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NAVSHIPS 0967-878-5010

TECHNICAL MANUAL

for

RADIO SET
AN/URT-24

DEPARTMENT OF THE NAVY
NAVAL ELECTRONIC SYSTEMS COMMAND

~~UNCLASSIFIED~~

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PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title Page	Original		
ii to vii	Original		
1-0 to 1-25	Original		
2-0 to 2-19	Original		
3-0 to 3-2	Original		
4-1 to 4-14	Original		
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6-1 to 6-6	Original		
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TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 3 - FUNCTIONAL DESCRIPTION (Cont)		SECTION 6 - PARTS LIST (Cont)	
3-1. c. Antenna Coupler CU-937/UR	3-2	6-5. Stock Number Identification	6-2
d. Interconnection Box J-1265/U	3-2	6-6. Notes	6-2
SECTION 4 - TROUBLE SHOOTING		SECTION 7 - INSTALLATION	
4-1. Introduction	4-1	7-1. Unpacking and Handling . . .	7-1
4-2. Fault Isolation	4-1	7-2. Power Requirements	7-1
4-3. Test Equipment	4-1	7-3. Site Selection	7-1
4-4. Operational Checks	4-1	7-4. Installation Requirements	7-1
a. Turn on Checkout Procedure	4-1	a. Considerations	7-1
b. RF Amplifier AM-3007/ URT, Power Output Checkout Procedure	4-2	b. Cable Assemblies	7-1
c. Radio Transmitter T-827D/URT, Output Checkout Procedure	4-2	c. Installation	7-1
d. Interconnecting Cables, Checkout Procedure	4-2	(1) Mounting of Units	7-1
4-5. Trouble-Shooting Guide . . .	4-2	(2) Power Supply	7-10
SECTION 5 - MAINTENANCE		(3) Rack Installation	7-10
5-1. Failure, and Performance and Operational Reports	5-1	(4) Local RATT Transmission	7-10
5-2. Preventive Maintenance . . .	5-1	(5) Remote RATT Transmission	7-10
5-3. Repair	5-1	(6) Use of Ship's Frequency Standard for Operation	7-10
5-4. Diagrams	5-1	(7) Use of External Frequency Standard for Calibration	7-15
SECTION 6 - PARTS LIST		(8) Use of Internal Frequency Standard	7-15
6-1. Introduction	6-1	(9) Submarine Installation	7-15
a. Reference Designations	6-1	(10) Connection of Audio Transformers in Center-Tap Grounded Circuit	7-15
b. Ref Desig Prefix	6-1	d. Interconnection	7-15
6-2. List of Units	6-1	7-5. Antenna Coupler CU-937/UR Programming	7-16
6-3. Maintenance Parts List . . .	6-1		
6-4. List of Manufacturers	6-2		

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 7 - INSTALLATION (Cont)		SECTION 7 - INSTALLATION (Cont)	
7-6. Inspection and Adjustment	7-16	7-6. c. Performance Checks	7-16
a. Inspection	7-16	7-7. Interference Reduction	7-16
b. Adjustment	7-16		

LIST OF ILLUSTRATIONS

Figure	Page	Figure	Page
SECTION 1 - GENERAL INFORMATION		SECTION 2 - OPERATION	
1-1. Radio Set AN/URT-24, Typical Relationship of Units	1-1	2-1. Radio Transmitter T-827D/URT, Operating Controls, Indicators, and Connectors	2-6
1-2. Radio Transmitter T-827D/URT	1-6	2-2. RF Amplifier AM-3007/URT, Operating Controls and Indicators	2-11
1-3. Radio Transmitter T-827D/URT, Top View, Case Removed	1-7	2-3. Antenna Coupler CU-937/UR, Logging Chart	2-17
1-4. Radio Transmitter T-827D/URT, Bottom View, Case Removed	1-8	SECTION 3 - FUNCTIONAL DESCRIPTION	
1-5. Radio Transmitter T-827D/URT and RF Amplifier AM-3007/URT, Rear View	1-9	3-1. Radio Set AN/URT-24, Block Diagram	3-1
1-6. RF Amplifier AM-3007/URT	1-10	SECTION 5 - MAINTENANCE	
1-7. RF Amplifier AM-3007/URT, Top View, Case Removed	1-11	5-1. Radio Set AN/URT-24, Power Distribution Diagram	5-3
1-8. Antenna Coupler CU-937/UR, Side View, Case Removed	1-12	5-2. Radio Set AN/URT-24, System Interconnection Diagram	5-5
1-9. Interconnection Box J-1265/U, Top View, Front Panel Open	1-13	5-3. Radio Set AN/URT-24, System Keying Diagram	5-7
1-10. Interconnection Box J-1265/U, Front Panel	1-14	5-4. Radio Set AN/URT-24, System 28 Vdc Power Distribution	5-9

LIST OF ILLUSTRATIONS (Cont)

Figure	Page	Figure	Page
SECTION 7 - INSTALLATION		SECTION 7 - INSTALLATION (Cont)	
7-1.	Interconnection Box J-1265/U, Dimensions 7-3	7-5.	Radio Transmitter T-827D/ URT and RF Amplifier, AM-3007/URT, Mounted Dimensions 7-11
7-2.	Antenna Coupler CU-937/ UR, Dimensions 7-5	7-6.	Radio Set AN/URT-24, Mounting Bracket for Rack Mounting 7-13
7-3.	Radio Set AN/URT-24, System Installed 7-7	7-7.	Radio Set AN/URT-24, Typical Submarine In- stallation Diagram 7-17
7-4.	Radio Set AN/URT-24, Equipment Supplied 7-9		

LIST OF TABLES

Table	Page	Table	Page
SECTION 1 - GENERAL INFORMATION		SECTION 2 - OPERATION (Cont)	
1-1.	Radio Set AN/URT-24, Reference Designations . . 1-3	2-4.	Antenna Coupler CU-937/ UR, Tuning Chart for 25-Foot Whip Antenna . . . 2-14
1-2.	Radio Set AN/URT-24, Reference Data 1-14	2-5.	Antenna Coupler CU-937/ UR, Tuning Chart for 35-Foot Whip Antenna . . . 2-14
1-3.	Radio Transmitter T-827D/ URT, Crystal Complement 1-15	2-6.	Radio Set AN/URT-24, Operator's Preventive Maintenance Checks 2-19
1-4.	Radio Set AN/URT-24, Equipment Supplied 1-17	SECTION 4 - TROUBLE SHOOTING	
1-5.	Radio Set AN/URT-24, Equipment and Publications Required but Not Supplied 1-20	4-1.	Test Equipment Required for Trouble Shooting 4-1
SECTION 2 - OPERATION		4-2.	Radio Set AN/URT-24, Detailed Cable Data 4-3
2-1.	Radio Transmitter T-827D/URT, Operating Controls, Indicators and Connectors 2-1	4-3.	Trouble-Shooting Guide 4-10
2-2.	RF Amplifier AM-3007/ URT, Operating Controls and Indicators 2-7	SECTION 6 - PARTS LIST	
2-3.	Antenna Coupler CU-937/ UR, Tuning Chart for 15- Foot Whip Antenna 2-12	6-1.	List of Units 6-2
		6-2.	Maintenance Parts List . . . 6-3
		6-3.	List of Manufacturers 6-8

LIST OF TABLES (Cont)

Table	Page	Table	Page
SECTION 7 - INSTALLATION		SECTION 7 - INSTALLATION (Cont)	
7-1.	Radio Set AN/URT-24, Interconnecting Cable Assemblies 7-2	7-4.	Interconnection Box J-1265/U, Terminal Boards, Antenna Programming 7-20
7-2.	Radio Set AN/URT-24, Interconnections 7-16	7-5.	Antenna Coupler CU-937/UR, Tuning Inductor Prepositioning, Circuit Connections (TB1 of Antenna Coupler) 7-21
7-3.	Interconnecting Cable W10, Interconnection Box J-1265/U Terminal Board Connections 7-19		

SECTION 1

GENERAL INFORMATION

1-1. SCOPE.

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.

This Technical Manual describes Radio Set AN/URT-24 (hereafter referred to as the AN/URT-24) and includes general information, operation, functional description, trouble shooting, maintenance, a parts list and installation data.

1-2. GENERAL DESCRIPTION.

The AN/URT-24 is a multi-mode system capable of transmitting on any one of 280,000 channels, spaced in 0.1-kilohertz increments in the 2.0- to 29.9999-megahertz frequency range. Intelligence may be transmitted in continuous wave (CW), compatible amplitude modulation (compatible AM), radio teletype (RATT), upper sideband (USB), lower sideband (LSB), independent sideband (ISB) and ISB/RATT modes. The ISB mode permits two different types of intelligence to be transmitted simultaneously. The RATT mode can be obtained using suitable ancillary teletypewriter equipment. Tone-modulated continuous wave (MCW) facsimile, and standard amplitude modulated (AM) transmissions can also be made with the AN/URT-24.

The AN/URT-24 is intended primarily for general shipboard use, and submarine and shore installations. It can be rack mounted or stacked.

The AN/URT-24 consists of Radio Transmitter T-827D/URT (hereafter referred to as the T-827D/URT), RF Amplifier AM-3007/URT (hereafter referred to as the AM-3007/URT), Antenna Coupler CU-937/UR (hereafter referred to as the CU-937/UR), Interconnection Box J-1265/U

(hereafter referred to as the J-1265/U), Handset H-169/U (hereafter referred to as the H-169/U), Shock and Vibration Mount MT-3761/URC-35, and associated cable assemblies. The functional relationship of these units and associated GFM equipment is illustrated in figure 1-1.

1-3. REFERENCE DESIGNATIONS.

Table 1-1 lists the reference designations for all electronic assemblies and subassemblies contained in the units of the AN/URT-24 system.

1-4. DESCRIPTION OF UNITS.

a. RADIO TRANSMITTER

T-827D/URT.

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

(2) PHYSICAL CHARACTERISTICS. - The T-827D/URT (figure 1-2) 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 (see figures 1-3, 1-4, and 1-5).

(3) ELECTRICAL CHARACTERISTICS. - The T-827D/URT is an exciter

TABLE 1-1. RADIO SET AN/URT-24, REFERENCE DESIGNATION

UNIT	ELECTRONIC ASSEMBLY OR SUBASSEMBLY	DESIGNATION
T-827D/URT		1
T-827D/URT	Case	1A1
T-827D/URT	Chassis and front panel	1A2
T-827D/URT	Transmitter mode selector	1A2A1
T-827D/URT	Transmitter audio amplifier	1A2A2 and 1A2A3
T-827D/URT	RF amplifier	1A2A4
T-827D/URT	Frequency Standard	1A2A5
T-827D/URT	Translator/synthesizer	1A2A6
T-827D/URT	1 mc synthesizer	1A2A6A1
T-827D/URT	100 kc synthesizer	1A2A6A2
T-827D/URT	1 and 10 kc synthesizer	1A2A6A3
T-827D/URT	100 cps synthesizer	1A2A6A4
T-827D/URT	Spectrum generator	1A2A6A5
T-827D/URT	RF translator	1A2A6A6
T-827D/URT	Code generator	1A2A7

TABLE 1-1. RADIO SET AN/URT-24, REFERENCE DESIGNATIONS (Continued)

UNIT	ELECTRONIC ASSEMBLY OR SUBASSEMBLY	DESIGNATION
T-827D/URT	Power supply	1A2A8
T-827D/URT	RATT tone generator	1A2A9
T-827D/URT	Meter amplifier	1A2A10
T-827D/URT	Meter amplifier	1A2A11
T-827D/URT	Transmitter if. amplifier	1A2A12
T-827D/URT	Not used	1A2A13
T-827D/URT	Handset filter	1A2A14
T-827D/URT	Component board assembly	1A2A15
T-827D/URT	CPS control	1A2A16
AM-3007/URT		2
AM-3007/URT	Case	2A1
AM-3007/URT	Chassis	2A2
AM-3007/URT	Front panel	2A2A1
AM-3007/URT	APC/PPC directional coupler	2A2A2
AM-3007/URT	AC power supply	2A2A3

TABLE 1-1. RADIO SET AN/URT-24, REFERENCE DESIGNATIONS (Continued)

UNIT	ELECTRONIC ASSEMBLY OR SUBASSEMBLY	DESIGNATION
AM-3007/URT	Turret	2A2A4
AM-3007/URT	DC-to-DC converter	2A2A5
J-1265/U		3
CU-937/UR		4
MT-3761/URC-35	Base, shock mount	5
H-169/U	Handset assembly	6
	Interconnecting cables	7
	Assembly extender cables	8

producing a nominal 0.1-watt rf output, making it capable of driving the AM-3007/URT. The T-827D/URT employs a digital tuning assembly for automatically tuning to any one of 280,000 channels in 100-Hz steps in the 2.0- to 29.9999-megahertz frequency range. All circuits of the T-827D/URT (except two rf amplifier stages) utilize solid-state devices which are assembled into plug-in electronic assemblies. The frequency generation circuits are referenced to an ultra-stable crystal-controlled frequency standard, followed by low, mid, and high frequency rf mixers which convert the synthesizer frequencies to the appropriate output channel. The frequency

standard maintains a stability better than 1 part in 10^8 per day.

b. RF AMPLIFIER AM-3007/URT.

(1) FUNCTION. - The function of the AM-3007/URT is to provide linear amplification of the low-level rf output from the T-827D/URT for application to a 50-ohm impedance antenna system, or through the CU-937/UR to an antenna which is mismatched with respect to 50 ohms.

(2) PHYSICAL CHARACTERISTICS. - The AM-3007/URT (figures 1-5, 1-6, and 1-7) 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

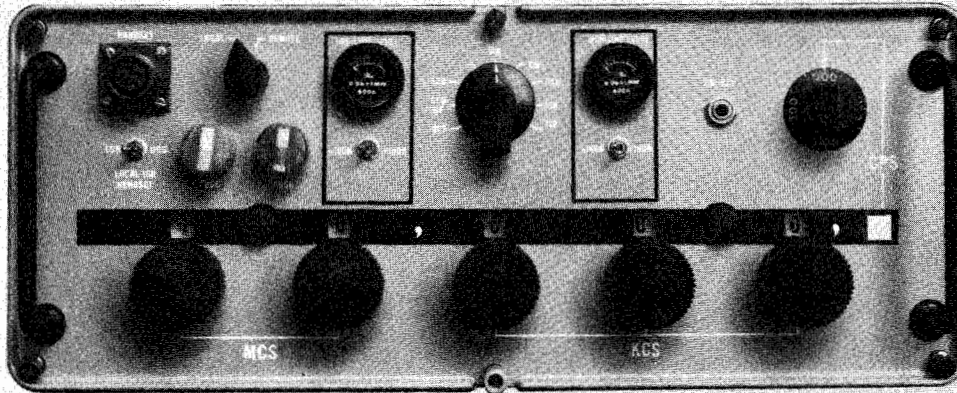


Figure 1-2. Radio Transmitter T-827D/URT

CU-937/UR are mounted on the front panel of the AM-3007/URT, which is secured to the case by six captive screws. The front panel also has cooling fins which act as a heat sink for the driver and final amplifier tubes.

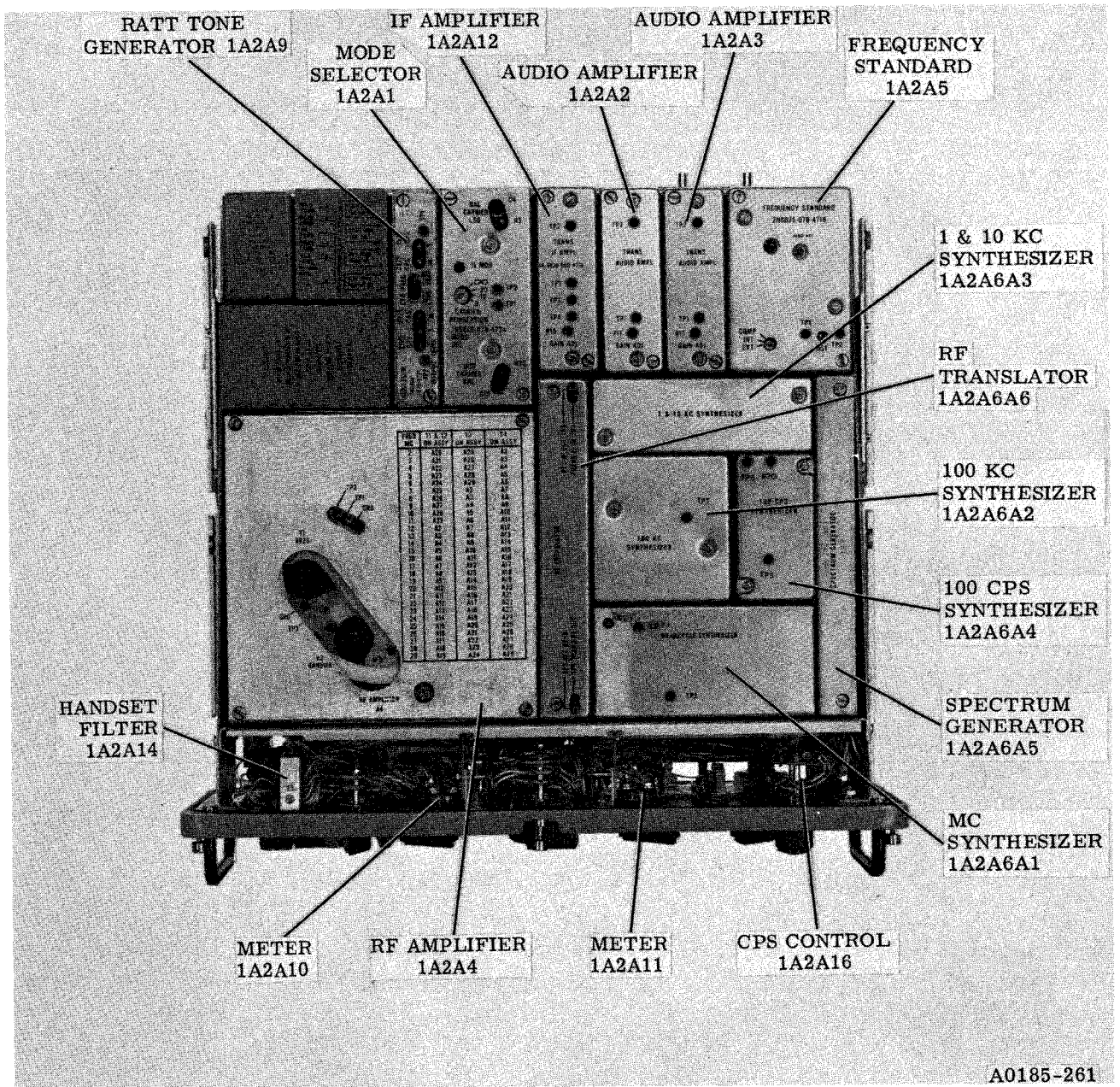
(3) ELECTRICAL CHARACTERISTICS. - The AM-3007/URT is a two-stage rf power amplifier which produces an output of 100 watts peak envelope power (PEP) SSB, 25 watts AM carrier, or 50 watts average CW or RATT into a 50-ohm load when supplied with an input of 0.1 to 0.25 watt. The AM-3007/URT acts as a linear amplifier. Except for the driver and final amplifier vacuum tubes, the AM-3007/URT is designed around solid-state devices. The AM-3007/URT is automatically tuned from the T-827D/URT by a five-wire code which is used to control a motor that positions a turret containing broadband coils. These coils act as part of tuned interstage and output tank 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.

c. ANTENNA COUPLER CU-937/UR.

(1) FUNCTION. - The function of the CU-937/UR is to match the system antenna to the 50-ohm output impedance of the AM-3007/URT.

(2) PHYSICAL CHARACTERISTICS. - The CU-937/UR is housed in a hermetically sealed weatherproof cylindrical case (figure 1-8). The case has four brackets to allow for mounting close to the system antenna, thus minimizing output power loss.

(3) ELECTRICAL CHARACTERISTICS. - The CU-937/UR operates at power levels of up to 100 watts input while maintaining a 50-ohm input impedance at a better than 1.5:1 voltage standing wave ratio (VSWR) over the 2.0- to 30.0-megahertz frequency range. Tuning of the CU-937/UR is accomplished entirely from the AM-3007/URT. The AM-3007/URT generates a tuning code to coarse-tune the CU-937/UR, and final adjustment to bring the VSWR to a minimum is then made using the controls on the front panel of the AM-3007/URT. Forward and reflected power is indicated by the RF OUTPUT meter on the AM-3007/URT front panel.



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Figure 1-3. Radio Transmitter T-827D/URT, Top View, Case Removed

