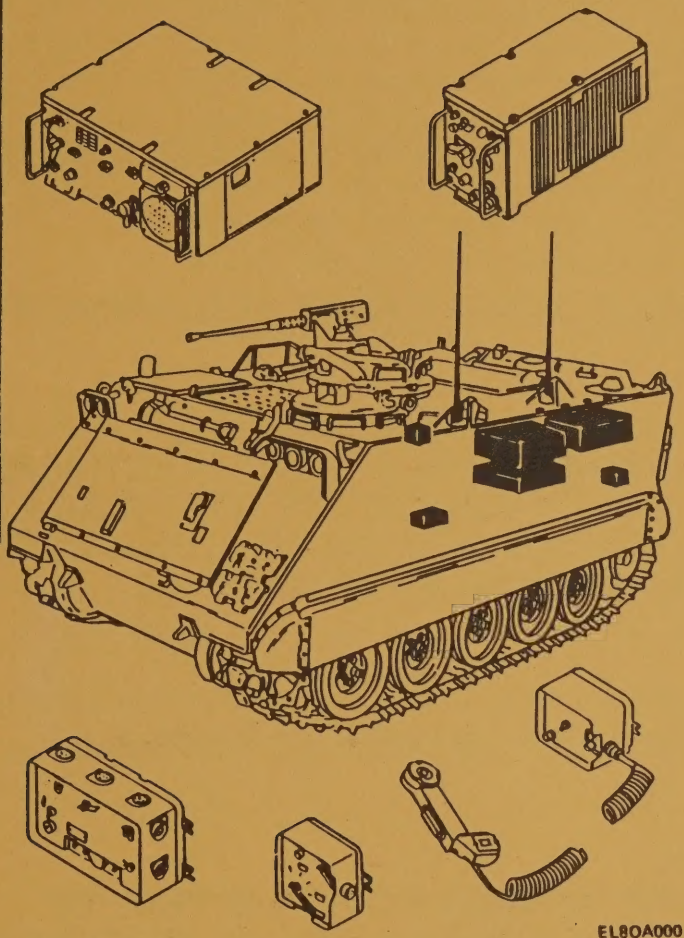
ARMY TM 11-5820-401-20-2
NAVY EE150-JA-MMO-020/E154 VRC 12, 43

TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL

This copy is a reprint, which includes pages from Changes 1, 2, and 3.



EL8OA000

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PRINCIPLES OF OPERATION PAGE 1-55

INSTALLATION PROCEDURES PAGE 2-3

PREVENTIVE MAINTENANCE CHECKS PAGE 3-2

TROUBLESHOOTING PAGE 3-16

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PREPARATION FOR STORAGE AND SHIPMENT PAGE 3-326

RADIO SETS: AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415), AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418), AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434), AN/VRC-48 (NSN 5820-00-223-7435), AN/VRC-49 (NSN 5820-00-223-7437)

(USED WITH INTERCOM SET AN/VIC-1(V))

DEPARTMENTS OF THE ARMY AND NAVY

3 JANUARY 1984



5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1 DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2 IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3 IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4 SEND FOR HELP AS SOON AS POSSIBLE

5 AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

Change
No. 3

DEPARTMENTS OF THE ARMY
AND THE NAVY
Washington, DC, 1 September 1995

Unit Maintenance Manual

RADIO SETS
AN/VRC-12 (NSN 5820-00-223-7412) (EIC: GCC)
AN/VRC-43 (NSN 5820-00-223-7415) (EIC: GCD)
AN/VRC-44 (NSN 5820-00-223-7412) (EIC: GCE)
AN/VRC-45 (NSN 5820-00-223-7418) (EIC: GCF)
AN/VRC-46 (NSN 5820-00-223-7433) (EIC: GCG)
AN/VRC-47 (NSN 5820-00-223-7434) (EIC: GCH)
AN/VRC-48 (NSN 5820-00-223-7435) (EIC: GCJ)
AN/VRC-49 (NSN 5820-00-223-7437) (EIC: GCK)

(USED WITH INTERCOM SET AN/VIC-1(V))

TM 11-5820-401-20-2/EE150-JA-MMO-020/E154 VRC 12, 43, 3 January 1984, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

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B-13 through B-50	B-13 through B-45/(B-46 blank)

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CHANGE

No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 September 1987

Organizational Maintenance Manual

RADIO SETS: AN/VRC-12, (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415), AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418), AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434), AN/VRC-48 (NSN 5820-00-223-7435), AN/VRC-49 (NSN 5820-00-223-7437),

(USED WITH INTERCOM SYSTEM AN/VIC-1(V))

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Remove pages	Insert pages
1-7 and 1-8	1-7 and 1-8
1-39 and 1-40	1-39 and 1-40
1-49 and 1-50	1-49 and 1-50
2-25 and 2-26	2-25 and 2-26
3-19 and 3-20	3-19 and 3-20
None	3-20.1 and 320.2
3-55 and 3-56	3-55 and 3-56
None	3-56.1, 3-56.2, and 3-56.3/(3-56.4 blank)
3-133 through 3-136	3-133 through 3-136
3-197 and 3-198	3-197 and 3-198
Index 9/(Index 10 blank)	Index 9/(Index 10 blank)
None	FO-22 (2 sheets)

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Vice Admiral, United States Navy
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Change

No. 1

DEPARTMENTS OF THE ARMY AND NAVY

Washington, DC, 15 January 1986

Organizational Maintenance Manual

RADIO SETS:
AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415), AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418), AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434), AN/VRC-48 (NSN 5820-00-223-7435), AN/VRC-49 (NSN 5820-00-223-7437)

(USED WITH INTERCOM SYSTEM AN/VIC-1(V))

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Remove pages	*Insert pages*
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
1-17 and 1-18	1-17 and 1-18
1-23 through 1-26	1-23 through 1-26
2-1 and 2-2	2-1 and 2-2
2-5 and 2-6	2-5 and 2-6
2-19 and 2-20	2-19 and 2-20
3-1 through 3-12	3-1 through 3-12
3-15 and 3-16	3-15 and 3-16
3-215 and 3-216	3-215 and 3-216
3-257 and 3-258	3-257 and 3-258
3-309 through 3-312	3-309 through 3-312
A-1 through A-3/(A-4 blank)	A-1 through A-3/(A-4 blank)
B-13 through B-88	B-13 through B-73/(B-74 blank)
C-1 and C-2	C-1 and C-2
Index 5 and Index 6	Index 5 and Index 6

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WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

WARNING

MOBILE OPERATION WITH WHIP ANTENNAS.
DO NOT STOP YOUR TRACKED VEHICLE UNDER POWERLINES.

If possible, try to maintain mobile communications with your antenna(s) tied down.

Make sure an antenna tip cap is securely taped on the end of any whip antenna having two or three antenna elements.

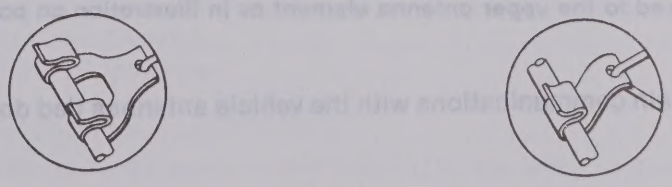
Do not lean against or touch any antenna while the RT is transmitting.

During cross-country operation, do not allow anyone to stick an arm, leg or weapon over the sides of all vehicles. If your antenna accidentally touches a powerline and a leg, arm or weapon contacts a damp bush or the ground, a serious or fatal accident can happen.

If you are not sure that an antenna on your vehicle will clear a powerline, stop before you get close to the powerline and either carefully tie down the antenna or remove antenna sections to make sure that you can safely drive under the powerline.

Do not stand closer than 20 inches (0.5 meters) to all RT antennas when the unit is transmitting. High levels of electromagnetic radiation exist in this area.

Vehicles with AT-912 or AS-1729 antennas mounted more than 6 feet above ground can strike railroad crossing powerlines if the whip antenna comes loose from its tiedown during road or rail movement. A serious or fatal accident could happen.



EL8OA200

With the antenna tied down in the secure position, damage to the whip can occur if the whip contacts any fixed object such as overhead bridges, etc. The possibility of serious or fatal injury exists to outside personnel from flying antenna parts.

WARNING

Never attempt to carry a radio receiver-transmitter (RT) yourself. Serious injury could result.

WARNING

HIGH VOLTAGE is used in the operation of the receiver-transmitters, RT-524/VRC and RT-246/VRC, of a tracked vehicle's radio-intercom system. DEATH ON CONTACT can result, so observe the following safety precautions:

DO NOT operate a receiver-transmitter (RT) with its top and/or bottom panels removed.

DO NOT touch or stand within 20 inches (0.5 meters) of an RT's antenna when there is a possibility that the RT could be keyed and transmitting.

If at all possible, work on the equipment only when another person is nearby who is competent in CARDIOPULMONARY RESUSCITATION (CPR) and the five safety steps shown on inside front cover.

DO NOT BE MISLED by the terms "low voltage" and "low potential". Voltages/potentials as low as 50 volts can cause DEATH under certain conditions.

Remove or tape all exposed personal metal objects (e.g., watches, rings, and medallions) before working on C-E equipment.

WARNING

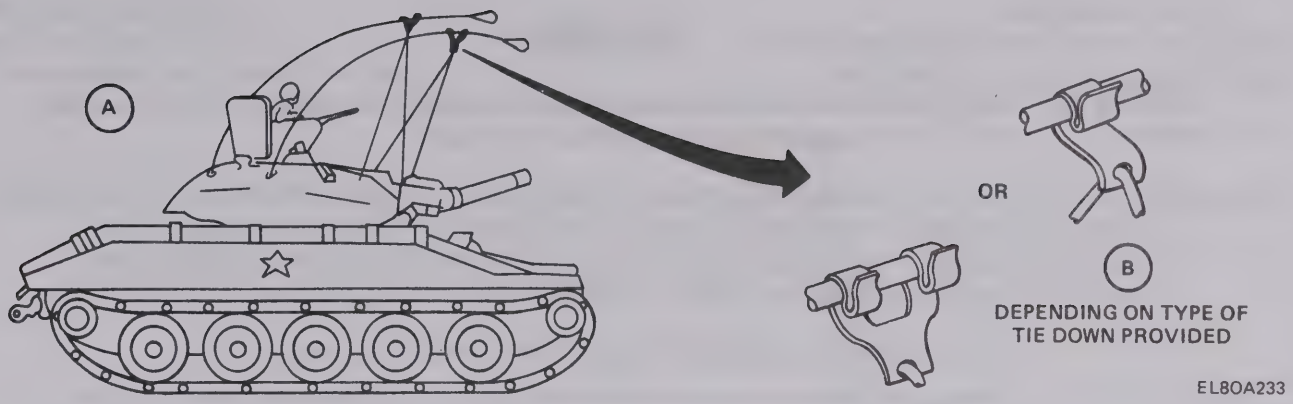
HIGH VOLTAGE can be encountered when a communication antenna of a tracked vehicle strikes a powerline. DEATH TO PERSONS inside, or in contact with, the vehicle can result. To reduce this hazard:

DO NOT stop or park a vehicle under any type of powerline.

If you are not sure that an antenna will clear a powerline, stop the vehicle before getting close to the powerline and then either remove an antenna element or carefully tie down the antenna elements to insure that the vehicle can be safely driven under the powerline.

Tracked vehicles with antennas that have two or more antenna elements (auxiliary receiver antennas and/or RT antennas AT-912/VRC and AS-1729/VRC) will probably strike railroad and/or street car power (trolley) lines unless the antenna elements are correctly tied down as in illustration A. To reduce the risk of an antenna element coming loose from its tiedown clamp, the clamp must be secured to the upper antenna element as in illustration on page A and C.

If possible, try to maintain communications with the vehicle antennas tied down.



WARNING

DEATH or SERIOUS INJURIES can result:

When antenna tip caps are NOT installed on the upper element of antennas that are to be tied down.

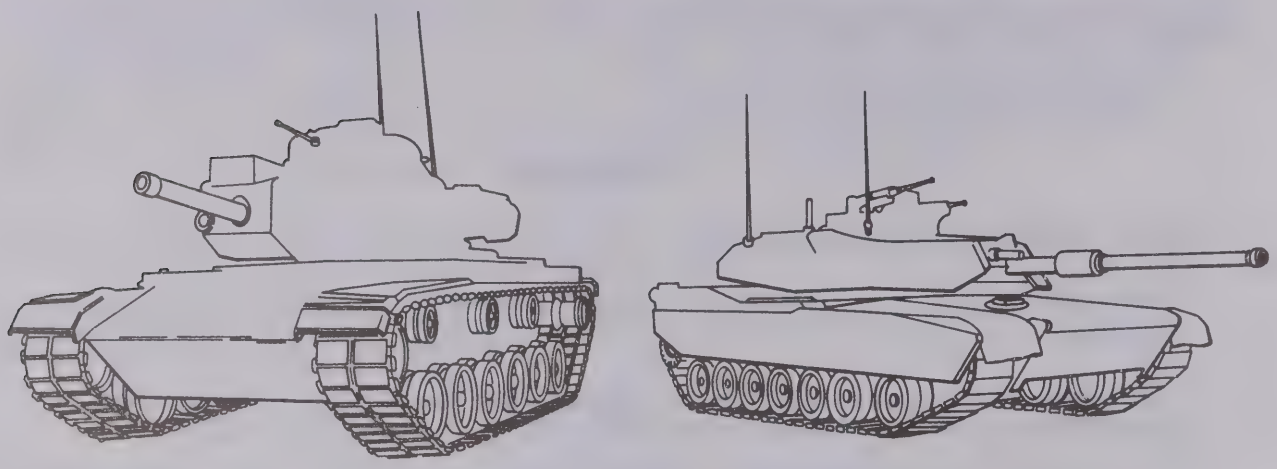
When a tied down antenna strikes a fixed object such as an overhead bridge, tree limb, and so forth. In this case, persons outside may be struck by flying antenna parts.

WARNING

Fumes of TRICHLOROTRIFLUOROETHANE are poisonous. Provide adequate ventilation whenever you use TRICHLOROTRIFLUOROETHANE. Do not use solvent near heat or open flame. TRICHLOROTRIFLUOROETHANE will not burn, but heat changes the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. TRICHLOROTRIFLUOROETHANE dissolves natural skin oils. DO NOT get the solvent on your skin. Use gloves, sleeves and an apron which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

WARNING

DEATH or SERIOUS INJURY can result when wrong items of equipment are installed in certain vehicles.



M60 M1

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Anytime Receiver-Transmitter RT-246(*)/VRC or RT-524(*)/VRC is installed in an M60A2 tank or an Abrams M1 tank, special antenna cables MUST be used to connect the receiver-transmitter to its antenna.

DO NOT USE A STANDARD CX-4722 control cable or a CG-1773 rf signal cable in M60A2 and M1 tanks. Serious injury or even DEATH may result because the standard cables radiate rf signals that can cause the main turret, and/or the commander's cupola, and/or the main gun, to move violently.

CAUTION

Throughout this manual, there are CAUTIONS that must be observed when doing specific procedures to avoid possible damage to the equipment. Read each caution carefully and then adhere to appropriate safety procedures when doing the work.

TECHNICAL MANUAL
NO. 11-5820-401-20-2
EE150-JA-MMO-020/E154 VRC 12, 43

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND NAVY
Washington, DC, 3 January 1984

Organizational Maintenance Manual

RADIO SETS: AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415), AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418), AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434), AN/VRC-48 (NSN 5820-00-223-7435), AN/VRC-49 (NSN 5820-00-223-7437)

(USED WITH INTERCOM SYSTEM AN/VIC-1(V))

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 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007. For Navy, mail comments to the Commander, Naval Electronics Systems Command, ATTN: ELEX 8122, Washington, DC 20360. A reply will be furnished directly to you.

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Section	I	General Information	1-1
	II	**Equipment Description and Data**	**1-5**
	III	**Principles of Operation**	**1-55**
CHAPTER 2		INSTALLATION	2-1
Section	I	Installation Tools and Materials	2-1
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	III	**Troubleshooting**	**3-16**
	IV	**Maintenance Procedures**	**3-187**
	V	**Preparation For Storage or Shipment**	**3-326**

*This manual together with TM 11-5820-401-20-1, -10-1, and -10-2, supersedes TM 11-5820-401-12 including all changes.

		Page
APPENDIX A	REFERENCES	A-1
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APPENDIX C	EXPENDABLE SUPPLIES AND MATERIALS	C-1
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INDEX		Index 1
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HOW TO USE THIS MANUAL

This manual is designed to help you do organizational maintenance for the eight AN/VRC-12 series radio sets installed with the AN/VIC-1(V) in tracked vehicles.

The front cover provides a Table of Contents for quick reference to important information by general listing. The Index on the final pages will help locate specific information by alphabetical listing.

Measurements in this manual are given in both English and Metric Units.

Read all preliminary information found at the beginning of each procedure. It has important information and safety instructions you must follow before beginning work.

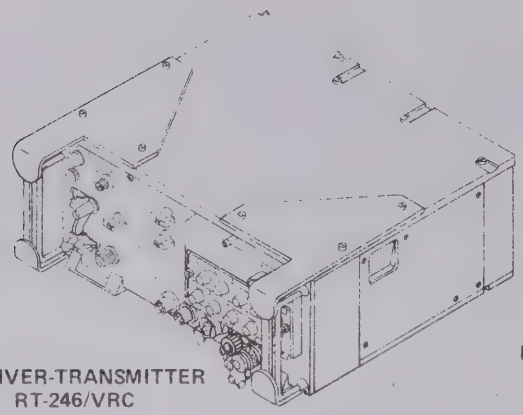
Warning pages are at the beginning of this manual. You should learn the warnings before doing maintenance on the equipment, and always follow appropriate safety procedures and precautions.

Paragraphs in this manual are numbered by chapter and order of appearance within a chapter. A subject index appears at the beginning of each chapter section to help you find the exact paragraph you are looking for.

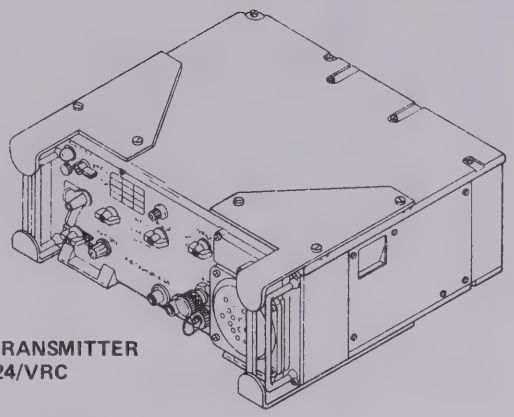
Instructions for using troubleshooting tables are located in paragraph 3-7.

Instructions for performing the PMCS are located in paragraph 3-5.

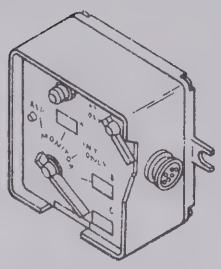
Instructions for installing items of equipment are located in chapter 2, section III.
Instructions for evaluating the performance of the equipment are located in paragraph 3-15.



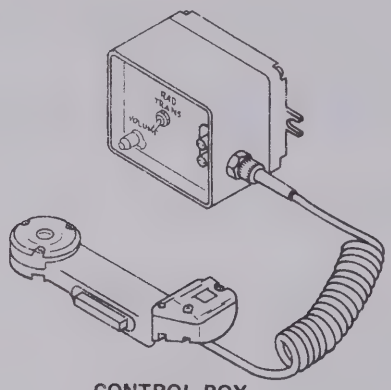
RECEIVER-TRANSMITTER
RT-246/VRC



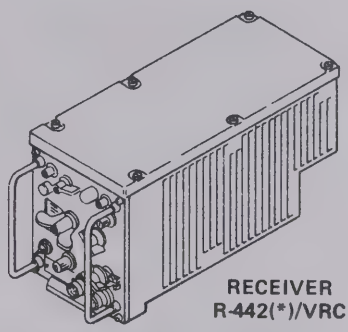
RECEIVER-TRANSMITTER
RT-524/VRC



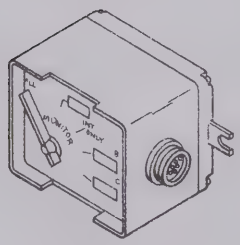
CONTROL BOX
C-2297/VRC



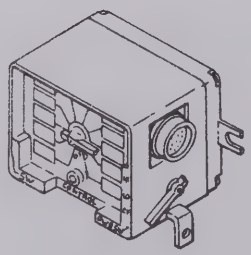
CONTROL BOX
C-2296/VRC



RECEIVER
R-442(*)/VRC



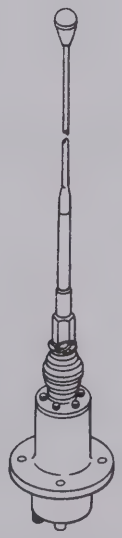
CONTROL BOX
C-2298/VRC



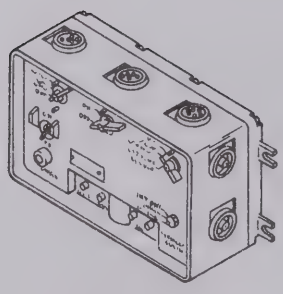
CONTROL BOX
C-2742/VRC



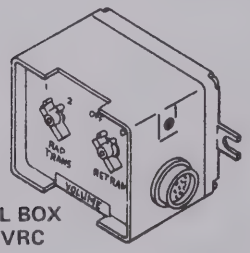
AUXILIARY RECEIVER
R-442 ANTENNA



RT ANTENNA
AS-1729/VRC



MAIN JUNCTION BOX
AM-1780/VRC



CONTROL BOX
C-2299/VRC

EL8OA002

CHAPTER 1

INTRODUCTION

Subject	Section	Page
General Information	I	1-1
Equipment Description and Data	II	1-5
Principles of Operation	III	1-55

OVERVIEW

This chapter provides general information about the Communication - Electronic (C-E) items of equipment that make up the AN/VRC-12 series of radio-intercom systems installed in tracked vehicles. Specifically, this chapter covers the names and model numbers of the C - E components, common maintenance forms and records associated with the components, general administrative procedures for the components, and specific descriptions and data about each component. It also presents the basic principles of operation for each circuit of a typical radio-intercom system.

Section I GENERAL INFORMATION

Subject	Para	Page
Scope	1-1	1-1
Consolidated Index of Army Publications and Blank Forms	1-2	1-2
Reporting Equipment Improvement Recommendations (EIR)	1-3	1-2
Maintenance Forms, Records, and Reports	1-4	1-2
Destruction of Army Electronics Materiel to Prevent Enemy Use	1-5	1-2
Administrative Storage	1-6	1-2
Nomenclature Cross-Reference List	1-7	1-3
Hand Receipt Manual	1-8	1-4

1-1. SCOPE.

TYPE OF MANUAL: This manual covers organizational maintenance for communication (radio-intercom) systems in tracked vehicles. These systems consist of Intercommunication (intercom) Set AN/VIC-1(V) in combination with any eight AN/VRC-12 series of radio sets.

MODEL NUMBERS AND EQUIPMENT NAMES: The AN/VRC-12 series of radio sets consists of: AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48 and AN/VRC-49.

The AN/VIC-1(V) intercom set consists of the main junction box/amplifier with combinations of crewmember control boxes (C-2297/VRC with C-2296/VRC and/or C-2298/VRC).

PURPOSE OF RADIO - INTERCOM SYSTEM: The AN/VIC-1 intercom set provides for communication between crewmembers of a tracked vehicle over wire communications. The AN/VRC-12 radio sets provide for communication command and control in a tracked vehicle over a two-way FM radio link.

The radio sets are used in tracked vehicles such as tanks and armored personnel carriers. When the radios are installed in jeeps, trucks, or other wheeled vehicles, refer to TM 11-5820-401-20-1/ EE150-JA-MMO-010/E154VRC 12, 43.

1-1. SCOPE. (CONT)

The AN/VIC-1(V) also provides crewmembers with access to the AN/VRC-12 radio sets for two-way radio communication.

1-2. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS.

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your AN/VIC-12 series of radio sets or AN/VIC-1(V) intercom set 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. Put it on SF 368 (Quality Deficiency Report) according to instructions of chapter 12 of DA Pam 738-750 and then mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey, 07703-5007. We'll send you a reply.

Navy personnel are encouraged to submit EIR through their local Beneficial Suggestion Program.

1-4. MAINTENANCE FORMS, RECORDS, AND REPORTS.

REPORTS OF MAINTENANCE AND EQUIPMENT STATUS (TAMMS)

Department of the Army forms and procedures used for equipment maintenance and status will be those prescribed by DA Pam 738-750 as contained in Maintenance Management Update.

Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol 3 and unsatisfactory Material/Conditions (UR Submissions) IAW OPNAVINST 4790.2, Vol 2, chapter 17.

REPORT OF PACKAGING AND HANDLING DEFICIENCIES

Fill out and forward SF 364 (Report of Discrepancy (ROD)), as prescribed by AR 735-11-2/DLAR 4140.55/ NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

DISCREPANCY IN SHIPMENT REPORT (DISREP) (SF 361)

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

1-5. DESTRUCTION OF ARMY ELECTRONICS MATERIEL TO PREVENT ENEMY USE.

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

1-6. ADMINISTRATIVE STORAGE.

Administrative storage of equipment shall be done in accordance with TM 740-90-1, Administrative Storage of Equipment. Disassembly and repacking of equipment for shipment or limited storage are covered in paragraphs 3-27 and 3-28.

1-7. NOMENCLATURE CROSS-REFERENCE LIST.

This list contains common names used throughout this manual in place of official nomenclature.

NOTE

Equipment identified with (*) represents all models of the equipment.

Common Name	Official Nomenclature
AM-1780/VRC (main junction box/ amplifier)	Amplifier, Audio Frequency, AM-1780/VRC
antenna, RT	Antenna AS-1729/VRC, Antenna AS-2731/GRC, or Antenna AT-912/VRC (entire assemblies including antenna elements, bases, and mounts)
antenna matching unit	Antenna Base Matching Unit MX-6707/VRC (part of Antenna AS-1729/VRC), Antenna Base Matching Unit MX-9146/GRC (part of Antenna AS-2731/GRC), or Antenna Matching Unit MX-2799/VRC (part of Antenna AT-912/VRC)
AN/VRC-12 series of radio sets	AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48, and AN/VRC-49
aux receiver	Receiver, Radio R-442(*)/VRC
aux receiver antenna	Antenna Base AB-15/GR or AB-558/GR with Antenna Elements MS-116A, MS-117A, and MS-118A
aux receiver mounting	Mounting MT-1898/VRC
combination headset	Headset Microphone H-161/U
control box	Control, Intercommunication Set
handset	Handset H-189/GR or H-250/U (earphone and microphone and push-to-talk switch)
headset	Headset H-140A/U or H-251/U (earphone only)
helmet	Armored Vehicle Crewmember Helmet. DH-132A with Headset and Microphone Installed (replaces the CVC Helmet) (NSN 8470-01-130-8180, small; 8470-01-130-3794, medium; 8470-01-130-3795, large)
intercom set	Intercommunication Set AN/VIC-1(V)
loudspeaker	Loudspeaker LS-454/U

1-7. NOMENCLATURE CROSS-REFERENCE LIST. (CONT)

Common Name	Official Nomenclature
microphone	Microphone, Dynamic M-80/U (microphone only)
minisuppressor	Suppressor, Electrical Transient NSN 5915-01-024-3877
radio relay box or retransmit box	Control, Radio Set C-2999/VRC
receiver-transmitter or RT	Receiver-Transmitter RT-246(*)/VRC or RT-524(*)/VRC
remote box	Control, Frequency Selector C-2742/VRC (used with RT-246/VRC)
RT mounting	Mounting MT-1029/VRC
suppressor	Suppressor, Electrical Transient MX-7777(*)/GRC

1-8. HAND RECEIPT MANUAL.

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). TM 11-5820-401-20-2-HR provides a listing on a preprinted DA Form 2062 (Hand Receipt) of Accountable End Items (COEI) and Additional Authorization List (AAL) items related to the AN/VRC-12 series radio sets used in tracked vehicles with Intercom Set AN/VIC-1(V). There is a preprinted hand receipt for each radio-intercom system authorized for each type of tracked vehicle. Each preprinted hand receipt lists the items of equipment authorized for the installation, each item's National Stock Number (NSN), and the number (quantity) of any one item authorized for standard configurations.

As an aid to property accountability, additional -HR manuals may be requisitioned from the US Army Adjutant General Publications Center, Baltimore, MD, in accordance with the procedures in chapter 3, AR 310-2, and DA Pam 310-10-2.

AN/VIC-1(V) items are installed in the tracked vehicle when built. Refer to the vehicular manual for specific installation.

Radio set items consist of the receiver-transmitter(s) (RTs), the antenna(s), and the aux receiver appropriate to the AN/VRC-12 series radio set to be used with a particular vehicle.

Accessory kit items consist of the helmet sets, headsets, handsets, microphones, loudspeakers, and receiver antennas appropriate to a particular vehicle. Control Boxes C-2742/VRC and C-2299/VRC are included if installation calls for it.

Section II EQUIPMENT DESCRIPTION AND DATA

Subject	Para	Page
Purpose and Use of Equipment	1-9	1-5
Equipment Data	1-10	1-6
Description of Components	1-11	1-14
Location of Major Components and Cabling of:		
Personnel Carrier (APC) M113 (*)	1-12	1-39
Command Post (CP) M577 (*)	1-13	1-41
Recovery Vehicle M88A1	1-14	1-42
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Combat Engineer's Vehicle (CEV) M728	1-16	1-44
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Interim Fire Support Team Vehicle (FIST-V)	1-22	1-50
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1-9. PURPOSE AND USE OF EQUIPMENT.

The items of the AN/VIC-1(V) intercom set provide for intercommunication between crewmembers of a vehicle. It also provides crewmembers the control and use of the radio set installed in the system from their individually assigned positions within the vehicle.

The heart of the radio-intercom system is the AM-1780. Each crewmember is connected to the AM-1780 through an assigned control box. Audio interface between a crewmember and the control box is normally provided by a Helmet, DH-132A, or a Headset/Microphone Set H-161/GR.

The AN/VRC-12 series radios are the most commonly found radio sets in the field army. They provide short-range, FM two-way radio communications in the 30- to 75.75-MHz frequency range. Various types of antennas are available depending on the type of mission and transmission range needed.

The eight configurations of these radio sets consist of various combinations of two basic radio components: a VHF FM receiver-transmitter and an auxiliary VHF FM receiver.

The vehicle batteries and charging system provide the required 22- to 30-volt dc power source for both the radio set and the intercom set.

Secure communication is possible using Vinson or Nestor speech-security equipment and the X-mode facility of the radio components.

For further information on operating instructions, refer to TM 11-5820-401-10-2.

1-10. EQUIPMENT DATA.

The following table lists the operational characteristics of the intercom set and radio set items of equipment.

AN/VIC-1(V) INTERCOMMUNICATION COMPONENTS

CONTROL BOXES

C-2296/VRC, C-2297/VRC, C-2298/VRC	
Frequency range	500 to 3,000 Hz (audio)
Intercom function	Provides communication between crewmembers
Radio function	Provides communication over all radio components connected to AM-1780/VRC
C-10456/VRC (Abrams) - Modified C-2298/VRC	
Frequency range	500 to 3,000 Hz
Intercom function	Provides communication between crewmembers
Radio function	Provides access to all radios connected to AM-1780/VRC
Remote intercom/radio keying function	Provides remote keying from various Abram's controls
C-10680/VRC (Interim FIST) - Modified C-2298/VRC	
Frequency range	500 to 3,000 Hz
Intercom function	Provides communication between crewmembers
Radio function	Provides access over all radios connected to AM-7046/VRC As compared to a C-2298/VRC, a C-10680/VRC provides access to a third RT and monitors one receiver

AMPLIFIER/JUNCTION BOXES

Audio Frequency Amplifier AM-1780/VRC	
Frequency range	500 to 3,000 Hz
Intercom function	Provides communication (intercom) between control boxes
Radio function	Provides control of radios selected at control boxes
Circuit Impedences:	
Microphone circuits	150 ohms ± 20 percent
Headset and loudspeaker circuits	150 ohms ± 20 percent
LINE binding posts	600 ohms ± 20 percent
AUDIO INPUT binding posts	5,000 ohms
Radio transmitter microphone input circuit	150 ohms ± 20 percent
Radio receiver audio output circuits	150 ohms ± 20 percent
Operating voltage requirements	22 to 30 vdc

1-10. EQUIPMENT DATA. (CONT)

Audio Frequency Amplifier AM-7046/VRC (Interim FIST V) - Modified AM-1780/VRC	
Frequency range	500 to 3,000 Hz
Radio function	Provides control of radios selected at control boxes Compared to an AM-1780/VRC, the AM-7046/VRC provides access to a third RT
Intercom function	Provides communication (intercom) between control boxes
Circuit Impedences:	
Microphone circuits	150 ohms ± 20 percent
Headset and loudspeaker circuits	150 ohms ± 20 percent
LINE binding posts	600 ohms ± 20 percent
AUDIO INPUT binding posts	5,000 ohms
Radio transmitter microphone input circuit	150 ohms ± 20 percent
Radio receiver audio output circuits	150 ohms ± 20 percent
Operating voltage requirements	22 to 30 vdc

RECEIVER TRANSMITTERS (RT)

RT-246(*)/VRC and RT-524(*)/VRC	
Type of receiver-transmitter	FM
Frequency range	30 to 75.95 MHz at 0.05-MHz intervals
Frequency stability	± 3 kHz of selected frequency
Number of channels available	920
Type of tuning	Manual tuning in RT-246(*)/VRC. Ten frequencies can be preset for automatic push-button tuning. Tuning can also be selected automatically from a C-2742/VRC connected to RT-246/VRC.
Antenna jack impedance (rf)	50 ohms, BNC jack
RT antenna matching unit control	The RT automatically selects proper matching networks in antennas (AS-1729/VRC and AS-2731/GRC can also be manually selected) The RT provides control voltages to its antenna matching unit for proper tuning of the antenna elements
Operating conditions	Push-to-talk (transmit) and release-to-listen (receive)

1-10. EQUIPMENT DATA. (CONT)

RECEIVER-TRANSMITTERS (RT) (Cont)

RT-246(*)/VRC and RT-524(*)/VRC (Cont)

Modes of operation	Voice (radio telephone) and, with additional equipment, retransmission (radio relay), and X-mode (speech-secured)
X-mode operation	Provides for secure voice communication
Audio response capability	300 to 3000 Hz
Operating voltage requirement	22 to 30 vdc
Transmitting Features	
Output rf power (into ideal 50-ohm antenna):	
Low power	0.5 to 10 watts
High power	30 watts minimum to 65 watts maximum
Transmission distance (using whip antenna)	Approximately 5 miles (8 km) on low power, approximately 25 miles (40 km) on high power
Carrier deviation	Audio input of 2.8 millivolts produces rf carrier deviation of 8 ± 2 kHz
Squelch tone signal	150 Hz ± 1 Hz transmitted on all settings of SQUELCH switch except OLD ON position
Audio input impedance	150-ohm microphone, 600 ohms for X-mode operation at X-mode jack
Duty cycle	Capable of operating continuously at high power in 120°F (49°C) temperature with input operating voltage 22 vdc and for 1 hour with input voltage of 30 vdc
Power Drain:	
Low power	3 amps at 25 vdc
High power	10 amps at 25 vdc
Receiving Features	
RF signal sensitivity	0.1 microvolt minimum
Audio output impedances (nominal):	
External loudspeaker	160 ohms
Headphone	150 ohms
To radio-intercom system (fixed level monitoring)	1800 ohms
X-mode	600 ohms
Squelch types	
Carrier (operative in OLD SQUELCH)	Responsive to carrier signal
Tone (operative in NEW SQUELCH)	Responsive to 150-Hz squelch tone signal

1-10. EQUIPMENT DATA. (CONT)

AUX RECEIVER R-442/VRC

Type of receiver	FM
Frequency capability	30 to 70.95 MHz at 0.05-MHz intervals
Frequency stability	± 3 kHz of selected frequency
Number of channels available	920
Tuning capability	Manual tuning (only)
Antenna jack impedance (rf)	50 ohms, BNC jack
Modes of operation	Receive only
X-mode operation	Provides for secure voice communication
Audio response capability	300 to 3000 Hz
Operating voltage requirement	22 to 30 vdc
Receiving Features	
RF signal sensitivity	0.1 microvolt minimum
Audio output impedances (nominal):	
External loudspeaker	160 ohms
Headphone	150 ohms
To radio-intercom system (fixed level monitoring)	1800 ohms
X-mode	600 ohms
Squelch types	
Carrier (operative in OLD SQUELCH)	Responsive to carrier noise
Tone (operative in NEW SQUELCH)	Responsive to 150-Hz squelch tone signal of received signal

TRANSIENT SUPPRESSORS

Transient Suppressor MX-7777(*)/GR	
Input voltage 22 to 28 vdc power source	Normally vehicular electrical system
Maximum input voltage	Approximately 40 vdc
Output voltage	Same as input voltage but not in excess of 36 vdc
Output load	Not in excess of 50 amps at 28 vdc
Electrical suppression	Electrical transients (spikes) of the dc power source in excess of approximately 36 v are prevented from being applied to output load
Overload and short-circuit protection	50 amp circuit breaker
Reversed dc input voltage	Reversed voltage is prevented from being applied to output load
Overheating protection	Thermostat switch and 50 amp circuit breakers Requires 2 minutes to cool before resetting

1-10. EQUIPMENT DATA. (CONT)

TRANSIENT SUPPRESSORS (Cont)

Minisuppressor (NSN 5915-01-024-3877)	
Input voltage 22-to 28-vdc power source	Normally vehicular electrical system
Maximum input voltage	Approximately 40 vdc
Output voltage	Same as input voltage but not in excess of 35 vdc
Electrical suppression	Electrical transients (spikes) of the dc power source in excess of approximately 35 v are suppressed before reaching the output load Electrical spikes in excess of 50 vdc will blow a fuse within the suppressor, lighting its lamp With lamp lit, source voltage is applied to output load, but there will be no suppression
Heat dissipation	A suppressor heat sink is installed on radio mount to cool (dissipate) the suppressor Can reach a temperature in excess of 215°F

ANTENNAS

AS-1729/VRC (Round Base)	
Antenna type	Two section whip consisting of Matching Unit MX-6707/VRC and Antenna Elements AS-1730/VRC (lower) and AT-1095/VRC (upper)
Frequency range	30 to 76 MHz
Power handling capability	70 w maximum
Input impedance (rf)	50 ohms; BNC jack
AS-2731/GRC (Compact)	
Antenna type	Single section whip consisting of Matching Unit MX-9146/GRC and Antenna Element AS-2732/GRC
Frequency range	30 to 80 MHz
Power handling capability	70 w maximum
Input impedance (rf)	50 ohms; BNC jack
AT-912/VRC (Square Base)	
Antenna type	Two section whip consisting of Matching Unit MX-2799/VRC and Antenna Elements AT-1096/VRC (lower) and AT-1095/VRC (upper)
Frequency range	30 to 76 MHz
Power handling capability	70 w maximum
Input impedance (rf)	50 ohms; BNC jack

1-10. EQUIPMENT DATA. (CONT)

Auxiliary Receiver Antennas	
Antenna type	Three section whip consisting of Antenna Base AB-15/GR or AB-558/GR and Antenna Elements MS-116A (lower), MS-117A (middle) and MS-118A (upper) Antenna Element AT-1095/VRC is sometimes used on tanks to reduce antenna height
Frequency range	30 to 76 MHz
CONTROL, FREQUENCY SELECTOR	
C-2742/VRC	Used with RT-246/VRC only
Radio function	Used to remotely select any one of the ten preset frequencies Also provides remote control of the input operating voltage and transmit rf power level of the RT-246/VRC
CONTROL, RADIO SET C-2299/VRC	
Frequency range (audio)	500 to 3000 Hz
Radio function	Provides radio relay operations for the AN/VRC-45 and AN/VRC-49 configurations
AUDIO ACCESSORIES (Several available)	
Push-to-talk /release-to-listen	Key switch spring held at release-to-listen
Microphone impedance	150 ohms ± 15 percent
Earphone and loudspeaker impedance	600 ohms ± 20 percent

1-10. EQUIPMENT DATA. (CONT)

The following table lists the weights and dimensions of the intercom and radio sets components.

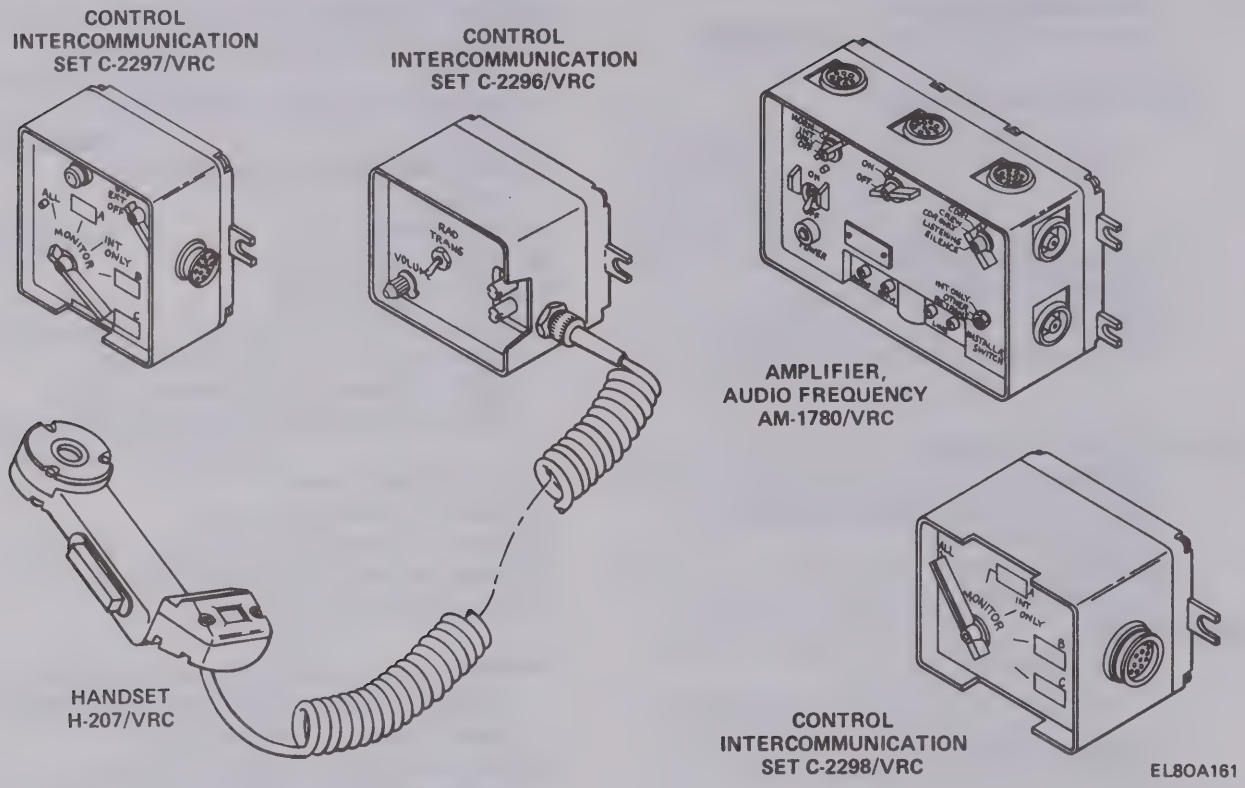
AN/VIC-1(V) INTERCOMMUNICATION COMPONENTS	
CONTROL BOXES	
C-2298/VRC	3 3/4 inches (9.53 cm) high, 3 3/8 inches (8.57 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 1/2 pounds (1.13 kg)
C-2297/VRC	4 3/4 inches (12.07 cm) high, 3 3/8 inches (8.57 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 1/2 pounds (1.13 kg)
C-2296/VRC	3 3/8 inches (8.57 cm) high, 3 3/8 inches (8.57 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 1/2 pounds (1.13 kg)
C-10456/VRC (Abrams) (modified C-2298/VRC)	3 3/4 inches (9.53 cm) high, 3 3/8 inches (8.57 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 1/2 pounds (1.13 kg)
C-10680/VRC (Interim FIST-V) (modified C-2298/VRC)	3 3/4 inches (9.53 cm) high, 3 3/8 inches (8.57 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 1/2 pounds (1.13 kg)
AMPLIFIER/JUNCTION BOX	
Audio Frequency AM-1780/VRC	5 3/4 inches (14.61 cm) high, 3 3/4 inches (9.53 cm) deep, 9 2/3 inches (24.55 cm) wide, 8 pounds (3.63 kg)
AM-7046/VRC (Interim FIST-V) (modified AM-1780/VRC)	5 3/4 inches (14.61 cm) high, 3 3/4 inches (9.53 cm) deep, 9 2/3 inches (24.55 cm) wide, 8 pounds (3.63 kg)
RECEIVER-TRANSMITTERS (RT)	
RT-524/VRC	6 3/4 inches (17.15 cm) high, 13 3/8 inches (33.97 cm) deep, 15 3/8 inches (39.05 cm) wide, 51 pounds (23.15 kg)
RT-246/VRC	6 3/4 inches (17.15 cm) high, 13 3/8 inches (33.97 cm) deep, 15 3/8 inches (39.05 cm) wide, 51 pounds (23.15 kg)
AUX RECEIVER	
R-442(*)VRC	6 3/4 inches (17.15 cm) high, 13 3/8 inches (33.97 cm) deep, 5 5/8 inches (14.29 cm) wide, 18 1/4 pounds (8.29 kg)
TRANSIENT SUPPRESSOR MX-7777(*)/VRC	5 1/4 inches (13.34 cm) high, 10 1/4 inches (26.04 cm) deep, 6 1/3 inches (16.09 cm) wide, 10 pounds (4.54 kg)
RT ANTENNAS	
AS-1729/VRC (assembled)	10 1/2 feet (3.20 m) long, 10 pounds (4.54 kg)
Element AS-1730/VRC	4.36 feet (1.33 m) long
Element AT-1095/VRC	5 3/8 feet (1.64 m) long
Antenna Matching Unit MX-6707/VRC	14 3/8 inches (36.51 cm) long

1-10. EQUIPMENT DATA. (CONT)

AS-2731/GRC (assembled)	6 5/8 feet (2.02 m) long, 9 pounds (4.09 kg)
Element AS-2732/GRC	5 3/8 feet (1.64 m)
Antenna Matching Unit MX-9146/GRC	16 inches (40.64 cm) long, 6 1/2 pounds (2.95 kg)
AT-912/VRC (assembled)	11 1/4 feet (3.43 m) long when MX is vertical; 10 1/2 feet (3.20 m) long when MX is horizontal, 18 pounds (8.17 kg)
Element AT-1095/VRC	5 3/8 feet (1.64 m) long
Element AT-1096/VRC	4 1/2 feet (1.37 m) long
Base AB-719/VRC	9 1/2 inches (24.13 cm) long
Antenna Matching Unit MX-2799/VRC	4 inches (10.16 cm) high, 5 1/4 inches (13.34 cm) deep, 12 1/2 inches (31.75 cm) wide, 10 pounds (4.54 kg)
AUX RECEIVER ANTENNA	
Assembled	11 1/8 ft (3.39 m) long
Mast Base AB-15/GR and AB-558/GR	17 1/2 inches (44.45 cm) long
Element MS-116A	3.29 feet (1.00 m) long
Element MS-117A	3.29 feet (1.00 m) long
Element MS-118A	3.31 feet (1.01 m) long
MOUNTINGS	
Mount MT-1029/VRC	5 inches (12.70 cm) high, 13 1/2 inches (34.30cm) deep, 15 7/8 inches (46.32 cm) wide, 17 1/2 pounds (7.94 kg)
Mount MT-1898/VRC	5 inches (12.70 cm) high, 13 1/2 inches (34.30 cm) deep, 5 1/2 inches (13.97 cm) wide, 9 1/4 pounds (4.20 kg)
CONTROL, RADIO SET C-2299/VRC	3 3/8 inches (8.57 cm) high, 3 3/8 inches (8.57 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 pounds (0.91 kg)
CONTROL, FREQUENCY SELECTOR C-2742/VRC	3 3/16 inches (8.10 cm) high, 3 1/4 inches (8.26 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 pounds (0.91 kg)

1-11. DESCRIPTION OF COMPONENTS.

INTERCOMMUNICATION SET AN/VIC-1(V) COMPONENTS



The AN/VIC-1(V) components and the interconnecting cables are part of the installed electrical harness in tracked vehicles. An input source of 22 to 30 vdc (provided by the vehicle's electrical system) makes the intercom set operational. Audio accessories are also needed for the AN/VIC-1(V) to be operational.

Audio accessories are issued separately as part of the vehicle's installation accessory kit items.

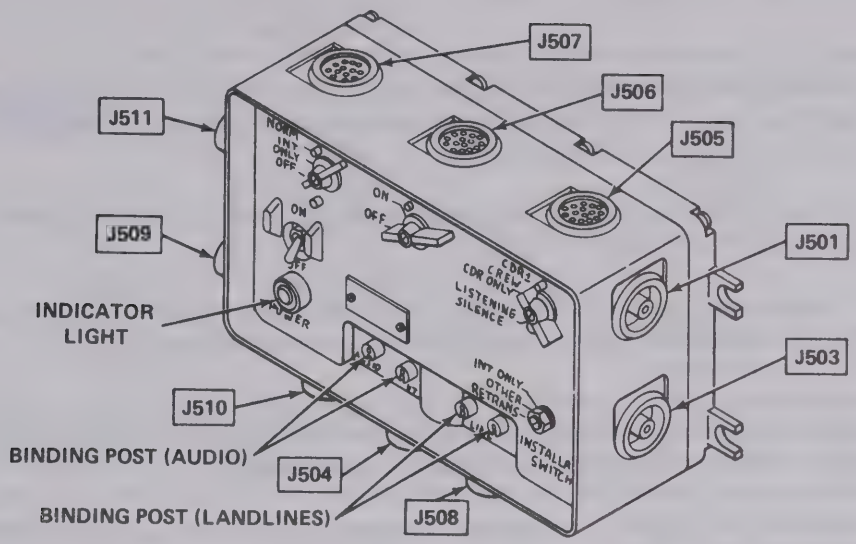
All tracked vehicles have one main junction box/amplifier and at least two crewmember control boxes. Up to six crewmember control boxes (all types) may be connected to the main junction box/amplifier.

Mounting lugs are located on the sides of the control boxes and amplifier's back cover. Captive screws hold the gasket-sealed back cover in place. All controls and jacks are waterproof.

For information on a specific installation, refer to TM 11-5820-401-10-2-HR or SB 11-131.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

AMPLIFIER/JUNCTION BOX AM-1780/VRC



The AM-1780/VRC junction box/audio frequency amplifier is the heart of the tracked vehicle's communication system. It is the communication system's main junction or interconnecting box. It controls the vehicle source voltage (22 to 30 vdc) distribution to the crewmember control boxes (at least two but no more than six). It also controls the vehicle source voltage to the associated radio set.

All operating controls are on the front panel. The MAIN PWR switch is set to INT ONLY for only intercom power or NORM for radio and intercom power.

The INSTALLATION switch is set by a screwdriver according to the attached radio set for AN/VRC-49 (-45). The INSTALLATION switch is set to RETRANS and Relay Box C-2299/VRC is attached to the AM-1780/VRC. For the other six radio set configurations, the INSTALLATION switch is set to OTHER. When there is no radio mount (no radio set), the INSTALLATION switch is set to INT ONLY for input power through Jack J508.

The POWER CKT BKR controls dc power to the AM-1780/VRC circuits and control boxes, and provides overload protection. The POWER CKT BKR and the MAIN PWR switch (at NORM) control the radio intercom system and provide power to the first radio (A-RT). The same settings will provide the same dc output to control the B-receiver through the A-RT mount.

The RADIO TRANS switch, located at the upper right corner, prevents keying associated RT's (at LISTENING SILENCE). When set at CDR ONLY, RADIO TRANS switch allows only the commander to key (transmit over) associated RT's. All crewmembers can key RT's at CDR + CREW position.

The INT ACCENT switch is set to ON for automatic reduction of radio monitoring signal when the intercom is keyed. The POWER CKT BKR is set to ON to apply power and provide overload (1.5 amp) to intercom circuits.

There are ten jacks on the top, bottom, and sides for control boxes and radios. See chart on page 1-16.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

AMPLIFIER/JUNCTION BOX AM-1780/VRC (CONT)

JACK	PURPOSE
J501	Provides power to AM-1780/VRC from A-RT Mount MT-1029/VRC. It provides audio signals and RT control interface to the A-RT through its MT-1029/VRC (J22) (AN/VRC-12, -43 through -49).
J503	Provides audio signals and RT control for C-RT through its MT-1029/VRC (J22) (AN/VRC-49,-45).
J504	Provides commander (CDR) C-2298/VRC intercom and radio function interface that is independent of all other crewmember control boxes.
J505,J506 and J507	Are wired together in parallel. They are used, as required, to connect the driver C-2298/VRC or C-2297/VRC and additional crew (not CDR) C-2298/VRC's. This provides for intercom and radio function interfaces.
J508	Provides C-R-442/VRC monitor only signals interface through its MT-1898/VRC (J12) (AN/VRC-44,-48).
J509 and J511	Provide connection for Relay Box C-2299/VRC for automatic retransmission (relay) (AN/VRC-49,-45).
J510	(Nine pins) Provides B-R-442/VRC monitor only signals interface to its MT-1898/VRC (J12) (AN/VRC-12,-44,-47,-48).

On the lower AM-1780 front panel, two pairs of binding posts provide for connection of an additional radio receiver (AUDIO) and a field telephone or switchboard (LINE).

AMPLIFIER/JUNCTION BOX AM-7046/VRC

The AM-7046/VRC is a modified AM-1780/VRC. It functions the same as the AM-1780/VRC, except it has an additional internal relay used when radios other than AN/VRC-12 series are additionally installed equipment in a vehicle.

The INSTALLATION switch is always set to and left in OTHER.

Jack J510 is an 18-pin jack on the AM-7046/VRC. It provides a connection for a third RT through Cable CX-4723.

Jack J508 provides a connection for the B-auxiliary receiver through Cable CX-7616.

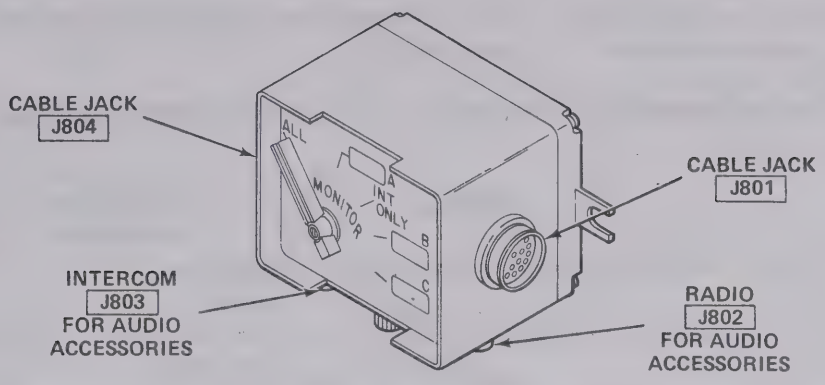
The two pairs of binding posts on the AM-7046/VRC lower panel (AUDIO and LINE) are not used.

The C-10680/VRC is the only control box used with the AM-7046/VRC.

The Radio Relay Control Box C-2299/VRC is not used with the AM-7046/VRC.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

CONTROL BOX C-2298/VRC



EL8OA163

The Control Box C-2298/VRC allows communication between crewmembers in most tracked vehicles through the AM-1780/VRC. Outside communication is possible through the receiver-transmitter. C-2298 control boxes are available to the commander, other crewmembers, and, in some vehicles, to the driver.

The MONITOR switch is the C-2298/VRC main control. Located on the front panel, it selects the radio and intercom function. When an audio accessory is connected as illustrated (see page 1-19), the crewmember can talk and listen on intercom and radio (see chart below).

POSITION	LETS COMMANDER	LETS OTHER CREWMEMBERS
ALL	TALK and LISTEN on intercom TALK over A-RT LISTEN to all items connected to AM-1780/VRC, at the same time	Same
A	TALK and LISTEN on intercom TALK and LISTEN over A-RT	Same (see note 1)
INT ONLY	TALK and LISTEN on intercom only (When intercom is keyed)	Same
B (radio duplex mode)	TALK and LISTEN on intercom LISTEN to B-R-442/VRC TALK on A-RT	Same (see note 1)
C	TALK and LISTEN on intercom TALK and LISTEN over C-RT LISTEN over C-receiver (if used)	TALK and LISTEN over C-RT only (see note 2)

Notes

1. A crewmember (other than CDR) cannot talk over radio when another crewmember is using the intercom.
2. In tank-type vehicles, a driver's C-2298/VRC MONITOR switch in C-position has no function due to limited circuits in the slipring assembly.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

CONTROL BOX C-2298/VRC (CONT)

The VOLUME control, located on the bottom of the box, controls the levels of radio and intercom signals applied to audio accessory plugs.

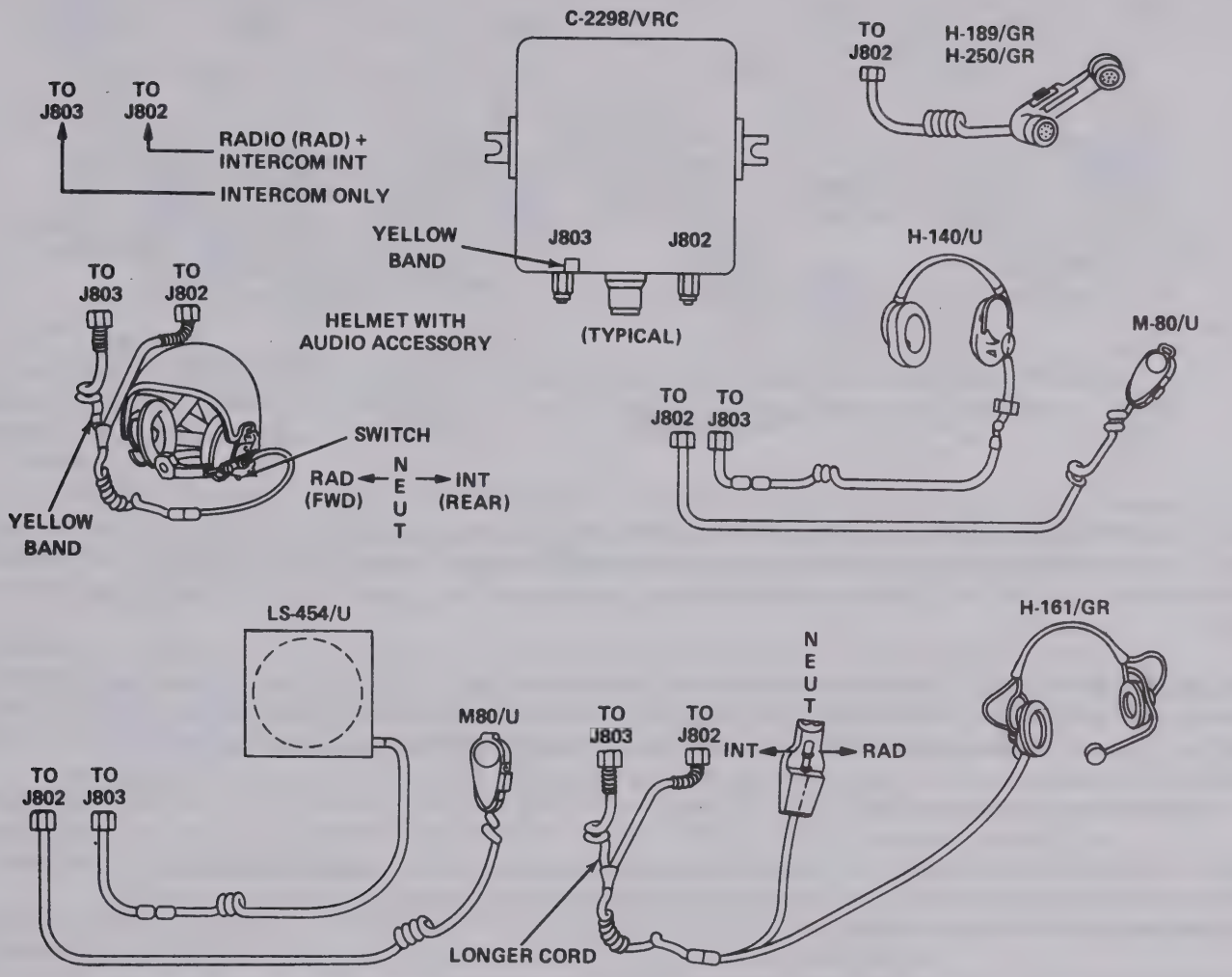
There are four jacks: two on the sides (J804) (J801) and two on the bottom (J803) (J802). (See chart below.)

NOTE

The C-2298/VRC is used with an AM-1780/VRC only.

JACK	PURPOSE
J801 and J804	(18 pins) Wired in parallel. (Cable from AM-1780/VRC may be connected to either jack.) Provide all power and control voltages used by the C-2298/VRC. Provide for radio and intercom function. Provide connection to another C-2298/VRC (tandem).
J802	(Five pins) When audio accessory is connected, talk/listen on intercom and radios are possible, as selected by MONITOR switch. Exception: When the Helmet DH-132A or H-161/GR is connected (see illustration), the key switch provides selection of the intercom and radio.
J803	(Five pins) When audio accessory is connected, talk/listen on intercom and listen (only) to radios are possible, as selected by MONITOR switch. Exception: When the Helmet DH-132A or H-161/GR is connected (see illustration), the key switch provides selection of the intercom and radio.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

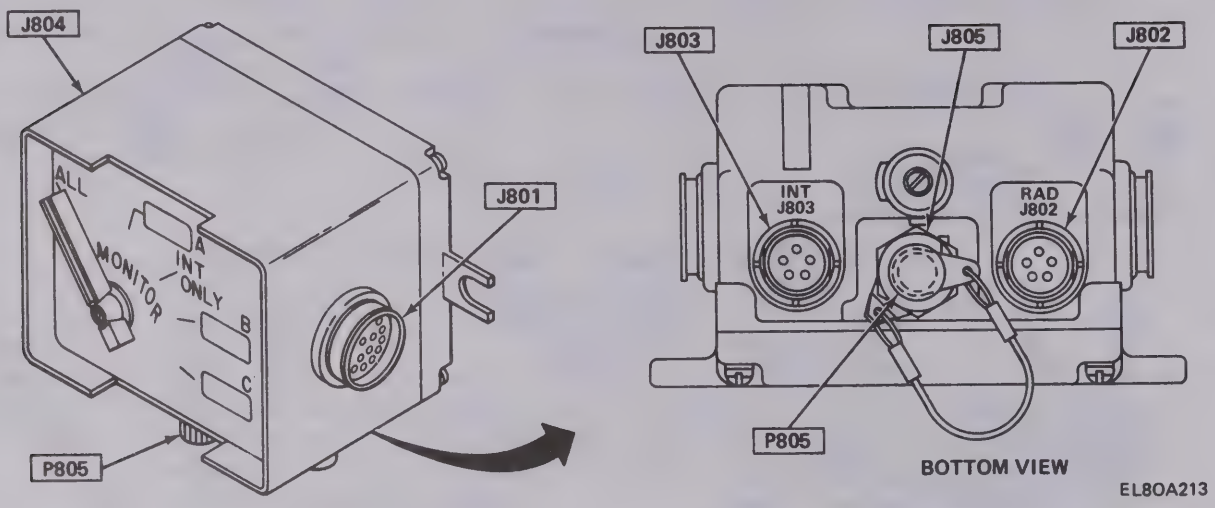


C-2298 AUDIO ACCESSORIES FOR AN/VIC-1 WITH RADIO SET

EL8OA205

1-11. DESCRIPTION OF COMPONENTS. (CONT)

CONTROL BOX C-10456(*)/VRC (ABRAMS)



The C-10456/VRC is a modified Control Box C-2298/VRC. It is used exclusively in the Abrams M1 tank. The C-10456/VRC functions the same as the C-2298/VRC except it allows remote keying of the intercom set (AN/VIC-1(V)) and the radio set through the use of the special REMOTE keying jack (J805).

The special REMOTE keying jack and a dummy plug are located behind the VOLUME control. When the dummy plug is installed on the REMOTE keying jack, the C-10496/VRC provides the same functions and has the same features as a C-2298/VRC. When the dummy plug is disconnected, the REMOTE keying jack provides a connection for the Abrams special remote keying switches to the C-10456/VRC through additional Abrams cables.

When the REMOTE jack is used, the push-to-talk/release-to-listen switch on the crewmember's audio accessory is disabled. In this case, the push-to-talk/release-to-listen function is provided by switches on specific Abrams controls.

If the REMOTE jack is left open (dummy plug and Abrams special cables not connected), the radio-intercom system cannot be keyed (radio LISTEN only).

NOTE

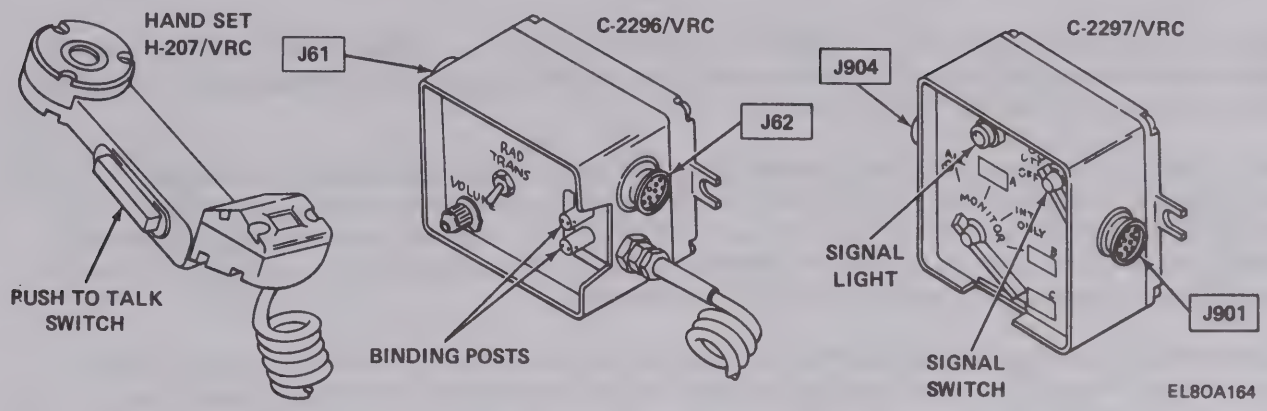
The C-10456/VRC is used with an AM-1780/VRC only.

CONTROL BOX C-10680 (INTERIM FIST)

The C-10680/VRC is a modified Control Box C-2298/VRC. It can only be used with an AM-7046/VRC. Both are used exclusively in the Interim FIST vehicles. The C-10680/VRC provides the same functions, and has the same features, as a C-2298/VRC. There are three exceptions. The center position of the MONITOR switch (labeled INT ONLY on a C-2298/VRC) provides access to a third receiver-transmitter, part of the AN/GRC-160 radios. (The AN/GRC-160 has Cable CX-4723 connected to AM-7046/VRC jack, J510.) For the B-position, the R-442/VRC is connected through Cable CX-7616 to AM-7046/VRC jack, J508. For the C-position, TALK and LISTEN on one of the AN/GRC-160 radios. (This AN/GRC-160 has Cable CX-4723 connected to the AM-7046/VRC jack, J503.)

1-11. DESCRIPTION OF COMPONENTS. (CONT)

CONTROL BOX C-2297/VRC



Control Box C-2297/VRC and C-2296/VRC are used together in tank-type vehicles (except the M1 Abrams). When Control Box C-2296/VRC is installed on the outside of the vehicle, the driver's control box is a C-2297/VRC instead of a C-2298/VRC.

The C-2297/VRC MONITOR switch VOLUME control and AUDIO jacks provide the same functions as that of the C-2298/VRC. The left cable jack (J904) provides a connection to the AM-1780/VRC or a C-2298/VRC (in tandem). The right cable jack (J901) provides a connection to the C-2296/VRC outside control box.

The external switch (OFF/EXT/SIG) controls the application of the C-2297/VRC circuits to the C-2296/VRC. The lamp on the front panel is constantly lit when the external switch is in EXT. It indicates to the driver that the C-2297/VRC radio-intercom circuits are connected to the C-2296/VRC. The SIG position is spring-loaded to automatically return it to EXT when released.

When the driver turns the external switch to SIG, the lamp on the C-2297/VRC front panel and another lamp installed near the C-2296/VRC outside control box will light. The lighted lamp attracts the attention of the C-2296/VRC user.

When the driver turns the external switch to OFF, the C-2297/VRC radio-intercom circuits are disconnected from the C-2296/VRC and the lamp on the C-2297/VRC front panel is out.

NOTE

In tanks, the driver's C-2297/VRC MONITOR switch C-position has no function due to limited wiring of the tanks slipring assembly.

In all vehicles, the C-2297/VRC receives radio signals from A-RT only.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

CONTROL BOX C-2296/VRC

Outside Control Box C-2296/VRC is used with the driver's Control Box C-2297/VRC to allow an outside person to use the vehicle radio-intercom system. The C-2296/VRC is always installed within a water-tight compartment attached to the rear fender well.

The C-2296/VRC is connected by its left cable jack (J61) to the radio-intercom system through the C-2297/VRC right cable jack (J901). The C-2296/VRC right cable jack (J62) provides a connection to an outside signaling lamp that is mounted near the C-2296/VRC. The LINE binding posts are wired to the AM-1780/VRC through the C-2297/VRC when the C-2297/VRC external switch is set at EXT. They provide for a connection of a field telephone or switchboard.

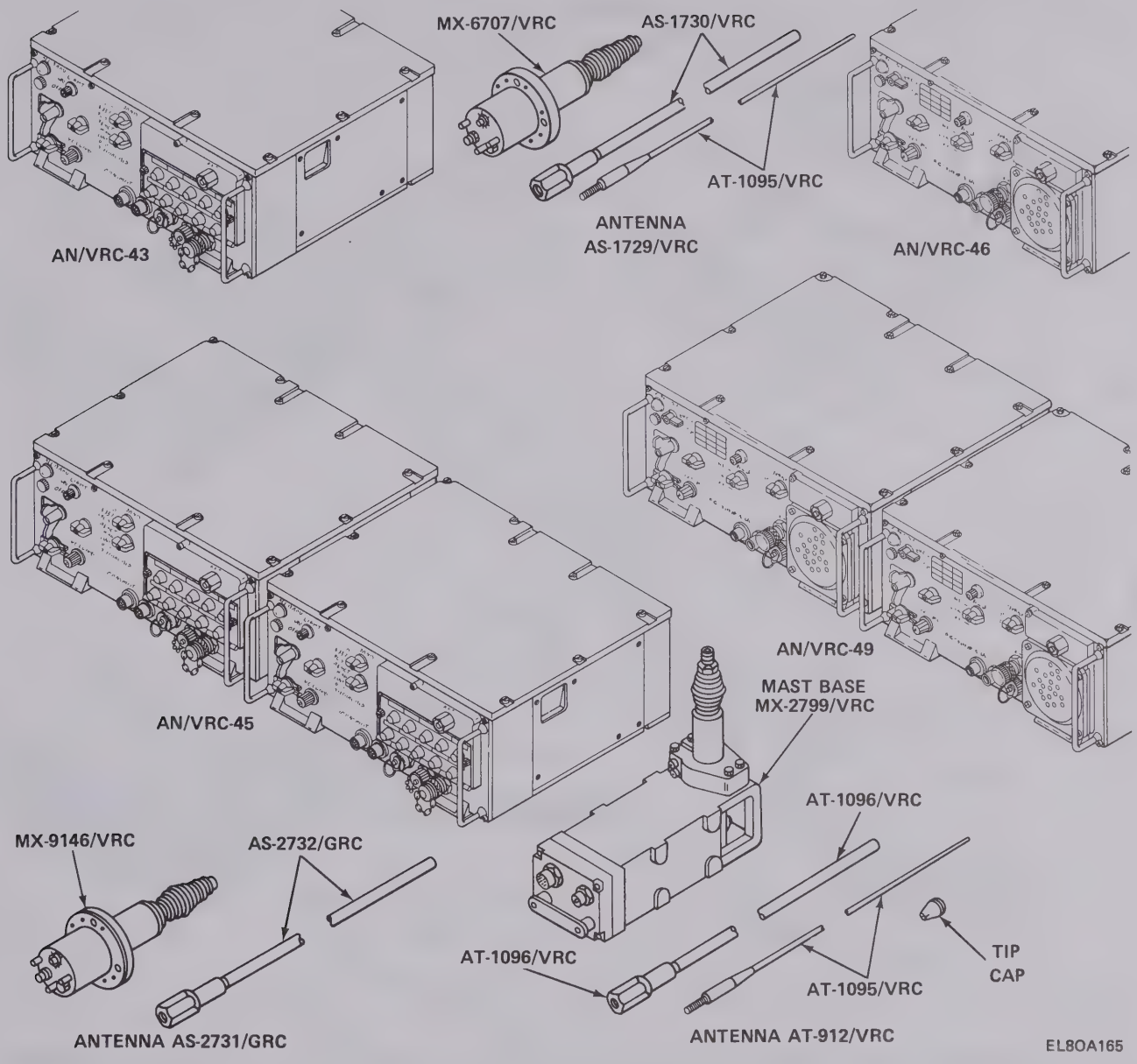
Handset H-207 is part of the C-2296/VRC. The VOLUME control on the C-2296/VRC is used to adjust the loudness of the audio signal heard at the H-207. The C-2296/VRC RAD TRANS/INT switch is spring-held in INT. The position of the C-2296/VRC RAD TRANS/INT switch determines which set (INTERCOM, INT or RADIO, RAD TRANS) is keyed by the push-to-talk/release-to-listen (key) switch on the H-207.

When the C-2297/VRC external switch is at EXT, the position of the C-2297/VRC MONITOR switch determines the radio component to be accessed from the C-2296/VRC. When the C-2297/VRC external switch is at EXT and the C-2297/VRC MONITOR switch is in any position (except C), the intercom can be accessed from the C-2296/VRC.

When the C-2297/VRC external switch is at OFF, the person outside can signal the driver by pressing in and releasing the H-207 key switch. This action will cause the lamp on the C-2297/VRC front panel and the lamp mounted near the C-2296/VRC to blink on and off each time the H-207 key switch is pressed and released.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RADIO SET COMPONENTS: AN/VRC-12 SERIES

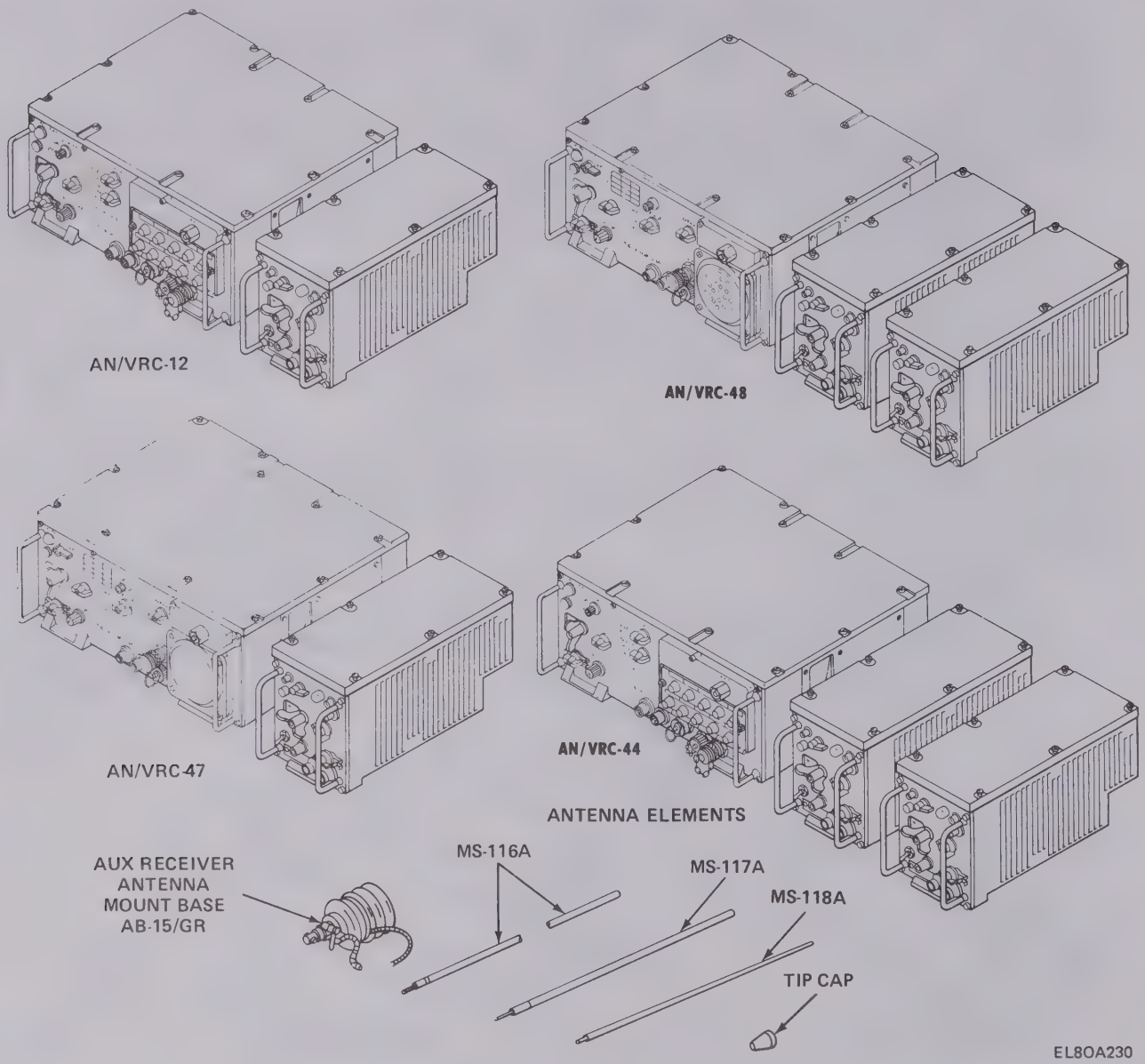


CONFIGURATIONS OF AN/VRC-12 SERIES RADIOS

The FM medium-power radio sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49 are commonly referred to as the AN/VRC-12 series radios. All eight configurations of these radio sets consist of various combinations of two basic components: an FM receiver-transmitter (RT-246/VRC or RT-524/VRC); and six of the configurations include an auxiliary FM receiver (R-442/VRC).

1-11. DESCRIPTION OF COMPONENTS. (CONT)

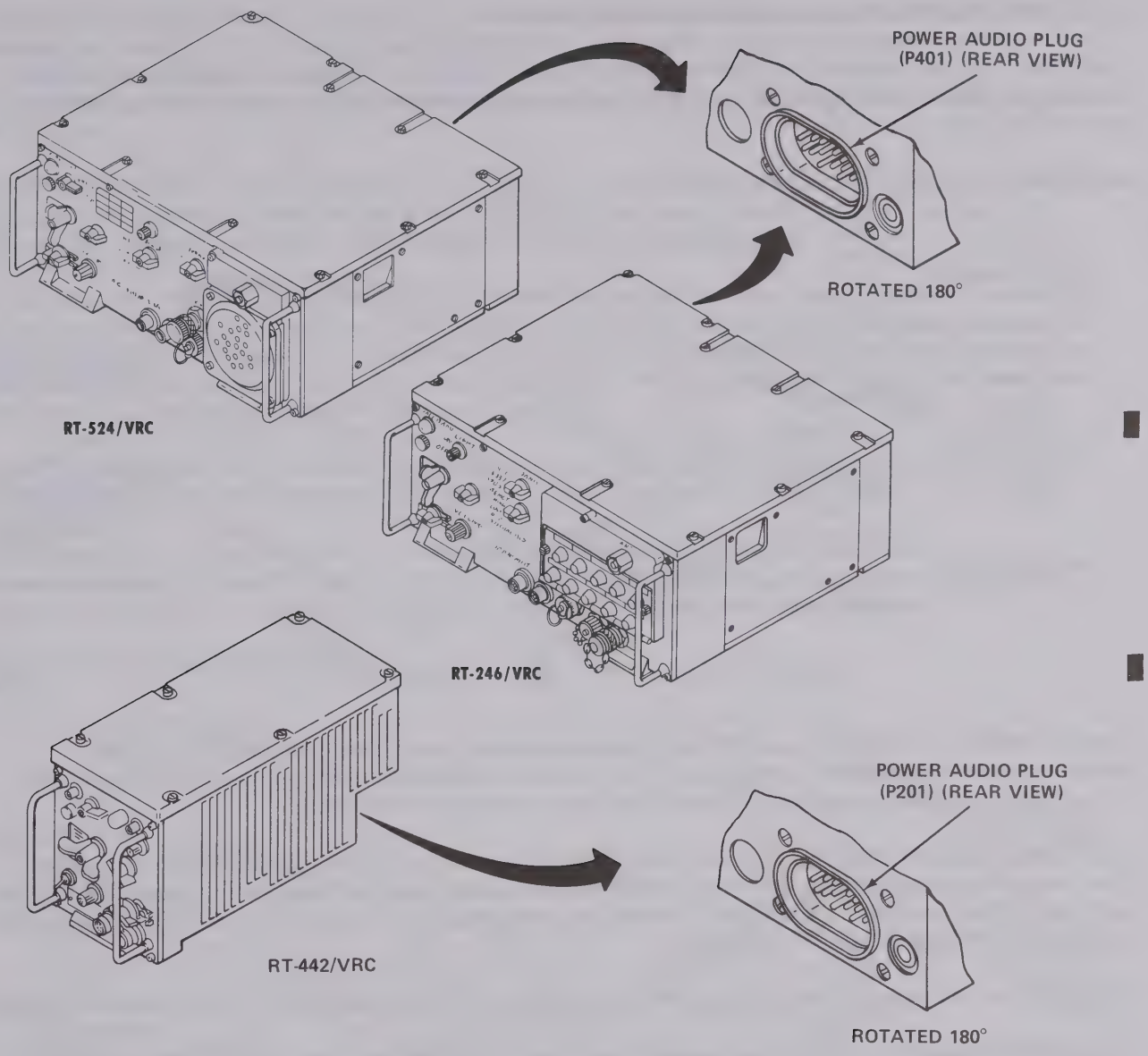
RADIO SET COMPONENTS: AN/VRC-12 SERIES (CONT)



CONFIGURATIONS OF AN/VRC-12 SERIES RADIOS

The Auxiliary Receiver R-442/VRC is used for the AN/VRC-12, AN/VRC-44, AN/VRC-47 and AN/VRC-48 radio sets.

1-11. DESCRIPTION OF COMPONENTS. (CONT)



The radio components in the AN/VRC-12 series, the RT-246/VRC, RT-524/VRC, and R-442/VRC are rugged, lightweight, compact VHF FM radio units. They are housed in waterproof cases, and all the operating controls are on the front panel. On each of the three units, the plug at the rear mates with the junction box jack on the rear wall of their radio mount.

A blower inside each RT aids in cooling the equipment. The top and bottom covers of all radio components are held by captive screws.

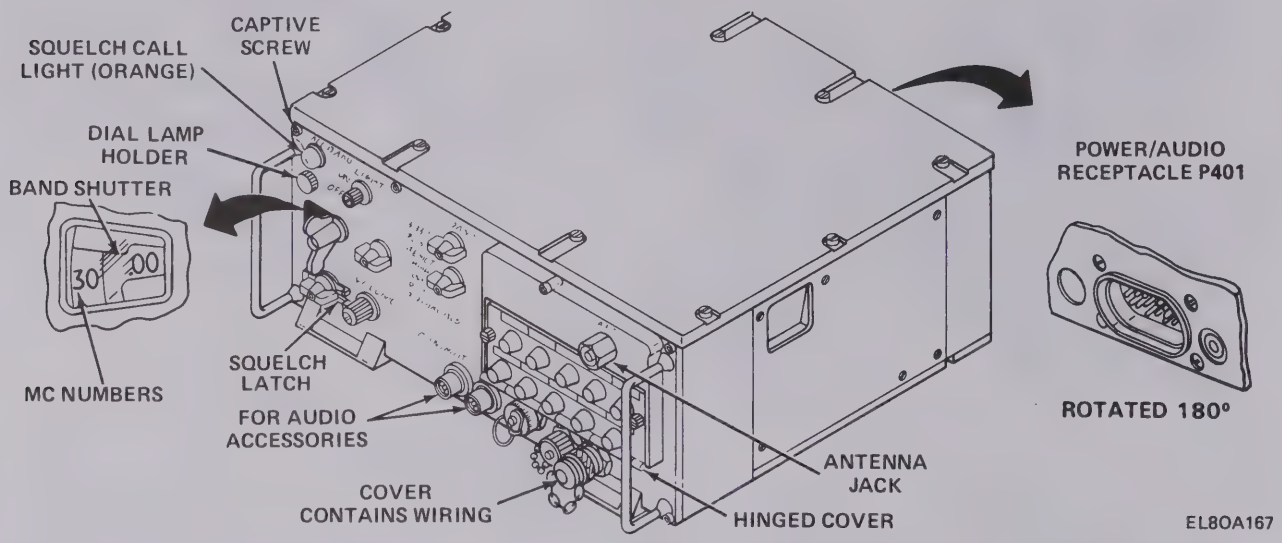
All configurations in the AN/VRC-12 series have at least one RT (RT-246/VRC or RT-524/VRC). Each RT has its own antenna (AS-1729/VRC, AT-912/VRC or AS-2731/GRC). Each RT is secured to its own mounting MT-1029/VRC. Four of the configurations (AN/VRC-12, -44, -47, -48) have Aux Receiver(s) (R-442/VRC). Each of the aux receivers is secured to its own mounting, MT-1898/VRC.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RADIO SET COMPONENTS: AN/VRC-12 SERIES (CONT)

The R-442/VRC has an antenna which consists of three whip antenna elements attached to one Mast Base AB-15/GR or AB-558/GR. Only one aux receiver antenna is used with the four configurations AN/VRC-12, -44, -47 or -48.

RECEIVER TRANSMITTER RT-246/VRC



The RT-246/VRC provides two-way FM radio communication on a push-to-talk/release-to-listen basis. It contains ten pushbuttons, which, when preset, provide automatic access to any one of ten preset frequencies. All operational controls and jacks are on the front panel.

The POWER switch (ON/OFF) is used to turn the RT on and off. It can also turn on and off all those components connected to the RT. The POWER switch also establishes the rf output power level (LOW or HIGH) of its transmitter. The REMOTE setting is used when a Remote Box C-2742/VRC is connected to the REMOTE jack on the RT front panel.

The LIGHT switch controls the power to the dial lamp and the CALL lamp. It turns the lamps on and off.

The BAND switch selects the tuning range for manual tuning band A (30.00 to 52.95 MHz) or band B (53.00 to 75.95 MHz). The MC control provides manual tuning of the RT in 1-MHz steps (30, 31, 53, 54, etc). The KC control provides manual tuning in 0.05-MHz steps (0.00, 0.05, 0.10, etc). A protective shutter covers the MC numbers of the BAND not used.

When the BAND switch is set at AUTO, band selection and the actual operating frequency is determined by the pushbutton that is pressed in. Instructions for presetting the ten pushbuttons to desired operating (channel) frequencies are on the back side of the pushbutton hinged cover.

The ANT and the ANT CONT jacks provide the connections for two cables to connect the RT antenna to the RT. The ANT jack connects an rf cable (CG-1773/U) to provide the rf signal pattern. The ANT CONT connects the control cable (CX-4722) to the RT. This provides for tuning the antenna elements according to operating frequency.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

The two MIKE jacks provide connection for a variety of audio accessories (e.g., an external loudspeaker, headphones, microphones, handsets and combination headphone/microphones).

The VOLUME control adjusts the loudness of signals heard from any audio accessory connected to the MIKE jacks.

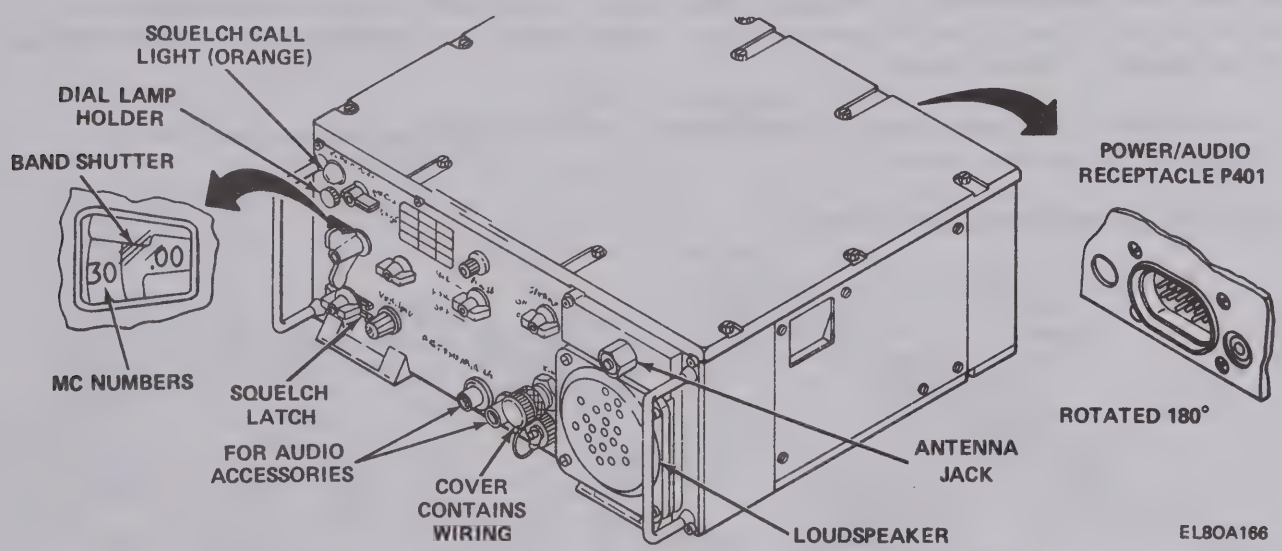
The SQUELCH switch has four positions. If a signal is not received, and the SQUELCH is in either of its OFF positions, a random noise, called rushing noise, is produced by the RT receiver. The rushing noise will be passed to the audio reproducers and heard as a hissing sound.

If a signal is not received and the SQUELCH is in either of its ON positions, the RT squelch circuit will be activated and the audio reproducer will be quieted. For this situation, when a signal is received or the RT is keyed, the RT squelch circuit will automatically be deactivated. The received signal or voice sidetone signal will be heard from the RT audio reproducer. When the squelch deactivates, the RT CALL lamp will also light (if the RT's light switch is ON).

The CALL lamp shows that a signal is being received while the SQUELCH control is set to NEW ON or OLD ON. When the squelch deactivates, the CALL lamp will light (if LIGHT is at ON).

An X-mode jack is provided for connecting the RT to additional equipment for speech-secure transmission. When this is the case, an X-MODE switch inside the RT must be set to X-MODE. When secure equipment is not provided, the X-mode plug must be placed on the X- mode jack.

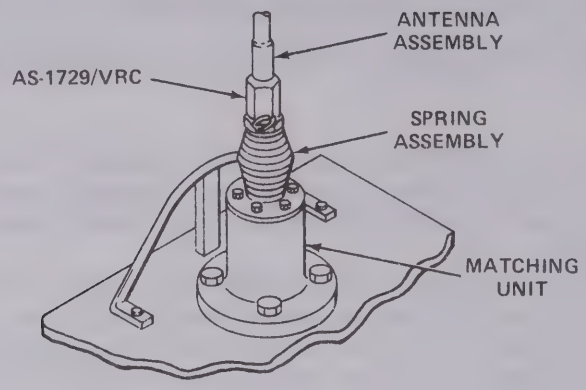
RECEIVER-TRANSMITTER RT-524/VRC



The RT-524/VRC provides the same functions and has the same features as the RT-246, except that there are no provisions for automatic pushbutton tuning and remote control from a C-2742/VRC. Instead of these features, the RT-524/VRC has a built-in loudspeaker (the RT-246 does not). The front panel SPEAKER switch is used to turn the built-in speaker on and off.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

ANTENNAS AT-912/VRC, AS-1729/VRC, AS-2731/GRC



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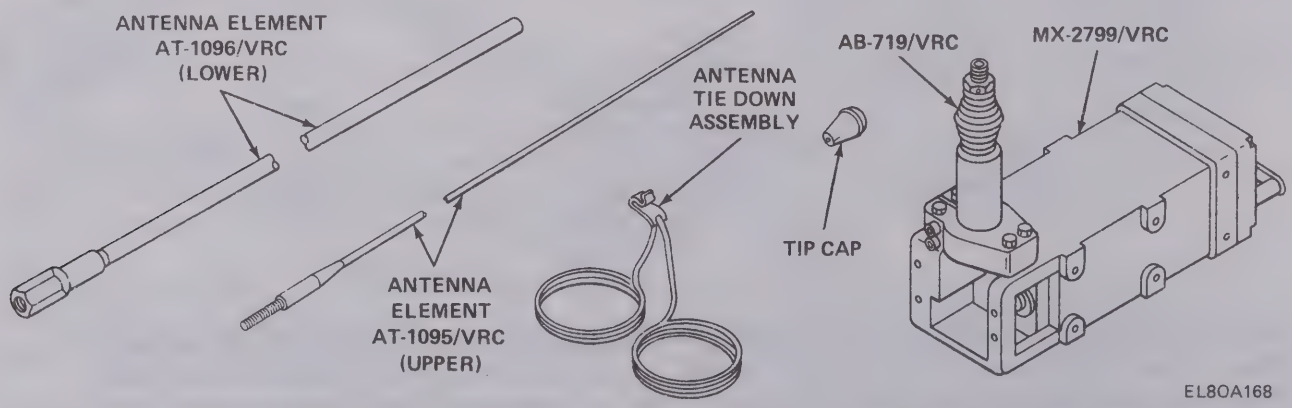
The AT-912/VRC, the AS-1729/VRC, and the AS-2731/GRC are used with the RT-246/VRC and RT-524/VRC. All three antennas receive and transmit signals for the receiver-transmitter(s). Each antenna has a matching unit and one or two antenna elements.

The matching unit acts as a base for the antenna element. It also tunes the antenna elements to the operating frequency of the receiver-transmitter. The spring assembly in the matching unit allows the antenna element to bend easily when it strikes an obstruction.

All three matching units will automatically tune their antenna elements according to tuning voltages applied from the associated RT through a control cable. The MX-6707/VRC and MX-9146/GRC have a switch on their base for manual tuning when the control cable is disconnected. The MX-2799/VRC has no provisions for manual tuning.

The antenna elements are used to radiate (transmit) signals during transmission and to collect (receive) signals when receiving.

ANTENNA AT-912/VRC (SQUARE BASE)



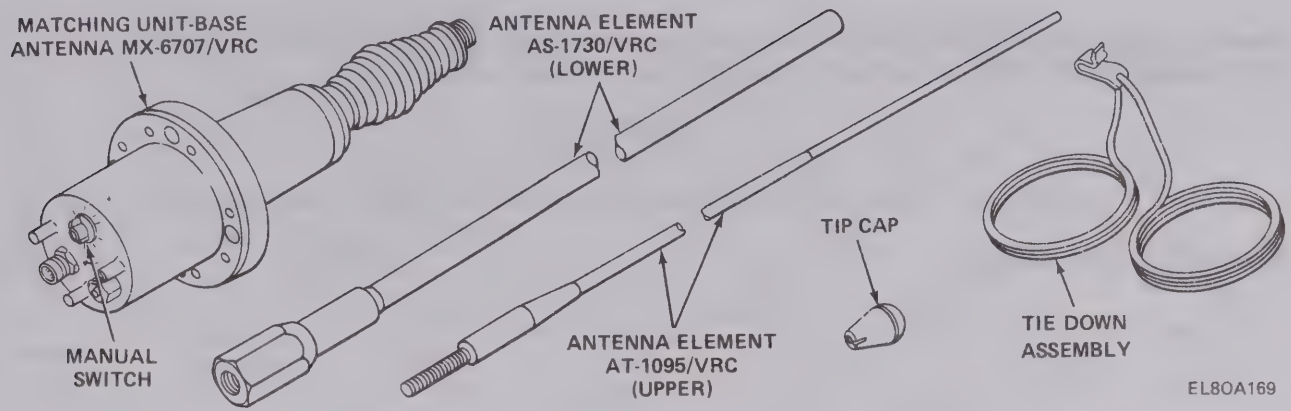
EL8OA168

The Antenna AT-912/VRC consists of two whip antenna elements (AT-1095/VRC and AT-1096/VRC), a tip cap, antenna support (AB-719/VRC), antenna tiedown assembly, Matching Unit MX-2799/VRC, and miscellaneous hardware.

When RT Control Cable CX-4722 is connected to the matching unit, the MX-2799/VRC automatically tunes the antenna elements to the transmitting frequency of the receiver-transmitter.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

ANTENNA AS-1729/VRC (ROUND BASE)



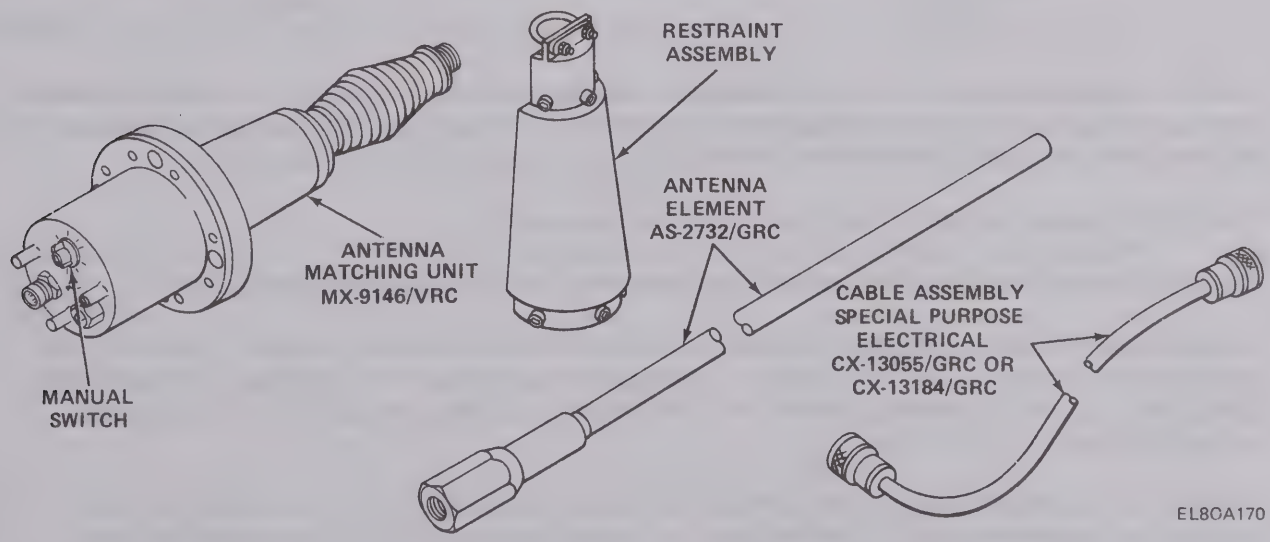
The Antenna AS-1729/VRC consists of two whip antenna elements (AT-1095/VRC and AS-1730/VRC), a tip cap, Matching Unit MX-6707/VRC, and miscellaneous hardware.

The MX-6707/VRC tunes the antenna elements either by automatic or manual selection. The MANUAL tuning switch is on the bottom of the matching unit.

NOTE

Disconnect the CX-4722 cable before manually tuning the antenna matching unit.

ANTENNA AS-2731/GRC (COMPACT)



The Antenna AS-2731/GRC consists of one antenna element (AS-2732/GRC), adaptor control cable assembly (CX-13055/GRC), Matching Unit MX-9146/GRC and miscellaneous hardware.

The MX-9146/GRC tunes the antenna elements either by automatic or manual selection. The MANUAL tuning switch is on the bottom of the matching unit.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

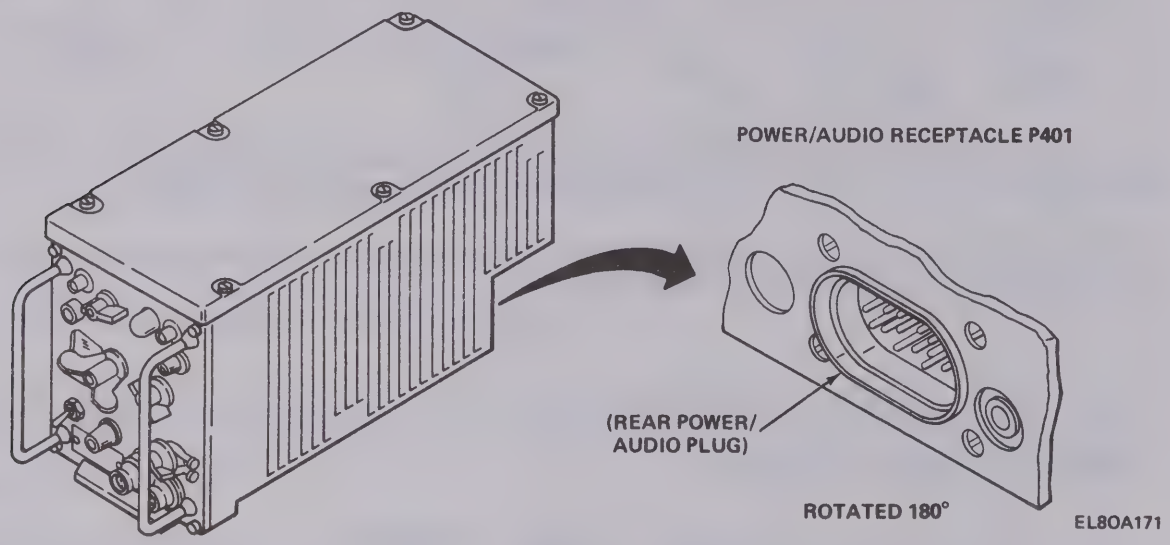
ANTENNA AS-2731/GRC (COMPACT) (CONT)

The CX-13055/GRC and CX-13184/GRC are short adaptor cables, either of which connects the MX-9146/GRC to the RT antenna control cable (CX-4722) for automatic tuning.

NOTE

Disconnect the CX-4722 before manually tuning the antenna matching unit.

AUX RECEIVER R-442/VRC



The Aux Receiver R-442/VRC provides receive-only FM radio communications from a distant station. It is used as part(s) of the configurations AN/VRC-12, -44, -47, and -48. For these configurations, the R-442/VRC('s) will be operated on a channel frequency other than the associated RT.

The POWER switch is used to turn the aux receiver on and off.

The LIGHT switch controls dc power to the dial window lamp and SQUELCH call indicator.

The BAND switch selects tuning of frequency band A (30.00 to 52.95 MHz) or band B (53.00 to 75.95 MHz). In the KC position, the TUNE control provides manual tuning of the receiver in 0.05-MHz steps (0.00, 0.05, 0.10, etc). In the MC position, the TUNE control provides manual tuning of the receiver in 1-MHz steps (30, 31, 53, 54, etc).

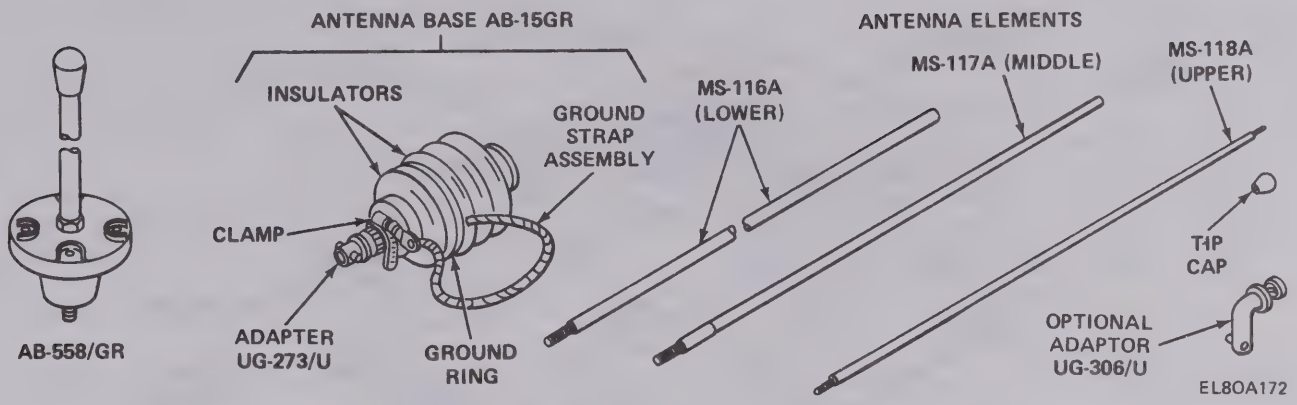
Two ANT jacks (wired in parallel) are provided to connect an rf cable from the auxiliary receiver antenna to the receiver (B-RCVR). When there is a second receiver (C-RCVR), as in AN/VRC-44 or -48, the unused ANT jack on the B-RCVR is connected by rf cable to either ANT jack on the C-RCVR so that both receivers use the same auxiliary receiver antenna.

Two AUDIO jacks, used in parallel with each other, may be used to connect audio accessories, such as headsets and loudspeakers.

The VOLUME control adjusts the loudness of signals heard from any audio accessory connected to the AUDIO jacks.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

AUX RECEIVER ANTENNA: AB-15/GR or AB-558/GR



The antennas for the Auxiliary Receiver R-442 consist of three whip antenna elements (MS-116A, MS-117A, MS-118A), a tip cap, the tiedown assembly (not illustrated), an adaptor (UG-2731/U) and a base (AB-15/GR or AB-558/GR). The base has no tuning circuits.

The upper section of both bases have a shaft with a spring section. The spring section allows the antenna elements to bend easily when the antenna strikes an obstruction. Both bases have a ground strap assembly which consists of a ground wire and a ground clamp. The ground ring rests on a rubber washer. After the antenna is mounted, the grounding clamp completes the ground when connected to the Adaptor UG-2731/U.

The antenna elements are used to collect (receive) signals.

The Adaptor UG-2731/U is needed to connect the aux receiver rf cable to the antenna base jack.

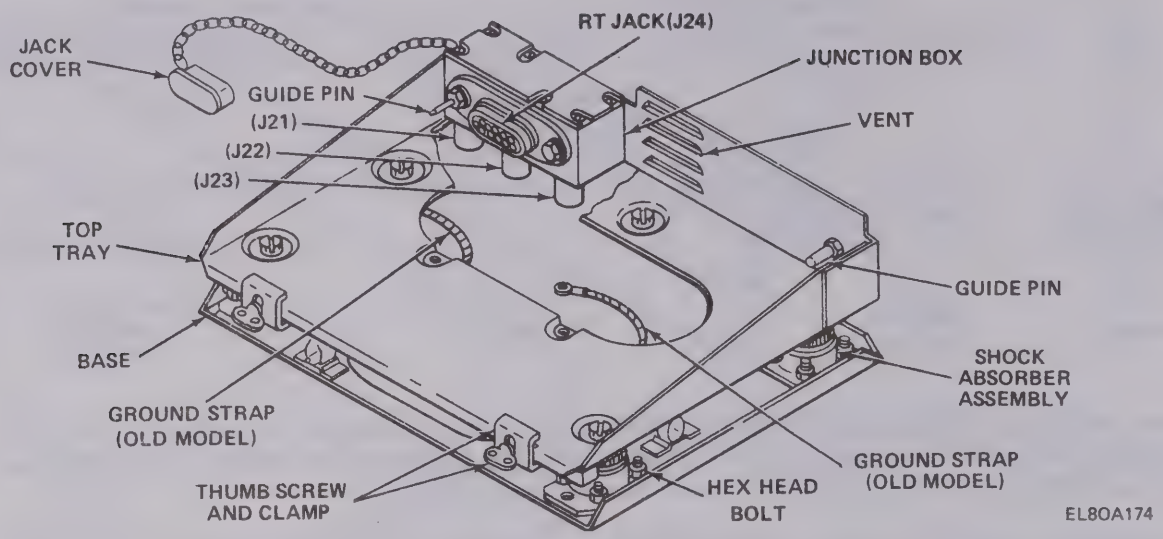
The Adaptor UG-306/U is an optional adaptor used in some installations. This optional adaptor is used when a right-angle connection is required to prevent damage to the rf cable.

NOTE

The Antenna Element AT-1095/VRC may be substituted for the normally used three elements (MS-116A, MS-117A, MS-118A) when a shorter antenna is needed to avoid overhead powerlines.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

MOUNTING MT-1029/VRC



The Mounting MT-1029/VRC is used to hold the RT-246/VRC or RT-524/VRC in a vehicle.

The MT-1029/VRC consists of an upper tray and a lower base. They are connected to each other by five bolts and shock absorber assemblies. A grounding strap is connected between the upper tray and lower base to insure good grounding. (Earlier models (before 1973) have two grounding straps.)

The lower base is bolted to the radio shelf of the vehicle. The upper tray has two thumbscrews and clamp assemblies. These lock the RT in place. Two guide pins at the rear of the upper tray aid in holding the RT. They also insure the proper alinement of RT's rear plug (P401) with the mount jack (J24).

A gasket-sealed junction box (J-box) is at the left side of the MT-1029/VRC rear wall. The RT jack, J24, is on the front of the J-box. There are three jacks on the bottom. From left to right is a power input jack (J21), an additional equipment convenience jack (J22), and a power outlet jack (J23).

The J-box obtains RT operating voltage (22 to 30 vdc) from the vehicle electrical system at J21 and applies it to the RT at J24. The J-box jacks, J22 and J23, also distribute power, control, and signal voltages between the installed RT and other equipment of the vehicle communication system.

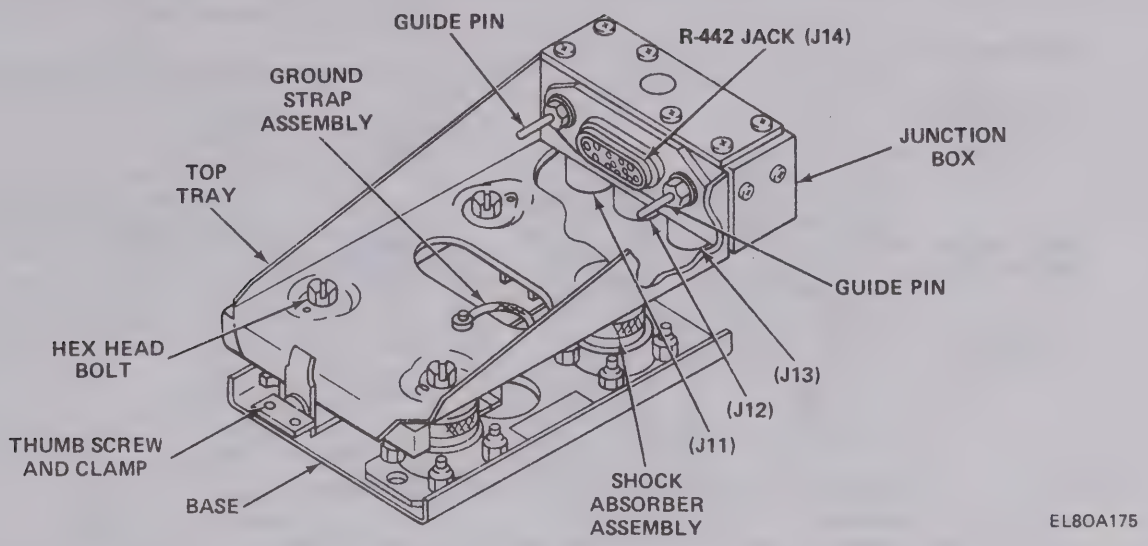
The earlier models have a 100-ampere fuse (as part of the J-box cover) for protection of the vehicle electrical system.

A vent (opening) is at the center of the mount's rear wall. The vent alines with the installed RT exhaust blower. The vent and the exhaust blower must be kept clear of any obstructions to insure proper cooling of the RT.

Vinson speech-secure equipment (TSEC/KY-57) can be connected to the RT when interconnecting box J-3513/U is installed between the mount's upper tray and the lower base.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

MOUNTING MT-1898/VRC



The Mounting MT-1898/VRC is used to hold the Aux Receiver R-442/VRC in a vehicle.

The MT-1898/VRC consists of an upper tray and a lower base. They are connected to each other by four bolts and shock absorber assemblies. A grounding strap is connected between the upper tray and lower base to insure good grounding.

The lower base is bolted to the radio shelf of the vehicle. The upper tray has one thumbscrew and clamp assembly. It locks the R-442 in place. Two guide pins at the rear of the upper tray aid in holding the R-442/VRC. They insure the proper alinement of the R-442/VRC rear plug (P401) with the mount jack (J14).

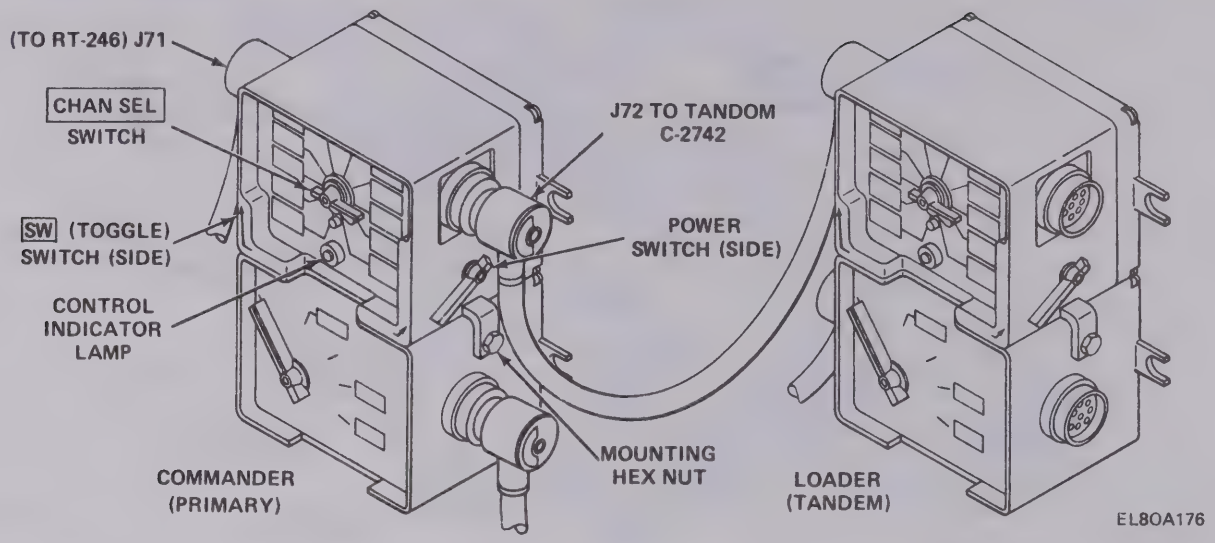
A gasket-sealed junction box (J-box) is at the center of the MT-1898/VRC rear wall. The R-442/VRC jack (J14) is on the front of the J-box. There are three jacks on the bottom. From left to right is a power input jack (J11), an additional equipment convenience jack (J12), and a power outlet jack, (J13).

The J-box obtains operating voltage (22 to 30 vdc) from the A-RT mount through its power input jack (J11). Jacks J12 and J13 also distribute power and signal voltages between the installed R-442/VRC and other equipment of the vehicle's communication system.

Vinson speech-secure equipment (TSEC/KY-57) can be connected to the receiver when interconnecting box J-3514/U is installed between the mount's upper tray and the lower base.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

FREQUENCY SELECTOR CONTROL BOX C-2742/VRC



The Control Frequency Selector (Remote Box) C-2742/VRC is used exclusively with the RT-246/VRC. It permits three remote functions: remote R-246/VRC input power control, remote selection of RT-246/VRC rf transmit power level (low or high), and remote selection of any one of ten preset frequencies.

In some tracks, two C-2742/VRC boxes are connected in tandem. In this case, the C-2742/VRC directly connected to the RT-246/VRC is called the primary C-2742/VRC. The box connected to the primary C-2742/VRC is called the tandem C-2742/VRC. Only one C-2742/VRC at a time can be used to remotely select the RT-246/VRC rf transmit level and preset channel frequency.

The primary C-2742/VRC (J71) provides a connection to the RT-246/VRC. When it is a tandem C-2742/VRC, J71 provides a connection to the primary C-2742/VRC. Primary jack, J72, provides a connection to the tandem C-2742/VRC. When it is a tandem C-2742/VRC, J72 has no connection.

The C-2742/VRC PWR switch is used to turn the RT-246/VRC on and off (HI/LO and OFF). It also selects the RT-246/VRC rf transmit power level (HI or LO). Only a primary C-2742/VRC power switch can be used to turn the RT-246/VRC on and off.

The SW (toggle) switch is used to establish remote control at a specific remote box. This switch is spring-held in its forward position. When the primary C-2742/VRC power switch is at HI or LO (RT-246/VRC is on), pushing and releasing this switch establishes the remote selection of RT-246/VRC transmit rf power level. It also allows more selection of preset channel frequency at the C-2742/VRC (primary or tandem) whose SW switch is activated.

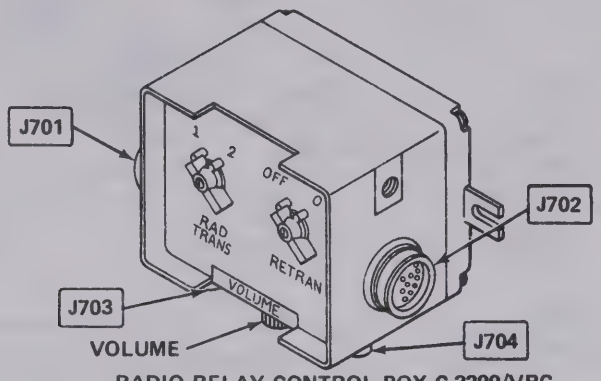
The CONTROL lamp is located on the C-2742/VRC front panel. It lights to indicate the controlling remote box. (When in tandem, only one control lamp should be lit at one time.)

The CHAN SEL (channel selector) is a ten-position switch with write-in spaces for each position. Progressing clockwise, the lower left write-in position corresponds with pushbutton number 1, the next write-in position corresponds with pushbutton number 2, the next with number 3, and so forth, to the lower right write-in position, which corresponds with pushbutton number 10.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

Cable Jacks J71 and J72 are on either side of C-2742/VRC. The left jack (J71) provides cable connection to the RT-246/VRC. When two C-2742/VRC's are used, the right jack (J72) provides connection to (J71) of the second C-2742/VRC.

RADIO RELAY CONTROL BOX C-2299/VRC



RADIO RELAY CONTROL BOX C-2299/VRC

EL80A177

The Radio Relay Control Box C-2299/VRC is connected between the receiver-transmitters of radio sets AN/VRC-45 and AN/VRC-49 through the AM-1780/VRC. In these configurations, the C-2299/VRC provides for automatic radio relay (retransmission) operation. Retransmission is needed when radio stations are too far apart to communicate directly with each other.

Jack J701 provides a connection to the AM-1780/VRC (J511) and to the A-RT of the installed radio set. Jack J702 provides a connection to the AM-1780/VRC (J509) and to the C-RT of the installed set.

The five-pin audio jacks (J703 and J704) are on the C-2299/VRC bottom, along with the VOLUME control. The RAD TRANS switch is on the C-2299/VRC front panel. All are not used when the C-2299/VRC is connected to an AM-1780/VRC. In tracked vehicles, the functions normally provided by the jacks, the control and the switch, are done at the individual crewmember's control boxes.

The RETRANS switch provides for the relay or independent operation of the two RT's which make up the installed radio set. When at OFF, the independent operation of the two RT's is provided from the individual crewmember's control boxes. Relay operation is not provided in the OFF position. When at ON, automatic relay operation is provided. Independent operation of the two RT's from the individual crewmember's control boxes is not provided in the ON position. When the radio-intercom is providing relay operation (RETRANS at ON), simultaneous intercom between crewmembers also is provided.

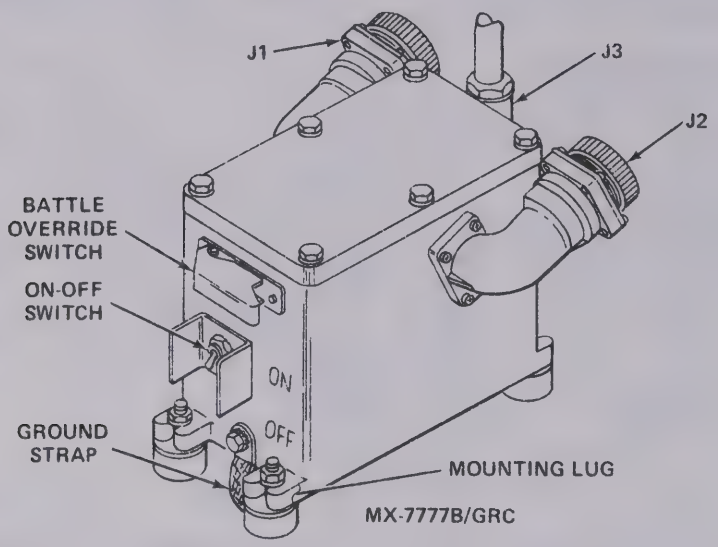
VOLUME control is on the bottom of the box. It is not used in tracked vehicles.

Cable Jacks J701 and J702 provide connection to the AM-1780/VRC.

Cable Jacks J703 and J704 are not used in tracked vehicles.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

TRANSIENT SUPPRESSOR MX-7777 (*)/GRC



EL8OA178

The MX-7777 (*)/GRC is an in-line (series-connected) transient suppressor that protects the components of the tracked vehicle radio-intercom system against short duration voltage spikes (transients). These spikes are caused by operating other outboard equipment (e.g., turret-turning and gun-positioning drive motors). The MX-7777 (*)/GRC also protects the vehicle electrical system against overloads in the connected C-E equipment. It also protects the C-E equipment from inadvertent reversal of the input power cable leads.

All MX-777(*)/GRC models have a jack J3 on the rear panel. It provides a connection to the vehicle electrical system. All models have two jacks, J1 and J2. These provide for connection of C-E equipment. On a MX-7777 A/GRC, these jacks are on the left side. On a MX-7777 B/GRC, J1 is on the right side and J2 is on the left side.

All MX-7777 (*)/GRC models also have a power ON-OFF/50-ampere-circuit breaker. When OFF, this circuit breaker removes operating voltage from all equipment connected, directly or indirectly, to J1 and/or J2. When ON, the transient suppressor limits the output power to a maximum of 36 vdc at 50 amperes.

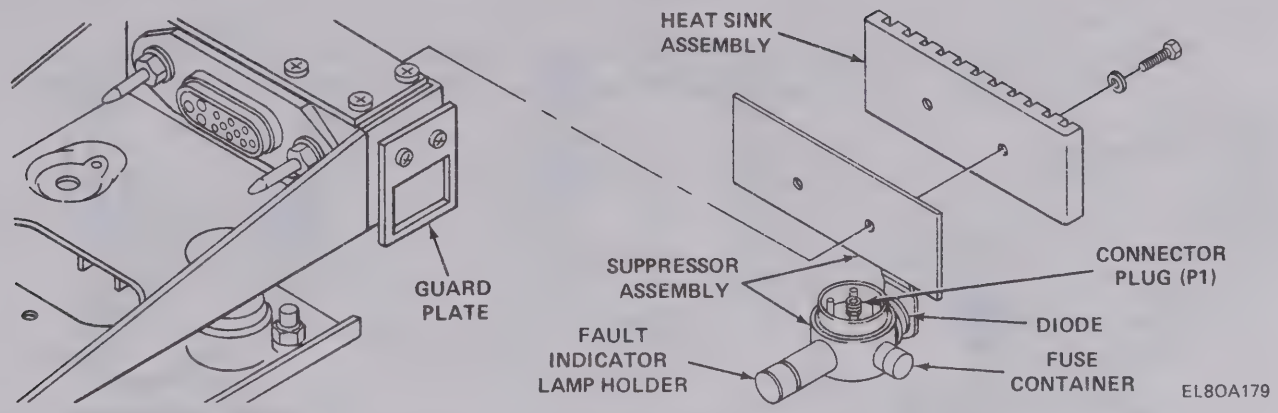
The MX-7777 B/GRC models have a BATTLE OVERRIDE switch that is under a protective red hood (switch guard). When the BATTLE OVERRIDE switch is ON, the protection circuits are bypassed and no protection is provided. This switch should be set to ON only in extreme emergencies.

The MX-7777 (*)/GRC uses Special Purpose Electrical Cable CX-10613/G to connect to the vehicle battery system. Their location on the MX-7777 (*)/GRC varies with the different models.

A ground strap forms the ground between the MX-7777 (*)/GRC and the radio shelf. The location of the strap varies with different models.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

TRANSIENT SUPPRESSOR (MINISUPPRESSOR)



The minisuppressor is a parallel (shunt) connected transient suppressor. It is used in place of the MX-7777 (*)/GRC in tank-type tracked vehicles (M60 series, M551 series and M1 Abrams). The minisuppressor, like the MX-7777 (*)/GRC, protects the vehicle radio-intercom components from short-duration voltage spikes (transients). These voltage spikes of over 35 volts occassionally occur on the vehicle dc powerlines.

The minisuppressor plugs into the dc outlet jack of either the MT-1029/VRC (J23) or MT-1898/VRC (J13). It consists of a suppressor assembly, a heat sink assembly and a guard plate.

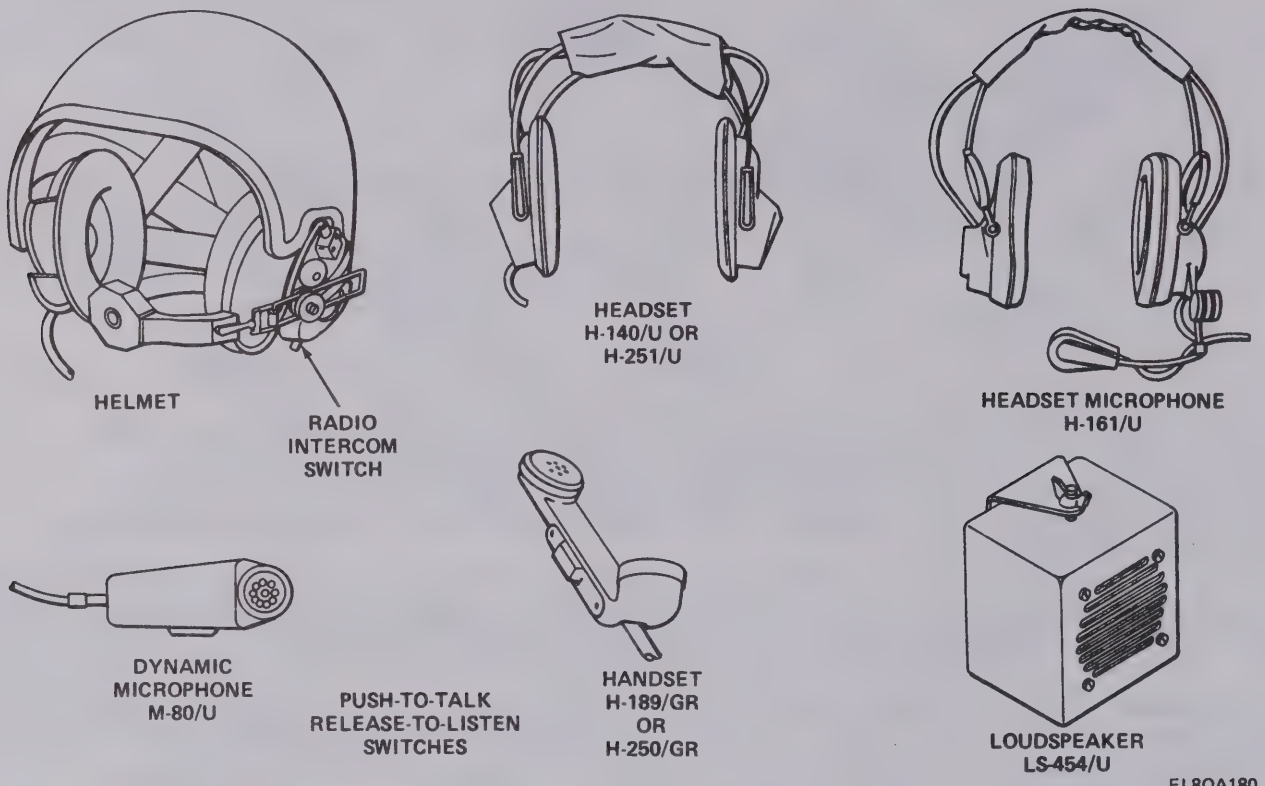
The suppressor assembly consists of a diode (at back) in series with a 50-ampere fuse (in fuse container). These are connected between Pins A and B of the plug. The fault indicator lamp (in lampholder) is connected in parallel (shunt) with the fuse. The indicator lamp will light when the diode shorts and blows the fuse, indicating a fault.

Reversed input voltage of the dc input power to the minisuppressor and excessive voltage spikes causes a heat buildup (over 200°F). This will short the diode and blow the fuse. When the fault indicator lamp is lit, the minisuppressor is not protecting the components of the radio-intercom system; therefore, it must be replaced as soon as practical.

The heat sink assembly aids in cooling the suppressor assembly. It can reach temperatures of over 215°F. The guard helps shield personnel from the high temperatures reached by the minisuppressor.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

AUDIO ACCESSORIES



Typical audio accessories include a helmet, headsets, a headset-microphone assembly, a microphone, handsets and a loudspeaker. They allow the crewmembers use of the vehicular communication system.

The Dynamic Microphone M-80/U is provided with a push-to-talk/release-to-listen (key) switch.

Typical handsets are the H-189/GR and the H-250/U. They are provided with a microphone, an earphone, and a push-to-talk/release-to-listen (key) switch.

The Headsets H-140/U and H-251/U and the Loudspeaker LS-454/U are audio reproducers only.

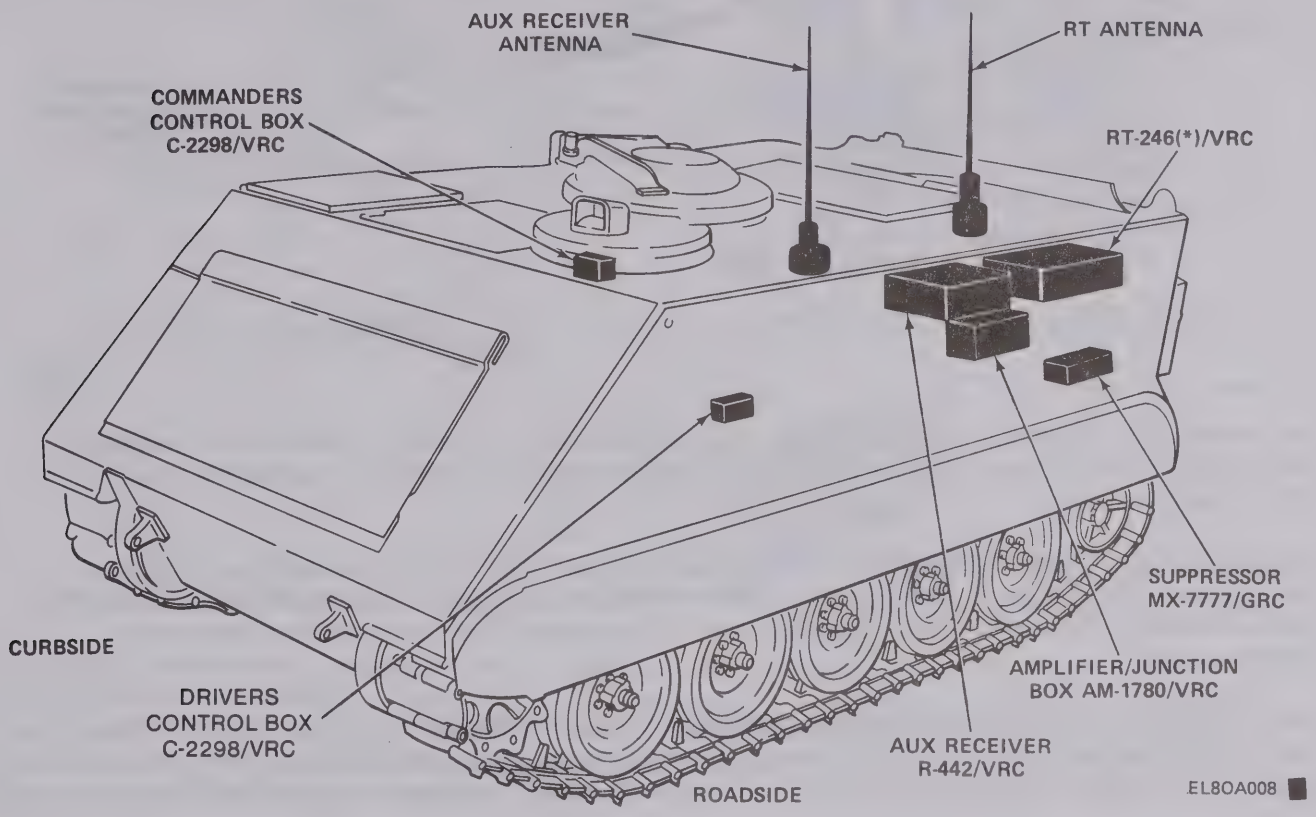
The Helmet DH-132A and the Headset Microphone H-161/U have a special key switch. This switch has three positions. Its center position provides for listening only. The INT position accesses the intercom for talk/listen. The RAD position (spring-loaded) provides access to an RT on a push-to-talk/release-to-listen basis.

All audio accessories connect to a variety of components, as described throughout this paragraph.

1-12. LOCATION OF MAJOR COMPONENTS AND CABLING OF PERSONNEL CARRIER (APC) M113(*).

NOTE

Each vehicle described in this manual has the ability to have Vinson Security Equipment installed. Instructions for installation and operation are provided in TM 11-5820-312-12.

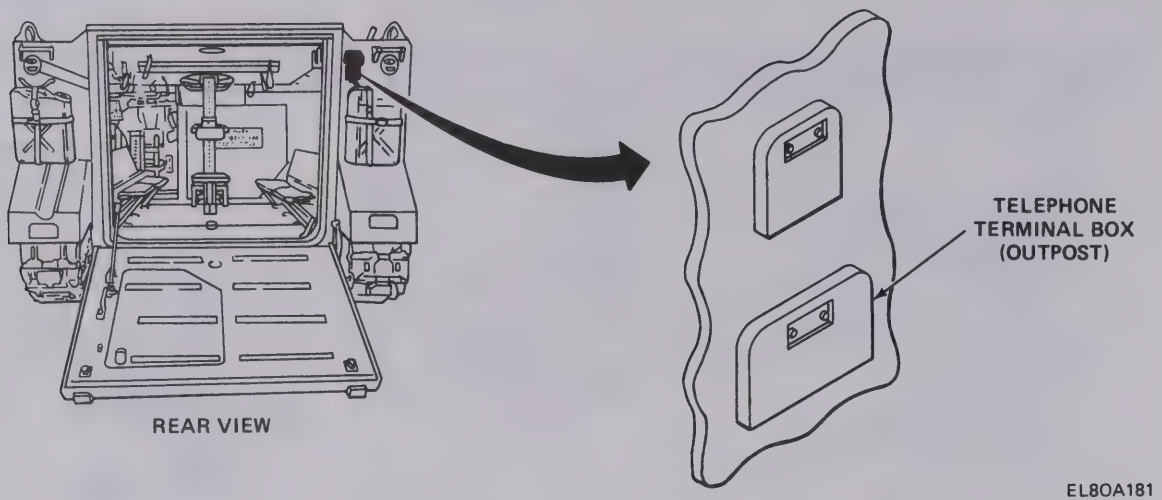


The M113(*) is designed for a number of tasks: transport for troops and/or cargo in support of tactical operations, command post, or a specialized attack vehicle. The communication system onboard consists of standard AN/VIC-1(V) items and any one of the AN/VRC-12 series radio sets.

The AN/VRC-12 radio equipment installed in the M113 carriers is normally mounted on a radio shelf on the roadside wall of the personnel compartment.

The aux receiver antenna and the antenna for the RT-246/VRC are mounted on the carrier roof. The aux receiver antenna is mounted toward the roadside front of the vehicle. The RT-246/VRC Antenna AS-1729/VRC or AT-912/VRC is mounted toward the roadside rear of the vehicle.

1-12. LOCATION OF MAJOR COMPONENTS AND CABLING OF PERSONNEL CARRIER (APC) M113(*). (CONT)



The Amplifier/Junction Box AM-1780/VRC is mounted under the radio shelf (under the Aux Receiver R-442/VRC, center of the roadside wall). The RT-246/VRC (or the RT-524/VRC) is mounted in the left of the R-442/VRC.

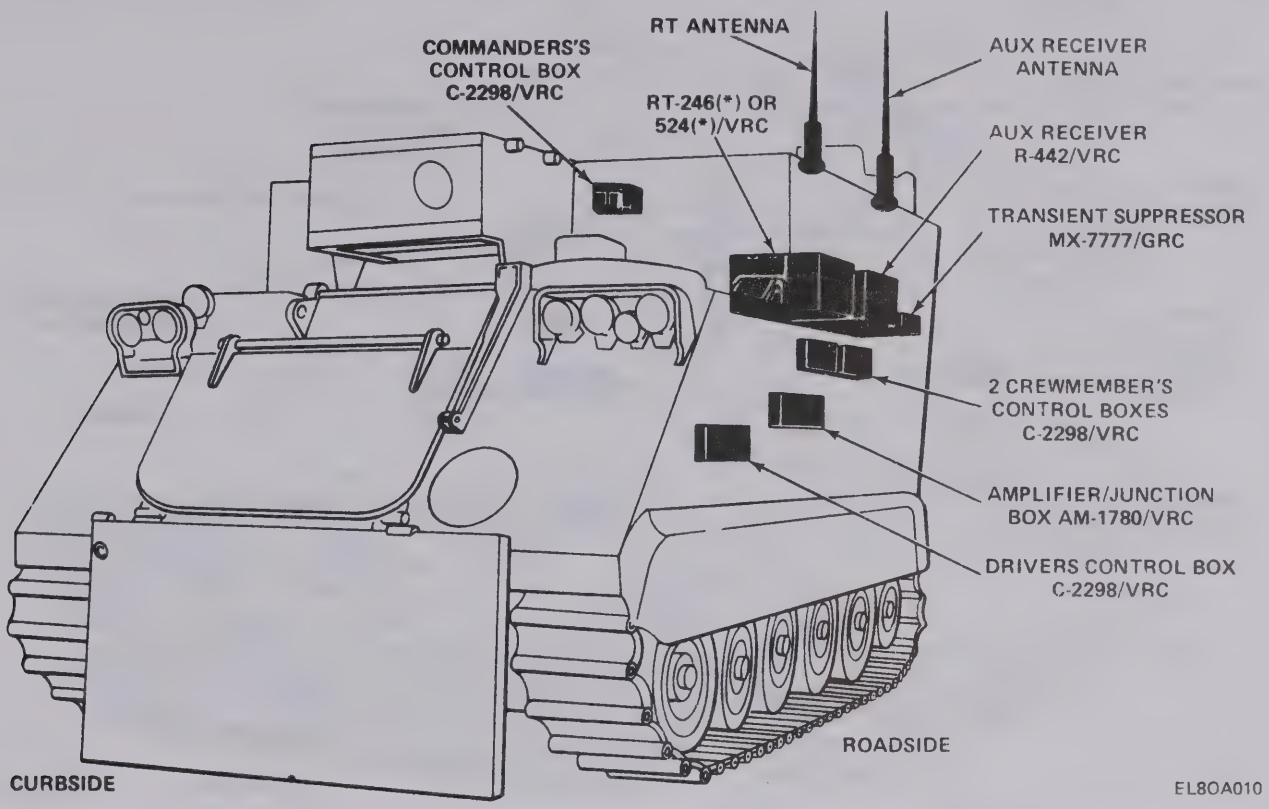
The driver's Control Box C-2298/VRC is in the driver's compartment left of the driver's position. The commander's Control Box C-2298/VRC is on the front wall of personnel compartment, left center of the commander's position. As many as four extra C-2298 control boxes can be added, depending on the mission.

The M113 series vehicle does not have an outside Control Box C-2296/VRC. Instead, each carrier in the M113 series has a terminal box with two pairs of binding posts located left of the rear curbside taillight. The binding posts provide for connecting field wires to the vehicular AM-1780/VRC.

The Transient Suppressor MX-7778/GRC is under the R-442/VRC on the fender well, near the rear wall.

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-13. LOCATION OF MAJOR COMPONENTS AND CABLING OF COMMAND POST (CP) M577(*).



The M577 is an armored personnel carrier and serves as a mobile field command post. The communication system onboard consists of standard AN/VIC-1(V) and any one of the AN/VRC-12 series radio sets. The basic AN/VIC-1(V) set has two control boxes: driver and commander. However, as many as four extra C-2298/VRC control boxes can be added depending on the mission. This vehicle has two additional crewmember control boxes.

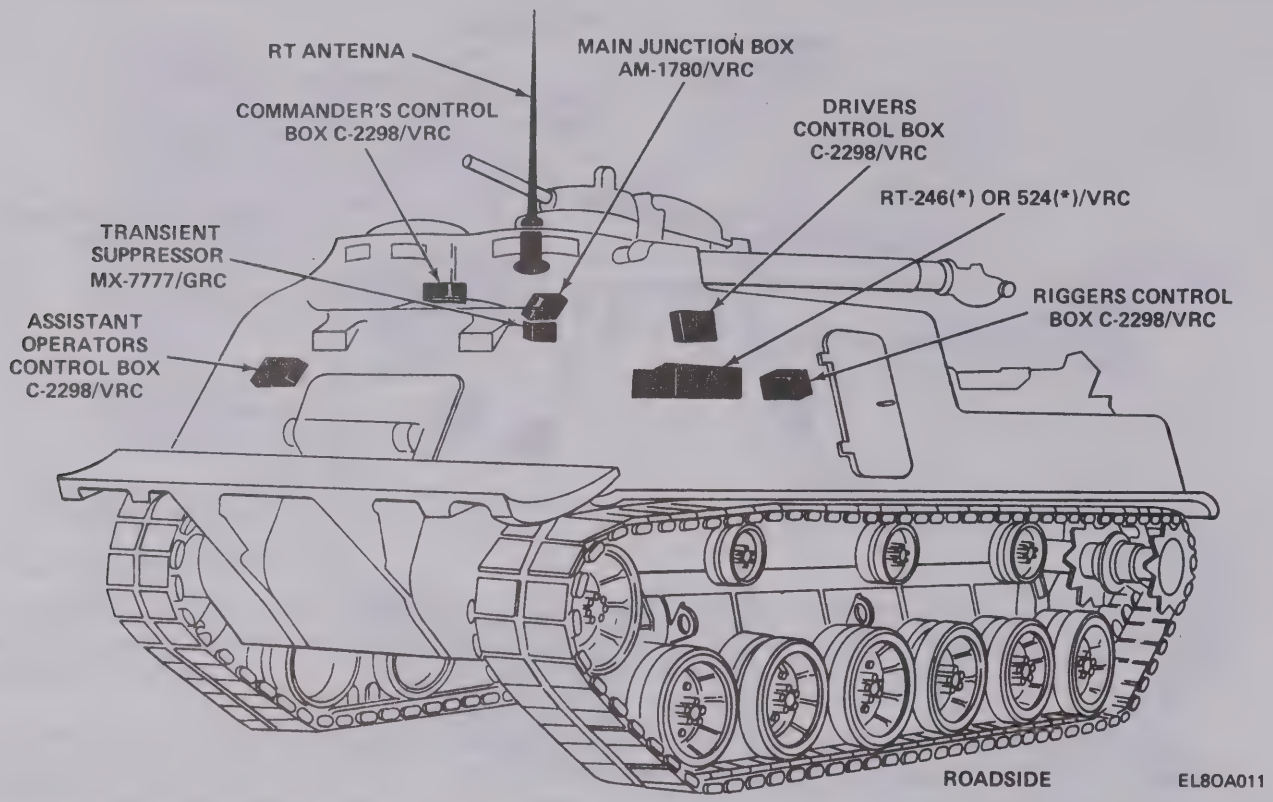
All the radio and intercom equipment in the Command Post (CP) M577(*) have locations similar to the M113.

An additional crewmember's control box is under the radio shelf.

The Transient Suppressor MX-7777/GRC is located next to the R-442/VRC (on the radio shelf).

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-14. LOCATION OF MAJOR COMPONENTS AND CABLING OF RECOVERY VEHICLE M88A1.



The M88A1 is a full-tracked medium recovery vehicle. The communication system consists of the AN/VIC-1(V) intercom with either the AN/VRC-46 or the AN/VRC-43 radio set (shown without C-2742/VRC). Each crewmember has a Control Box C-2298/VRC.

The RT-246/VRC or the RT-524/VRC is mounted on the radio shelf which is secured to the top of the roadside wall in the oddment compartment.

The RT antenna is mounted in the forward roof above the RT.

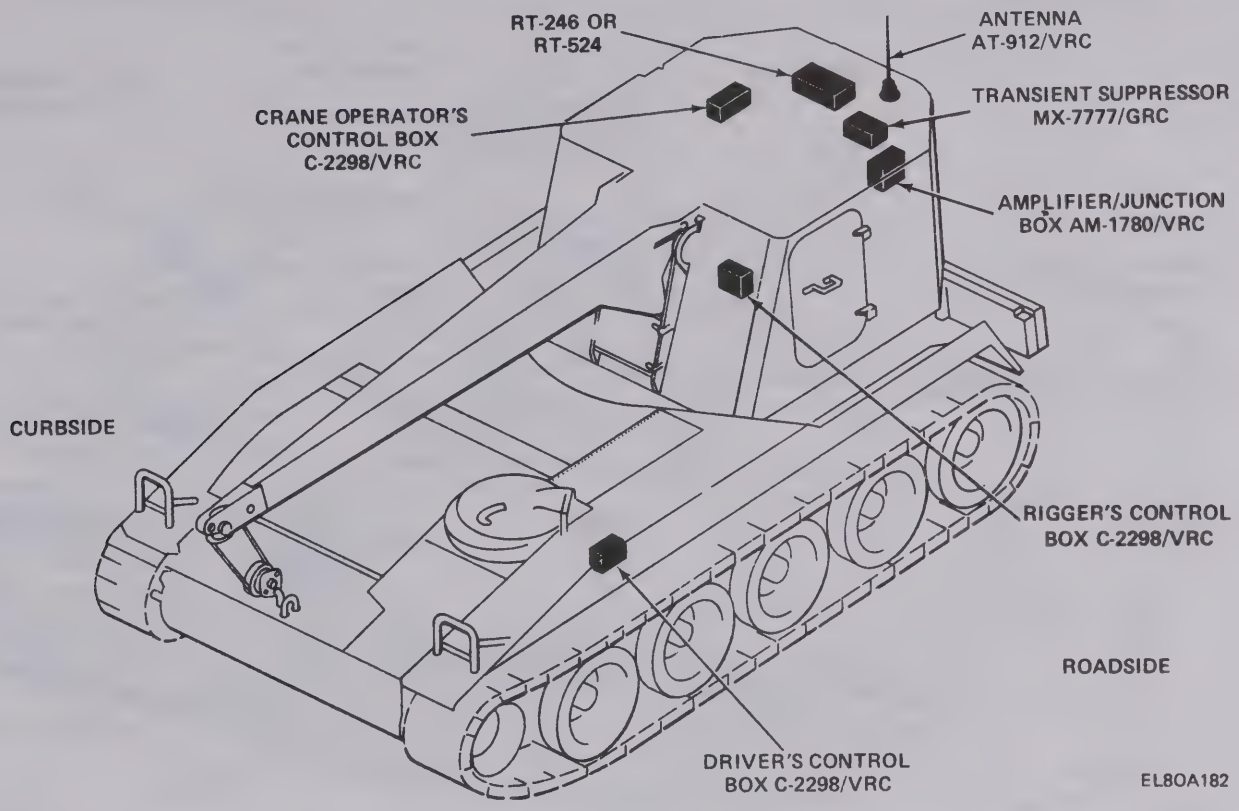
The Main Junction Box AM-1780/VRC is mounted above the RT on the hull wall.

The assistant operator's control box is located on the front curbside wall. The commander's control box is in the front center above the commander's seat. The driver's control box is left of the driver's seat on the roadside wall. The rigger's control box is on the rear wall, curbside of the rigger's seat.

The Transient Suppressor MX-7777/GRC is on the radio shelf bracket toward the front left of RT.

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-15. LOCATION OF MAJOR COMPONENTS AND CABLING OF RECOVERY VEHICLE M578.



The M578 is a light recovery vehicle. It is equipped with an AN/VIC-1(V) intercom set and AN/VRC-46 or AN/VRC-43 radio set. All crewmembers have the Control Box C-2298/VRC.

The RT-524/VRC or RT-246/VRC is on the radio shelf located on the center rear cab wall.

The RT antenna is mounted on the rear roadside roof.

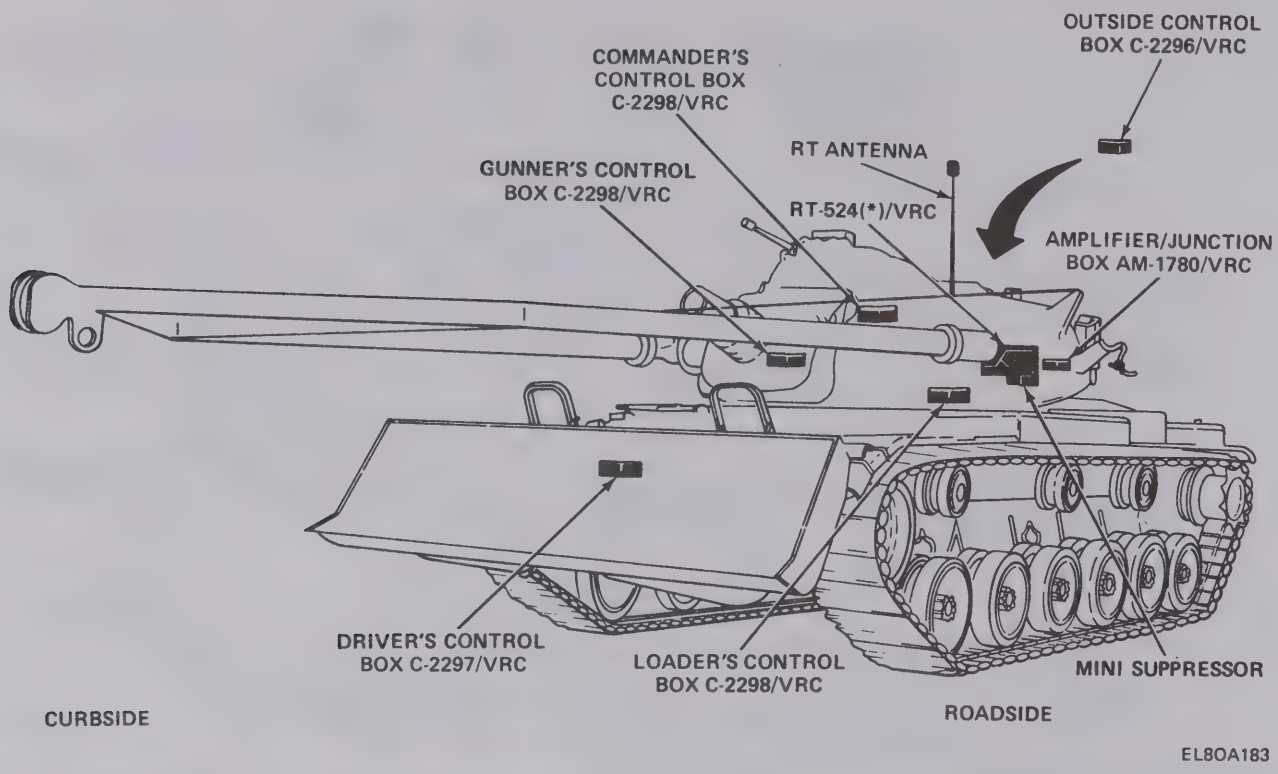
The Amplifier/Junction Box AM-1780/VRC is on the rear roadside cab wall.

The driver's control box is mounted next to the driver on the roadside hull wall of the M578. The rigger's control box is located on the roadside cab wall. The crane operator's control box is located behind the operator's seat on the curbside cab wall.

The Transient Suppressor MX-7777/GRC is on the radio shelf, right of the RT.

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-16. LOCATION OF MAJOR COMPONENTS AND CABLING OF COMBAT ENGINEER'S VEHICLE (CEV) M728.



The M728 (CEV) is a full-tracked combat vehicle (M60 Series) designed for engineering operations such as bridge and building construction under combat conditions. The AN/VIC-1 (V) intercom set with the AN/VRC-46 radio set is installed in the vehicle.

The RT-524/VRC is on the rear turret wall shelf.

The RT antenna is behind commander's hatch on the rear turret roof.

The AM-1780/VRC amplifier is mounted next to the RT. The AM-1780/VRC amplifier is to the right on the shelf.

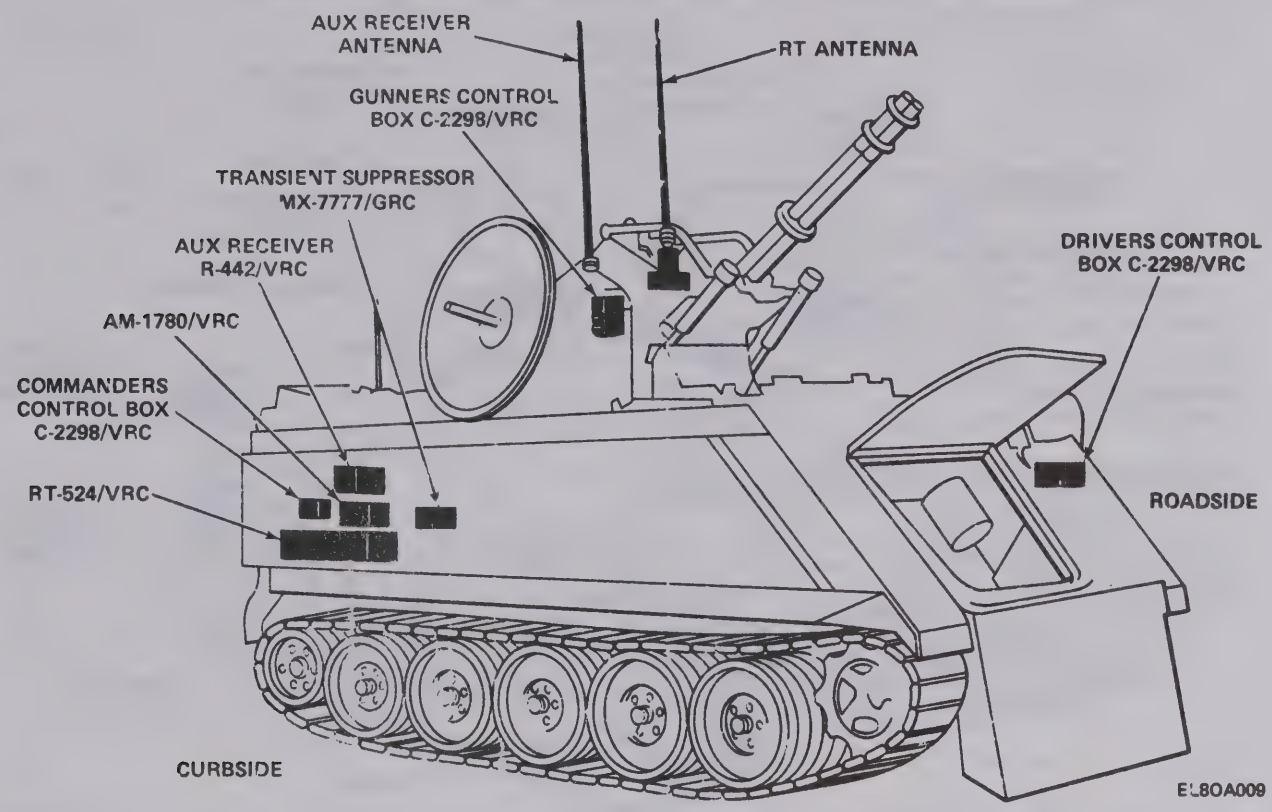
The commander, loader, and gunner have the Control Box C-2298/VRC. The driver has the Control Box C-2297/VRC. There is also an outside Control Box C-2296/VRC on the curbside rear fender.

The commander's C-2298/VRC is on the curbside turret wall. The gunner's C-2298/VRC is on the curbside turret wall to the gunner's right. The loader's C-2298/VRC is on the roadside turret wall, left of the loader's position. The driver's C-2297/VRC is on the hull wall on the right side of the driver's compartment.

The minisuppressor is inside the Mounting Base MT-1029/VRC (under the RT-524/VRC).

COMPONENT INSTALLATION AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-17. LOCATION OF MAJOR COMPONENTS AND CABLING OF AIR DEFENSE ARTILLERY GUN (VULCAN) M163.



The M163 is a 20-mm self-propelled air defense gun mounted on the lightweight-tracked M113 chassis. The radio-intercom system consists of the AN/VIC-1 (V) plus the AN/VRC-47. Each crewmember (commander, driver, and gunner) have Control Box C-2298/VRC.

The AN/VRC-47 radio equipment installed in the M163 is mounted on the rear curbside wall. The Aux Receiver R-442/VRC is mounted above the Amplifier Junction Box AM-1780/VRC. The Receiver Transmitter RT-524/VRC is mounted below the AM-1780/VRC amplifier.

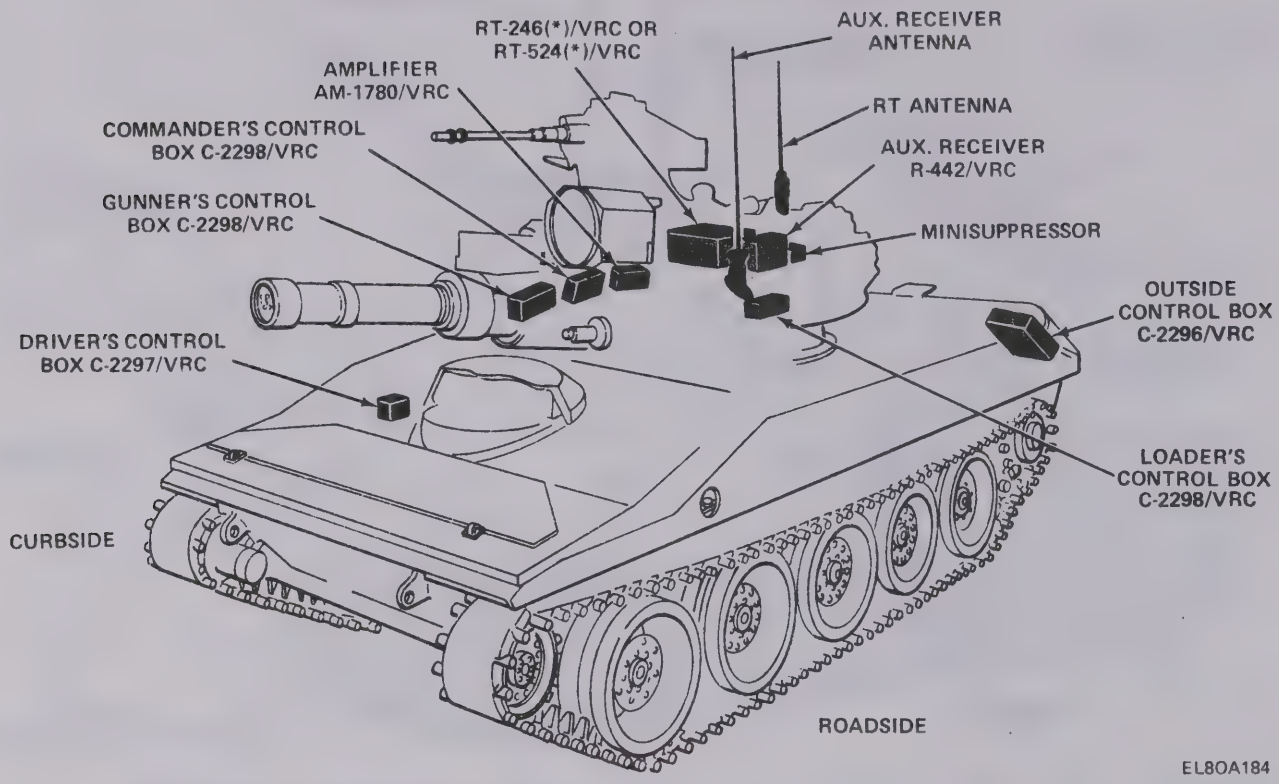
The RT antenna and the aux receiver antenna are mounted on the turret roof on either side of the 20-mm Cannon M168.

The commander's C-2298/VRC is located on the rear curbside wall next to the AM-1780/VRC amplifier. The driver's C-2298/VRC is located on the roadside wall to the left of the driver's seat. The gunner's C-2298/VRC is located on the right side of the gunner's position in the rotating gun turret.

The Transient Suppressor MX-7777B/GRC is located to the left of the AM-1780/VRC in front of the battery box.

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-18. LOCATION OF MAJOR COMPONENTS AND CABLING OF ARMED RECONNAISSANCE/AIRBORNE ASSAULT VEHICLE (ARAAV) (SHERIDAN).



The M551 (Sheridan) is an armored reconnaissance/airborne assault vehicle (ARAAV). The radio-intercom system consists of the AN/VIC-1 (V) and the AN/VRC-12, AN/VRC-46, or AN/VRC-47.

The RT-246/VRC (AN/VRC-12) or RT-524/VRC (AN/VRC-46 or -47) and R-442/VRC (AN/VRC-12 or -47) are on a shelf on the center rear turret wall. The R-442/VRC is to the right of the RT.

The RT antenna is on the top of the turret, rear of the loader's hatch. The aux receiver's antenna can be mounted to the turret side, left front of the loader's hatch.

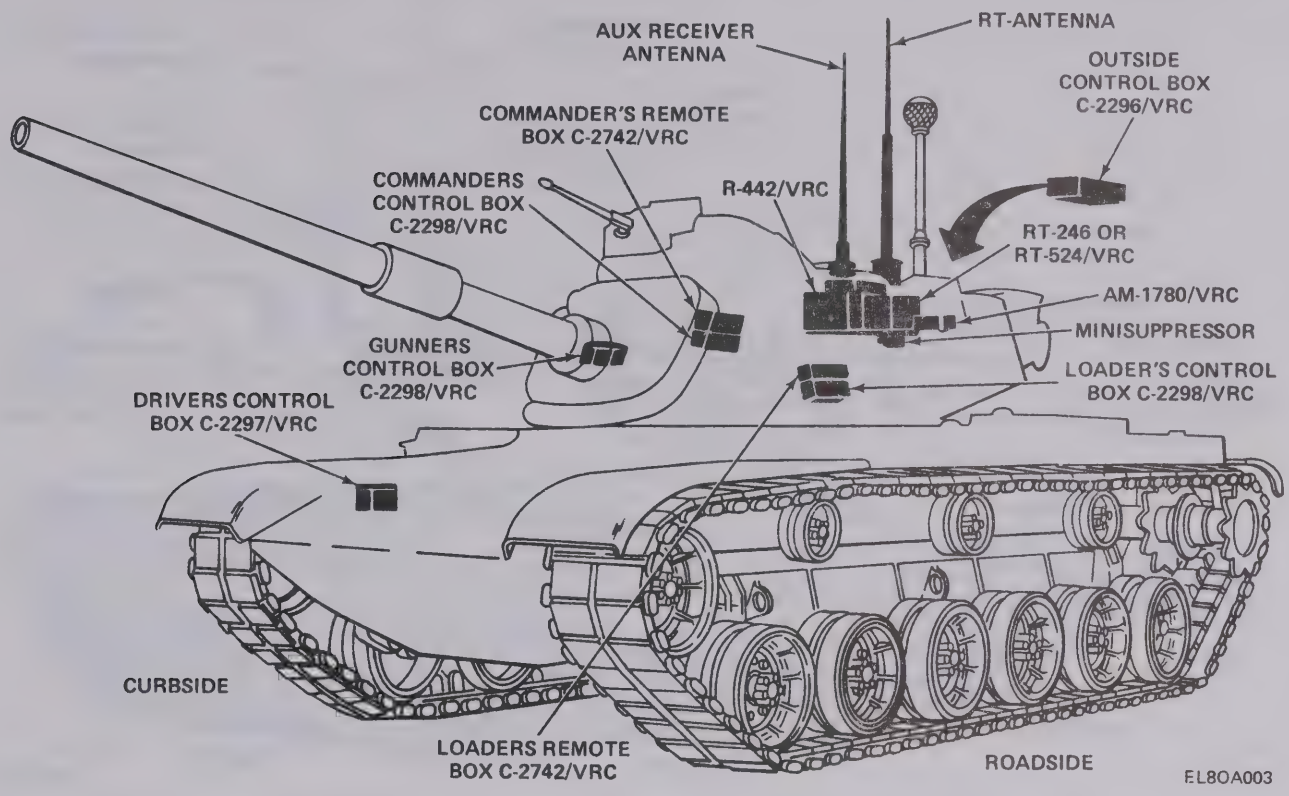
The AM-1780/VRC is on the turret wall, right of the commander's position.

The commander's C-2298/VRC is mounted upside down, right of the commander's position. The gunner's C-2298/VRC is on the turret wall, right of the gunner. The loader's C-2298/VRC is left of the loader on the turret wall. The driver's C-2297/VRC is on the hull, right of the driver's position. The C-2296/VRC is on the tank's rear roadside.

The minisuppressor dc outlet jack is connected to the dc outlet jack of the Mounting Base MT-1029/VRC (for AN/VRC-46) or the dc outlet jack of the aux receiver Mounting Base MT-1898/VRC (for AN/VRC-12 or -47).

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-19. LOCATION OF MAJOR COMPONENTS AND CABLING OF TANK M60A1, M60A2, AND M60A3.



The M60A1, M60A2, and M60A3 are tanks in the full-tracked M60 series of combat vehicles. The radio-intercom system includes the AN/VIC-1 (V) and Radio Sets AN/VRC-12, or AN/VRC-46, -47.

The location of the RT-246/VRC (AN/VRC-12) or the RT-524/VRC (AN/VRC-46 or -47) is on the right side of the turret wall shelf. The R-442/VRC (AN/VRC-12 or -47) is mounted to the left of the RT.

The RT antenna is mounted behind the commander's hatch on the rear curbside turret. The aux receiver antenna can be mounted to the left rear of the loader hatch.

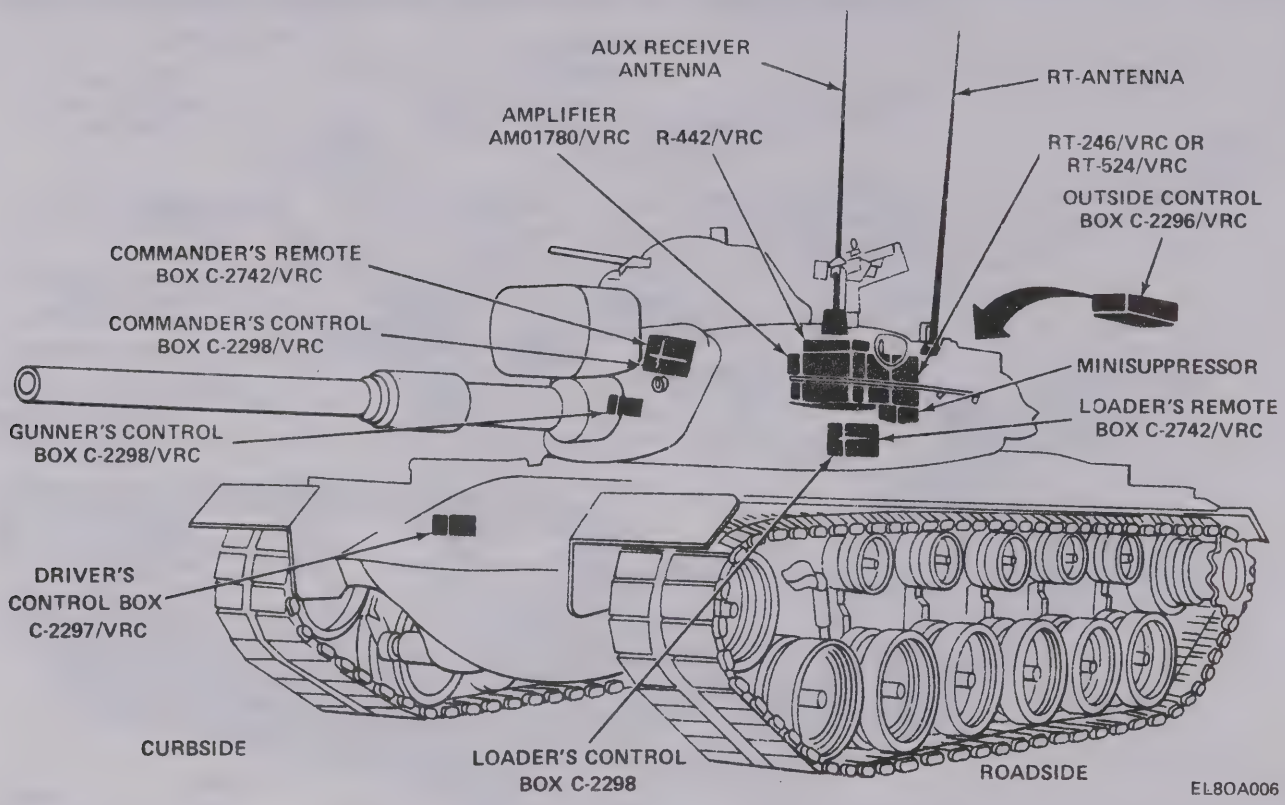
The AM-1780/VRC is mounted on the rear turret wall behind the loader's position.

The commander, loader and gunner have C-2298/VRC. The driver has a C-2297/VRC. The commander's C-2298/VRC is mounted on the curbside turret wall. The gunner's C-2298/VRC is on the curbside turret wall, to the gunner's right. The driver's C-2297/VRC is on the hull wall, on the right side of the driver's compartment. The commander and the loader have the Remote Box C-2742/VRC mounted on top of the Control Boxes C-2298/VRC.

The M60A1, M60A2 and M60A3 all have the minisuppressor mounted in the dc outlet jack of the last radio mount in the circuit. (The Mounting Base MT-1029/VRC for an AN/VRC-46 or the Mounting Base MT-1898/VRC for AN/VRC-12 or -47.)

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-20. LOCATION OF MAJOR COMPONENTS AND CABLING OF TANK M48A5.



The M48A5, at present, is the only model of the M48 series being fielded. The AN/VIC-1 (V) radio-intercom system is similar to that in the M60 series. It consists of the AN/VIC-1 (V), and the radio sets AN/VRC-12, AN/VRC-46 or -47.

The location of the RT-246/VRC (AN/VRC-12) or the RT-524/VRC (AN/VRC-46, or -47) is on the right side of the roadside turret wall shelf. The R-442/VRC (AN/VRC-12 or -47) is mounted to the left of the RT.

The RT antenna is mounted on the curbside top rear of the turret behind the commander's hatch. The aux receiver antenna is mounted on the roadside top turret rear just behind the loader's hatch.

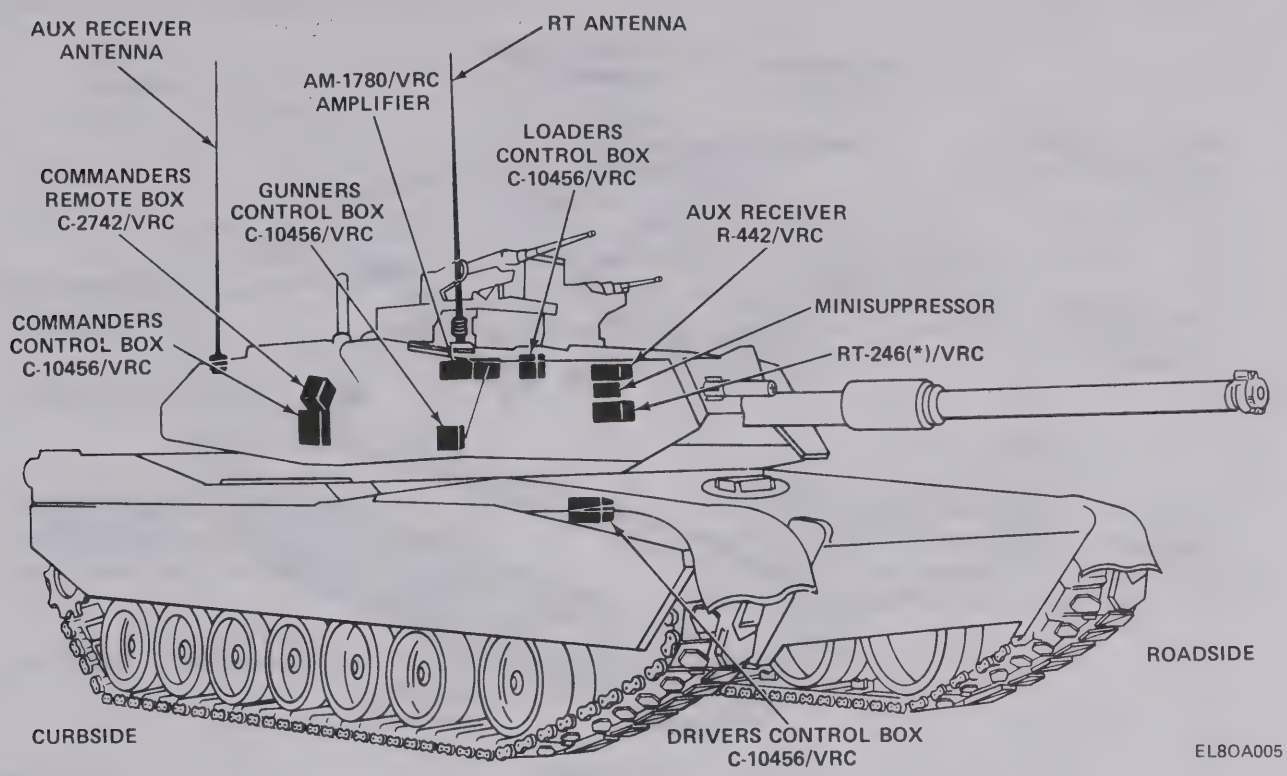
The AM-1780/VRC amplifier is to the left of the RT on the rear turret wall.

The commander, loader and gunner have the C-2298/VRC. The driver has the C-2297/VRC. The commander's C-2298/VRC is mounted on the curbside turret wall. The gunner's C-2298/VRC is on the curbside turret wall, to the gunner's right. The driver's C-2297/VRC is on the hull wall, on the right side of the driver's compartment. The commander and the loader have the Remote Box C-2742/VRC mounted on top of the Control Boxes C-2298/VRC.

The M48A5 has a minisuppressor which is mounted to the dc outlet jack of the MT-1898/VRC (for AN/VRC-12 or -47) or the dc outlet jack of the MT-1029/VRC.

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-21. LOCATION OF MAJOR COMPONENTS AND CABLING OF TANK M1 (ABRAMS).



The M1 (Abrams) tank is the newest of the main battle tanks. The radio-intercom system contains the AN/VIC-1 (V) and the AN/VRC-12.

The radio components are mounted on two-level radio shelf located on the roadside turret wall, to the front left of the loader's position. The RT-246/VRC is on the lower level shelf. The R-442/VRC is directly above the RT on the upper level.

The RT antenna is mounted on the rear bussel roof. The aux receiver antenna is on the curbside rear bussel roof.

The AM-1780/VRC is left rear of the loader's seat.

Each crewmember has a C-10456/VRC. The commander has the Remote Box C-2742/VRC. The commander's C-10456/VRC is on the curbside turret wall, right of the commander's position. The gunner's C-10456/VRC is on the same wall, right of the gunner. The loader's C-10456/VRC is on the front curbside hull wall, right of the driver.

The commander's Frequency Selector Box C-2742/VRC is mounted on the C-10456/VRC control box.

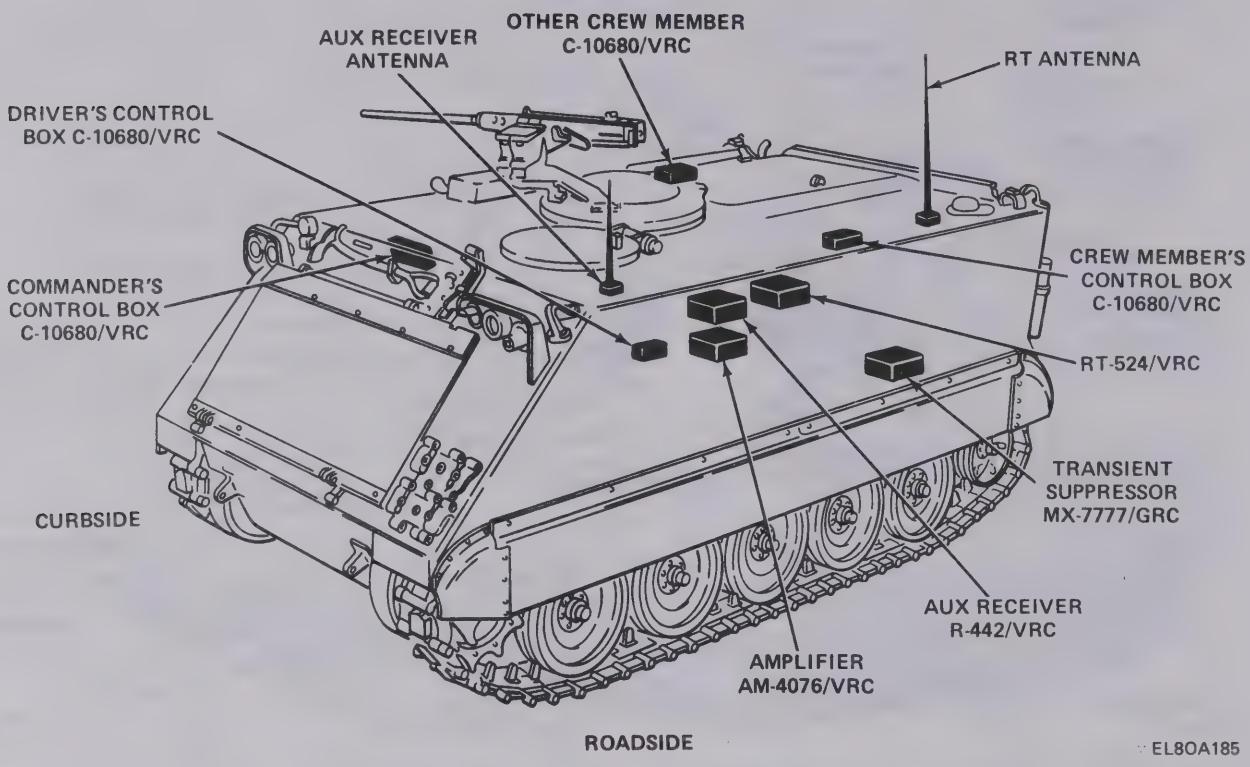
NOTE

Other authorized radio sets for an M1 tank do not require installation of the remote control box.

The minisuppressor for the M1 is installed in the dc outlet jack of the aux receiver mounting MT-1898/VRC.

COMPONENT INSTALLATIONS AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-22. LOCATION OF MAJOR COMPONENTS AND CABLING OF INTERIM FIRE SUPPORT TEAM VEHICLE (FIST-V).



The Interim FIST-V is a modified (special purpose) M113 armored personnel carrier for use by the Field Artillery. The onboard communication system consists of a modified AN/VIC-1 (V) intercom set in combination with special radio equipment. The modified AN/VIC-1 (V) has a special Main Junction Box/Amplifier AM-7046/VRC (modified AM-1780/VRC) and special Control Boxes C-10680/VRC (modified C-2298/VRC). The special radio equipment consists of radio set AN/VRC-47/VRC with two traditional radio sets (AN/GRC-160).

The AN/VRC-47 radio equipment installed in the Interim FIST-V is normally mounted on a radio shelf on the roadside wall of the personnel compartment. The RT-524/VRC is left of the R-442/VRC.

The RT antenna is mounted on the rear roadside roof. The aux receiver antenna is mounted on the front roadside roof, left of the driver's hatch.

The Amplifier/Junction Box AM-7046/VRC (a modified AM-1780/VRC) is mounted under the R-442/VRC.

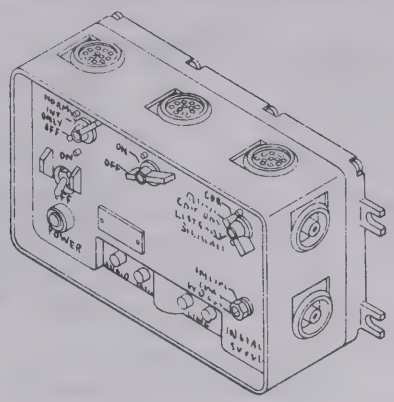
The commander's C-10680/VRC is on the forward wall, in front of the commander's position. The driver's C-10680/VRC is on the roadside wall, left of the driver's position. There are two extra C-10680/VRC control boxes mounted opposite each other on the roadside and curbside ceiling. (They are connected in tandem.)

The Transient Suppressor MX-7777/GRC is mounted on the roadside fender well, near the rear wall.

COMPONENT INSTALLATION AND CABLING: See chapter 2, section III, and paragraph 3-25.

1-23. DIFFERENCES BETWEEN MODELS.

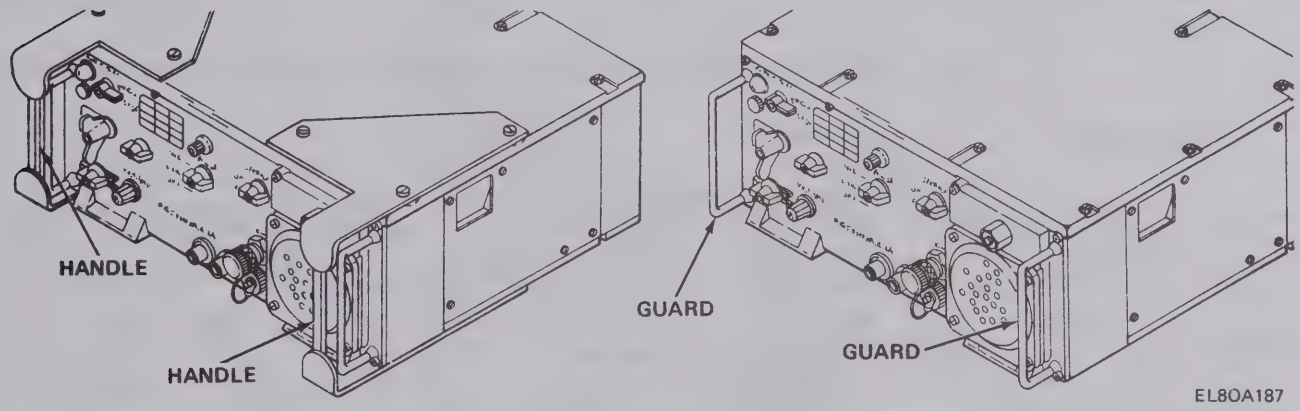
AMPLIFIER/JUNCTION BOX AM-1780/VRC



EL8OA186

OLDER MODEL	NEWER MODEL
Has an interphone amplifier with a variable gain which must be adjusted at support maintenance.	Has an interphone amplifier with a fixed gain. Those procured under contract DAA807-80-C-DD21, have rubber-covered binding posts with LINE changed to TELE/REMOTE.

RECEIVER-TRANSMITTERS: RT-524/VRC AND RT-524A/VRC
RT-246/VRC AND RT-246A/VRC

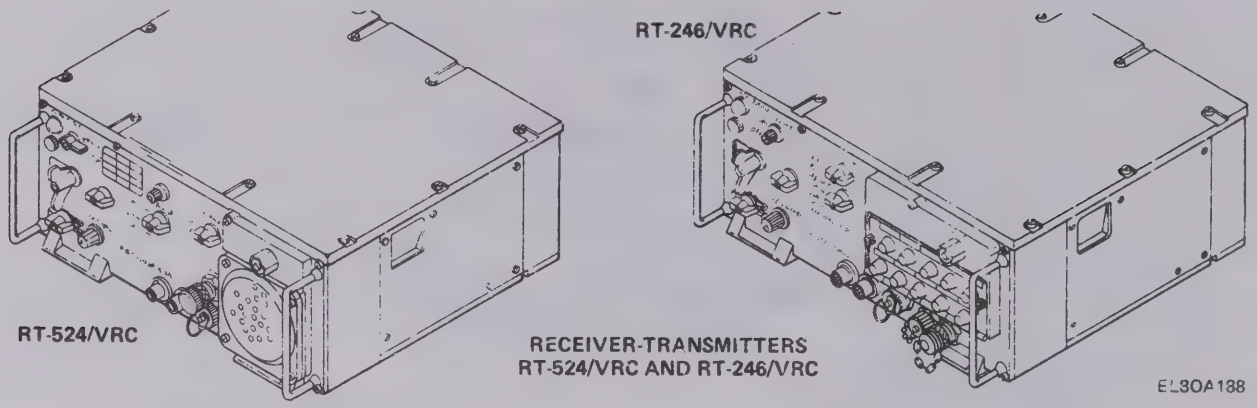


EL8OA187

RT-524/VRC or RT-246/VRC	RT-524A/VRC or 246A/VRC
Has handles over small guards.	Has larger, stronger guards which can be used as handles.

1-23. DIFFERENCES BETWEEN MODELS. (CONT)

RECEIVER-TRANSMITTERS RT-524(*)/VRC AND RT-246(*)/VRC



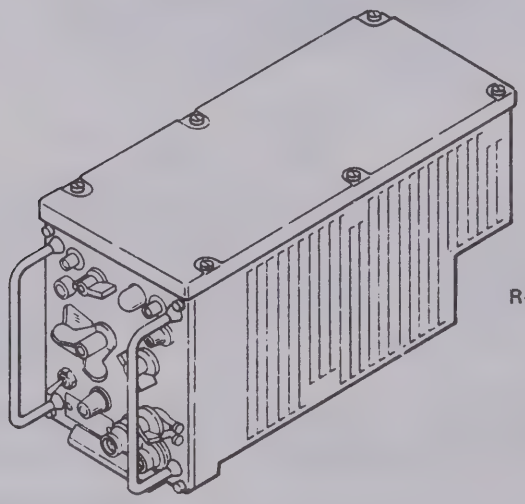
RECEIVER-TRANSMITTERS
RT-524/VRC AND RT-246/VRC

EL30A188

The RT-524(*)/VRC has a built-in loudspeaker and a speaker switch.

The RT-246(*)/VRC has pushbutton remote and tuning control capability. It does not have a built-in loudspeaker.

AUXILIARY RECEIVERS R-442/VRC AND R-442A/VRC



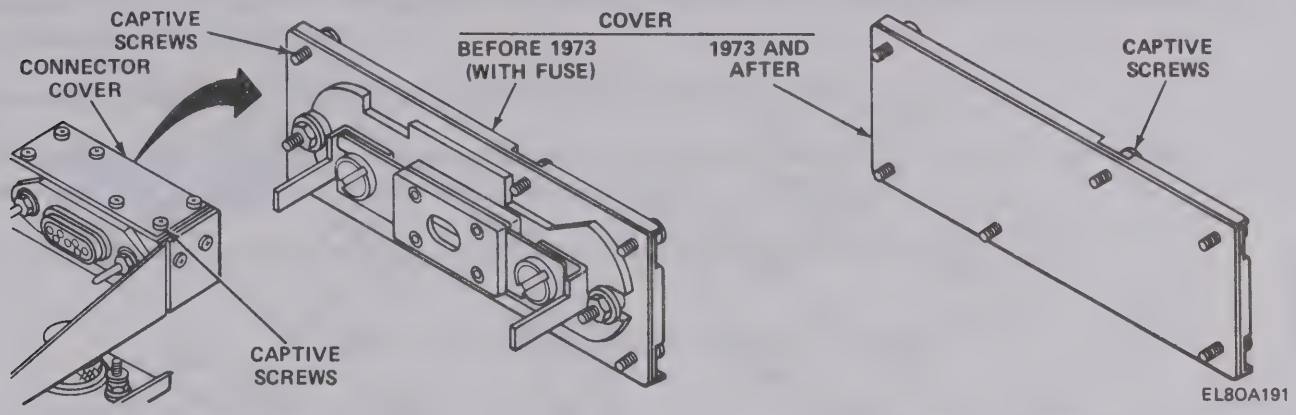
AUXILIARY RECEIVERS
R-442/VRC AND R-442A/VRC

EL80A190

All features of the R-442/VRC and the R-442A/VRC are the same except the R-442A/VRC has the same tuner voltage regulator as the RT-524A/VRC or the RT-246A/VRC.

1-23. DIFFERENCES BETWEEN MODELS. (CONT)

MOUNTS MT-1029/VRC AND MT-1898/VRC BEFORE 1973, AND 1973 AND AFTER



BEFORE 1973

J-box cover has a fuse.

In addition, the captive screws of the cover are the slotted type.

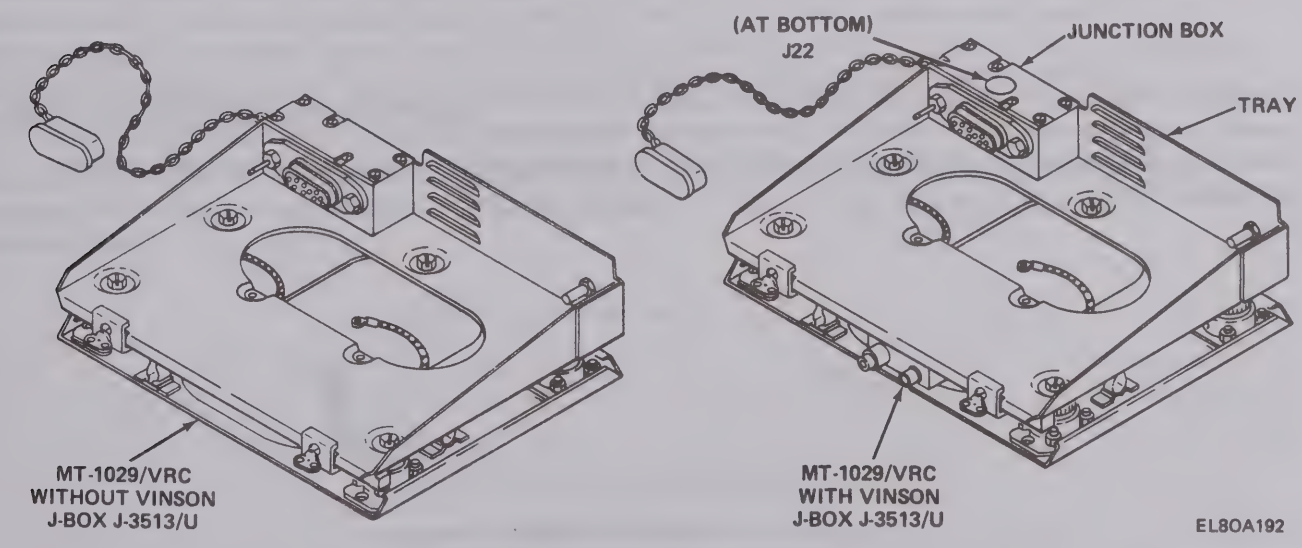
There are two grounding straps (in MT-1029/VRC only).

1973 AND AFTER

J-box cover has no fuse, and the captive screws are phillips type.

There is one grounding strap.

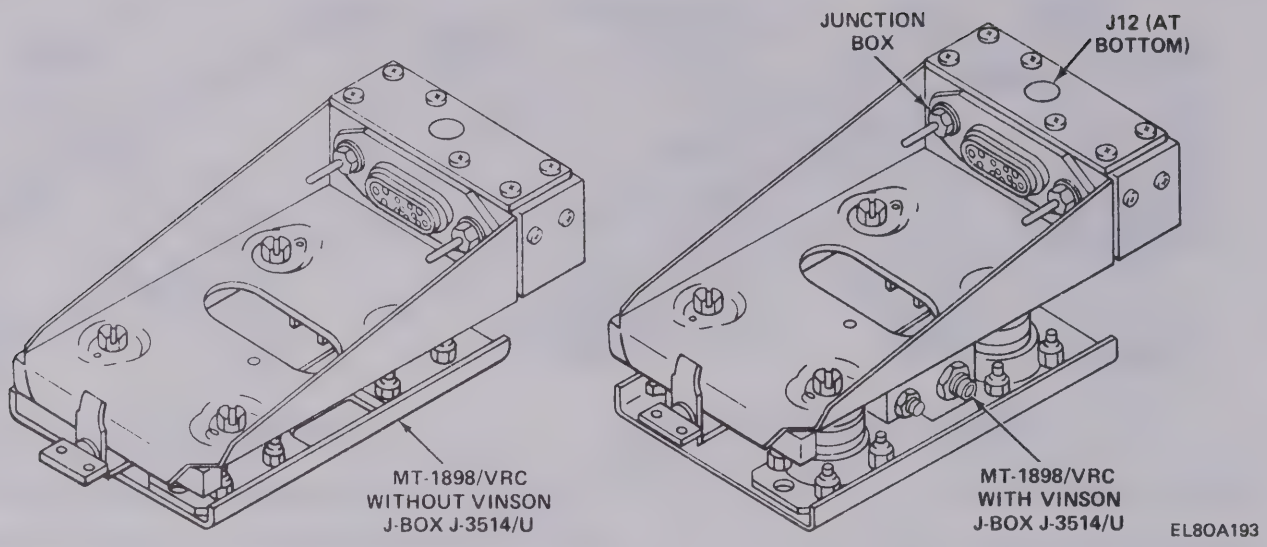
MOUNT MT-1029/VRC: WITH AND WITHOUT VINSON J-BOX J-3513/U (NO FUSE)



The Vinson J-Box J-3513/U is mounted on the shock absorbers, sandwiched between the base and the tray of the Mounting MT-1029/VRC. The Vinson plug (P1) connects with Mounting Jack J22.

1-23. DIFFERENCES BETWEEN MODELS. (CONT)

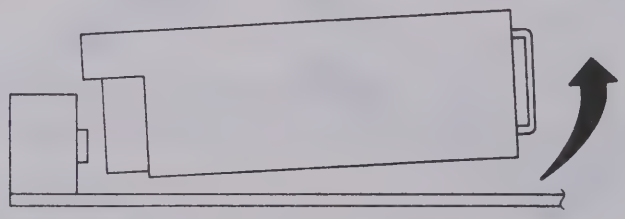
MOUNT MT-1898/VRC: WITH AND WITHOUT VINSON J-BOX J-3514/U



The Vinson J-Box J-3514 is mounted on the shock absorbers, sandwiched between the base and the tray of the Mounting MT-1898/VRC. The Vinson plug (P1) connects with the Mounting Jack J12. There is a no ground strap used with the Vinson J-Box. A wire is added between J14 Pin C and J12 Pin C inside the mount J-box. (For details, refer to TM 11-5810-312-12).

1-24. SAFETY, CARE, AND HANDLING.

Make sure the mount clamp assemblies are locked to hold the radio component securely in the radio mount while the vehicle is in motion. Do not set the receiver-transmitter on the rear of the unit. The blower assembly may be damaged by such things as stones, metal objects, and mud lying on the ground or floor.



DO NOT LIFT UP A RADIO COMPONENT TO INSTALL OR REMOVE IT FROM ITS MOUNTING

EL8OA277

1-24. SAFETY, CARE, AND HANDLING. (CONT)

When removing the receiver-transmitter or receiver from the RT mount, pull it straight out. Put the electrical connector cover on all exposed radio jacks of the mount to protect the jacks pin from the effects of weather and dirt.

Make sure radio-intercom system is turned off before starting vehicle.

When using radio equipment for prolonged periods of time (e.g. more than 15 minutes) make sure vehicle is running, or battery may become discharged.

Do not use radio components for steps and cables for steps or for handrails.

Section III PRINCIPLES OF OPERATION

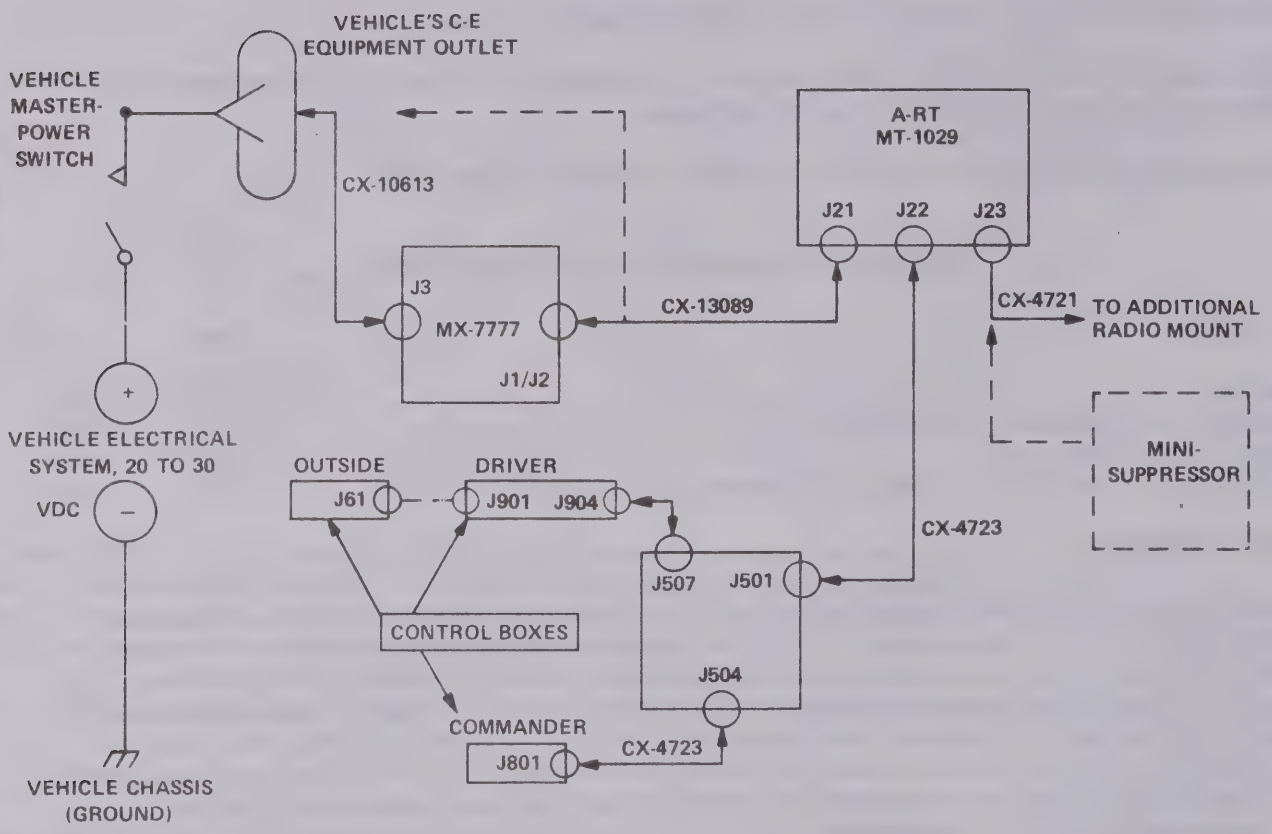
Subject	Para	Page
General	1-25	1-55
System DC Power Input and Distribution	1-26	1-56
Intercom Talk/Listen	1-27	1-62
Radio Set Interface Portion of the Radio-Intercom System	1-28	1-68

1-25. GENERAL.

This section covers the principles of operation of a tracked vehicle communications system, consisting of an AN/VIC-1 intercom set and a typical AN/VRC-12 series radio set. DC power is traced from its source to each component of this radio-intercom system. The INTERCOM KEYING and TALK voice paths are followed from the keying audio accessory, at the control box of an individual crew position, to the main junction box. Then, the INTERCOM LISTEN paths are followed from the main junction box to the control boxes monitoring audio accessories. RADIO INTERFACE with the intercom set, that is, keying, transmitting through, and monitoring of, each radio component from the individual crew position is also covered.

Refer to TM 11-5820-401-20-1 for the principles of operation of the RT and R-442 receive signal paths and the RT keying and loudspeaker muting, as well as the RT transmitted signal paths and the RT-246 servosystem.

1-26. SYSTEM DC POWER INPUT AND DISTRIBUTION.



EL8OA291

ELECTRICAL SYSTEM

A tracked vehicle's radio-intercom system requires an input operating voltage of 22 to 30 vdc. This voltage is normally provided by the vehicle's electrical system. A vehicle's electrical system consists of a charging system and a battery pack. The charging system produces a battery-charging voltage of 25.5 to 30 vdc when the engine is running. The battery pack consists of at least two 12-volt batteries connected in series. When more power is needed for the vehicle onboard equipment, the battery pack consists of four or six 12-volt batteries, connected in series-parallel.

SUPPRESSORS

Operating onboard equipment, such as gun-positioning and turret-turning drive motors, produce voltage spikes (transients) that are above the 22 to 30 vdc operating voltage. These spikes can damage the radio-intercom equipment. To protect equipment from voltage spikes, the radio-intercom system contains a suppressor. In tank-type vehicles, this suppressor is shunt-connected and called a minisuppressor. Other tracked vehicles use series-connected Suppressor MX-7777.

1-26. SYSTEM DC POWER INPUT AND DISTRIBUTION. (CONT)

INITIAL VOLTAGE DISTRIBUTION

The radio-intercom system's operating voltage is available at the vehicle's C-E equipment outlet jack, and its application is controlled by the vehicle's MASTER POWER switch. When an MX-7777 is used, Cable CX-10613 connects the operating voltage (22 to 30 vdc) to MX-7777 Jack J3. The MX-7777 then provides the following:

1. Voltage spike suppression.
2. Overload protection.
3. Main power on/off control.

The MX-7777 output jack (J1 or J2) connects operating voltage to the A-RT's Mount MT-1029 through Cable CX-13089.

When a minisuppressor is used, the C-E equipment outlet jack applies operating voltage directly to J21 of the A-RT's mount through CX-13089. The minisuppressor is connected to the mount's dc outlet jack. It provides voltage spike suppression, but not overload protection and main power on/off control.

