Operator's, Organizational, and Direct Support Maintenance Manual for Radio Test Set Group OQ-273/ARC-164(V)

(NSN 5821-01-072-8146)

Headquarters, Department of the Army

30 Jul 1980

WARNING

All operations must conform to TB 385-4, Safety Precautions for Maintenance of Electrical Electronic Equipment (8 August 1979).

WARNING

Avoid shock; ground the test set. Before connecting to a power source, the protective ground terminals must be connected to the equipment grounding (safety) conductor (green) of the power cable. Ensure that the AC line power plug is connected to a circuit that has a protective earth (safety) ground. Improperly grounded equipment can result in hazardous voltages between equipments. Ensure that all devices connected to the test set are connected to earth ground.

WARNING

Be aware of the WARNINGS pertaining to TRICHLOROTRIFLUOROETHANE before doing any work with cleaning compounds or chemicals. Before using these agents, check with your local Safety Office or Preventive Medicine Activity. They can provide information on any hazards when using these agents and how to avoid them.

Technical Manual

HEADQUARTERS
DEPARTMENT OF THE ARMY

No. TM 11-6625-2950-13

Washington, DC, 30 JULY 1980

Operator's, Organizational, and Direct Support Maintenance Manual

for

RADIO TEST SET GROUP OQ-273/ARC-164(V)

(NSN 5821-01-072-8146)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommend Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703.

In either case, a reply will be furnished direct to you.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Scope

This manual describes Radio Test Set Group OQ-273/ARC-164(V) (test set group) (fig. 1-1) and covers the installation, organizational, and direct support maintenance of this equipment, It includes instructions for operating the equipment, troubleshooting, and replacement of malfunctioning components. It also lists the tools and test equipment available at the direct support level.

1-2. Indexes of Publications

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

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO'S) pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System.

b. Report of Packaging and Handling Deficiencies Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/ NAVSUPINST4030.29/AFR71-13/MCOP4030.29A, and DLAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

1-4. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-5. Reporting Equipment Improvement Recommendations (EIR)

If your Radio Test Set Group OQ-273/ARC-164(V) needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703. We'll send you a reply.

1-6. Administrative Storage

Before storing the equipment, verify its operational status by performing the Organizational Preventive Maintenance Checks and Services (Chapter 3). If defects are noted in the equipment, make repairs or refer it to higher category maintenance in accordance with the Maintenance Allocation Chart (appendix D).

1-7. Calibration

No calibration of the test set group is required.

1-8. Official Nomenclature Cross-Reference List

The official nomenclature and cross-reference list for the equipment is listed in table 1-1.

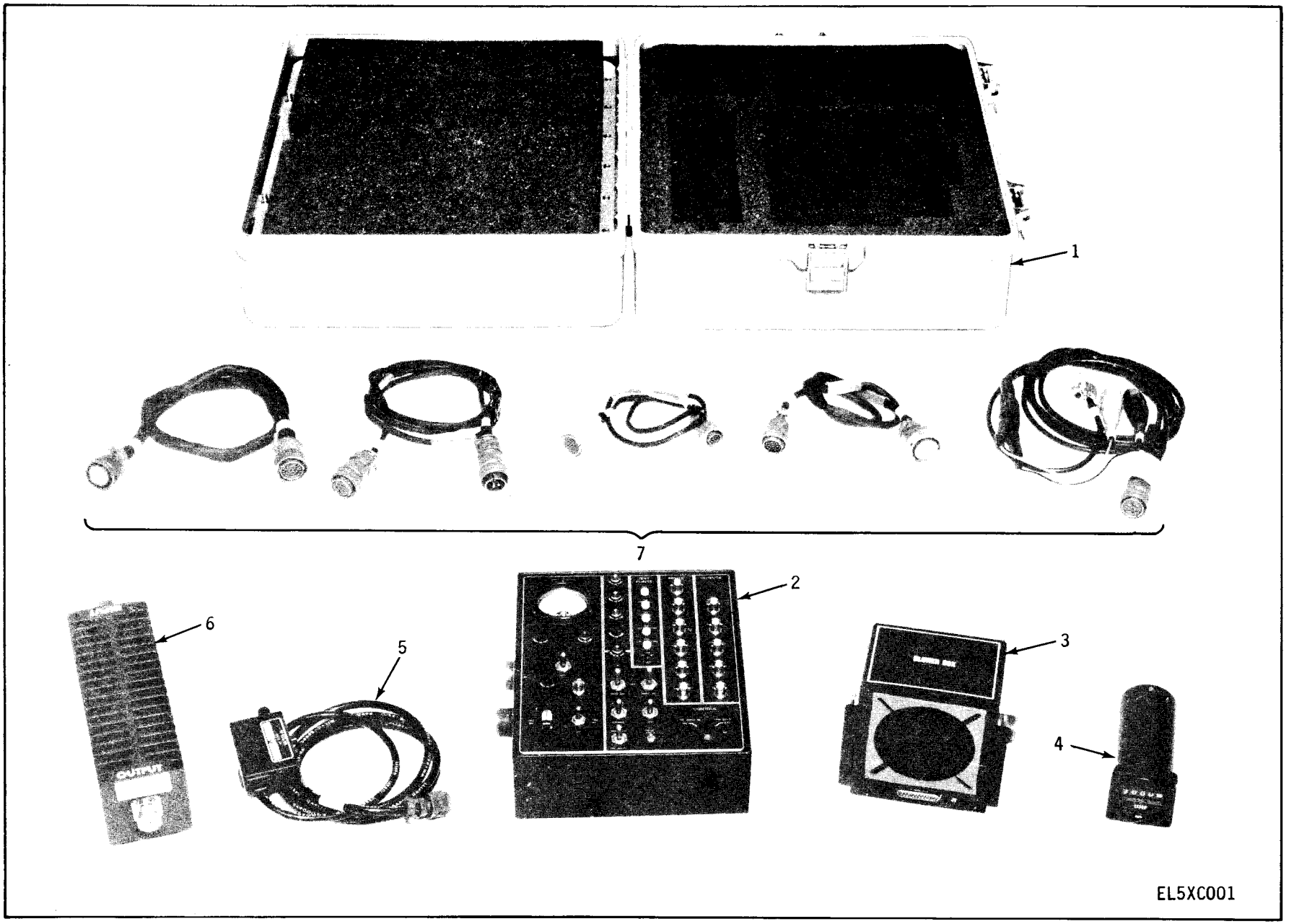


Figure 1-1. Radio Test Set Group OQ-273/ARC-164(V).

Table 1-1. Official Nomenclature Cross-Reference List

Nomenclature	Common name
Test Set Group, Radio OQ-273/ARC-164(V)	Test set group
Interconnecting Box J-3652/ARC-174(V)	Interconnecting Box
Cooler, Air, Electronic Equipment HD-1063/ARC-164(V)	Air cooler
Case, Test Set Group CY-7774/ARC-164(V)	Transit Case
Cable Assembly, Special Purpose, Electrical CX-13106/ARC-164(V)	Cable assembly W5
Cable Assembly, Special Purpose, Electrical CX-13107/ARC-164(V)	Cable assembly W4
Cable Assembly, Special Purpose, Electrical CX-13108/ARC-164(V)	Cable assembly W3
Cable Assembly, Special Purpose, Electrical CX-13109/ARC-164(V)	Cable assembly W2
Cable Assembly, Power, Electrical Branched CX-13110/ARC-164(V)	Cable assembly W1
Local Headset Adapter MX-9530/ARC*	Headset adapter
Frequency Channel Indicator ID-1961A/ARC-164(V)	Indicator
Radio Set AN/ARC-164(V)12	Uhf radio set
Receiver-Transmitter, Radio RT-1288/ARC-164(V)	Uhf receiver-transmitter
Control, Radio Set C-10547/ARC-164(V)	Uhf radio control

*Not used in testing the uhf receiver-transmitter.

SECTION II. DESCRIPTION AND DATA

1-9. Purpose and Use

Test Set Group OQ-273/ARC-164(V) is a test set that is capable of testing Radio Set Control C-10547/ARC-164(V) alone or testing the C-10547/ARC-164(V) along with the Receiver-Transmitter RT-1288/ARC-164(V). The test set group also provides a means of checking the serial word data with the use of Frequency Channel Indicator ID-1961A/ARC-164(V).

1-10. Description

The test set group consists of the following (fig. 1-1):

a. *Transit Case* (Item 1). The watertight transit case, with a pressure relief valve, provides a compact means of transporting the test set group.

b. *Interconnecting Box.* (Item 2). The interconnetting box provides connections mounted on the side of the unit for equipment under test and for the air cooler and indicator. Test points and coaxial connectors are mounted on the front panel and are used for measuring and monitoring voltages of the equipment under test. A dc ammeter is provided to measure the input current. The CONTROL switch controls the operational mode of the uhf receiver-transmitter.

DESCRIPTION OF DATA (CONT)

c. Air Cooler. (Item 3). The air cooler provides cooling air to the uhf receiver-transmitter.

NOTE

An interlock circuit insures that the uhf receiver-transmitter cannot be operated without the required cooling airflow.

d. Indicator. (Item 4). The indicator is used to check the serial word data of the equipment under test.

e. Headset Adapter. (Item 5). The headset adapter connects a remote headset t o the uhf receiver-transmitter.

NOTE

The headset adapter is not used in testing the uhf receiver-transmitter.

f. Attenuator. (Item 6). The 50-ohm, 30-db attenuator is used to reduce the rf output of the uhf receiver-transmitter under test.

g. Cable Assemblies. (Item 7). Five connecting cable assemblies:

(1) *Cable Assembly W1.* Cable assembly W1, connects 27.5 vdc and 115 vat, 60 Hz power to the test set group and equipment under test.

(2) *Cable Assembly W2.* Cable assembly W2, connects the air cooler to the interconnecting box.

(3) *Cable Assembly W5.* Cable assembly W5, connects the indicator t he interconnecting box.

(4) *Cable Assembly W4.* Cable assembly W4, connects the uhf radio control to the interconnecting box.

(5) *Cable Assembly W3.* Cable assembly W3, connect the uhf receiver-transmitter to the interconnecting box.

1-11. Tabulated Data

Dimensions:
- Width . . . .22 in.
- Height . . . . . .10-5/8 in.
- Depth . . . .19 in.

Weight . . . .40 lb.

Input Power . . . .115 vac,60 Hz

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. Service Upon Receipt of Equipment

a. inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3).

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with paragraph 1-3. The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing.

c. Check to see whether the equipment has been modified. (Equipment which has been modified will have the MWO number on the transit case.) Check also to see whether all currently applicable MWO's have been applied. (Current MWO's applicable to the equipment are listed in DA Pam 310-7.)

d. Refer to SB 38-100 for packaging material data.

e. Record the warranty date. The test set group is under warranty until that date which is annotated on the warranty label.

2-2. Unpacking the Test Set Group

a. Open the corrugated carton and fold back the top flaps.

b. Remove the four corner pads.

c. Remove the contents from the carton.

d. Open the airtight bag and remove the inner corrugated carton,

e. Open the inner corrugated carton and remove the contents.

f. Remove the test set group from the cushioning and inner wrapping material.

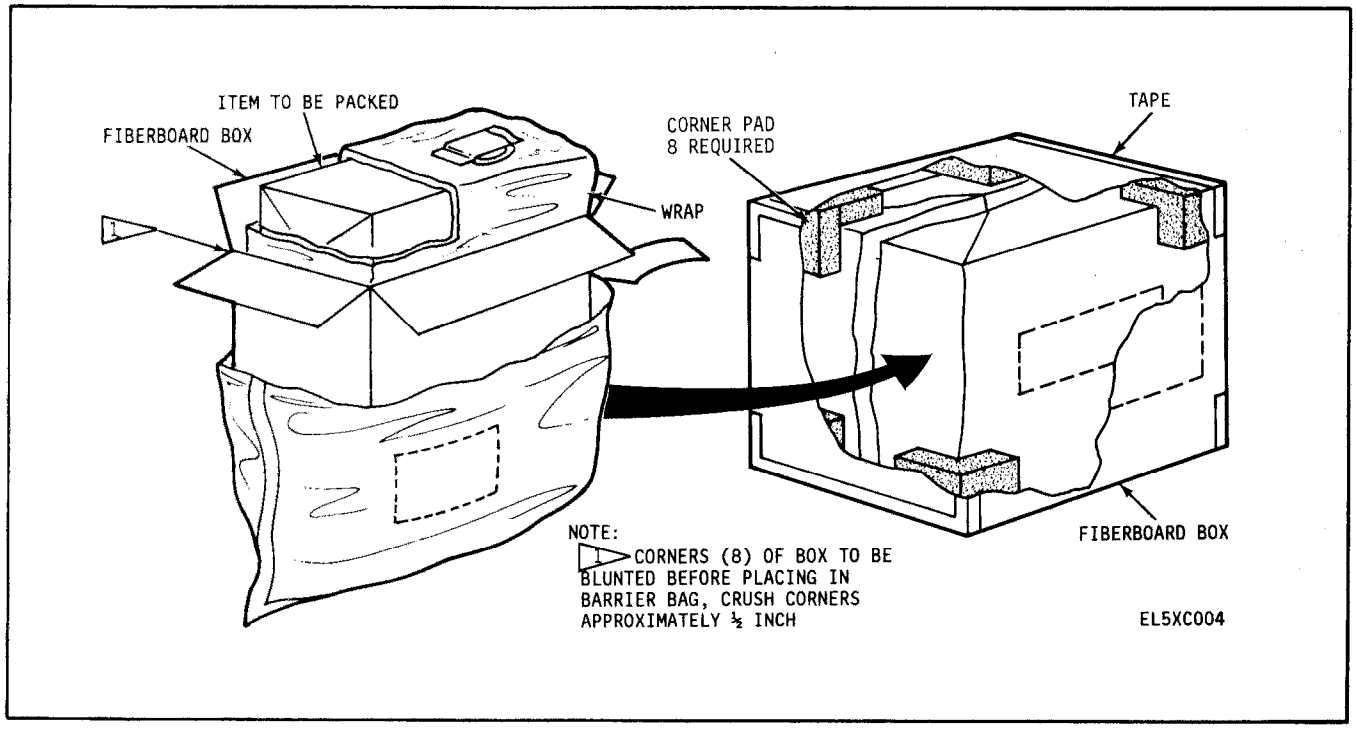


Figure 2-1. Test Set Group Packaging Diagram

2-3. Packaging the Indicator

The following are packaging procedures for shipment to depot of any applicable items replaced during trouble analysis:

a. Retain the packaging material in which the spare was packed at the time of receipt, or replace with equivalent packaging material.

b. Using this packaging material, pack the item replaced according to the following information:

(1) For indicator boards A2, A3, and A4, refer to figure 2-2.

(2) For indicator board A1, refer to figure 2-3.

