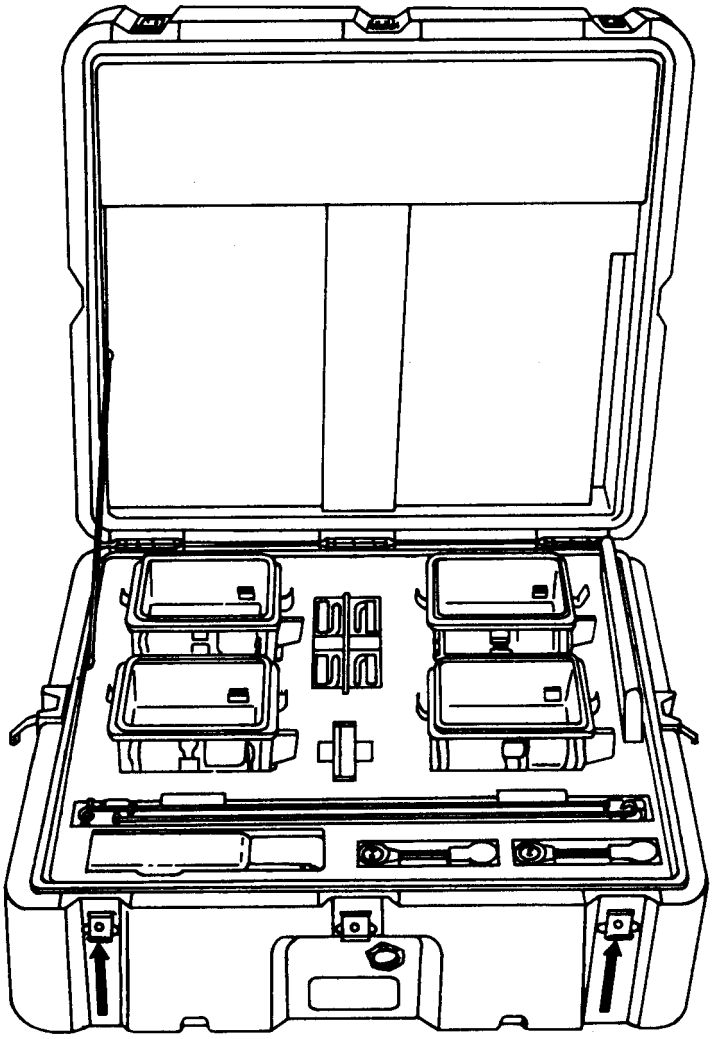
TECHNICAL MANUAL

OPERATOR'S AND UNIT MAINTENANCE MANUAL



SIMULATOR, DETECTOR UNIT, CHEMICAL AGENT AUTOMATIC ALARM, M81

(NSN 6665-01-088-4789)

Approved For Public Release; Distribution Unlimited

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1987

WARNING

The operator must note and carefully follow all M8Al Automatic Chemical Agent Alarm safety Precautions. Carefully read the hazard warnings on the inside front cover of the technical manual, TM 3-6665-312-12&P, before operating the Simulator.

WARNING

If removal of M43A1 Detector outlet filter is required, removal must be performed by authorized personnel.

WARNING

The M81 Simulator weighs about 45 pounds. Use two people to lift it.

CAUTION

Remove transmitter batteries before shipment or inactive service of 30 days or more or damage to transmitter may result.

CAUTION

Do not operate transmitter OPR switch if antenna is not installed.

CAUTION

The M43A1 Interface Cable must not interfere with electrical spring contacts or Interface Cable Retainer on inside of ring or extend between case-top assembly and receiver ring top surface or damage may result.

CAUTION

Any attempt to mount a transmitter tone module in a receiver or vice versa could damage the equipment.

For first aid procedures, refer to FM 21-11.

TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 DECEMBER 1987

Operator's and Unit
Maintenance Manual

SIMULATOR, DETECTOR UNIT,
CHEMICAL AGENT AUTOMATIC ALARM, M81
(NSN 6665-01-088-4789)
Approved For Public Release; Distribution Is Unlimited

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 Armament, Munitions and Chemical Command, ATTN: AMSMC-MAR-T (A), Aberdeen Proving Ground, MD 21010-5423. A reply will be furnished to you.

HOW TO USE THIS MANUAL

Use the front cover locator and marked pages to quickly find the parts of the manual shown on the cover. These portions of the manual were chosen because they are used most often. Inside, the manual has been divided into chapters, sections, and paragraphs which are all numbered sequentially.

Finding the Instruction You Need.

1. How do you start?

Look at the front cover of this manual. On the right side you will find the listing INTRODUCTION. The locator tells you to go to Page 1-1. You must familiarize yourself with M81 Simulator and its components before you begin any task.

2. What do you do if you have a failure?

Look at the symptom index on Page 4-2 and find your symptom. The symptom index will tell you where to find the appropriate troubleshooting procedure. If, for example, none of the receivers respond to the transmitter, you will find this symptom in Paragraph 4-9e.

3. How do you fix a problem?

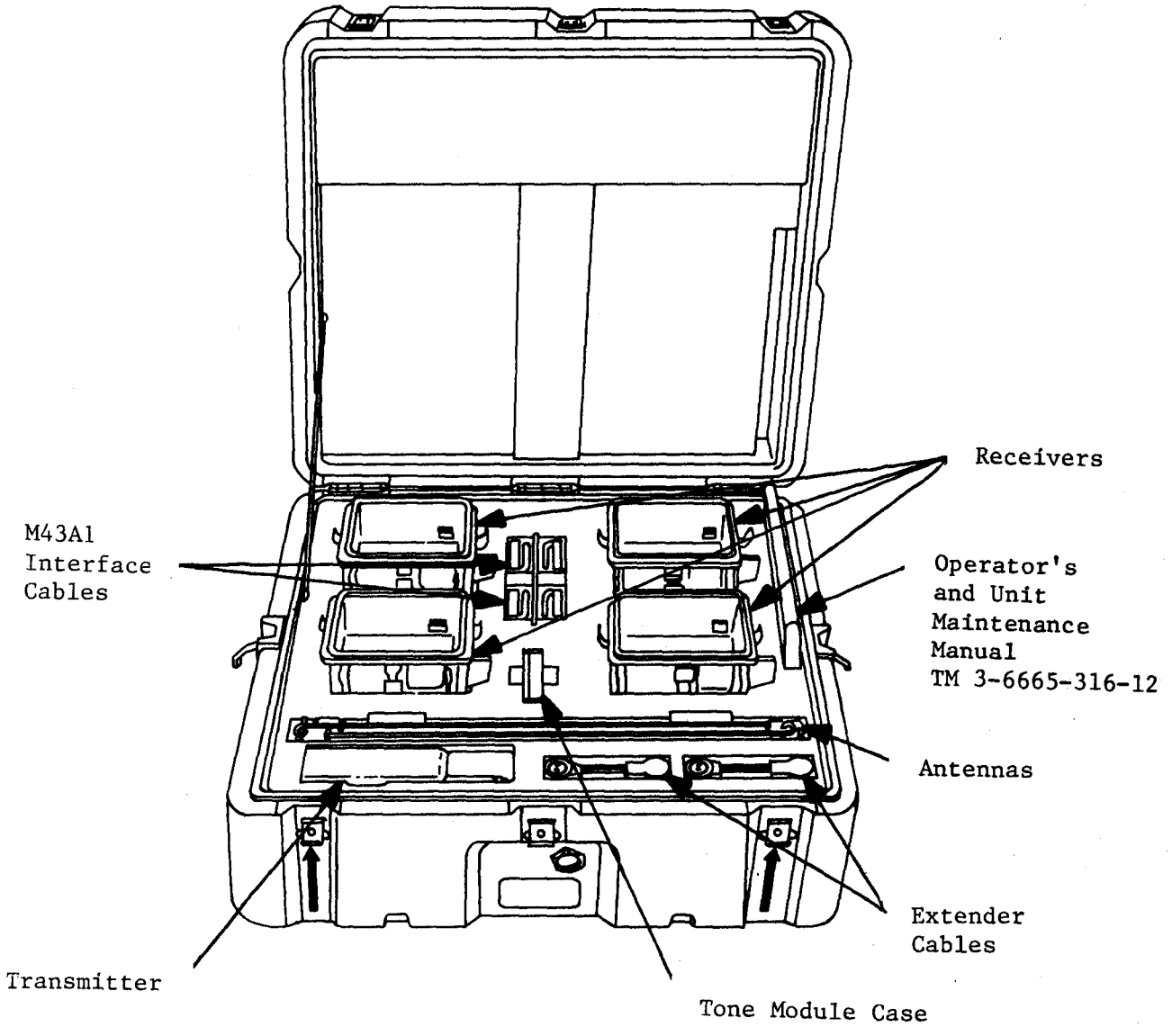
Follow the instructions in the troubleshooting table. Follow the procedure until the problem is fixed.

4. What if these procedures still do not fix the problem?

Obtain a new simulator.

NOTE

Simulators are obtained from Training Audio-visual Support Center (TASC).



SIMULATOR, DETECTOR UNIT,
CHEMICAL AGENT AUTOMATIC ALARM,
M81

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

a. Type of Manual: Operator's and Unit Maintenance Manual.

b. Model Number and Equipment Name: Simulator, Detector Unit, Chemical Agent Automatic Alarm, M81.

c. Purpose of Equipment: Used with M43A1 Detector, part of the M8Al Automatic Chemical Agent Alarm, the Simulator allows training personnel to simulate the movement of a chemical agent cloud across a battlefield.

1-2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

According to TM 43-0002-31, destruction of unclassified chemical training equipment and supplies is not required.

1-4. PREPARATION FOR STORAGE OR SHIPMENT

See Chapter 4, Section V of this manual for this information.

1-5. NOMENCLATURE CROSS-REFERENCE LIST

Common Name	Official Nomenclature
Catch	Catch Strike
CHAN SEL Switch	Selector Switch
Detector	M43A1 Chemical Agent Automatic Alarm Detector Unit
Extender Cable	Power Cable
Gasket	Rubber Seal

1-5 l NOMENCLATURE CROSS-REFERENCE LIST (continued)

Common Name	Official Nomenclature
Latch	Clamping Catch
M42 Alarm	M42 Chemical Alarm Unit
M43A1 Detector	M43A1 Chemical Agent Automatic Alarm Detector Unit
M8A1 Alarm	M8A1 Automatic Chemical Agent Alarm
OPR Switch	Toggle Switch
Simulator	Simulator, Detector Unit, Chemical Agent Automatic Alarm, M81.
TEST GOOD Indicator	Indicator Light

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

If any part of your Simulator 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 or performance. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, US Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD (R), Rock Island, IL 61299-6000. We'll send you a reply.

Section II. EQUIPMENT DESCRIPTION

1-7. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The Simulator has the following characteristics, capabilities, and features:

- Physically and electrically compatible with M43A1 Detectors.
- Operating temperature 20°F to 100°F.
- Splashproof protected for operation in rain and snow.
- Unit mean time to repair of 30 minutes.
- Can be operated by persons wearing chemical protective gear.
- Man-portable.
- Has an effective operating range of 1000 meters.

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

a. Transit Case.

The transit case contains:

ONE TECHNICAL MANUAL TM 3-6665-316-12 (l)--Describes the operating, troubleshooting, and maintenance procedures for the Simulator.

FOUR RECEIVERS (2)--Mounted in and used to activate the M43A1 Detectors.

FIVE INTERCHANGEABLE AND IDENTICAL ANTENNAS (3)--Mount on the transmitter and the receivers.

FOUR EXTENDER CABLES (4)--Used to extend BA3517/U Battery Power Cables when receivers are mounted in M43A1 Detectors.

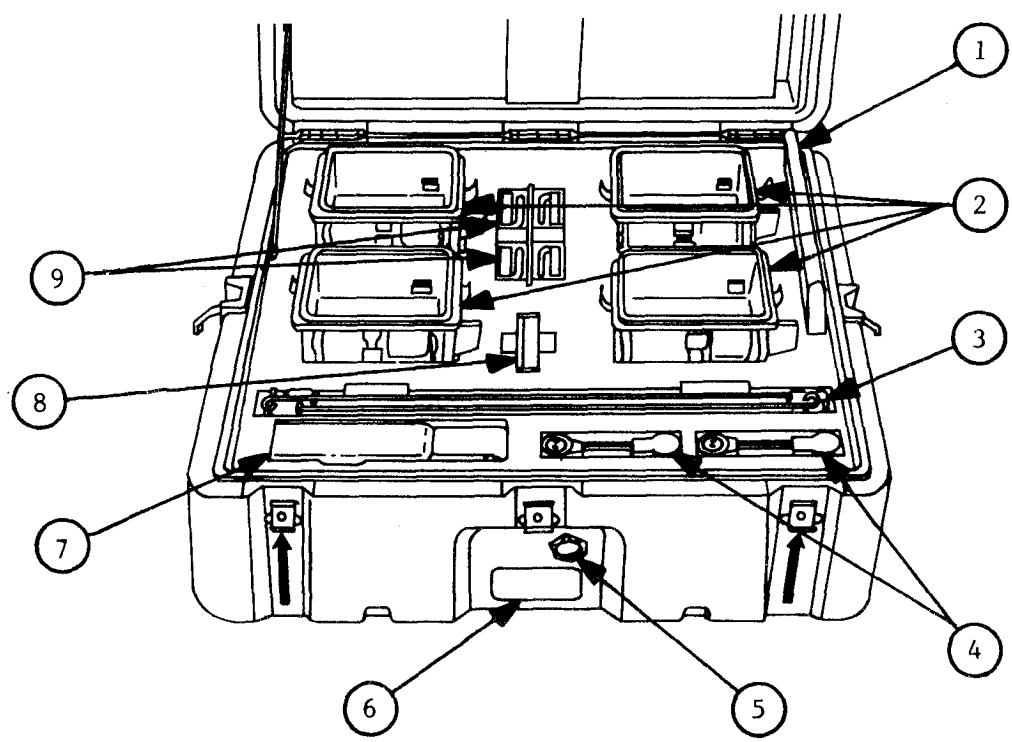
PRESSURE RELIEF VALVE (5)--Used to equalize pressure between the inside and outside of the transit case.

IDENTIFICATION PLATE (6)--Identifies the transit case by part number, serial number, and item name.

ONE TRANSMITTER (7)–-Used to activate the receivers.

ONE TONE MODULE CASE (8)--Used to hold special-purpose tone modules and screwdriver.

FOUR M43A1 INTERFACE CABLES (9)--Used to interface the receivers with the M43A1 Detectors.



1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued)

b. Transmitter

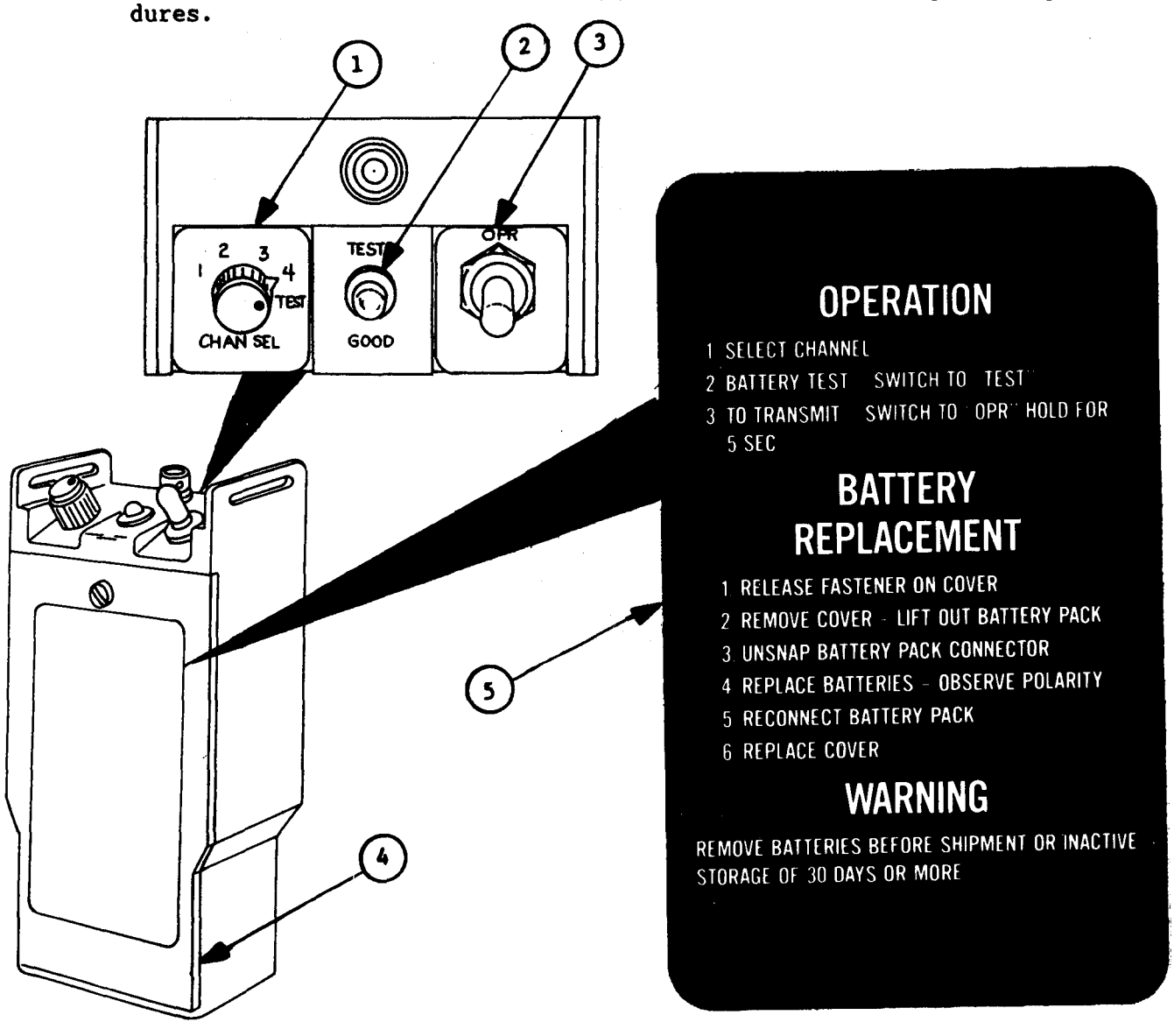
CHANNEL SELECT DECAL (1)--Identifies operating positions of CHAN SEL switch.

TEST GOOD INDICATOR (2)--Indicates power available during transmission or battery test.

OPERATE DECAL (3)--Identifies location of OPR switch.

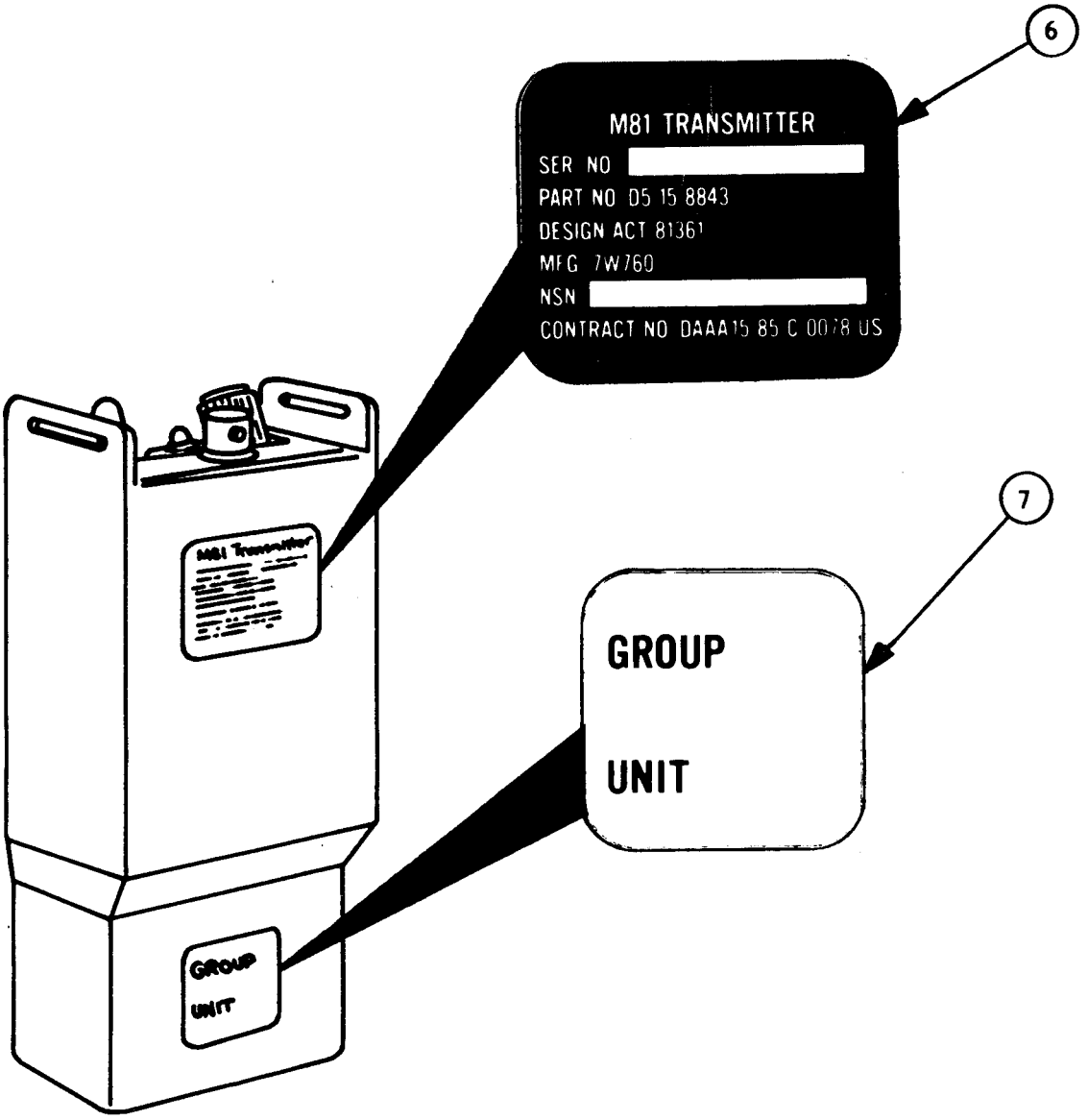
COVER ASSEMBLY (4)--Protects components mounted within chassis assembly against moisture or other substances which could harm transmitter operation.

OPERATING INSTRUCTIONS PLATE (5)--Contains transmitter operation procedures.



IDENTIFICATION PLATE (6)--Identifies transmitter by part number, serial number, and item name.

GROUP/UNIT IDENTIFICATION PLATE (7)--Provides space to record the GROUP and UNIT identification numbers found on the transmitter tone module.



1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued)

BATTERY HOLDER (8)--Contains batteries which power transmitter circuitry.

TRANSMITTER TONE MODULE (9)--Contains circuitry which determines which group of receivers the transmitter can activate.

ENCODER PRINTED WIRING ASSEMBLY (10)--Produces codes which are transmitted to receivers, and determines the sequence of the codes.

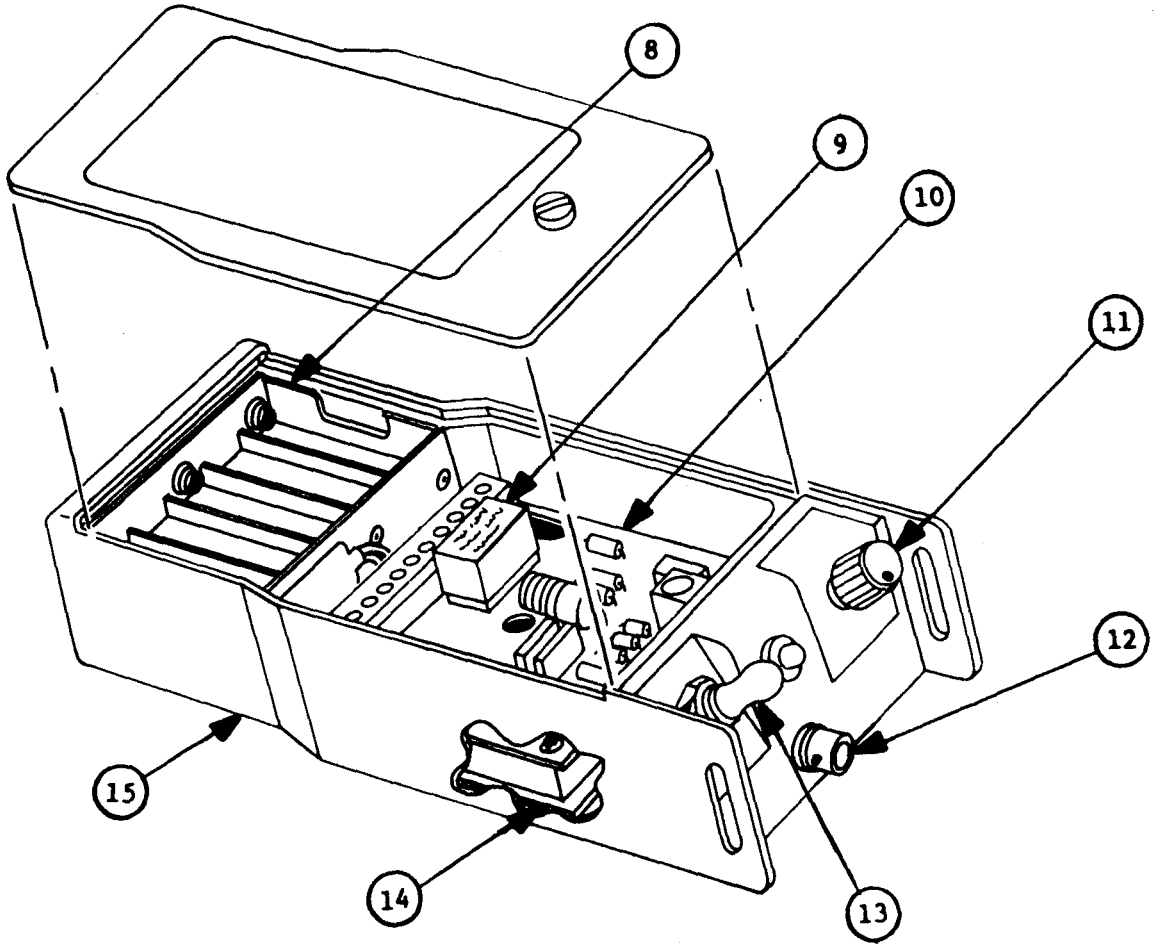
CHAN SEL SWITCH (11)--Switch that allows operator to choose which receivers to activate. In the TEST position, this switch allows you to test transmitter batteries without transmitting a signal.

COAXIAL CONNECTOR (12)--Connects antenna to transmitter.

OPR SWITCH (13)--Switch that allows operator to activate a receiver and test transmitter batteries.

TRANSMITTER PRINTED WIRING ASSEMBLY (14)--Contains circuitry which sends signal to receivers.

CHASSIS ASSEMBLY (l5)--Case in which other transmitter components are mounted.



c. Receiver

GASKET (l)--Provides seal between M43A1 Detector case-top assembly and receiver ring.

ELECTRICAL SPRING CONTACTS (2)--Allow M43A1 Detector heater power to travel between detector case-top and case-bottom assemblies while the receiver is in place.

COAXIAL CONNECTOR (3)--Connects antenna to receiver.

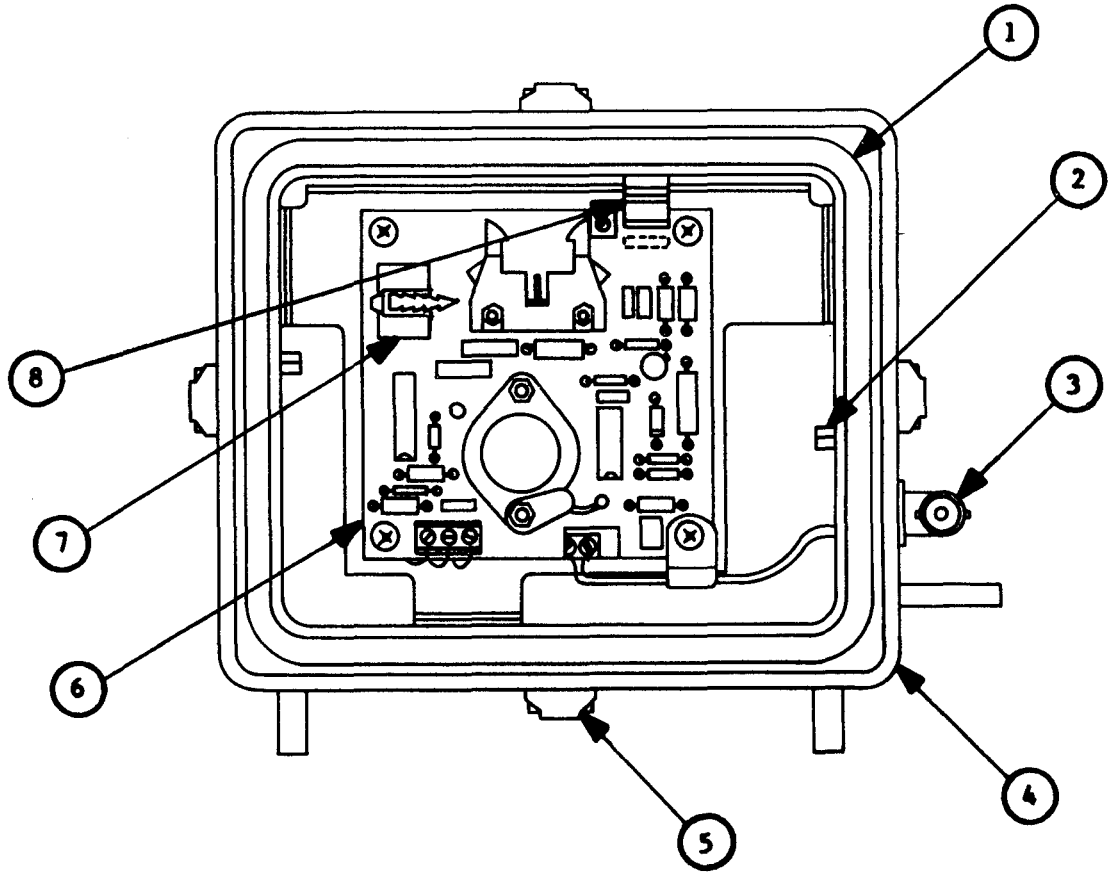
RECEIVER RING (4)--Fits between case-top and case-bottom assemblies of the M43A1 Detector, and provides a mount for all other receiver parts.

