TECHNICAL MANUAL

# OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL

# TEST SET GROUPS, RADAR

## OQ-64(V)1/APS-94D AND OQ-94(V)2/APS-94D

HEADQUARTERS, DEPARTMENT OF THE ARMY

SEPTEMBER 1970

WARNING

**DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT**

**Be careful when working around the +100-volt and –250-volt circuits, or on the 115-volt ac and dc line connections.**

**DON'T TAKE CHANCES!**

**EXTREMELY DANGEROUS VOLTAGES EXIST IN THE FOLLOWING UNIT:**

| | |
|---|---|
| **Interface Test, Electronic Circuit Plug-In Unit** | |
| **TS-2376/APS-94D** | **8000 volts** |
| | **8750 volts** |

WARNING

**The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. DO NOT use near an open flame. Trichloroethane is not flammable, but exposure of the fumes to an open flame converts it to highly toxic, dangerous gases.**

TECHNICAL MANUAL
No. 11-6625-1830-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 26 September 1970

# Operator's and Organizational Maintenance Manual

# TEST SET GROUPS, RADAR OQ-64(V)1/APS-94D AND OQ-64(V)2/APS-D

## PART ONE

LIST OF ILLUSTRATIONS

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# PART ONE

# TEST SET GROUPS, RADAR OQ-64(V)1/APS-94D AND OQ-64(V)1/APS-94D LESS INTERFACE TEST, ANTENNA DRIVE TS-2974/APS-94D

## CHAPTER 1

## INTRODUCTION

### Section I. GENERAL

**1-1. Scope**

This two-part manual describes Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D. Part one covers the operation, maintenance and repair, shipment, and demolition of three components of Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D; Control, Test Set C-8495/APS-94D, Interface Test, Radio Frequency TS-2975/APS-94D, and Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D. Part two covers the operation, maintenance and repair, shipment, and demolition of another component of Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D, the Interface Test, Antenna Drive TS-2974/APS-94D. Both parts of the manual include information pertaining to cleaning and inspection of the equipment, repairs, and replacement of parts available to operator and organizational maintenance.

1-2. Index of Publication

***a. DA Pam 310–4.*** **Refer to the latest issue of DA Pam 310–4 to determine whether there are any new editions, changes, or additional publications pertaining to the equipment.**

***b. DA Pam 310–7.*** **Refer to the latest issue of DA Pam 310–7 to determine whether there** are any Modification Work Orders (**MWO's**) pertaining to the equipment.

**1-3. Forms and Records**

**a. Reports of Maintenance and Unsa*tisfactory*** *Equipment.* Use equipment forma **and records in** *accordance with instructions in TM* 38-750.

*b. Report of Packaging* **and Handling De**ficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army), NAVSUP Pub 378 (Navy), AFR 71-4 (Air Force), and MCO P4030.29 (Marine corps).

***c. Discrepancy in Shipment Report (DISREP) (SF 361).*** **Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as pre**scribed in AR 55-38 (Army), NAVS**UP Pub 459** *(Navy), AFM 75-34* **(Air Force), and MCO P4610.19 (Marine Corps).**

***d. Reporting of Equipment Manual Improvements.*** **The reporting of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U. S. Army Electronics Command, ATTEN: AMSEL–ME–NMP–EM, Fort Monmouth, N. J. 07703.**

### Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

***a. Purpose.*** **Control, Test Set C–8495/APS–94D, Interface Test, Radio Frequency TS–2975/APS–94D, and Interface Test, Electronic Circuit Plug-In TS–2976/APS–94D, which are parts of Test Set Groups, Radar OQ–64(V)1/APS–94D**

and OQ-64(V)/APS-94D, are service and troubleshooting aids for Receiver-Transmitter, Radar RT-899/APS-94D. These test units supply the required voltages and signals (normally supplied by the Processor, Radar Signal CM-374/APS-94D) to operate Receiver-Transmitter Radar RT-899/APS-94D or individual modules, connected for bench testing. Interface Test, Antenna Drive TS-2974/APS-94D, a part of Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D, is a service and troubleshooting aid for Antenna AS-2199/APS-94D and Interconnecting Box J-2794/APS-94D. The TS-2974/APS-94D unit supplies the required voltages and signals to perform continuity checks and functional operation tests of the unite under tests

*b. Use.* Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D, with the aid of ancillary test equipment, are used to verify proper or improper operation of Receiver-Transmitter, Radar RT-899/APS-94D, Antenna AS-2199/APS-94D, and Interconnecting Box J-2794/APS-94D. Also, it is used as an aid to maintenance personnel in' troubleshooting, adjustment, and alignment of the above AN/APS-94D components.

### 1-5. Differences in Equipment

Test Set Group, Radar QQ-64(V)1/APS-94D consists of Control, Test Set C-8495/APS-94D, Interface Test, Radio Frequency TS-2975/APS-94D, and Interface Test, Antenna Drive 2974/APS-94D. Test Set Group, Radar OQ-64(V_2/APS-94D consists of Control, Test Set C-8495/APS-94D, Interface Test, Radio Frequency TS-2975/APS-94D, Interface Test, Electronic Circuit Plug-In TS-2976/APS-94D, and Interface 'Test, Antenna Drive TS-2974/APS-94D. Part me of this manual describes Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D. less Interface Test, Antenna Drive TS-2974/APS-94D. Part two describes Interface Test, Antenna Drive TS-2974/APS-94D, a part of Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D.

### 1-6. Technical Characteristics

#### *a. Control, Test Set C-8495/APS-94D.*

**Input power**

Alternating current ----115 ±5.0 volt alternating current, 400 Hx, 3-phase, 4 wire, 0.5k VA.

Direct current ---------- 27.5 ±0.5 volts direct current 160 watts.

**Outputs to Receiver-Transmitter, Radar RT-889/APS-94D**

Primary power ---------115 ±5.0 volts alternating current, 400 Hz, 4 wire, 3-phase.
27.4 ±0.5 volts direct current.

Modulator trigger ---------- Pulse repetition frequency (see TM 11-5895-578-34 (when published)).
Pulse width: 400 ±100 nanoseconds.
Pulse amplitude: -4 ±0.75 volts from 0 ±0.75 volts.

Dead time gate ------Pulse repetition frequency (see TM 11-5895-578-34 (when published)).
Pulse width: 409.6 ±20 microseconds.
Pulse amplitude: +4 ±0.75 volts to -4 ±0.75 volts.

Antenna gate (both) ----Pulse repetition frequency: 5.9 ±0.2 pulse-per-second, with PRF switch set to MEDIUM.
Duty cycle: 50% ±10% for each gate.
Pulse amplitude: +4.0 ±0.75 volts to -4 ±0.76 Volta

Antenna trigger ---Pulse repetition frequency: 11.8 ±0.4 pulses-per second, with PRF switch set to MEDIUM.
Pulse width: 409.6 ±20 microseconds.
Pulse amplitude: -4 ±0.75 volts from ±0.75 volts.

1 second mark ---------- Pulse repetition frequency: 1 pulse-per-second ±0.1 pulse-per second.
Duty cycle: 50% ±10% per each one second mark.
Pulse amplitude: -4 ±0.75 volts to +4 ±0.75 volts.

**Magnetron frequency control voltage** ..... 0 to 11 volts dc (voltage obtained from Receiver-Transmitter, Radar RT-899/APS-94D under test).

**Outputs to Interface Test, Radio Frequency TS-2975/APS-94D**

**Oscillator supply voltage** ..... 100 ±10 volts dc at 50 milliamperes.

**Operating voltages** ..... 27.5 ±0.5 volts dc at 40 milliamperes.
±5 ±0.25 volts dc at 200 milliamperes max.

**RF switch gate** ..... Pulse repetition frequency: (see TM 11-5895-578-34 (when published)), single pulse or 27 ±1 pulse burst (for minimum discernible signal test).
Pulse width: selectable in four steps, X1, X4, X16, and X32 (see TM 11-5895-578-34 (when published)).
Pulse amplitude: +4 ±0.75 volts from 0.0 ±0.75 volts.
Pulse delay: 3.2, 6.8, or 12.8 microseconds, adjustable.

**Outputs to Interface Test, Electronic Circuit Plug-in TS-2976/APS-94D**

**Operating voltages** ..... 115 ±5 volts ac, 3-phase 400 Hz.
+20 ±1 volts dc at 5 milliamperes.
+27.5 ±0.5 volts dc at 1 ampere.
±5 ±0.25 volts dc, regulated.

**Modulator trigger** ..... Pulse repetition frequency: (see TM 11-5895-578-34 (when published)).
Pulse width: 400 ±100 nanoseconds.
Pulse amplitude: –4 volts ±0.75 volts from 0 ±0.75 volts.

**Dead time gate** ..... Pulse repetition frequency: (see TM 11-5895-578-34 (when published)).
Pulse width: 409.6 ±20 microseconds.
Pulse amplitude: +4 ±0.75 volts to –4 ±0.75 volts.

**Circulator gate** ..... Pulse repetition frequency: (see TM 11-5895-578-34 (when published)).
Duty cycle: 50% ±10% for each gate.
Pulse amplitude: +4.0 ±0.75 volts to –4 ±0.75 volts.

**Antenna trigger** ..... Pulse repetition frequency: (see TM 11-5895-578-34 (when published)).
Pulse width: 409.6 ±20 microseconds.
Pulse amplitude: –4 ±0.75 volts from 0 ±0.75 volts.

### *b. Interface Test, Radio Frequency TS-2975 APS-94D.*

**Frequency range** ..... Refer to TM 11-5785-578-34 (when published).

**Power level** ..... –105 dBm to –18 dBm minimum.

**Pulse width** ..... Selectable in four steps, X1, X4, X16, and X32 by the PULSE WIDTH switch on the control unit (see TM 11-5895-578-34 (when published)).

**Pulse delay** ..... Delayed from the modulator trigger signal by 3.2, 6.4, or 12.8 microseconds, adjustable.

**Power Meter 2A4** ..... Measures average power over a range of +10 dBm to –30 dBm ±1%.

**Frequency measurement** ..... In conjunction with power meter 2A4 measures frequencies over a frequency band of 8.20 GHz to 12.4 GHz ±0.08%, over an ambient room temperature of 13°C (55°F) to 33°C (91°F).

## 1-7. Components and Dimensions

The components and dimensions of Test Set Group, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D are listed in table 1-f.

## 1-8. Common Names

Table 1-2 lists the components of Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D that have been assigned common names to avoid lengthy repetition of nomenclature throughout this manual.

Table 1-1. Component and Dimensions

| FSN | Quantity | Item | Dimensions (in.) | | | Unit weight (lb) |
|---|---|---|---|---|---|---|
| | | | Height | Depth | Width | |
| 6625-191-7421 | 1 | Test Set Group, Radar OQ-64(V)1/ APS-94D including: | | | | |
| 6625-194-2857 | 1 | Control, Test Set C-8495/APS-94D | 19 1/4 | 21 | 24 1/4 | 70 |
| 6625-194-2856 | 1 | Adapter, Test MX8630/ APS-94D | | | | |
| | | Cable assemblies (table 1-3) | | | | |
| 6625-194-2846 | 1 | Interface Test, Radio Frequency TS-2975/APS-94D | 27 1/2 | 28 1/2 | 30 1/2 | 135 |
| | 1 | Non-metallic nut driver | | | | |
| | 1 | Socket wrench | | | | |
| | 1 | Modified connector | | | | |
| | 1 | Mounting hardware | | | | |
| | | Power cable for power meter 2A4 | | | | |
| 6625-194-2850 | 1 | Interface Test, Antenna Drive TS-2974/APS-94D | 19 1/4 | 21 | 24 1/4 | 80 |
| | 1 | Spring scale | | | | |
| | | Cable assemblies (table 6-2) | | | | |
| | | or | | | | |
| 6625-194-2849 | 1 | Test Set Group, Radar OQ-64(V)2/ APS-94D including: | | | | |
| 6625-194-2857 | 1 | Control, Test Set C-8495/APS-94D | 19 1/4 | 21 | 24 1/4 | 70 |
| 6625-194-2856 | 1 | Adapter, Test MX-8630/ APS-94D | | | | |
| | | Cable assemblies (table 1-3) | | | | |
| 6625-194-2845 | 1 | Interface Test, Radio Frequency TS-2975/APS-94D including: | 27 1/2 | 28 1/2 | 30 1/2 | 135 |
| | 1 | Non-metallic nut driver | | | | |
| | 1 | Socket wrench | | | | |
| | 1 | Modified connector | | | | |
| | 1 | Mounting hardware | | | | |
| | 1 | Power cable for power meter 2A4 | | | | |
| 6625-194-2832 | 1 | Interface Test, Electronic Circuit Plug-In Unit TS-2976/ APS-94D | 19 1/4 | 22 3/4 | 30 1/2 | 115 |
| 6625-194-4922 | 1 | Adapter, Test MX-8743/ APS-94D | | | | |
| | | Cable assemblies (table 1-4) | | | | |
| 6625-194-2850 | 1 | Interface Test, Antenna Drive TS-2974/APS-94D | 19 1/4 | 21 | 24 1/4 | 80 |
| | 1 | Spring scale | | | | |
| | 1 | Cable assemblies (table 6-2) | | | | |

Table 1-2. Common Names

| Ref des. | Nomenclature | Common name |
|---|---|---|
| -- | Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D | Test set group |
| 3 | Control, Test Set C-8495-APS/94D | Control unit |
| 2 | Interface Test, Radio-Frequency TS-2975/APS-94D | Rf test set |
| 4 | Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D | Module test set |
| 2 | Receiver-Transmitter, Radar RT-899/APS-94D | Receiver-transmitter |
| | Nut driver, non-magnetic | Nut driver |
| | Tool, socket wrench | Socket wrench |
| | Connector, modified | Modified connector |
| | All cable assemblies | By reference designation, as cable W1 |

1-9. Description of Control, Test Set C-8495/ APS-94D (fig 1-1)

**The control unit is contained in a combination case separable into two compartments. The bottom compartment contains the control panel and the electronic circuitry for the control unit, the cover provides storage for the test cables (table 1–3) and module extender (para 1–12*d*) All controls, indicators, and jacks necessary for operation of the control unit are located on the control panel. The combination case is equipped with eight rubber feet, two carrying handles, eight latch assemblies, eight guard rails, and a pressure relief valve in the case wall for equalization of inside-to-outside pressure.**

1-10. Description of Interface Test, Radio Frequency TS-2975/APS-94D (fig 1-2)

The RF test set is contained **in a modular case** which has a removeable **bottom -- base** Fastened to this bottom is a rotatable 28- by 28-inch baseplate to which the electronics are mount ed. The mounting bracket supporting the receiver-transmitter is also located on the rotatable baseplate, which permits the receiver-transmitter under test to be rotated so the component to be **tested is facing** to the front The baseplate is **prevented from rotating** until the baseplate locking pm (fig 1-2) is removed There are four metal locking spacers located on the bottom of the baseplate, that are tightened when the test set is to be transported (fig 2-4) The antenna port

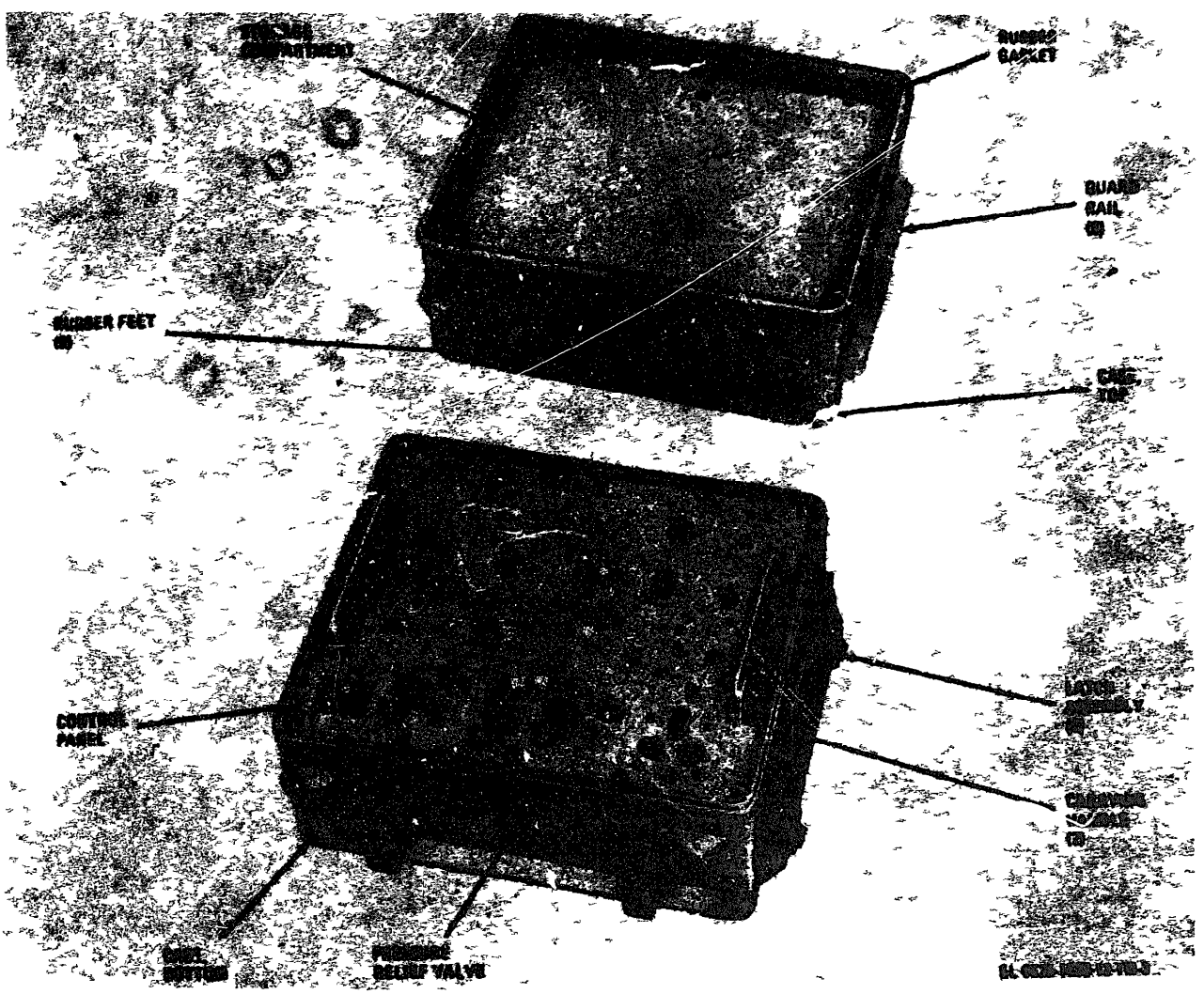



Figure 1-1. Control, Test Set C-3495/APS-94D, less minor components.

coupler/selector subassembly 2A1 and the minor components of the RF test set are stored in a protective foam rubber insert (fig. 2–3). The top half of the foam insert is cemented to the inside top of the rf test set cover, while the bottom insert half is detailed to set on top of the components mounted on the baseplate. Detachable subassembly 2A1 connects the antenna ports of the receiver-transmitter under test to the rf test set. Also, subassembly 2A1 selects either the right or left antenna port of the receiver-transmitter.

1-11. Description of Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D (fig 1-3)

The module test set is contained in a combination case similar to, but larger than, the case for the control unit. The bottom compartment contains the control panel and the electronics of the module test set; the top compartment provides storage for test cables (table 1–4), a modified connector and modified module extender (para 1–12e). All controls, indicators, and jacks necessary

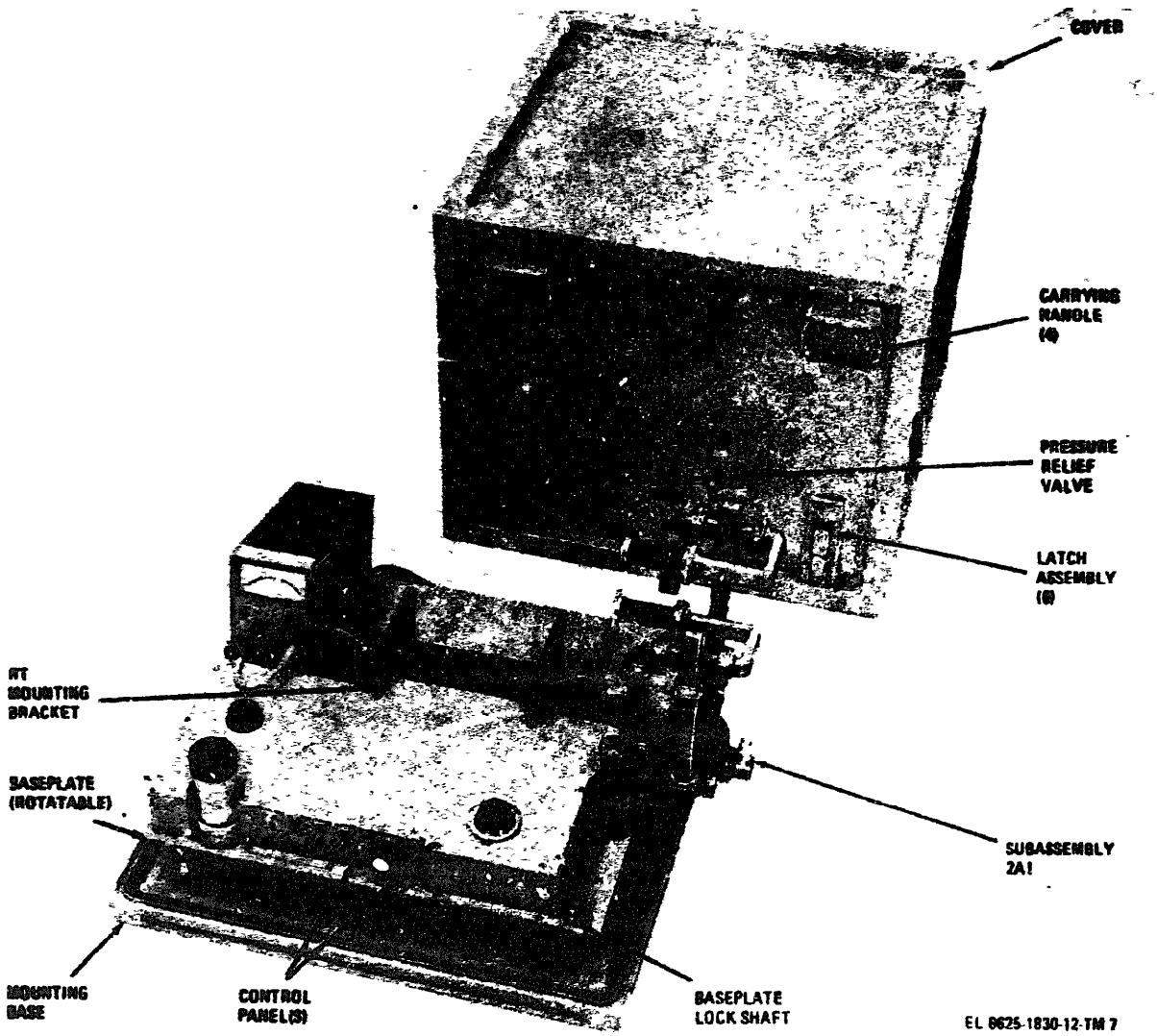



Figure 1-2. Interface Test, Radio Frequency TS-2975/APS-94D, less minor components.

for operation of the module test set are located on the control panel. The combination case is equipped with eight rubber feet, eight guard rails, two carrying handles, and a pressure relief valve in the case wall for equalization of inside-to-outside pressure.

## 1-12. Description of Minor Components (fig. 1-4)

Minor components of the test set are shown in figure 1–4 and described in the following subparagraphs. Table 1–3 and table 1–4 list the control unit and the module test set cables. The

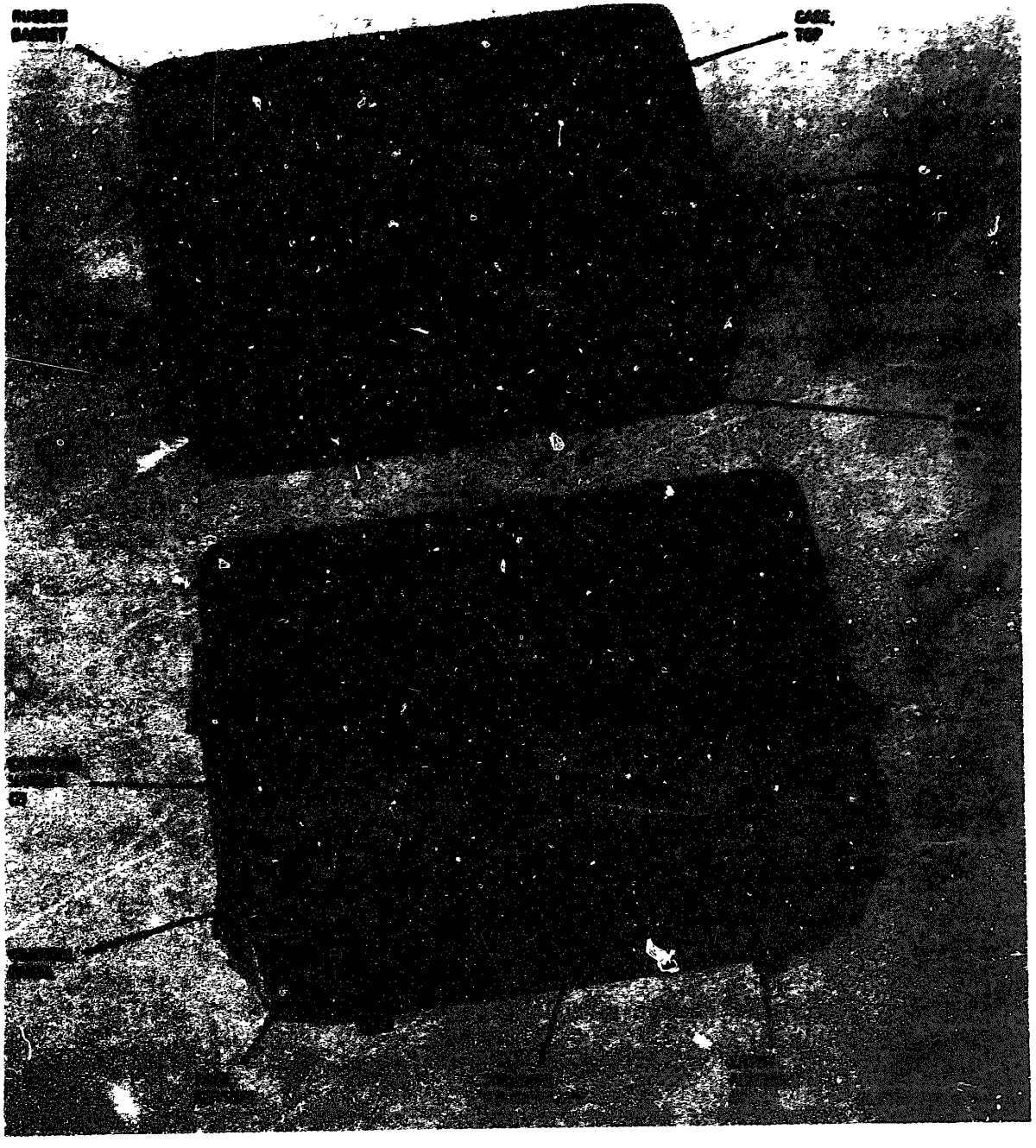



Figure 1-3. Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D, less minor components.

reference designation, nomenclature and description, and interconnection data for the cables are given in these tables. The rest of the minor components are described in subparagraphs *a* through *g*, below, and shown in figure 1–4.

