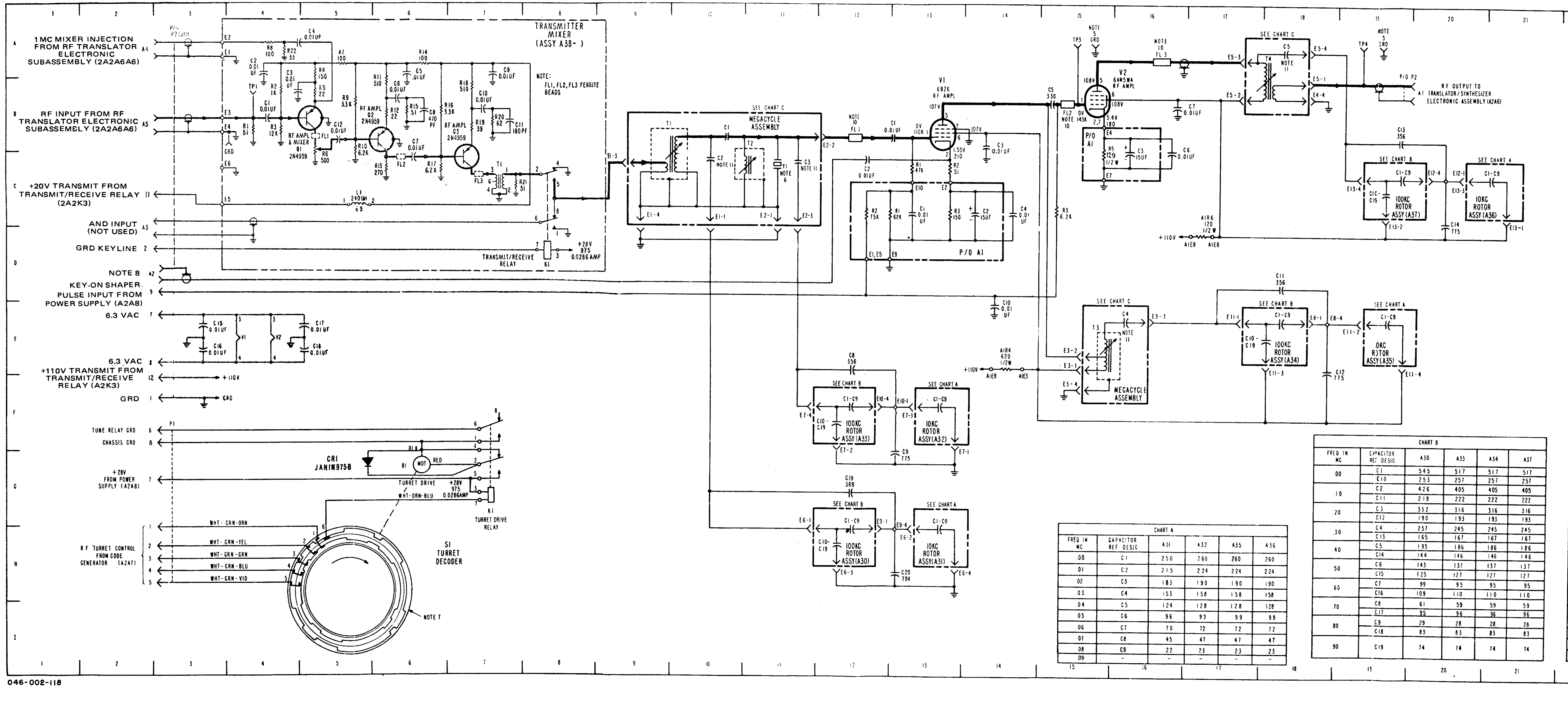
PARTS LOCATION INDEX

REF DES	LCTN
B1	6G
C1	12B
C2	12C
C3	14B
C4	14C
C5	15B
C6	16C
C7	16B
C8	12E
C9	13F
C10	14E
C11	18D
C12	18E
C13	19B
C14	20C
C15	3E
C16	3E
C17	5E
C18	5E
C19	12G
C20	12H
CR1	6G
FL1	12B
FL2	15B
FL3	16A
K1	7G
P1	3F, 3G, 3H
	3A, 3B, 3C
	3D, 3E, 3F
	19B
R1	13C
R2	13C
R3	15C
S1	5H
TP4	19A
V1	4E, 13B
V2	4E, 5B
A1C1	13C
A1C2	14C

REF DES	LCTN
A1C3	16B
A1R1	12C
A1R2	12C
A1R3	13C
A1R4	14E
A1R5	15B
A1R6	16D
A2C1	10B
thru	
A29C1	
A2C2	10C
thru	
A29C3	
A2C3	11C
thru	
A29C3	
A2C4	16D
thru	
A29C4	
A2C5	18A
thru	
A29C5	
A2T1	9B
thru	
A29T1	
A2T2	11B
thru	
A29T2	
A2T3	15E
thru	
A29T3	
A2T4	17A
thru	
A29T4	
A9Y1	11C
A10Y1	11C
A19Y1	11C
A30C1	12H
thru	
A30C9	

REF DES	LCTN
A30C10	12H
thru	
A30C19	
A31C1	13H
thru	
A31C9	
A32C1	13F
thru	
A32C9	
A33C1	12F
thru	
A33C9	
A33C10	12F
thru	
A33C19	
A34C1	18E
thru	
A34C9	
A34C10	18E
thru	
A34C19	
A35C1	19E
thru	
A35C9	
A36C1	20C
thru	
A36C9	
A37C1	19C
thru	
A37C9	
A37C10	19C
thru	
A37C19	
A38C1	4B
A38C2	4A
A38C3	4B
A38C4	4A
A38C5	6A
A38C6	6B
A38C7	6C

REF DES	LCTN
A38C8	6B
A38C9	7A
A38C10	7B
A38C11	7B
A38C12	5B
A38FL1	5B
A38FL2	6C
A38FL3	7C
A38K1	8D
A38L1	5C
A38Q1	5B
A38Q2	6B
A38Q3	7C
A38R1	4B
A38R2	4B
A38R3	4B
A38R4	5A
A38R5	5B
A38R6	5B
A38R7	5A
A38R8	4A
A38R9	5B
A38R10	5B
A38R11	6A
A38R12	6B
A38R13	6C
A38R14	6A
A38R15	6B
A38R16	6B
A38R17	6C
A38R18	7B
A38R19	7B
A38R20	7B
A38R21	7C
A38R22	4A
A38T1	7C
A38TP1	4B



NOTES:

1. PREFIX ALL REF DES WITH 2A2A4.
2. UNLESS OTHERWISE SPECIFIED:
   a. ALL RESISTANCE VALUES ARE IN OHMS K-INDICATES THOUSANDS OF OHMS.
   b. ALL RESISTORS ARE 1/4 WATT, ± 5% TOL
   c. ALL CAPACITANCE VALUES ARE IN PICOFARADS, UF INDICATES MICROFARADS.
3. NUMBERS ADJACENT TO COILS AND TEST POINTS INDICATE DC RESISTANCE (VALUES LESS THAN ONE OHM ARE NOT SHOWN).
4. ALL RESISTANCE READINGS TAKEN WITH RF AMPLIFIER ELECTRONIC ASSEMBLY REMOVED FROM CHASSIS AND REFERENCED TO GROUND.
5. DURING MEASUREMENT AT A TEST POINT USE GROUND MARKED ADJACENT TO TEST POINT.
6. CRYSTAL Y1 USED ONLY ON ASSEMBLIES A9, A10 AND A19, AND FUNCTION ONLY WHEN USED IN T-827/URT.
7. S1 SHOWN IN 2MC POSITION.
8. P2-A2 IS WIRED BUT NOT USED IN AN/WRC-1 SYSTEM.
9. CAPACITORS IN CHARTS A, B, AND C WHICH ARE 100PF AND GREATER ARE 1/2%. CAPACITORS LESS THAN 100PF ARE 1%, EXCEPT C1 IN CHART C WHICH IS 5%.
10. FL1, FL2, AND FL3 ARE PARASITIC SUPPRESSORS.
11. NOT USED IN 2MC POSITION
12. UNLESS OTHERWISE INDICATED ALL VOLTAGES ARE DC, TAKEN WITH MULTIMETER AN/PSM-4A.
13. REFER TO APPLICABLE PRINTED CIRCUIT BOARD ILLUSTRATION FOR TRANSFORMER CIRCUIT ORIENTATION.
14. A38C5 VALUE CHANGES TO 0.0022UF ON UNIT SER. NO 111 AND ABOVE.

CHART A

FREQ IN MC	CAPACITOR REF DESIG	A31	A32	A35	A36
.00	C1	250	260	260	260
.01	C2	215	224	224	224
02	C3	183	190	190	190
.03	C4	153	158	158	158
.04	C5	124	128	128	128
.05	C6	96	93	99	99
.06	C7	70	72	72	72
.07	C8	45	47	47	47
08	C9	22	23	23	23
.09	–	–	–	–	–

CHART B

FREQ IN MC	CAPACITOR REF DESIG	A30	A33	A34	A37
.00	C1	545	517	517	517
	C10	253	257	257	257
.10	C2	426	405	405	405
	C11	219	222	222	222
.20	C3	332	316	316	316
	C12	190	193	193	193
.30	C4	257	245	245	245
	C13	165	167	167	167
.40	C5	195	186	186	186
	C14	144	146	146	146
.50	C6	143	137	137	137
	C15	125	127	127	127
.60	C7	99	95	95	95
	C16	109	110	110	110
.70	C8	61	59	59	59
	C17	95	96	96	96
.80	C9	29	28	28	28
	C18	83	83	83	83
.90	C19	74	74	74	74

CHART C

FREQ IN MC	ON ASSY	C1	ON ASSY	C2	ON ASSY	C3	ON ASSY	C4	ON ASSY	C5
2	A20	9.1	A20	SHORT	A20	SHORT	A25	SHORT	A2	SHORT
3	A21	6.2	A21	1247	A21	1253	A26	1247	A3	1253
4	A22	5.6	A22	623	A22	629	A27	623	A4	629
5	A23	5.1	A23	416	A23	422	A28	416	A5	422
6	A24	3.9	A24	312	A24	318	A29	312	A6	318
7	A25	3.3	A25	250	A25	256	A2	250	A7	256
8	A26	3.0	A26	208	A26	214	A3	208	A8	214
9	A27	2.7	A27	179	A27	185	A4	179	A9	185
10	A28	2.7	A28	157	A28	163	A5	157	A10	163
11	A29	2.4	A29	140	A29	146	A6	140	A11	146
12	A2	2.2	A2	126	A2	132	A7	126	A12	132
13	A3	2.0	A3	115	A3	120	A8	115	A13	120
14	A4	2.0	A4	105	A4	111	A9	105	A14	111
15	A5	2.0	A5	97	A5	103	A10	97	A15	103
16	A6	2.0	A6	91	A6	96	A11	91	A16	96
17	A7	2.0	A7	85	A7	90	A12	85	A17	90
18	A8	1.8	A8	80	A8	85	A13	80	A18	85
19	A9	1.8	A9	75	A9	80	A14	75	A19	80
20	A10	1.8	A10	71	A10	76	A15	71	A20	76
21	A11	2.0	A11	67	A11	73	A16	67	A21	73
22	A12	2.0	A12	64	A12	68	A17	64	A22	68
23	A13	2.0	A13	61	A13	66	A18	61	A23	66
24	A14	2.0	A14	58	A14	63	A19	58	A24	63
25	A15	2.0	A15	56	A15	61	A20	56	A25	61
26	A16	2.0	A16	54	A16	59	A21	54	A26	59
27	A17	2.0	A17	52	A17	57	A22	52	A27	57
28	A18	2.0	A18	50	A18	55	A23	50	A28	55
29	A19	2.0	A19	48	A19	53	A24	48	A29	53

Figure 5-16. RF Amplifier Assembly 2A2A4, Schematic Diagram

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
A1	4A	A1R24	5C	A2C42	12H	A2R24	14C	A4	8E
A1C1	2B	A1Y1	3B	A2C44T	10B	A2R25	13D	A4C1	8D
A1C2	3B	A2	14I	A2CR1	12H	A2R26	13A	A4C2	9E
A1C3	3B	A2C1	8C	A2CR2	11F	A2R27	14B	A4CR1	9D
A1C4	4B	A2C2	7C	A2DS1	13H	A2R28	14D	A4R1	8E
A1C5	4B	A2C3	8B	A2J1	1H, 2F, 17B	A2R29	15A	A4Q1	8E
A1C6	5B	A2C4	8D	A2J2	7E	A2R30T	15D		
A1C7	6A	A2C5	8B	A2L1	9B	A2R31T	16B		
A1C8T	2B	A2C6	8B	A2L2	13B	A2R32	5G		
A1C9	6B	A2C7	10B	A2L3	7G	A2R33	6F		
A1C10	4C	A2C8	10B	A2L4	11G	A2R34	5G		
A1C11T	3B	A2C9	10B	A2Q1	8C	A2R36	6G		
A1C12	2D	A2C10	10C	A2Q2	9B	A2R37	6H		
A1CR1	6A	A2C11	11B	A2Q3	11C	A2R38	6H		
A1CR2	5C	A2C12	11B	A2Q4	13C	A2R39	7F		
A1Q1	4B	A2C13	11B	A2Q5	15C	A2R40	8G		
A1Q2	5B	A2C14	12C	A2Q6	5G	A2R41	8H		
A1Q3	6B	A2C15	12B	A2Q7	7H	A2R42	8F		
A1Q4	3E	A2C16	14B	A2Q8	8G	A2R43	8H		
A1Q5	4E	A2C17	14C	A2Q9	11G	A2R44T	9G		
A1Q6	4C	A2C18	10B	A2Q10	12G	A2R46	10H		
A1Q7	5D	A2C19	10B	A2Q11	13G	A2R47	10G		
A1R1	2B	A2C20	14A	A2R1	7C	A2R48	11F		
A1R2	4B	A2C21	15B	A2R2	8C	A2R49	11H		
A1R3	4A	A2C22	15B	A2R3	8B	A2R51	12G		
A1R4	4A	A2C23	5G	A2R4	8B	A2R52	12H		
A1R5	4B	A2C24	5G	A2R5	9B	A2R53	12G		
A1R6	5B	A2C25	5G	A2R6	9C	A2R54	12H		
A1R7	5A	A2C26	5H	A2R7	8A	A2R55	13G		
A1R8	6A	A2C27	6H	A2R8	9A	A2R56	13H		
A1R9	2A	A2C28	6H	A2R9	8D	A2R57	13F		
A1R10T	3C	A2C29	7G	A2R10	9C	A2R58	14F		
A1R11	4C	A2C30	7H	A2R11	9D	A2R60	7G		
A1R12	6B	A2C31	8G	A2R12	9B	A2R61	9H		
A1R13	2D	A2C32	8H	A2R13	10C	A2R62	5H		
A1R14	3D	A2C33	8G	A2R14	11B	A2S1	3G		
A1R15	3E	A2C34	8G	A2R15	11D	A2T1	12B		
A1R16	3E	A2C35	6G	A2R16	11A	A2T2	15B		
A1R17	3C	A2C36	10G	A2R17	11D	A2T3	9G		
A1R18	4C	A2C37	10G	A2R18T	12B	A3	5D		
A1R19	4E	A2C38	11G	A2R19	12C	A3J2	2E, 5E		
A1R20	4E	A2C39	11G	A2R20	13B	A3Q1	6E		
A1R21	5E	A2C40	11H	A2R21	13D	A3R1	6D		
A1R22	4C	A2C41	11H	A2R22	13B	A3R2	2E		
A1R23T	4D	A2C42	13H	A2R23	13C				

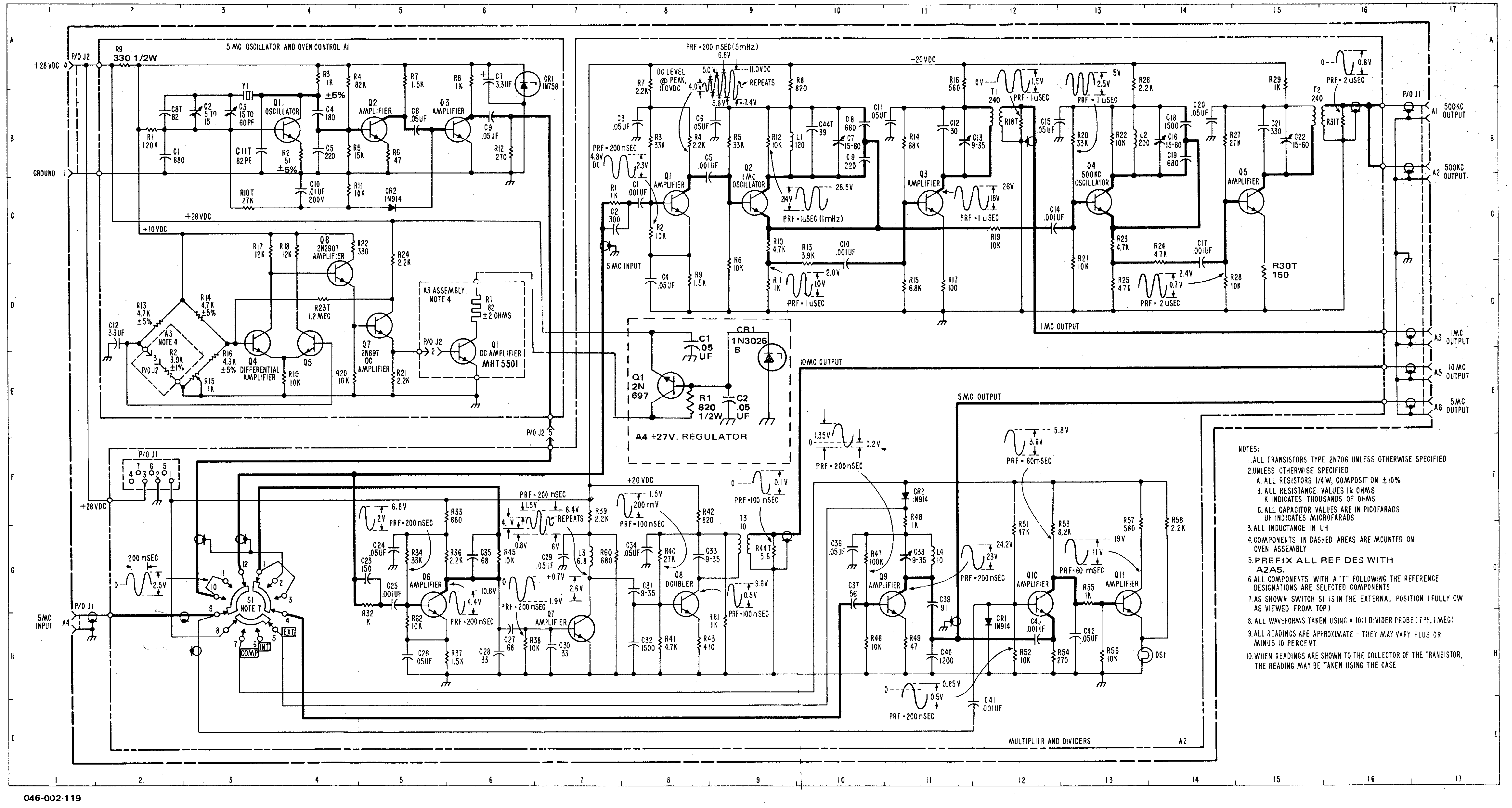


Figure 5-17. Frequency Standard Assembly 2A2A5, Schematic Diagram

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN
A1	4A	C1	4E
A1P1	3A	C2	10C
A2	6H	J4	3B
A2P1	5H	J5	3G
A3	8H	J6	6G
A3J1	8H	P1	1B
A3J3	9H	P2	9G
A3J4	8H	P3	11G
A3J5	8H	P7	10C
A3J6	9H	P8	10D
A3J7	8H	P9	10D
A4	4H	P10	10D
A4P1	3H	P11	10D
A5	7A	P12	10E
A5J1	6A	P13	10E
A5J2	7A	P14	8G
A5J3	5A	P15	8G
A5J4	8A	P16	9G
A5J5	8A	P17	8G
A5J6	6A	P18	8G
A6	11D	P19	9G
A6J1	11D	P21	5B
A6J2	11E	P22	6B
A6J3	11E	P23	6B
A6J4	11D	P24	8B
A6J5	11D	P25	8B
A6J6	11C	P26	7B
A6J7	11D		

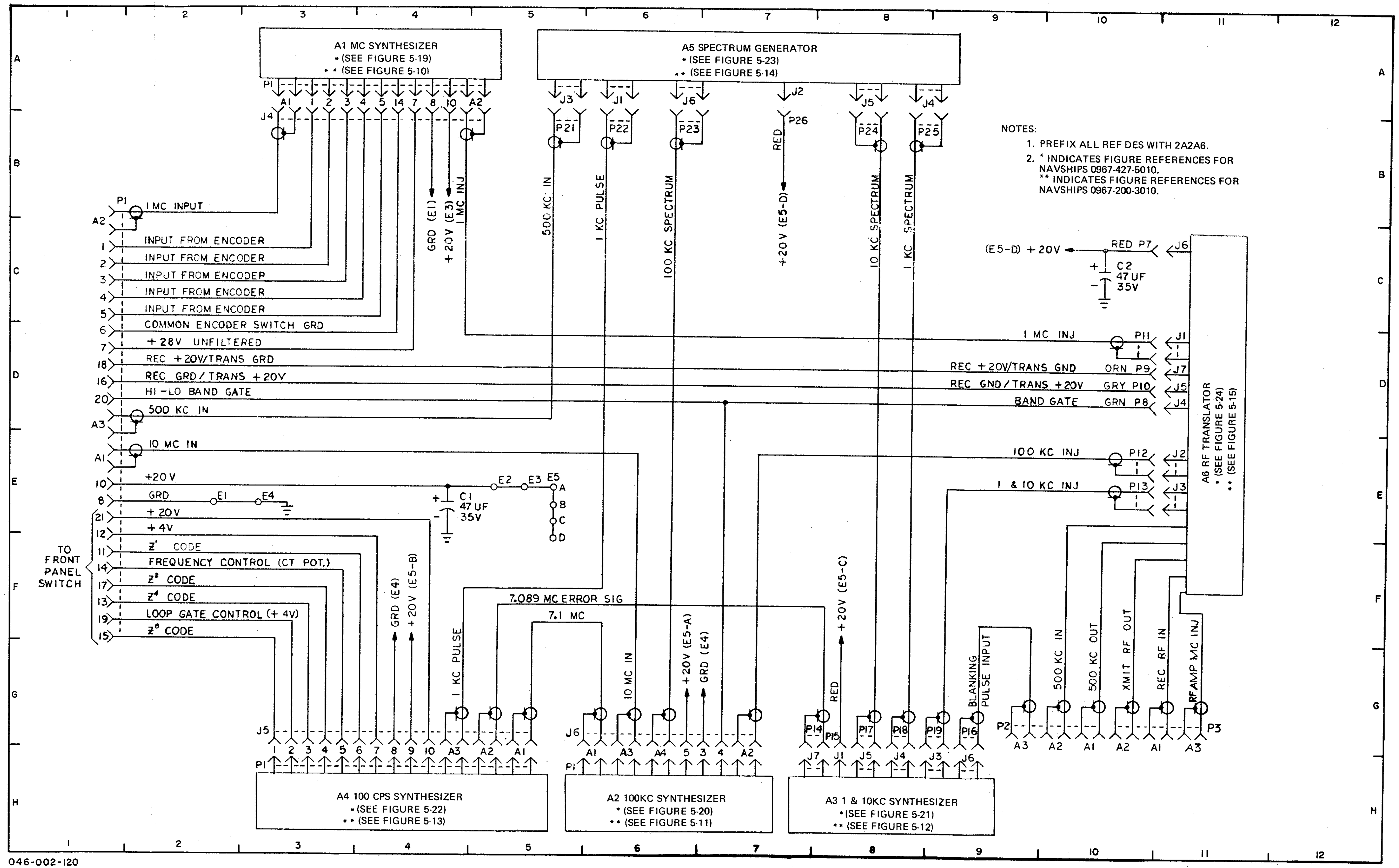
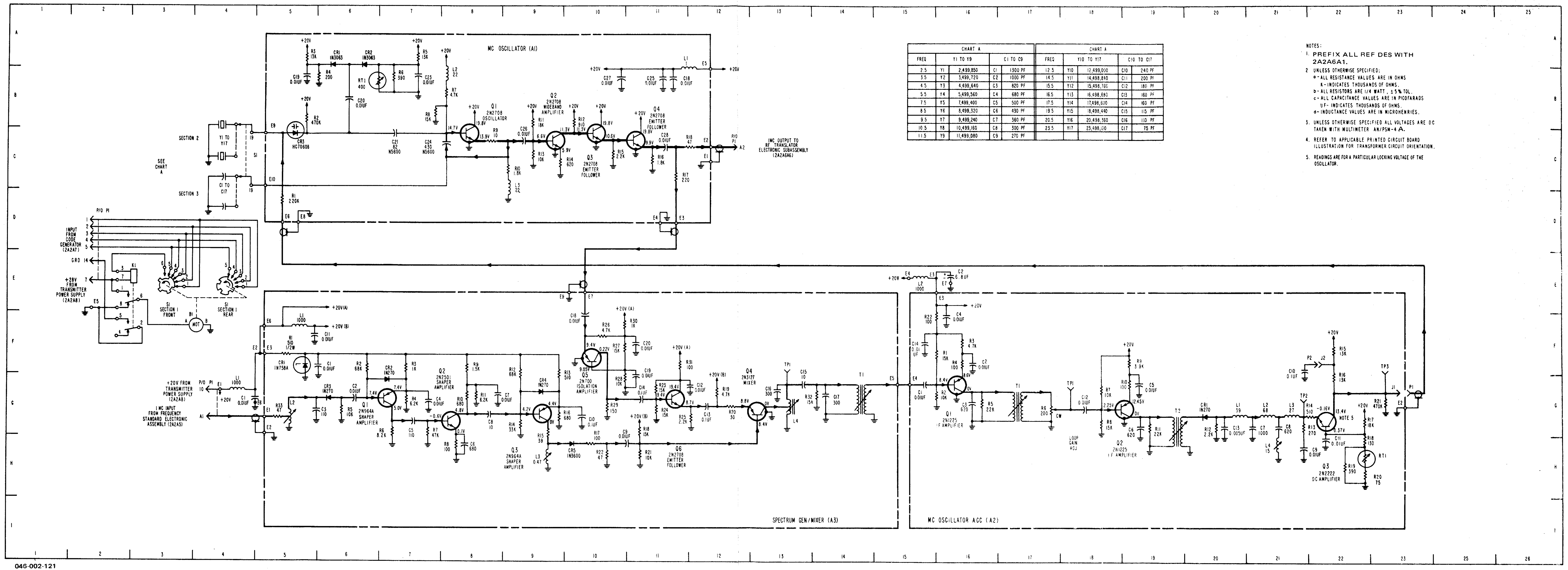


Figure 5-18. Translator/Synthesizer **Assembly** 2A2A6, Schematic Diagram

PART LOCATION INDEX

REF DES	LCTN
B1	3F
C1 thru C17	4C
C1	4G
C2	16E
K1	3E, 3D
L1	4G
L2	15E
P1	2D, 2E, 4G, 12C
S1	3E, 4C, 4E
Y1 thru Y17	4C
A1C18	11B
A1C19	5B
A1C20	6B
A1C21	7C
A1C23	7B
A1C24	8C
A1C25	11B
A1C26	9C
A1C27	10B
A1C28	11C
A1CR1	6A
A1CR2	6A
A1CR3	5C
A1L1	11A
A1L2	8B
A1L3	9C
A1Q1	8C
A1Q2	9C
A1Q3	10C
A1Q4	11C
A1R1	5D
A1R2	5B
A1R3	5A
A1R4	6B
A1R5	7A
A1R6	7B
A1R7	8B
A1R8	7B
A1R9	8C
A1R10	9C
A1R11	9B
A1R12	10B
A1R13	9C
A1R14	9C
A1R15	10C
A1R16	11C
A1R17	11C
A1R18	12C
A1RT1	6B
A2C1	15G
A2C2	16F
A2C3	16G
A2C4	16F
A2C5	19G
A2C6	19G
A2C7	21G
A2C8	21G
A2C9	21H
A2C10	21F
A2C11	22H
A2C12	18G
A2C13	20G
A2C14	15F
A2CR1	20G
A2J1	23G
A2J2	22F
A2L1	20G
A2L2	21G
A2L3	21G
A2L4	21H
A2P1	23G
A2P2	22F
A2Q1	16G
A2Q2	19G
A2Q3	22G
A2R1	16F
A2R2	16G
A2R3	16F
A2R4	16F
A2R5	16G
A2R6	17G
A2R7	18G
A2R8	18G
A2R9	19F
A2R10	19G
A2R11	19G
A2R12	20G
A2R13	21G
A2R14	22G
A2R15	22F
A2R16	22G
A2R17	22G
A2R18	22H
A2R19	22H
A2R20	22H
A2R21	23G
A2R22	15F
A2RT1	22H
A2T1	18G
A2T2	19G
A2TP1	18G
A2TP2	21G
A2TP3	23F
A3C1	6F
A3C2	6G
A3C3	5G
A3C4	7G
A3C5	7G
A3C6	8H
A3C7	8G
A3C8	8G
A3C9	10H
A3C10	10G
A3C11	5F
A3C12	12G
A3C13	12G
A3C14	11G
A3C15	13G
A3C16	13G
A3C17	14G
A3C18	10F
A3C19	11G
A3C20	11F
A3CR1	5F
A3CR2	7G
A3CR3	6G
A3CR4	9G
A3CR5	10H
A3L1	5F
A3L2	5G
A3L3	9H
A3L4	13G
A3Q1	7G
A3Q2	8G
A3Q3	9G
A3Q4	13G
A3Q5	10F
A3Q6	11G
A3R1	5F
A3R2	6F
A3R3	7F
A3R4	7G
A3R5	6G
A3R6	7G
A3R7	7G
A3R8	8H
A3R9	8F
A3R10	8G
A3R11	8G
A3R12	9F
A3R13	9F
A3R14	9G
A3R15	9G
A3R16	9G
A3R17	10H
A3R18	11G
A3R19	12G
A3R20	12G
A3R21	11H
A3R22	10H
A3R23	11G
A3R24	11G
A3R25	12G
A3R26	10F
A3R27	10F
A3R28	10G
A3R29	10G
A3R30	10F
A3R31	11F
A3R32	14G
A3R33	5G
A3T1	13G
A3TP1	13F



046-002-121

Figure 5-19. MC Synthesizer Subassembly 2A2A6A1, Schematic Diagram

PARTS LOCATION INDEX

REF DES	LCTN
P1	1A, 1C, 1D, 1E, 1F, 1H, 1I, 8H, 9D, 9E, 9F
A1C1	12G
A1C2	12G
A1C3	13H
A1C4	15G
A1C5	14G
A1C6	10E
A1C7	10E
A1C8	10F
A1C9	10F
A1C10	13C
A1C11	11B
A1C12	11C
A1C13	10C
A1C14	15C
A1C15	14B
A1C16	14C
A1C17	15B
A1CR1	14H
A1CR2	14H
A1CR3	12D
A1CR4	12E
A1CR5	12E
A1CR6	11F
A1CR7	12F
A1CR8	12F
A1CR9	12F
A1CR10	12F
A1CR11	13D
A1CR12	13E
A1CR13	15E
A1CR14	15E
A1IC1	12B
A1IC2	13D
A1IC3	12D
A1IC4	15D
A1Q1	11H

REF DES	LCTN
A1Q2	12H
A1Q3	13H
A1Q4	15H
A1Q5	11C
A1Q6	10C
A1Q7	14B
A1Q8	14D
A1Q9	16G
A1R1	12G
A1R2	12G
A1R3	11H
A1R4	12H
A1R5	12H
A1R6	13G
A1R7	13G
A1R8	15G
A1R9	14H
A1R10	14H
A1R11	14G
A1R12	15H
A1R13	11D
A1R14	10E
A1R15	11E
A1R16	10E
A1R17	11F
A1R18	10F
A1R19	Not used
A1R20	10F
A1R21	13E
A1R22	11D
A1R23	10C
A1R24	11C
A1R25	10C
A1R26	11C
A1R27	10B
A1R28	13C
A1R29	13C
A1R30	14C
A1R31	14B
A1R32	14B

REF DES	LCTN
A1R33	14B
A1R34	14C
A1R35	14C
A1R36	14C
A1R37	16D
A1R38	14B
A1R39	11C
A1R40	15G
A1T1	15C
A1TP1	11H
A1TP2	15F
A1TP3	12B
A1TP4	13B
A1TP5	15C
A2C1	2B
A2C2	2B
A2C3	3C
A2C4	4C
A2C5	5D
A2C6	6B
A2C7	3E
A2C8	4E
A2C9	4D
A2C10	6D
A2C11	6E
A2C12	3D
A2C13	5D
A2C14	5B
A2C15	6B
A2CR1	3B
A2CR2	Not used
A2CR3	4C
A2CR4	3E
A2CR5	6C
A2CR6	7C
A2CR7	5B
A2CR8	5C
A2CR9	5C
A2FL1	4C
A2L1	Not used

REF DES	LCTN
A2L2	5E
A2IC1	2C
A2Q1	3C
A2Q2	4E
A2Q3	7B
A2R1	3B
A2R2	Not used
A2R3	3C
A2R4	3C
A2R5	4C
A2R6	5C
A2R7	6B
A2R8	7C
A2R9	4E
A2R10	7B
A2R11	5E
A2R12	4E
A2R13	4E
A2R14	3E
A2R15	3D
A2R16	5E
A2R17	6B
A2T1	6C
A2TP1	5A
A2TP2	7B
A2TP3	5A
A2TP4	5A
A3C1	4G
A3C2	3G
A3C3	4H
A3C4	3H
A3C5	2H
A3C6	3I
A3C7	4I
A3C8	5I
A3C9	5H
A3C10	6H
A3C11	6G
A3C12	7H

REF DES	LCTN
A3C13	7I
A3C14	7G
A3C15	3F
A3C16	5H
A3FL1	Not used
A3FL2	4H
A3L1	Not used
A3L2	2I
A3Q1	3G
A3Q2	3H
A3Q3	6H
A3Q4	7H
A3R1	3F
A3R2	3G
A3R3	3G
A3R4	4G
A3R5	3H
A3R6	3H
A3R7	3H
A3R8	3H
A3R9	3I
A3R10	5I
A3R11	5I
A3R12	5H
A3R13	6G
A3R14	6G
A3R15	6H
A3R16	6H
A3R17	6G
A3R18	6H
A3R19	7G
A3R20	7H
A3R21	3H
A3T1	7I
A3TP1	2H
A3TP2	4H
A3TP3	4G
A3TP4	5H
A3TP5	8H

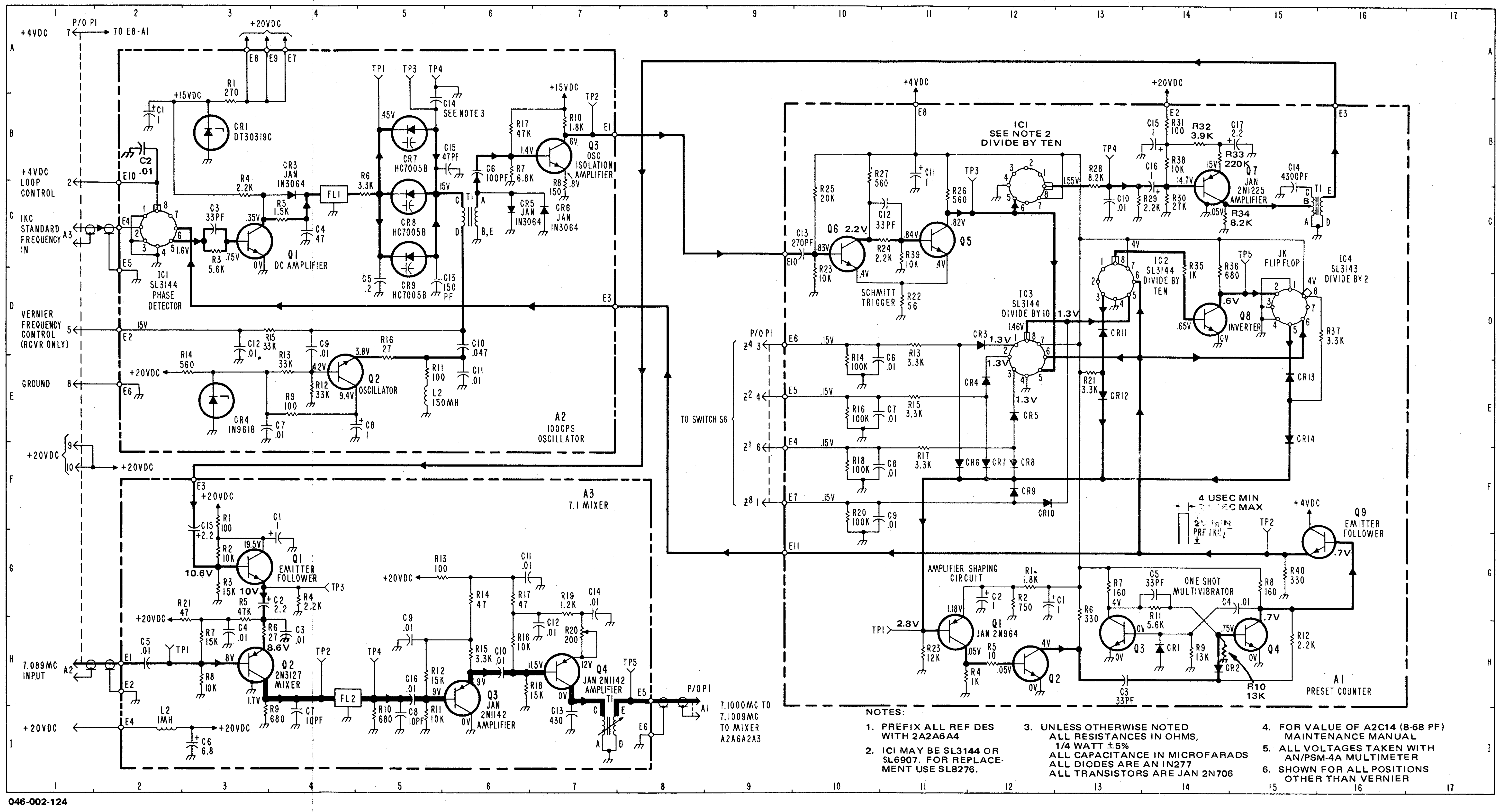


Figure 5-22. 100-CPS Synthesizer Subassembly 2A2A6A4, Schematic Diagram

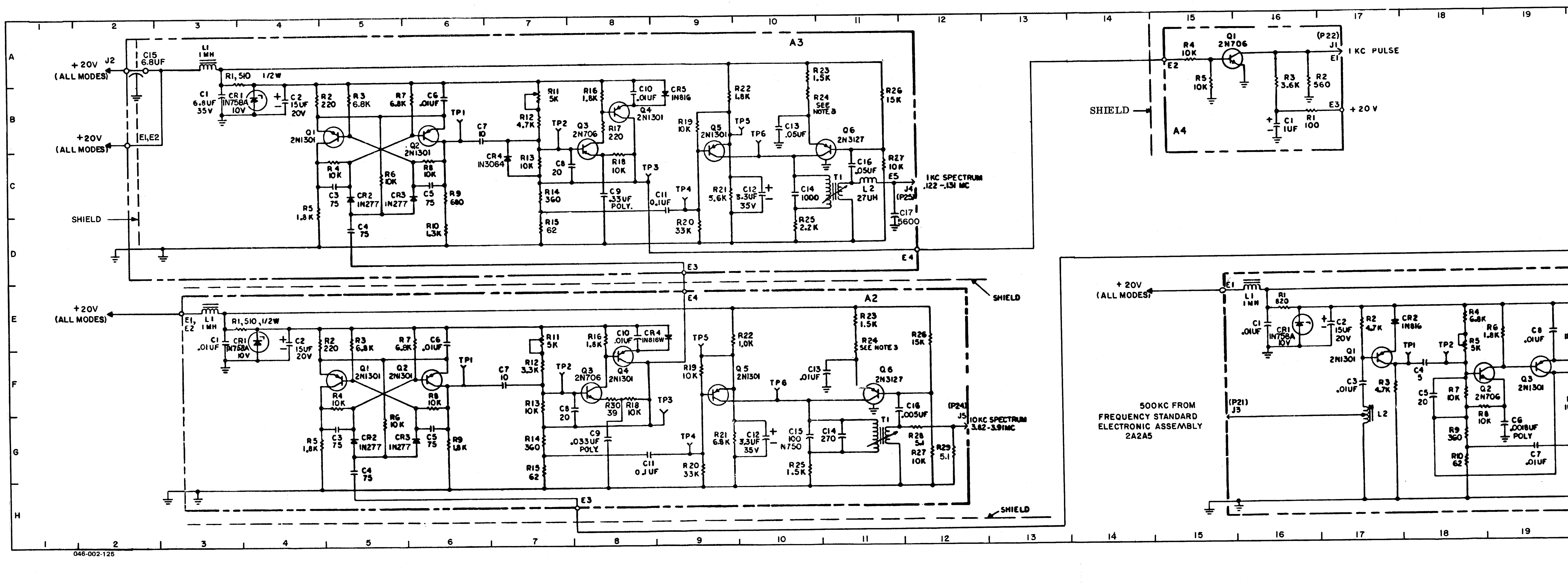
NOTES:

1. PREFIX ALL REF DES WITH 2A2A6A5
2. UNLESS OTHERWISE SPECIFIED:
   a. ALL RESISTORS ARE IN OHMS
   b. ALL RESISTORS ARE 5%, 1/4W
   c. ALL CAPACITORS ARE IN MICROMICROFARADS
3. R24 SELECTED AT FACTORY FROM VALUES BETWEEN 1.0K AND 8.2K

Figure 5-23. Spectrum Generator Subassembly 2A2A6A5, Schematic Diagram

PART LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
J2	2A	A1R6	19E	A2C14	11G	A2R27	12G	A3Q6	11C
A1C1	16E	A1R7	18F	A2C15	10G	A2R28	12G	A3R1	4A
A1C2	17E	A1R8	18G	A2C16	11F	A2R29	12G	A3R2	4B
A1C3	17F	A1R9	18G	A2CR1	4E	A2R30	8F	A3R3	5B
A1C4	18F	A1R10	18G	A2CR2	5G	A2T1	11G	A3R4	5C
A1C5	18F	A1R11	20F	A2CR3	6G	A2TP1	6F	A3R5	4C
A1C6	19G	A1R12	20F	A2CR4	9E	A2TP2	7F	A3R6	5C
A1C7	19G	A1R13	20G	A2J5	12G	A2TP3	9F	A3R7	6B
A1C8	19E	A1R14	20G	A2L1	3E	A2TP4	9G	A3R8	6C
A1C9	21E	A1R15	21E	A2Q1	5F	A2TP5	9E	A3R9	6C
A1C10	21G	A1R16	21H	A2Q2	6F	A2TP6	10F	A3R10	6D
A1C11	21G	A1R17	22E	A2Q3	8F	A3C1	3B	A3R11	7B
A1C12	21G	A1R18	22G	A2Q4	8F	A3C2	4B	A3R12	7B
A1C13	22F	A1R19	23E	A2Q5	9F	A3C3	5C	A3R13	7C
A1C14	22F	A1R20	22G	A2Q6	11F	A3C4	5D	A3R14	7C
A1C15	23E	A1R21	23E	A2R1	4E	A3C5	6C	A3R15	7D
A1C16	23G	A1R22	25F	A2R2	4E	A3C6	6B	A3R16	8B
A1C17	24F	A1R23	23E	A2R3	5E	A3C7	6B	A3R17	8B
A1C18	25F	A1R24	23G	A2R4	5F	A3C8	8C	A3R18	8C
A1C19	25F	A1R25	25F	A2R5	4G	A3C9	8C	A3R19	9B
A1CR1	16E	A1T1	21G	A2R6	5G	A3C10	8B	A3R20	9D
A1CR2	17E	A1T2	26F	A2R7	6E	A3C11	9C	A3R21	9C
A1CR3	20E	A1TP1	18F	A2R8	6F	A3C12	10C	A3R22	9B
A1CR4	23F	A1TP2	18F	A2R9	6G	A3C13	10B	A3R23	10A
A1J3	15G	A1TP3	20F	A2R10	Not used	A3C14	10C	A3R24	10B
A1J6	26F	A1TP4	20F	A2R11	7E	A3C15	2A	A3R25	10D
A1L1	16E	A1TP5	20G	A2R12	7F	A3C16	11C	A3R26	11B
A1L2	17G	A1TP6	21F	A2R13	7F	A3C17	11D	A3R27	11C
A1L3	Not used	A2C1	3E	A2R14	7G	A3CR1	4B	A3T1	11C
A1L4	Not used	A2C2	4E	A2R15	7G	A3CR2	5C	A3TP1	6B
A1Q1	17F	A2C3	5G	A2R16	8E	A3CR3	6C	A3TP2	7B
A1Q2	18F	A2C4	5G	A2R17	Not used	A3CR4	7C	A3TP3	8C
A1Q3	19F	A2C5	6G	A2R18	8F	A3CR5	9B	A3TP4	9C
A1Q4	20G	A2C6	6E	A2R19	9F	A3J4	12C	A3TP5	10B
A1Q5	21F	A2C7	7F	A2R20	9G	A3L1	3A	A3TP6	10B
A1Q6	23F	A2C8	8F	A2R21	9G	A3L2	11C	A4C1	16B
A1R1	16E	A2C9	8G	A2R22	9E	A3Q1	5B	A4J1	17A
A1R2	17E	A2C10	8E	A2R23	11E	A3Q2	6B	A4Q1	15A
A1R3	17F	A2C11	8G	A2R24	11F	A3Q3	8B	A4R1	16B
A1R4	18E	A2C12	10G	A2R25	10G	A3Q4	8B	A4R2	16B
A1R5	18F	A2C13	11F	A2R26	12E	A3Q5	9C	A4R3	16B
								A4R4	15A
								A4R5	15B



PART LOCATION INDEX

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2C4	7H	A3C20	20G	A4C10	12B	A4R3	10B	A5C2	17D
2C5	7G	A3CR1	18H	A4C11	12B	A4R4	11B	A5C3	21C
2C6	4G	A3CR2	18H	A4C12	13B	A4R5	11B	A5C4	18C
2C7	4G	A3CR3	19H	A4C13	13B	A4R6	11B	A5C5	18B
2C8	9G	A3Q1	12H	A4C14	13A	A4R7	13B	A5C6	19B
2C9	8G	A3Q2	16G	A4C15	14B	A4R8	13B	A5C7	19C
2FL1	8G	A3R1	11H	A4C16	14B	A4R9	13A	A5C8	20C
2Q1	7G	A3R2	12H	A4C17	14B	A4R10	13A	A5C9	20D
2Q2	5G	A3R3	11H	A4C18	14B	A4R11	13B	A5C10	21C
2R1	7H	A3R4	12H	A4C19	15A	A4R12	14B	A5C11	21C
2R2	7H	A3R5	15H	A4C20	Not used	A4R13	15B	A5CR1	20D
2R3	7H	A3R6	16G	A4C21	10C	A4R14	15B	A5L1	21B
2R4	5G	A3R7	16H	A4C22	9D	A4R15	9D	A5L2	19C
2R5	4G	A3R8	16H	A4C23	10D	A4R16	10D	A5L3	20C
2R6	4G	A3R9	17H	A4C24	9D	A4R17	10C	A5Q1	17D
2R7	4G	A3R10	18G	A4C25	11D	A4R18	11D	A5Q2	18C
2R8	6F	A3R11	18H	A4C26	10D	A4R19	12C	A5Q3	19C
2R9	5G	A3R12	18H	A4C27	12C	A4R20	11D	A5Q4	20C
2T1	6G	A3R13	19H	A4C28	12C	A4R21	13D	A5R1	17D
2T2	8G	A3R14	19G	A4C29	10C	A4R22	13D	A5R2	17C
2T3	9G	A3R15	21G	A4C30	15D	A4R23	13D	A5R3	17C
2TP1	9G	A3R16	12G	A4C31	12D	A4R24	13D	A5R4	18C
3C1	11H	A3T1	13H	A4C32	12D	A4R25	13C	A5R5	18D
3C2	21I	A3T2	15H	A4C33	12D	A4R26	14D	A5R6	19C
3C3	20I	A3T3	19G	A4C34	13D	A4R27	15D	A5R7	19D
3C4	11H	A3T4	21G	A4C35	13D	A4R28	15B	A5R8	19D
3C5	12G	A3TP1	12G	A4C36	14D	A4T1	9B	A5R9	19C
3C6	12H	A3TP2	15G	A4C37	13C	A4T2	11B	A5R10	19D
3C7	13H	A3TP3	17G	A4C38	14D	A4T3	12B	A5R11	20C
3C8	14H	A3TP4	21F	A4C39	14D	A4T4	12B	A5R12	19D
3C9	14H	A3Y1	14G	A4C40	14D	A4T5	14B	A5R13	19D
3C10	16G	A3Y2	20F	A4C41	15B	A4T6	15B	A5R14	19D
3C11	17H	A4C1	9B	A4CR1	15B	A4T7	9D	A5R15	20C
3C12	17H	A4C2	9B	A4CR2	15C	A4T8	11D	A5R16	21C
3C13	17G	A4C3	10B	A4FL1	10D	A4T9	12D	A5R17	20D
3C14	18H	A4C4	11B	A4IC1	10B	A4T10	12D	A5TP1	18D
3C15	18G	A4C5	10C	A4IC2	10D	A4T11	14D		
3C16	19H	A4C6	10B	A4Q1	13B	A4T12	15D		
3C17	20G	A4C7	10A	A4Q2	13D	A4TP1	11A		
3C18	19G	A4C8	11B	A4R1	9B	A4TP2	11D		
3C19	20G	A4C9	12B	A4R2	10B	A5C1	17B		

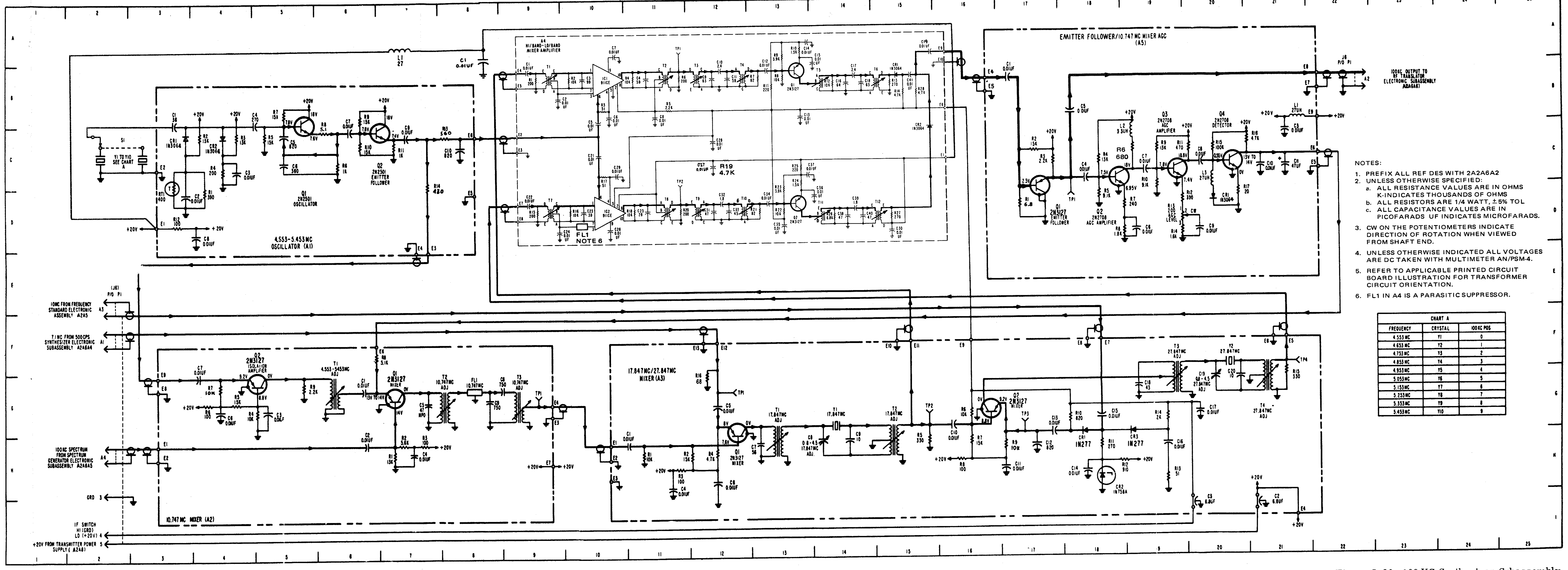

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Figure 5-20. 100 KC Synthesizer Subassembly 2A2A6A2, Schematic Diagram

PART LOCATION INDEX

REF DES	LCTN
C1	8A
L1	7A
P1	2E, 2F
	2H, 2I
	22B
S1	2C
Y1	
thru	2C
Y10	
A1C1	3C
A1C2	3D
A1C3	4C
A1C4	5C
A1C5	5C
A1C6	5C
A1C7	6C
A1C8	4D
A1C9	7C
A1C10	8C
A1CR1	3C
A1CR2	4C
A1Q1	5C
A1Q2	7C
A1R1	4C
A1R2	4C
A1R3	4C
A1R4	4C
A1R5	5C
A1R6	6C
A1R7	5B
A1R8	6C
A1R9	6B
A1R10	6C
A1R11	7C
A1R12	3D
A1R13	8C
A1R14	7C
A1RT1	3C
A2C1	6G
A2C2	6H
A2C3	5G

REF DES	LCTN
A2C4	7H
A2C5	7G
A2C6	4G
A2C7	4G
A2C8	9G
A2C9	8G
A2FL1	8G
A2Q1	7G
A2Q2	5G
A2R1	7H
A2R2	7H
A2R3	7H
A2R4	5G
A2R5	4G
A2R6	4G
A2R7	4G
A2R8	6F
A2R9	5G
A2T1	6G
A2T2	8G
A2T3	9G
A2TP1	9G
A3C1	11H
A3C2	21I
A3C3	20I
A3C4	11H
A3C5	12G
A3C6	12H
A3C7	13H
A3C8	14H
A3C9	14H
A3C10	16G
A3C11	17H
A3C12	17H
A3C13	17G
A3C14	18H
A3C15	18G
A3C16	19H
A3C17	20G
A3C18	19G
A3C19	20G

REF DES	LCTN
A3C20	20G
A3CR1	18H
A3CR2	18H
A3CR3	19H
A3Q1	12H
A3Q2	16G
A3R1	11H
A3R2	12H
A3R3	11H
A3R4	12H
A3R5	15H
A3R6	16G
A3R7	16H
A3R8	16H
A3R9	17H
A3R10	18G
A3R11	18H
A3R12	18H
A3R13	19H
A3R14	19G
A3R15	21G
A3R16	12G
A3T1	13H
A3T2	15H
A3T3	19G
A3T4	21G
A3TP1	12G
A3TP2	15G
A3TP3	17G
A3TP4	21F
A3Y1	14G
A3Y2	20F
A4C1	9B
A4C2	9B
A4C3	10B
A4C4	11B
A4C5	10C
A4C6	10B
A4C7	10A
A4C8	11B
A4C9	12B

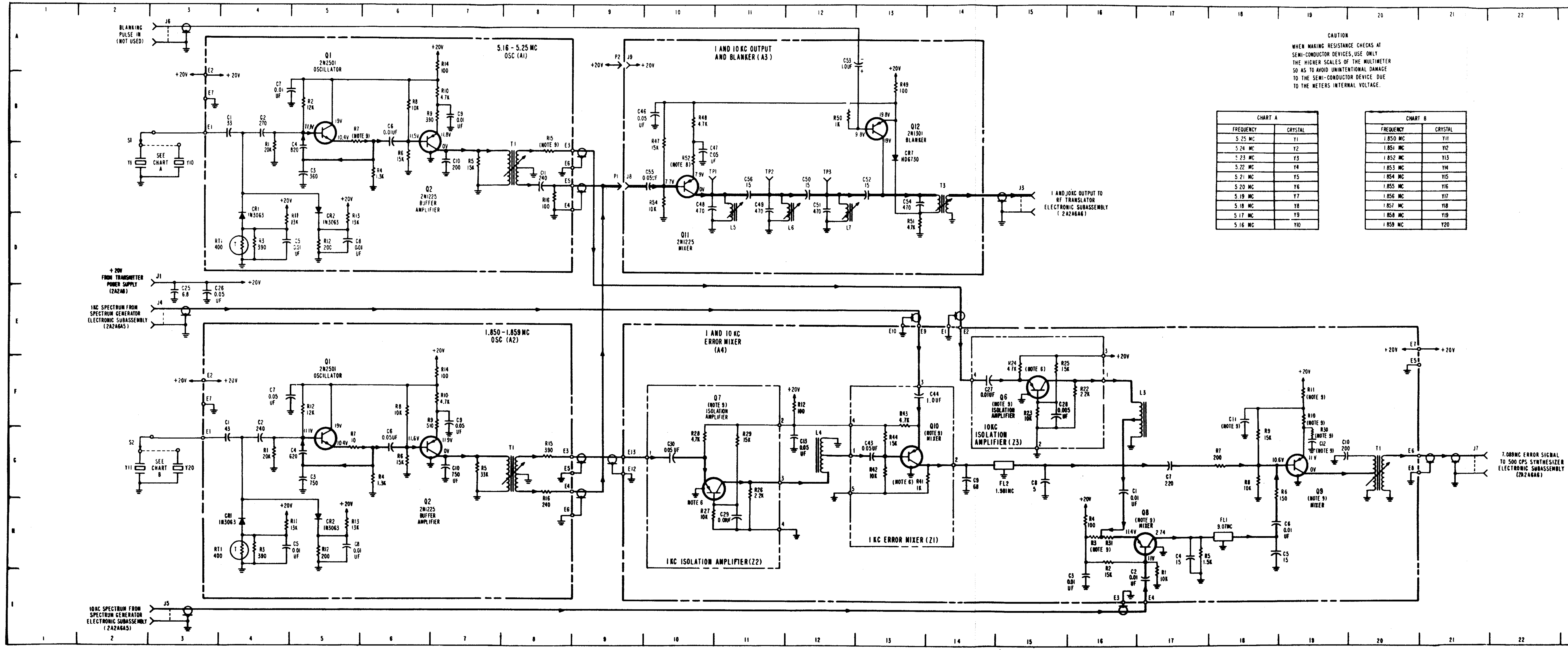
REF DES	LCTN
A4C10	12B
A4C11	12B
A4C12	13B
A4C13	13B
A4C14	13A
A4C15	14B
A4C16	14B
A4C17	14B
A4C18	14B
A4C19	15A
A4C20	Not used
A4C21	10C
A4C22	9D
A4C23	10D
A4C24	9D
A4C25	11D
A4C26	10D
A4C27	12C
A4C28	12C
A4C29	10C
A4C30	15D
A4C31	12D
A4C32	12D
A4C33	12D
A4C34	13D
A4C35	13D
A4C36	14D
A4C37	13C
A4C38	14D
A4C39	14D
A4C40	14D
A4C41	15B
A4CR1	15B
A4CR2	15C
A4FL1	10D
A4IC1	10B
A4IC2	10D
A4Q1	13B
A4Q2	13D
A4R1	9B
A4R2	10B

REF DES	LCTN
A4R3	10B
A4R4	11B
A4R5	11B
A4R6	11B
A4R7	13B
A4R8	13B
A4R9	13A
A4R10	13A
A4R11	13B
A4R12	14B
A4R13	15B
A4R14	15B
A4R15	9D
A4R16	10D
A4R17	10C
A4R18	11D
A4R19	12C
A4R20	11D
A4R21	13D
A4R22	13D
A4R23	13D
A4R24	13D
A4R25	13C
A4R26	14D
A4R27	15D
A4R28	15B
A4T1	9B
A4T2	11B
A4T3	12B
A4T4	12B
A4T5	14B
A4T6	15B
A4T7	9D
A4T8	11D
A4T9	12D
A4T10	12D
A4T11	14D
A4T12	15D
A4TP1	11A
A4TP2	11D
A5C1	17B

REF DES	LCTN
A5C2	17D
A5C3	21C
A5C4	18C
A5C5	18B
A5C6	19B
A5C7	19C
A5C8	20C
A5C9	20D
A5C10	21C
A5C11	21C
A5CR1	20D
A5L1	21B
A5L2	19C
A5L3	20C
A5Q1	17D
A5Q2	18C
A5Q3	19C
A5Q4	20C
A5R1	17D
A5R2	17C
A5R3	17C
A5R4	18C
A5R5	18D
A5R6	19C
A5R7	19D
A5R8	19D
A5R9	19C
A5R10	19D
A5R11	20C
A5R12	19D
A5R13	19D
A5R14	19D
A5R15	20C
A5R16	21C
A5R17	20D
A5TP1	18D

PART LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
C25	3E	A1RT1	4D	A3CR7	13C	A4R7	18G
C26	3E	A1T1	8C	A3J8	9C	A4R8	18G
J1	3D	A2C1	4G	A3J9	9A	A4R9	18F
J3	15C	A2C2	4G	A3J10	9D	A4R10	19F
J4	3E	A2C3	5G	A3L5	11C	A4R11	19F
J5	3I	A2C4	5G	A3L6	12C	A4R12	12F
J6	3A	A2C5	4H	A3L7	12C	A4R30	19F
J7	21G	A2C6	6G	A3Q11	10C	A4R31	16H
P1	9C	A2C7	4F	A3Q12	13B	A4T1	20G
P2	9A	A2C8	5H	A3R47	10B	A4Z1C43	13G
S1	2B	A2C9	7F	A3R48	10B	A4Z1C44	13F
S2	2G	A2C10	7G	A3R49	13B	A4Z1Q10	13G
Y1 thru Y10	2C, 3C	A2CR1	4H	A3R50	12B	A4Z1R41	13G
Y11thru Y20	2G, 3G	A2CR2	5H	A3R51	13D	A4Z1R42	13G
A1C1	4B	A2Q1	5G	A3R52	10C	A4Z1R43	13F
A1C2	4B	A2Q2	6G	A3R54	10C	A4Z1R44	13G
A1C3	5C	A2R1	4G	A3T3	14C	A4Z2C29	11H
A1C4	5C	A2R2	5F	A3TP1	10C	A4Z2C30	10G
A1C5	4D	A2R3	4H	A3TP2	11C	A4Z2Q7	10G
A1C6	6B	A2R4	6G	A3TP3	12C	A4Z2R26	11G
A1C7	4B	A2R5	7G	A4C1	16G	A4Z2R27	10H
A1C8	5D	A2R6	6G	A4C2	17I	A4Z2R28	10G
A1C9	7B	A2R7	5G	A4C3	16I	A4Z2R29	11G
A1C10	7C	A2R8	6F	A4C4	17H	A4Z3C27	14F
A1C11	8C	A2R9	7F	A4C5	19H	A4Z3C28	15F
A1CR1	4C	A2R10	7F	A4C6	19H	A4Z3Q6	15F
A1CR2	5C	A2R11	4H	A4C7	17G	A4Z3R22	16F
A1Q1	5B	A2R12	5H	A4C8	15G	A4Z3R23	15F
A1Q2	6B	A2R13	5H	A4C9	14G	A4Z3R24	15F
A1R1	4B	A2R14	7F	A4C10	19G	A4Z3R25	15F
A1R2	5B	A2R15	8G	A4C11	18F		
A1R3	4D	A2R16	8G	A4C12	19G		
A1R4	6C	A2RT1	4H	A4C13	12G		
A1R5	7C	A2T1	8G	A4FL1	18H		
A1R6	6C	A3C46	10B	A4FL2	15G		
A1R7	5B	A3C47	10C	A4L3	17F		
A1R8	6B	A3C48	10C	A4L4	12G		
A1R9	7B	A3C49	11C	A4Q8	17H		
A1R10	7B	A3C50	12C	A4Q9	19G		
A1R11	4D	A3C51	12C	A4R1	17I		
A1R12	5D	A3C52	13C	A4R2	16H		
A1R13	5C	A3C53	13A	A4R3	16H		
A1R14	7A	A3C54	13C	A4R4	16H		
A1R15	8C	A3C55	10C	A4R5	17H		
A1R16	8C	A3C56	11C	A4R6	19H		



NOTES:

1. PREFIX ALL REF DES WITH 2A2A6A3.
2. UNLESS OTHERWISE SPECIFIED:
   a. ALL RESISTANCE VALUES ARE IN OHMS. K INDICATES THOUSANDS OF OHMS.
   b. ALL RESISTORS ARE 1/4 WATT, ±5% TOL
   c. ALL CAPACITANCE VALUES ARE IN PICOFARADS UF INDICATES MICROFARADS.
3. NUMBERS ADJACENT TO WINDINGS, COILS, AND TEST POINTS INDICATE DC RESISTANCE (VALUES LESS THAN ONE OHM ARE NOT SHOWN).
4. UNLESS OTHERWISE INDICATED ALL VOLTAGES ARE DC TAKEN WITH MULTIMETER AN/PSM-4A.
5. REFER TO APPLICABLE PRINTED CIRCUIT BOARD ILLUSTRATION FOR TRANSFORMER CIRCUIT ORIENTATION.
6. CIRCUITS Z1, Z2 AND Z3 IN A4 ARE ENCAPSULATED, TRANSISTORS A4Z1Q10, A4Z2Q7 AND A4Z306 ARE THEREFORE INACCESSIBLE AND NO VOLTAGE READING FOR THESE TRANSISTORS ARE AVAILABLE.
7. THIS SCHEMATIC REFLECTS THE CURRENT MODEL OF 1 AND 10 KC SYNTHESIZER ELECTRONIC SUB-ASSEMBLY, EARLIER USED CIRCUIT CONFIGURATIONS AND COMPONENTS ARE INDICATED BY SEPARATE DETAILS, WHERE REQUIRED OR BY APPROPRIATE NOTES.
8. VALUE OF RESISTOR A3R52 IS SELECTED AT TIME OF ASSEMBLY BETWEEN 12 AND 39 OHMS.
9. VARIATIONS EXIST FOR THE COMPONENTS LISTED VELOW DUE TO EQUIPMENT DESIGN CHANGES. USE EXISTING COMPONENT TYPES FOR REPLACEMENT PURPOSES.