LATCHES (5)--Hold receiver to catches on M43A1 Detector case-top assembly.

DECODER PRINTED WIRING ASSEMBLY (6)--Contains circuitry which determines whether the receiver will respond to an encoded signal from transmitter.

RECEIVER TONE MODULE (7)--Contains circuitry that determines which encoded signal will activate the receiver.

INTERFACE CABLE RETAINER (8)--Retains position of M43A1 Interface Cable when receiver assembly is mounted in an M43A1 Detector.,



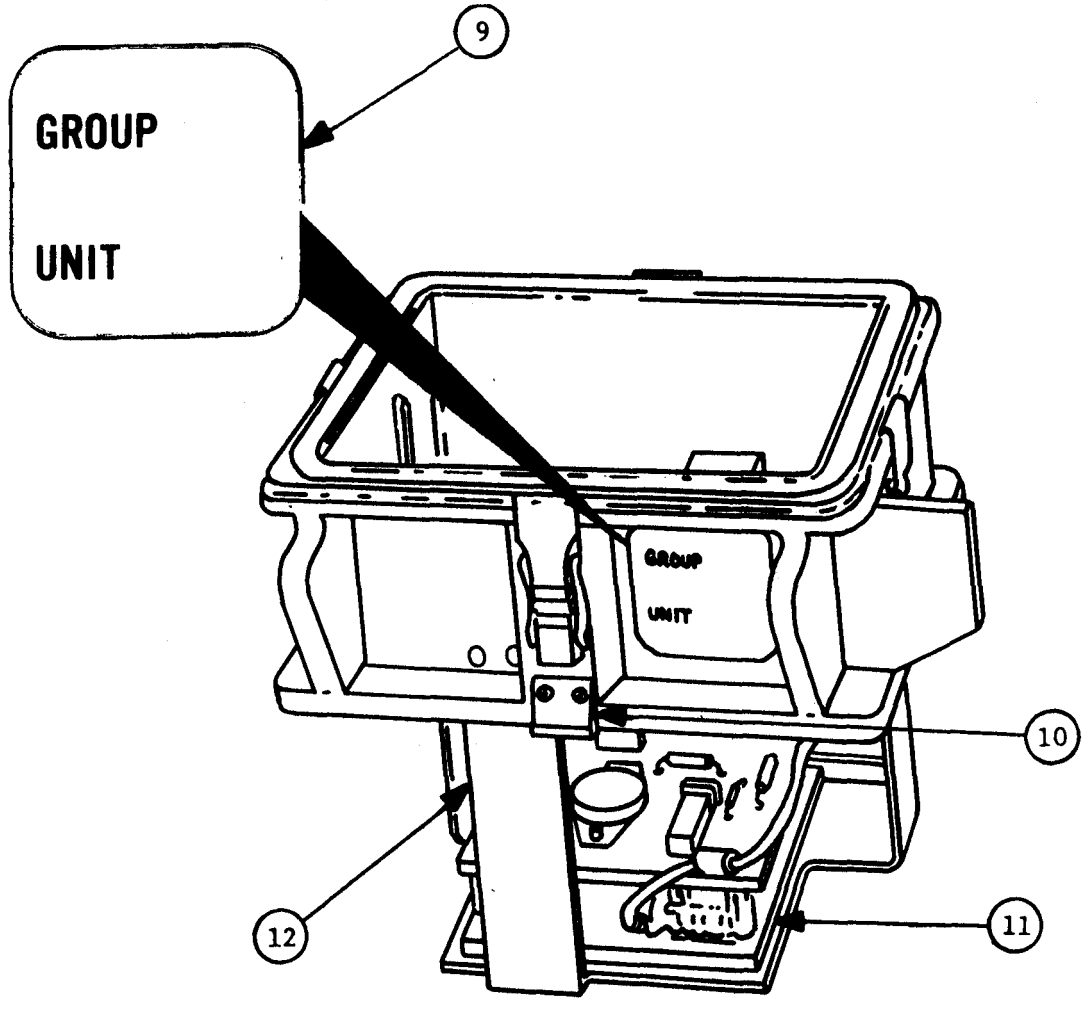
1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued)

GROUP/UNIT IDENTIFICATION PLATE (9)--Provides space to record the GROUP and UNIT identification numbers found on the receiver tone module.

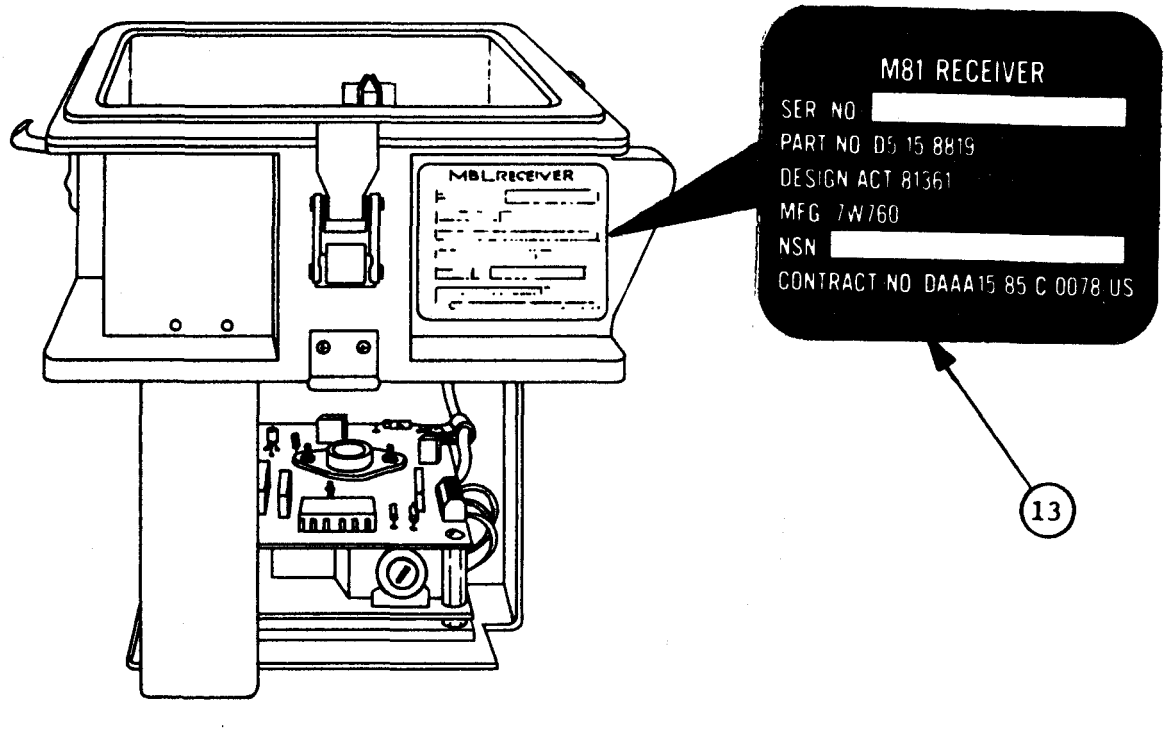
CATCHES (lO)--Hold receiver to latches on M43A1 Detector case-bottom assembly.

RECEIVER PRINTED WIRING ASSEMBLY (11)--Contains circuitry which accepts the encoded signal from the transmitter.

EXTENDER (12)--Lowers receiver electronic components to allow space for M43A1 Detector internal components.



IDENTIFICATION PLATE (13)--Identifies the receiver by part number, serial number, and item name.

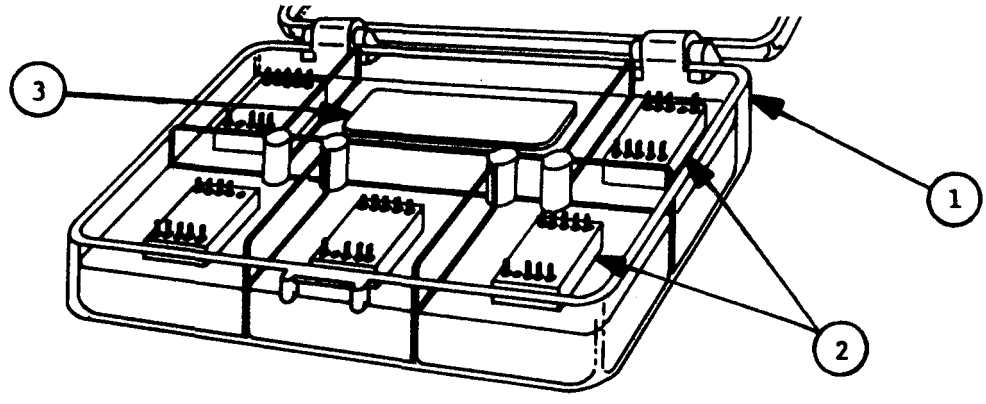


d, Tone Module Case.

TONE MODULE CASE (l)--Holds five special-purpose tone modules and one screwdriver.

ONE SET OF FIVE SPECIAL-PURPOSE TONE MODULES (2)--Allows the receivers to respond only to a transmitter containing a tone module from the same set.

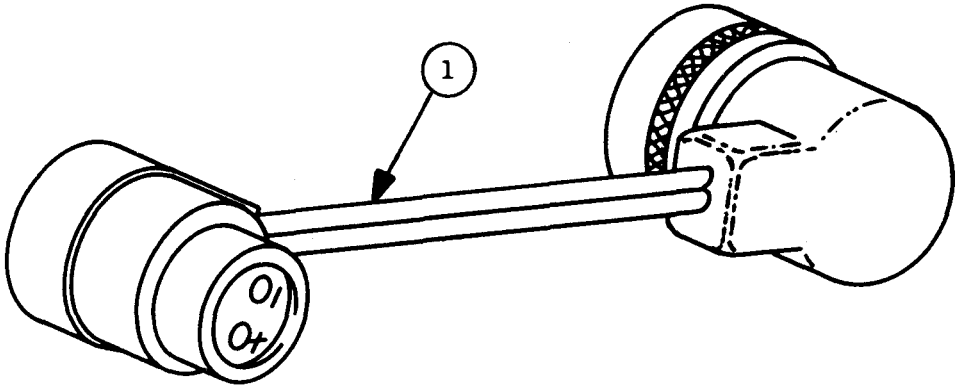
SCREWDRIVER (3)--Used in maintenance of transmitter.



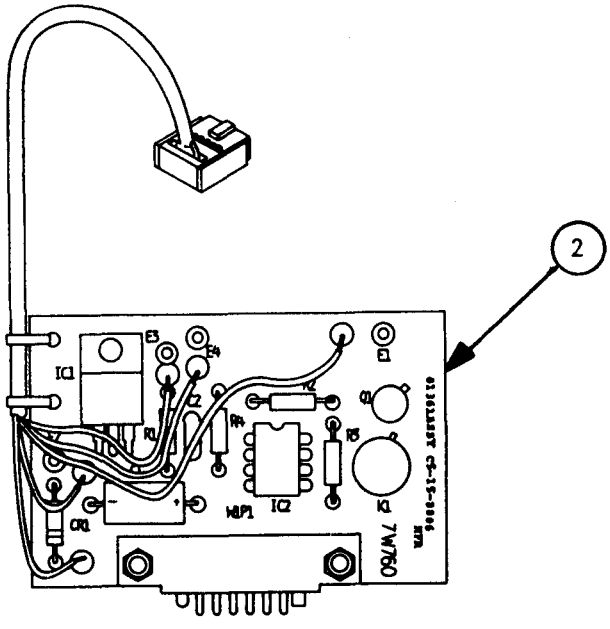
1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued)

e. Cables.

EXTENDER CABLE (l)--Extends the BA3517/U Battery Power Cable when a receiver is mounted on an M43A1 Detector which is powered by an attached BA3517/U Battery.

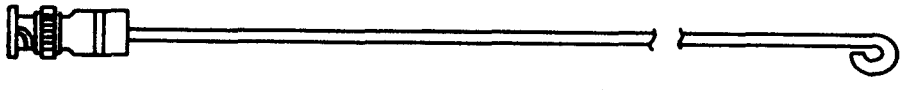


M43A1 INTERFACE CABLE (2)--Provides a connection between receiver circuitry and M43AI Detector Circuitry.



f. Antennas.

Permit propagation of the signal from the transmitter to the receivers.



1-9. EQUIPMENT DATA

Physical Characteristics:

Receiver

Length	7.54 in. (19.2 cm)
Width	6.28 in. (16.0 cm)
Height	5.75 in. (14.6 cm)
Weight	2.5 lb (13 kg)

Transmitter

Length	8.75 in. (22.2 cm)
Width	3.76 in. (9.6 cm)
Height	2.10 in. (5.3 cm)
Weight	2.5 lb (1.13 kg)

Transit Case (Full)

Length	24.25 in. (61.6 cm)
Width	25.88 in. (65.7 cm)
Height	12.31 in. (31.3 cm)
Weight	45.0 lb (20.4 kg)

Electrical Characteristics:

Receiver

- o Frequency type and range: VHF, 141.925 MHz.
- o Frequency stability: 0.001% (14°F(-10°C) to 104°F(4O°C)) .
- o Operating voltage: +12 V ± 15%.
- o Maximum standby current: 20 MA at +12 V.
- o Maximum receive current: 150 MA at +12 V.

Transmitter

- o Frequency type and range: VHF, 141.925 MHz.
- o Frequency stability: 0.0005% (14°F(-10°C) to 104°F(4O°C)).
- o Operating voltage: +15 V ± 15%.
- o Operating current: 180 mA (maximum) at +15 V.

Operating Range:

Nominal 3280-foot (1000-meter) range. In heavy vegetation, uneven terrain, or very hard rain, the range could be reduced. Detectors in which receivers have been installed should be separated from each other by at least 82 feet (25 meters).

1-9. EQUIPMENT DATA (continued)

Environmental Limitations:

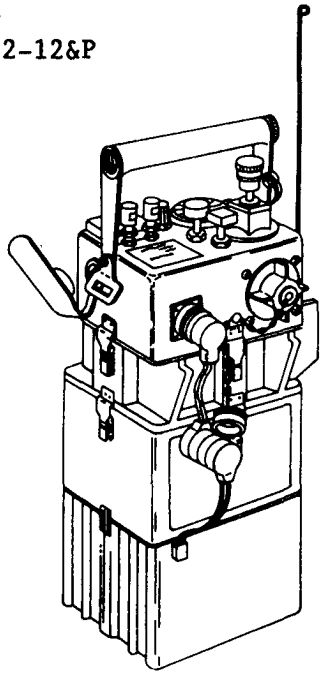
Temperature

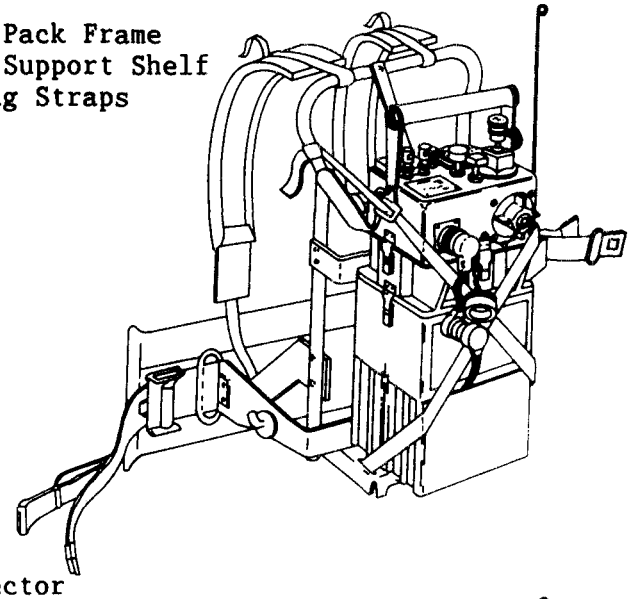
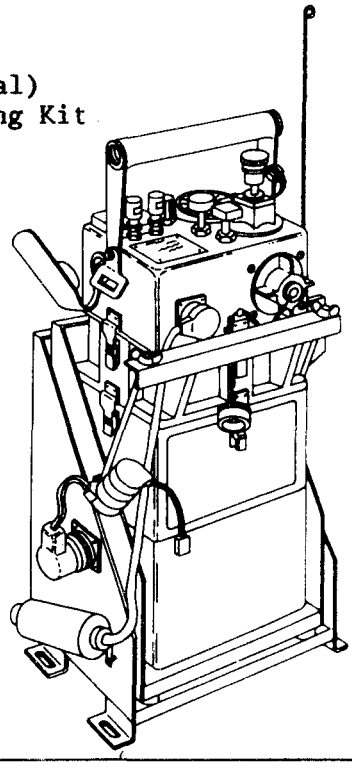
- o Operating: 20°F(-6.7°C) to 1OO°F(37.8°C).
- o Storage: -40°F(-40°C) to 140°F(60°C).

Humidity--up to 100% relative humidity.
Operation in rain or snow--splashproof protected.

1-10. EQUIPMENT CONFIGURATION

TABLE 1-1
CONFIGURATION

Configuration	Equipment Required
Fixed Emplacements	1. M43A1 Detector 2. Receiver Assembly 3. Antenna 4. M42 Alarm (optional, not pictured, up to 5) 5. Power Options a. BA3517/U Battery b. See TM 3-6665-312-12&P 

Configuration	Equipment Required
Manpack	1. M43A1 Detector 2. Receiver Assembly 3. Antenna 4. BA3517/U Battery 5. Backpack a. Field Pack Frame b. Cargo Support Shelf c. Webbing Straps 
Vehicle Mount	1. M43A1 Detector 2. Receiver Assembly 3. Antenna 4. BA3517/U Battery (optional) 5. M228 High Profile Mounting Kit 6. M42 Alarm, not pictured 

1-11. SAFETY, CARE, AND HANDLING

There are no hazards involved with the Simulator itself. However, potential hazards are involved in the operation of M43A1 Detectors. The operating procedures for the M43Al Detector are contained in the Operator's and Organizational Maintenance Manual for M8A1 Automatic Chemical Agent Alarm and Auxiliary Equipment, TM 3-6665-312-12&P.

WARNING

The operator must note and carefully follow all M8A1 Automatic Chemical Agent Alarm safety precautions. Carefully read the hazard warnings on the inside front cover of the technical manual, TM 3-6665-312-126P, before operating the Simulator.

WARNING

If removal of M43A1 Detector outlet filter is required, removal must be performed by authorized personnel.

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-12. GENERAL SYSTEM PRINCIPLES OF OPERATION

The Simulator makes it possible for you to cause M43A1 Detectors to alarm as if a chemical agent has been detected. The effective range of the Simulator is 1000 meters. You can imitate a moving chemical-agent cloud by causing detectors to alarm, one at a time or in groups. Each Simulator consists of one transmitter, four receivers, associated cables and antennas, and two sets of tone modules.

The transmitter is powered by batteries mounted in the unit and is used to broadcast a radio signal. This signal is picked up by the receivers. The receivers are installed in, and receive power from, the host detectors. When a receiver responds to a transmitter signal, that receiver causes its host detector to alarm. It is not necessary that all four receivers be used in a training exercise. Depending on training exercise needs, fewer detectors, and, therefore, fewer receivers, may be used.

The transmitter signal is coded so that only certain receivers respond when the signal is broadcast. The code is determined by a plug-in tone module which is installed in the transmitter. Similar tone modules are installed in the receivers, and determine which receiver(s) will respond to a signal.

Tone modules are identified by SERIAL numbers (for example, 000-1), which are printed on the modules. The first three digits of each SERIAL number are referred to as the GROUP number. The GROUP number tells you to which set a tone module

belongs. The last digit of the SERIAL number is referred to as the UNIT number. The UNIT number tells you if the tone module is to be used in a transmitter (5) or in a receiver (1, 2, 3, or 4).

A GROUP/UNIT identification plate is mounted on the outside of the transmitter and on one face of each receiver ring. When a tone module is installed, the SERIAL number is written on the plate with a china marking (grease) pencil. This allows you to identify the tone module without opening a transmitter or removing a receiver from its detector.

Every tone module is part of a set. Each set consists of one transmitter tone module and four receiver tone modules. Every tone module in a set will have the same GROUP number. A tone module can be used only with other tone modules bearing the same GROUP number.

Each Simulator includes two sets of tone modules. One set is referred to as the standard set, and the other is referred to as the special-purpose set.

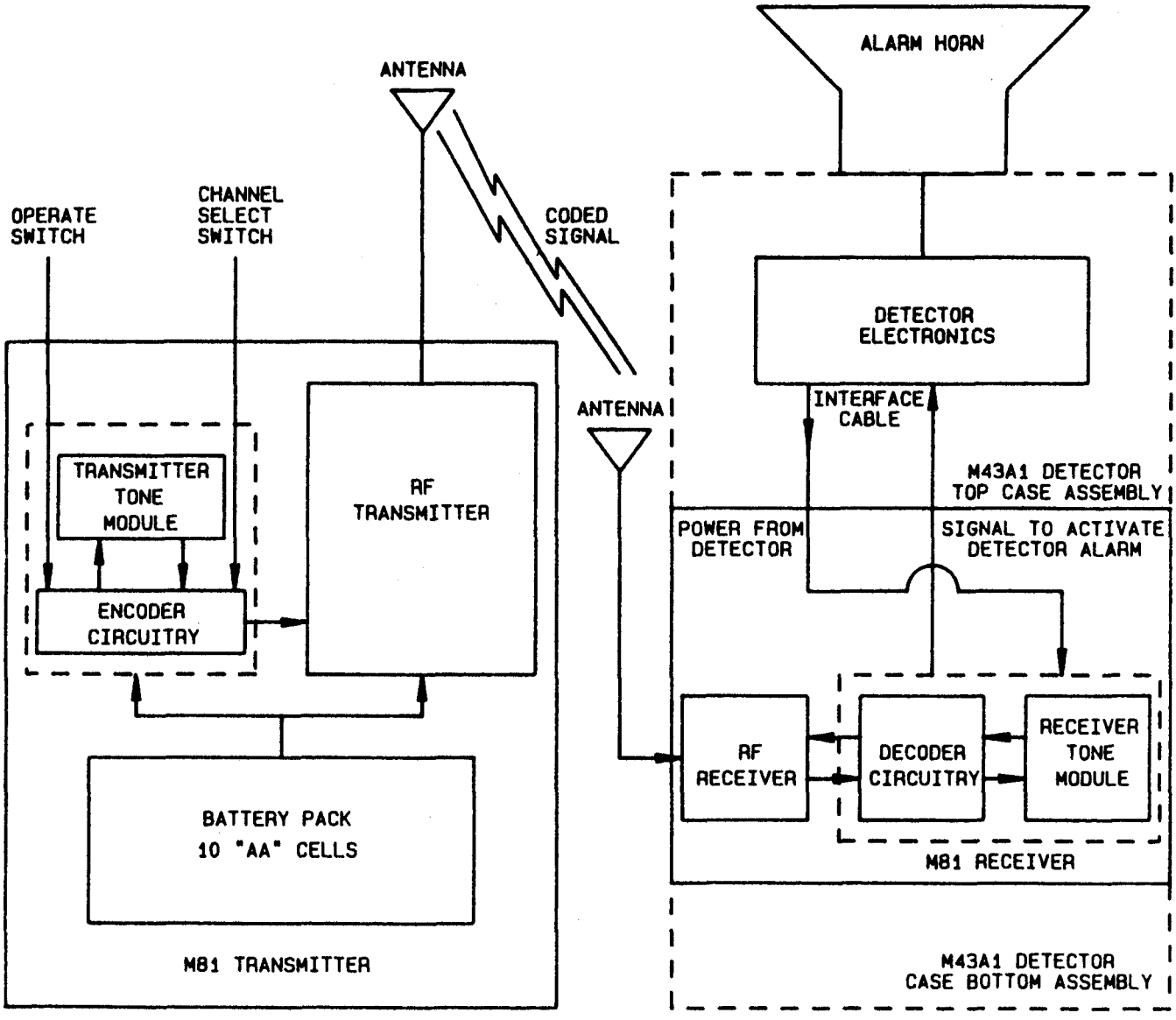
Every standard set has GROUP number 000, and is the same as every other standard set. Any transmitter containing a standard set tone module can cause any receiver containing a standard-set module within range to respond. This allows you to cause two-or-more receivers to respond at a time using a single transmitter.

The special-purpose set has a GROUP number other than 000, and is different than the standard set. A receiver containing a tone module from a special-purpose set will respond only to a transmitter containing a module from that same set. Therefore, two Simulators can be operated in a 1000-meter radius without interference if one Simulator contains a special-purpose set.

Preparing the receiver for operation requires no tools. The receivers are installed between the case-top assemblies and the case-bottom assemblies of the detectors. When receivers are installed, the detectors can still be used in any standard configurations. Prior to operation, transmitter batteries must be installed. This procedure requires use of the screwdriver contained in the tone module case.

Operation of the transmitter requires two steps. First, the CHAN SEL switch is turned to the numbered position matching the UNIT number of the receiver which is to respond. Next, the OPR switch is pushed to the OPR position and held for 5 seconds. When the switch is released, it returns to the OFF position by itself.

The transmitter includes a built-in battery test. When the OPR switch is pushed to OPR and the CHAN SEL switch is in the TEST position, the TEST GOOD indicator will come on if the batteries are adequate. No signal is transmitted when the CHAN SEL switch is in the TEST position. The TEST GOOD indicator will also come on whenever the OPR switch is pushed to OPR and the CHAN SEL switch is in the 1, 2, 3 or 4 positions if the batteries are adequate. A signal is broadcast when the CHAN SEL switch is in the 1, 2, 3 or 4 positions and the OPR switch is pushed to OPR.



PRINCIPLES OF OPERATION

BLOCK DIAGRAM

1-13. TECHNICAL THEORY OF OPERATION

The Simulator makes it possible to activate M43A1 Detectors from up to 1000 meters away. Using the Simulator, an operator can imitate the movement of a chemical agent cloud across an area. Each Simulator consists of one transmitter, four receivers, cables, antennas, and two sets of tone modules.

The transmitter is used to broadcast a frequency-modulated (FM) radio signal, which causes an electronic switch closure in a receiver. This switch closure causes an M43A1 Detector to alarm.

The signal broadcast by the transmitter consists of three different tones which are transmitted in a timed sequence. The actual tones and the order in which they are transmitted can be varied, and make up the signal code. This code determines which receiver(s) will respond to a signal from a transmitter.

The key to the code is the plug-in tone module. The tone module consists of three resistors. The values of the resistors determine the signal tones. The physical positions of the resistors in the tone module determine the basic sequence. The actual sequence in which the tones are transmitted is determined by the setting of the 5-position CHAN SEL switch.

The signal code a receiver will respond to is determined by the receiver tone module. The receiver tone module also contains three resistors. The values of the resistors determine to which tones the receiver will respond. The physical positions of the resistors in the tone module determine to which tone sequence the receiver will respond.

Each tone module is identified by a SERIAL number. The first three digits, or GROUP number, will vary according to the values of the resistors in the tone module. The last digit, or UNIT number, will vary according to the physical positions of the resistors in the tone module. The UNIT number for a transmitter tone module is always 5. The UNIT number for a receiver tone module can be 1, 2, 3, or 4.

The transmitter tone module is mounted on the encoder printed wiring assembly. The receiver tone module is mounted on the decoder printed wiring assembly. Transmitter tone modules cannot be mounted in receivers, and receiver tone modules cannot be mounted in transmitters.

CAUTION

Any attempt to mount a transmitter tone module in a receiver or vice-versa could damage the equipment.

Each tone module is part of a set. Each set consists of one transmitter tone module and four receiver tone modules. The GROUP numbers on all five tone modules in a set will be the same.

1-13. TECHNICAL THEORY OF OPERATION (continued)

Each Simulator includes two sets of tone modules. One set is known as the standard set, and the other set is known as the special-purpose set.

Every tone module in a standard set has a GROUP number 000. Every standard set is the same. That is, the tone modules in all standard sets contain the same resistors arranged in the same sequences. Every tone module with SERIAL number 000-4, for example, is the same as every other tone module with that SERIAL number.

Special-purpose tone module sets have GROUP numbers other than 000. Receivers containing tone modules from a special-purpose set will respond only to a transmitter containing a tone module from the same set.

A transmitter is powered by batteries which are mounted in the unit. Power is routed to the encoder printed wiring assembly when the OPR switch is pushed to OPR and the CHAN SEL switch is set to 1, 2, 3, or 4. A built-in test circuit monitors battery voltage, and causes the TEST GOOD indicator to light if the batteries are good . At the same time, a signal is transmitted.

If the OPR switch is pushed to the OPR position while the CHAN SEL switch is set to TEST, power is routed to a dummy load which simulates the transmitter-circuitry load. If the batteries are good, the TEST GOOD indicator comes on. No signal is broadcast.

Batteries which test GOOD assure that the transmitter can broadcast a signal 1000 meters.

Receivers are installed in, and draw operating power from, the host detectors. Every decoder printed wiring assembly includes a voltage regulator. Therefore, the receiver can be operated whenever power within the correct range (+18 to +36 V) is connected to the detector. The receiver requires a nominal +12 V.

A M43Al Interface Cable is used to connect receiver and detector circuitry when a receiver is installed in a M43A1 Detector. This cable attaches to a test connector on the detector. Power and necessary signals travel between the detector and the receiver through this cable. When a correctly coded transmitter signal is picked up, a relay in the decoder printed wiring assembly closes. This closure routes an electrical ground to the detector circuitry through the interface cable. The ground triggers the built-in-test (BIT) circuit, causing ‘the detector to alarm.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. TRANSMITTER

CAUTION

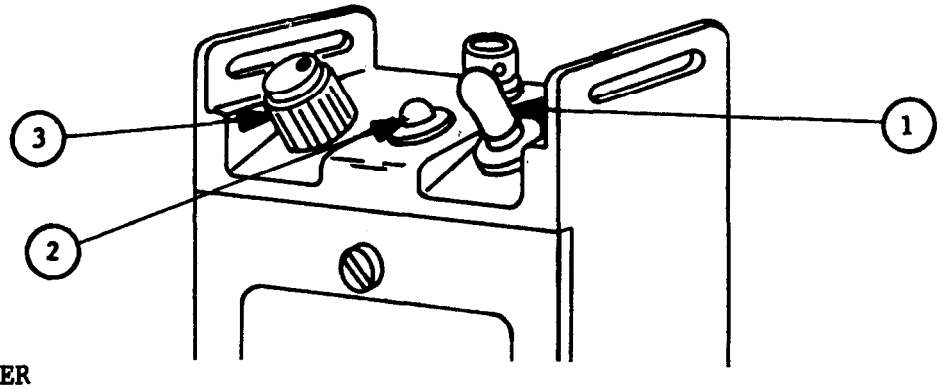
Do not operate transmitter OPR switch if antenna is not installed.