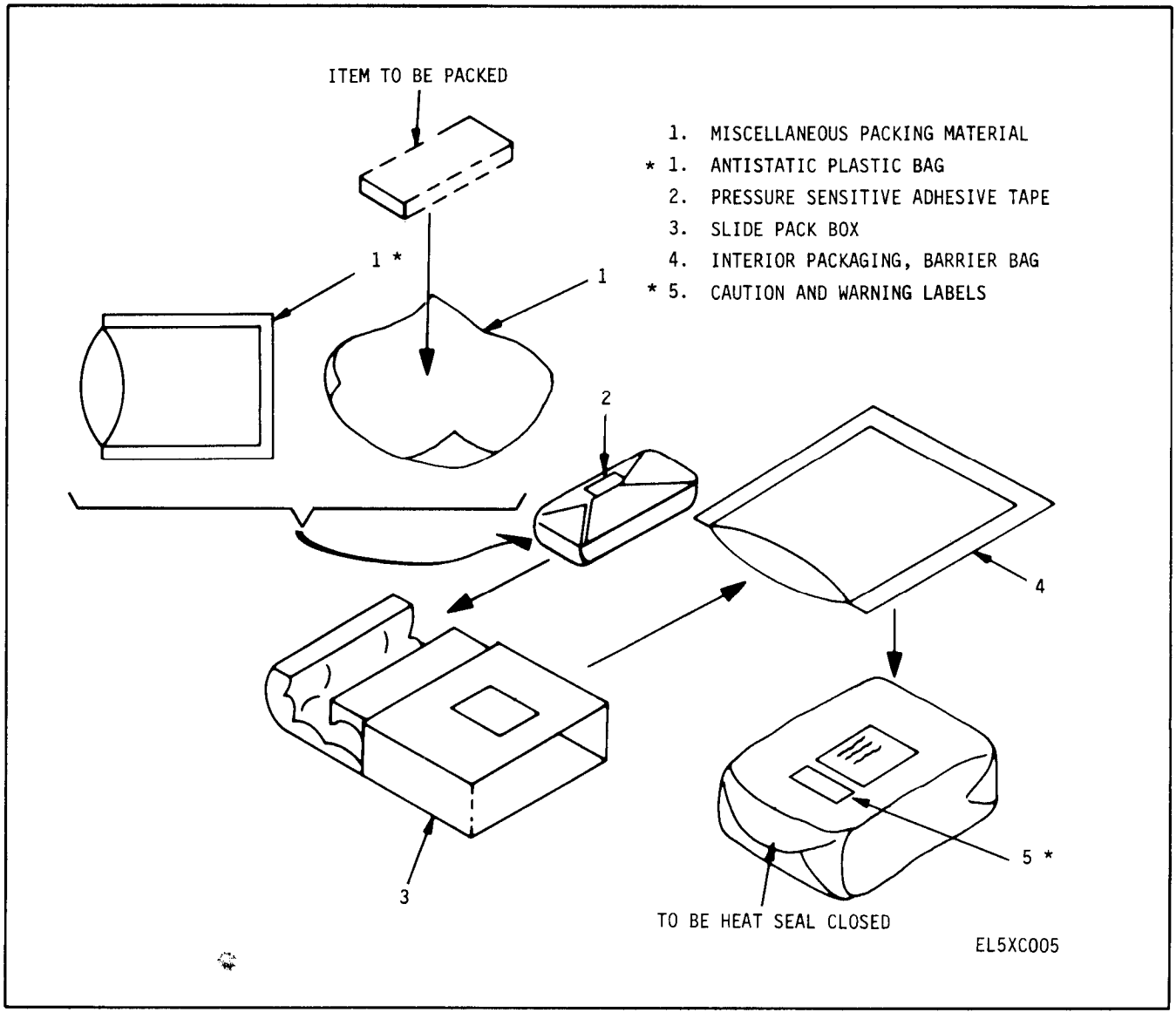


Figure 2-2. General Use Packaging Diagram

Section II. CONTROLS AND INSTRUMENTS

2-4. Damage from Improper Settings

Damage to the test set group is limited to physical damage. Damage to the external controls andindicators can occur if the equipment is dropped. The transit case provides protection for the test set group to the maximum extent possible.

2-5. Operator Controls, Indicators, Connectors, and Test Points (figure 2-4).

Table 2-1 is a list of operator controls, indicators, connectors, and test points on the interconnecting box.

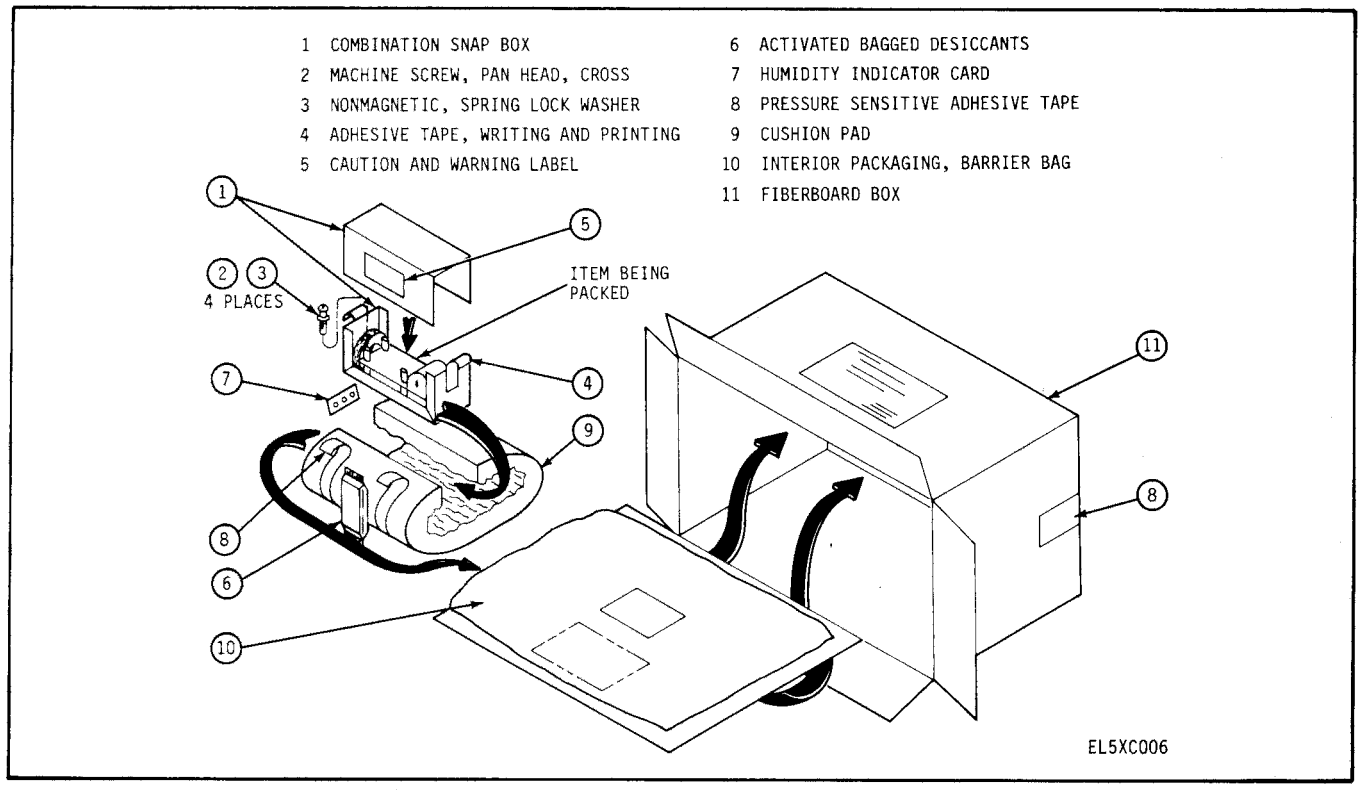


Figure 2-3. Indicator Board No. 1 Packaging Diagram

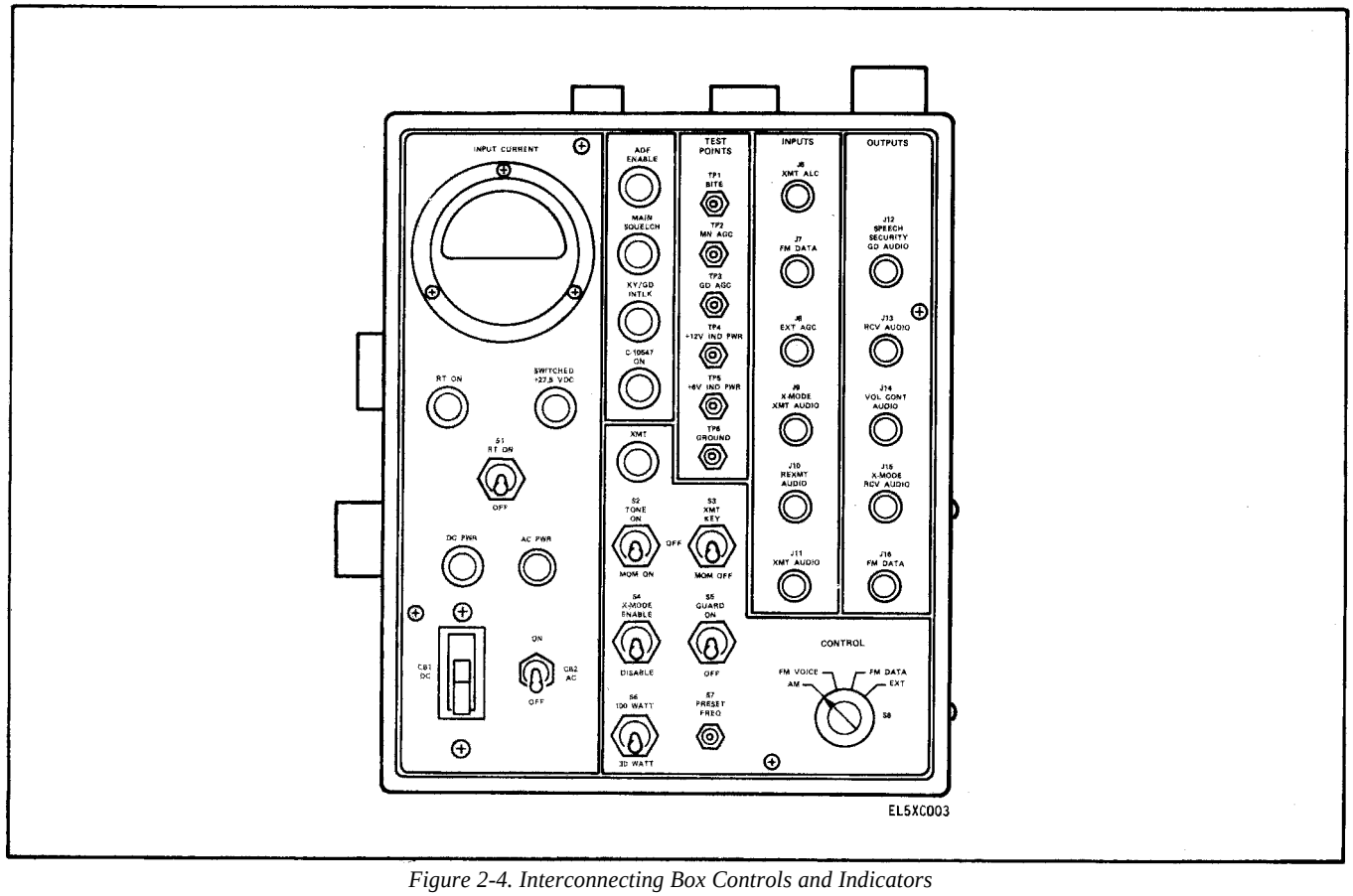


Figure 2-4. Interconnecting Box Controls and Indicators

Table 2-1. Operating Controls, Indicators. Connectors, and Test Points

Control, indicator, connector, or test point	Function
Circuit breaker CB1 DC	Protects the uhf receiver-transmitter and uhf radio control from a direct current (over 25 amperes) overload.
Circuit breaker CB2 AC	Protects the fan in the air cooler from an alternating current (over 0.5 ampere) overload. ***NOTE*** The 115-vac, 60-Hz power activates a relay (K1). The relay prevents the uhf receiver-transmitter from operating until the fan is operating.
RT ON switch S1	Turns the uhf receiver-transmitter on and off.
INPUT CURRENT meter M1	Measures the current of the uhf receiver-transmitter and uhf radio control.
TONE ON switch S2 (Three position toggle switch)	Provides ground for the tone keyline to activate the uhf receiver-transmitter. Position — Function ON — Grounds tone keyline. MOM ON — Momentarily grounds tone keyline (spring-loaded position). OFF — Opens tone keyline.
XMT KEY switch S3 (Three position toggle switch)	Position — Function ON — Grounds XMT keyline. MOM ON — Momentarily grounds XMT keyline (spring-loaded position). OFF — Opens XMT keyline.
X-MODE ENABLE switch S4	Provides ground for the x-mode enable line to activate the uhf receiver-transmitter to the x-mode condition. Position — Function ENABLE — Grounds x-mode line. DISABLE — Opens x-mode line.
GUARD ON switch S5	Provides ground for the guard on/off line to activate the guard receiver in the uhf receiver-transmitter.
100 WATT-30 WATT switch S6	Provides ground for 100-watt disable line. Position — Function 30 WATT — Grounds 100-watt disable line and provides approximately 30-watts of output power. 100 WATT — Opens 100-watt disable line and provides approximately 30-watts of output power.
PRESET FREQ switch S7 (Two position pushbutton switch)	Provides a ground for the preset frequency read line.. Position — Function Pressed — Grounds the preset frequency read line and activates the uhf radio control and indicator to read the frequency that is programed on the selected preset channel (spring loaded position). Released — Opens the preset frequency read line.

Table 2-1. Operating Controls, Indicators, Connectors, and Test Points-Continued

Control, indicator, connector, or test point	Function
CONTROL switch S8 (Four position rotary switch)	Provides a means of controlling the mode of the uhf receiver-transmitter. Position — Function A M — Switches the logic circuit so that both binary A and B are high. FM VOICE — Switches the logic circuit so that binary A is high and binary B is low. FM DATA — Switches the logic circuit so that binary A is low and binary B is high. EXT — Switches the logic circuit so that both binary A and B are low.
DC PWR indicator lamp (L1)	Provides an indication that +27.5 vdc is applied to the test set group.
AC PWR indicator lamp (L2)	Provides an indication that 115 vat, 60 Hz power is applied to the test set group.
RT ON indicator lamp (L3)	Provides an indication that S1 is On and the uhf receiver-transmitter is activated at the power supply. The lamp receives its control signal from the data converter of the uhf receiver-transmitter,
SWITCHED +27.5 VDC indicator lamp (L4)	Provides an indication that the uhf receiver-transmitter is ON and is providing a +27.5 vdc output.
ADF ENABLE indicator lamp (L5)	Provides an indication that the uhf radio control is providing a ground to the ADF enable line.
MAIN SQUELCH indicator lamp (L6)	Provides an indication that the received signal of the uhf receiver-transmitter is of sufficient strength to open the main squelch gate,
KY/GD INTLK indicator lamp (L7)	Provides an indication of proper wiring of the uhf radio control KY/GD interlock circuit.
XMT indicator lamp (L9)	Provides an indication that the uhf receiver-transmitter is in the transmit mode of operation.
C-10547 ON indicator lamp (L8)	Provides an indication that the uhf radio control is ON.
J1	Provides a means of connecting air cooler J2 via cable W2 to interconnecting box.
J2	Provides a means of connecting uhf receiver-transmitter J1 via cable W3 to interconnecting box,
J3	Provides a means of connecting indicator J1 via cable W5 to interconnecting box.
J4	Provides a means of connecting uhf radio control J1 via cable W4 to interconnecting box.
J5	Provides a means of connecting 27.5 vdc and 115 vac via cable W1 to interconnecting box.
J6 XMT ALC connector	Provides dc voltage into the uhf receiver-transmitter that will reduce the power output.
J7 FM DATA connector	Provides fM data into into the uhf receiver-transmitter.