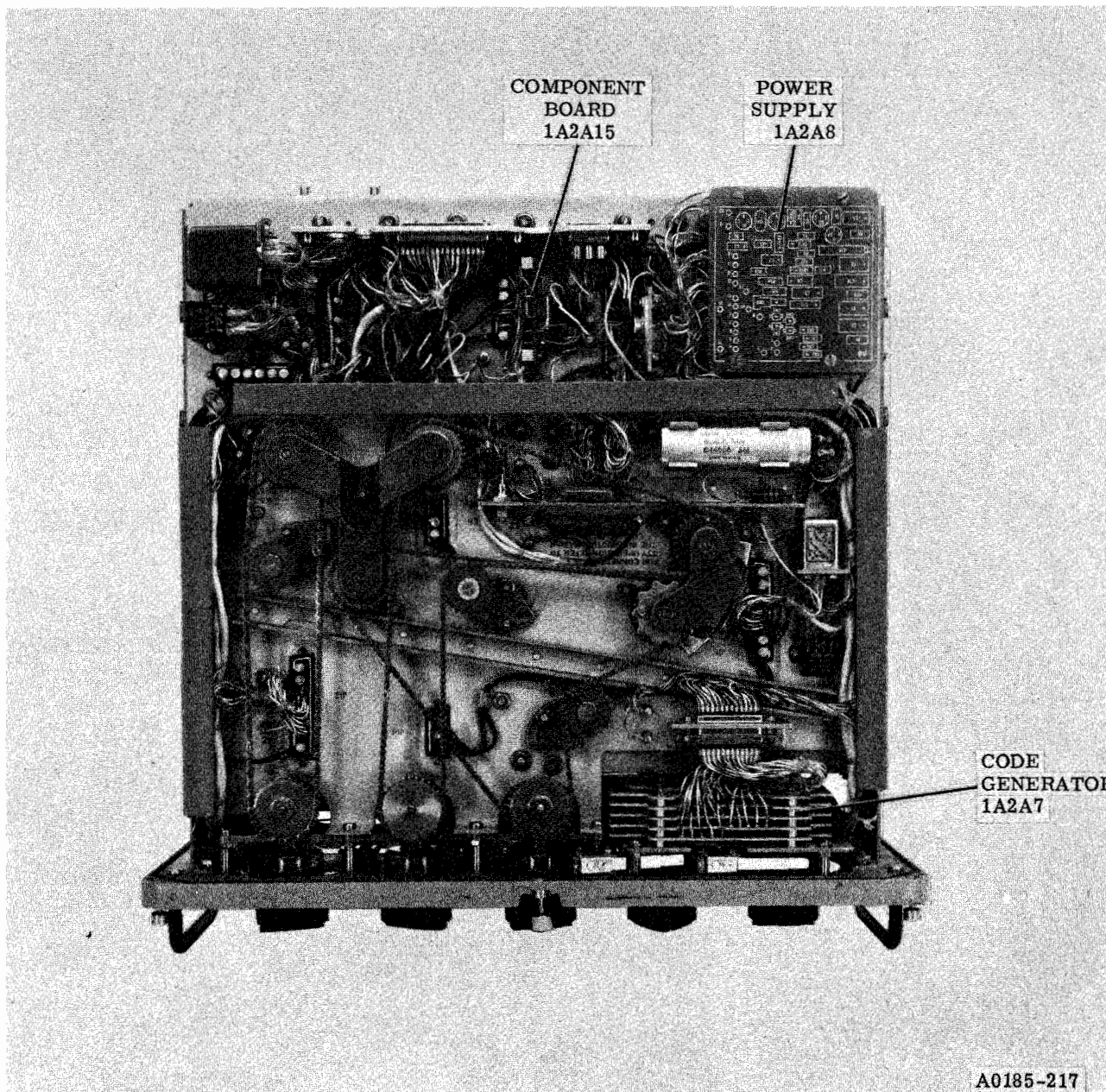


Figure 1-4. Radio Transmitter T-827D/URT, Bottom View, Case Removed

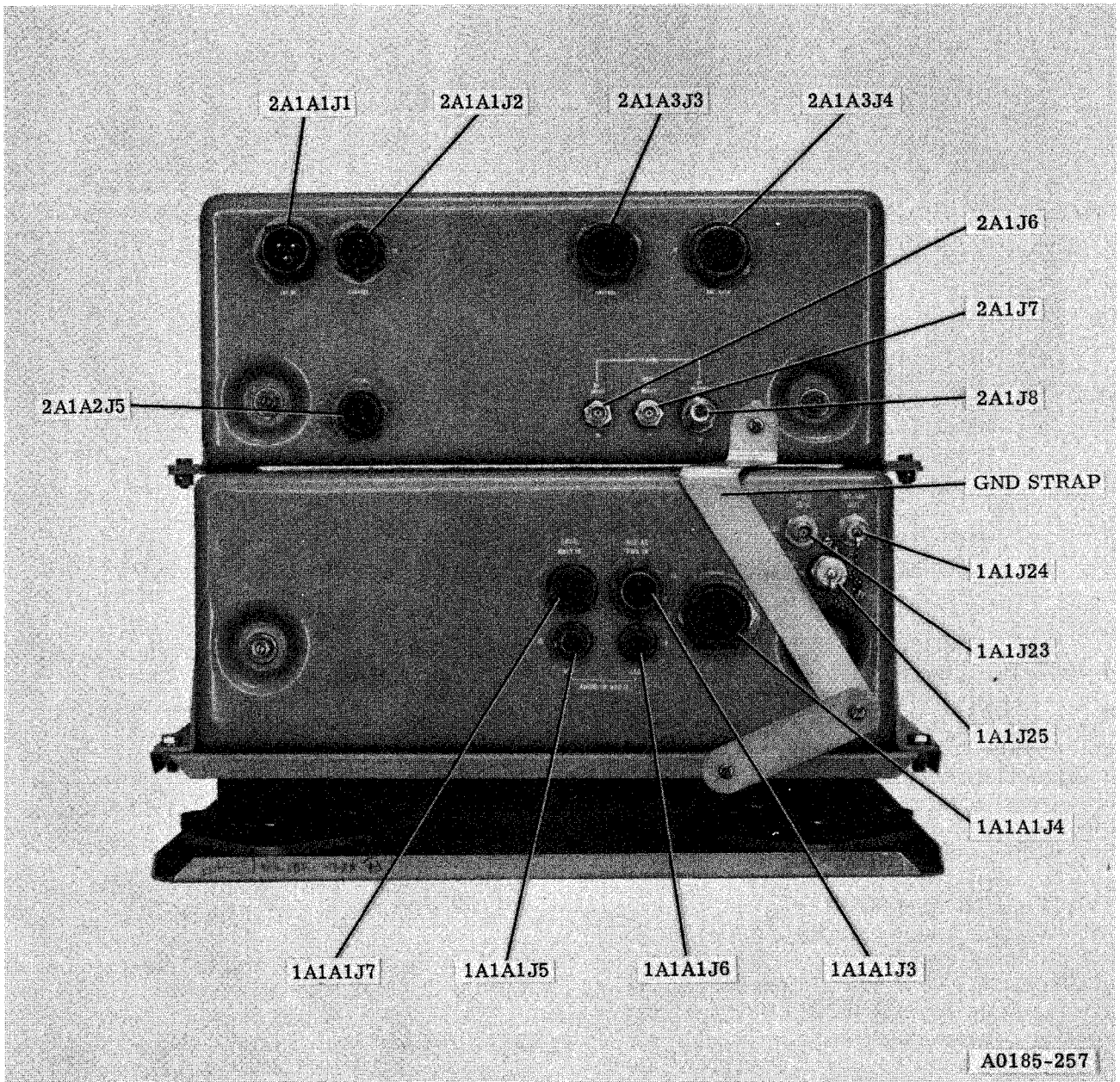


Figure 1-5. Radio Transmitter T-827D/URT and RF Amplifier AM-3007/URT,
Rear View

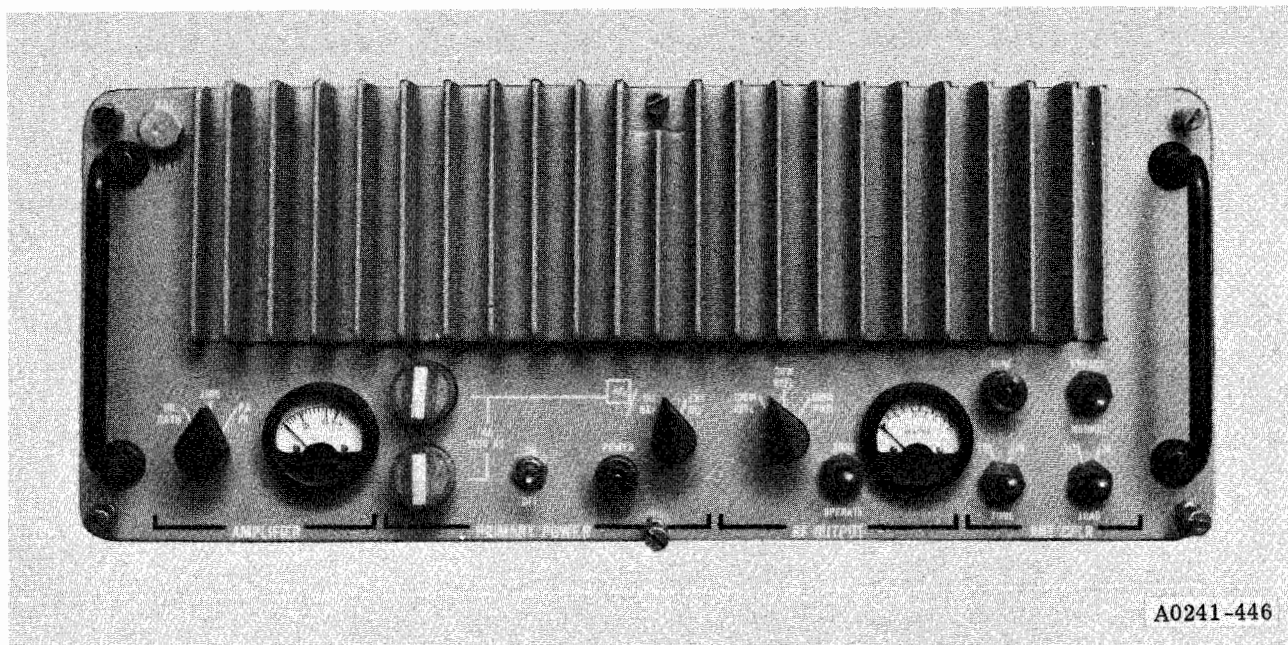


Figure 1-6. RF Amplifier AM-3007/URT

d. INTERCONNECTION BOX
J-1265/U.

(1) FUNCTION. - The function of the J-1265/U is to interconnect the major units of the AN/URT-24 and the ancillary equipments of the system. The J-1265/U also preprograms the CU-937/UR for either the 15-, 25-, or 35- foot whip antenna (35-foot whip antenna is preferred).

(2) PHYSICAL CHARACTERISTICS. - The J-1265/U is a box structure with the necessary connectors for system interconnections mounted on the front panel (figures 1-9 and 1-10). 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 and it can be bolted into place for installation.

(3) ELECTRICAL CHARACTERISTICS. - The J-1265/U contains no active electronic circuits, but it furnishes the physical interconnection components for the system. The J-1265/U also serves to program the CU-937/UR. This is accomplished by jumpering various terminals on

two of the seven terminal boards mounted in the J-1265/U.

1-5. RADIO SET AN/URT-24,
REFERENCE DATA.

Table 1-2 summarizes the reference data for the AN/URT-24.

1-6. RADIO TRANSMITTER T-827D/URT,
CRYSTAL COMPLEMENT.

Table 1-3 lists the crystal complement for the T-827D/URT.

1-7. RADIO SET AN/URT-24,
EQUIPMENT SUPPLIED.

Table 1-4 lists equipment supplied with the AN/URT-24.

1-8. RADIO SET AN/URT-24,
EQUIPMENT AND PUBLICATIONS
REQUIRED BUT NOT SUPPLIED.

Table 1-5 lists equipment and publications required but not supplied with the AN/URT-24.

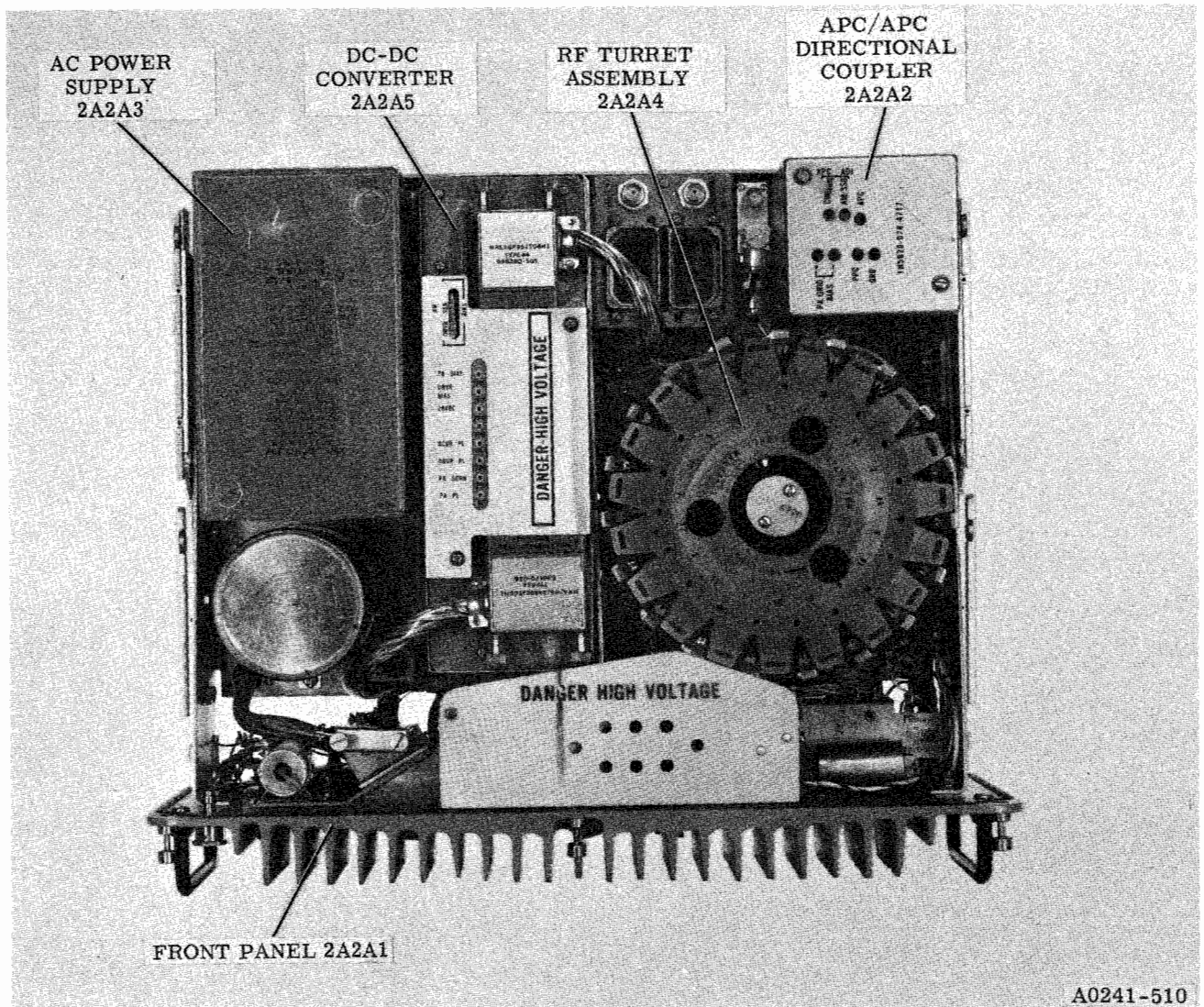


Figure 1-7. RF Amplifier AM-3007/URT, Top View, Case Removed

1-9. FACTORY AND FIELD CHANGES.

No factory or field changes have been made to the AN/URT-24.

1-10. EQUIPMENT SIMILARITIES.

The prime difference between Radio Set AN/URT-24 and Radio Set AN/WRC-1 is the receiving capability of Radio Set AN/WRC-1 provided by Radio Receiver R-1051 ()/URR.

The Antenna Coupler CU-937/UR and Interconnection Box, J-1265/U are interchangeable between Radio Sets AN/URT-24 and AN/WRC-1.

Radio Transmitter T-827(D)/URT contains several mechanical and electrical improvements over earlier models used in Radio Set AN/WRC-1, however, modular electronic subassemblies are interchangeable between T-827(D)/URT and T-827(B)/URT models. In addition, the majority of

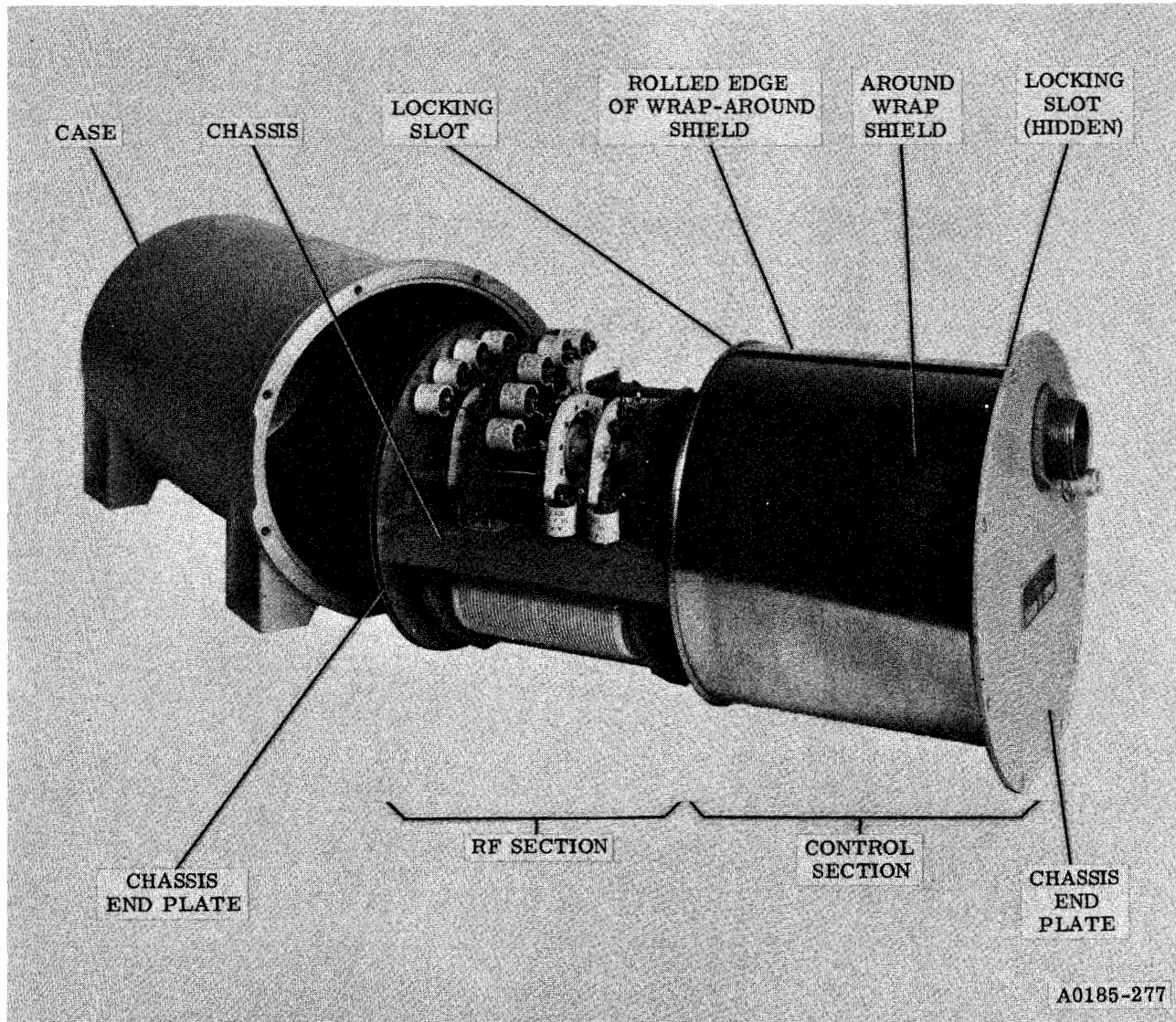


Figure 1-8. Antenna Coupler CU-937/UR, Side View, Case Removed

the electronic subassemblies in the T-827 (D)/URT may also be interchanged with modules in the T-827/URT and T-827(A)/URT, however, this does not include the Translator Synthesizer A2A6. Refer to Technical Manual for Radio Transmitter T-827(D)/URT, NAVSHIPS 0967-878-4010 for specific equipment similarities.

RF Amplifier AM-3007/URT provided with Radio Set AN/URT-24 also contains several performance and reliability improvements over earlier versions used in Radio Set AN/WRC-1. The four removable

electronic subassemblies are interchangeable between different revisions of the RF Amplifier AM-3007/URT. Refer to Technical Manual for RF Amplifier AM-3007/URT and Antenna Coupler CU-937/UR, NAVSHIPS 0967-878-6010 for specific modifications.

1-11. PREPARATION FOR RESHIPMENT.

To prepare the AN/URT-24 for reshipment, proceed as follows:

- a. Ensure that all electronic assemblies are fastened securely. Check that tubes V1 and V2 in AM-3007/URT and rf

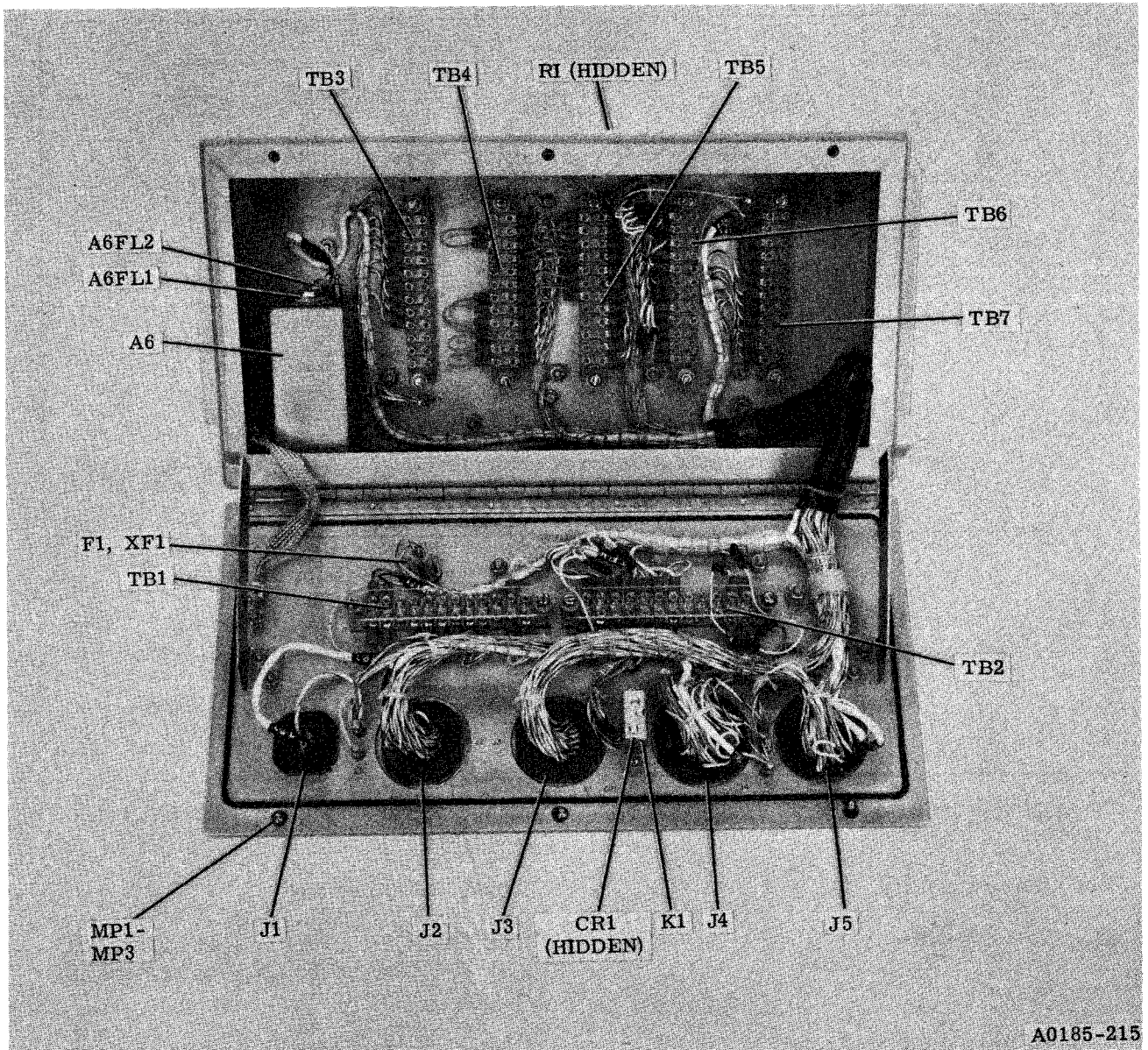


Figure 1-9. Interconnection Box J-1265/U, Top View, Front Panel Open

amplifier electronic assembly 1A2A4 are properly mounted, using vibration-proof shields provided.

b. On T-827D/URT, set Mode Selector switch at OFF.

c. On AM-3007/URT, set PRIMARY POWER selector switch at OFF.

d. For reshipment, use containers and packing material similar to those originally used to ship the AN/URT-24.

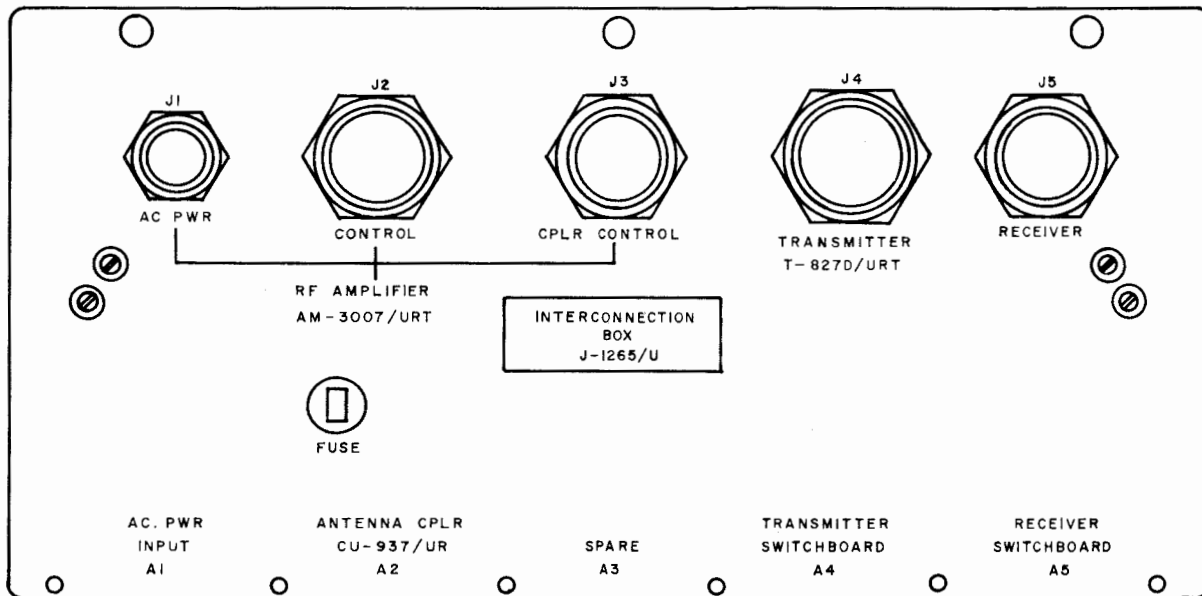


Figure 1-10. Interconnection Box J-1265/U, Front Panel

TABLE 1-2. RADIO SET AN/URT-24, REFERENCE DATA

Frequency range	2.0000 to 29.9999 MHz, in 0.1-kHz increments
Frequency stability	1 part in 10^8 per day
Modes of operation	USB, LSB, ISB, RATT, ISB/RATT (ISB with RATT on USB), CW, and compatible AM
Type of frequency control	Crystal-controlled synthesizers referenced to a 5-MHz internal or external frequency standard
Intermodulation distortion	-30 dB maximum
Carrier suppression	-50 dB
T-827D/URT power output	0.1 watt nominal
T-827D/URT primary power requirements	65 watts, 115 Vac \pm 10 percent, single phase, 48 to 450 Hz

TABLE 1-2. RADIO SET AN/URT-24, REFERENCE DATA (Continued)

AM-3007/URT power output	100 watts PEP SSB, 25 watts carrier power for compatible AM, 50 watts CW and RATT
AM-3007/URT output impedance	50 ohms
AM-3007/URT spurious radiation	50 dB below PEP output
AM-3007/URT primary power requirements	335 watts, 115 Vac \pm 10 percent, single phase, 48 to 450 Hz
System operating ambient temperature range	0°C to 50°C

TABLE 1-3. RADIO TRANSMITTER T-827D/URT, CRYSTAL COMPLEMENT

REF DESIG	TYPE OF CUT	CRYSTAL OSC FREQ (MHz)	OPERATING TEMP RANGE	TOLERANCE (PERCENT)
A2A5A3Y1	AT	5.000000	83.0°C to 87.0°C	0.001
A2A6A1Y1	AT	2.498850	0°C to 75°C	0.003
A2A6A1Y2	AT	3.499720	0°C to 75°C	0.003
A2A6A1Y3	AT	4.499640	0°C to 75°C	0.003
A2A6A1Y4	AT	5.499560	0°C to 75°C	0.003
A2A6A1Y5	AT	7.499400	0°C to 75°C	0.003
A2A6A1Y6	AT	8.499320	0°C to 75°C	0.003
A2A6A1Y7	AT	9.499240	0°C to 75°C	0.003
A2A6A1Y8	AT	10.499160	0°C to 75°C	0.003
A2A6A1Y9	AT	11.499080	0°C to 75°C	0.003
A2A6A1Y10	AT	12.499000	0°C to 75°C	0.003
A2A6A1Y11	AT	14.498840	0°C to 75°C	0.003
A2A6A1Y12	AT	15.498760	0°C to 75°C	0.003
A2A6A1Y13	AT	16.498680	0°C to 75°C	0.003

TABLE 1-3. RADIO TRANSMITTER T-827D/URT, CRYSTAL COMPLEMENT (Continued)

REF DESIG	TYPE OF CUT	CRYSTAL OSC FREQ (MHz)	OPERATING TEMP RANGE	TOLERANCE (PERCENT)
A2A6A1Y14	AT	17.498600	0°C to 75°C	0.003
A2A6A1Y15	AT	19.498440	0°C to 75°C	0.003
A2A6A1Y16	AT	20.498360	0°C to 75°C	0.003
A2A6A1Y17	AT	23.498120	0°C to 75°C	0.003
A2A6A2Y1	AT	4.553	0°C to 75°C	0.003
A2A6A2Y2	AT	4.653	0°C to 75°C	0.003
A2A6A2Y3	AT	4.753	0°C to 75°C	0.003
A2A6A2Y4	AT	4.853	0°C to 75°C	0.003
A2A6A2Y5	AT	4.953	0°C to 75°C	0.003
A2A6A2Y6	AT	5.053	0°C to 75°C	0.003
A2A6A2Y7	AT	5.153	0°C to 75°C	0.003
A2A6A2Y8	AT	5.253	0°C to 75°C	0.003
A2A6A2Y9	AT	5.353	0°C to 75°C	0.003
A2A6A2Y10	AT	5.453	0°C to 75°C	0.003
A2A6A3Y1	AT	5.25	0°C to 75°C	0.003
A2A6A3Y2	AT	5.24	0°C to 75°C	0.003
A2A6A3Y3	AT	5.23	0°C to 75°C	0.003
A2A6A3Y4	AT	5.22	0°C to 75°C	0.003
A2A6A3Y5	AT	5.21	0°C to 75°C	0.003
A2A6A3Y6	AT	5.20	0°C to 75°C	0.003
A2A6A3Y7	AT	5.19	0°C to 75°C	0.003
A2A6A3Y8	AT	5.18	0°C to 75°C	0.003
A2A6A3Y9	AT	5.17	0°C to 75°C	0.003

TABLE 1-3. RADIO TRANSMITTER T-827D/URT, CRYSTAL COMPLEMENT (Continued)