Transmitter controls and indicators consist of the OPR switch, the TEST GOOD indicator, and the CHAN SEL switch.

a. The OPR switch (1) is a 2-position momentary switch. When the switch is in the off position, no current is routed to transmitter circuitry. When the switch is pushed to the OPR position, the TEST GOOD indicator will light if the transmitter batteries are good. The transmitter will broadcast a coded signal if the CHAN SEL switch is in Position 1, 2, 3, or 4.

b. The TEST GOOD indicator (2) is a red indicator light. This indicator comes on whenever the OPR switch is pushed to the OPR position if the transmitter batteries are good.

c. The CHAN SEL switch (3) is a 5-position rotary selector switch. Four positions correspond to UNIT numbers recorded on the GROUP/UNIT identification plates mounted on receivers. The fifth position is the TEST position. When the OPR switch is pushed to the OPR position~ the receiver(s) with a UNIT number matching the CHAN SEL switch numbered setting will be activated. If the CHAN SEL switch is in the TEST position, a battery test circuit will check battery voltage, and no receivers will be activated.



2-2. RECEIVER

The receiver assembly includes no operator controls or indicators.

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-3. GENERAL

a) Purpose. Checks and services listed in Table 2-1 are routine procedures for ensuring Simulator equipment is in serviceable condition.

b) Always keep in mind the CAUTIONS and WARNINGS. Perform the checks listed in Table 2-1 before operating the Simulator equipment.

c) Report any malfunctions or failures on the proper forms (see DA PAM 738-750). If equipment is not serviceable, do not accept on hand receipt.

2-4. PMCS COLUMN ENTRIES

a. Item Number Column. Use this column for item numbers to put in the TM number column on DA Form 2404 Equipment Inspection and Maintenance Worksheet, when recording results of PMCS.

b. Interval Column. This column, headed "B", contains a dot (Ž) opposite the appropriate checks to be performed before operation.

c. Item to be Inspected/Procedure Column. Contains the items to be inspected. This column also contains a brief description of how the check is to be performed. It contains all the information needed-to do the checks and services.

d. Equipment is Not Ready/Available if: Column. This column tells you when and why your equipment cannot be used.

TABLE 2-1
OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation

Item No.	Interval B	Item to be Inspected/Procedure	Equipment is Not Ready/Available if:
1	•	TRANSIT CASE Check to see that transit case contents are complete (Paragraph 1-8a).	Any item is missing.

2	o	**RECEIVER TONE MODULE** NOTE Checks should be done for all four receiver tone modules. Looking down into receiver ring, locate tone module (1).	Tone module is missing.
		NOTE It may be necessary to loosen plastic tiedown strap to read SERIAL number. Carefully note SERIAL number (2) printed on tone module. First three digits of SERIAL number should match three digits recorded next to word GROUP on transmitter GROUP/UNIT identification plate (3). Check if tone module is properly and firmly seated.	First three digits of SERIAL number do not match GROUP digits of transmitter. Tone module is not properly and firmly seated.

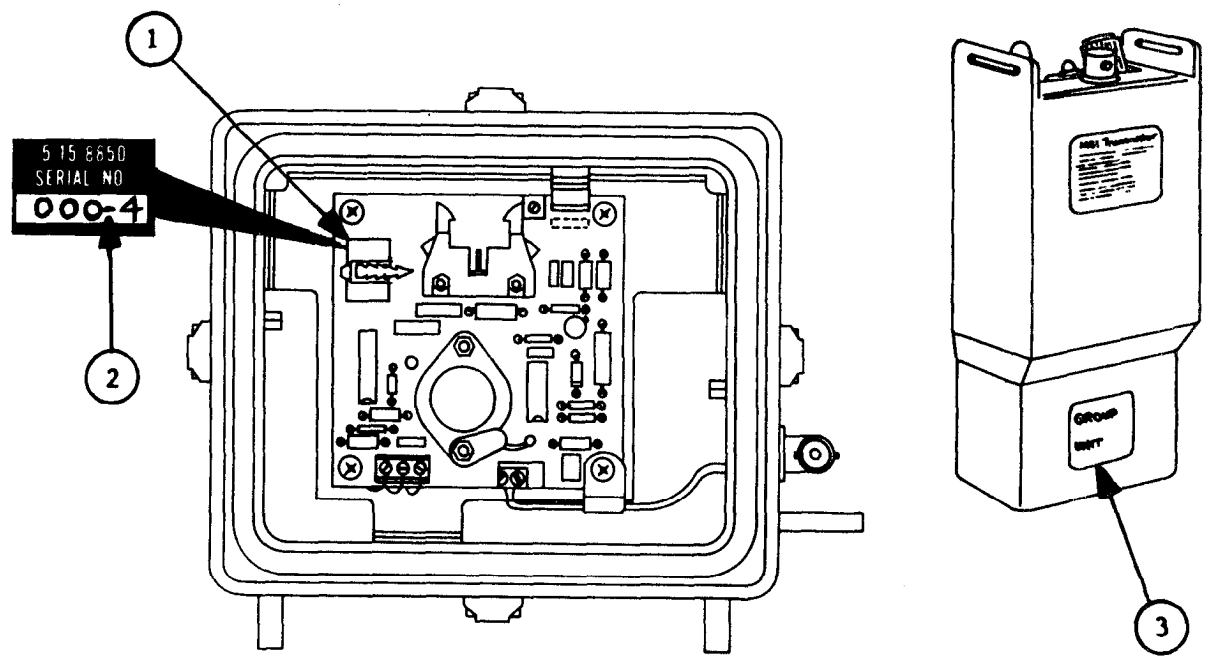
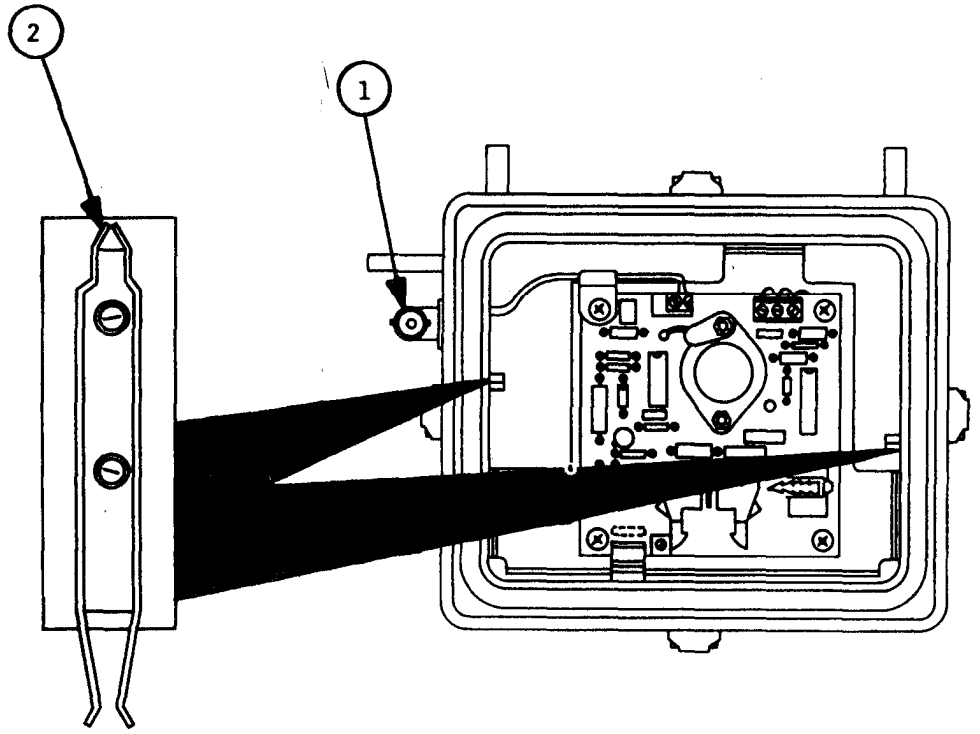


TABLE 2-1
OPERATOR PREVENTIVE MAINTRNANCE CHECKS AND SERVICES (continued)

B-Before Operation

Item No.	Interval B	Item to be Inspected/Procedure	Equipment is Not Ready/Available if:
3	•	**ELECTRICAL SPRING CONTACTS** NOTE Checks should be done for all four receivers. Position receiver so receiver ring is up, extender is down, and coaxial connector (1) is to your left. Looking down into receiver ring, locate two electrical spring contacts (2) mounted on inner surface. Check if any of the electrical spring contacts are bent, broken, or missing.	Contacts are bent, broken, or missing.



B-Before Operation

Item No.	Interval B	Item to be Inspected/Procedure	Equipment is Not Ready/Available if:
4	•	**M43A1 INTERFACE CABLE** NOTE Checks should be made for all four M43A1 interface cables. Locate Connector W1P1 (1). Inspect connector for bent, broken, or missing pins. Locate cable assembly (2). Check if there are any wires which are disconnected.	 Pins are bent, broken, or missing. Wire(s) are disconnected.

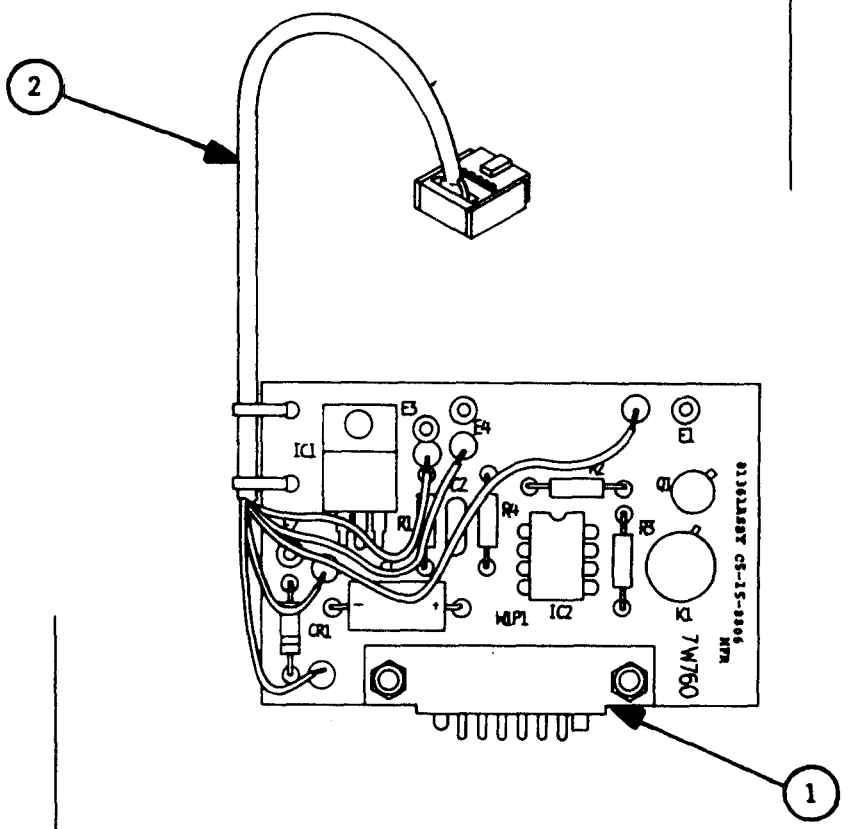
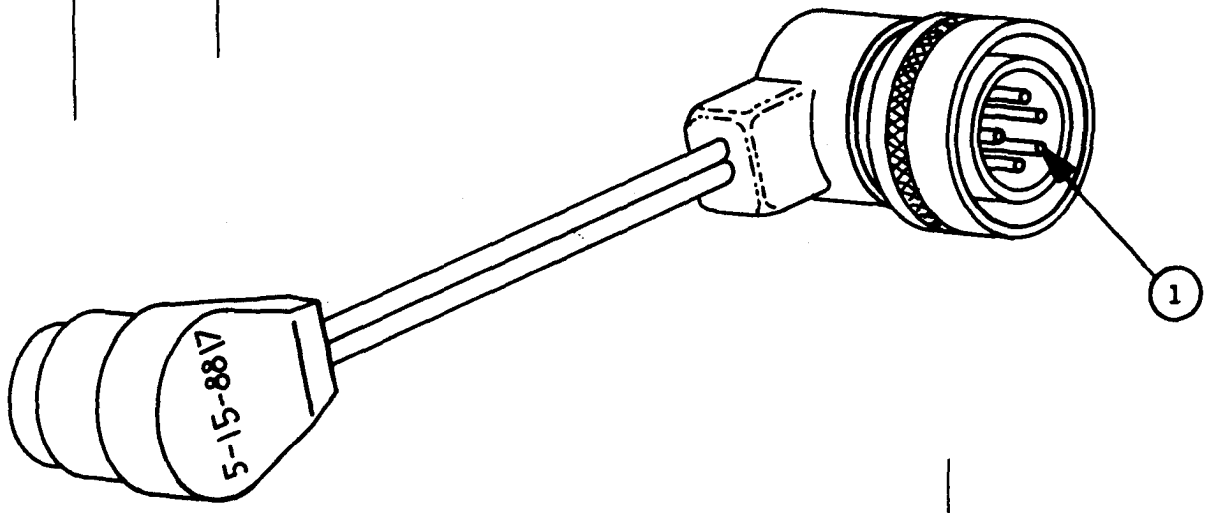


TABLE 2-1
OPERATOR PREVENTIVE MAINTANANCE CHECKS AND SERVICES (continued)

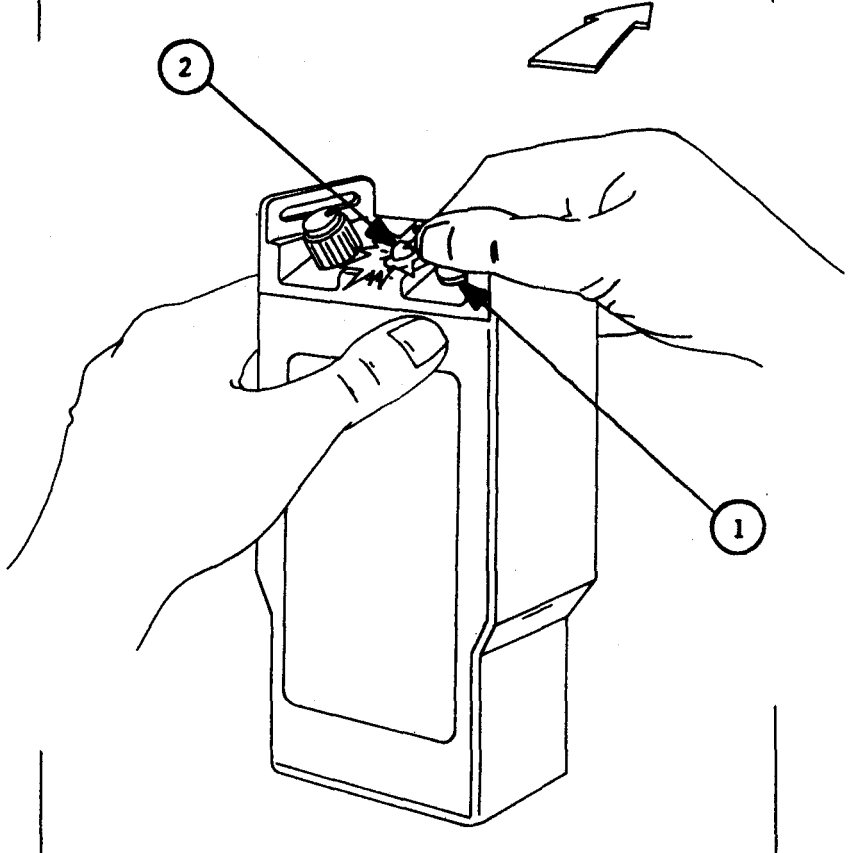
B-Before Operation

Item No.	Interval B	Item to be Inspected/Procedure	Equipment is Not Ready/Available if:
5	•	**EXTENDER CABLE** NOTE Checks should be done for all four extender cables. Inspect cable for frayed insulation. Inspect connectors for bent, cracked, broken, or corroded pins (1).	 Insulation is frayed. Pins are bent, cracked, broken, or corroded.



B-Before Operation

Item No.	Interval B	Item to be Inspected/Procedure	Equipment is Not Ready/Available if:
6	•	**BATTERY TEST** Set CHAN SEL switch of transmitter to TEST position. CAUTION Ensure CHAN SEL switch is in TEST position before pushing OPR switch. Push OPR switch (1) to OPR position. Observe TEST GOOD indicator (2). If indicator light comes on, batteries are good. If indicator light does not come on, batteries are not good.	TEST GOOD indicator light does not come on.



Section III. OPERATION UNDER USUAL CONDITIONS

2-5. ASSEMBLY AND PREPARATION FOR USE

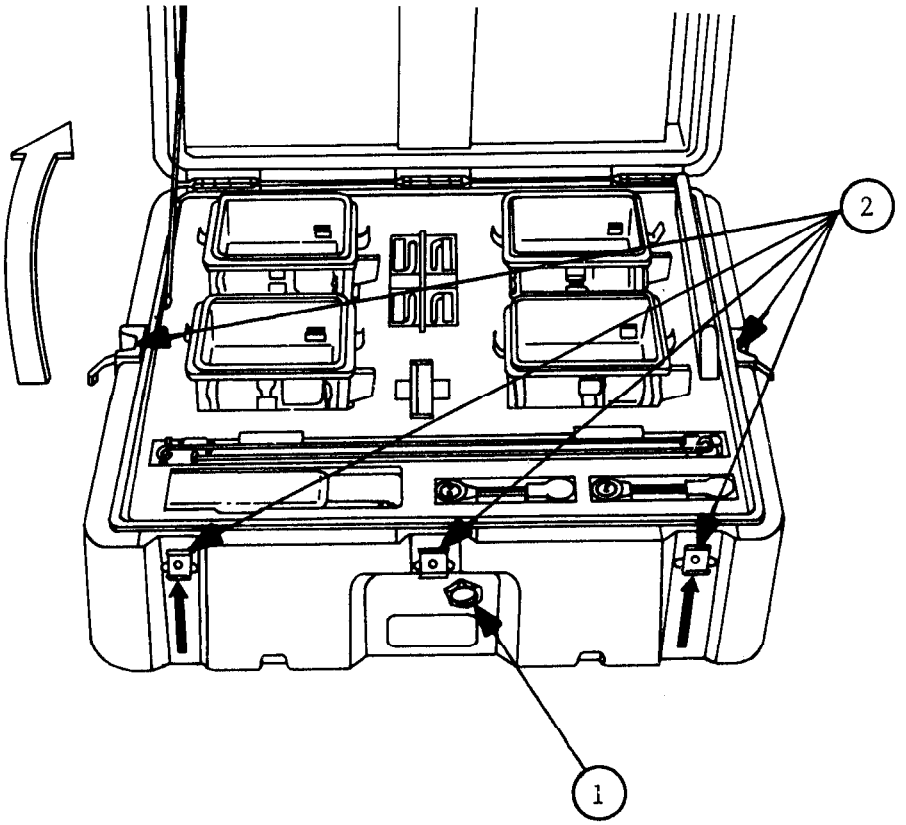
Procedures required to assemble the Simulator and prepare it for use consist of:

- Transit Case Opening Procedures.
- Installation of Transmitter Antenna.
- Ensure the M43A1 Detector is Operating Properly.
- Installation of Receiver in M43A1 Detector.

a. **Transit Case Opening Procedure**

To open the transit case, perform the following:

1. Position transit case on flat surface so pressure relief valve (1) is toward you and on the bottom half of the case.
2. Press pressure relief valve to relieve pressure that may have built up in the case.
3. Unhook latches (2).
4. Open transit case to show Simulator parts.
5. Use transit case for transport or storage as needed.



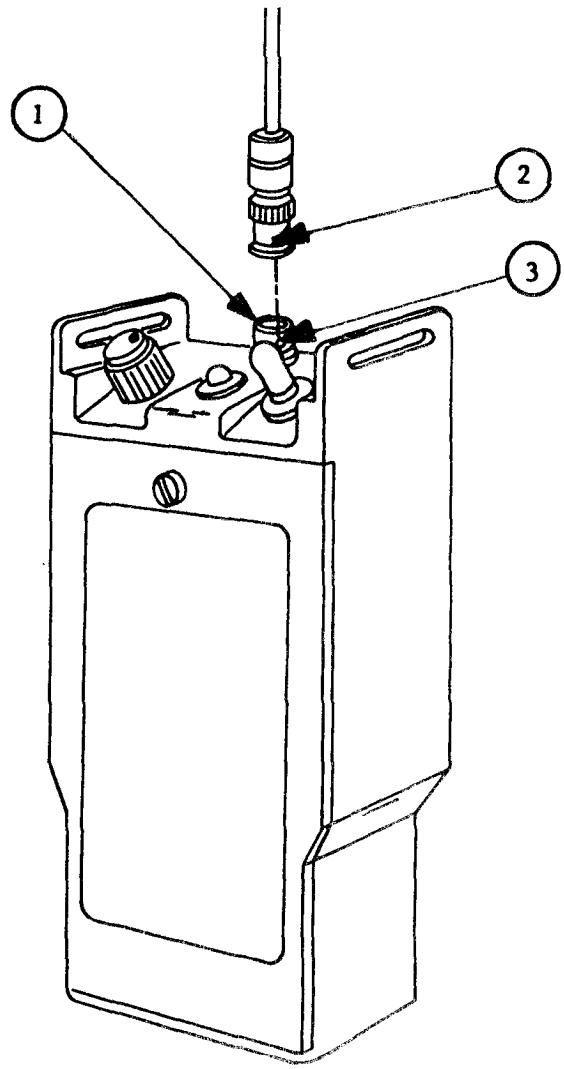
b. Installation of Transmitter Antenna

To install transmitter antenna, perform the following:

1. Locate coaxial connector (l).

2. Remove antenna from transit case. Aline slots (2) on antenna jack with studs (3) on coaxial connector.

3. Push antenna jack down onto coaxial connector and, at same time, turn antenna jack clockwise l/4 turn to lock.



c. Ensure the M43A1 Detector is Operating Properly

Perform the operational check in Operator PMCS Procedures (TM 3-6665-312--l2&P).

2-5. ASSEMBLY AND PREPARATION FOR USE (continued)

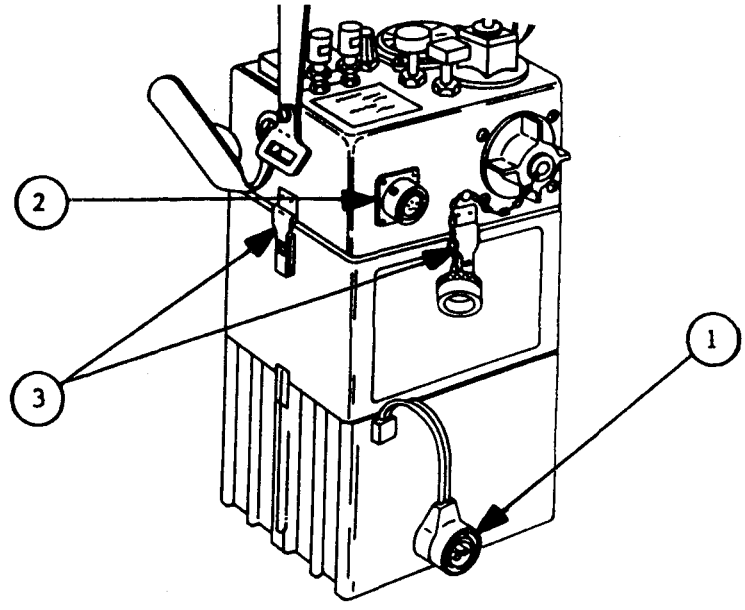
d. Installation of Receiver in M43A1 Detector

To install a receiver in an M43A1 Detector, perform the following:

1. Position detector so that the words 24 VDC INPUT and AIR FILTER are toward you.

2. If detector is powered by BA3517/U Battery, pull out on BA3517/U Battery Power Cable connector (1) until it is disengaged from 24 VDC INPUT connector (2). If detector is connected to any other power source, turn power source connector lockring 1/4 turn counterclockwise, and then pull it away from 24 VDC INPUT connector until connectors are disengaged.

3. Release four latches (3) holding detector case-top assembly to case-bottom assembly. Disengage latches from catches on case-top assemblv.



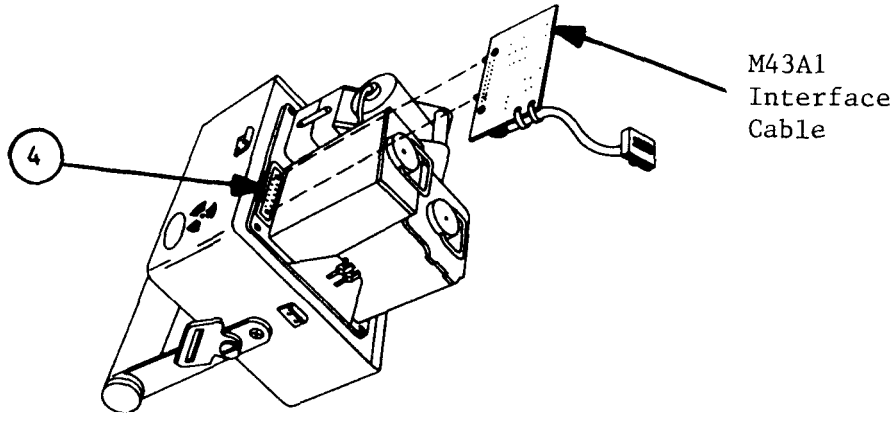
4. Pull up on detector carrying handle until detector internal components clear rim of case-bottom assembly.

5. Position case-top assembly so word CAUTION and black radiation hazard symbol on one face of case-top assembly are up, internal components point up at an angle to your right, and case-top assembly rests on carrying handle and one top edge (as shown).

6. Remove M43A1 Interface Cable from transit case.

7. Line up pins on plug on M43AI Interface Cable with holes on 14-pin Test Connector J1O (4). Be sure keying pins on two connectors line up male-to-female.

8. Push pins on M43A1 Interface Cable plug into holes on Test Connector J1O until pins are fully seated.



9. Remove receiver from transit case.

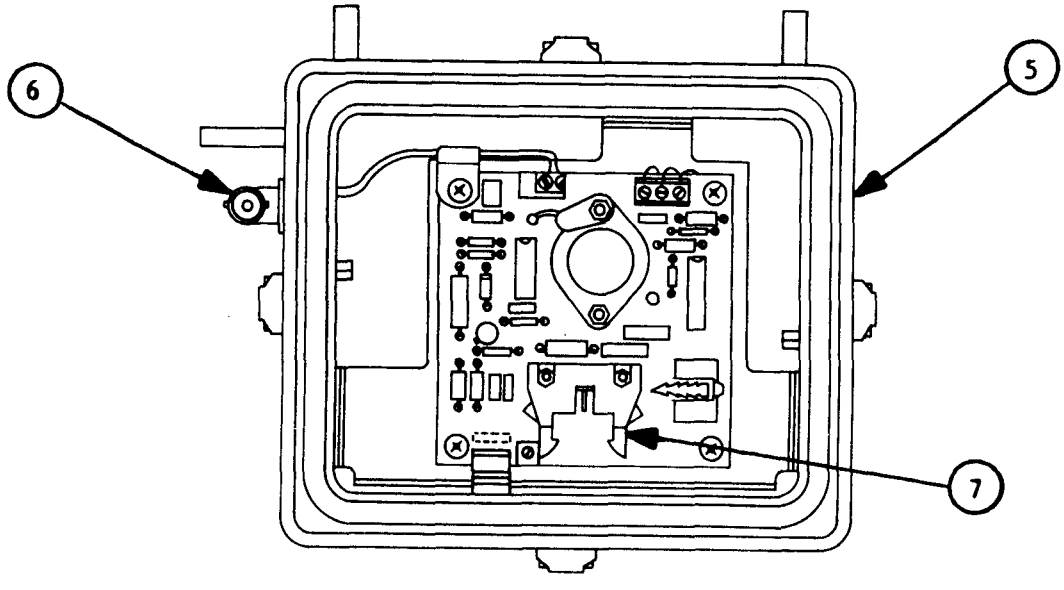
10. Position receiver (5) on flat surface so receiver ring is up, extender is down, and coaxial connector (6), is to your left.

11. Looking down into receiver ring, locate Connector P1 (7) on decoder printed wiring assembly.

12. Position case-top assembly above receiver ring so word CAUTION and black radiation hazard symbol are toward you.

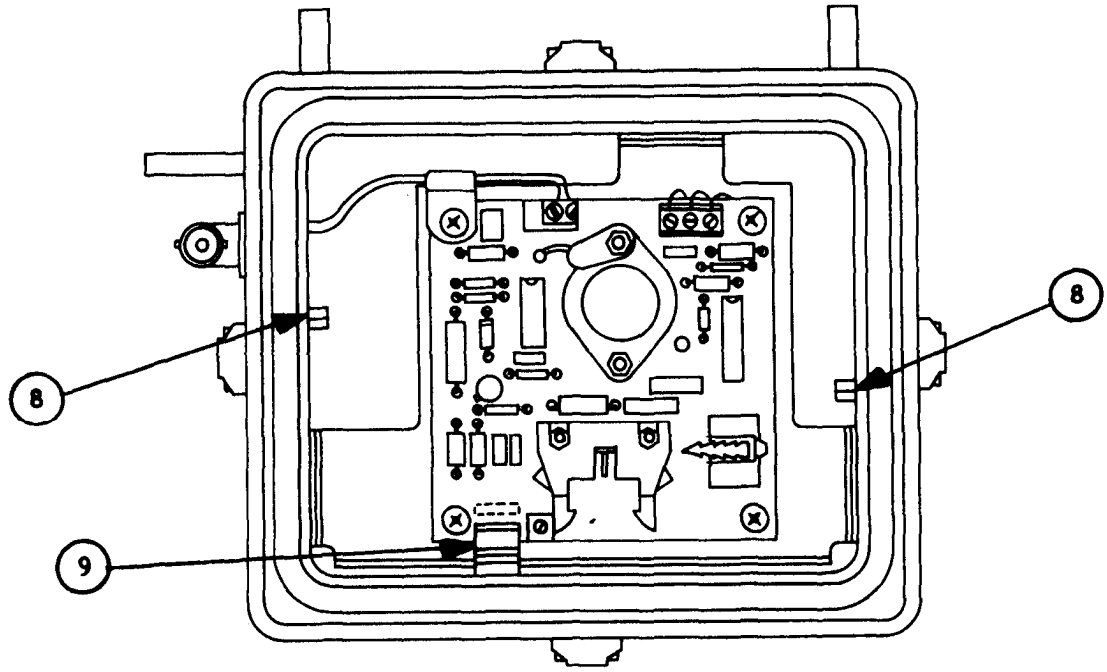
CAUTION

The M43A1 Interface Cable must not interfere with electrical spring contacts or Interface Cable Retainer on inside of ring or extend between case-top assembly and receiver ring top surface or damage may result.