*a. Modified connector.* The modified connector is a special connector for use by the test set user. This connector is used when the receiver-transmitter module 2A11A2 is being tested.

*b. Non-Magnetic Nut Driver. The* non-magnetic nut driver is a special tool for the test set user. It has a 7/16 hexagon socket with a hole depth of 6 inches. The nut driver is used while replacing the magnetron in the receiver-transmitter. The nut driver is stored in the rf test set (fig. 2-3).

c. socket Wrench. The socket wrench with diding bar handle is a special tool for use by the test set user. It has a deep socket and is used to remove the clenching rim clamp assemblies from the receiver-transmitter under test. The socket wrench is stored in the rf test set (fig. 2-3).

*d. Adapter, Test MX-8630/APS-94D. The* module extender is 12 inches long with a connector on one end that mates with the control unit modules. This one module extender will extend any module in the control unit for servicing. The module extender is stored in the cover of the control unit (fig. 1–2).

a. *Adapter, Test* MX-8743/APS-94D. The module extender is 9.75 inches long with a connector on one end that mates with the module test set modules. This one module extender will extend any module in the module test for servicing The module extender is stored in the cover of the module test set (fig. 14).

*f. Power Meter* 2A4 *Primary Power Cable.* When the RF test set is in use, the power cable connects primary ac power to power meter 2A4. The power cable is disconnected from the power meter when the RF test set is to be shipped. The power meter power cable is stored in the RF test set (fig. 24).

g. Mounting Hardware. The hardware furnished with the RF test set is used to mount the receiver-transmitter under test to the RF test set and subassembly 2A1 of the RF test set to the receiver-transmitter. The mounting hardware is stored in the RF test set (fig. 28).

Table 1-3. Control, Test Set C-3495/APS-94D, Cable Assemblies

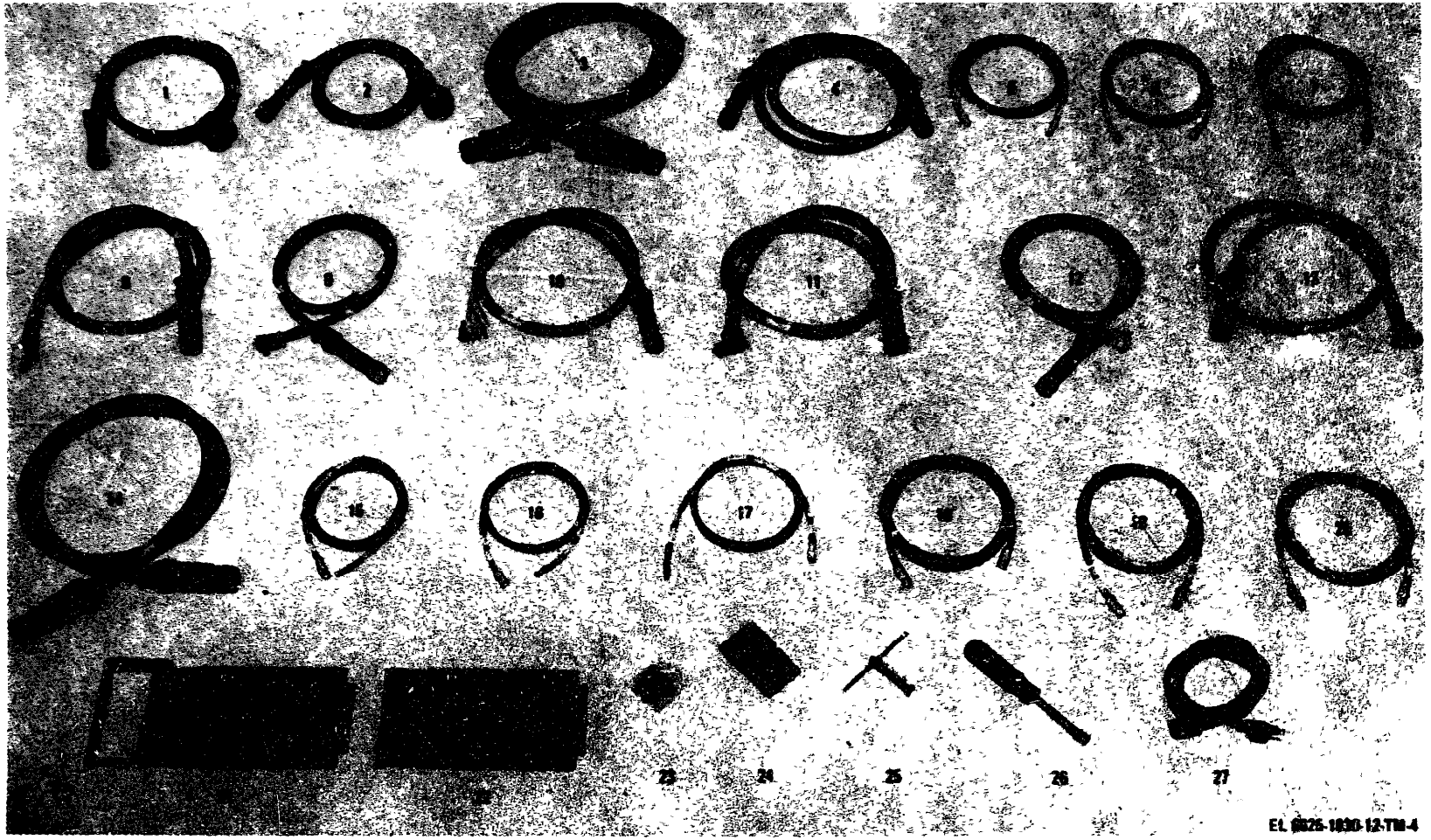
| Ref desig | Nomenclature and description | P1 destination | P2 destination |
|---|---|---|---|
| 3W1 | Cable Assembly, Power, Electrical CX–12240/U (6FT) | To bench 115 vac power source | To connector 3J2 on control unit |
| 3W2 | Cable Assembly, Power, Electrical CX–12241/U (6FT) | To bench 28 vdc power source | To connector 3J1 on control unit |
| 3W3 | Cable Assembly, Special Purpose, Electrical CX–12292/U (6FT) | Connector 2J1 on receiver-transmitter | To connector 3J3 on control unit |
| 3W4 | Cable Assembly, Special Purpose, Electrical CX–12431/U (6FT) | Connector 2J1 on RF test set | To connector 3J6 on the control unit |
| 3W5 | Cable Assembly, Radio Frequency CG–3618/U (6FT) | Connector 2J4 on the receiver-transmitter | To connector 3J5 on the control unit |
| 3W6 | Cable Assembly, Radio Frequency CG–3618/U (6FT) | Connector 2J2 on the receiver-transmitter | To connector 3J4 on the control unit |
| 3W7 | Cable Assembly, Radio Frequency CG–3618/U (6FT) | Connector 2J2 on the RF test set | To connector 3J7 on the control unit |

Table 1-4 Interface Test, electronic Plug-In Unit TS-2976/APS-94D, Cable Assemblies

| Ref desig | Nomenclature and description | P1 destination | P2 destination |
|---|---|---|---|
| 4W1 | Cable Assembly, Special Purpose, Electrical CX–12302/U (4FT) | Connector 4J47 or to 4J40 on module test set | To connector 2A5P1 of AN/APS–94D module 2A5 |
| 4W2 | Cable Assembly, Special Purpose, Electrical CX–12300/U (4FT) | Connector 4J32 on module test set | To connector 2A10J2 of AN/APS–94D module 2A10 |

Table 1-4 Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D, Cable Assemblies-Continued

| Ref desig | Nomenclature and description | P1 destination | P2 destination |
|---|---|---|---|
| 4W3 | Cable Assembly, Special Purpose, Electrical CX-12305/U (6FT) | Connectors 4J39 or 4J94 on module test set | Alligator clip leads to AN/APS-94D modules 2A2, 2A7 or 2A8 |
| 4W4 | Cable Assembly, Special Purpose, Electrical CX-12304/U (4FT) | Connectors 4J8, 4J12, 4J22, or 4J71 on module test set | To connectors 2A1P1, 2A13P1, 2A12P1, or 2A16J1 of AN/APS-94D modules 2A1, 2A13, 2A12, or 2A16 |
| 4W5 | Cable Assembly, Special Purpose, Electrical CX-12301/U (6FT) | Connectors 4J66, 4J67, 4J94 or 4J95 on module test set | To connectors 2A9P1, 2A18J1, 2A11A2P1, 2A14P1 or 2A4P1 of AN/APS-94D modules 2A9, 2A18, 2A11A2, 2A14 or 2A4. |
| 4W6 | Cable Assembly, Special Purpose, Electrical CX-12303/U (4FT) | Connectors 4J30, 4J57, 4J62 or 4J88 on module test set | To connectors 2A6P1, 2A15P1, 2A17J1 or 2A10J1 on AN/APS-94D modules 2A6, 2A15, 2A17, or 2A10 |
| 4W7 | Cable Assembly, Special Purpose, Electrical CX-12298/U (6FT) | Connector 4J1 on module test set | To connector 3J8 on control unit |
| 4W8 | Cable Assembly, Radio Frequency CG-3627/U (4FT) | Connector 4J2 on module test set | AN/APS-94D modules 2A7, 2A8, 2A9, 2A11A2 or 2A14 |
| 4W9 | Cable Assembly, Radio Frequency CG-3627/U (4FT) | Connector 4J3 on module test set | AN/APS-94D modules 2A7, 2A8, 2A11A2 or 2A14 |
| 4W10 | Cable Assembly, Radio Frequency CG-3626/U (4FT) | Ancillary test equipment | AN/APS-94D module 2A14 |
| 4W11 | Cable Assembly, Radio Frequency CG-3632/U (4FT) | Connector 4J89 on module test set | Connector 4J92 on module test set |
| 4W12 | Cable Assembly, Radio Frequency CG-3618/U (6FT) | Connector 4J2 on module test set | Connector 3J9 on control unit |
| 4W13 | Cable Assembly, Radio Frequency CG-3618/U (6FT) | Connector 4J3 on module test set | Connects 3J10 on control unit |




1—Cable Assembly, Power, Electrical CX-12240/U (6 FT), 3W1
2—Cable Assembly, Power, Electrical CX-12241/U (6FT), 3W2)
3—Cable Assembly, Special Purpose, Electrical CX-12292/U(6FT), 3W3
4—Cable Assembly, Special Purpose, Electrical CX-12431/U(6FT), 3W4
5—Cable Assembly, Radio Frequency CG-3618/U (6FT), 3W5
6—Cable Assembly, Radio Frequency CG-3618/U (6FT), 3W6
7—Cable Assembly, Radio Frequency CG-3618/U (6FT), 3W7
8—Cable Assembly, Special Purpose, Electrical CX-12302/U(4FT), 4W1
9—Cable Assembly, Special Purpose, Electrical 12300/U(4FT), 4W2
10—Cable Assembly, Special Purpose, Electrica 12305/U(6FT), 4W3
11—Cable Assembly, Special Purpose, Electrica 12304/U(4FT), 4W4
12—Cable Assembly, Special Purpose, Electrica 12301/U(4FT), 4W5

Figure 1-4. Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D, minor components.

13—Cable Assembly, Special Purpose, Electrical CX-12208/U (4FT), 4W6
14—Cable Assembly, Special Purpose, Electrical CX-12208/U (4FT), 4W7
15—Cable Assembly, Radio Frequency CG-3627/U (4FT) 4W8
16—Cable Assembly, Radio Frequency CG-3627/U (4FT), 4W9
17—Cable Assembly, Radio Frequency CG-3626/U (4FT), 4W10
18—Cable Assembly, Radio Frequency CG-3632/U (4FT), 4W11
19—Cable Assembly, Radio Frequency CG-3618/U (6FT), 4W12
20—Cable Assembly, Radio Frequency CG-3618/U (6FT), 4W13
21—Adapter, Test MX-3630/APS-94D
22—Adapter, Test MX-3743/APS-94D
23—Mounting hardware
24—Connector, modified
25—Tool, socket wrench
26—Nut driver, non-magnetic
27—Power meter 2A4, primary power cable

Figure 1-4 -Continued

# CHAPTER 2

# INSTALLATION AND OPERATING INSTRUCTIONS

## Section I. SERVICE UPON RECEIPT OF EQUIPMENT

### 2 - 1 . Unpacking (figs. 2–1 and 2-2)

a. Packaging Data. When packed for shipment or limited storage, each unit of Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D is packed in a separate crate. Each unit is packaged in a separate cleated plywood ship-p ping crate that is reinforced with metal strapping. The complete shipping crate dimensions, weight and volume of each and each packaged unit are listed in table 2-1. A typical shipping crate with its contents, for the control unit and the module test set, is shown in figure 2-1. A typical shipping crate with its contents, for the rf test set, is shown in figure 2-2.

***b. Unpacking Instructions.***

CAUTION

Do not attempt to pry off the top and sides of the cleated plywood shipping crate. Prying may damage the equipment.

(1) Cut the metal straps from around the plywood shipping crate.

(2) Remove the nails from the top and sides of the shipping crate.

Table 2-1. Packaging Data

| Unit name | Dimensions (inches) | | | Weight (pounds) | Volume (cubic feet) |
|---|---|---|---|---|---|
| | Height | Width | Depth | | |
| Control, Test Set C–8495/APS–94D | 26 | 31 | 23 | 120 | 13.1 |
| Interface Test, Electronic Circuit Plug-In Unit TS–2976/APS–94D | 26 | 37 | 29.5 | 170 | 16.4 |
| Interface Test, Radio Frequency TS–2975/APS–94D | 33.5 | 37 | 35 | 260 | 25.8 |

(8) Spread the side covers of the shipping crate to provide working space.

(4) Remove the foam corner blocks and corrugated fiberboard liners from around the unit.

**NOTE**

**The number of corrugated fiberboard liners (minimum of one at top, bottom, and sides of units) will vary, due to the thickness of the foam corner blocks used.**

(6) Obtain assistance and remove the unit from the shipping crate.

**(6) Save the plywood box and other packing materials for repackaging.**

### 2-2. Checking Unpacked Equipment

***a. Checking Equipment for Completeness.*** **See that the equipment is complete as listed on the packing slip. If a packing slip is not available,** check the equipment against the items listed in table l-l. Report all discrepancies (paragraph 1-3c).

NOTE

Shortage of a minor assembly or a part that does not affect proper functioning of the equipment should not prevent use of the equipment.

***b. Checking Equipment for Damage. Check*** the equipment for damage incurred during ship ment. If the equipment was improperly packaged, or damaged, report the difficulty on DD Form 6 **or** (DISREP (SF 361) ), as pertinent.

***c. Checking Equipment for Modifications.*** If the equipment has been used **or** reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has

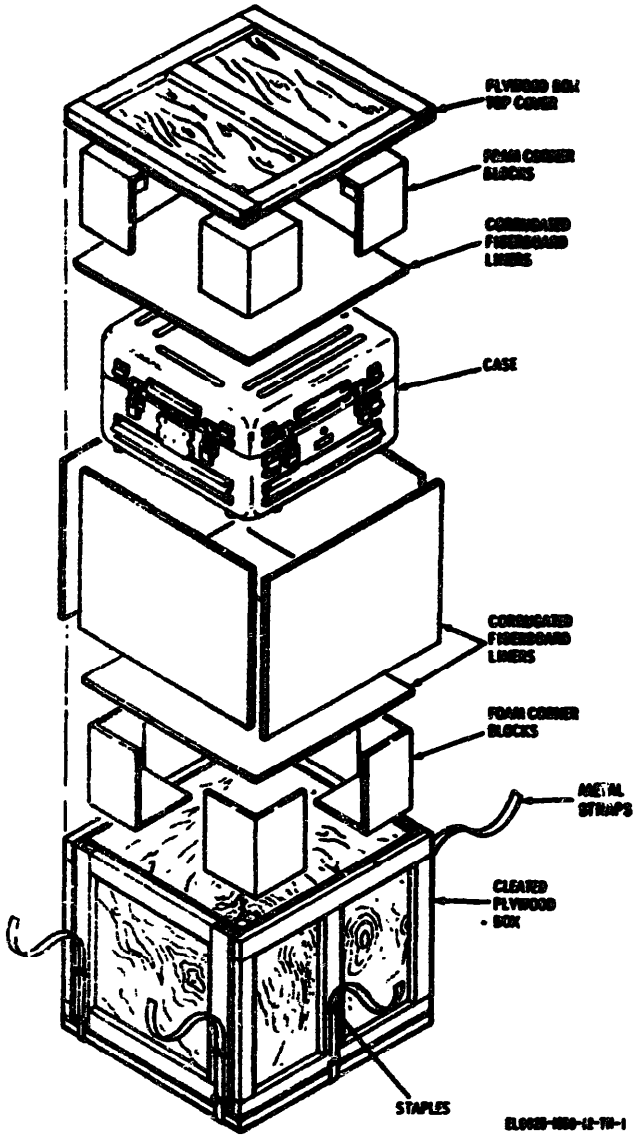



Figure 2-1. ***Control, Test Set C-8495/APS-94D and Interface Test, Electronic Circuit Plug-In Unit TS-8976/APS-94D, typical packaging.***

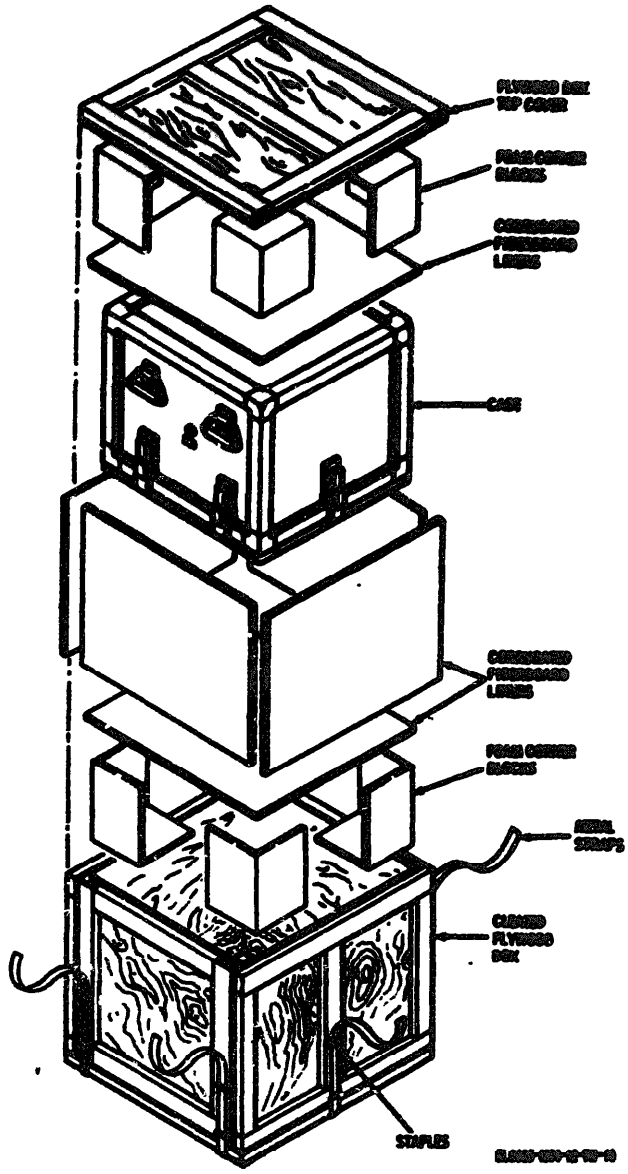



Figure 2-2. ***Interface Test, Radio Frequency TS-8976/ APS-94D, typical packaging.***

been modified, the MWO number(s) will appear on the front panel near the nomenclature plate. Check to see whether the modified equipments am covered in the manual.

**NOTE**

**This manual does not include Modification Work Orders (MWO) for the equipment.**

2-3. Initial Installation
**(figs. 2-3 and 2-4)**

**The RF test set is the only component of the OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D that requires special instructions for installation. Install the RF test set as directed in the following before starting preliminary operating procedures (para 2-7).**

***a.*** **Depress the pressure relief valve (fig. 1-1) to allow the internal and external pressure of the case to equalize.**

***b.*** **Unfasten the draw-bolt latches and remove the cover from the rf test set (fig. 1-1).**

***c.*** **Remove the foam minor component storage insert from the RF test set (fig. 2-3).**

***d.*** **Loosen the four metal lock spacers (fig. 2-4) so the RF test set baseplate may be rotated.**

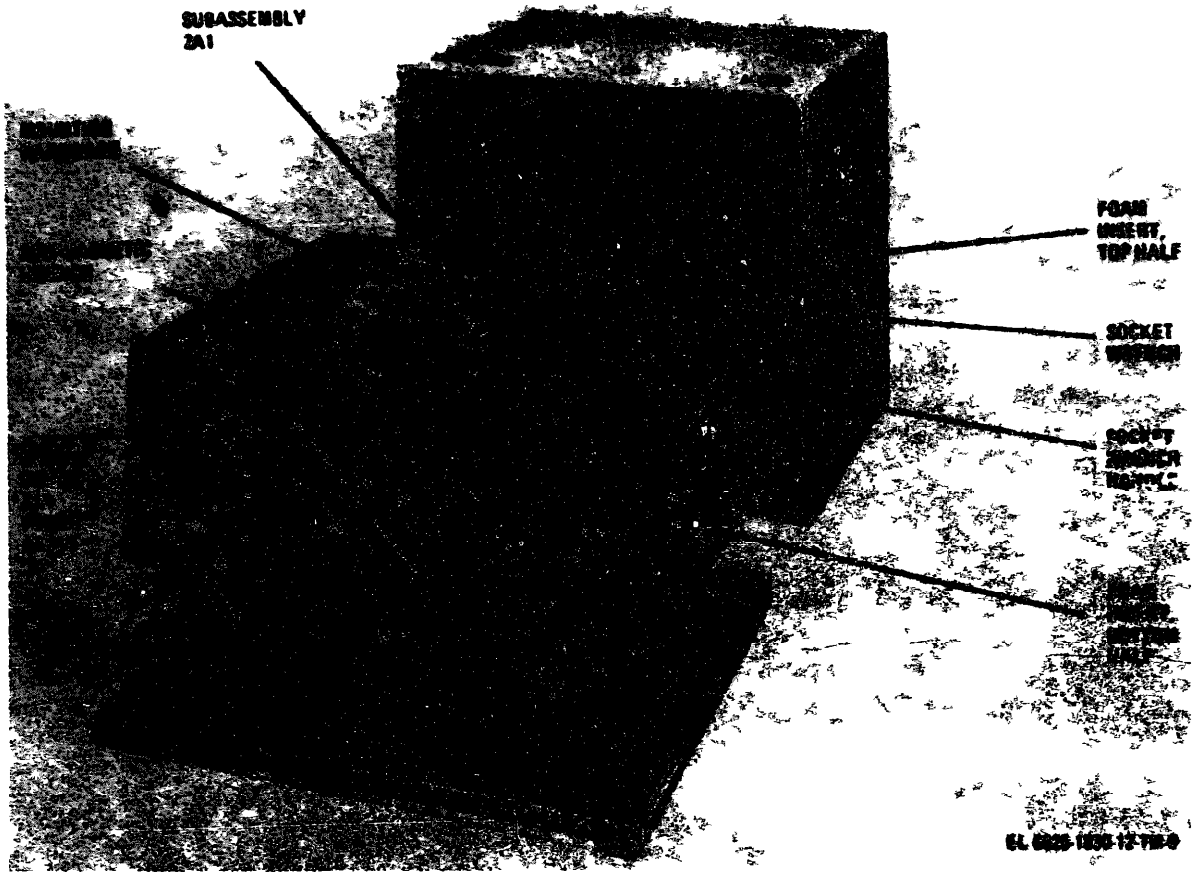



Figure 2-3 ***Interface Test, Radio Frequency TS-2975/APS-94D subassembly 2A1 and minor component storage.***

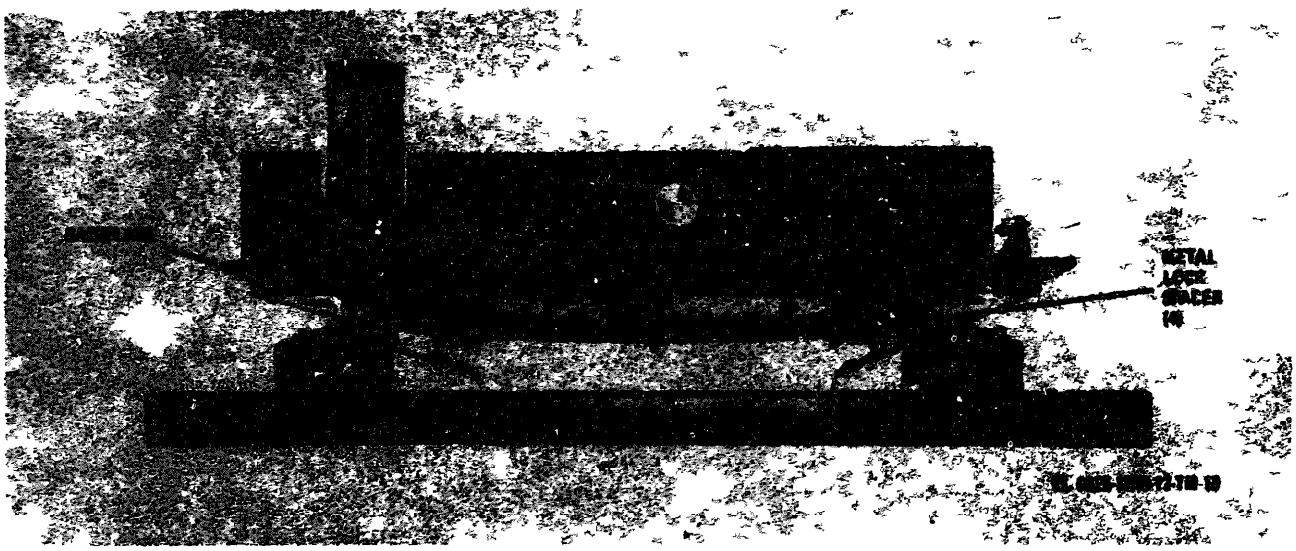



Figure 2-4. ***Interface Test, Radio Frequency TS-2975/APS-94D metal lock spacers***

Section II. OPERATING INSTRUCTIONS

## 2-4. Control, Test Set C-8495/APS-94D, Controls, Indicators, and Jacks (fig. 2-5)

Table 2-2 lists the control unit controls, indicators, and jacks and a functional description for each. The control panel is shown in figure 2-5.