A-RT MOUNT MT-1029

The A-RT's MT-1029 is the radio-intercom system's central interconnection point for the source voltage. The mount's jacks provide source voltage to other equipment in the following manner:

1. J22 applies 22 to 30 vdc to the AM-1780 at J501 through Cable CX-4723.
2. J23 applies 22 to 30 vdc to additional radio components through Cable CX-4721.
3. J24 applies 22 to 30 vdc to the A-RT.

The source voltage may be applied directly, from J21 to the A-RT through J24, or it may be remotely applied to the A-RT, from J22 to the AM-1780, back through J22 to the A-RT and then through J24.

When additional radio components are part of the system, source voltage may be applied to those components, directly or remotely, through J23 of the A-RT's mount.

MAIN JUNCTION BOX AM-1780/VRC

The AM-1780 serves as a main junction box for the interconnection of the intercom control boxes and the system's radio set. Switches on the AM-1780 control the application of source voltage to the jacks that lead to the control boxes and the reapplication of source voltage to the system's radio components when they are set up for remote operation.

CONTROL BOXES

The intercom control boxes are located at the individual crew positions and will permit the crew to access the intercom for intercommunications or the radio components for radio communications.

Each control box is connected to the AM-1780 by a CX-4723 cable or two CX-7060 cables. The commander's control box is always connected to J504 of the AM-1780. The other crewmember's control boxes are connected to J505, J506 and/or J507.

1-26. SYSTEM DC POWER INPUT AND DISTRIBUTION. (CONT)

CONTROL BOXES (CONT)

The commander and the crew generally use a C-2298 control box. In some tank-type vehicles, however, the driver's control box can be a C-2297. When this is the case, the C-2297 will be connected to the AM-1780 with CX-7060 cables and an outside control box (model C-2296) will be connected to the C-2297 with additional vehicle and intercom cables.

DC POWER INPUT AND DISTRIBUTION IN NONTANK VEHICLES

(Refer to FO-1.)

Initial Ground Application

The negative side of the dc power source is tied to ground at the vehicle's chassis. Therefore, ground is available at Pin B of the VEHICLE COMMO POWER BENDIX JACK. Ground is applied through Cable CX-10613 and connected in parallel to Pins C and D of MX-7777 Jack J3. Pins C and D are wired directly to Pin B of J1 and Pin B of J2. From Pin B of J2, ground is applied through Cable CX-13089 to Pin A of the A-RT mount's Jack J21.

Pin A of J21 is wired directly to Pin A of the mount's three other jacks and, through them, applies ground in the following manner:

1. At J22, Pin A makes ground available, through Cable CX-4723, to the AM-1780. Pin A of J501 applies this ground directly to the AM-1780's chassis.
2. At J23, Pin A makes ground available at the mount's dc power output. This ground is applied through a CX-4721 cable to Pin A of an additional radio component's mount.
3. At J24, Pin A makes ground available to the A-RT. Pin A of P401 applies this ground directly to the A-RT's chassis.

Initial Positive DC Voltage Distribution

The positive side of the dc power input source (22 to 30 vdc) is applied at Pin A of the VEHICLE COMMO POWER BENDIX JACK. The voltage is applied through Cable CX-10613 and connected in parallel to Pins A and B of MX-7777 Jack J3.

In the MX-7777B, the source voltage may take the following two paths:

1. Through CB1, the main power (ON/OFF) switch, and the suppressor to Pin A of J2 and J1. CB1 controls power to the radio-intercom system and provides overload protection to the vehicle's electrical system.
2. Through the BATTLE OVERRIDE switch to Pin A of J2 and J1. This switch is operated only in extreme emergencies. It allows the source voltage to bypass CB1 and the suppressor. When the BATTLE OVERRIDE switch is on, the MX-7777B does not provide overload and transient protection.

NOTE

The MX-7777B is the only MX-7777 model to feature the BATTLE OVERRIDE function.

The source voltage is applied through Cable CX-13089 to Pin B of J21 on the A-RT's mount. The 22 to 30 vdc is applied from Pin B of J21 through E21 (on the terminal board) and 100-amp Fuse F11 to E24 (on the terminal board).

1-26. SYSTEM DC POWER INPUT AND DISTRIBUTION. (CONT)

NOTE

E21 and F11 appear only in mounts produced before 1973. In mounts produced in 1973 and after, Pin B of J21 is wired directly to E24.

From E24, the source voltage is applied directly to Pin B of J22, J23 and J24.

Direct Input Power to Radio Components and Intercom

All AN/VRC-12 series radio sets have an A-RT, and the LINK position of its MT-1029 establishes how the A-RT gets its source voltage. When the LINK is in its DIRECT position (between E23 and E24), the (22 to 30 vdc) source voltage is applied from Pin B of J21 to Pin J of J24, and the A-RT can be operated as long as its own power switch is on; that is, it can be operated independently of the operating state of the intercom components.

When the A-RT is in its mount, P401 connects with J24. DC input power is applied to the A-RT in the following manner:

1. Pin B of J24 applies 22 to 30 vdc through Pin B of P401 to Contacts 4 and 5 of Power Control Relay K404.
2. Pin J of J24 applies 22 to 30 vdc through Pin J of P401 and Diode CR411 to Pin 7 of K404.

CR411 is a reverse-polarity-protect diode. It prevents K404 from energizing (turning on) if the source voltage polarity is reversed.

CAUTION

Source voltage polarity reversal is often caused by connecting the power cable leads to the wrong battery terminals. Reversed polarity will damage the mount.

When the polarity is correct and the A-RT's power switch is on (LOW or HIGH), the path from K404, Pin 2 to ground is completed. The relay energizes and stays energized until the A-RT's power switch is turned off.

When K404 energizes, Contact 6 meets Contact 4, applying source voltage to the following two paths:

1. Through a one-amp circuit breaker to the voltage regulator assembly and LIGHT Switch S101. When the LIGHT switch is set to ON, dc power is applied to the DIAL LAMP and the CALL lamp.
2. Through a 15-amp circuit breaker to the antenna frequency control circuit.

Additionally, energized Contact 3 meets Contact 5, sending 22 to 30 vdc through Pin C of P401 back into the mount. This A-RT controlled voltage is applied to the mount at Pin C of J24 from which it is wired directly to Pin C of J22 and J23.

J22 and J23 of the A-RT's mount provide a central distribution point for dc power to additional components of the radio set. Any components wired to Pin C of J22 or J23 can only be turned on when the A-RT is turned on (LOW or HIGH). Components wired to Pin B receive dc power independent of the A-RT.

1-26. SYSTEM DC POWER INPUT AND DISTRIBUTION. (CONT)

Direct Input Power to Radio Components and Intercom (Cont)

When an additional radio component is set up for direct operation, the component gets its power directly from the power source. Therefore, the additional component operates whether or not the A-RT is in its mount. The source voltage is applied from the A-RT's mount through CX-4721 to B-Receiver Mount MT-1898 (or C-RT Mount MT-1029). Pin B of J23 applies source voltage through the cable to Pin B of J11 (MT-1898) or J21 (MT-1029).

The ground path at Pin A of J11 is applied directly to J13 and J14. At J14 ground is applied through P201 to the R-442's chassis.

In its direct position, the B-Receiver mount's LINK is set between E13 and E14. Pin B of J11 applies 22 to 30 vdc through Fuse F11 to E14.

NOTE

F11 appears only in mounts produced before 1973. In mounts produced in 1973 and after, Pin B of J11 is wired directly to E14.

From E14, source voltage is applied through E13 to Pin C of J14. Pin C of J14 mates with Pin C of the R-442's P201. Inside the R-442, the input voltage is applied through Circuit Breaker (power switch) CB101, and reverse-polarity-protect Diode CR101, to the voltage regulator assembly and, when the R-442's LIGHT switch is set to ON, to the DIAL lamp and the CALL lamp.

Direct operating voltage is applied from Pin B of J22 (A-RT's MT-1029) through Cable CX-4723 to the AM-1780 at Pin B of J501. To establish direct input to the AM-1780, its MAIN POWER switch must be in INT ONLY. When the MAIN POWER switch is in INT ONLY, its upper and lower switch segments are in the center position. The operating voltage at Pin B of J501 is applied through the upper switch segment of CB501 and is available for distribution to the control boxes. CB501 provides overload protection to the system's dc power input circuit. To make operating voltage available for distribution, the POWER CKT BKR switch (CB501) must be set to ON. When the CB501 is ON, it applies operating voltage to the A250 interphone amplifier and to the AM-1780's POWER indicator lamp, causing the lamp to glow.

NOTE

To see the lamp glowing, turn the lamp lens collar counterclockwise.

The operating voltage is applied from Pin C of the AM-1780's control box jacks through CX-4723 (or CX-7060) cables to the control boxes at Pin C of J801 and J804. From here, operating voltage is applied to the A80 microphone amplifiers.

When it is set up for direct operation, the entire radio-intercom system can be shut down from **only** one point, the MX-7777 main power switch (CB1).

Remote Input Power to Radio Components and Intercom

When the radio intercom system is set up for remote operation, the A-RT may no longer operate independently of the intercom components. For the radio intercom system to be in remote, the following conditions must exist:

1. The links of all radio mounts must be in their REMOTE position (between E22 and E23, and E12 and E13).

1-26. SYSTEM DC POWER INPUT AND DISTRIBUTION. (CONT)

2. The AM-1780 MAIN POWER switch must be set to NORM.
3. The A-RT and AM-1780 must both be on.

When the A-RT's MT-1029 link is in the REMOTE position (between E22 and E23), 22 to 30 vdc is applied from the power source through the A-RT's mount to the AM-1780, back to the A-RT's mount and into the A-RT; then, from the A-RT to other radio components.

When the AM-1780 MAIN POWER switch is set to NORM, its two switch segments are in the upper position. DC input voltage enters the AM-1780 at Pin B of J501 from Pin B of J22, just as it did when the system was set up for direct operation. But because the lower switch segment is in the upper position, the voltage is applied from Pin B of J501 through the switch segment back to J501 at Pin D. Cable CX-4723 carries the voltage back to the A-RT's mount at Pin D of J22. The operating voltage passes through the link to Pin J of J24 and into the A-RT as described previously.

The A-RT controlled voltage from Pin C of J22 is applied through Cable CX-4723 to Pin C of J501. Now in the AM-1780, the voltage is applied through the upper segment of the MAIN POWER switch (NORM position) and through CB501 to the other intercom components as described previously. The A-RT controlled voltage from Pin C of J23 provides remote input power to additional radio components. When the B-Receiver's LINK is set between E12 and E13 (its REMOTE position), and the A-RT is in its mount and turned on, the A-RT controlled operating voltage is applied from J23 through a CX-4721 cable, Pin C of J11 to E12, and Pin C of J13. From E12, it is applied through the LINK, E13 and Pin C of J14 to Pin C of P201. The operating voltage is then applied to the R-442 as described previously.

In REMOTE, the entire radio-intercom system can be shut down by turning off any one of the following:

1. The MX-7777 main power switch (CB1).
2. The A-RT's POWER switch.
3. The AM-1780 MAIN POWER switch.

Normally, the radio-intercom system is set up for remote dc input power. This setup allows the commander to turn the system off from whichever power switch is closest to him.

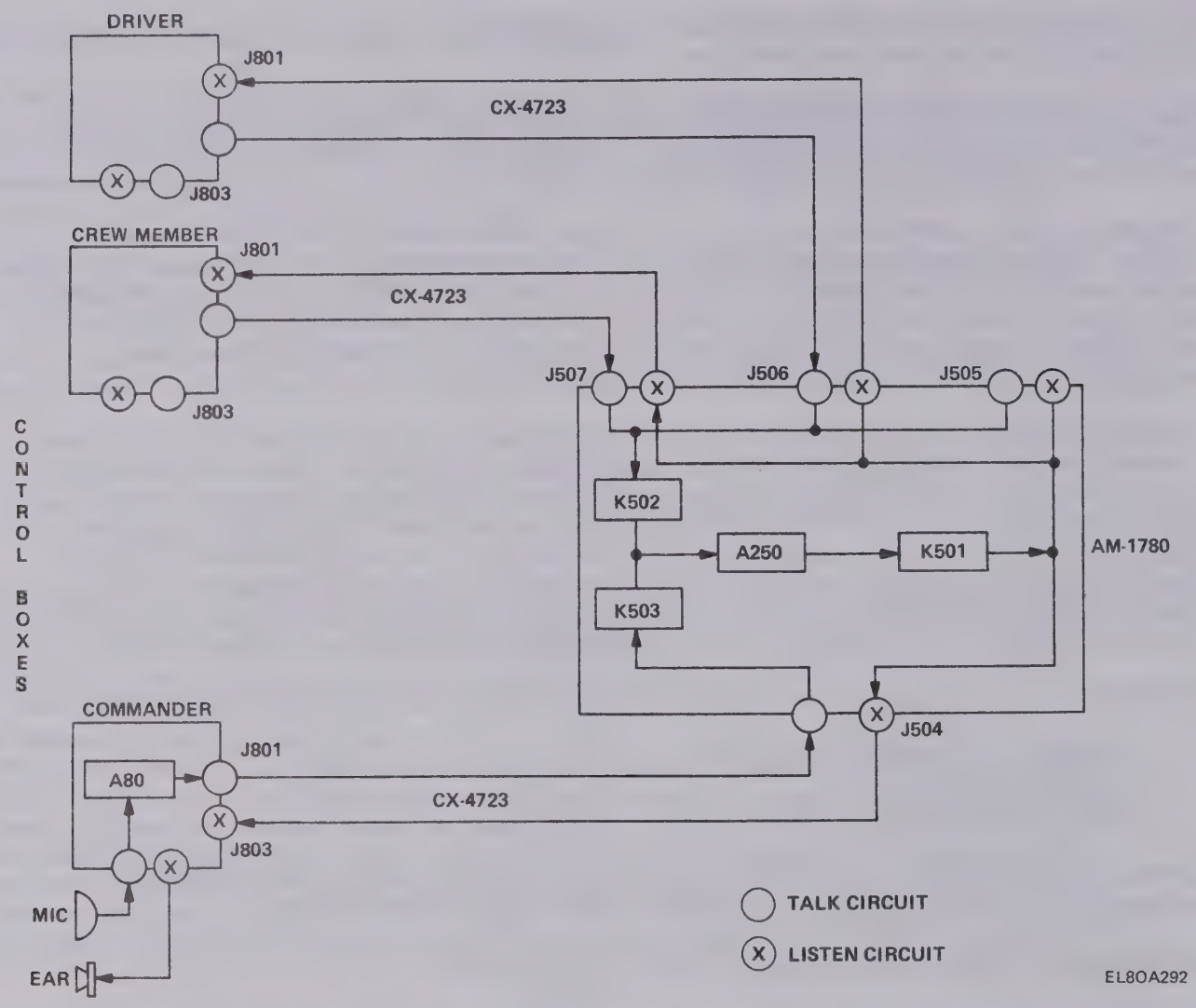
DC POWER INPUT AND DISTRIBUTION IN TANK-TYPE VEHICLES

(Refer to FO-2.) Instead of a series-connected transient suppressor, the tank-type vehicle uses a shunt-connected minisuppressor, which consists of a lamp in parallel with a fuse. The lamp and fuse are in series with a suppressor. The minisuppressor operates on voltage supplied through Pins A (ground) and B (22 to 30 vdc) of the dc outlet jack on the A-RT's or additional radio component's mount. It operates even when the A-RT, the radio components, and the AM-1780 are off. That is, it is hot all the time, except if the vehicle's C-E EQUIPMENT OUTLET is off.

In tank-type vehicles, the dc source voltage passes from the turret relay box through Cable CX-13089 directly to the A-RT mount at J21. Ground is available at Pin B of the turret relay box output jack, which is wired directly to the relay box's chassis. Ground is applied through Cable CX-13089 to Pin A of J21. The 22- to 30-vdc source voltage is applied from Pin A of the turret relay box output jack through Cable CX-13089 to Pin B of J21. From J21, dc source voltage follows the same path as described previously under DC Power Input and Distribution in Nontank Vehicles.

In most tanks, the driver is equipped with a C-2297 control box which is connected to an outside Control Box C-2296. The dc power distribution in this circuitry is closely related to its talk/listen function. Therefore, it will be covered under Intercom in Tank-Type Vehicles in paragraph 1-27.

1-27. INTERCOM TALK/LISTEN.



The heart of the radio-intercom system is the AM-1780. Within the AM-1780 are three relays: K501, K502, and K503. The key to whether or not a crewmember accesses the intercom or a radio is found in the functioning of these relays. K503 is called the **commander's talk relay.** Only the commander controls this relay. K502 is called the **crew talk relay.** All crewmembers, including the commander, control this relay. K501 is called the **listen relay.** All crewmembers control this relay, too.

For the commander to access the intercom, K501, K502 and K503 must be energized. For the commander to access an RT, K503 must be deenergized.

For the rest of the crew to access the intercom, K501 and K502 must be energized. For the rest of the crew to access an RT, K501 and K502 must be deenergized.

The commander may access an RT if other crewmembers are accessing the intercom. However, the rest of the crew cannot access an RT if any one crewmember including the commander, is accessing the intercom.

1-27. INTERCOM TALK/LISTEN. (CONT)

When the radio-intercom system is set up for intercom talk/listen, the appropriate relays are energized by closing the key switch of the audio accessory connected to the control box. This action is called keying the intercom and it allows a crewmember to talk over the intercom. The intercom talk circuit is from the audio accessory's microphone through the control box's A80 amplifier, the appropriate AM-1780 jack (J504 for the commander; J505, J506, and J507 for the rest of the crew), and the appropriate AM-1780 energized relay (K503 for the commander and K502 for the rest of the crew) to the AM-1780's Amplifier A250.

All crewmembers hear the intercom, including the crewmember who is talking over the intercom (intercom voice sidetone). The intercom listen circuit is from the A250 amplifier through energized Relay K501, the appropriate jack, and the control box to the earphones of the audio accessory or a loudspeaker.

INTERCOM IN NONTANK VEHICLES

Intercom Keying

(Refer to FO-3.) When the AM-1780 POWER CKT BKR switch (CB501) is set to ON, 22 to 30 vdc is applied to the three relays. In order for them to energize, however, the path to their ground (negative) side must be completed. This is accomplished through the key switch of the crewmember's audio accessory.

When the key switch of the audio accessory is connected to J803 of the C-2298, that crewmember can key the intercom only. This is true regardless of the position of the control box's MONITOR switch. An RT cannot be keyed from J803.

When the key switch of the audio accessory is connected to J802, a crewmember can key the intercom only when the MONITOR switch is in the INT ONLY position. (For when an RT is keyed from J802, see paragraph 1-28.)

The audio accessory's key switch is connected between Pins C and A of J803 or J802. When the commander keys his audio accessory from J803, ground is applied from Pin A, through the closed contacts of the keyed accessory and out Pin C. Ground is then applied to and exits the C-2298 at, Pin H of J801 (or J804). Cable CX-4723 connects the ground path through Pin H of the AM-1780's J504. In the AM-1780, ground is applied to K503, then passes through CR521 to K502 and K501. Ground completes each relay's circuit and causes each to energize. From J802, the circuit is the same, except that ground will pass through the MONITOR switch only when it is in the INT ONLY position.

The crewmembers energize only K502 and K501 when they access the intercom. The ground path from the keyed audio accessory of a crewmember's C-2298 is nearly the same as that from the commander's C-2298. However, the ground path is different in the AM-1780. The crewmember's control boxes are always connected to the AM-1780 at Jacks J505, J506 or J507. The commander's control box is always connected at J504. Diode CR521 will **not** let the ground from Pin H of J505, J506 or J507 be applied to K503. Therefore, ground is applied to K502 and K501 only, energizing them.

Intercom Talk and Intercom Listen

(Refer to FO-4.) The audio accessory's microphone element (key switch closed) is connected between Pins D and A of the control box's J802 or J803. When the mike is keyed, the talk signal is applied through Pin D of J802 or J803 to the A80. The A80 amplifies the talk signal and sends it through the upper segment of the MONITOR switch to J801 (or J804).

1-27. INTERCOM TALK/LISTEN. (CONT)

Intercom Talk

From the commander's control box, the intercom talk signal may take one of two paths through the MONITOR switch:

1. When the MONITOR switch is set to ALL, A, INT ONLY, or B, the signal passes through Pin K of J801 (or J804) and Cable CX-4723 to Pin K of J504. In the AM-1780, the signal passes through Contacts 2 and 5 of K503 (energized) to Interphone Amplifier A250.
2. When the MONITOR switch is set to C, the signal passes through the lowest contact of the MONITOR switch's upper segment to Pin V of J801 (or J804). Cable CX-4723 applies the signal to Pin V of J504. In the AM-1780, the signal passes through Contacts 6 and 1 of K503 (energized) to Interphone Amplifier A250.

The intercom talk signals from the rest of the crew follow the same path in the crew control box, except when their MONITOR switch is set to C. The crew has no intercom talk/listen function in the C-position. The circuitry in a crewmember's C-2298 is the same as that of the commander, but note that there is no Pin V input at AM-1780 Jacks J505, J506 and J507. When the MONITOR switch is set to A, ALL, INT ONLY, or B, the crewmember's talk signal passes from Pin K of these jacks, through Contacts 13 and 14 of K502 (energized), to Interphone Amplifier A250.

Intercom Listen

After the A250 amplifies the intercom talk (voice) signals, they enter the INTERCOM LISTEN circuit at Pin L of J504, J505, J506, and J507; and K501. When energized, the contacts of K501 mate, and the listen signals are sent to Pins B, E, and M of J504, J505, J506, and J507. With K501 energized, the listen signal is also applied to Pin J of J504. The listen signal passes through Cable CX-4723 to the matching pins of J801 (J804). From here, they provide listen circuits for the control boxes at the selected MONITOR switch positions (see table).

PIN	MATCHING MONITOR SWITCH POSITION
L	ALL
M	A
E	INT ONLY
B	B
J	C (commander only)

After passing through the MONITOR switch, the listen signal is adjusted by the VOLUME control resistor before passing through Pins B and E of J803 or J802 and into the earphones of the audio accessory (Pin B) or a speaker (Pin E).

1-27. INTERCOM TALK/LISTEN. (CONT)

INTERCOM IN TANK-TYPE VEHICLES

The radio-intercom system in tank-type vehicles is the same as that of nontank vehicles, except in those tank-type vehicles whose driver's control box is a C-2297 instead of a C-2298. When this is the case, there is also an outside control box, C-2296, connected to the C-2297. The intercom keying and intercom talk/listen principles of operation are otherwise the same in both tank-type and nontank vehicles. Therefore, this section covers only intercom talk/listen, using Control Boxes C-2297 and C-2296. The explanation of dc power distribution in these control boxes is also covered here, instead of in paragraph 1-26.

(Refer to FO-5.) Control Box C-2296 allows personnel outside the vehicle to talk/listen with personnel inside the vehicle (intercom) or access an RT. The C-2297's SIG/EXT/OFF (external) switch controls the connection of the C-2296 to the driver's control box commo circuits.

DC Power

Ground is applied to Pin A of C-2297 Jack J904, and operating voltage (22 to 30 vdc) to Pin C of J904 through the following connections:

1. Cable CX-7060 (AM-1780).
2. Pins N (ground) and E (operating voltage) of the TURRET BENDIX CONNECTOR.
3. SLIPRING assembly.
4. Pins N (ground) and E (operating voltage) of the HULL BENDIX CONNECTOR.
5. Cable CX-7060 (C-2297).

From Pin A of J904, ground is applied to the C-2297's chassis. From here it goes out Pin A of J901, through a CX-7057 cable, to Pin N of the DRIVER BENDIX CONNECTOR, through the vehicle hull wiring to Pin N of the OUTSIDE BENDIX CONNECTOR. From here, ground is applied through Cable CX-7056 and Pin A of C-2296 Jack J61, to the C-2296's chassis.

From Pin C of J904, operating voltage (22 to 30 vdc) is applied to Amplifier A80 (Pin 3) and to one side of the signaling/external lamp.

Assume that the C-2297's external switch is set to OFF. The three switch segment contacts are in their lowest position, so the commo lines leading to C-2296 are open. If an outside person wishes to enter the circuitry, he must signal the driver from the C-2296.

The C-2296 consists of the following:

1. A Handset H-207.
2. A RAD TRANS/INT switch, which is spring-held in the INT position.
3. A lamp, connected to the C-2296 by Cable CX-7621.

1-27. INTERCOM TALK/LISTEN. (CONT)

Outside Person's Signaling Path

To signal the driver, the outside person presses the key switch of the H-207. When the key switch is pressed (closed), both the C-2296 lamp and the C-2297 lamp light. When the key switch is released (opened), the lamps go off.

When closed, the key switch connects the signaling ground to TB61, Terminal 4. Terminal 4 applies the ground through Pin A of J62 to the C-2296's lamp. The signaling path continues through the lamp, leaving the C-2296 at Pin B of J61. The C-2296 signaling path passes through a CX-7056 cable, Pin K of the OUTSIDE BENDIX CONNECTOR, the hull wiring, Pin K of the DRIVER BENDIX CONNECTOR, and Cable CX-7057 to Pin B of the C-2297's Jack J901. The signaling path continues through the upper segment of the external switch (which is in the OFF position) to the C-2297's lamp. When closed, the H-207 key switch places the two lamps in series and both light.

Driver's Signaling Path

If the driver wants the outside person's attention, he sets the external switch to SIG. The SIG position of the switch is spring-loaded. (When the driver releases the switch it returns to EXT.) The SIG position is the upper setting of the three switch segments.

The driver's signaling path starts at the C-2297's common ground (chassis ground). It passes through the center switch segment and out Pin D of J901. The signaling path passes through Cable CX-7057. Pin D of the DRIVER BENDIX CONNECTOR, the hull wiring, Pin D of the OUTSIDE BENDIX CONNECTOR, and Cable CX-7056 to Pin D of the C-2296's J61. The signaling path is applied through the RAD TRANS/INT switch (spring-held in INT position) to Pin A of J62 where it is applied to the C-2296's lamp. The signaling path then returns through Pin B of J62 to the C-2297 lamp as described previously. Again both lamps light.

OUTSIDE ACCESS TO INTERCOM TALK/LISTEN

The outside person can gain access to the intercom (or RT) when the driver sets the C-2297 external switch to EXT. This places the contacts of the C-2297's three switch segments in the center position. When the switch is in EXT, the C-2296 lamp is off, but the C-2297 lamp stays on. The EXT lamp circuit is from the C-2297's chassis ground, through the resistor and the upper switch segment to the C-2297 lamp. The lower segment completes the operating voltage (22 to 30 vdc) circuit to the C-2296 A80 amplifier. The operating voltage path is from Pin B of the C-2297's A80, through the center position of the external switch's lower segment to Pin C of J901, through Cable CX-7057 to Pin C of the DRIVER BENDIX CONNECTOR, through the hull wiring to Pin C of the OUTSIDE BENDIX CONNECTOR, through Cable CX-7056 to Pin C of J61 and to pin B of the C-2296's A80 amplifier.

Intercom Keying from the C-2296

For the outside person to key the intercom, the following three conditions must exist:

1. The C-2297 external switch is in EXT.
2. The C-2296 RAD TRANS/INT switch is in INT (spring-held).
3. The H-207 key switch is keyed (closed).

1-27. INTERCOM TALK/LISTEN. (CONT)

(Refer to FO-6.) Keying completes the connection of chassis ground at Pin 1 of TB61 through the key switch (closed) of the H-207 to Pin 4 of TB61. The keying ground is applied through the RAD TRANS/INT switch, (INT position) out Pin D of J61, through Cable CX-7056, Pin D of the OUTSIDE BENDIX CONNECTOR, the vehicle's hull wiring, Pin D of the DRIVER BENDIX CONNECTOR, and Cable CX-7057. It is applied to the C-2297 at Pin D of J901, and through the center position of the switch segment, exiting the C-2297 at Pin H of J904.

From here, the keying ground is applied to Pin H of J507 (or J506 or J505), through Cable CX-7060, Pin M of the HULL BENDIX CONNECTOR, the SLIPRING assembly, Pin M of the TURRET BENDIX CONNECTOR and another CX-7060 cable.

Pin H of J507 applies the keying ground to K501 and K502, energizing them. CR521 prevents K503 (commander's talk relay) from being energized.

Intercom Talk/Listen from the C-2296

For the outside person to talk on the intercom, the following four conditions must exist:

1. The C-2297 external switch is in EXT.
2. The C-2297 MONITOR switch is in ALL, A, INT ONLY, or B (not C).
3. The H-207 is keyed.
4. The AM-1780's K501 and K502 are energized.

(Refer to FO-7.)

Intercom Talk Signal. Keying completes the connection of chassis ground at Pin 1 of TB61 through the mike element and Pin 3 of TB61 to the A80 amplifier. The A80 amplifies the microphone talk signal and sends it out to Pin K of J61.

The talk signal is applied to Pin K of J901 through Cable CX-7056, Pin B of the OUTSIDE BENDIX CONNECTOR, the hull wiring, Pin B of the DRIVER BENDIX CONNECTOR and Cable CX-7057. It is applied through the upper segment of the C-2297 external switch and the monitor switch contact (lower segment) to Pin K of J904.

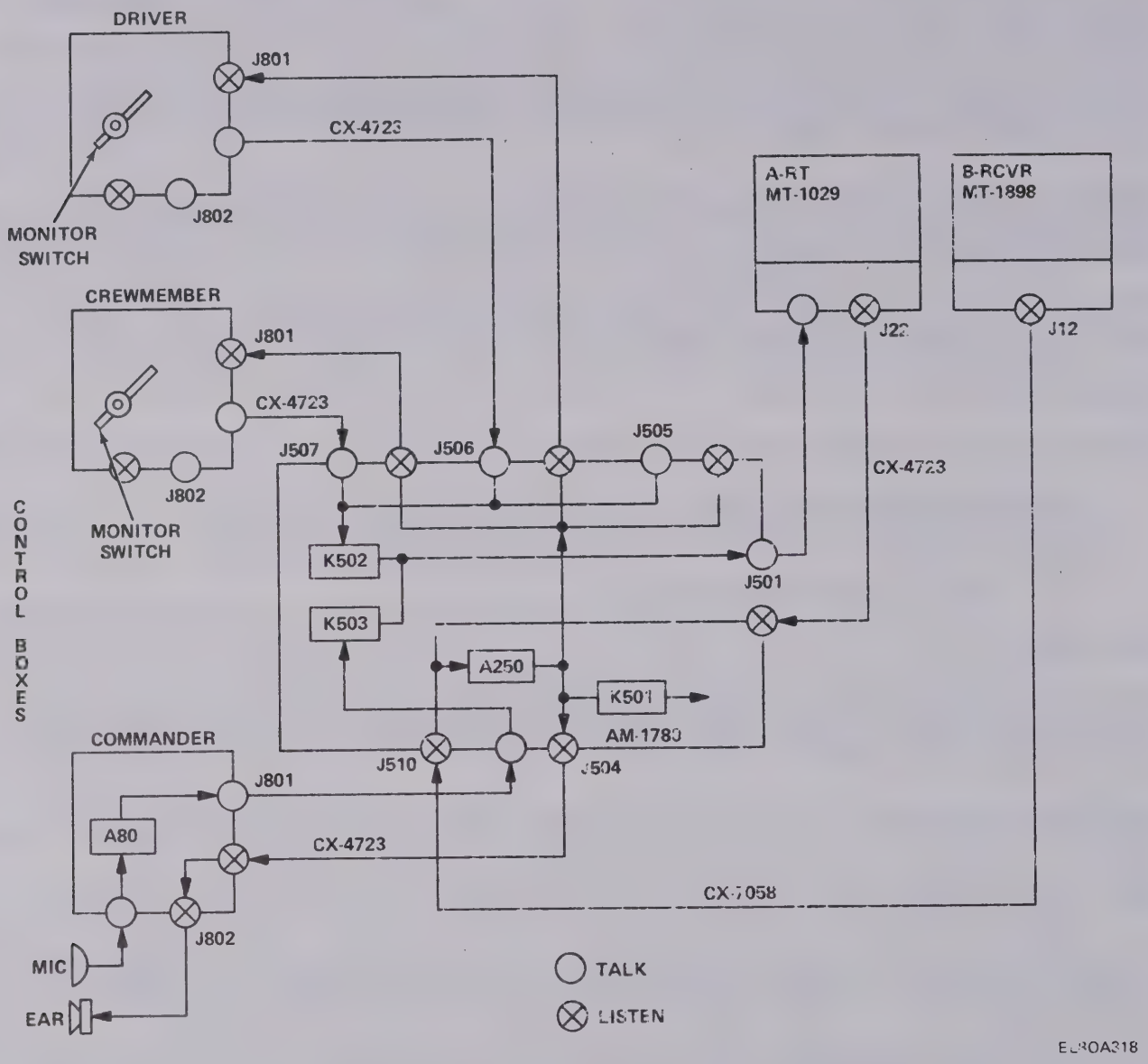
Pin K of J904 passes the talk signal to Pin K of J507 through Cable CX-7060, Pin F of the HULL BENDIX CONNECTOR, the SLIPRING assembly, Pin F of the TURRET BENDIX CONNECTOR and another CX-7060 cable.

From Pin K of J507, the talk signal is applied through Pins 13 and 14 of K502 (energized) to Interphone Amplifier A250.

Intercom Listen Signal. The listen signal is applied from the A250 to pin L of J507 and through the contacts of Relay K501 (energized) to Pins B, E, and M of J507. It is applied to Pins B, E, M and L of J904 through Cable CX-7060; Pins J, G, A and B of the TURRET BENDIX CONNECTOR; the SLIPRING assembly; Pins J, G, A and B of the HULL BENDIX CONNECTOR; and another Cable CX-7060.

The listen signal passes from J904 Pin B, E, M or L through the matching pin of the C-2297 MONITOR switch (upper segment) and the lower segment of the external switch to Pin J of J901. It enters the C-2296 at Pin J of J61 after passing through Cable CX-7057, Pin A of the DRIVER BENDIX CONNECTOR, the hull wiring, Pin A of the OUTSIDE BENDIX CONNECTOR and Cable CX-7056. The listen signal is adjusted by the VOLUME control resistor, before being applied through Pin 5 of TB61 to the earphone element of the H-207.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM.



The AM-1780's relays, as explained in paragraph 1-27, establish the selection of monitoring (listen) signals and the routing of voice (talk) signals in the radio-intercom system. When energized, they route voice signals for intercom distribution. When deenergized, they route voice signals to an RT.

The monitor (receive) signals from an RT and a receiver are applied through their mount to the AM-1780. The AM-1780 applies both an amplified version (muted) and an unamplified version (unmuted) of each radio component's monitor signal to the control boxes, which then applies them to the audio accessory (phone or speaker).

Voice signals from the keyed audio accessory's microphone are applied through the control boxes to the AM-1780 which routes them to the appropriate RT when the AM-1780 relays (K502; K503) are deenergized.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

The radio component to be monitored or used for transmission is selected by the setting of the control box MONITOR switch.

FIXED AUDIO (MUTED) MONITORING (ALL) CIRCUIT IN NONTANK VEHICLES

For crewmembers (including the commander) to monitor all radio and intercom components at the same time, the equipment controls must be set to the following positions:

1. The control box MONITOR switch to ALL or the intercom keyed.
2. The AM-1780:
   a. MAIN POWER switch to NORM.
   b. POWER CKT BKR to ON.
   c. INSTALLATION SWITCH to RETRANS (for the AN/VRC-45 and AN/VRC-49 configurations) or OTHER (for other configurations).

Additionally, the radio components must be on and producing a received signal.

NOTE

When the radio's audio output is FIXED level (muted audio) its VOLUME control has no effect. Only the **control box** VOLUME control can change the level of the monitoring signal.

A-RT Fixed Audio (Muted) Monitoring

(Refer to FO-8.) The A-RT's received audio from Audio Filter FL5001 is applied through Monitor Amplifier A5100 to Pin K of P401. Pin K of P401 mates with Pin K of J24. The MONITOR OUT circuit passes the fixed audio (muted) signal out of the mount at Pin K of J22. It is applied through Cable CX-4723 to the AM-1780 at Pin K of J501.

NOTE

In the radio-intercom system, the A-RT is always connected to the AM-1780 at J501.

The fixed audio signal is applied through the AM-1780's isolation network to the INT ACCENT switch. When the INT ACCENT switch is set to OFF, the signal passes directly to and through the A250 amplifier to Pin L of Jacks J504, J505, J506 and J507, which apply it through Cable CX-4723 to the crewmember's C-2298 at Pin L of J801 (J804). In the C-2298, the signal is applied through the ALL position of the MONITOR switch, adjusted by the VOLUME controls resistor and sent to the audio accessory via Pin E (speaker) or Pin B (earphone) of J802 or J803.

Fixed Audio Monitoring from Other Radio Components

C-RT. (Refer to FO-9.) The C-RT fixed audio (muted) signal path is nearly the same as that of the A-RT, except that the C-RT is always connected to the AM-1780 at Jack J503.

B-Receiver. (Refer to FO-10.) The B-Receiver fixed audio (muted) signal path is also nearly the same as that of the A-RT, except that the B-Receiver is always connected to J510 with a CX-7058 cable.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

C-Receiver. (Refer to FO-11.) The C-Receiver is always connected to J508, and its MONITOR OUT (muted) signal passes from Pin K of its mount's Jack J12, through Cable CX-7616, to Pin C (not K) of J508. Otherwise, the C-Receiver's fixed audio (muted) signal path is nearly the same as that of the A-RT.

NONFIXED AUDIO (UNMUTED) MONITORING (A, B and C) CIRCUITS IN NONTANK VEHICLES

For crewmembers (including the commander) to monitor a specific radio, the following conditions must exist:

1. The control box MONITOR switch is set to the unmuted audio circuit to be monitored.

RADIO COMPONENT TO BE MONITORED	MATCHING MONITOR SWITCH SETTING
A-RT	A
B-Receiver	B
C-RT or C-Receiver	C

2. The radio component to be mounted is on and producing a received signal.

NOTE

The AM-1780 does not have to be turned on.

3. The VOLUME controls of both the radio component and the control box establish an audio listening level. That is, if either VOLUME control is off, there will be no audio output (heard).
4. The intercom is not keyed.

A-RT Nonfixed Audio (Unmuted) Monitoring

(Refer to FO-8.) The A-RT's unmuted received audio signal from Audio Filter FL5001 is adjusted by the VOLUME control resistor, and applied through T5001 and Pin B of the SPKR jack, leaving the A-RT at Pin S of P401. Pin S of P401 mates with Pin S of the mount's J24, which is wired to Pin H (PHONE OUT) of J22. J22 passes the signal from the mount, through Cable CX-4723, into the AM-1780 at Pin H of J501. The audio signal (PHONE IN) is applied through the deenergized contacts (9 and 10) of Relay K501 to Pin M of J504, J505, J506 and J507. It then passes through Cable CX-4723, Pin M of control box jack, J801 (J804), and the MONITOR switch (A position). After adjustment by the control box's VOLUME control, the unmuted audio signal is applied to the audio accessories through Pins B (earphone) or E (speaker) of J802 or J803.

Nonfixed Audio (Unmuted) Monitoring from Other Radio Components

C-RT. (Refer to FO-9.) The C-RT nonfixed audio (unmuted) signal path is nearly the same as that of the A-RT. The differences are as follows:

1. The C-RT is always connected to the AM-1780 at J503.
2. Pin H of J503 applies the unmuted audio (PHONE IN) signal directly to Pin J of J505, J506, and J507 and through Contacts 15 and 16 of deenergized Relay K501 to Pin J of J504.
3. The signal enters each control box at Pin J of J801 (J804).
4. The control box MONITOR switch is in its C position.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

B-Receiver. (Refer to FO-10.) The B-Receiver nonfixed audio (unmuted) signal path is nearly the same as that of the A-RT, with the following exceptions:

1. The B-Receiver is always connected by a CX-7058 cable to the AM-1780 at J510.
2. Pin H of J510 applies the unmuted audio (PHONE IN) signal through Contacts 12 and 13 of deenergized Relay K501 to Pin B of the jacks leading to the control boxes.
3. The signal enters each control box at Pin B of J801 (J804).
4. The control box MONITOR switch is in its B position.

C-Receiver. (Refer to FO-11.) The C-Receiver nonfixed audio (unmuted) signal path is nearly the same as that of the C-RT, except that the C-Receiver is always connected by a CX-7616 cable to J508. Pin D of J508 applies the unmuted signal to the rest of the PHONE IN circuitry.

NOTE

If someone keys the intercom while a radio received signal is being monitored, K501 will energize and Pins M (A-RT) and B (B-RCVR) of the jacks leading from the AM-1780 to the control boxes and Pin J of J504 will be connected to the output of A250 (Pin L of J504-J507). The listener will then hear a fixed (muted) audio signal, regardless of the position of the control boxes MONITOR switch.

INTERCOM ACCENT CIRCUITS

(Refer to FO-8.) All radio fixed level monitoring (muted) signals applied to the AM-1780 come together at the INT ACCENT switch. If the INT ACCENT switch is set to OFF, the fixed level radio signals are at the same volume as the intercom talk input signals. This can confuse the listener. It is more advantageous to make intercom signals louder than other monitoring signals. This can be accomplished through the AM-1780's INTERCOM ACCENT function.

To establish intercom accent, the AM-1780's INT ACCENT switch must be set to ON. With the INT ACCENT switch at ON and the intercom keyed (paragraph 1-27), K502 is energized. With K502 energized, all radio fixed-level monitoring signals are applied to Interphone Amplifier A250 through a 24 k ohm resistor. This resistor drops all radio signal levels drastically (muting). Therefore, the intercom talk signal, which is not attenuated (decreased) by a resistor, is louder.

When the intercom is not keyed, K502 is deenergized, and the radio fixed-level monitoring signals are not attenuated because there is no intercom signal to interfere with them. When the INT ACCENT switch is set to ON and there is no intercom talk signal, the fixed- level audio signal is applied through deenergized Relay K502 Pins 19 and 18 to A250 amplifier. That is, it takes the path of least resistance, bypassing the 24 K resistor. There is no reduction in sound.

When the INT ACCENT switch is set to OFF, the radio fixed-level audio signals are applied from the isolation circuit, through S503 (OFF position), directly to the A250 amplifier. The signal is not attenuated (muted) even if the intercom is keyed.

A-RT AND C-RT KEYING AND MODULATION CIRCUITS (SIMPLEX MODE) IN NONTANK VEHICLES

NOTE

When the radio-intercom system is operating in simplex mode, signals may be transmitted or received, but not at the same time (push to talk; release to listen).

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

The following conditions enable a crewmember to transmit through an A-RT or C-RT in simplex mode:

1. The RT is keyed.
2. Both the RT and the AM-1780 are on.
3. The audio accessory used for keying must be attached to control box Jack J802.
4. To key an A-RT, the control box MONITOR switch is set to A or ALL, To key a C-RT, it is set to C.
5. For the commander to key the RT, the AM-1780 RAD TRANS switch is set to CDR ONLY or CDR + CREW. For the crew to key the RT, it is set to CDR + CREW.
6. The AM-1780 INSTALLATION switch is set to RETRANS for AN/VRC-45 or AN/VRC-49, and in OTHER for all other configurations.

A-RT. (Refer to FO-12.)

RT Keying. Ground (RT keying path) is applied through Pin A of J802 through the closed contacts of the keyed audio accessory push-to-talk switch, Pin C of J802, and the MONITOR switch in the ALL, A, or B position to Pin D of J801. It is applied through Cable CX-4723 to Pin D of the AM-1780's control box input jack. The keying signal is then applied through either Pin 1 or Pin 2 of the RADIO TRANS switch and through the INSTALLATION switch (Pin 2 to Pin 3) to Pin S of J501; through Cable CX-4723 into the A-RT's mount at Pin S (RT REMOTE KEYING IN) of J22. The signal enters the A-RT at Pin H of P401 which is mated to Pin H of J24. From here the RT keying ground is applied to the keying relays of the A-RT.

RT Voice Modulation Path. Ground is applied through Pin A of J802 through the closed contacts of the key switch to the mike, activating the voice modulation signal. The voice path is through Pin D of J802, the A80 amplifier, the MONITOR switch (All, A, or B position), Pin K of J801 (J804), and Cable CX-4723 to Pin D of the AM-1780's control box input jack. The voice signal is then applied through the deenergized contacts of K503 (commander) or K502 (crew), Pin U of J501, Cable CX-4723, Pin U of the mount's J22 (REMOTE MIC IN) and Pin N of J24, entering the A-RT at Pin N of P401.

C-RT. (Refer to FO-13.)

RT Keying. The keying ground path to the C-RT passes through the control box MONITOR switch in its C position (to Pin F of J801 (J804). From Pin F of J801, the keying ground is applied through the CX-4723 cable to Pin F of the AM-1780's control box input jacks. It is then applied through Pin 5 or 6 of the RADIO TRANS switch and through the INSTALLATION switch (Pin 5 to Pin 7) to Pin S of J503. From here, the keying ground signal is applied to the C-RT in the same manner as described for the A-RT.

RT Voice Modulation Path. The voice modulation signal is applied to the C-RT in nearly the same manner as described for the A-RT, except that it leaves the control box at Pin V of J801 (J804), enters the AM-1780 at Pin V of the control box input jacks, and exits the AM-1780 at Jack J503, Pin U.

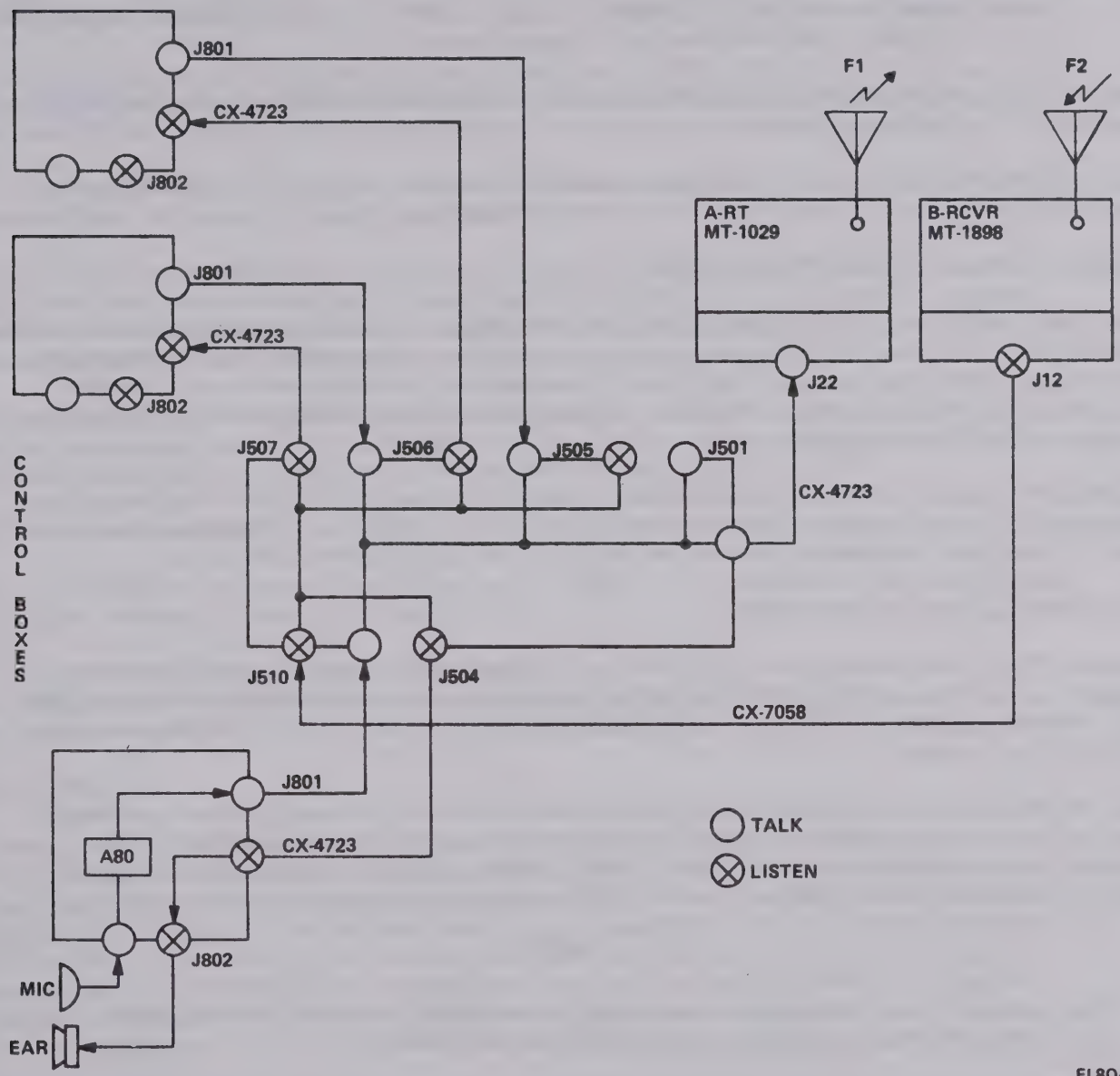
A-RT AND C-RT MODULATION/SIDETONE CIRCUITS (SIMPLEX)

Except when the control box MONITOR switch is at B, RT voice sidetone to crewmembers' earphones is provided through the monitoring circuits described on pages 1-69 and 1-70.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

RADIO DUPLEX CIRCUITS

When Radio Set AN/VRC-12, -44, -47, or -48 is installed with an Intercommunication Set AN/VIC-1, radio duplex capabilities will be provided.



Radio duplex allows a crewmember to transmit and receive at the same time over a radio link (like using a telephone). On a push-to-talk basis, the A-RT operates as a transmitter only on one frequency (F1); whereas, the B-Receiver operates as a continuous receiver on another frequency (F2).

(Refer to FO-14.) The radio duplex system is a radio set consisting of an A-RT and a B-Receiver. To establish a duplex mode, the following conditions must exist:

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

1. The A-RT and B-Receiver are set to different frequencies and turned on.
2. The control box MONITOR switch is set to B.
3. The audio accessory that has the key switch is connected to J802.
4. The AM-1780:
   a. INSTALLATION switch is set to OTHER.
   b. RADIO TRANS switch is set to CDR ONLY or CDR + CREW for the commander to access the A-RT, or to CDR + CREW for the crew to access the A-RT.

The A-RT keying and voice modulation paths are the same as described previously on page 1-72, RT Keying and RT Voice Modulation Path.

The B-Receiver monitoring path is the same as described previously on page 1-70, Nonfixed Audio (Unmuted) Monitoring from Other Radio Components, B-Receiver.

RADIO INTERFACE IN TANK-TYPE VEHICLES

Radio interface in tank-type vehicles, like their intercom talk/listen, is nearly the same as in nontank vehicles, except in those tank-type vehicles equipped with driver's Control Box C-2297 and outside Control Box C-2296. (See paragraph 1-27.) Even in these vehicles, the radio interface is otherwise the same as in nontank vehicles. This section will, therefore, limit its coverage to the radio interface circuitry in the C-2297 and C-2296.

The MONITOR switch settings of the C-2297 are the same as those of the C-2298. In fact, except for its connection to the C-2296, the C-2297 functions just like the C-2298. The C-2296 has no monitor switch. The signal it receives depends on the position of the C-2297's MONITOR switch.

A-RT Fixed Audio (Muted) Monitoring

(Refer to FO-15.) After passing through the AM-1780's A250 amplifier, the A-RT muted monitoring signal is applied through Pin L of J507, a CX-7060 cable, Pin B of the TURRET BENDIX CONNECTOR, the SLIPRING assembly, Pin B of the HULL BENDIX CONNECTOR, and another CX-7060 cable, to the C-2297 at Pin L of J904.

The A-RT muted monitoring signal passes through the C-2297 MONITOR switch, which is in the ALL position, and the external switch (S901) to Pin J of J901. From here, it is applied to the C-2296 through Cable CX-7057, Pin A of the DRIVER BENDIX CONNECTOR, the hull wiring, Pin A of the OUTSIDE BENDIX CONNECTOR, and Cable CX-7056, entering the control box at Pin J of J61.

NOTE

Pin J is always the listen signal connecting pin for the C-2296. The actual listen signal is governed by the position of the driver's (C-2297's) MONITOR switch.

The monitor signal level is adjusted by the VOLUME control resistor before being applied through Pin 5 of TB61 to the H-207 earphone.

B-Receiver Fixed Audio (Muted) Monitoring

(Refer to FO-16.) After passing through the AM-1780's A250 amplifier, the B-Receiver fixed audio (muted) monitoring signal follows the same path as that just described for the A-RT; that is, the signal passes through the ALL position of the C-2297's MONITOR switch.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

A-RT Nonfixed Audio (Unmuted) Monitoring

(Refer to FO-15.) The A-RT nonfixed audio (unmuted) monitoring (PHONE IN) signal is applied from Pin M of the AM-1780's J507 to Pin M of the C-2297's J904 through a CX-7060 cable, Pin A of the TURRET BENDIX CONNECTOR, the SLIPRING assembly, Pin A of the HULL BENDIX CONNECTOR and another CX-7060 cable.

The nonfixed audio (unmuted) signal is applied through the C-2297's MONITOR switch (in the A position), the external switch to Pin J of J901. From here, the audio monitoring signal follows the same path (to the C-2296's H-207) described under A-RT Fixed Audio (Muted) Monitoring, page 1-74.

B-Receiver Nonfixed Audio (Unmuted) Monitoring

(Refer to FO-16.) The B-Receiver nonfixed audio (unmuted) monitoring (PHONE IN) signal is applied from Pin B of the AM-1780's J507 through a CX-7060 cable, Pin J of the TURRET BENDIX CONNECTOR, the SLIPRING assembly, Pin J of the HULL BENDIX CONNECTOR and another CX-7060 cable to Pin B of the C-2297's J904.

The nonfixed audio (unmuted) signal is applied through the C-2297's MONITOR switch (in the B position), the external switch, to Pin J of J901. From here, the audio monitoring signal follows the same path described under A-RT Fixed Audio (Muted) Monitoring, page 1-74.

A-RT Keying and Modulation

For an outside person to transmit through the vehicle's A-RT, the six conditions described on page 1-71 and the following conditions must exist:

1. The driver's (C-2297's) MONITOR switch is set to ALL or A.
2. The C-2296 RAD TRANS/INT switch is held in RAD TRANS.
3. The H-207 is keyed.

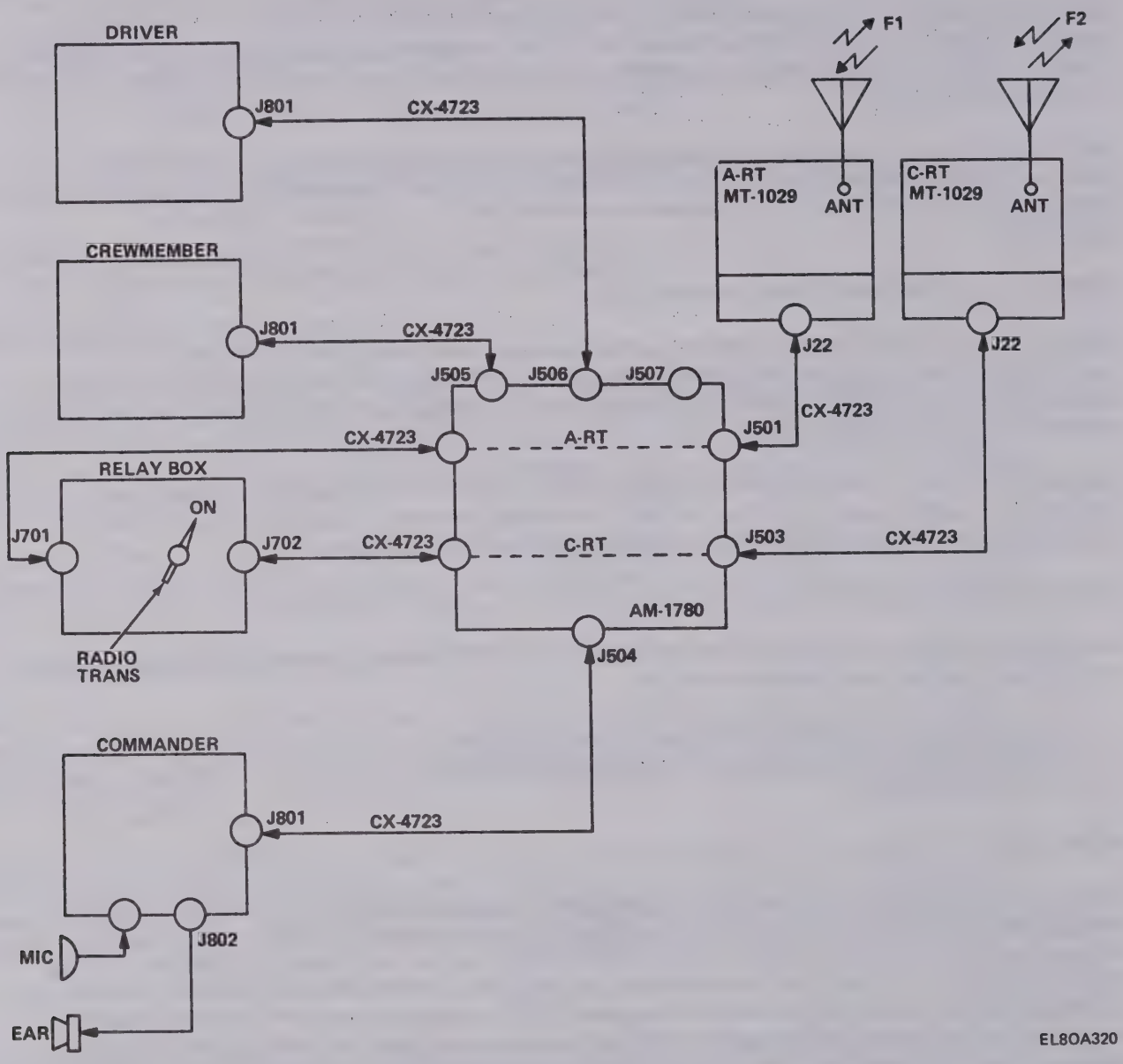
(Refer to FO-17.)

RT Keying. When the H-207 key switch is closed, the keying ground is applied from Pin I of TB61, through the closed contacts of the H-207's push-to-talk switch, to Pin 4 of TB61. It is applied through the RAD TRANS/INT switch (held in RAD TRANS), Pin H of J61, Cable CX-7060, Pin H of the OUTSIDE BENDIX CONNECTOR, the hull wiring, Pin H of the DRIVER BENDIX CONNECTOR, into the C-2297 at Pin H of J901; through the lower segment of the external switch (EXT position), and the upper segment of the MONITOR switch (All, A, or B positions), to Pin D of J904. It is then applied through a CX-7060 cable, Pin D of the HULL BENDIX CONNECTOR, the SLIPRING assembly, Pin D of the TURRET BENDIX CONNECTOR, and another CX-7060 cable to Pin D of the AM-1780's J507.

RT Voice Modulation Path. When the H-207 is keyed, the voice signal (modulation) path is completed. Ground is applied from Pin 1 of TB61 and the closed contacts of the H-207's key switch to the mike, activating the voice signal. The voice path is then from the mike to Pin 3 of TB61. The voice signal is amplified by the A80, passes out Pin K of J61, through Cable CX-7056, Pin B of the OUTSIDE BENDIX CONNECTOR, the hull wiring, and Pin B of the DRIVER BENDIX CONNECTOR into the C-2297 at Pin K of J901. It passes through the upper segment of the external switch (EXT position) and the lower segment of the MONITOR switch (All, A, or B positions), out Pin K of J904; through a CX-7060 cable, Pin F of the HULL BENDIX CONNECTOR, the SLIPRING assembly, Pin F of the TURRET BENDIX CONNECTOR, and another CX-7060 cable to Pin K of the AM-1780's J507.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

RADIO RELAY CIRCUITS (RETRANSMISSION)



When Radio Set AN/VRC-49 or AN/VRC-45 is installed with an Intercommunication Set AN/VIC-1 in which a C-2299 is connected to the AM-1780, radio relay (retransmission) capabilities will be provided. The radio relay station is operated between distant radio simplex stations that are too far apart to communicate with each other directly.

For relay operation, a signal received by the C-RT (F2) will automatically key the A-RT and the C-RT's received signal becomes the modulating signal for the A-RT. The A-RT will then automatically re-transmit the C-RT's received signal. A signal received by the A-RT (F1) will automatically key the C-RT and the A-RT's received signal becomes the modulating signal for the C-RT. The C-RT will then automatically retransmit the A-RT's received signal.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

(Refer to FO-18, sheet 2.) AN/VRC-49 and AN/VRC-45 configurations consist of two RT's: an A-RT and a C-RT. In the radio-intercom system, the A-RT is connected to J501 of the AM-1780 and the C-RT is connected to J503 of the AM-1780. The C-2299 is connected to the system in the following manner:

1. J701 of the C-2299 is connected to J511 of the AM-1780 (A-RT).
2. J702 of the C-2299 is connected to J509 of the AM-1780 (C-RT).

J511 provides access to the A-RT and J509 to the C-RT for radio relay operations.

In tracked vehicles, the operator's audio accessories are not connected to the C-2299 (J703 and J704). Instead, they are connected to the control boxes as described previously. Since this is the case, the RAD TRANS switch of the C-2299 has no function. When the C-2299's RETRANS switch is set to OFF, individual crewmembers have access to the RT's as described previously. When the RETRANS switch is set to ON, the crewmembers do not have access to the RT's, which are in an automatic retransmission mode. However, the crew does have access to the intercommunications set, and individual crewmembers can talk to each other, even though radio retransmission is in progress. Monitoring of the retransmissions is also available at the crewmember's control boxes.

To establish a retransmission mode, the following conditions must exist:

1. The two RT's SQUELCH switches are set to a squelch ON position (i.e., OLD ON or NEW ON).
2. The RT's are on different frequencies so that one RT's transmitted signal does not block the other's receive signal.
3. Each RT is set to the frequency of the station it is communicating with.
4. The AM-1780's INSTALLATION switch is set to RETRANS.
5. The C-2299 RETRANS switch is set to ON.

In a retransmission operation, one of the RT's acts as a receiver. It also keys the second RT (transmitter). The received signal is processed and used as a modulating signal for the transmitting RT. The A-RT can receive a signal and key the C-RT, or the C-RT can receive a signal and key the A-RT. The process is automatic. Once it has been set up, the relay circuits automatically switches signals between one RT and the other.

Assume that the A-RT receives a signal, and the C-RT is to retransmit it.

Retrans C-RT Keying. The signals received by the A-RT are applied to Audio Filter FL5001 and to the SQUELCH module. When the signal passes through the SQUELCH module with the A-RT's SQUELCH switch set to OLD ON or NEW ON, the squelch is disabled. The disabling of the squelch energizes Squelch Relay K5002, establishing a ground. The ground is applied through Relay K504 to Pin T of P401. Pin T of P401 mates with Pin T of the mount's J24, which applies the ground directly to Pin T of J22 (RETRANSMIT RT KEYING OUT). From here, this keying ground signal is applied through Cable CX-4723, Pin T of the AM-1780's J501, the A-RETRANSMIT RT KEYING IN wire, Pin T of J511, and another CX-4723 cable, to Pin T of the C-2299's Jack J701.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

In the C-2299, the keying ground signal is applied through the C-RT RETRANS KEYING wire and the closed contacts (RETRANS ON) of the RETRANS switch to Pin S of J702. Ground is applied through still another CX-4723 cable, Pin S of the AM-1780's J509, the C-REMOTE KEYING OUT wire, Pin S of J503, a fourth CX-4723 cable, and Pin S of the C-RT mount's J22 to Pin H (REMOTE KEYING IN) of J24, J24 mates with P401, connecting the keying ground through Pin H of P401, to the keying relays of the C-RT. The relays energize and the C-RT goes into its transmit mode.

Retrans C-RT Modulation Path. The C-RT modulation path starts at the same point as the C-RT retrans keying. The audio (voice) output of Audio Filter FL5001 is applied through the monitor amplifier to Pin K of P401. Pin K of P401 mates with Pin K of the mount's J24. Pin K of J24 is wired (MONITOR OUT) directly to J22.

J22 applies the audio signal through a CX-4723 cable to the AM-1780 at Pin K of J501. At the tie point, the audio signal is applied to the AM-1780's isolation network and distributed to the control boxes for monitoring. At the same time, the voice signal is applied through the AM-1780's A-MONITOR wire to Pin K of J511; through another CX-4723 cable to Pin K of the C-2299's J701. The MONITOR IN wire applies the signal through the RETRANS switch in the ON position, which routes it through the C-RT MIC OUT wire to pin U of J702.

The audio signal passes through another CX-4723 cable to Pin U of the AM-1780's J509; through the C-REMOTE MIC OUT wire, Pin U of J503, and Cable CX-4723 to the C-RT's mount at Pin U of J22. Pin U of J22 is wired directly (REMOTE MIC IN) to Pin N of J24. Pin N of J24 mates with Pin N of P401, completing the audio path to the C-RT. The audio signal is then applied through the modulation/isolation transformer (Z401) to the C-RT's Speech Amplifier A8500 for modulation.

When the distant station that is communicating with the A-RT stops transmitting, the following occurs:

1. The A-RT stops receiving.
2. With no received signal, the A-RT's SQUELCH circuit causes the squelch relay (K5002) to deenergize, opening the C-RT's keying ground circuit.
3. The open circuit deenergizes the C-RT's keying relays.
4. The unkeyed C-RT goes back to a receive standby mode (squelch on).

(Refer to FO-18, sheet 1.)

A-RT Keying and Modulation. Assume that the A-RT is selected for transmission (MONITOR switch at ALL or A). The A-RT keying ground is established by closing the key switch of the audio accessory connected to the control box. As described previously, the keying ground is applied from Pin C of the control box's J802 to Pin D of the AM-1780's J504 (commander) or J505, J506, or J507 (Driver/Crew), through the MONITOR switch (ALL or A positions), through Pin D of J801 or J804, and through a CX-4723 cable. From Pin D of the AM-1780's control box jacks, the A-RT's keying ground is applied to Pin L of the AM-1780's J511 as follows:

For the Commander: From Pin D of J504, through the AM-1780's RADIO TRANS switch (CDR ONLY or CDR + CREW positions Pins 1 to 3) to J511 Pin L.

For the Driver/Crew: From Pin D of J505, J506, or J507, through contacts 4 and 3 of K501 (deenergized) and through the RADIO TRANS switch (CDR + CREW position, Pins 2 to 3) to J511 Pin L.

1-28. RADIO SET INTERFACE PORTION OF THE RADIO-INTERCOM SYSTEM. (CONT)

From the AM-1780's J511 Pin L, the A-RT's keying ground is applied to the C-2299's J701 Pin L by a CX-4723 cable, goes through the closed contacts of the C-2299's RETRANS switch (OFF position) and back out J701 at Pin S (A-RT RETRANS KEYING). From here (J701 Pins S) it follows the same path to the A-RT keying relay as described earlier. The voice signal of a keyed microphone connected to the control box is applied from Pin D of J802 to Pin K of the AM-1780's J504 (commander) or J505, J506, or J507 (Driver/Crew), through the control box's A80 (amplifier), the MONITOR switch (All or A positions), and through a CX-4723 cable. From Pin K of the AM-1780's control box jacks, the A-RT voice modulation signal is applied to Pin U of the AM-1780's J501 and onto the A-RT's.

Control Box Keying Through the C-2299 to the RTs (Radio Simplex Mode)

When the C-2299's RETRANS switch is set to ON the A-RT and C-RT cannot be keyed and voice modulated from the control boxes. To provide keying and modulation capabilities from the control boxes, the C-2299's RETRANS switch must be set to OFF. Either the A-RT or C-RT can then be accessed from the control boxes for transmission.

CHAPTER 2

INSTALLATION

Subject	Section	Para
Installation Tools and Materials	I	2-1
Service Upon Receipt	II	2-2
Installation Procedures	III	2-3

OVERVIEW

This chapter contains information concerning tools, materials and procedures needed for installation of radio components of the AN/VRC-12 series radio sets and the cabling of these radio components, together and with the components of the AN/VIC-1 intercom set. This chapter also provides information on unpacking and checking of equipment upon receipt and procedures to verify correct installation.

Section I INSTALLATION TOOLS AND MATERIALS

Subject	Para	Page
Common Tools and Equipment	2-1	2-1
Special Installation Tools and Materials	2-1	2-1

2-1. COMMON TOOLS AND EQUIPMENT.

Authorized common tools and equipment are listed in appendix B of this TM and in either your unit's Modified Table of Organization and Equipment (MTOE) or Table of Distribution and Allowances (TDA), whichever is applicable to your unit.

2-2. SPECIAL INSTALLATION TOOLS AND MATERIALS.

Specific tools required to install items of equipment in tracked vehicles are listed in appendix B. Expendable materials are listed in appendix C.

Most tools required for all installation procedures are contained in Tool Kit, Electronic Equipment TK-101/G. When specific tools not contained in Tool Kit, Electronic Equipment TK-101/G are needed, they will be listed at the beginning of that installation procedure.

NOTE

Special tools needed and not contained in Tool Kit, Electronic Equipment TK-101/G (for example, an electric drill, drill bits, metal punches, etc.) can normally be obtained from your motor maintenance section.

If additional parts or hardware are needed for a particular installation, refer to TM 11-5820-401-10-2-HR. This technical manual contains example hand receipts for each type of vehicle and lists National stock numbers (NSN's) for that vehicle's various radio-intercom items of equipment.

Section II SERVICE UPON RECEIPT

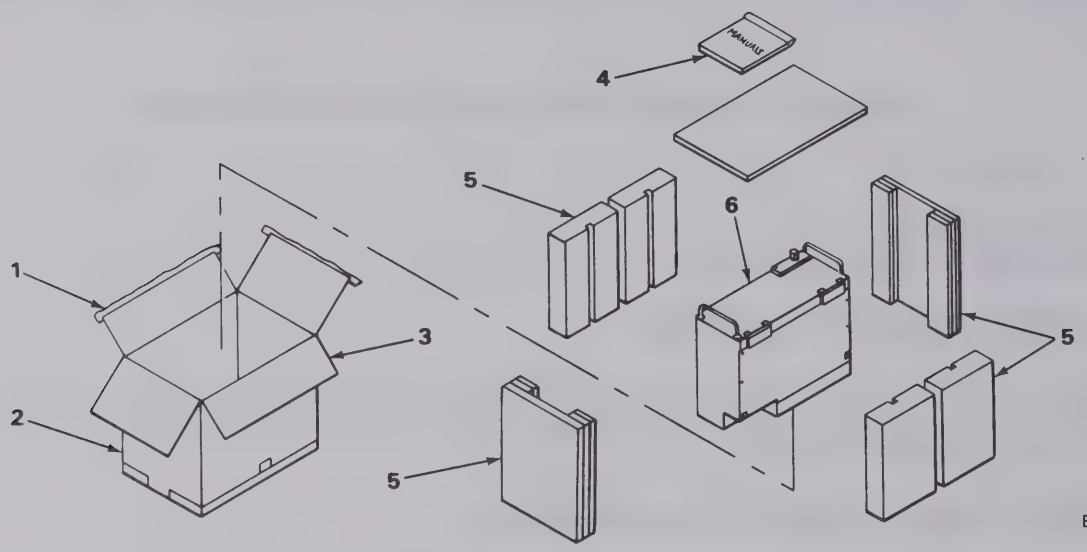
Subject	Para	Page
Inspection Upon Receipt of Tracked Vehicle	2-3	2-2
Unpacking and Checking Radio Set Items of Equipment	2-4	2-2

2-3. INSPECTION UPON RECEIPT OF TRACKED VEHICLE.

Before you have unpacked the various components of the radio sets, inspect the items of the vehicle's electrical harness for dents, broken lights or knobs, cut or frayed cables, and corrosion on metal surfaces.

2-4. UNPACKING AND CHECKING RADIO SET ITEMS OF EQUIPMENT.

TOOLS: Tool Kit, Electronic Equipment TK-101/G



WARNING

The radio set items of equipment are compact and heavy (over 60 lb). Be very careful when handling them. **Serious** personnel **injury** could **occur**. Observe proper handling procedures (paragraph 2-17).

NOTE

If unit is packed in a wooden crate, remove wooden crate. When cutting cardboard with knife, do not allow knife to enter carton. Save all packing material for storage purposes.

1. Using knife, cut tape (1) on box (2).
2. Open flaps (3) and fold back.
3. Remove manuals (4).
4. Remove fiberboard pads (5).
5. Lift out radio set component (6) (RT illustrated).

Inspect for damage sustained during shipment. If there is any, report the damage on SF 364 (Report of Discrepancy (ROD)). (See paragraph 1-4.)

2-4. UNPACKING AND CHECKING RADIO SET ITEMS OF EQUIPMENT. (CONT)

Check the equipment against the packing slip. If shipment is not complete, report discrepancies using SF-361 (Discrepancies in Shipment Report (DISREP). (See paragraph 1-4.)

Check whether applicable MWO's have been applied.

Section III INSTALLATION PROCEDURES

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Determining Position of RT X-MODE Switch	2-23	2-57

2-5. GENERAL.

Procedures in this section describe the mounting of the components of the AN/VRC-12 series of radio sets in tracked vehicles. Installation procedures also provide for the required cabling for the AN/VIC-1 Intercom and AN/VRC-12 series radios.

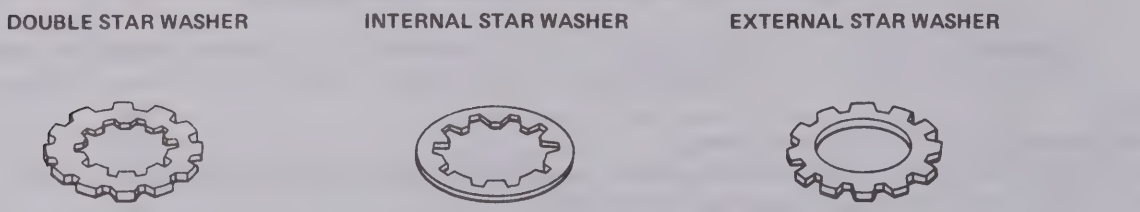
NOTE

The configuration of the AN/VIC-1 intercom set and the AN/VRC-12 series radio set depends on the vehicle and its mission. Refer to TM 11-5820-401-10-2-HR for the radio set components, the electrical harness and installation accessory kit for each type of tracked vehicle.

2-5. GENERAL. (CONT)

COMMONLY USED WASHERS

Each procedure requires the use of bolts or screws, star washers and nuts for installation of components and grounding straps.



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Star washers are used to make sure the mounting bolts or screws and nuts on the radio set items do not vibrate loose. The double star washer is used in all cases where a grounding lug is present (or larger bolts or screws with a threaded shaft of 1/4 inch and larger); this type of star washer will normally bite through the vehicle paint to insure good grounding.

Both external and the internal star washers are used with small screws. They may not bite through the paint.

NOTE

To insure good grounding, scrape paint off mating surfaces when small star washers are used or thick paint is present.

IDENTIFYING AND TAGGING CABLE CONNECTIONS

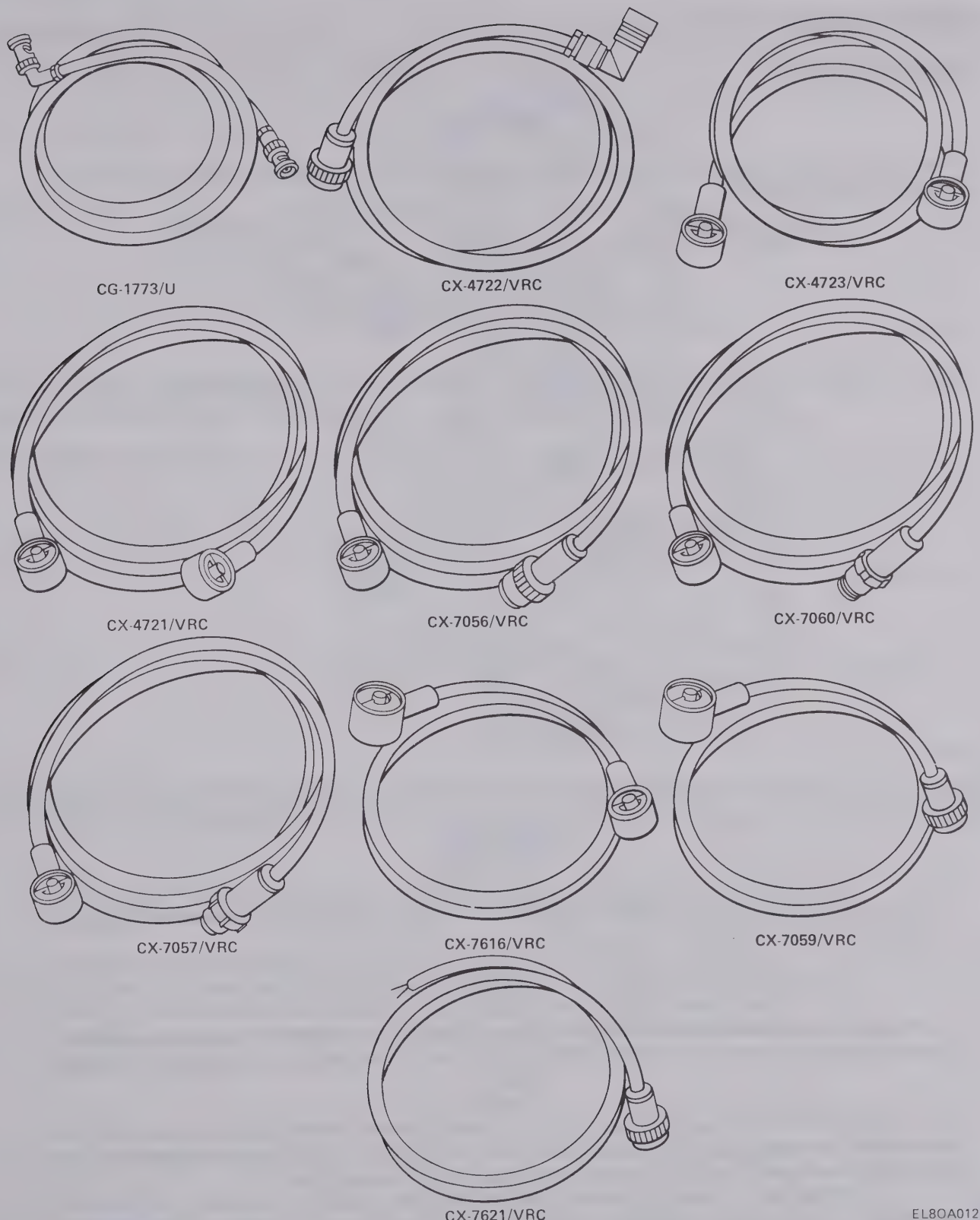
To complete the installation of the radio-intercom components in a tracked vehicle, various cables are used to connect the components together.

The plug at the ends of a cable may be a right-angle (elbow) type or a straight type, depending on the cable routing requirements. For some cables, an elbow adaptor is available to change a straight connection to a right-angle connection. To identify the cable plugs with their equipment jacks in the future, write the number of the jack (J501, J509, J71, etc) on a tag or decal and attach it to the cable plug. Do this when the cable plug is properly attached to the equipment jack.

NOTE

A printed set of decals is available for use in identifying cable plugs.

2-5. GENERAL. (CONT)



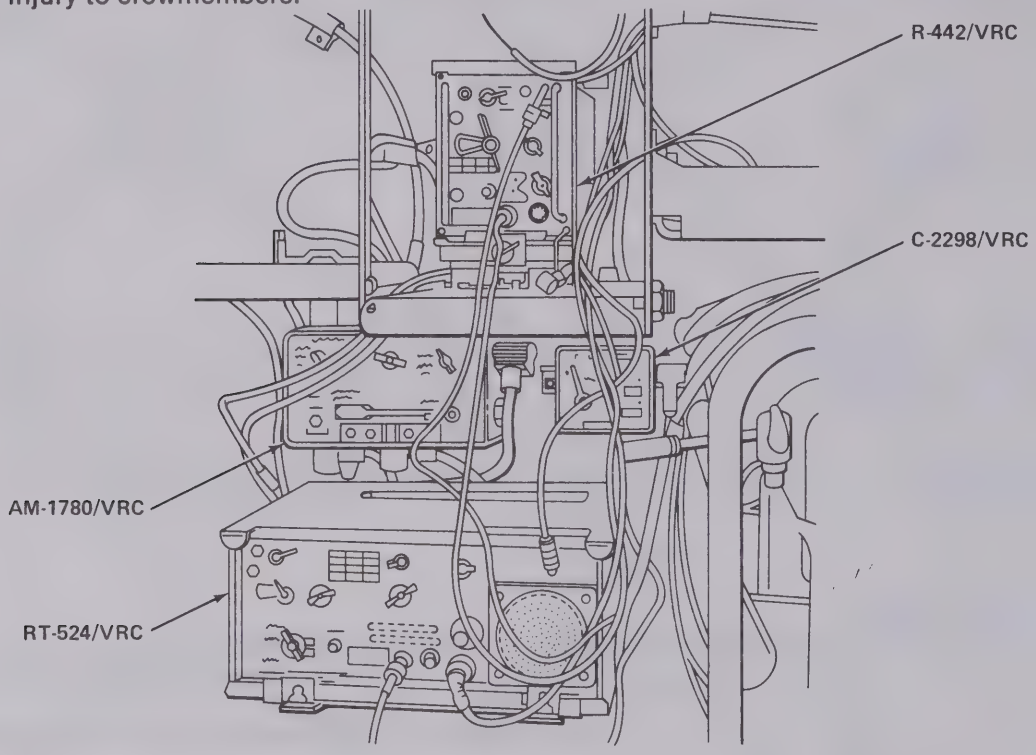
2-5. GENERAL. (CONT)

CABLE ROUTING AND PLUG ORIENTATION

Orientation of Cables

WARNING

Incorrect cable routing may cause the cable to extend into the crew compartment, resulting in injury to crewmembers.



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Connect cable as required by installation procedures in this section. If cables do not lie as shown by the installation illustration, or interferes with crew movement, reorient as described in this section.

WARNING

To safeguard against electrical shock and possible damage to equipment, remove or tape all personal exposed metal objects (e.g., watches, rings and medallions).

CAUTION

Cable plugs must be at the proper angle when mated to the corresponding jack, or the cable will obstruct the other cable connections to that component. It may also cause equipment damage.

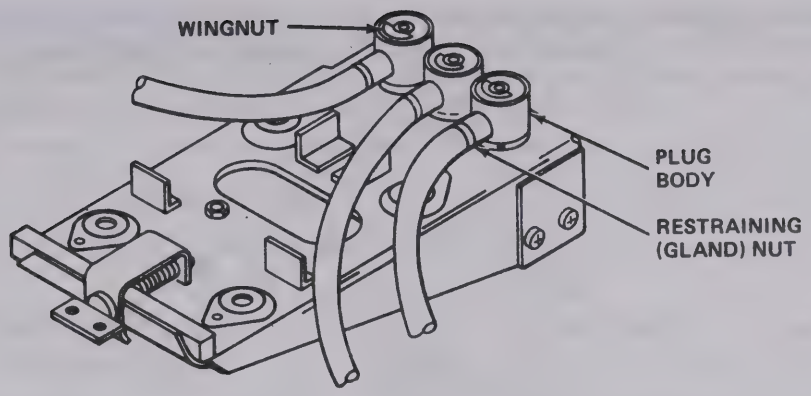
NOTE

Installation instructions for a particular vehicle include cable routing diagrams. Cable strapping directions must be followed to avert hazardous obstructions.

For proper routing of cables and placement of components, see chapter 2, section III, paragraph 2-7 through 2-16, or an appropriate 2300 series TM.

2-5. GENERAL. (CONT)

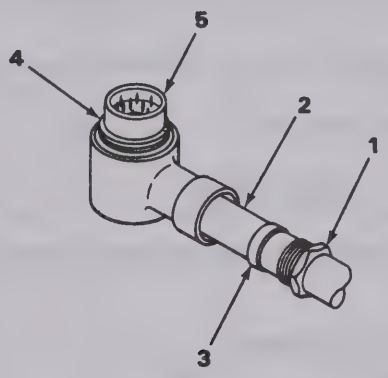
Plug Orientation



EL8OA279

Plug orientation refers to the cable plug's position when connected to its corresponding jack. The plug body's angle depends upon the alinement of a cable plug keyway with its jack key.

Changing Plug Orientation



EL8OA278

PRELIMINARY PROCEDURE: Unplug each end of cable from its jack.

WARNING

Remove (turn off) power from a connector before removing or installing a cable. Connector pins may be damaged due to arcing. Extreme electrical hazards may exist, causing death.

1. Using adjustable wrench, unscrew gland nut (1). Slide gland nut down cable (2).
2. Using small screwdriver, carefully remove packing (3). Slide packing down cable (2).
3. Using appropriate spanner wrench, remove locking ring (4) on pin side of plug.
4. Gently pull out pin-block assembly (5) until it can be rotated to desired position.

NOTE

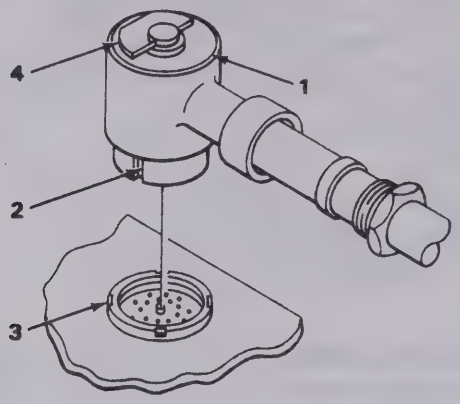
In either direction, do not rotate pin-block assembly more than one-quarter turn (three notch positions) from center.

5. Replace pin-block assembly (5) and locking ring (4). Tighten with appropriate spanner wrench.
6. Replace packing (3) and gland nut (1), and tighten gland nut (1) with adjustable wrench.

2-5. GENERAL. (CONT)

CONNECTING CABLE PLUGS TO ASSOCIATED JACKS

PRELIMINARY PROCEDURE: Inspect pins of plug and associated jack for damage, (e.g., bent or missing pins, etc). If necessary, straighten using pliers.



EL8OA280

1. Check that locking rings (1) are tight. If necessary, tighten using appropriate spanner wrench,
2. Aline plug keyway (2) with associated jack's key (3) and then gently press plug in until it initially seats (drops in).
3. Lift plug wingnut (4) and turn clockwise until plug is fully seated and tightly secured to its jack. (Fingertighten only.)
4. Return plug's wingnut (4) to its stowed position.

CAUTION

Do not attempt to reorient cables by adjusting equipment jacks. Damage to equipment could occur.

2-6. INSTALLING INTERCOM SET AN/VIC-1 (V) ITEMS.

The components and cables of the intercom set are part of the equipment electrical harness of tracked vehicles. The components of the intercom set are an intercom amplifier and associated control boxes for use by vehicle crewmembers. The electrical harness also includes mountings for receiver-transmitters and for auxiliary receivers, mounting brackets and interconnecting cables.

WARNING

Before installing or removing any cables from the components of the radio-intercom system, unplug Power Cable CX-13089 from the vehicle's C-E equipment dc outlet jack or the MX-7777/VRC. **Extreme** electrical **hazards** may exist that could cause **death**.

CAUTION

Make sure power is removed (turned off) from a connector before removing or installing a cable plug. Plug/jack pins may be **damaged** due to arcing.

2-7. CABLE CONNECTIONS FOR THE AM-1780/VRC (OR AM-7046/VRC).

CAUTION

The cable connection from the MT-1029/VRC of A-RT must be attached to J501 of the AM-1780/VRC (all radio set configurations). The cable connection from the C-RT's MT-1029/VRC must be attached to J503 (AN/VRC-45 and -49 configurations). If either of these cables are attached to any other jack, serious damage will occur to the AM-1780/VRC.

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4723/VRC	AM-1780/VRC or AM-7046/VRC	J501		A-RT Mount MT-1029/VRC (All configurations)	J22	
CX-4723/VRC	AM-1780/VRC or AM-7046/VRC	J503		C-RT Mount MT-1029/VRC (AN/VRC-45 or -49)	J22	
CX-4723/VRC (See Notes 1, 2, 4)	AM-1780/VRC or AM-7046/VRC	J507		Crewmember's Control Box C-2298/VRC (or C-10456/VRC or C-10680/VRC)	J801 (or J804)	
CX-4723/VRC (See Notes 1, 2, 4)	AM-1780/VRC or AM-7046/VRC	J506		Crewmember's Control Box C-2298/VRC (or C-10456/VRC or C-10680/VRC)	J801 (or J804)	
CX-4723/VRC (See Notes 2, 6)	AM-1780/VRC or AM-7046/VRC	J504		Commander's Control Box C-2298/VRC (or C-10456/VRC or C-10680/VRC)	J801 (or J804)	
CX-7058/VRC	AM-1780/VRC only	J510	P1	B-Receiver Mount MT-1898/VRC (AN/VRC-12, -44, -47 or -48)	J12	P2
CX-7616/VRC	AM-1780/VRC only	J508	P1	C-Receiver Mount MT-1898/VRC (AN/VRC-44 or -48)	J12	P2
CX-7060/VRC (See Notes 1, 3)	AM-1780/VRC only	J505	P2	Turret Bendix Jack		P1
CX-4723/VRC (See Note 5)	AM-1780/VRC only	J509		Control Box C-2299/VRC (C-RT of AN/VRC-45 or -49)	J702	

2-7. CABLE CONNECTIONS FOR THE AM-1780/VRC (OR AM-7046/VRC). (CONT)

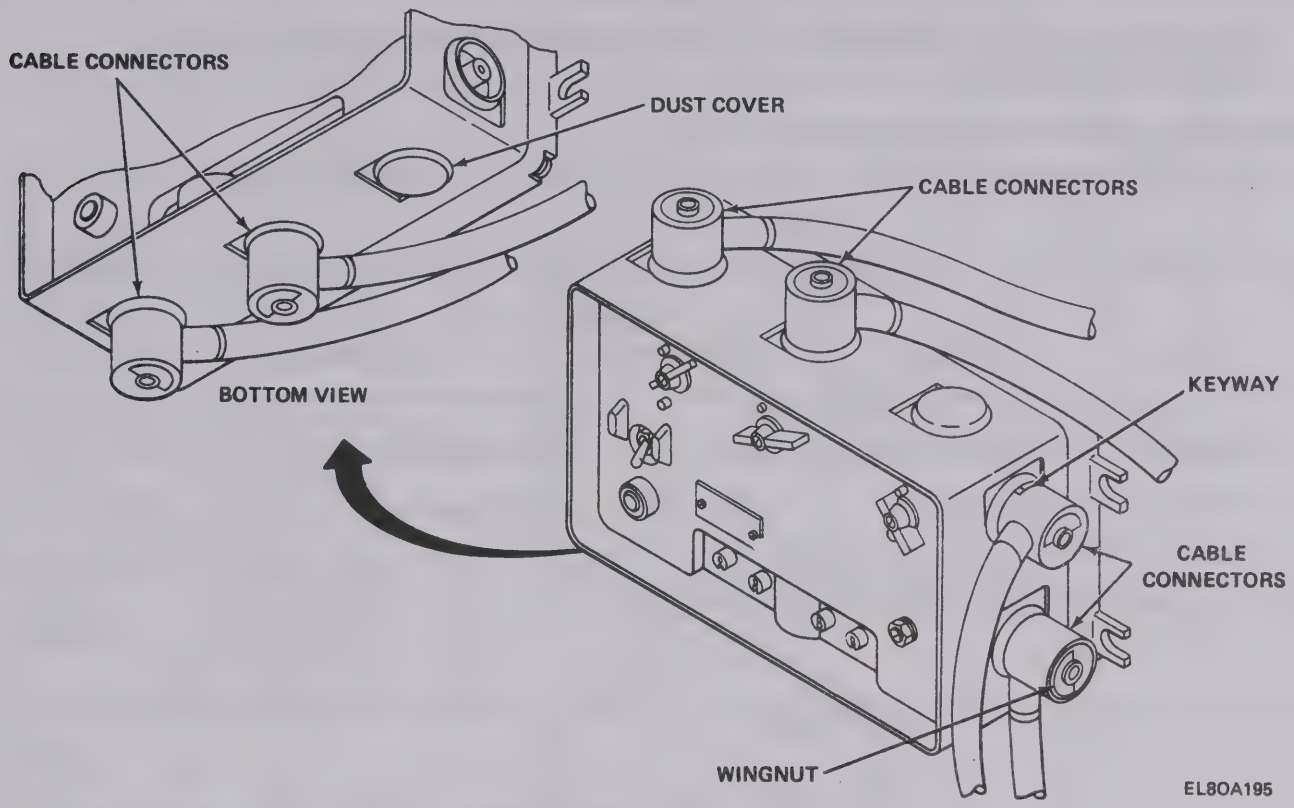
FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4723/VRC (See Note 5)	AM-1780/VRC only	J511		Control Box C-2299/VRC (A-RT of AN/VRC-45 or -49)	J701	
CX-7616/VRC	AM-7046/VRC only	J508		B-Receiver Mount MT-1898/VRC (-47 only)	J12	

NOTES

1. Cable can connect to any of the AM-1780/VRC top jacks (J505, J506, J507).
2. Cable can connect to either the left or right jack (J801 or J804) on C-2298/VRC (or C-10456/VRC or C-10680/VRC).
3. In Turret-type vehicles, there are two CX-7060 cables: one from the AM-1780/VRC to turret Bendix jack and the other from a hull Bendix jack to the control box. Vehicle wiring connects the two Bendix jacks together.
4. Up to six control boxes can be connected to the AM-1780/VRC or AM-7046/VRC.
5. Cable must connect C-2299 left jack J701 to AM-1780 jack J511, and right jack J702 to AM-1780 jack to J509.
6. In some tanks, the commander's C-2298/VRC (or C-10456/VRC) has a cable connection to the cupola.

2-7. CABLE CONNECTIONS FOR THE AM-1780/VRC (OR AM-7046/VRC). (CONT)

INSTALLATION OF CABLES AND PLUG ORIENTATION



NOTE

Cable orientation of J511 and J509 is similar to that of J503 and J501.

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. (If plug orientation is not correct, see paragraph 2-5 for detailed procedure.)
3. Lift and turn wingnut clockwise until plug is locked on jack. Fingertighten only.

CAUTION

Jack orientation should not be changed. Damage to equipment could result.

CABLE SELECTION AND ROUTING

Refer to TM 11-2300 series manual for type of tracked vehicle and radio set.

2-8. CABLE CONNECTIONS FOR CONTROL, RADIO SET C-2299/VRC.

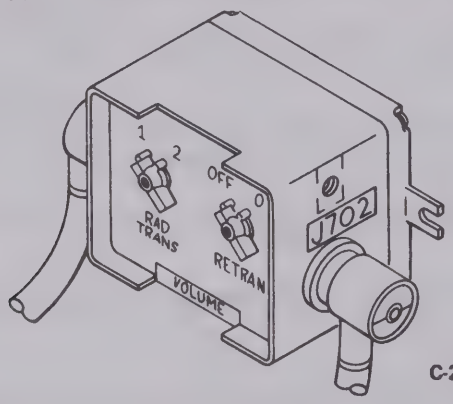
CAUTION

Set AM-1780 PWR CKT BKR switch to OFF. Pins and jacks will be damaged due to arcing if power is not turned off.

CABLING C-2299/VRC (FOR AN/VRC-45, -49)

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4723/VRC	C-2299/VRC	J701		AM-1780/VRC	J511	
CX-4723/VRC	C-2299/VRC	J702		AM-1780/VRC	J509	

INSTALLATION OF CABLES AND PLUG ORIENTATION



C-2299/VRC EL8OA219

NOTE

See paragraphs 1-12 through 1-22 for installation location.

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. (If plug orientation is not correct, see paragraph 2-5 for detailed procedure.)
3. Lift and turn wingnut clockwise until plug is locked into jack. Fingertighten only.

CABLE SELECTION AND ROUTING

Refer to TM 11-2300 series manual for type of tracked vehicle and radio set.

2-9. CABLE CONNECTIONS FOR CONTROL BOXES C-2298/VRC, C-10456/VRC, AND C-10680/VRC.

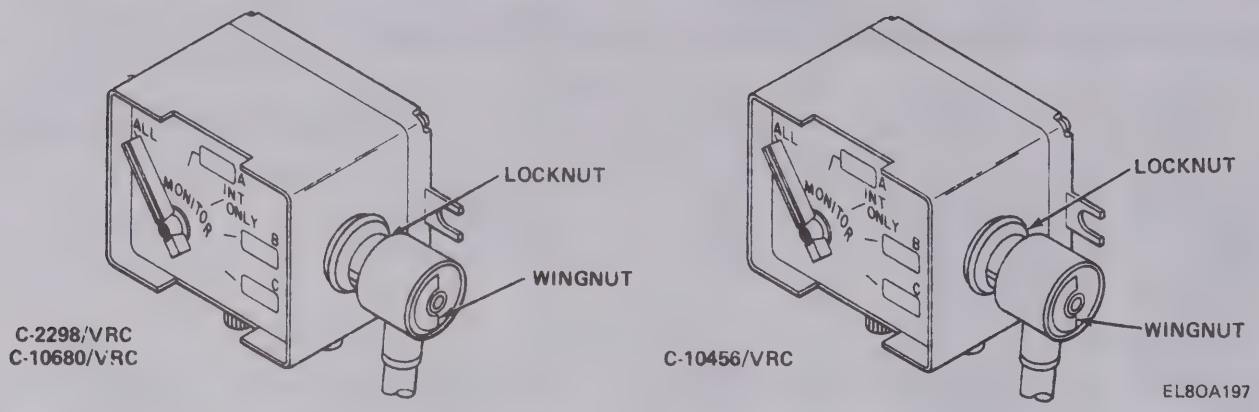
FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4723/VRC (See Note 2, 3)	Commander's C-2298/VRC C-10456/VRC C-10680/VRC	J801 or J804		AM-1780/VRC or AM-7046/VRC	J504	
CX-4723/VRC (See Note 1)	Crewmember's C-2298/VRC C-10456/VRC C-10680/VRC	J801 or J804		AM-1780/VRC or AM-7046/VRC	J505 J506 or J507	
CX-4723/VRC (See Note 4)	Crewmember's C-2298/VRC C-10456/VRC C-10680/VRC	J801 or J804		Another Crewmember's Control Box	J801 or J804	

NOTES

1. Cable can connect to either the left or right jack on control box.
2. In some tanks, the commander's C-2298/VRC or C-10456/VRC has a cable connection to the cupola for audio accessories.
3. Cable from commander's box must be connected to J504 of AM-1780/VRC or AM-7046/VRC.
4. Crewmember's control boxes (not the commander's) may be connected in tandem.

2-9. CABLE CONNECTIONS FOR CONTROL BOXES C-2298/VRC, C-10456/VRC, AND C-10680/VRC. (CONT)

INSTALLATION OF CABLES AND PLUG ORIENTATION



1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. (If plug orientation is not correct, see paragraph 2-5 for detailed procedure.)
3. Lift and turn wingnut clockwise until plug is locked on jack. Fingertighten only.

CAUTION

Jack orientation should not be changed. Damage to equipment could result.

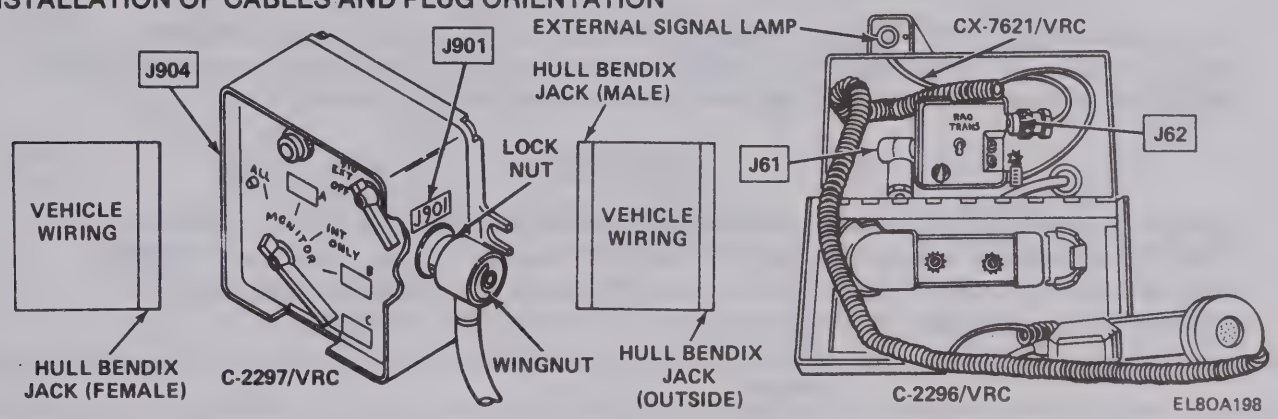
CABLE SELECTION AND ROUTING

Refer to TM 11-2300 series manual for type of tracked vehicle and radio set.

2-10. CABLE CONNECTIONS FOR CONTROL BOXES C-2297/VRC AND C-2296/VRC.

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-7060/VRC	Driver's Control Box C-2297/VRC	J904	P2	Hull Bendix Jack (Female)		P1
CX-7057/VRC		J901	P2	Hull Bendix Jack (Male)		P1
CX-7056/VRC	Outside Control Box C-2296/VRC	J61	P2	Outside Bendix Jack		P1
CX-7621/VRC		J62	P1	External Signal Lamp		

INSTALLATION OF CABLES AND PLUG ORIENTATION



1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. If plug orientation is not correct, see paragraph 2-5 for detailed procedure.
3. Lift and turn wingnut clockwise until plug is locked on jack. Fingertighten only.

CAUTION

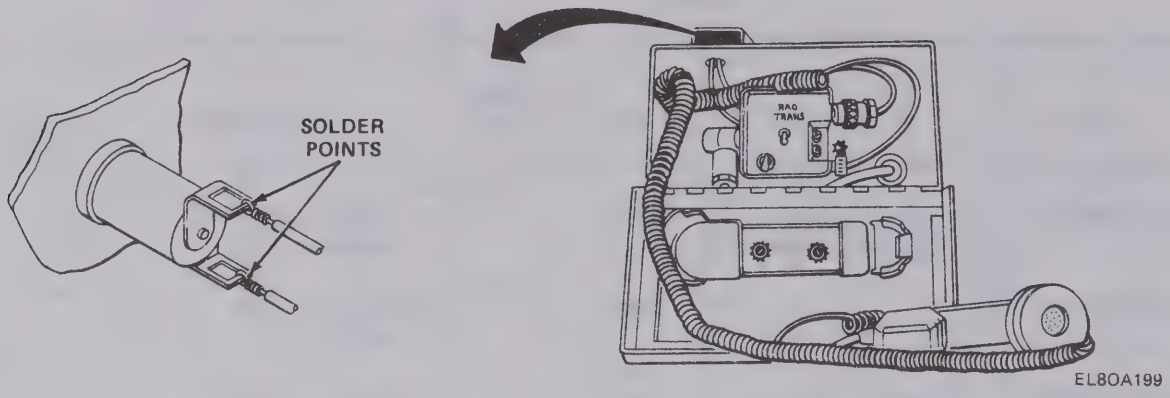
Jack orientation should not be changed. Damage to equipment could result.

CABLE SELECTION AND ROUTING

Refer to TM 11-2300 series manual for type of tracked vehicle and radio set.

2-10. CABLE CONNECTIONS FOR CONTROL BOXES C-2297/VRC AND C-2296/VRC. (CONT)

CABLING C-2296/VRC SIGNAL LAMP



Solder CX-7621/VRC open ends to the outside signal lamp fixture.

2-11. CABLE CONNECTIONS FOR MT-1029/VRC WITHOUT VINSON J-BOX C-3513.

WARNING

Unplug Power Cable CX-13089 from vehicle's C-E equipment outlet jack or MX-7777/VRC before removing or installing any cable plug of a radio mount. **Extreme** electrical **hazards** exist that could cause **death.** Also, plug/jack pins may be **damaged** due to **arcing.**

CAUTION

The cable connection from the MT-1029/VRC of A-RT must be attached to J501 of the AM-1780/VRC (all radio set configurations). The cable connection from the C-RT's MT-1029/VRC must be attached to J503 (AN/VRC-45 and -49 configurations). If either of these cables are attached to any other jack, serious damage will occur to the AM-1780/VRC.

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-13089/VRC	A-RT Mount	J21	P2	MX-7777(*)/VRC or Vehicle DC Outlet	J1 or J2	P1
CX-4723/VRC	A-RT Mount	J22		AM-1780/VRC (All configurations)	J501	
CX-4721/VRC	A-RT Mount	J23	P1	B-Receiver Mount MT-1898/VRC (AN/VRC-12, -44, -47, -48)	J11	P2
CX-4721/VRC	A-RT Mount	J23	P1	C-RT Mount MT-1029/VRC (AN/VRC-45, -49)	J21	P2
CX-4723/VRC	C-RT Mount	J22		AM-1780/VRC (AN/VRC-45, -49)	J503	

2-11. CABLE CONNECTIONS FOR MT-1029/VRC WITHOUT VINSON J-BOX C-3513. (CONT)

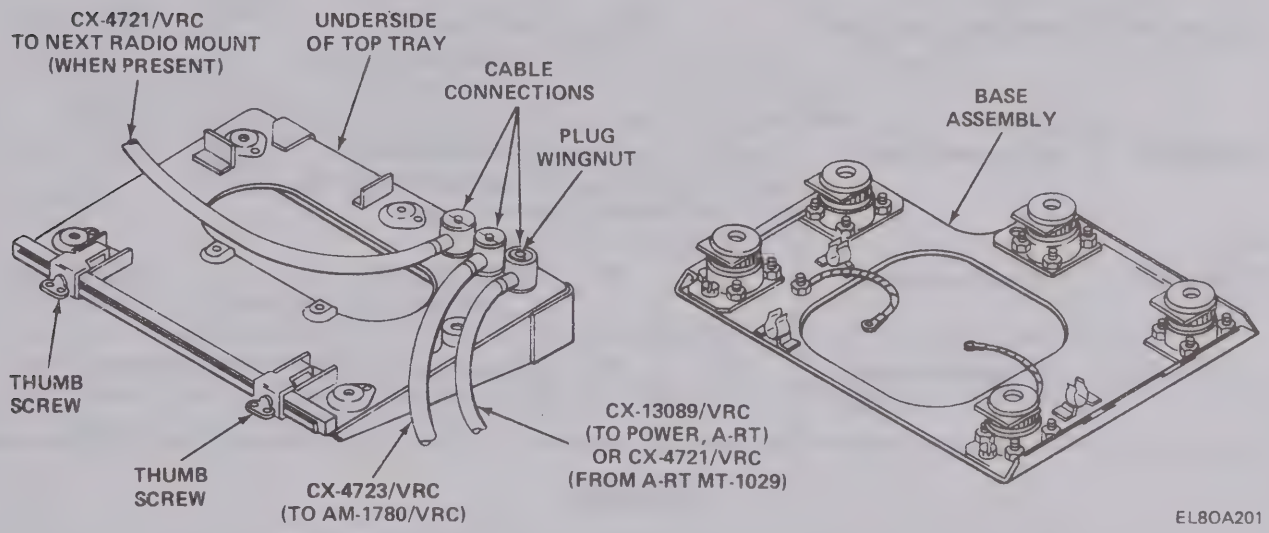
WARNING

If a minisuppressor is present, allow 10-minute cooling before working on cable connections.

NOTE

Some vehicles have the minisuppressor plug (P1) connected to the MT-1029/VRC (J23) instead of CX-4721/VRC (to next radio mounting). (See paragraph 2-21 for details.)

PRELIMINARY PROCEDURE: Remove RT (if present) from mount tray.
Remove top tray from its base. (See paragraph 3-19.)
Turn tray over to see cable plug. The thumbscrews should be closest to you.



INSTALLATION

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. If plug orientation is not correct, see paragraph 2-5 for detailed procedure.
3. Lift and turn wingnut clockwise until the plug is locked on jack. Fingertighten only.

CAUTION

Only change the orientation of the cable plug. Never change the jack orientation. Damage to equipment could occur.

4. Replace tray. (See paragraph 3-19.)

2-12. CABLE CONNECTIONS FOR MT-1898/VRC WITHOUT VINSON J-BOX C-3514.

WARNING

Unplug Power Cable CX-13089 from vehicle's C-E equipment outlet jack or MX-7777/VRC before removing or installing any cable plug of a radio mount. **Extreme** electrical **hazards** exist that could cause **death.** Also, plug/jack pins may be **damaged** due to **arcing.**

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4721/VRC	B-Receiver Mount	J11	P2	A-RT Mount (AN/VRC-12, -44 -47, -48)	J23	P1
CX-7058/VRC	B-Receiver Mount	J12	P2	AM-1780/VRC (AN/VRC-12, -44, -47, -48)	J510	P1
CX-7616/VRC	C-Receiver Mount	J12	P2	AM-1780/VRC (AN/VRC-44, -48)	J508	P1
CX-4721/VRC	C-Receiver Mount	J11	P2	B-Receiver Mount (AN/VRC-44, -48)	J13	P1

NOTE

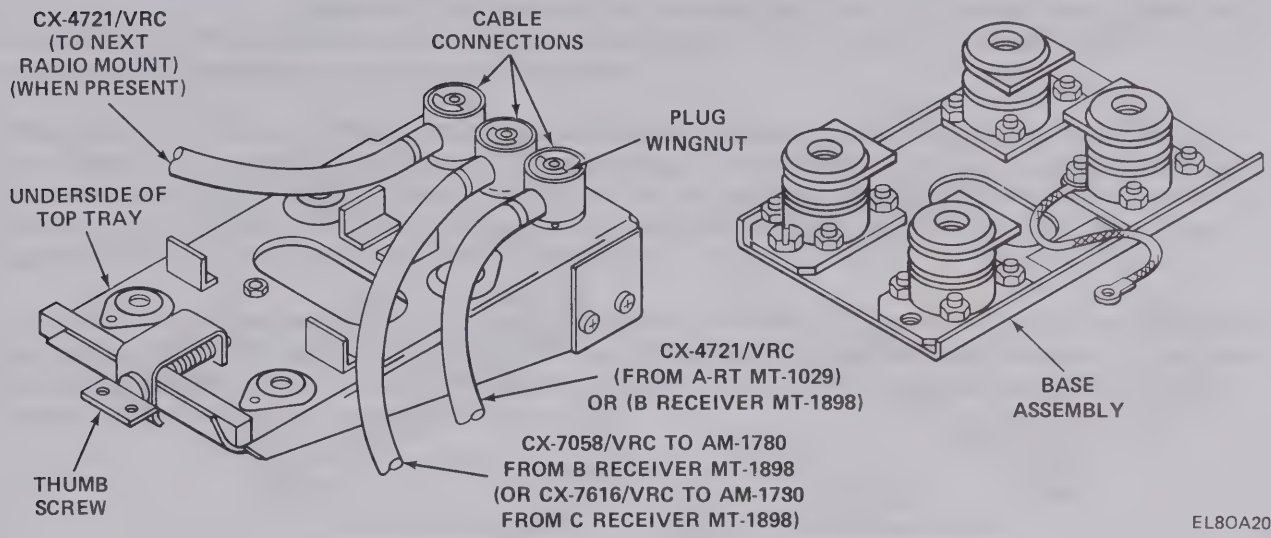
Some vehicles have the minisuppressor plug (P1) connected to the MT-1898/VRC (J13) instead of CX-4721/VRC (to next radio mounting). (See paragraph 2-21 for details.)

WARNING

If a minisuppressor is present, allow 10-minute cooling before working on cable connections.

2-12. CABLE CONNECTIONS FOR MT-1898/VRC WITHOUT VINSON J-BOX C-3514. (CONT)

PRELIMINARY PROCEDURE: Remove R-442/VRC from mount tray.
Remove top tray from its base (see paragraph 3-19).
Turn tray over to see cable plug. The thumbscrews should be closest to you.



1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. If plug orientation is not correct, see paragraph 2-5 for detailed procedure.
3. Lift and turn wingnut clockwise until plug is locked on jack. Fingertighten only.
4. Replace tray. (See paragraph 3-19.)

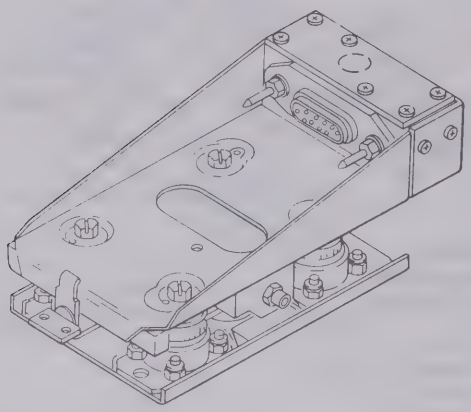
CAUTION

Only change the orientation of the cable plug. Never change the jack orientation. Damage to equipment could occur.

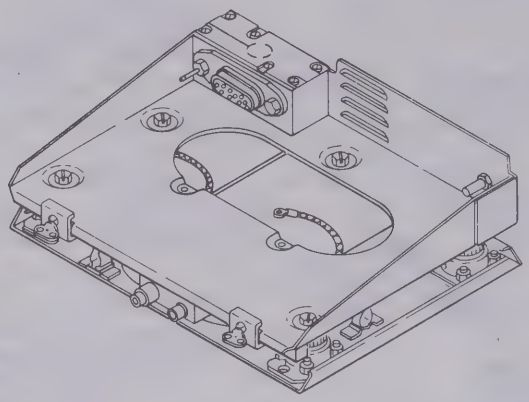
2-13. INSTALLATION OF MT-1029/VRC WITH VINSON J-BOX C-3513 AND MT-1898/VRC WITH VINSON J-BOX C-3514.

WARNING

Unplug Power Cable CX-13089 from vehicle's C-E equipment outlet jack or MX-7777/VRC before removing or installing any cable plug of a radio mount. **Extreme** electrical **hazards** exist that could cause **death.** Also, plug/jack pins may be **damaged** due to **arcing.**



MT-1898/VRC WITH
VINSON J-BOX C-3514/U



MT-1029/VRC WITH
VINSON J-BOX C-3513/U

EL8OA206

The Vinson J-Boxes are installed between the top tray and the base assembly of the mountings. Install the J-Box C-3513 in the MT-1029. Install the J-Box C-3514 in the MT-1898. Refer to TM 11-5820-312-12 for nomenclature of kits, installation instructions, repair parts and some operator procedures.

CABLE CONNECTIONS AND PLUG ORIENTATION FOR J-BOX C-3514/U AND J-BOX C-3513/U

See vehicle installation for cable instructions. (Refer to TM 11-5820-312-12.)

2-14. INSPECTING LINK POSITION IN MT-1029/VRC AND MT-1898/VRC.

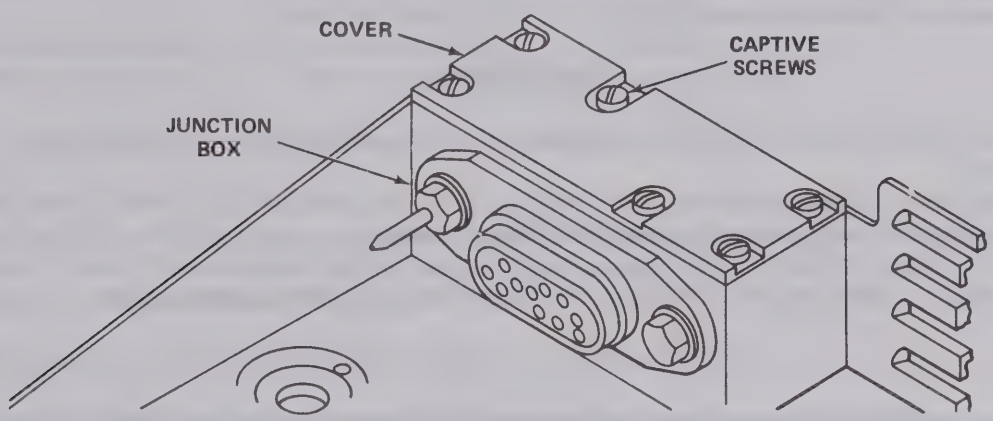
WARNING

Unplug Power Cable CX-13089 from vehicle's C-E equipment outlet jack or MX-7777/VRC before removing a mount's J-box cover. **Extreme** electrical hazards exist within the J-box that could cause **death.**

Inspecting the link position is usually done after replacing the MT-1029/VRC or the MT-1898/VRC in a vehicle before their radio components are installed.

When MT-1029/VRC and MT-1898/VRC radio mounts are installed in tracked vehicles, the POWER LINK within the mount's junction box is normally set up for remote dc input power control. When an A-RT mount is set up for REMOTE, the A-RT will not turn on until after the AM-1780 MAIN PWR switch is turned to NORM. When other radio component mounts are set up for REMOTE dc input power, they cannot be turned on until after the A-RT is turned on.

If the POWER LINK within a mount junction box is set up for DIRECT, the radio component installed on that mount can be turned on regardless of the operating state of any other radio-intercom component. Setting a POWER LINK for DIRECT should only be done when an extreme emergency exists and the radio component must be independently operated.



INITIAL PROCEDURE

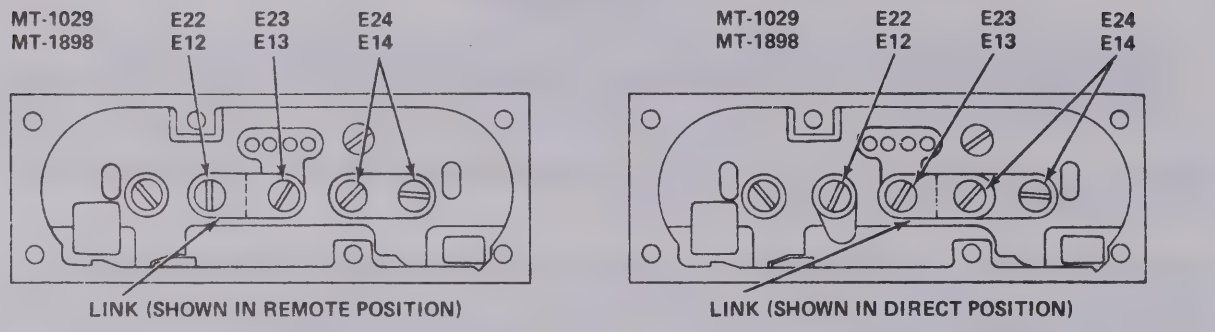
1. Using screwdriver, loosen six captive screws.
2. Using screwdriver, pry off cover.

CAUTION

Do not damage gasket between J-box and its cover.

3. Look inside J-box. See if link is in desired position.

2-14. INSPECTING LINK POSITION IN MT-1029/VRC AND MT-1898/VRC. (CONT)



EL8OA209

To change link position (if needed):

1. Using screwdriver, loosen terminal screws E22 (E12), E24 (E14) and the pivotal screw E23 (E13). (Do not remove.)
2. Swing the LINK so it is between the pivotal screw E23 (E13) and E22 (E12) for REMOTE or E24 (E14) for DIRECT.
3. Using screwdriver, tighten screws E22 (E12), E23 (E13) and E24 (E14).

CAUTION

For older models (before 1973), insure fuse lugs are lined up with terminal board holes while replacing cover.

4. Replace cover. Using screwdriver, tighten six captive screws.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731.

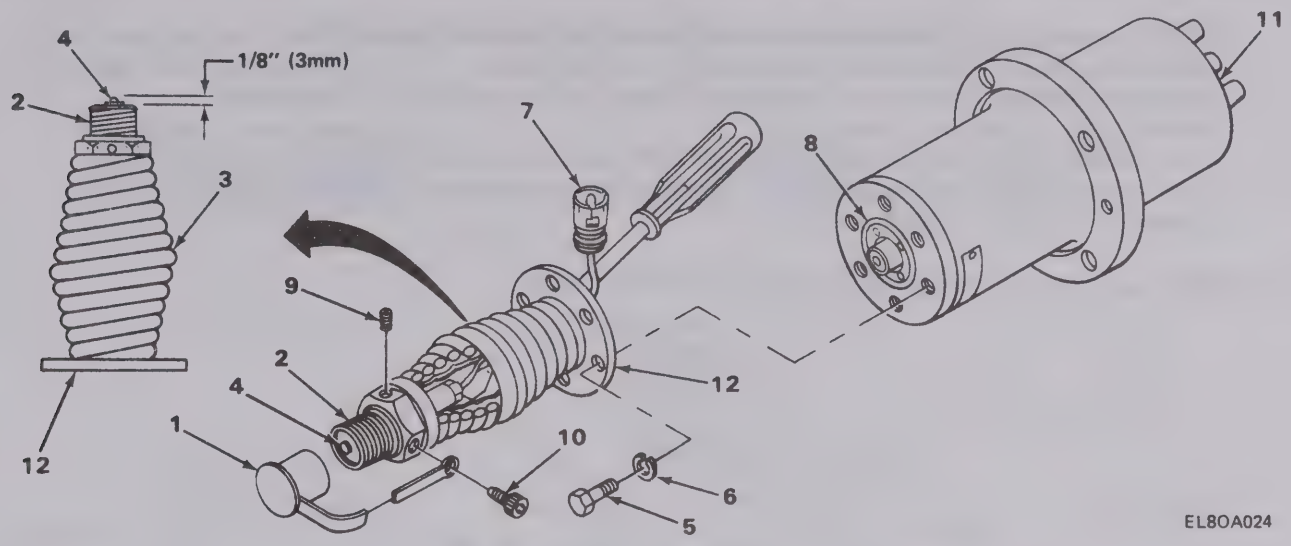
GENERAL

This paragraph provides procedures for the installation of RT Antennas AT-912, AS-1729 and AS-2731. The procedures given will be the same for the AS-1729 and AS-2731, but the AT-912 will have its own procedure. The procedure for installing the antenna elements applies to all three antennas. The only difference is the AS-2731 does not have an upper element; the AT-912 and AS-1729 do.

The authorized tools for the procedures in this paragraph are found in Tool Kit, Electronic Equipment TK-101/G.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

INSPECTING TIP CONTACT OF MX-6707, MX-9146 AND MX-2799 (AB-719)



1. Pull off dust cover (1) from threaded portion (2) of spring assembly (3).
2. See that tip contact (4) is about 1/8 inch above threaded portion (2).

NOTE

If tip contact (4) is 1/8 inch above the threaded portion (2), go to installation of matching unit. For MX-6707 or MX-9146, see page 2-25. For MX-2799 (AB-719), see page 2-29. If the tip contact is not 1/8 inch above the threaded portion, see below for MX-6707 and MX-9146 or page 2-24 for MX-2799 (AB-719).

CHANGING THE LENGTH OF MX-6707 OR MX-9146 TIP CONTACT

1. Using 7/16-inch wrench, loosen and remove six bolts (5) and lockwashers (6).
2. Remove spring assembly (3) and unplug rf cable (7) from matching unit. Do not lose O-ring (8).
3. Using 3/32-inch hex wrench, loosen two setscrews (9) and a third hex (cap) screw (10).

CAUTION

When doing step 4, do not cut rf cable (7) with screwdriver. Hold rf cable (7) to one side of spring assembly (3).

4. Insert flat-tip screwdriver into spring assembly (3). Push up gently on bottom of tip contact (4) until tip extends 1/8 inch above the threaded portion (2) of the spring assembly (3).

NOTE

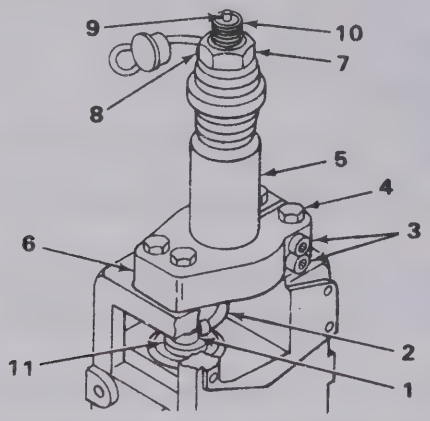
If tip contact is worn and will not extend above the threaded portion of the spring assembly, reassemble and refer matching unit to higher level of maintenance.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

CHANGING THE LENGTH OF MX-6707 OR MX-9146 TIP CONTACT (CONT)

5. Using hex wrench, tighten two setscrews (9) and third hex (cap) screw (10).
6. Coat O-ring (8) with silicone compound (item 1, appendix C).
7. Replug rf cable (6). Place spring assembly (3) onto matching unit (11). Press down gently.
8. Aline holes on spring assembly flange (12) with holes in matching unit (11).
9. Install six bolts (5) and lockwashers (6). Using torque wrench with 7/16-inch socket, tighten to 40 in. lb torque.

CHANGING LENGTH OF THE MX-2799 (AB-719) TIP CONTACT



EL8OA286

1. Unplug rf cable plug (1) from MX-2799 jack (11).
2. Using 1/2-inch wrench, loosen two side bolts (3) and two top bolts (4).
3. Remove spring assembly (5) from its C-clamp (6).
4. Using 3/32-inch hex wrench, loosen two setscrews (7) and a cap screw (8).

CAUTION

When doing step 5, do not cut rf cable (2) with screwdriver. Hold rf cable (2) to one side.

5. Push up gently on bottom of tip contact (9) until tip contact extends 1/8 inch above top of threaded portion (10).
6. Using 3/32-inch hex wrench, tighten two setscrews (7) and a cap screw (8).
7. Insert spring assembly (5) into its C-clamp (6) and connect rf cable plug (1) to MX-2799 rf jack (11). (Position spring assembly (5) so that connected rf cable (2) is not crimped.)
8. Using 1/2-inch wrench, tighten two side bolts (3) and two top bolts (4).

INSTALLATION OF MX-6707 OR MX-9146 REINFORCING RING (ADAPTOR PLATE)

CAUTION

A steel reinforcing ring must be installed on round-base matching units. The ring protects the Lexan plastic flange and keeps water from getting through the gasket.

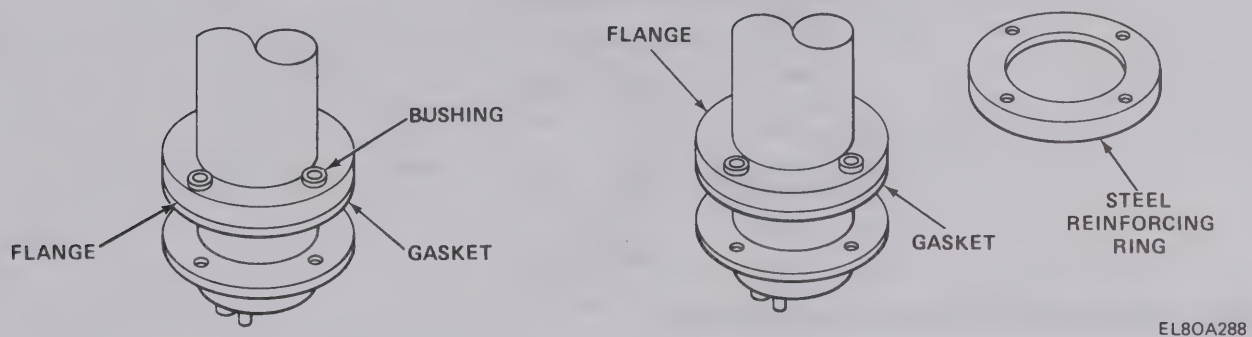
2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

NOTE

If the matching unit already has a steel reinforcing ring attached to the flange, go to the installation procedures below.

IF THE STEEL REINFORCING RING HAS BUSHINGS IN THE FLANGE, YOUR MAINTENANCE SUPPORT CAN DRIVE THE BUSHINGS OUT FOR YOU.

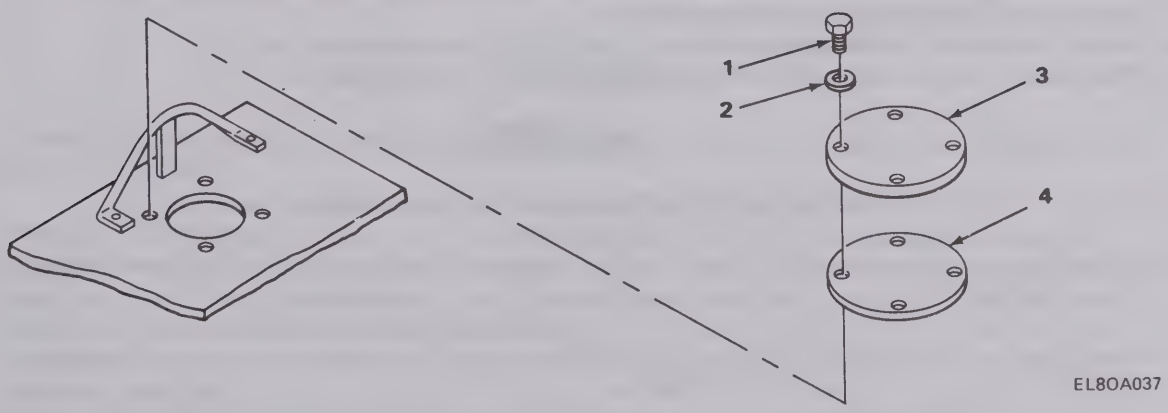
IF THE STEEL REINFORCING RING IS PROVIDED LOOSE (NOT ATTACHED TO THE FLANGE), YOU MUST INSTALL IT BEFORE INSTALLING MATCHING UNIT.



EL8OA288

INSTALLATION OF MX-6707 OR MX-9146

INITIAL PROCEDURE: Remove vehicle antenna port cover.



EL8OA037

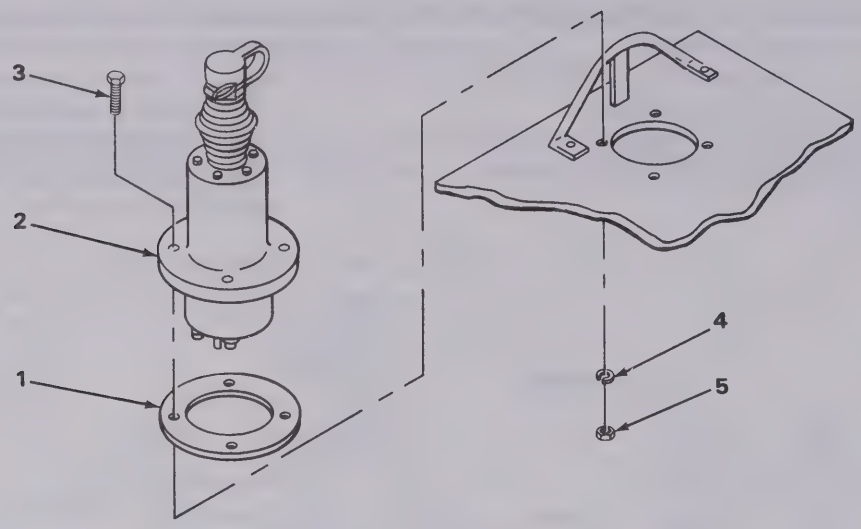
1. Using wrench, remove four bolts (1) and lockwashers (2).
2. Remove cover (3) and gasket (4) from vehicle's antenna port (5).

NOTE

Do not discard vehicle port cover. Put it in administrative storage.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

INSTALLATION OF MX-6707 OR MK-9146 (CONT)



EL8OA025

To install Matching Unit MX-6707 or MX-9146/VRC:

1. Apply a thin coat of silicone compound (item 1, appendix C) to gasket (1).
2. Place gasket (1) on matching unit (2). Aline holes in gasket (1) with holes of matching unit (2).
3. Insert matching unit (2) into vehicle's antenna port. Aline holes of matching unit (2) and gasket (1) with holes of antenna port.
4. Insert four bolts (3) through holes of matching unit (2) and antenna port.
5. Place a star washer (4) and nut (5) on each bolt (3) from inside vehicle.

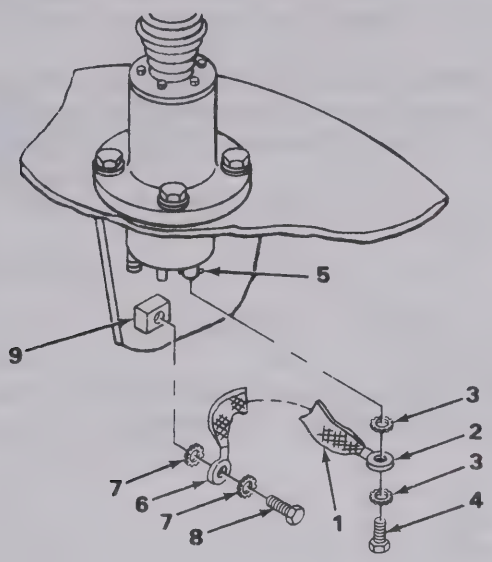
CAUTION

Overtightening of hardware may damage matching unit (2).

6. Using torque wrench and 9/16-inch socket, tighten bolts (3) to 100 in. lb. Turn clockwise.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

INSTALLATION OF GROUND STRAP FOR MATCHING UNITS MX-6707 AND MX-9146



EL8OA026

WARNING

To prevent possible electrical shock, make certain that the ground strap is correctly grounded to the vehicle body.

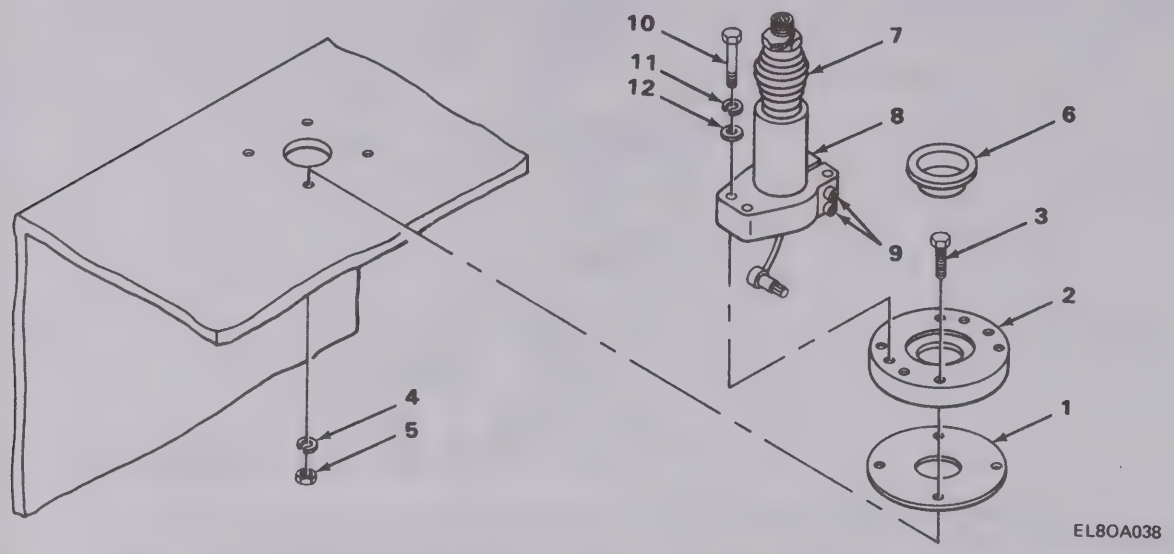
1. Position ground strap (1) so terminal lug with smaller hole (2) is towards matching unit's threaded post (5).
2. Insert bolt (4) through starwasher (3), lug (2), another starwasher (3) and into threaded post (5). Using 7/16-inch wrench, tighten until snug.
3. Position other end of ground strap (1) so terminal lug with larger hole (6) is toward vehicle's threaded post (9).
4. Insert bolt (8) through starwasher (7), lug (6) and another starwasher (7) and into threaded post (9). Using 1/2-inch wrench, tighten until snug.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

INSTALLATION OF ANTENNA BASE AB-719 AND MATCHING UNIT MX-2799

PRELIMINARY PROCEDURE: Remove vehicle antenna port cover. (See page 2-25.)

Installation of AB-719



1. Apply thin coat of silicone compound (item 1, appendix C) to gasket (1) (part of antenna installation materials).

NOTE

For horizontal MX-2799 mounting, install mounting bracket on vehicle's side wall. For vertical MX-2799 mounting, install mounting bracket on vehicle's roof interior.

2. Place gasket (1) over vehicle antenna port. Aline gasket holes with antenna port holes.
3. Place adaptor plate (2) on gasket (1). Aline adaptor plate holes with holes of gasket and antenna port.
4. Insert four bolts (3) through adaptor plate gasket (1) and antenna port.
5. Place lockwasher (4) and nut (5) on each bolt (3) from inside vehicle.
6. Using 1/2-inch wrench, tighten four bolts (3).
7. Insert seal (6) into adaptor plate (2).
8. Insert spring assembly (7) into C-clamp (8) (painted top up) until bottom of spring assembly (7) extends 1/2 inch out of bottom of clamp (8).
9. Using 1/2-inch wrench, tighten slightly two bolts (9) of clamps (8).

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

NOTE

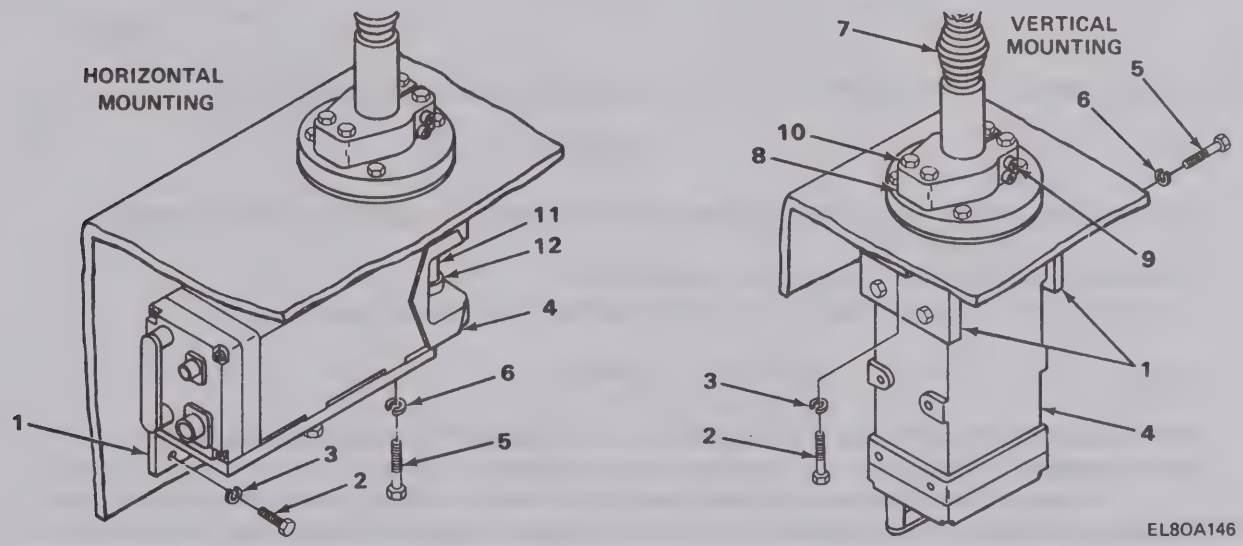
Matching Unit MX-2799 can be mounted horizontally (left), or vertically (right).

10. Place C-clamp (8) on adaptor plate (2) so bottom of spring assembly (7) inserts through seal (6). Aline upper holes of clamp (8) with holes of adaptor plate (2).
11. Insert four bolts (10), lockwasher (11), and flat washer (12) through clamp (8) into adaptor plate (2).
12. Using 1/2-inch wrench, tighten slightly four bolts (10).

Installation of MX-2799 and Cabling AB-719

NOTE

For horizontal MX-2799 mounting, install mounting bracket on vehicle's side wall. For vertical MX-2799 mounting, install mounting bracket on vehicle's roof interior.



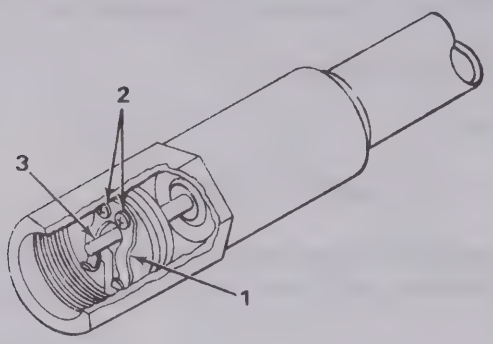
1. Install mounting bracket (1) into desired position (horizontal or vertical) using four bolts (2) and lockwasher (3). Using 1/2-inch wrench, tighten bolts.
2. Place MX-2799 (4) on mounting bracket (1). Aline holes of bracket with holes of MX-2799.
3. Insert four bolts (5) with lockwasher (6) through bracket holes into matching unit (4). Using 7/16-inch wrench, tighten.
4. Connect AB-719 rf cable plug (11) to MX-2799 jack (12). Slide spring assembly (7) up or down in clamp (8) to insure proper connection. (RF cable should not be crimped.)
5. Using 1/2-inch wrench, tighten two side C-clamp bolts (9).
6. Tighten four top bolts (10).

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

INSPECTION OF LOWER RT ANTENNA ELEMENT'S HORSESHOE CONTACT

TOOLS: Tool Kit, Electronic Equipment TK-101/G

Antenna Elements AS-2732/GRC (AS-2731/GRC), AS-1730/VRC (AS-1729/VRC) and AT-1096/VRC (AT-912/VRC)



EL8OA157

1. Check that horseshoe contact (1) is not damaged (e.g., flattened or broken).

NOTE

If horseshoe contact (1) is damaged, refer antenna element to higher level of maintenance.

2. If loose, tighten two screws (2). (Use screwdriver.)
3. Using screwdriver, push against the button contact (3) and check spring action.

NOTE

If the button contact (3) does not spring back, refer antenna element to higher level of maintenance.

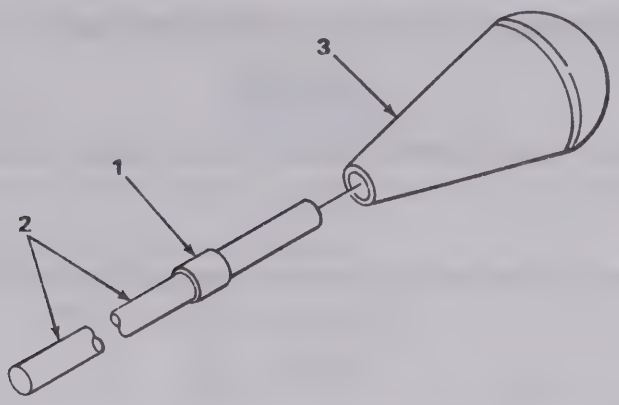
INSTALLATION OF ANTENNA TIP CAP AT-1095 (RT) AND MS-118 (AUX RECEIVER)

MATERIALS: Pressure-sensitive tape (item 4, appendix C)
Insulation tape (item 3, appendix C)
PRELIMINARY PROCEDURE: Insure proper length of upper element:
AT-1095/VRC 64 1/2 inches (163.83 cm) long.
MS-118A 39 3/4 inches (100.33 cm) long.

CAUTION

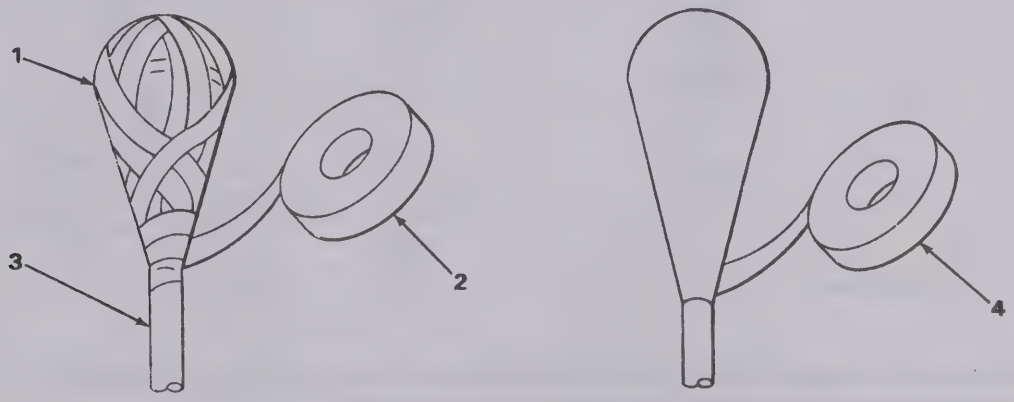
The antenna tip cap assembly and its plastic slotted end have to be reinforced and secured by pressure-sensitive tape and insulation tape.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)



EL8OA040

1. Wrap six or seven layers of 1/2-inch-wide pressure-sensitive tape (1) 2 inches from upper element (2) tip.
2. Place antenna tip cap (3) over tip of upper element (2). Push down until tip cap (3) (lower slotted part) rests in contact with the tape (1).



EL8OA041

3. Start taping at a tip cap (3) slot. Wrap tape (1) across tip cap (3), conforming with the shape of tip cap (3), so that tape (1) goes over the cap tip and returns to slotted end. Cut tape (1). (Repeat step until all slots have been reinforced and the tip cap is completely covered.)
4. Start wrapping 1/4-inch-wide electrical tape (4) on the upper element (2) just below pressure-sensitive tape (1), following the tip contour while lightly stretching the electrical tape (4). Wrap over top and back to the starting position on element (2). (Repeat until entire tip assembly is completely covered and the lower end is neatly tapered to upper element (2).)

CAUTION

Replace the electrical tape when excessively scuffed or weathered. The electrical insulating tape seals and protects the pressure-sensitive tape from the effects of sunlight and moisture.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

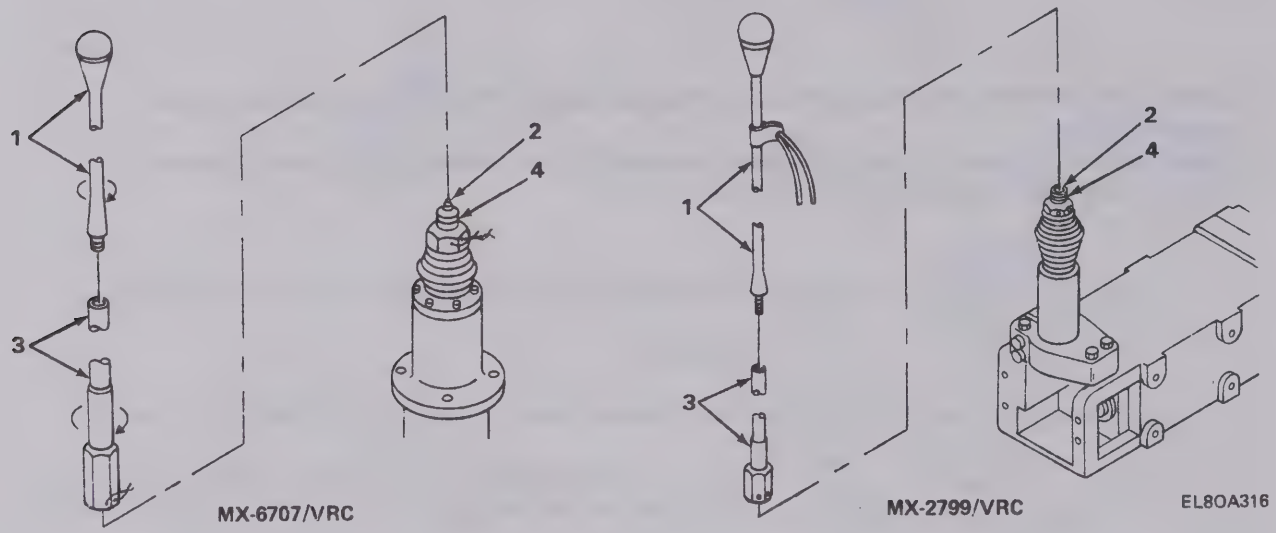
ASSEMBLING ANTENNA ELEMENTS OF AT-912, AS-1729, AND AS-2731

WARNING

Do not install antenna elements in an electrical storm.

NOTE

The AS-2731 does not use a top element, only a lower element. Therefore it is not included in this procedure.



1. Apply silicone compound (item 1, appendix C) to the threads (2) of upper element (1).
2. Screw upper element (1) into lower element (3). Handtighten.

NOTE

The bottom of the lower element (3) should cover the O-ring (4).

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

SECURING ASSEMBLED ANTENNA ELEMENTS TO MATCHING UNITS MX-2799, MX-6707, AND MX-9146

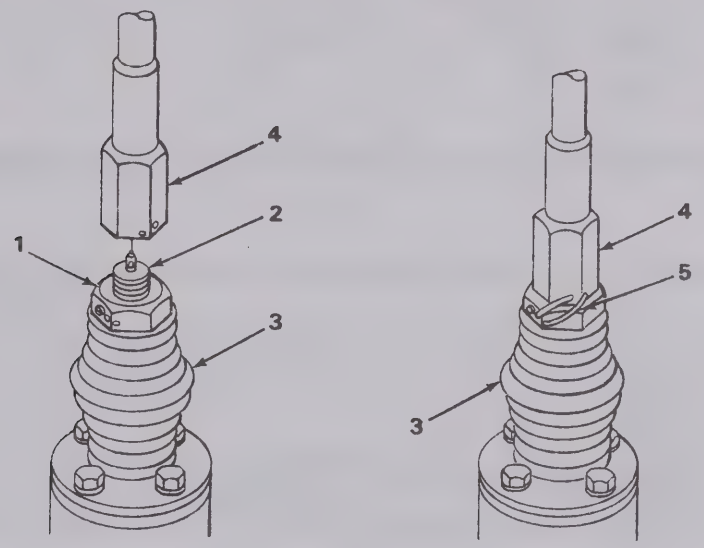
WARNING

Do not install antenna elements in an electrical storm.

PRELIMINARY PROCEDURE: For MX-2799 and MX-6707:
Assemble antenna elements. (See page 2-32.)
Install tip cap. (See page 2-30.)

NOTE

When lower element (4) is properly seated on spring assembly (3), O-ring (1) cannot be seen.



EL8OA287

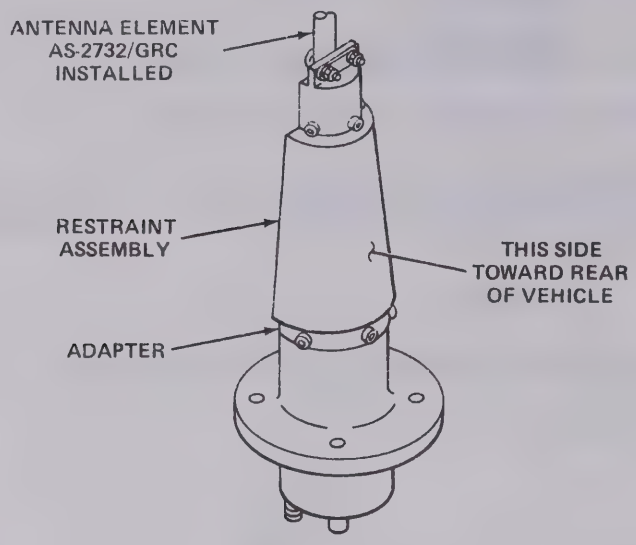
1. Apply silicone compound (item 1, appendix C) to O-ring (1) of threaded portion (2) of spring assembly (3).
2. Apply a light coat of silicone compound (item 1, appendix C) to threaded portion (2) of spring assembly (3).
3. Screw lower element (4) on threaded portion (2) of spring assembly (3). Handtighten.
4. Insert safety wire (5) through hole in lower element (4).
5. Insert other end of safety wire (5) through hole in spring assembly (3).
6. Using flat-nose pliers, twist free ends of safety wire (5) three to six times (pigtail method).
7. Cut excessive ends of safety wire (5). Bend remaining safety wire against the hexagonal portion of spring assembly (3).

NOTE

The safety wire helps keep the lower element from coming loose from the spring assembly while traveling.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

INSTALLATION OF MX-9146 RESTRAINT ASSEMBLY

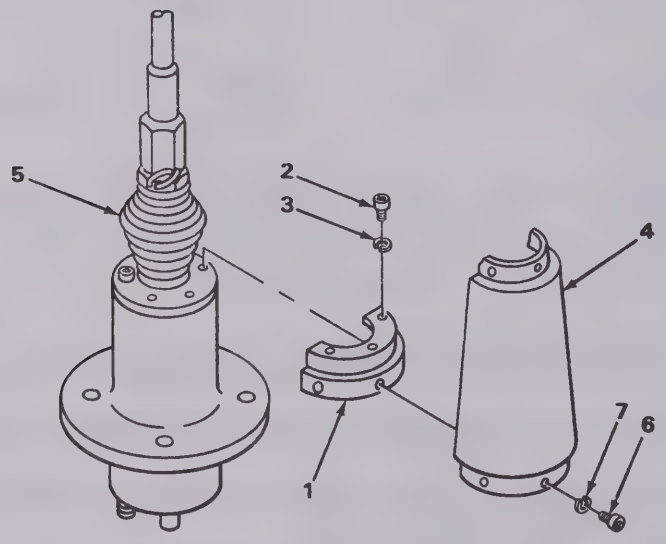


CAUTION

THE RESTRAINT ASSEMBLY MUST FACE THE REAR OF THE VEHICLE WHEN INSTALLED. THEREFORE, DETERMINE THE POSITION OF THE ADAPTER AND, IF NECESSARY, REPOSITION MX-9146/GRC IN VEHICLE.

EL8OA289

PRELIMINARY PROCEDURE: Remove three bolts and lockwashers from the MX-9146/VRC's spring assembly (5) flange.

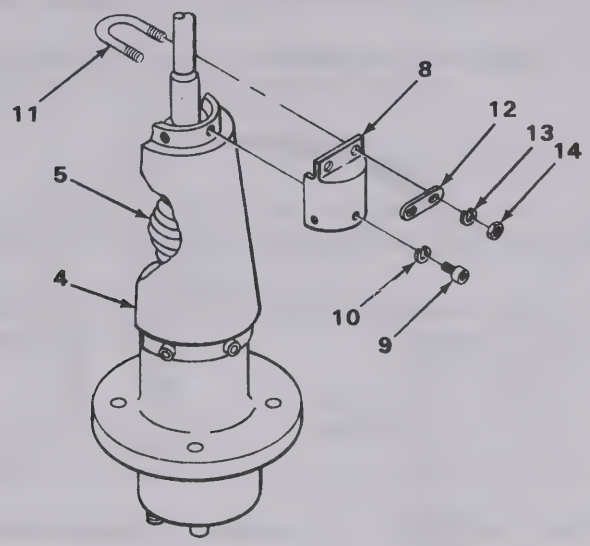


EL8OA275

1. Place adaptor (1) on flange of spring assembly. Aline the top holes of adaptor (1) with the holes in the flange of the spring assembly (5).
2. Insert three 7/16-inch-long bolts (2) through lockwashers (3) into the holes (top) of adaptor (1) and the flange of the spring assembly (5). Using 7/16-inch wrench, tighten.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

3. Place restraint assembly (4) against the spring (5). Aline holes of restraint assembly with the side holes of adaptor.
4. Insert three 1/4-inch-long hex (cap) screws (6) through lockwashers (7) into restraint assembly. Using 3/16-inch hex wrench, tighten.



EL8OA283

5. Place insert (8) over top of restraint assembly (4). Aline holes of insert (8) with holes of restraint assembly (4).
6. Insert three 1/4-inch-long hex (cap) screws (9) through lockwashers (10) and into holes of insert (8) and restraint assembly (4). Using 3/16-inch hex wrench, tighten.
7. Slide clamp hasp (11) around top of spring (bottom of antenna element) and through top holes of insert (8).
8. Slide bracket (12) onto hasp (11) threaded ends.
9. Place lockwashers (13) and hex nuts (14) over threaded ends of hasp (11). Using 3/16-inch wrench, tighten until bracket (12) is held firmly against the top of insert (8).

CAUTION

Do not overtighten hasp (11) to insert (8) assembly. Overtightening could break or crack bottom of antenna assembly.

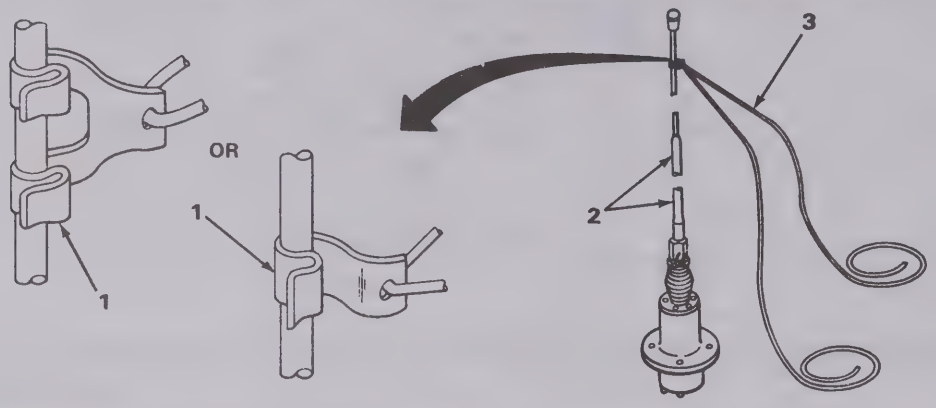
2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

ANTENNA TIEDOWN PROCEDURE FOR RT AND AUX RECEIVER ANTENNAS

WARNING

Do not use RT for transmission while attaching the antenna tiedown assembly.

PRELIMINARY PROCEDURE: Tie down the rope (3) placed through tiedown assembly (1).



EL8OA028

1. Slide locking jaw of tiedown assembly (1) around middle of upper element (2).

WARNING

Antenna element must be installed in tiedown assembly (1) as illustrated to prevent the element from coming loose and returning to an upright position. In an upright position, an element could strike a powerline. Death to persons inside, or in contact with, the vehicle can result.

2. Pull tiedown assembly rope (3) so antenna is at 30° to 45° angle to ground.
3. Tie both ends of tiedown assembly rope (3) to convenient places on the vehicle. The bowline knot is best because it won't slip or come loose easily.

WARNING

The use of a bowline knot is recommended. The bowline knot will not easily come loose, preventing the elements from returning to an upright position.

Be sure that the tip of antenna is not projecting over the outside of the vehicle.

CAUTION

Do not cross antenna elements when tying down. Damage to radio components can result.

NOTE

The antenna may be used in the tied down position.

If the ends of tiedown rope unravel, cut off the unraveled part. Put the end over a flame for a moment to seal the threads.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS AT-912, AS-1729, AND AS-2731. (CONT)

CAUTION

Before connecting cables to the matching unit and the RT, turn RT POWER switch to OFF. Connector pins may be damaged due to arcing if this precaution is not observed.

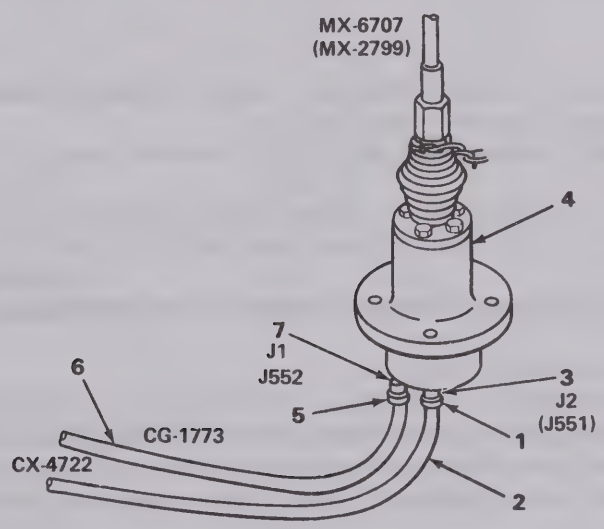
CABLING ANTENNAS

PRELIMINARY PROCEDURE: Install RT. (See paragraph 2-17.)

NOTE

Before cabling the antenna to its RT, refer to cable charts on pages 2-45 through 2-47. Certain tracked vehicles do not use standard Control Cable CX-4722/VRC and RF Cable CG-1773/U.

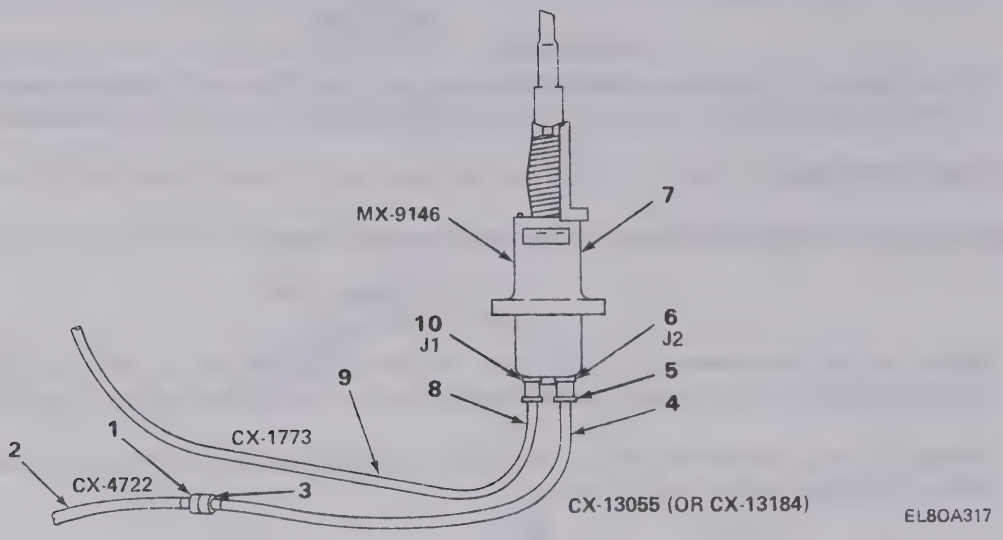
Always connect the cable with the largest plug (control cable) to the matching unit before connecting the smaller plug (rf cable).



For MX-6707 (MX-2799):

1. Connect plug (1) of Control Cable CX-4722 (or modified) (2) to Jack J2 (J551) (3) of matching unit (4). Turn plug collar until it locks in place.
2. Connect plug (5) of RF Cable CG-1773 (or modified) (6) to Jack J1 (J552) (7) of matching unit (4). Turn plug collar until it locks in place.

2-15. INSTALLATION AND CABLING OF RT ANTENNAS, AT-912, AS-1729, AND AS-2731. (CONT)



For MX-9146:

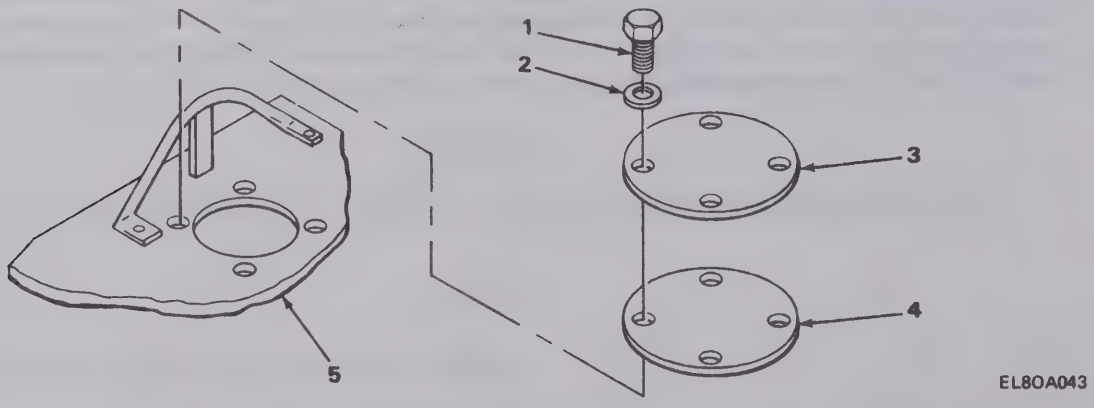
1. Connect plug (1) of Control Cable CX-4722 (2) to plug (3) of Adaptor Cable CX-13055 (or CX-13184) (4). Turn plug collar until it locks in place.
2. Connect plug (5) of adaptor cable (4) to Jack J2 (6) of matching unit (7). Turn plug collar until it locks in place.
3. Connect plug (8) of RF Cable CG-1773 (9) to Jack J1 (10) of matching unit. Turn plug collar until it locks in place.

2-16. INSTALLATION AND CABLING OF AUXILIARY RECEIVER ANTENNA.

INSTALLATION OF ANTENNA BASE AB-558/GR

There are two different antenna bases used for the auxiliary receiver antenna. The most common base used for tracked vehicles is the AB-558/GR which is the first installation given. The AB-15/GR installation follows and, in turn, is followed by the remaining procedures which apply to both antennas.

INITIAL PROCEDURE: Remove vehicle antenna port cover.

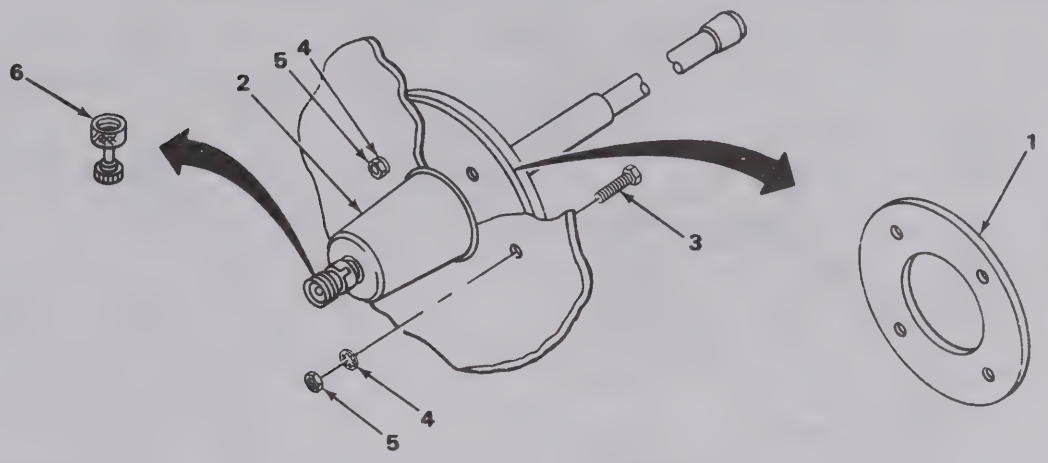


1. Using adjustable wrench, remove four bolts (1) and lockwashers (2).
2. Remove cover (3) and gasket (4) from vehicle's antenna port.

2-16. INSTALLATION AND CABLING OF AUXILIARY RECEIVER ANTENNA. (CONT)

NOTE

Do not discard vehicle port cover. Put it in administrative storage.



EL8OA045

NOTE

Remove the paint from the area of the hardware mounting hole which is to accommodate the grounding ring for grounding.

To install:

1. Apply a thin coat of silicone compound (item 1, appendix C) to gasket (1).
2. Place gasket (3) on bottom of AB-558 (2). Aline holes in gasket (1) with holes of AB-558 (2).
3. Insert AB-558 (2) into vehicle's antenna port. Aline holes of AB-558 (2) and gasket (1) with holes of antenna port.
4. Insert four bolts (3) through holes of AB-558 (2) and antenna port.
5. Place a star washer (4) and nut (5) on each bolt from inside vehicle.

CAUTION

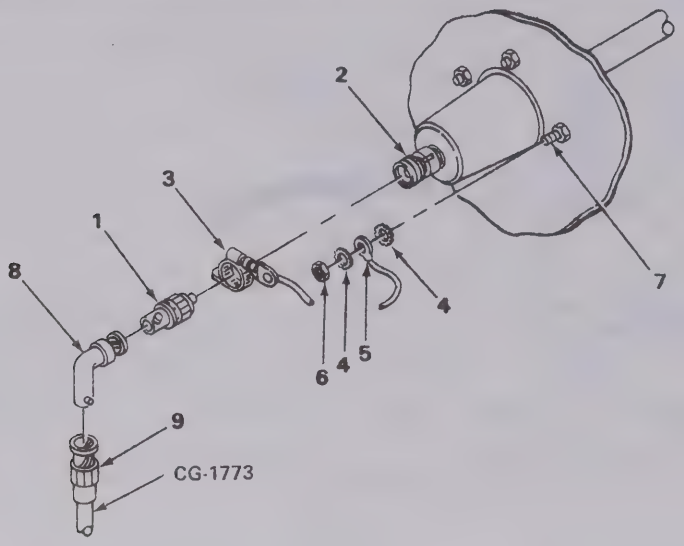
Overtightening of hardware (4) and (5) may damage AB-558 (2).

6. Tighten four bolts (3) using 1/2-inch wrench.
7. Remove binding post assembly (6). (Keep this binding post for future use.)

2-16. INSTALLATION AND CABLING OF AUXILIARY RECEIVER ANTENNA. (CONT)

INSTALLATION OF GROUND STRAP FOR ANTENNA BASE AB-558/GR

PRELIMINARY PROCEDURE: Install Antenna Base AB-558/GR. (See page 2-39.)



EL8OA274

1. Screw Adaptor UG-273/U (1) onto AB-558's jack (2). Fingertighten until snug.
2. Slide grounding clamp (3) over tightening collar (larger portion) of Adaptor UG-273/U (1). Fingertighten but insure tight fit.
3. Put a star washer (4), the lug on the free end of the ground strap (5), another star washer (4), and nut (6) on mounting bolt (7). Using a 7/16-inch wrench, tighten until snug.

CABLING ANTENNA BASE AB-558/GR

NOTE

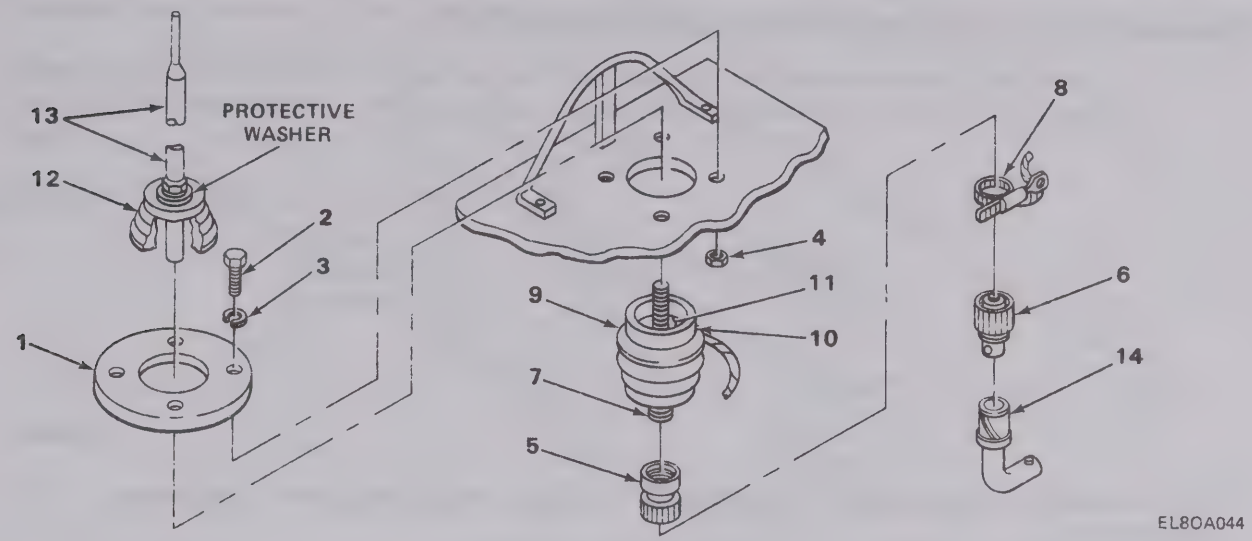
Some installations require a right-angle Adaptor UG-306/U. Refer to TM 11-5820-401-20-2-HR for these installations.

1. Connect Adaptor UG-306/U (8) (if required) to Adaptor UG-273/U (1). Turn plug collar until it locks in place.
2. Connect RF Cable CG-1773 plug (9) to Adaptor UG-306/U (8) or UG-273/U (1). Turn plug collar until it locks in place.

2-16. INSTALLATION AND CABLING OF AUXILIARY RECEIVER ANTENNA. (CONT)

INSTALLATION AND CABLING OF ANTENNA BASE AB-15/GR AND GROUND STRAP

PRELIMINARY PROCEDURE: Remove vehicle port cover. (See page 2-25.)



INITIAL PROCEDURE (IF NEEDED)

1. Secure adaptor plate (1) over antenna port using four bolts (2), lockwashers (3), and nuts (4). Tighten using 7/16-inch wrench.
2. Remove paint 1/4 inch around bottom side of vehicle's antenna port.
3. Remove binding post (5). (Keep this binding post for future use.)

To install Antenna Base AB-15/GR and ground strap:

1. Screw Adaptor UG-273/U (6) to antenna base threaded post (7).
2. Connect grounding clamp (8) to tightening collar of UG-273/U (6). Fingertighten but insure tight fit.
3. Put a thin coat of silicone compound (item 1, appendix C) on rubber gasket (9). Place rubber gasket (9) over lower insulator (11).
4. Place ground ring (10) over lower insulator (11) so it rests on the rubber gasket (9).
5. Put a thin coat of silicone compound (item 1, appendix C) on another rubber gasket (9). Stick rubber gasket (9) to bottom side of upper insulator (12).
6. Insert lower insulator (11) with rubber gasket (9) and ground ring (10) through antenna port.
7. Place upper insulator (12) and rubber gasket (9) over lower insulator (11).
8. Insert support (13) through rubber gasket (9). Screw support (13) on stud of lower insulator (11). Handtighten.

CAUTION

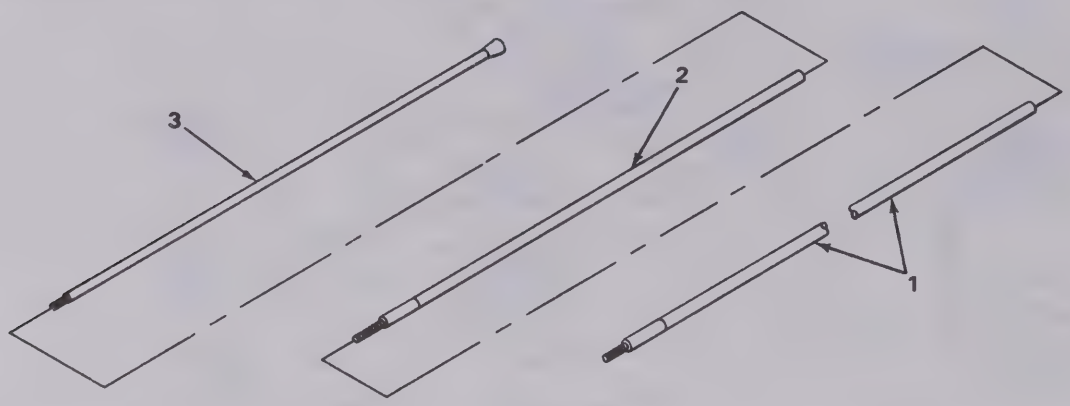
Do not overtighten antenna support. Damage to ceramic insulators could occur.

2-16. INSTALLATION AND CABLING OF AUXILIARY RECEIVER ANTENNA. (CONT)

INSTALLATION OF ANTENNA TIP CAP

Install tip cap on auxiliary receiver antenna upper element, MS-118. (See paragraph 2-15.)

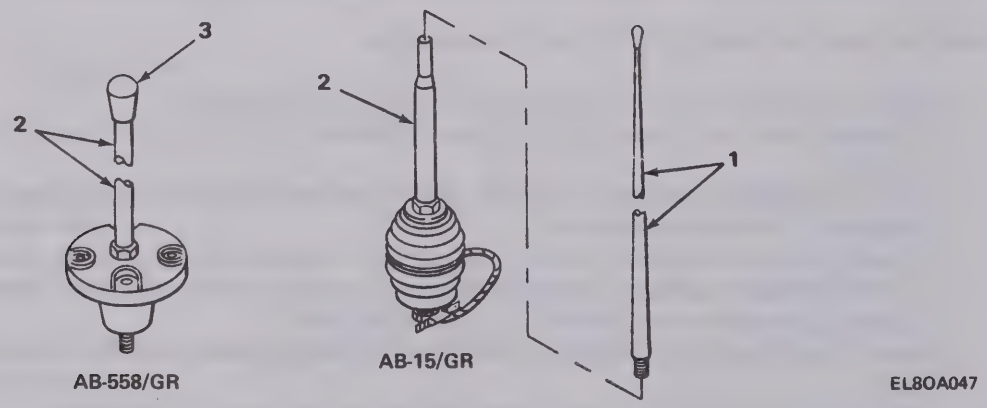
ASSEMBLING ANTENNA ELEMENTS MS-116, MS-117 AND MS-118



1. Apply silicone compound (item 1, appendix C) to threads of upper element (1) and middle element (2).
2. Screw middle element (2) into lower element (1). Handtighten.
3. Screw upper element (3) into middle element (2). Handtighten.

SECURING ASSEMBLED ANTENNA ELEMENTS TO ANTENNA BASE

PRELIMINARY PROCEDURE: Remove protective cap (3) from antenna support (2).



1. Apply silicone compound (item 1, appendix C) to threads of lower element (1).
2. Screw lower element (1) into antenna base (2). Handtighten.

ANTENNA TIE DOWN

Install antenna tiedown assembly and tie down antenna so that it is at a 30° to 45° angle to ground. (See paragraph 2-15.)

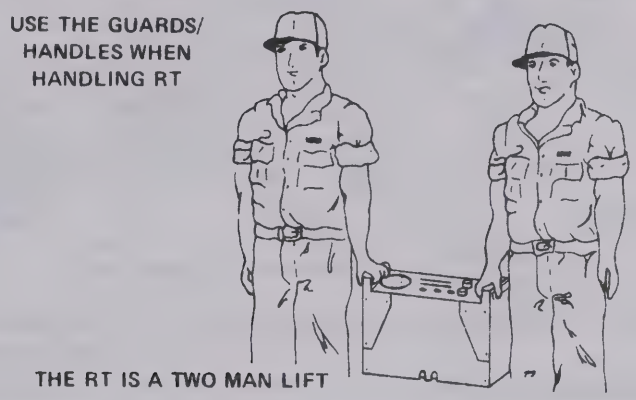
2-17. HANDLING, INSTALLING AND CABLING RECEIVER-TRANSMITTERS RT-524/VRC AND RT-246/VRC (WITHOUT LOCKING DEVICE).

WARNING

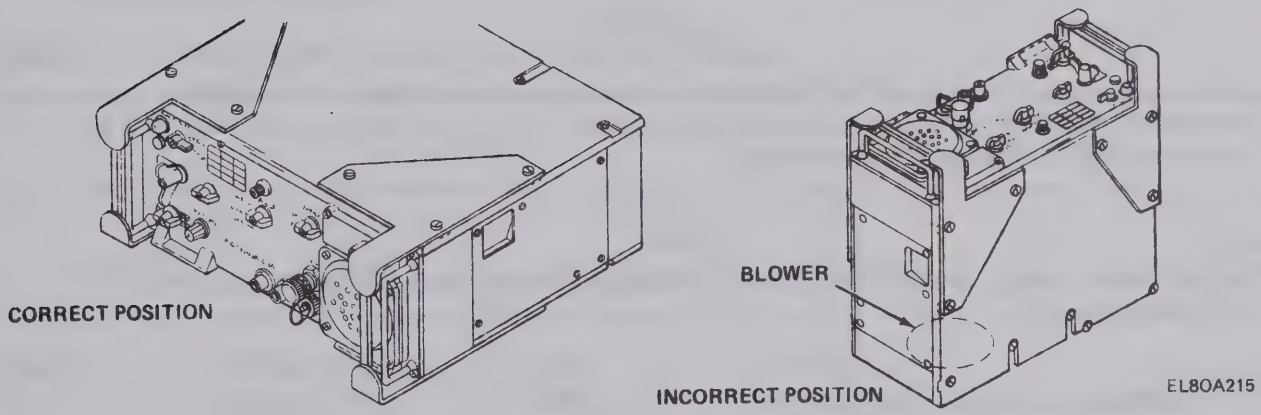
The receiver-transmitters are compact and heavy (over 60 lb). Be very careful when handling them. An object of such weight is considered a two-man lift.

Remove (turn off) power to a connector before removing or installing a cable. Connector pins may be **damaged** due to **arcing. Extreme** electrical **hazards** may exist that could cause **death.**

HANDLING RT-524/VRC AND RT-246/VRC



EL8OA214



EL8OA215

CAUTION

Set the RT on any of its sides, except the rear of the unit. The blower assembly may be damaged by such things as stones, metal objects, and mud lying on the ground or floor.

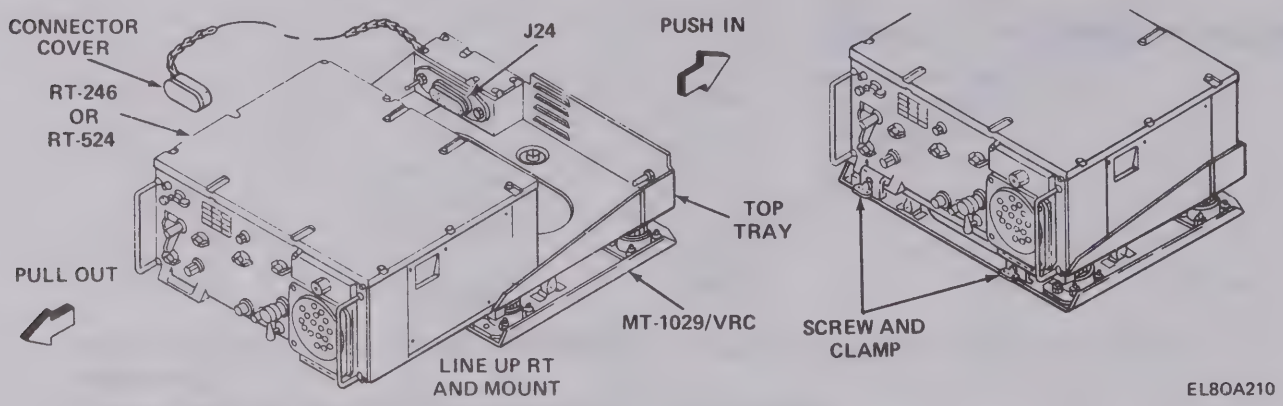
2-17. HANDLING, INSTALLING AND CABLING RECEIVER-TRANSMITTERS RT-524/VRC AND RT-246/VRC (WITHOUT LOCKING DEVICE). (CONT)

CAUTION

Before installing (or removing) an RT from its mount, turn off the POWER switch on the RT. Plug/jack pins may be **damaged** due to **arcing**.

INSTALLATION OF RT-524/VRC OR RT-246/VRC

PRELIMINARY PROCEDURE: RT antenna must be installed and cabled. (See paragraph 2-15.)



INITIAL PROCEDURE: Remove electrical cover.

CAUTION

Before putting the RT on its MT-1029/VRC, clean mount's top tray. Remove the electrical cover from mount's RT jack (J24) and insure that it and its chain will not be in the way of the RT. Damage to the RT plug (P401) could occur.

NOTE

Inspect mount jack (J24) and RT plug (P401) and guide pins for damage (e.g., bent, broken, or missing pins).

To install:

1. Lift RT. Set it on mount's top tray.
2. Line up back of RT with guide pins on mount's rear wall.
3. Push RT straight back into mount.

CAUTION

Be careful to keep RT flat on mount tray when sliding RT into (or out of) MT-1029/VRC. Damage to jack (J24) pins of the mount and RT plug (P401) will occur.

4. Lift up each clamp and tighten thumbscrews to lock RT to its mounting. Fingertighten.

CAUTION

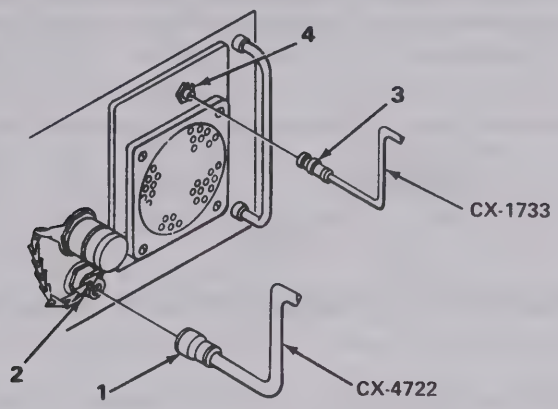
When RT is removed from MT-1029/VRC, put the electrical connector cover on the radio jack (J24). Damage to the jack pins can occur.

2-17. HANDLING, INSTALLING AND CABLING RECEIVER-TRANSMITTERS RT-524/VRC AND RT-246/VRC (WITHOUT LOCKING DEVICE). (CONT)

CABLING OF RT-524/VRC OR RT-246/VRC

NOTE

Cabling applies to A-RT of all AN/VRC-12 configurations. It also applies to C-RT of AN/VRC-45 and -49 configurations.



EL8OA281

1. Connect control cable plug (1) of CX-4722 (or modified) to ANT CONT jack (2) of RT. Turn clockwise until plug locks into place.
2. Connect rf cable plug (3) of CG-1773 (or modified) to ANT jack (4) of RT. Turn clockwise until plug locks into place.

CABLING - STANDARD (NOT M60A2 AND ABRAMS M1 TANKS)

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4722	RT-524(*)/VRC or RT-246(*)/VRC	ANT CONT	P1	MX-6707 or MX-2799 or MX-9146	J2 J551 J2	P2 P2 P2

NOTE

For MX-9146 control cabling, connect P1 of CX-13055 (or CX-13184) to P2 of CX-4722 and P2 of CX-13055 (or CX-13184) to J2 of MX-9146.

CG-1773	RT-524(*)/VRC or RT-246/VRC	ANT	P1	MX-6707 or MX-9146 or MX-2799 or MX-9146	J1 J1 J552 J1	P2 P2 P2 P2

2-17. HANDLING, INSTALLING AND CABLING RECEIVER-TRANSMITTERS RT-524/VRC AND RT-246/VRC (WITHOUT LOCKING DEVICE). (CONT)

CABLING - M60A2 AND M1 (ABRAMS) TANKS

WARNING

Do not use standard RT antenna cables in the M60A2 and Abrams M1 tanks. Serious injury or **death** can occur because the standard cables radiate undesirable signals that could cause the main turret and/or the tank commander's cupola and/or the main gun to move violently.

CABLING M60A TANK

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4722 (Modified)	RT-524(*)/VRC or RT-246(*)/VRC	ANT CONT	P1	MX-6707 or MX-9146	J2 J2	P2 P2

NOTE

For MX-9146 control cabling, connect P1 of CX-13055 to P2 of CX-4722 (modified) and P2 of CX-13055 to J2 of MX-9146.

CG-1773 (Modified)	RT-524(*)/VRC or RT-246(*)/VRC	ANT	P1	MX-6707 or MX-9146	J1 J1	P2 P2

2-17. HANDLING, INSTALLING AND CABLING RECEIVER-TRANSMITTERS RT-524/VRC AND RT-246/VRC (WITHOUT LOCKING DEVICE). (CONT)

CABLING M1 TANK

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4722 (Modified)	RT-524(*)/VRC or RT-246(*)/VRC	ANT CONT	P1	MX-6707 or MX-9146	J2 J2	P2 P2

NOTE

For MX-9146 control cabling, connect P1 of CX-13184 to P2 of CX-4722 (modified) and P2 of CX-13184 to J2 of MX-9146.

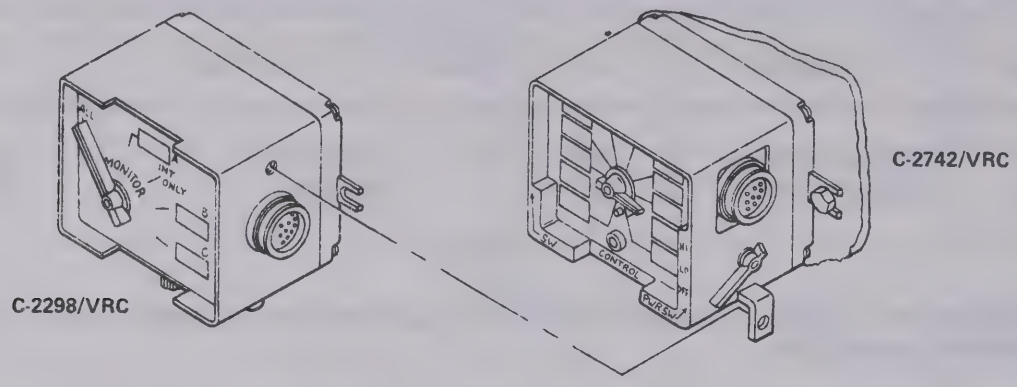
CG-1773 (Modified)	RT-524(*)/VRC or RT-246(*)/VRC	ANT	P1	MX-6707 or MX-9146	J1 J1	P2 P2

2-18. INSTALLING AND CABLING CONTROL, FREQUENCY SELECTOR C-2742/VRC.

CAUTION

Set RT-246 POWER switch to OFF. Turn to OFF all communications equipment or serious arcing will occur, causing damage to connector pins.

INSTALLING C-2742/VRC



To install C-2742/VRC:

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. (If plug orientation is not correct, see paragraph 2-5 for detailed procedure.)
3. Lift and turn wingnut clockwise until plug is locked into jack. Fingertighten only.

NOTE

The C-2742/VRC (primary) is commonly mounted on the commander's control box. In tanks, if a second C-2742/VRC is installed, it is commonly mounted on the loader's control box.

INSTALLATION OF CABLES ON C-2742

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-7059/VRC	RT-246/VRC	REMOTE	P1	C-2742/VRC (Primary) (Commander's)	J71	P2
CX-4723/VRC	C-2742/VRC (Primary) (Commander's)	J72		C-2742/VRC (Loader's)	J71	

2-19. HANDLING, INSTALLING AND CABLING AUXILIARY RECEIVER R-442/VRC.

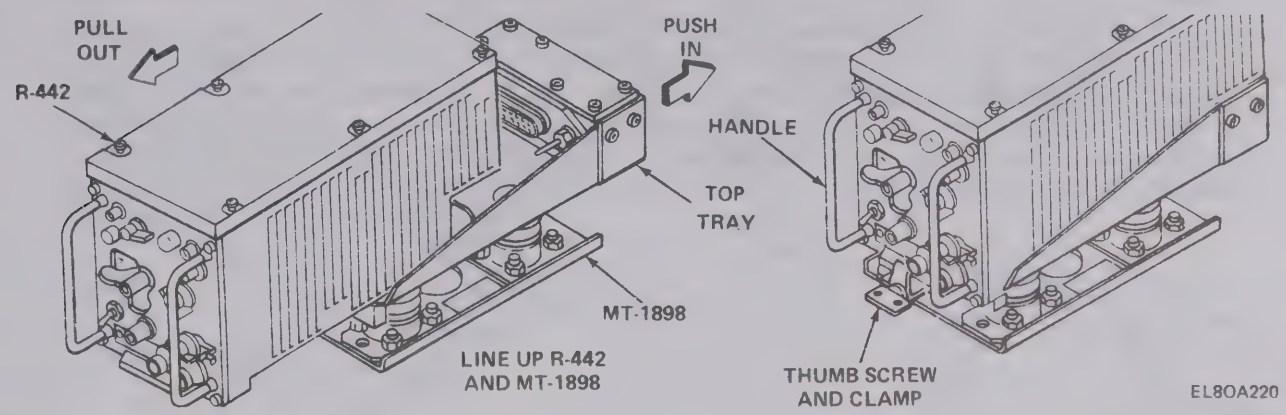
CAUTION

Before installing (or removing) an aux receiver from the mounting, set R-442 POWER switch to OFF or serious **arcing** will occur, causing **damage** to connector pins.

HANDLING R-442/VRC

Use the guards/handles when carrying the R-442/VRC.

INSTALLING AUXILIARY RECEIVER R-442/VRC



PRELIMINARY PROCEDURE: Before pushing the R-442 on MT-1898, clean MT-1898 top tray. Remove the electrical cover from MT-1898 radio jack (J14) and insure that it and its chain will not be in the way of the R-442. Inspect mount jack (J14) and R-442 plug (P201) and guide pins for damage (e.g., bent, broken or missing pins).

1. Lift R-442. Set it on mount's top tray.
2. Line up back of R-442 with guide pins on mount's rear wall.
3. Push R-442 straight back into mount.

CAUTION

Be careful to keep R-442 flat on mount's tray when sliding R-442 into (or out of) MT-1898/VRC. Damage to jack (J14) pins of the mount and R-442 plug (P201) will occur.

4. Lift up clamp and tighten thumbscrew to lock R-442 to its mounting. Fingertighten.

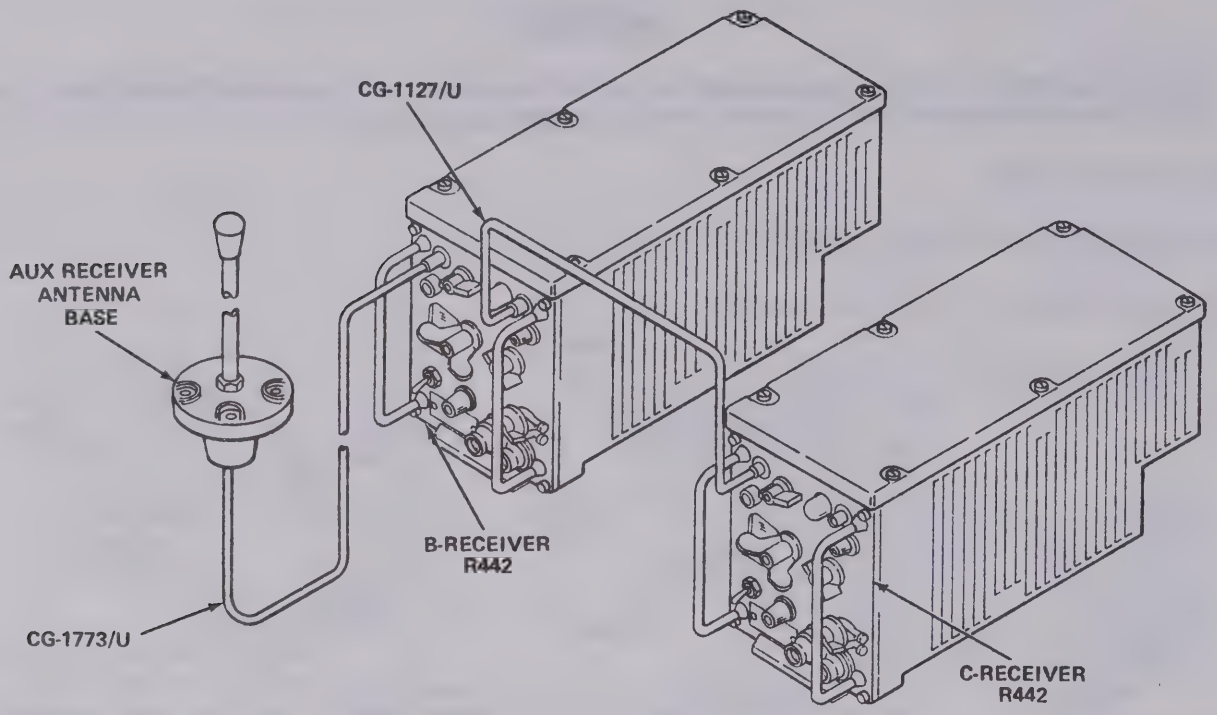
CAUTION

When removing the R-442 from MT-1898/VRC, put the electrical connector cover on the radio jack (J14). Damage to jack pins can occur.

CABLING OF R-442

See pages 2-40 and 2-41 for cabling of auxiliary receiver antenna. Some installations require the use of a right angle adaptor UG-306/U.

2-19. HANDLING, INSTALLING AND CABLING AUXILIARY RECEIVER R-442/VRC. (CONT)



EL8OA221

TYPICAL CABLING

For installations where there are two auxiliary receivers, the B- and C-receivers are coupled together and the auxiliary receiver antenna is connected to one of the receivers. Coupling is done by connecting together the closest ANT jacks on the B- and C-receiver using Cable CG-1127/U. Plug P1 on CG-1127/U is identical to P2 so either plug can be attached to either auxiliary receiver.

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-1773/U	B-Receiver	ANT (Either)		Antenna Base AB-15/GR or AB-558/GR (AN/VRC-12, -47)		
CG-1773/U	C-Receiver	ANT (Right)		Antenna Base AB-15/GR or AB-558/GR (AN/VRC -44, -48)		
CG-1127/U	C-Receiver	ANT (Left)		B-Receiver (AN/VRC -44, -48)	ANT (Right)	

2-20. INSTALLATION AND CABLING TRANSIENT SUPPRESSOR MX-7778/GRC.

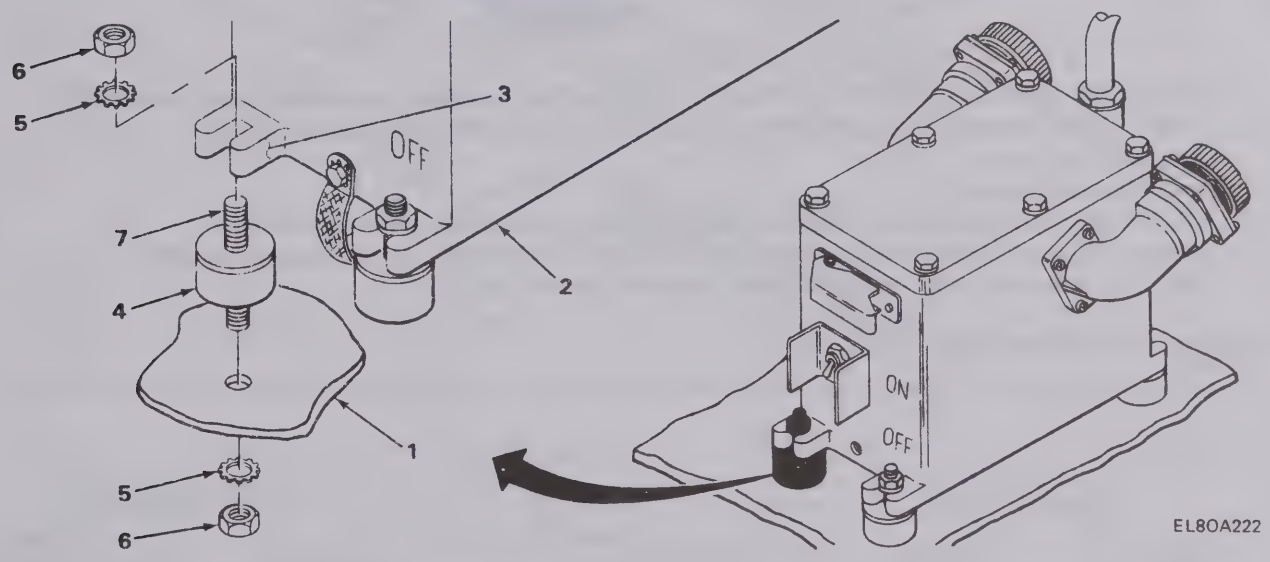
CAUTION

Before installing a transient suppressor, turn vehicle MASTER POWER switch to OFF, or unplug main power cable from vehicle's C-E equipment outlet. **Serious arcing** will occur, causing **damage** to connector pins.

INSTALLATION OF TRANSIENT SUPPRESSOR

NOTE

See paragraphs 1-12 through 1-22 for location in vehicles. In some vehicles, Transient Suppressor MX-7777/GRC, part of MX-7778/GRC, may be mounted on a radio shelf or the vehicle fender. If the suppressor is to be mounted on a vehicle hull, a special bracket supplied with the suppressor must be used. For all installations, position the suppressor so that the circuit breaker and BATTLE OVERRIDE switches are readily available and cables are easily installed and routed. The drill and 1/4-inch drill bit required for this installation can be obtained from the motor maintenance shop.



1. Drill four holes through surface (1) where the MX-7777/GRC (2) is to be attached. Use the hole template provided with a new MX-7778/GRC as a guide for drilling. With older models, use the mounting lugs (3) for determining the placement of the drill holes.

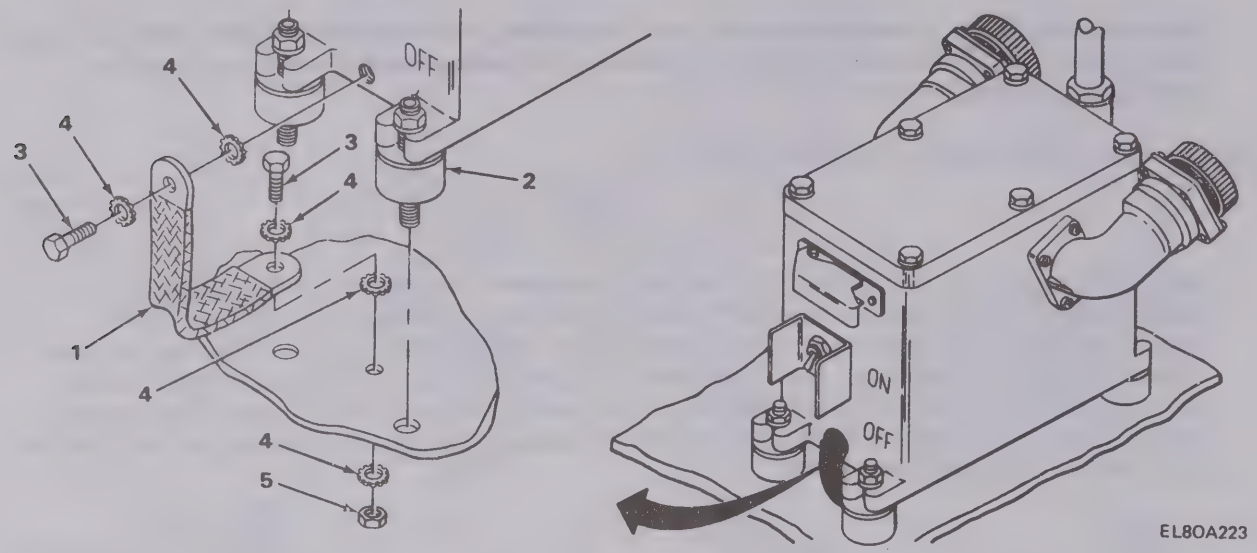
NOTE

For hull installation, position suppressor mounting bracket over tapped holes in vehicle hull and secure bracket with four bolts and star washers.

2. Place a rubber mount assembly (4) into each of the four mounting drill holes.
3. Place a star washer (5) and a nut (6) over each mounting stud (7) from the underside of mounting surface. Tighten with a 7/16-inch wrench.
4. Set MX-7777/GRC (2) onto rubber mount assembly (4) so that each mounting stud (5) passes through a mounting lug (3).
5. Place a star washer (5) and a nut (6) over each mounting stud (7). Tighten with a 7/16-inch wrench.