2-5. ASSEMBLY AND PREPARATION FOR USE (continued)

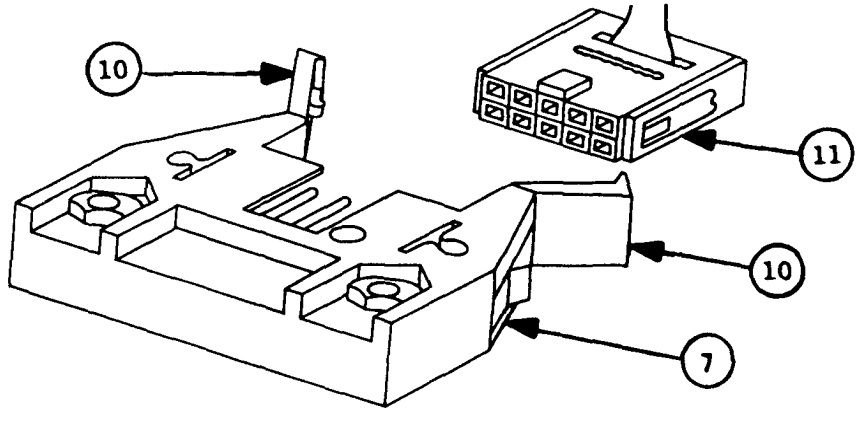
13. While guiding M43A1 Interface Cable out thru bottom of receiver ring, lower detector internal components into receiver ring. Be sure none of M43Al Interface Cable extends between case-top assembly and receiver ring top surface. Be sure cable does not interfere with electrical spring contacts (8) or interface cable retainer (9) on inside of receiver ring.



14. Lower case-top assembly until bottom surface contacts top surface of receiver ring, ensuring M43A1 Interface Cable board is properly seated in interface cable retainer.

15. Engage four latches on receiver ring with four catches on case-top assembly. Push down on four locking tabs to lock latches.

16. Push two catches (10) on Connector PI (7) on decoder printed wiring assembly apart. Line up M43A1 Interface Cable Connector J1 (11) with Connector P1.



17. Push M43A1 Interface Cable connector onto Connector P1 until catches on Connector P1 close on back of M43A1 Interface Cable connector. Push two catches together until they snap into straight-ahead position. Carefully tuck excess cable into receiver ring so that no part of cable sticks out.

18. Position case-bottom assembly so USUAL RESERVICING INSTRUCTION plate is toward you.

19. Position case-top assembly and receiver assembly above case-bottom assembly. The words 24 VDC INPUT and AIR' FILTER should be toward you .

20. Lower receiver until bottom surface of receiver ring contacts top surface of case-bottom assembly.

21. Engage four latches on case bottom assembly with four catches on receiver ring. Push down on latch-locking tabs to lock latches.

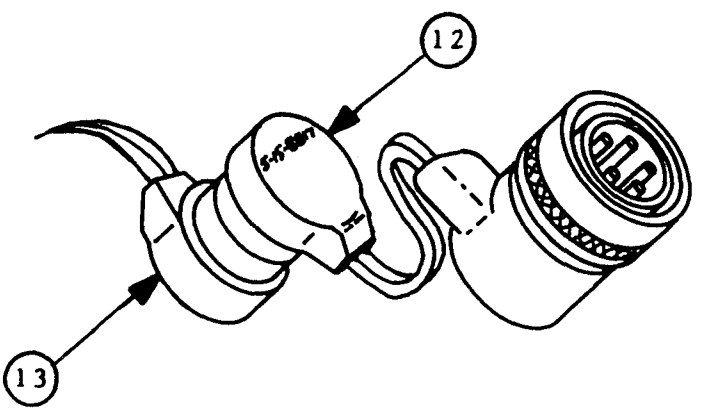
NOTE

Do not connect power source connector to 24 VDC INPUT connector until so instructed.

22. If BA3517/U Battery is installed with the M43A1 Detector, begin at Step 23. If BA3517/U Battery is not installed with M43A1 Detector, go to Step 25.

23. Remove extender cable from transit case.

24. Push extender cable connector (12) and BA3517/U Battery Power Cable connector (13) together until they are fully seated.

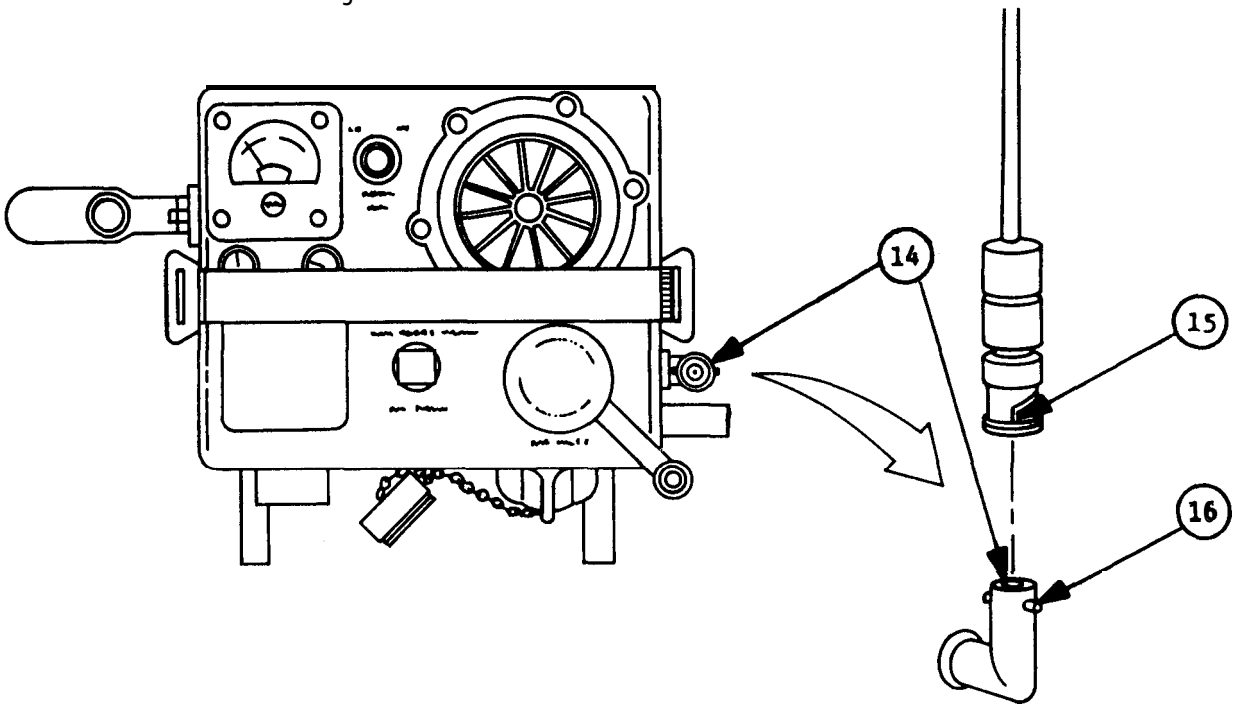


2-5. ASSEMBLY AND PREPARATION FOR USE (continued)

25. Locate coaxial connector (14) on one face of receiver ring.

26. Remove antenna from transit case. Aline slots (15) on antenna jack with studs (16) on coaxial connector.

27. Push antenna jack down onto coaxial connector and, at same time, turn antenna jack clockwise 1/4 turn to lock.



28. If detector is to be powered by BA3517/U Battery, perform Steps 29 and 30. If detector is to be powered by source other than BA3517/U Battery, go to Step 31.

29. Notify personnel within audible range that an alarm may sound. Push extender cable connector onto M43A1 Detector 24 VDC INPUT connector and then turn connector 1/4 turn clockwise to lock.

30. Go to Step 32.

31. To connect power source other than BA3517/U Battery, notify personnel within audible range that an alarm may sound. Push power source connector onto M43A1 Detector 24 VDC INPUT connector and then turn power source connector lockring 1/4 turn clockwise to lock.

32. If alarm sounds when power is connected, allow the alarm to sound at least five times. Then press BATTERY TEST AND RESET PRESS button. The BATTERY TEST AND RESET PRESS button may have to be held down for 60 seconds. The above procedure may have to be repeated several times.

33. Repeat the above steps for each receiver.

34. Perform the Receiver Test Procedure (Paragraph 4-17).

35. You are now ready to go onto Operating Procedures (Paragraph 2-6).

2-6. OPERATING PROCEDURES

a. Choosing a Site

When you are choosing a site for an exercise in which a Simulator will be used, you need to take into account two things:

- o Are the receiver/detectors deployed the way they would be on a battlefield?
- o Are the receiver/detectors and transmitter deployed so that the signal from the transmitter can reach all receiver/detectors and cause the detectors to go into alarm?

1. Are the receiver/detectors deployed the way they would be on a battlefield?

The M43A1 Detector is designed to provide a tactical unit with two things its members will need to survive during a chemical attack:

- o Detection of a toxic agent cloud, and
- o Early warning to troops in the protected position.

On a battlefield, good judgement in deploying detectors can mean the difference between timely detection of an attack or massive numbers of chemical casualties.

The M43A1 Detector can be remoted up to 400 meters from the M42 Alarm. The greater the remoted distance, the greater the warning time. However, there are practical limits to the remoted distance. If it is too great, the agent clouds that have no chance of hitting the position will be detected. If the M43A1 Detectors are too far out, there is a chance of an agent cloud slipping behind them. To decide the actual location of detectors, you must consider the chemical agent delivery threat, the terrain, and the state of preparedness of friendly troops.

Usually, the Simulator will be used with four detectors. On the battlefield, when four detectors (as opposed to six) are used to protect a position, the detectors are shifted into the wind whenever the wind direction changes more than 20 degrees. This ensures that the detectors are always upwind of the unit or units to be protected.

When choosing a site for placement of receiver/detectors during an exercise, remember one important thing: detectors should be deployed according to wind direction, not according to the direction of the enemy.

The receiver/detectors should be within line-of-sight of the transmitter, and there should be as few buildings, trees, or other obstacles separating transmitter and receiver/detectors as possible.

2-6. OPERATING PROCEDURES (continued)

2. Are the receiver/detectors and transmitter deployed so that a signal from the transmitter will cause the detectors to go into alarm?

A transmitter must be located in a position that will assure communication with all receiver/detectors with which it is to operate. To ensure efficient transmission and reception, the following factors should be considered:

- Hills and mountains between transmitter and receivers normally limit the range of the Simulator. In mountainous or hilly terrain, positions relatively high on the slopes should be selected. Locations at the base of a cliff or in a deep ravine or valley should be avoided. A location that will give line-of-sight transmission should be selected whenever possible.

- Dry ground has high resistance and limits the range of good transmission and reception. If possible, the transmitter and receivers should be located near moist ground, which has much less resistance. Water, and in particular salt water, will greatly increase the distances that can be covered.

- Trees with heavy foliage absorb radio waves, and leafy trees have more of an adverse effect than evergreens. Wet foliage has more of adverse effect than dry foliage. The transmitter and receiver antennas should be kept clear of all foliage and dense brush.

- A position in a tunnel or beneath an underpass or steel bridge should not be selected. Transmission and reception under these conditions are almost impossible.

- Buildings located between the transmitter and receiver, particularly steel and reinforced concrete structures, hinder both transmission and reception.

- All types of pole wire lines, such as telephone, telegraph, and high-tension power lines, should be avoided when you are selecting a site. Such wire lines absorb power from radiating antennas located in their vicinity. Such lines also introduce hum and noise interference in receiving antennas.

- Positions adjacent to heavily traveled roads and highways should be avoided. In addition to the noise and confusion caused by tanks and trucks, ignition systems in vehicles may cause electrical interference.

- Battery-charging units and generators should not be located close to transmitter or receivers.

- Atmospheric conditions can also affect transmission and reception. Such conditions include fog, thunderstorms, and sunspots.

For more factors affecting transmission and reception, you should read US Army field manual FM 24-18, Tactical Single-Channel Radio Communications Techniques.

NOTE

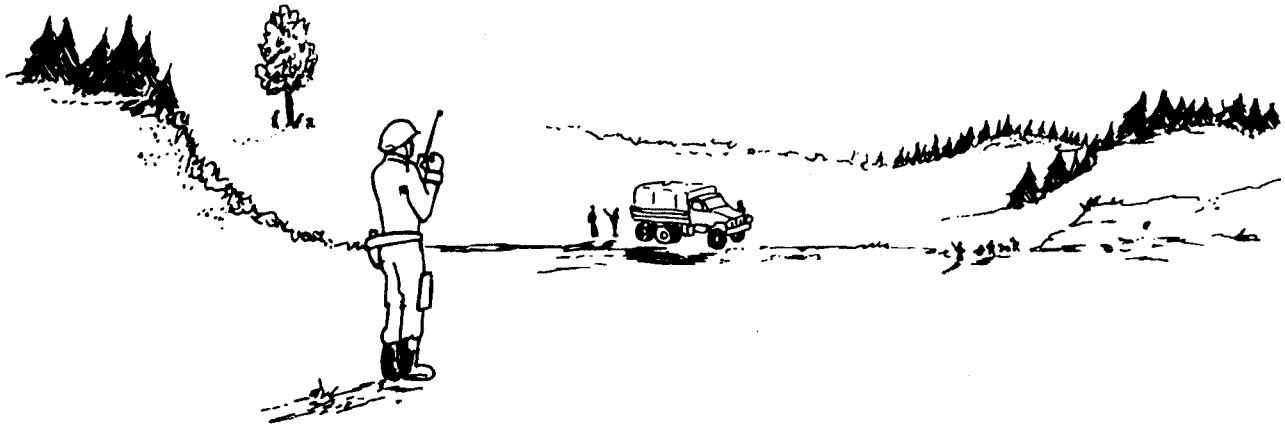
If you think that conditions at the exercise site could have an adverse effect on radio transmission or reception, conduct a pre-exercise dry run.

b. Operation of the Simulator System

1. Make sure Assembly and Preparation for Use Instructions (Paragraph 2-5) have been performed.

2. Repeat Step 1 for every M43A1 Detector to be used in training exercise.

3. No detectors should be located more than 1000 meters from transmitter. No detector should be located less than 25 meters from any other detector. Carefully note location of each detector, and record each detector location using UNIT digit recorded on receiver GROUP/UNIT identification plate. Reset every detector to be used in training exercise.



4. To imitate movement of chemical agent cloud, activate receivers in order of location (left-to-right, closest-to–farthest, etc.).

a. Turn the transmitter CHAN SEL switch to select the channel matching the unit number of the receiver which is to respond.

2-6. OPERATING PROCEDURES (continued)

b. Be sure the transmitter antenna is pointing straight up, the OPERATING PROCEDURES plate is toward you and you are facing the receivers. Switch to “OPR” and hold there for 5 seconds. Release the switch.

c. Repeat Steps a and b for each of the receiver/detectors.

NOTE

If one or more detectors fail to alarm, re-transmit from the same location.

d. If none of the detectors alarm, initiate troubleshooting procedure “No receivers respond to transmitter”, (Paragraph 4-9e).

e. If any of the detectors do not alarm, initiate troubleshooting procedure “One to three receivers do not respond to transmitter”, (Paragraph 4-9f).

f. If one or more detectors alarm without a signal from the transmitter, initiate troubleshooting procedure "One or more detectors continue to alarm after power has been applied and detector has been reset”, (Paragraph 4-9b).

5. Perform Preparation for Movement procedures (Paragraph 2-7).

2-7. PREPARATION FOR MOVEMENT

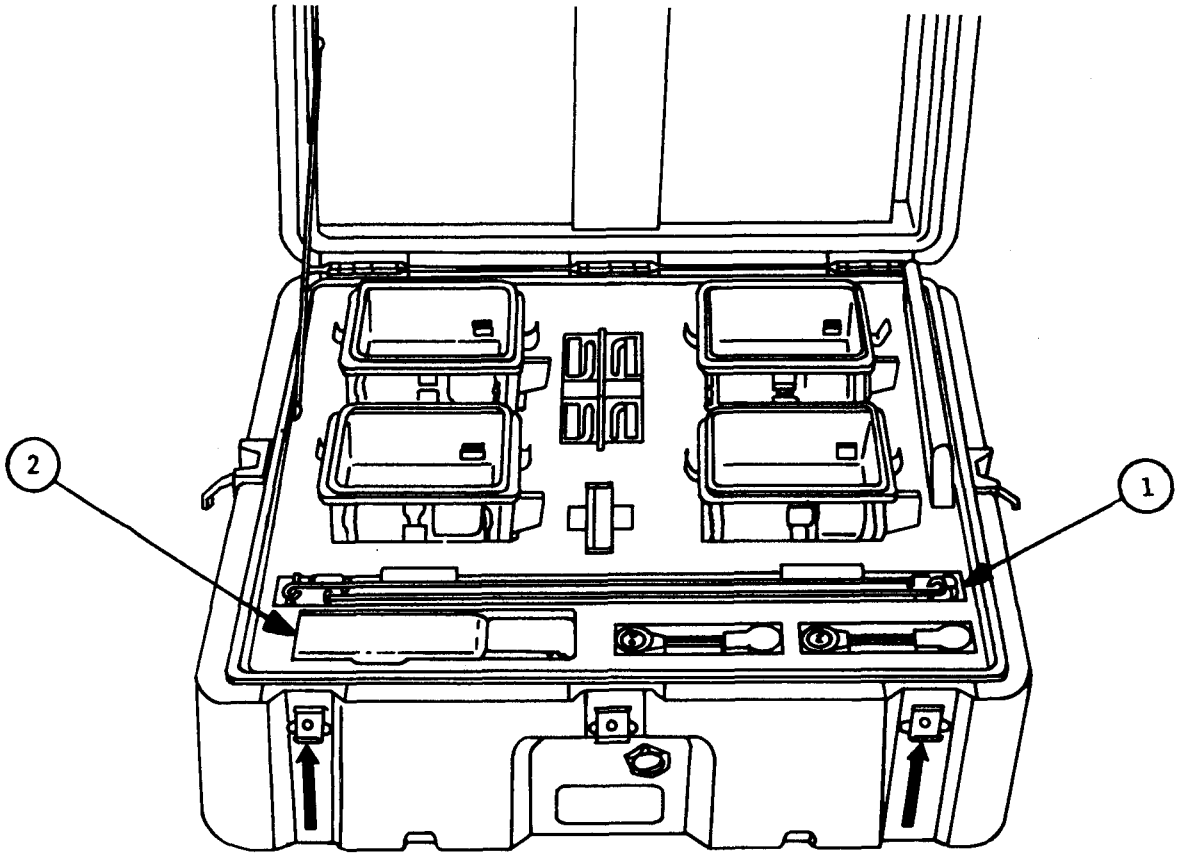
You should perform the following procedures in the order listed. Procedures required to prepare Simulator for movement consist of:

- o Removal of Transmitter Antenna.
- o Removal of Receiver Antenna.
- o Removal of Receiver from M43A1 Detector.

a. Removal of Transmitter Antenna

To remove transmitter antenna, perform the following:

1. Place CHAN SEL switch in TEST position.
2. Push down on antenna jack and, at the same time, turn jack 1/4 turn counterclockwise.
3. Pull antenna off coaxial connector.
4. Stow antenna and transmitter in antenna compartment (1) and transmitter compartment (2), respectively, in transit case.

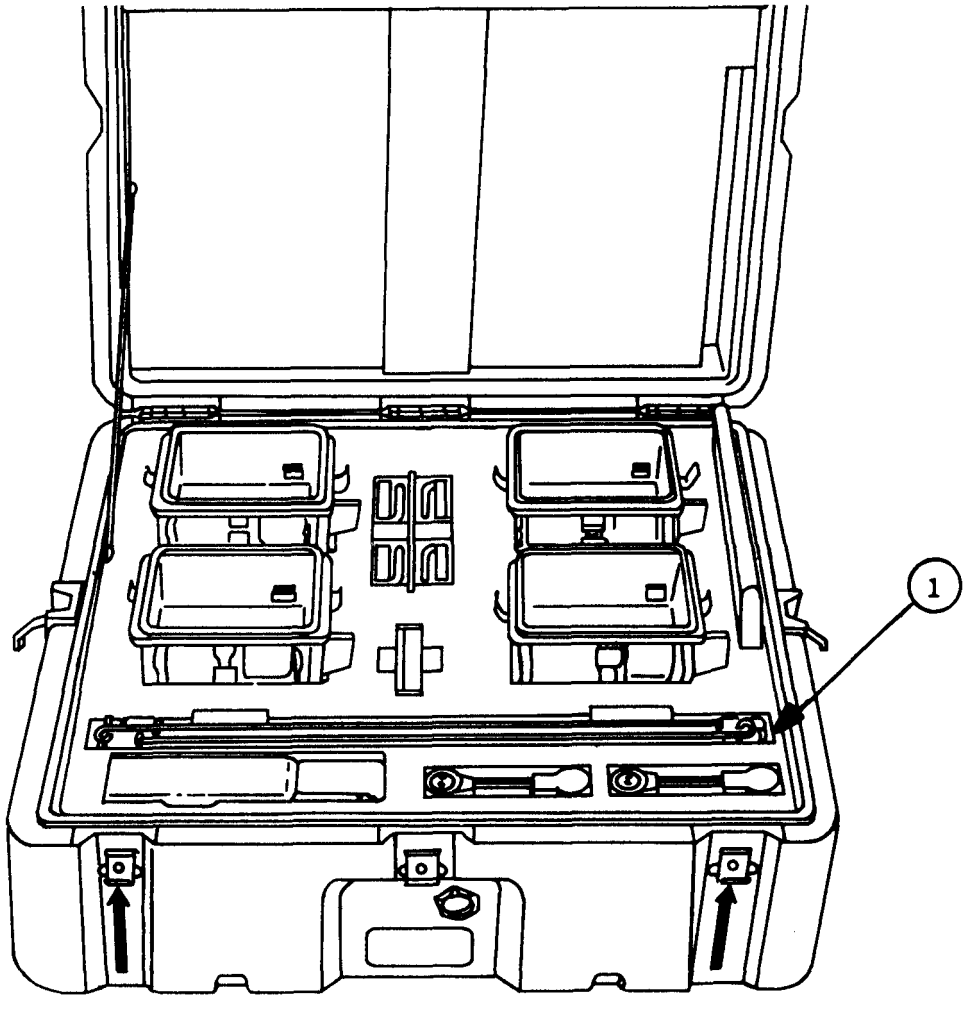


2-7. PREPARATION FOR MOVEMENT (continued)

b. Removal of Receiver Antenna

To remove receiver antenna, perform the following:

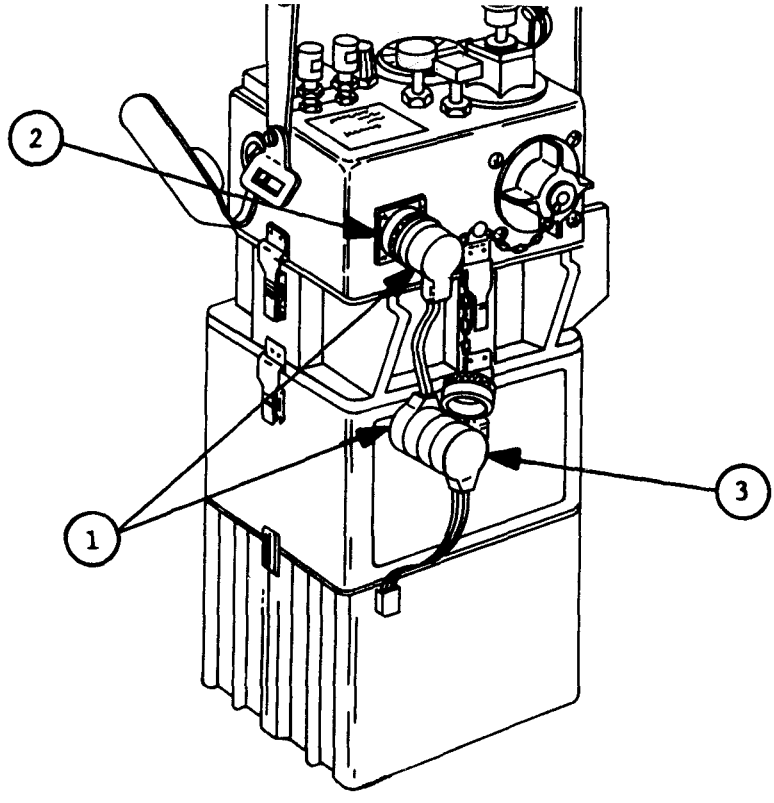
1. Push down on antenna jack and, at the same time, turn jack 1/4 turn counterclockwise.
2. Pull antenna off coaxial connector.
3. Stow antenna in antenna compartment (1) in transit case.



c. Removal of Receiver from M43A1 Detector

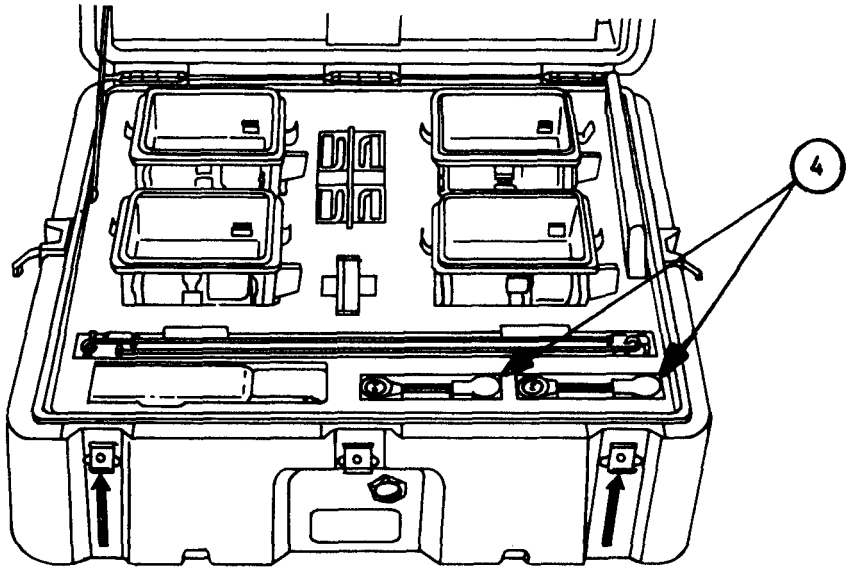
To remove receiver from M43A1 Detector, perform the following:

1. Position detector and receiver so that labels 24 VDC INPUT and AIR FILTER are toward you.



2. If detector and receiver are powered by BA3517/U Battery, perform Steps 3 and 4. If detector and receiver are powered by source other than BA3517/U Battery, go to Step 5.

3. Turn extender cable connector 1/4 turn counterclockwise and pull connector (1) from 24 VDC INPUT connector (2). Remove extender cable connector from BA3517/U Battery Power Cable connector (3). Stow extender cable in cable compartment (4) in transit case.



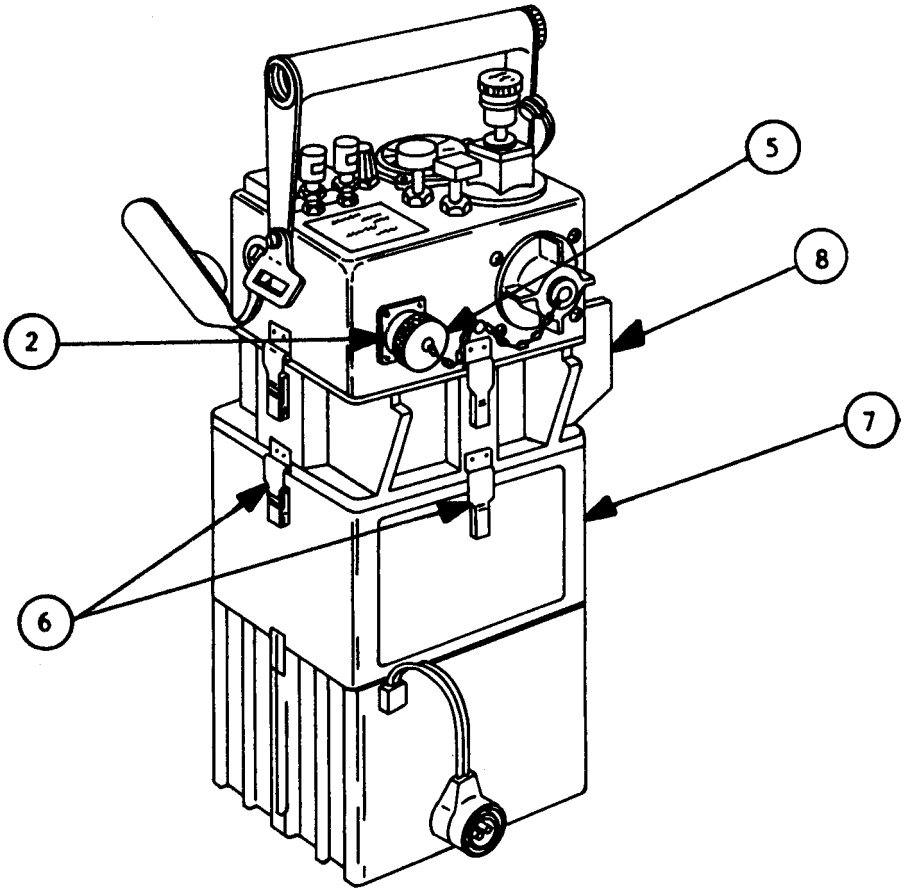
2-7. PREPARATION FOR MOVEMENT (continued)

4. Go to Step 6.

5. If detector and receiver are powered by source other than BA3517/U Battery, turn power source connector lockring 1/4 turn counterclockwise, and then pull connectors apart until they are disengaged.