Table 2-1. Operating Controls, Indicators, Connectors, and Test Points-Continued

Control, indicator, connector, or test point	Function
J8 EXT AGC connector	Provides dc voltage into the AGC circuit of the main receiver of the uhf receiver-transmitter.
J9 X-MODE XMT AUDIO connector	Provides audio signal into the X-mode transmit audio line in the uhf receiver-transmitter.
J10 REXMT AUDIO connector	Provides audio signal into the retransmit audio line in the uhf receiver-transmitter.
J11 XMT AUDIO connector	Provides audio signal into the transmit audio line in the uhf receiver-transmitter.
J12 SPEECH SECURITY GD AUDIO connector	Monitors the speech security guard line out of the uhf receiver-transmitter.
J13 RCV AUDIO connector	Monitors the receive audio line out of the uhf receiver-transmitter.
J14 VOL CONT AUDIO connector	Monitors the volume control audio line out of the uhf radio control.
J15 X-MODE RCV AUDIO connector	Monitors the X-mode receive audio line out of the uhf receiver-transmitter.
J16 FM DATA connector	Monitors the fM data out line of the uhf receiver-transmitter.
TP1 BITE test point	Provides a dc voltage indication of the operation of the uhf receiver-transmitter.
TP2 MN AGC test point	Provides a point at which to measure the main AGC dc voltage at the uhf receiver-transmitter.
TP3 GD AGC test point	Provides a point at which to measure the guard AGC dc voltage of the uhf receiver-transmitter.
TP4 +12V IND PWR test point	Provides a point at which to measure the +12 vdc produced by the uhf radio control.
TP5 +6V IND PWR test point	Provides a point at which to measure the +6 vdc produced by the uhf radio control.
TP 6 GROUND test point	Provides a return path for the dc voltage indications that are measured at TP1, TP2, TP3, TP4, and TP5.

Section III. OPERATING UNDER USUAL CONDITIONS

2-6. Preliminary Procedure

a. *General.*

CAUTION

The transmit case is an airtight unit. Changes in temperature or altitude can cause pressure to build up inside the case. The pressure relief buttom must be pressed prior to unlocking the case.

(1) Press the pressure relief valve located on the transit case to the right of the carrying handle.

(2) Remove the interconnecting box, attenuator, air cooler, indicator, and headset adapter from the case.

(3) Unlock the connecting cable storage case by sliding the two locks to the outside.

(4) Remove the five cable assemblies from the case.

b. *Uhf Radio Set Test Setup* (fig. 2-5).

(1) Attach the air cooler to the power supply section of the uhf receiver-transmitter by means of four slotted-shaft screws.

(2) Connect cable assembly W3 to interconnecting box connector J2, and uhf receiver-transmitter connect or J1.

(3) Connect cable assembly W4 to interconnecting box connector J4, and uhf radio control connector J1.

(4) Connect cable assembly W5 to interconnecting box connector J3, and indicator connector J1.

(5) Connect cable assembly W2 to interconnecting box connector J1, and air cooler connector J2.

(6) Connect cable assembly W1 to interconnecting box connector J5, and 27.5 vdc and 115 vac, 60 Hz power supplies.

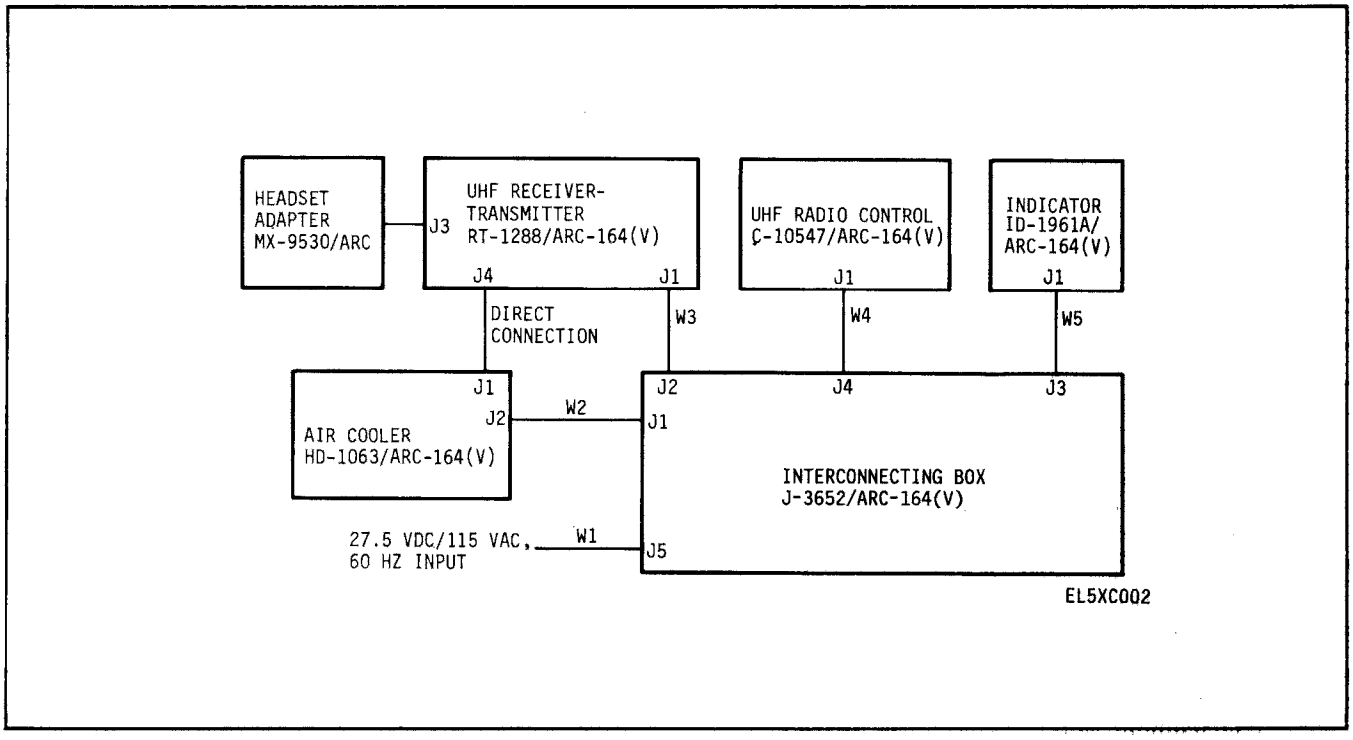


Figure 2-5. Uhf Radio Set Test Setup.

2-7. Operating Procedure

Follow the procedure as outlined in TM 11-5841-286-13 for testing the uhf receiver-transmitter and uhf radio control,

2-8. Procedure for Shutdown

CAUTION

Prior to removing any cables insure that both CB1 DC and CB2 AC are in the OFF positions and the external power supplies have been turned off.

a, Disconnect cable assembly W1 from interconnecting box connector J5, and external power supplies.

b. Disconnect cable assembly W2 from interconnecting box connector J1, and air cooler connector J2.

c. Disconnect cable assembly W5 from interconnecting box J3, and indicator connector J1.

d. Disconnect cable assembly W4 from interconnecting box connector J4, and uhf radio control connector J1.

e. Disconnect cable assembly W3 from interconnecting box connector J2, and uhf receiver-transmitter connector J1.

f. Disconnect air cooler from power supply section of uhf receiver-transmitter.

2-9. Repacking the Test Set Group

a. Place the five cable assemblies in the connecting cable storage case.

NOTE

Care should be taken when placing the cable assemblies in the storage compartment. Place the cables so that none of the plugs are overlapping.

b. Lock the connecting cable storage case.

c. Place the interconnecting box, attenuator, air. cooler, indicator, and headset adapter in the transit case.

d. Close and lock the transit case.

CHAPTER 3

OPERATOR/CREW AND ORGANIZATIONAL MAINTENANCE

Section I. OPERATOR/CREW MAINTENANCE

3-1. Scope

a. Preventive Maintenance. To insure that the test set group is always ready for operation, it must be inspected systematically so that defects can be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed in this chapter. The item numbers indicate the sequence of, and minimum inspection required. Defects discovered during operation of the unit should be noted for future correction to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would cause damage to the equipment.

b. Inspection, Testing, Repair, and Replacement. Inspection, testing, repair, and replacement of malfunctioning components or assemblies will be accomplished at the direct support level only.

3-2. Operator Preventive Maintenance Checks and Services

Operator preventive maintenance checks and services listed in table 3-1 are required daily, weekly, and under the following special conditions:

a. Before the test set group is taken on a mission.

b. When the test set group is initially received.

c. At least once a week if the equipment is maintained in a standby condition.

Table 3-1. Operator Preventive Maintenance Checks and Services

B-Before D-During A-After W-Weekly M-Monthly C-Combat Operability Check

Item no.	Interval						Item to be inspected	Procedures	Equipment will be reported not ready (red) if
	B	D	A	W	M	C			
1	✓						Test set group	Check equipment for completeness and general condition.	Any items are missing or physically broken.
2				✓			Exterior surfaces	Clean the exterior surfaces of the equipment.	
3	✓						Meter glass	Inspect the meter glass for physical damage, dust, and moisture.	Glass broken or visible signs of interior moisture.
4	✓						Test points and jacks	Inspect the test points and jacks of the interconnecting box for evidence of physical damage.	Any physical damage exists.
5		✓					Switches and circuit breakers	During operation check the switches and circuit breakers for proper mechanical action.	Switches or circuit breakers fail to operate properly.

Table 3-1. Operator Preventive Maintenance Checks and Services-Continued

B-Before D-During | A-After W-Weekly | M-Monthly C-Combat Operability Check

Item no.	Interval B	D	A	W	M	C	Item to be inspected	Procedures	Equipment will be reported not ready (red) if
6		✓					Air cooler, indicator, headset adapter, attenuator	During operation check that each assembly is functioning properly.	Any item fails to function properly.
7		✓					Indicator lamps	During operation, press to test all indicator lamps.	Indicator lamps fail to illuminate.
8	✓						Cable assemblies	Inspect cable assemblies for cuts, cracked or gouged jackets, fraying, and kinks.	Jackets show any signs of cuts, cracks, gouges, fraying, or kinks.
9				✓			Hardware	Inspect all exterior hardware for looseness and damage. All screws must be present and tight.	Any piece of hardware is is missing.
10				✓			Preservation	Inspect the equipment for bare spots, rust, and corrosion.	Condition is such that equipment must be removed from system for repainting.

3-3. Troubleshooting

Troubleshooting at the operator level is limited to visual inspection and replacement of cables or other obvious defective components.

Section II. ORGANIZATIONAL MAINTENANCE

3-4. Tools and Equipment Required

No special tools or equipment are required.

3-5. Cleaning

a. Remove dust and dirt with a clean, soft cloth.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

b. Remove grease, fungus, and ground-in dirt with a cloth dampened (not wet) with trichlorotrifluoroethane.

CAUTION

Do not press on the meter face (glass) when cleaning; the meter may be damaged.

c. Clean the meter face with a soft, clean cloth. If necessary, dampen the cloth with a mild soap solution.

3-6. Painting and Finishing

Clean rust and corrosion from the metal surfaces by lightly sanding them down to bare metal with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to TB 43-0118 for field instructions for painting and preserving electronic equipment.

3-7. Lubrication Procedures

No lubrication is required on the radio test set group.

3-8. Troubleshooting

No troubleshooting is authorized at the organizational level.

3-9. Organizational Preventive Maintenance Checks and Services

Table 3-2 lists the preventive maintenance checks and services to be accomplished at the organizational level.

Table 3-2. Organizational Preventive Maintenance Checks and Services

B-Before D-During A-After W-Weekly M-Monthly C-Combat Operability Check

Item no.	Interval B	D	A	W	M	C	Item to be inspected	Procedures	Equipment will be reported not ready (red) if
1					✓		Cable assemblies	Inspect the cable assemblies for cuts, cracked or gouged jackets, fraying, or kinks.	Jackets show any signs of cuts, cracks, gouges, fraying, or kinks.
2				✓			Exterior surfaces	See that exterior surfaces are free of dust, dirt, oil, grease, water, fungus, and corrosion. Clean as needed.	Condition is such that equipment must be removed from system for repainting.
					✓			Inspect exterior for loose hardware and corrosion. Tighten lose hardware; remove corrosion.	Condition is such that equipment must be removed from system for repainting.
3				✓			Painted surfaces	Check to see that outer painted surfaces are free of bare spots and corrosion. Refinish as needed.	Condition is such that equipment must be removed from system for repainting.
4				✓			Meter glass	Clean and check for cracks and breaks.	Meter glass is cracked or broken.
5				✓			Indicator lamps	Check indicator lamps for proper operation. Replace as necessary.	
6		✓					Operation	During operation, be alert for any abnormal indications.	Test set group fails to function properly.

CHAPTER 4

PRINCIPLES OF OPERATION

4-1. General

Principles of operation will be divided to cover each of the individual components of the test set group. These components are: interconnecting box, air cooler, headset adapter, and indicator. Schematic diagrams of interconnecting box, air cooler, and cable assemblies are provided to supplement maintenance procedures.

4-2. Interconnecting Box-(Figure 2-4 and FO-1)

a. The interconnecting box provides interface test points to fault-isolate the uhf receiver-transmitter and uhf radio control. Figure 2-5 illustrates the interconnecting box in a functional test setup with the components of the uhf radio set. Headset Adapter MX-9530/ARC is not used in this configuration. Air cooler connector J1 connects directly to uhf receiver-transmitter connector J4. When used in this test setup, the air cooler provides the required cool airflow to the uhf receiver-transmitter. An interlock circuit in the interconnecting box prevents the uhf receiver-transmitter from operating without airflow from the air cooler.

b. The 27.5 vdc power is applied to interconnecting box connector J5. When circuit breaker CB1 DC is closed, power is applied through connector J1 and to air cooler connector J2. Dc power is then applied from air cooler connector J1 to uhf receiver-transmitter J4 to energize the circuits in the uhf receiver-transmitter. The internal uhf receiver-transmitter power supply is not energized at this time until a ground path is completed in the POWER ON/OFF circuit. This ground return is accomplished when ac power is applied to the interconnecting box. The 115-volt, 60-Hz ac power is applied to interconnecting box J5. When circuit breaker CB2 AC is closed, and RT ON switch S1 is on, two circuits are energized as follows:

(1) The air cooler blower turns onto provide the needed cooling air to the uhf receiver-transmitter.

(2) Relay K1 energizes providing a ground return path from the uhf receiver-transmitter, through the closed RT ON switch S1 and through the closed contacts of relay K1.

c. Lamps L1 (DC PWR) and L2 (AC PWR) indicate that external power is applied and that circuit breakers CB1 DC and CB2 AC are closed. Lamp L3 (RT ON) indicates that RT ON switch S1 is closed and the uhf receiver-transmitter is activated by the uhf receiver-transmitter power supply. Lamp L4 (SWITCHED +27.5 VDC) indicates that the uhf receiver-transmitter is operating and providing a +27.5 vdc output. Lamp L8 (C-10547 ON) indicates that a ground has been supplied to the POWER ON/ OFF circuit of the uhf radio control. This lamp lights whenever external power is applied to the interconnecting box, CB1 DC, CB2 AC, and RT ON switches S1 are on; and when all uhf radio set circuits are functioning properly. Lamps L5 (ADF ENABLE) and L7 (KY/GD INTLK) indicate that a ground has been applied to the uhf radio set ADF enable and KY/GD interlock circuits. Lamp L6 (MAIN SQUELCH) indicates that the strength of a received signal is sufficient to open the main squelch gate in the uhf receiver-transmitter. Lamp L9 (XMT) indicates that a ground has been provided to the transmit keyline. This lamp lights whenever the uhf receiver-t ransmitter is keyed.

d. Test points TP1 through TP5, when used in conjunction with TP6 (ground) provide direct voltage readings from the uhf receiver-transmitter and indicator, Input jacks J6 through J11 provide connections for applying external signals into the uhf receiver-transmitter, Output jacks J12 through J16 provide connections for sampling output signals from the uhf receiver-transmitter and uhf radio control.