COMPONENT	CURRENT MODEL	EARLIER MODELS
RESISTOR A1R7	5.1 OHMS	15 OHMS
RESISTOR A1R15	820 OHMS	620 OHMS
RESISTOR A4R3	10K OHMS	4.7K OHMS
RESISTOR A4R10	10K OHMS	4.7K OHMS
RESISTOR A4R11	470 OHMS	100 OHMS
RESISTOR A4R30	15 OHMS	NOT INCLUDED ON EARLIER MODELS
RESISTOR A4R31	62 OHMS	NOT INCLUDED ON EARLIER MODELS
CAPACITOR A4C11	0.01 UF	0.05 UF
CAPACITOR A4C12	0.01 UF	0.05 UF
TRANSISTOR A4Q8	2N3127	EARLIER MODELS USED 2N700 UNMARKED BUT SELECTED FOR LOW GAIN, LATER MODELS USED 2N700 MARKED WITH BLUE DOT; STILL LATER MODELS USED SM2059
TRANSISTOR A4Q9	2N3127	2N700
TRANSISTOR A4Z1Q10	2N3127	2N700
TRANSISTOR A4Z2Q7	2N3127	2N700
TRANSISTOR A4Z3Q6	2N3127	2N700

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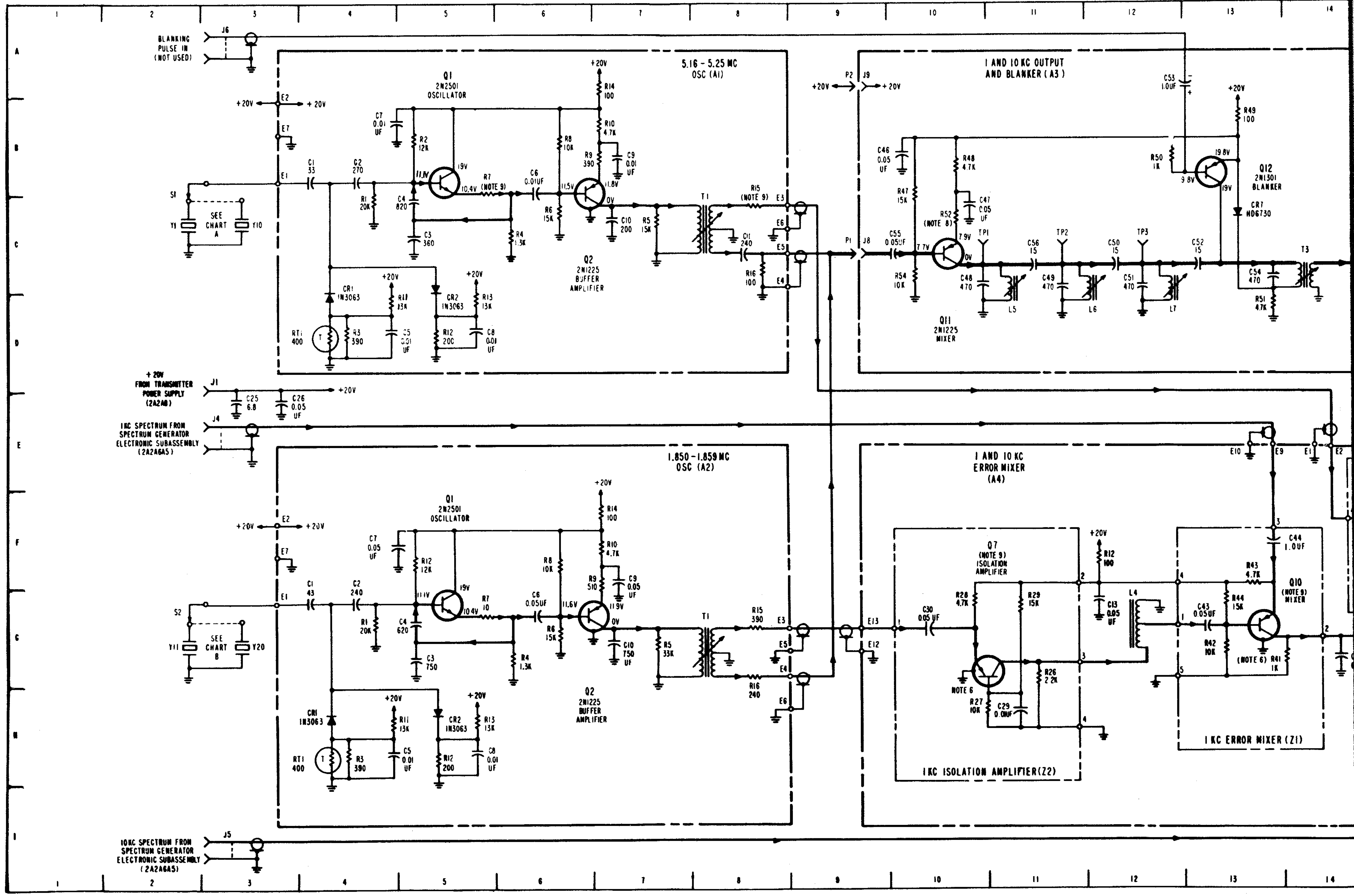
Figure 5-21. 1 and 10 KC Synthesizer Subassembly 2A2A6A3, Schematic Diagram

PART LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
C25	3E	A1RT1	4D	A3CR7	13C	A4R7	18G
C26	3E	A1T1	8C	A3J8	9C	A4R8	18G
J1	3D	A2C1	4G	A3J9	9A	A4R9	18F
J3	15C	A2C2	4G	A3J10	9D	A4R10	19F
J4	3E	A2C3	5G	A3L5	11C	A4R11	19F
J5	3I	A2C4	5G	A3L6	12C	A4R12	12F
J6	3A	A2C5	4H	A3L7	12C	A4R30	19F
J7	21G	A2C6	6G	A3Q11	10C	A4R31	16H
P1	9C	A2C7	4F	A3Q12	13B	A4T1	20G
P2	9A	A2C8	5H	A3R47	10B	A4Z1C43	13G
S1	2B	A2C9	7F	A3R48	10B	A4Z1C44	13F
S2	2G	A2C10	7G	A3R49	13B	A4Z1Q10	13G
Y1 thru Y10	2C, 3C	A2CR1	4H	A3R50	12B	A4Z1R41	13G
Y11thru Y20	2G, 3G	A2CR2	5H	A3R51	13D	A4Z1R42	13G
A1C1	4B	A2Q1	5G	A3R52	10C	A4Z1R43	13F
A1C2	4B	A2Q2	6G	A3R54	10C	A4Z1R44	13G
A1C3	5C	A2R1	4G	A3T3	14C	A4Z2C29	11H
A1C4	5C	A2R2	5F	A3TP1	10C	A4Z2C30	10G
A1C5	4D	A2R3	4H	A3TP2	11C	A4Z2Q7	10G
A1C6	6B	A2R4	6G	A3TP3	12C	A4Z2R26	11G
A1C7	4B	A2R5	7G	A4C1	16G	A4Z2R27	10H
A1C8	5D	A2R6	6G	A4C2	17I	A4Z2R28	10G
A1C9	7B	A2R7	5G	A4C3	16I	A4Z2R29	11G
A1C10	7C	A2R8	6F	A4C4	17H	A4Z3C27	14F
A1C11	8C	A2R9	7F	A4C5	19H	A4Z3C28	15F
A1CR1	4C	A2R10	7F	A4C6	19H	A4Z3Q6	15F
A1CR2	5C	A2R11	4H	A4C7	17G	A4Z3R22	16F
A1Q1	5B	A2R12	5H	A4C8	15G	A4Z3R23	15F
A1Q2	6B	A2R13	5H	A4C9	14G	A4Z3R24	15F
A1R1	4B	A2R14	7F	A4C10	19G	A4Z3R25	15F
A1R2	5B	A2R15	8G	A4C11	18F		
A1R3	4D	A2R16	8G	A4C12	19G		
A1R4	6C	A2RT1	4H	A4C13	12G		
A1R5	7C	A2T1	8G	A4FL1	18H		
A1R6	6C	A3C46	10B	A4FL2	15G		
A1R7	5B	A3C47	10C	A4L3	17F		
A1R8	6B	A3C48	10C	A4L4	12G		
A1R9	7B	A3C49	11C	A4Q8	17H		
A1R10	7B	A3C50	12C	A4Q9	19G		
A1R11	4D	A3C51	12C	A4R1	17I		
A1R12	5D	A3C52	13C	A4R2	16H		
A1R13	5C	A3C53	13A	A4R3	16H		
A1R14	7A	A3C54	13C	A4R4	16H		
A1R15	8C	A3C55	10C	A4R5	17H		
A1R16	8C	A3C56	11C	A4R6	19H		



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PARTS LOCATION INDEXD

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
J13	1D, 12F	A1A2	8B	A1C32	10G	A1L8	8G
J14	1F, 1G		(See A1A1)	A1C33	10F	A1L9	11E
A1A1	5F	A1A3	8E	A1C34	10F	A1L10	11G
A1A1C1	Not used		(See A1A1)	A1C35	11F	A1R1	3G
A1A1C2	Not used	A1C1	5G	A1C36	7H	A1R2	3G
A1A1C3	14E	A1C2	4F	A1C37	8H	A1R3	6G
A1A1C4	13D	A1C3	7G	A1C38	10G	A1R4	3E
A1A1C5	14E	A1C4	2F	A1C39	11G	A1R5	3E
A1A1C6	15E	A1C5	3F	A1C40	9B	A1R6	3A
A1A1C7	15E	A1C6	3F	A1CR1	3G	A1R7	3A
A1A1C8	15D	A1C7	4F	A1CR2	3G	A1R8	6C
A1A1C9	15E	A1C8	4F	A1CR3	3E	A1R9	6C
A1A1C10	16E	A1C9	3C	A1CR4	4A	A1R10	8C
A1A1C11	Not used	A1C10	Not used	A1CR5	4C	A1R11	6E
A1A1C12	Not used	A1C11	3A	A1CR6	6A	A1R12	5D
A1A1C13	16C	A1C12	5D	A1CR7	6C	A1R13	Not used
A1A1CR1	13D	A1C13	3B	A1CR8	9H	A1R14	9F
A1A1CR2	13E	A1C14	4A	A1FL1	5A	A1R15	10E
A1A1CR3	16D	A1C15	4C	A1FL2	5C	A1R16	11F
A1A1CR4	16D	A1C16	5A	A1FL3	10C	A1R17	9G
A1A1IC1	15D	A1C17	5C	A1IC1	9G	A1T1	4A
A1A1R1	13D	A1C18	6B	A1J1	2H	A1T2	4C
A1A1R2	13D	A1C19	6C	A1J2	2D	A1T3	6A
A1A1R3	13C	A1C20	7B	A1J3	2E	A1T4	6C
A1A1R4	14E	A1C21	7B	A1J4	2B	A1T5	10C
A1A1R5	14D	A1C22	8C	A1J5	12A	A1T6	10F
A1A1R6	15E	A1C23	9B	A1J6	12G	A1TP1	Not used
A1A1R7	15D	A1C24	10B	A1J7	12E	A1TP2	Not used
A1A1R8	16E	A1C25	10D	A1L1	3F	A1TP3	Not used
A1A1R9	16D	A1C26	9E	A1L2	2B	A1TP4	Not used
A1A1R10	17D	A1C27	6D	A1L3	5B	A1TP5	2G
A1A1R11	17D	A1C28	8E	A1L4	6B	A1TP6	2F
A1A1R12	17C	A1C29	8F	A1L5	7A	A1TP7	3D
A1A1T1	14D	A1C30	8G	A1L6	10A	A1TP8	11F
A1A1T2	16D	A1C31	9G	A1L7	7D		

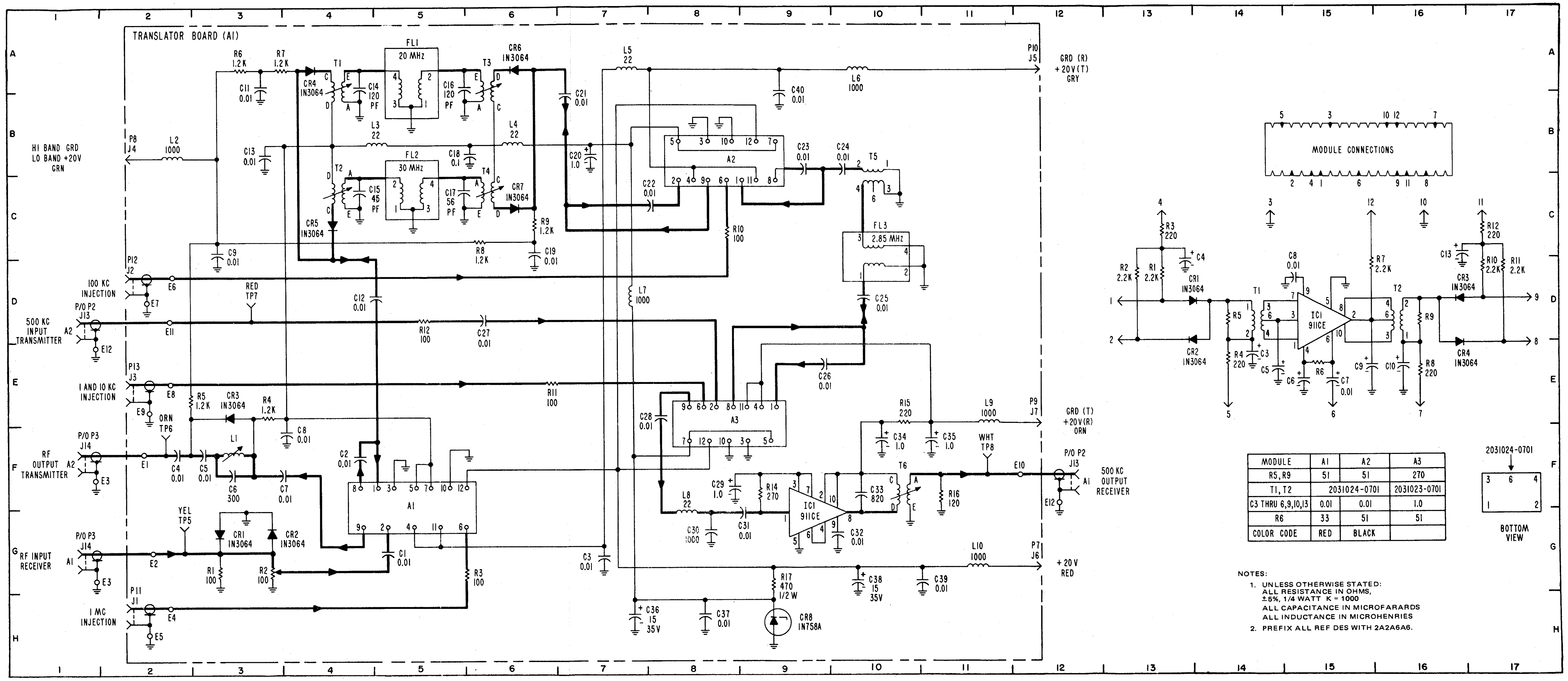

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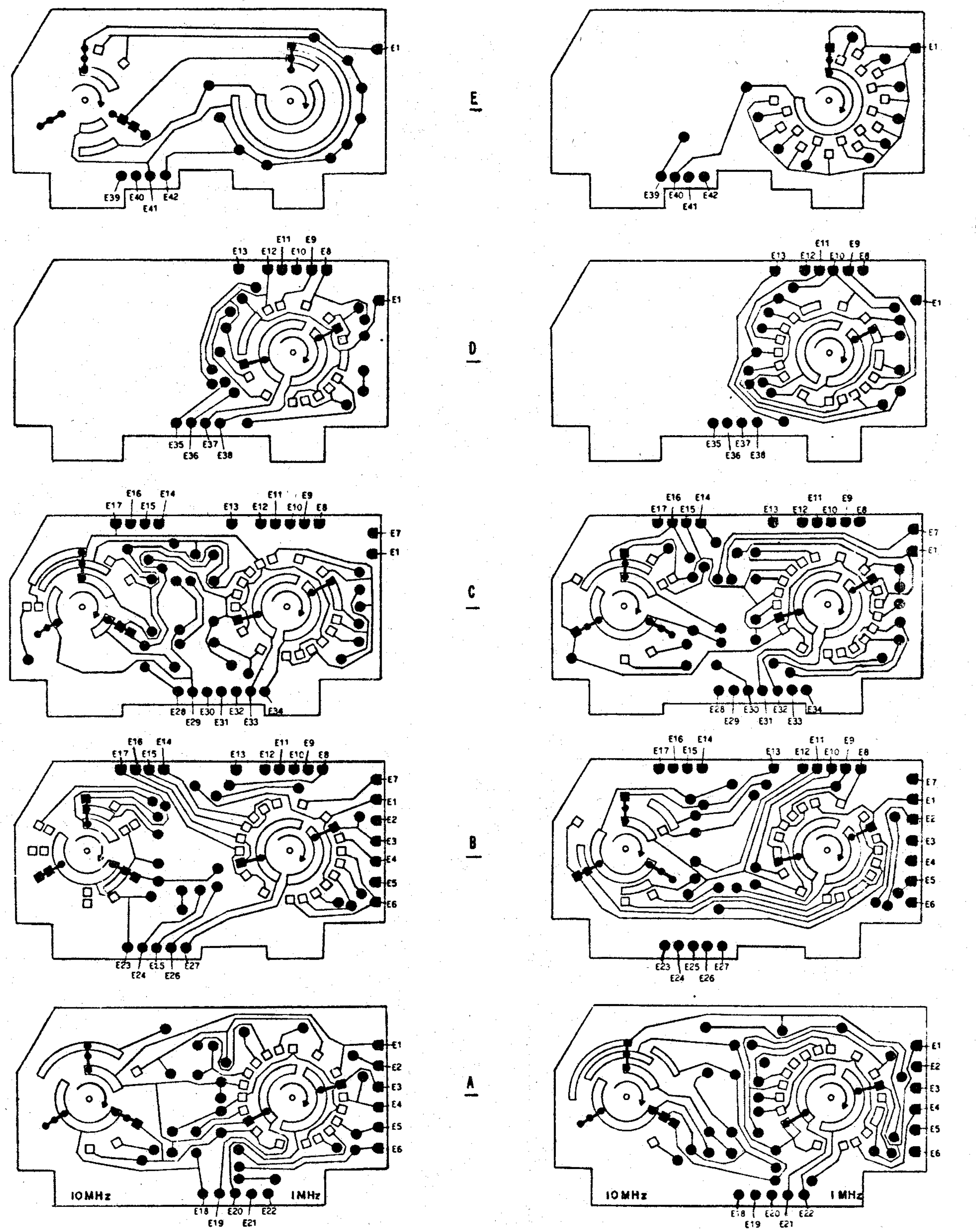
Figure 5-24. RF Translator Subassembly 2A2A6A6, Schematic Diagram



FRONT SIDES

REAR SIDES (VIEWED THRU BOARD FROM FRONT SIDE)

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INTER-BOARD AND PLUG P1 WIRING DATA

FROM	TO	FUNCTION
E21A	P1-1	RF AMPLIFIER CODE
E22A	P1-2	
E19A	P1-3	
E20A	P1-4	
E27B	P1-5	
E25B	P1-21	MHZ SYNTHESIZER CODE
E36D	P1-22	
E35D	P1-23	
E38D	P1-24	
E37D	P1-25	
E32C	P1-13	TA AMPLIFIER CODE
E31C	P1-14	
E34C	P1-15	
E33C	P1-16	
E26B	P1-17	
E24B	P1-6	HI/LO CONTROL
E39E	P1-7	TUNE RELAY GRD.
E29C	P1-10	100 KC IMAGE CONTROL
E30C	P1-12	
E42E	T1-11	GRD PULSE
E41E	P1-9	GROUND

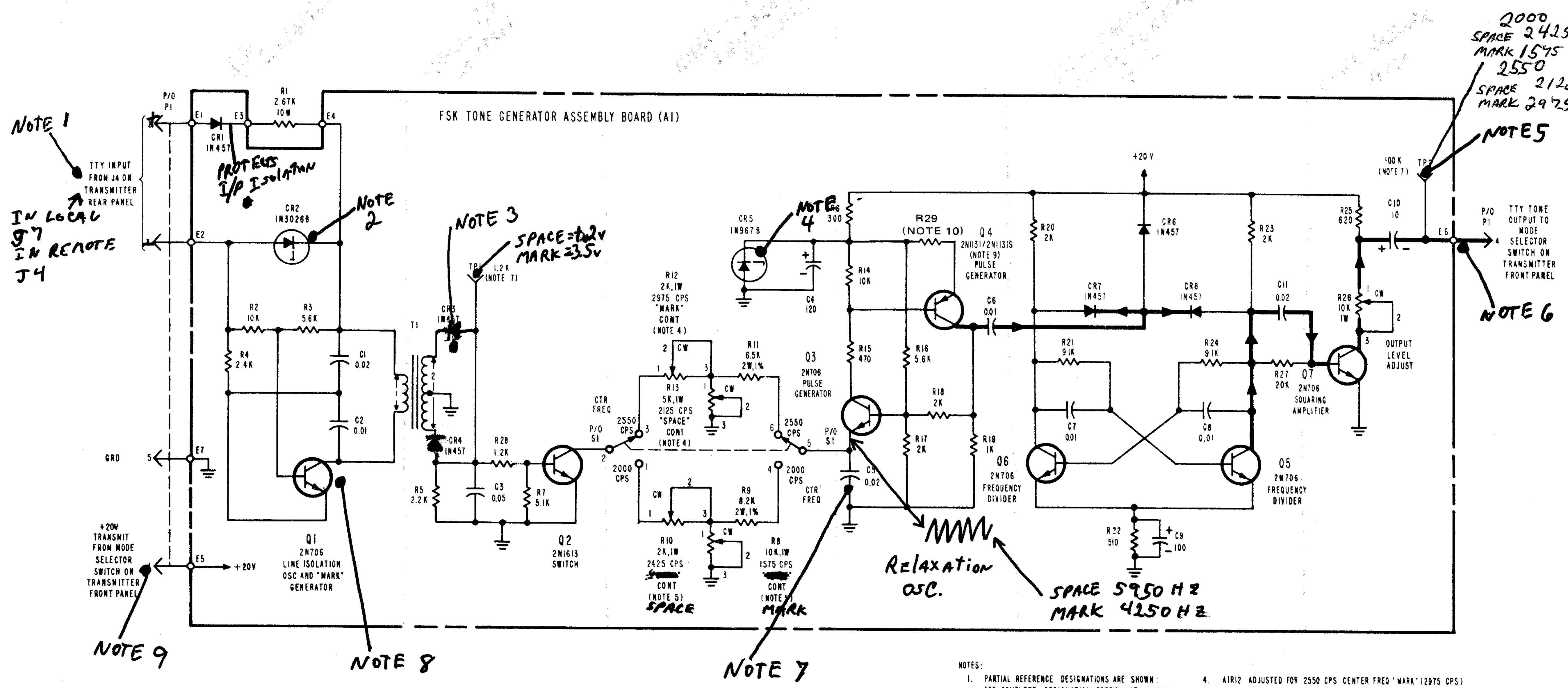
E1 OF BOARDS A,B,C,D, AND E ARE CONNECTED TOGETHER
E2 OF BOARDS A AND B ARE CONNECTED TOGETHER
E3 OF BOARDS A AND B ARE CONNECTED TOGETHER
E4 OF BOARDS A AND B ARE CONNECTED TOGETHER
E5 OF BOARDS A AND B ARE CONNECTED TOGETHER
E6 OF BOARDS A AND B ARE CONNECTED TOGETHER
E7 OF BOARDS B AND C ARE CONNECTED TOGETHER
E8 OF BOARDS B, C AND D ARE CONNECTED TOGETHER
E9 OF BOARDS B, C AND D ARE CONNECTED TOGETHER
E10 OF BOARDS B, C AND D ARE CONNECTED TOGETHER
E11 OF BOARDS B, C AND D ARE CONNECTED TOGETHER
E12 OF BOARDS B, C AND D ARE CONNECTED TOGETHER
E13 OF BOARDS B, C AND D ARE CONNECTED TOGETHER
E14 OF BOARDS B AND C ARE CONNECTED TOGETHER
E15 OF BOARDS B AND C ARE CONNECTED TOGETHER
E16 OF BOARDS B AND C ARE CONNECTED TOGETHER
E17 OF BOARDS B AND C ARE CONNECTED TOGETHER

NOTES:

1. SOLID CIRCLES INDICATE FRONT AND REAR OF PC BOARD ARE CONNECTED TOGETHER AT THAT POINT.
2. SWITCH WIPERS SHOWN IN 00 MCS POSITION.
3. BOARD A IS LOCATED CLOSEST TO FRONT PANEL.

Figure 5-25. Code Generator Assembly 2A2A7, Schematic Diagram

NOTE 1. 5-10ma DC
NOTE 2. 18v ZENER
NOTE 3. Full wave Rectifier
NOTE 4. 18v ZENER
NOTE 5. 1v p/p Square wave — 1v p/p
NOTE 6. SPACE 2975 HZ
MARK 2125 HZ
differ. 425 HZ
NOTE 7. C-5 insently CHARGES TROUGH Q-3 until Q-3 cuts off THEN DisCHARGES TROUGH Q-2, R-13, R-12 R-11 in space condition
THROUGH R-13, R-11 IN MARK condition
(discharges Faster In SPACE causes Higher o/p FREQ of Q-3)
NOTE 8. MODIFIED colpits mark I/P produces A 50-80 KHZ o/p THROUGH T-1.
SPACE no o/p
NOTE 9. ONLY IN FSK & ISB/FSK



NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH 2A2A9
2. UNLESS OTHERWISE SPECIFIED:
   A. ALL RESISTANCE VALUES ARE IN OHMS. K-INDICATES THOUSANDS OF OHMS.
   B. ALL RESISTORS ARE 1/4 WATT, ± 5% TOL
   C. ALL CAPACITANCE VALUES ARE IN MICROFARADS
3. CW ON ALL POTENTIOMETERS INDICATE DIRECTION OF ROTATION WHEN VIEWED FROM SHAFT END.
4. A1R12 ADJUSTED FOR 2550 CPS CENTER FREQ 'MARK' (2975 CPS)
   A1R13 ADJUSTED FOR 2550 CPS CENTER FREQ 'SPACE' (2125 CPS)
5. A1R10 ADJUSTED FOR 2000 CPS CENTER FREQ 'MARK' (2425 CPS)
   A1R8 ADJUSTED FOR 2000 CPS CENTER FREQ 'SPACE' (1575 CPS)
6. NUMBERS ADJACENT TO WINDINGS AND TEST POINTS INDICATE DC RESISTANCE
7. RESISTANCE VALUES AT SIGNIFICANT TEST POINTS ARE TO CHASSIS WITH ALL UNITS INTERCONNECTED, BUT EQUIPMENT DE-ENERGIZED
8. REFER TO APPLICABLE PRINTED CIRCUIT BOARD ILLUSTRATION FOR TRANSFORMER CIRCUIT ORIENTATION
9. Q4 IS REPLACED WITH 2N1131 OR 2N1131S. REPLACEMENT TRANSISTOR MUST HAVE FOLLOWING PARAMETERS:
   f: 1KC/S V_{CE}: 10V DC
   I_C: 2MADC   hfe: < 42
10. R29 SELECTED AT FACTORY FROM VALUES BETWEEN 270 AND 470 OHMS.

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Figure 5-26. FSK Tone Generator Assembly 2A2A9, Schematic Diagram

Spacial TP must remov cover

2nd IF Amp

From machinal Filters mode selector

Positive Dc Level if V2 Draws Grid current

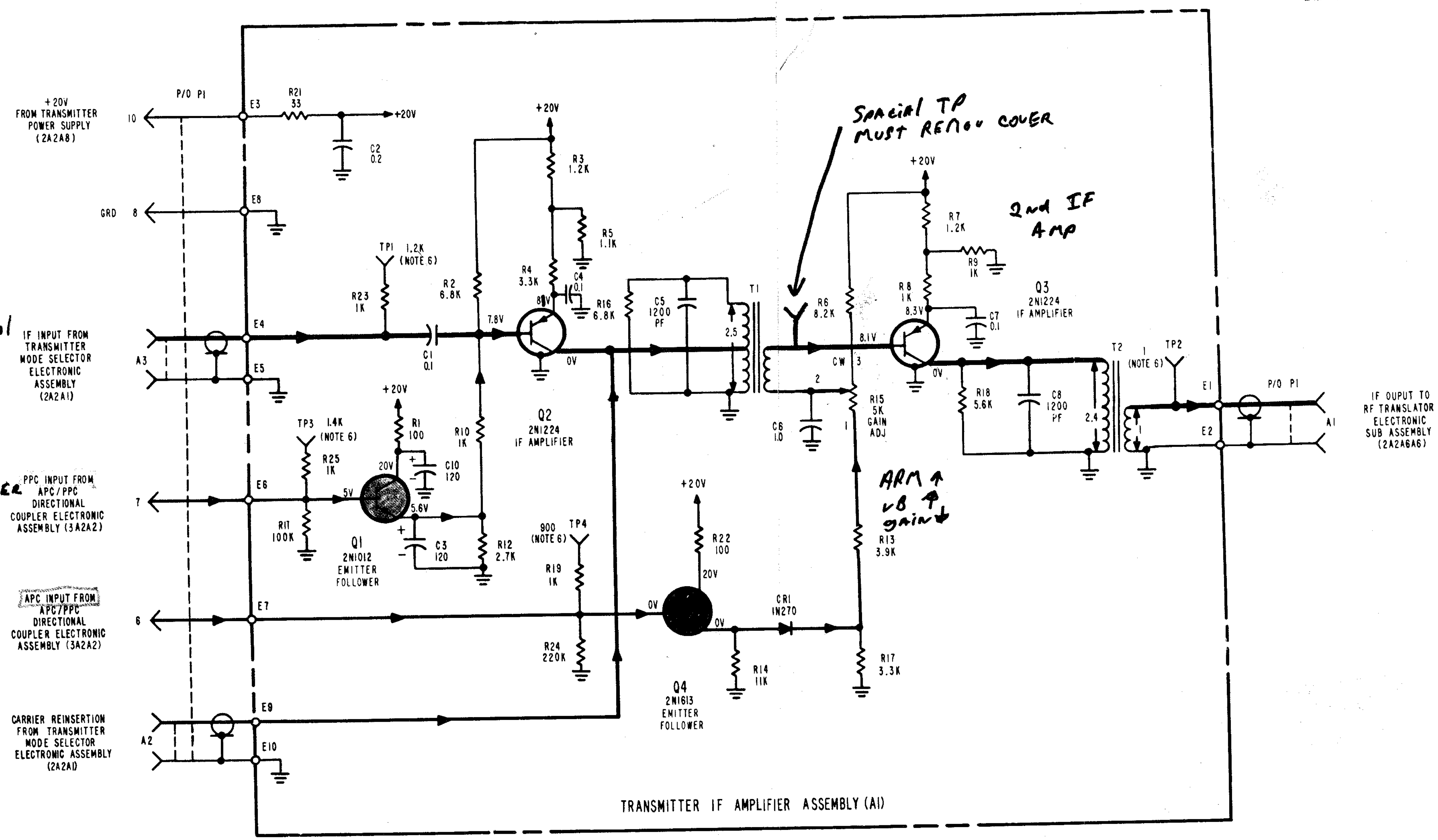
Peak Power control

Positive dc level directly proportional to average power o/p from AM-3007

Average power control

AM & CW carrier

ARM ↑ vB ↑ gain ↓



PPC Q-1 increasing conduction ER12 ↑ Bias Q2 ↓ Gain Q-2 ↓

APC CR1 Fwd Bias after average power has increased to a sufficient level reduce Q3 Gain

CR1 Fwd Bias ER17 ↑ Q3 Bias ↓ gain ↓

NOTES

1. PREFIX ALL REF DES WITH 2A2A12.
2. UNLESS OTHERWISE SPECIFIED:
   a- ALL RESISTANCE VALUES ARE IN OHMS K-INDICATES THOUSANDS OF OHMS.
   b- ALL RESISTORS ARE 1/4 WATT, ±5% TOL.
   c- ALL CAPACITANCE VALUES ARE IN MICROFARADS, PF INDICATES PICOFARADS.
3. NUMBERS ADJACENT TO WINDINGS AND TEST POINTS INDICATE DC RESISTANCE (VALUES LESS THAN ONE OHM ARE NOT SHOWN).
4. CW ON ALL POTENTIOMETERS INDICATE DIRECTION OF ROTATION WHEN VIEWED FROM SHAFT END.
5. UNLESS OTHERWISE INDICATED ALL VOLTAGES ARE DC TAKEN WITH MULTIMETER AN/PSM-4 A.
6. RESISTANCE VALUES AT SIGNIFICANT TEST POINTS ARE TO CHASSIS WITH ALL UNITS INTERCONNECTED, BUT EQUIPMENT DE-ENERGIZED.
7. REFER TO APPLICABLE PRINTED CIRCUIT BOARD ILLUSTRATION FOR TRANSFORMER CIRCUIT ORIENTATION.

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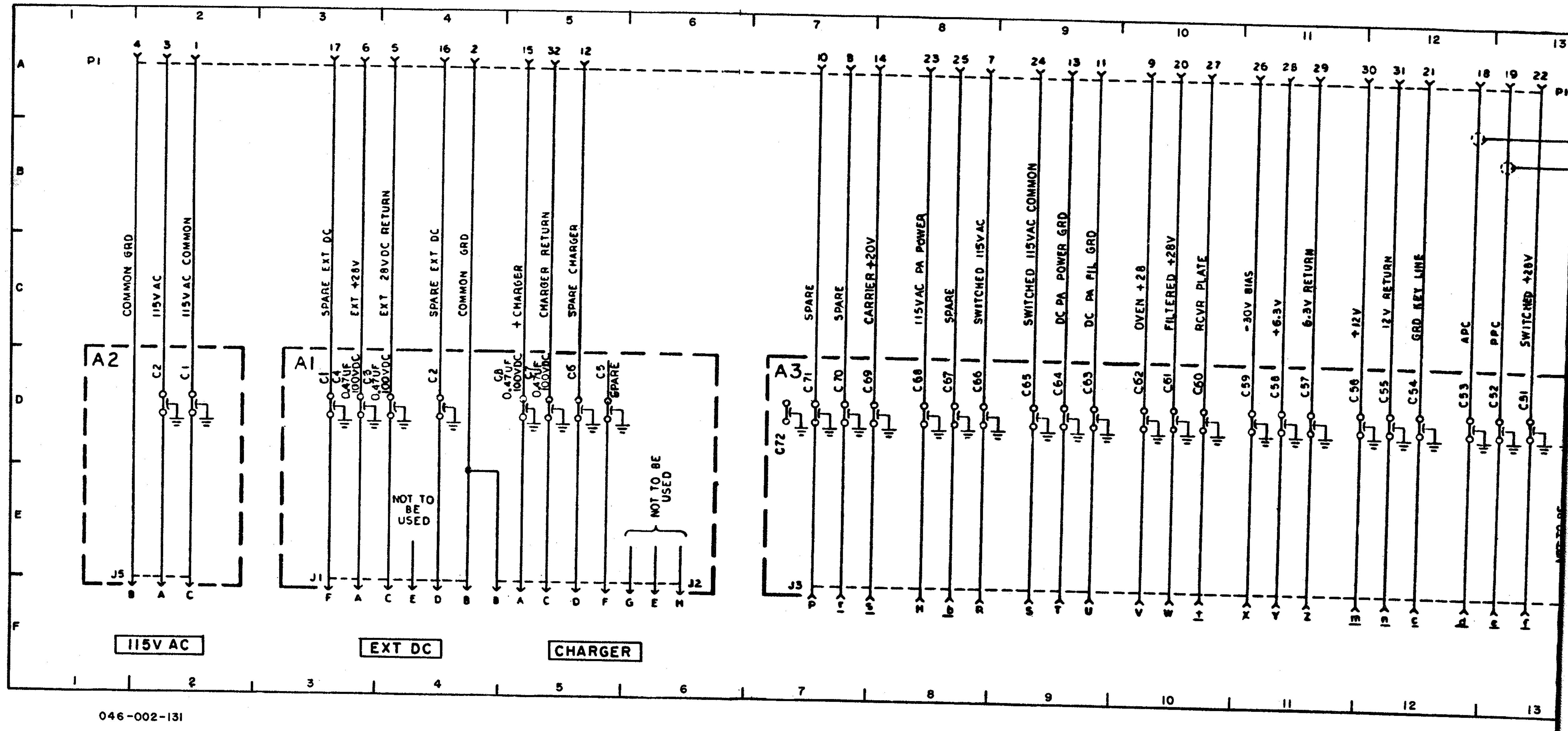
Figure 5-27. Transmitter IF. Amplifier Assembly 2A2A12, Schematic Diagram

NOTES:
1. PREFIX ALL REF DES WITH 3A1.
2. UNLESS OTHERWISE SPECIFIED ALL CAPACITORS ARE 1000 PICOFARADS.

Figure 5-29. Case 3A1, Schematic Diagram

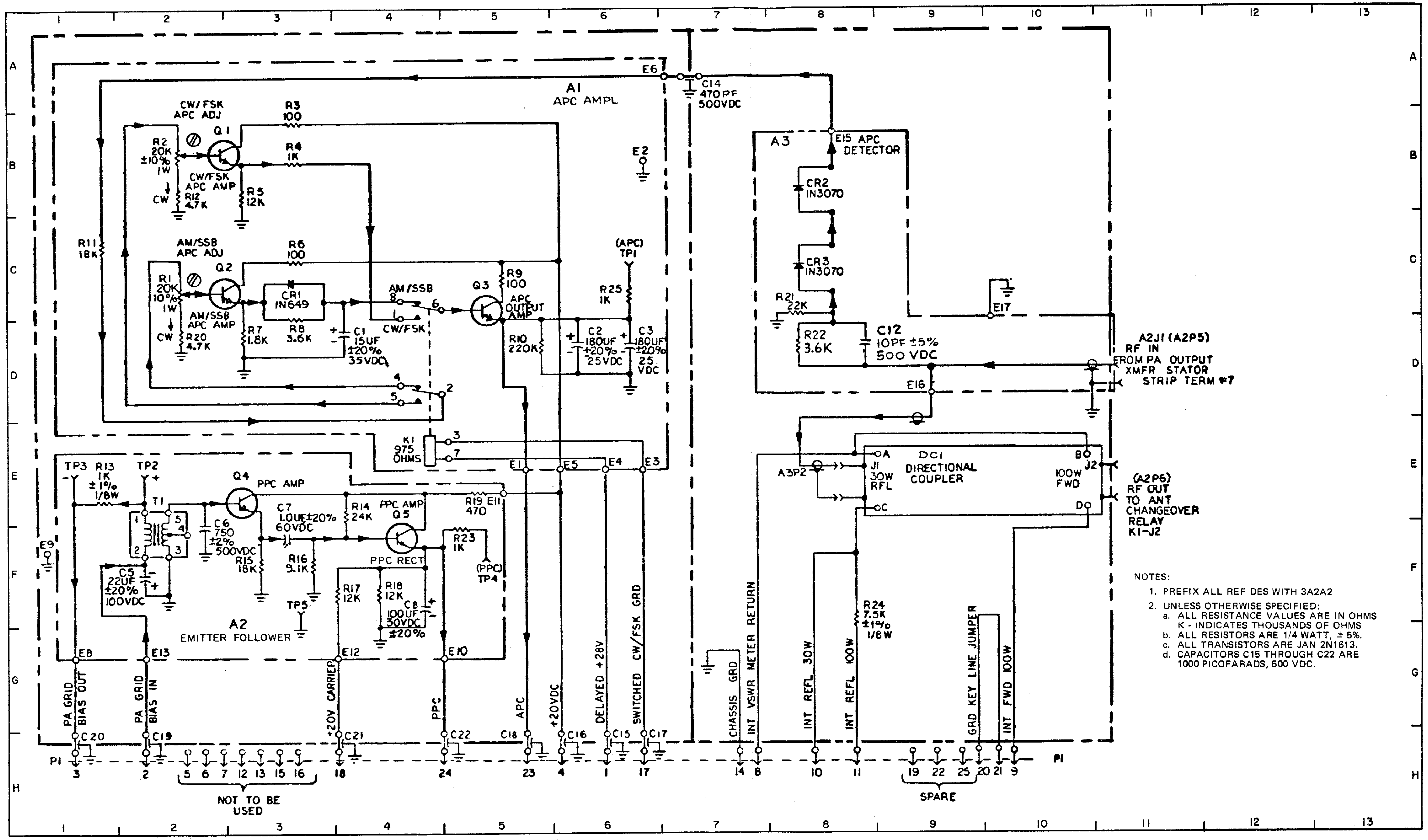
PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
J1	3F	A3C9	28D	A3C41	17D
J2	6F	A3C10	28D	A3C42	16D
J3	7F	A3C11	28D	A3C43	16D
J4	19F	A3C12	27D	A3C44	16D
J5	1F	A3C13	27D	A3C45	16D
J6	33F	A3C14	27D	A3C46	15D
J7	33F	A3C15	27D	A3C47	15D
J8	32F	A3C16	26D	A3C48	15D
P1	1A	A3C17	26D	A3C49	14D
P2	14A	A3C18	26D	A3C50	14D
P3	33A	A3C19	25D	A3C51	13D
P4	33A	A3C20	25D	A3C52	13D
P5	32A	A3C21	25D	A3C53	12D
R1	20C	A3C22	25D	A3C54	12D
R2	19C	A3C23	24D	A3C55	12D
A1C1	3D	A3C24	24D	A3C56	11D
A1C2	4D	A3C25	24D	A3C57	11D
A1C3	4D	A3C26	23D	A3C58	11D
A1C4	3D	A3C27	23D	A3C59	11D
A1C5	5D	A3C28	23D	A3C60	10D
A1C6	5D	A3C29	22D	A3C61	10D
A1C7	5D	A3C30	22D	A3C62	10D
A1C8	5D	A3C31	22D	A3C63	9D
A2C1	2D	A3C32	21D	A3C64	9D
A2C2	2D	A3C33	21D	A3C65	9D
A3C1	31D	A3C34	21D	A3C66	8D
A3C2	30D	A3C35	21D	A3C67	8D
A3C3	30D	A3C36	20D	A3C68	8D
A3C4	30D	A3C37	18D	A3C69	8D
A3C5	29D	A3C38	18D	A3C70	7D
A3C6	29D	A3C39	17D	A3C71	7D
A3C7	29D	A3C40	17D	A3C72	7D
A3C8	29D				



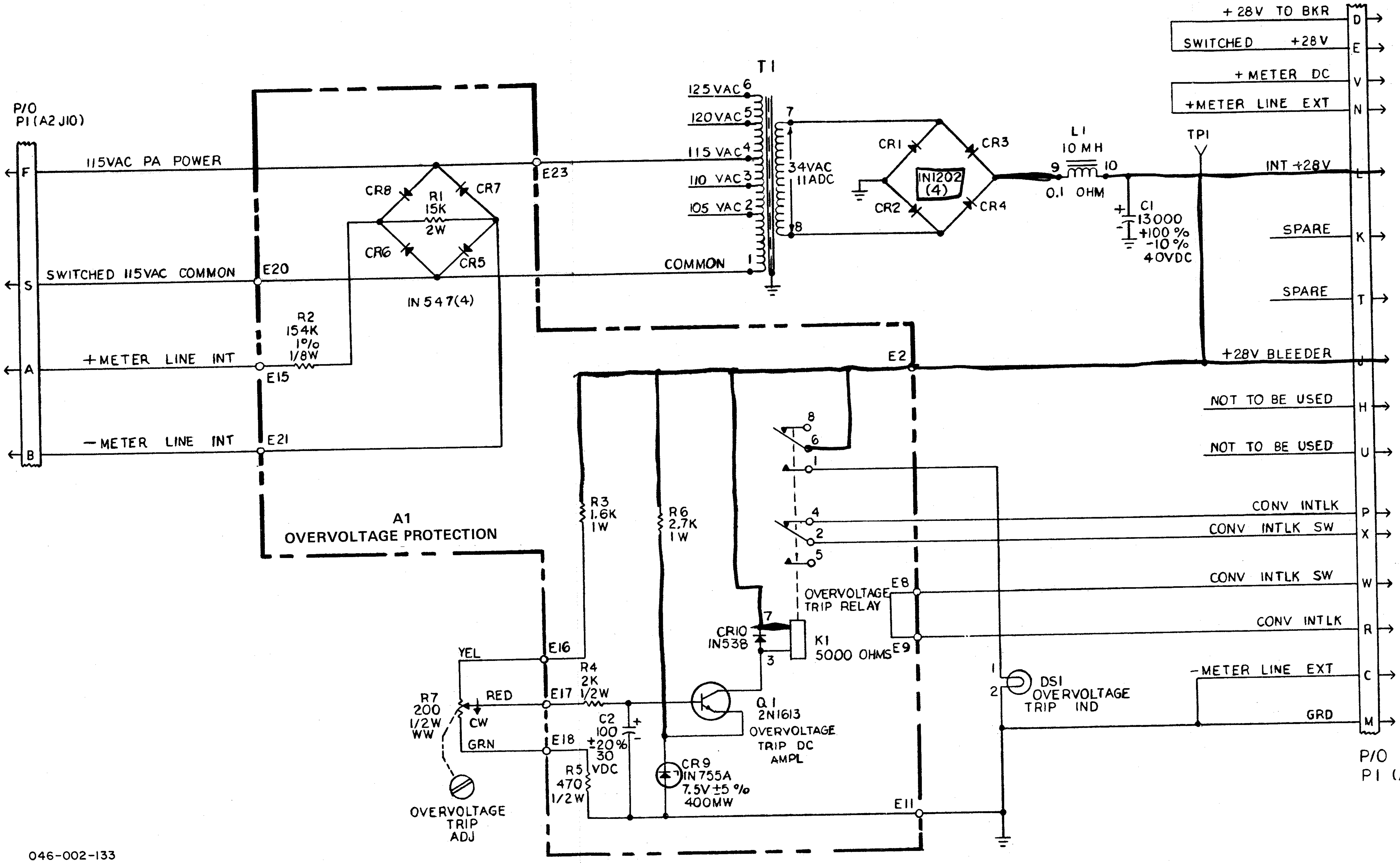
PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
A1C1	4D	A1R25	6C	A3C12	8D
A1C2	6D	A1TP1	6C	A3C14	7A
A1C3	6D	A2C5	2F	A3CR2	8B
A1CR1	3C	A2C6	2F	A3CR3	8C
A1K1	4E	A2C7	3F	A3P2	8E
A1Q1	3B	A2C8	4F	A3R21	8C
A1Q2	3C	A2Q4	3E	A3R22	8D
A1Q3	5C	A2Q5	4F	C15	6H
A1R1	2C	A2R13	1E	C16	6H
A1R2	2B	A2R14	4E	C17	6H
A1R3	3B	A2R15	3F	C18	5H
A1R4	3B	A2R16	3F	C19	2H
A1R5	3B	A2R17	4F	C20	1H
A1R6	3C	A2R18	4F	C21	4H
A1R7	3D	A2R19	5E	C22	5H
A1R8	3C	A2R23	5F	DC1	9E
A1R9	5C	A2T1	2F	DC1J1	8E
A1R10	5D	A2TP2	2E	DC1J2	11E
A1R11	1C	A2TP3	1E	J1	11D
A1R12	2B	A2TP4	5F	P1	1H
A1R20	2D	A2TP5	3F		



046-002-132

Figure 5-30. APC/PPC/Directional Coupler 3A2A2, Schematic Diagram



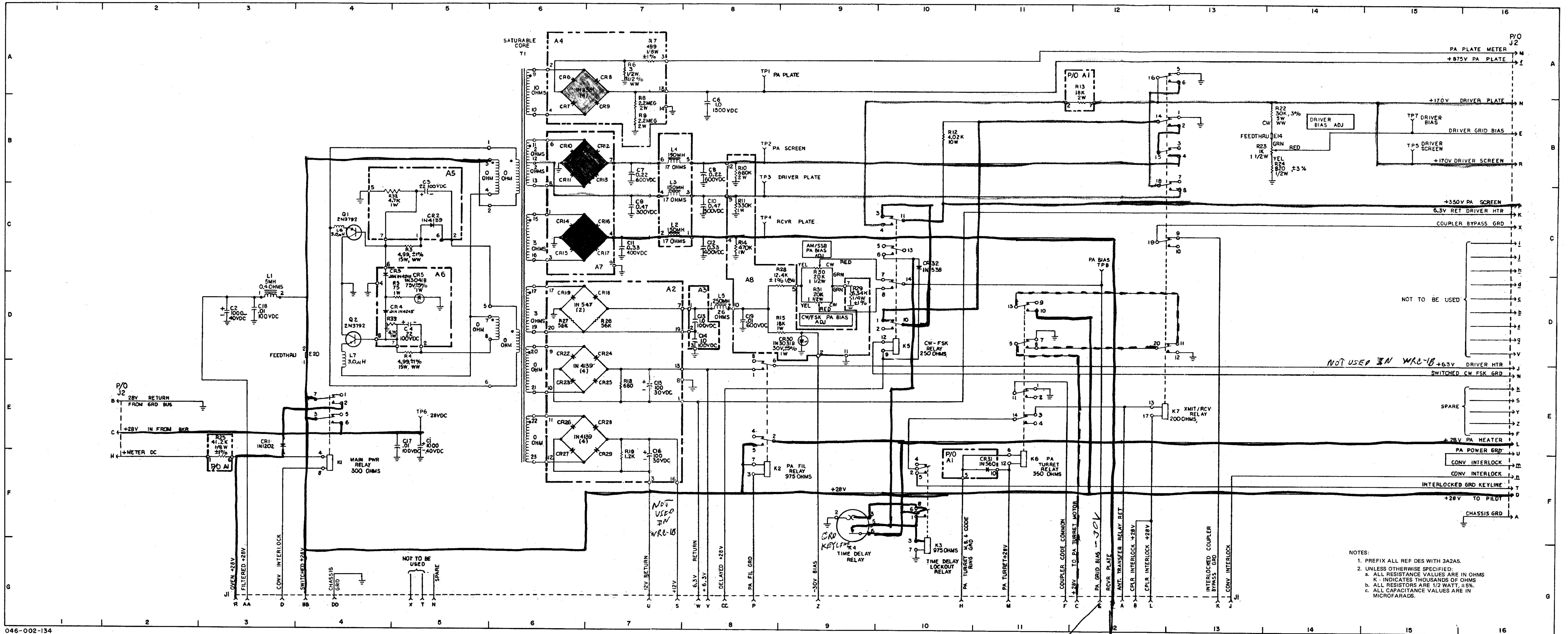
NOTES:

1. PREFIX ALL REF DES WITH 3A2A3.
2. UNLESS OTHERWISE SPECIFIED:
   a. ALL RESISTANCE VALUES ARE IN OHMS
      K – INDICATES THOUSANDS OF OHMS
   b. ALL RESISTORS ARE ±5%.
   c. ALL CAPACITANCE VALUES ARE IN MICROFARADS.

Figure 5-31. AC Power Supply 3A2A3, Schematic Diagram

PARTS LOCATION INDEX

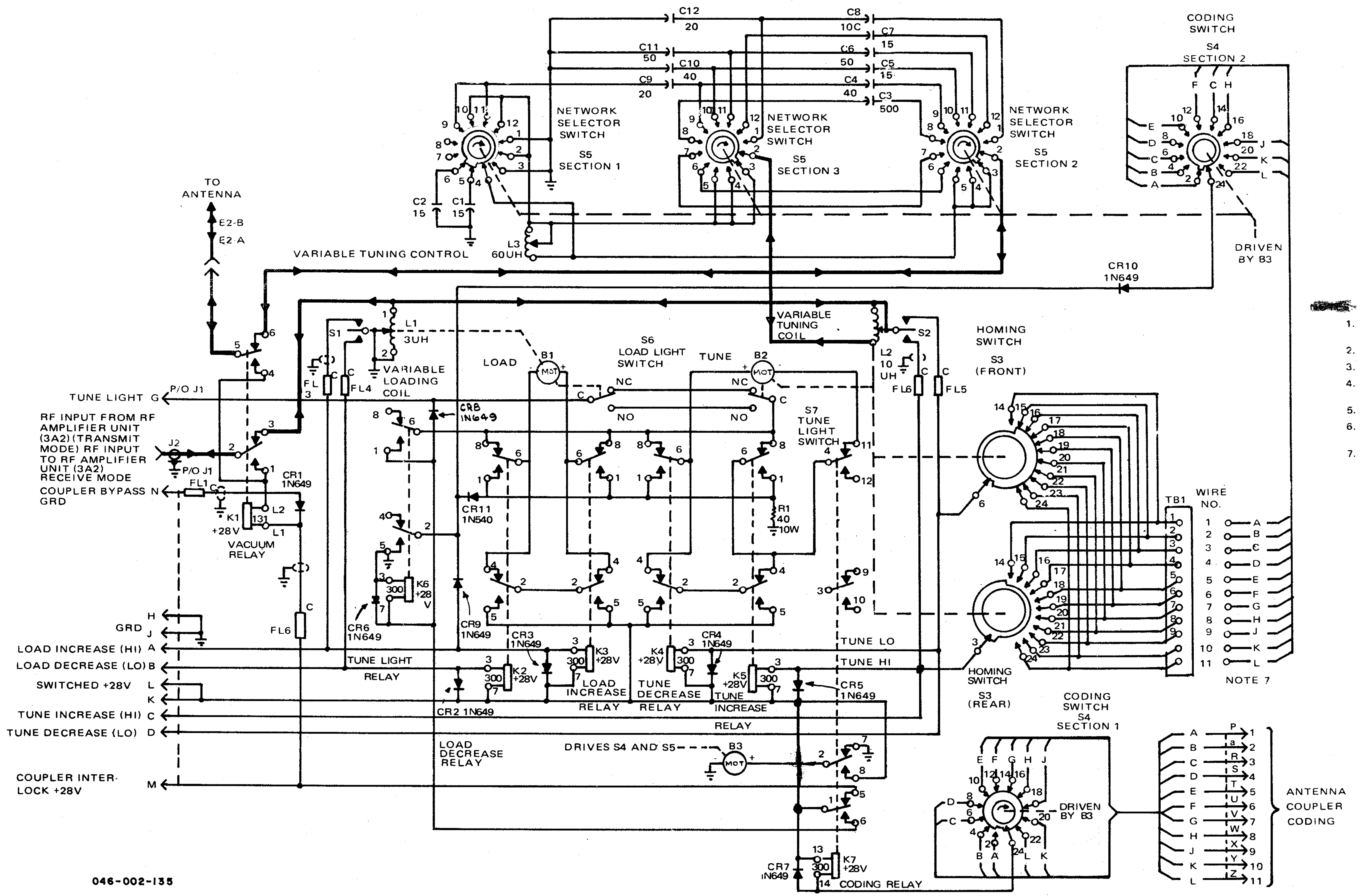
REF DES	LCTN	REF DES	LCTN
C1	5E	A2C15	7E
C2	3D	A2C16	7F
C6	8B	A2CR18	7D
C7	7B	A2CR19	6D
C8	8B	A2CR22	6D
C9	7C	A2CR23	6E
C10	8C	A2CR24	7D
C11	7C	A2CR25	7E
C12	8C	A2CR26	6E
C17	5E	A2CR27	6F
C18	3D	A2CR28	7E
CR1	3E	A2CR29	7F
CR32	10C	A2R18	7E
J1	3G	A2R19	7F
J2	2E, 16A	A2R26	7D
K1	4F	A2R27	6D
K2	8F	A3C13	8D
K3	10G	A3C14	8D
K4	9F	A4CR6	6A
K5	10D	A4CR7	6B
K6	11F	A4CR8	7A
K7	13E	A4CR9	7B
L1	3D	A4R6	7A
L2	7C	A4R7	7A
L3	7C	A4R8	7B
L4	7B	A4R9	7B
L5	8D	A5C3	5C
L6	4C	A5CR2	5C
L7	4D	A5R32	4C
Q1	4C	A6C4	5D
Q2	4D	A6CR3	4D
R3	5C	A6CR4	4D
R4	5D	A6CR5	5D
R12	10B	A6R33	4D
R22	14B	A7CR10	6B
R23	14B	A7CR11	6B
R24	14B	A7CR12	7B
R30	9C	A7CR13	7B
R31	9D	A7CR14	6C
T1	6A	A7CR15	6C
TP1	8A	A7CR16	7C
TP2	8B	A7CR17	7C
TP3	8B	A8C19	8D
TP4	8C	A8CR30	9D
TP5	15B	A8R10	8B
TP6	5E	A8R11	8C
TP7	15B	A8R14	8C
TP8	12C	A8R15	9D
A1CR31	11F	A8R28	9D
A1R13	12B	A8R29	9D
A1R25	3F		



10 #27's KEY ON SHAPER PULSE

NOT USED IN WRC-1B

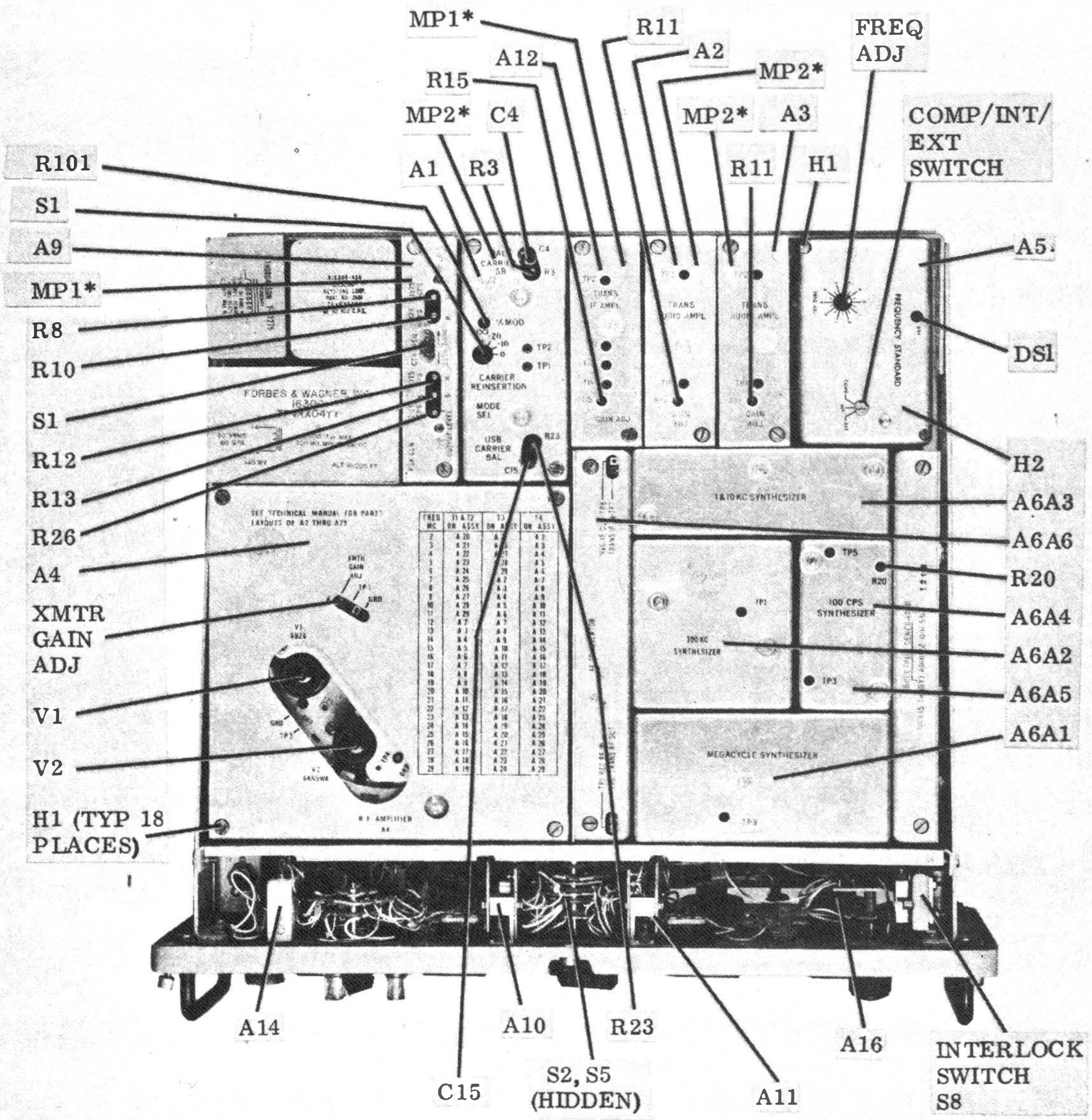
Figure 5-32. DC-to-DC Converter 3A2A5, Schematic Diagram



1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR COMPLETE DESIGNATION, PREFIX WITH 5.
2. ALL CAPACITANCE VALUES ARE IN PICOFARADS.
3. ALL RESISTANCE VALUES ARE IN OHMS.
4. NUMBERS ADJACENT TO COILS INDICATE DC RESISTANCE (VALUES LESS THAN ONE OHM ARE NOT SHOWN).
5. UNLESS OTHERWISE INDICATED, ALL VOLTAGES ARE DC.
6. HEAVY LINES INDICATE SIGNAL FLOW FOR TRANSMIT AND RECEIVE MODES OF OPERATION.
7. REFER TO THE INSTALLATION SECTION FOR PATCHING TO TB1.