*Table 2-2. Control, Test Set C-8495/APS-94D, Controls, Indicators and Jacks*

| Control, indicator or jack | Function |
|---|---|
| PRIME **POWER** | |
| ***POWER*** ON-OFF (two-position toggle) | In the ON position, applies 115 vac (line to neutral), 3-phase, 400 Hz and 28 vdc to the control unit. |
| DC CIRCUIT BREAKER (push-button) | Opens if the 28 vdc circuits draw excessive current. |
| AC CIRCUIT BREAKER (push-to-reset) | Opens if the 115 vac circuits draw excessive current. |
| PANEL LIGHTS switch (two-position toggle, spring-loaded to the ***off position)*** | **In the** TEST position, applies power to the control unit RT FAULT light, the TRANSMITTER ON light, and the TRANSMITTER READY light to test the operation of the lamps, |
| **RT POWER-POWER switch** (two-position toggle) | In the ON position, applies poser to the receiver-transmitter under test. |
| TRANSMIT-STAND BY switch (two-position toggle) | In the TRANSMIT position, turns on the high voltage power supply in the receiver-transmitter under **test. In the STAND BY position, allows the transmitter to warm up (requires approximately 3 minutes) to a "transmitting condition".** |
| PBF switch (three-position rotary) | Se**lects a *LOW*, NORMAL, or HIGH pulse repetition frequency for the MODULATOR TRIGGER output.** |
| **PULSE WIDTH switch (four-position rotary)** | ***Selects one of four pulse*** widths for the RF SWITCH GATE output signal. |
| **PULSE DELAY switch (three-position rotary)** | Delays the RF switch gate and selects one ***of*** three **delays, which is inserted into the SCOPE SYNC (MOD TRIG) circuit when measuring receiver recovery time.** |
| **ANTENNA select switch (three-position rotary)** | **Selects right, left** or both antenna. |
| TRANSMITTER FREQUENCY control (potentiometer) | Changes the frequency of **the receiver-transmitter magnetron under test.** |
| SCOPE SYNC switch (six-position rotary) | **Selects a sync signal to sync an external oscilloscope when performing various tests on the receiver-transmitter under test.** |

| Switch Position | Action |
|---|---|
| **ANT** GATE | **Connects a sync signal to an external oscilloscope for observing** the antenna gate **signal** |
| ***ANT* TRIG** | **Connects a sync signal to an external oscilloscope for observing the antenna trigger signal** |
| **DEAD TIME** GATE | **Connects a sync signal to an external oscilloscope for observing the dead time gate signal** |
| 1 S MARK | **Connects a sync signal to an external oscilloscope for observing** the 1 second mark signal |

Table 2-2. *Control, Test Set C-2495/APS-94D, Controls, Indicators And Jacks*—Continued

| Control, indicator or jack | Function: Switch Position | Function: Action |
|---|---|---|
| SCOPE SYNC switch (six-position rotary) (cont) | MOD TRIG | Connects a sync signal to an external oscilloscope for observing the modulator trigger signal |
| | MDS TEST | Connect a sync signal to an external oscilloscope when performing the MDS test. |
| PRIME POWER-POWER ON light (green) | | When lit, indicates that prime power has been applied to the control unit. |
| RT POWER-POWER ON light (green) | | When lit, indicates that operating power has been applied to the receiver-transmitter under test. |
| TRANSMITTER READY light (white) | | When lit, indicates that the transmitter portion of the receiver-transmitter is ready to transmit. |
| TRANSMITTER ON light (white) | | When lit, indicates that voltage has been applied to the receiver-transmitter. |
| RT FAULT light (red) | | When lit, indicates that one or more of seven receiver-transmitter circuits are not functioning correctly. |
| DC PWR J1 | | Connects 28 vdc to the control unit. |
| AC PWR J2 | | Connects 115 vac, 3-phase, 400 Hz to the control unit. |
| POWER J3 | | Connects power and control signals to the receiver-transmitter under test (2J1). |
| ANTENNA TRIGGER J4 | | Connects the antenna trigger signal to the receiver-transmitter under test (2J2). |
| MODULATOR TRIGGER J5 | | Connects the modulator trigger signal to the receiver-transmitter under test (2J4). |
| POWER J6 | | Connects power to the RF test set of the test set (2J1). |
| RF SWITCH GATE J7 | | Connects RF switch gate timing pulses to the RF test set (2J2) of the test set. |
| POWER J8 | | Connects power and control signals to the module test set (4J1) of the test set. |
| ANTENNA TRIGGER J9 | | Connects the antenna trigger signal to the module test set (4J2) of the test set. |
| MODULATOR TRIGGER J10 | | Connects the modulator trigger signal to the module test set (4J3) of the test set. |
| SCOPE SYNC J11 | | Connects a sync pulse, selected by the SCOPE SYNC switch, to an external oscilloscope. |

## 2-5. Interface Test, Radio Frequency TS-2975/APS-94D, Controls, Indicators, and Jacks (fig. 2-6 and 2-7)

Table 2-3 lists the rf test set controls, indicators, and jacks and a functional description for each. The control panel is shown in figures 2-6 and 2-7.

Table 2-3. *Interface Test, Radio Frequency TS-2975/APS-94D, Controls, Indicators and Jacks*

| Control, indicator or jack | Function |
|---|---|
| POWER ON-OFF switch (two-position toggle) | In the ON position, applies operating voltages to the RF test set. |
| METER SWITCH (two-position rotary) | In the RECEIVER position, measurement is made of the frequency and power (before attenuation) of a low level RF signal which may be inserted into a selected antenna port of the receiver transmitter under test. In the TRANSMITTER position, measurement of the frequency and average power of the transmitter under test may be made. |

Table 2-3. *Interface Test, Radio Frequency TS-2975/APS-94D, Controls, Indicators and Jacks—Continued*

| Control, indicator or jack | Function |
|---|---|
| OSCILLATOR FREQUENCY control (manual tuning knob) | Tunes oscillator 2A2 in the RF test set. |
| ATTENUATION control (calibrated attenuator) | Selects the amount of attenuation applied to the RF test set output RF signal, –4 dBm to –100 dBm ±2 dB. |
| FREQUENCY control | Measures input and output frequencies. |
| LEFT-RIGHT antenna port selector switch (2-position rotary) | Selects either the right or left antenna port of the receiver-transmitter under test. |
| ATTENUATOR control (variable attenuator) | Increases the amplitude of the input signal to the RF test set from the receiver-transmitter under test 8 dBm. |
| MDS OFFSET switch (two-position toggle, spring loaded to the off position) | Momentary operation of the MDS OFF-SET switch causes the simulated video signal to move on the face of the oscilloscope. |
| POWER ON light (green) | When lit, indicates that the POWER switch has been actuated. |
| Desiccator (desiccant in a clear plastic container) | When any color but blue, indicates that the desiccant has absorbed the maximum amount of moisture and must be changed. |
| Jack J1 | Connects operating voltages from the control unit (J6) to the RF test set. |
| Jack J2 | Connects the RF switch gate signal from the control unit (J7) to the RF test set. |
| DETECTOR J4 | Connects the detected transmitter RF pulse to ancillary test equipment. |
| Power Meter (2A4) | Measures power of the RF generated in the RF test set or average power of the transmitter under test. |
| Power meter 2A4, front panel (B, fig. 2–7): | |
| POWER ON-OFF switch (two-position switch) | In the ON position, applies prime power to the power meter. |
| COARSE ZERO | Adjusts the power meter coarse zero with the RANGE switch set to COARSE ZERO. |
| FINE ZERO (two-position toggle, spring loaded to the open position) | Momentarily actuating the FINE ZERO switch zeros the meter. |
| RANGE switch (eight-position rotary) | Selects full scale ranges from 0.01 milliwatts (–30 dBm) to 10 milliwatts (±10 dBm). |
| MOUNT RESISTANCE switch (two-position slide) | Selects resistance equal to that of the thermistor mount in use. Set to 100 ohms for the mount used with the RF test set. |
| CALIBRATION FACTOR switch (18-position rotary) | Set to calibration factor printed on the body of the thermistor mount. The same calibration factor is stamped on the side of the power meter mounting bracket. |
| AC LINE light (red) | When lit, indicates that power has been applied to the power meter. |
| Connector J1 | Connects the RF power from the thermistor mount into the power meter. |
| Power meter 2A4, rear panel (B, fig. 2–7) | |
| Line voltage slide switch | Set to the line voltage available (115 vac or 230 vac, 50 to 400 Hz). |
| Power input connector J5 | Connects external operating power source to the power meter. |

## 2-6. Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D (fig. 2-8)

Table 2-4 lists the module test set controls, indicators, and jacks and a functional description for each. The control panel is shown in figure 2-8.

Table 2-4. *Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D, Controls, Indicators, And Jacks*

| *Control, indicator or jack* | *Function* |
|---|---|
| **PRIME POWER** | |
| POWER switch (2-position toggle) | In the ON position, applies 115 vac, 3-phase, 400 Hz, +100 vdc, +20 vdc, and 28 vdc to the module test set. |
| PANEL LIGHTS TEST (2-position toggle, spring loaded to the off position) | In the up position (direction of arrow), applies 28 vdc to the module test set panel lights to check for faulty lamp operation. |
| BREAKERS, DC, AC (push-to-reset) | The DC circuit breaker opens when excessive dc current is present in the module under test. The AC circuit breaker opens when excessive ac current is present in the module test set or the module under test. |
| POWER ON light (green) | When lit, indicates that the POWER switch has been actuated. |
| ANT TRIGGER J2 | Connects the antenna trigger signal from the control unit (J9) to the module test set. |
| MOD TRIGGER J3 | Connects the modulator trigger signal from the control unit (J10) to the module test set. |
| POWER IN J1 | Connects voltages and control signals from the control unit (J8) to the module test set. |
| J4 | Common ground for all test points. |
| J5 | Monitors –37 vdc from rectifier 4A1. |
| J6 | Monitors +15 vdc from regulator 4A2. |
| J7 | Monitors –15 vdc from regulator 4A2. |
| EXT GND | Provides an external ground connection. |
| **TEST AMPL** | |
| INPUT J92 | Connects the output signal from ancillary test equipment to the input of the test amplifier or the output of the rf switch to the input of the test amplifier. |
| OUTPUT J93 | Connects the output of the test amplifier to modules under test. |
| **RF SWITCH** | |
| PULSE WIDTH switch (two-position toggle) | In the NARROW position, provides narrow (0.2 μsec) RF output pulses. In the WIDE position provides wide (1409 μsec) RF output pulses. |
| INPUT J90 | Connects the outpnt signal from ancillary test equipment to the input of the rf switch. |
| OUTPUT J89 | Connects the output of the rf switch to the input (J92) of the TEST AMPL. |
| **SCOPE SYNC** | |
| SELECT switch (six-position rotary) | *Switch Position* / *Action* |
| | 1 SECOND MARK / Connects a sync signal to a external oscilloscope for observing the 1 second mark signal |

Table 2-4. *Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D, Controls, Indicators, And Jacks*—Continued.

| *Control, indicator or jack* | *Function* | |
|---|---|---|
| | *Switch Position* | *Action* |
| **SELECT switch (six-position rotary) (cont)** | **MOD TRIGGER** | Connects a sync signal to an external oscilloscope for observing the modulator trigger signal |
| | **ANT TRIGGER** | Connects a sync signal to an external oscilloscope for observing the antenna trigger signal |
| | **CIRCULATOR GATE** | Connects a sync signal to an external oscilloscope for observing the circulator gate signal |
| | **DEAD TIME GATE** | Connects a sync signal to an external oscilloscope for observing the dead time gate signal |
| | **400 HZ LINE** | Connects a sync signal to an external oscilloscope for observing power supply ripple |
| **OUTPUT J91** | Connects a sync pulse, selected by the SCOPE SYNC SELECT switch, to an external oscilloscope. | |
| **2A1 TEST** | | |
| **Switches S3 through S8 (2-position toggle) and the FUNCTION switch (10-position rotary)** | Switches S3 through S8, in conjunction with the FUNCTION switch, establishes various test conditions for module 2A1 under test. | |
| **GO light (green)** | When lit, indicates that the circuits being tested in module 2A1 under test are functioning. | |
| **Jack J8** | Connects voltages from the module test set 2A1 TEST station to module 2A1 under test. | |
| **2A2 TEST** | | |
| **Jack J39** | Connects 3-phase 115 vac, 400 Hz and neutral from the circuit tester unit to module 2A2 under test. | |
| **Jack J40** | Connects voltages from the module test set to module 2A2 under test. | |
| **Test jacks J41 through J46** | Monitors module 2A2 test points. | |
| **2A4 TEST** | | |
| **HIGH VOLTAGE switch (two-position toggle)** | In the ON position applies 115 vac, 3-phase, 400 Hz to 2A4 TEST station high voltage power supply and +28 vdc to the HIGH VOLTAGE ON light. | |
| **HIGH VOLTAGE ON light (green)** | When lit, indicates that the HIGH VOLTAGE switch has been actuated and 115 vac, 3-phase, 400 Hz has been applied to 2A4 TEST station high voltage power supply. | |
| **MOD TEST J97** | Connects the modulator output signal from the modulator under test to ancillary test equipment. | |
| **Jack J95** | Connects the modulator trigger and –250 vdc to 2A4A1 of module 2A4 under test. | |
| **Test jacks J98, J99 and J100** | Monitors module 2A4 test point. | |
| **2A5 TEST** | | |
| **POLARITY control (three-position rotary)** | Switches the polarity of the simulated motor drive error voltage applied to module 2A5 under test. | |
| **Jack J47** | Connects voltages and control signals from the module test set to module 2A5 under test. | |
| **Test jacks J48, J49 and J50** | Monitors module 2A5 test points. | |

Table 2-4. *Interface Test, Electronic Circuit Plug-In Unit TS-2976/APS-94D, Controls, Indicators, And Jacks*—Continued.

| *Control, indicator or jack* | *Function* |
|---|---|
| **2A6 TEST** | |
| **XMIT GND switch (two-position toggle)** | **In the ON position, applies a ground to module 2A6 under test.** |
| **STEERING control (potentiometer)** | **Supplies a variable minus voltage to module 2A6 under test.** |
| **Jack J30** | **Connects voltages and control signals from the module test set to module 2A6 under test.** |
| **Test jacks J31 through J36** | **Monitors module 2A6 test points.** |
| **2A7, 2A8, 2A11A2 and 2A14 TEST** | |
| **Jack J94** | **Connects voltages from the module test set to module 2A7, 2A8, 2A11A2 or 2A14 under test.** |
| **2A9 TEST** | |
| **MODE switch (two-position toggle)** | **In the PULSE position connects the dead time gate signal (at the prf selected by the PRF switch on the control unit) from the module test set to module 2A9 under test. In the CW position connects –5 vdc to module 2A9 under test.** |
| **IN J54** | **Connects the frequency marker signals from module 2A9 under test to the module test set.** |
| **75 MHZ OUT J55** | **Connects the 75 MHz signal from the module test set to ancillary test equipment.** |
| **45 MHZ OUT J56** | **Connects the 45 MHz signal from the module test set to ancillary test equipment.** |
| **Jack J53** | **Connects power and control signals from the module test set to module 2A9 under test.** |
| **2A10 TEST** | |
| **ANT SAMPLE switch (three-position toggle)** | **In the HIGH position, applies a voltage to module 2A10 under test. In the LOW position no voltage is applied. In the ALTN position, the circulator gate is applied.** |
| **ANT BOTH switch (two-position toggle)** | **In the ON position, applies +20 vdc to module 2A10 under test.** |
| **DELAY 20V switch (two-position toggle)** | **In the ON position, applies +20 vdc to module 2A10 under test.** |
| **XMIT GND switch (two-position toggle)** | **In the ON position, applies a ground to module 2A10 under test.** |
| **Test jacks J84 through J87** | **Monitors module 2A10 test points.** |
| **J82** | **Connects control signals from the module test set to module 2A10 under test.** |
| **J83** | **Connects voltages and control signals from the module test set to module 2A10 under test.** |
| **2A12 TEST** | |
| **FAULT SELECT switch (12-position rotary)** | *Switch position* / *Input selected*: 1 Loop error (+); 2 Loop error (–); 3 Afc loop error (+); 4 Afc loop error (–); 5 Magnetron Servo loop error (+); 6 Magnetron servo loop error (-); 7 Modulator fault; 8 Passband signal; 9 Circulator fault; 10 Video output fault; 11 Afc fault |
| **LEVEL control (potentiometer)** | **Controls the positive or negative level of the simulated test signals applied to module 2A12 under test.** |
| **GO light (green)** | **When lit, indicates that the circuit being tested in module 2A12 under test is functioning correctly.** |

Table 2-4 *Interface Test, Electronic Circuit Plug-In Unit TS-2970/APS-94D, Controls, Indicators, And Jacks—Continued.*

| Control, indicator or jack | Function |
|---|---|
| VIDEO jack J23 | Connects simulated video pulses (positive dead time gates) from 2A12 test station to module 2A12. |
| Test jacks J24, J25, J26 and J27 | Monitors module 2A12 test points. |
| Jack J22 | Connects control signals from the module test set to module 2A12 under test. |
| **2A13 TEST** | |
| LO STEER control (potentiometer) | Supplies a variable positive voltage to module 2A13 under test. |
| LO SEARCH switch (two-position toggle) | In the ON position, applies a positive voltage to module 2A13 under test. In the OFF position, applies a ground to module 2A13 under test. |
| LOAD control (potentiometer) | Supplies a variable load for testing circuits in module 2A13 under test. |
| Test jacks J13 through J20 | Monitors module 2A13 test points. |
| Jack J12 | Connects voltages and control signals from the module test set to module 2A13 under test. |
| **2A15 TEST** | |
| FAN TEST switch (two-position toggle, spring-loaded to off position) | When actuated to the FAN TEST position, applies 3-phase 115 vac to blower motor B1 in module 2A15 under test. |
| MOTOR DRIVE control (potentiometer) | Applies a variable positive (FWD), variable negative (RVS) or 0 (STOP) dc voltage to the magnetron tuning motor in module 2A15 under test. |
| Test jacks J58 and J59 | Test jacks J58 and J59 monitors the preselector steering voltage of module 2A15 under test. |
| Jack J57 | Connects voltages and control signals from the module test set to module 2A15 under test. |
| **2A16 TEST** | |
| Test jacks J72 through J81 | Monitors module 2A16 test points. |
| Jack J71 | Connects voltages from the circuit tester unit to module 2A16 under test. |
| **2A17 TEST** | |
| LOAD switch (two-position toggle) | In the HALF LOAD position, a partial load is connected to module 2A17 under test. In the FULL LOAD position, a full load is connected to module 2A17 under test. |
| Test jacks J63, J64 and J65 | Monitor module 2A17 test points. |
| Jack J62 | Connects voltages and loads to module 2A17 under test. |
| **2A18 TEST** | |
| LOAD switch (two-position toggle) | In the HALF LOAD position, a partial load is connected to module 2A18 under test. In the FULL LOAD position, a full load is connected to module 2A18 under test. |
| Test jacks J68 and J69 | Monitors module 2A18 test points. |
| Jack J67 | Connects voltage and loads to module 2A18 under test. |

## 2-7. Preliminary Operating Procedure

**Perform the preliminary procedures listed below before starting the equipment (para 2–11). The test setup described in *a* below is for Radar Test Set Group OQ–64(V)1/APS–94D. The test setups described in *a* and *b* below are for Test Set Group, Radar OQ–64(V)2/APS–94D. Test setups described in *a* and *b* below and shown in figures 2–9 and 2–10 respectively are individual setups, however, both test setups may be combined into one test setup.**

***a. Control Unit and RF Test Set Procedures.***

**(1) Unfasten the latches and remove the cover from the control unit (fig. 1–1).**

**(2) Remove the cable assemblies and test leads from the cover of the control unit.**

**(3) Remove subassembly 2A1 and the minor components from the RF test set foam storage insert (fig. 2–3).**

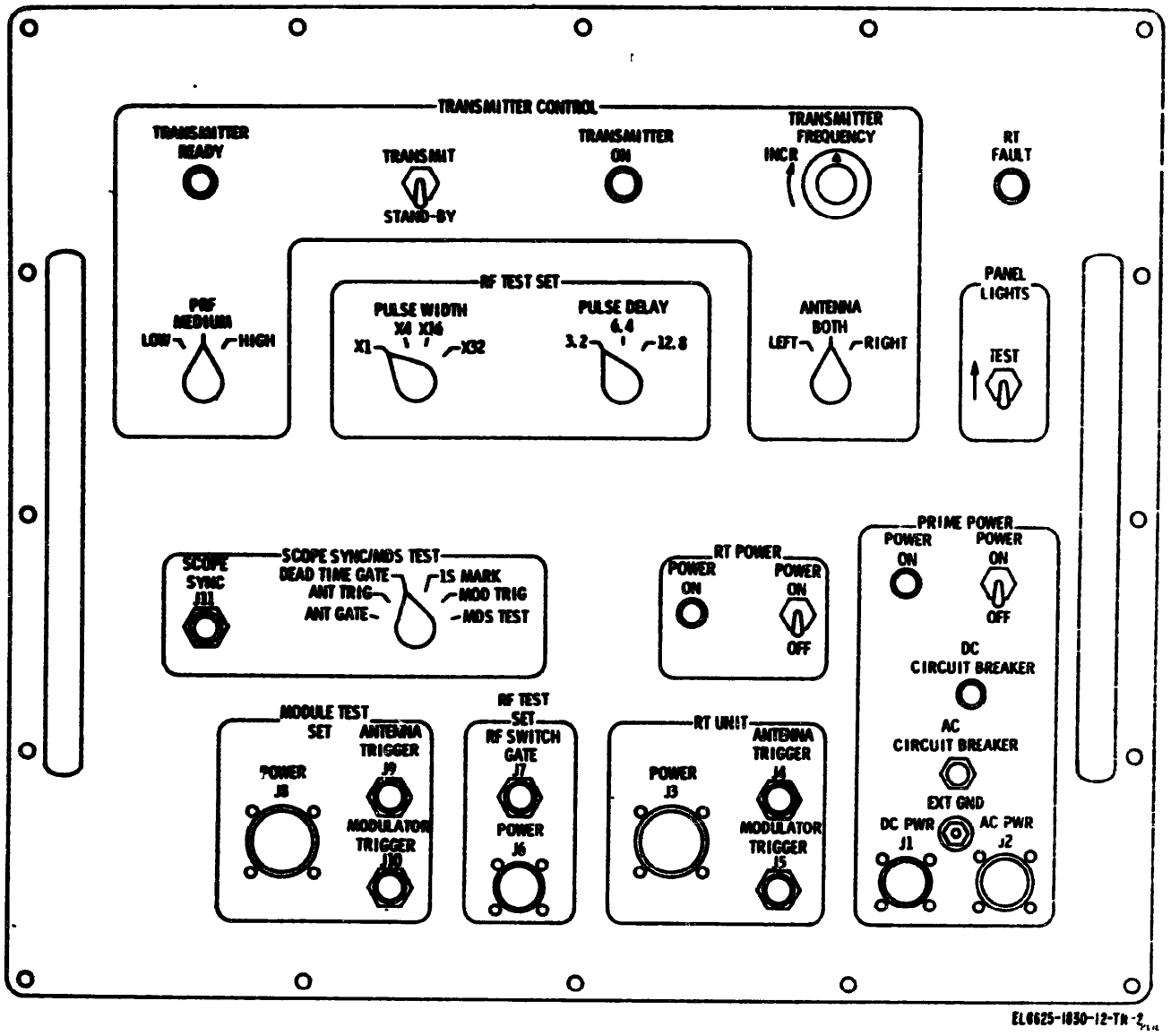



Figure 2-5. Control, Test Set C-8495/APS-94D, controls, indicators, and jacks.

**(4) Interconnect the control unit and the rf test set as illustrated in figure 2–9.**

**(5) With the control unit POWER switch set to OFF (fig. 2–5), connect the ac and dc power cables to the control unit and to the respective bench sources.**

**(6) Perform the performance check (para 2–11a) before continuing.**

**(7) Mount the receiver-transmitter to be tested on the RF test set (para 2–8).**

**(8) Mount subassembly 2A1 on the RF test set (para 2–10).**

**(9) With the control unit POWER switch set to OFF (fig. 2–5), connect the control unit to the receiver-transmitter under test (fig. 2–9).**

b. Control *Unit and Module Teat Set Proce*dures. Perform the preliminary procedures listed below before starting the equipment (pars 2-11b).

(1) Depress the pressure relief valves (fig. l-l and 1-8) to allow the internal and external pressure to equalize.

(2) Unfasten the draw-bolt latches and rem the covers from the control unit (fig. l-l) and the module test set (fig. 1-3).

(3) Remove the cables and test leads from the covers of the control unit and the module test set.

(4) Interconnect the control unit and the module test set as illustrated in figure 2-10.