2-20. INSTALLATION AND CABLING OF TRANSIENT SUPPRESSOR MX-7778/GRC. (CONT)

INSTALLATION OF GROUND STRAP



1. Drill a hole for ground strap (1) on the mounting surface between the front rubber mounts (2).
2. Insert bolt (3) through star washer (4), ground strap (1), another star washer (4) and mounting surface.

On the underside surface:

3. Place a star washer (4) and nut (5) on bolt (3). Using 7/16-inch wrench, tighten.
4. Insert bolt (3) through star washer (4), ground strap (1), another star washer (4) and into MX-7777 threaded hole. Using 7/16-inch wrench, tighten bolt.

CABLING OF SUPPRESSOR

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-10613/G	Vehicle C-E Equipment DC Power Outlet		P1	MX-7777/GRC	J3	P2
CX-13089/VRC	MX-7777/GRC	J1 or J2	P1	A-RT Mount MT-1029/VRC (AN/VRC-12 Series)	J21	P2

2-21. INSTALLATION OF MINISUPPRESSOR IN A RADIO MOUNT.

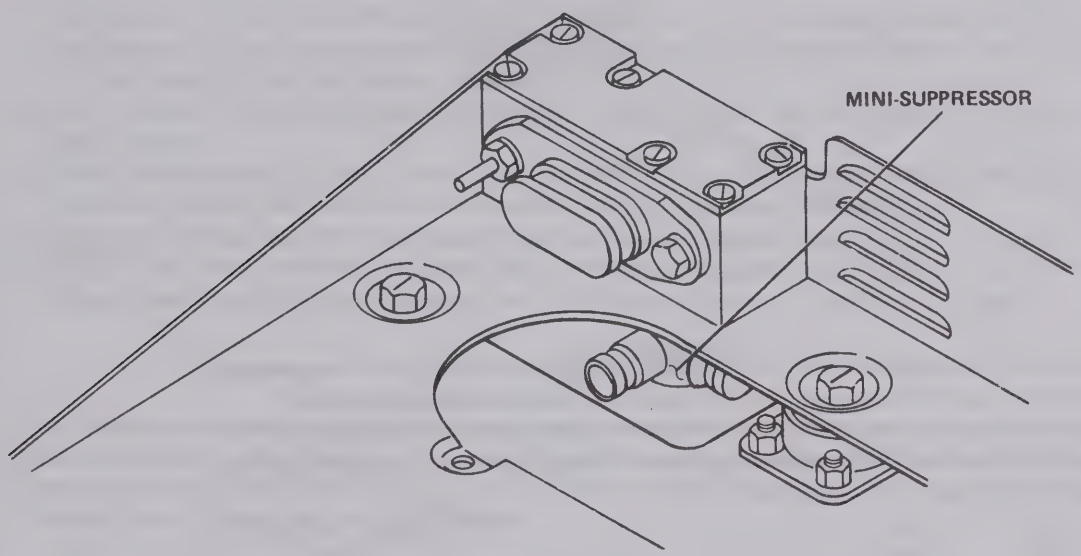
WARNING

Once installed, the minisuppressor is active, even when the radio-intercom system POWER switches are off. Do not touch heat sink or the suppressor body. These surfaces can become so hot (215°F (88°C)) they can injure personnel (severe burns). Allow 10-minute cooling before replacing minisuppressor.

NOTE

When the minisuppressor is used in a vehicle, the MX-7778(*)/GRC is not installed.

LOCATION OF MINISUPPRESSOR



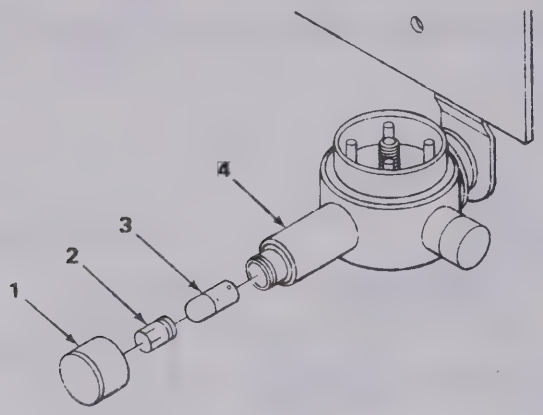
CONFIGURATION	ASSEMBLY	MOUNTING JACK
AN/VRC-46 (-43)	A-RT MT-1029/VRC	J23
AN/VRC-47 (-12)	B-RCVR MT-1898/VRC	J13
AN/VRC-48 (-44)	C-RCVR MT-1898/VRC	J13
AN/VRC-49 (-45)	C-RT MT-1029/VRC	J23

2-21. INSTALLATION OF MINISUPPRESSOR IN A RADIO MOUNT. (CONT)

WARNING

The minisuppressor, once installed, is active. The heat sink reaches 215°F (88°C). Allow 10-minute cooling before replacing minisuppressor. **Severe burns** will result if **touched**.

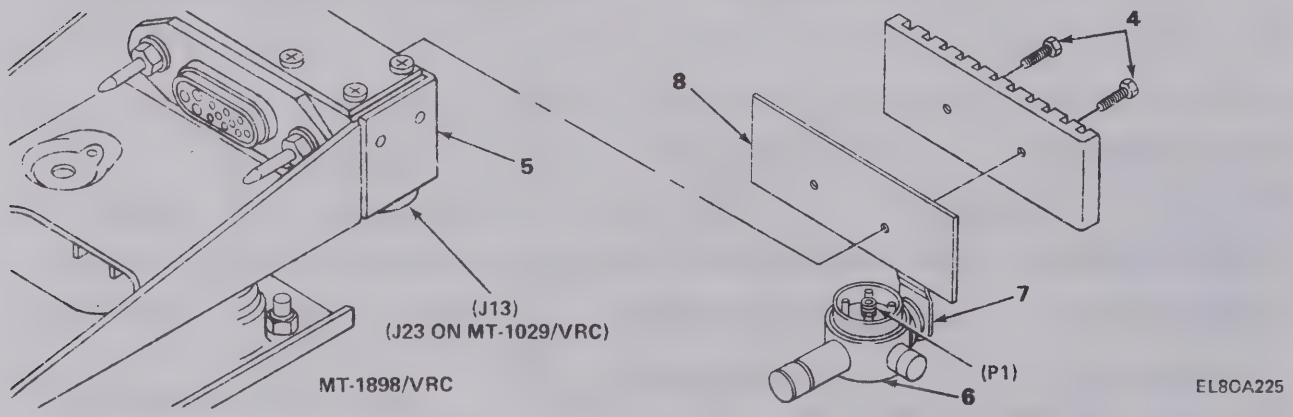
PRELIMINARY PROCEDURE: Turn off vehicle power and unplug Power Cable CX-13089 from vehicle's C-E equipment outlet.
Remove ground strap and top tray of mount. (See paragraph 3-19.)



EL8OA032

INSTALLATION

1. Unscrew and remove lamp lens (1), lamp retainer (2) and lamp (3) from suppressor (4). Check that lamp filament is not broken. (Check continuity using ohmmeter.)
2. Install lamp (3) into lamp retainer (2). Insert lamp (3) and lamp retainer (2) into mini-suppressor. Place lens (1) over retainer, screw on suppressor (4), and handtighten.



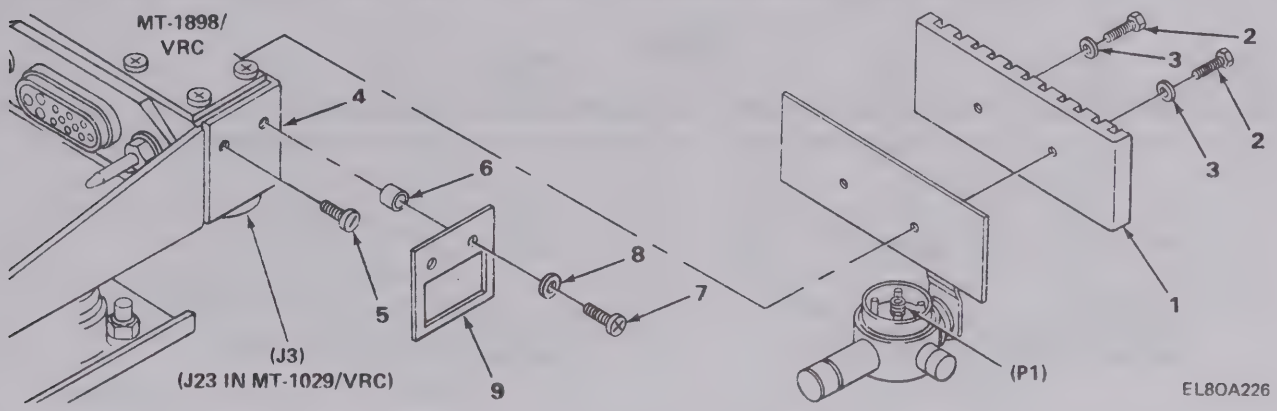
EL8OA225

3. Remove and discard the two screws (4) from the back of MT-1898/VRC (or MT-1029/VRC) J-box (5).
4. Apply a thin coating of silicone compound (item 1, appendix C) to entire back of J-box (5).
5. Carefully mate the minisuppressor plug (P1) with the MT-1898 jack (J13) (or MT-1029 jack (J23)). Handtighten minisuppressor wingnut (6).

NOTE

Do not remove convector (8) connection to the diode mounting screw and washer (7).

2-21. INSTALLATION OF MINISUPPRESSOR IN A RADIO MOUNT. (CONT)



6. Apply a coating of silicone compound (item 1, appendix C) to back of heat sink (1).
7. Using two 5/8-inch-long screws (2) and lockwashers (3), attach the heat sink (1) to the back of the J-box (4). Tighten using screwdriver.
8. Remove and discard the two screws from the right side of the MT-1898 (or the left side of MT-1029) (5).
9. Using the spacers (6), two 7/8-inch-long screws (7) and washers (8), attach the guard plate assembly (9) on the side of the radio mounting. Tighten using screwdriver.
10. Wipe off excess silicone compound from edges of the heat sink (1).
11. Install the radio mounting tray and ground straps. (See paragraph 3-19.)
12. Reconnect the CX-13089 power cable to MT-1898 (J11) or MT-1029 (J21) outlet.

WARNING

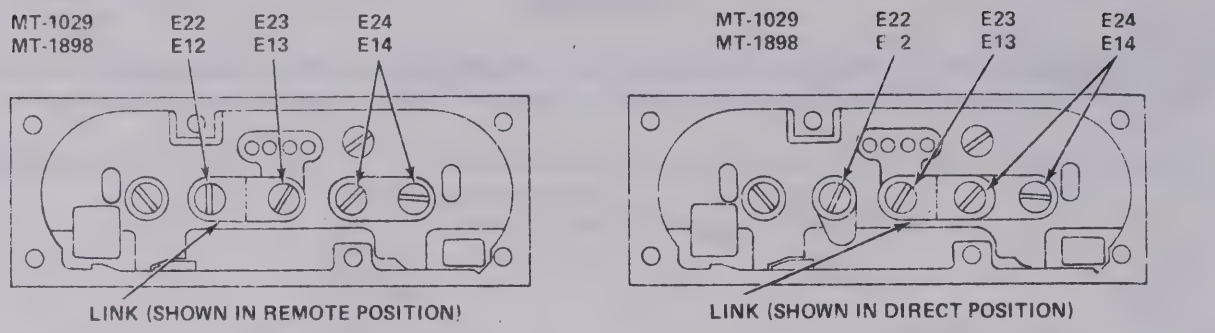
Once installed, the minisuppressor is active, even when the radio-intercom system POWER switches are off. Do not touch the heat sink or the suppressor body. These surfaces can become so hot (215°F (88°C)) they can injure personnel (severe burns). Allow 10-minute cooling before replacing minisuppressor.

NOTE

Follow steps above when installing minisuppressor in replacement mounting. Also, see paragraph 3-21.

Remove the old silicone compound before installing the minisuppressor on another radio mount.

2-22. VERIFYING LINK POSITION OF RADIO MOUNT.



INITIAL PROCEDURE

1. Set vehicle MASTER POWER switch(es) to OFF.
2. Set MX-7777 POWER circuit breaker to OFF.
3. On AM-1780/VRC, set:
   a. POWER CKT BKR to OFF.
   b. MAIN PWR to OFF.
   c. INSTALLATION SWITCH to RETRANS (AN/VRC-45 and -49) or to OTHER (all the other AN/VRC-12 configurations).
4. Set all radio components POWER switches to OFF.
5. Set vehicle MASTER POWER switch(es) and MX-7777 power circuit breaker to ON.

VERIFICATION

1. Other than A-RT, set additional radio components POWER switches to ON. (C-RT or C-R-442 and/or B-R-442.) If **additional** radio component dial lamp lights, change link position from DIRECT to REMOTE in the mount whose radio dial lamp lights.
2. Turn A-RT POWER switch on (LOW). If A-RT dial lamp lights, change link position from DIRECT to REMOTE in the A-RT MT-1029.
3. Turn AM-1780 MAIN PWR switch to NORM. If all radio component lamps do not light, trouble exists within the system.

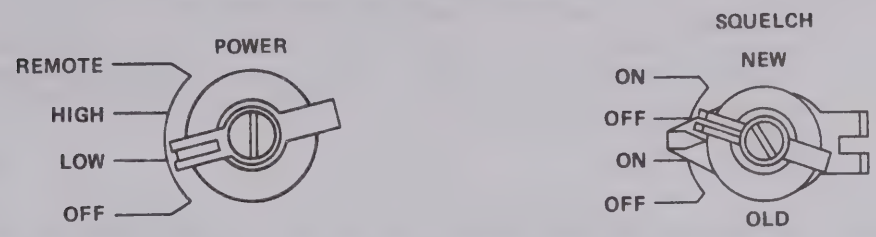
NOTE

If radio component's dial lamps light when doing step 3, the links within the mounts are in REMOTE.

2-23. DETERMINING POSITION OF RT X-MODE SWITCH.

NOTE

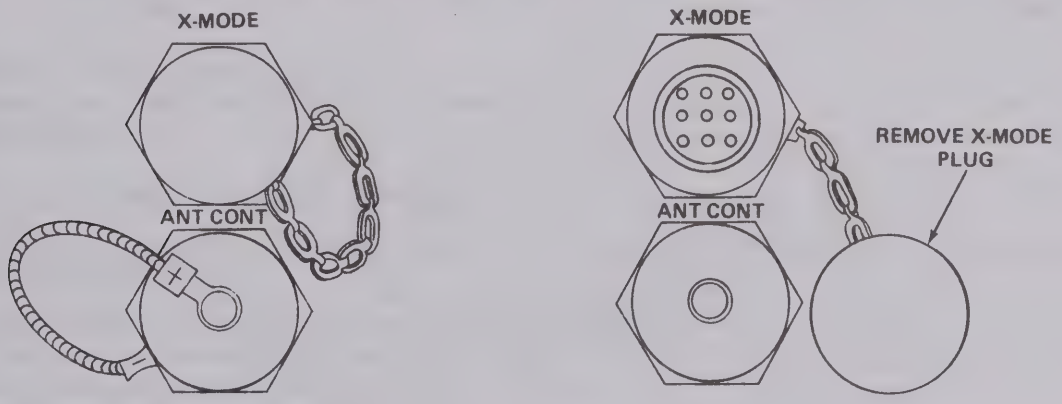
The X-MODE-NORMAL switch inside RT should be in the X-MODE position for **both** NORMAL and X-MODE operation.



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RT X-MODE SWITCH CHECK:

1. Turn SQUELCH switch to OFF.
2. Turn POWER switch to LOW. You should hear a rushing noise (hissing sound). If there is no rushing noise, RT is bad. See chapter 3, section III, Troubleshooting.



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3. Remove X-MODE plug. If the RT internal switch is in X-MODE, the rushing noise will disappear. If the rushing noise is still there, the switch is probably in NORMAL. See paragraph 3-16 for changing X-MODE switch position.
4. Replace X-MODE plug. Rushing noise should reappear. If the noise does not reappear, see chapter 3, section III, Troubleshooting.

NOTE

The setting of X-MODE switch inside a R-442 depends on whether or not speech-securing equipment is installed. When speech-secured, set to X-MODE; when not, set to NORMAL. See paragraph 3-17.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE

Subject	Section	Page
Repair Parts, Special Tools, TMDE and Support Equipment	I	3-1
Organizational Preventive Maintenance Checks and Services	II	3-2
Troubleshooting	III	3-16
Maintenance Procedures	IV	3-187
Preparation for Storage or Shipment	V	3-326

OVERVIEW

This chapter contains information concerning maintenance for the AN/VRC-12 series radio sets in combination with the AN/VIC-1 intercom set at the organizational maintenance level. Troubleshooting is done on a radio set and the intercom set operating as a communications system installed in a tracked vehicle. Organizational maintenance procedures are provided for individual components of the radio intercom sets. When similar maintenance is done for more than one component, those components are grouped together.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

Subject	Para	Page
Common Tools and Equipment	3-1	3-1
Special Tools, TMDE and Support Equipment	3-2	3-1
Repair Parts	3-3	3-2

3-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to appendix B of this TM and/or to the table that is applicable to your unit.

Modified Table of Organization and Equipment (MTOE)
Tables of Distribution and Allowances (TDA)
Joint Tables of Allowances (JTA)
Common Tables of Allowances (CTA)

3-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.

Tools, test equipment (TMDE) and support equipment are listed in the Maintenance Allocation Chart (MAC), appendix B.

3-3. REPAIR PARTS.

Repair parts needed for organizational maintenance can be found in the following manuals.

TM 11-5820-401-20P	AN/VRC-12 series radio set components: RT 524(*)/VRC, RT 246(*)/VRC, RCVR 442(*)/VRC, RT Antennas, Auxiliary RCVR Antennas, Mountings 1029/VRC and 1898/VRC, Controls C-2299 and C-2742 Spare Parts and Special Tools List
TM 11-5830-340-12	AN/VIC-1 intercom set components: AM-1780, AM-7046 (FIST), C-2298, C-2297, C-2296, C-10456, (Abrams) and C-10680 (FIST) Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists for Intercommunication Set AN/VIC-1(V)
TM 11-5915-223-24P	Electrical Transient Suppressor MX-7778/GRC Repair Parts and Special Tools List

Section II ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Subject	Para	Page
General	3-4	3-2
Organizational Maintenance Level Preventive Maintenance Checks and Services	3-5	3-3
Cleaning and Touchup Painting	3-6	3-15

3-4. GENERAL.

As specified in this section, Preventive Maintenance Checks and Services (PMCS) are done to:

1. Spot small communications system problems and correct them before they cause system failure.
2. Keep the communications equipment in good physical condition.
3. Insure that each component is functioning properly, both as an individual component, and with other components of the communication system with which it is combined.

Organizational maintenance level PMCS for radio-intercom systems are normally done on a monthly and quarterly basis as scheduled on DD Form 314, Preventive Maintenance Schedule and Record. Your supervisor will establish a Monthly and Quarterly PMCS schedule (DD Form 314) for each tracked vehicle that has a radio-intercom system, but this PMCS may be done on a more frequent basis as directed by your supervisor.

Monthly (M) PMCS would be scheduled, for example; 12 January, 12 February, 12 March, etc. Quarterly (Q) PMCS, done every three months, would be scheduled, for example; 12 January, 12 April, 12 July, etc. The organizational level checks and services are listed in paragraph 3-5.

A record of any faults found during periodic PMCS and the corrective actions taken should be maintained on DA Form 2404, Equipment Inspection and Maintenance Worksheet.

3-4. GENERAL. (CONT)

A faulty item of equipment that cannot be repaired at the organizational maintenance level will be sent to the next higher level of maintenance, accompanied by a DA Form 2407, Maintenance Request.

NOTE

Complete instructions for the use, completion and disposition of maintenance forms and records are contained in DA Pam 738-750, The Army Maintenance Management System (TAMMS).

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

Organizational maintenance level PMCS for C-E equipment are done to ensure that your unit's radio-intercom equipment is in top operating condition. A comprehensive PMCS program reduces equipment downtime and increases your unit's operational readiness.

Some PMCS are considered to be routine and should be done anytime you see that they need to be done. For some items of equipment, routine PMCS are not listed in the PMCS table. Routine PMCS that are listed in the PMCS table are there because others have reported unusual or significant problems with a particular item of equipment.

Some routine PMCS would include the following:

1. Check and ensure that the vehicle's radio-intercom system is complete. Refer to TM 11-5820-401-10-2-HR for examples of hand receipts whose end item listings can be used to inventory the equipment.

CAUTION

Use only clear water and a rag to clean plastic surfaces. Do not paint a plastic surface. Damage to plastic will result if cleaned with solvents or painted.

2. Check equipment surfaces for corrosion, rust, and fungus. Clean and touch up paint as appropriate. General procedures are contained in paragraph 3-6.

NOTE

If the C-2296 is present, it is important to keep the C-2296 outer compartment clean.

3. Check the controls of components to insure that knobs are not missing, broken or loose, and that controls turn properly. Detailed instructions for replacing control knobs are in chapter 3, section IV.

4. Check for loose plugs and jacks. Tighten cable plug lockrings and cable restraining devices (glands). If a plug has an O-ring, check and insure that it is properly installed and lubricated. Tighten component jack lockrings. Tightening of jacks and plugs is contained in chapter 2, section III.

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

5. Check plug-to-jack connections. Insure proper plug orientation and tightness of connections. See chapter 2, section III for cable installation and orientation of plugs and cables.

6. Check for loose mountings, hardware, brackets, etc. Tighten as appropriate. Replacement procedures for the specific item of equipment are contained in chapter 3, section IV.

WARNING

Insure that the correct types of bolts or screws, star washers and nuts are used and properly assembled. Severe electrical hazards exist when items of equipment are not properly installed and grounded.

7. Check for bent or missing mounting guides and connector pins. All unused jacks must have protective (dust) covers installed. Refer to TM 11-5820-401-10-2 for typical cabling diagrams that will assist in identifying unused jacks of a specific tracked vehicle radio-intercom system.

8. Check cables for fraying, cuts ,cracks, dry rot or other damage. Fix or replace as appropriate. Check for improperly routed cables. Refer to an appropriate TM 11-2300 series installation manual for cable routing instructions.

9. If the C-2296 is present, check that the rubber grommets protecting the cables are in place. If the C-2296 is present, insure that the lid holding the H-207 of the C-2296 closes freely. Lubricate as required.

   Also, check the lid's rubber gasket. Lubricate as required.

NOTE

Before doing the PMCS listed below, check and insure that all current Modification Work Orders (MWO's) for the specific radio-intercom system have been accomplished. DA PAM 310-1, Consolidated Index of Army Publications and Blank Forms (microfiche), paragraph 82, contains a listing of current MWO's for communications-electronics equipment.

The ● in the INTERVAL column indicates when a check and service should be done as follows: M-Monthly, and Q-Quarterly.

The numbers in the ITEM NO. column show the order in which the check or service should be done. These numbers should be used when recording deficiencies and shortcomings on DA Form 2404.

Perform routine preventive maintenance as required when inspecting each item.

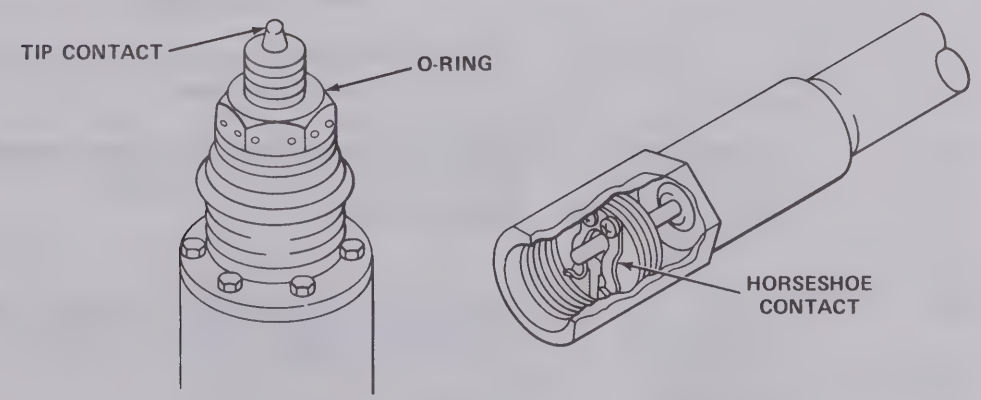
If your RT and AUX receiver has not been aligned within a year from stamped date, they must be turned in to DS maintenance for alignment.

All RT's and AUX receivers in storage must be aligned yearly or when put into use from storage, whichever occurs first.

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
			ANTENNA (RT and Aux RCVR)	**WARNING** Do not transmit on the RT while handling the antenna.
1		●	Elements	Check antenna elements for damage, (e.g., split or shortened 6 or more inches, stripped threads, etc). Replace damaged elements. (See paragraph 3-18.)
2		●	Element Threads	Clean and lubricate threads. (Use silicone compound, item 1, appendix C.)
3		●	Element Contacts (RT antenna)	Check that tip contact sticks up from the top of the spring assembly about 1/8-inch. Check that it is not loose and O-ring is in place. Adjust contact. (See paragraph 2-15.) Check that horseshoe contact inside base of lower element is not broken or missing. Replace element if contact is damaged. (See paragraph 2-15.)

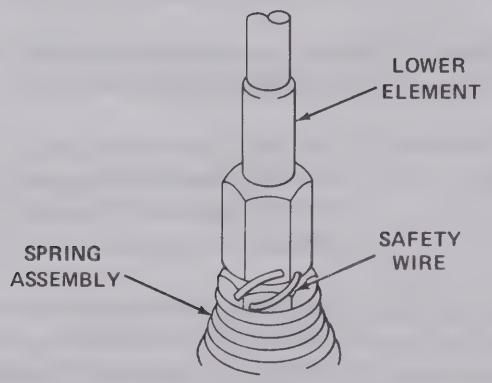


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3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
4	●		O-Ring and Safety Wire	Check that O-ring on threaded portion of spring assembly cannot be seen when lower element is in place. If seen, see paragraph 2-15. Check that safety wire is in place to secure lower element to spring assembly. Install new wire if missing or broken. (See paragraph 2-15.) **CAUTION** Do not overtighten lower element to spring assembly. Damage to contacts may result.



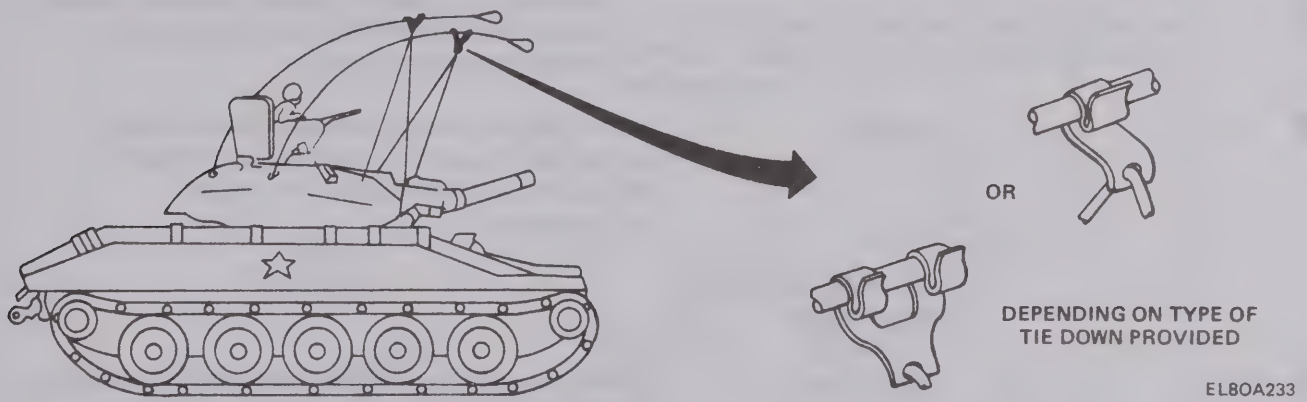
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				WARNING Severe electrical hazard exists if equipment is not properly grounded.
5	●		Ground Strap (AS-1729/VRC, AS-2731/VRC, Aux RCVR)	Check that ground strap is properly connected. Replace if frayed or damaged. (See paragraph 2-16.)
6	●		Tip Cap (AS-1729/VRC, AT-912/VRC, Aux RCVR)	Check for cracked, loose, or missing tip cap. Replace if cracked. (See paragraph 2-15.)

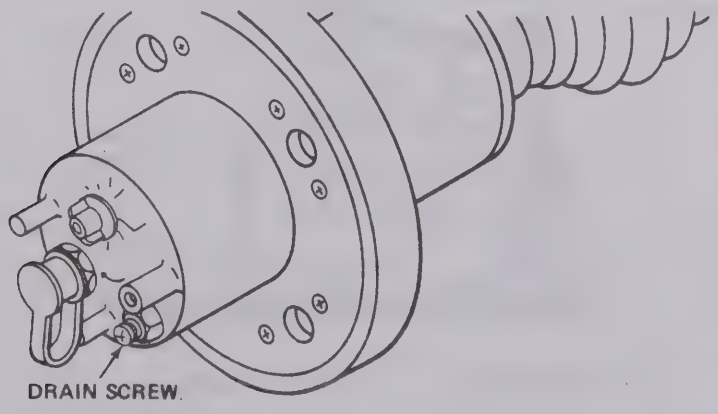
3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
				CAUTION Insure that tip will not swing beyond the side of the vehicle.
7	•		Tiedown (AS-1729/VRC, AT-912/VRC, Aux RCVR)	Check to see that tiedown rope is connected to the proper place on the vehicle. Make sure it is adjusted to tie down the antenna whip between a 30° and 45° angle. (See paragraph 2-15.)



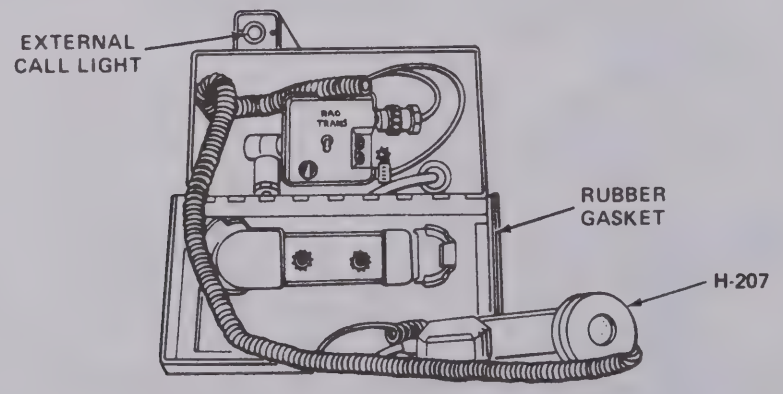
8	•		Water Drain (Matching Unit MX 6707 only)	Drain all water trapped inside the matching unit. (See paragraph 3-18.)



3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
				WARNING DO NOT USE STANDARD CABLE (CX-4722) IN THE M60A2 AND ABRAMS M1 TANKS. Serious injury or death can occur. The standard cable radiates undesirable signals that could cause the main turret, tank commander's cupola, and/or the main gun to move violently. When Antenna AS-2731/GRC is used, make sure that the MX-9146/GRC antenna control adaptor cable is a CX-13055/GRC (M60A2) or a CX-13184/GRC (Abrams M1).
9		●	Cables	Insure that the correct antenna cables (rf and control) are in place for the type of tracked vehicle. Replace if it is any other. (See paragraph 2-17.)
			OUTSIDE CONTROL BOX C-2296	
10		●	Signal Lamp	Check to see that outside signal lamp is properly in place. Replace if missing or broken. (See paragraph 3-22.)



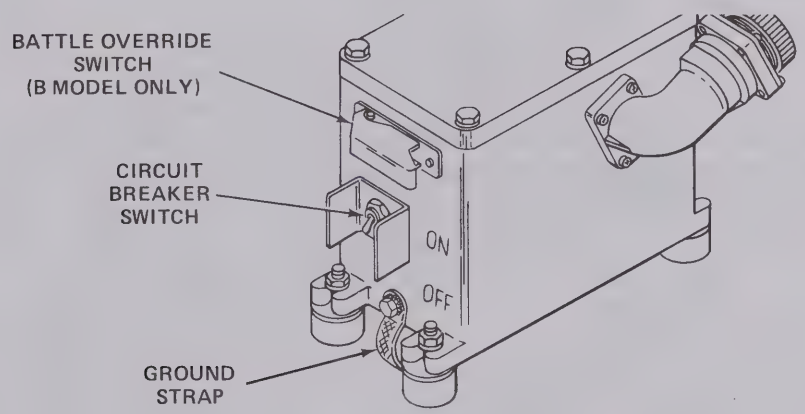
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11	●		H-207 and Cord	Check for damage.

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
			SUPPRESSOR, ELECTRICAL TRANSIENT (MX-7777/GRC)	
12	●		Controls: a. Circuit Breaker b. BATTLE OVER-RIDE switch	a. Check for smooth operation. b. With radio turned off, check for smooth operation.
13		●	Ground Strap	Check that ground strap is properly connected. Tighten if loose; replace if frayed or damaged. (See paragraph 2-20.)

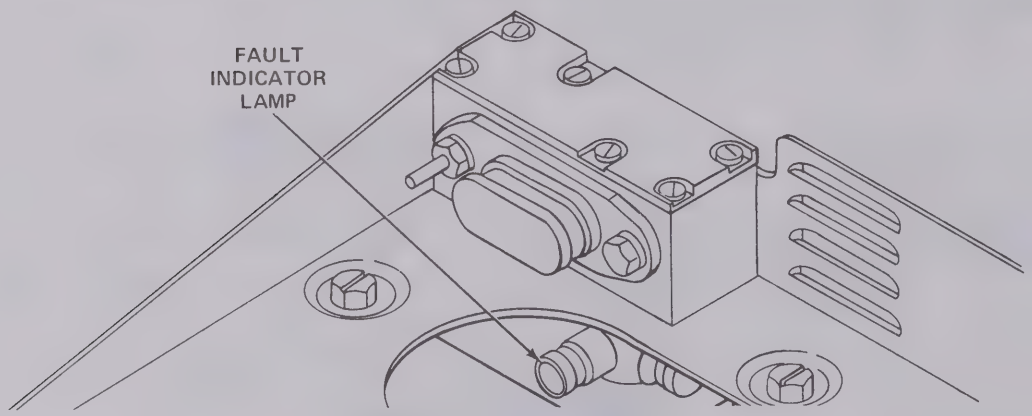


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3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
			MINISUPPRESSOR (if provided instead of MX-7778/GRC)	
14		•	Fault Indicator Lamp	Remove fault indicator lamp and check it, using ohmmeter. Then reinstall. Check that lamp does not light when power is applied to radio-intercom system. If lit, replace minisuppressor. (See paragraph 2-21.)

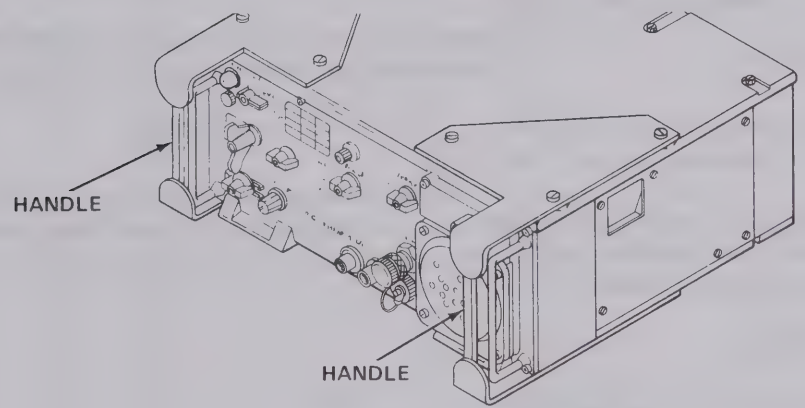


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3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

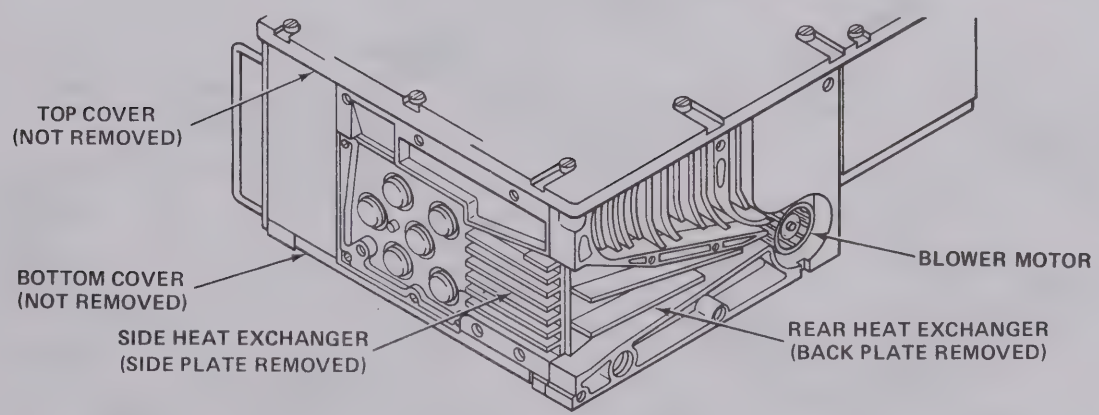
M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
			RT 524(*)/VRC and/or RT 246(*)/VRC	
15	●		Handles	Check that all plain models of RT have handles over front panel guards. Install if missing. (See paragraph 3-16.)



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16		●	Heat Exchanger	Clean heat exchanger with a stiff bristle brush to remove hard dirt and a soft bristle brush to remove loose dirt. (See paragraph 3-16.)

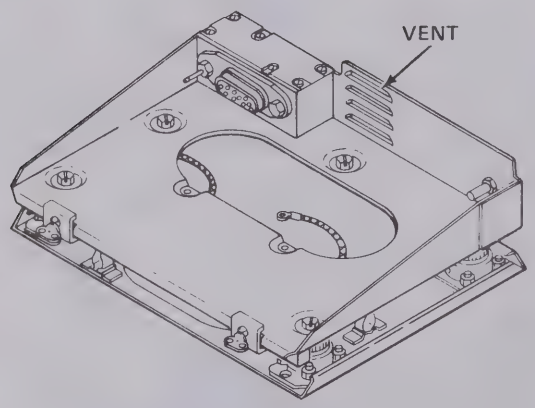


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3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
16		●	Heat Exchanger (Cont)	**CAUTION** To prevent dirt from entering inside RT, do not remove top and bottom covers. In dusty areas such as deserts, cleaning may be required monthly or even weekly. Clean vent port on Mounting MT-1029/VRC when RT is removed for cleaning of heat exchanger. **CAUTION** On early model RT mountings, a special vent cover is provided. This vent cover must be installed when RT is in operation.

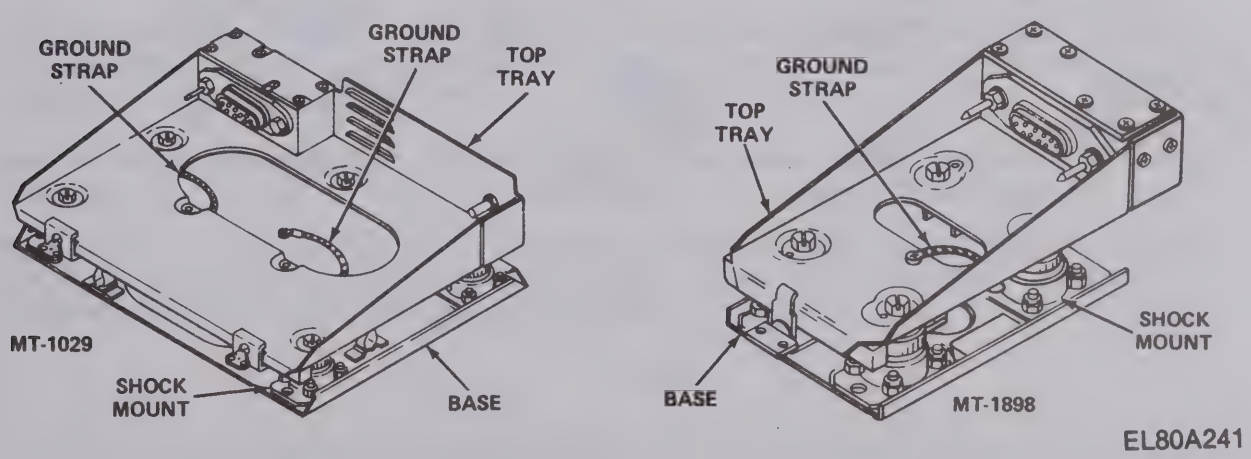


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3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

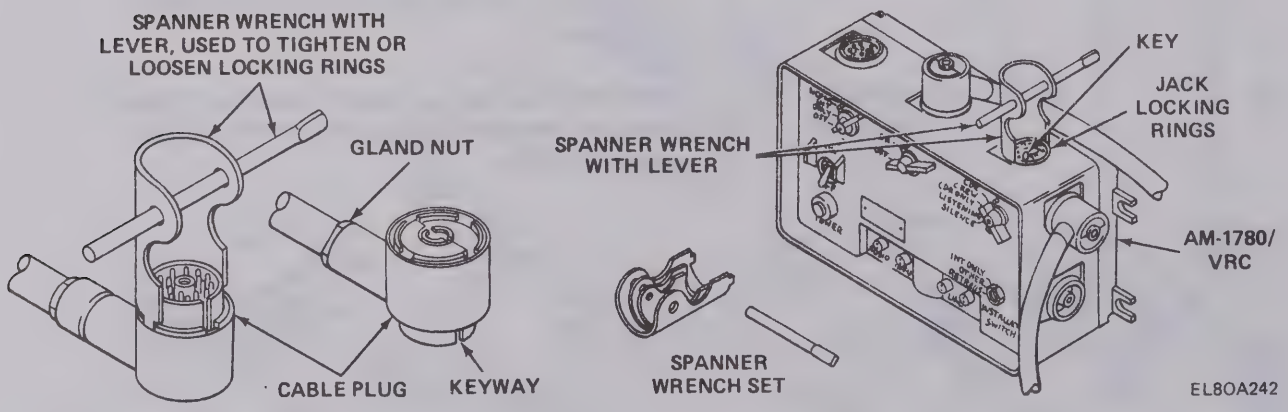
ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
			MOUNTINGS MT-1029/VRC MT-1898/VRC	**WARNING** Severe electrical hazard exists if equipment is not properly grounded. **NOTE** MT-1029 mounts produced after 1972 have only one ground strap.
17		•	Ground Strap	Check ground strap between mounting base assembly and top tray for proper connection. Replace if frayed or damaged. (See paragraph 3-19.)
				NOTE MT-1029 has five shock mounts. MT-1898 has four.
18		•	Shock (Resilient) Mounts	Check that top tray is properly attached to base assembly. Replace broken shock mount. (See paragraph 3-19.)



3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
			VEHICLE COMMUNICATIONS SYSTEM	**CAUTION** Do not attempt to change cable orientation by rotating component jacks. Damage to internal wiring could occur to change cable orientation. See paragraph 2-5.
19		•	Cable Connections	Check that cable plug and component jack locking rings are tight to prevent twisting of cables and possible damage to equipment's internal wiring. Tighten locking rings with spanner wrench. Tighten loose cable restraint's (gland) nut using adjustable wrench.



3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
				NOTE The operational check may be done sooner if you are instructed to do so by your supervisor.
20		•	Communications System	Do the operational check procedures to check communications system performance and combat readiness. (See paragraph 3-13 for procedures.)

3-6. CLEANING AND TOUCHUP PAINTING.

WARNING

Fumes of TRICHLOROTRIFLUOROETHANE are poisonous. Provide adequate ventilation whenever you use TRICHLOROTRIFLUOROETHANE. Do not use solvent near heat or open flame. TRICHLOROTRIFLUOROETHANE will not burn, but heat exchanges the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. TRICHLOROTRIFLUOROETHANE dissolves natural skin oils. DO NOT get the solvent on your skin. Use gloves, sleeves and an apron which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

CAUTION

Use only clear water and a rag to clean plastic surfaces. Do not paint a plastic surface. Damage to plastic will result if cleaned with solvents or painted.

Equipment should be kept free of dirt, grease, rust, fungus, and corrosion. Clean and dust the outside surfaces frequently with a lint-free cloth dampened with cleaning compound (item 6, appendix C) **except** antenna matching units.

Clean the plastic body of antenna matching units with clear water. Inspect plastic body for hairline cracks.

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to applicable painting and refinishing instructions given in SB 11-573, and TB 43-0118.

NOTE

Heat-reflecting paint should be applied to the receiver-transmitters and aux receivers that are used in open vehicles which are continually exposed to the sun. This paint requires special application procedures and should be referred to a higher level of maintenance.

Section III TROUBLESHOOTING

Subject	Para	Page
General	3-7	3-16
Types of Problems	3-8	3-17
Troubleshooting Procedures	3-9	3-18
Explanation of Symbols and Notes	3-10	3-18
Selecting Proper Flow Chart	3-11	3-19
Troubleshooting Flow Charts	3-12	3-20

3-7. GENERAL.

This section provides the techniques and procedures (troubleshooting methods) that are used to system troubleshoot a tracked vehicle's radio-intercom system and identify a bad item of equipment.

Troubleshooting methods for typical radio-intercom systems are presented in the form of flow charts. These flow charts are used to systematically get from the symptoms of trouble to the actual bad item of equipment by specifying only essential information.

The troubleshooting flow charts provided in this section are based on the intercommunication set (AN/VIC-1) and the AN/VRC-12 series radio sets normally installed in M113 Armor Personnel Carriers, M577 Command Post Carriers, and M-60 Tanks. Troubleshooting can be done on any other tracked vehicle communication system configuration (AN/VIC-1 in combination with any one of eight AN/VRC-12 series radio sets) by using the methods presented by the flow charts and allowing for variations of the installed equipment.

SYSTEM TROUBLESHOOTING

System troubleshooting is done on a faulty (non-operational) radio-intercom system to identify and then repair the item of equipment causing the system to be non-operational. System troubleshooting is not done on an operational system. To determine if system troubleshooting is required, the suspected radio-intercom system first should be evaluated using the operational check procedure provided in chapter 3, section IV. If symptoms of trouble are observed when doing the operational check procedure, system troubleshooting should be initiated. Based on the observed symptoms of trouble, system troubleshooting for any radio-intercom system consists of four basic steps:

1. Interpret the symptoms of trouble as to a circuit of the system that, when bad, would cause the problem. Some examples are:

   a. The system's AM-1780 will not come on denotes that the AM-1780's dc input power circuit is bad.

   b. The RT's antenna matching unit does not tune when the RT's MC-TUNE-KC controls are changed from 67.05 to 62.20 MHz denotes that the control circuit between the RT and its antenna matching unit is bad.

3-7. GENERAL. (CONT)

2. For the determined bad circuit, analyze and interpret an appropriate circuit diagram as to:

   a. All items of equipment involved in the circuit's operation.

   b. How the circuit is intended to work (operate).

   c. Type of problem encountered. (See paragraph 3-8 below.)

NOTE

Circuit diagrams for the individual circuits of a typical radio-intercom system are provided as foldouts at the rear of this manual. Principles of operation of the various circuits of a typical radio-intercom system are provided in chapter 1, section III.

3. Based on the results of 2 above, again analyze the faulty circuit's diagram as to the best troubleshooting approach (t/s method) to include appropriate t/s techniques and a procedure.

   a. Examples of t/s techniques include voltage tracing, circuit disturbing, continuity checking, and circuit substituting.

   b. A t/s procedure means to establish, by test points, the sequential order the t/s techniques should be done to obtain valid conclusions.

4. Based on the results of 3 above, apply the t/s method within the system's faulty circuit to the point where the actual bad item of equipment is identified.

After system troubleshooting has identified the actual bad item of equipment, repair that item of equipment by fixing its problem or replacing the item with a good item of the same type. After a repair action has been accomplished, again evaluate the operation of the radio-intercom system to see if the repair is effective and that no other faults exist.

3-8. TYPES OF PROBLEMS.

Problems within a radio-intercom system can normally be cataloged as to an adverse open or an adverse short. If, when doing the operational check, a function:

1. Does not occur when it should, an item of equipment within the affected circuit probably contains an adverse open.

2. Occurs before it should, an item of equipment within the affected circuit probably contains an adverse short.

Determining the type of problem before troubleshooting a bad circuit will speed up the troubleshooting process in that the best troubleshooting method can be more easily determined.

3-9. TROUBLESHOOTING PROCEDURES.

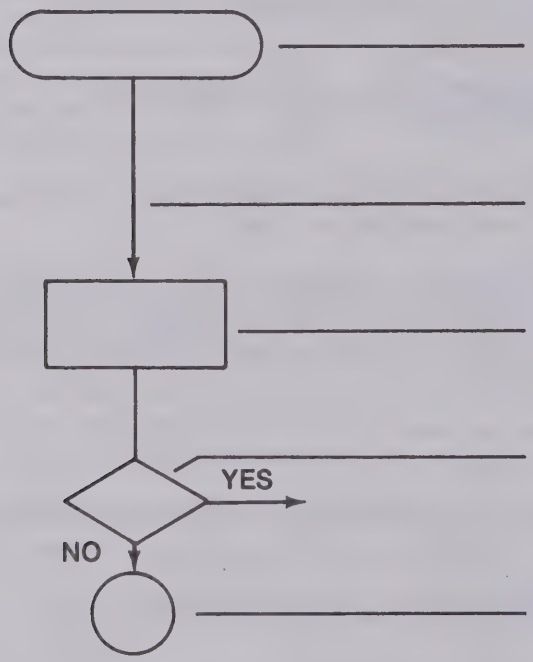
The troubleshooting flow charts of this section are based on the four steps of system troubleshooting presented in paragraph 3-7. Based on the observed symptoms of trouble, each chart presents an easy-to-follow procedure, including specific troubleshooting techniques that, when followed, will identify the faulty item of equipment.

NOTE

The troubleshooting procedure will isolate only one fault at a time. After the fault has been found and corrected, repeat the operational check to see if the repair corrected the problem and then to see if there are any additional faults.

When using a particular flow chart procedure, follow along on the appropriate circuit diagram. Note 1 of each chart will reference a specific circuit diagram and the circuit diagrams are provided as foldouts (FO) at the rear of this manual.

3-10. EXPLANATION OF SYMBOLS AND NOTES.

SYMBOL	EXPLANATION
	Test Procedure Start: (Rectangle with rounded corners) Indicates start of the test procedure and contains a brief description of the symptom of trouble.
	Test Procedure Flow Line: (Heavy line and arrowhead) Indicates direction of the procedure flow.
	Test Procedure Instruction: (Rectangle) Provides instructions for doing a specific test (t/s technique).
	Decision: (Diamond) Indicates that a decision must be made (YES or NO) in answer to a question about the previous test. Path taken depends on the answer (YES or NO).
	Connector: (Circle) Directs user to an entry point of another chart. Contains an entry number (#) that is same as entry number of other chart and a sheet number (Sh #) that indicates the number of follow-on pages.
NOTES	Notes Column: Presents additional critical information, such as: more specific instructions about how to do a test, **cautions** and **warnings** that must be observed when doing a test, and additional information about what to do after doing a test. Also provides references to appropriate circuit diagrams.

3-11. SELECTING PROPER FLOW CHART.

Selecting the proper flow chart is dependent upon the symptoms of trouble observed when doing a particular step of the operational check. The operational check procedure is provided in chapter 3, section IV. When abnormal indications are observed as the result of doing the actions specified for a particular step, that step will either state the faulty item of equipment or will reference a specific troubleshooting flow chart. Simply follow the direction of the operational check step to get to the correct troubleshooting chart.

HOW TO USE A FLOW CHART.

After selecting a proper flow chart as described in paragraph 3-11, proceed as follows:

1. Do the actions described in the first rectangle.
2. Answer YES or NO to the question asked in the diamond that follows the first rectangle.
3. Go to the next step as directed by the answer to the YES/NO question.
4. Do additional steps as required, and directed, until the actual bad item of equipment is identified, and then follow the repair instruction presented in that box.
5. Repeat operational check after each repair is completed.

WARNING

To guard against electrical shock, remove or tape exposed personal metal objects (e.g., watches, rings, medallions) before doing the procedure of any flow chart.

Within the flow charts, special symbols are used. They are:

1. Ω for ohms (measure of resistance).
2. ∞ for infinity (a number too high to express).
3. $>$ for greater than.
4. $<$ for less than.

Other important conditions and actions that pertain to the procedure of any flow chart are:

1. Before starting a procedure, the controls and cabling of the items of equipment of the radio-intercom system being checked must be as they were when the symptoms of trouble were observed.
2. Unless otherwise stated, all voltage measurements, resistance measurements, and circuit disturbance checks are to be made with respect to chassis ground (bare metal).

3-11. SELECTING PROPER FLOW CHART. (CONT)

3. To circuit disturb, set up the multimeter as an ohmmeter (Rx10 range). For detailed procedures on circuit disturbing an audio accessory, see page 3-192.

4. To measure an ac talk-signal, set up the multimeter as an ac voltmeter (lowest range unless otherwise specified) and then connect the meter probes between the specified test point and chassis ground. Next, key the mike and note the meter reading. Finally, sharply whistle into the keyed mike and look to see if the meter reading changes. Any change of the ac voltage reading indicates the presence of the talk-signal.

CAUTION

To guard against equipment damage when making measurements or circuit disturbing with power applied, make sure the proper pins of the specified test point are used (selected) and that the meter probes do not touch.

3-11.1. FREQUENCY INTERFERENCE AND FREQUENCY SELECTION.

Mutual frequency interference problems are often generated when several fm transmitters operating on different frequencies are situated in the same locale. The problem can occur between AN/VRC-12 series radios and also between these radios and low-power fm radios, such as Radio Sets AN/PRC-25 (TM 11-5820-398-12) and AN/PRC-77 (TM 11-5820-667-12) as well as the vehicular versions of these radios: Radio Sets AN/VRC-53, AN/VRC-64, AN/GRC-125, and AN/GRC-160 (TM 11-5820-498-12). The following procedures can be of assistance in eliminating such frequency interference among radios that are operating near each other. The frequency separation requirements apply between receiver-transmitters and between receiver-transmitters and R-442(*)/VRC.

1. Use low power transmission unless it has been established that communication can only be accomplished on high power. This is accomplished by setting the receiver-transmitter POWER switch on LOW for low power transmission and on HIGH for high power transmission.

2. In cases of nonmutual interference (for example, when frequency A interferes with frequency B, but frequency B does not interfere with frequency A), consider using frequency A on a secure voice net. In this situation, the characteristic transmitter output when operating in a secure voice net is such that it tends to induce less of an interfering signal.

3. Due to internal interference in the squelch circuit of the receiver-transmitters and R-442(*)/VRC when no signal is being received, the following frequencies should not be used for communication. The interference at these frequencies causes the CALL lamp to light when the SQUELCH switch is set to OLD ON and also quieting (no rushing noise) when the switch is set to the OFF position.

   a. 33.90 MHz

   b. 45.20 MHz

   c. 56.50 MHz

   d. 67.80 MHz

4. Avoid the use of frequencies which are harmonically related. For example:

   a. Do not use frequencies which are separated by exactly 5.75 or 23.00 MHz.

b. Do not use frequencies which are in the order of the second harmonic. For example, the frequency setting of 30.00, 32.65, and 35.00 will possibly interfere with a radio using 60.00, 65.30, and 70.00 MHz, respectively. Changing either the lower frequency or the higher frequency should eliminate the interference that may occur.

c. Use the retransmission interference charts (fig. FO-22) as a guide in selecting frequencies that will not interfere with radios that are continually in close proximity to each other. These charts are used to determine interfering frequencies that should not be selected for use by retransmission configuration radio sets, such as AN/VRC-49 and AN/VRC-45. The black areas indicate mutually interfering frequencies. For example, there would be interference between 31.45 MHz and the following 53 70 (±10 kHz), 54.45 MHz (±10 kHz), 55.45 MHz (±10 kHz), 57.30 (±10 kHz), 60.15 (±10 kHz), 61.55 MHz (±10 kHz), etc.

5. Observe the recommended minimum frequency versus distance restrictions given below:

MINIMUM FREQUENCY SEPARATION REQUIRED	MINIMUM ANTENNA DISTANCE SEPARATION (WHIP ANTENNA OR RC-292)	
	BETWEEN AN/VRC-12 SERIES RADIOS ON HIGH POWER	BETWEEN AN/VRC-12 SERIES RADIOS ON LOW POWER: OR BETWEEN AN/PRC-25 AND AN/PRC-77[a]
10 MHz	5 feet[b]	5 feet
7 MHz	60 feet	10 feet
4 MHz	150 feet	50 feet
2 MHz	400 feet	200 feet
1 MHz	800 feet	350 feet

[a]This includes the vehicular versions of these radios.
[b]This distance is representative of those vehicles in which retransmission radio sets are used (AN/VRC-49 and AN/VRC-45).

3-11.2. TROUBLESHOOTING FLOW CHART INDEX.

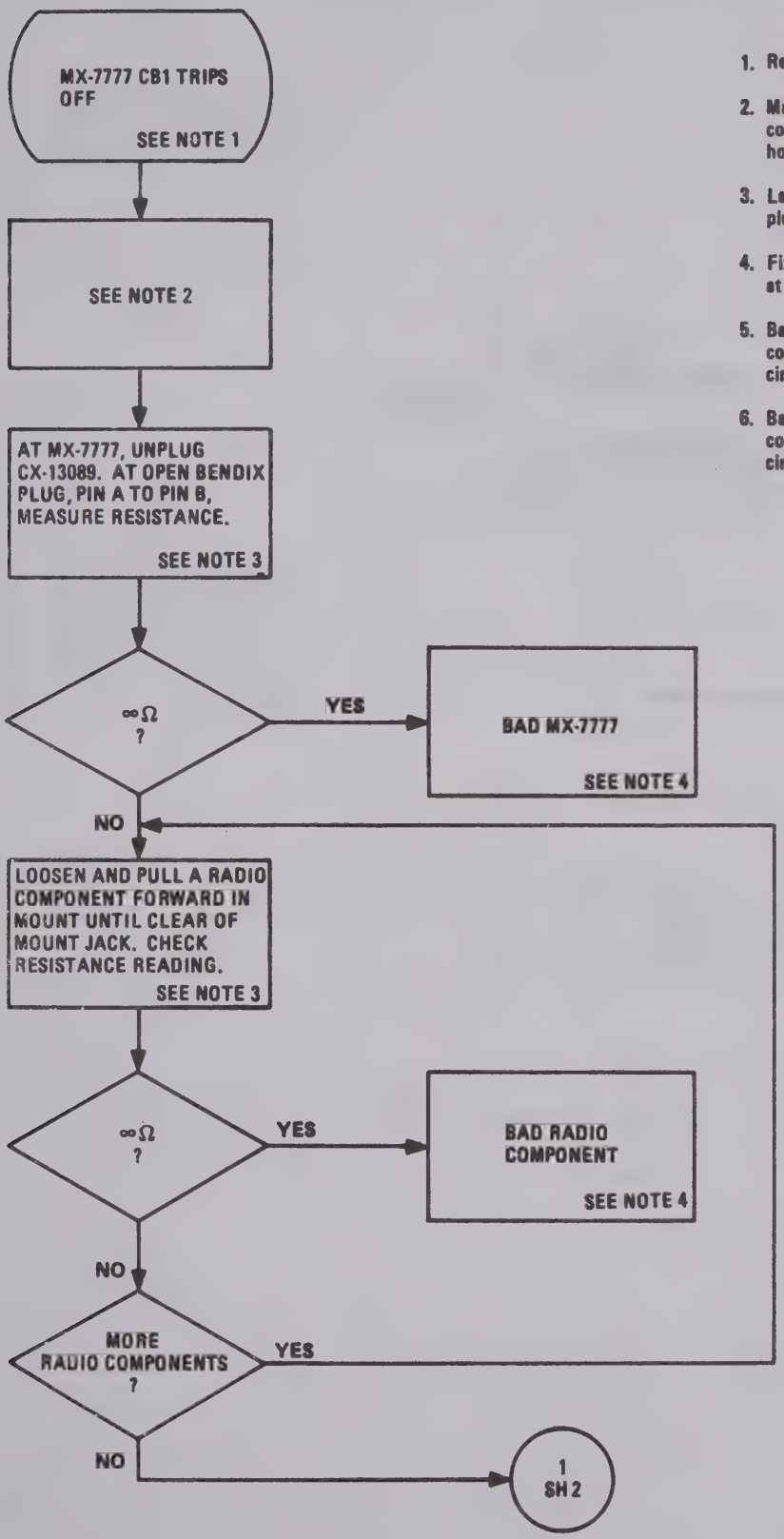
Subject	Page No.
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C-Receiver Monitoring Circuit, C-Position of CDR Monitor Switch	3-150

3-11.2. TROUBLESHOOTING FLOW CHART INDEX. (CONT)

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3-12. TROUBLESHOOTING FLOW CHARTS.

CHART 1
Troubleshoot Intercom Input Power Circuit (Adverse Short) (Sheet 1 of 5)

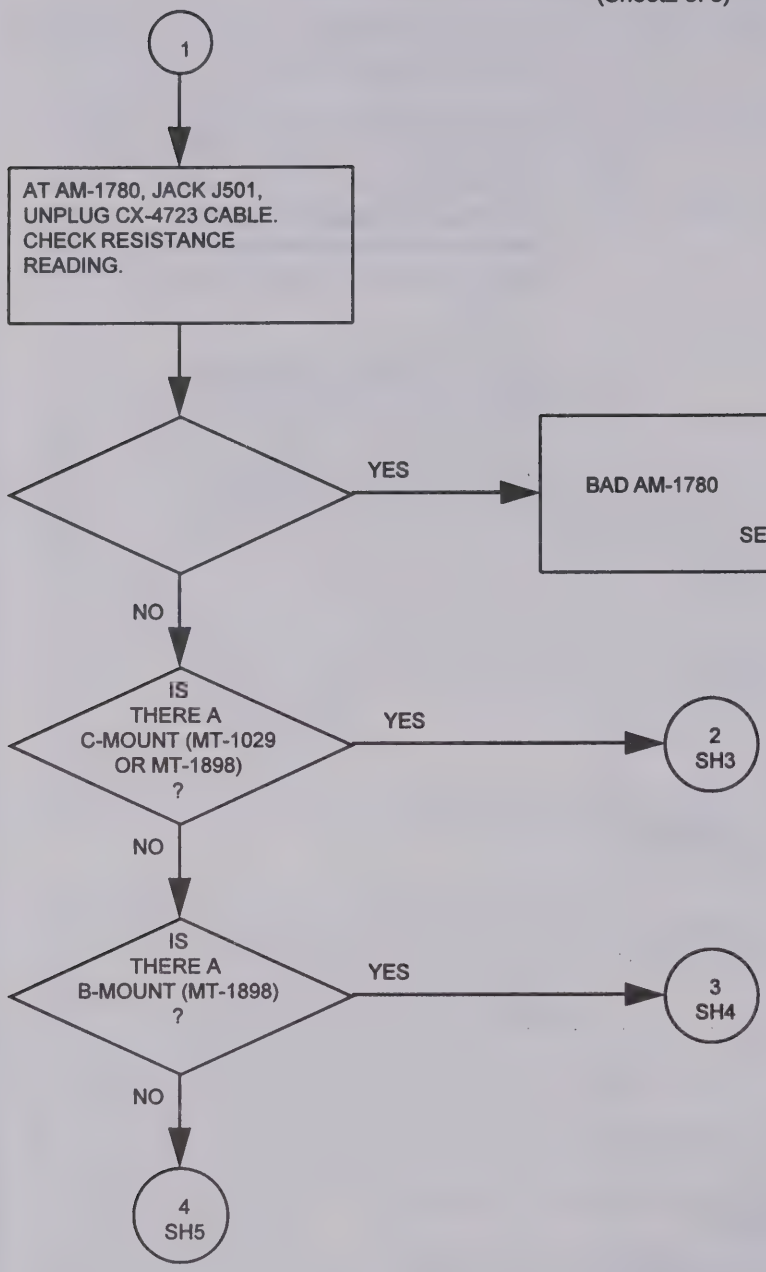


NOTES

1. Refer to FO-1 in back of this manual.
2. Make sure the MX-7777 electrical suppressor's combat override switch is in the OFF (closed hood) position.
3. Leave meter probes connected at open Bendix plug (pins A and B) for the remainder of tests.
4. Fix or replace and return to operational check at this time.
5. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.
6. Bad MT-1898. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

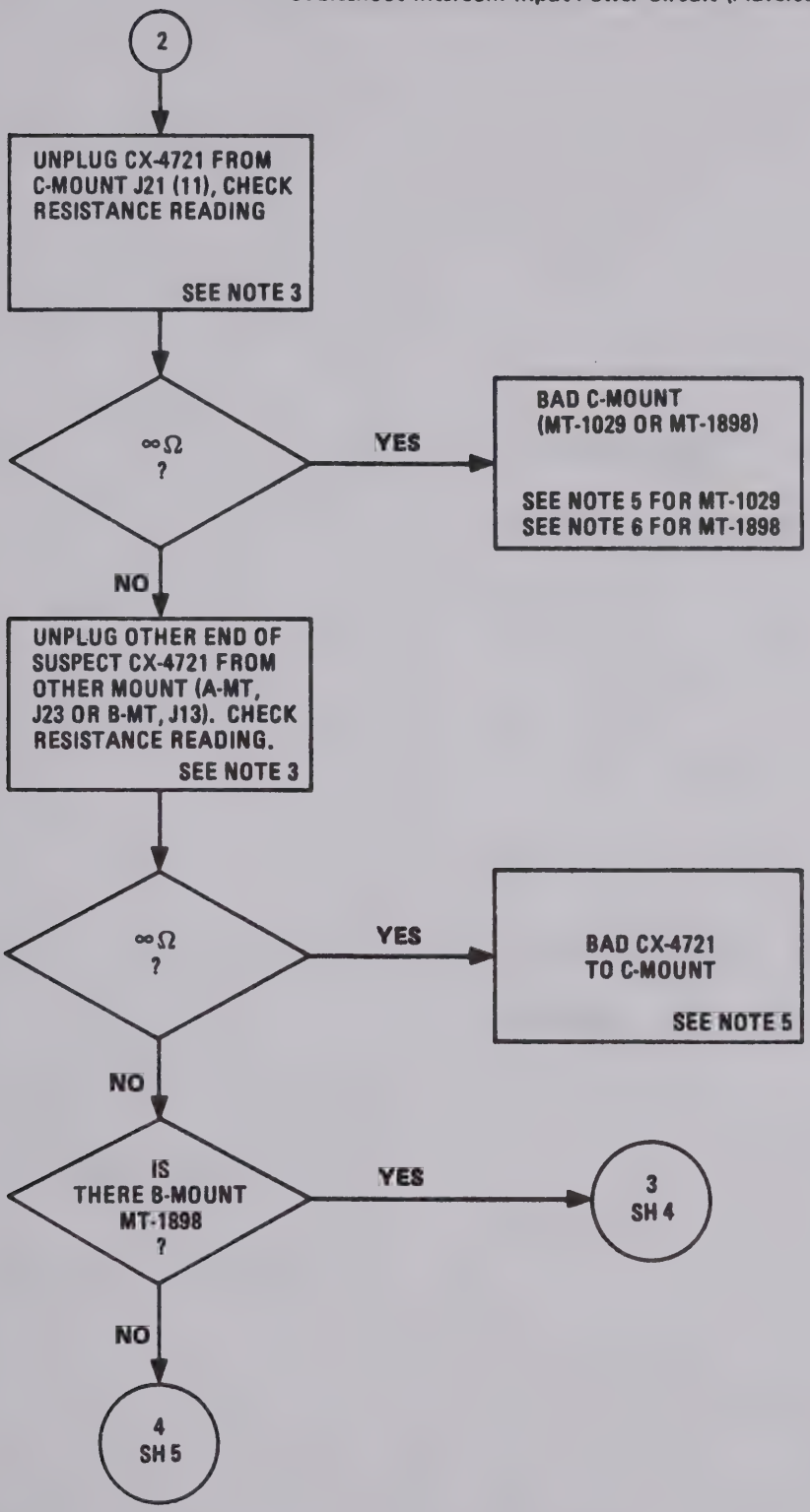
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART1
Troubleshoot Intercom Input Power Circuit (Adverse Short)
(Sheet2 of 5)



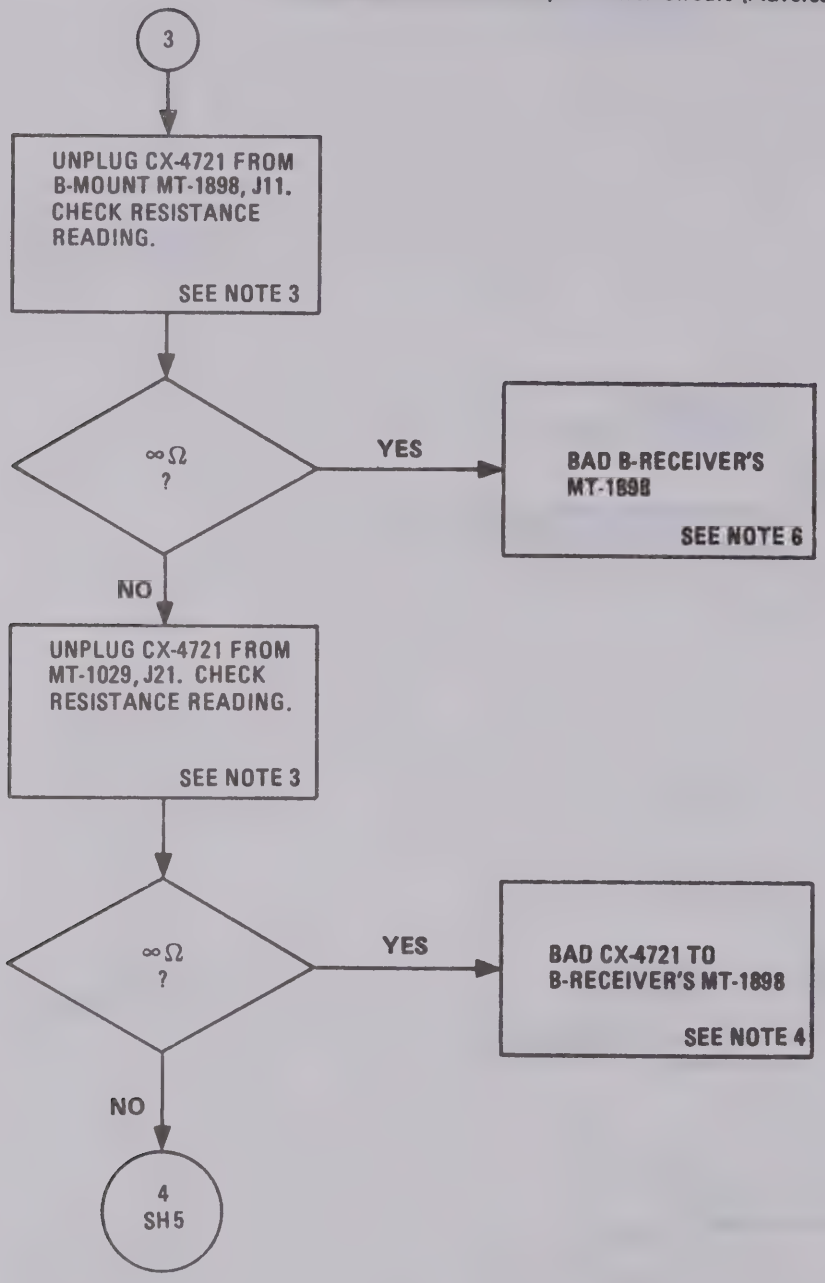
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 1
Troubleshoot Intercom Input Power Circuit (Adverse Short) (Sheet 3 of 5)



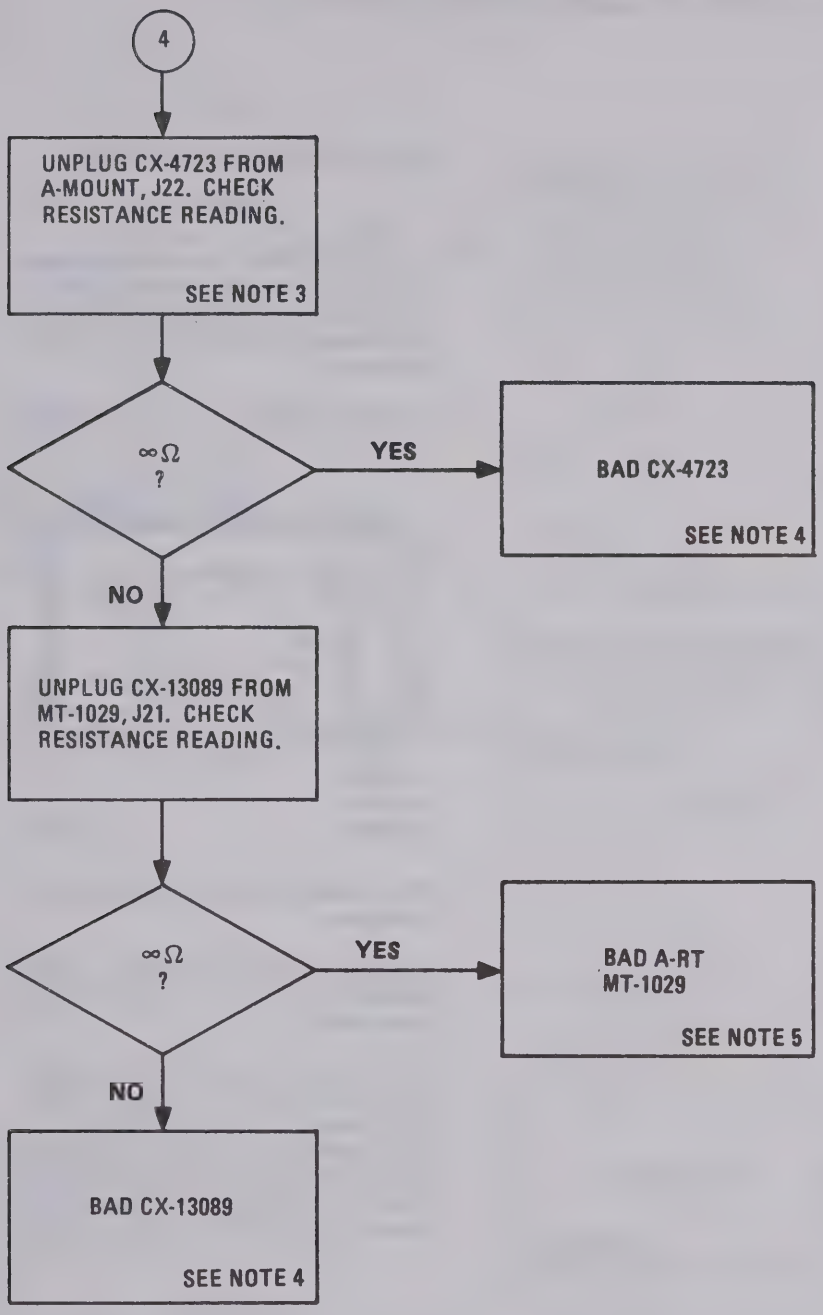
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 1
Troubleshoot Intercom Input Power Circuit (Adverse Short) (Sheet 4 of 5)



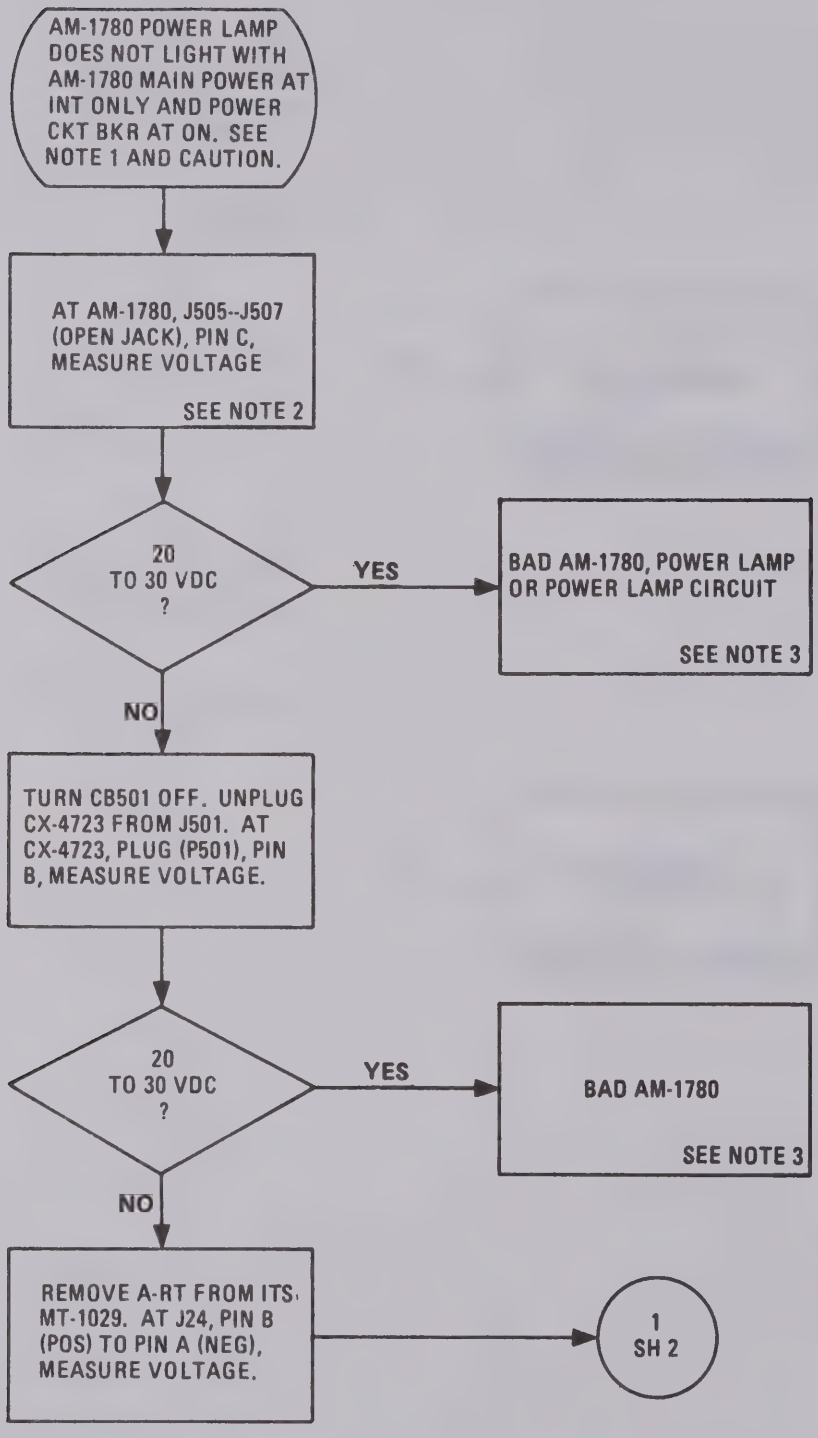
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 1
Troubleshoot Intercom Input Power Circuit (Adverse Short) (Sheet 5 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 2
Troubleshoot Intercom Input Power Circuit (Adverse Open)(Sheet 1 of 3)



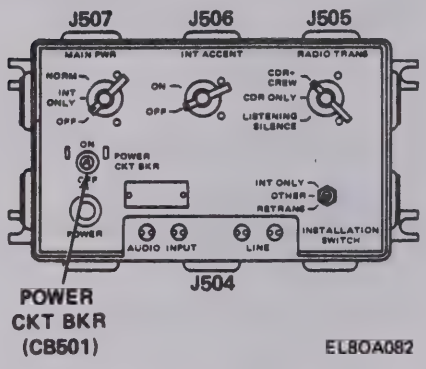
NOTES

1. Refer to FO-1 in back of this manual.

CAUTION

The AM-1780 POWER lamp through normal usage may become loose and rotate in the AM-1780 housing causing an adverse short. Check to see that lamp is tight and properly positioned.

2. If all jacks are filled, remove one plug to make test then replace it.



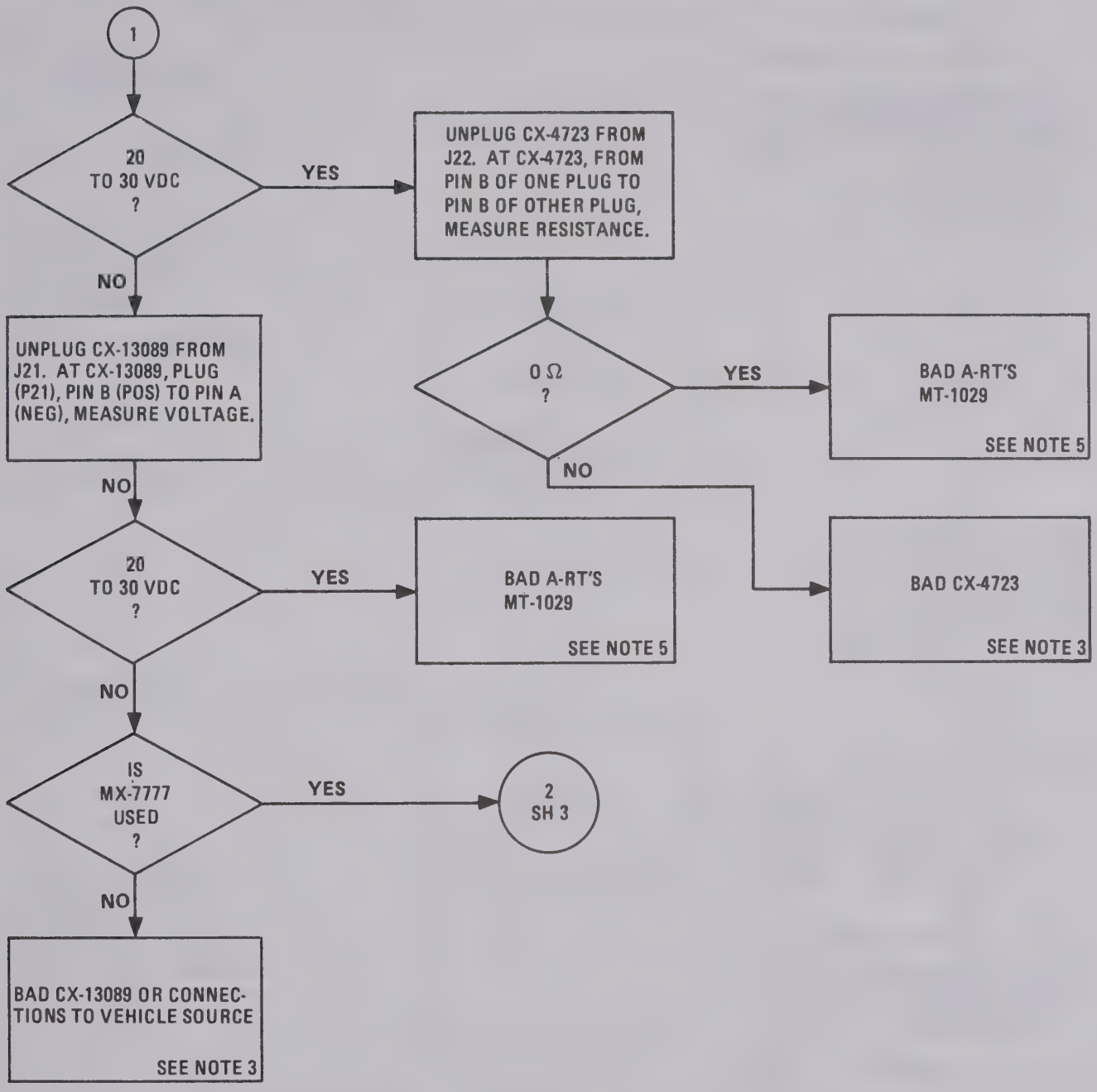
3. Fix or replace and return to operational check at this time.

4. Make sure the MX-7777 electrical suppressor's combat override switch is in the OFF (closed hood) position.

5. Bad MT-1029. Check J-box fuse and inside wiring for continuity at: J21 pin A to J24 pin A; then from J21 pin B to J24 pin B. Check position of link and condition of wiring from E22 to pin J of J24. Mounts produced after 1972 do not have a fuse. Replace mount if not repairable.

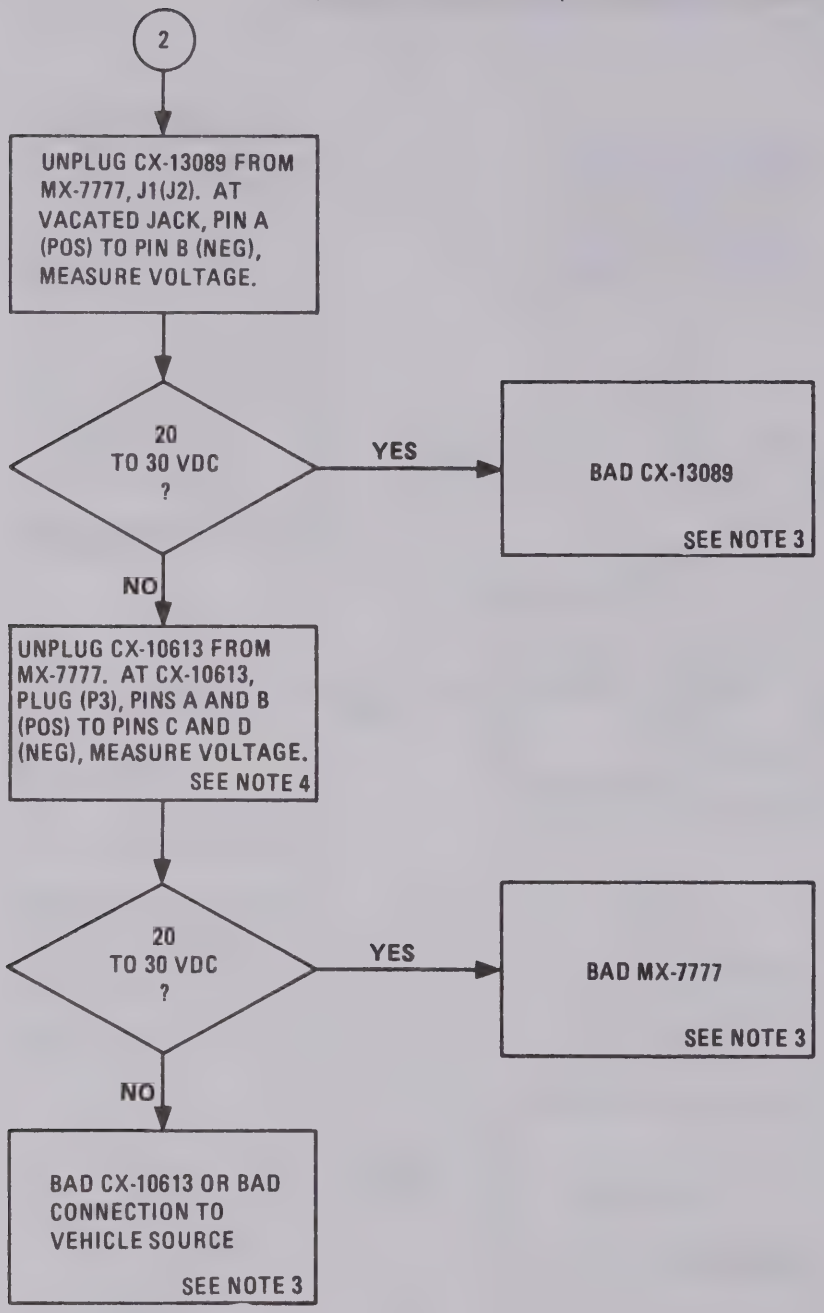
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 2
Troubleshoot Intercom Input Power Circuit (Adverse Open)(Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

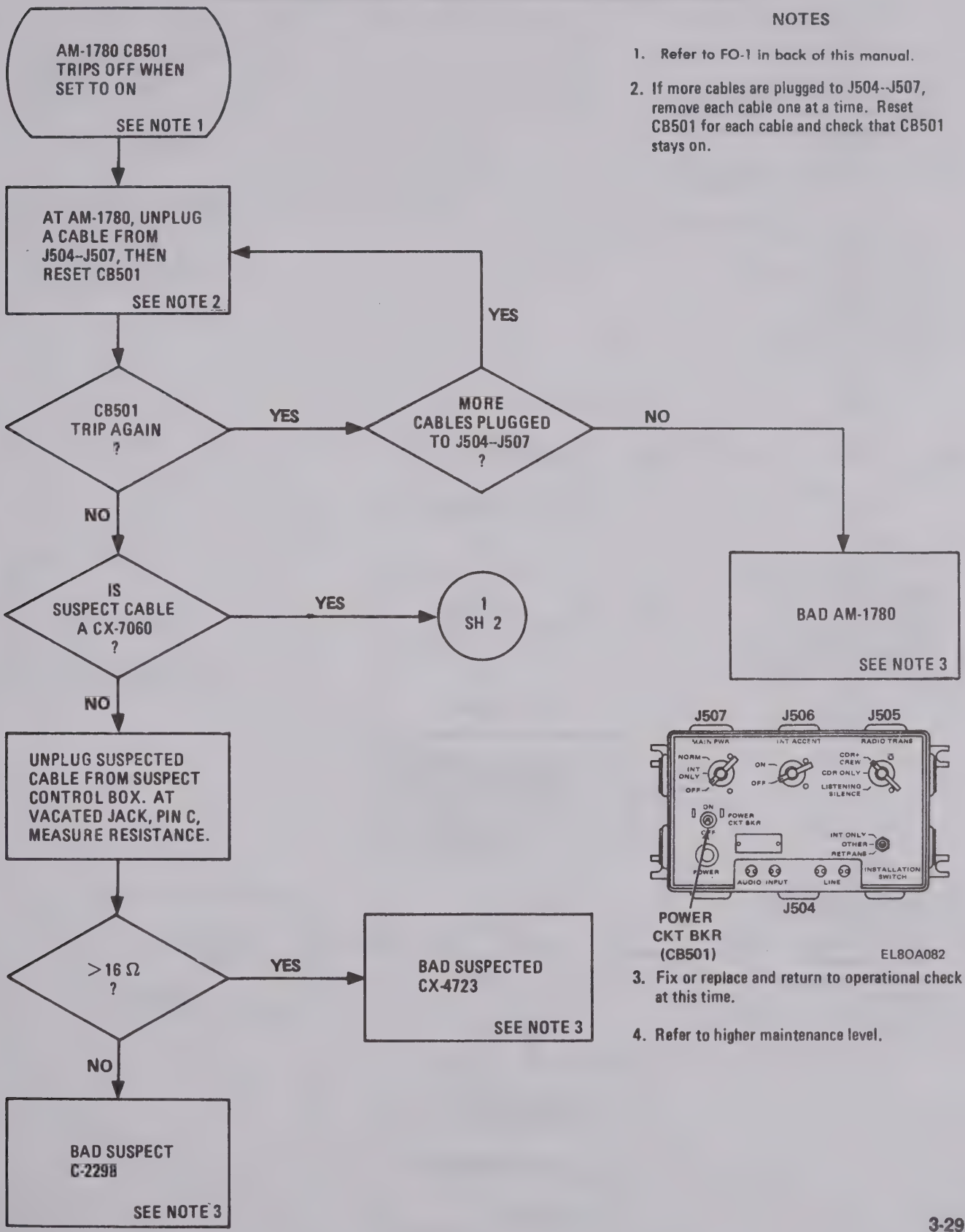
CHART 2
Troubleshoot Intercom Input Power Circuit (Adverse Open)(Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 3

Troubleshoot Intercom Power Distribution Circuit (Adverse Short) (Sheet 1 of 2)



NOTES

1. Refer to FO-1 in back of this manual.
2. If more cables are plugged to J504--J507, remove each cable one at a time. Reset CB501 for each cable and check that CB501 stays on.

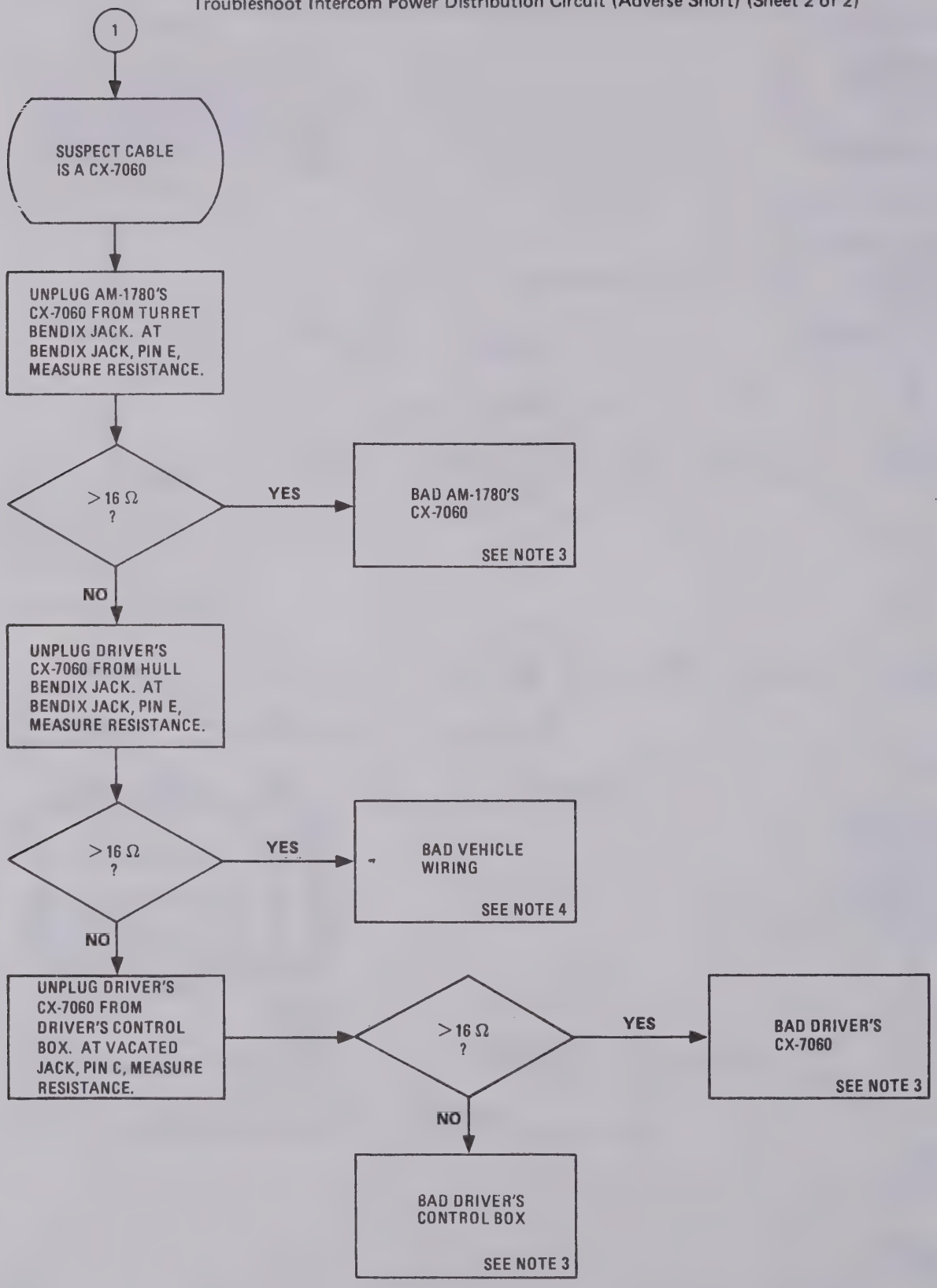
EL8OA082

3. Fix or replace and return to operational check at this time.
4. Refer to higher maintenance level.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 3

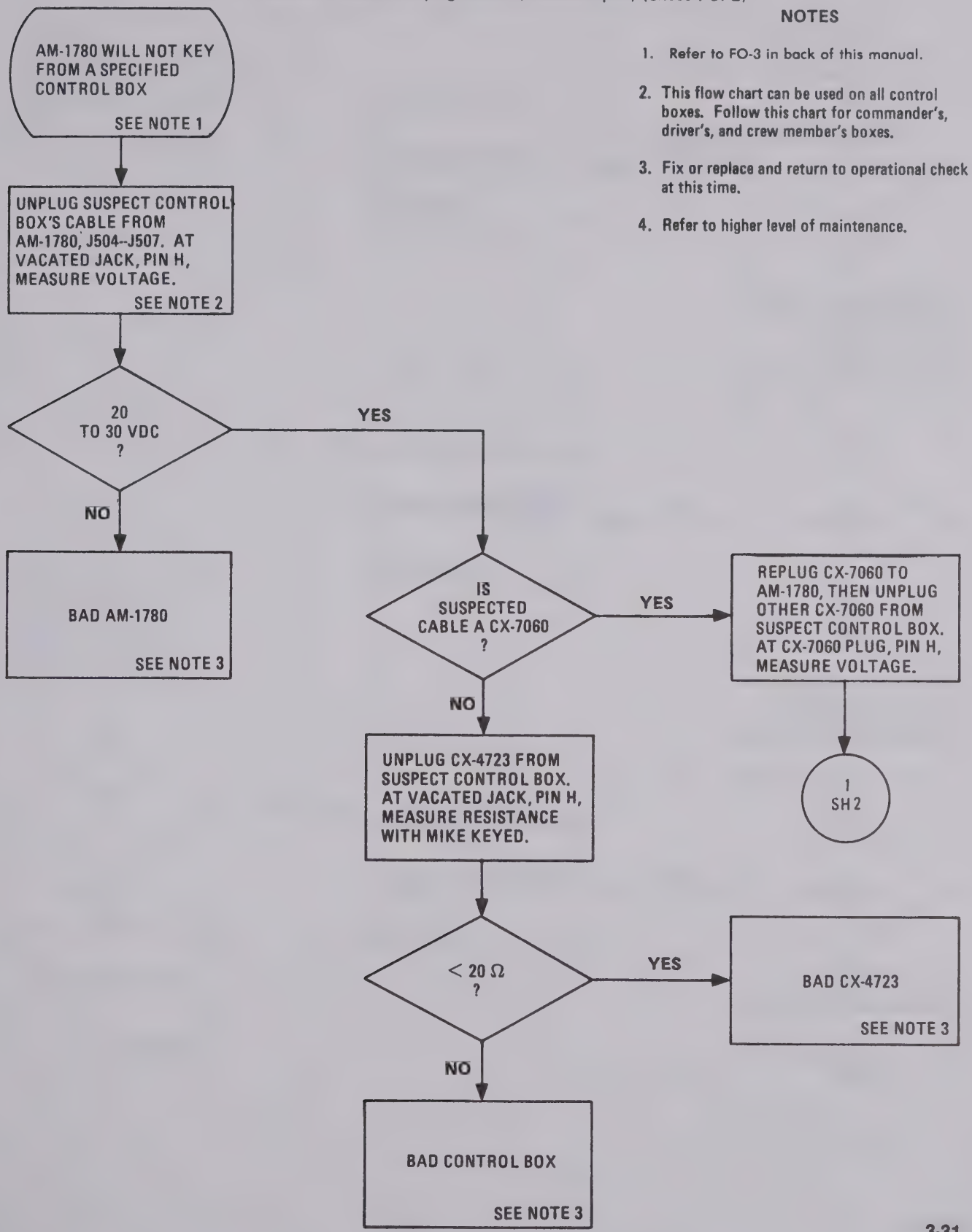
Troubleshoot Intercom Power Distribution Circuit (Adverse Short) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 4

Troubleshoot Intercom Keying Circuit (Adverse Open) (Sheet 1 of 2)

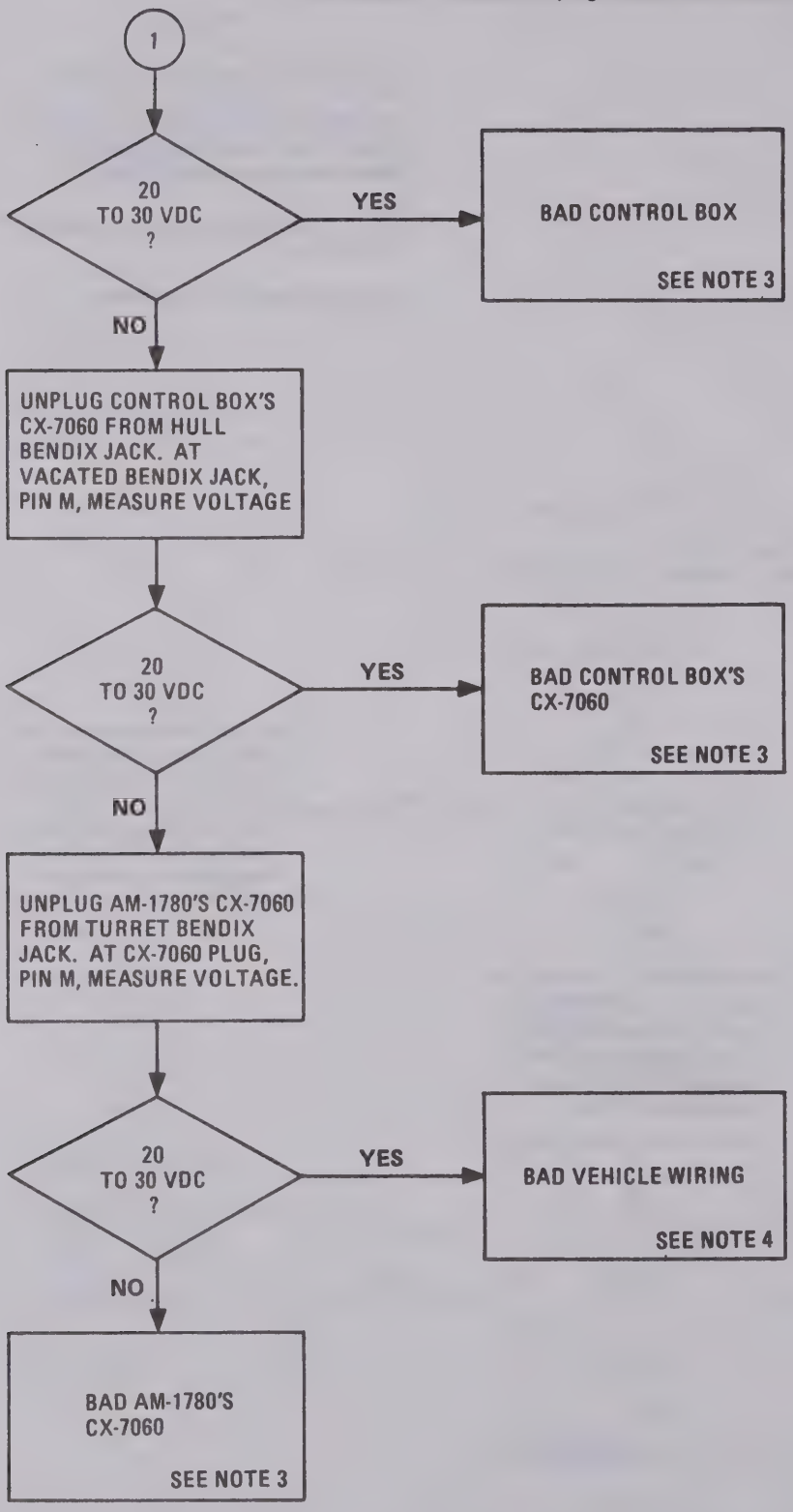


NOTES

1. Refer to FO-3 in back of this manual.
2. This flow chart can be used on all control boxes. Follow this chart for commander's, driver's, and crew member's boxes.
3. Fix or replace and return to operational check at this time.
4. Refer to higher level of maintenance.

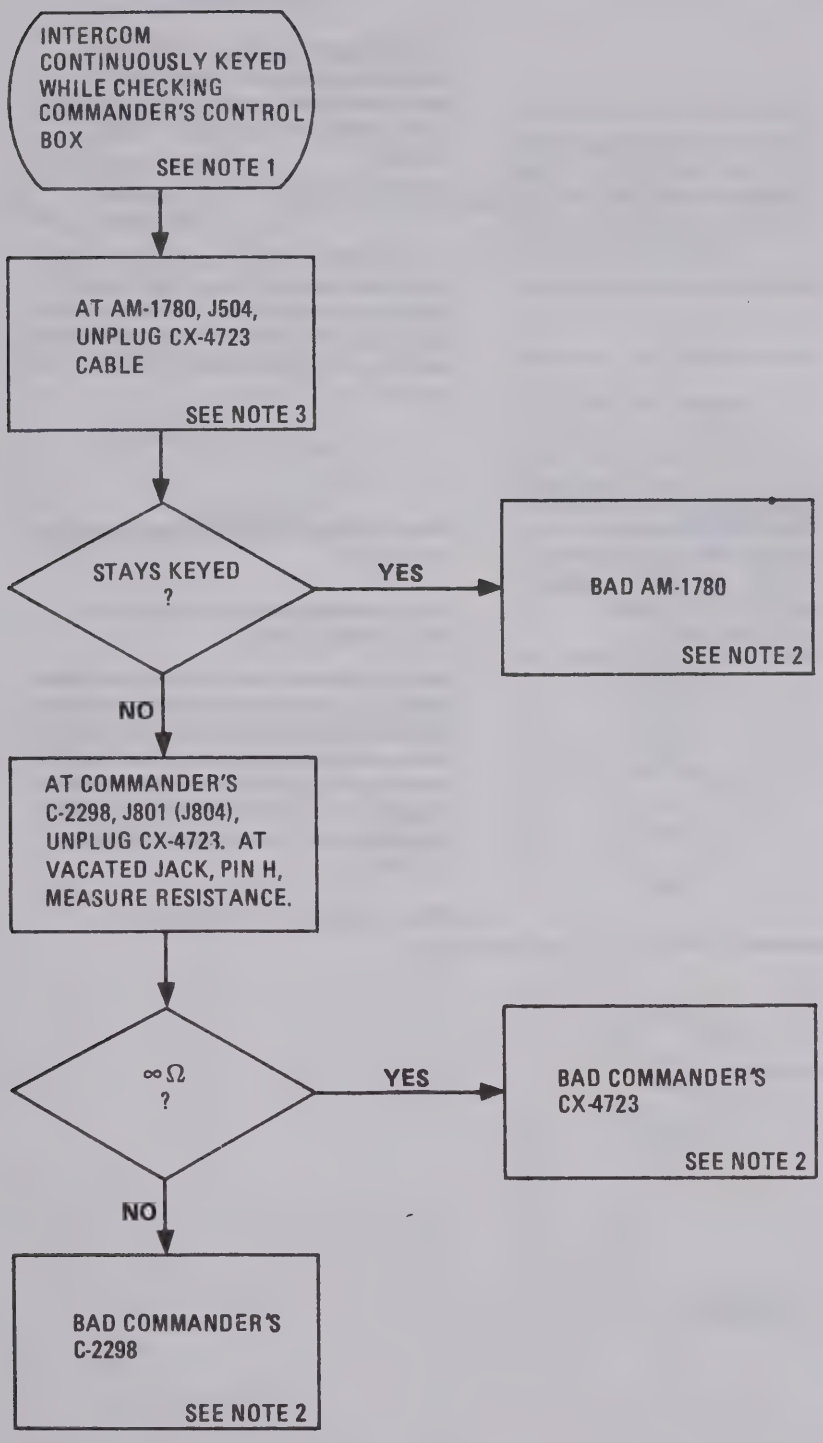
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 4
Troubleshoot Intercom Keying Circuit (Adverse Open) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 5
Troubleshoot Intercom Keying Circuit (Adverse Short) (Sheet 1 of 1)



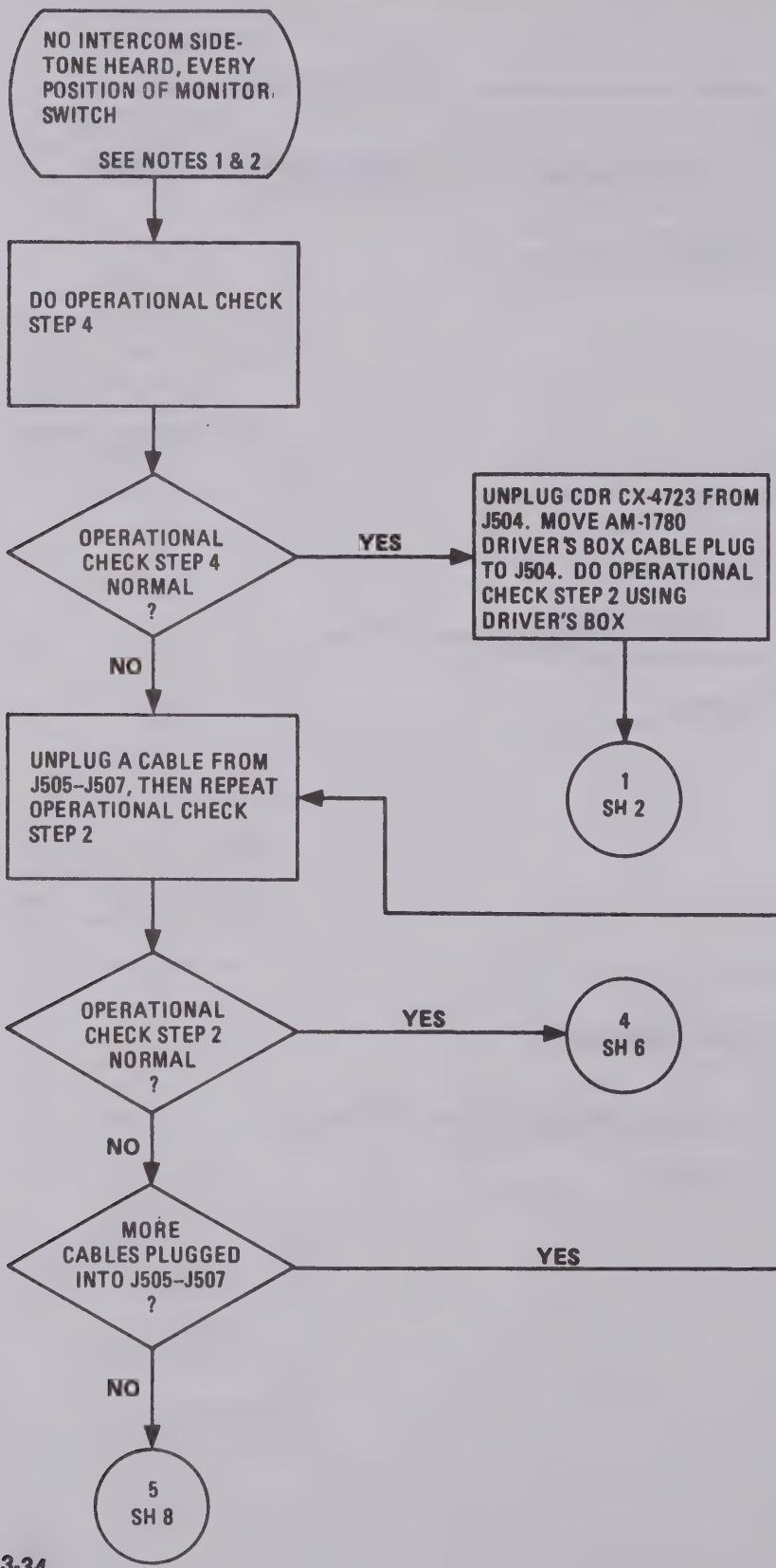
NOTES

1. Refer to FO-3 in back of this manual.
2. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 1 of 22)



CAUTION

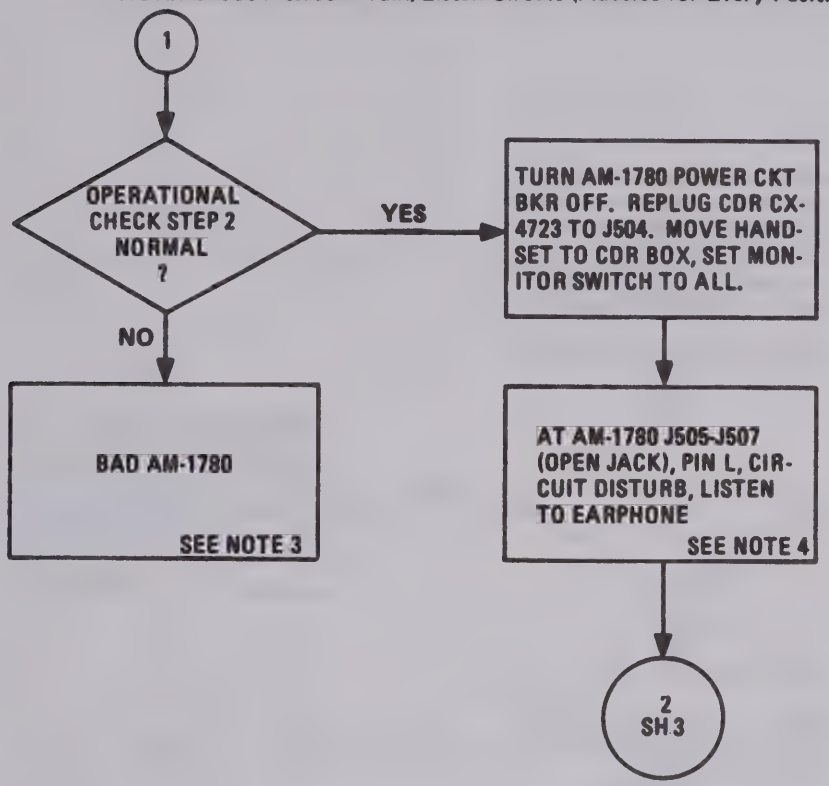
To guard against equipment damage when making measurements or circuit disturb with power applied, make sure proper pin is selected and meter probes do not touch together.

1. Refer to FO-4 in back of this manual.
2. Follow this flow chart in sequence for no sidetone in any position of monitor switch on commander's control box. For other control boxes (except C-2296) with no sidetones in any position of the monitor switch, enter flow chart at point 5 SH 7.
3. Fix or replace and return to operational check at this time.
4. Set up multimeter as an ohmmeter to do circuit disturb, RX10.
5. Set up multimeter as an AC voltmeter (lowest range). Connect meter probes between signal line (test point) and chassis ground, then key mike and note reading. Next, sharply whistle into keyed mike and see if the meter reading changes. Any change in AC voltage indicates the presence of the talk signal. (Reading is <1 volt.)
6. Refer to higher maintenance level.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

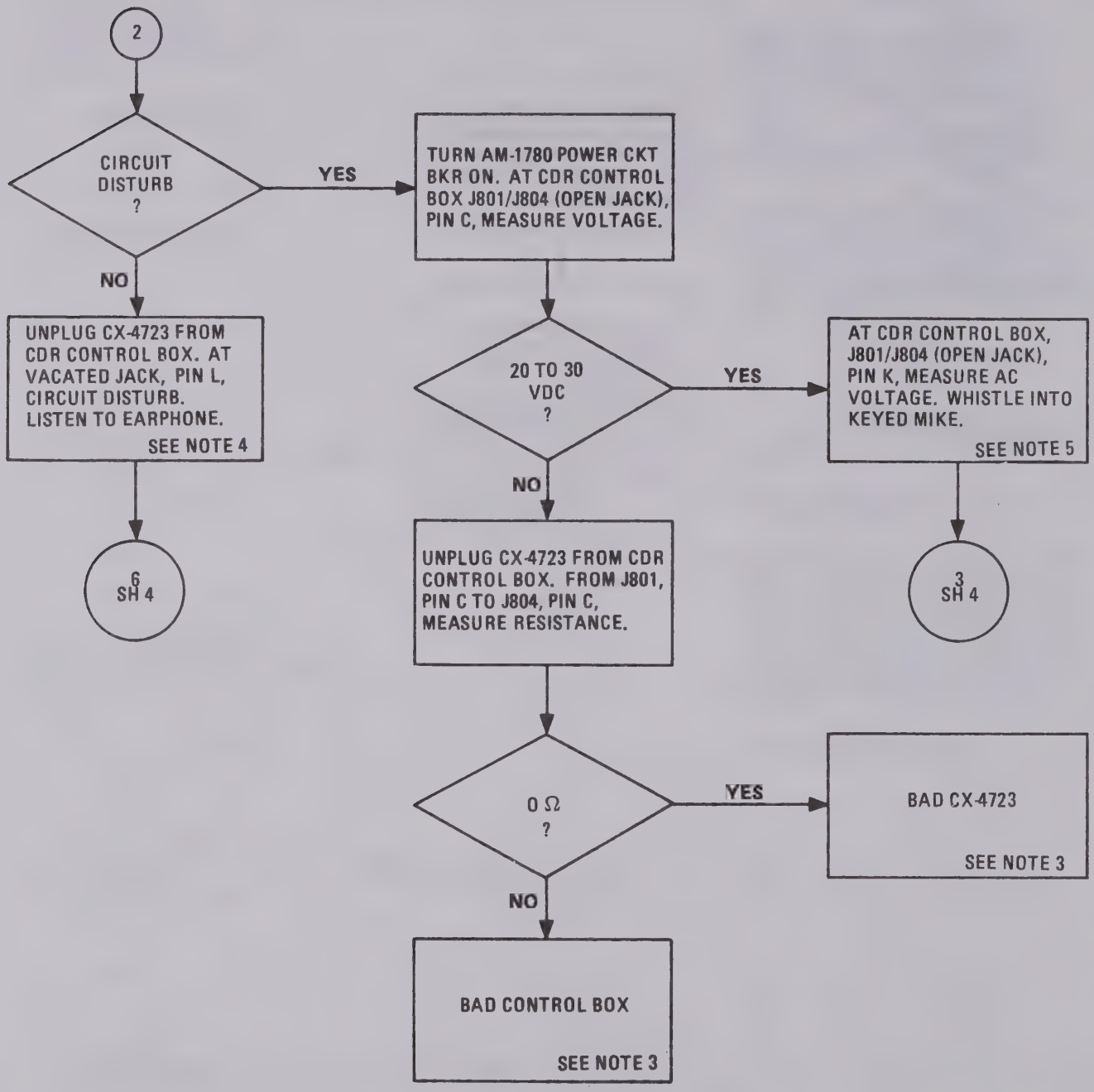
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 2 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

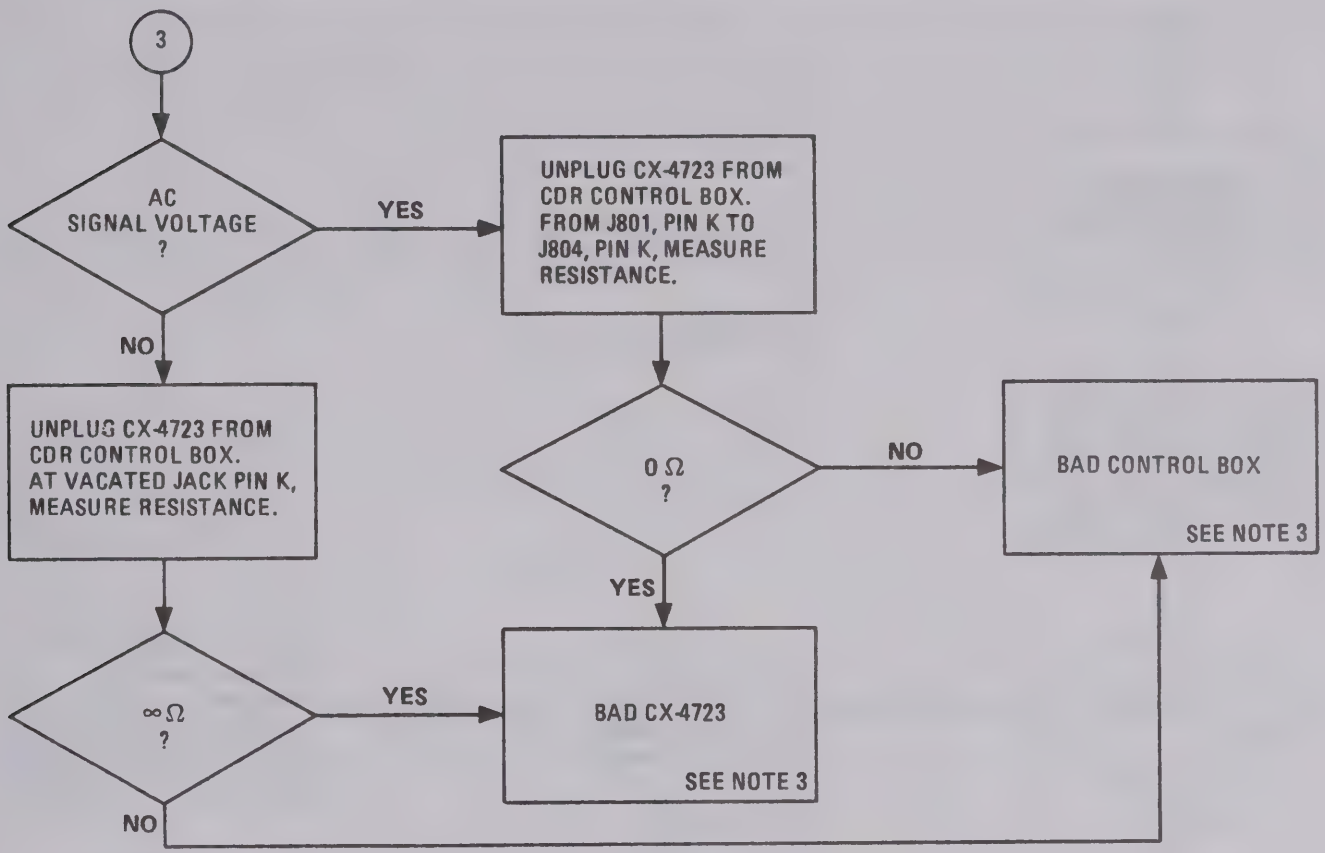
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 3 of 22)

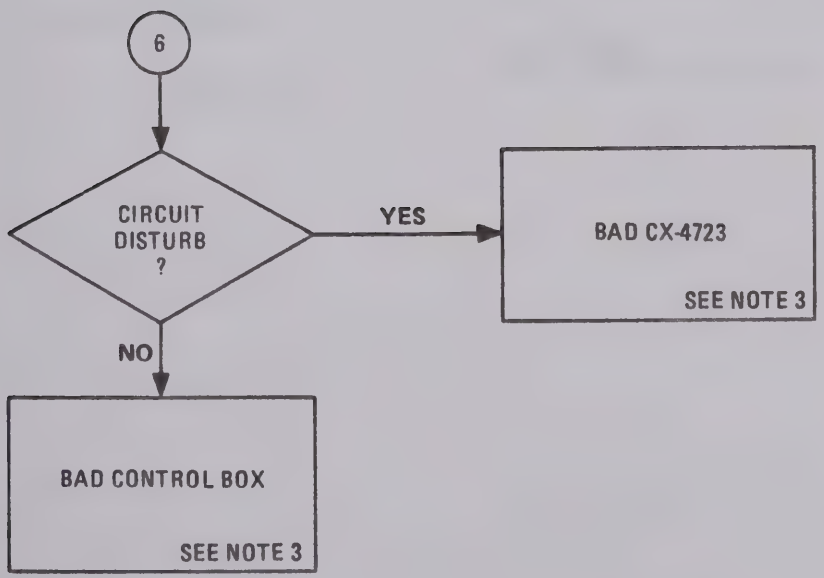


3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 4 of 22)

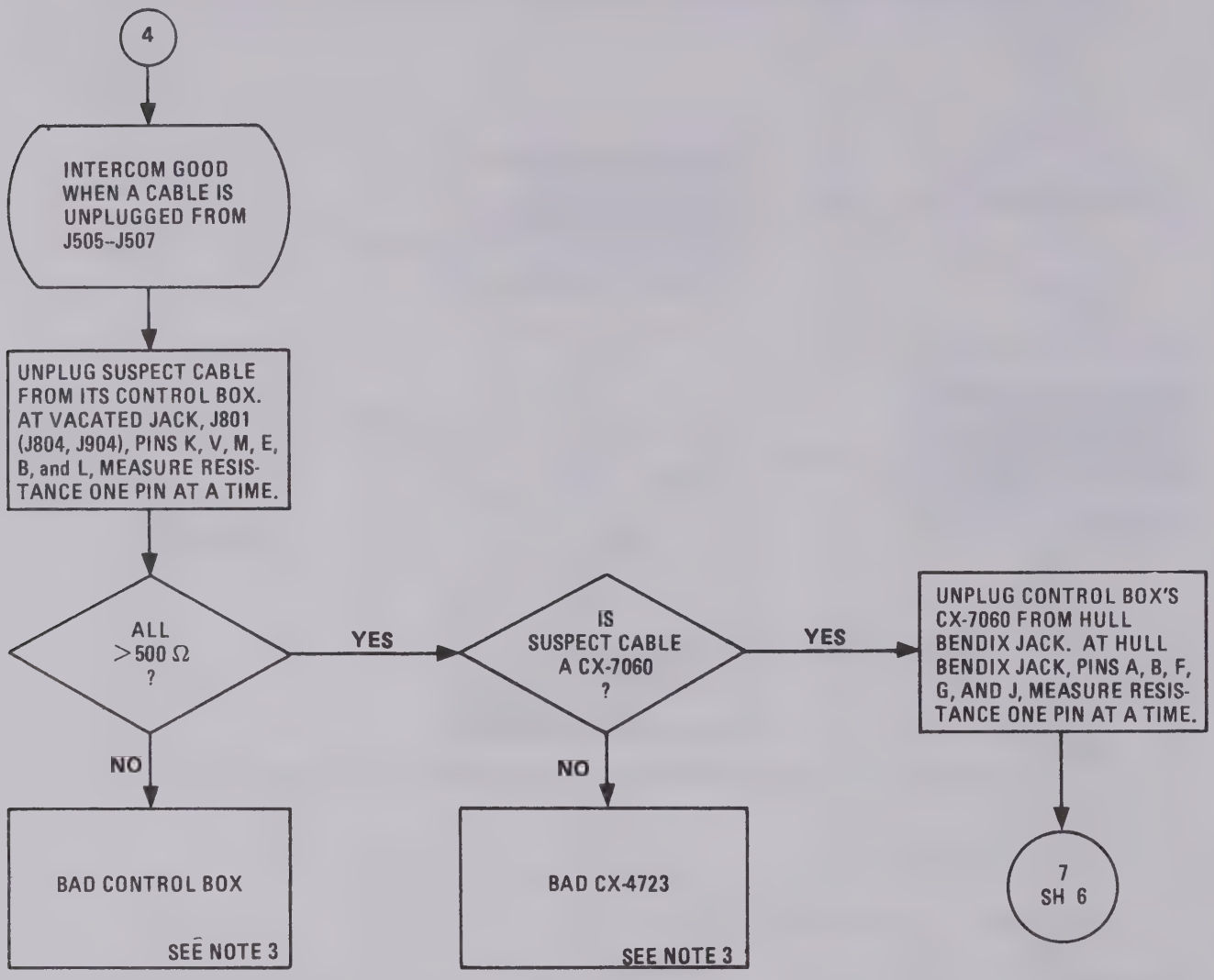




3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

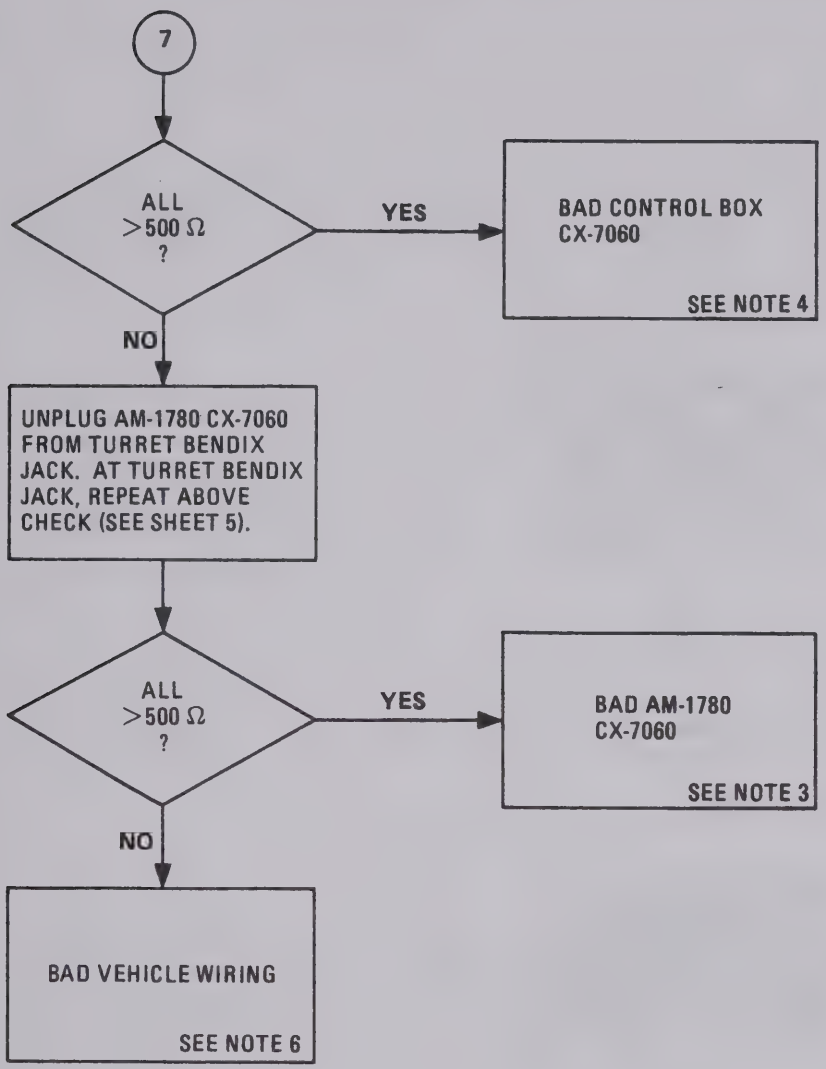
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 5 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

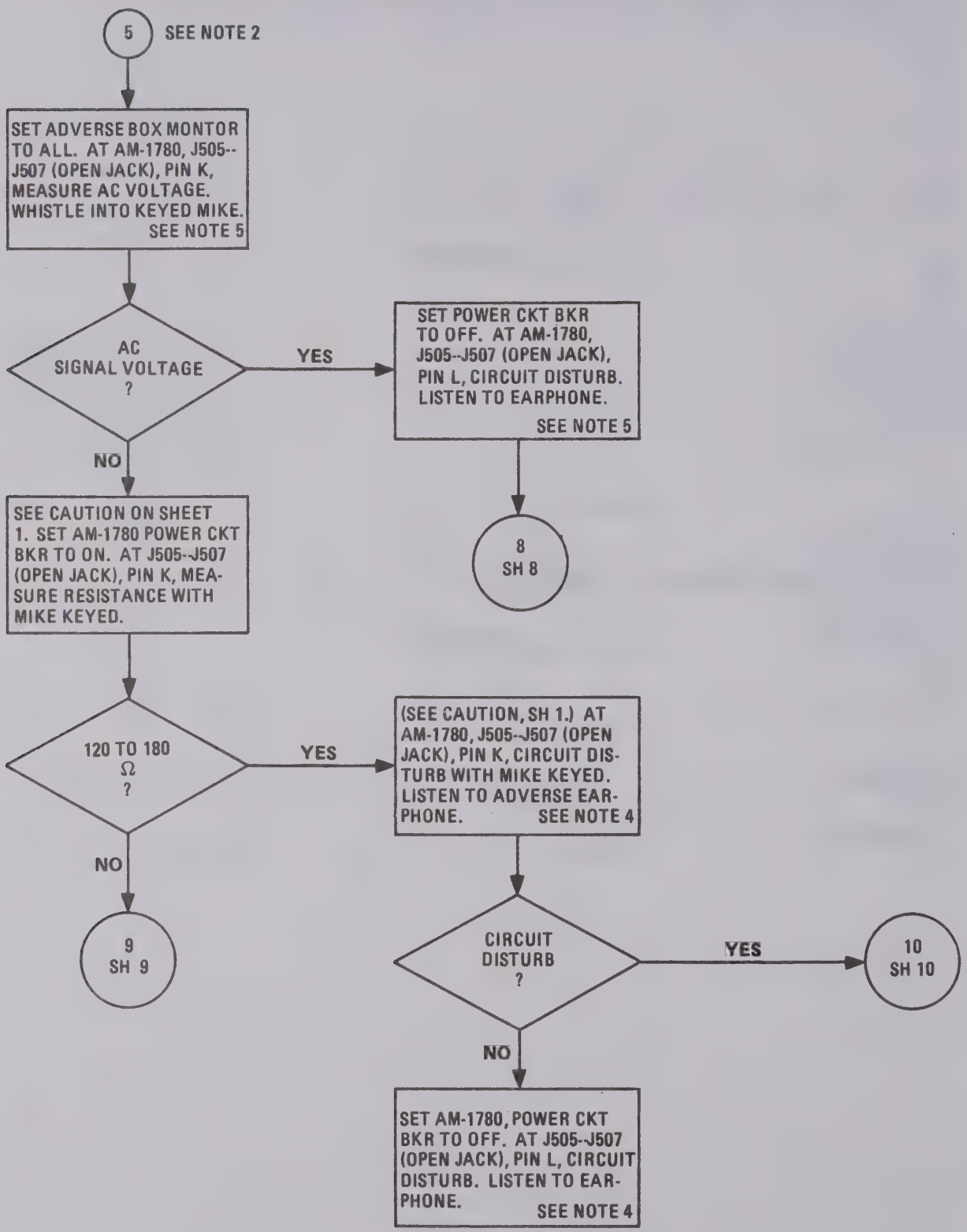
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 6 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

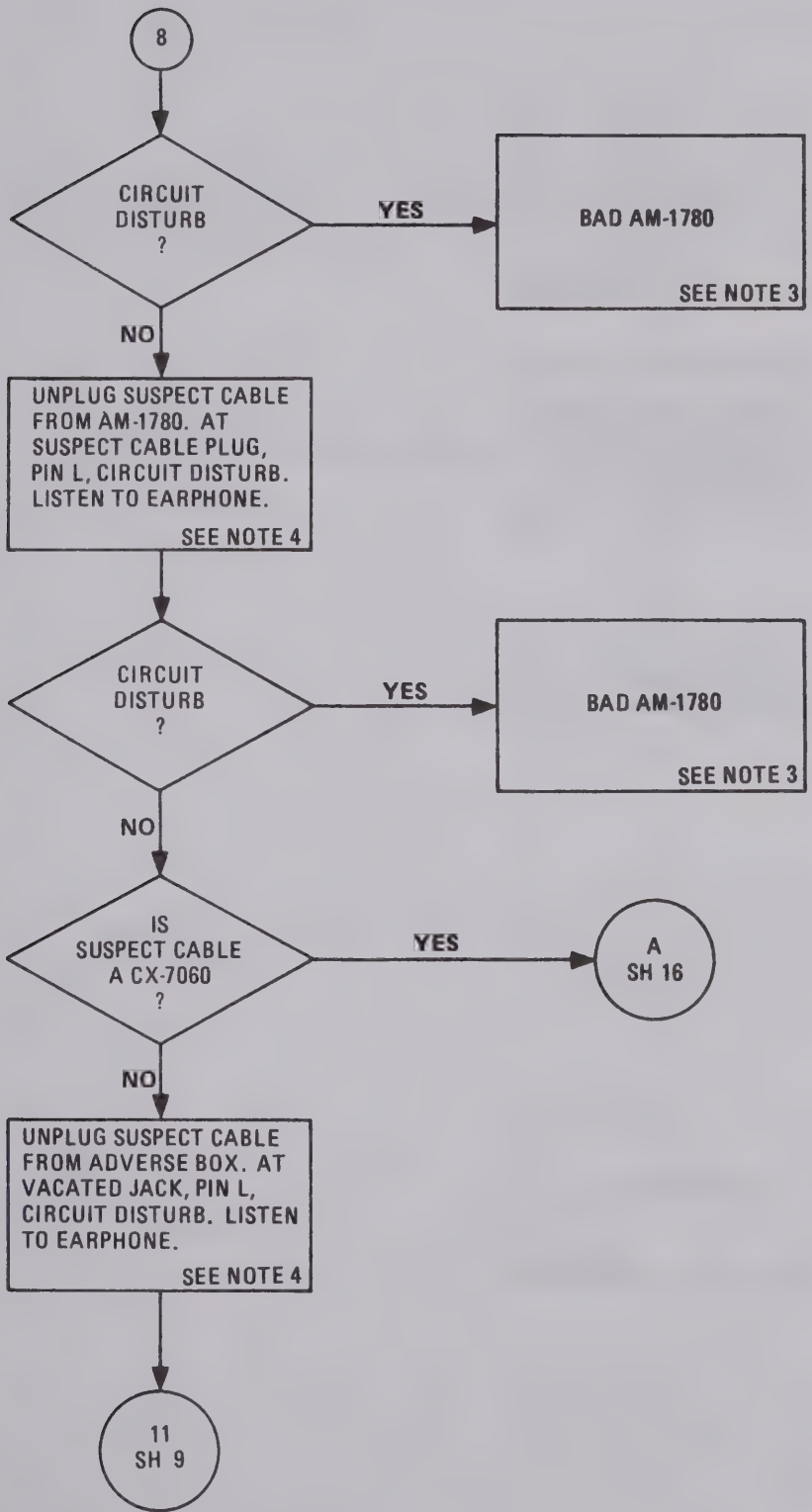
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 7 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

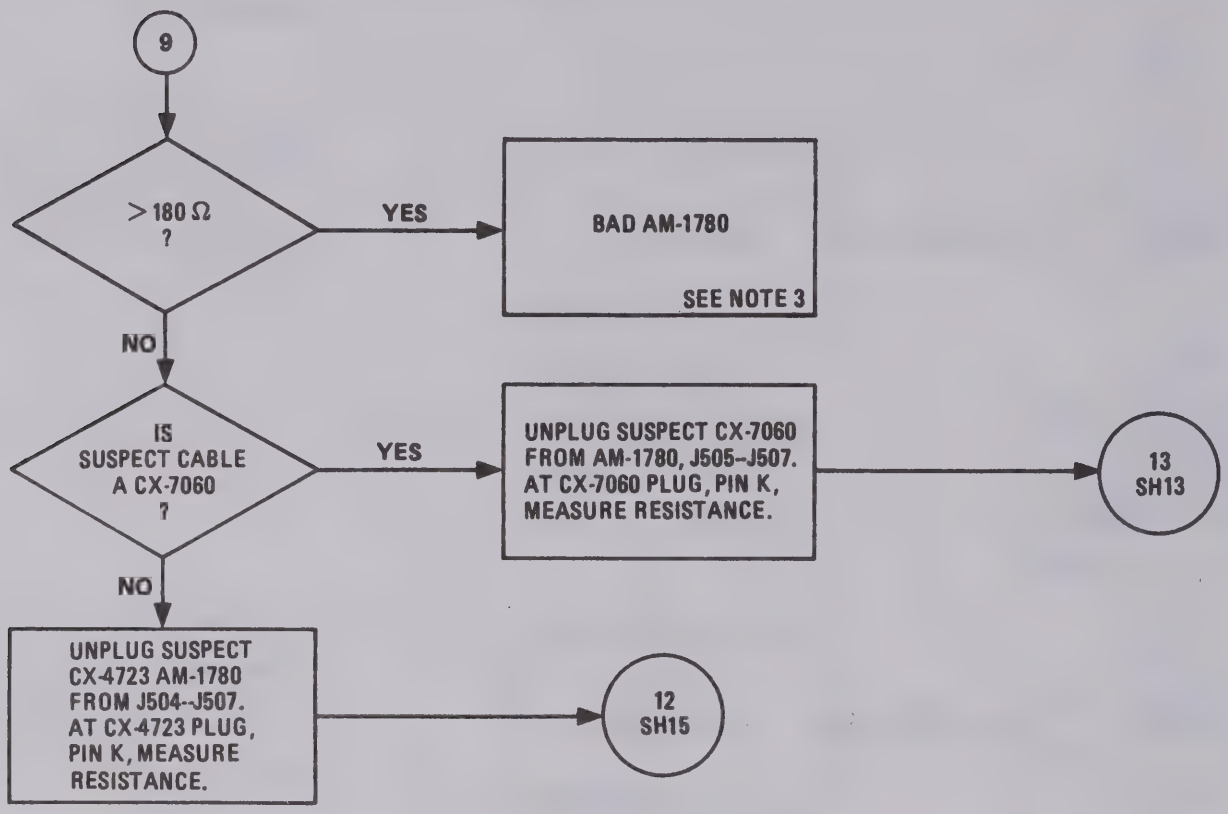
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 8 of 22)

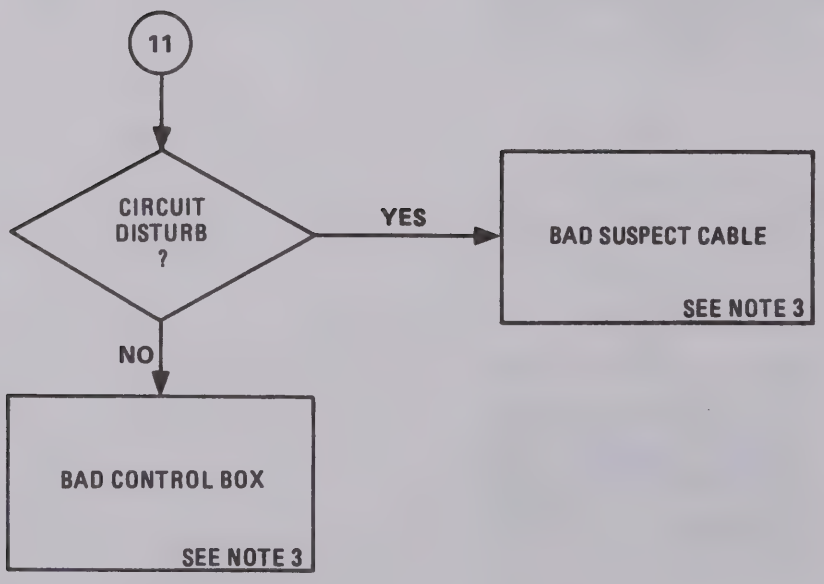


3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 9 of 22)

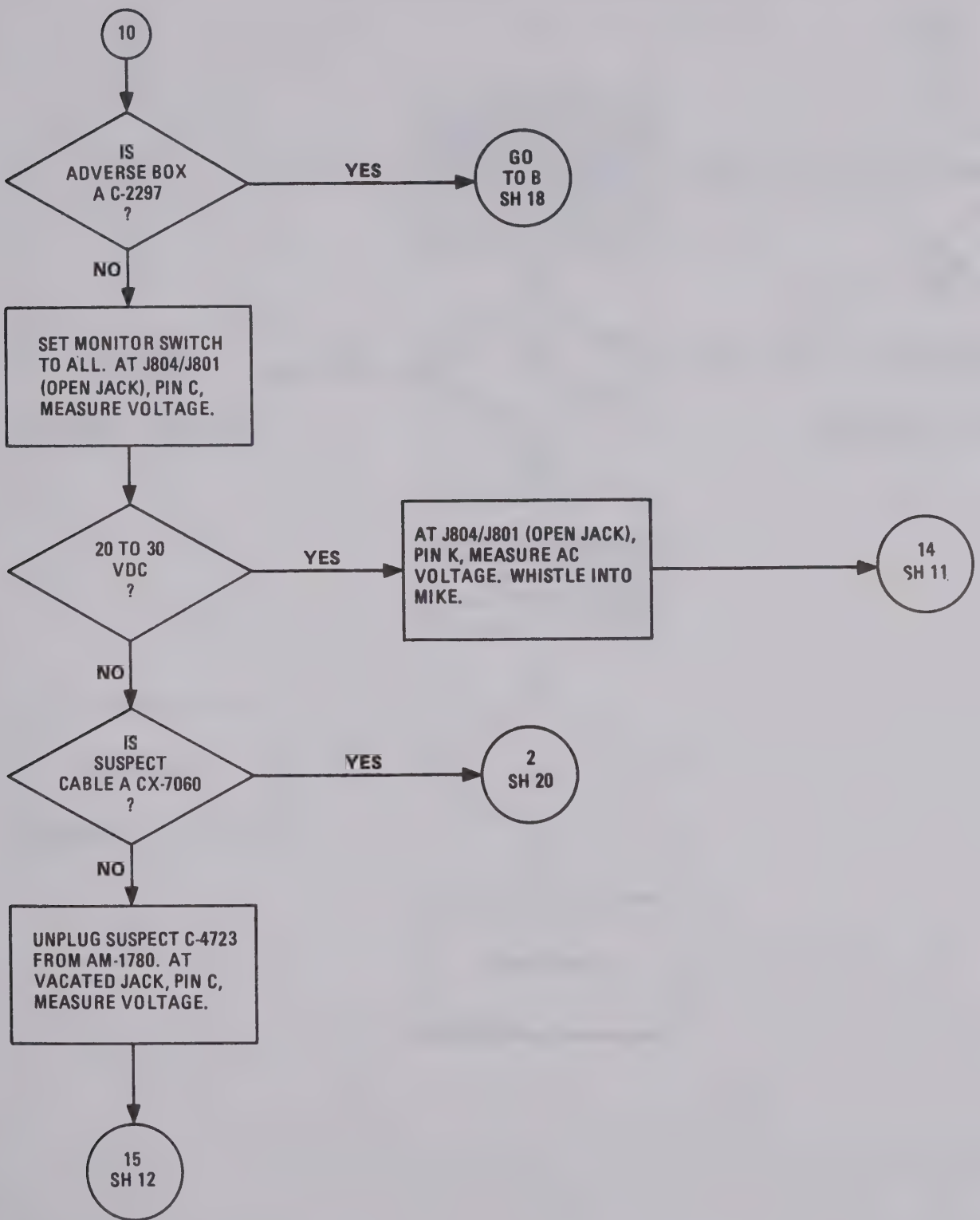




3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

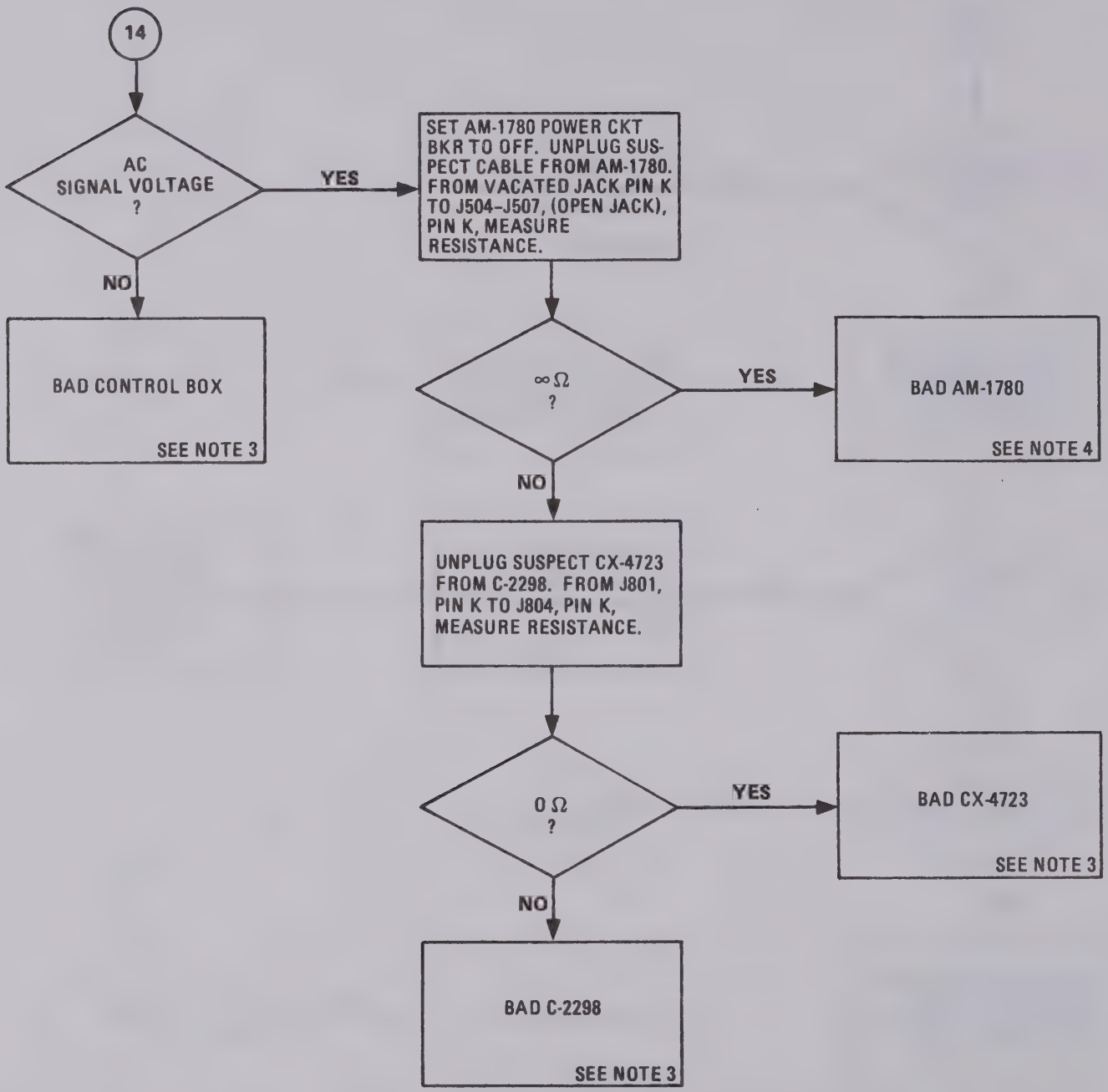
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 10 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

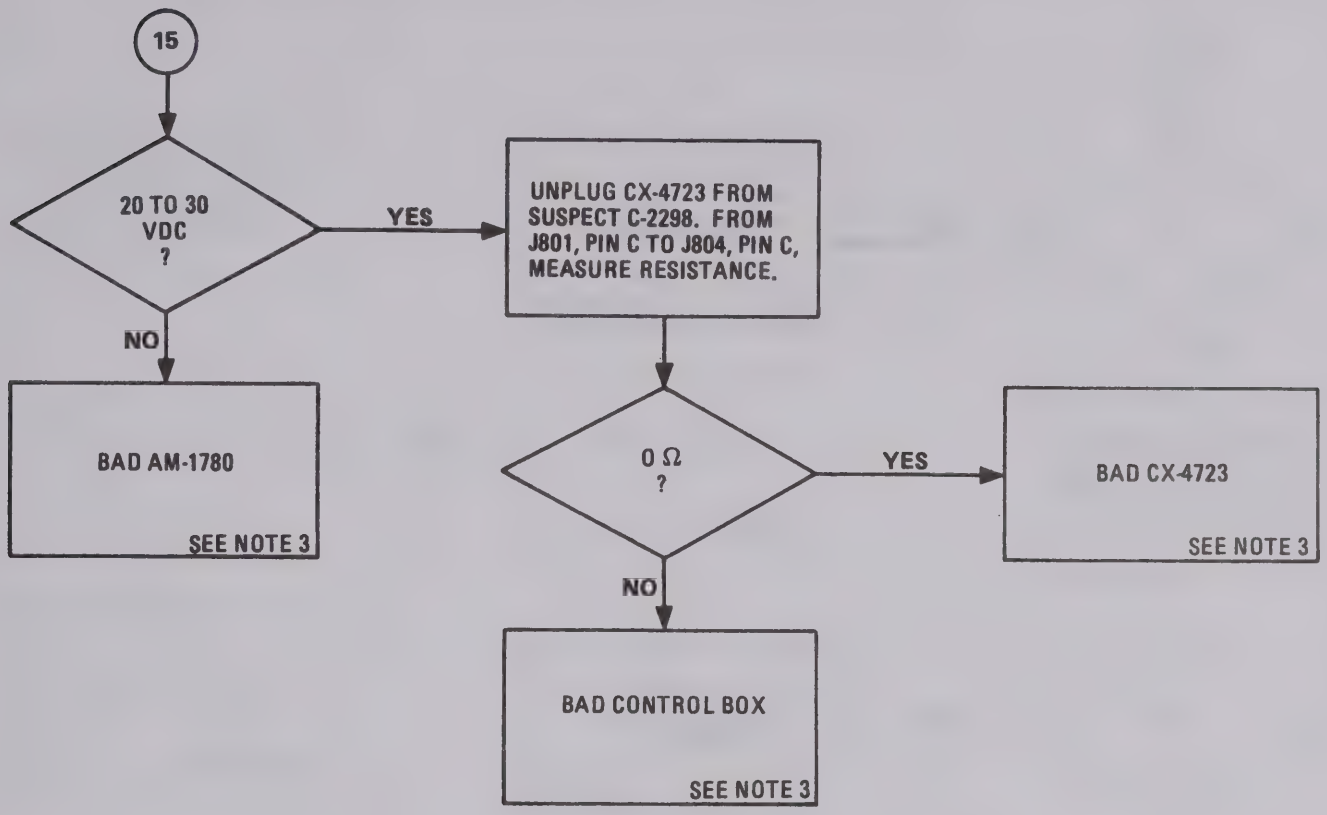
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 11 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

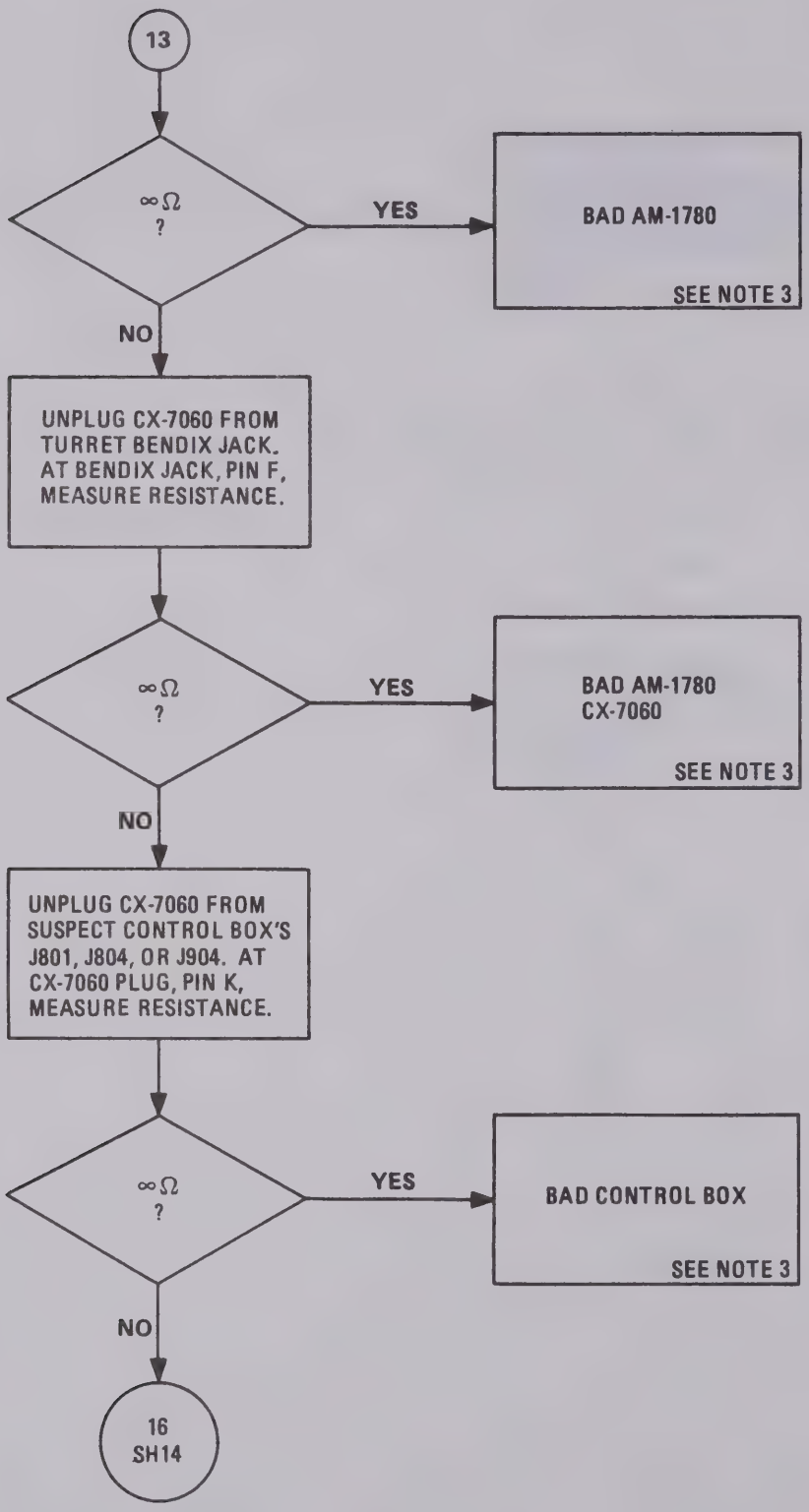
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 12 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

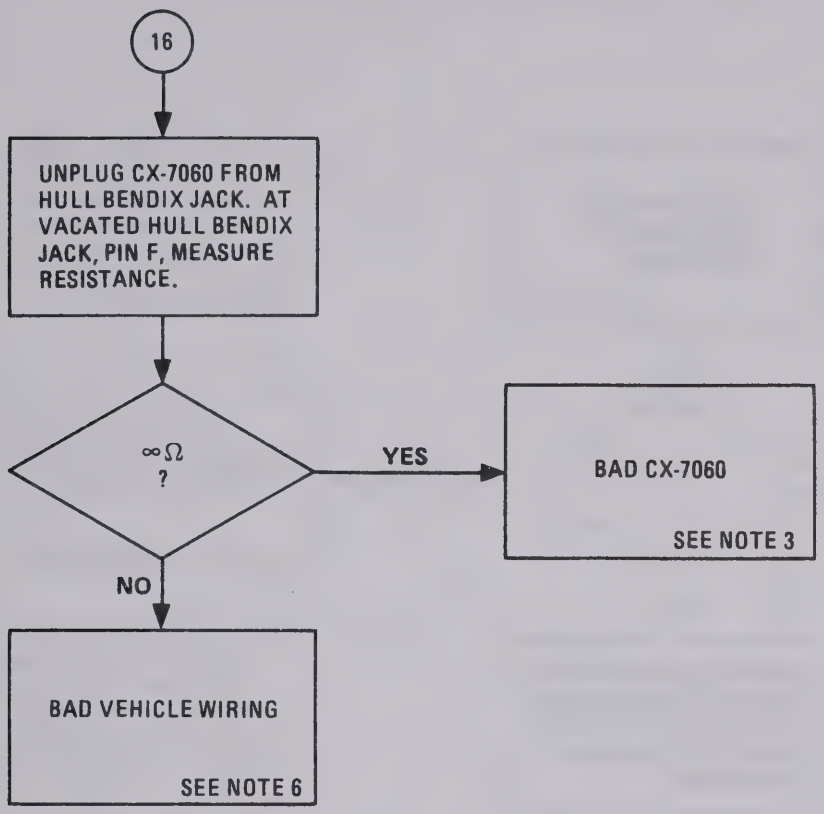
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 13 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

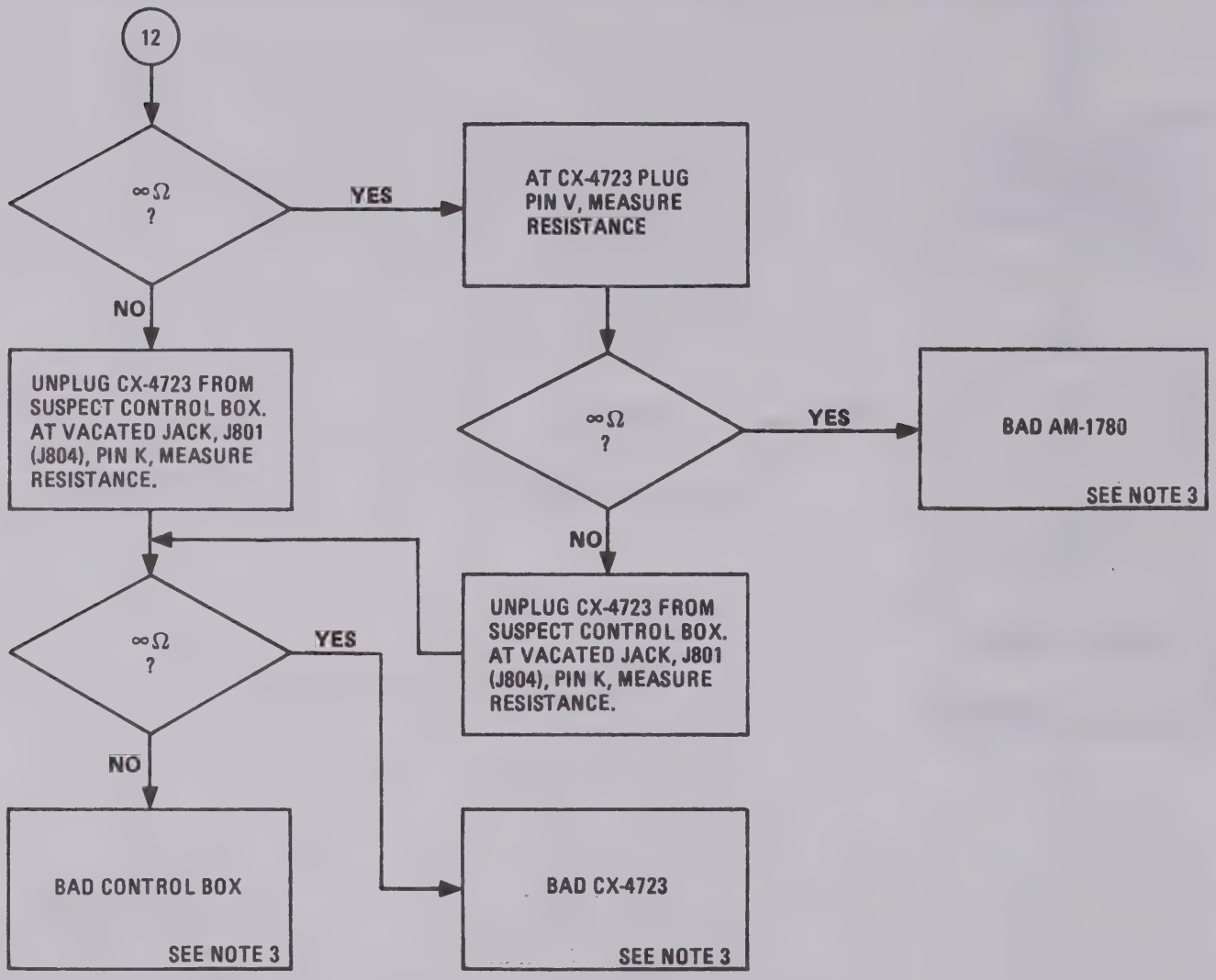
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 14 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

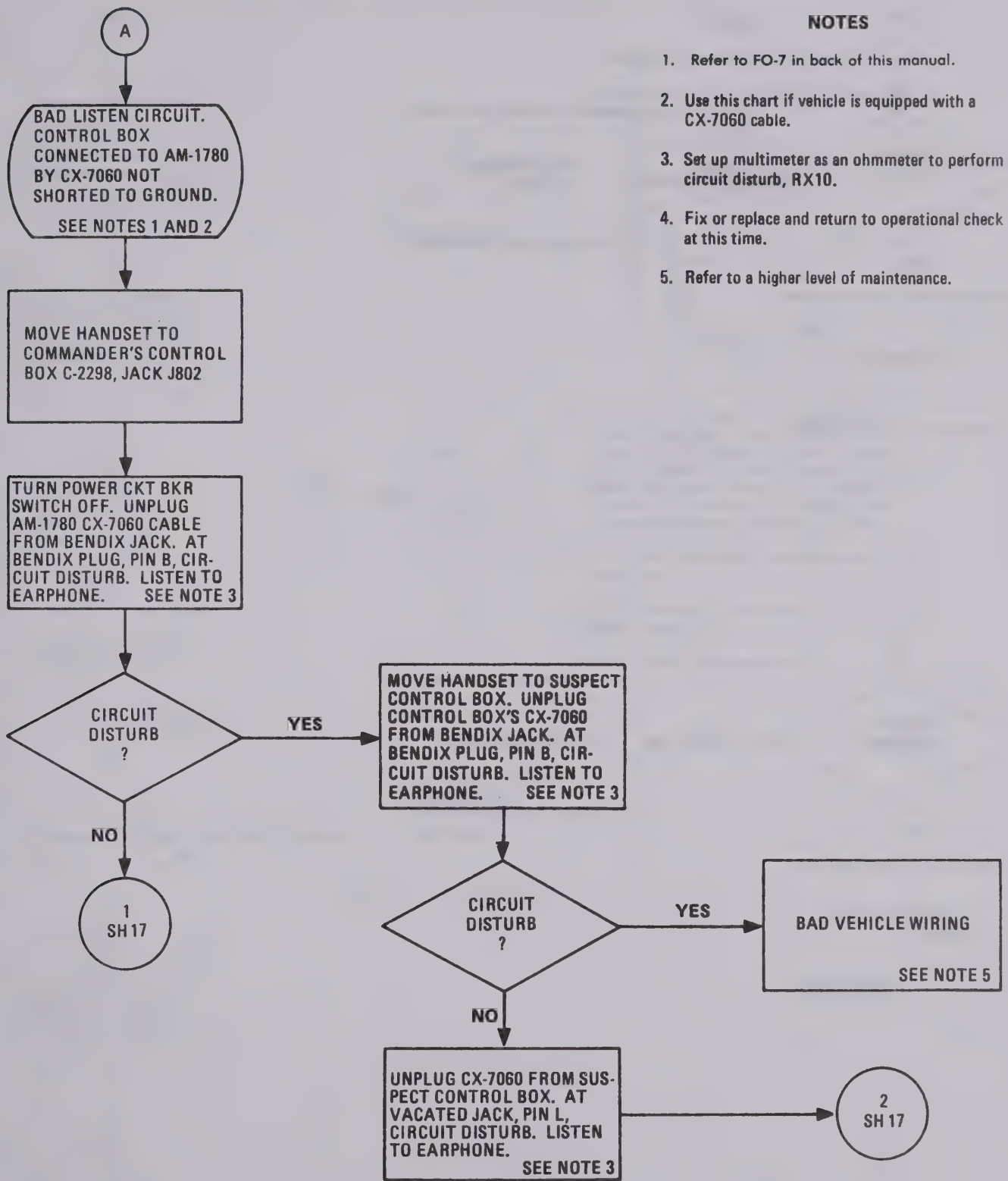
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 15 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 16 of 22)



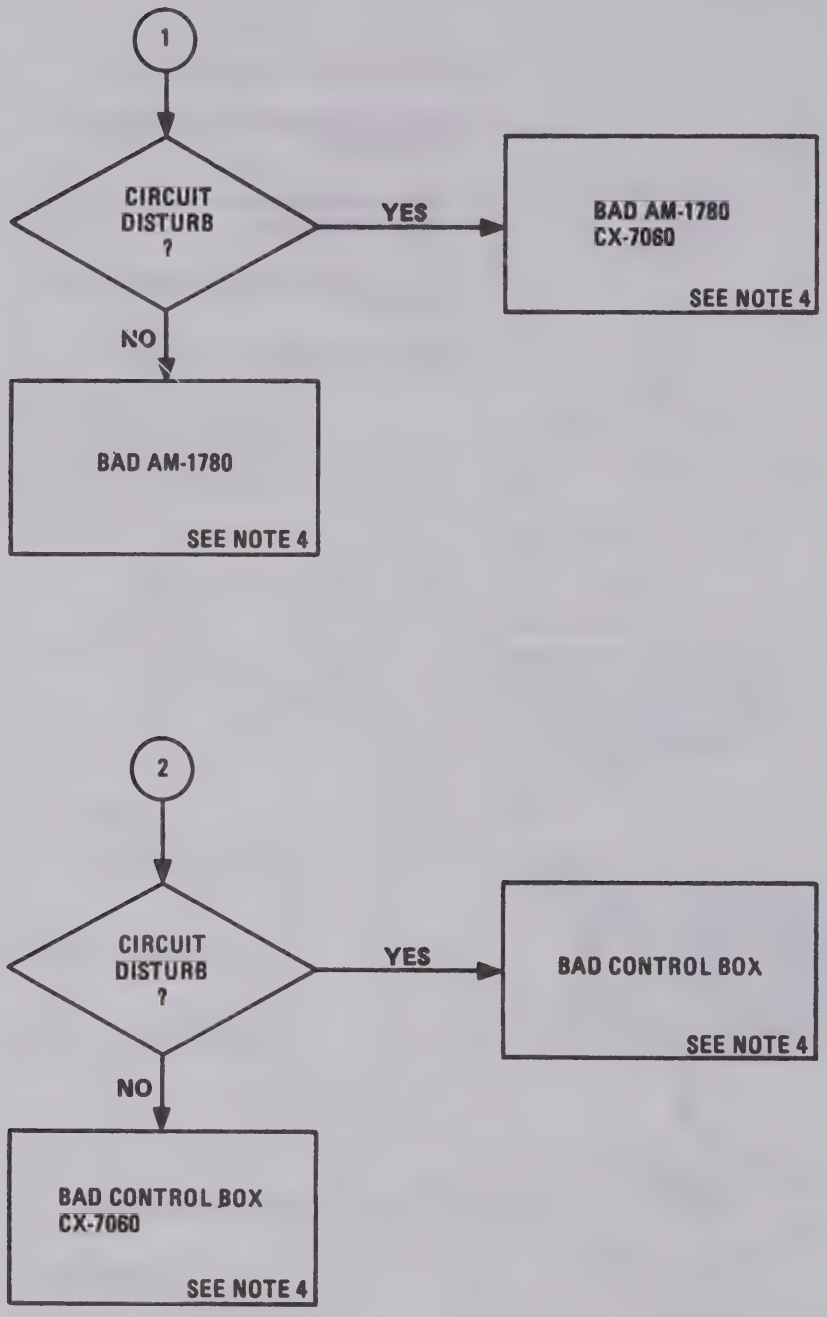
NOTES

1. Refer to FO-7 in back of this manual.
2. Use this chart if vehicle is equipped with a CX-7060 cable.
3. Set up multimeter as an ohmmeter to perform circuit disturb, RX10.
4. Fix or replace and return to operational check at this time.
5. Refer to a higher level of maintenance.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

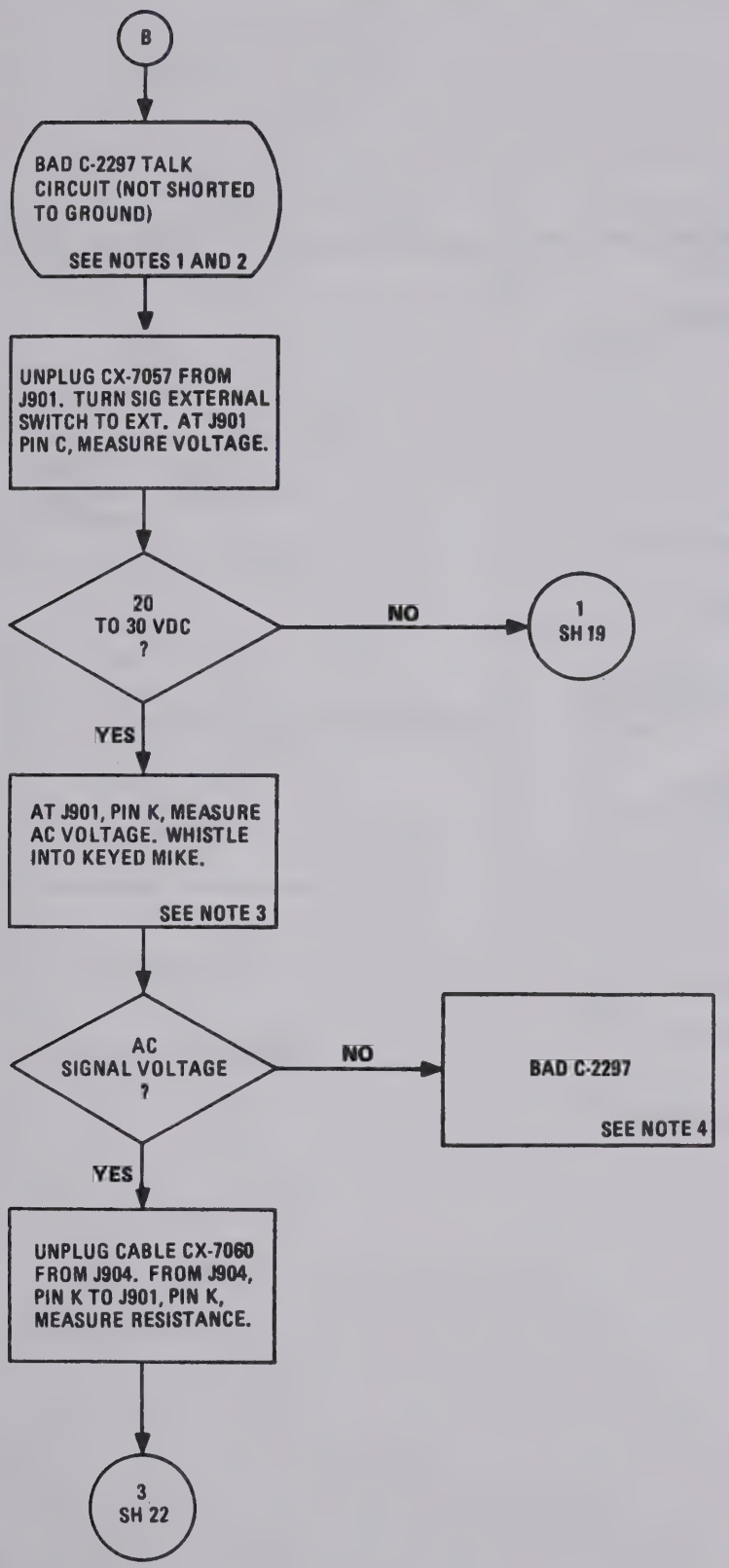
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 17 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

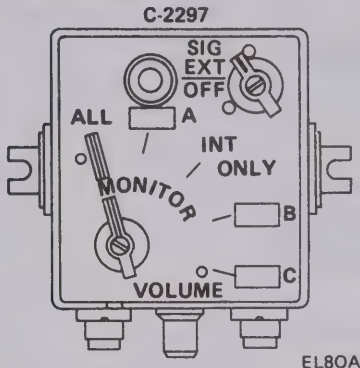
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 18 of 22)



NOTES

1. Refer to FO-7 in back of this manual.
2. Use this flow chart if vehicle is equipped with a C-2297 drivers control box.

C-2297



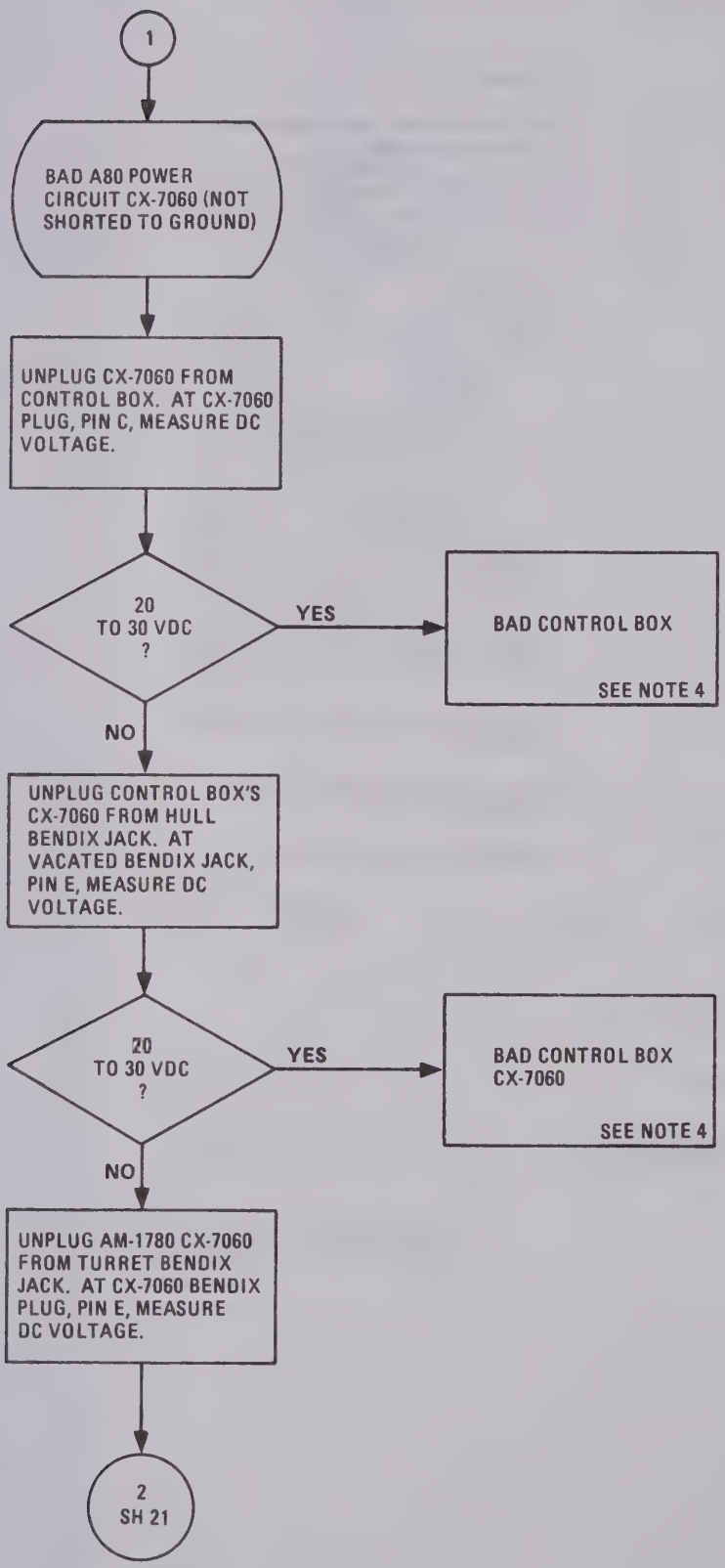
EL8OA083

3. Set up multimeter as an AC voltmeter (lowest range) connect meter probes between signal line (test point) and chassis ground; then key mike and note reading. Next sharply whistle into keyed mike and see if meter reading changes. A change in AC voltage reading indicates the presence of the talk signal. (Reading is <1 volt.)
4. Fix or replace and return to operational check at this time.
5. Set up multimeter as an ohmmeter to do circuit disturb, RX10.
6. Refer to higher maintenance level.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

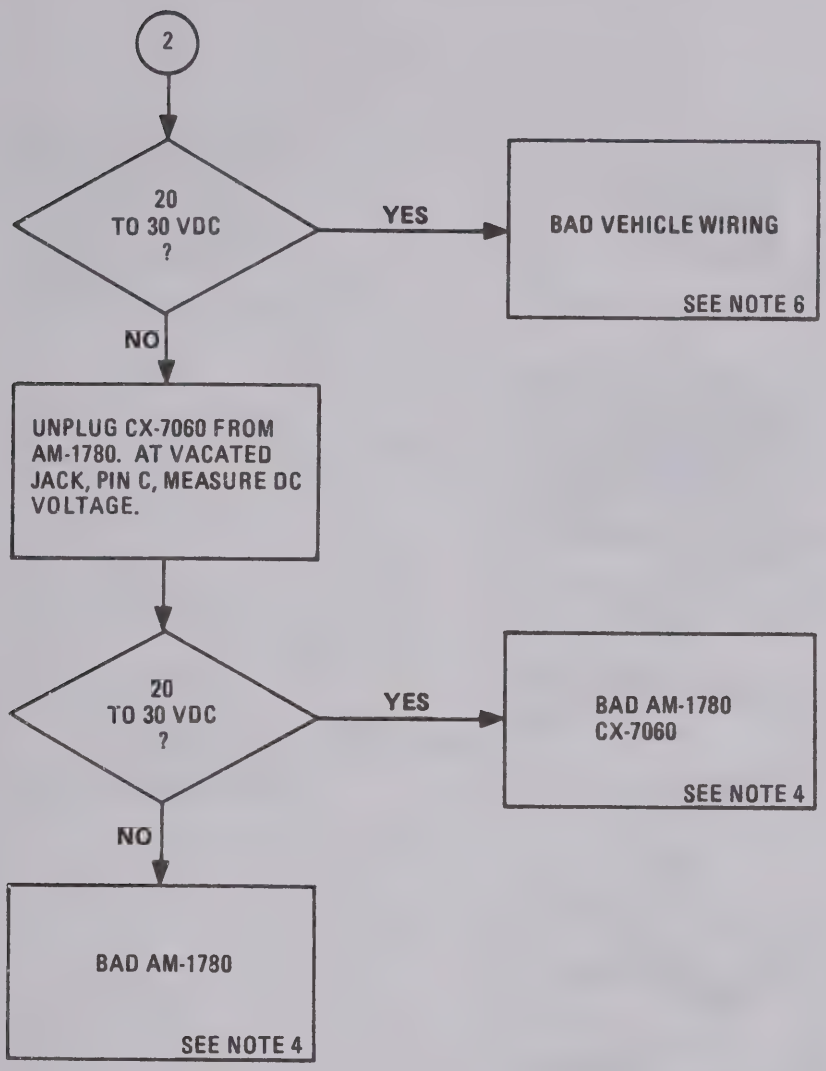
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 19 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

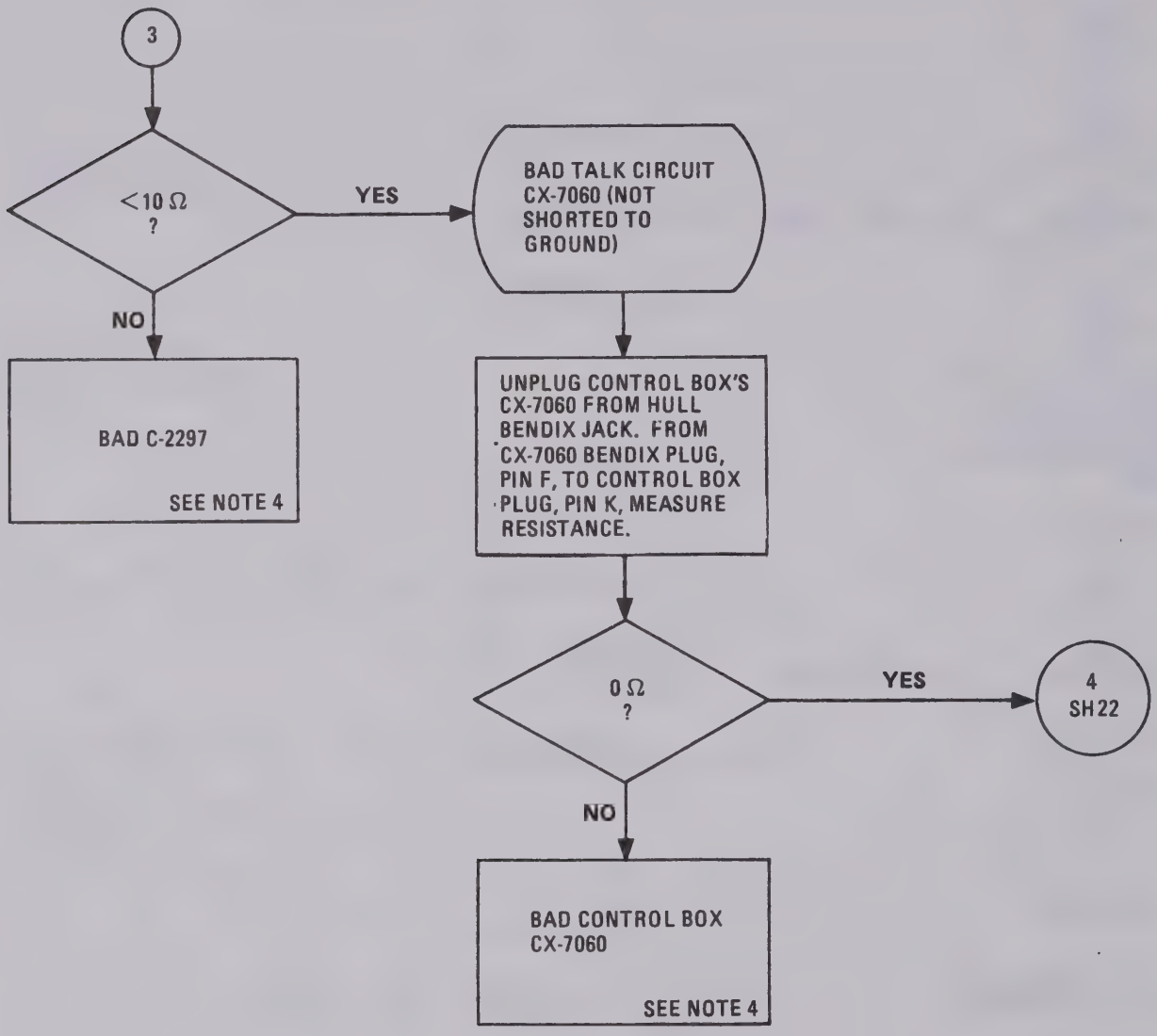
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 20 of 22)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 21 of 22)



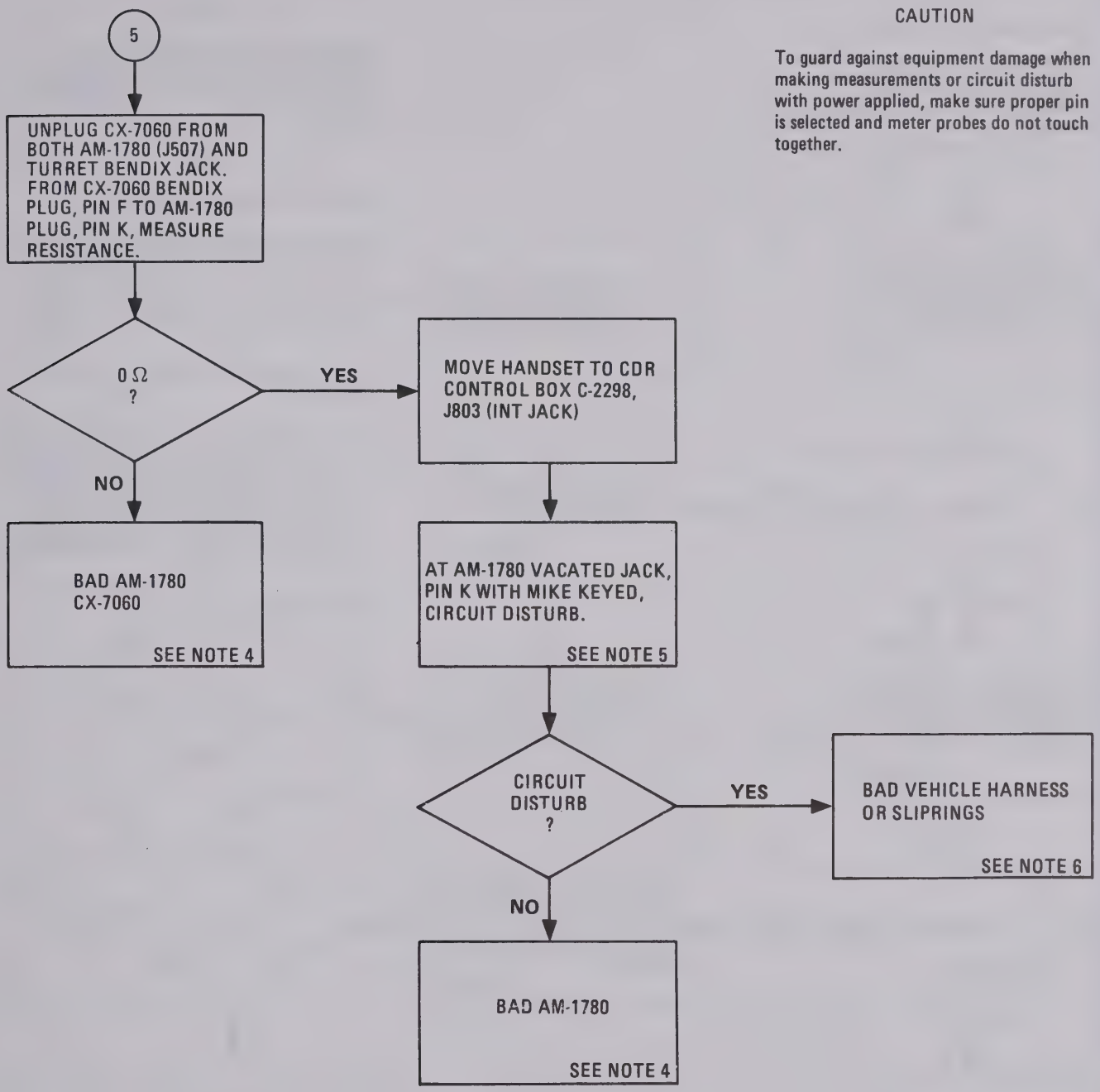
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 22 of 22)

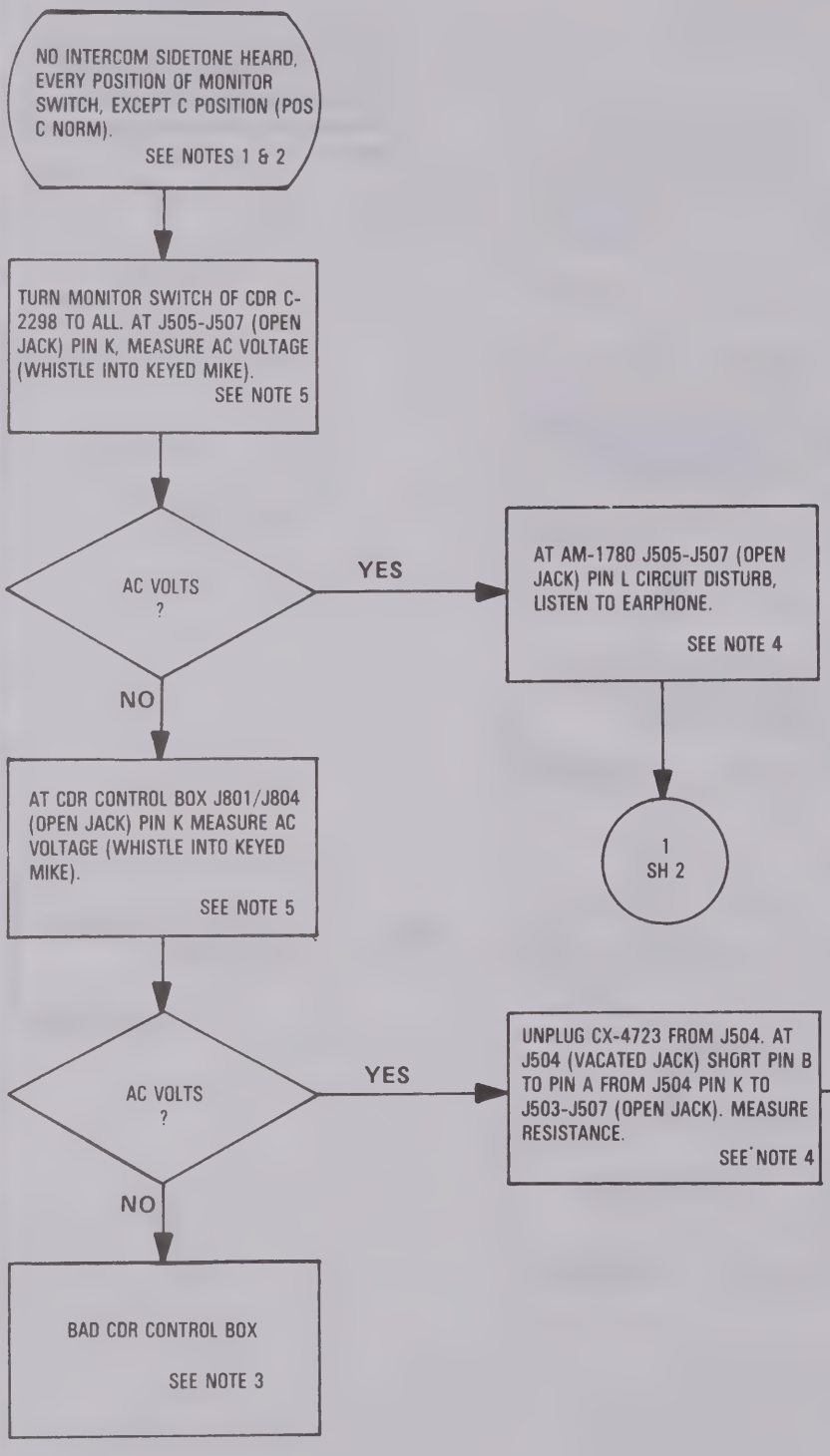
CAUTION

To guard against equipment damage when making measurements or circuit disturb with power applied, make sure proper pin is selected and meter probes do not touch together.



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6.1
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position Except C-Position) (Sheet 1 of 3)



CAUTION

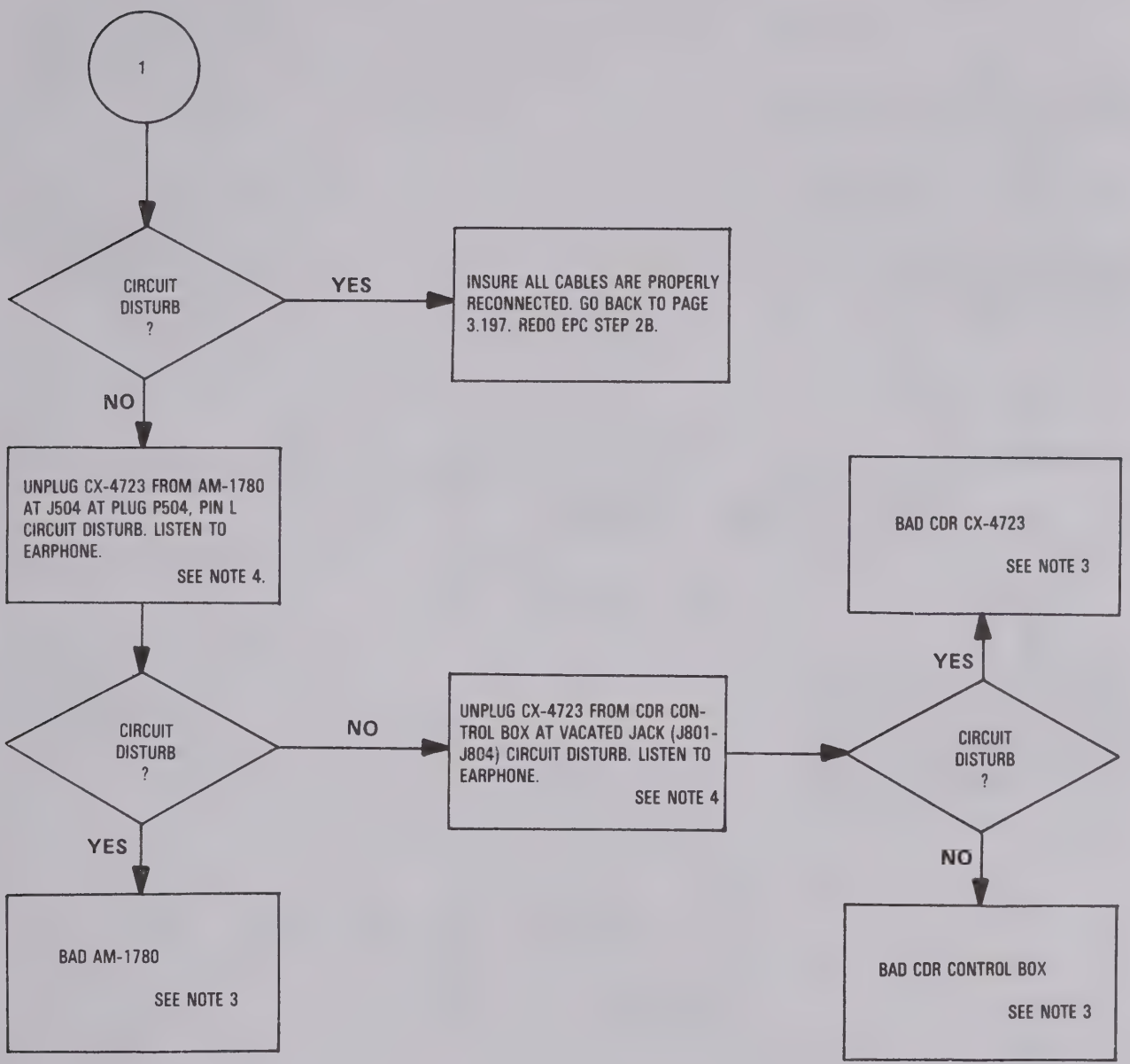
To guard against equipment damage when making measurements or equipment disturb with power applied, make sure proper pin is selected and meter probes do not touch together.

NOTES

1. Refer to FO-4 in back of this manual.
2. Follow this flow chart in sequence for no side tone in any position of monitor switch except C-position.
3. Fix or replace or return to operational check at this time.
4. Set up multimeter as an ohmmeter to do circuit disturb, RX10.
5. Set up multimeter as an AC voltmeter (lowest range). Connect meter probes between signal line (test point) and chassis ground, then key mike and note reading. Next, sharply whistle into keyed mike and see if the meter reading changes. Any change in AC voltage indicates the presence of the talk signal. (Reading is <1 volt.)
6. Refer to higher maintenance level.