IREVACACTION 001 TUNE LIGHT BLINKS
" OF B2

Figure 5-33. Antenna Coupler CU-937/UR, Schematic Diagram



NOTES:

1. PREFIX ALL REF DES WITH 2A2.
2. ASSEMBLY A6 CONSISTS OF A6A1 THRU A6A6.

* ASSEMBLY COVER

046-002-136

Figure 5-34. T-827B/URT Chassis, Top View, Component Location

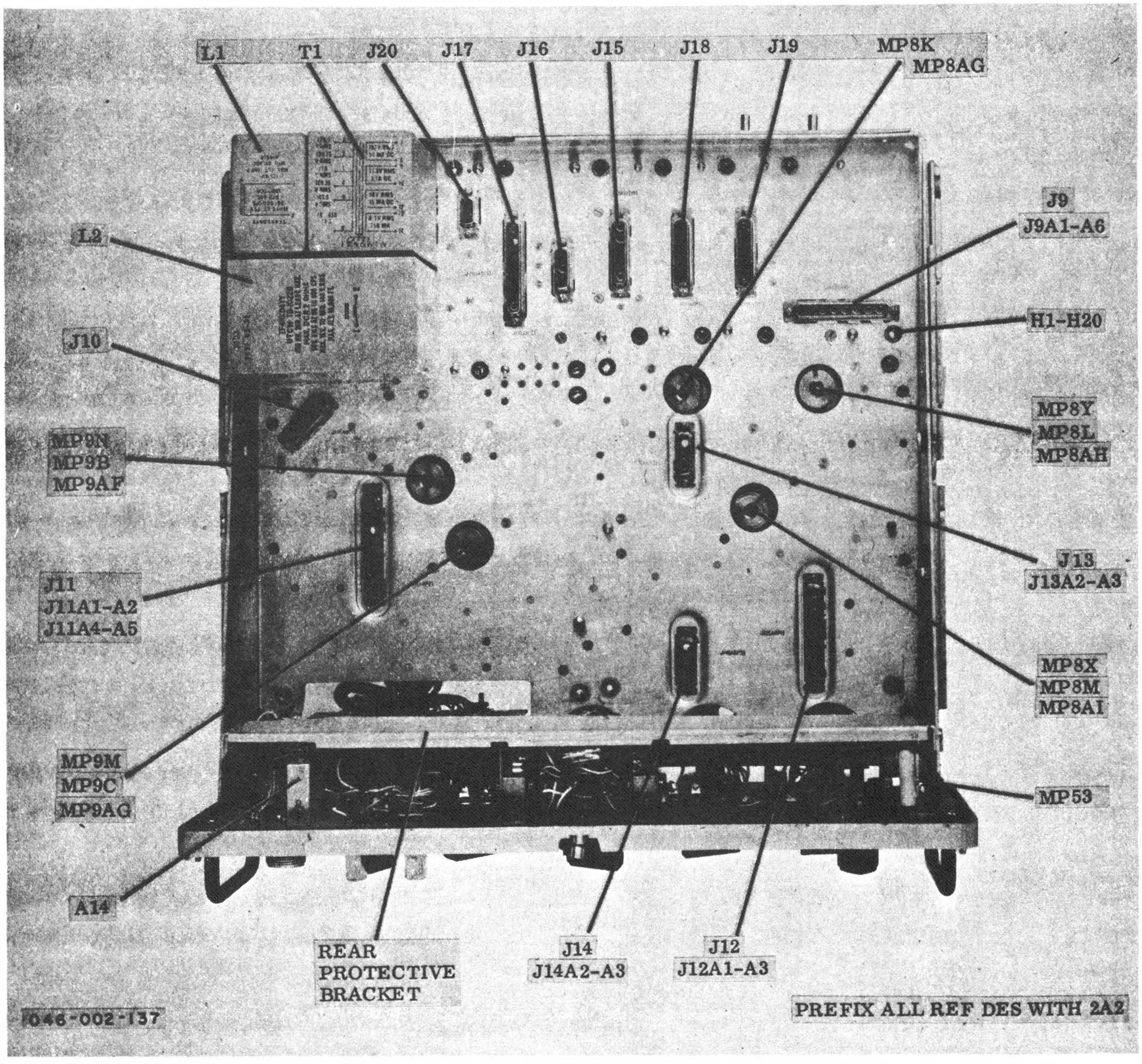


Figure 5-35. T-827B/URT Chassis Less Assemblies, Top View, Component Location

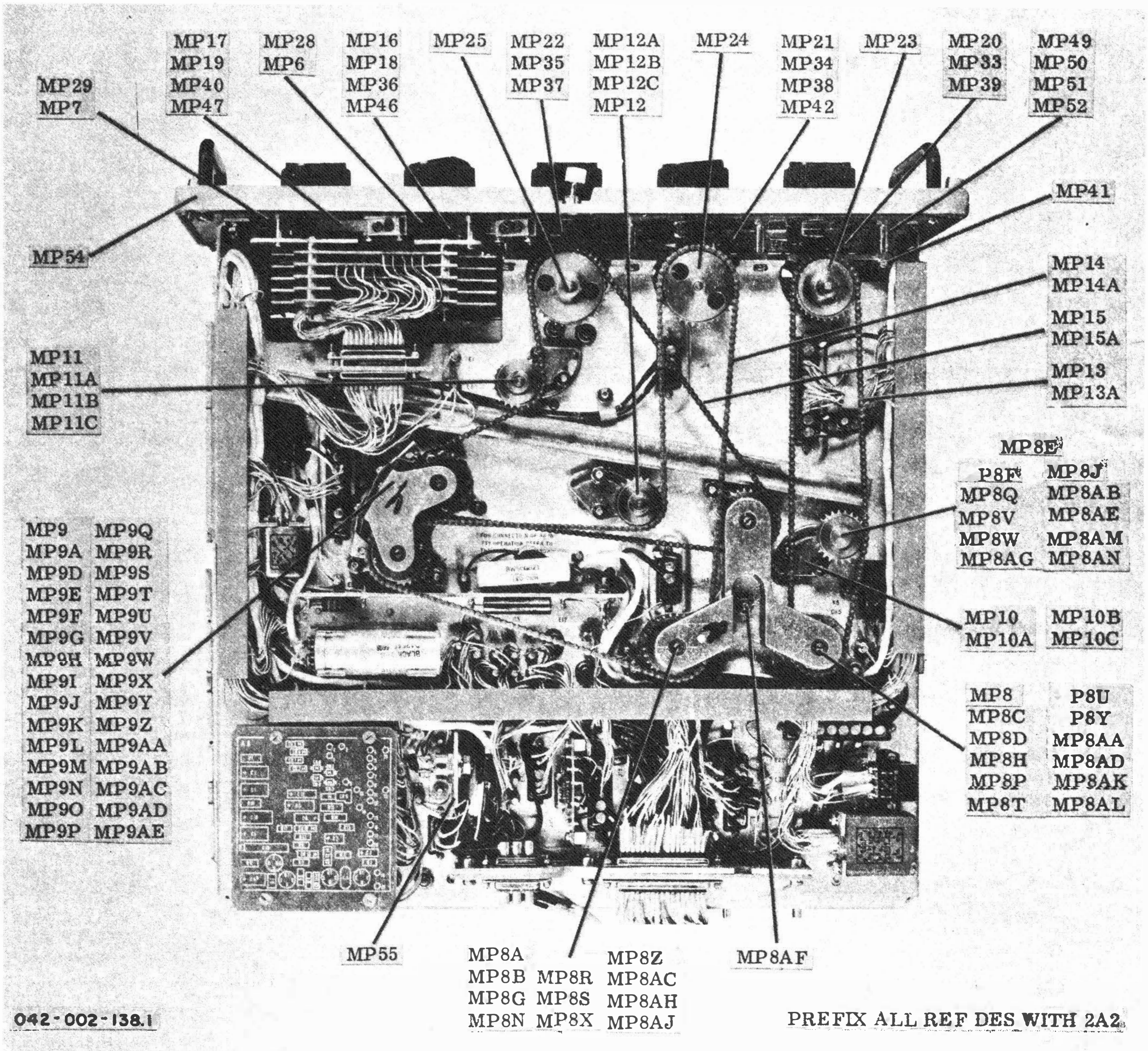


Figure 5-36. T-827B/URT Chassis, Bottom View,
Component Location (Sheet 1 of 2)

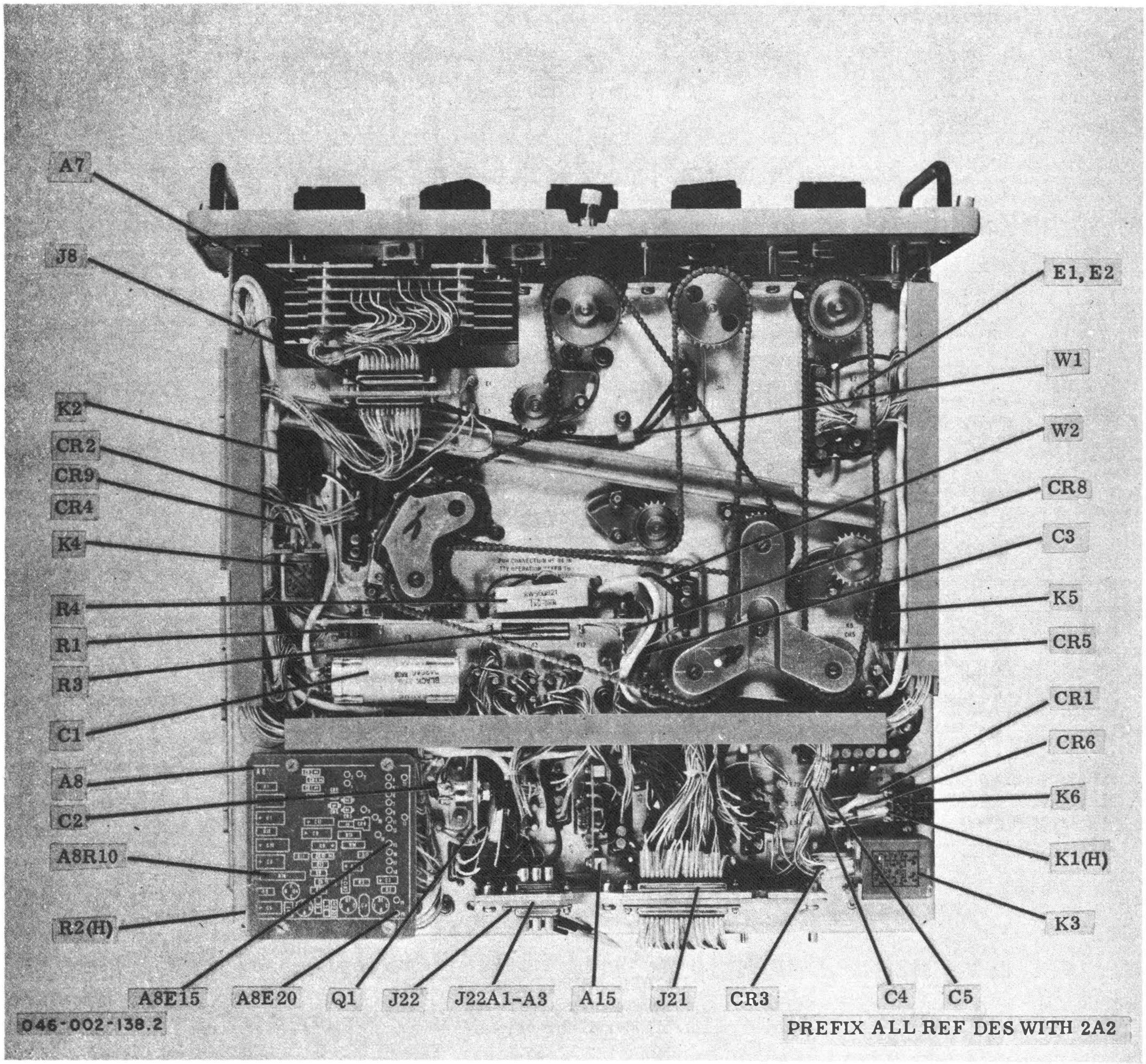


Figure 5-36. T-827B/URT Chassis, Bottom View, Component Location (Sheet 2 of 2)

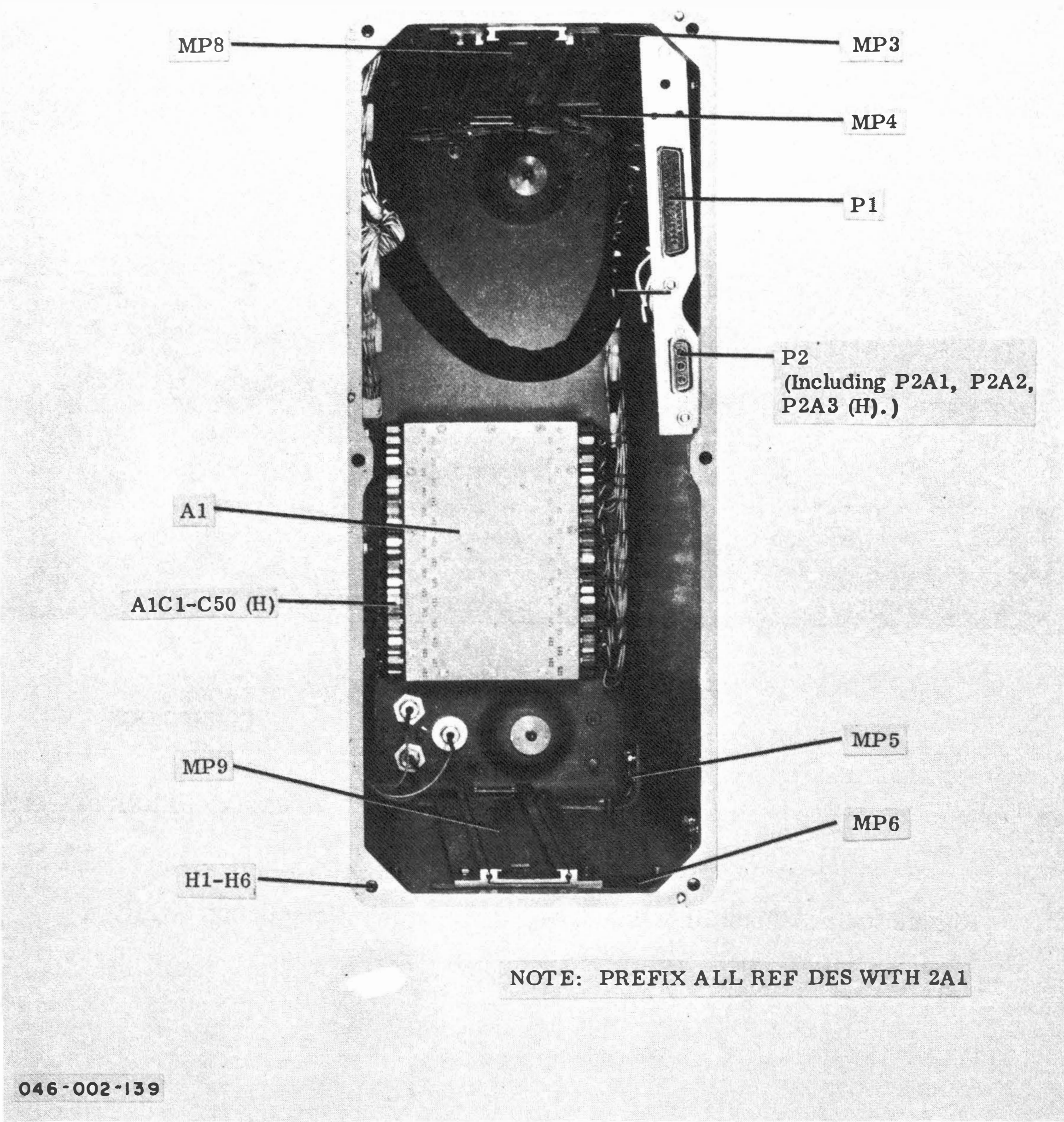


Figure 5-37. T-827B/URT Case, Inside View, Component Location

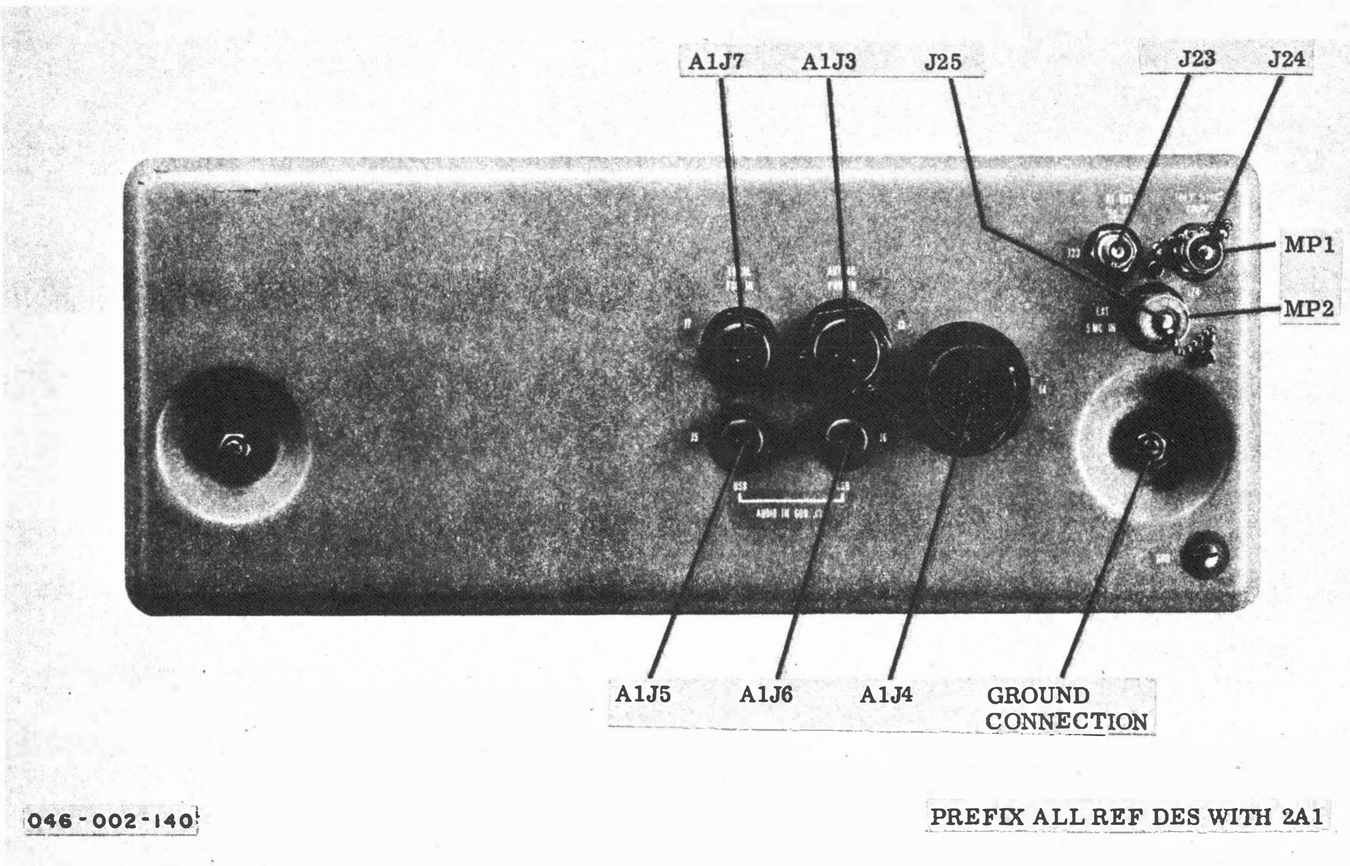


Figure 5-38. T-827B/URT Case, Rear View, Component Location

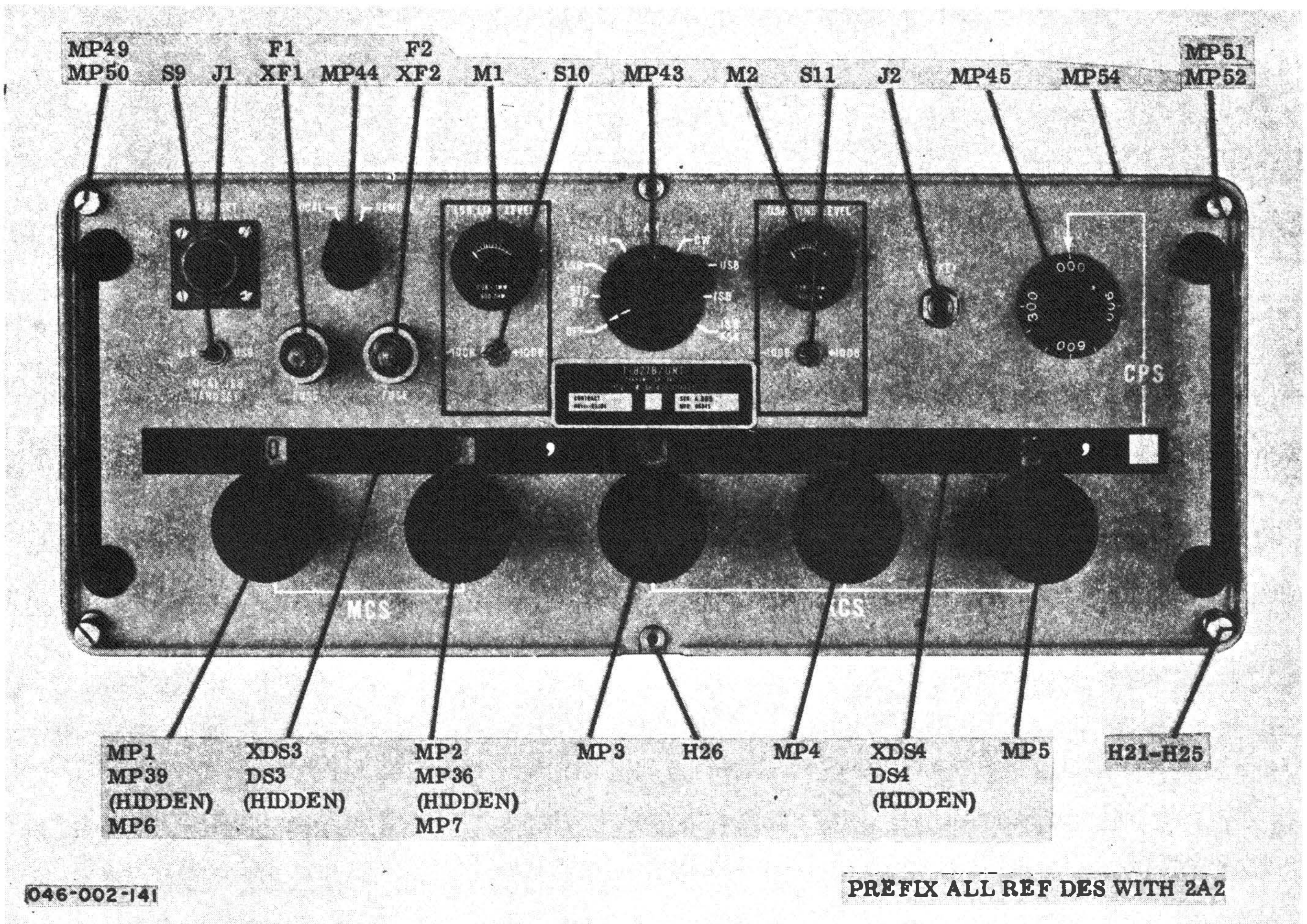


Figure 5-39. T-827B/URT Front Panel, Component Location

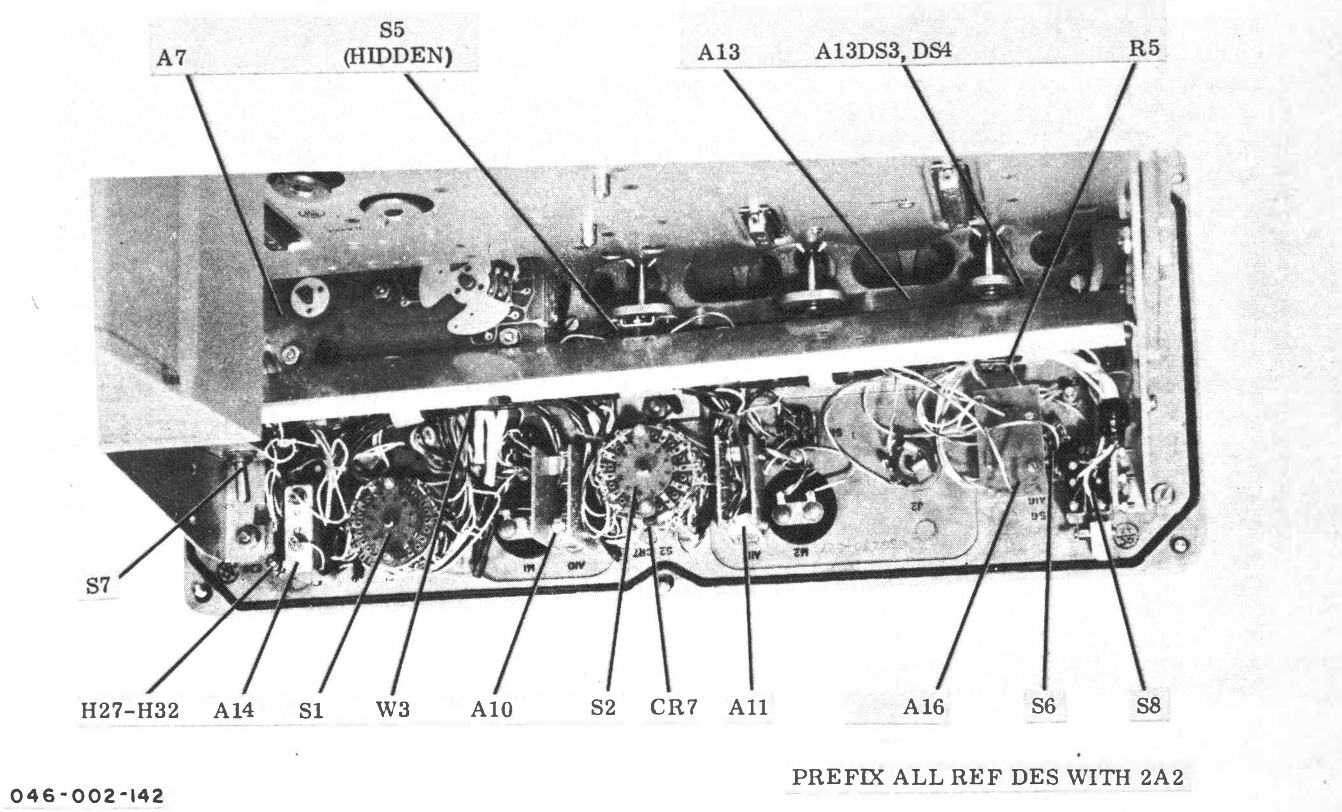


Figure 5-40. T-827B/URT Rear View of Front Panel, Component Location

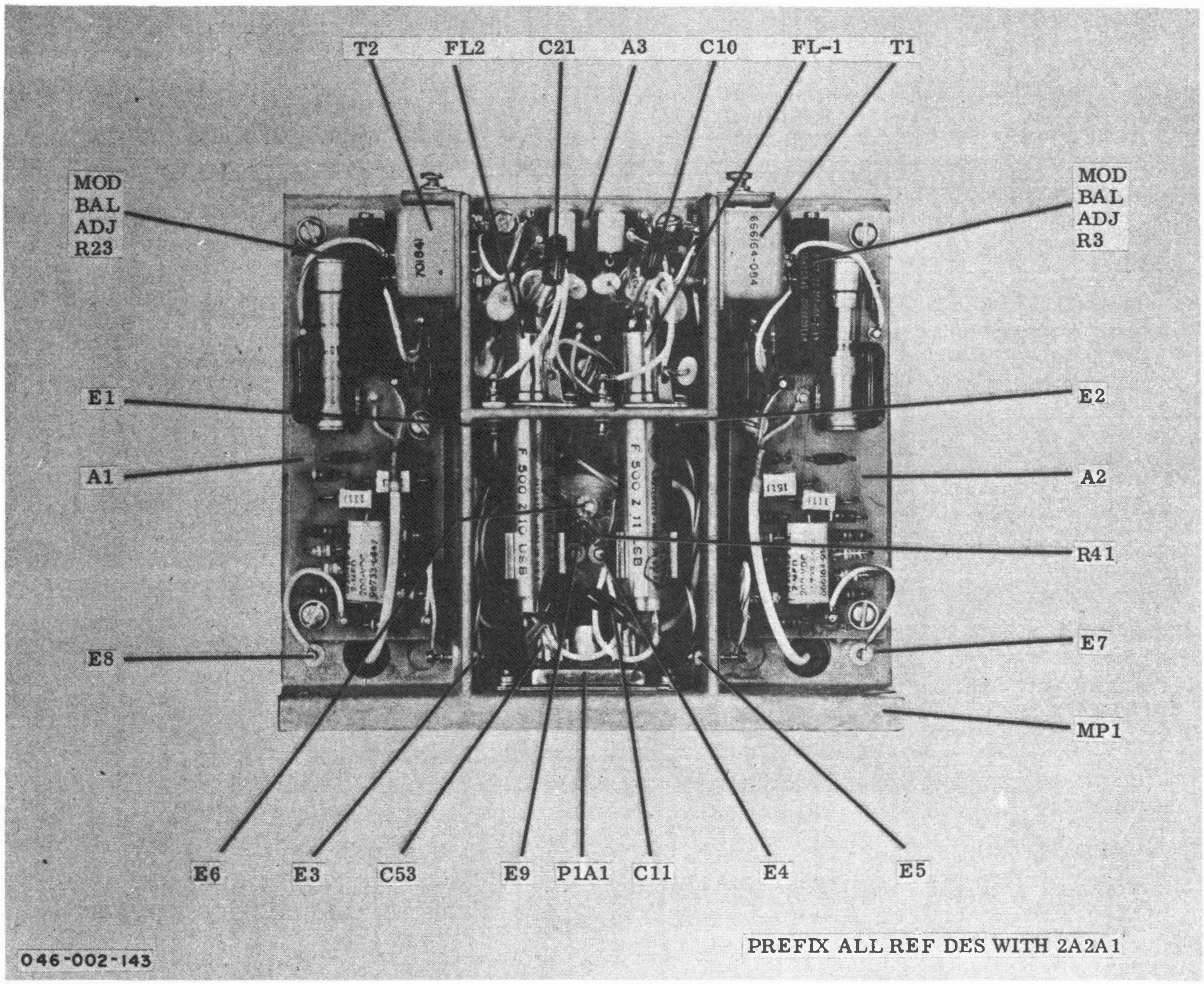


Figure 5-41. Transmitter Mode Selector Assembly 2A2A1, Right Side, Component Location

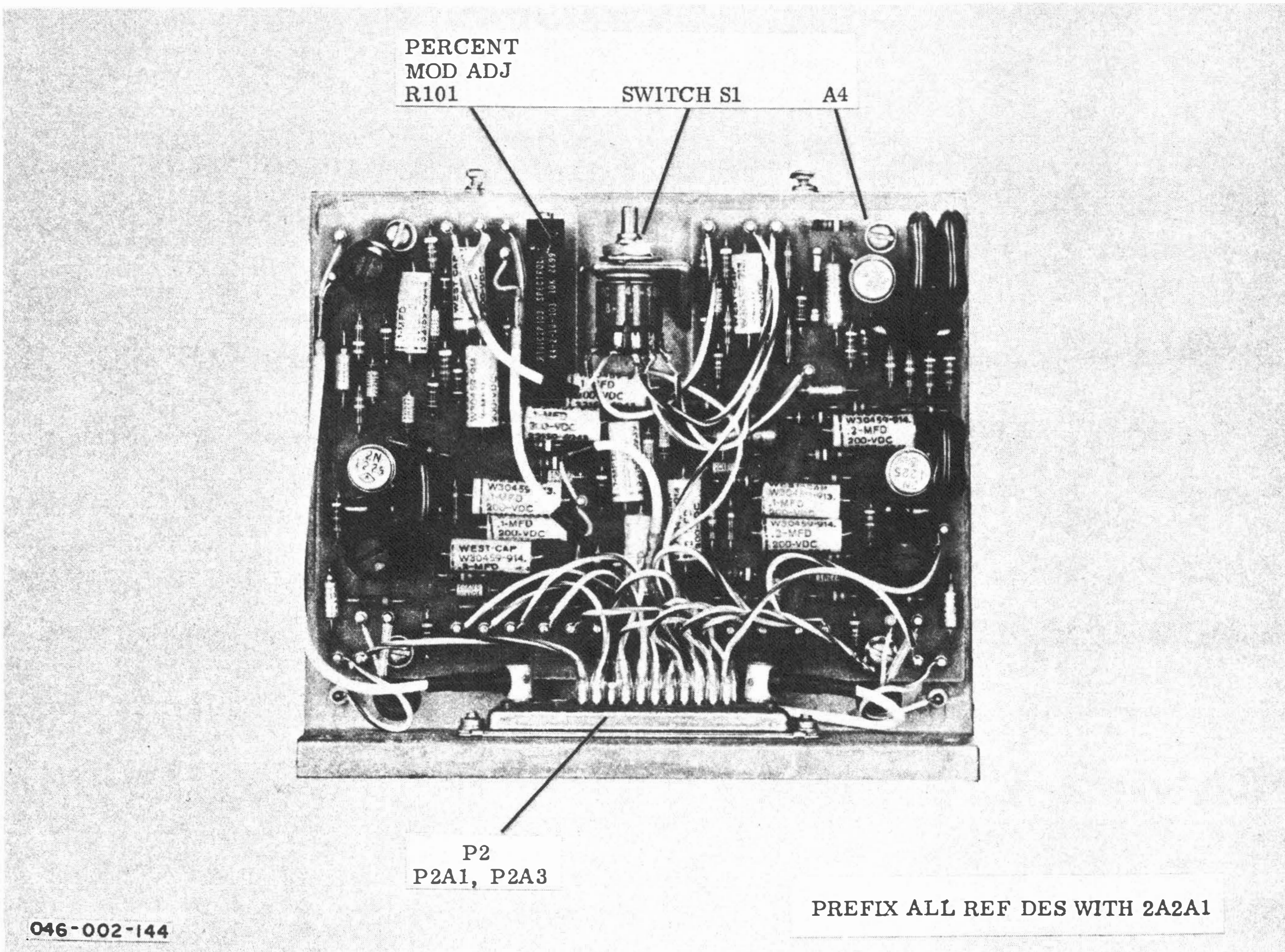
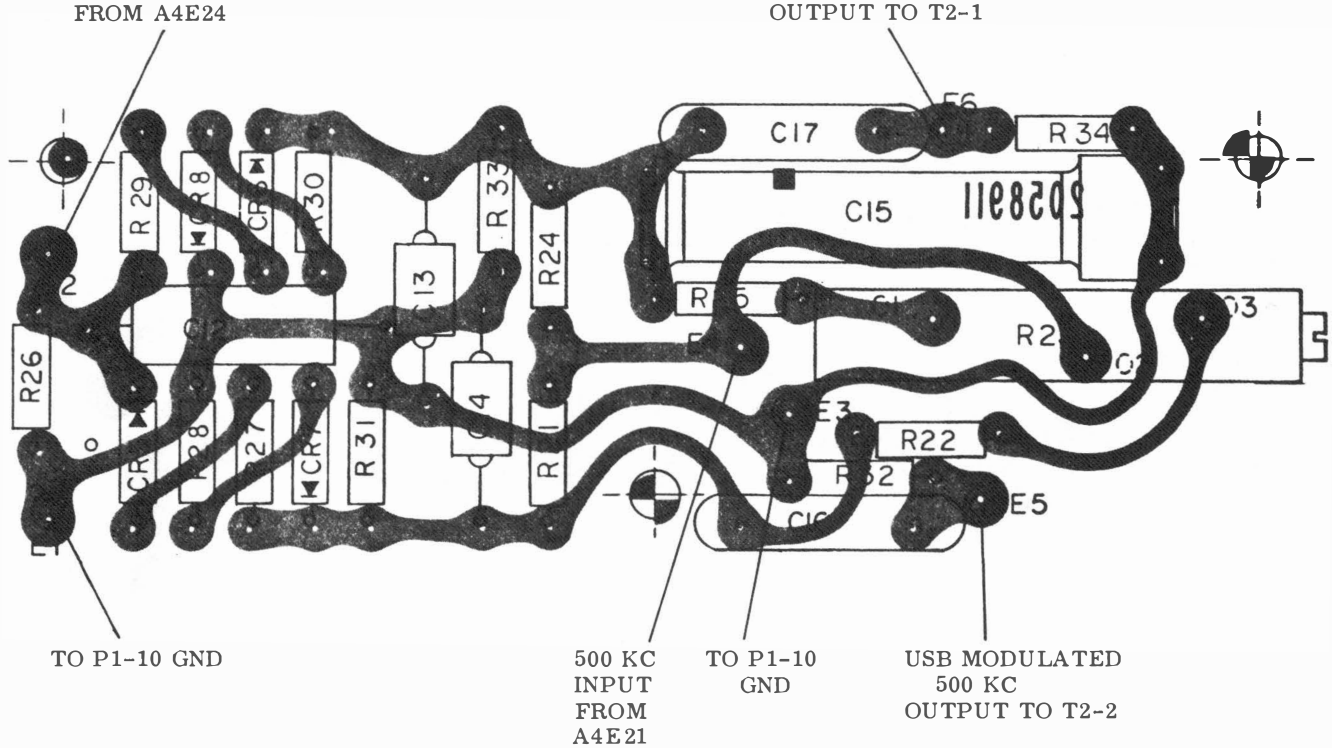


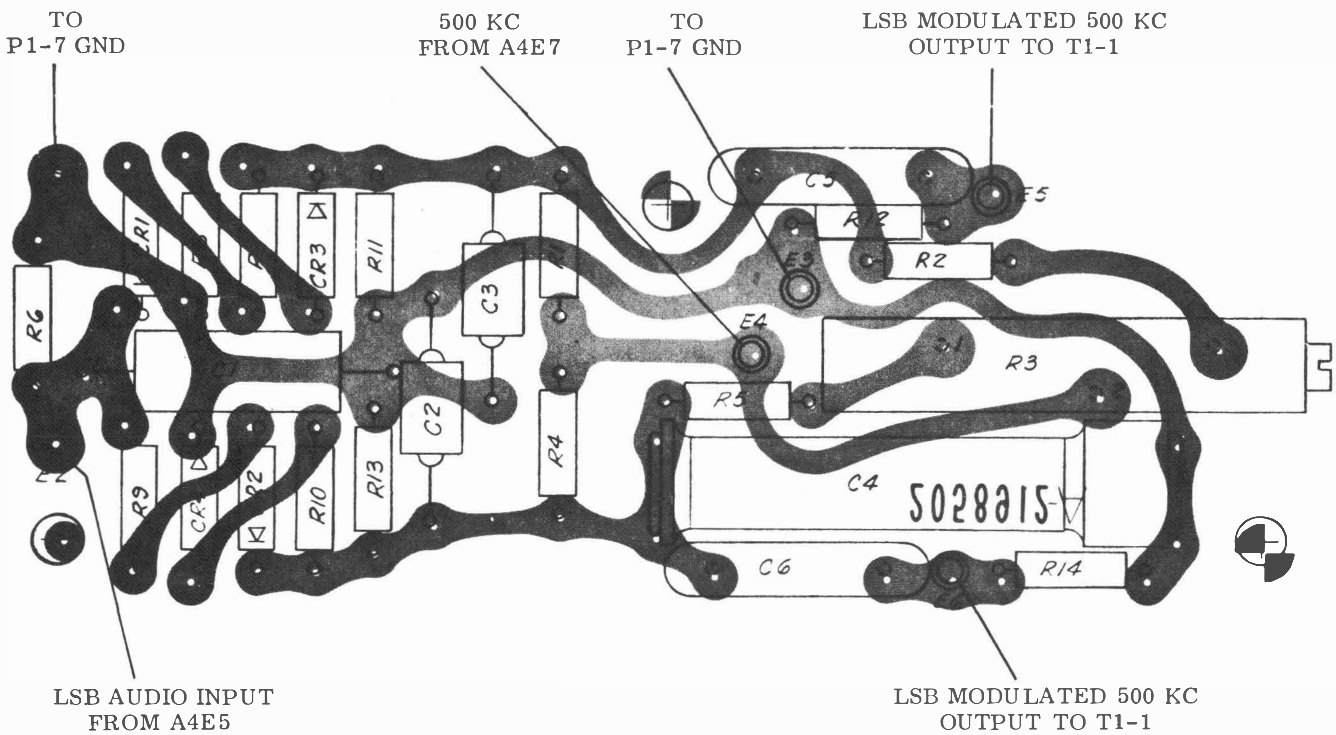
Figure 5-42. Transmitter Mode Selector Assembly 2A2A1, Left Side, Component Location



046-002-145

NOTE: PREFIX ALL REF DES WITH 2A2A1A1.

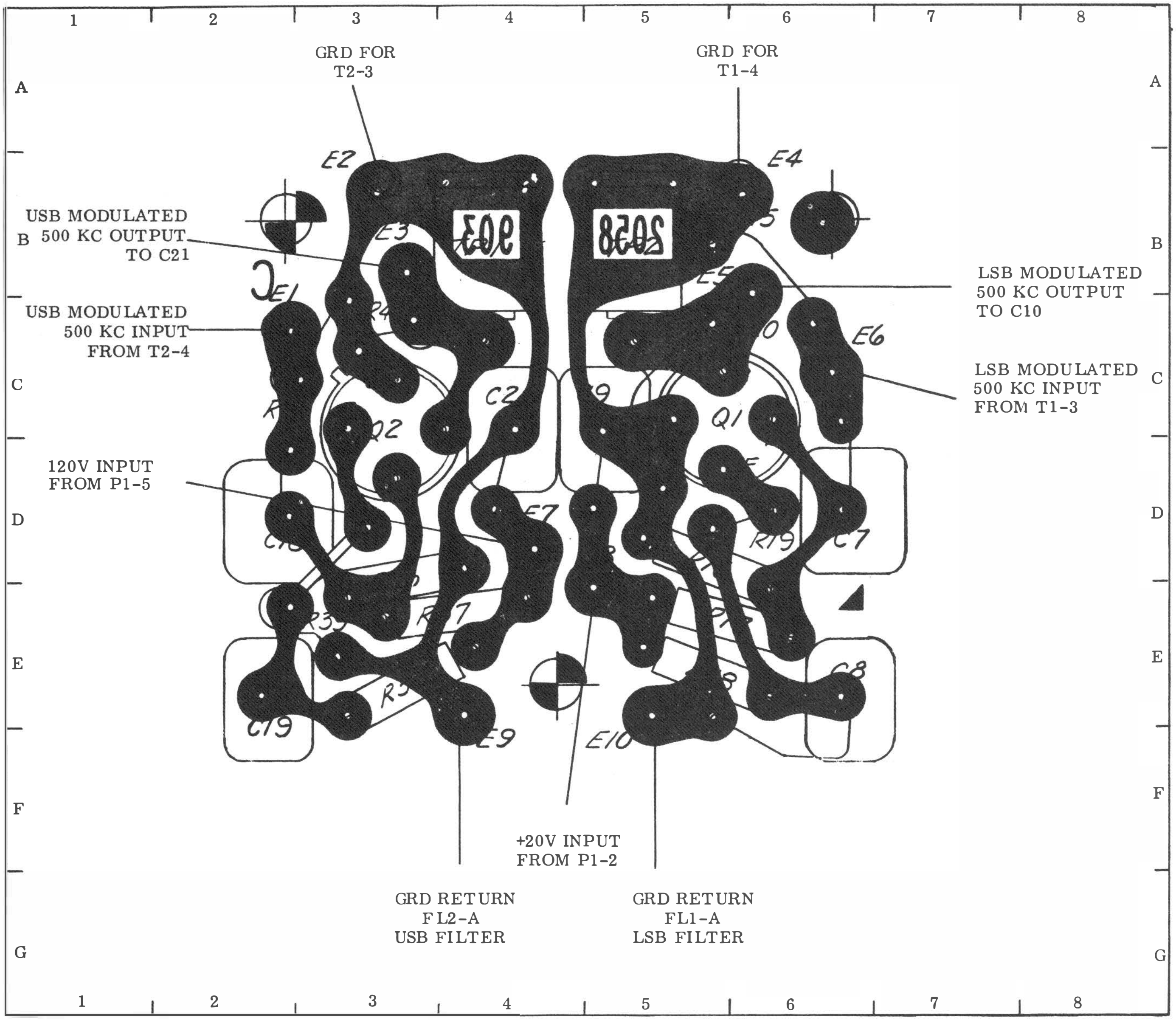
Figure 5-43. USB Balanced Modulator PCB (P/O 2A2A1), Component Location



046-002-146

NOTE: PREFIX ALL REF DES WITH 2A2A1A2

Figure 5-44. LSB Balanced Modulator PCB (P/O 2A2A1), Component Location



046-002-147

NOTE:
REF DES PREFIX 2A2A1.

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
C1		C20	4C	Q1	5C	R21	
thru	Not used	E1	2C	Q2	3C	thru	Not used
C6		E2	3B	R1		R34	
C7	6D	E3	3B	thru	Not used	R35	2C
C8	6E	E4	6B	R14		R36	3E
C9	5C	E5	6C	R15	5B	R37	4E
C10		E6	6C	R16	5D	R38	3E
thru	Not used	E7	4D	R17	5E	R39	2E
C17		E8	5E	R18	5E	R40	3C
C18	2D	E9	4E	R19	6D	TP1	4B
C19	2F	E10	5F	R20	5C	TP2	5B

Figure 5-45. Isolation Amplifier PCB (P/O 2A2A1), Component Location

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN	REF DES	LCTN
C25	4E	E9	4F	R72	8D
C26	6E	E10	5F	R73	8D
C27	8E	E11	5F	R74	9D
C28	9E	E12	5F	R75	7F
C29	10D	E13	6F	R76	9E
C30	5E	E14	6F	R77	9F
C31	3E	E15	7F	R78	9F
C32	4E	E16	7F	R79	9F
C33	9B	E17	7F	R80	3F
C34	10C	E18	8F	R81	4F
C35	10B	E19	8F	R82	4F
C36	10B	E20	8F	R83	5F
C37	9C	E21	9F	R84	4F
C38	7D	E22	10F	R85	5D
C39	10F	E23	10G	R86	4D
C40	3F	E24	10G	R87	3D
C41	5E	E25	8C	R88	3C
C42	9D	E26	8C	R89	3C
C43	3C	E27	8B	R90	4C
C44	4C	E28	8B	R91	4B
C45	4B	E29	7B	R92	4C
C46	6D	E30	4B	R93	4C
C47	5D	E31	4B	R94	7E
C48	8E	E32	5B	R95	6E
C49	7E	E33	6E	R96	7E
C50	6C	E34	10E	R97	7D
C51	8B	Q6	10D	R98	5D
C52	4C	Q7	3D	R99	7D
CR10	7B	Q8	9B	R100	7F
CR11	7E	R53	6F	R101	5B
CR12	5D	R54	6E	R102	5C
CR13	8F	R55	6F	R103	8B
CR14	9F	R56	6F	R104	8C
CR15	4F	R57	9D	R105	8B
CR16	3C	R58	9E	R106	8C
CR17	3D	R59	9D	R107	8C
CR18	4C	R60	4E	R108	7B
CR19	6D	R61	3E	R109	7C
CR20	7D	R62	4E	R110	7C
CR21	7D	R63	9C	R111	7B
E1	5B	R64	9C	R112	7C
E2	3B	R65	9B	R113	4B
E3	3B	R66	9C	R114	8C
E4	3G	R67	10C	R115	5C
E5	3G	R68	10C	RT1	8B
E6	3F	R69	10C	T3	9E
E7	3F	R70	10D	T4	3E
E8	4F	R71	7F	T5	3B

NOTE:
PREFIX ALL REF DES WITH 2A2A1A4.

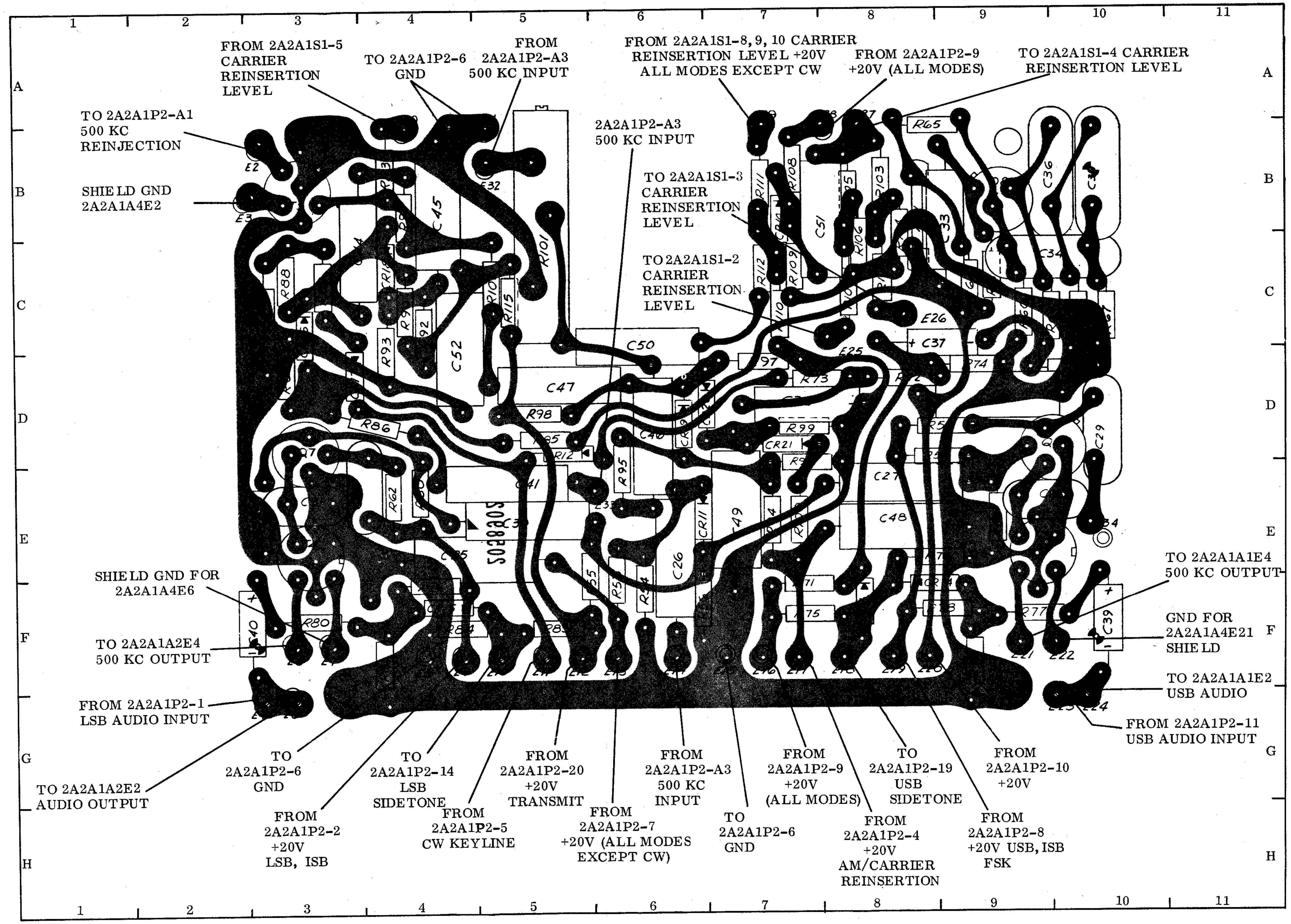


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Figure 5-46. 500-KC Amplifiers/Gates and Sidetone Oscillator PCB (P/O 2A2A1), Component Location

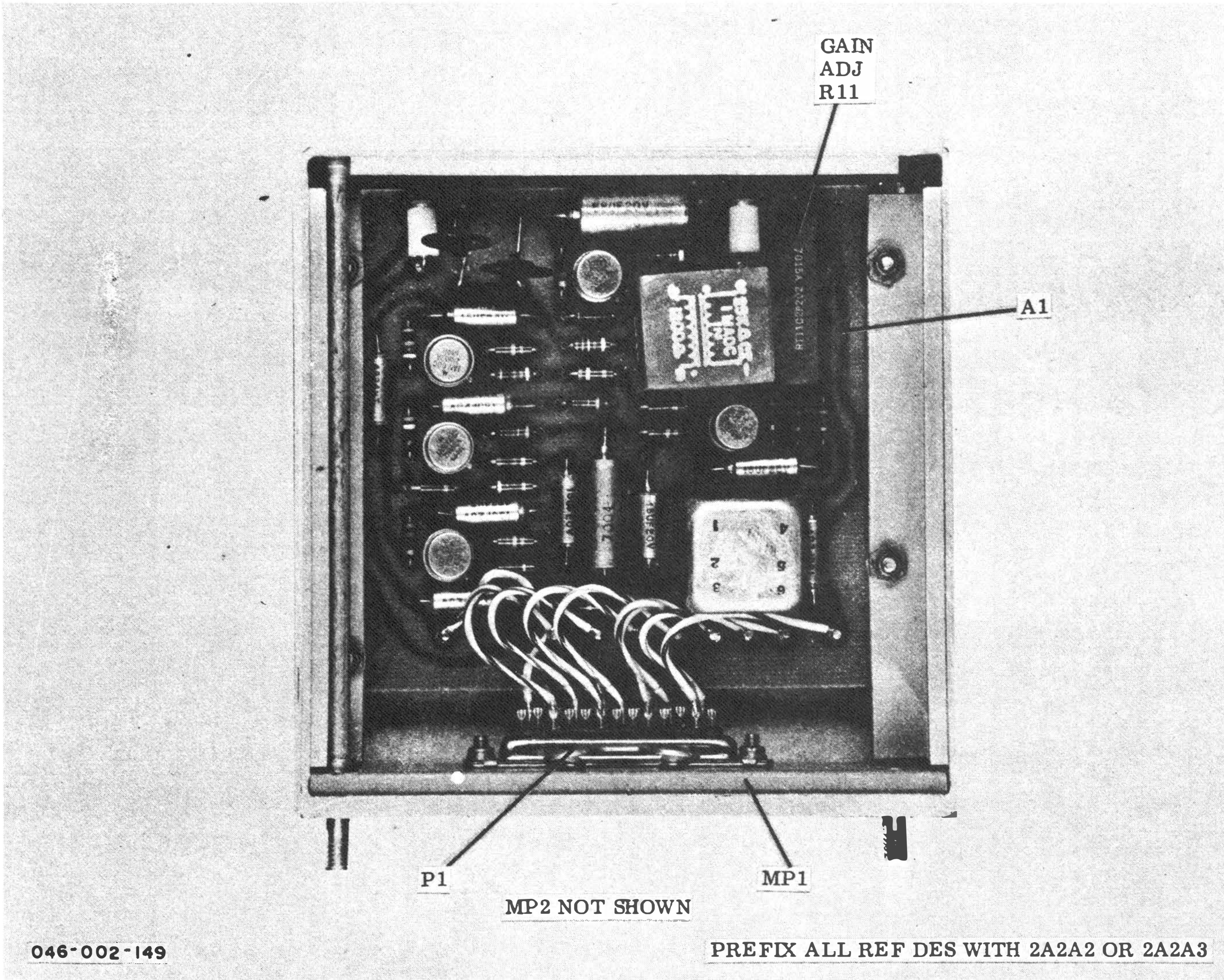


Figure 5-47. Transmitter Audio Amplifier Assembly 2A2A2 or 2A2A3, Component Location

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN
C1	7E	R3	6D
C2	7D	R4	5C
C3	5E	R5	4C
C4	3C	R6	5D
C5	5A	R7	4D
C6	3D	R8	4E
C7	3E	R9	4E
C8	4E	R10	4F
C9	3F	R11	7B
C10	5E	R12	7D
C11	2C	R13	7D
CR1	5C	R14	6B
E1	3F	R15	5C
E2	4F	R16	4B
E3	5F	R17	2C
E4	5F	R18	2D
E5	6F	R19	3E
E6	6F	R20	4D
E7	7F	R21	2E
E8	8F	R22	5F
E9	7E	R23	4C
Q1	6D	RV1	4B
Q2	5B	RV2	3B
Q3	3C	T1	6E
Q4	3D	T2	6C
Q5	3E	TP1	6B
R1	7D	TP2	3B
R2	6D		

NOTES:

1. PREFIX ALL REF DES WITH 2A2A2A1 or 2A2A3A1.
2. ⚠1 THESE TEST POINTS ARE THE SAME FOR BOTH 2A2A2A1 AND 2A2A3A1.

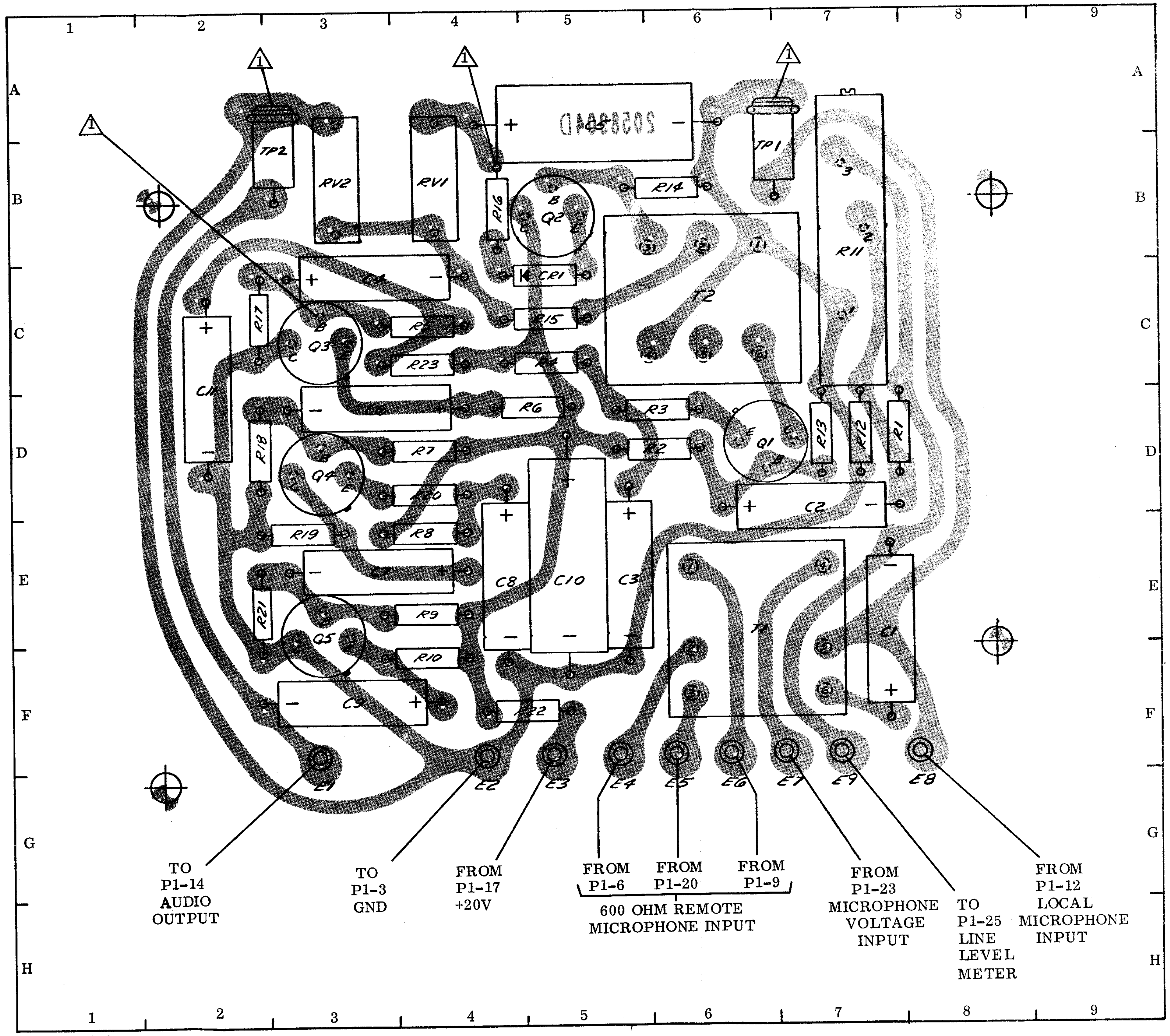


Figure 5-48. Transmitter Audio Amplifier PCB, Component Location.

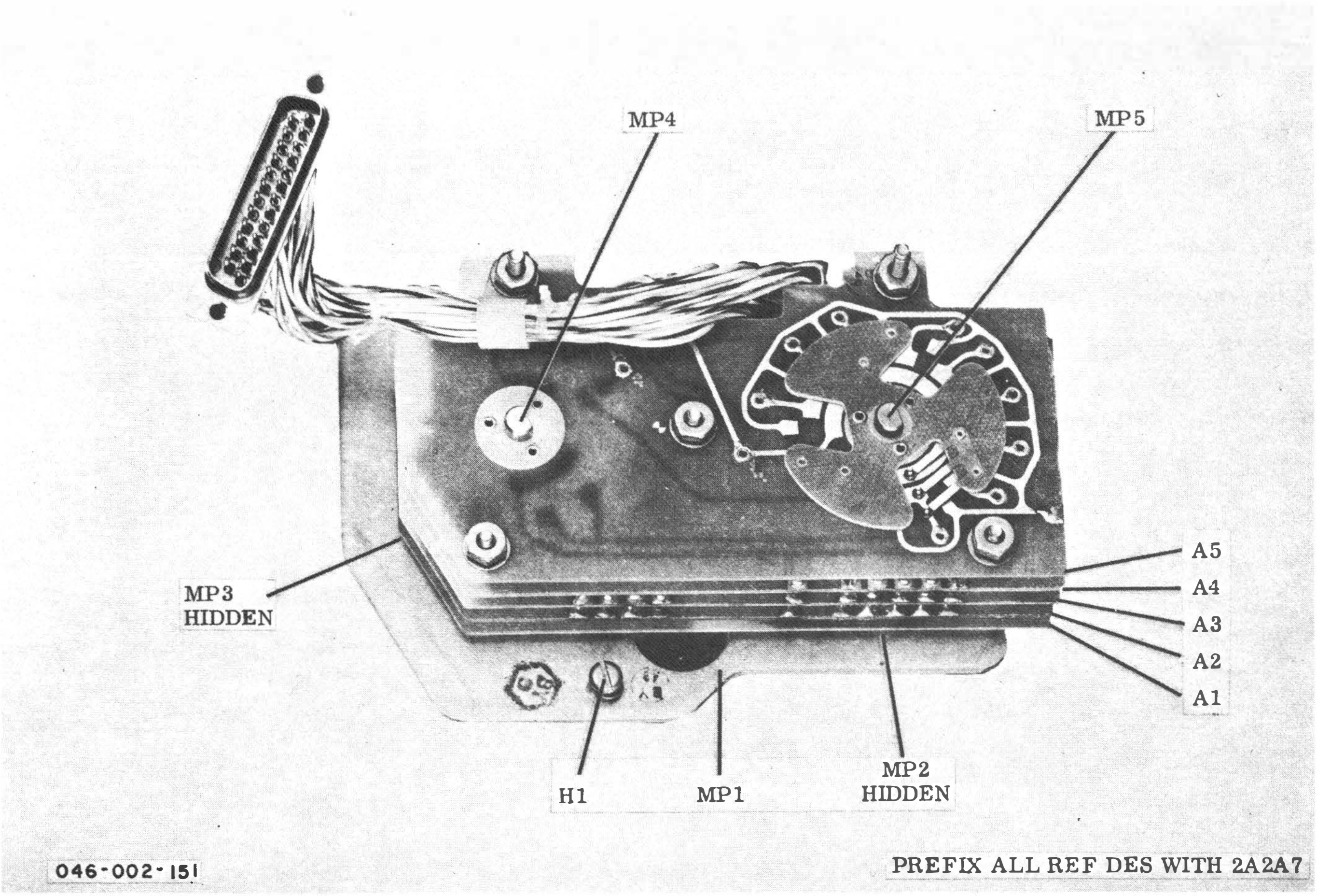


Figure 5-49. Code Generator Assembly 2A2A7, Component Location

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN
C1	7B	E10	7G
C2	7B	E11	6G
C3	3G	E12	7G
C4	3E	E13	6G
C5	3B	E14	5G
C6	5B	E15	5G
C7	4F	E16	5G
C8	5D	E17	4G
C9	6D	E18	4G
C10	5B	E19	3G
C11	6D	E20	5G
CR1	9E	E21	9G
CR2	9E	Q1	3F
CR3	9E	Q2	2E
CR4	9E	Q3	2C
CR5	7E	Q4	3C
CR6	7E	R1	8B
CR7	8E	R2	3G
CR8	8E	R3	3E
CR9	6F	R4	2D
CR10	4D	R5	3D
CR11	2D	R6	3D
CR12	3E	R7	2C
CR13	3D	R8	4D
E1	9E	R9	3A
E2	9E	R10	4B
E3	9F	R11	4C
E4	9G	R12	4D
E5	9G	R13	5F
E6	8G	R14	5F
E7	7G	R15	6F
E8	7G	R16	6B
E9	7F		

NOTE:
PREFIX ALL REF DES WITH 2A2A8.