REF DESIG	TYPE OF CUT	CRYSTAL OSC FREQ (MHz)	OPERATING TEMP RANGE	TOLERANCE (PERCENT)
A2A6A3Y10	AT	5.16	0°C to 75°C	0.003
A2A6A3Y11	AT	1.850	0°C to 75°C	0.003
A2A6A3Y12	AT	1.851	0°C to 75°C	0.003
A2A6A3Y13	AT	1.852	0°C to 75°C	0.003
A2A6A3Y14	AT	1.853	0°C to 75°C	0.003
A2A6A3Y15	AT	1.854	0°C to 75°C	0.003
A2A6A3Y16	AT	1.855	0°C to 75°C	0.003
A2A6A3Y17	AT	1.856	0°C to 75°C	0.003
A2A6A3Y18	AT	1.857	0°C to 75°C	0.003
A2A6A3Y19	AT	1.858	0°C to 75°C	0.003
A2A6A3Y20	AT	1.859	0°C to 75°C	0.003

TABLE 1-4. RADIO SET AN/URT-24, EQUIPMENT SUPPLIED

QTY PER EQUIP	NOMENCLATURE		OVER-ALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	Radio Transmitter	T-827D/URT	7.0	17.38	18.9	1.33	70
1	RF Amplifier	AM-3007/URT	7.0	17.37	17.0	1.20	78
1	Interconnection Box	J-1265/U	4.0	8.0	17.375		14
1	Shock and Vibration Mount	MT-3761/URC-35	3.625	16.75	19.750		17

TABLE 1-4. RADIO SET AN/URT-24, EQUIPMENT SUPPLIED (Continued)

QTY PER EQUIP	NOMENCLATURE		OVER-ALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	Antenna Coupler	CU-937/UR	9.48 (diam- eter)	-	20.8	0.82	26
1	Handset (including cord and plug assembly)	H-169/U (with CX-1846A/U)					
1	Intercon- necting Cables	W1, 2, 3, 4 and 6					
1	Kit, Antenna Coupler Mating Connectors	7W10P1 and 7W8P1					
1	Kit, Trans- mitter RF Signal Mating Connectors	7W8P2					
1	Kit, Auxil- iary Mating Connectors						
2	Technical Manual for Radio Set AN/URT-24	NAVSHIPS 0967-878-5010					
2	Technical Manual for RF Ampli- fier AM- 3007/URT and Antenna Coupler CU-937/UR	NAVSHIPS 0967-878-6010					

TABLE 1-4. RADIO SET AN/URT-24, EQUIPMENT SUPPLIED (Continued)

QTY PER EQUIP	NOMENCLATURE		OVER-ALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	Reference Standards Book for Radio Set AN/URT-24	NAVSHIPS 0967-878-5050					
1	Reference Standards Book for RF Amplifier AM-3007/URT and Antenna Coupler CU-937/UR	NAVSHIPS 0967-878-6050					
1	Performance Standards Sheets for Radio Set AN/URT-24	NAVSHIPS 0967-878-5040					
1	Performance Standards Sheets for RF Amplifier AM-3007/URT and Antenna Coupler CU-937/UR	NAVSHIPS 0967-878-6040					
1	Operator's Instruction Chart for RF Amplifier AM-3007/URT and Antenna Coupler CU-937/UR	NAVSHIPS 0967-878-6030					
1	Operator's Instruction Chart for Radio Set AN/URT-24	NAVSHIPS 0967-878-5030					

TABLE 1-5. RADIO SET AN/URT-24, EQUIPMENT AND PUBLICATIONS
REQUIRED BUT NOT SUPPLIED

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Antenna		Propagation of rf signals	
1	Cable set		Interconnection	
1	CW key		Local keying for CW operation	
1	Teletypewriter Panel	TT-23/SG (or equivalent)	RATT operation	
1	Teletypewriter Control Panel	C-1004/SG (or equivalent)	RATT operation	
1	Teletypewriter Power Supply	PP-3494/U (or equivalent)	RATT operation	
1	Radio Set Control	C-1138/UR (or equivalent)	Shipboard remote control operation	
1	Key Control Panel	SB-315/U (or equivalent)	Keying for CW operation	
1	Multimeter	AN/PSM-4 () (or equivalent)	Trouble-shooting and maintenance procedures	Ranges: 0 to 1000 Vdc, 9 ranges, 20,000 ohms/volt 0 to 250 Vac, 8 ranges 5000 ohms/volt 0 to 20 megohms, 5 ranges Accuracy: ±3 percent of full scale
1	Multimeter, Electronic	AN/USM-116() with T connector (or equivalent)	Trouble-shooting and maintenance procedures	Frequency range: 2 to 30 MHz Input impedance: 100,000 ohms/volt Accuracy: 2 percent

TABLE 1-5. RADIO SET AN/URT-24, EQUIPMENT AND PUBLICATIONS
REQUIRED BUT NOT SUPPLIED (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Multimeter, Electronic (Cont)			Ranges: 0 to 10 volts 0 to 30 volts 0 to 100 volts
1	Multimeter, Electronic (rf voltmeter) (or equivalent)	CCVO-91CA (or equivalent)	Trouble-shooting and maintenance procedures	Input impedance: 20,000 ohms/ volt at 500 kHz Ranges: 0 to 1 mv 0 to 3 mv 0 to 10 mv 0 to 100 mv 0 to 300 mv 0 to 1000 mv 0 to 3000 mv
1	Transmitter Switchboard	SB-83/SRT (or equivalent)		
1	Multimeter, Electronic	ME-6()/U (or equivalent)	Trouble-shooting 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
1	Voltmeter, Heterodyne	CDAN-2005*	Trouble-shooting and maintenance procedures	Frequency range: 20 kHz to 30 MHz ranges Voltage range: 15 microvolts to 15 volts, 7 ranges

*Available for restoration activities only.

TABLE 1-5. RADIO SET AN/URT-24, EQUIPMENT AND PUBLICATIONS
REQUIRED BUT NOT SUPPLIED (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Voltmeter, Heterodyne (Cont)			Input impedance: 5,000,000 ohms at 100 kHz 90,000 ohms at 30 MHz (in parallel with 5.5 pf) Frequency accuracy: 2% ±2 kHz Voltage accuracy: 0.5 dB Built-in loudspeaker
1	RF Signal Generator	CAQI-606A (or equivalent)	Trouble-shooting 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 equivalent)	Trouble-shooting and maintenance procedures	Frequency: 100 kHz, 500 kHz, and 5 MHz Stability: 1 part in 10 ⁸ Output: 0.5 volt
1	Oscilloscope	AN/USM-105A (or equivalent)	Trouble-shooting and maintenance procedures	Frequency: DC to 15 MHz Frequency response: 100 kHz Ranges: 0.5 volt peak-to-peak 3 volts peak-to-peak 10 volts peak-to-peak 2500 volts peak-to- peak Sensitivity: 2 to 10 Vdc

TABLE 1-5. RADIO SET AN/URT-24, EQUIPMENT AND PUBLICATIONS
REQUIRED BUT NOT SUPPLIED (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Electrical Dummy Load	DA-91()/U	Trouble-shooting and maintenance procedures	Impedance: 50 ohms Power rating: As required
1	Analyzer Test Set	TS-1379/U	Trouble-shooting and maintenance procedures	Frequency: 2 to 30 MHz Resolution: 100 Hz
	Spectrum Analyzer	TS-1379/U		Sensitivity: 2 μ V full scale
	Tuning Head	REC-1		Sweep width: 7 kHz
	Two-Tone Audio Signal Generator	SG-376A/U (or equivalent)		
1	Frequency Meter	AN/USM- 207() (or equivalent)	Trouble-shooting and maintenance procedures	Frequency range: 0 to 30 MHz Accuracy: \pm 1 Hz
1	Audio Signal Generator	AN/URM-127 (or equivalent)	Trouble-shooting 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

**These test sets are special test fixtures available only at the Special Module Repair facility.

TABLE 1-5. RADIO SET AN/URT-24, EQUIPMENT AND PUBLICATIONS
REQUIRED BUT NOT SUPPLIED (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Test Set, Frequency Standard	TS-2134/WRC- 1**	Testing frequency standard electronic assembly	Simulates actual operating conditions
1	Test Set, Electronic Cir- cuit Plug-In Unit	TS-2135/WRC- 1**	Testing common electronic assemblies	Simulates actual operating conditions
1	Base, Molded (Driver)	GD/E-666230- 282	Trouble-shooting and maintenance procedures	Completes turret connections
1	Base, Molded (Output)	GD/E-666230- 280	Trouble-shooting and maintenance procedures	Completes turret connections
1	AN/PSM-4() Technical Manual	NAVSHIPS 91583	Trouble-shooting and maintenance procedures	
1	AN/USM-116 Technical Manual	NAVSHIPS 93808	Trouble-shooting and maintenance procedures	
1	CCVO-91CA Technical Manual	NAVSHIPS 0967-097-5010	Trouble-shooting and maintenance procedures	
1	ME-6()/U Technical Manual	NAVSHIPS 92423	Trouble-shooting and maintenance procedures	
1	CDAN-2005 Technical Manual	NAVSHIPS 0967-090-4010	Trouble-shooting and maintenance procedures	
1	AN/USM-105A Technical Manual	NAVSHIPS 0967-085-3010	Trouble-shooting and maintenance procedures	

**These test sets are special test fixtures available at the Special Module Repair facility.

TABLE 1-5. RADIO SET AN/URT-24, EQUIPMENT AND PUBLICATIONS
REQUIRED BUT NOT SUPPLIED (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	TS-1379/U REC-1 SG-376A/U Technical Manuals	NAVSHIPS 0969-246-4010 NAVSHIPS 0969-120-7020 NAVSHIPS 0969-245-9010	Trouble-shooting and maintenance procedures	
1	AN/USM- 207() Technical Manual	NAVSHIPS 0969-028-4010	Trouble-shooting and maintenance procedures	
1	AN/URM-127 Technical Manual	AIR FORCE T.O. 33A1-8- 176-14	Trouble-shooting and maintenance procedures	
1	CAQI-606A Technical Manual	NAVSHIPS 0967-186-6010	Trouble-shooting and maintenance procedures	
1	AN/URQ-9 Technical Manual	NAVSHIPS 93806(A)	Trouble-shooting and maintenance procedures	
1	Coaxial T Connector	U6-274A/U	Trouble-shooting and maintenance procedures	50 ohms
1	Resistor	RC42GF510J (or equivalent)	Trouble-shooting and maintenance procedures	51 ohms, ±5 percent, 2 watts, noninductive

SECTION 2

OPERATION

2-1. FUNCTIONAL OPERATION.

a. GENERAL. - Radio Set AN/URT-24 is a multi-mode system capable of transmitting on any one of 280,000 channels, spaced in 0.1-kilohertz increments in the 2.0- to 29.999-megahertz frequency range. Intelligence may be transmitted in continuous wave (CW), compatible amplitude modulation (compatible AM), radio teletype (RATT), upper sideband (USB), lower sideband (LSB), independent sideband (ISB), and ISB/RATT modes. The ISB mode permits two different types of intelligence to be transmitted simultaneously. The RATT mode can be obtained using suitable ancillary teletypewriter equipment. Tone-modulated continuous wave (MCW) facsimile and standard amplitude (AM) transmissions can also be made with the AN/URT-24. The major electronic components of the AN/URT-24 are Radio Transmitter T-827D/URT, RF Amplifier AM-3007/URT, Antenna Coupler CU-937/UR, and Interconnection Box J-1265/U.

b. OPERATION.

(1) RADIO TRANSMITTER

T-827D/URT. - The T-827D/URT is tuned by setting the MCS and KCS controls and the CPS switch on the front panel to the desired frequency. Tuning the T-827D/URT to an operating frequency generates a tuning code within the T-827D/URT which is used externally to tune the AM-3007/URT to the same operating channel as the T-827D/URT. Audio signals from the handset are applied to the T-827D/URT where the signals are translated to an rf signal and amplified. When compatible AM or CW transmission is used, the carrier is reinserted in the signal path in the T-827D/URT. The resultant output frequency of the T-827D/URT is translated to the desired rf output by mixing it with three injection frequencies in a triple-conversion process. When RATT transmission is used, a tone generator in the T-827D/URT is energized. Loop current

from the ancillary teletypewriter (TTY) equipment produces a frequency shift output which is centered on one of two selectable center frequencies (2000 or 2550 Hz), depending on the ancillary equipment used. The RATT output is transmitted on the upper sideband. The T-827D/URT contains an rf amplifier which is digitally tuned and provides a minimum of 0.1-watt output to the AM-3007/URT.

(2) RF AMPLIFIER AM-3007/URT. - The AM-3007/URT is the rf linear amplifier unit of the AN/URT-24 and provides 100 watts peak envelope power (PEP, SSB), 25 watts AM carrier, or 50 watts CW or RATT. The AM-3007/URT feeds two dc average power and peak power control levels to the T-827D/URT to prevent its rf output from exceeding the predetermined level. The high-power output of the AM-3007/URT is transferred to the antenna through the CU-937/UR.

(3) ANTENNA COUPLER

CU-937/UR. - The CU-937/UR matches a 15-foot, 25-foot, or 35-foot whip antenna to the 50-ohm coaxial transmission line from the AM-3007/URT for any frequency in the 2.0- to 29.999-megahertz frequency range. A code from the AM-3007/URT automatically rough-tunes the CU-937/UR to one of eleven different channels. Fine tuning of the CU-937/UR is accomplished from ANT CPLR TUNE and LOAD controls on the AM-3007/URT front panel.

2-2. OPERATING PROCEDURES.

a. DESCRIPTION OF OPERATING CONTROLS, INDICATORS, AND CONNECTORS. - All controls, indicators, and connectors required for normal operation of the AN/URT-24 are located on the front panels of the T-827D/URT and the AM-3007/URT. Tables 2-1 and 2-2 list the operating controls, indicators, and connectors with their functions and the associated reference designation. Figure 2-1 illustrates and locates the operating

TABLE 2-1. RADIO TRANSMITTER T-827D/URT, OPERATING CONTROLS, INDICATORS AND CONNECTORS

CONTROL, INDICATOR, OR CONNECTOR	REF DESIG	FUNCTION						
LOCAL ISB HANDSET switch	S9	<p>Selects channel of handset audio input and output in ISB and ISB/RATT mode.</p> <table border="1"> <thead> <tr> <th data-bbox="911 646 1057 716"><u>Switch Position</u></th> <th data-bbox="1057 646 1547 716"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="911 716 1057 835">LSB</td> <td data-bbox="1057 716 1547 835">Applies handset audio microphone and earphone to LSB channel</td> </tr> <tr> <td data-bbox="911 835 1057 955">USB</td> <td data-bbox="1057 835 1547 955">Applies handset audio microphone and earphone to USB channel</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	LSB	Applies handset audio microphone and earphone to LSB channel	USB	Applies handset audio microphone and earphone to USB channel
<u>Switch Position</u>	<u>Equipment Response</u>							
LSB	Applies handset audio microphone and earphone to LSB channel							
USB	Applies handset audio microphone and earphone to USB channel							
HANDSET connector	J1	Used to connect handset to T-827D/URT.						
FUSE (with indicator)	F1, DS1	Protects T-827D/URT against overload; indicator lights when fuse is open.						
FUSE (with indicator)	F2, DS2	Protects T-827D/URT against overload; indicator lights when fuse is open.						
LOCAL/REMOTE switch	S1	<p>Selects local or remote key and input to T-827D/URT.</p> <table border="1"> <thead> <tr> <th data-bbox="911 1388 1057 1457"><u>Switch Position</u></th> <th data-bbox="1057 1388 1547 1457"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="911 1457 1057 1577">LOCAL</td> <td data-bbox="1057 1457 1547 1577">T-827D/URT keying and input accomplished locally by operator</td> </tr> <tr> <td data-bbox="911 1577 1057 1696">REMOTE</td> <td data-bbox="1057 1577 1547 1696">T-827D/URT keying and input accomplished from remote location</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	LOCAL	T-827D/URT keying and input accomplished locally by operator	REMOTE	T-827D/URT keying and input accomplished from remote location
<u>Switch Position</u>	<u>Equipment Response</u>							
LOCAL	T-827D/URT keying and input accomplished locally by operator							
REMOTE	T-827D/URT keying and input accomplished from remote location							
Mode Selector switch	S2	<p>Selects T-827D/URT mode of operation.</p> <table border="1"> <thead> <tr> <th data-bbox="911 1808 1057 1877"><u>Switch Position</u></th> <th data-bbox="1057 1808 1547 1877"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="911 1877 1057 1915">OFF</td> <td data-bbox="1057 1877 1547 1915">No power is applied</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	OFF	No power is applied		
<u>Switch Position</u>	<u>Equipment Response</u>							
OFF	No power is applied							

TABLE 2-1. RADIO TRANSMITTER T-827D/URT, OPERATING CONTROLS, INDICATORS AND CONNECTORS (Continued)

CONTROL, INDICATOR, OR CONNECTOR	REF DESIG	FUNCTION																		
Mode Selector switch (Cont)		<table border="0"> <thead> <tr> <th data-bbox="771 537 899 604"><u>Switch Position</u></th> <th data-bbox="1036 569 1317 604"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="771 625 889 661">STD BY</td> <td data-bbox="954 625 1360 688">Energizes frequency standard and tube filaments</td> </tr> <tr> <td data-bbox="771 716 834 751">LSB</td> <td data-bbox="954 716 1295 779">T-827D/URT operates in LSB mode</td> </tr> <tr> <td data-bbox="771 806 857 842">RATT</td> <td data-bbox="954 806 1344 905">T-827D/URT operates in RATT mode (850-Hz shift in USB bandpass)</td> </tr> <tr> <td data-bbox="771 932 824 968">AM</td> <td data-bbox="954 932 1317 1031">T-837D/URT operates in compatible AM mode (USB modulation plus carrier)</td> </tr> <tr> <td data-bbox="771 1058 824 1094">CW</td> <td data-bbox="954 1058 1349 1178">T-827D/URT operates in CW mode; transmitted frequency is at front-panel frequency setting</td> </tr> <tr> <td data-bbox="771 1205 834 1241">USB</td> <td data-bbox="954 1205 1295 1268">T-827D/URT operates in USB mode</td> </tr> <tr> <td data-bbox="771 1295 824 1331">ISB</td> <td data-bbox="954 1295 1312 1415">T-827D/URT operates in ISB mode; simultaneous transmissions on LSB and USB</td> </tr> <tr> <td data-bbox="771 1442 915 1478">ISB/RATT</td> <td data-bbox="954 1442 1360 1541">T-827D/URT transmits RATT on USB and voice on LSB simultaneously</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	STD BY	Energizes frequency standard and tube filaments	LSB	T-827D/URT operates in LSB mode	RATT	T-827D/URT operates in RATT mode (850-Hz shift in USB bandpass)	AM	T-837D/URT operates in compatible AM mode (USB modulation plus carrier)	CW	T-827D/URT operates in CW mode; transmitted frequency is at front-panel frequency setting	USB	T-827D/URT operates in USB mode	ISB	T-827D/URT operates in ISB mode; simultaneous transmissions on LSB and USB	ISB/RATT	T-827D/URT transmits RATT on USB and voice on LSB simultaneously
		<u>Switch Position</u>	<u>Equipment Response</u>																	
		STD BY	Energizes frequency standard and tube filaments																	
		LSB	T-827D/URT operates in LSB mode																	
		RATT	T-827D/URT operates in RATT mode (850-Hz shift in USB bandpass)																	
		AM	T-837D/URT operates in compatible AM mode (USB modulation plus carrier)																	
		CW	T-827D/URT operates in CW mode; transmitted frequency is at front-panel frequency setting																	
		USB	T-827D/URT operates in USB mode																	
ISB	T-827D/URT operates in ISB mode; simultaneous transmissions on LSB and USB																			
ISB/RATT	T-827D/URT transmits RATT on USB and voice on LSB simultaneously																			
LSB LINE LEVEL switch	S10	<p>Selects range for LSB LINE LEVEL meter M1</p> <table border="0"> <thead> <tr> <th data-bbox="771 1650 899 1717"><u>Switch Position</u></th> <th data-bbox="1036 1682 1317 1717"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="771 1738 862 1774">-10DB</td> <td data-bbox="954 1738 1349 1837">10 dB is subtracted from LSB LINE LEVEL meter M1 indication</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	-10DB	10 dB is subtracted from LSB LINE LEVEL meter M1 indication														
<u>Switch Position</u>	<u>Equipment Response</u>																			
-10DB	10 dB is subtracted from LSB LINE LEVEL meter M1 indication																			

TABLE 2-1. RADIO TRANSMITTER T-827D/URT, OPERATING CONTROLS, INDICATORS AND CONNECTORS (Continued)

CONTROL, INDICATOR, OR CONNECTOR	REF DESIG	FUNCTION						
LSB LINE LEVEL switch (Cont)		<table border="0"> <tr> <td data-bbox="915 541 1029 604"><u>Switch Position</u></td> <td data-bbox="1170 569 1468 600"><u>Equipment Response</u></td> </tr> <tr> <td data-bbox="902 632 997 657">+10DB</td> <td data-bbox="1089 632 1495 688">10 dB is added to LSB LINE LEVEL meter M1 indication</td> </tr> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	+10DB	10 dB is added to LSB LINE LEVEL meter M1 indication		
<u>Switch Position</u>	<u>Equipment Response</u>							
+10DB	10 dB is added to LSB LINE LEVEL meter M1 indication							
LSB LINE LEVEL meter	M1	Indicates LSB audio input line level.						
USB LINE LEVEL switch	S11	Selects range of USB LINE LEVEL meter M2.						
		<table border="0"> <tr> <td data-bbox="915 905 1029 968"><u>Switch Position</u></td> <td data-bbox="1162 932 1459 963"><u>Equipment Response</u></td> </tr> <tr> <td data-bbox="902 995 997 1020">-10DB</td> <td data-bbox="1089 995 1520 1079">10 dB is subtracted from USB LINE LEVEL meter M2 indication</td> </tr> <tr> <td data-bbox="902 1115 997 1140">+10DB</td> <td data-bbox="1089 1115 1503 1171">10 dB is added to USB LINE LEVEL meter M2 indication</td> </tr> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	-10DB	10 dB is subtracted from USB LINE LEVEL meter M2 indication	+10DB	10 dB is added to USB LINE LEVEL meter M2 indication
<u>Switch Position</u>	<u>Equipment Response</u>							
-10DB	10 dB is subtracted from USB LINE LEVEL meter M2 indication							
+10DB	10 dB is added to USB LINE LEVEL meter M2 indication							
USB LINE LEVEL meter	M2	Indicates USB audio input line level.						
CW KEY jack	J2	Used to connect local CW hand key to T-827D/URT.						
CPS switch	S6	Increases T-827D/URT tuning capabilities.						
		<table border="0"> <tr> <td data-bbox="915 1472 1029 1535"><u>Switch Position</u></td> <td data-bbox="1162 1499 1459 1530"><u>Equipment Response</u></td> </tr> <tr> <td data-bbox="902 1566 959 1591">000</td> <td data-bbox="1089 1566 1487 1650">T-827D/URT is tuned to frequency indicated by MCS and KCS digit indicators</td> </tr> <tr> <td data-bbox="902 1686 1016 1711">100-900</td> <td data-bbox="1089 1686 1487 1801">T-827D/URT is tuned 100-900 Hz above frequency indicated by MCS and KCS digit indicators</td> </tr> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	000	T-827D/URT is tuned to frequency indicated by MCS and KCS digit indicators	100-900	T-827D/URT is tuned 100-900 Hz above frequency indicated by MCS and KCS digit indicators
<u>Switch Position</u>	<u>Equipment Response</u>							
000	T-827D/URT is tuned to frequency indicated by MCS and KCS digit indicators							
100-900	T-827D/URT is tuned 100-900 Hz above frequency indicated by MCS and KCS digit indicators							

TABLE 2-1. RADIO TRANSMITTER T-827D/URT, OPERATING CONTROLS, INDICATORS AND CONNECTORS (Continued)

CONTROL, INDICATOR, OR CONNECTOR	REF DESIG	FUNCTION
MCS controls		
10 MC		Selects 10 MC digit of desired operating frequency; digit selected will be displayed in window above control.
1 MC		Selects 1 MC digit of desired operating frequency; digit selected will be displayed in window above control.
KCS controls		
100 KC		Selects 100 KC digit of desired operating frequency; digit selected will be displayed in window above control.
10 KC		Selects 10 KC digit of desired operating frequency; digit selected will be displayed in window above control.
1 KC		Selects 1 KC digit of desired operating frequency; digit selected will be displayed in window above control.
Interlock switch combined with AUX-NORM switch	A1A2S2 A1A2S1 (on case assembly)	Interlock switch disconnects 115-Vac operating power from T-827D/URT when chassis is removed from case; switch can be defeated by gripping plunger, centering in hole in chassis bracket, and pulling outward. AUX-NORM switch selects ac power for T-827D/URT operation either from associated power amplifier (NORM) or through auxiliary ac power cable (AUX).