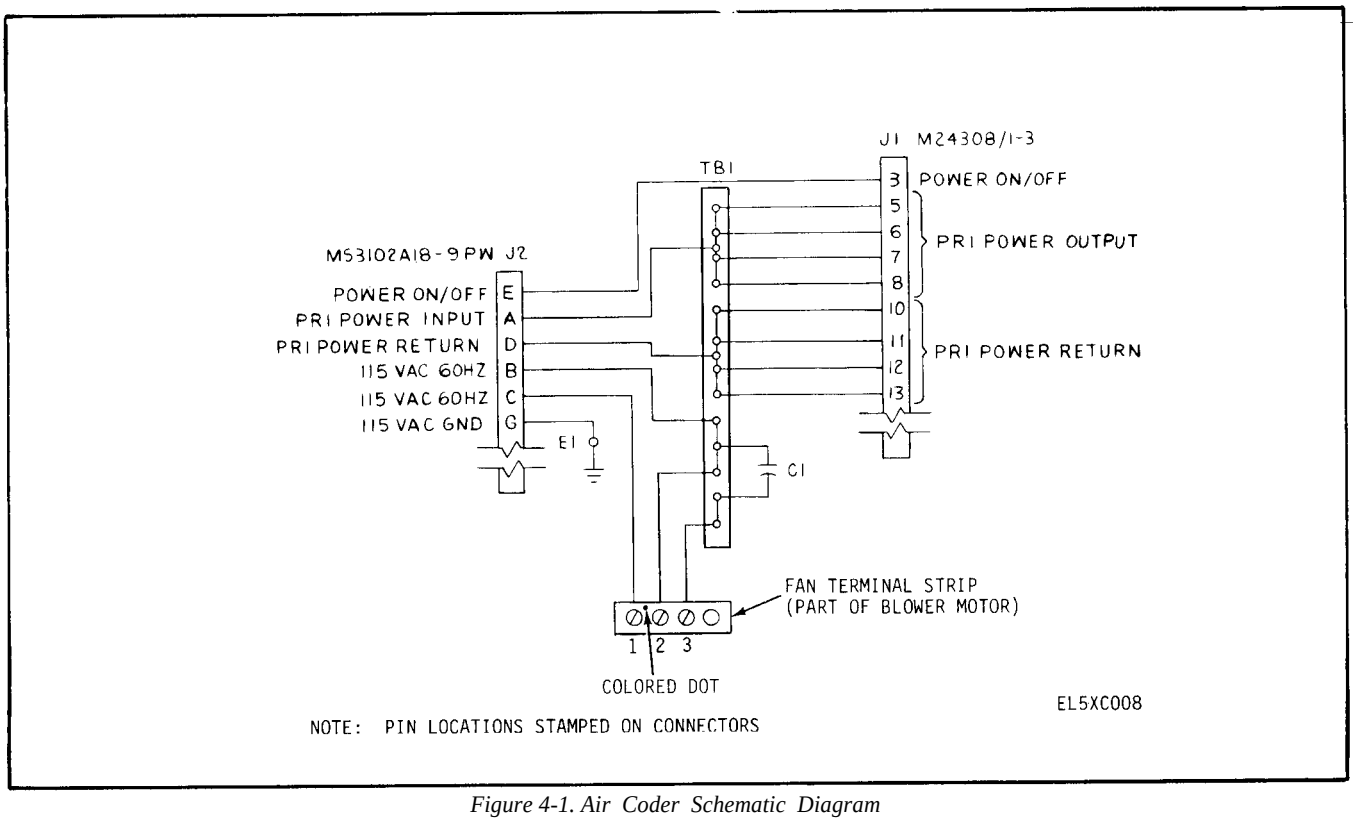


Figure 4-1. Air Coder Schematic Diagram

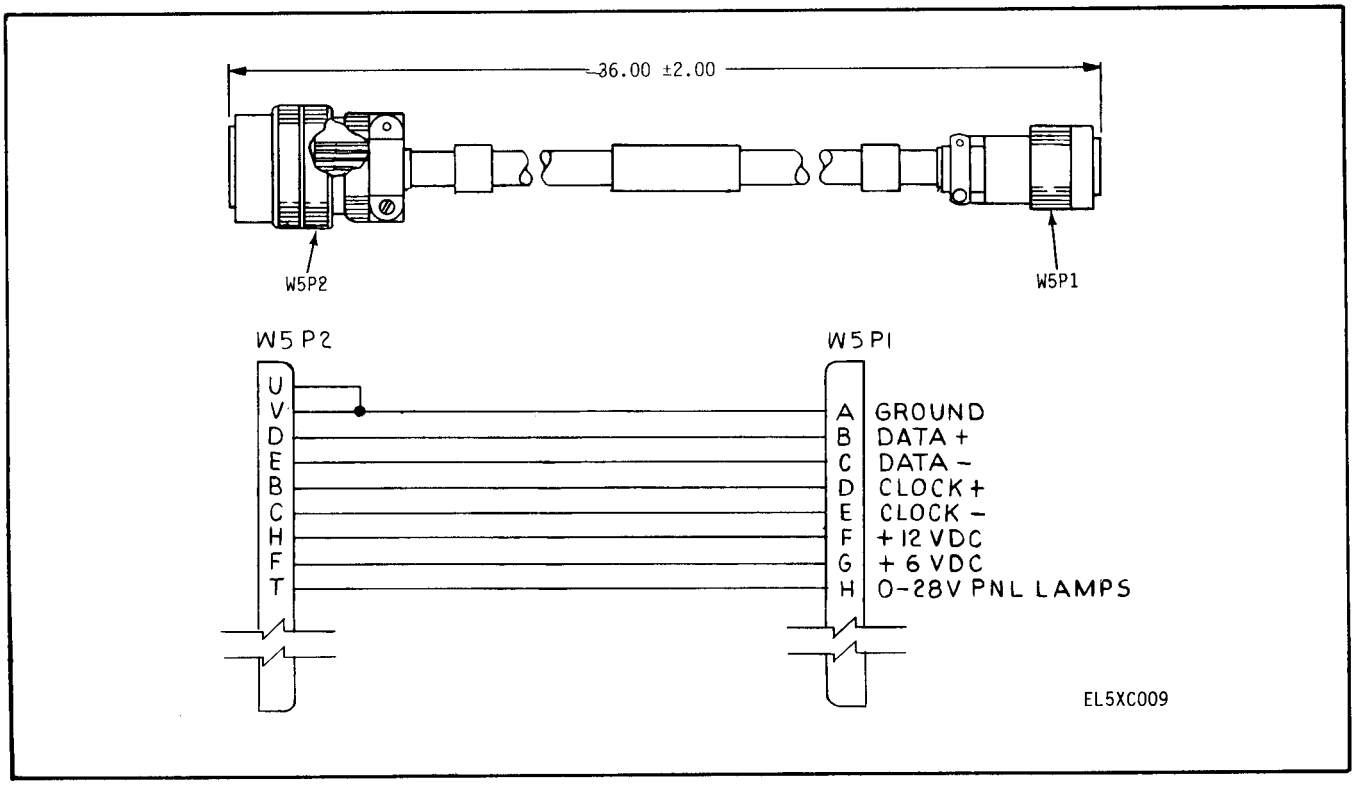


Figure 4-2. CX-13106/ARC-164(V) Cable Assembly Wiring Diagram

e. CONTROL switch S8 connects the uhf receiver-transmitter mode control circuit through interconnecting box connector J2. The four positions supply either a logic high (open) or a logic low (ground) to the uhf receiver-transmitter to change the operating mode. Refer to TM 11-5841-286-13 for a functional description of the logic circuits controlling the uhf receiver-transmitter operating mode.

4-3. Air Cooler

The air cooler provides cooling airflow to the uhf receiver-transmitter. It also provides an interface for electrical power between the interconnecting box and the uhf receiver-transmitter. The blower motor receives 115 vac operating power directly from the interconnecting box. A 27.5 vdc primary power input, a 27.5 vdc primary power return, and a POWER ON/OFF control line are routed from the interconnecting box to the power supply of the uhf receiver-transmitter through the air cooler. J1 is a direct connection to the uhf receiver-transmitter. Cable assembly W2 connects the air cooler J2 to the interconnecting box J1.

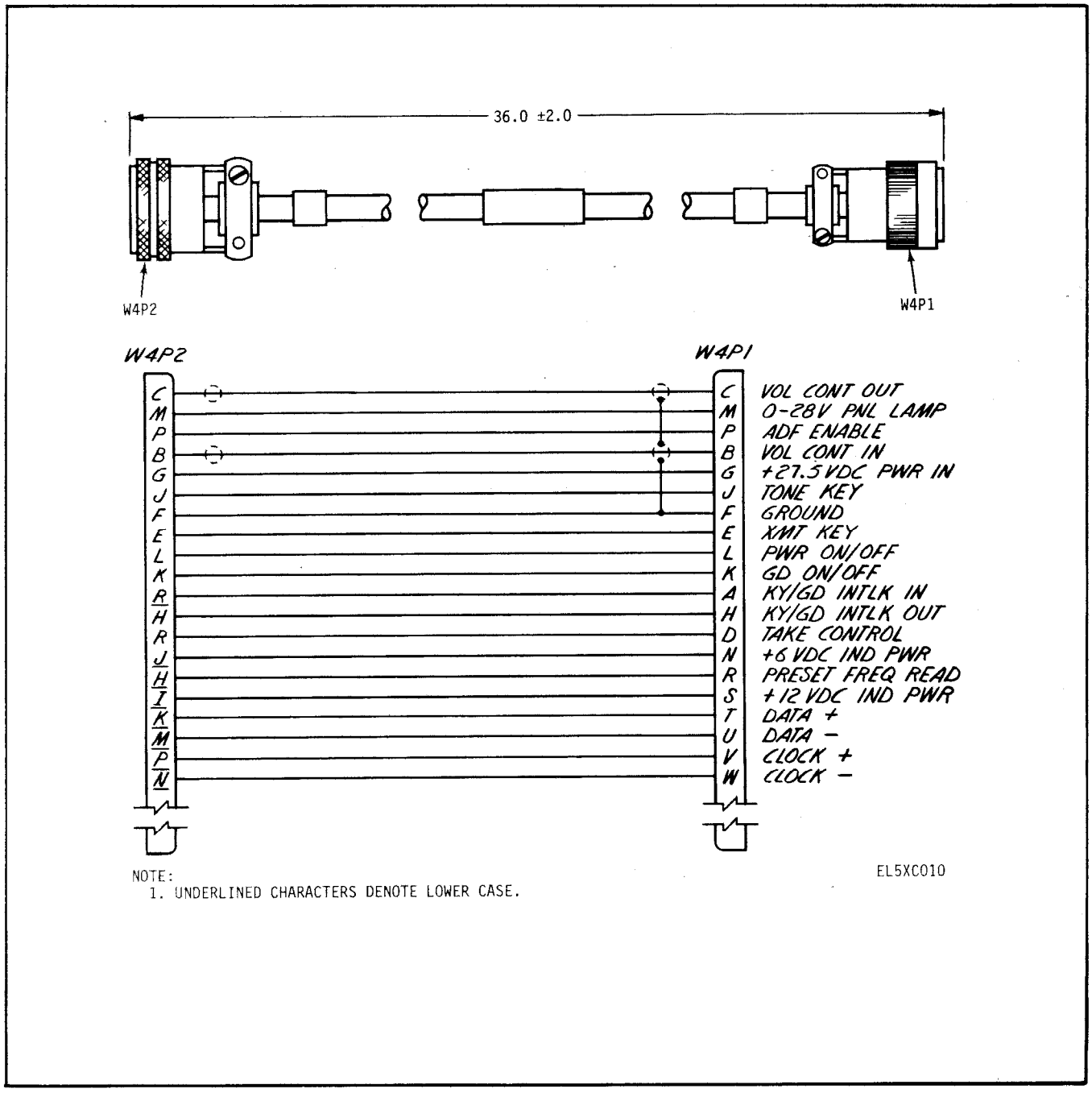


Figure 4-3. CX-13107/ARC-164(V) Cable Assembly Wiring Diagram

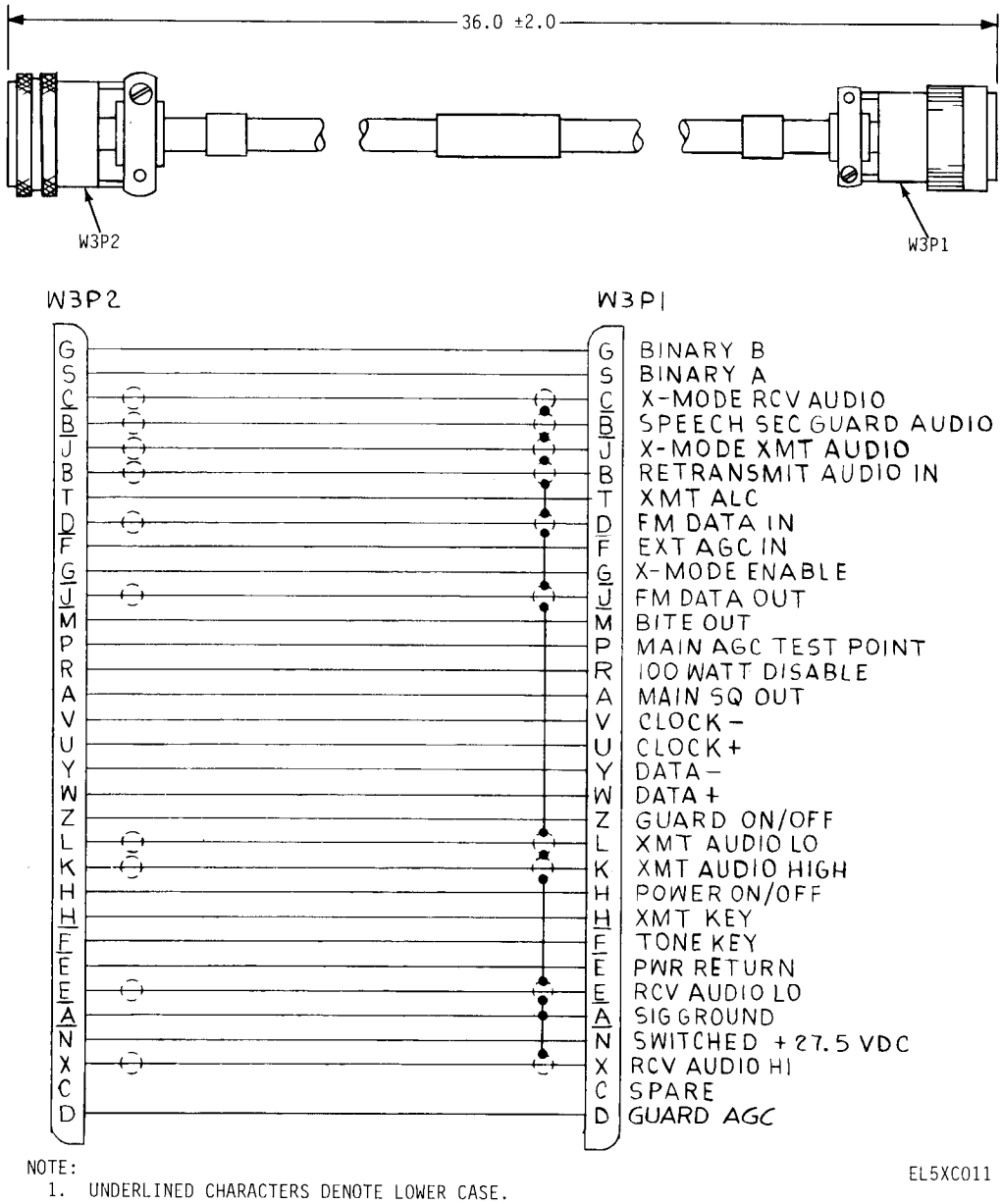


Figure 4-4. CX-13108/ARC-164(V) Cable Assembly Wiring Diagram

4-4. Headset Adapter

The headset adapter enables the operator to perform a talk/listen test on the uhf receiver-transmitter. It is connected to the uhf receiver-transmitter J3 and provides:

a. Impedance matched receiver output to Headset-Microphone H-157/AIC.

b. Amplification of Headset-Microphone H-157/AIC output sufficient to modulate transmitter.

c. Audio gain control of output of Headset-Microphone H-157/AIC.