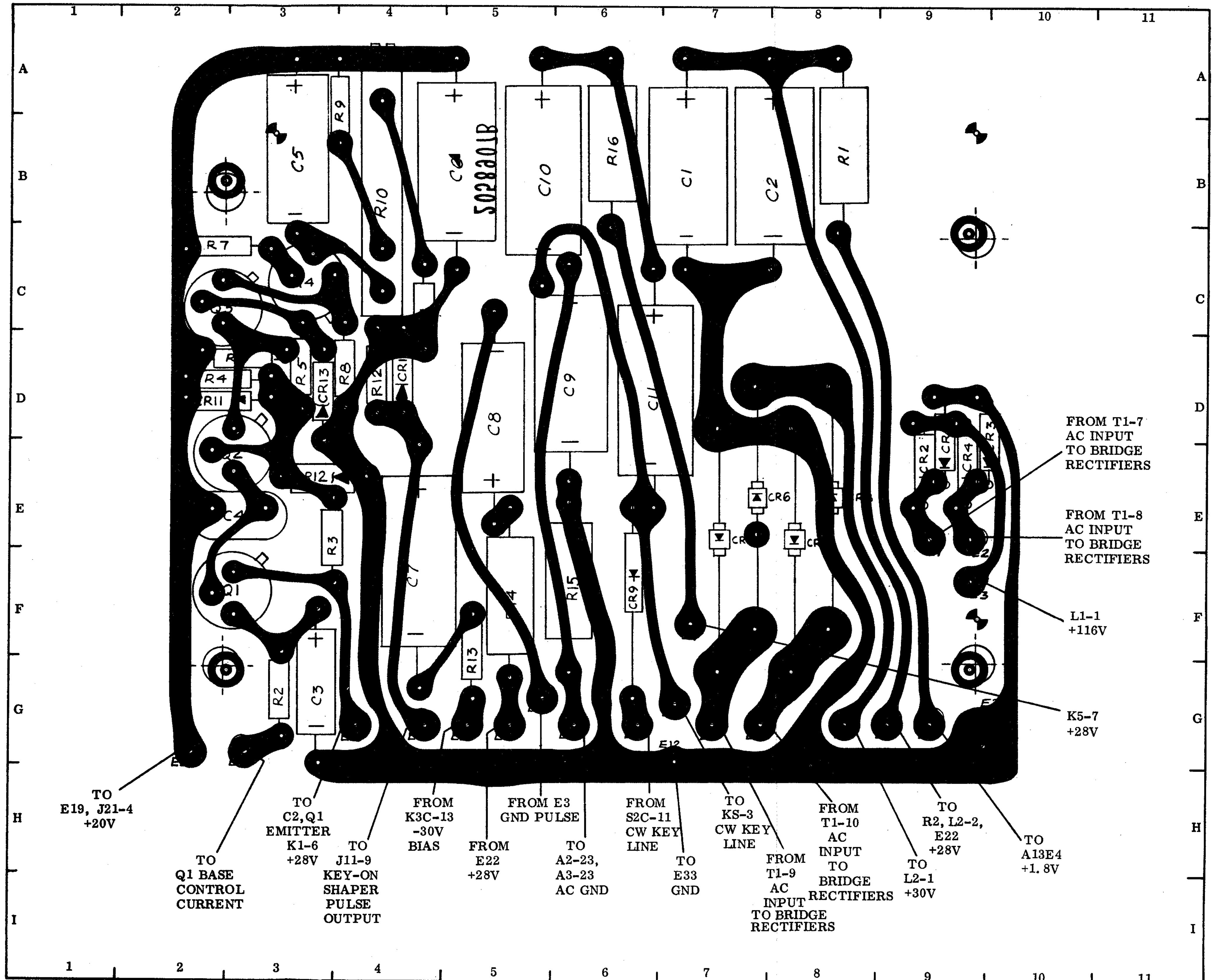


Figure 5-50. Power Supply PCB (P/O 2A2A8), Component Location

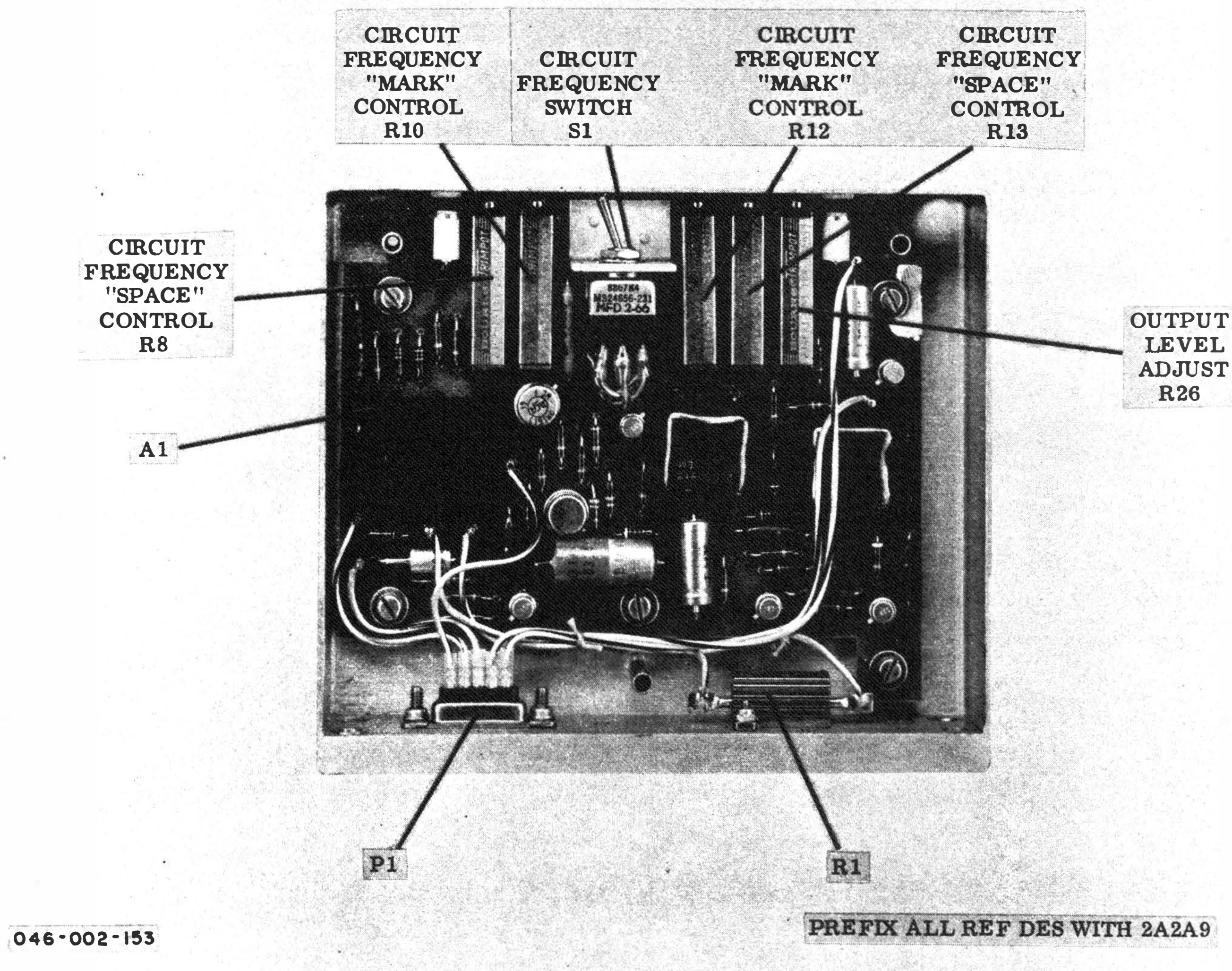
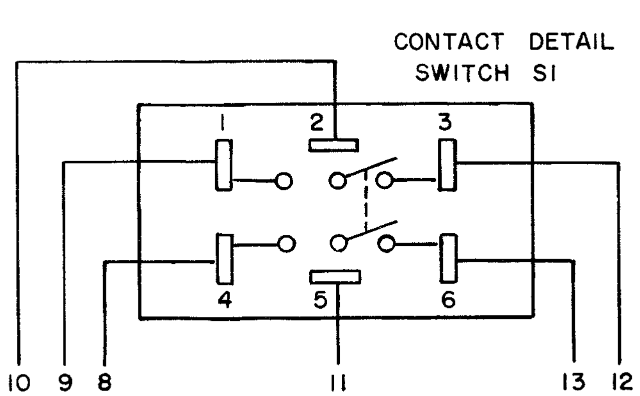


Figure 5-51. FSK Tone Generator Assembly 2A2A9, Component Location

NOTE:
REF DES PREFIX 2A2A9A1

PART LOCATION INDEX

REF DES	LCTN	REF DES	LCTN
C1	2D	R1	Not used
C2	4E	R2	3F
C3	2C	R3	4F
C4	5F	R4	4F
C5	7D	R5	2C
C6	7E	R6	4E
C7	8F	R7	3C
C8	9F	R8	4B
C9	6F	R9	5C
C10	8C	R10	4B
C11	8D	R11	6C
CR1	3E	R12	6B
CR2	3E	R13	7B
CR3	3C	R14	5E
CR4	3C	R15	5D
CR5	6E	R16	5D
CR6	7E	R17	6E
CR7	8F	R18	5D
CR8	7D	R19	5D
E1	2E	R20	7E
E2	2E	R21	8F
E3	3E	R22	7F
E4	4E	R23	7D
E5	4D	R24	9E
E6	8B	R25	8C
E7	9D	R26	8B
Q1	4F	R27	8D
Q2	5D	R28	3C
Q3	6D	R29	5E
Q4	5E	S1	5C
Q5	7F	T1	3D
Q6	9F	TP1	3B
Q7	9C	TP2	8B



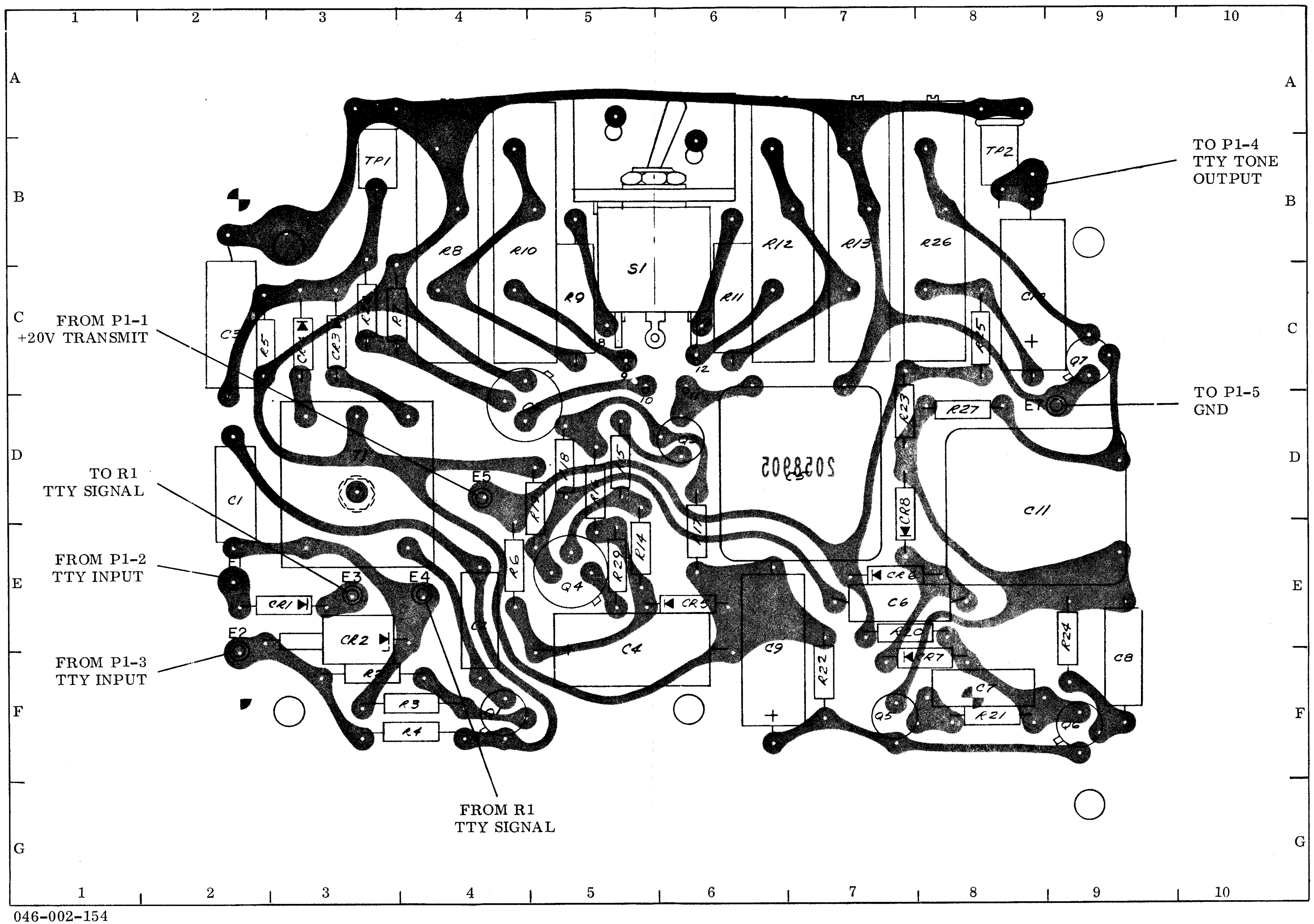
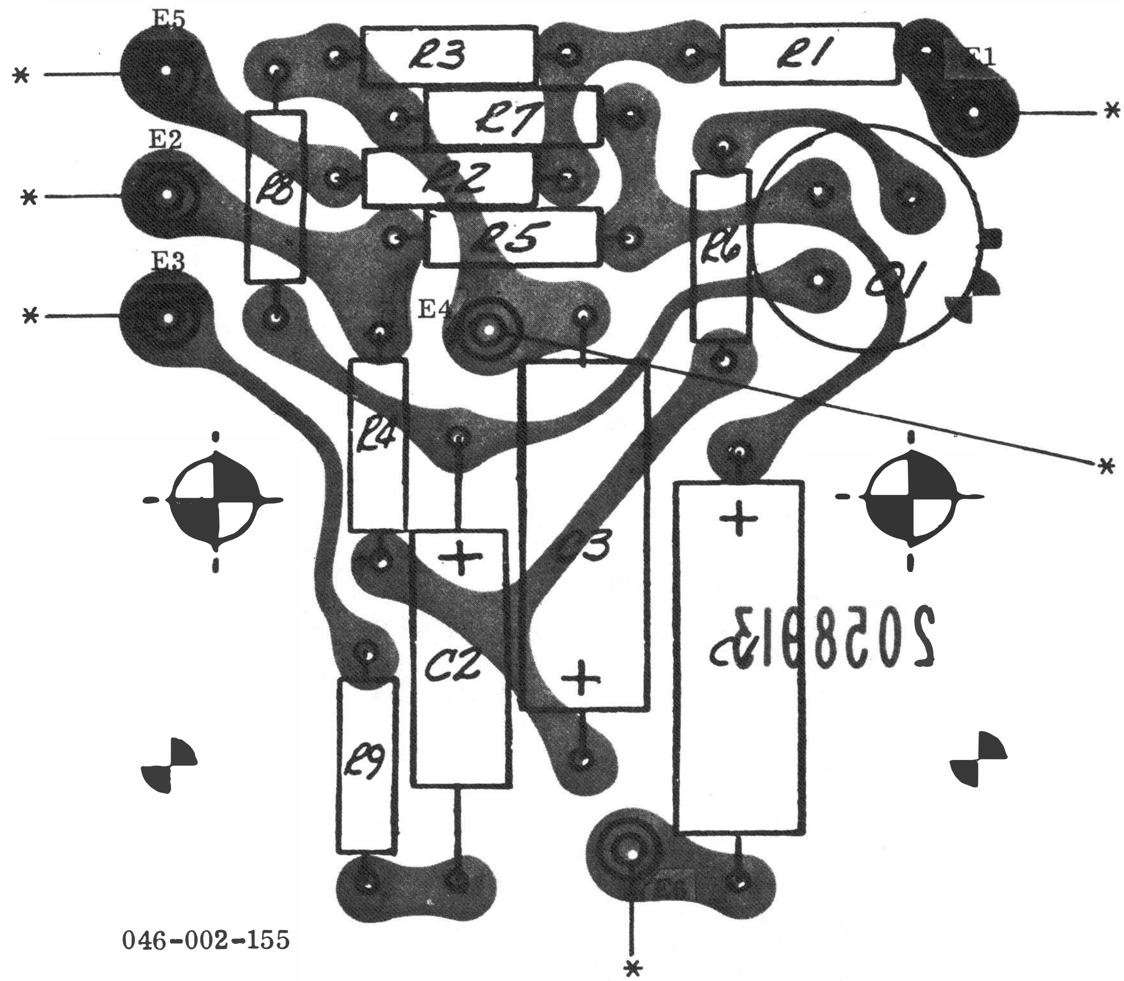


Figure 5-52. FSK Tone Generator PCB (P/O 2A2A9), Component Location



NOTES:
1. REF DES PREFIX 2A2A10 or 2A2A11.
2. *REFER TO TABLE BELOW FOR THESE CONNECTIONS

A10	ORIGIN/DESTINATION	A11	ORIGIN/DESTINATION
E1	LSB AUDIO OUTPUT TO S10-6	E1	USB AUDIO OUTPUT TO S11-6
E2	+20V FROM A8	E2	+20V FROM A8
E3	OUTPUT TO M1-1, 0.744 VRMS FOR METER FULL SCALE DEFLECTION	E3	OUTPUT TO M2-1, 0.744 VRMS FOR METER FULL SCALE DEFLECTION
E4	TO E40 GROUND	E4	TO E37 GROUND
E5	LSB AUDIO INPUT FROM S10-1	E5	USB AUDIO INPUT FROM S11-1
E6	LSB AUDIO INPUT FROM S10-3	E6	USB AUDIO INPUT FROM S11-3

Figure 5-53. Meter Amplifier PCB (2A2A10 or 2A2A11), Component Location

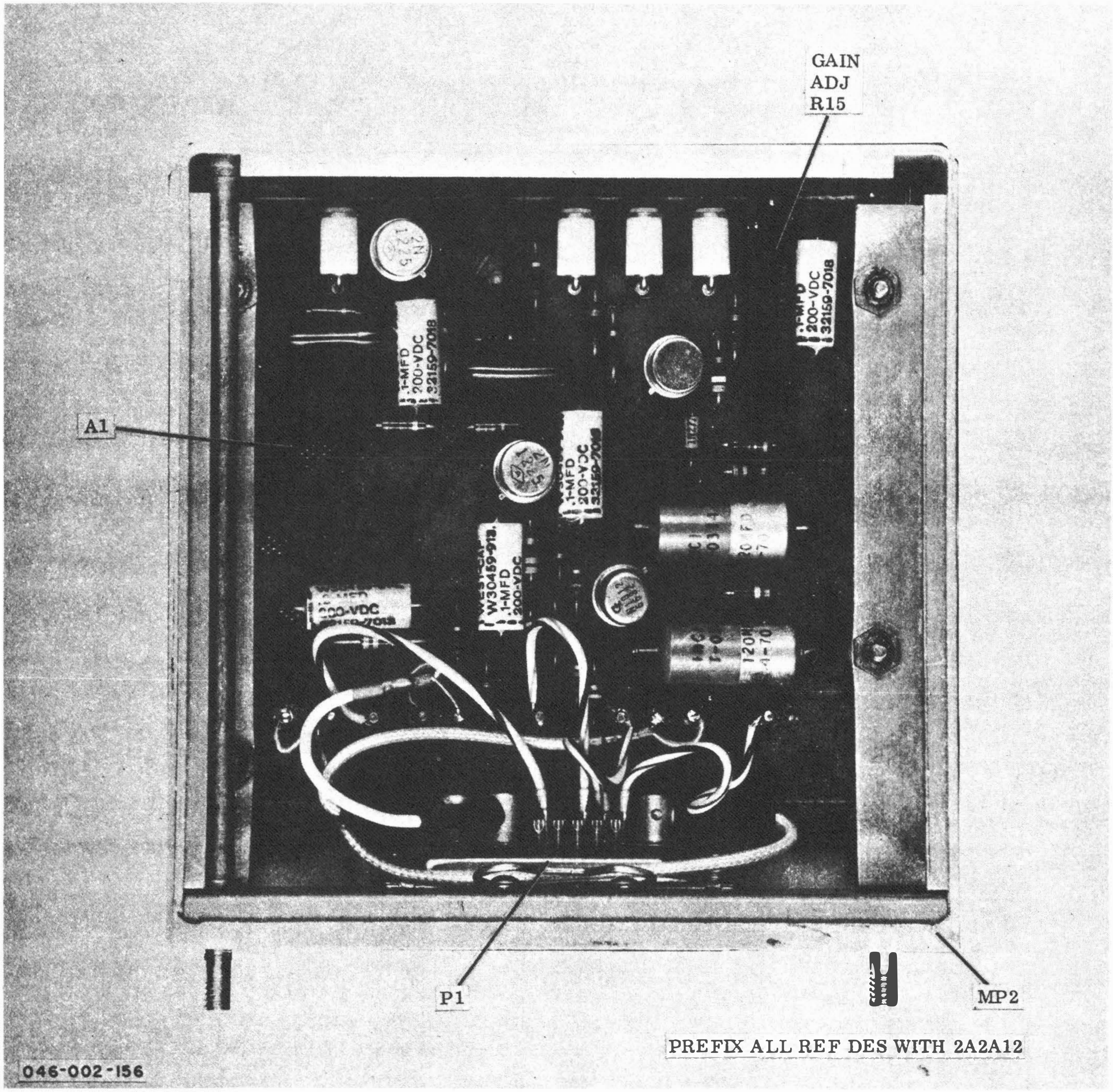


Figure 5-54. Transmitter IF. Amplifier Assembly 2A2A12, Component Location

PARTS LOCATION INDEX

REF DES	LCTN	REF DES	LCTN
C1	5D	R4	5E
C2	3E	R5	5F
C3	7D	R6	5A
C4	4E	R7	4C
C5	4C	R8	4B
C6	8B	R9	3C
C7	3B	R10	5D
C8	2B	R11	5F
C9	Not used	R12	5E
C10	7F	R13	7C
CR1	7C	R14	7C
E1	2F	R15	7B
E2	2F	R16	4B
E3	3F	R17	7D
E4	6F	R18	2B
E5	6F	R19	7B
E6	6F	R20	Not used
E7	7F	R21	3F
E8	5F	R22	4F
E9	3F	R23	5B
E10	4F	R24	7E
Q1	6E	R25	6A
Q2	5D	T1	4A
Q3	3A	T2	2C
Q4	6A	TP1	5A
R1	5F	TP2	2A
R2	5E	TP3	6A
R3	4E	TP4	7A

NOTE:
PREFIX ALL REF DES WITH 2A2A12A1

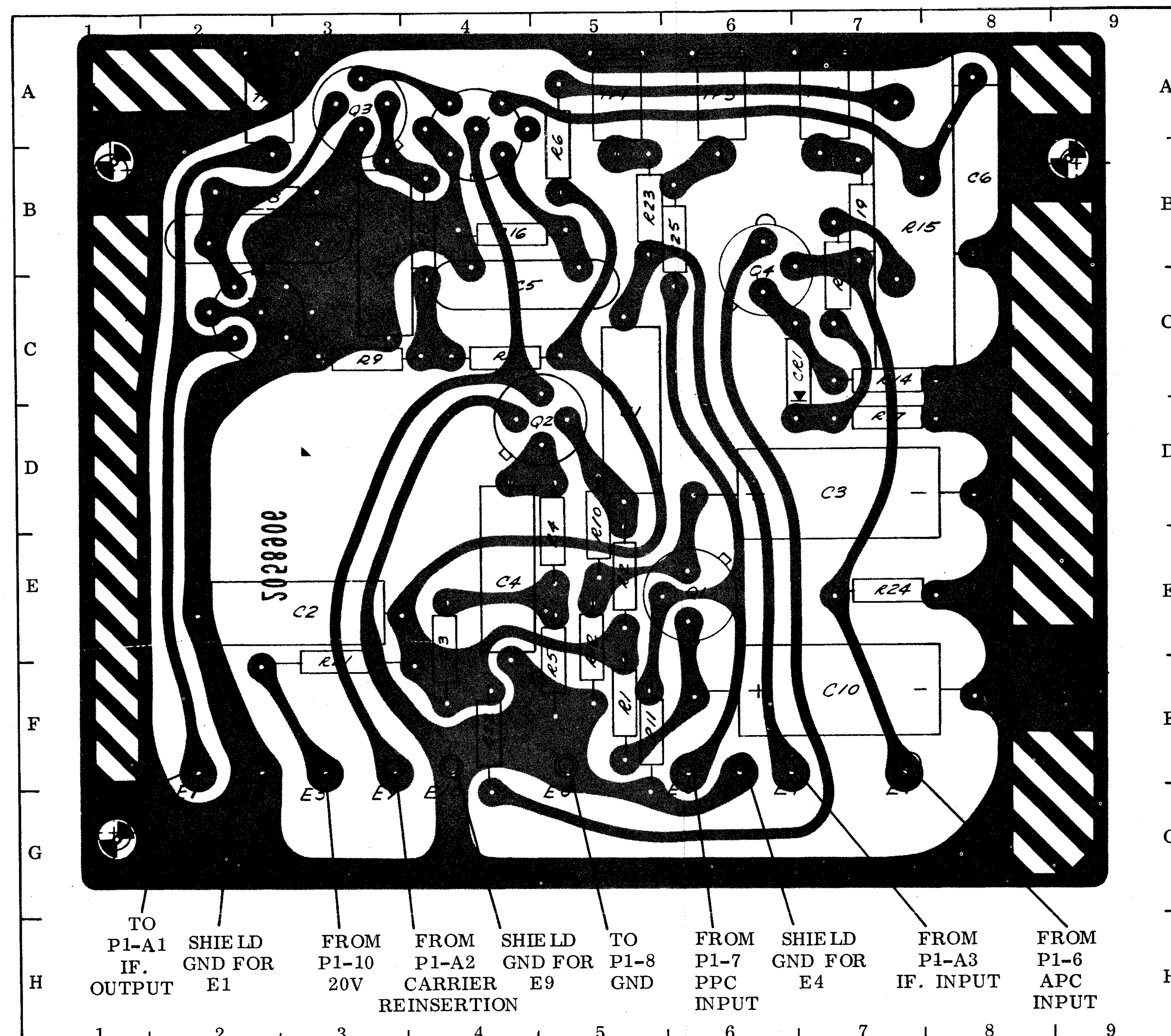


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Figure 5-55. Transmitter IF. Amplifier PCB (P/O 2A2A12), Component Location

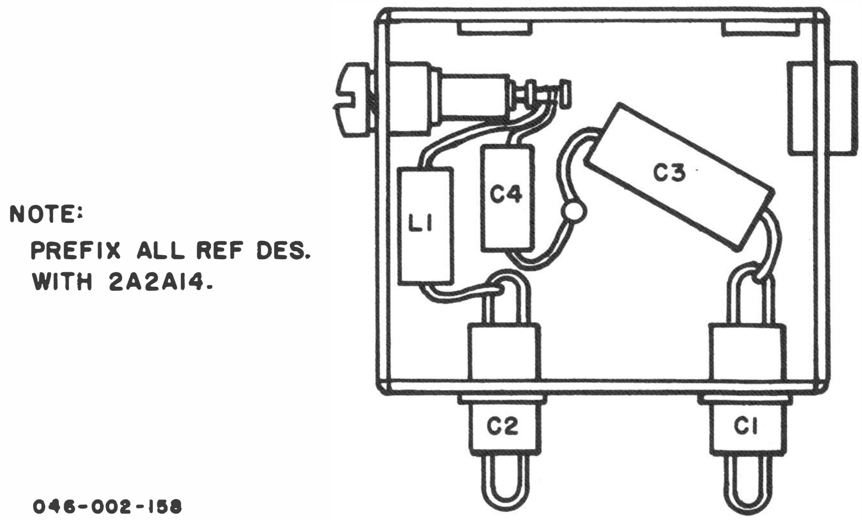


Figure 5-56. Handset Filter Assembly 2A2A14, Component Location

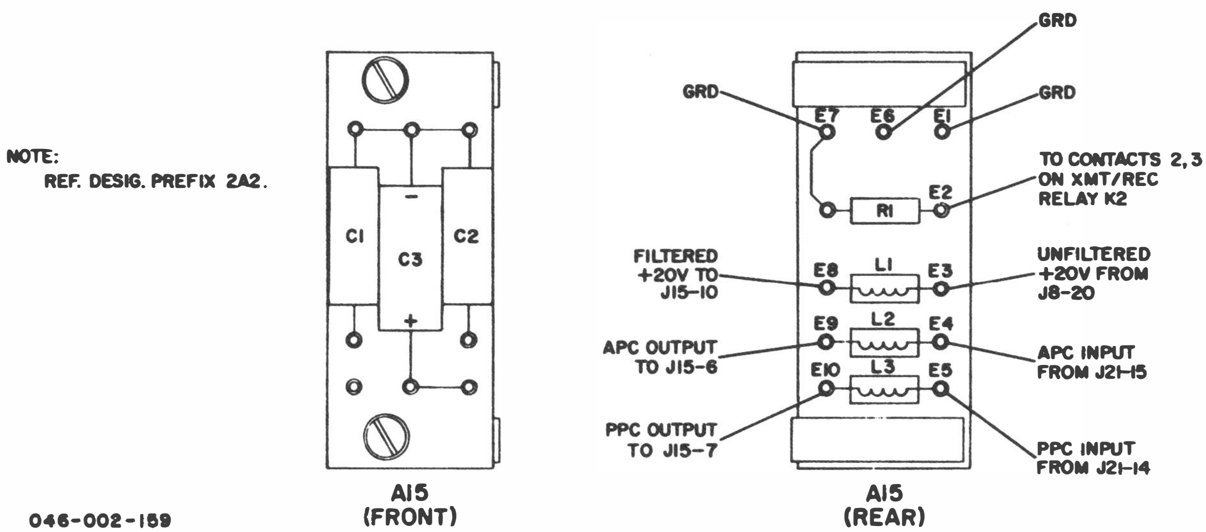
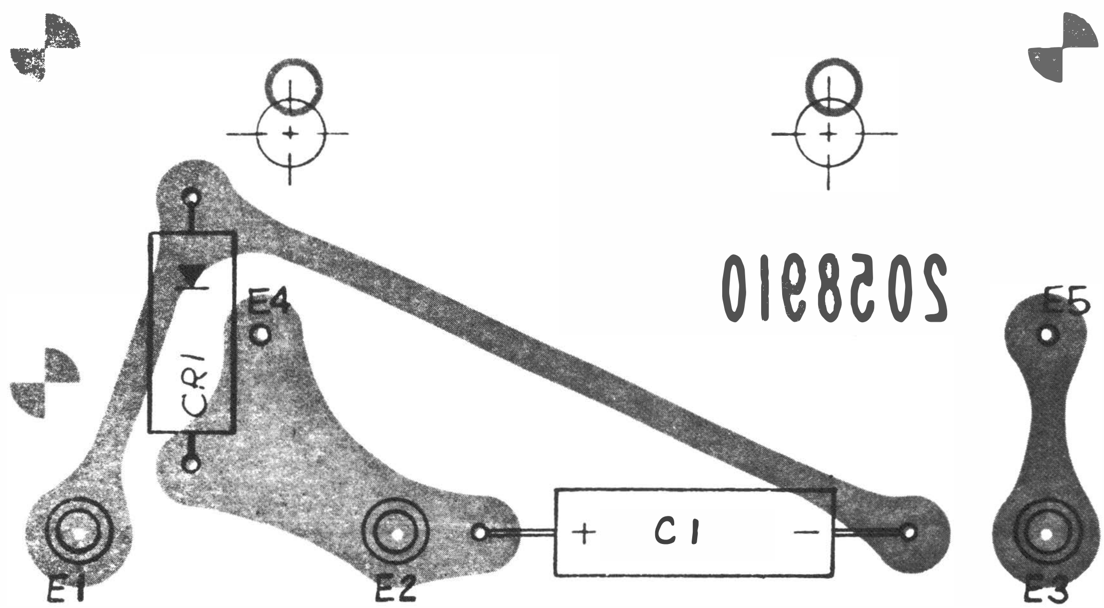


Figure 5-57. Transmitter IF. Filter Assembly 2A2A15, Component Location



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NOTE
PREFIX ALL REF DES WITH 2A2A16.

Figure 5-58. 4-Vdc Power Supply PCB (2A2A16), Component Location

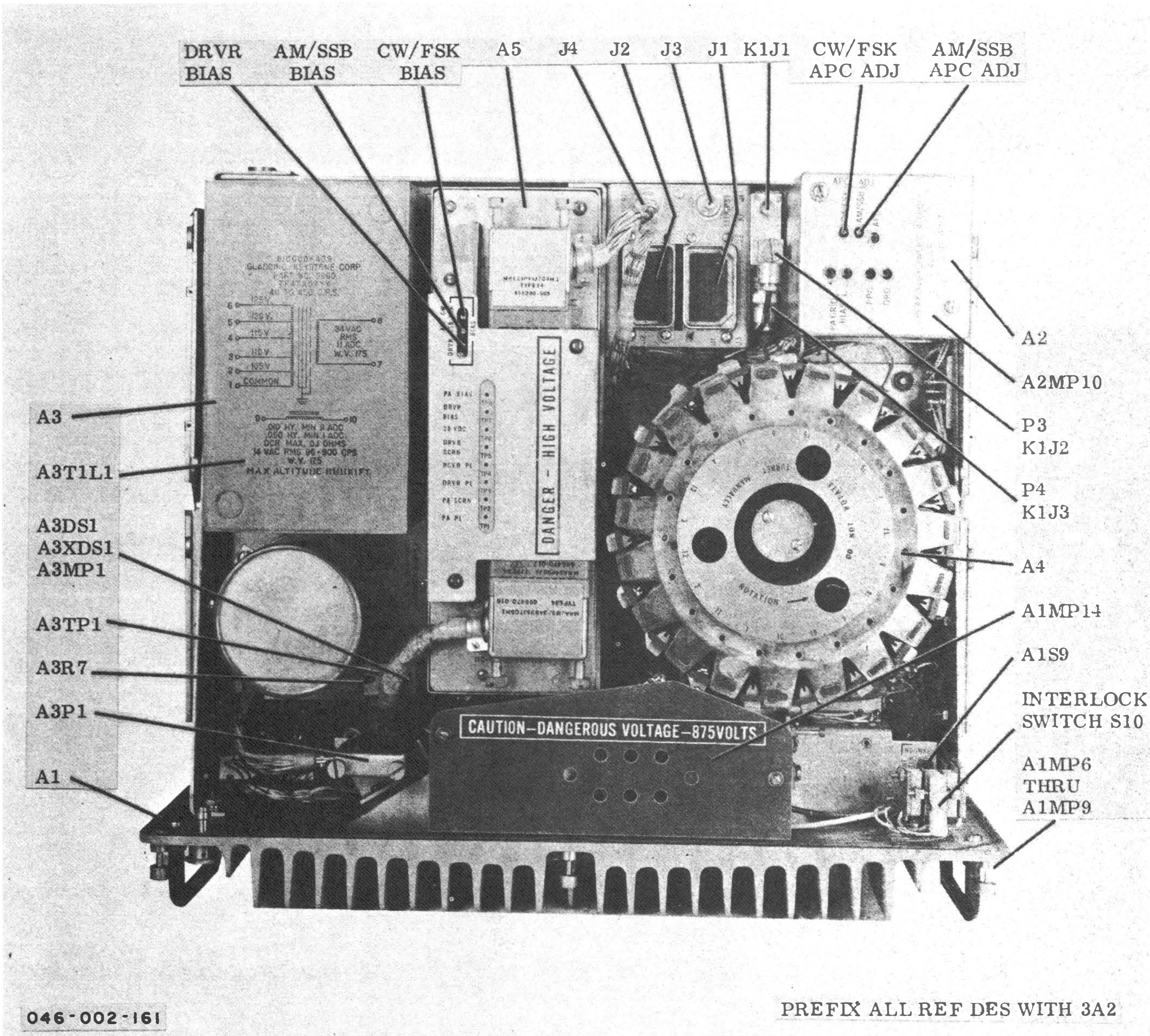


Figure 5-59. AM-3007/URT Chassis, Top View, Component Location

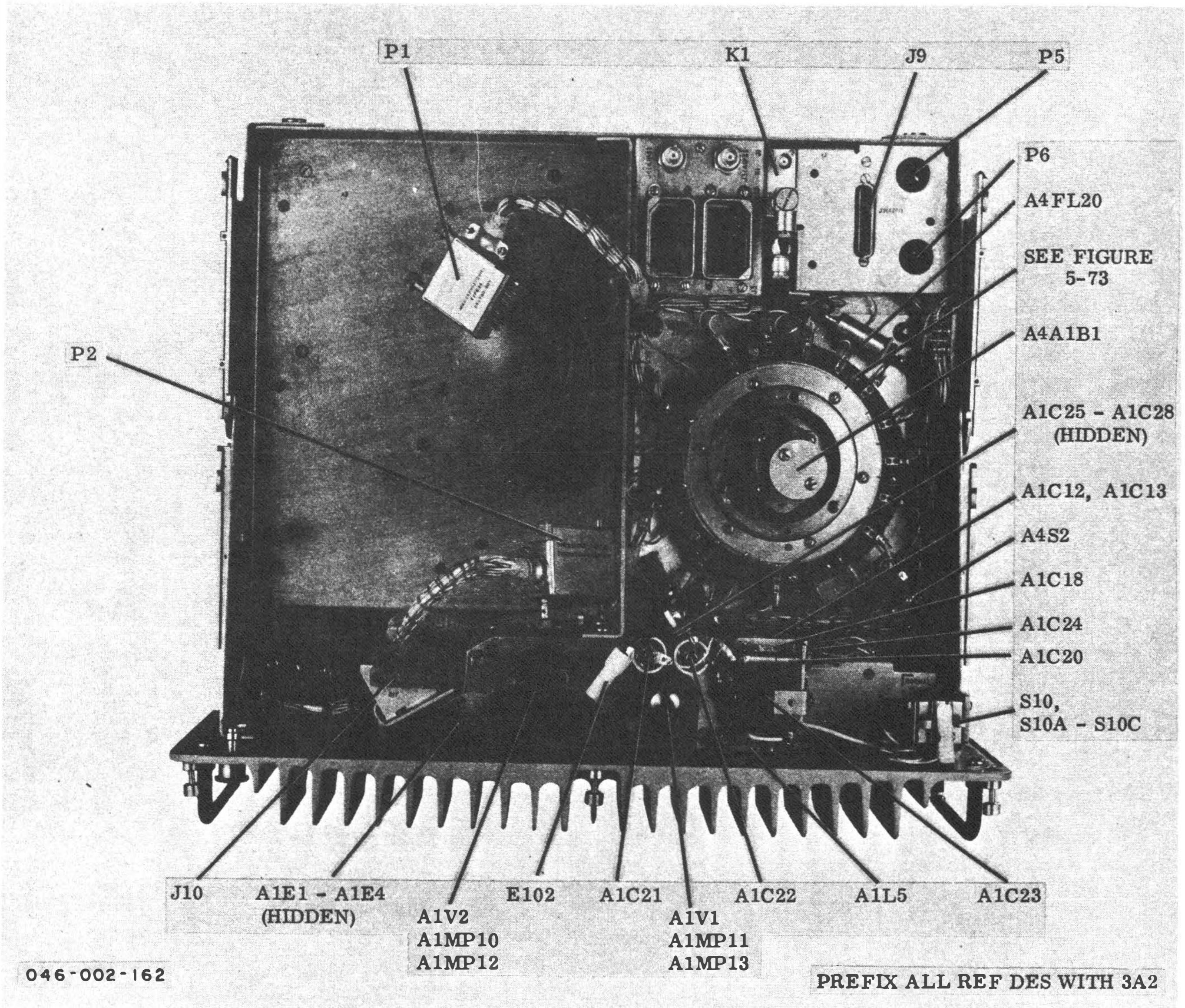


Figure 5-60. AM-3007/URT Chassis Less Assemblies, Top View, Component Location

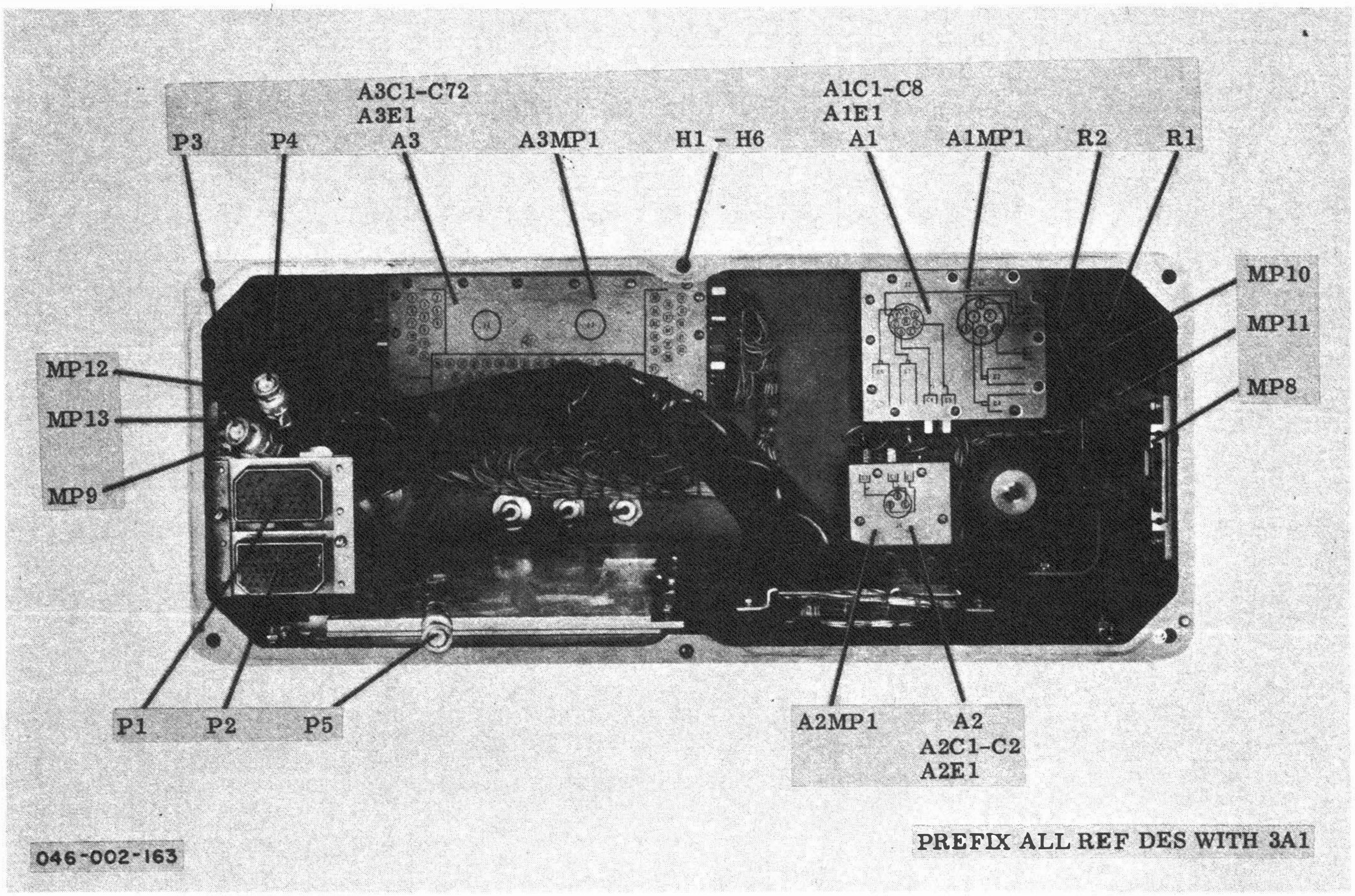


Figure 5-61. AM-3007/URT Case, Inside View, Component Location

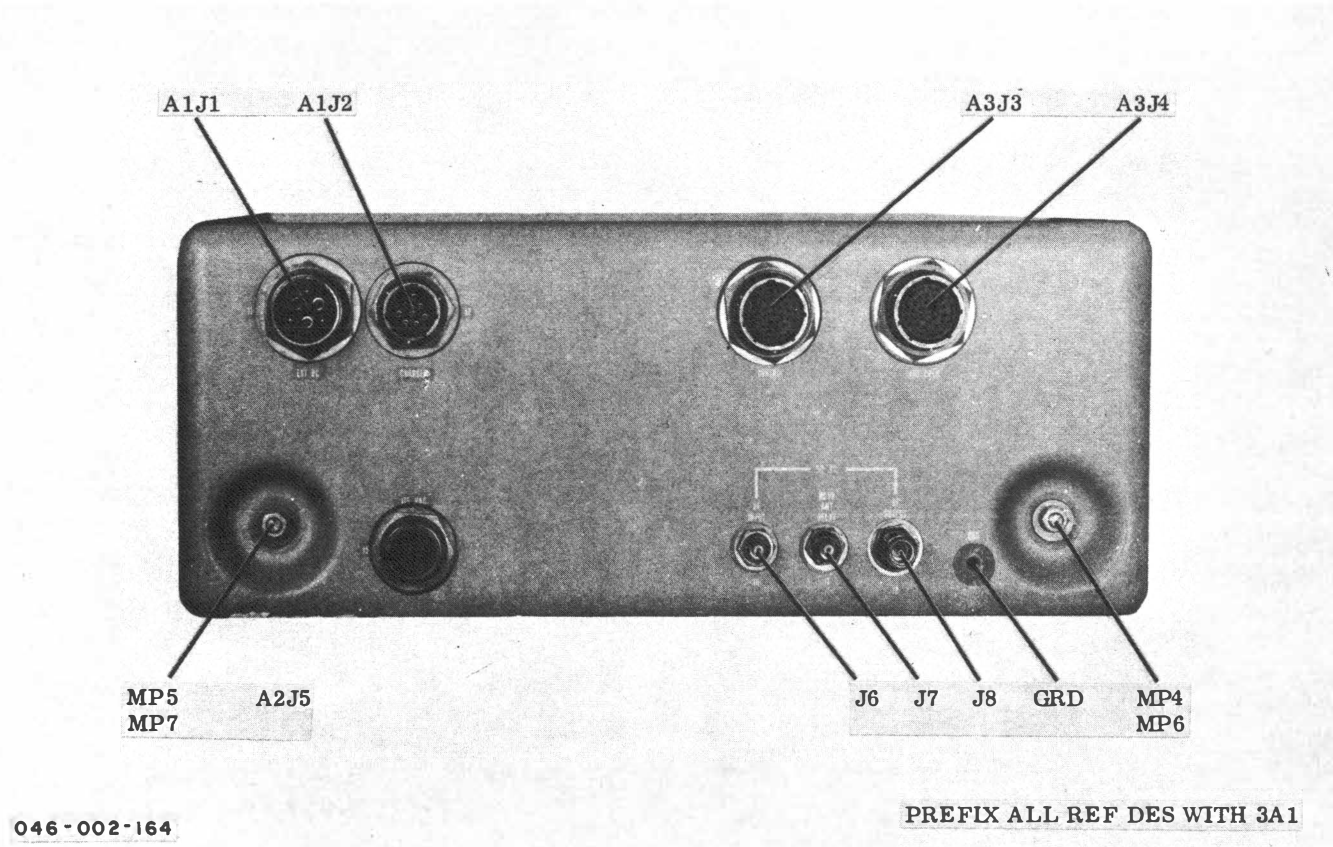


Figure 5-62. AM-3007/URT Case, Rear View, Component Location

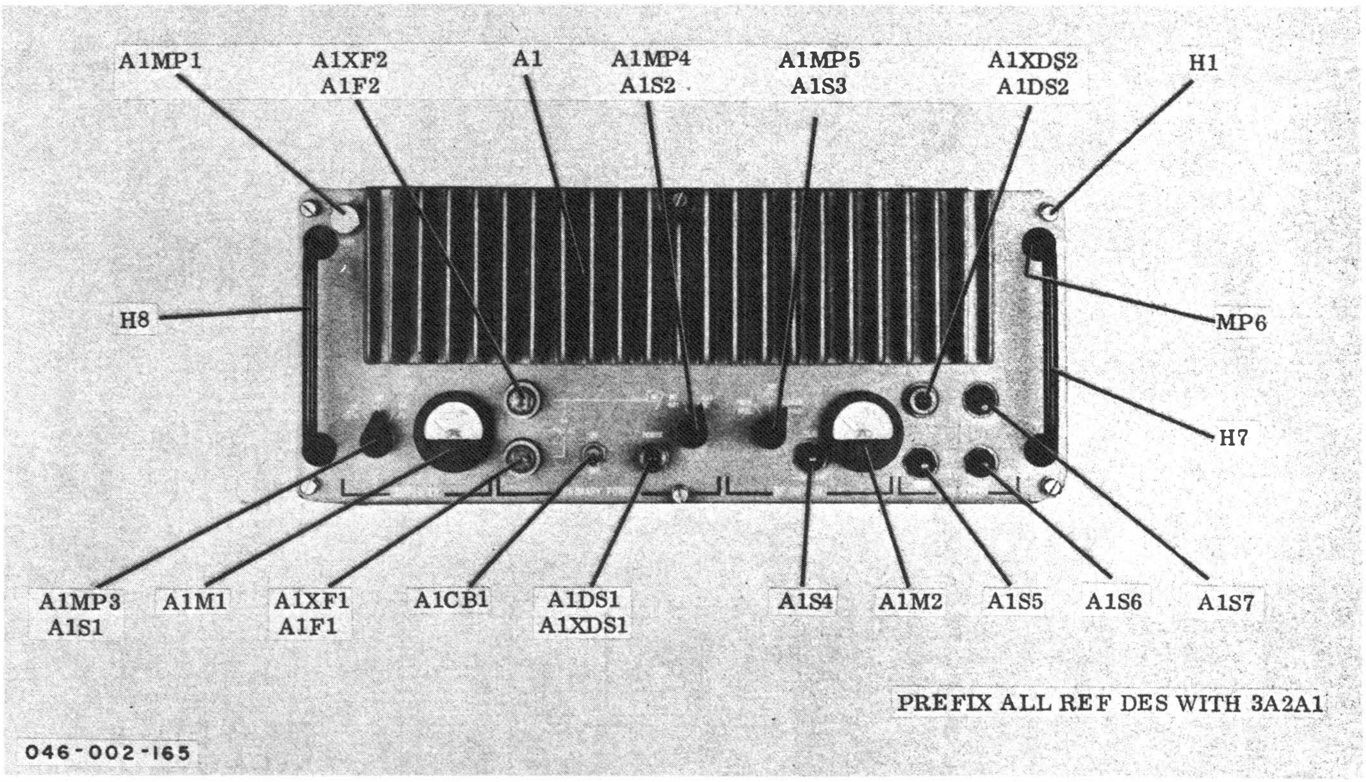


Figure 5-63. AM-3007/URT Front Panel, Component Location

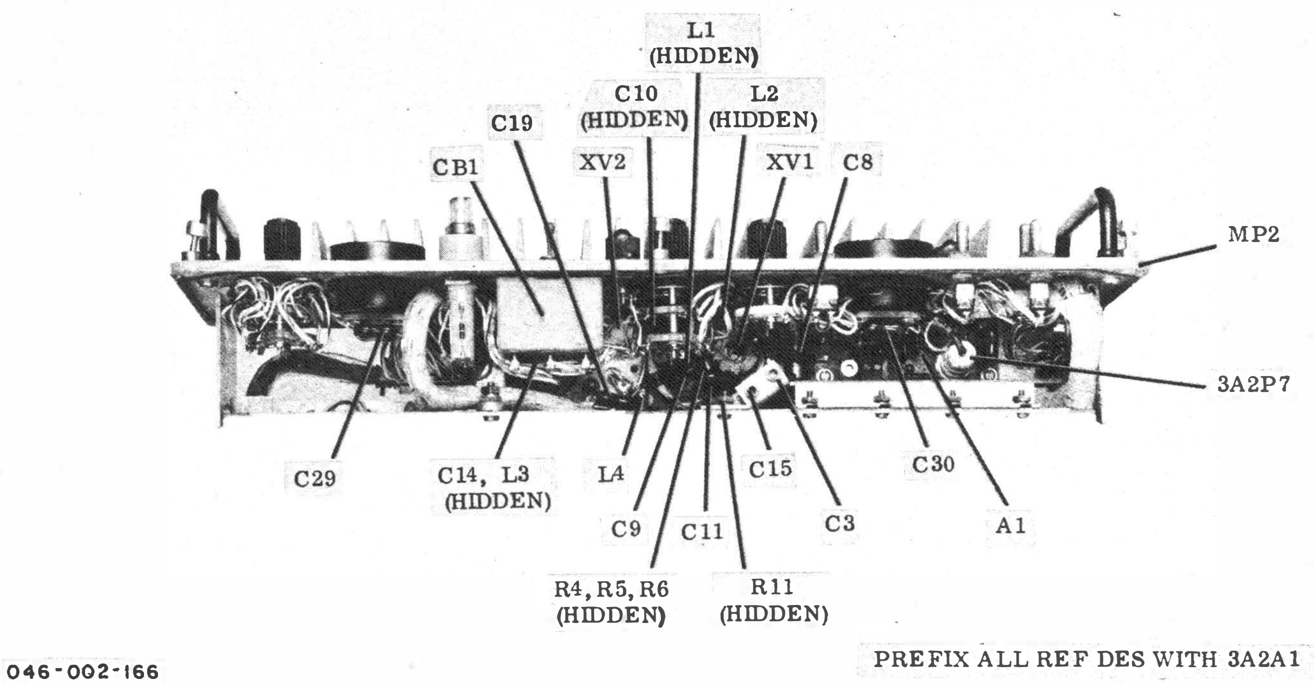
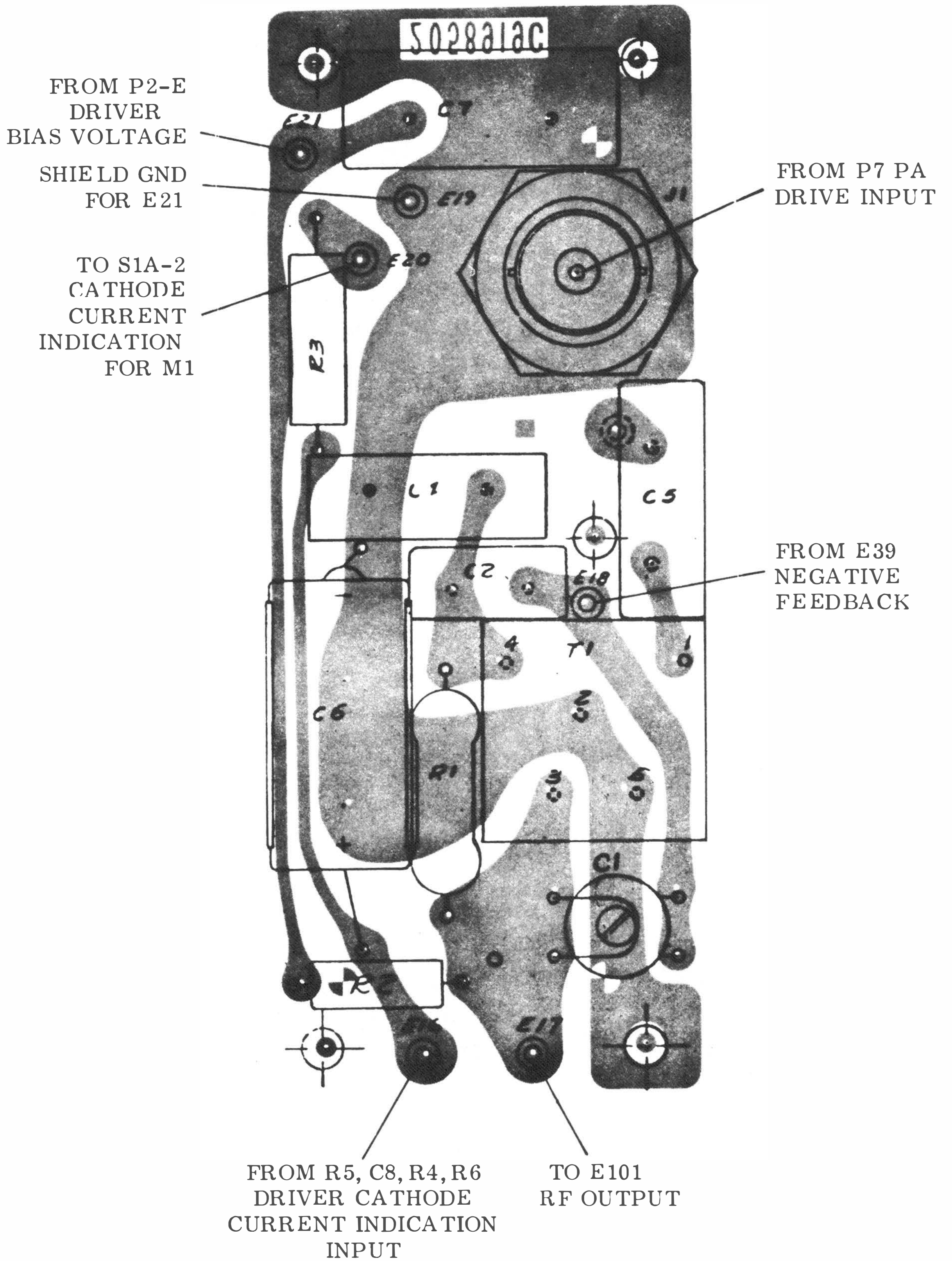


Figure 5-64. AM-3007/URT Rear View of Front Panel, Component Location



NOTE:
PREFIX ALL REF
DES WITH 3A2A1A1

046-002-167

Figure 5-65. RF Input Bridge PCB (3A2A1A1), Component Location

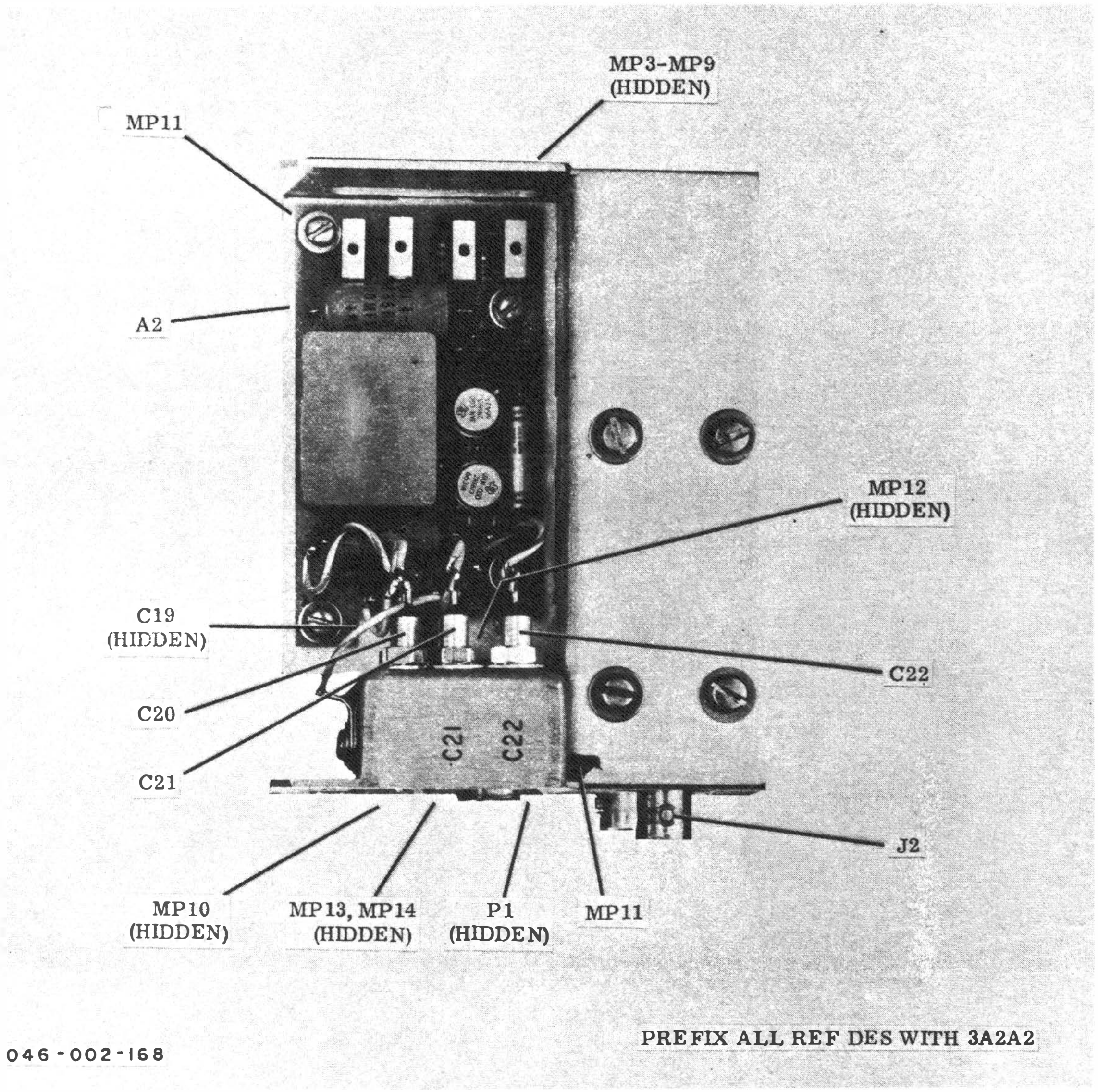


Figure 5-66. APC/PPC/Directional Coupler Assembly 3A2A2, Front View, Component Location