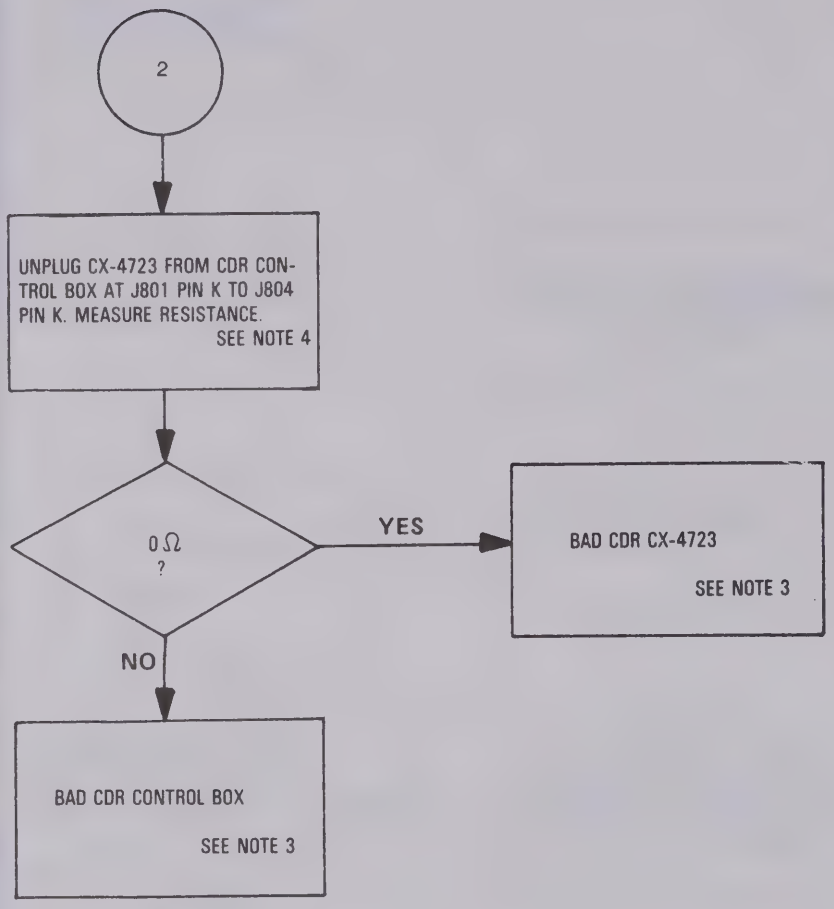
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6.1
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch, Except C-Position)
(Sheet 2 of 3)



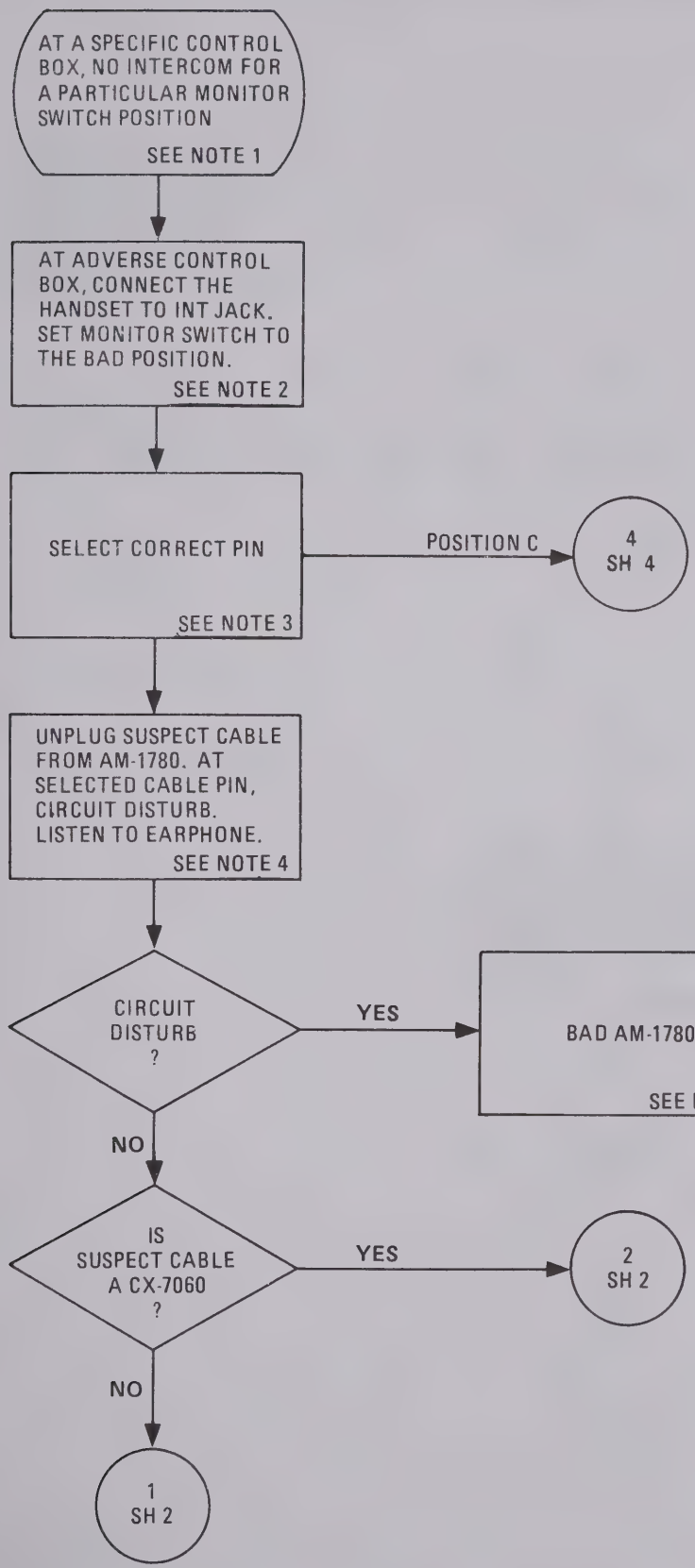
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

Chart 6.1
Troubleshooting Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch Except C-Position)
(Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 7
Troubleshoot Intercom Talk/Listen Circuit (A Particular Position of Monitor Switch is Adverse)
(Sheet 1 of 6)



NOTES

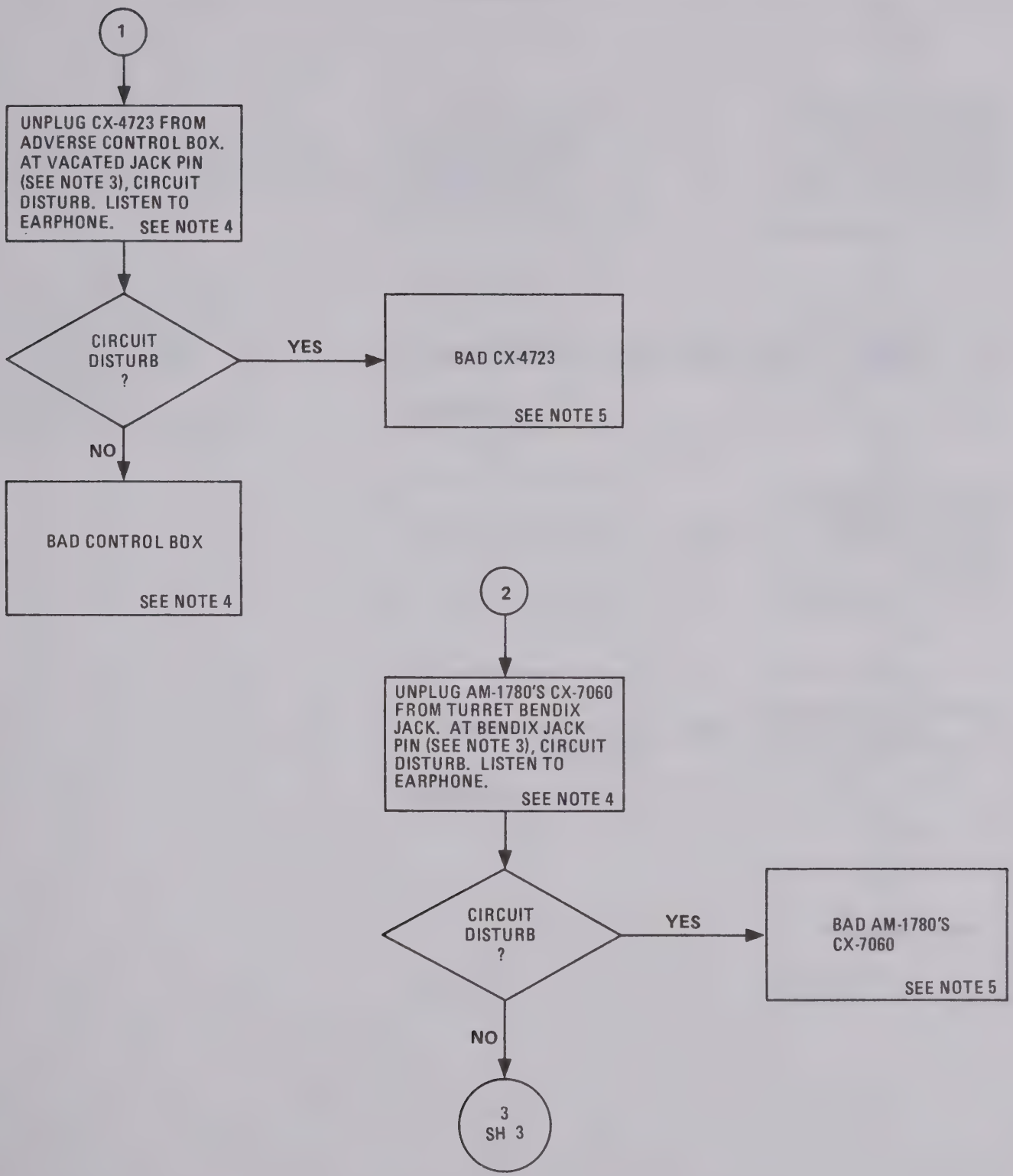
1. Refer to FO-4 in back of this manual.
2. Follow this chart in sequence for any position of the MONITOR switch and for any commander's, driver's, and crew member's control boxes.
3. Select the correct pin for the MONITOR switch or the Bendix cable from the below listed chart.

Position	Use	CX-7060 Bendix
ALL	Pin L	B
A	Pin M	A
INT	Pin E	G
B	Pin B	J
C	See 4 SH 4	N/A

4. Set up multimeter as an ohmmeter to perform circuit disturb, RX10.
5. Fix or replace and return to operational check at this time.
6. Refer to higher maintenance level.
7. Set up multimeter as an AC voltmeter (lowest range) connect meter probes between signal line (test point) and chassis ground, then key mike and note reading. Next, sharply whistle into mike and look to see if the meter reading changes. Any change in AC voltage reading indicates the presence of the talk signal. (Reading is $<$ 1 volt).

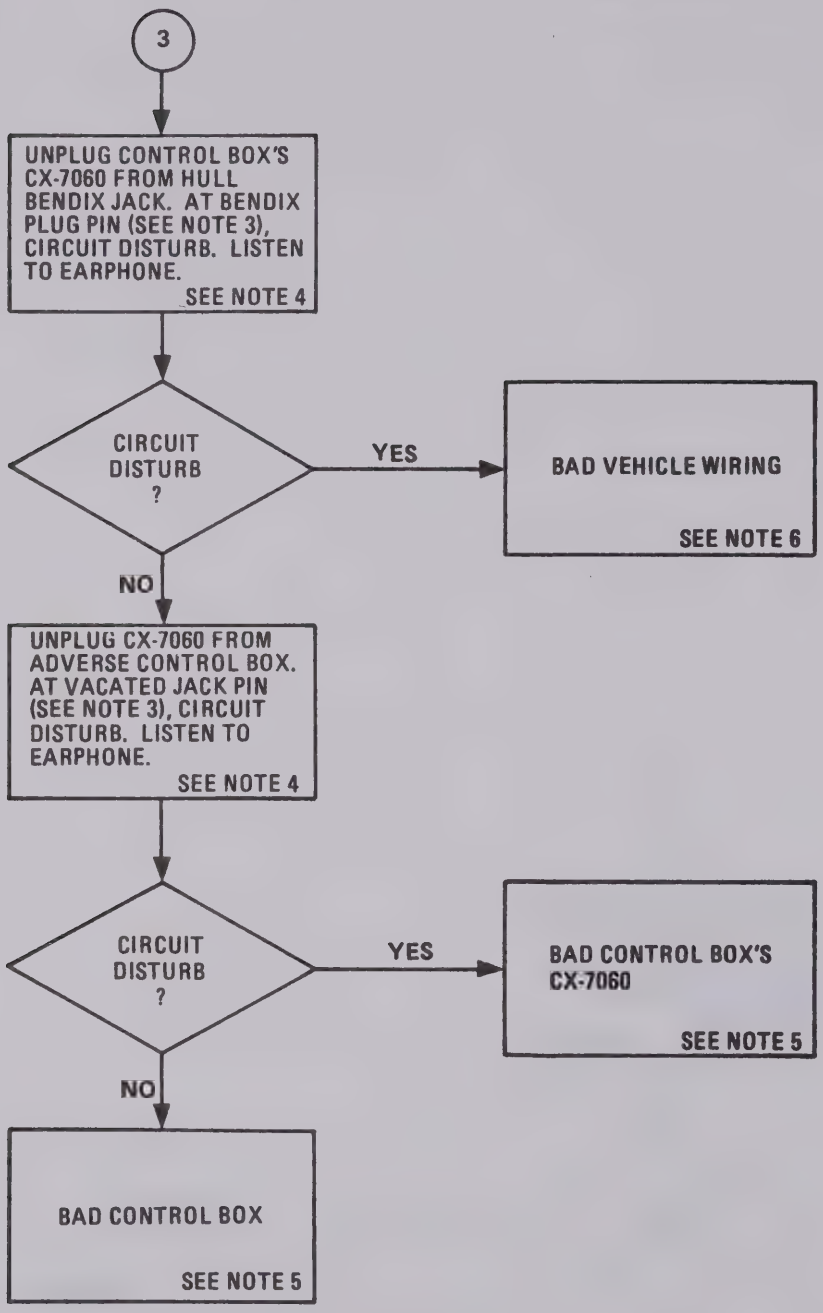
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 7
Troubleshoot Intercom Talk/Listen Circuit (A Particular Position of Monitor Switch is Adverse)
(Sheet 2 of 6)



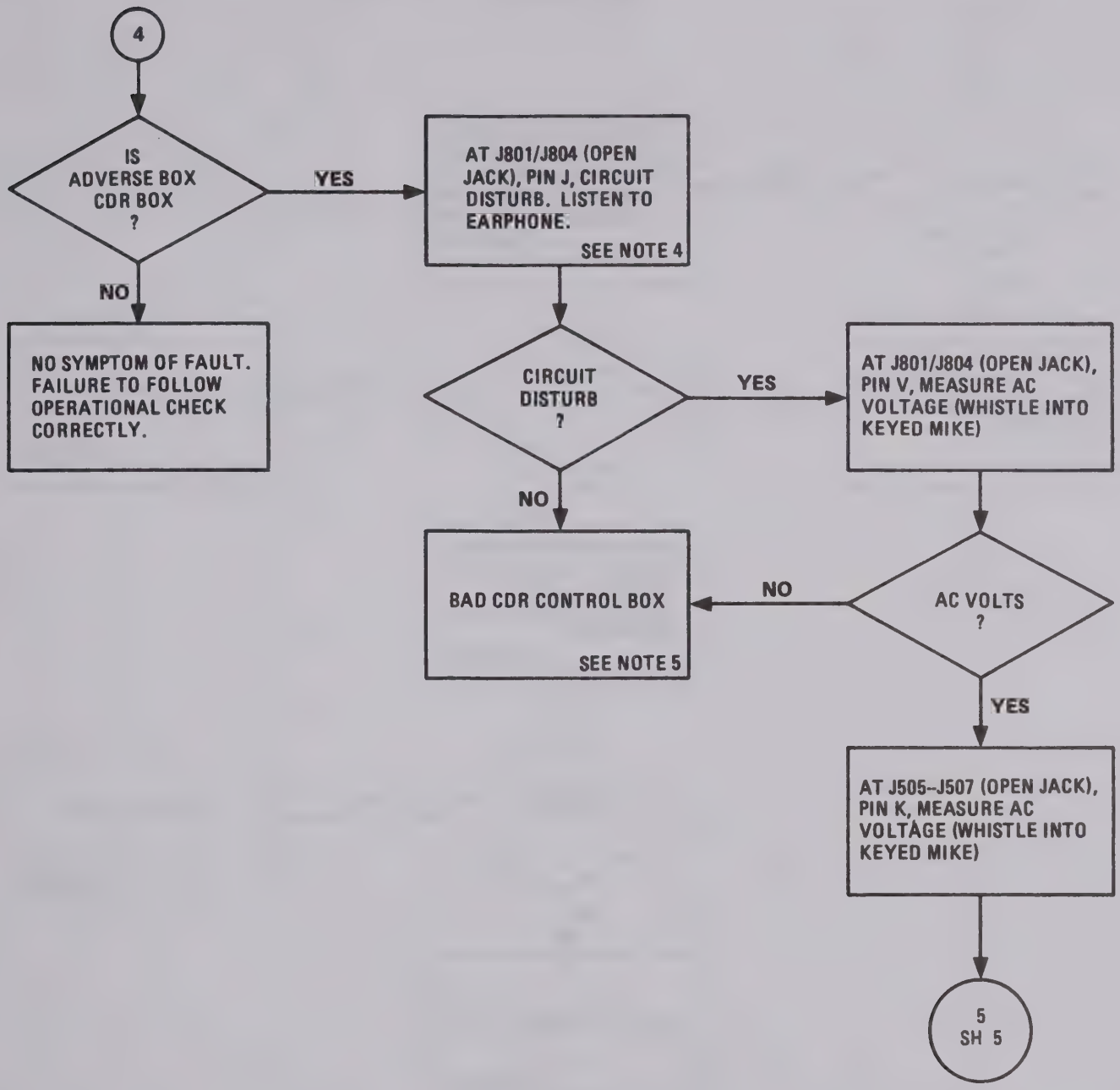
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 7
Troubleshoot Intercom Talk/Listen Circuit (A Particular Position of Monitor Switch is Adverse)
(Sheet 3 of 6)



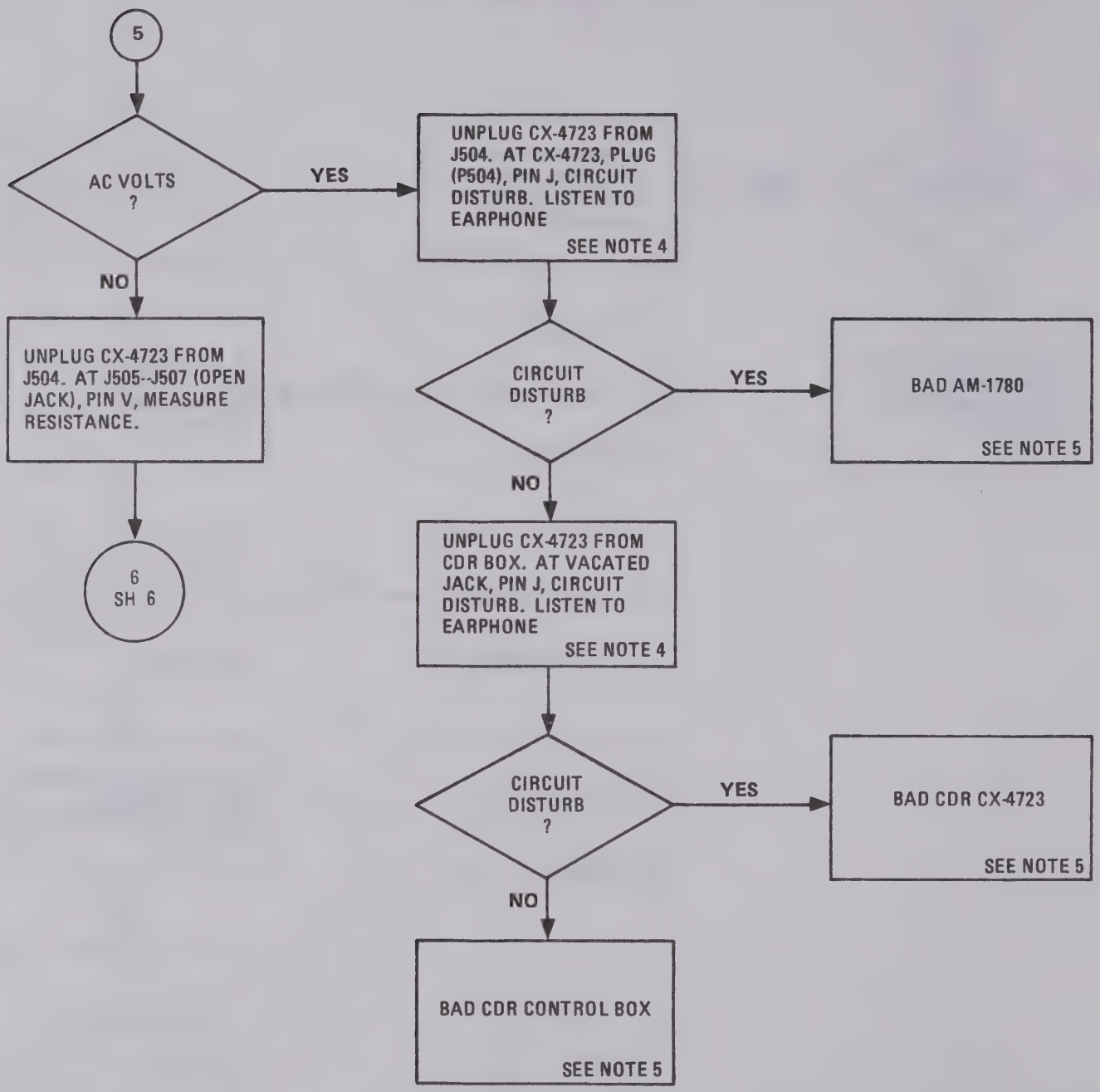
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 7
Troubleshoot Intercom Talk/Listen Circuit (A Particular Position of Monitor Switch is Adverse)
(Sheet 4 of 6)



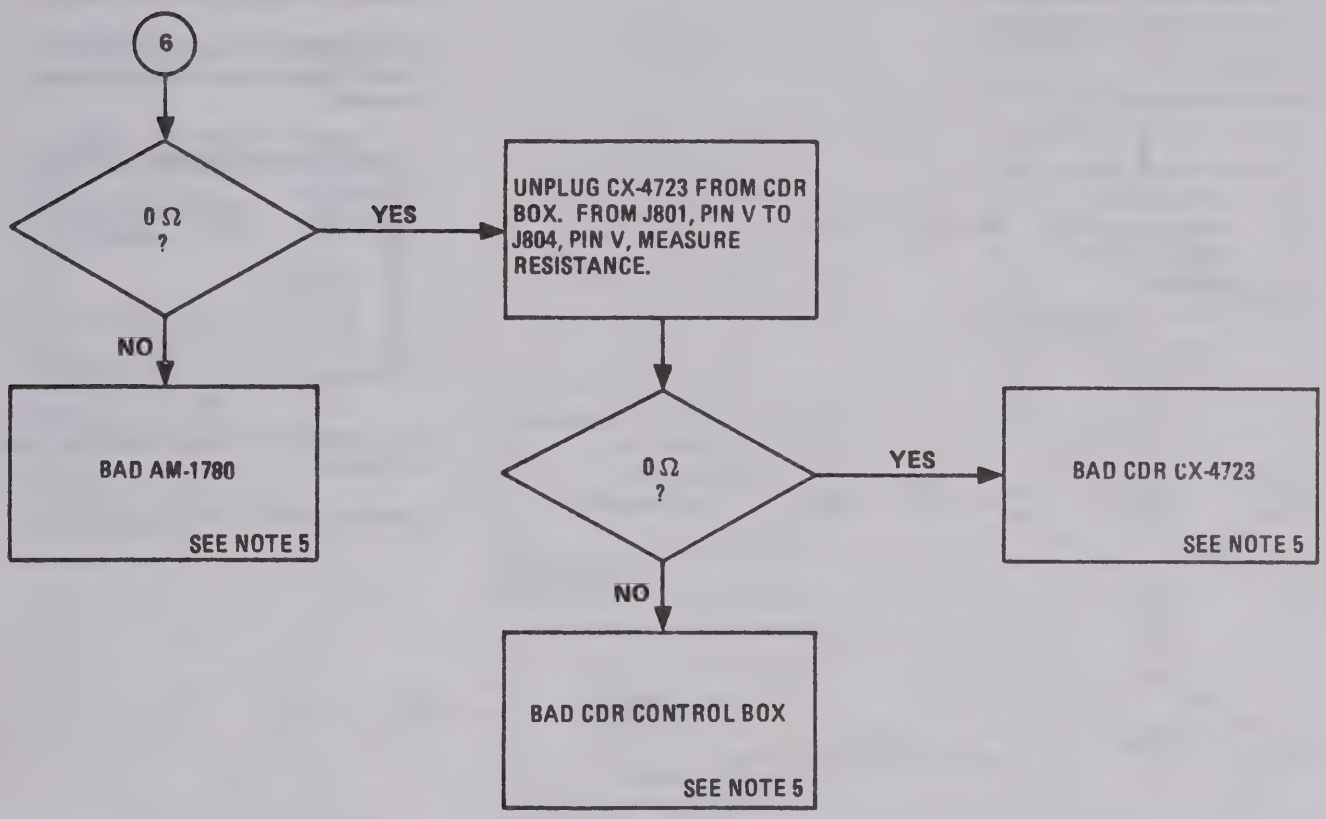
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 7
Troubleshoot Intercom Talk/Listen Circuit (A Particular Position of Monitor Switch is Adverse)
(Sheet 5 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

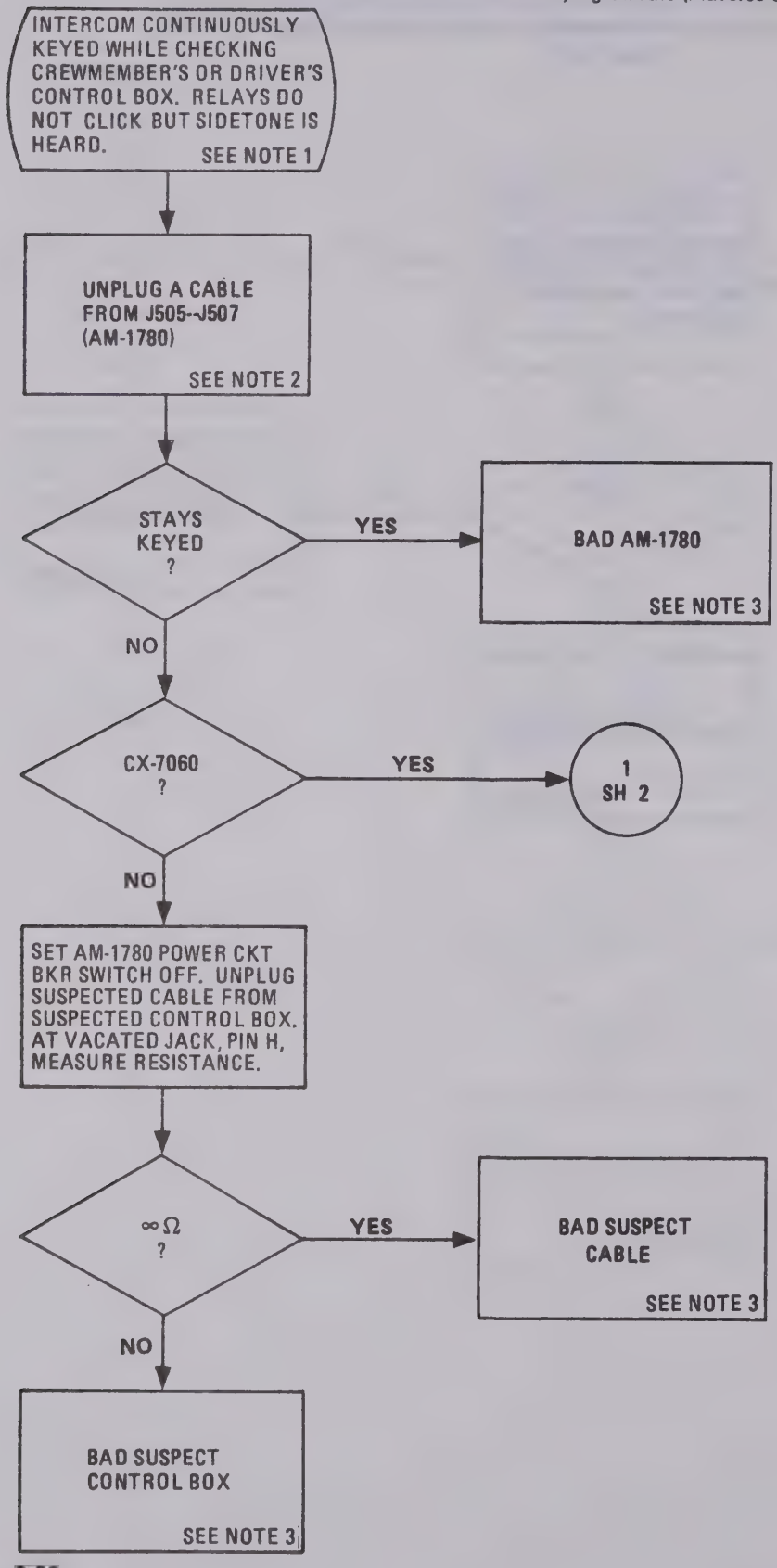
CHART 7
Troubleshoot Intercom Talk/Listen Circuit (A Particular Position of Monitor Switch is Adverse)
(Sheet 6 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

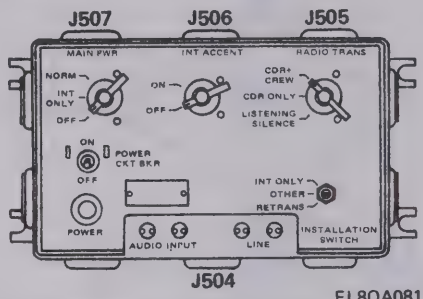
CHART 8

Troubleshoot Intercom Keying Circuit (Adverse Short) (Sheet 1 of 2)



NOTES

1. **Refer to FO-3 in back of this manual.**
2. **If more cables are plugged to J505--J507, remove one at a time until fault is isolated (unkeys).**

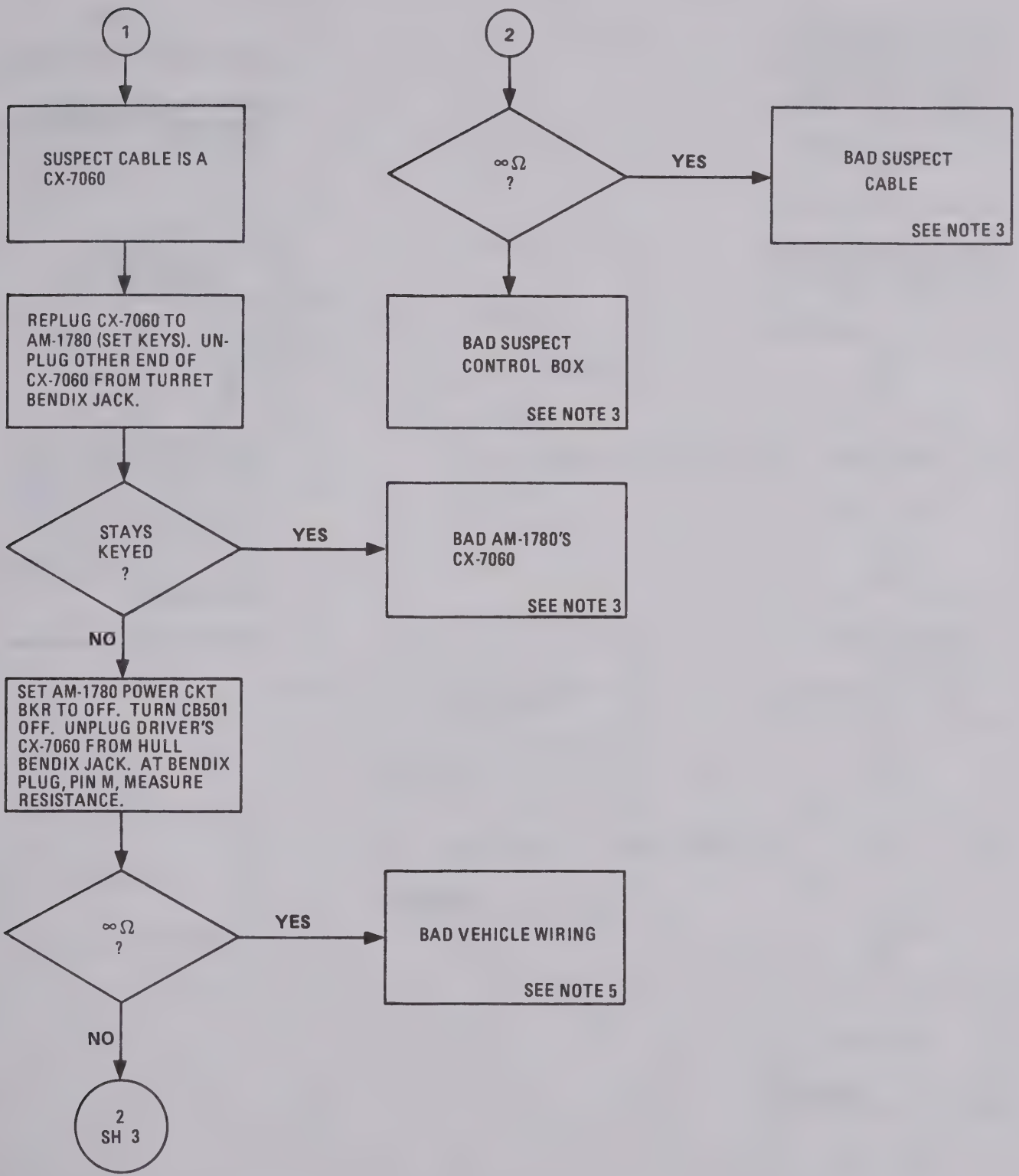


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3. **Fix or replace and return to operational check at this time.**
4. **Refer to a higher maintenance level.**

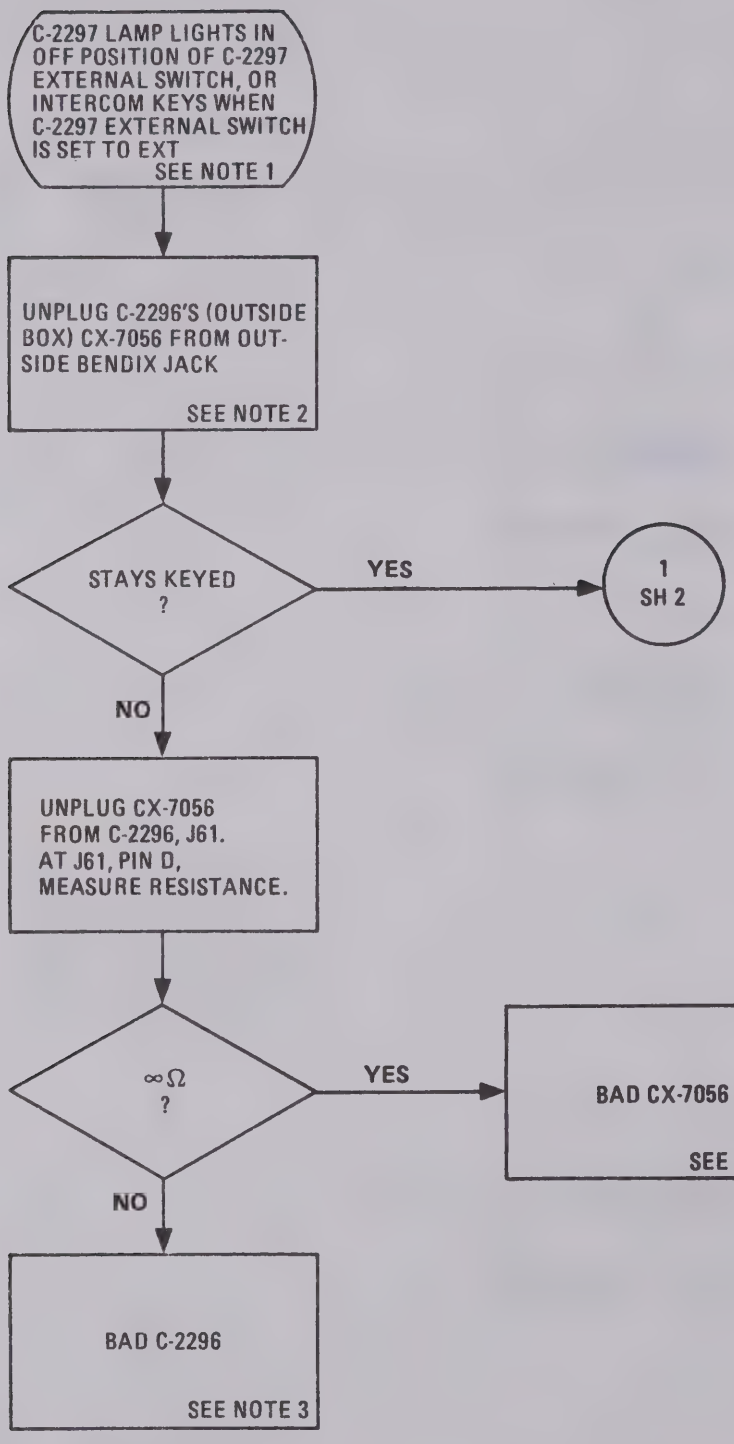
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 8
Troubleshoot Intercom Keying Circuit (Adverse Short) (Sheet 2 of 2)



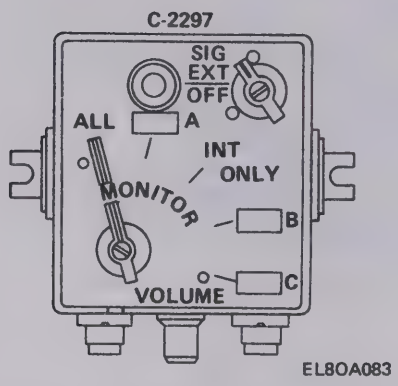
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 9
Troubleshoot C-2296 Intercom Keying Circuit (Adverse Short) (Sheet 1 of 2)



NOTES

1. Refer to FO-6 in back of this manual.
2. Use this flow chart if the vehicle is equipped with a C-2297/VRC driver's control box.

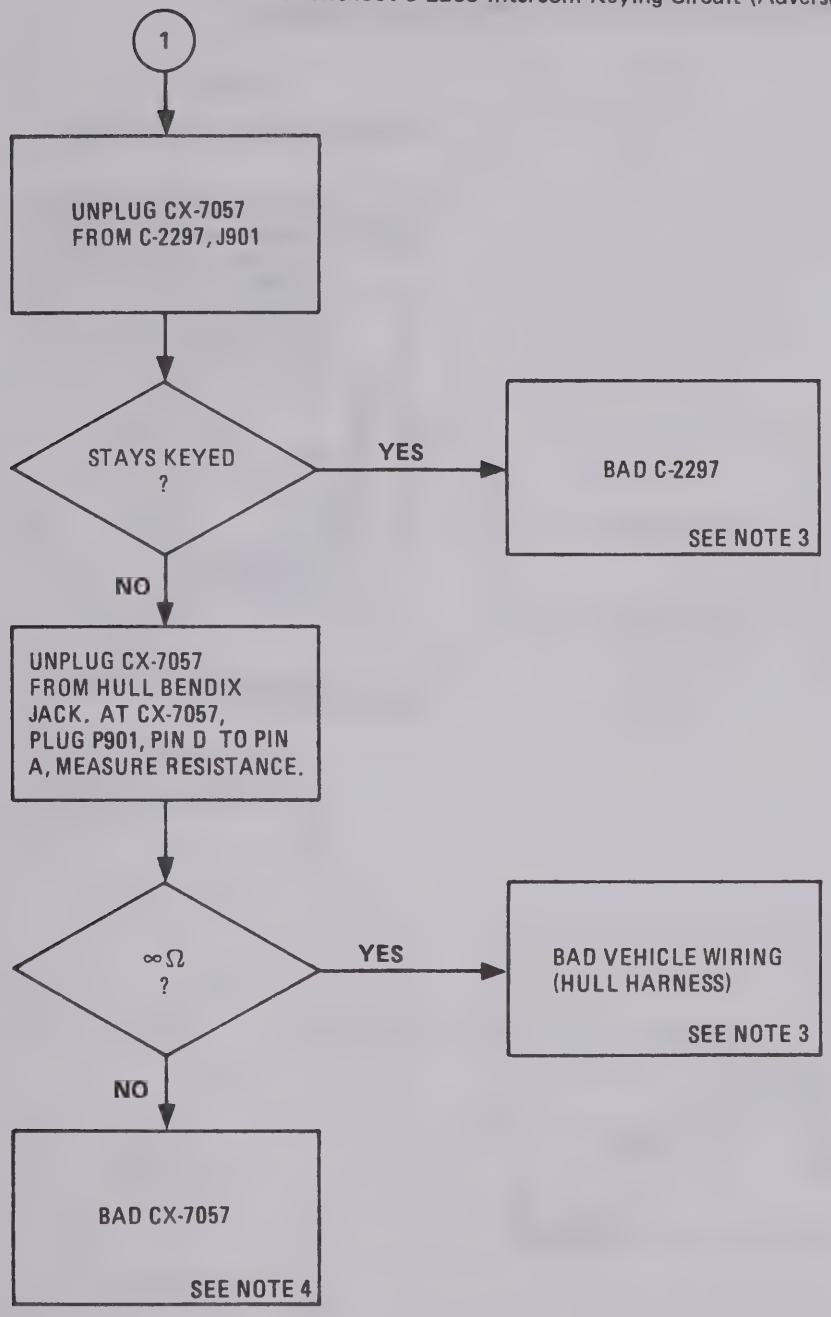


3. Fix or replace and return to operational check at this time.
4. Refer to higher level of maintenance.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

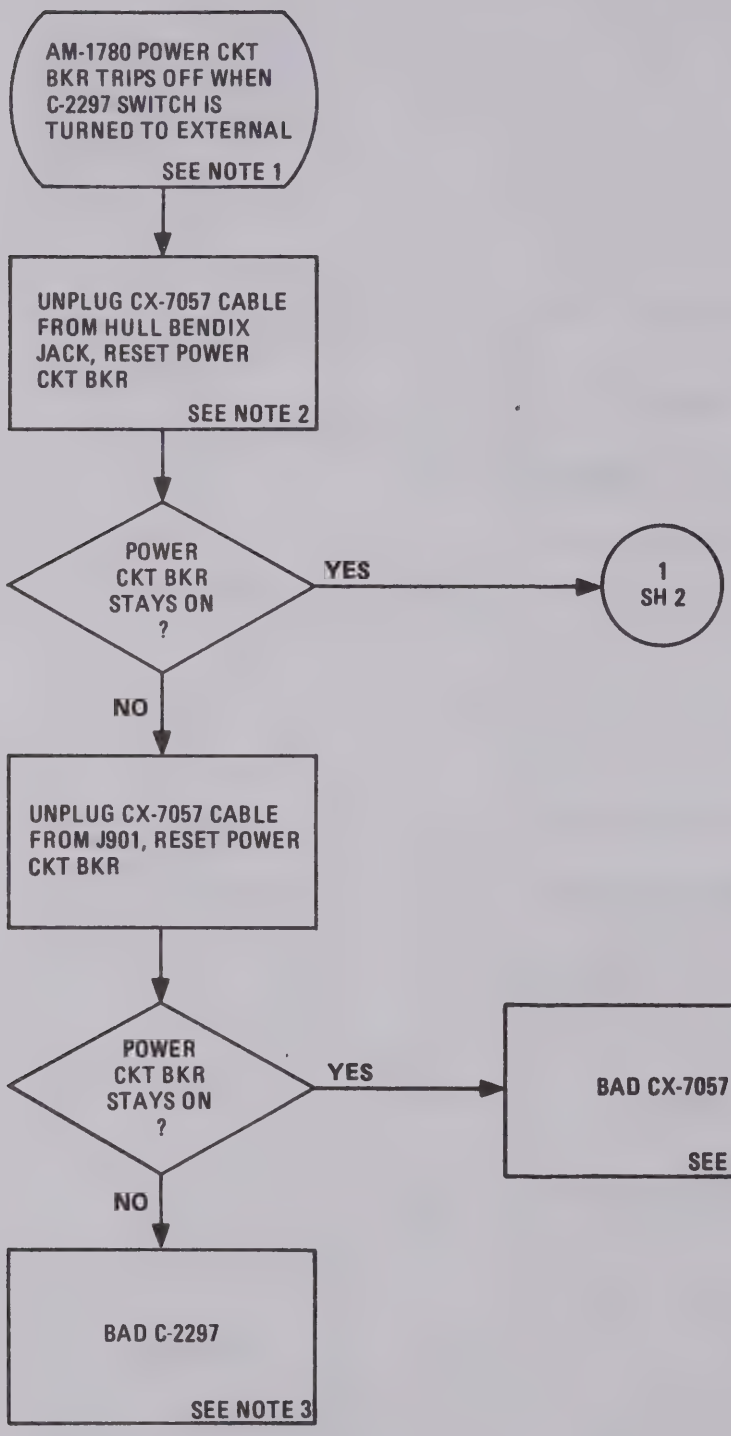
CHART 9

Troubleshoot C-2296 Intercom Keying Circuit (Adverse Short) (Sheet 2 of 2)



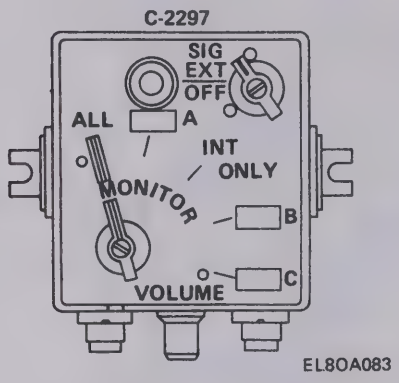
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 10
Troubleshoot Intercom Power Distribution Circuit (Adverse Short) (Sheet 1 of 2)



NOTES

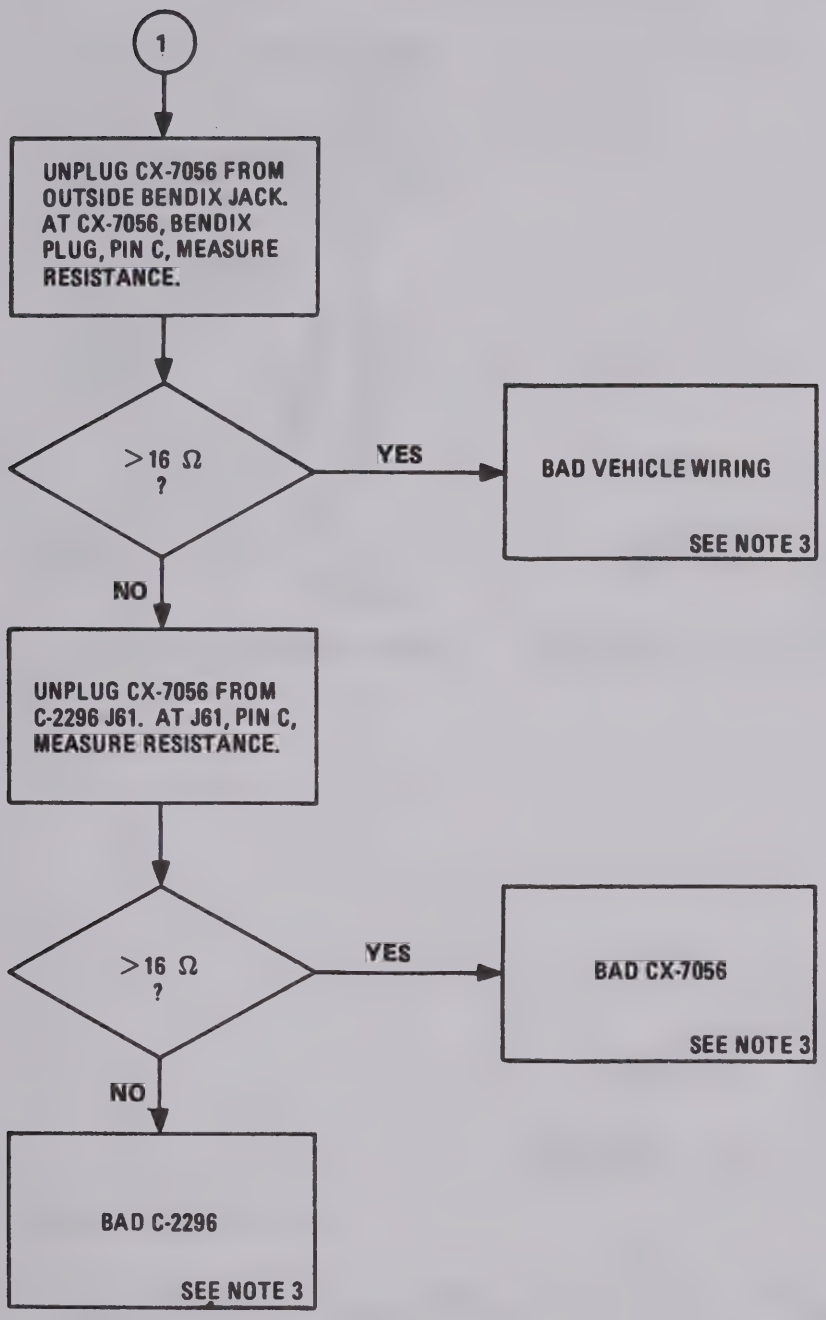
1. Refer to FO-5 in back of this manual.
2. Use this chart if vehicle is equipped with a C-2297/VRC control box.



3. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

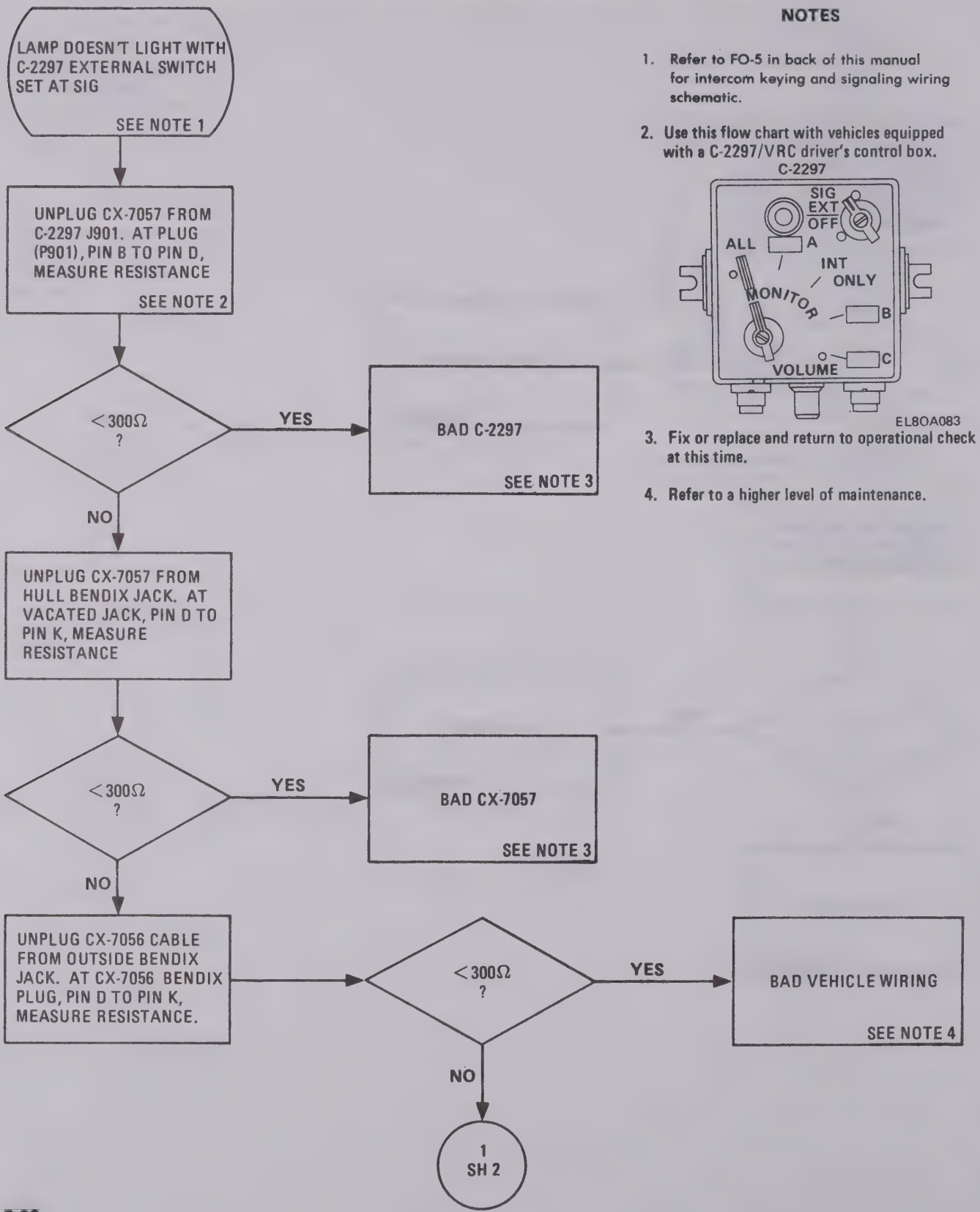
CHART 10
Troubleshoot Intercom Power Distribution Circuit (Adverse Short) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 11

Troubleshoot Intercom Keying and Signaling Circuit (Adverse Open) (Sheet 1 of 2)



NOTES

1. Refer to FO-5 in back of this manual for intercom keying and signaling wiring schematic.
2. Use this flow chart with vehicles equipped with a C-2297/VRC driver's control box.

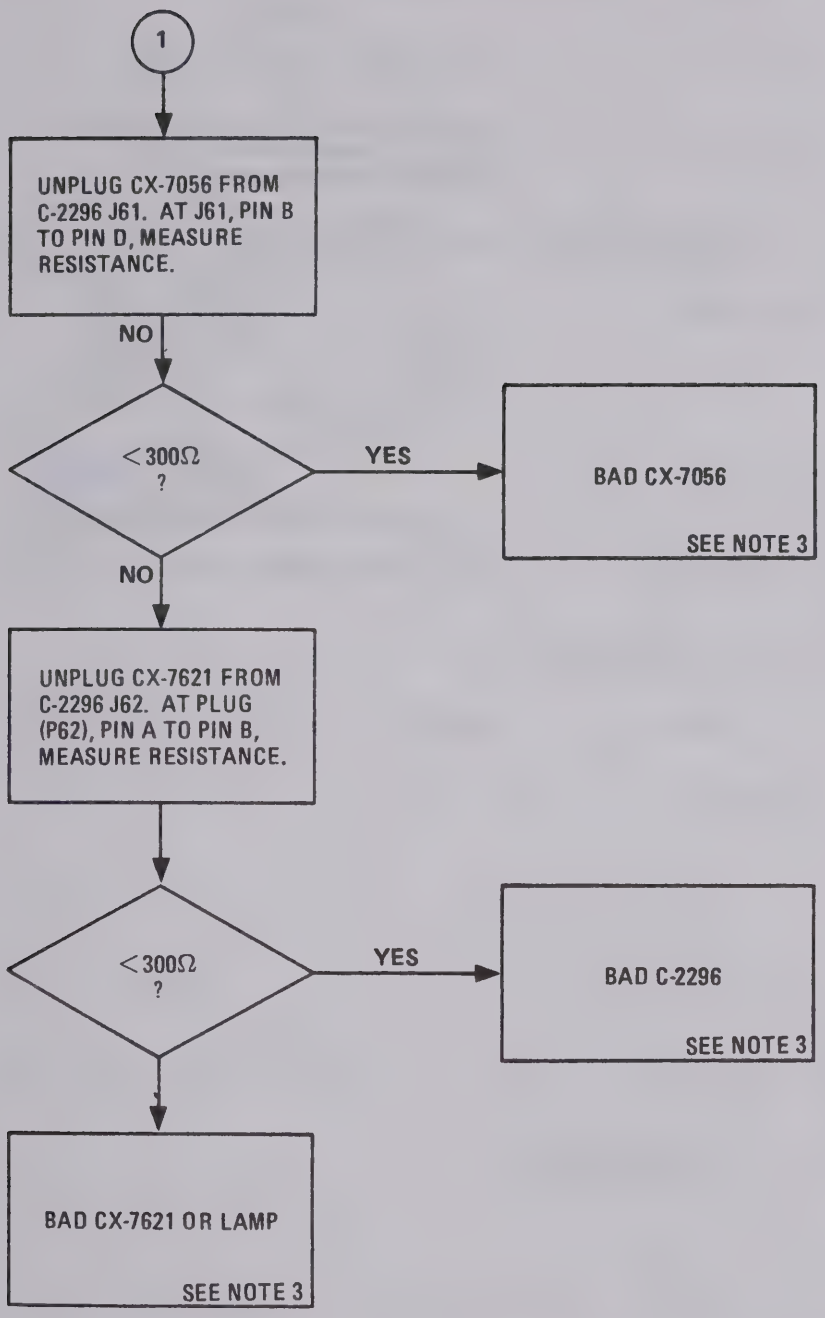
C-2297

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3. Fix or replace and return to operational check at this time.
4. Refer to a higher level of maintenance.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

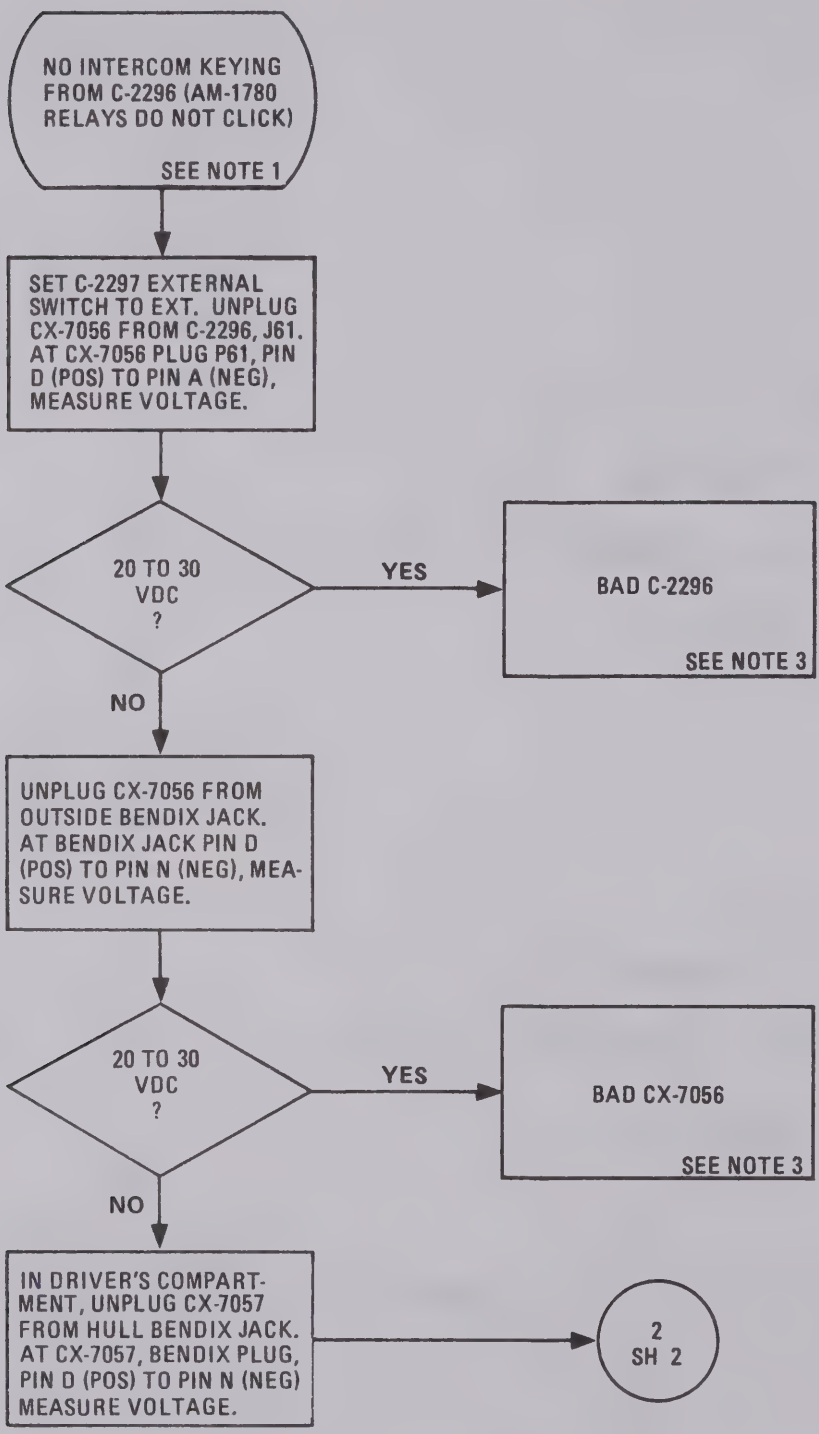
CHART 11
Troubleshoot Intercom Keying and Signaling Circuit (Adverse Open) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

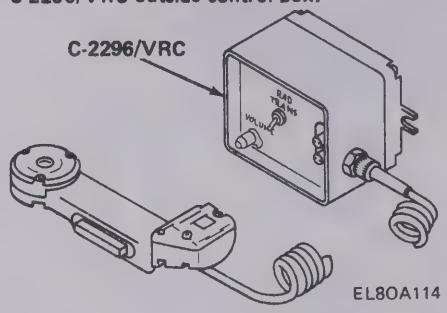
CHART 12

Troubleshoot C-2296 Intercom Keying and Signaling Circuits (Adverse Open) (Sheet 1 of 2)



NOTES

1. Refer to FO-6 in back of this manual.
2. Use this chart with vehicles equipped with a C-2297/VRC drivers control box and C-2296/VRC outside control box.

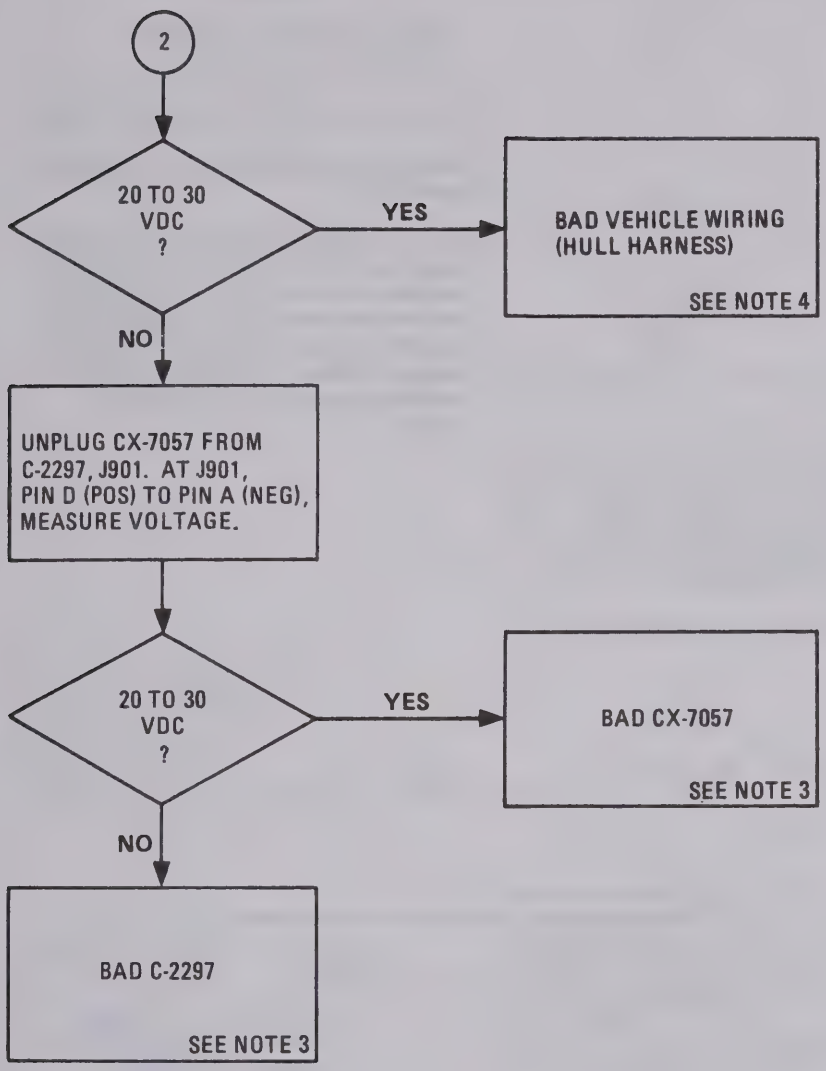


3. Fix or replace and return to operational check at this time.
4. Refer to higher maintenance level.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 12

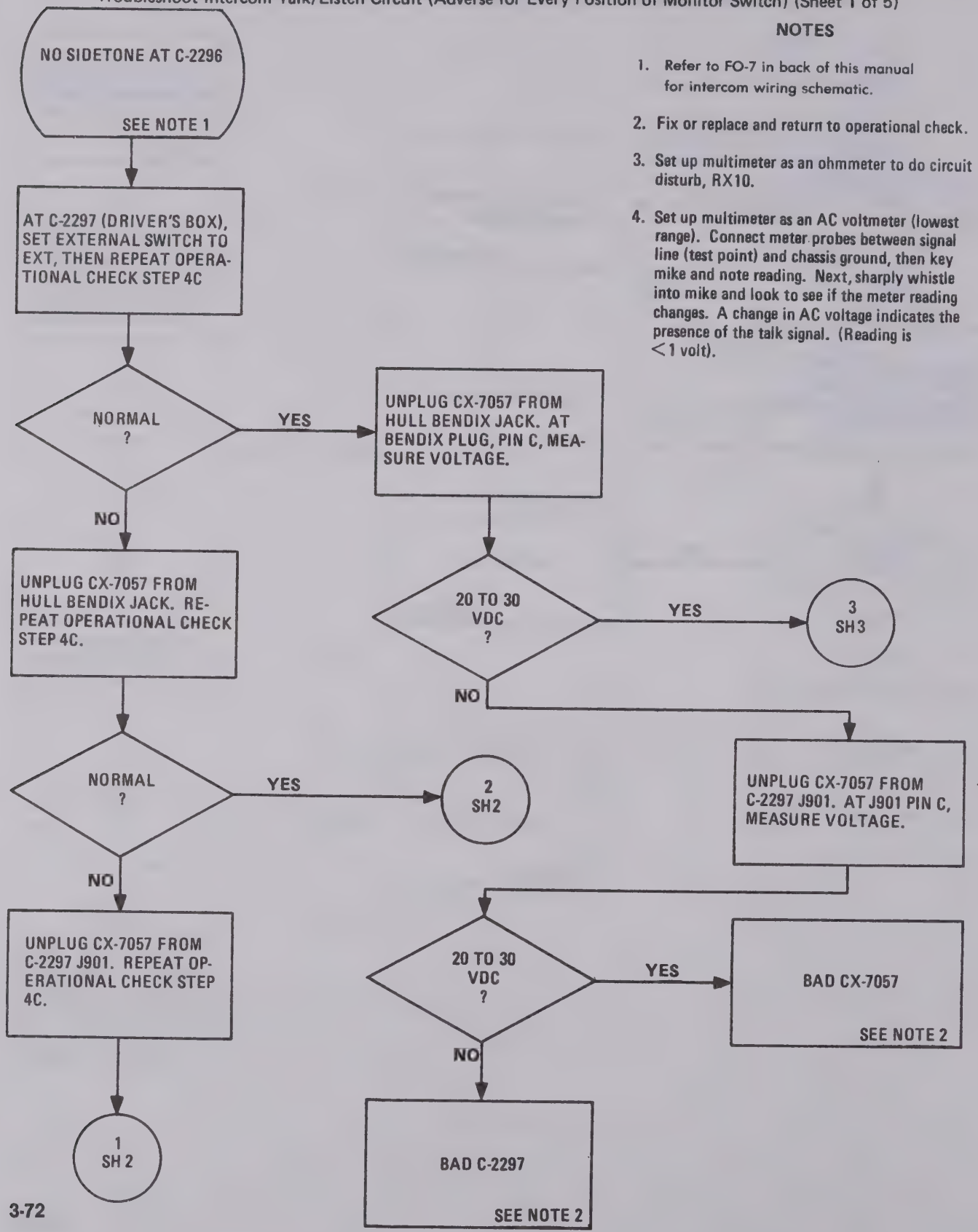
Troubleshoot C-2296 Intercom Keying and Signaling Circuits (Adverse Open) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 13

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 1 of 5)



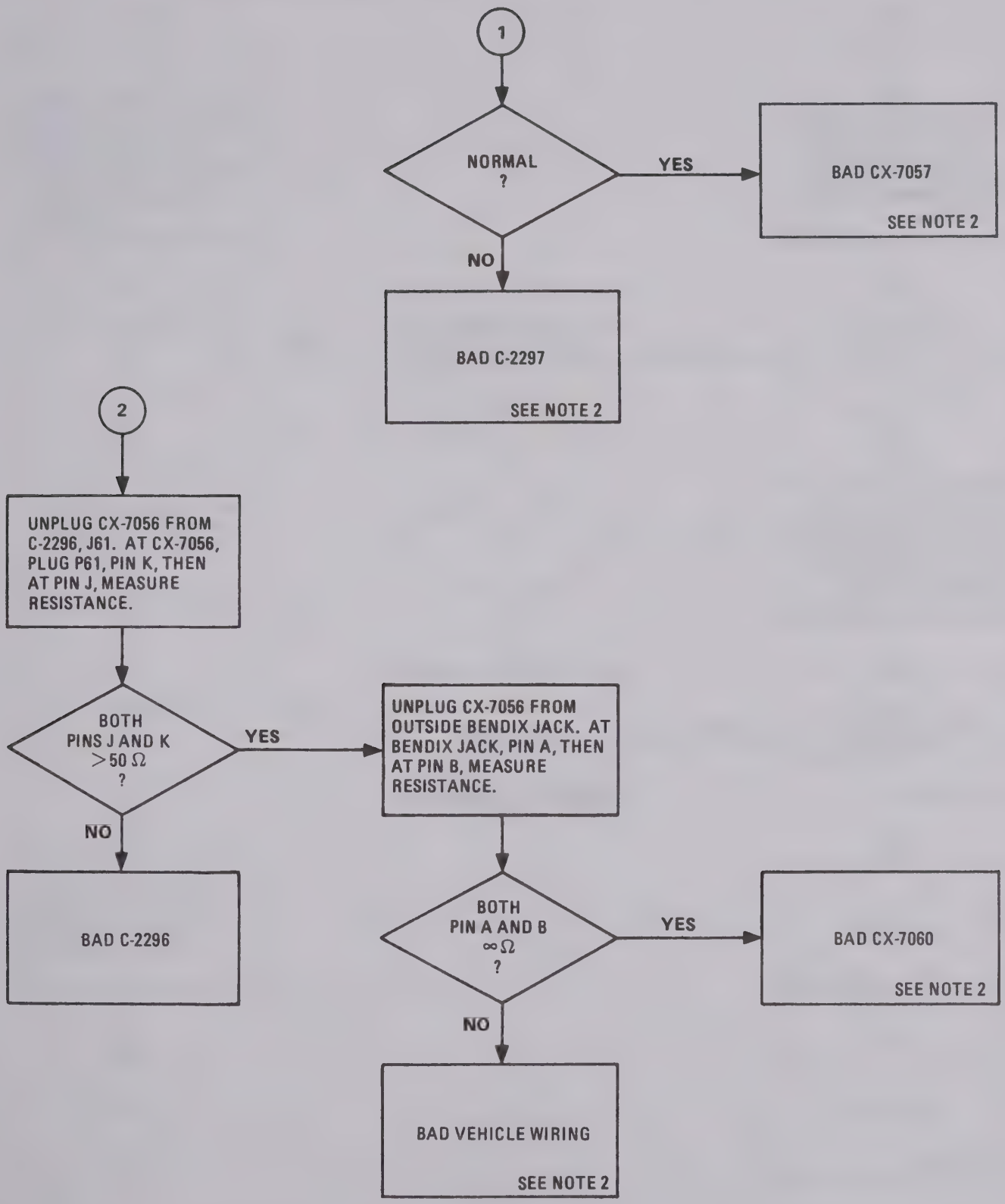
NOTES

1. Refer to FO-7 in back of this manual for intercom wiring schematic.
2. Fix or replace and return to operational check.
3. Set up multimeter as an ohmmeter to do circuit disturb, RX10.
4. Set up multimeter as an AC voltmeter (lowest range). Connect meter probes between signal line (test point) and chassis ground, then key mike and note reading. Next, sharply whistle into mike and look to see if the meter reading changes. A change in AC voltage indicates the presence of the talk signal. (Reading is <1 volt).

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 13

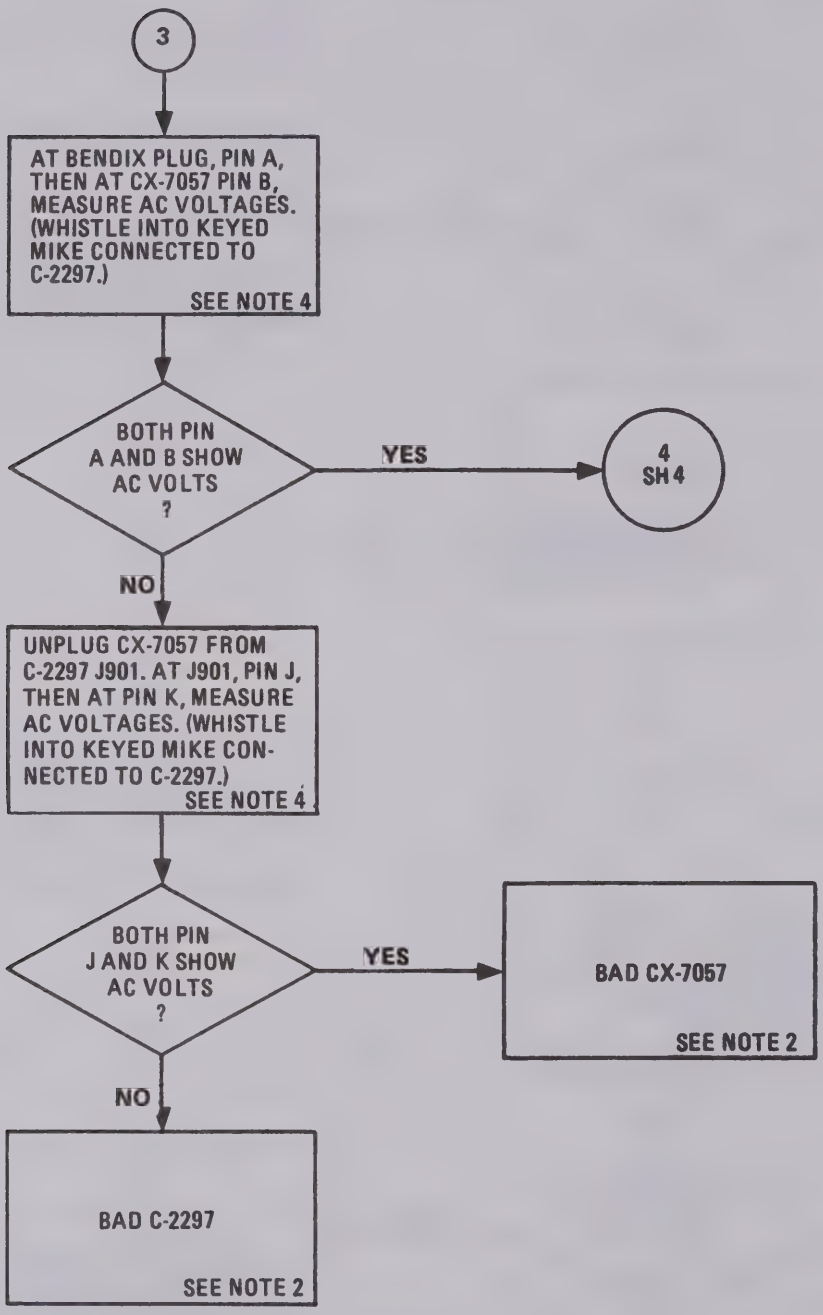
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 2 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 13

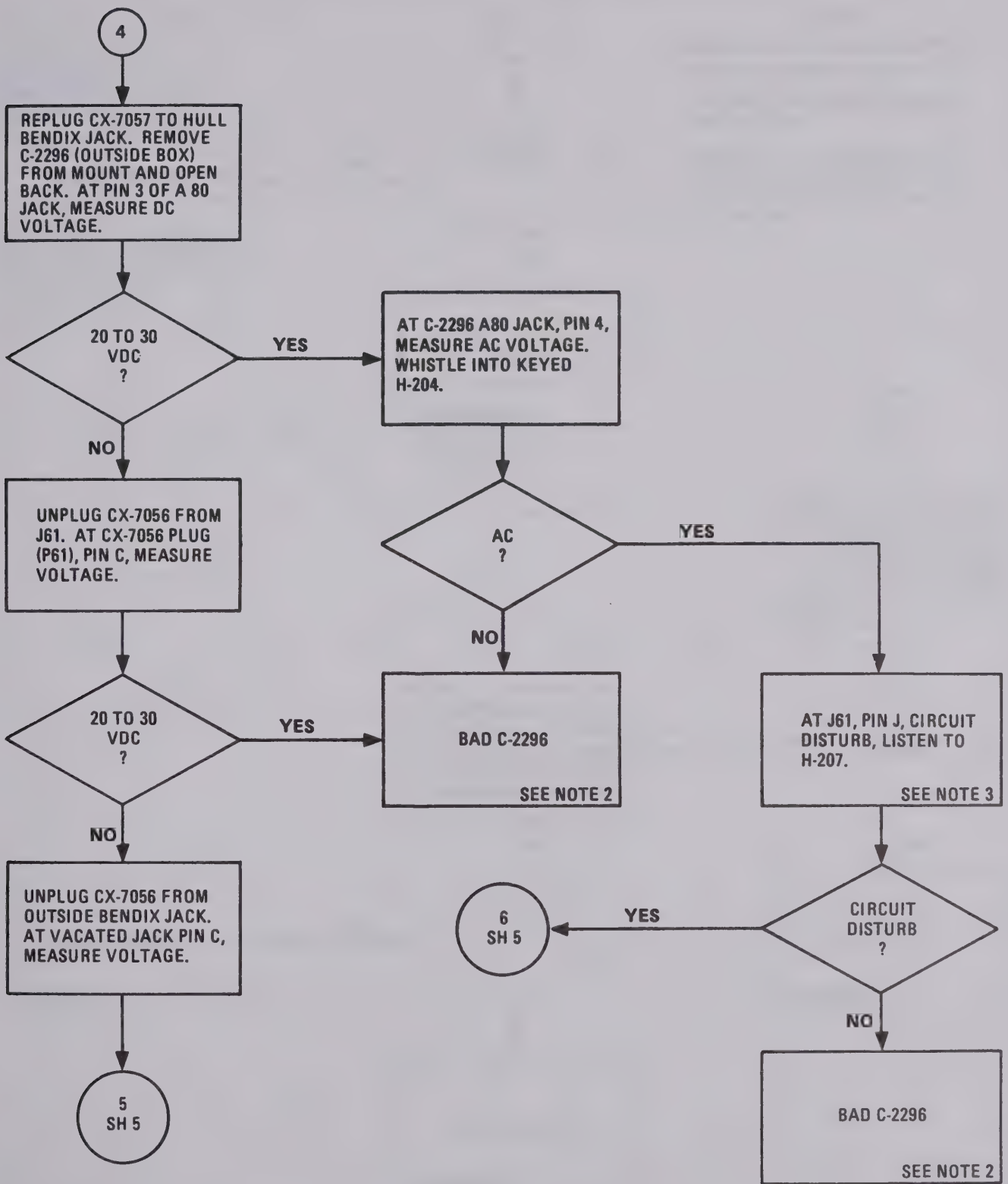
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 3 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 13

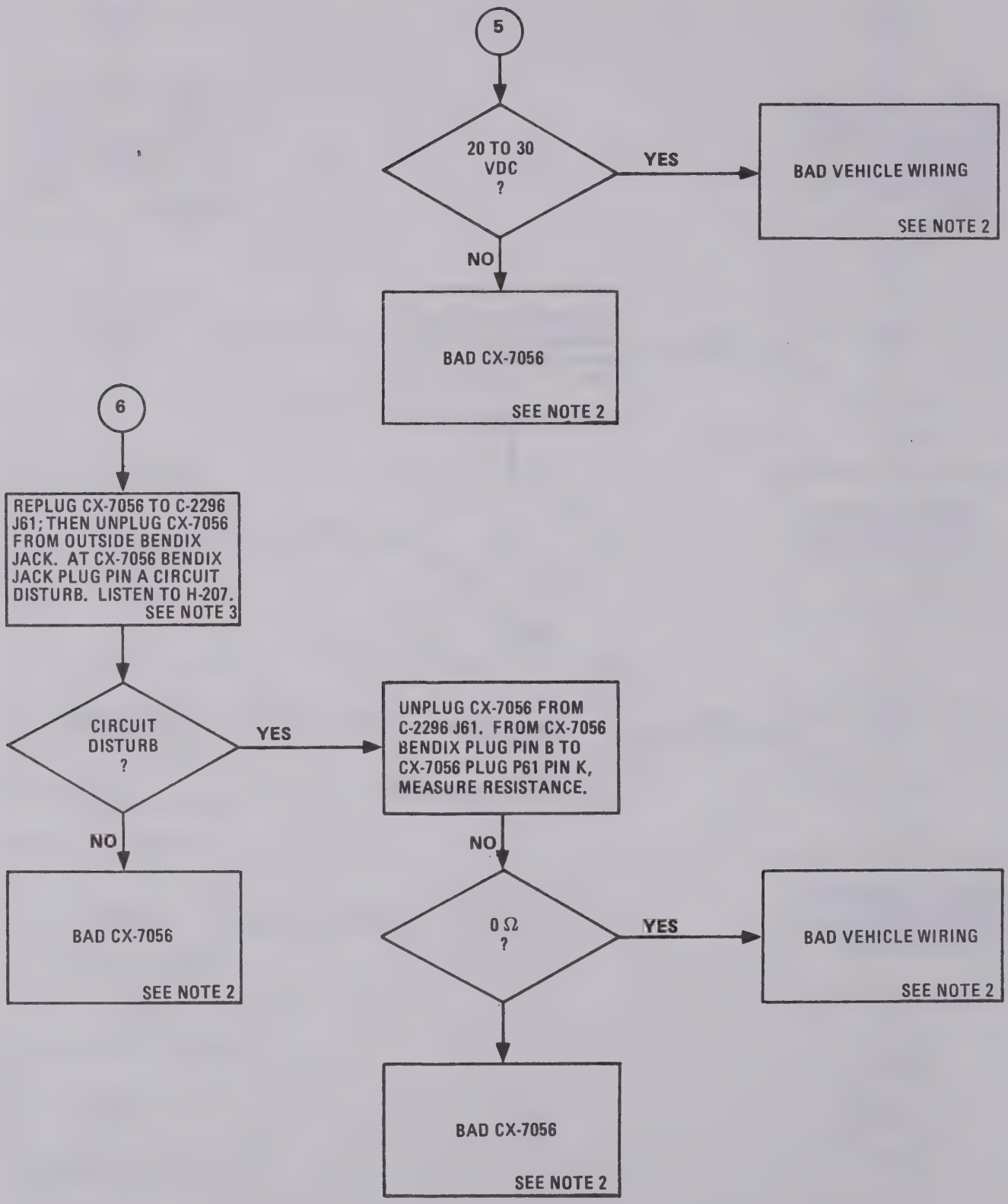
Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 4 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

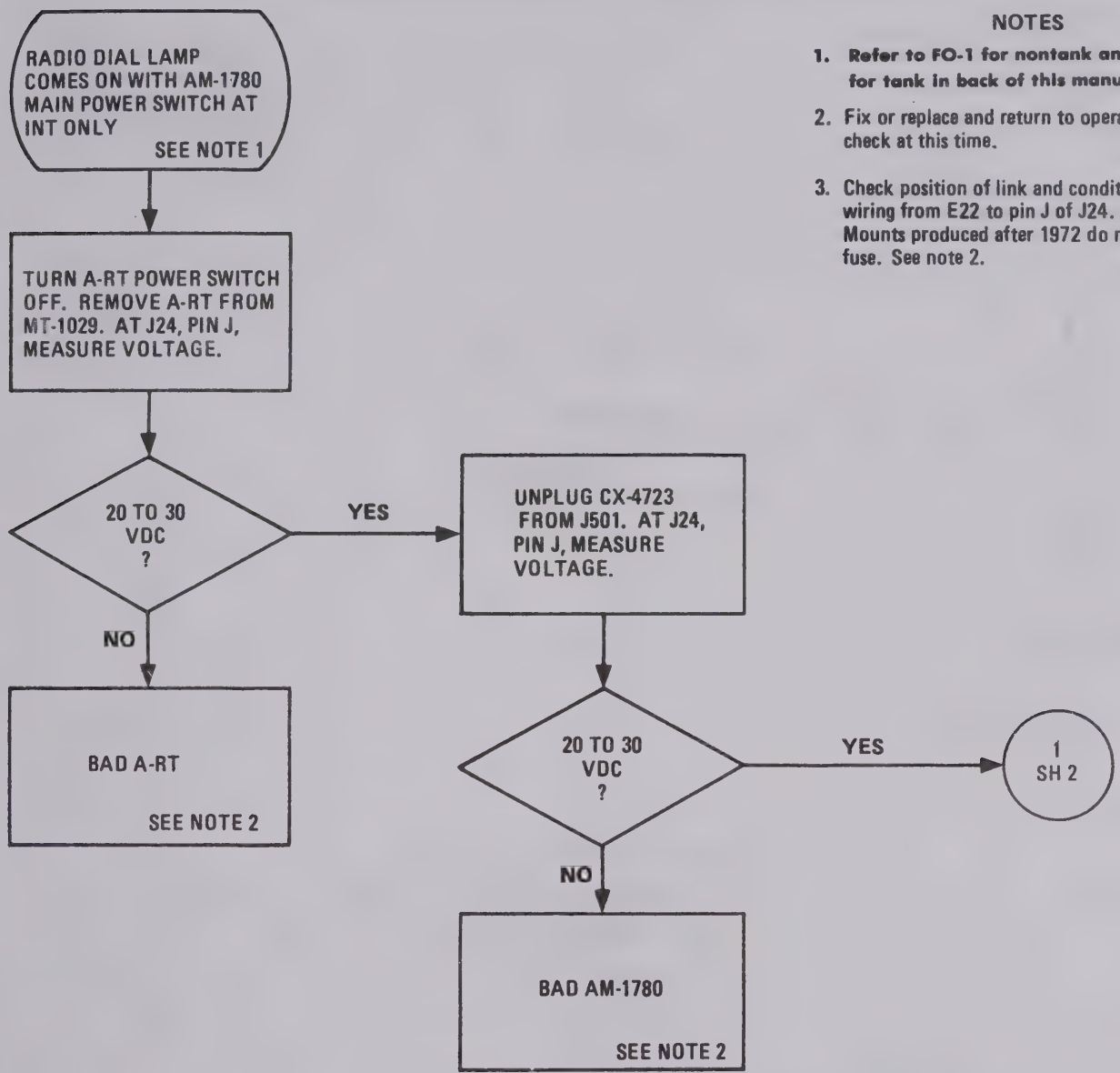
CHART 13

Troubleshoot Intercom Talk/Listen Circuit (Adverse for Every Position of Monitor Switch) (Sheet 5 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 14
Troubleshoot Radio Set Input Power Circuit (Adverse Short) (Sheet 1 of 2)

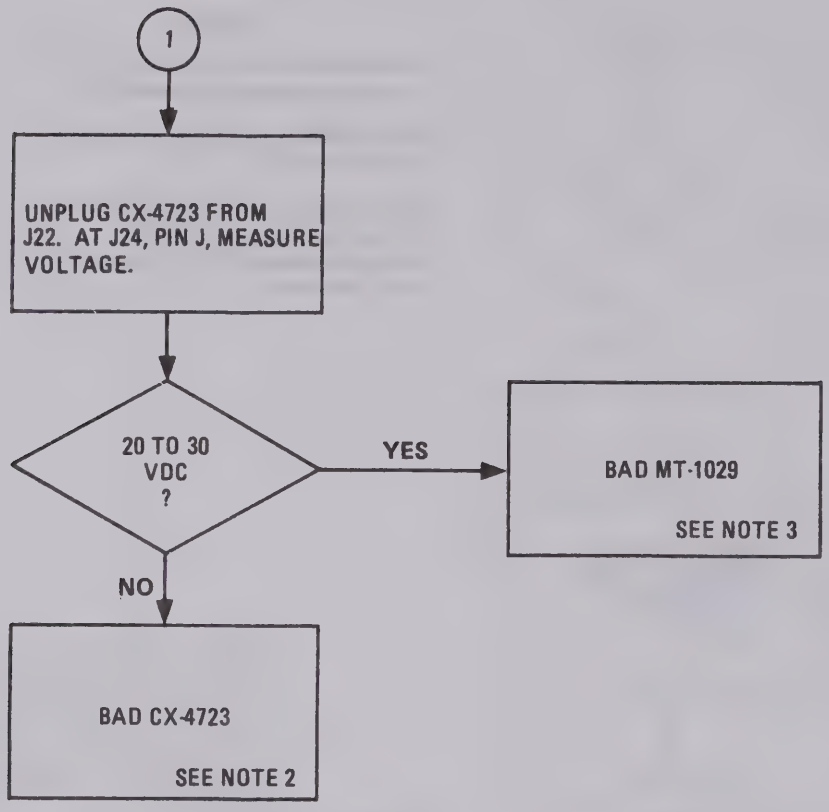


NOTES

1. **Refer to FO-1 for nontank and FO-2 for tank in back of this manual.**
2. Fix or replace and return to operational check at this time.
3. Check position of link and condition of wiring from E22 to pin J of J24. Mounts produced after 1972 do not have a fuse. See note 2.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

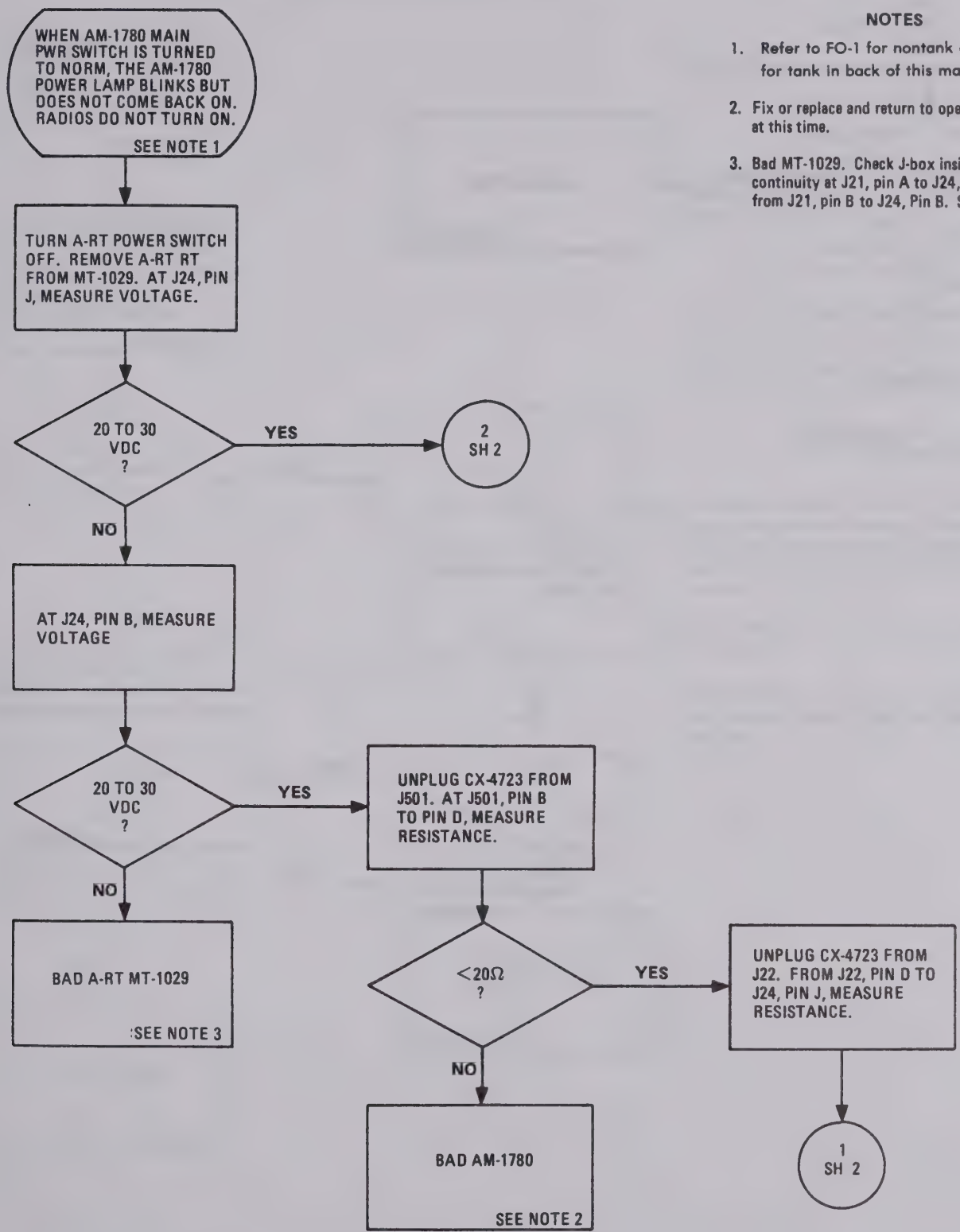
CHART 14
Troubleshoot Radio Set Input Power Circuit (Adverse Short) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 15

Troubleshoot Radio Set Remote Input Power Circuit (Adverse Open) (Sheet 1 of 2)

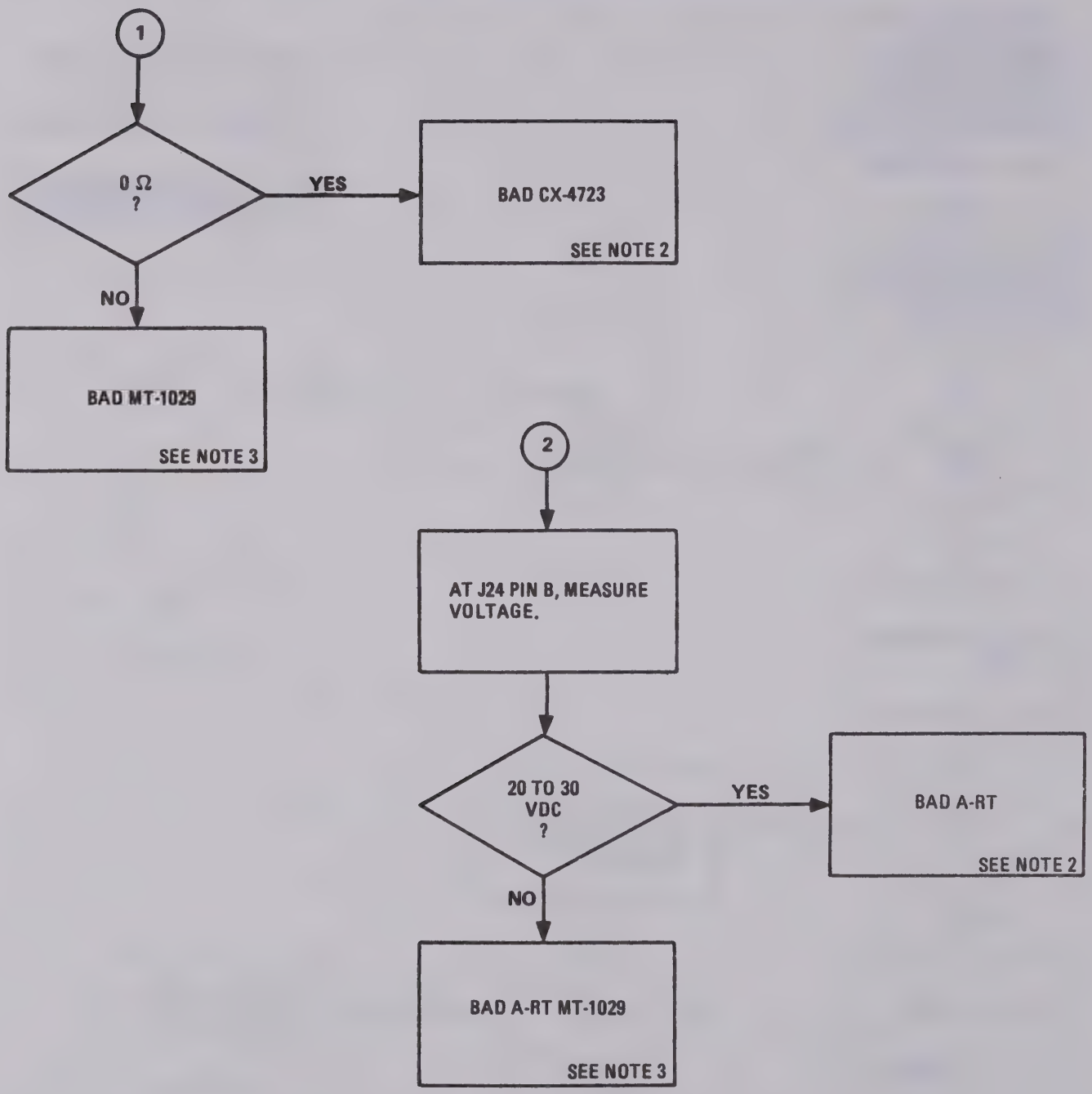


NOTES

1. Refer to FO-1 for nontank and FO-2 for tank in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Bad MT-1029. Check J-box inside wiring for continuity at J21, pin A to J24, pin A; then from J21, pin B to J24, Pin B. See note 2.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

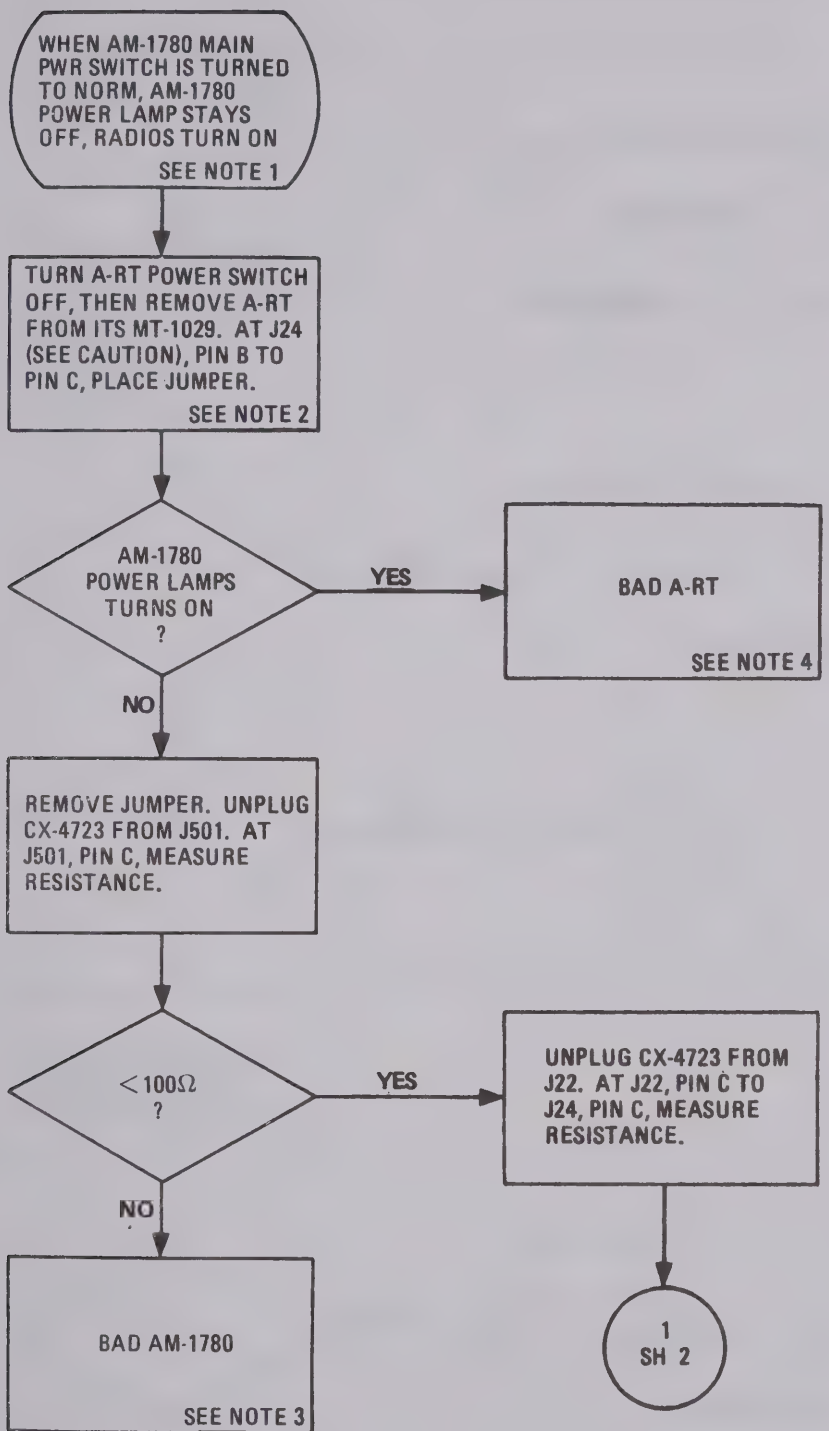
CHART 15
Troubleshoot Radio Set Remote Input Power Circuit (Adverse Open) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 16

Troubleshoot Intercom Return Power Circuit (Adverse Open) (Sheet 1 of 2)

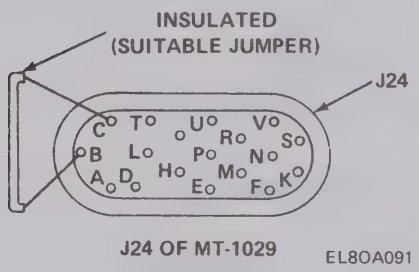


NOTES

1. Refer to FO-1 in back of this manual.

CAUTION

To prevent any possible equipment damage make sure that the jumper is placed in the correct plug holes (pin B to pin C).



J24 OF MT-1029 EL8OA091

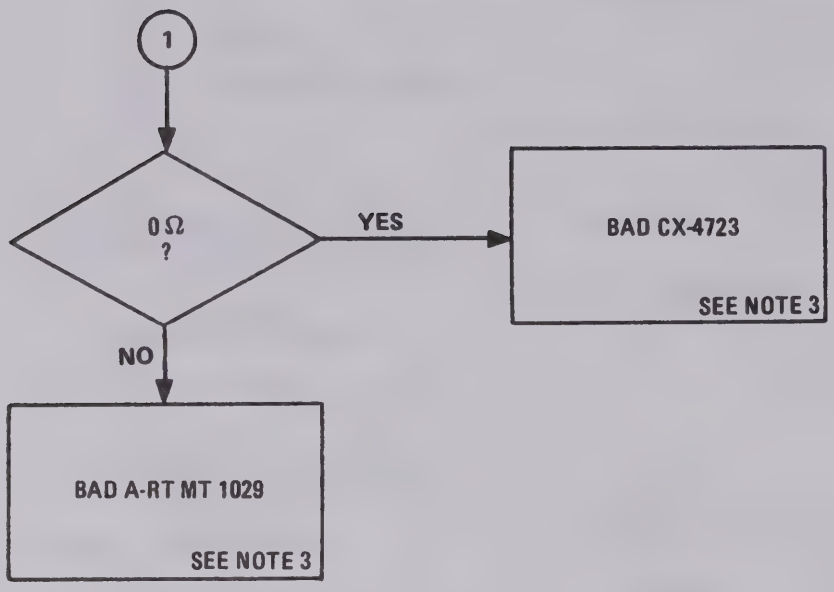
2. A suitable jumper may be made in the field by using a paper clip or a piece of field communication wire. Make sure that the jumper is insulated (black electrical insulation tape can be used).

3. Fix or replace and return to operational check at this time.

4. Bad MT-1029. Check J-box inside wiring for continuity from J22 pin C to J24 pin C. See note 3.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

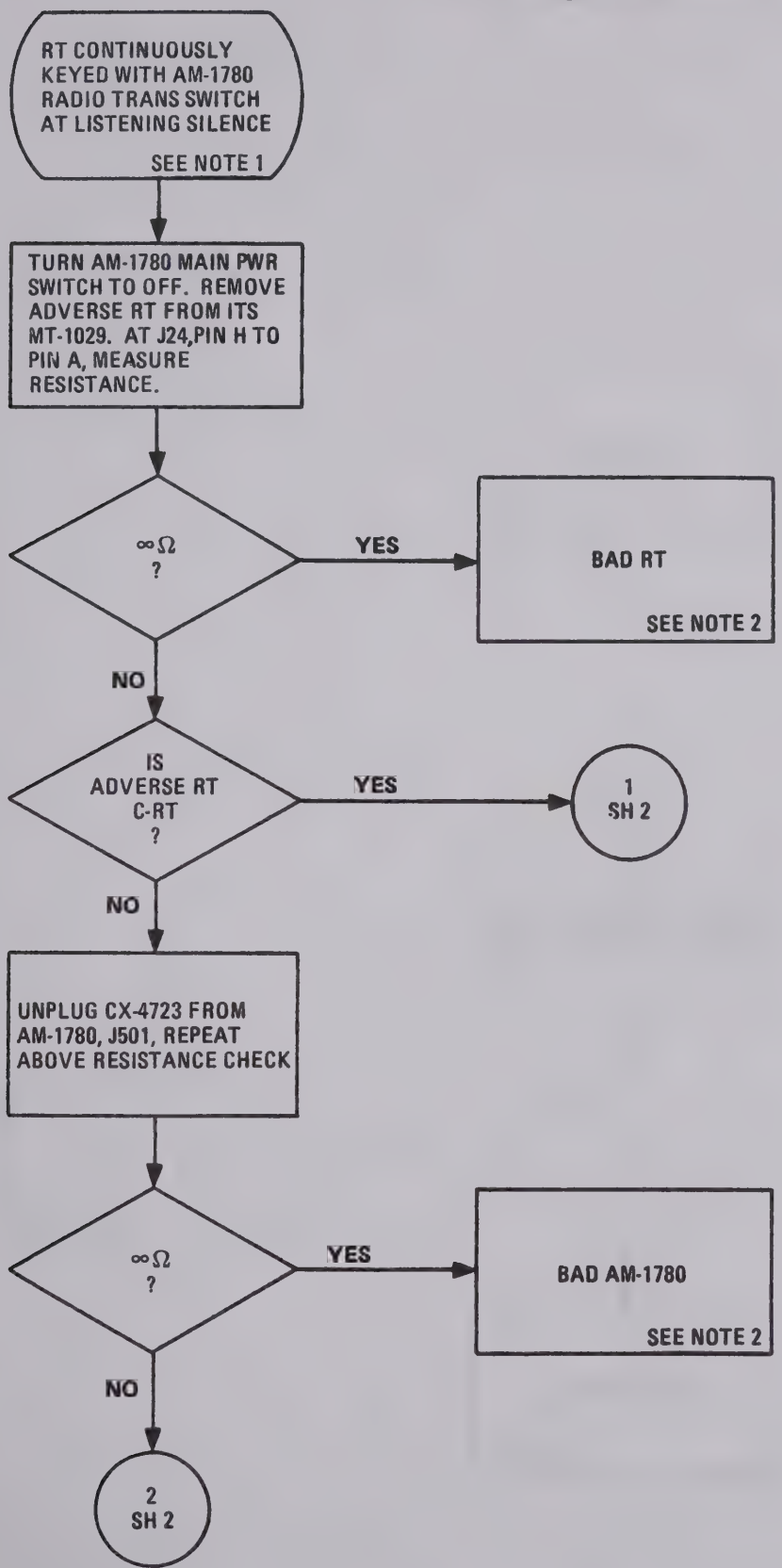
CHART 16
Troubleshoot Intercom Return Power Circuit (Adverse Open) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 17

Troubleshoot RT Keying Circuit (Adverse Short When AM-1780 Radio Trans Switch is Set to Listening Silence) (Sheet 1 of 2)

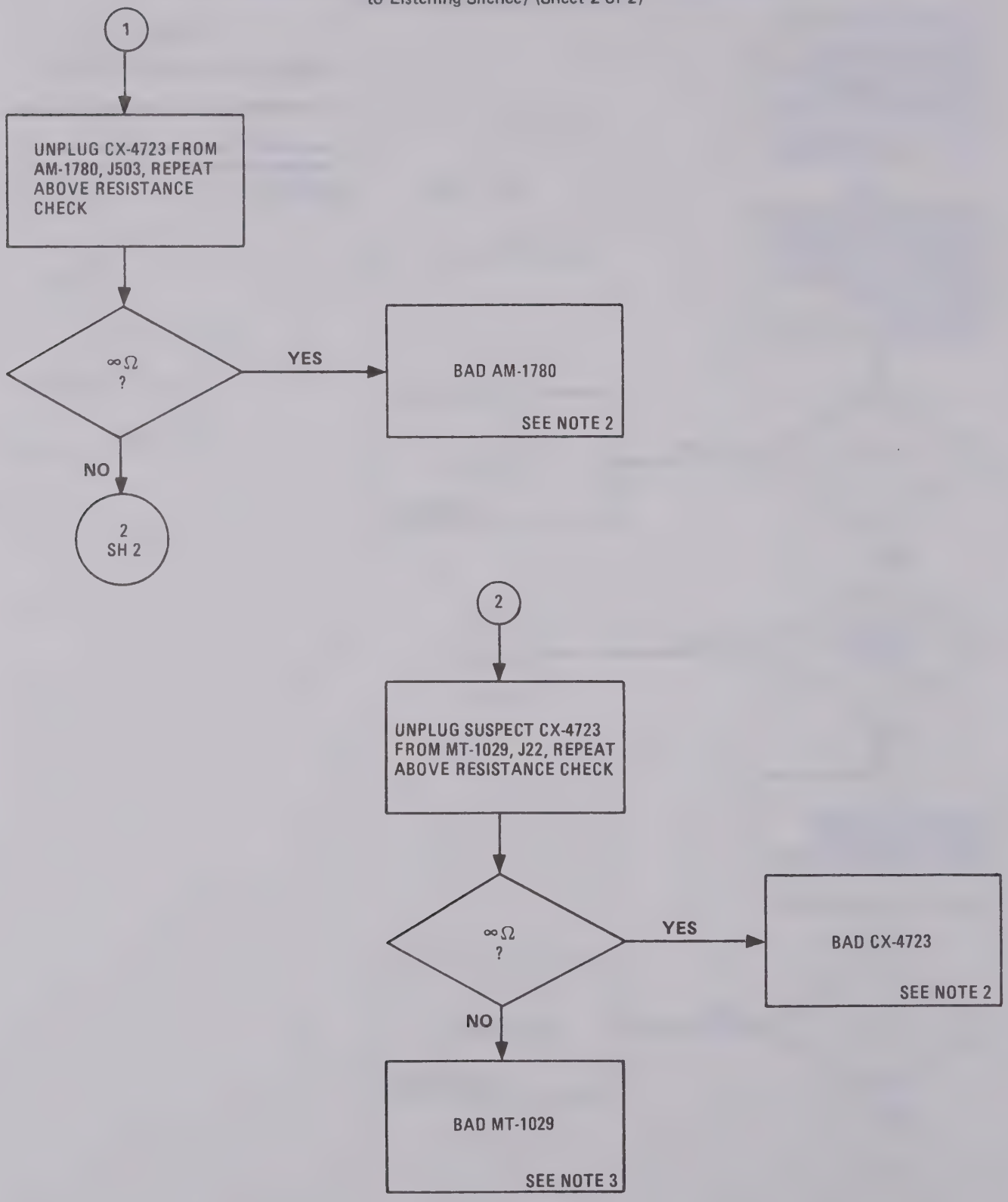


NOTES

1. Refer to FO-12 in back of this manual.
2. Fix or replace and return to operational check.
3. Bad MT-1029. Check J-box inside wiring for continuity at J24, pin H to J22, pin S. See note 2.

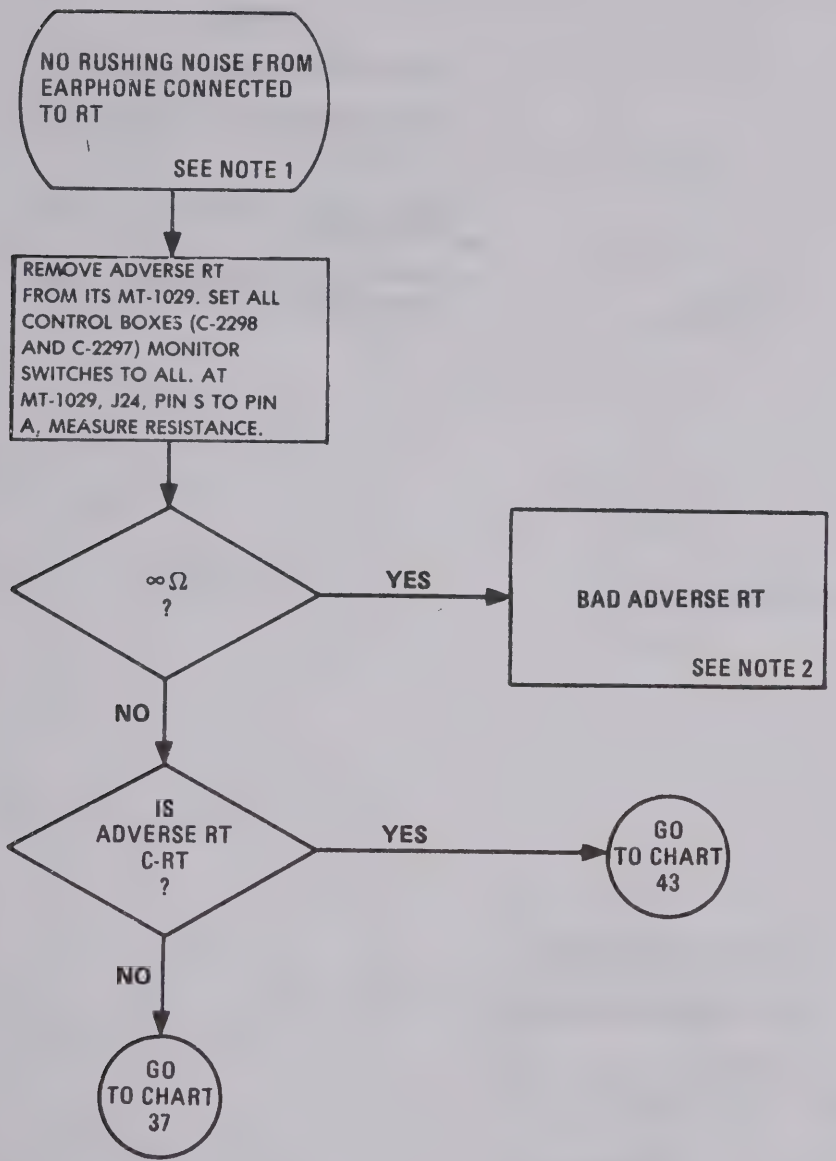
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 17
Troubleshoot RT Keying Circuit (Adverse Short When AM-1780 Radio Trans Switch is Set to Listening Silence) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 18
Troubleshoot RT Phone Output Circuit (Sheet 1 of 1)

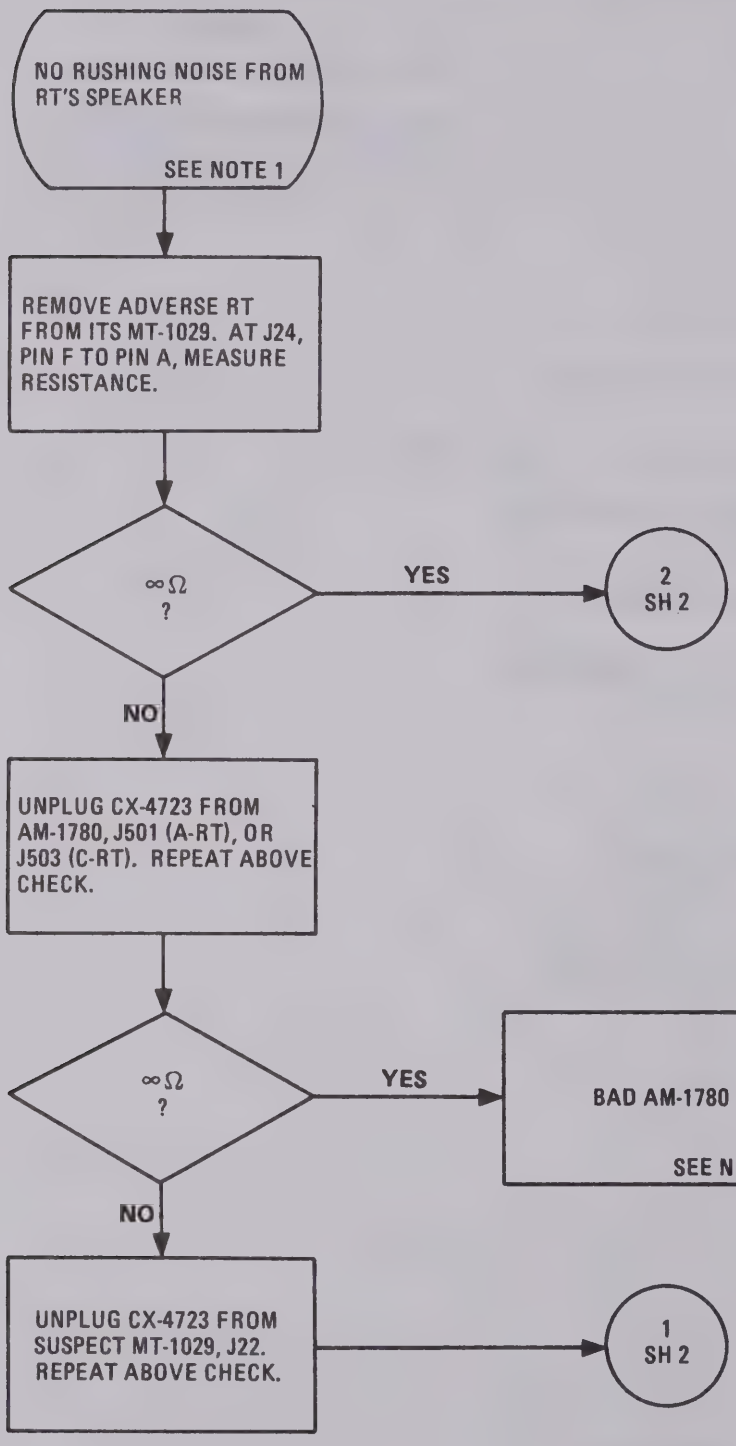


NOTES

1. Refer to FO-21 in back of this manual.
2. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 19
Troubleshoot RT Speaker Output Circuit (Sheet 1 of 2)

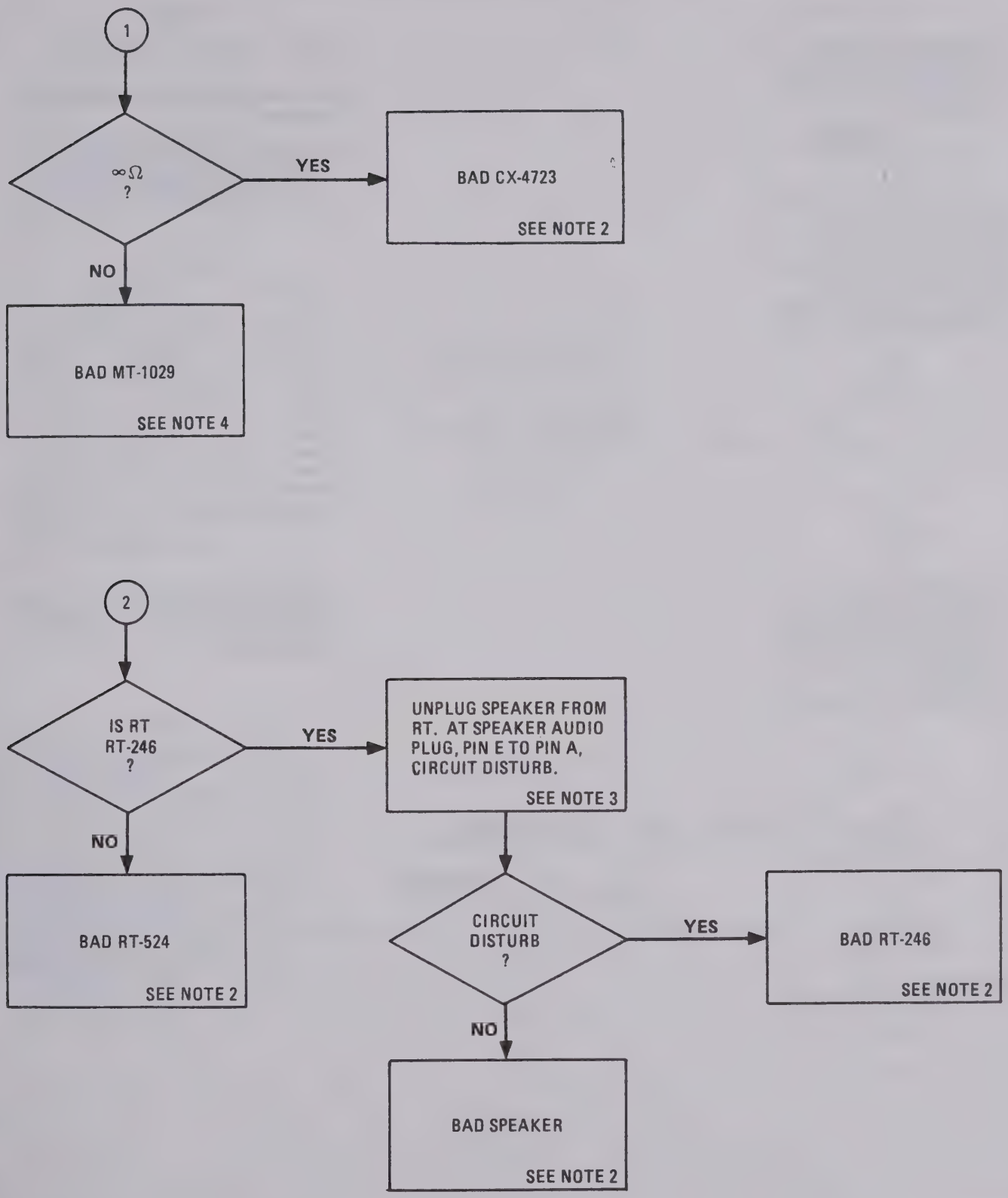


NOTES

1. Refer to FO-21 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Set up multimeter as an ohmmeter to do circuit disturb.
4. Bad MT-1029. Check J-box inside wiring for continuity from J24, pin F to J22, Pin J. See note 2.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

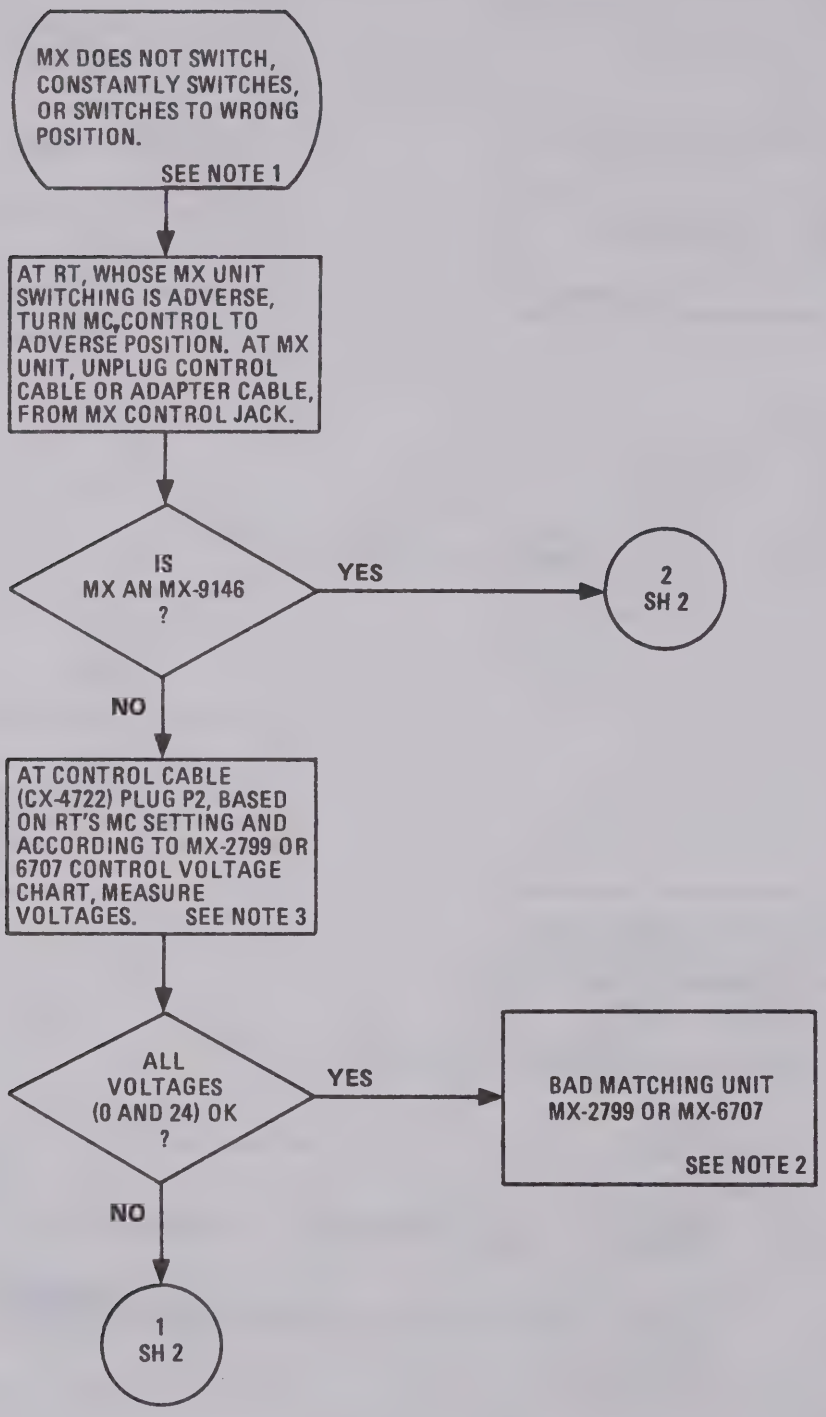
CHART 19
Troubleshoot RT Speaker Output Circuit (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 20

Troubleshoot RT Antenna Matching (MX) Unit Control Circuit (Sheet 1 of 3)



NOTES

1. Refer to FO-21 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Matching unit control voltage chart for MX-2799 and MX-6707. Control cable is CX-4722 and modified CX-4722.

MX-2799 or 6707

FREQ MHz	BAND	PIN DESIGNATION							
		N	A	B	D	E	F	H	J
30-33	Low	24	24	0	24	0	0	0	0
33-37	Low	24	24	0	0	24	0	0	0
37-42	Low	24	24	0	0	0	24	0	0
42-47.5	Low	24	24	0	0	0	0	24	0
47.5-53	Low	24	24	0	0	0	0	0	24
53-56	High	24	0	24	24	0	0	0	0
56-60	High	24	0	24	0	24	0	0	0
60-65	High	24	0	24	0	0	24	0	0
65-70.5	High	24	0	24	0	0	0	24	0
70.5-76	High	24	0	24	0	0	0	0	24

MX-2799 ONLY

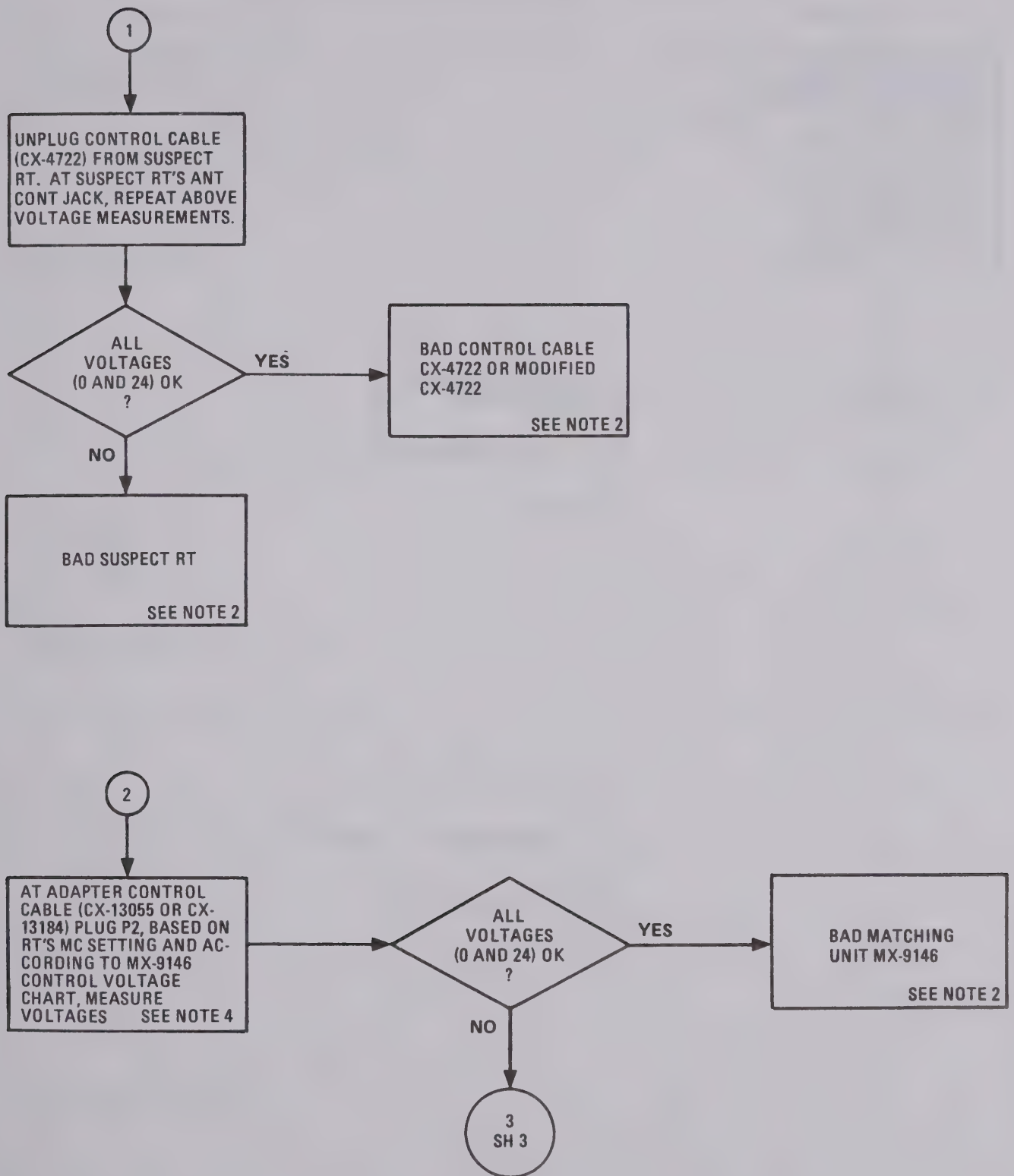
4. Matching unit control voltage chart for MX-9146. Adapter control cable is CX-13055 or CX-13184 and control cable is CX-4722 or modified CX-4722.

MX-9146

CONTROL VOLTAGES AT P2 OF CX-13055									
SUB-BAND	FREQ MHz	BAND	PIN DESIGNATION							
			K	A	B	D	E	F	G	H
1	30-33	A	24	24	0	24	0	0	0	0
2	33-37	A	24	24	0	0	24	0	0	0
3	37-42	A	24	24	0	0	0	24	0	0
4	42-47.5	A	24	24	0	0	0	0	24	0
5	47.5-73	A	24	24	0	0	0	0	0	24
6	53-56	B	24	0	24	24	0	0	0	0
7	56-60	B	24	0	24	0	24	0	0	0
8	60-65	B	24	0	24	0	0	24	0	0
9	65-70.5	B	24	0	24	0	0	0	24	0
10	70.5-80	B	24	0	24	0	0	0	0	24

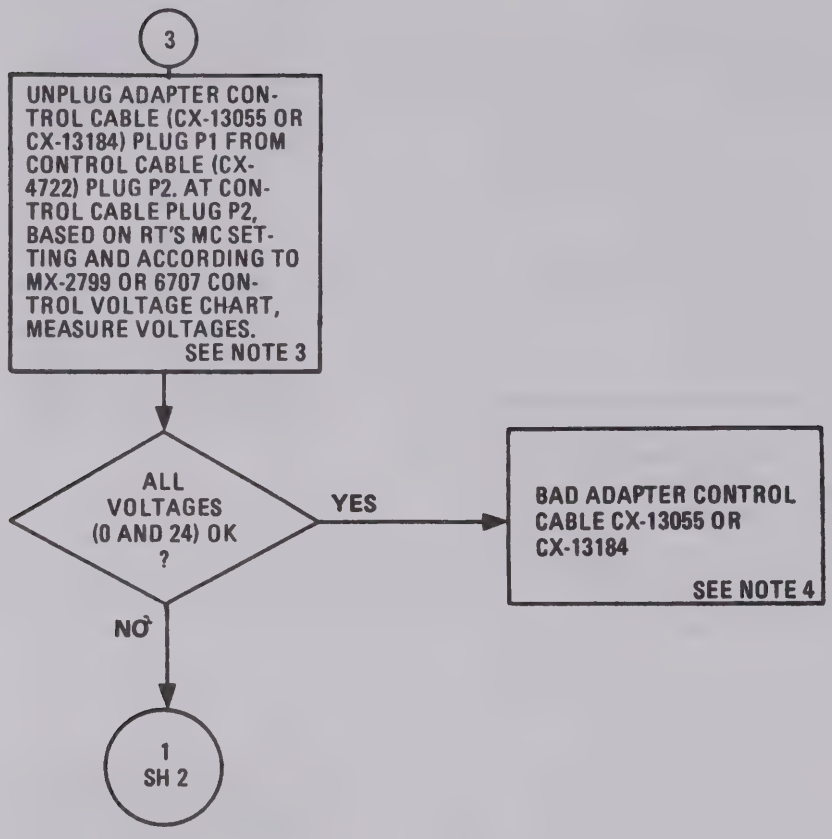
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 20
Troubleshoot RT Antenna Matching (MX) Unit Control Circuit (Sheet 2 of 3)



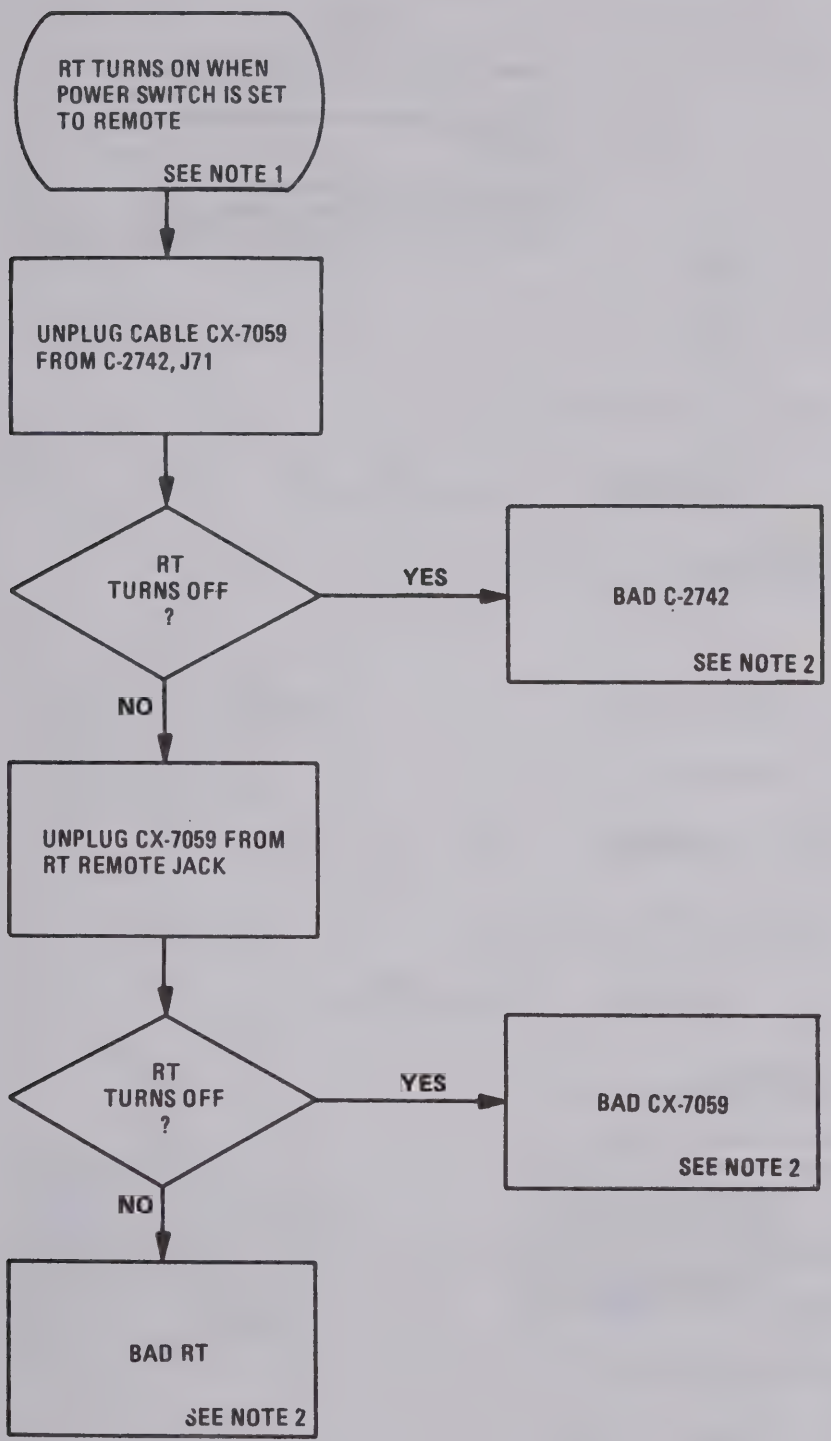
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 20
Troubleshoot RT Antenna Matching (MX) Unit Control Circuit (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 21
Troubleshoot RT-246/C-2742 Remote Power Control Circuit (Adverse Short) (Sheet 1 of 1)



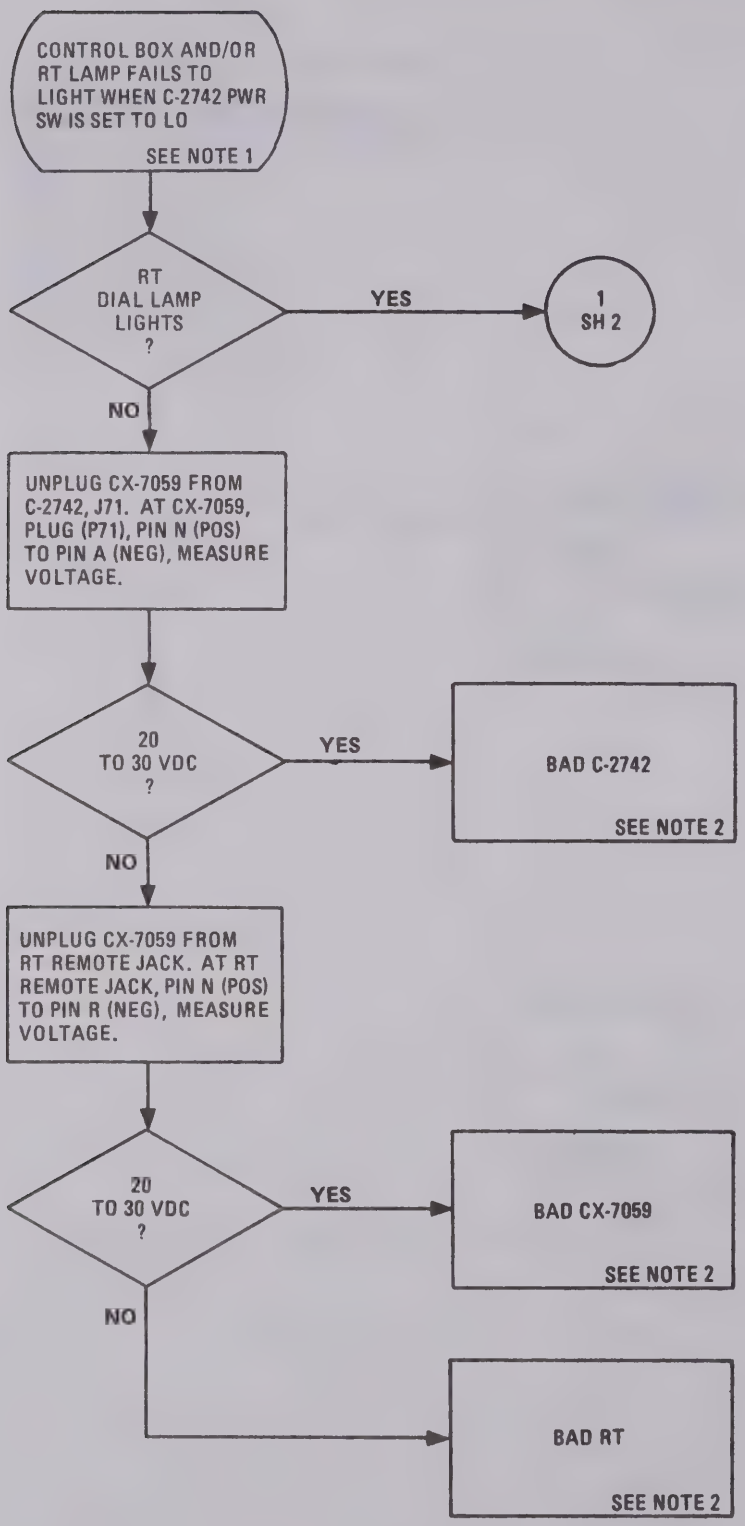
NOTES

1. Refer to FO-19 in back of this manual.
2. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 22

Troubleshoot RT-246/C-2742 Remote Power Control Circuit (Adverse Open) (Sheet 1 of 3)



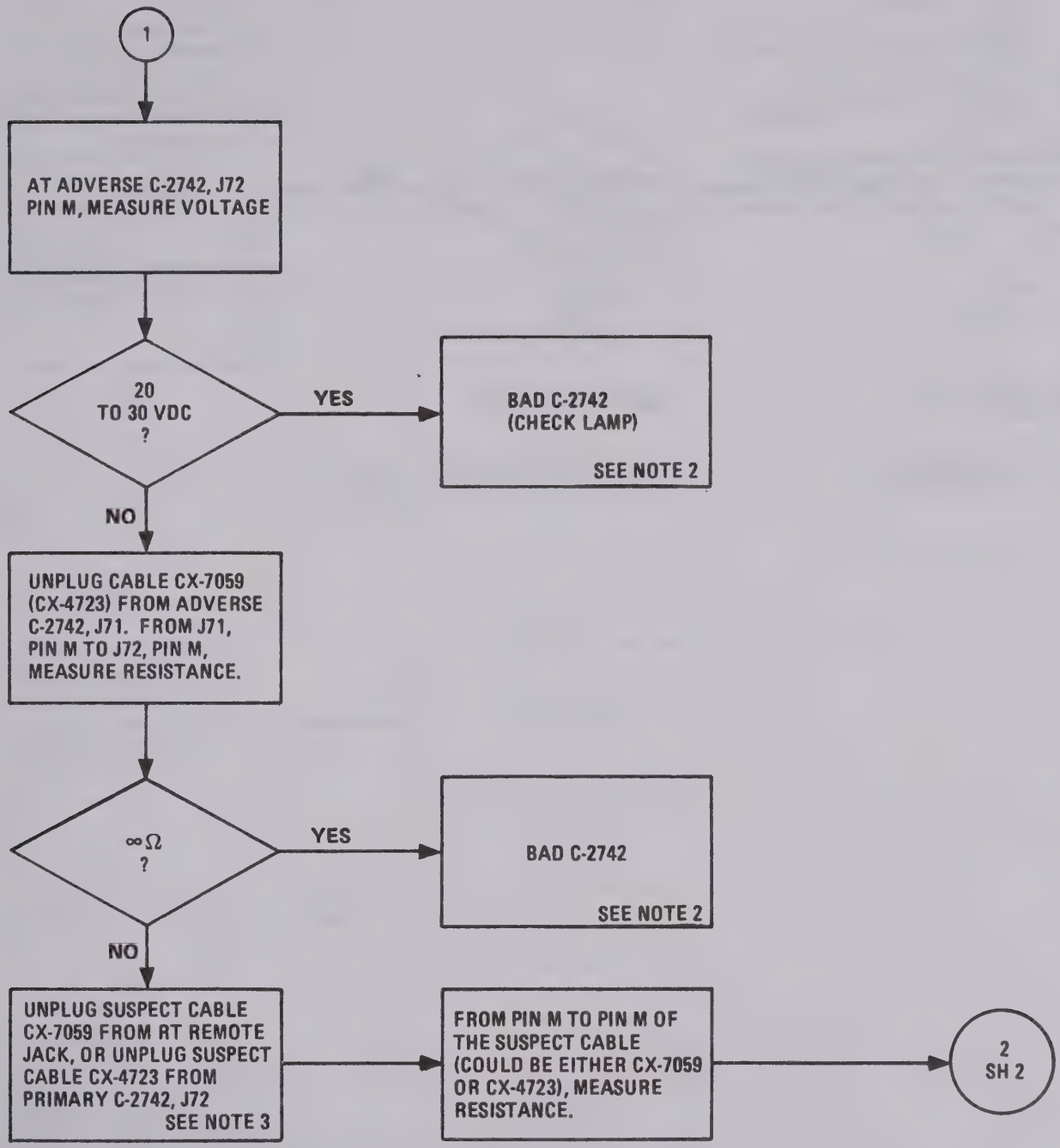
NOTES

1. Refer to FO-19 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. In this step either cable, (CX-7059 or CX-4723) could be the suspect bad cable. The resistance is checked from one cable plug to the other.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

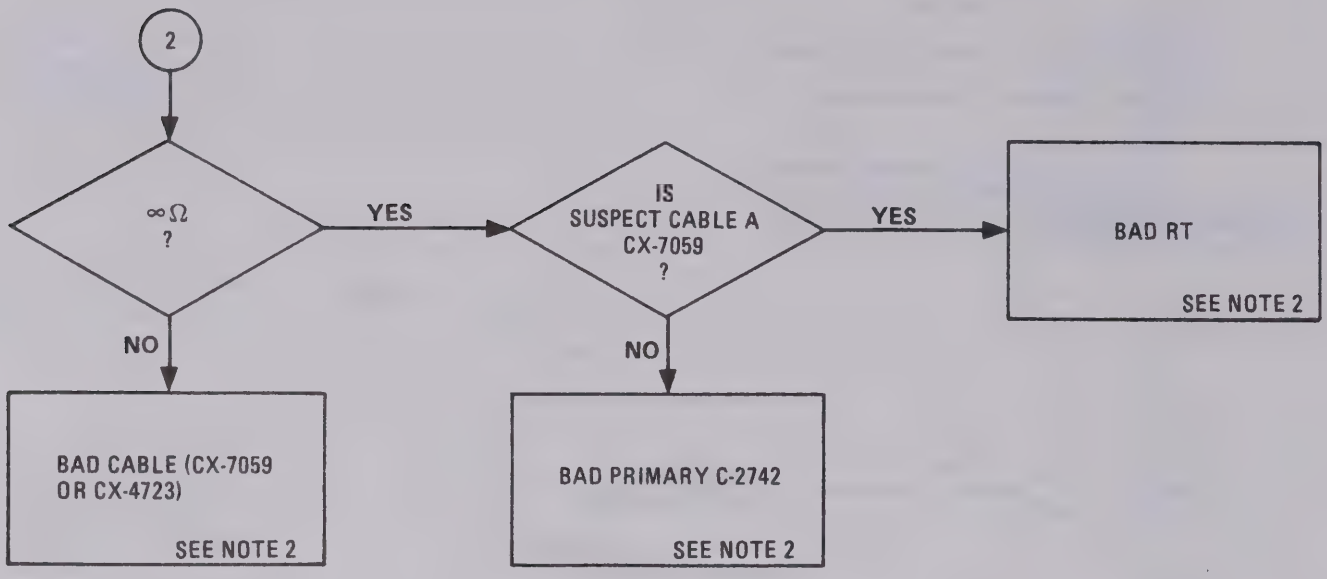
CHART 22

Troubleshoot RT-246/C-2742 Remote Power Control Circuit (Adverse Open) (Sheet 2 of 3)



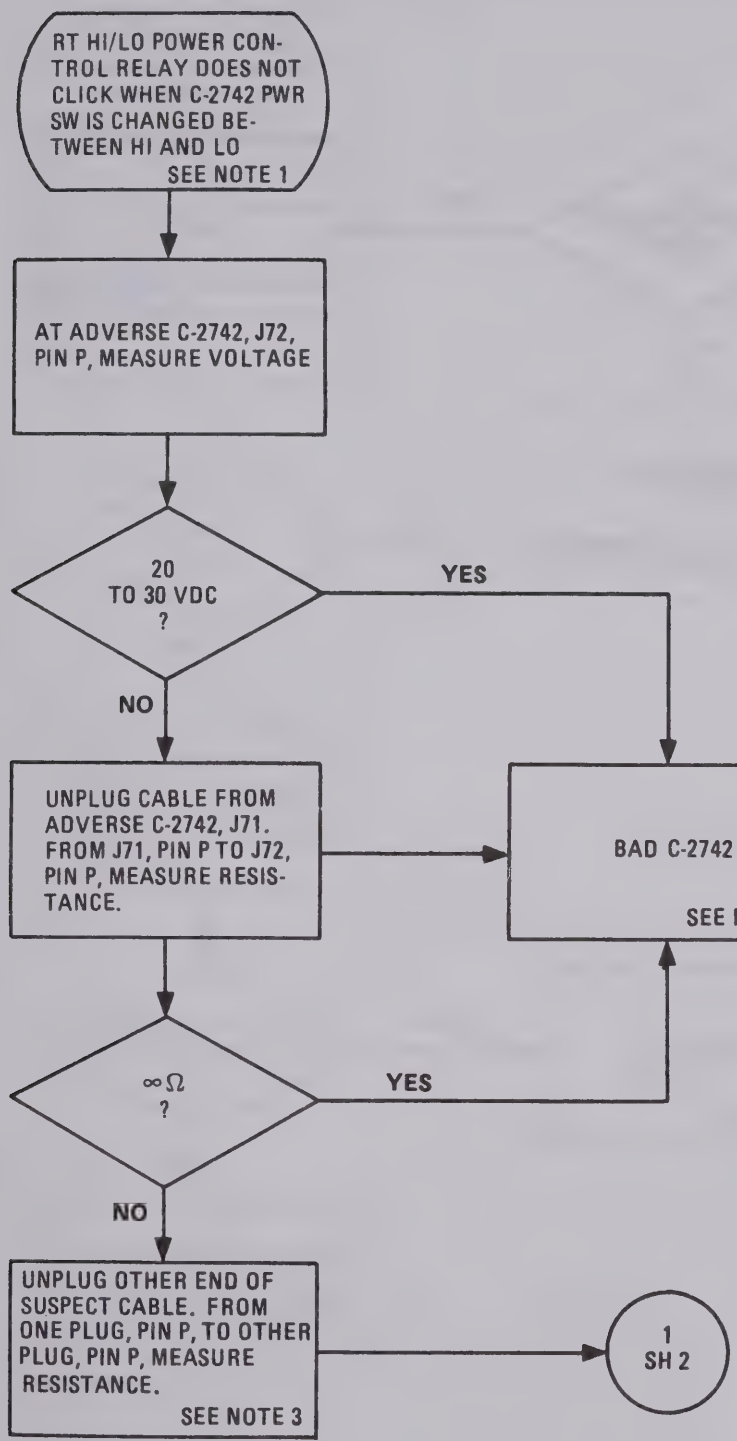
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 22
Troubleshoot RT-246/C-2742 Remote Power Control Circuit (Adverse Open) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 23
Troubleshoot RT-246 C-2742 HI/LO Power Control Circuit (Sheet 1 of 2)

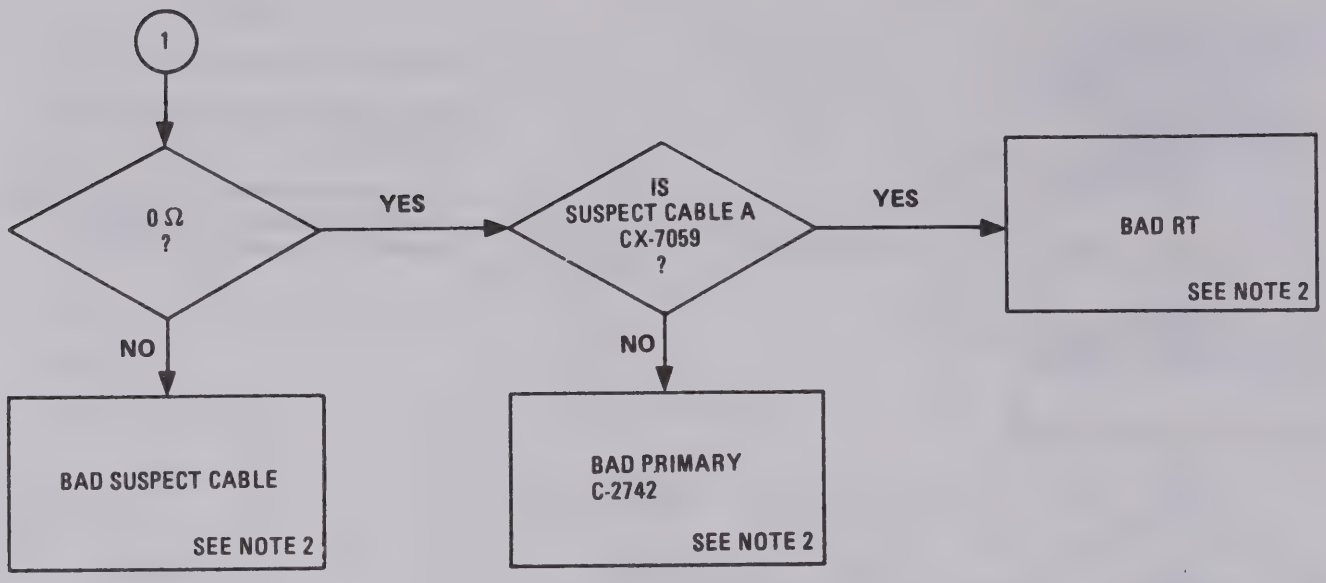


NOTES

1. Refer to FO-19 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. In this step either cable (CX-7059 or CX-4723) could be the suspect cable. The resistance is checked from one cable plug to the other.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

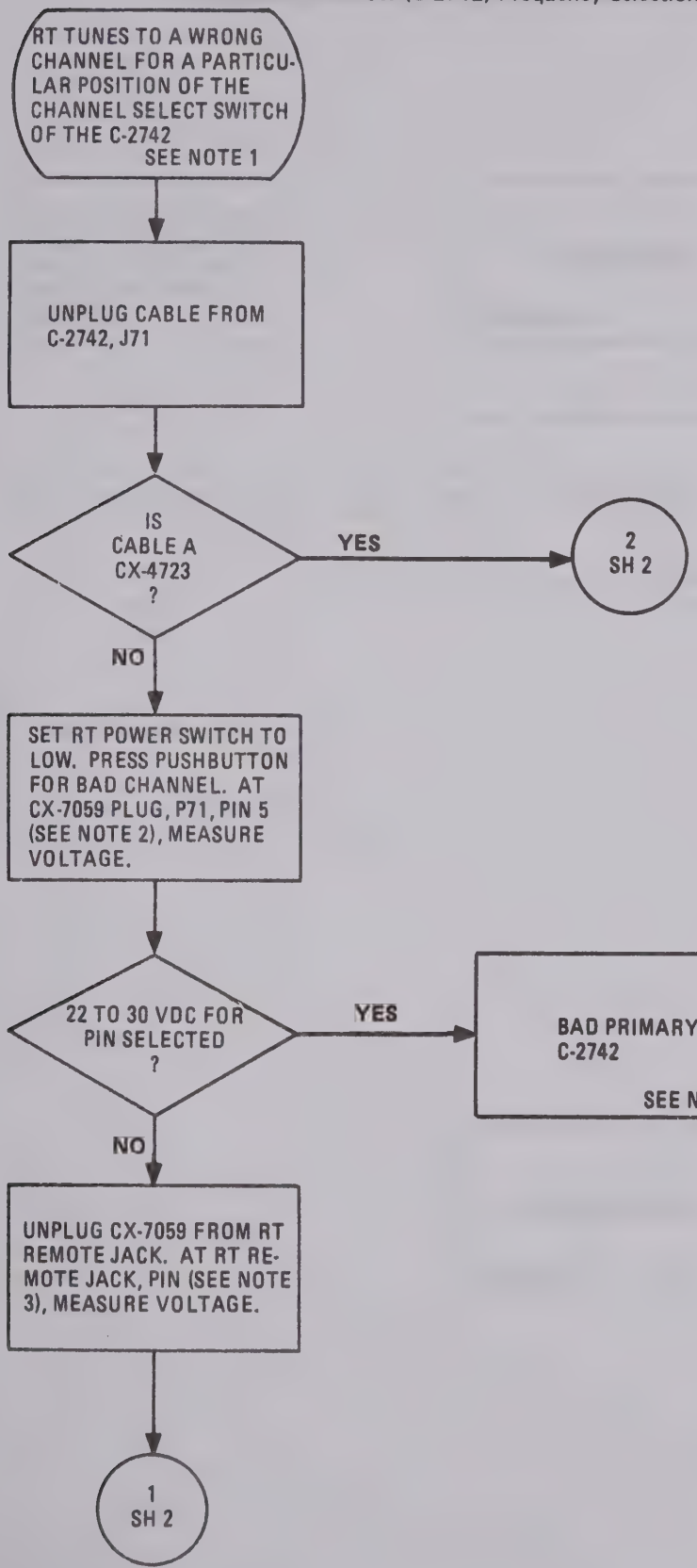
CHART 23
Troubleshoot RT-246 C-2742 HI/LO Power Control Circuit (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 24

Troubleshoot Remote (C-2742) Frequency Selection Circuit (Wrong Selection) (Sheet 1 of 3)



NOTES

1. Refer to FO-18 in back of this manual.
2. For the CHAN SEL position selected, the P71, J72 pin indicated should have a 22 to 30 VDC reading. All other channel pins should show zero (0) volts. See table below.

CHANNEL	P71, J72, PIN
1	T
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

3. For the channel button pressed, the REMOTE jack pin indicated should have a 22 to 30 VDC reading. All other channel pins should show zero (0) volts. See table below.

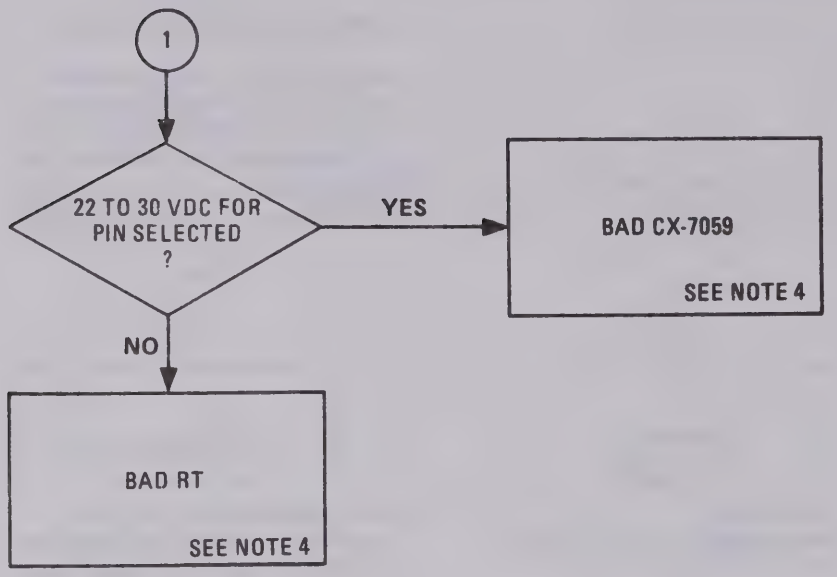
CHANNEL	REMOTE JACK, PIN
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

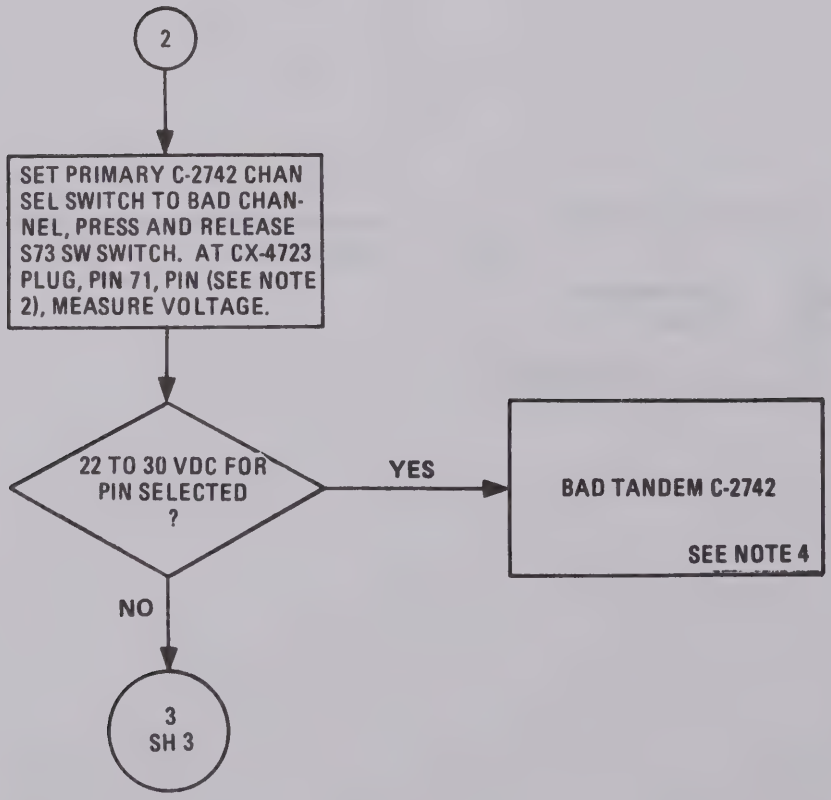
4. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 24

Troubleshoot Remote (C-2742) Frequency Selection Circuit (Wrong Selection) (Sheet 2 of 3)

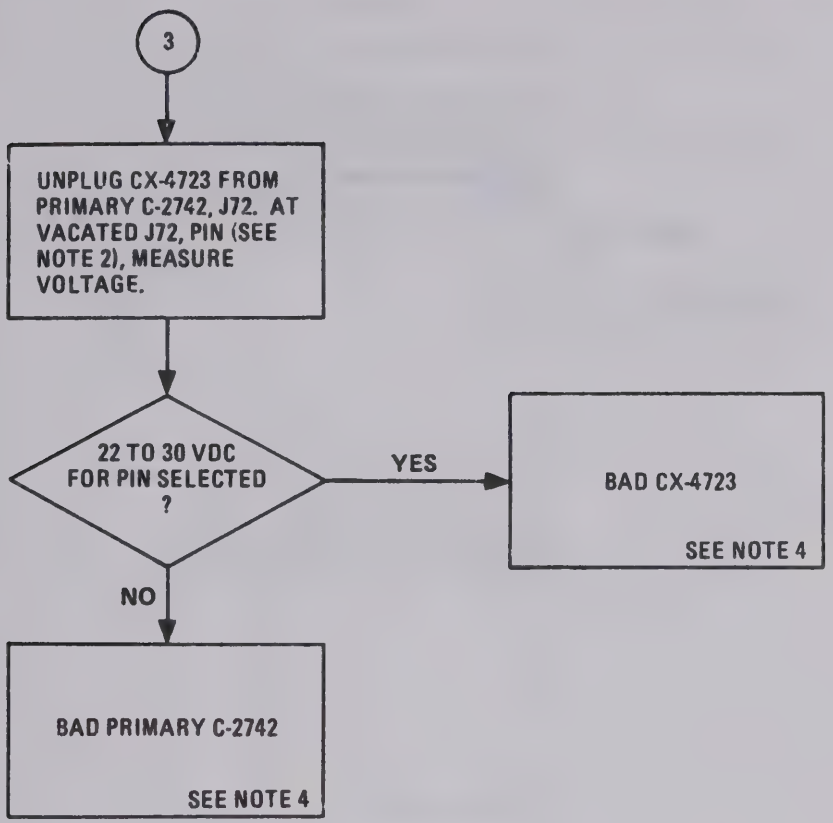




3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 24

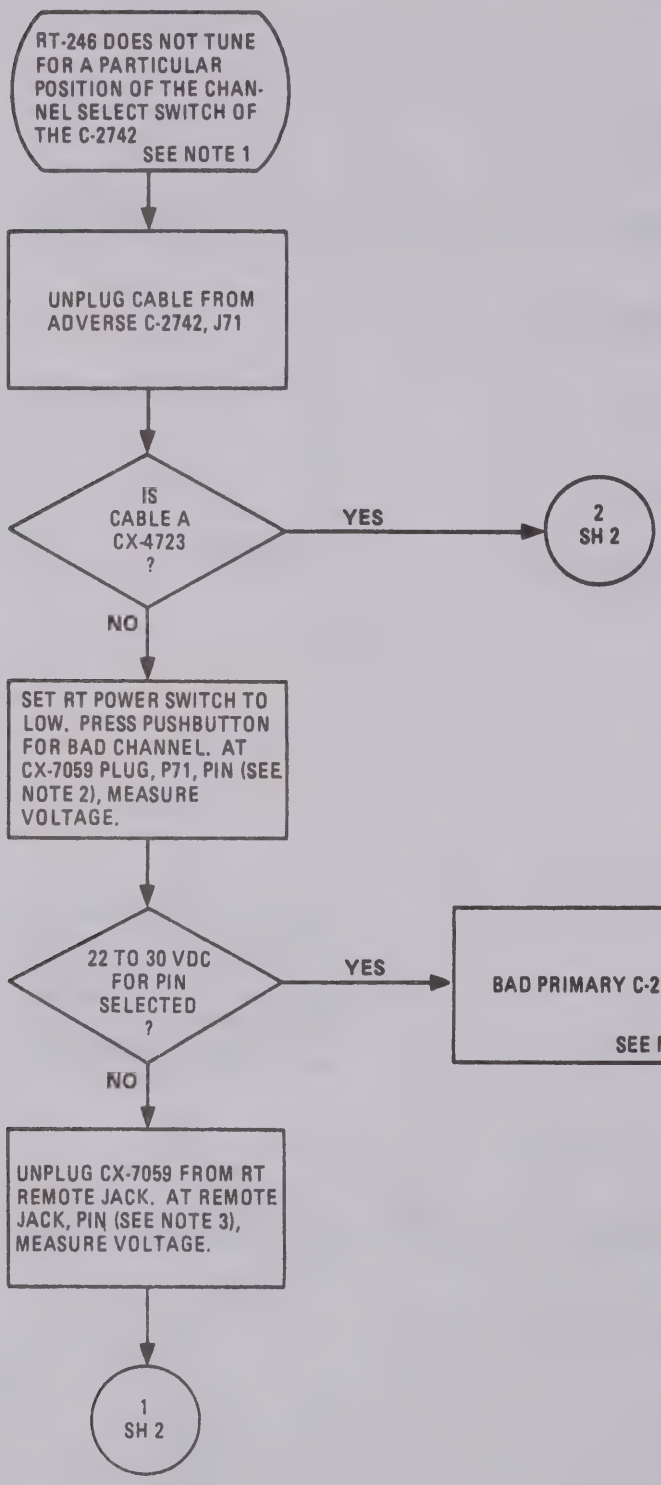
Troubleshoot Remote (C-2742) Frequency Selection Circuit (Wrong Selection) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 25

Troubleshoot RT-246/C-2742 Remote Frequency Selection Circuit (No Selection) (Sheet 1 of 3)



NOTES

1. Refer to FO-19 in back of this manual.
2. For the CHAN SEL position selected, the P71, J72, pin indicated should have a 22 to 30 VDC reading. All other channel pins should show zero (0) volts. See table below.

CHANNEL	P71, J72, PIN
1	T
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

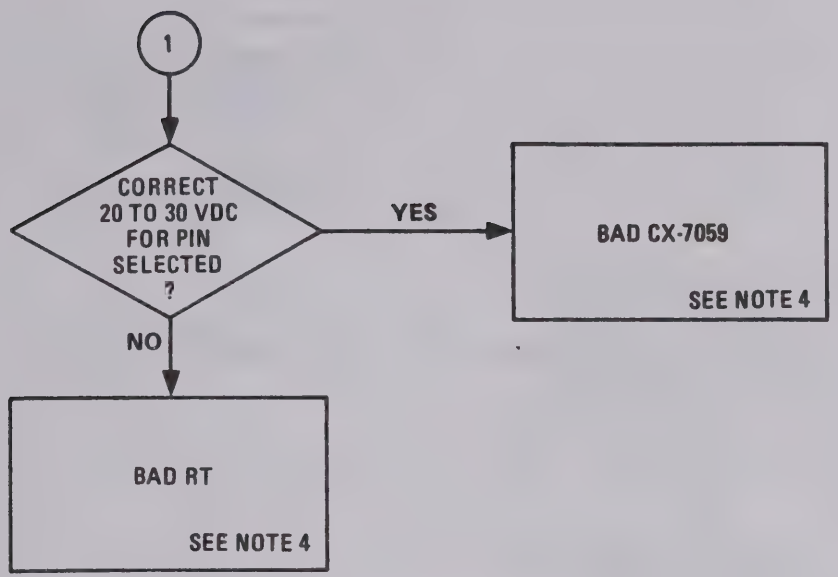
3. For the channel button pressed, the REMOTE jack, pin indicated should be 22 to 30 VDC reading. All other channel pins should show zero (0) volts. See table below.

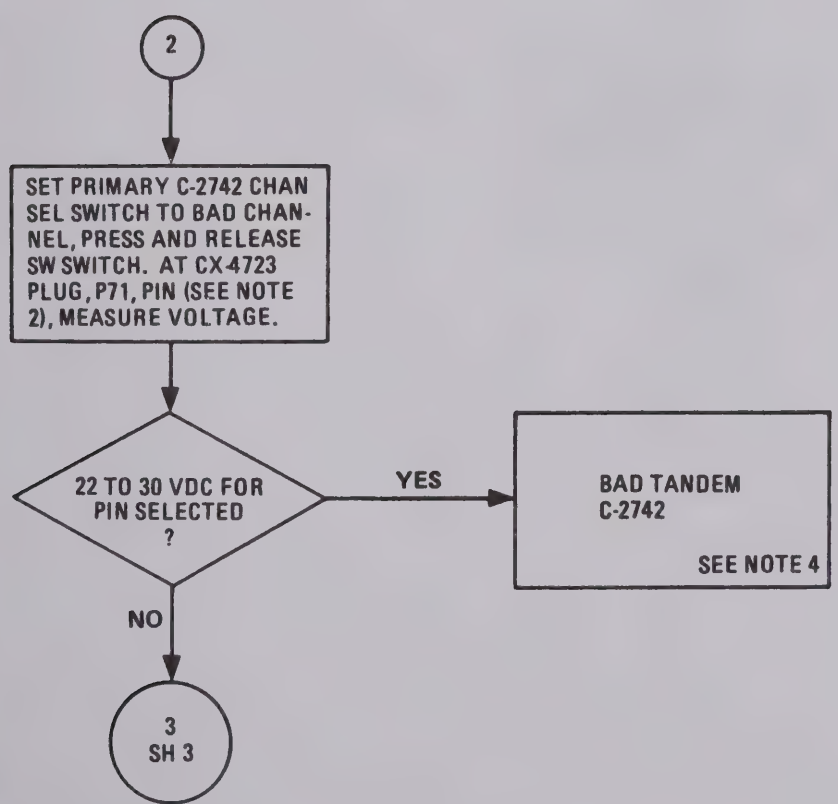
CHANNEL	REMOTE jack, pin
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

4. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 25
Troubleshoot RT-246/C-2742 Remote Frequency Selection Circuit (No Selection) (Sheet 2 of 3)

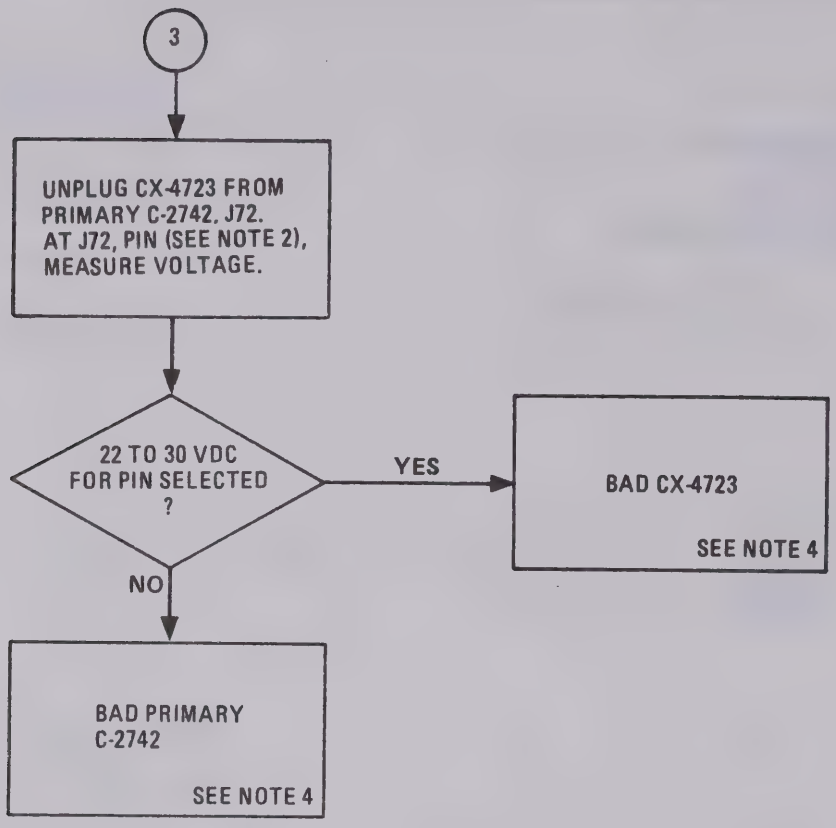




3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

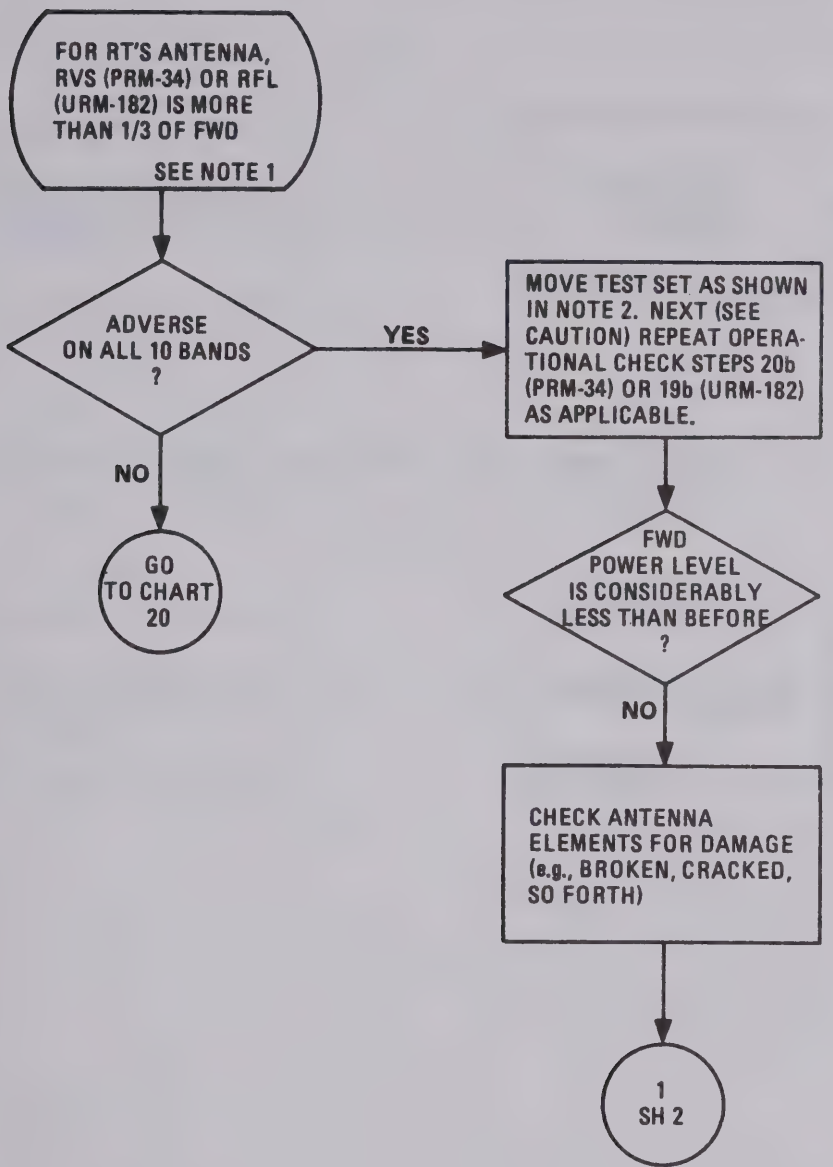
CHART 25

Troubleshoot RT-246/C-2742 Remote Frequency Selection Circuit (No Selection) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 26
Troubleshoot RT Antenna RF Signal Path Circuit (Sheet 1 of 3)



NOTES

1. Refer to FO-21 in back of this manual.
2. Fix or replace and return to operational check at this time.

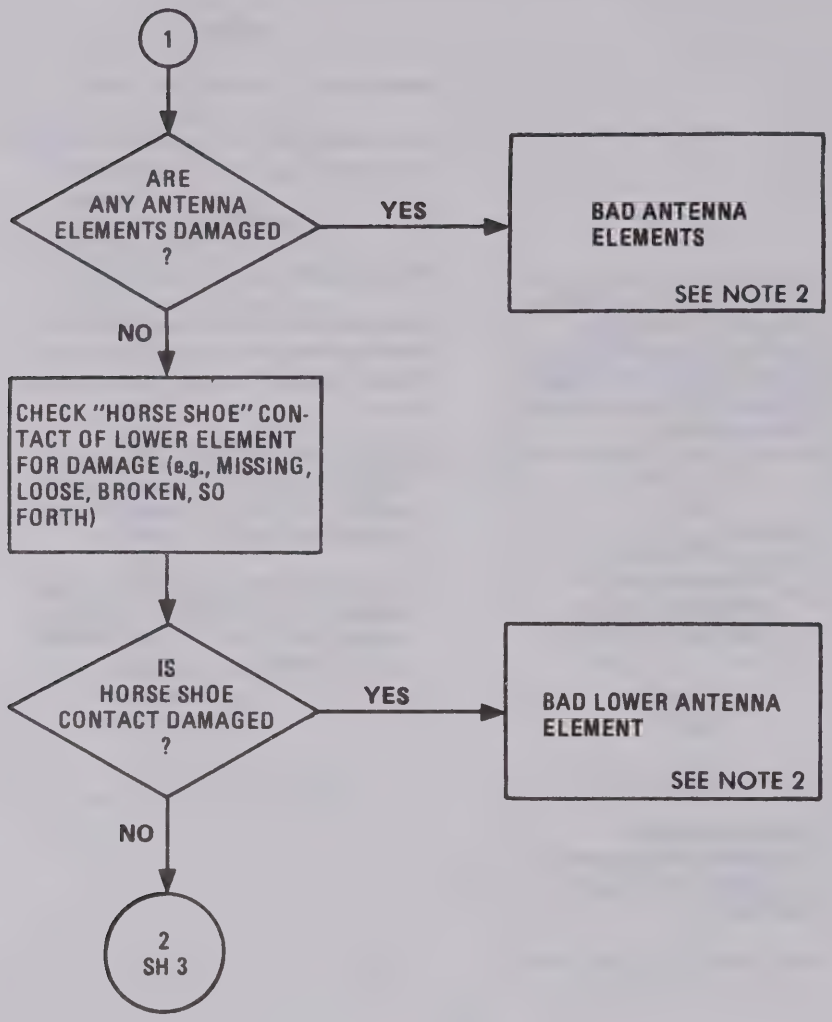
CAUTION

Insure all antenna cables are connected.

3. Disconnect cables CG-409 and CG-1773/U from test setup. Move test set from RT to base of antenna. Reconnect cables as shown below.
   a. Test Set AN/PRM-34 CG-409: Connect between test set ANT jack and matching unit J2. CG-1773/U: Connect between test set radio jack and RT ANT jack.
   b. Test set AN/URM-182 CG-409: Connect between J4 on TS-2609 and Matching Unit J1. CG-1773/U: Connect between J3 on TS-2609 and RT ANT jack.

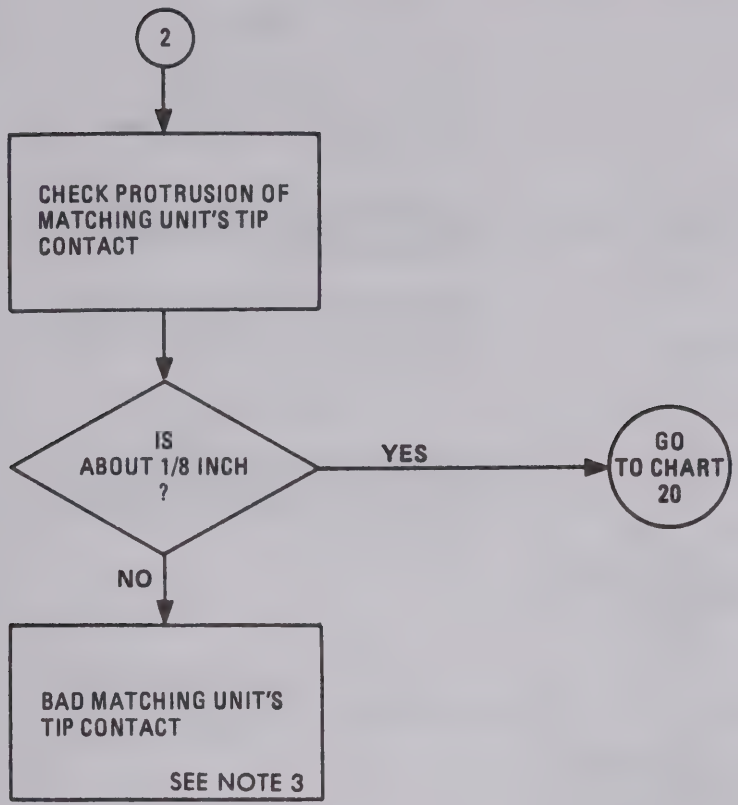
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 26
Troubleshoot RT Antenna RF Signal Path Circuit (Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

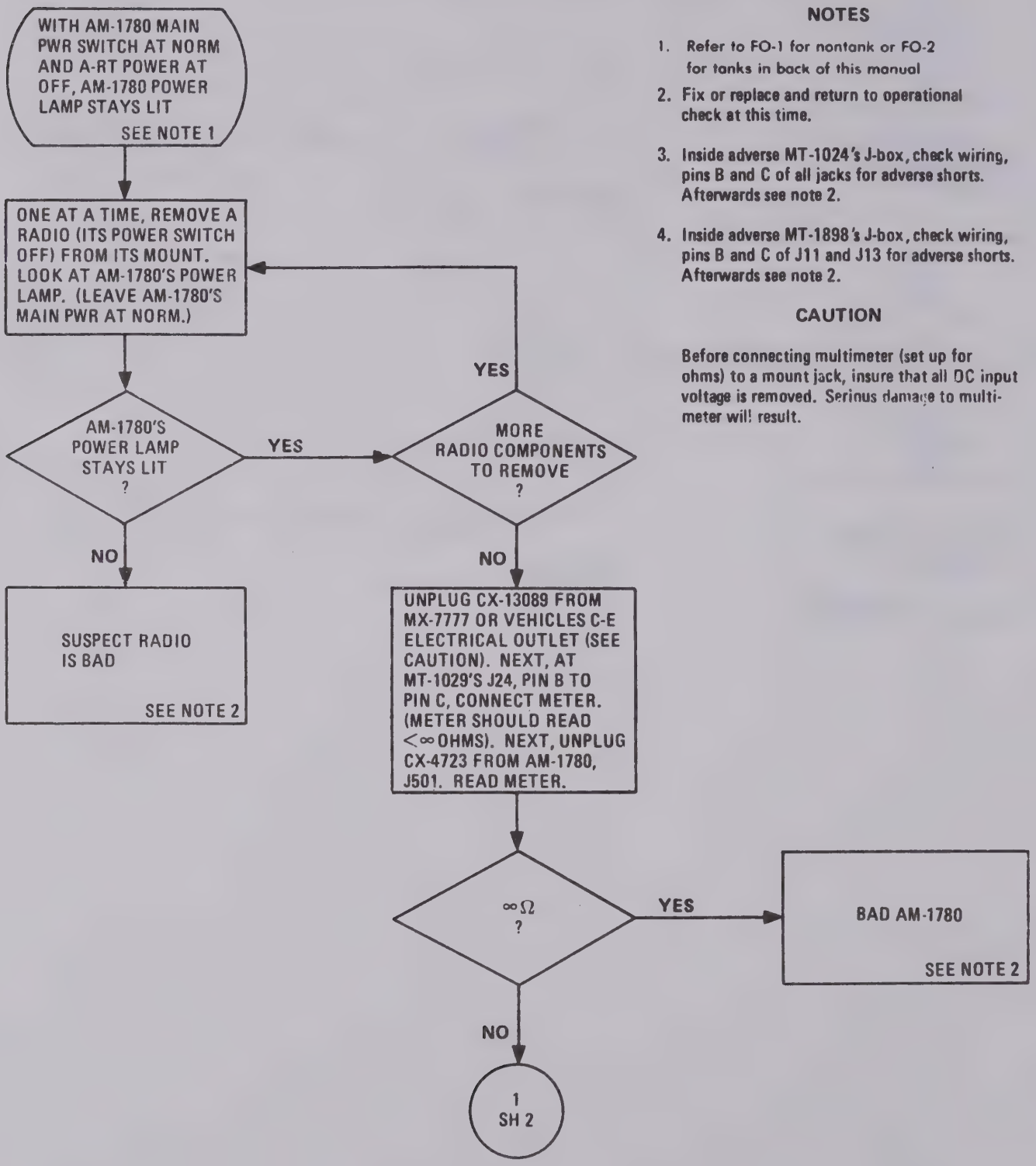
CHART 26
Troubleshoot RT Antenna RF Signal Path Circuit (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 27

Troubleshoot AM-1780's Input Power Return (A-RT Controlled) Circuit, Adverse Short (Sheet 1 of 6)



NOTES

1. Refer to FO-1 for nontank or FO-2 for tanks in back of this manual
2. Fix or replace and return to operational check at this time.
3. Inside adverse MT-1024's J-box, check wiring, pins B and C of all jacks for adverse shorts. Afterwards see note 2.
4. Inside adverse MT-1898's J-box, check wiring, pins B and C of J11 and J13 for adverse shorts. Afterwards see note 2.

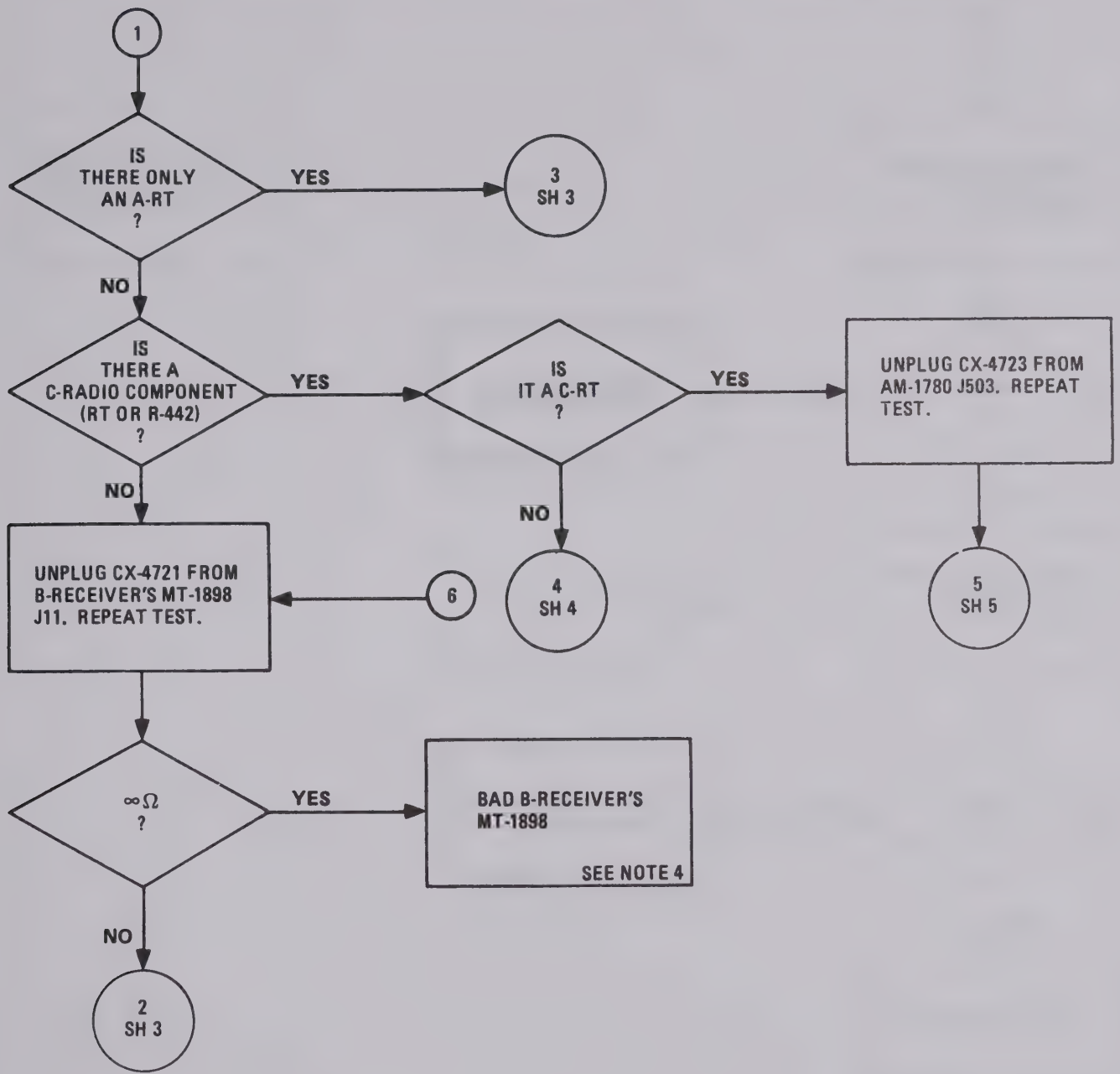
CAUTION

Before connecting multimeter (set up for ohms) to a mount jack, insure that all DC input voltage is removed. Serious damage to multimeter will result.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 27

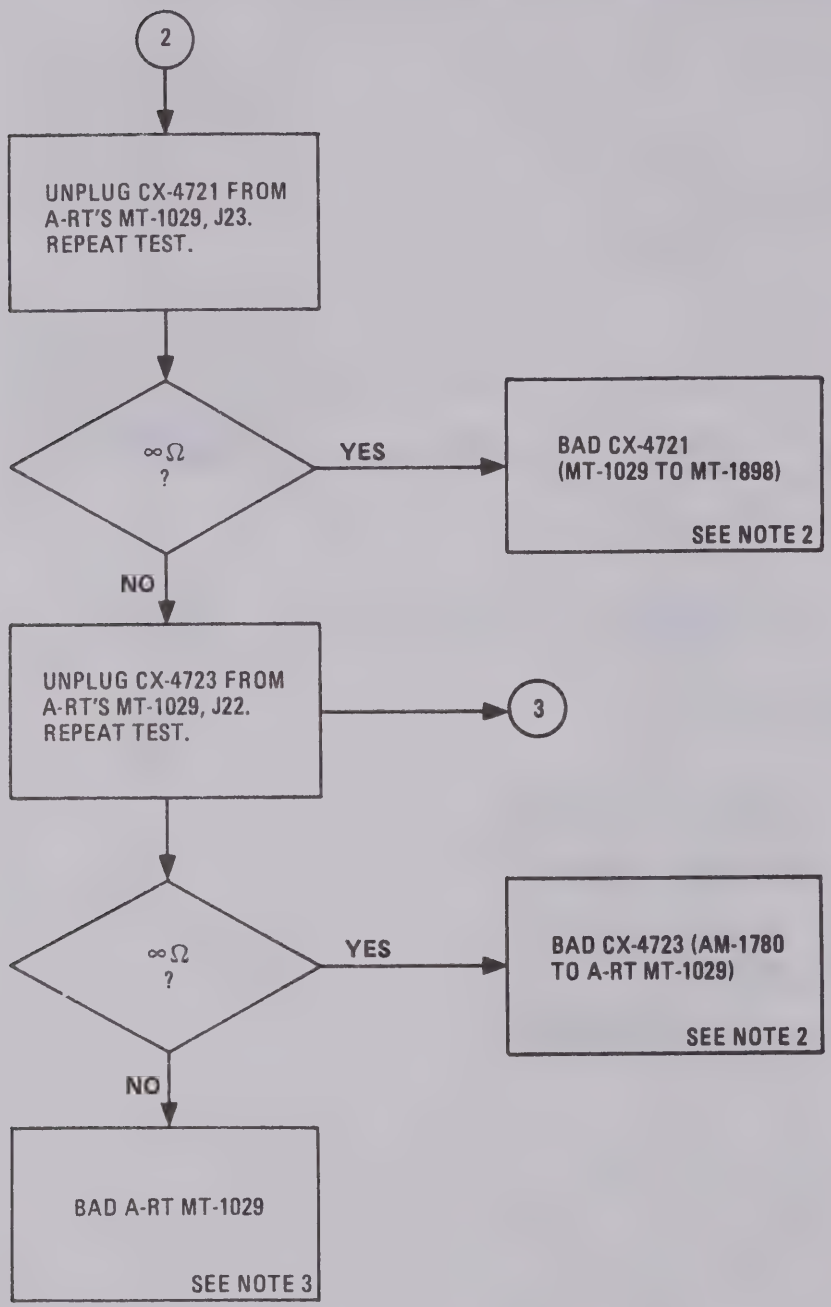
Troubleshoot AM-1780's Input Power Return (A-RT Controlled) Circuit, Adverse Short (Sheet 2 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

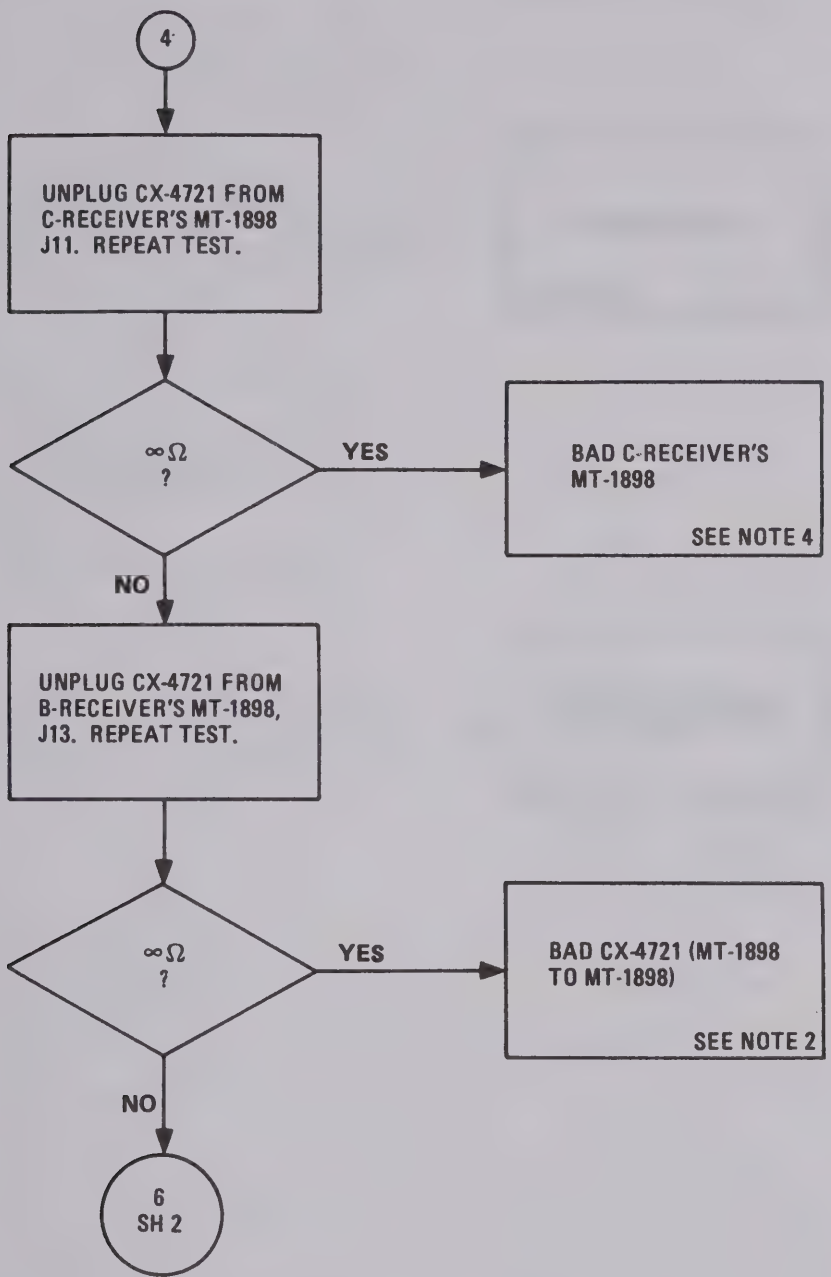
CHART 27

Troubleshoot AM-1780's Input Power Return (A-RT Controlled) Circuit, Adverse Short (Sheet 3 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

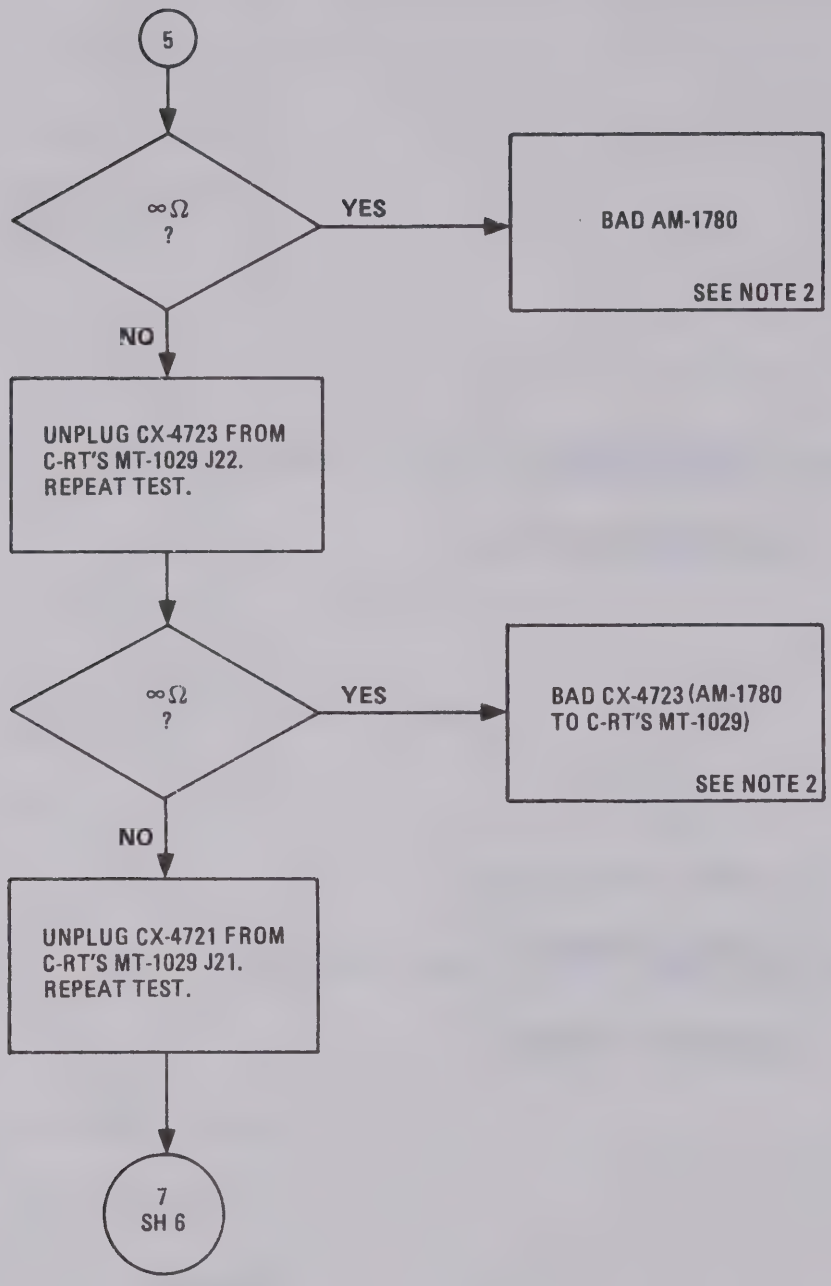
CHART 27
Troubleshoot AM-1780's Input Power Return (A-RT Controlled) Circuit, Adverse Short (Sheet 4 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 27

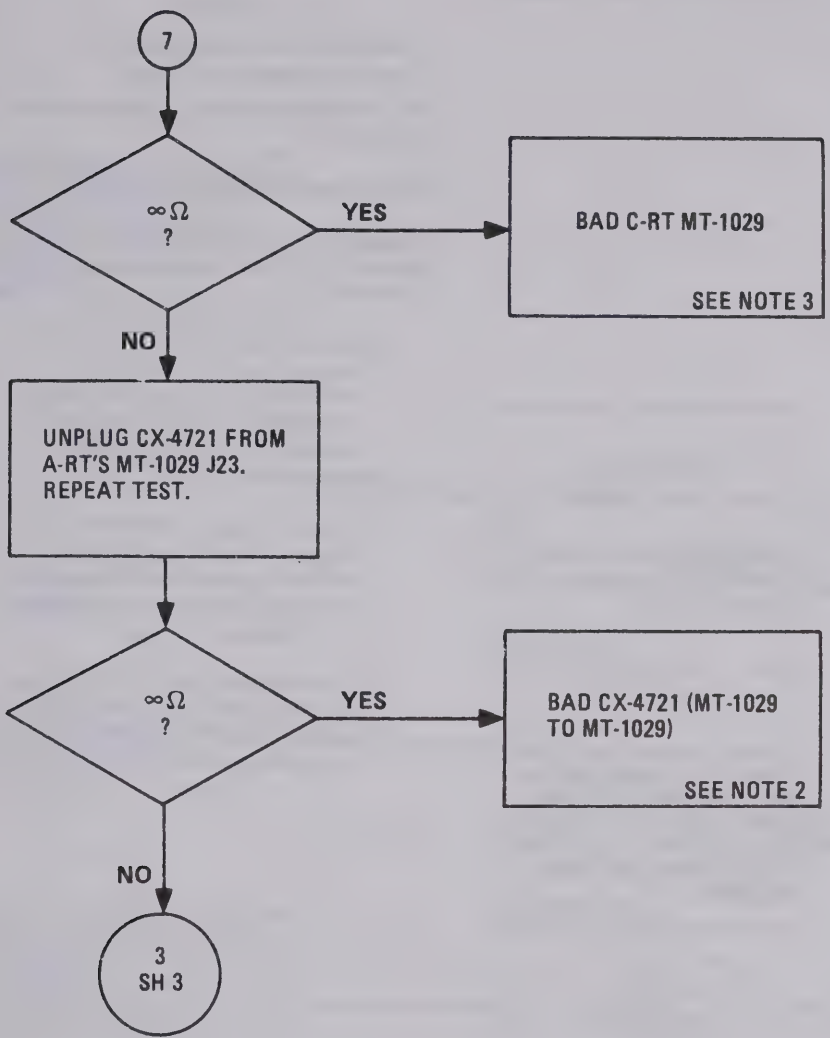
Troubleshoot AM-1780's Input Power Return (A-RT Controlled) Circuit, Adverse Short (Sheet 5 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 27

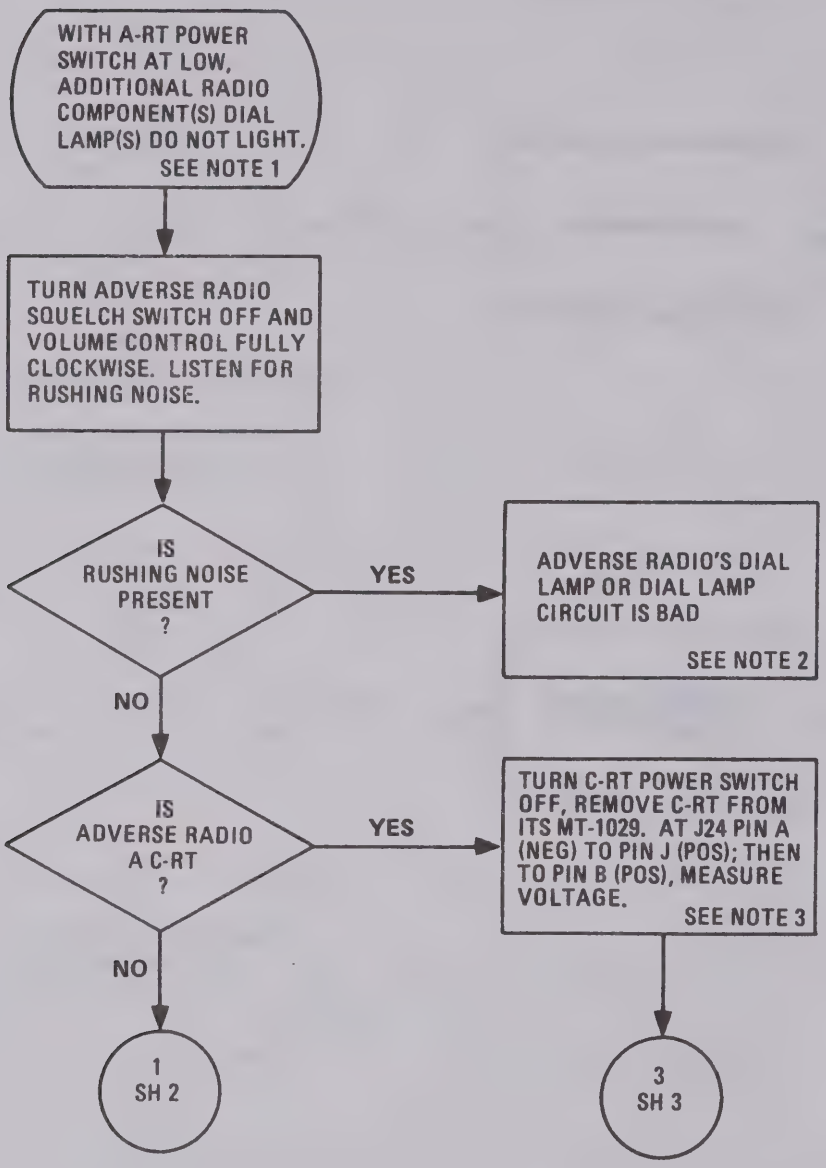
Troubleshoot AM-1780's Input Power Return (A-RT Controlled) Circuit, Adverse Short (Sheet 6 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 28

Troubleshoot Additional Radio Component Remote Input Power (A-RT Controlled) Circuit (Adverse Open) (Sheet 1 of 5)

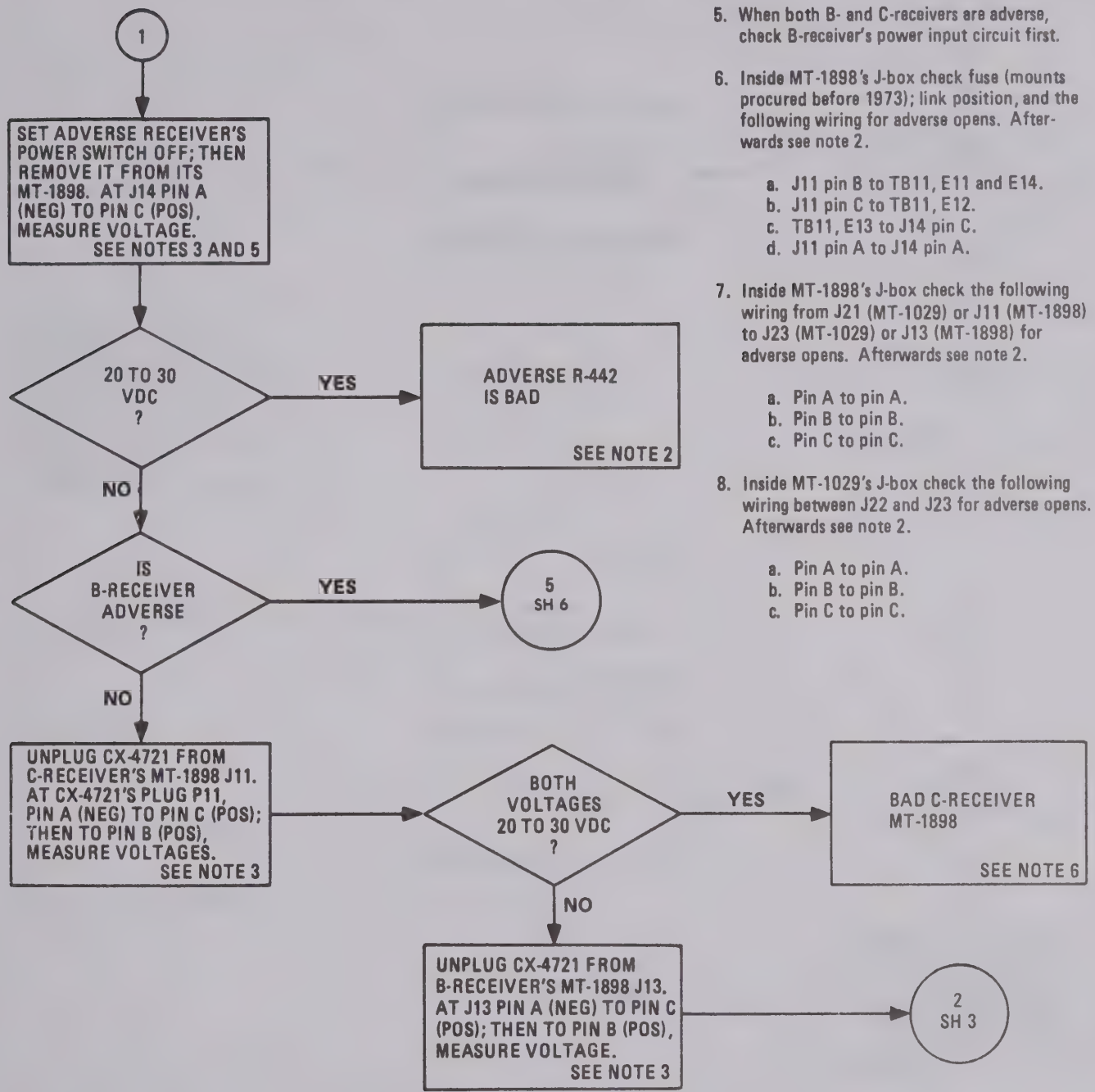


NOTES

1. Refer to FO-1 for nontanks or FO-2 for tanks in back of this manual.
2. Fix or replace and return to operational check at this time.
3. A-RT's power switch must be at low.
4. Compare results of voltage checks for J24 of the C-RT's MT-1029 as shown below; then see note 2.
   a. If pin J to pin A is 20 to 30 VDC, but pin B to pin A is not, inside MT-1029's J-box check fuse (mounts procured before 1973) and wiring from J21 pin B to J24 pin B for adverse opens.
   b. If pin B to pin A is 20 to 30 VDC, but pin J to pin A is not, inside MT-1029's J-box check link position and wiring from J21 pin C to J24 pin J for adverse opens.
   c. If both are not 20 to 30 VDC, inside MT-1029's J-box check wiring from J21 pin A to J24 pin A for an adverse open and the checks of a and b above.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 28
Troubleshoot Additional Radio Component Remote Input Power (A-RT Controlled) Circuit
(Adverse Open) (Sheet 2 of 5)



5. When both B- and C-receivers are adverse, check B-receiver's power input circuit first.

6. Inside MT-1898's J-box check fuse (mounts procured before 1973); link position, and the following wiring for adverse opens. Afterwards see note 2.

   a. J11 pin B to TB11, E11 and E14.
   b. J11 pin C to TB11, E12.
   c. TB11, E13 to J14 pin C.
   d. J11 pin A to J14 pin A.