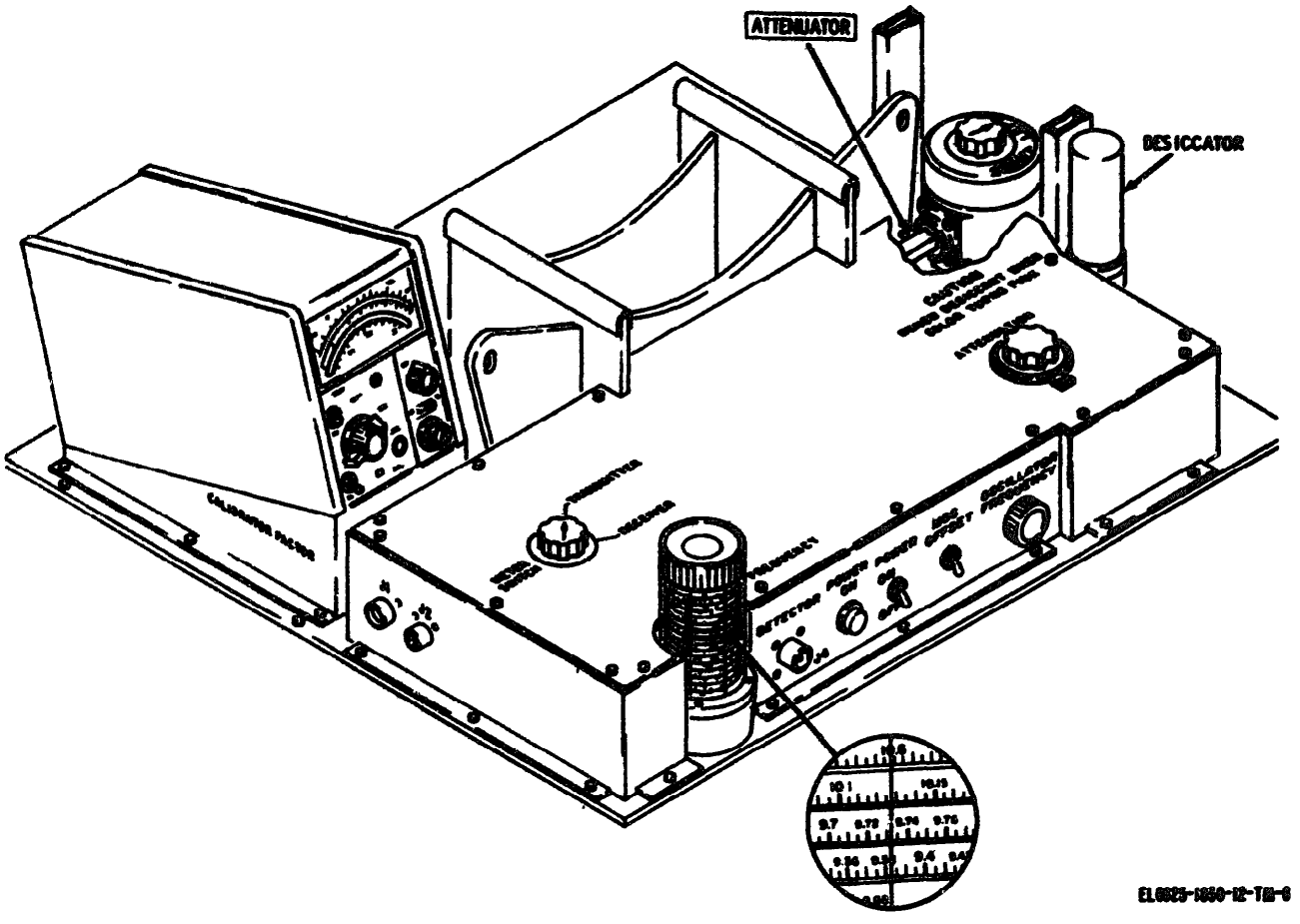



Figure 2-6 ***Interface Test, Radio Frequency TS-2975/APS-94D controls, indicators, and jacks (less power meter 2A4)***

**(5) With the control unit POWER switch *set* to OFF (fig 2-5), connect the ac and dc power cables to the control unit and the respective bench sources.**

**(6) Perform the performance check (para 2-11*b*)**

**(7) With the module test set POWER switch set to OFF, connect the test cable(s) from the module test set to the module to be tested (fig 2-10 and table 2-4)**

**NOTE**

**Cover all connectors of the test set, not in use, with the connector covers provided.**

2 - 8 . Mounting Receiver-Transmitter, Radar RT-899/ASP-94D on interface Test, Radio Frequency TS-2975/APS-94D. (fig 2-11)

CAUTION

**Do not allow the receiver-transmitter to rest on either housing cover as the weight of the unit may damage the covers Place the receiver-transmitter on edge, so it rests on the clenching rim clamp assembly covers.**

**NOTE**

**Two men are required to lift, position and secure the receiver-transmitter under test on the RF test set.**

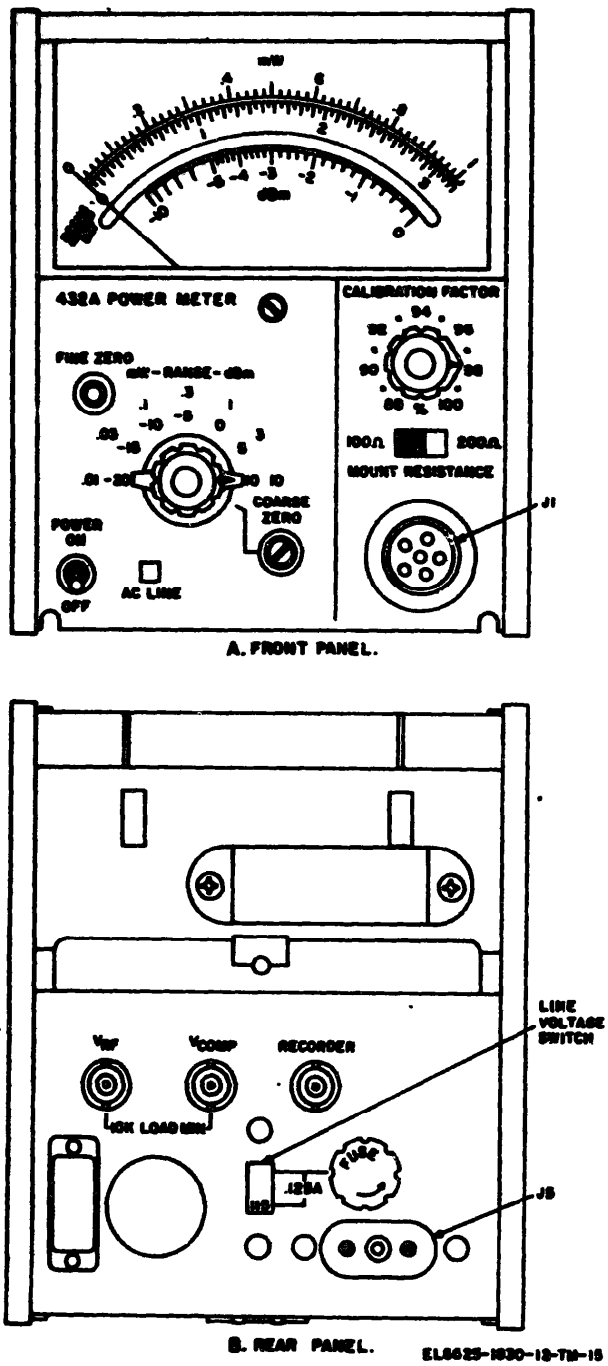



Figure 2-7. *Interface Test, Radio Frequency TS-2975/APS-94D, power meter 2A4, controls, indicators, and jacks.*

**a. Remove the two shock mounts and ground straps, on the opposite side of the receiver-transmitter from the blower housing, by removing the two screws, the two lockwashers and the two flat washers. Save the hardware.**

**b. Unlock the RF test set baseplate (fig. 1-2) and rotate it by lifting the baseplate lock shaft** so the receiver-transmitter may be mounted from the rear of the rf test set. This makes the rt mounting bracket more accessible.

a. With the receiver-transmitter blower housing in the up position and the antenna waveguide ports to the left, position the receiver-transmitter on the mounting bracket with the shock-mount brackets resting against the rt mounting **bracket.**

d. Secure the receiver-transmitter to the RF test set rt mounting bracket using the two screws, the four flat washers and the two wing nuts **sup** plied with the rf test set (23, fig. 1-4).

a Use the 1/2-inch hexagon socket wrench and sliding bar handle (26 and 26, fig. 1-4), applied with the RF test set, to loosen the 1/2-inch self-locking hexagon nub at the detachable and the nondetachable coupling of the clenching rim clamp assembly until the detachable coupling can be uncouple&

f. Remove the clenching rim clamp assembly and housing aver. To prevent damage to the cover, place it in a safe place.

g. Rotate the base plate of the **rf test set un**til the other clenching rim clamp assembly is accessible and repeat the procedures given in e and f above.

### 2-9. Removal of Receiver-Transmitter Radar RT-899/APS-94D from Interface Test, Radio Frequency TS-5975/APS-94D

(fig 2-12)

CAUTION

Make sure the RF test set power (fig. 2-6) and the control unit (fig. 2-5) power is turned off, and the cables connecting the control unit to the receiver-transmitter (fig. 29) are disconnected, before removing the receiver-transmitter from the RF test set.

NOTE

Two men are required to remove the receiver-transmitter from the RF test set.

a. Remove the eight phillips head **screws se**- the flexible waveguide sections of subassembly 2A1 to the antenna ports of the receiver-transmitter (c, fig. 2-12).

***b.* Disengage** the switch clamp.

c. Hold 2A1 subassembly with one hand and release the waveguide quick disconnect flanges that secure waveguide section W16 **to** attenuator 2A1AT4. Carefully remove subassembly 2A1 front the RF test set.

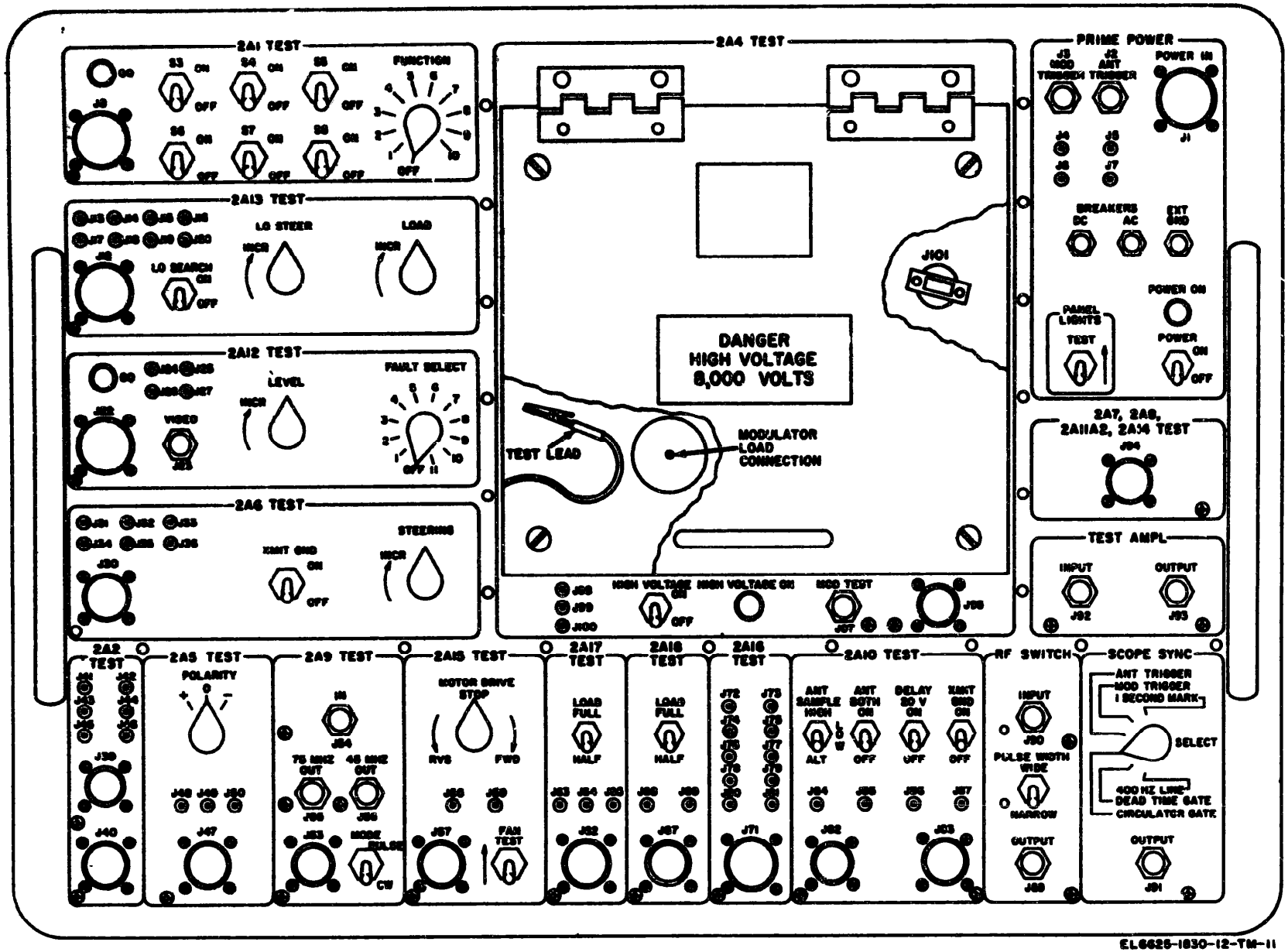



Figure 2-8. *Interface Test, Electronic Circuit Plug-In Unit TS-6976/APS-94D, controls, indicators, and jacks.*

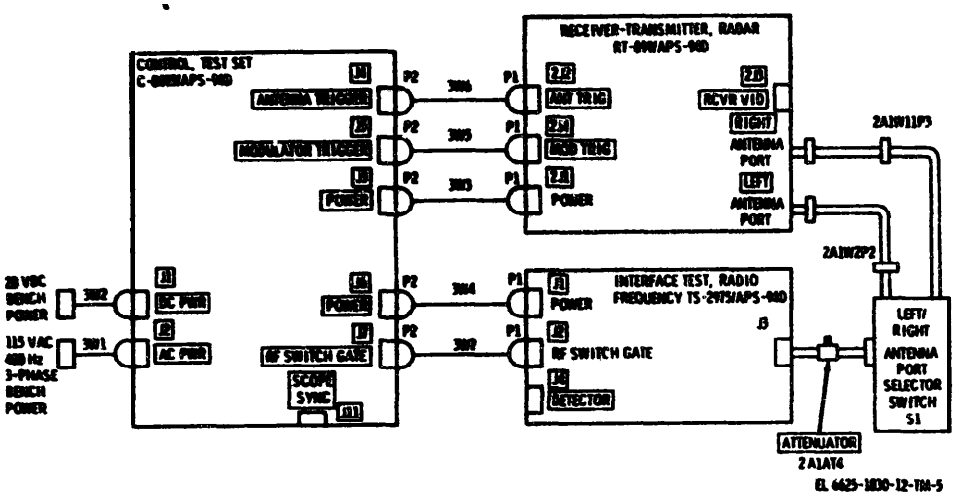



Figure 2-9. ***Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D, typical test hookup to Receiver-Transmitter, Radar RT-899/APS-94D.***

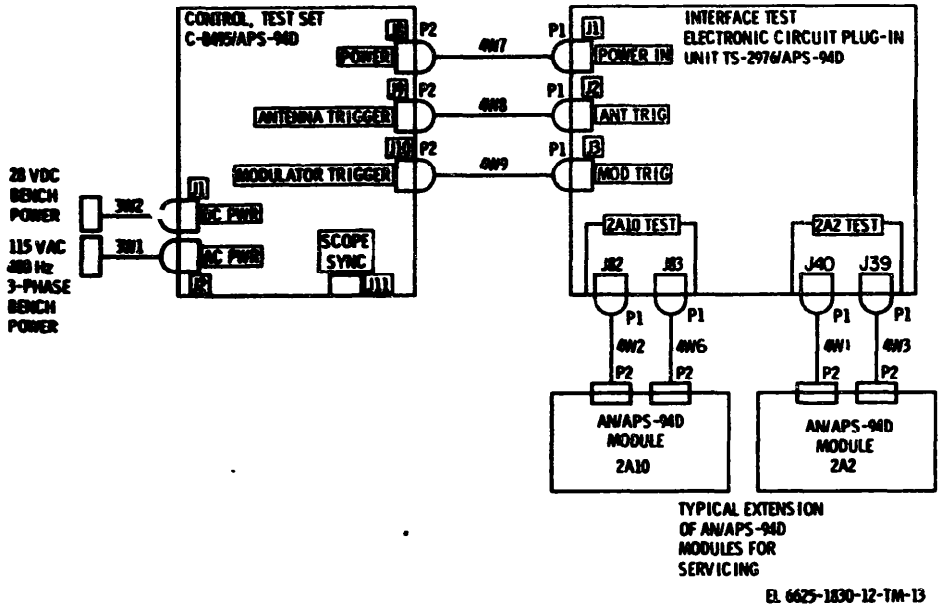



Figure 2-10. ***Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D, typical test hookup to Receiver-Transmitter, Radar RT-899/APS-94D modules.***

**d. Inspect the receiver-transmitter housing covers O-rings and radio frequency interference (rfi) shields for damage. Replace if necessary (TM 11-5895-518-34 (when published)).**

**e. Position one housing cover on the housing rim and a clenching rim clamp assembly over the cover edge and the housing rim.**

**f. Alternately tighten the selflocking nut on the detachable coupling and the nondetachable coupling. Between each few turns of the self-locking nuts, lightly tap the perimeter of the clenching rim clamp assembly with a rubber mallet to insure that the rubber O-ring and the rfi shield are seating properly. Continue this procedure until the clenching rim clamp assembly is fairly tight, but not completely tight. Final** tightening of the clenching rim clamp assembly is accomplished with the receiver-transmitter removed from the RF test set. The final tightening is done with the unit removed from the RF test set to prevent range to the RF test set components from the vibration caused by the tapping with the mallet.

g. Rotate the RF test set baseplate and install the other housing cover and clenching rim clamp assembly using the same procedure as given in e and f above.

h. Remove the hardware securing the receiver-transmitter to the RF test set rt mounting bracket. Carefully remove the receiver-transmitter from the RF test set and set it on a paged surface with the blower housing up.

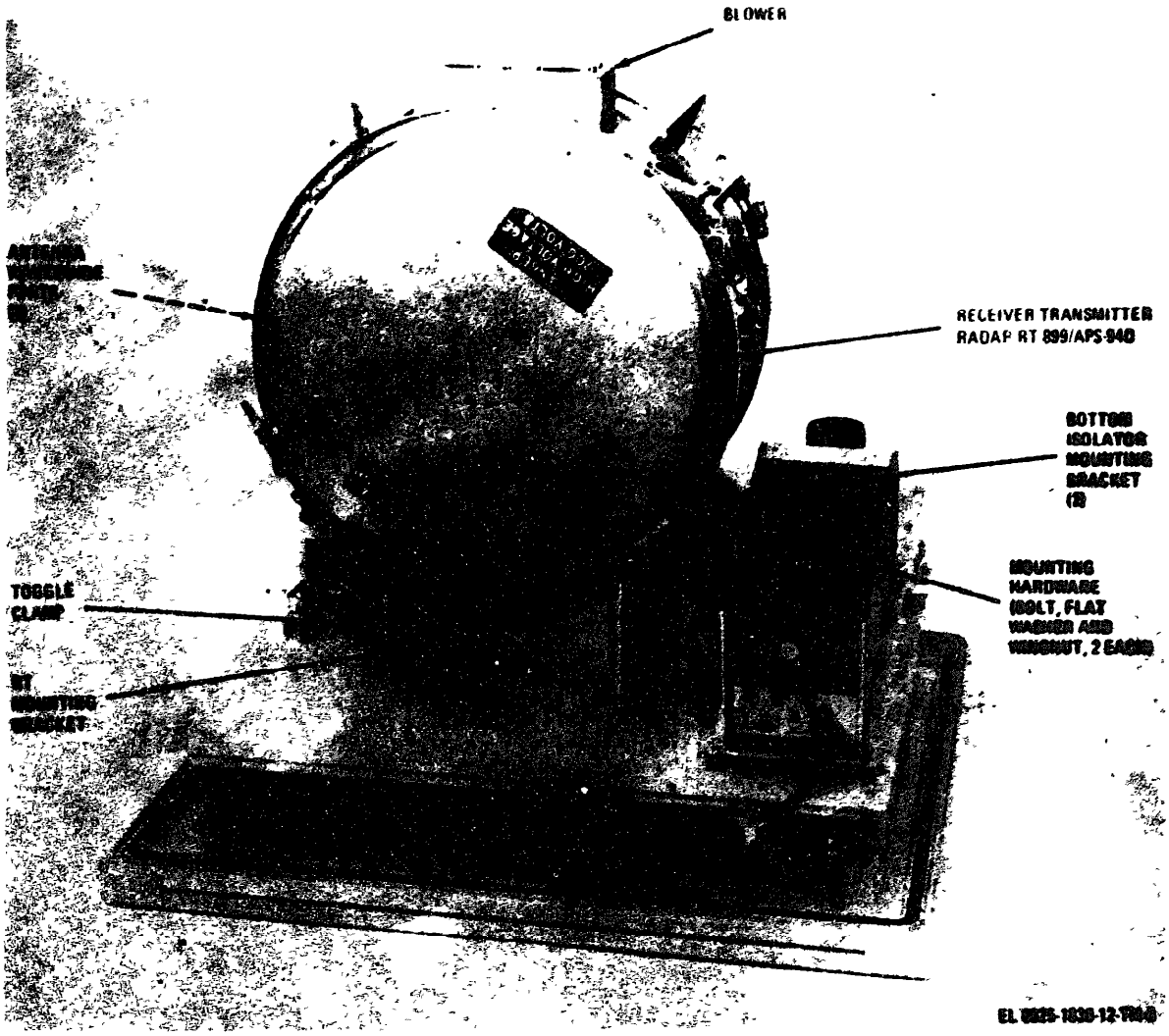



Figure 2-11. ***Mounting Receiver-Transmitter, Radar RT-889/APS-94D on Interface Test, Radio Frequency TS-2975/APS-94D.***

**i. Complete the tightening of the clenching rim clamp assembly using the procedure described in *f* above.**

**j. Replace subassembly 2A1, the 1/2-inch socket wrench, and the mounting hardware in the storage compartment of the RF test set (fig. 2–3).**

## 2-10. Mounting Subassembly 2A1 to Interface Test, Radio Frequency TS-2975/APS-94D and Receiver-Transmitter, Radar RT-889/APS-94D under test

(fig. 2-12)

**Check subassembly 2A1 to make sure that no foreign materials are present in the waveguide sections. Foreign materials in the waveguide sections of subassembly 2A1 may damage the receiver-transmitter under test.**

CAUTION

**Subassembly 2A1 is always mounted after the receiver-transmitter to be tested is to facilitate mounting the receiver-transmitter and to eliminate possible damage to subassembly 2A1.**

***a.*** **Unlock the RF test set baseplate by removing the baseplate lock pin (A, fig. 2–12) and rotate it until the receiver-transmitter antenna ports face the operator.**

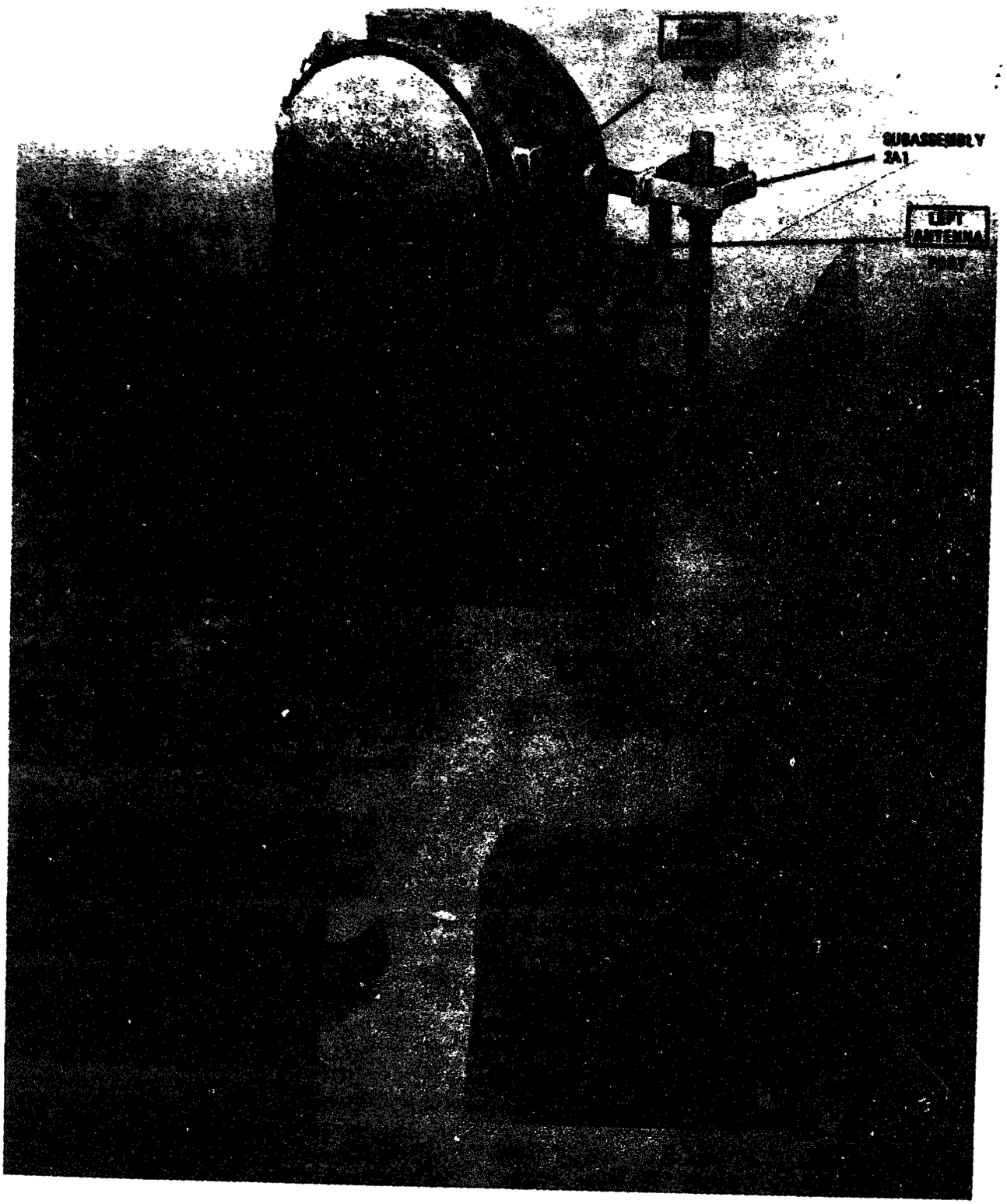



Figure 2-12. ***Mounting Subassembly 2A1 on Interface Test, Radio Frequency TS-2975/APS-94D and to Receiver-Transmitter, Radar RT-999/APS-94D.***

*b.* Set the mounting plate of subassembly 2A1 on the **baseplate** of the RF test set (A, fig. 2-12) and carefully slide 2A1 onto the RF test set until the waveguide flange of attenuator 2A1AT4 mates with the waveguide flange of waveguide 2W16, (B, fig. 2-12) **at the same** time passing the quick-disconnect fork around the flange of attenuator 2A1AT4. Engage the waveguide quick-disconnect.

c. Engage the toggle clamp (fig. 2-11) to hold the mounting plate of 2A1 down on the baseplate of the RF test set.

d. Loosen the two screws securing the receiver-transmitter to the rf test set so the eceiver-transmitter may be rotated while subassembly 2A1 is being connected to the receiver-transmitter antenna waveguide ports.

e. Secure the flexible waveguide sections of 2A1 to the receiver-transmitter waveguide antenna ports with the eight Phillips head screws supplied with the rf test set (C, fig. 2-12).

f. Tighten the two screws securing the receiver-(transmitter to the rf test set

## 2-11. Performance Check

If an abnormal indication is observed during the performance check, refer to the troubleshooting chart (para ***3-6b). The*** performance check for the control unit-RF test set configuration is covered in a below and the performance check for the control unit-module test set configuration is covered in ***b*** below.