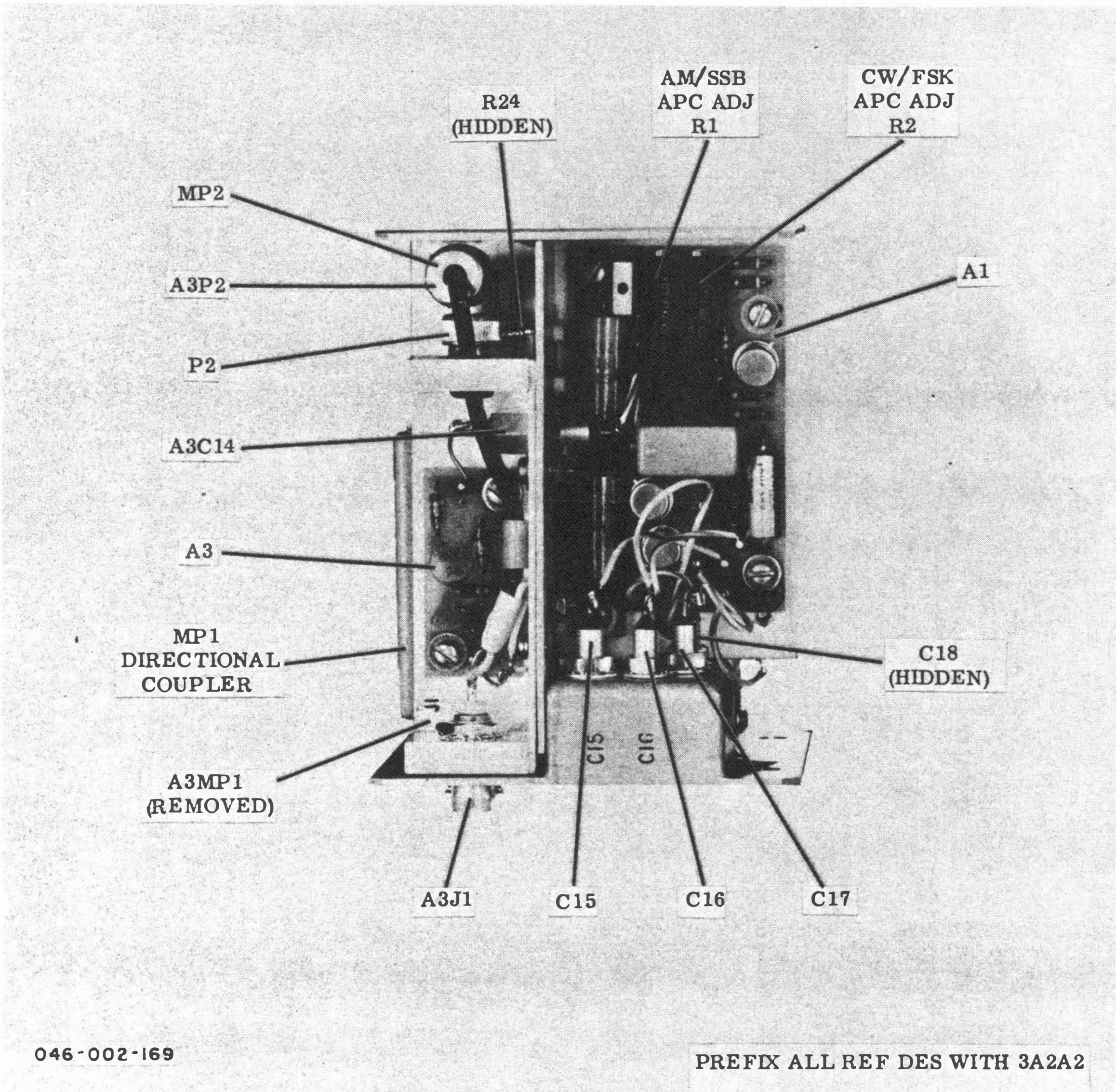
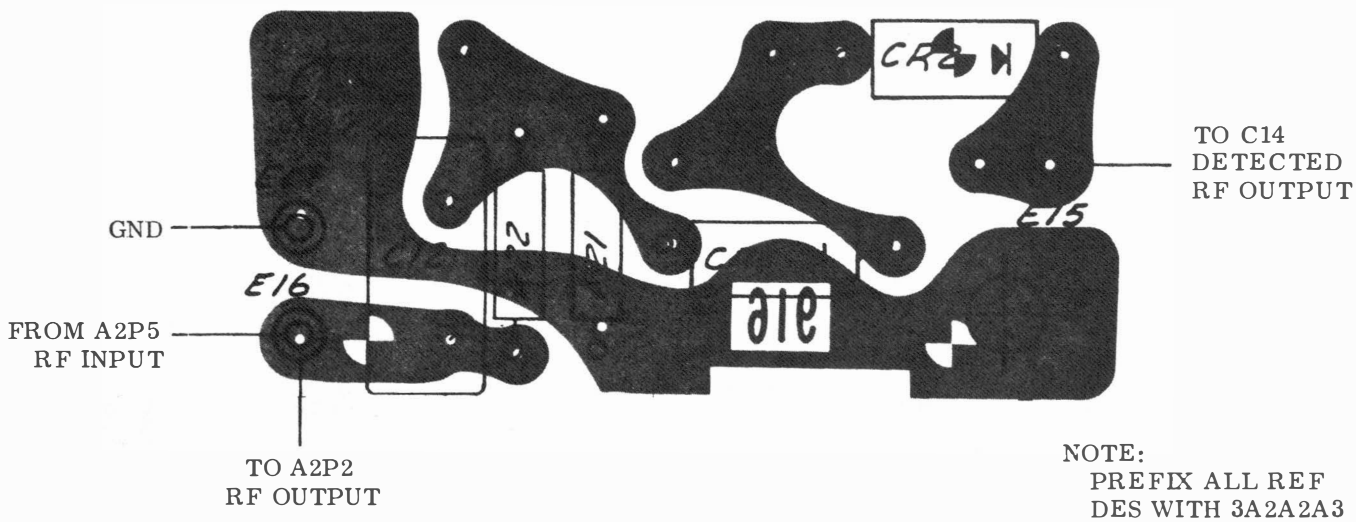
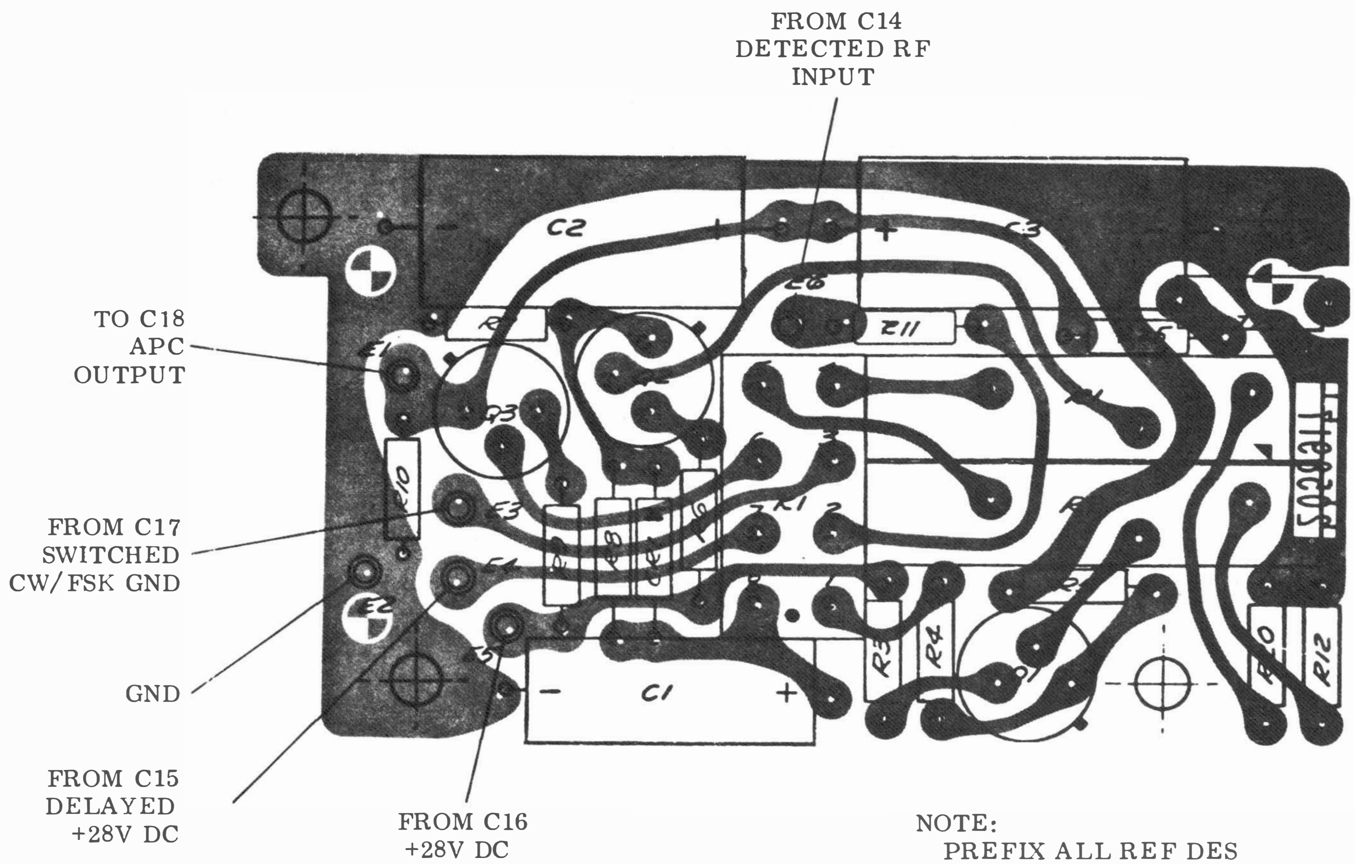


Figure 5-67. APC/PPC/Directional Coupler Assembly 3A2A2,
Rear View, Component Location



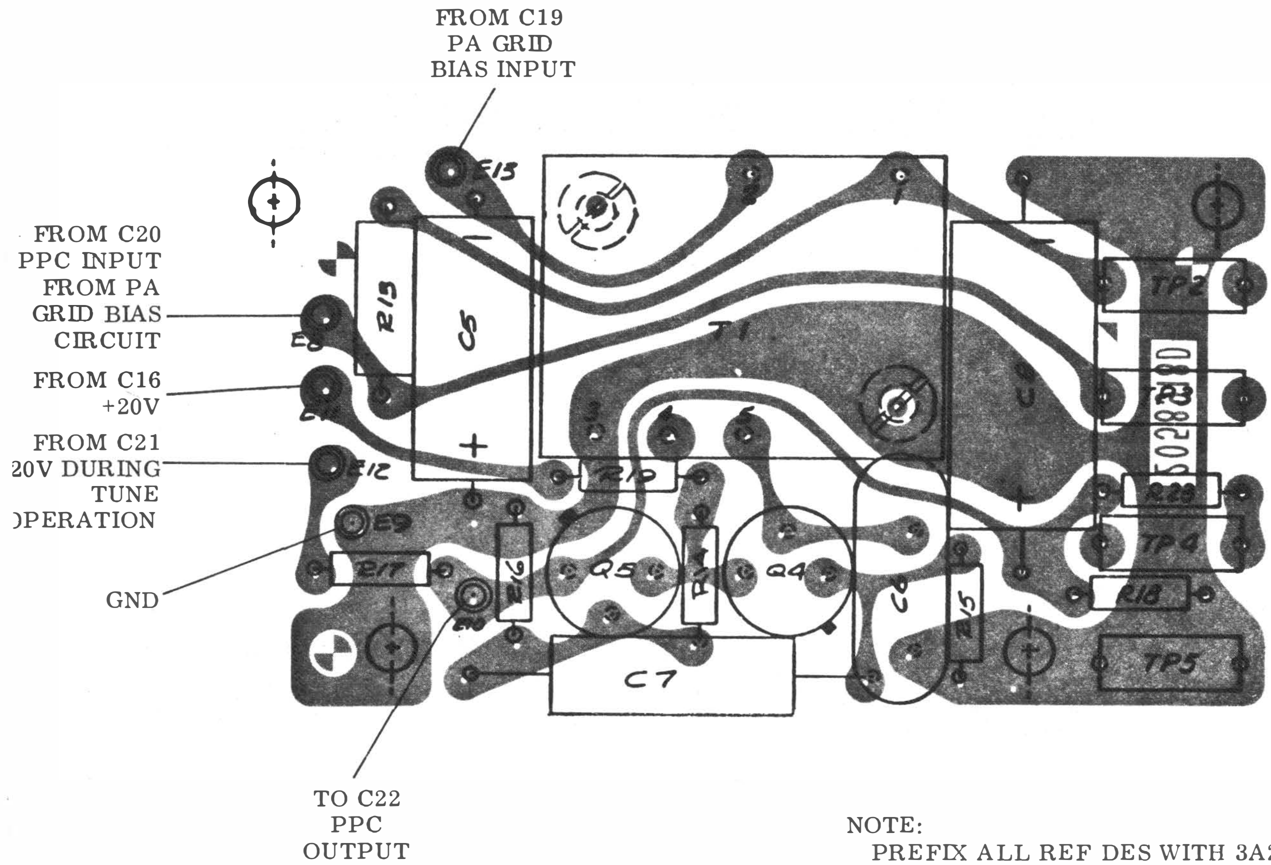
046-002-170

Figure 5-68. APC Detector PCB (3A2A2A3), Component Location



046-002-171

Figure 5-69. APC Amplifier PCB (3A2A2A1), Component Location



NOTE:
PREFIX ALL REF DES WITH 3A2A2A2

046-002-172

Figure 5-70. PPC Amplifier PCB (3A2A2A2), Component Location

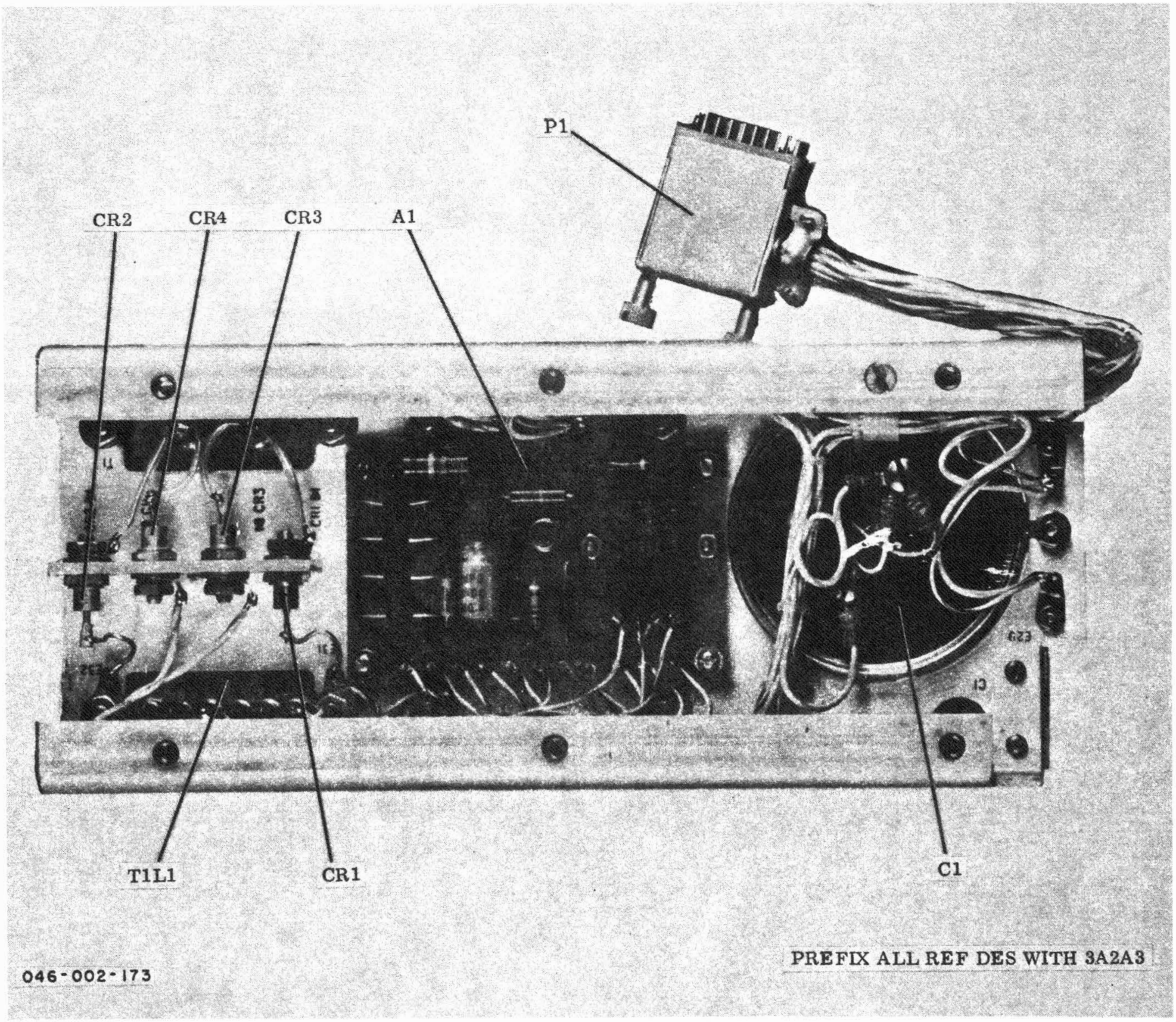
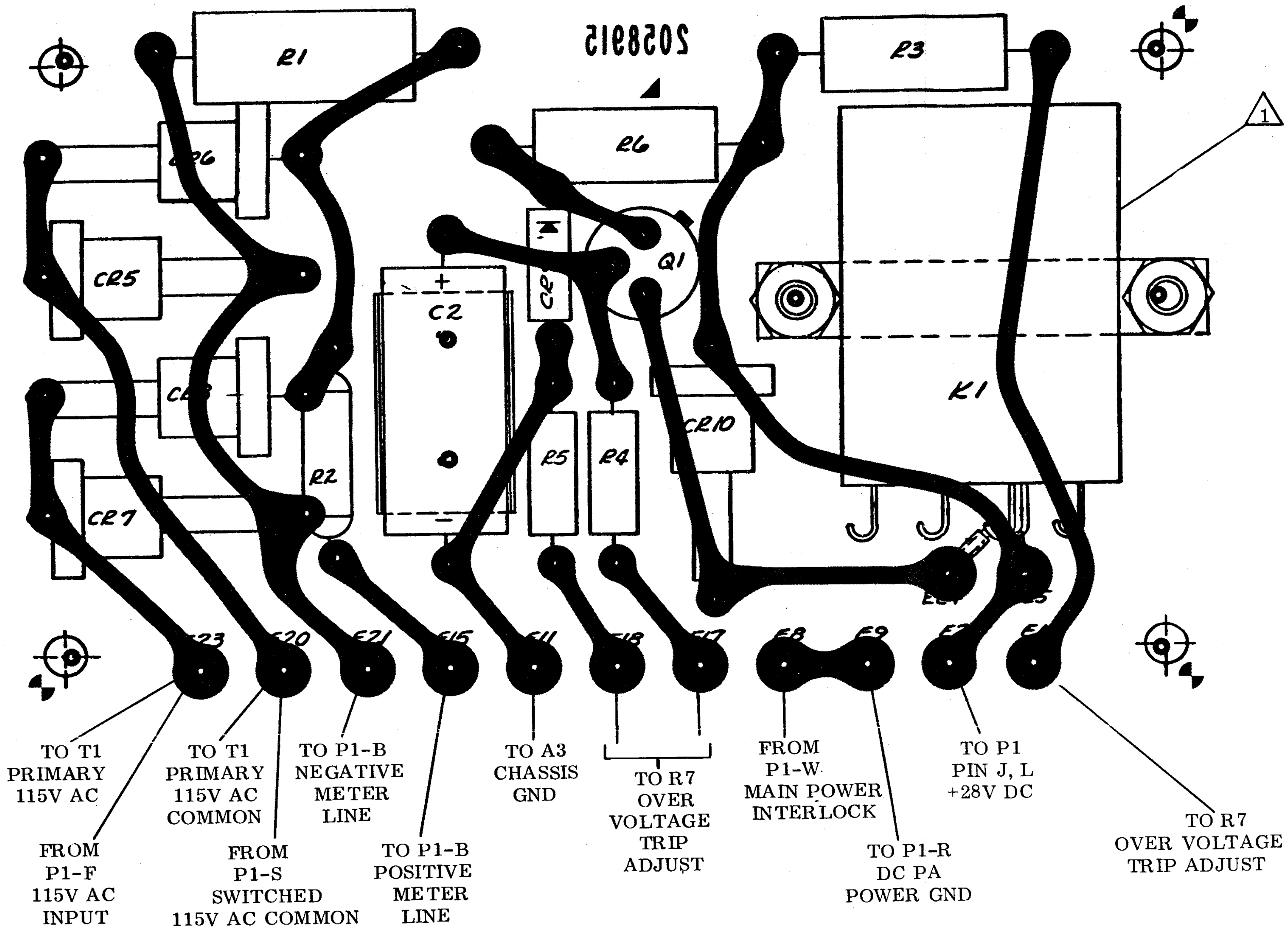


Figure 5-71. AC Power Supply Assembly 3A2A3 Bottom View, Component Location



046-002-174

NOTES:

1. PREFIX ALL REF DES WITH 3A2A3A1.
2. 1

K1-1	TO DS1-1 +28V
K1-2	TO P1-X MAIN POWER INTERLOCK
K1-3	FROM Q1 COLLECTOR
K1-4	TO P1-1 INTERLOCK GND
K1-5	NO CONNECTION
K1-6	FROM E2 +28V
K1-7	FROM E2 +28V
K1-8	NO CONNECTION

Figure 5-72. Overvoltage Protection PCB (3A2A3A1), Component Location

3A2A4 TURRET ASSEMBLY MFR 58189 666230-063

CALL OUT	REF DES	CALL OUT	REF DES	CALL OUT	REF DES
1	MP48, MP49, MP50 (P/O MP24)	30	T3	59	MP8
2	MP51, MP52, MP53 (P/O MP24)	31	T13	60	MP5
3	MP54, MP55, MP56 (P/O MP24)	32	T4	61	MP2, 3, 4
4	MP57, MP58, MP59 (P/O MP24)	33	T14	62	MP6
5	MP45 (P/O MP24)	34	T5	63	FL20
6	MP46 (P/O MP24)	35	T15	64	NO REF DES
7	FL1	36	T6	65	MP10
8	FL11	37	T16	66	A1B1
9	FL2	38	T7	67	A1MP4
10	FL12	39	T17	68	A1MP6
11	FL3	40	T8	69	A1MP2
12	FL13	41	T18	70	A1MP5
13	FL4	42	T9	71	A1MP3
14	FL14	43	T19	72	A1MP1
15	FL5	44	T10	73	MP47
16	FL15	45	MP27	74	MP25
17	FL6	46	MP28	75	MP60
18	FL16	47	MP11	76	MP44
19	FL7	48	MP12	77	R20
20	FL17	49	MP1	78	S2
21	FL8	50	MP7	79	H1 - H4
22	FL18	51	MP13	80	MP29 - MP32
23	FL9	52	MP14-MP19	81	MP40 - MP43
24	FL19	53	MP61	82	MP33 - MP39
25	FL10	54	MP20	83	A1H5 - H8
26	T1	55	MP21	84	A1MP7
27	T11	56	MP22	85	A1MP8
28	T2	57	MP23	86	A1H1 - A1H4
29	T12	58	MP9		

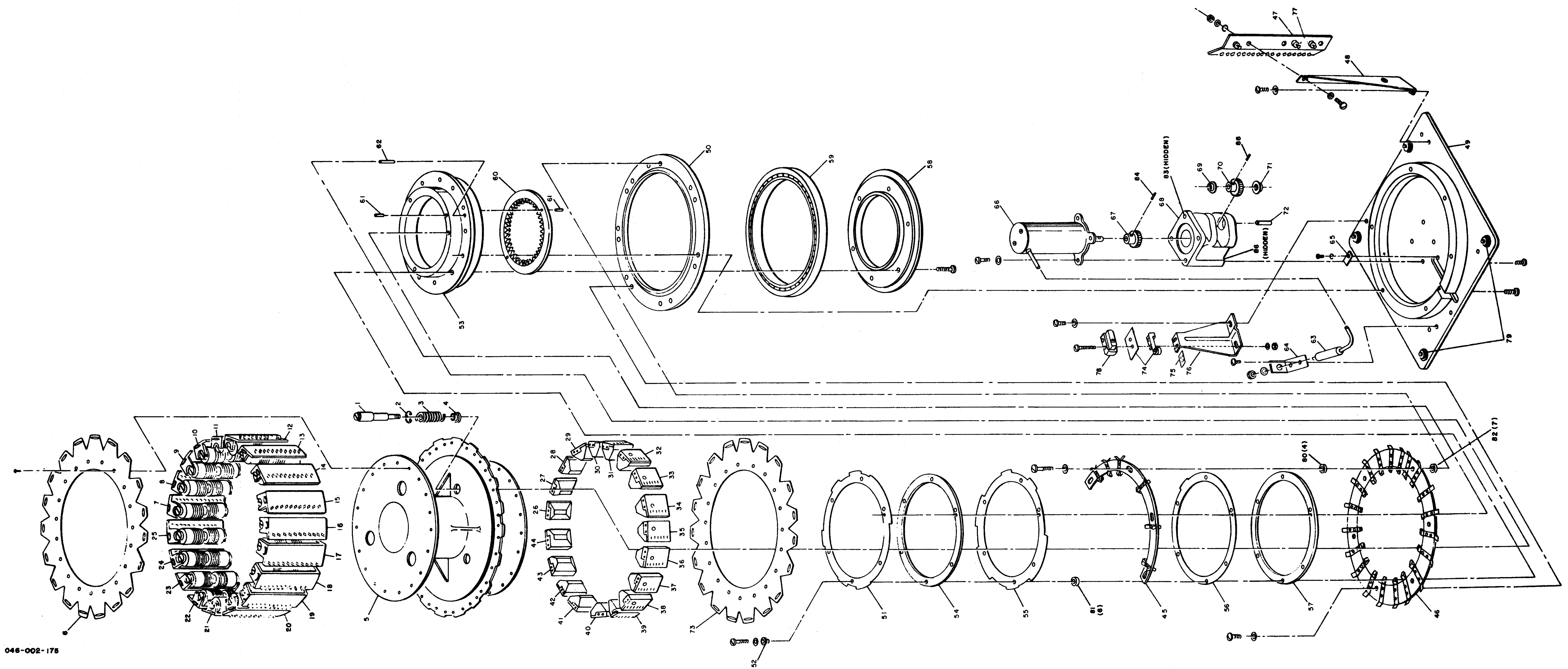


Figure 5-73. Turret Assembly 3A2A4, Exploded View

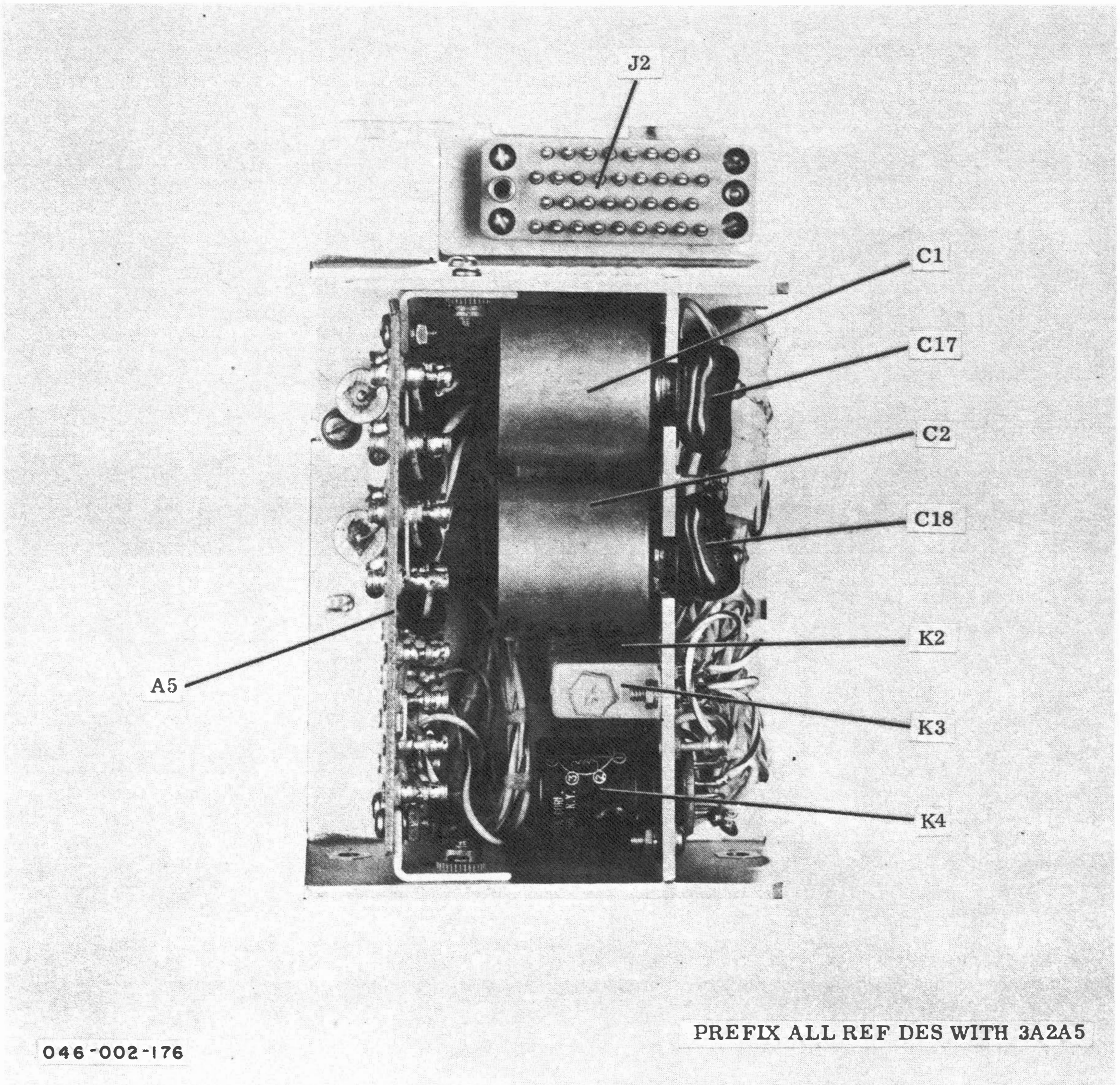


Figure 5-74. DC-to-DC Converter Assembly 3A2A5
Front View, Component Location

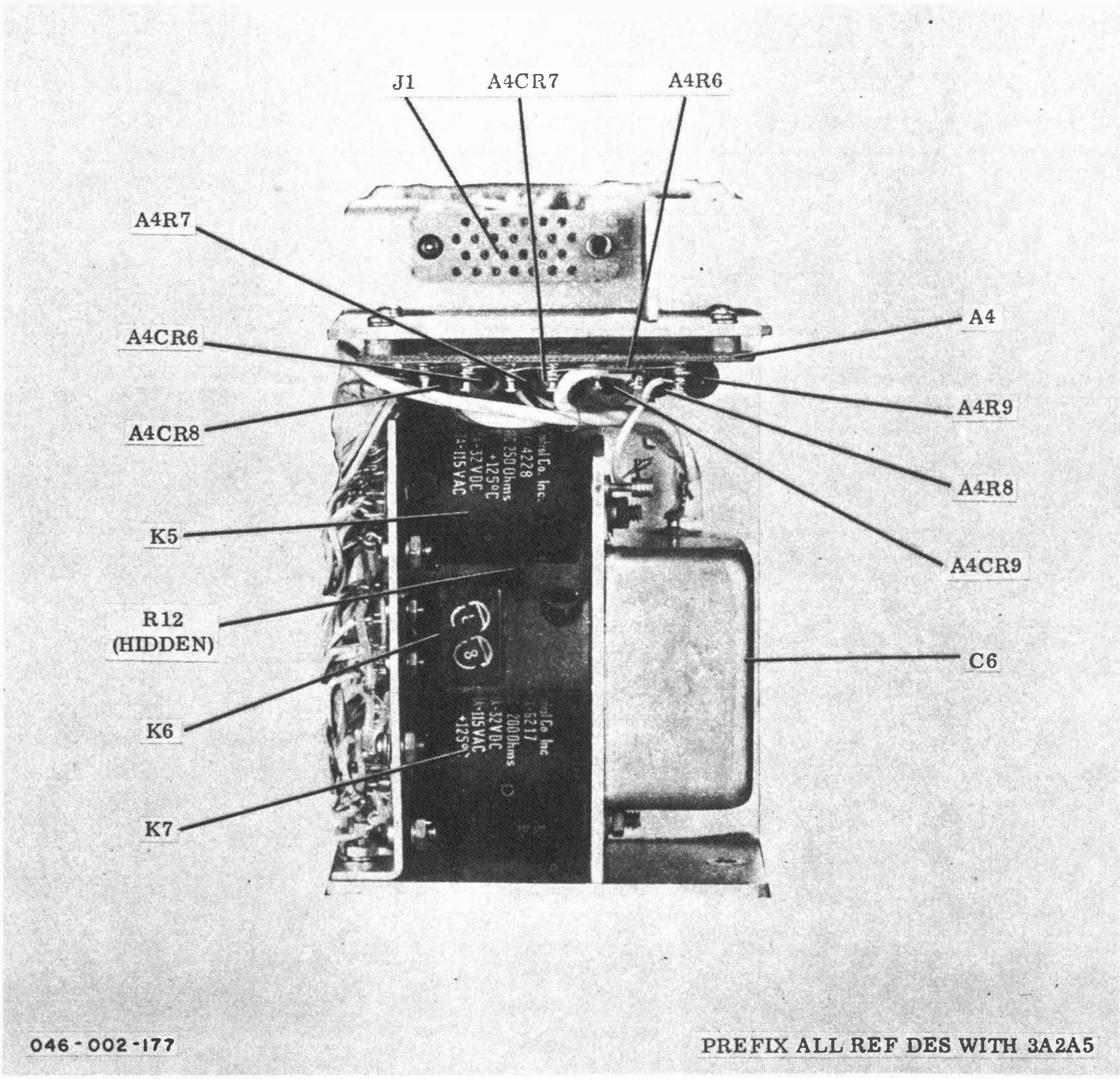


Figure 5-75. DC-to-DC Converter Assembly 3A2A5
Rear View, Component Location

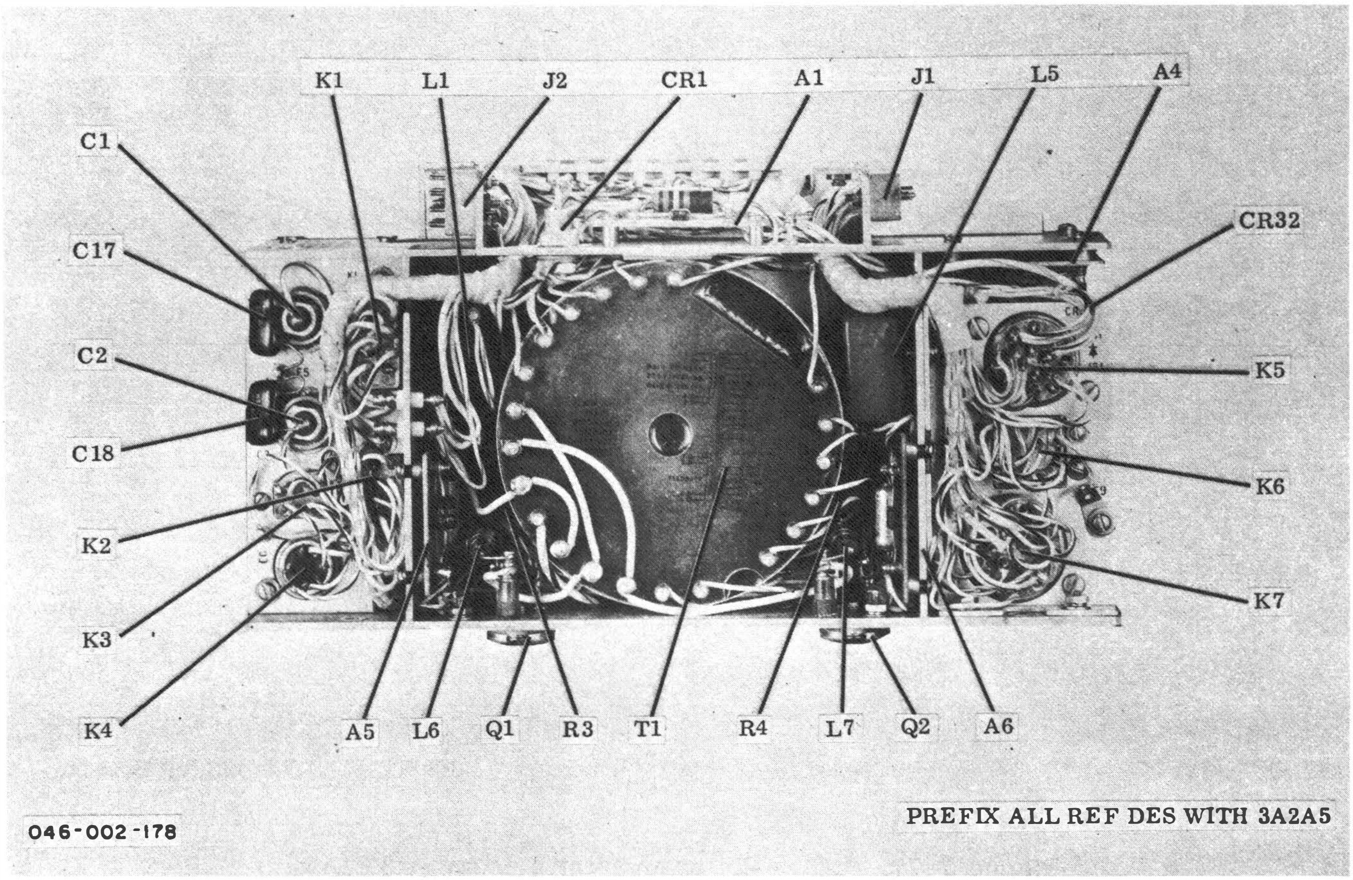


Figure 5-76. DC-to-DC Converter Assembly 3A2A5
Right View, Component Location

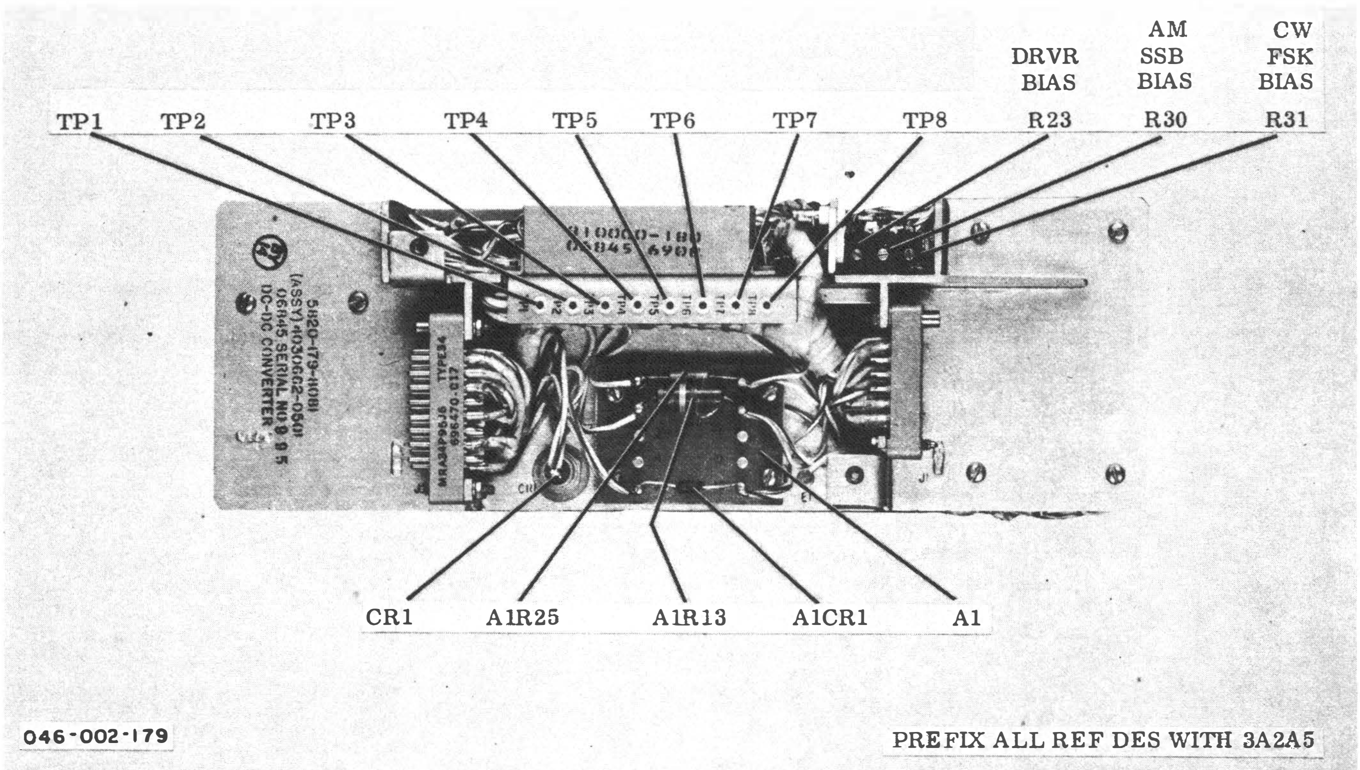


Figure 5-77. DC-to-DC Converter Assembly 3A2A5
Top View, Component Location

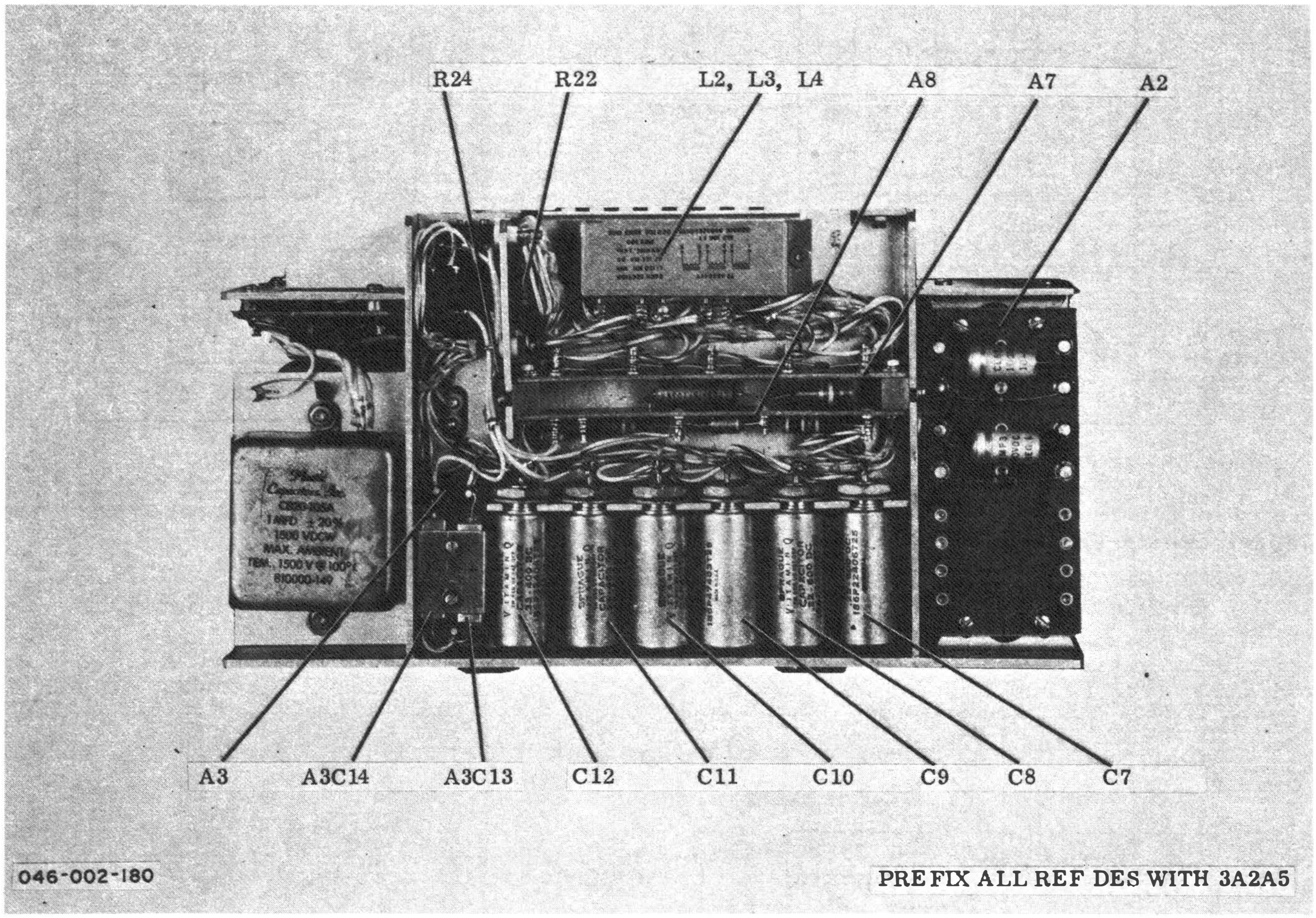


Figure 5-78. DC-to-DC Converter Assembly 3A2A5
Left View, Component Location

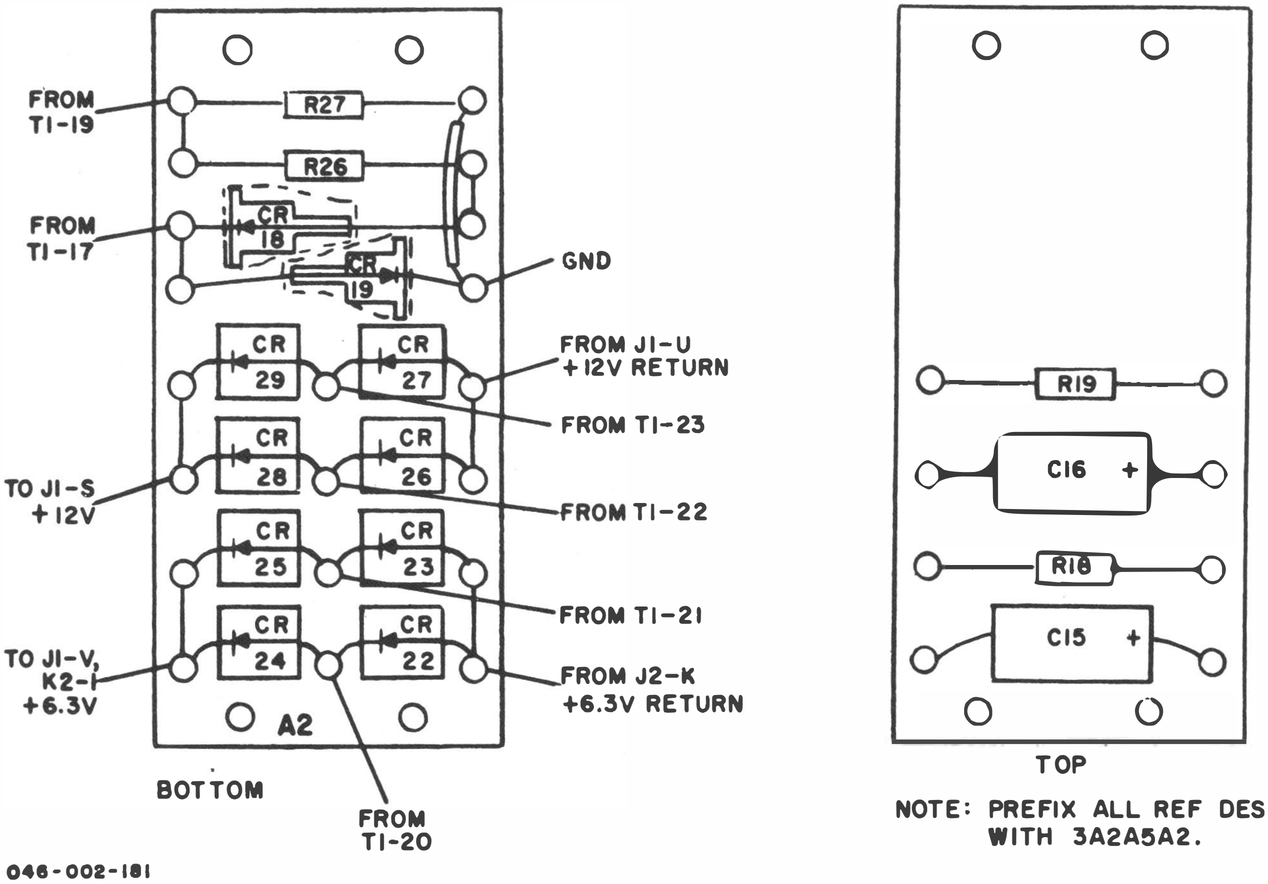


Figure 5-79. DC-to-DC Converter Board (3A2A5A2), Component Location

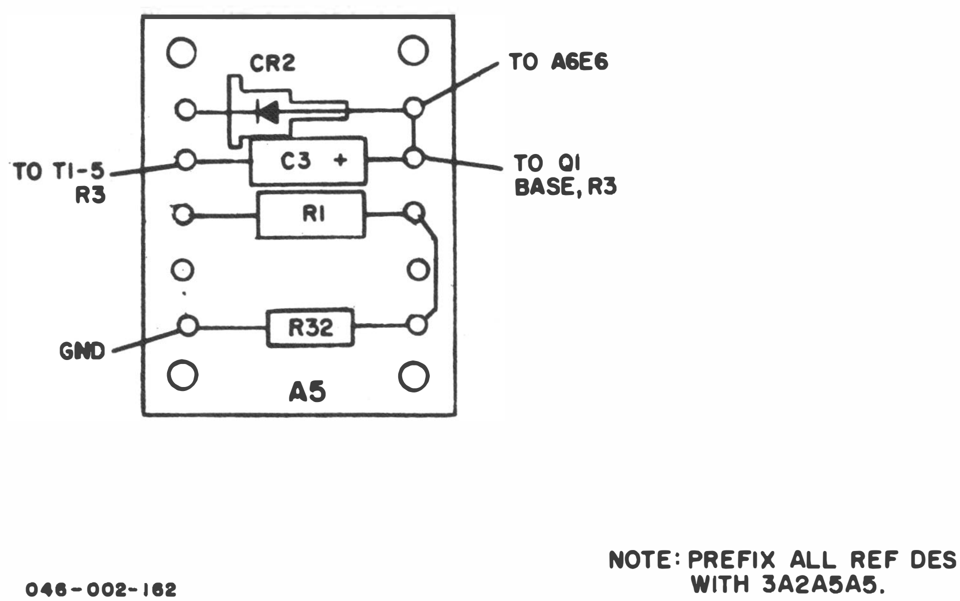


Figure 5-80. DC-to-DC Converter Board (3A2A5A5), Component Location

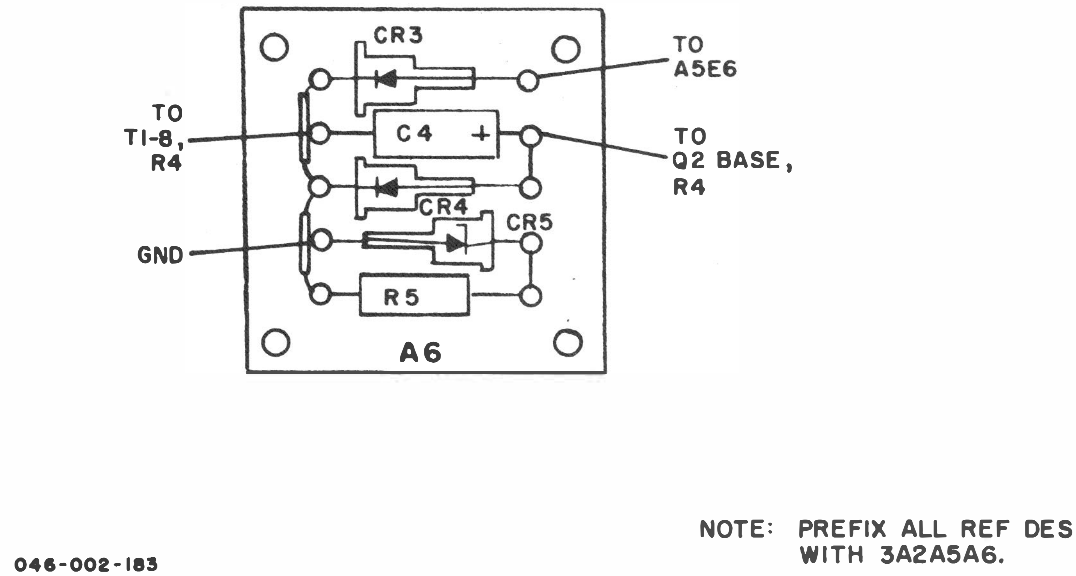


Figure 5-81. DC-to-DC Converter Board (3A2A5A6), Component Location

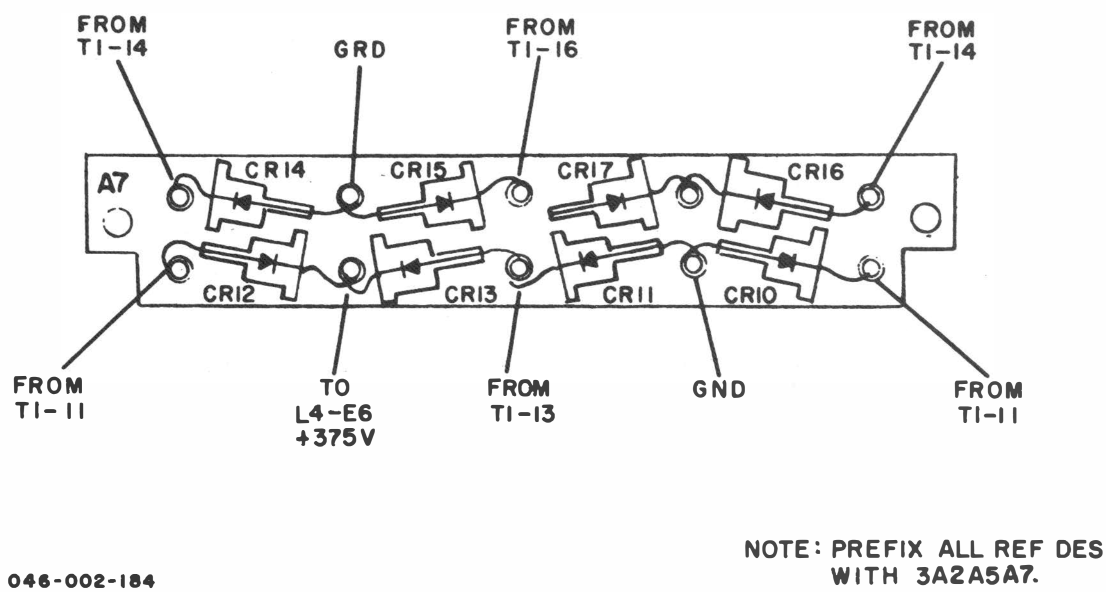


Figure 5-82. DC-to-DC Converter Board (3A2A5A7), Component Location

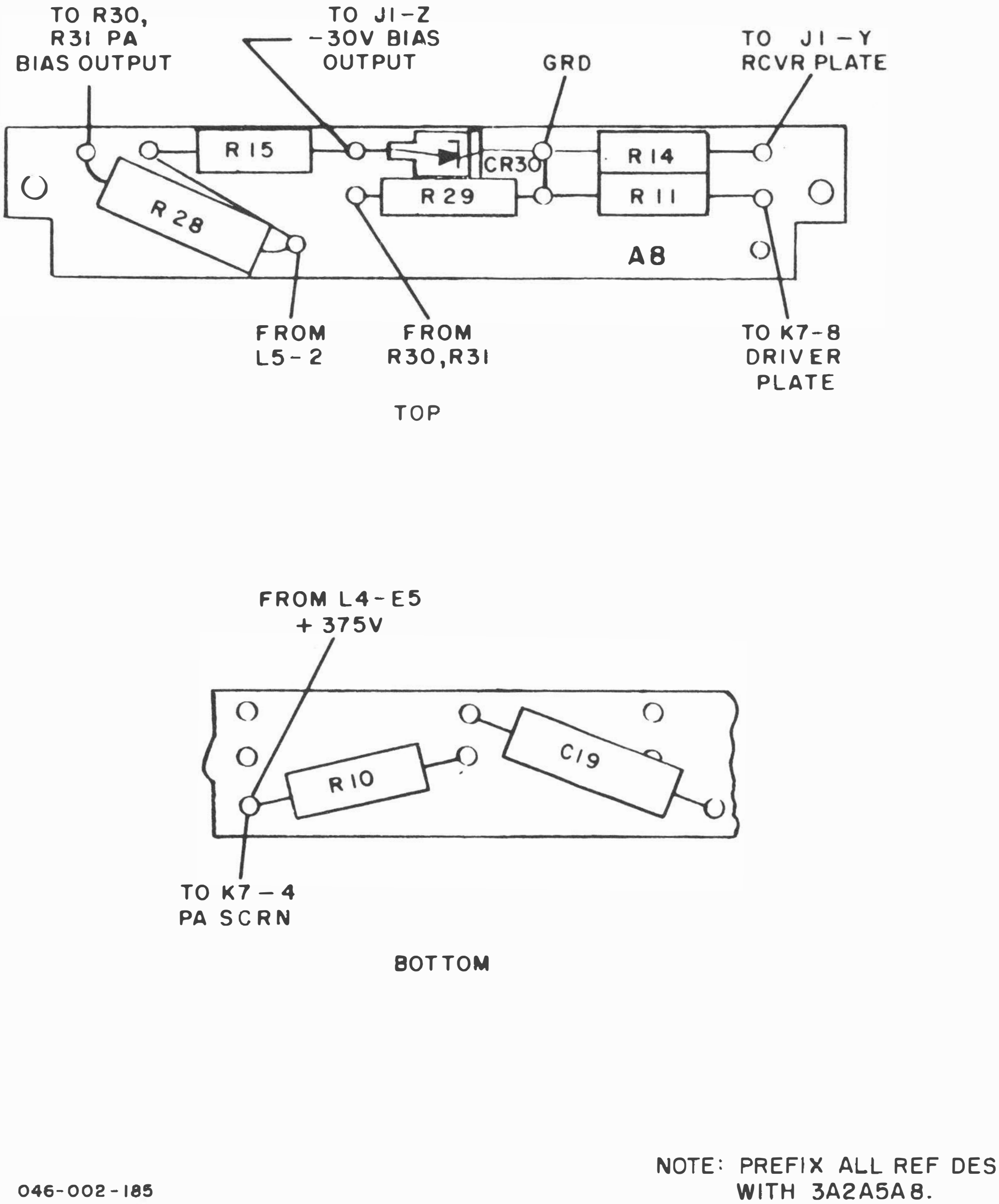


Figure 5-83. DC-to-DC Converter Board (3A2A5A8), Component Location

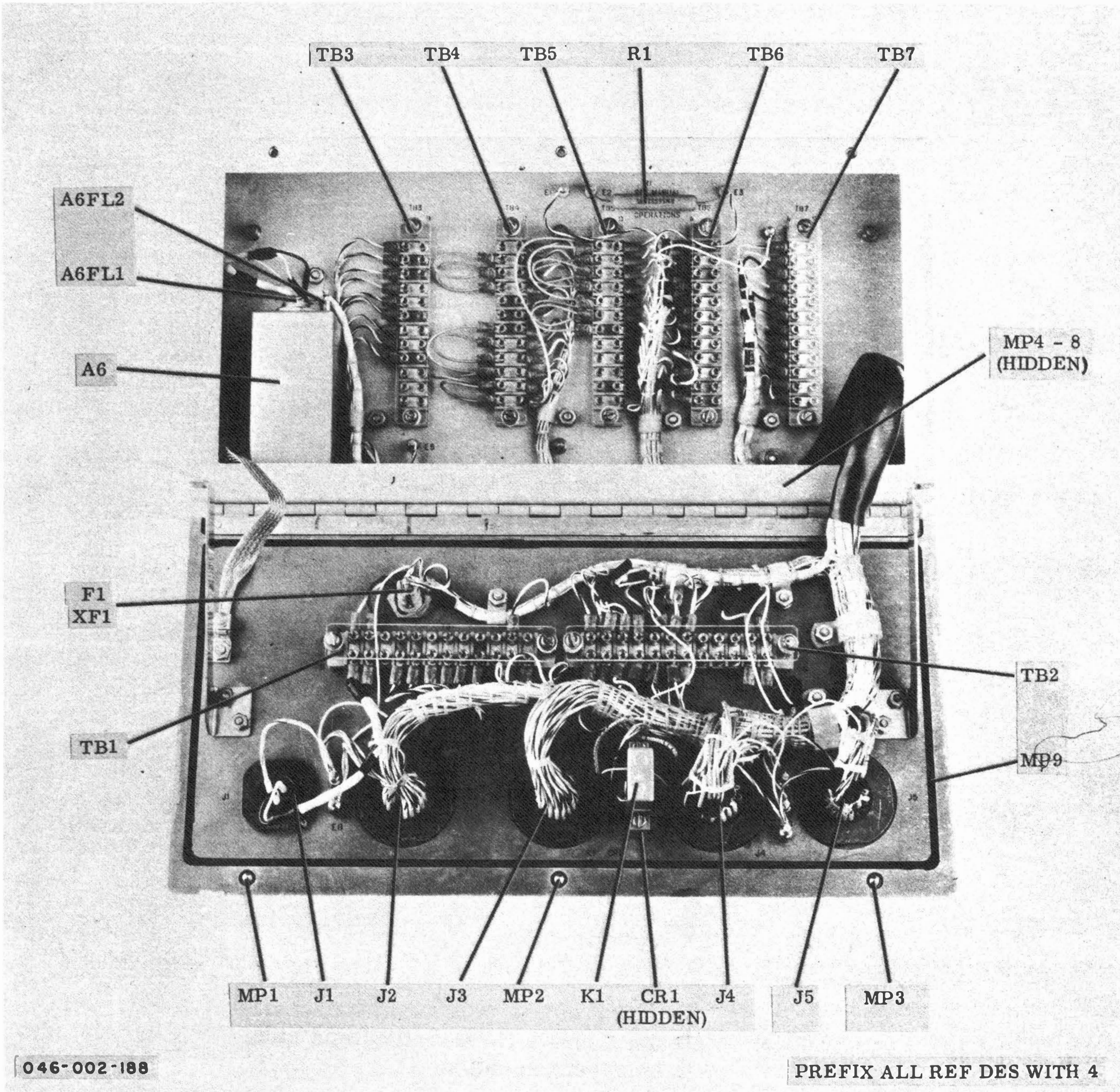


Figure 5-84. Interconnection Box J-1265/U, Cover Open, Component Location

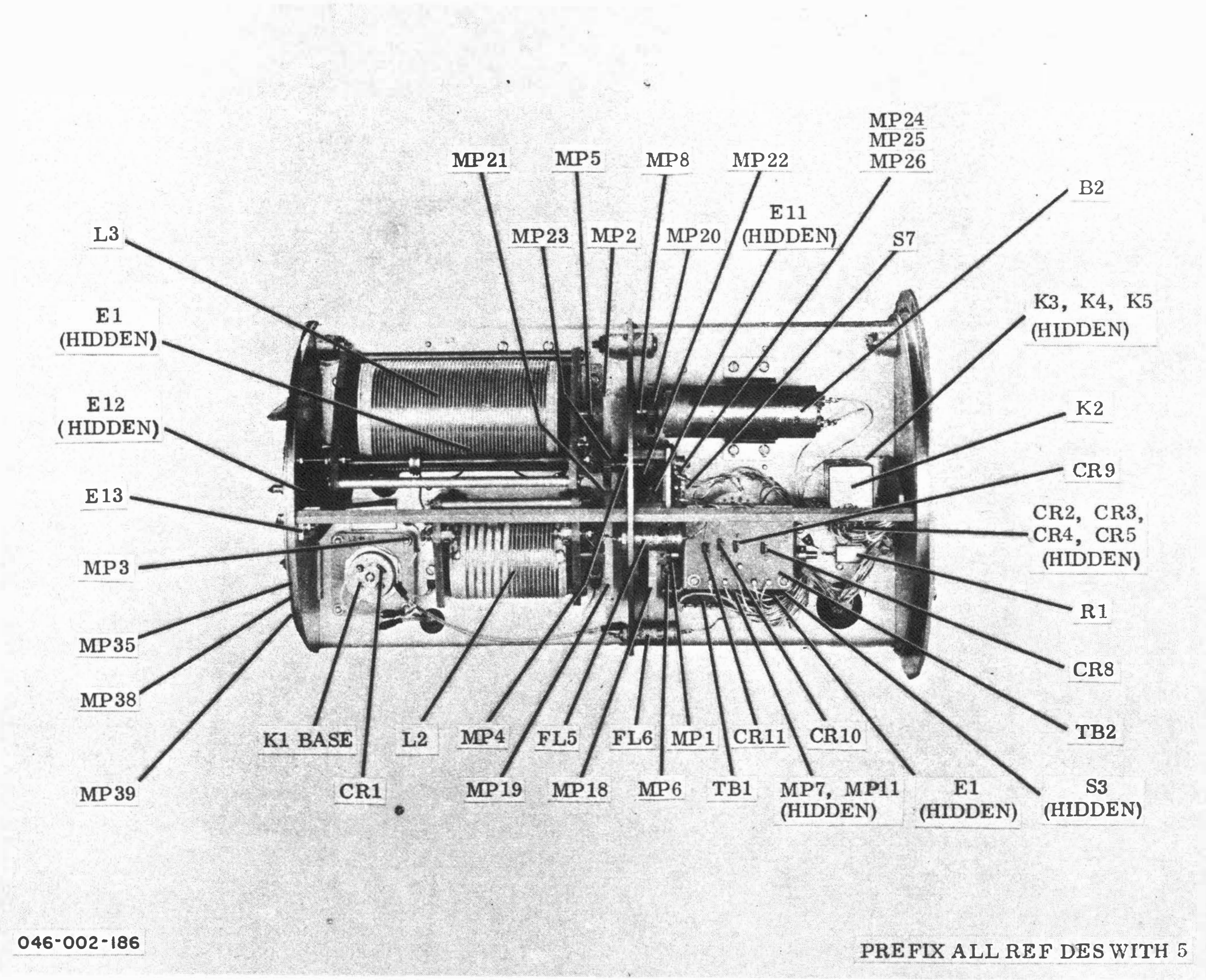


Figure 5-85. Antenna Coupler CU-937/UR Right Side, Component Location

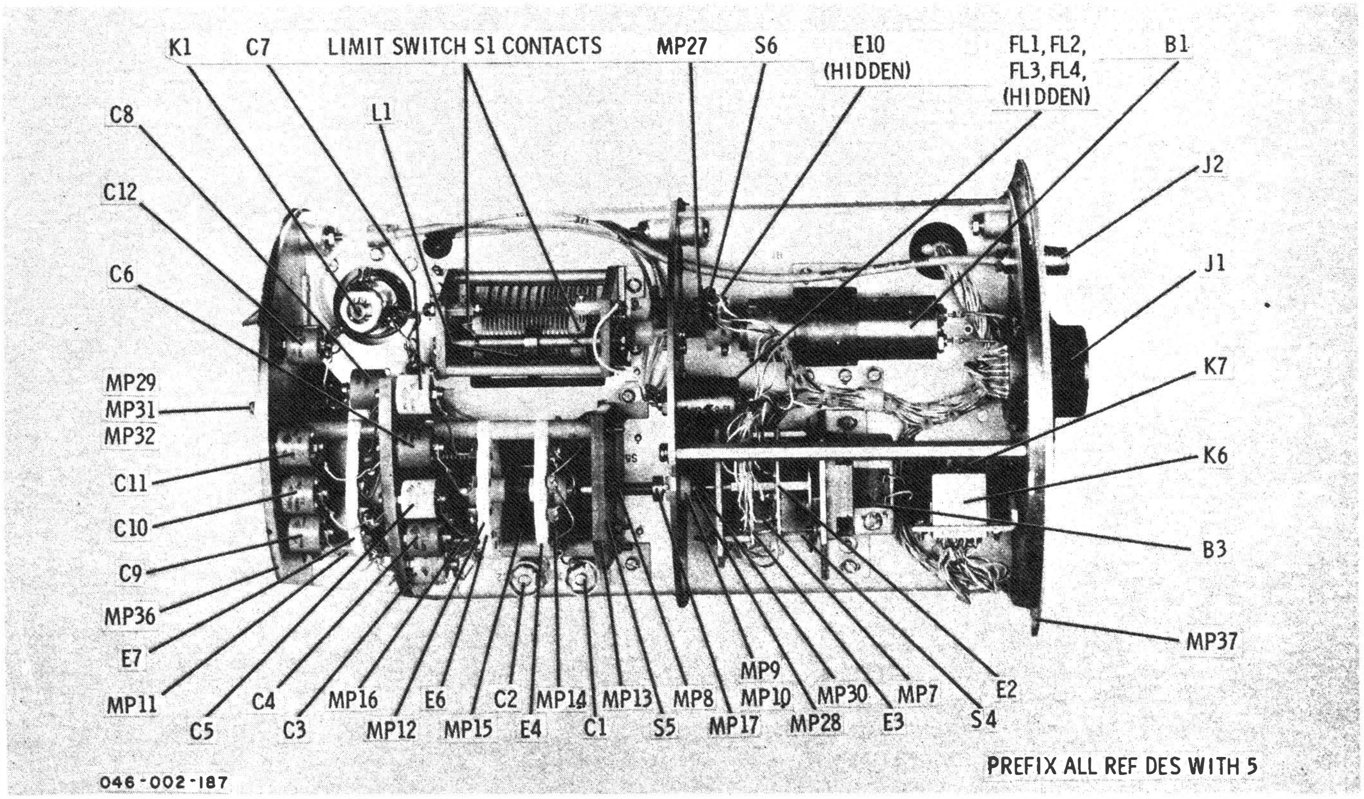


Figure 5-86. Antenna Coupler CU-937/UR Left Side, Component Location

SECTION 6
PARTS LIST

6-1. INTRODUCTION.