6. Screw protective cover (5) onto M43A1 Detector 24 VDC INPUT connector (2).

7. Release the four latches (6) holding case-bottom assembly (7) to receiver (8). Disengage latches from catches on receiver ring.

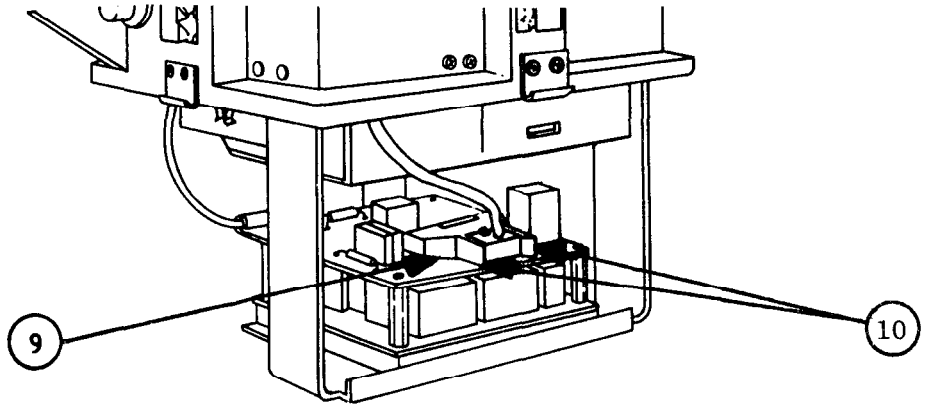


8. Pull up on detector carrying handle until extender clears rim of case-bottom assembly.

9. Position case-top assembly so that labels 24 VDC INPUT and AIR FILTER are away from you.

10. Locate Connector P1 (9) on the decoder printed wiring assembly.

11. Push two release levers (10) apart until M43A1 Interface Cable connector is ejected from Connector P1.



12. Release four latches holding receiver to case-top assembly. Disengage four latches from four catches on case-top assembly.

NOTE

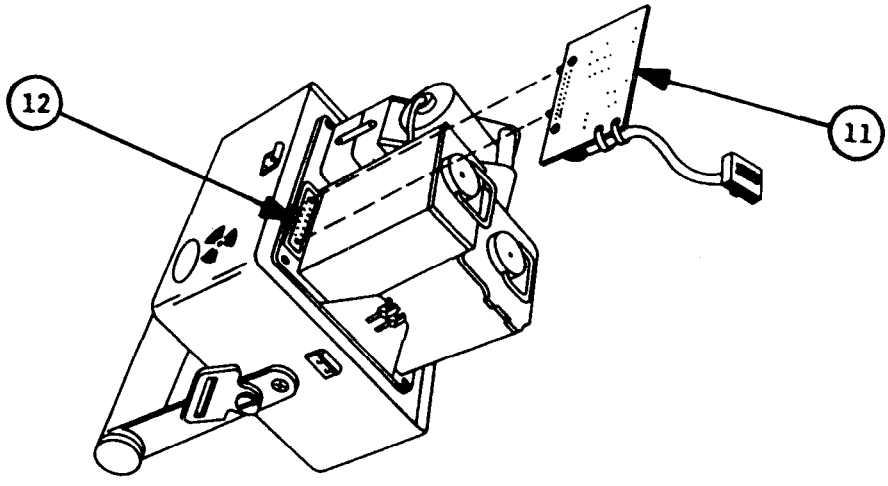
Be sure M43Al Interface Cable does not catch on any part of receiver.

13. Pull up on detector carrying handle until detector internal components clear rim of receiver ring.

14. Position case-top assembly so word CAUTION and black radiation–hazard symbol are up, internal components point up at angle to your right, and case-top assembly rests on carrying handle and top edge of one face of case-top assembly (as shown).

15. Locate M43A1 Interface Cable (11) attached to case-top assembly at Test Connector J1O (12).

16. Grasp M43AI Interface Cable and pull out until pins on M43A1 Interface Cable connector clear holes on Test Connector J1O.



2-7. PREPARATION FOR MOVEMENT (continued)

CAUTION

M43A1 Interface Cable must be stowed with pins up.

17. Stow M43A1 Interface Cable (13) and receiver (14) in compartments in transit case.

18. Repeat steps in Paragraph 2-7b and Steps 1 thru 17 in Paragraph 2-7c for each receiver.

19. Lower transit case top and secure five latches (15).

20. Position case-bottom assembly so that USUAL RESERVICING INSTRUCTIONS plate is toward you. Position case-top assembly above case-bottom assembly so that the words 24 VDC INPUT and AIR FILTER are toward you .

21. Lower case-top assembly until its bottom surface contacts top surface of case-bottom assembly.

22. Engage four latches on case-bottom assembly with catches on case-top assembly. Push down on latch-locking tabs to lock latches.

2-8. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTIONS PLATES

See Chapter 1, Section II, Paragraph l-8b, Item 5, of this manual.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

The Simulator will always be used with the M43A1 Detector. No special procedures are required to operate the Simulator under unusual weather or environmental conditions. However, it should be noted that the Simulator highest operating temperature (1OO°F) is lower than the highest operating temperature for M43Al Detector (120°F). Also, the lowest operating temperature for the Simulator (20°F) is higher than the lowest operating temperature for M43A1 Detector (-40°F).

CHAPTER 3

ASSOCIATED EQUIPMENT MAINTENANCE INSTRUCTIONS

For information on the M43A1 Detector, see Chapter 3 and 4, TM 3-6665-312-12&P, M8A1 Automatic Chemical Agent Alarm.

CHAPTER 4

UNIT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment refer to Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-2. SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

See Section III of the Maintenance Allocation Chart in Appendix B for your TMDE.

4-3. REPAIR PARTS

There are no repair parts.

Section II. SERVICE UPON RECEIPT

M81 Simulators are hand-receipted from Training Audio-Visual Support Center (TASC). TASC is responsible for service upon receipt procedures.

Section III. TROUBLESHOOTING PROCEDURES

4-4. INTRODUCTION

This section consists of troubleshooting flow charts. These charts can lead you in logical steps from symptoms observed during operation or maintenance to the causes of and remedies for a malfunction. The most common malfunctions are included in this section.

NOTE

Troubleshooting Procedures are done with receivers installed in M43A1 Detectors.

4-5. SYMPTOM INDEX

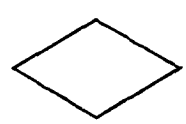
Symptom	Troubleshooting Procedure (Paragraph)
M43A1 Detector	
M43A1 Detector does not run with M81 receiver installed when powered by BA3517/U battery.	4-7
Transmitter	
a. Transmitter TEST GOOD indicator does not light when OPR Switch is in OPR position and receivers do not respond.	4-8a
b. All receivers respond one at a time but transmitter TEST GOOD indicator does not light when OPR Switch is pushed to OPR.	4-8b
c. Transmitter TEST GOOD indicator lights when OPR Switch is in OFF position.	4-8c
Receiver	
a. Receivers activate one at a time when CHAN SEL Switch is turned even though transmitter OPR Switch is not pushed to OPR position.	4-9a
b. One or more detectors continue to alarm after power has been applied and detector has been reset.	4-9b
c. Two or more receivers respond at one time when OPR Switch is pushed to OPR.	4-9C
d. Receiver responds when Battery Test is performed.	4-9d
e. No receivers respond to transmitter.	4-9e
f. One to three receivers do not respond to transmitter.	4-9f

4-6. TROUBLESHOOTING FLOW CHART SYMBOLS

Three symbols are used in the troubleshooting flow charts. These symbols are:

a. Oval--Identifies a starting or stopping point in a troubleshooting chart.

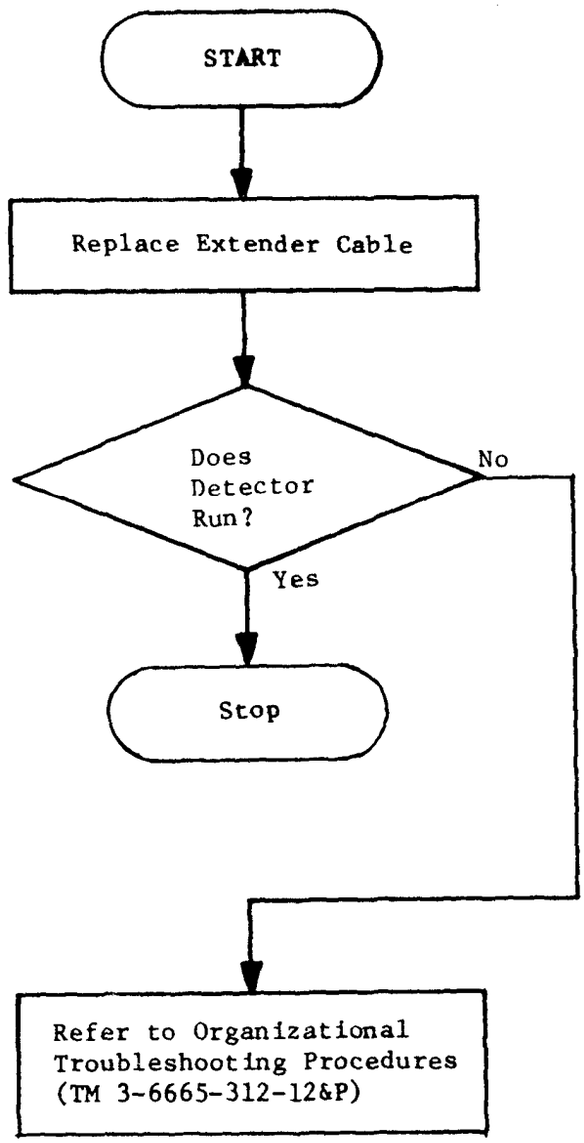
b. Diamond--Identifies a decision which you will make based on test results.



c. Rectangle--Identifies an action you will take based on the decision.

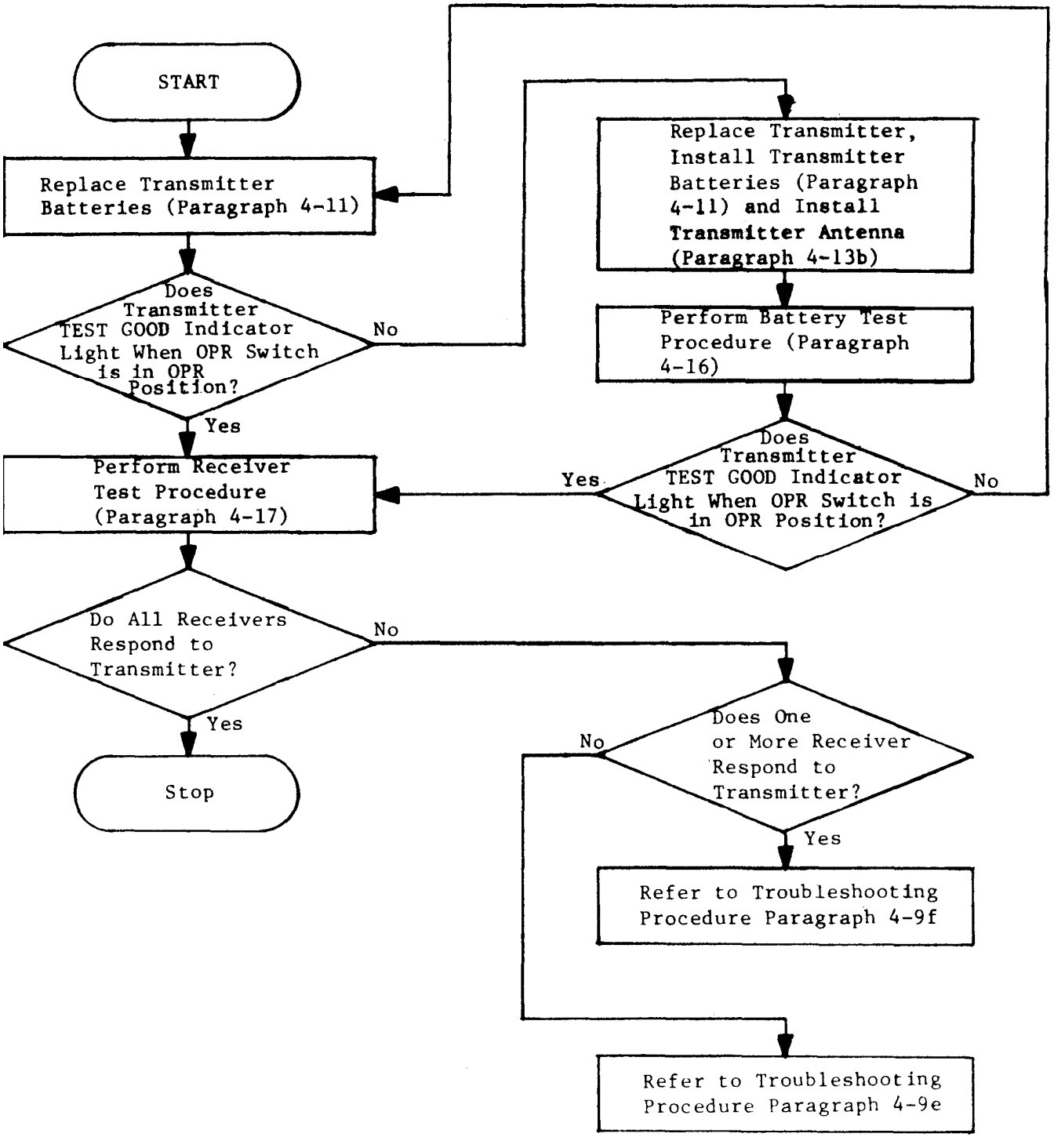
4-7. M43A1 DETECTOR

Symptom: M43A1 Detector does not run with M81 receiver installed when powered by BA3517/U battery.

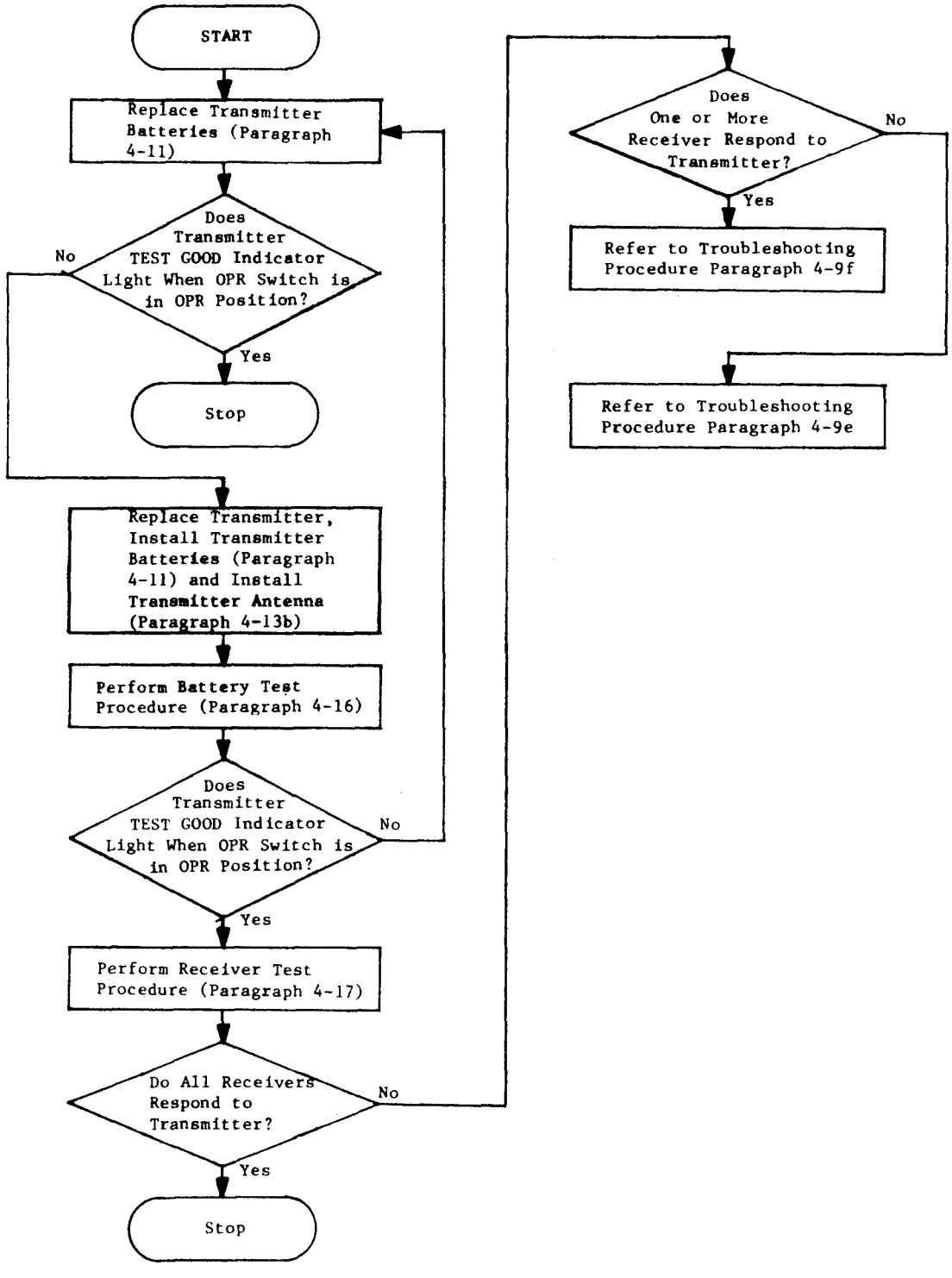


4-8. TRANSMITTER

a. Symptom: Transmitter TEST GOOD indicator does not light when OPR Switch is in OPR position and receivers do not respond.

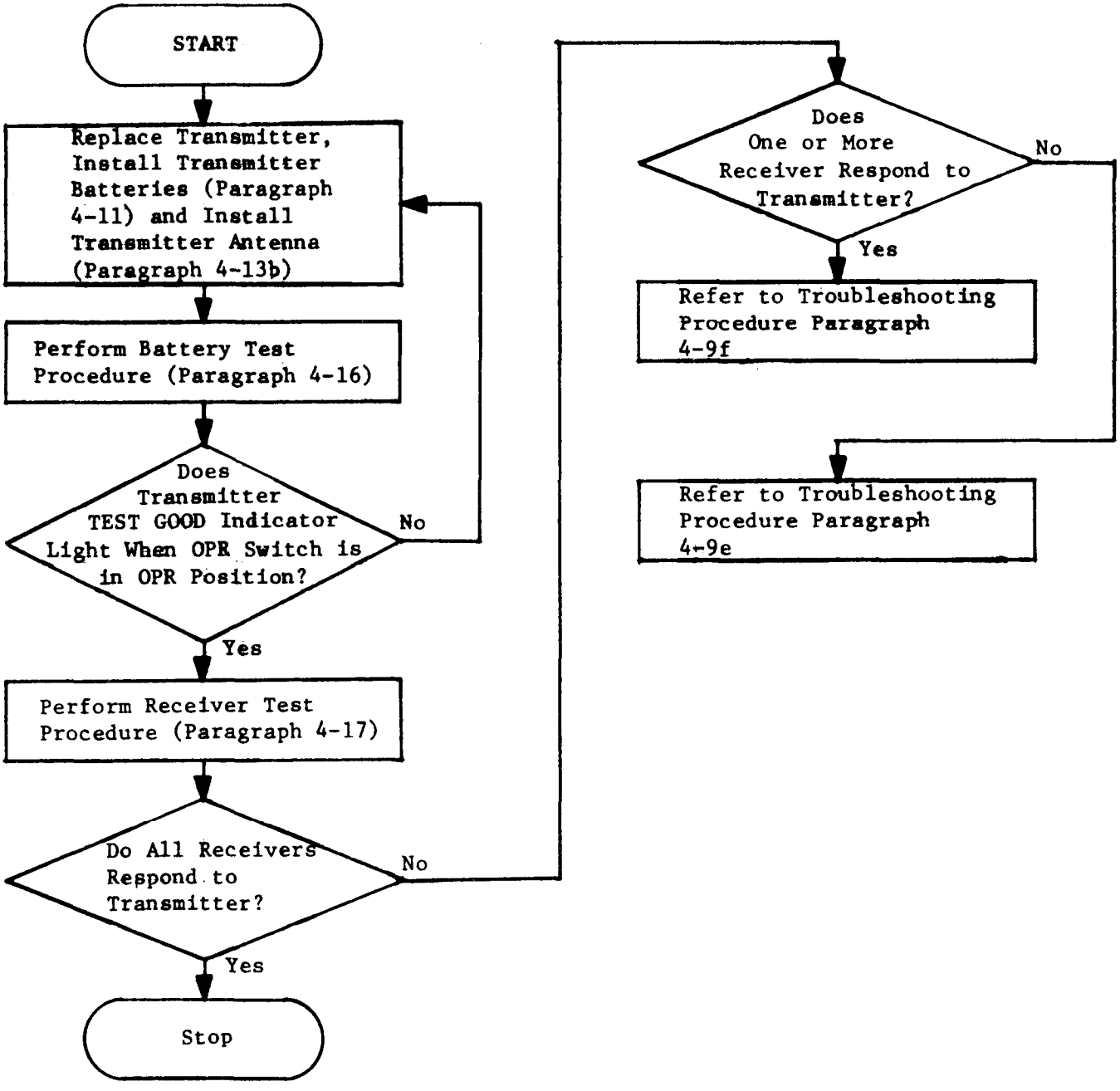


b. Symptom: All receivers respond one at a time but transmitter TEST GOOD indicator does not light when OPR Switch is pushed to OPR.



4-8. TRANSMITTER (continued)

c. Symptom: Transmitter TEST GOOD indicator lights when OPR Switch is in OFF position.

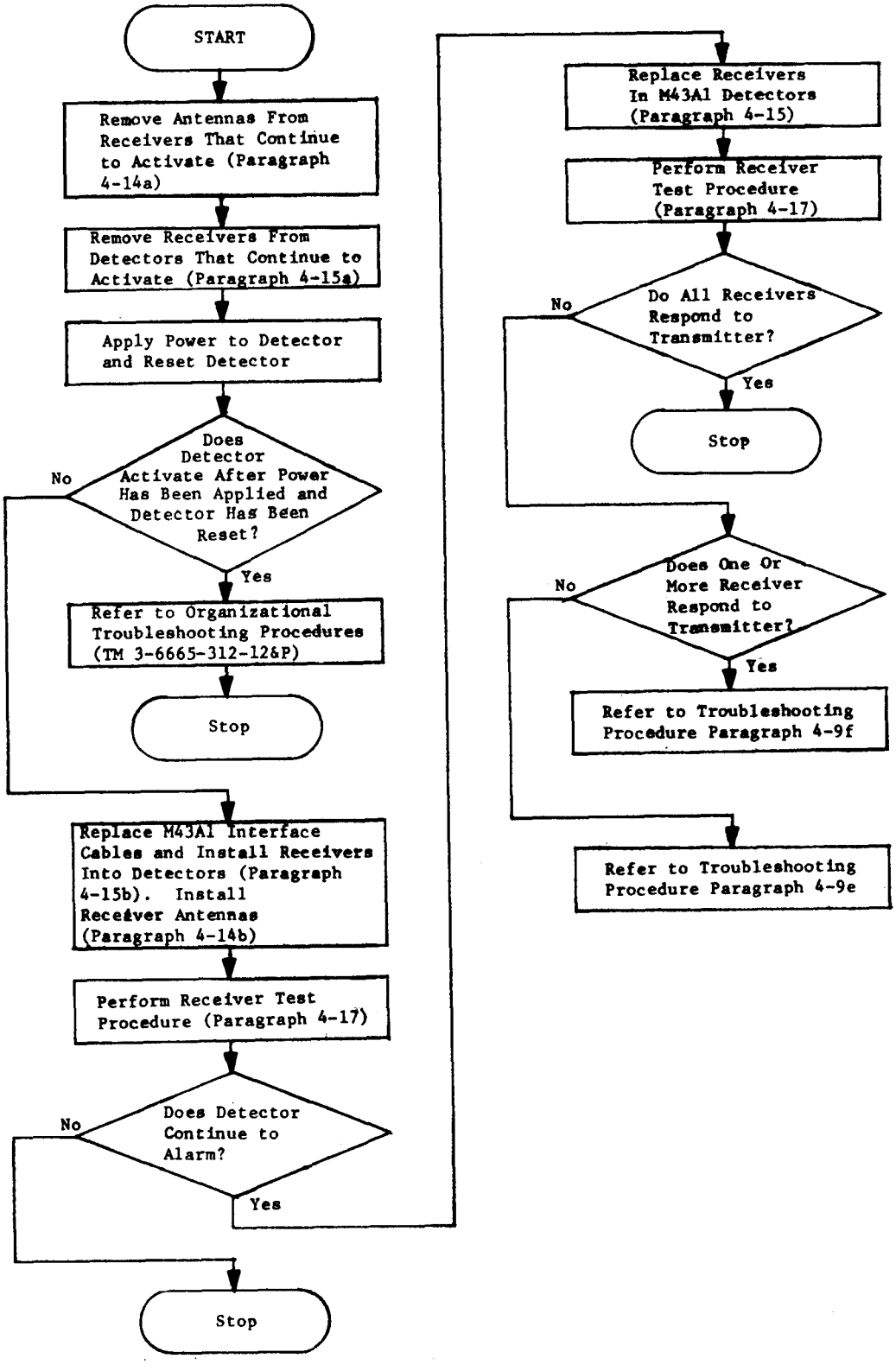


4-9. RECEIVER

a. Symptom: Receivers activate one at a time when CHAN SEL Switch is turned, even though transmitter OPR Switch is not pushed to OPR position.

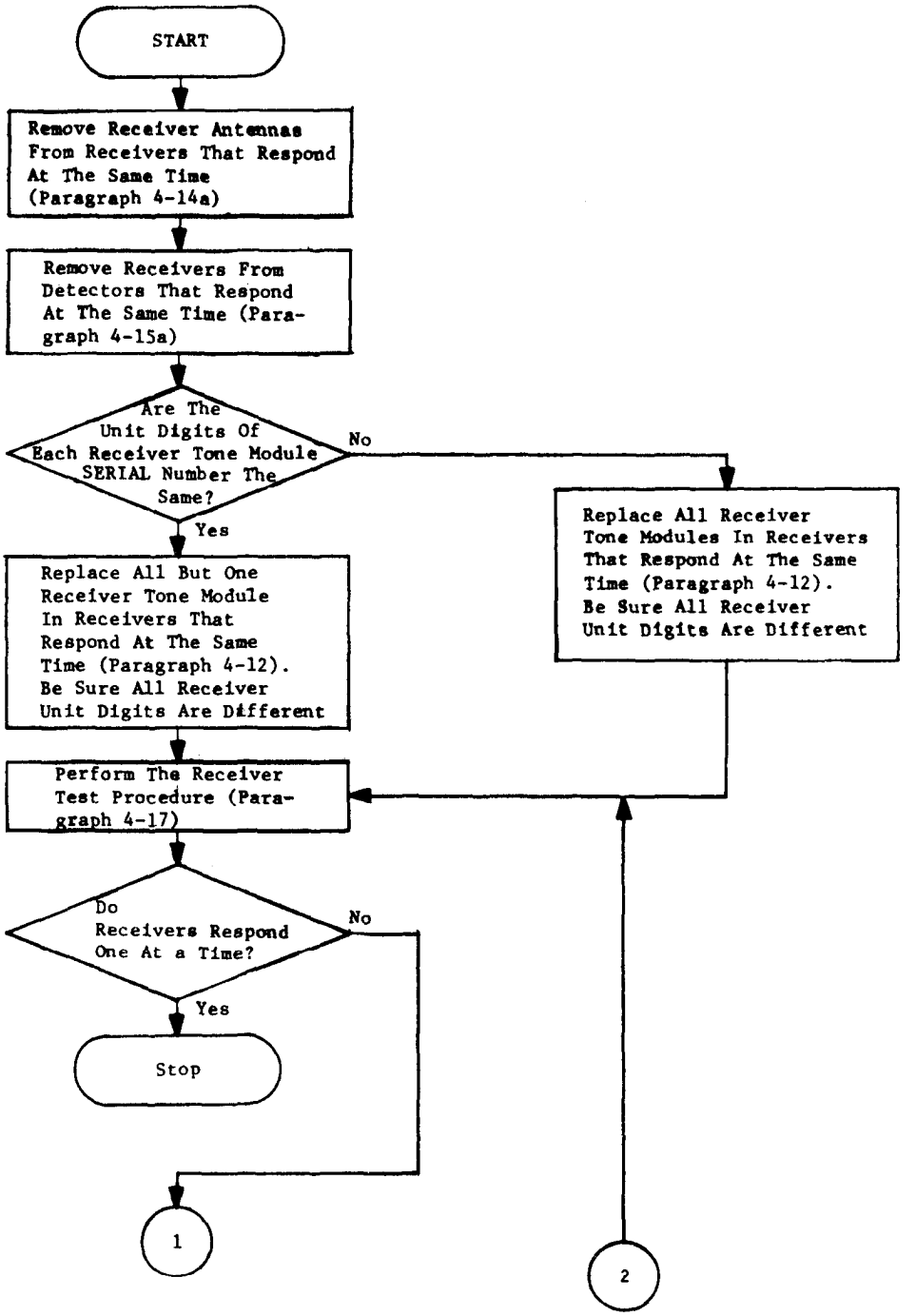
Refer to Troubleshooting Procedure Paragraph 4-8c.