NOTE

Cover **all** connectors of the test set not in use, with the connector covers provided.

***a. Control Unit-RF Test Set Configuration (fig. 2-9).***

(1) Depress the control unit AC and DC CIRCUIT BREAKER switches to insure they are reset (fig. 2-5).

(2) Set the control unit **PRIME** POWER-POWER switch to ON; the POWER ON pilot light (green) and the RT FAULT light (red) should light.

(3) Actuate the control unit **PANEL** LIGHTS switch to TEST; the TRAN**SMITTER** READY **light** (white) and the 'IRAN**SMITTER** ON light (white) should illuminate.

(4) Set the control unit RT PO**WER swi**tch to ON; **the** POWER ON light (**green) sho**uld illuminate.

**(5) Plug the RF test set power meter into 115 volts ac, 60 Hz and (fig. 2–7) set the RF test set power meter POWER switch to ON. Allow a 15-minute warmup period. Coarse zero the power meter (para 2–12).**

**(6) Set the RF test set METER SWITCH (fig. 2–6) to the RECEIVER position and the power meter RANGE switch to 0 dBm (1 mW). Fine zero the power meter by momentarily actuating the FINE ZERO switch (fig. 2–7). When fine zeroing the power meter make sure the RF test set POWER switch is OFF.**

**(7) Set the RF test set POWER switch (fig.** 2-6) to ON; the **POWER ON light (green)** should illuminate.

**(8) Rotate the rf test set frequency meter FREQUENCY control until a minimum 1 dBm dip is observed on the power meter. This frequency reading is the frequency of the RF test set oscillator 2A2.**

**(9) Rotate the rf test set OSCILLATOR FREQUENCY control several turns and repeat the procedures given in (8) above.**

**(10) Turn the frequency meter FREQUENCY control until the power meter indicates a maximum peak. This reading is the power output of the RF test set oscillator 2A2.**

(11) Set the RF test set power meter POWER switch to OFF, the **rf test set POWER switch** to OFF, the control **unit RT POWER switch to** OFF, and the con**trol unit PRIME POWER-POWER switch to OFF.**

***b. Control Unit-Module Test Set Configuration (fig. 2–10).***

**(1) Repeat the procedures given in *a*(1) through (3) above.**

**(2) Depress the module test set AC and DC BREAKERS to insure they are reset.**

**(3) Set the module test set PRIME POWER-POWER switch to ON. The POWER ON light (green) should illuminate.**

**(4) Actuate the module test set PANEL LIGHTS switch to TEST. The 2A1 TEST-GO light (green), the 2A12 TEST-GO light (green) and the HIGH VOLTAGE ON light (green) should illuminate.**

**(5) Set the module test set HIGH VOLTAGE switch to ON. The HIGH VOLTAGE ON light (green) should illuminate.**

**(6) Set the module test set HIGH VOLTAGE switch to OFF, the module test set PRIME POWER-POWER switch to OFF, the control unit PRIME POWER-POWER switch to OFF.**

2-12. Power Meter 2A4, Coarse Zero (fig. 2-7)

To coarse zero power meter 2A4, proceed as follows:

a. Turn the RF power to the power meter off by turning the RF test set POWER switch to OFF (fig. 2-7).

b. Set the power meter RANGE selector switch (fig. 2-7) to COARSE ZERO.

e. Adjust the COARSE ZERO screwdriver adjustment until the meter indicates zero.

2-13. Operating Procedure

The test set group is used to test and align, and as an aid in troubleshooting Receiver-Transmitter, Radar RT-899/APS-94D. Technical manual TM 11-5895-578-34 (when published), covering Radar Surveillance Set AN/APS-94D, contains the procedures for operating the test set. Table 2-5 lists the cables and cable connections for testing the AN/APS-94D modules.

**2-14. Stopping Procedure**

Perform the following when use of the test set group is completed. The control **unit-RF test** set configuration covered in a and b below covers the control unit-module test set configuration.

a ***Control Unit-RF Test Sat*** Configuration.

(1) Set the RF **test set** POWER switch to OFF (fig. 2-6).

Table 2-5. Module Test Set, Module Extender Cables

| Test station | Cable | From circuit tester connector | To RT module connector |
|---|---|---|---|
| 2A1 | 4W4 | 4J8 (P1) | 2A1P1 (P2) |
| 2A2 | 4W3 | 4J39 (P1) | 2A2A1–T1 (clip leads) |
| 2A2 | 4W1 | 4J40 (P1) | 2A2J1 (P2) |
| 2A4 | 4W5 | 4J95 (P1) | 2A4P1 (P2) |
| 2A5 | 4W1 | 4J47 (P1) | 2A5P1 (P2) |
| 2A6 | 4W6 | 4J30 (P1) | 2A6P1 (P2) |
| 2A7 | 4W3 | 4J94 (P1) | 2A7 (clip leads) |
| 2A8 | 4W3 | 4J94 (P1) | 2A8 (clip leads) |
| 2A9 | 4W5 | 4J53 (P1) | 2A9P1 (P2) |
| 2A10 | 4W2 | 4J82 (P1) | 2A10J2 (P2) |
| 2A10 | 4W6 | 4J83 (P1) | 2A10J1 (P2) |
| 2A11A2 | 4W5 | 4J94 (P1) | 2A11A2P1 (P2) |
| 2A12 | 4W4 | 4J22 (P1) | 2A12P1 (P2) |
| 2A13 | 4W4 | 4J12 (P1) | 2A13P1 (P2) |
| 2A14 | 4W5 | 4J94 (P1) | 2A14P1 (P2) |
| 2A15 | 4W6 | 4J57 (P1) | 2A15P1 (P2) |
| 2A16 | 4W4 | 4J71 (P1) | 2A16J1 (P2) |
| 2A17 | 4W6 | 4J62 (P1) | 2A17J1 (P2) |
| 2A18 | 4W5 | 4J67 (P1) | 2A18J1 (P2) |

(2) Set the control unit RT POWER switch to OFF and the control unit PRIME POWER-POWER switch to OFF (fig. 26).

(3) Disconnect the test cables connecting the control unit to the receiver-transmitter (fig. 2-9).

(4) Disconnect subassembly 2A1 and remove it from the RF test set (para 2-8).

(5) Remove the receiver-transmitter from **the RF test set (para 2–9**).

**(6) Disconnect the** cables between the control unit and the RF test set (fig. 2-9).

(7) Place the cables in the storage compartment of the control unit (fig. l-l).

(8) Place subassembly 2A1 and the minor components in the RF test set storage compartment **(fig. 2–8)**

(**9) Place** the covers on the control unit and the RF test set and secure them by fastening the draw-bolt latches (fig. l-l and 1-2).

***b. Control Unit-Module*** *Test Set* ***Configuration.***

**(1) If ON, set the module test set HIGH** VOLTAGE switch to OFF (fig. 2-8).

(2) **Set the module test set** PRIME POWER-POWER **switch to OFF (fig. 2-8).**

**(3) Disconnect the test cables connecting the** control **unit to the module test set (fig. 2-10).**

**(4) Disconnect any module extender cables that may be connected to the module test set (fig.** 2-10).

(5) Place the cables in the storage compartments **of the control unit (fig.** l-l) and the module test set ( fig. 13).

**(6) Place the covers on the control unit and the module test set and secure by fastening the latches (figs. l-l and 1-3).**

# CHAPTER 3

# OPERATOR'S MAINTENANCE INSTRUCTIONS

## Section I. SCOPE AND MATERIALS

### 3-1. Scope of Maintenance

The operator's maintenance duties are listed below together with a reference to the paragraphs covering the specific maintenance function.

a Daily preventive maintenance checks and services (para 3-4).

b. Weekly preventive maintenance checks and services (para 3-4).

c. Cleaning (para 3-5).

d. Troubleshooting (para 3-7).

### 3-2. Materials Required

The following materials are required for operator's maintenance.

a. Cleaning fluid (trichloroethane)

*b. Clean,* dry, lint-free cloth

c. Soft bristle brush

## Section II. OPERATOR'S PREVENTIVE MAINTENANCE

### 3-3. Preventive Maintenance, General

a Purpose. Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

*b. Preventive Maintenance Checks and Serv*eces. The preventive maintenance checks and services (PMCS) charts (para 3-4) outline functions to be performed at specific intervals. These checks and services are designed to maintain Army electronic equipment in a combat serviceable condition; that is, in good general physical condition and in good operating condition. To assist the operator in maintaining combat serviceability, the charts indicate intervals to inspect, what to inspect, how to inspect, and what the normal conditions are. The *Paragraph refer*cnce column lists appropriate paragraphs that contain detailed preventive maintenance information. If a defect cannot be remedied by the operator, higher category maintenance is required. Records and reports of these checks and services must be made in accordance with TM 38–750.

### 3-4. Operator's Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the test set group are required on a daily and weekly basis.

*a. Daily Check. The* PCMS chart of subparagraph c below specifies checks and services that must be accomplished daily and under special conditions listed below:

(1) When the equipment is initially installed.

(2) When the equipment is reinstalled after removal for any reason.

(3) At least once each week if the equip ment is maintained in standard condition.

*b. Weekly Checks. The* PMCS chart of sub paragraph *d,* below, specifies additional checks and services that must be performed once each week.

*c. Operator's Daily Preventive Maintenance Check and Services Chart.*

| Interval and sequence no. | | | | | |
|---|---|---|---|---|---|
| Before operation | During operation | After operation | Item to be inspected | Procedure | Paragraph reference |
| 1 | | | All test set group cases and panels | Inspect for signs of deterioration (dirt, corrosion, fungus, etc) of external surfaces. | Para 3–5. |

| Interval and sequence no. Before operation | During operation | After operation | Item to be inspected | Procedure | Paragraph reference |
|---|---|---|---|---|---|
| 2 | | | Electrical cabling | Check for broken or cut cables. Replace as necessary. | |
| 3 | | | | Check for loose or cracked indicator lamp lenses. Replace as necessary. | Para 3–7. |
| 4 | 7 | 10 | All test set group panels | Check that protective caps for electrical connectors are in place and fit properly. | Refer to higher category of maintenance. |
| 5 | | | Subassy 2A1 | Check waveguide openings for foreign material lodged in the waveguide; remove. | None. |
| | 6 | | All test set group panels | Check for proper mechanical operation of each control or switch as used during operation. | Para 3–6*b*. |
| | 8 | | All test set group panels | Check that all indicator lamps illuminate when PANEL LIGHTS switch is pressed. | Para 3–6*b*. |
| | 9 | | All units | During operation, be alert for faulty or unusual operation. | Para 3–6*b*. |

*d. Operator's Weekly Preventive Maintenance Checks and Services Chart.*

| Interval and sequence no. Before operation | During operation | After operation | Item to be inspected | Procedure | Paragraph reference |
|---|---|---|---|---|---|
| 1 | | | Cables connectors, jacks, and plugs | Inspect connectors for corrosion, bent pins, or thread damage. Replace as necessary. | Refer to higher category maintenance. |
| 2 | | | All front panels | Inspect handles, latches, hinges, and other exterior items for looseness. | Refer to higher category maintenance. |

## 3-5. Cleaning

Inspect the test set. The test set should be free of moisture, dirt, grease, and fungus and the desiccant should be a blue color.

*a.* Remove moisture and loose dirt with a clean soft cloth.

WARNING

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. DO NOT use near an open flame. Trichloroethane is not flammable, but exposure of the fumes to an open flame converts it to highly toxic, dangerous gases.

*CAUTION*

DO NOT allow the trichloroethane cleaning fluid to come in contact with the power meter or frequency meter faces. The cleaning fluid may damage the transparent plastic faces.

b. Remove grease, fungus, and ground-in dirt from the test set; use a soft cloth dampened (not wet) with cleaning fluid.

c. Remove dirt from connectors with a brush; remove moisture with a dry cloth.

*d.* Clean the power meter and frequency meter faces with a soft clean cloth. If dirt is difficult to remove, dampen cloth with water; mild soap may be use for more effective effective cleaning.

e. Change the desiccant in the desiccator if it is any color but blue.

Section III. OPERATOR's TROUBLESHOOTING

## 3-6. General Troubleshooting Information

a. General *Instructions.* The troubleshooting chart of subparagraph b supplements the during operation checks contained in the operator's daily preventive maintenance checks and services chart (para 3-4) and the steps contained in the performance check (para 2-10). To troubleshoot the equipment, perform all steps of the performance check (para 2-10) until an abnormal condition or result is observed. When an abnormal condition or result is observed, note the apparent malfunction and turn to the corresponding malfunction in the troubleshooting chart. Perform the corrective actions indicated in the troubleshooting chart. If the corrective action indicated does not result in correction of the malfunction, higher category maintenance is required.

*b. Operator's Troubleshooting Chart.*

| Item No. | Trouble symptom | Probable trouble | Checks and corrective actions |
|---|---|---|---|
| 1. | PRIME POWER-POWER does not illuminate when the control unit POWER switch is set to ON. | *a.* Defective pilot light. | *a.* Replace defective pilot light (para 3–7). |
| | | *b.* Defective POWER switch. | *b.* Refer to higher category maintenance. |
| 2. | Panel lights do not illuminate when the control unit PANEL LIGHTS switch is set to TEST. | *a.* Loose dc power cable 3W2. | *a.* Tighten dc power cable 3W2 connection. |
| | | *b.* Dc power cable 3W2 defective. | *b.* Refer to higher category maintenance. |
| 3. | TRANSMITTER READY light on the control unit does not illuminate. | *a.* Defective light. | *a.* Replace defective light (para 3–7). |
| | | *b.* Defective internal circuitry. | *b.* Refer to higher category maintenance. |
| 4. | TRANSMITTER ON light does not illuminate when the TRANSMIT-STAND BY switch is set to TRANSMIT. | *a.* Defective light. | *a.* Replace defectivt light (para 3–7). |
| | | *b.* Defective TRANSMIT-STAND BY switch. | *b.* Refer to higher category maintenance. |
| 5. | RT FAULT light does not illuminate. | *a.* Defective light. | *a.* Replace defective light (para 3–7). |
| | | *b.* Defective internal circuitry. | *b.* Refer to higher category maintenance. |
| 6. | RT POWER-POWER ON light does not illuminate when RT POWER switch is set to ON. | *a.* Defective light. | *a.* Replace defective light (para 3–7). |
| | | *b.* Defective RT POWER switch. | *b.* Refer to higher category maintenance. |
| 7. | External oscilloscope can not be synchronized in any position of the SCOPE SYNC switch. | *a.* SCOPE SYNC cable loose. | *a.* Tighten SCOPE SYNC cable connection. |
| | | *b.* Defective internal circuitry. | *b.* Refer to higher category maintenance. |
| 8. | Frequency of RF test set oscillator 2A2 can not be read on the frequency meter. | *a.* RF test set METER SWITCH not in the RECEIVER position. | *a.* Check position of METER SWITCH. If correct, refer to higher category maintenance. |
| | | *b.* Defective frequency meter or METER SWITCH. | *b.* Refer to higher category maintenance. |
| 9. | Frequency of receiver-transmitter under test cannot be read on the RF test set frequency meter. | *a.* Rf test set METER SWITCH not in the TRANSMITTER position. | *a.* Check position of METER SWITCH. If correct, refer to higher category maintenance. |
| | | *b.* Defective frequency meter or METER SWITCH. | *b.* Refer to higher category maintenance. |
| 10. | Power out of the rf test set oscillator 2A2 cannot be read on the power meter. | *a.* RF test set METER SWITCH not in the RECEIVER position. | *a.* Check position of METER switch. If correct, proceed to *b* below. |
| | | *b.* Frequency meter tuned to the oscilloscope frequency. | *b.* Detune the frequency meter while observing the power meter. If the power still cannot be read, refer to higher category maintenance. |
| | | *c.* Power meter defective. | *c.* Refer to higher category maintenance. |

| Item No. | Trouble symptom | Probable trouble | Checks and corrective actions |
|---|---|---|---|
| 11. | Power out of the receiver-transmitter cannot be read on the RF test set power meter. | a. RF test set METER SWITCH not in the TRANSMITTER position. | a. Check position of METER SWITCH. If correct, proceed to b below. |
| | | b. Frequency meter tuned to the transmitter frequency. | b. Detune the frequency meter while observing the power meter. If the power still cannot be read, refer to higher category maintenance. |
| | | c. Power meter defective. | c. Refer to higher category maintenance. |
| 12. | POWER ON light does not illuminate when the module test set POWER switch is set to ON. | a. Defective pilot light. | a. Replace defective pilot light (para 3-7). |
| | | b. Defective POWER switch. | b. Refer to higher category maintenance. |
| 13. | Panel lights do not illuminate when the module test set PANEL LIGHTS switch is set to TEST. | a. Loose power cable 4W7. | a. Tighten power cable 4W7. |
| | | b. Power cable 4W7 defective. | b. Refer to higher category maintenance. |
| 14. | 2A1 TEST station GO light on the module test set does not illuminate. | a. Defective light. | a. Replace defective light (para 3-7). |
| | | b. Defective internal circuitry. | b. Refer to higher category maintenance. |
| 15. | 2A12 TEST station GO light on module test set does not illuminate. | a. Defective light. | a. Replace defective light (para 3-7). |
| | | b. Defective internal circuitry. | b. Refer to higher category maintenance. |
| 16. | HIGH VOLTAGE ON light on module test set does not illuminate. | a. Defective light. | a. Replace defective light (para 3-7). |
| | | b. Defective HIGH VOLTAGE switch. | b. Refer to higher category maintenance. |
| 17. | External oscilloscope can not be synchronized in any position of the module test set SCOPE SYNC | a. SCOPE SYNC cable loose. | a. Tighten SCOPE SYNC cable connection. |
| | | b. Defective internal circuitry. | b. Refer to higher category maintenance. |

### 3-7. Removal and Replacement of Panel Lights

a. Removal. To remove a panel light, unscrew the lens assembly. The light bulb will come out of the socket with the lens assembly. Pull the light bulb out of the lens assembly.

*b. Replacement. To* replace a panel light, insert the light bulb in the lens assembly until it is seated securely in place. Screw the lens assembly into the socket. Check the operation of the new light by actuating the PANEL LIGHTS TEST switch to see if the light will illuminate.

# CHAPTER 4

# ORGANIZATIONAL MAINTENANCE

## Section I. GENERAL

### 4-1. Scope of Maintenance

Organizational maintenance duties are listed below together with a reference to the paragraphs covering Me specific maintenance function/

*a.* Monthly preventive maintenance checks and services (para 4-4).

b. Quarterly preventive maintenance checks and services (para 44).

c. Touchup painting (para 4-5).

d. Troubleshooting (para 4-8).

e. Repairs (para 4-9).

### 4-2. Tools, Test Equipment, and Materials Required

The following tools, test equipment, and materials are required for organizational maintenance.

*a.* Sandpaper (fine)
*b.* Electrical tape (black plastic)
*c.* Paint brush
*d.* Tool Kit, Electronic Equipment TK-101/G
*e.* Multimeter AN/URM-105
*f.* Primer, color f per MIL-P-8585
*g.* Enamel, light gray type III, **class** 2 per MIL-E-15090

## Section II. ORGANIZATIONAL PREVENTIVE MAINTENANCE

### 4-3. General

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable. The contents of paragraph 3-3 apply to organizational preventive maintenance as well as to operator's preventive maintenance.

### 4-4. Organizational Preventive Maintenance Checks and Service Periods

***a. Service Periods.*** Perform the maintenance functions indicated in the monthly (b below) or quarterly (c below) preventive maintenance checks ad services charts. A month is defined as approximately 30 calendar days of 8-hour per day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. The requirement for monthly and or quarterly preventive maintenance checks and services is not limited to equipment in everyday use. These preventive maintenance checks and services must also be performed on equipment maintained in a standby (ready *for im*mediate operation) condition. Equipment in limited storage, which requires servicing before operation, does not require monthly and or quarterly maintenance. Operator's and monthly preventive maintenance checks and services constitute a part of the quarterly preventive maintenance checks and services and must be performed concurrently. All deficiencies will be recorded in accordance with the requirements of TM 38-750.

***b. Monthly Organizational Preventive Maintenance Checks and Services Chart.***

| Sequence number | Item to be inspected | Procedure | Paragraph reference |
|---|---|---|---|
| 1 | Exterior surfaces | Inspect exposed metal surfaces for rust and corrosion. Clean and touchup paint as required. | Para 4–5 |

| Sequence number | Item to be inspected | Procedure | Paragraph reference |
|---|---|---|---|
| 2 | Cables and connectors | Inspect cable connectors for corrosion, bent pins, or thread damage. Repair or replace as necessary. Inspect all cables for cracks, cuts, or badly chafed areas on cable jacketing. | Para 4-6. |
| 3 | Handles and latches | Inspect handles, latches, hinges, and other exterior items for looseness. Tighten as necessary. | Para 4-7. |
| 4 | Front panel | Check all control knobs for looseness, correct knobs indications, and rotation. Reset and tighten as required. | None. |
| 5 | Test set | Check test set for completeness. | Table 1-1. |

*c. Quarterly Organizational Preventive Maintenance Checks and Services Chart.*

| Sequence number | Item to be inspected | Procedure | Paragraph reference |
|---|---|---|---|
| 1 | Publications | See that all publications are complete, serviceable, and current. | DA Pam 310-4. TM 38-750 and DA Pam 310-7. |
| 2 | Modifications | Check DA Pam 310-7 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled. | |

4-5. Touchup Painting

WARNING

The primer and enamel used for touchup painting are flammable. Perform the touchup in au approved area that is away from fire or flame.

a. Use the primer and enamel *specified in* paragraph 4-2.

*b*. Refer to the applicable cleaning and refinishing instructions contained in TB 746-10, Field Instructions for Painting and Preserving Electronic Command Equipment.

4-6. Lubrication

Lubrication of the rf test set is performed by higher category maintenance.

4-7. Adjustment of Case Latch Tension

Check latches for tension. Tension is adequate when the cover is firmly secured to the case and all latches are tight. Perform the following if any of the latches are loose.

*a.* Exert downward pressure on the latch to permit disengagement. Disengage the latch from the case cover.

*b.* Using a 3/8-inch open-end wrench, hold the latch nut in position while turning the latch in the direction that will secure the cover more firmly.

*c.* Engage the latch on the case cover, then exert upward pressure on the latch to secure.

*d.* Check the latch for sufficient tension.

*e.* Repeat *a* through *c* as required until the desired latch tension is obtained.

## Section III. ORGANIZATIONAL TROUBLESHOOTING

4-8. General

a. Procedural *Instructions. The* organizational troubleshooting chart of subparagraph *b* below supplements the organizational preventive maintenance checks and services. To troubleshoot the equipment, perform all functions, starting with sequence number 2, in the organizational preventive maintenance checks and services chart paragraph 4-4. Proceed through the functions until an abnormal condition or result is obtained. When an abnormal condition or result is obtained, note the apparent trouble symptom and turn to the corresponding trouble symptom in the troubleshooting chart (subpara *b*). Perform the checks and corrective actions indicated in the troubleshooting chart. If the corrective measures indicated do not result in correction of the trouble, higher category maintenance is required.

*b. Organizational Troubleshooting Chart.*

| Item No. | Trouble symptom | Probable trouble | Checks and corrective actions |
|---|---|---|---|
| 1. | No ac power to control unit | a. Dirty or bent pins on connector J2 (AC PWR). | a. Clean and/or straighten connector pins. |
| | | b. Defective cable 3W1. | b. Inspect and make continuity checks of the cable (para 4–9). |
| 2. | No dc power to control unit | a. Dirty or bent pins on connector J1 (DC PWR). | a. Clean and/or straighten connector pins. |
| | | b. Defective cable 3W2. | b. Inspect and make continuity checks of the cable (para 4–9). |
| 3. | No output from one or more of control unit connectors (J3 thru J7). | a. Dirty or bent connector pins. | a. Clean and/or straighten connector pins. |
| | | b. Defective cable(s) 3W3 thru 3W7. | b. Inspect and make continuity checks of cables (para 4–9). |
| 4. | Unable to correctly position one or more of the control unit front panel rotary switches | a. Loose rotary switch knob(s). | a. Position and tighten switch knob(s) as required. |
| | | b. Defective switch(s). | b. Refer to higher category maintenance. |
| 5. | RF test set power meter does not indicate power out of RF test set or power into RF test set. | Line switch (on rear of power meter) in wrong position or 1/8 ampere fuse (on rear of power meter) blown. | Check line switch. Replace fuse. Refer to higher category maintenance. |
| 6. | No power to module test set. | a. Dirty or bent pins on connector J1, POWER IN. | a. Clean and/or straighten connector pins. |
| | | b. Defective cable 4W7. | b. Inspect and make continuity checks of the cable (para 4–9). |
| 7. | No output from one or more of the module test set connectors. | a. Dirty or bent connector pins. | a. Clean and/or straighten connector pins. |
| | | b. Defective cables. | b. Inspect and make continuity checks of cables (para 4–9). |
| 8. | Unable to correctly position one or more of the module test set front panel rotary switches. | a. Loose rotary switch knob(s). | a. Position and tighten switch knob(s) as required. |
| | | b. Defective switch(s). | b. Refer to higher category maintenance. |

4-9. Cable Continuity Check and Repair

*a. Cable Continuity Check.* Turn off power to test set and disconnect cable from test set and equipment under test. Use the ohmmeter and check the continuity of the cable from pin-to-pin. If any pin-to-pin measurement indicates an open (no continuity) refer to higher category maintenance.

b. Cable Repair. Repair - cables that are cracked, cut, or badly chafed by wrapping with black, plastic electrical tape. Straighten bent connector pins with a small pair of needle-n-pliers, being careful not to break the pins. If the cable connector is corroded, clean with cleaning fluid and a soft-bristled brush. If the cable cannot be repaired by any of the above methods refer to higher category maintenance.