6-2. REFERENCE DESIGNATIONS. The unit numbering method of assigning reference designations has been used to identify units, assemblies, subassemblies, and parts. This method has been expanded as much as necessary to adequately cover the various degrees of subdivision of the equipment. Examples of this unit numbering method and typical expansions of the same are illustrated by the following:

Example 1:

1 R 1

Unit No. | Class of Item | Item No. within Class

Read as: First (1) resistor (R) of first unit (1).

Example 2:

4 A1 R1

Unit No. | Subassembly designation | Class and No. of Item

Read as: First (1) resistor (R) of first (1) subassembly (A) of fourth (4) unit.

Example 3:

3 A1 A2 R1

Unit No | Subassembly designation | Subassembly designation | Class and No. of Item

Read as: First (1) resistor (R) of second (2) subassembly (A) of first (1) subassembly (A) of third (3) unit.

6-3. REFERENCE DESIGNATION PREFIX. Partial reference designations are used on the equipment and illustrations. The partial reference designations consist of the class letter(s) and the identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Prefixes are provided on illustration notes.

6-4. LIST OF UNITS AND ASSEMBLIES.

6-5. Table 6-1 is a listing of the units comprising the system. The units are listed by unit numbers in numerical order. Thus when the complete reference designation of a part is known, this table will furnish the identification of the unit in which the part is located, since the first number of a complete reference designation identifies the unit.

NOTE

Unit 1 in Radio Set AN/WRC-1B is Radio Receiver R-1051B/URR. For the receiver parts list refer to NAVSHIPS 0967-427-4010.

6-6. MAINTENANCE PARTS LIST.

6-7. Table 6-2 lists all assemblies and required parts. The assemblies are listed in numerical sequence. Maintenance parts for each assembly are listed alphabetically-numerically by class of part following the unit designation. Thus the parts for each assembly are grouped together. Table 6-2 provides the following information: (1) the complete reference designation each unit, assembly, subassembly, or part, (2) reference to explanatory notes in paragraph 6-13, (3) noun name and brief description, and (4) identification of the illustration which pictorially locates the parts.

6-8. Printed circuit boards, assembly boards modules, etc., are listed first as individual items in the maintenance parts list. In addition, at the completion of a parts listing for each assembly the individual circuit board, assembly board, module, etc. is then broken down by components into separate parts listings. When there is a redundancy of such electronic assemblies, reference is made to the parts breakdown previously listed.

6-9. LIST OF MANUFACTURERS.

6-10. Table 6-3 lists the manufacturer of parts used in the equipment. The table includes the manufacturer's code used in table 6-2 to identify the manufacturers.

6-11. STOCK NUMBER IDENTIFICATION.

6-12. Allowance Parts List (APL) issued by the Electronics Supply Office (ESO) include Federal Stock Numbers and Source Maintenance and Recoverability Codes. Therefore, reference should be made to the APL prepared for the equipment for stock numbering information.

6-13. NOTES.

6-14. Parts variation within each article are identified by a Letter Symbol in the Notes Column of table 6-2. The absence of a Letter Symbol in the Notes Column indicates that the part is used on all articles covered by this manual.

Note 1 - selected value at assembly.

TABLE 6-1. LIST OF ASSEMBLIES

UNIT AND ASSEMBLY NO.	QTY	NAME	IDENTIFYING FIGURE	PARTS PAGE
2	1	Radio Transmitter	1-2	6-4
2A1	1	Case	5-37, -38	6-4
2A1A1	1	Filter Box	5-37, -38	6-4
2A2	1	Main Frame	5-35, -36, -39, -40	6-5
2A2A1	1	Mode Selector	5-34, -41 thru -46	6-9
2A2A2	1	IF./Audio Amplifier	5-34, -47, -48	6-13
2A2A3	1	IF./Audio Amplifier	5-34	6-14
2A2A4	1	RF Amplifier	5-34	6-15
2A2A5	1	Frequency Standard	5-34	6-15
2A2A6	1	Translator/ Synthesizer	5-34	6-15
2A2A7	1	Code Generator	5-36, -49	6-15
2A2A8	1	Power Supply	5-36, -50	6-16

TABLE 6-1. LIST OF ASSEMBLIES (Cont)

UNIT AND ASSEMBLY NO.	QTY	NAME	IDENTIFYING FIGURE	PARTS PAGE
2A2A9	1	FSK Tone Generator	5-34, -51, -52	6-17
2A2A10	1	Meter Amplifier	5-34, -53	6-18
2A2A11	1	Meter Amplifier	5-34	6-18
2A2A12	1	IF. Amplifier	5-34, -54, -55	6-19
2A2A13	1	Panel Lamp Assembly	5-40	6-20
2A2A14	1	Filter Box, Handset	5-34, -56	6-20
2A2A15	1	IF. Filter	5-36, -57	6-20
2A2A16	1	Power Supply	5-34, -58	6-20
3	1	Radio Frequency Amplifier	1-2	6-21
3A1	1	Case	5-61	6-21
3A1A1	1	Filter Box	5-61, -62	6-21
3A1A2	1	Filter Box	5-61, -62	6-22
3A1A3	1	Filter Box	5-61, -62	6-22
3A2	1	Main Frame	5-59, -60	6-22
3A2A1	1	Front Panel	5-63, -64	6-23
3A2A2	1	Directional Coupler	5-59, -65, -67 thru -70	6-26
3A2A3	1	Power Supply	5-59, -71, -72	6-28
3A2A4	1	Turret	5-59, -73	6-28
3A2A5	1	Converter	5-59, -74 thru -83	6-31
4	1	Interconnection Box	1-1, 5-84	6-35
4A6	1	Filter Box	5-84	6-35
5	1	Antenna Coupler	1-1, 5-85, -86	6-36
6	1	Handset and Cable	1-1	6-39
7	1	Interconnecting Cables	1-1	6-39
8	1	Extender Cables		6-40

TABLE 6-2. MAINTENANCE PARTS LIST

TRANSMITTER, RADIO T-827B/URT

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2		TRANSMITTER, RADIO T-827B/URT: Mfr 06845, pn 2058953-0501.	1-2

CASE ASSEMBLY, TRANSMITTER

2A1		CASE ASSEMBLY, TRANSMITTER: Mfr 06845, pn 666230-034 or 4030685-0501.	5-37
2A1H1-H6		INSERT: Mfr 06845, pn 540725-131.	5-37
2A1J1-J22		Not used	
2A1J23-J24		CONNECTOR, RECEPTACLE, ELECTRICAL: 0.500 in. dia, 1.16 in. lg, mfr 91737, pn 15519.	5-38
2A1J25		CONNECTOR, RECEPTACLE, ELECTRICAL: 0.550 in. dia, 1.625 in. lg, mfr 95712, pn 33417 .	
2A1MP1		CAP, CONNECTOR: MIL type CW123A/U.	
2A1MP2		CAP, CONNECTOR: MIL type MX913/U.	5-38
2A1MP3-MP6		BRACKET, SLIDE: Mounting brackets for left and right hand slide assemblies, mfr 06845, pn 4030961-0501.	5-37
2A1MP7		Not used	
2A1MP8		SLIDE, RIGHT HAND: (complete - includes case and chassis assembly) mfr 05236 or 83508, 06845, dwg 4030800-0702.	
2A1MP9		SLIDE, LEFT HAND: (complete - includes case and chassis assembly) mfr 05236 or 83508, 06845, dwg 4030800-0701.	
2A1P1		CONNECTOR, RECEPTACLE, ELECTRICAL: 2.635 in. w, 0.633 in. thk, mfr 91146, pn DDSMF50S.	
2A1P2		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.541 in. w, 0.494 in. h, 0.634 in. thk, mfr 91146, pn DAMF3W3SC31. P/o case cable harness, mates with 2A2J22.	
2A1P2A1-A3		CONNECTOR, PLUG, ELECTRICAL: Coaxial, rt angle, mfr 91146, pn DM53743-5053.	5-37

FILTER BOX ASSEMBLY

2A1A1		FILTER BOX ASSEMBLY: Mfr 06845, pn 4030717-0501.	5-37
2A1A1C1-C50		CAPACITOR: MIL type CK70AW102M.	5-37
2A1A1J1-J2		Not used	
2A1A1J3		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.375 in. dia, 0.968 in. thk, mfr 77820, pn 71-74116-5P. Auxiliary 115 Vac receptacle.	5-38
2A1A1J4		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.939 in. × 1.938 in. ×1.105 in., mfr 77820, pn PT07A22-55P, receptacle for T-827B/URT control cable.	
2A1A1J5-J6		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.000 in. dia, 0.968 in. thk, mfr 77820, pn 71-74111-4P. Auxiliary 600 ohm audio input receptacles.	
2A1A1J7		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.250 in. dia, 0.986 in. thk, mfr 77820, pn 71-74114-2P, local tty input receptacle.	5-38

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

CHASSIS AND FRONT PANEL ASSEMBLY, T-827B/URT

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2		CHASSIS AND FRONT PANEL ASSEMBLY, T-827B/URT: Mfr 06845, pn 2058951-0501.	5-35
2A2C1		CAPACITOR: MIL type CE31C900J. Filter for 110 volts dc supply.	5-36
2A2C2		CAPACITOR, FIXED, MYLAR: 0.01 μF ±20%, 200 Vdc, 0.625 in. lg, 0.240 in. w, 0.170 in. thk, mfr 02777, 06845, dwg 4030795-0701.	
2A2C3-C5		CAPACITOR, FIXED: 0.1 μF ±20%, 200 Vdc 0.625 in. lg × 0.240 in. w × 0.170 in. thk, mfr 02777, 06845, dwg 4030795-0703.	
2A2CR1-CR6		SEMICONDCUTOR DEVICE, DIODE: MIL type 1N649.	5-36
2A2CR7		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4245.	5-40
2A2CR8		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N2976B.	5-36
2A2CR9		Same as 2A2CR1.	
2A2CR10		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4971.	
2A2E1-E2		TERMINAL: 0.25 in. dia, 0.60 in. lg, mfr 71279, type 2380-1.	
2A2E3-E4		TERMINAL: 0.25 in. dia, 0.719 in. lg, mfr 06779, pn 766.	
2A2E5		TERMINAL: 0.25 in. dia, 0.66in. lg, mfr 71279, pn 2381-1-05.	
2A2E6-E7		Same as 2A2E3.	
2A2E8		Same as 2A2E5.	
2A2E9-E12		Not used	
2A2E13-E20		Same as 2A2E3.	
2A2E21		Same as 2A2E1.	
2A2E22-E25		Same as 2A2E3.	
2A2E26		Same as 2A2E1.	
2A2E27-E30		Same as 2A2E5.	
2A2E31		Same as 2A2E3.	
2A2E32		Not used	
2A2E33		Same as 2A2E1.	
2A2E34		Same as 2A2E5.	
2A2E35-E36		Same as 2A2E3.	
2A2E37		Same as 2A2E5.	
2A2E38-E44		Not used	
2A2E45-E46		Same as 2A2E3.	
2A2E47		Not used	
2A2E48-E49		Same as 2A2E3.	5-36
2A2F1-F2		FUSE: 3/4 amps, slow blow, MIL type FO2B250V3-4AS	5-35
2A2H1-H20		NUT, CAPTIVE: Floating type, size 10-32, mfr 86455, pn LAC032-2.	5-35
2A2H21-H25		SCREW, CAPTIVE: Mfr 06845, pn 4030574-0001.	5-39
2A2H26		SCREW, PANEL: Mfr 06845, pn 666231-671.	5-39
2A2H27-H32		NUT, CAPTIVE: Mfr 06845, pn 666164-259.	5-40
2A2J1		CONNECTOR: MIL type MS3102R14S5S, handset receptacle.	5-39
2A2J2		JACK, TELEPHONE: MIL type JJ033.	5-39
2A2J3-J7		Not used	
2A2J8		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.583 in. lg, 0.494 in. w, 0.426 in thk, mfr 91146, pn DBSM25S.	5-36
2A2J9		CONNECTOR, RECEPTACLE, ELECTRICAL:2.729 in. lg, 0.494 in. w, 13 cont, ASB filled, mfr 91146, pn DCM13W6S1C31.	5-35
2A2J9A1-A6		CONNECTOR, PLUG, ELECTRICAL: Coaxial, rt angle, mfr 91146, pn DM53743-5054.	
2A2J10		CONNECTOR, RECEPTACLE, ELECTRICAL: 15 cont, 5 amps 1.541 in. lg, 0.494 in., 0.429 in., mfr 91146, pn DASM15S2.	
2A2J11		CONNECTOR, RECEPTACLE, ELECTRICAL: 17 cont, ASB filled, 2.789 in. lg, 0.494 in. w, mfr 91146, pn DCM17N5S1C31.	
2A2J11A1-A2		Same as 2A2J9A1.	
2A2J11A3		Not used	5-35

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

CHASSIS AND FRONT PANEL ASSEMBLY, T-827B/URT (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2J11A4-A5		Same as 2A2J9A1.	5-35
2A2J12		CONNECTOR, RECEPTACLE, ELECTRICAL: 25 cont, ASB filled, mfr 91146, pn DCM25W3S1C31.	
2A2J12A1-A3		Same as 2A2J9A1.	
2A2J13-J14		CONNECTOR, RECEPTACLE, ELECTRICAL: 3 cont, ASB filled, 1.541 in. × 0.494 in. × 0.422 in., mfr 91146, pn DAM3W3S2C31.	
2A2J13A1-J14A1		Not used	
2A2J13A2-A3, J14A2-A3		Same as 2A2J9A1	
2A2J15		CONNECTOR, RECEPTACLE, ELECTRICAL: 13 cont, ASB filled, 2.088 in. lg, 0.494 in. w, mfr 91146, pn DBM13W3S2C31.	
2A2J16		CONNECTOR, RECEPTACLE, ELECTRICAL: 11 cont, ASB filled, 1.541 in. lg, 0.494 in. w, mfr 91146, pn DAM11W1S2C31.	
2A2J17		Same as 2A2J12.	
2A2J18-J19		CONNECTOR, RECEPTACLE, ELECTRICAL: 25 cont, 5 amp, 2.088 in. × 0.494 in. × 0.429 in., mfr 91146, pnDBSM25S2.	
2A2J20		CONNECTOR, RECEPTACLE, ELECTRICAL: 9 cont, 5 amp, 1.213 in. × 0.494 in. × 0.429 in., mfr 91146, pnDESM9S2.	5-35
2A2J21		CONNECTOR, RECEPTACLE, ELECTRICAL: 50 cont, 5 amp, 2.635 in. × 0.605 in. × 0.426 in., mfr 91146, pn DDSM50P.	5-36
2A2J22		CONNECTOR, RECEPTACLE, ELECTRICAL: 3 cont, ASB filled, 1.541 in. lg, 0.494 in. w, mfr 91146, pn DAM3W3PC31.	5-36
2A2J22A1-A3		Same as 2A2J9A1.	
2A2K1-K2		RELAY, ARMATURE: 2 form C/DPDT, 3 amp at 28 Vdc, 0.5 amp at 115 Vac, 975 ohms dc ±10% at 25 deg C, 26.5 Vdc ±5%, 1.330 in. lg, 0.396 in. 2, 0.875 in. h, mfr 02289. pn 2B2111. K1-tune relay, K2 MI-LO filter relay.	
2A2K3		RELAY, ARMATURE: 1.375 in. lg, 0.968 in. w, 1.625 in. h, 600 ohms ±10%, 26.5V, 4PDT, mfr 29238, 06845, dwg 4030500-0701, transmit/receiver relay.	
2A2K4		RELAY, ARMATURE: 0.890 in. lg, 0.890 in. w, 1.140 in. h, 500 ohms ±10%, 12 volts, DPDT, mfr 29238, 06845, dwg 4030500-0702, push-to-talk relay.	
2A2K5		RELAY, ARMATURE: 1.450 in. lg, 0.445 in. w, 0.275 in. h, 500 ohms, 7.0 mAdc, mfr 02289, pn 2BC1971, cw mold relay.	
2A2K6		Same as 2A2K1. Ground pulse relay.	5-36
2A2L1		REACTOR: 4.500 in. × 2.625 in. × 1.688 in., 2 terminals 175 Vdc, mfr 70674, pn A14514, +100 Vdc filter.	5-35
2A2L2		REACTOR: 4.125 in. lg, 2.500 in. w, 1.500 in. h, range 96 Hz to 900 Hz, 1.4 amp dc, 140 volts, mfr 93928, pn 16300, +28 Vdc filter.	5-35
2A2M1-M2		METER, AUDIO LEVEL: Case style 05, 3900 ohms, 1000 Vrms mfr 81030, pn 3201-210.	5-39
2A2M3		METER: Elapsed Time Indicator for T-827B/URT with field change 1 - AN/WRC-1B installed.	
2A2MP1-MP5		KNOB ASSEMBLY: Mfr 06845, pn 2058802-0501.	5-39
2A2MP6-MP7		DIAL, MC: Mfr 06845, pn 4013395-0501.	5-36
2A2MP8		SPROCKET ASSEMBLY: Triple, complete with all parts, mfr 06845, pn 4030590-0501.	5-36
2A2MP8A		CHASSIS SPIDER: W/o gears and hardware, mfr 06845, pn 666162-134.	
2A2MP8B-8G		BEARING, SLEEVE: Mfr 06845, pn 2031154-0001.	
2A2MP8H-8J		SPROCKET, DRIVE: Pitch dia 1.411, pitch 0.1475, 30 teeth, mfr 72625, 06845, dwg 666273-099 or 4030801-0701.	5-36
2A2MP8K-8M		DISK, COUPLING: 0.875 in. dia × 0.390 in. cres, mfr 06845, pn 666231-631 or 4030895-0001.	5-35
2A2MP8N-8P		SPRING, WASHER: 0.562 in. dia × 0.001 in. thk, mfr 73682, 06845, dwg 810000-506.	5-36

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

CHASSIS AND FRONT PANEL ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2MP8Q-8V		RING, RETAINING: MIL type MS16333-1819.	5-36
2A2MP8W-8X		SHAFT, COUPLING: 0.1874 in. dia, 1.062 in. lg, cres, mfr 06845, pn 666231-619 or 4030601-0501.	
2A2MP8Y		SHAFT, COUPLING: 0.1874 in. dia, 1.328 in. lg, cres. mfr 06845, pn 666231-617 or 4030598-0501.	
2A2MP8Z-8AB		RING, RETAINING: 0.472 in. OD, 0.382 in. ID, 0.025 in. thk mfr 77339, pn TRC820.	
2A2MP8AC-8AF		CLAMP, SPROCKET: 0.484 in. lg, 0.344 in. w, 0.187 in.thk mfr 06845, pn A09455-001 or 4030502-0001.	5-36
2A2MP8AG-8AI		PIN, DOWEL: 0.0618 in. dia × 0.5074 in. lg, cres, mfr 06845, pn 639670-007.	5-35
2A2MP9		SPROCKET ASSEMBLY, DUAL: With all parts mounted, mfr 06845, pn 666162-222 or 4030675-0501.	5-36
2A2MP9A		CHASSIS SPIDER, STAKED: Without gears and hardware, mfr 06845, pn 666163-116 or 4030872-0501.	5-36
2A2MP9B-9C		Same as 2A2MP8Y.	5-35
2A2MP9D-9E		SPROCKET, DRIVE: Pitch dia 1.411, pitch 1.463, 30 teeth mfr 72625, 06845, dwg 666162-066 or 4030777-0701.	5-36
2A2MP9F-9G		Same as 2A2MP8N.	
2A2MP9H-9K		Same as 2A2MP8B.	
2A2MP9L-9M		Same as 2A2MP8K.	
2A2MP9N-9O		BEARING, ROLLER NEEDLE: 1 11/32 in. OD, 3/16 in. ID, 1/4 in. lg, mfr 60380, pn B34.	
2A2MP9P-9Q		PIN, ROLLER: 0.1875 in. dia, 0.400 in. lg, cres, mfr 06845, pn 666163-114.	
2A2MP9R-9S		ARM, SPRING DETENT: 2.14 in. × 0.300 in. × 0.38 in., mfr 06845, pn 666163-199 or 4030879-0001.	
2A2MP9T-9U		Same as 2A2MP8AG.	
2A2MP9V-9W		WHEEL, INDEX: 1.24 in. dia, 10 lobes, cres, mfr 06845, pn 666163-115.	
2A2MP9X-9Y		Same as 2A2MP8Z.	
2A2MP9Z-9AC		SPACER: 0.48 in. lg, × 0.300 in. w × 0.062 in. thk, brass 1/2 hard, mfr 06845, pn 666163-806.	
2A2MP9AD-9AE		SCREW CAP, HEX SOCKET: 4-40 × 0.375 in. lg, mfr 06432, 06845, dwg 2031168-0702.	
2A2MP9AF-9AG		Same as 2A2MP8AG.	5-36
2A2MP10		BLOCK ADJUSTABLE IDLER ASSEMBLY LOW: With sprocket mfr 06845, pn 666162-094 or 4030550-0501.	
2A2MP10A		SHAFT, SPROCKET IDLER: 0.1875 in. dia, 0.64 in. lg, cres, mfr 06845, pn 666162-073 or 4030871-0001.	
2A2MP10B		SPROCKET, WHEEL: Pitch 0.1475, pitch dia 1.130, 24 teeth, mfr 72625, 06845, dwg 666162-092 or 4030779-0701.	
2A2MP10C		Same as 2A2MP9N.	
2A2MP11		Same as 2A2MP10.	
2A2MP11A		Same as 2A2MP10A.	
2A2MP11B		Same as 2A2MP10B.	
2A2MP11C		Same as 2A2MP9N.	
2A2MP12		BLOCK ADJUSTABLE IDLER ASSEMBLY HIGH: With sprocket, mfr 06845, pn 666162-095 or 4030550-0502.	
2A2MP12A		Same as 2A2MP10A.	
2A2MP12B		Same as 2A2MP10B.	
2A2MP12C		Same as 2A2MP9N.	
2A2MP13		CHAIN: 19.7650 in., 0.1475 pitch, 134 pitches with master link, mfr 72625, pn CAU4147CL00, dwg 666273-066, kc digit.	
2A2MP13A		MASTER LINK WITH KEEPER AND CLIP: Mfr 72625, pn CAU4147CL00.	
2A2MP14		CHAIN: 30.9750 in., 0.1475 pitch, 210 pitches with master link, mfr 72625, pn CAU4147CL00, 06845, dwg 666162-201, 10 kc digit.	5-36

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

CHASSIS AND FRONT PANEL ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2MP14A		Same as 2A2MP13A.	5-36
2A2MP15		CHAIN: 23,8950 in., 0.1475 pitch, 162 pitches with master link, mfr 72625, pn CAU4147CL00, 06845, dwg 666162-202, 100 kc digit.	
2A2MP15A		Same as 2A2MP13A.	
2A2MP16-MP17		SPRING, DETENT SUBASSEMBLY: Mc knobs, includes detent spring, mount spring, support plate, and mounting hardware, mfr 06845, pn 666230-191.	
2A2MP18-MP19		PIN, BEARING: 0.1562 in. dia, 0.40 in. lg, mfr 06845, pn 666230-187.	
2A2MP20-MP22		GEAR, MITER (PAIR): Diameteral pitch 64, pitch dia 500, 32 teeth, mfr 00141, pn N2-1.	
2A2MP23		SPROCKET, DRIVE: Pitch 0.1475, 30 teeth, dia 1.411, OD 1.463, mfr 72625, 06845, dwg 4030778-0701.	
2A2MP24-MP25		SPROCKET, DRIVE: Pitch 0.1475, 36 teeth, dia 1.692, OD 1.744, mfr 72625, 06845 dwg 4030780-0701.	
2A2MP26-MP27		Not used.	
2A2MP28-MP29		SHAFT, SUPPORT BRACKET, GEARS: 0.171 in. dia, 2.122 in. lg, mfr 06845, pn 4030873-0001.	
2A2MP30-MP32		Not used.	
2A2MP33-MP35		DIAL AND COLLAR ASSEMBLY: For kHz shafts, mfr 06845, pn 666162-227.	5-36
2A2MP36-MP39		PLATE STOP, SINGLE: For kHz and MHz knob, mfr 06845, pn 4013364-0001.	5-39
2A2MP40		PLATE STOP, DOUBLE: For 10 MHz knob, mfr 06845, pn 4013365-0001.	5-36
2A2MP41		BRACKET ASSEMBLY, SUPPORT: For kHz digit shafts and bevel gear drives, includes ball bearings mfr 06845, pn 4030935-0501.	5-36
2A2MP42		SPACER: For bracket 2A2MP41, mfr 06845, pn 4030866-0002.	5-36
2A2MP43		KNOB: For mode selector switch, MIL type MS91528-1B2B.	5-39
2A2MP44		KNOB: For local remote switch, MIL type MS91528-1K2B.	5-39
2A2MP45		KNOB: 100 CPS knob, mfr 06845, pn 4013369-0001.	5-39
2A2MP46-MP47		BEARING, ROLLER: For MHz detent assembly, mfr 60380, pn B2-1-2-4.	5-36
2A2MP48		HANDLE: Aluminum, for front panel, mfr 06845, pn 540542-019.	
2A2MP49-MP52		FERRULE: For handle 2A2MP48, mfr 06845, pn 540542-203.	5-36
2A2MP53		ACTUATOR, INTERLOCK SWITCH, MODIFIED: Mfr 06845, pn 666230-745.	5-35
2A2MP54		GASKET:Formed, valcanized, 13.75 in. dia, mfr 06845, pn 666162-105.	5-36
2A2MP55		MOUNTING KIT: For 2A2Q1, c/o:	5-36
		06845, pn 688003-021 Insulator washer (2 ea)	
		06845, pn 688003-006 Insulator washer (1 ea)	
		06845, pn 2074901-2329 Flat Washer (1 ea)	
		96906, pn MS35335-33 Lock washer 1/4 in. (1 ea)	
		06845, pn 2074176-3409 Hex nut 1/4-28 (1 ea)	
2A2Q1		TRANSISTOR: Case style A13, mfr 80131, pn 2N1209.	5-36
2A2R1		RESISTOR: MIL type RL42S133J.	
2A2R2		RESISTOR: Fixed, wirewound, 1.125 in. lg, × 0.646 in. × 0.317 in, 332 ohms ±3%, 5W, mfr 91637, pn RH5-33PORM3PCT	
2A2R3		RESISTOR: MIL type RW55V101.	5-36
2A2R4		RESISTOR: MIL type RC07GF821J.	5-36
2A2R5		RESISTOR: MIL type RE65G64R9.	5-40
2A2S1		SWITCH, ROTARY: 2 sect, 2 position, 2 amp, 28 Vdc, 1 amp at 110 Vac, 1.250 in. lg, mfr 76854, pn 5-42513-210.	
2A2S2		SWITCH, ROTARY: 4 sect, 9 positions, 2 amp at 28 Vdc, 1 amp at 110 Vac, 1.788 in. lg, mfr 76854, pn 5-48273-2-11.	

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

CHASSIS AND FRONT PANEL ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2S3-S4		Not used	
2A2S5		SWITCH, SECTION ROTARY: 1 1/4 in. dia × 7/8 in. w, consisting of rotary section and bracket, mfr 06845, pn 666230-791 or 4030969-0501.	5-40
2A2S6		SWITCH S/A: 2 1/2 in. lg × 1 1/4 in. w × 1 3/4 in h, consisting of rotary section, 100 cycle control, mfr 06845, pn 2058949-0501.	
2A2S7		SWITCH: MIL type MS35059-4.	
2A2S8		INTERLOCK SWITCH S/A: Mfr 58189, pn 666231-001.	5-40
2A2S9-S11		SWITCH: MIL type MS24656-231.	5-39
2A2T1		TRANSFORMER, POWER: 4.500 in. × 2.625 in. × 2.250 in., 48-450 Hz, 215 volts, mfr 28994, pn 3661.	5-38
2A2W1		COAX TYPE NO. 28 (double shield-miniature 50 ohms): Mfr 06090, pn Raychem pn 42-508.	5-36
2A2W2		COAX TYPE: RG196 (used in various assemblies).	5-36
2A2W3		SHIELDED PAIR TYPE B NO. 20: Mfr 06845, pn 620409-361.	5-40
2A2XF1-XF2		FUSEHOLDER: MIL type FHL17G.	5-39

TRANSMITTER MODE SELECTOR ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A1		TRANSMITTER MODE SELECTOR ASSEMBLY: Mfr 06845, pn 666230-047 or 4030687-0501.	5-34
2A2A1C1-C9		Not used	
2A2A1C10A		CAPACITOR, FIXED, MICA: 0.172 in. × 0.358 in. × 0.450 in. 142 pF ±2%, 300 Vdc, mfr 72136, DM15F1420G300V, use with filter coded yellow.	5-41
2A2A1C10B		CAPACITOR, FIXED, MICA: 0.460 in. × 0.370 in. × 0.190 in. 150 pF ±2%, mfr 72136, 06845, dwg 4030802, used with filter coded green.	
2A2A1C10C		CAPACITOR, FIXED, MICA: 0.460 in. × 0.370 in. × 0.180 in. 130 pF ±2%, mfr 72136, 06845, dwg 4030802-0711, use with filter coded orange.	
2A2A1C11A		Same as 2A2A1C10A.	
2A2A1C11B		Same as 2A2A1C10B.	
2A2A1C11C		Same as 2A2A1C10C.	
2A2A1C12-C20		Not used	
2A2A1C21A		Same as 2A2A1C10A.	
2A2A1C21B		Same as 2A2A1C10B.	
2A2A1C21C		Same as 2A2A1C10C.	
2A2A1C22-C52		Not used	
2A2A1C53A		Same as 2A2A1C10A.	
2A2A1C53B		Same as 2A2A1C10B.	
2A2A1C53C		Same as 2A2A1C10C.	
2A2A1E1-E2		TERMINAL, FEED THRU: Teflon, 0.531 in. lg, 0.172 in. dia, mfr 98291, pn FTSM2TURC2.	
2A2A1E3		TERMINAL, FEED THRU: Teflon, 0.500 in. lg, 0.172 in. dia, mfr 98291, pn FTSM1TURC4.	
2A2A1E4		TERMINAL, SUBMINIATURE STANDOFF: 0.350 in. lg, 0.172 in. dia, mfr 98291, pn STSM1TUR.	
2A2A1E5		Same as 2A2A1E3.	
2A2A1E6		Same as 2A2A1E4.	
2A2A1E7-E8		Same as 2A2A1E1.	
2A2A1E9		Same as 2A2A1E4.	
2A2A1FL1		FILTER, BANDPASS: Hermetically sealed case, 0.670 in. × 0.750 in. × 2.250 in., 500 kHz, mfr 95105, pn 526-9419-000.	
2A2A1FL2		FILTER, BANDPASS: Hermetically sealed case, 0.670 in., 0.750 in., 2.250 in., 500 kHz, mfr 95105, pn 526-9420-000.	5-41

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

TRANSMITTER MODE SELECTOR ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A1H1-H2		SCREW, CAPTIVE: 10-32 ×4.84 in. lg, mfr 06845, pn 4030521-0001.	5-34
2A2A1MP1		FRAME, STAKED: 5.078 in. lg ×2.088 in. w ×4.355 in. h, al alloy, chem film, mfr 06845, pn 666231-092 or 4030726-0501	5-41
2A2A1MP2		COVER, MARKED: 5.088 in. lg ×2.088 in. w ×4.340 in. h, al alloy, iridite finish, mfr 06845, pn 666230-093 or 4030656-0501	5-34
2A2A1P1		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.541 in. × 0.494 in × 0.7031 in., 5 amp, mfr 91146, pn DAM11W1PC31F115.	5-41
2A2A1P1A1		CONNECTOR, PLUG, ELECTRICAL: Coaxial, rt angle, mfr 71468, pn DM53741-5059.	5-41
2A2A1P2		CONNECTOR, RECEPTACLE, ELECTRICAL: 2.729 in. lg, 0.494 in. w, 25 cont, mfr 71785, pn DCM25W3PC31F115.	5-42
2A2A1P2A1		Same as 2A2A1P1A1.	5-42
2A2A1P2A2		Not used	
2A2A1P2A3		Same as 2A2A1P1A1.	5-42
2A2A1R1-R40		Not used	
2A2A1R41		RESISTOR: MIL type RL07S301J.	5-41
2A2A1S1		SWITCH, ROTARY: MIL type SR19B30B1MP0.	5-42
2A2A1T1-T2		TRANSFORMER, RF: 0.750 in. ×0.505 in., 500 kc, 750 $\mu\mu$F ±10%, mfr 93928, pn 11210.	5-41
2A2A1A1		CHANNEL 1 (USB) BALANCED MODULATOR SUBASSEMBLY: Component board with all components assembled, mfr 06845, pn 666164-058 or 4030965-0501.	5-41
2A2A1A1C1-C11		Not used	
2A2A1A1C12		CAPACITOR, FIXED, PAPER: 0.275 in. w ×0.625 in. lg, 0.2 μF ±20%, 200 Vdc, mfr 02777, 06845, dwg 4030795-0704.	5-43
2A2A1A1C13		CAPACITOR: MIL type MS15826-98.	
2A2A1A1C14		CAPACITOR: MIL type MS15876-101.	
2A2A1A1C15		CAPACITOR, VARIABLE: 1 23/64 in. lg, 15/64 in. dia, 10-60 μF, 1000 Vdc, mfr 73899, pn VCJ1079.	
2A2A1A1C16-C17		CAPACITOR, FIXED, CERAMIC: 0.736 in. ×0.484 in., 0.208 in., 1500 $\mu\mu$F ±2%, 500 Vdc, mfr 72136, pn DM20E152G500V.	
2A2A1A1CR1-CR4		Not used	
2A2A1A1CR5-CR8		SEMICONDUCTOR DEVICE SET: 4 matched MIL type 1N904 diodes.	
2A2A1A1E1-E6		TERMINAL: 0.93 in. dia ×0.24 in. lg, mfr 86577, pn 1D3-8A.	
2A2A1A1R1-R20		Not used	
2A2A1A1R21		RESISTOR: MIL type RN55D1000F.	
2A2A1A1R22		Same as 2A2R4.	
2A2A1A1R23		RESISTOR: MIL type RT11C2P202.	
2A2A1A1R24		Same as 2A2A1A1R21.	
2A2A1A1R25		Same as 2A2R4.	
2A2A1A1R26		RESISTOR: MIL type RL07S112J.	
2A2A1A1R27-R30		RESISTOR: MIL type RC07GF101J.	
2A2A1A1R31		RESISTOR: MIL type RL07S202J.	
2A2A1A1R32		RESISTOR: MIL type RL07S512J.	
2A2A1A1R33		Same as 2A2A1A1R31.	
2A2A1A1R34		Same as 2A2A1A1R32.	5-43
2A2A1A2		CHANNEL 2 (LSB) BALANCED MODULATOR SUBASSEMBLY: Component board with all components assembled, mfr 06845, pn 666164-066 or 4030966-0501.	5-41
2A2A1A2C1		Same as 2A2A1A1C12.	5-44
2A2A1A2C2		Same as 2A2A1A1C13.	
2A2A1A2C3		Same as 2A2A1A1C14.	
2A2A1A2C4		Same as 2A2A1A1C15.	
2A2A1A2C5		Same as 2A2A1A1C16.	
2A2A1A2C6		Same as 2A2A1A1C16.	
2A2A1A2CR1-CR4		Same as 2A2A1A1CR5-CR8.	5-44

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

TRANSMITTER MODE SELECTOR ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A1A2E1-E6		Same as 2A2A1A1E1.	5-44
2A2A1A2R1		Same as 2A2A1A1R21.	
2A2A1A2R2		Same as 2A2R4.	
2A2A1A2R3		Same as 2A2A1A1R23.	
2A2A1A2R4		Same as 2A2A1A1R21.	
2A2A1A2R5		Same as 2A2R4.	
2A2A1A2R6		Same as 2A2A1A1R26.	
2A2A1A2R7		Same as 2A2A1A1R27.	
2A2A1A2R8		Same as 2A2A1A1R27.	
2A2A1A2R9		Same as 2A2A1A1R27.	
2A2A1A2R10		Same as 2A2A1A1R27.	
2A2A1A2R11		Same as 2A2A1A1R31.	
2A2A1A2R12		Same as 2A2A1A1R32.	
2A2A1A2R13		Same as 2A2A1A1R31.	
2A2A1A2R14		Same as 2A2A1A1R32.	5-44
2A2A1A3		ISOLATION AMPLIFIER: Component board with all components assembled, mfr 06845, pn 666164-066 or 4030731-0501.	5-41
2A2A1A3C1-C6		Not used	
2A2A1A3C7		Same as 2A2A1A1C12.	
2A2A1A3C8-C9		CAPACITOR, FIXED: 0.170 in. × 0.240 in. × 0.625 in. lg, 0.1 μF ±20%, 200 Vdc, mfr 02777, 06845, dwg 4030795-0703.	5-45
2A2A1A3C10-C17		Not used	
2A2A1A3C18		Same as 2A2A1A1C12.	
2A2A1A3C19-C20		Same as 2A2A1A3C8.	
2A2A1A3E1-E10		Same as 2A2A1A1E6.	
2A2A1A3Q1-Q2		TRANSISTOR: MIL type 2N1225.	
2A2A1A3R1-R14		Not used	
2A2A1A3R15		RESISTOR: MIL type RC07GF102J.	
2A2A1A3R16		RESISTOR: MIL type RC07GF103J.	
2A2A1A3R17-R18		Same as 2A2A1A3R16.	
2A2A1A3R19		RESISTOR: MIL type RC07GF221J.	
2A2A1A3R20		Same as 2A2A1A1R31.	
2A2A1A3R21-R34		Not used	
2A2A1A3R35		Same as 2A2A1A3R15.	
2A2A1A3R36		Same as 2A2A1A3R16.	
2A2A1A3R37-R38		Same as 2A2A1A3R16.	
2A2A1A3R39		Same as 2A2A1A3R19.	
2A2A1A3R40		Same as 2A2A1A1R31.	
2A2A1A3TP1-TP2		ADAPTER, TEST, WHITE, BODY: 0.378 in. lg, 0.218 in. dia, 0.400 in. mtg. center, mfr 98291, pn SKT103PCWHITE.	5-45
2A2A1A4		500 KC GATES: Component board with all components assembled, mfr 06845, pn 666231-020 or 4030971-0501.	5-42
2A2A1A4C1-C24		Not used	
2A2A1A4C25		Same as 2A2A1A1C12.	5-46
2A2A1A4C26-C27		Same as 2A2A1A3C19.	
2A2A1A4C28		CAPACITOR, FIXED, MICA: 0.470 in. × 0.400 in. × 0.230 in., 820 μμF ±5%, 300 Vdc, mfr 72136, 06845, dwg 4030802-0730.	
2A2A1A4C29		CAPACITOR: MIL type CM06F332G03.	
2A2A1A4C30		Same as 2A2A1A3C19.	
2A2A1A4C31		Same as 2A2A1A4C28.	
2A2A1A4C32		Same as 2A2A1A4C29.	
2A2A1A4C33		CAPACITOR: MIL type CS13BF685K.	
2A2A1A4C34		CAPACITOR, FIXED, CERAMIC: 0.756 in. × 0.514 in. × 0.246 in., 3600 μμF ±2%, 500 Vdc, mfr 72136, pn DM20E362G500V.	
2A2A1A4C35		CAPACITOR, FIXED, CERAMIC: 0.758 in. × 0.521 in. × 0.254 in., 3900 μμF ±2%, 500 Vdc, mfr 72136, pn DM20E392G500V.	5-46

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

TRANSMITTER MODE SELECTOR ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A1A4C36		Same as 2A2A1A4C34.	5-46
2A2A1A4C37		CAPACITOR: MIL type CS13BF105M.	
2A2A1A4C38		Same as 2A2A1A4C33.	
2A2A1A4C39		Same as 2A2A1A4C37.	
2A2A1A4C40		Same as 2A2A1A4C37.	
2A2A1A4C41		Same as 2A2A1A3C19.	
2A2A1A4C42		Same as 2A2A1A1C12.	
2A2A1A4C43		CAPACITOR: MIL type CS13BE225K.	
2A2A1A4C44		Same as 2A2A1A3C19.	
2A2A1A4C45		Same as 2A2A1A1C12.	
2A2A1A4C46		Same as 2A2A1A3C19.	
2A2A1A4C47		Same as 2A2A1A3C19.	
2A2A1A4C48		Same as 2A2A1A1C12.	
2A2A1A4C49		Same as 2A2A1A1C12.	
2A2A1A4C50		Same as 2A2A1A3C19.	
2A2A1A4C51		Same as 2A2A1A3C19.	
2A2A1A4C52		Same as 2A2A1A1C12.	
2A2A1A4CR1-CR10		Not used	
2A2A1A4CR11-CR21		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N277.	
2A2A1A4CR22-CR99		Not used	
2A2A1A4CR100		Same as 2A2A1A4CR11.	
2A2A1A4E1-E34		Same as 2A2A1A1E1.	
2A2A1A4Q1-Q5		Not used	
2A2A1A4Q6-Q7		TRANSISTOR: MIL type 2N1225.	
2A2A1A4Q8		TRANSISTOR: MIL type 2N652A.	
2A2A1A4R1-R52		Not used	
2A2A1A4R53		Same as 2A2A1A3R15.	
2A2A1A4R54		RESISTOR: MIL type RL07S752J.	
2A2A1A4R55-R57		Same as 2A2A1A3R15.	
2A2A1A4R58		RESISTOR: MIL type RL07S203J.	
2A2A1A4R59		RESISTOR: MIL type RC07GF391J.	
2A2A1A4R60		Same as 2A2A1A3R15.	
2A2A1A4R61		Same as 2A2A1A4R58.	
2A2A1A4R62		Same as 2A2A1A4R59.	
2A2A1A4R63		RESISTOR: MIL type RL07S302J.	
2A2A1A4R64		RESISTOR: MIL type RL07S242J.	
2A2A1A4R65		Same as 2A2A1A4R63.	
2A2A1A4R66		RESISTOR: MIL type RC07GF273J.	
2A2A1A4R67		Same as 2A2A1A4R58.	
2A2A1A4R68		Same as 2A2A1A4R58.	
2A2A1A4R69		Same as 2A2A1A3R16.	
2A2A1A4R70		RESISTOR: MIL type RC07GF151J.	
2A2A1A4R71		Same as 2A2A1A1R32.	
2A2A1A4R72		RESISTOR: MIL type RL07S911J.	
2A2A1A4R73		RESISTOR: MIL type RC07GF472.	
2A2A1A4R74		Same as 2A2A1A3R16.	
2A2A1A4R75		Same as 2A2A1A3R16.	
2A2A1A4R76		Same as 2A2A1A3R16.	
2A2A1A4R77		RESISTOR: MIL type RC07GF222J.	
2A2A1A4R78		Same as 2A2A1A3R16.	
2A2A1A4R79		RESISTOR: MIL type RL07S513J.	
2A2A1A4R80		Same as 2A2A1A4R77.	
2A2A1A4R81		Same as 2A2A1A3R16.	
2A2A1A4R82		Same as 2A2A1A4R79.	5-46

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

TRANSMITTER MODE SELECTOR (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A1A4R83		Same as 2A2A1A3R16.	5-46
2A2A1A4R84		Same as 2A2A1A3R16.	
2A2A1A4R85		Same as 2A2A1A1R32.	
2A2A1A4R86		RESISTOR: MIL type RC07GF822J.	
2A2A1A4R87		Same as 2A2A1A3R16.	
2A2A1A4R88		RESISTOR: MIL type RC07GF892J.	
2A2A1A4R89		Same as 2A2A1A1R26.	
2A2A1A4R90		Same as 2A2A1A1R32.	
2A2A1A4R91		RESISTOR: MIL type RL07S751J	
2A2A1A4R92		Same as 2A2A1A4R72.	
2A2A1A4R93		RESISTOR: MIL type RL07S432J.	
2A2A1A4R94		Same as 2A2A1A3R16.	
2A2A1A4R95		RESISTOR: MIL type RL07S201J.	
2A2A1A4R96		Same as 2A2A1A4R79.	
2A2A1A4R97		Same as 2A2A1A3R16.	
2A2A1A4R98		Same as 2A2A1A1R32.	
2A2A1A4R99		Same as 2A2A1A4R73.	
2A2A1A4R100		Same as 2A2A1A3R15.	
2A2A1A4R101		RESISTOR: MIL type RT11C2P103.	
2A2A1A4R102		Same as 2A2A1A4R54.	
2A2A1A4R103		RESISTOR: MIL type RC07GF272J.	
2A2A1A4R104		Same as 2A2A1A4R103.	
2A2A1A4R105		Same as 2A2A1A4R93.	
2A2A1A4R106		Same as 2A2A1A3R15.	
2A2A1A4R107		Same as 2A2A1A4R93.	
2A2A1A4R108		Same as 2A2A1A1R32.	
2A2A1A4R109		Same as 2A2A1A3R16.	
2A2A1A4R110		Same as 2A2A1A4R79.	
2A2A1A4R111		Same as 2A2A1A3R16.	
2A2A1A4R112		Same as 2A2A1A4R95.	
2A2A1A4R113		Same as 2A2A1A1R32.	
2A2A1A4R114		RESISTOR: MIL type RL07S362J.	
2A2A1A4R115		Same as 2A2A1A1R27.	
2A2A1A4RT1		RESISTOR, THERMAL: 0.125 in. dia, 0.625 in. lg, 10 k ohms, ±10%, mfr 02606, pn QB41J1.	
2A2A1A4T1-T2		Not used	
2A2A1A4T3		TRANSFORMER, RF: 0.422 in. dia × 0.490 in. lg, 500 kc, 820 pF, mfr 06845, pn 2058928-0501.	
2A2A1A4T4		Same as 2A2A1A4T3.	
2A2A1A4T5		TRANSFORMER, RF: 400 ohms, 100 mV at 500 kc, winding no. 1 and winding no. 2 approx 115 turns cw each winding, mfr 06845, pn 2058930-0501.	
2A2A1A4XQ1-XQ5		Not used	
2A2A1A4XQ6-XQ7		MOUNTING PAD: For transistor 0.344 in. dia × 0.075 in. thk, mfr 07047, pn 10027.	
2A2A1A4XQ8		MOUNTING PAD: For transistor, mfr 07047, pn 10012.	5-46

AUDIO AMPLIFIER ASSEMBLY

2A2A2		AUDIO AMPLIFIER ASSEMBLY: Mfr 06845, pn 666230-043.	5-34
2A2A2H1-H2		SCREW, CAPTIVE: Mfr 06845, pn 666163-233.	5-34

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

AUDIO AMPLIFIER ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A2MP1		FRAME, STAKED: Mfr 06845, pn 666231-930.	5-47
2A2A2MP2		COVER: Mfr 06845, pn 666231-735	5-34
2A2A2P1		CONNECTOR, RECEPTACLE, ELECTRICAL: 0.743 in. lg, 0.513 in. w, 25 cont, mfr 91146, pn DBM25PC31.	5-47
2A2A2A1		AMPLIFIER, AUDIO: Component board with all components assembled, mfr 06845, pn 666231-015 or 4030773-0501.	5-48
2A2A2A1C1-C4		Same as 2A2A1A4C33.	
2A2A2A1C5		CAPACITOR: MIL type CS13BE686K.	
2A2A2A1C6-C9		Same as 2A2A1A4C33.	
2A2A2A1C10		CAPACITOR, FIXED, ELECTROLYTIC: 0.341 in. dia × 0.750 in. lg, 0.120 μF ±10%, mfr 01295, pn SCM127HP0020A2.	
2A2A2A1C11		Same as 2A2A1A4C33.	
2A2A2A1CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N816.	
2A2A2A1Q1		Same as 2A2A1A4Q8.	
2A2A2A1Q2		TRANSISTOR: MIL type 2N388.	
2A2A2A1Q3-Q5		Same as 2A2A1A4Q8.	
2A2A2A1R1		RESISTOR: MIL type RC07GF561J.	
2A2A2A1R2		Same as 2A2A1A3R16.	
2A2A2A1R3		RESISTOR: MIL type RC07GF271J.	
2A2A2A1R4		RESISTOR: MIL type RC07GF392J.	
2A2A2A1R5		Same as 2A2A1A4R66.	
2A2A2A1R6		RESISTOR: MIL type RL07S515J.	
2A2A2A1R7		Same as 2A2A2A1R7.	
2A2A2A1R8		Same as 2A2A1A4R99.	
2A2A2A1R9		RESISTOR: MIL type RC07GF183J.	
2A2A2A1R10		Same as 2A2A1A4R103.	
2A2A2A1R11		Same as 2A2A1A1R23.	
2A2A2A1R12		Same as 2A2A2A1R1.	
2A2A2A1R13		RESISTOR: MIL type RC07GF682J.	
2A2A2A1R14		Same as 2A2A1A4R58.	
2A2A2A1R15		RESISTOR: MIL type RL07S134J.	
2A2A2A1R16		Same as 2A2A1A3R19.	
2A2A2A1R17		RESISTOR: MIL type RL07S303J.	
2A2A2A1R18		Same as 2A2A2A1R4.	
2A2A2A1R19		Same as 2A2A1A4R77.	
2A2A2A1R20		Same as 2A2A1A1R27.	
2A2A2A1R21		Same as 2A2A2A1R13.	
2A2A2A1R22		Same as 2A2A1A1R27.	
2A2A2A1R23		Same as 2A2A1A4R63.	
2A2A2A1RV1-RV2		RESISTOR, VOLTAGE, SENSITIVE: 0.570 in. OD, 0.200 in. thk, disk type, 125 k ohms -10% 1/4W, 300 cps to 3500 cps, mfr 10646, pn 694BNR1252K.	
2A2A2A1T1		TRANSFORMER: MIL type TF5RX16ZZ	
2A2A2A1T2		TRANSFORMER, AUDIO FREQUENCY: Mld epoxy resin case, 0.781 in. × 0.531 in. × 0.875 in. OA dim, 25000 ohms, ±10%, CT Prim, 1200 ohms ±10% CT Sec, mfr 00348, pn M4162.	
2A2A2A1TP1-TP2		Same as 2A2A1A3TP1.	5-48

AUDIO AMPLIFIER ASSEMBLY

2A2A3		AUDIO AMPLIFIER ASSEMBLY: Mfr 06845, pn 666230-043. NOTE: This assembly is identical to 2A2A2. Use 2A2A2 prefix in lieu of 2A2A3 for parts identification and location.	5-34

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

RF AMPLIFIER ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A4		RF AMPLIFIER ASSEMBLY: Mfr 58189, pn A70733-001, mfr 06845, pn 666230-029, or mfr 06845, pn 4030677-0501. 76 5820-00-167-7675	5-34
		NOTE: This assembly is depot repairable except replacement of vacuum tubes. All parts are listed in Overhaul and Repair Manual, NAVSHIPS 0967-034-2000.	
2A2A4V1		TUBE, ELECTRON: MIL type 6BZ6.	
2A2A4V2		TUBE, ELECTRON: MIL type 6AN5Wa.	

FREQUENCY STANDARD ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A5		FREQUENCY STANDARD ASSEMBLY: Mfr 58189, pn 666230-006, mfr 06845, pn 4013399-0701, or mfr 58189, pn A70744-001.	5-34
2A2A5H1-H2		SCREW, CAPTIVE: 14844 pn 5227-946	
		NOTE: This assembly is depot repairable. All parts are listed in Overhaul and Repair Manual, NAVSHIPS 0967-034-2000.	

TRANSLATOR/SYNTHESIZER ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A6		TRANSLATOR/SYNTHESIZER ASSEMBLY: Mfr 06845, pn 2058940-0501, mfr 06845, pn 2058940-0502, mfr 58189, pn A70733-001.	5-34
		NOTE: This assembly (of six sub-modules) is depot repairable. All parts are listed in Overhaul and Repair Manual, NAVSHIPS 0967-034-2000.	