4-5. Indicator

The indicator logic circuits and indicators provide a 6-digit readout of the manually selected channel frequency, a 2-digit readout of the selected preset channel number, or a single digit (G) guard channel indication. The logic driven indicators are magnetically activated wheels. Input serial data (data+, data-, clock+, and clock -) and dc operating power are provided to the indicator through interconnecting box J3. The indicator is made up of four plug-together printed circuit assemblies. Board 4 (A4) contains the serial data line receiver and one-half of the serial-to-parallel conversion circuitry. Board 3 (A3) contains the other half of the serial-to-parallel circuitry and an error detector. Board 2 (A2) contains the gating logic that selects the proper parallel data for display (frequency data, channel number data, or guard data). Board 1 (A1) contains the BCD (binary coded decimal)-to-decimal decoder/drivers for the magnetic wheel indicators and a transistor switch to remove full operating voltage from the wheels during steady state conditions.

4-6. Cable Assemblies

The five cable assemblies provide connections for the equipment to be tested.

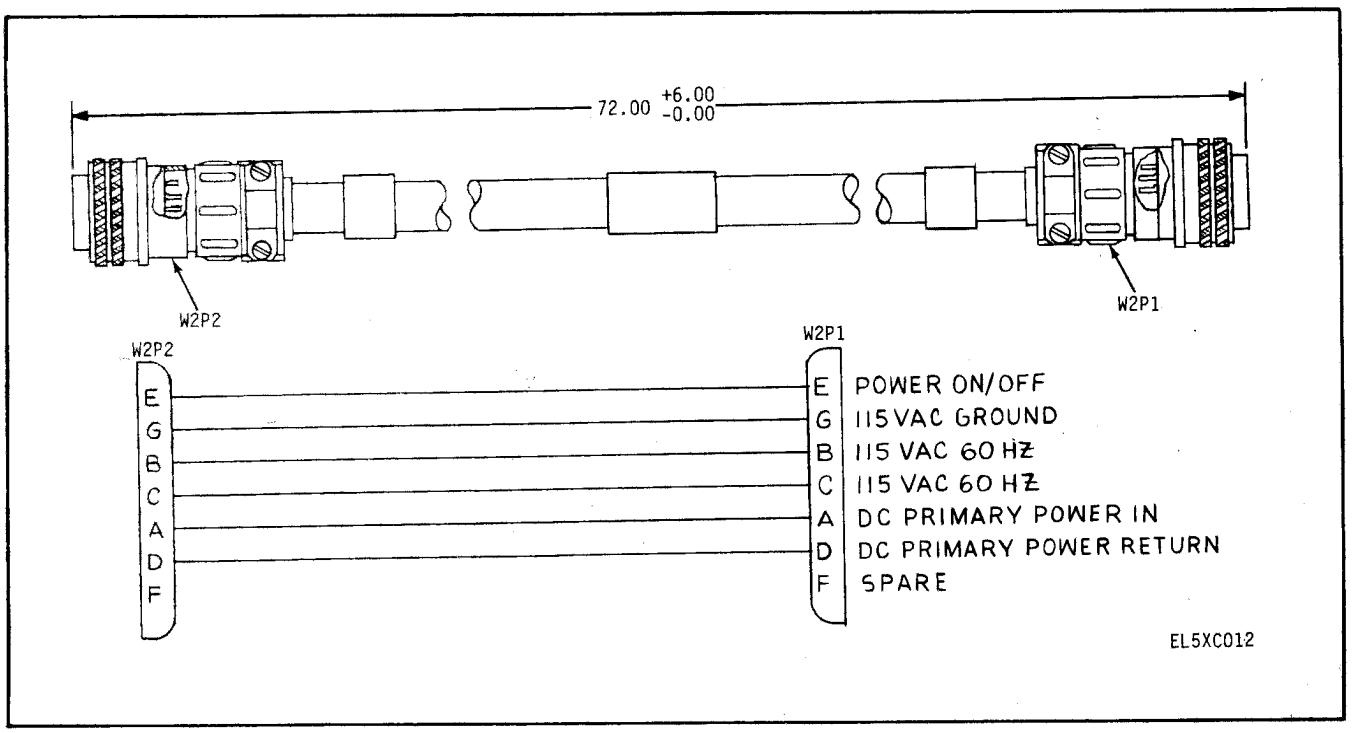
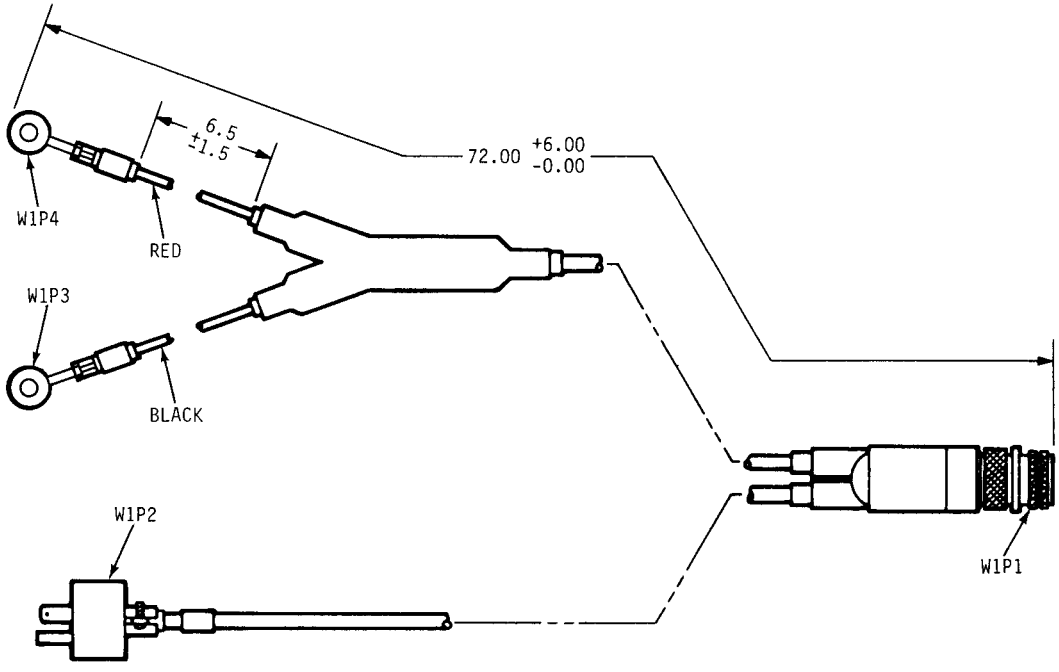
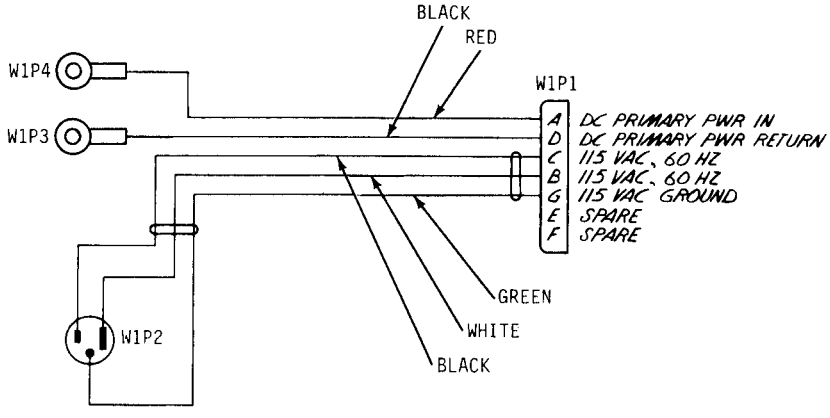


Figure 4-5. CX-13109/ARC-164(V) Cable Assembly Wiring Diagram





EL5XC013

Figure 4-6. CX-13110/ARC-164(V) Cable Assembly Wiring Diagram

CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

5-1. Scope of Maintenance

This chapter contains information required to maintain the test set group. Included in this chapter are trouble-shooting procedures, disassembly and reassembly instructions, and functional tests for each individual component of the test set group. Figure FO-2 is an interconnecting diagram and is included to supplement the maintenance procedure.

a. Indicator. Maintenance for the indicator will be limited to inspection and replacement of individual circuit cards. A trouble analysis flow diagram is provided to isolate a faulty assembly.

b. Attenuator and Headset Adapter. Maintenance for the attenuator and headset adapter is limited to inspection and replacement of the item.

c. Interconnecting Box. Maintenance for the interconnecting box includes a continuity test of the internal wiring and an operational check of the relay, K1.

d. Functional Test. Prior to any maintenance being performed on a suspected malfunctioning test set group, a functional test should be accomplished. This functional test includes connecting the test set group to a known good uhf receiver-transmitter and uhf radio control and checking the operation of each component of the test set group. By using this procedure, a fault can be isolated to a specific component of the test set group. Should a unit under test fail the functional test, the first step should be to check the continuity of the cable assemblies (fig. 4-2 through 4-6).

5-2. Organization of Maintenance Instructions

Table 5-1 is an index of maintenance instructions covered in this chapter.

Table 5-1. Index of Maintenance Instructions

Component/ assembly	Service	Inspect	Test	Trouble-shooting	Replace	Install
Interconnecting box	5-13	5-18	5-19	5-6	5-12A	---
Headset adapter	5-13	5-18	5-19	5-7	---	---
Air cooler	5-13	5-18	5-19	5-8	5-12B	---
Indicator	5-13	5-18	5-19	5-9	5-12C	---
Attenuator	5-13	5-18	5-19	5-10	---	---

Section II. TOOLS AND EQUIPMENT

5-3. Tools and Test Equipment Required

Table 5-2 lists the tools and equipment required for direct support maintenance.

Table 5-2. Tools and Test Equipment Required

Test equipment	Technical manual	Common name	Used for
Voltmeter, Digital AN/GSM-64	TM-11-6625-444-15	Voltmeter	Voltage and resistance measurements.
Tool Kit, Electronic Equipment TK-100G	---	Tool Kit	Disassembly and reassembly of components of test set group
C-10547/ARC-164(V) Control Box	TM-11-5841-286-13	Uhf Radio Control	Functional check of test set group.
Power Supply PP-1104C/G	TM-11-6130-246-12	Power Supply	Providing regulated dc power source.
Oscilloscope AN/ USM-281C		Oscilloscope	Monitoring waveforms.

5-4. Materials Required

Refer to appendix E for a list of materials required for direct support maintenance.

Section III. TROUBLESHOOTING

5-5. General Instructions

This section contains troubleshooting information for each component of the test set group. Continuity checks and a trouble analysis flow diagram are provided to supplement maintenance procedures.

5-6. Interconnecting Box Troubleshooting

Table 5-3 is a troubleshooting chart for the interconnetting box. This procedure will check all the internal wiring, functioning of the controls and indicators, and operation of the relay, K1.

Table 5-3. Troubleshooting Chart for Interconnecting Box

Step no.	Control setting: Test equipment	Control setting: Equipment under test	Test procedures		Performance standard
1	All measurements made with multimeter set on OHMS and RX100.	All Switches OFF unless otherwise specified.	Check continuity between the following points (follow control settings and performance standards listed):		
			FROM	TO	
		CB1 DC ON	J5A	J4M	Continuity
		CB2 AC OFF	J5A	J4M	No continuity
		S5 ON	J5D	J4K	Continuity
		S5 OFF	J5D	J4K	No continuity
		S3 XMT KEY	J5D	J4E	Continuity
		S3 OFF	J5D	J4E	100 to 200 ohms
		S3 MOM ON	J5D	J4E	Continuity
		S6-30 WATT	J5D	J2R	Continuity

Table 5-3. Troubleshooting Chart for Interconnecting Box-Continued

Step no.	Control setting: Test equipment	Control setting: Equipment under test	Test procedure		Performance standard
1		S6-100 WATT	J5D	J2R	No continuity
		S7 DEPRESSED	J4D	J2b	620 ±40 ohms
		S7 RELEASED	J4R	J2b	No continuity
		S7 DEPRESSED	J4R	J3A	Continuity
		S4 X-MODE ENABLE	J2g	TP6	Continuity
		S4 X-MODE DISABLE	J2g	TP6	No continuity
		S2 ON	J5D	J4J	Continuity
		S2 OFF	J5D	J4J	No Continuity
		S2 MOM ON	J5D	J4J	Continuity
		CB2 AC ON	J5C	J1C	Continuity
		CB2 AC ON	J5B	J1B	Continuity
		CB2 AC OFF	J5C	J1C	No continuity
			J5D	J1D	Continuity
			J5G	J1G	Continuity
			J4G	J1A	Continuity
			J4U	J2Y	Continuity
			J4T	J2W	Continuity
			J4W	J2V	Continuity
			J4V	J2U	Continuity
			J4B	J2X	Continuity
			J4K	J2Z	Continuity
			J4E	J2h	Continuity
			J4J	J2f	Continuity
			J4A	J3H	Continuity
			J4V	J3D	Continuity
			J4W	J3E	Continuity
			J4T	J3B	Continuity
			J4U	J3C	Continuity
			J4S	J3F	Continuity
			J4N	J3G	Continuity
			J4C	J4F	150 ±5 ohms
			J4D	J4F	Continuity
			J2T	J6	Continuity
			J2d	J7	Continuity
			J2F	J8	Continuity
			J2J	J9	Continuity
			J2B	J10	Continuity
			J2K	J11	Continuity
			J2M	TP1	Continuity
			J2P	TP2	Continuity
			J2D	TP3	Continuity
			J2a	TP6	Continuity
			J2e	TP6	Continuity
			J2L	TP6	Continuity
			J2E	TP6	Continuity.
			J2c	J4F	510 ±50 ohms
			J2j	J4F	2200 ±200 ohms
		S6-30 WATT	J2R	J4F	Continuity
		S8-FM DATA	J2S	J2b	620 ±60 ohms
		S8-EXT	J2S	J2b	620 ±60 ohms

Table 5-3. Troubleshooting Chart for Interconnecting Box-Continued

Step no.	Control setting: Test equipment	Control setting: Equipment under test	Test procedures		Performance standard
1		S8-AM	J2S	J2b	No continuity
Cont.		S8-FM VOICE	J2S	J2b	No continuity
		S8-FM VOICE	J2G	J2b	620 ±60 ohms
		S8-EXT	J2G	J2b	620 ±60 ohms
		S8-AM	J2G	J2b	No continuity
		S8-FM DATA	J2G	J2b	No continuity
2			Apply 115 vac, 60 Hz to the test set.		
3		CB2 AC ON	Set CB2 AC to ON.		
4			Check continuity from		
		S1 ON	J1E to J4F		Continuity
		S1 OFF	J1E to J4F		No continuity
5			Disconnect the 115 vac, 60 Hz.		
6			Apply 28 vdc		
7			Press to test all lamps.		Lamps illuminate

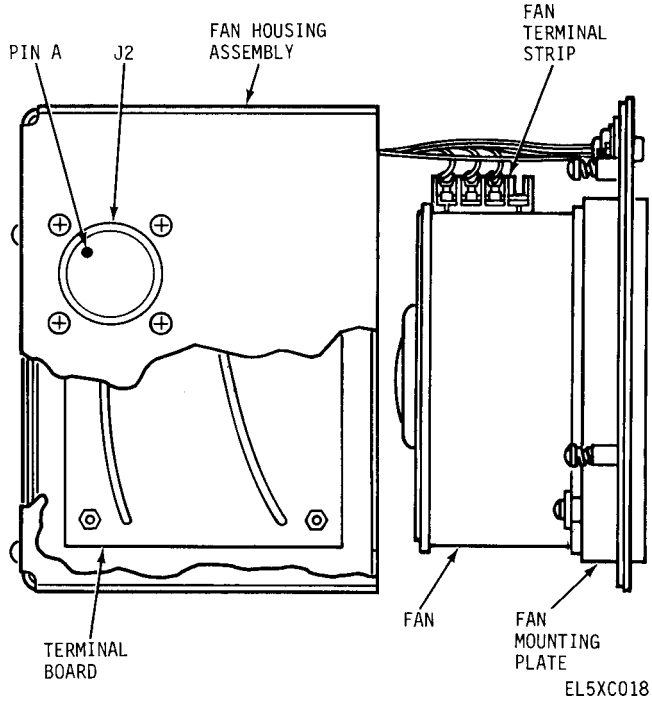


Figure 5-1. Air Cooler Component Location Diagram.