TABLE 2-1. RADIO TRANSMITTER T-827D/URT, OPERATING CONTROLS, INDICATORS AND CONNECTORS (Continued)

CONTROL, INDICATOR OR CONNECTOR	REF DESIG	FUNCTION										
CARRIER REINSERTION switch	A2A1S1	<p>Selects pilot carrier used to frequency-lock associated receiver to T-827D/URT in LSB, ISB, and USB modes.</p> <table border="1"> <thead> <tr> <th data-bbox="911 667 1040 730"><u>Switch Position</u></th> <th data-bbox="1170 695 1463 730"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="911 758 927 779">0</td> <td data-bbox="1097 758 1523 814">Maximum pilot carrier output provided</td> </tr> <tr> <td data-bbox="911 852 959 873">-10</td> <td data-bbox="1097 852 1487 909">Pilot carrier output -10 dB ±2 dB down from maximum</td> </tr> <tr> <td data-bbox="911 947 959 968">-20</td> <td data-bbox="1097 947 1487 1003">Pilot carrier output -20 dB ±2 dB down from maximum</td> </tr> <tr> <td data-bbox="911 1041 927 1062">∞</td> <td data-bbox="1097 1041 1455 1098">Pilot carrier output fully suppressed</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	0	Maximum pilot carrier output provided	-10	Pilot carrier output -10 dB ±2 dB down from maximum	-20	Pilot carrier output -20 dB ±2 dB down from maximum	∞	Pilot carrier output fully suppressed
<u>Switch Position</u>	<u>Equipment Response</u>											
0	Maximum pilot carrier output provided											
-10	Pilot carrier output -10 dB ±2 dB down from maximum											
-20	Pilot carrier output -20 dB ±2 dB down from maximum											
∞	Pilot carrier output fully suppressed											
CTR FREQ switch	A9S1	<p>Selects center frequency for RATT mode of operation.</p> <table border="1"> <thead> <tr> <th data-bbox="911 1213 1040 1276"><u>Switch Position</u></th> <th data-bbox="1170 1241 1463 1276"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="911 1304 976 1325">2000</td> <td data-bbox="1097 1304 1511 1360">Provides center frequency of 2000 Hz for RATT mode</td> </tr> <tr> <td data-bbox="911 1398 976 1419">2550</td> <td data-bbox="1097 1398 1511 1455">Provides center frequency of 2550 Hz for RATT mode</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	2000	Provides center frequency of 2000 Hz for RATT mode	2550	Provides center frequency of 2550 Hz for RATT mode				
<u>Switch Position</u>	<u>Equipment Response</u>											
2000	Provides center frequency of 2000 Hz for RATT mode											
2550	Provides center frequency of 2550 Hz for RATT mode											

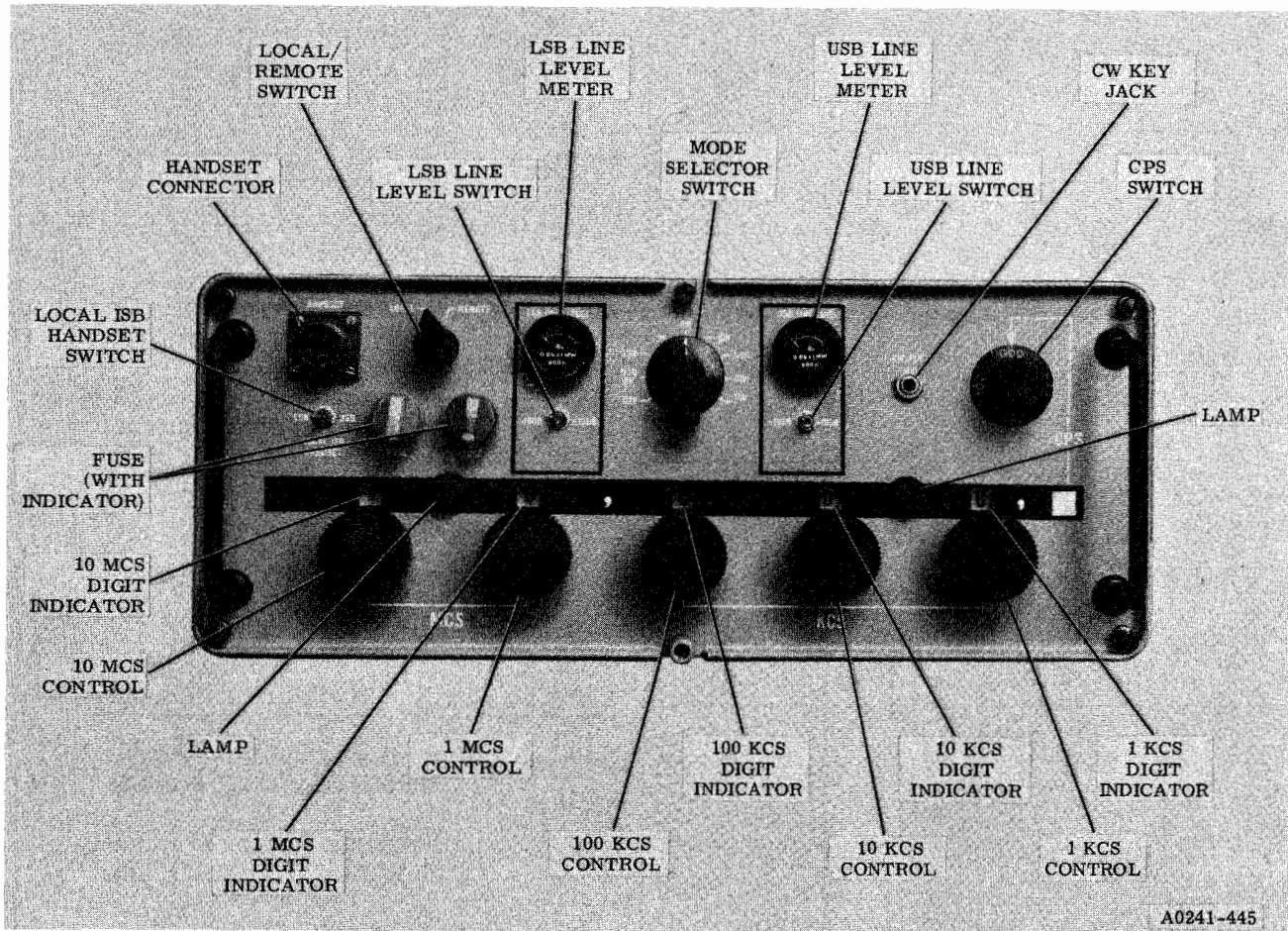


Figure 2-1. Radio Transmitter T-827D/URT, Operating Controls, Indicators and Connectors

TABLE 2-2. RF AMPLIFIER AM-3007/URT, OPERATING CONTROLS AND INDICATORS

CONTROL OR INDICATOR	REF DESIG	FUNCTION								
BAT VENT		Provides ventilation, if necessary, when internal battery is used as +28-volt power source.								
AMPLIFIER meter switch	S1	<p>Selects circuits to be monitored by AMPLIFIER meter M1.</p> <table border="0"> <thead> <tr> <th data-bbox="922 726 1040 789"><u>Switch Position</u></th> <th data-bbox="1179 753 1479 789"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="911 814 1052 842">DR CATH</td> <td data-bbox="1097 814 1479 877">Meter M1 indicates driver cathode current</td> </tr> <tr> <td data-bbox="911 905 987 932">LINE</td> <td data-bbox="1097 905 1528 968">Meter M1 indicates input line voltage</td> </tr> <tr> <td data-bbox="911 995 1013 1022">PA PL</td> <td data-bbox="1097 995 1479 1058">Meter M1 indicates power output stage plate current</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	DR CATH	Meter M1 indicates driver cathode current	LINE	Meter M1 indicates input line voltage	PA PL	Meter M1 indicates power output stage plate current
<u>Switch Position</u>	<u>Equipment Response</u>									
DR CATH	Meter M1 indicates driver cathode current									
LINE	Meter M1 indicates input line voltage									
PA PL	Meter M1 indicates power output stage plate current									
AMPLIFIER meter	M1	Provides indications of driver cathode current, equipment input line voltage, power output stage plate current, and circuit selected by AMPLIFIER meter switch S1.								
PRIMARY POWER 4A, 115V AC fuse (with indicator)	F1, XF1 F2, XF2	Protects AM-3007/URT against overload; indicator lights when fuse is open; one fuse for each leg of ac input line.								
PRIMARY POWER ON-OFF circuit breaker	CB1	<p>Used to control primary power input of over-all communication system.</p> <table border="0"> <thead> <tr> <th data-bbox="922 1566 1040 1629"><u>Switch Position</u></th> <th data-bbox="1179 1593 1479 1629"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="911 1654 976 1682">OFF</td> <td data-bbox="1097 1654 1479 1682">No primary power applied</td> </tr> <tr> <td data-bbox="911 1709 959 1736">ON</td> <td data-bbox="1097 1709 1430 1736">Primary power applied</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	OFF	No primary power applied	ON	Primary power applied		
<u>Switch Position</u>	<u>Equipment Response</u>									
OFF	No primary power applied									
ON	Primary power applied									
POWER indicator	DS1	Lights to indicate that power is applied to AN/URT-24 system.								

TABLE 2-2. RF AMPLIFIER AM-3007/URT, OPERATING CONTROLS AND INDICATORS (Continued)

CONTROL OR INDICATOR	REF DESIG	FUNCTION								
PRIMARY POWER selector switch*	S2	<p>Selects primary power source for AN/URT-24.</p> <table border="0"> <thead> <tr> <th data-bbox="789 604 911 667"><u>Switch Position</u></th> <th data-bbox="1049 636 1325 667"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="789 695 911 758">AC/INT. BAT.</td> <td data-bbox="967 695 1365 779">AM-3007/URT operates from nominal 115-Vac external power source</td> </tr> <tr> <td data-bbox="789 814 911 846">EXT DC</td> <td data-bbox="967 814 1365 898">AM-3007/URT operates from external +28-Vdc power source</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	AC/INT. BAT.	AM-3007/URT operates from nominal 115-Vac external power source	EXT DC	AM-3007/URT operates from external +28-Vdc power source		
<u>Switch Position</u>	<u>Equipment Response</u>									
AC/INT. BAT.	AM-3007/URT operates from nominal 115-Vac external power source									
EXT DC	AM-3007/URT operates from external +28-Vdc power source									
RF OUTPUT meter switch	S3	<p>Selects ranges for RF OUTPUT meter M2.</p> <table border="0"> <thead> <tr> <th data-bbox="789 1024 911 1087"><u>Switch Position</u></th> <th data-bbox="1049 1056 1325 1087"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="789 1115 911 1178">100W REFL</td> <td data-bbox="967 1115 1365 1178">Meter M2 indicates reflected power, 100 watts full scale</td> </tr> <tr> <td data-bbox="789 1203 911 1234">30W REFL</td> <td data-bbox="967 1203 1365 1266">Meter M2 indicates reflected power, 30 watts full scale</td> </tr> <tr> <td data-bbox="789 1297 911 1329">100W FWD</td> <td data-bbox="967 1297 1365 1381">Meter M2 indicates transmitted (forward) power, 100 watts full scale</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	100W REFL	Meter M2 indicates reflected power, 100 watts full scale	30W REFL	Meter M2 indicates reflected power, 30 watts full scale	100W FWD	Meter M2 indicates transmitted (forward) power, 100 watts full scale
<u>Switch Position</u>	<u>Equipment Response</u>									
100W REFL	Meter M2 indicates reflected power, 100 watts full scale									
30W REFL	Meter M2 indicates reflected power, 30 watts full scale									
100W FWD	Meter M2 indicates transmitted (forward) power, 100 watts full scale									
RF OUTPUT meter	M2	<p>Provides indication of transmitted and reflected power output from AM-3007/URT in ranges selected by switch S3.</p>								
RF OUTPUT TUNE/OPERATE switch	S4	<p>Controls system keying for tuning of CU-937/UR.</p> <table border="0"> <thead> <tr> <th data-bbox="789 1654 911 1717"><u>Switch Position</u></th> <th data-bbox="1049 1686 1325 1717"><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="789 1745 911 1776">TUNE</td> <td data-bbox="967 1745 1365 1829">System is keyed in AM so that CU-937/UR can be tuned using AM carrier</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	TUNE	System is keyed in AM so that CU-937/UR can be tuned using AM carrier				
<u>Switch Position</u>	<u>Equipment Response</u>									
TUNE	System is keyed in AM so that CU-937/UR can be tuned using AM carrier									

*AN/URT-24 operates from 115 Vac only.

TABLE 2-2. RF AMPLIFIER AM-3007/URT, OPERATING CONTROLS AND INDICATORS (Continued)

CONTROL OR INDICATOR	REF DESIG	FUNCTION						
RF OUTPUT TUNE/ OPERATE switch (Cont)		<table border="0"> <tr> <td style="text-align: center;"><u>Switch Position</u></td> <td style="text-align: center;"><u>Equipment Response</u></td> </tr> <tr> <td>OPERATE</td> <td>All AM-3007/URT circuits are connected for normal operation</td> </tr> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	OPERATE	All AM-3007/URT circuits are connected for normal operation		
<u>Switch Position</u>	<u>Equipment Response</u>							
OPERATE	All AM-3007/URT circuits are connected for normal operation							
<p>Note</p> <p>If the T-827D/URT is in any mode except CW or RATT, setting RF OUTPUT TUNE/OPERATE switch at TUNE will automatically key the T-827D/URT in AM mode. If the T-827D/URT is in CW or RATT mode, transmitter Mode Selector switch S2 must be set at some other mode to tune the CU-937/UR.</p>								
ANT CPLR TUNE switch	S5	Used in conjunction with ANT CPLR LOAD switch S6 to fine-tune CU-937/UR; activates motor-driven variable inductor.						
ANT CPLR LOAD switch	S6	Used in conjunction with ANT CPLR TUNE switch S5 to fine-tune CU-937/UR; activates motor-driven variable inductor.						
ANT CPLR TUNE indicator	DS2	Lights while the CU-937/UR is programming; flashes once per revolution of tune coils when S5 is operated; flashes once per revolution of load coils when S6 is operated.						
ANT CPLR BYPASS/ NORMAL switch	S7	<p>Switches the CU-937/UR elements into and out of receiver antenna rf line.</p> <table border="0"> <tr> <td style="text-align: center;"><u>Switch Position</u></td> <td style="text-align: center;"><u>Equipment Response</u></td> </tr> <tr> <td>BYPASS</td> <td>CU-937/UR elements are bypassed in receive mode</td> </tr> <tr> <td>NORMAL</td> <td>CU-937/UR elements are inserted in receiver antenna rf line</td> </tr> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	BYPASS	CU-937/UR elements are bypassed in receive mode	NORMAL	CU-937/UR elements are inserted in receiver antenna rf line
<u>Switch Position</u>	<u>Equipment Response</u>							
BYPASS	CU-937/UR elements are bypassed in receive mode							
NORMAL	CU-937/UR elements are inserted in receiver antenna rf line							

TABLE 2-2. RF AMPLIFIER AM-3007/URT, OPERATING CONTROLS AND INDICATORS (Continued)

CONTROL OR INDICATOR	REF DESIG	FUNCTION						
ANT INTLK switch*	S9	<p>Bypasses +28-volt coupler interlock circuit for testing with the CU-937/UR disconnected.</p> <table border="0"> <thead> <tr> <th><u>Switch Position</u></th> <th><u>Equipment Response</u></th> </tr> </thead> <tbody> <tr> <td>NORMAL</td> <td>Normal system operation</td> </tr> <tr> <td>INTLK</td> <td>Antenna coupler disabled</td> </tr> </tbody> </table>	<u>Switch Position</u>	<u>Equipment Response</u>	NORMAL	Normal system operation	INTLK	Antenna coupler disabled
<u>Switch Position</u>	<u>Equipment Response</u>							
NORMAL	Normal system operation							
INTLK	Antenna coupler disabled							
Overvoltage trip indicator*	A3DS1	Lights when 28 volts from ac power supply electronic assembly is disabled because of overvoltage.						

*Located on top of chassis.

controls, indicators, and connectors of the T-827D/URT and figure 2-2 illustrates and locates the operating controls and indicators of the AM-3007/URT.

b. SEQUENCE OF OPERATION. - Proceed as follows:

Note

The AN/URT-24 is normally used with a 115-Vac power source. The PRIMARY POWER selector switch on the AM-3007/URT should be set at AC/INT. BAT. at time of initial system installation and should not be reset thereafter. Set AUX-NORM switch A1A2S1 on the T-827D/URT at NORM.

(1) On T-827D/URT, set Mode Selector switch at STD BY and on AM-3007/URT set PRIMARY POWER ON-OFF circuit breaker at ON. Allow 20-minute warm-up period for general operation and at least

60-minute warm-up period for optimum frequency stability.

(2) Check line voltage indication on AMPLIFIER meter on AM-3007/URT.

Note

The next step will produce results only after the 40-second time delay has elapsed.

(3) On AM-3007/URT, set AMPLIFIER meter switch at DR. CATH. AMPLIFIER meter should indicate at DR SET mark. Set AMPLIFIER meter switch at PA PL. AMPLIFIER meter should indicate at PA SET mark.

(4) On AM-3007/URT, set ANT CPLR BYPASS/NORMAL switch at NORMAL.

(5) Using MCS controls, KCS controls, and CPS switch on front panel of T-827D/URT, select desired operating frequency. Frequency selected will be

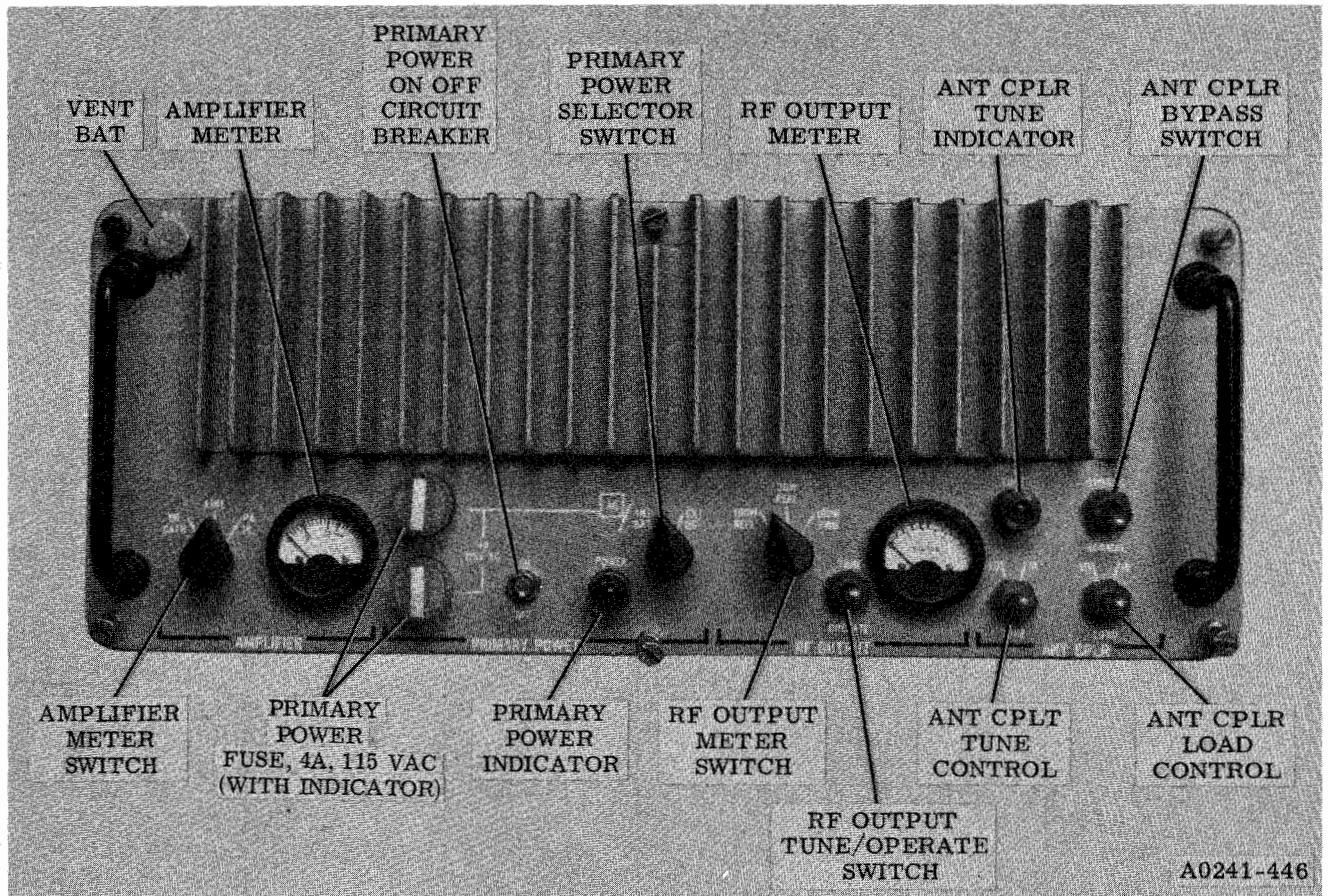


Figure 2-2. RF Amplifier AM-3007/URT, Operating Controls and Indicators

displayed in small windows above MCS and KCS controls.

Note

When operating frequency selected differs sufficiently from one previously used, the AM-3007/URT will be retuned and the CU-937/UR will be rough tuned to new frequency automatically. The ANT CPLR TUNE indicator on the AM-3007/URT will go out when this reprogramming is completed.

(6) Fine-tune CU-937/UR to selected operating frequency as follows:

Note

Rehome the CU-937/UR by switching the MCS knobs on the T-827D/URT at random until ANT CPLR TUNE indicator on the AM-3007/URT lights, then reset to desired frequency.

(a) If 15-foot whip antenna is used, refer to table 2-3 (table 2-4 for 25-foot antenna; table 2-5 for 35-foot antenna) and locate frequency closest to selected operating frequency.

(b) On AM-3007/URT, hold ANT CPLR LOAD switch at LO for required number of flashes of ANT CPLR TUNE indicator listed in LOAD column of table.

TABLE 2-3. ANTENNA COUPLER CU-937/UR, TUNING CHART FOR
15-FOOT WHIP ANTENNA

FREQ (MHz)	TUNE	LOAD	FREQ (MHz)	TUNE	LOAD
2.00	7 HI	10 LO	13.00	5 HI	15 LO
2.49	5 LO	12 LO	13.99	1 HI	14 LO
2.50	1 HI	12 LO	14.00	5 HI	16 LO
2.99	6 LO	13 LO	15.00	3 HI	17 LO
3.00	9 HI	12 LO	15.99	1 HI	16 LO
3.49	4 HI	13 LO	16.00	1 HI	16 LO
3.50	4 HI	13 LO	17.00	O	15 LO
3.99	1 HI	14 LO	17.99	O	15 LO
4.00	1 HI	14 LO	18.00	O	15 LO
4.99	4 LO	14 LO	19.00	1 LO	16 LO
5.00	4 LO	14 LO	19.99	1 LO	16 LO
5.99	7 LO	14 LO	20.00	3 HI	5 LO
6.00	12 HI	14 LO	21.00	1 HI	14 LO
6.99	6 HI	14 LO	21.99	O	14 LO
7.00	6 HI	14 LO	22.00	3 LO	17 LO
7.99	O	15 LO	23.00	3 LO	18 LO
8.00	O	15 LO	23.99	3 LO	18 LO
9.00	7 LO	15 LO	24.00	2 LO	16 LO
9.99	12 LO	14 LO	25.00	3 LO	16 LO
10.00	1 HI	15 LO	25.99	4 LO	18 LO
11.00	5 LO	14 LO	26.00	4 LO	18 LO
11.99	5 LO	13 LO	27.00	4 LO	16 LO
12.00	9 HI	16 LO	27.99	5 LO	17 LO

TABLE 2-3. ANTENNA COUPLER CU-937/UR, TUNING CHART FOR
15-FOOT WHIP ANTENNA (Continued)

FREQ (MHz)	TUNE	LOAD	FREQ (MHz)	TUNE	LOAD
28.00	5 LO	17 LO	29.99	6 LO	18 LO
29.00	6 LO	17 LO			

TABLE 2-4. ANTENNA COUPLER CU-937/UR, TUNING CHART FOR
25-FOOT WHIP ANTENNA

FREQ (MHz)	TUNE	LOAD	FREQ (MHz)	TUNE	LOAD
2.00	1 HI	11 LO	8.00	13 HI	15 LO
2.49	7 LO	13 LO	9.00	9 HI	14 LO
2.50	8 HI	12 LO	9.99	6 HI	11 LO
2.99	2 HI	12 LO	10.00	6 HI	11 LO
3.00	2 HI	12 LO	11.00	5 HI	11 LO
3.49	1 LO	13 LO	11.99	3 HI	13 LO
3.50	1 LO	13 LO	12.00	3 HI	13 LO
3.99	5 LO	13 LO	13.00	2 HI	15 LO
4.00	5 LO	13 LO	13.99	O	15 LO
4.99	9 LO	13 LO	14.00	O	15 LO
5.00	9 HI	13 LO	15.00	1 LO	16 LO
5.99	1 LO	11 LO	15.99	1 LO	16 LO
6.00	1 LO	11 LO	16.00	4 HI	15 LO
6.99	9 LO	10 LO	17.00	2 HI	15 LO
7.00	27 HI	14 LO	17.99	1 HI	16 LO
7.99	20 HI	13 LO	18.00	1 HI	16 LO

TABLE 2-4. ANTENNA COUPLER CU-937/UR, TUNING CHART FOR
25-FOOT WHIP ANTENNA (Continued)

FREQ (MHz)	TUNE	LOAD	FREQ (MHz)	TUNE	LOAD
19.00	O	16 LO	25.00	4 LO	18 LO
19.99	O	18 LO	25.99	6 LO	17 LO
20.00	O	18 LO	26.00	5 HI	18 LO
21.00	1 LO	18 LO	27.00	4 HI	17 LO
21.99	2 LO	18 LO	27.99	3 HI	16 LO
22.00	2 LO	18 LO	28.00	2 HI	18 LO
23.00	3 LO	18 LO	29.00	1 HI	17 LO
23.99	4 LO	18 LO	29.99	1 HI	17 LO
24.00	4 LO	18 LO			

TABLE 2-5. ANTENNA COUPLER CU-937/UR, TUNING CHART FOR
35-FOOT WHIP ANTENNA

FREQ (MHz)	TUNE	LOAD	FREQ (MHz)	TUNE	LOAD
2.00	1 HI	9 LO	4.99	8 LO	8 LO
2.49	5 LO	11 LO	5.00	3 HI	9 LO
2.50	7 HI	10 LO	5.99	9 LO	6 LO
2.99	1 HI	10 LO	6.00	27 HI	13 LO
3.00	1 HI	10 LO	6.99	19 HI	9 LO
3.49	O	10 LO	7.00	2 HI	11 LO
3.50	O	10 LO	7.99	4 LO	8 LO
3.99	5 LO	10 LO	8.00	4 LO	8 LO
4.00	9 HI	10 LO	9.00	1 HI	9 LO

TABLE 2-5. ANTENNA COUPLER CU-937/UR, TUNING CHART FOR
35-FOOT WHIP ANTENNA (Continued)

FREQ (MHz)	TUNE	LOAD	FREQ (MHz)	TUNE	LOAD
9.99	3 LO	13 LO	20.00	2 LO	17 LO
10.00	12 HI	10 LO	21.00	3 LO	17 LO
11.00	9 HI	15 LO	21.99	3 LO	17 LO
11.99	O	8 LO	22.00	3 LO	17 LO
12.00	O	8 LO	23.00	3 LO	17 LO
13.00	3 HI	16 LO	23.99	4 LO	18 LO
13.99	1 HI	16 LO	24.00	8 LO	14 LO
14.00	1 HI	16 LO	25.00	8 LO	15 LO
15.00	3 LO	11 LO	25.99	9 LO	16 LO
15.99	3 LO	16 LO	26.00	9 LO	16 LO
16.00	3 LO	16 LO	27.00	9 LO	16 LO
17.00	5 LO	15 LO	27.99	10 LO	16 LO
17.99	6 LO	13 LO	28.00	10 LO	16 LO
18.00	O	17 LO	29.00	10 LO	16 LO
19.00	1 LO	17 LO	29.99	10 LO	15 LO
19.99	2 LO	17 LO			

(c) On AM-3007/URT, hold ANT CPLR TUNE switch at position indicated in table for required number of flashes of ANT CPLR TUNE indicator listed in table.

(d) On AM-3007/URT, set RF OUTPUT meter switch at 100W REFL.

(e) On AM-3007/URT, set RF OUTPUT TUNE/OPERATE switch at TUNE and minimize indication on RF OUTPUT meter by adjusting ANT CPLR TUNE control (HI or LO) and ANT CPLR LOAD control (HI and LO). Alternately adjust both controls until indication on RF OUTPUT meter nulls.