CODE GENERATOR ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A7		CODE GENERATOR ASSEMBLY (for use in Transmitter only): Mfr 06845, pn 809000-253 or 4030746-0501.	5-36
2A2A7A1		PRINTED CIRCUIT BOARD: First section, mfr 06845, pn 4030743-0501.	5-49
2A2A7A2		PRINTED CIRCUIT BOARD: Second section, mfr 06845, pn 4030937-0501.	
2A2A7A3		PRINTED CIRCUIT BOARD: Third section, mfr 06845, pn 4030940-0501.	
2A2A7A4		PRINTED CIRCUIT BOARD: Fourth section, mfr 06845, pn 4030744-0501.	
2A2A7A5		PRINTED CIRCUIT BOARD: Fifth section, mfr 06845, pn 4030748-0501.	5-49

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

CODE GENERATOR ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A7H1		SCREW, CAPTIVE: Mfr 06845, pn 666273-015.	5-49
2A2A7MP1		MOUNTING PLATE: 3.800 in. ×3.40 in. ×0.090 in. thk, mfr 06845, pn 666273-014.	
2A2A7MP2-MP3		COUPLING DISK 1 and 10 MC: 0.750 in. dia ×0.284 in., mfr 06845, pn 666231-236.	
2A2A7MP4-MP5		SHAFT, 1 AND 10 MC: 0.210 in. dia ×1.76 in. lg, mfr 06845, pn 666231-235.	5-49

POWER SUPPLY ASSEMBLY

2A2A8		POWER SUPPLY ASSEMB:Y: Mfr 06845, pn 666230-750 or 4030721-0501.	5-36
		CAPACITOR, FIXED, TANTALUM: 0.765 in. lg, ×0.375 in. dia, 120 μF +75 -15%, 40 Vdc, mfr 14433, pn TO314-120MFP75ORM15%.	5-50
2A2A8C2		Same as 2A2A8C1	
2A2A8C3		CAPACITOR, FIXED: MIL type C313BF685K	
2A2A8C4		CAPACITOR, FIXED, MICA: 0.470 in. lg × 0.378 in. w × 0.220 in. thk, 820 μF ±2%, 300 Vdc, mfr 72136, pn DM15F821G300V.	
2A2A8C5		CAPACITOR: MIL type CS13BF156K.	
2A2A8C6		Same as 2A2A8C1.	
2A2A8C7		CAPACITOR: MIL type CS13BF476K.	
2A2A8C8		Same as 2A2A8C5.	
2A2A8C9		Same as 2A2A8C1.	
2A2A8C10-C11		Same as 2A2A8C7.	
2A2A8CR1-CR4		Same as 2A2CR1.	
2A2A8CR5-CR8		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N5199.	
2A2A8CR9		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4245.	
2A2A8CR10-CR11		Same as 2A2A1A4CR11.	
2A2A8CR12		SEMICONDUCTOR DEVICE, DIODE: Case style A9, type design B, mfr 80131, pn 2N963B.	
2A2A8CR13		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N750A.	
2A2A8E1-E20		Same as 2A2A1A1E1.	
2A2A8Q1		TRANSISTOR: MIL type 2N1131.	
2A2A8Q2-Q4		TRANSISTOR: MIL type 2N697.	
2A2A8R1		RESISTOR: MIL type RL32S910J.	
2A2A8R2		RESISTOR: MIL type RC07G470J.	
2A2A8R3		Same as 2A2A1A4R99.	
2A2A8R4		Same as 2A2R4.	
2A2A8R5		RESISTOR: MIL type RC07GF681J.	
2A2A8R6-R7		Same as 2A2A1A4R99.	
2A2A8R8		Same as 2A2A1A3R15.	
2A2A8R9		RESISTOR: MIL type RC07GF152J.	
2A2A8R10		RESISTOR, VARIABLE: 1.160 in. lg, 0.190 in. w, 500 ohms ±5%, mfr 80294, pn RT12C2P501.	
2A2A8R11		RESISTOR: MIL type RC07GF331J.	
2A2A8R12		Same as 2A2A1A4R86.	
2A2A8R13		RESISTOR: MIL type RC07GF562J.	
2A2A8R14		RESISTOR: MIL type RC32GF181J.	
2A2A8R15		RESISTOR: MIL type RL32S161J.	
2A2A8R16		RESISTOR: MIL type RC32GF221J.	
2A2A8XQ1-XQ4		MOUNTING PAD, TRANSISTOR: Mfr 07047, pn 10012.	5-50

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

FSK TONE GENERATOR ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A9		FSK TONE GENERATOR ASSEMBLY: Mfr 06845, pn 666230-051 or 4018684-0501	5-34
2A2A9H1-H2		SCREW, CAPTIVE: 10-32 × 4.84 in. lg, mfr 06845, pn 4030521-0001.	5-34
2A2A9MP1		COVER: Mfr 06845, pn 4030909-0001.	
2A2A9P1		CONNECTOR, RECEPTACLE, ELECTRICAL: 1.213 in. lg × 0.494 in. w × 0.688 in. thk, 5 amp, mfr 91146, pn DESM9PF115.	5-51
2A2A9R1		RESISTOR: MIL type RE65G2671.	
2A2A9A1		FSK TONE GENERATOR: Printed circuit board with all components mounted, mfr 06845, pn 4030722-0501.	5-51
2A2A9A1C1		CAPACITOR: MIL type CK15AX223M.	5-52
2A2A9A1C2		CAPACITOR: MIL type CK14AX103M.	
2A2A9A1C3		CAPACITOR: MIL type CK16AX473M.	
2A2A9A1C4		Same as 2A2A8C2.	
2A2A9A1C5		CAPACITOR, FIXED, MICA, DIELECTRIC: 0.890 in. lg, × 0.810 in. w × 0.370 in. thk, 20,000 pF, 1 Mc, 300 Vdc, mfr 72136, pn DM30F203F300V.	
2A2A9A1C6-C8		Same as 2A2A9A1C2.	
2A2A9A1C9		CAPACITOR: MIL type CS13BC107K.	
2A2A9A1C10		CAPACITOR: MIL type CS13BF106K.	
2A2A9A1C11		Same as 2A2A9A1C5.	
2A2A9A1CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N483B.	
2A2A9A1CR2		SEMICONDUCTOR DEVICE, DIODE: Case style A2, mfr 80131, pn 1N3026B.	
2A2A9A1CR3-CR4		Same as 2A2A9A1CR1.	
2A2A9A1CR5		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N967B.	
2A2A9A1CR6-CR8		Same as 2A2A9A1CR1.	
2A2A9A1Q1		TRANSISTOR: MIL type 2N706.	
2A2A9A1Q2		TRANSISTOR: MIL type 2N1613.	
2A2A9A1Q3		Same as 2A2A9Q1.	
2A2A9A1Q4		TRANSISTOR: Case style TO-5, mfr 07263, pn 2N1131S.	
2A2A9A1Q5-Q7		Same as 2A2A9Q1.	
2A2A9A1R1		Not used	
2A2A9A1R2		Same as 2A2A1A3R16.	
2A2A9A1R3		Same as 2A2A8R13.	
2A2A9A1R4		Same as 2A2A1A4R64.	
2A2A9A1R5		Same as 2A2A1A4R77.	
2A2A9A1R6		Same as 2A2A1R41.	
2A2A9A1R7		Same as 2A2A1A1R32.	
2A2A9A1R8		Same as 2A2A1A4R101.	
2A2A9A1R9		RESISTOR, FIXED, WIREWOUND: 0.687 in. lg, 0.125 in. dia 8200 ohms ±1%, 2W, mfr 00213, pn SB1W822F.	
2A2A9A1R10		Same as 2A2A1A1R23.	
2A2A9A1R11		RESISTOR, FIXED, WIREWOUND: 0.687 in. lg, 0.125 in. dia, 6500 ohms ±1%, mfr 00213, pn SB1W652F.	
2A2A9A1R12		Same as 2A2A1A1R23.	
2A2A9A1R13		RESISTOR: MIL type RT11C2P502.	
2A2A9A1R14		Same as 2A2A1A3R16.	
2A2A9A1R15		RESISTOR: MIL type RC07GF471J.	
2A2A9A1R16		Same as 2A2A8R13.	
2A2A9A1R17-R18		Same as 2A2A1A1R31.	
2A2A9A1R19		Same as 2A2A1A3R15.	
2A2A9A1R20		Same as 2A2A1A1R31.	5-52

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

FSK TONE GENERATOR ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A9A1R21		RESISTOR: MIL type RL07S912J.	5-52
2A2A9A1R22		RESISTOR: MIL type RL07S511J.	
2A2A9A1R23		Same as 2A2A1A1R31.	
2A2A9A1R24		Same as 2A2A9A1R21.	
2A2A9A1R25		RESISTOR: MIL type RL07S621J.	
2A2A9A1R26		Same as 2A2A1A4R101.	
2A2A9A1R27		Same as 2A2A1A4R58.	
2A2A9A1R28		RESISTOR: MIL type RC07GF122J.	
2A2A9A1R29A	1	Same as 2A2A9A1R15.	
2A2A9A1R29B	1	RESISTOR: MIL type RL07S431J.	
2A2A9A1R29C	1	RESISTOR: MIL type RC07GF391J.	
2A2A9A1R29D	1	RESISTOR: MIL type RC07GF271J.	
2A2A9A1R29E	1	RESISTOR: MIL type RC07GF331J.	
2A2A9A1S1		SWITCH: MIL type MS24656-231.	
2A2A9A1T1		TRANSFORMER, RF: 0.760 in. lg, ×0.860 in. w ×0.44 in. h, mfr 06845, pn 4030648-0501.	
2A2A9A1TP1-TP2		Same as 2A2A1A3TP1.	5-52

METER AMPLIFIER ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A10		METER AMPLIFIER ASSEMBLY: Printed circuit board with all components mounted, mfr 06845, pn 666230-746.	5-34 5-53
2A2A10C1		CAPACITOR: MIL type CS13BE15K.	
2A2A10C2		CAPACITOR: MIL type CS13AB010M.	
2A2A10C3		Same as 2A2A10C1.	
2A2A10Q1		Same as 2A2A1A4Q8.	
2A2A10R1		Same as 2A2A1A1R27.	
2A2A10R2		Same as 2A2A1A4R114.	
2A2A10R3		RESISTOR: MIL type RL07S511J.	
2A2A10R4		Same as 2A2A2A1R4.	
2A2A10R5		Same as 2A2A1A3R16.	
2A2A10R6		Same as 2A2A2A1R1.	
2A2A10R7		Same as 2A2A1A4R66.	
2A2A10R8		Same as 2A2A1A4R99.	
2A2A10R9		Same as 2A2A1A4R114.	5-53

METER AMPLIFIER ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A11		METER AMPLIFIER ASSEMBLY: Printed circuit board with all components mounted, mfr 06845, pn 666230-746. NOTE: This assembly is identical to 2A2A10. Use 2A2A10 prefix in lieu of 2A2A11 for parts identification and location.	5-34

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

IF. AMPLIFIER ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A12		IF. AMPLIFIER ASSEMBLY: Mfr 06845, pn 666230-039.	5-34
2A2A12H1-H2		Same as 2A2A1H1	5-34
2A2A12MP1		COVER: Mfr 06845, pn 666231-324.	5-34
2A2A12MP2		FRAME AND BASE: Mfr 06845, pn 4030605-0501.	5-34
2A2A12P1		CONNECTOR, RECEPTACLE, ELECTRICAL: 2.088 in. lg, 0.494 in. h, 0.451 in. thk, mfr91146, pn DBM13W3PC31F115.	5-54
2A2A12P1A1-A3		Same as 2A2A1P1A1.	
2A2A12A1		IF AMPLIFIER: Printed circuit board with all components assembled, mfr 06845, pn 666231-030 or 4030972-0501.	5-54
2A2A12A1C1		Same as 2A2A1A3C8.	5-55
2A2A12A1C2		Same as 2A2A1A1C12.	
2A2A12A1C3		Same as 2A2A8C2.	
2A2A12A1C4		Same as 2A2A1A3C8.	
2A2A12A1C5		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 0.732 in. × 0.478 in. × 0.200 in., 1200 μμF ±5%, mfr 72136, pn DM20B122J500V.	
2A2A12A1C6-C7		Same as 2A2A1A3C8.	
2A2A12A1C8		Same as 2A2A12C5.	
2A2A12A1C9		Not used	
2A2A12A1C10		Same as 2A2A8C2.	
2A2A12A1CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N217.	
2A2A12A1Q1		TRANSISTOR: MIL type 2N1012.	
2A2A12A1Q2-Q3		Same as 2A2A1A3Q1.	
2A2A12A1Q4		Same as 2A2A9A1Q2.	
2A2A12A1R1		Same as 2A2A1A1R27.	
2A2A12A1R2		Same as 2A2A2A1R13.	
2A2A12A1R3		Same as 2A2A9A1R28.	
2A2A12A1R4		RESISTOR: MIL type RC07GF332J.	
2A2A12A1R5		Same as 2A2A1A1R26.	
2A2A12A1R6		Same as 2A2A1A4R86.	
2A2A12A1R7		Same as 2A2A9A1R28.	
2A2A12A1R8-R10		Same as 2A2A1A3R15.	
2A2A12A1R11		RESISTOR: MIL type RC07GF104J.	
2A2A12A1R12		Same as 2A2A1A4R103.	
2A2A12A1R13		Same as 2A2A2A1R4.	
2A2A12A1R14		RESISTOR: MIL type RL07S113J.	
2A2A12A1R15		Same as 2A2A9A1R13.	
2A2A12A1R16		Same as 2A2A2A1R13.	
2A2A12A1R17		RESISTOR: MIL type RC07GF332J.	
2A2A12A1R18		Same as 2A2A8R13.	
2A2A12A1R19		Same as 2A2A1A3R15.	
2A2A12A1R20		Not used	
2A2A12A1R21		RESISTOR: MIL type RC07GF330J.	
2A2A12A1R22		Same as 2A2A1A1R27.	
2A2A12A1R23		Same as 2A2A1A3R15.	
2A2A12A1R24		RESISTOR: MIL type RC07GF224J.	
2A2A12A1R25		Same as 2A2A1A3R15.	
2A2A12A1T1		TRANSFORMER, INTERMEDIATE FREQUENCY: 0.422 in. × 0.490 in. lg, 500 kc, pin type term., mfr 06845, pn 2058925-0501.	
2A2A12A1T2		TRANSFORMER, INTERMEDIATE FREQUENCY: 0.422 in. × 0.490 in. lg, 500 kc, pin type term., mfr 06845, pn 2058925-0502.	
2A2A12A1TP1-TP4		Same as 2A2A1A3TP1.	
2A2A12A1XQ1-XQ2		TRANSISTOR, MOUNTING PAD: Mfr 07047, pn 10027.	5-55

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

LIGHT PANEL ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A13		LIGHT PANEL ASSEMBLY: Mfr 06845, pn 666230-235 or 4030553-0501.	5-40
2A2A13DS1-DS2		Not used	
2A2A13DS3-DS4		LAMP, INDICATOR: 28 Vdc, 0.04 amp, mfr 72914, pn A9906-1.	5-40

FILTER BOX, HANDSET

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A14		FILTER BOX, HANDSET: With all parts assembled, mfr 06845, 666230-458.	5-34
2A2A14C1-C2		CAPACITOR, FIXED, CERAMIC: 0.812 in. lg, 0.218 in. dia, 400 pF ±20%, 500 Vdc, mfr 72982, pn 2445-000.	5-56
2A2A14C3		CAPACITOR, FIXED, CERAMIC: 0.625 in. lg × 0.275 in. × 0.215 in., 0.02 μF ±20%, 200 Vdc, mfr 02777, 06845, dwg 666164-914.	|
2A2A14C4		CAPACITOR, FIXED, CERAMIC: 0.375 in. lg × 0.140 in. × 0.215 in., 0.01 μF ±20%, 200 Vdc, mfr 02777, 06845, dwg 666164-911.	|
2A2A14L1		COIL, RF: MIL type MS90537-51.	5-56

IF. FILTER AND COMPONENT BOARD

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A15		IF. FILTER AND COMPONENT BOARD: With all components mounted, mfr 06845, pn 666230-459 or 4030706-0501.	5-36
2A2A15C1-C2		Same as 2A2A1A1C12.	
2A2A15C3		CAPACITOR: MIL type CS13BE107K.	5-57
2A2A15L1-L3		Same as 2A2A14L1.	
2A2A15R1		RESISTOR: MIL type RC20GF100J.	5-57

4-VOLT DC POWER SUPPLY BOARD

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2A16		4-VOLT DC POWER SUPPLY BOARD: Mfr 06845, pn A00070 or 2058948-0501.	5-34
2A2A16C1		CAPACITOR: MIL type CS13BF105M.	5-58
2A2A16CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N748A.	
2A2A16R1		RESISTOR: MIL type RWP21F63R4F (used only in units manufactured prior to 2-26-68)	5-58

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

AMPLIFIER, RADIO FREQUENCY AM-3007/URT

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3		AMPLIFIER, RADIO FREQUENCY AM-3007/URT: Mfr 06845, pn 666230-055 or 4030686-0501.	1-2

CASE ASSEMBLY, RADIO FREQUENCY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A1		CASE ASSEMBLY, RADIO FREQUENCY: Mfr 06845, pn 666230-058 or 4030689-0501.	5-61
3A1H1-H6		INSERT: Mfr 06845, pn 540725-131.	5-61
3A1J1-J5		Not used	
3A1J6-J7		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 95712, pn 2230-8.	5-62
3A1J8		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 91146, pn NJB1F0.	5-62
3A1MP1		GASKET: For filter box 3A1A3, 6.001 in. lg, 2.00 in. w, 0.020 in. thk, mfr 06845, pn 666230-101.	5-61
3A1MP2		GASKET: For filter box 3A1A1, 3.76 in. lg, 2.00 in. w, 0.020 in. thk, mfr 06845, pn 666230-100.	
3A1MP3		GASKET: For filter box 3A1A2, 2.00 in. lg, 1.68 in. w, 0.20 in. thk, mfr 06845, pn 666230-099.	5-61
3A1MP4-MP5		PIN, GUIDE: 1.00 in. lg, 0.247 in. dia, 1.00 in. dia flange, cres, mfr 06845, pn 666088-035.	5-62
3A1MP6-MP7		O RING: For guide pin, 0.750 in. dia, 0.070 in. thk, mfr 86579, pn 016-4087.	5-62
3A1MP8		SLIDE, PIVOT: Right hand, mfr 83508, 06845, dwg 666231-914, (complete assembly includes chassis pivot section).	5-61
3A1MP9		SLIDE, PIVOT: Left hand, mfr 83508, 06845, dwg 666231-913, (complete assembly includes chassis pivot section).	
3A1MP10		BRACKET, SLIDE MOUNTING: 4.74 in. × 1.875 in., mfr 06845, pn 666231-939.	
3A1P1		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 91146, pn DPXA32-33S.	
3A1P2		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 91146, pn DPXA57-33S.	
3A1P3-P5		CONNECTOR, PLUG, ELECTRICAL: Mfr 95712, pn 4982-2.	
3A1R1-R2		RESISTOR: MIL type RE75G15R0.	5-61

FILTER BOX ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A1A1		FILTER BOX ASSEMBLY: Mfr 06845, pn 666230-109 or 4030637-0501.	5-61
3A1A1C1-C2		CAPACITOR: MIL type CK70AW102M.	
3A1A1C3-C4		CAPACITOR: MIL type CZ24BKB474.	
3A1A1C5-C6		Same as 3A1A1C1.	
3A1A1C7-C8		Same as 3A1A1C3.	
3A1A1E1		TERMINAL, TURRET: Mfr 71279, pn 1579-1-05.	5-61
3A1A1J1		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 77820, pn 71-74120-22P.	5-62

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

FILTER BOX ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A1A1J2		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 77820, pn PT07A16-8P.	5-62
3A1A1MP1		COVER, FILTER BOX: 4.00 in. × 3.25 in. × 0.064 in. thk, mfr 06845, pn 666088-106.	5-61

FILTER BOX ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A1A2		FILTER BOX ASSEMBLY: Ac power filter, mfr 06845, pn 666231-115.	5-61
3A1A2C1-C2		Same as 3A1A1C1.	5-61
3A1A2J1-J4		Not used	
3A1A2J5		CONNECTOR, RECEPTACLE, ELECTRICAL: Ac power receptacle, mfr 77820, pn 71-74116-5P.	5-62
3A1A2MP1		COVER, FILTER BOX: 2.20 in. × 1.82 in. × 0.032 in. thk, mfr 06845, pn 666231-118.	5-61

FILTER BOX ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A1A3		FILTER BOX ASSEMBLY: Mfr 06845, pn 666230-110 or 4030694-0501.	5-61
3A1A3C1-C72		Same as 3A1A1C1.	|
3A1A3E1		Same as 3A1A1E1.	5-61
3A1A3J1-J2		Not used	
3A1A3J3		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 77820, pn PT07A20-41S.	5-62
3A1A3J4		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 77820, pn PT07A20-39S.	5-62
3A1A3MP1		COVER, FILTER BOX: Mfr 06845, pn 666288-109.	5-61

CHASSIS ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2		CHASSIS ASSEMBLY: Mfr 06845, pn 666230-059 or 4030688-0501.	5-59
3A2E1-E101		Not used	
3A2E102		CONTACT ASSEMBLY: PA plate lead, mfr 06845, pn 4018968-0501. Contact from PA Heat Sink Cap to RF Turret Assembly.	5-60
3A2J1		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 71468, pn DPXA32-34P, mates with 3A1P1 on case cable harness.	5-59
3A2J2		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 71468, pn DPXA57-34P, mates with 3A1P2 on case cable harness.	|
3A2J3-4		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 95712 pn BNC2230-8.	5-59
3A2J5-J8		Not used	
3A2J9		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 91146, pn DBSM25S, mates with 3A2A2P1 on APC/PPC/directional coupler assembly.	5-60

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

CHASSIS ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2J10		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 81312, pn MRAMS20S95J6TY34, mates with 3A2A3P1 on ac power supply assembly.	5-60
3A2K1		SWITCH, RF TRANSMISSION LINE: Mfr 00471, pn DKC61BNC, antenna transfer switch (relay).	
3A2P1		CONNECTOR, PLUG, ELECTRICAL: Mfr 81312, pn MRE26P95JTC6H1TY34, mates with 3A2A5J1 on DC to DC converter assembly.	
3A2P2		CONNECTOR, PLUG, ELECTRICAL: Mfr 81312, pn MRAMS34S95JTC6H1TY34, mates with 3A2A5J2 on DC to DC converter assembly.	5-60
3A2P3		CONNECTOR, PLUG, ELECTRICAL: Mfr 95712, pn BNCRPL3MO, mates with J2 on antenna transfer relay.	5-59
3A2P4		CONNECTOR, PLUG, ELECTRICAL: Mfr 95712, pn 4982-2, mates with J3 on antenna transfer switch.	5-59
3A2P5		Same as 3A2P3, mates with J1 on APC/PPC/directional coupler assembly.	5-60
3A2P6		Same as 3A2P3, mates with J2 on APC/PPC/ directional coupler assembly.	5-60
3A2P7		Same as 3A2P4, mates with J1 on RF input bridge assembly.	5-64
3A2S1-S9		Not used	
3A2S10		SWITCH, INTERLOCK, CHASSIS INTERLOCK: Mfr 06845, pn 666231-111, includes three switches, knob bracket and hardware.	5-60
3A2S10A-10C		SWITCH, INTERLOCK: Mfr 06845, pn 666230-716.	5-60
3A2TB1		Not used	
3A2TB2		PLATE, GROUNDING: 1.50 in. × 1.50 in. × 0.125 in. thk, 8 terminals, mfr 06845, pn 666230-117.	5-60

FRONT PANEL ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A1		FRONT PANEL ASSEMBLY: Mfr 06845, pn 666230-089 or 4030693-0501.	5-63
3A2A1C1-C2		Not used	
3A2A1C3		CAPACITOR, VARIABLE: Driver plate tune, 0.25 in. dia × 0.59 in. lg, mfr 73899, pn VC21GY.	5-64
3A2A1C4-C7		Not used	
3A2A1C8		CAPACITOR: MIL type CP09A1KB104K3, metering circuit filter.	
3A2A1C9-C10		CAPACITOR: MIL type CM07F822J03, filament bypass for driver tube 3A2A1V2.	
3A2A1C11		CAPACITOR: MIL type CM07G103J03, screen bypass for driver tube.	5-64
3A2A1C12-C13		CAPACITOR, FIXED, PAPER: 0.1 μF ±20%, 300 Vdc, mfr 56289, pn 186P10403T15.	5-60
3A2A1C14		Same as 3A2A1C9.	5-64
3A2A1C15		CAPACITOR, VARIABLE: 0.250 in. dia × 1.25 in. lg, 0.8 - 18 pF, 750 Vdc, mfr 73899, pn VC23GBE, PA grid tune.	5-64
3A2A1C16-C17		Not used	

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

FRONT PANEL ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A1C18		CAPACITOR, FIXED, CERAMIC: 0.375 in. dia × 0.375 in. lg, 7 pF ± 0.05 pF, 5000 Vdc, mfr 96095, pn AC4WT7PORM5NPO.	5-60
3A2A1C19		Same as 3A2A1C11.	5-64
3A2A1C20		CAPACITOR, VARIABLE: 0.312 in. dia × 2.125 in. lg, 0.8 - 10 pF, 5000 Vdc, mfr 73899, pn VCJ1054.	5-60
3A2A1C21		CAPACITOR, FIXED, CERAMIC: 0.812 in. dia × 0.891 in. lg, 60 pF ±2%, 4.0 kV, mfr 96095, pn AC060PORM2PCTNPO.	|
3A2A1C22		CAPACITOR, FIXED, CERAMIC: 0.812 in. dia × 0.891 in. lg, 30 pF ±2%, 7.5 kV, mfr 96095, pn AC030PORM2PCTNPO.	|
3A2A1C23		CAPACITOR, FIXED, MICA: 1.188 in. × 0.938 in. × 1.125 in. lg, 9100 pF ±20%, 1500 Vdc, mfr 76854, type FC.	|
3A2A1C24		CAPACITOR, VARIABLE: 0.327 in. dia × 1.375 in. lg, 0.8 - 18 pF, 1250 Vdc, mfr 73899, pn VCJ1112.	|
3A2A1C25		CAPACITOR, FIXED, MICA: 0.500 in. dia × 0.596 in. lg, 51 pF ±5%, 750 Vdc, mfr 72982, pn 2922-625-0510J.	|
3A2A1C26		CAPACITOR, FIXED, MICA: 0.500 in. dia × 0.596 in. lg, 186 pF ±1%, 350 Vdc, mfr 72982, pn 2922-625-186F.	|
3A2A1C27		CAPACITOR, FIXED, MICA: 0.500 in. dia × 0.596 in. lg, 248 pF ±1%, 350 Vdc, mfr 72982, pn 2922-625-2480F.	|
3A2A1C28		CAPACITOR, FIXED, MICA: 0.500 in. dia × 0.596 in. lg, 496 pF ±1%, 350 Vdc, mfr 72982, pn 2922-625-4960F.	5-60
3A2A1C29-C30		Same as 3A2A1C9.	5-64
3A2A1CB1		CIRCUIT BREAKER: 1.925 in. × 1.500 in. × 1.281 in. h, mfr 74193, pn SM030.	5-63
3A2A1CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4246.	5-59
3A2A1CR2		Eliminated by FC-2-AN/WRC-1B.	
3A2A1DS1-DS2		LAMP: MIL type MS25237-327.	5-63
3A2A1E1-E4		TERMINAL, STANDOFF: Insulated, 0.250 in. dia × 0.625 in. lg, mfr 81312, pn 775.	5-60
3A2A1F1-F2		FUSE CARTRIDGE: 0.25 in. dia × 1.250 in. lg, 4 amps, 125 volts, mfr 71400, type MDX.	5-63
3A2A1H1-H6		SCREW, CAPTIVE: No. 10-32, mfr 06845, pn 4030574-0001.	|
3A2A1H7-H8		HANDLE ASSEMBLY: Mfr 57533, pn 9041-19.	5-63
3A2A1L1-L2		COIL, RF: 0.218 in. dia × 0.562 in. lg, 3.0 μH ±10%, 1000 mA, mfr 99800, pn BP1141, driver tube filament chokes.	5-64
3A2A1L3		COIL, RF: 0.360 in. dia × 1.00 in. lg, 3 μH ±20%, 8 amps, mfr 99800, pn BP1448, pa tube filament choke.	|
3A2A1L4		COIL, RF: 0.280 in. dia × 0.900 in. lg, 100 μH ±10%, 530 mA, mfr 99800, pn 2890-425, pa screen choke.	5-64
3A2A1L5		Same as 3A2A1L4. Pa plate circuit choke.	5-60
3A2A1M1		METER, ELECTRICAL INDICATING: 1.786 in. dia × 1.437 in. thk, mfr 81030, pn 150W001X2 (modified).	5-63
3A2A1M2		METER, ELECTRICAL INDICATING: 1.786 in. dia × 1.437 in. thk, mfr 81030, pn 150W100X1 (modified).	|
3A2A1MP1		RELIEF VALVE ASSEMBLY: 0.304 dia × 1.090 in. lg, mfr 06845, pn 666231-566.	5-63
3A2A1MP2		GASKET: Front panel, 14.00 in. dia, mfr 07700, pn 91531.	5-64
3A2A1MP3-MP5		KNOB: Pointer type, front panel, mfr 49956, pn 70-5-2G.	5-63
3A2A1MP6-MP9		FERRULE: Mfr 57533, pn 9944-3.	5-59

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

FRONT PANEL ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A1MP10		HEAT SINK ASSEMBLY: 10.00 in. lg, ×6.40 in. w, ×0.500 in. thk, mfr 06845, pn 4030572-0001, PA plate cap.	5-60
3A2A1MP11		SHIELD: Heat and vibration transfer, 3.86 in. lg ×1.34 in. w, mfr 06845, pn 666231-569, wrap-around heat sink for driver tube 3A2A1V1.	
3A2A1MP12		SHIELD: Heat and vibration transfer, 5.78 in. lg ×2.00 in. w, mfr 06845, pn 666231-567, wrap-around heat sink for PA tube 3A2A1V2.	
3A2A1MP13		SHIELD: Heat and vibration transfer, 4.24 in. lg, 1.34 in. w, mfr 06845, pn 666132-570.	5-60
3A2A1MP14		PLATE, HIGH VOLTAGE PROTECTIVE: Plastic, mfr 06845, pn 2004499-0001, covers PA and driver tubes.	5-59
3A2A1R1-R3		Not used	
3A2A1R4		RESISTOR: MIL type RWP20F1960D.	5-64
3A2A1R5-R6		RESISTOR: MIL type RC20GF220J.	
3A2A1R7-R10		Not used	
3A2A1R11		RESISTOR: MIL type RC07GF473J.	5-64
3A2A1S1		SWITCH, ROTARY: 2 section, 2 poles per section, 3 position, 1.188 in. dia, 1.548 in. thk, mfr 76845, type FC.	5-63
3A2A1S2		SWITCH, ROTARY: 2 section, 3 poles, 2 position, non shorting contacts, 1.297 in. dia, 1.346 in. thk, mfr 71590, type SA(03) S30B1MC.	
3A2A1S3		SWITCH, ROTARY: 1 section, 2 poles, 3 position, non shorting contacts, 1.297 in. dia, 1.627 in. thk, mfr 71590, type SR(03)S30C1MC.	
3A2A1S4		SWITCH, TOGGLE: Sealed, mfr 27193, pn 8869K6.	
3A2A1S5-S6		SWITCH, TOGGLE: Double throw, spring return, 0.562 in. dia, 1.274 in. thk, mfr 27193, pn 8868K2.	
3A2A1S7		SWITCH, TOGGLE: Sealed, 0.562 in. ×0.562 in. ×0.706 in. h, mfr 27193, pn 8869K7.	5-63
3A2A1S8		Not used	
3A2A1S9		SWITCH, TOGGLE: Subminiature, sealed, 0.546 in. × 0.546 in., 0.749 in. h, mfr 27193, pn 8867K4.	5-60
3A2A1V1		TUBE, ELECTRON: MIL type 8233.	
3A2A1V2		TUBE, ELECTRON: MIL type 8116.	5-60
3A2A1XDS1-XDS2		LIGHT, INDICATOR: Mfr 72619, pn 174-8430W1.	5-63
3A2A1XF1-XF2		FUSEHOLDER: MIL type FHL17G1.	5-63
3A2A1XV1		SOCKET, ELECTRON TUBE: 1.250 in. dia, 0.703 in. thk, mfr 71785, pn 149-19-11-073.	5-64
3A2A1XV2		SOCKET, ELECTRON TUBE: Mfr 74970, pn 122-105-200.	5-64
3A2A1A1		RF INPUT BRIDGE ASSEMBLY: Printed circuit board with all parts mounted, mfr 06845, pn 666231-549 or 4030734-0501.	5-64
3A2A1A1C1		CAPACITOR, VARIABLE: 0.250 in. dia, 0.672 in. lg, 0.8 -4.5 pF, 750 Vdc, mfr 73899, pn VCJ1460.	5-65
3A2A1A1C2		CAPACITOR: MIL type CM05F101G03.	
3A2A1A1C3		Not used	
3A2A1A1C4		CAPACITOR: Mfr 06845, pn 690131-821.	
3A2A1A1C5		CAPACITOR: MIL type CM05F222G03.	
3A2A1A1C6		CAPACITOR: Mfr 06845, pn 696088-151.	
3A2A1A1C7		CAPACITOR: MIL type CM05F822G03.	
3A2A1A1J1		CONNECTOR, RECEPTACLE, ELECTRICAL: 0.500 in. dia, 1.03 in. lg, mfr 91146, pn BNCRB19F0.	
3A2A1A1R1		RESISTOR: MIL type RL32AD161J.	
3A2A1A1R2		RESISTOR: MIL type RC20GF473J.	
3A2A1A1R3		RESISTOR: MIL type RN60C19R6F.	5-65

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

FRONT PANEL ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A1A1T1		TRANSFORMER, BROAD BAND INPUT: 0.68 in. × 0.68 in. × 0.51 in. h, 30 pF ±15%, 8 Mc, mfr 25159, 06845, dwg 4030847-0701.	5-65

APC/PPC/DIRECTIONAL COUPLER ASSEMBLY

3A2A2		APC/PPC/DIRECTIONAL COUPLER ASSEMBLY: Mfr 06845, pn 666231-809 or 4030741-0501.	5-59
3A2A2C1-C14		Not used	
3A2A2C15-C22		CAPACITOR: MIL type CK70AW102M.	5-65, 5-67
3A2A2J1-J2		Part of 3A2A2MP1.	
3A2A2MP1		DIRECTIONAL COUPLER: 1.000 in. dia, 3.703 in. lg, mfr 70998, pn 4148.	5-67
3A2A2MP2		GROMMET: MIL type MS35489-1.	5-67
3A2A2MP3-MP9		BUSHING: Molded plastic, 0.312 in. OD, 0.218 in. ID, 0.20 in. thk, mfr 06845, pn 666162-385.	5-66
3A2A2MP10		COVER: Mfr 06845, pn 666231-810 or 4030933-0001.	5-59
3A2A2MP11		FRAME: Mfr 06845, pn 666231-796 or 4030596-0501.	5-66
3A2A2MP12		Same as 3A2A2MP2.	
3A2A2MP13-MP14		TERMINAL: Ground lug, mfr 78189, pn 2104-04-00.	5-66
3A2A2P1		CONNECTOR, RECEPTACLE, ELECTRICAL: Mfr 91146, pn DSBM25P. Mates with 3A2J9 on AM-3007/URT chassis.	5-66
3A2A2P2		CONNECTOR: MIL type UG913A/U modified, mates with J1 on 3A2A2MP1.	5-67
3A2A2R1-R23		Not used	
3A2A2R24		RESISTOR: MIL type RN60C7R50F.	5-67
3A2A2A1		APC AMPLIFIER: Printed circuit board with all components assembled, mfr 06845, pn 666231-541.	5-67
3A2A2A1C1		CAPACITOR: MIL type CS13BF156K.	5-69
3A2A2A1C2-C3		CAPACITOR: MIL type CL65BG181MP3.	
3A2A2A1CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N649.	
3A2A2A1K1		RELAY: DPDT, 28 Vdc - 225 mH, 115 Vac - 0.60 pF, mfr 02289, pn 2F2428.	
3A2A2A1Q1-Q3		TRANSISTOR: MIL type 2N1613.	
3A2A2A1R1-R2		RESISTOR, VARIABLE: 1.250 in. lg, 0.292 in. w, 0.300 in. h, 20 ohms ±20%, mfr 02111, 06845, dwg 4030487-0701.	
3A2A2A1R3		RESISTOR: MIL type RC07GF101J.	
3A2A2A1R4		RESISTOR: MIL type RC07GF102J.	
3A2A2A1R5		RESISTOR: MIL type RC07GF123J.	
3A2A2A1R6		Same as 3A2A2A1R3.	
3A2A2A1R7		RESISTOR: MIL type RC07GF182J.	
3A2A2A1R8		RESISTOR: MIL type RL07S362J.	
3A2A2A1R9		Same as 3A2A2A1R3.	
3A2A2A1R10		RESISTOR: MIL type RC07GF224J.	
3A2A2A1R11		RESISTOR: MIL type RC07GF183J.	
3A2A2A1R12		RESISTOR: MIL type RC07GF472J.	
3A2A2A1R13-R19		Not used	
3A2A2A1R20		Same as 3A2A2A1R12.	
3A2A2A1R21-R24		Not used	
3A2A2A1R25		Same as 3A2A2A1R4.	5-69

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

APC/PPC/DIRECTIONAL COUPLER ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A2A1TP1		JACK, TEST POINT: 0.400 in. lg, 0.230 in. × 0.156 in., mfr 74970, pn 105-751.	5-69
3A2A2A1XQ1-XQ3		PAD, TRANSISTOR: Mfr 07047, pn 10012.	5-69
3A2A2A2		PPC AMPLIFIER: Printed circuit board with all components assembled, mfr 06845, pn 666231-545.	5-66
3A2A2A2C1-C4		Not used	
3A2A2A2C5		CAPACITOR: MIL type CL65BN220MP3.	5-70
3A2A2A2C6		CAPACITOR: MIL type CM06F751G03.	
3A2A2A2C7		CAPACITOR: MIL type CL23CK010TM3.	
3A2A2A2C8		CAPACITOR: MIL type CL65BH101MP3.	
3A2A2A2E1-E7		Not used	
3A2A2A2E8-E13		TERMINAL, STUD: 0.093 in. dia, 0.240 in. lg, mfr 86577, pn 1D3-8B.	
3A2A2A2Q1-Q3		Not used	
3A2A2A2Q4-Q5		TRANSISTOR: MIL type 2N1613.	
3A2A2A2R1-R12		Not used	
3A2A2A2R13		RESISTOR: MIL type RN60C1001F.	
3A2A2A2R14		RESISTOR: MIL type RL07S243J.	
3A2A2A2R15		RESISTOR: MIL type RC07GF183J.	
3A2A2A2R16		RESISTOR: MIL type RL07S912J.	
3A2A2A2R17-R18		RESISTOR: MIL type RC07GF183J.	
3A2A2A2R19		RESISTOR: MIL type RC07GF471J.	
3A2A2A2R20-R22		Not used	
3A2A2A2R23		RESISTOR: MIL type RC07GF102J.	
3A2A2A2T1		TRANSFORMER: 1.156 in. lg, 0.875 in. w, 0.875 in. h, 12 k ohms ±15%, 12.6 ma, mfr 00348, pn M4341.	
3A2A2A2TP1		Not used	
3A2A2A2TP2-TP5		JACK, TEST POINT: Mfr 74970, pn 105-751.	
3A2A2A2XQ1-XQ3		Not used	
3A2A2A2XQ4-XQ5		MOUNTING PAD, TRANSISTOR: Mfr 07047, pn 10012.	5-70
3A2A2A3		DETECTOR ASSEMBLY: Printed circuit board with all components assembled, mfr 06845, pn 666231-581 or 4030984-0501.	5-67
3A2A2A3C1-C11		Not used	
3A2A2A3C12		CAPACITOR: MIL type CM05CD100D03.	5-68
3A2A2A3C13		Not used	
3A2A2A3C14		CAPACITOR: MIL type CK70AW471M.	
3A2A2A3CR1		Not used	
3A2A2A3CR2-CR3		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N3070.	
3A2A2A3E1-E14		Not used	
3A2A2A3E15-E17		TERMINAL, STUD: 0.093 in. dia, 0.240 in. lg, mfr 86577, pn ID3-8B.	
3A2A2A3-J1		CONNECTOR, RECEPTACLE, ELECTRICAL: MIL type UG625B/U.	
3A2A2A3MP1		COVER: Detector assembly; mfr 06845, pn 2058831-0001.	
3A2A2A3P1		Not used	
3A2A2A3P2		CONNECTOR, RIGHT ANGLE: 0.56 in dia, 1.63 in. lg, mfr 91146, pn BNC UG913A/U modified.	
3A2A2A3R1-R20		Not used	
3A2A2A3R21		RESISTOR: MIL type RC07GF223J.	5-68

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

APC/PPC/DIRECTIONAL COUPLER ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A2A3R22		RESISTOR: MIL type RL07S362J.	5-68

POWER SUPPLY ASSEMBLY, AC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A3		POWER SUPPLY ASSEMBLY, AC: Mfr 06845, pn 666231-561 or 4030735-0501.	5-59
3A2A3C1		CAPACITOR, FIXED, ELECTROLYTIC: 3 1/16 in. dia, 5 in. lg, 40 Vdc, mfr 76845, pn 32D2134T.	5-71
3A2A3CR1-CR4		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N1202.	5-71
3A2A3DS1		LAMP: MIL type MS25237-327.	5-59
3A2A3MP1		LENS: MIL type LC12RN.	5-59
3A2A3P1		CONNECTOR, PLUG, ELECTRICAL: MIL type MRA20PTC6H1.	5-71
3A2A3R1-R6		Not used	
3A2A3R7		RESISTOR, VARIABLE: 200 ohms, mfr 80294, pn 224S1-201.	5-59
3A2A3T1L1		TRANSFORMER/INDUCTOR: 7 in. lg, 4.188 in. w, 4.562 in. h, mfr 07028, type M20.	5-59
3A2A3TP1		JACK, TIP: 0.172 in. dia, 0.345 in. lg, mfr 98291, pn SKT14.	5-59
3A2A3XDS1		LAMPHOLDER: MIL type LH72.	5-59
3A2A3A1		POWER SUPPLY SUBASSEMBLY: Printed circuit board with all components assembled, over voltage circuit, mfr 06845, pn 666231-558.	5-71
3A2A3A1C1		Not used	
3A2A3A1C2		CAPACITOR: MIL type CL65BH101MP.	5-72
3A2A3A1CR1-CR4		Not used	
3A2A3A1CR5-CR8		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4247.	
3A2A3A1CR9		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N755A.	
3A2A3A1CR10		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4245.	
3A2A3A1K1		RELAY: 1.200 in. lg, 0.200 in. w, 1.275 in. h, 5000 ohms ±10%, 7.0 ma, mfr 02289, pn 2BC1971.	
3A2A3A1Q1		TRANSISTOR: MIL type 2N1613.	
3A2A3A1R1		RESISTOR: MIL type RC42GF153J.	
3A2A3A1R2		RESISTOR: MIL type RN60C1543F.	
3A2A3A1R3		RESISTOR: MIL type RL32S162J.	
3A2A3A1R4		RESISTOR: MIL type RL20S202J.	
3A2A3A1R5		RESISTOR: MIL type RC20GF471J.	
3A2A3A1R6		RESISTOR: MIL type RC32GF272J.	
3A2A3A1XQ1		MOUNTING PAD, TRANSISTOR: Mfr 07047, pn 10012.	5-72

TURRET ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A4		TURRET ASSEMBLY: Mfr 06845, pn 666230-063 or 4030974-0501.	5-59
3A2A4FL1		FILTER, OUTPUT: 2.25 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030654-0501 or 666230-462.	5-73
3A2A4FL2		FILTER, OUTPUT: 2.75 MHz nom, 1.080 in × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0502 or 666230-464.	5-73

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

TURRET ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A4MP21		DISC, SELECTOR CENTER: 4.562 in. dia × 0.011 in. thk, silver alloy sheet, mfr 06845, pn 666231-085.	5-73
3A2A4MP22		DISC, SELECTOR LOWER: 4.376 in. dia × 0.011 in. thk, silver alloy sheet, mfr 06845, pn 666164-422.	
3A2A4MP23		Same as 3A2A4MP20.	
3A2A4MP24		TURRET ASSEMBLY: Mfr 06845, pn 666231-097 (c/o 3A2A4MP45-MP59).	
3A2A4MP25		ACTUATOR, SWITCH: Mfr 91929, pn JS5 (u/w 3A2A4S2).	
3A2A4MP26		TURRET MOUNT: Mfr 06845, pn 666164-525 (c/o 3A2A4MP2-MP6 and 3A2A4MP61).	
3A2A4MP27		STATOR, STAKED, TURRET (SELECTOR): 11 contacts, mfr 06845, pn 666231-083.	
3A2A4MP28		STATOR, STAKED, ANTENNA: 20 contacts, mfr 06845, pn 666164-516.	
3A2A4MP29-MP32		WASHER, SPACER: Nylon, 0.312 in. dia × 0.170 in. thk, mfr 06845, pn 666164-511.	
3A2A4MP33-MP39		WASHER, SPACER: Nylon, 0.312 in. dia × 0.062 in. thk, mfr 06845, pn 666164-509.	
3A2A4MP40-MP43		WASHER, SPACER: Nylon, 0.312 in. dia × 0.139 in. thk, mfr 06845, pn 666164-510.	
3A2A4MP44		BRACKET, DOUBLE ANGLE: 2.08 in. × 1.54 in. × 0.0625 in. thk, cres, pass, mfr 06845, pn 666231-798.	
3A2A4MP45		TURRET: Mfr 06845, pn 666231-095 (p/o 3A2A4MP24).	
3A2A4MP46-MP47		PLATE, RETAINER: 6.760 in. dia × 0.016 in. thk, copper nickel plate, mfr 06845, pn 666164-412 (p/o 3A2A4MP24).	
3A2A4MP48-MP50		SCREW, CAPTIVE: No 10-32 × 1.78 in. lg, cres, mfr 06845, pn 666164-409 (p/o 3A2A4MP24).	
3A2A4MP51-MP53		RING, RETAINING: E-ring, MIL type MS16633-1-1031 (p/o 3A2A4MP24).	
3A2A4MP54-MP56		SPRING: 1.25 in. lg, 10 turns, mfr 06845, pn 549007-026 (p/o 3A2A4MP24).	
3A2A4MP57-MP59		WASHER, SHOULDERED: 0.400 in. dia × 0.094 in. thk, cres, pass, mfr 06845, pn 666164-419, (p/o 3A2A4MP24).	
3A2A4MP60		PLATE, NUT: 0.26 in. × 0.76 in. × 0.062 in. thk, cres, pass, mfr 06845, pn 666231-716.	
3A2A4MP61		MOUNT, TURRET: 4.250 in. dia × 0.718 in. thk, alum alloy, mfr 06845, pn 666164-524 (p/o 3A2A4MP26).	
3A2A4R1-R19		Not used	
3A2A4R20		RESISTOR: MIL type RCR07G473J.	
3A2A4S1		3A2A4MP13, MP14, MP22, MP27, MP28 make up 3A2A4S1.	
3A2A4S2		SWITCH: SPDT, 0.781 in. lg, 0.250 in. w, 0.356 in. h, mfr 91929, pn 11SM3T.	
3A2A4T1		TRANSFORMER, RF: 2.25 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0501 or 666231-041.	
3A2A4T2		TRANSFORMER, RF: 2.75 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0502 or 666231-043.	
3A2A4T3		TRANSFORMER, RF: 3.25 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0503 or 666231-045.	
3A2A4T4		TRANSFORMER, RF: 3.75 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0504 or 666231-047.	
3A2A4T5		TRANSFORMER, RF: 4.5 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0505 or 666231-049.	
3A2A4T6		TRANSFORMER, RF: 5.5 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0506 or 666231-051.	
3A2A4T7		TRANSFORMER, RF: 6.5 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0507 or 666231-053.	
3A2A4T8		TRANSFORMER, RF: 7.5 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0508 or 666231-055.	5-73

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

TURRET ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A4FL3		FILTER, OUTPUT: 3.25 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0503 or 666230-466.	5-73
3A2A4FL4		FILTER, OUTPUT: 3.75 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0504 or 666230-468.	
3A2A4FL5		FILTER, OUTPUT: 4.50 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0505 or 666230-470.	
3A2A4FL6		FILTER, OUTPUT: 5.50 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0506 or 666230-472.	
3A2A4FL7		FILTER, OUTPUT: 6.50 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0507 or 666230-474.	
3A2A4FL8		FILTER, OUTPUT: 7.50 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0508 or 666230-476.	
3A2A4FL9		FILTER, OUTPUT: 9.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0509 or 666230-478.	
3A2A4FL10		FILTER, OUTPUT: 11.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0510 or 666230-480.	
3A2A4FL11		FILTER, OUTPUT: 13.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0511 or 666230-482.	
3A2A4FL12		FILTER, OUTPUT: 15.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0512 or 666230-484.	
3A2A4FL13		FILTER, OUTPUT: 17.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0513 or 666230-486.	
3A2A4FL14		FILTER, OUTPUT: 19.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0514 or 666230-488.	
3A2A4FL15		FILTER, OUTPUT: 21.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0515 or 666230-490.	
3A2A4FL16		FILTER, OUTPUT: 23.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0516 or 666230-492.	
3A2A4FL17		FILTER, OUTPUT: 25.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0517 or 666230-494.	
3A2A4FL18		FILTER, OUTPUT: 27.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0518 or 666230-496.	
3A2A4FL19		FILTER, OUTPUT: 29.0 MHz nom, 1.080 in. × 1.045 in. × 2.562 in. lg, mfr 06845, pn 4030645-0519 or 666230-498.	
3A2A4FL20		RF FILTER: P/o Turret Drive Motor 3A2A4A1B1.	
3A2A4H1-H4		NUT, CAPTIVE: No. 10-32, steel cad pl, mfr 46384, pn LAS032-2.	
3A2A4MP1		BASE, TURRET ASSEMBLY: 6.760 in. × 6.760 in. × 0.43 in. mfr 06845, pn 666230-167.	
3A2A4MP2-MP4		PIN, INSERT: MIL type MS171524-219 (p/o 3A2A4MP26).	
3A2A4MP5		GEAR, INTERNAL TOOTH: 2.998 in. dia × 0.125 in. thk, pitch 48, 120 teeth, cres, mfr 00141, pn CC2-120.	
3A2A4MP6		PIN, INSULATED: 0.132 in. dia × 0.68 in. lg, nylon, mfr 06845, pn 666164-508.	
3A2A4MP7		COLLAR: 5.50 in. dia, mfr 06845, pn 666164-523.	
3A2A4MP8		BEARING, BALL: Mfr 32828, pn KB40XP(modified).	
3A2A4MP9		COLLAR, TURRET MOUNT: 4.0 in. dia, mfr 06845, pn 666164-407.	
3A2A4MP10		CLAMP, WIRING: Mfr 06845, pn 666164-415.	
3A2A4MP11		PLATE, STATOR: Mfr 06845, pn 666231-598.	
3A2A4MP12		BRACKET, SUPPORT: 4.50 in. h × 0.62 in. × 1.12 in. × 0.160 in. thk, alum alloy, mfr 06845, pn 666231-799.	
3A2A4MP13		DISC, SELECTOR UPPER: 4.376 in. dia × 0.011 in. thk, silver alloy sheet, mfr 06845, pn 666231-084.	
3A2A4MP14-MP19		BUSHING, INSULATED: 0.180 in. dia, × 0.272 in. thk, nylon, mfr 06845, pn 666164-426.	
3A2A4MP20		SPACER, INSULATED: Plastic, 4.125 in. dia × 0.062 in. thk, mfr 06845, pn 666164-425.	5-73

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

TURRET ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A4T9		TRANSFORMER, RF: 9.0 MHz, 1.00 in. × 0.98 in. × 1.468 in lg, mfr 06845, pn 4030607-0509 or 666231-057.	5-73
3A2A4T10		TRANSFORMER, RF: 11.0 MHz, 1.00 in. × 0.98 in. × 1.468 in lg, mfr 06845, pn 4030607-0510 or 666231-059.	
3A2A4T11		TRANSFORMER, RF: 13.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0511 or 666231-061.	
3A2A4T12		TRANSFORMER, RF: 15.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0512 or 666231-063.	
3A2A4T13		TRANSFORMER, RF: 17.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0513 or 666231-065.	
3A2A4T14		TRANSFORMER, RF: 19.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0514 or 666231-067.	
3A2A4T15		TRANSFORMER, RF: 21.0 MHz, 1.00 in. × 0.98 in. × 1.468 in lg, mfr 06845, pn 4030607-0515 or 666231-069.	
3A2A4T16		TRANSFORMER, RF: 23.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0516 or 666231-071.	
3A2A4T17		TRANSFORMER, RF: 25.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0517 or 666231-073.	
3A2A4T18		TRANSFORMER, RF: 27.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0718 or 666231-075.	
3A2A4T19		TRANSFORMER, RF: 29.0 MHz, 1.00 in. × 0.98 in. × 1.468 in. lg, mfr 06845, pn 4030607-0719 or 666231-077.	
3A2A4A1		DRIVE MOTOR SUBASSEMBLY: Consists of motor, motor m mount, gears, and all hardware, mfr 06845, pn 666231-797.	
3A2A4A1B1		MOTOR, DC: 28 Vdc, 0.150 amps, 1.266 in. dia × 2.922 in. lg, mfr 16127, pn 73062-1.	
3A2A4A1H1-H4		INSERT, SCREW LOCKING: MIL type MS21209C0615.	
3A2A4A1H5-H8		INSERT, HELI-COIL: MIL type MS21209F1-15.	
3A2A4A1MP1		SHAFT, IDLER: 0.687 in. lg × 0.422 in. dia, mfr 06845, pn 666164-417.	
3A2A4A1MP2-MP3		BUSHING, SHAFT: Flanged, 0.422 in. dia, mfr 06845, pn 666172-723.	
3A2A4A1MP4		GEAR, SPUR: 0.625 in. dia, 28 teeth, pitch 48, mfr 06845, pn 666164-529.	
3A2A4A1MP5		GEAR, IDLER: 1.0 in. dia, 48 teeth, pitch 48, mfr 06845, pn 666164-530.	
3A2A4A1MP6		MOUNT, MOTOR: Mfr 06845, pn 666164-405.	
3A2A4A1MP7		PIN: MIL type MS16562-213.	
3A2A4A1MP8		PIN: MIL type MS16562-192.	5-73

DC-TO-DC CONVERTER ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A5		DC-TO-DC CONVERTER ASSEMBLY: Mfr 06845, pn 666088-171 or 4030662-0501.	5-59
3A2A5C1-C2		CAPACITOR, FIXED, TANTALUM: 1000 mfd +50% -15%, 40 Vdc, 1.125 in. dia, 1.062 in. lg, mfr 90201, pn XTV108TO40POL.	5-74
3A2A5C3-C5		Not used.	
3A2A5C6		CAPACITOR, FIXED: 1 mfd ±20%, 1500 Vdc, 2.00 in. × 2.00 in. × 1.125 in. h, mfr 99120, pn CB20-105A.	5-75
3A2A5C7-C8		CAPACITOR, FIXED PAPER: 0.22 mfd ±20%, 600 Vdc, 0.670 in. dia, 1 9/16 in. lg, mfr 56289, pn 186P22406T15.	5-78
3A2A5C9-C10		CAPACITOR, FIXED, PAPER: 0.47 mfd ±20%, 300 Vdc, 0.670 in. dia, 1 9/16 in. lg, mfr 56289, pn 186P47403T15.	
3A2A5C11-C12		CAPACITOR, FIXED PAPER: 0.33 mfd ±20%, 400 Vdc, 0.670 in. dia, 1 9/16 in. lg, mfr 56289, pn 186P33404T15.	5-78
3A2A5C13-C16		Not used.	

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

DC-TO-DC CONVERTER ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A5C17-C18		CAPACITOR, FIXED, MICA: 10,000 mmf ±10%, 100Vdc, 0.805 in. lg, 0.625 in. w, 0.412 in. thk, mfr 72136, pn DM20F103K100V.	5-74
3A2A5CR1		Same as 3A2A3CR1.	5-76
3A2A5CR2-CR31		Not used.	
3A2A5CR32		Same as 3A2A3A1CR10.	
3A2A5J1		CONNECTOR: MIL type MREMS26S95J6TY34.	
3A2A5J2		CONNECTOR: MIL type MRA3P95J6TY34.	
3A2A5K1		RELAY: 300 ohms ±10%, 26 Vdc, DPDT, 1.075 in. lg, 0.515 in. w, 1.260 in. h, mfr 09026, pn BR7X300D5S152.	
3A2A5K2-K3		RELAY: 975 ohms ±10%, 26.5 Vdc, DPDT, 0.800 in. lg, 0.396 in. w, 0.875 in. h, mfr 02289, pn 2B2110.	
3A2A5K4		RELAY: SPST, MIL type RY2B2A.	5-76
3A2A5K5		RELAY: Hermetically sealed, 4PDT, 5 amps at 29 Vdc, mfr 02288, pn MHZ4228.	5-75
3A2A5K6		RELAY: 4 pole, 0.800 in. w, ×1.360 in. lg, ×0.322 in. thk mfr 70309, pn JH12D26-5.	
3A2A5K7		RELAY: Hermetically sealed, 4PDT, 3 amps at 26.5 Vdc, mfr 05587, pn X943.	5-75
3A2A5L1		INDUCTOR, POWER: 5 mH, 2 amp, 100 volts, 2 in. dia, 0.875 in. h, mfr 17637, pn 2127.	5-76
3A2A5L2-L4		INDUCTOR, POWER: 150 mH, 0.125 amp, 500 Vdc, mfr 06845, pn 4030852-0701.	5-78
3A2A5L5		INDUCTOR, TOROIDAL: 250 mH ±10%, 70 volts, 1.297 in. lg, 0.719 in. w, 1.750 in. h, mfr 07388, pn M30-52.	5-76
3A2A5L6-L7		COIL, RF: 0.250 in. dia, 0.500 in. lg, 3.0 μH ±10% at 20 Mc, mfr 99800, 06845, dwg 4010375-0701.	5-76
3A2A5Q1-Q2		TRANSISTOR: Mfr 04713, pn SJ2016.	5-76
3A2A5R1-R2		Not used.	
3A2A5R3-R4		RESISTOR: MIL type RE70G4R99.	5-76
3A2A5R5-R11		Not used.	
3A2A5R12		RESISTOR: MIL type RE65G4021.	5-75
3A2A5R13-R21		Not used.	
3A2A5R22		RESISTOR, FIXED, WIREWOUND: 30 K ohms ±3%, 5w, 11/32 in. dia, 15/16 in. lg, mfr 91637, pn RS5-303H.	5-78
3A2A5R23		RESISTOR, VARIABLE: 0.292 in. w, 1.250 in. lg, 0.300 in. h, 1 ohm ±10%, 1.5 w, mfr 73138, 06845, dwg 4030487-0702.	5-77
3A2A5R24		RESISTOR: MIL type RWP19F8250F.	5-78
3A2A5R25-R29		Not used.	
3A2A5R30-R31		RESISTOR, VARIABLE: 0.292 in. w, 1.250 in. lg, 0.300 in. h, 20 ohms ±20%, 1.5 w, mfr 73138, 06845, dwg 4030487-0703.	5-77
3A2A5T1		TRANSFORMER, POWER: 27.5 Vdc ±15%, 38.5 Vdc max, 4.000 in. dia, 2.250 in. h, mfr 17637, pn UTCW2328.	5-76
3A2A5TP1-TP8		CONNECTOR: 0.172 in. dia, 0.345 in. lg, mfr 98291, pn SKT14.	5-77
3A2A5A1		COMPONENT BOARD ASSEMBLY: Mfr 06845, pn 666231-595 or 4030737-0501.	5-76
3A2A5A1CR1-CR30		Not used.	
3A2A5A1CR31		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4248.	5-77
3A2A5A1R1-R12		Not used.	
3A2A5A1R13		RESISTOR: RC42GF183J.	5-77
3A2A5A1R14-R24		Not used.	
3A2A5A1R25		RESISTOR: MIL type RN60C4122F.	5-77
3A2A5A2		COMPONENT BOARD ASSEMBLY: Mfr 06845, pn 666231-524 or 4030982-0501.	5-78
3A2A5A2C1-C14		Not used.	
3A2A5A2C15-C16		Same as 3A2A2A2C8.	5-79
3A2A5A2CR1-CR17		Not used.	
3A2A5A2CR18-CR19		Same as 3A2A3A1CR5.	5-79

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

DC-TO-DC CONVERTER ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A5A2CR22-CR29		SEMICONDCUTOR DEVICE, DIODE: MIL type 1N4139.	5-79
3A2A5A2R1-R17		Not used.	
3A2A5A2R18		RESISTOR: MIL type RC20GF681J	
3A2A5A2R19		RESISTOR: MIL type RC20GF122J.	
3A2A5A2R20-R25		Not used.	
3A2A5A2R26-R27		RESISTOR: MIL type RC20GF563J.	5-79
3A2A5A3		CAPACITOR ASSEMBLY:Mfr 06845, pn 666231-599.	5-78
3A2A5A3C1-C12		Not used.	
3A2A5A3C13-C14		CAPACITOR, FIXED PAPER: 1 mfd ±10%, 100 Vdc, 1.140 in lg, 0.425 in. w, 0.325 in. h, mfr 99515, pn MG1-105E1S.	5-78
3A2A5A4		COMPONENT BOARD ASSEMBLY: Mfr 06845, pn 666231-521 or 4030566-0501.	5-75
3A2A5A4CR1-CR5		Not used.	
3A2A5A4CR6-CR9		SEMICONDUCTOR DEVICE, DIODE: 1N2361.	5-75
3A2A5A4R1-R5		Not used.	
3A2A5A4R6		RESISTOR: MIL type RWP17F3R01D.	
3A2A5A4R7		RESISTOR: MIL type RN60C4990F.	
3A2A5A4R8-R9		RESISTOR: MIL type RC42GF225J.	5-75
3A2A5A5		COMPONENT BOARD ASSEMBLY: Mfr 06845, pn 666231-515 or 4030736-0501.	5-76
3A2A5A5C1-C2		Not used.	
3A2A5A5C3		Same as 3A2A2A2C5.	5-80
3A2A5A5CR1		Not used.	
3A2A5A5CR2		Same as 3A2A5A2CR22.	
3A2A5A5R1-R31		Not used.	
3A2A5A5R32		RESISTOR: MIL type RC32GF472J.	5-80
3A2A5A6		COMPONENT BOARD ASSEMBLY: Mfr 06845, pn 666231-518 or 4030733-0501.	5-76
3A2A5A6C1-C3		Not used.	
3A2A5A6C4		Same as 3A2A2A2C5.	5-81
3A2A5A6CR1-CR2		Not used.	
3A2A5A6CR3-CR4		Same as 3A2A3A1C10.	
3A2A5A6CR5		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N3041E.	
3A2A5A6R1-R4		Not used.	
3A2A5A6R5		RESISTOR: MIL type RL32S750J.	
3A2A5A6R6-R32		Not used.	
3A2A5A6R33		Same as 3A2A5A5R32.	5-81
3A2A5A7		DIODE ASSEMBLY: Mfr 06845, pn 666231-505 or 4030732-0501.	5-78
3A2A5A7CR1-CR9		Not used.	
3A2A5A7CR10-CR13		Same as 3A2A5A1CR31.	5-82
3A2A5A7CR14-CR17		Same as 3A2A3A1CR5.	5-82
3A2A5A8		COMPONENT BOARD ASSEMBLY: Mfr 06845, pn 666231-501.	5-78
3A2A5AC1-C18		Not used.	
3A2A5A8C19		CAPACITOR: MIL type CP09A1KF103K3.	5-83
3A2A5A8CR1-CR29		Not used.	
3A2A5A8CR30		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N3031B.	
3A2A5A8R1-R10		Not used.	
3A2A5A8R11		RESISTOR: MIL type RC32GF334J.	5-83

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

DC-TO-DC CONVERTER ASSEMBLY (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2A5A8R12-R13		Not used.	
3A2A5A8R14		RESISTOR: MIL type RC32GF474J.	5-83
3A2A5A8R15		RESISTOR: MIL type RC32GF183J.	
3A2A5A8R16-R27		Not used.	
3A2A5A8R28		RESISTOR: MIL type RN70C1242F.	
3A2A5A8R29		RESISTOR: MIL type RN65C6341F.	5-83

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

INTERCONNECTION BOX J-1265/U

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4		INTERCONNECTION BOX J-1265/U: Mfr 06845, pn A00081-001 or 666230-075 or 4030664-0501.	1-1
4CR1		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N649.	5-84
4CR2-CR3		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N649, required only when FC3-AN/WRC-1B installed.	
4F1		FUSE: MIL type FO2B125V2AS.	
4J1		CONNECTOR: Mfr 77820, pn 71-74116-5S.	
4J2		CONNECTOR: Mfr 77820, pn PT07A20-41P.	
4J3		CONNECTOR: Mfr 77820, pn PT07A20-39P.	
4J4		CONNECTOR: Mfr 77820, pn PT07A22-55S.	
4J5		CONNECTOR: Mfr 77820, pn PT07A20-39S.	
4K1		RELAY: Hermetically sealed, DPDPT, inductive 5 amp at 32 Vdc, resistive 10 amp at 32 Vdc, mfr 09026, pn BR7X300D5S152.	
4K2-K3		RELAY: Mfr 02289, pn 2B2111, required only when FC 3-AN/WRC-1B installed.	
4MP1-MP3		SCREW, CAPTIVE: Mfr 06845, pn 666164-260.	
4MP4		STUFFING TUBE: MIL type MS16156-2.	
4MP5-MP6		STUFFING TUBE: MIL type MS16158-5.	
4MP7-MP8		STUFFING TUBE: MIL type MS16157-4.	
4MP9		GASKET: Mfr 06845, pn 666231-294.	
4R1		RESISTOR: MIL type RW65G821.	
4TB1-TB7		TERMINAL BOARD: Mfr 88223, pn 26TB12.	
4XF1		FUSEHOLDER: MIL type FHL18G2-1.	5-84

FILTER BOX ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A6		FILTER BOX ASSEMBLY: Mfr 06845, pn 666235-278 or 4030728-0501.	5-84
4A6FL1-FL2		FILTER, RF: Mfr 56289, pn 5JX94.	5-84

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

ANTENNA COUPLER CU-937/UR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5		ANTENNA COUPLER CU-937/UR: Mfr 06845, pn 666230-071 or 4030699-0501.	1-2
5B1-B2		MOTOR, DIRECT CURRENT: 0.2 amps, 26 volts, mfr 25140, pn 29A854.	5-85, 5-86
5B3		ACTUATOR, ELECTRO-MECHANICAL, ROTARY: 26.5 Vdc, 0.6 amp at rated load, 50 in. oz rated output torque, mfr 25140, pn type 67A202.	5-86
5C1-C2		CAPACITOR, FIXED, CERAMIC: 15 pf ±5%, 7500 Vdc, 0.812 in. dia, 0.890 in. thk, mfr 71590, pn 850S15Z.	5-86
5C3		CAPACITOR, FIXED, CERAMIC: 500 pf ±20%, 5000 Vdc, 0.812 in. dia, 0.890 in. thk, mfr 96095, pn AC8-500PORM20-PCTH1K.	
5C4		CAPACITOR, FIXED, CERAMIC: 40 pf ±2%, 7500 Vdc, 0.812 in. dia, 0.890 in. thk, mfr 71590, pn 850S40Z.	
5C5		Same as 5C1.	
5C6		CAPACITOR, FIXED, CERAMIC: 50 pf ±2%, 7500 Vdc, 0.812 in. dia, 0.890 in. thk, mfr 71590, pn 850S50Z.	
5C7		Same as 5C1.	
5C8		CAPACITOR, FIXED, CERAMIC: 100 pf ±2%, 5000 Vdc, 0.812 in. dia, 0.890 in. thk, mfr 71590, pn 850S100N.	
5C9		CAPACITOR, FIXED, CERAMIC: 20 pf ±0.5 μμF, 7500 Vdc, 0.812 in. dia, 0.890 in. thk, mfr 80378, pn 850S20Z.	
5C10		Same as 5C4.	
5C11		Same as 5C6.	
5C12		Same as 5C9.	5-86
5CR1-CR10		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N649.	5-85
5CR11		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N4246.	5-85
5FL1-FL6		FILTER, RF: 1-3/16 in. lg, 9/16 in. dia, 2 amps, 100 Vdc, mfr 56289, pn 2JX48.	5-85, 5-86
5J1		CONNECTOR: MIL type UG680A/U, FC1-CU-937/UR.	5-86
5J2		CONNECTOR, ELECTRICAL, RECEPTACLE: 0.875 in. dia, 1.43 in. lg, mfr 91146, pn NJB3F55.	5-86
5K1		RELAY, VACUUM, HIGH VOLTAGE: 1.35 in. dia, 3.00 in. h, mfr 73905, pn RB3.	5-86
5K2-K6		RELAY: 10 amps at 32 volts, DPDT, mfr 09026, pn BR7X300D5S152.	5-85
5K7		RELAY: Hermetically sealed, 0.590 in. dia, 1.380 in. lg, 4PDT, 300 ohms ±10%, 18.0 V, mfr 05587, pn X943.	5-86
5L1		INDUCTOR ASSEMBLY, VARIABLE: 0.1 to 3 μH, with all hardware assembled, mfr 06845, pn 666230-974.	5-86
5L2		INDUCTOR ASSEMBLY, VARIABLE: 0.1 to 10 μH, with all hardware assembled, mfr 06845, pn 666230-975.	5-85
5L3		INDUCTOR ASSEMBLY, VARIABLE: 2 to 60 μH, with all hardware assembled, mfr 06845, pn 666230-976.	5-85
5MP1		GEAR, WORM, STAINLESS STEEL: 0.479 in. lg × 0.375 in. dia, mfr 00141, pn Q8-2. P/O drive assembly for 5S3. Meshes with 5MP2.	5-85
5MP2		GEAR, SPUR, BRONZE, 40 TEETH: Mfr 00141, pn Q7-25. P/O drive assembly for 5S3. Meshes with 5MP1.	
5MP3-MP4		COLLAR, STAINLESS STEEL: 0.1875 in. ID × 0.4375 in. OD × 0.187 in. thk, mfr 01351, pn SCO-5.	5-85
5MP5		SHAFT, STAINLESS STEEL: 1.870 in. dia × 1.56 in. lg, mfr 06845, pn 666230-828, shaft for 5MP2.	5-85
5MP6		SHAFT, STAINLESS STEEL, CHAMFERED EACH END: 0.1872 in. dia, × 4.38 in. lg, mfr 06845, pn 666231-142, shaft for MP1.	5-85
5MP7		SHAFT, STAINLESS STEEL: 0.2947 in. dia × 2.50 in. lg, chamfered, mfr 06845, pn 666230-985. Two dowelss mounted, shaft for 5S4.	5-86