7. Inside MT-1898's J-box check the following wiring from J21 (MT-1029) or J11 (MT-1898) to J23 (MT-1029) or J13 (MT-1898) for adverse opens. Afterwards see note 2.

   a. Pin A to pin A.
   b. Pin B to pin B.
   c. Pin C to pin C.

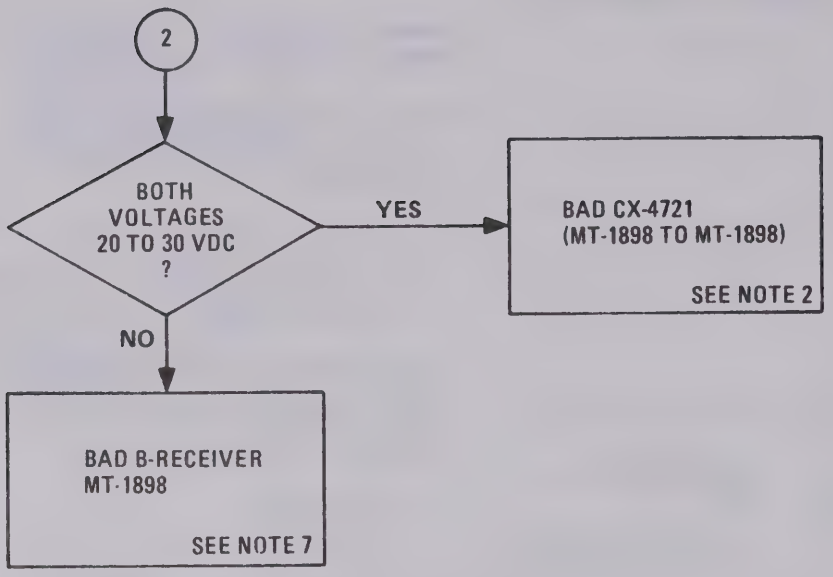
8. Inside MT-1029's J-box check the following wiring between J22 and J23 for adverse opens. Afterwards see note 2.

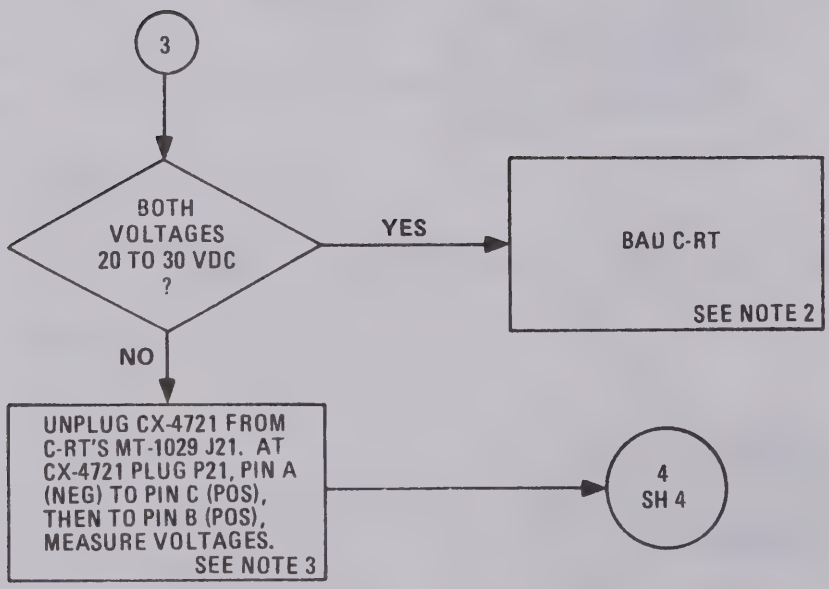
   a. Pin A to pin A.
   b. Pin B to pin B.
   c. Pin C to pin C.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 28

Troubleshoot Additional Radio Component Remote Input Power (A-RT Controlled) Circuit (Adverse Open) (Sheet 3 of 5)

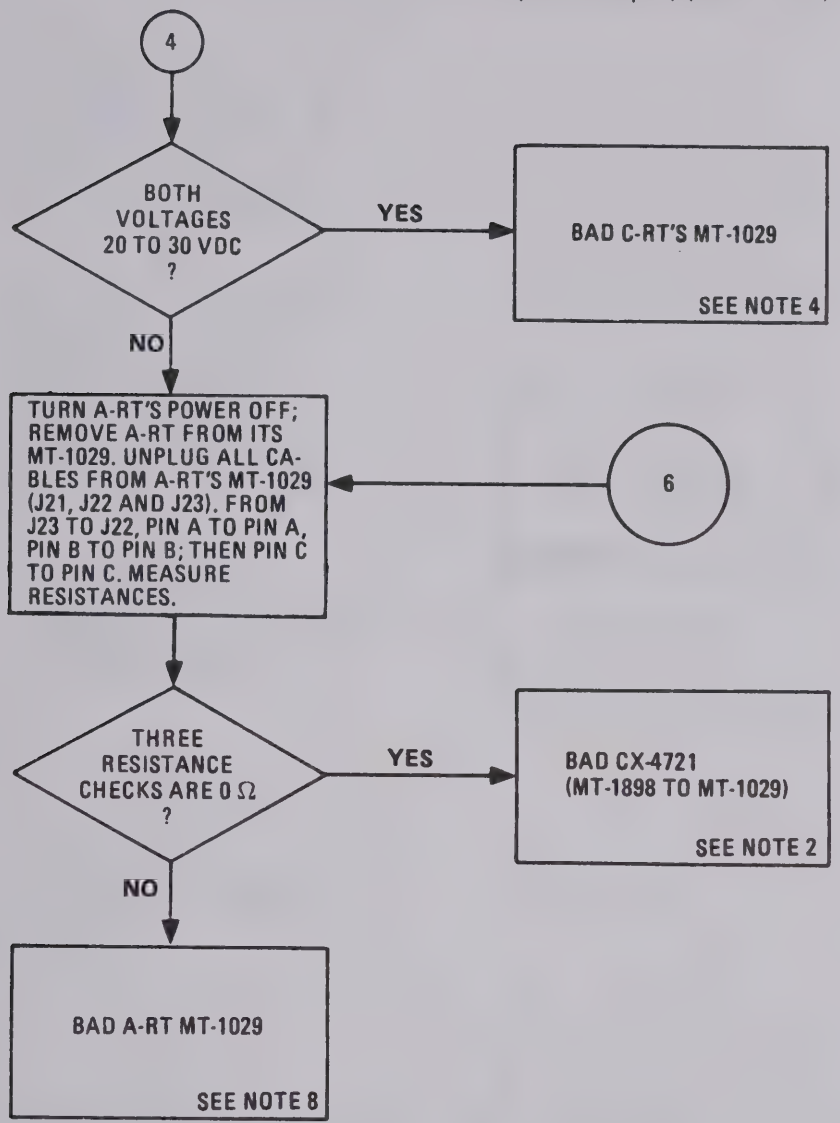




3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

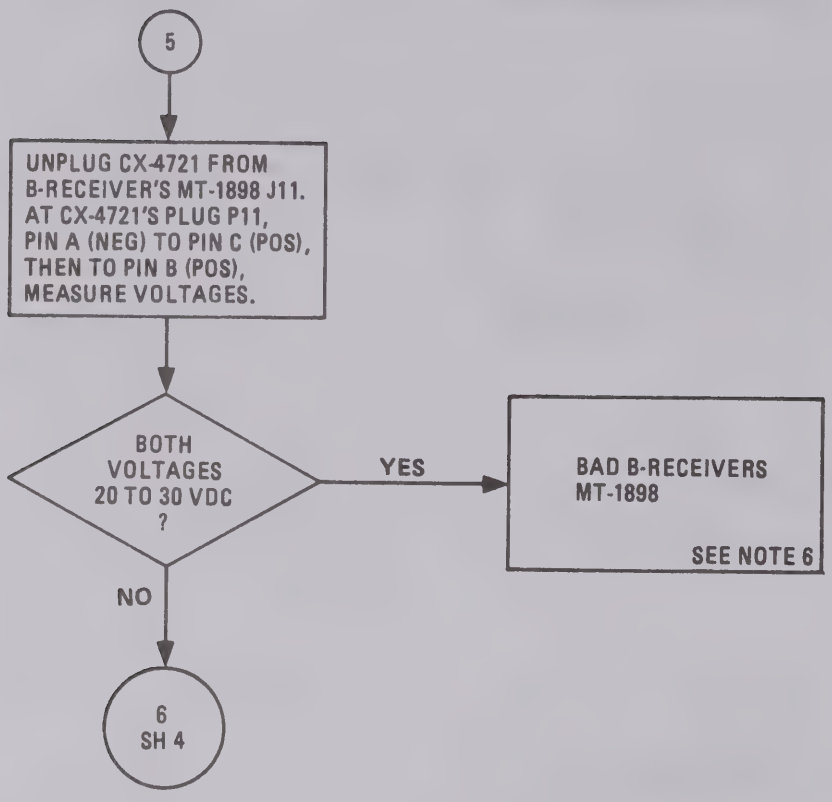
CHART 28

Troubleshoot Additional Radio Component Remote Input Power (A-RT Controlled) Circuit (Adverse Open) (Sheet 4 of 5)



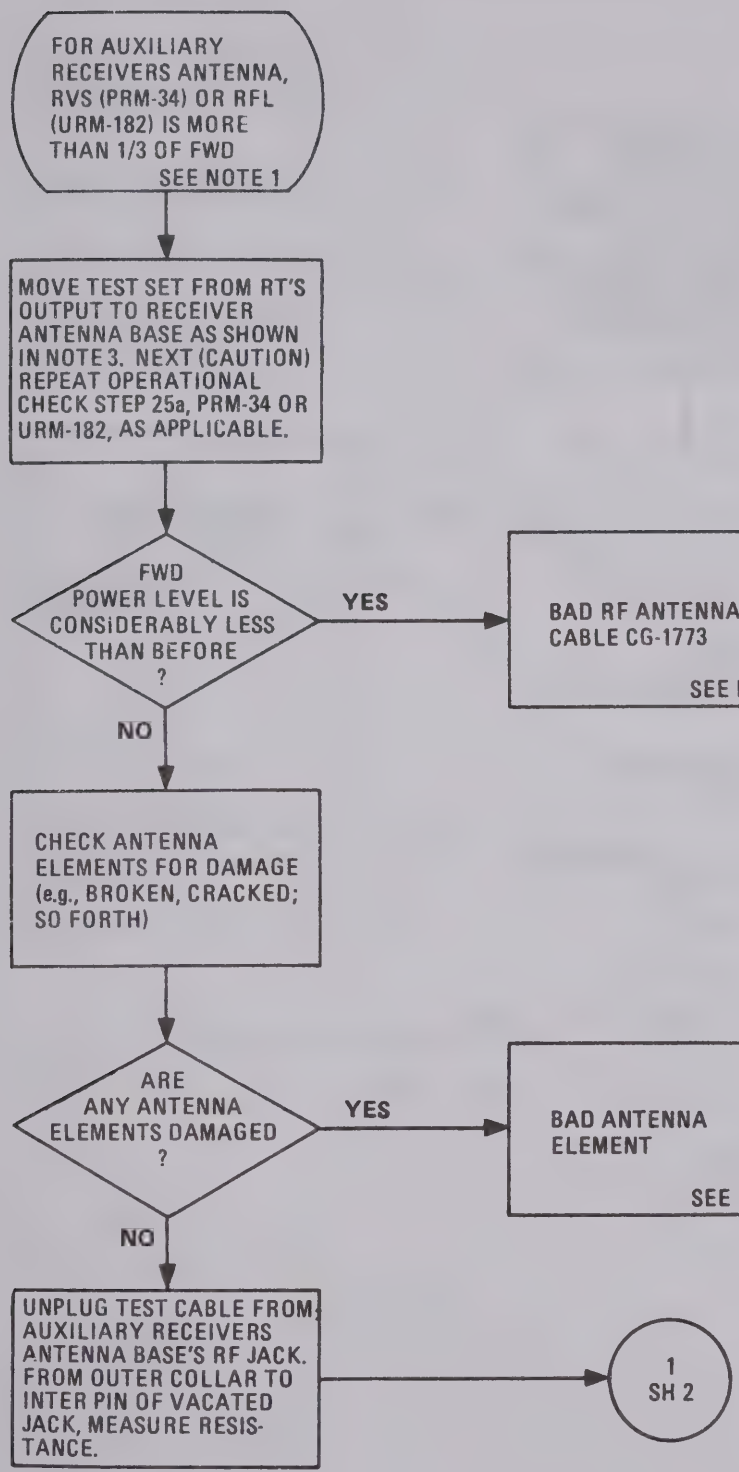
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 28
Troubleshoot Additional Radio Component Remote Input Power (A-RT Controlled) Circuit (Adverse Open) (Sheet 5 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 29
Troubleshoot Auxiliary Receivers Antenna Circuit (Sheet 1 of 2)



NOTES

1. Refer to FO-20 and FO-21 in back of this manual.
2. Fix or replace and return to operational check at this time.

CAUTION

Insure all antenna cables are connected.

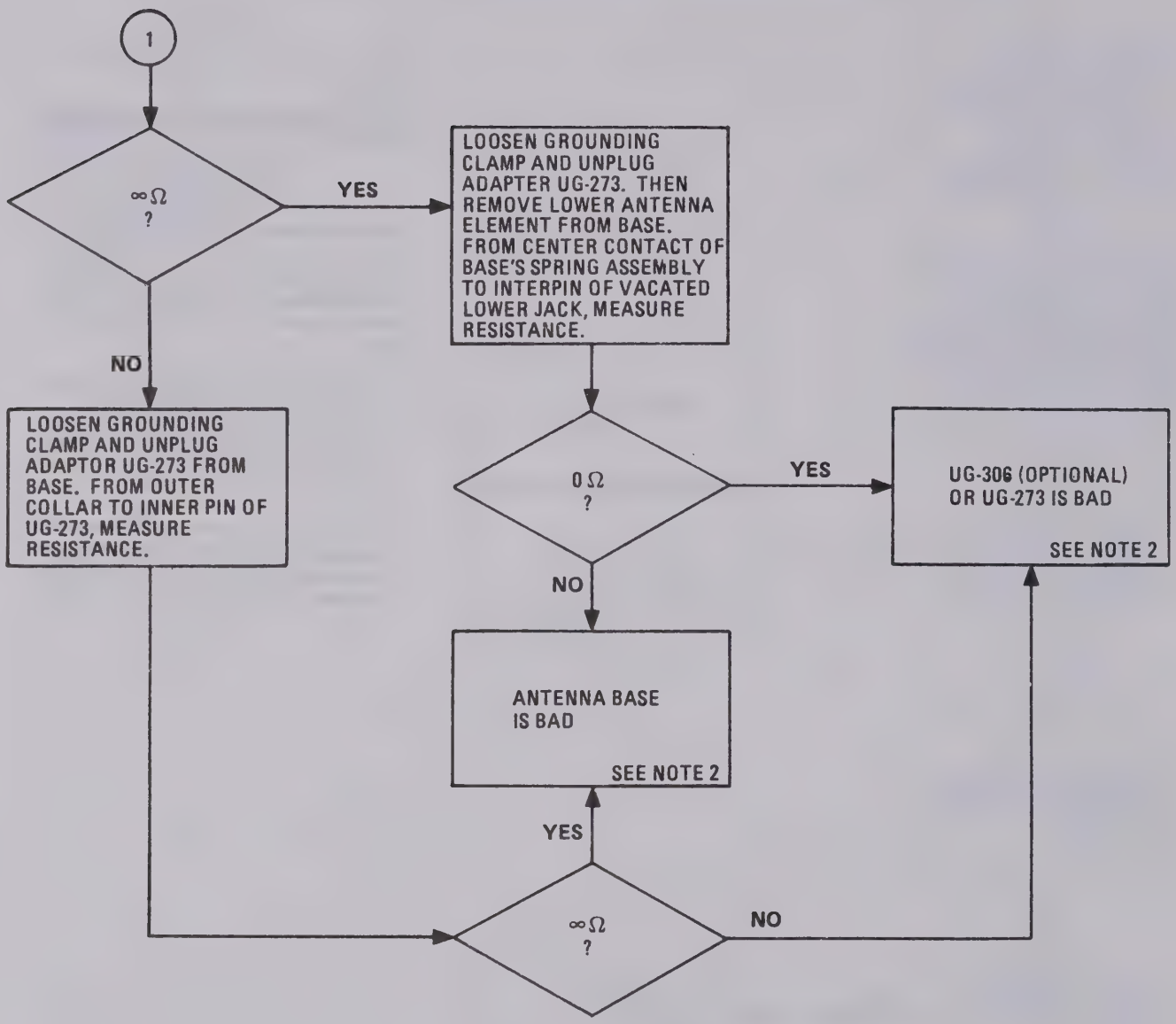
3. Disconnect cables CG-409 and CG-1773/U from test setup. Move Test Set from RT to base of antenna. Reconnect cables as shown below.

   a. Test Set AN/PRM-34 CG-409: Connect between Test Set ANT Jack and Aux. Receiver Antenna Base Jack CG-1773/U: Connect between Test Set RADIO Jack and RT ANT Jack.

   b. Test Set AN/URM-182 CG-409: Connect between J4 or TS-2609 and Aux Receiver Antenna Base Jack. CG-1773/U: Connect between J3 on TS-2609 and RT ANT Jack.

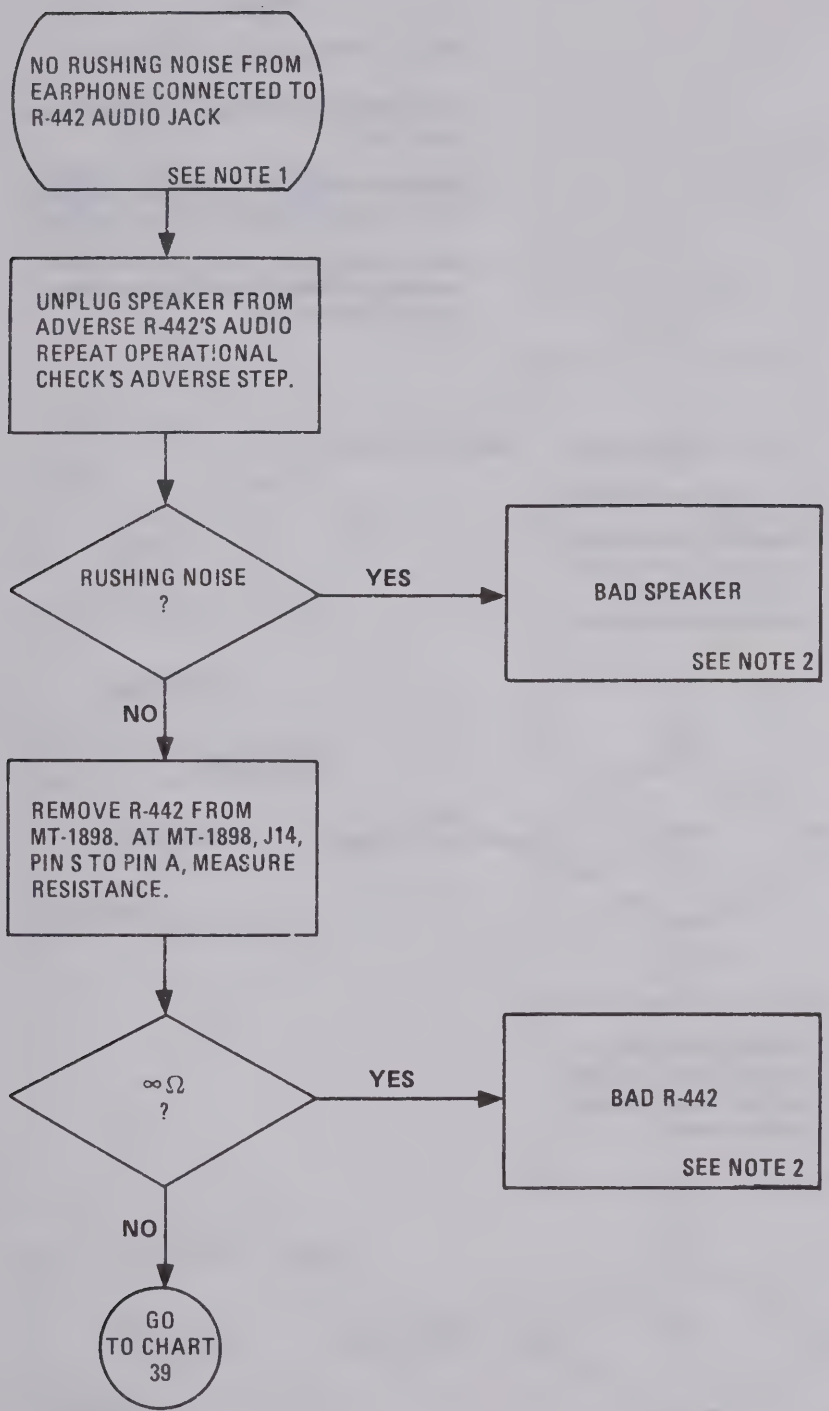
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 29
Troubleshoot Auxiliary Receivers Antenna Circuit (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 30
Troubleshoot R-442 Phone Output Circuit (Sheet 1 of 1)

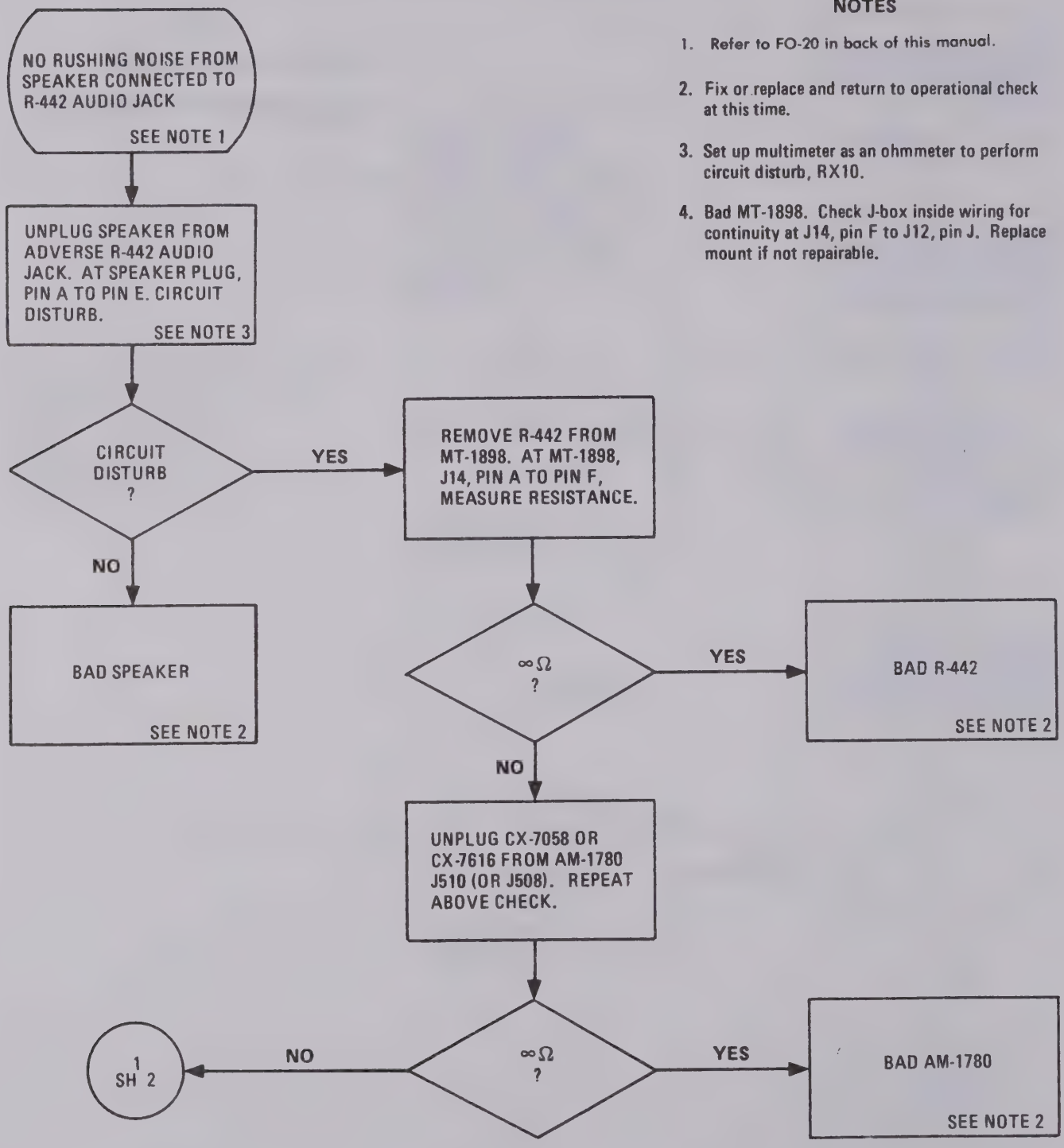


NOTES

1. Refer to FO-9 in back of this manual.
2. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 31
Troubleshoot R-442 Speaker Output Circuit (Sheet 1 of 2)

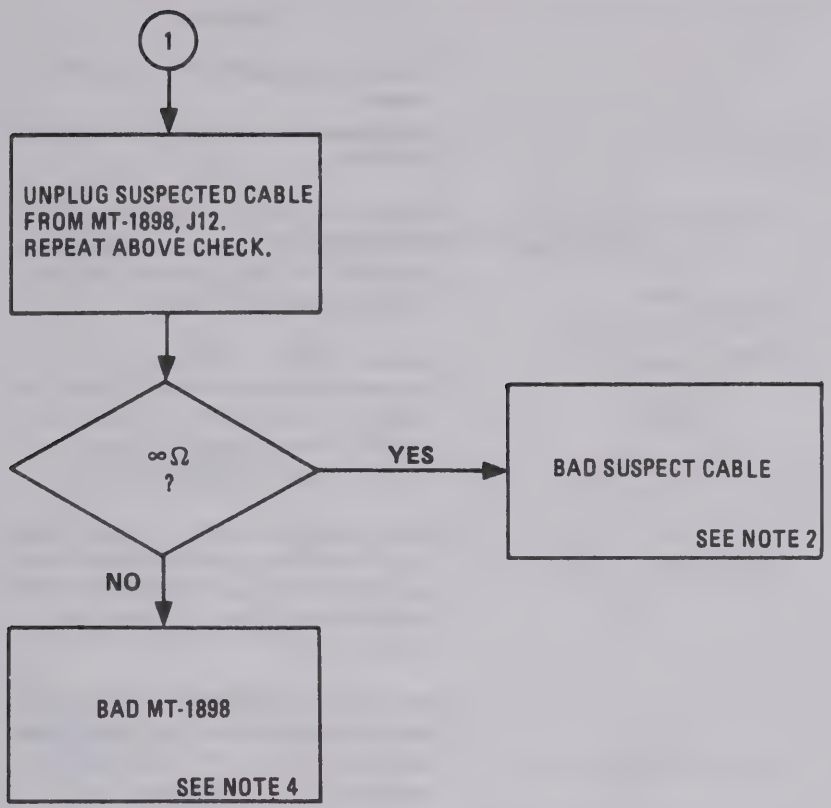


NOTES

1. Refer to FO-20 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Set up multimeter as an ohmmeter to perform circuit disturb, RX10.
4. Bad MT-1898. Check J-box inside wiring for continuity at J14, pin F to J12, pin J. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

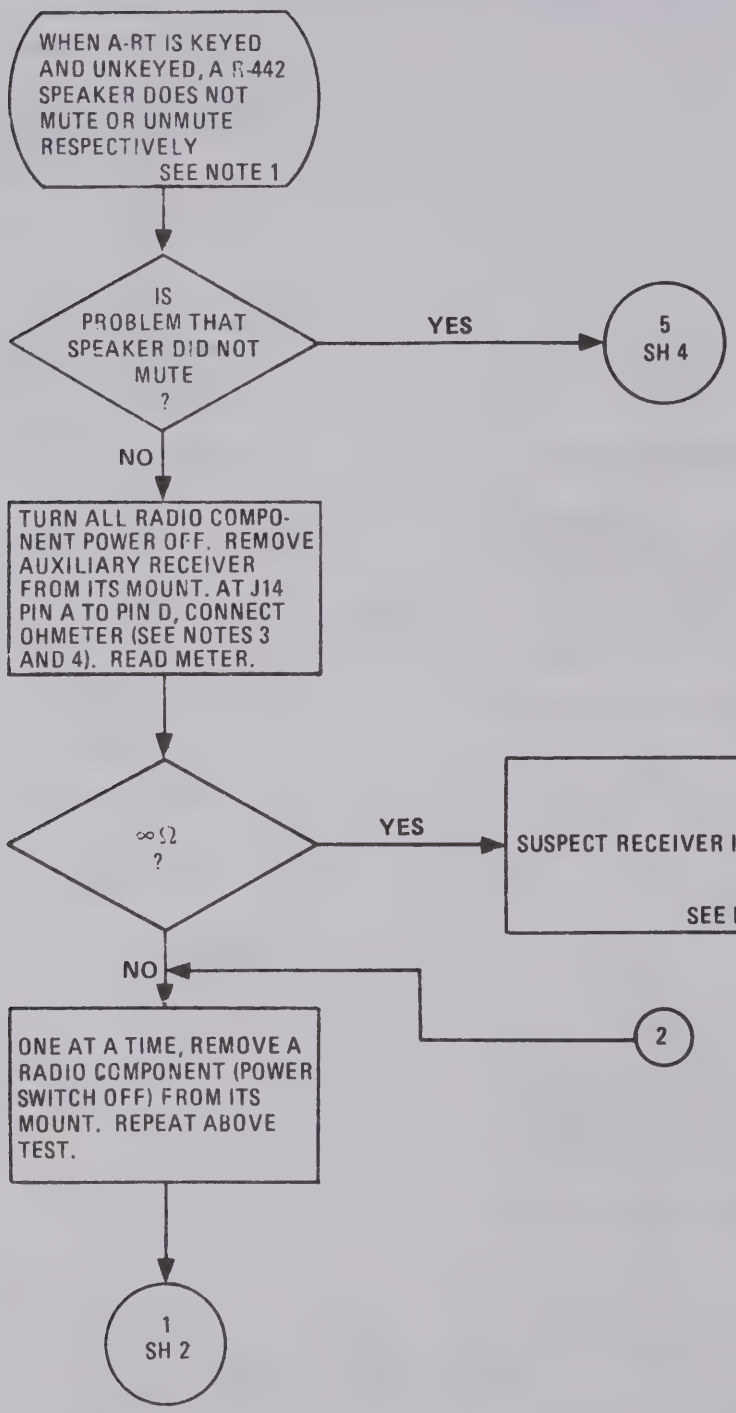
CHART 31
Troubleshoot R-442 Speaker Output Circuit (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 32

Troubleshoot A-RT'S Auxiliary Receiver Speaker Muting Circuit (Sheet 1 of 7)

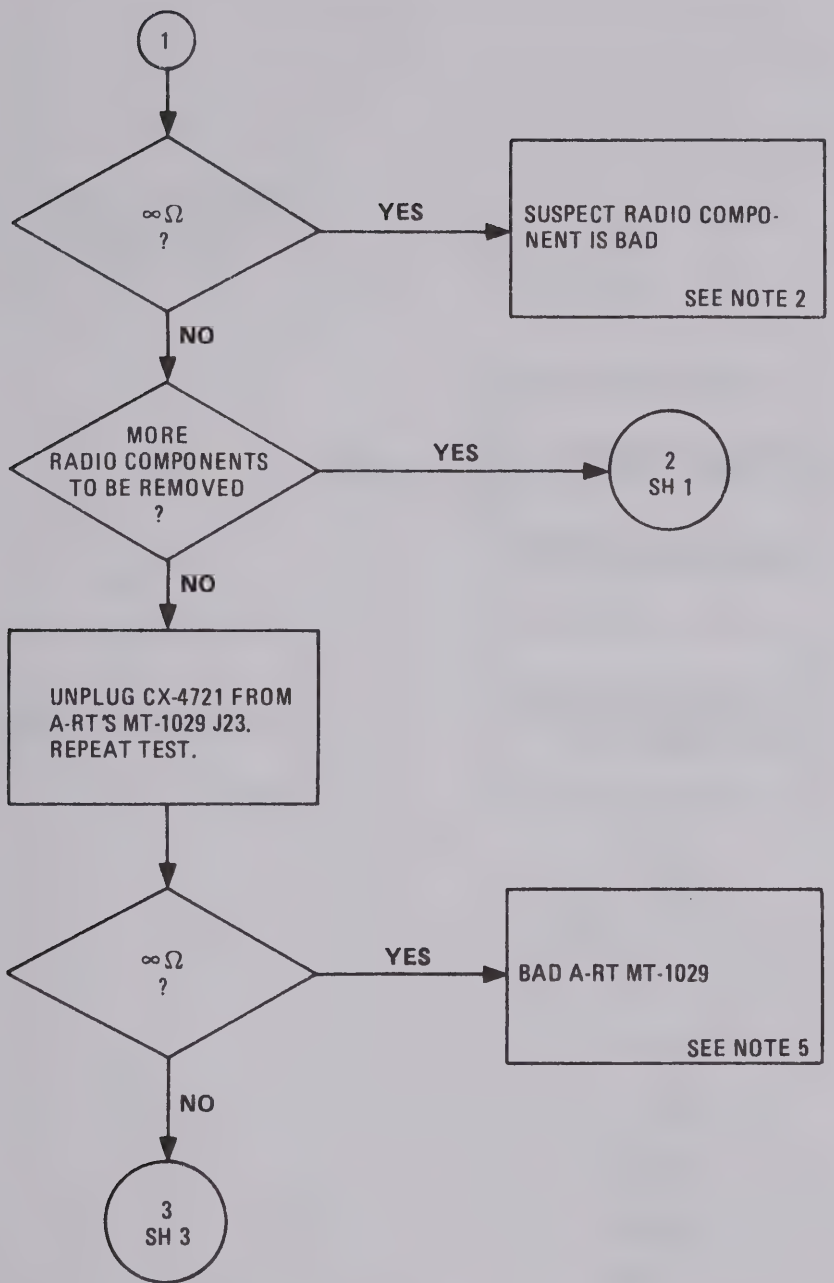


NOTES

1. Refer to FO-20 and FO-21 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. When there are both a B-and C-receiver (AN/VRC-44 and -48), connect multimeter (set up for OHMS, R x 1K) to J14 of the C-receiver's mount as prescribed by note 4.
4. Because of CR21 in A-RT's mount, positive (+) meter probe is connected to J14 pin D and negative (–) meter probe to J14 pin A. For a TS-352, "ohms" probe is negative (–) and "common" probe is positive (+).
5. Inside adverse mounts J-box check wiring from J24 (MT-1029) or J14 (MT-1898) pin D to J21 and J23 (MT-1029) or J11 and J13 (MT-1898) pin D for adverse shorts. Afterwards, see note 2.
6. When both the B- and C-receivers won't mute, check the B-receiver first. Connect multimeter (set up for OHMS, Rx 1K) to J14 of adverse receiver's mount as prescribed by note 4.
7. Inside adverse mount's J-box, check wiring from J24 (MT-1029) or J14 (MT-1898) pin D to J23 (MT-1029) or J11 and J13 (MT-1898) pin D for adverse opens. Afterwards see note 2.

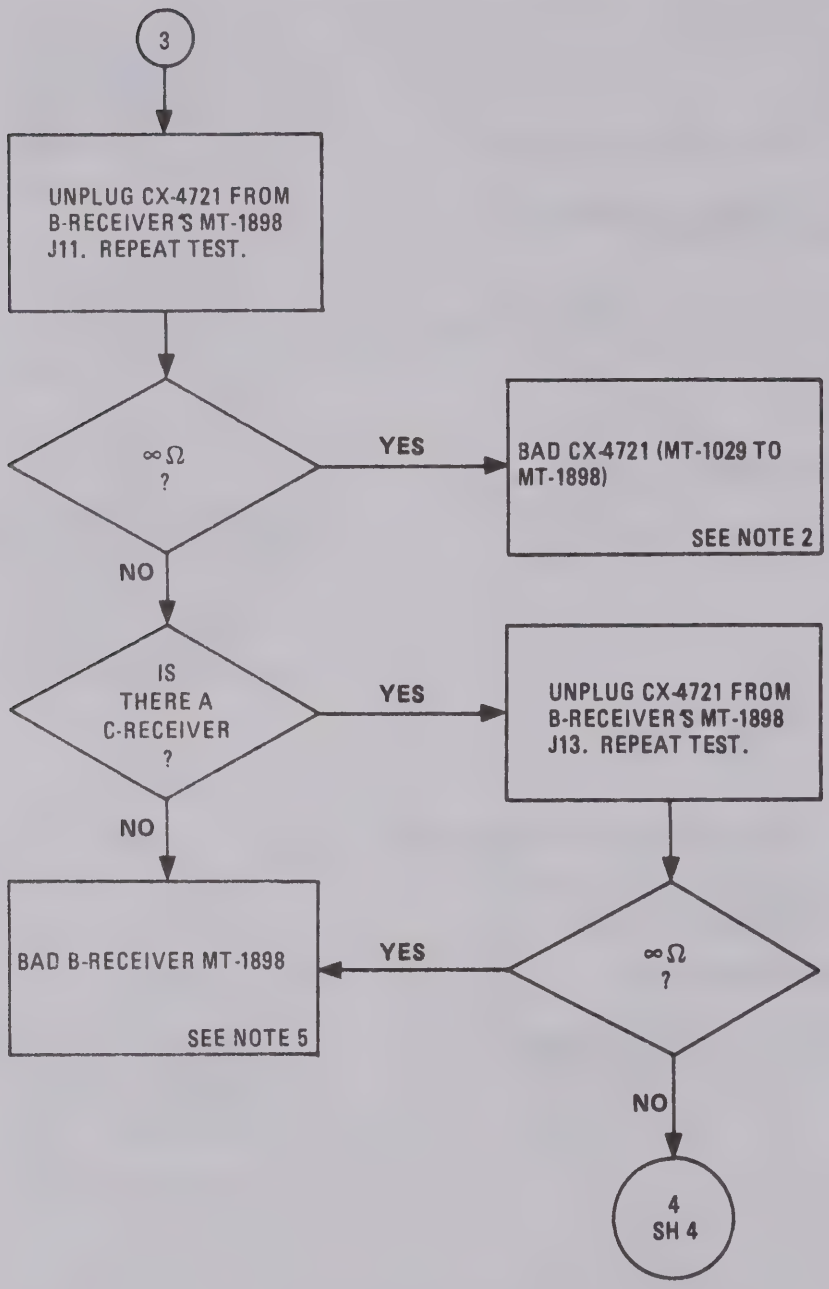
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 32
Troubleshoot A-RT'S Auxiliary Receiver Speaker Muting Circuit (Sheet 2 of 7)



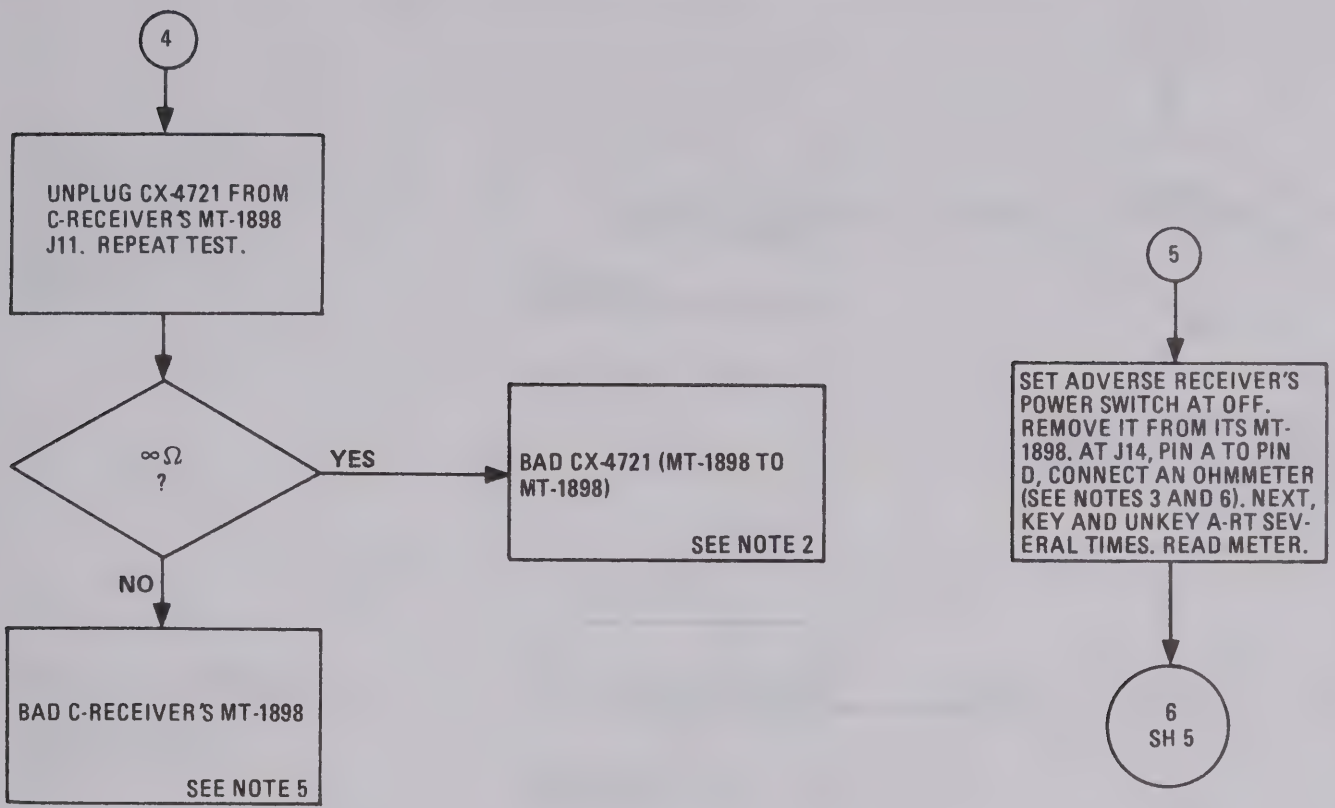
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 32
Troubleshoot A-RT'S Auxiliary Receiver Speaker Muting Circuit (Sheet 3 of 7)



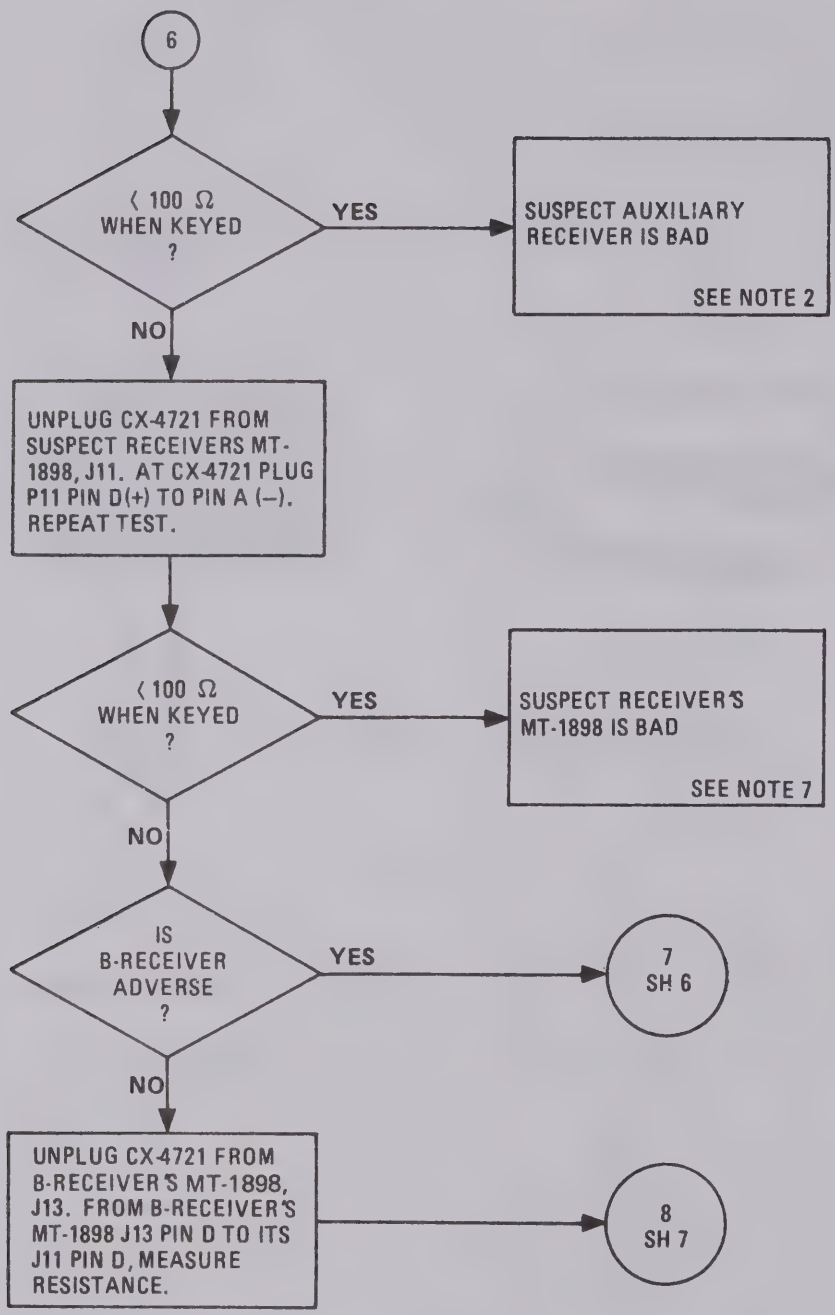
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 32
Troubleshoot A-RT'S Auxiliary Receiver Speaker Muting Circuit (Sheet 4 of 7)



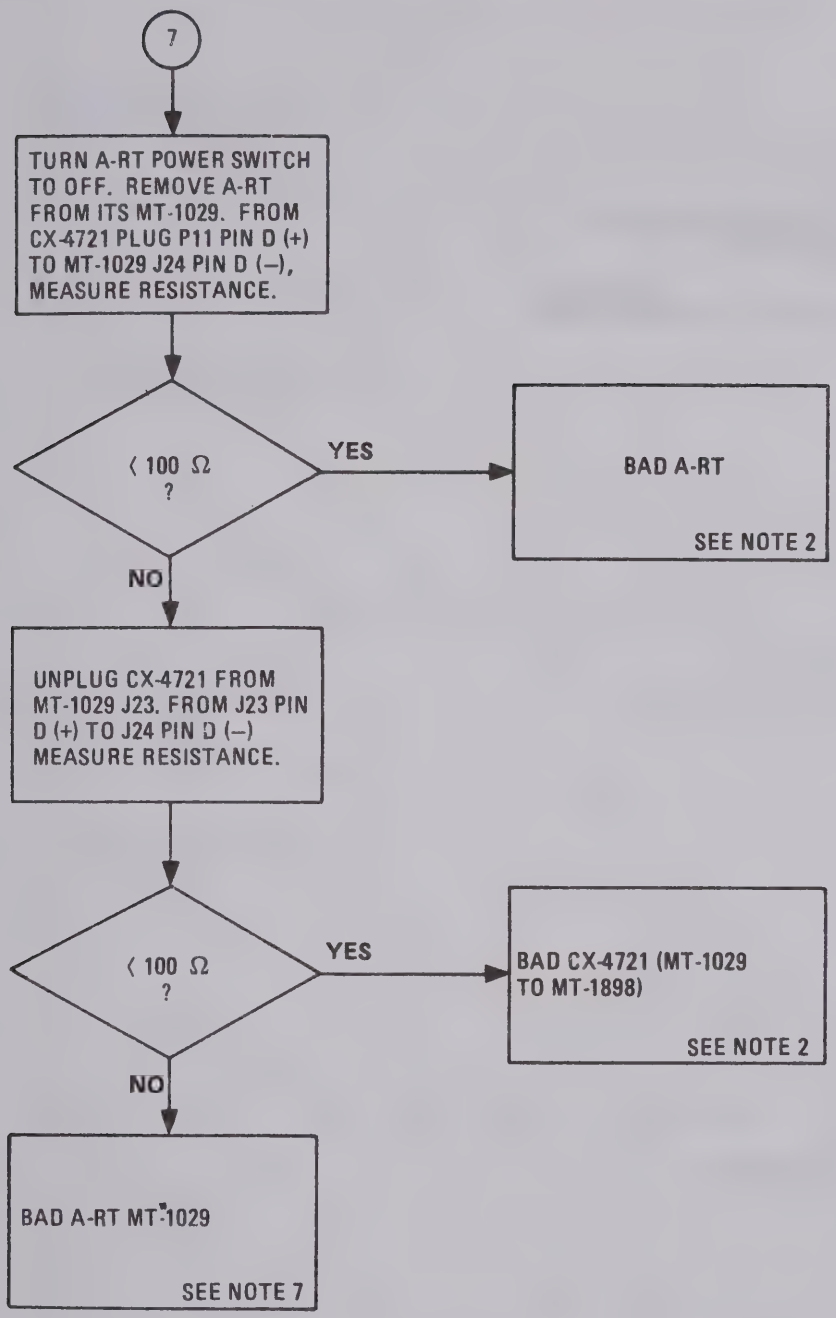
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 32
Troubleshoot A-RT'S Auxiliary Receiver Speaker Muting Circuit (Sheet 5 of 7)



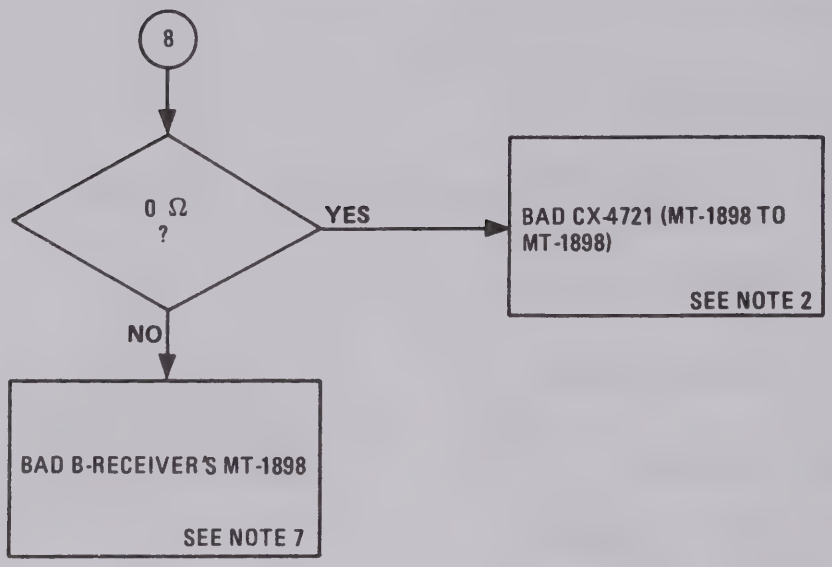
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 32
Troubleshoot A-RT'S Auxiliary Receiver Speaker Muting Circuit (Sheet 6 of 7)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

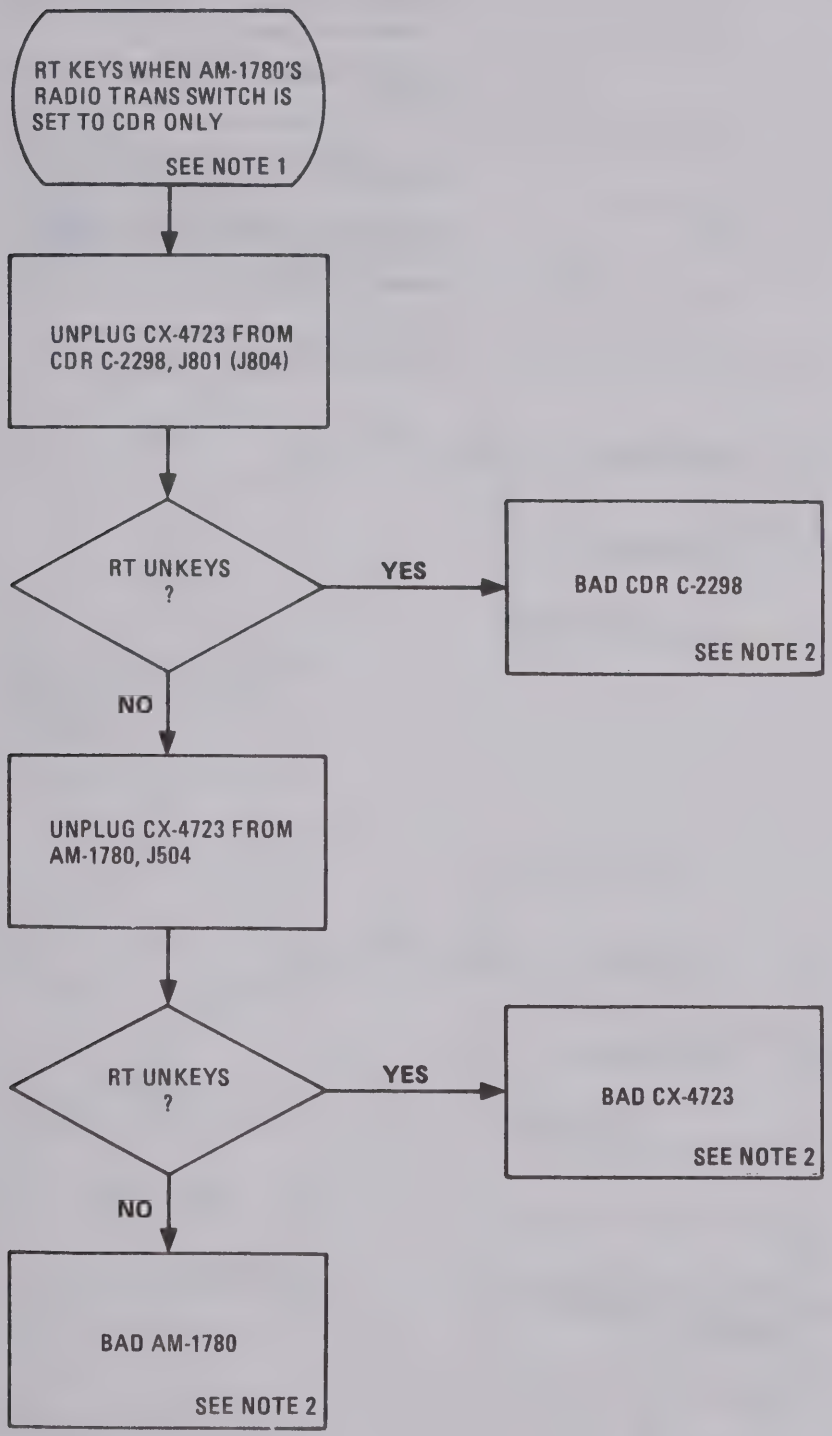
CHART 32
Troubleshoot A-RT'S Auxiliary Receiver Speaker Muting Circuit (Sheet 7 of 7)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 33

Troubleshoot RT Keying Circuit CDR Only Position of Radio Trans Switch (Adverse Short) (Sheet 1 of 1)



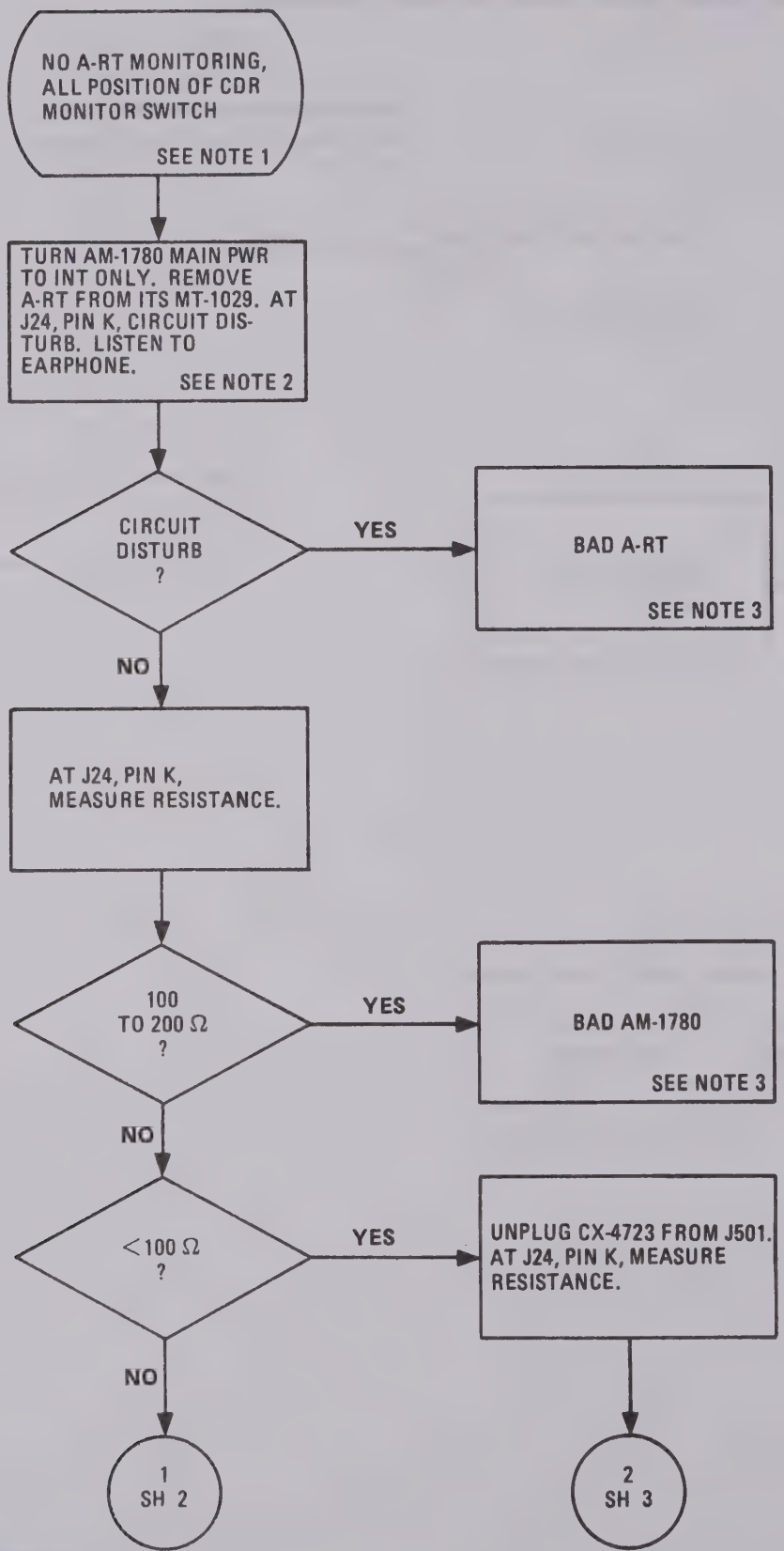
NOTES

1. Refer to FO-12 for nontanks or FO-17 for tanks in back of this manual.
2. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHAPTS. (CONT)

CHART 34

Troubleshoot A-RT Monitoring Circuit, All Position of Commander Monitor Switch (Sheet 1 of 3)



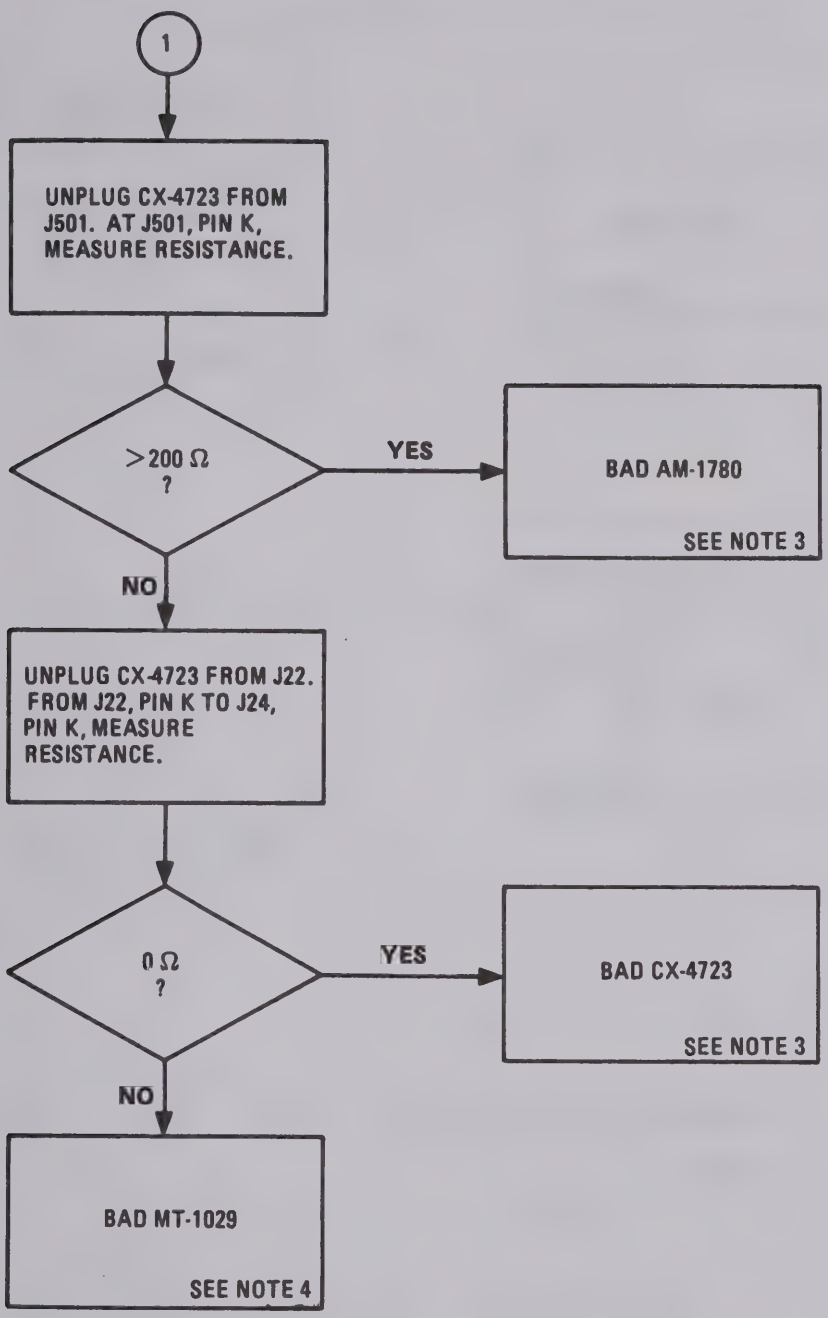
NOTES

1. Refer to FO-8 for nontanks or FO-15 for tanks in back of this manual.
2. Set up multimeter as an ohmmeter to do circuit disturb.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1029. Check J-box inside wiring for continuity at J24, pin K to J22, pin K. Replace mount if not repairable.
5. Bad MT-1029. Check J-box inside wiring for shorts, J24 and J22 pin K to other pins.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 34

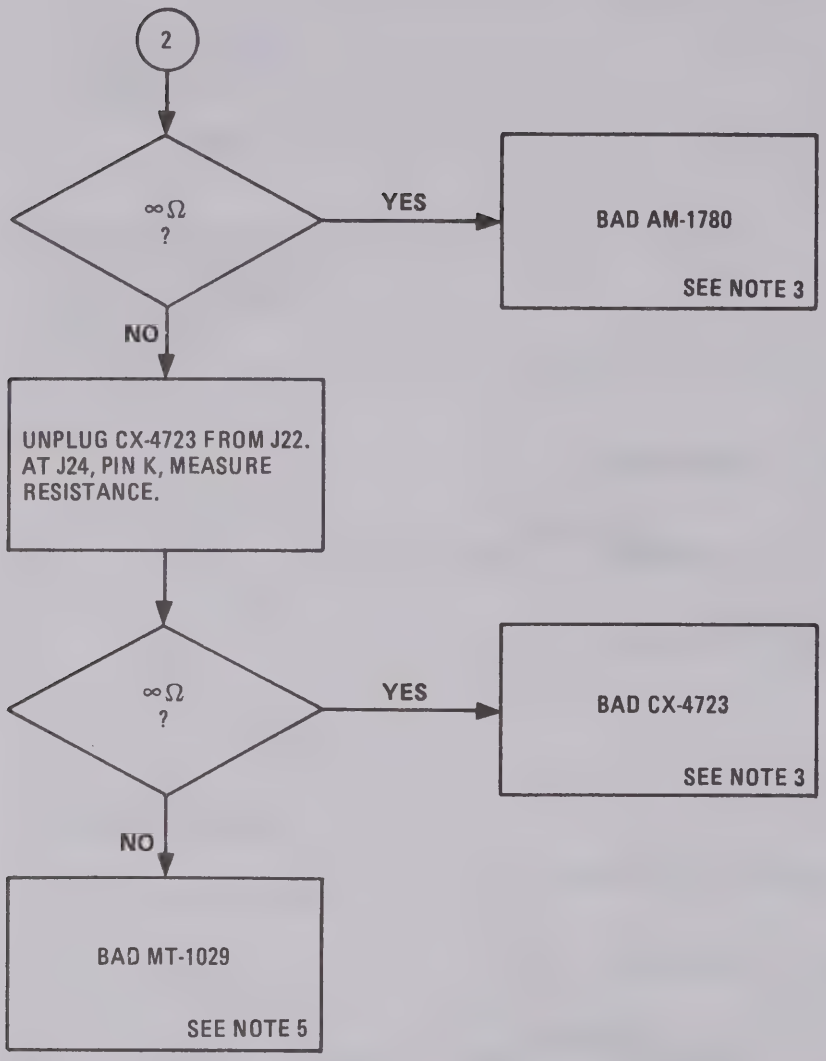
Troubleshoot A-RT Monitoring Circuit, All Position of Commander Monitor Switch (Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

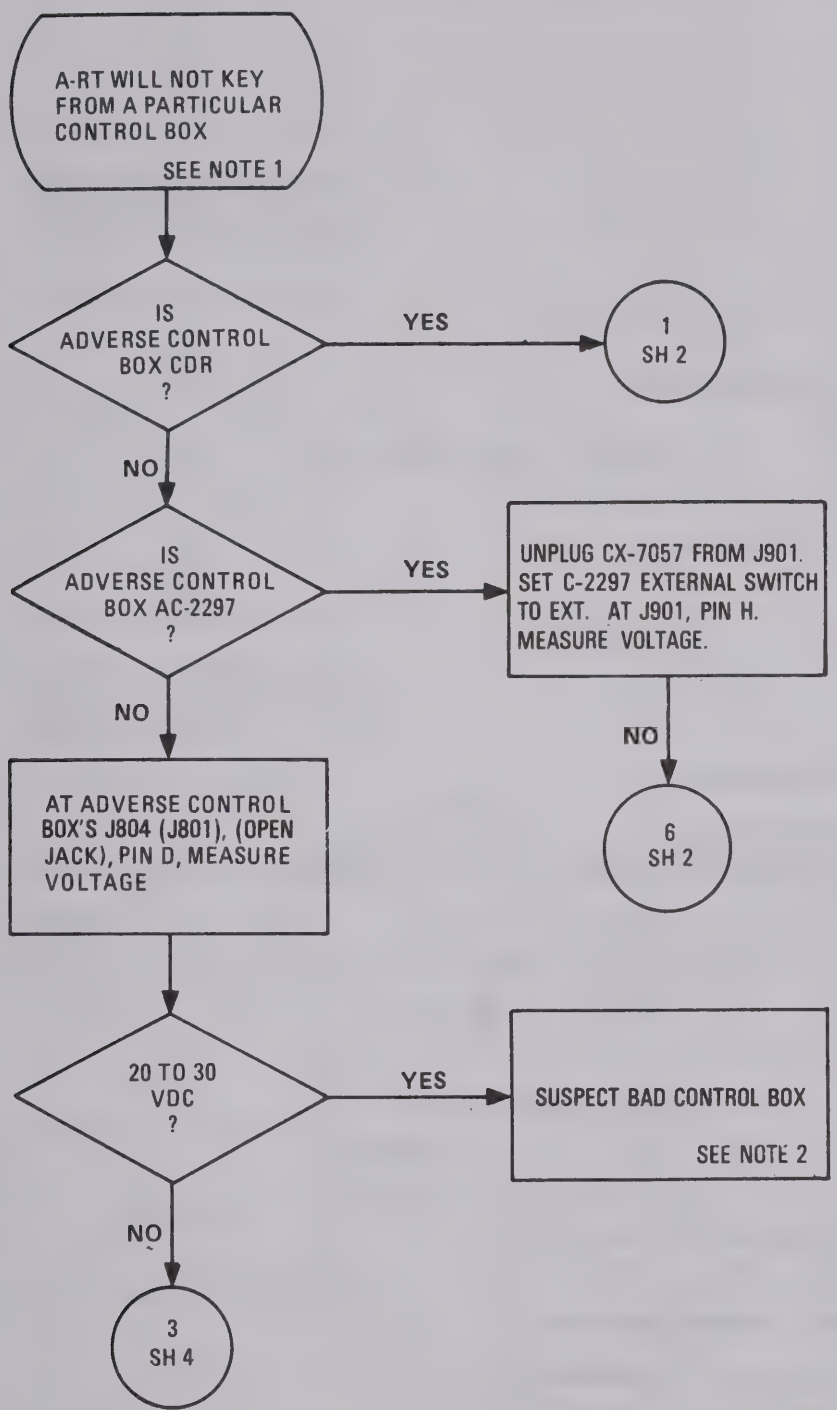
CHART 34

Troubleshoot A-RT Monitoring Circuit, All Position of Commander Monitor Switch (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 35
Troubleshoot A-RT Keying Circuit (Adverse When Monitor Switch At All) (Sheet 1 of 6)



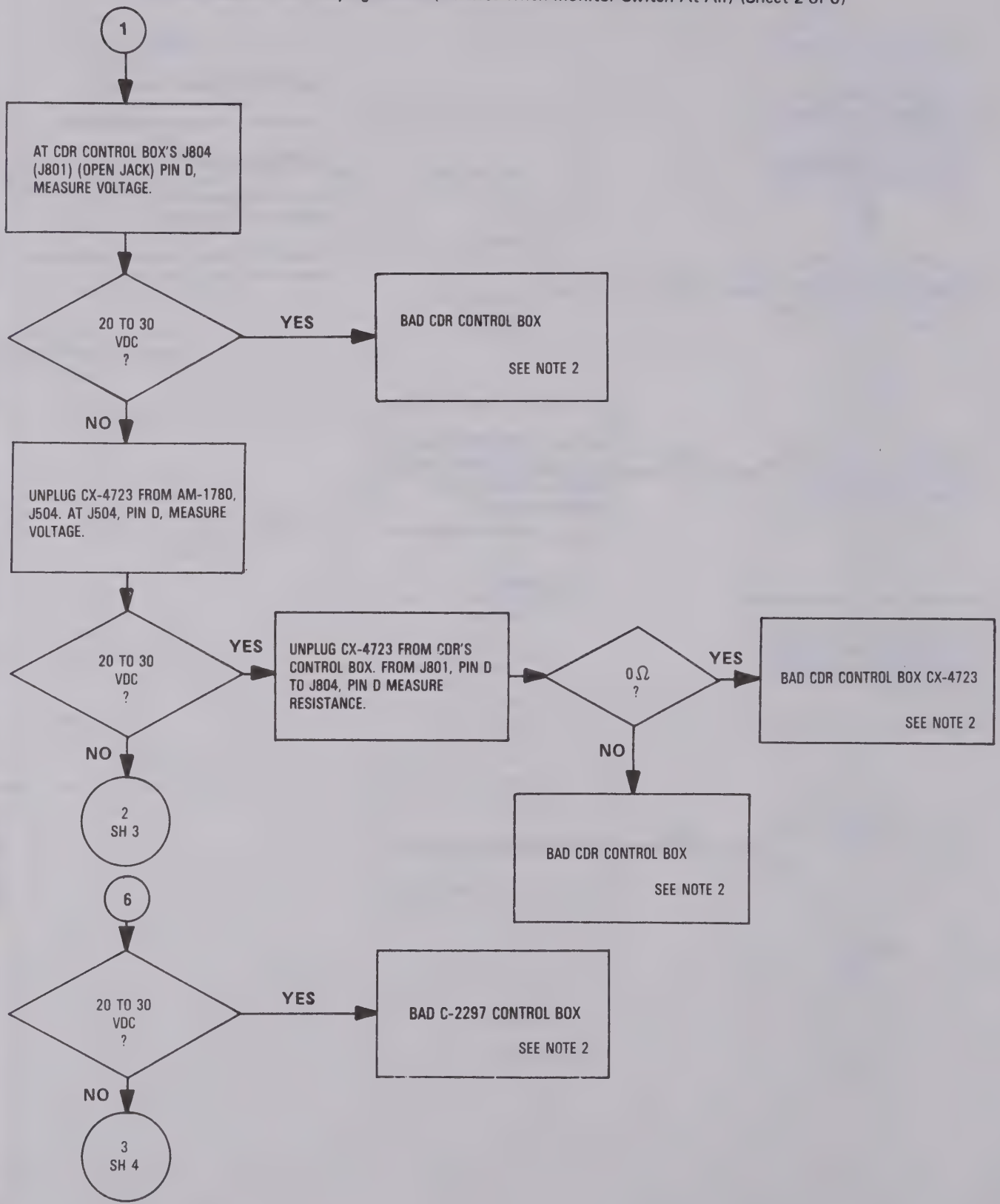
NOTES

1. Refer to FO-12 in back of this manual.
2. Fix or replace and return to operational check.
3. Refer to a higher level of maintenance.
4. Any open jack position J504, J505, J506, or J507 will do for this measurement.
5. Bad MT-1029. Check J-box inside wiring for continuity of J22, pin S to J24, pin H.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

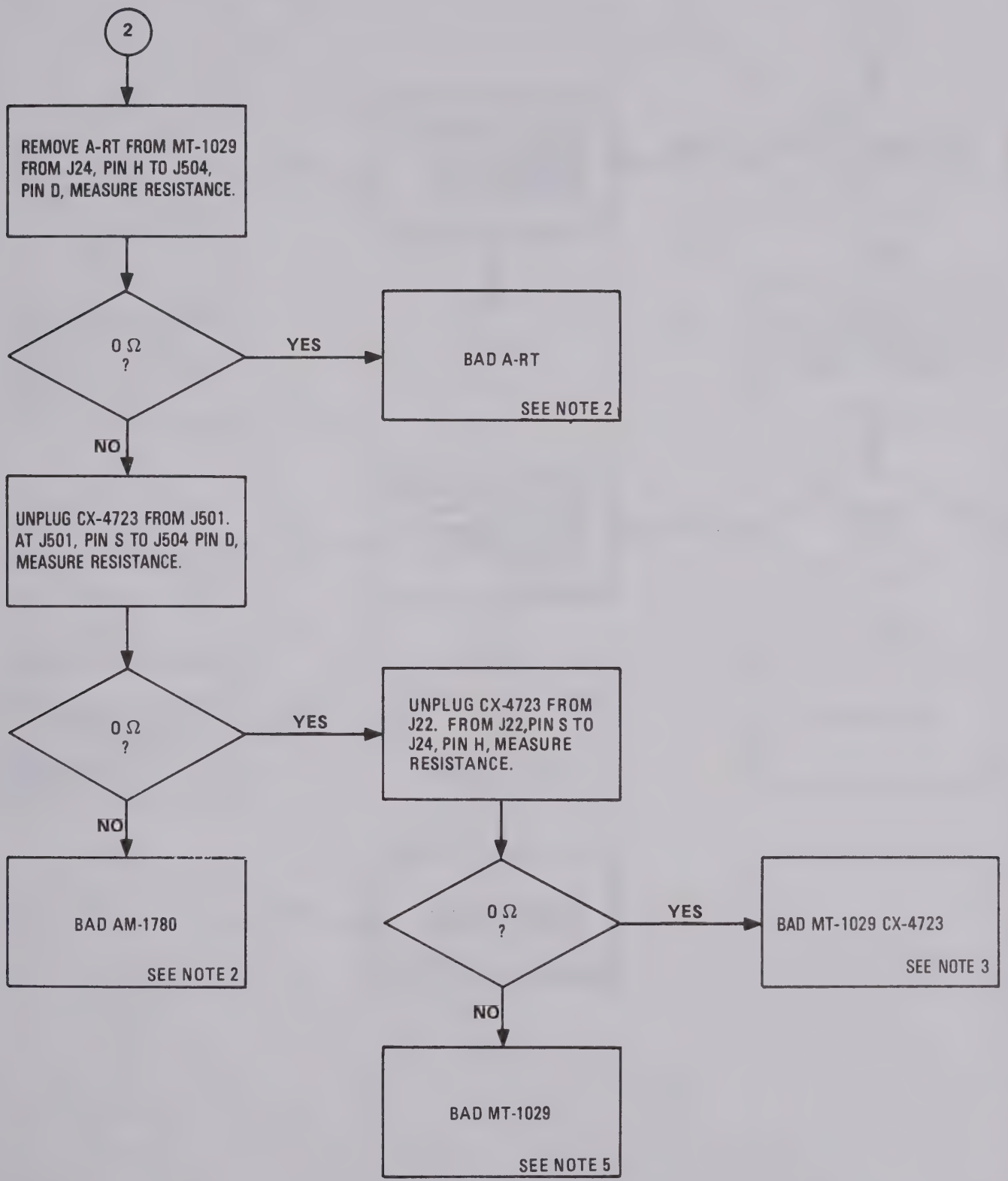
CHART 35

Troubleshoot A-RT Keying Circuit (Adverse When Monitor Switch At All) (Sheet 2 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

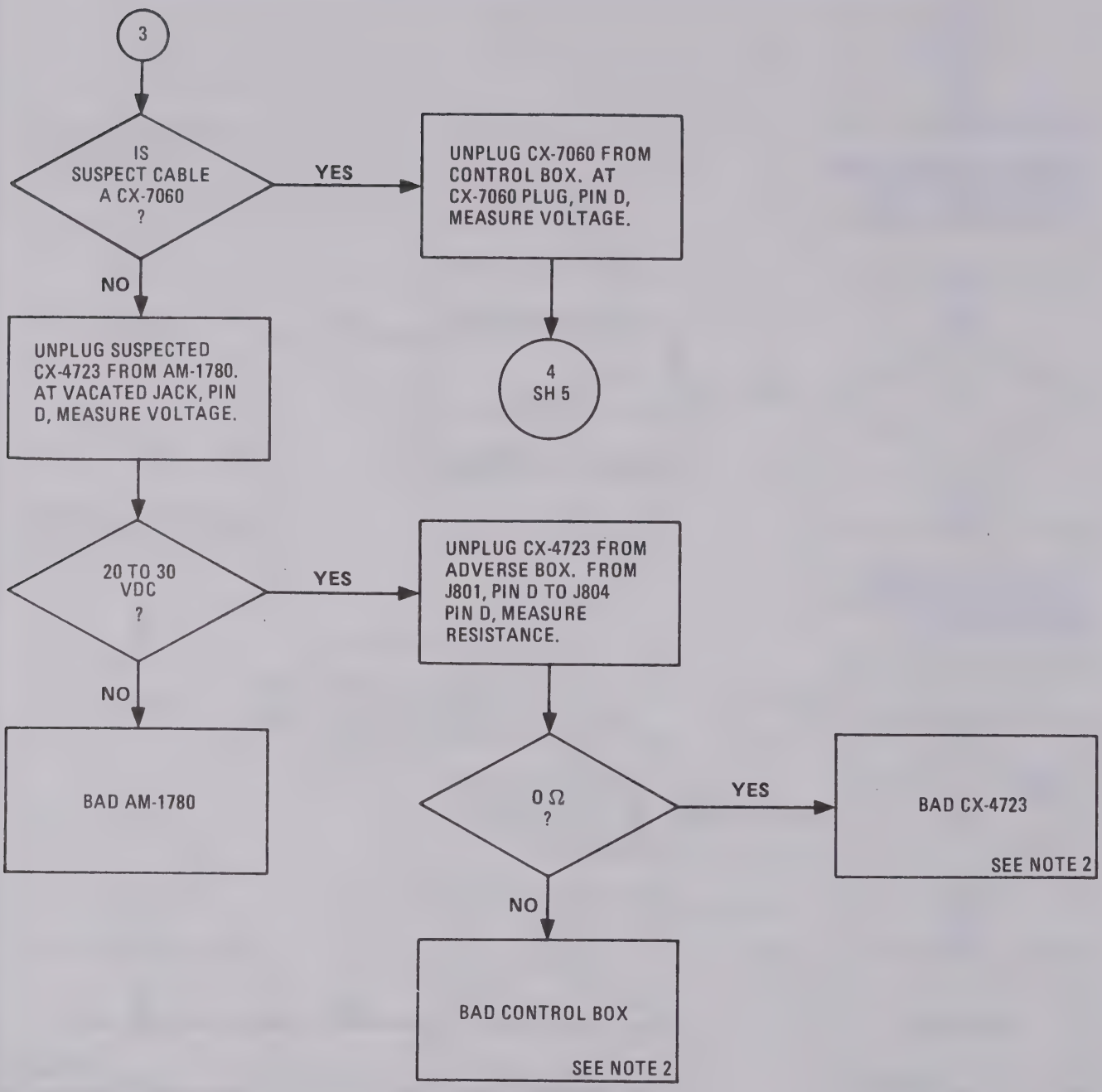
CHART 35
Troubleshoot A-RT Keying Circuit (Adverse When Monitor Switch At All) (Sheet 3 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 35

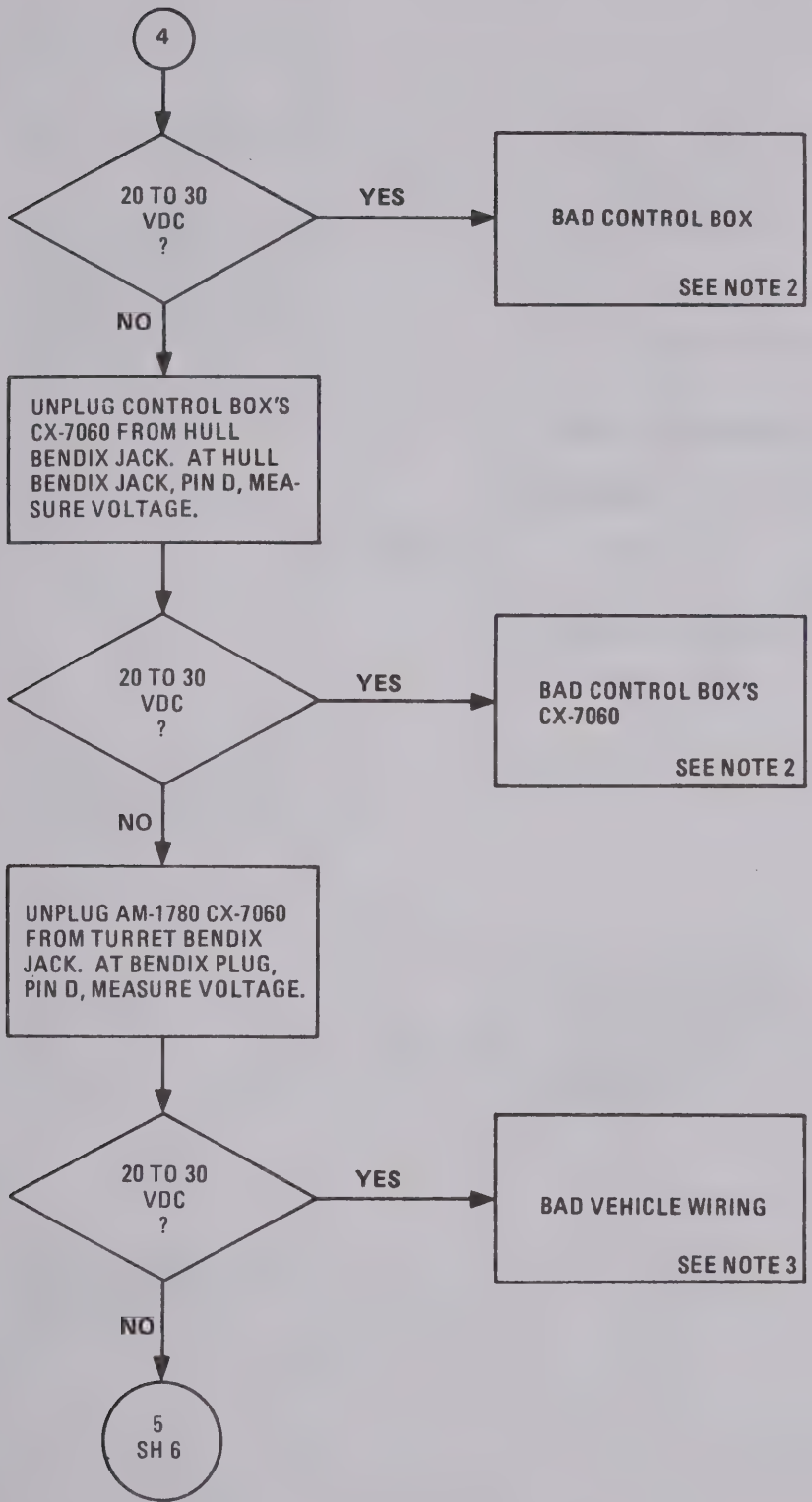
Troubleshoot A-RT Keying Circuit (Adverse When Monitor Switch At ALL) (Sheet 4 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 35

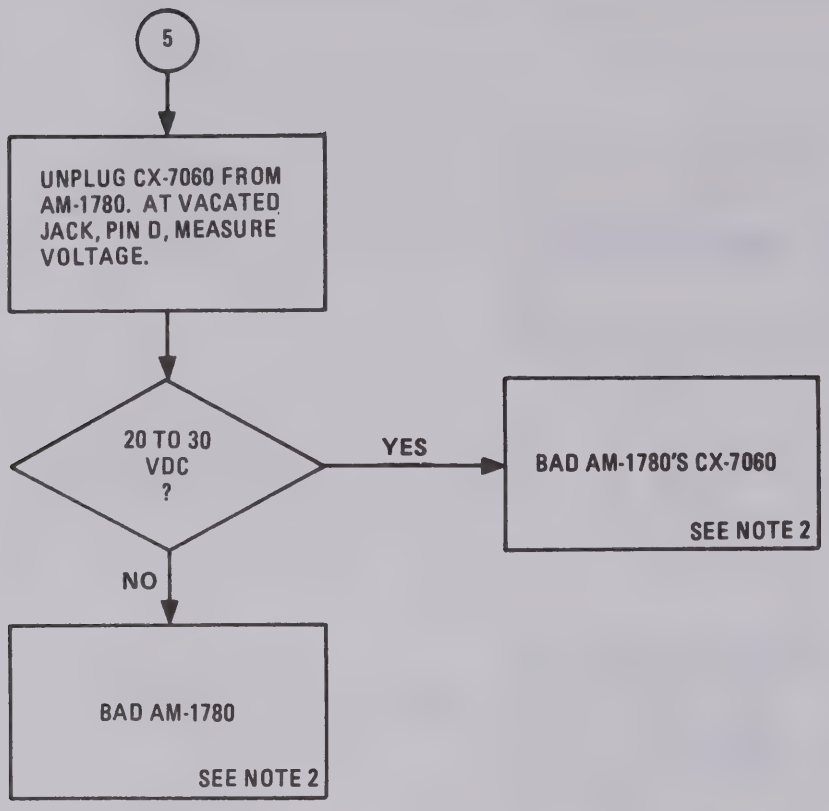
Troubleshoot A-RT Keying Circuit (Adverse When Monitor Switch At All) (Sheet 5 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

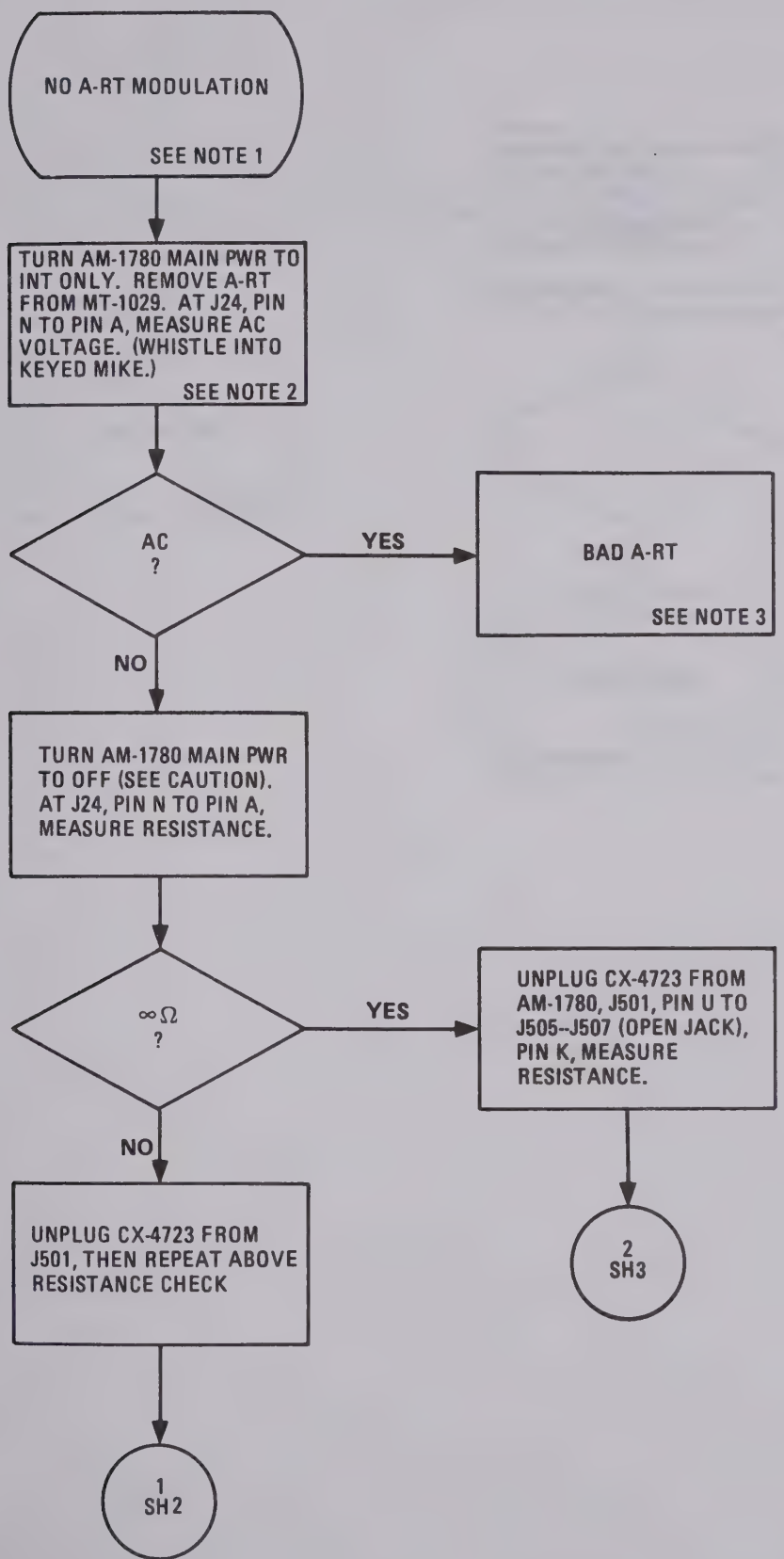
CHART 35

Troubleshoot A-RT Keying Circuit (Adverse When Monitor Switch At All) (Sheet 6 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 36
Troubleshoot A-RT Modulation Circuit (Sheet 1 of 3)



NOTES

1. Refer to FO-12 for nontanks or FO-17 for tanks in back of this manual.
2. Set up multimeter as an AC voltmeter (lowest range). Connect meter probes between signal line (test point) and chassis ground, then key mike and note reading. Next, sharply whistle into mike and look to see if reading changes. An increase in AC voltage indicates the presence of the talk signal. (Reading is <1 volt.)
3. Fix or replace and return to operational check at this time.

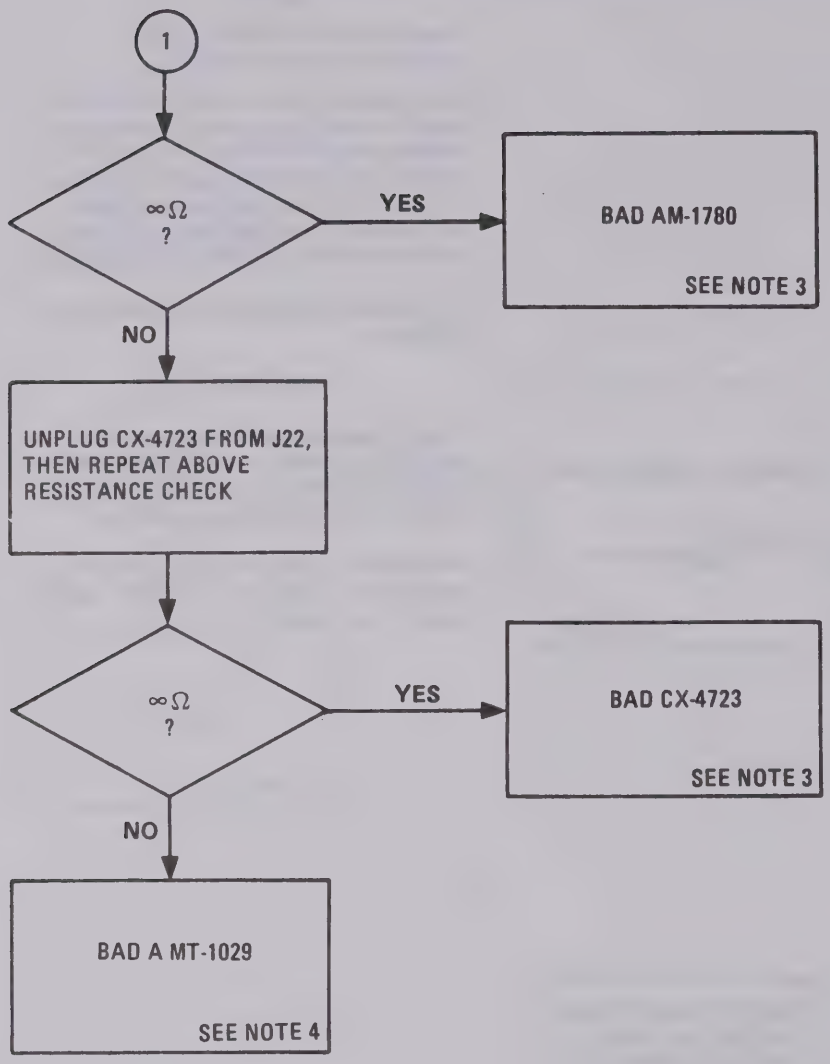
CAUTION

To guard against equipment damage when making measurements on circuits with power applied, make sure proper pins are selected and meter probes do not touch together.

4. Bad MT-1029. Check J-box inside wiring for continuity at J22, pin U to J24, pin N. Replace mount if not repairable.

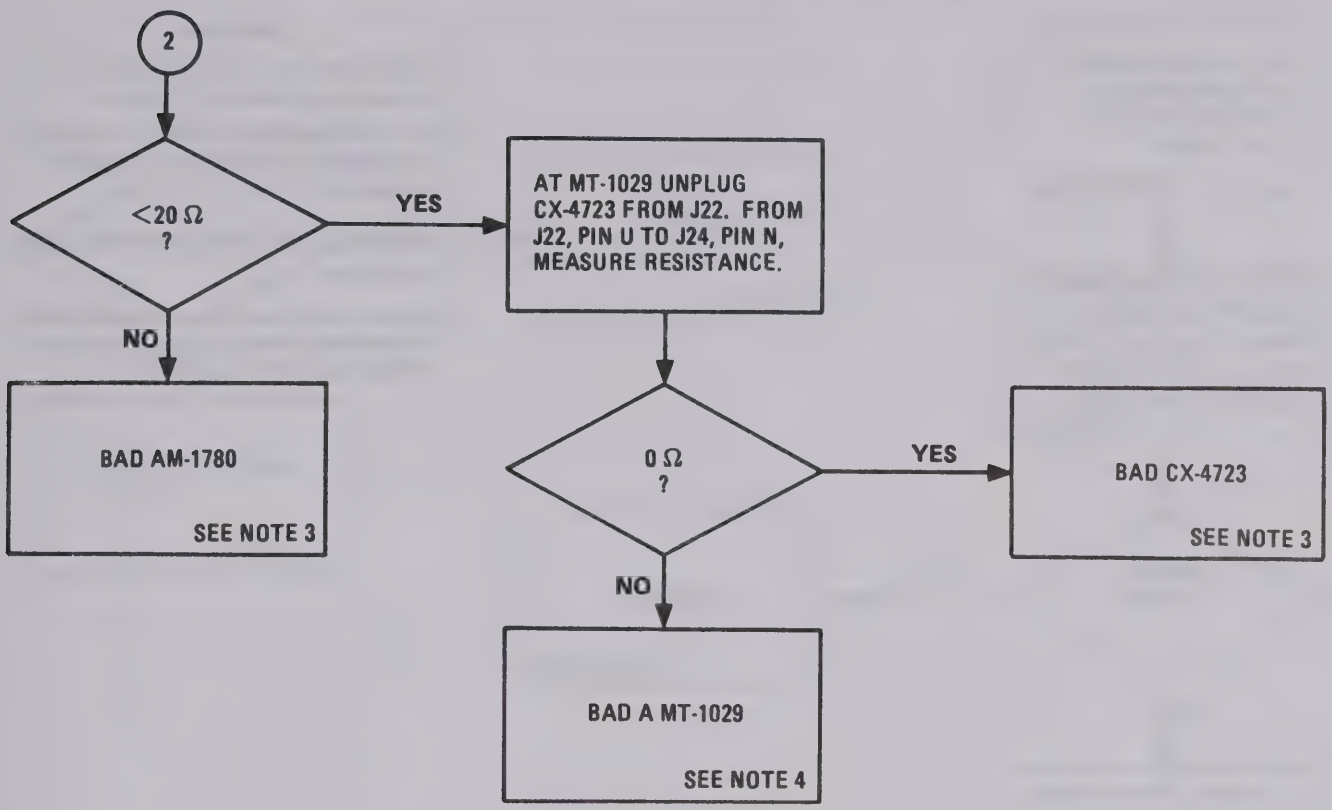
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 36
Troubleshoot A-RT Modulation Circuit (Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

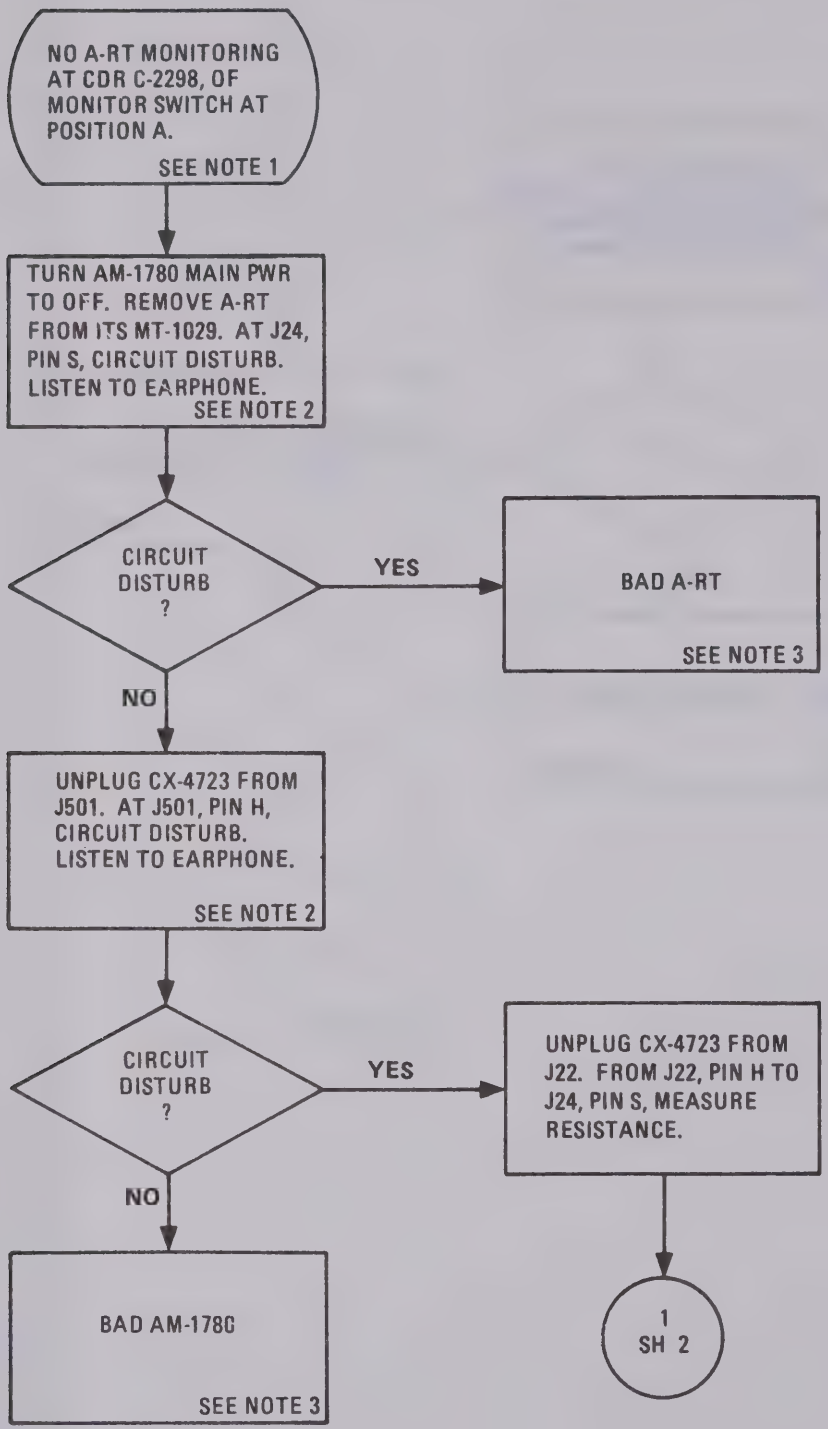
CHART 36
Troubleshoot A-RT Modulation Circuit (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 37

Troubleshoot A-RT Monitoring Circuit, A-Position of CDR Monitor Switch (Sheet 1 of 2)

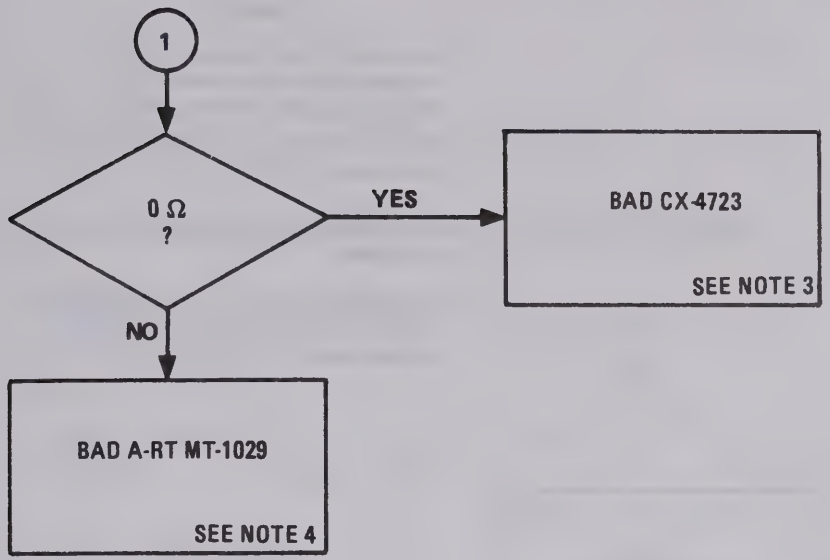


NOTES

1. Refer to FO-12 for nontanks or FO-17 for tanks in the back of this manual.
2. Set up multimeter as an ohmmeter to perform circuit disturb, RX10. Earphone should be connected to CDR box's RAD jack.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1029. Check J-box and inside wiring for continuity from J22, pin H to J24, pin S. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

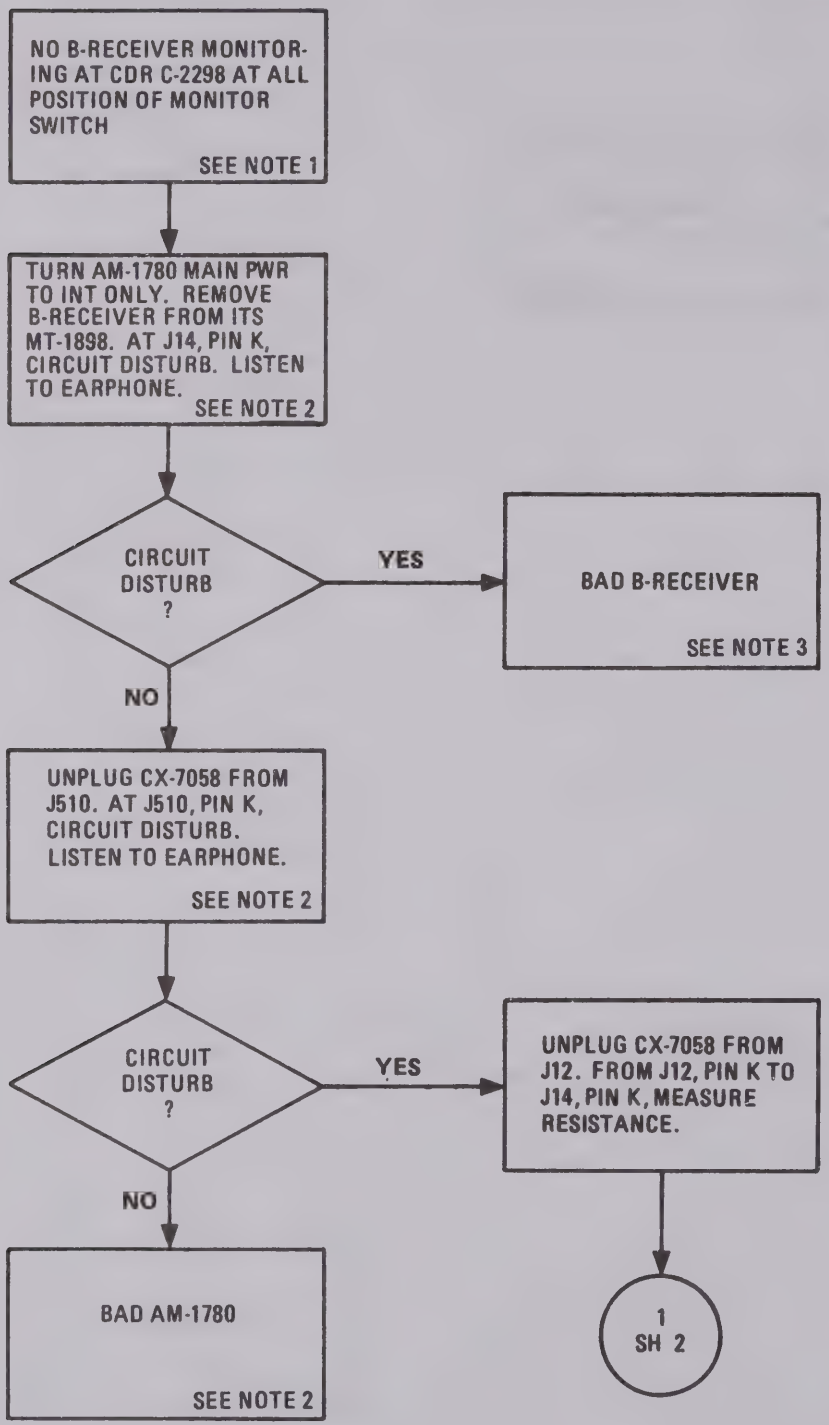
CHART 37
Troubleshoot A-RT Monitoring Circuit, A-Position of CDR Monitor Switch (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 38

Troubleshoot B-Receiver Monitoring Circuit All Position of Monitor Switch (Sheet 1 of 2)

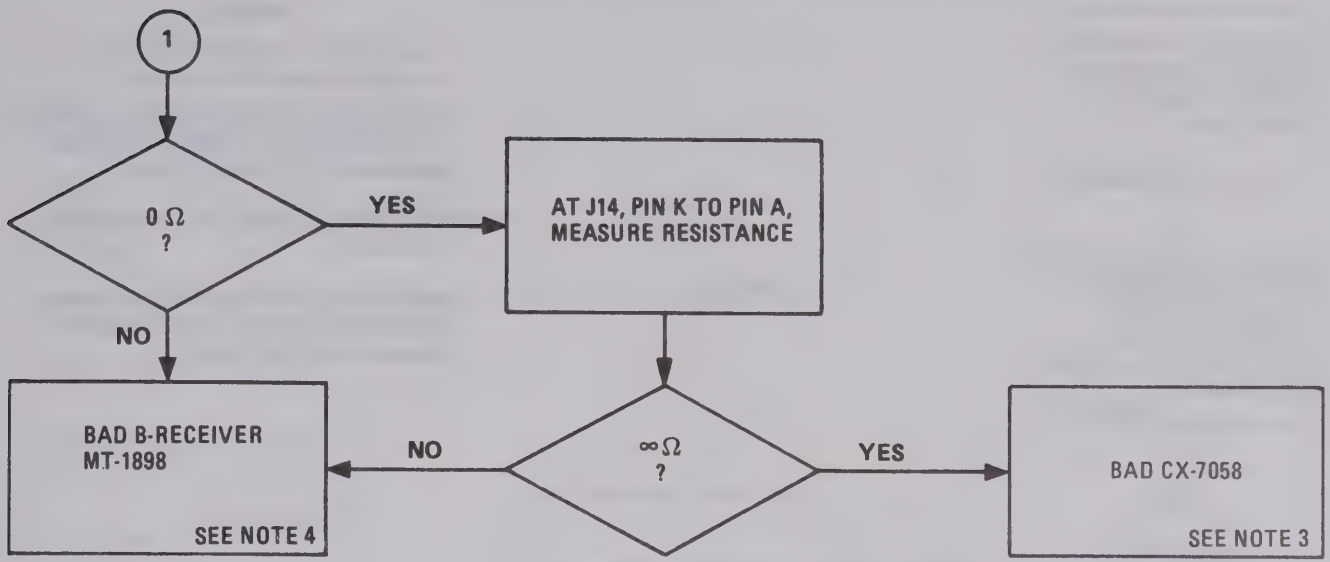


NOTES

1. Refer to FO-10 for nontanks or FO-16 for tanks in back of this manual for B-receiver muted monitoring wiring schematic.
2. Set up multimeter as an ohmmeter to perform circuit disturb, RX10.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1898. Check J-box and inside wiring for continuity from J12,pin K to J14,pin K. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

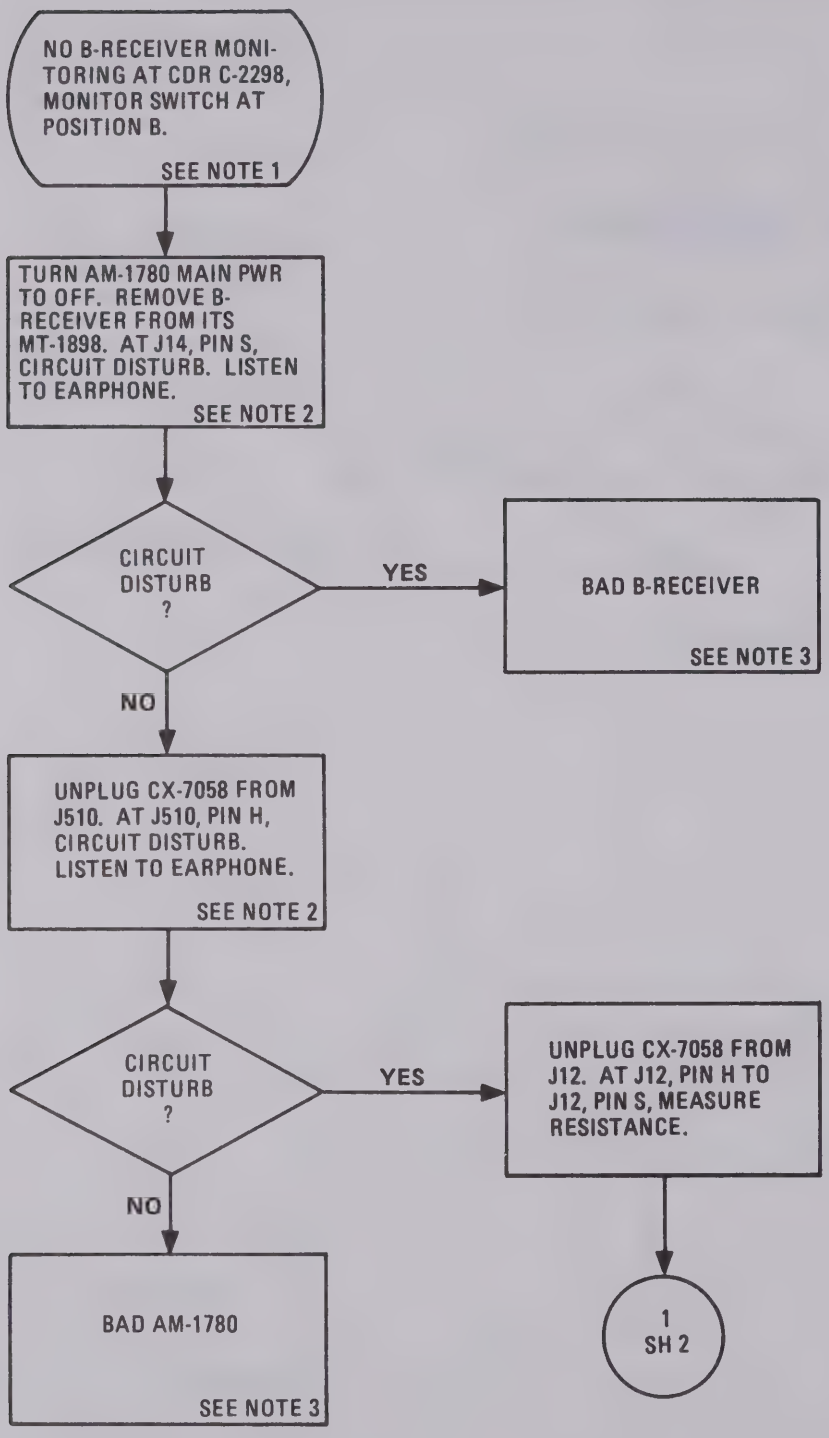
CHART 38
Troubleshoot B-Receiver Monitoring Circuit All Position of Monitor Switch (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 39

Troubleshoot B-Receiver Monitoring Circuit, B-Position of the Monitor Switch (Sheet 1 of 2)



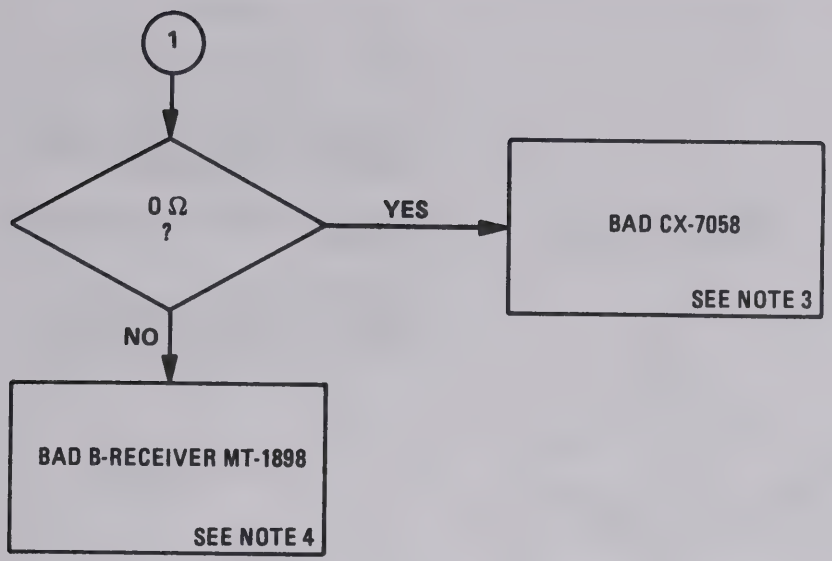
NOTES

1. Refer to FO-10 for nontanks or FO-16 for tanks in back of this manual.
2. Set up multimeter as an ohmmeter to perform circuit disturb, RX10. Earphone should be connected to CDR box's RAD jack.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1898. Check J-box and inside wiring for continuity from J12, pin H to J14, pin S. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 39

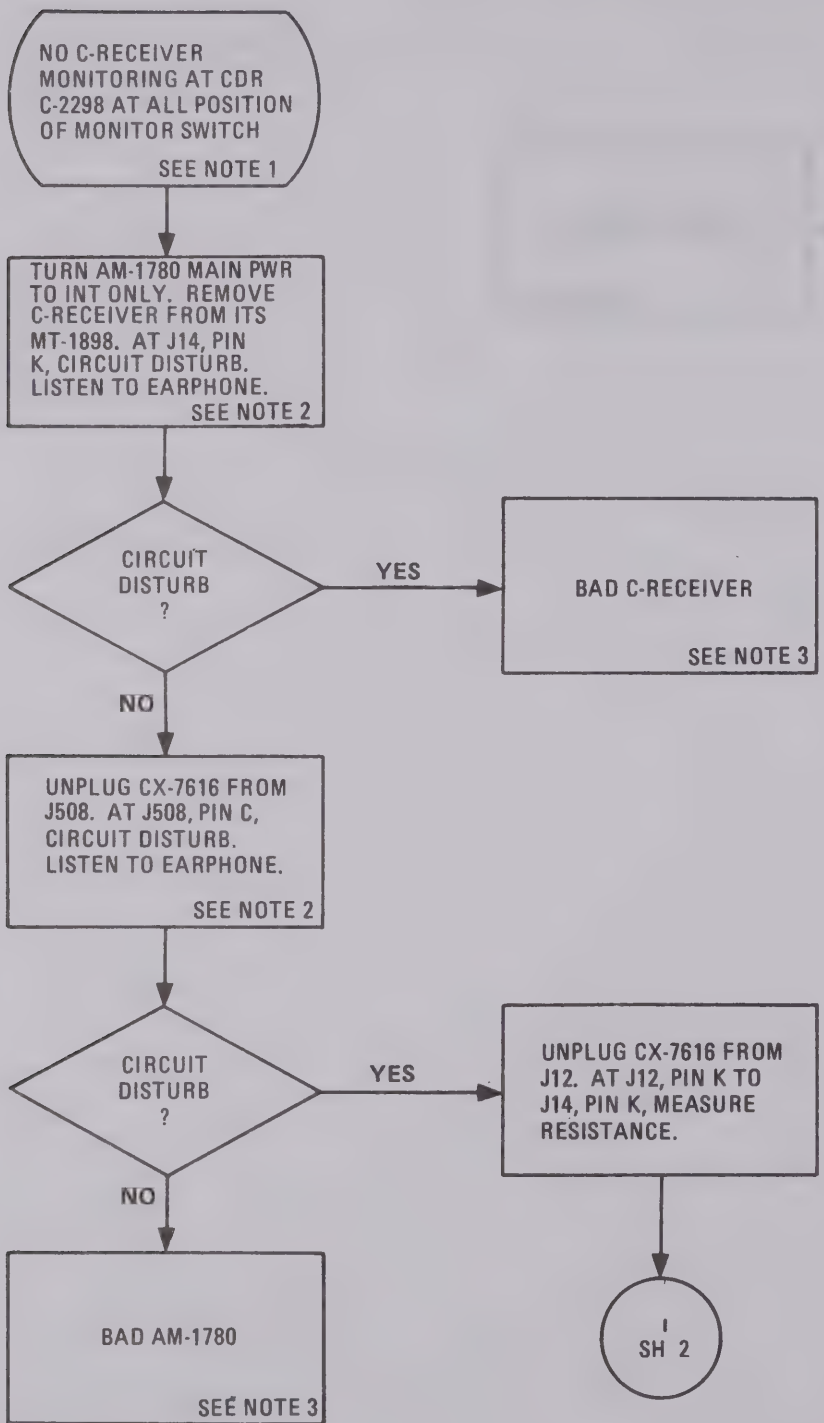
Troubleshoot B-Receiver Monitoring Circuit, B-Position of the Monitor Switch (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 40

Troubleshoot C-Receiver Monitoring Circuit, All Position of CDR Monitor Switch (Sheet 1 of 2)



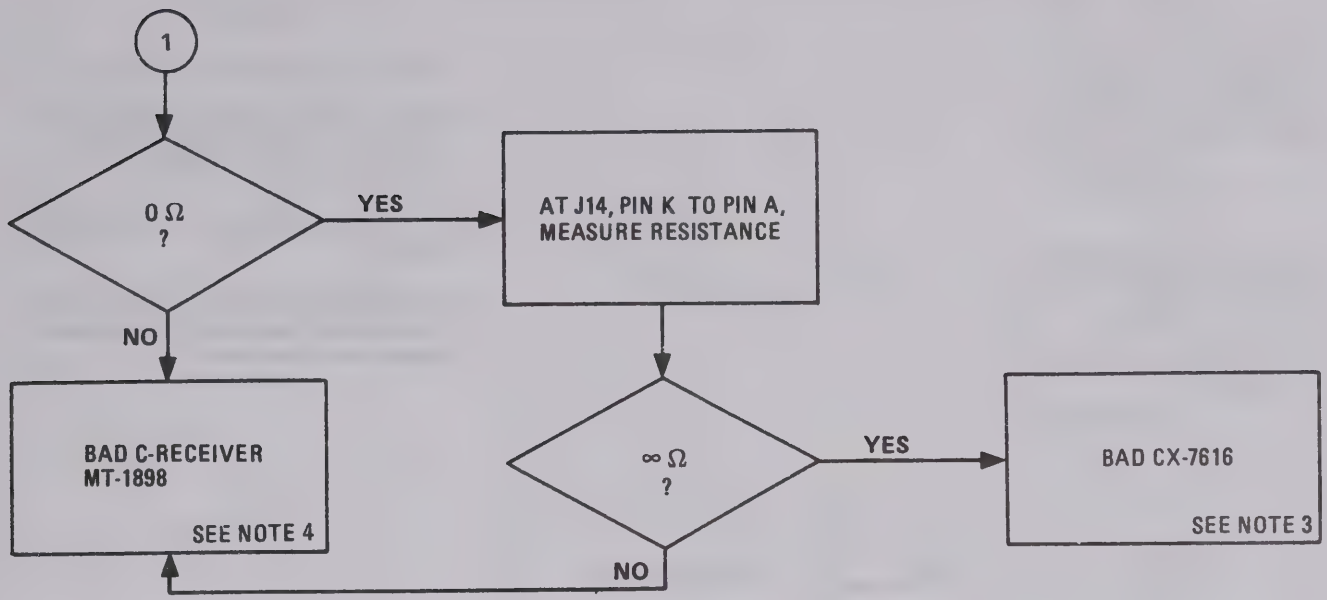
NOTES

1. Refer to FO-11 in back of this manual.
2. Set up multimeter as an ohmmeter to perform circuit disturb, RX10. Earphone should be connected to CDR's RAD jack.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1898. Check J-box and inside wiring for continuity from J12, pin K to J14, pin K. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 40

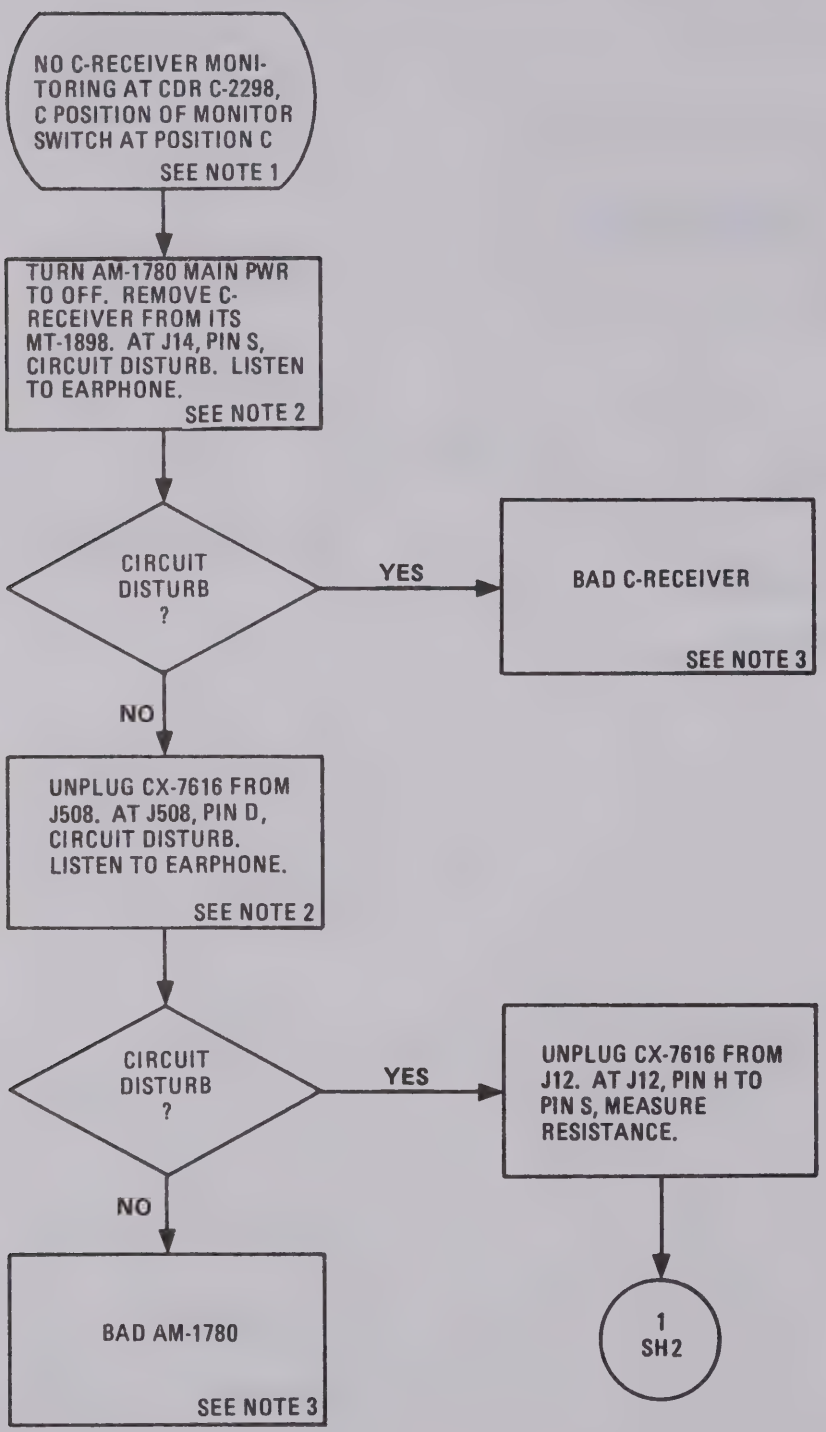
Troubleshoot C-Receiver Monitoring Circuit, All Position of CDR Monitor Switch (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 41

Troubleshoot C-Receiver Monitoring Circuit, C-Position of CDR Monitor Switch (Sheet 1 of 2)

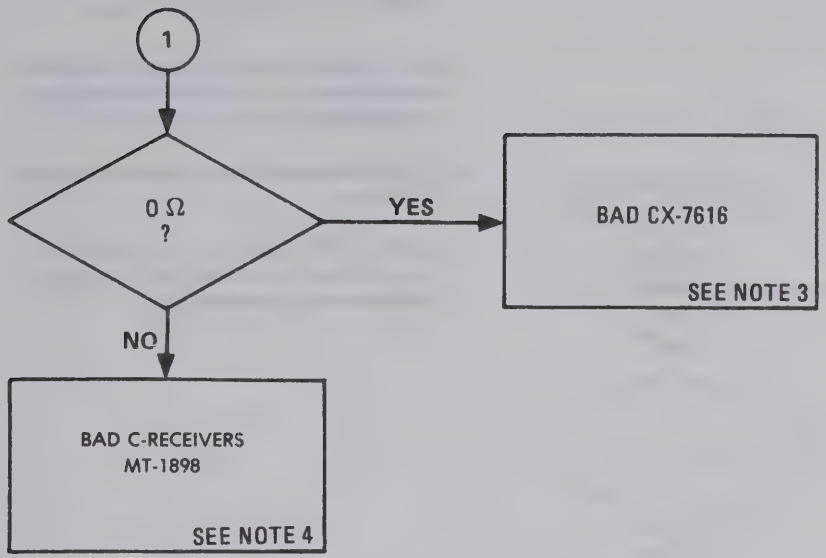


NOTES

1. Refer to FO-11 in back of this manual.
2. Set up multimeter as an ohmmeter to perform circuit disturb, RX10. Earphone should be connected to CDR box's RAD jack.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1898. Check J-box and inside wiring for continuity, from J22, pin H to J24, pin S. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

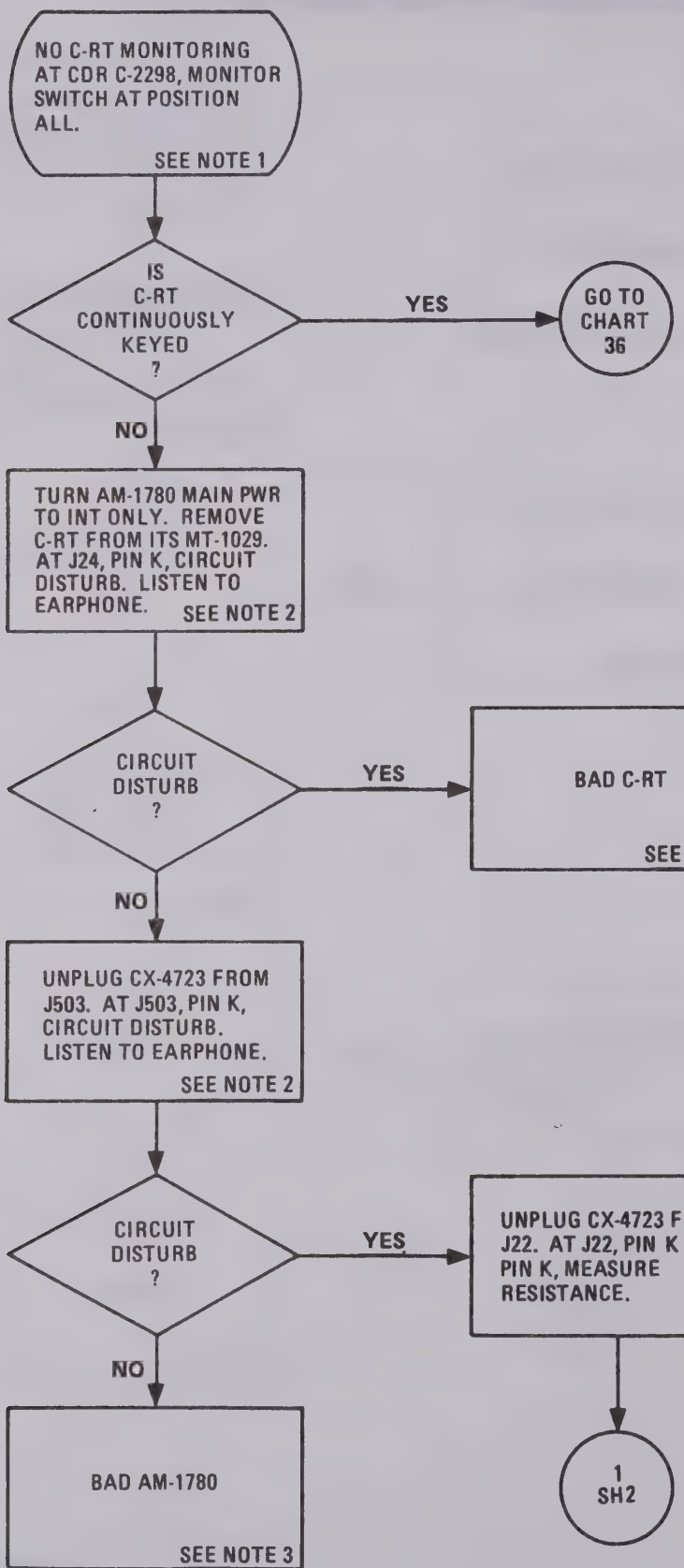
CHART 41
Troubleshoot C-Receiver Monitoring Circuit, C-Position of CDR Monitor Switch (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 42

Troubleshoot C-RT Monitoring Circuit, All Position of CDR Monitor Switch (Sheet 1 of 2)

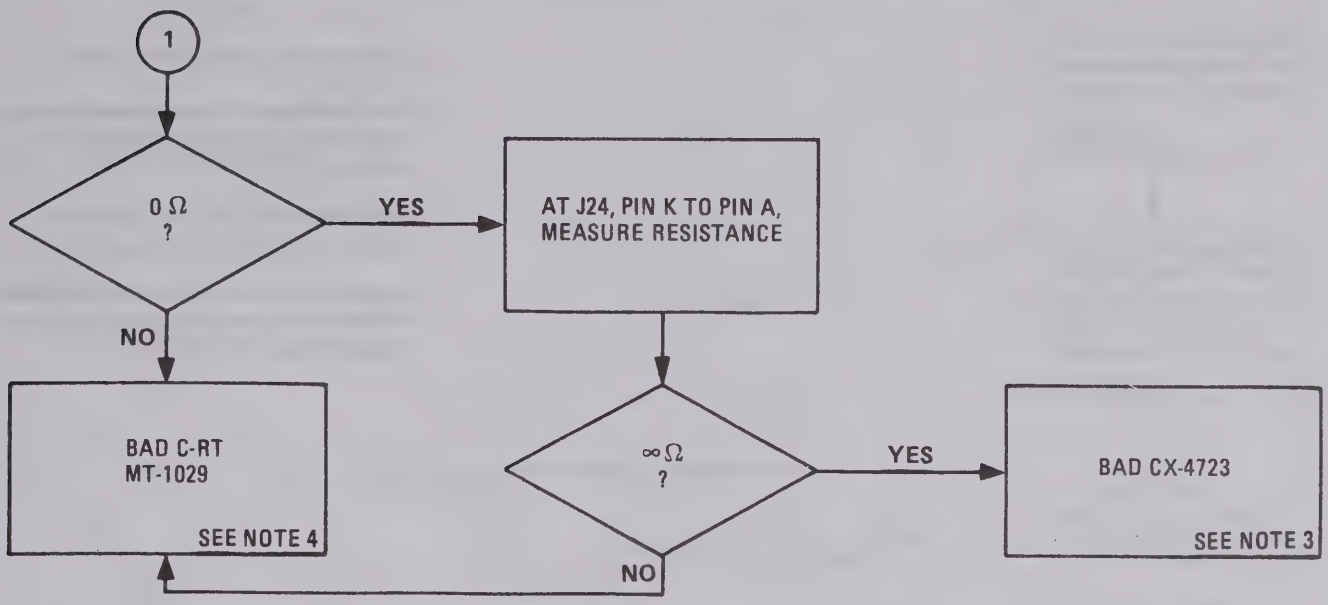


NOTES

1. Refer to FO-9 in back of this manual.
2. Set up multimeter as an ohmmeter to perform circuit disturb, RX10. Earphone should be connected to CDR box's RAD jack.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1029. Check J-box and inside wiring for continuity from J22, pin K to J24, pin K. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

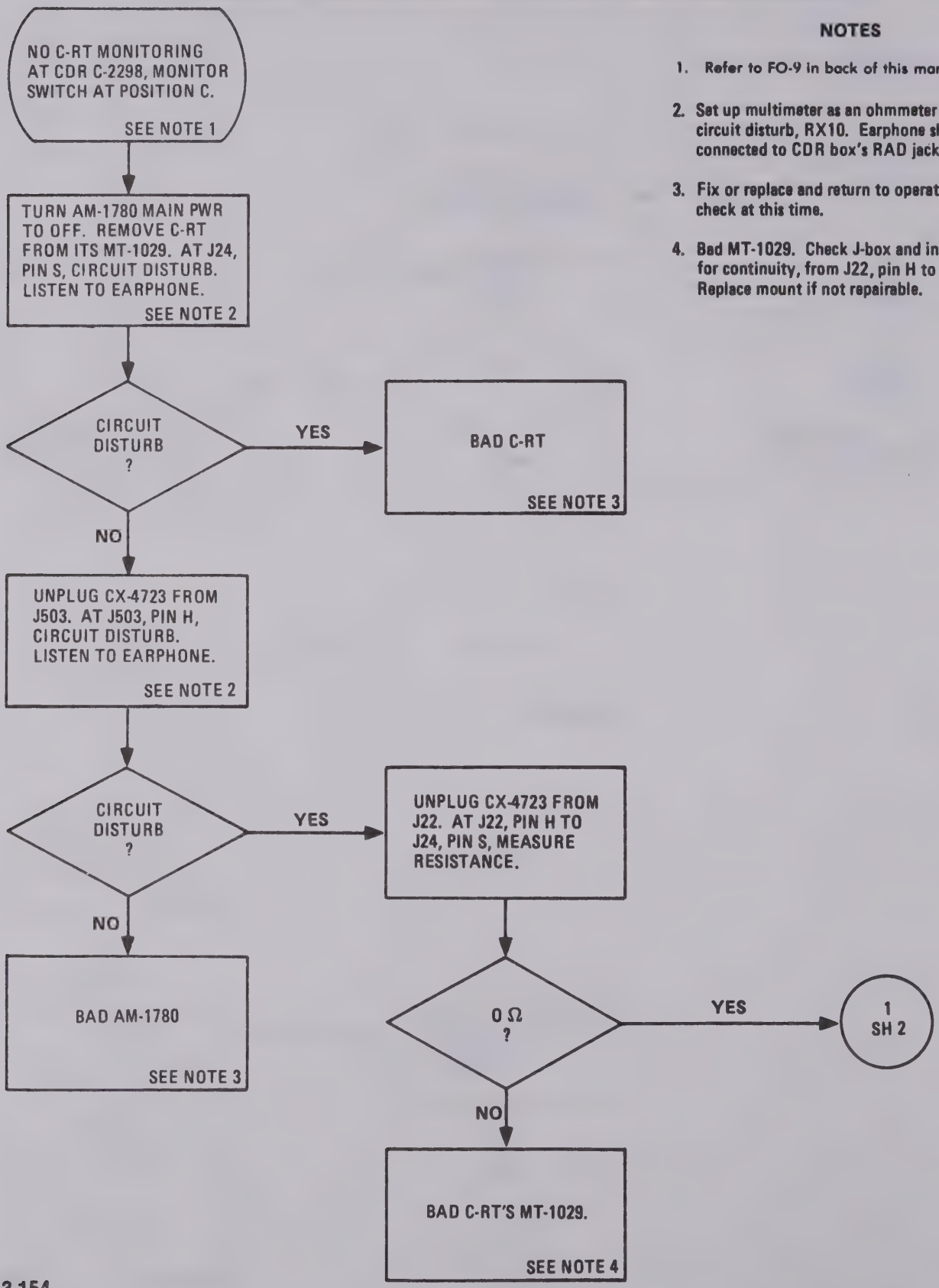
CHART 42
Troubleshoot C-RT Monitoring Circuit, All Position of CDR Monitor Switch (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 43

Troubleshoot C-RT Monitoring Circuit, C-Position of CDR Monitor Switch (Sheet 1 of 2)



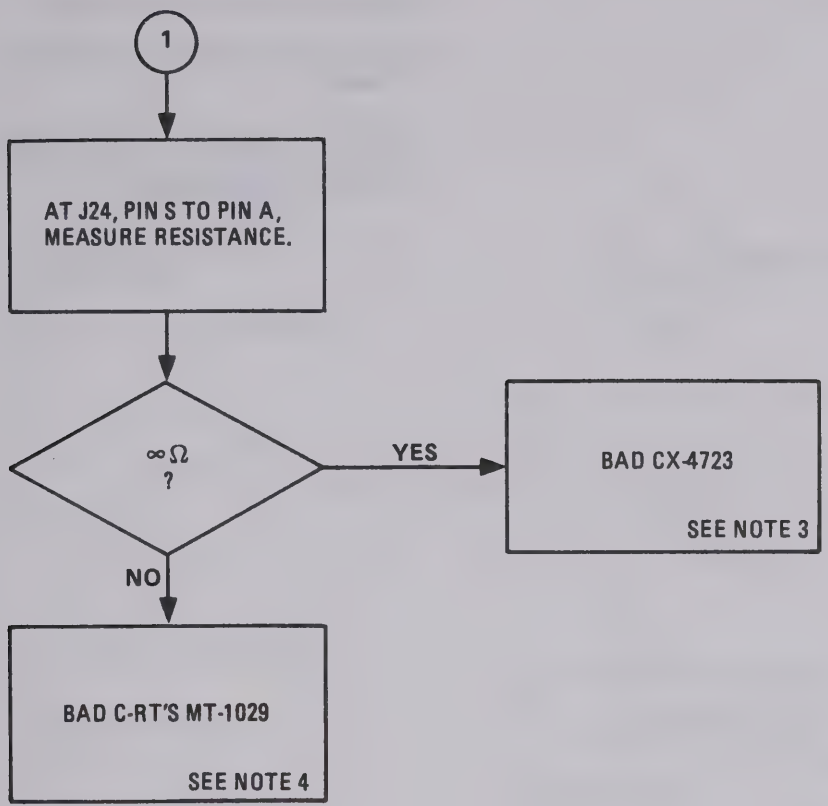
NOTES

1. Refer to FO-9 in back of this manual.
2. Set up multimeter as an ohmmeter to perform circuit disturb, RX10. Earphone should be connected to CDR box's RAD jack.
3. Fix or replace and return to operational check at this time.
4. Bad MT-1029. Check J-box and inside wiring for continuity, from J22, pin H to J24, pin S. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 43

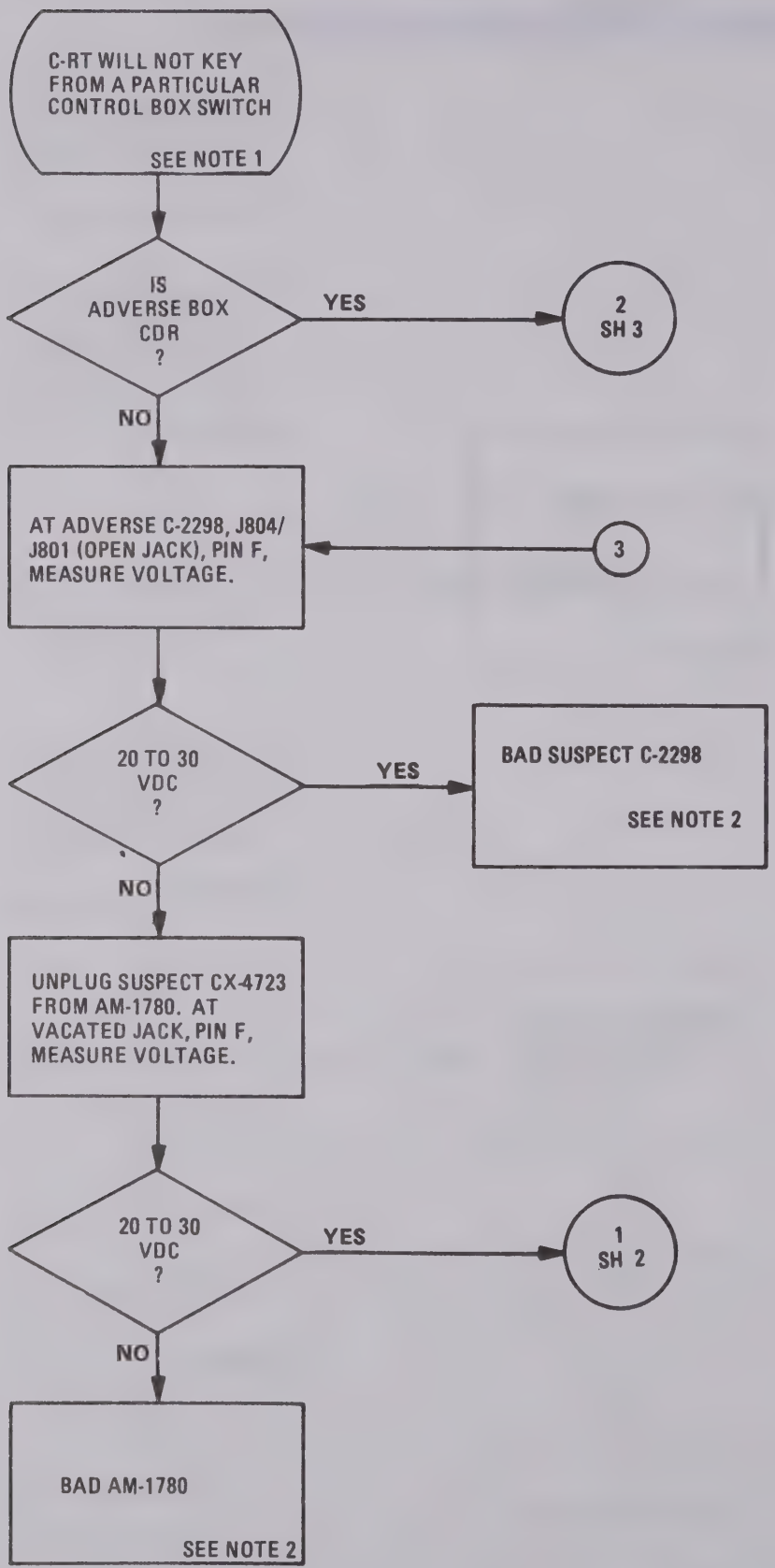
Troubleshoot C-RT Monitoring Circuit, C-Position of CDR Monitor Switch (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 44

Troubleshoot C-RT Keying Circuit (Sheet 1 of 4)

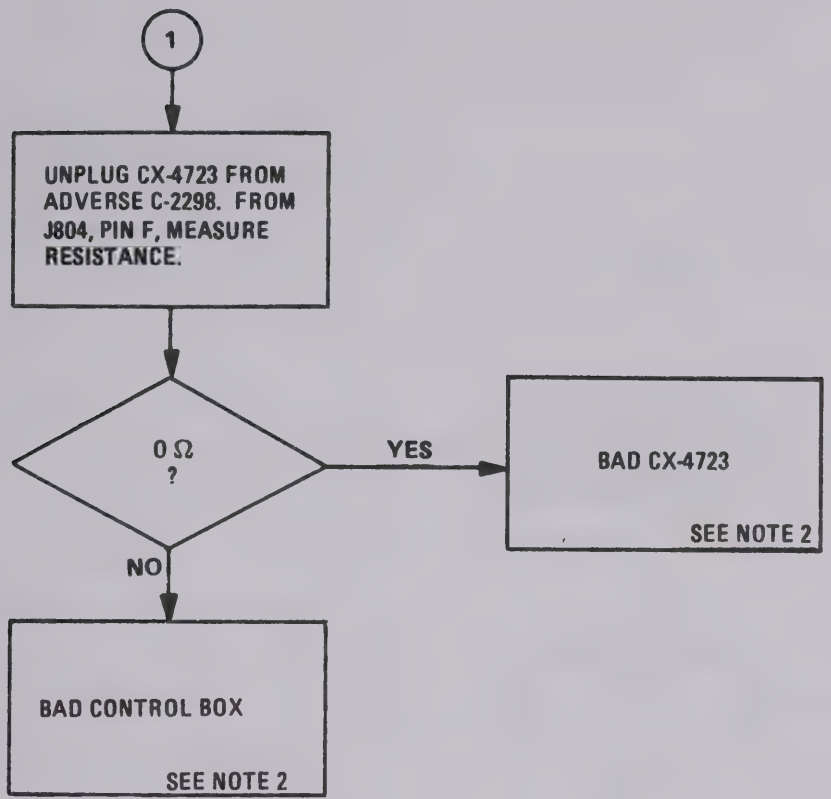


NOTES

1. Refer to FO-13 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Bad MT-1029. Check J-box and inside wiring for continuity, from J22, pin S to J24, pin H. Replace mount if not repairable.

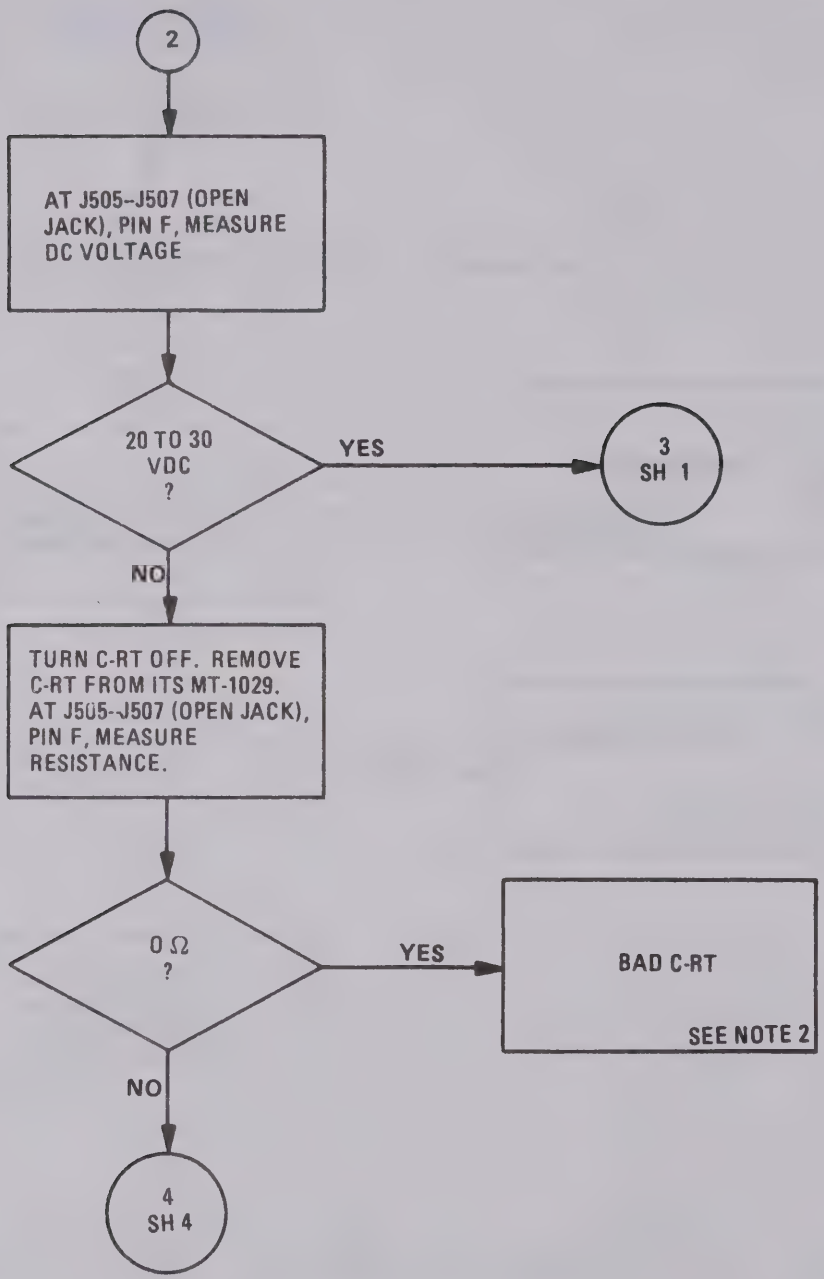
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 44
Troubleshoot C-RT Keying Circuit (Sheet 2 of 4)



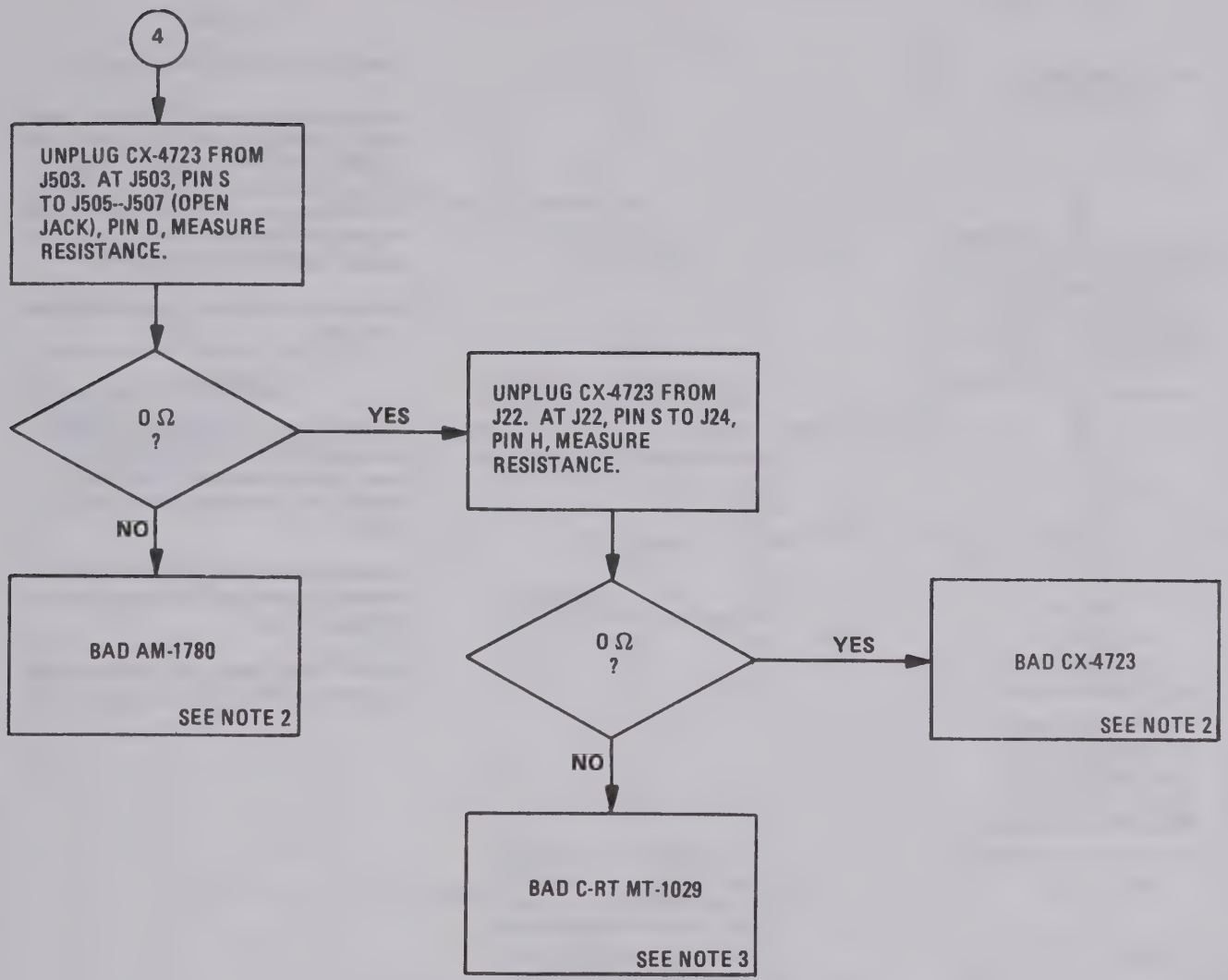
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 44
Troubleshoot C-RT Keying Circuit (Sheet 3 of 4)



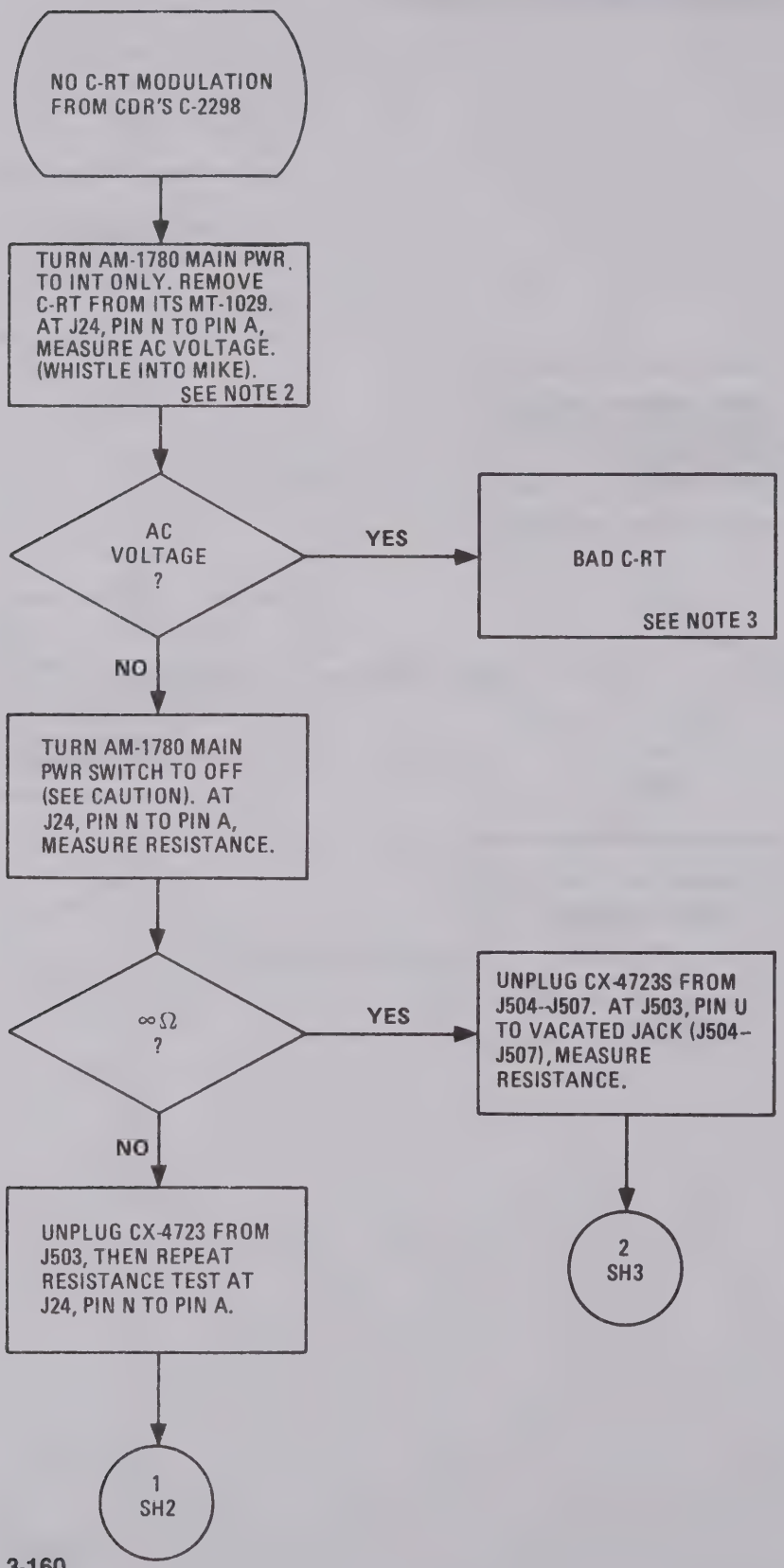
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 44
Troubleshoot C-RT Keying Circuit (Sheet 4 of 4)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 45
Troubleshoot C-RT Modulation Circuit, C-Position of CDR's Monitor Switch (Sheet 1 of 3)



NOTES

1. Refer to FO-13 in back of this manual.
2. Set up multimeter as an AC voltmeter (lowest range). Connect meter probes between signal line (test point) and chassis ground, then key mike and note reading. Next, sharply whistle into mike and look to see if the meter changes. A change in AC voltage indicates the presence of a talk signal. (Reading is $<$ 1 volt).
3. Fix or replace and return to operational check at this time.

CAUTION

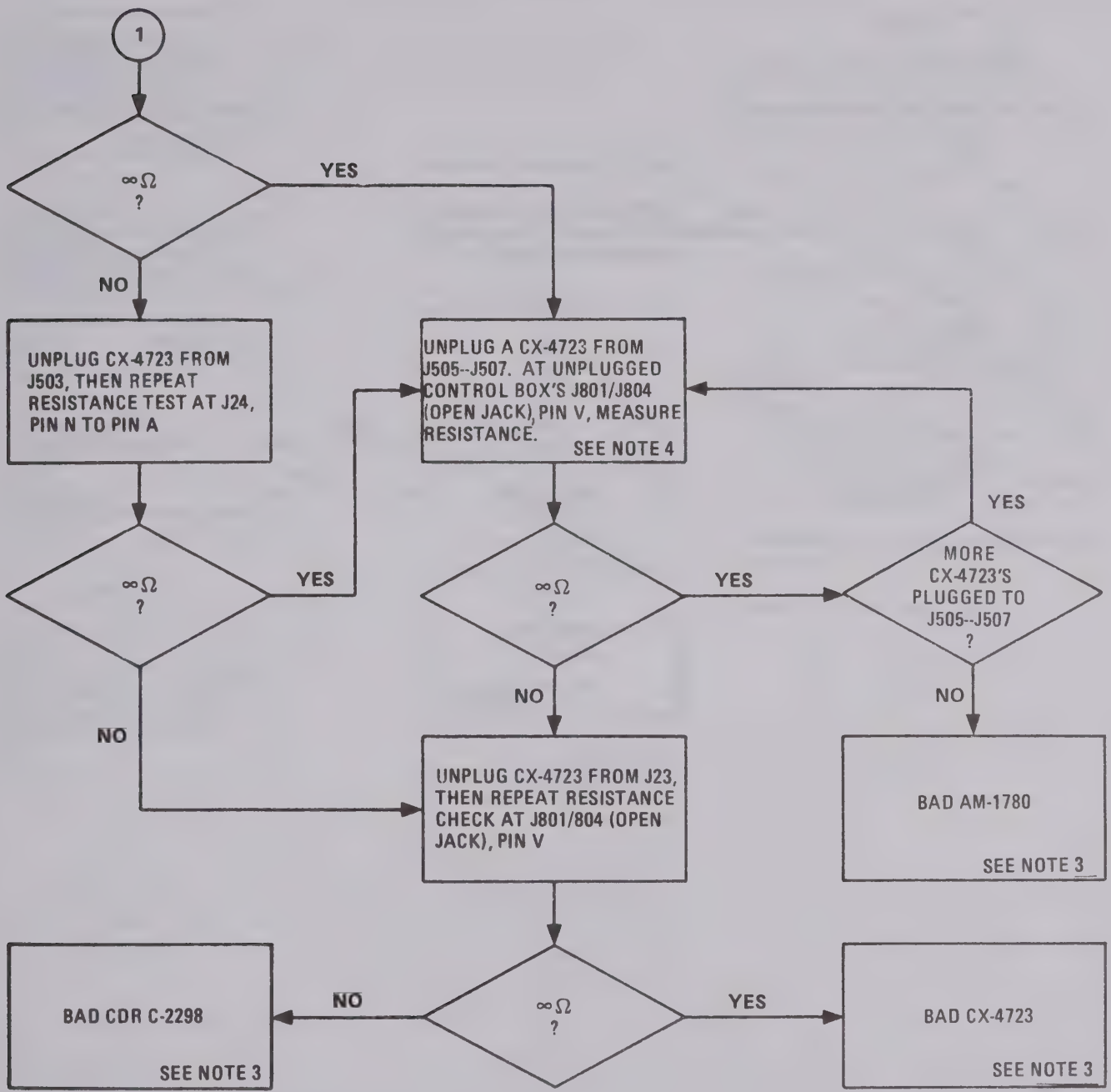
To guard against equipment damage when making measurements on circuits with power applied, make sure proper pins are selected and meter probes do not touch together.

4. If more cables are plugged to J505–J507, remove each cable one at a time and measure resistance of each.
5. Bad MT-1029. Check J-box and inside wiring for continuity from J22, pin U to J24, pin N.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 45

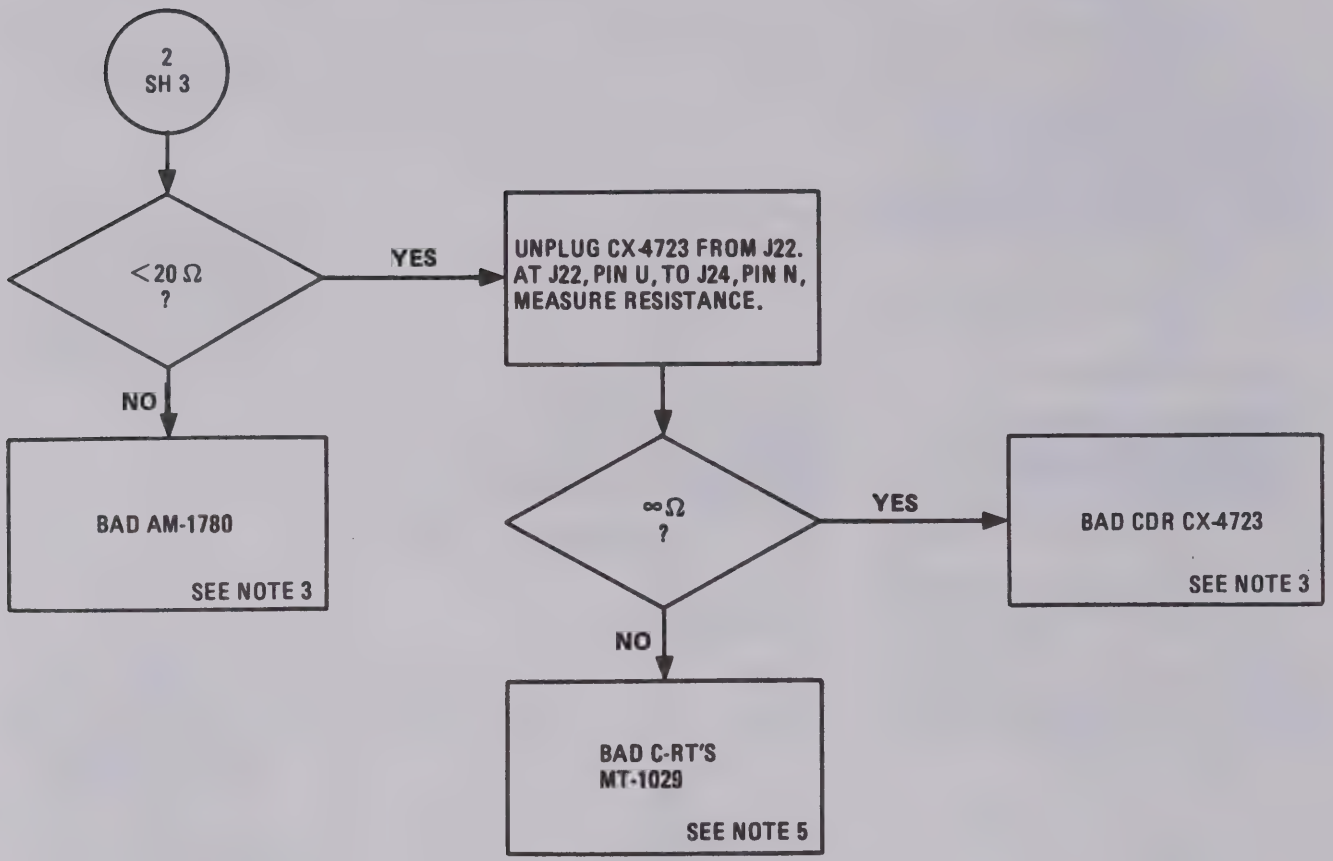
Troubleshoot C-RT Modulation Circuit, C-Position of CDR's Monitor Switch (Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

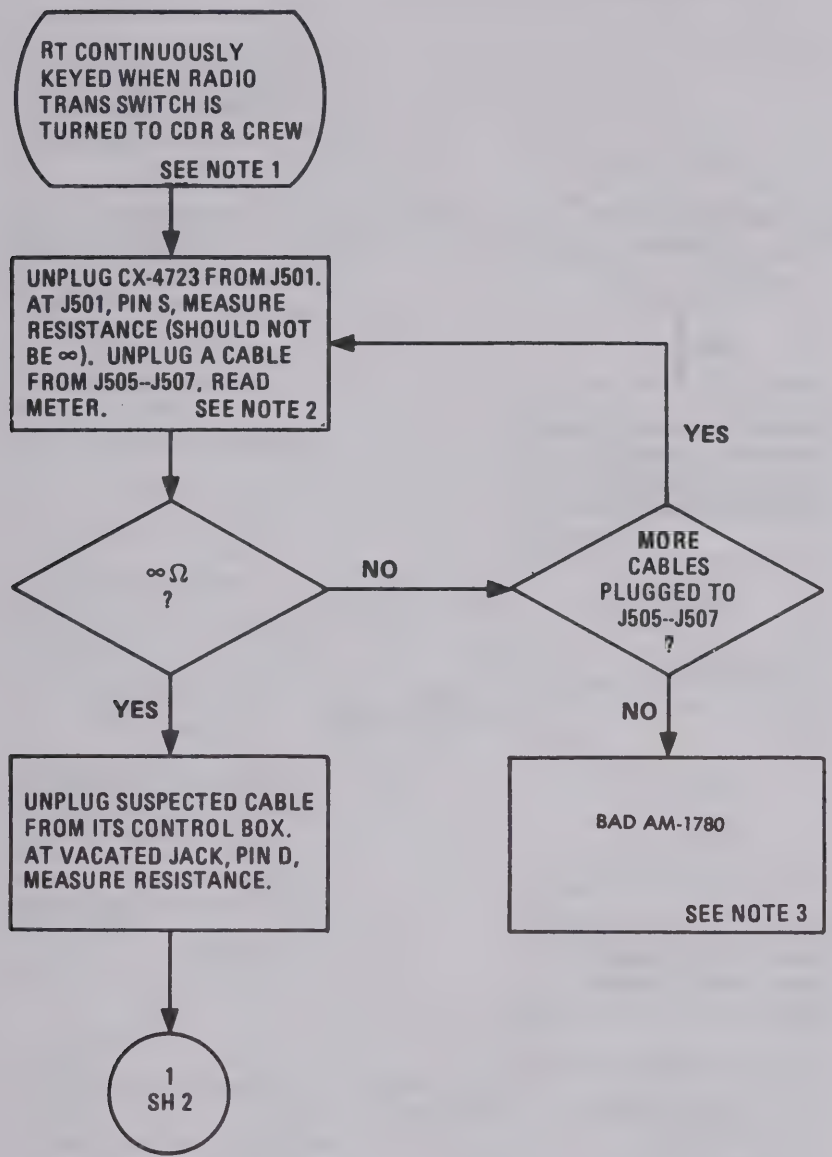
CHART 45

Troubleshoot C-RT Modulation Circuit, C-Position of CDR's Monitor Switch (Sheet 3 of 3)



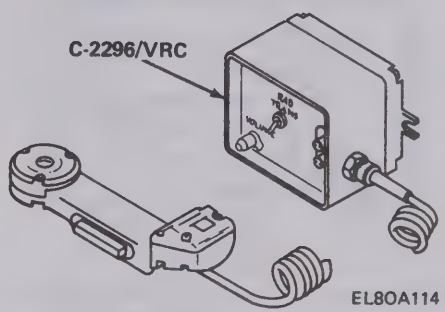
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 46
Troubleshoot RT Keying Circuit CDR + Crew Position of Radio Trans Switch (Adverse Short)
(Sheet 1 of 2)



NOTES

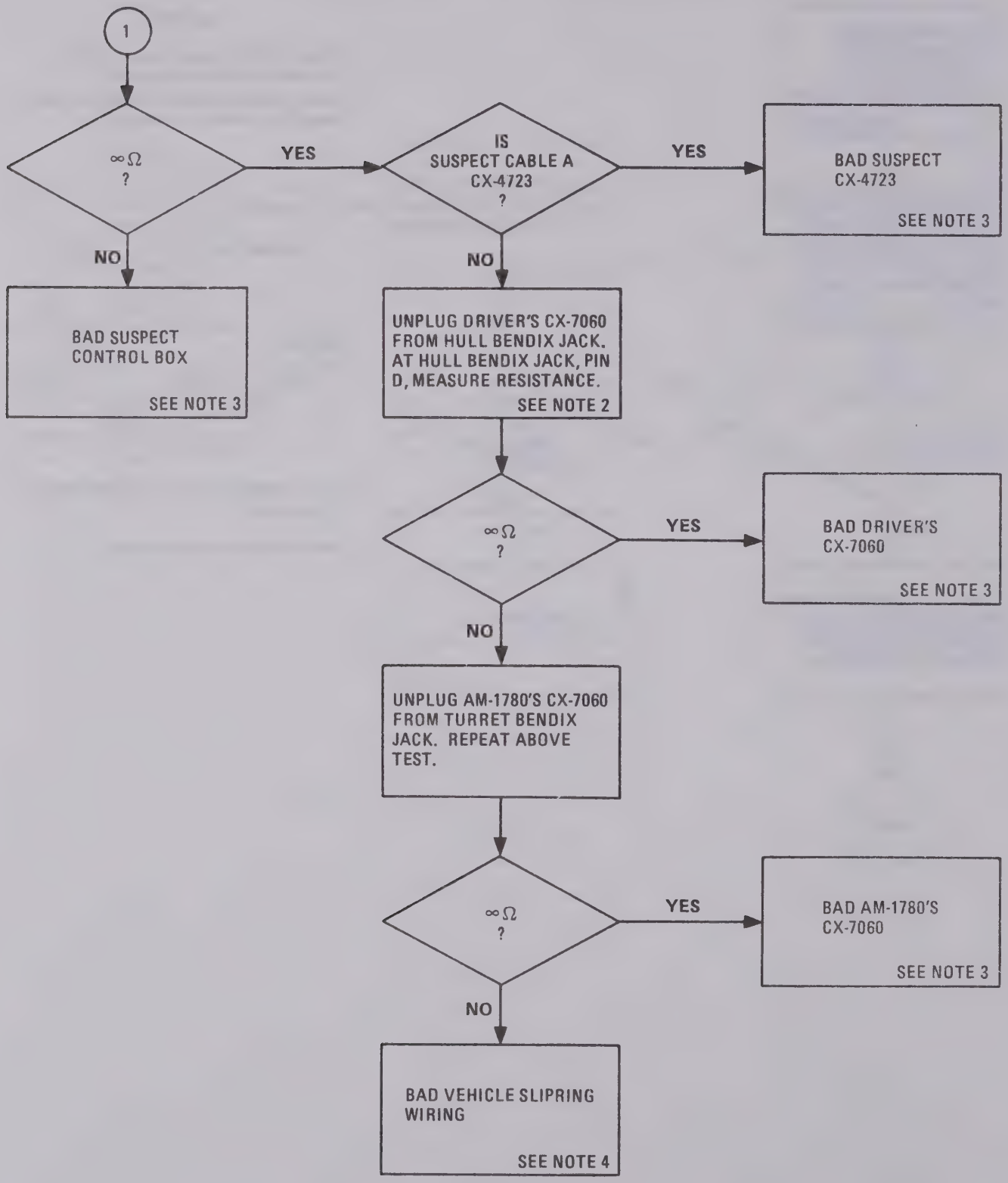
1. Refer to FO-12 for nontanks or FO-17 for tanks in back of this manual.
2. Leave meter probes connected at J501 (pin S to ground) for remainder of this test.



3. Fix or replace and return to operational check at this time.
4. Refer to higher maintenance level.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

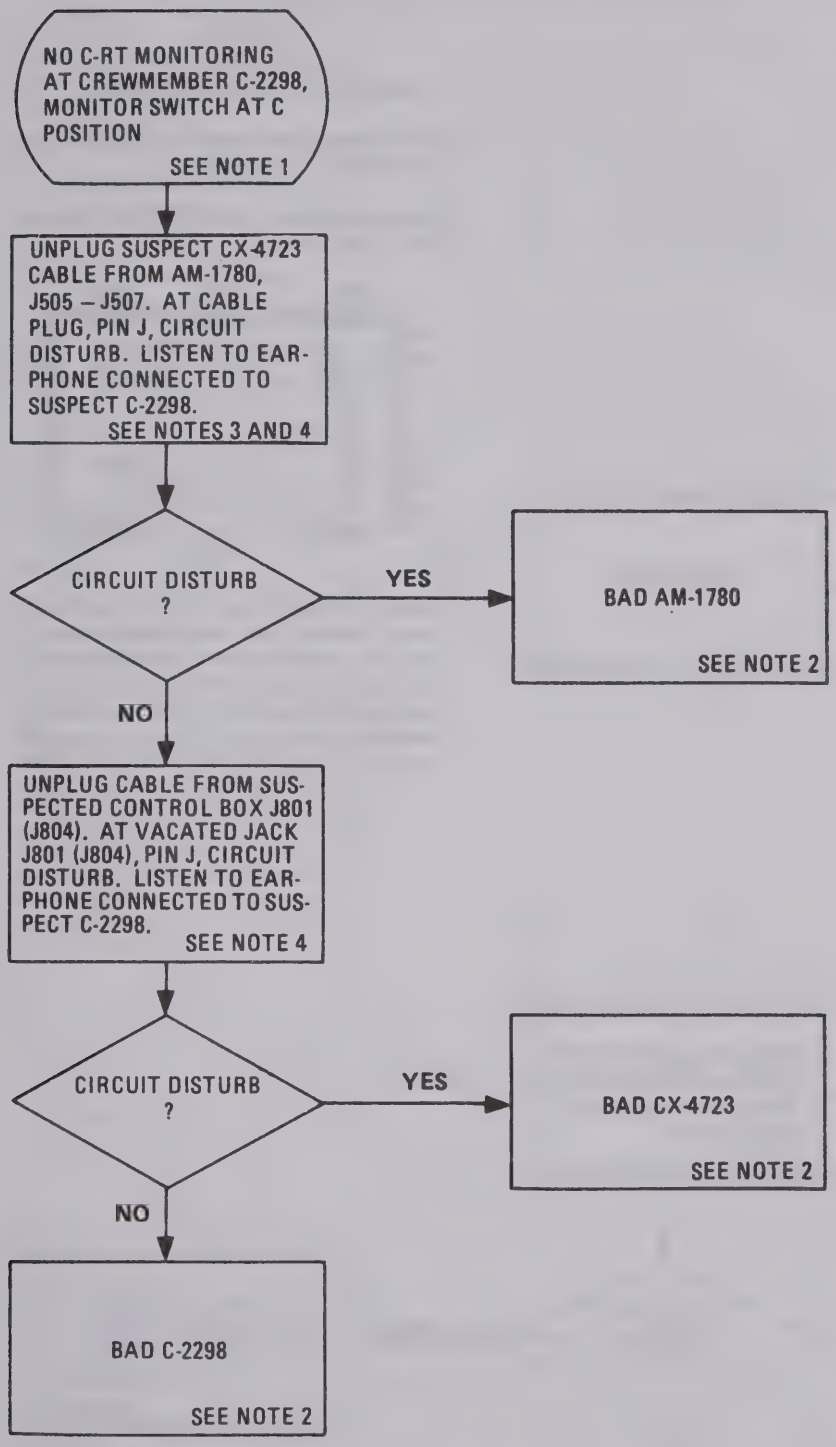
CHART 46
Troubleshoot RT Keying Circuit CDR + Crew Position of Radio Trans Switch (Adverse Short)
(Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

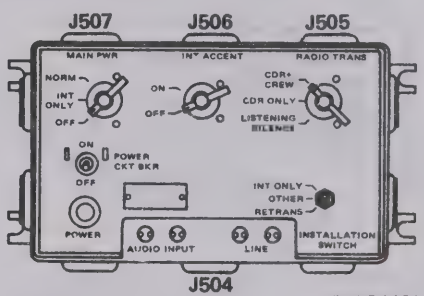
CHART 47

Troubleshoot C-RT Monitor Circuit C Position of Crewmember C-2298 Monitor Switch (Sheet 1 of 1)



NOTES

1. Refer to FO-9 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Cable connections to AM-1780.



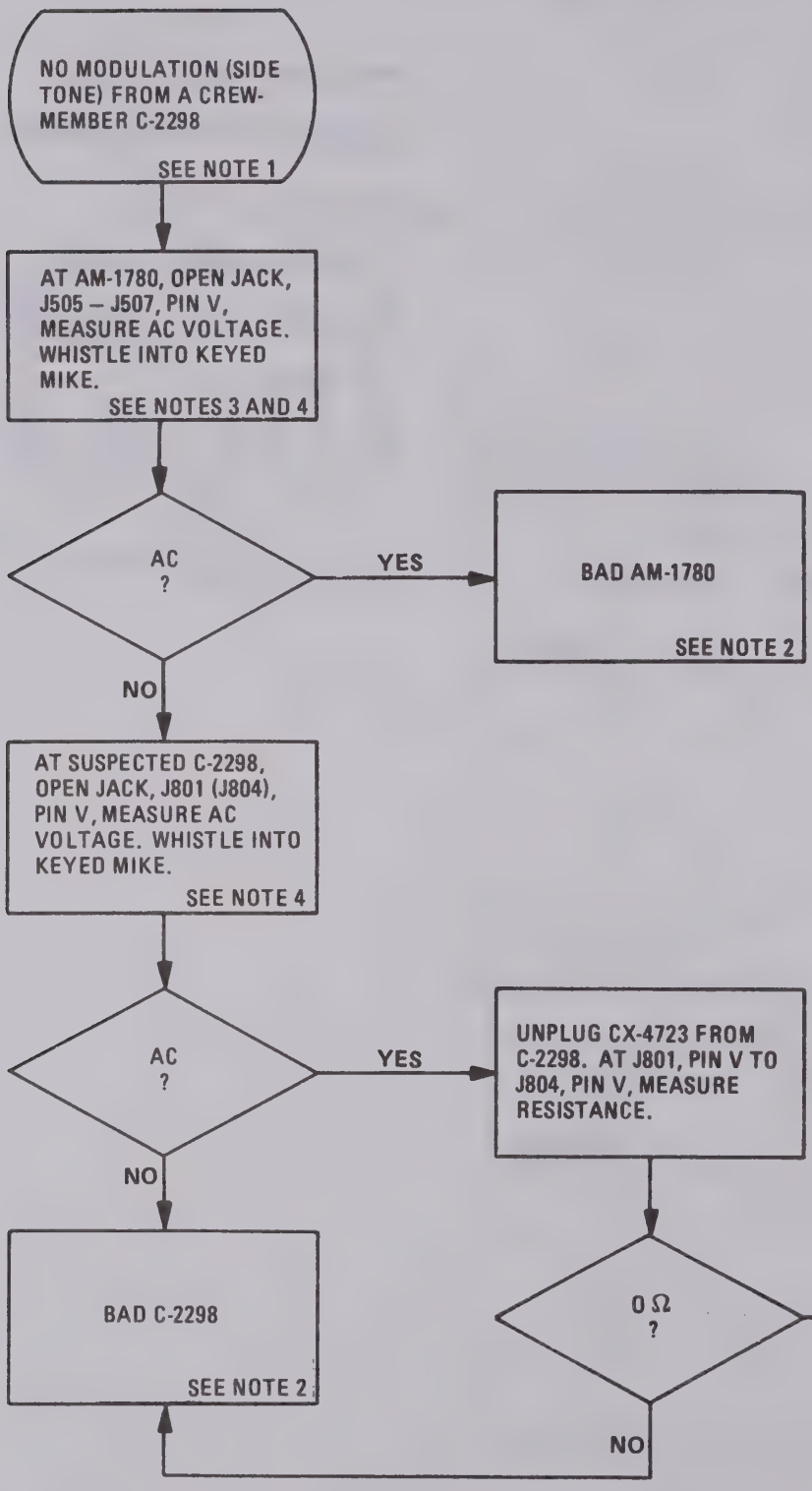
EL8OA081

4. Set up multimeter as an ohmmeter to perform circuit disturb, RX10.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

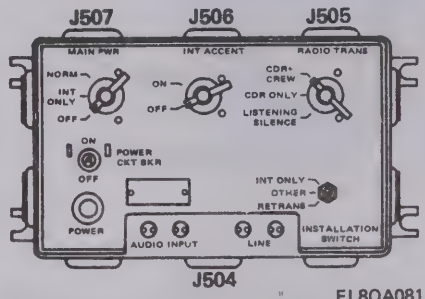
CHART 48

Troubleshoot C-RT Modulation Circuit, From Crew Box C-2298/VRC (Sheet 1 of 1)



NOTES

1. Refer to FO-9 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Cable connections to AM-1780. Any open jack J505 – J507 will do.

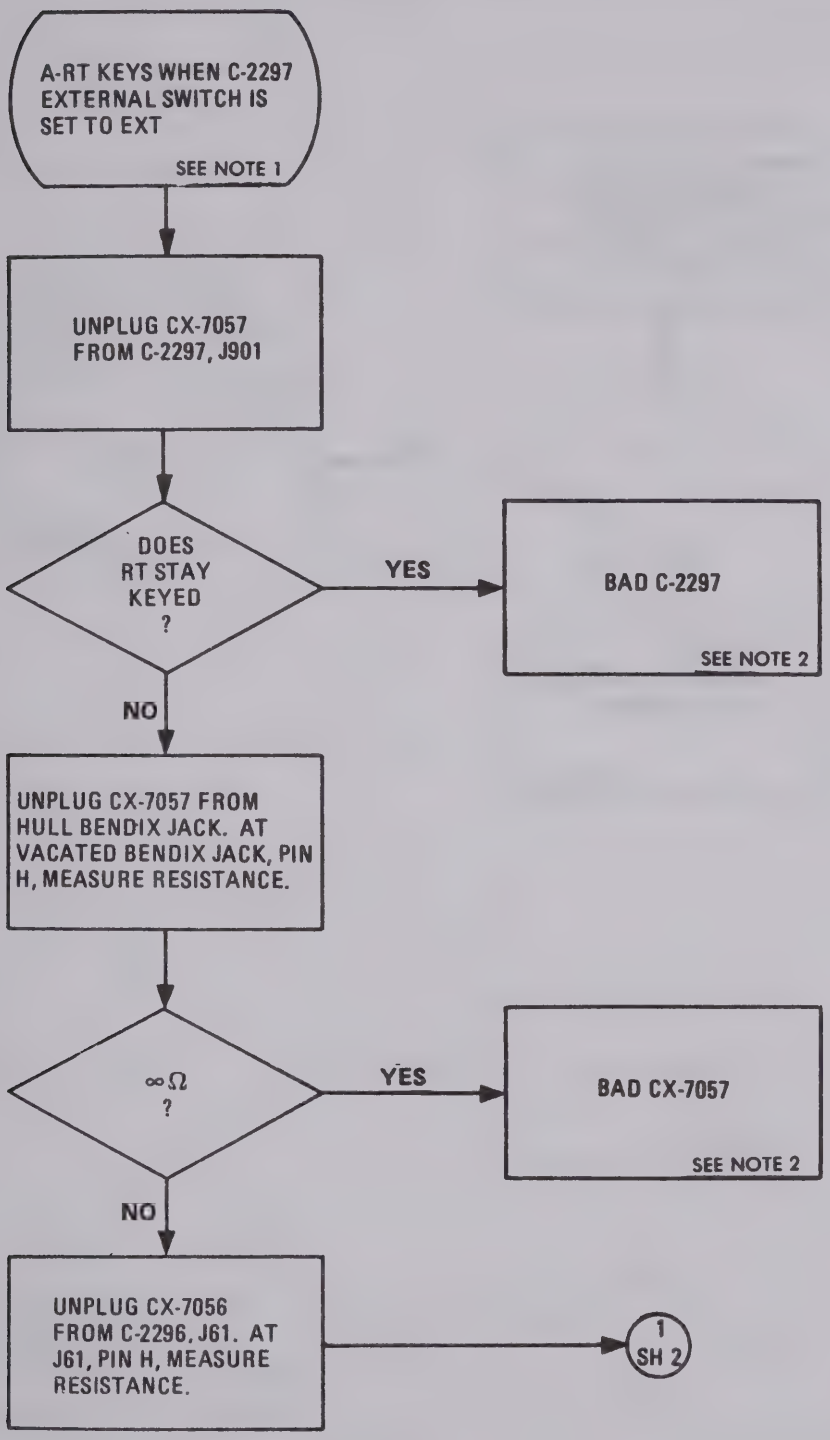


EL8OA081

4. Set up multimeter as an AC voltmeter lowest range. Connect meter probes between signal line (test point) and chassis ground, then key mike and note reading. Next, sharply whistle into keyed mike and see if the meter reading changes. A change in AC voltage indicates the presence of the talk signal (Reading is <1 volt).

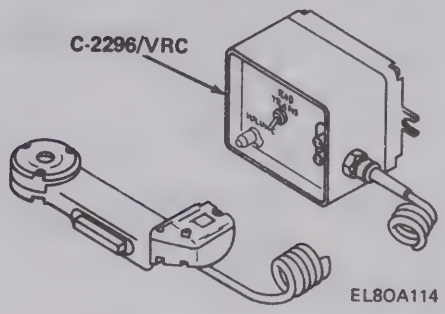
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 49
Troubleshoot C-2296 RT Keying Circuit (Adverse Short) (Sheet 1 of 2)



NOTES

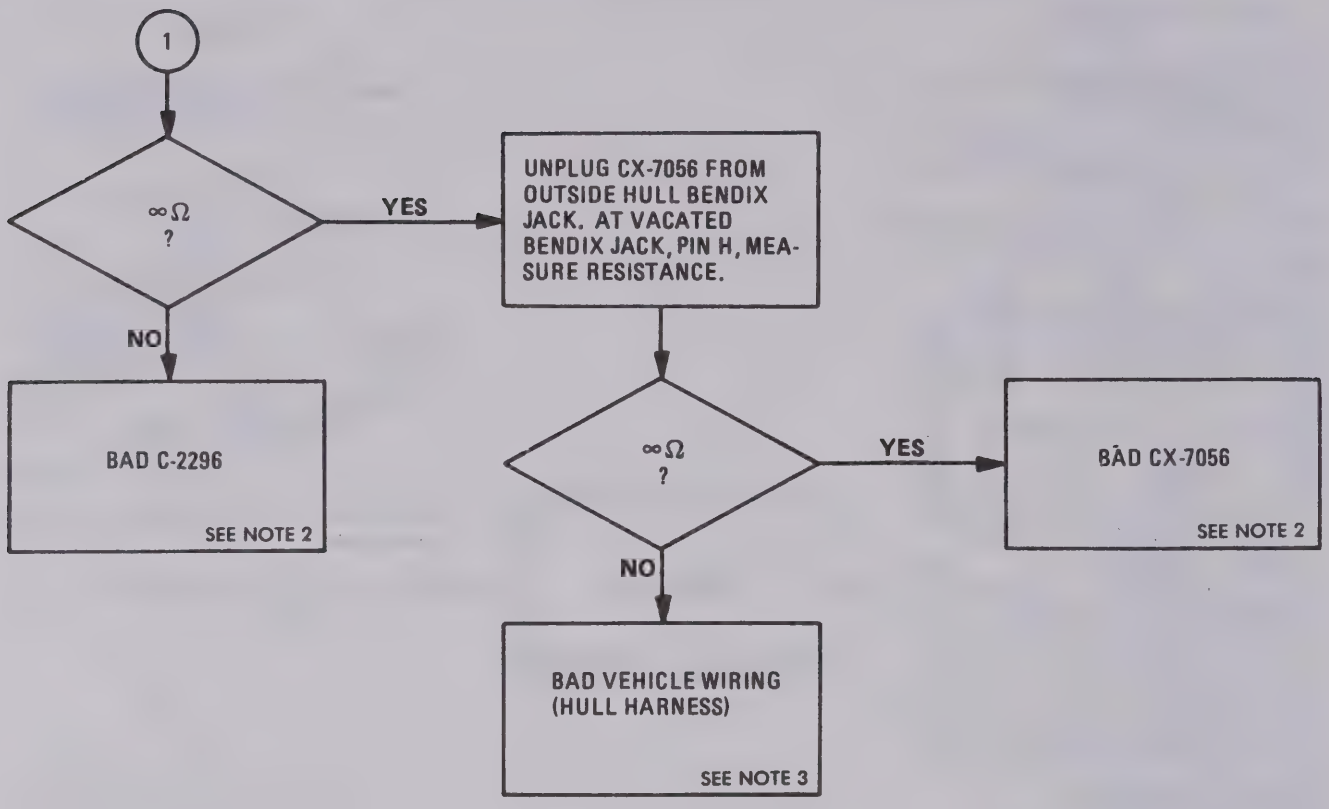
1. Refer to FO-17 in back of this manual.