5-7. Headset Adapter Troubleshooting

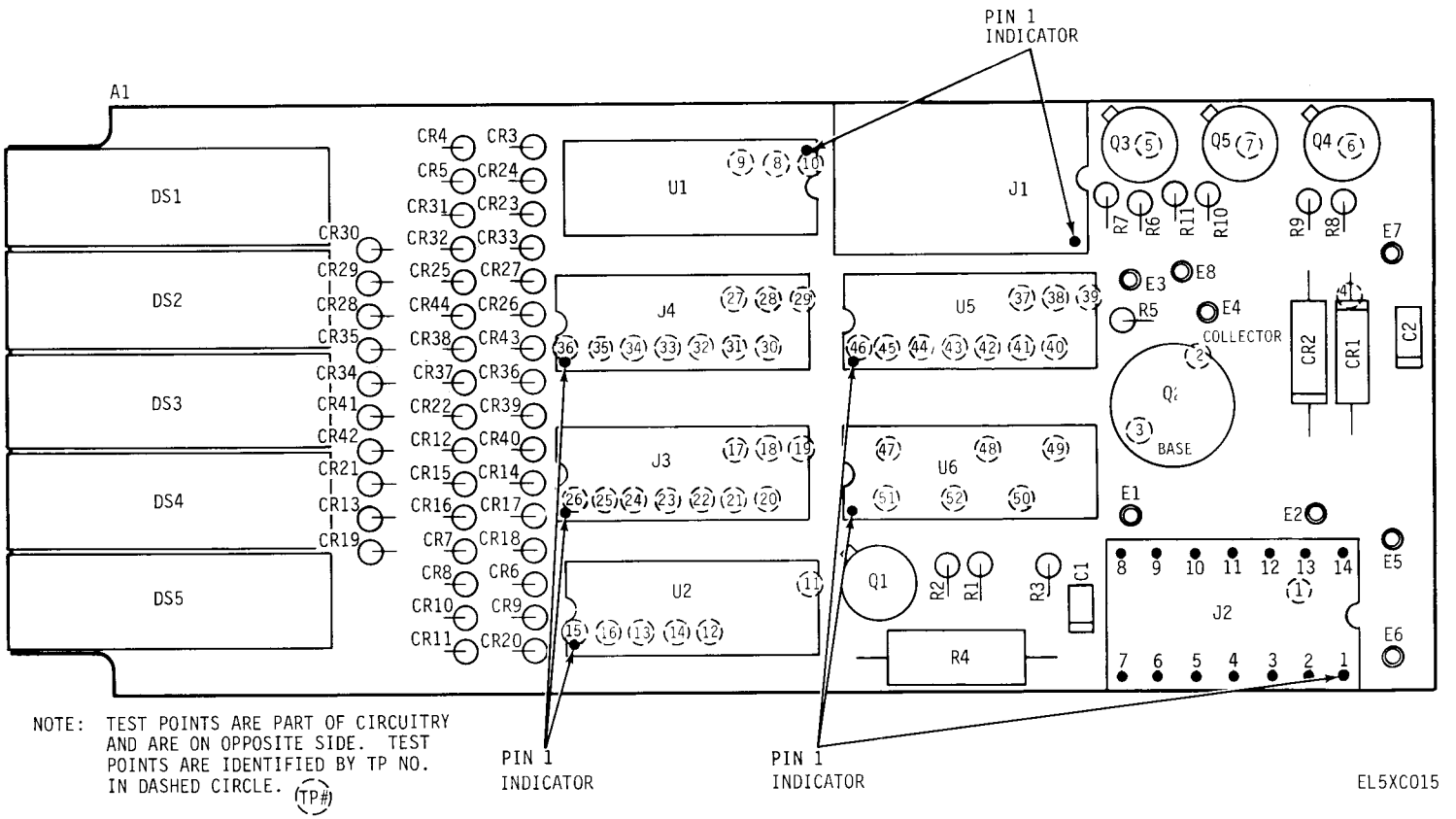
Troubleshooting the headset adapter is limited to inspection and replacement of the item.

5-8. Air Cooler Troubleshooting

Table 5-4 is a troubleshooting chart for the air cooler assembly. This procedure will check the internal wiring of the air cooler. Should an open circuit be found, the wiring as well as the printed terminal board should be checked for breaks. The fan is a throw-away item. Figure 5-1 is provided to aid in locating the components of the air cooler.

Table 5-4. Troubleshooting Chart for Air Cooler

Step no.	Control setting: Test equipment	Control setting: Equipment under test	Test procedure	Performance standard
1	All measurements made with multimeter set on OHMS and RX100	N/A	Check for continuity between the following points: FROM TO J2E J1-3 J2A J1-5 J2A J1-6 J2A J1-7 J2A J1-8 J2D J1-10 J2D J1-11 J2D J1-12 J2D J1-13 Remove the air cooler cover to gain access to the fan terminal strip. J2G GROUND(E1) J2B Fan terminal strip 2 J2C Fan terminal strip 1 J2B Positive C1 Negative C1 Fan terminal strip 3 Replace the air cooler cover. ***NOTE*** Should all the previous steps check good, problem is either a defective C1 or fan assembly.	 Continuity Continuity Continuity Continuity Continuity Continuity Continuity Continuity Continuity Continuity Continuity Continuity Continuity Continuity



NOTE: TEST POINTS ARE PART OF CIRCUITRY AND ARE ON OPPOSITE SIDE. TEST POINTS ARE IDENTIFIED BY TP NO. IN DASHED CIRCLE. (TP#)

Figure 5-2. Indicator Board No. 1 Assembly.

5-9. Indicator Troubleshooting

Figure FO-3 is a trouble analysis flow diagram for the ID-1961A/ARC-164(V). The operation of the indicator under normal conditions will determine the nature of the malfunction (fig. 2-5). A key to the use of the diagram is contained as part of the diagram. Figures 5-2 and 5-3 are provided to aid in locating test points.

CAUTION

Use special care when handling the magnetic wheel drums. If the drums are bent, the indicators cannot operate properly.

Special precautions must be taken when handling the four indicator boards as they contain metal oxide semiconductor (MOS) devices which can be ruined by static electricity. Use dummy shorting plugs when the boards are removed from the indicator. A grounded strap should be worn when handling these boards. All tools should be grounded. Boards should be stored and transported with dummy shorting plugs and in conductive bags or in conductive foam. Do not use nylon, teflon, or plastic tools or brushes; do not wear nylon clothing. Never connect a board to test equipment with power applied.

5-10. Attenuator Troubleshooting

Troubleshooting the attenuator is limited to inspection and replacement of the item.

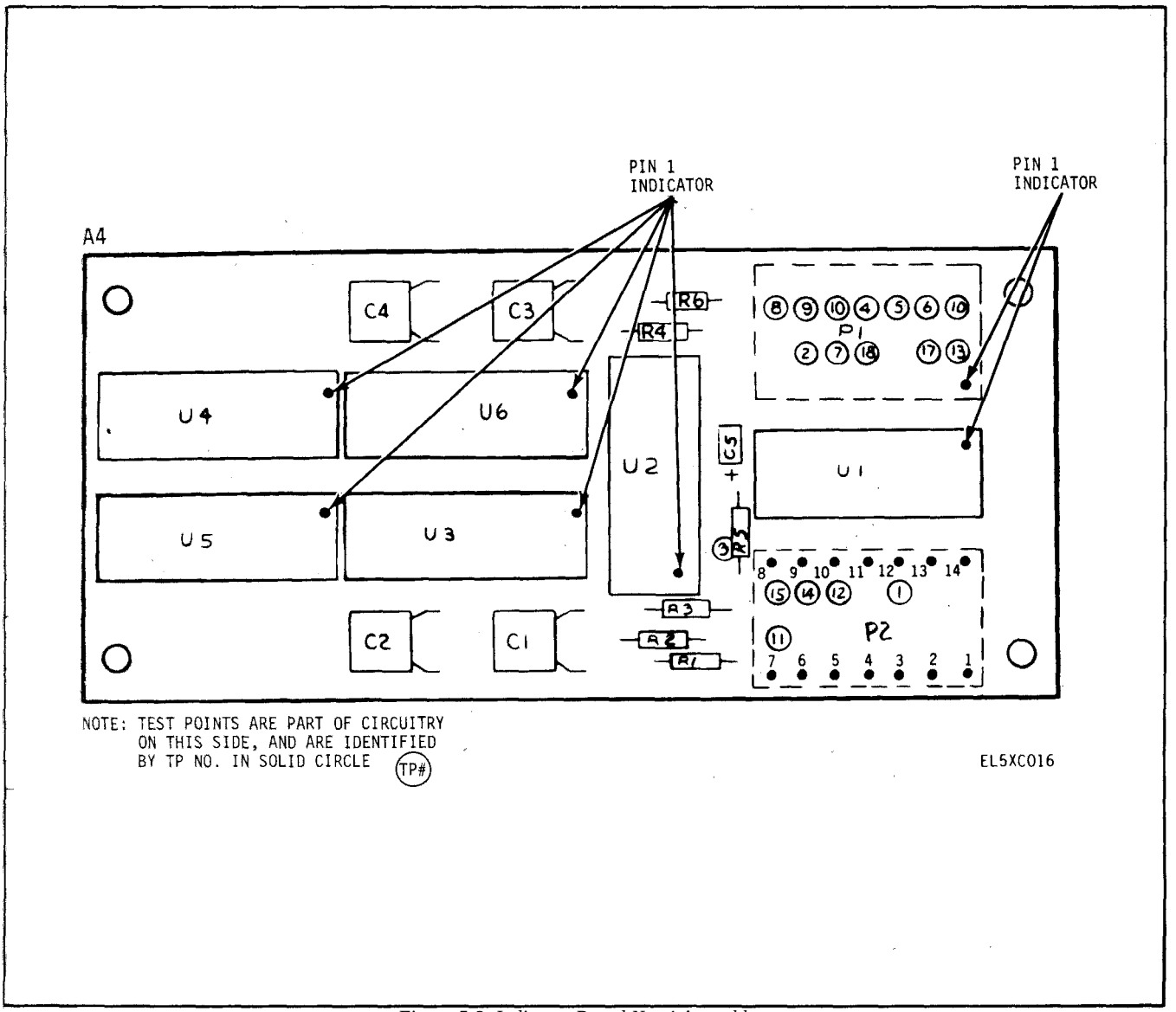


Figure 5-3. Indicator Board No. 4 Assembly.

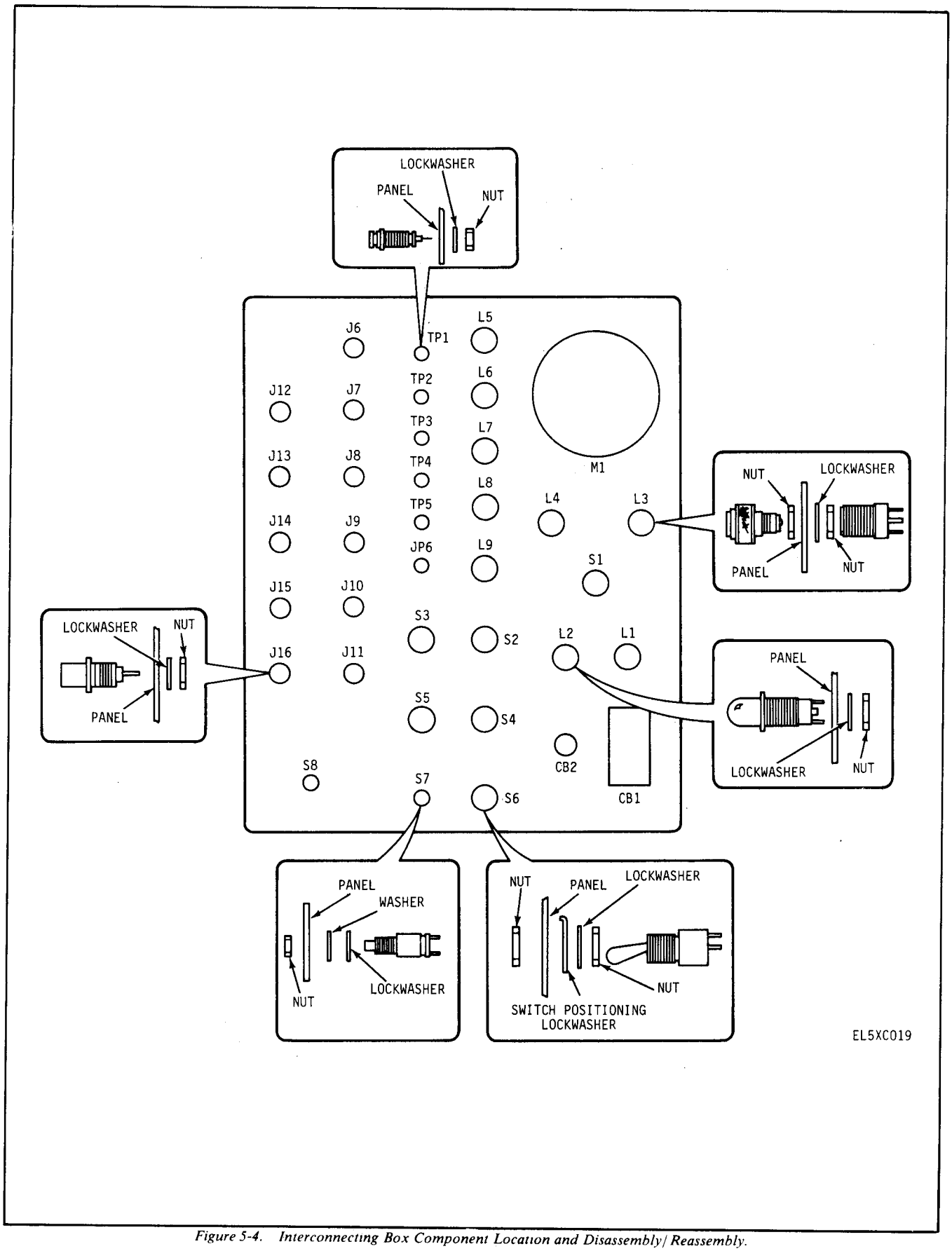


Figure 5-4. Interconnecting Box Component Location and Disassembly/ Reassembly.

Section IV. DIRECT SUPPORT MAINTENANCE PROCEDURES

5-11. General

Direct support maintenance for the test set group includes disassembly, repair, replacement, and reassembly to return the malfunctioning unit to a service condition.