Note

When specific frequencies are to be used often and to permit tuning under radio silence conditions, time and effort can be saved by developing the logging chart shown in figure 2-3. This is accomplished by noting exact number of indicator flashes and direction of tuning in appropriate columns for each switch as nulling procedure is performed. Place a copy of the logging chart near the AM-3007/URT for reference.

(f) On AM-3007/URT, set RF OUTPUT meter switch at 30W REFL.

(g) Repeat step (e) until meter pointer rests in small black area at left of meter scale.

(7) On T-827D/URT, set LOCAL/REMOTE switch at LOCAL and connect handset to HANDSET connector on front panel.

(8) To transmit voice in AM mode, set Mode Selector switch on T-827D/URT at AM, press push-to-talk switch on handset, and talk.

(9) To transmit voice in LSB or USB mode, set Mode Selector Switch on T-827D/URT as desired, press push-to-talk switch on handset and talk. Monitor LSB LINE LEVEL and/or USB LINE LEVEL meters on T-827D/URT as applicable to verify presence of audio signal, and RF OUTPUT meter on AM-3007/URT to verify rf transmission.

Note

To inject carrier into the LSB or USB transmission, set CARRIER REINSERTION switch A2A1S1 on T-827D/URT at desired level setting (0, -10, or -20).

(10) To transmit on independent sideband, set Mode Selector switch on T-827D/URT at ISB and LOCAL ISB HANDSET switch at either LSB or USB, according to channel desired.

(11) To transmit on CW, set Mode Selector switch on T-827D/URT at CW, connect CW key to CW KEY jack on front panel of T-827D/URT, and operate key.

(12) To transmit RATT with local teletype equipment, set Mode Selector switch on T-827D/URT at RATT and connect teletypewriter loop and keylines to LOCAL RATT IN connector J7 on rear of T-827D/URT case. (For remote operation, these connections are made through J-1265/U and LOCAL/REMOTE switch must be set at REMOTE.) When these procedures are completed, proceed as follows:

(a) Loosen screws on front panel of T-827D/URT and pull chassis out fully on slides.

(b) Set CTR FREQ switch on top of RATT tone generator at desired center frequency (2000 or 2550). RATT tone generator is located just left of center at rear of chassis.

(c) Release slide locks, slide chassis back into case, and secure it. Wait at least 40 seconds for time delay relay to operate before attempting to transmit.

(13) To transmit RATT and voice simultaneously, set Mode Selector switch on T-827D/URT at ISB/RATT (RATT will be on USB; voice, on LSB.) If operating locally, set LOCAL ISB HANDSET switch at LSB on monitor voice sidetone.

(14) To transmit two simultaneous voice or other audio transmissions from remote location, set Mode Selector switch on T-827D/URT at ISB. One voice transmission will be on USB; other voice transmission will be on LSB.

(15) To transmit voice on different channels locally, set Mode Selector switch on T-827D/URT at ISB and alternate LOCAL ISB HANDSET switch between USB AND LSB as desired to change channels.

c. REMOTE OPERATION. - Proceed as follows:

(1) On T-827D/URT set LOCAL/REMOTE switch at REMOTE.

(2) On T-827D/URT, set Mode Selector switch at desired mode of operation.

(3) Notify remote operator that AN/URT-24 is ready for remote operation.

Note

Separate Radio Set Control C-1138/UR (or equivalents) must be connected to USB and LSB remote T-827D/URT audio input lines at ship's transmitter switchboards if both USB and LSB remote operation are intended.

d. STANDBY AND SHUTDOWN. - Proceed as follows:

Note

When it is desired to eliminate required warm-up period, the PRIMARY POWER ON-OFF circuit breaker on the AM-3007/URT must be left at ON and Mode Selector switch on the T-827D/URT must be left at STD BY.

(1) On AM-3007/URT, set PRIMARY POWER ON-OFF circuit breaker at OFF.

(2) On T-827D/URT, set Mode Selector switch at OFF.

2-3. OPERATOR'S MAINTENANCE.

a. OPERATING CHECKS AND ADJUSTMENTS. - When a system malfunction is encountered, the operator should perform the following steps to determine the cause of the trouble:

(1) Check to see that T-827D/URT is set at proper frequency.

(2) Check to see that power is applied to system by observing indication on AMPLIFIER meter of AM-3007/URT with AMPLIFIER meter switch at LINE.

(3) Check to see that POWER indicator on AM-3007/URT is lit.

(4) Check all fuses; if any are open, associated indicator will light. Replace open fuses.

(5) Check all cables for breakage and check connectors for proper locations and proper seating.

(6) On AM-3007/URT, check indication of AMPLIFIER meter with AMPLIFIER meter switch at DR CATH and then at PA PL. Incorrect readings indicate malfunction in AM-3007/URT.

(7) Request radio check from party other than one presently in contact.

(8) If operator cannot locate trouble, refer problem to maintenance personnel.

b. PREVENTIVE MAINTENANCE. - Preventive maintenance that can be performed by the operator is listed in table 2-6. Refer to Reference Standards Book, NAVSHIPS 0967-878-5050, for further information.

c. EMERGENCY MAINTENANCE. - If the system malfunctions while a technician is not available, the operator should perform the following emergency repair procedures:

(1) Try another mode of operation.
(2) Perform steps (1) through (7) of paragraph 2-3a.

(3) Replace any damaged cables.
(4) Loosen screws on front panels of T-827D/URT and AM-3007/URT and pull chassis out from cases. Perform following checks:

(a) Check all electronic assemblies for proper seating.

(b) Check vacuum tubes to see that filaments are lit. If tubes in T-837D/URT rf amplifier electronic assembly are to be replaced, remove tube shield and pull tube out with tube puller, using steady pressure straight up. Dust cover over electronic assembly may be removed if necessary. Do not attempt to remove tubes from AM-3007/URT.

TABLE 2-6. RADIO SET AN/URT-24, OPERATOR'S PREVENTIVE
MAINTENANCE CHECKS

INSPECT FOR	REMEDY
Dust	Clean exterior with soft, lint-free cloth; clean interior with brush, cloth, or compressed air.
Loose handles, mounting screws, or other hardware	Tighten loose hardware.
Chain drive tension or binding	Oil lightly.
Cable assemblies broken, frayed, or damaged	Repair or replace.

SECTION 3

FUNCTIONAL DESCRIPTION

3-1. OVER-ALL FUNCTIONAL DESCRIPTION.

Radio Set AN/URT-24 is a multi-mode system capable of transmitting on any one of 280,000 channels, spaced in 0.1-kilohertz increments in the 2.0- to 29.999-megahertz frequency range. (See figure 3-1.) Intelligence may be transmitted in continuous wave (CW), compatible amplitude modulation (compatible AM), radio teletype (RATT), upper sideband (USB), lower sideband (LSB), and independent sideband (ISB) modes. The ISB mode permits two different types of intelligence to be transmitted simultaneously. The RATT mode can be obtained using suitable ancillary teletypewriter equipment. Tone-modulated continuous wave (MCW) and facsimile transmissions can also be made with the AN/URT-24.

The AN/URT-24 consists of Radio Transmitter T-827D/URT, RF Amplifier AM-3007/URT, Antenna Coupler CU-937/UR, Interconnection Box J-1265/U, Handset H-169/U, Shock and Vibration Mount MT-3761/URC-35, associated cable assemblies, and ancillary GFM equipments.

a. RADIO TRANSMITTER T-827D/URT. - The T-827D/URT accepts audio or coded intelligence and converts it to one of 280,000 possible operating rf frequencies in the 2.0- to 29.999-megahertz frequency range. It is capable of operating in any of LSB, USB, ISB, CW, ISB/RATT, RATT, and compatible AM modes of operation. Tuning is accomplished digitally by means of five control knobs (MCS and KCS) and a switch (CPS) located on the front panel, and may be changed in 0.1-kHz increments. The T-827D/URT has a nominal rf output level of 0.1 watt, with a maximum output level of at least 0.25 watt, and is designed to be used with an associated rf power amplifier such as the AM-3007/URT.

In the AM and SSB transmit modes of operation, the input from a microphone is applied to the T-827D/URT. The voice signals are amplified and are used to modulate a 500-kHz carrier, providing a 500-kHz intermediate frequency. 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 operating frequency. The rf signal is power amplified to a nominal 0.1-watt level. In CW operation, 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 voice signals in the AM or SSB modes of operation. In RATT operation, the coded application of TTY loop current is converted to audio frequencies representing marks and spaces. These audio signals are applied to the audio circuits of the T-827D/URT. Thereafter, these signals are processed in the same manner as the voice signals in AM or SSB modes of operation.

Tuning the T-827D/URT to an operating frequency also generates a tuning code within the T-827D/URT which is used externally to tune the AM-3007/URT to the same operating channel as the T-827D/URT. The AM-3007/URT feeds two dc average power and peak power control levels to the T-827D/URT to prevent its rf output from exceeding the predetermined level.

The T-827D/URT consists of nine plug-in electronic assemblies and a power supply. These assemblies are mode selector electronics assembly A2A1, audio amplifier electronic assemblies A2A2 and A2A3, rf amplifier electronic assembly A2A4, frequency standard electronic assembly A2A5, translator/synthesizer electronic assembly A2A6, code generator electronic assembly A2A7, RATT tone generator electronic assembly A2A9, and if. amplifier electronic assembly A2A12.

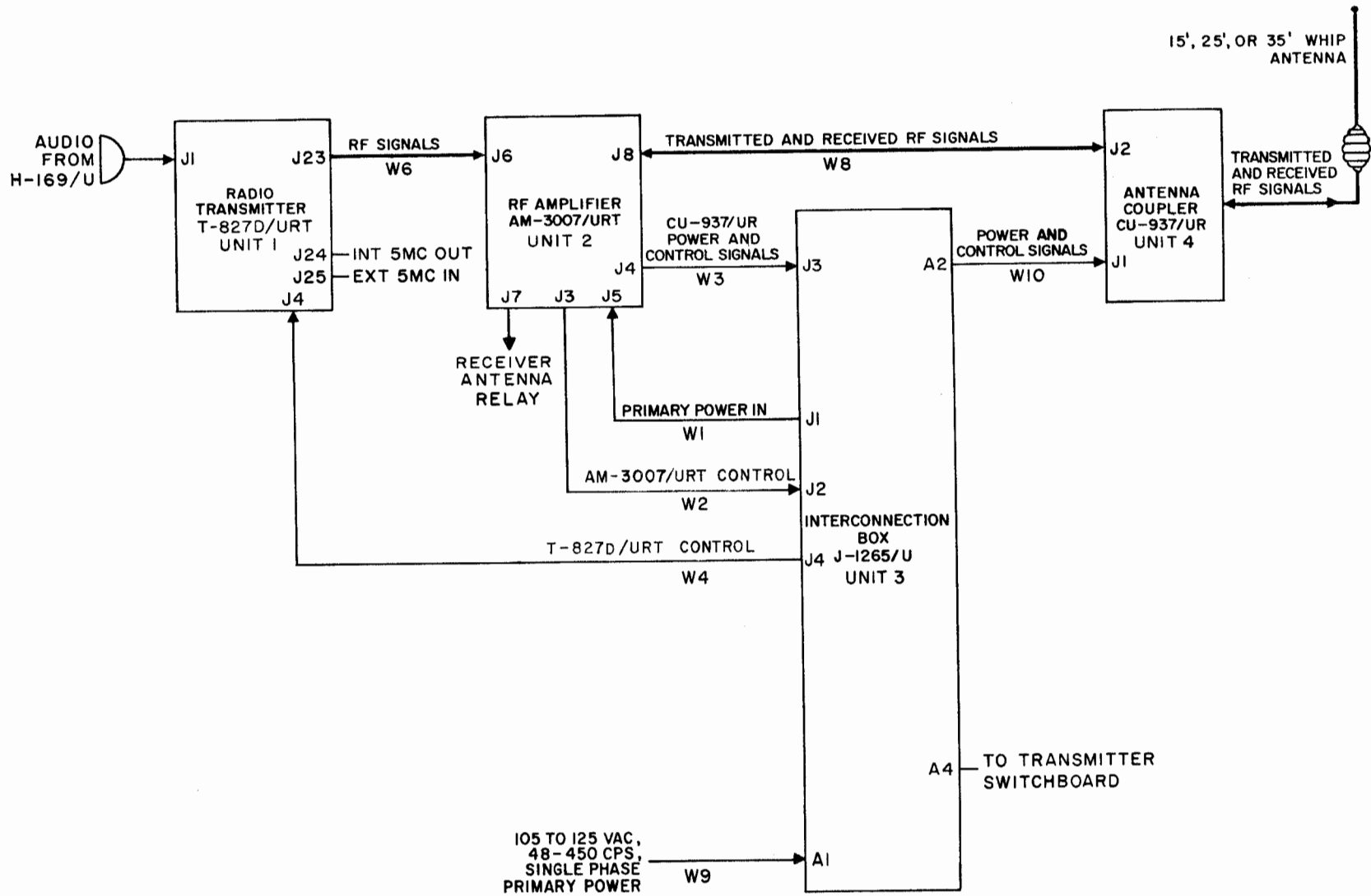


Figure 3-1. Radio Set AN/URT-24, Block Diagram

(Translator/synthesizer electronic assembly A2A6 consists of six electronic sub-assemblies.)

b. RF AMPLIFIER AM-3007/URT. - The AM-3007/URT consists of an rf input bridge circuit, a driver amplifier and a power amplifier stage, turret electronic assembly A2A4 with control circuits, a peak power control (ppc) circuit, an average power control (apc) circuit, directional coupler electronic assembly A2A2, ac power supply electronic assembly A2A3, and dc-to-dc converter electronic assembly A2A5. The AM-3007/URT is the final power output stage of the AN/URT-24. The AM-3007/URT amplifies the rf signal applied to it from a nominal 0.1-watt level to 100 watts peak envelope power (PEP, SSB), 25 watts AM carrier, or 50 watts CW or RATT. Average power and peak power control signals developed in the AM-3007/URT are applied to the T-827D/URT for automatic transmission level control. The AM-3007/URT uses fixed tuned interstage and output circuits. These circuits are switched to the selected channel under the control of the code applied from the T-827D/URT. The high-power output of the AM-3007/URT is transferred to the antenna through the CU-937/UR.

c. ANTENNA COUPLER CU-937/UR. - The CU-937/UR consists of three tuned coils and associated circuits for remote tuning and loading. The CU-937/UR is used for transmitting in all modes of communication system operation. The CU-937/UR matches a 15-foot, 25-foot, or 35-foot whip antenna to the 50-ohm coaxial transmission line from the AM-3007/URT for any frequencies in the 2.0000- to 29.9999-megahertz frequency range. A code from the AM-3007/URT automatically tunes the CU-937/UR to one of eleven different channels. Fine tuning is accomplished from the ANT CPLR TUNE and LOAD controls 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.

d. INTERCONNECTION BOX J-1265/U. - The J-1265/U interconnects the major units of the AN/URT-24 and the ancillary equipments of the system, and preprograms the CU-937/UR for either the 15-, 25-, or 35-foot whip antenna. The J-1265/U contains no active electronic circuits and furnishes the electrical interconnection of components of the system.

SECTION 4

TROUBLE SHOOTING

4-1. INTRODUCTION.

The maintenance technician has trouble-shooting aids available in the form of an over-all block diagram (figure 3-1), power distribution diagram (figure 5-1), trouble-shooting guide (table 4-3) and detailed cable data (table 4-2). The technician should use these aids in locating the faulty unit.

4-2. FAULT ISOLATION.

The recommended plan for trouble-shooting the AN/URT-24 to isolate a fault involves the following steps:

a. Carefully inspect for obvious troubles such as loose connections, damaged cables, broken parts, etc., and clear all such defects before proceeding.

b. Perform operational check procedures in paragraph 4-4a through d in order to verify operation of equipment and/or to localize trouble to T-827D/URT, AM-3007/URT, CU-937/UR, or interconnecting cables.

4-3. TEST EQUIPMENT.

Table 4-1 lists test equipment required to trouble shoot the AN/URT-24.

TABLE 4-1. TEST EQUIPMENT
REQUIRED FOR TROUBLE SHOOTING

NAME	DESIGNATION
Multimeter	AN/PSM-4()
Multimeter, Electronic (rf voltmeter)	CCVO-91CA

4-4. OPERATIONAL CHECKS.

The operational checks for the AN/URT-24 include a series of procedures which should be performed, in turn, to check out equipment performance. Each operational check procedure includes, as applicable, the normal results to be expected, an indication of the probable cause of trouble if an abnormal result is obtained, and suggestions to follow to aid in isolating trouble.

a. TURN-ON CHECKOUT
PROCEDURE. - To turn on and check out the operation of the AN/URT-24, proceed as follows:

Note

The AN/URT-24 is intended for use with a nominal 115-Vac power source. On AM-3007/URT, the PRIMARY POWER selector switch should be set at AC/INT. BAT. at the time of initial system installation and should not be reset thereafter. On the T-827D/URT, set AUX-NORM switch A1A2S1 at NORM. Refer to table 2-1.

(1) On T-827D/URT, set Mode Selector switch at STD BY and on AM-3007/URT, set PRIMARY POWER ON-OFF circuit breaker at ON. Allow 20-minute warm-up period for general operation and at least 60-minute warm-up period for optimum frequency stability.

(2) On AM-3007/URT, check line voltage indication on AMPLIFIER meter. If indication is abnormal, check following as applicable. If checks in following steps are normal, refer to technical manuals for T-827D/URT and/or AM-3007/URT and CU-937/UR for further trouble-shooting procedures.

- (a) Check for open fuses in T-827D/URT and/or AM-3007/URT.
- (b) Check power cables for loose connections.
- (c) Check relay K1 in J-1265/U.

Note

The next step will produce results only after the 40-second time delay has elapsed.

(3) On AM-3007/URT, set AMPLIFIER meter switch at DR. CATH. AMPLIFIER meter should indicate at DR SET mark. Set AMPLIFIER meter switch at PA PL. AMPLIFIER meter should indicate at PA SET mark. If either indication is abnormal, refer to technical manual for AM-3007/URT and CU-937/UR.

b. RF AMPLIFIER AM-3007/URT, POWER OUTPUT CHECKOUT PROCEDURE. - On T-827D/URT, set Mode Selector switch at AM. On AM-3007/URT, set RF OUTPUT meter switch at 100W FWD and set RF OUTPUT TUNE/OPERATE switch at TUNE. If indication is abnormal, refer to technical manual for the AM-3007/URT for further troubleshooting procedures. If indication is normal, proceed to paragraph 4-4c.

c. RAPID TRANSMITTER T-827/URT, OUTPUT CHECKOUT PROCEDURE. - To check the output of the T-827D/URT, proceed as follows:

- (1) Loosen front-panel screws of T-827D/URT and pull chassis out fully on slides.

WARNING

High voltages exist in the T-827D/URT. Exercise caution when

operating the unit with the chassis pulled out from the case.

(2) Defeat chassis interlock by gripping plunger, centering it in hole in chassis bracket, and pulling outward.

(3) Connect Electronic Multimeter (rf voltmeter) CCVO-91CA to test point 1A2A4TP4 on T-827D/URT.

(4) Connect handset to HANDSET jack.

(5) Set Mode Selector switch at AM.

(6) Key T-827D/URT. If rf voltmeter indicates no output, refer to technical manual for T-827D/URT for further troubleshooting procedures. If indication is normal, proceed to step (7).

(7) Disconnect handset. Connect CW key to CW KEY jack.

(8) Set Mode Selector switch at CW.

(9) Key T-827D/URT. If rf voltmeter indicates no output, refer to technical manual for T-827D/URT for further troubleshooting procedures. If indication is normal, proceed to paragraph 4-4d.

d. INTERCONNECTING CABLES, CHECKOUT PROCEDURE. - With the aid of table 4-2, check the interconnecting cables between the T-827D/URT and the AM-3007/URT. If a faulty cable is found, repair and reinitiate system checkout procedures. If no faulty cables are found, refer to technical manual for AM-3007/URT and CU-937/UR for further troubleshooting procedures.

4-5. TROUBLE-SHOOTING GUIDE.

Table 4-3 summarizes troubleshooting procedures for the AN/URT-24.

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA

CABLE	PIN	FUNCTION
W1	A	115 Vac
	B	Common ground
	C	115-Vac common
W2	A	Coding No. 1
	B	Coding No. 2
	C	Coding No. 3
	D	Coding No. 4
	E	Coding No. 5
	F	Coupler bypass ground
	G	CW/RATT ground
	H	115-Vac rf amplifier power
	J	RF amplifier turret +28 volts
	K	Ground pulse
	L	Spare
	M	RF Amplifier Range
	N	+20 volts
	P	Spare
	R	Switched 115 Vac
	S	Switched 115-Vac common
	T	RF amplifier dc power ground
	U	RF amplifier filament ground
	V	Oven +28 volts
W	Filtered +28 volts	
X	-30-volt bias	
Y	+6.3 volts	

J-1265/U
to
AM-3007/URT

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA (Continued)

CABLE	PIN	FUNCTION
W2 (Cont)	Z	+6.3-volt return
	<u>a</u>	Spare
	<u>b</u>	Spare
	<u>c</u>	Ground keyline
	<u>d</u>	APC
	<u>e</u>	PPC
	<u>f</u>	Switched +28 volts
	<u>g</u>	Not to be used
	<u>h</u>	Shields of J2d, e, m, n
	<u>i</u>	Shields of J2H, R, S
	<u>j</u>	Not to be used
	<u>k</u>	Spare
	<u>m</u>	+12 volts
	<u>n</u>	+12-volt return
	<u>p</u>	Coupler interlock +28 volts
	<u>q</u>	Common ground
<u>r</u>	Spare	
<u>s</u>	Carrier +20 volts	
<u>t</u>	Receiver plate voltage	
W3	A	2-2.499 MHz
	B	2.5-2.999 MHz
	C	3-3.499 MHz
	D	3.5-3.999 MHz
	E	4-4.999 MHz
		} Ground lines

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA (Continued)

CABLE	PIN	FUNCTION
W3 (Cont)	F	5-5.999 MHz
	G	6-6.999 MHz
	H	7-7.999 MHz
	J	8-9.999 MHz
	K	10-11.999 MHz
	L	12-13.999 MHz
	M	14-15.999 MHz
	N	16-17.999 MHz
	P	18-19.999 MHz
	K	20-21.999 MHz
	S	22-23.999 MHz
	T	24-25.999 MHz
	U	26-27.999 MHz
	V	28-29.999 MHz
	W	Tune increase (HI)
	X	Tune decrease (LO)
	Y	Load increase (HI)
	Z	Load decrease (LO)
	<u>a</u>	Interlocked coupler bypass ground
	<u>b</u>	Not to be used
<u>c</u>	Spare	
<u>d</u>	Spare	
<u>e</u>	Spare	
<u>f</u>	Spare	

} Ground
lines

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA (Continued)

CABLE	PIN	FUNCTION
W3 (Cont)	<u>g</u>	VSWR meter return
	<u>h</u>	Not to be used
	<u>i</u>	Not to be used
	<u>j</u>	Coupler interlock +28 volts
	<u>k</u>	Reflected 100 watts
	<u>m</u>	Coupler switched +28 volts
	<u>n</u>	Tune light
	<u>p</u>	Reflected 30 watts
	<u>q</u>	Forward 100 watts
	<u>r</u>	Common ground
W4	A	Coding No. 1
	B	Coding No. 2
	C	Coding No. 3
	D	Coding No. 4
	E	Coding No. 5
	F	RF amplifier range
	G	CW/RATT ground
	H	12 VOLT return
	J	Coupler interlock +28 volts
	K	Ground keyline
	L	+12 volts
	M	+28 volts
	N	+20 volts
	P	Ground pulse

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA (Continued)

CABLE	PIN	FUNCTION
W4 (Cont)	R	115 Vac
	S	115-Vac common
	T	Carrier +20 volts
	U	115 Vac (remote)
	V	-30-volt bias
	W	ISB audio
	X	LSB/ISB sidetone
	Y	Sidetone except LSB
	Z	Common ground
	<u>a</u>	LSB audio
	<u>b</u>	USB audio
	<u>c</u>	CW/RATT keyline
	<u>d</u>	APC
	<u>e</u>	PPC
	<u>f</u> }	600-ohm LSB/ISB input
	<u>g</u> }	
	<u>h</u>	Shields of J4-d, e
	<u>i</u>	Shields of J4-m, n, R, S, U
	<u>j</u>	Spare
	<u>k</u>	Push-to-talk (PPT) +12-volt keyline
<u>m</u>	Spare (shielded wire)	
<u>n</u>	115-Vac operate	
<u>p</u>	Not to be used	

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA (Continued)

CABLE	PIN	FUNCTION
W4 (Cont)	<u>q</u> }	600-ohm USB/AM/ISB input
	<u>r</u> }	
	<u>s</u>	Earphone audio
	<u>t</u>	TTY input (-) (remote)
	<u>u</u>	Spare
	<u>v</u>	Spare
	<u>w</u>	Not to be used
	<u>x</u>	Not to be used
	<u>y</u>	Not to be used
	<u>z</u>	Not to be used
	AA	Not to be used
	BB	TTY input (+) (remote)
	CC	Not to be used
	DD	Not to be used
EE	Not to be used	
FF	Not to be used	
GG	Not to be used	
HH	Not to be used	
W5		Not used in AN/URT-24
W6 (Coaxial Cable)		RF T-827D/URT to AM-3007/URT
W7		Not used in AN/URT-24
W8		RF, AM-3007/URT to CU-937/UR

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA (Continued)

CABLE	PIN	FUNCTION
W9	A	115 Vac
	B	Common ground
	C	115-Vac common
W10	A	Load increase (HI)
	B	Load decrease (LO)
	C	Tune increase (HI)
	D	Tune decrease (LO)
	E	Spare
	F	Spare
	G	Tune light
	H	Ground
	J	Ground
	K	Switched +28 volts
	L	Switched +28 volts
	M	Coupler interlock +28 volts
	N	Coupler bypass ground
	P	Coupler network No. 1
	R	Coupler network No. 3
	S	Coupler network No. 4
	T	Coupler network No. 5
	U	Coupler network No. 6
V	Coupler network No. 7	
W	Coupler network No. 8	
X	Coupler network No. 9	

TABLE 4-2. RADIO SET AN/URT-24, DETAILED CABLE DATA (Continued)

CABLE	PIN	FUNCTION
W10 (Cont)	Y	Coupler network No. 10
	Z	Coupler network No. 11
	<u>a</u>	Coupler network No. 2
	<u>b</u>	Spare
	<u>d</u>	Spare

TABLE 4-3. TROUBLE-SHOOTING GUIDE

STEP	UNIT	CONTROL SETTING	NORMAL INDICATION	PROBABLE TROUBLE AREA IF INDICATION IS ABNORMAL
1	AM-3007/URT	2A2A1S2 PRIMARY POWER selector switch: AC/INT. BAT.		
2		2A2A1S3 RF OUTPUT meter switch: 100W FWD		
3		2A2A1S7 ANT CPLR BYPASS NORMAL switch: NORMAL		
4		2A2A1S9 ANT INTLK switch: NORMAL		
		Note The ANT INTLK switch is located on top right side of chassis behind front panel.		