2. Fix or replace and return to operational check at this time.
3. Refer to a higher maintenance level.

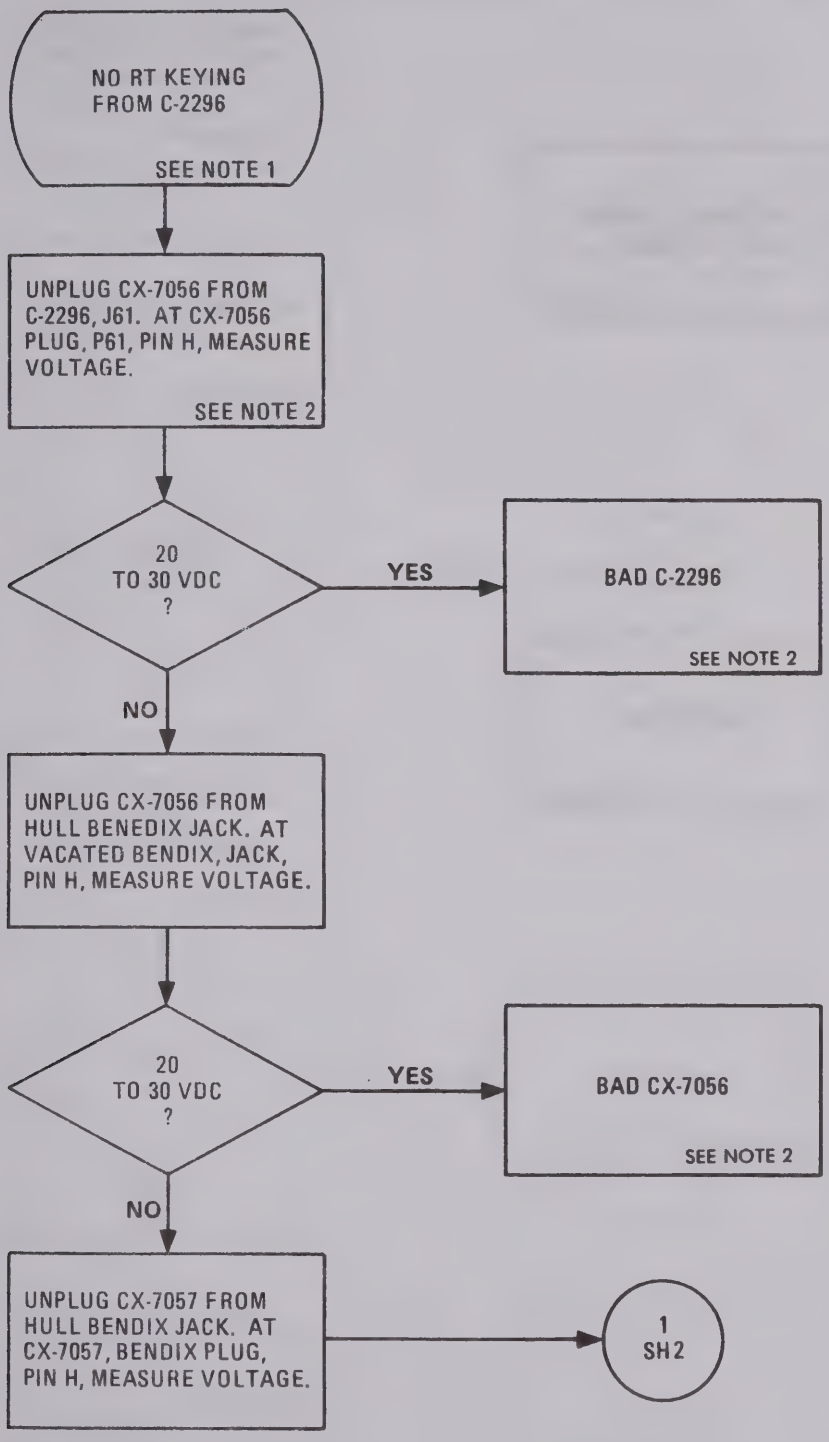
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 49
Troubleshoot C-2296 RT Keying Circuit (Adverse Short) (Sheet 2 of 2)



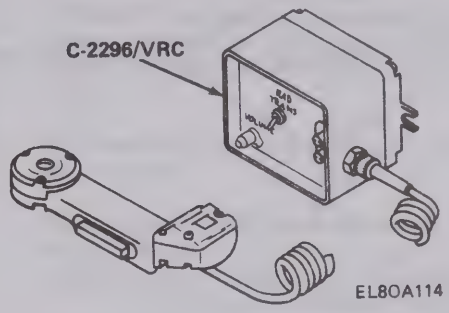
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 50
Troubleshoot C-2296 RT Keying Circuit (Adverse Open) (Sheet 1 of 2)



NOTES

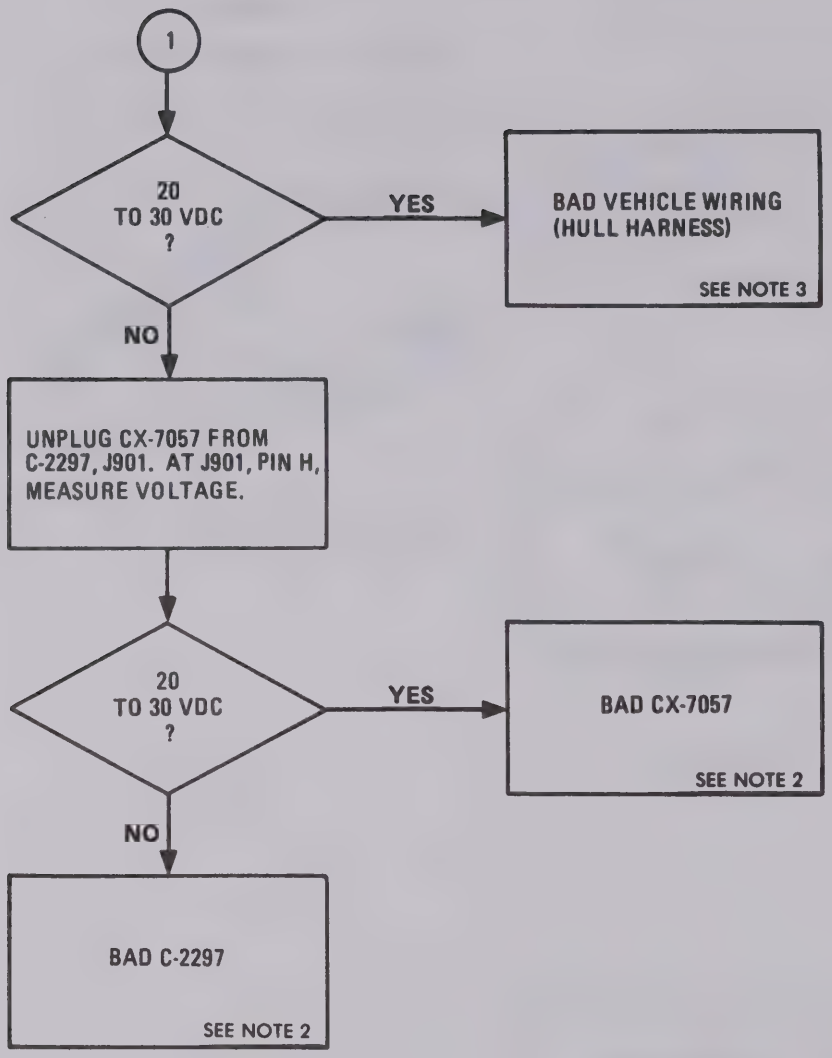
1. Refer to FO-17 in back of this manual.
2. Fix or replace and return to opertional check at this time.



3. Refer to a higher maintenance level.

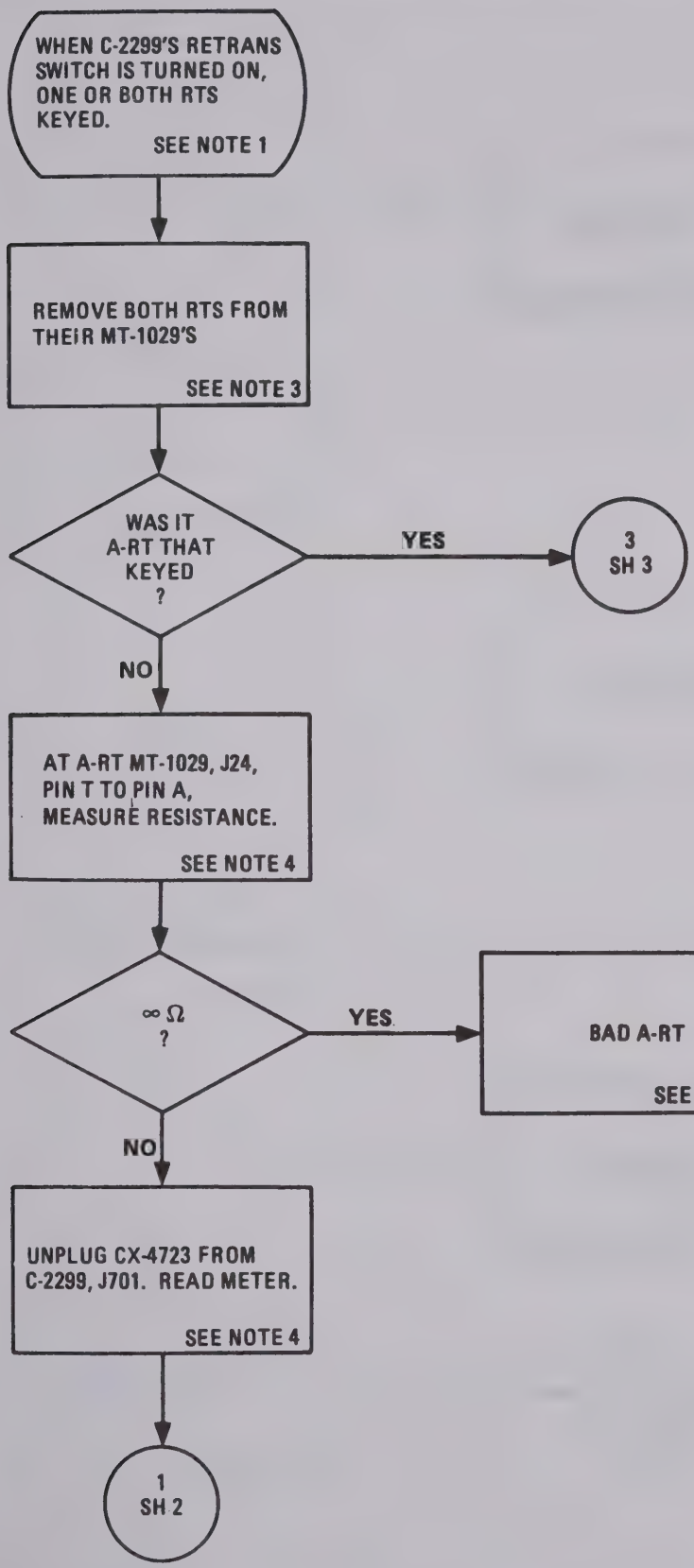
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 50
Troubleshoot C-2296 RT Keying Circuit (Adverse Open) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 51
Troubleshoot Retransmit Keying Circuit (Adverse Short) (Sheet 1 of 5)

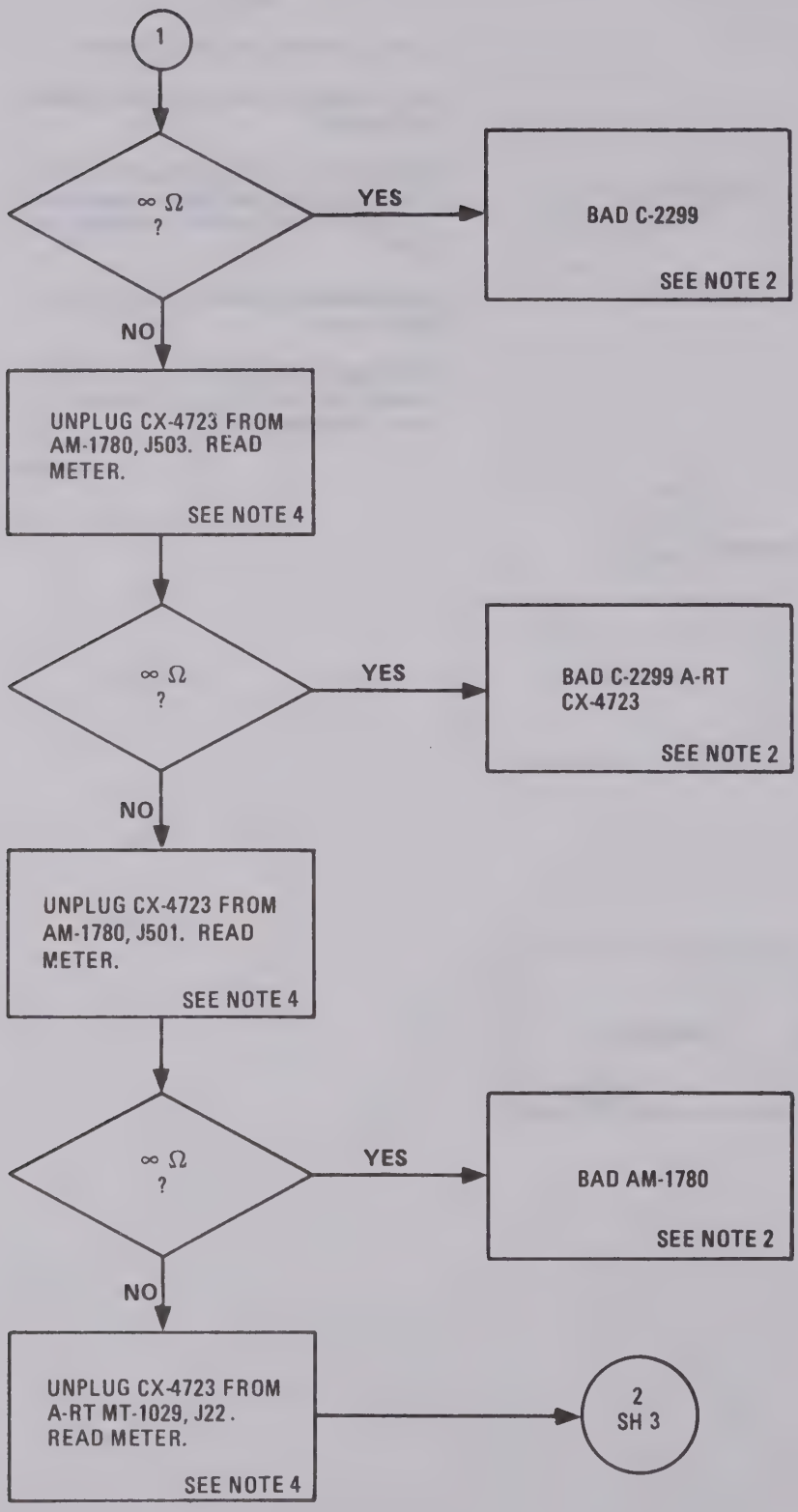


NOTES

1. Refer to FO-18 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Mark each RT according to its position before removing from mounts. (With a grease pencil, write on RT which is an A-RT and which is a C-RT).
4. Leave multimeter connected to MT-1029, J24, pin T to pin A.
5. Inside adverse MT-1029 J-box, check wiring from J24, pin T to J22, pin T for adverse shorts. Afterward, see note 2.

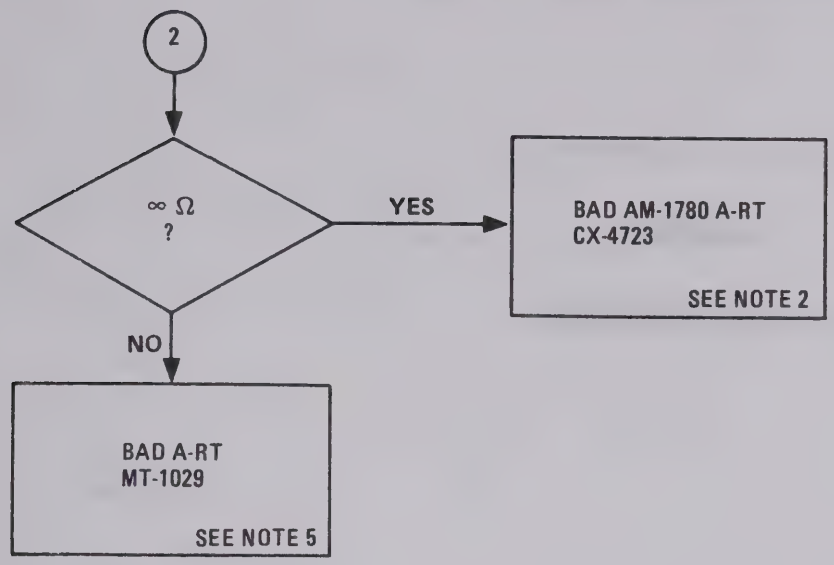
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

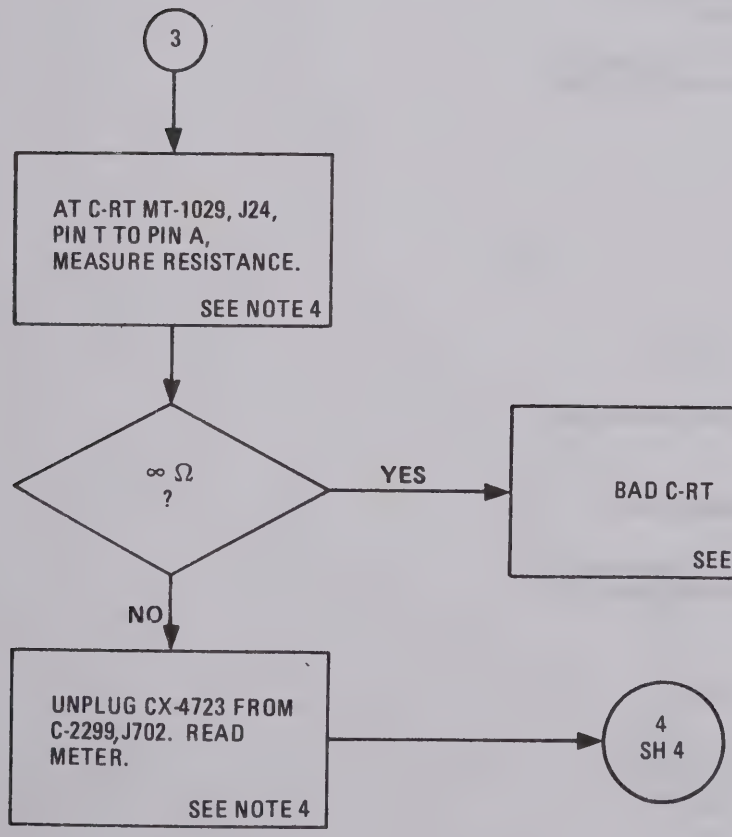
CHART 51
Troubleshoot Retransmit Keying Circuit (Adverse Short) (Sheet 2 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

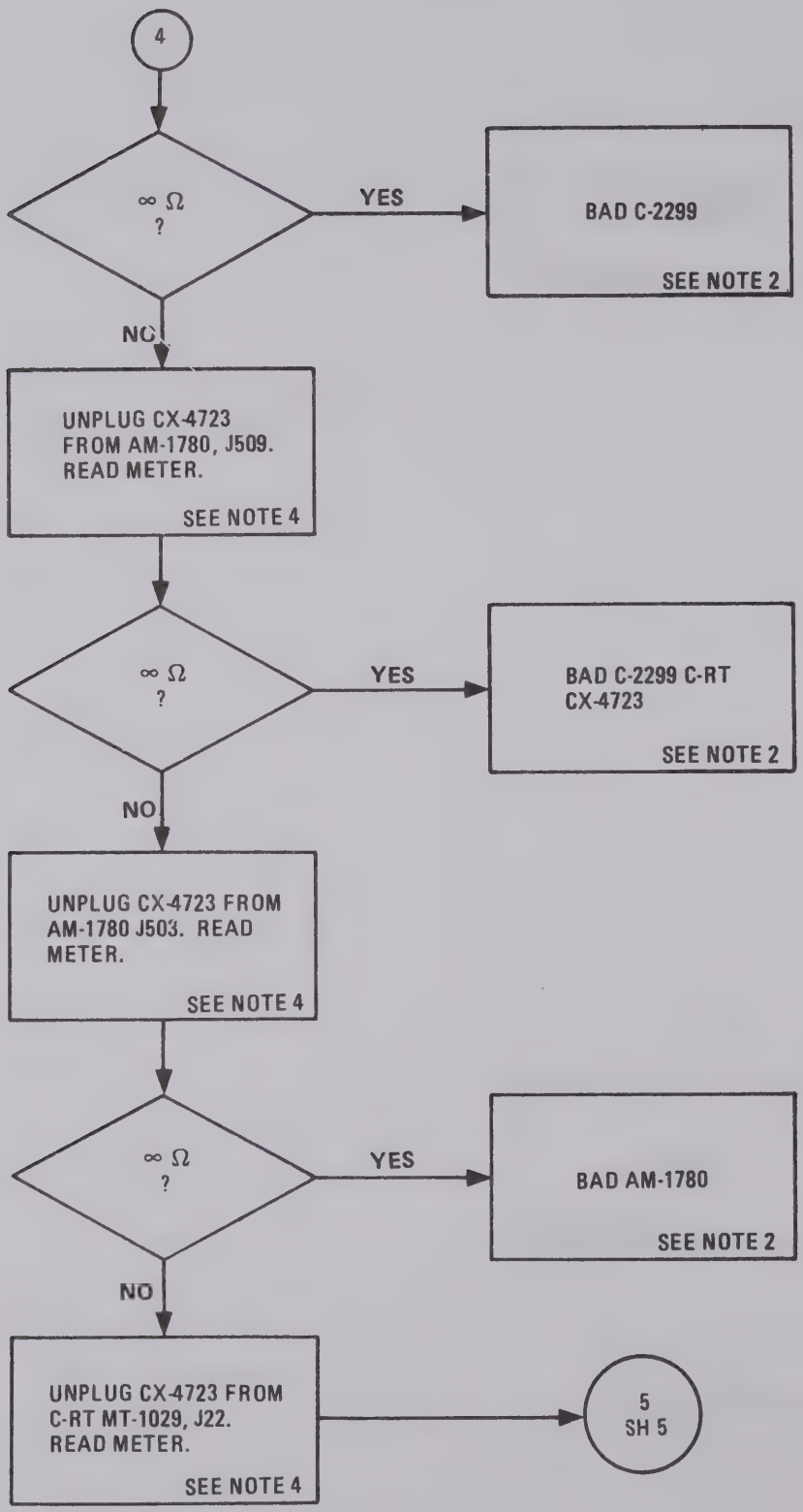
CHART 51
Troubleshoot Retransmit Keying Circuit (Adverse Short) (Sheet 3 of 5)





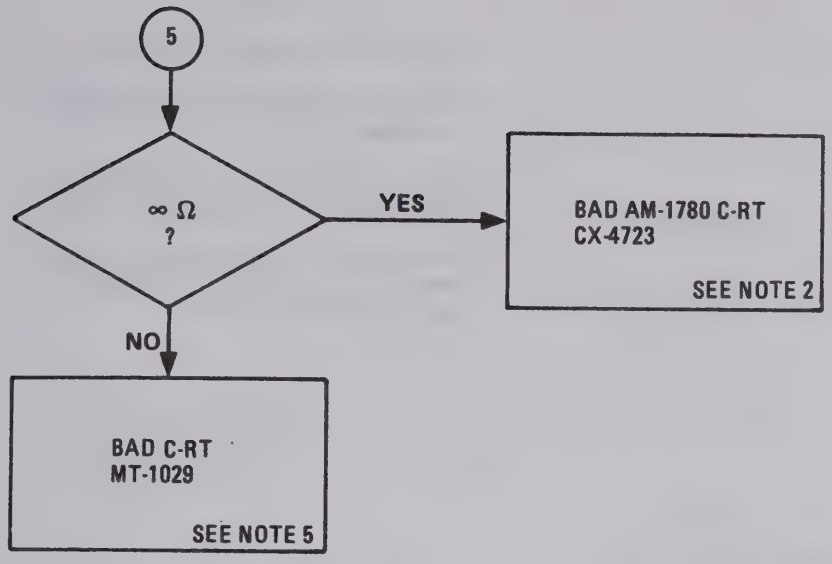
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 51
Troubleshoot Retransmit Keying Circuit (Adverse Short) (Sheet 4 of 5)



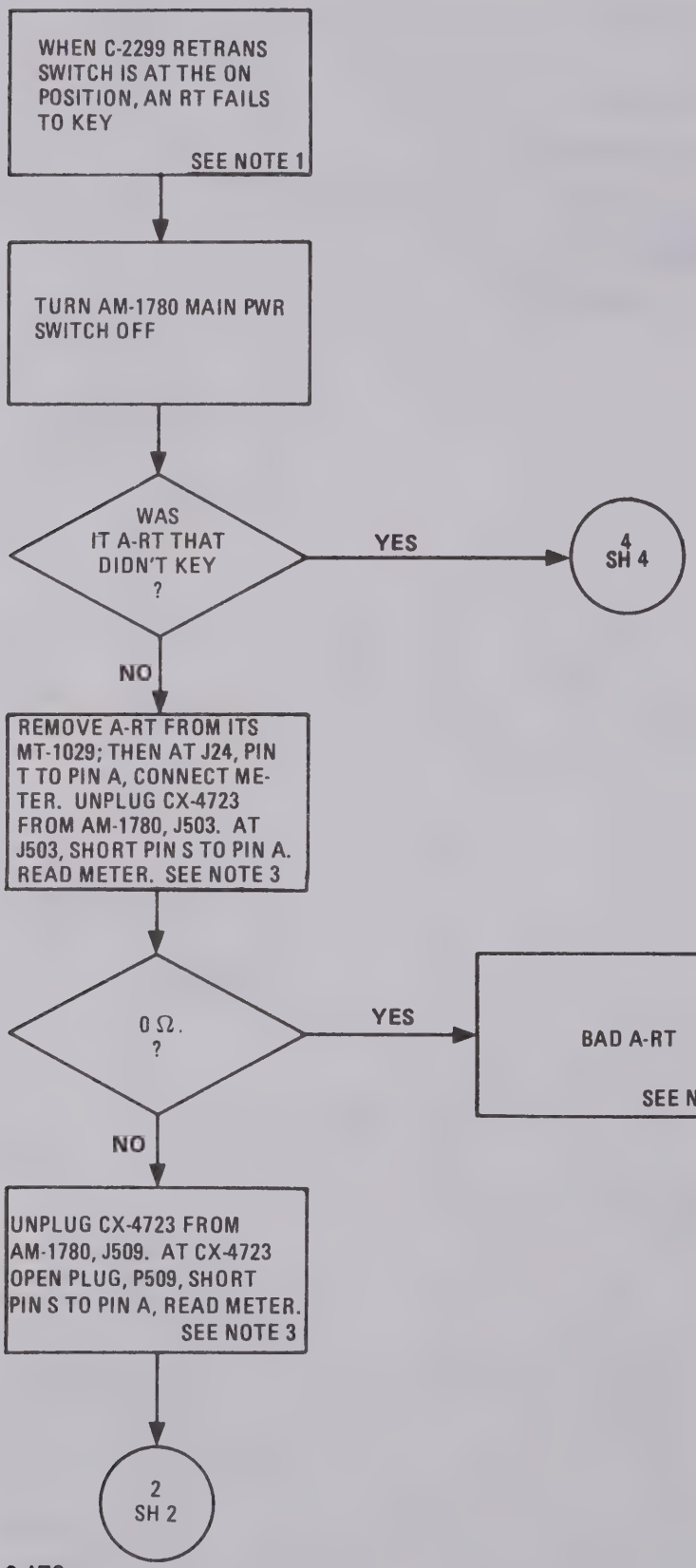
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 51
Troubleshoot Retransmit Keying Circuit (Adverse Short) (Sheet 5 of 5)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 52
Troubleshoot Retransmit Keying Circuit (Adverse Open) (Sheet 1 of 6)

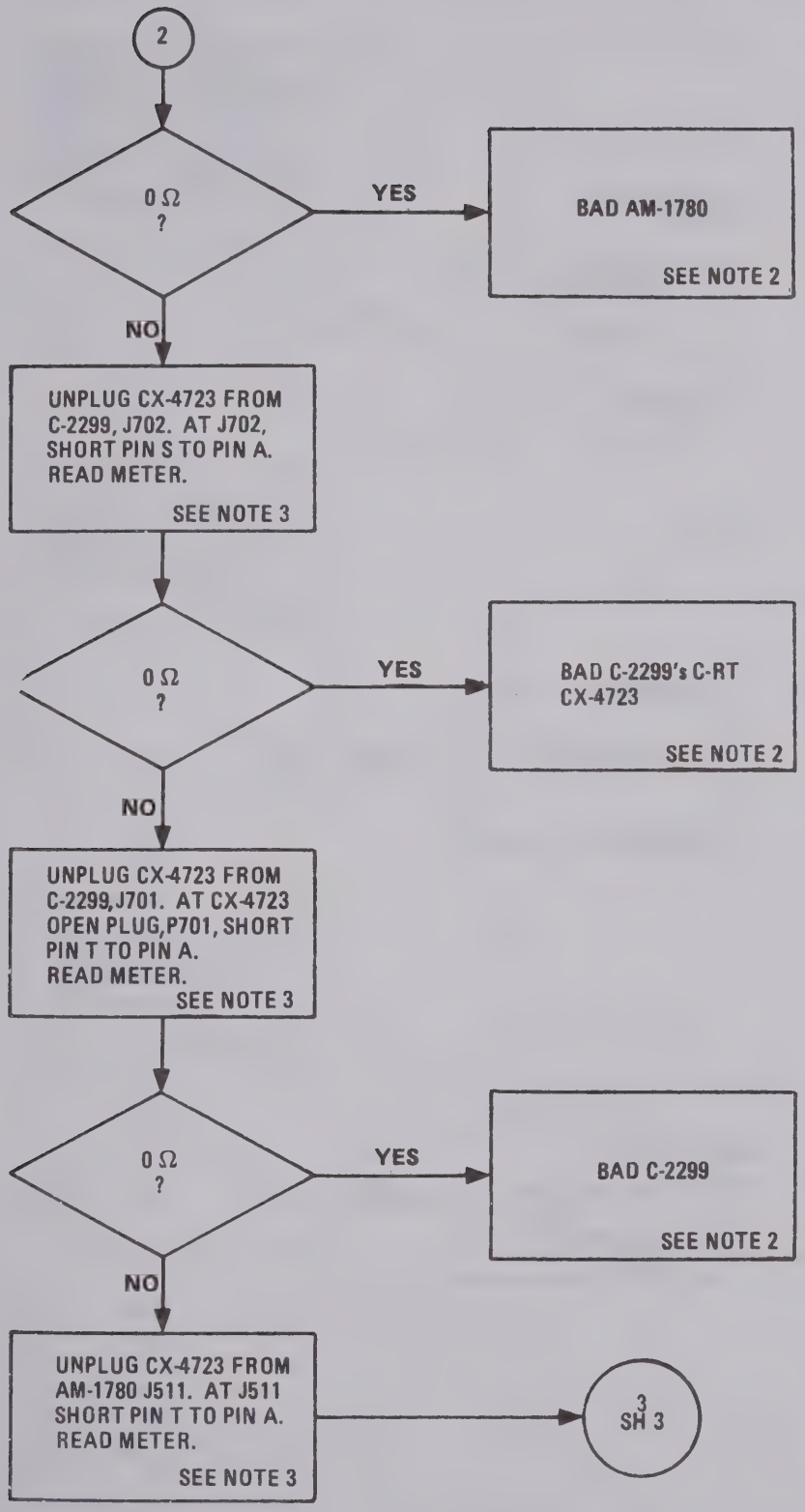


NOTES

1. Refer to FO-18 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Leave multimeter (set up to measure resistance connected to MT-1029, J24, pin T to pin A).
4. Inside adverse MT-1029 J-box, check wiring from J24, pin T to J22, pin T, for adverse opens. Afterwards, see note 2.

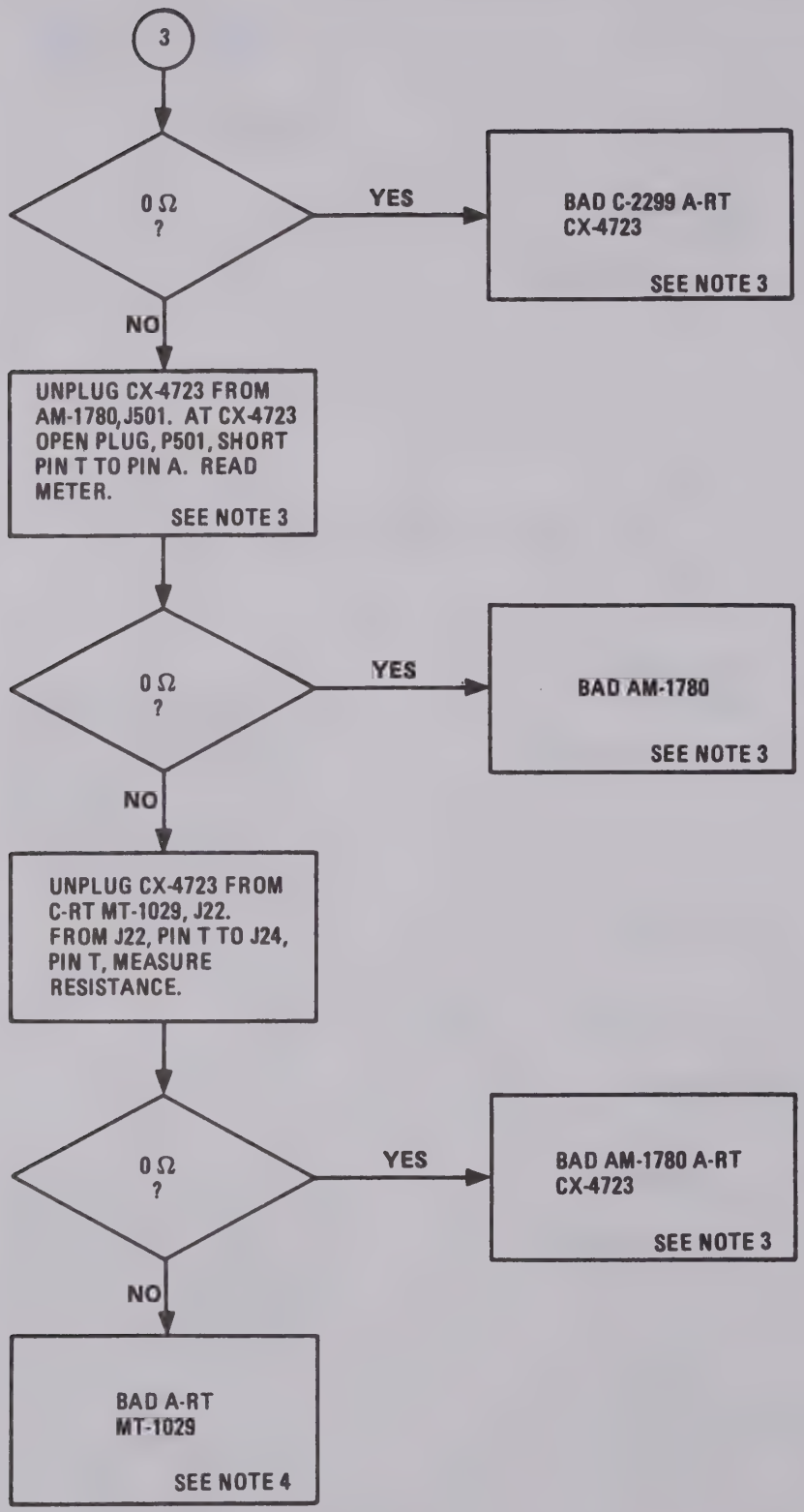
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 52
Troubleshoot Retransmit Keying Circuit (Adverse Open) (Sheet 2 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

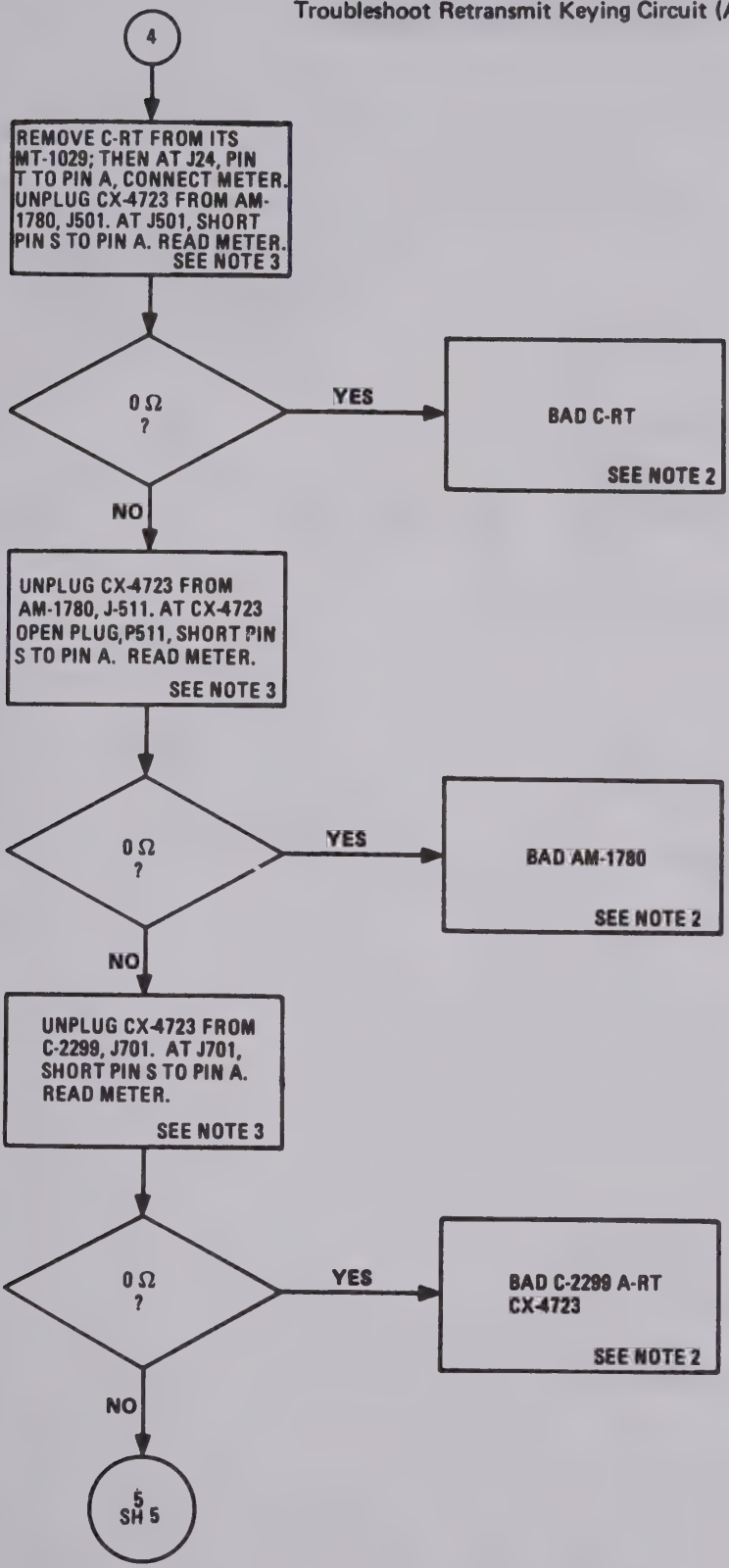
CHART 52
Troubleshoot Retransmit Keying Circuit (Adverse Open) (Sheet 3 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 52

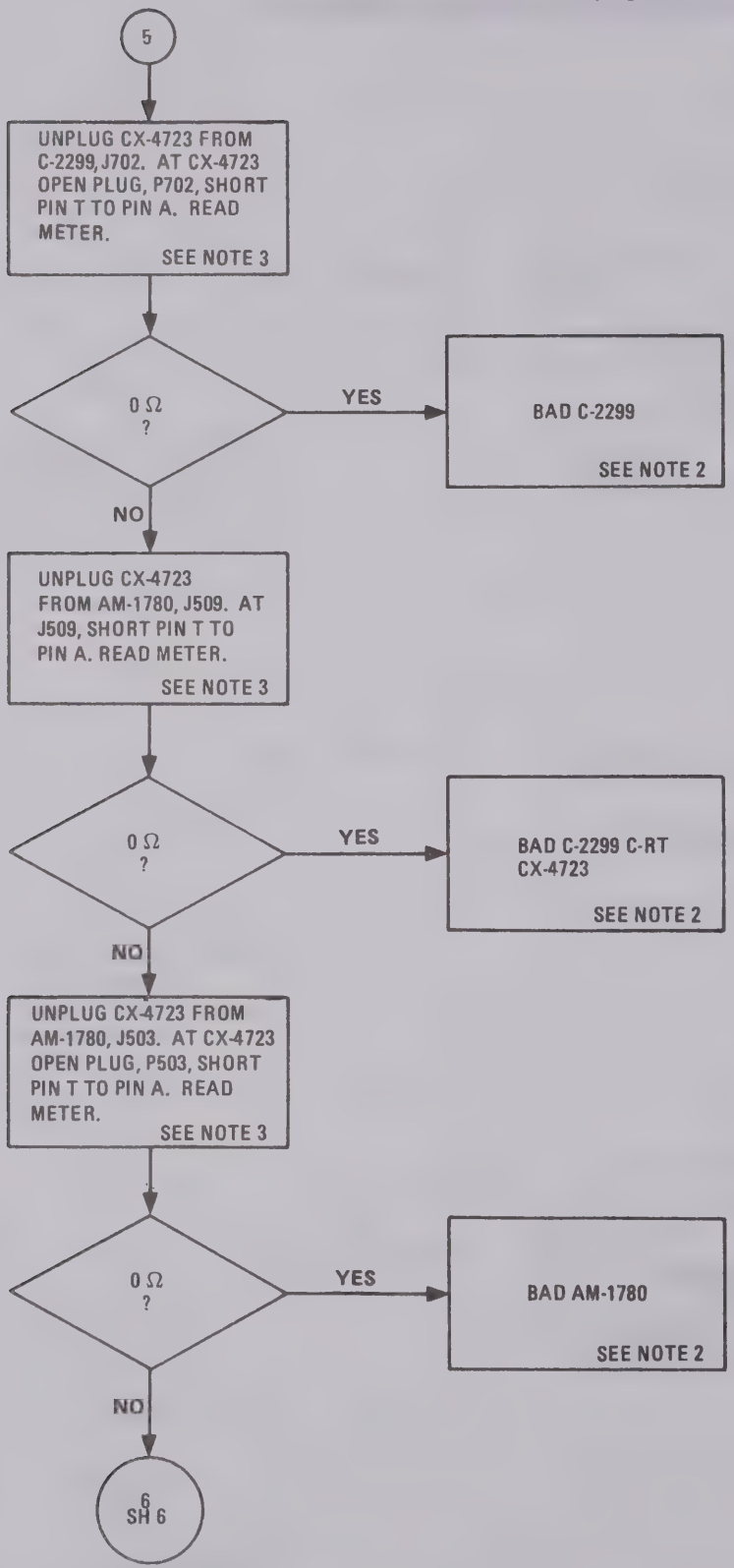
Troubleshoot Retransmit Keying Circuit (Adverse Open) (Sheet 4 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

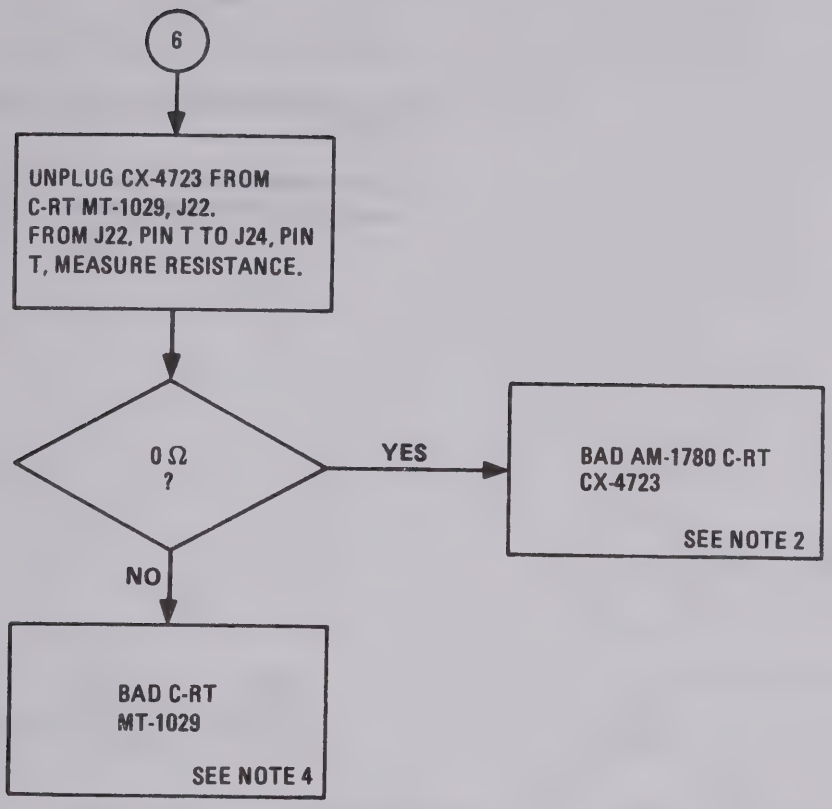
CHART 52

Troubleshoot Retransmit Keying Circuit (Adverse Open) (Sheet 5 of 6)



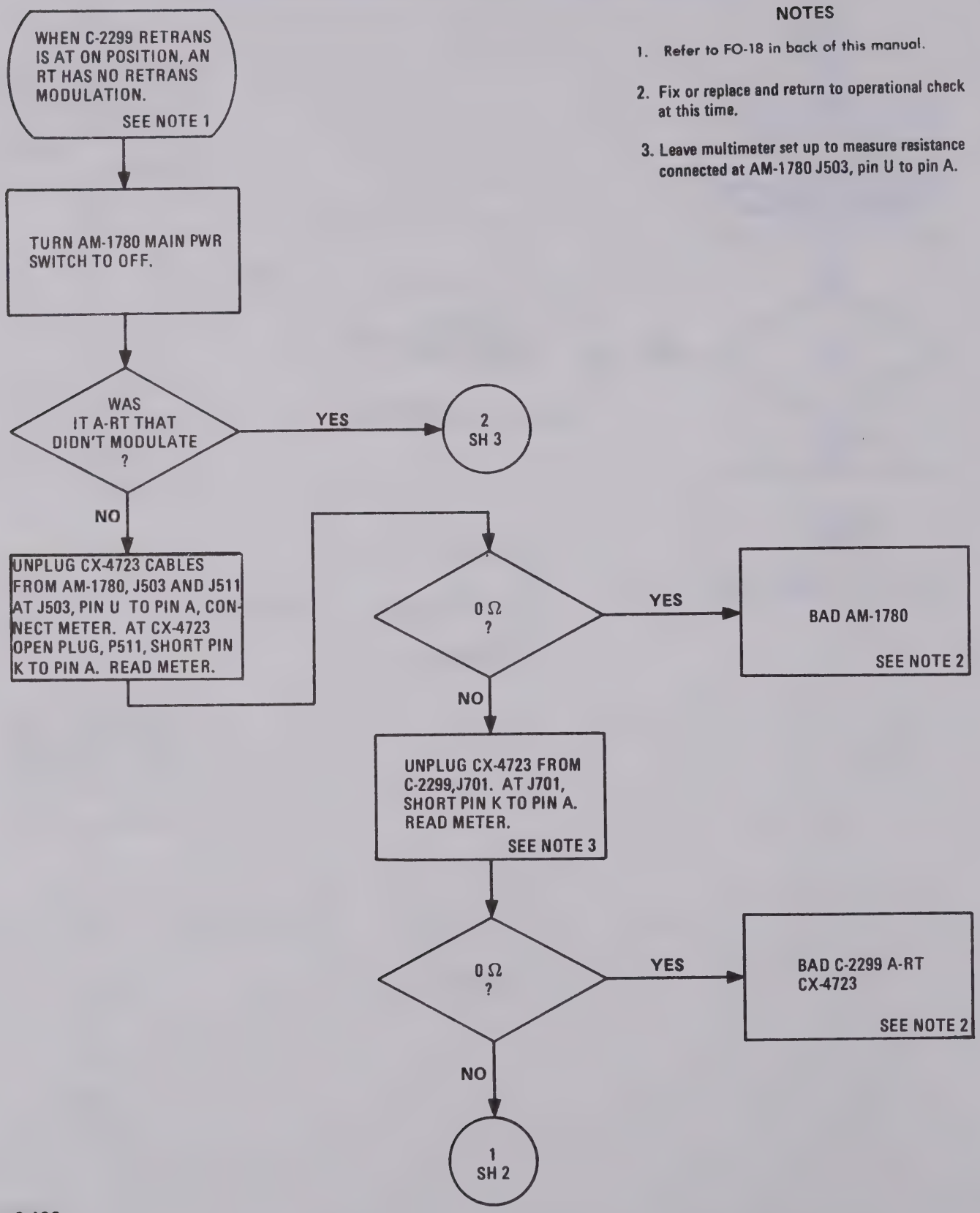
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 52
Troubleshoot Retransmit Keying Circuit (Adverse Open) (Sheet 6 of 6)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 53
Troubleshoot Retransmit Modulation Circuit (Sheet 1 of 4)

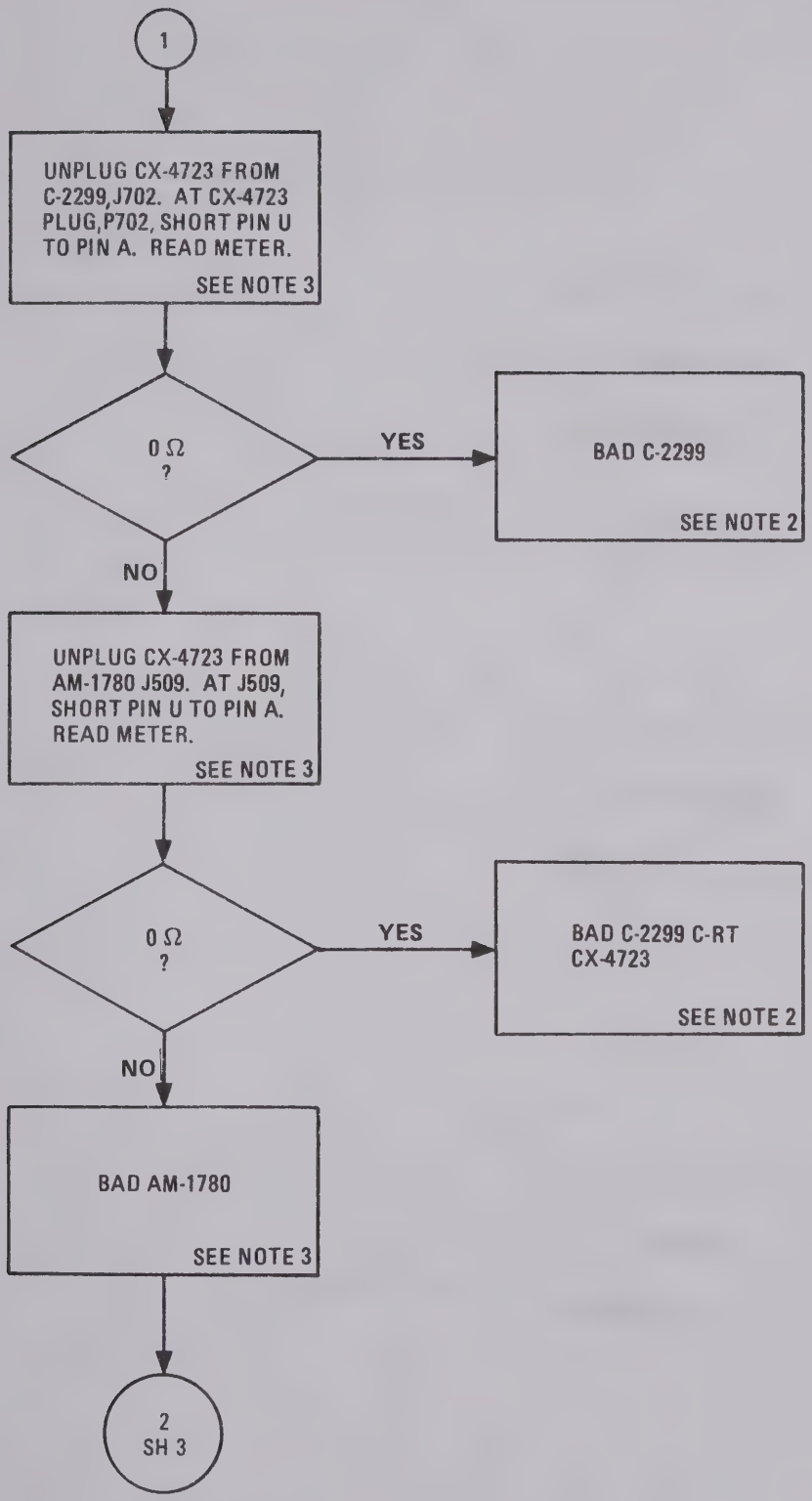


NOTES

1. Refer to FO-18 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Leave multimeter set up to measure resistance connected at AM-1780 J503, pin U to pin A.

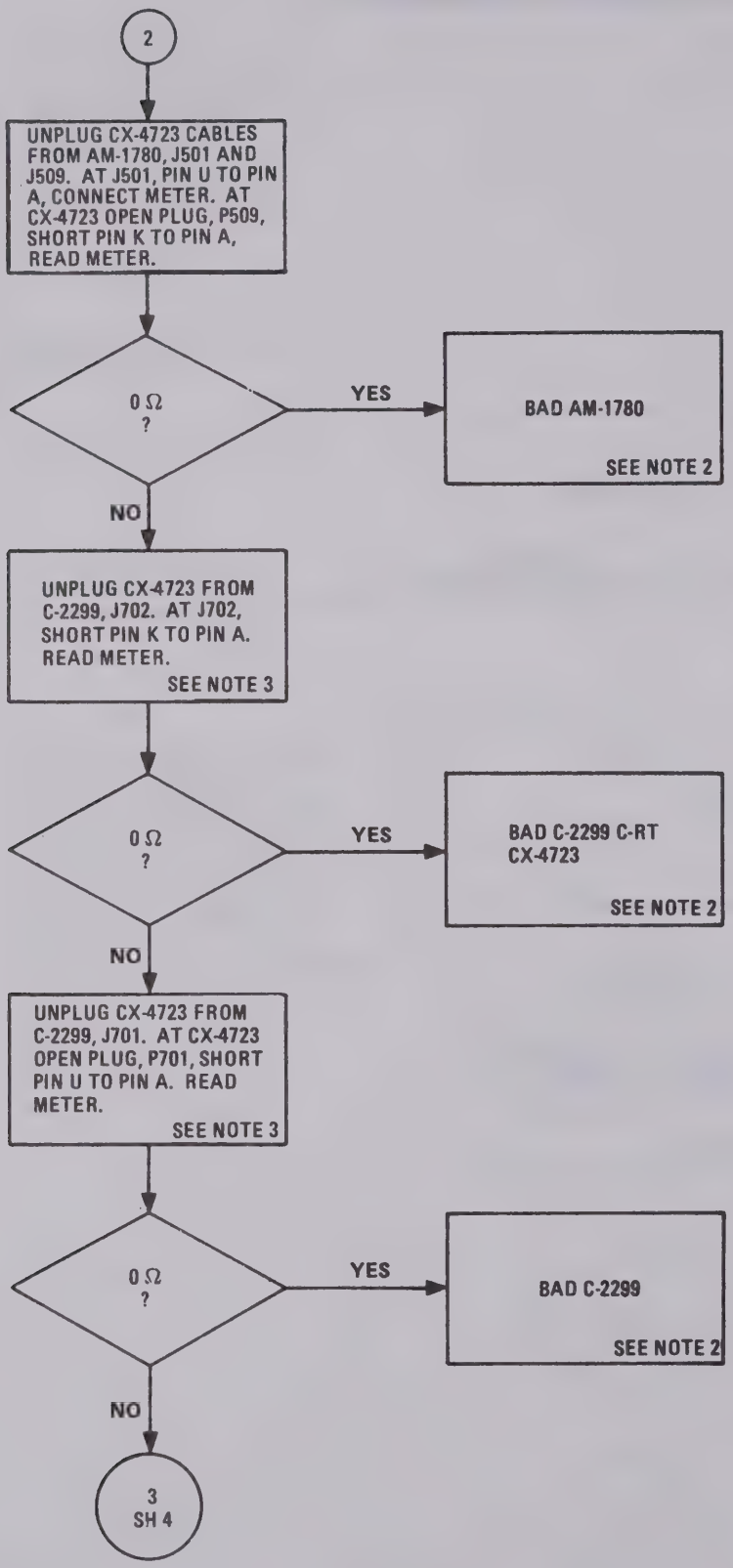
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 53
Troubleshoot Retransmit Modulation Circuit (Sheet 2 of 4)



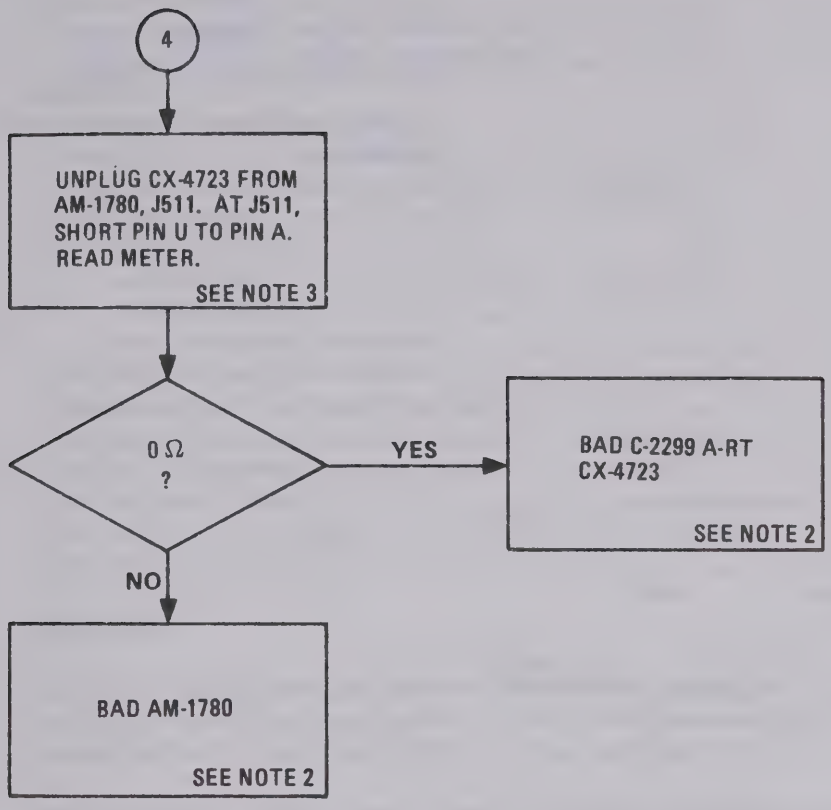
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 53
Troubleshoot Retransmit Modulation Circuit (Sheet 3 of 4)



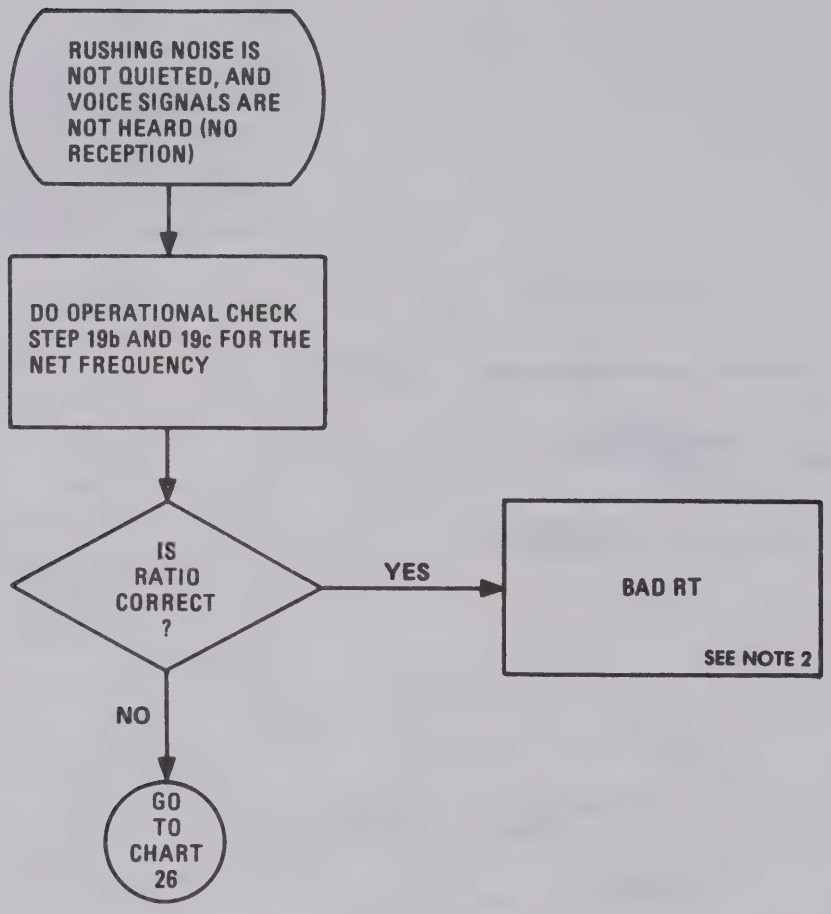
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 53
Troubleshoot Retransmit Modulation Circuit (Sheet 4 of 4)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 54
Troubleshoot RT Receive Signal Path (Sheet 1 of 1)



NOTE

1. Refer to FO-21 in back of this manual.
2. Fix or replace and return to operational check at this time.

Section IV MAINTENANCE PROCEDURES

Subject	Para	Page
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Procedure Using Test Set AN/PRM-34	3-14	3-189
Procedure Using Test Set AN/URM-182	3-15	3-232
Maintenance		
RT-246/VRC and RT-524/VRC	3-16	3-273
R-442/VRC	3-17	3-280
Antennas (Bases, Matching Units, and Elements)	3-18	3-285
RT Antennas		
AS-1729/VRC	3-18	3-285
AT-912/VRC	3-18	3-287
AS-2731/GRC	3-18	3-288
Auxiliary Receiver Antennas	3-18	3-290
MT-1029/VRC and MT-1878/VRC	3-19	3-292
Replacement of Transient Suppressor	3-20	3-296
Minisuppressor	3-21	3-297
AN/VIC-1 Components	3-22	3-298
Control Box C-2299/VRC	3-23	3-303
Control Box C-2742/VRC	3-24	3-305
Cables	3-25	3-307

OVERVIEW

This section contains organizational maintenance procedures for the items of equipment that make up the tracked vehicle communication system. This system consists of the AN/VIC-1(V) intercom set installed with any one of eight AN/VRC-12 series radio sets.

The Operational Check is used to see if the equipment is functioning properly. Faults or malfunctions found during the Operational Check indicate what troubleshooting should be done to locate a faulty item of equipment.

Maintenance procedures are provided for fixing or replacing each item of equipment at the organizational maintenance level using authorized tools and repair equipment and replacement parts. Refer to appendix B, Maintenance Allocation Chart.

3-13. OPERATIONAL CHECK.

The Operational Check (Op Check) provides a step-by-step procedure for evaluating the communications system (any one of eight AN/VRC-12 series radio sets in combination with intercom set AN/VIC-1(V)) installed in military, tracked vehicles. It specifies the procedure to be used to check the operational state of the radio set's and the intercom set's items of equipment. It includes tests for the RT's, each RT antenna and C-2742/VRC, auxiliary receivers and their antenna, radio components' mounts, the amplifier/junction box, various crewmember control boxes, and the communication system's retransmission box.

3-13. OPERATIONAL CHECK. (CONT)

The Op Check is normally done with the equipment installed in the vehicle. As a minimum, the Op Check is done as part of the scheduled preventive maintenance checks and services (PMCS) for the vehicle's communications system. At the discretion of the C-E equipment maintenance supervisor, the Op Check could be done more often than the scheduled PMCS. After every repair of an item of equipment, the portion of the Op Check that applies to that item of equipment should be done again to insure that the malfunction has been corrected and that no other malfunctions exist.

NOTE

To insure valid evaluation results for the components of the communication system being checked, the Op Check must be followed exactly as written.

The Op Check first lists certain **preparatory actions** that, when done, establish a starting condition for the **equipment performance checklist** that follows.

The equipment performance checklist portion is divided into **blocks** (A, B, C, etc.) and each **block** contains Op Check steps that, when done, test a specific circuit, or a set of closely related circuits, within a major component or within two or more components connected and working together.

Overall, and within each block, the Op Check **steps** are numerically sequenced (1, 2, 3, etc.) and these **step** numbers should be referenced when completing columns a and c of a reporting worksheet, DA Form 2404.

Each step is **subtitled** according to the specific functions being checked, and each column lists the **actions** to be done and the **expected normal indications.**

When **normal** indications are observed for a specific **step**, proceed to the next step or follow the How to Proceed instructions below that step. When **normal** indications are observed for all steps within a block, follow the How to Proceed instructions at the end of that block.

When **abnormal** indications are observed for a specific step, that step will either state the faulty item of equipment or reference a **troubleshooting chart**, by number. These charts are contained in section III of this chapter.

Each **troubleshooting chart** provides a step-by-step troubleshooting method (including t/s techniques and a procedure) that when followed will identify the faulty item of equipment.

Throughout the Op Check are cautions, warnings, and setups that must be observed or done for equipment and personal safety as well as an accurate evaluation of all of the communication system's functions.

3-13. OPERATIONAL CHECK. (CONT)

Based on which test set is available (AN/PRM-34 or AN/URM-182) two versions of the Op Check procedure are provided.

1. When Test Set AN/PRM-34 is available, use the procedure of paragraph 3-14 below.
2. When Test Set AN/URM-182 is available, use the procedure of paragraph 3-15, starting on page 3-232.

3-14. PROCEDURE USING TEST SET AN/PRM-34.

The AN/PRM-34 test set must be used to complete this procedure. Cabling instructions and test set switch settings for the AN/PRM-34 will be given as they apply throughout the procedure.

INITIAL ADJUSTMENTS

WARNING

To safeguard against electrical shock and possible damage to equipment, remove or tape **all** personal exposed metal objects such as watches, rings, and medallions.

To prevent possible personal injury and damage to the equipment, turn all communication component POWER switches to OFF. Depending on the type of vehicle and its actual communication system, turn OFF the following:

1. Vehicle MASTER POWER switches (hull and turret)
2. MX-7777 circuit breaker and BATTLE OVERRIDE switches
3. AM-1780 MAIN PWR and POWER CKT BKR switches
4. RT unit (RT-524/RT-246) POWER switches
5. R-442 POWER switches
6. C-2742 PWR SW (power switch) switches.

CAUTION

Do not start vehicle engine with communication system turned on. Make certain that **all** communication components that have POWER switches are turned to OFF. Starting a vehicle engine with the communication system on can cause serious damage to its components.

INSTALLATION CHECKS

Refer to chapter 1, section II of this manual or an appropriate 2300 series TM to insure that all items of equipment of the communication system are properly installed and that all cables are properly routed and connected.

NOTE

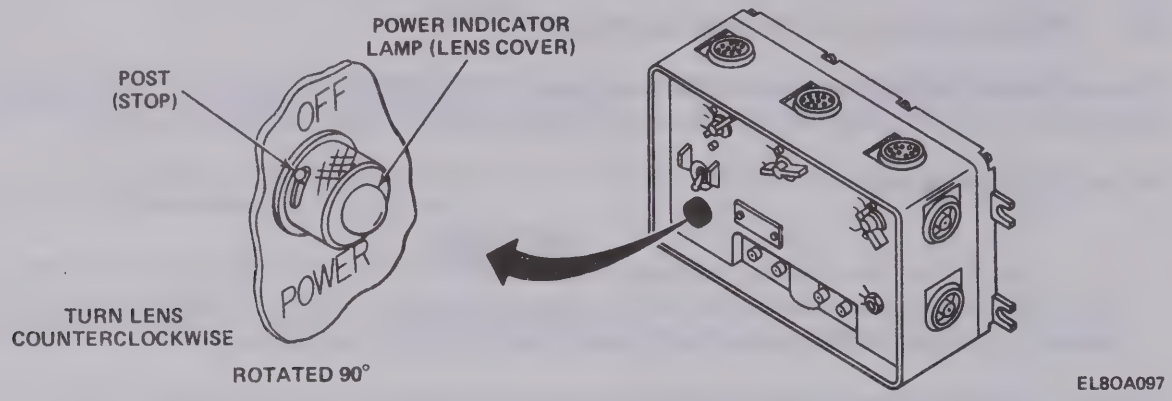
TM 11-5820-401-10-2-HR contains example hand receipts that, based on the type of vehicle and the communication system configurations, can be used to inventory items of equipment and determine National stock numbers (NSN's).

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

PRESET CONTROLS

To establish a logical starting point for the evaluation procedures, the controls of the components of the communication system must be preset according to the following preparatory actions.

MAIN JUNCTION BOX, AM-1780/VRC



Set the AM-1780/VRC controls as follows:

1. Set INSTALLATION SWITCH at:
   RETRANS when radio set is an AN/VRC-49 (-45) with Relay Box C-2299.
   OTHER for all other radio set configurations.
2. Turn RADIO TRANS switch to LISTENING SILENCE.
3. Turn INT ACCENT switch to OFF.
4. Open POWER lamp lens cover by turning lens cover counterclockwise to stop (about one-eighth turn).

CAUTION

The POWER lamp receptacle may become loose and rotate in the AM-1780 housing causing an adverse short. Do not operate the AM-1780 when this receptacle is loose.

CONTROL BOX, C-2299/VRC (WHEN INCLUDED)

Turn RETRANS switch to OFF.

RECEIVER-TRANSMITTERS, RT-524/VRC AND RT-246/VRC

Set the controls of **all** Receiver-Transmitters as follows:

1. Turn BAND switch to 30-52 (A).
2. Turn LIGHT switch to ON.
3. Turn SPEAKER switch to ON (RT-524/VRC only).
4. Tune MC-TUNE-KC controls for 50.00 MHz.
5. Turn SQUELCH switch to OLD OFF.
6. Turn VOLUME control fully counterclockwise to stop (no volume).

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

RECEIVER-TRANSMITTERS, RT-524/VRC AND RT-246/VRC (CONT)

NOTE

Objectionable interference may result when an RT is tuned to 33.90; 45.20; 56.50; and 67.80 MHz. Avoid tuning an RT to these frequencies.

RECEIVERS R-442/VRC (WHEN INCLUDED)

Set the controls of **all** auxiliary receivers as follows:

1. Turn BAND switch to 30-52 (A) .
2. Turn LIGHT switch to ON.
3. Tune MC-TUNE-KC controls for 50.00 MHz.
4. Turn VOLUME control fully counterclockwise to stop (no volume).
5. Turn SQUELCH switch to OLD OFF.

REMOTE BOX, C-2742/VRC (WHEN INCLUDED)

Unplug **all** CX-7059 cables from their RT-246 REMOTE jacks.

CONTROL BOX, C-2297/VRC (WHEN INCLUDED)

Set the C-2297 controls (at the driver's location) as follows:

1. Turn external control switch to OFF.
2. Open lamp lens cover by turning lens collar counterclockwise to stop (about one-eighth turn). See illustration on page 3-190.

CAUTION

The lamp receptacle may become loose and rotate in the C-2297 housing causing an adverse short. Do not operate the C-2297 if this receptacle is loose.

VERIFY OPERATION OF HANDSET H-189/U (H-250/U)

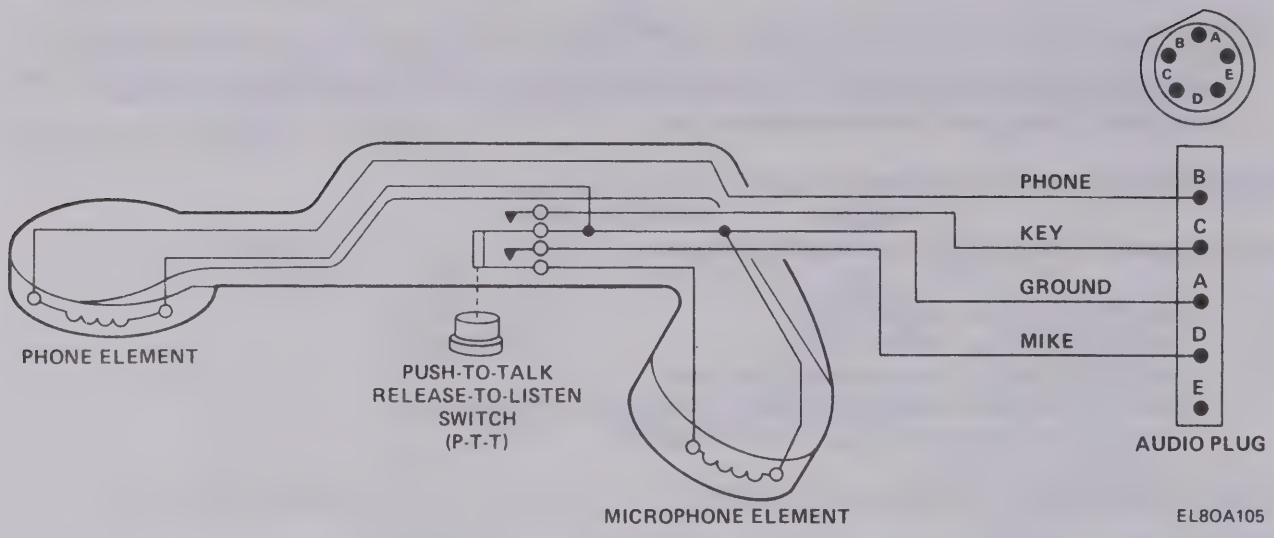
To check the performance of the components of the communication system, a **known good** handset **must** be used. Operation of the handset can be checked by using a multimeter as follows.

NOTE

Set up multimeter for OHMS, RX10 and do the following checks.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

VERIFY OPERATION OF HANDSET H-189/U (H-250/U) (CONT)



Phone Element Check: Circuit disturb between Pin A and B of handset's audio plug. A clicking sound should be heard from phone element.

Keying Check: Connect meter leads between Pin A and C of handset's audio plug. With handset's push-to-talk switch held in, meter should show zero (0) ohms. With handset's push-to-talk switch released, meter should show infinity (∞) ohms.

Microphone Element Check: Connect meter leads between Pin A and Pin D of handset's audio plug. While listening to microphone element, press and release handset's push-to-talk switch several times. A clicking sound should be heard from microphone element.

NOTE

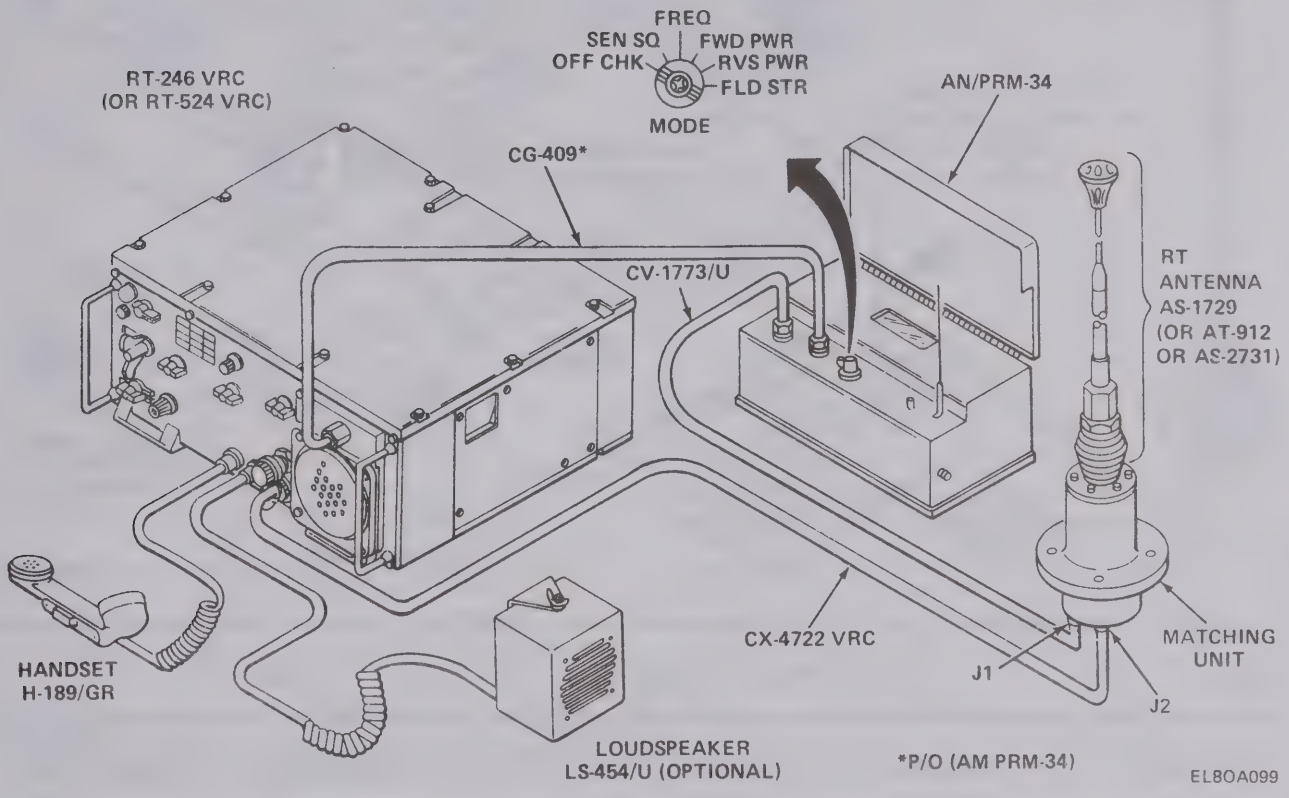
Before connecting cables and audio accessories to components of the communication system, make sure that all plug and jack contacts or pins are clean and undamaged. After connection, insure that the connection is tight.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

AN/PRM-34 TEST SET CABLING

The AN/PRM-34 is a self-contained test set that can be used to check specific functions of the radio set components (RT-524, RT-246 and R-442) and their antennas. For all radio sets of the communication system, first connect the test set to the A-RT and then, **as directed later**, connect it to other radio components as illustrated below.

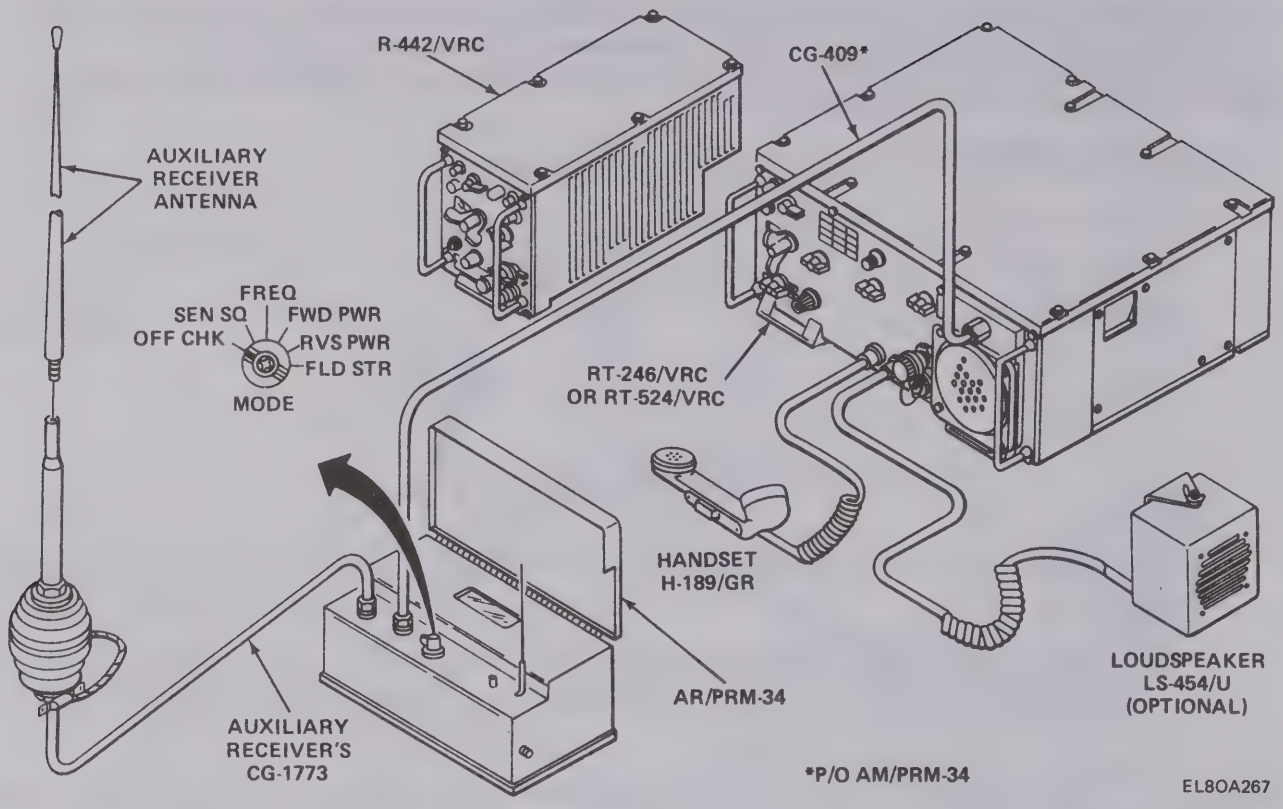
RT-524/VRC OR RT-246/VRC (RT AND RT's ANTENNA CHECKS)



FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-409	AN/PRM-34	RADIO		A-RT	ANT	
CG-1773/U(RT)	AN/PRM-34	ANT		Matching Unit	J1	
CX-4722/VRC	A-RT	ANT CONT	P1	Matching Unit	J2	P2

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

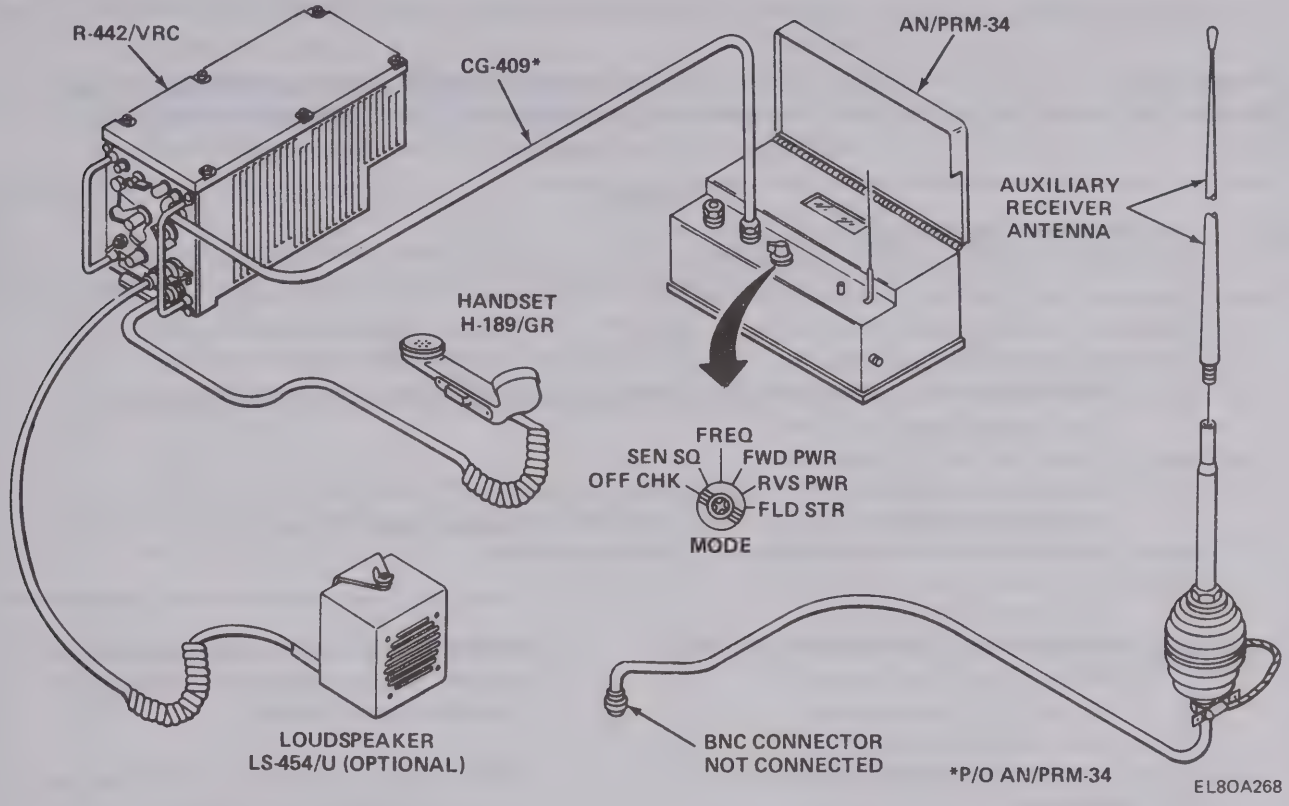
AUXILIARY RECEIVER(S) ANTENNA CHECKS



FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-1773 (Aux Receiver)	AN/PRM-34	ANT		Auxiliary Receiver Antenna Base AB-15 or AB-558		
CG-409	AN/PRM-34	RADIO		A-RT	ANT	

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

R-442/VRC, RECEIVER CHECKS



FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-409	Aux Rec	ANT		AN/PRM-34	Radio	

VERIFY OPERATION OF TEST SET AN/PRM-34

The AN/PRM-34 has a self-check feature that is used to verify its operation. Self-check the AN/PRM-34 before using it to test radio components as follows.

CAUTION

To prevent possible damage to the AN/PRM-34, insure that the communication system is off before self-checking the test set. (Actions of Initial Adjustments must be done first.)

1. Turn AN/PRM-34 MODE switch to OFF/CHECK.
2. Press down AN/PRM-34 PUSH TO TEST switch. The MHz lamp should light and display should be 01.000 or 1-000. Any other indications indicate a faulty AN/PRM-34 (possibly a bad battery).
3. Release PUSH TO TEST switch before going on.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

A. INTERCOM INPUT POWER CHECKS

Do these checks for all communication systems. Some systems use a minisuppressor (plugged into a radio mount dc outlet jack) instead of a Transient Suppressor MX-7777. When this is the case, skip step 1b.

Step 1 AM-1780/VRC INPUT POWER

NOTE

For these checks, the BATTLE OVERRIDE switch of the MX-7777A should remain OFF (closed hood).

A minisuppressor may be used in place of the MX-7777. If so, the minisuppressor lamp should **not** be lit. View the minisuppressor through the radio mount. If lamp is lit, replace minisuppressor.

a. Set vehicle MASTER power switch(es) to ON.	a. Vehicle MASTER power lamp(s) should light. If lamp(s) does not light, report condition to supervisor.
b. If appropriate, set MX-7777 circuit breaker to ON.	b. MX-7777 circuit breaker should stay on. If circuit breaker trips, refer to troubleshooting chart 1.
c. Turn AM-1780 MAIN PWR switch to INT ONLY.	c. AM-1780 POWER lamp should **not** light. If lamp lights, AM-1780 is bad.
d. Set AM-1780 POWER CKT BKR switch to ON.	d. AM-1780 POWER lamp should light. If POWER lamp does not light, refer to troubleshooting chart 2. If POWER CKT BKR trips OFF, refer to troubleshooting chart 3.

HOW TO PROCEED. Go to block B.

B. COMMANDER'S (CDR) CONTROL BOX, C-2298/VRC, INTERCOM CHECKS

Do these checks for the commander's C-2298. In some vehicles a C-2742 is mounted on top of the CDR box. When this is the case, check the C-2742 functions **as directed later**.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 2	INTERCOM KEYING AND TALK/LISTEN FROM INT JACK	
	Setup for commander's (CDR) control box: 1. Connect handset to INT jack, J803 (yellow band). 2. Turn VOLUME control fully clockwise (maximum volume). **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	a. One at a time, for each listed position of MONITOR switch, key handset and speak into its microphone. ALL A INT ONLY B C (Unkey handset before going on.)	a. For each listed position of MONITOR switch, AM-1780 relays should click and intercom voice sidetone should be heard. If for: Any switch position, relays do **not** click **and** there is **no** sidetone, refer to troubleshooting chart 4. Any switch position, relays do **not** click **but** sidetone is heard, refer to troubleshooting chart 5. Every switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 6. Every switch position, relays click **but** there is **no** sidetone except for position C, position C is normal. Refer to troubleshooting chart 6.1. A particular switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 7.
	INTERCOM KEYING AND TALK/LISTEN FROM RAD JACK	
	Setup for commander's (CDR) control box: 1. Move handset to RAD jack, J802. 2. Turn MONITOR switch to INT ONLY. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	b. Key handset and speak into its mike. (Unkey handset before going on.)	b. AM-1780 relays should click **and** sidetone should be heard. If indications are incorrect, the CDR C-2298 is bad.
	HOW TO PROCEED. When installation has: Only a driver's box (no crewmember's boxes), go to block D. Crewmember boxes, check each crewmember box, in turn, one at a time according to block C.	

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

C. CREWMEMBER'S (CREW) CONTROL BOX(ES), C-2298/VRC, INTERCOM CHECKS

Do these checks for each crewmember's C-2298 (one at a time) but not driver's control box. In some vehicles a C-2742 is mounted on top of a specific crewmember's control box. When this is the case, check the C-2742 functions **as directed later.**

Step 3	INTERCOM KEYING AND TALK/LISTEN FROM INT JACK	
	Setup for crewmember's control box being checked: 1. Move handset to INT jack, J803 (yellow band). 2. Turn crewmember's box VOLUME control fully clockwise (maximum volume). **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	a. One at a time, for each listed position of MONITOR switch, key handset and speak into its microphone. ALL A INT ONLY B (Unkey handset before going on.)	a. For each listed position of MONITOR switch, AM-1780 relays should click and intercom voice sidetone should be heard. If for: Any switch position, relays do **not** click **and** there is **no** sidetone, refer to troubleshooting chart 4. Any switch position, relays do **not** click **but** sidetone is heard, refer to troubleshooting chart 8. Every switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 6. A particular switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 7.
	INTERCOM KEYING AND TALK/LISTEN FROM RAD JACK	
	Setup for crewmember's control box being checked: 1. Move handset to RAD jack, J802. 2. Turn MONITOR switch to INT ONLY. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 3 (cont)	b. Key handset and speak into its mike. (Unkey handset before going on.)	b. AM-1780 relays should click and sidetone should be heard. If indications are incorrect, C-2298 being checked is bad.
HOW TO PROCEED. When installation has: More than one crewmember C-2298, repeat step 3 for each additional crewmember C-2298, one at a time, (but not driver's box). Only one crewmember C-2298, **or** all crewmembers' C-2298's have been checked, go to block D.		

D. DRIVER'S CONTROL BOX, C-2298/VRC OR C-2297/VRC, INTERCOM CHECKS

Do these checks for any driver's C-2298 or C-2297. In some vehicles the driver has a C-2298 and others a C-2297. When a C-2297 is used, check its additional functions **as directed later.**

Step 4	INTERCOM KEYING AND TALK/LISTEN FROM INT JACK	
	Setup for driver's control box: 1. Connect handset to INT jack, J803 or J903 (yellow band). 2. Turn VOLUME control fully clockwise (maximum volume). 3. If control box is a C-2297, the external control switch should be at OFF. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	a. One at a time, for each listed position of MONITOR switch, key handset and speak into its microphone. ALL A INT ONLY B (Unkey handset before going on.)	a. For each listed position of MONITOR switch, AM-1780 relays should click and intercom voice sidetone should be heard. If for: Any switch position, relays do **not** click **and** there is **no** sidetone, refer to troubleshooting chart 4. Any switch position, relays do **not** click **but** sidetone is heard, refer to troubleshooting chart 8. Every switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 6. A particular switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 7.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 4 (cont)	INTERCOM KEYING AND TALK/LISTEN FROM RAD JACK	
	Setup for driver's control box: 1. Move handset to RAD jack, J802 or J902. 2. Turn MONITOR switch to INT ONLY. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	b. Key handset and speak into its mike. (Unkey handset before going on.)	b. AM-1780 relays should click and sidetone should be heard. If indications are incorrect, driver's C-2298 or C-2297 is bad.
HOW TO PROCEED. When driver's box is a: C-2298, go to block F. C-2297, make sure lamp lens cover is open (counterclockwise to stop), then go to block E and complete steps 5 and 6.		

E. C-2297/VRC – C-2296/VRC SIGNALING AND OUTSIDE CONTROL BOX, C-2296/VRC, INTERCOM CHECKS

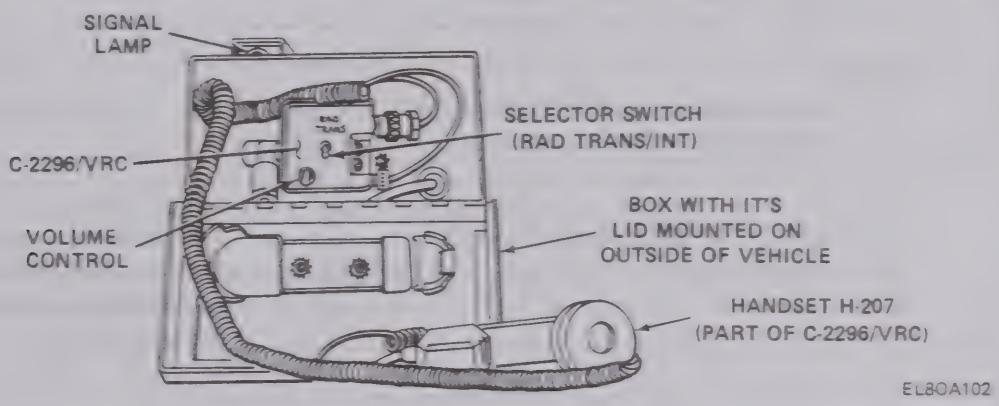
Do these checks when an outside control box, C-2296, is connected to the driver's C-2297.

Step 5	C-2297 – C-2296 SIGNALING	
	NOTE For substep c, C-2296 signal lamp is also checked.	
	Turn C-2297 external control switch as follows: a. OFF	Signal lamp should: a. **Not** light. If lamp does light, refer to troubleshooting chart 9.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 5 (cont)	b. EXT	b. Light. If lamp does **not** light **and:** AM-1780 POWER CKT BKR does **not** trip, C-2297 lamp or its circuit is bad. AM-1780 POWER CKT BKR trips, refer to troubleshooting chart 10. If lamp does light, **but** AM-1780 relays click, refer to troubleshooting chart 9.
	c. SIG	c. Light. If lamp does **not** light, refer to troubleshooting chart 11.
	Direction: Return C-2297 external control switch to EXT and its MONITOR switch to ALL.	

OUTSIDE CONTROL BOX, C-2296/VRC, INSTALLED WITH SIGNAL LAMP



Step 6	OUTSIDE CONTROL BOX, C-2296, INTERCOM KEYING AND TALK/LISTEN

Setup:
1. Turn C-2296 VOLUME control fully clockwise (maximum volume).
2. C-2296 switch should be at INT (spring held).
3. C-2297 external control switch should be at EXT.

NOTE

For this check, intercom sidetone loudness depends on control box VOLUME setting.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 6 (cont)	Key handset H-207 and speak into its mike. (Unkey handset before going on.)	AM-1780 relays should click **and** intercom voice sidetone should be heard. If relays do **not** click, refer to trouble-shooting chart 12. If relays click **but** there is **no** sidetone, refer to troubleshooting chart 13.
HOW TO PROCEED. Go to block F.		

F. A-RT REMOTE AND AM-1780 INTERCOM RETURN POWER CHECKS

Do these checks for all communication systems. **All** systems have A-RT's and some systems have additional radio components. When this is the case, check the additional radio component's remote power functions **as directed later**.

Step 7	A-RT REMOTE INPUT POWER	
	Setup: 1. Move handset to A-RT RETRANSMIT R/W jack. 2. AM-1780 MAIN PWR switch should be at INT ONLY.	
	a. Turn A-RT POWER switch to LOW.	a. A-RT dial lamp should **not** light **and** A-RT matching unit should **not** switch. If indications are incorrect, refer to troubleshooting chart 14.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 7 (cont)	AM-1780 INTERCOM RETURN INPUT POWER AND A-RT REMOTE POWER	
	b. Slowly turn AM-1780 MAIN PWR switch to NORM.	b. AM-1780 POWER lamp should momentarily go off (blink); then AM-1780 POWER lamp **and** A-RT dial lamp should light. A-RT matching unit might switch. If A-RT dial lamp **and** AM-1780 POWER lamp **do not** light, refer to troubleshooting chart 15. If A-RT dial lamp **does** light but AM-1780 POWER lamp **does not** come back on, refer to troubleshooting chart 16. If AM-1780 POWER lamp comes on, **but** A-RT dial lamp **does not** light, A-RT dial lamp or circuit is bad. If A-RT keys (blower runs **and** a FWD PWR check indicates rf transmit power), refer to troubleshooting chart 17.
HOW TO PROCEED. Go to block G.		

G. RT AUDIO OUTPUT AND INITIAL MATCHING UNIT (MX) CONTROL CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 8	AUDIO OUTPUT
	Setup: 1. Unplug Antenna Cable CG-1773 from AN/PRM-34 ANT jack. 2. Handset should be connected to RT being checked. **CAUTION** **Do not** key an RT when Antenna Cable CG-1773 is unplugged.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 8 (cont)	Turn RT VOLUME control fully clockwise (cw); then counterclockwise (ccw) to midpoint.	In earphone and speaker: Rushing noise loudness should increase. At full volume, rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard in earphone, refer to troubleshooting chart 18. If rushing noise is not heard in speaker, refer to troubleshooting chart 19.
Step 9	INITIAL MATCHING UNIT (MX) CONTROL	
	Turn RT BAND switch to other setting: then **return** to original setting.	Switching sound should be heard at the matching unit. (For the MX-6707 or MX-9146 the range setting should agree with the RT MC setting.) If matching unit fails to switch or won't stop switching, refer to troubleshooting chart 20.
HOW TO PROCEED. Go to block H.		

H. RT RECEIVER FUNCTIONS AND MX CONTROL CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 10	SQUELCH CONTROL AND CALL LAMP	
	Rotate RT SQUELCH switch through all four positions.	a. **OFF positions:** Loud rushing noise should be heard. b. **ON positions:** Rushing noise should be quieted (eliminated). c. **CALL lamp:** Should remain OFF for all positions. If indications are incorrect, RT being checked is bad.

3-14. PROCEDURE USING TEST SET AN/PRM - 34. (CONT)

Step 11	RECEIVER SENSITIVITY (RECEPTION) AND COMPLETE MX CONTROL	
	Setup: Turn AN/PRM-34 MODE switch to SEN SQ. Direction: For the RT being checked, starting with 50.00 MHz, do the substeps (a thru d) for each frequency listed below. Frequency setting: **1**. 50.00, **2**. 45.00, **3**. 40.00, **4**. 35.00, **5**. 30.00 (change BAND switch setting) **6**. 55.00, **7**. 60.00, **8**. 65.00, **9**. 70.00 and **10**. 75.00.	
	a. As RT frequency is changed, listen for matching unit switching.	a. MX switching sound should be heard when RT MC setting is changed by more than 3 MHz. If, for any setting, MX fails to switch or its switching won't stop, refer to troubleshooting chart 20.
	b. Turn RT SQUELCH switch to OLD OFF; then press down and release AN/PRM-34 PUSH TO TEST several times.	b. When AN/PRM-34 PUSH TO TEST is pressed, rushing noise should be quieted and a tone should be heard at audio accessories. When AN/PRM-34 PUSH TO TEST is released, rushing noise should be heard. If indications are incorrect, RT being checked is bad.
	c. Turn RT SQUELCH switch to NEW OFF; then press down and release AN/PRM-34 PUSH TO TEST several times.	c. Indication should be the same as sub-step b.
	d. One at a time, tune RT (in 5-MHz steps) to other nine frequency settings listed. At each setting, repeat substeps a, b, and c.	d. For each frequency setting, indications should be same as in substeps a and b.
Step 12	SQUELCH SENSITIVITY	
	Setup: 1. Tune RT being checked to 75.00 MHz. 2. AN/PRM-34 MODE switch should be at SENS SQ.	

3-14. PROCEDURE USING TEST SET AN/PRM - 34. (CONT)

Step 12 (cont)	a. Turn RT SQUELCH switch to NEW ON; then press down and release AN/PRM-34 PUSH TO TEST several times.	a. When AN/PRM-34 PUSH TO TEST is pressed, CALL lamp should light; a tone should be heard. When AN/PRM-34 PUSH TO TEST is released, CALL lamp should go off and a **very short** burst of rushing noise should be heard. If these indications are incorrect, RT being checked is bad.
	b. Turn RT SQUELCH switch to OLD ON; then again press down and release the AN/PRM-34 PUSH TO TEST several times.	b. Indication should be the same as sub-step a.
HOW TO PROCEED. Go to block I.		

I. RT KEYING AND MUTING CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 13 KEYING

Setup:
1. Return SQUELCH switch of RT being checked to OLD OFF.
2. Replug CG-1773 to AN/PRM-34 ANT jack.
3. POWER switch of RT being checked should be at LOW.

CAUTION

For this check, **do not** key RT when antenna is disconnected. When keyed, if blower does not run, **do not** keep RT keyed for more than 3 seconds.

Key RT. (Press/release the PTT switch several times.) (Unkey RT before going on.)	**When PTT is pressed,** RT relays should click, blower should run; rushing noise should drastically reduce. If there is no keying, RT being checked is bad. **When PTT is released,** relays should again click, rushing noise should return and blower might stop running. If RT remains keyed, refer to trouble-shooting chart 17.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 14 MUTING		
	With RT speaker on (VOLUME at mid-point), again key RT. (Unkey RT before going on.)	With mike at about 10 inches from speaker, there should be **no** audio feedback (squeal). If feedback does occur, RT being checked is bad.
HOW TO PROCEED. When RT being checked is an: RT-246, go to block J. RT-524, go to block L.		

J. RT-246 SERVO TUNE (AUTOMATIC TUNING) CHECKS

Do this check for all RT-246's. When radio set is an AN/VRC-45, first do this check for the A-RT and then **as directed later** do it again for the C-RT.

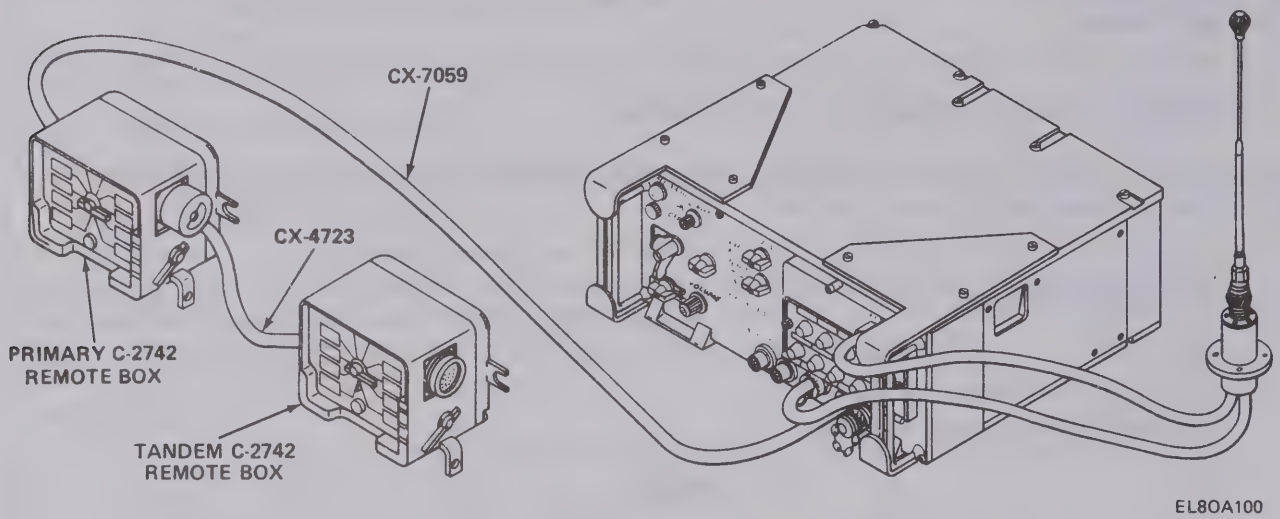
Step 15 AUTOMATIC TUNE		
	Setup for RT being checked: Turn RT BAND switch to AUTO. **NOTE** Instructions for presetting RT-246 pushbuttons are on closed side of the pushbutton's hinged cover. Refer to sample DA Form 2404 of block L (page 3-211) for ten frequencies to be preset.	
	a. Using the ten frequencies given, preset frequency 1 on pushbutton ①, frequency 2 on pushbutton ②, etc., until all ten are preset. b. In descending order, press each pushbutton, **but allow each tuning cycle to complete before pressing another pushbutton.**	a. The preset frequency should appear in RT dial-frequency window as presetting is accomplished. MX switching sound should be heard. b. RT MC-TUNE-KC controls should change to preset frequency. MX switching sound should be heard. If RT fails to tune, RT being checked is bad. If, for any preset frequency, MX fails to switch or won't stop switching, refer to troubleshooting chart 20.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

HOW TO PROCEED. When RT-246 being checked has:
C-2742's, go to block K.
No C-2742's, go to block L.

K. RT-246/REMOTE BOX, C-2742 INTERFACE CHECKS

Do these checks for all RT-246's that have C-2742's. When radio set is an AN/VRC-45, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.



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When two remote boxes, C-2742, are in tandem, first check the box directly connected to the RT (primary C-2742).

Step 16	R-246 REMOTE POWER CONTROL	
	Setup for RT-246 being checked: 1. Press in RT-246 pushbutton ① (allow tuning cycle to complete). 2. Turn RT POWER switch to OFF. 3. Replug CX-7059 cables to appropriate RT REMOTE jack. 4. Unlock **all** C-2742 knob stops. 5. Turn **all** C-2742 CHAN SEL switches to channel 1 (lower left write-in space). 6. **All** C-2742 PWR SW (power switches) should be at OFF. 7. If two C-2742's are in tandem, unplug CX-4723 from primary C-2742.	
	a. Turn RT POWER switch to REMOTE.	a. RT should remain off. If RT comes on, refer to troubleshooting chart 21.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 16 (cont)	b. Turn C-2742 PWR SW to LO,then press back and release C-2742 SW (toggle switch).	b. RT dial lamp and C-2742 control lamp should light. (Power might come on without pressing SW.) If lamps fail to light, refer to troubleshooting chart 22.
Step 17	RT-246 HIGH/LOW POWER CONTROL (RT TRANSMIT RF)	
	Turn C-2742 PWR SW to HI; then to LO, several times.	At RT, high/low power relay should click each time C-2742 PWR SW is changed. If relay fails to click, refer to trouble-shooting chart 23.
Step 18	RT-246 REMOTE FREQUENCY SELECTION	
	In turn, **but allowing each tuning cycle to complete,** turn C-2742 CHAN SEL switch through all ten positions.	RT MC-TUNE-KC controls and BAND switch (as appropriate) should change according to the ten RT-246 preset frequencies. If RT tunes to wrong frequency or won't stop tuning, refer to troubleshooting chart 24. If RT fails to change frequency, refer to troubleshooting chart 25.
	Direction: When C-2742's are in tandem, replug CX-4723 to primary C-2742 (J72). Repeat steps 16 b, 17 and 18 (above) for the second C-2742. (The primary C-2742 PWR SW must remain at LO or HI.) Upon completion go to step 19 below.	
Step 19	RT-246 REMOTE INPUT POWER CONTROL SHUTDOWN	
	a. Turn RT primary C-2742 PWR SW to OFF. b. Turn RT POWER switch to LOW.	a. RT should stop operating. If RT continues to operate, refer to trouble-shooting chart 21. b. RT dial lamp should light. If lamp fails to light, RT being checked is bad.
HOW TO PROCEED Go to block L.		

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

L. RT TRANSMITTER RF POWER LEVELS AND FREQUENCY ACCURACY CHECKS

Do this check for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

CAUTION

Insure that all antenna components and cables are connected to the appropriate RT.

NOTE

During the checks of block L, specific RT data must be recorded. This data is in addition to other maintenance actions recorded on the reporting DA Form 2404. Refer to illustration on page 3-211 for layout format of this additional worksheet.

Complete the heading on this form according to unit's standard operating procedure (SOP).

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

ADDITIONAL DA FORM 2404 SAMPLE LAYOUT

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET
For use of this form see TM 38 750 the proponent agency is the Office of the Deputy Chief of Staff for Logistics.

1 ORGANIZATION (RT Serial no.)		2 NOMENCLATURE AND MODEL		
3 REGISTRATION/SERIAL NSN	4a MILES	b (RT Model no. (e.g. RT-524, RT-246))	5 DATE	6 TYPE INSPECTION
7				
TM NUMBER	TM DATE	TM NUMBER		

COLUMN a — Enter TM item number.

COLUMN b — Enter the applicable condition status symbol.

COLUMN c — Enter deficiencies and shortcomings.

COLUMN d — Show corrective action for deficiency or shortcoming listed in Column c.

COLUMN e — Individual ascertaining completed corrective action initial in this column.

STATUS SYMBOLS

"X" — Indicates a deficiency in the equipment that places it in an inoperable status.

CIRCLED "X" — Indicates a deficiency, however, the equipment may be operated under specific limitations as directed by higher authority or as prescribed locally, until corrective action can be accomplished.

HORIZONTAL DASH "(-)" — Indicates that a required inspection, component replacement, maintenance operation check or test flight is due but has not been accomplished, or an overdue MWO has not been accomplished.

DIAGONAL "(/)" — Indicates a material defect other than a deficiency which must be corrected to increase deficiency or to make the item completely serviceable.

LAST NAME INITIAL IN BLACK, BLUE-BLACK INK, OR PENCIL Indicates that a completely satisfactory condition exists.

FOR AIRCRAFT Status symbols will be recorded in red.

ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.

8a. SIGNATURE (Person(s) performing inspection)	8b. TIME	9a. SIGNATURE (Maintenance Supervisor)	9b. TIME	10. MANHOURS REQUIRED

TM ITEM NO a	STATUS b	DEFICIENCIES AND SHORTCOMINGS c	CORRECTIVE ACTION d	INITIAL WHEN CORRECTED e
1.	75.00	a.____ FWD b.____ RVS c.____ MHz	6. 31.45 a.____ FWD b.____ RVS c.____ MHz	
2.	67.05	a.____ FWD b.____ RVS c.____ MHz	7. 35.60 a.____ FWD b.____ RVS c.____ MHz	
3.	62.20	a.____ FWD b.____ RVS c.____ MHz	8. 39.65 a.____ FWD b.____ RVS c.____ MHz	
4.	58.25	a.____ FWD b.____ RVS c.____ MHz	9. 44.80 a.____ FWD b.____ RVS c.____ MHz	
5.	54.40	a.____ FWD b.____ RVS c.____ MHz	10. 50.85 a.____ FWD b.____ RVS c.____ MHz	

DA FORM 1 APR 79 2404 Replaces edition of 1 Jan 64 which will be used

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3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 20 HIGH-LEVEL POWER AND FREQUENCY ACCURACY

Setup:
1. Prepare a worksheet (DA Form 2404). See illustration on page 3-211.
2. Turn POWER switch of RT being checked to HIGH.

NOTE

To obtain a valid check, the vehicle should be in a clear area of about a 25-foot radius of the RT antenna.

Direction:
Starting with 75.00 MHz, do the below listed substeps (a thru e) for each frequency listed on worksheet.

CAUTION

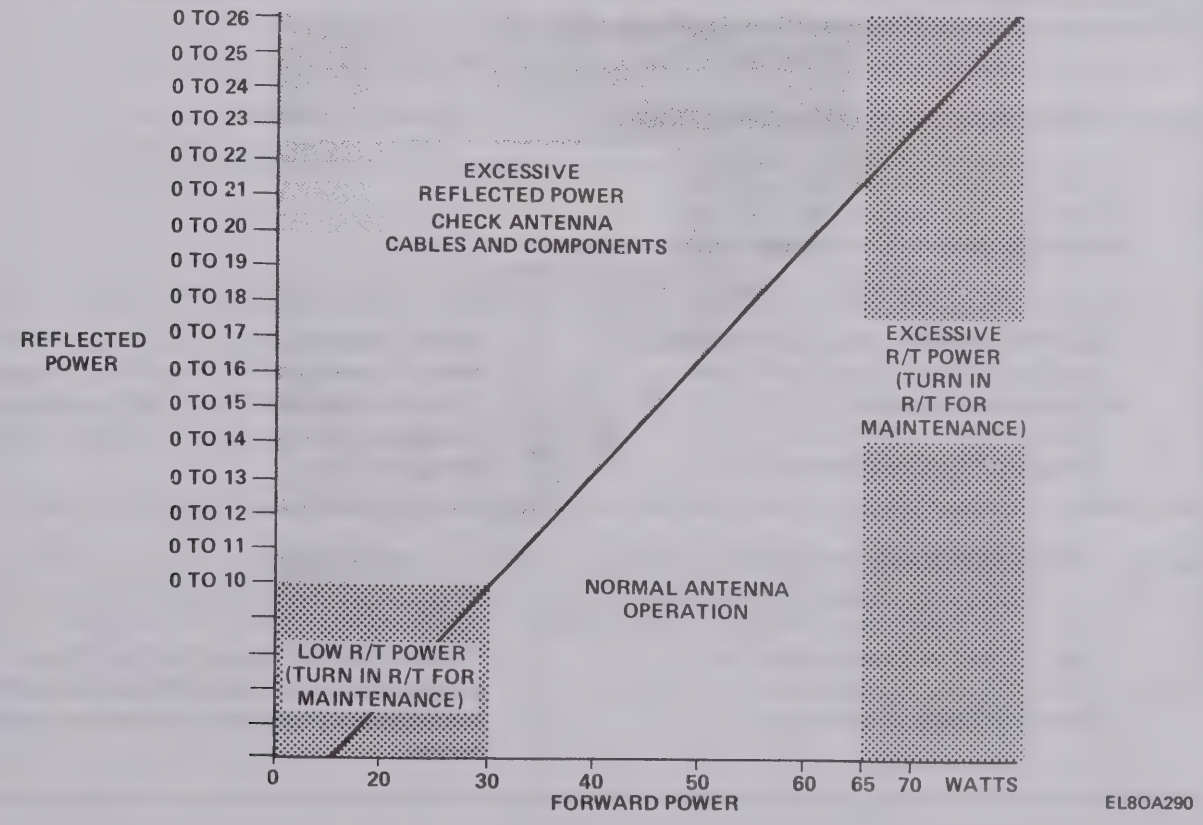
Do not change RT tuning when RT is keyed.

a. As RT frequency is changed, listen for matching unit switching.	a. MX switching sound should be heard when RT MC setting is changed. If, for any setting, MX fails to switch or won't stop switching, refer to troubleshooting chart 20.
b. Turn AN/PRM-34 MODE switch to FWD PWR. Key RT; then press down the AN/PRM-34 PUSH TO TEST. (On worksheet, next to the appropriate listed frequency, record the AN/PRM-34 reading at substep a.) Release PUSH TO TEST and unkey RT.	b. AN/PRM-34 should indicate (display) between 30 and 65 watts. EXAMPLE: 75.00 MHz $\frac{40}{\text{FWD}}$ Regardless of reading, complete substeps c, d, and e before referring to troubleshooting conclusions at end of this step.
c. Turn AN/PRM-34 MODE switch to RVS PWR. Key RT; then press AN/PRM-34 PUSH TO TEST. (On worksheet, next to appropriate listed frequency record the AN/PRM-34 reading at substep b.) Release PUSH TO TEST and unkey RT.	c. AN/PRM-34 should indicate (display) no more than one-third of FWD PWR reading. EXAMPLE: 75.00 MHz a. $\frac{40}{\text{FWD}}$ b. $\frac{13.3}{\text{RVS}}$

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 20 (cont)	d. Turn AN/PRM-34 MODE switch to FREQ. Key RT; allow 3-second warmup, then press down AN/PRM-34 PUSH TO TEST. (On worksheet, next to appropriate listed frequency, record the AN/PRM-34 reading at substep c.) Release PUSH TO TEST and unkey RT.	d. AN/PRM-34 should indicate (display) the RT dial frequency setting plus or minus (±) 4 kHz. EXAMPLE: 35.60 MHz not less than 35.596 not more than 35.604 If result is more than 4 kHz off dial frequency, RT being checked is bad.
	e. One at a time, tune RT being checked to other nine frequency settings listed on worksheet. At each frequency repeat substeps a through d and complete worksheet as directed.	e. For each frequency setting, indications should be same as substeps a through d. Troubleshooting conclusions: If, for any frequency setting: RVS PWR is more than one-third of FWD PWR reading regardless of the FWD PWR reading, refer to troubleshooting chart 26. RVS PWR is less than one-third of FWD PWR **but** FWD PWR is less than 30 watts or more than 65 watts, RT being checked is bad.

TRANSMITTED FORWARD-VS-REFLECTED POWER CHART (RT POWER SWITCH AT HIGH)



3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 21	LOW-LEVEL RF POWER OUTPUT	
	Setup: 1. Turn POWER switch of RT being checked to LOW. 2. Turn AN/PRM-34 MODE switch to FWD PWR.	
	a. Key RT; then press down AN/PRM-34 PUSH TO TEST. (Unkey RT before going on.)	a. AN/PRM-34 should indicate (display) 0.5 to 10 watts. If indication is incorrect, RT being checked is bad.
	b. Change RT BAND switch to other position. Key RT; then press down AN/PRM-34 PUSH TO TEST. (Unkey RT before going on.)	b. Indication should be the same as sub-step a.
HOW TO PROCEED. Go to block M.		

M. RT MODULATION AND SIDETONE CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 22	150-HZ SIDETONE AND MODULATION	
	Setup: POWER switch of RT being checked should be at LOW.	
	Key RT; while keyed, turn RT SQUELCH switch through all four positions. Listen to earphone. (Unkey RT before going on.)	150-Hz sidetone should be heard in earphone for all SQUELCH positions **except** OLD ON. (Adjust RT VOLUME as required.) If sidetone is not heard, RT being checked is bad.
Step 23	VOICE SIDETONE AND MODULATION	
	Key RT and initiate a radio check. (Unkey RT before going on.)	Voice sidetone should be heard in earphone. (Adjust RT VOLUME as required.) If sidetone is not heard, RT being checked is bad.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-12, -44, -47, -48 or -49; -45 (whose C-RT has **not** been checked), go to block N.
AN/VRC-43, -46 or -49; -45 (whose C-RT **has** been checked) go to block Q.

N. ADDITIONAL RADIO COMPONENT REMOTE POWER CONTROL CHECK

Do this check for all communication systems that have two or more radio components.

Step 24	REMOTE POWER CONTROL	
	NOTE If for substep b below, an additional radio component's dial lamp lights, the link of that additional component's mount is probably in direct. Check with your supervisor for direction.	
	a. Turn A-RT POWER switch to OFF.	a. A-RT dial lamp and AM-1780 POWER lamp should go off. If A-RT's lamp remains lit (regardless of action of AM-1780's POWER lamp), A-RT is bad. If A-RT's dial lamp goes off **but** AM-1780's POWER lamp stays on, refer to troubleshooting chart 27.
	b. Turn **all** additional radio component POWER switches to ON. (Not A-RT.)	b. Additional radio component(s) dial lamp(s) should **not** light. If an additional radio component's dial lamp lights, the **link** in that component's mount is probably in **direct**.
	c. Turn A-RT POWER switch to LOW.	c. A-RT and additional radio component(s) dial lamp(s) and AM-1780 POWER lamp should light. If additional radio component's dial lamps fail to light, refer to troubleshooting chart 28.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-45 or -49, cable C-RT as shown in illustration "RT-524/VRC or -246/VRC RT and RT Antenna Checks" on page 3-193 and then check C-RT starting with block G.
AN/VRC-12, -44, -47 or -48, go to block O.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

O. R-442 CHECKS

Do these checks for all radio sets that have R-442's. When radio set is an AN/VRC-44 or -48, first do these checks for B-Receiver and then **as directed later** do them again for the C-Receiver.

Step 25	RECEIVER ANTENNA	
	Setup: 1. Turn A-RT and all R-442 POWER switches to OFF. 2. Connect receiver antenna to AN/PRM-34 and RT. (See illustration "Auxiliary Receiver Antenna Checks" on page 3-194.) 3. Turn AN/PRM-34 MODE switch to FWD PWR. 4. Turn A-RT POWER switch to HIGH (allow 2-minute warmup). 5. Tune A-RT to 62.20 MHz when standard AUX receiver antenna is used, 39.65 MHz when AS1095 is used.	
	a. Key A-RT; then press down AN/PRM-34 PUSH TO TEST. b. Turn AN/PRM-34 MODE switch to RVS PWR. Key A-RT; then press down AN/PRM-34 PUSH TO TEST. (Unkey RT before going on.)	a. AN/PRM-34 should indicate (display) between 30 and 65 watts. b. AN/PRM-34 should indicate (display) no more than one-third of the FWD PWR reading. If indication is over one-third of FWD PWR, see troubleshooting chart 29.
Step 26	AUDIO OUTPUT	
	Setup: 1. Turn A-RT POWER switch to OFF. 2. Connect AN/PRM-34 to R-442 being checked. (See illustration "R-442/VRC Receiver Checks" on page 3-195.) 3. Turn AN/PRM-34 MODE switch to SENS SQ. 4. Controls of R-442 being checked should be preset according to instructions on page 3-191. 5. Connect handset to AUDIO jack of R-442 being checked. 6. Set POWER switch of R-442 being checked to ON-RESET. (If required to turn R-442 on, turn A-RT POWER switch to LOW.)	
	Turn R-442 VOLUME control fully clockwise (cw); then counterclockwise (ccw) to midpoint.	In earphone and speaker (if used): Rushing noise loudness should increase; at full volume, rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard in earphone, refer to troubleshooting chart 30. If rushing noise is not heard in speaker, refer to troubleshooting chart 31.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 27	SQUELCH CONTROL AND CALL LAMP	
	Rotate R-442 SQUELCH switch through all four positions.	a. **OFF positions:** Loud rushing noise should be heard. b. **ON positions:** Rushing noise should be quieted (eliminated). c. **CALL lamp:** Should remain off **for all** positions. If indications are incorrect, R-442 being checked is bad.
Step 28	RECEIVER SENSITIVITY (RECEPTION)	
	Setup: Turn AN/PRM-34 MODE switch to SENS SQ. Direction: For the R-442 being checked, starting with 50.00 MHz, do the substeps (a, b and c) for each frequency listed below. Frequency setting: **1.** 50.00, **2.** 45.00, **3.** 40.00, **4.** 35.00, **5.** 30.00, (change BAND switch setting), **6.** 55.00, **7.** 60.00, **8.** 65.00, **9.** 70.00, and **10.** 75.00.	
	a. Turn R-442 SQUELCH switch to OLD OFF; then press down and release AN/PRM-34 PUSH TO TEST several times.	a. **When AN/PRM-34 PUSH TO TEST is pressed,** rushing noise should be quieted and a tone should be heard at audio accessories. **When AN/PRM-34 PUSH TO TEST is released**, rushing noise should be heard. If indications are incorrect, R-442 being checked is bad.
	b. Turn R-442 SQUELCH switch to NEW OFF; then press down and release AN/PRM-34 PUSH TO TEST several times.	b. Indication should be the same as substep a above.
	c. One at a time, turn R-442 (in 5-MHz steps) to other nine frequency settings listed. At each setting repeat substeps a and b.	c. For each frequency setting, indications should be same as substeps a and b.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 29	SQUELCH SENSITIVITY	
	Setup: 1. Tune R-442 being checked to 75.00 MHz. 2. AN/PRM-34 MODE switch should be set at SENS SQ.	
	a. Turn R-442 SQUELCH switch to NEW ON; then press down and release AN/PRM-34 PUSH TO TEST several times.	a. **When AN/PRM-34 PUSH TO TEST is pressed,** CALL lamp should light; a tone should be heard. **When AN/PRM-34 PUSH TO TEST is released,** CALL lamp should go off and a very short burst of rushing noise should be heard. If indications are incorrect, R-442 being checked is bad.
	b. Turn R-442 SQUELCH switch to OLD ON; then press down and release AN/PRM-34 PUSH TO TEST several times.	b. Indication should be the same as sub-step a.
	HOW TO PROCEED. When radio set being checked is an: AN/VRC-44 or -48 (whose C-Receiver has **not** been checked), check C-Receiver starting with step 26 of block O. AN/VRC-12, -47 or -44; -48 (whose C-Receiver **has** been checked) with: No R-442 speakers, go to block Q. R-442 speakers, go to block P.	

P. R-442 SPEAKER MUTING CHECK

Do this check for all radio sets whose R-442 has a speaker.

Step 30	SPEAKER MUTING, RT KEYED	
	Setup: 1. Connect a speaker (LS-454/U) to an AUDIO jack of each R-442. 2. Tune **all** R-442's to 75.00 MHz. 3. Turn **all** R-442 SQUELCH switches to OFF. (Verify rushing noise of all R-442 speakers.) 4. Turn **all** R-442 VOLUME controls from off, one-quarter turn clockwise. 5. Move handset to A-RT RETRANSMIT R/W jack. 6. A-RT should be tuned to 62.20 MHz.	

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 30 (cont)	Key RT. (Press/release PTT switch several times.) (Unkey RT before going on.)	**When RT is keyed,** rushing noise from R-442 speaker(s) should be greatly reduced. **When RT unkeys,** R-442 rushing noise from speaker(s) should return to preset level. If indications are incorrect, refer to troubleshooting chart 32.
HOW TO PROCEED. Go to block Q.		

Q. COMMANDER'S RADIO/INTERCOM INTERFACE CHECKS

Do these checks for all communication systems.

Step 31 A-RT/INTERCOM FUNCTIONS

Setup:
1. Preset **all** radio components as follows:
   a. Turn **all** SQUELCH switches to an ON position.
   b. Turn **all** VOLUME controls to midpoint positions.
   c. Tune **all** MC-TUNE-KC controls to unassigned, but different, frequencies.
   d. **All** POWER switches at ON (RT's to LOW; Receivers to ON).
2. Move handset to commander's (CDR) control box RAD jack J802 and then turn CDR box's:
   a. VOLUME control fully clockwise (maximum volume).
   b. MONITOR switch to ALL.
3. AM-1780 RADIO TRANS switch should be at LISTENING SILENCE.

COMMANDER RT KEYING LOCKOUT

a. Key and unkey handset several times. (Unkey handset before going on.)	a. C-RT and/or A-RT should **not** key. If either or both key, AM-1780 is bad.
b. Turn AM-1780 RADIO TRANS switch to CDR ONLY. (Do **not** key handset.)	b. C-RT and/or A-RT should **not** key. If either or both key, refer to troubleshooting chart 33.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 31 (cont)

A-RT MUTED MONITORING, MONITOR SWITCH AT ALL

NOTE

For this check, rushing noise loudness depends on control box VOLUME setting only.

c. Turn A-RT SQUELCH switch to an OFF position.	c. Loud rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 34.

A-RT KEYING AND MODULATION, MONITOR SWITCH AT ALL

NOTE

For this check, voice sidetone loudness depends on control box VOLUME setting only.

d. Key handset and then speak into its mike. (Unkey handset before going on.)	d. A-RT should key (relays click, blower runs, rushing noise drastically reduces) **and** voice sidetone should be heard. If A-RT does **not** key, refer to trouble-shooting chart 35. If A-RT keys, **but** there is **no** voice sidetone, refer to troubleshooting chart 36.

INTERCOM ACCENT, MONITOR SWITCH AT ALL

Setup:
1. Move handset to commander's (CDR) control box INT jack J803 (yellow banded). (Loud rushing noise should be heard.)
2. Turn AM-1780 INT ACCENT switch to ON.

e. Key and unkey handset several times. (Unkey handset before going on.)	e. Rushing noise should decrease each time intercom is keyed. If rushing noise does **not** decrease, AM-1780 is bad.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 31 (cont)

A-RT UNMUTED MONITORING, MONITOR SWITCH AT A

Setup:
Move handset to commander's (CDR) control box RAD jack J802. (Loud rushing noise should be heard.)

NOTE

For this check, rushing noise loudness depends on both A-RT VOLUME **and** control box VOLUME settings.

f. Turn CDR MONITOR switch to A.	f. Rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 37.

A-RT KEYING AND MODULATION, MONITOR SWITCH AT A

NOTE

For this check, the loudness of the voice sidetone depends on both the A-RT VOLUME **and** control box VOLUME settings.

g. Key handset and then speak into mike. (Unkey handset and turn A-RT SQUELCH switch to an ON position before going on.)	g. Indications should be the same as sub-step d. If incorrect, CDR C-2298 is bad.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-43 or -46, go to block R.
AN/VRC-12, -44, -47 or -48, go to step 32 below.
AN/VRC-45 or -49, go to step 34.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 32 RADIO DUPLEX/INTERCOM FUNCTIONS

Setup:
1. A-RT SQUELCH switch should be at an ON position.
2. Turn commander's (CDR) control box MONITOR switch to ALL.

B-RECEIVER MUTED MONITORING, MONITOR SWITCH AT ALL

NOTE

For this check, rushing noise loudness depends on control box VOLUME setting.

a. Turn B-Receiver SQUELCH switch to an OFF position.	a. Loud rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 38.

B-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT B

NOTE

For this check and substep c, rushing noise loudness depends on **both** B-Receiver **and** control box VOLUME settings.

b. Turn CDR MONITOR switch to B.	b. Rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 39.

A-RT KEYING WITH B-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT B

c. Key handset. (Unkey handset and turn B-Receiver SQUELCH switch to an ON position before going on.)	c. A-RT should key (relays click; blower runs) **and** rushing noise should be heard at CDR box B-Receiver. If incorrect, CDR C-2298 is bad.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-12 or -47, go to block R.
AN/VRC-44 or -48, go to step 33 below.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 33 C-RECEIVER/INTERCOM FUNCTIONS

Setup:
1. B- and C-Receivers' SQUELCH switches should be at an ON position.
2. Turn commander's (CDR) control box MONITOR switch to ALL.

C-RECEIVER MUTED MONITORING, MONITOR SWITCH TO ALL

NOTE

For this check, rushing noise loudness depends on control box VOLUME setting.

a. Turn C-Receiver SQUELCH switch to an OFF position.	a. Loud rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 40.

C-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT C

NOTE

For this check, rushing noise loudness depends on **both** C-Receiver VOLUME **and** control box VOLUME settings.

b. Turn CDR MONITOR switch to C. (Turn C-Receiver SQUELCH switch to an ON position before going on.)	b. Rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 41.

HOW TO PROCEED. Go to block R.

Step 34 C-RT/INTERCOM FUNCTIONS

Setup:
1. A- and C-RT SQUELCH switches should be at an ON position.
2. Turn commander's (CDR) control box MONITOR switch to ALL.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 34 (cont) C-RT MUTED MONITORING, MONITOR SWITCH AT ALL

NOTE

For this check, rushing noise loudness depends on control box VOLUME setting only.

a. Turn C-RT SQUELCH switch to an OFF position.	a. Loud rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 42.

C-RT UNMUTED MONITORING, MONITOR SWITCH AT C

NOTE

For this check, rushing noise loudness depends on **both** A-RT VOLUME **and** control box VOLUME setting.

b. Turn CDR MONITOR switch to C.	b. Rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 43.

C-RT KEYING AND MODULATION, MONITOR SWITCH AT C

NOTE

For this check, the loudness of the voice sidetone depends on **both** the C-RT VOLUME **and** control box VOLUME settings.

c. Key handset **and then** speak into its mike. (Unkey handset and turn C-RT SQUELCH switch to an ON position before going on.)	c. C-RT should key (relays click, blower runs; rushing noise drastically reduced) **and** voice sidetone should be heard. If C-RT does **not** key, refer to troubleshooting chart 44. If C-RT keys **but** there is **no** voice sidetone, refer to troubleshooting chart 45.

HOW TO PROCEED. Go to block R.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

R. ADDITIONAL C-2298 CONTROL BOXES RADIO/INTERCOM CHECKS

Do these checks for all communication systems that have crewmember and/or driver C-2298's in addition to a CDR C-2298. Some vehicles will have a combination C-2297 and C-2296. When this is the case, check the C-2297/C-2296 **as directed later.**

Step 35 CREW RT KEYING LOCKOUT

Setup:
1. Preset all radio components as follows:
   a. Turn **all** SQUELCH switches to an ON position.
   b. Turn **all** VOLUME controls to midpoint position.
2. Move handset to RAD jack J802 of the additional C-2298 to be checked **and then** turn that C-2298 MONITOR switch to ALL.
3. AM-1780 RADIO TRANS switch should be at CDR only.

a. Key and unkey handset several times. (Unkey handset before going on.)	a. C-RT and/or A-RT should **not** key. If **either or** both key, AM-1780 is bad.
b. Turn AM-1780 RADIO TRANS switch to CDR + CREW. (**Do not** key handset.)	b. C-RT **and/or** A-RT should **not** key. If **either or** both key, refer to troubleshooting chart 46.

Step 36 A-RT KEYING AND MODULATION, MONITOR SWITCH AT ALL

Setup:
At C-2298 being checked:
1. Connect handset to RAD jack J802.
2. Turn MONITOR switch to ALL.
3. Turn VOLUME control fully clockwise (maximum volume).

NOTE

For this check, the loudness of the voice sidetone depends on the control box VOLUME setting only.

a. Key handset and then speak into its mike. (Unkey handset before going on.)	a. A-RT should key (relays click; blower runs) and voice sidetone should be heard. If A-RT does not key, refer to trouble-shooting chart 35. If A-RT keys but there is **no** voice sidetone, AM-1780 is bad.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 36 (cont)	A-RT KEYING, MONITOR SWITCH AT A	
	b. Turn MONITOR switch to A and then key and unkey handset several times. (Unkey handset before going on.)	b. A-RT should key (relays click; blower runs) **and** unkey. If A-RT does **not** key, C-2298 being checked is bad.
	A-RT KEYING, MONITOR SWITCH AT B	
	c. Turn MONITOR switch to B **and then** key **and** unkey handset several times. (Unkey handset before going on.)	c. A-RT should key (relays click; blower runs) **and** unkey. If A-RT does **not** key, the C-2298 being checked is bad.
HOW TO PROCEED. When radio set being checked is an: AN/VRC-12, -43, -46 or -47, one at a time, check every C-2298 **not** yet checked by repeating step 36, a through c. Then, if system: Includes a C-2297, go to block S. Does **not** include a C-2297, go to block U. AN/VRC -44, -45, -48 or -49, go to step 37 below.		
Step 37	C-RT OR C-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT C	
	Setup: At C-2298 being checked, turn MONITOR switch to C. **NOTE** For this check, rushing noise loudness depends on **both** radio component VOLUME **and** control box VOLUME settings.	
	Turn C-Radio component's SQUELCH switch to an OFF position. (Return SQUELCH switch to an ON position before going on.)	Rushing noise should be heard at C-2298 being checked. If rushing noise is **not** heard, refer to troubleshooting chart 47.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

HOW TO PROCEED. When radio set being checked is an:
AN/VRC -44 or -48, one at a time, check every C-2298 **not** yet checked by repeating steps 36 and 37. Then go to block U.
AN/VRC -45 or -49, go to step 38 below.

Step 38 C-RT KEYING AND MODULATION, MONITOR SWITCH AT C

NOTE

For this check, the loudness of the voice sidetone depends on **both** the C-RT VOLUME **and** control box VOLUME settings.

Key handset and then speak into its mike. (Unkey handset before going on.)	C-RT should key (relays click; blower runs) and voice sidetone should be heard. If C-RT does not key, refer to troubleshooting chart 44. If C-RT keys but there is **no** voice sidetone, refer to troubleshooting chart 48.

HOW TO PROCEED. One at a time, check every C-2298 **not** yet checked by repeating steps 36, 37 and 38. Then if system:
Includes a Relay Box C-2299, go to block T.
Does **not** include a C-2299, go to block U.

S. CONTROL BOXES C-2297 AND C-2296 RADIO/INTERCOM CHECKS

Do these checks for all communication systems that have Control Box C-2297. Normally a C-2297 is installed in tank-type vehicles as the driver's box and is used in combination with a C-2296 to provide persons outside the vehicle access to the vehicle's communication system. These tank-type vehicles are normally equipped with Radio Sets AN/VRC -12, -43, -46, or -47 only.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 39	A-RT KEYING AND MODULATION, MONITOR SWITCH AT ALL	
	Setup: 1. Preset **all** radio components as follows: a. Turn **all** SQUELCH switches to an ON position. b. Turn **all** VOLUME controls to midpoint position. 2. Move handset to the C-2297 RAD jack J902 **and then**: a. Turn MONITOR switch to ALL. b. Turn VOLUME control fully clockwise (maximum volume). c. External control switch should be at OFF. **NOTE** For this check, the loudness of the voice sidetone depends on the control box VOLUME setting only.	
	a. Key handset and speak into its mike. (Unkey handset before going on.)	a. A-RT should key (relays click; blower runs) **and** voice sidetone should be heard. If A-RT does **not** key, refer to trouble-shooting chart 35. If A-RT keys, **but** there is **no** voice sidetone, the AM-1780 is bad.
	A-RT KEYING, MONITOR SWITCH AT A	
	b. Turn MONITOR switch to A **and then** key **and** unkey handset several times. (Unkey handset before going on.)	b. A-RT should key (relays click; blower runs) **and** unkey. If A-RT does **not** key, C-2297 is bad.
	A-RT KEYING, MONITOR SWITCH AT B	
	c. Turn MONITOR switch to B **and then** key **and** unkey handset several times. (Unkey handset before going on.)	c. Indications should be same as substep b.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 39 (cont)	A-RT KEYING FROM C-2296	
	Setup: 1. Turn C-2297 MONITOR switch to ALL. 2. Unplug handset from C-2297.	
	d. Turn C-2297 external control switch to EXT.	d. A-RT should **not** key. If A-RT keys, refer to troubleshooting chart 49.
	e. At C-2296, hold switch in RAD while keying H-207 **and** speaking into H-207 mike.	e. A-RT should key **and** voice sidetone should be heard. If indications are incorrect, refer to troubleshooting chart 50.
	HOW TO PROCEED. Go to block U.	

T. RADiO RELAY (RETRANSMISSION) CHECKS

Do these checks for a communication system that has Radio Set AN/VRC -45 or -49 with a Relay Box C-2299 connected to the AM-1780.

Step 40	A-RT TRANSMITTER/C-RT RECEIVER
	Setup: 1. Turn **both** RT SQUELCH switches to NEW ON. 2. **Both** RT POWER switches should be at LOW. 3. Tune C-RT to 75.00 MHz. 4. Tune A-RT to 52.00 MHz. 5. AN/PRM-34 test set should be connected to the C-RT. (See illustration "RT-524/VRC or -246/VRC (RT and RT antenna checks)" on page 3-193.) 6. Turn AN/PRM -34 MODE switch to SENS SQ. 7. Turn commander's (CDR) control box MONITOR switch to A. 8. Connect handset to CDR control box RAD jack, J802. **CAUTION** Insure that A-RT antenna is properly cabled to the A-RT.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 40 (cont)	a. Turn C-2299 RETRANS switch to ON.	a. **Both** RT's should remain unchanged. If indications are incorrect, refer to troubleshooting chart 51.
	b. Press down AN/PRM-34 PUSH TO TEST.	b. C-RT CALL lamp should light. A-RT should key **and** 900-Hz tone should be heard at the commander's earphone (A-RT modulation). If A-RT fails to key, refer to trouble-shooting chart 52. If A-RT fails to modulate (900-Hz tone), refer to troubleshooting chart 53.
	C-RT TRANSMITTER/A-RT RECEIVER	
	Setup: 1. Turn POWER to **both** RT's off. (Turn only A-RT POWER switch to OFF **when C-RT** power is **remoted**). 2. Move AN/PRM-34 from C-RT antenna circuit to A-RT antenna circuit (see illustration "RT-524/VRC or -246/VRC (RT and RT antenna checks)" on page 3-193.) **CAUTION** Insure that C-RT antenna is properly recabled to C-RT. 3. Tune A-RT to 75.00 MHz. 4. Tune C-RT to 52.00 MHz. 5. Turn both RT POWER switches to LOW. 6. Turn commander's (CDR) control box MONITOR switch to C.	
	c. Press down AN/PRM-34 PUSH TO TEST.	c. A-RT CALL lamp should light. C-RT should key **and** 900-Hz tone should be heard at commander's earphone (C-RT modulation). If C-RT fails to key, refer to trouble-shooting chart 52. If C-RT fails to modulate (900-Hz tone), refer to troubleshooting chart 53.
	Direction: Turn C-2299 RETRANS switch to OFF.	
HOW TO PROCEED. Go to block U.		

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

U. DISTANCE CHECK

Do this check for all communications systems.

Step 41	DISTANCE CHECK	
	Setup: Place communication system in its operational environment.	
	Establish communication with another radio set (station) located a prescribed distance away (planning range). (A simple Radio Check will do.)	The distant radic set's (station) operator should respond. If response is **not** heard, check siting.
HOW TO PROCEED. Go to block V.		

V. SHUT DOWN OF RADIO INTERCOM SYSTEM AFTER CHECKS

Do this check for all communications systems.

Step 42	SHUT DOWN RADIO INTERCOM SYSTEM	
	a. Turn A-RT POWER switch to OFF.	a. All radio components and AM-1780 should stop operating. (POWER and dial lamps should go off.) If radio mount's links are in REMOTE **and** the radio components/AM-1780 **don't** stop operating, A-RT is bad.
	b. Slowly turn AM-1780 MAIN PWR switch to OFF.	b. AM-1780 POWER lamp should blink on **and** then go off. If it fails to go off, AM-1780 is bad.
	Direction: 1. Turn all additional radio components POWER switches to OFF. 2. Disconnect AN/PRM-34 test set and march order (repack in carrying case). 3. Recable radio set according to installation instructions, chapter 2, section III.	

3-15. PROCEDURE USING TEST SET AN/URM-182.

The AN/URM-182, which includes Wattmeter TS-2609/URM-182, must be used to complete this procedure. Cabling instructions for the AN/URM-182 and TS-2609 switch settings will be given as they apply throughout the procedure.

INITIAL ADJUSTMENTS

WARNING

To safeguard against electrical shock and possible damage to equipment, remove or tape **all** personal exposed metal objects (e.g., watches, rings and medallions).

To prevent possible personnel injury and damage to the equipment, turn all communication component POWER switches to OFF. Depending on the type of vehicle and its actual communication system, turn to OFF the following:

1. Vehicle MASTER POWER switches (hull and turret)
2. MX-7777 circuit breaker and BATTLE OVERRIDE switches
3. AM-1780 MAIN PWR and POWER CKT BKR switches
4. RT unit (RT-524/RT-246) POWER switches
5. R-442 POWER switches
6. C-2742 PWR SW (power switch) switches.

CAUTION

Do not start vehicle engine with communication system turned on. Make certain that **all** communication components that have POWER switches are turned to OFF. Starting a vehicle engine with the communication system on can cause serious damage to its components.

INSTALLATION CHECKS

Refer to chapter 1, section II of this manual or an appropriate 2300 series TM to insure that all items of equipment of the communication system are properly installed and that all cables are properly routed and connected.

NOTE

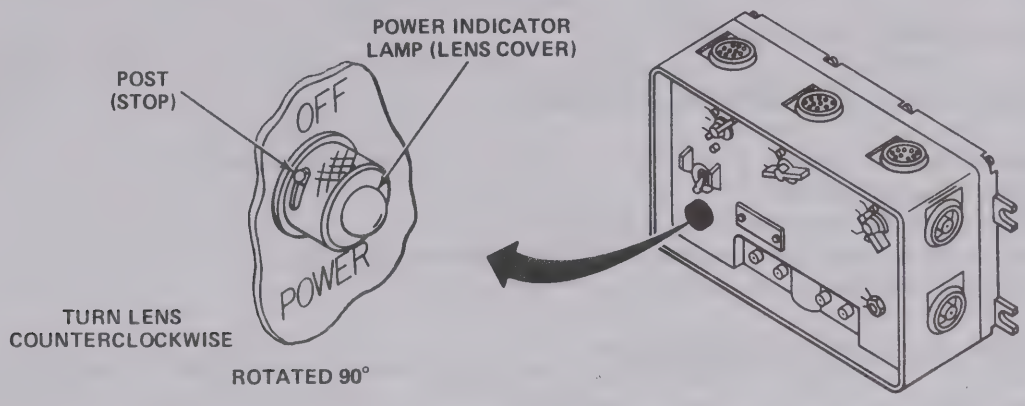
TM 11-5820-401-10-2-HR contains example hand receipts that, based on the type of vehicle and the communication system configuration, can be used to inventory items of equipment and determine National stock numbers (NSN's).

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

PRESET CONTROLS

To establish a logical starting point for the evaluation procedure, the controls of the communication system must be preset according to the following preparatory actions.

MAIN JUNCTION BOX, AM-1780/VRC



Set the AM-1780/VRC controls as follows:

1. Set INSTALLATION SWITCH at:
   RETRANS when radio set is an AN/VRC-49 (-45) with Relay Box C-2299.
   OTHER for all other radio set configurations.
2. Turn RADIO TRANS switch to LISTENING SILENCE.
3. Turn INT ACCENT switch to OFF.
4. Open POWER lamp lens cover by turning lens cover counterclockwise to stop (about one-eighth turn).

CAUTION

The POWER lamp receptacle may become loose and rotate in the AM-1780 housing causing an adverse short. Do not operate the AM-1780 if this receptacle is loose.

CONTROL BOX, C-2299/VRC (when included)

Turn RETRANS switch to OFF.

RECEIVER-TRANSMITTERS, RT-524/VRC AND RT-246/VRC

Set the controls of **all** Receiver-Transmitters as follows:

1. Turn BAND switch to 30-52 (A)
2. Turn LIGHT switch to ON.
3. Turn SPEAKER switch to ON (RT-524 only).
4. Tune MC-TUNE-KC controls for 50.00 MHz.
5. Turn SQUELCH switch to OLD OFF.
6. Turn VOLUME control fully counterclockwise to stop (no volume).

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

RECEIVER-TRANSMITTERS, RT-524/VRC AND RT-246/VRC (CONT)

NOTE

Objectionable interference may result when RT is tuned to 33.90; 45.20; 56.50; and 67.80 MHz. Avoid tuning RT to these frequencies.

RECEIVERS R-442/VRC (when included)

Set the controls of **all** auxiliary receivers as follows:

1. Turn BAND switch to 30-52 (A) .
2. Turn LIGHT switch to ON.
3. Tune MC-TUNE-KC controls for 50.00 MHz.
4. Turn VOLUME control fully counterclockwise to stop (no volume).
5. Turn SQUELCH switch to OLD OFF.

REMOTE BOXES, C-2742/VRC (when included)

Unplug **all** CX-7059 cables from their RT-246 REMOTE jacks.

CONTROL BOX, C-2297/VRC (when included)

Set the C-2297 controls (at the driver's location) as follows:

1. Turn external control switch to OFF.
2. Open lamp lens cover by turning lens collar counterclockwise to stop (about one-eighth turn). See illustration on page 3-233.

CAUTION

The lamp receptacle may become loose and rotate in the C-2297 housing causing an adverse short. Do not operate the C-2297 if this receptacle is loose.

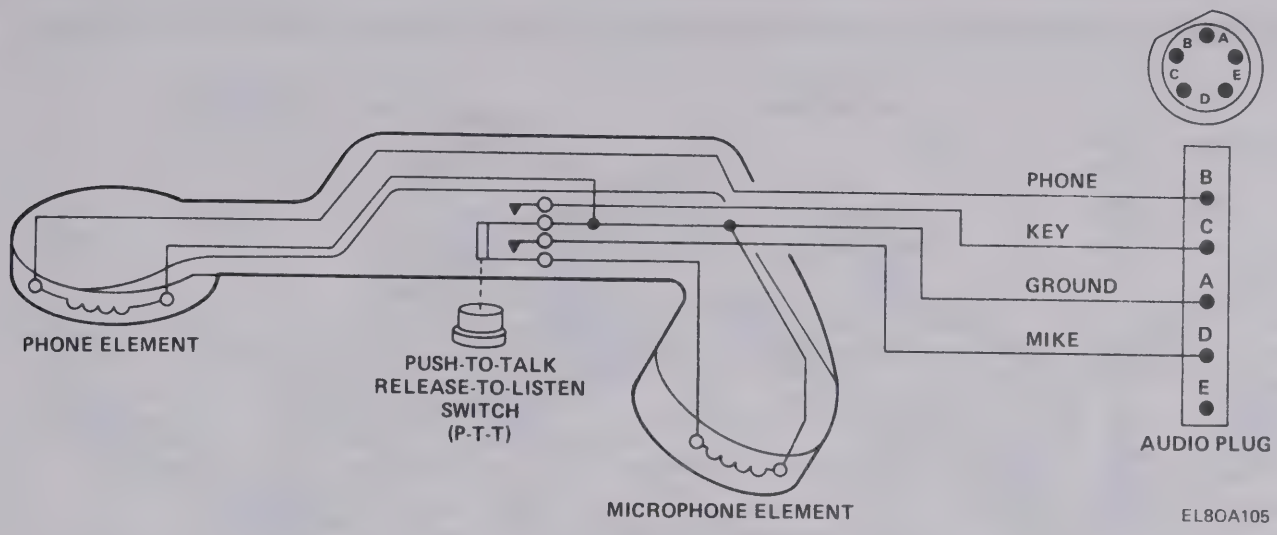
VERIFY OPERATION OF HANDSET H-189/U (H-250/U)

To check the performance of the components of the communication system, a **known good** handset must be used. Operation of the handset can be checked by using a multimeter as follows:

NOTE

Set up multimeter for OHMS, R X10 and do the following checks.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)



Phone Element Check: Circuit disturb between pin A and B of handset's audio plug. A clicking sound should be heard from phone element.

Keying Check: Connect meter leads between pin A and C of handset's audio plug. With handset's push-to-talk switch held in, meter should show zero (0) ohms. With handset's push-to-talk switch released, meter should show infinity (∞) ohms.

Microphone Element Check: Connect meter leads between pin A and pin D of handset's audio plug. While listening to microphone element, press and release handset's push-to-talk switch several times. A clicking sound should be heard from microphone element.

NOTE

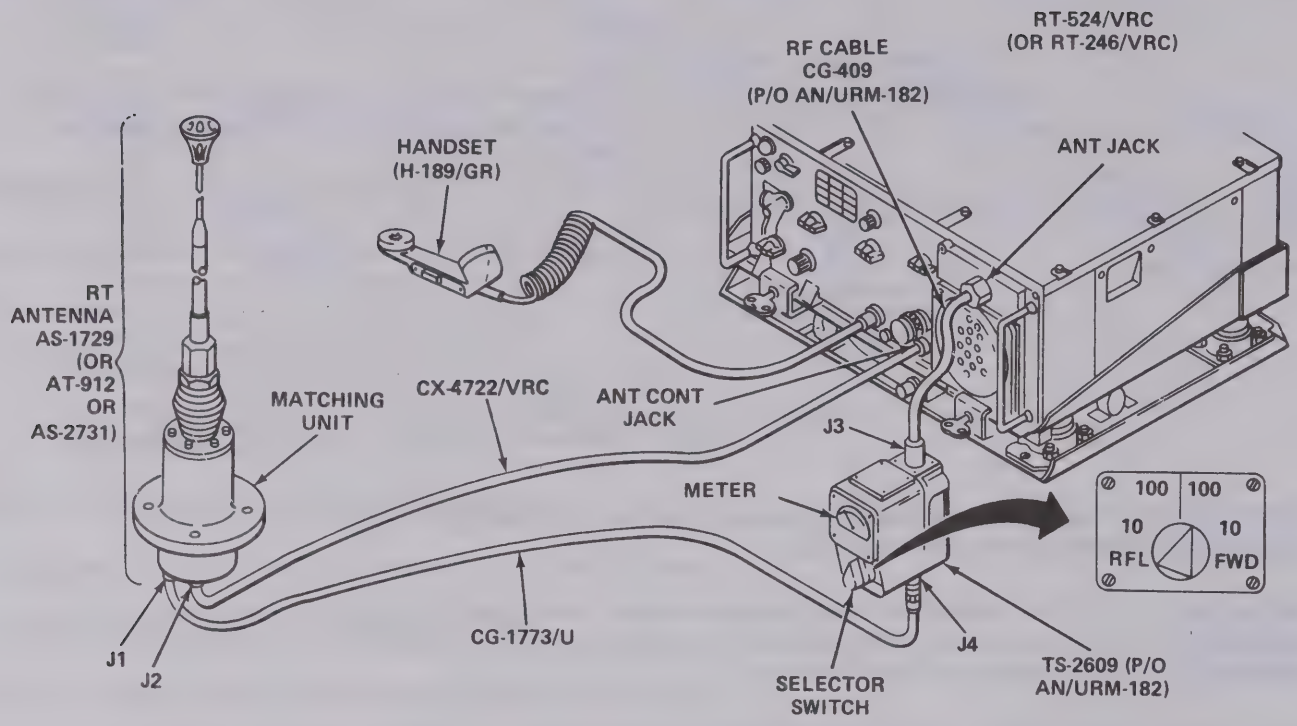
Before connecting cables and audio accessories to components of the communication system, make sure that all plug and jack contacts or pins are clean and undamaged. After connection, insure that the connection is tight.

AN/URM-182 (TS-2609) TEST SET CABLING

The TS-2609/URM-182 is an in-line wattmeter that is used to check the rf transmit power levels of the RT-524 and RT-246 and the effectiveness of the RT antenna and auxiliary receiver's antenna. For any one of the radio sets being checked, first connect the wattmeter in-line with the A-RT antenna according to the first illustration below and then, **as directed later,** connect it in-line with the other antennas.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

RT-524/VRC OR -246/VRC, RT AND RT ANTENNA CHECKS



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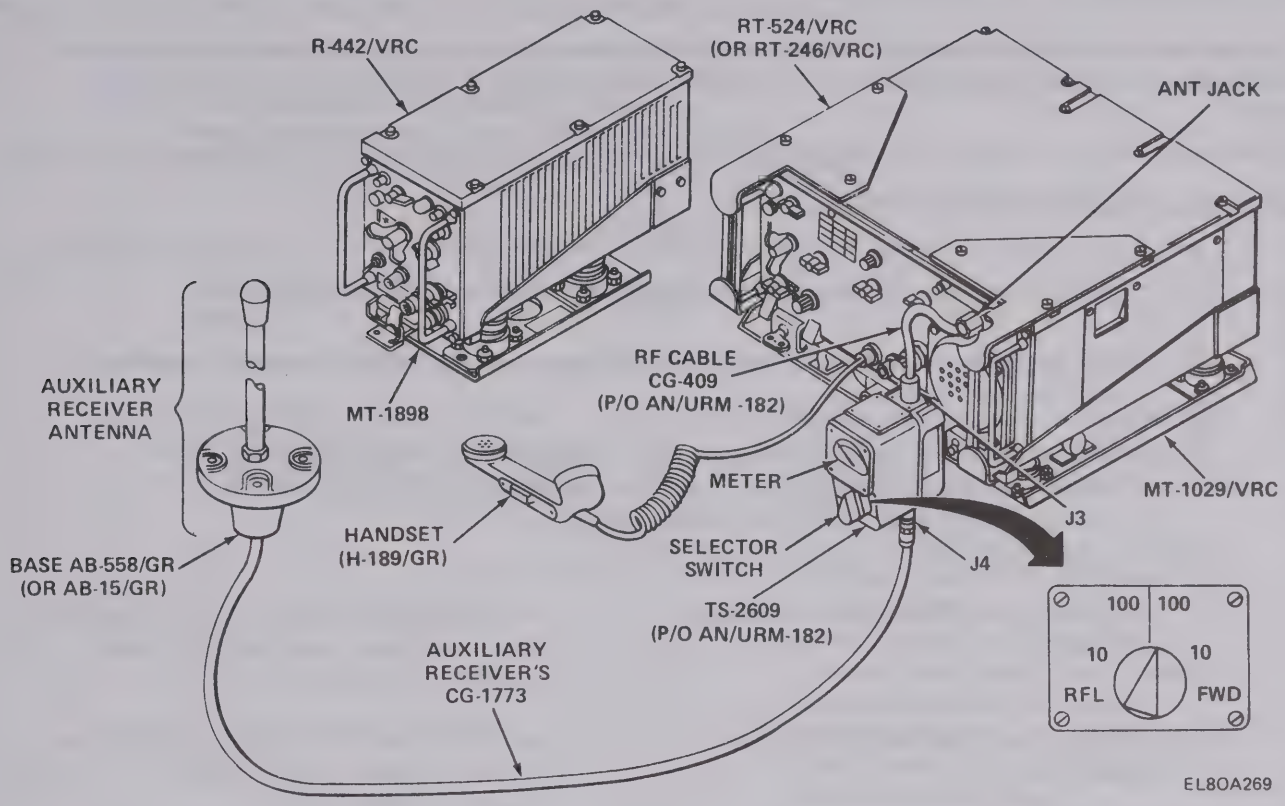
FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-409	TS-2609	J3		A-RT	ANT	
CG-1773 (RT)	TS-2609	J4		Matching Unit	J1	
CX-4722/VRC	A-RT	ANT CONT	P1	Matching Unit	J2	P2

NOTE

Set the meter SELECTOR SWITCH on the TS-2609 to 100 FWD position.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

AUXILIARY RECEIVERS ANTENNA CHECKS



FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-409	TS-2609	J3		A-RT	ANT	
CG-1773 (Aux Receiver)	TS-2609	J4		Aux Receiver Antenna Base AB-558/GR OR AB-15/GR		

NOTE

Set the meter SELECTOR SWITCH on the TS-2609 to 100 FWD position.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

A. INTERCOM INPUT POWER CHECKS

Do these checks for all communication systems. Some systems use a minisuppressor (plugged into a radio mount's dc outlet jack) instead of a Transient Suppressor MX-7777. When this is the case, skip step 1b.

Step 1	AM-1780/VRC INPUT POWER	
	NOTE For these checks, the BATTLE OVERRIDE switch of the MX-7777A should remain OFF (closed hood). A minisuppressor may be used in place of the MX-7777. If so, the minisuppressor lamp should **not** be lit. View the minisuppressor through the radio mount. If lamp is lit, replace the minisuppressor.	
	a. Set vehicle MASTER power switch(es) to ON.	a. Vehicle MASTER power lamp(s) should light. If lamp(s) does not light, report condition to supervisor.
	b. If appropriate, set MX-7777 circuit breaker to ON.	b. MX-7777 circuit breaker should stay on. If circuit breaker trips, refer to troubleshooting chart 1.
	c. Turn AM-1780 MAIN PWR switch to INT ONLY.	c. AM-1780 POWER lamp should **not** light. If lamp lights, AM-1780 is bad.
	d. Set AM-1780 POWER CKT BKR switch to ON.	d. AM-1780 POWER lamp should light. If POWER lamp does not light refer to troubleshooting chart 2. If POWER CKT BKR trips OFF, refer to troubleshooting chart 3.
HOW TO PROCEED. Go to block B.		

B. COMMANDER'S (CDR) CONTROL BOX, C-2298/VRC, INTERCOM CHECKS

Do these checks for the commander's C-2298. In some vehicles a C-2742 is mounted on top of the CDR box. When this is the case, check the C-2742 functions **as directed later**.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 2	INTERCOM KEYING AND TALK/LISTEN FROM INT JACK	
	Setup for commander's (CDR) control box: 1. Connect handset to INT, jack, J803 (yellow band). 2. Turn VOLUME control fully clockwise (maximum volume). **NOTE** For this check,intercom sidetone loudness depends on control box VOLUME setting.	
	a. One at a time, for each listed position of MONITOR switch, key handset and speak into its microphone. ALL A INT ONLY B C (Unkey handset before going on.)	a. For each listed position of MONITOR switch, AM-1780 relays should click **and** intercom voice sidetone should be heard. If for: Any switch position, relays do not click **and** there is **no** sidetone, refer to troubleshooting chart 4. Any switch position, relays do not click **but** sidetone is heard, refer to troubleshooting chart 5. Every switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 6. A particular switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 7.
	INTERCOM KEYING AND TALK/LISTEN FROM RAD JACK	
	Setup for commander's (CDR) control box: 1. Move handset to RAD jack, J802. 2. Turn MONITOR switch to INT ONLY. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	b. Key handset and speak into its mike. (Unkey handset before going on.)	b. AM-1780 relays should click, sidetone should be heard. If indications are incorrect, CDR's C-2298 is bad.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

HOW TO PROCEED. When installation has:
Only a driver's box (no crewmember's boxes), go to block D.
Crewmember boxes, check each crewmember box in turn, one at a time, according to block C.

C. CREWMEMBER'S (CREW) CONTROL BOX(ES), C-2298/VRC, INTERCOM CHECKS

Do these checks for each crewmember's C-2298, one at a time, but not driver's control box. In some vehicles a C-2742 is mounted on top of a specific crewmember's control box. When this is the case, check the C-2742 functions **as directed later.**

Step 3 INTERCOM KEYING AND TALK/LISTEN FROM INT JACK

Setup for crewmember's control box being checked:
1. Move handset to INT jack, J803 (yellow band).
2. Turn VOLUME control fully clockwise (maximum volume).

NOTE

For this check, intercom sidetone loudness depends on control box VOLUME setting.

a. One at a time, for each listed position of MONITOR switch, key handset and speak into its microphone. ALL A INT ONLY B (Unkey handset before going on.)	a. For each listed position of MONITOR switch, AM-1780 relays should click **and** intercom voice sidetone should be heard. If for: Any switch position, relays do not click **and** there is **no** sidetone, refer to troubleshooting chart 4. Any switch position, relays do not click **but** sidetone is heard, refer to troubleshooting chart 8. Every switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 6. A particular switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 7.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 3 (cont)	INTERCOM KEYING AND TALK/LISTEN FROM RAD JACK	
	Setup for crewmember's control box being checked: 1. Move handset to RAD jack, J802. 2. Turn MONITOR switch to INT ONLY. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	b. Key handset and speak into its mike. (Unkey handset before going on.)	b. AM-1780 relays should click **and** sidetone should be heard. If indications are incorrect, C-2298 being checked is bad.
HOW TO PROCEED. When installation contains: More than one crewmember C-2298's, repeat step 3 for each additional crewmember C-2298, one at a time, (but not driver's box). Only one crewmember C-2298, **or** all crewmember C-2298's have been checked, go to block D.		

D. DRIVER'S CONTROL BOX, C-2298/VRC OR C-2297/VRC, INTERCOM CHECKS

Do these checks for any driver's C-2298 or C-2297. In some vehicles the drivers have a C-2298 and in others, a C-2297. For a C-2297, check its additional functions **as directed later.**

Step 4	INTERCOM KEYING AND TALK/LISTEN FROM INT JACK
	Setup for driver's control box: 1. Connect handset to INT jack J803 or J903 (yellow band). 2. Turn VOLUME control fully clockwise (maximum volume). 3. If control box is a C-2297, the external control switch should be at OFF. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 4 (cont)	a. One at a time, for each listed position of MONITOR switch, key handset and speak into its microphone. ALL A INT ONLY B (Unkey handset before going on.)	a. For each listed position of MONITOR switch, AM-1780 relays should click **and** intercom voice sidetone should be heard. If for: Any switch position, relays do **not** click **and** there is **no** sidetone, refer to troubleshooting chart 4. Any switch position, relays do **not** click **but** sidetone is heard, refer to troubleshooting chart 8. Every switch position relays click **but** there is **no** sidetone, refer to troubleshooting chart 6. A particular switch position, relays click **but** there is **no** sidetone, refer to troubleshooting chart 7.

INTERCOM KEYING AND TALK/LISTEN FROM RAD JACK

Setup for driver's control box: 1. Move handset to RAD jack, J802 or J902. 2. Turn MONITOR switch to INT ONLY. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
b. Key handset and speak into its mike. (Unkey handset before going on.)	b. AM-1780 relays should click **and** sidetone should be heard. If indications are incorrect, driver is C-2298 or C-2297 is bad.

HOW TO PROCEED. When driver's box is a:
C-2298, go to block F.
C-2297, make sure its lamp lens cover is open (counterclockwise to stop) then go to block E and complete steps 5 and 6.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

E. C-2297/VRC – C-2296/VRC SIGNALING AND OUTSIDE CONTROL BOX, C-2296/VRC INTERCOM CHECKS

Do these checks when an outside control box, C-2296, is connected to the driver's C-2297.

Step 5 C-2297 – C-2296 SIGNALING

NOTE

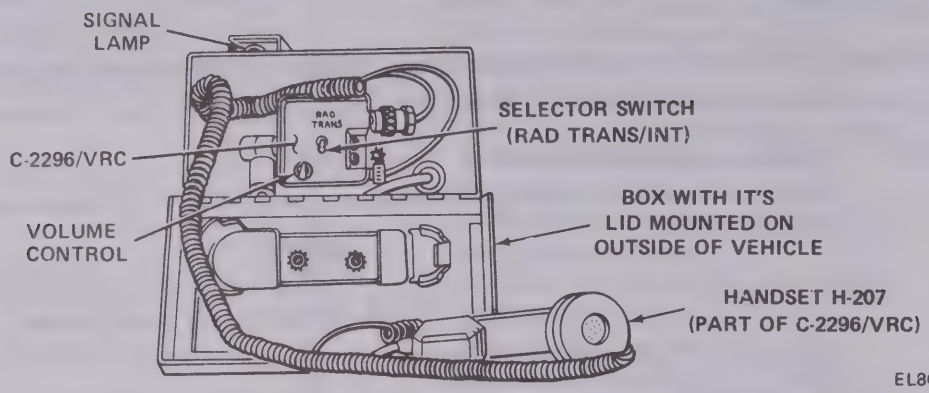
For substep c, C-2296 signal lamp is also checked.

Turn C-2297 external control switch as follows:	Signal lamp should:
a. OFF	a. **Not** light. If lamp does light, refer to troubleshooting chart 9.
b. EXT	b. Light. If lamp does **not** light **and:** AM-1780 POWER CKT BKR does **not** trip, C-2297 lamp or its circuit is bad. AM-1780 POWER CKT BKR trips, refer to troubleshooting chart 10. If lamp does light, **but** AM-1780 relays click, refer to troubleshooting chart 9.
c. SIG	c. Light. If lamp does **not** light, refer to troubleshooting chart 11.

Direction:
Return C-2297 external control switch to EXT and its MONITOR switch to ALL.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

OUTSIDE CONTROL BOX C-2296/VRC INSTALLED WITH SIGNAL LAMP



Step 6	OUTSIDE CONTROL BOX, C-2296/INTERCOM KEYING AND TALK/LISTEN	
	Setup: 1. Turn C-2296 VOLUME control fully clockwise (maximum volume). 2. C-2296 switch should be at INT (spring held). 3. C-2297 external control switch should be at EXT. **NOTE** For this check, intercom sidetone loudness depends on control box VOLUME setting.	
	Key handset H-207 and speak into its mike. (Unkey handset before going on.)	AM-1780 relays should click **and** intercom voice sidetone should be heard. If relays do **not** click, refer to trouble-shooting chart 12. If relays click **but** there is **no** sidetone, refer to troubleshooting chart 13.
HOW TO PROCEED. Go to block F.		

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

F. A-RT REMOTE AND AM-1780 INTERCOM RETURN POWER CHECKS

Do these checks for all communication systems. All systems have A-RT's and some systems have additional radio components. When this is the case, check the additional radio component's remote power functions **as directed later.**

Step 7 A-RT REMOTE INPUT POWER	
Setup: 1. Move handset to A-RT RETRANSMIT R/W jack. 2. AM-1780 MAIN PWR switch should be at INT ONLY.	
a. Turn A-RT POWER switch to LOW.	a. A-RT dial lamp should **not** light **and** A-RT matching unit should **not** switch. If indications are incorrect, refer to troubleshooting chart 14.
AM-1780 INTERCOM RETURN INPUT POWER AND A-RT REMOTE POWER	
b. Slowly turn AM-1780 MAIN PWR switch to NORM.	b. AM-1780 POWER lamp should momentarily go off (blink); then AM-1780 POWER lamp **and** A-RT dial lamp should light. (A-RT matching unit might switch.) If A-RT dial lamp **and** AM-1780 POWER lamp **do not** light, refer to trouble-shooting chart 15. If A-RT dial lamp lights **but** AM-1780 POWER lamp **does not** come back on, refer to troubleshooting chart 16. If AM-1780 POWER lamp comes on, **but** A-RT dial lamp **does not** light, A-RT dial lamp or its circuit is bad. If A-RT keys (blower runs **and** a FWD PWR check indicates RF transmit power), refer to troubleshooting chart 17.
HOW TO PROCEED. Go to block G.	

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

G. RT AUDIO OUTPUT AND INITIAL MATCHING UNIT (MX) CONTROL CHECKS

Do these checks for all RT's. When radio set is an AN/VRC -45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 8	AUDIO OUTPUT	
	Setup: 1. Unplug Antenna Cable CG-1773 from AN/PRM-34 ANT jack. 2. Handset should be connected to RT being checked. **CAUTION** **Do not** key an RT when its Antenna Cable CG-1773 is unplugged.	
	Turn RT VOLUME control fully clockwise (cw); then counterclockwise (ccw) to midpoint.	In earphone and speaker: Rushing noise loudness should increase. At full volume, rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard on earphone, refer to troubleshooting chart 18. If rushing noise is not heard on speaker, refer to troubleshooting chart 19.
Step 9	INITIAL MATCHING (MX) UNIT CONTROL	
	Turn RT BAND switch to other setting; then **return** to original setting.	Switching sound should be heard at the matching unit. (For the MX-6707 or MX-9146, the range setting should agree with the RT MC setting.) If matching unit fails to switch or switching won't stop, refer to troubleshooting chart 20.
HOW TO PROCEED. Go to block H.		

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

H. RT RECEIVER AND SQUELCH SENSITIVITY CHECKS

Do these checks for **all** RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 10	SQUELCH CONTROL AND CALL LAMP	
	Rotate RT SQUELCH switch through all four positions.	a. **OFF positions:** Loud rushing noise should be heard. b. **ON positions:** Rushing noise should be quieted (eliminated). c. **CALL lamp:** Should remain OFF for all positions. If indications are incorrect, RT being checked is bad.
Step 11	RECEIVER AND SQUELCH SENSITIVITY	
	Setup: Tune RT being checked to receive a NET frequency.	
	RECEPTION	
	Rotate RT SQUELCH switch through all four positions.	a. **OFF positions.** Rushing noise should be quieted and voice signals should be heard loud and clear. CALL lamp should remain off. If indications are incorrect, refer to troubleshooting chart 54.
	SQUELCH SENSITIVITY AND CALL LAMP	
	Rotate RT SQUELCH switch through all four positions.	b. **ON positions.** CALL lamp should light and voice signals should be heard loud and clear. If, substep a is correct but b is incorrect, RT being checked is bad.
HOW TO PROCEED. Go to block I.		

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

I. RT KEYING AND MUTING CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 12	KEYING	
	Setup for RT being checked: 1. Turn SQUELCH switch to OLD OFF. 2. Tune to a frequency other than a NET frequency. 3. POWER switch should be at LOW. **CAUTION** For this check, **do not** key RT when antenna is disconnected. When keyed, if blower does not run, **do not** keep RT keyed for more than 3 seconds.	
	Key RT. (Press/release the PTT switch several times.) (Unkey RT before going on.)	**When PTT is pressed,** RT relays should click, blower should run and rushing noise should drastically reduce. If RT fails to key, RT being checked is bad. **When PTT is released,** relays should again click, rushing noise should return and blower might stop running. If RT remains keyed, refer to trouble-shooting chart 17.
Step 13	MUTING	
	With RT speaker on (VOLUME at mid-point), again key RT. (Unkey RT before going on.)	With mike at about 10 inches from speaker, there should be **no** audio feedback (squeal). If feedback occurs, RT being checked is bad.
HOW TO PROCEED. When RT being checked is an: RT-246, go to block J. RT-524, go to block L.		

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

J. RT-246 SERVO TUNE (AUTOMATIC TUNING) CHECKS

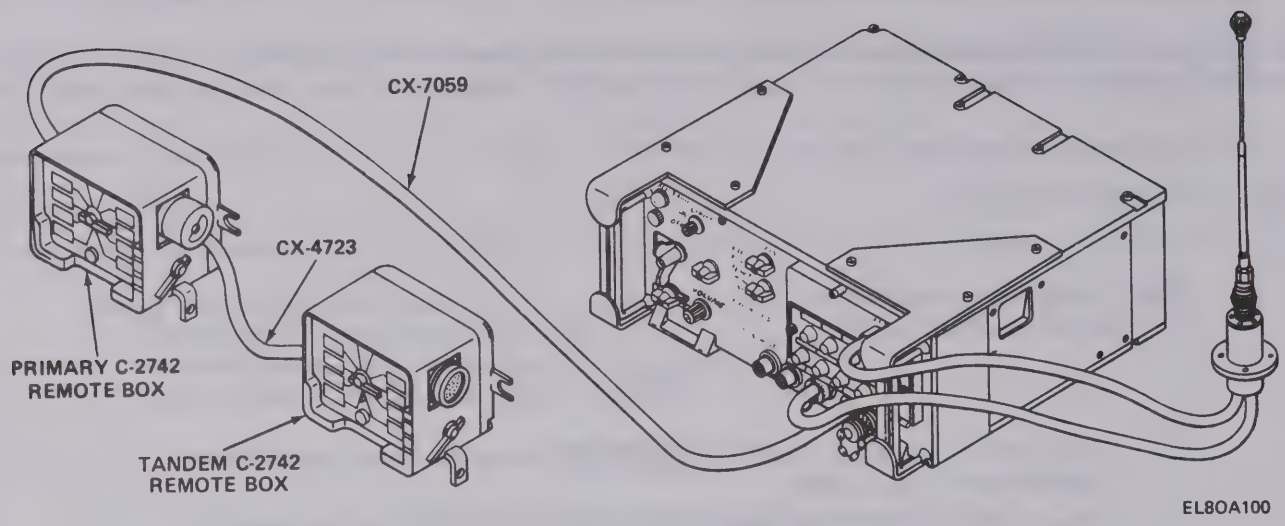
Do this check for all RT-246's. When radio set is an AN/VRC-45, first do this check for the A-RT and then **as directed later** do it again for the C-RT.

Step 14 AUTOMATIC TUNE		
	Setup for RT being checked: Turn BAND switch to AUTO. **NOTE** Instructions for presetting RT-246 pushbuttons are on closed side of the pushbutton hinged cover. Refer to sample DA Form 2404 of block L (page 3-252) for ten frequencies to be preset.	
	a. Using the ten frequencies given, preset frequency 1 on pushbutton ① , frequency 2 on pushbutton ② , etc., until all ten are preset.	a. The preset frequency should appear in RT dial-frequency window as presetting is accomplished. MX switching sound should be heard.
	b. In descending order, press each pushbutton, **but allow each tuning cycle to complete before pressing another pushbutton.**	b. RT MC-TUNE-KC controls should change to preset frequency. MX switching sound should be heard. If RT fails to tune, RT being checked is bad. If, for any preset, frequency MX fails to switch or won't stop switching, refer to troubleshooting chart 20.
HOW TO PROCEED. When RT-246 being checked has: C-2742's, go to block K. **No** C-2742's, go to block L.		

K. RT-246/REMOTE BOX, C-2742 INTERFACE CHECKS

Do these checks for all RT-246's that have C-2742's. When radio set is an AN/VRC-45, first do these checks for the A-RT and then, **as directed later,** do them again for the C-RT.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)



When two C-2742 remote boxes are in tandem, first check the box directly connected to the RT (primary C-2742).

Step 15	R-246 REMOTE INPUT POWER CONTROL	
	Setup for RT-246 being checked: 1. Press in RT-246 pushbutton ① (allow tuning cycle to complete). 2. Turn RT POWER switch to OFF. 3. Replug CX-7059 cable to appropriate RT REMOTE jack. 4. Unlock **all** C-2742 knob stops. 5. Turn **all** C-2742 CHAN SEL switches to channel 1 (lower left write-in space). 6. **All** C-2742 PWR SW (power switches) should be at OFF. 7. If two C-2742's are in tandem, unplug CX-4723 from primary C-2742, J72.	
	a. Turn RT POWER switch to REMOTE.	a. RT should remain off. If RT comes on, refer to troubleshooting chart 21.
	b. Turn C-2742 PWR SW to LO, then press back and release C-2742 SW (toggle switch).	b. RT dial lamp and C-2742 control lamp should light. (C-2742 lamp might come on without pressing PWR SW.) If lamps fail to light, refer to troubleshooting chart 22.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 16	RT-246 HIGH/LOW TRANSMIT RF POWER CONTROL	
	Turn C-2742 PWR SW to HI; then to LO, several times.	At RT, high/low power relay should click each time C-2742 PWR SW is changed. If relay fails to click, refer to trouble-shooting chart 23.
Step 17	RT-246 REMOTE FREQUENCY SELECTION	
	In turn, **but allowing each tuning cycle to complete,** turn C-2742 CHAN SEL switch to each of its ten positions.	RT MC-TUNE-KC controls and BAND switch (as appropriate) should change according to the ten RT-246 preset frequencies. (MX switching should occur.) If RT tunes to wrong frequency or won't stop tuning, refer to troubleshooting chart 24. If switch fails to change, refer to troubleshooting chart 25.
	Direction: When C-2742's are in tandem, replug CX-4723 to primary C-2742, J72. Repeat steps 15b, 16 and 17 (above) for the second C-2742. (The primary C-2742 PWR SW **must** remain at LO or HI.) Upon completion go to step 18 below.	
Step 18	RT-246 REMOTE INPUT POWER CONTROL SHUTDOWN	
	a. Turn primary C-2742 PWR SW to OFF. b. Turn RT POWER switch to LOW.	a. RT should stop operating. If RT continues to operate, refer to trouble-shooting chart 21. b. RT dial lamp should light. If lamp fails to light, RT being checked is bad.
HOW TO PROCEED. Go to block L.		

L. RT TRANSMITTER RF POWER LEVELS AND ANTENNA CHECKS

Do this check for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

CAUTION

Check that antenna components and cables are connected to appropriate RT.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

NOTE

During the checks of block L, specific RT data must be recorded. This data is in addition to other maintenance actions recorded on the reporting DA Form 2404. Refer to following illustration for format of this additional worksheet. Complete the heading on this form according to unit's standard operating procedure (SOP).

ADDITIONAL DA FORM 2404 SAMPLE LAYOUT

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET
For use of this form see TM 38 750 the proponent agency is the Office of the Deputy Chief of Staff for Logistics.

1 ORGANIZATION (RT Serial no.)			2 NOMENCLATURE AND MODEL	
3 REGISTRATION/SERIAL NSN	4a MILES	b (RT Model no. (e.g. RT-524, RT-246))	5 DATE	6 TYPE INSPECTION
7				
TM NUMBER	TM DATE	TM NUMBER		

COLUMN a — Enter TM item number.

COLUMN b — Enter the applicable condition status symbol.

COLUMN c — Enter deficiencies and shortcomings.

COLUMN d — Show corrective action for deficiency or shortcoming listed in Column c.

COLUMN e — Individual ascertaining completed corrective action initial in this column.

STATUS SYMBOLS

"X" — Indicates a deficiency in the equipment that places it in an inoperable status.

CIRCLED "X" — Indicates a deficiency, however, the equipment may be operated under specific limitations as directed by higher authority or as prescribed locally, until corrective action can be accomplished.

HORIZONTAL DASH "(-)" — Indicates that a required inspection, component replacement, maintenance operation check or test flight is due but has not been accomplished, or an overdue MWO has not been accomplished.

DIAGONAL "(/)" — Indicates a material defect other than a deficiency which must be corrected to increase deficiency or to make the item completely serviceable.

LAST NAME INITIAL IN BLACK, BLUE-BLACK INK, OR PENCIL Indicates that a completely satisfactory condition exists.

FOR AIRCRAFT Status symbols will be recorded in red.

ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.

8a. SIGNATURE (Person(s) performing inspection)	8b. TIME	9a. SIGNATURE (Maintenance Supervisor)	9b. TIME	10. MANHOURS REQUIRED

TM ITEM NO a	STATUS b	DEFICIENCIES AND SHORTCOMINGS c	CORRECTIVE ACTION d	INITIAL WHEN CORRECTED e
1.	75.00	a.____ FWD b.____ RFL	6. 31.45 a.____ FWD b.____ RFL	
2.	67.05	a.____ FWD b.____ RFL	7. 35.60 a.____ FWD b.____ RFL	
3.	62.20	a.____ FWD b.____ RFL	8. 39.65 a.____ FWD b.____ RFL	
4.	58.25	a.____ FWD b.____ RFL	9. 44.80 a.____ FWD b.____ RFL	
5.	54.40	a.____ FWD b.____ RFL	10. 50.85 a.____ FWD b.____ RFL	

DA FORM 1 APR 79 2404 Replaces edition of 1 Jan 64 which will be used

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3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 19 HIGH-LEVEL RF TRANSMIT POWER AND ANTENNA

Setup:
1. Prepare a worksheet (DA Form 2404). See illustration on 3-252 page.
2. Turn POWER switch of RT being checked to HIGH.
3. TS-2609 SELECTOR switch should be at 100 FWD.

NOTE

To obtain a valid check, the vehicle should be in a clear area at least a 25-foot radius from the RT antenna.

Direction:
For RT being checked, starting with 75.00 MHz, do the substeps (a thru d) for each frequency listed on worksheet.

CAUTION

Do not change RT tuning when RT is keyed.

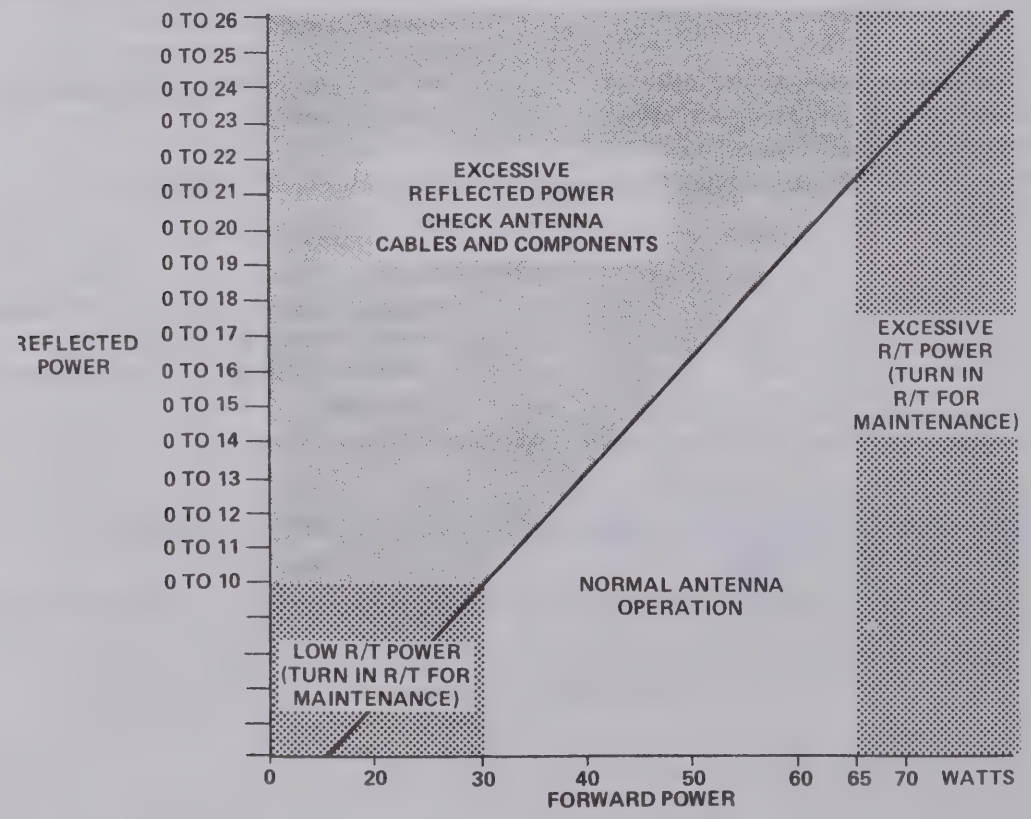
a. As RT frequency is changed, listen for matching unit switching.	a. MX switching sound should be heard when RT MC setting is changed. If, for any setting, MX fails to switch or won't stop switching, refer to troubleshooting chart 20.
b. Key RT and observe the TS-2609 meter reading. (On worksheet, next to the appropriate listed frequency, record the TS-2609 reading at sub-step a.) Unkey RT.	b. TS-2609 should indicate between 30 and 65 watts. EXAMPLE: 75.00 MHz $\frac{40}{\text{FWD}}$ Regardless of reading, complete sub-steps c and d before referring to troubleshooting conclusions at end of this step.

Direction:
For this step, when initial reading is less than 10, hold the TS-2609 SELECTOR switch in 10 RFL (RT keyed).

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 19 (cont)	c. Turn TS-2609 SELECTOR switch to 100 RFL, key RT and observe meter reading. (On worksheet, next to appropriate listed frequency, record the TS-2609 reading at substep b.) Unkey RT.	c. TS-2609 should indicate no more than one-third of FWD PWR reading. EXAMPLE: 75.00 MHz a. 40 / FWD b. 13.3 / RFL
	d. One at a time, tune RT being checked to other nine frequency settings listed on worksheet. At each setting repeat substeps a through c and complete worksheet as directed.	d. For each frequency setting, indications should be same as substeps a through c. Troubleshooting conclusions: If for any frequency setting: RFL PWR is more than one-third of FWD PWR reading, regardless of the FWD PWR reading, refer to troubleshooting chart 26. RFL PWR is less than one-third of FWD PWR **but** FWD PWR is less than 30 watts or more than 65 watts, RT being checked is bad.

TRANSMITTED FORWARD-VS-REFLECTED POWER CHART, RT POWER SWITCH AT HIGH



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3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 20 LOW-LEVEL RF TRANSMIT POWER

Setup:
1. Tune RT being checked to a frequency other than a NET frequency.
2. Turn POWER switch of RT being checked to LOW.
3. Turn TS-2609 SELECTOR switch to 100 FWD.

NOTE

For this step, when the initial indication is less than 10 watts, hold the TS-2609 SELECTOR switch in the 10 FWD position (RT keyed).

a. Key RT. (Unkey RT before going on.) b. Change RT BAND switch to other position, then key RT. (Unkey RT before going on.)	a. TS-2609 should indicate 0.5 to 10 watts. If indication is incorrect, RT being checked is bad. b. Indication should be the same as sub-step a.

HOW TO PROCEED. Go to block M.

M. RT MODULATION, SIDETONE AND TRANSMITTER FREQUENCY ACCURACY CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 21 150-Hz SIDETONE AND MODULATION

Setup for RT being checked:
Power switch should be at LOW.

Key RT; while keyed, turn RT SQUELCH switch through all four positions. Listen to earphone. (Unkey before going on.)	150-Hz sidetone should be heard in earphone for all SQUELCH positions **except** OLD ON. (Adjust RT VOLUME as required.) If sidetone is not heard, RT being checked is bad.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 22	VOICE SIDETONE AND MODULATION	
	Key RT and initiate a radio check. (Unkey RT before going on.)	Voice sidetone should be heard in earphone. (Adjust RT VOLUME as required.) If sidetone is not heard, RT being checked is bad.
Step 23	TRANSMITTER FREQUENCY ACCURACY	
	Setup for RT being checked: 1. Tune RT to a NET frequency. 2. Turn SQUELCH switch to NEW ON. **NOTE** If for this check, the distant receiver's front panel **cannot** be seen, initiate a radio check with distant station. For this check, when communication cannot be established in LOW power, turn POWER switch of RT being checked to HIGH and repeat this step.	
	Key RT and initiate a radio check. (Unkey RT before going on.)	CALL lamp should light at test receiver or NET operator should respond. If indications are incorrect, check siting. If siting okay, RT being checked is bad.
HOW TO PROCEED. When radio set being checked is an: AN/VRC-12, -44, -47, -48 or -45; -49, (whose C-RT has **not** been checked), go to block N. AN/VRC-43; -46 or -45; -49 (whose C-RT **has** been checked), go to block Q.		

N. ADDITIONAL RADIO COMPONENT REMOTE INPUT POWER CONTROL CHECK

Do this check for all communication systems that have two or more radio components.

Step 24	REMOTE POWER CONTROL	
	NOTE If for substep b below an additional radio component's dial lamp lights, the link of that additional component's mount is in direct. Check with your supervisor for direction.	

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 24 (cont)	a. Turn A-RT POWER switch to OFF.	a. A-RT dial lamp and AM-1780 POWER lamp should go off. If A-RT's dial lamp remains lit (regardless of action of AM-1780's POWER lamp), A-RT is bad. If A-RT's dial lamp goes off **but** AM-1780's POWER lamp stays on, refer to troubleshooting chart 27.
	b. Turn **all** additional radio component POWER switches to ON. (Not A-RT.)	b. Additional radio component(s) dial lamp(s) should **not** light. If additional radio component's dial lamp lights, the **link** in that component's mount is probably in **direct**.
	c. Turn A-RT POWER switch to LOW.	c. A-RT and additional radio component(s) dial lamp(s) and AM-1780 POWER lamp should light. If additional radio component's dial lamps fail to light, refer to troubleshooting chart 28.

HOW TO PROCEED: When radio set being checked is an:
AN/VRC-45 or -49, cable C-RT as shown in illustration "RT-524/VRC or -246/VRC, RT and RT Antenna Checks" on page 3-236 and then check C-RT starting with block G.
AN/VRC-12, -44, -47 or -48, go to block O.

O. R-442 CHECKS

Do these checks for all radio sets that have R-442's. When radio set is an AN/VRC-44 or -48, first do these checks for B-Receiver and then, **as directed later**, do them again for the C-Receiver.

Step 25	RECEIVER ANTENNA
	Setup: 1. Turn A-RT and **all** R-442 POWER switches to OFF. 2. Connect receiver antenna to AN/URM-182 and RT. (See illustration "Auxiliary Receivers Antenna Checks" on page 3-237) 3. Turn TS-2609 SELECTOR switch to 100 FWD. 4. Turn RT POWER switch to HIGH (allow 2-minute warmup). 5. Tune RT to 62.20 MHz when standard AUX receiver is used, 39.65 MHz when AS1095 is used.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 25 (cont)	a. Key A-RT and observe TS-2609 meter reading. b. Turn TS-2609 SELECTOR switch to 100 RFL, then key RT and observe meter reading. (If RFL reading is 10 or less, turn TS-2609 SELECTOR switch to 10 RFL.) (Unkey RT before going on.)	a. TS-2609 should indicate between 30 and 65 watts. b. TS-2609 RFL reading should be **no more than** one-third of FWD PWR reading. If indication is over one-third, see troubleshooting chart 29.
Step 26	AUDIO OUTPUT	
	Setup: 1. Turn A-RT POWER switch to OFF. 2. Controls of R-442 being checked should be preset according to instructions on page 3-234. 3. Connect handset to AUDIO jack of R-442 being checked. 4. Set POWER switch of R-442 being checked to ON-RESET. (If required to turn R-442 on, turn A-RT POWER switch to LOW.)	
	Turn R-442 VOLUME control fully clockwise (cw); then counterclockwise (ccw) to midpoint.	In earphone and speaker (if used): rushing noise loudness should increase; at full volume, rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard in earphone, refer to troubleshooting chart 30. If rushing noise is not heard in speaker, refer to troubleshooting chart 31.
Step 27	SQUELCH CONTROL AND CALL LAMP	
	Rotate R-442 SQUELCH switch through all four positions.	a. **OFF positions:** Loud rushing noise should be heard. b. **ON positions:** Rushing noise should be quieted (eliminated). c. **CALL lamp:** Should remain off **for all** positions. If indications are incorrect, R-442 being checked is bad.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 28	RECEIVER AND SQUELCH SENSITIVITY	
	Setup: Tune R-442 being checked to receive a NET frequency.	
	RECEPTION	
	Rotate R-442 SQUELCH switch through all four positions.	**OFF position:** Rushing noise should be quieted and voice signals should be heard loud and clear. CALL lamp should remain OFF. If indications are incorrect, R-442 being checked is bad.
	SQUELCH SENSITIVITY AND CALL LAMP	
	Rotate R-442 SQUELCH switch through **all** four positions.	**ON position:** Call lamp should light and voice signals should be heard loud and clear. If indications are incorrect, R-442 being checked is bad.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-44 or -48 (whose C-Receiver has **not** been checked), check C-Receiver starting with step 26 of block O.
AN/VRC-12, -47 or -44; -48 (whose C-Receiver **has** been checked) with:
No R-442 speakers, go to block Q.
R-442 speakers, go to block P.

P. R-442 SPEAKER MUTING CHECK, RT KEYED

Do this check for all radio sets whose R-442 has a speaker.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 29	SPEAKER MUTING, RT KEYED	
	Setup: 1. Connect a speaker (LS-454/U) to an AUDIO jack of each R-442. 2. Tune **all** R-442's to 75.00 MHz. 3. Turn **all** R-442 SQUELCH switches to OFF. (Verify rushing noise of all R-442 speakers.) 4. Turn **all** R-442 VOLUME controls, from off, one-quarter turn clockwise. 5. Move handset to A-RT RETRANSMIT R/W jack. 6. Tune A-RT to 62.20 MHz.	
	Key RT. (Press/release PTT switch several times.) (Unkey RT before going on.)	**When RT is keyed,** rushing noise from R-442 speaker(s) should be greatly reduced. **When RT unkeys,** R-442 rushing noise from speaker(s) should return to preset level. If indications are incorrect, refer to troubleshooting chart 32.
How to Proceed. Go to block Q.		

Q. COMMANDER'S RADIO/INTERCOM INTERFACE CHECKS

Do these checks for all communication systems.

Step 30	A-RT INTERCOM FUNCTIONS
	Setup: 1. Preset **all** radio components as follows: a. Turn **all** SQUELCH switches to an ON position. b. Turn **all** VOLUME controls to midpoint positions. c. Tune **all** MC-TUNE-KC controls to unassigned, but different, frequencies. d. **All** POWER switches at ON (RT's to LOW; receivers to ON). 2. Move handset to commander's (CDR) control box RAD jack, J802, and then turn CDR box's: a. VOLUME control fully clockwise (maximum volume). b. MONITOR switch to ALL. 3. AM-1780 RADIO TRANS switch should be at LISTENING SILENCE.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 30 (cont)	COMMANDER RT KEYING LOCKOUT	
	a. Key and unkey handset several times. (Unkey handset before going on.)	a. C-RT and/or A-RT should **not** key. If either or both key, AM-1780 is bad.
	b. Turn AM-1780 RADIO TRANS switch to CDR ONLY. (Do **not** key handset.)	b. C-RT and/or A-RT should **not** key. If either **or** both key, refer to troubleshooting chart 33.
	A-RT MUTED MONITORING, MONITOR SWITCH AT ALL	
	NOTE For this check, rushing noise loudness depends on control box VOLUME setting only.	
	c. Turn A-RT SQUELCH switch to an OFF position.	c. Loud rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 34.
	A-RT KEYING AND MODULATION, MONITOR SWITCH AT ALL	
	NOTE For this check, voice sidetone loudness depends on control box VOLUME setting only.	
	d. Key handset and then speak into its mike. (Unkey handset before going on.)	d. A-RT should key (relays click, blower runs, rushing noises drastically reduce) **and** voice sidetone should be heard. If A-RT does **not** key, refer to trouble-shooting chart 35. If A-RT keys, **but** there is **no** sidetone, refer to troubleshooting chart 36.
	INTERCOM ACCENT, MONITOR SWITCH AT ALL	
	Setup: 1. Move handset to Commander's (CDR) control box INT jack, J803 (yellow band). (Loud rushing noise should be heard.) 2. Turn AM-1780 INT ACCENT switch to ON.	

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 30 (cont)	e. Key and unkey handset several times. (Unkey handset before going on.)	e. Rushing noise should decrease each time intercom is keyed. If rushing noise does **not** decrease, AM-1780 is bad.
	A-RT UNMUTED MONITORING, MONITOR SWITCH AT A	
	Setup: Move handset to commander's (CDR) control box RAD jack, J802. (Loud rushing noise should be heard.) **NOTE** For this check, rushing noise loudness depends on **both** A-RT VOLUME **and** control box VOLUME settings.	
	f. Turn CDR MONITOR switch to A.	f. Rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 37.
	A-RT KEYING AND MODULATION, MONITOR SWITCH AT A	
	NOTE For this check, the loudness of the voice sidetone depends on **both** the A-RT VOLUME **and** control box VOLUME settings.	
	g. Key handset and then speak into mike. (Unkey handset and turn A-RT SQUELCH switch to an ON position before going on.)	g. Indications should be same as substep d. If incorrect, CDR C-2298 is bad.
HOW TO PROCEED. When radio set being checked is an: AN/VRC-43 or -46, go to block R. AN/VRC-12, -44, -47 or -48, go to step 31 below. AN/VRC-45 or -49, go to step 33 below.		

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 31 RADIO DUPLEX/INTERCOM FUNCTIONS

Setup:
1. A-RT SQUELCH switch should be at an ON position.
2. Turn commander's (CDR) control box MONITOR switch to ALL.

B-RECEIVER MUTED MONITORING, MONITOR SWITCH AT ALL

NOTE

For this check, rushing noise loudness depends on control box VOLUME setting only.

a. Turn B-Receiver SQUELCH switch to an OFF position.	a. Loud rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 38.

B-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT B

NOTE

For this check and substep c, rushing noise loudness depends on both B-Receiver and control box VOLUME settings.

b. Turn CDR MONITOR switch to B.	b. Rushing noise should be heard at CDR box. If rushing noise is not heard, refer to troubleshooting chart 39.

A-RT KEYING WITH B-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT B

c. Key handset. (Unkey handset and turn B-Receiver SQUELCH switch to an ON position before going on.)	c. A-RT should key (relays click; blower runs) **and** rushing noise should be heard at CDR box B-Receiver. If incorrect, CDR C-2298 is bad.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-12 or -47, go to block R.
AN/VRC-44 or -48, go to step 32 below.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 32 C-RECEIVER/INTERCOM FUNCTIONS

Setup:
1. B- and C- Receivers' SQUELCH switches should be at an ON position.
2. Turn commander's (CDR) control box MONITOR switch to ALL.

C-RECEIVER MUTED MONITORING, MONITOR SWITCH TO ALL

NOTE

For this check, rushing noise loudness depends on control box VOLUME setting only.

a. Turn C-Receiver SQUELCH switch to an OFF position.	a. Loud rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 40.

C-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT C

NOTE

For this check, rushing noise loudness depends on **both** C-Receiver **and** control box VOLUME settings.

b. Turn CDR MONITOR switch to C. (Turn C-Receiver SQUELCH switch to an ON position before going on.)	b. Rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 41.

HOW TO PROCEED. Go to block R.

Step 33 C-RT/INTERCOM FUNCTIONS

Setup:
1. A- and C-RT SQUELCH switches should be at an ON position.
2. Turn commander's (CDR) control box MONITOR switch to ALL.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 33 (cont) C-RT MUTED MONITORING, MONITOR SWITCH AT ALL

NOTE

For this check, rushing noise loudness depends on control box VOLUME setting only.

a. Turn C-RT SQUELCH switch to an OFF position.	a. Loud rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 42.

C-RT UNMUTED MONITORING, MONITOR SWITCH AT C

NOTE

For this check, rushing noise loudness depends on **both** A-RT **and** control box VOLUME setting.

b. Turn CDR MONITOR switch to C.	b. Rushing noise should be heard at CDR box. If rushing noise is **not** heard, refer to troubleshooting chart 43.

C-RT KEYING AND MODULATION, MONITOR SWITCH AT C

NOTE

For this check, the loudness of the voice sidetone depends on **both** the C-RT **and** control box VOLUME settings.

c. Key handset **and then** speak into its mike. (Unkey handset and turn C-RT SQUELCH switch to an ON position before going on.)	c. C-RT should key (relays click, blower runs; rushing noise drastically reduced) **and** voice sidetone should be heard. If C-RT does **not** key, refer to troubleshooting chart 44. If C-RT keys **but** there is **no** voice sidetone, refer to troubleshooting chart 45.

HOW TO PROCEED. Go to block R.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

R. ADDITIONAL C-2298 CONTROL BOXES RADIO/INTERCOM CHECKS

Do these checks for all communication systems that have crewmember and/or driver C-2298's in addition to a CDR C-2298. Some vehicles will have a combination C-2297 and C-2296. When this is the case, check the C-2297/C-2296 **as directed later**.

Step 34	CREW RT KEYING LOCKOUT	
	Setup: 1. Preset all radio components as follows: a. Turn **all** SQUELCH switches to an ON position. b. Turn **all** VOLUME controls to midpoint position. 2. Move handset to RAD Jack J802 of the additional C-2298's to be checked **and then** turn that C-2298 MONITOR switch to ALL. 3. AM-1780 RADIO TRANS switch should be at CDR ONLY.	
	a. Key and unkey handset several times. (Unkey handset before going on.)	a. C-RT and/or A-RT should **not** key. If **either or** both key, AM-1780 is bad.
	b. Turn AM-1780 RADIO TRANS switch to CDR + CREW. (**Do not** key handset.)	b. C-RT **and/or** A-RT should **not** key. If **either or** both key, refer to troubleshooting chart 46.
Step 35	A-RT KEYING AND MODULATION, MONITOR SWITCH AT ALL	
	Setup: At C-2298 being checked: 1. Connect handset to RAD Jack J802. 2. Turn MONITOR switch to ALL. 3. Turn VOLUME control fully clockwise (maximum volume). **NOTE** For this check, the loudness of the voice sidetone depends on the control box VOLUME setting only.	
	a. Key handset **and then** speak into its mike. (Unkey handset before going on.)	a. A-RT should key (relays click; blower runs) **and** voice sidetone should be heard. If A-RT does **not** key, refer to troubleshooting chart 35. If A-RT keys **but** there is **no** voice sidetone, AM-1780 is bad.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 35 (cont)	A-RT KEYING, MONITOR SWITCH AT A	
	b. Turn MONITOR switch to A and then key and unkey handset several times. (Unkey handset before going on.)	b. A-RT should key (relays click; blower runs) **and** unkey. If A-RT does not key, C-2298 being checked is bad.
	A-RT KEYING, MONITOR SWITCH AT B	
	c. Turn MONITOR switch to B **and then** key **and** unkey handset several times. (Unkey handset before going on.)	c. A-RT should key (relays click; blower runs) **and** unkey. If A-RT does **not** key, C-2298 being checked is bad.
HOW TO PROCEED. When radio set being checked is an: AN/VRC-12, -43, -46 or -47, one at a time, check every C-2298 **not** yet checked by repeating step 35, a through c. Then, if system: Includes a C-2297, go to block S. Does **not** include a C-2297, go to block U. AN/VRC-44, -45, -48 or -49, go to step 36 below.		
Step 36	C-RT or C-RECEIVER UNMUTED MONITORING, MONITOR SWITCH AT C	
	Setup: At C-2298 being checked, turn MONITOR switch to C. **NOTE** For this check, rushing noise loudness depends on **both** radio component **and** control box VOLUME settings.	
	Turn C-Radio component's SQUELCH switch to an OFF position. (Return SQUELCH switch to an ON position before going on.)	Rushing noise should be heard at C-2298 being checked. If rushing noise is **not** heard, refer to troubleshooting chart 47.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

HOW TO PROCEED. When radio set being checked is an: AN/VRC-44 or -48, one at a time, check every C-2298 **not** yet checked by repeating steps 35 and 36. Then go to block U. AN/VRC-45, or -49, go to step 37 below.	
Step 37 C-RT KEYING AND MODULATION, MONITOR SWITCH AT C	
NOTE For this check, the loudness of the voice sidetone depends on **both** the C-RT VOLUME **and** control box VOLUME settings.	
Key handset and then speak into its mike. (Unkey handset before going on.)	C-RT should key (relays click; blower runs) and voice sidetone should be heard. If C-RT does not key, refer to troubleshooting chart 44. If C-RT keys but there is **no** voice sidetone, refer to troubleshooting chart 48.
HOW TO PROCEED. One at a time, check every C-2298 **not** yet checked by repeating steps 35, 36 and 37. Then if system: Includes a Relay Box C-2299, go to block T. Does **not** include a C-2299, go to block U.	

S. CONTROL BOXES C-2297 AND C-2296 RADIO/INTERCOM CHECKS

Do these checks for all communication systems that have Control Box C-2297. Normally a C-2297 is installed in tank-type vehicles as the driver's box and is used in combination with a C-2296 to provide persons outside the vehicle access to the vehicle's communication system. These tank-type vehicles are normally equipped with Radio Sets AN/VRC-12,-43, -46 or -47 only.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 38 A-RT KEYING AND MODULATION, MONITOR SWITCH AT ALL

Setup:
1. Preset **all** radio components as follows:
   a. Turn **all** SQUELCH switches to an ON position.
   b. Turn **all** VOLUME controls to midpoint position.
2. Move handset to the C-2297 RAD jack J902, and then:
   a. Turn MONITOR switch to ALL.
   b. Turn VOLUME control fully clockwise (maximum volume).
   c. External control switch should be at OFF.