# CHAPTER 5

# SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

## Section I. SHIPMENT AND LIMITED STORAGE

### 5-1. Disassembly of Equipment

**Prepare the test set for shipment or storage as follows:**

***a.*** **Disconnect the test cables, power cables and all minor components or subassemblies from the test set (fig. 2–7 and 2–8).**

***b.*** **Place the test cables, power cables, minor components and subassemblies in the test set storage compartments (fig. 1–1, 1–4, and 1–5).**

***c.*** **Tighten the four metal lock spacers on the RF test set (fig. 1–3).**

***d.*** **Place the covers in position on the bottom halves of the test set cases. Secure the covers to the bottom halves of the test set cases with the draw-bolt latches (fig. 1–1, 1–4 and 1–5).**

### 5-2. Repackaging for Shipment or Limited Storage

**The exact procedure for repacking depends on the materials available and the conditions under which the equipment is to be shipped or stored. In addition to the procedures given in *a* and *b* below, the information in paragraph 2–1, covering original packaging, will be helpful.**

***a. Material Requirements.*** **The materials listed in table 5–1, 5–2, and 5–3 below are required for packaging the test set. For stock numbers of the materials, refer to SB 38–100.**

***b. Repackaging.*** **Package the test set as follows:**

**(1) Make sure the procedures listed in paragraph 5–1 have been completed.**

**(2) Use the original crates and packing materials if available. If not, fabricate a shipping crate and packing materials using the materials described in *a* above.**

**(3) Place the shipping crate on the floor and line it with the corner blocks and the fiberboard liners as shown in figures 2–1 and 2–2.**

**(4) Place the test set unit in the shipping crate and install the top corner blocks and fiberboard liners (fig. 2–1 and 2–2).**

**(5) Nail the shipping crate cover to the shipping crate.**

**(6) Install steel straps around the box using staples.**

Table 5-1. ***Materials for Fabrication of Control Unit Shipping Box.***

| Qty | Materials |
|---|---|
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), top and bottom, 24 by 21.5 inches |
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), sides, 24.5 by 19.5 inches |
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), ends, 21.5 by 19–5 inches |
| 8 | Foam corner blocks (unicellular, polyethylene foam, MIL–C–46842), 7 by 7 by 7 inches with 2-inch thick walls. |
| As req. | Steel strapping, flat (QQ–S–7B1, Type 1, Class B, Grade 2) 0.75 inches wide by 0.023 inches thick |
| As req. | Cleated plywood box (PPP–B–601, Style A, Domestic Type) inside dimensions 24 by 29 by 26 inches |

Table 5-2. ***Materials for Fabrication of RF Test Set Shipping Box.***

| Qty | Materials |
|---|---|
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), top and bottom 23 by 30.5 inches |
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), sides 30.5 by 19.5 inches |
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), ends 23 by 19.5 inches |
| 8 | Foam corner blocks (unicellular, polyethylene foam, MIL–C–46842), 9 by 9 by 9 inches with 2-inch thick walls. |

Table 5-2. *Materials for Fabrication of RF T Set Shipping Box—Continued*

| Qty | Materials |
|---|---|
| As req. | Steel strapping, flat (QQ–S–781, Type 1, Class B, Gradt 2) 0.75 inch wide by 0.023 inch thick |
| As req. | Cleated plywood box (PPP–B–601, Style A, Domestic Type), inside dimensions 23 by 35 by 27.5 inches |

*Table 5–3. Materials for Fabrication of Module Test Set Shipping Box.*

| Qty | Materials |
|---|---|
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), top and bottom, 30.5 by 28.5 inches |

Table 5-3. *Materials for Fabrication of Module Test Set Shipping Box—Continued*

| Qty | Materials |
|---|---|
| 2 min. | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), sides, 28.5 by 27.5 inches |
| 2 min. | Fiberboard liners (PPP–F–320), CF, DOM, SW, 200), ends, 30.5 by 27.5 inches |
| 8 | Foam corner blocks (unicellular, polyethylene foam, MIL–C–46843), 7 by 7 by 7 inches with 2-inch thick walls. |
| As req. | Steel strapping, flat (QQ–S–7B1, Type 1, Class B, Grade 2) 0.75 inches wide by 0.023 inches thick |
| As req. | Cleated plywood box (PPP–B–601), Style A, Domestic Type) inside dimensions 24 by 29 by 26 inches |

## Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

### 5-3. Authority for Demolition

**The demolition procedures given in paragraph 5–4 shall be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.**

### 5-4. Methods of Destructions.

**Any or all of the methods of destruction given below may be used. The time available shall be the major determining factor for the methods to be used in most instances when destruction of equipment is undertaken. The tactical situation also will determine in what manner the destruction order will be carried out.**

*a. Smash.* **Smash the control panel and the connector plugs; use sledges, axes, hammers, crowbars, and any other heavy tools available.**

**NOTE**

**The underside of the panel-chassis assembly should also be demolished. Remove the panel-chassis assembly from the case by removing the captive screws and lifting from the case.**

*b. Cut.* **Cut the input cables in a number of places; use axes, handaxes, machetes, or similar tools.**

*c. Burn.* **Burn as much of the equipment as is flammable; use gasoline, oil, flamethrowers, and similar tools. Burn the instruction literature first. Pour gasoline on the cables and the internal wiring, and light it.**

*d. Explode.* **Use explosives to complete demolition or to cause maximum damage before burning, when time does not permit complete demolition by other means. Powder charges, fragmentation grenades, or incendiary grenades may be used. Incendiary grenades are usually most effective when destruction of small parts and wiring is desired.**

*e. Dispose.* **Bury or scatter the destroyed parts, or throw them into nearby waterways. This is particularly important if a number of parts have not been completely destroyed.**

# PART TWO

# INTERFACE TEST, ANTENNA DRIVE TS-2974/APS-94D

## CHAPTER 6

## INTRODUCTION

### 6-1. General

**Interface Test, Antenna Drive TS–2974/APS–94D is part of Test Set Groups, Radar OQ–64(V)1/APS–94D and OQ–64(V)2/APS–94D. Since it operates independently from the other equipments of the test set group, Interface Test, Antenna Drive TS–2974/APS–94D is covered separately in part two of this technical manual. Part two covers operation, maintenance and repair, shipment, and demolition of Interface Test, Antenna Drive TS–2974/APS–94D. Also included in part two is information pertaining to cleaning and inspection of the equipment, repairs, and replacement of parts available to operator and organizational maintenance.**

### 6-2. Purpose and Use

***a. Purpose.*** **Interface Test, Antenna Drive TS–2974/APS–94D is a service and troubleshooting aid for Antenna AS–2199/APS–94D and Interconnecting Box J–2794/APS–94D, components of Radar Surveillance Set AN/APS–94D. The unit supplies the required voltages and signals to perform continuity checks and functional operation tests of the units under test.**

***b. Use.*** **Interface Test, Antenna Drive TS–2974/APS–94D, with the aid of ancillary test equipment, is used to verify proper or improper operation, aid maintenance personnel in troubleshooting, adjustment, and alignment of Antenna AS–2199/APS–94D and Interconnecting Box J–2794/APS–94D. It is possible to test the units while installed in an aircraft or on a bench. Also, for more extensive tests, the module 1A1 and servo amplifier module can be removed** from Interconnecting Box J-2794/APS-94D **and** Antenna AS-219p/APS-94D, **respectively, and** checked on Interface Test, Antenna Drive TS–*2974/APS-94D.*

### 6-3. Technical Characteristics of Interface Test, Antenna Drive TS-2974/APS-94D

***a. Antenna Test*** Section.

*Power required* -------- *27.5 ±.05 vdc, 200* **watts**
*Outputs to Antenna AS-2199/APS-94D*
**Dc levels ---------- 27.5 ±1.5 vdc**
**Inputs from Antenna AS-2199/APS-94D**
**Antenna fault voltage ----------27.5 ±1.5 vdc**
**Interlock continuity ------27.5 ±1.5 vdc**
**Signal ground ------Chassis ground**

***b. Interconnecting Box Test Section.***

**Power required ---------115 vac, 3-phase, 400 Hz, 350 watts**
**Outputs to Interconnecting Box J–2794/APS–94D**
**Power, ac ---------115 vac nominal, 3-phase, 400 Hz, Variable from 87.5 ±7.5 vac to 137.5 ±2.5 vac**
**Power, dc ----------27.5 vdc nominal. Variable from 16.0 ±2.0 vdc to 36.0 ±4.0 vdc**
**Outputs to 1A1 TEST connector**
**Test voltage, ac -----45 vac nominal, 3-phase, Variable from 35.0 ±5.0 vac to 55.0 ±5.0 vac**
**Test voltage, dc -----27.5 nominal. Variable from 16.0 ±2.0 vdc to 36.0 ±4.0 vdc**

6-4. Components and Dimensions

a. Components. The components of Interface Test, Antenna Drive *TS-2974/APS-94D are listed* in table I-l.

***b. Dimensions of Major*** Components. ***Interface*** Test, Antenna Drive TS-2974/APS-94D is contained in a single combination case. The case is 19.25 inches high by 24.25 inches wide by 21 inches deep, including rubber mounting feet and guard rails. The unit, with the cables packed in the case, weighs approximately 80 pounds. Figures 6-1 and 6-2 illustrate the unit and the minor components, respectively.

6-5. Common Name

Table 6-1 provides common names for both Interface Test, Antenna Drive TS-2974/APS-94D and for the portions of Radar **Surveillance** Set AN/APS-94D that are tested.

6-6. Description of Equipment (fig. 6-1)

a. The combination case is separable into two compartmented halves. The bottom compartment contains the control panel and electronics and top compartment provides storage for the test cables. All controls, indicators, and jacks neses-sary for the operation of the unit are located on the front panel. The two halves of the case are hold together by eight draw-bolt latches that are adjustable for tension. The combination case is equipped with eight rubber feet, two carrying handles, and a pressure relief valve.

*Table 6-1. Common Names*

| *Ref desig* | *Nomenclature* | *Common name* |
|---|---|---|
| 1 | **Interface Test, Antenna Drive TS–2974/APS–94D** | **Test set** |
| | **Radar Surveillance Set AN/APS–94D** | **Radar set** |
| 1 | **Interconnecting Box J–2974/APS–94D** | **Interconnecting box** |
| 4 | **Antenna AS–2199/APS–94D** | **Antenna** |
| | **All cable assemblies** | **By reference designation, as W1** |

b. The top compartment contains a hinged inner door, which is secured by three push-button fasteners. Clipped to the hinged inner **door is** a spring scale. Also, mounted on the door are four servo amplifier mounting posts and a **stop pin.**

6-7. Description of Minor Components (fig. 6-2)

a. Minor components of the test set are shown in figure 6-2. The test cables are described in table 6-2 and the spring scale is discussed in b **b&W.**

*Table 6-2. Interface Test, Antenna Drive TS-2974/APS-94D, Cable* Assemblies

| *Reference designation* | *Nomenclature* | *P1 destination* | *P2 destination* |
|---|---|---|---|
| **W1** | **Cable Assembly, Special Purpose, Electrical CX–12294/U (4 ft)** | **Jack J1 on interconnecting box** | **Jack J1 on test set** |
| **W2** | **Cable Assembly, Special Purpose, Electrical CX–12233/U (4 ft)** | **Jack J2 on interconnecting box** | **Jack J2 on test set** |
| **W3** | **Cable Assembly, Special Purpose, Electrical CX–12295/U (4 ft)** | **Jack J3 on interconnecting box** | **Jack J3 on test set** |
| **W4** | **Cable Assembly, Special Purpose, Electrical CX–12296/U (4 ft)** | **Jack J4 on interconnecting box** | **Jack J4 on test set** |
| **W5** | **Cable Assembly, Special Purpose, Electrical CX–12297/U (4 ft)** | **Jack J5 on interconnecting box** | **Jack J5 on test set** |
| **W6** | **Cable Assembly, Power, Electrical CX–12240/U (6 ft)** | **Bench 115 vac power source** | **Jack J6 on test set** |
| **W7** | **Cable Assembly, Power, Electrical CX–12241/U (6 ft)** | **Bench 28 vdc power source** | **Jack J7 on test set** |
| **W8** | **Cable Assembly, Special Purpose, Electrical CX–12298/U (6 ft)** | **Jack 4J1 on antenna** | **Jack J8 on test set** |
| **W9** | **Cable Assembly, Special Purpose, Electrical CX–12299/U (6 ft)** | **Jack 4A1J2 on servo assembly** | **Jack J9 on test set** |

b. The spring scale, clipped to the top compartment of the combination, case, is used to measure the torque required to rotate Antenna AS-2199/APS-94D and the torque output of the servo amplifier. The scale is calibrated from 0 to 20 pounds in 4-ounce divisions.

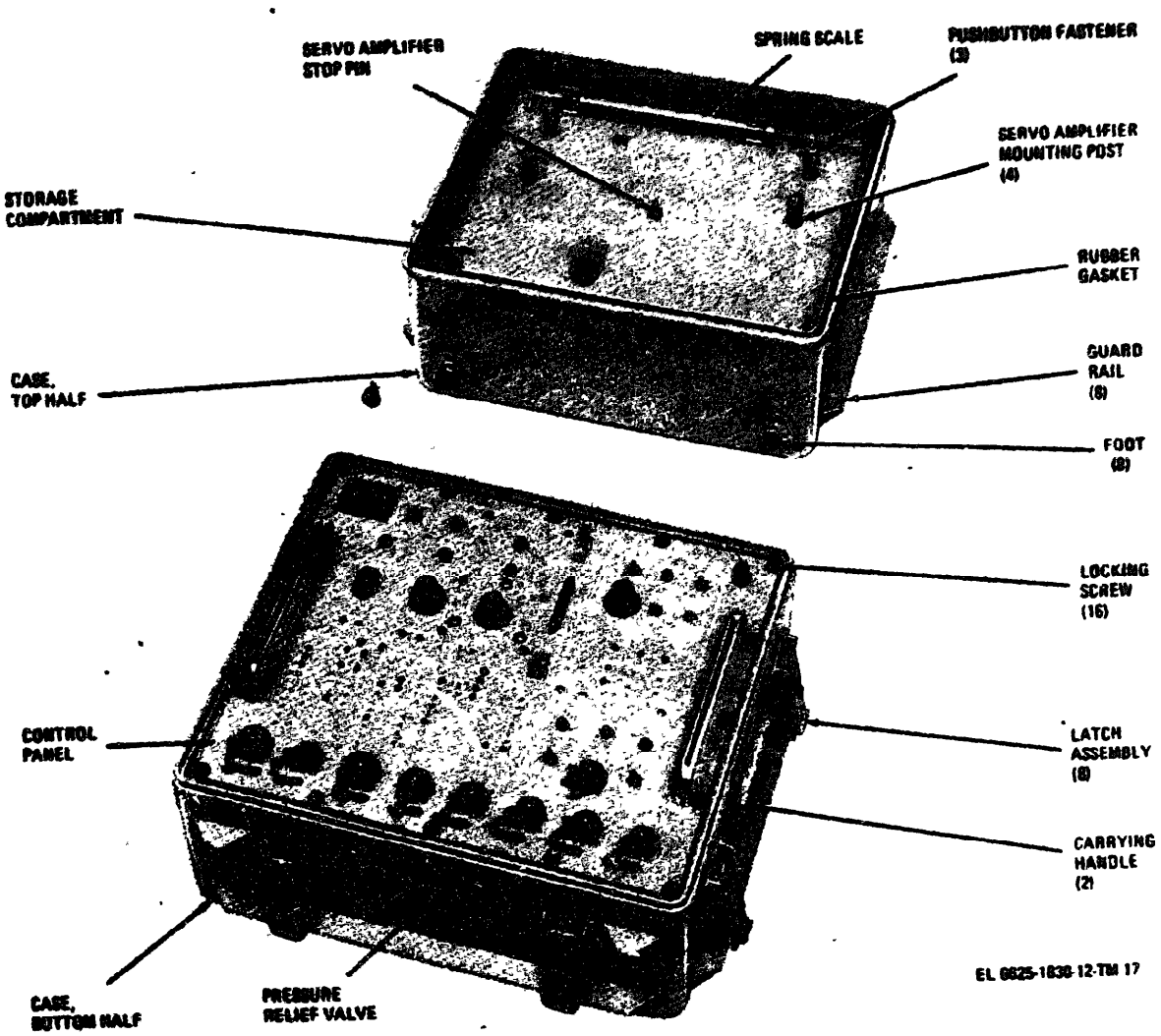
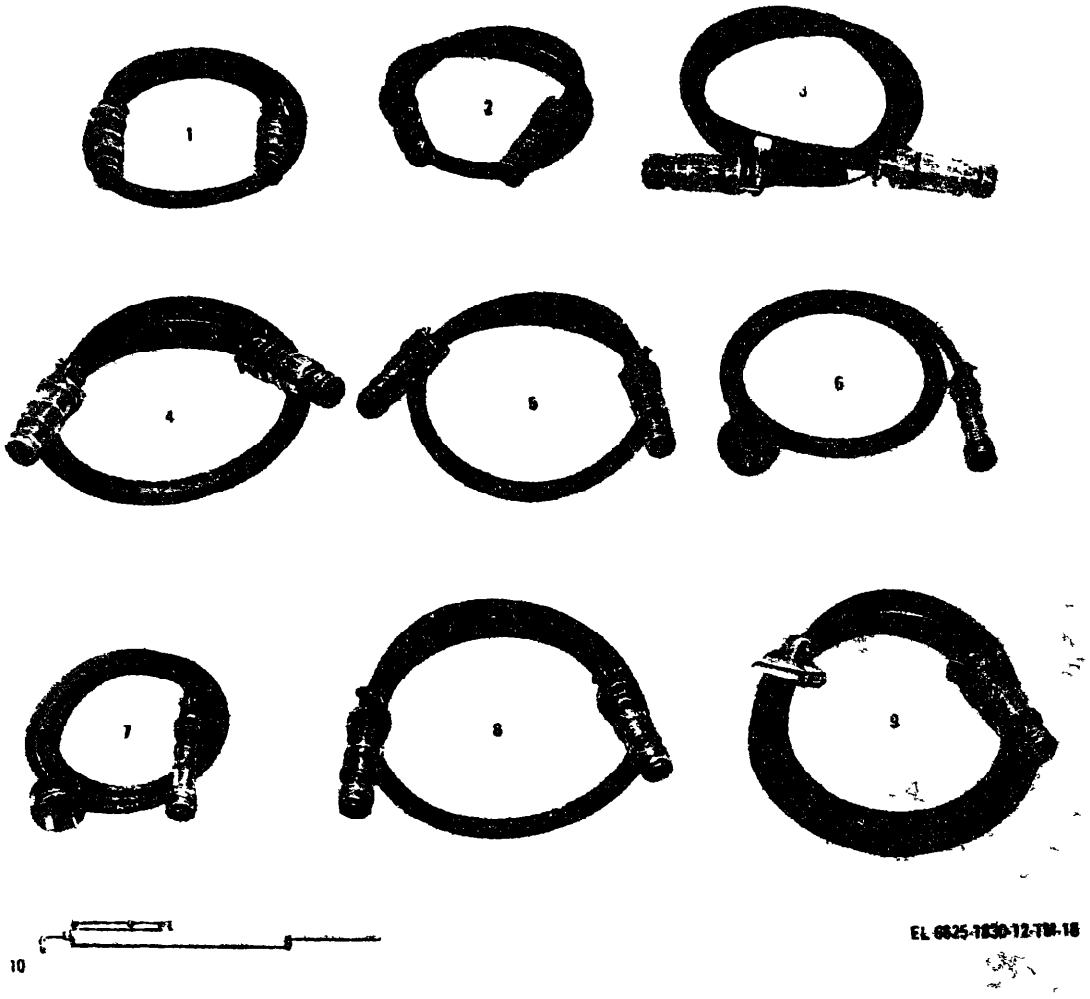



Figure 6-1. Interface Test, Antenna Drive TS-2974/APS-94D, less minor components.




**1—Cable Assembly, Special Purpose, Electrical CX–12294/U (4 ft)**
**2—Cable Assembly, Special Purpose, Electrical CX–12233/U (4 ft)**
**3—Cable Assembly, Special Purpose, Electrical CX–12295/U (4 ft)**
**4—Cable Assembly, Special Purpose, Electrical CX–12295/U (4 ft)**
**5—Cable Assembly, Special Purpose, Electrical CX–12297/U (4 ft)**
**6—Cable Assembly, Power, Electrical CX–12240/U (6 ft)**
**7—Cable Assembly, Power, Electrical CX–12241/U (6 ft)**
**8—Cable Assembly, Special Purpose, Electrical CX–12298/U (6 ft)**
**9—Cable Assembly, Special Purpose, Electrical CX–12299/U (6 ft)**
**10—Spring scale**

Figure 6-2 ***Interface Test, Antenna Drive TS–2974/APS–94D, minor components.***

# CHAPTER 7

# INSTALLATION AND OPERATING INSTRUCTIONS

## Section I. SERVICE UPON RECEIPT OF EQUIPMENT

### 7-1. Unpacking (fig 7-1)

***a. Packaging Data.*** **When packed for shipment or limited storage, the test set is packaged in a cleated plywood shipping crate that is reinforced with metal strapping. The bound box is approximately 26 inches high by 31 inches wide by 28 inches deep and weighs an estimated 125 pounds including contents. The volume of the bound box is approximately 18.1 cubic feet. A typical shipping crate with its contents is shown in figure 7–1.**

***b. Removing Contents.***

**(1) Cut the metal straps from around the plywood shipping crate.**

CAUTION

**Do not attempt to pry off the top and sides of the cleated plywood shipping crate. Prying may damage the equipment.**

**(2) Remove the nails from the top and sides of the shipping crate.**

**(3) Spread the sides of the shipping crate to provide working space.**

**(4) Remove the foam corner blocks and corrugated fiberboard liners from around the unit.**

**NOTE**

**The number of corrugated fiberboard liners (minimum of one at top, bottom, and sides of unit) will vary due to the thickness of the foam corner blocks used.**

**(5) Obtain assistance and remove the unit from the shipping crate.**

**(6) Save the plywood box and other packing materials for repackaging.**

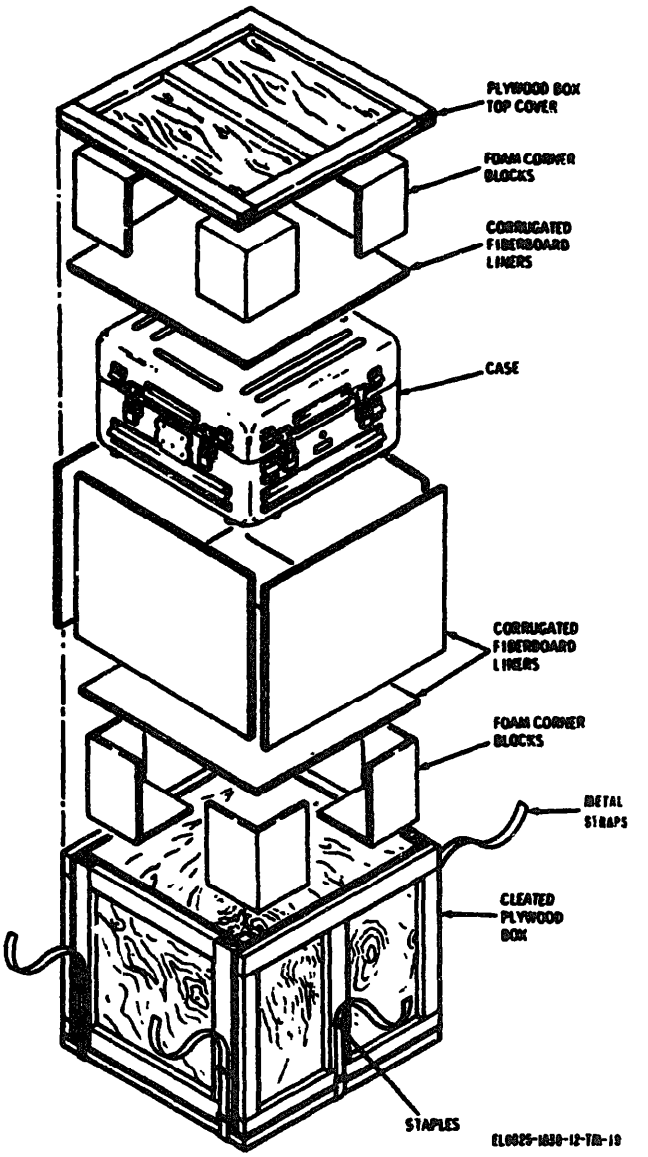



Figure 7-1 Packaging of Interface Test, Antenna Drive TS-3974/APS-94D.

### 7-2. Checking Unpacked Equipment

***a. Checking Equipment for Completeness.*** **See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the items in table 1–1. Report all discrepancies (para 1–8*c*).**

**NOTE**

**Shortage of a minor part that does not affect proper functioning of the equipment should not prevent use of the equipment.**

***b. Checking Equipment for Damage. Inspect*** the equipment for damage incurred during shipment If the equipment was improperly packaged, or damaged, report the difficulty on DD Form 6 or DISREP (SF 361), as pertinent

***c. Checking Equipment for Modifications.*** If the equipment has been used or reconditioned, see whether it has ***been*** changed by a modification work order (MWO). If the equipment has been modified, the MWO number(s) will appear on the unit near the nomenclature plate, Check to see whether the modified equipments are covered in the manual.

NOTE

This manual does not include Modification Work Orders (MWO) for the equipment.

## Section II. OPERATING INSTRUCTIONS

### 7-3. Interface Test, Antenna Drive TS-2974/APS-94D Controls, Indicators, and Jacks (fig. 7-2)

Table 7-1 lists the Interface Teat, Antenna Drive TS-2974/APS-94D controls, indicators, and jacks and gives a brief functional description of each item. The controls, indicators, and jacks arc illustrated in figure 7-2.

### 7-4. Preliminary Operating Procedure

***a. Antenna and Interconnecting Box..*** Perform the preliminary procedures listed below before connecting the equipment to test the antenna (fig. 7-3) or interconnecting box (fig. 7-4).