TABLE 4-3. TROUBLE-SHOOTING GUIDE (Continued)

STEP	UNIT	CONTROL SETTING	NORMAL INDICATION	PROBABLE TROUBLE AREA IF INDICATION IS ABNORMAL
5	T-827D/URT	1A1A2S1 AUX-NORM switch: NORM Note The AUX-NORM switch is located on top right side of case.		
6		1A2S2 Mode Selector switch: ISB		
7		a. 1A2S11 USB LINE LEVEL switch: -10DB b. 1A2S10 LSB LINE LEVEL switch: -10DB		
8		1A2S9 LOCAL ISB HANDSET switch: USB		
9		1A2S1 LOCAL/REMOTE switch: LOCAL		
10		MCS and KCS frequency controls set to desired checkout frequency		
11	AM-3007/URT	2A2A1CB1 PRIMARY POWER ON-OFF circuit breaker: ON	AMPLIFIER meter M1 indicates NOM LINE, and POWER indicator DS1 lights.	F1, F2
	T-827D/URT		MCS and KCS digit indicators light.	F1, F2
12	AM-3007/URT	a. 2A2A1S1 AMPLIFIER meter switch: set at DR CATH	AMPLIFIER meter M1 indicates DR SET.	AM-3007/URT
	T-827D/URT	b. Handset H-169/U: Press push-to-talk button and talk into handset at normal voice level	USB LINE LEVEL meter indicates about 0 dB.	H-169/U or T-827D/URT

TABLE 4-3. TROUBLE-SHOOTING GUIDE (Continued)

STEP	UNIT	CONTROL SETTING	NORMAL INDICATION	PROBABLE TROUBLE AREA IF INDICATION IS ABNORMAL
12 (Cont)	AM-3007/URT	<p>c. 2A2A1S1 AMPLIFIER meter switch: set at DR CATH and repeat step b</p> <p>d. Release push-to-talk button on H-169/U and AMPLIFIER meter switch</p> <p style="text-align: center;">Note</p> <p>Step 12 verifies exciter input to AM-3007/URT (USB).</p>	AMPLIFIER meter M1 indicates one-half division to left of DR SET.	T-827D/URT or W6P1 cable
13	T-827D/URT	<p>a. 1A2S9 LOCAL ISB HANDSET switch: LSB</p> <p>b. Handset H-169/U: Press push-to-talk button and talk into handset at normal voice level</p>	LSB LINE LEVEL meter indicates about 0 dB.	H-169/U or T-827D/URT
	AM-3007/URT	c. 2A2A1S1 AMPLIFIER meter switch: set at DR CATH position and repeat step b	AMPLIFIER meter M1 indicates one-half division to left of DR SET.	T-827D/URT or W6P1 cable
14	T-827D/URT	1A2S2 Mode Selector switch: AM		
15	AM-3007/URT	a. 2A2A1S1 AMPLIFIER meter switch: set at PA PL	AMPLIFIER meter M1 indicates PA SET.	AM-3007/URT
	T-827D/URT	b. Handset H-169/U: Press push-to-talk button and hold	RF OUTPUT meter M2 indicates about 25 watts.	CU-937/UR or T-827D/URT

TABLE 4-3. TROUBLE-SHOOTING GUIDE (Continued)

STEP	UNIT	CONTROL SETTING	NORMAL INDICATION	PROBABLE TROUBLE AREA IF INDICATION IS ABNORMAL
16	T-827D/URT, AM-3007/URT	Talk into H-169/U at normal voice level. Note If AMPLIFIER meter M1 remains at PA SET and voice peaks appear low on RF OUTPUT meter M2, an open transmission line is suspected.	AMPLIFIER meter M1 indicates voice peaks about 1-1/2 divisions to right of DR SET. RF OUTPUT meter M2 indicates about 10 watts above carrier level.	AM-3007/URT AM-3007/URT, CU-937/UR, transmission line, or antenna
17		Release push-to-talk button on Handset H-169/U and release AMPLIFIER meter switch 2A2A1S1		
18	AM-3007/URT T-827D/URT	a. 2A2A1S3 RF OUTPUT meter switch: 30W REFL b. Handset H-169/U: Press push-to-talk button and hold Note 1. If reflected power is slightly greater than forward power, check for open transmission line. Check connectors and line run. Perform continuity check using Multimeter AN/PSM-4() Rx1 scale. Normal reading will be less than 10 ohms to ground depending on length of line.	RF OUTPUT meter M2 indicates less than 1 watt reflected.	Transmission line, AM-3007/URT, or antenna coupler needs retuning.

TABLE 4-3. TROUBLE-SHOOTING GUIDE (Continued)

STEP	UNIT	CONTROL SETTING	NORMAL INDICATION	PROBABLE TROUBLE AREA IF INDICATION IS ABNORMAL
18 (Cont)		<p>Note (Cont)</p> <p>2. If forward power indication at M2 is the same as the reflected power indication, check for continuity between the output of the CU-937/U and the antenna.</p> <p>3. If forward power is normal (about 25 watts) and reflected power is erratic or cannot be tuned out, check ground straps at the CU-937/UR and all connections. Check length of lead in cable between the CU-937/UR output and the base of the whip antenna. This cable length is critical and must not exceed 12 inches.</p> <p>4. If the antenna system is suspected of being defective, perform the following isolation check:</p> <p style="padding-left: 40px;">a. On AM-3007/URT, set ANT CPLR BYPASS/NORMAL switch at BYPASS.</p> <p style="padding-left: 40px;">b. Disconnect transmission line from J8 and perform a megohmmeter check of the antenna and transmission line. A reading above 400 megohms is normal.</p>		

SECTION 5

MAINTENANCE

5-1. FAILURE, AND PERFORMANCE
AND OPERATIONAL REPORTS.

Note

The NAVAL Electronic Systems Command no longer requires the submission of failure reports for all equipments. Failure Reports and Performance and Operational Reports are to be accomplished for designated equipments (refer to Electronics Installation and Maintenance Book, NAVSHIPS 900,000) only to the extent required by existing directives. All failures shall be reported for those equipments requiring the use of Failure Reports.

5-2. PREVENTIVE MAINTENANCE.

The following preventive maintenance procedures should be performed every 90 days.

- a. Operate all controls through all positions and check for positive action.
- b. Remove dust from chassis with brush or cloth.

- c. Tighten all loose screws.
- d. Visually inspect equipment for discoloration, etc.
- e. Refer to associated equipment Technical Manuals and perform electrical tests detailed therein.

For further preventive maintenance procedures, refer to the Reference Standards Book for the AN/URT-24, NAVSHIPS 0967-878-5050.

5-3. REPAIR.

Refer to the associated equipment technical manuals for detailed repair procedures.

5-4. DIAGRAMS.

Figure 5-1 is a power distribution diagram for Radio Set AN/URT-24. Figure 5-2 is a system interconnection diagram, figure 5-3 is a system keying diagram, and figure 5-4 is a system 28 Vdc power distribution diagram. The interconnecting equipment cables are listed in table 4-2.

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.

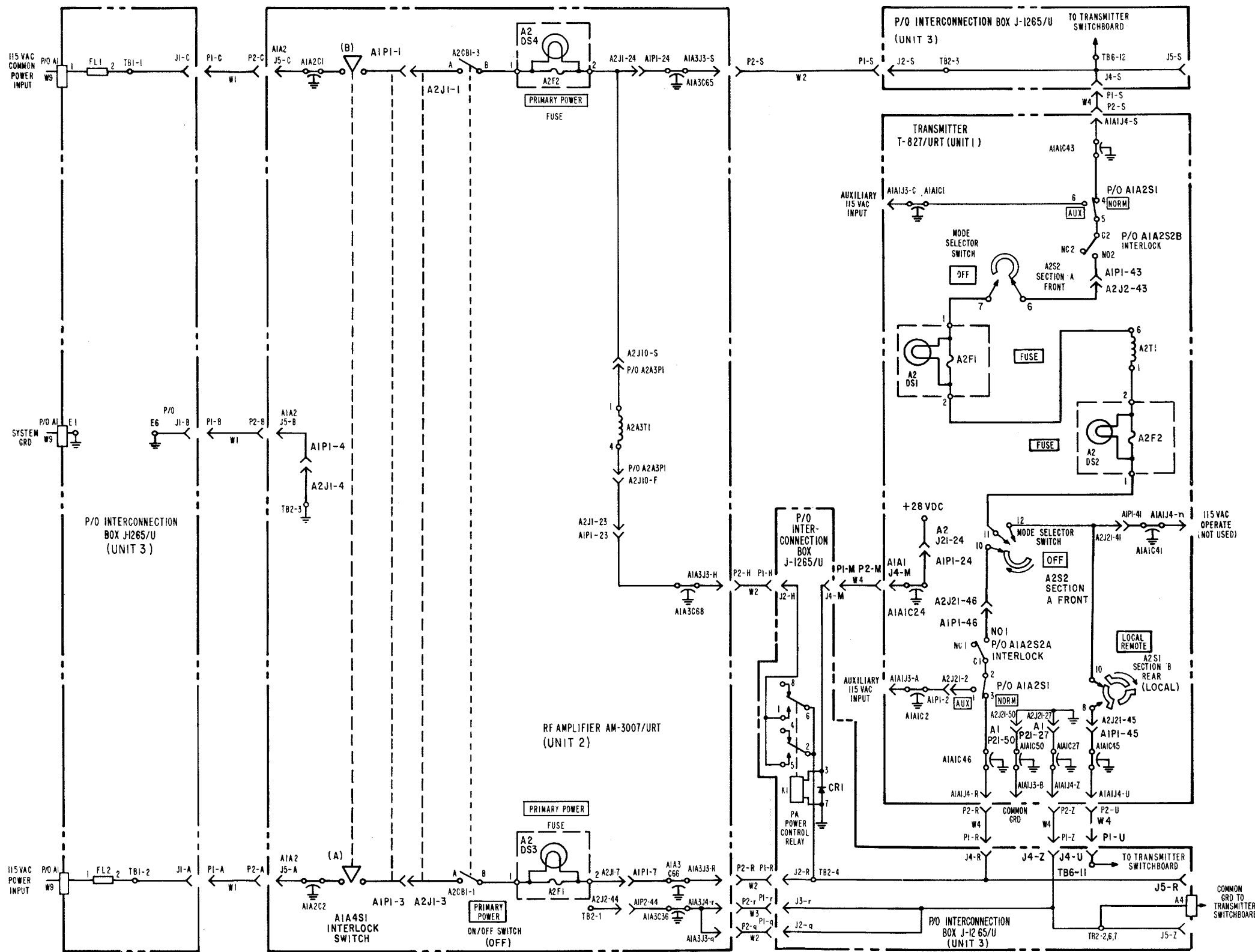


Figure 5-1. Radio Set AN/URT-24,
Power Distribution Diagram

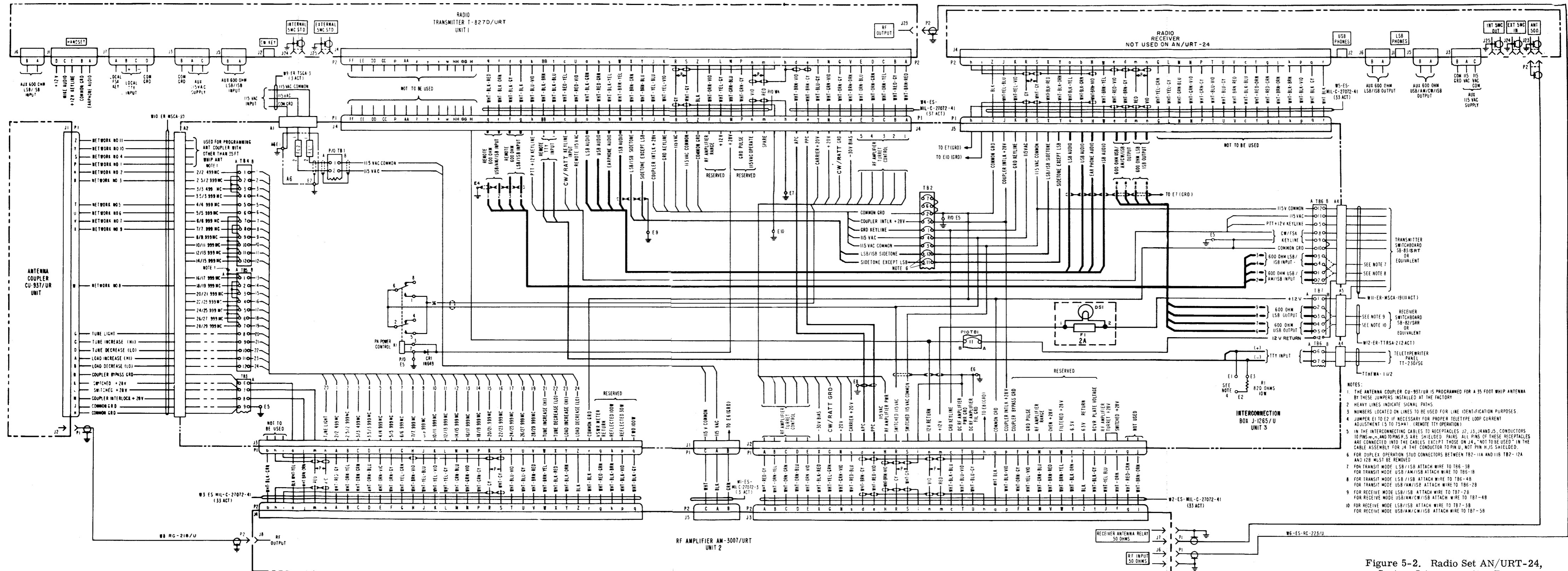
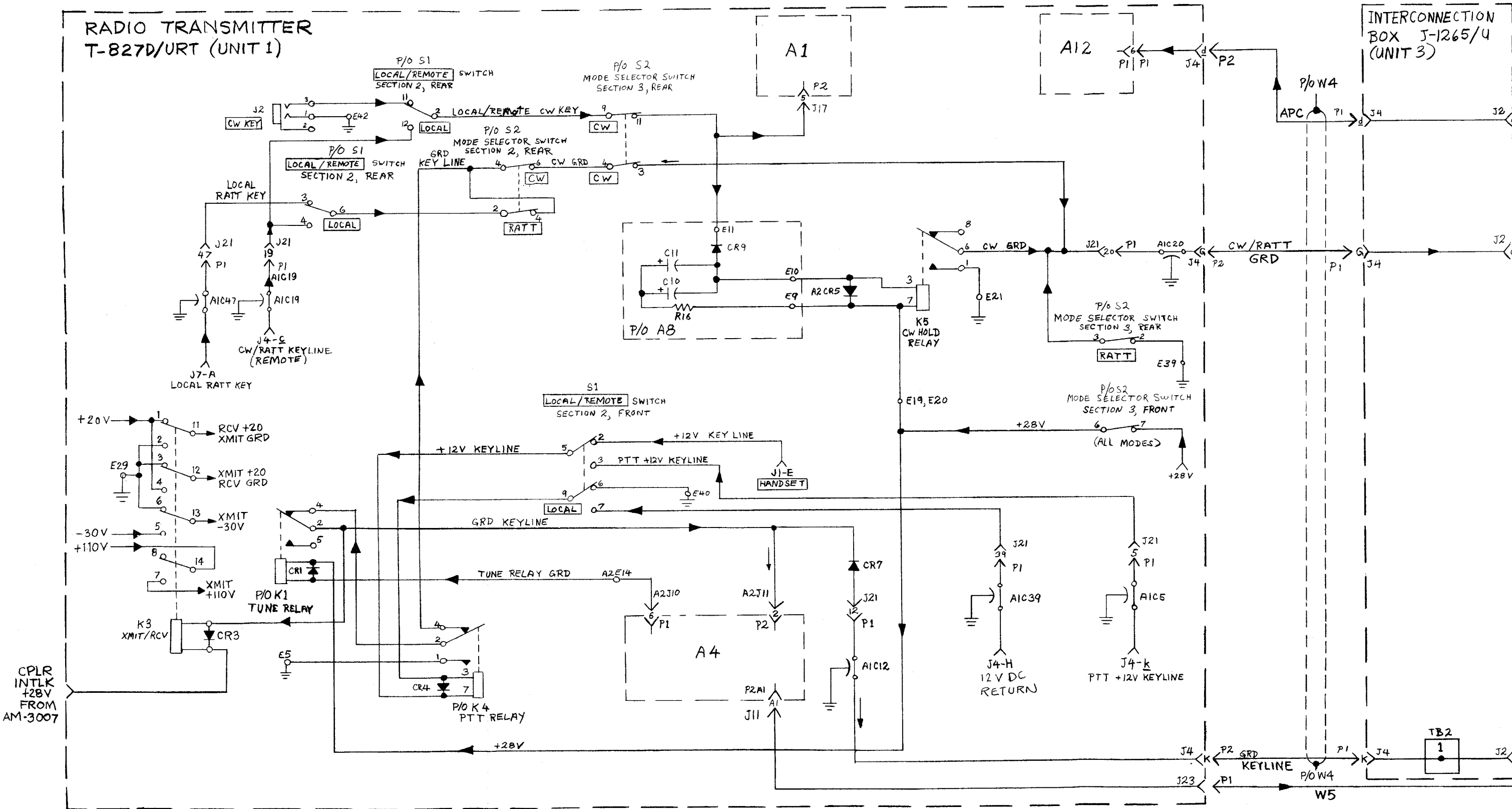


Figure 5-2. Radio Set AN/URT-24,
System Interconnection Diagram

ORIGINAL

RADIO TRANSMITTER T-827D/URT (UNIT 1)



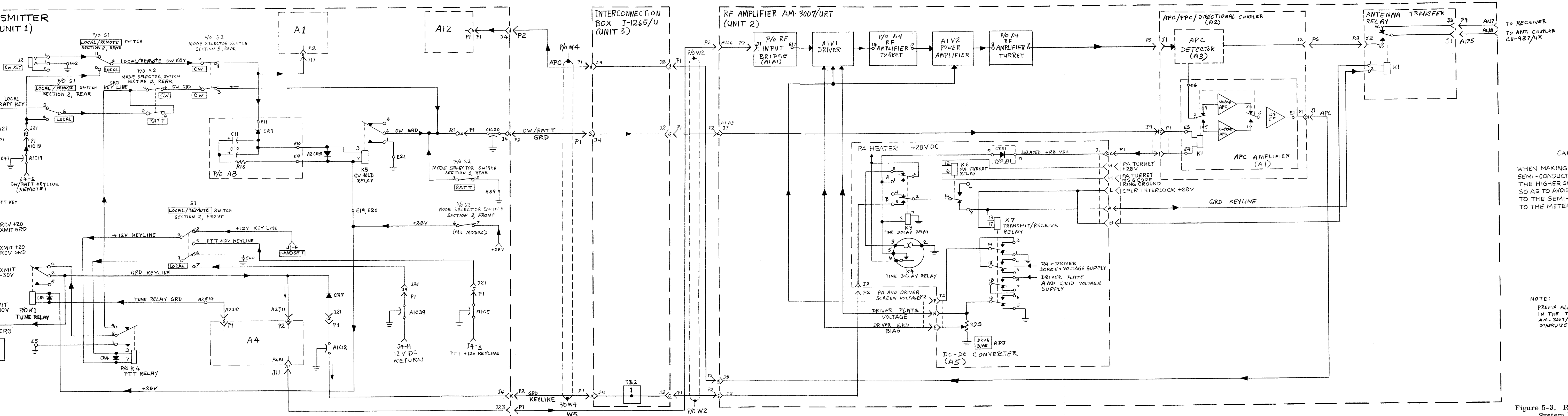


Figure 5-3. Radio Set AN/URT-24,
System Keying Diagram

ORIGINAL

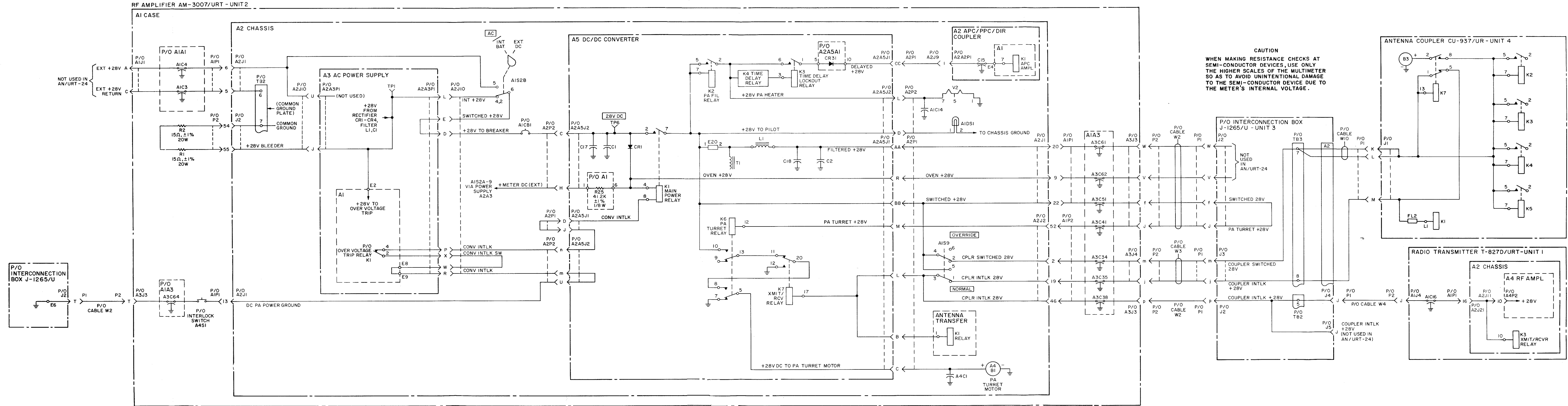


Figure 5-4. Radio Set AN/URT-24,
System 28 VDC Power Distribution

SECTION 6

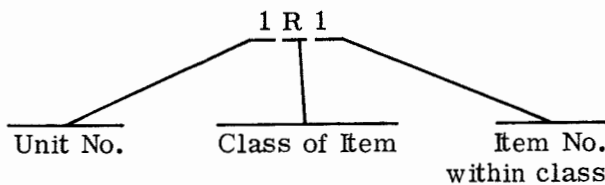
PARTS LIST

6-1. INTRODUCTION.

a. REFERENCE DESIGNATIONS.

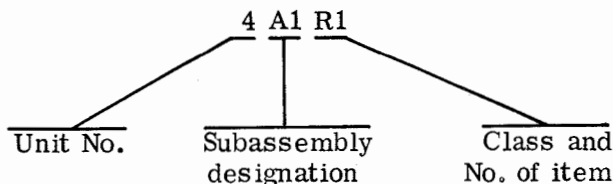
The unit numbering method of assigning reference designations has been used to identify units, assemblies, subassemblies, and parts. This method has been expanded as much as necessary to adequately cover the various degrees of subdivision of the equipment. Examples of this unit numbering method and typical expansions of the same are illustrated by the following:

Example 1:



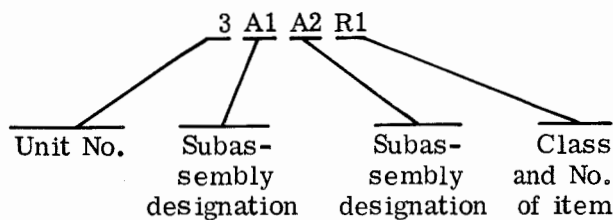
Read as: First (1) resistor (R) of first unit (1).

Example 2:



Read as: First (1) resistor (R) of first (1) subassembly (A) of fourth (4) unit.

Example 3:



Read as: First (1) resistor (R) of second (2) subassembly (A) of first (1) subassembly (A) of third (3) unit.

b. REF DESIG 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 illustrations following the notation "REF DESIG PREFIX".

6-2. LIST OF UNITS.

Table 6-1 is a listing of the units comprising the equipment. 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. Table 6-1 also provides the following information for each unit listed: (1) quantity per equipment, (2) official name, (3) designation, (4) colloquial name, and (5) location of the first page of its parts listing in table 6-2.

6-3. MAINTENANCE PARTS LIST.

Table 6-2 lists all units and their maintenance parts. The units are listed in numerical sequence. Maintenance parts for each unit are listed alphabetically-numerically by class of part following the unit designation. Thus the parts for each unit 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 6-6, (3) noun name and brief description, and (4) identification of the illustration which pictorially locates the part.

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 unit, 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 in subsequent units, reference is made to the parts breakdown previously listed.

6-4. LIST OF MANUFACTURERS.

Table 6-3 lists the manufacturers of parts used in the equipment. The table includes the manufacturer's code used in table 6-2 to identify the manufacturers. The code is contained in Federal Supply Code for Manufacturers, H4-1.

6-5. STOCK NUMBER IDENTIFICATION.

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.

6-6. NOTES.

Note Column, 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.