NOTE

For this check, the loudness of the voice sidetone depends on the control box VOLUME setting only.

a. Key handset **and** speak into its mike. (Unkey handset before going on.)	a. A-RT should key (relays click; blower runs) **and** voice sidetone should be heard. If A-RT does **not** key, refer to troubleshooting chart 35. If A-RT keys, **but** there is **no** voice sidetone, the AM-1780 is bad.

A-RT KEYING, MONITOR SWITCH AT A

b. Turn MONITOR switch to A **and then** key **and** unkey handset several times. (Unkey handset before going on.)	b. A-RT should key (relays click; blower runs) **and** unkey. If A-RT does **not** key, C-2297 is bad.

A-RT KEYING, MONITOR SWITCH AT B

c. Turn MONITOR switch to B **and then** key **and** unkey handset several times. (Unkey handset before going on.)	c. Indications should be same as substep b.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 38 (cont)	A-RT KEYING FROM C-2296	
	Setup: 1. Turn C-2297 MONITOR switch to ALL. 2. Unplug handset from C-2297.	
	d. Turn C-2297 external control switch to EXT.	d. AR-T should **not** key. If A-RT keys, refer to troubleshooting chart 49.
	e. At C-2296, hold switch in RAD while keying H-207 **and** speaking into H-207 mike.	e. A-RT should key **and** voice sidetone should be heard. If indications are incorrect, refer to troubleshooting chart 50.
HOW TO PROCEED. Go to block U.		

T. RADIO RELAY (RETRANSMISSION) CHECKS

Do these checks for a communication system that has Radio Set AN/VRC-45 or -49 with a Relay Box C-2299 connected to the AM-1780.

Step 39	A-RT TRANSMITTER/C-RT RECEIVER
	Setup: 1. C-2299 RETRANS switch should be at OFF. 2. Turn **both** RT SQUELCH switches to NEW ON. 3. **Both** RT POWER switches should be at LOW. 4. Tune C-RT to 50.85 MHz. 5. Tune A-RT to 73.85 MHz. 6. Turn commander's (CDR) control box MONITOR switch to A. 7. Connect handset to CDR control box RAD jack, J802. **CAUTION** Insure that **both** RT antennas are properly cabled to their RT's.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 39 (cont)	a. Turn C-2299 RETRANS switch to ON.	a. **Both** RT's should remain unchanged. If indications are incorrect, refer to troubleshooting chart 51.
	b. Turn C-RT SQUELCH switch to NEW OFF. At C-RT RETRANSMIT (R/W) jack, short Pin E to ground.	b. C-RT CALL lamp should light. A-RT should key and rushing noise (A-RT modulation) should be heard at commander's earphone. If A-RT fails to key, refer to troubleshooting chart 52. If rushing noise (A-RT modulation) is **not** heard, refer to troubleshooting chart 53.
	c. At C-RT remove short (Pin E to ground). Turn C-RT SQUELCH switch to NEW ON.	c. C-RT CALL lamp should go out. A-RT should unkey, rushing noise should **not** be heard. If indications are incorrect, refer to troubleshooting chart 51.
	C-RT TRANSMITTER/A-RT RECEIVER	
	Setup: Turn commander's (CDR) control box MONITOR switch to C.	
	d. Turn A-RT SQUELCH switch to NEW OFF. At A-RT RETRANSMIT (R/W) jack, short Pin E to ground.	d. A-RT CALL lamp should light. C-RT should key **and** rushing noise (C-RT modulation) should be heard at commander's earphone. If C-RT fails to key, refer to troubleshooting chart 52. If rushing noise (C-RT modulation) is **not** heard, refer to troubleshooting chart 53.
	e. At A-RT, remove short (Pin E to ground). Turn A-RT SQUELCH switch to NEW ON.	e. A-RT CALL lamp should go out. C-RT should unkey **and** rushing noise should **not** be heard. If indications are incorrect, refer to troubleshooting chart 51.
	Direction: Turn C-2299 RETRANS switch to OFF.	
HOW TO PROCEED. Go to block U.		

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

U. DISTANCE CHECK

Do this check for all communication systems.

Step 40 DISTANCE CHECK		
	Setup: Place communication system in its operational environment.	
	Establish communication with another radio set (station) located a prescribed distance away (planning range). (A simple Radio Check will do.)	The distant radio set's (station) operator should respond. If response is **not** heard, check siting.
HOW TO PROCEED. Go to block V.		

V. SHUT DOWN OF RADIO INTERCOM SYSTEM AFTER CHECKS

Do this check for all communication systems.

Step 41 SHUT DOWN RADIO INTERCOM SYSTEM		
	a. Turn A-RT POWER switch to OFF.	a. ALL radio components and AM-1780 should stop operating. (POWER and dial lamps should go off.) If radio mount's links are in REMOTE **and** the radio components/AM-1780 **don't** stop operating, A-RT is bad.
	b. Slowly turn AM-1780 MAIN PWR switch to OFF.	b. AM-1780 POWER lamp should blink on **and** then go off. If it fails to go off, AM-1780 is bad.
	Direction: 1. Turn all additional radio component POWER switches to OFF. 2. Disconnect AN/URM-182 test set and repack in carrying case. 3. Recable radio set according to installation instructions, chapter 2, section III.	

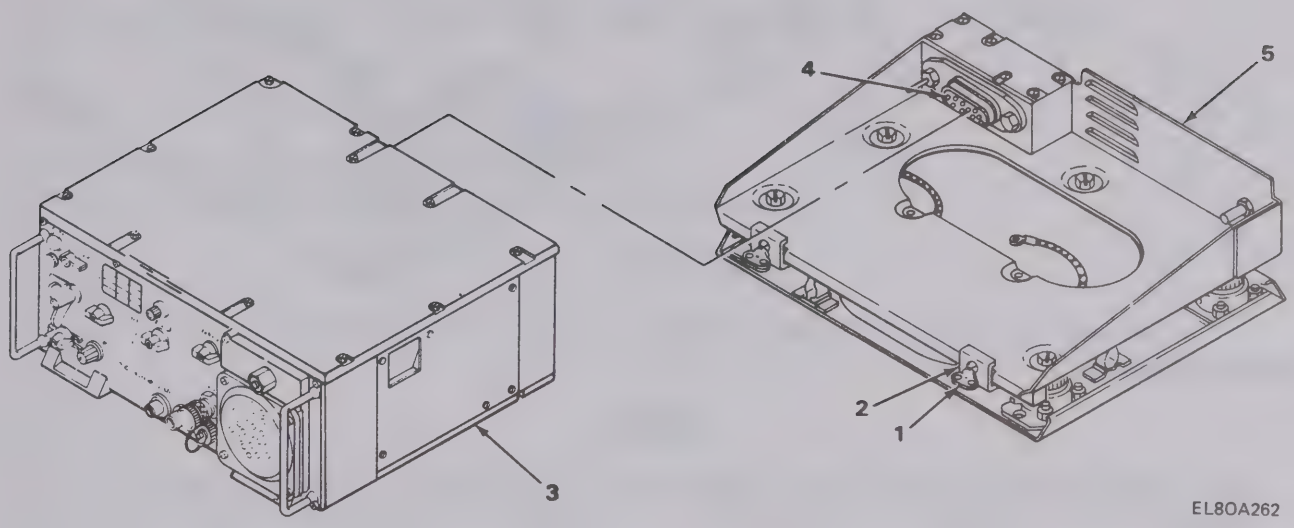
3-16. RT-246(*)/VRC AND RT-524(*)/VRC.

REMOVAL OF RT

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn vehicle power to OFF.
Remove cables to RT.
TECHNICIANS: Two

WARNING

RT weighs 61 lb. Two technicians should lift RT.



1. Unscrew two thumbscrews (1) to lower clamp (2).
2. Pull RT (3) forward until the rear of RT (3) is clear of connector assembly (4).

CAUTION

Use both handles or guards to pull and then lift RT to prevent equipment damage.

3. Lift RT (3) from mount (5).

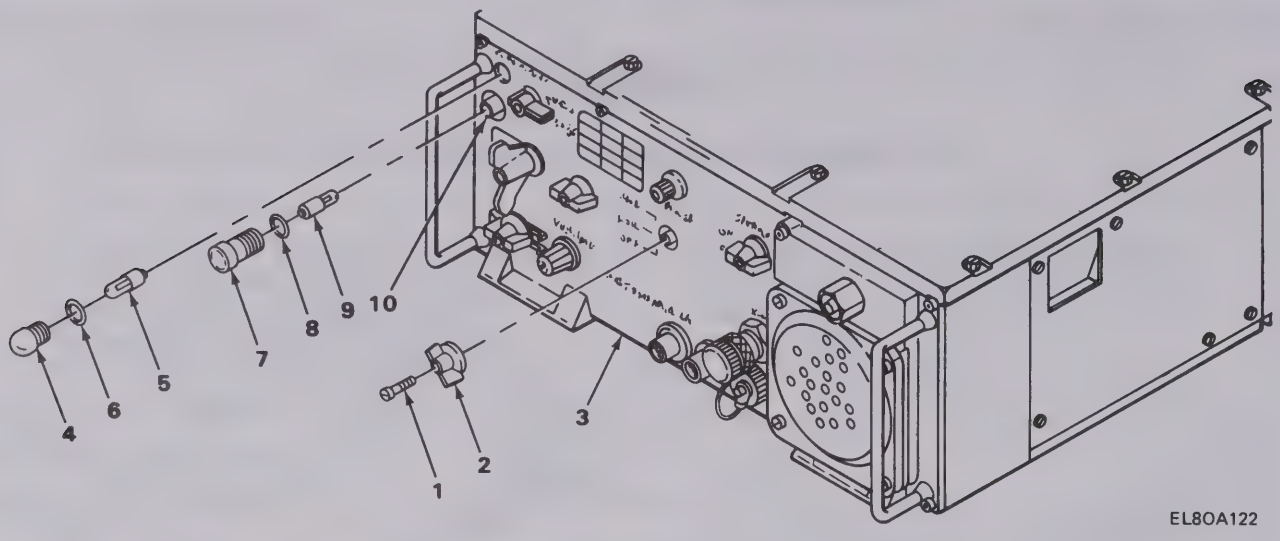
REPLACEMENT OF RT

For replacement of RT, see paragraph 2-17.

3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

REPLACEMENT OF KNOBS, CALL LAMP, AND DIAL WINDOW

Replacement procedures are the same for the RT-246, RT-246A, RT-524, and RT-524A.
TOOLS: Tool Kit, Electronic Equipment TK-101/G



Removal of Knobs

NOTE

Note position of indicator line on knob when removing, and replace new knob in the same position.

1. Using screwdriver, loosen screw (1) from knob (2).
2. Remove knob (2) from associated RT control (3).

Installation of Knobs

1. Install knob (2) on associated RT control (3).
2. Using screwdriver, tighten screw (1).

Removal of Call Lamp

1. Unscrew and remove lens (4) with lamp (5) and O-ring (6).
2. Pull lamp (5) from lens (4).

Installation of Call Lamp

NOTE

Check that O-ring is seated properly around lens.

CAUTION

Do not overtighten lens.

3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

1. Insert lamp (5) in lens (4).
2. Insert lens (4) with lamp (5) and O-ring (6).

Removal of Dial Window Lamp

1. Unscrew and remove lamp screw (7) and O-ring (8).
2. Grasping flared end of lamp (9), pull from lamp receptacle (10).

Installation of Dial Window Lamp

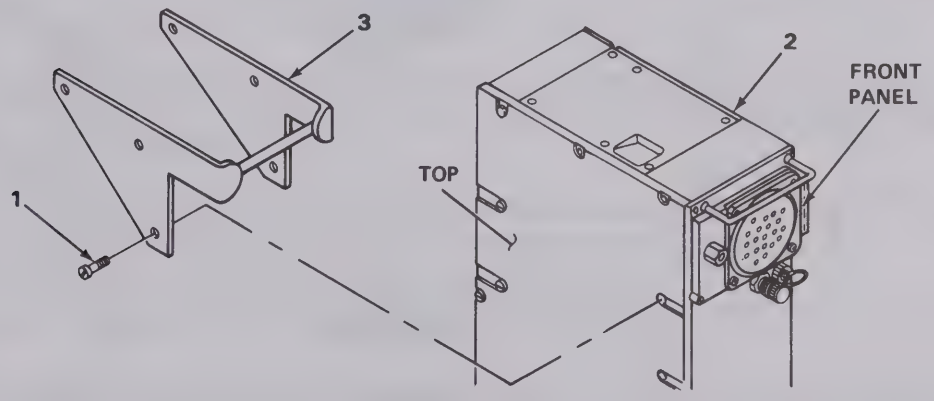
1. Push lamp (9) (glass bulb in) in lamp receptacle (10).
2. Screw lamp screw (7) on lamp receptacle (10).

INSTALLATION OF HANDLE ASSEMBLY

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Place RT on its side on floor.

CAUTION

Do not set RT on its rear panel. Damage to the RT blower could result.



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NOTE

Due to screw locations on bottom of RT, left and right handle assemblies cannot be interchanged.

1. Using screwdriver, loosen and remove six screws (1) from top and bottom of RT (2).
2. Position top and bottom of handle assembly (3) on RT (2) and aline holes.
3. Using screwdriver, insert six screws (1) in top and bottom of handle assembly.
4. Turn RT (2) over so that it is resting on its side with handle assembly (3) installed.
5. Repeat this procedure for other handle assembly.

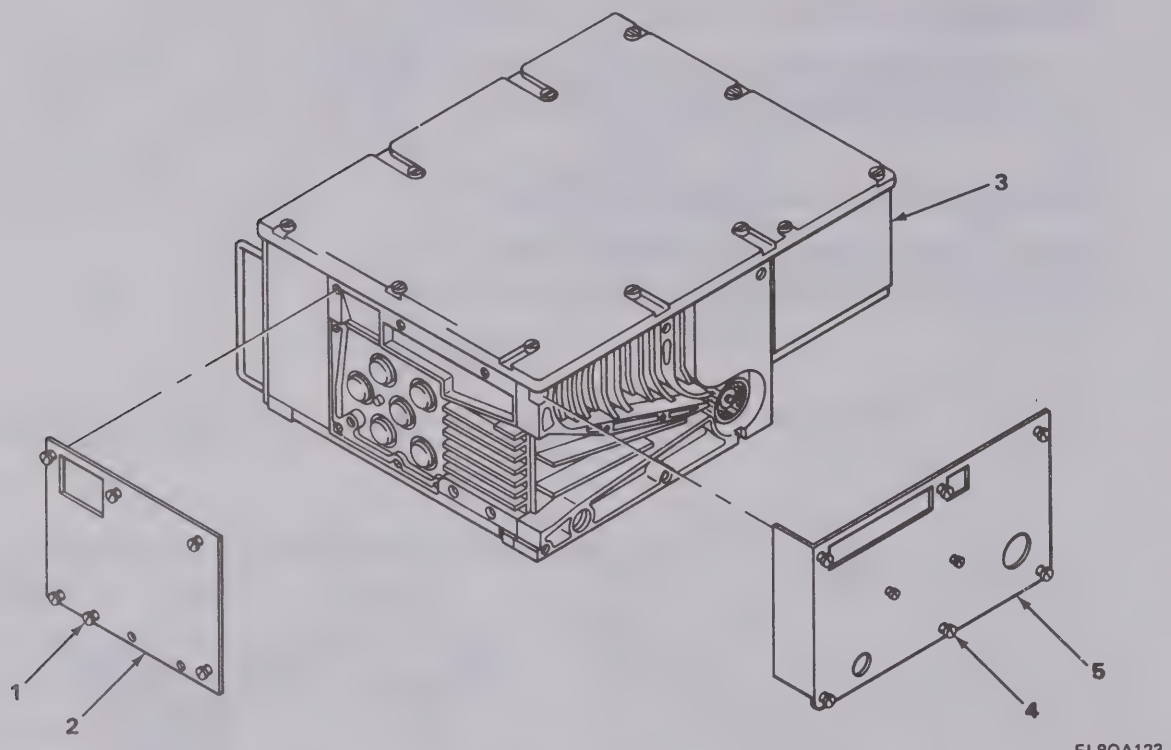
3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

REMOVAL OF SIDE AND REAR COVER PANELS

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove RT from mount and place on left side.

CAUTION

Do not set RT on its rear panel. Damage to the RT blower could result.



CAUTION

Do not remove RT top and bottom covers. Dirt and other substances will damage internal parts.

1. Using screwdriver, loosen six captive screws (1) of side cover panel (2).
2. Remove side cover panel (2) from RT (3).
3. Using screwdriver, loosen eight captive screws (4) of rear cover panel (5).
4. Remove rear cover panel (5) from RT (3).

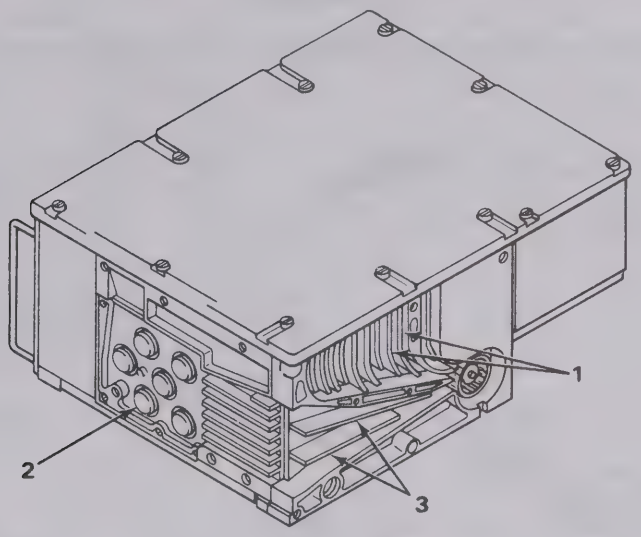
REPLACEMENT OF SIDE AND REAR COVER PANELS

1. Put rear cover panel (5) in place.
2. Using screwdriver, tighten eight captive screws (4).
3. Put side cover panel (2) in place.
4. Using screwdriver, tighten six captive screws (1).

3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

REMOVAL OF DIRT FROM HEAT EXCHANGER AND BLOWER ASSEMBLY

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove RT from mounting and set on its left side. (See removal of RT page 3-273.)
Remove side and back covers (page 3-275) and heat exchanger.



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CAUTION

Do not remove top and/or bottom covers of RT. Dirt removed during cleaning of heat exchanger surfaces may get inside. Do not use trichlorotrifluoroethane when cleaning RT. Power transistor assembly will be damaged.

1. Using stiff-haired brush, loosen encrusted dirt from heat exchanger surfaces (1).
2. Using stiff-haired brush, loosen dirt from power transistor assembly surfaces (2).
3. Using soft-haired brush, remove dirt from heat exchanger surfaces (1).
4. Using soft-haired brush, remove dirt from power transistor assembly surfaces (2).
5. Using toothbrush, remove dirt from vanes and fins (3) of blower motor.

NOTE

For replacement of covers, see removal of side and back cover panels, page 3-276. For replacement of RT, see paragraph 2-17.

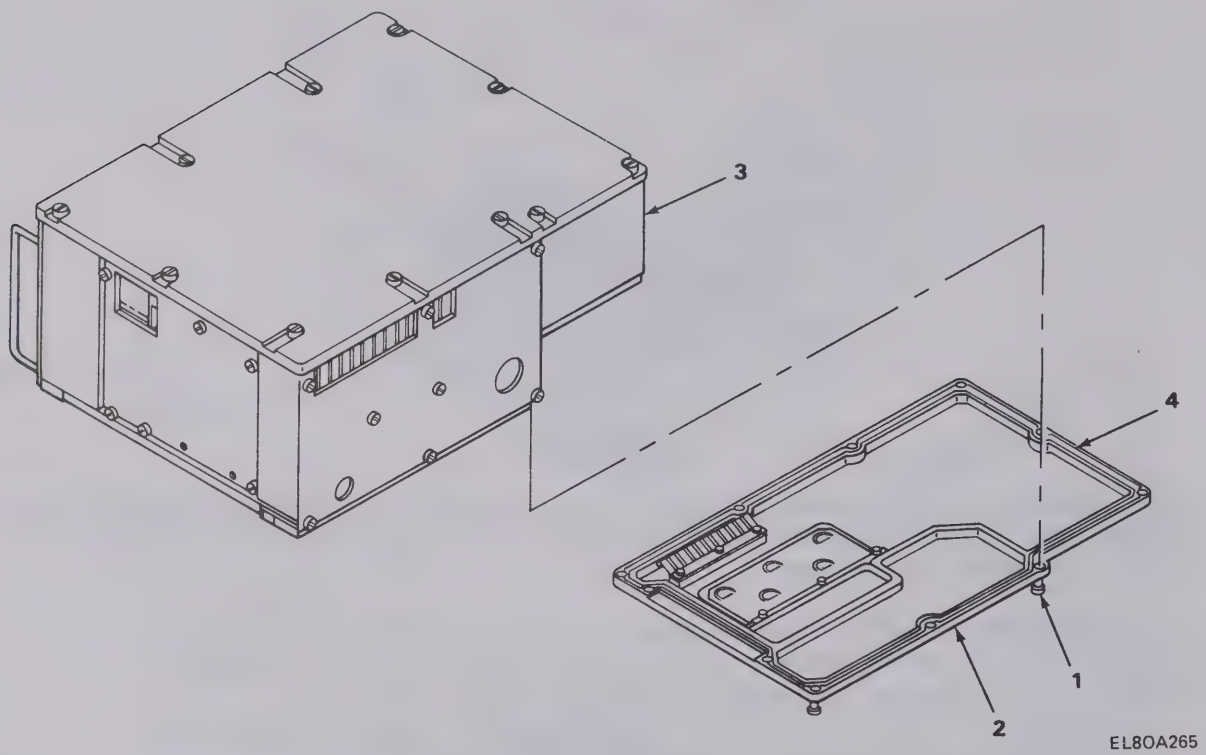
3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

REMOVAL OF BOTTOM COVER

TOOLS: Tool Kit, Electronic Equipment TK-101/G
MATERIALS/PARTS: Silicone compound (item 1, appendix C)
PRELIMINARY PROCEDURE: Remove RT from mount. (See removal of RT, page 3-273.)

CAUTION

Do not set RT on its rear panel. Damage to the RT blower could result.



1. Using screwdriver, loosen captive screws (1) from bottom cover (2).
2. Remove bottom cover (2) from RT (3).

NOTE

All radio components have a gasket that requires lubrication before replacing the cover.
cover.

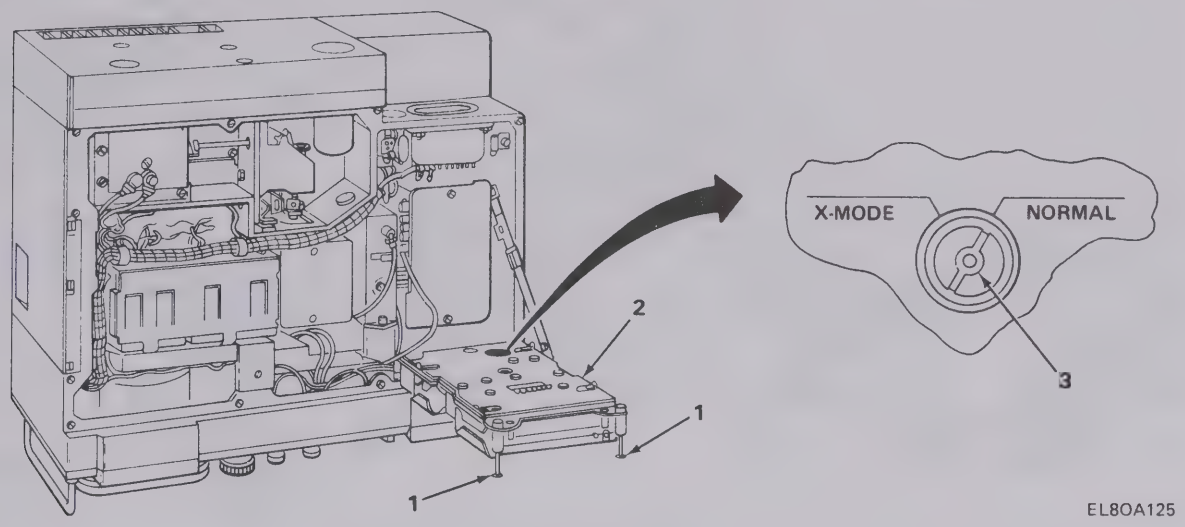
REPLACEMENT OF BOTTOM COVER

1. Apply a thin coat of silicone compound to gasket (4).
2. Put cover (2) in place.
3. Using screwdriver, tighten captive screws (1).

3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

SETTING RT X-MODE/NORMAL SWITCH FOR SECURE COMMUNICATION

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove bottom cover. (See removal of bottom cover, page 3-276.)



NOTE

For a test to determine the position of the X-MODE/NORMAL switch, see paragraph 2-23.

1. Using screwdriver, loosen two captive screws (1) on rear of A4000 assembly (2).
2. Raise A4000 assembly (2).
3. Set X-MODE/NORMAL switch (3) to X-MODE position.
4. Lower A4000 assembly (2).
5. Using screwdriver, tighten two captive screws (1).

CAUTION

Do not overtighten screws.

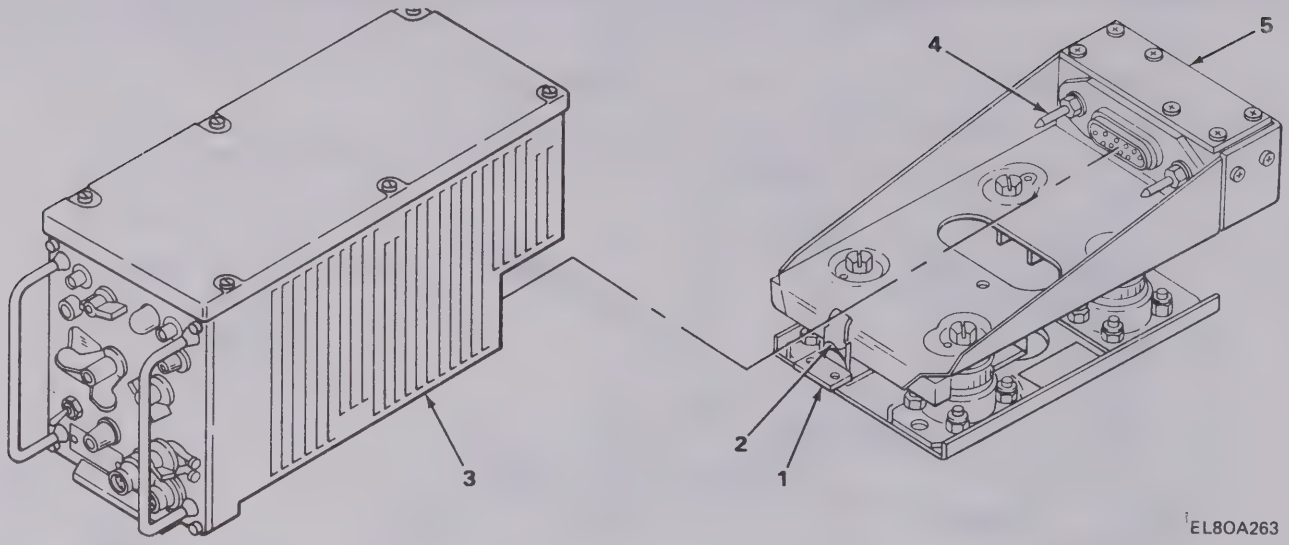
NOTE

For replacement of cover, see removal of bottom cover, page 3-278.

3-17. R-442(*)/VRC.

REMOVAL OF R-442

PRELIMINARY PROCEDURE: Turn vehicle power to OFF.



CAUTION

Use both guards to pull and then lift receiver to prevent equipment damage.

1. Unscrew thumbscrew (1) to lower clamp (2).
2. Pull receiver (3) forward until the rear of receiver (3) is clear of the connector assembly (4).

CAUTION

Be careful to slide the R-442 into (or out of) the MT-1898/VRC. Damage to the radio jack (J14) can occur.

3. Lift receiver (3) from mount (5).

REPLACEMENT OF R-442

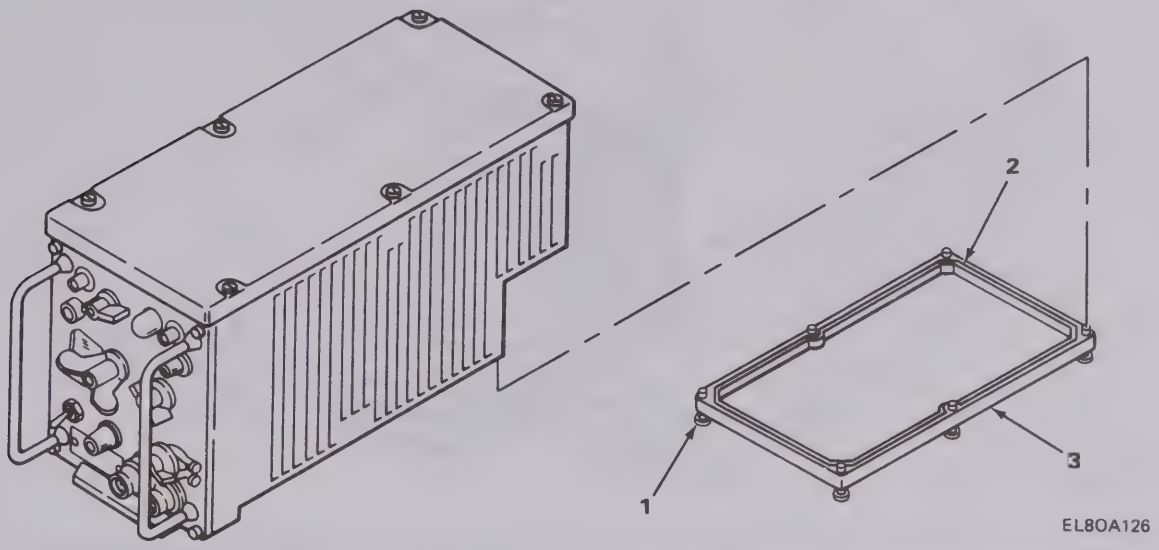
1. Place receiver (3) into mount (5).
2. Aline receiver (3) with connector assembly (4) and push back.
3. Screw thumbscrew (1) until clamp (2) tightens receiver (3) into mount (5).

3-17. R-442(*)/VRC. (CONT)

REMOVAL OF BOTTOM COVERS

TOOLS: Tool Kit, Electronic Equipment TK-101/G

PRELIMINARY PROCEDURE: Remove R-442 from mounting bracket. (See removal of R-442, page 3-280.)



CAUTION

Do not damage gasket (2) with screwdriver. If gasket is damaged, replace to insure waterproofing protection of junction box.

1. Using screwdriver, loosen six captive screws (1).
2. Remove bottom cover (3).

INSTALLATION OF BOTTOM COVERS

1. Install bottom cover (3).
2. Using screwdriver, tighten six captive screws (1).

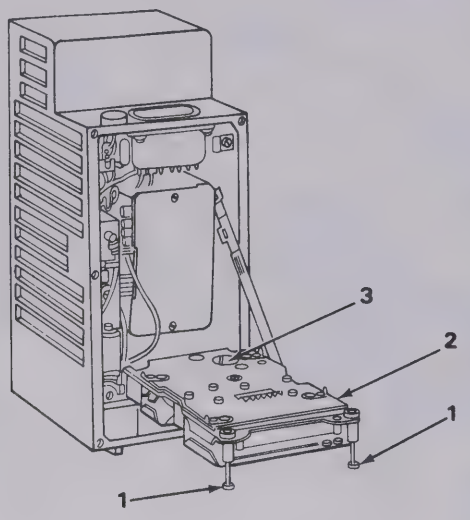
CAUTION

Do not overtighten screws.

3-17. R-442(*)/VRC. (CONT)

SETTING OF X-MODE/NORMAL SWITCH

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove bottom cover. (See removal of bottom cover, page 3-281.)



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1. Using screwdriver, loosen two captive screws (1) on rear of A4000 assembly (2).
2. Raise A4000 assembly (2).
3. Set X-MODE/NORMAL switch (3) to desired position.
4. Lower A4000 assembly (2).
5. Using screwdriver, tighten two captive screws (1).

CAUTION

Do not overtighten screws.

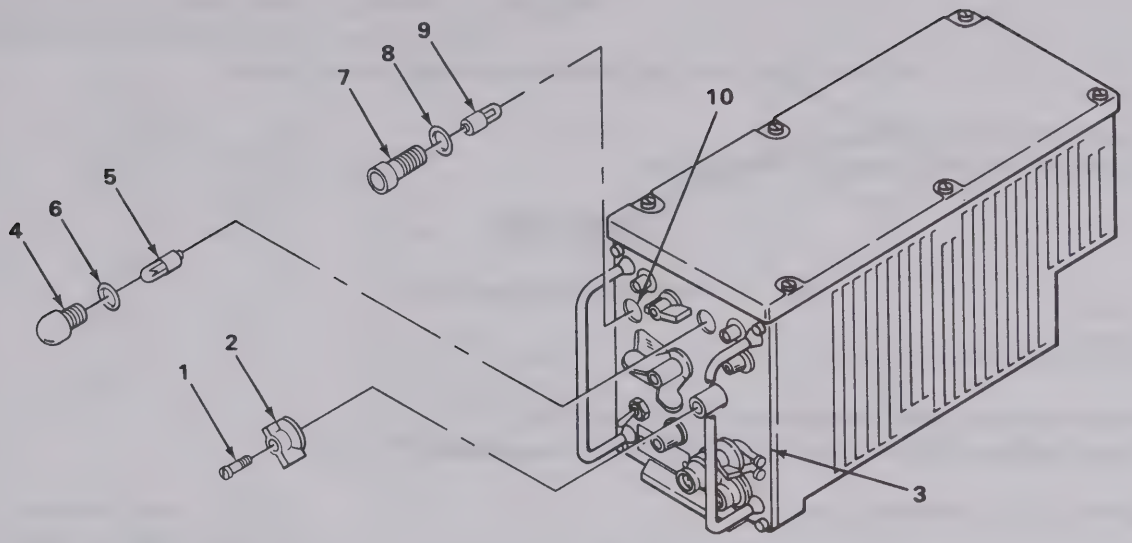
NOTE

For replacement of bottom cover, see page 3-281. Tag the receiver if it is to be used in X-MODE.

3-17. R-442(*)/VRC. (CONT)

REPLACEMENT OF KNOBS AND LAMPS

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.



Removal of Knobs

NOTE

Note position of indicator line on knob when removing, and replace new knob in the same position.

1. Using screwdriver, unscrew screw (1) from knob (2).
2. Remove knob (2) from associated receiver control (3).

Replacement of Knobs

1. Place knob (2) on associated receiver (3) control.
2. Using screwdriver, tighten screw (1).

Removal of Call Lamp

1. Unscrew and remove lens (4) with lamp (5) and O-ring (6).
2. Pull lamp (5) from lens (4).

3-17. R-442(*)/VRC. (CONT)

REPLACEMENT OF KNOBS AND LAMPS (CONT)

Replacement of Call Lamp

NOTE

Check that O-ring (6) is properly seated around lens.

1. Push lamp (5) in lens (4).
2. Screw lens (4) with lamp (5) and O-ring (6).

CAUTION

Do not overtighten lens.

Removal of Dial Window Lamp

1. Unscrew and remove lamp screw (7) and O-ring (8).
2. Grasping flared end of lamp (9), pull from lamp receptacle (10).

Replacement of Dial Window Lamp

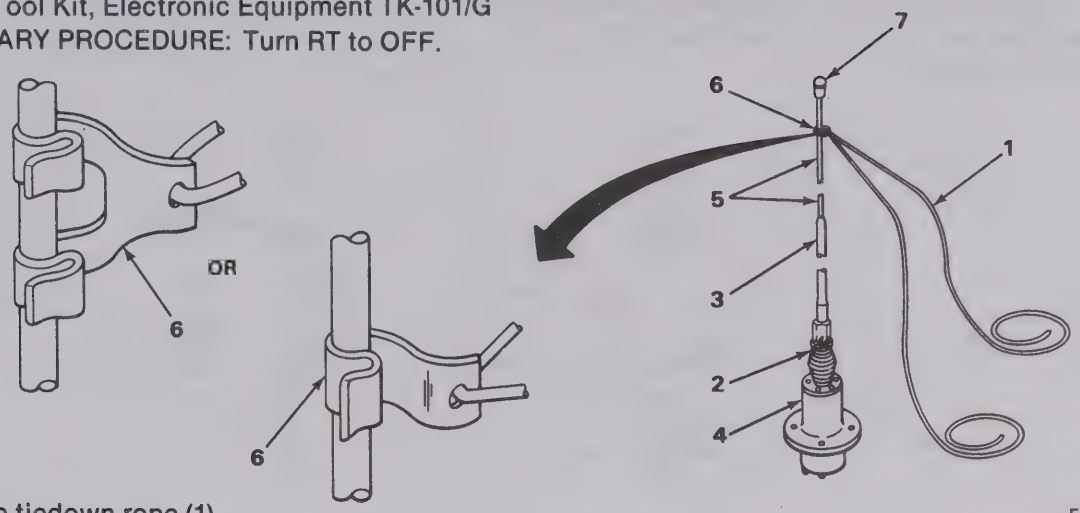
1. Push lamp (9) in lamp receptacle (bulb in) (10).
2. Screw lamp screw (7) into lamp receptacle on front of receiver (3).

3-18. ANTENNAS.

AS-1729/VRC

Replacement of Antenna Elements AT-1095 and AS-1730

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT to OFF.



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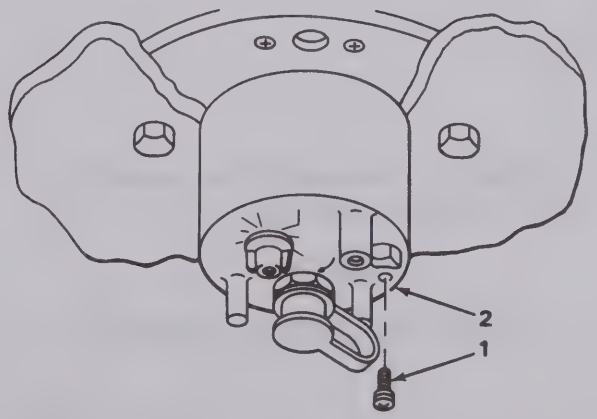
1. Untie tiedown rope (1).
2. Remove safety wire (2).
3. Unscrew AS-1730 (lower element) (3) from matching unit (4).
4. Unscrew AT-1095 (upper element) (5).
5. Remove tiedown assembly (6) and tip cap (7).

NOTE

For replacement, see paragraph 2-15.

Drainage of Water from Matching Unit MX-6707

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.



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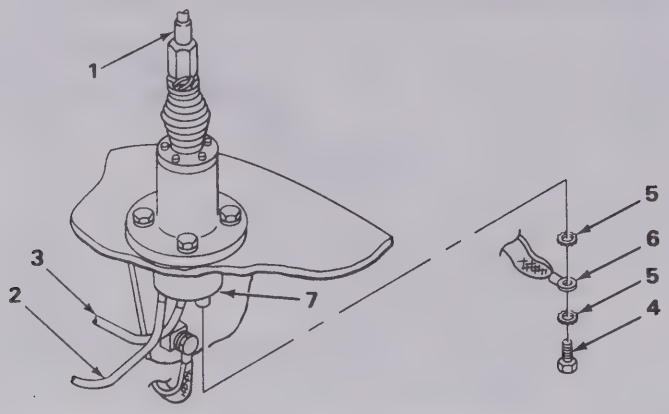
1. Using cross-tip screwdriver, remove seal screw (1) from matching unit (2). While holding a rag under matching unit (2), drain moisture.
2. Screw seal screw (1) into matching unit (2).

3-18. ANTENNAS. (CONT)

AT-1729/VRC (CONT)

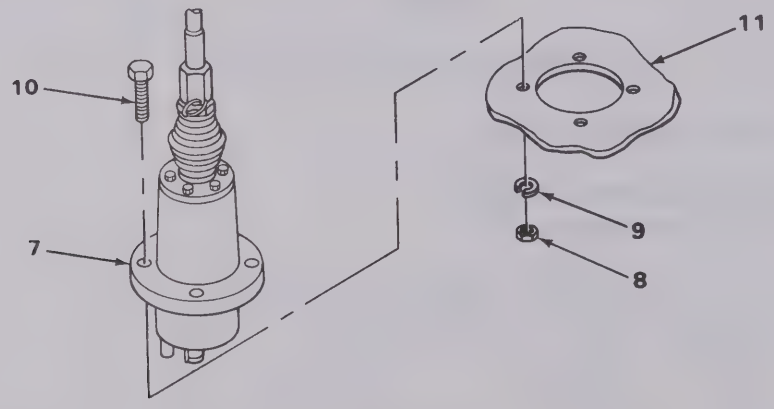
Replacement of Antenna Matching Unit MX-6707

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT to OFF.
TECHNICIANS: Two



EL8OA138

1. Remove antenna elements (1). (See replacement of Antenna Elements AT-1095/VRC and AS-1730/VRC, page 3-285.)
2. Remove control cable (2) and rf cable (3).
3. Using screwdriver, remove ground strap screw (4)and lockwasher (5).
4. Remove ground strap (6) and second lockwasher (5) from matching unit (7).



EL8OA139

5. Remove four mounting nuts (8) and lockwashers (9) from screws (10).
6. Remove matching unit (7) from vehicle's antenna port (11).

NOTE

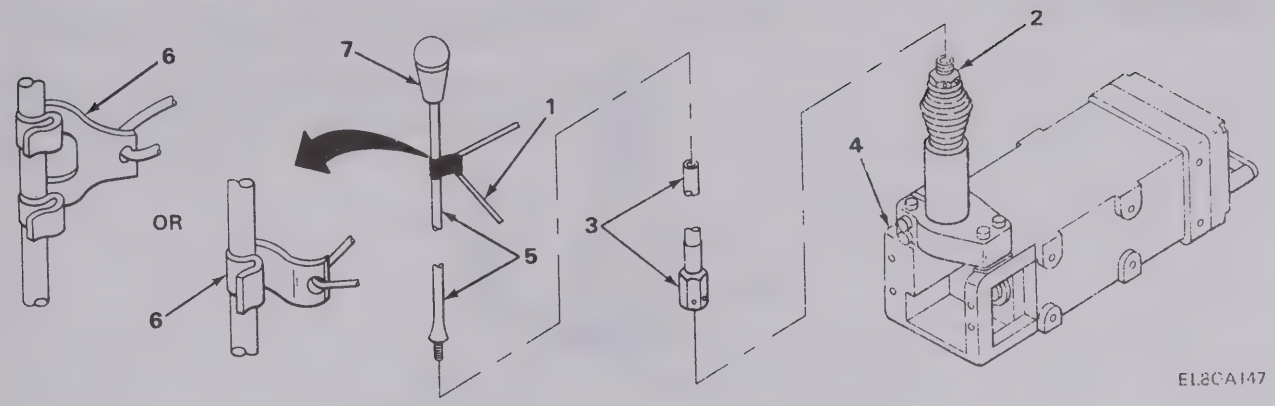
For replacement, see paragraph 2-15.

3-18. ANTENNAS. (CONT)

AT-912/VRC

Replacement of Antenna Elements AT-1095 and AT-1096

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT to OFF.



1. Untie tiedown rope (1).
2. Remove safety wire (2).
3. Unscrew AT-1096 (lower element) (3) from matching unit (4).
4. Unscrew AT-1095 (upper element) (5).
5. Remove tiedown assembly (6) and tip cap (7).

NOTE

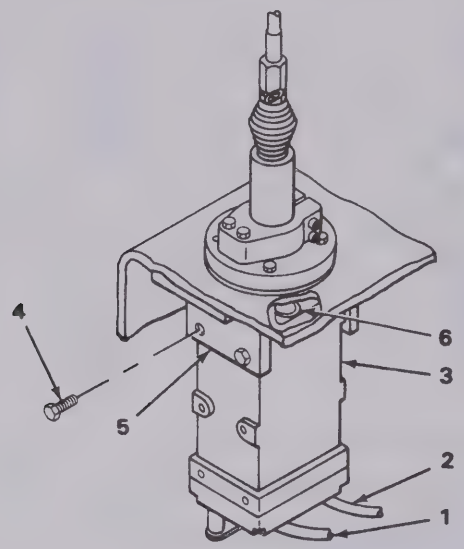
For replacement, see paragraph 2-15.

3-18. ANTENNAS. (CONT)

AT-912/VRC (CONT)

Replacement of Matching Unit MX-2799

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT to OFF.
TECHNICIANS: Two



EL8OA148

1. Remove control cable (1) and rf cable (2) from matching unit (3).
2. Unscrew six mounting bolts (4) from mounting brackets (5).
3. Disconnect plug (6) and remove matching unit (3).

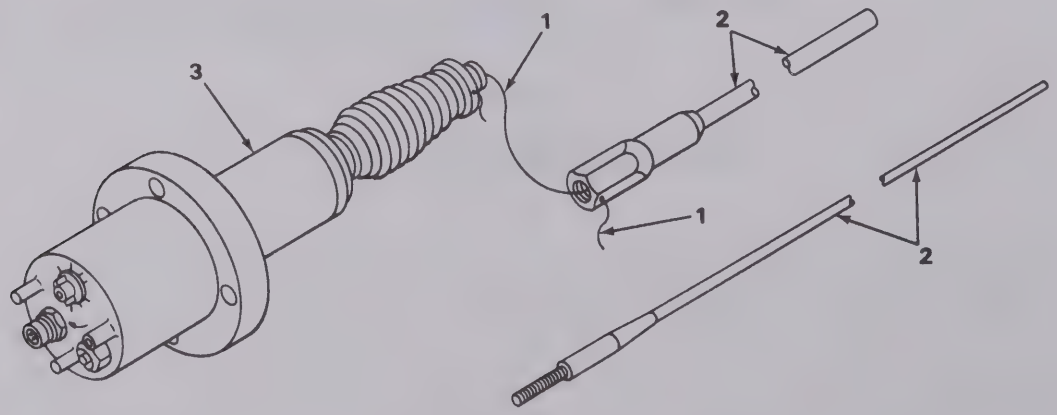
NOTE

For replacement, see paragraph 2-15.

AS-2731/GRC

Replacement of Antenna Element AS-2732

MATERIALS/PARTS: Silicone compound (item 1, appendix C)
PRELIMINARY PROCEDURE: Turn RT to OFF.



EL8OA142

3-18. ANTENNAS. (CONT)

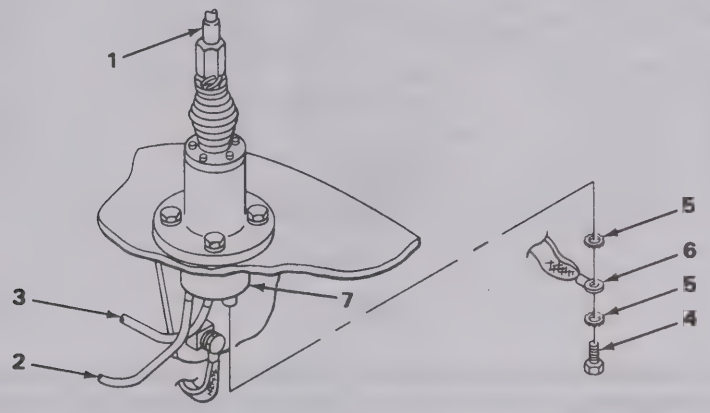
1. Remove safety wire (1) from element (2).
2. Unscrew element (2) from matching unit (3).

NOTE

For replacement, see paragraph 2-15.

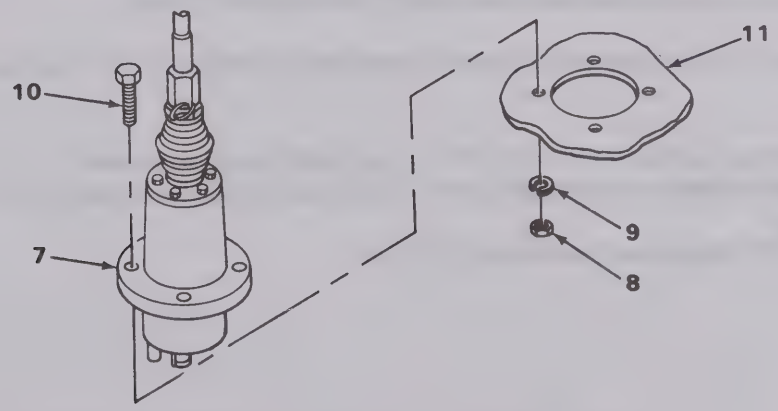
Replacement of Antenna Matching Unit MX-9146

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT to OFF.
TECHNICIANS: Two



EL8OA143

1. Unscrew antenna element (1). (See replacement of AS-2732/VRC, page 3-288.)
2. Remove control cable (2) and rf cable (3).
3. Using screwdriver, loosen and remove screw (4) and lockwasher (5).
4. Remove ground strap (6) and second lockwasher (5) from matching unit (7).



EL8OA144

5. Unscrew four mounting nuts (8) and lockwashers (9) from bolts (10).
6. Remove matching unit (7) from vehicle's antenna port (11).

NOTE

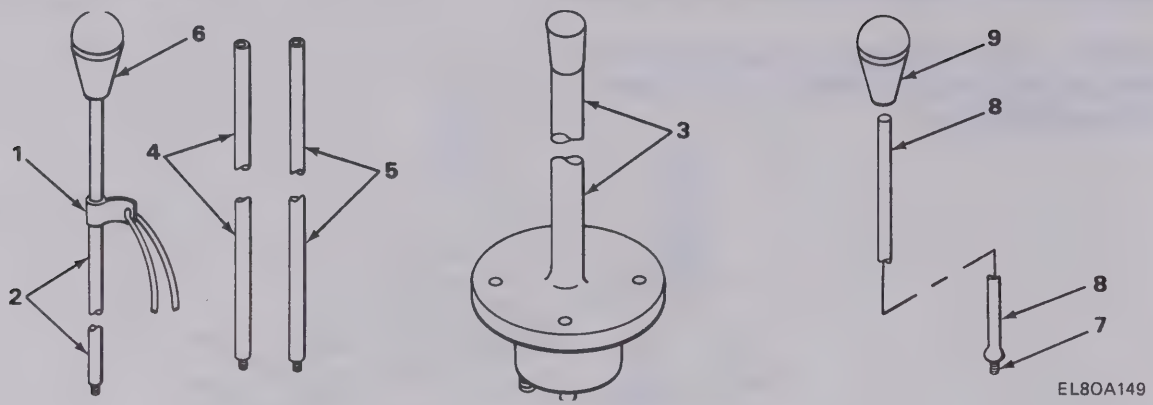
For replacement, see paragraph 2-15.

3-18. ANTENNAS. (CONT)

AUXILIARY RECEIVER ANTENNA

Removal of Antenna Elements MS-116, MS-117, and MS-118

MATERIALS/PARTS: Silicone compound (item 1, appendix C)
Antenna Element (NSN 5820-00-856-2728)
PRELIMINARY PROCEDURE: Turn RT to OFF.



NOTE

When one or more of the antenna elements (MS-116, MS-117, or MS-118) breaks, replace the entire antenna element section with Antenna Element AT-1095/VRC.

1. Untie antenna tiedown assembly (1).
2. Unscrew lower element (2) from antenna base (3).
3. Unscrew middle element (4) from lower element (2).
4. Unscrew upper element (5) from lower element (2).
5. Pull tip cap (6) and antenna tiedown assembly (1) from upper element.

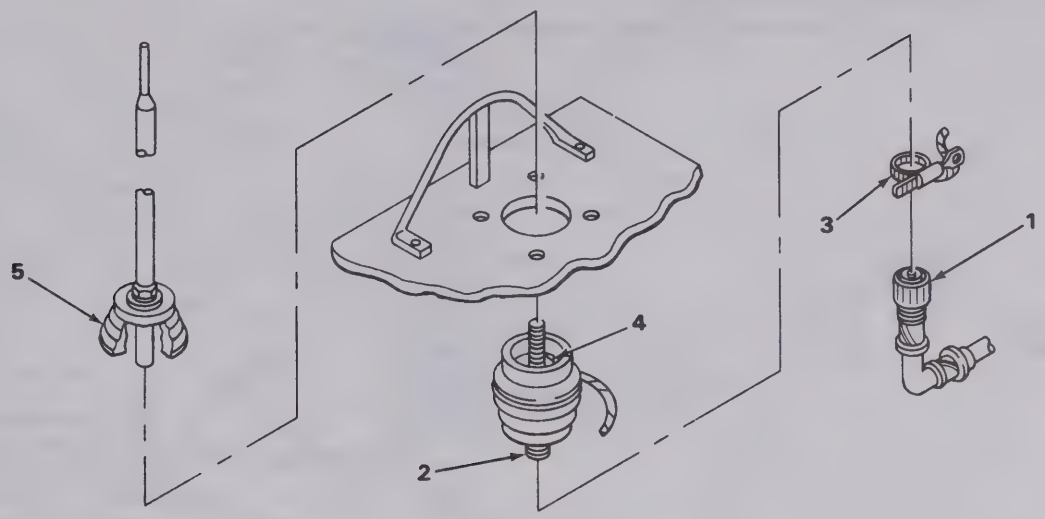
Replacement of Antenna Elements MS-116, MS-117, and MS-118 with Antenna Element AT-1095/VRC.

1. Place tip cap (9) over the tip of AT-1095/VRC (8) and push down to secure.
2. Apply a thin coat of silicone compound (item 1, appendix C) to the threads (7) of AT-1095/VRC (8).
3. Screw AT-1095/VRC (8) into antenna base (3).

3-18. ANTENNAS. (CONT)

Replacement of Base AB-15/GR

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn receiver to OFF.
Remove antenna elements. (See page 3-290.)



EL8OA151

1. Unscrew cable adaptor (1) from jack (2).
2. Remove ground clamp (3) from cable adaptor (1).
3. Unscrew and remove lower insulator (4) from upper insulator (5).

NOTE

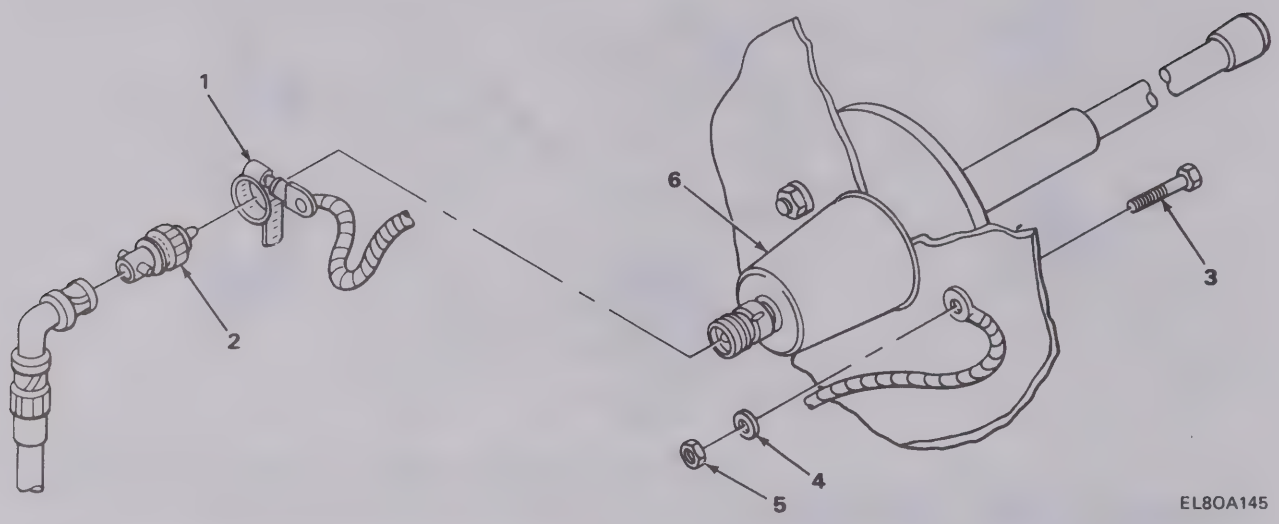
For replacement, see paragraph 2-16.

3-18. ANTENNAS. (CONT)

AUXILIARY RECEIVER ANTENNA (CONT)

Replacement of AB-558/GR

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT to OFF.
Remove antenna elements. (See page 3-290.)



1. Unscrew ground clamp (1) and remove rf jack (2).
2. Unscrew two mounting bolts (3), lockwashers (4), and nuts (5).
3. Remove base (6).

NOTE

For replacement, see paragraph 2-16.

3-19. MT-1029/VRC AND MT-1898/VRC.

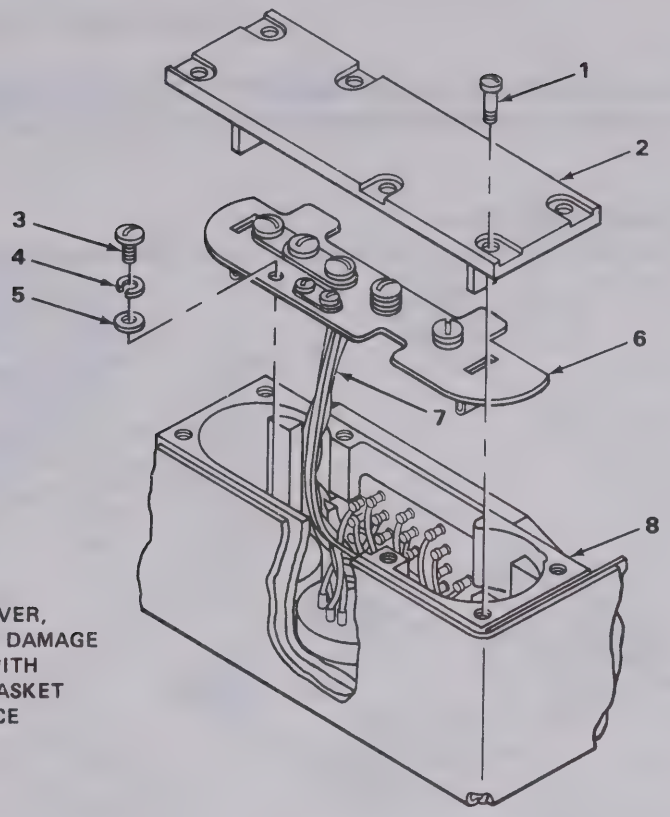
REMOVAL AND REPAIR OF TERMINAL BOARD

WARNING

Remove (turn off) power from a connector before removing or installing a cable. Connector pins may be damaged due to arcing. Extreme electrical hazards may exist that could cause death.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Unplug CX-13089 from MX-7777/GR and C-E equipment dc outlet.

3-19. MT-1029/VRC AND MT-1898/VRC. (CONT)



CAUTION

WHEN REMOVING COVER, BE CAREFUL NOT TO DAMAGE INTERNAL GASKET WITH SCREWDRIVER. IF GASKET IS DAMAGED, REPLACE IMMEDIATELY.

EL8OA152

1. Loosen six screws (1) and lift off cover (2).
2. Unscrew and remove screw (3), lockwasher (4) and flat washer (5) from terminal board (6).
3. Insert screwdriver behind terminal board (6) and pry up from underneath.

CAUTION

Do not apply excessive pressure on terminal board (6).

4. Inspect wires (7) and their connections. Solder if needed.

NOTE

Solder connections in accordance with TB SIG-222.

REPLACEMENT OF TERMINAL BOARD

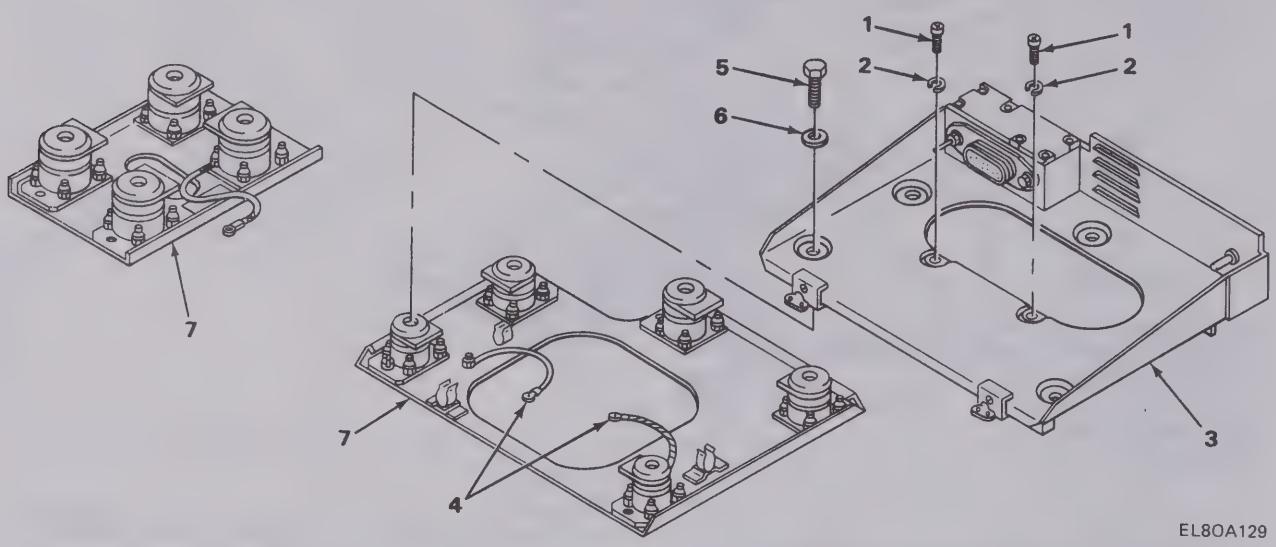
1. Insert tabs of terminal board (6) between slots inside of mount (8).
2. Insert screw (3), lockwasher (4) and flat washer (5) through terminal board (6) and tighten.
3. Place cover (2) into position.
4. Tighten six screws (1).

3-19. MT-1029/VRC AND MT-1898/VRC. (CONT)

REMOVAL OF TOP TRAY

This procedure applies to both the MT-1029/VRC and MT-1898/VRC. The difference between the two is that the MT-1898/VRC has four bolts and the MT-1029/VRC has five. This procedure is given for the MT-1029/VRC.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove RT or aux receiver from mount. (See paragraph 3-16 or 3-17.)



NOTE

Some MT-1029's use two ground straps. If your MT-1029 has two, remove both.

1. Using screwdriver, loosen and remove screw (1) and lockwasher (2) from top tray (3).
2. Remove ground strap (4).
3. Using 1/2-inch wrench, loosen and remove five bolts (5) and five flat washers (6).
4. Remove top tray (3).

INSTALLATION OF TOP TRAY

NOTE

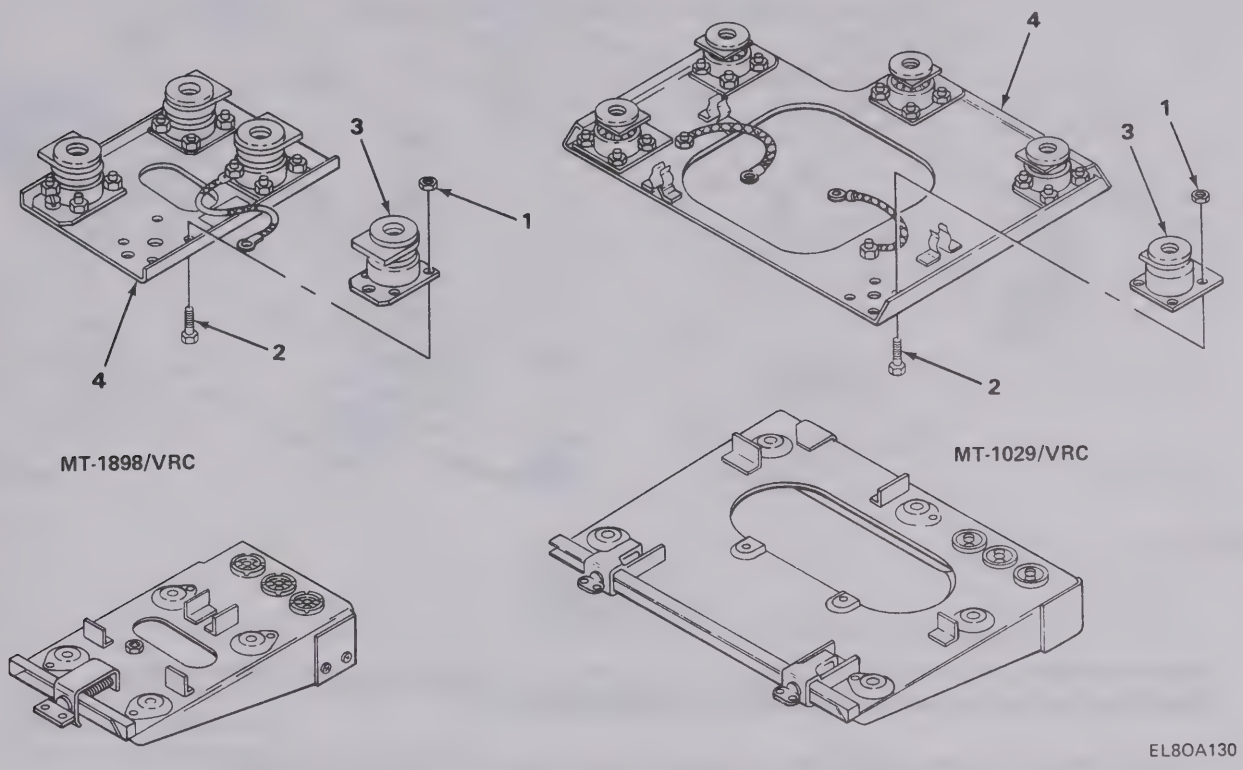
Flat side of resilient mounts must be positioned as shown to touch stops on underside of top tray.

1. Put top tray (3) in place on base assembly (7).
2. Using 1/2-inch wrench, secure five flat washers (6) and five bolts (5).
3. Using screwdriver, secure ground strap (4), lockwasher (2), and screw (1).
4. Replace RT or receiver in mount. (See paragraph 2-17 for RT, and paragraph 2-19 for receiver.)

3-19. MT-1029/VRC AND MT-1898/VRC. (CONT)

REMOVAL OF SHOCK ABSORBERS

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove top tray. (See removal of top tray, page 3-294.)



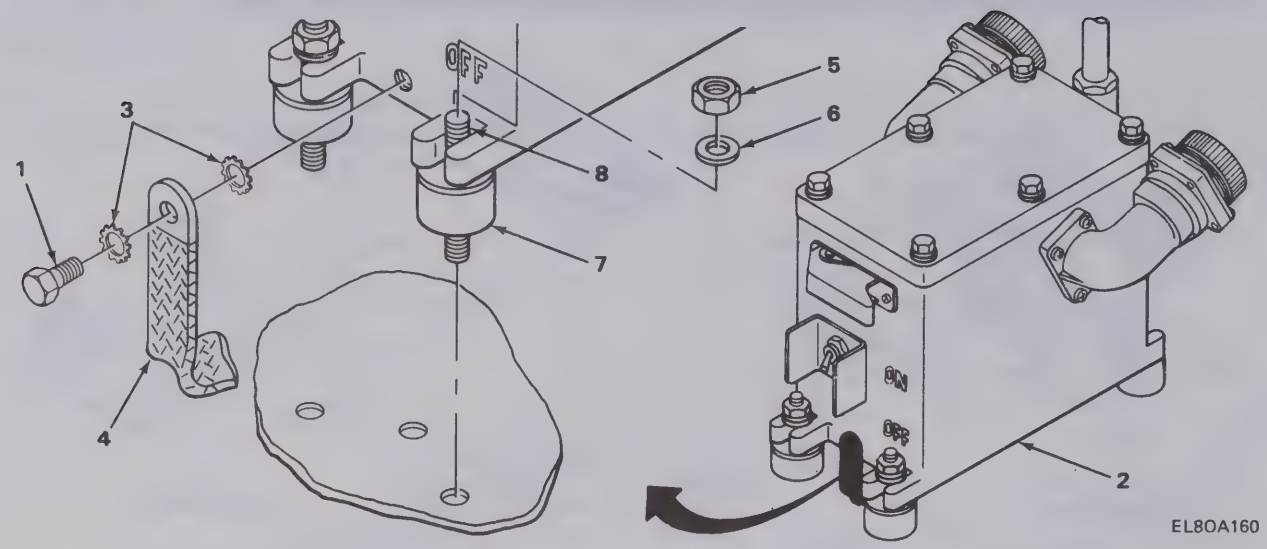
1. Using wrench to hold nuts (1), unscrew four screws (2) with cross-tip screwdriver.
2. Remove shock absorber (3) from base assembly (4).
3. Repeat steps 1 and 2 for all shock absorbers (3).

REPLACEMENT OF SHOCK ABSORBERS

1. Aline mounting holes on the shock absorber (3) and the base assembly (4).
2. Insert four screws (2) through the bottom of the base assembly (4).
3. Place nuts (1) onto phillips head screw (2).
4. Hold nuts (1) with wrench and tighten screws (2).
5. Repeat steps 1 through 4 for all shock absorbers mounts (3).
6. Replace top tray. (See page 3-294.)

3-20. REPLACEMENT OF TRANSIENT SUPPRESSOR.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove cables.
Turn off vehicle power.



REMOVAL

WARNING

High amperage current flows in and out of Electrical Transient Suppressor MX-7778/GRC. Disconnect cables before removal to avoid electrical shock.

1. Using wrench, unscrew bolt (1) from transient suppressor (2). Remove two star washers (3) and ground strap (4).
2. Using wrench, unscrew four nuts (5) and lockwashers (6).
3. Lift off transient suppressor (2) from four rubber mounts (7).

REPLACEMENT

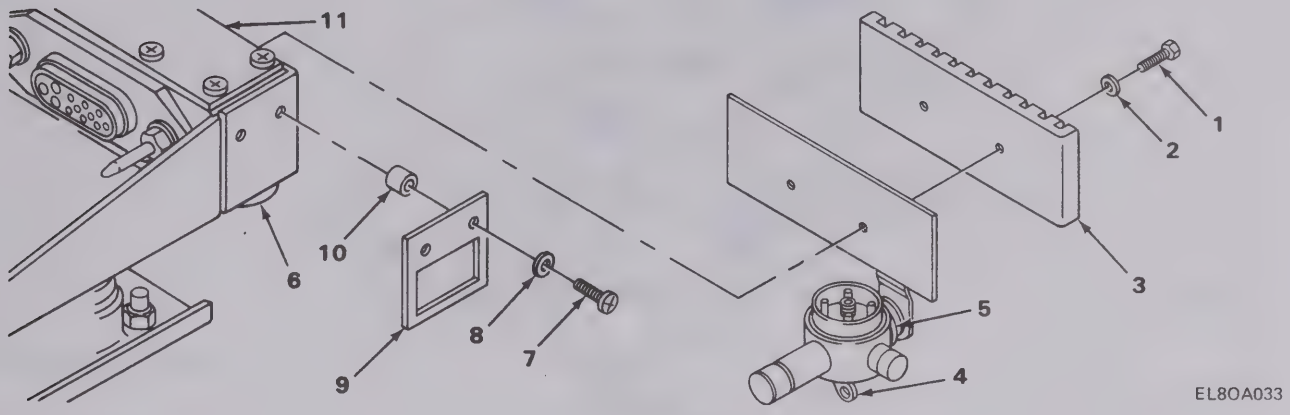
1. Place transient suppressor (2) onto four rubber mounts (7).
2. Place four lock washers (6) and nuts (5) onto threaded studs (8) of the rubber mount (7).
3. Insert bolt (1) through the first star washer (3), ground strap (4), and the second star washer (3).
4. Install bolt (1) into mounting hole of the transient suppressor (2) and tighten.

3-21. MINISUPPRESSOR.

REMOVAL

TOOLS: Tool Kit, Electronic Equipment TK-101/G

PRELIMINARY PROCEDURE: Remove top tray. (See removal of top tray, paragraph 3-19.)
Turn off vehicle power.
Disconnect power cable from minisuppressor.



WARNING

Allow at least 10 minute for heat sink to cool before proceeding.

1. Unscrew two screws (1) and lockwashers (2) and remove heat sink (3).
2. Unscrew wingnut (4).
3. Pull minisuppressor (5) from jack (6).

NOTE

If the minisuppressor is to be reused, remove the silicone compound from the heat sink (3) and the minisuppressor (5).

4. Unscrew two screws (7) and lockwashers (8).
5. Remove guard (9) and spacers (10) from mounting bracket (11).

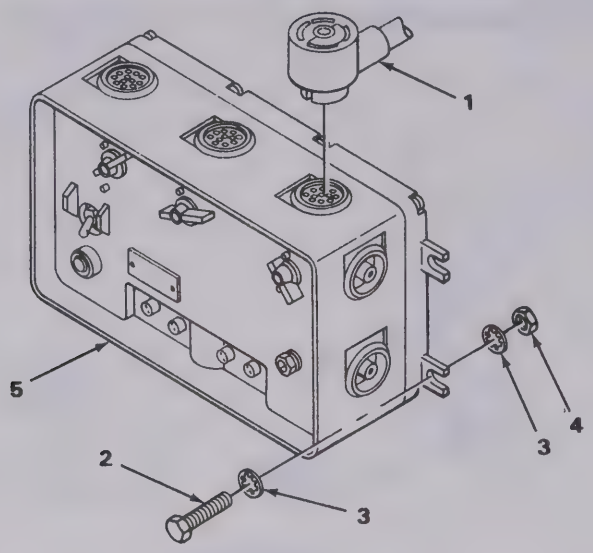
NOTE

For replacement procedures, see paragraph 2-21.

3-22. AN/VIC-1 COMPONENTS.

REMOVAL OF AMPLIFIER AM-1780/VRC

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.



EL8OA131

1. Remove all cables (1).
2. Using 9/16-inch wrench, remove all screws (2), two star washers (3) and nut (4).
3. Remove AM-1780/VRC (5).

NOTE

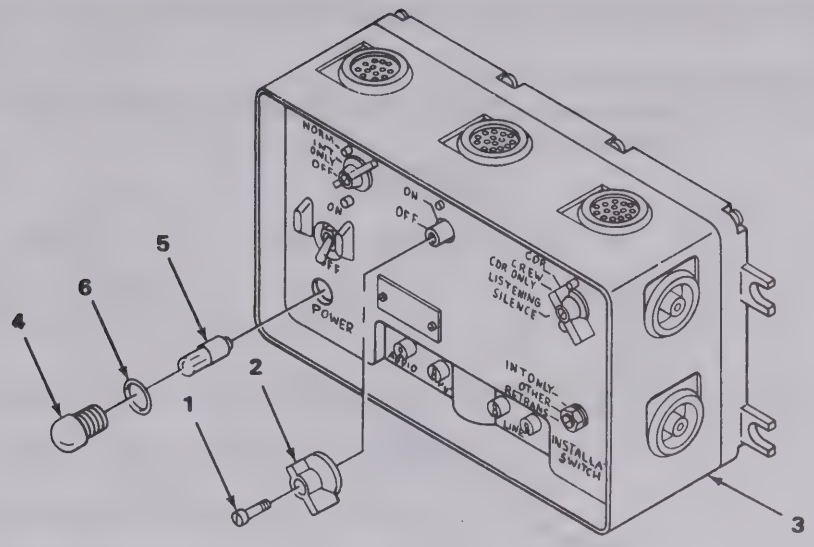
For replacement, see paragraph 2-7.

AMPLIFIER BOX AM-1780/VRC

Replacement of Knobs and Lamps

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.

3-22. AN/VIC-1 COMPONENTS. (CONT)



EL8OA132

Removal of Knobs

NOTE

Note the position of indicator line on knob when removing and replacing knob.

1. Using screwdriver, unscrew screw (1) from knob (2).
2. Pull knob (2) from AM-1780/VRC (3).

Installation of Knobs

1. Place knob (2) on AM-1780/VRC (3).
2. Using flat-tip screwdriver, tighten screw (1).

Removal of Lamp

1. Unscrew and remove lens (4) with lamp (5) and O-ring (6).
2. Pull lamp (5) from lens (4).

Installation of Lamp

NOTE

Check that the O-ring is properly seated around the lens.

CAUTION

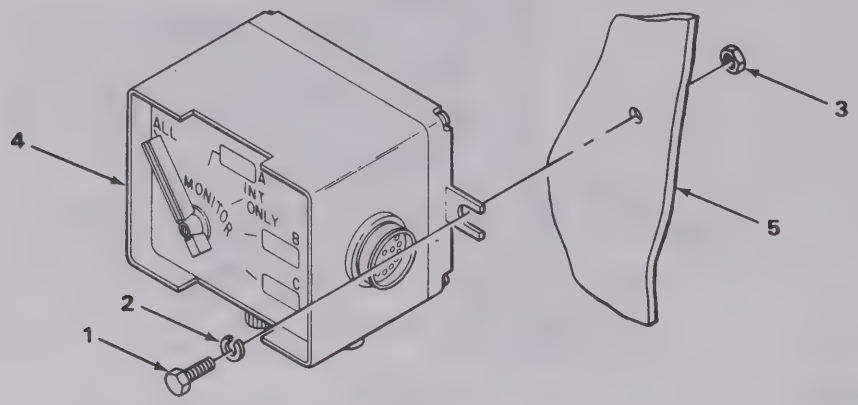
Do not overtighten lens.

1. Place lamp (5) in lens (4).
2. Tighten lens (4) with lamp (5) and O-ring (6) into AM-1780/VRC (3).

3-22. AN/VIC-1 COMPONENTS. (CONT)

REMOVAL OF CONTROL BOXES C-2296, C-2297, C-2298, C-10456 AND C-10680

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.



EL8OA133

1. Using wrench, unscrew two screws (1) and lockwasher (2) from nuts (3).
2. Remove control box (4) from mounting area (5).

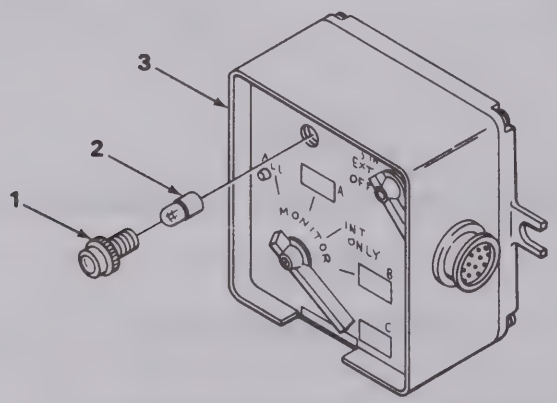
NOTE

If Control Box C-2742 is mounted on a control box, it must be removed. For removal of C-2742, see paragraph 3-24.

For replacement, see paragraphs 2-9 and 2-10.

REMOVAL OF LAMP FROM CONTROL BOX C-2296

PRELIMINARY PROCEDURE: Turn power to OFF.



EL8OA135

3-22. AN/VIC-1 COMPONENTS. (CONT)

1. Unscrew lens (1) and lamp (2) from control box (3).
2. Pull lamp (2) from lens (1).

REPLACEMENT OF LAMP FROM CONTROL BOX C-2296

CAUTION

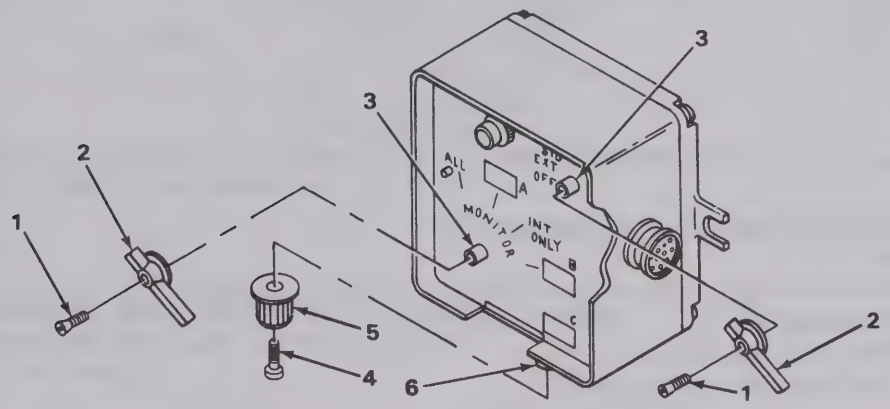
Do not overtighten lens.

1. Insert lamp (2) into lens (1).
2. Tighten lens (1) and lamp (2) into control box (3).

REMOVAL OF KNOBS FROM CONTROL BOXES C-2296, C-2297, C-2298, C-10456, AND C-10680

The procedures for knob removal are the same for all control boxes.

TOOLS: Tool Kit, Electronic Equipment TK-101/G



EL8OA134

NOTE

Note the position of knobs before removal.

1. Using screwdriver, unscrew screw (1).
2. Pull selector knob (2) from shaft (3).
3. Using screwdriver, unscrew screw (4).
4. Pull volume control knob (5) from shaft (6).

REPLACEMENT OF KNOBS FROM CONTROL BOXES C-2296, C-2297, C-2298, C-10456, AND C-10680

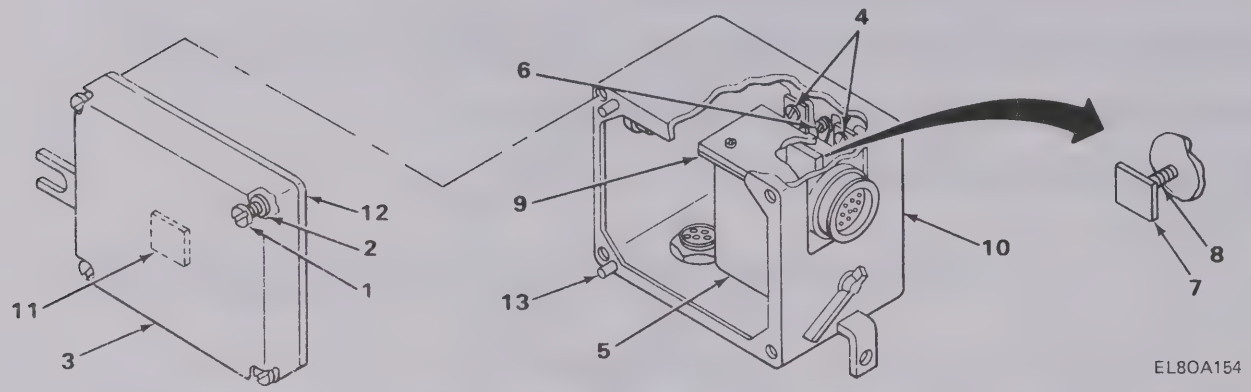
1. Place selector knob (2) onto shaft (3), pointing in the position in which it was removed.
2. Tighten screw (1) into shaft (3) and secure selector knob (2).
3. Place volume control knob (5) onto shaft (6), pointing in the position in which it was removed.
4. Tighten screw (4) into shaft (6) and secure volume control knob (5).

3-22. AN/VIC-1 COMPONENTS. (CONT)

REMOVAL OF MICROPHONE AMPLIFIER MODULE A80

The amplifier is used in Control Boxes C-2296, C-2297, C-2298, C-10456 and C-10680. To remove and replace the amplifier, use the following procedure.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.
Remove unit from mounting area. (See removal of control box, page 3-300.)



1. Unscrew four captive screws (1) and lockwashers (2).
2. Remove cover (3).
3. Loosen two captive screws (4) which retain bracket so that A80 assembly (5) can be lifted to clear the back of the box (10).
4. Loosen A80 captive retaining screw (6).
5. Carefully remove A80 amplifier assembly (5).

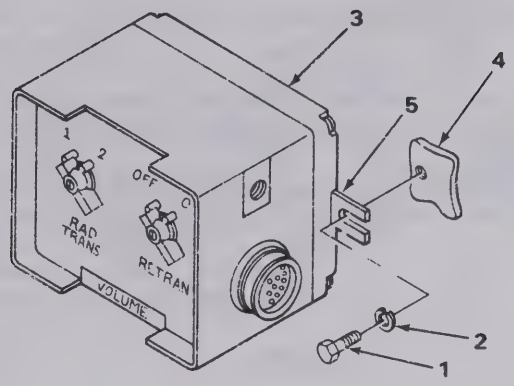
REPLACEMENT OF MICROPHONE AMPLIFIER MODULE A80

1. Check to see if rubber pad (7) is glued to stud (8) inside box (10)behind A80 assembly. If not, put in place.
2. Position A80 assembly (5) so that its pins aline with pins of jack (9).
3. Press A80 assembly (5) into place.
4. Tighten A80 captive screw (6).
5. Hold A80 bracket in position and tighten two captive bracket-retaining screws (4).
6. Check to see if rubber pad (11) and preformed packing (12) are attached to rear cover (3). If not, put in place.
7. Apply a light coating of silicon compound (item 1, appendix C) to the preformed packing (12). Position cover (3) so its holes aline with guide pins (13) and press into place.
8. Tighten four captive screws (1).
9. Replace control box (10). (See page 3-300.)
10. Connect cables. (See cabling diagram, paragraph 2-9.)

3-23. CONTROL BOX C-2299.

REMOVAL

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.



EL8OA249

1. Using wrench, unscrew and remove two bolts (1) and lockwashers (2).
2. Remove C-2299 (3) from mounting surface (4).

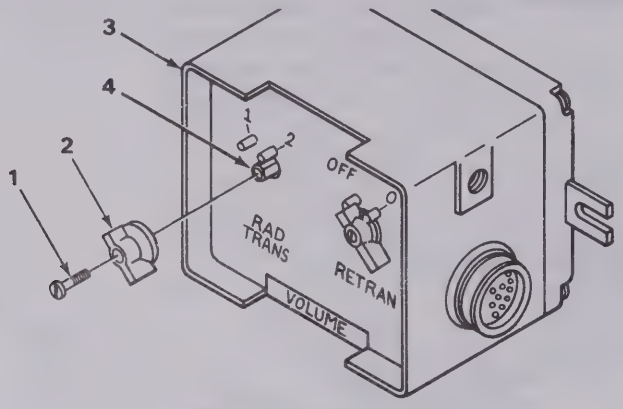
REPLACEMENT

1. Aline mounting tabs (5) with hole in mounting surface (4).
2. Insert two bolts (1) through lockwashers (2).
3. Tighten with wrench.

3-23. CONTROL BOX C-2299. (CONT)

REMOVAL OF KNOB

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.



EL8OA251

NOTE

Note the position in which the knob is pointing.

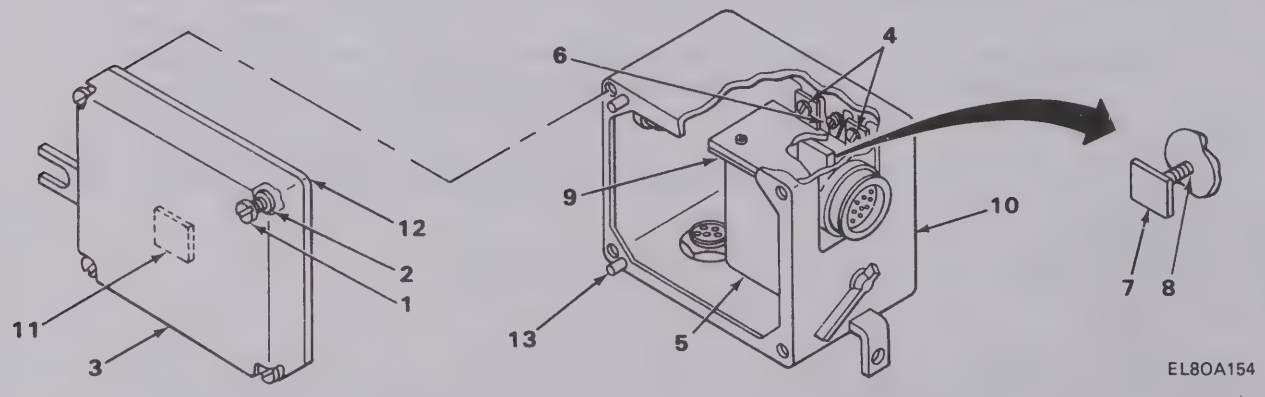
1. Using screwdriver, unscrew screw (1) from knob (2).
2. Pull knob (2) from C-2299 (3).

REPLACEMENT OF KNOB

1. Place the knob (2) onto the shaft (4) in the same position it was removed.
2. Insert screw (1) through knob (2) and tighten.

REMOVAL OF MICROPHONE AMPLIFIER MODULE A80

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.
Remove unit from mounting area. (See page 3-303.)



EL8OA154

3-23. CONTROL BOX C-2299. (CONT)

1. Unscrew four captive screws (1) and lockwashers (2).
2. Remove cover (3).
3. Loosen two captive screws (4) which retain bracket so that A80 assembly (5) can be lifted to clear the back of the box (9).
4. Carefully remove A80 amplifier assembly (5).

REPLACEMENT OF MICROPHONE AMPLIFIER MODULE A80

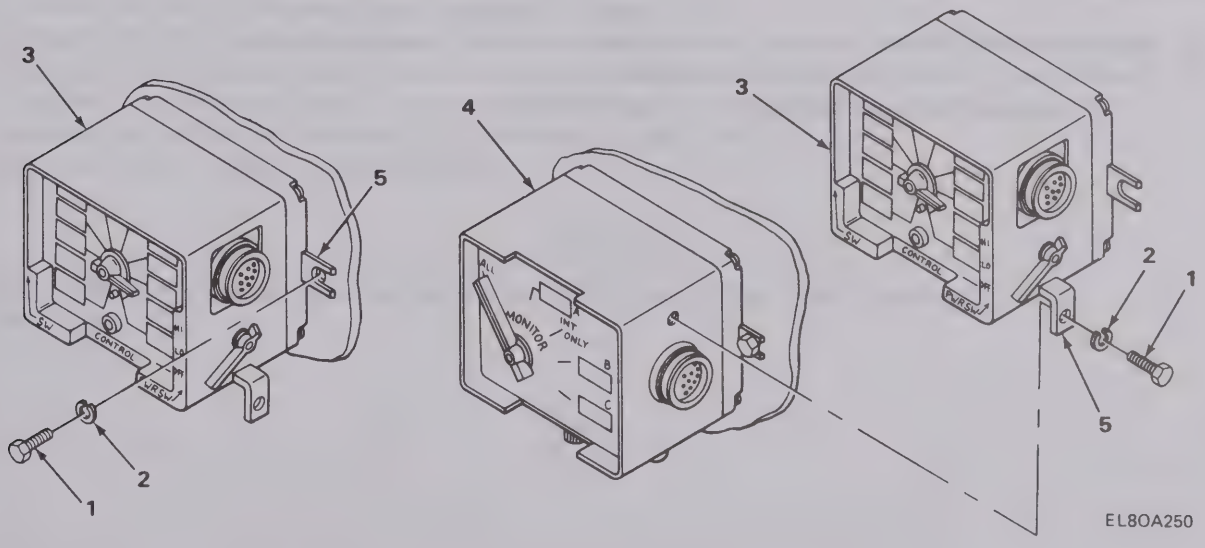
1. Check to see if rubber pad (7) is glued to stud (8) inside box (10) behind A80 assembly. If not, put in place.
2. Position A80 assembly (5) so that its pins aline with pins of jack (9).
3. Press A80 assembly (5) into place.
4. Tighten A80 captive screw (6).
5. Hold A80 bracket in position and tighten two captive bracket-retaining screws (4).
6. Check to see if rubber pad (11) and preformed packing (12) are attached to rear cover (3). If not, put in place.
7. Apply a light coating of silicon compound (item 1, appendix C) to the preformed packing (12). Position cover (3) so its holes aline with guide pins (13) and press into place.
8. Tighten four captive screws (1).
9. Replace control box (10). (See pages 3-300.)
10. Connect cables. (See cabling diagram, paragraph 2-9.)

3-24. CONTROL BOX C-2742.

REMOVAL

Control box C-2742 can be mounted two ways, on a flat surface or on top of a control box.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.



1. Using wrench, unscrew and remove two screws (1) and lockwashers (2).
2. Remove C-2742 (3) from mounting surface or control box (4).

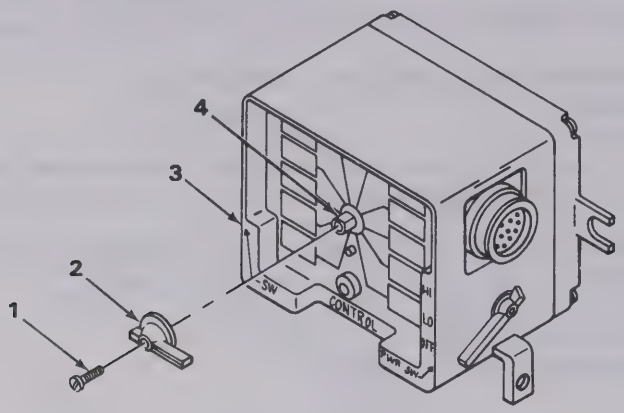
REPLACEMENT

1. Aline mounting tabs (5) with mounting holes of mounting surface or control box (4).
2. Insert two screws (1) and lockwasher (2) and tighten.

3-24. CONTROL BOX C-2742. (CONT)

REMOVAL OF KNOB

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.



EL8OA159

NOTE

Note the position in which the knob is pointing.

1. Using screwdriver, loosen and remove screw (1) from knob (2).
2. Pull knob (2) from C-2742 (3).

REPLACEMENT OF KNOB

1. Place the knob (2) onto the shaft (4) in the same position it was removed.
2. Insert screw (1) through knob (2) and tighten.

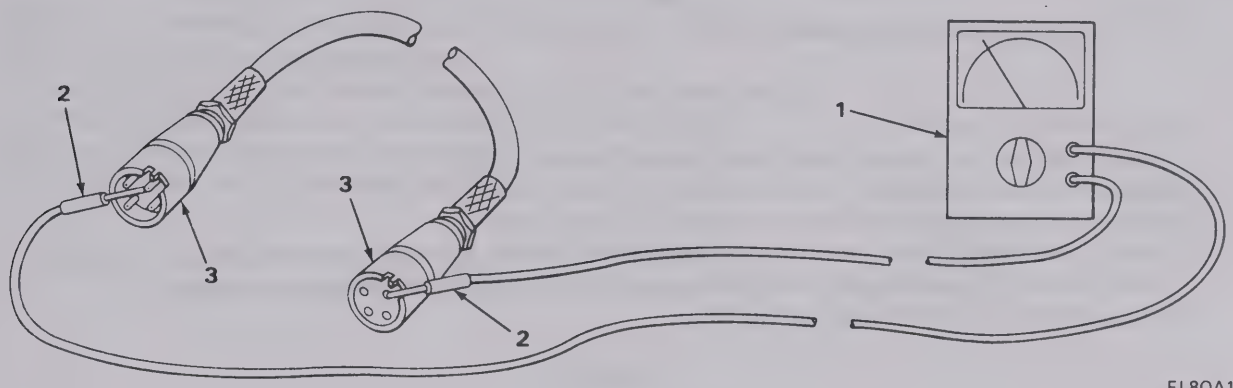
3-25. CABLES.

Cables are to be tested if troubleshooting finds a problem with them. Repair of the cable is limited to testing, resoldering of wires separated from plug terminals, and replacement of plugs. If it is established during testing that a cable has a wire with a short, or a break in the middle of it, the cable should be replaced.

TESTING FOR CONTINUITY (ADVERSE OPENS)

If troubleshooting has indicated a certain pin connection is faulty, test that pin first.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
Multimeter AN/USM-223 (or equivalent)
PRELIMINARY PROCEDURE: Remove cable from unit.



EL8OA136

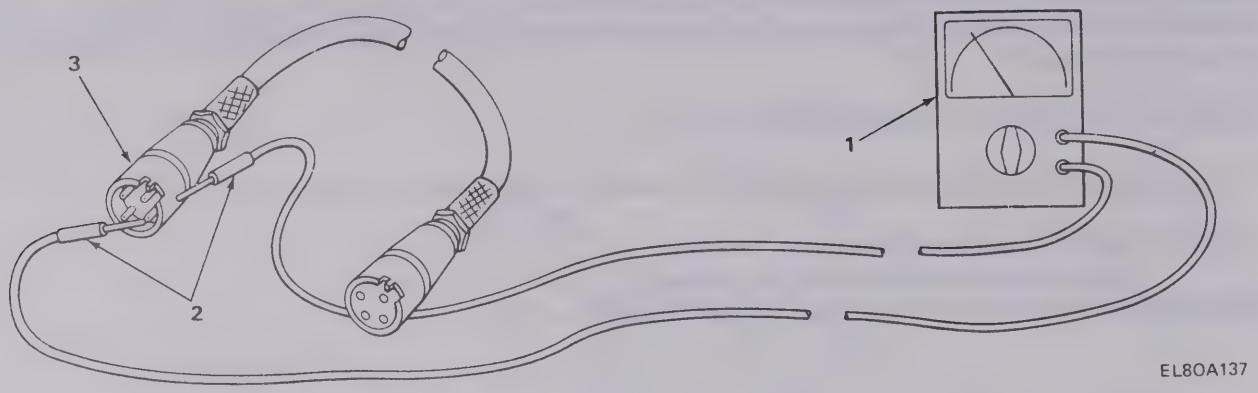
1. Set multimeter (1) to R x 1.
2. Connect the two test leads (2) and zero the multimeter (1).
3. Separate the test leads (2).
4. Connect a test lead (2) to the pin of the plug (3) to be tested.
5. Connect the other test lead (2) to the corresponding pin of the other plug (3). (See cable schematics, beginning on page 3-310, for wiring of cables and plugs.)
6. The multimeter (1) should read zero ohms.

NOTE

If the multimeter (1) does not read zero ohms, check plug for bad pins or loose pin connections.

3-25. CABLES. (CONT)

TESTING FOR ADVERSE SHORTS



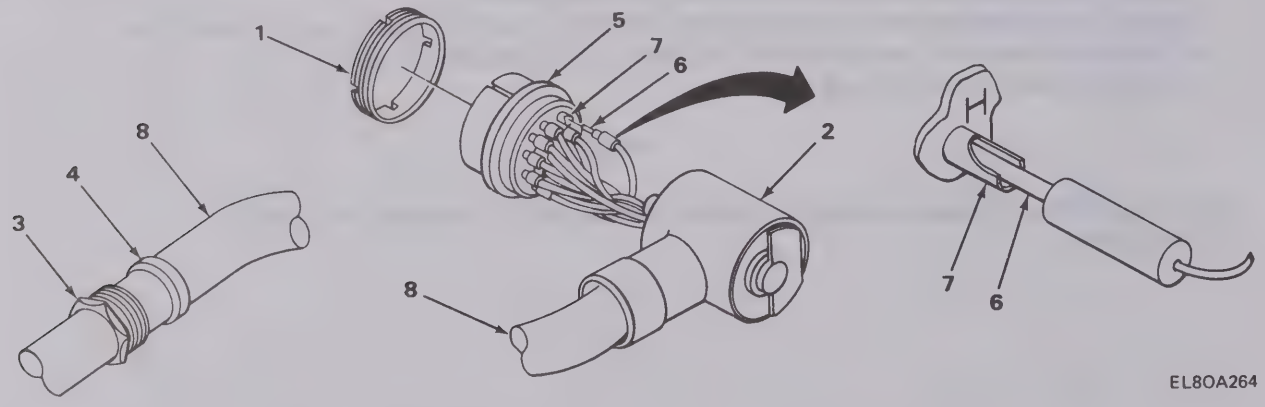
EL8OA137

1. Set multimeter (1) to R x 1.
2. Connect the two test leads (2) and zero the multimeter (1).
3. Separate the test leads (2).
4. Connect a test lead (2) to the pin of the plug (3) to be tested.
5. Connect a test lead (2) one at a time, to each pin of the plug and the outer casing of the plug (3). (See cable schematics, beginning on page 3-310, for wiring of cables and plugs.)
6. The multimeter (1) should read infinity (∞).

NOTE

Pin A is standard ground of most cable plugs in the system.

REPAIR OF CABLES



EL8OA264

1. Using spanner wrench, remove locknut (1) from plug housing (2).
2. Using wrench, loosen gland nut (3) and remove gland (4).
3. Pull plug (5) from plug housing (2).
4. Check for loose or broken wires (6) and shorted connections.

3-25. **CABLES.** (CONT)

NOTE

Check for shorting between adjacent pins, using ohmmeter.

5. Resolder any wires (6) that are disconnected from their pins (7).

NOTE

Refer to wiring diagrams as listed on page 3-310 for details covering wire connections and proper color coding.

Before soldering or unsoldering, be familiar with TB SIG-222.

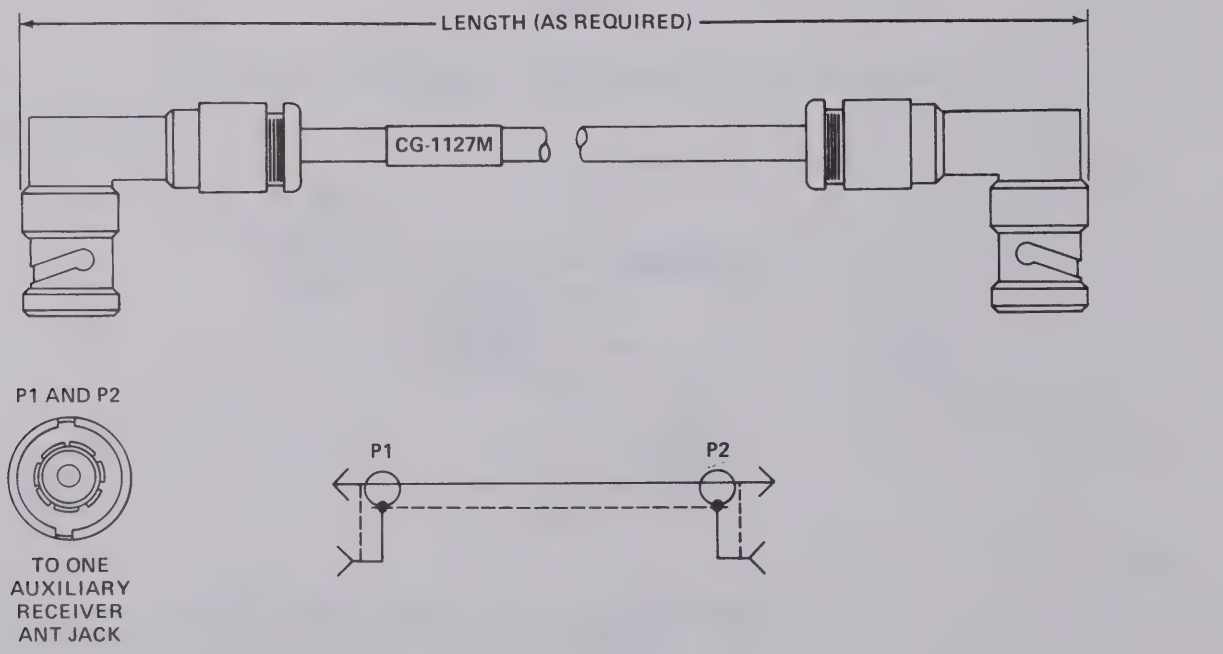
6. Test for continuity again. (See testing for continuity and shorts in this paragraph.)
7. Push plug (5) into plug housing (2).
8. Using spanner wrench, install locknut (1) into plug housing (2).
9. Pull cable (8) to eliminate slack in the plug housing (2).
10. Insert gland (4) into plug housing (2).
11. Install gland nut (3) into plug housing and tighten with wrench.

3-25. CABLES. (CONT)

CABLE SCHEMATICS

	Page
CG-1127/U	3-310
CG-1773.A.B/U and CG-1773 (Modified)	3-311
CX-10613/GRC	3-311
CX-4721/VRC	3-312
CX-4722/VRC	3-313
CX-4722/VRC (Modified)	3-314
CX-4723/VRC	3-315
CX-7056/VRC	3-316
CX-7057/VRC	3-317
CX-7058/VRC	3-318
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CX-7060A/VRC	3-320
CX-7616/VRC	3-321
CX-7621/VRC	3-322
CX-10355/GRC	3-323
CX-13089/GRC	3-324
CX-13184/GRC	3-325
CX-10613/G	3-311

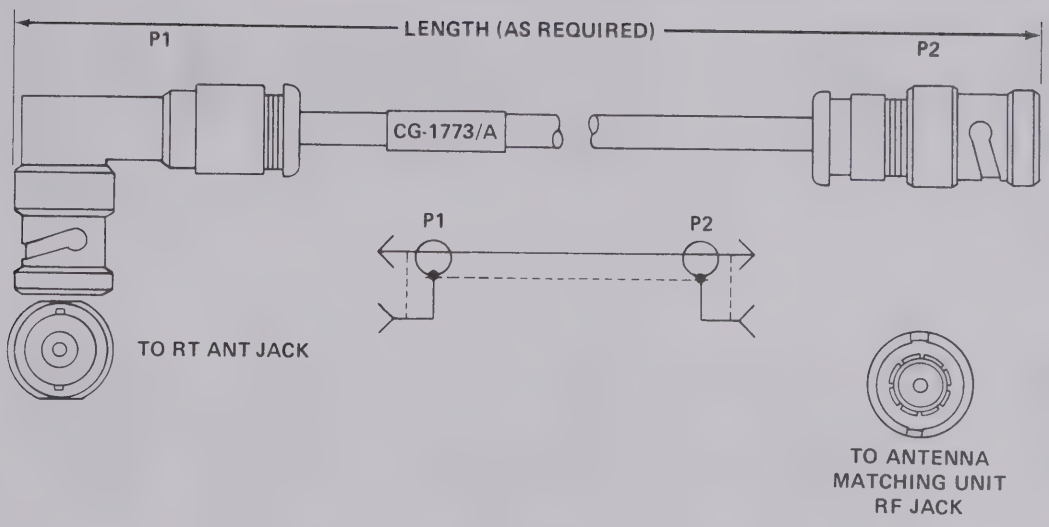
CG-1127/U



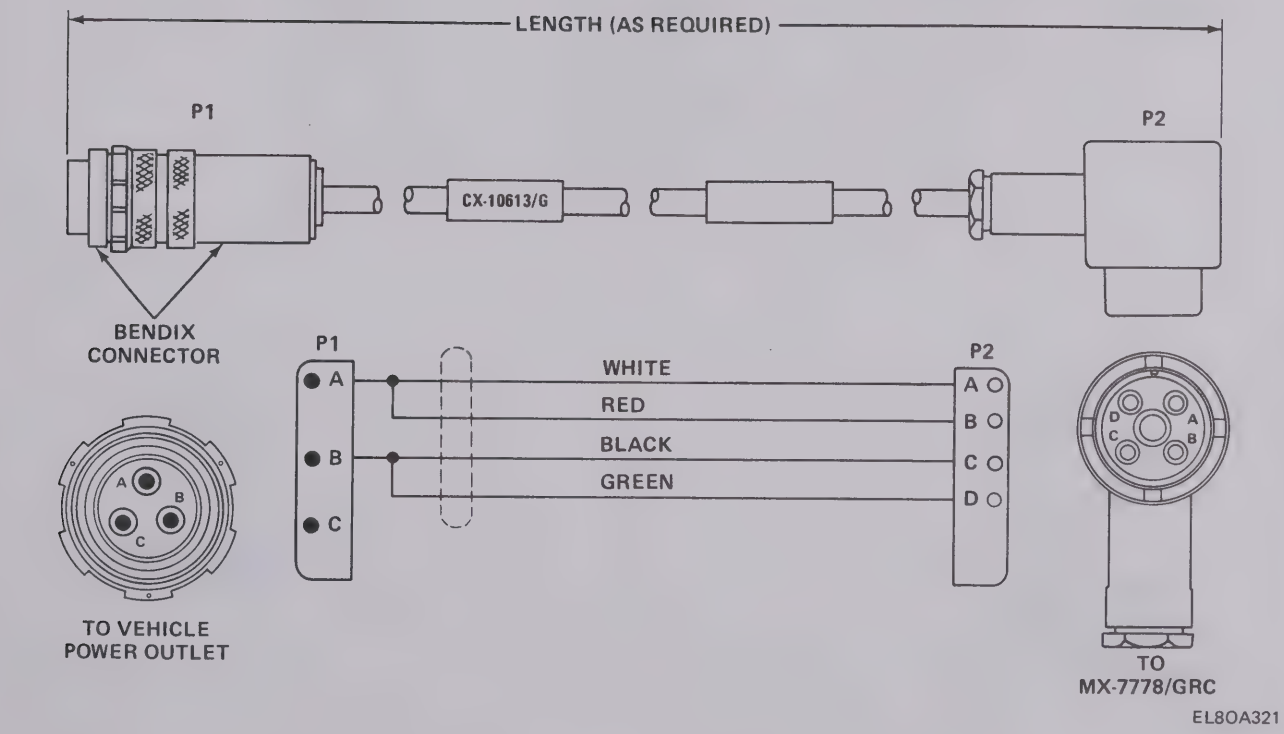
EL8OA252

3-25. **CABLES.** (CONT)

CG-1773,A,B/U AND CG-1773 (MODIFIED)

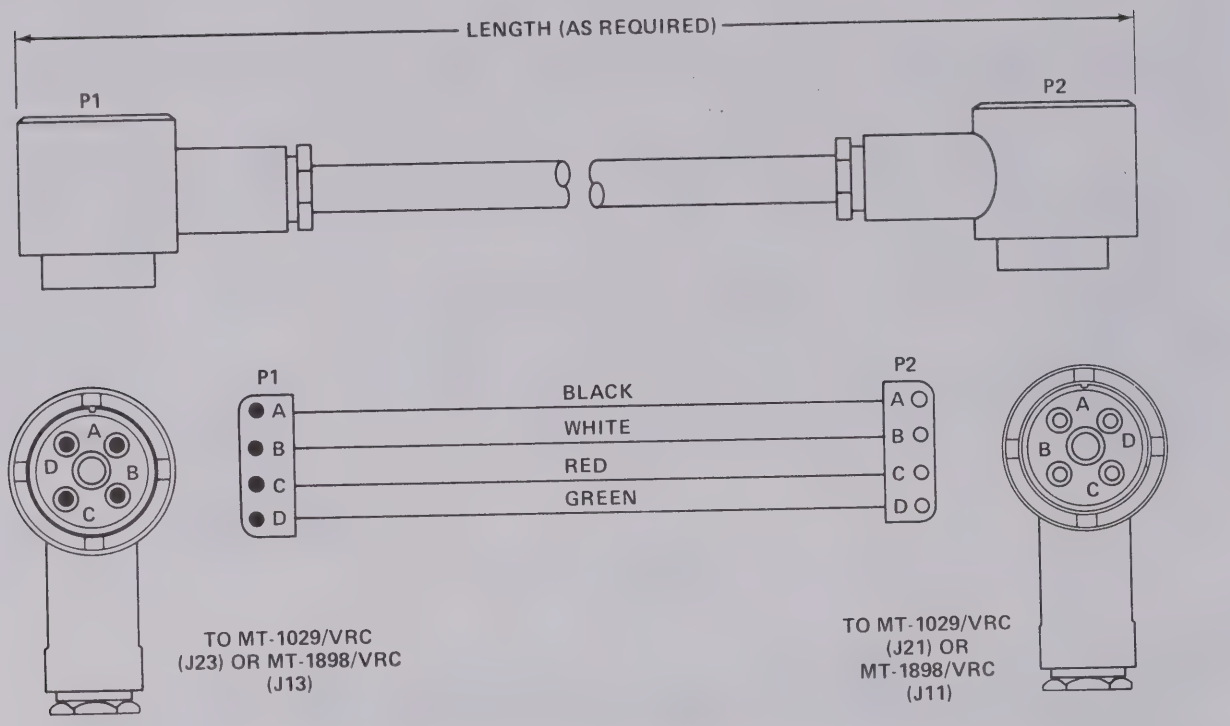


CX-10613/G



3-25. CABLES. (CONT)

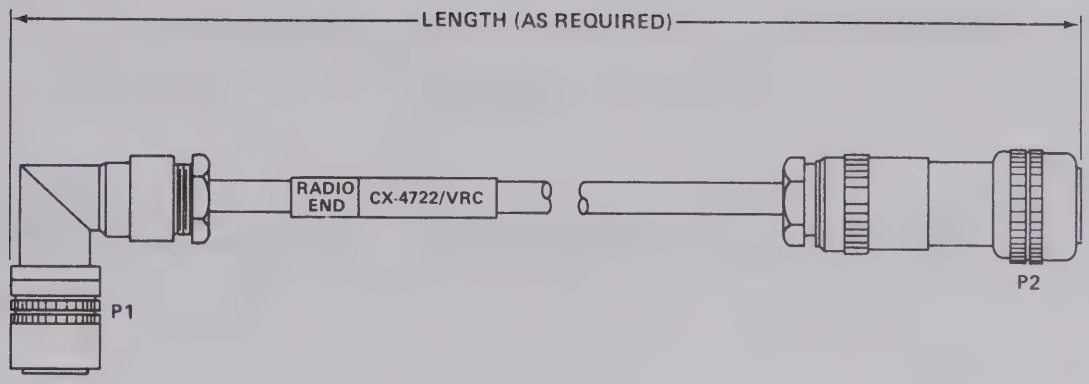
CX-4721/VRC

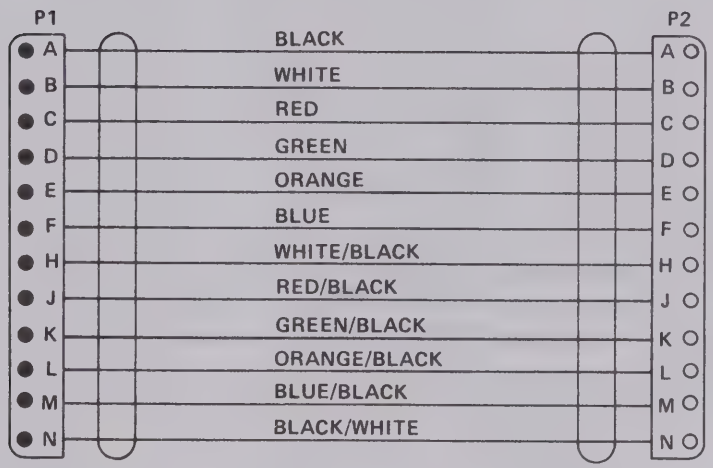


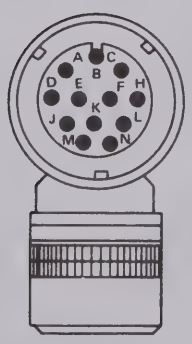
EL8OA254

3-25. CABLES. (CONT)

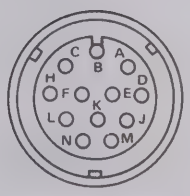
CX-4722/VRC







TO RF ANT CONT JACK

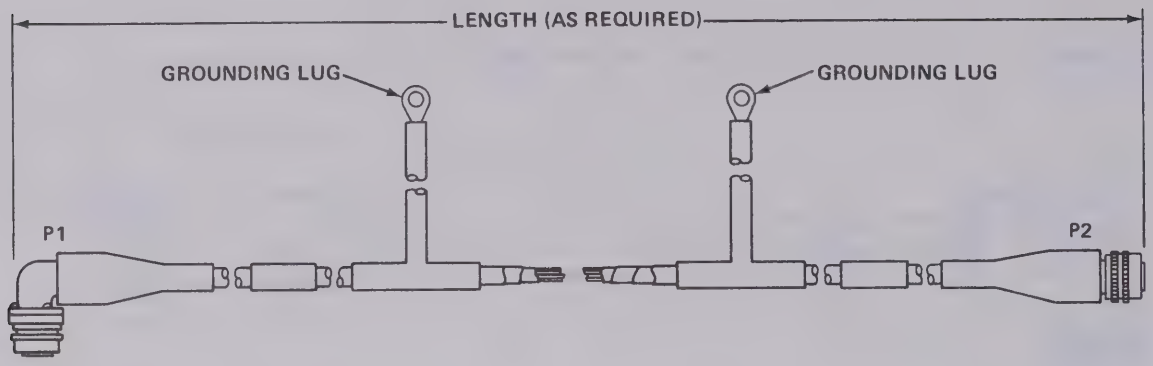


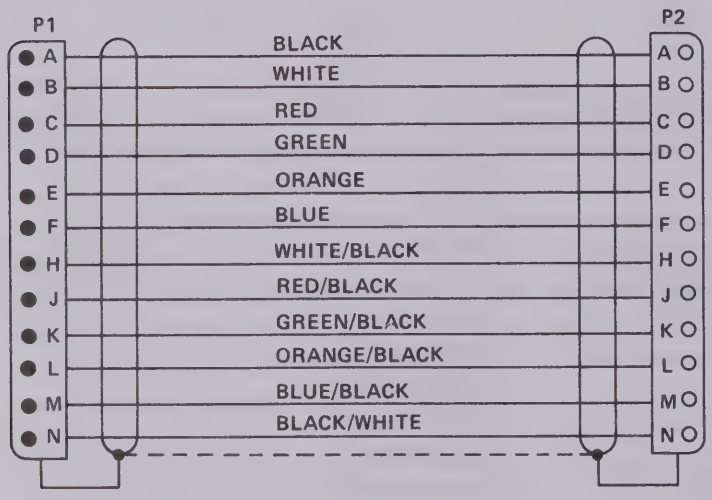
TO ANTENNA MATCHING UNIT CONTROL JACK OR CX-13055 OR CX-13089 MALE PIN PLUG

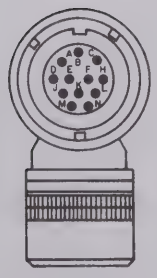
EL8OA255

3-25. CABLES. (CONT)

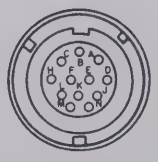
CX-4722/VRC (MODIFIED)







TO RT ANT
CONT JACK

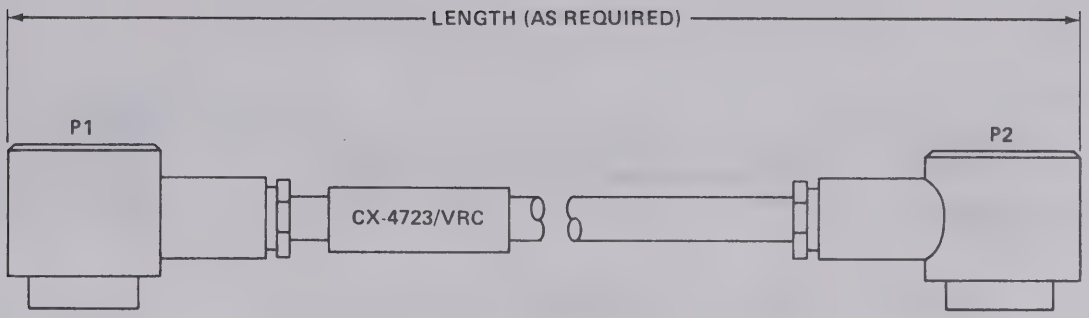


TO ANTENNA
MATCHING UNIT
CONTROL JACK OR
CX-13055 OR
CX-13184 MALE PIN PLUG

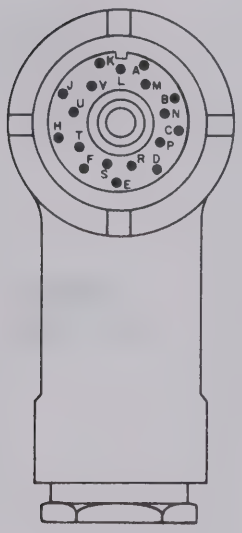
EL8OA261

3-25. CABLES. (CONT)

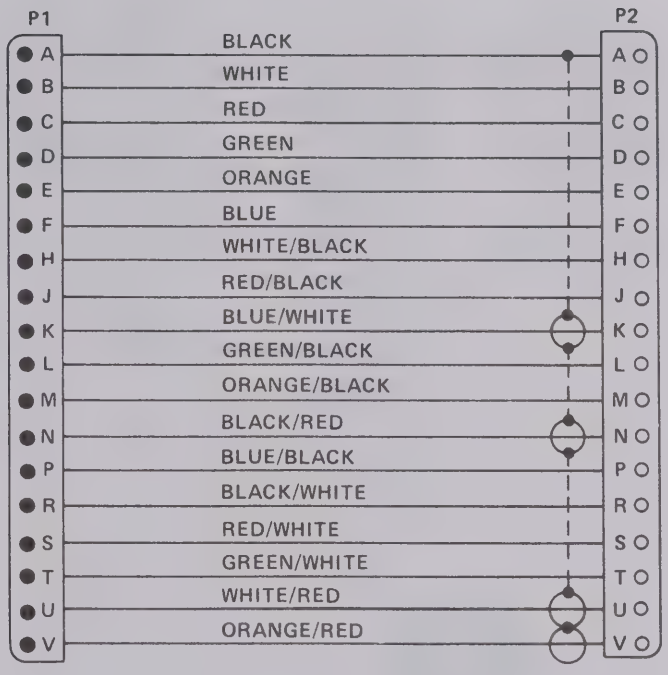
CX-4723/VRC



P1 AND P2



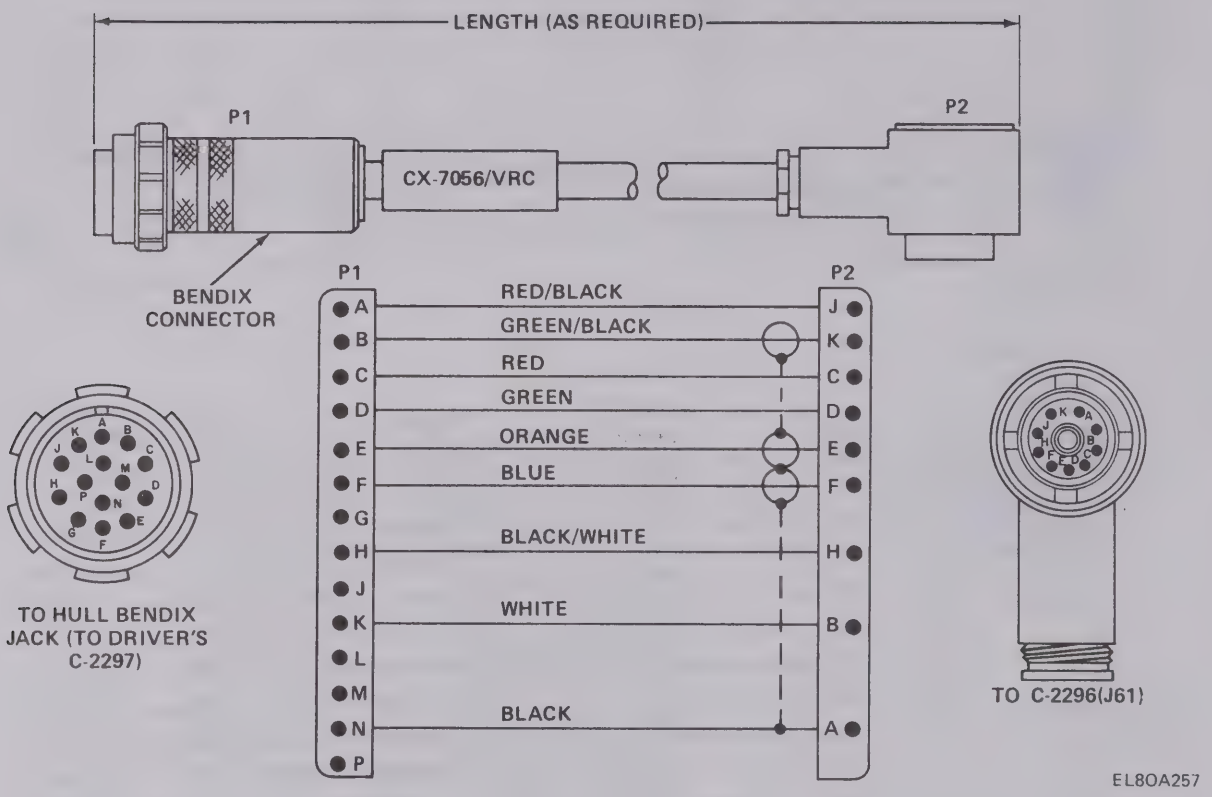
TO JACK OF VARIOUS COMPONENTS EG, MT-1029/VRC (J22), MT-1898 (J12), C-2297 (J904), C-2298, C-10456, C-10680 (J801 OR J804), C-2299 (J701 OR J702), C-2742 (J71 OR J72)



EL8OA256

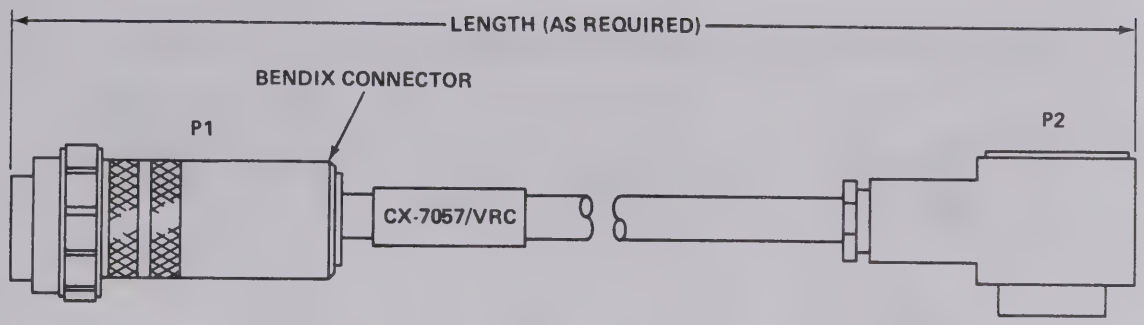
3-25. CABLES. (CONT)

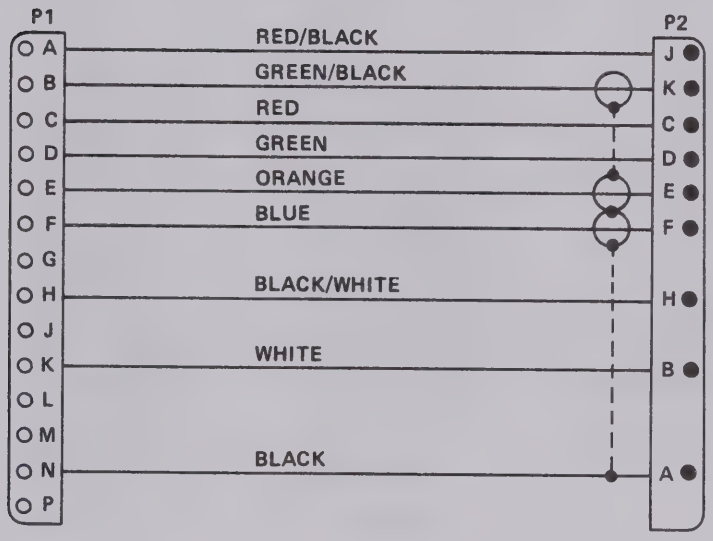
CX-7056/VRC

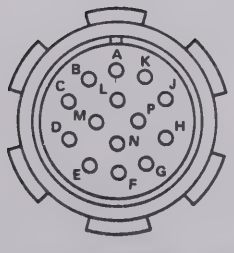


3-25. CABLES. (CONT)

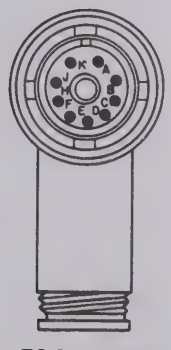
CX-7057/VRC







TO HULL BENDIX JACK
(TO C-2299)

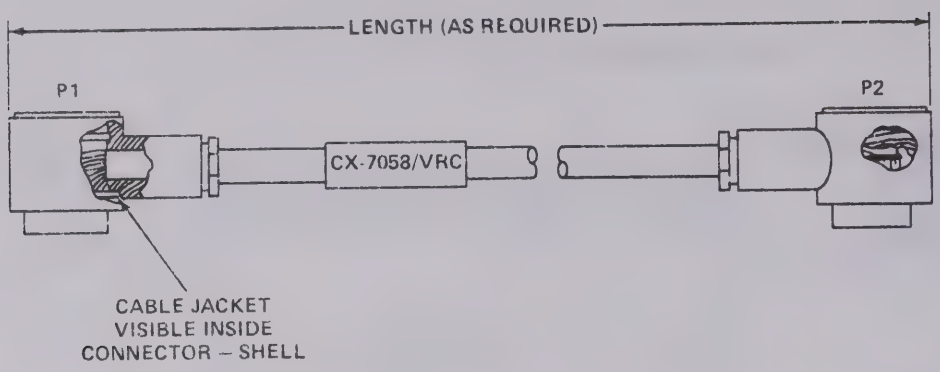


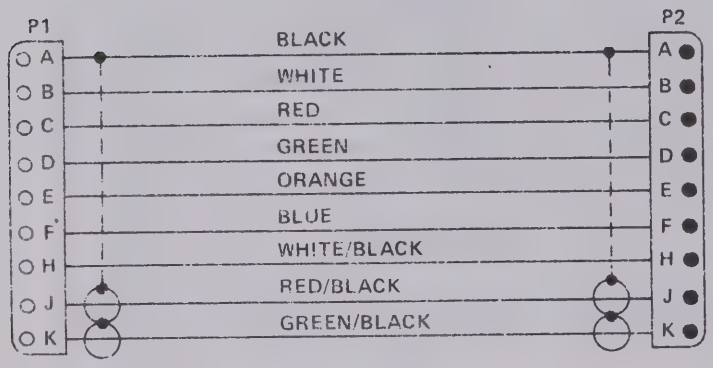
TO DRIVER'S
C-2297/VRC (J901)

EL8OA258

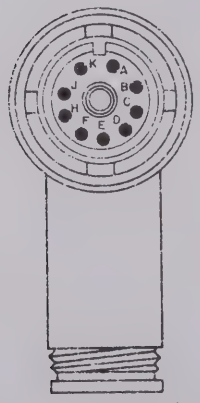
3-25. CABLES. (CONT)

CX-7058/VRC





P1 AND P2

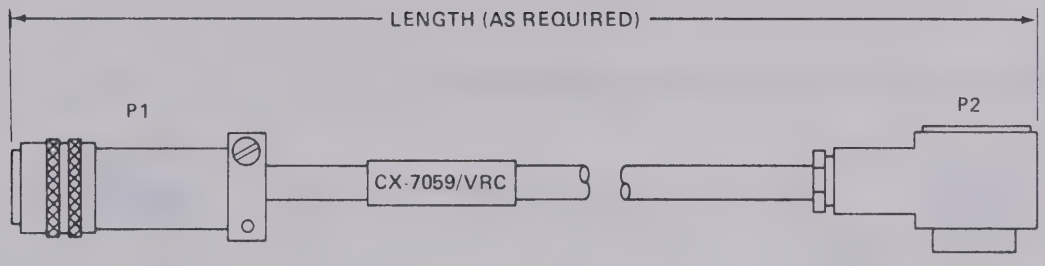


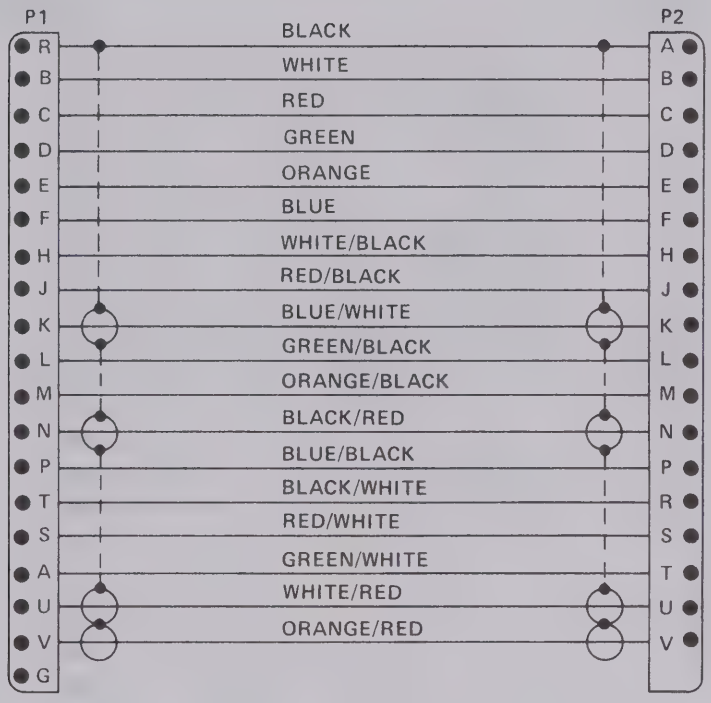
ONE PLUG TO AM-1780/VRC (J510);
OTHER PLUG TO MT-1898/VRC (J12)

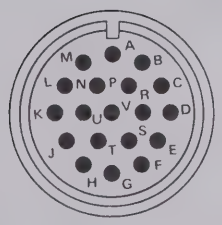
EL8OA259

3-25. CABLES. (CONT)

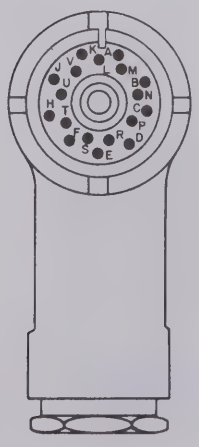
CX-7059/VRC







TO
RT-246(*)/VRC
REMOTE JACK

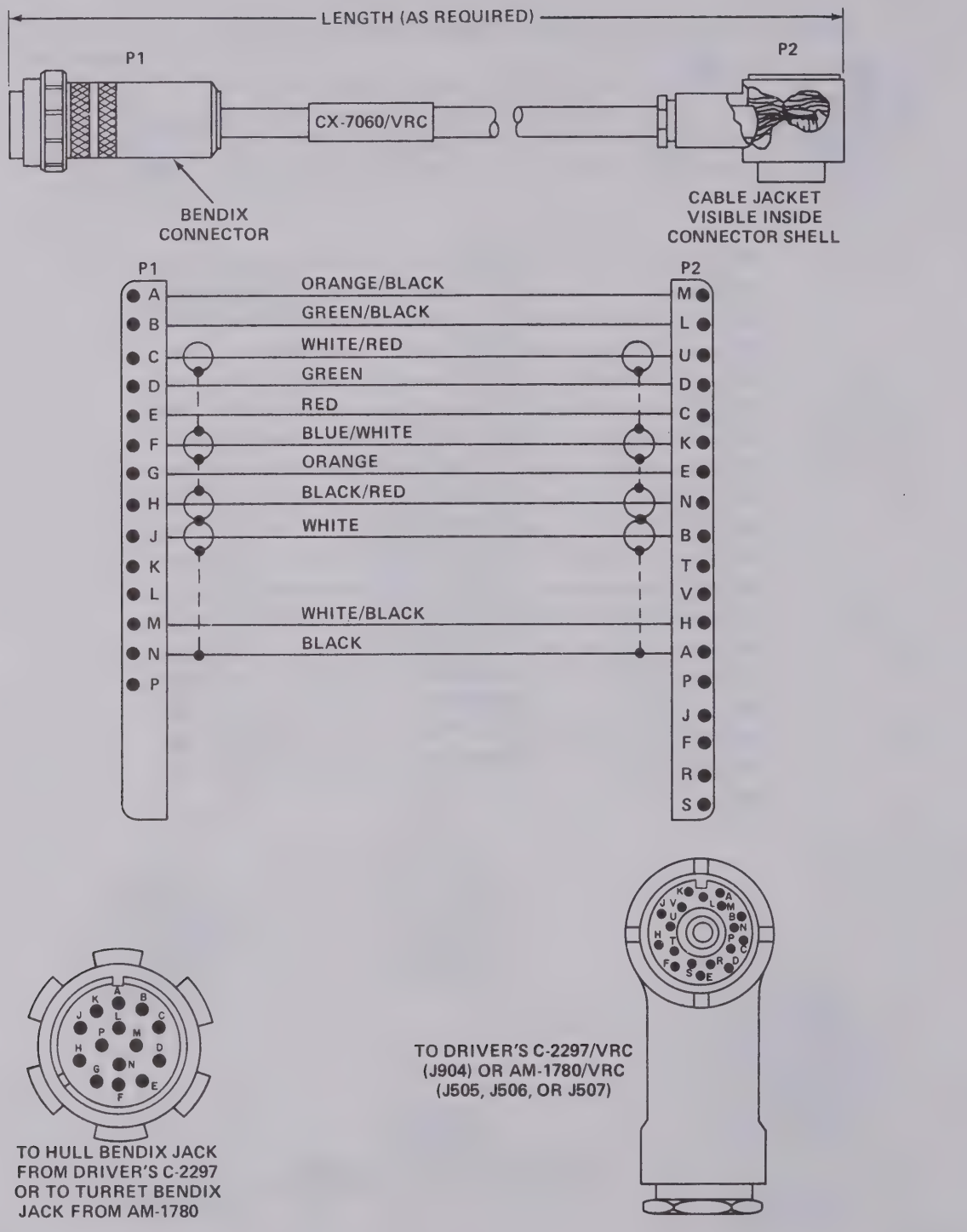


TO
C-2742/VRC
(J71)

EL8OA260

3-25. CABLES. (CONT)

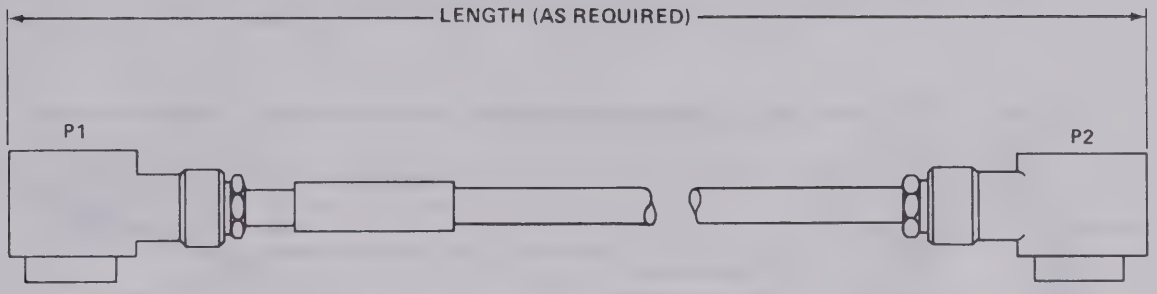
CX-7060A/VRC

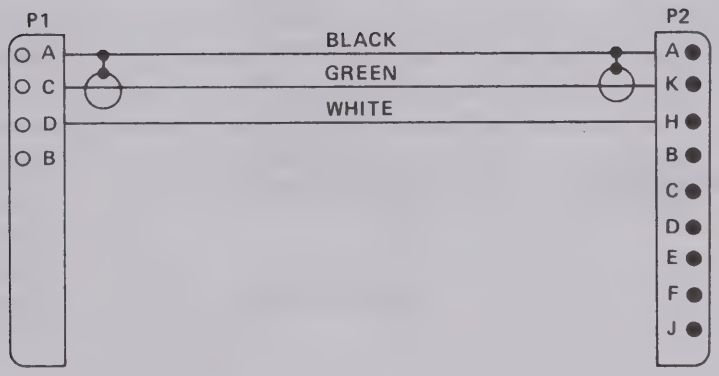


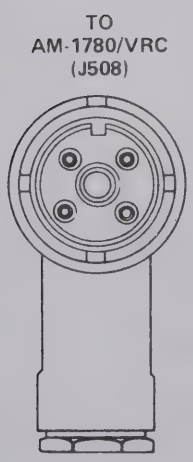
EL8OA243

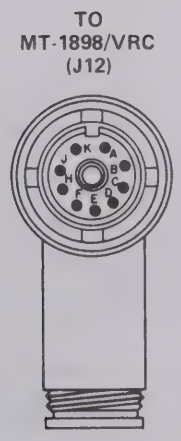
3-25. **CABLES.** (CONT)

CX-7616/VRC





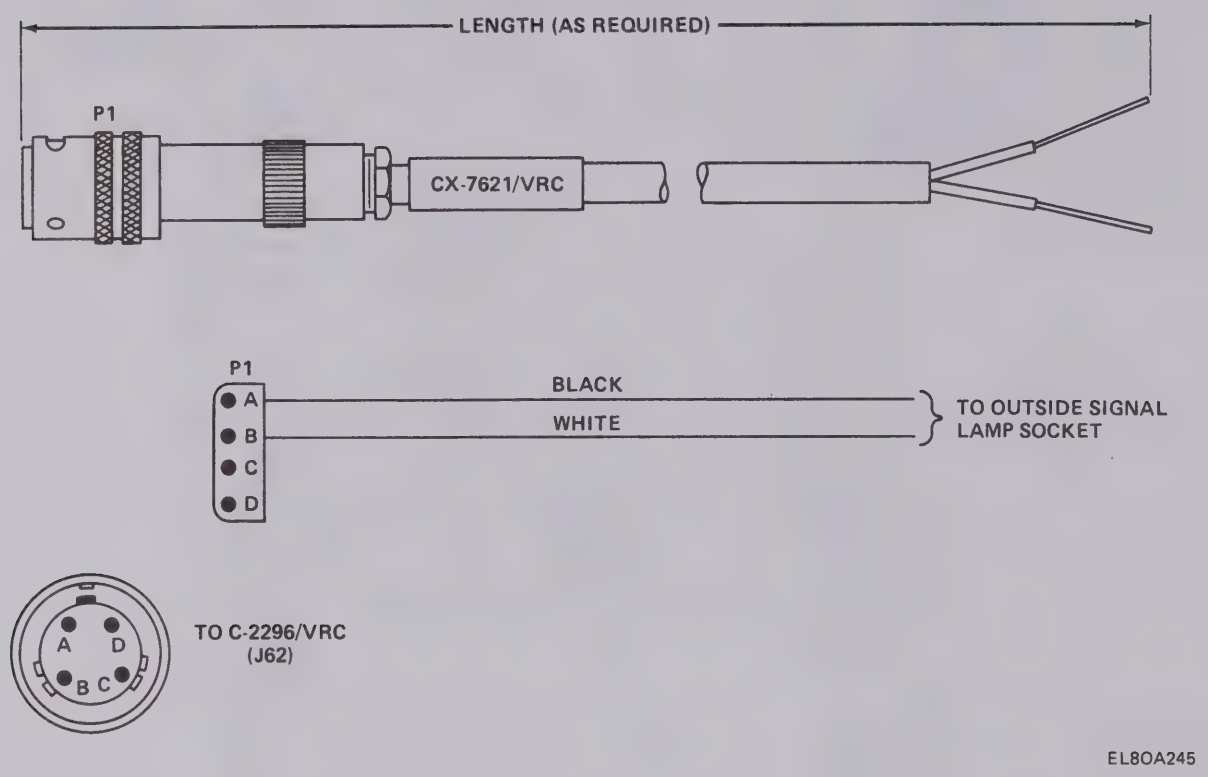




EL8OA244

3-25. CABLES. (CONT)

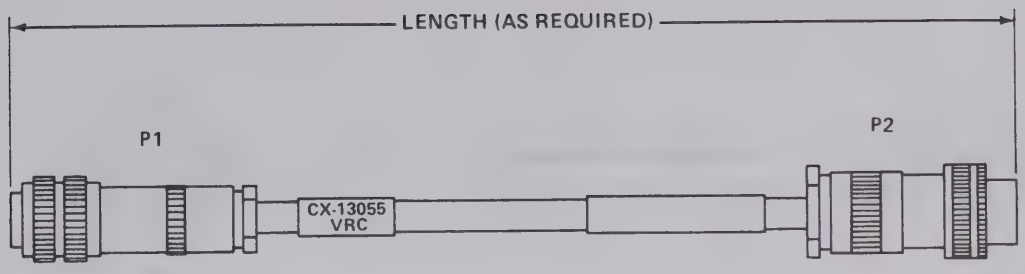
CX-7621/VRC

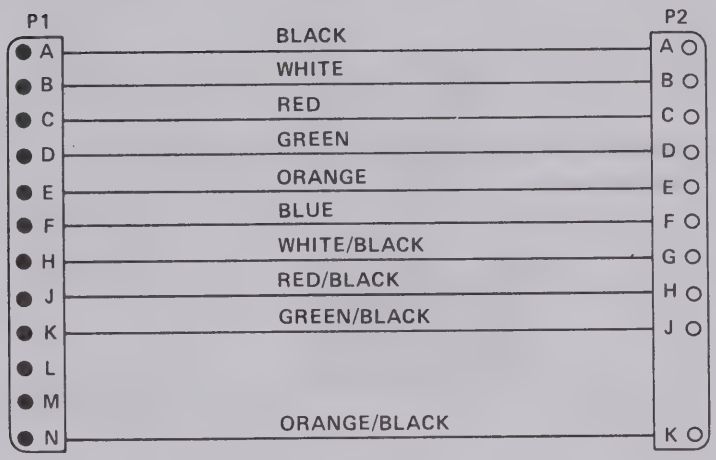


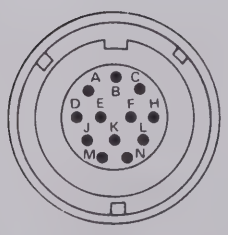
EL8OA245

3-25. CABLES. (CONT)

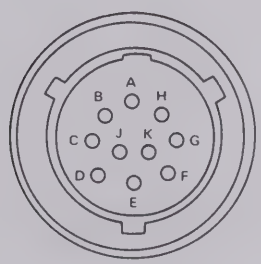
CX-13055/GRC







TO FEMALE PIN PLUG
OF CX-4722 OR
MODIFIED CX-4722

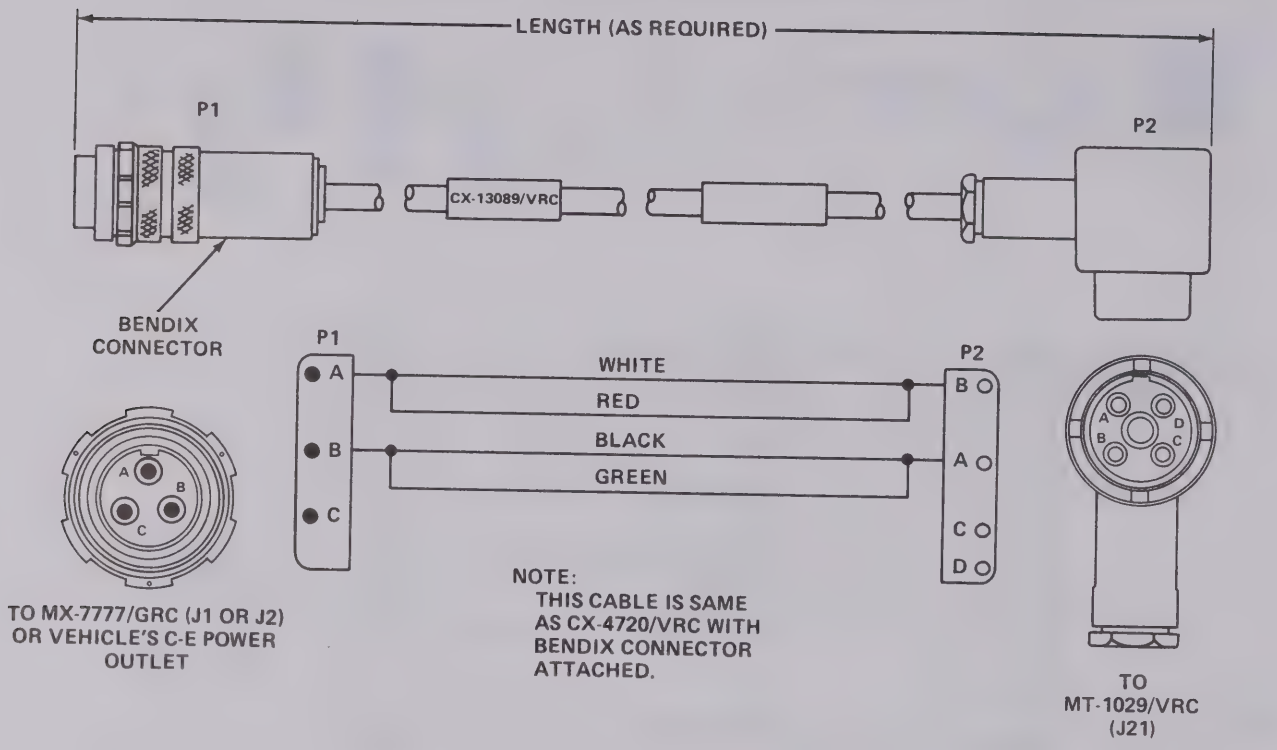


TO MX-9146
ANTENNA CONTROL
JACK

EL8OA246

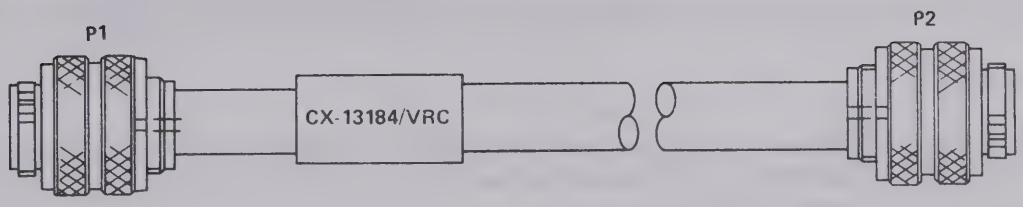
3-25. CABLES. (CONT)

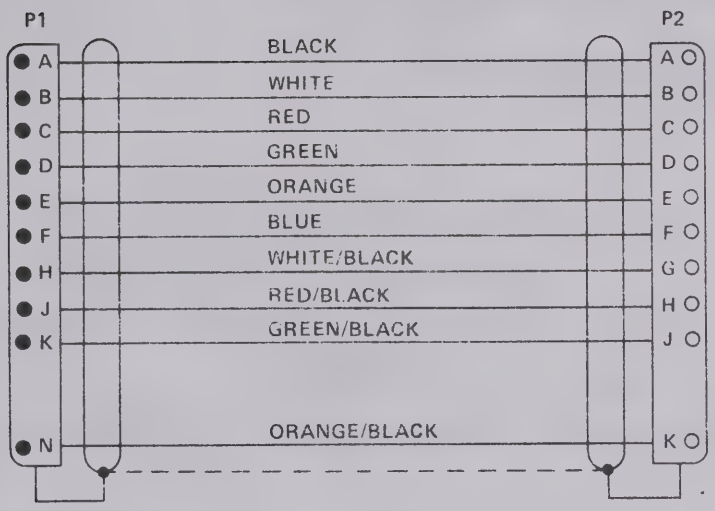
CX-13089/GRC

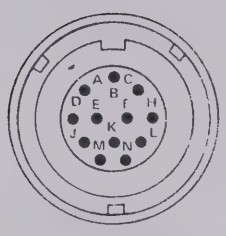


3-25. CABLES. (CONT)

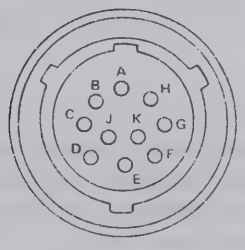
CX-13184/GRC







TO FEMALE PIN PLUG
OF CX-4722/VRC
OR MODIFIED CX-4722



TO MX-9146
ANTENNA CONTROL
JACK

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Section V PREPARATION FOR STORAGE OR SHIPMENT

Subject	Para	Page
General	3-26	3-326
Administrative Storage	3-27	3-326
Intermediate Storage	3-28	3-327
Flyable Storage	3-29	3-327

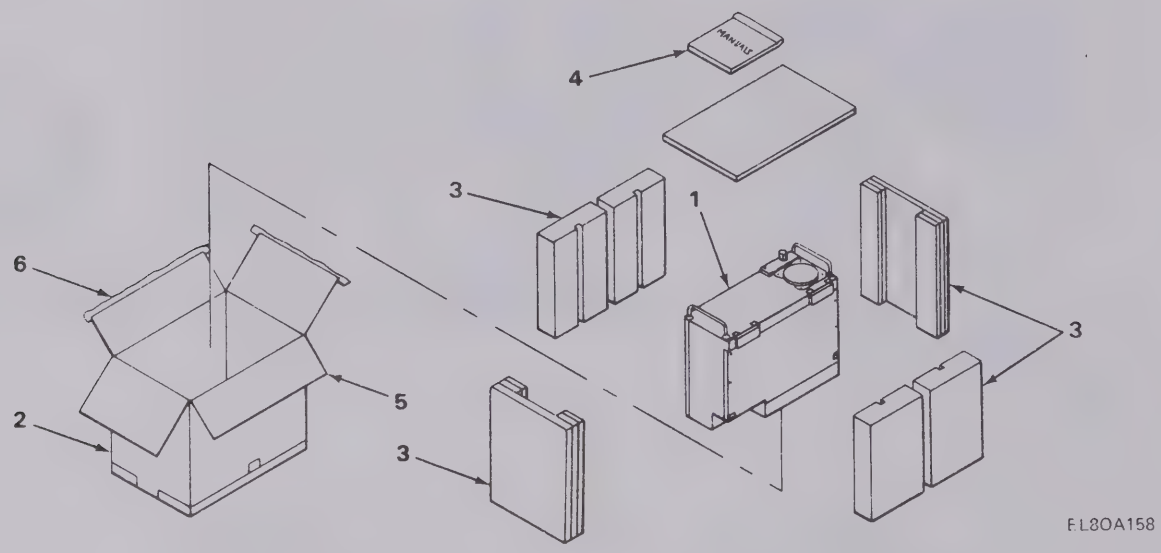
3-26. GENERAL.

This section provides procedures for repacking components of the AN/VRC-12 radio sets. Before repacking, the next scheduled PMCS should be performed, all known problems corrected, and all current Modification Work Orders (MWO's) applied.

3-27. ADMINISTRATIVE STORAGE.

Administrative storage means storage from 1 to 45 days.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
MATERIALS/PARTS: Shipping cartons



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PACKING

1. Secure dust covers on equipment jacks.
2. Place radio set component (1) (RT illustrated) in carton (2).
3. Arrange fiberboard pads (3) as shown.
4. Replace equipment manuals (4).
5. Close flaps (5) and seal carton with tape (6).

NOTE

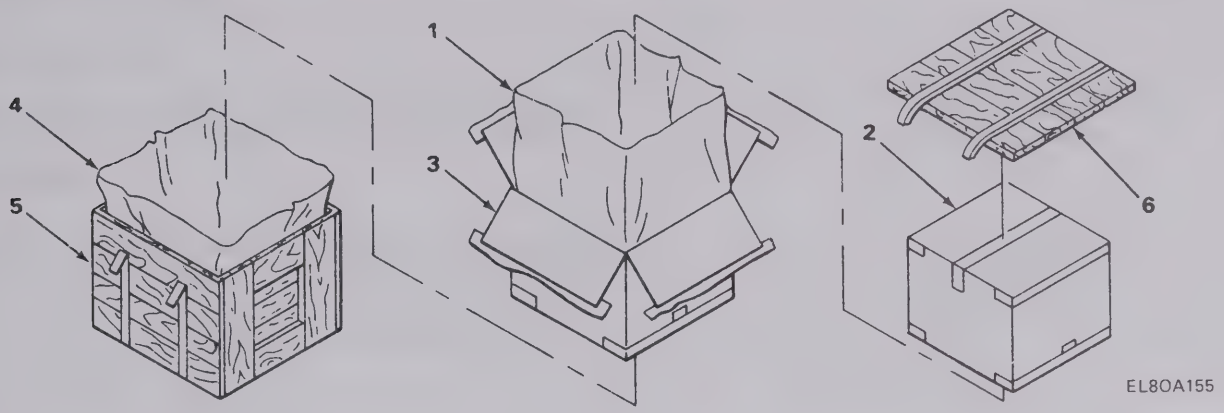
Carton must be marked with nomenclature model identification, and serial number of radio component.

Place carton in secure storage area.

3-28. INTERMEDIATE STORAGE.

Intermediate storage means storage between 46 and 180 days.

TOOLS: Hammer
MATERIALS/PARTS: Shipping cartons and box
Waterproof barrier wrap
PRELIMINARY PROCEDURE: Pack equipment for administrative storage. (See paragraph 3-27.)



PACKING

1. Place waterproof barrier wrap (1) around equipment carton (2) and seal.
2. Place equipment carton in outer carton (3).
3. Place waterproof barrier wrap (4) around outer carton and seal.
4. Place outer carton in box (5) and nail box cover (6) to top of box.

NOTE

Box must be marked with nomenclature, model identification, and serial number of radio component.

Place box in secure storage area.

3-29. FLYABLE STORAGE.

Flyable or long-term storage is for more than 180 days. The packing and storage procedure is the same as intermediate storage. (See paragraph 3-28.)

APPENDIX A

REFERENCES

A-1. SCOPE.

The following is a list of all pamphlets, forms, service bulletins, and technical manuals referenced in or related to this manual.

A-2. PAMPHLETS.

Consolidated Index of Army Publications and Blank Forms	DA Pam 310-1
The Army Maintenance Management System (TAMMS)	DA Pam 738-750

A-3. FORMS.

Recommended Changes to Publications and Blank Forms	DA FORM 2028
Recommended Changes to Equipment Technical Manuals	DA FORM 2028-2
Equipment Inspection and Maintenance Worksheet	DA FORM 2404
Discrepancy in Shipment Report (DISREP)	SF-361
Report of Discrepancy (ROD)	SF-364
Quality Deficiency Report	SF-368

A-4. SERVICE AND TECHNICAL BULLETINS.

Vehicular Radio Sets and Authorized Installations	SB 11-131
Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment	SB 11-573
Blower Cover FSN 5820-K98-4055 for Mounting MT-1029/VRC	SB 11-586
Warning Notice for Vehicles in Which Radios Are Mounted	SB 11-624
Application, Installing, Maintenance and Testing of Suppressor, Electrical Transient (NSN 5915-01-024-3877)	SB 11-638
Field Instructions for Painting and Preserving Electronics Command Equipment, Including Camouflage Pattern Painting of Electrical Equipment Shelters	TB 43-0118

A-5. TECHNICAL MANUALS.

Operator's and Organizational Maintenance for Communications Security Equipment TSEC/KE-57	TM 11-5810-256-12
Operator's and Organizational, Direct Support and General Support Maintenance Manual for Installation Kits, Electronic Equipment Used with Communications Security Equipment TSEC/KY-38 and HYL-3/TSEC	TM 11-5810-290-14&P
Operator's and Organizational Maintenance Manual for NESTOR Communications Systems Using TSEC/KY-8 and TSEC/KY-38 with Radio Sets and Associated Equipment	TM 11-5810-300-12
Operator's and Organizational Maintenance Manual: Installation Kits for Communications Security Equipment TSEC/KY-57	TM 11-5810-312-12

A-5. TECHNICAL MANUALS. (CONT)

Operator's Manual: Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), and AN/VRC-49 (5820-00-223-7437) (Used with Intercom System)	TM 11-5820-401-10-2
Hand Receipt Technical Manual Covering End Item/Components of End Item (COEI). Basic Issue Items, and Additional Authorization List (AAL) for Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), and AN/VRC-49 (5820-00-223-7437) (Used with Intercom System)	TM 11-5820-401-10-2-HR
Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Control, Frequency Selector C-2742/VRC and Control, Radio Set C-2299/VRC	TM 11-5820-401-35-1
Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools List: Control, Intercommunication Set C-2296/VRC (FSN 5820-892-3337)	TM 11-5820-401-35-6
Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools List: Control, Intercommunication Set C-2297/VRC	TM 11-5820-401-35-7
Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools List: Control, Intercommunication Set C-2298/VRC (FSN 5820-892-3339)	TM 11-5820-401-35-8
Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tools List: Mounting MT-1029/VRC (FSN 5820-893-1323) and Mounting MT-1898/VRC (FSN 5820-893-1324)	TM 11-5820-401-35-9
Direct Support Maintenance Manual Including Repair Parts and Special Tools Lists: Control, Intercommunication Set C-10456/VRC (NSN 5830-01-082-0804)	TM 11-5830-257-30&P
Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools Lists): Intercommunications Set AN/VIC-1(V). Controls Intercommunications Set, C-10456/VRC (NSN 5830-01-082-0804), C-10680/VRC and Amplifier, Audio Frequency, AM-7046/VRC	TM 11-5830-340-12
Operator's and Organizational Maintenance Manual: Suppressor, Electrical Transient MX-7778/GRC (NSN 5915-00-937-9564)	TM 11-5915-223-12
Operator's, Organizational, Direct Support and General Support Maintenance Manual: Suppressor, Electrical Transient MX-7778A/GRC (NSN 5915-00-413-6718)	TM 11-5915-224-14

A-5. TECHNICAL MANUALS. (CONT)

Operator, Organizational, Field and Depot Maintenance Repair Parts and Special Tool Lists: Loudspeaker, Permanent Magnet LS-454/U	TM 11-5965-255-15P
Operator's, Organizational, Field and Depot Maintenance Repair Parts and Special Tool Lists: Headset, Electrical H-140A/U	TM 11-5965-260-15P
Organizational and DS Maintenance Manual Including Repair Parts and Special Tool Lists: Headset Microphone Dynamic H-161/U and H-161A/U	TM 11-5965-262-13
Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools List): Handset H-189/GR (NSN 5965-00-069-8886)	TM 11-5965-280-15
Organizational, DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Headset-Microphone Kit MK-1039/G	TM 11-5965-282-15
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Antenna AS-1729/VRC (NSN 5985-00-985-9024)	TM 11-5985-262-14
Operator's, Organizational, and Direct Support Maintenance Manual: Antenna AS-2731/GRC (NSN 5985-01-017-0785)	TM 11-5985-355-13
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual for Transmission Cable Kits MK-456/GRC and MK-456A/GRC (NSN 5995-00-973-1544)	TM 11-5995-202-15
Administrative Storage of Equipment	TM 740-90-1
Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)	TM 750-244-2

A-6. MISCELLANEOUS PUBLICATIONS.

Tool Kit, Electronic Equipment TK-101/G (NSN 5180-00-064-5178)	SC 5180-91-CL-R13
Operator and Organizational Maintenance: Multimeter AN/URM-105, Including Multimeter ME-77/U	TM 11-6625-203-12

APPENDIX B

MAINTENANCE ALLOCATION

Section I INTRODUCTION

B-1. GENERAL.

This appendix provides a summary of maintenance operations for the AN/VRC-12 series radio sets and AN/VIC-1 intercom set. 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 the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, 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 (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

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

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

f. Install. To install an item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

g. Replace. To substitute serviceable like-type part subassembly or module (component or assembly) for an unserviceable counterpart.

h. Repair. To apply maintenance services (inspect, test, service, adjust, aline, 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 part, subassembly, module (component or assembly), end item, or system.

B-2. MAINTENANCE FUNCTIONS. (CONT)

i. Overhaul. To restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e.,DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

j. 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 equipment/components.

B-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 Function. 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 the 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 worktime 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 varies at different maintenance categories, appropriate worktime figures will be shown for each category. The number of task-hours specified by the worktime 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 Eqpt. 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.

B-4. TOOL AND TEST EQUIPMENT REQUIREMENTS.

a. Tool or Test Equipment Reference (Ref) 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 to 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 (FSCM) (5-digit) in parentheses.

B-5. REMARKS.

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 in section II.

Section II MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-12

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-12								
01	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Section XI)								
03	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Section XIII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section III MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-43

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-43								
01	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Section XI)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section IV MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-44

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-44								
01	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Section XI)								
03	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Section XIII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section V MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-45

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-45								
01	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Section XI)								
03	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section VI MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-46

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-46								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Section XII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section VII MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-47

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-47								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Section XII)								
03	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Section XIII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section VIII MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-48

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-48								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Section XII)								
03	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Section XIII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section IX MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-49

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-49								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Section XII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section X MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-54

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/VRC-54								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Section XII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								
05	RADIO SET AN/VRC-24, AN/VRC-24A (See Separate MAC in TM 11-5820-222-20)								

Section XI MAINTENANCE ALLOCATION CHART FOR RECEIVER–TRANSMITTER, RADIO RT–246A/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
01	RECEIVER–TRANS–MITTER, RADIO RT–246A/VRC SM–D–413501 DL–SM–B–413500	Inspect	0.5	0.5				See Sect XIV	See Sect XV
		Test		0.5				1 thru 6	A
		Test			1.0			7 thru 23	B
		Test				1.5		7 thru 23	C
		Service		0.5				1	
		Align			2.5			7 thru 23	
		Install		0.4				1,6	
		Repair		0.3				1	AF
		Replace		0.3				1	
		Repair			3.0			7 thru 23	D
		Repair				3.5		7 thru 23	
		Overhaul					50.	24 thru 49, 101 thru 132, 201 thru 223	
0101	Control Assy (Front Panel Group) (A300) SM–D–414366	Test			0.5			7 thru 13	B
		Repair			0.3			7 thru 9, 13	O
		Repair			0.5			7 thru 9, 13	G
		Repair					2.0	33,47,130, 131,132, 219	
010101	VHF Tuner Assy (A1000) SM–D–416345	Test			0.2			7,10,21	D
		Repair			0.5				E, AE
01010101	Tuner, VHF (A1000) SM–D–188980	Test			0.5			7,10,21	B
		Replace			0.5			8,9	
		Repair				0.5		8,9	G
		Repair					0.7	28,33,35, 43,44,45, 128,129 132,203, 221	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0101010101	Tuner, VHF (A1000A) SM–D–416341	Test Repair			0.5		0.5	7,10,21 28,33,35, 43,44,45, 128,129, 132,203, 221	B G
010102	Oscillator Assy, RF (A2000A, SM–D–921126)	Test Replace			0.3 0.3			7,10,21 8,9	B X
010103	Oscillator–Buffer (A6000A, SM–D–416342)	Test Repair			0.3 0.3			7,10,21 8,9	E,AE
01010301	Oscillator–Buffer (Osc–Buff and Parent Board) SM–D–188989	Test Replace Repair			0.3 0.3	 0.5		8,9,11,13 8,9 8,9	B O
0101030101	Circuit Card Assy (Parent Board) (TB06001) SM–D–416335	Test Replace				0.3 0.2		8,9,11,13 8,9	B
0101030102	Oscillator–Buffer (Case and Tuner) SM–D–416343	Test Replace Repair			0.4	 0.2 0.3		7,10,21 8,9	B

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
010104	Null Switch Assy (A7000, SM–C–414770)	Replace			0.2			8,9	
010105	Selector Control Assy (A7100, SM–C–414649)	Test					0.2	33 thru 218	
		Replace			0.3			8,9	
		Repair			0.3			8,9	T
		Repair				1.0		8,9	U
		Repair					2.0	33,132,218	
010106	Amplifier, Synchro (A7200, SM–D–414741) (A7200A, SM–D–921412)	Replace			0.3			8,9	X
010107	Control Wiring Assy SM–E–414411								E
01010701	Wiring Harness Assy SM–E–414413	Test			0.3			13	B
		Test					0.5	47	
		Repair			0.2	1.0		8,9,21	O
		Repair					1.0	8,9,21	G
		Replace						126,130, 132	
010108	Switch Assy SM–D–414632	Test				0.2		21	B
		Replace				0.7		8,9	
		Repair				0.5		8,9	
010109	Panel and Housing Assy SM–D–414496	Repair			0.5			8,9	T
		Repair				0.8		8,9	C
		Repair					1.5	132,219	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
01010901	Panel Assy SM–D–414500	Repair			0.3			8,9	O
		Repair				0.5		8,9	G,I
		Repair					0.6	132,219	
01010902	Gear Set Assy SM–D–414525	Replace				0.8		8,9	
		Repair					0.8	130,131, 132,219	
0102	Crystal Reference System Assy (A3000A, SM–D–413519)	Test			0.3			7,10,21	B
		Test					0.5	28,33,35, 43,45,204	
		Repair			0.3			8,9	K
		Repair					0.8	28,35,43, 45,132,204	AE
010201	Chassis Assy, Electrical (A1, SM–D–413528)	Test			0.3			13	B
		Test					0.5	204	
		Replace			0.5			8,9	L
		Repair			0.5			8,9	
		Repair					0.7	132	
0103	Amplifier Assy, IF (A4000A, SM–C–413717)	Test			0.3			7,10,21	B
		Test					0.3	28,35,37, 44,46,205	
		Align			0.4			7,10,21	F
		Repair			0.3			8,9	K,AE
		Repair					0.5	28,35,37, 44,46,132, 205	
010301	Chassis Assy, Electrical (A1, SM–D–413802)	Test			0.2			13	B
		Test				0.2		13,21	B
		Replace			0.5			8,9	
		Repair				0.5		8,9	H
		Repair					0.5	132	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0104	Amplifier Assy, IF (Audio and Squelch Amplifier) (A5000A, SM–D–413820)	Test			0.3			7,10,21	B
		Test					0.3	28,32,36, 37,45,206	
		Align			0.2			7,10,21	F
		Replace			0.2			8,9	
		Repair			0.5			8,9	K,Z
		Repair					0.5	28,32,36, 37,45,132, 206	
010401	Chassis Assy, Electrical (A1, SM–D–413879)	Test			0.3			13	B
		Replace			0.2			8,9	
		Repair			0.3			8,9	N
		Repair				0.5		8,9	M
0105	Transmitter Speech Amplifier and Modulator Assy, (A8000A, SM–C–414170)	Test			0.3			7,10,21	B
		Align			0.5			7,10,21	F
		Test					0.3	27,28,32, 35,36,37, 208	
		Repair				0.3		8,9	M
		Repair					0.5	26,27,28, 32,35,37, 132,208	
		Repair			0.3			8,9	K,AE
010501	Chassis Assy, Electrical (A1, SM–C–414276)	Test				0.2		13	B
		Test					0.2	27,28,32, 35,36,37, 208	
		Replace			0.3				N
		Repair			0.3				M
		Repair				0.5			
		Repair					0.5		

MAINTENANCE ALLOCATION CHART FOR RECEIVER–TRANSMITTER, RADIO RT–246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0106	Power Supply Assy (A9000A, SM–D–921504)	Test				0.3		13	B
		Test					0.3	24,29,33, 37,217	
		Replace			0.2			8,9	AA
		Repair					1.0	24,29,33, 37,132, 217	
010601	Power Supply, Electrical (Circuit Board Assy) (A9000A–2, SM–D–921544)	Test					0.3	24,29,33, 37,217	
		Replace					0.5	8,9	AB
		Repair					0.8	24,29,33, 37,132,217	
010602	Circuit Card Assy (Cover Assy) (A9000A–1, SM–D–921507)	Replace					0.1	8,9	
		Repair					0.5	24,29,33, 37,132,217	
010603	Chassis Assembly (A9000A, SM–D–921514)	Repair					0.5	132	AB
010604	Resistor Assembly (A9000A, SM–D–921525)	Test					0.3	13	B
		Replace					0.5	8,9	AB
		Repair					0.3	8,9	
010605	Power Supply Panel Assy (A9000A, SM–B–921523)	Repair					0.4	132	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARK
0107	Semiconductor Device Assy (A9000B, SM–D–921530)	Test			0.3			13	P
		Replace			0.2			8,9	AA
0108	Power Amplifier Assy (A6200, SM–D–439956)	Test			0.5			7,10,21	B
		Test					0.5	202	
		Align			0.8			7,10,21	F
		Replace			0.2			8,9	
		Repair			1.0			8,9	H
		Repair				1.5		8,9	O
		Repair					2.0	33,35,38, 39,132,202	
010801	RF Amplifier Assy (Final Amplifier) (A6201, SM–D–413994)	Repair			0.7			8,9	O
		Repair				1.0		8,9	A
		Repair					1.0	132	
010802	Gear Set (MP6201, SM–D–413982)	Replace			0.2			8,9	O
		Repair			0.3			8,9	
		Repair				0.3		8,9	
010803	Wiring Assy SM–E–413971	Test			0.2			13	B
		Repair			0.5			8,9	O
		Repair				1.0		8,9	
01080301	Wiring Harness Assy SM–E–413975	Test				0.2		13	B
		Repair				0.5		8,9	
010804	Tank Circuit Assy (Z6201, SM–D–413999)	Test					0.2	202	
		Repair			0.3			8,9	O
		Repair				0.5		8,9	G
		Replace				0.7		8,9	
010805	Amplifier Subassembly (Driver) (A6100, SM–D–414045)	Test					0.3	202	
		Align			0.3			7,10,21	F
		Replace			0.5			8,9	
		Repair			0.5			8,9	Q
		Repair				0.5		8,9	O

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0109	Voltage Regulator Assy (Voltage Regulator and Housing) (A400, SM–D–414112)	Test			0.5			7,13,21	B
		Test					0.8	47	
		Repair			0.8			8,9	O
		Repair				1.5		8,9	G,I,J,V
		Repair					1.5	126,132	
010901	Chassis Assy, Electrical (A1, SM–C–414149)	Test				0.3		7,13,21	B
		Repair			0.3			8,9	H
		Repair				0.3		8,9	
		Replace				0.5		8,9	
010902	Wiring Assy, Voltage Reg (Chassis Wiring Assy) SM–E–414135	Test			0.8			7,13	B
		Test					0.8	47	
		Repair				0.8		8,9	G
		Repair					0.8	132	
01090201	Wiring Harness Assy SM–E–414137	Test					0.5	47	
		Replace					1.0	132	
010903	Housing Assy SM–D–414163	Repair					0.5	132	
		Replace					1.0	132	
0110	Gear Set Assy (Intermediate Gear Train) (A6, SM–D–413892)	Test				0.1		8,9	B
		Replace				0.3		8,9	
		Repair				1.0		8,9	R
		Repair					1.5	201	
0111	Cover Assy (Bottom) SM–D–414288	Replace		0.1				1	S
		Repair			0.3			8,9	
		Repair				0.5		8,9	
0112	Cover Assy (Top) SM–D–414297	Replace		0.1				1	
		Repair				0.5		8,9	
0113	Handle and Guard Assy (Right) (14850, A1–8882D)	Replace			0.1			1	AG
		Install			0.5			8,9	W
		Repair			0.5			8,9	
0114	Handle and Guard Assy (Left) (14850, A1–8883D)	Replace			0.1			1	AG
		Install			0.5			8,9	W
		Repair			0.5			8,9	

Section XII MAINTENANCE ALLOCATION CHART FOR RECEIVER–TRANSMITTER, RADIO RT–524A/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
02	RECEIVER–TRANS–	Inspect	0.5	0.5					
	MITTER, RADIO	Test		0.5				1 thru 6	A
	RT–524A/VRC	Test			1.0			7 thru 23	B
	SM–D–414826	Test				1.5		7 thru 23	C
	DL–SM–B–414825	Service		0.5				1	
	DL–SM–B–414827	Align			2.5			7 thru 23	
		Install		0.4				1,8,9	
		Repair		0.3				1	AF
		Replace		0.3				1	
		Repair			3.0			7 thru 23	D
		Repair				3.5		7 thru 23	
		Overhaul					50.	24 thru 49, 101 thru 132, 201 thru 223	
0201	Control Assy	Test			0.5			7 thru 13	B
	(Front Panel Group)	Repair			0.3			7,9,13	O
	(A350)	Repair				0.5		7,9,13	G
	SM–D–414380	Repair					2.0	33,47,130, 131,132, 219	
020101	VHF Tuner Assy	Test			0.2			7,10,21	D
	(A1000)	Repair			0.5				E,AE
	SM–D–416345								
02010101	Tuner, VHF	Test			0.5			7,10,21	B
	(A1000)	Replace			0.5			8,9	
	SM–D–188980	Repair				0.5		8,9	G
		Repair					0.7	28,33,35, 43,44,45, 128,129, 132,203, 221	

MAINTENANCE ALLOCATION CHART FOR RECEIVER–TRANSMITTER, RADIO RT–524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0201010101	Tuner, VHF (A1000A) SM–D–416341	Test Repair			0.5		 0.5	7,10,21 28,33,35, 43,44,45, 128,132, 203,221	G
020102	Oscillator Assy, RF (A2000A, SM–D–921126)	Test Replace			0.3 0.3			7,10,21 8,9	B X
020103	Oscillator Buffer (A6000A, SM–D–416342)	Test Repair			0.3 0.3			7,10,21 8,9	E,AE
02010301	Oscillator–Buffer (Osc–Buf & Parent Bd) SM–D–188989	Test Replace Repair			0.3 0.3	 0.5		8,9,11,13 8,9 8,9	B O
0201030101	Oscillator–Buffer (Case & Tuner) SM–D–416343	Test Replace Repair			0.4	 0.2 0.3		7,10,21 8,9 8,9	B G
020104	Control Wiring Assy SM–E–414837								E
02010401	Wiring Harness Assy SM–E–414839	Test Test Repair Repair Replace			0.3 0.2	 1.0	 0.5 1.0	13 47 8,9,21 8,9,21 126,130, 132	B O G
0201040101	Switch Assy SM–D–414632	Test Replace Repair				0.2 0.7 0.5		21 8,9 8,9	B

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
020105	Panel & Housing Assy SM–D–414841	Repair Repair Repair			0.5	0.8	1.5	8,9 8,9 132,219	T C
02010501	Panel Assy SM–D–414843	Repair Repair Repair			0.3	0.5	0.6	8,9 8,9 132,219	O G
02010502	Gear Set Assy SM–D–414849	Replace Repair				0.8	0.8	8,9 130,131, 132,219	
0202	Crystal Reference System Assy (A3000A, SM–D–413519)	Test Test Repair Repair			0.3 0.5		0.5 0.8	7,10,21 28,33,35, 45 8,9 28,35,43, 45,132, 204	B K AE
020201	Chassis Assy Electrical, (A1, SM–D–413528)	Test Test Replace Repair Repair			0.3 0.5 0.5		0.5 0.7	13 204 8,9 8,9 132	B L
0203	Amplifier Assy , IF (A4000A, SM–C–413717)	Test Test Align Repair Repair			0.3 0.4 0.3		0.3 0.5	7,10,21 28,35,37, 44,46, 205 7,10,21 8,9 28,35,37, 44,46, 132,205	B F K,AE
020301	Chassis Assy, Electrical (A1, SM–D–413802)	Test Test Replace Repair Repair			0.2 0.5	0.2 0.5	0.5	13 13,21 8,9 8,9 132	B B H

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0204	Amplifier Assy, IF (Audio & Squelch Amplifier) A5000A SM–D–413820	Test			0.3			7,10,21	B
		Test					0.3	28,32,36, 37,45, 206	F
		Align			0.2			7,10,21	K,Z
		Replace			0.2			8,9	M
		Repair			0.5			8,9	
		Repair				0.5		8,9	
		Repair					0.5	28,32,36, 37,45, 132,206	
020401	Chassis Assy, Electrical (A1, SM–D–413879)	Test			0.3			13	B
		Replace			0.2			8,9	N
		Repair			0.3			8,9	M
		Repair				0.5		8,9	
0205	Transmitter Speech Amp & Modulator Assy (A8000A, SM–C–414170)	Test			0.3		0.3	7,10,21, 27,28,32, 35,36,37, 208	B
		Test							F
		Align			0.5			7,10,21	K,AE
		Repair			0.3			8,9	M
		Repair				0.3		8,9	
		Repair					0.5	27,28,32, 35,36,37, 208	
020501	Chassis Assy, Electrical (A1, SM–C–414276)	Test				0.2	0.2	13	B
		Test						27,28,32, 35,36,37, 208	
		Replace			0.3			8,9	N
		Repair			0.3	0.5		8,9	M
		Repair						8,9	
		Repair					0.5	132,208	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0206	Power Supply Assy (A9000A, SM–D–921504)	Test Test Replace Repair Repair			 0.2	0.3	 0.3 1.0	13 24,29,33, 37,217 8,9 24,29,32, 33,132, 217	B AA
020601	Power Supply, Electrical (Circuit Board Assy) A9000A–2, SM–D–921544	Test Replace Repair					0.3 0.5 0.8	24,29,33, 37,217 8,9 24,29,32, 33,132, 217	AB
020602	Circuit Card Assy (Cover Assy) A90001, SM–D–991507	Replace Repair					0.1 0.5	8,9 24,29,33, 37,132, 217	
020603	Chassis Assy (A9000A, SM–D–921514)	Repair					0.5	132	AB
020604	Resistor Assy (A9000A, SM–D–921525)	Test Replace Repair					0.3 0.5 0.3	13 8,9 8,9	B AB
020605	Power Supply Panel Assy (A9000A, SM–B–921523)	Repair					0.4	132	
0207	Semiconductor Device Assy (A9400B, SM–D–921530)	Test Replace			0.3 0.2			13 8,9	P AA

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0208	Power Amplifier Assy (A6200, SM–D–439956)	Test			0.5			7,10,21	B
		Test					0.5	202	
		Align			0.8			7,10,21	F
		Replace			0.2			8,9	
		Repair			1.0			8,9	H
		Repair				1.5		8,9	O
		Repair					2.0	8,9	
		Repair						33,35,38, 39,132, 202,223	
020801	RF Amplifier Assy (Final Amplifier) (A6201, SM–D–413994)	Repair			0.7			8,9	O
		Repair				1.0		8,9	G
		Repair					1.0	132	
020802	Gear Set (MP6201, SM–D–413982)	Replace			0.2			8,9	O
		Repair			0.3			8,9	
		Repair				0.3		8,9	
020803	Wiring Assy, SM–E–413971	Test			0.2			13	B
		Repair			0.5			8,9	O
		Repair				1.0		8,9	
02080301	Wiring Harness Assy SM–D–413975	Test				0.2		13	B
		Repair				0.5		8,9	
020804	Tank Circuit Assy (Z6201, SM–D–413999)	Test					0.2	202	O
		Repair			0.3			8,9	G
		Repair				0.5		8,9	
		Replace					0.7	8,9	
020805	Amplifier Subassembly (Driver) (A6100, SM–D–414045)	Test					0.3	202	F
		Align			0.3			7,10,21	
		Replace			0.5			8,9	Q
		Repair			0.5			8,9	O
		Repair				0.5		8,9	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMAR
02080501	Tuner, Radiofrequency (Driver Tuning Assy) (A6102, SM–D–414048)	Test					0.2	202	O
		Replace			0.3				
		Repair					0.5	8,9	
		Repair					0.5	33,35,38, 39,132, 202,223	
02080502	Driver Ampl Assy (A6101, SM–D–414063)	Test			0.3			7,10,21	B
		Test					0.5	202	
		Replace					0.5		G
		Repair				1.0		8,9	
		Repair					1.0	33,35,38, 39,132, 202	
0209	Voltage Regulator Assy (Voltage Regulator & Hosing) (A400, SM–D–414112)	Test			0.5			7,13,21	B
		Test					0.8	47	
		Repair			0.8	1.5		8,9	O
		Repair					1.5	8,9	G,I,J,V
		Repair						132	
020901	Chassis Assy, Elec (A1, SM–C–414149)	Test				0.3		7,13,21	B
		Repair			0.3			8,9	H
		Repair				0.3		8,9	
		Replace				0.5		8,9	
020902	Wiring Assy, Voltage Reg (Chassis Wiring Assy) SM–E–414135	Test			0.8			7,13,21	B
		Test					0.8	47	
		Repair				0.8		8,9	G,I,J,V
								132	
02090201	Wiring Harness Assy SM–E–414137	Test					0.5	47	
		Replace					1.0	132	
020903	Housing Assy SM–D–414163	Repair					0.5	132	
		Replace					1.0	132	
0210	Gear Set Assy (Intermediate Gear Train) (A6, SM–D–413892)	Test				0.1		8,9	B
		Replace				0.3		8,9	
		Repair				1.0		8,9	R
		Repair					1.5	201	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER–TRANSMITTER, RADIO
RT–524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0211	Cover Assy (Bottom) SM–D–318065 (SM–D–414288)	Replace Repair		0.1	 0.3			1 8,9	AD
0212	Cover Assy (Top) SM–D–414297	Replace Repair		0.1	 0.3			1 8,9	
0213	Handle & Guard Assy (Right) (14850) A1–8882D	Replace Install Repair			0.1 0.5 0.5			1 8,9 8,9	AG W
0214	Handle & Guard Assy (Left) (14850) A1–8883D	Replace Install Repair			0.1 0.5 0.5			1 8,9 8,9	AG W

Section XIII MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R–442A/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
03	RECEIVER, RADIO	Inspect	0.5	0.5					
	R–442A/VRC	Test		0.5				1 thru 6	A
	SM–D–414901	Test			1.0			7 thru 23	B
	DL–SM–B–414900	Test				1.5		7 thru 23	C
		Service		0.5				1	
		Align			2.5			7 thru 23	
		Install		0.4				1,8,9	
		Repair		0.3				1	AF
		Replace		0.3				1	
		Repair			3.0			7 thru 23	D
		Repair				3.5		7 thru 23	
		Overhaul					40.	24 thru 49, 101 thru 132, 201 thru 223	
0301	Control Assy	Test			0.5			7 thru 13	B
	(Front Panel Group)	Repair			0.3			7,9,13	O
	(A100)	Repair				0.5		7,9,13	G
	SM–D–414915	Repair					2.0	33,47,130, 131,132, 220	
030101	VHF Tuner Assy	Test			0.2			7,10,21	D
	(A1000)	Repair			0.5				E,AE
	SM–D–416345								
03010101	Tuner, VHF	Test			0.5			7,10,21	B
	(A1000)	Replace			0.5			8,9	
	SM–D–188980	Repair				0.5		8,9	G
		Repair					0.7	28,33,35, 43,44,45, 128,129, 132,203, 221	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER, RADIO
R–442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0301010101	Tuner, VHF (A1000A) SM–D–416341	Test Repair			0.5		0.5	7,10,21 28,33,35, 43,44,45, 128,129, 132,203, 221	G
030102	Oscillator Assy, RF (A2000A, SM–D–921126)	Test Replace			0.3 0.3			7,10,21 8,9	B X
030103	Control Wiring Assy SM–E–414918								E
03010301	Wiring Harness Assy SM–E–414922	Test Test Repair Repair Replace			0.3 0.2	 1.0	 0.5 1.0	13 47 8,9,21 8,9,21 126,130, 132	B O G
030104	Panel & Housing Assy SM–D–414936	Repair Repair Repair			0.5	 0.8	 1.5	8,9 8,9 132,220	T C
03010401	Panel Assy SM–D–414932	Repair Repair Repair			0.3	 0.5	 0.6	8,9 8,9 132,220	O G
03010402	Gear Set Assy SM–D–414938	Replace Repair				0.8	 0.8	8,9 130,131, 132,220	

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER, RADIO
R–442A/VRC (CONT)

(1)	(2)	(3)	(4) MAINTENANCE CATEGORY					(5)	(6)
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQPT	REMARKS
0302	Crystal Reference System Assy (A3000A, SM–D–413519)	Test Test Repair Repair			0.3 0.5		 0.5 0.8	7,10,21 28,33,35, 43,45,204 8,9 28,33,35, 43,45,132, 204	B K AE
030201	Chassis Assy Electrical, (A1, SM–D–413528)	Test Test Replace Repair Repair			0.3 0.5 0.5		 0.5 0.7	13 204 8,9 8,9 132	B L
0303	Amplifier Assy, IF (A4000A, SM–C–413717)	Test Test Align Repair Repair			0.3 0.4 0.3		 0.3 0.5	7,10,21 28,35,37, 44,46,205 7,10,21 8,9 28,35,37, 44,46,132 205	B F K,AE
030301	Chassis Assy, Electrical (A1, SM–D–413802)	Test Test Replace Repair Repair			0.2 0.5	 0.2 0.5	 0.5	13 13,21 8,9 8,9 132	B B H

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER, RADIO
R–442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0304	Amplifier Assy, IF (Audio & Squelch Amplifier (A5000A, SM–D–413820)	Test			0.3			7,10,21	B
		Test					0.3	28,32,36, 37,45, 206	F
		Align			0.2				
		Replace			0.2				
		Repair			0.5	0.5		7,10,21	K,Z
		Repair						8,9	M
		Repair					0.5	8,9	
		Repair						8,9	
								28,32,36, 37,45, 132,206	
030401	Chassis Assy, Electrical (A1, SM–D–413879)	Test			0.3			13	B
		Replace			0.2			8,9	
		Repair			0.3			8,9	N
		Repair				0.5		8,9	M
0305	Voltage Regulator Assy (Voltage Regulator & Housing) (A200, SM–D–414906)	Test			0.5			7,13,21	B
		Test					0.8	47	O
		Repair			0.8	1.5		8,9	G
		Repair					1.5	8,9	
		Repair						126,132	
030501	Voltage Regulator Wiring Assy (Chassis Wiring Assy) SM–D–414908	Test			0.8			7,13,21	B
		Test					0.3	47	G
		Repair				0.5		8,9	
		Repair					0.8	132	
030502	Housing Assy SM–D–414912	Repair				0.4		8,9	O
		Repair					0.5	132	
		Replace					1.0	132	
0306	Cover Assy (Top) SM–D–414957	Replace		0.1				1	
		Repair			0.3			8,9	
0307	Cover Assy(Bottom) SM–D–414960	Replace		0.1				1	
		Repair			0.3			8,9	

Section XIV TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK–101/G	5180–00–064–5178	
2	O	Digital Multimeter AN/PSM–45A or Multimeter AN/URM–105 (6625–00–581–2036) or AN/USM–223 (6625–00–999–7465)	6625–01–265–6000	
3	O	Power Supply PP–2953	6130–00–985–7899	
4	O	Dummy Load DA–553/U (Dummy Load, DA–437/U (5985–00–089–8990) may be used)		
5	O	Meter, RF Power AN/URM–182 or AN/URM–182A	6625–00–148–9371	
6	O	Test Set, Radio AN/PRM–34	6625–01–094–5646	
7	F,H,D	Power Supply PP–4763A/GRC (Power Supply PP–1104/G (6130–00–635–4900) or equal may be used)	6130–00–113–9768	
8	F,H,D	Tool Kit, Electronic Equipment TK–100/G (Tool Kit, Electronic Repairman (5180–00–532–9112) may be used)	5180–00–605–0079	
9	F,H,D	Tool Kit, Electronic Equipment TK–105/G	5180–00–610–8177	
10	F,H,D	Test Set Communications, Portable AN/GRM–114A (When provided will replace Items 11 thru 20)	6625–01–114–4481	
11	F,H	Multimeter ME–26B/U (Multimeter ME–303/U (6625–00–969–4105) may be used)	6625–00–646–9408	
12	F,H	Generator, Signal SG–1171 /U	6625–01–133–6160	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
13	F,H	Multimeter AN/USM–486 or (Multimeter AN/USM–223 (6625–00–999–7465) may be used for all purposes except Test of Semiconductor Devices by Measurement of Forward and Reverse Junction Resistance	6625–01–145–2430	
14	F,H	Electronic Counter, Digital Readout AN/USM–459, (H–P 5328A) (Electronic Counter AN/USM–207A (6625–00–044–3228) or Frequency Counter H–P MDL 5245L (6625–00–973–4837) may be used)	6625–01–061–8928	
15	F,H	Generator, Signal SG–1170/U (Generator, Signal AN/URM–103 (6625–00–868–8352), Generator, Signal SG–1144 (6625–01–075–8478), Generator, Signal AN/URM–48 (6625–00–553–1178), may be used. Frequency accuracy considerations will require use of an external frequency counter)	6625–01–120–3501	
16	F,H	Distortion Analyzer TS–4084/U (Distortion Analyzer AN/URM–184 (6625–00–802–8718), Spectrum Analyzer TS–723/U (6625–00–432–7312) may be used)	6625–01–127–0057	
17	F,H	Oscilloscope AN/USM–488, (Oscilloscope AN/USM–281C (6625–00–106–9622) may be used	6625–01–187–7847	
18	F,H	Meter, Radio Frequency Power AN/URM–120	6625–00–813–8430	
19	F,H	Dummy Load, Electrical DA–75/U (Dummy Load, DA–553 may be used)	6625–00–177–1639	
20	F,H	Meter, Modulation ME–57 (80058)	6625–00–432–7312	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
21	F,H,D	Maintenance Kit Electronic MK–1978/VRC (When Maintenance Kit MK–1978/VRC is not provided, the following minimum fixtures and accessories are required) Test Cable No. 1 (6625–00–880–6149) Test Cable No. 2 (6625–00–880–5209) Test Cable No. 3 (6625–00–880–5215) Test Cable No. 4 (6625–00–880–5216) Test Cable No. 5 (6625–00–880–6079) Test Cable No. 6 (6625–00–880–6081) Test Cable No. 7 (6625–00–880–6095) Test Cable No. 8 (6625–00–880–6097) Test Cable No. 9 (6625–00–880–6152) Test Cable No. 12, 20 DB Pad, DA–397, or Equal (6625–00–738–5991) (Substitutes may be fabricated) Al000A Alignment Cover, (Fabricate per TM 11 –5820–401–34–2) A6000A Alignment Cover, (Fabricate per TM 11–5820–401–34–2) A8100 Alignment Cover, (Fabricate per TM 11–5820–401–34–2) Alignment Tool JFD (73899) P/N 5284, (Preferred) or Alignment Tool Jonard 3767 (5120–00–724–3767) Post Extraction Tool, Viking Ind. (53156) 098–0300–0001 (Preferred) Pin Extraction Tool, Viking Ind. (53156) 115–0040–000 (Preferred) or Installation and Removal Tool (96906) (5120–00–230–3770) MS18278–1 Extender Cable, A–5000A Assy (Test Cable No. 12. Fabricate per TM 11 –5820–401–34–2) Extender Cable, A6200 Assy (Fabricate per TM 1 1 –5820–401–34–2) Cable, RF CG–409/U Antenna AS–1 729/VRC	6625–01–078–5893	

NOTE

Equivalent commercial equipment not otherwise specified may be used by maintenance activities when such equipment is provided. This does not constitute authority to deviate from the provisions of AR 750–43.

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
22	0,F,H	Hand Set H–250/G (Or Equal)	5965–01–247–4723	
23	F,H,D	Aftenuator, Variable CN–796/U	5985–00–831–5991	
24	D	A9000A Test Panel		
25	D	Analyzer ZM–3	6625–00–229–1060	
26	D	Audio Oscillator H–P 200AB		
27	D	Deviation Meter, Marconi 2300A	6625–00–480–8706	
28	D	Digital Readout, Electronic Counter AN/USM–459	6625–01–061–8928	
29	D	Electronic Multimeter Fluke 8000A	6625–01–322–8175	
30	D	Control, Frequency Selector C–2742/VRC	5820–00–892–3343	
31	D	Multimeter, Simpson MDL260	6625–00–985–3951	
32	D	Oscilloscope Tevtronix MDL 7704A	6625–00–115–2402	
33	D	Power Supply PP–1 104/G	6130–00–635–4900	
34	D	Signal Generator AN/GRM–50 (H–P606A)	6625–00–003–3238	
35	D	Signal Generator H–P 8660B	6625–01–011–2491	
36	D	Signal Generator AN/URM–1 27	6625–00–783–5965	
37	D	Spectrum Analyzer H–P–4333		
38	D	Waftmeter, Thru–Line Bird MDL 43		
39	D	Dummy Load Bird MDL		
40	D	Waftmeter, Bird MDL 61 (2 1/2–20W)		
41	D	Voltmeter ME–30C/U	6625–00–669–0742	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
42	D	Voltmeter, Electronic, Boonton 91C (RF Millivoltmeter)	6625–00–973–2294	
43	D	Spectrum Analyzer, Consisting of: HP 141T Mainframe HP 8552B RF Section HP 8553B IF Section	 6625–00–424–4370 6625–00–431–9339 6625–00–432–5055	
44	D	RF Millivoltmeter, Boonton 92BD		
45	D	Digital Voltmeter, Simpson 464		
46	D	DC Voltmeter AN/USM–98A	6625–00–753–2115	
47	D	AN/GSM–72 Robotester		
48	D	High Impedance (XlO) Probe, HP 1124A (or Equal) Required with Item 43, Spectrum Analyzer		
49	D	Video Amplifier, HP461A, is required with some Deviation Meters (Item 27) Marconi TF2300 Series do not require Video Amplifier		
NOTE REF CODES 50 THRU 100 DELETED				
101	D	Adapter UG–274B/U	5935–00–201–2411	
102	D	Alignment Cover Set, Consisting of: (Fabricate per DMWR 11–5820–401) A1000A; Al200; A3300A; A3600A; A4100A; A4200A; A6000A; A8100A; A8200A		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
103	F,H,D	Test Cable No. 1	6625–00–880–6149	
104	F,H,D	Test Cable No. 2	6625–00–880–5209	
105	F,H.D	Test Cable No. 3	6625–00–880–5215	
106	F,H,D	Test Cable No. 4	6625–00–880–5216	
107	F,H,D	Test Cable No. 5	6625–00–880–6079	
108	F,H,D	Test Cable No. 6	6625–00–880–6081	
109	F,H,D	Test Cable No. 7	6625–00–880–6095	
110	F,H,D	Test Cable No. 8	6625–00–880–6097	
111	F,H,D	Test Cable No. 9 Fabricate the following per DMWR 11–5820–401.	6625.–00–880–6152	
112	D	Test Cable No. 11		
113	D	Test Cable No. 12		
114	D	Test Cable No. 13		
115	D	Test Cable No. 14		
116	D	Test Cable No. 15		
117	D	Test Cable No. 16		
118	D	Test Cable No. 17		
119	D	Cable Assy, RF CG–409/U Series		
120	D	Cable Assy Special Purpose, Electrical CX–7059/VRC (5 ft)	5995–00–823–2865	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
121	D	Adapter UG–201/U	5935–00–259–0205	
122	D	Adapter UG–914	5935–00–250–4680	
123	D	Microphone M–80/GR	5965–00–179–7762	
124	D	Loudspeaker LS–454/U	5965–00–876–2375	
125	D	Attenuator CN–796/U	5985–00–087–2597	
126	D	Pin Extractor Tools (For P401–1 P351, etc.) P/N 098–0300–000 (Post Tool); P/N 115–0040–000 (Tip Tool) Viking Industries,Chatsworth,CA 91311		
127	D	PAD, 20 DB, 50–Ohm (Fabricate per DMWR 11–5820–401)		
128	D	Al 200 Test Card, TAD # (TAD: Tobyhanna Army Depot, PA)		
129	D	Al 400 Test Card, TAD #		
130	D	Torque Wrench: 0–36 oz in		
131	D	Torque Wrench: 0–75 oz in		
132	D	Tool Kit, Electronic Repairman	5180–00–532–9112	
NOTE REF CODES 133 THRU 200 DE-LETED				

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
		FIXTURES		
201	D	Intermediate Gear Train Alignment and Holding Fixture TAD#		
202	D	Heat Exchanger Alignment and Test Fixture TAD# AN/VRC–12–999–Head		
203	D	Al 000A (VHF Tuner) Alignment and Test Fixture TAD# AN/VRC–12–012		
204	D	A3000 (CRS Tray) Alignment and Test Fixture TAD# AN/VRC–12–007		
205	D	A4000 (RCVR IF Tray) Alignment and Test Fixture TAD# AN/VRC–12–003		
206	D	A5000 (RCVR Audio Amp) Alignment and Test Fixture TAD# AN/VRC–12–995		
207	D	A6000 (XMTR Master Osc–Buff) Alignment and Test Fixture TAD# AN/VRC–12–996		
208	D	A8000 (XMTR Modulator Tray) Alignment and Test Fixture TAD# AN/VRC–12–001		
209	D	VHF Tuner Module Fixtures: All00 – SM–D–324021, Modified A1200 – SM–D–324022, Modified Al300 – SM–D–324023, Modified A1400 – SM–D–324024, Modified A1500 – SM–D–323854, Modified Al600 – AN/VRC–12–882 Al600A (See DMWR 11–5820–401) A2000 (Reference Oscillator)		
210	D	Sundial Fixture, A2000A (See DMWR 11–5820–401) TAD# AN/VRC–12–024		
211	D	A2100 (Voltage Regulator Card) Test Fixture TAD# AN/VRC–12–896, A2100A (See DMWR 11–5820–401)		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO–TRANSMITTERS RT–246A/VRC, RT–524A/VRC AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP-MENT REF CODE	MAINT CATEGO-RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
212	D	CRS Module Fixtures: A3100 SM–D–323843, A3200 SM–D–323840, A3300 SM–D–323841, A3400 SM–D–323844, A3500 SM–D–323844, A3600 SM–D–323845, A3700 SM–D–323846		
213	D	IF Amplifier Module Fixtures: A4100 TAD# A4200 TAD# A4300 TAD#		
214	D	Audio Amplifier Module Fixtures: A5100 SM–D–323847, A5200 SM–D–323849, A5300 SM–D–323849, A5100A, A5200A, A5300A (See DMWR 11–5820–401)		
215	D	Master Oscillator – Buffer Amplifier Circuit Card Fixtures: A6300 SM–D–323860, A6400 SM–D–323861		
216	D	Transmitter Modulator Module Fix-tures: A8100 SM–D–323845, A8200 SM–D–323851, A8300 SM–D–323850, A8400 SM–D–323853, A8500 SM–D–323852		
217	D	A9000( ),/9400( ), A, Load Test Fixture TAD# AN/VRC–12–186		
218	D	A7000 (Autotuning) Fixtures: A7200 – TAD# AN/VRC–12–906		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO TRANSMITTERS RT–246A/VRC AND RT–524A/VRC, AND RADIO–RECEIVER R–442A/VRC (Cont)

TOOL/TEST EQUIP–MENT REF CODE	MAINT CATEGO–RY	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
219	D	RT–246A and RT–524A Control Assy Fixtures (Front Panel): Front Panel Panel Fixture, TAD#514 Microswitch Fixture, TAD#Final Overall Radio Test Fixture, TAD#AN/VRC–12–040		
220	D	R–442(*)/VRC Control Assy Fixtures		
221	D	Magnavox Fixture T–19454		
222	D	Magnavox Fixture T–19433		
223	D	Magnavox Fixture T–19162		

Section XV REMARKS

REFERENCE CODE	REMARKS
A	Operational check as part of system.
B	Bench test to determine source of fault.
C	Includes gear trains and wiring.
D	By replacement of modules, relays, and selected individual components.
E	These items appear without maintenance function or categories to provide for clarity and compatibility between this document and the RPSTL.
F	Alinement as part of the RT or RCVR. Includes replacement of cores, slugs, and locking strips.
G	Repair as part of the RT or RCVR by rewiring and/or replacement of hardware and components.
H	By replacement of selected subassemblies.
I	By replacement of connectors, conductors, relay sockets, etc.
J	By replacement of individual wire, cables, switch assembly, and selected components.
K	By replacement of modules, parent board assembly, and parent board assembly pins.
L	By replacement of parent board assembly, parent board pins, and connector.
M	By replacement of elements of chassis assembly and/or connector.
N	By replacement of parent board assembly.
O	By replacement of selected piece parts and assemblies.
P	For continuity and power transistor tests.
Q	By replacement of tube, switch, and attaching hardware.
R	By replacement of external compnents and bushings.
S	By replacement of attaching hardware and packing.