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

ANTENNA COUPLER CU-937/UR (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5MP8		SHAFT, PLASTIC ROD: 0.248 in. dia × 7.32 in. lg, chamfered each end. Shaft for 5S5, mfr 06845, pn 666230-973.	5-86
5MP9-MP10		COLLAR: 0.25 in. ID × 0.50 in. OD × 0.25 in. thk. Retainers for 5MP8, mfr 01351, pn SC04-6.	
5MP11		BEARING PLATE ASSEMBLY, LAMINATED FIBER GLASS, BEARINGS INSTALLED: Mfr 06845, pn 666231-145, rear (antenna end) mount for 5S5.	
5MP12		BEARING PLATE ASSEMBLY, LAMINATED FIBER GLASS, BEARING INSTALLED: Mfr 06845, pn 666231-147, mount for 5S5 (middle) and 5C4-5C7.	
5MP13		BEARING PLATE ASSEMBLY, LAMINATED FIBER GLASS BEARING INSTALLED: Mfr 06845, pn 666231-164, front mount for 5S5.	
5MP14		SWITCH SECTION, ROTOR ASSEMBLY: 1 section, 2 poles, 12 positions, non shorting contacts, mfr 06845, pn 810000-326 rotor front section of 5S5.	
5MP15-MP16		SWITCH SECTION, ROTARY ASSEMBLY: 1 section, 1 pole, 12 positions, non-shorting contacts, mfr 06845, pn 810000-327, rotors for rear and middle section of 5S5.	
5MP17		COUPLING: Cres, mfr 06845, pn 666231-879, mounts on front (S4) end of shaft 5MP8.	5-86
5MP18		GEAR, SPUR, NYLON 144 TEETH: Mfr 06845, pn 810000-238 drives switch 5S3.	5-85
5MP19		GEAR, SPUR, NYLON 144 TEETH: Mfr 06845, pn 810000-237, drives inductor assembly 5L2.	
5MP20		GEAR SPUR, STAINLESS STEEL, 60 TEETH: Mfr 06845, pn G7-60, mounts on drive shaft of 5B2.	
5MP21		GEAR, SPUR, STAINLESS STEEL, 60 TEETH: Mfr 06845, pn G5-60, drives nylon gears 5MP19 and 5MP23.	
5MP22		GEAR, SPUR, STAINLESS STEEL: Same as 5MP21, driven by gear 5MP20.	
5MP23		GEAR, SPUR, NYLON, 55 TEETH: Mfr 00141, pn AB2-55, drives inductor assembly 5L3.	
5MP24		SHAFT, CAM, NYLON: 2.125 in. lg, mfr 06845, pn 666230-838 operates actuator of switch 5S7.	
5MP25		CAM, ALUMINUM ALLOY: Mfr 06845, pn 666230-830, operates actuator of switch 5S7.	5-85
5MP26-MP27		ADAPTER, SWITCH ACTUATOR: Mfr 91929, pn JS5, roller and leaf for sensitive switches 5S6 and 5S7.	5-85, 5-86
5MP28		ADAPTER, NYLON : Mfr 06845, pn 666230-531, part of coupling for shafts of 5S4 and 5S5.	5-86
5MP29		INSULATOR ASSEMBLY: Rf feethrough to antenna, consists of insulator, flange ring and gasket, mfr 75539, pn H71194A.	
5MP30		COUPING: Cres, mfr 06845, pn 666231-873, coupling for shaft of 5S4.	
5MP31		NUT-CONTACT, BERYLIUM COPPER, SLOTTED CONTACTS: Mfr 06845, pn 666231-167, friction contact from RF Insulator stud to 5MP32.	
5MP32		PIN, RF CONTACT, BERYLIUM COPPER: Mfr 06845, pn 666230-808, mounts to center of fiber glass insulator 5MP35.	5-86
5MP33-MP34		Not used.	
5MP35		INSULATOR, FIBER GLASS: 3.50 in. dia, 0.40 in. thk, mfr 06845, pn 666230-812.	5-85
5MP36		GASKET, O-RING: 8.012 in. OA dia, mfr 06845, pn 810000-437, seals rear (antenna) end of coupler.	5-86
5MP37		GASKET, O-RING: 8.512 in. OA dia, NAVSECNORDIV sketch 450SK219002, seals front (connector) end of coupler.	5-86

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

ANTENNA COUPLER CU-937/UR (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5MP38		GASKET, FLAT: 3.094 in. OA dia, 0.188 in. thk, for sealing MP29. NAVSECNORDIV sketch 450SK219004, (part of field change 1-CU-937/UR).	5-85
5MP39		GASKET, FLAT: 3.125 in. OA dia, 0.031 in. thk, for sealing MP29, NAVSECNORDIV Sketch 450SK219005 (part of field change 1-CU-937/UR).	5-85
5MP40		GAGE, PRESSURE: 0-30 psi 1-1/2 in. nominal dia, mfr 61349, pn AW 1/2-9-0, (part of field change 1-CU-937/UR).	
5MP41		VALVE, PRESSURE: Mfr 53477, pn 1468A8, (part of field change 1-CU-937/UR).	
5R1		RESISTOR: MIL type RE65G40R2.	5-85
5S1-S2		CONTACTS, ELECTRICAL: Mfr 06845, pn 666231-872, limit switch contacts for inductor assembly 5L2.	5-86
5S3		SWITCH, ROTARY SELECTOR, WAFER: Single section, 24 positions, mfr 06845, pn 666231-159, homing position selector switch.	5-85
5S4		SWITCH ASSEMBLY: Consists of actuator 5B3, rotary switch sections 5S4A and 5S4B, switch shaft front and rear mounting brackets, and all hardware, mfr 06845, pn 666231-165.	5-86
5S4A		SWITCH SECTION, ROTARY: 1 section, 2 poles, mfr 06845, pn 810000-321, front (actuator) end of 5S4.	5-86
5S4B		SWITCH SECTION, ROTARY: Mfr 06845, pn 810000-322, rear section of 5S4.	
5S5		SWITCH ASSEMBLY: Consists of rotary sections 5MP14, 15, 16, 5S5A, B, and C, bearing plates 5MP11, 12, 13, shaft and all hardware for mounting, mfr 06845, pn 666231-148.	
5S5A		SWITCH SECTION, STATOR: Mfr 06845, pn 810000-323.	
5S5B		SWITCH SECTION, STATOR: Mfr 06845, pn 810000-324.	
5S5C		SWITCH SECTION, STATOR: Mfr 06845, pn 810000-325.	5-86
5S6-S7		SWITCH SENSITIVE: Mfr 91929, pn 11SM3T, load and tune light switches.	5-85
5TB1		TERMINAL BLOCK; Mfr 75382, pn 3/4ST12.	5-85

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

HANDSET AND CABLE ASSEMBLY

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
6		HANDSET AND CABLE ASSEMBLY: MIL type H-169/U.	1-1

INTERCONNECTING CABLES

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
7		INTERCONNECTING CABLES	
7W1		CABLE ASSEMBLY: AC power, mfr 06845, pn 666230-760	1-1
7W1P1		CONNECTOR, PLUG, ELECTRICAL: Mfr 77820, pn 10-S72616-5P, mates with 4J1.	
7W1P2		CONNECTOR, PLUG, ELECTRICAL: Mfr 77820, pn 10-72616-5S, mates with 3A1A2J5.	
7W2		CABLE ASSEMBLY: Mfr 06845, pn 666230-761 or 4030977-0501.	
7W2P1		CONNECTOR, PLUG, ELECTRICAL: MIL type MS3116J20-41S, mates with 4J2.	
7W2P2		CONNECTOR, PLUG, ELECTRICAL: MIL type MS3116J20-41P, mates with 3A1A3J3.	
7W3		CABLE ASSEMBLY: Mfr 06845, pn 666230-762.	
7W3P1		CONNECTOR, PLUG, ELECTRICAL: MIL type MS3116J20-39S, mates with 4J3.	
7W3P2		CONNECTOR, PLUG, ELECTRICAL: MIL type MS3116J20-39P, mates with 3A1A3J4.	
7W4		CABLE ASSEMBLY: T-827B/URT control cable, mfr 06845, pn 666230-764.	
7W4P1		CONNECTOR, PLUG, ELECTRICAL: MIL type MS3116J22-55P, mates with 4J4.	
7W4P2		CONNECTOR, PLUG, ELECTRICAL: MIL type MS3116J22-55S, mates with 3A1A1J4.	
7W5		CABLE, SPECIAL PURPOSE: Mfr 58189, pn 666230-763.	
7W6		CABLE ASSEMBLY, RADIO FREQUENCY: Mfr. 06845, pn 666230-765.	
7W6P1		CONNECTOR, PLUG, ELECTRICAL: MIL type UG88E/U, mates with 3A1J23.	
7W6P2		CONNECTOR, PLUG, ELECTRICAL: MIL type UG88E/U, mates with 3A1J6.	
7W7		CABLE, SPECIAL PURPOSE: Mfr 58189, pn 666230-766.	
7W8		CABLE ASSEMBLY: RF AM-3007/URT to CU-937/UR. Fabricate locally using required length of RG-218/U.	
7W8P1		CONNECTOR, PLUG, ELECTRICAL: MIL type UG-941C/U, mates with 5J2.	
7W8P2		CONNECTOR, PLUG, ELECTRICAL: MIL type UG-941C/U, mates with 3A1J8.	
7W9		CABLE ASSEMBLY, AC POWER: Locally fabricated from required length of TSGA-3, mates through 4-A1P1 to 41TB1.	
7W10		CABLE ASSEMBLY, COUPLER CONTROL: Locally fabricated from required length of MSCA-30.	
7W10P1		CONNECTOR, PLUG, ELECTRICAL: Mfr 91146, pn MR0628-12S-14A66, mates with 4J1.	
7W11		CABLE ASSEMBLY, J-1265/U TO TRANSMITTER SWITCHBOARD: Locally fabricated from required length of MSCA-14.	1-1

TABLE 6-2. MAINTENANCE PARTS LIST (Cont)

ASSEMBLY (MODULE) EXTENDER CABLES

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
8		ASSEMBLY (MODULE) EXTENDER CABLES	
8W1		CABLE ASSEMBLY, EXTENDER, TRANSMITTER MODE SELECTOR: Mfr 58189, pn 666243-076, mates with 2A2A1P2 and 2A2J17.	
8W2		CABLE ASSEMBLY, EXTENDER, TRANSMITTER MODE SELECTOR: Mfr 58189, pn 666243-070, mates with 2A2A1P1 and 2A2J16.	
8W3		CABLE ASSEMBLY, EXTENDER, AUDIO AMPLIFIER: Mfr 58189, pn 666243-074, mates with 2A2A2P1 or 2A2A3P1 and 2A2J18 or 2A2J19.	
8W4		CABLE ASSEMBLY, EXTENDER, IF. AMPLIFIER: Mfr 58189, pn 666243-071, mates with 2A2A12P1 and 2A2J15.	
8W5		CABLE ASSEMBLY, EXTENDER, RATT GENERATOR: Mfr 58189, pn 666243-078, mates with 2A2A9P1 and 2A2J20.	
8W6		CABLE ASSEMBLY, EXTENDER, APC/PPC/DIRECTIONAL COUPLER: Mfr 58189, pn 666243-074, mates with 3A2A2P1 and 3A2J9.	
8W7		CABLE ASSEMBLY, EXTENDER, APC/PPC/DIRECTIONAL COUPLER: Mfr 58189, pn 666243-077, mates with 3A2P5 or 3A2P6 and 3A2A2J1 and 3A2A2J2.	
8W8		CABLE ASSEMBLY, EXTENDER, DC-TO-DC CONVERTER: Mfr 58189, pn 666243-075, mates with 3A2A5J1 and 3A2P1.	
8W9		CABLE ASSEMBLY, EXTENDER, DC-TO-DC CONVERTER: Mfr 58189, pn 666243-073, mates with 3A2A5J2 and 3A2P2.	
8W10		CABLE ASSEMBLY, EXTENDER, AC POWER SUPPLY: Mfr 58189, pn 666243-079, mates with 3A2A3P1 and 3A2J10.	

TABLE 6-3. LIST OF MANUFACTURERS

MFR CODE	NAME	ADDRESS
00141	PIC Design Corporation	P.O. Box 335 Benrus Center Ridgefield, Ct. 06877
00213	Sage Electronic Corporation	P.O. Box 3926 Rochester, N.Y. 14610
00348	Microtran Co. Inc.	145 East Mineola Avenue Valley Stream, N. Y. 11582
00471	Dowkey Co. Inc.	P.O. Box 348 2260 Industrial Lane Broomfield, Colo. 80020
01295	Texas Instruments, Inc. Semiconductorcomponents Division	13500 North Central Expressway Dallas, Tex. 75231
01351	Dynamic Gear Co. Inc.	175 Dixon Avenue Amityville, N. Y. 11701
02111	Spectrol Electronic Corporation	17070 East Gale Avenue City of Industry, Calif. 91745
02288	Allied Control Co. Inc.	100 Relay Road Plantsville, Ct. 06479
02289	HIG, Inc.	Spring Street and Route 75 Windsor Locks, Conn. 06096
02606	Fenwal Laboratories	Morton Grove, Ill. 60053
02777	Hopkins Engineering Company	12900 Foothill Boulevard San Fernando, Calif. 91342
04713	Motorola, Inc. Semiconductor Products Division	5005 E. McDowell Road Phoenix, Az. 85008
05236	Jonathan Manufacturing Company	1101 S. Acacia Avenue Fullerton, Calif. 92631
05587	Couch S.H. Division ESB Inc.	36 River Street Boston, Mass. 02126
06090	Raychem Corporation	300 Constitution Drive Menlo Park, Calif. 94025
06432	All Craft Screw and Hardware Co. Inc.	40-17-22nd Street Long Island City, N.Y. 11101

TABLE 6-3. LIST OF MANUFACTURERS (Cont)

MFR CODE	NAME	ADDRESS
06779	Par Aide Products Company	286 N. Pascal Street St. Paul, Mn. 55104
06845	The Bendix Corporation Communications Division	E. Joppa Road Baltimore, Md. 21204
07028	Bush Transformer Division Gladdingkeystone Corporation	707 North Street Endicott, N. Y. 13760
07047	Ross Milton Co.	511 Second Street Pike Southampton, Pa. 18966
07263	Fairchild Semiconductor, A Division of Fairchild Camera and Instrument Corporation	464 Ellis Street Mountain View, Calif. 94040
07388	Torotel, Inc.	13402 S. 71 Highway Grandview, Mo. 64030
07700	Technical Wire Products, Inc.	129 Dermody Street Craneford, N. J. 07016
09026	Babcock Electronics Corporation Relays Division	3501 Harbor Boulevard P.O. Box 1499 Costa Mesa, Calif. 92626
10646	Carborundum Co. The	P.O. Box 337 Niagra Falls, N. Y. 14302
14433	ITT Semiconductors A Division of International Telephone and Telegraph Corporation	3301 Electronics Way West Palm Beach, Fla. 33401
16127	Rotamec Inc.	P.O. Box C Admiral Station Tulsa, Ok 74115
17637	Universal Torid Coil Winding Inc.	1190 Grove Street Irvington, N. J. 07111
22599	Elastic Stop Nut Division of Amerace Esna Corporation	16150 Stagg Street Van Nuys, Calif. 91407
25140	Globe Industries Division of TRW Inc.	2275 Stanley Avenue Dayton, Ohio 45404
25159	Inductive Components Inc.	149 Sullivan Lane Westbury, N. Y. 11590

TABLE 6-3. LIST OF MANUFACTURERS (Cont)

MFR CODE	NAME	ADDRESS
27193	Cutlerhammer Inc. Specialty Products Division	4201 N. 27th Street Milwaukee, Wis. 53216
28994	Gladdingkeystone Corporation	179 River Street Oneonta, N. Y. 13820
29238	Hartadvance Relay Division Oak Electro/Netics Corporation	201 W. Centralia Street Elkhorn, Wis. 53121
46384	Penn Engineering and Mfg. Corp.	Old Easton Highway Doylestown, Pa. 18901
53477	Scovill Mfg. Co. Fluid Power Division	U.S. Route 1 Wake Forest, N. C. 27587
56289	Sprague Electric Company	North Adams, Mass. 01247
57533	Sterling Precision Corporation	103 Park Avenue New York, N. Y. 10017
58189	General Dynamics Corporation Electronics Division	1400 N. Goodman Street Rochester, N. Y. 14601
60380	Torrington Company, The Subsidiary of Ingersoll-Rand Corporation	59 Field Street Torrington, Ct. 06790
61349	Ametek/U.S. Gauge	909 Clymer Avenue Sellersville, Pa. 18960
70674	ADC Products Division of Magnetic Controls Company	4900 West 78th Street Minneapolis, Minn. 55435
70998	Bird Electronic Corporation	30303 Aurora Road Cleveland, Ohio 44139
71279	Cambridge Thermionic Corporation	445 Concord Avenue Cambridge, Mass. 02138
71400	Bussmann Mfg. Division of McFraw Edison Company	2536 W. University Street St. Louis, Mo. 63017
71468	ITT Cannon Electric	666 E. Dyer Road Santa Ana, Ca. 92702
71590	Centralab Electronics Division of Globe-Union Inc.	5757 N. Green Bay Avenue Milwaukee, Wi. 53201
71785	Cinch Mfg. Co. Division of TRW Inc.	1501 Morse Avenue Elk Grove Village, Il. 60007

TABLE 6-3. LIST OF MANUFACTURERS (Cont)

MFR CODE	NAME	ADDRESS
72136	The Electro Motive Mfg. Co. Inc.	South Park and John Streets Willimantic, Conn. 06226
72619	Dialight Corporation Subsidiary of Digitronics Corporation	60 Stewart Avenue Brooklyn, N. Y. 11237
72625	Amsted Industries, Inc. Diamond Chain Company Division	402 Kentucky Avenue Indianapolis, In. 46225
72914	Grimes Manufacturing Company	515 N. Russell Urbana, Ohio 43078
72982	Erie Technological Products, Inc.	644 W. 12th Street Erie, Pa. 16512
73138	Beckman Instruments, Inc. Helipot Division	2500 Harbour Boulevard Fullerton, Calif. 92634
73682	Garrett George K Company Division MSL Industries, Inc.	Torresdale Avenue at Tolbut St. Philadelphia, Pa. 19136
73899	JFD Electronics Corporation	15th at 62nd Street Brooklyn, N. Y. 11219
73905	ITT Jennings	970 McLaughlin Avenue San Jose, Calif. 95108
74193	Heinemann Electric Company	2600 Brunswick Pike Trenton, N. J. 08602
74970	Johnson E. F. Company	299 10th Avenue SW Waseca, Minn. 56093
75382	Kulka Electric Corporation	633-643 S. Fulton Avenue Mt. Vernon, N. Y. 10550
75539	Lapp Insulator Co. Inc.	Gilbert Street Leroy, N. Y. 14482
76845	Oak Manufacturing Co., Division of Oak Electro/Netics Corporation	S. Main Street Crystal Lake, Ill. 60014
77339	National Lock Washer Co.	Industrial Parkway P.O. Box 115 North Branch, N.J. 08876
77820	Bendix Corporation The Electrical Components Division	Sherman Avenue Sidney, N.Y. 13838
78179	Illinois Tool Works Inc. Shakerproof Division	St. Charles Road Elgin, Ill. 60126
80131	Electronic Industries Association	

TABLE 6-3. LIST OF MANUFACTURERS (Cont)

MFR CODE	NAME	ADDRESS
80294	Bourns, Inc.	1200 Columbia Avenue Riverside, Calif. 92507
80378	Vought Aeronautics Division LTV Aerospace Corporation	P.O. Box 5906 Dallas, Tex. 75222
81030	International Instruments Division Sigma Instruments Inc.	88 Marsh Hill Road Orange, Conn. 06477
81312	Winchester Electronics Division Litton Industries Inc.	Main Street and Hillside Avenue Oakville, Conn. 06779
83508	Grant Pulley and Hardware Company	High Street West Nyack, N.Y. 10994
86455	Pennsylvania Engineering Company	1119 N. Howard Philadelphia, Pa. 19123
86577	Precision Metal Products of Malden, Inc.	41 Elm Street Stoneham, Mass. 02180
86579	Precision Rubber Products Corp.	3110 Oakridge Drive Dayton, Ohio 45417
88223	General Products Corporation	107 Salem Street Union Springs, N.Y. 13160
90201	Mallory Capacitor Company	3029 East Washington Street P.O. Box 372 Indianaplis, Ind. 46206
91146	ITT Cannon Electric Salem Division	Salem, Ma.
91637	Dale Electronics Inc.	P.O. Box 609 Columbus, Nebr. 68601
91737	ITT Gremar, Inc.	10 Micro Drive Woburn, Mass. 01801
91929	Honeywell Inc. Micro Switch Division	Chicago and Spring Streets Freeport, Ill. 61032
93928	Forbes and Wagner Inc.	345 Central Avenue Silver Creek, N. Y. 14136
95105	Collins Radio Company	Newport Beach, Calif.

TABLE 6-3. LIST OF MANUFACTURERS (Cont)

MFR CODE	NAME	ADDRESS
95712	Bendix Corporation The Microwave Devices Division	Hurricane Road Franklin, Ind. 46131
96095	Aerovoc Corporation	Seneca Avenue Olean, N. Y. 14760
96906	Military Standards Promulgated by Military Departments Under Authority of Defense Standardization Manual 4120 3-M	
98291	Sealectro Corporation	225 Hoyt Mamaroneck, N.Y. 10544
99120	Plastic Capacitors, Inc.	2620 N. Claybourn Avenue Chicago, Ill. 60614
99515	Marshall Industries Capacitor Division	1961 Walker Avenue Monrovia, Calif. 91016
99800	Delevan Division American Precision Industries, Inc.	270 Quacker Road East Aurora, N.Y. 14052

SECTION 7
INSTALLATION

7-1. UNPACKING AND HANDLING.

7-2. Special procedures need not be followed when unpacking units of the AN/WRC-1B system. Since the system is comprised of accurately calibrated precision units, rough handling should be avoided. Extreme caution must be taken when removing each unit from its packing container to prevent damage to the controls and connectors.

7-3. POWER REQUIREMENTS.

7-4. The AN/WRC-1B system is designed to operate from a nominal 115-Vac, single-phase, 48- to 450-Hz power source. Refer to figure 5-10 for a primary power distribution diagram of the system.

7-5. SITE SELECTION.

7-6. In selecting a shipboard installation site, adequate consideration must be given to space requirements (figures 7-1, 7-2 and 7-3). These requirements will include space for servicing the slide-mounted equipment when extended from the case, for shock-mount deflection, and for cable bends. The CU-937/UR must be placed close to the base of the antenna to permit the connection between the antenna and the antenna and the CU-937/UR to be made with a 12-inch long stranded copper conductor. For best results, the antenna should be mounted as high as possible above the ship's superstructure. However, the cable between the CU-937/UR and the J-1265/U should not exceed 300 feet.

7-7. In selecting a shore installation site, similar considerations must be given to the space requirements. The antenna should be mounted high enough to clear any surrounding hills, wood, or buildings. In addition, the antenna should be located as far as possible from any high-power transmission lines or hospitals to prevent interference.

7-8. INSTALLATION REQUIREMENTS.

NOTE

Installation of the equipment requires reference to the appropriate Installation Control Drawings (not provided in this manual).

7-9. CONSIDERATIONS. The following factors should be considered when determining the proper location of the AN/WRC-1B system:

a. Best operating conditions.

b. Ease of maintenance, adjustment of equipment, and replacement and repair of defective parts or complete units.

c. Possibility of interaction between units and other electronic equipment in the vicinity.

d. Critical and minimum cable length requirements.

e. Adequate heat dissipation.

f. Availability of an adequate ground.

7-10. INSTALLATION. Units of the AN/WRC-1B are stacked and secured together in the order shown in figure 7-1. Mounting brackets and hardware are supplied with each unit. These brackets facilitate stacking of the units.

7-11. To install the AN/WRC-1B system, proceed as follows:

a. After determining the best location for the system, set shock mount on mounting surface and mark off mounting holes. Drill or prepare mounting surface as required.

WARNING

To avoid injury to personnel, do not overstress mounting bolts, since shock may cause them to shear.

CAUTION

Be sure to use the system Shock Mount MT-3115/WRC-1 when the AN/WRC-1B units are to be stacked. The receiver Shock Mount MT-3114/UR will not support the weight of the stacked AN/WRC-1B units.

NOTE

In shore installations, the shock mounts are not normally used. Return the mounts to the supply system.

b. Using the hardware provided, secure shock mount to mounting surface.

c. Attach mounting brackets to the sides of each unit as shown in figure 7-1, using hardware supplied.

d. Using the hardware provided, bolt the units together in the order shown in figure 7-1. Bolt the R-1051B/URR to the shock mount.

e. Mount the J-1265/U to bulkhead using the mounting plate provided (figure 7-2). The mounting plate must be drilled as required. Observe caution in locating mounting bolt holes only within the portion of the mounting plate extending beyond the chassis on each side. The mounting bolts (provided by the installing activity) may be weleded to the bulkhead or stanchions. Since the mounting plate is aluminum, it cannot be welded directly to the steel structure of the ship.

NOTE

The installing activity must supply proper glands for J-1265/U stuffing tubes.

f. To install the CU-937/UR, drill mounting holes (figure 7-3) approximately 10 inches from the antenna base and bolt the CU-937/UR to the mounting surface.

CAUTION

Ensure good metal-to-grounds for all units.

7-12. To install the equipment in an equipment rack, proceed as follows:

a. Attach one mounting bracket (figure 7-4) to each side of each unit using the hardware supplied.

b. Place units in the rack in the order shown in figure 7-1 and bolt bracket to front of rack. The use of installed rack shelves or base plates is recommended in rack installations.

c. Perform steps e and f of paragraph 7-11.

7-13. INTERCONNECTION. Interconnection of the units of the AN/WRC-1B system is shown in figure 7-5. All connections are made at the rear of the units, with the exception of the headset, the handset, and the local CW key connections. The headset is connected to the USB PHONES connector on the R-1051B/URR front panel. The handset is connected to the HANDSET connector on the T-827B/URT front panel, and the CW key (if used) is connected to the CW KEY connector, also on the T-827B/URT front panel. Connect a ground lead to the base of the shock mount. Refer to table 7-1 for normal interconnection information.

7-14. PRIMARY POWER ADJUSTMENTS. The AN/WRC-1B is designed to operate

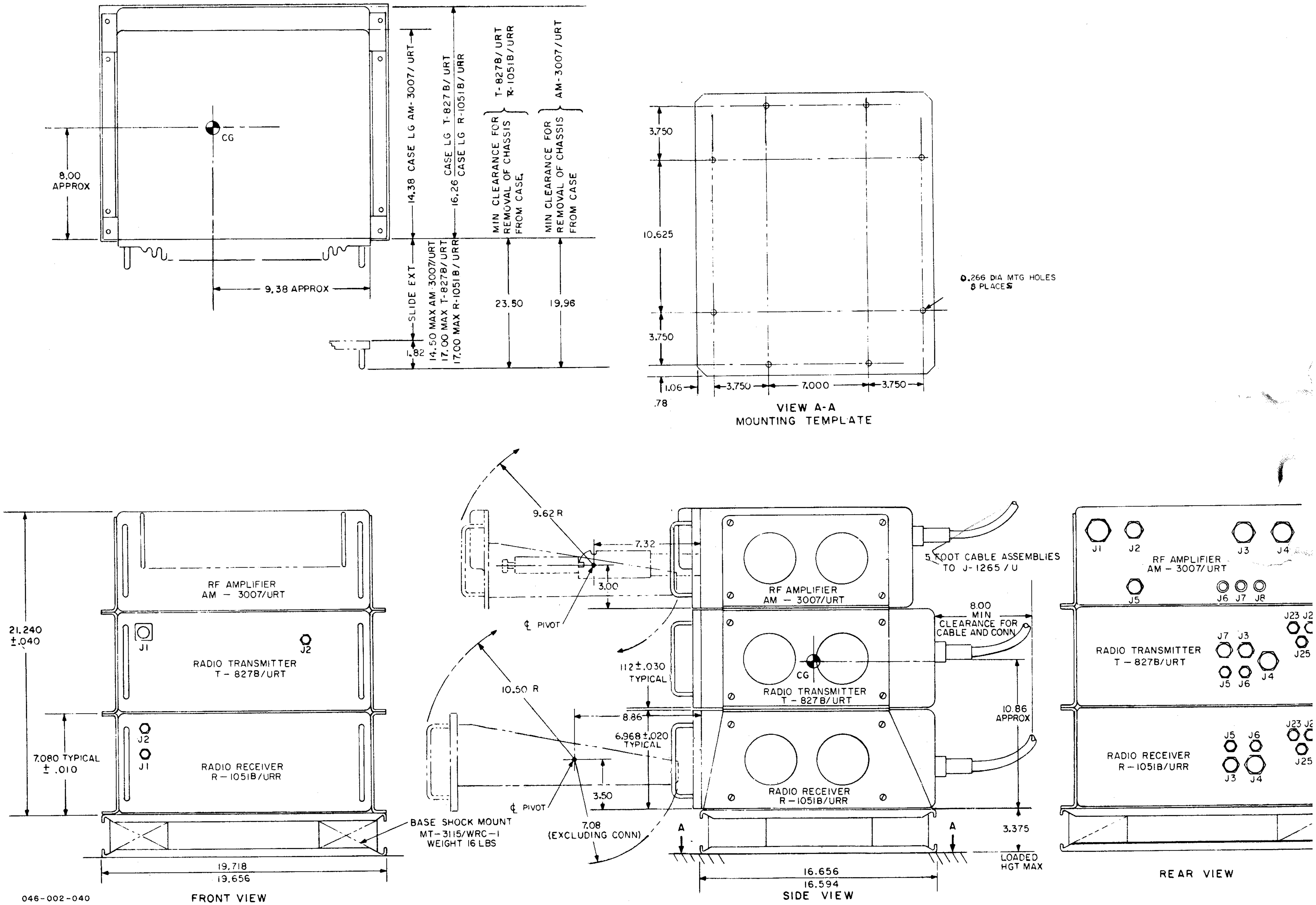
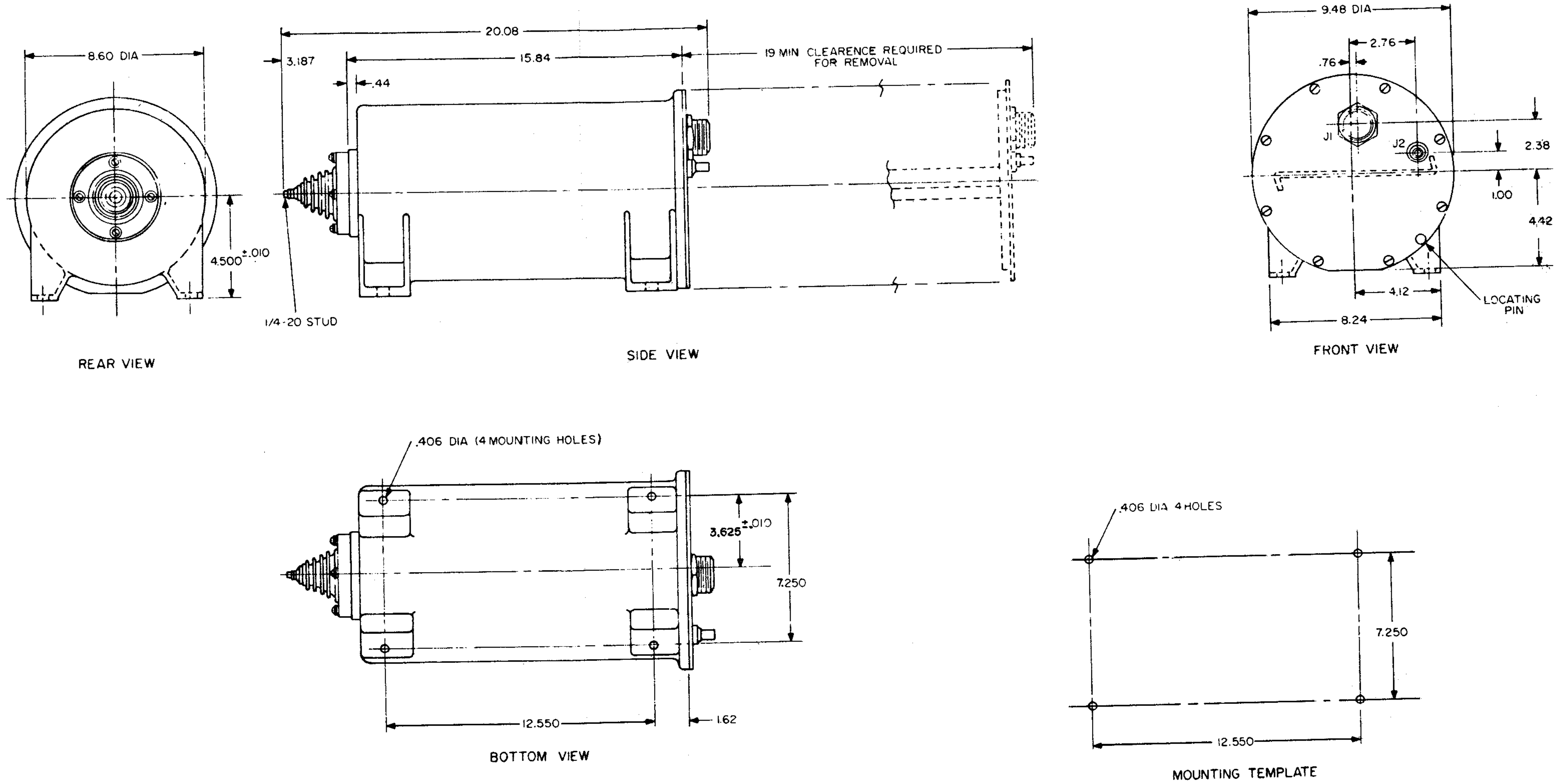


Figure 7-1. Radio Set AN/WRC-
System Instal



NOTES:

1. SPECIFICATIONS
   SIZE 935 IN3
   WEIGHT 30LBS (APPROX)
   HEAT DISSIPATION 50WATTS MAX
   TEMPERATURE -28°C TO +65°C (OPERATING)
   FREQUENCY RANGE 2-30 MHZ

046-002-039

Figure 7-2. Interconnection Box J-1265/U, Dimensions

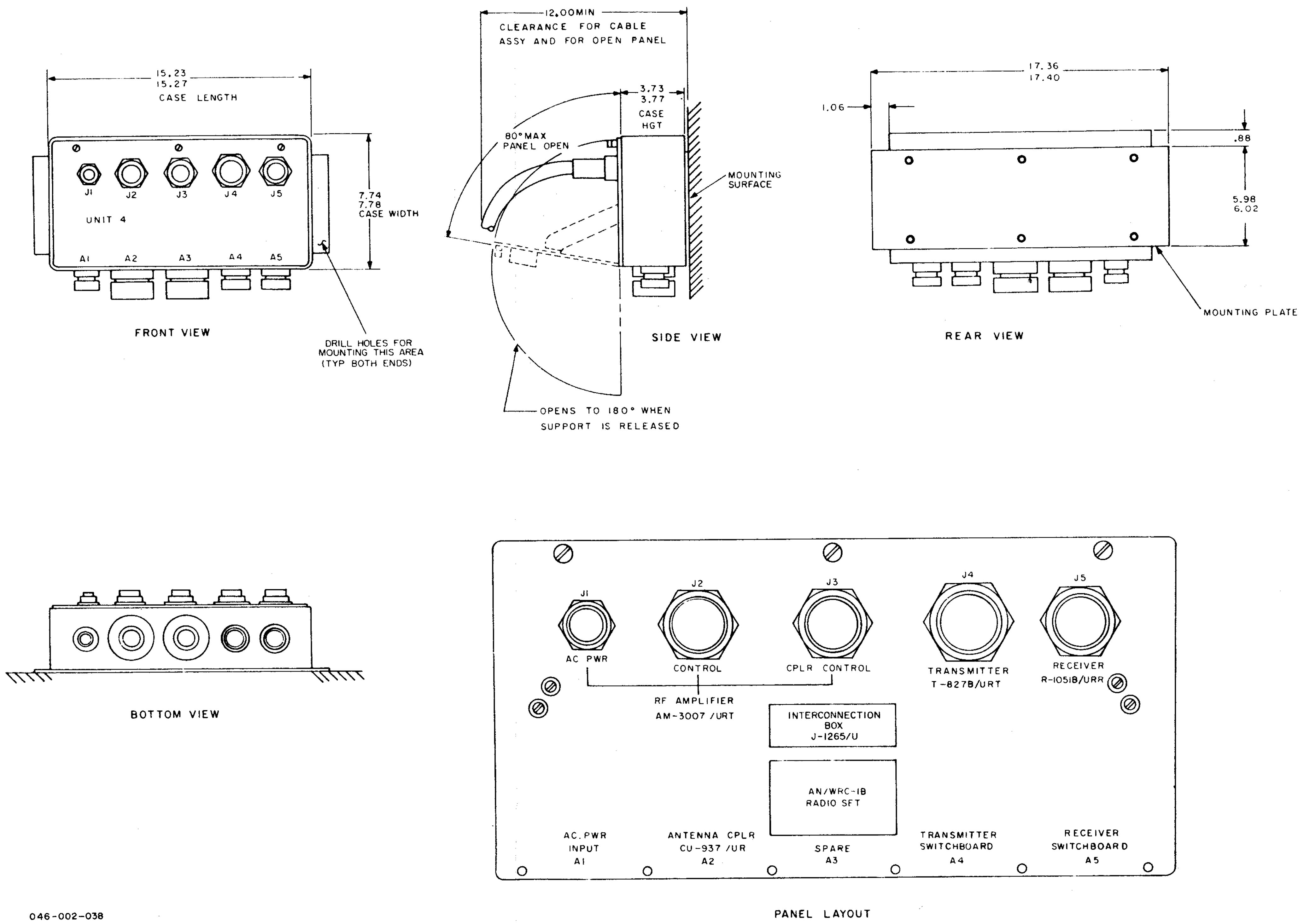
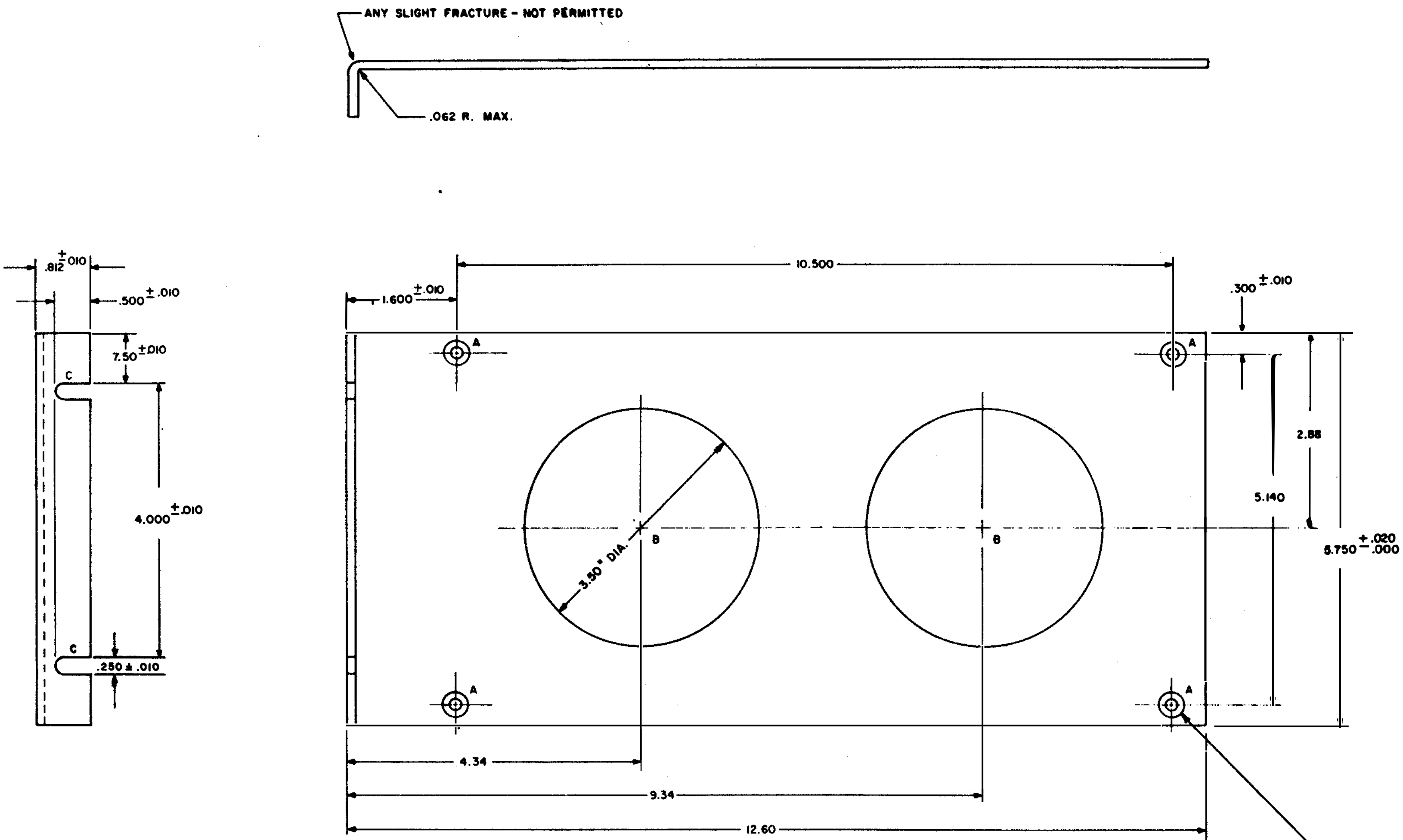


Figure 7-3. Antenna Coupler CU-937/UR, Dimensions



NOTES:

1. FINISH: IRIDITE NO. 14 PER MIL-C-5541 PAINT PER MIL-E-15090 ENAMEL EQUIPMENT, LIGHT GRAY (FORMULA NO 11)
2. MATERIAL .125" THICK ALUMINUM ALLOY 5052-H32 PER QQ-A-318
3. NOT SUPPLIED. IF REQUIRED, INSTALLATION ACTIVITY MUST FABRICATE

046-002-045

Figure 7-4. Radio Set AN/WRC-1B, Mounting Bracket for Rack Mounting

TABLE 7-1. RADIO SET AN/WRC-1B, INTERCONNECTIONS

CABLE	FROM	TO
W5	1J4 (Receiver)	4J5 (Interconnection Box)
W7	1J23 (Receiver)	3J7 (RF Amplifier)
W4	2J4 (Transmitter)	4J4 (Interconnection Box)
W6	2J23 (Transmitter)	3J6 (RF Amplifier)
W1	3J5 (RF Amplifier)	4J1 (Interconnection Box)
W2	3J3 (RF Amplifier)	4J2 (Interconnection Box)
W3	3J4 (RF Amplifier)	4J3 (Interconnection Box)
W8	3J8 (RF Amplifier)	5J2 (Antenna Coupler)
W9	4A1 (Interconnection Box)	AC Power Input
W10	4A2 (Interconnection Box)	5J1 (Antenna Coupler)
W11	4A4 (Interconnection Box)	Transmitter Switchboard
W12	4A5 (Interconnection Box)	Receiver Switchboard

from a nominal 115-Vac supply. The movable tap on the input of the transformer (3A3T1) in the AM-3007/URT is set for a 115-Vac input when shipped. If the supply voltage is not 115 Vac, refer to figure 5-31 and move the taps on the primary of the transformer as follows:

a. Loosen the front-panel screws and slide the AM-3007/URT chassis out from the case until the slides lock.

b. Tilt the chassis up 90 degrees to expose the bottom. Transformer 3A3T1 will now be in the lower left-hand corner of the chassis.

c. Unsolder the movable input lead (top). Do not unsolder the common lead.

d. Referring to figure 5-31, wrap the end of the movable lead around the input terminal corresponding to the input voltage.

e. Solder the lead to the terminal, ensuring that a good solder connection is made.

f. Tilt chassis back to horizontal, release the slide locks, slide chassis back into case, and secure it.

g. Refer to figure 5-13 and repeat steps a through f for input transformer 2A2T1 in the T-827B/URT.

h. Refer to the receiver chassis and main frame schematic in NAVSHIPS 0967-427-4010, and repeat steps a through f for input transformer 1A2T1 in the R-1051B/URR.

7-15. ANTENNA COUPLER PROGRAMMING. Antenna Coupler CU-937/UR and Interconnection Box J-1265/U, as shipped, are programmed for use with a 35-foot whip antenna. If operation with a 15- or 25-foot whip antenna is required, the

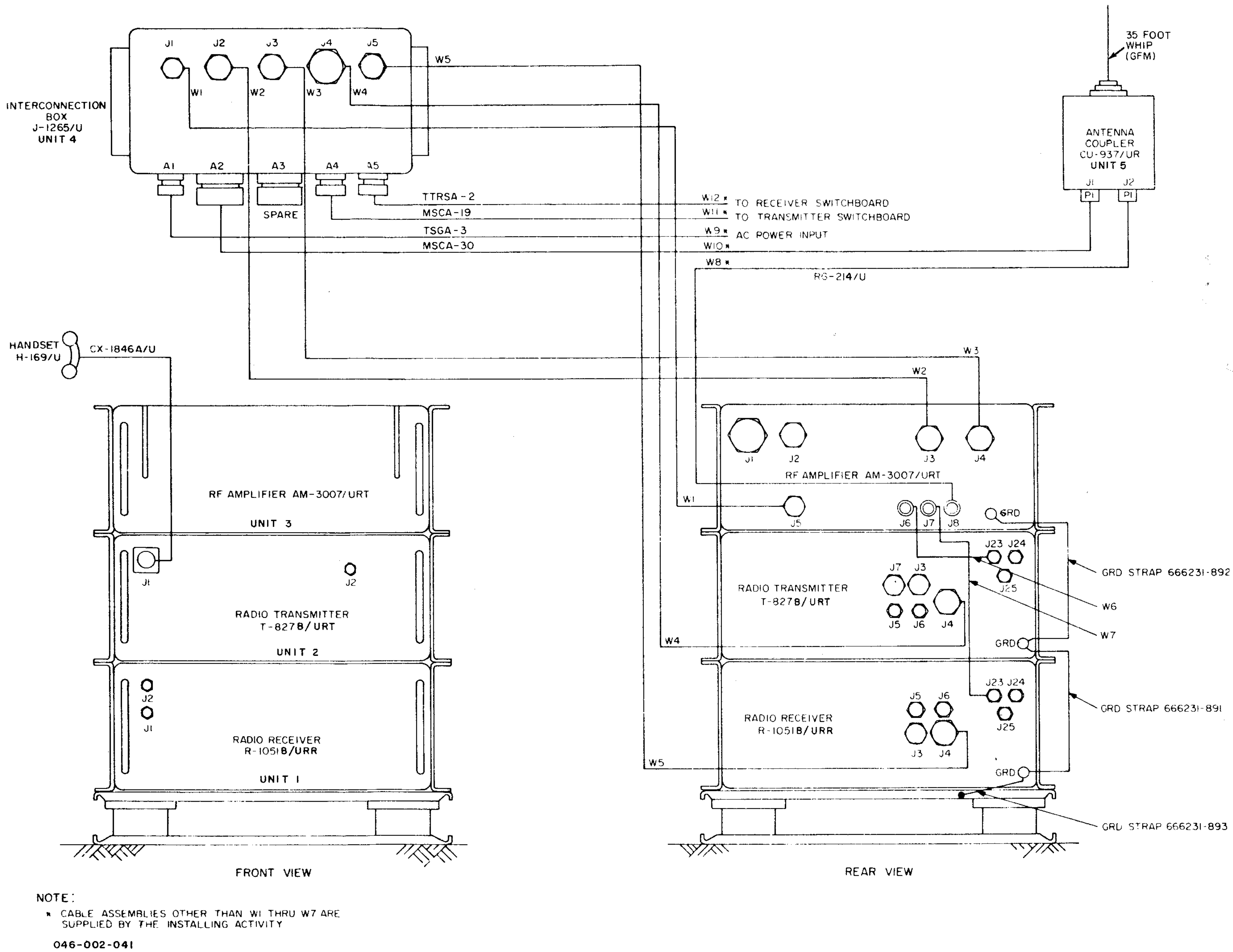


Figure 7-5. Radio Set AN/WRC-1B, Interconnection Diagram

J-1265/U and CU-937/UR terminal boards must be reprogrammed. Reconnect W10 leads as shown in table 7-2, rewire J-1265/U terminal boards as shown in table 7-3, and rewire CU-937/UR terminal board as shown in table 7-4. Doublecheck all connections before applying power.

7-16. REQUIREMENTS FOR SPECIAL USAGE. Certain adaptations and/or connections must be made to equip the AN/WRC-1B system for operation under special usage situations. These requirements are given in the following paragraphs.

7-17. Local FSK Transmission. If local FSK transmission is required, proceed as follows:

a. Connect teletypewriter loop and key lines to connector J7 (LOCAL FSK IN) on the rear of the T-827B/URT. (See figure 5-13.)

b. Loosen front-panel screws and pull T-827B/URT chassis out from case. Set CTR FREQ switch on top of FSK Tone Generator Electronic Assembly at desired center frequency (2000 or 2550 Hz).

c. Refer to figure 5-13 and jumper E4 to E7 to increase loop current, if required.

d. Slide chassis back into case and secure it.

e. Set transmitter mode selector switch to ISB/FSK or at FSK, and set transmitter LOCAL/REMOTE switch to LOCAL.

7-18. Remote FSK Transmission. If remote FSK transmission is required, proceed as follows:

a. Connect the remote teletypewriter loop and key lines.

b. Loosen front-panel screws and pull T-827B/URT chassis out from case, Set CTR FREQ switch on top of the FSK Tone Generator Electronic Assembly at desired center frequency (2000 or 2550 Hz).

c. Slide chassis back into case and secure it.

d. Loosen the three screws securing front panel of the J-1265/U and open panel.

e. Refer to figure 5-8 and jumper E1 to E2 to increase remote loop current, if required.

f. Close J-1265/U frontpanel and secure it.

TABLE 7-2. INTERCONNECTING CABLE W10, INTERCONNECTION BOX J-1265/U TERMINAL BOARD CONNECTIONS

W10J1 ANTENNA COUPLER CU-937/UR	15-FOOT WHIP ANTENNA	25-FOOT WHIP ANTENNA	35-FOOT WHIP ANTENNA
J1-Z	No Connection	No Connection	No Connection
J1-Y	No Connection	TB5-6B	No Connection
J1-S	No Connection	No Connection	No Connection
J1-P	TB4-1A	No Connection	No Connection
J1-a	TB4-2A	TB4-1A	TB4-1A
J1-R	TB4-3A	TB4-2A	TB4-2A
J1-T	TB4-7A	TB4-6A	TB4-5A
J1-U	TB4-10A	No Connection	TB4-6A

TABLE 7-2. INTERCONNECTING CABLE W10, INTERCONNECTION BOX J-1265/U TERMINAL BOARD CONNECTIONS (Cont)

W10J1 ANTENNA COUPLER CU-937/UR	15-FOOT WHIP ANTENNA	25-FOOT WHIP ANTENNA	35-FOOT WHIP ANTENNA
J1-V	TB4-11A	TB5-1B	TB4-7A
J1-X	No Connection	TB4-9A	TB4-8A
J1-W	TB4-12A	TB5-7B	TB5-2A
J1-A, -B, -C, -D, -G, -H, -J, -K, -L, -M and -N	These conductors are always connected as shown in figure 5-8.		

TABLE 7-3. INTERCONNECTION BOX J-1265/U, TERMINAL BOARDS, ANTENNA PROGRAMING

15-FOOT WHIP ANTENNA		25-FOOT WHIP ANTENNA		35-FOOT WHIP ANTENNA	
FROM	TO	FROM	TO	FROM	TO
TB4-3B	TB4-4B	TB4-2B	TB4-3B	TB4-2A	TB4-3A
TB4-4B	TB4-5B	TB4-3B	TB4-4B	TB4-3A	TB4-4A
TB4-5B	TB4-6B	TB4-4B	TB4-5B	TB4-7A	TB4-10A
TB4-7B	TB4-8B	TB4-6B	TB4-7B	TB4-8A	TB4-9A
TB4-8B	TB4-9B	TB4-8B	TB5-1A	TB4-10A	TB4-11A
TB4-11B	TB5-3A	TB5-1A	TB5-2A	TB4-11A	TB4-12A
TB5-3A	TB5-5A	TB5-2A	TB5-3A	TB4-12A	TB5-1A
TB5-5A	TB5-6A	TB5-3A	TB5-4A	TB5-1A	TB5-5A
TB5-6A	TB5-7A	TB5-4A	TB5-5A	TB5-2A	TB5-3A
TB4-12A	TB5-1A	TB4-9A	TB4-1-B	TB5-3A	TB5-4A
TB5-1A	TB5-2A	TB4-10B	TB4-11B	TB5-5A	TB5-6A
TB5-2A	TB5-4A	TB4-11B	TB4-12B	TB5-6A	TB5-7A

TABLE 7-4. ANTENNA COUPLER CU-937/UR, TUNING INDUCTOR PREPOSITIONING, CIRCUIT CONNECTIONS (TB1 OF ANTENNA COUPLER)

TB1	15-FOOT WHIP ANTENNA	25-FOOT WHIP ANTENNA	35-FOOT WHIP ANTENNA
	WIRE NUMBER	WIRE NUMBER	WIRE NUMBER
1	4	4	4
2	Blank	Blank	Blank
3	Blank	Blank	Blank
4	1	1	1
5	2	2	Blank
6	5, 9	Blank	9
7	Blank	5	2, 6
8	3, 6	3, 6	5, 7
9	7, 8	7, 9	3, 8
10	10	10	10
11	11	8, 11	11

g. Set transmitter mode selector switch to ISB/FSK or FSK, and set transmitter LOCAL/REMOTE switch to REMOTE.

7-19. Use with Ship's Frequency Standard. If it is required to use the ship's frequency standard for operation, proceed as follows:

a. Connect the ship's frequency standard output to connector J25 (EXT 5 MC IN) on the rear of the T-827B/URT and to connector J25 (EXT 5 MC IN) on the rear of the R-1051B/URR.

b. Loosen front-panel screws and slide both chassis from their respective cases.

c. Set switch S1 (COMP/INT/EXT) on top of Frequency Standard Electronic Assembly to EXT. This electronic assembly is located at the right rear of both chassis.

d. Slide both chassis back into the cases and secure them.

7-20. Dual Use of Single Frequency Standard. If it is required to use the output from the T-827B/URT internal Frequency Standard Electronic Assembly in the R-1051B/URR, proceed as follows:

a. Loosen the front-panel screws and slide the T-827B/URT chassis out from the case.

b. Set switch S1 (COMP/INT/EXT) on top of the Frequency Standard Electronic Assembly to COMP. This electronic assembly is located at the right rear of the chassis.

c. Slide chassis back into case and secure it.

d. Connect cable between connector J24 (INT 5 MC OUT) on the rear of the T-827B/URT and connector J25 (EXT 5 MC IN) on the rear of the R-1051B/URR.

e. Loosen front-panel screws and slide R-1051B/URR chassis from case.

f. Set switch S1 (COMP/INT/EXT) on top of Frequency Standard Electronic Assembly to EXT. This electronic assembly is located at right rear of chassis.

g. Slide chassis back into case and secure it.

7-21. If it is required to use the output from the R-1051B/URR internal Frequency Standard Electronic Assembly in the T-827B/URT, perform the steps above, substituting the receiver for the transmitter and vice versa. A whole chain of units may be set up using one frequency standard in this manner.

7-22. Use of External Frequency Standard for Calibration. If it is required to use an external frequency standard for calibration of the T-827B/URT, proceed as follows:

a. Connect the external frequency standard to connector J25 (EXT 5 MC IN) on the rear of the T-827B/URT.

b. Loosen the front-panel screws and slide the T-827B/URT chassis out from the case.

c. Set switch S1 (COMP/INT/EXT) on top of Frequency Standard Electronic Assembly to COMP. This electronic assembly is located at the right rear of the chassis.

d. Slide chassis back into case and secure it.

e. After calibration, ensure that cables are reconnected as they were initially and all switches are in the proper positions.

7-23. To use an external frequency standard for calibrating the receiver, perform the steps above, substituting the R-1051B/URR for the T-827B/URT.

7-24. Use of Both Internal Frequency Standards. If the internal frequency standards of each unit are to be used, proceed as follows:

a. Loosen front-panel screws and slide T-827B/URT chassis out from case.

b. Set switch S1 (COMP/INT/EXT) on top of Frequency Standard Electronic Assembly to INT. This electronic assembly is located at right rear of chassis.

c. Slide chassis back into case and secure it.

7-25. Simplex Operation. If simplex operation is required, proceed as follows:

a. Ensure that connector J23 (ANT 50 Ω) on the rear of the R-1051B/URR is connected to connector J7 (RCVR ANT RELAY) on the rear of the AM-3007/URT.

b. Loosen the front-panel screws and slide the R-1051B/URR chassis out from the case.

c. Ensure that switch S9 (SIMPLEX/DUPLEX) is in the SIMPLEX position. This switch is located just behind the front panel on the left side of the chassis.

d. Slide the chassis back into the case and secure it.

7-26. Duplex Operation. If duplex operation is required, proceed as follows:

a. Ensure that connector J23 (ANT 50 Ω) on the rear of the R-1051B/URR is connected to a different antenna than the one connected to the CU-937/UR.

b. Loosen the front-panel screws and slide the R-1051B/URR chassis out from the case.

c. Ensure that switch S9 (SIMPLEX/DUPLEX) is in the DUPLEX position.

d. Refer to figure 5-8 and perform the steps outlined in note 6 on the figure.

e. Slide chassis back into case and secure it.

7-27. Use of Auxiliary Power. If the use of auxiliary power is required, proceed as follows:

a. Disconnect cables from connector J4 on the rear of the R-1051B/URR and the T-827B/URT.

b. Using a type MS-3186-5S connector, connect the auxiliary power to connector J3 (AUX AC PWR IN) on the rear of the R-1051B/URR and the T-827B/URT.

c. Loosen the front-panel screws and slide both the R-1051B/URR and the T-827B/URT chassis from the cases.

d. Set switch S7 (AUX/NORM) on both units to AUX. This switch is located just behind the front panel on the left side of the cases of the chassis.

e. Slide both chassis back into the cases and secure them.

7-28. Use with an External VSWR Meter. If the use of an external Vswr meter is required due to the length of the cabling, refer to figure 5-28 and connect a wattmeter element (same as the one in the AM-3007/URT) to the appropriate pins of the connector at the CU-937/UR end of the cable. Then proceed as follows:

a. Loosen the front-panel screws and pull pull the AM-3007/URT chassis out from the case.

b. Set switch S8 (RF PWR MTR) to EXT. This switch is located at the right front of the chassis.

c. Slide chassis back into the case and secure it.

7-29. Use with a Balanced, Grounded, Center-Tap Operation. The audio transformers in the T-827B/URT and R-1051B/URR (located in the Transmitter Audio Amplifier and Receiver IF./Audio Amplifier Electronic Assemblies) do not have grounded center taps as supplied. If it is required that these transformers work into a balanced, grounded, center-tap circuit, proceed as follows:

CAUTION

Do not ground center taps if working into an unbalanced circuit.

a. Loosen the front-panel screws and slide the T-827B/URT and R-1051B/URR chassis from the cases.

b. For instructions covering the R-1051B/URR, refer to Section 7 of NAVSHIPS 0967-427-4010.

c. Tilt transmitter chassis up 90 degrees to expose bottom. Refer to figure 5-35 and locate J18 and J19.

d. Refer to figure 5-13 and perform the steps outlined in note 6 on that schematic.

e. Tilt chassis back to horizontal, release slide locks, slide chassis back into case, and secure it.

7-30. INSPECTION AND ADJUSTMENT.

7-31. INSPECTION. Each major unit of the AN/WRC-1B system should be carefully checked for damage to indicators and switches and for loose hardware and knobs. Make sure that all electronic assemblies are firmly seated and that tubes are properly secured in tube sockets. Check connectors for dirt, damage to pins, and broken insulators. Replace or repair as necessary. Check that all cables are properly connected and that all fuses are in place.

7-32. INTERFERENCE REDUCTION. As a precaution against interference, operate the AN/WRC-1B system with all units bolted securely in their cases. Check that proper ground connections have been made to the AN/WRC-1B system units, and to the CU-937/UR.

7-33. ADJUSTMENT. After installation, refer to Maintenance Standards Books, NAVSHIPS 0967-427-5030, NAVSHIPS 0967-427-4030, and NAVSHIPS 0967-427-3030. Use the procedures therein outlined to check out the AN/WRC-1B. Should any adjustments be found necessary, refer to the applicable procedures in Section 5 of this manual. Before beginning the checkout procedures, ensure that the following switches are in the proper positions according to the type of installation.

a. Radio Transmitter T-827B/URT:

LOCAL/REMOTE (S1)
AUX/NORM (S7)
CTR FREQ (A5S1)

b. Radio Receiver R-1051B/URR:

LOCAL/REMOTE (S1)
SIMPLEX/DUPLEX (S9)
AUX/NORM (S7)

c. RF Amplifier AM-3007/URT:

PRIMARY POWER Selector (S2)
ANTENNA INTERLOCK (S9)
ANT CPLR BYPASS (S7)
RF PWR MTR (S8)

7-34. PERFORMANCE CHECKS. Perform the applicable operating procedures described in Section 2 to ensure proper installation.

ALPHABETICAL INDEX

ALPHABETICAL INDEX (Cont)

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