Table 7-1. Interface Test, Antenna Drive TS-2974/ASP-94D Controls, Indicators, and Jacks

| *Control, indicator, or jack* | *Function* |
|---|---|
| **Prime power:** | |
| **AC POWER circuit breaker (two-position toggle)** | **In ON position, applies 115 vac (line to neutral), 3-phase, 400 Hz power to test set.** |
| **DC POWER circuit breaker (two-position toggle)** | **In ON position, applies 28 vdc to test set.** |
| **AC POWER ON light (green)** | **When lit, indicates that ac power has been applied to test set.** |
| **DC POWER ON light (green)** | **When lit, indicates that dc power has been applied to test set.** |
| **AC POWER J6 jack** | **Connects 115 vac power to test set.** |
| **DC POWER J7 jack** | **Connects 28 vdc power to test set.** |
| **I BOX TEST field:** | |
| **INTERLOCK switch (two-position toggle, spring loaded in the down position)** | **When activated (in direction of arrow), removes ac and dc power from interconnecting box.** |
| **RESET switch (two-position toggle, spring loaded in the down position)** | **When activated (in direction of arrow), restores operation that has been interrupted by the INTERLOCK switch or a voltage limit relay.** |
| **TEST SELECT switch (three-position rotary)** | **Selects the type of test to be performed by the test set.** |
| | ***Switch Position*** — ***Action*** |
| | **PROBE CONTINUITY** — **Connects PROBES test jacks in series with a voltage and CONTINUITY light** |
| | **SERIES CONTINUITY** — **Connects voltage and CONTINUITY lamp in series with circuits in interconnecting box** |
| | **VOLTAGE LIMIT** — **Connects AC and DC LIMIT TEST circuits into test circuit** |
| **DC LIMIT TEST control (potentiometer)** | **Varies the dc voltage applied to over- and under-voltage circuits in interconnecting box.** |
| **AC LIMIT TEST control (variable transformer)** | **Varies the ac voltage applied to over- and under-voltage circuits in interconnecting box.** |
| **AC RELAY FAULT light (red)** | **When lit, indicates one or two phases of ac prime power has been interrupted.** |
| **CONTINUITY light (green)** | **When lit, indicates continuity according to conditions set up by TEST SELECT switch.** |

Table 7-1. Interface Test, Antenna Drive TS-294/ASP-94D, Controls, Indicators, and Jacks-Continued

| *Control, indicator, or jack* | *Function* |
|---|---|
| DC LIMIT TEST light (green) | When lit, indicates that interconnecting box over- and under-voltage circuits detect and an-limit condition. Goes out when an out-of-limits condition is detected. |
| AC LIMIT TEST light (green) | When lit, indicates that interconnecting box over- and under-voltage circuits detect an in-limit condition. Goes out when an out-of-limits condition is detected. |
| 1A1 TEST connector | Accepts module 1A1 for more detailed tests than can be made with module installed in interconnecting box. |
| PROBES test jacks | Used in conjunction with CONTINUITY lamp to make continuity checks, provided TEST SELECT switch is in PROBE CONTINUITY position. |
| DC LIMIT TEST VOLTAGE test jacks | Used to connect external voltmeter to measure voltage being applied to over- and under-voltage circuits in interconnecting box. |
| AC LIMIT TEST VOLTAGE test jacks NEUT, A, B, C | Used to connect external voltmeter to measure voltage being applied to ac over- and under-voltage circuits in interconnecting box. |
| J1 jack | Connects ac and dc signals to jack J1 on interconnecting box. |
| J1 test jacks (A through L) | Connected to corresponding contact of jack J1. |
| J2 jack | Connects continuity paths to jack J2 on interconnecting box. |
| J2 test jacks (A through V) | Connected to corresponding contact of jack J2. |
| J3 jack | Connects test signals and continuity paths to jack J3 on interconnecting box. |
| J3 test jacks (A through J) | Connected to corresponding contact of jack J3. |
| J4 jack | Connects test signals and continuity paths to jack J4 on interconnecting box. |
| J4 test jacks (A through C) | Connected to corresponding contact of jack J4. |
| J5 jack | Connects continuity paths to jack J5 on interconnecting box. |
| J5 test jacks (A through V) | Connected to corresponding contact of jack J5. |
| ANTENNA TEST field: | |
| STABILIZE-LOCK switch (two-position toggle) | Energizes and de-energizes antenna servo and gyro circuits. |
| *Switch Position* | *Action* |
| STABILIZE | Energizes servo and gyro circuits |
| LOCK | Deenergizes servo and gyro and locks antenna in position |
| BITE TEST switch (two-position toggle, spring loaded in the down position) | When activated (in direction of arrow), monitors antenna built in test equipment (BITE) when CENTERING RATE switch is in HIGH position. |
| SIGNAL control (potentiometer) | Varies amplitude of simulated gyro signal. |
| SIGNAL POLARITY switch (two-position toggle) | Reverses polarity of simulated gyro signal. |
| CENTERING RATE switch (two-position toggle) | Selects transmitter or BITE test. |
| *Switch Position* | *Action* |
| LOW | Provides simulator transmitter- on signal |
| HIGH | Enables BITE circuit |
| ANTENNA FAULT light (red) | When lit, indicates antenna fault. |
| ANTENNA TEST J8 jack | Connects dc power and test signals to antenna. |
| ANTENNA TEST J9 jack | Connects test signals to antenna. |
| SPIN MOTOR PH1, PH2 test jacks | Connected to phase 1 (PH1) and phase 2 (PH2) power that energizes the gyro spin motor. |
| SIG GEN PR 1 test jacks | Used to measure gyro signal generator voltage. |
| BRAKE test jacks | Used to measure antenna brake voltage. |
| TORQUER test jacks | Used to measure output of cage potentiometer in servo amplifier. |

Table 7-1 Interface Test, Antenna Drive TS-2974/ASP-94D, Controls, Indicators, and Jacks-Continued

| Control, indicator, or jack | Function |
|---|---|
| SIGNAL test jacks | Used to measure simulated gyro signal generated by SIGNAL control. |
| PANEL LIGHTS switch (two-position toggle, spring loaded in the down position) | In the TEST position, applies power to AC RELAY FAULT, DC LIMIT TEST, AC LIMIT TEST, and ANTENNA FAULT lights to test operation of lights. |
| EXT GND jack | Chassis ground for connecting test set to external ground. |

(1) Depress the pressure relief valve (fig. 6-1) to allow the interval and external pressure to equalize.

(2) Unfasten the latches and remove the cover from the test set (fig. 6-1).

(3) Remove the test cables from the top compartment of the test set.

(4) With the test set AC and DC PO switches in the OFF position, connect t and dc power cables (W6 and W7) to resp bench power sources.

(5) Perform the performance check (pa 5) before continuing.

(6) Position test set switches and contr follows before operating the test set (para

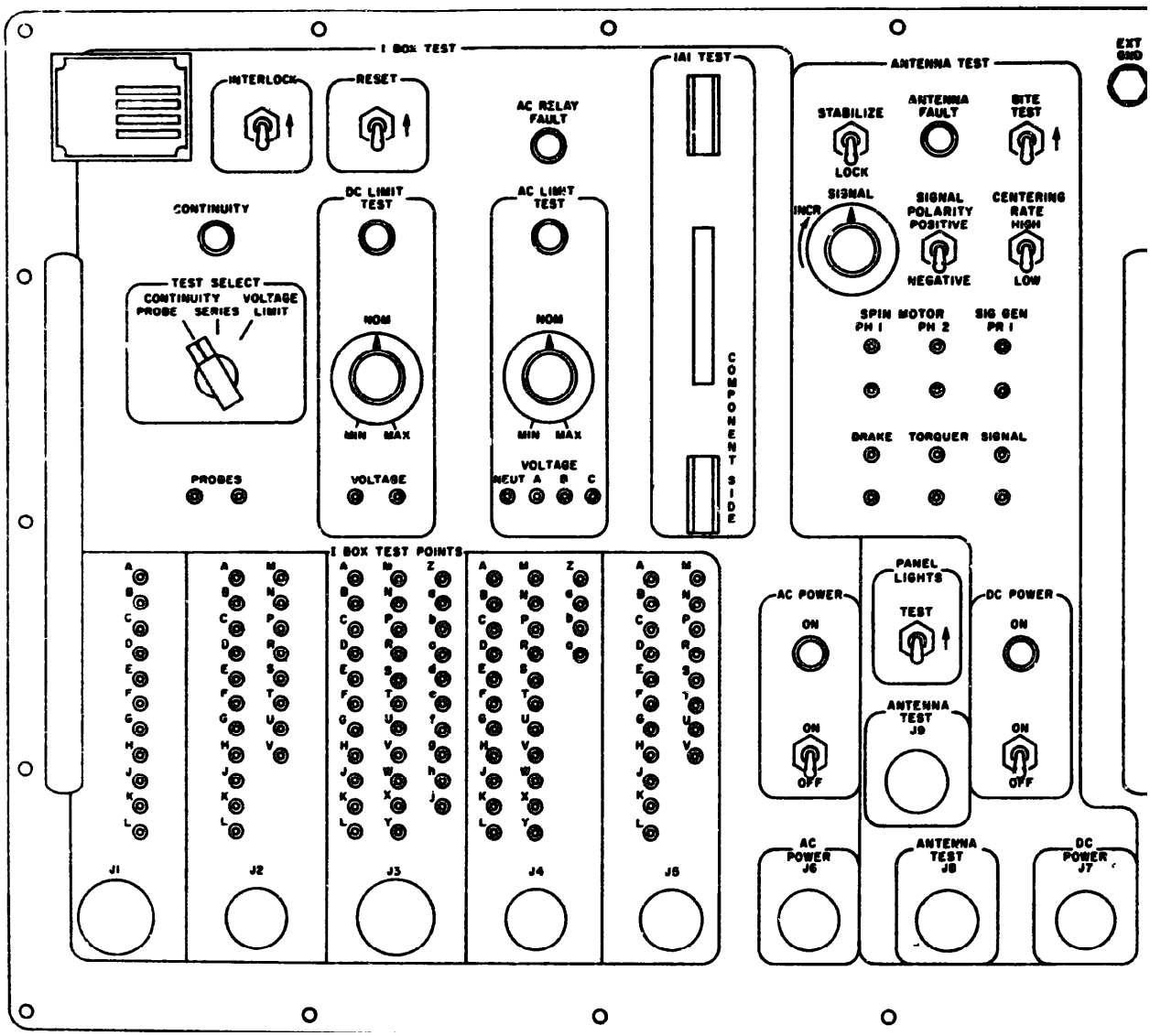



Figure 7-2. Interface Test, Antenna Driver TS-2974/APS-94D, controls, indicators, and jacks.

| Switch or control | Position |
|---|---|
| AC POWER | OFF |
| DC POWER | OFF |
| DC LIMIT TEST | NOM |
| AC LIMIT TEST | NOM |
| TEST SELECT | PROBE CONTINUITY |
| STABILIZE-LOCK | LOCK |
| SIGNAL | fully ccw |
| SIGNAL POLARITY | POSITIVE |
| CENTERING RATE | LOW |

***b. Testing AN/APS-94D Servo Assembly 4A1.*** **To test the AN/APS-94D servo amplifier 4A1, follow the same general instructions given in *a* above, except for the following:**

**(1) Perform the performance check (para 7–5).**

**(2) Place servo assembly on mounting posts in top of case as shown in figure 7–5. Engage stop pin in hole in turnbuckle.**

**(3) Connect test cables W8 and W9 to servo amplifier as shown in figure 7–5.**

7-5. Performance Check

If an abnormal indication is observed during the performance check, refer to the troubleshooting chart in paragraph 8-6.

a. Set the AC and DC POWER switches to ON. The AC and DC POWER lights (green) and *ANTENNA* FAULT light (red) should illuminate.

b. Set TEST SELECT switch to PROBE CONTINUITY.

***c.*** **Install jumper between PROBES jacks. CONTINUITY light sh**ould illuminate **Remove jumper.**

***d.*** **Actuate PANEL LIGHTS switch to TEST. The AC RELAY FAULT, DC LIMIT TEST, and AC LIMIT TEST lights should illuminate and the ANTENNA FAULT light should remain illuminated.**

## 7-6. Operating Procedure

The test set is used to test, align, and troubleshout Interconnecting Box J-2794/APS-94D and Antenna AS-2199/APS-94D. Technical manual TM 11-5895-578-34 (when published), covering Radar Surveillance Set AN/APS-94D, contains the procedures for operating the test set.

## 7-7. Stopping Procedure

Perform the following **steps** when testing **with** the test set has been completed.

a. Set the AC POWER switch to OFF **(fig. 7-2).**

***b. Set the DC*** POWER switch to OFF.

c. If the interconnecting box **module** 1A1 was being tested separately, remove the **module from** the 1A1 TEST connector.

d. If the antenna **servo amplifier** 4A1 module was being tested separately, disconnect the test cables from **the** module and **remove the module from the mounting posts on storage compartment inner door.**

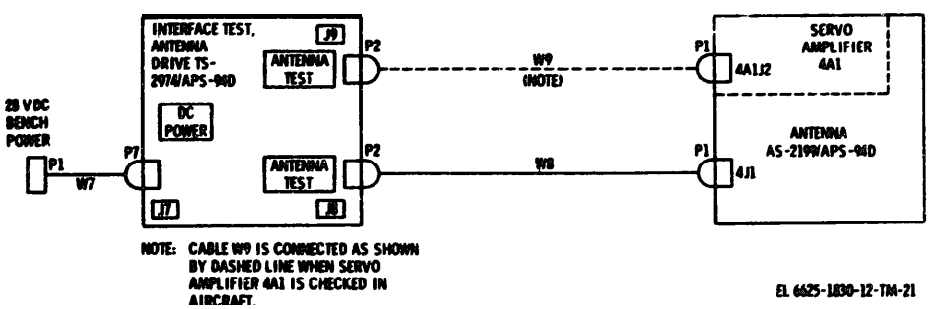



Figure *7-3. Antenna AS-2199/APS-94D, test setup.*

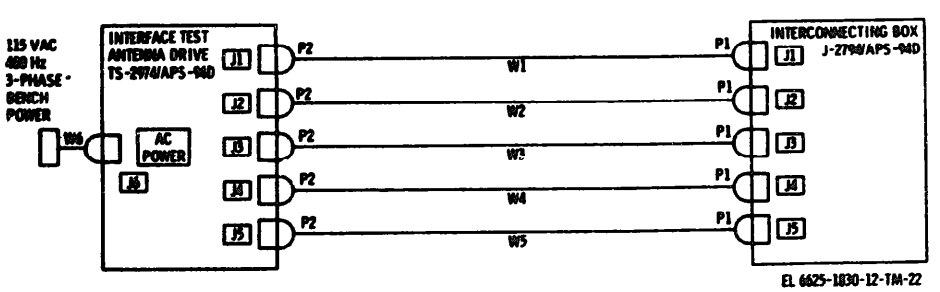



*Figure 7-4. Interconnecting Box J-2974/APS-94D,* teat *setup.*

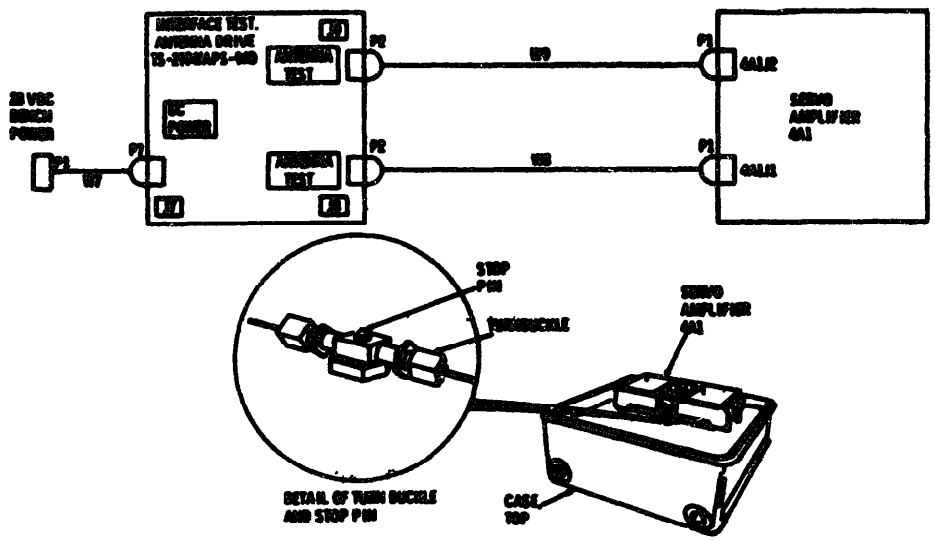



Figure 7-5. Amplifier 4A1, test setup.

*e.* Disconnect the test cables between the unit under test and the test set. Disconnect power cables.

*f.* Place the test cables in the storage compartment in the top half of the case.

*g.* Close and secure the inner door by fastening the three pushbutton fasteners.

*h.* Install connector covers on all test set connectors.

*i.* Install spring scale in clips on storage compartment inner door.

*j.* Place the cover on the test set and secure by fastening the latches (fig. 6-1).

# CHAPTER 8

# OPERATOR'S MAINTENANCE INSTRUCTIONS

## Section I. SCOPE AND MATERIALS

### 8-1. Scope of Maintenance

**The operator's maintenance duties are listed below together with a reference to the paragraphs covering the specific maintenance function.**

***a.*** **Daily preventive maintenance checks and services (para 8–4).**

***b.*** **Weekly preventive maintenance checks and services (para 8–4).**

***c.*** **Cleaning (para 8–5).**

***d.*** **Troubleshooting (para 8–7).**

### 8-2. Material Required

**The following materials are required for operator's maintenance.**

***a.*** **Cleaning compound, fluid (trichloroethane)**

***b.*** **Clean, dry, lint-free cloth**

***c.*** **Soft bristle brush**

## Section II. OPERATOR's PREVENTIVE MAINTENANCE

### 8-3. Preventive Maintenance, General

***a. Purpose.*** **Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.**

***b. Preventive Maintenance Checks and Services.*** **The preventive maintenance checks and services (PMCS) charts (para 8–4) outline functions to be performed at specific intervals. These checks and services are designed to maintain Army electronic equipment in a combat serviceable condition; that is, in good general physical condition and in good operating condition. To assist the operator in maintaining combat serviceability, the charts indicate intervals to inspect, what to inspect, how to inspect, and what the normal conditions are. The *Paragraph reference* column lists appropriate paragraphs that contain detailed preventive maintenance information. If a defect cannot be remedied by the operator, higher category maintenance is required. Records and reports of these checks and services must be made in accordance with TM 38–750.**

### 8-4. Operator's Preventive Maintenance Checks and Services Periods

Preventive maintenance **checks and services of the test set are required on a daily and weekly basis.**

***a. Daily Checks.*** **The PMCS chart of subparagraph *c* below specifies checks and services that must be accomplished daily and under the special conditions listed below:**

**(1) When the equipment is initially installed.**

**(2) When the equipment is reinstalled after removal for any reason.**

**(3) At least once each week if the equipment is maintained in standard condition.**

***b. Weekly Checks.*** **The PMCS chart of subparagraph *d* below specifies additional checks and services that must be performed once each week.**

***c. Operator's Daily Preventive Maintenance Checks and Services Chart.***

| Interval and sequence no. | | | | | |
|---|---|---|---|---|---|
| *Before operation* | *During operation* | *After operation* | *Item to be inspected* | *Procedure* | *Paragraph reference* |
| 1 | | | Test set case and panel. | Inspect for signs of deterioration (dirt, corrosion, fungus, etc) of external surfaces. | Para 8–5. |

| Interval and sequence no. | | | Item to be inspected | Procedure | Paragraph reference |
|---|---|---|---|---|---|
| Before operation | During operation | After operation | | | |
| 2 | | | Electrical cabling | Check for broken or cut cables. Replace as necessary. | |
| 3 | | | | Check for loose or cracked indicator lamp lenses. Replace as necessary. | Para 8–7. |
| 1 | 6 | 10 | Test set panels. | Check that protective caps for electrical connectors are in place and fit properly. | Refer to higher category of maintenance |
| | 7 | | Test set panels. | Check for proper mechanical operation of each control or switch as used during operation. | Para 8–6b. |
| | 8 | | Test set panels. | Check that all indicator lamps illuminate when PANEL LIGHTS switch is pressed. | Para 8–6b. |
| | 9 | | Test set. | During operation, be alert for faulty or unusual operation. | Para 8–6b. |

*d. Operator's Weekly Preventive Maintenance Checks and Services Chart.*

| Interval and sequence no. | | | Item to be inspected | Procedure | Paragraph reference |
|---|---|---|---|---|---|
| Before operation | During operation | After operation | | | |
| 1 | | | Cables, connectors, jacks, and plugs. | Inspect connectors for corrosion, bent pins, or thread damage. Replace cables as necessary. | Refer to higher category of maintenance. |
| 2 | | | All front panels. | Inspect handles, latches, hinges, and other exterior items for looseness. | Refer to higher category of maintenance. |

8-5. Cleaning

Inspect the test set. The test set should be free of moisture, dirt, grease, and fungus.

*a.* Remove moisture and loose dirt with a clean soft cloth.

**WARNING**

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. DO NOT use near an open flame. Trichloroethane is not flammable, but exposure of the fumes to an open flame converts it to highly toxic, dangerous gases.

*b.* Remove grease, fungus, and ground-in dirt from the test set; use a soft cloth dampened (not wet) with trichloroethane.

*c.* Remove dirt from connectors with a brush; remove moisture with a dry cloth.

## Section III. OPERATOR'S TROUBLESHOOTING

8-6. General Troubleshooting Information

*a. Procedural Instructions.* The troubleshooting chart of subparagraph *b* below supplements the during-operation checks contained in the operator's daily preventive maintenance checks and services chart (para 8–4) and the steps contained in the performance check (para 7–5). To troubleshoot the equipment, perform all steps of the performance check until an abnormal condition or result is observed. When an abnormal condition or result is observed, note the apparent malfunction and turn to the corresponding malfunction in the troubleshooting chart (8–7). Perform the corrective actions indicated in the troubleshooting chart. If the corrective action indicated does not result in correction of the malfunction, higher category maintenance is required.

*b. Operator's Troubleshooting Chart.*

| Item No. | Trouble system | Probable trouble | Checks and corrective actions |
|---|---|---|---|
| 1. | AC POWER ON light does not illuminate when AC POWER circuit breaker is set to ON. | a. Defective pilot lamp. | a. Replace defective pilot lamp (para 8–7). |
| | | b. Loose ac power cable W6. | b. Tighten ac power cable W6 connection. |
| | | c. Ac power cable W6 defective. | c. Refer to higher category maintenance. |
| | | d. AC POWER circuit breaker defective. | d. Refer to higher category maintenance. |
| 2. | DC POWER ON light does not illuminate when DC POWER circuit breaker is set to ON. | a. Defective pilot lamp. | a. Replace defective pilot lamp (para 8–7). |
| | | b. Loose dc power cable W7. | b. Tighten dc power cable W7 connection. |
| | | c. Dc power cable W7 defective. | c. Refer to higher category maintenance. |
| | | d. DC POWER circuit breaker defective. | d. Refer to higher category maintenance. |
| 3. | CONTINUITY light does not light when TEST SELECT switch is set to PROBE CONTINUITY and jumper is placed between PROBES jacks. | a. Defective pilot lamp. | a. Replace defective pilot lamp (para 8–7). |
| | | b. Jumper not making contact. | b. Install jumper properly. |
| | | c. Defective TEST SELECT switch. | c. Refer to higher category maintenance. |
| 4. | All AC RELAY FAULT, DC LIMIT TEST and AC LIMIT TEST lights illuminate, except one, when PANEL LIGHTS switch is set to TEST. | a. Lamp that is not illuminated is burned out. | a. Replace defective pilot lamp (para 8–7). |
| | | b. PANEL LIGHTS switch defective. | b. Refer to higher category maintenance. |

8-7. Removal and Replacement of Panel Lamps

a. Removal To remove a panel lamp, anscrew the lens assembly. The lamp will come out of the socket with the lens assembly. Pull the amp out of the lens assembly.

*b. Replacement.* To replace a panel lamp, insert the new lamp in the lens assembly until it is seated securely in place. *Screw* the lens assembly into the socket Check the operation of the new lamp by actuating the PANEL LIGHTS switch to see if the lamp illuminates.

# CHAPTER 9

# ORGANIZATIONAL MAINTENANCE

## Section I. GENERAL

### 9-1. Scope of Maintenance

**Organizational maintenance duties are listed below together with a reference to the paragraphs covering the specific maintenance function.**

***a.*** **Monthly preventive maintenance checks and services (para 9–4).**

***b.*** **Quarterly preventive maintenance checks and services (para 9–4).**

***c.*** **Touchup painting (para 9–5).**

***d.*** **Troubleshooting (para 9–8).**

***e.*** **Repairs (para 9–9).**

### 9-2. Tools, Test Equipment, and Materials Required

The following tools, test equipment, and materiala are required for organizational maintenance.

a. Sandpaper (fine)
b. Electrical tape (black plastic)
c. Paint brush
d. Tool Kit, Electronic Equipment TK-101/G
e. Multimeter AN/URM-106
f. Primer, color Y per MIL-P-8585
g. Enamel, light gray type III, class 2 per MIL-E-15090

## Section II. PREVENTIVE MAINTENANCE

### 9-3. General

**Preventive maintenance** is the systematic camp **servicing, and inspection** of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable. The contents of paragraph 8-3 apply to organizational preventive maintenance as well as to **operator's preventive** maintenance.

### 9-4. Organizational Preventive Maintenance Checks and Services Periods

***a. Service Periods.*** **Perform the maintenance functions indicated in the monthly (*b* below) or quarterly (*c* below) preventive maintenance checks and services charts. A month is defined as approximately 30 calender days of 8-hour per day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks** and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. The requirement for monthly and or quarterly preventive maintenance checks and services in not limited to equipment in everyday use. These preventive maintenance checks and services must also be performed on equip ment maintained in a standby (ready for immediate operation) condition. Equipment in limited storage, which requires servicing before operation, does not require monthly and or quarterly maintenance. Operator's daily and weekly and organizational monthly preventive maintenance checks and services constitute a part of the quarterly preventive maintenance checks and services and must be performed concurrently. All deficiencies will be recorded in accordance with the requirements of TM 38-750.