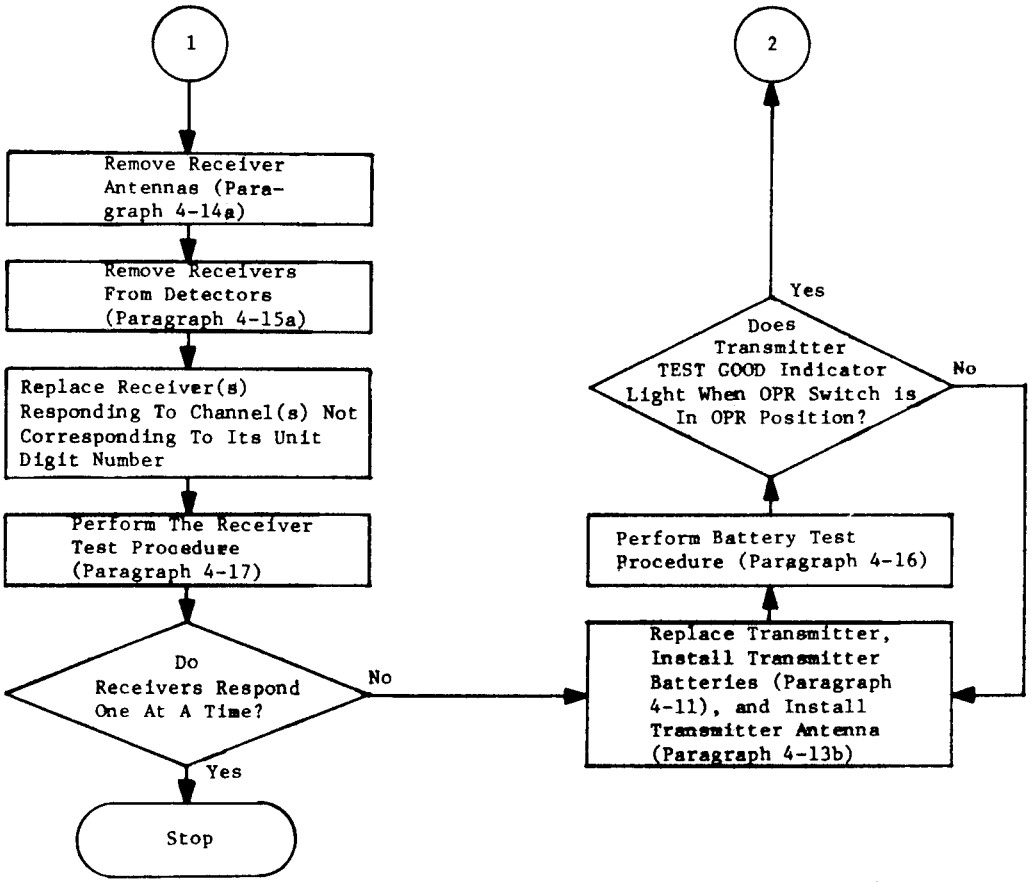
b. Symptom: One or more detectors continue to alarm after power has been applied and detector has been reset.



4-9. RECEIVER (continued)

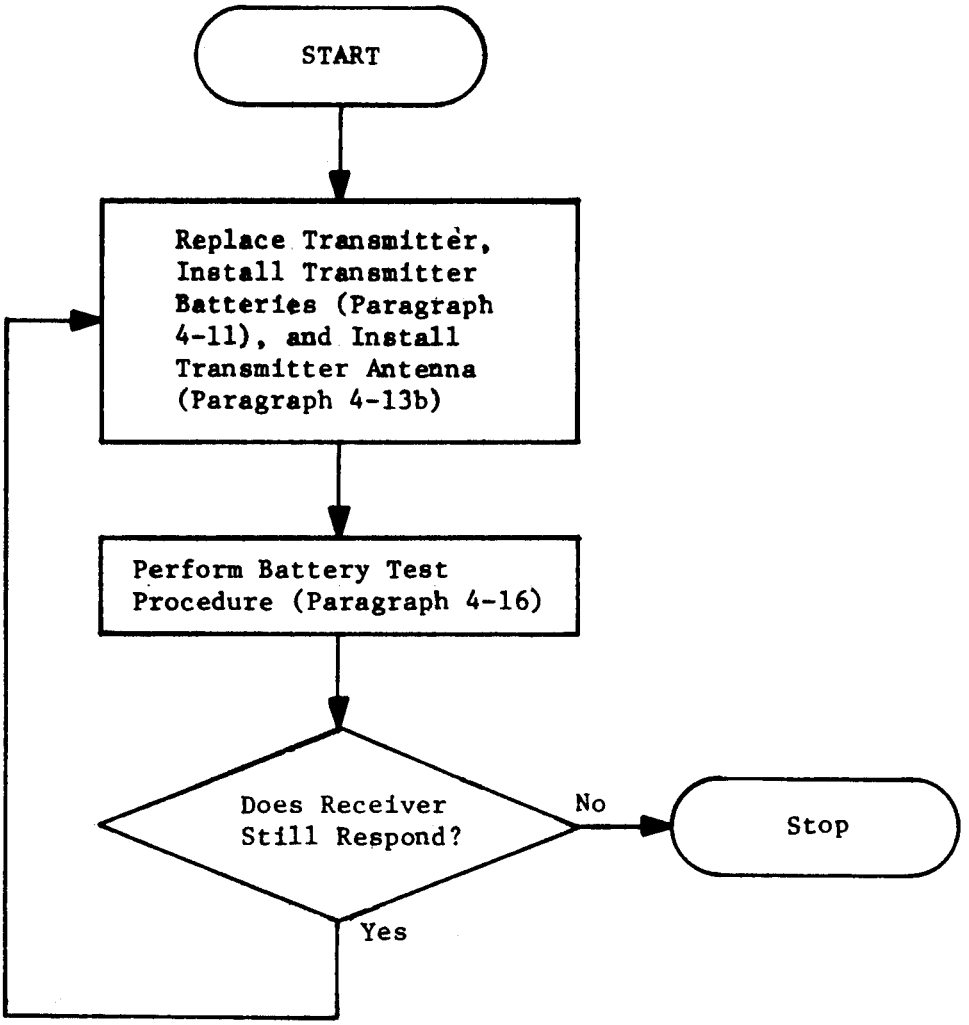
c. Symptom: Two or more receivers respond at one time when OPR Switch is pushed to OPR.



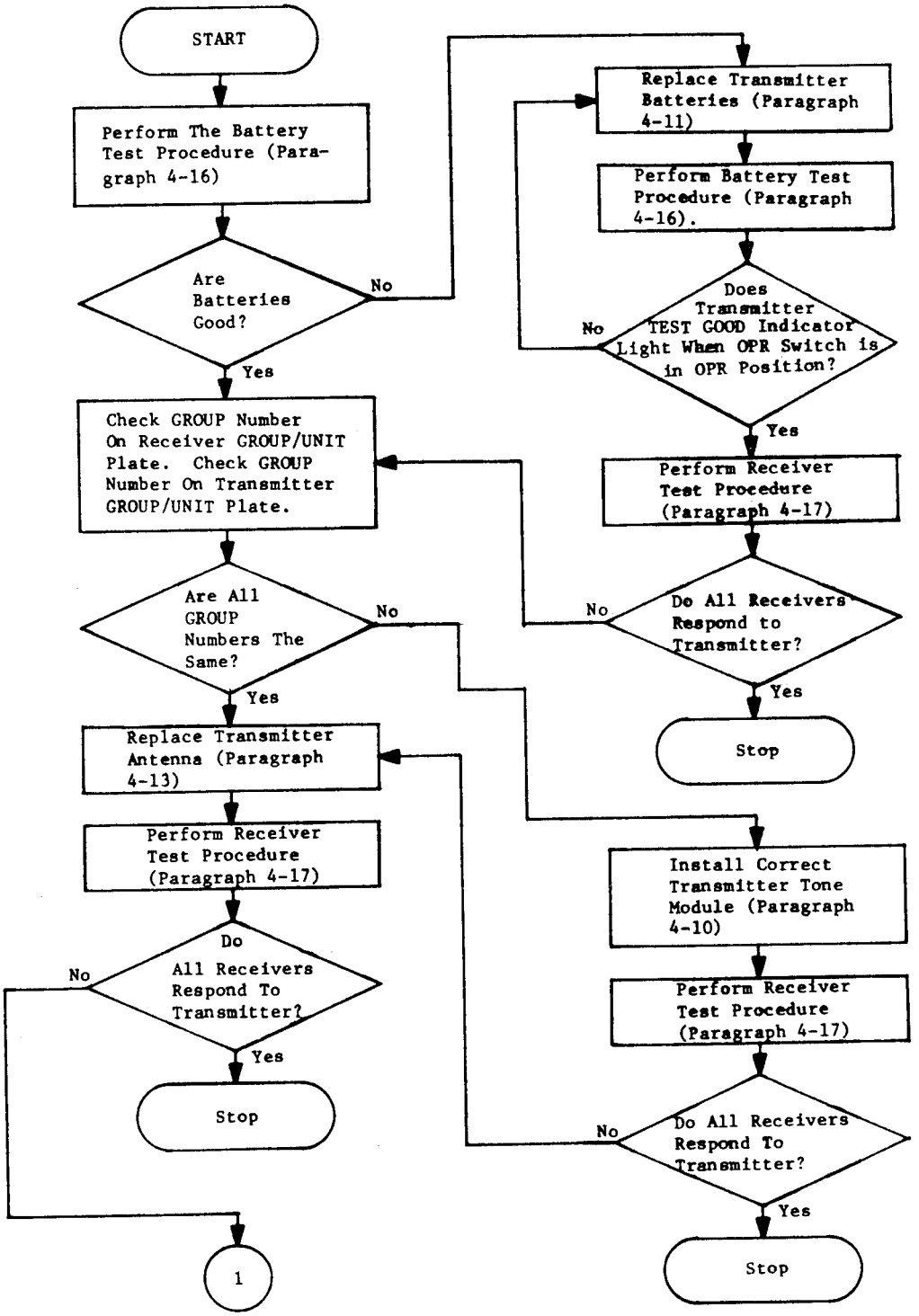

1
Remove Receiver Antennas (Paragraph 4-14a)
Remove Receivers From Detectors (Paragraph 4-15a)
Replace Receiver(s) Responding To Channel(s) Not Corresponding To Its Unit Digit Number
Perform The Receiver Test Procedure (Paragraph 4-17)
Do Receivers Respond One At A Time?
No
Yes
Stop
Replace Transmitter, Install Transmitter Batteries (Paragraph 4-11), and Install Transmitter Antenna (Paragraph 4-13b)
Perform Battery Test Procedure (Paragraph 4-16)
Does Transmitter TEST GOOD Indicator Light When OPR Switch is In OPR Position?
Yes
No
2

4-9. RECEIVER (continued)

d. Symptom: Receiver responds when Battery Test is performed.

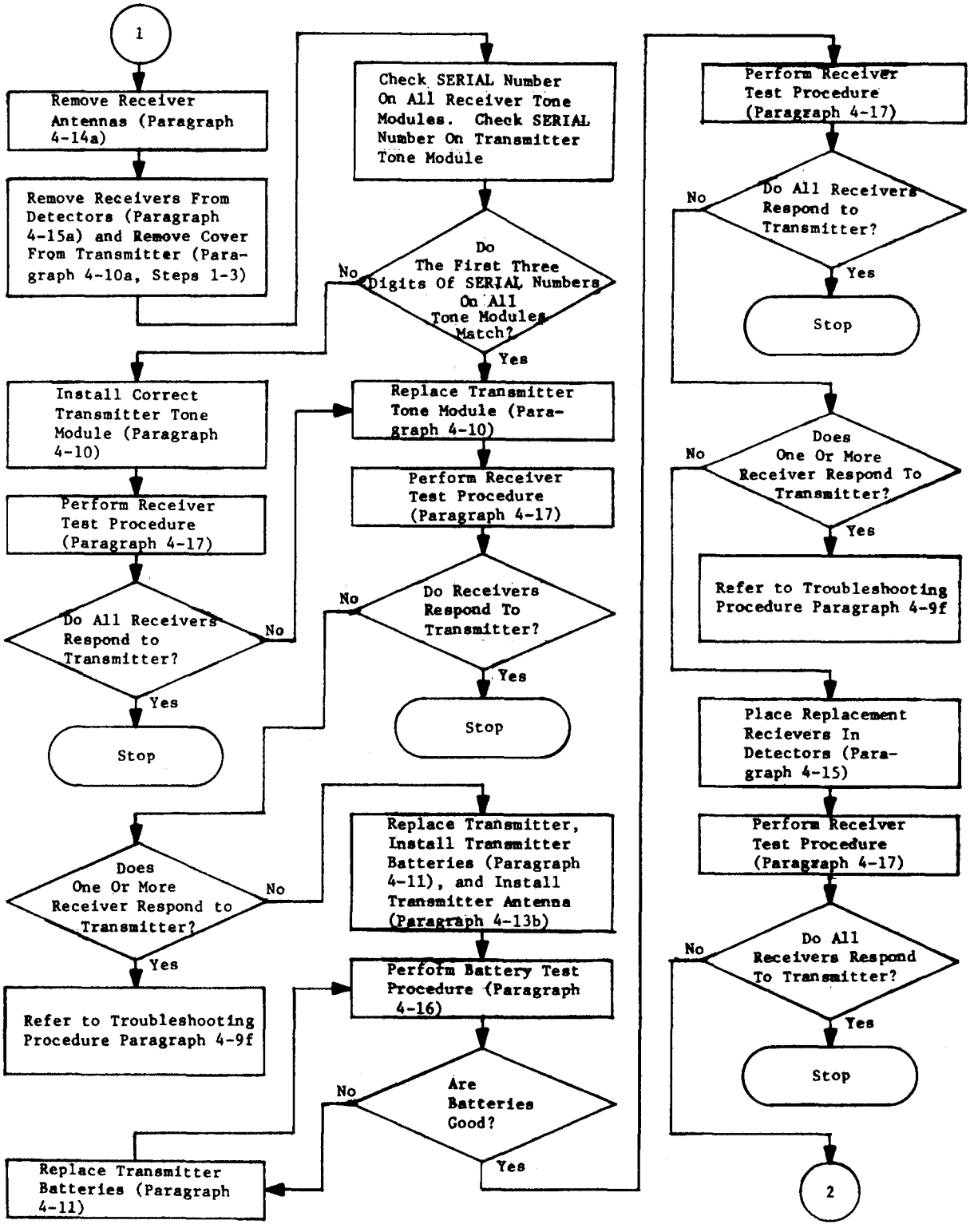


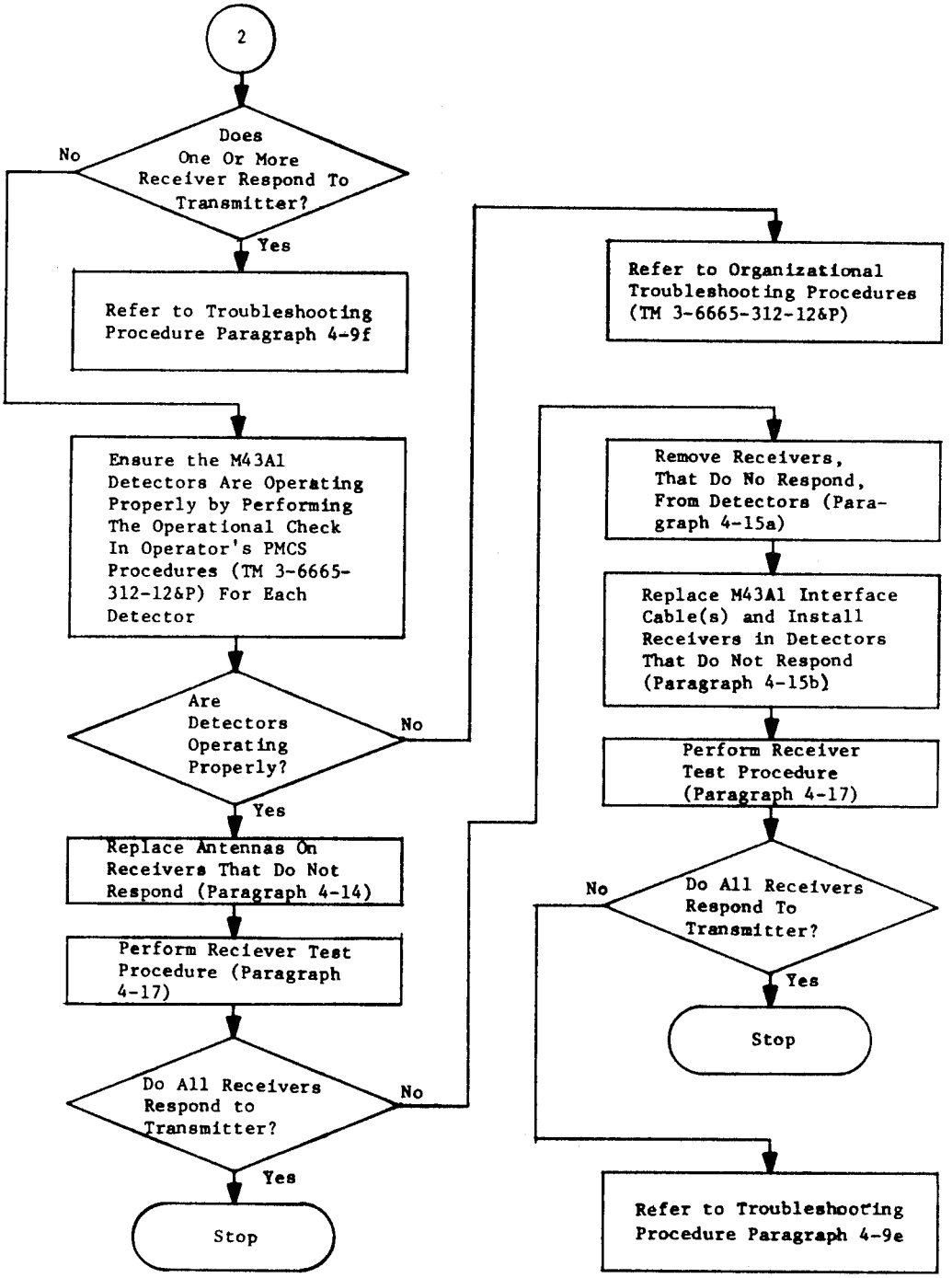
e. Symptom: No receivers respond to transmitter.



4-9. RECEIVER (continued)

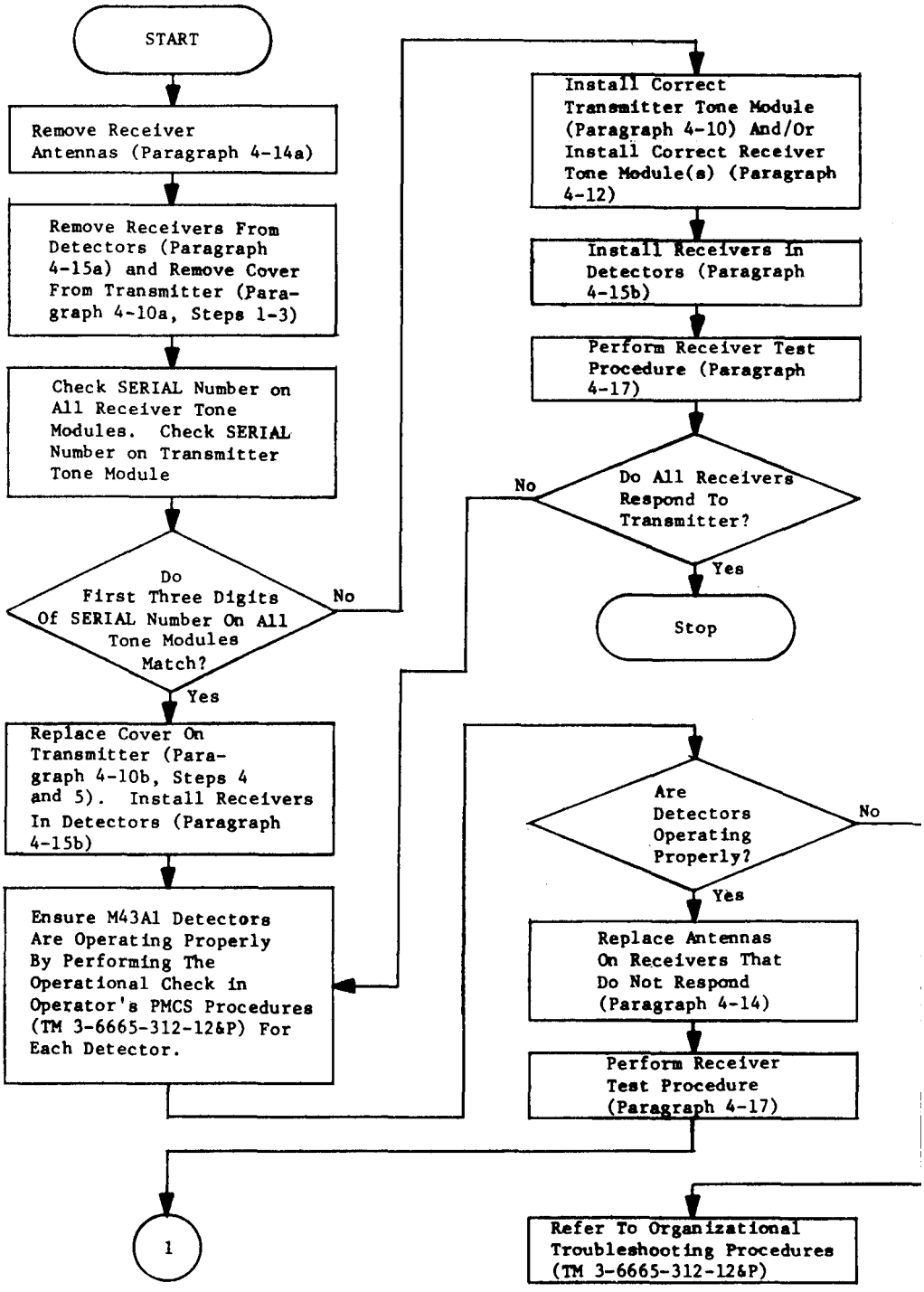
e. Symptom: No receivers respond to transmitter (continued).

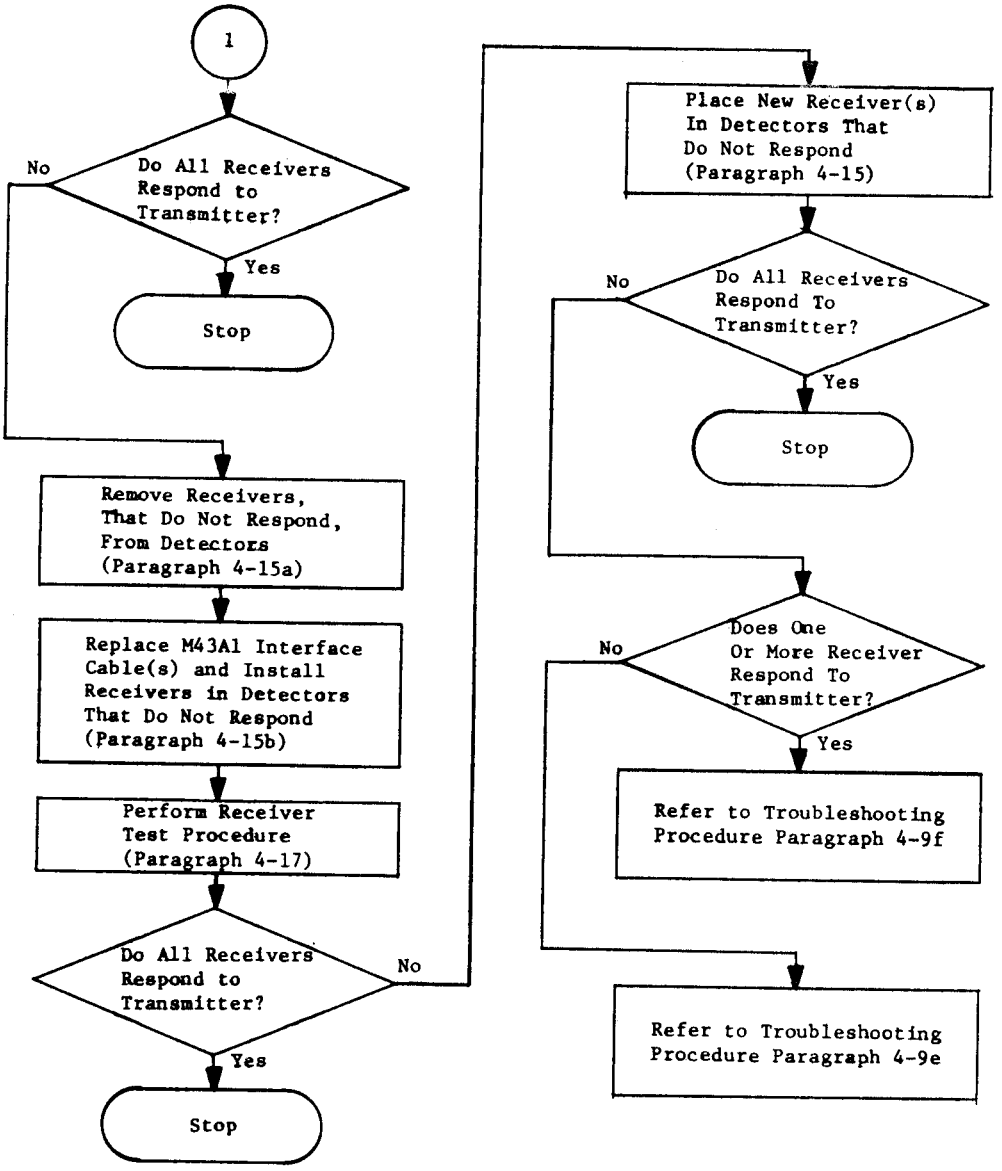



2
Does One Or More Receiver Respond To Transmitter?
No
Yes
Refer to Troubleshooting Procedure Paragraph 4-9f
Ensure the M43A1 Detectors Are Operating Properly by Performing The Operational Check In Operator's PMCS Procedures (TM 3-6665-312-12&P) For Each Detector
Are Detectors Operating Properly?
No
Yes
Refer to Organizational Troubleshooting Procedures (TM 3-6665-312-12&P)
Replace Antennas On Receivers That Do Not Respond (Paragraph 4-14)
Perform Reciever Test Procedure (Paragraph 4-17)
Do All Receivers Respond to Transmitter?
No
Yes
Stop
Remove Receivers, That Do No Respond, From Detectors (Paragraph 4-15a)
Replace M43A1 Interface Cable(s) and Install Receivers in Detectors That Do Not Respond (Paragraph 4-15b)
Perform Receiver Test Procedure (Paragraph 4-17)
Do All Receivers Respond To Transmitter?
No
Yes
Stop
Refer to Troubleshooting Procedure Paragraph 4-9e

4-9 l RECEIVER (continued)

f. Symptom: One to three receivers do not respond to transmitter.




1
Do All Receivers Respond to Transmitter?
No
Yes
Stop
Remove Receivers, That Do Not Respond, From Detectors (Paragraph 4-15a)
Replace M43A1 Interface Cable(s) and Install Receivers in Detectors That Do Not Respond (Paragraph 4-15b)
Perform Receiver Test Procedure (Paragraph 4-17)
Do All Receivers Respond to Transmitter?
No
Yes
Stop
Place New Receiver(s) In Detectors That Do Not Respond (Paragraph 4-15)
Do All Receivers Respond To Transmitter?
No
Yes
Stop
Does One Or More Receiver Respond To Transmitter?
No
Yes
Refer to Troubleshooting Procedure Paragraph 4-9f
Refer to Troubleshooting Procedure Paragraph 4-9e

Section IV. MAINTENANCE PROCEDURES

Simulator maintenance procedures consist of replacement procedures and test procedures.

Replacement procedures include:

- o Replacement of Transmitter Tone Module
- o Replacement of Transmitter Batteries
- o Replacement of Receiver Tone Module
- o Replacement of Transmitter Antenna
- o Replacement of Receiver Antenna
- o Replacement of Receiver in M43A1 Detector

Test Procedures include:

- o Battery Test Procedure
- o Receiver Test Procedure

4-10. REPLACEMENT OF TRANSMITTER TONE MODULE

This task covers:

a. Removal
b. Installation

INITIAL SETUP

Tools : Screwdriver (from tone module case).
Materials/Parts: Grease Pencil (Item 2, Appendix E, or equivalent).

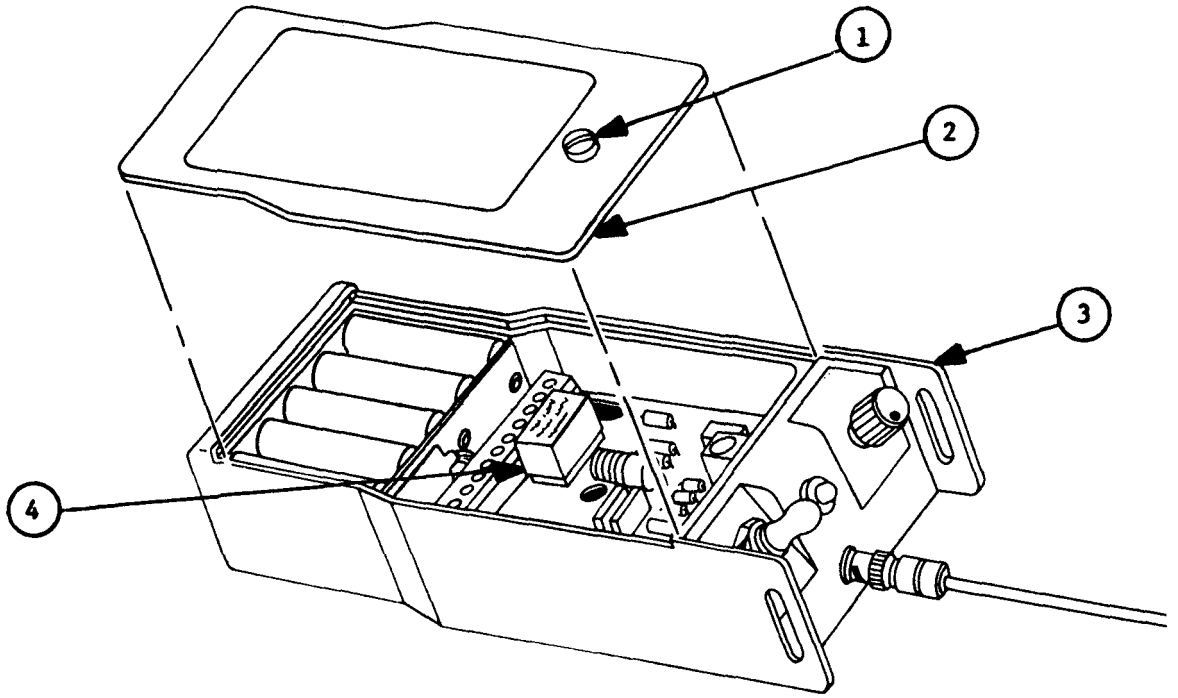
a. Removal

1. Position transmitter so that slot-head screw (1) holding cover (2) to chassis (3) is up.

2. Loosen screw holding cover to chassis.

3. Remove cover from chassis.

4. Locate tone module (4).



5. Carefully pull tone module up until pins clear holes in socket XZ1. Set tone module aside.

b. Installation

CAUTION

Any attempt to mount a transmitter tone module in a receiver or vice-versa could damage the equipment.