5-12. Disassembly

a. Interconnecting Box. To gain access to the internal wiring of the interconnecting box, remove the eight cross-tip screws and remove the rear cover. Should replacement of the plug-in relay (K1) be necessary it will first be necessary to remove the mounting bracket which is attached to the sidewall of the case. For disassembly of lamps, test points, jacks and switches refer to figure 5-4.

b. Air Cooler (fig. 5-1)

(1) *Access to Fan Housing Assembly.* To gain access to the housing assembly:

(a) Remove the outer four cross-tip screws on the uhf receiver-transmitter side of the air cooler.

(b) Slide the fan and fan plate assembly from the housing.

NOTE

The fan and fan plate assembly will remain attached to the housing by the internal wiring.

(2) *Removal of Fan Assembly.* To remove the fan assembly:

(a) Loosen the four cross-tip screws on the fan plate assembly and rotate the four rim clamps until the flat edge is facing the fan.

(b) Remove the three wires fron fan terminal strip (fig. 5-1).

NOTE

When removing the fan assembly, insure the three wires are tagged as to proper location on the fan terminal strip. If the correct location for the wires is unknown, refer to figure 4-1 and check for continuity to J2.

(c) Remove the fan assembly.

(3) *Removal of Terminal Board TB1.* To remove the terminal board:

(a) Remove the four cross-tip screws holding the terminal board to the housing assembly.

(b) Remove the terminal board from the housing assembly.

NOTE

The terminal board will remain attached to the housing by the internal wiring.

(4) *Gasket.* Should it be necessary to replace the gasket, use adhesive per MIL-A-46106, type 1, color clear.

c. Indicator. To disassemble the indicator, perform the following procedures:

(1) Remove the four screws at the rear of the indicator case.

CAUTION

Do not push the indicator assembly from the case using the front lighting panel since this may damage the panel.

(2) Grasp the rear casting of the indicator and, with a twisting motion, pull the case off the indicator assembly.

(3) Remove the four screws from the top strap connecting the front and rear castings.

(4) Remove the four circuit board mounting screws.

CAUTION

The connector pins are easily bent. Pressure to separate the connectors must be applied evenly to both connectors. Also use care not to bump indicator wheels while removing boards.

(5) Carefully separate the individual board assemblies.

CAUTION

Immediately after each board is removed, insert dummy shorting plugs in all connectors to prevent damage to MOS integrated circuits.

5-13. Cleaning

Refer to paragraph 3-5 for cleaning instructions on the equipment.

5-14. Reassembly

No special instructions are given for reassembly of the equipment. Reassembly is obvious upon inspection of the equipment and parts location diagrams.

5-15. Repainting and Refinishing Instructions

Repainting and refinishing are covered in detail in paragraph 3-6.

5-16. Lubrication

None required.

Section V. DIRECT SUPPORT TESTING PROCEDURES

5-17. General

This section contains direct support testing procedures and physical inspection for the test set group.

5-18. Physical Inspection

Table 5-5 is a physical inspection chart for the test set group. This inspection is to be performed prior to any maintenance.

5-19. Direct Support Testing

Perform the procedures given in paragraphs 5-6 through 5-10.

Table 5-5. Physical Inspection Chart for Test Set Group

Item to be Inspected	Test procedure	Performance standard
Interconnecting Box, Air Cooler, Indicator Attenuator, Headset Adapter, and Cable Assemblies	*a.* Inspect cases of all components for damage, missing parts, and condition of paint. ***NOTE*** Touchup painting is recommended in place of refinishing whenever practicable.	*a.* No damage evident or parts missing. External surfaces intended to be painted do not show metal. Panel lettering is legible.
	b. Inspect all controls for loose or missing screws, bolts, and nuts.	*b.* Screws, nuts, and bolts are tight; none are missing.
	c. Inspect all connectors, jacks, and test points for looseness or damage.	*c.* No looseness or damage is evident.
	d. Operate all switches	*d.* Switches operate properly.

APPENDIX A
REFERENCES

DA Pam 310-4	Index of Technical Publications: Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
SB 11-543	Safety and Breakaway Wire for Electronic Equipment Installed in Aircraft
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 38-100	Preservation, Packaging, Packing, and Marking Materials, Supplies, and Equipment Used by the Army.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-6130-246-12	Operator's and Organizational Maintenance Manual: Power Supply PP-1104C/G (NSN 6130-00-542-6385).
TM 11-6625-444-15	Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual: Digital Voltmeter AN/GSM-64.
TM 11-6625-2658-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Oscilloscope AN/USM-281C (NSN 6625-00-106-9622).
TM 11-6625-2950-23P	Organizational and Direct Support Maintenance Repair Parts and Special Tools List for Radio Test Set Group OQ-273/ ARC-164(V).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists integral components of the basic issue items for the test set group to help you inventory items required for safe and efficient operation.

B-2. General

This Components of End Item List is divided into the following sections:

a. *Section II. Integral Components of the End Item.* These items, when assembled, comprise the test set group and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. *Section III. Basic Issue Items.* These are the minimum essential items required to place the test set group in operation, to operate it, and to perform emergency repairs. Although shipped separately, packed they must accompany the test set group during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. Explanation of Columns

a. *Illustration.* This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration on which the item is shown.

(2) *Item Number.* The number used to identify item called out in the illustration.

b. *National Stock Number.* Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. *Part Number.* Iindicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. *Description.* Indicates the Federal item name and, if required, a minimum description to identify the item.

e. *Location.* The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to the adjacent area.

f. *Usable on Code.* "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of the codes used in these lists are:

(EXAMPLE)

Code	Used On
PAA	Model 114
PAB	Model 114A
PAC	Model 114B

g. *Quantity Required (Qty Reqd).* This column lists the quantity of each item required for a complete major item.

h. *Quantity.* This column is left blank for use during an inventory. Under the Rcv'd column, list the quantity you actually receive on your major item. The date columns are for your use when you inventory the major item at a later date; such as for shipment to another site.

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATIO (A) FIG NO.	(1) ILLUSTRATIO (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER (FSCM)	(4) LOCATION	(5) SABL ON CODE	(6) QTY REQ	QU RCVI	TITY DATE
1-1		5821-01-072-8146	RADIO TEST GROUP OQ-273/ARC-164(V)					
1-1	1	5821-01-072-9841	CASE , TEST SET GROUP CY-7774/ARC-164(V)					
1-1	2	5821-01-074-0071	INTERCONNECTING BOX J-3652/ARC-164(V)					
1-1	3	5821-01-073-0091	COOLER, AIR, ELECTRONIC EQUIPMENT HD-1063/ARC-164(V)					
1-1	4	5821-01-042-8113	FREQUENCY CHANNEL INDICATOR ID-1961 A/ARC- 164(V					
1-1	5	5965-01-005-0341	LOCAL HEADSET ADAPTER MX-9530/ARC					
1-1	6		ATTENUATOR					
1-1	7	5995-01-073-0116	CABLE ASS EMBLY, POWER, ELECTRICAL BRANCHED CX-13110/ARC- 164(V) (W1)					
1-1	7	5995-01-073-0004	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-13109/ARC-164 (V) (W2)					
1-1	7	5995-01-072-0005	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-13108/ARC- 164(V) (W3)					
1-1	7	5995-01-073-5605	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-13107/ARC- 164(V) (W4)					
1-1	7	5995-01-072-8088	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-13106/ARC- 164(V) (W5)					

SECTION III BASIC ISSUE ITEMS

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER (FSCM)	(4) LOCATION	(5) SABLE ON CODE	(6) QTY REQD	QUA RCVD	TY DATE
			TM 11-6625-2950-13 (TECHNICAL MANUAL)					

DRSEL-MA Form 6010, (1 Mar 77) (Edition of 1 Jun 76 is obsolete) HISA-FM ;-77

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists additional items you are authorized for the support of the test set group.

C-2. General

This list identifies items that do not have to accompany the test set group and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. Explanation of Listing

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

SECTION II ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER AND FSCM	USABLE ON CODE	(3) UNIT OF MEAS	(4) QTY AUTH
	NOT APPLICABLE			

APPENDIX D

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

D-1. General

This appendix provides a summary of the maintenance operations for the test set group. 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.

D-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons 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.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the higest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

D2-3. Column Entries

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

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of

the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

D-4. Tool and Test Equipment Requirements (Section III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

D-5. Remarks (Section IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

SECTION II MAINTENANCE ALLOCATION CHART
FOR
RADIO TEST SET GROUP OQ-273/ARC-164(V)

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT.	(6) EMARKS
00	TEST SET GROUP, RADIO OQ-273/ARC-164(V)	Service		0.2				2	
		Inspect		0.1					
		Test			0.2			2	
		Replace		0.1					
		Repair		0.1				2	A
		Repair			0.2				
		Repair					X		G
01	INTERCONNECTING BOX J-3652/ARC-164(V)	Inspect			0.1				
		Test			0.3			1	
		Replace		0.1					
		Repair			0.5				B
02	COOLER, AIR ELEC EQUIPMENT HD-1063/ARC-164(V)	Inspect			0.1				
		Test			0.1			1	
		Replace		0.1					
		Repair			0.5			2	C
03	ATTENUATOR, 100W, 30db	Inspect			0.1				
		Replace			0.1				D
04	INDICATOR ID-1961A/ARC-164(V)	Inspect			0.1				
		Test			0.3			1 thru 5	
		Replace		0.1					
		Repair			0.4			2	E
		Repair					X		G
0401	CIRCUIT CARD ASSEMBLY A1	Inspect			0.1				
		Test					X		G
		Replace			0.1			2	
		Repair					X		G
0402	CIRCUIT CARD ASSEMBLY A2	Inspect			0.1				
		Test					X		G
		Replace			0.1			2	
		Repair					X		G
0403	CIRCUIT CARD ASSEMBLY A3	Inspect			0.1				
		Test					X		G
		Replace			0.1			2	
		Repair					X		G
0404	CIRCUIT CARD ASSEMBLY A4	Inspect			0.1				
		Test					X		G
		Replace			0.1			2	
		Repair					X		G
05	CABLE ASSEMBLY, POWER, ELEC, BRANCHED CX-13110/ARC-164 (V)	Inspect			0.1				
		Test			0.2			1	
		Replace			0.1				
		Repair			0.4			2	
06	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC. CX-13106/ARC-164 (V)	Inspect			0.1				
		Test			0.2			1	
		Replace			0.1				
		Repair			0.4			2	F
07	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC. CX-13107/ARC-164(V)	Inspect			0.1				
		Test			0.2			1	
		Replace			0.1				
		Repair			0.4			2	F
08	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC. CX-13108/ARC-164(V)	Inspect			0.1				
		Test			0.2			1	
		Replace			0.1				
		Repair			0.4			2	F
09	CABLE ASSEMBLY, SPECIAL PURPOSE ELEC. CX-13109/ARC-164 (V)	Inspect			0.1				
		Test			0.2			1	
		Replace			0.1				
		Repair			0.4			2	F

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR

RADIO TEST SET GROUP OQ-273/ARC-164(V)

OOL OR TES' EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	IATIONAL/NATC STOCK NUMBER	TOOL NUMBER
1	F,O	VOLTMETER, DIGITAL AN/GSM-64	625-00-870-2264	
2	F,O	TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G	180-00-605-0070	
3	F	CONTROL BOX C-10547/ARC-164(V)	821-01-070-4433	
4	F	POWER SUPPLY PP-1104C/G	130-00-635-4900	
5	F	OSCILLOSCOPE AN/USM-281	625-00-228-2201	

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	REPAIR OF THE LOCAL HEADSET ADAPTER MX-9530/ARC IS ACCOMPLISHED BY REPLACING IT BECAUSE IT IS A THROW-AWAY ITEM.
B	REPAIR BY REMOVING/REPLACING DEFECTIVE SWITCHES, TEST JACKS, METER, AND CONNECTORS; AND BY CORRECTING DEFECTIVE WIRING.
C	REPAIR BY REMOVING/REPLACING DEFECTIVE BLOWER MOTOR AND BY CORRECTING DEFECTIVE WIRING. THE BLOWER MOTOR IS A THROW-AWAY ITEM.
D	THE ATTENUATOR IS BASICALLY A MECHANICAL ITEM WITH AN EXTREMELY LOW FAILURE RATE. THE ATTENUATOR IS A COMMERCIALLY BOUGHT ITEM AND, IN CASE OF FAILURE, WOULD BE RETURNED TO THE DEPOT OR FACTORY FOR REPAIR.
E	THE INDICATOR IS REPAIRED BY REMOVING/REPLACING ASSEMBLIES (PRINTED CIRCUIT BOARDS) 0401 THROUGH 0404.
F	REPAIR BY REMOVING/REPLACING DEFECTIVE CONNECTORS AND/OR CORRECTING DEFECTIVE WIRING.
G	DEPOT MAINTENANCE TO BE ACCOMPLISHED BY WARNER ROBBINS AIR LOGISTICS COMMAND ON A DEPOT MAINTENANCE INTERSERVICE SUPPORT AGREEMENT.

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the test set group. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. Explanation of Columns

a. *Column 1 - Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. *Column 2 - Level.* This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. *Column 3 - National Stock Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

d. *Column 4 - Description.* Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturing (FSCM) in parentheses, if applicable.

e. *Column 5 - Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue requisition the lowest unit of issue that will satisfy your requirements.

SECTION II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO AND FSCM	(5) UNIT OF MEAS
1	O,F	8020-00-257-038	BRUSH	EA
2	O,F	8010-00-297-054	ENAMEL, LUSTERLESS PAINT, BLACK	CN
3	O,F	8305-00-222-242	LINT-FREE CLOTH	EA
4	O,F	5350-00-186-885	SANDPAPER, FINE	SH
5	F	3439-00-194-972	SOLDER	LB
6	O,F	6850-00-105-308	TRICHLOROTRIFLUOROETHANE	CN

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10 July 1975

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TM 11-5840-340-20P	23 Jan 78	Radar Set AN/PRC-76

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
33			
44		19	
45			

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

For item 2, change the NSN to read: 5835-00-134-9186.
Reason: Accuracy.

Identify the cover on the junction box (item no. 5).
Reason: It is a separate item and is not called out on figure 19.