***b. Organizational Monthly Preventive Maintenance Checks and Services Chart.***

| *Sequence number* | *Item to be inspected* | *Procedure* | *Paragraph reference* |
|---|---|---|---|
| 1 | Test set | Check test set for completeness. | |
| 2 | Exterior surfaces | Inspect exposed metal surfaces for rust and corrosion. Clean and touchup paint as required. | Para 9–5. |

| Sequence number | Item to be inspected | Procedures | Paragraph reference |
|---|---|---|---|
| 3 | Cables and connectors | Inspect cable connectors for corrosion, bent pins, or thread damage. Repair or replace as necessary. Inspect all cables for cracks, cuts, or badly chafed areas on cable jacketing. | Para 9–10. |
| 4 | Handles and latches | Inspect handles, latches, hinges, and other exterior items for looseness. Tighten as necessary. | None. |
| 5 | Front panel | Check all control knobs for looseness, correct indications, and rotation. Reset and tighten as required. | None. |

*c. Organizational Quarterly Preventive Maintenance Checks and Services Chart.*

| Sequence number | Item to be inspected | Procedures | Paragraph reference |
|---|---|---|---|
| 1 | Publications | See that all publications are complete, serviceable, and current. | DA Pam 310–4. |
| 2 | Modifications | Check DA Pam 310–7 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately; all NORMAL MWO's must be scheduled. | TM 38–750 and DA Pam 310–7. |

9-5. Touchup Painting Instructions

WARNING

The primer and enamel used for touchup painting are flammable. Perform the touchup in an approved area that is away from fire or flame.

*a.* Use the primer and enamel specified in paragraph 9–2.

b. Refer to the applicable cleaning and refinishing instructions contained in TB 746-10, Field Instructions for Painting and Preserving Electronic Command Equipment,

9-6. Adjustment of Case Latch Tension

Check latches for tension. Tension is adequate when tie cover firmly secure to the case and all latches are tight. Perform the following if any of the latches are loose.

*a.* Exert downward pressure on the latch to permit disengagement. Disengage the latch from the case cover.

*b.* Using a 3/8-inch open-end wrench, hold the latch nut in position while turning the latch in the direction that will secure the cover more firmly.

*c.* Engage the latch on the case cover, then exert upward pressure on the latch to secure.

*d.* Check the latch for sufficient tension.

*e.* Repeat the procedures given in *a* through *c* above as required until the desired latch tension is obtained.

9-7. Lubrication

No, lubrication of the test is required.

## Section III. ORGANIZATIONAL TROUBLESHOOTING

9-8. General

*a. Procedural Instructions.* The organizational troubleshooting chart (para 9–9) supplements the organizational preventive maintenance checks and services. To troubleshoot the equipment, perform all functions starting with sequence number 2, in the organizational preventive maintenance checks and services chart (para 9–4b). Proceed through the functions until an abnormal condition or result is obtained. When an abnormal condition or result is obtained, note the apparent trouble symptom and turn to the corresponding trouble symptom in the troubleshooting chart of subparagraph *b*. Perform the checks and corrective actions indicated in the troubleshooting chart. If the corrective measures indicated in the troubleshooting chart. If the corrective measures indicated do not result in correction of the trouble, higher category maintenance is required.

**5. Organizational Troubleshooting Chart.**

| Item No. | Trouble symptom | Probable trouble | Checks and corrective actions |
|---|---|---|---|
| 1. | No ac power to test set | a. Dirty or bent pins on jack J6 (AC POWER) | a Clean and/or straighten connector pins |
| | | b. Defective cable W6. | b Insert and make continuity checks of the cable (para 9–9) |
| 2. | No dc power to test set | a. Dirty or bent pins on jack J7 (DC POWER) | a. Clean and/or straighten connector pins. |
| | | b. Defective cable W7 | b Inspect and make continuity checks of the cable (para 9–9) |
| 3. | No output from one or more of test jacks (J1 through J5, J8, and J9) | a Dirty or bent connector pins. | a Clean and/or straighten connector pins. |
| | | b Defective cable(s) W1 through W6, W8, and W9. | b Inspect and make continuity checks of cables (para 9–9) |
| 4. | Unable to correctly position one or more of the test set front panel rotary switches | a. Loose rotary switch knob(s) | a. Position and tighten switch knob(s) as required. |
| | | b. Defective switch(s) | b Refer to higher category maintenance. |

*9-9. Cable Continuity Check and Repair*

*a. Cable Continuity Check. Turn off power to* test set and disconnect cable from test set and equipment under test. Use the ohmmeter and check the continuity of the cable **from** pm-to-pin **If any pin-to-pin measurement indicates an open (no continuity), refer to higher category maintemance**

*b Cable Repair Repair* **cables that are cracked,** cut, or badly chafed by wrapping with black, plastic electrical tape Straighten bent connector pins with a small pair of needle-nom pliers, being careful not to break the pins If the cable connector is corroded, clean with cleaning compound and a soft-bristled brush If the cable cannot be repaired by any of the above methods, refer to **higher** category maintenance

# CHAPTER 10

# SHIPMENT, STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

## Section I. SHIPMENT AND LIMITED STORAGE

### 10-1. Disassembly of Equipment

Prepare the test set for shipment limited storage as follow:

a. Disconnect all test cables, coil them, and tie them with cotton twine.

b. Place cable assemblies W1 through W9 in storage compartment of test set case under the inner door. Fill any empty spaces with soft cushioning material.

c. Place the technical manual on top of the cables before closing the inner door.

d. Close and sure the inner door by fastening the three pushbutton fasteners.

e. Place the top half of the case containing the cables and the technical manual on the test set and fasten the eight latches. Be sure the top half is evenly seated so the gasket will be tight all the way around and render the case watertight.

### 10-2. Repackaging for Shipment or Limited Storage

a. General The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored. Adapt the procedures outlined below whenever circumstances permit. The information concerning the original packaging (para *7-1) will also be helpful. Also, use the original* shipping box and packing materials, if available, and pack the case as described below. If the original shipping box and packing materials to the dimensions given in table 10-1.

b. Packaging. Package the test set as outlined below. Refer to figure 7-1.

(1) Make sure the procedures listed in paragraph 10-1 have bean completed.

(2) Place four foam comer blocks and one or more corrugated fiberboard liners in bottom of cleated-plywood box.

(3) Place test set in cleated-plywood box.

(4) Use remaining four foam comer blocks and corrugated fiberboard liners as required to restrict any free movement of the case.

Table 10-1. *Materials for Fabrication of Test Set Shipping Box*

| Qty | Materials |
|---|---|
| 2 min | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200, top and bottom, 24 by 21.5 inches |
| 2 min | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), sides 24.5 by 19.5 inches |
| 2 min | Fiberboard liners (PPP–F–320, CF, DOM, SW, 200), ends 21.5 by 19.5 inches. |
| 8 | Foam corner blocks (unicellular, polyethylene foam, MIL–C–46842), 9 by 9 by 9 inches with 2-inch thick walls |
| As req. | Steel strapping, flat (QQ–5–781, Type 1, Class B, Grade 2) 0.75 inch wide by 0.023 inch thick |
| As req. | Cleated plywood box (PPP–B–601, Style A, Domestic Type), inside dimensions 23 by 35 by 27.5 inches |

(5) Secure plywood top to cleated-plywood box.

(6) Install three straps (QQ–S–781) around box, using staples (FF–N–105).

## Section II. DEMOLITION TO PREVENT ENEMY USE

### 10-3. Authority for Demolition

Demolition of the equipment will be accomplished only upon order of the commander. Use the destruction procedure outlined in paragraph 5–4 to prevent further use of the equipment.

### 10-4. Methods of Destruction

The tactical situation and time available will determine the method to be used when destruction of equipment is ordered. In most cases it is preferable to demolish completely some portions

of the equipment rather than to partially destroy all the equipment.

*a. Smash.* Use sledges, axes, hammers, crowbars, and any other heavy tools to smash the equipment.

**NOTE**

The underside of the panel-chassis assembly should also be demolished. If time permits, remove the panel chassis assembly from the case by removing the captive screws and lifting from the case.

*b. Cut.* Use axes, handaxes, machetes, and similar tools to cut cable assemblies and wiring. Cut all cables and wiring in a number of places.

WARNING

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent, and only when all personnel concerned are thoroughly familiar with demolition procedures. See FM 5-25.

*c. Burn.* Burn the technical manuals first. Burn as much of the equipment as is flammable; use gasoline, oil, flamethrowers, and similar materials. Pour gasoline on the cut cables and wiring and ignite it. Use a flamethrower to burn spare parts, or pour gasoline on the spares and ignite them. Use incendiary grenades to complete the destruction of the equipment.

*d. Explode.* Use explosives to complete demolition or to cause maximum damage before burning when time does permit complete demolition by other means. Powder charges, fragmentation grenades, or incendiary grenades may be used. Incendiary grenades are usually most effective if destruction of small parts and wiring is desired.

*e. Dispose.* Bury or scatter the destroyed parts or throw them into nearby waterways. This is particularly important if a number of parts have not been completely destroyed.

## 10-5. Reporting

A report of the material destroyed shall be made through command channels.

# APPENDIX A

## REFERENCES

The following publications contain information applicable to the operation and maintenance of Test Set Groups, Radar OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D.

| | |
|---|---|
| DA Pam 310-4 | Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders. |
| DA Pam 310-7 | U. S. Army Equipment Index of Modification Work Orders. |
| FM 5-25 | Explosives and Demolition. |
| SB 11-573 | Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment. |
| TB 746-10 | Field Instructions for Painting and Preserving Electronics Command Equipment. |
| (C) TM 11-5895-578-12 | Operator's and Organizational Maintenance Manual: Radar Surveillance Set AN/APS-94D(V). |
| (C) TM 11-5895-587-34 (When published) | DS and GS Maintenance Manual, Radar Surveillance SET AN/APS-94D(V). |
| (C) TM 11-5895-587-50 (When published) | Depot Maintenance Manual, Radar Surveillance Set AN/APS-94D(V). |
| TM 11-6625-203-12 | Operator and Organizational Maintenance Manual for Multimeter AN/URM-105, Including Multimeter ME-77/U. |
| TM 38-750 | Army Equipment Record Procedures. |

# APPENDIX B

# MAINTENANCE ALLOCATION

## Section I. INTRODUCTION

### B-1. General

**This appendix provides a summary of the maintenance operations covered in the equipment literature for OQ-64(V)1/APS-94D and OQ-64(V)2/APS-94D. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.**

### B-2. Maintenance Functions

**Maintenance functions will be limited to and defined as follows:**

*a. INSPECT.* **To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.**

*b. TEST.* **To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.**

*c. SERVICE.* **To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.**

*d. ADJUST.* **To rectify to the extent necessary to bring into proper operating range.**

*e. ALIGN.* **To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.**

*f. CALIBRATE.* **To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.**

*g. INSTALL.* **To set up for use in an operational environment such as an encampment, site, or vehicle.**

*h. REPLACE.* **To replace unserviceable items with serviceable like items.**

*i. REPAIR.* **To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.**

*j. OVERHAUL.* **Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.**

*k. REBUILD.* **The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.**

*l. SYMBOLS.* **The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.**

### B-3. Explanation of Format

*a. Column 1, group number.* Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies and and modules with the next higher assembly.

*b. Column 2, functional group.* Column 2 lists the noun names of components, assemblies, subassemblies and modules on which maintenance is authorized.

*c. Column 3, maintenance functions.* Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories.
The codes used represent the various maintenance categories as follows:

| Code | Maintenance Category |
|---|---|
| C | Operator/Crew |
| O | Organizational Maintenance |
| F | Direct Support Maintenance |
| H | General Support Maintenance |
| D | Depot Maintenance |

*d. Column 4, tools and test equipment.* Column 4 specifies, by code, those tools and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

*e. Column 5, Remarks.* Self-explanatory.

### B-4. Explanation of Format of Table 1, Tool and Test Equipment Requirements

The column in Table I, Tool and Test Equipment Requirements are as follows:

*a. Tools and Equipment.* The numbers in this column coincide with the numbers used in the tools and equipment column of the Maintenance Allocation Chart. The numbers indicate the applicable tool for the maintenance function.

*b. Maintenance Category.* The codes in this column indicate the maintenance category normally allocated the facility.

*c. Nomenclature.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

*d. Federal Stock Number.* This column lists the Federal stock number of the specific tool or test equipment.

*e. Tool Number.* Not used.

SECTION II. MAINTENANCE ALLOCATION CHART FOR
TEST SET GROUPS, RADAR OQ-64(V)1/APS-94D AND OQ-64(V)2/APS94D

| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 1 | INTERFACE TEST, ANTENNA DRIVE TS-2974/APS-94D | O | | | | | | | | | | | 23 | EXTERNAL |
| | | H | | | | | | | | | | | 24 | INTERNAL |
| | | | O | | | | | | | | | | 12 | |
| | | | H | | | | | | | | | | 13, 14, 15, 26, 29 | |
| | | | | O | | | | | | | | | 23 | EXTERNAL |
| | | | | H | | | | | | | | | 24 | INTERNAL |
| | | | | | H | | | | | | | | 13, 14, 15, 24, 26 | |
| | | | | | | | | | | H | | | 24 | REPLACE PARTS |
| | | | | | | | | | | D | | | 24 | DEPOT FACILITIES |
| | | | | | | | | | | | D | | 24 | DEPOT FACILITIES |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 2 | INTERFACE TEST, RADIO FREQUENCY POWER TS-2975/APS-94D | O | | | | | | | | | | | 23 | EXTERNAL |
| | | H | | | | | | | | | | | 24 | INTERNAL |
| | | | O | | | | | | | | | | 12 | CABLES |
| | | | H | | | | | | | | | | 1, 2, 3, 6, 7, 11, 15, 16 | |
| | | | | | | | | | | | | | 18, 22, 31, 32 | |
| | | | | O | | | | | | | | | 23 | EXTERNAL |
| | | | | H | | | | | | | | | 24 | INTERNAL |
| | | | | | H | | | | | | | | 1, 2, 3, 6, 7, 11, 15, 16 | |
| | | | | | | | | | | | | | 18, 22, 24 | |
| | | | | | | | | | | H | | | 24 | REPLACE MODULES |
| | | | | | | | | | | D | | | 24 | DEPOT FACILITIES |
| | | | | | | | | | | | D | | 24 | DEPOT FACILITIES |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 2A1 | ANTENNA PORT COUPLER SELECTOR | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 11, 16, 22 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | | | D | | | | | | 11, 16, 22, 24 | |
| | | | | | | | | H | | | | | 24 | |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
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| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 2A2 | OSCILLATOR | H | | | | | | | | | | | 24 | |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
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| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 2 A 3 | SWITCH DRIVER | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 13, 17 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
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| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 2A4 | POWER METER | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 11, 16, 22 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | | D | | | | | | | 4, 11, 16, 22, 24, 26 | |
| | | | | | | | D | | | | | | 4, 11, 16, 22, 24, 26 | |
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| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 2 A 5 | SWITCH, COAXIAL DIODE | H | | | | | | | | | | | 24 | |
| | | | H | | | | | | | | | | 24 | |
| | | | | | | | | H | | | | | 24 | |
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| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 3 | CONTROL, TEST SET C-8495/APS-94D | O | | | | | | | | | | | 23 | EXTERNAL |
| | | H | | | | | | | | | | | 24 | INTERNAL |
| | | | O | | | | | | | | | | 12 | CABLES |
| | | | H | | | | | | | | | | 13, 15, 17, 20, 25, 26, 28 | |
| | | | | O | | | | | | | | | 23 | EXTERNAL |
| | | | | H | | | | | | | | | 24 | INTERNAL |
| | | | | | H | | | | | | | | 13, 15, 17, 20, 24 | |
| | | | | | | | | | | | | | 25, 26 | |
| | | | | | | | | | | H | | | 24 | REPLACE MODULES |
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| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 3A1 | OSCILLATOR - PRF COUNTER | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 5, 13, 15, 17, 21 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | | | | H | | | | | 24 | |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 3A2 | ANTENNA COUNTER | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 5, 13, 15, 17, 21 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
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| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 3 A 3 | POWER SUPPLY REGULATOR | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 13, 15, 21, 25 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 3A4 | VOLTAGE MONITOR | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 13, 15, 17, 21, 25 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | | | | H | | | | | 24 | |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 4 | INTERFACE TEST, ELECTRONIC CIRCUIT PLUG-IN UNIT TS-2976/APS-94D | O | | | | | | | | | | | 23 | EXTERNAL |
| | | H | | | | | | | | | | | 24 | INTERNAL |
| | | | O | | | | | | | | | | 12 | |
| | | | H | | | | | | | | | | 8,10,13,15,20,26,27,30 | |
| | | | | O | | | | | | | | | 24 | EXTERNAL |
| | | | | H | | | | | | | | | 24 | INTERNAL |
| | | | | | | | | | | | | | 8, 10, 13, 15, 20, 24, | |
| | | | | | | | | | | | | | 26, 27 | |
| | | | | | | | | | | H | | | 24 | REPLACE MODULES |
| | | | | | | | | | | | D | | 24 | DEPOT FACILITIES |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 4A1 | RECTIFIER BOARD | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 13, 21, 26 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | D | | | | | | | | 13, 21, 24, 25 | |
| | | | | | | | | H | | | | | 24 | |
| | | | | | | | | | H | | | | 24 | |
| | | | | | | | | | | D | | | 24 | DEPOT FACILITIES |
| | | | | | | | | | | | D | | 19, 24 | DEPOT FACILITIES |
| | | | | | | | | | | | | D | 19, 24 | DEPOT FACILITIES |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 4A2 | REGULATOR ±15 VDC | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 13, 17, 21 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | D | | | | | | | | 13, 17, 21, 24 | |
| | | | | | | | | H | | | | | 24 | |
| | | | | | | | | | H | | | | 24 | |
| | | | | | | | | | | D | | | 24 | DEPOT FACILITIES |
| | | | | | | | | | | | D | | 19, 24 | DEPOT FACILITIES |
| | | | | | | | | | | | | D | 19, 24 | DEPOT FACILITIES |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 4A3 | DRIVER BOARD | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 5, 9, 13, 15, 17, 21 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | | | | H | | | | | 24 | |
| | | | | | | | | | H | | | | 24 | |
| | | | | | | | | | | D | | | 24 | DEPOT FACILITIES |
| | | | | | | | | | | | D | | 19, 24 | DEPOT FACILITIES |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 4A4 | TEST AMPLIFIER | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 9, 13, 15, 17 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | | | | H | | | | | 24 | |
| | | | | | | | | | H | | | | 24 | |
| | | | | | | | | | | D | | | 24 | DEPOT FACILITIES |
| | | | | | | | | | | | D | | 19, 24 | DEPOT FACILITIES |
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| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTION | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| 4A5 | RF SWITCH | H | | | | | | | | | | | 24 | |
| | | | D | | | | | | | | | | 10, 15, 17 | |
| | | | | H | | | | | | | | | 24 | PREVENTIVE MAINT |
| | | | | | | | | H | | | | | 24 | |
| | | | | | | | | | H | | | | 24 | |
| | | | | | | | | | | D | | | 24 | DEPOT FACILITIES |
| | | | | | | | | | | | D | | 19, 24 | DEPOT FACILITIES |
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TABLE 1. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TEST SET GROUPS, RADAR OQ-6[illegible](V)1/APS-94D AND OQ-6[illegible](V)2/APS-94D

TOOL AND TEST EQUIPMENT REQUIREMENTS

| TOOL OR TEST EQUIPMENT REFERENCE CODE | MAINTENANCE CATEGORY | NOMENCLATURE | FSN | TOOL NUMBER |
|---|---|---|---|---|
| 1 | H, D | ADAPTER (OSM FEMALE-TO 'N' FEMALE) OMNI-SPECTRA TYPE 21010 | 5935-824-7588 | |
| 2 | H, D | ANALYZER, SPECTRUM AN/UPM-84 | 6625-557-262 | |
| 3 | H, D | CABLE, POWER | N FSN | user fabricated |
| 4 | D | CALIBRATOR, POWER METER HP 8477A | N FSN | |
| 5 | H, D | COUNTER, ELECTRONIC, DIGITAL READOUT AN/USM-207 | 6625-911-6368 | |
| 6 | D | COUNTER PLUG-IN UNIT (HIGH FREQUENCY); COMPUTER MEASUREMENT CORP 886A | N FSN | |
| 7 | H, D | DETECTOR, CRYSTAL HEWLETT-PACKARD X424A02 | 6625-945-2881 | |
| 8[a] | H, D | DIVIDER, POWER MICROLABS DA3FB | 6625-973-5426 | |
| 9[a] | D | GENERATOR, PULSE HP 222A | 6625-930-8215 | |
| 10[a] | H, D | GENERATOR, SIGNAL AN/USM-44 | 6625-649-3263 | 2 REQUIRED |

TOOL AND TEST EQUIPMENT REQUIREMENT

| TOOL OR TEST EQUIPMENT REFERENCE CODE | MAINTENANCE CATEGORY | NOMENCLATURE | FSN | TOOL NUMBER |
|---|---|---|---|---|
| 11 | H, D | GENERATOR, SIGNAL SG-400/U | 6625-814-3854 | |
| 12 | O | MULTIMETER AN/URM-105 | 6625-581-2036 | |
| 13 | H, D | MULTIMETER TS-352B/U | 6625-553-0142 | |
| 14 | H, D | GENERATOR, SIGNAL TS-421/U | 6625-669-0228 | |
| 15 | H, D | OSCILLOSCOPE AN/USM-281A | 6625-228-2201 | |
| 16 | H, D | POWER METER AN/USM-260 | 6625-917-3099 | HP-431C |
| 17 | H, D | POWER SUPPLY PP-3940/G | 6130-985-8136 | 4 required |
| 18 | H, D | POWER SUPPLY PP-3941/G | 6130-985-8143 | |
| 19 | D | REPAIR KIT, PRINTED WIRING BOARD MK-772/ U | 5999-757-7042 | |
| 20 | H, D | TERMINATION, 50 OHM HEWLETT-PACKARD MODEL 10100A | 6625-880-3947 | |

TOOL MO TEST EQUIPMENT REQUIREMENTS - CONTINUED

| TOOL OR TEST EQUIPMENT REFERENCE CODE | MAINTENANCE CATEGORY | NOMENCLATURE | FSN | TOOL NUMBER |
|---|---|---|---|---|
| 21 | D | TEST FIXTURE, PWB SUBASSEMBLY | N FSN | user-fabricated |
| 22 | H, D | THERMISTOR HP 486A | 6625-065-3213 | |
| 23 | O | TOOL KIT, ELECTRONIC EQUIPMENT TK-101/G | 5180-094-5178 | |
| 24 | H, D | TOOL KIT, ELECTRONIC EQUIPMENT TK-105/U | 5180-610-8177 | |
| 25 | H, D | TRANSFORMER, VARIABLE; GENERAL RADIO TYPE M-2G3 | 5950-847-4683 | |
| 26 | H,D | VOLTMETER, DIGITAL ; NON LINEAR SYSTEMS X-2 | 6625-068-0611 | |
| 27[a] | H, D | VOLTMETER, RF AN/URM-145 | 6625-973-9386 | |
| 28 | H, D | TEST FIXTURE, CONTROL | N FSN | user-fabricated |
| 29 | H, D | TEST FIXTURE, ANTENNA DRIVE | N FSN | user-fabricated |
| 30[a] | H, D | TEST FIXTURE, HIGH VOLTAGE LOAD | N FSN | user-fabricated |
| 31 | H, D | METER, FREQUENCY PRD 559A | 6625-620-7481 | |
| 32 | H, D | ADAPTER, COAXIAL TO WAVEGUIDE UG-105/U | 5985-083-3519 | p/o AN/USM-37A |

[a] These equipments are required to support the OQ-64(V)2/APS-94D but are not required to support the OQ-64(V)1/APS-94D.

**By Order of the Secretary of the Army:**

**W. C. WESTMORELAND,**
**General, United States** Army,
Chief of Staff.

**Official:**

**KENNETH G. WICKHAM,**
***Major General, United States Army,***
***The Adjutant General.***

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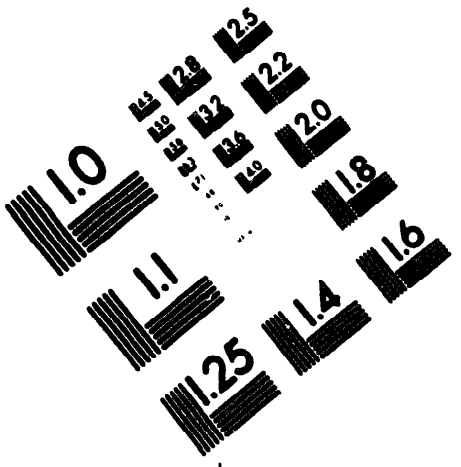
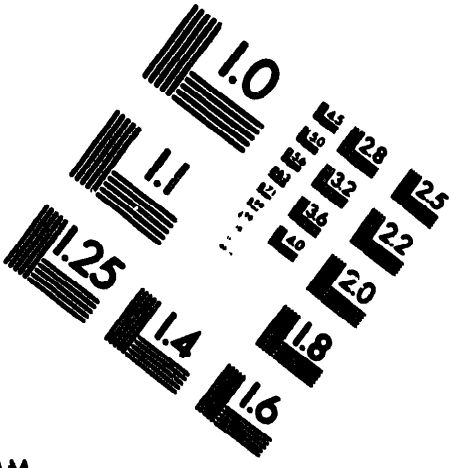
DEPARTMENT OF THE ARMY

MICROFORM
TEST TARGET

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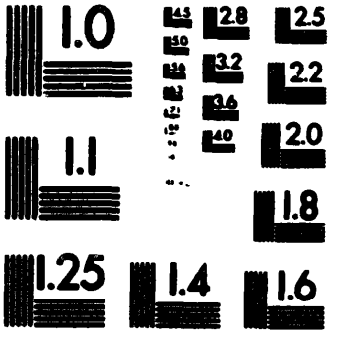


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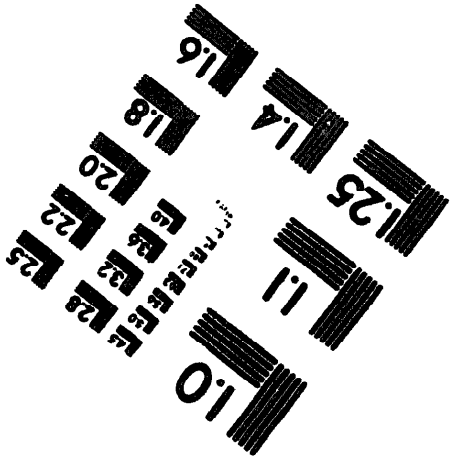



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