1. Last digit of SERIAL number printed on replacement tone module should be 5. Last digit 1, 2, 3, or 4 would identify receiver tone module. Record SERIAL number of transmitter tone module on piece of paper.

NOTE

Be sure first three digits of transmitter tone module SERIAL number match first three digits of SERIAL number on receiver tone modules.

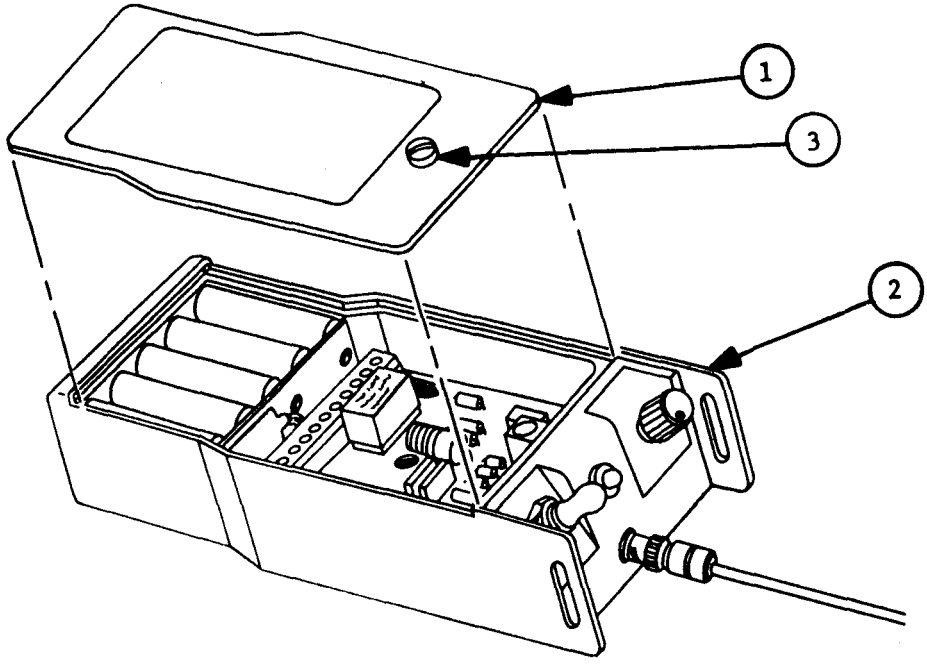
4-10. REPLACEMENT OF TRANSMITTER TONE MODULE (continued)

2. Carefully aline pins on tone module with holes in socket XZ1. One pin has been removed from tone module, and corresponding hole in socket XZ1 has been filled. This allows tone module to be installed only one way.

3. Push tone module down into socket XZ1 until pins are fully seated.

4. Mount cover (1) on chassis (2).

5. Turn screw (3) down until snug. Do not over-tighten screw.

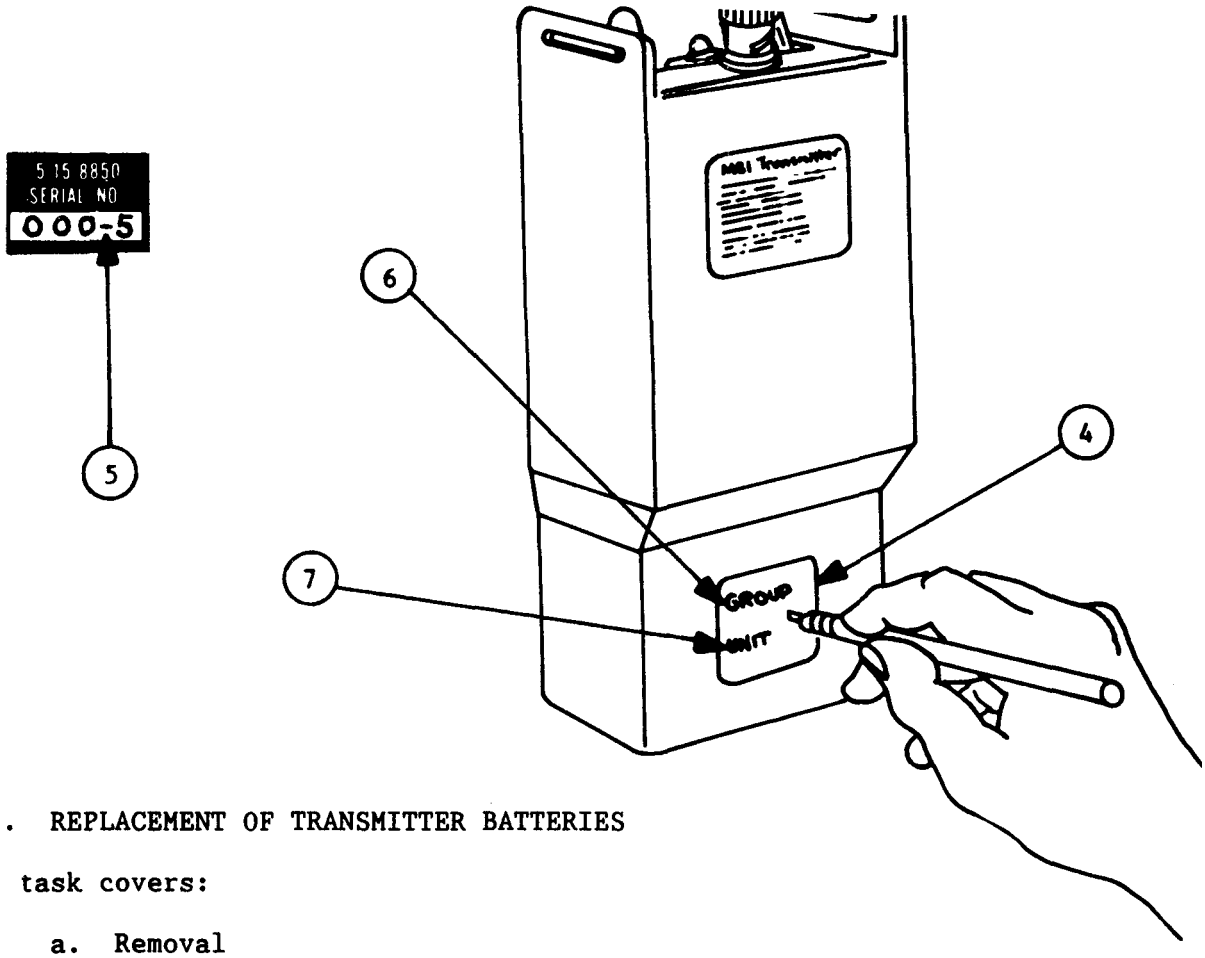


6. Turn transmitter over so GROUP/UNIT identification plate (4) is up.

7. If first three digits of replacement tone module SERIAL number (5) do not match GROUP digits (6) recorded on transmitter GROUP/UNIT identification plate (4), record first three digits of replacement tone module SERIAL number next to word GROUP. Record last digit next to UNIT (7). Make sure digit recorded next to UNIT is a 5.

NOTE

Grease pencil markings can be rubbed off to make corrections to digits recorded on transmitter.



4-11. REPLACEMENT OF TRANSMITTER BATTERIES

This task covers:

a. Removal
b. Installation

INITIAL SETUP

Tools: Screwdriver (from tone module case).
Materials/Parts: 10 Batteries (Item 1, Appendix E, or equivalent).

NOTE

These procedures are correct with or without the presence of the transmitter antenna.

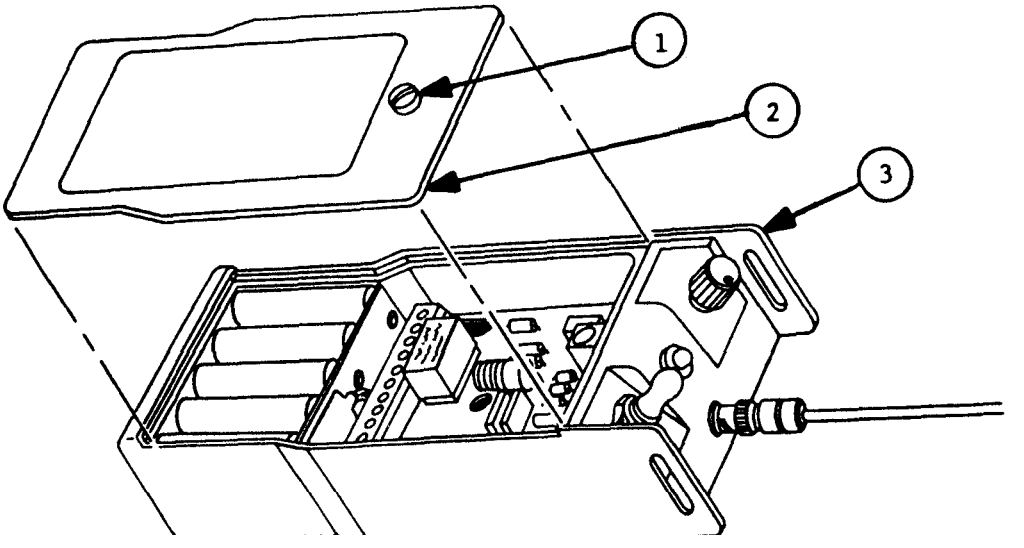
4-11. REPLACEMENT OF TRANSMITTER BATTERIES (continued)

a. Removal

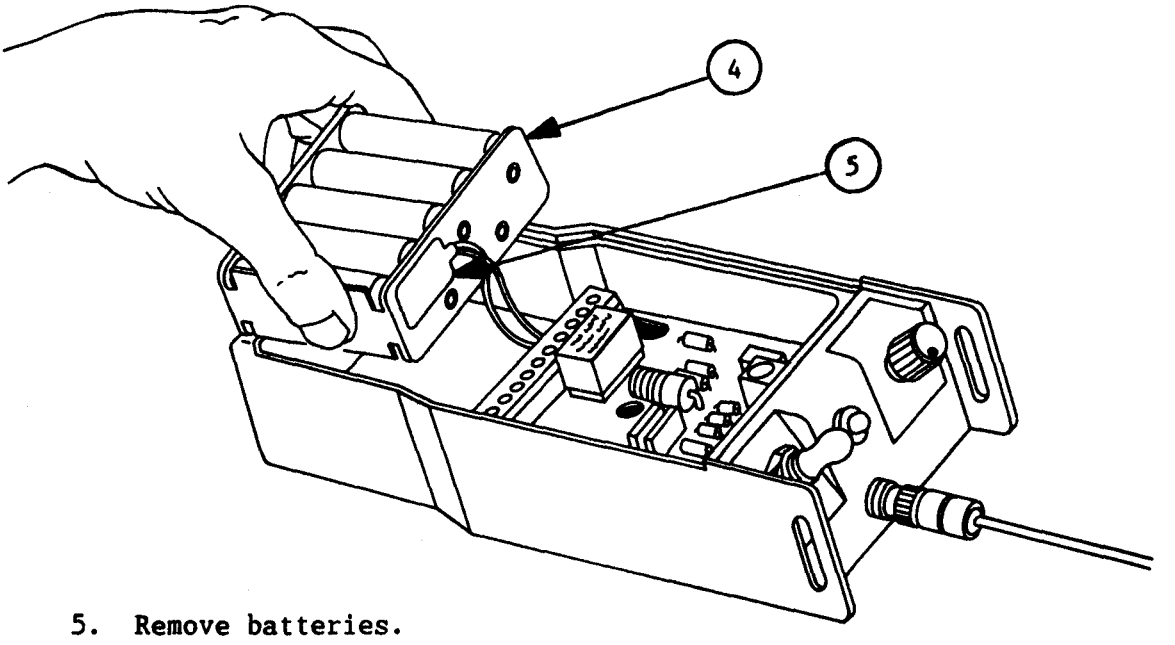
1. Position transmitter so that slot-head screw (1) holding cover (2) to chassis (3) is up.

2. Loosen screw.

3. Remove cover from chassis.



4. Locate battery holder (4). Lift battery holder out of chassis until electrical connector (5) clears rim of chassis. Disconnect electrical connector (5) from battery holder (4).

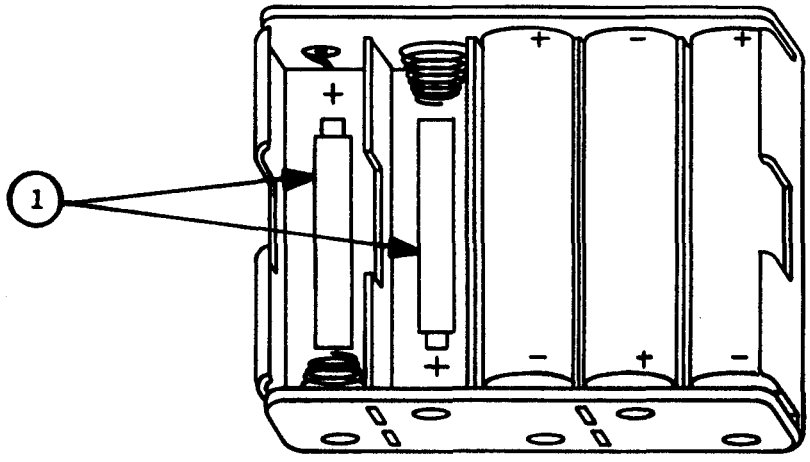


5. Remove batteries.

6. Discard batteries according to Standard Operating Procedures.

b. Installation

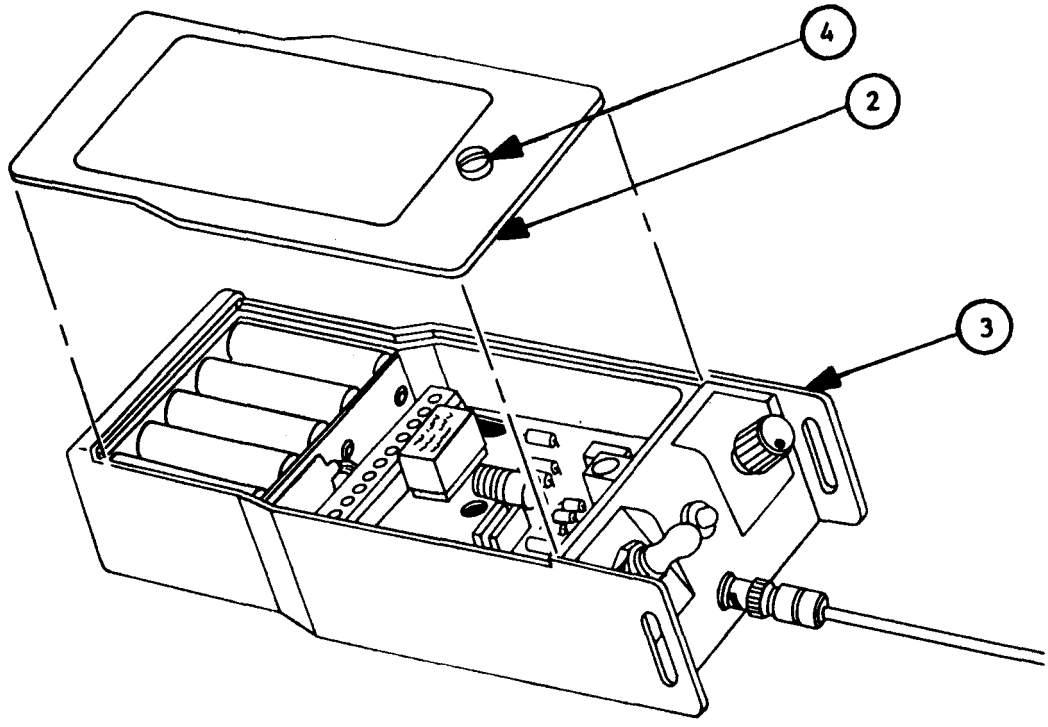
1. Install batteries in battery holder according to outlines (1) at rear of battery slots. Reconnect electrical connector to battery holder.



2. Return battery holder to chassis.

3. Mount cover (2) on chassis (3).

4. Turn slot-head screw (4) down until snug. Do not over-tighten screw.



4-12. REPLACEMENT OF RECEIVER TONE MODULE

This task covers:

a. Removal.
b. Installation.

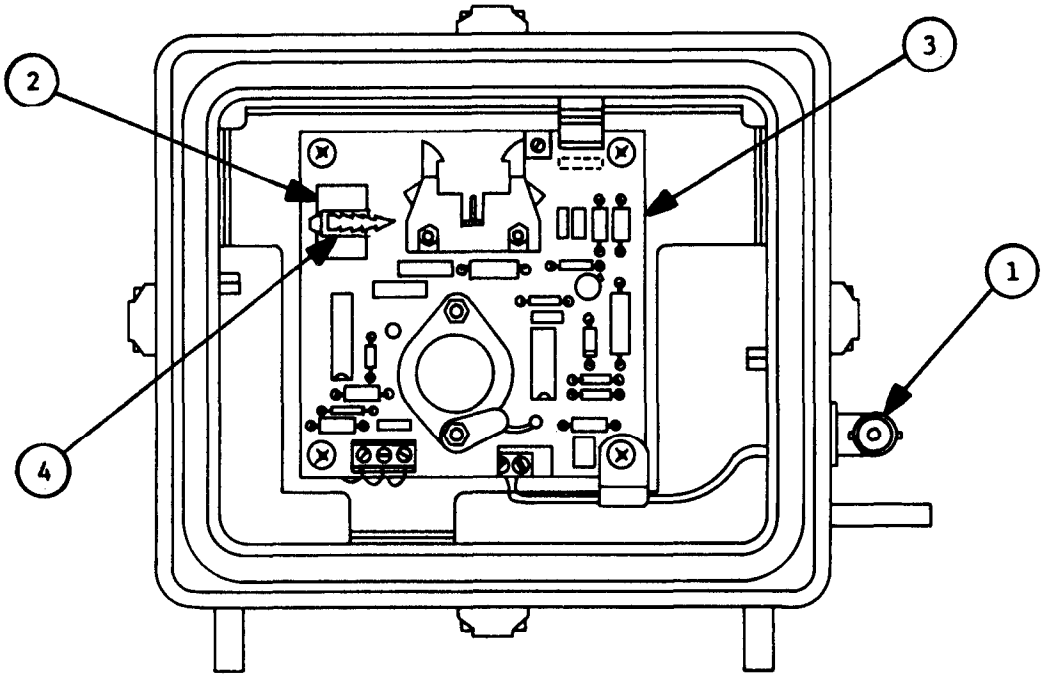
INITIAL SETUP

Materials/Parts: Grease Pencil (Item 2, Appendix E, or equivalent).

a. Removal

1. Position receiver so receiver ring is up, extender is down and coaxial connector (1) is to your right.

2. Looking down into receiver ring, locate tone module (2) on decoder printed wiring assembly (3).



3. Carefully twist end of tiedown strap (4) 90° so strap can be opened. Open strap, and pull up on tone module until pins clear holes in socket XZ1.

b. Installation

CAUTION

Any attempt to mount a transmitter tone module in a receiver or vice-versa could damage the equipment.

1. Carefully note serial number printed on tone module to be installed. The last digit of serial number should be 1, 2, 3, or 4. A last digit 5 would identify transmitter tone module. Be sure that receivers in M81 Simulator have different UNIT digits (l).

2. Aline tone-module pins with holes in socket XZ1. One pin has been removed from tone module, and corresponding hole in socket XZ1 has been filled. This allows tone module to be installed only one way.

3. Push tone module down into socket XZ1 until pins are fully seated.

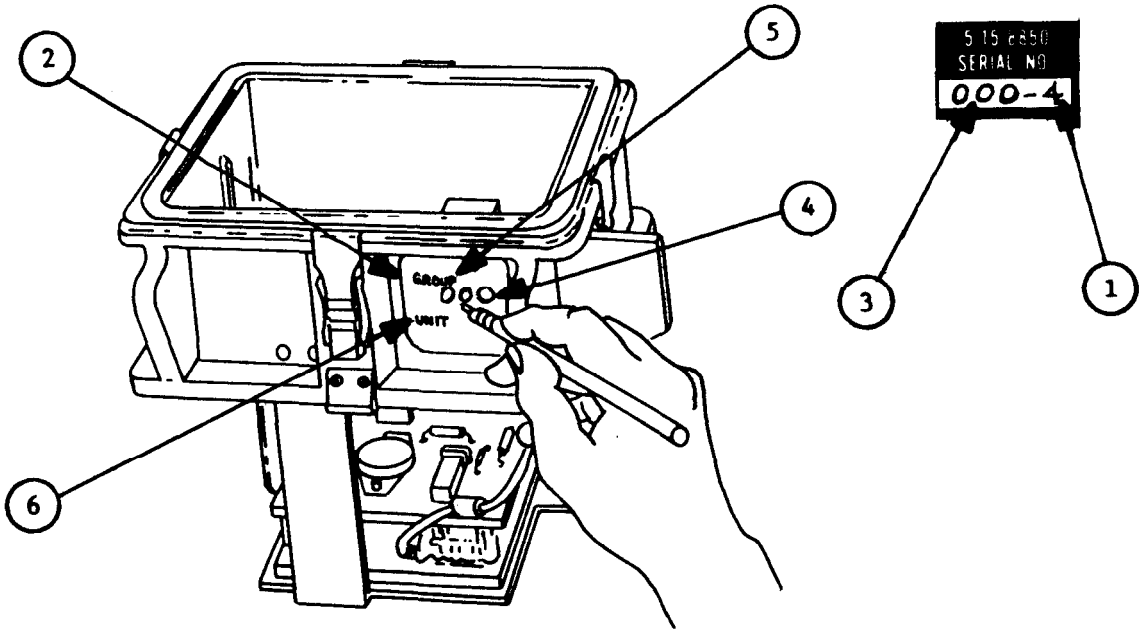
4. Reconnect tiedovn strap and carefully pull snug. Be sure that strap is locked.

5. Locate GROUP/UNIT identification plate (2) mounted on one face of receiver ring.

6. If first three digits of replacement tone module SERIAL number (3) do not match GROUP digits (4) on GROUP/UNIT identification plate, record first three digits next to word GROUP (5). Record last digit of SERIAL number next to word UNIT (6).

NOTE

Grease pencil markings can be rubbed off to make corrections to digits recorded on receiver.



4-13. REPLACEMENT OF TRANSMITTER ANTENNA

This task covers:

a. Removal.
b. Installation.

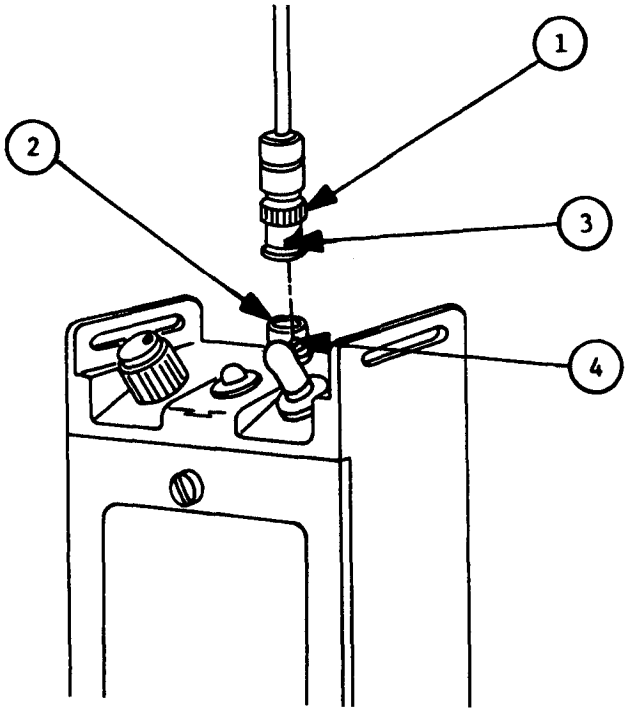
INITIAL SETUP

No special equipment/materials required.

a. Removal

1. Push down antenna jack (1) and, at the same time, turn jack 1/4 turn counterclockwise.

2. Pull antenna off coaxial connector (2).



b. Installation

1. Locate coaxial connector (2).

2. Aline slots (3) on antenna jack with studs (4) on coaxial connector.

3. Push antenna jack down onto coaxial connector and, at same time, turn antenna jack clockwise 1/4 turn to lock.

4-14. REPLACEMENT OF RECEIVER ANTENNA

This task covers:

a. Removal.
b. Installation.

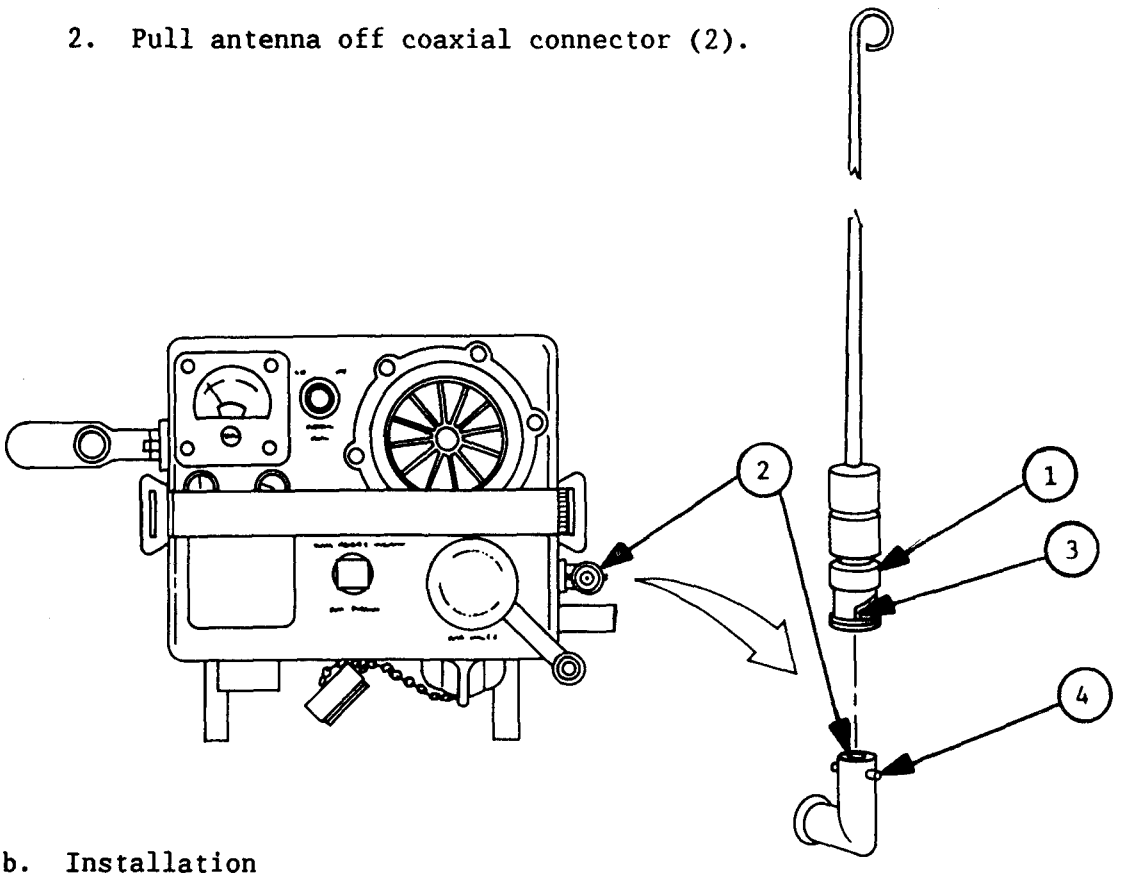
INITIAL SETUP

No special equipment/materials required.

a. Removal

1. Push down on antenna jack (1) and, at same time, turn jack 1/4 turn counterclockwise.

2. Pull antenna off coaxial connector (2).



b. Installation

1. Locate coaxial connector (2) on one face of receiver ring.

2. Aline slots (3) on antenna jack with studs (4) on coaxial connector.

3. Push antenna jack down onto coaxial connector and, at same time, turn antenna jack clockwise 1/4 turn to lock.

4-15. REPLACEMENT OF RECEIVER IN M43A1 DETECTOR

This task covers:

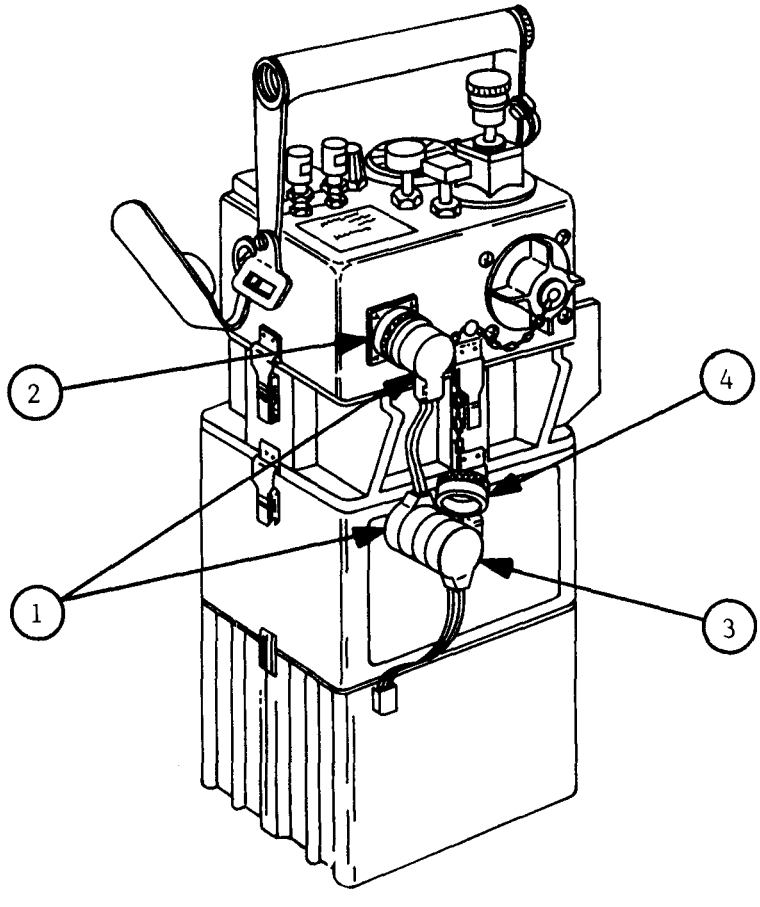
a. Removal.
b. Installation.

INITIAL SETUP

No special equipment/material required.

a. Removal.