TABLE 6-1. LIST OF UNITS

UNIT NO.	QTY	NAME	DESIGNATION	COLLOQUIAL NAME	PAGE
1	1	Radio Transmitter	T-827D/URT	Transmitter (See NAVSHIPS 0967-878-4010)	6-3
2	1	Radio Frequency Amplifier	AM-3007/URT	RF Amplifier (See NAVSHIPS 0967-878-6010)	6-3
3	1	Interconnection Box	J-1265/U	Interconnection Box	6-3
4	1	Antenna Coupler	CU-937/UR	Antenna Coupler (See NAVSHIPS 0967-878-6010)	6-4
5	1	Base, Shock Mount	----	Shock Mount	6-4
6	1	Handset Assembly	H-169/U	Handset	6-4
7	1	Interconnecting Cables	----	Interconnecting Cables	6-4
8	1	Assembly Extender Cables	----	Assembly Extender Cables	6-5

TABLE 6-2. MAINTENANCE PARTS LIST (Continued)

RADIO SET AN/URT-24

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1		RADIO SET, AN/URT-24, MFR 58189, P/N A70172-001	
2		TRANSMITTER, T-827D/URT, MFR 58189, P/N A70173-001	
3		AMPLIFIER, RADIO FREQUENCY, AM-3007/ URT, MFR 58189, P/N A70178-001	
3A1		INTERCONNECTION BOX, J-1265/U, MFR 58189, P/N 666230-075	
3A2-A3		STUFFING TUBE, MIL TYPE MS16156-2	
3A4-A5		STUFFING TUBE, MIL TYPE MS16156-5	
3CR1		STUFFING TUBE, MIL TYPE MS16156-4	
3F1		SEMICONDUCTOR DEVICE, DIODE, MFR 80131, P/N 1N649	
3J1		FUSE, MIL TYPE F026125V2AS	
3J2		CONNECTOR, RECEPTACLE, ELECTRICAL, 1.375 IN. LG X 1.375 IN. W X 1.093 IN. H, MFR 77820, P/N 71-74116-5S	
3J3		CONNECTOR, RECEPTACLE, ELECTRICAL, 1.812 IN. LG X 1.812 IN. W X 1.105 IN. H, MFR 77820, P/N PT07A20-41P	
3J4		CONNECTOR, RECEPTACLE, ELECTRICAL, 1.812 IN. LG X 1.812 IN. W X 1.105 IN. H, MFR 77820, P/N PT07A20-39P	
3J5		CONNECTOR, RECEPTACLE, ELECTRICAL, 1.938 IN. LG X 1.938 IN. W X 1.105 IN. H, MFR 77820, P/N PT07A22-55S	
3K1		CONNECTOR, RECEPTACLE, ELECTRICAL, 1.812 IN. LG X 1.812 IN. W X 1.105 IN. H, MFR 77820, P/N PT07A20-39S	
3MP1-MP3		RELAY, ARMATURE, 10 AMPS AT 32VDC, 1.718 IN. LG X 0.515 IN. W X 1.550 IN. H, MFR 09026, P/N BR7X300D5S152	
3R1		SCREW, CAPTIVE, MFR 58189, P/N 666164- 260	
3TB1-TB7		RESISTOR, MIL TYPE RW56G821	
		TERMINAL BOARD, 12 TERMINALS, 4.500 IN. LG X 0.687 IN. W X 0.375 IN. H, MFR 88223, P/N 26TB12	

TABLE 6-2. MAINTENANCE PARTS LIST (Continued)

RADIO SET AN/URT-24

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3XF1		FUSEHOLDER, MIL TYPE FHL18G1	
3A6		FILTER BOX ASSEMBLY, MFR 58189, P/N 666231-278	
3A6FL1-FL2		FILTER, RADIO INTERFERENCE, 5 AMPS, 0.072 OHMS, 400 VDC, MFR 56289, P/N 5JX94	
4		COUPLER, ANTENNA, CU-937/UR, MFR 58189, P/N 666230-071	
5		BASE, SHOCK MOUNT, ELECTRICAL EQUIPMENT, TYPE MT-3761/URC-35, MFR 58189, P/N A55318-002.	
6		HANDSET AND CABLE ASSEMBLY, MIL TYPE H-169/U	
7		INTERCONNECTING CABLES	
7W1		CABLE ASSEMBLY, AC POWER, MFR 58189, P/N A70834-001	
7W1P1		CONNECTOR, PLUG, ELECTRICAL, MFR 77820, P/N 10-S72616-5P, MATES WITH 3J1	
7W1P2		CONNECTOR, PLUG, ELECTRICAL, MFR 77820, P/N 10-72616-5S, MATES WITH 2A1A2J5	
7W2		CABLE ASSEMBLY, MFR 58189, P/N A70836-001, AM-3007/URT CONTROL CABLE	
7W2P1		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE MS3116J20-41S, MATES WITH 3J2	
7W2P2		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE MS3116J20-41P, MATES WITH 2A1A3J3	
7W3		CABLE ASSEMBLY, MFR 58189, P/N A70837-001	
7W3P1		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE MS3116J20-39S, MATES WITH 3J3	
7W3P2		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE MS3116J20-39P, MATES WITH 2A1A3J4	
7W4		CABLE ASSEMBLY, T-827D/URT CONTROL CABLE, MFR 58189, P/N A70838-001	
7W4P1		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE MS3116J22-55P, MATES WITH 3J4	

TABLE 6-2. MAINTENANCE PARTS LIST (Continued)

RADIO SET AN/URT-24

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
7W4P2		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE MS3116J22-55S, MATES WITH 2A1A1J4	
7W5		NOT USED	
7W6		CABLE ASSEMBLY, RADIO FREQUENCY, MFR 58189, P/N 70839-001	
7W6P1		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE UG88E/U, MATES WITH 1A1J23	
7W6P2		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE UG88E/4, MATES WITH 2A1J6	
7W7		NOT USED	
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 4J2	
7W8P2		CONNECTOR, PLUG, ELECTRICAL, MIL TYPE UG-941C/U, MATES WITH 2A1J8	
7W9		CABLE ASSEMBLY, AC POWER, LOCALLY FABRICATED FROM REQUIRED LENGTH OF TSGA-3. MATES THROUGH 3A1 TO 3TB1	
7W10		CABLE ASSEMBLY, COUPLER CONTROL, LOCALLY FABRICATED FROM REQUIRED LENGTH OF MSCA-30	
7W10P1		CONNECTOR, PLUG, ELECTRICAL, MFR 91146, P/N MR0628-12S-14A66. MATES WITH 4J1	
7W11		CABLE ASSEMBLY, J-1265/U TO TRANS- MITTER SWITCHBOARD. LOCALLY FAB- RICATED FROM REQUIRED LENGTH OF MSCA-14	
8		ASSEMBLY (MODULE) EXTENDER CABLES	
8W1		CABLE ASSEMBLY, EXTENDER, TRANS- MITTER MODE SELECTOR; MFR 58189, P/N 666243-076. MATES WITH 1A2A1P2 AND 1A2J17	
8W2		CABLE ASSEMBLY, EXTENDER, TRANS- MITTER MODE SELECTOR; MFR 58189, P/N 666243-070. MATES WITH 1A2A1P1 AND 1A2J16	

TABLE 6-2. MAINTENANCE PARTS LIST (Continued)

RADIO SET AN/URT-24

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
8W3		CABLE ASSEMBLY, EXTENDER, AUDIO AMPLIFIER; MFR 58189, P/N 666243-074. MATES WITH 1A2A2P1 OR 1A2A3P1 AND 1A2J18 OR 1A2J19	
8W4		CABLE ASSEMBLY, EXTENDER, IF AMPLIFIER; MFR 58189, P/N 666243-071. MATES WITH 1A2A12P1 AND 1A2J15	
8W5		CABLE ASSEMBLY, EXTENDER, RATT GENERATOR; MFR 58189, P/N 666243-078. MATES WITH 1A2A9P1 AND 1A2J20	
8W6		CABLE ASSEMBLY, EXTENDER, APC/PPC/DIRECTIONAL COUPLER; MFR 58189, P/N 666243-074. MATES WITH 2A2A2P1 AND 2A2J9	
8W7		CABLE ASSEMBLY, EXTENDER, APC/PPC/DIRECTIONAL COUPLER; MFR 58189, P/N 666243-077. MATES WITH 2A2A2P5 OR 2A2A2P6 AND 2A2J1 OR 2A2J2	
8W8		CABLE ASSEMBLY, EXTENDER, DC-TO-DC CONVERTER; MFR 58189, P/N 666243-075. MATES WITH 2A2A5J1 AND 2A2P1	
8W9		CABLE ASSEMBLY, EXTENDER, DC-TO-DC CONVERTER; MFR 58189, P/N 666243-073. MATES WITH 2A2A5J2 AND 2A2P2	
8W10		CABLE ASSEMBLY, EXTENDER, AC POWER SUPPLY; MFR 58189, P/N 666243-079. MATES WITH 2A2A3P1 AND 2A2J10	

TABLE 6-3. LIST OF MANUFACTURERS

MFR CODE	NAME	ADDRESS
09026	Babcock Electronics Corp Relay Division	Costa Mesa, Calif.
56289	Sprague Electric Co.	North Adams, Mass.
58189	General Dynamics Corp. Electronics Division	Rochester, N. Y.
71468	ITT Cannon Electric Inc.	Los Angeles, Calif.
77820	The Bendix Corp. Electrical Components Division	Sidney, N. Y.
88223	General Products Corp. 107 Salem Street	Union Springs, N. Y. Zip Code 13160

SECTION 7
INSTALLATION

7-1. UNPACKING AND HANDLING.

Special procedures need not be followed when unpacking units of the AN/URT-24 system. Since the system is composed 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.

7-2. POWER REQUIREMENTS.

The AN/URT-24 system is designed to operate from a nominal 115 Vac, single phase, 48 to 450 Hz. Refer to figure 5-1 for a primary power distribution diagram of the system. Table 1-2 lists the power requirements.

7-3. SITE SELECTION.

In selecting a shipboard installation site, adequate consideration must be given to space requirements (figures 7-1 through 7-4). This requirement will include space for servicing the slide-mounted equipment when extended from the cases, 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 CU-937/UR to be made with a 12-inch long stranded copper conductor (see figure 7-5). 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.

7-4. INSTALLATION REQUIREMENTS.

a. CONSIDERATIONS. - The following factors should be considered when determining the proper location of the AN/URT-24 system:

- (1) Best operating conditions.

- (2) Ease of maintenance, adjustment of equipment, and replacement and repair of defective parts or complete units.

- (3) Possibility of interaction between units and other electronic equipment in the vicinity.

- (4) Critical and minimum cable length requirements.

- (5) Adequate heat dissipation.

- (6) Availability of an adequate ground.

b. CABLE ASSEMBLIES. - Cable assemblies required for installation of the AN/URT-24 are listed in table 7-1.

c. INSTALLATION.

- (1) MOUNTING OF UNITS. - Units of the AN/URT-24 are stacked and secured together in the order shown in figure 7-3. Mounting brackets and hardware are supplied with each unit. These brackets facilitate stacking of the units. To install the AN/URT-24 system, proceed as follows:

- (a) After determining best location for system, set shock mount on mounting surface and mark off mounting holes. Drill or prepare mounting surface as required.

CAUTION

Be sure to use the system shock mount MT-3761/URC-35 when the AN/URT-24 units are to be stacked.

Note

In shore installations, the shock mounts are not normally used. Return the mounts to the supply system.

- (b) Using hardware provided, secure shock mount to mounting surface.

TABLE 7-1. RADIO SET AN/URT-24, INTERCONNECTING CABLE ASSEMBLIES

REF DESIG	MATES WITH	CABLE/PLUG PART NO.
7W1		MIL-C-27072-3
W1P1	3J1	10-72616-5S
W1P2	2J5	10-72616-5S
7W2		MIL-C-27072-41
W2P1	3J2	MS-3116J-20-39S
W2P2	2J3	MS-3116J-20-39S
7W3		MIL-C-27072-41
W3P1	3J3	MS-3116J-20-39S
W3P2	2J4	MS-3116J-20-39S
7W4		MIL-C-27072-41
W4P1	3J4	MS-3116J-20-39S
W4P2	1J4	MS-3116J-20-39S
7W6		RG-223/U
W6P1	2J6	MS35168-88E
W6P2	1J23	MS35168-88E
7W8*		RG-215/U
W8P1	4J2	UG-941B/U
W8P2	2J8	UG-941B/U
7W9	3A1	TSGA-3
7W10*		MSCA-30
W10P1	4J1	Cannon MR06-28-12S-14-A66
	3A2	Handwired to TB4

*W8 and W10 supplied by installing activity.

AN/URT-24
INSTALLATION

NAVSHIPS 0967-878-5010

Figure
7-1

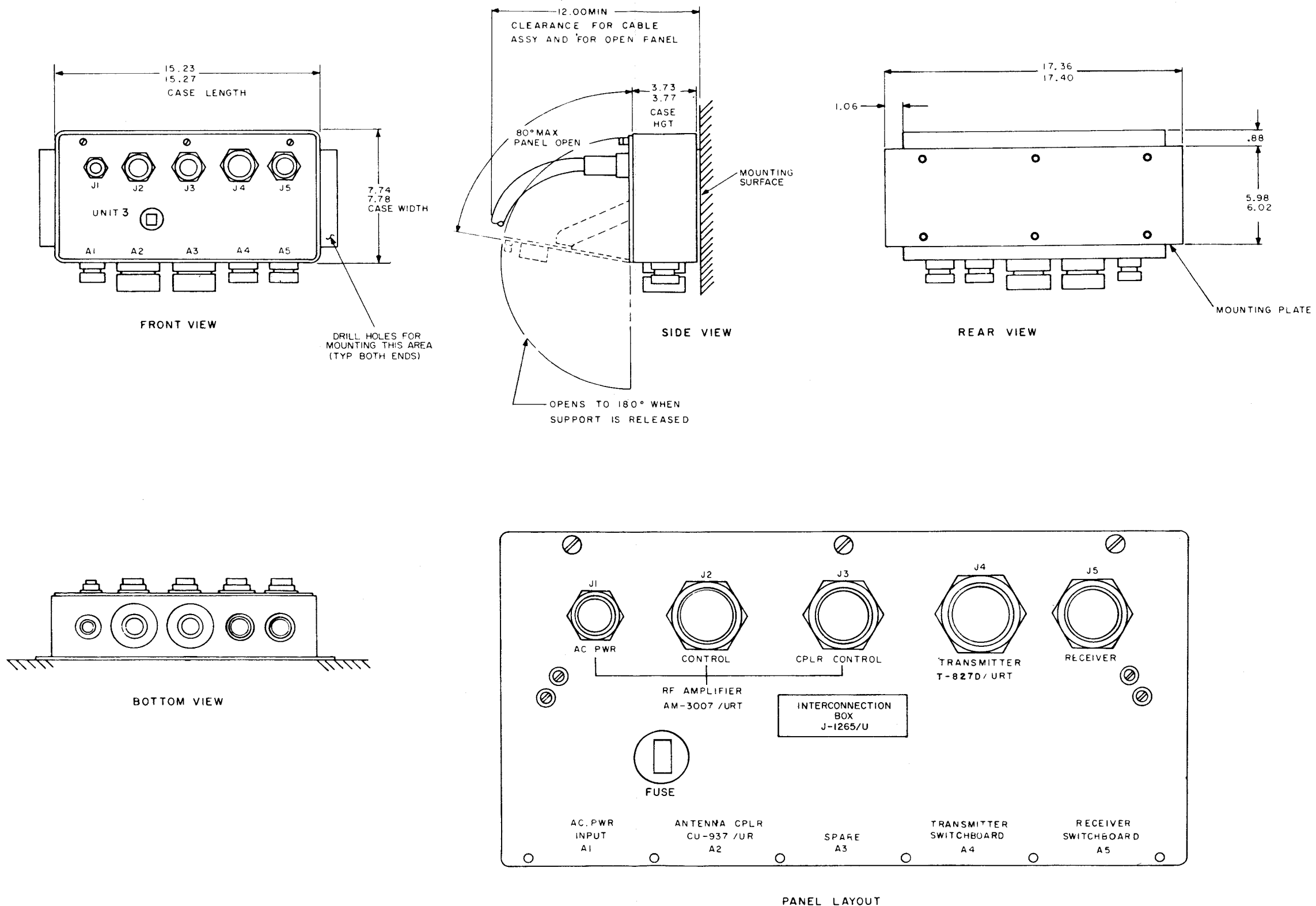
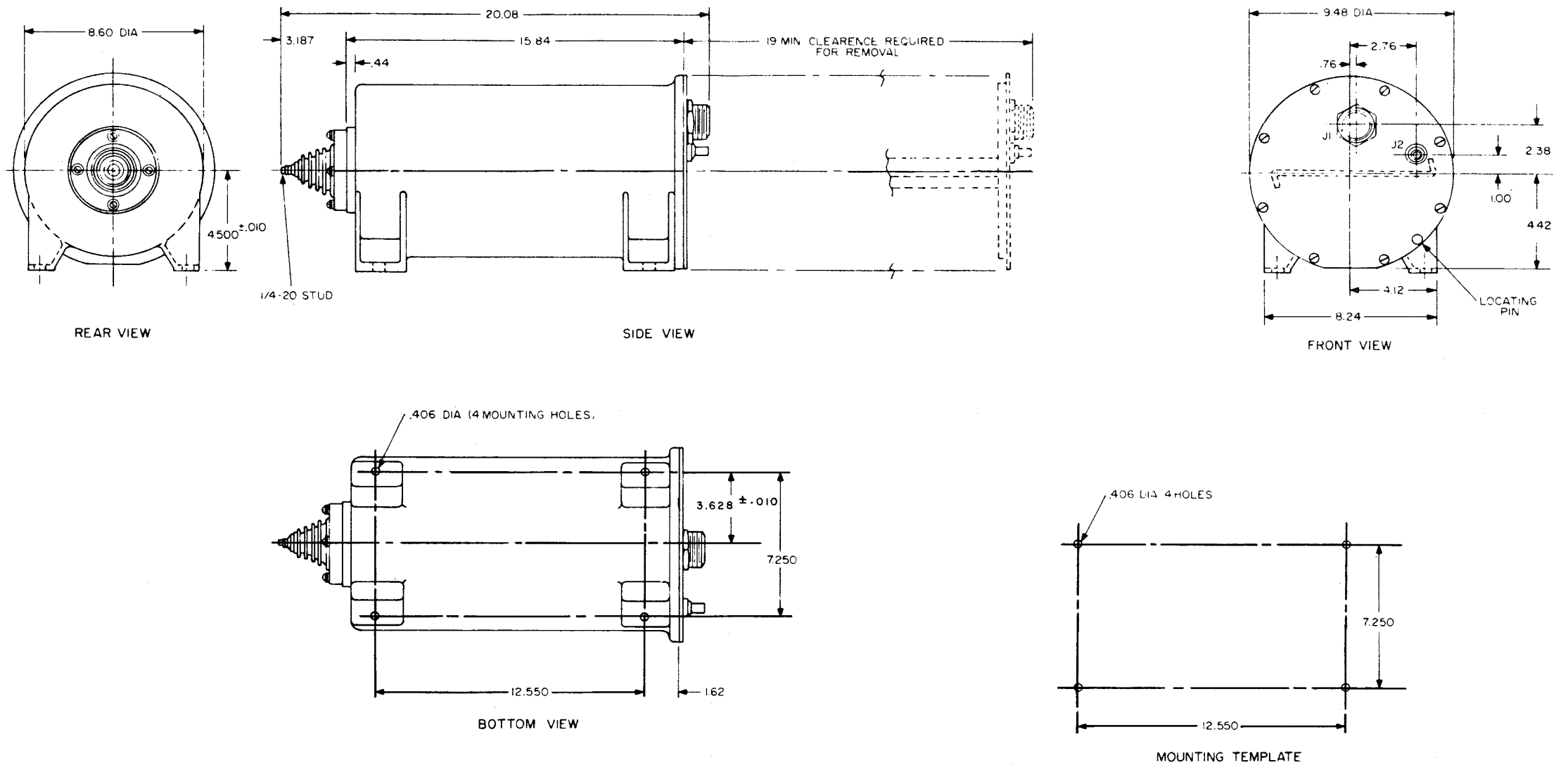


Figure 7-1. Interconnection Box
J-1265/U, Dimensions

ORIGINAL

7-3, 7-4



NOTES:

- I. SPECIFICATIONS
 - SIZE 935 CU IN
 - WEIGHT 30LBS (APPROX)
 - HEAT DISSIPATION 50WATTS MAX
 - TEMPERATURE -28°C TO +65°C (OPERATING)
 - FREQUENCY RANGE 2-30MC

Figure 7-2. Antenna Coupler CU-937/UR,
Dimensions

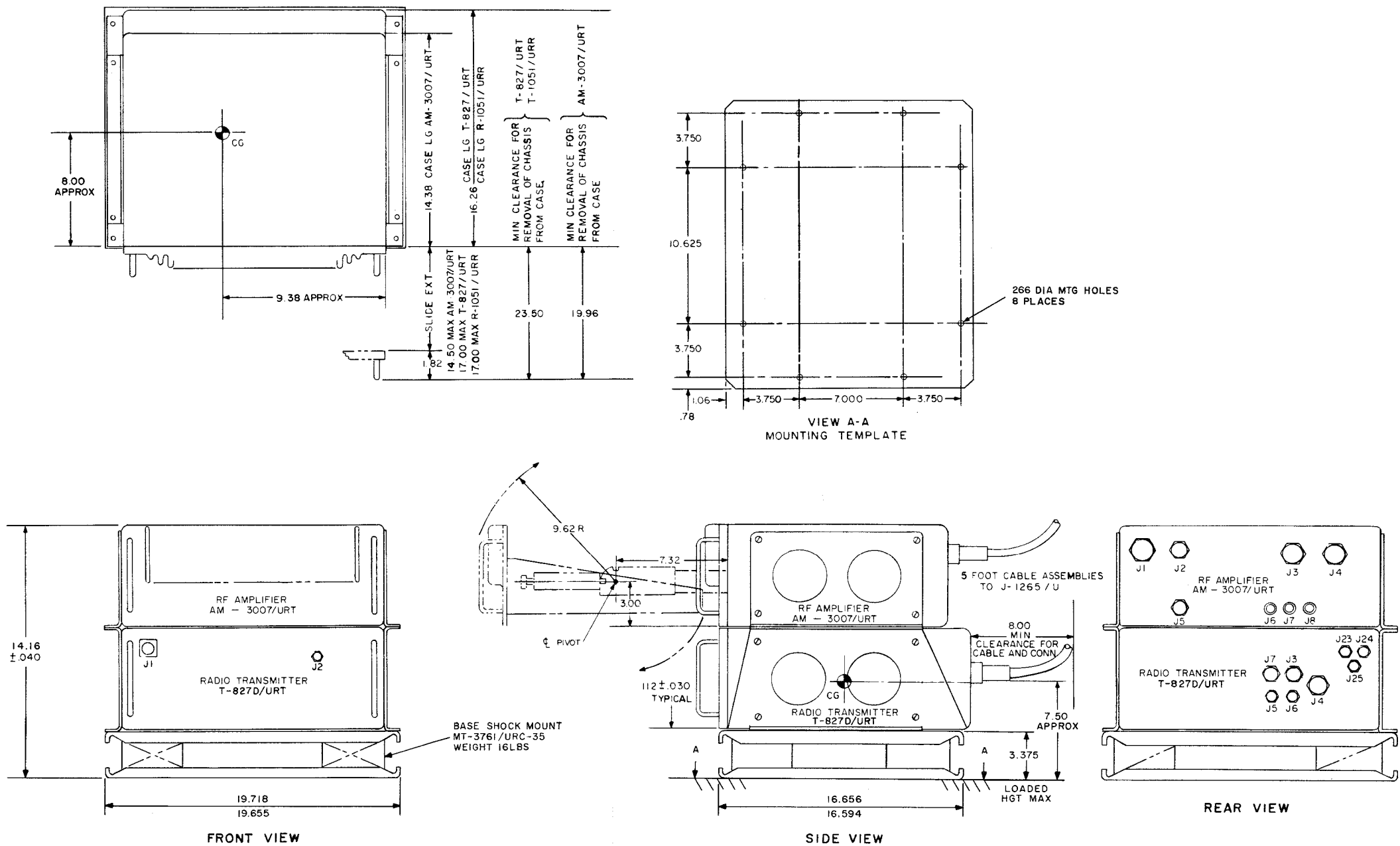


Figure 7-3. Radio Transmitter
T-827D/URT and RF Amplifier,
AM-3007/URT Mounted,
Dimensions

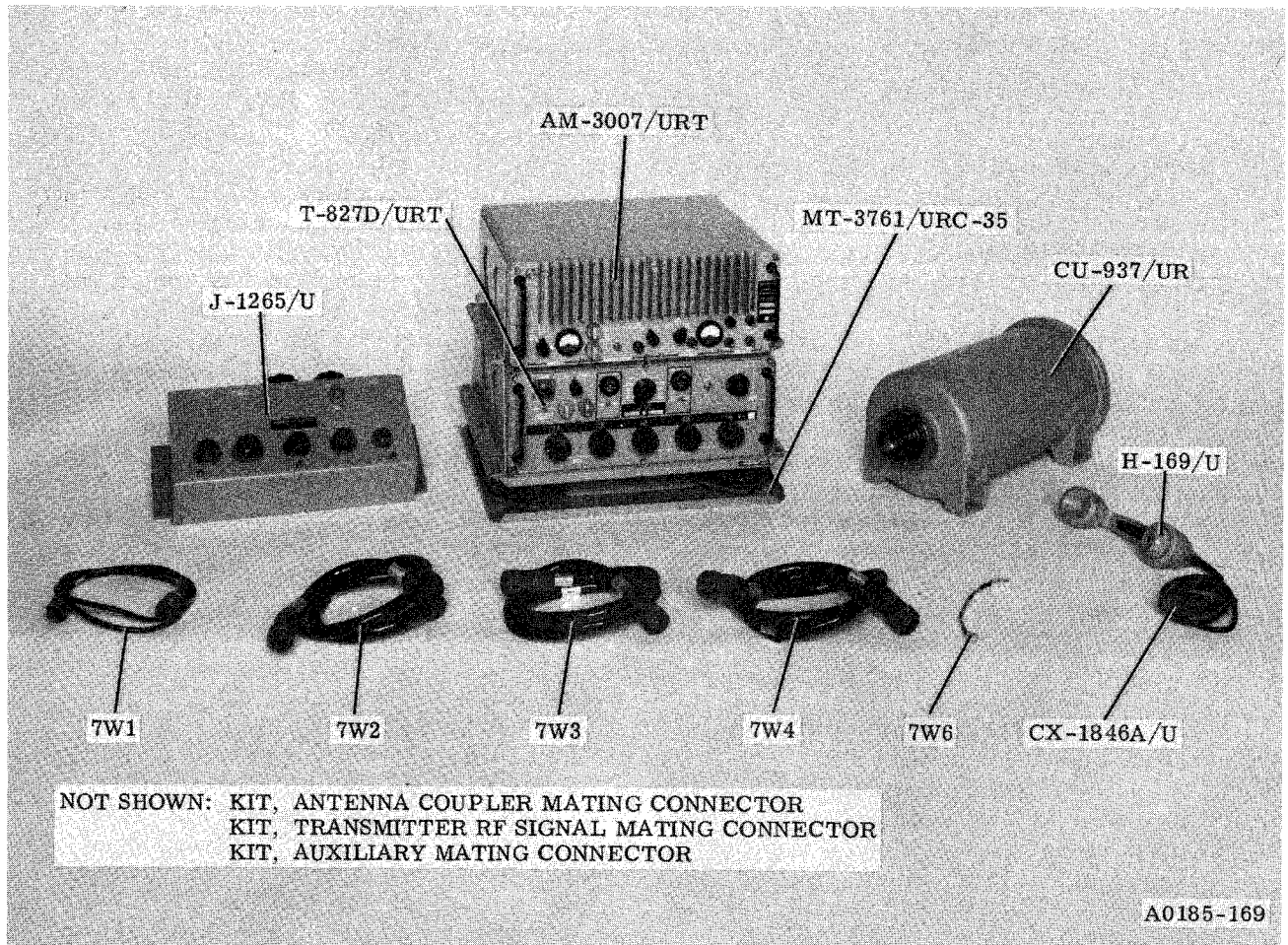


Figure 7-4. Radio Set AN/URT-24, Equipment Supplied

(c) Attach mounting brackets to sides of each unit as shown in figure 7-3 using hardware supplied.