REMARKS (CONT)

REFERENCE CODE	REMARKS
T	By replacement of relays, external switches, knobs, packings, and attaching hardware.
U	By replacement of switch circuit boards, connectors, selected mechanical parts, and wiring.
V	By replacement of chassis, connectors, wiring, and circuit card.
W	When installed, to repair front panel damage.
X	"Plain" and "A" model assemblies are interchangeable.
Y	"Plain" and "A" model assemblies are physically and electrically interchangeable but require different adjustments.
Z	Interchangeable in pairs: A–5200A and A–5300A, or A–5200 and A–5300.
AA	Interchangeable in pairs: A–9000A and A–9400B, or A–9000 and A–9400, A9400A.
AB	Subassemblies are not directly interchangeable between "Plain " and 'A" models.
AC	Power transistors must be replaced as pairs.
AD	For replacement of entire cover assembly, use cover provided on RT–246, (80063) SM–D–414288,
AE	For replacement, unit will be assembled from subassemblies of this functional group.
AF	By replacement of knobs and lamps.
AG	When installed, handles are to remain installed during shipment to and from DS level.

Section XVI MAINTENANCE ALLOCATION CHART FOR ANTENNA AT–912/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	ANTENNA AT–912/VRC	Inspect	0.1					See Sect XVII	
		Install		0.5				1	
		Test		0.2				2 thru 5	
		Overhaul					1.0	6 thru 22	
01	ANTENNA ELEMENTS AT–1095/VRC, AT–1096/VRC	Replace		0.5					
		Repair					0.5		
02	ANTENNA MATCH–ING UNIT–BASE MX–2799/VRC	Install		0.5				1	
		Replace		0.5				1	
		Overhaul					2.0	6 thru 22	
03	BASE, ANTENNA SUPPORT AB–719/VRC	Install		0.1				1	
		Replace		0.2				1	
		Repair					0.5		

Section XVII TOOL AND TEST EQUIPMENT REQUIREMENTS FOR ANTENNA AT-912/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O	Test Set, Radio AN/PRM-34	6625-01-094-5646	
3	O	Meter, RF Power AN/URM-182 or URM-182A	6625-00-148-9371	
4	O	Multimeter TS-352B/U	6625-00-553-0142	
5	O	Multimeter AN/URM-105	6625-00-581-2036	
6	D	Multimeter ME-26B/U	6625-00-646-9409	
7	D	Digital Readout, Electronic Counter AN/USM-207	6625-00-911-6368	
8	D	Amplifier, Radio Frequency AM-3495/U	6625-00-985-8891	
9	D	Unit Oscillator: General Radio, Type 1211-B		
10	D	Unit Oscillator: General Radio, Type 1215-B (2 ea)		
11	D	Unit Regulated Power Supply: General Radio, Type 1201-A (2 ea)		
12	D	Unit IF Amplifier: General Radio, Type 1216-A		
13	D	Mixer-Rectifier: General Radio, Type 874-MR		
14	D	UHF Admittance Meter: General Radio, Type 1602-B		
15	D	Generator, Signal AN/USM-44	6625-00-539-9685	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR ANTENNA AT-912/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
16	D	Radio Interference Measuring Set AN/URM-85	6625-00-776-0595	
17	D	Power Supply PP-1104/G	6130-00-542-6385	
18	D	Receiver-Transmitter, Radio RT-524/VRC	5820-00-892-0622	
19	D	Wattmeter, Bird Model 614		
20	D	Ground Plane, 10 ft x 10 ft Sheet Capper 80 Screen Capper		
21	D	MX-2799/VRC Alinement Cover (Locally Fabricate: DMWR 11-5820-401-5)		
22	D	Adapter General Radio, GR 874-2BPA (2 ea)		
23	D	Termination, 50-Ohms, General Radio GR 1602-P4		
24	D	Switch Assembly (Locally Fabricate: DMWR 11-5820-401-4)		

Section XVIII MAINTENANCE ALLOCATION CHART FOR CONTROL, FREQUENCY SELECTOR C-2742/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
00	CONTROL, FREQUENCY SELECTOR C-2742/VRC	Inspect	0.10	0.10				(See Sect XIX)	(See Sect XX)
		Install		0.20					
		Test		0.10				1	
		Test			0.30			3,4	A
		Repair		0.1				2	B
		Repair			0.50				
		Overhaul					1.00	3,4	

Section XIX TOOL AND TEST EQUIPMENT REQUIREMENTS FOR CONTROL, FREQUENCY SELECTOR

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	F	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	
3	O,F,D	Multimeter TS-352B/U	6625-00-553-0142	
4	F,D	Power Supply PP-1104/U	6130-00-542-6385	

Section XX REMARKS (C-2742/VRC)

REFERENCE CODE	REMARKS
A	Operational test.
B	Repair by replacing knobs, indicator lens, lamp, receptacle covers, mounting hardware, and cover assembly.

Section XXI MAINTENANCE ALLOCATION CHART FOR CONTROL, RADIO SET C-2299/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	CONTROL, RADIO SET C-2299/VRC	Inspect	0.10	0.10				(See Sect XXII)	(See Sect XXIII)
		Install		0.20				1	
		Repair		0.20					A
		Repair			0.50			2	
		Test		0.10					B
		Test			0.50			3	
		Overhaul					1.00	4 thru 7	

Section XXII TOOL AND TEST EQUIPMENT REQUIREMENTS FOR CONTROLS, RADIO SET C-2299/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O,F	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	
3	F	Multimeter TS-352B/U	6625-00-553-0142	
4	D	Power Supply PP-1104/U	6130-00-542-6385	
5	D	Analyzer, Spectrum TS-723B/U	6625-00-668-9418	
6	D	Generator, Signal AN/URM-127	6625-00-783-5965	
7	D	Oscilloscope AN/USM-281A	6625-00-228-2201	

Section XXIII REMARKS (C-2299/VRC)

REFERENCE CODE	REMARKS
A	Repair by replacing knobs, receptacle covers, and mounting hardware.
B	Operational tests.

Section XXIV MAINTENANCE ALLOCATION CHART FOR MOUNTING MT-1029/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
00	MOUNTING MT-1029/VRC							(See Sect XXV)	
		Inspect		0.20					
		Install		0.50				1	
		Test		0.50				2	
		Repair			0.20			1,2	A
		Test			0.50			3	
		Repair			0.50			4	
		Overhaul					1.00	3,4	

Section XXV TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MOUNTING MT-1029/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O	Multimeter AN/URM-105	6625-00-581-2036	
3	O,F,D	Multimeter TS-352B/U	6625-00-553-0142	
4	F,D	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	

Section XXVI REMARKS (MT-1029/VRC)

REFERENCE CODE	REMARKS
A	Repair by replacing shock abosorbers and rewiring terminal board.

Section XXVII MAINTENANCE ALLOCATION CHART FOR MOUNTING MT-1898/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	MOUNTING MT-1898/VRC							(See Sect XXVIII)	
		Inspect		0.10					
		Install		0.50				1	
		Test		0.50				2	
		Repair						1,2	A
		Test			0.50			3	
		Repair			0.50			4	
		Overhaul					1.00	3,4	

Section XXVIII TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MOUNTING MT-1898/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O	Multimeter AN/URM-105	6625-00-581-2036	
3	O,F,D	Multimeter TS-352B/U	6625-00-553-0142	
4	F,D	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	

Section XXIX REMARKS (MT-1898/VRC)

REFERENCE CODE	REMARKS
A	Repair by replacing shock absorbers and rewiring terminal board.

Section XXX MAINTENANCE ALLOCATION CHART FOR INTERCOMMUNICATION SET AN/VIC-1

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
00	INTERCOMMUNICATION SET AN/VIC-1	Inspect	0.25						A
		Service	0.5						B
		Test		0.5				2	
		Install		0.5				1,2	C
		Repair		1.0					
01	AMPLIFIERS, AUDIO FREQUENCY AM-1780/VRC, AM-7046/VRC	Inspect	0.25						I
		Service	0.25						A
		Test		0.25				4 thru 11	B
		Test			1.0			4 thru 11	D
		Adjust			2.5			5 thru 8, 10	E
		Replace		0.25				2	F
		Repair		1.0				2 thru 8	F
		Repair			2.5			10,11,12	G
02	CONTROLS, INTERCOMMUNICATION SET C-2296/VRC, C-2297/VRC, C-2298/VRC, C-10456, C-10680	Inspect	0.1						
		Test	0.1						B
		Test			0.5			4 thru 19	D
		Service		0.1				2	A
		Repair		0.25				1,2	F
		Repair			1.5			3 thru 8 10,11,12	G
		Replace		0.5				2	

Section XXXI MAINTENANCE ALLOCATION CHART FOR AMPLIFIERS, AUDIO FREQUENCY AM-1780/VRC, AM-7046

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
01	AMPLIFIERS, AUDIO FREQUENCY AM-1780/VRC, AM-7046-VRC							(See Sect XXXIII)	(See Sect XXXIV)
		Inspect	0.1						
		Test		0.3				1	A
		Test			1.0			4 thru 8	A
		Test					1.3	4 thru 8	A
		Service		0.1				2	
		Adjust		0.5				4 thru 8	B
		Adjust					0.5	4 thru 8	
		Repair		0.8				2	C
		Repair			1.5			3	D
		Repair					2.0	3	
		Overhaul					3.0		
		Rebuild					4.0		

Section XXXII MAINTENANCE ALLOCATION CHART FOR CONTROLS, INTERCOM SET C-2296/VRC, C-2297/VRC, C-2298/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	INTERCOMMUNI-CATIONS SET AN/VIC-1(V)	Inspect	0.25						
		Service	0.5						A
		Test		0.5					B
		Install		0.5				2	
		Repair		1.0				1,2	C
01	AMPLIFIER, AUDIO FREQUENCY AM-1780/VRC AND AM-7046/VRC	Inspect	0.25						I
		Service	0.25						A
		Test		0.25				4 thru 11	B
		Test			1.0			4 thru 11	D
		Adjust			0.5			5 thru 8, 10	E
		Replace		0.25				2	
		Repair		1.0				2	F
		Repair			2.5			3 thru 8, 10,11,12	G
02	CONTROL, INTER-COMMUNICATIONS SET C-2296/VRC	Inspect	0.1						
		Test	0.1						B
		Test			0.5			4 thru 19	D
		Service		0.1				2	A
		Repair		0.25				1,2	F
		Repair			1.5			3 thru 8, 10,11,12	G
		Replace		0.5				2	
03	CONTROL, INTER-COMMUNICATIONS SET C-2297/VRC	Inspect	0.1						
		Test	0.1						B
		Test			0.5			4 thru 12	D
		Service		0.1				2	A
		Repair		0.25				1,2	F
		Repair			1.5			3 thru 8, 10,11,12	G
		Replace		0.25				2	

MAINTENANCE ALLOCATION CHART FOR CONTROLS, INTERCOM SET C-2296/VRC, C-2297/VRC, C-2298/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
04	CONTROL, INTER-COMMUNICATIONS SET C-2298/VRC, C-10456/VRC AND C-10680/VRC	Inspect	0.1						H
		Test	0.1						B
		Test			0.5			4 thru 8, 10 thru 19	D
		Service		0.1				2	
		Repair		0.25				1,2	F
		Repair			1.5			3 thru 8, 10,11,12	G
		Replace		0.25				2	

Section XXXIII TOOL AND TEST EQUIPMENT REQUIREMENTS FOR INTERCOMMUNICATION SET AN/VIC-1

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Multimeter, AN/URM-105	6625-00-581-2036	
2	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
3	F	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	
4	F	Multimeter TS-352B/U	6625-00-999-7465	
5	F	Power Supply PP-1104/G	6130-00-542-6385	
6	F	Signal Generator AN/URM-127	6625-00-783-5965	
7	F	Spectrum Analyzer TS-723/U	6625-00-668-9918	
8	F	Voltmeter, Electronic ME-30/U	6625-00-643-1670	
9	F	Oscilloscope AN/USM-281A	6625-00-228-2201	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR INTERCOMMUNICATION SET AN/VIC-1 (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
10	F	Test Cable Number 1	6625-00-880-6149	
11	F	Test Cable Number 2	6625-00-880-5209	
12	F	Cable Assembly CG-1471/U (3 ft)	6625-00-880-6081	
13	F	Test Box (Locally Fabricated)		
14	F	Receiver-Transmitter, Radio RT-524/VRC	5820-00-892-0622	
15	F	Mounting MT-1029/VRC	5820-00-893-1323	
16	F	RF Wattmeter AN/URM-120	6625-00-813-8340	
17	F	Control, Intercommunication C-2297/VRC	5820-00-892-3338	
18	F	Cable Assembly, Special Purpose, Electrical CS-4723/VRC (5 ft)	5995-00-823-2883	
19	F	Cable Assembly, Power Electrical CX-4720/VRC (10 ft)	5995-00-823-2726	

Section XXXIV REMARKS

REFERENCE CODE	REMARKS
A	Preventive maintenance.
B	Operational test.
C	Major component or cable replacement.
D	All tests.
E	Inter phone amplifier.
F	Replace lamp, knobs, covers.
G	All repairs.
H	C-10456/VRC, C-10680/VRC are modified C-2298/VRC.
I	AM-7046/VRC is a modified AM-1780/VRC.

Section XXXV MAINTENANCE ALLOCATION CHART FOR MX-7778/GRC SUPPRESSOR ELECTRICAL

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	SUPPRESSOR, ELECTRICAL TRANSIENT MX-7778/GRC	Inspect		0.1					A
		Service		0.25					B
		Install		1.0				3	
		Replace		0.5				3	
		Test			0.5			1,2	
		Repair			1.0			4,5	
01	CABLE ASSEMBLY SPECIAL PURPOSE CX-10613/G	Inspect		0.1					A
		Replace		0.25					
		Repair			0.5			4,5	C
02	SUPPRESSOR, ELECTRICAL TRANSIENT MX-7777A/GRC	Inspect		0.1					A
		Service		0.25					B
		Replace		0.5				3	
		Test			0.5			1,2	
		Repair			1.0			4,5	D
		Repair				1.5		1,4,5	D
		Overhaul					1.5	4,5,6	

Section XXXVI TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MX-7778/GRC SUPPRESSOR ELECTRICAL

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F,H,D	Power Supply PP-1104C/G	6130-00-542-6385	
2	F,H,D	Multimeter ME-26/U	6625-00-360-2493	
3	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
4	F,H,D	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	
5	F,H,D	Tool Kit, Electronic Equipment TK-105/G	5180-00-610-8177	
6	D	Power Supply (100 VDC and 100 Amperes Capacity)		

Section XXXVII REMARKS
(MX-7778/GRC SUPPRESSOR ELECTRICAL)

REFERENCE CODE	REMARKS
A	Visual.
B	Clean, touchup paint.
C	Connectors only.
D	By parts replacement.

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I INTRODUCTION

C-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/VRC-12 series radios and AN/VIC-1 intercom set.

These items are authorized to you by CTA 50-970, Expendable Items (except medical, class V, repair parts, and heraldic items).

C-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 1, appendix E).

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

C - Operator/Crew
O - Organizational

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 Federal Supply Code for Manufacturer (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 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 NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION (FSCM)	(5) U/M
1	C	6850-00-880-7616	Silicone Compound	tube (8 oz)
2	C	9505-00-293-4208	Wire, Nonelectrical (Safety Wire)	lb
3	O	5970-00-816-6056	Insulation Tape, Electrical, Plastic	ft
4	O	7510-00-290-8036	Pressure Sensitive Tape, Filament Reinforced	yd (60)
5	C	6850-00-105-3084	Cleaning Compound, Freon TF (Trichlorotrifluoroethane)	oz (16)
6	O	6850-00-984-5853	Cleaning Compound, Freon PCA (Trichlorotrifluoroethane)	gal. (5)

GLOSSARY

Section I ABBREVIATIONS

ant	antenna
ant cont	antenna connection
aux	auxiliary
chan sel	channel select
ckt-brk	circuit breaker
cvc	combat vehicle crewmember (helmet)
dc	direct current
fm	frequency modulated
hi	high
Hz	hertz
int	intercom
kc	kilocycles
kHz	kilohertz
lo	low
mc	megacycles
MHz	megahertz
pwr	power
rad trans	radio transmission
retrans	retransmission
rf	radio frequency
RT	radio transmitter
rw	radio wire
rwi	radio wire integration
spkr	speaker
sw	switch
vdc	voltage direct current
VRC	vehicle radio communications

Section II DEFINITION OF UNUSUAL TERMS

COMMUNICATION SYSTEM. Equipment installed in a vehicle which permits communication to a station distant from the vehicle and also between crewmembers within the vehicle.

CONFIGURATION. A combination of AN/VRC-12 Radio Set components and/or AN/VIC-1 Intercom Set components installed in a specific vehicle.

CONTROLLED AUDIO. A received audio signal that is not amplified by the Interphone Amplifier A-250 of the AM-1780/VRC.

CONTROL BOX. A component located remotely from the RT which can be used to control communication and may provide a connector for audio accessories.

DEMODULATION. The process in a receiver of removing a carrier frequency from the audio signal so that the audio signal remains.

DUPLEX. Mode of radio operation in which both reception and transmission can be performed at the same time.

DEFINITION OF UNUSUAL TERMS (CONT)

FIXED AUDIO. A received audio signal which is amplified by the Interphone Amplifier A250 of the AM-1780/VRC.

FORWARD POWER. The strength of an rf signal from a transmitter radiated by its antenna.

FREQUENCY MODULATION. A type of radio transmission in which the frequency of an rf carrier wave is varied in accordance with a modulating signal while the amplitude of the carrier wave remains constant.

IMPEDANCE. The opposition of a circuit to the flow of alternating current, measured in ohms.

INTERCOM ACCENT. Lowering of the volume of a fixed audio signal so that the audio level of the intercom set is higher (louder) than the audio level of the radio set.

INTERCOM SET. Any configuration of components installed in a vehicle which provides communication between crewmembers in the vehicle.

MATCHING UNIT. A component of an RT antenna system which electrically matches the impedance of the antenna to the frequency at which the RT is tuned so that the antenna may radiate the rf signal with the greatest efficiency. May also be used to physically mount the antenna elements.

MODULATION. The process of varying some characteristic, such as the frequency, of a continuous wave (carrier) in accordance with a modulating signal such as an audio signal.

MUTING. Reduction of speaker output (loudness) to prevent acoustic feedback to an audio accessory microphone.

OPERATIONAL CHECK. A test or series of tests of a communication system which checks the performance of the communication system and its components under controlled operating conditions to determine combat readiness of the system.

ORIENTATION. Positioning of connected cables so that they do not interfere with other cables or crewmember activity.

RADIO SET. Any configuration of components installed in a vehicle which provide communication to a station distant from the vehicle.

REFLECTED POWER. The strength of an incoming rf signal passed by a receiver antenna to the receiver.

REMOTE CONTROL. The operation of the communication system by remotely located components of the system.

RETRANSMISSION. The arrangement of two radio sets connected together to provide automatic retransmission of signals between two radios that are too far apart to communicate directly with each other.

ROUTING. Path taken by cables to interconnect a communications system within a vehicle.

SIDETONE. The sound of user's own voice heard in earphone or loudspeaker while speaking into microphone.

DEFINITION OF UNUSUAL TERMS (CONT)

SIMPLEX. Mode of radio set operation in which either transmission or reception only is performed at any one time.

SQUELCH. A receiver circuit which automatically turns the sound off when no antenna signal is present and turns it on when an antenna signal is present.

X-MODE. A mode of operation which provides for secure communication between stations.

*. Symbol when basic model number refers to all models of the equipment.

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		FO3		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

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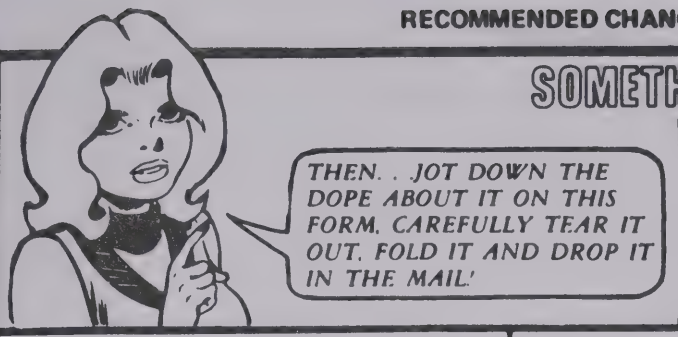
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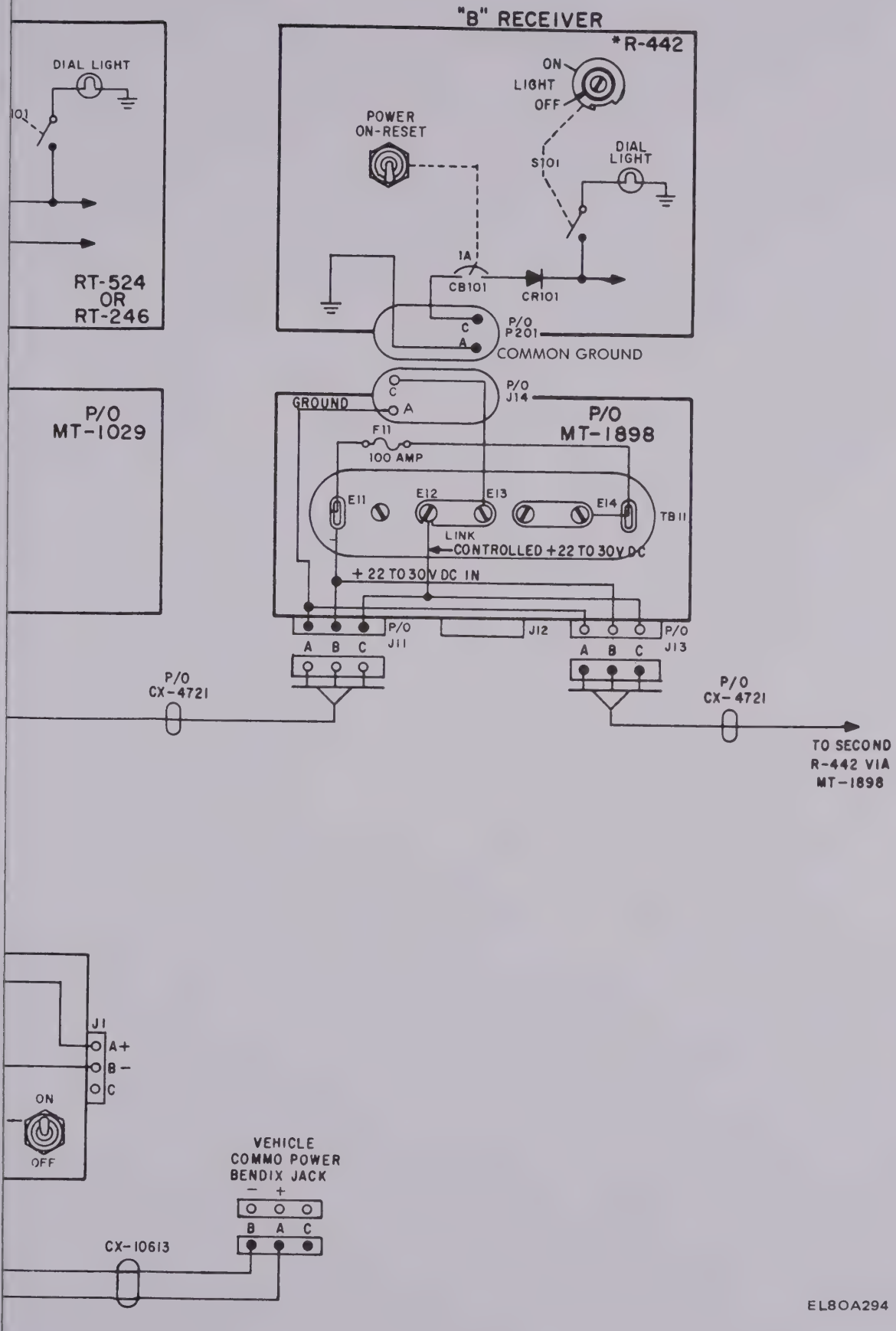
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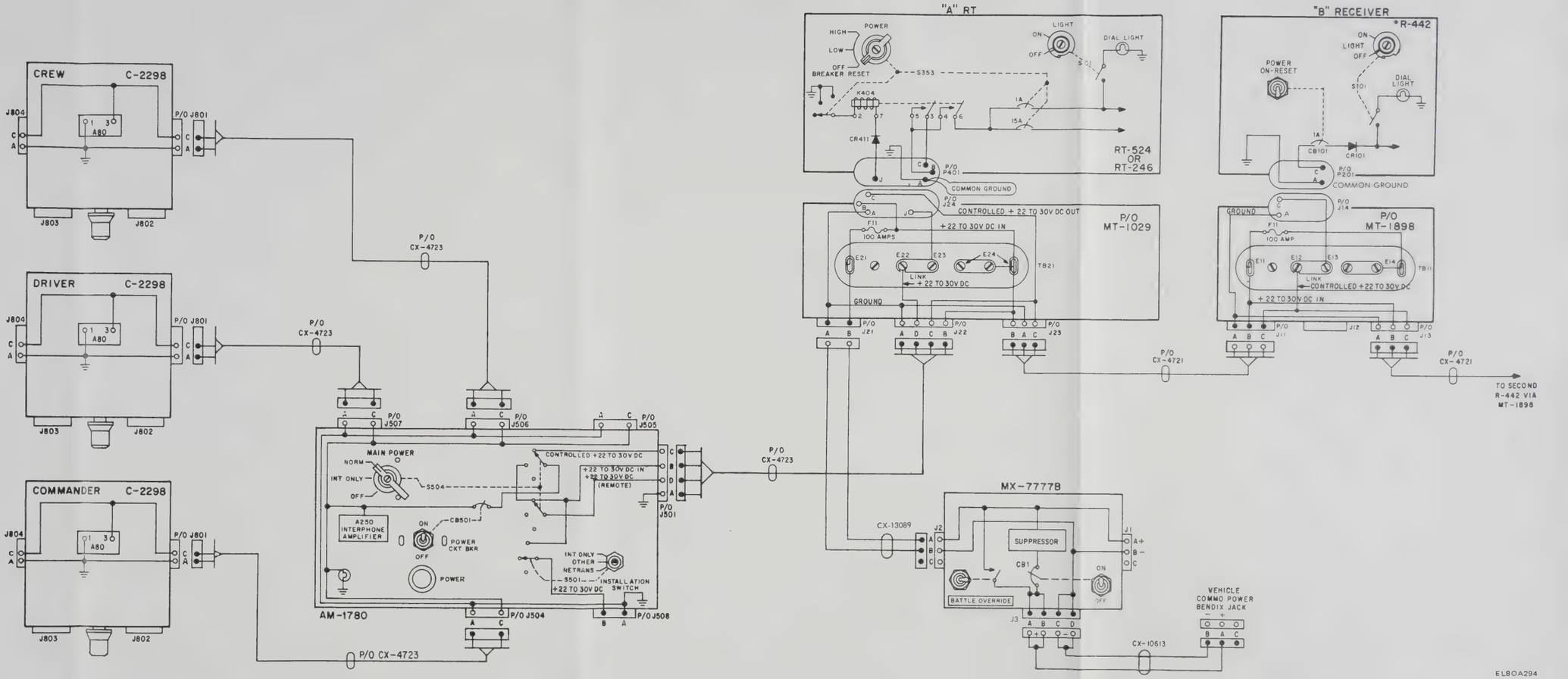
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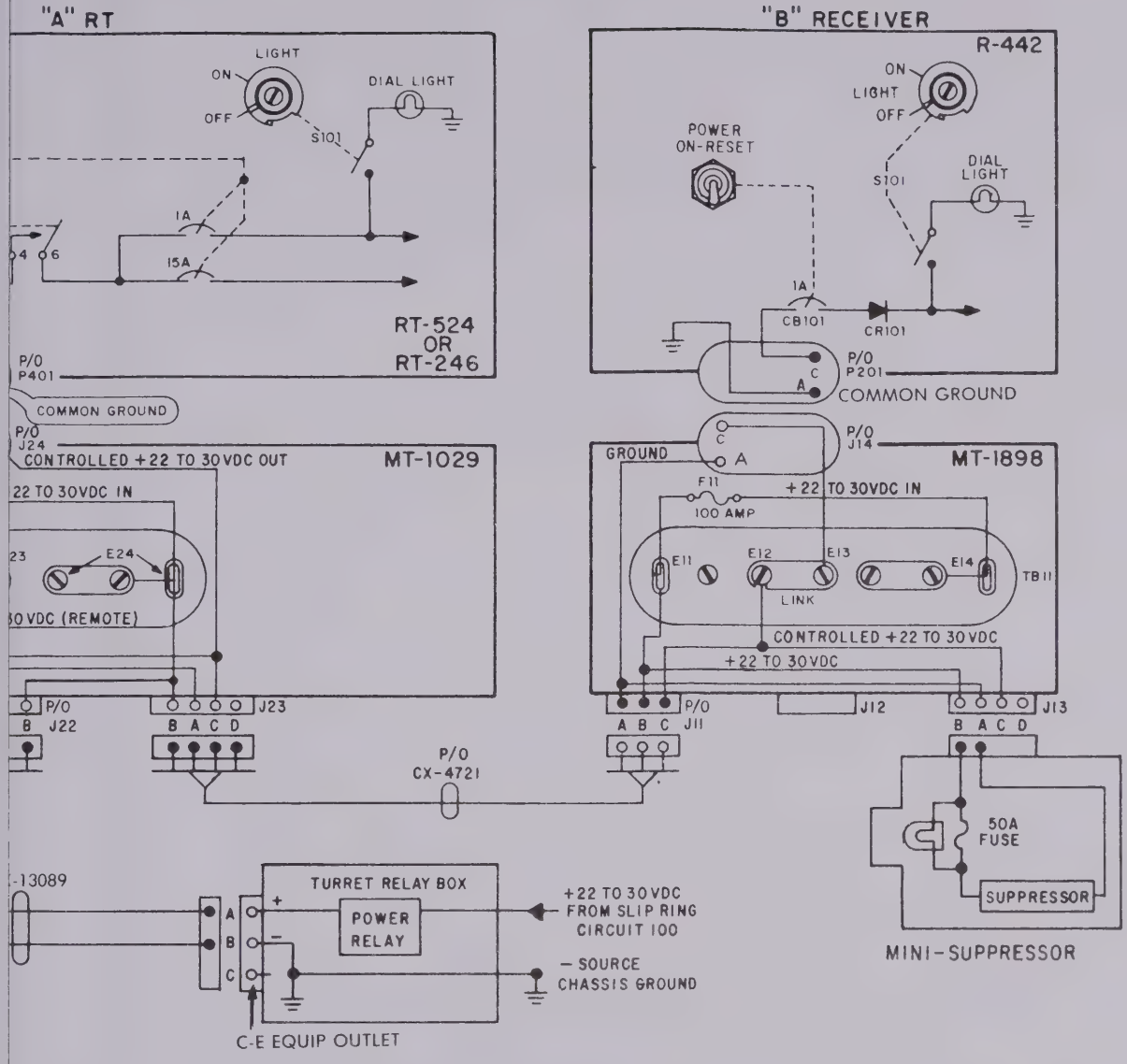
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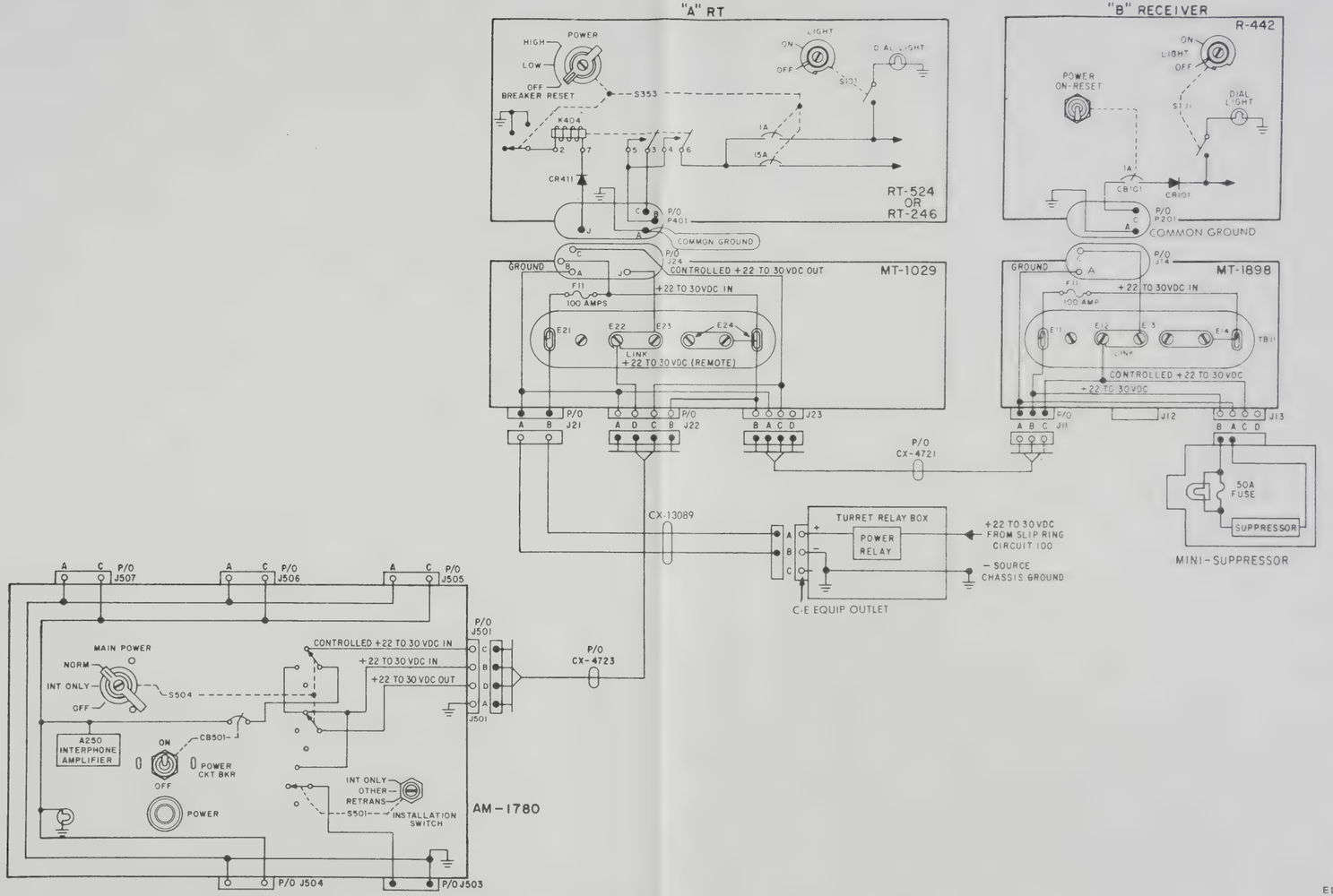


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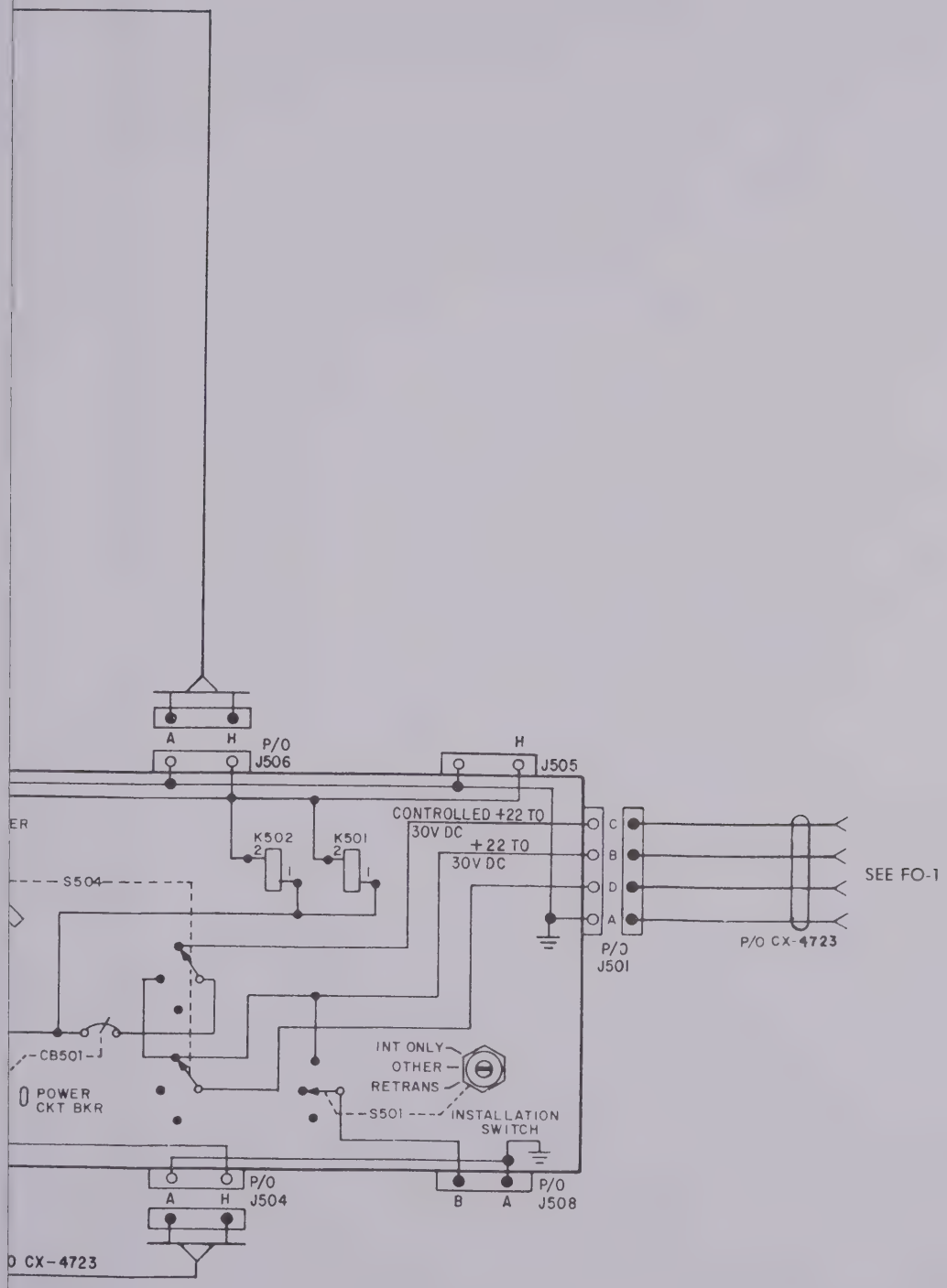
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FO-2. Tank DC Power Input with Mini-Suppressor



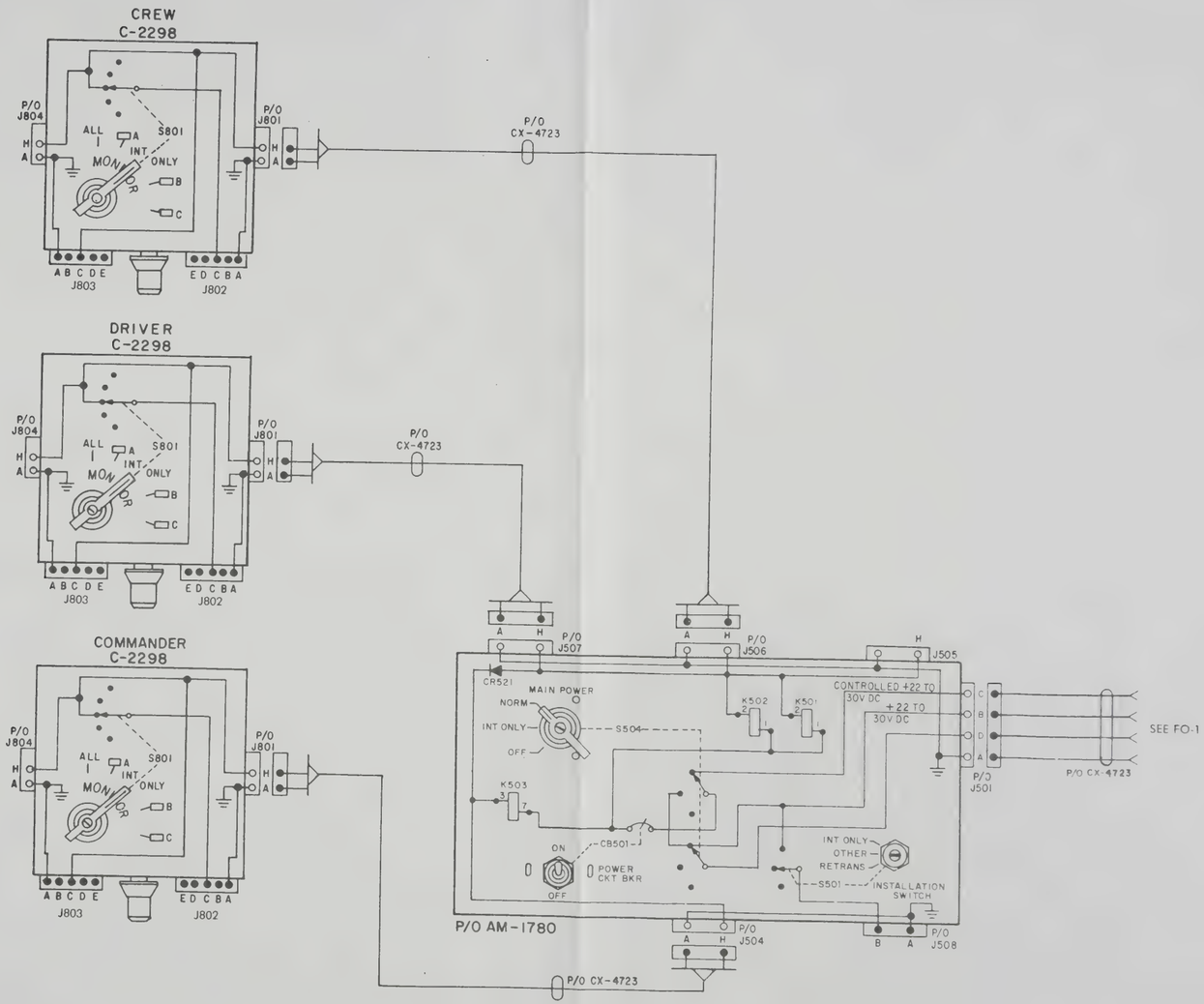
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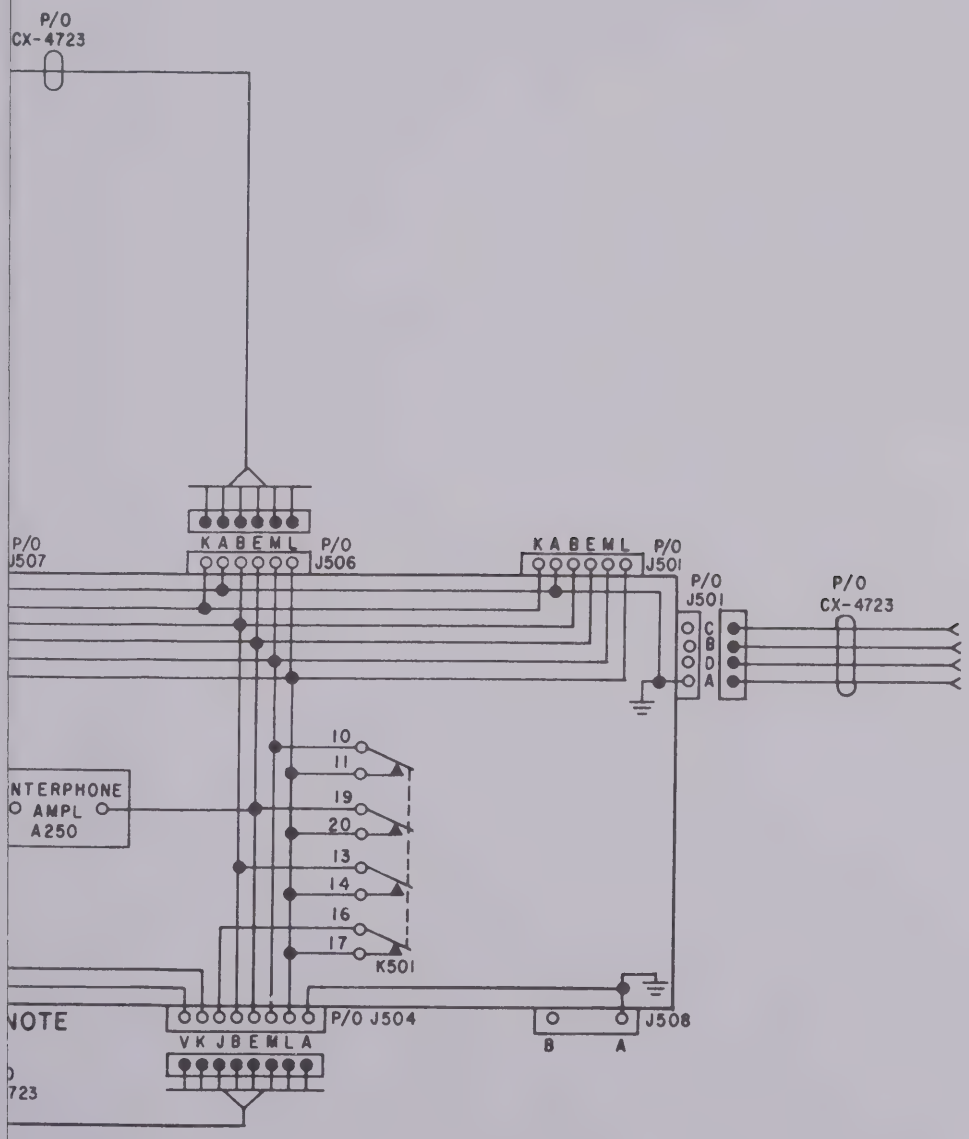
FO-3. Intercom Keying



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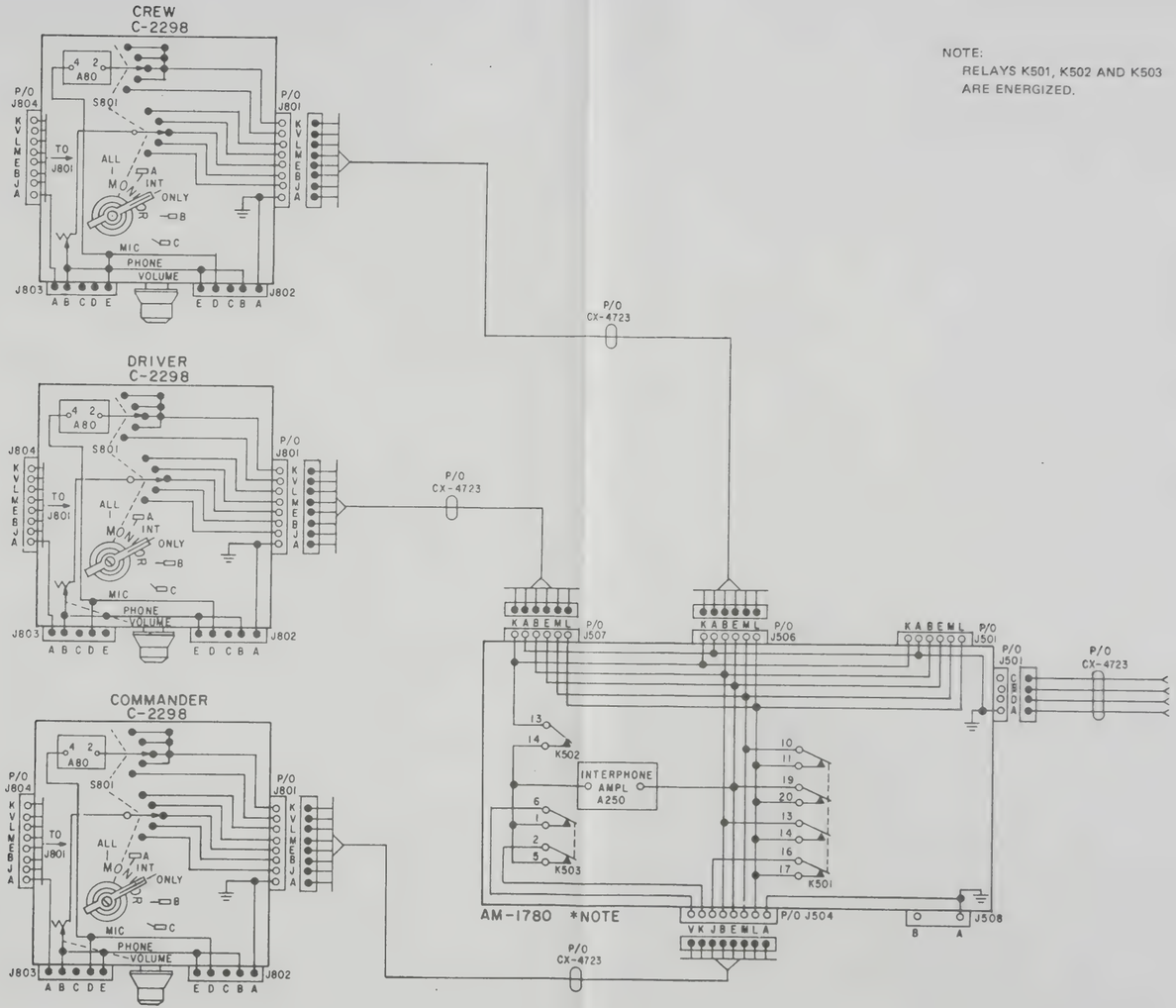
FO-3. Intercom Keying

NOTE:
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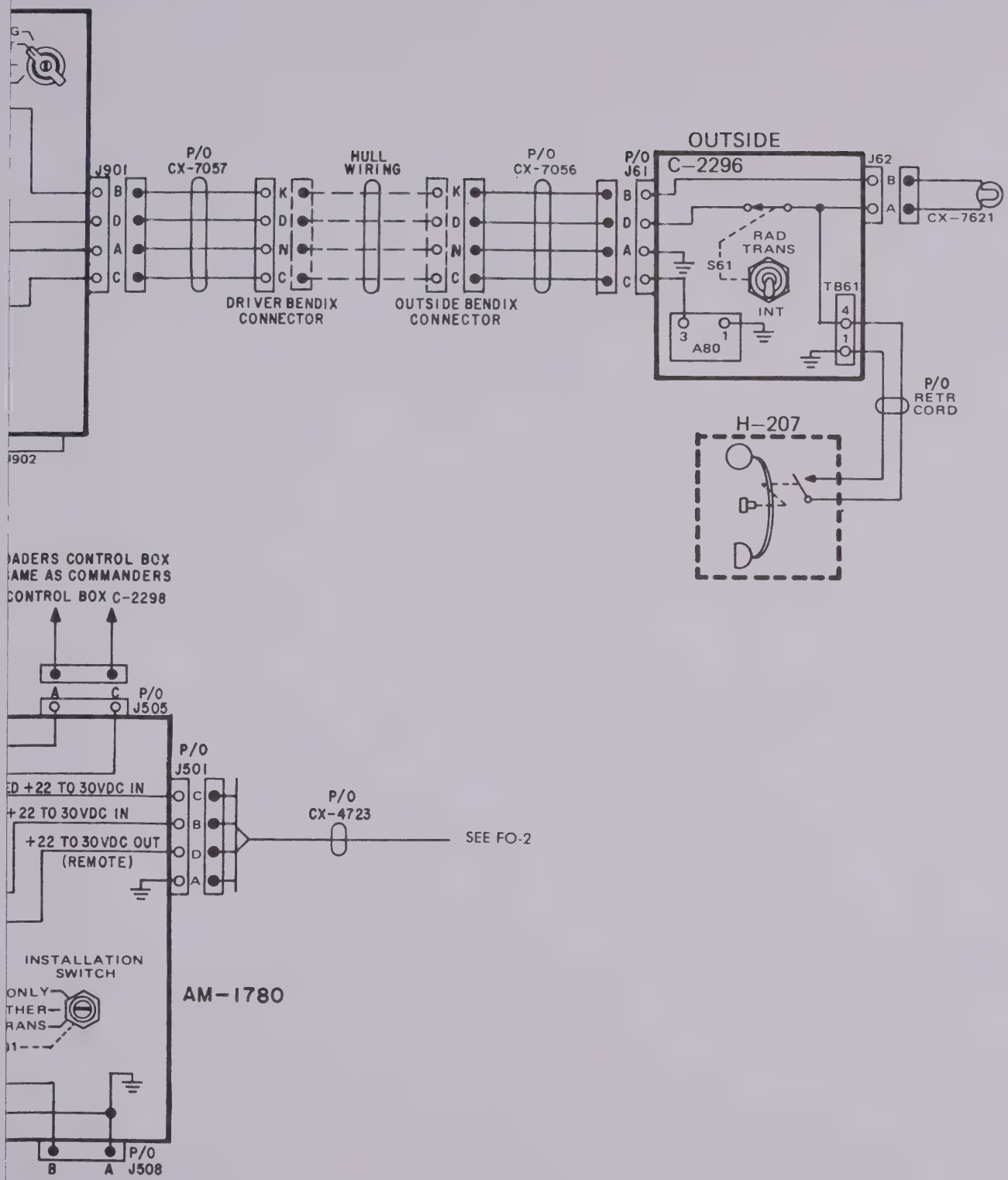
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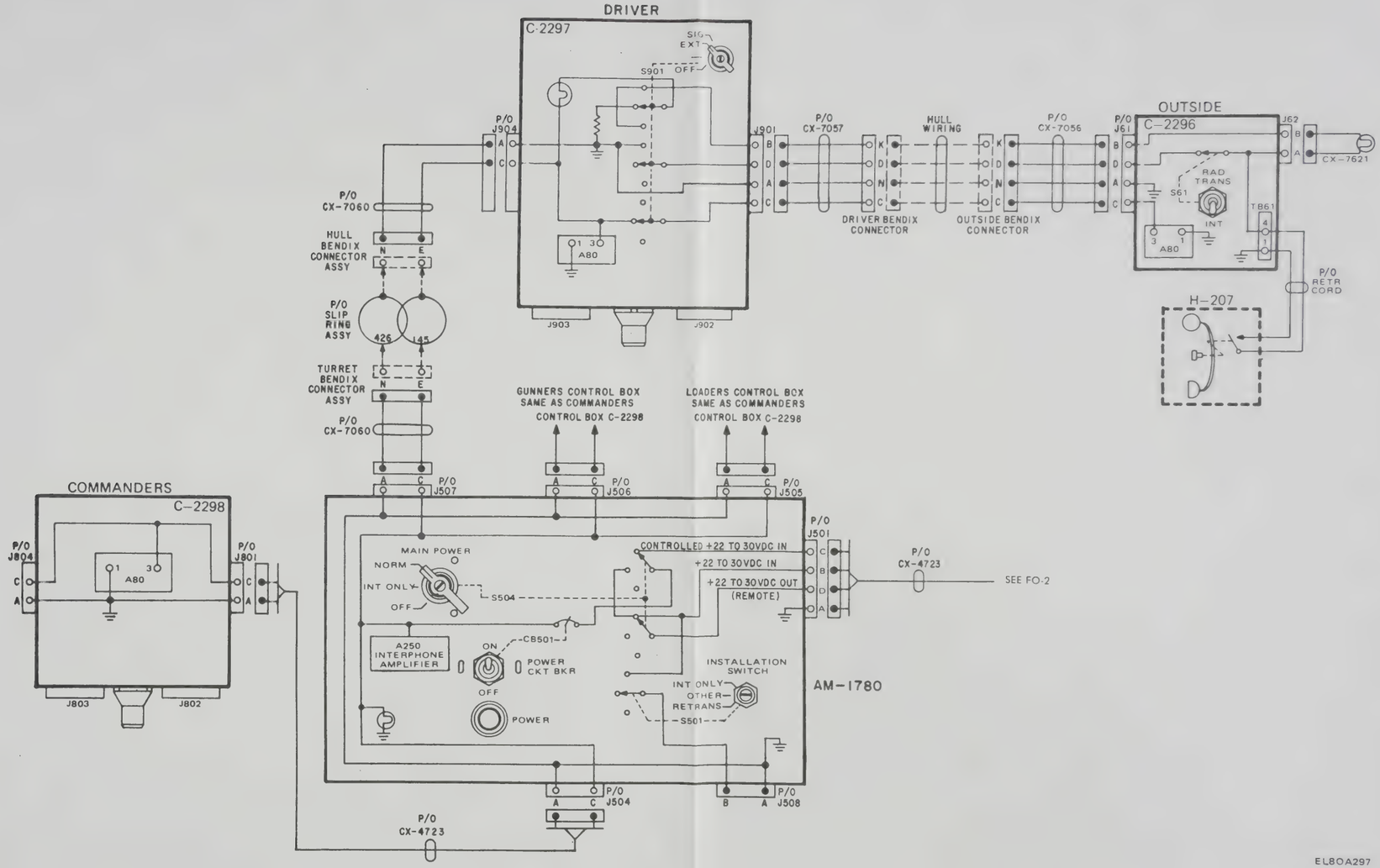
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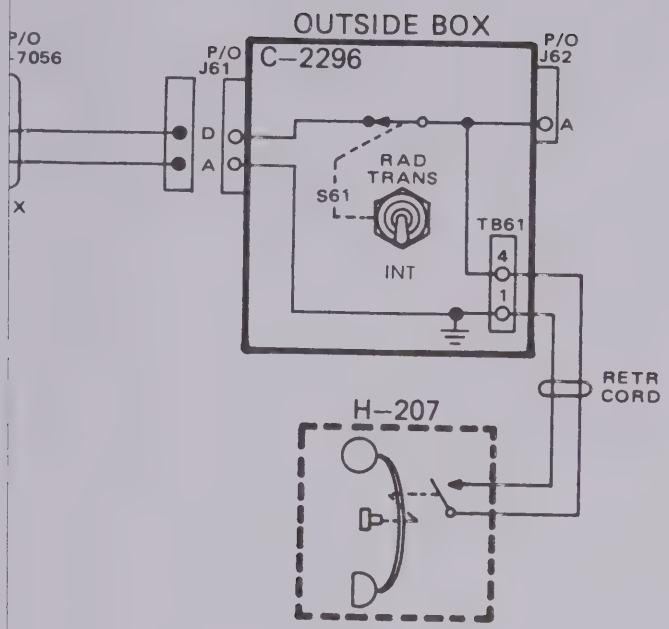


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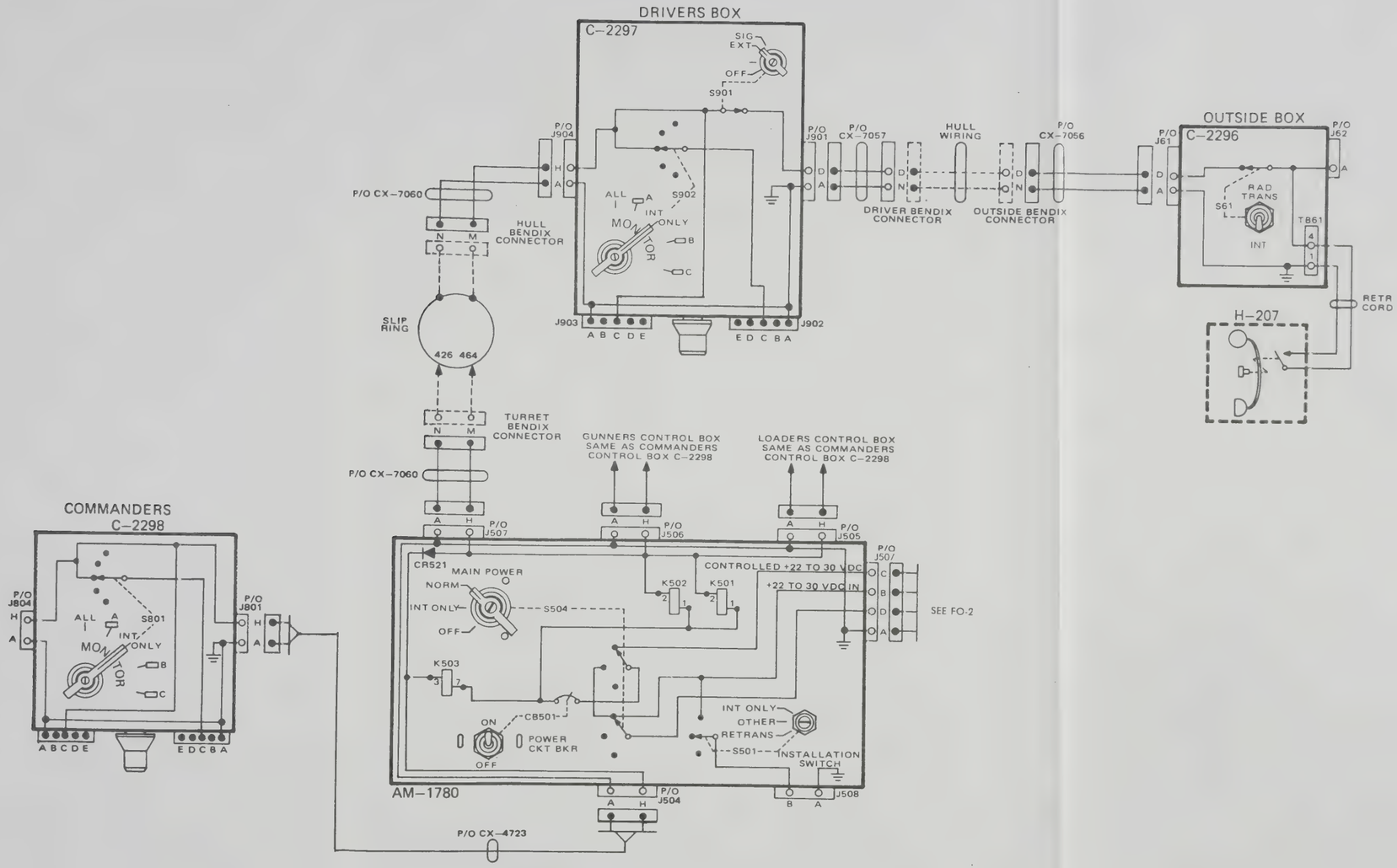


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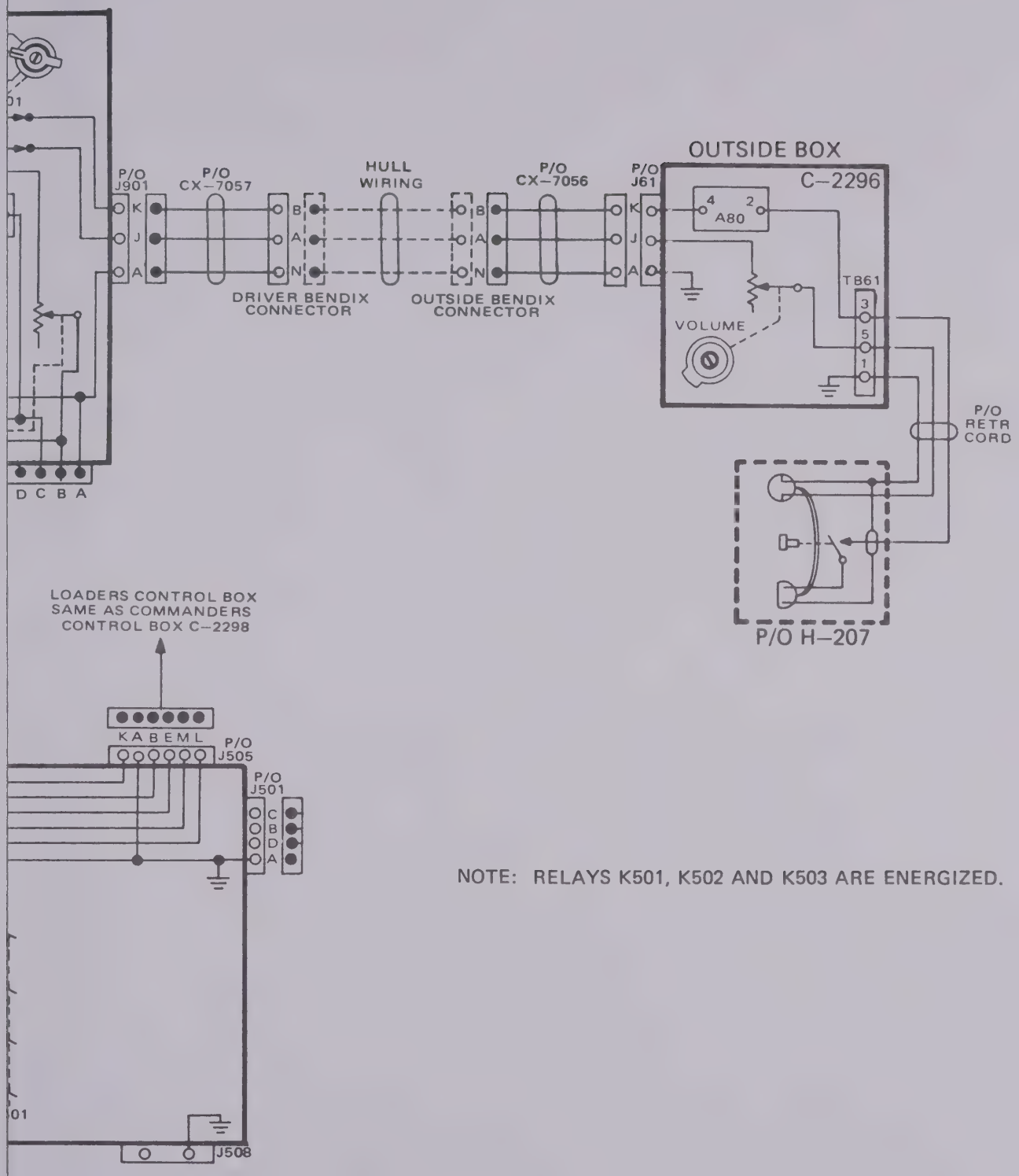
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FO-6. Tank Intercom Keying



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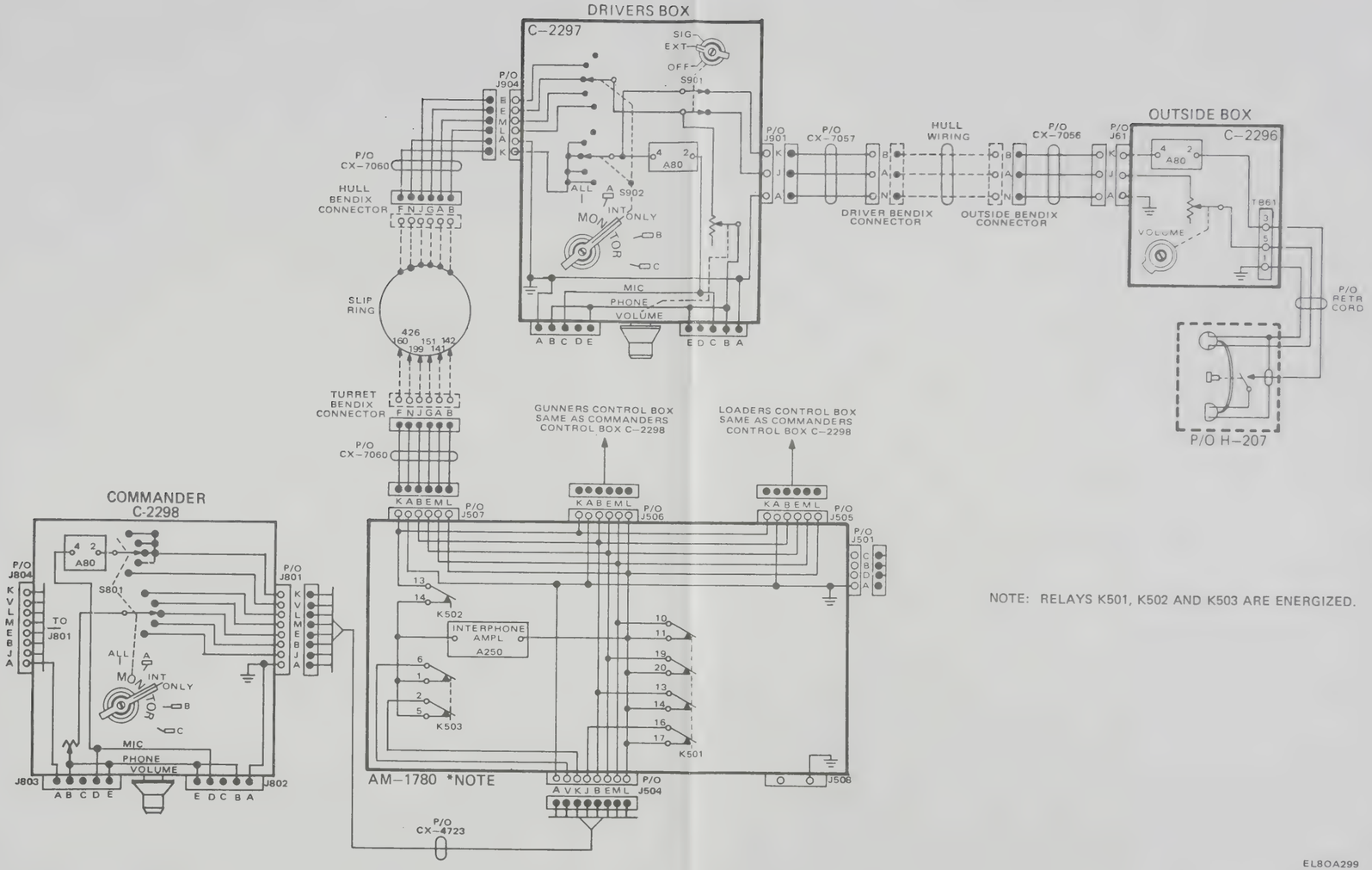
FO-6. *Tank Intercom Keying*



NOTE: RELAYS K501, K502 AND K503 ARE ENERGIZED.

EL8OA299

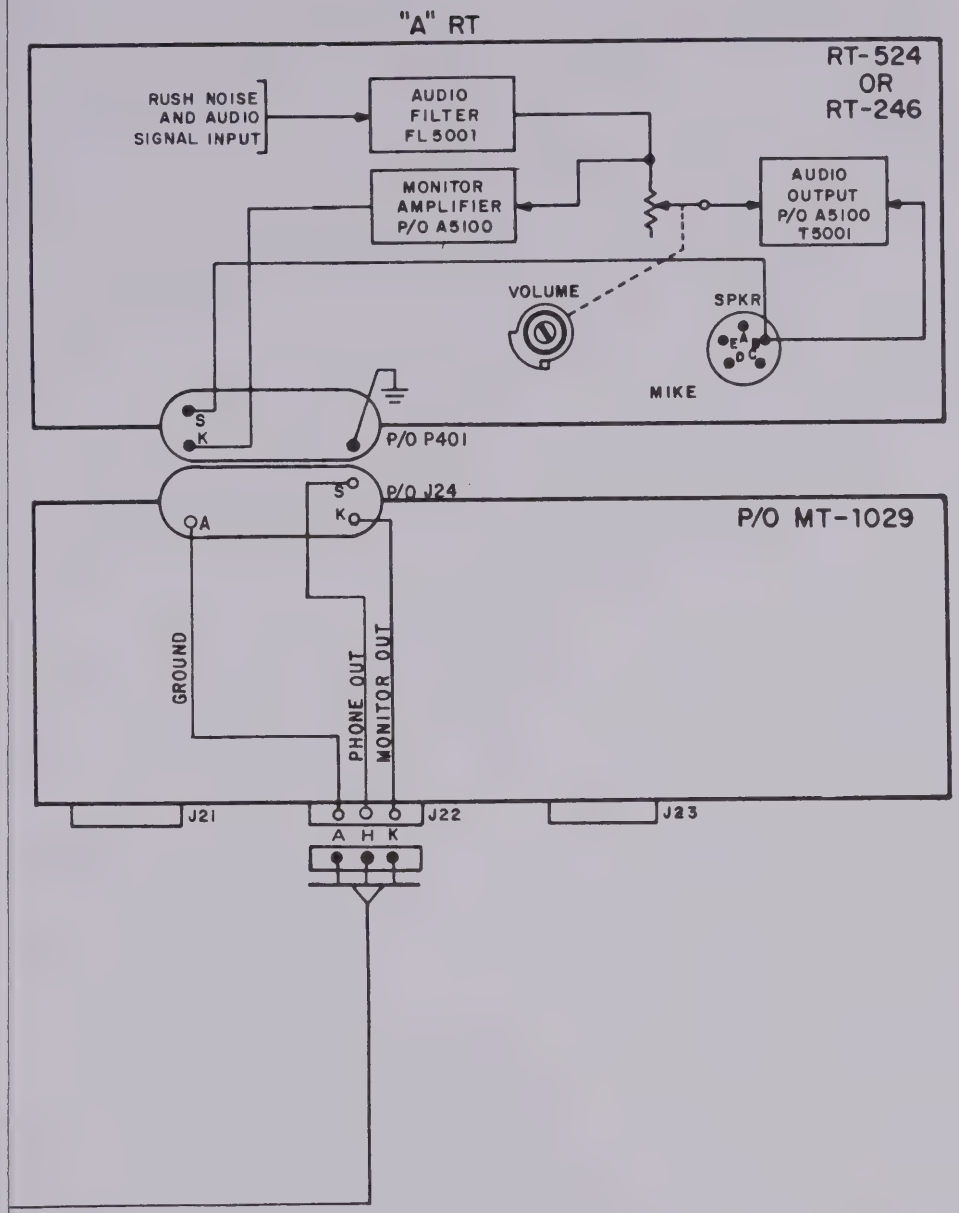
FO-7. Tank Intercom Talk/Listen



NOTE: RELAYS K501, K502 AND K503 ARE ENERGIZED.

EL80A299

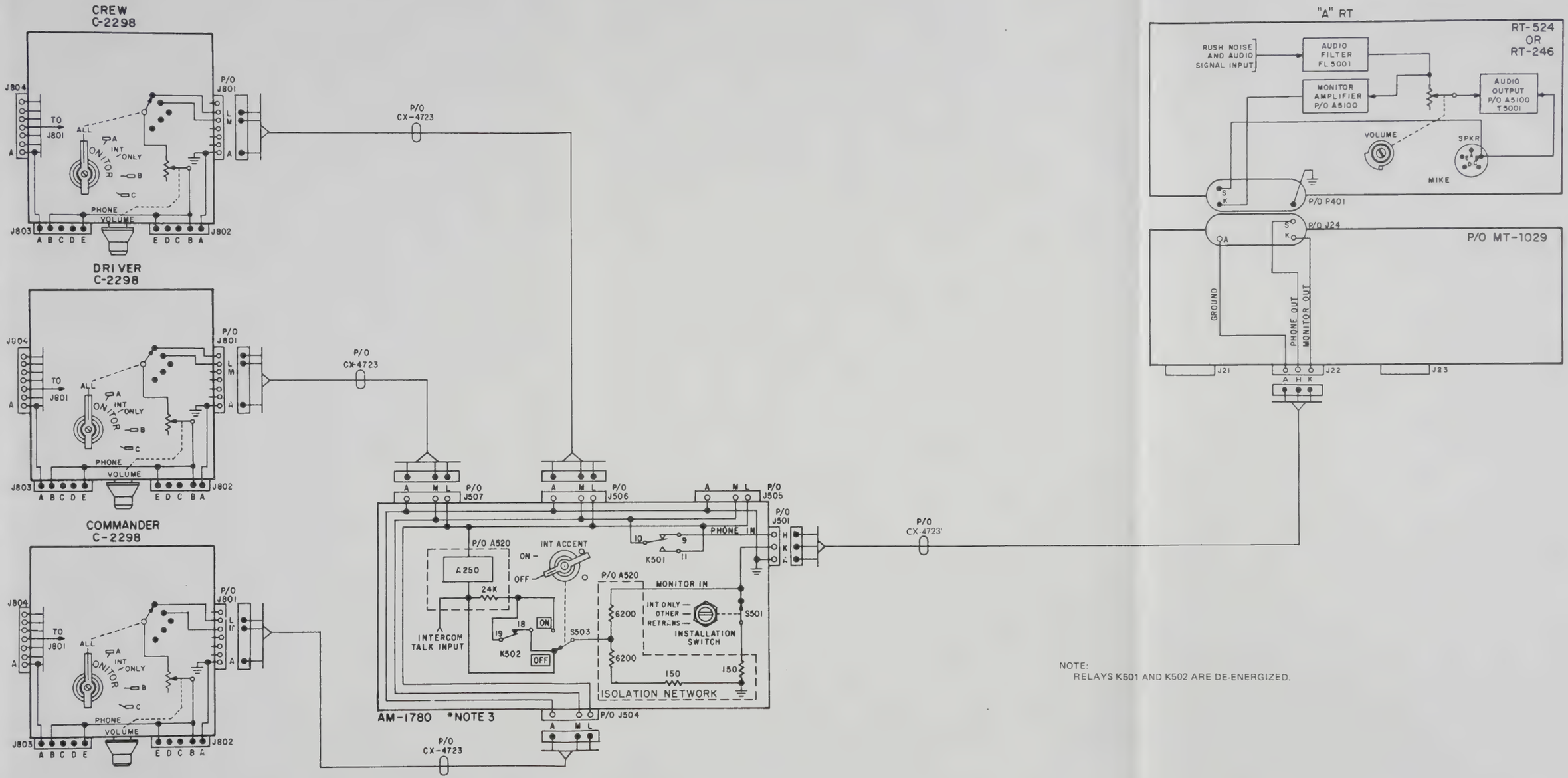
FO-7. Tank Intercom Talk/Listen



AND K502 ARE DE-ENERGIZED.

EL8OA3

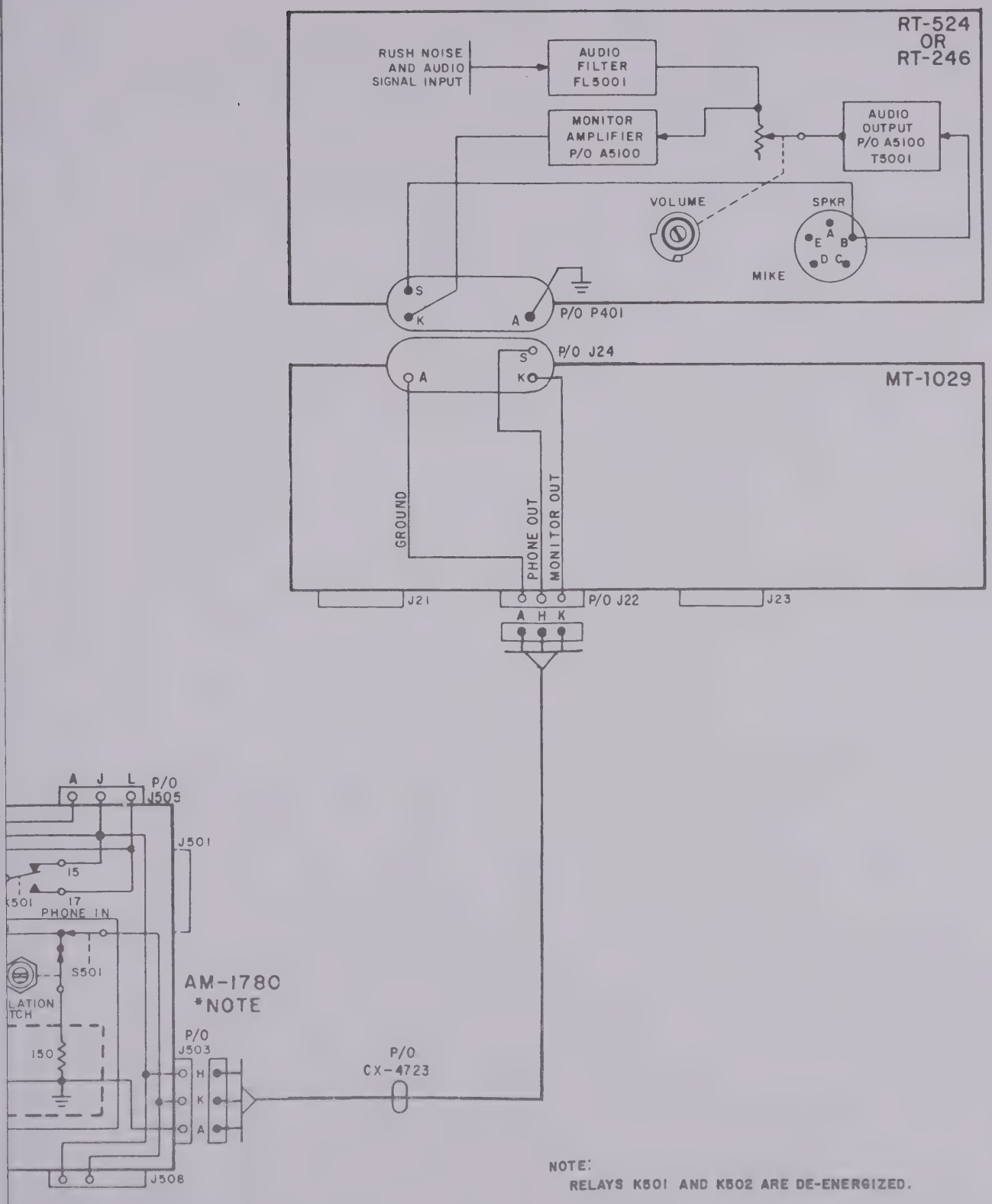
FO-8. "A" RT Monitoring



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL8OA3

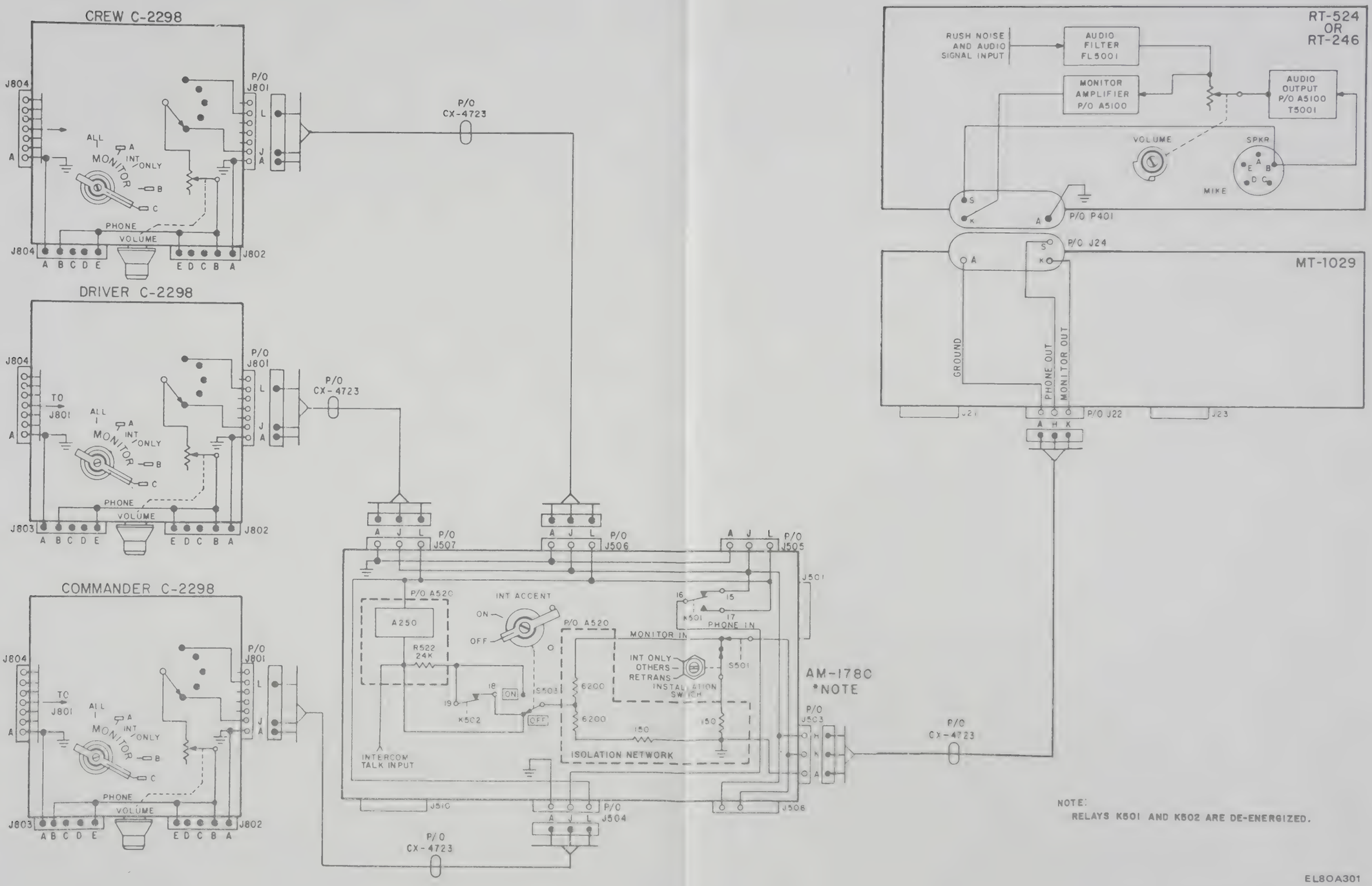
FO-8. "A" RT Monitoring



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL8OA301

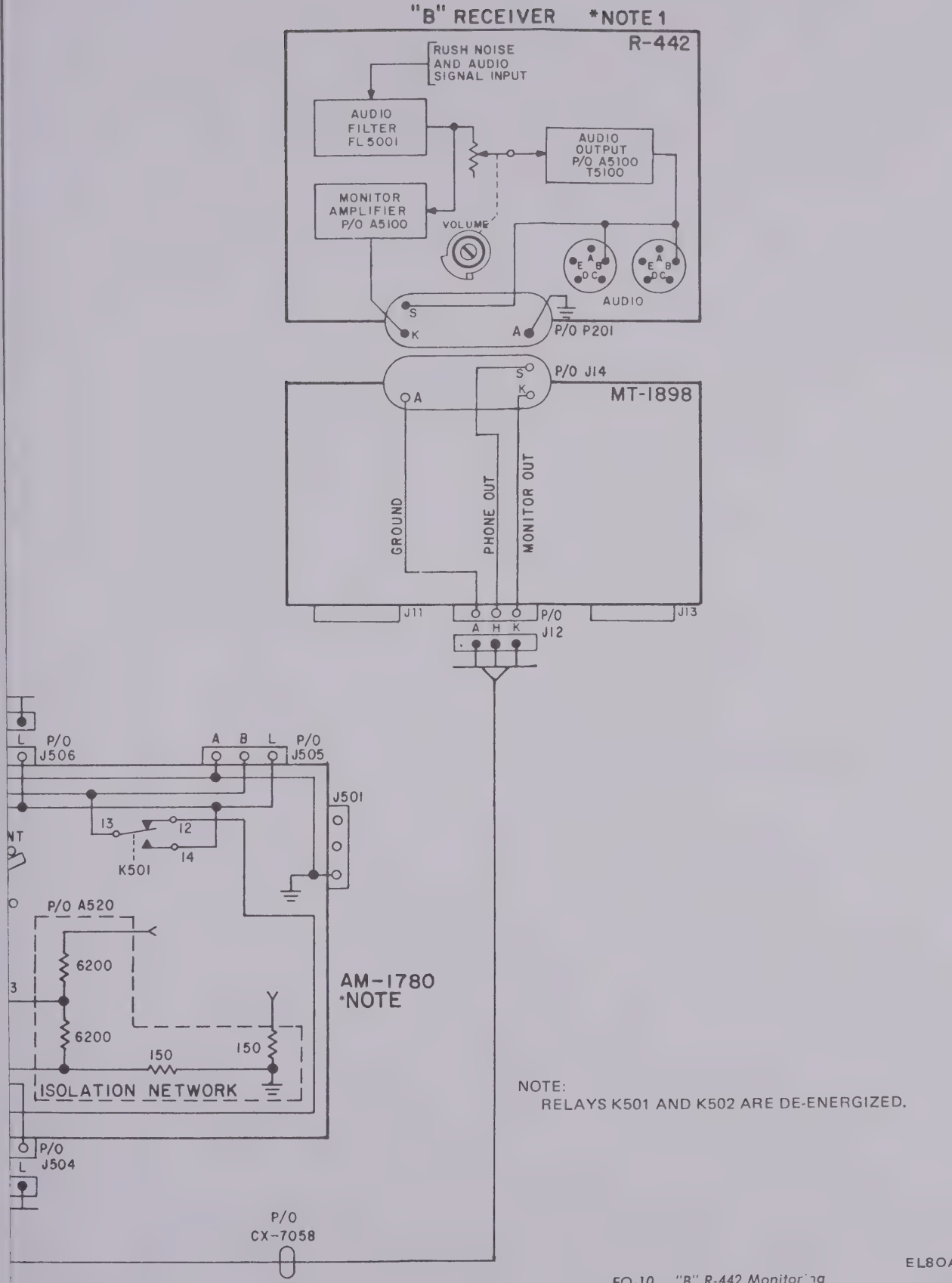
FO-9. "C" RT Monitoring



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL80A301

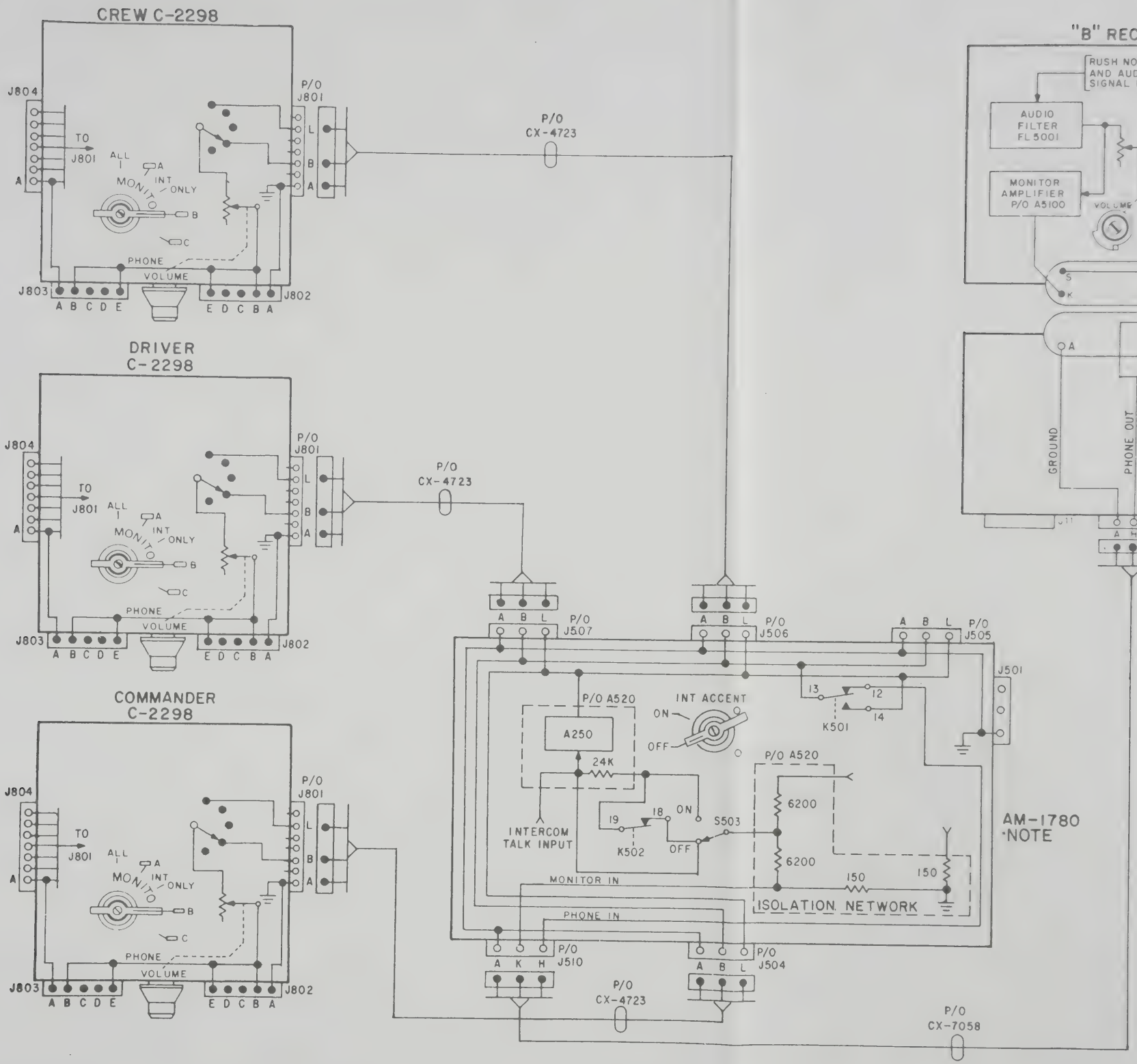
FO-9. "C" RT Monitoring



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL8OA302

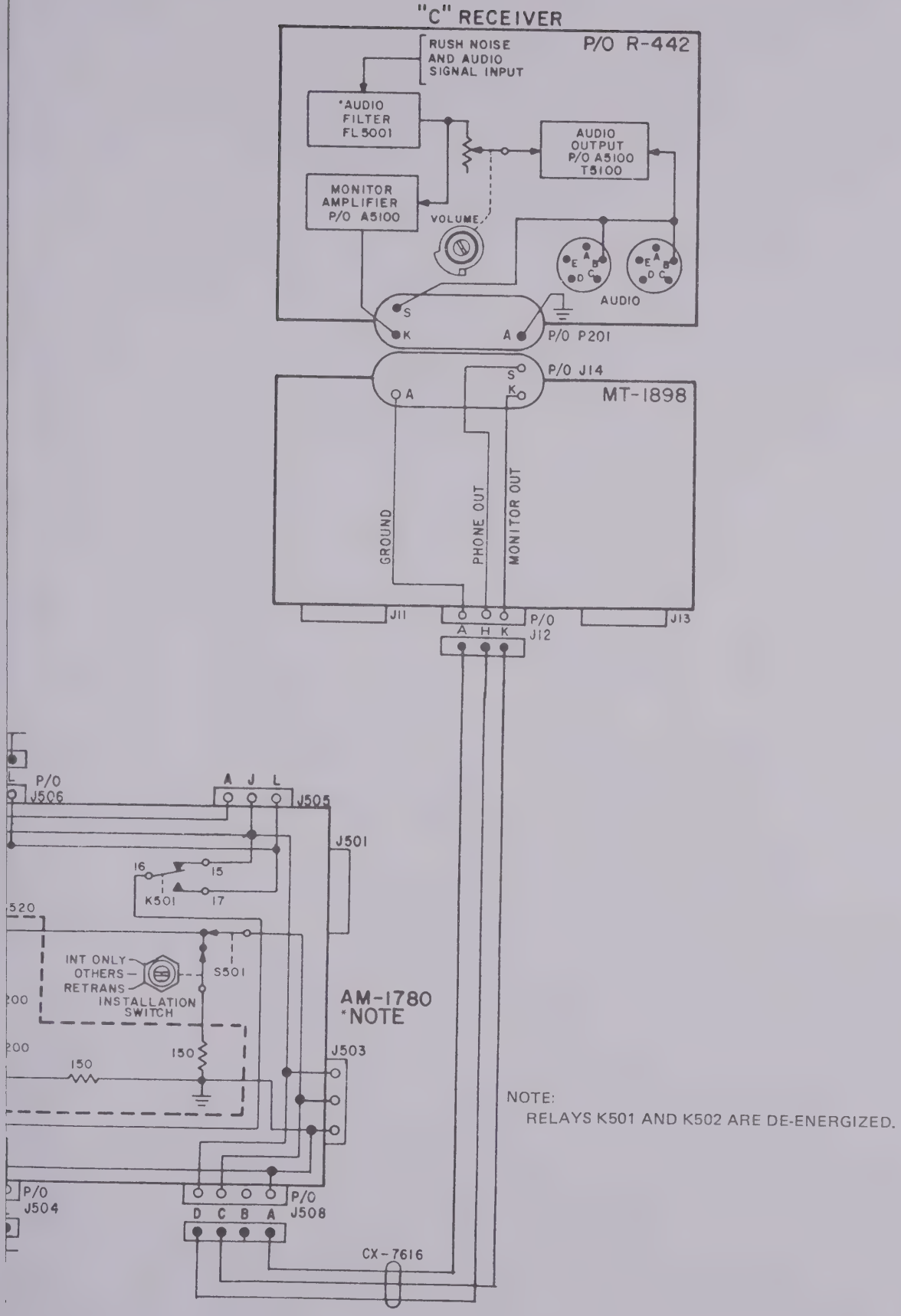
FO-10. "B" R-442 Monitoring



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL80A302

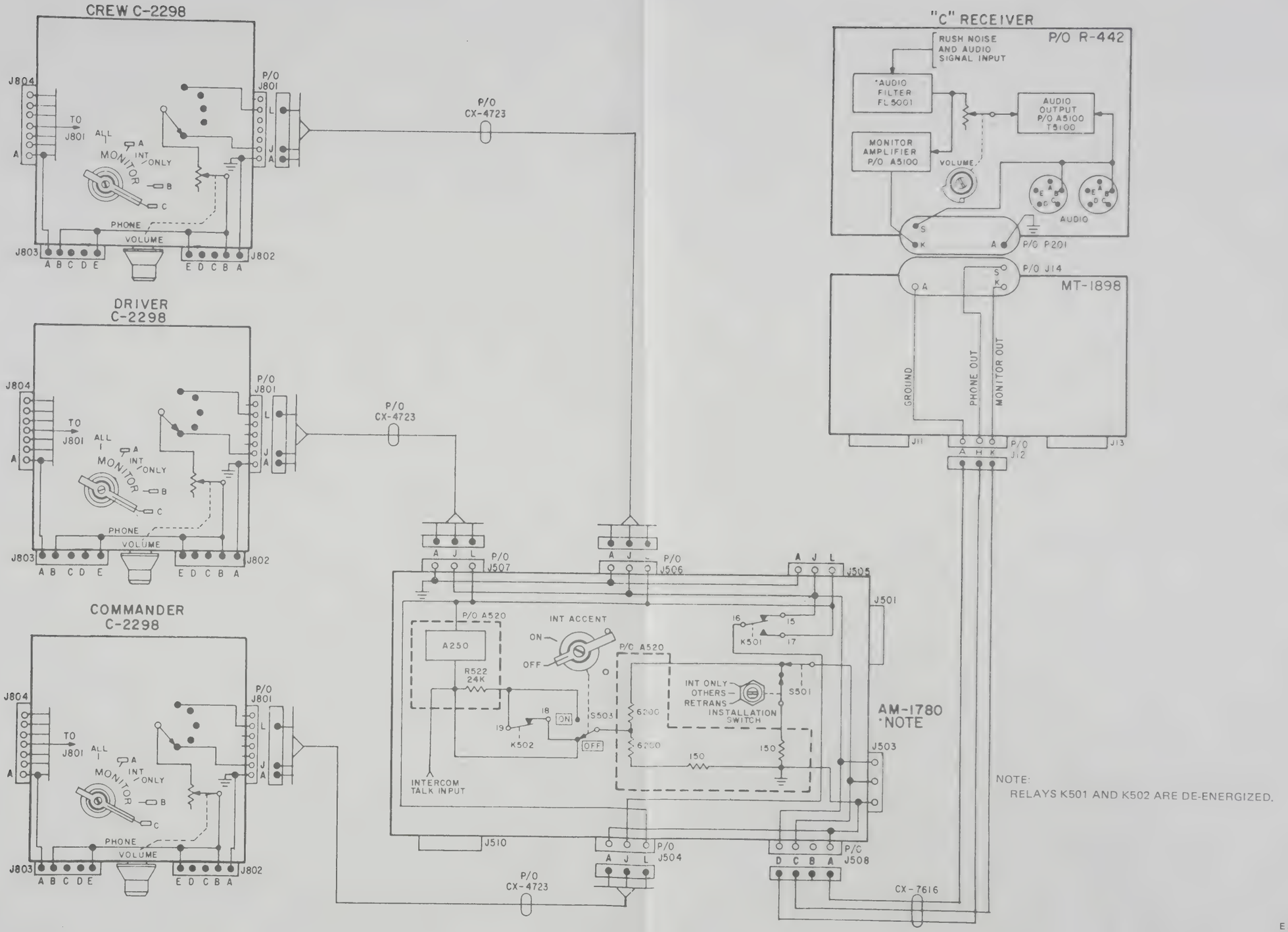
FO-10. "B" R-442 Monitoring



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

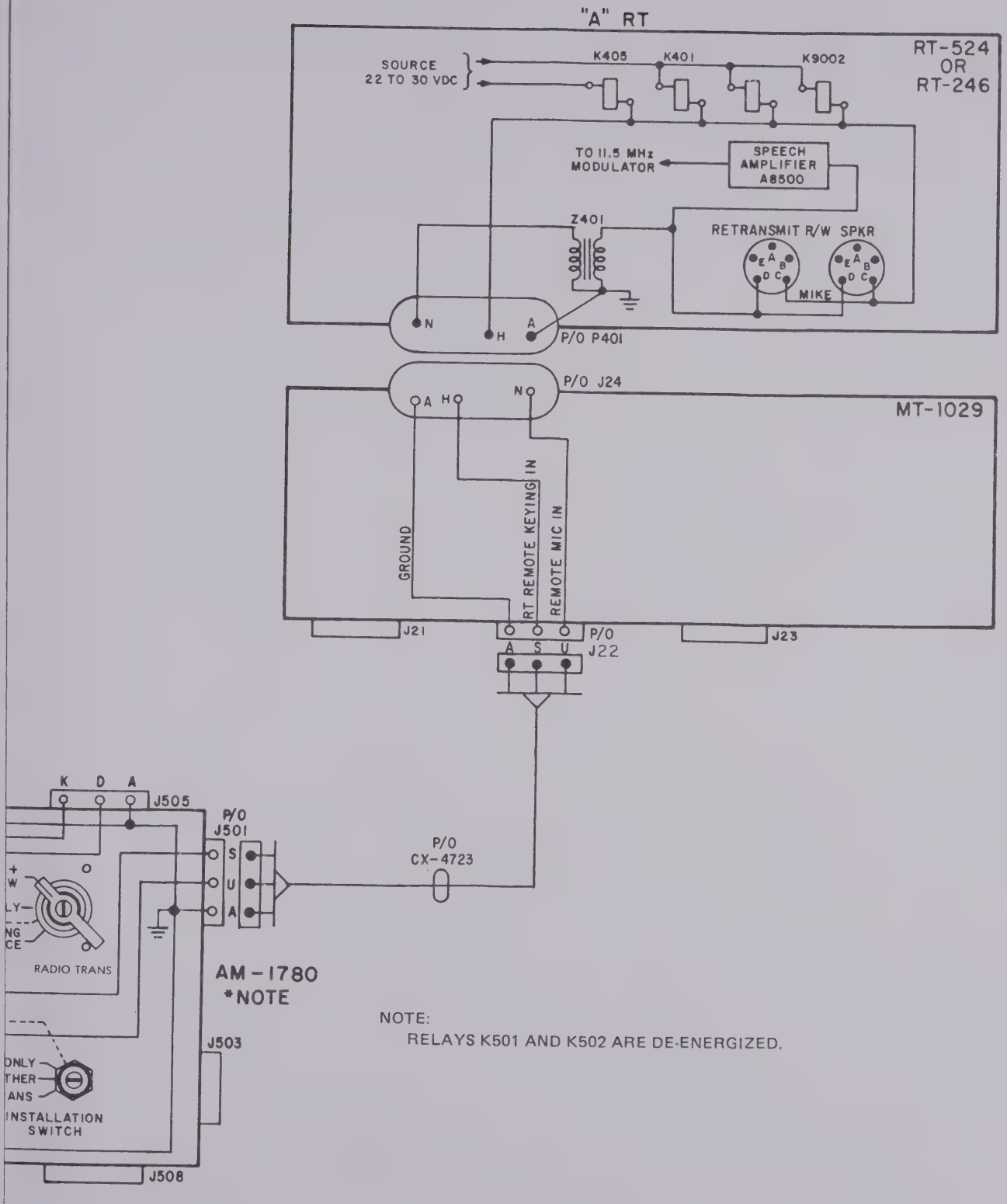
EL80A303

FO-11. "C" R-442 Monitoring



EL80A303

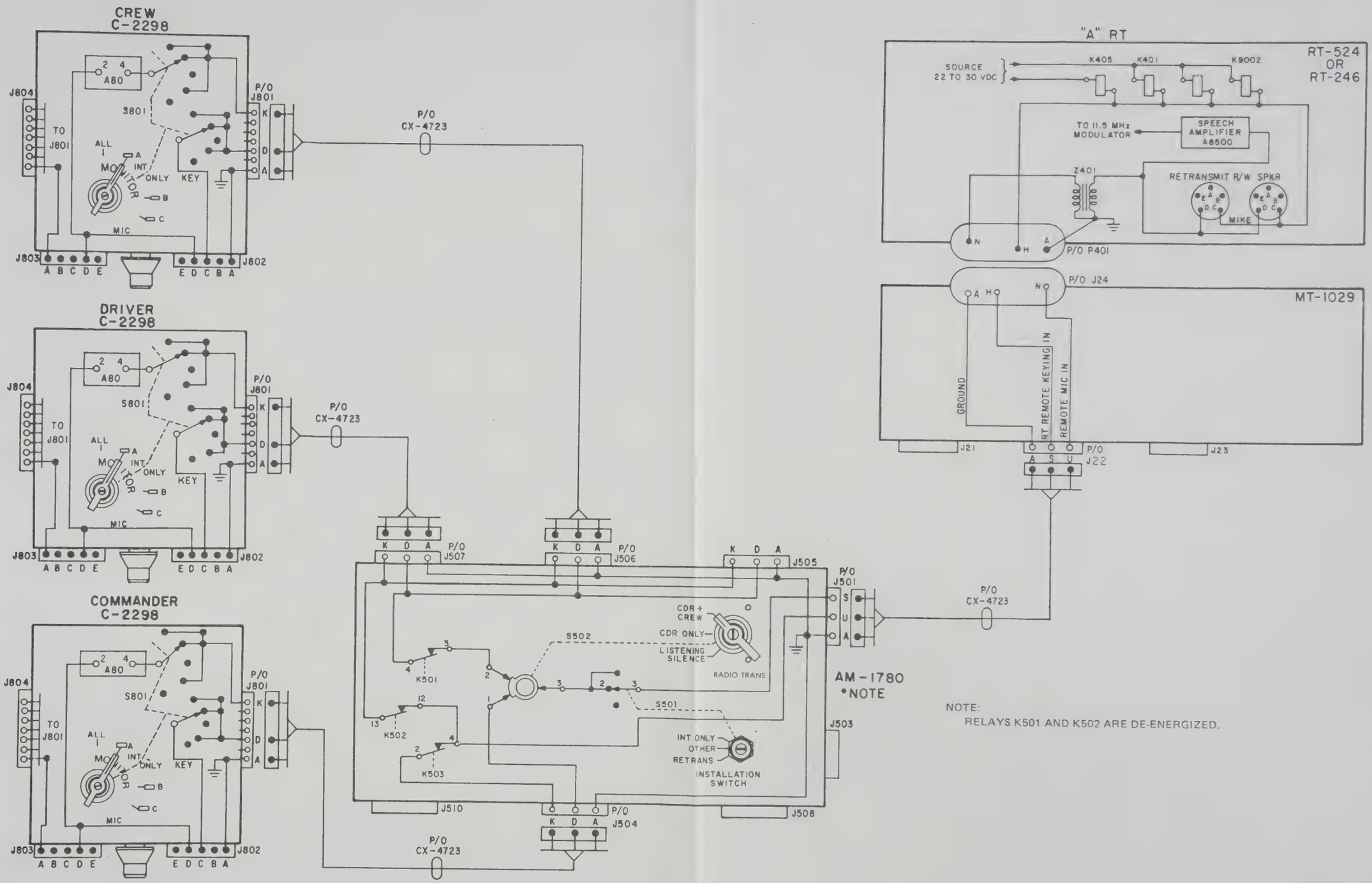
FO-11. "C" R-442 Monitoring



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL80A304

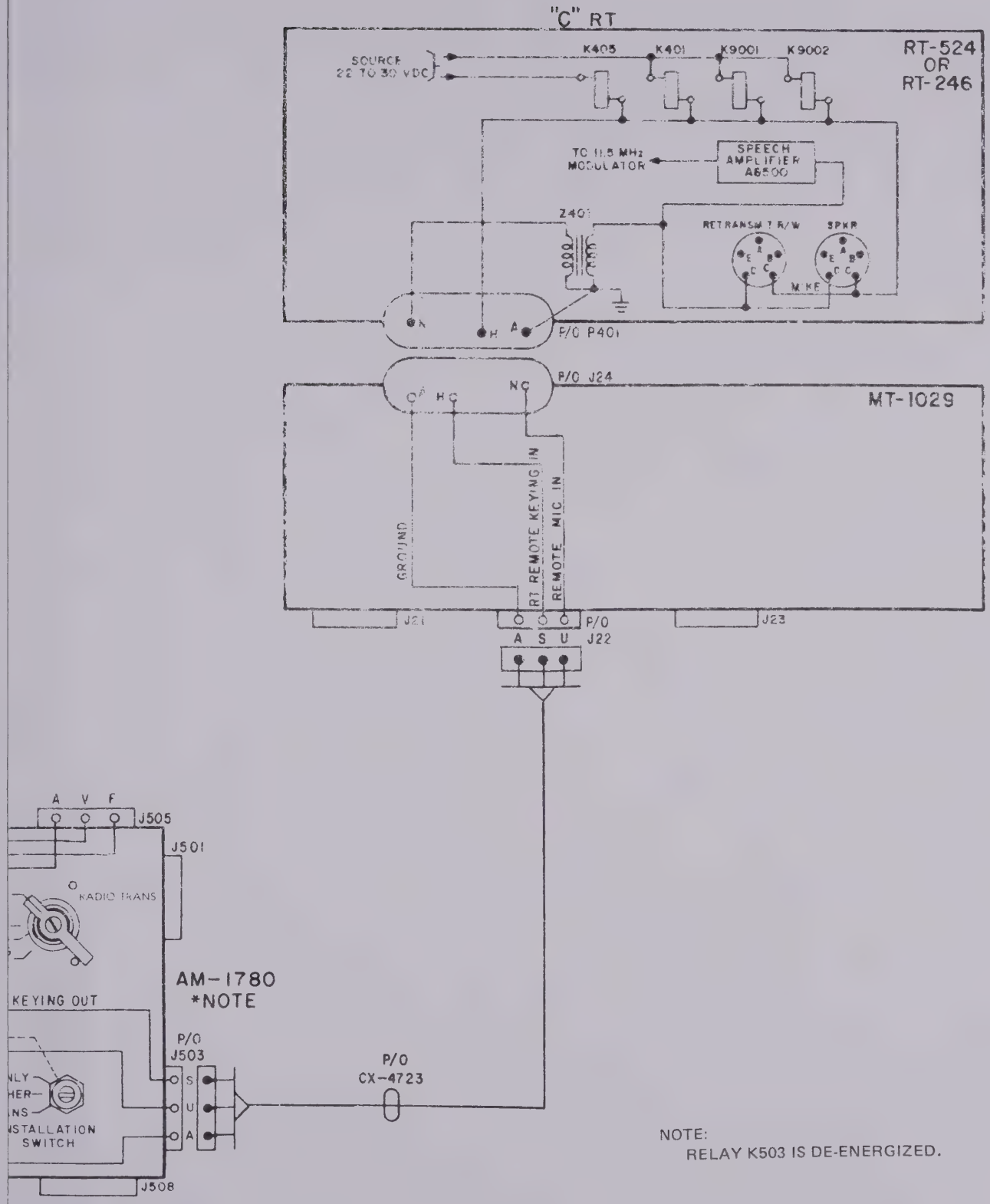
FO-12. "A" RT Keying and Modulation



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL8OA304

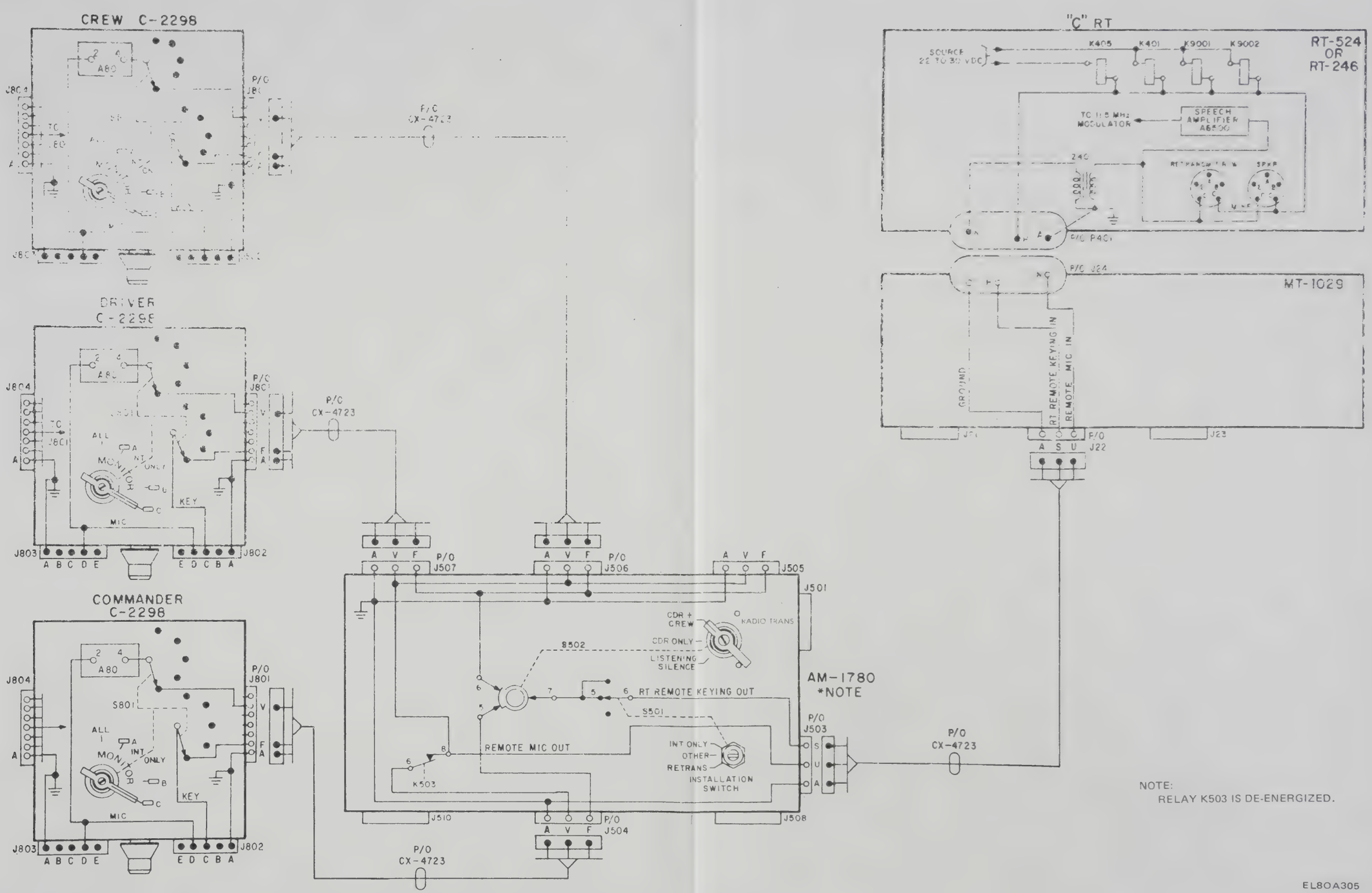
FO-12. "A" RT Keying and Modulation



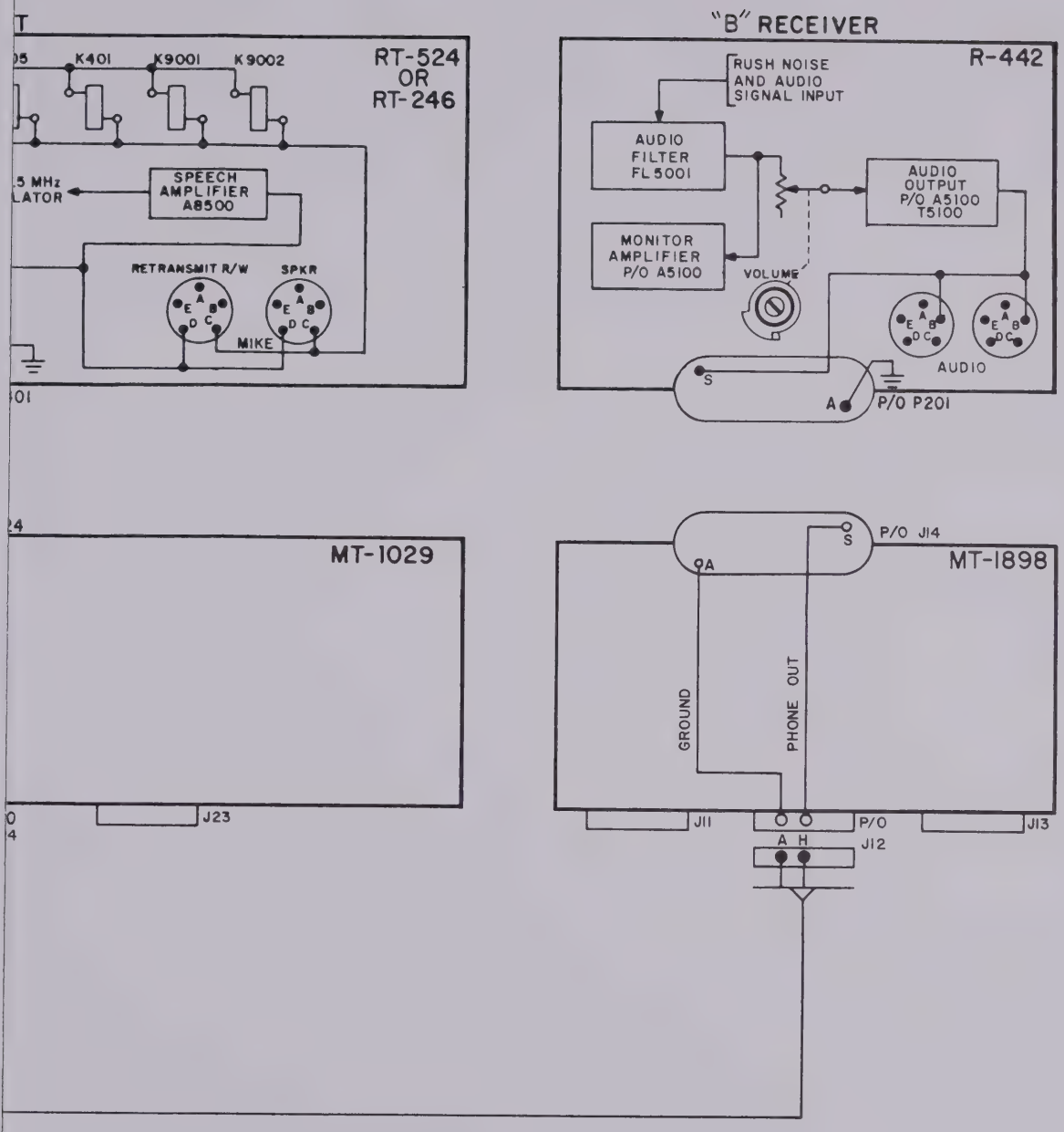
NOTE:
RELAY K503 IS DE-ENERGIZED.

EL8OA305

FO-13. "C" RT Keying and Modulation



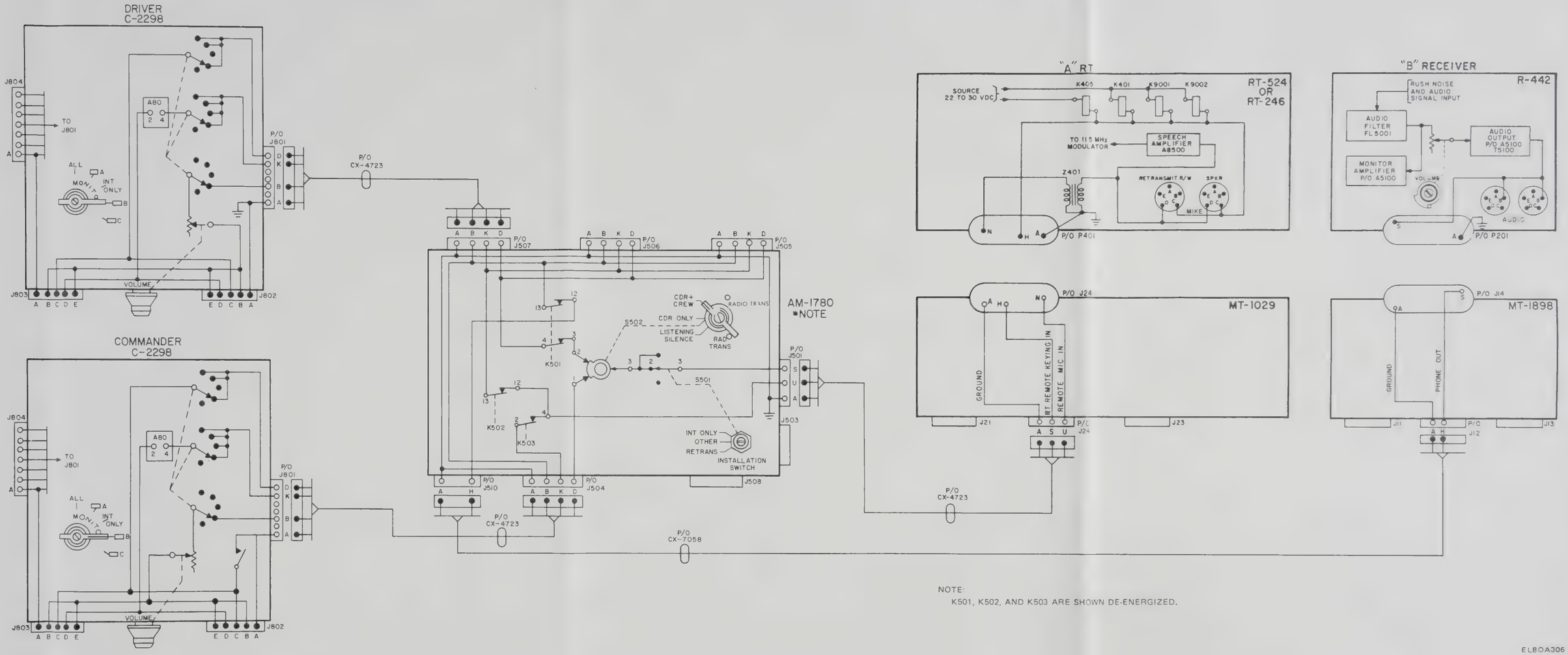
FO-13. "C" RT Keying and Modulation



OWN DE-ENERGIZED.

EL8OA306

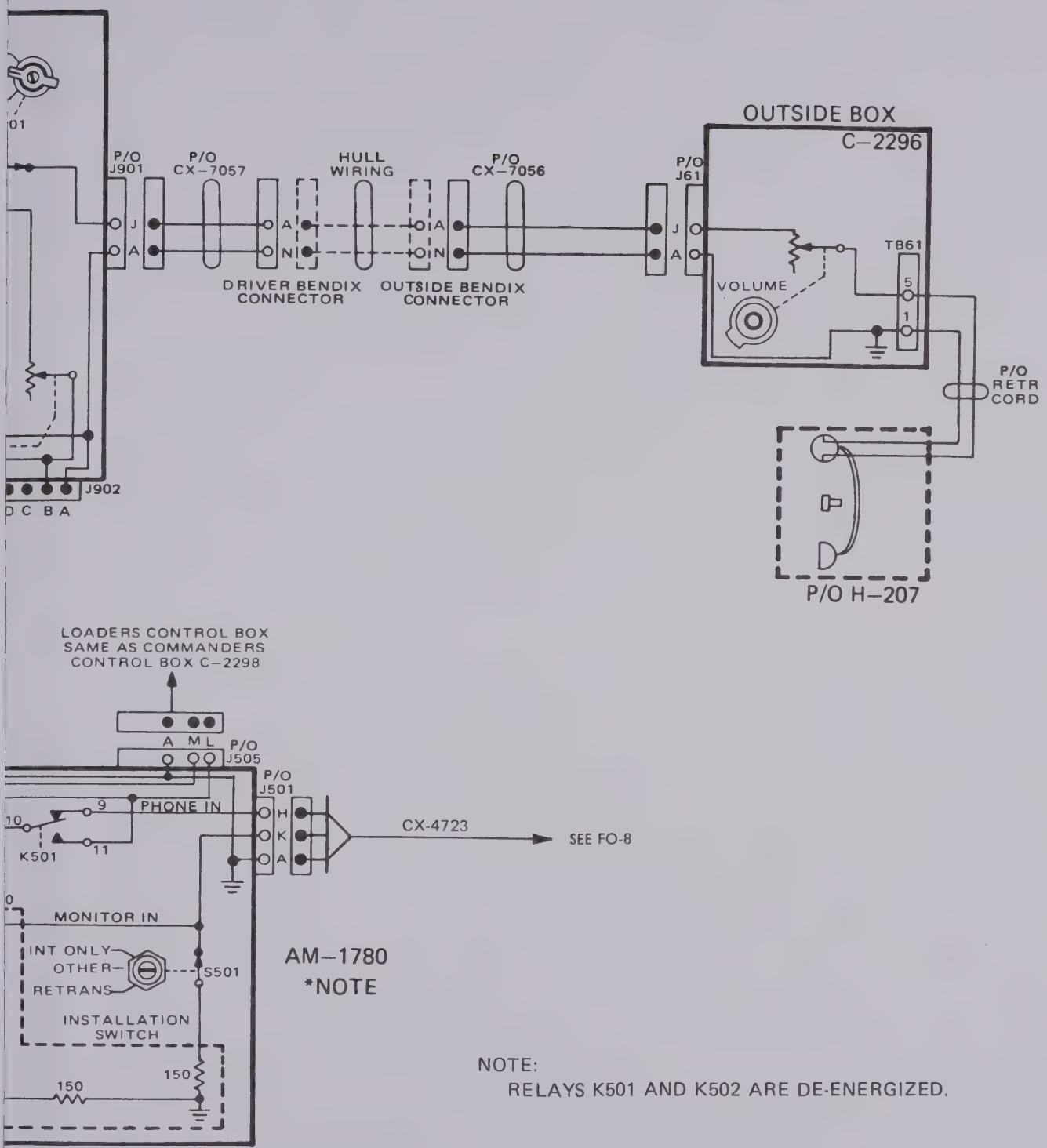
FO-14. Duplex Circuit



NOTE:
K501, K502, AND K503 ARE SHOWN DE-ENERGIZED.

EL80A306

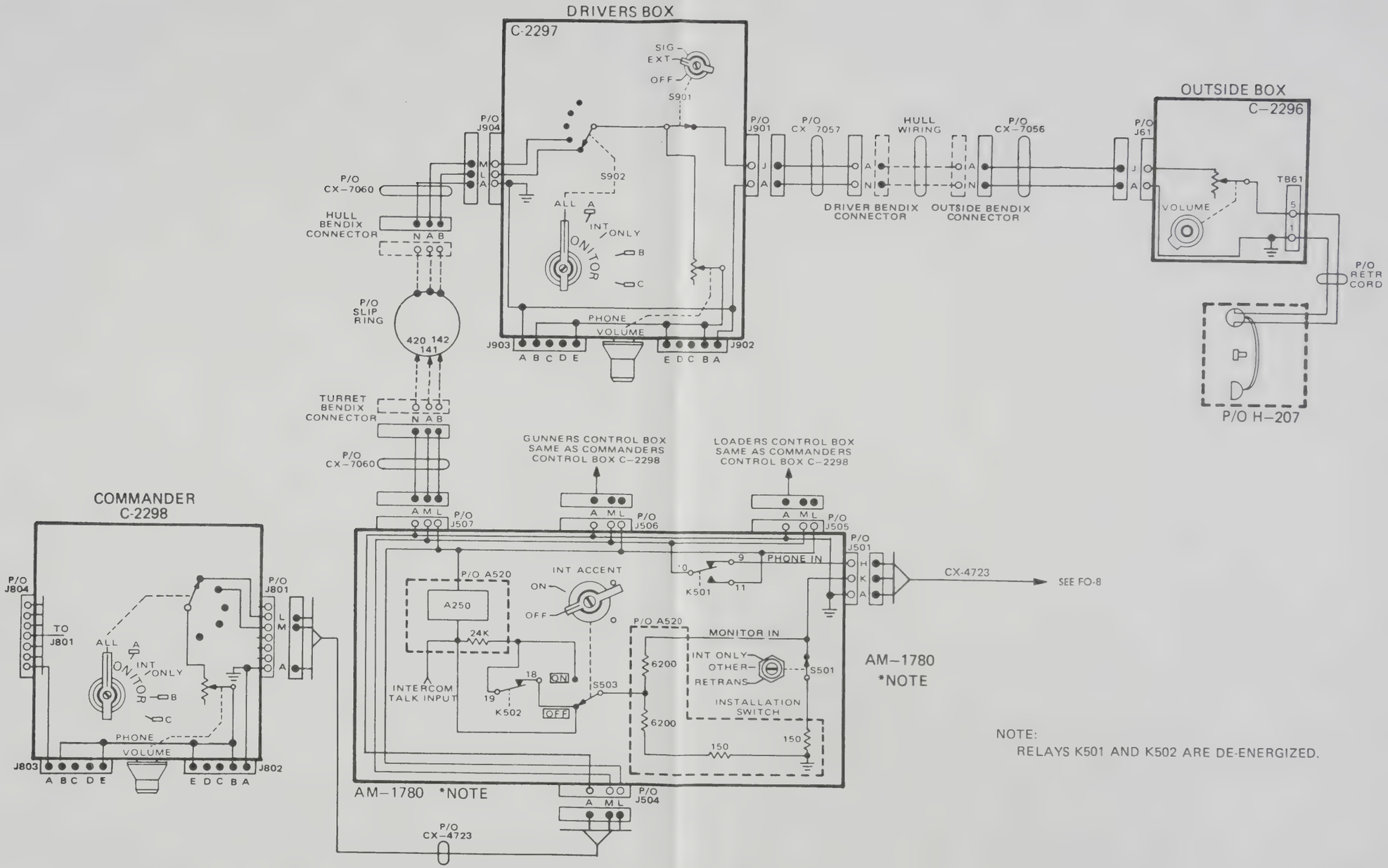
FO-14. Duplex Circuit



NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL8OA307

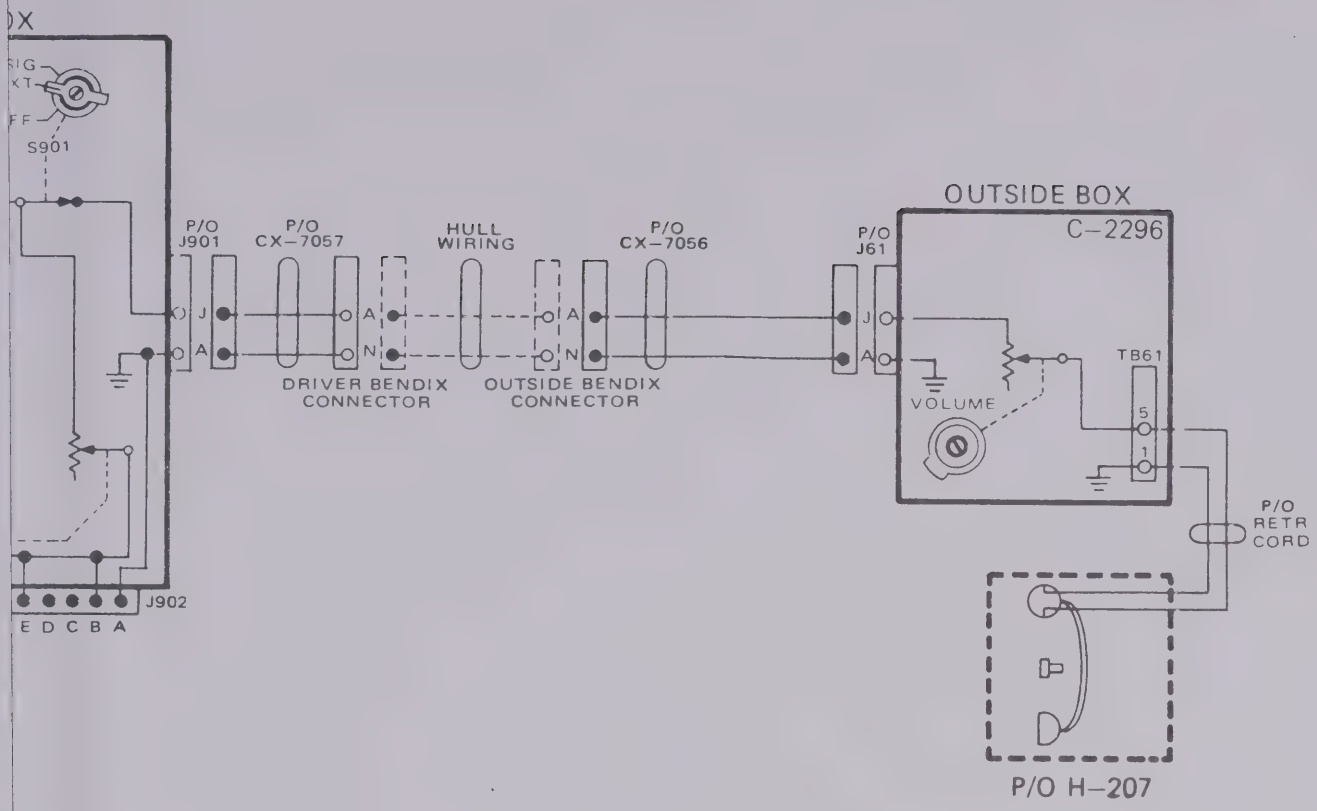
FO-15. Tank "A" RT Monitoring

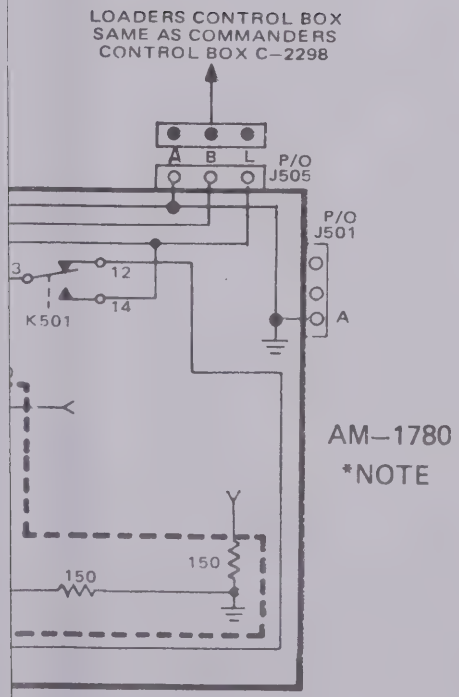


NOTE:
RELAYS K501 AND K502 ARE DE-ENERGIZED.

EL80A307

FO-15. Tank "A" RT Monitoring



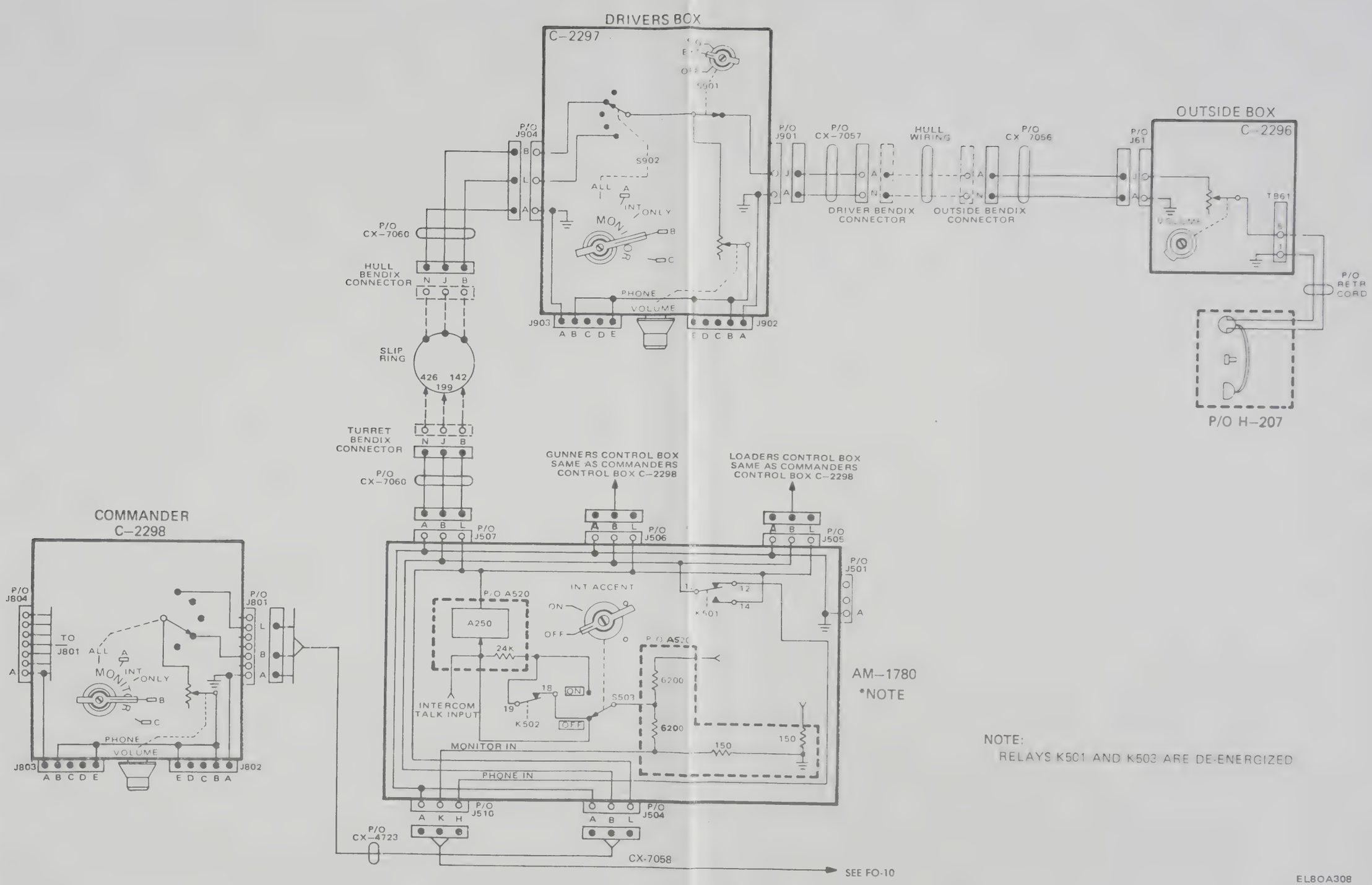


NOTE:
RELAYS K501 AND K503 ARE DE-ENERGIZED.

SEE FO-10

EL8OA308

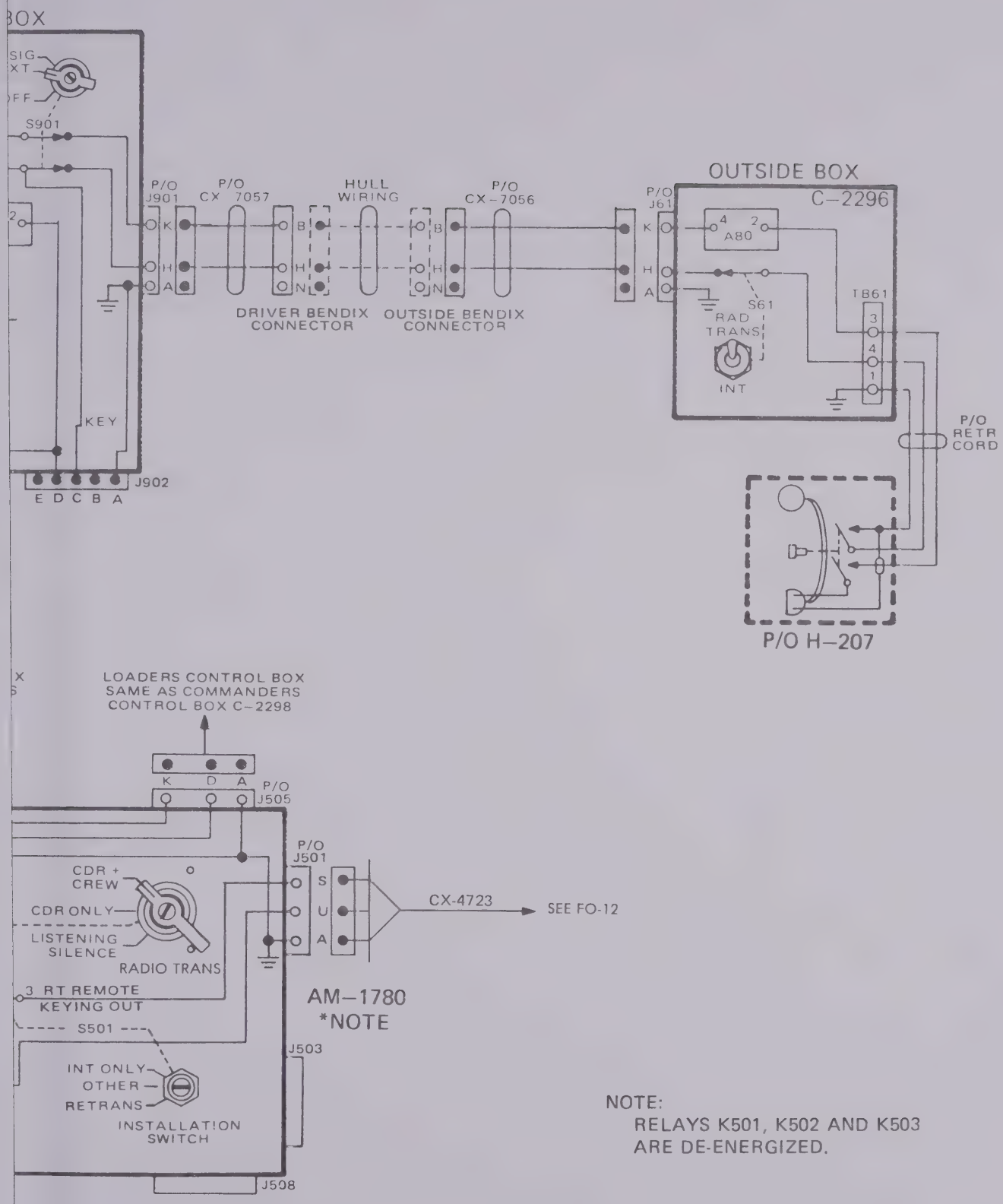
FO-16. Tank "B" R-442 Monitoring



NOTE:
RELAYS K501 AND K503 ARE DE-ENERGIZED

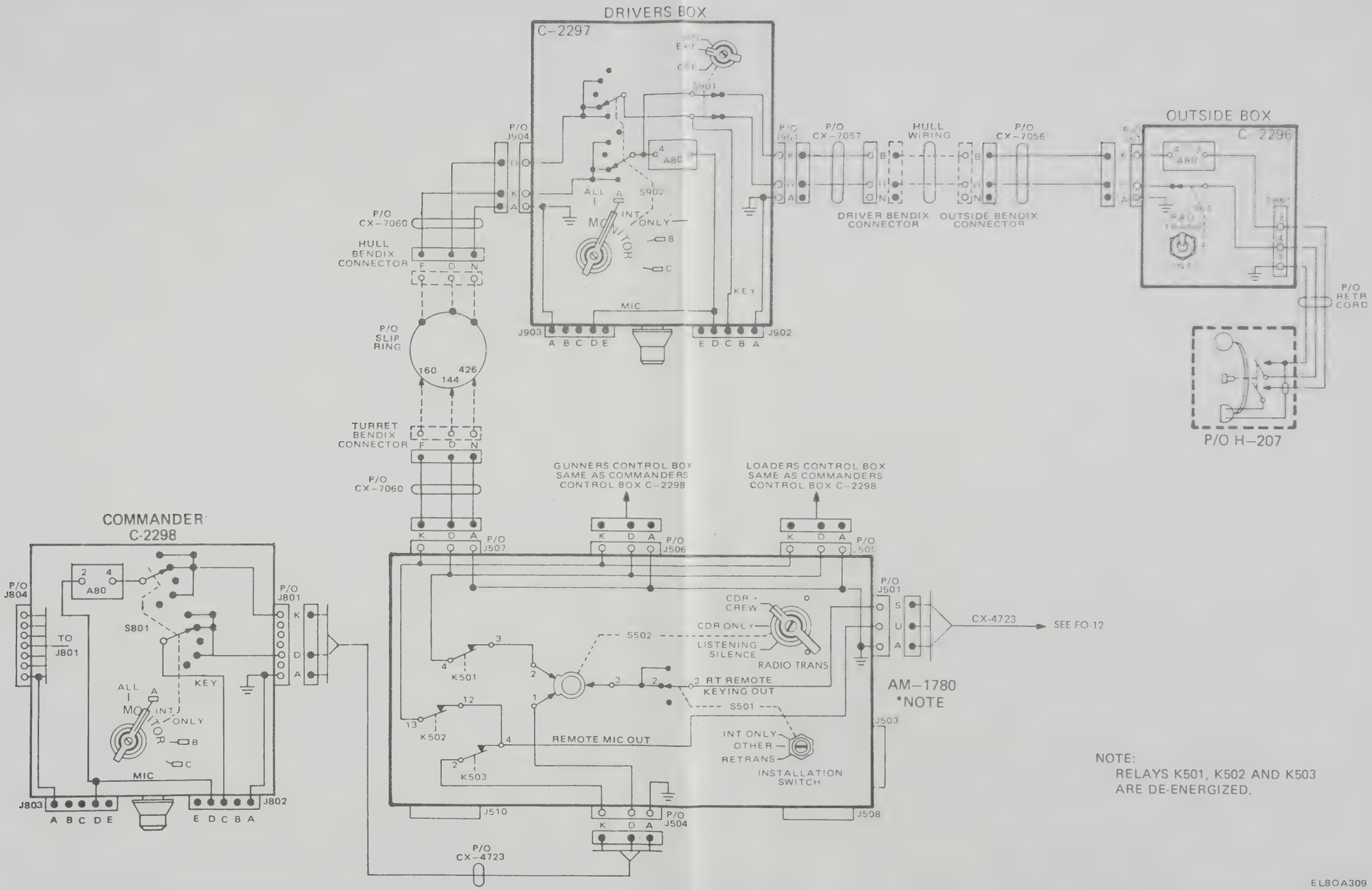
EL80A308

FO-16. Tank "B" R-442 Monitoring



EL8OA309

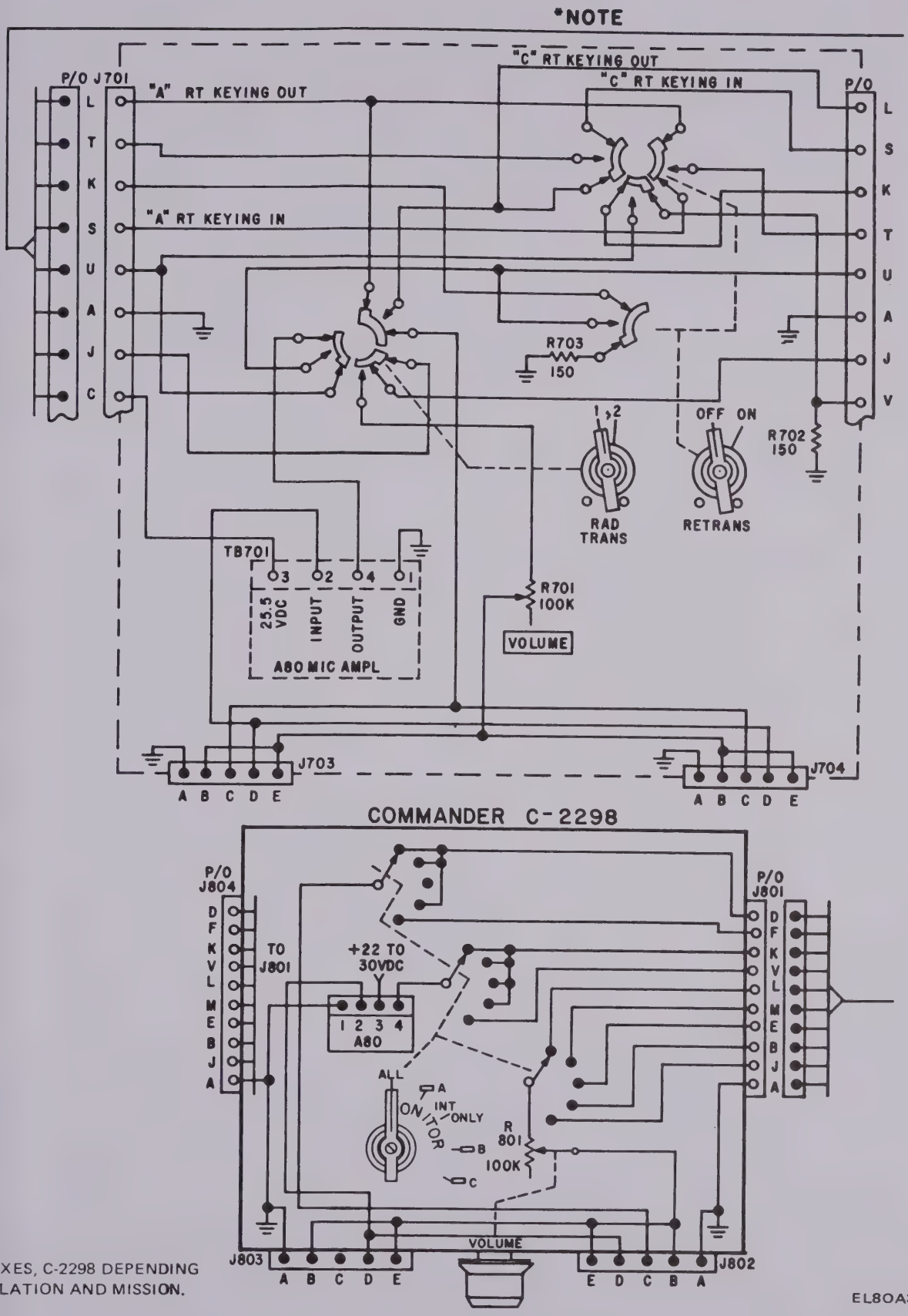
FO-17. Tank "A" RT Keying and Modulation



NOTE:
RELAYS K501, K502 AND K503 ARE DE-ENERGIZED.

EL80A309

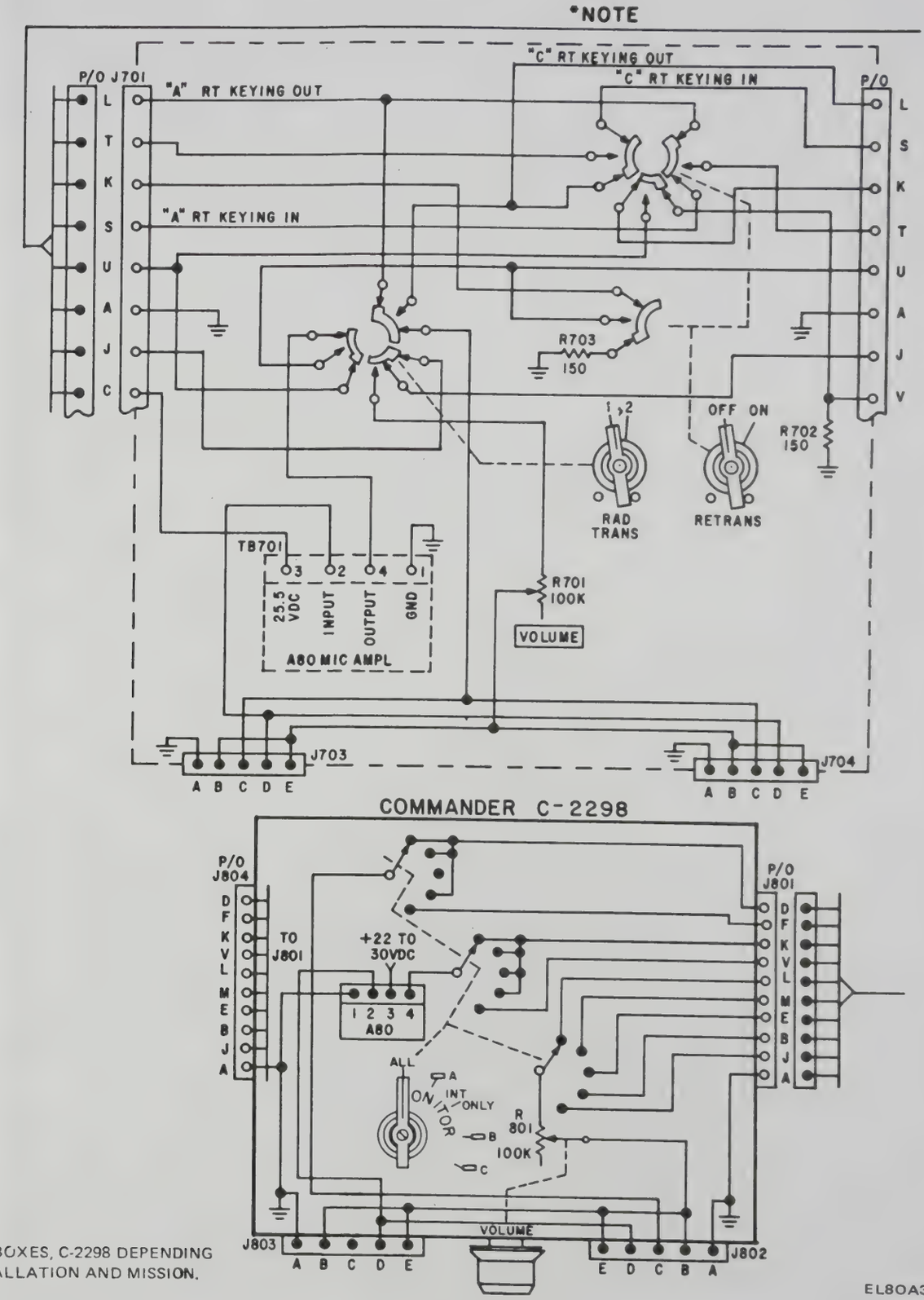
FO-17. Tank "A" RT Keying and Modulation



EW BOXES, C-2298 DEPENDING
NSTALLATION AND MISSION.

EL80A312

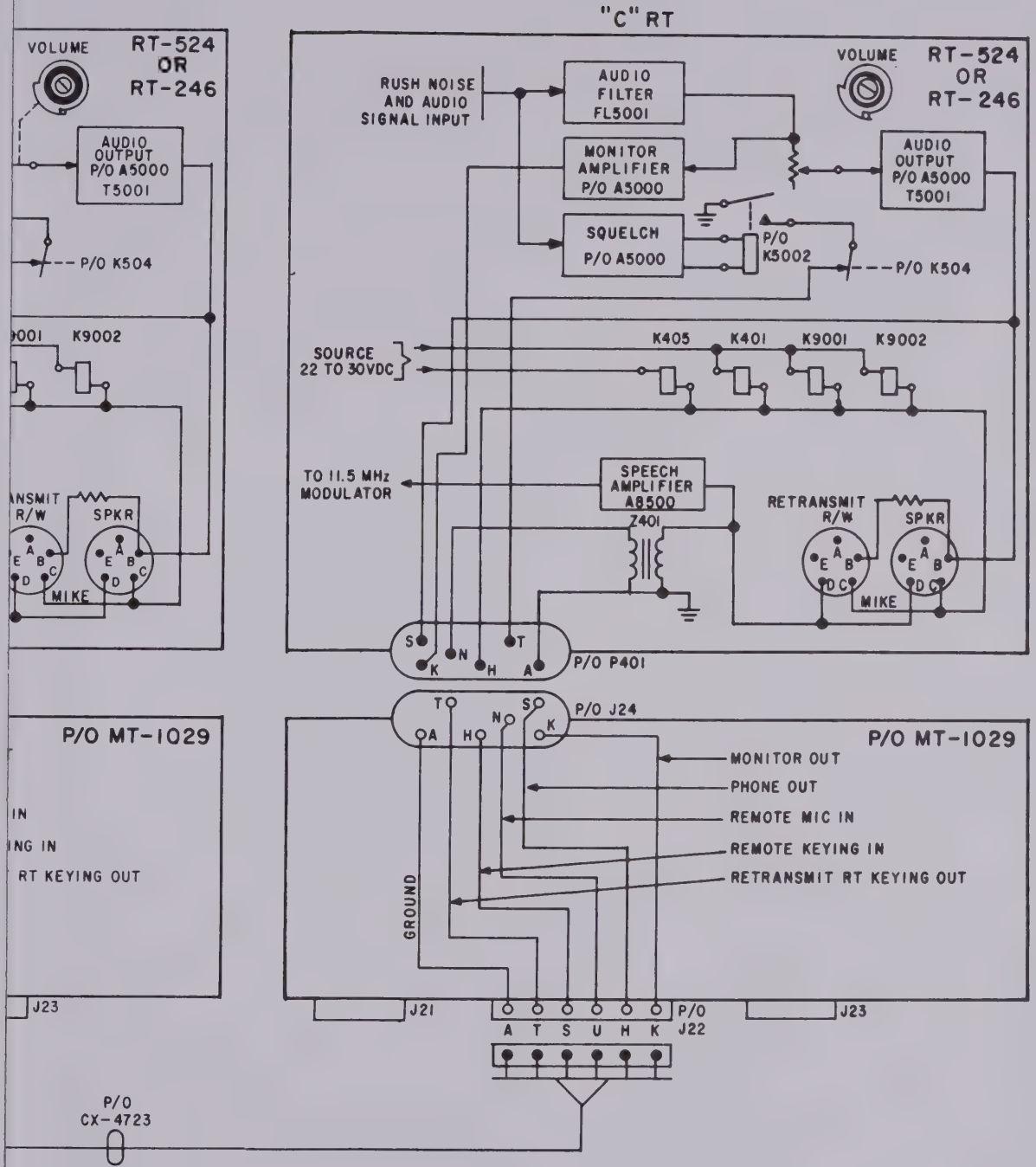
FO-18. Relay (Retransmission) Circuits (Sheet 1 of 2)



NOTE:
ADDITIONAL CREW BOXES, C-2298 DEPENDING UPON ACTUAL INSTALLATION AND MISSION.

EL80A312

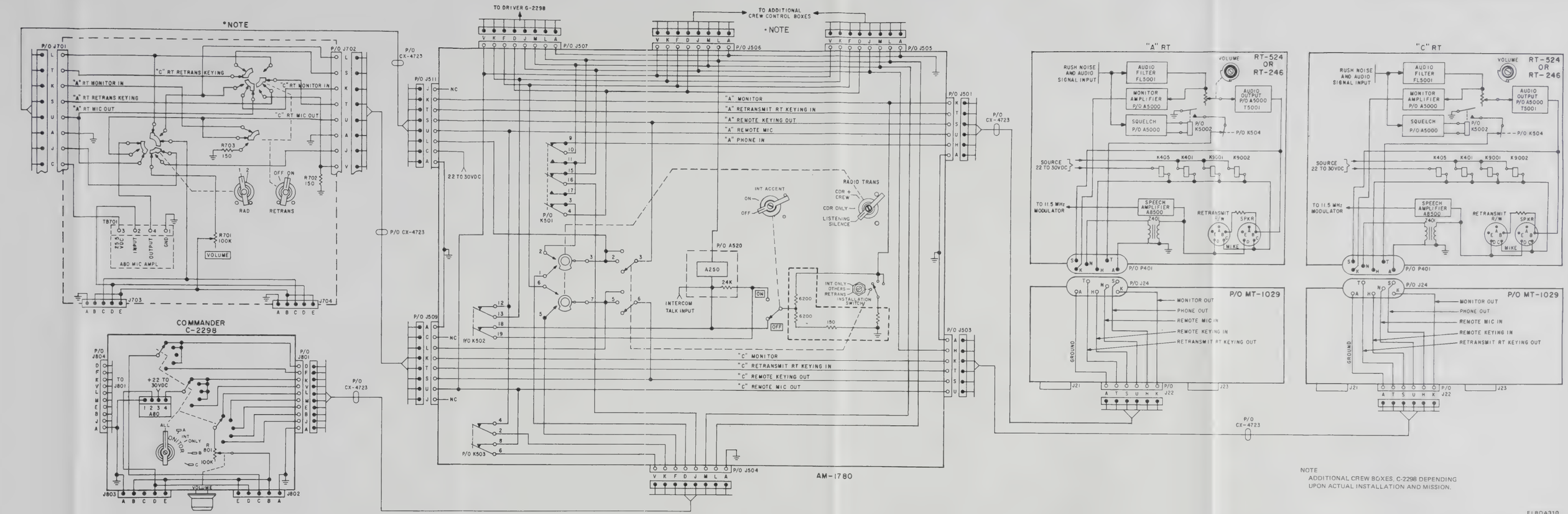
FO-18. Relay (Retransmission) Circuits (Sheet 1 of 2)



NOTE:
ADDITIONAL CREW BOXES, C-2298 DEPENDING UPON ACTUAL INSTALLATION AND MISSION.

EL8OA310

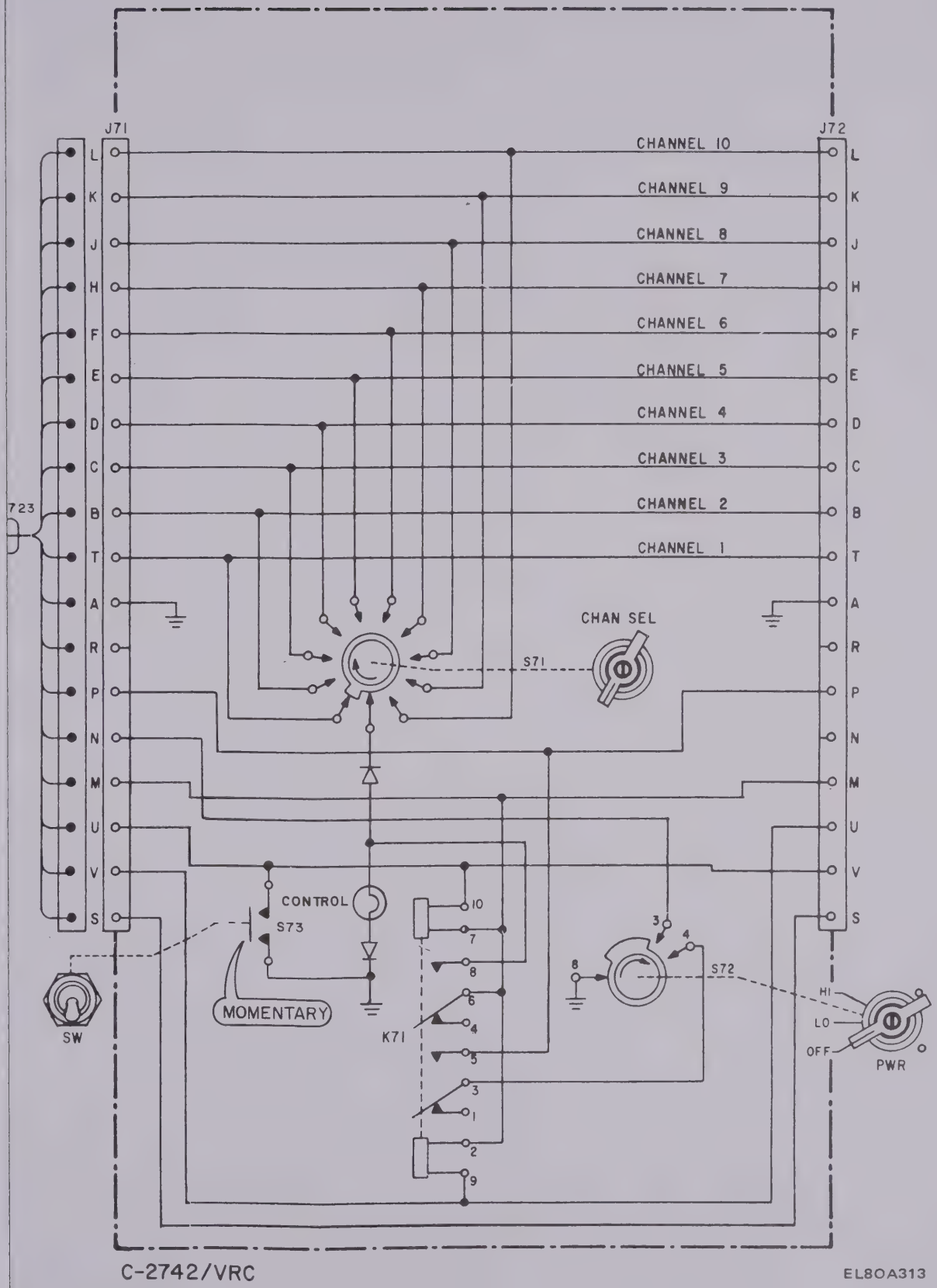
FO-18. Relay (Retransmission) Circuits (Sheet 2 of 2)



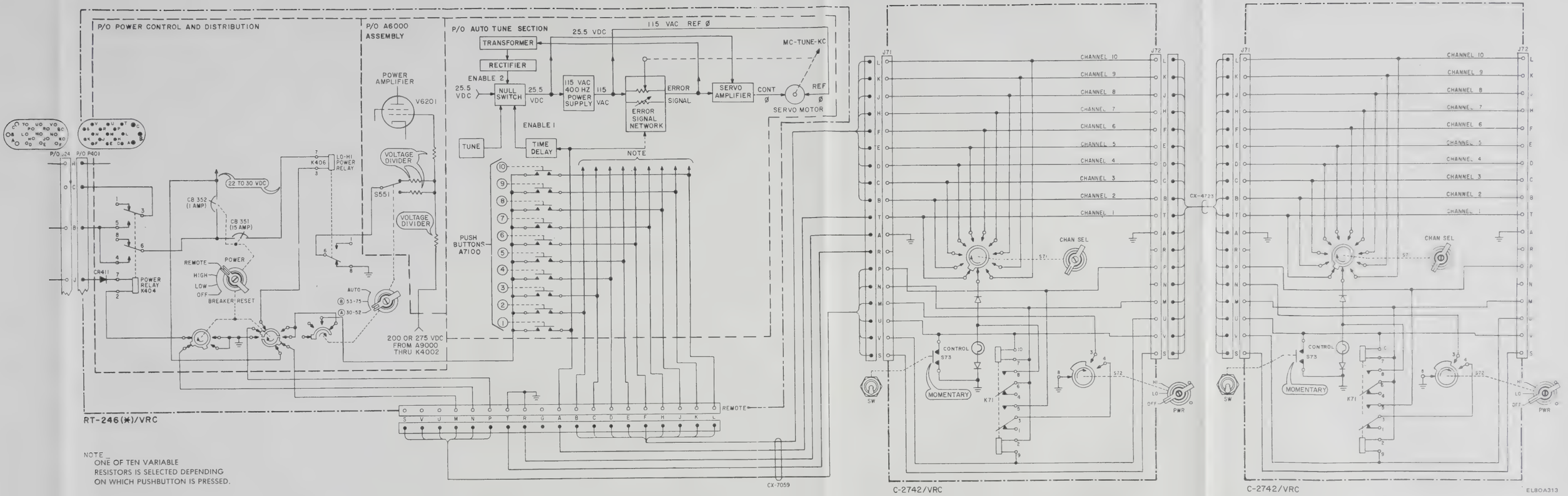
NOTE
ADDITIONAL CREW BOXES, C-2298 DEPENDING UPON ACTUAL INSTALLATION AND MISSION.

EL80A310

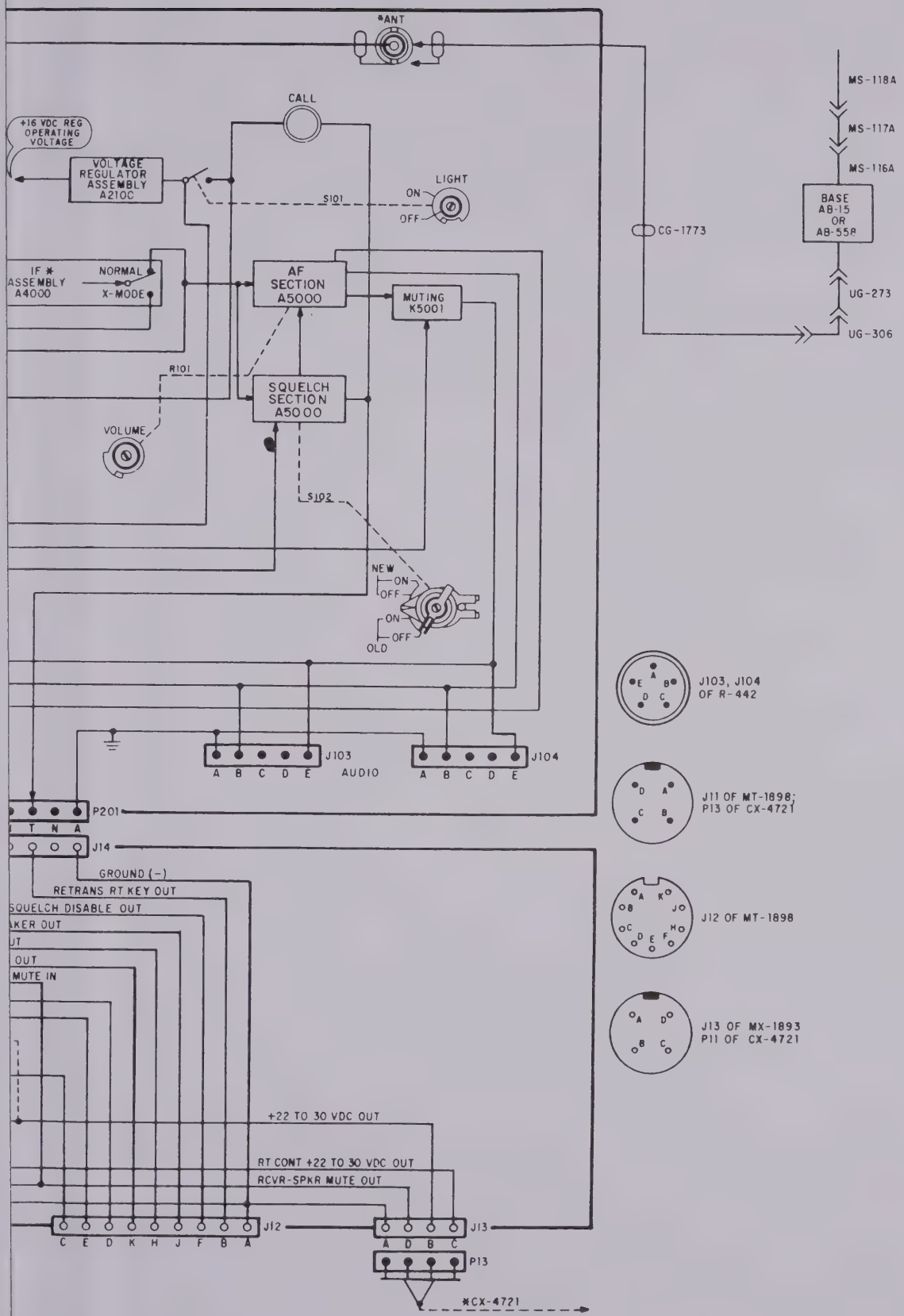
FO-18 Relay (Retransmission) Circuits (Sheet 2 of 2)



FO-19. RT-246 and C-2742 Remote Power Control



NOTE
ONE OF TEN VARIABLE RESISTORS IS SELECTED DEPENDING ON WHICH PUSHBUTTON IS PRESSED.



EL8OA314

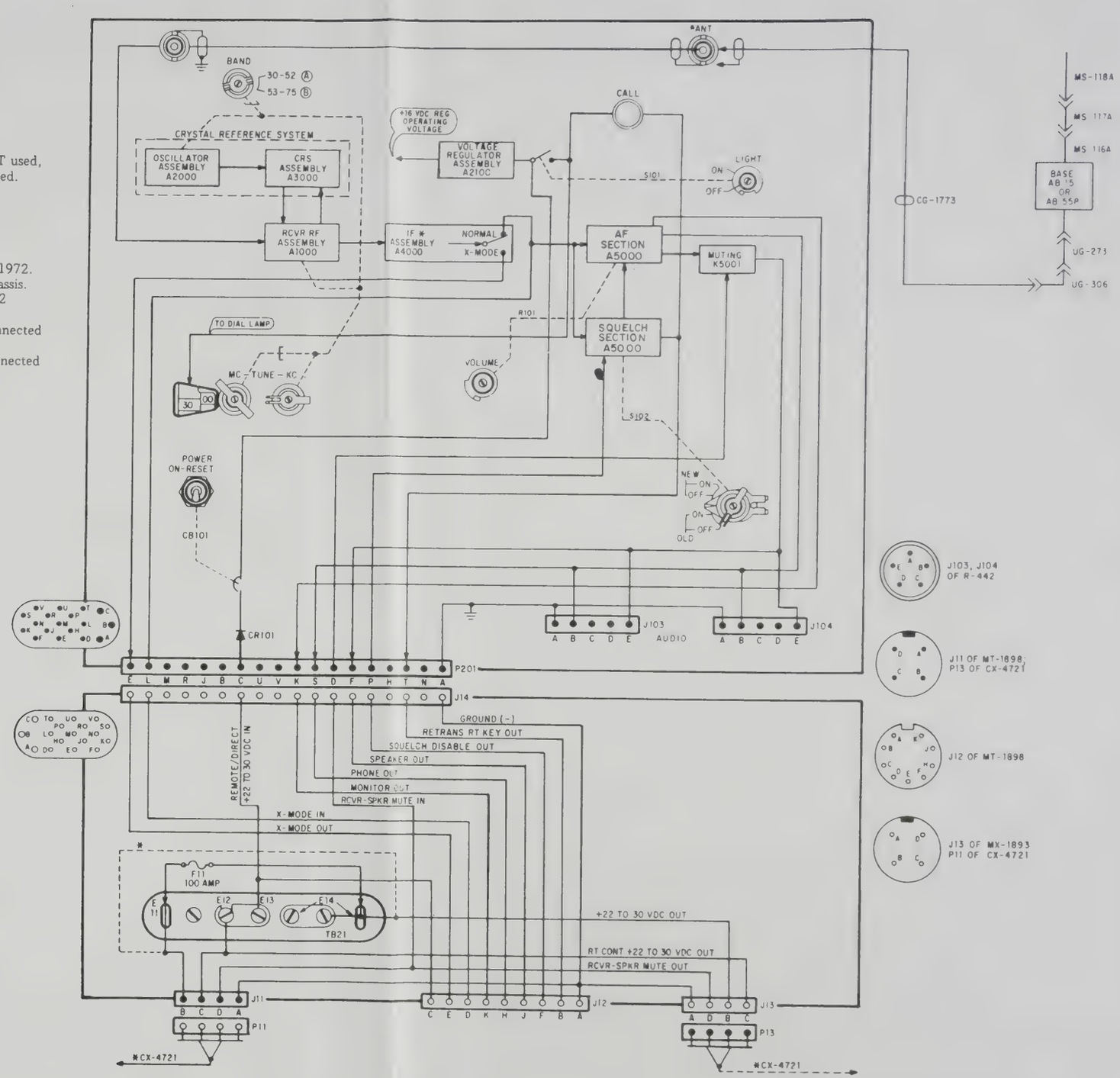
FO-20. R-442 with MT-1898

Notes: R-442.

1. X-MODE switch (bottom of A4000) must be in NORMAL, when speech secure equipment is NOT used, or X-MODE, when speech secure equipment is used.
2. For AN/VRC-48 (-44), "C" R-442 ANT jack is connected to one of "B" R-442 ANT jacks by a CG-1127 cable.

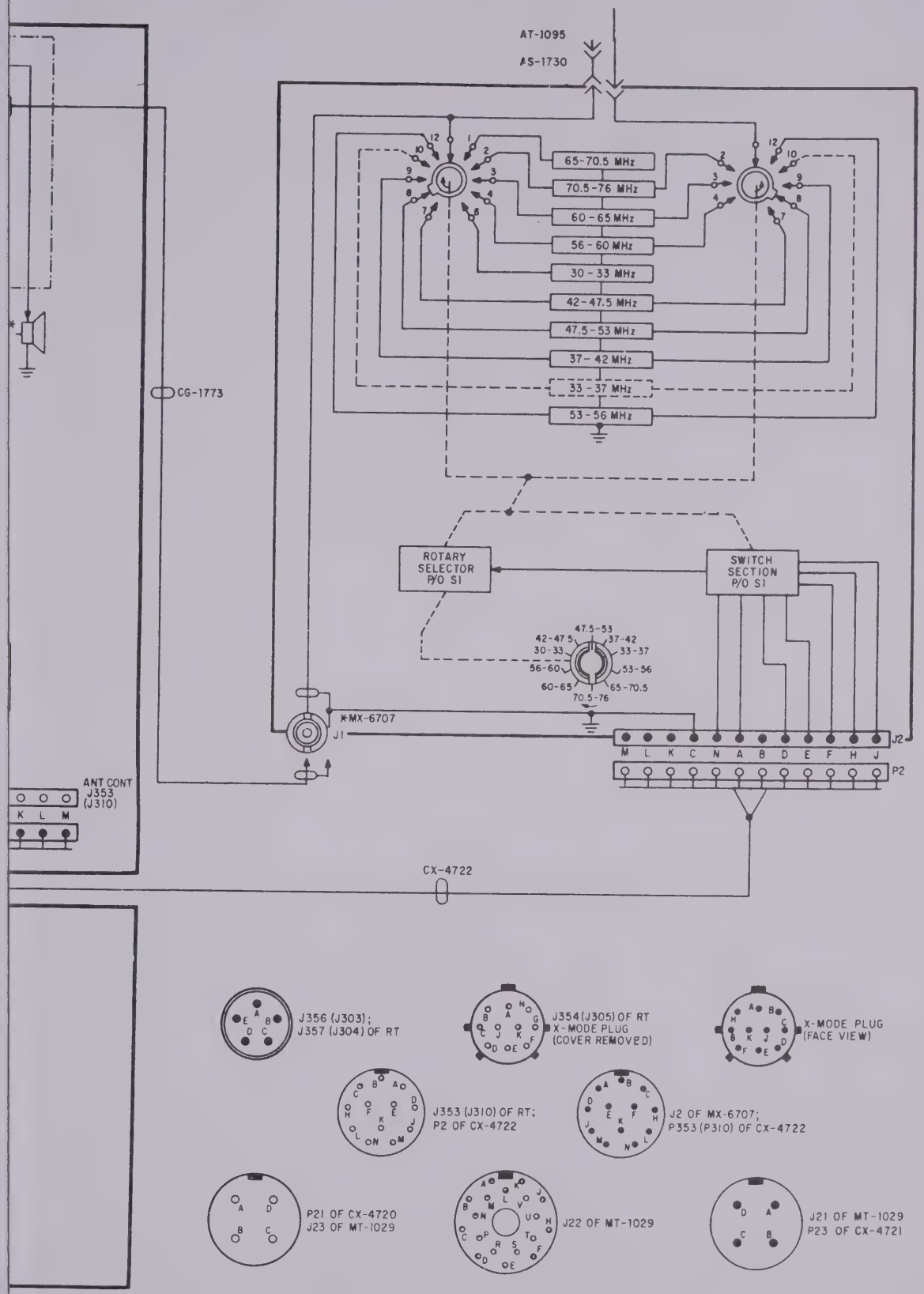
Notes: MT-1898.

1. E11 and F11 are NOT in mounts provided after 1972.
2. Ground (wire A) is NOT connected to mount chassis.
3. For all configurations link is normally between E12 and E13 for controlled power (remote).
4. For AN/VRC -47 (-12) "B" MT-1898, J11, is connected to "A" MT-1029, J23, by CX-4721 cable.
5. For AN/VRC-48 (-44), "C" MT-1898, J11, is connected to "B" MT-1898, J13, by a CX-4721 cable.



EL80A314

FO-20. R-442 with MT-1898



EL8OA315

FO-21. AN/VRC-46 (43) Radio Set Diagram (Nonsecure)

Notes: RT Unit.
1. Reference designations in parenthesis ( ) denotes RT-246 only.
2. X-MODE plug must be in place when speech security equipment is NOT used.
3. X-MODE switch (bottom of A4000) is set to, and left in X-MODE.

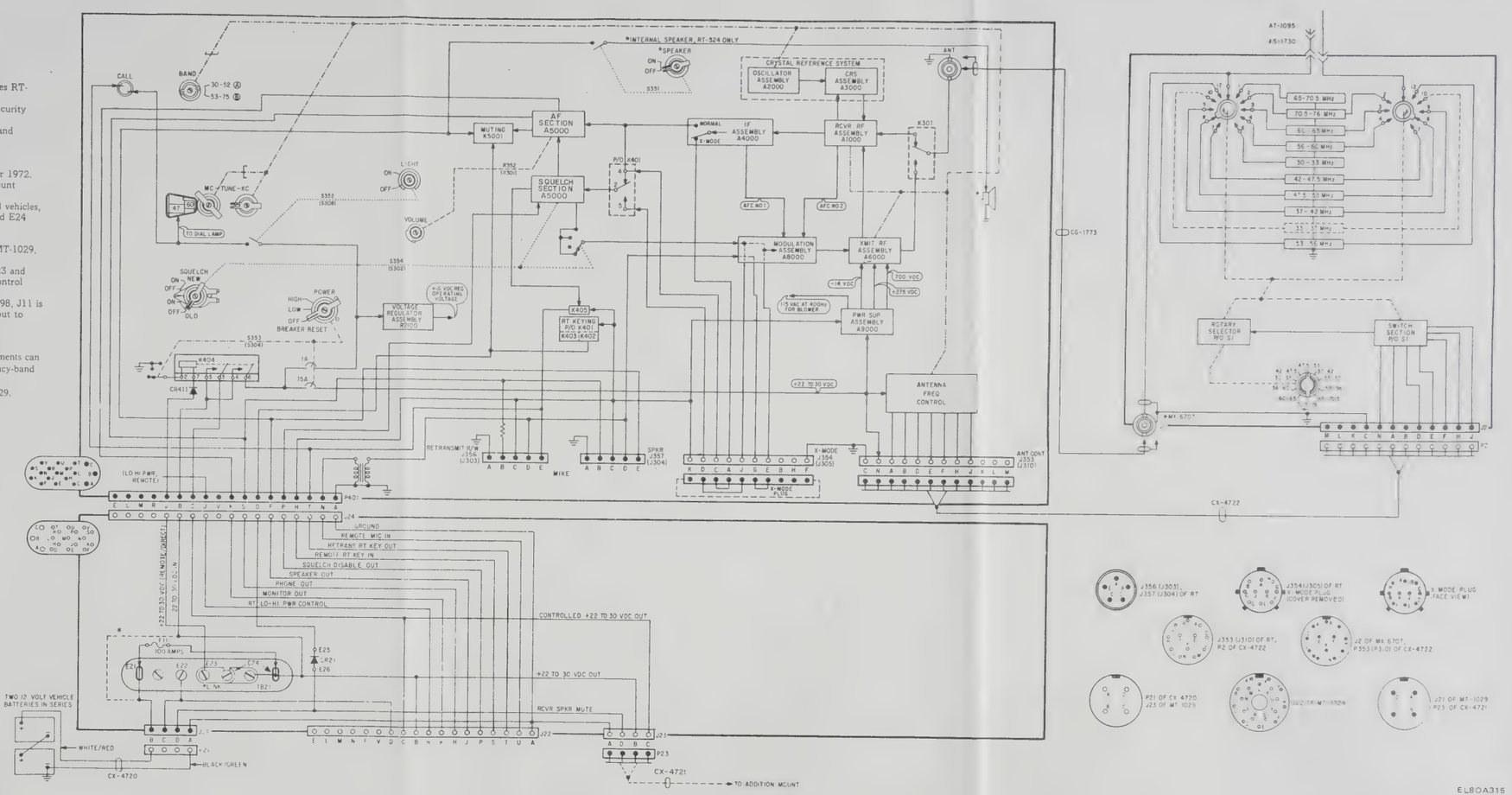
Notes: MT-1029.
1. E21 and F11 are NOT in mounts provided after 1972.
2. Ground wire (wire A) is NOT connected to mount chassis.
3. For all radio configurations installed in wheeled vehicles, "A" MT-1029 link is normally between E23 and E24 for DIRECT power input to "A" RT.
4. For AN/VRC-49 (-45):
   a. "C" MT-1029, J21, is connected to "A" MT-1029, J23, for power input to "C" RT.
   b. "C" MT-1029 link is normally between E23 and E22 for "C" RT REMOTE power input control by "A" RT.
5. For AN/VRC-47 (12) and -48 (-44) "B" MT-1898, J11 is connected to "A" MT-1029, J23, for power input to "B" R-442.

Notes: AS-1729.
1. With CX-4722 unplugged from J2, antenna elements can be manually tuned by turning MX-6707 frequency-band switch to the appropriate position.
2. Antenna AT-912 may be used instead of AS-1729.

FREQ MHz	BAND	PIN DESIGNATION							
		N	A	B	D	F	F	H	J
30-33	LOW	24	24	0	24	0	0	0	0
33-37	LOW	24	24	0	0	24	0	0	0
37-42	LOW	24	24	0	0	0	24	0	0
42-47.5	LOW	24	24	0	0	0	0	24	0
47.5-53	LOW	24	24	0	0	0	0	0	24
53-56	HIGH	24	0	24	24	0	0	0	0
56-60	HIGH	24	0	24	0	24	0	0	0
60-65	HIGH	24	0	24	0	0	24	0	0
65-70.5	HIGH	24	0	24	0	0	0	24	0
70.5-76	HIGH	24	0	24	0	0	0	0	24

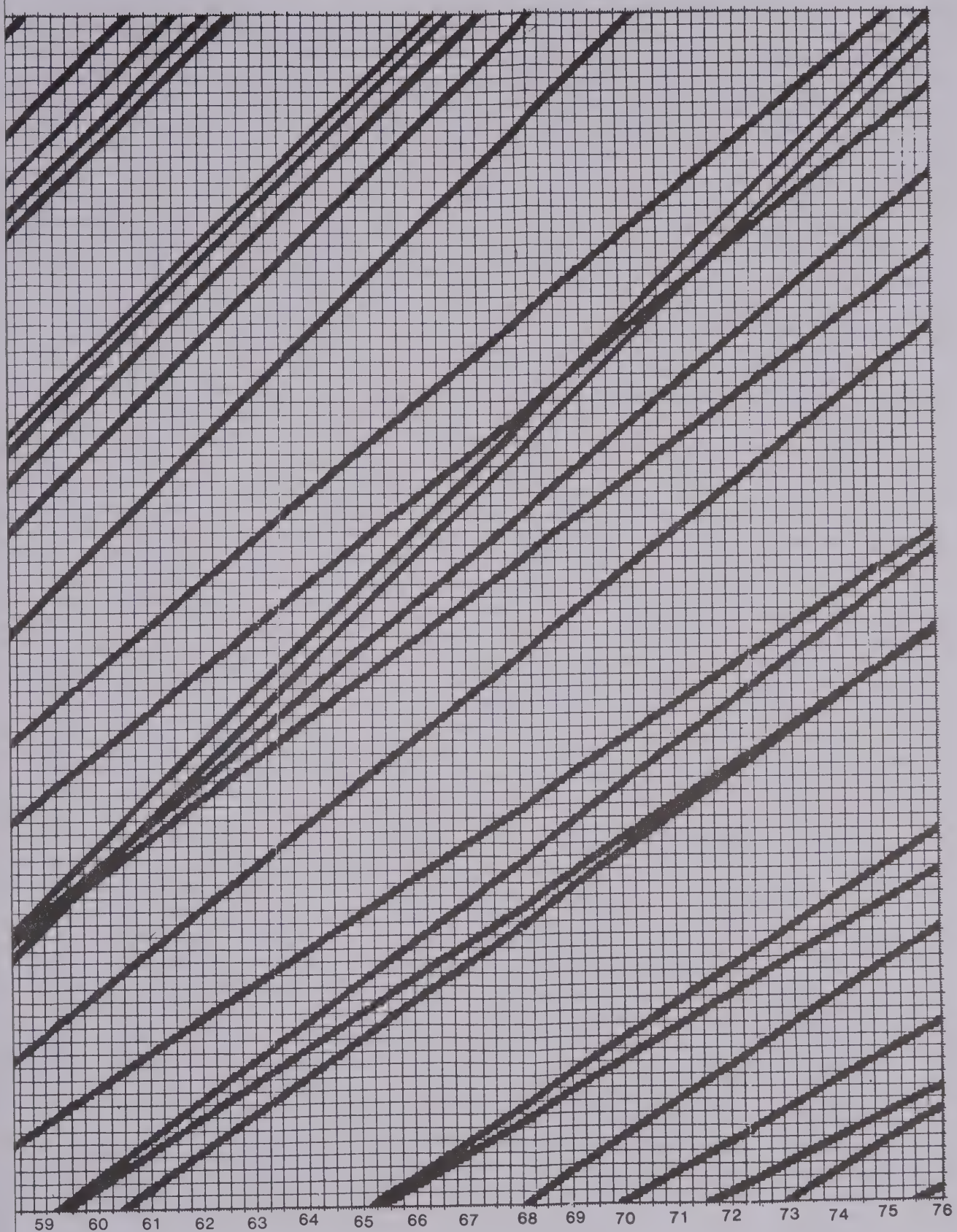
MX-2799 ONLY

ANTENNA MATCHING UNIT CONTROL VOLTAGE CHARD



EL80A315

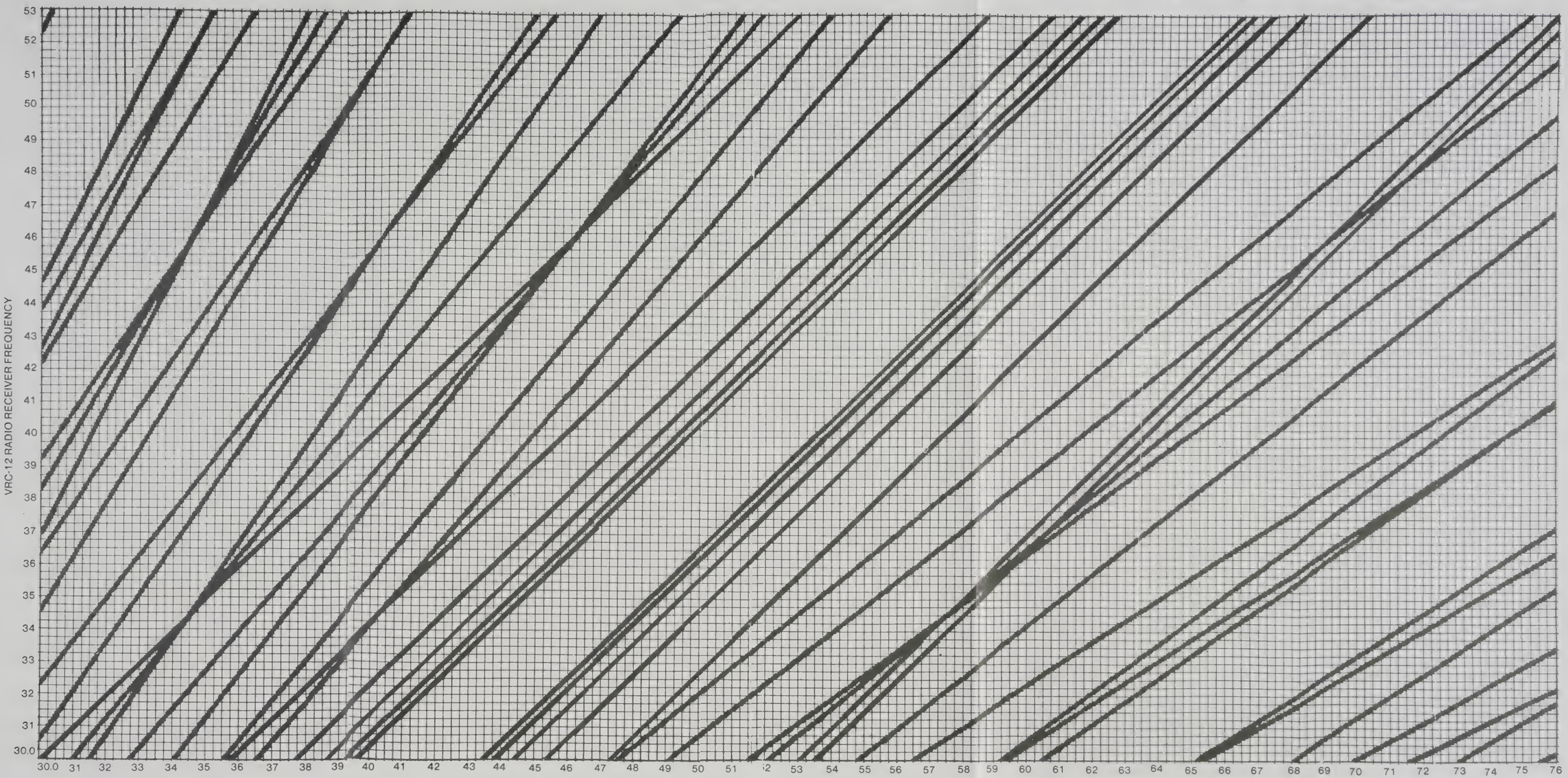
FO-21. AN/VRC-46 (43) Radio Set Diagram (Nonsecure)



EL5820-401-12-TM-125①

Change 2

FO-22. Interfering Frequencies Chart
(Sheet 1 of 2)

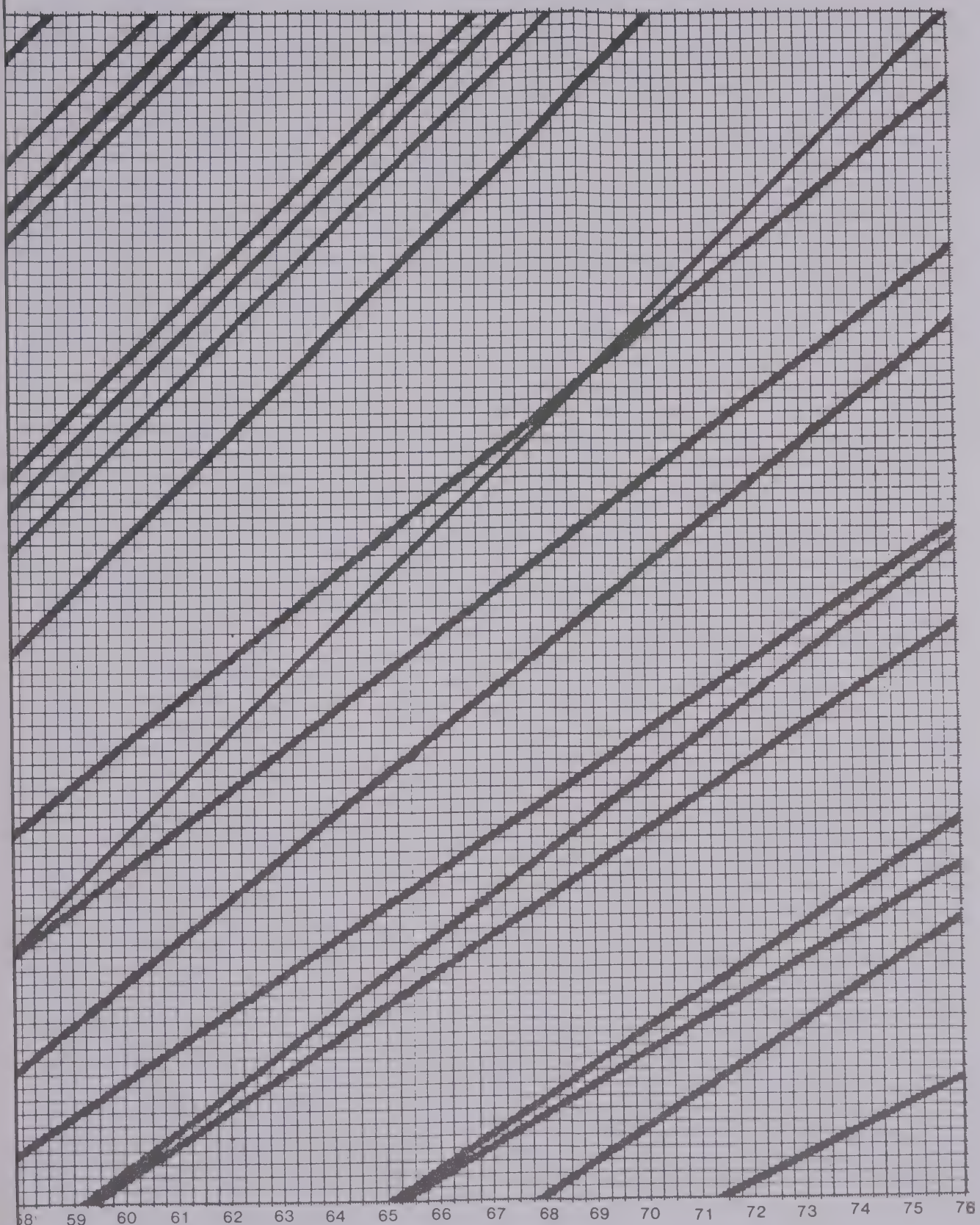


NOTE:

WHEN USING RETRANSMISSION, THE TWO CHANNELS MUST BE SEPARATED BY AT LEAST 10 MHz

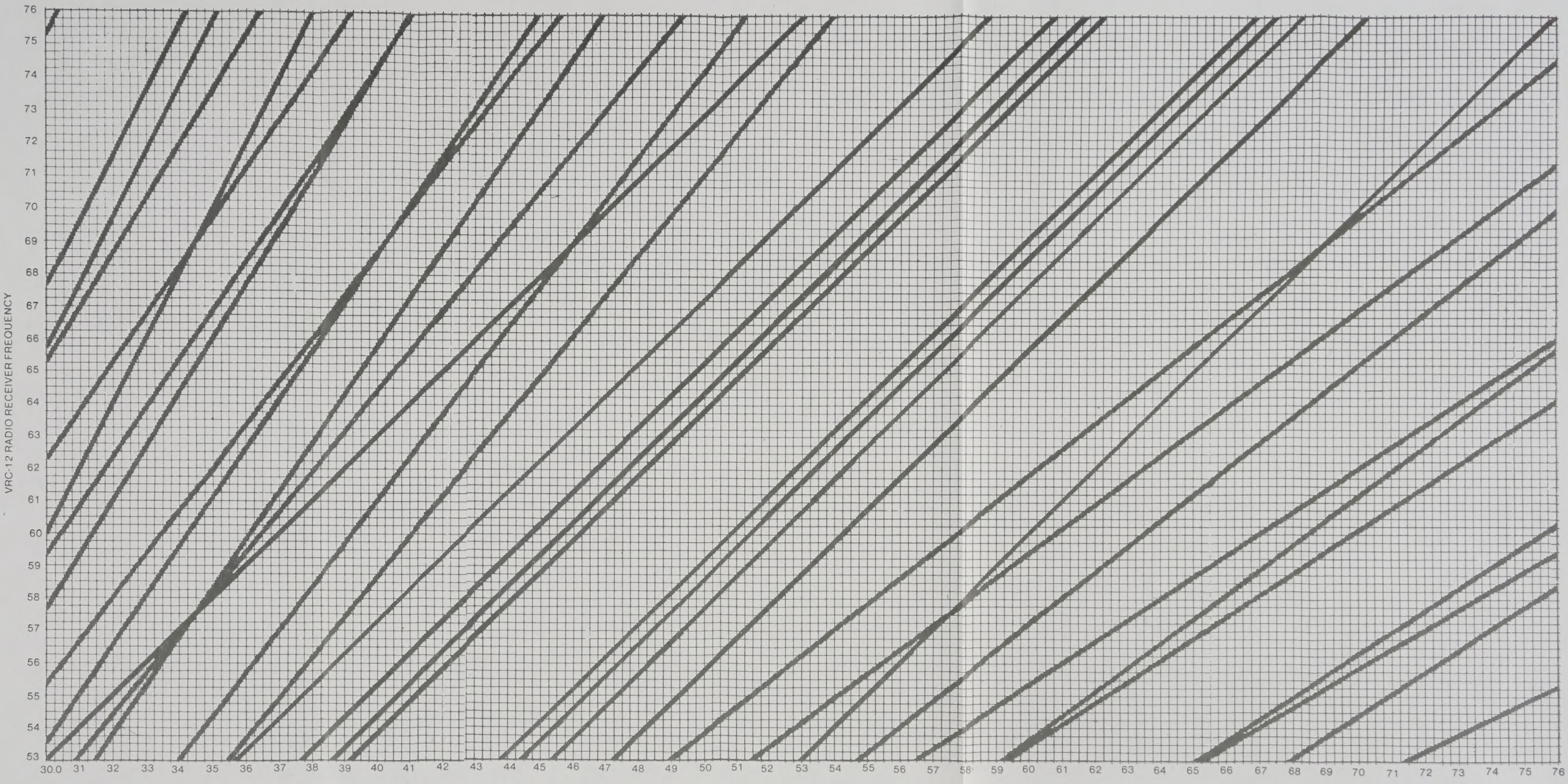
EL5820-401-12-TM-125①

FO-22. Interfering Frequencies Chart (Sheet 1 of 2)



EL5820-401-12-TM-125②

FO-22. Interfering Frequencies Chart
(Sheet 2 of 2)



NOTE:

WHEN USING RETRANSMISSION, THE TWO CHANNELS MUST BE SEPARATED BY AT LEAST 10 MHz

PIN: 054636-000