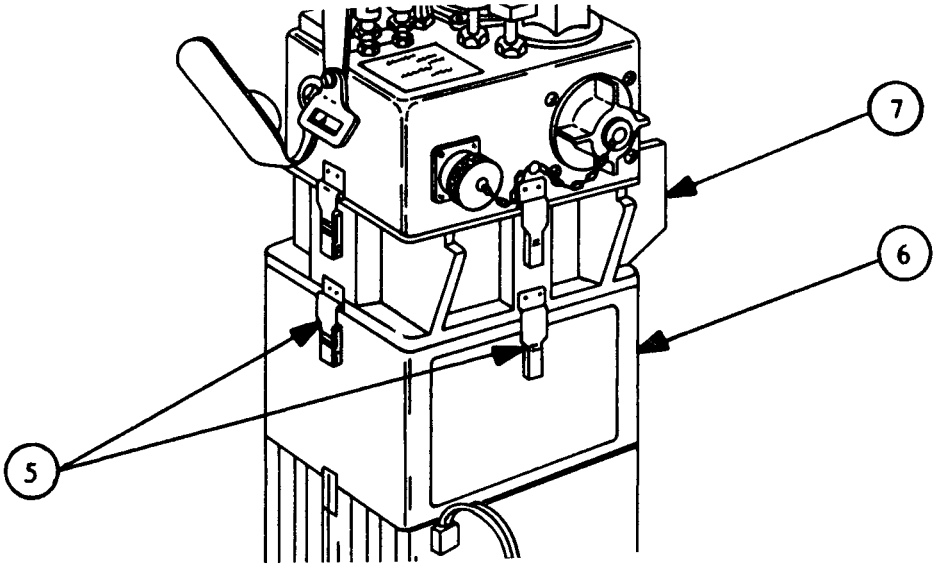
1. Position detector and receiver so that labels M43A1 Detector 24 VDC INPUT and AIR FILTER are toward you.



2. Turn extender cable connector 1/4 turn counterclockwise and pull connector (1) from 24 VDC INPUT connector (2). Remove extender cable connector from BA3517/U Battery Power Cable connector (3).

3. Screw protective cover (4) onto M43A1 Detector 24 VDC INPUT connector (2).

4. Release the four latches (5) holding case-bottom assembly (6) to receiver (7). Disengage latches from catches on receiver ring.

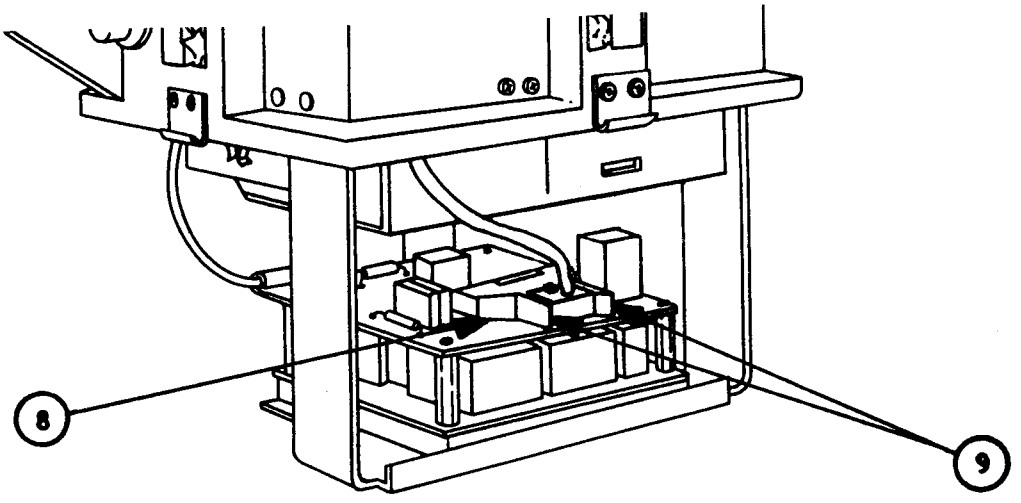


5. Pull up on detector carrying handle until extender clears rim of case-bottom assembly.

6. Position case-top assembly so that the word CAUTION and black radiation-hazard symbol are toward you.

7. Locate Connector P1 (8) on the decoder printed wiring assembly.

8. Push two release levers (9) apart until M43A1 Interface Cable connector is ejected from Connector P1.



4-15. REPLACEMENT OF RECEIVER IN M43A1 DETECTOR (continued)

9. Release four latches holding receiver to case-top assembly. Disengage four latches from-four catches on case-top assembly.

NOTE

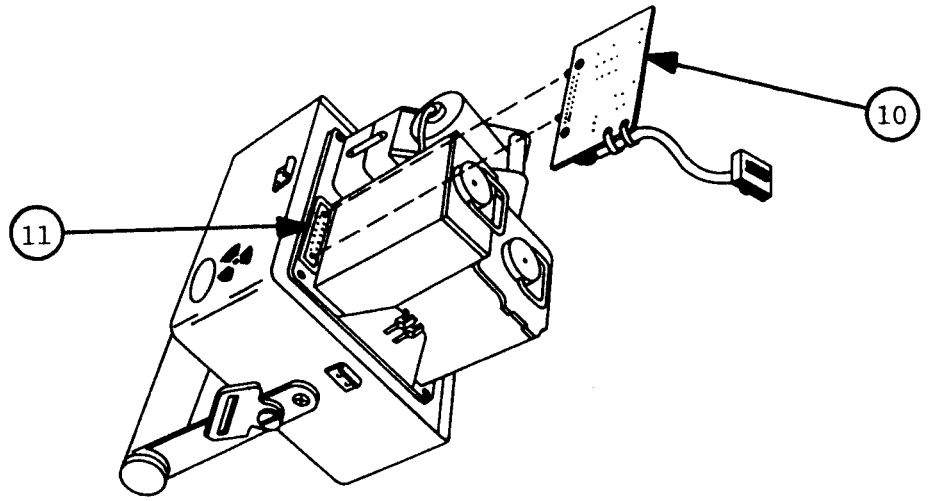
Be sure M43AI Interface Cable does not catch on any part of receiver.

10. Pull up on detector carrying handle until detector internal components clear rim of receiver ring.

11. Position case-top assembly so word CAUTION and black radiation-hazard symbol are up, internal components point up at angle to your right, and case-top assembly rests on carrying handle and top edge of one face of case-top assembly (as shown).

12. Locate M43A1 Interface Cable (10) attached to case-top assembly at Test Connector J10 (11).

13. Grasp M43A1 Interface Cable and pull out until pins on M43A1 Interface Cable connector clear holes on Test Connector J10.



14. Position case–bottom assembly so that USUAL RESERVICING INSTRUCTION plate is toward you. Position case-top assembly above case-bottom assembly so that the words 24 VDC INPUT and AIR FILTER are toward you .

15. Lower case-top assembly until its bottom surface contacts top surface of case-bottom assembly.

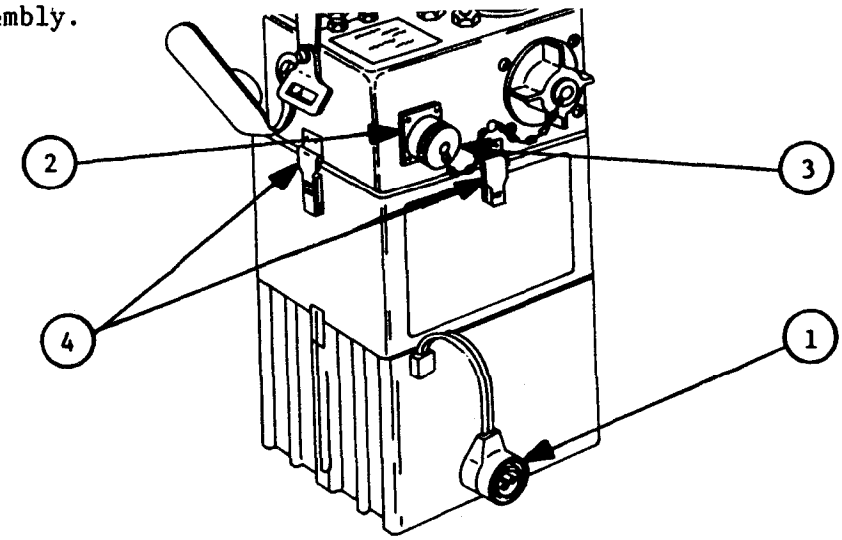
16. Engage four latches on case-bottom assembly with catches on case-top assembly. Push down on latch-locking tabs to lock latches.

b. Installation.

1. Position detector so that the words 24 VDC INPUT and AIR FILTER are toward you.

2. If the BA3517/U Battery Power Cable connector (1) is connected to the 24 VDC INPUT connector (2), pull out on BA3517/U Battery Cable connector until it is disengaged from **24** VDC INPUT connector and replace protective cover (3) on 24 VDC Input Connector.

3. Release the four latches (4) holding detector case-top assembly to case-bottom assembly. Disengage latches from catches on case-top assembly.

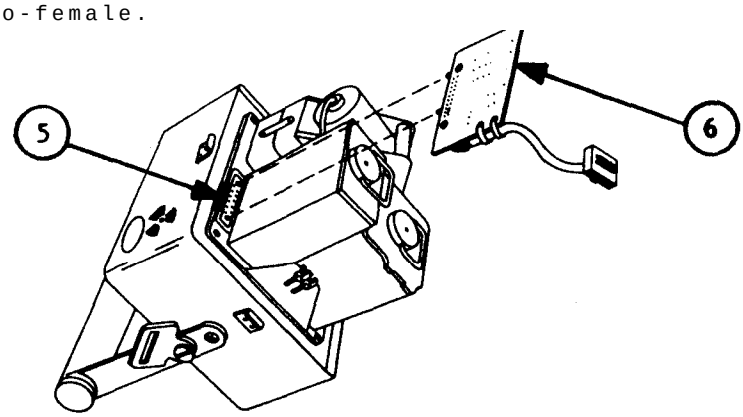


4. Pull up on detector carrying handle until detector internal components clear rim of case-bottom assembly.

5. Position case-top assembly so word CAUTION and black radiation hazard symbol on one face of case-top assembly are up, internal components point up at an angle to your right, and case-top assembly rests on carrying handle and one top edge.

6. Locate 14-pin Test Connector J1O (5).

7. Line up pins on plug on M43A1 Interface Cable (6) with holes on 14-pin Test Connector J1O. Be sure keying pins on two connectors line UP male-to-female.



4-15. REPLACEMENT OF RECEIVER IN M43A1 DETECTOR (continued)

8. Push pins on M43A1 Interface Cable plug into holes on Test Connector J10 until pins are fully seated.

9. Position receiver on flat surface so receiver ring is up, extender is down, and coaxial connector (7), is to your left.

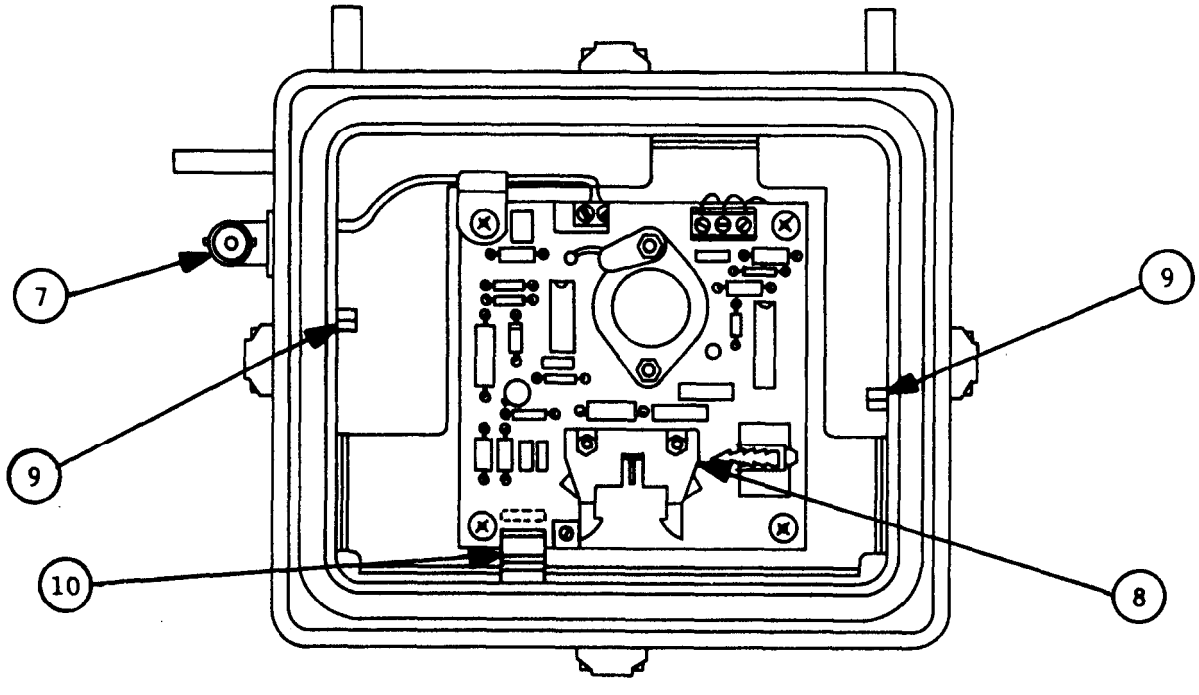
10. Looking down into receiver ring, locate Connector P1 (8) on decoder printed wiring assembly.

11. Position case-top assembly above receiver ring so word CAUTION and black radiation hazard symbol are toward you.

CAUTION

The M43A1 Interface Cable must not interfere with electrical spring contacts or Interface Cable Retainer on inside of ring or extend between case-top assembly and receiver ring top surface or damage may result.

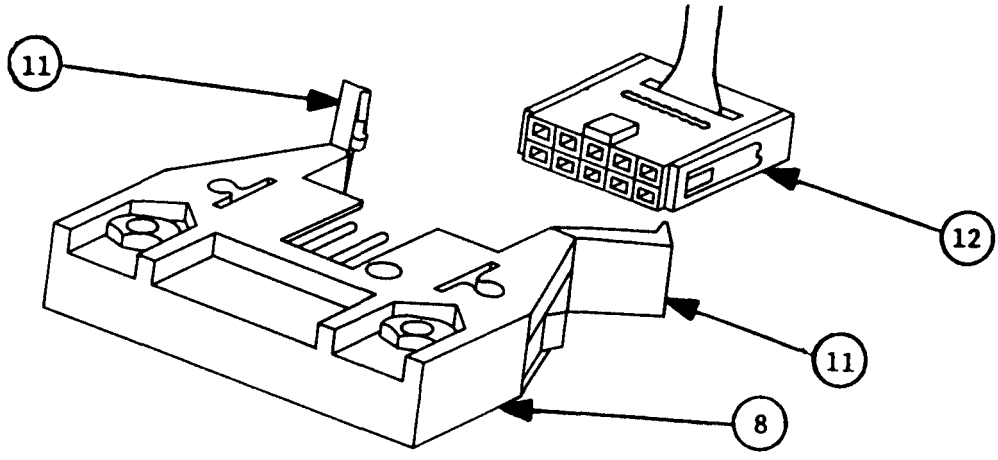
12. While guiding M43A1 Interface Cable out thru bottom of receiver ring, lower detector internal components into receiver ring. Be sure none of M43A1 Interface Cable extends between case-top assembly and receiver ring top surface. Be sure cable does not interfere with electrical spring contacts (9) or Interface Cable Retainer (10) on inside of receiver ring.



13. Lower case-top assembly until bottom surface contacts top surface of receiver ring, ensuring M43A1 Interface Cable board is properly seated in interface cable retainer.

14. Engage four latches on receiver ring with four catches on case-top assembly. Push down on four locking tabs to lock latches.

15. Push two catches (11) on connector P1 (8) on decoder printed wiring assembly apart. Line up M43A1 Interface Cable Connector J1 (12) with Connector P1.



16. Push M43A1 Interface Cable connector onto Connector P1 until catches on Connector P1 close on back of M43A1 Interface Cable connector. Push two catches together until they snap into straight-ahead position. Carefully tuck excess cable into receiver ring so that no part of cable sticks out.

17* Position case-bottom assembly so USUAL RESERVICING INSTRUCTION plate is toward you.

18. Position case-top assembly and receiver assembly above case–bottom assembly. The words 24 VDC INPUT and AIR FILTER should be toward you .

19. Lower receiver until bottom surface of receiver ring contacts top surface of case-bottom assembly.

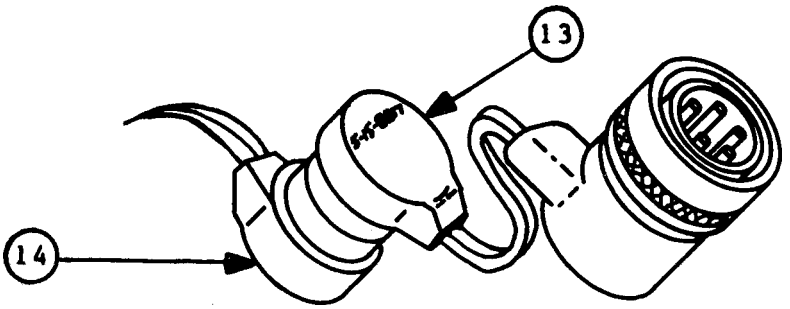
20. Engage four latches on case bottom assembly with four catches on receiver ring. Push down on latch-locking tabs to lock latches.

NOTE

Do not connect extender cable connector to M43A1 Detector 24 VDC INPUT connector until so instructed.

4-15. REPLACEMENT OF RECEIVER IN M43A1 DETECTOR (continued)

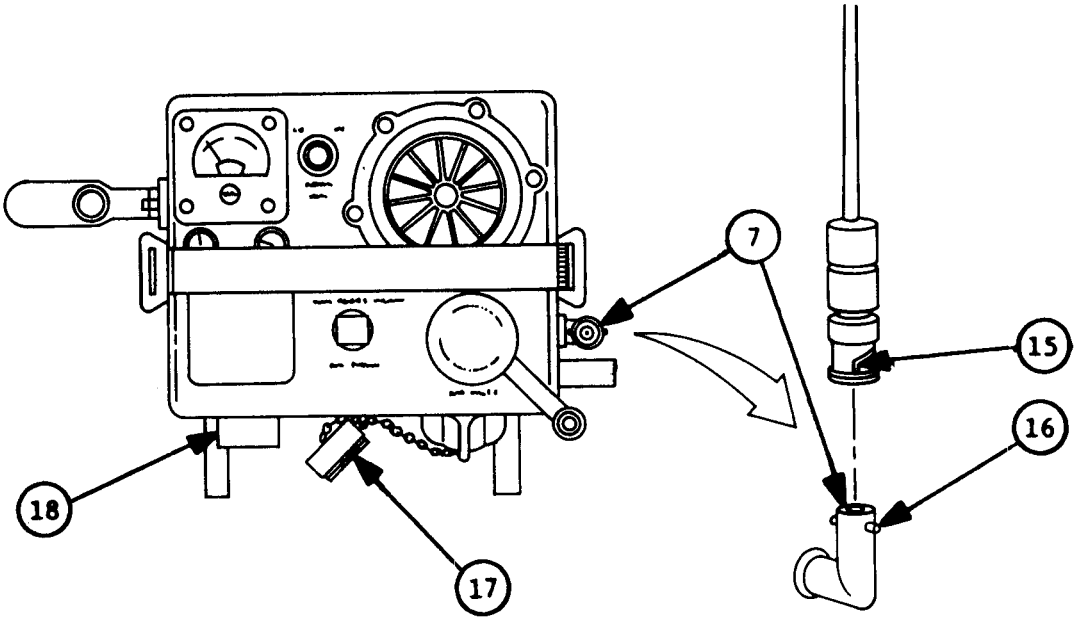
21. Push extender cable connector (13) and BA3517/U Battery Power Cable connector (14) together until they are fully seated (as shown).



22. Locate coaxial connector (7) on one face of receiver ring.

23. Obtain antenna. Aline slots (15) on antenna jack with studs (16) on coaxial connector.

24. Push antenna jack down onto coaxial connector and, at same time, turn antenna jack clockwise 1/4 turn to lock.



25. Remove protective cover (17) from M43A1 Detector 24 VDC INPUT connector (18).

26. Notify personnel within audible range that an alarm may sound. Push extender cable connector onto M43A1 Detector 24 VDC INPUT connector and then turn connector 1/4 turn clockwise to lock.

27. Reset the detector by pressing the BATTERY TEST AND RESET PRESS button. The BATTERY TEST AND RESET PRESS button may have to be held down for 60 seconds.

4-16. BATTERY TEST PROCEDURE

INITIAL SETUP

No special equipment/materials required.

NOTE

These procedures are correct with or without the presence of the transmitter antenna.

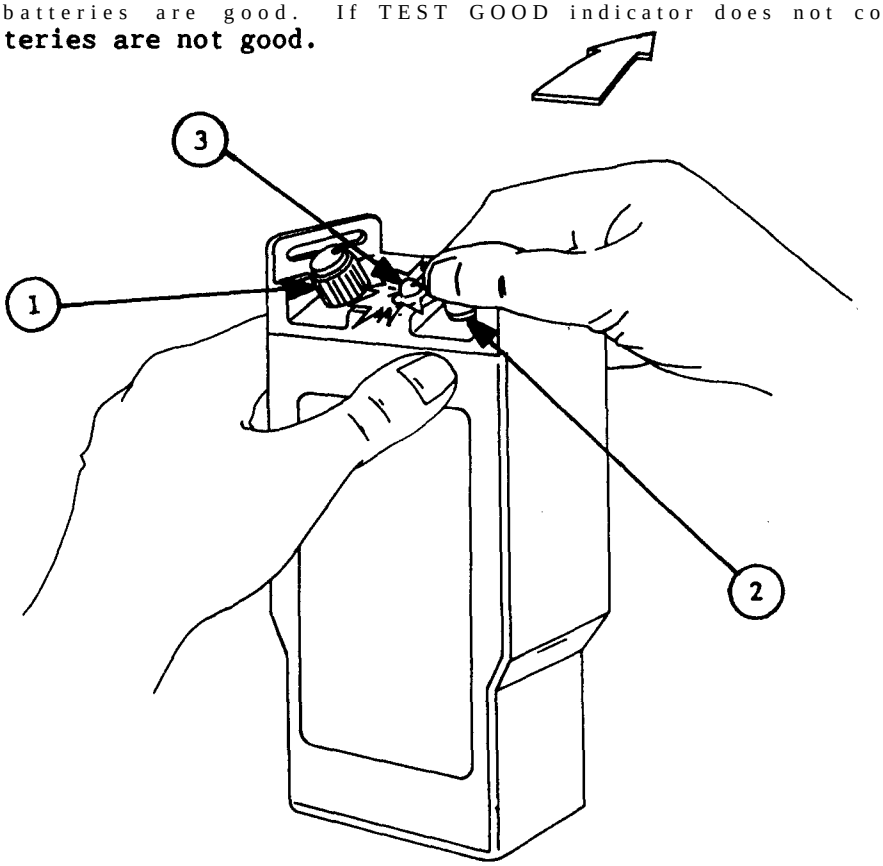
a. Turn CHAN SEL switch (1) to TEST.

CAUTION

Ensure CHAN SEL switch is in TEST position before pushing OPR switch.

b. Push OPR switch (2) to OPR position.

c. Observe TEST GOOD indicator (3). If TEST GOOD indicator comes on, batteries are good. If TEST GOOD indicator does not come on, batteries are not good.



4-17. RECEIVER TEST PROCEDURE

INITIAL SETUP

No special equipment/materials required.

a. Before performing the following steps, be sure that the following procedures have been performed.

   1. Installation of receiver ring in M43A1 Detector (Paragraph 4-15b) .

   2. Installation of receiver antenna (Paragraph 4-14b).

b. Separate each M43A1 Detector, with receiver installed, from the transmitter by approximately 20 meters (66 feet). The receiver/detectors should be within line-of-sight of the transmitter.

c. Turn the Transmitter CHAN SEL switch to select a channel matching the UNIT digit of the receiver to respond.

d. Be sure the antenna is pointing straight up, the operating plate is toward you, and you are facing the receivers. Switch to OPR and hold there for 5 seconds. Release the switch.

e. Reset detector by pressing the BATTERY TEST AND RESET PRESS button. The BATTERY TEST AND RESET PRESS button may have to be held down for 60 seconds.

f. Repeat Steps c, d, and e for each of the receiver/detectors.

Section V. PREPARATION FOR STORAGE OR SHIPMENT

4-18. ADMINISTRATIVE STORAGE

a. Preparation For Storage.

CAUTION

Remove transmitter batteries before shipment or inactive service of 30 days or more or damage to transmitter may result.

NOTE

Batteries should not be stored at temperatures above +75°F. Ideal storage temperature is -35°F to +35°F.

1. Remove transmitter batteries according to instructions in Paragraph 4-11a. Mount cover on chassis and turn screw down until snug.

2. Clean transmitter and receivers with either a damp or dry rag, as required. Do not use dry-cleaning solvent or gasoline for cleaning electronic equipment.

b. Storage.

1. Batteries - Store batteries in a cool, dry, well-ventilated area. Clean contacts before reinstalling.

2. M81 Simulator - Store M81 Simulator in its transit case. To the extent practicable, place transit case in covered storage.

c. Removal From Storage.

1. Reinstall transmitter batteries according to instructions in Paragraph 4-11b.

2. Perform battery test procedure according to instructions in Paragraph 4-16.

3* Resume normal operation and maintenance of M81 Simulator.

APPENDIX A

REFERENCES

A-1. Scope.

This appendix lists all forms, field manuals, and technical publications referenced in this manual.

A-2. Forms.

Recommended Changes to Publications and Blank Forms . . . .DA Form 2028
Recommended Changes to Equipment Technical Publications . . . .DA Form 2028-2
Equipment Inspection and Maintenance Worksheet . . . .DA Form 2404
Quality Deficiency Report. . . . . .SF 368

A-3. Field Manuals.

Tactical Single-Channel Radio Communications Techniques . . . .FM 24-18
First Aid for Soldiers. . . . . ..FM 21-11

A-4. Technical Manuals.

The Army Maintenance Management System (TAMMS) . . . .DA PAM 738-750
Modification Work Orders (MWO) Equipment Index . . . .DA PAM 750-10
Destruction of Chemical Weapons and Defense
Equipment to Prevent Enemy Use. . . . . .TM 43-0002-31

Technical Manual, Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List, M8A1 Automatic Chemical Agent
Alarm . . . .TM 3-6665-312-12&P

APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I
INTRODUCTION

B-1. THE ARMY MAINTENANCE SYSTEM MAC.

a. This introduction (Section 1) provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System Concept.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in Column 4 as:

UNIT, Which includes two subcolumns, C (operator/crew) and O (unit maintenance)
INTERMEDIATE, Which includes two subcolumns, F (Intermediate Direct Support) and W (Intermediate General Support)
DEPOT, Which includes a D (Depot) subcolumn

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

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 (e.g., by sight, sound, or feel).

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.

B-2 . MAINTENANCE FUNCTIONS (continued).

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. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service and 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.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed 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.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material 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. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

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

b. Column 2, Component/Assembly. Column 2 contains the item 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.

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the 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 level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time); troubleshooting/fault location 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. The symbol designations for the various maintenance categories are as follows:

C . . . .Operator or crew
O . . . .Unit Maintenance
F . . . ..Intermediate Direct Support Maintenance
H. . . . . ..Intermediate General Support Maintenance
L.. . . . . ..Specialized Repair Activity
D. . . . . ..Depot Maintenance

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

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetical order, which shall be keyed to the remarks contained in Section IV.

B-4 . EXPLANATION OF COLUMNS IN TOOLS AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National Stock Number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5 . EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. Column 1, Reference Code. The code recorded in column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

SECTION II
MAINTENANCE ALLOCATION CHART
FOR M81 SIMULATOR

(1) Group No.	(2) Component/Assembly	(3) Maint. Fctn.	(4) Maint. Level					(5) Tools and Equipment	(6) Remarks
			Unit		Interm.		Depot		
			c	o	F	H	D		
00	Simulator, Detector Unit, Chemical Agent Automatic Alarm, M81	Inspect	.1						
		Test		.4					
		Service	.1						
		Repair		.1					"A"

SECTION III
TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR M81 SIMULATOR

Not Applicable

SECTION IV
REMARKS

Ref. Code	Remarks
"A"	Components which are replaceable by Unit Maintenance are:

Assembly	Part Number
Cable, Interface, M43Al	C5-15-8806
Power Cable	D5-15-8817
Receiver Assembly	D5-15-8819
Transmitter Assembly	D5-15-8843
Tone Module Set, Special Purpose	D5-15-8850-XXX
Tone Module Set	D5-15-8850-000
Transit Case	D5-15-8856
Antenna, Modified	C5-15-8903

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

SECTION I
INTRODUCTION

C-1. Scope.

This appendix lists components of end item and basic issue items for the simulator to help you inventory items required for safe and efficient operation.

C-2. General.

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the simulator in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the simulator during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns.

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

C-3. EXPLANATION OF COLUMNS (continued).

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quantity required (Qty. Rqr.). Indicates the quantity of the item authorized to be used with/on the equipment.

SECTION II
COMPONENTS OF END ITEM LIST

There are no Components of End Items (COEI).

SECTION III
BASIC ISSUE ITEMS

(1) Illus Number	(2) National Stock Number	(3) Description FSCH and Part Number — Usable On Code	(4) U/M	(5) Qty Rqr
		TM 3-6665-316-12 Operator's and Unit Maintenance Manual, Simulator, Detector Unit, Chemical Agent Automatic Alarm, M81	ea	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST (AAL)

There is no Additional Authorization List (AAL).

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I
INTRODUCTION

E-1. Scope.

This appendix lists expendable supplies and materials you will need to operate and maintain the Simulator. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

E-2. Explanation of Columns.

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

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

C -- Operator/Crew
O -- Unit Maintenance

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

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

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

SECTION II

1	O	6135-00-935-2587	Battery, Dry, BA3058/U (10 per system)	ea
2	C	7510-00-240-1526	Pencil, DZ	ea

INDEX

INDEX (continued)

INDEX (continued]

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
4-5	4-8b		

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

A battery test procedure should be performed after replacing the transmitter batteries in the first troubleshooting rectangle.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

NAME, GRADE, PHONE NO.

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Joan Doe Mgr

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TM 3-6665-315-12	DECEMBER 1987	Operator's and Unit Maintenance Manual, Simulator, Detector Unit, Cml Agt Auto Alm, M81

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