Add the cover of the junction box as an item in the listing for figure 19.
Reason: Same as above

SAMPLE

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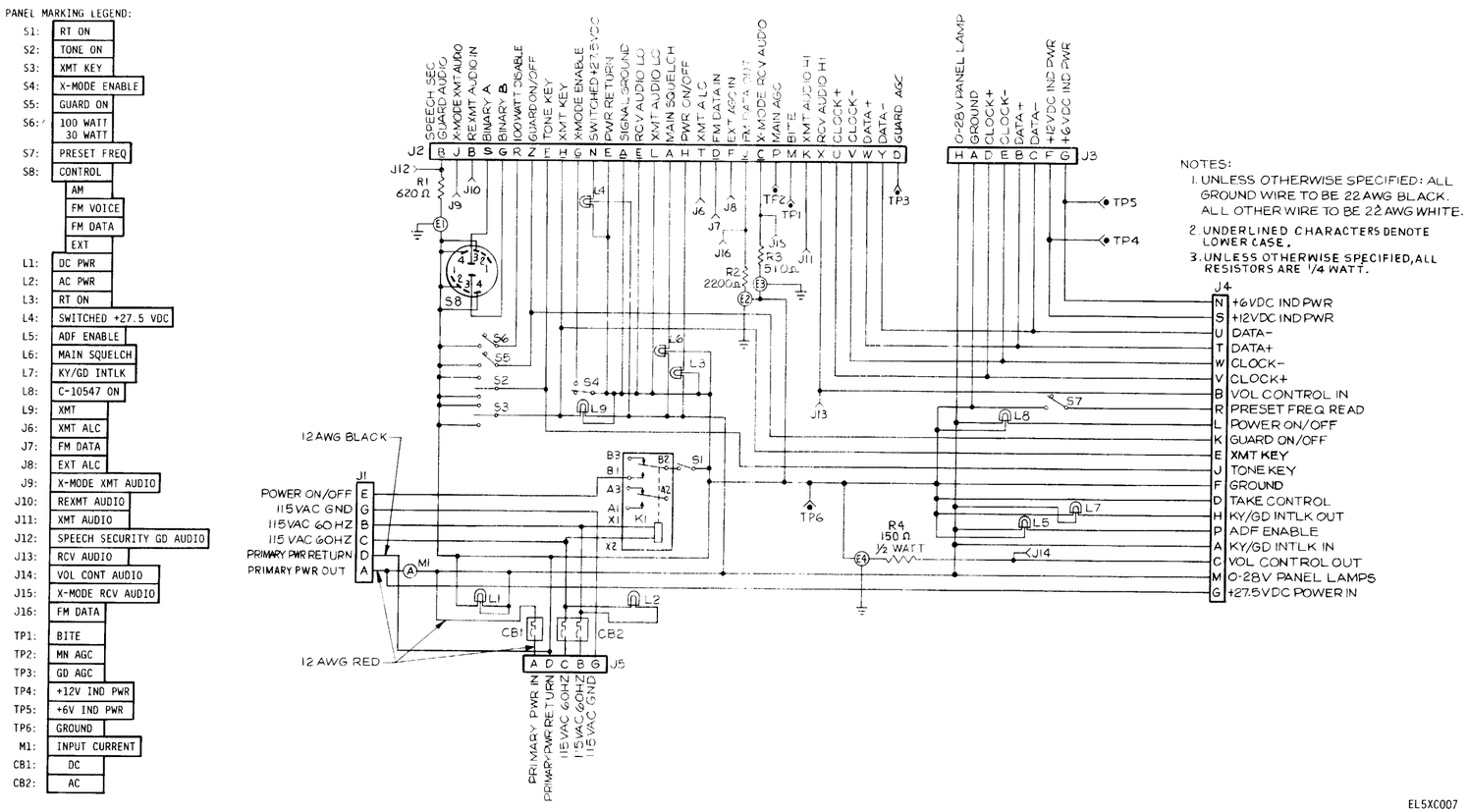


Figure FO-1. Interconnecting Box Schematic Diagram

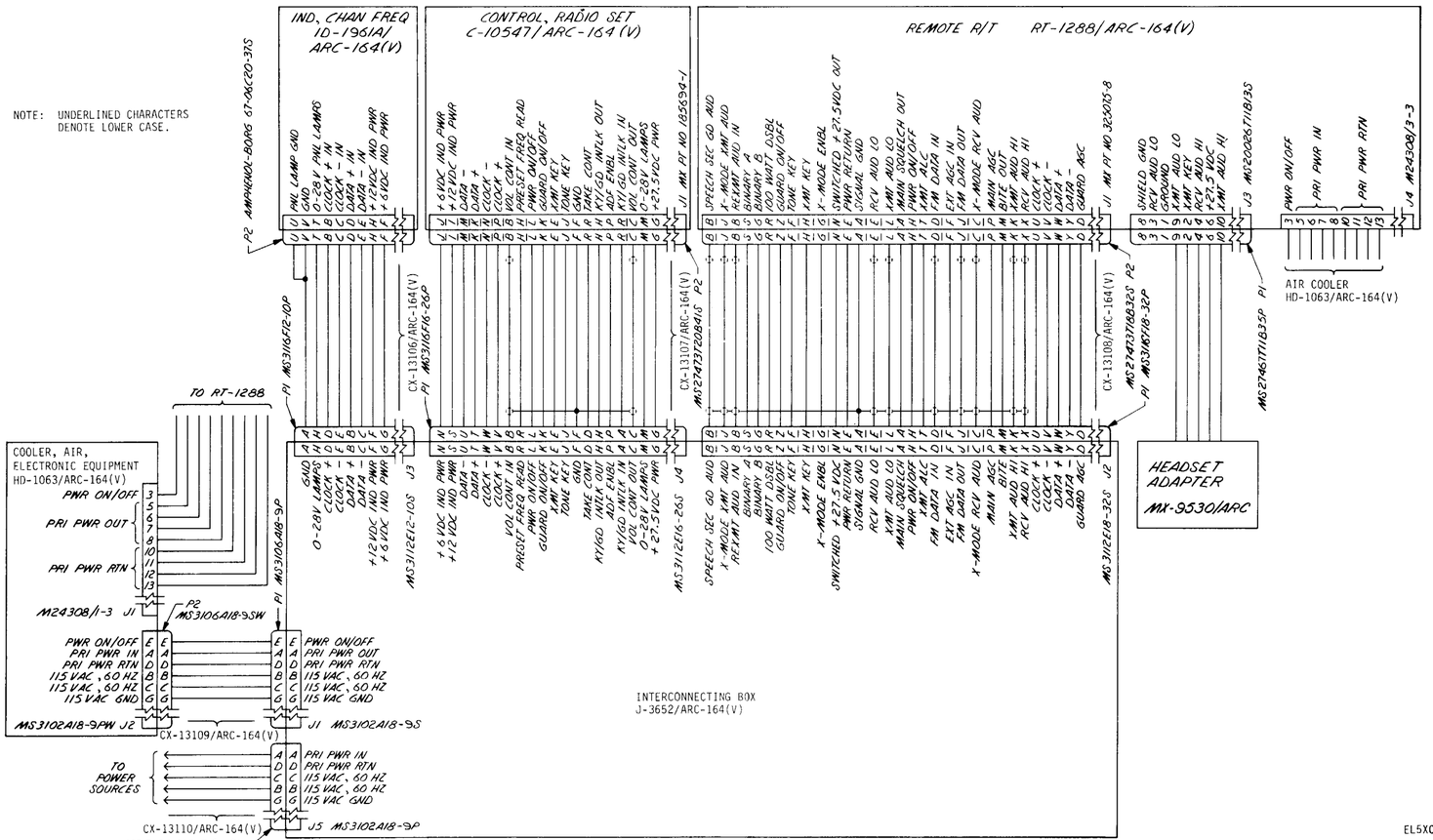


Figure FO-2. Test Set Group Interconnecting Diagram.

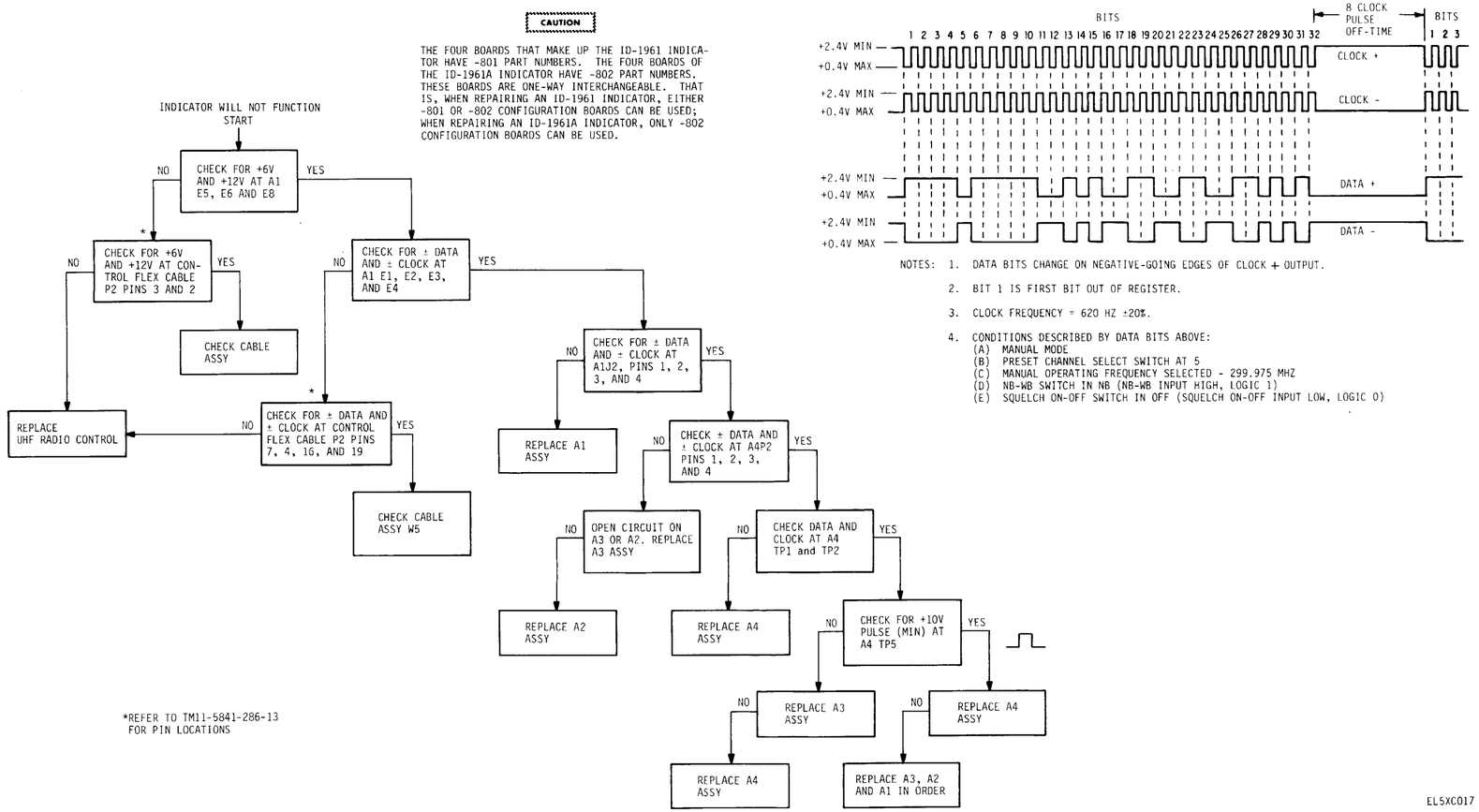
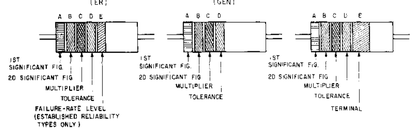


Figure FO-3. Frequency Channel Indicator ID-1961A/ARC-164(V) Trouble Analysis.



COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS.

COLOR-CODE MARKING FOR FILM-TYPE RESISTORS.

TABLE I
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL
BLACK	0	BLACK	0	BLACK	1			BROWN	M=1.0
BROWN	1	BROWN	1	BROWN	10			RED	P=0.1
RED	2	RED	2	RED	100			ORANGE	R=0.01
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	S=0.001
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP. TYPES ONLY)	WHITE	
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5		SOLDERABLE
BLUE	6	BLUE	6	BLUE	1,000,000	RED	± 2 (NOT AP-		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				ESTABLISHED RELIABILITY)		
GRAY	8	GRAY	8	SILVER	0.01				
WHITE	9	WHITE	9	GOLD	0.1				

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH.)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE.

BAND C — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.)

BAND D — THE RESISTANCE TOLERANCE.

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL. (PERCENT FAILURE PER 1,000 HOURS.) ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1½ TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

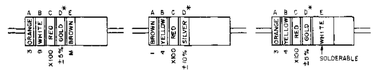
RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS (THESE ARE NOT COLOR CODED.)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA-NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE:

2R7 = 2.7 OHMS 10R0 = 10.0 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS.

EXAMPLES OF COLOR CODING



NOMINAL RESISTANCE 3,900 OHMS
RESISTANCE TOLERANCE ±5%
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 1,400 OHMS
RESISTANCE TOLERANCE ±1%

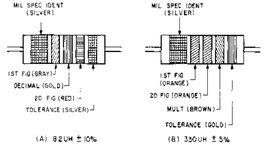
NOMINAL RESISTANCE 3,400 OHMS
RESISTANCE TOLERANCE ±5%
TERMINAL SOLDERABLE

COMPOSITION-TYPE RESISTORS

FILM-TYPE RESISTORS

* IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD

A. COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS



COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES. AT A, AN EXAMPLE OF THE CODING FOR AN 8.2UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330UH INDUCTOR ARE ILLUSTRATED.

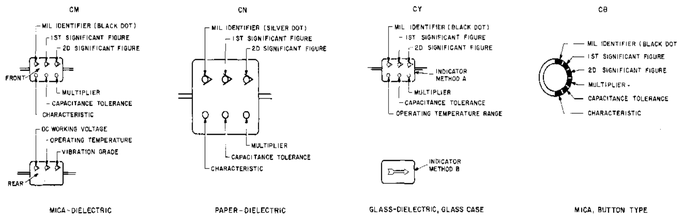
TABLE 2
COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES.

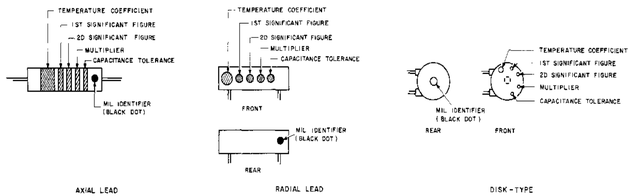
COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL.

B. COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

CAPACITORS, FIXED, VARIOUS-DIELECTRICS, STYLES CM, CN, CY, AND CB.





C. COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS.

TABLE 3 — FOR USE WITH STYLES CM, CN, CY AND CB.

COLOR	MIL ID	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE			CHARACTERISTIC			DC WORKING VOLTAGE	OPERATING TEMP RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CB	CM	CY, CM	CM
BLACK	CM, CY, CB	0	0	1			±20%	±20%	A				-55°TO+70°C	10-55Hz
BROWN		1	1	10					B	E	S			
RED		2	2	100	±2%		±2%	±2%	C				-55°TO+85°C	
ORANGE		3	3	1,000	±30%				D		U	300		
YELLOW		4	4	10,000					E				-55°TO+125°C	10-2,000Hz
GREEN		5	5		±5%				F			500		
BLUE		6	6										-55°TO+150°C	
PURPLE (VIOLET)		7	7											
GRAY		8	8											
WHITE		9	9											
GOLD				0.1			±5%	±5%						
SILVER	CN			0.01	±10%	±10%	±10%	±10%						

TABLE 4 — TEMPERATURE COMPENSATING, STYLE CC.

COLOR	TEMPERATURE COEFFICIENT[4]	1ST SIG FIG	2D SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		±2.0 UUF	CC
BROWN	-30	1	1	10	±1%		
RED	-80	2	2	100	±2%	±0.25 UUF	
ORANGE	-150	3	3	1,000			
YELLOW	-220	4	4				
GREEN	-330	5	5		±5%	±0.5 UUF	
BLUE	-470	6	6				
PURPLE (VIOLET)	-750	7	7				
GRAY		8	8	0.01*			
WHITE		9	9	0.1*	±10%		
GOLD	+100			0.1		±1.0 UUF	
SILVER				0.01			

1. THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF.
2. LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS: MIL-C-5, MIL-C-25D, MIL-C-11272B, AND MIL-C-10950C RESPECTIVELY.
3. LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D.
4. TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE.
* OPTIONAL CODING WHERE METALLIC PIGMENTS ARE UNDESIRABLE.

ESC-FM 913-73

Figure FO-4. Resistor/Capacitor Color Code Chart.

By Order of the Secretary of the Army:

EDWARD C. MEYER
General, United States Army
Chief of Staff

Official:

J.C. PENNINGTON
Major General, United States Army
The Adjutant General

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