(d) Using hardware provided, bolt units together in order shown in figure 7-3. Bolt T-827D/URT to shock mount.

(e) Mount J-1265/U to bulkhead using mounting plate provided on unit. Mounting plate must be drilled as required; observe precaution in locating mounting bolt holes only within portion of mounting plate extending beyond chassis on each side. Mounting bolts (provided by installing activity) may be welded to bulkhead or stanchions. Since mounting plate is

aluminum, it cannot be welded directly to steel structure of ship.

Note

Installing activity must supply proper glands for J-1265/U stuffing tubes.

(f) To install CU-937/UR, drill mounting holes (figure 7-2) approximately 10 inches from antenna base and bolt CU-937/UR to mounting surface.

(g) Connect all cables as shown in figure 7-5.

(h) Connect CU-937/UR to antenna with 12" of extruded RG-17A/U.

CAUTION

Ensure good metal-to-metal grounds for all units.

(2) POWER SUPPLY. - The AN/URT-24 is designed to operate from a nominal 115-Vac supply. The movable taps on the inputs of transformers A3T1 in the AM-3007/URT and A2T1 in the T-827D/URT are set for a 115-Vac input when shipped. If the supply voltage is not 115-Vac, refer to the installation section of Technical Manuals for RF Amplifier AM-3007/URT and Antenna Coupler CU-937/UR, NAVSHIPS 0967-878-6010, and for Radio Transmitter T-827D/URT, NAVSHIPS 0967-878-4010, for procedure for changing transformer inputs.

(3) RACK INSTALLATION. - To install the equipment in an equipment rack, proceed as follows:

(a) Prepare four mounting brackets as shown in figure 7-6.

(b) Attach one mounting bracket to each side of each unit using hardware supplied.

(c) Place units in rack in order shown in figure 7-3 and bolt bracket to front of rack. Use of installed rack shelves or base plates is recommended in rack installations.

(d) Perform steps (e) through (g) of paragraph 7-4c(1).

(4) LOCAL RATT TRANSMISSION. - If local RATT transmission is required, proceed as follows:

(a) Connect teletypewriter loop and keylines to connector J7 (LOCAL RATT IN) on rear of T-827D/URT.

(b) Loosen front-panel screws and pull T-827D/URT chassis out from case. Set CTR FREQ switch on top of RATT tone generator electronic assembly at desired center frequency (2000 Hz or 2550 Hz).

(c) Refer to Technical Manual for Radio Transmitter T-827D/URT, NAVSHIPS 0967-878-4010, and jumper E4

to E7 (Note 7, figure 5-1) to increase loop current, if required.

(d) Slide chassis back into case and secure it.

(e) On T-827D/URT, set mode Selector switch at ISB/RATT or at RATT, and set LOCAL/REMOTE switch at LOCAL.

(5) REMOTE RATT TRANSMISSION. - If remote RATT transmission is required, proceed as follows:

(a) Refer to table 4-2 and connect remote teletypewriter loop and keylines as indicated.

(b) Loosen front-panel screws and pull T-827D/URT chassis out from case. Set CTR FREQ switch on top of RATT tone generator electronic assembly at desired center frequency (2000 Hz or 2550 Hz).

(c) Slide chassis back into case and secure it.

(d) Loosen three screws securing front panel of J-1265/U and open panel.

(e) Refer to Technical Manual for RF Amplifier AM-3007/URT and Antenna Coupler CU-937/UR, NAVSHIPS 0967-878-6010, figure 5-5, and jumper E1 to E2 (Note 3, figure 5-5) to increase remote loop current, if required.

(f) Close J-1265/U front panel and secure it.

(g) On T-827D/URT, set Mode Selector switch at ISB/RATT or RATT, and set LOCAL/REMOTE switch at REMOTE.

(6) USE OF SHIP'S FREQUENCY STANDARD FOR OPERATION. - If it is required to use the ship's frequency standard for operation, proceed as follows:

(a) Connect frequency standard output to connector J25 (EXT 5MC IN) on rear of T-827D/URT.

(b) Loosen front-panel screws and slide T-827D/URT chassis from case.

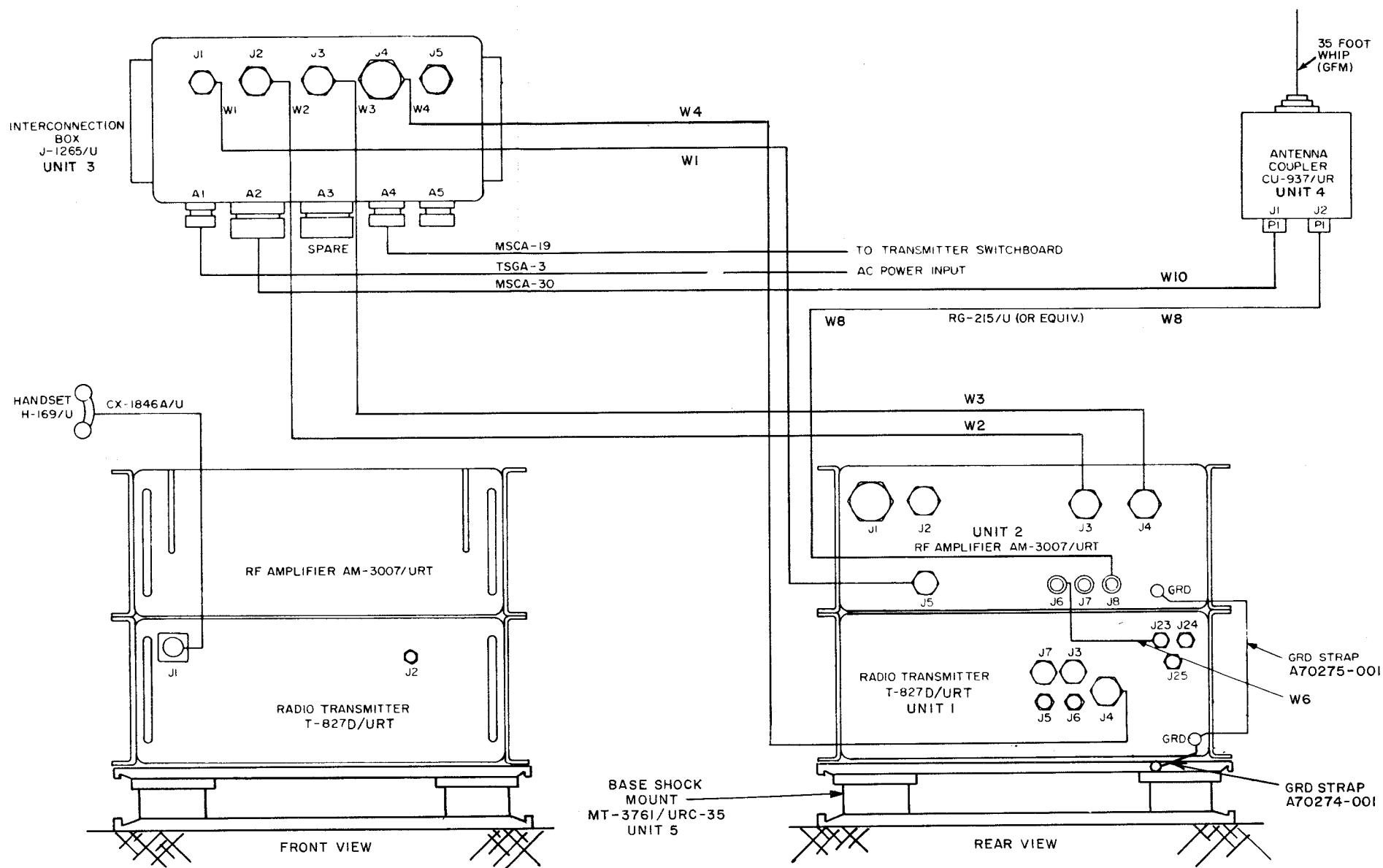
(c) Set switch S1 (COMP/INT/EXT), on top of frequency standard electronic assembly at EXT. This electronic assembly is located at right rear of chassis.

(d) Slide chassis back into case and secure it.

AN/URT-24
INSTALLATION

NAVSHIPS 0967-878-5010

Figure
7-5



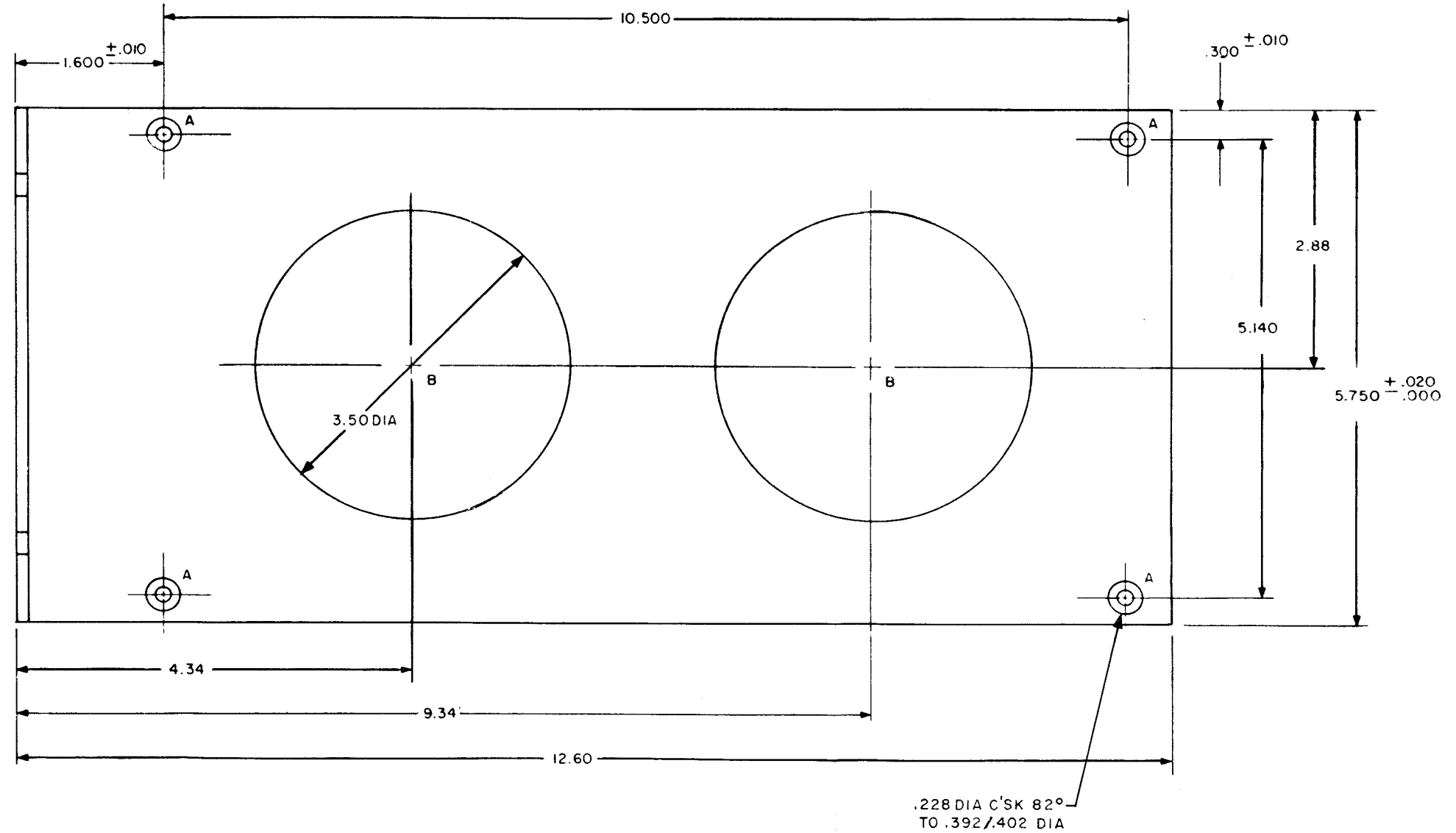
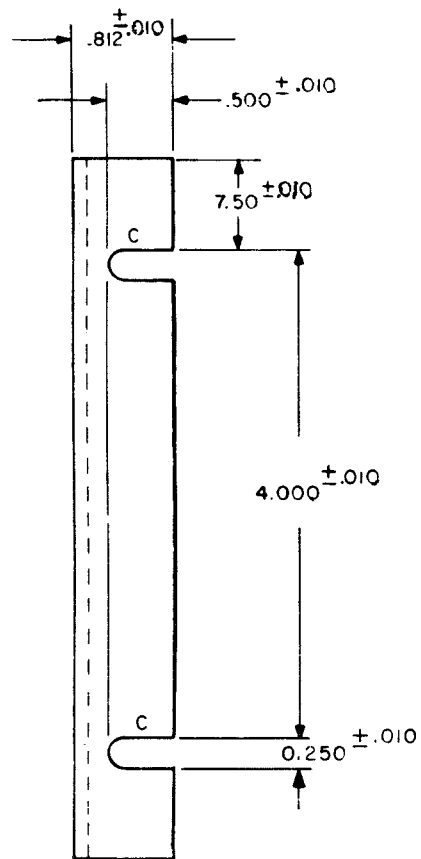
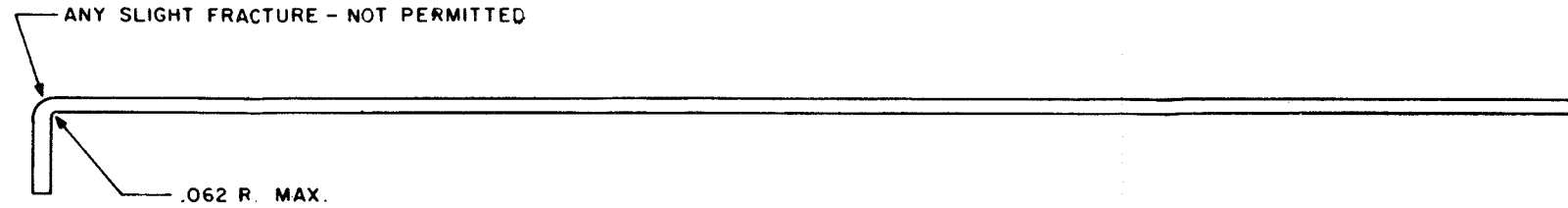
NOTE:

1. CABLE ASSEMBLIES OTHER THAN W1 THRU W4 AND W6 ARE SUPPLIED BY THE INSTALLING ACTIVITY
2. CONNECTORS FOR W8 AND W10 ARE SUPPLIED WITH THE EQUIPMENT.
3. MATING CONNECTORS FOR J3, J5, J6 AND J7 OF UNIT 1 SUPPLIED WITH THE EQUIPMENT.
4. CONNECT CU-937/UR TO ANTENNA WITH 12" OF EXTRUDED RG-17A/U.

Figure 7-5. Radio Set AN/URT-24,
Interconnection Diagram

ORIGINAL

7-11, 7-12



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

Figure 7-6. Radio Set AN/URT-24,
Mounting Bracket for Rack Mounting

(7) USE OF EXTERNAL FREQUENCY STANDARD FOR CALIBRATION.

- If it is required to use an external frequency standard for calibration of the T-827D/URT, proceed as follows:

(a) Connect external frequency standard to connector J25 (EXT 5 MC IN) on rear of T-827D/URT.

(b) Loosen front-panel screws and slide T-827D/URT chassis out from case.

(c) Set switch S1 (COMP/INT/EXT) on top of frequency standard electronic assembly at COMP. This electronic assembly is located at right rear of chassis.

(d) Perform calibration, referring to 5 mc oscillator adjustment in Technical Manual for T-827D/URT, NAVSHIPS 0967-878-4010, for procedure.

(e) Remove external frequency standard from J25, reset switch S1, slide chassis back into case, and secure it.

(f) After calibration, ensure that cables are reconnected as they were initially and all switches are in proper positions.

(8) USE OF INTERNAL FREQUENCY STANDARD. - If the internal frequency standard is to be used for the T-827D/URT, proceed as follows:

(a) Loosen front-panel screws and slide chassis out from case.

(b) Set switch S1 (COMP/INT/EXT) on top of frequency standard electronic assembly at INT. This electronic assembly is located at right rear of chassis.

(c) Slide chassis back into case and secure it.

(9) SUBMARINE INSTALLATION. - To install the equipment in a submarine, proceed as follows:

Note

Antenna Coupler CU-937/UR is not used in submarine installations.

(a) Perform steps (a) through (e) of paragraph 7-4c(1).

(b) Install auxiliary units as illustrated in figure 7-7.

(c) Connect all cables as shown in figures 7-5 and 7-7.

WARNING

To avoid injury to personnel, do not overstress mounting bolts since shock may cause them to shear.

(10) CONNECTION OF AUDIO TRANSFORMERS IN CENTER-TAP GROUNDED CIRCUIT. - The audio transformers in the T-827D/URT 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 front-panel screws and slide T-827D/URT chassis from case.

(b) Tilt chassis up 90 degrees to expose bottom. Locate J18 and J19.

(c) Refer to T-827D/URT schematic diagram and perform steps outlined in Note 6 on that schematic.

(d) Tilt chassis back to horizontal, release slide locks, slide chassis back into case, and secure it.

d. INTERCONNECTION. - Interconnection of the units of the AN/URT-24 system is shown in figure 7-5. All connections are made at the rear of the units, with the exception of the handset and the local CW key connections. The handset is connected to the HANDSET connector on the T-827D/URT front panel, and the CW key (if used) is connected to the CW KEY connector, also on the T-827D/URT front panel. Connect a ground lead to the base of the shock mount. Refer to table 7-2 for normal interconnection information.

TABLE 7-2. RADIO SET AN/URT-24, INTERCONNECTIONS

CABLE	FROM	TO
7W1	2J5 (rf amplifier)	3J1 (interconnection box)
7W2	2J3 (rf amplifier)	3J2 (interconnection box)
7W3	2J4 (rf amplifier)	3J3 (interconnection box)
7W4	1J4 (transmitter)	3J4 (interconnection box)
7W5	Not used in AN/URT-24	
7W6	1J23 (transmitter)	2J6 (rf amplifier)
7W7	Not used in AN/URT-24	
7W8	2J8 (rf amplifier)	4J2 (antenna coupler)
7W9	External power source	3A1 (interconnection box)
7W10	3A2 (interconnection box)	4J1 (antenna coupler)

7-5. ANTENNA COUPLER CU-937/UR PROGRAMMING.

The CU-937/UR and the J-1265/U, as shipped, are programmed for use with a 35-foot whip antenna. If operation with a 15-foot or 25-foot whip antenna is required, the J-1265/U and the CU-937/UR terminal boards must be reprogrammed. Reconnect W7 leads as shown in table 7-3, rewire the J-1265/U terminal boards as shown in table 7-4, and rewire the CU-937/UR terminal board as shown in table 7-5. Double check all connections before applying power.

7-6. INSPECTION AND ADJUSTMENT.

a. INSPECTION. - Each major unit of the AN/URT-24 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.

b. ADJUSTMENT. - After installation, refer to Reference Standards Books, NAVSHIPS 0967-878-5050, and use the procedures therein outlined to check out the AN/URT-24. Should any adjustments be found necessary, refer to Section 5 of this manual. Check that all cables are properly connected and that all fuses are in place. Before beginning the checkout procedures, ensure that the following switches are in the proper positions according to the type of installation:

(1) T-827D/URT: LOCAL/REMOTE (A2S1); AUX-NORM (A1A2S1); CTR FREQ (A9S1).

(2) AM-3007/URT: PRIMARY POWER (S2); ANT INTLK (S9); ANT CPLR BYPASS/NORMAL (S7).

c. PERFORMANCE CHECKS. - Perform the applicable operating procedures described in Section 2 to ensure proper installation.

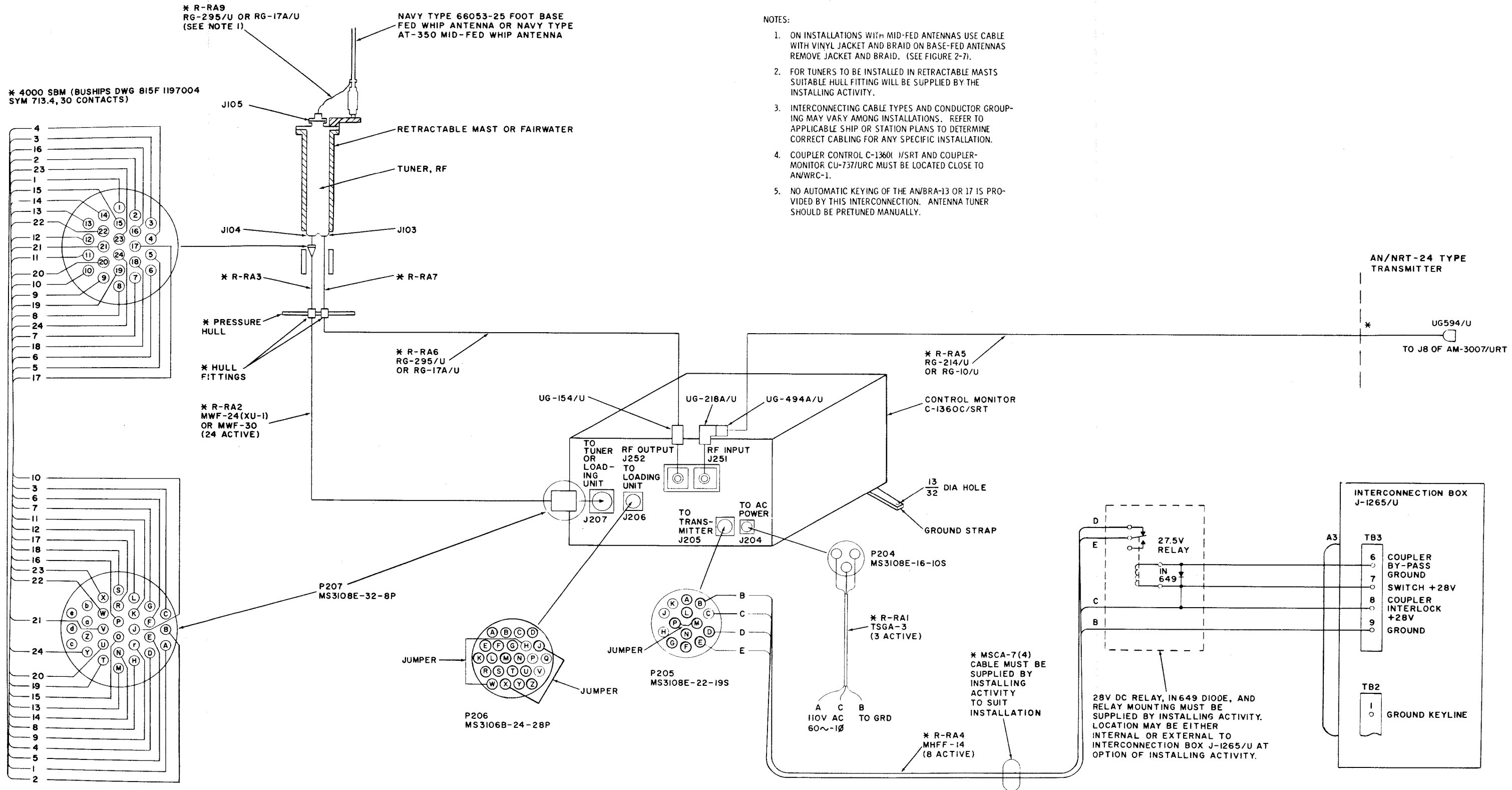
7-7. INTERFERENCE REDUCTION.

As a precaution against interference, operate the AN/URT-24 system with all

AN/URT-24
INSTALLATION

NAVSHIPS 0967-878-5010

Figure
7-7



- NOTES:
1. ON INSTALLATIONS WITH MID-FED ANTENNAS USE CABLE WITH VINYL JACKET AND BRAID ON BASE-FED ANTENNAS REMOVE JACKET AND BRAID. (SEE FIGURE 2-7).
 2. FOR TUNERS TO BE INSTALLED IN RETRACTABLE MASTS SUITABLE HULL FITTING WILL BE SUPPLIED BY THE INSTALLING ACTIVITY.
 3. INTERCONNECTING CABLE TYPES AND CONDUCTOR GROUPING MAY VARY AMONG INSTALLATIONS. REFER TO APPLICABLE SHIP OR STATION PLANS TO DETERMINE CORRECT CABLING FOR ANY SPECIFIC INSTALLATION.
 4. COUPLER CONTROL C-1360C/SRT AND COUPLER-MONITOR CU-737/URC MUST BE LOCATED CLOSE TO AN/WRC-1.
 5. NO AUTOMATIC KEYING OF THE AN/BRA-13 OR 17 IS PROVIDED BY THIS INTERCONNECTION. ANTENNA TUNER SHOULD BE PRETUNED MANUALLY.

Figure 7-7. Radio Set AN/URT-24, Typical Submarine Installation Diagram

ORIGINAL

7-17, 7-18

units bolted securely in their cases.
Check that proper ground connections

have been made to the AN/URT-24 system
units and to the CU-937/UR.

TABLE 7-3. INTERCONNECTING CABLE W10, INTERCONNECTION BOX J-1265/U
TERMINAL BOARD CONNECTIONS

W10P1 MATES WITH 4J1 ON ANTENNA COUPLER CU-937/UR	15-FOOT WHIP ANTENNA	25-FOOT WHIP ANTENNA	35-FOOT WHIP ANTENNA
4J1-Z	No connection	No connection	No connection
4J1-Y	No connection	TB5-6B	No connection
4J1-S	No connection	No connection	No connection
4J1-P	TB4-1A	No connection	No connection
4J1-a	TB4-2A	TB4-1A	TB4-1A
4J1-R	TB4-3A	TB4-2A	TB4-2A
4J1-T	TB4-7A	TB4-6A	TB4-5A
4J1-U	TB4-10A	No connection	TB4-6A
4J1-V	TB4-11A	TB5-1B	TB4-7A
4J1-X	No connection	TB4-9A	TB4-8A
4J1-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 5-2.

TABLE 7-4. INTERCONNECTION BOX J-1265/U, TERMINAL BOARDS,
ANTENNA PROGRAMMING

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	TB4-9B	TB4-10B	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 7-5. 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

VALIDATION PERFORMANCE

Title of Publication Technical Manual for Radio
Set AN/URT-24

NAVSHIPS 0967-878-5010

Contractor: General Dynamics/Electronics-Rochester

Sub-Contractor (if performing
validation):

Contract No(s) and Purchase Orders, if applicable

Chapter	Section	Paragraph	Date Validation Completed	Check here if not validated

Name & Authority of Validating
Officer:

Signature of Validating Officer:
