This copy is a reprint which includes current pages from Change 1.

TM 9-1265-208-10

TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

MULTIPLE INTEGRATED LASER

ENGAGEMENT SYSTEM

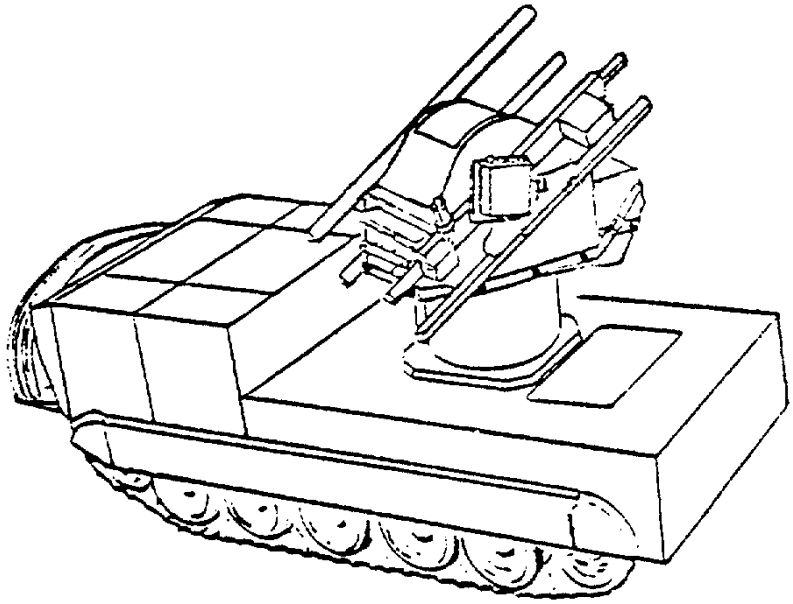
(MILES)

SIMULATOR SYSTEM, FIRING, LASER: M77

NSN 1265-01-154-9887

FOR

CHAPARRAL WEAPON SYSTEM



HEADQUARTERS, DEPARTMENT OF THE ARMY

OCTOBER 1984

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 29 JULY 1988

OPERATOR'S MANUAL
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM
(MILES)
SIMULATOR SYSTEM, FIRING, LASER: M77
NSN 1265-01-154-9887
FOR
CHAPARRAL WEAPON SYSTEM

TM 9-1265-208-10, October 9, 1984, is changed as follows:

1. Replace the old pages with the new pages as indicated below.
2. New or changed text is indicated by a vertical bar in the margin of the page.
3. Added or revised illustrations are indicated by a miniature pointing hand.

Old Page	New Page
i (ii blank)	i (ii blank)
1-1 and 1-2	1-1 and 1-2
2-83 thru 2-86	2-83 thru 2-86
3-3 thru 3-6	3-3 thru 3-6
3-19 and 3-20	3-19 and 3-20
B-3 and B-4	B-3 and B-4
B-5 and B-6	B-5 and B-6

File this change sheet in back of the publication for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

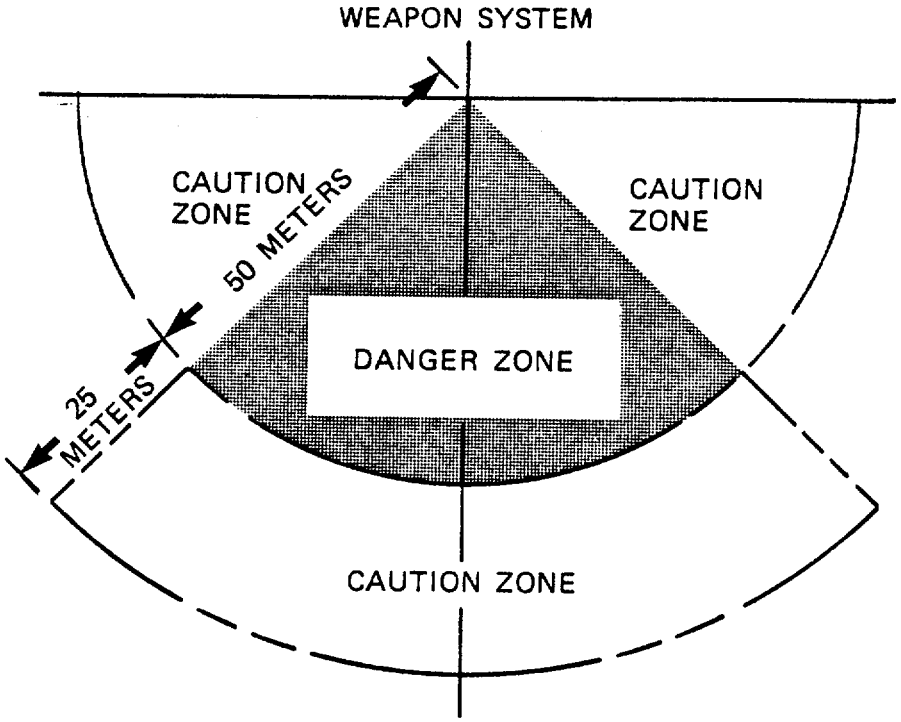
R. L. DILWORTH
Brigadier Genera/, United States Army
The Adjutant General

DISTRIBUTION:

To be distribution in accordance with DA Form'12-32, Operator's Maintenance requirements for MILES Simulator System, Firing, Laser, M77 (for CHAPARRAL).

WARNING

All personnel **STAY OUT of DANGER ZONE** behind WESS device. Enter caution zones only when absolutely necessary. Face away from blast and wear adequate ear protection.



Although laser light emitted by MILES laser transmitters is considered eye safe by the Bureau of Radiological Health. suitable precautions must be taken to avoid possible eye damage from overexposure to this radiated energy. Precautionary measures include the following:

- Avoid viewing laser emitter at close range (less than 12 meters) Increasing the eye-to-laser distance greatly reduces the risks of overexposure.
- Avoid viewing emitter directly along optical axis of radiated beam.
- Especially avoid viewing emitter through magnifying optics at engagement ranges of less than 75 meters for STINGER, VULCAN, and TOW, and 110 meters for the CHAPARRAL.
- Avoid allowing personnel with optics of higher transmission or magnifying power than normal tank optics to view STINGER, VULCAN, or TOW within 150 meters or the CHAPARRAL within 330 meters.

Primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

Do not cover D mate access hole (5). Personal Injury and/or Damage to MILES equipment and vehicle can occur if DETECTOR/POWER cable is damaged.

If task requires Vehicle Equipment Power to be turned ON, ensure Vehicle Equipment Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.

Insure all personnel are clear of the turret prior to energizing MOUNT DRIVE BREAKER.

Never arm the ATWESS until you are ready for a mission.

Never place hand over Armed and Loaded WESS device.

Handle ATWESS cartridges with the same care you use with any live ammunition. A severe jolt to the ATWESS may cause the cartridge to go off.

Use EAR PLUGS or approved HEARING PROTECTION. Keep them clean and ready to use. The MILES CHAPARRAL System uses ATWESS devices to simulate the sight and sound of an actual missile launch.

Ensure that all personnel stand clear of CHAPARRAL turret. Sudden superelevation can cause Severe Injury.

Ensure Mount Drive breaker on CHAPARRAL Weapon System is OFF. Failure to comply can result in Injury to Personnel.

Failure to set Mount Drive Breaker switch to OFF can result in injury to personnel.

Stand clear of the WESS Assembly when the ATWESS is fired. Back blast can cause Severe Injury.

Make sure personnel are clear of CHAPARRAL turret. Sudden superelevation can cause Severe Injury.

For information on FIRST AID, see FM 21-11.

TECHNICAL MANUAL
No. 9-1265-208-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 9 OCTOBER 1984

OPERATOR'S MANUAL
FOR
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM
(MILES)
SIMULATOR SYSTEM, FIRING, LASER: M77
NSN 1265-01-154-9887
FOR
CHAPARRAL WEAPON SYSTEM

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 back of this manual direct to: Commander, US Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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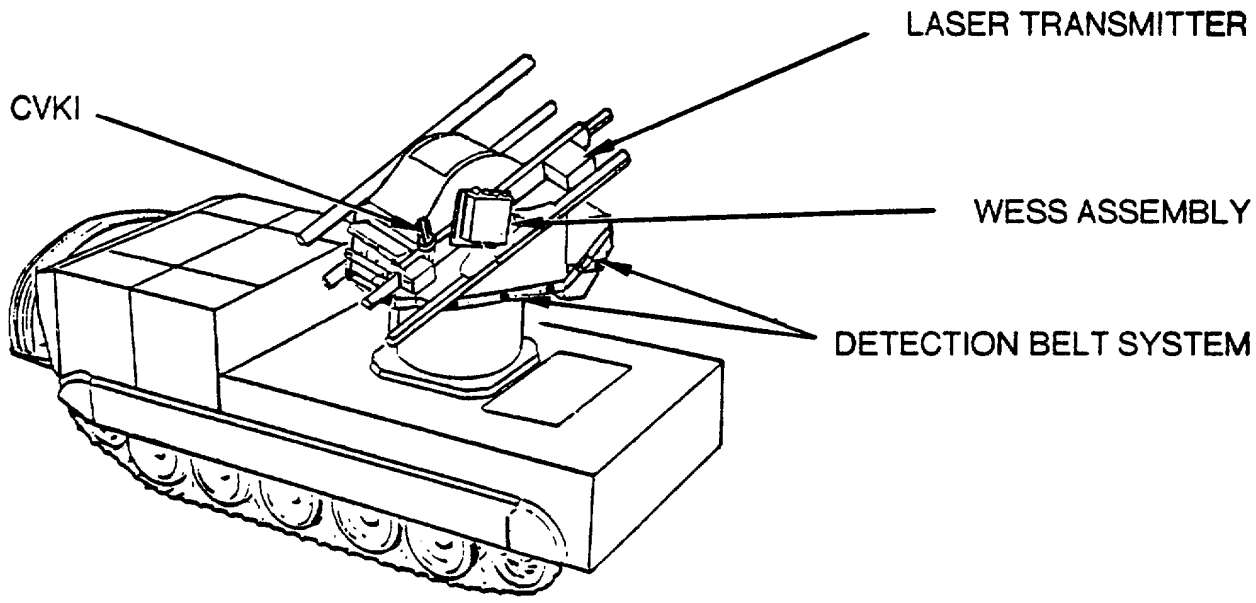
CHAPTER 1
INTRODUCTION

SECTION I. GENERAL INFORMATION



SCOPE

TYPE OF MANUAL. This manual shows you how to install, checkout, align, operate, and maintain the Multiple Integrated Laser Engagement System (MILES) Air-to-Ground Engagement System/Air Defense (AGES/AD), M77. for the CHAPARRAL weapon system.

This manual covers only authorized operator maintenance. Any maintenance problems not covered should be referred to organizational maintenance personnel.

NOTE

To use this manual you should be able to:

Operate, boresight, aim and fire the CHAPARRAL weapon system (see TM 9-1425-1586.10).

Complete DA Forms 2402 and 2404.

If you cannot do these tasks, ask your NCOIC or Instructor to show you how. When you can do all these tasks, go on with this manual.

PURPOSE OF EQUIPMENT. MILES AGES/AD equipment for the CHAPARRAL Weapon System consists of a laser transmitter and a detector system. It permits realistic combat training without the hazards of using live ammunition.

LIMITATION ON EQUIPMENT. MILES-equipped weapons have the same range and operational capabilities as the normal weapons but a dirty laser transmitter lens may reduce the effective range of the transmitters.

MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for equipment maintenance are those as prescribed in DA PAM 738-750, The Army Maintenance Management System (TAMMS).

HAND RECEIPT MANUAL. This manual has a companion document with a TM number followed by HR" (which stands for Hand Receipt). The TM 9-1265-208-10-HR consists of preprinted hand -receipts (DA Form 2062) that list end item related equipment (i.e., COEI, BII, and AAL) you must account for. As an aid to property accountability, additional HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 3, AR 310-2.

Commander
The U.S. Army Adjutant General Publications Center
2800 Eastern Boulevard
Baltimore, MD 21220

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs). If your MILES equipment for the Chaparral Weapon System 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. Put it on an SF 368 (Quality Deficiency Report). Mail the Quality Deficiency Report to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMCQAD, Rock Island. IL 61299- 6000. We'll send you a reply.

REFERENCE INFORMATION

This listing includes the Nomenclature Cross Reference List. List of Abbreviations, and an explanation of terms (glossary) used in this manual

NOMENCLATURE CROSS REFERENCE LIST

Common Name	Official Nomenclature
Adapter Set	Adapter Set, Simulator System, Laser: CHAPARRAL
ATWESS	Antitank Weapons Effect Signature Simulator
Battery Box	Battery Box Assembly
Chaparral Simulator System	Simulator System, Firing Laser: CHAPARRAL Weapon
Control Indicator Assembly (CIA)	Console Simulator System, Laser: For M113 APC
Detector Belt	Detector Belt Assembly. Segment No. 1; Segment No. 2.
Interface Control Assembly (ICA)	Console, Simulator System. Laser: Vehicle Interface
Kill Indicator (CVKI) KILL/HIT/MISS	Indicator, Simulator System, Laser: Combat Vehicle
Laser Transmitter CHAPARRAL	Transmitter Assembly, Simulator System. Laser:
Rail Assembly	Rail Assembly. Simulator System. Laser: CHAPARRAL
WESS	Simulator, Weapon Fire, CHAPARRAL

LIST OF ABBREVIATIONS

AGES/AD	Air-to-Ground Engagement System/Air Defense
ATWESS	Antitank Weapons Effect Signature Simulator
CIA	Control Indicator Assembly
ICA	Interface Control Assembly
MILES	Multiple Integrated Laser Engagement System
PMCS	Preventive Maintenance Checks and Services
WESS	Weapons Effect Signature Simulator

GLOSSARY

ATWESS	Pyrotechnic device used to simulate backblast. flash, noise, and smoke of a CHAPARRAL missile firing.
ATWESS Cartridge	Explosive round used in ATWESS.
Combat Vehicle Kill Indicator	MILES device attached to vehicles to provide external flashing light. Indicates that vehicle is under opposing fire ("NEAR MISS"). has been "HIT," or "KILLED."
Control Indicator Assembly (CIA)	Receives detected laser pulse signals from detector belts. Decodes these signals and activates appropriate audio and visual alarms associated with the CVKI and intercom. Displays information on attacking weaponary.
Controller	Umpire or Referee in a MILES training exercise.
Controller Gun	Device used to test MILES detector systems. Also used to disqualify soldiers or vehicles from an exercise.
Controller Key	Green key used by Controller to reset MILES transmitters and control consoles.
Fastener Tape	Hook and pile tape. Used to hold vehicle detector belts and other MILES equipment in place.
HIT	Simulated contact with opposing fire insufficient to disable vehicle or cause a fatality.
Interface Control Assembly (ICA)	Contains electronic circuitry to activate the laser transmitter when the weapon trigger is pressed.
KILL	Simulated contact with opposing fire sufficient to disable vehicle or cause a fatality.
Laser	Light Amplification by Stimulated Emission of Radiation
Laser Beam	Invisible beam of light which simulates weapon fire.
Laser Detector Assembly	Device that senses laser beams directed at it.
Laser Transmitter	Device that sends a laser beam.
MILES	Multiple Integrated Laser Engagement System. MILES consists of a laser transmitter and a detector system. It permits realistic combat training without the hazards of using live ammunition.

NEAR MISS	Simulated closeness to contact with opposing fire.
Simulator	Training device which takes the place of real equipment and which has many of its characteristics.
Orange Weapon Key	Activates ICA. Silences vehicle intercom when inserted in Control Indicator Assembly. Also used to "SELF-KILL" vehicle.
WESS	An ATWESS array. Pyrotechnic device used to simulate backblast, flash. noise, and smoke of a CHAPARRAL missile firing.

SECTION II. EQUIPMENT DESCRIPTION

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

PURPOSE OF MILES SIMULATOR SYSTEM, LASER: CHAPARRAL WEAPON SYSTEM

The MILES Simulator System, Laser: CHAPARRAL Weapon System, permits the vehicle to take part in realistic combat training exercises. Actual firing conditions of all vehicle weaponry is simulated using laser beams. ATWESS firing devices add to the system's realism.

Laser detectors mounted on the CHAPARRAL Weapon System sense enemy fire. MILES system electronics determine the accuracy and simulated damage of enemy fire. The system also detects the type of weapon directing enemy fire against the CHAPARRAL Weapon System.

FEATURES AND CAPABILITIES

- Easily installed and removed.
- Simulates firing capability of CHAPARRAL Weapon System.
- ATWESS firing devices add realism.
- Normal firing procedures used for weaponry.
- Detects all opposing fire.

    1. Attacking weapon accuracy

        a. "NEAR MISS"

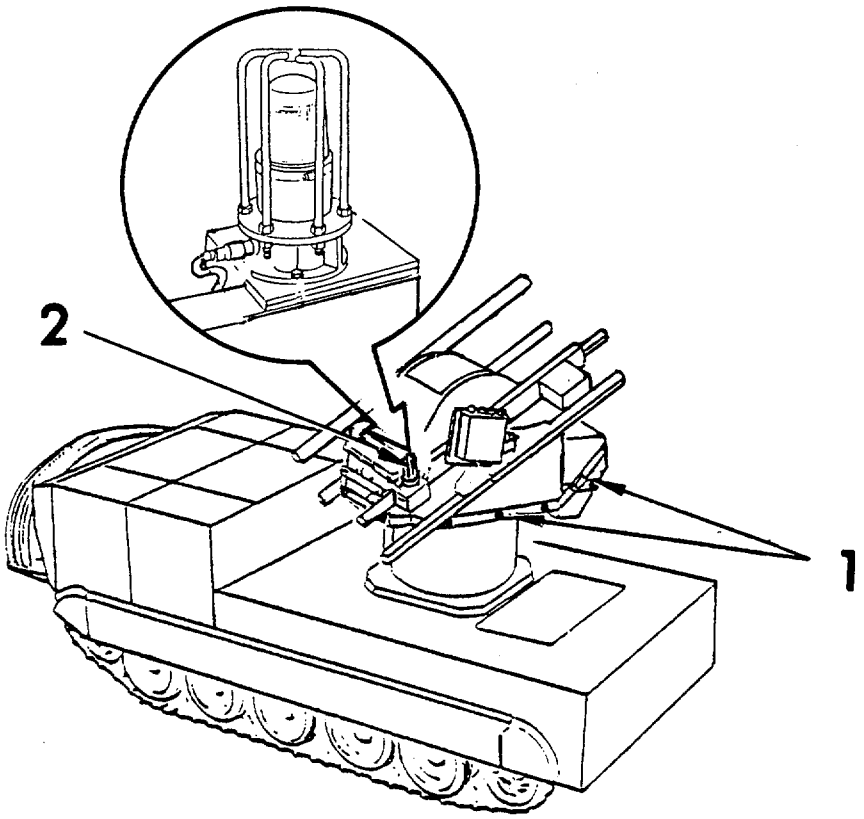
        b. "HIT"

        c. "KILL"

    2. Attacking weapon identification

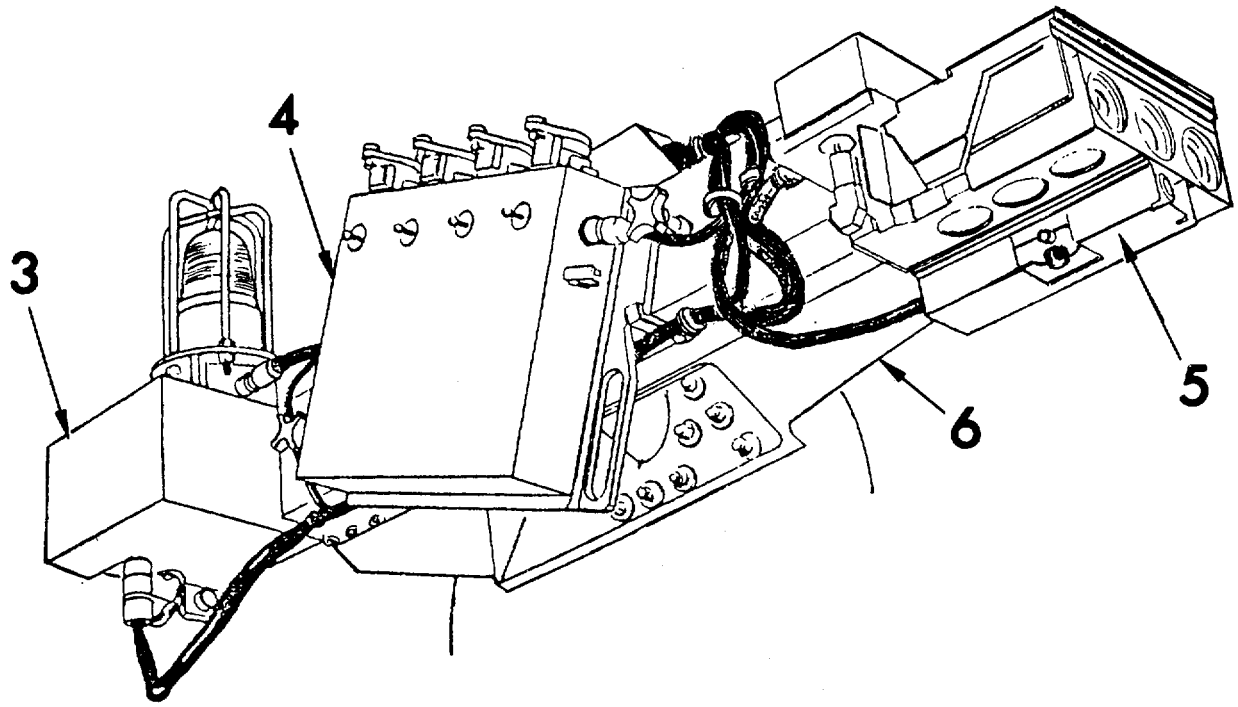
- Uses eye safe battery-powered laser transmitters.
- Operates in temperatures from -350C (-31°F) to 62°C (1440F).
- Compatible with all other MILES training devices.
- High visibility CVKI strobe light signals CHAPARRAL "NEAR MISS." "HIT," or "KILL."

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



Detection Belt System (1). Receives laser pulses from AGES/AD and MILES-equipped opposing weapons. Generates, amplifies and routes electrical signals to Control Indicator Assembly for determining whether signal was a "HIT," "KILL." or "NEAR MISS." Mounts on all sides of turret and front of M730 Tracked Vehicle.

CVKI (2). Provides a flashing light to indicate to aircraft, other vehicles. and ground troops that the CHAPARRAL has received a "NEAR MISS," "HIT," or "KILL.'.' Located on rail assembly.



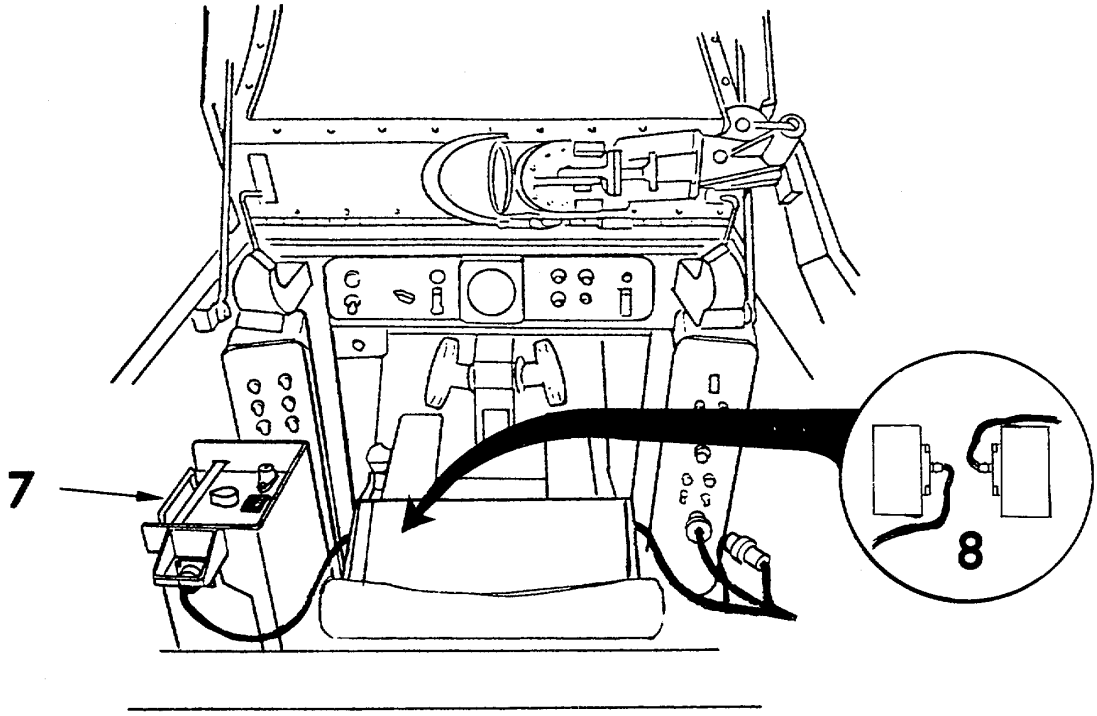
Control Indicator Assembly (CIA) (3). Receives detected laser pulse signals from detector belts. Decodes these signals, and actuates appropriate audio and visual alarms. Has key receptacle for initializing and resetting system. HIT/KILL weapon identity display is also provided. Located in a protective box on rail assembly.

WESS Assembly (4). Contains four ATWESS devices and associated electronics. Simulates smoke, noise and flash of actual rocket launches. Mounts on rail assembly.

Laser Transmitter (5). Simulates the firing of CHAPARRAL missile by transmitting a special coded laser signal. Located on rail assembly. Transmitter's motor assembly uses 24 V dc vehicle power.

Rail Assembly (6). Aluminum U-beam structure mounted on the upper right missile launcher. Provides support and electrical connections to mount the CIA, CVKI, WESS, and laser transmitter.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont)



Interface Control Assembly (ICA) (7). Provides interface with actual CHAPARRAL weapon firing system, WESS and laser transmitter. ICA panel displays indicate Total and Ready Rounds remaining and laser firing. Switches are used to select Total and Ready Rounds remaining indication and to reload system. ICA mounts inside Gunner's compartment.

Battery Boxes (8). Two battery boxes are installed. Each box contains two 6 V dc batteries for operating laser transmitter, CIA, detection system. and ICA. Battery boxes are located beneath Gunner's seat.

EQUIPMENT DATA

Table 1-1. MILES CHAPARRAL Weapon System Technical Characteristics

Transmitter		
Effective/Standoff Range	-	6000 meters
Total Rounds	-	12
Ready Rounds	-	4
Firing Rate	-	1 missile every 8 sec.
Laser Tubes	-	3
Power	-	12 V dc and 24 V dc
Reset/Initialization	-	Controller Key
Enable	-	Weapon Key
Operating Modes	-	Normal and Test
Weapons Effect Signature Simulator		
Total Rounds	-	4
Ready Rounds	-	4
Firing Rate	-	1 cartridge every 8 sec.
Power	-	12 V dc
Detection System		
Power	-	12 V dc
Reset/initialization	-	Controller Key
Combat Vehicle Kill Indicator		
Power	-	24 V dc

EQUIPMENT DATA

Table 1-2. MILES CHAPARRAL Major Components Weights and Dimensions

Item	Weight (pounds)	Dimensions (inches)
Transmitter	30	9.5 x 12 x 7
Interface Control Assembly	8	17.5 x 8 x 6
Control Indicator Assembly	7.87	5.7 x 5.5 x 5.5
Combat Vehicle Kill Indicator	11.6	14 x 7.3 (diameter)
Detector Belt Segment No. 1	2.38	144 x 2
Detector Belt Segment No. 2	1.5	37.5 x 2
Rail Assembly	35	13 x 6.5 x 63
Battery Box Assembly	1.31	7 x 5 x 4
CHAPARRAL Weapon Fire Simulator (WESS) Assembly	34.3	22 x 17 x 5

SECTION III. TECHNICAL PRINCIPLES OF OPERATION

BASIC PRINCIPLES OF OPERATION

The MILES system uses semiconductor laser beams to simulate actual weapon fire. An eye-safe invisible laser beam is sent out by each weapon's transmitter when it is fired. The laser beam is coded and simulates all of the weapon's capabilities including range, accuracy and destructive capability.

Laser detection systems are used to sense opposing fire. The detection systems detect opposing laser beams and determine whether they have scored a "NEAR MISS," "HIT," or "KILL." The systems activate alarms indicating the presence and damage of opposing fire.

The MILES system of laser beam transmitters and detectors allows safe realistic training exercises with a complete range of weaponry and vehicles.

MILES CHAPARRAL WEAPON SYSTEM CONFIGURATION

The CHAPARRAL M48 Intercept-Aerial Guided Missile System is equipped with a laser transmitter that is fired using normal weapon procedures. The turret exterior and vehicle body have special detector belts attached that sense opposing fire. A Control Indicator Assembly (CIA) mounted outside the weapon determines the extent of opposing fire and its effect. A flashing light (CVKI) mounted on the weapon's exterior is activated by the CIA when opposing fire is detected.

MISSILE FIRING

The MILES-equipped missile launchers are raised, lowered, aimed and fired using normal CHAPARRAL procedures. A MILES-supplied rail assembly is mounted on the upper right missile launcher. A laser transmitter and WESS assembly mount against the MILES rail assembly.

The WESS assembly contains four ATWESS devices. These devices are loaded with ATWESS cartridges.

When the MILES-equipped CHAPARRAL weapon system is fired. the ATWESS cartridges detonate providing noise, flash and smoke simulation of actual missile launches. Each ATWESS device simulates one of the missile launchers.

The MILES laser transmitter fires simultaneously with the ATWESS devices. The CHAPARRAL optical sight is used to hold and track the target until the turret superelevates.

After firing an ATWESS device, you may check to see how many laser rounds the MILES system has left. This is done by checking the Interface Control Assembly (ICA) display. Either READY or TOTAL rounds remaining can be selected by the ICA switch.

DRY-FIRE OPERATION

The laser transmitter on MILES-equipped CHAPARRALs can be fired without using ATWESS cartridges. A controller key must be used to set the MILES CHAPARRAL Weapon System for dry fire operation. The key is inserted in a receptacle on the Interface Control Assembly and selects either test (dry fire) or ATWESS operation.

VEHICLE DETECTION SYSTEM

Three detector belts containing 16 detectors are mounted on the turret of the CHAPARRAL Weapon System. Another detector belt containing 4 detectors is mounted on the front of the vehicle. Opposing fire is sensed by the detectors. They generate electrical signals which are amplified and fed to a decoder in the Control Indicator Assembly.

The decoder identifies the type of weapon that fired the opposing laser beam. It determines whether the laser shot was accurate enough to cause a "HIT" or whether a "NEAR MISS" occurred. It also determines if the weapon was capable of causing damage to the target (an M16 rifle, for example, cannot disable a tank) and the probability of "KILL" for that weapon. The probability of "KILLING" a target is different for each attacking weapon.

if a detector on the CHAPARRAL Weapon System is "HIT" by laser fire, one of three things will happen:

1. Two tones will sound in the vehicle intercom and CVKI light mounted on the vehicle exterior will flash two times. This means a "NEAR MISS" occurred.

2. Four to six tones will sound in the intercom and CVKI light will flash four or six times. This means a "HIT" but not a "KILL" occurred.

3. The intercom tone will sound continuously and CVKI light will flash continuously. This means a "KILL" occurred.

The CHAPARRAL crew can determine what type of weapon has fired on them by setting the switch on the MILES Control Indicator Assembly to HIT/KILL and pushing the display button. A code number indicating the attacking weapon will appear on the display following a "HIT" or "KILL." No code number appears for a "NEAR MISS."

The intercom tone is turned off after a "KILL" by inserting an Orange Weapon Key in the Control Indictor Assembly receptacle and turning it. If the key is removed from the CIA, the intercom tone will begin again. The CVKI light continues to flash until reset by a Controller.

VEHICLE TRANSIT

The MILES system Combat Vehicle Kill Indicator (CVKI) operates from the CHAPARRALs 24 V system. During operation from a fixed position, power for the CVKI is supplied from turret power. During transit, power is supplied from the M730 vehicle power system.

The detection and transmitter systems operate on MILES supplied battery systems and will operate when the CHAPARRAL is in fixed position or when it is in transit.

CHAPTER 2
OPERATING INSTRUCTIONS

SCOPE. This Chapter provides those instructions needed by the vehicle crew to install, test, operate, and remove the MILES CHAPARRAL equipment.

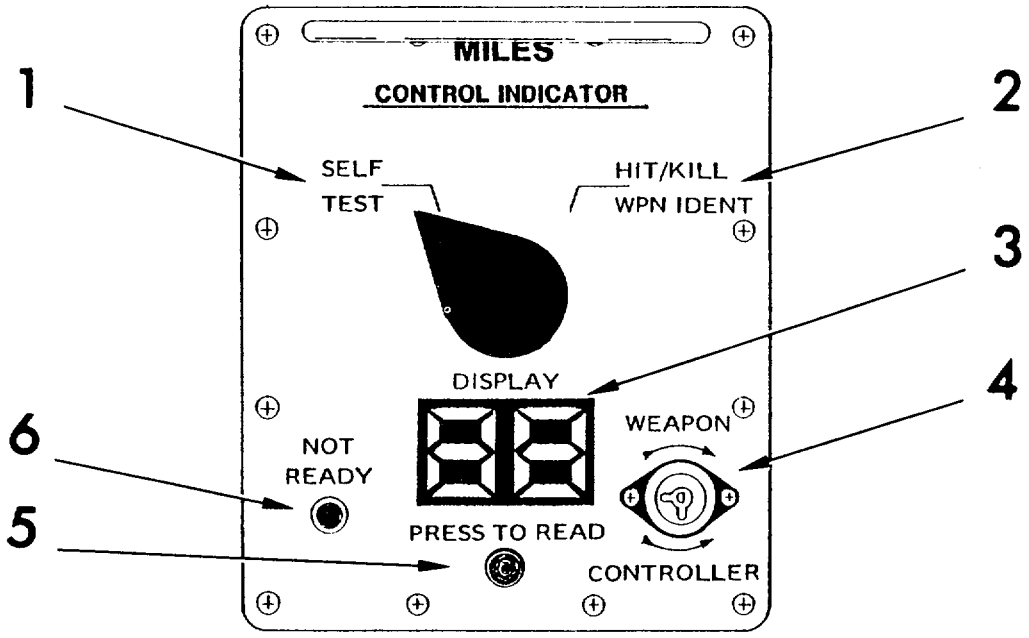
SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

MILES CHAPARRAL CONTROLS AND INDICATORS. The MILES CHAPARRAL Controls and Indicators are those associated with the Control Indicator Assembly (CIA), WESS, and Interface Control Assembly (ICA). All other controls and indicators, such as triggers and arming switches are those actually associated with the CHAPARRAL Weapon System.

CONTROL INDICATOR ASSEMBLY (CIA) CONTROLS AND INDICATORS. Controls and indicators for the CIA are listed in Table 2-1.

Table 2-1. Control Indicator Assembly Controls and Indicators

Key	Description	Function	Operating Position/Condition
1	SELF TEST	Perform Self Test	Turn to SELF TEST. Press PRESS TO READ. Display should read 88.
2	HIT/KILL WPN IDENT	Identifies weapon firing on you	Turn to HIT/KILL. Press PRESS TO READ. Display will show a number if detection system has been HIT or KILLED.
3	DISPLAY	Displays numbers	
4	WEAPON/ CONTROLLER	Reset system or silence alarm	Turn Orange Weapon Key to WEAPON to silence alarm or SELF KILL. Turn Green Controller Key to CONT to reset.
5	PRESS TO READ	Activates display	Press to activate display
6	NOT READY	Lights when not ready or "KILLED"	



Control Indicator Assembly Controls and Indicators

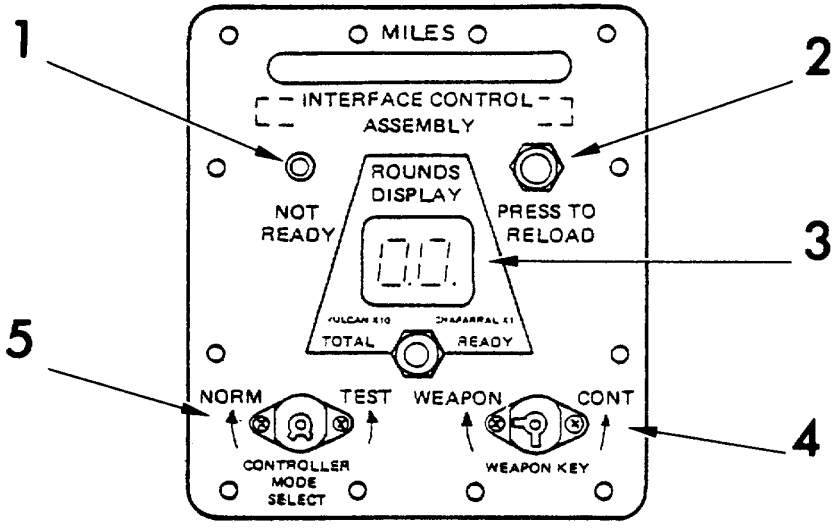
INTERFACE CONTROL ASSEMBLY (ICA) CONTROLS AND INDICATORS. Controls and indicators for the ICA are listed in Table 2-3.

Table 2-2. Interface Control Assembly Controls and Indicators Status Table (Not Ready Light and Rounds Display)

Not Ready Light Status	Rounds Display Switch Position	Display Reading	Operating Position
ON	TOTAL OR READY	00	Controller Key Required
OFF	TOTAL	1 to 12	Total Rounds Remaining
OFF	READY	1 to 4	Rounds Ready to Fire
ON	TOTAL	0	All Rounds Expended
ON	READY	0	Reload Required
ON	TOTAL OR READY	blank	Reloading
ON	TOTAL	1 to 12	KILLED or Weapon Key Required
ON	READY	1 to 4	KILLED or Weapon Key Required
ON	CENTER	Decimal Flashing	Laser Firing

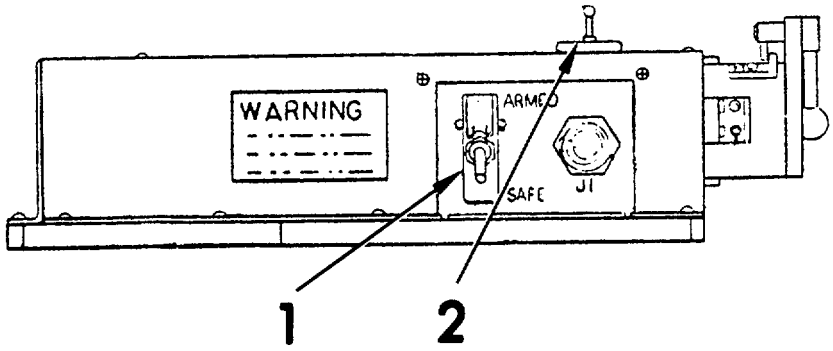
Table 2-3. Interface Control Assembly Controls and Indicators

Key	Description	Function	Operating Position/Condition
1	NOT READY	Lights when not ready	ON when: * Weapon or Controller Key not engaged * Needs reset * During reload time * Ready rounds is zero * Total rounds is zero * System KILLED OFF when: * Ready to fire
2	PRESS TO RELOAD	Reloads system	(Refer to Table 2-2)
3	ROUNDS DISPLAY-TOTAL, READY	Displays Rounds status	(Refer to Table 2-2)
4	WEAPON KEY WEAPON/CONT	Resets/turns system ON	Weapon Key in WEAPON position turns system on. Controller Key in CONT position resets system.
5	CONTROLLER MODE SELECT NORM/TEST	Selects Normal or Test Mode	Turn Controller Key to NORM for normal operation. Turn to TEST to fire laser without WESS.



Interface Control Assembly Controls and Indicators

WESS CONTROL AND INDICATORS



WESS SAFE/ARM switch (1)

Arms and disarms WESS Assembly

ATWESS SAFETY LEVERS (2)

Arms and disarms each ATWESS Device

SECTION II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

GENERAL. Preventive Maintenance Checks and Services will ensure that the MILES equipment will always be ready for operation and perform satisfactorily throughout its mission. Preventive maintenance checks consist of performing a systematic inspection to discover defects before they result in operational failure of the equipment. Defects or malfunctions discovered by the crew during use of the MILES equipment, or as a result of performing maintenance checks and services, will be reported using the proper forms (refer to DA PAM 738-750).

(1) Before you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your Before (B) PMCS.

(2) While you operate. Always keep in mind the CAUTION S and WARNINGS. Perform your During (D) PMCS.

(3) After you operate. Be sure to perform your After (A) PMCS.

(4) If your equipment fails to operate. Troubleshoot with proper equipment. Ask your Controller to check your equipment. Report any deficiencies using the proper forms. See DA PAM 738-750.

(5) If you find any problems. turn the item into the Training Aids Service Office (TASO).

Table 2-4. Operator/Crew Preventive Maintenance Checks and Services

NOTE

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

B - Before Operation **D - During Operation** **A - After Operation** **W - Weekly Operation** **M - Monthly Operation**

Item No.	Interval B	D	A	W	M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary.	Equipment Is Not Ready/Available If:
1	•					Batteries	Inspect for acid leaks.	Acid is present.
2	•					Battery Box (2)	Inspect for damaged connectors. Check that connectors and interior battery contacts are	Damage would prevent normal operation. serviceable.
3	•					Cable Assemblies (4)	Inspect for broken connectors and cut, worn, or bare wiring.	Connectors are broken or wiring is cut or bare.
4	•	•	•			Transmitter Assembly	Inspect for dirty or damaged lens. Check connector for damage.	Lens or connectors are damaged.
5	•					ICA	Inspect for cracks in display window.	Display window is cracked.
							Check that Weapon Key turns freely in WEAPON KEY receptacle.	Weapon Key does not turn freely.
							Check that Controller Key turns freely in MODE SELECT receptacle.	Controller Key does not turn freely.
							Inspect for evidence of switch damage.	Switch is damaged.
6	•			•		Detector Belts Segments (4)	Look for loose or cracked detectors or damaged connectors.	Detectors are loose or cracked; connectors are damaged.

Table 2-4. Operator/Crew Preventive Maintenance Checks and Services (Cont)

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

B - Before Operation **D - During Operation** **A - After Operation** **W - Weekly Operation** **M - Monthly Operation**

Item No.	Interval B	D	A	W	M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary.	Equipment Is Not Ready/Available If:
7	•		•			CVKI	Inspect for cracks in plastic lens.	Lens is cracked.
							Inspect for damaged receptacle.	Receptacle is damaged.
							Inspect for stripped mounting bracket threads.	CVKI cannot be securely mounted.
8	•	•				CIA	Inspect for cracks in display window.	Display window is cracked.
							Check that Weapon Key turns freely in WEAPON KEY receptacle.	Weapon Key does not turn freely.
							Inspect for evidence of switch damage.	Switch is damaged.
9	•					WESS	Check each ATWESS breech block for positive operation without binding.	Breech block binds.
							Check WESS connector and pins for damage.	
10	•					Rail and bent pins.	Inspect for broken connectors	Connectors are broken or pins are bent.
11	•					ATWESS Cartridge	Inspect for cracks in cartridge case, dented primer, tears or punctures in copper disc. (Replace any damaged cartridges in accordance with local EOD procedures.)	Cartridge case is cracked. primer is dented, copper disc is torn or punctured.

SECTION III. OPERATION UNDER USUAL CONDITIONS

GENERAL. Before the MILES equipment can be used, it must be properly installed on the CHAPARRAL Weapon System. To speed up procedures, work is organized into various tasks. While some crew members are performing one set of tasks, others can be performing another set.

Before you begin, **READ ALL STEPS IN THE TASK AND LOOK AT EACH ILLUSTRATION CAREFULLY**. To help perform a task, most steps have reference numbers to drawings. Do each step just the way you are instructed and in the order in which it occurs in this manual.

NOTE
Don't jump ahead. Don't skip any steps.

If your MILES equipment has a problem you can't fix using this manual, report it on DA Form 2404. To get a replacement, turn in the faulty equipment and the completed form.

TASK ASSIGNMENT. The Squad Leader assigns crewmen to tasks. The crewman turns to the appropriate section in this manual and performs the required steps IN ORDER. Occasionally, the manual may tell a crewman to wait until he has made sure that another crewman has completed an earlier task. On some tasks, two crewmen may have to work together.

START AT TASK 1 AFTER READING THE TASK ASSIGNMENT.

Certain steps must be done with the Controller present. A Controller Key, carried only by the Controller, is required to reset the system. The Squad Leader will determine when to call the Controller.

Those tasks involving the Controller must be done in this order:

1. Test Task 1 (See page 2-70)
2. Test Task 2 (See page 2-73)
3. Test Task 3 (See page 2-76)
4. Test Task 4 (See page 2-81)
5. Operational Tasks 4 (Recognizing Enemy Fire), and 5 (Resetting After a "KILL") (See pages 2-89 and 2-91)

The Vehicle Commander should coordinate the tasks, give assistance to any crewman who needs it, and check to make sure everything gets done.

NOTE

Unless otherwise indicated, in this manual references to <u>right</u> and <u>left</u> sides of CHAPARRAL turret use the seated Gunner as a standard.

In this manual references to right and left sides of CHAPARRAL M730 Carrier Vehicle use the seated Driver as a standard.

LIST OF TASKS

Tasks	Page
Assembly and Preparation for Use	
Preinstallation Task	2-10
Outside Installation Tasks	2-11
Inside Installation Tasks	2-60
Initial Adjustments. Daily Checks. and Self Test	
Alignment Tasks	2-68
Test Tasks	2-70
Operating Procedure	
Operational Tasks	2-82
Postoperational Tasks	2-93

Preinstallation Task:

Obtain all equipment needed to install and operate MILES Chaparral Weapon System from your NCOIC.

NOTE

Preparing the CHAPARRAL for MILES training requires three transit cases of MILES equipment. A MILES case for the M113 APC and two MILES cases for the CHAPARRAL system must be obtained. Not all equipment in the cases will be used.

Unpack MILES CHAPARRAL transit case and Rail Assembly transit case. Unpack MILES M113 APC transit case. Verify that all equipment is present and not visibly damaged. Check against illustrations in Appendix B, Components of End Item.

Obtain all Support Equipment (Appendix C), and Expendable/Durable Supplies and Materials (Appendix D).

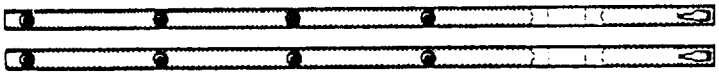
OUTSIDE INSTALLATION TASKS-LIST

Task	Title	Page
1	Obtain Equipment	2-12
2.	Clean and Prime Turret and Vehicle	2-15
3.	Install Fastener Tape on Turret	2-17
4.	Install Fastener Tape on Carrier Vehicle	2-25
5.	Inspect Fastener Tape	2-29
6.	Inspect and Service Detector Belt Segments	2-31
7.	Install Turret Front Detector Belt	2-32
8.	Install Turret Right Side Detector Belt	2-33
9.	Install Turret Left Side/Rear Detector Belt	2-34
10.	Inspect Detector Mounting Brackets	2-36
11.	Install Detector Mounting Brackets and Front Vehicle Belt	2-37
12.	Inspect Rail Assembly	2-41
13.	Install Rail Assembly	2-42
14.	Inspect Chaparral Laser Transmitter	2-43
15.	Install Laser Transmitter	2-44
16.	Inspect WESS	2-46
17.	Install WESS	2-47
18.	Inspect and Service CVKI Assembly	2-48
19.	Install CVKI	2-49
20.	Inspect Control Indicator Assembly (CIA)	2-50
21.	Install Control Indicator Assembly (CIA)	2-51
22.	Inspect Cable Assemblies	2-52
23.	Install Turret Cable Assemblies	2-53
24.	Install Vehicle Cable Assemblies	2-55
25.	Install Training Missile	2-59

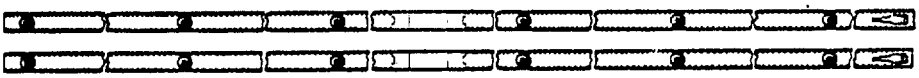
NOTE

Perform these tasks in the order given.

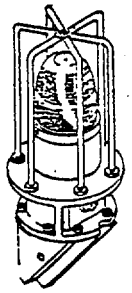
Outside Installation Task 1: Obtain Equipment. Completion of Outside Installation Tasks requires equipment listed and illustrated below. Equipment is supplied in either the MILES CHAPARRAL or MILES M113 APC transit cases. Locate and set aside this equipment.



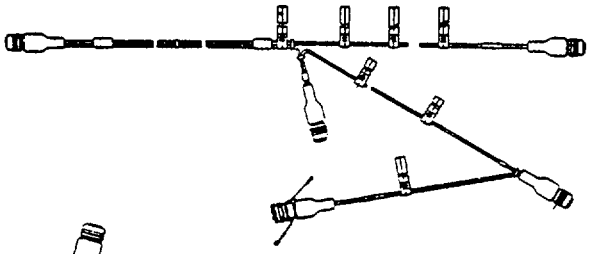
2 Detector Belt Segments Labeled Number 2
(from M113 APC transit case)



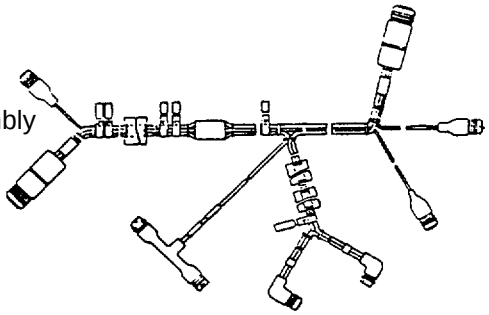
2 Detector Belt Segments Labeled Number 1
(from M1113 APC transit case)



1 CVKI Assembly
(from M113 APC transit case)



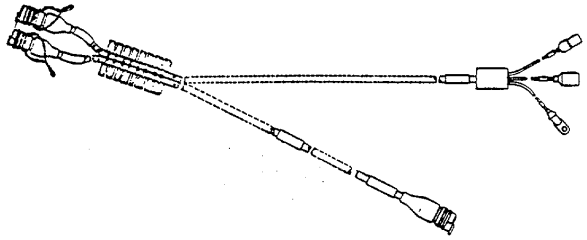
1 Belts Cable Assembly



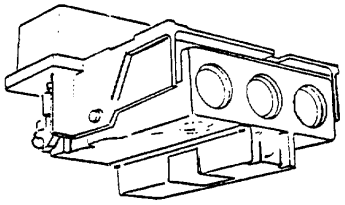
1 Turret Cable Assembly

1 Turret Power Cable Assembly

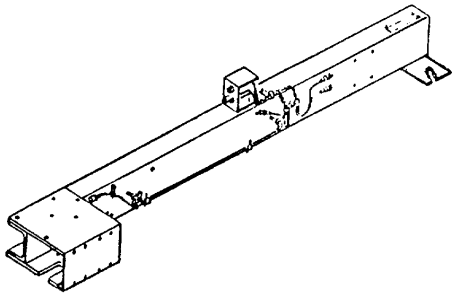
1 Detector/Power Cable Assembly



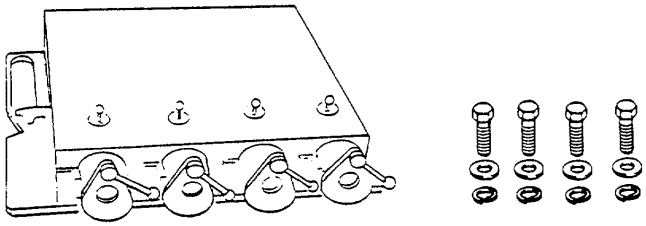
1 CHAPARRAL Weapon System Laser Transmitter



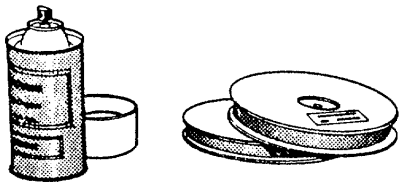
1 Rail Assembly



1 WESS and 4 3/8-16 cap screws (P/N MS35307-362) flat washers and lock washers

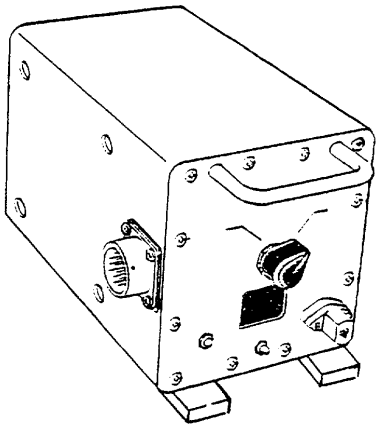


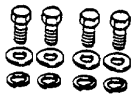
1 Installation Kit (1 can Primer and 1 roll Fastener Tape)



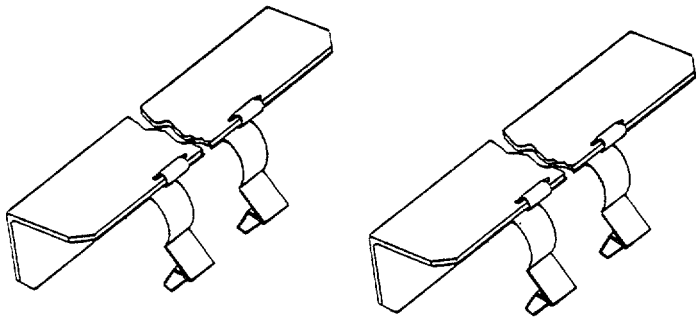
Outside Installation Task 1: Obtain Equipment (Cont)

1 Control Indicator Assembly (CIA)
(from M113 APC Transit Case)
and 4 1/4-20 cap screws, flat
washers and lock washers





2 Detector Mounting Brackets



Outside Installation Task 2: Clean and Prime Turret and Vehicle. Hook fastener tape (Item 3, Appendix D) must be installed on the CHAPARRAL as a base for mounting detector belts and cable assemblies. Vehicle surface must be cleaned and primed before applying tape.

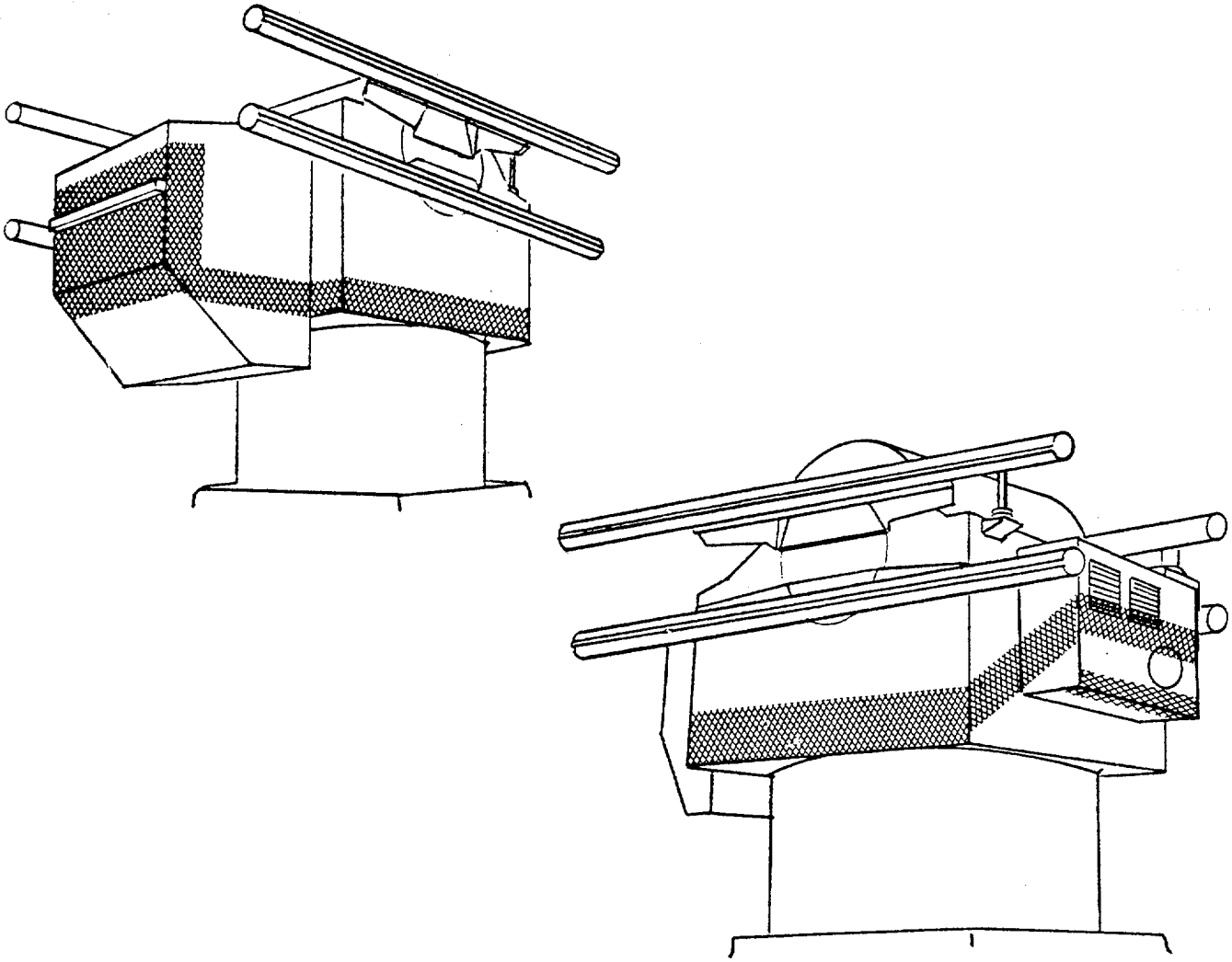
Using water, brush, and rags (Items 5 and 7, Appendix D), clean areas where tape will be installed as shown on shaded areas. Read fastener tape application instructions, Outside Installation Task 3 (page 2-17) to locate all areas requiring cleaning.

Minimum vehicle temperature for application of Primer is O0C (32°F).

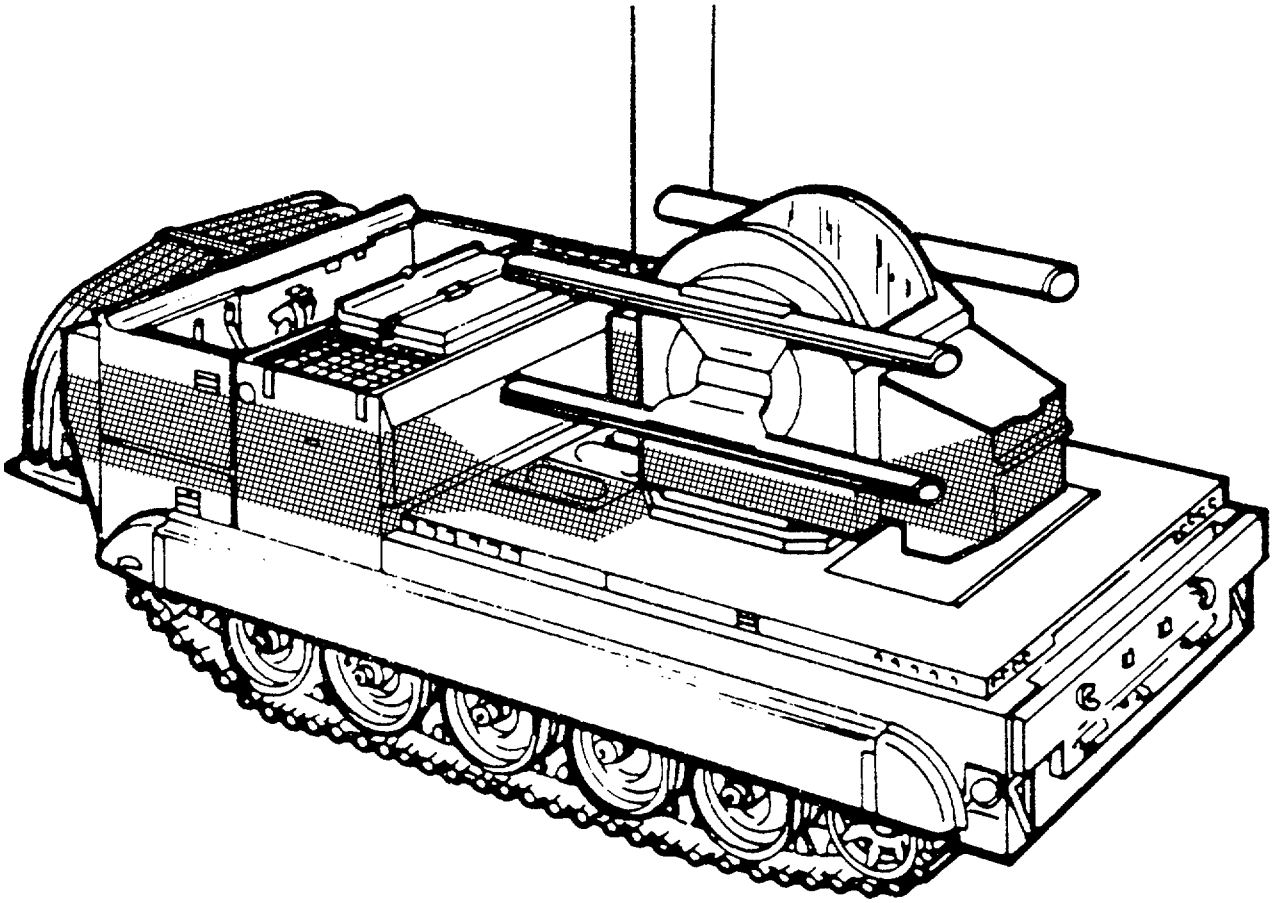
If vehicle is already equipped with fastener tape, go directly to Outside Task 5: Inspect Fastener Tape.

NOTE

Tape will not stick to dirty or greasy surfaces



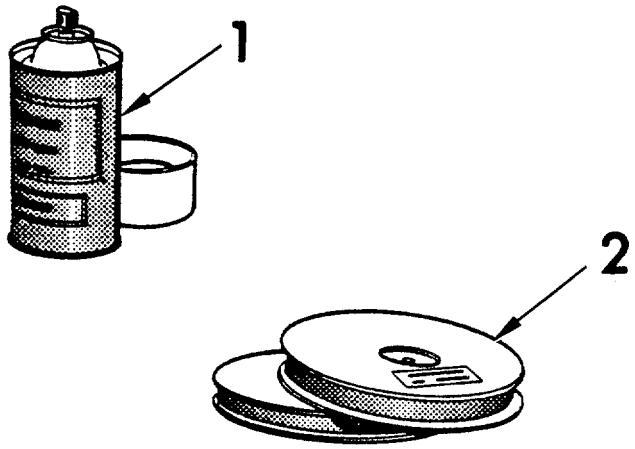
Outside Installation Task 2: Clean and Prime Turret and Vehicle (Cont).



CAUTION

Do not spray primer on air conditioning unit exhaust vent.

Installation kit; tape primer (1) and fastener tape (2)



Before spraying tape primer, be sure you know where to mount the tape: Location of tape is illustrated in Outside Task 3.

WARNING

Primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well- ventilated area.

Spray a heavy coat of tape primer on cleaned areas. Allow primer to dry 3 to 5 minutes before applying fastener tape.

Outside Installation Task 3: Install Fastener Tape.

NOTE

Do belt installation a section at a time.

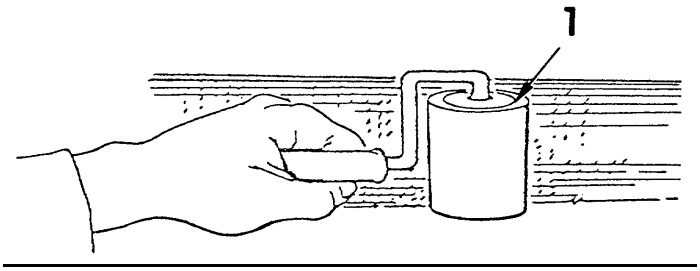
The tape has a protective paper backing which must be removed before installing. For small lengths, the entire backing may be removed before installing tape. For long lengths of tape, however, it is recommended that the backing material be removed while the tape is being installed. This will prevent adhesive on the back of the tape from accidentally sticking to itself. Apply tape smoothly, cutting tape at all corners, sharp contours, weld heads, screw heads and at any point where tape will not adhere.

After tape is placed on primered areas, it must be pressed very hard with hand roller (1) (Item 5, Appendix C). Use roller as shown. If roller is not available, the primer can lid may be used as a substitute.

More spray primer may be added where necessary.

NOTE

Do not place tape over welds.



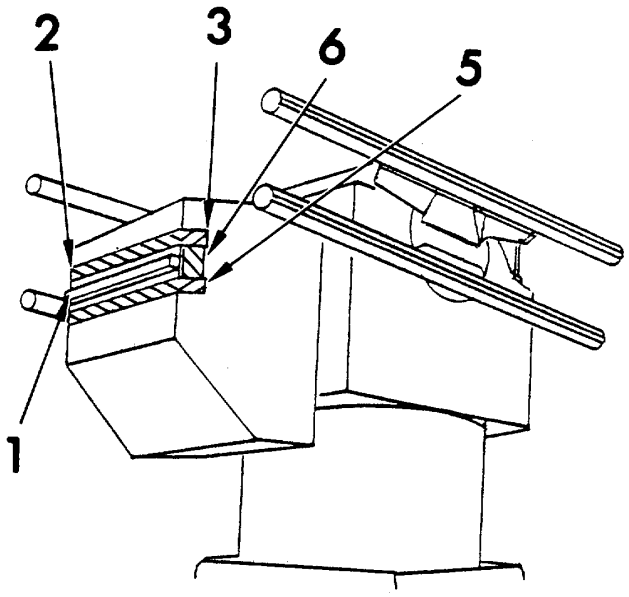
Outside Installation Task 3: Install Fastener Tape on Turret (Cont).

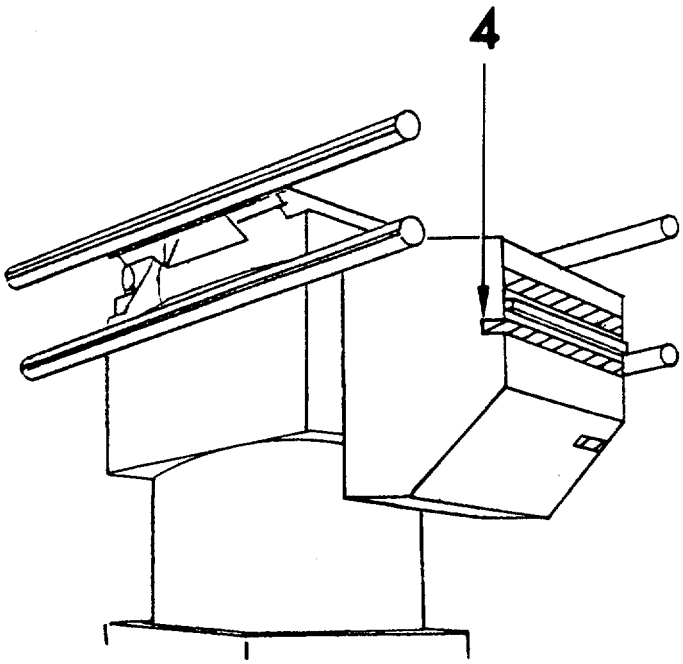
Raise launcher to FIRE position.

Install tape strip approximately 1 inch above air intake (1). Start strip at right edge (2) of heater air circulating assembly shield front. Continue across front and wrap around corner. Cut approximately 2 inches (3) from left edge.

Install tape strip approximately 1 inch below air intake. Start strip approximately 4 inches (4) from right edge. Continue around corner, across shield front and around left edge. Cut approximately 2 inches (5) from left edge.

Install short vertical strip (6) on left side of heater air circulating assembly shield. Connect top and bottom horizontal strips with new strip.





Install horizontal strip of tape approximately 2 inches above bottom turret edge. Start at rear edge (7) of turret. Cut tape at turret front edge (8).

Install horizontal strip across right side of heater air circulating assembly shield. Start at rear edge (9) of shield. Cut at front corner (10) of shield. Tape should cross just above nameplate (11).

NOTE

Do not cover nameplate.

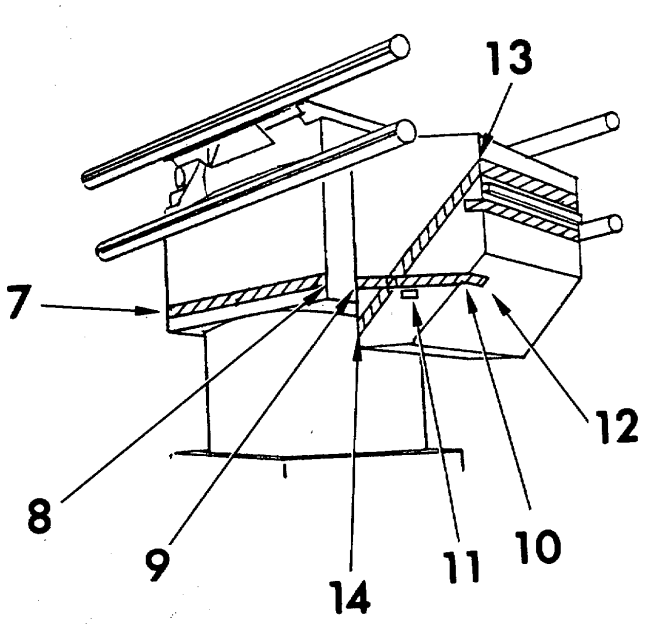
Cut 7-inch length of tape. Position on front (12) of Heater Air Circulating Assembly shield.

Angle a strip of tape down right side of shield. Start at edge (13) of top strip on shield front. Cut at horizontal strip just to rear of nameplate (11).

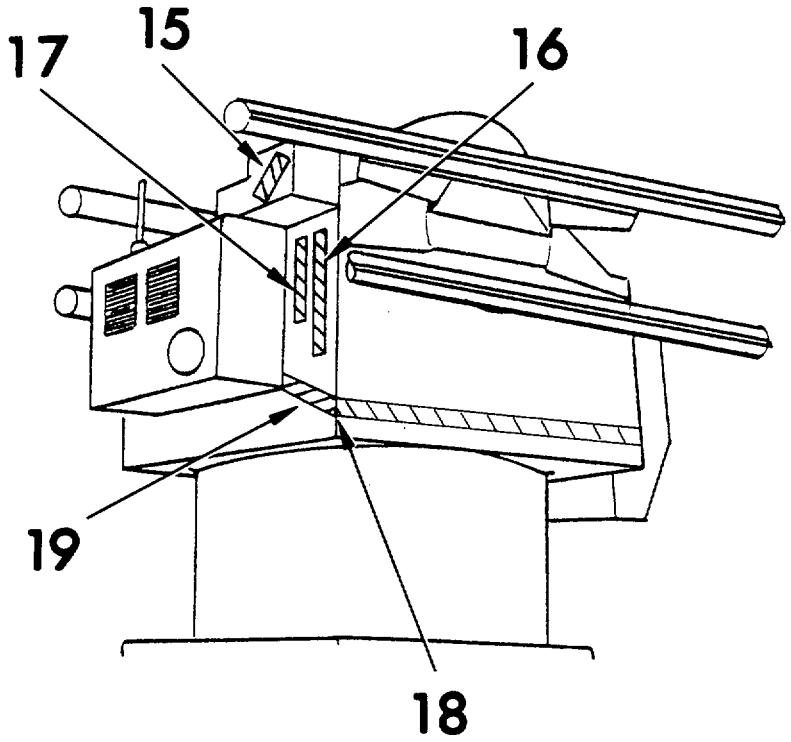
NOTE

Do not put fastener tape on top of previously installed fastener tape. One layer of tape is sufficient.

Continue with a new strip below the horizontal strip. Continue on diagonal and cut at rear edge (14) of shield.



Outside Installation Task 3: Install Fastener Tape on Turret (Cont).

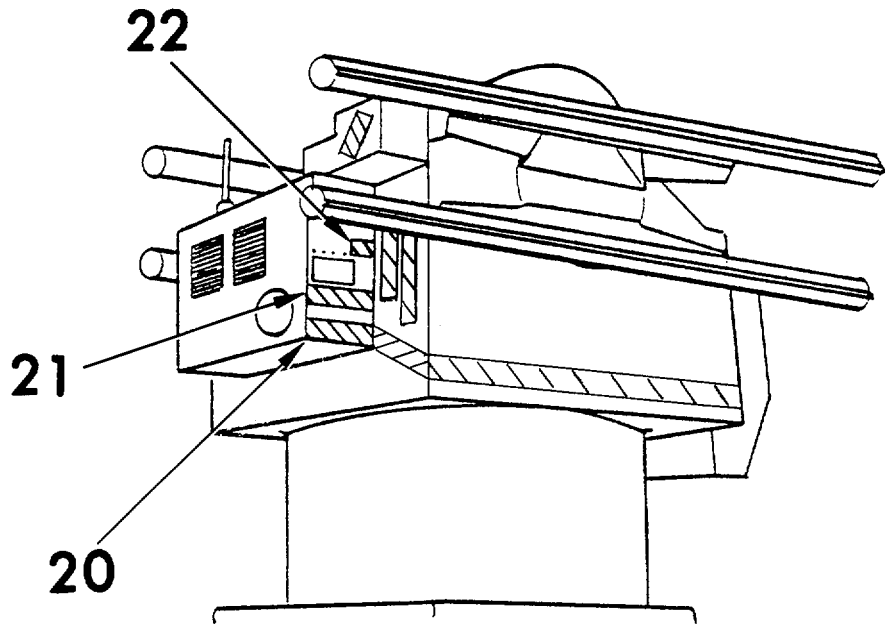


Cut 6-inch length of tape. Position tape diagonally on rear of Antenna Mast Bracket (15).

Cut 12-inch length of tape. Install strip (16) vertically on rear of turret approximately one inch from right edge and two inches below Air Conditioning Unit top.

Cut 8-inch length of tape. Install strip (17) alongside vertical strip on right side of turret rear. Start even with top of previously installed tape strip.

Install tape strip on turret right rear just above step. Start tape (18) even with existing tape on turret side. Angle slightly upward toward bottom (19) of Air Conditioning Unit.

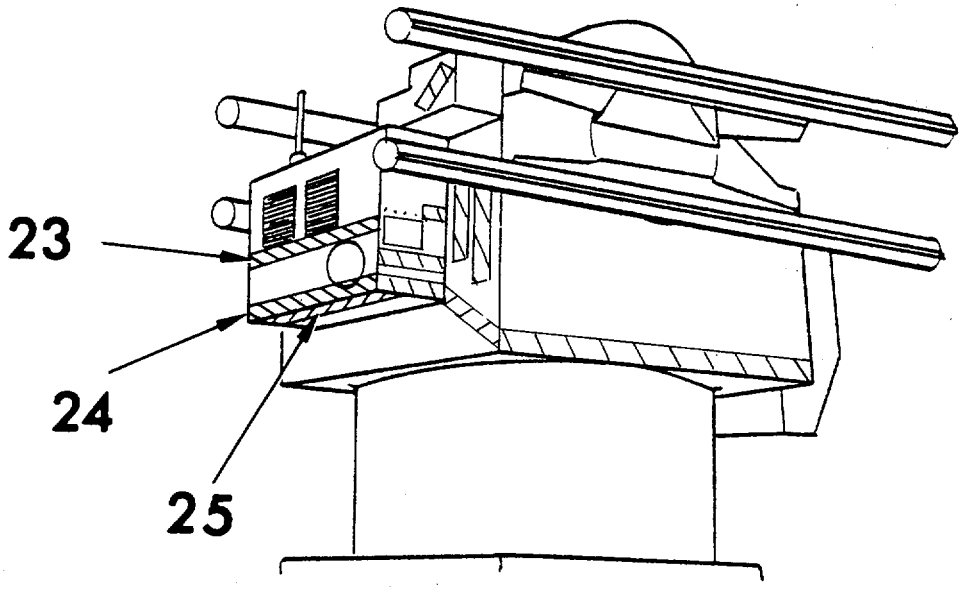


Install strip of tape (20) across bottom right side of air conditioning cover. Start at forward edge (20). Route tape just above bolt line at cover bottom. Cut at vertical hinge.

Install strip of tape (21) below handhold on right air conditioning cover side. Tape will be positioned parallel to rail and slightly above previously installed tape strip.

Cut 4-inch strip of tape. Install strip (22) on right side just forward of rail above bolt heads over handhold.

Outside Installation Task 3: Install Fastener Tape on Turret (Cont).



Install horizontal tape strip (23) on rear of air conditioning cover. Position strip along bottom of exhaust vents. Run from left edge to right edge of cover.

Install horizontal tape strip (24) on rear of air conditioning cover. Position just above screws along bottom edge of cover. Run from left edge to right edge.

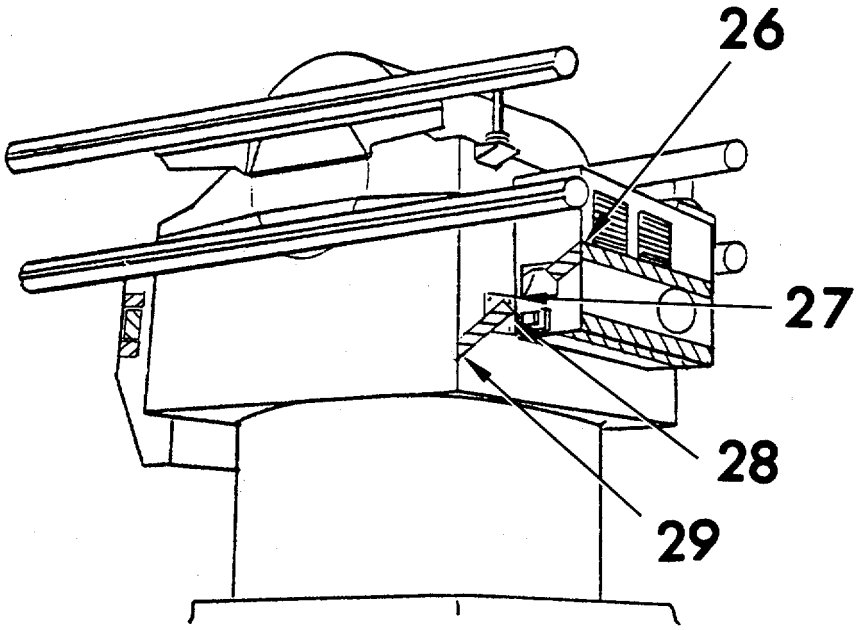
NOTE

Fastener tape must be cut for hex bolts if a clear, flush adhesion cannot be obtained.

Install tape strip (25) along bottom of air conditioning cover. Keep even with rear edge of cover and run from right to left edge.

Install tape strip on left side of air conditioning cover. Angle downward, starting (26) even with top tape strip on cover rear. Cut at forward edge (27) just above latch. Cut away any tape covering handhold.

Install 8-inch strip on left side of turret rear. Start above latch (28) and angle downward toward left edge (29) just above step.



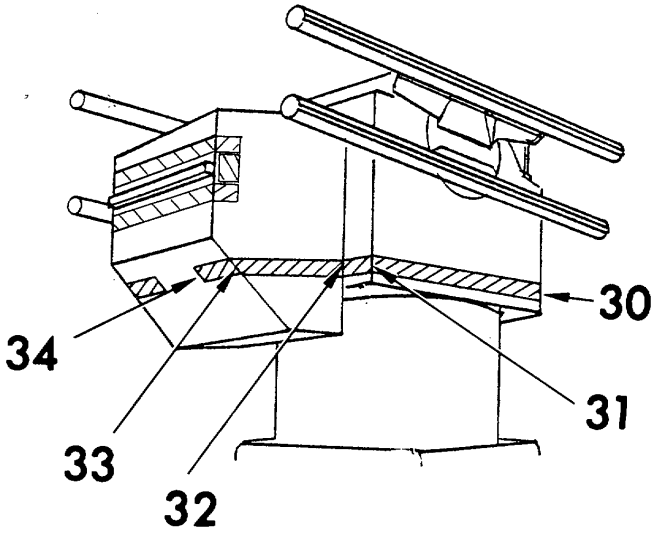
Outside Installation Task 3: Install Fastener Tape on Turret (Cont).

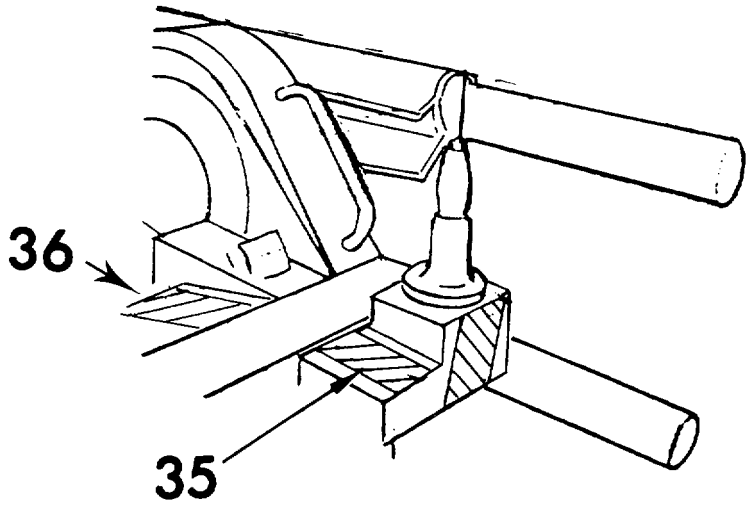
Install horizontal strip of tape approximately 2 inches above bottom edge of turret left side. Start at rear edge (30) of turret. Tape should align with previously installed tape on turret rear. Cut tape at turret front edge (31).

Install horizontal strip across left side of Heater Air Conditioning Assembly shield. Start at rear edge (32) of shield. Cut at front corner (33) of shield.

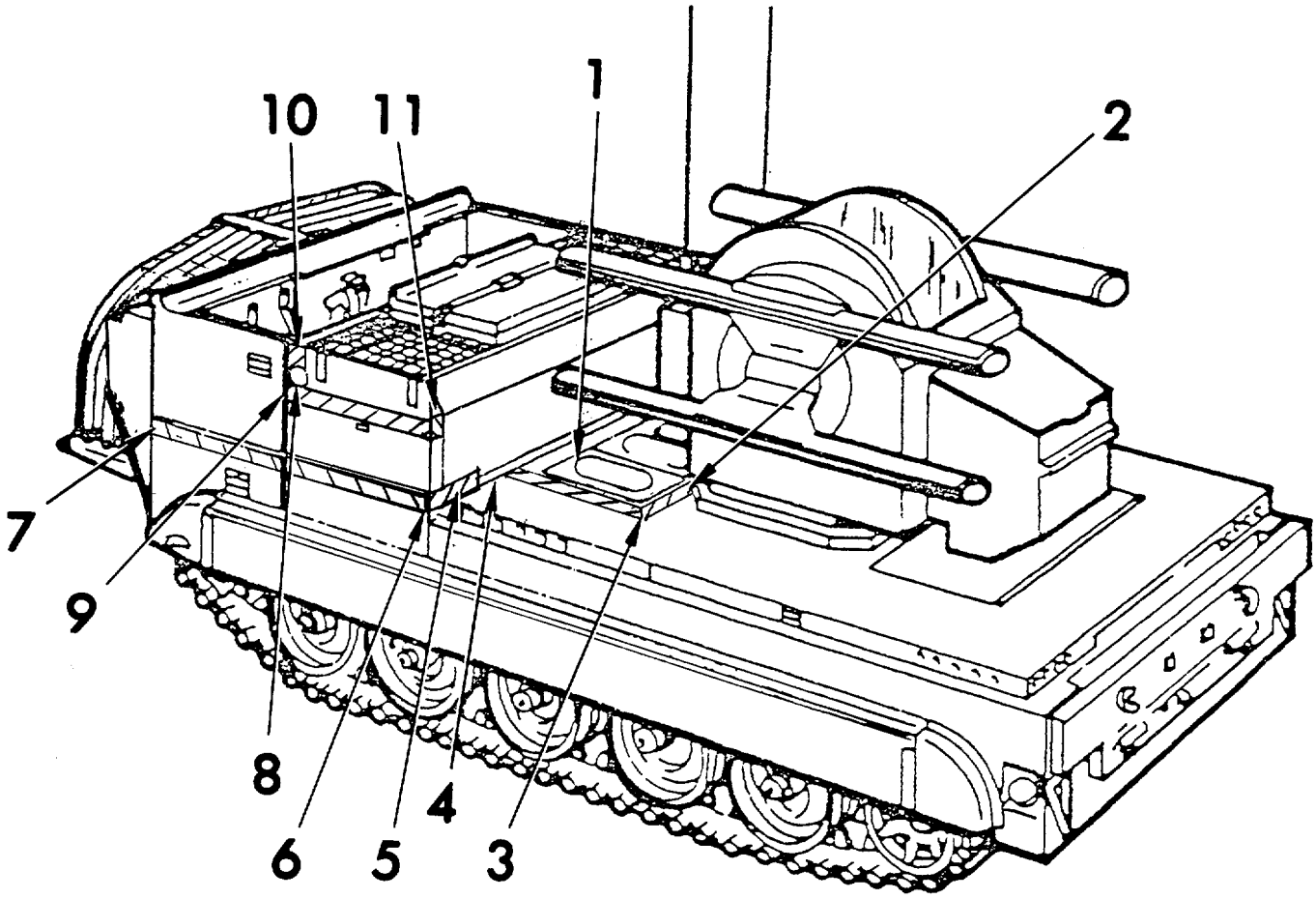
Cut a 7-inch piece of tape. Position on front (34) of air conditioning assembly shield. Keep even with and parallel to tape on right side of shield.

Cut two 4-inch strips of tape and position on both sides (35, 36) of canopy threshold.





Outside Installation Task 4: Install Fastener Tape on Carrier Vehicle.



Install fastener tape using same procedures as in Outside Task 3 (page 2-17).

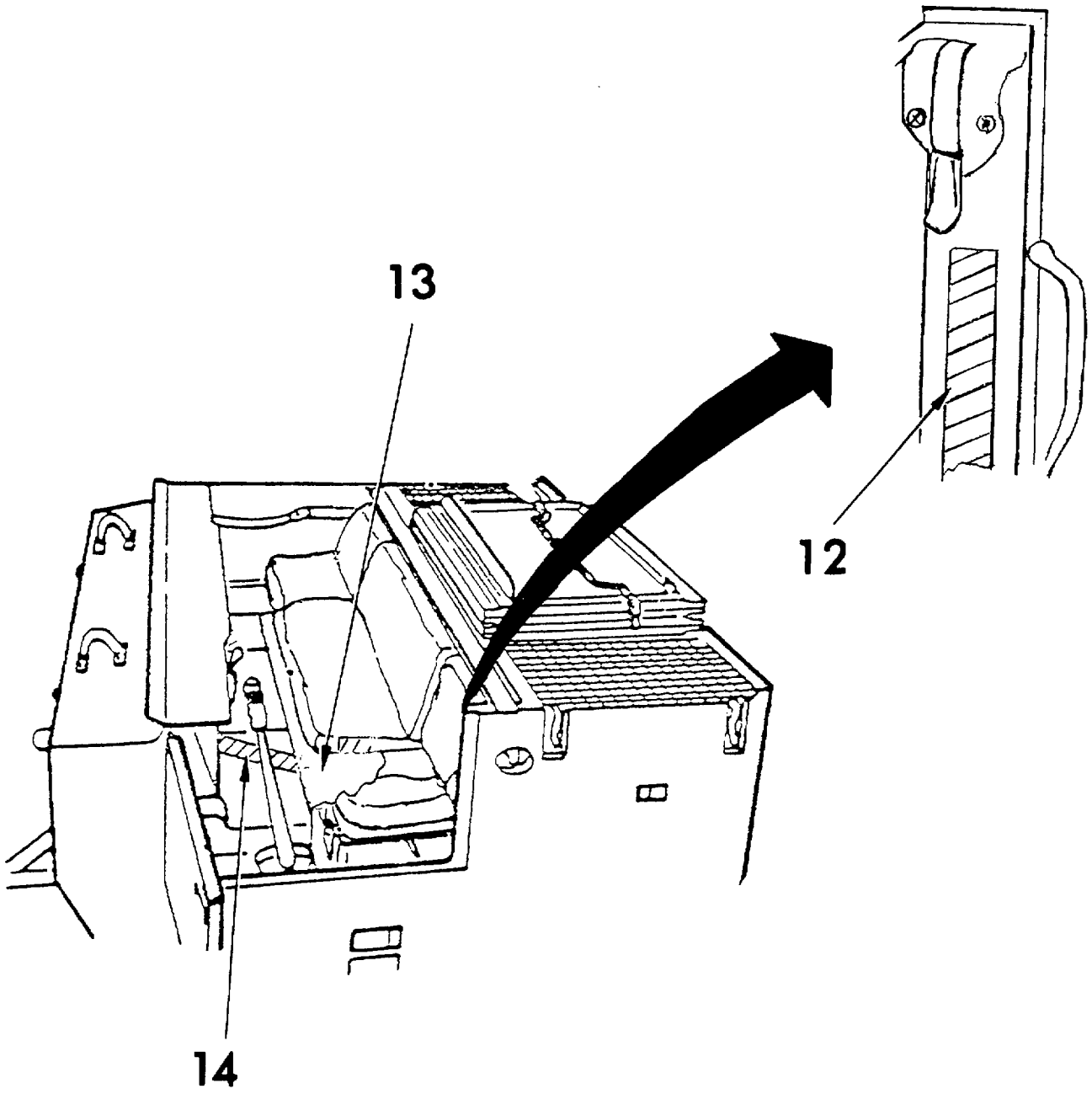
Apply fastener tape along bed of carrier vehicle. Place tape strip along rear edge of crew equipment D mate access holes (1). Start tape at point (2) where turret base is closest to access door. Cut tape at door left edge (3). Do not cover D mate access holes with tape. Add additional tape along left edge of equipment D mate access hole. Cut tape at blast guard (4).

Place 8 inch strip of tape in recess at bottom of vertical blast shield (5).

Apply fastener tape strip along left side of vehicle cab. Start even with vehicle bed (6). Keep tape below driver's door. Cut tape at front edge (7) of cab. Tape may be cut in several smaller lengths that break at weld lines on vehicle's surface.

Apply additional strip along left side of vehicle cab. Position tape just below fire extinguisher handle (8). Cut at door edge (9). Place small vertical strip of fastener tape above fire extinguisher handle. Cut at top edge (10) of cab. Do not cover bilge outlet. Place small strip (11) in-line with cab top strip at edge of vertical blast shield.

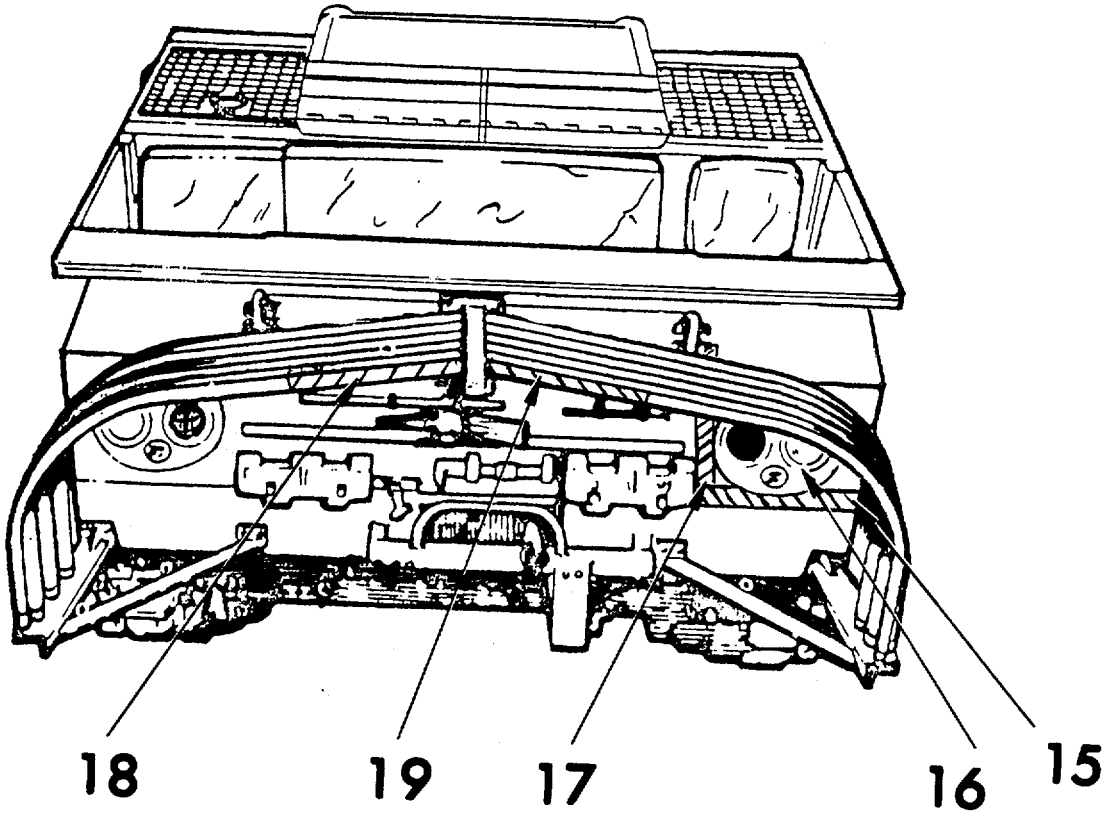
Outside Installation Task 4: Install Fastener Tape on Carrier Vehicle (Cont).



Cut a 10-inch strip of tape. Place strip vertically (12) inside carrier just behind driver's door. Position so it is vertical along side door edge.

Cut a 6-inch strip of tape. Install strip (13) along metal edge forward and to the right of driver's seat.

Cut a 12-inch strip of tape. Place strip (14) on floor of driver's compartment. Start just to right of driver's seat. Position tape so it runs forward along the floor at vehicle center as shown.



Apply additional tape along front of vehicle. Start even with tape on left side of vehicle (15). Run below headlamps (16). Cut on right side of headlamps.

Apply additional tape (17) vertically up the front of vehicle. Start even with previously installed tape. Continue onto top surface of vehicle. Cut tape.

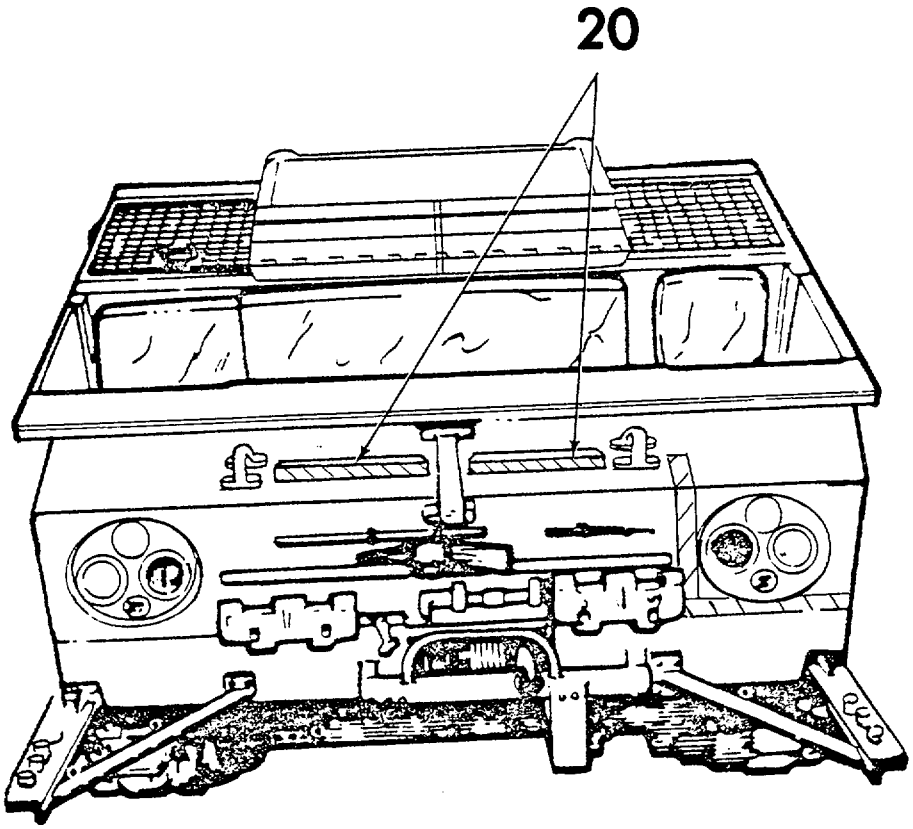
NOTE

If canopy rack is not stored on front of vehicle, omit the following two steps. Go directly to page 2-28.

Cut two 27-inch strips of fastener tape. Apply to top surface of front canopy rack. Position first strip to the right of the center rack mount (18). Position second strip to left of center rack mount (19).

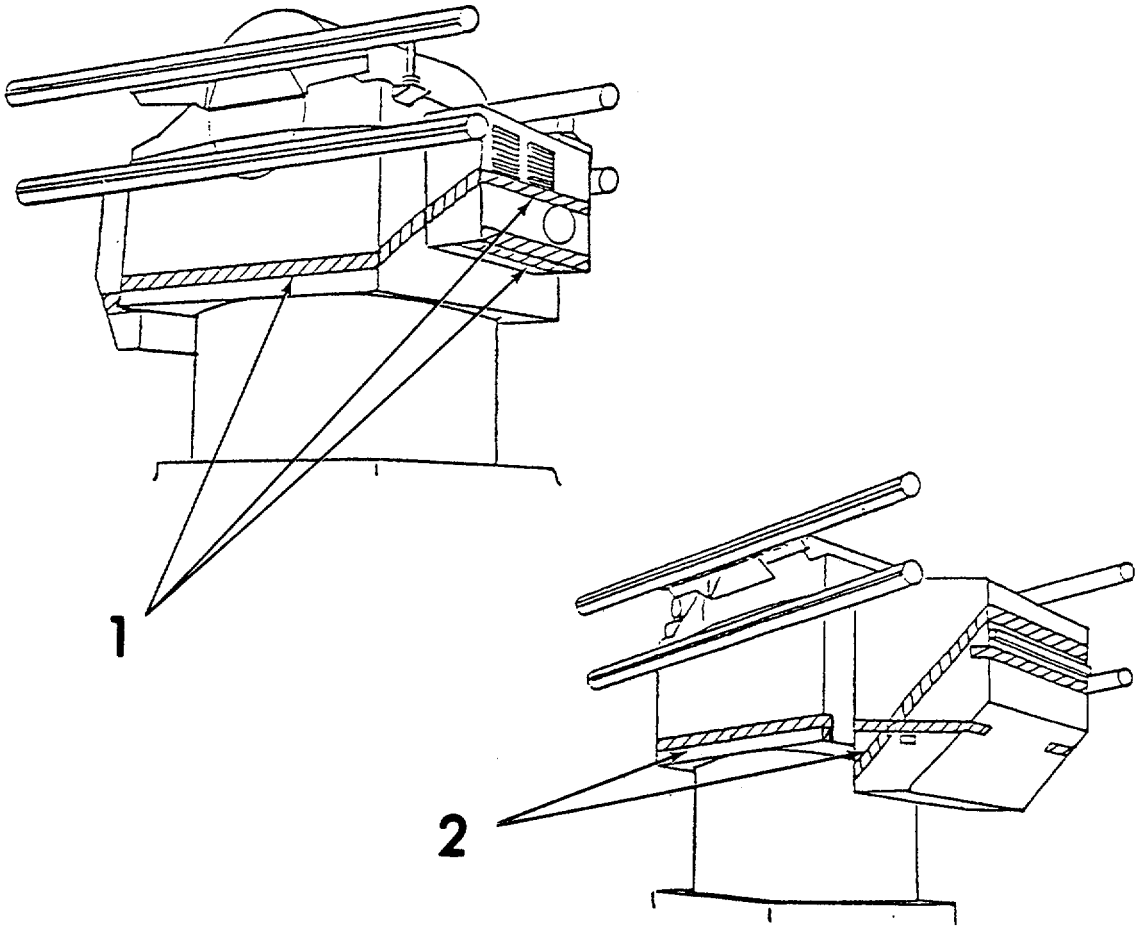
Outside Installation Task 4: Install Fastener Tape on Carrier Vehicle (Cont).

Omit following step if the racks are attached.



Cut two 12-inch strips of fastener tape. Position them (20) on top front edge of vehicle between center rack support and lifting lugs.

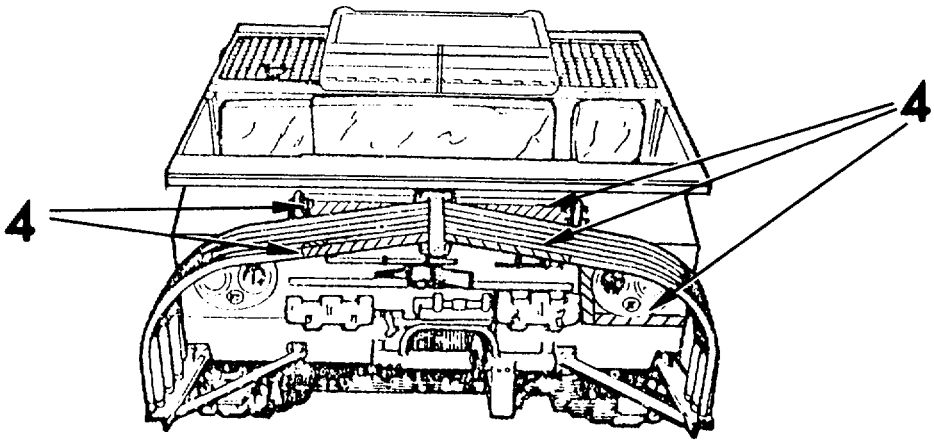
Outside Installation Task 5: Inspect Fastener Tape.

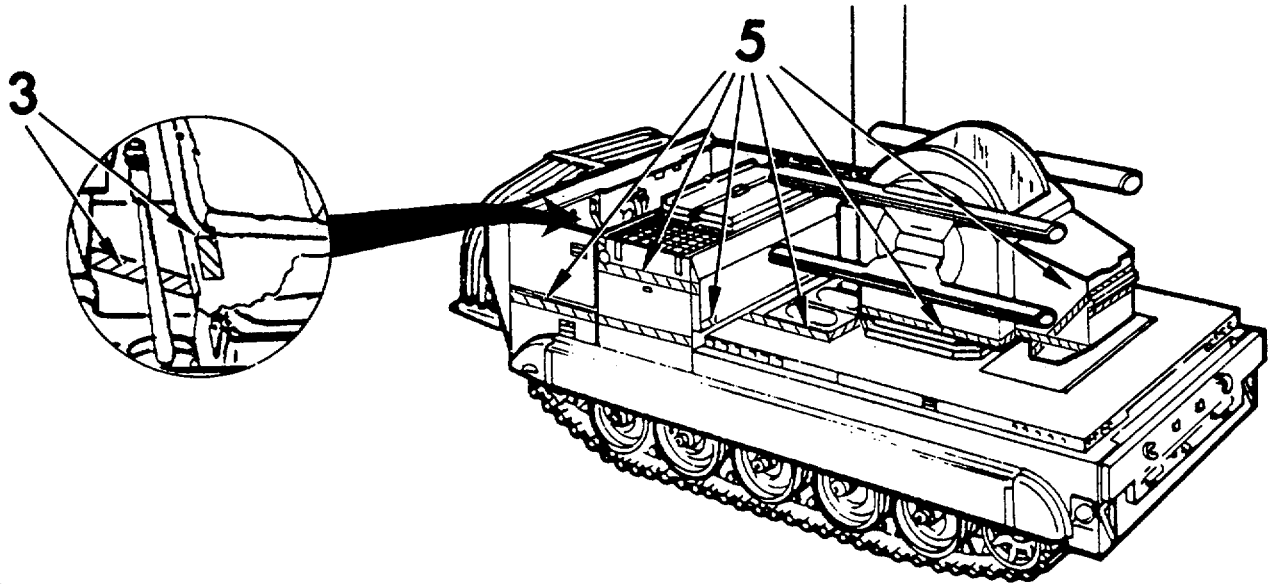


Check that fastener tape is mounted on both sides, front, and rear of CHAPARRAL turret as shown (1), (2).

If any fastener tape is missing from turret, mount tape on places it belongs. Use instructions given for Outside Installation Tasks 2 and 3.

Outside Installation Task 5: Inspect Fastener Tape (Cont).





Check that fastener tape is installed in driver's compartment (3).

Check that fastener tape is installed on front of vehicle (4).

Check that fastener tape is installed on left side of vehicle and vehicle bed (5).

If any fastener tape is missing from carrier vehicle, mount tape on places it belongs. Use instructions given for Outside Installation Tasks 2 and 4.

Outside Installation Task 6: Inspect and Service Detector Belt Segments. All four detector belt segments must be checked.

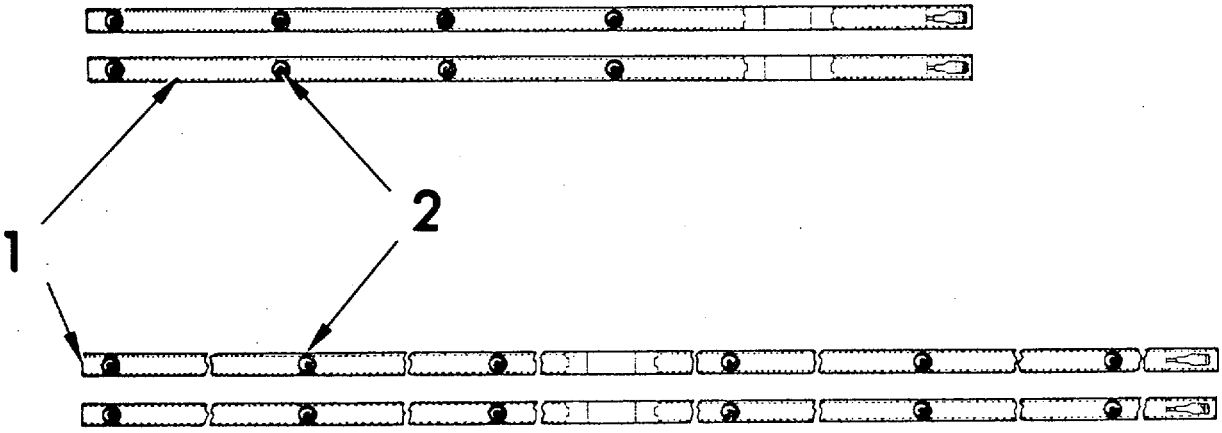
NOTE

Detector Belts are supplied with the MILES M113 APC Simulator System.

Look for any damage that would prevent normal operation of the belt segments (1).

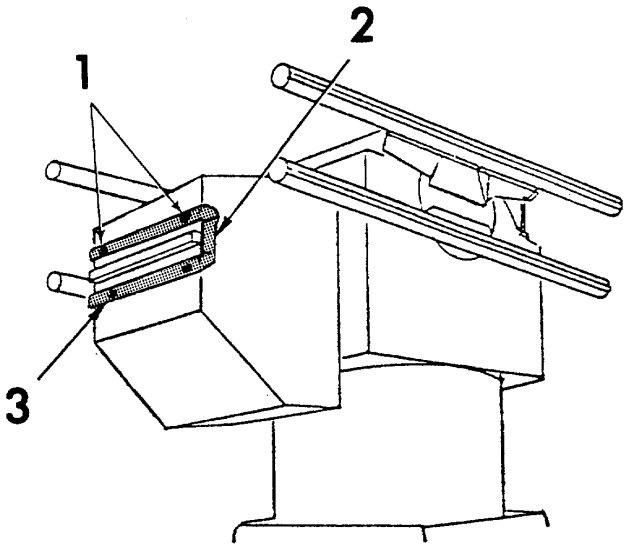
Wipe all detectors (2) clean.

Report any damage on DA Form 2404. Replace belt segments only if not operable.



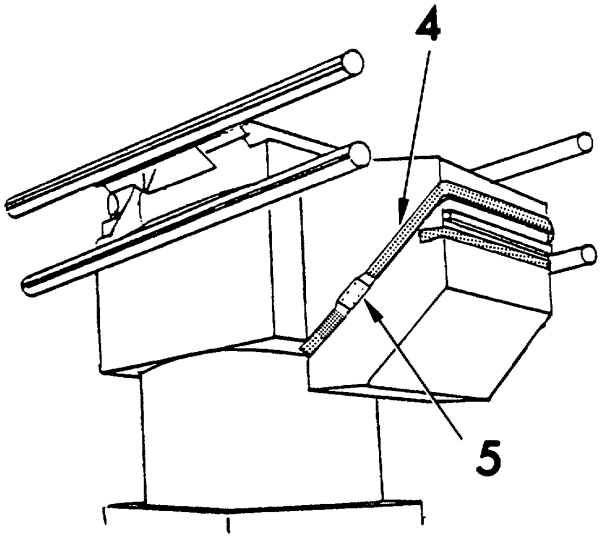
Outside Installation Task 7: Install Turret Front Detector Belt

Locate a detector belt labeled No. 2.



Position belt so that two detectors (1) closest to electronics box are centered on top tape strip on front of launcher. Press belt to tape.

Wrap belt along left edge of launcher (2) and position the next two detectors (3) on bottom strip of tape. Top and bottom detectors should be aligned vertically. Fold belt end around right edge of launcher front and press against tape.

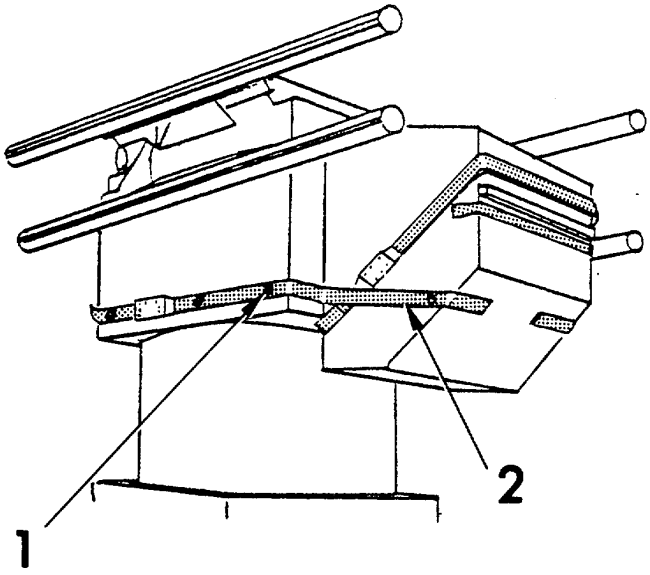


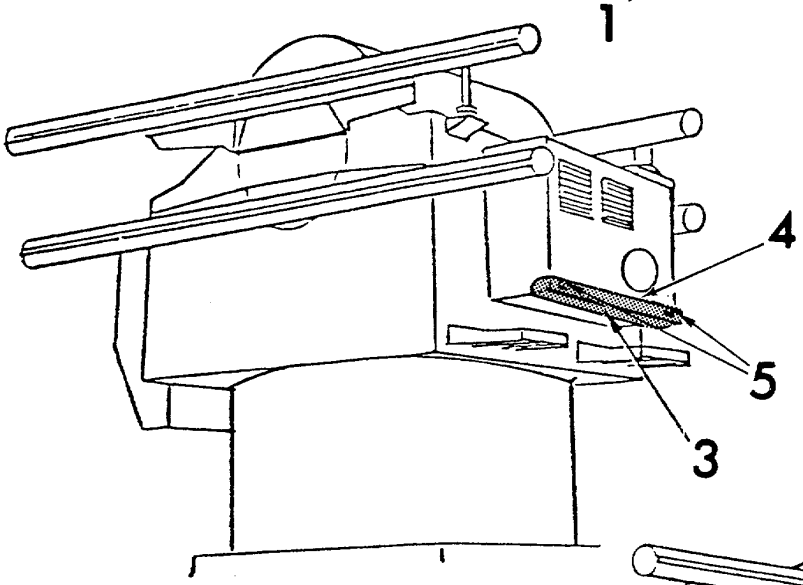
Angle remaining portion of belt along right side of launcher (4). The electronics box (5) should be located slightly above side panel nameplate.

Outside Installation Task 8: Install Turret Right Side Detector Belt

Locate a detector belt labeled No. 1.

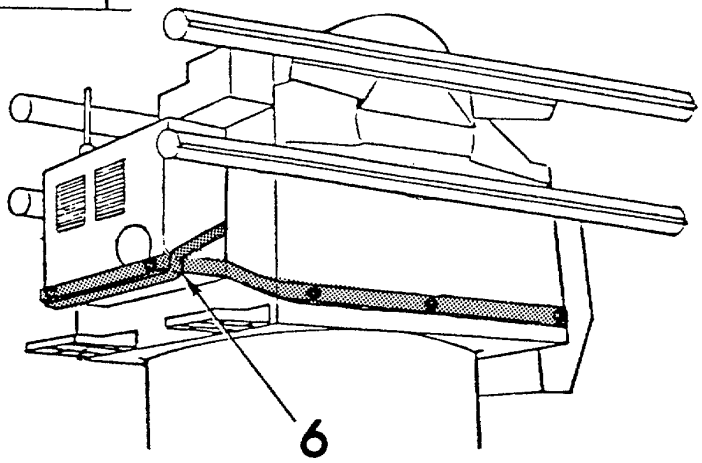
Place second detector (1) from belt end without the connector on fastener tape near turret right front edge at approximately the position shown. Work forward and press the belt (2) to tape along heater air circulating system cover. Then work toward rear, placing the belt on tape along turret. When installed properly, four detectors should be located on the side of the launcher. Remove and readjust belt if necessary.





Continue attaching belt to tape strips on lower rear of turret and lower side and rear of air conditioning cover. Wrap under the cover (3) and route the belt back to your right (4).

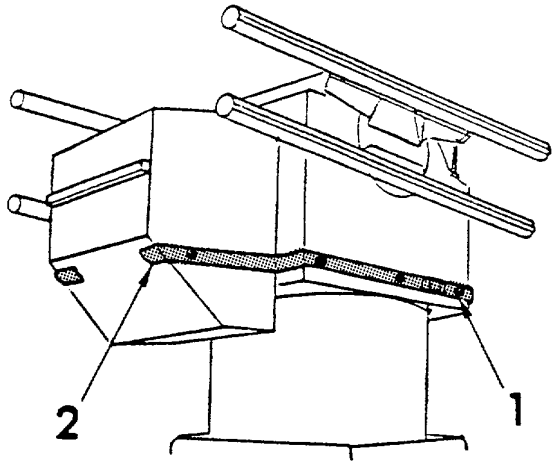
Two detectors should be located at each edge of the air conditioning cover (5). Readjust belt if necessary.



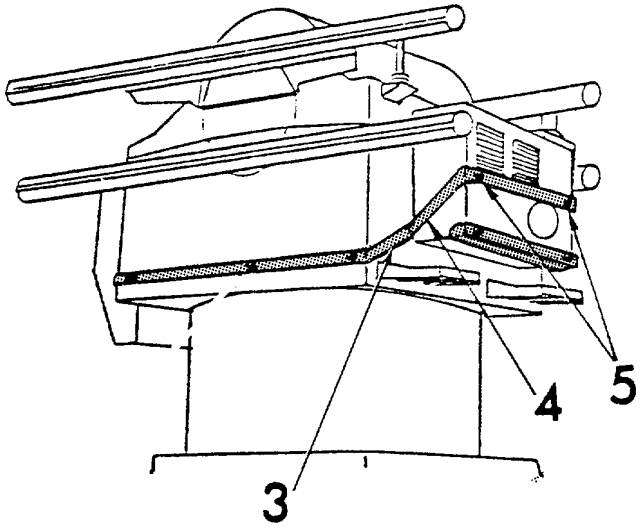
Attach remaining connector portion of belt to tape strip as shown (6).

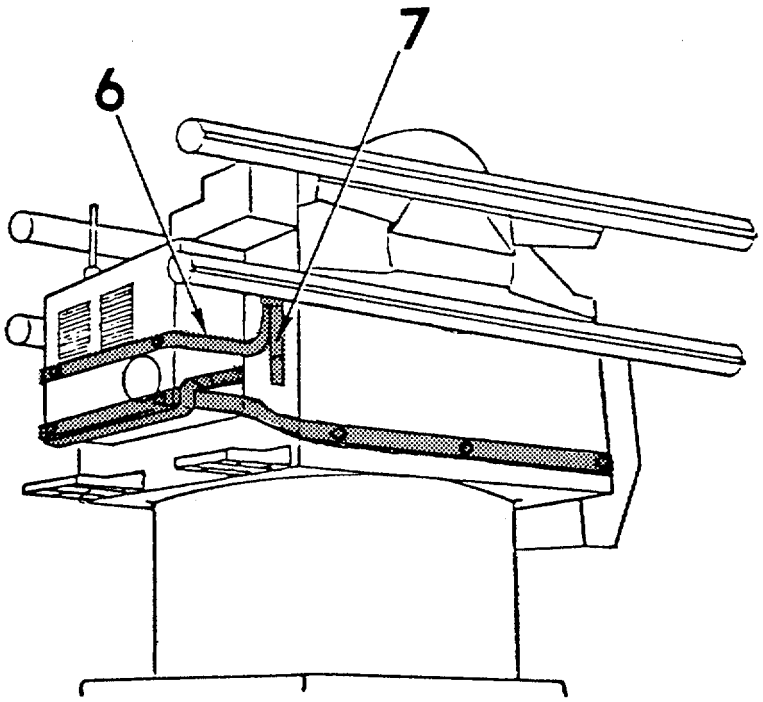
Outside Installation Task 9: Install Turret Left Side/Rear Detector Belt

Locate remaining detector belt labeled No. 1. Locate the third detector (1) from connector end. Place that detector at the rear left corner of the turret. Continue attaching belt toward turret front. When complete, about 6 inches of belt should wrap around the front (2).



Return to the left rear corner and attach remaining length of belt on the rear of vehicle. Follow the path of tape strips along the rear of turret (3), up the side (4), and across the rear (5) of air conditioning cover. Two detectors should be located at each end of air conditioning cover. Readjust belt if necessary.



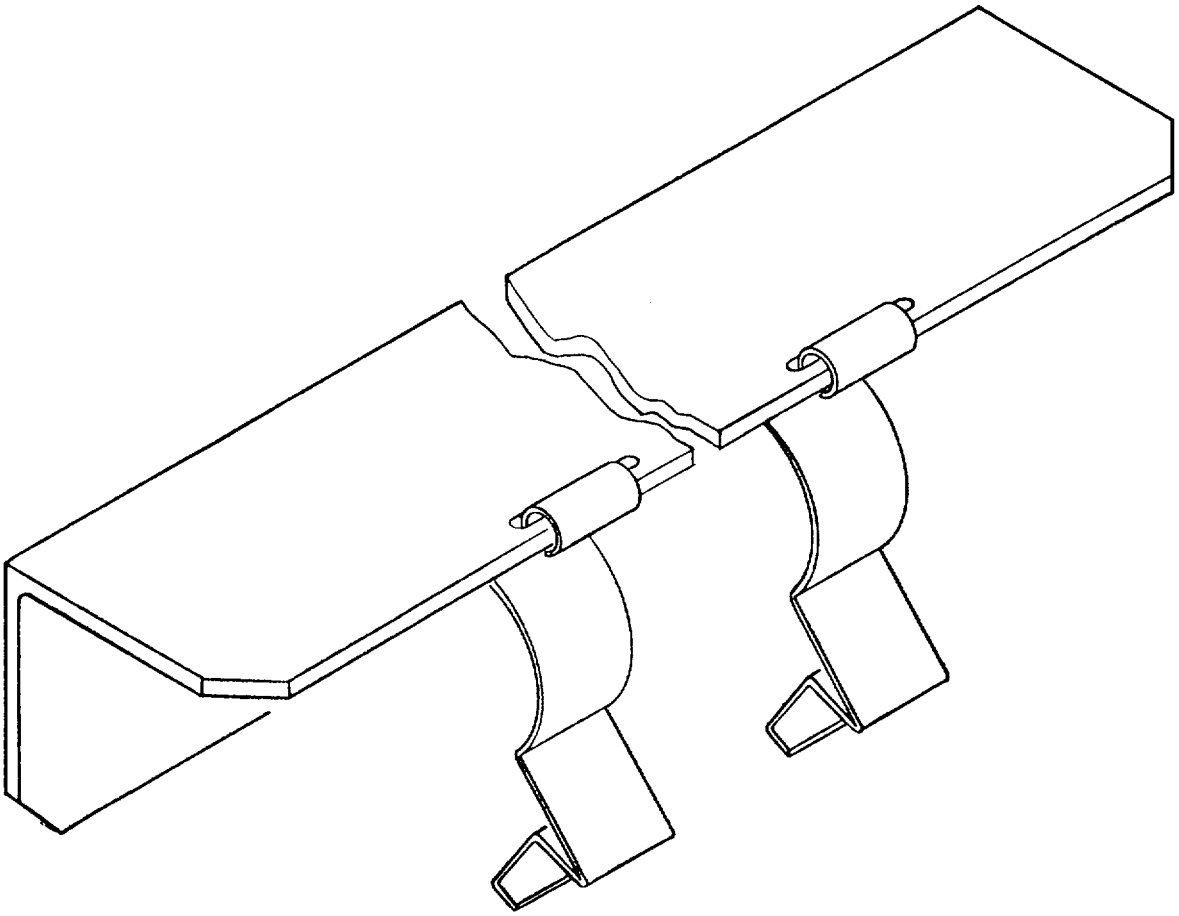


Continue installing belt around right side (6) of air conditioning cover and rear of turret (7), following tape strips as shown.

NOTE

When turret detector belts are properly installed, four detectors will be facing each direction; front, rear, and to both sides.

Outside Installation Task 10: Inspect Detector Mounting Brackets



Inspect two detector mounting brackets for obvious damage.

Check that fastener tape on bracket sides is intact.

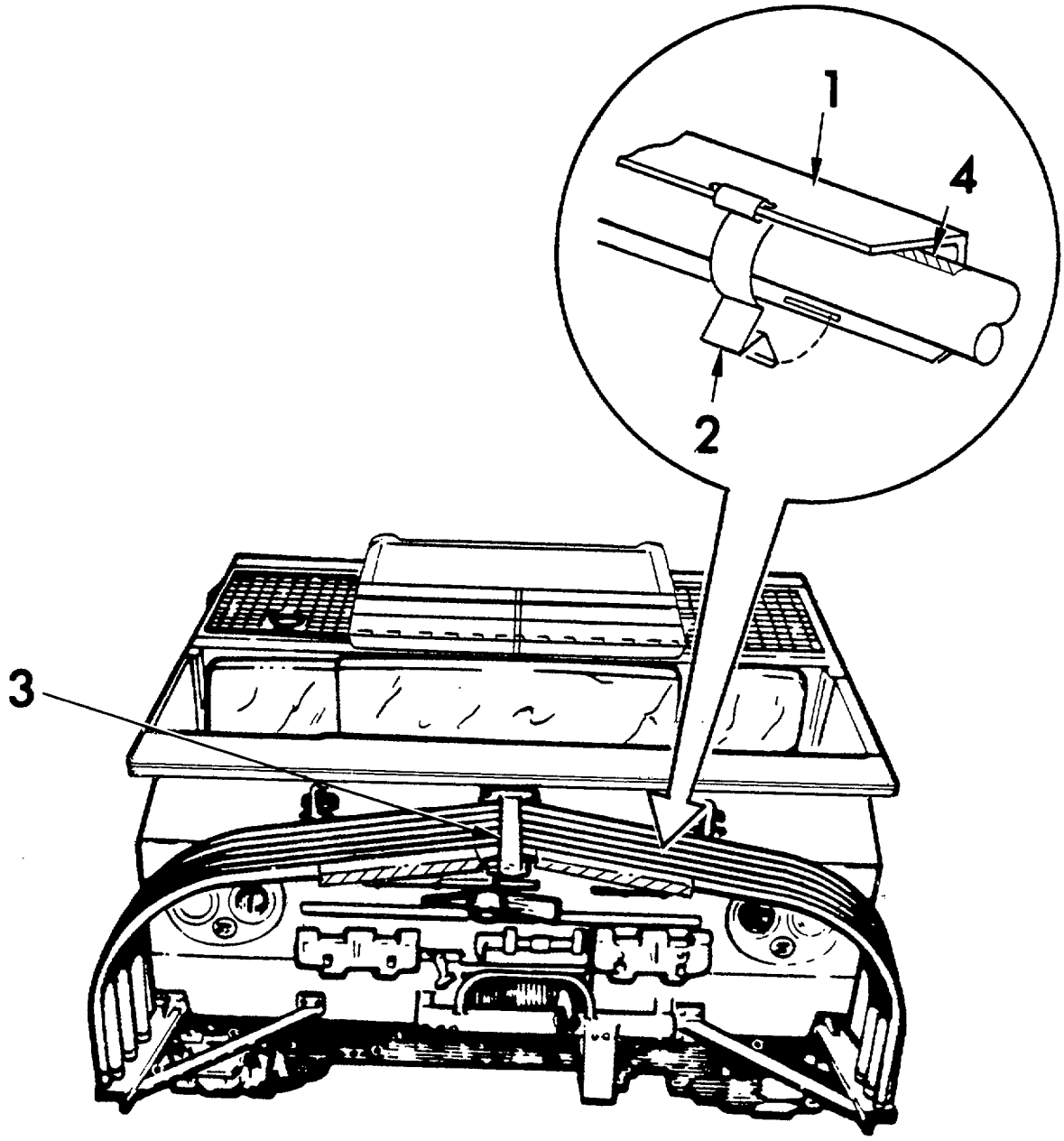
Report any damage on DA Form 2404. Replace only if not usable.

Outside Installation Task 11: Install Detector Mounting Brackets and Front Vehicle Belt

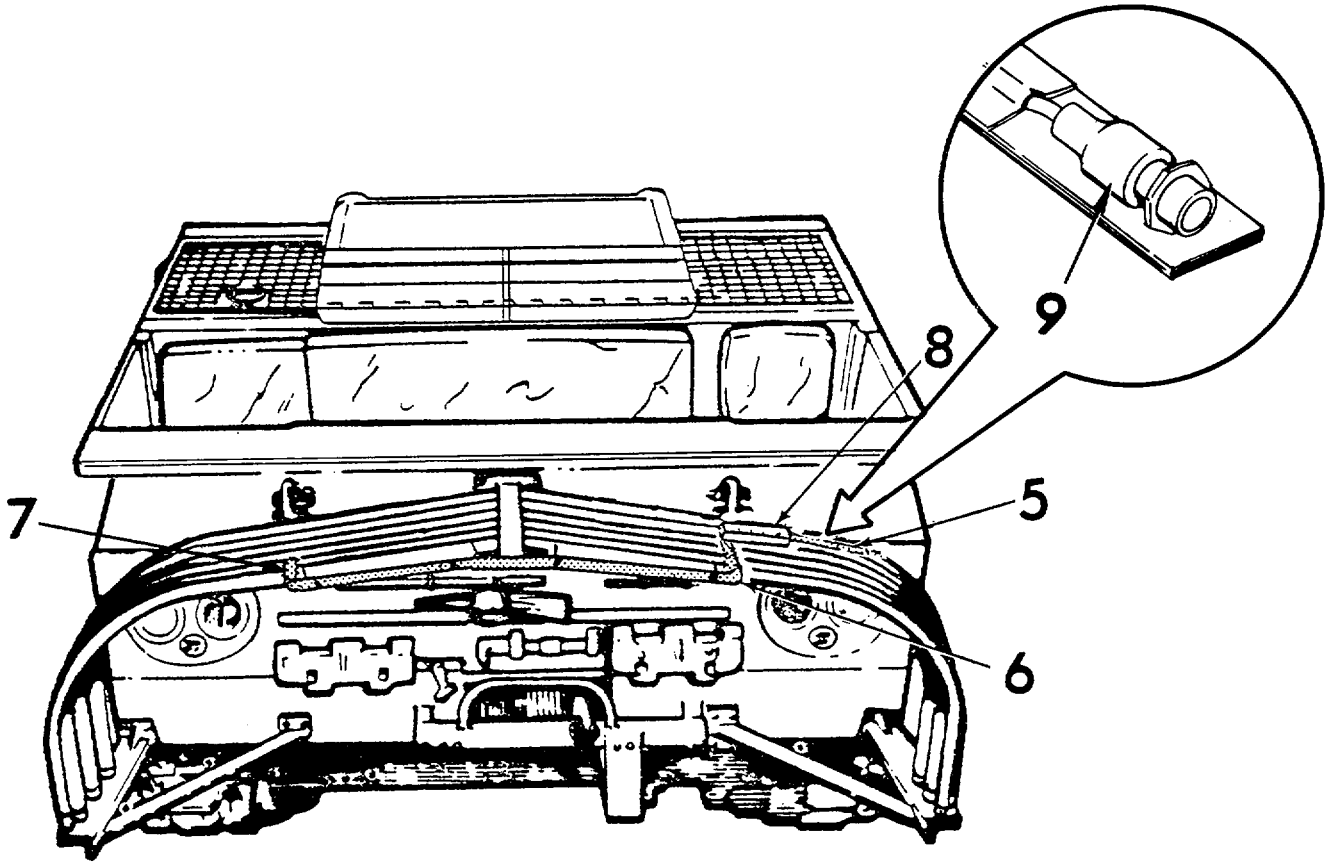
Front Mounted Canopy Racks

If vehicle is equipped with canopy racks which will not be removed during MILES training exercise, the front belt is installed as follows:

Clip detector mounting brackets (1) on outermost canopy rack. Slip spring clips (2) over rack and snap into place. Position one bracket on each side of rack center support (3). Mesh fastener tape on bracket against tape (4) Previously installed on canopy rack.



Outside Installation Task 11: Install Detector Mounting Brackets and Front Vehicle Belt (Cont).



Locate belt labeled No. 2.

Keep connector end (5) to vehicle left. Center belt on front of vehicle. Press against fastener tape on front of bracket (6). When properly positioned there are two detectors against each bracket. Reposition if necessary.

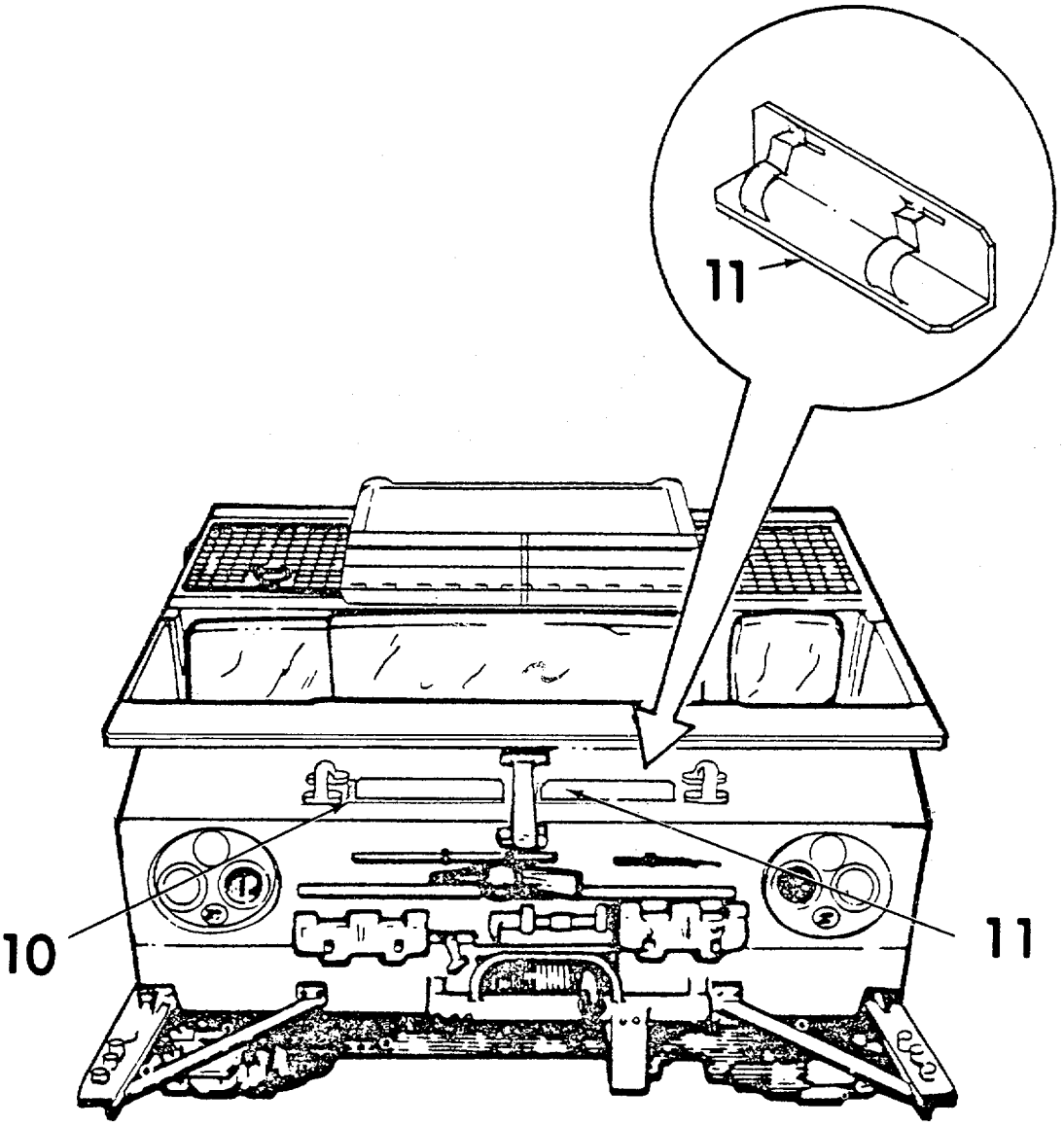
Press excess detector belt length against tape on top right (7) of canopy rack.

Position electronics box (8) against fourth or fifth interior canopy rack. Position with electrical connector (9) to left. Mark position of belt, electronics box, and connector on rack. Temporarily remove portion of belt from canopy rack and install fastener tape. Use procedures given in Outside Installation Tasks 2 and 4. Press belt, electronics box and connector firmly against tape.

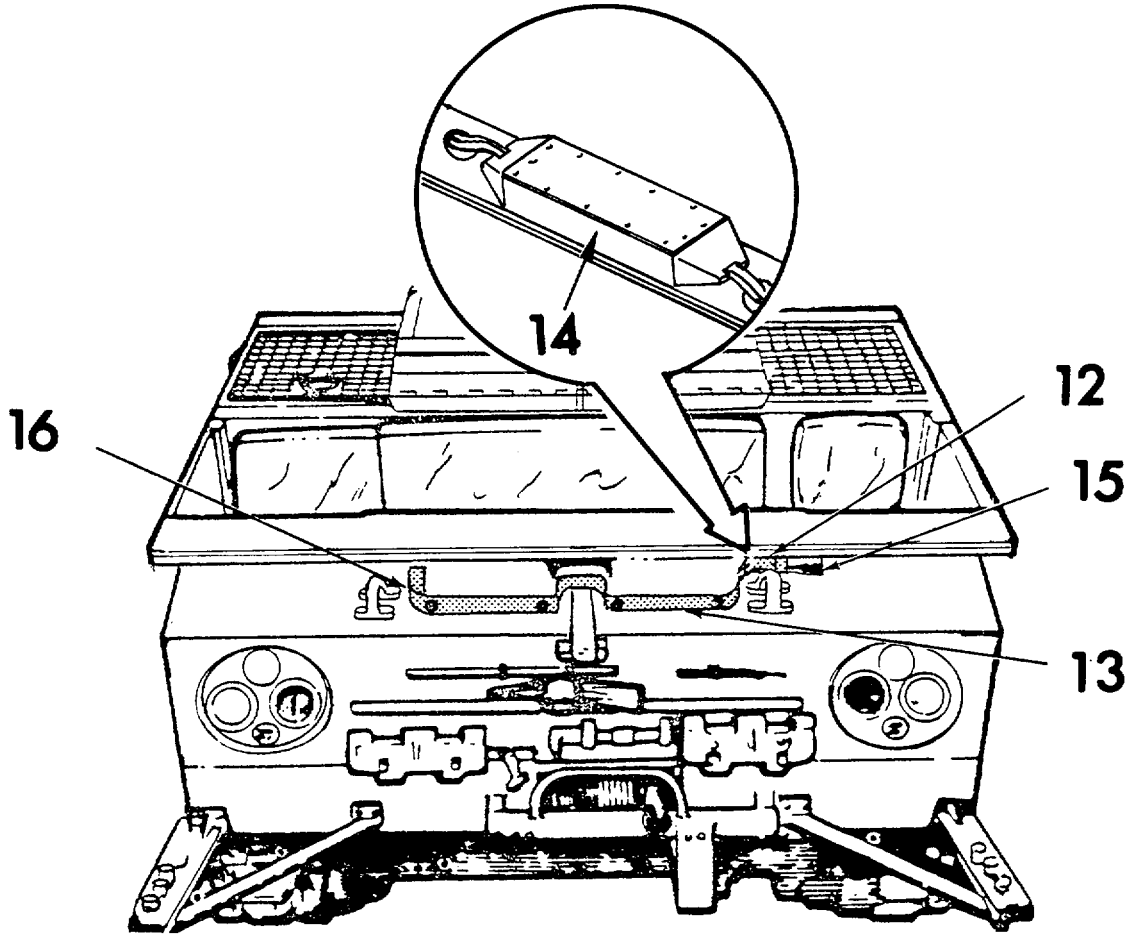
No Front Mounted Canopy Racks

If vehicle is not equipped with canopy racks, if they are damaged or missing or must be used to cover the launcher during MILES training exercises, the front detector belt is installed as follows:

Press detector mounting brackets against strips of fastener tape (10) previously installed on front of vehicle. Position brackets (11) so exterior fastener tape faces forward and is perpendicular to vehicle top.



Outside Installation Task 11: Install Front Vehicle Belt (Cont).



Locate belt labeled No. 2.

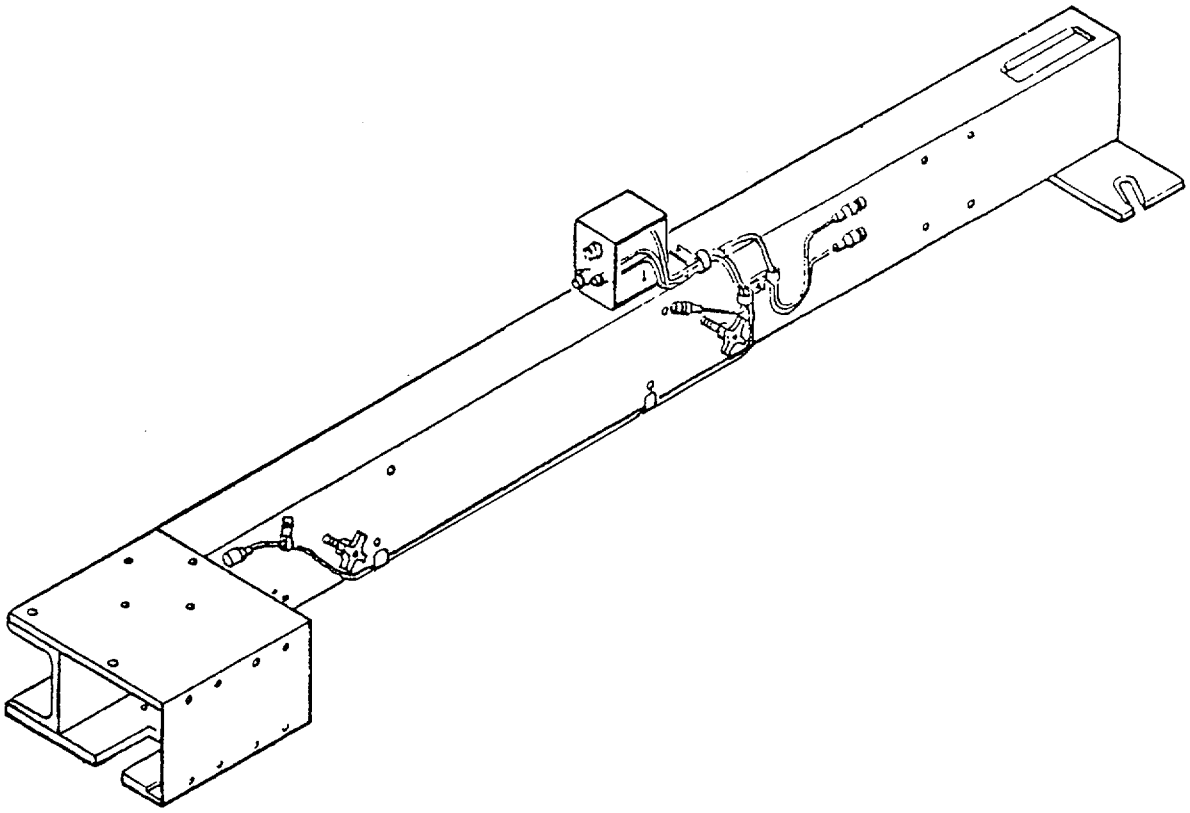
Keep connector end (12) to vehicle left. Center belt on front of vehicle. Press against fastener tape on front of brackets (13). When properly positioned there are two detectors against each bracket. Reposition if necessary.

Position electronic box (14) on top surface of vehicle with electrical connector (15) facing left. Mark location of belt. box and connector. Temporarily remove box and connector and apply fastener tape to marked areas. Use procedures given in Outside Tasks 2 and 4. Firmly press belt, box and connector against tape. Tuck any loose belt on right side between lifting ear (16) and bracket.

NOTE

Check that all detector belts are securely fastened to tape. Press together where necessary.

Outside Installation Task 12: Inspect Rail Assembly



Inspect Rail Assembly for any damage that might prevent normal installations.

Check for cuts and breaks in cable insulation.

Check electronic plugs for broken connectors and visible damage.

Report any damage on DA Form 2404. Replace Rail Assembly only if not usable.

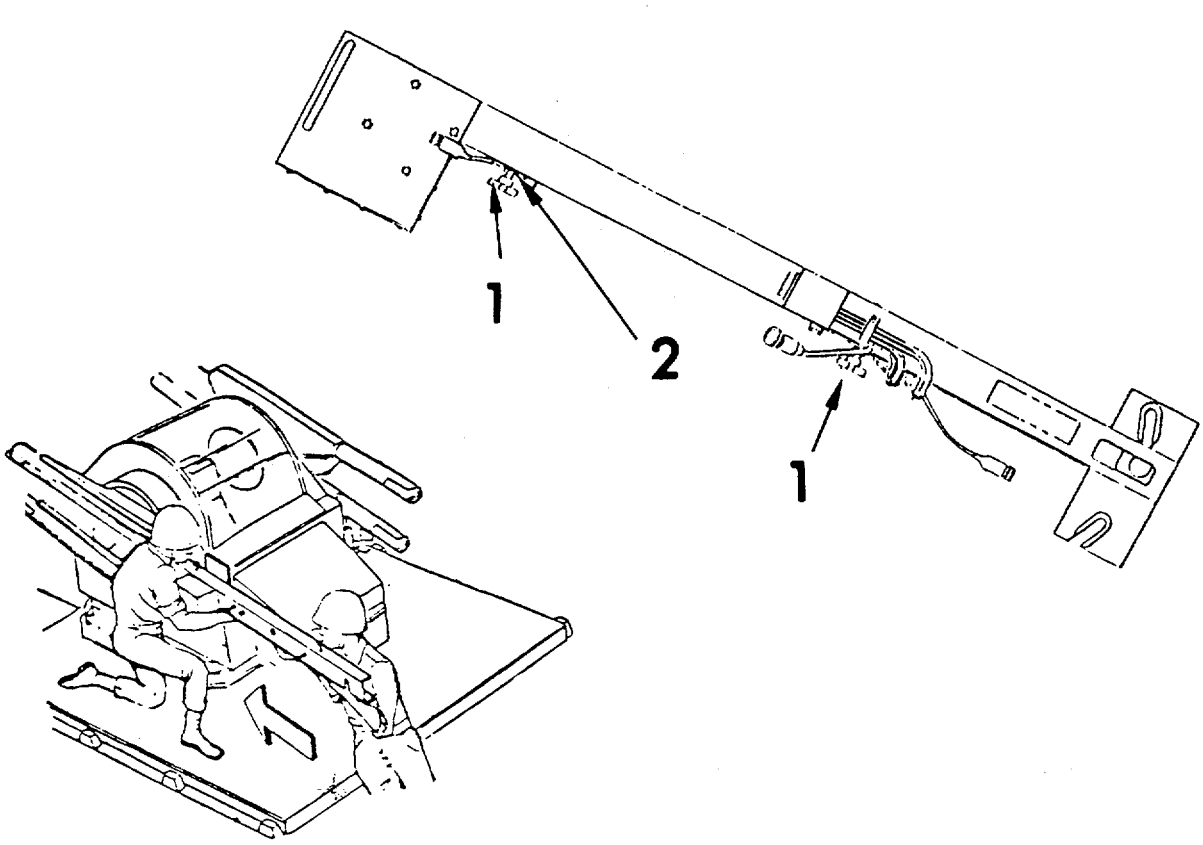
Outside Installation Task 13: Install Rail Assembly

Retract the mount.

The Rail Assembly installs on upper right launcher.

Make sure rail knob assemblies (1) are sufficiently screwed out so they will not interfere with launcher installation.

NOTE
Two crew members are required to install the Rail Assembly.

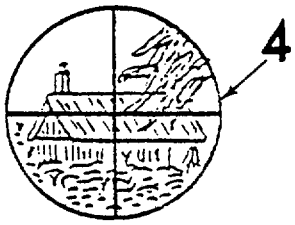


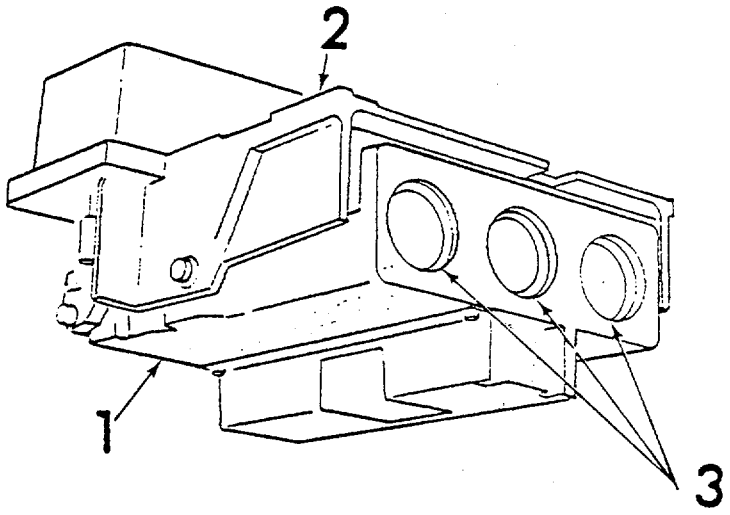
Use the same procedures to install the Rail Assembly as are used for a missile. Insure detente pin is LOCKED and IN POSITION. Align assembly with keyway on upper right launcher. Slide until assembly audibly locks into place.

Securely tighten Rail Knob Assemblies (1).

Lock Rail Knob Assembly in place. Using an adjustable wrench from vehicle tool kit, tighten locking nuts (2) on each Rail Knob Assembly.

Outside Installation Task 14: Inspect CHAPARRAL Laser Transmitter.





Inspect transmitter (1) and mounting brackets (2) for any damage that would prevent installation or normal operation.

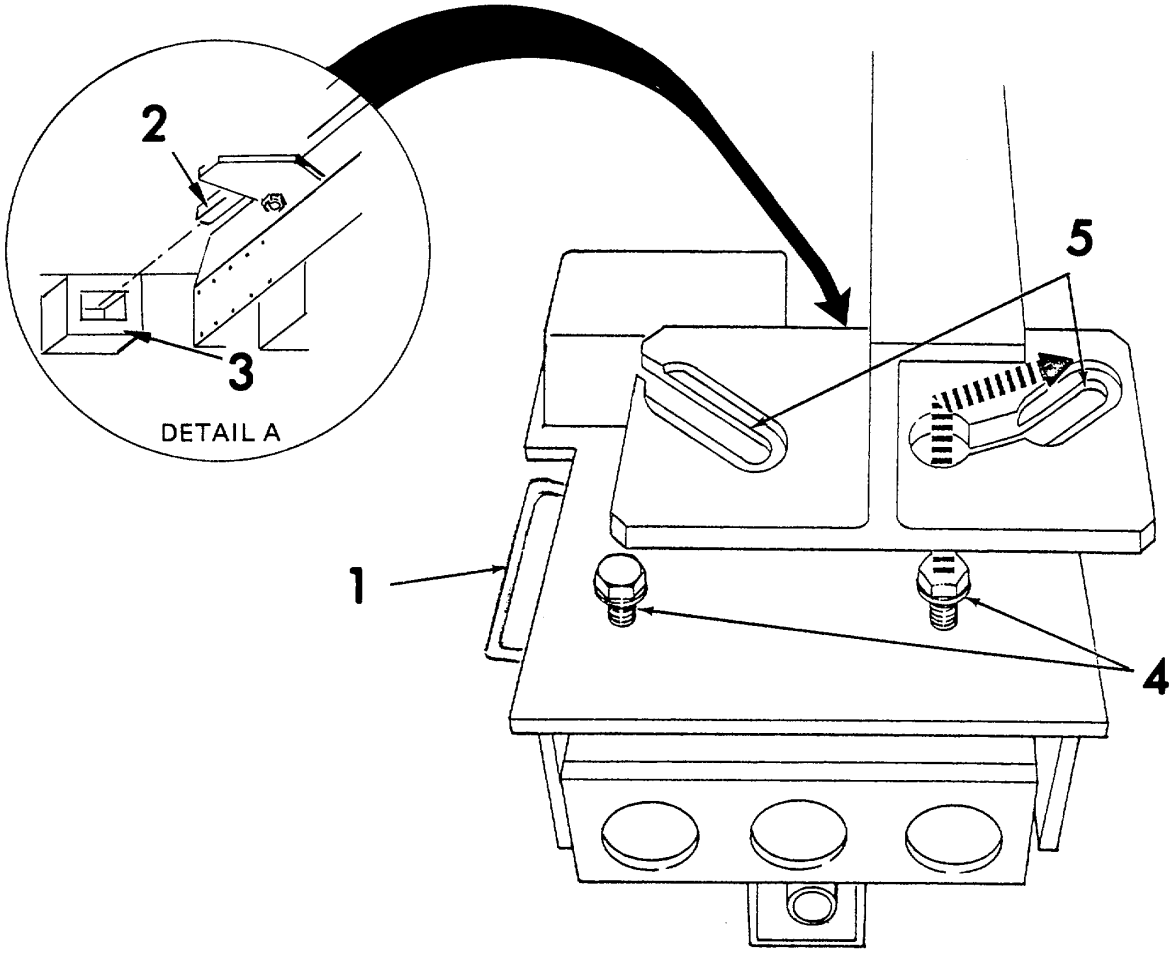
Make sure electronic receptacles have no visible damage.

Remove any dirt or oil from lenses (3) with lens paper (Item 6, Appendix D) or a soft dry cloth (Item 7, Appendix D).

Look through telescope (4). Be sure you can see distant objects clearly.

Report any damage on DA Form 2404. Replace transmitter only if not operable.

Outside Installation Task 15: Install Laser Transmitter.



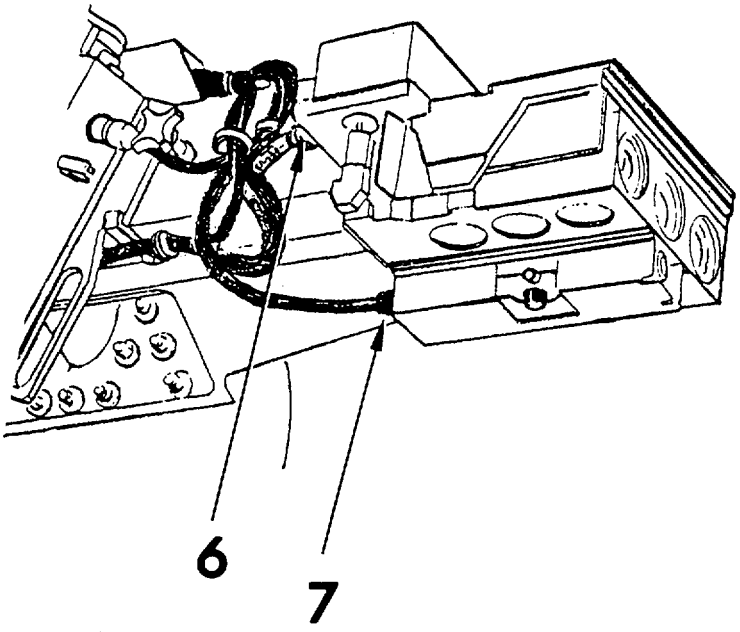
NOTE
Two crew members are required to install the transmitter.

Grasp transmitter by handles (1). Swing transmitter rear pivot arm (2) into seat (3) on bottom of rail (see Detail A). Rest weight on pivot arm (2).

Align transmitter mounting screws (4) with keyway (5) in forward section of Rail Assembly. Insert screws in keyway and slide towards CHAPARRAL turret.

Align bolt on rear of transmitter with hole on bottom of rail. Thread into hole.

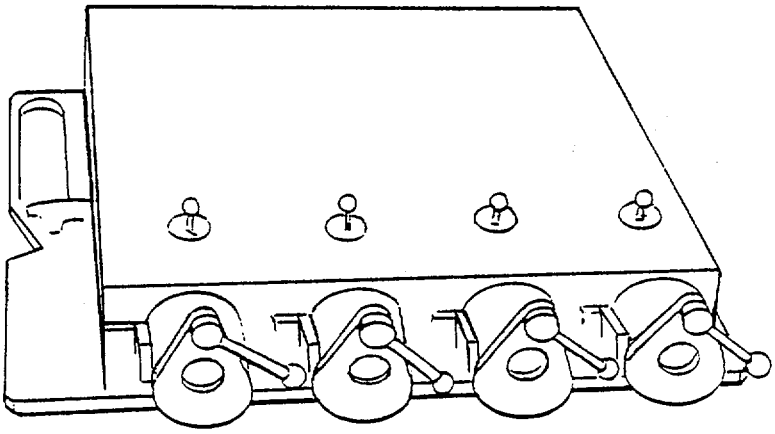
Tighten all bolts finger tight.



Connect Rail Assembly connector P13 MOTOR CONTROL (6) to connector J2 on rear of transmitter motor.

Connect Rail Assembly connector P12 TRANSMITTER (7) to connector J1 on rear of transmitter.

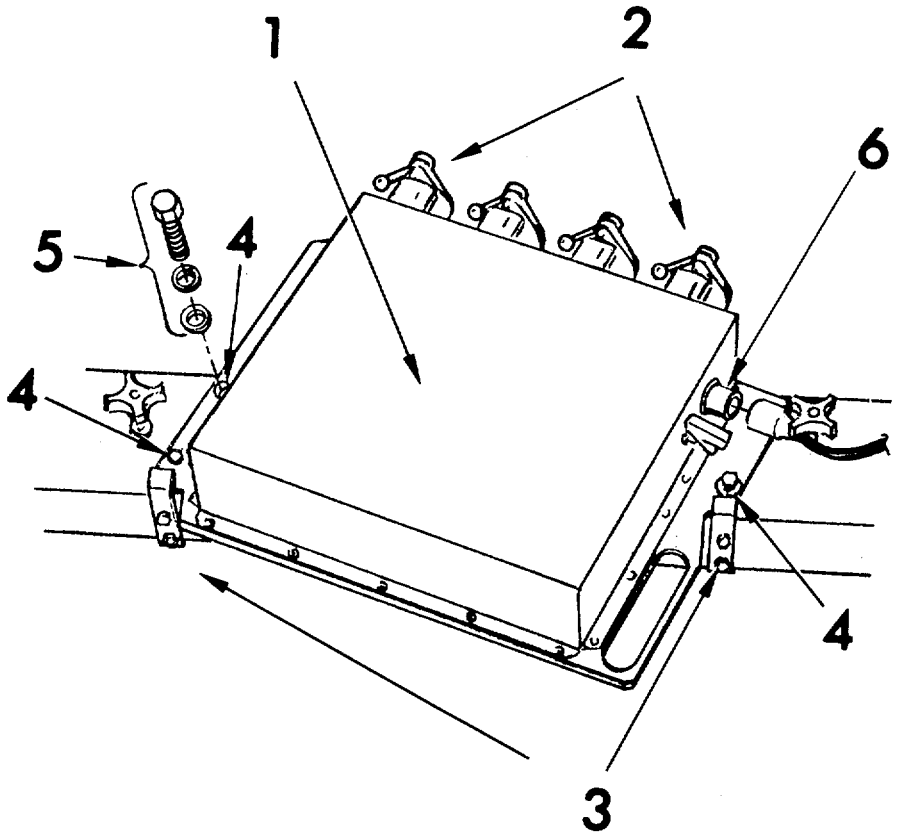
Outside Installation Task 16: Inspect WESS.



Inspect WESS device for any visible damage that would prevent proper installation or operation.

Report any damage on DA Form 2404. Replace WESS only if not operable.

Outside Installation Task 17: Install WESS.



Position WESS (1) with breech openings (2) on top.

Place WESS in two clip supports (3) on Rail Assembly. WESS sits at an angle as shown.

Align WESS assembly holes (4) with the four corresponding holes in rail assembly. Insert four 3/8-16 cap screws (5), lock washers (5), and flat washers (5) (Items 2i, 2N and 2L, Section II, Appendix B). Tighten with adjustable wrench from vehicle tool kit.

Connect Rail Assembly connector P11 to connector J1 (6) on the WESS Assembly.

Outside Installation Task 18: Inspect and Service CVKI Assembly.

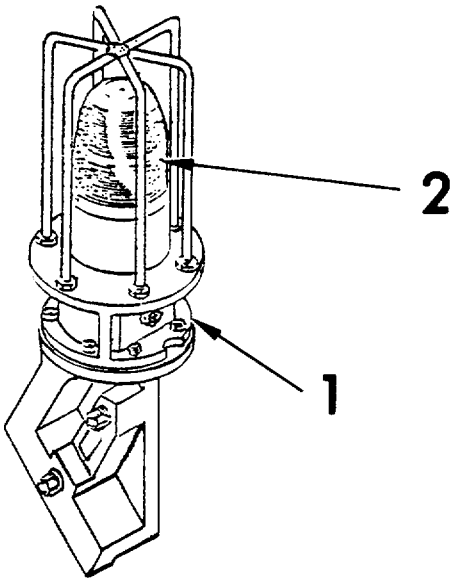
NOTE

CVKI Assembly is included in the MILES equipment for the M113 APC.

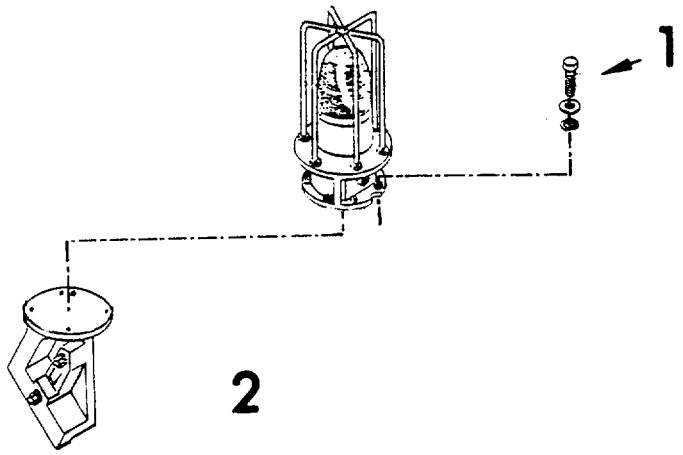
Inspect CVKI Assembly (1) for any damage that would affect proper installation or operation.

Inspect yellow lens (2) for cracks.

Report any damage on DA Form 2404. Replace only if lens is cracked or if unit is not operable.

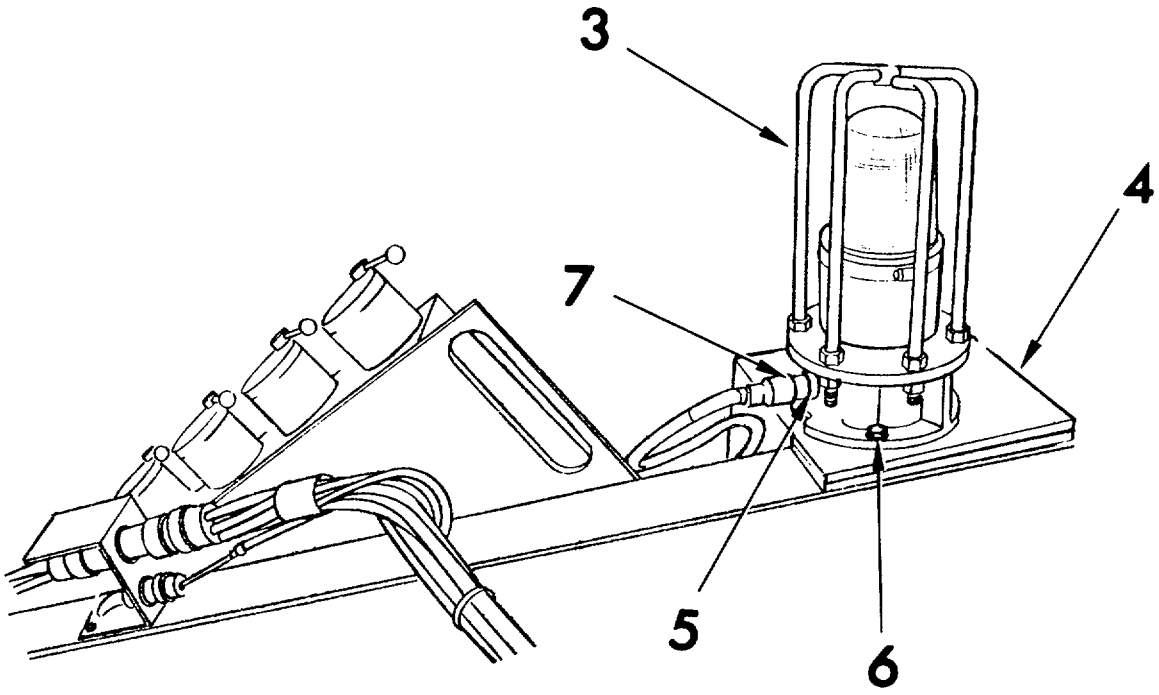


Outside Installation Task 19: Install CVKI



Remove CVKI from M113 mounting bracket (2). Disconnect 4 bolts (1) using 7/16-inch open end wrench from vehicle tool kit. Remove M113 mounting bracket. Stow M113 mounting bracket in M113 transit case.

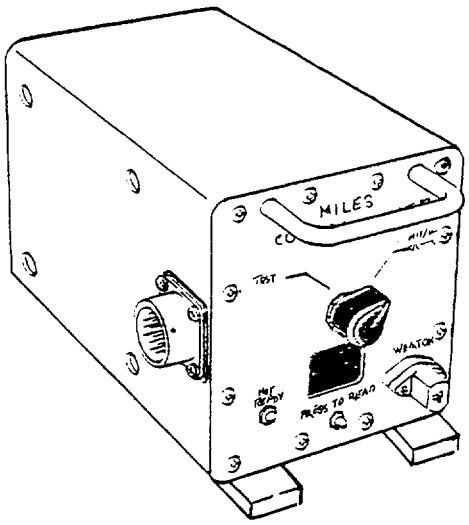
Place CVKI (3) against mounting bracket (4) on top rear of Rail Assembly. Make sure CVKI is flush against mounting bracket, guide pin is aligned and connector (5) is facing toward front. Reinstall and tighten 4 CVKI cap screws (6). Connect Rail Assembly connector P14, KILL INDICATOR (7) to J1 connector on CVKI.



Outside Installation Task 20: Inspect Control Indicator Assembly (CIA).

NOTE

Control Indicator Assembly (CIA) is included in the MILES equipment for the M113 APC.

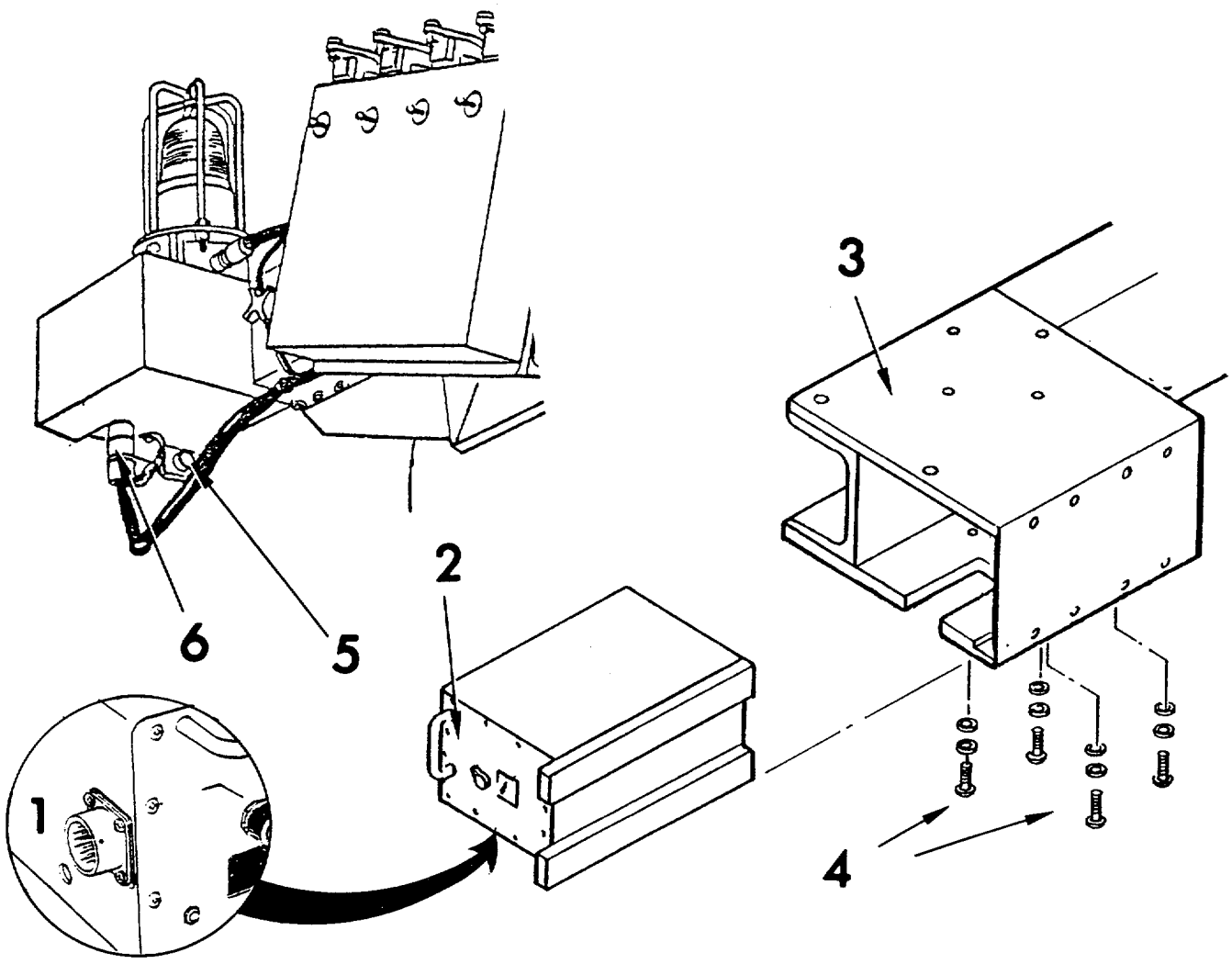


Inspect Control Indicator Assembly (CIA) for any damage that would prevent normal installation or operation.

Check that electronic receptacles have no visible damage.

Report any damage on DA Form 2404. Replace transmitter or mounting brackets only if not operable.

Outside Installation Task 21: Install Control Indicator Assembly (CIA).



Turn CIA on its side so that the connector (1) faces down and front panel (2) faces rear.

Slide CIA all the way into the mounting box (3) on Rail Assembly.

Align CIA holes with holes on bottom of rail assembly box. Install four MILES 1/4-20 screws (4) and locking hardware provided (Item 2G, 2K and 2M, Section II, Appendix B). Use adjustable wrench from vehicle tool kit..

Disconnect Rail Assembly plug P15 from dummy rail connector (5). Attach to receptacle J15 on CIA (6).

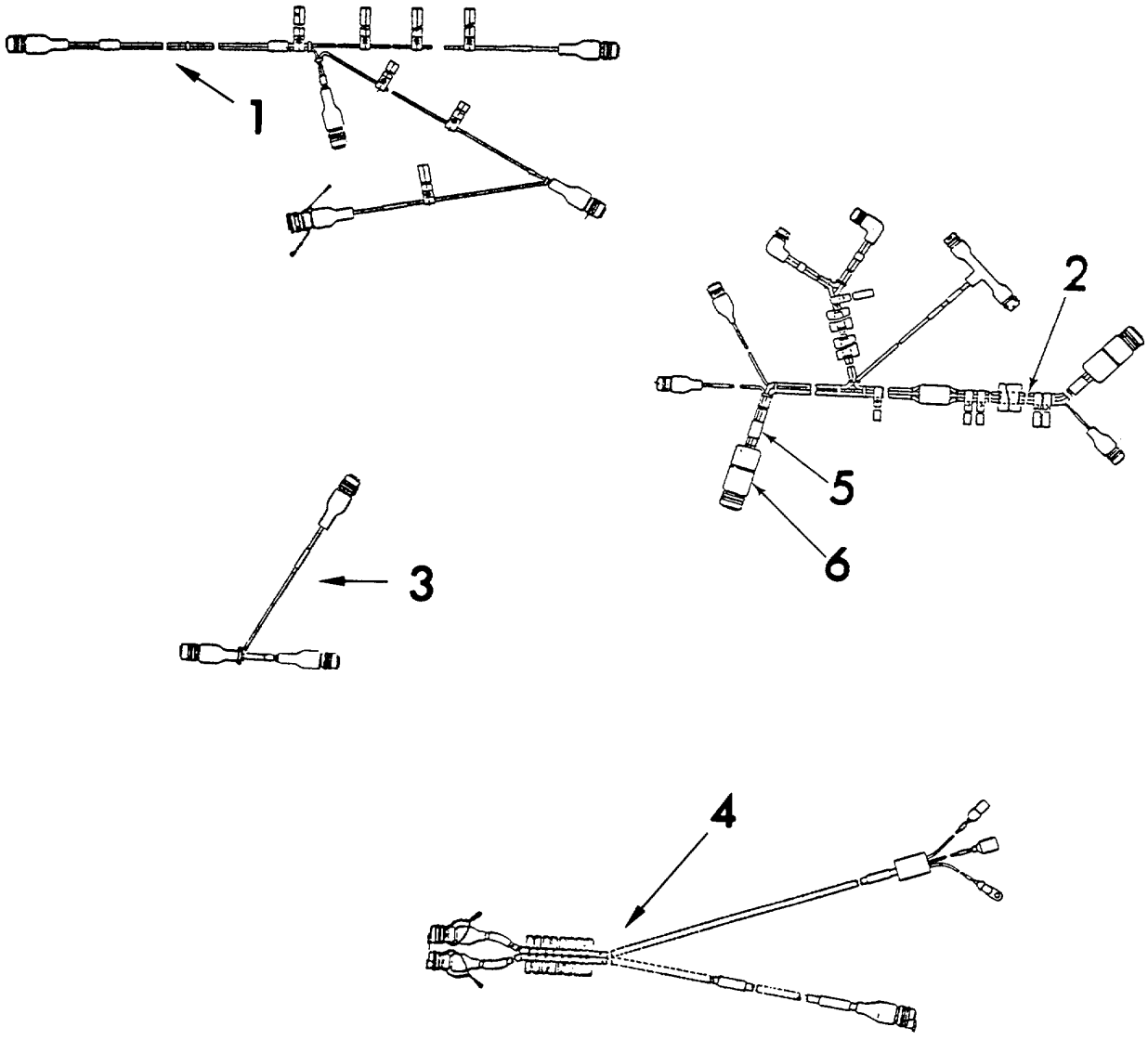
Outside Installation Task 22: Inspect Cable Assemblies.

Find cable assemblies labeled BELTS (1), TURRET (2). TURRET POWER (3) and DETECTOR/POWER (4).

Each connector should have label (5) showing where it goes.

Check all connectors (6) for obvious damage.

Report any damage on DA Form 2404. Replace transmitter cable assembly only if not operable.



Outside Installation Task 23: Install Turret Cable Assemblies.

Locate connector P9 (1) on TURRET cable assembly.

Locate connector J9 (2) on TURRET POWER cable assembly.

Connect J9 and P9.

Locate flat portion (3) of TURRET cable assembly. Position it across canopy threshold, and secure pads (4) to fastener tape (5) on antenna mount sides and on inside of canopy threshold. Route TURRET cable connector P8, TURRET POWER cable connector P20, and BELTS cable connector P10 around antenna mount (6) and up along inside of hand grip (7) towards rail.

Temporarily position remaining TURRET cable connectors inside gunner's station.

Locate connector P10 on BELTS cable assembly.

Connect P10 to receptacle J10 (8) on Rail Assembly.

Connect TURRET POWER cable connector P20 to J20 (9) on Rail Assembly.

Connect TURRET cable connector P8 to J8 (10) on Rail Assembly.

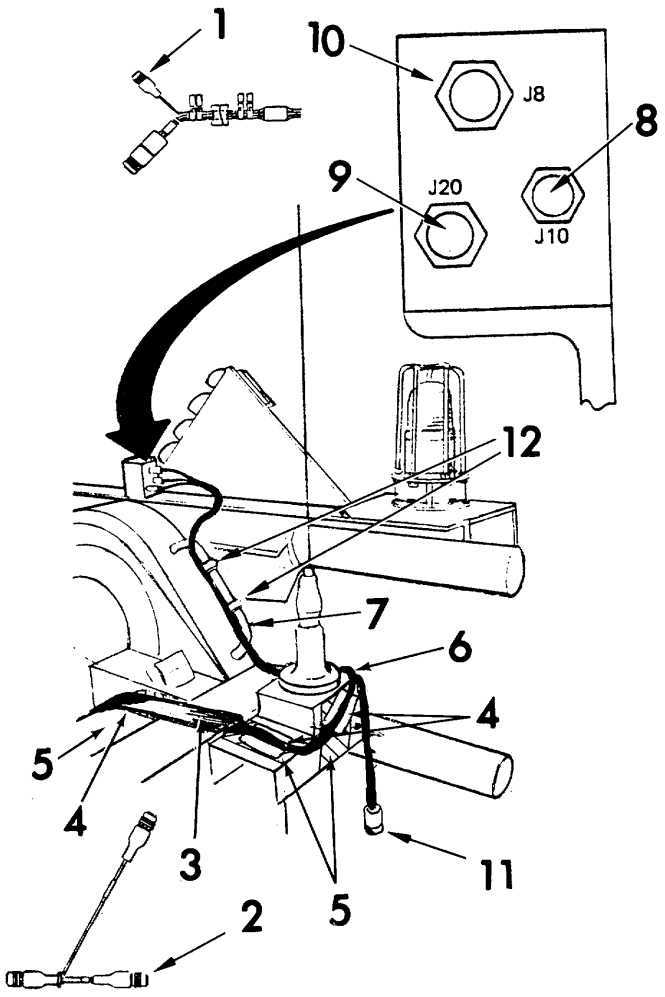
Let TURRET POWER cable connector P21 (11) drop along rear of turret.

Insure cables are routed alongside TURRET cable assembly, past antenna mount, and down towards detector belts.

CAUTION

Cable may be damaged if not secured to inside of handle.

Wrap two fastener ties (12) securely around TURRET, TURRET POWER and BELTS cable assemblies and hand grip.



Outside Installation Task 23: Install Turret Cable Assemblies (Cont).

Locate connectors P17 and P16 on BELTS cable assembly.

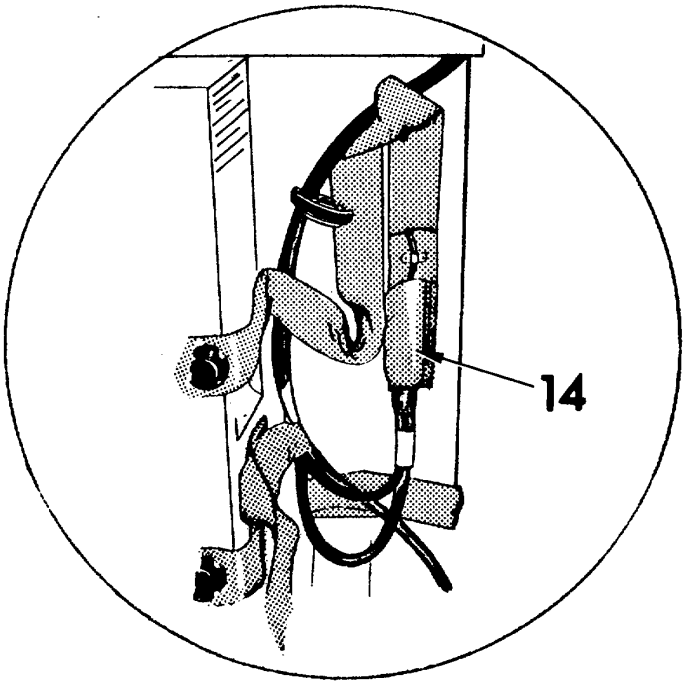
Route connectors down to right rear corner of turret.

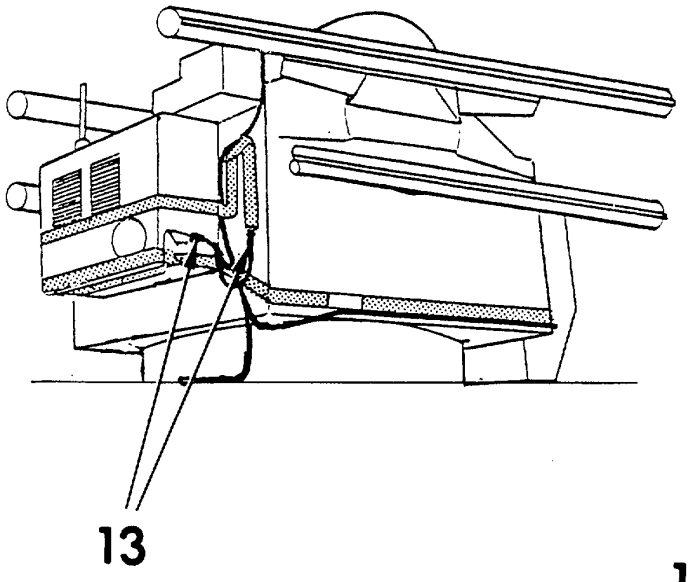
Connect to plugs (13) on ends of detector belts. Either connector may be attached to either plug.

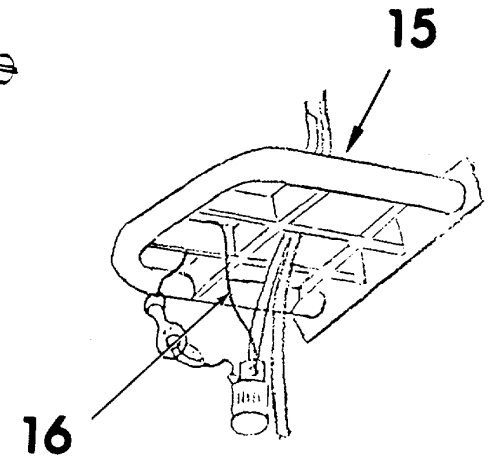
Secure connectors under flaps (14).

Locate connector P21 on TURRET POWER cable assembly and P19 on BELTS cable assembly. Route downward through grid of gunner's step (15).

Secure to step strip with Safety Lanyard (16).

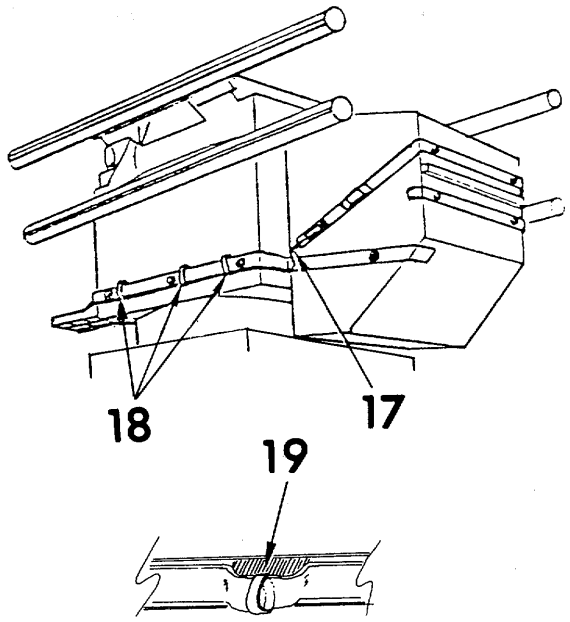






Locate connector P18 on BELTS cable assembly. Route cable connector P18 to front of launcher below the side detector belt. Connect to plug on front detector belt (17).

Secure cable to the side detector belt with the three tape ties (18). Lift up a portion of the belt and thread tape tie behind and around belt (19). Cinch tape ties firmly.



Outside Installation Task 24: Install Vehicle Cable Assemblies.

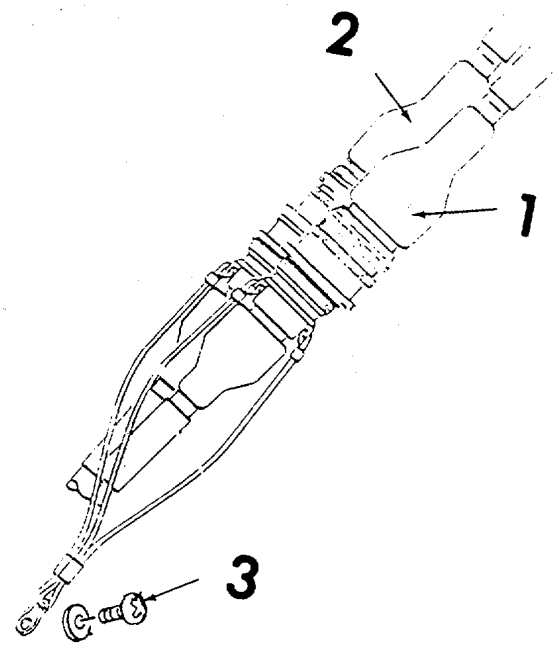
Locate connectors J19 and J21 on DETECTOR/POWER cable assembly.

Connect J19 to connector P19 (1) on BELTS cable assembly.

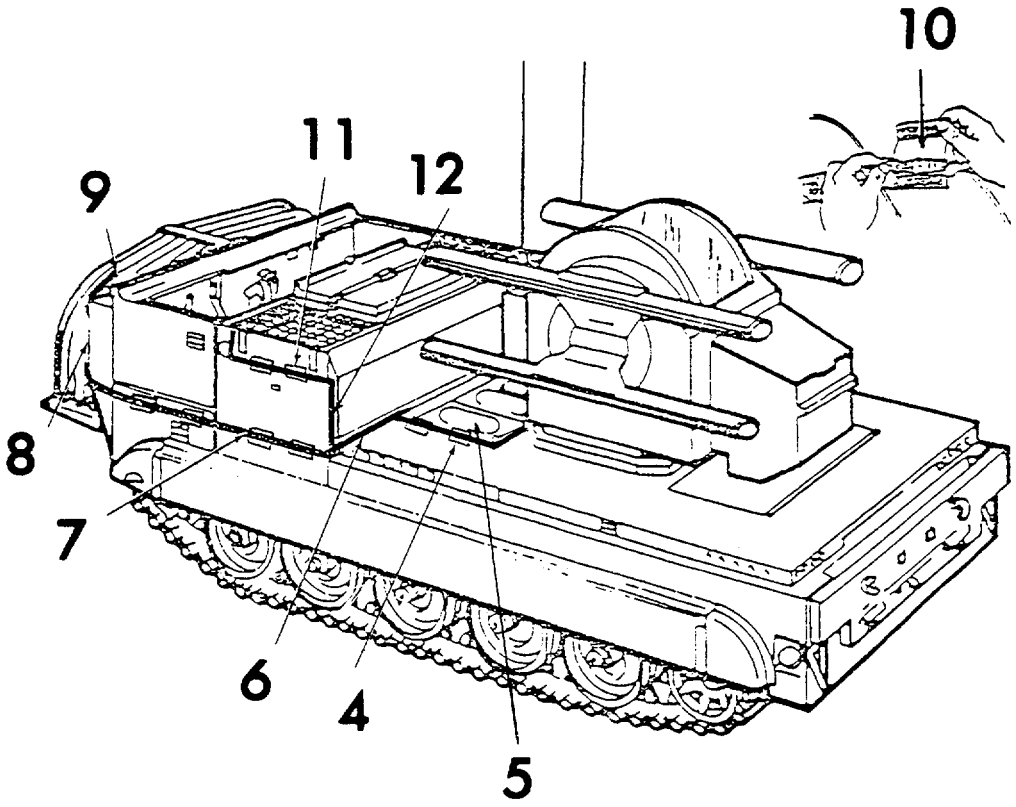
Connect J21 to connector P21 (2) on TURRET POWER cable assembly.

Remove screw from turret chain guard.

Secure DETECTOR/POWER cable Safety Lanyards under screw (3) and tighten with phillips screwdriver from vehicle tool kit.



Outside Installation Task 24: Install Vehicle Cable Assemblies (Cont).



Route DETECTOR/POWER cable forward along vehicle bed. Follow route of previously installed fastener tape. Press pads (4) on cable against tape.

WARNING

Do not cover D mate access hole (5). Personal Injury and/or Damage to MILES equipment and vehicle can occur if DETECTOR/POWER cable is damaged.

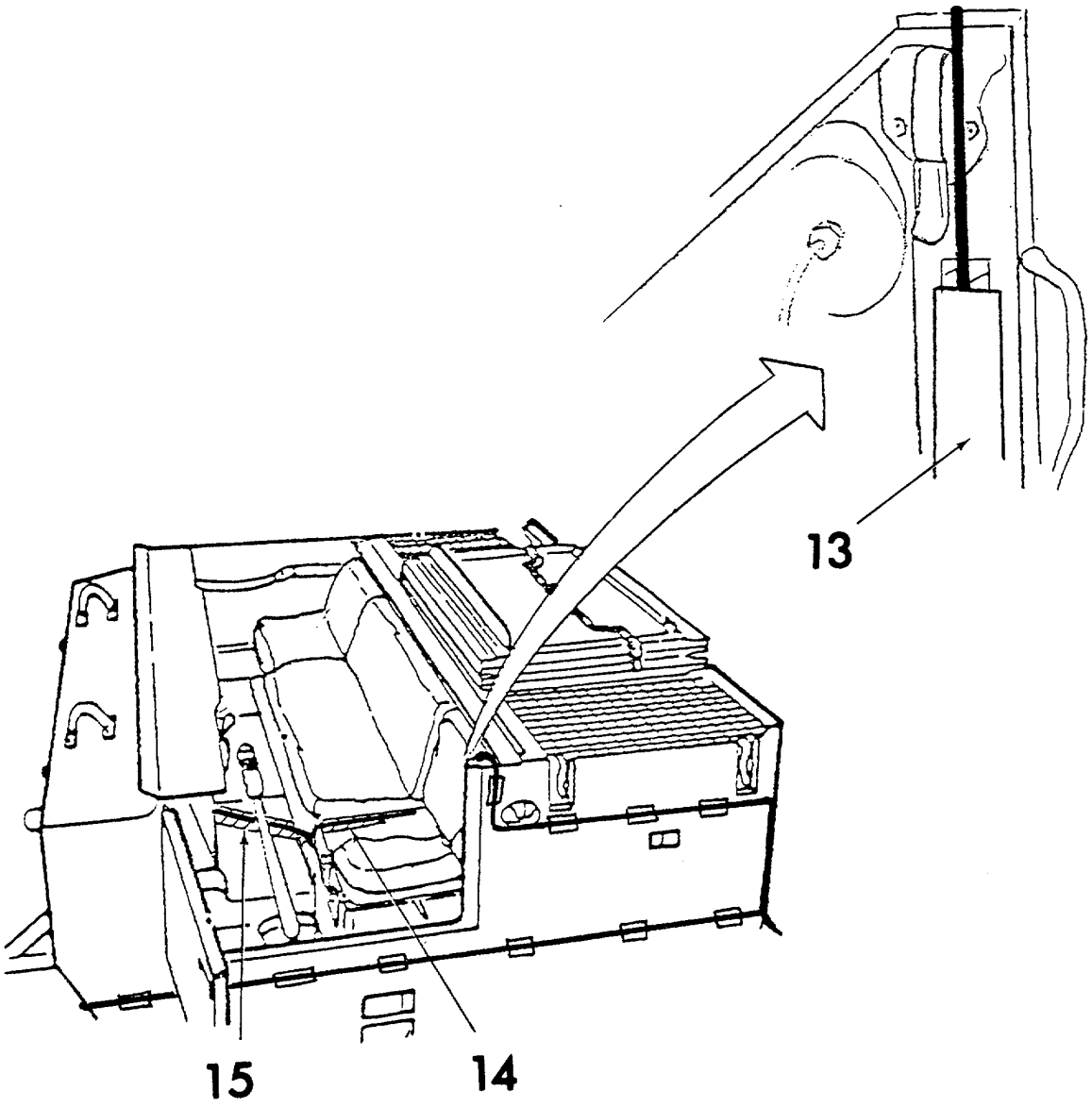
Route cable towards left side of vehicle. Press cable into slot (6) forward between blast shield and vehicle bed.

Route connector P22 forward beneath driver's door. Press cable pads (7) against fastener tape. Route cable up vehicle front (8) following fastener tape. Connect P22 to front belt connector (9). Cover with protective flap (10).

Route connectors P23, P24 and E1 up and across left side following upper fastener tape path (11).

Push vertical cable into space (12) between blast shield and vehicle cab.

Route cable up and over edge into driver's compartment.

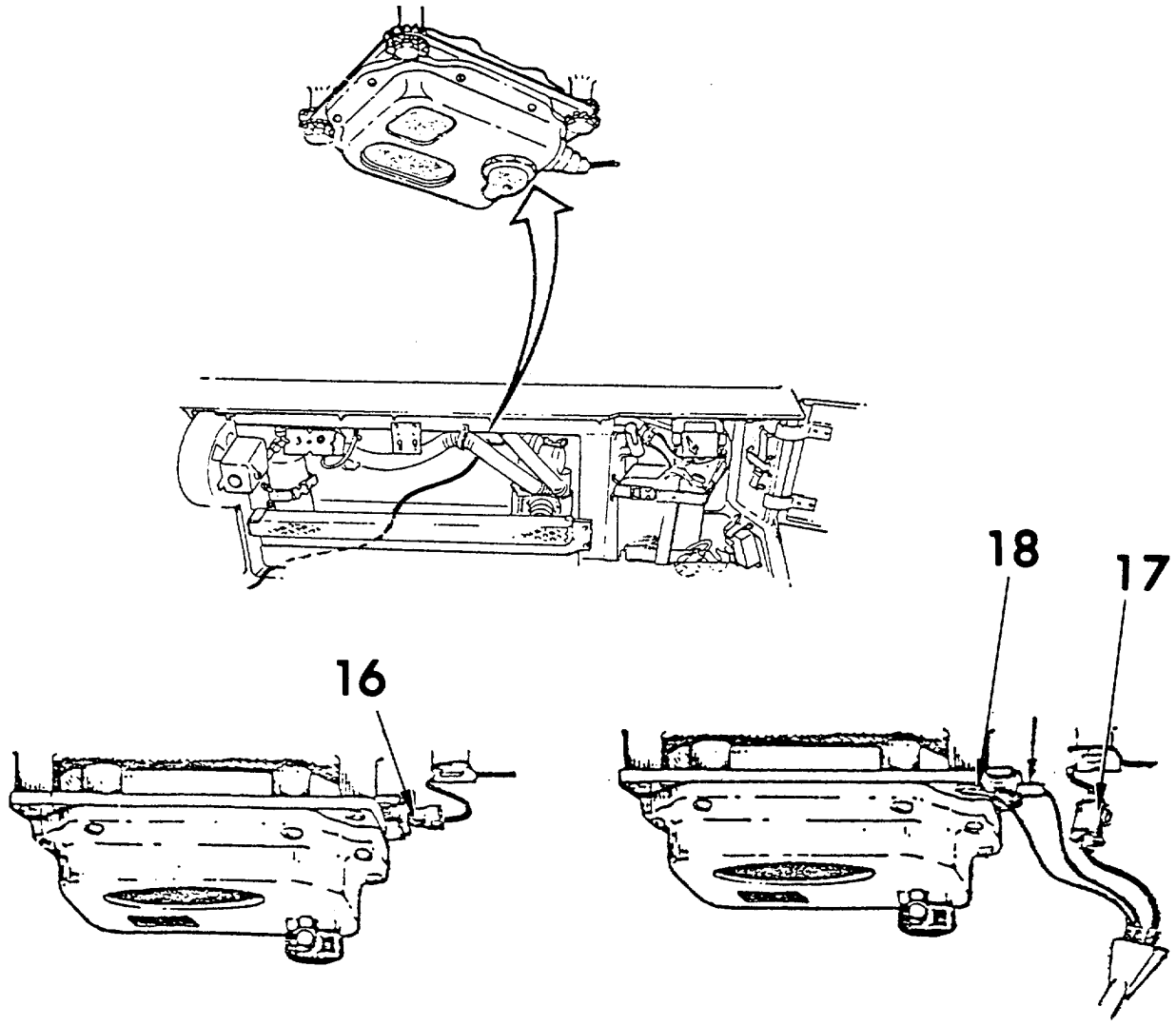


Pull cable tight and press pad (13) against interior fastener tape along side door.

Route behind folded down seat and press pad (14) against fastener tape to right of driver.

Route across floor and under instrument board. Press cable pad (15) against previously installed fastener tape.

Outside Installation Task 24: Install Vehicle Cable Assemblies (Cont).



Remove cable under instrument panel towards night light.

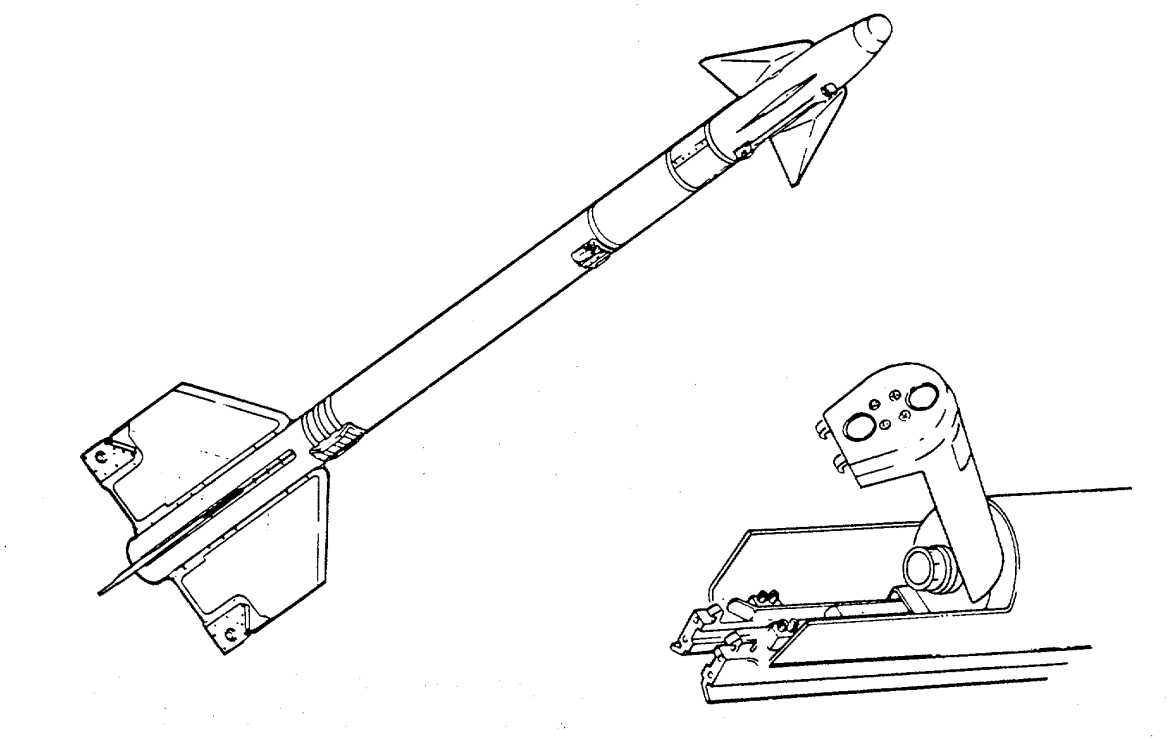
Remove night light power connection from light power receptacle below instrument panel. Locate and install cable assembly plug P24 in light power receptacle (16).

Plug power connection removed from light power receptacle into P23 (17) on cable assembly.

Attach ground connector E1 (18) to side of light fixture.

Secure cable to existing vehicle cables or hardware underneath instrument panel. Use fastener ties on DETECTOR/POWER cable.

Outside Installation Task 25: Install Training Missile



A CHAPARRAL M30 training missile, purging plug, or coolant indicator must be installed when using the MILES CHAPARRAL system.

If the CHAPARRAL M30 Training Missile is used with a live guidance system, use the blue shorting plug. This will prevent a guidance system blowdown. Refer to TM 9-1425-1586-10 for instructions on installing and operating with a training missile. The missile is installed on the lower right launch rail.

If the purging plug is used, disconnect the air compressor, and install purging plug in launch rail holding the MILES rail assembly.

The purging plug connector (Part No. 11072244) is installed when no training missile or training missiles without live guidance sections are used. It is installed on the lower right launch rack under the access door.

If the air compressor is connected, use the coolant indicator. Install coolant indicator on launch rail holding MILES rail assembly.

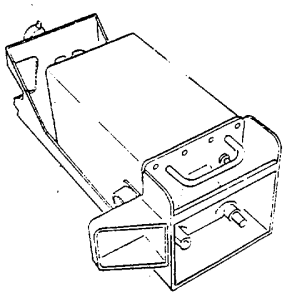
INSIDE INSTALLATION TASKS - LIST

Task	Title	Page
1.	Obtain Equipment	2-60
2.	Inspect Interface Control Assembly (ICA)	2-61
3.	Install Interface Control Assembly (ICA)	2-62
4.	Install Cable Assemblies	2-63
5.	Inspect Battery Boxes	2-65
6.	Connect and Install Battery Boxes	2-66

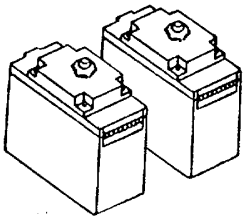
Inside Installation Task 1: Obtain Equipment. Completion of inside tasks requires equipment listed and illustrated below.

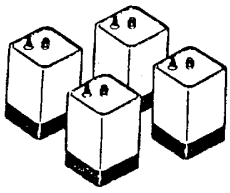
Locate and set aside this equipment.

1 Interface Control Assembly (ICA)



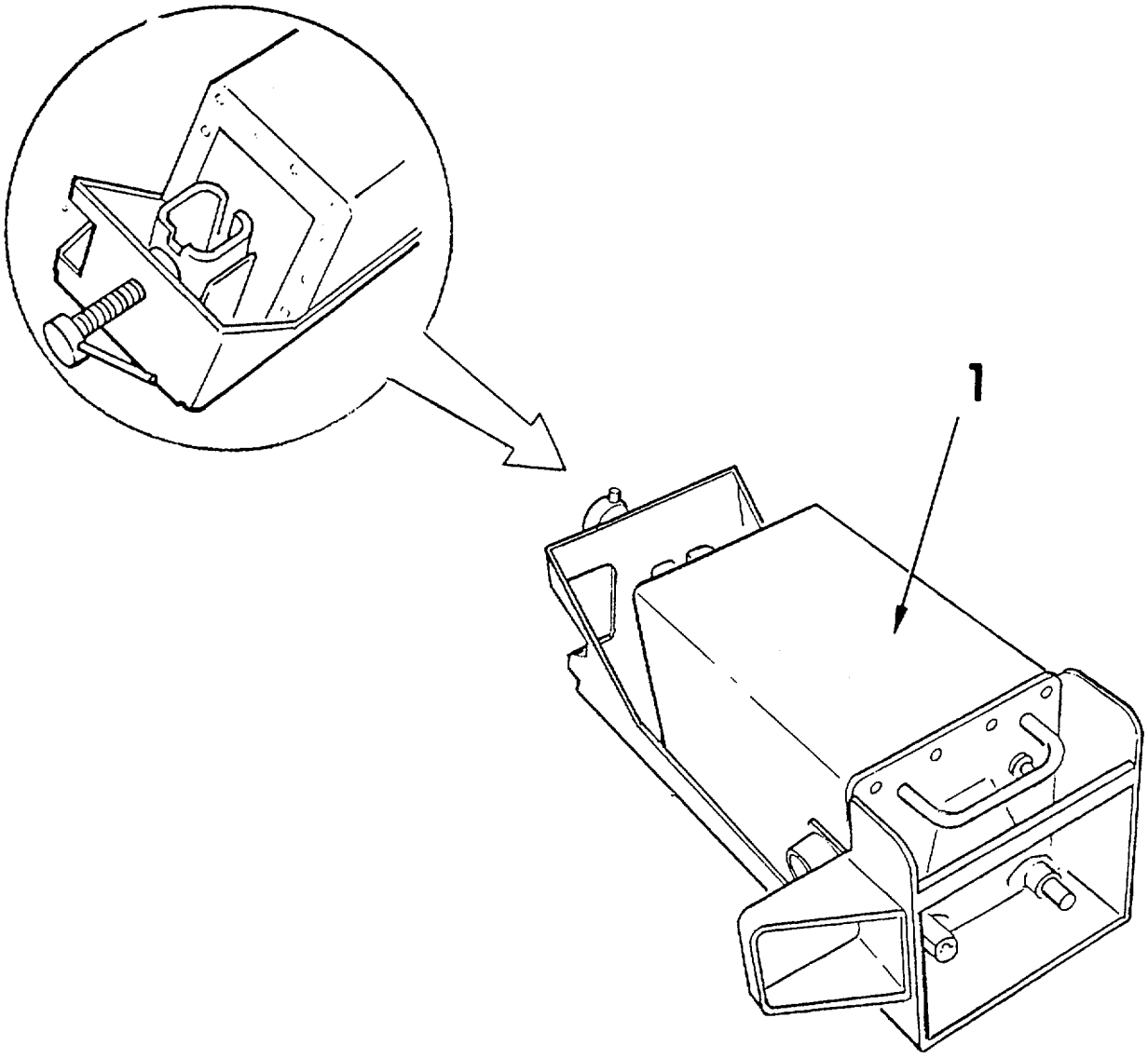
2 Battery Boxes* and four 6 V Batteries





*One from MILES M113 APC kit

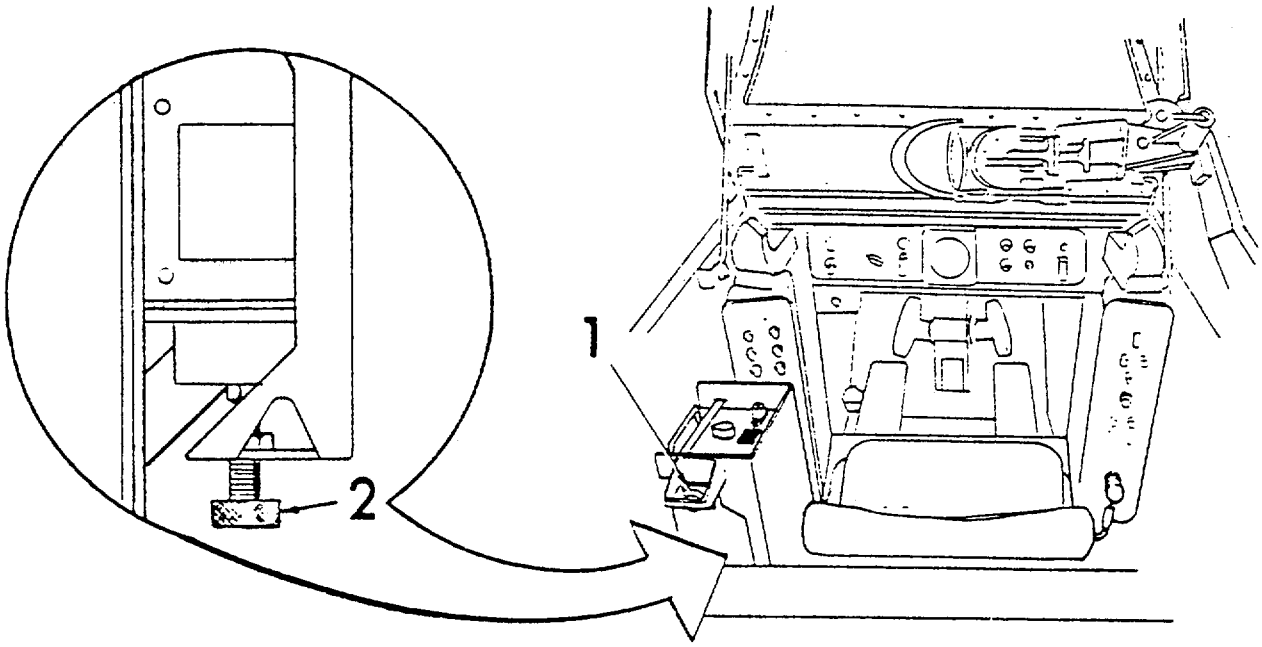
Inside Installation Task 2: Inspect Interface Control Assembly (ICA).



Inspect Interface Control Assembly (1) for any damage that would prevent normal operation.

Report any damage on DA Form 2404. Replace Interface Control Assembly (ICA) only if not operable.

Inside Installation Task 3: Install Interface Control Assembly (ICA).



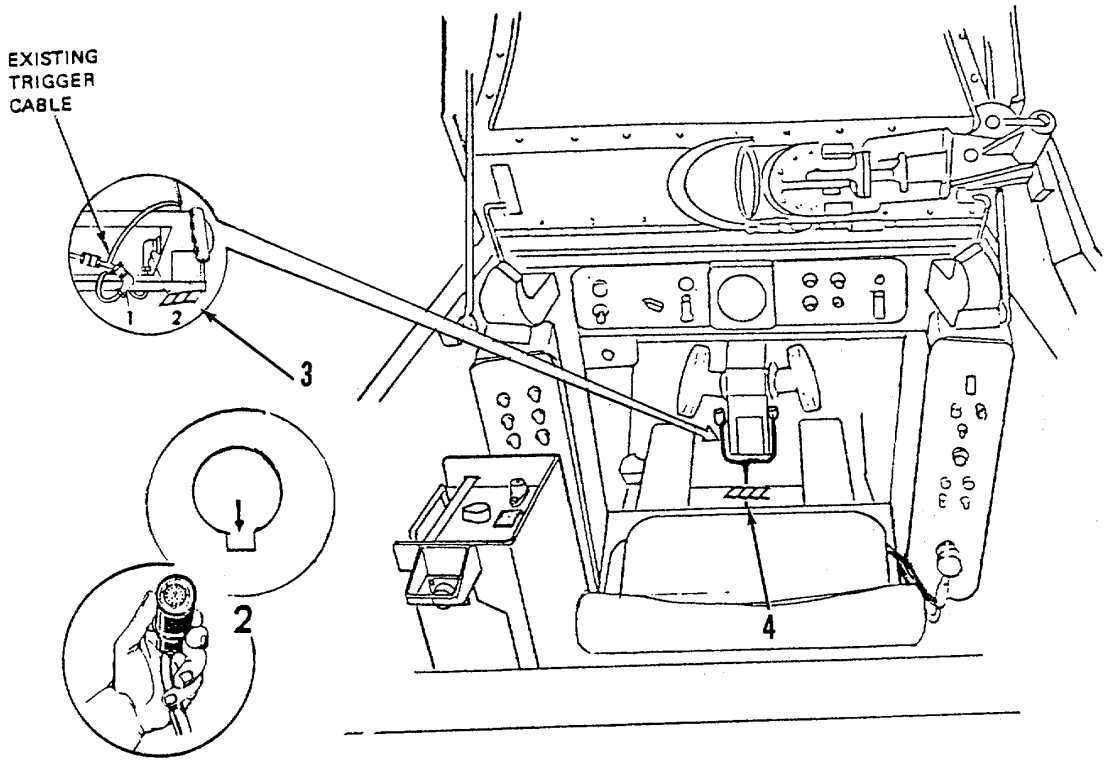
Lower gunner's seat to provide more working space.

Orient ICA so that the connector jack (1) is facing toward rear of the turret.

Back off screw assembly to its lowest position (2).

Set ICA bracket on step, screw assembly down, on left side of gunner's station. While supporting the ICA bracket with your left hand, reach under the step with your right hand and secure screw assembly to step support. Tighten screw until ICA is securely attached to the step.

Inside Installation Task 4: Install Cable Assemblies



Route MILES cables along right side rail under gunner's seat.

Locate and separate plugs labeled P3 and P4 on TURRET cable assembly from the others.

CAUTION

Prior to next step, ensure a CHAPARRAL System Mechanic is present.

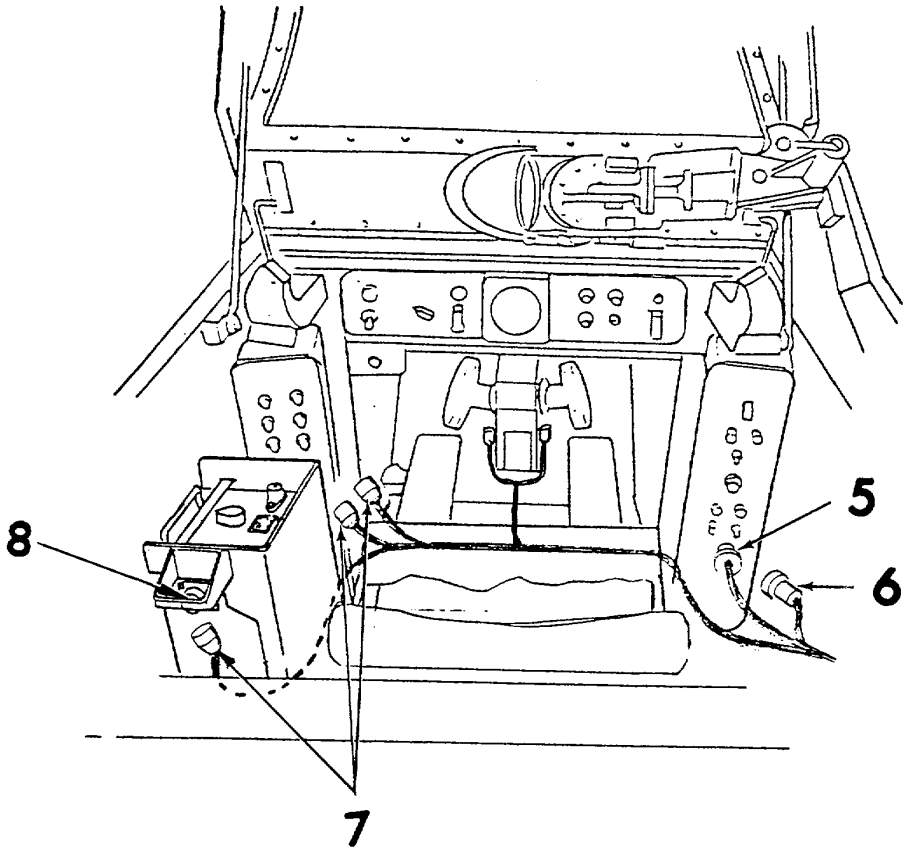
Reach under the Hand Control Unit and unplug Hand Control cable.

Connect Hand Control cable to connector labeled P4 (1).

Attach connector labeled P3 (2) into Hand Control Unit. Insert P3 with its keyway pointing downward.

Cut two 3-inch strips of fastener tape. Position first strip on the underside of the hand control unit (3). Position second strip on floor (4) below the hand control unit. Secure pads on TURRET cable assembly to fastener tape.

Inside Installation Task 4: Install Cable Assemblies (Cont).

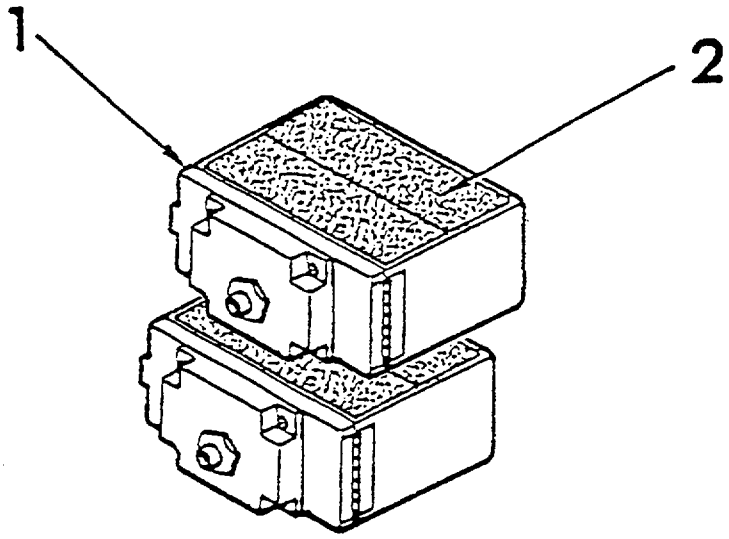


If installed, remove headset plug from communications panel. Connect TURRET Cable Assembly, connector P6 (5) to HEADSET jack. Connect headset plug to cable connector P7 (S).

Route the remaining three cables (P1, P2, and P5) under front part of gunner's seat to left side (7).

Route P1 under ICA and step and connect to ICA J1 (8). Temporarily leave connectors P2 and P5 on floor.

Inside Installation Task 5: Inspect Battery Boxes.



Inspect battery boxes (1) for damage that would prevent normal operation.

Report any damage on DA Form 2404. Replace only if not operable.

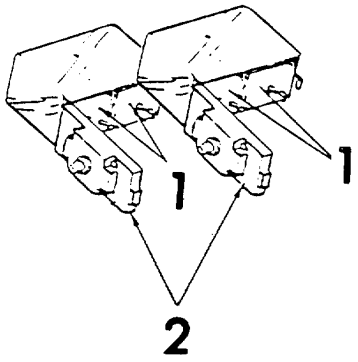
Make sure fastener tape (2) is attached to one side of each battery box. If fastener tape is missing, do not attempt to install new tape. Report on DA Form 2404 and replace battery box.

NOTE

One battery box is supplied with the MILES CHAPARRAL Weapon System and 1 box is supplied with the MILES M113 APC System.

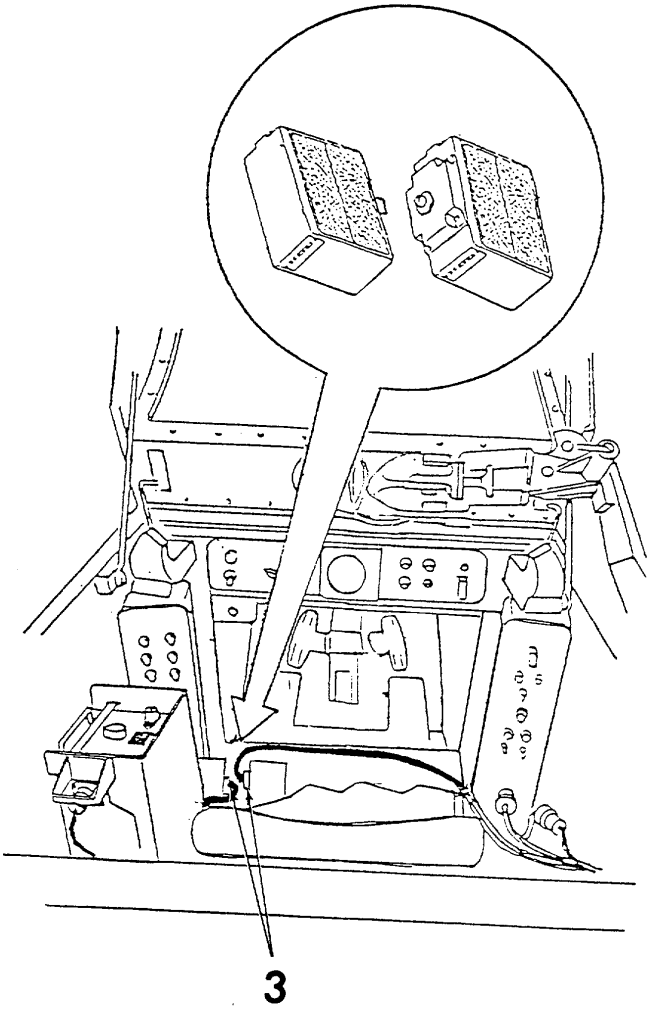
Inside Installation Task 6: Connect and Install Battery Boxes.

Insert two 6 V batteries in each box (1). Make certain battery contacts are visible when covers are open. Close and latch covers (2).



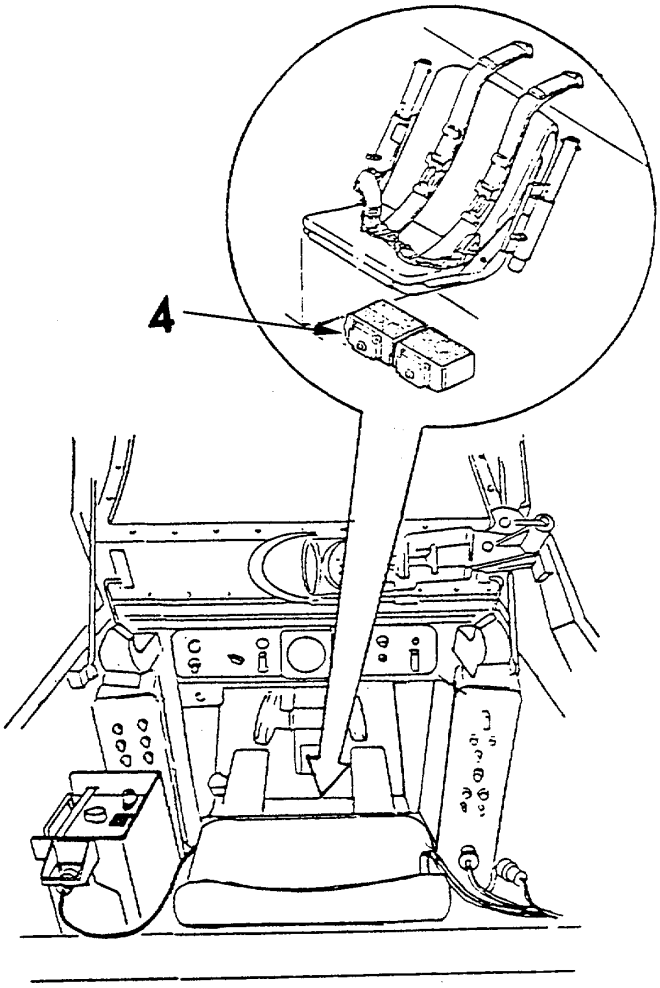
Raise seat to full upright position.

Connect MILES cable plug P2 to one battery box and plug P5 to the other (3).



Place battery boxes on floor under left side of seat (4)

Adjust seat as desired.



INITIAL ADJUSTMENTS, DAILY CHECKS AND SELF TEST

Alignment Task: CHAPARRAL Boresighting

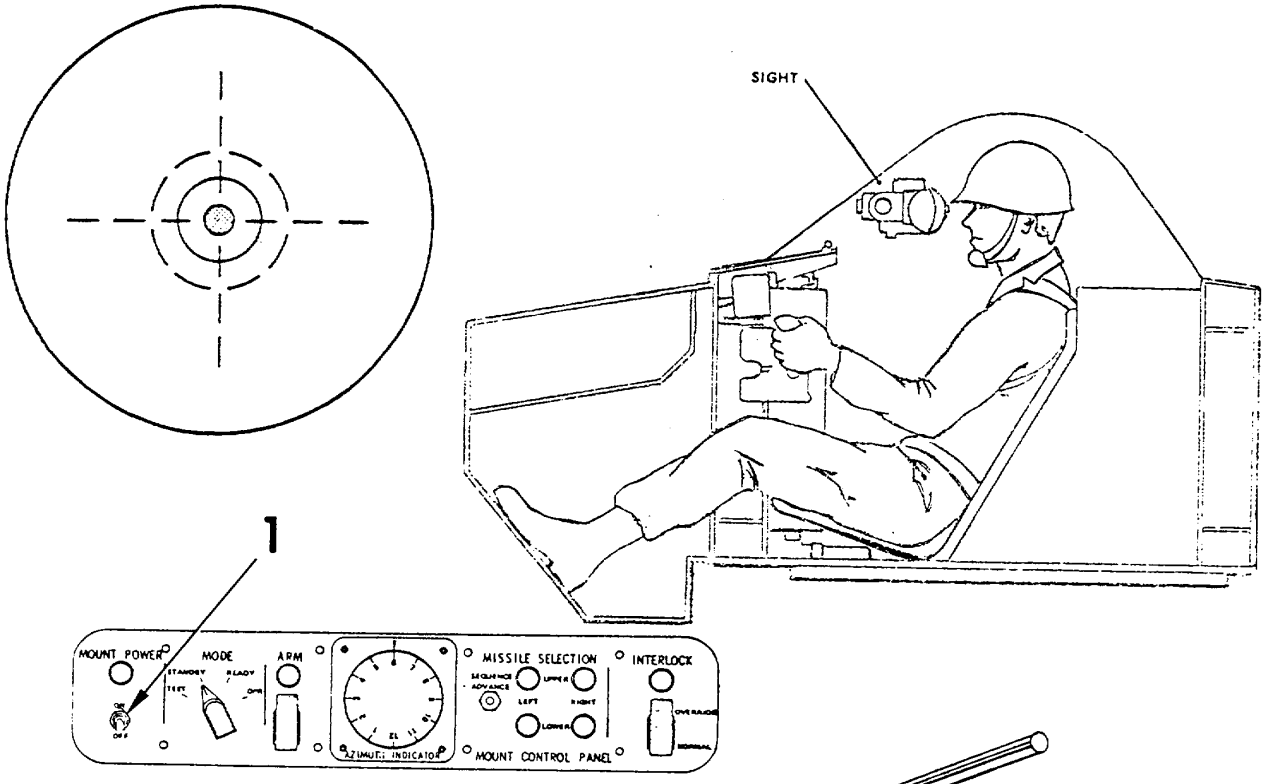
Boresighting procedures consist of adjusting transmitter (using the scope installed in the transmitter housing) to the CHAPARRAL sights.

Disconnect J19 from P19 on BELTS cable assembly. and J21 on BELTS cable assembly from P21 on TURRET POWER cable assembly.

Raise the mount.

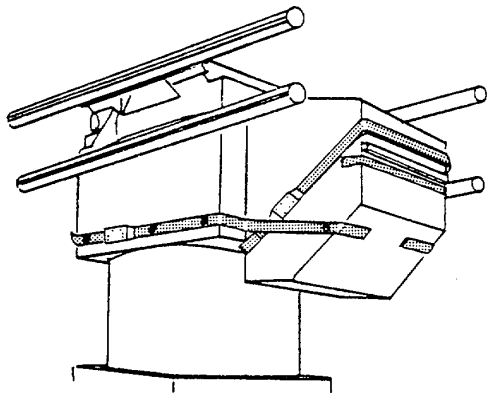
NOTE

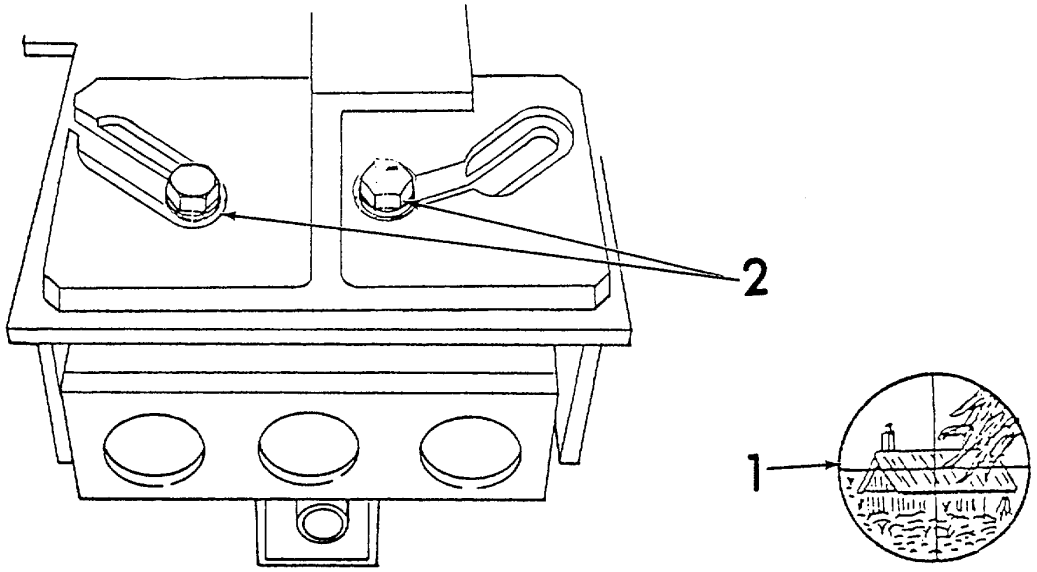
It is recommended that the same person who aims the CHAPARRAL sights also boresights the transmitter.



Align the weapon sights on a target at least 3000 meters distant.

Turn Mount Power to OFF (1).





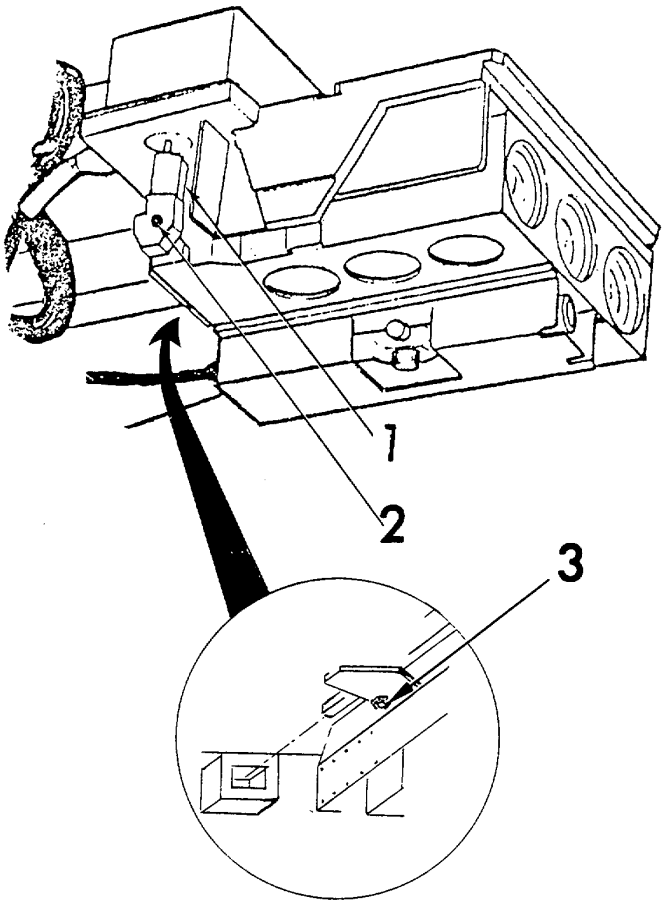
Azimuth

Slide transmitter from right to left until vertical crosshairs on MILES transmitter scope (1) are lined up with target in CHAPARRAL weapon sights.

Tighten transmitter top mounting screws (2).

Tighten transmitter bottom rear mounting screw (3).

Do not touch MILES scope adjustment screws.



Elevation

Raise or lower transmitter using vertical adjustment knob (1). Align MILES transmitter scope horizontal crosshair with target in weapon sights.

Tighten vertical locking screw (2).

Verify that azimuth and elevation of MILES transmitter is still aligned with weapon sight. Readjust as necessary.

TEST TASKS - LIST

Task	Title	Page
1.	CIA/CVKI Test	2-70
2.	ICA Test	2-73
3.	Transmitter Test	2-76
4.	Detector Belt Test	2-81

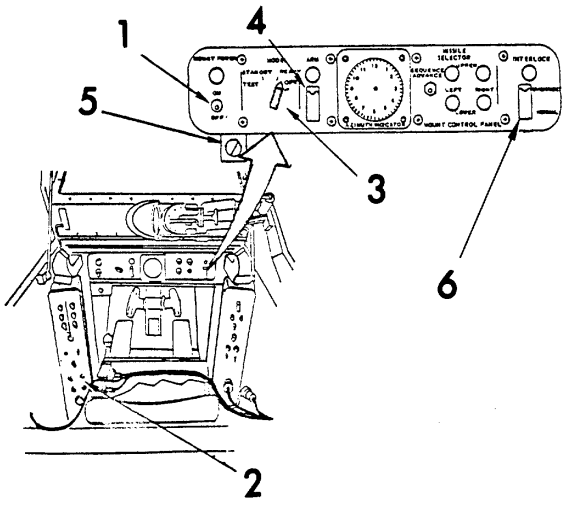
WARNING

If task requires Vehicle Equipment Power to be turned ON, ensure Vehicle Equipment Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.

Test Task 1: CIA/CVKI Test

NOTE

Before doing these tasks check with your crew chief to make sure all Outside and Inside Tasks have been completed. Perform all tasks in order.



Turn Master Power ON.
Turn Power Supply ON.
Turn MOUNT POWER switch (1) on turret center control panel to ON.
Turn MOUNT DRIVE BREAKER on turret left control panel (2) to ON.
Turn MODE switch (3) on turret center control panel to OPERATE.
Turn ARM switch (4) to ARM.
Turn TRIGGER key switch (5) to ON.

Turn switch on CIA to SELF TEST (1).

Press PRESS TO READ button (3) on CIA.

Display (2) should show 00.

If display does not show 00 or is blank, go to Troubleshooting, page 3-3.

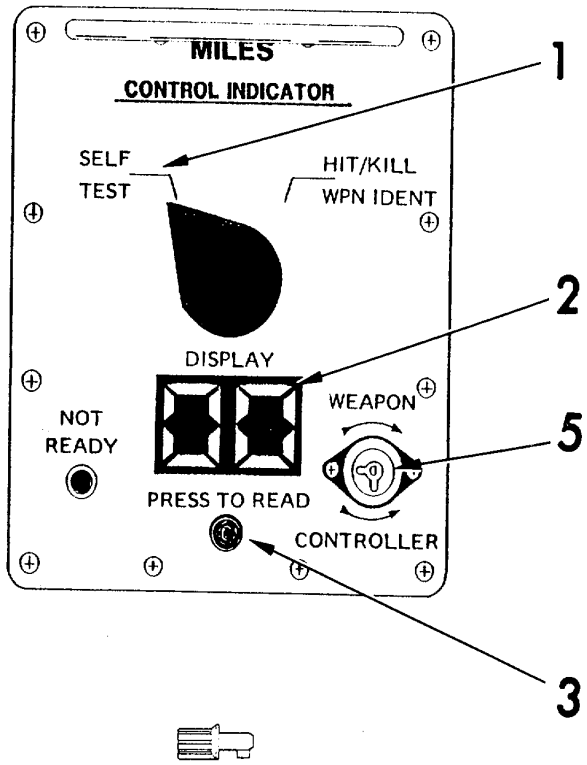
Ask Controller to reset system by inserting his key in receptacle on the CIA (5). Turn to CONTROLLER ON. Turn back and remove key.

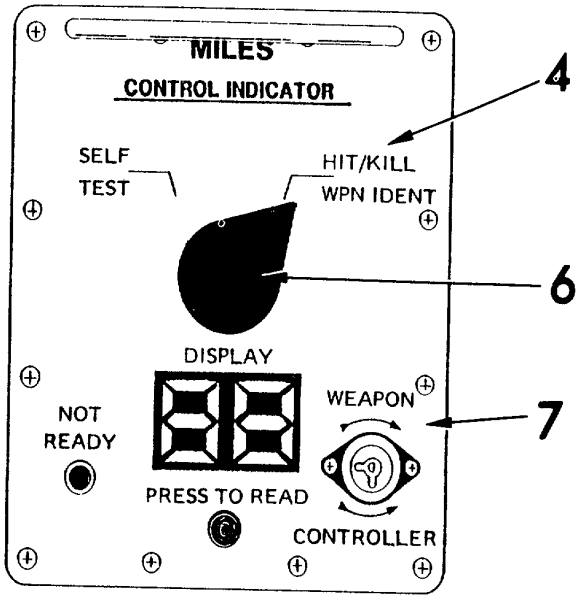
Turn indicator switch to HIT/KILL (4). Then turn to SELF TEST (1). Press PRESS TO READ button. Display should show **88.**

If display does not show **88**, go to Troubleshooting, page 3-3.

Turn indicator switch (6) to HIT/KILL. Insert the orange weapon key into CIA receptacle and turn to WEAPON (7). Verify that the CVKI flashes continuously. Press PRESS TO READ button. Display should show **99**.

If CVKI does not flash continuously or does not flash at all, or if **99** is not displayed, go to Troubleshooting, page 3-3.

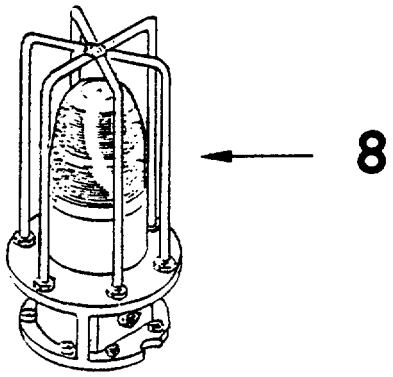




Test Task 1: CIA/CVKI Test (Cont).

Remove Orange Weapon Key. Verify that a tone sounds in the vehicle's intercom and the CVKI (8) is still flashing continuously.

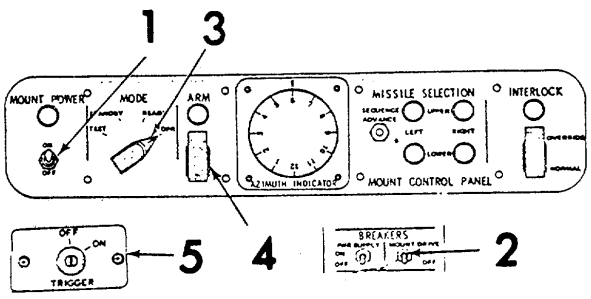
If CVKI does not flash continuously or tone does not sound in intercom: Go to Troubleshooting, page 3-3.



Ask Controller to reset system using the Controller Key.

Turn CIA Indicator switch to SELF TEST.

Test Task 2: ICA Test



Insure that:

Master Power is ON

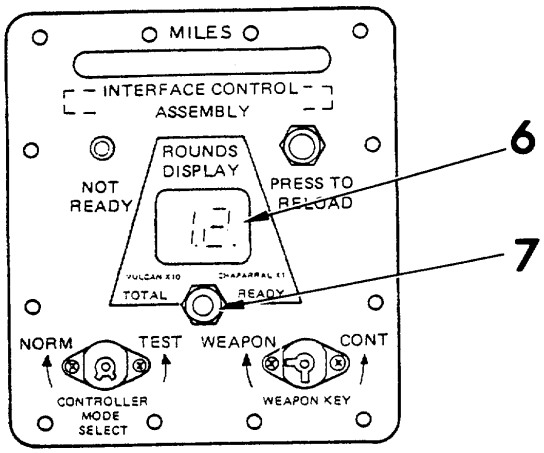
Power Supply is ON

MOUNT POWER (1) is ON

MOUNT DRIVE BREAKER (2) is ON

MODE switch (3) is at OPERATE ARM switch (4) is on ARM

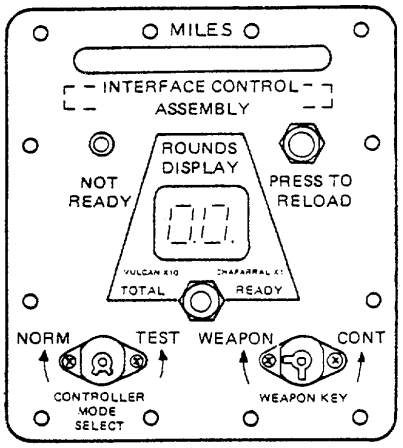
TRIGGER key switch (5) is ON



Verify display on ICA (6) reads 00 when the TOTAL/READY switch (7) is placed in either position.

If display does not read 00: Go to Troubleshooting page 3-3.

Ask Controller to reset system.



Verify that ICA display reads 12 when TOTAL/READY switch is placed in TOTAL position, and 4 when in READY position, Verify that NOT READY light is ON when green Controller Key is removed.

If ICA does not read 4 or 12 or NOT READY light is not ON when Controller Key is removed Go to Troubleshooting page 3-3.

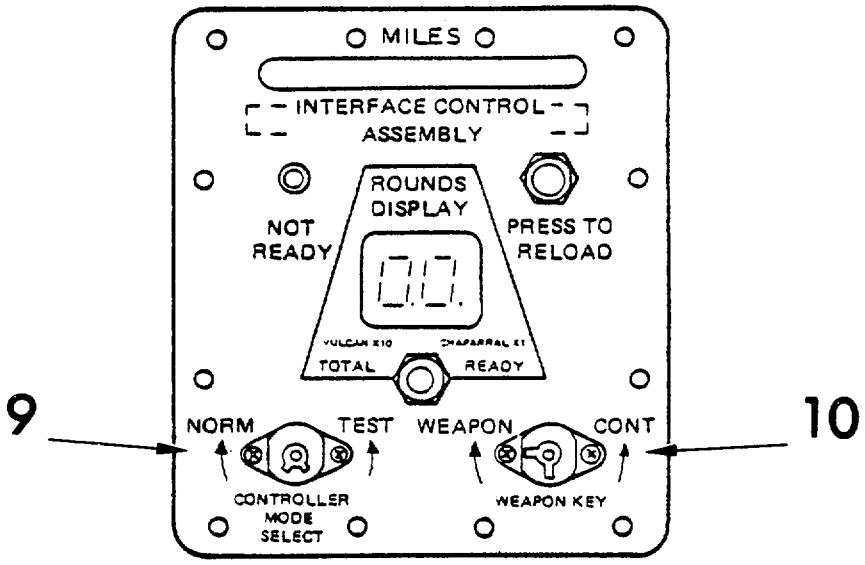
Test Task 2: ICA Test (Cont).

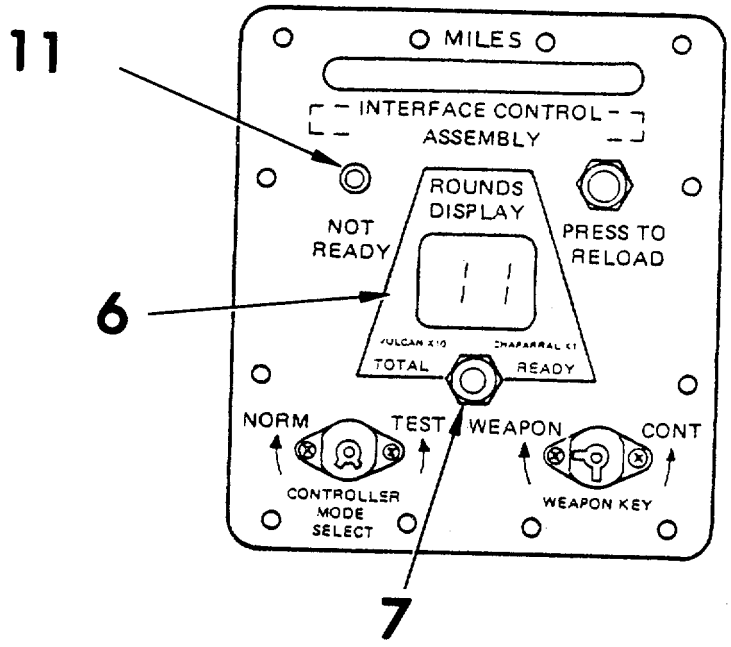
Have Controller insert green Controller Key in MODE SELECT receptacle (9) and turn to TEST position. (This allows transmitter operation without having to load and fire the WESS.)

Insert Orange Weapon Key in WEAPON KEY receptacle and turn to WEAPON (10).

Verify that NOT READY light goes OFF.

If light does not go OFF, go to Troubleshooting, page 3-3.





Fire transmitter by squeezing the weapon action switches then trigger switches on hand control until the rail superelevates. This takes approximately 6 seconds. Verify the following:

NOT READY light (11) is ON.

Decimal points on ICA ROUNDS DISPLAY (6) are flashing.

ROUNDS DISPLAY reads 11 when TOTAL/READY switch (7) is placed in TOTAL position after firing is complete. Firing time is 7 seconds.

ROUNDS DISPLAY reads 3 when TOTAL/READY switch is placed in READY position after firing is complete. Firing time is 7 seconds.

If any of these conditions do not occur, ask Controller to check out equipment using the MILES Systems Test Set (MSTS). Go to Troubleshooting, page 3-3.

Test Task 3: Transmitter Test.

CAUTION

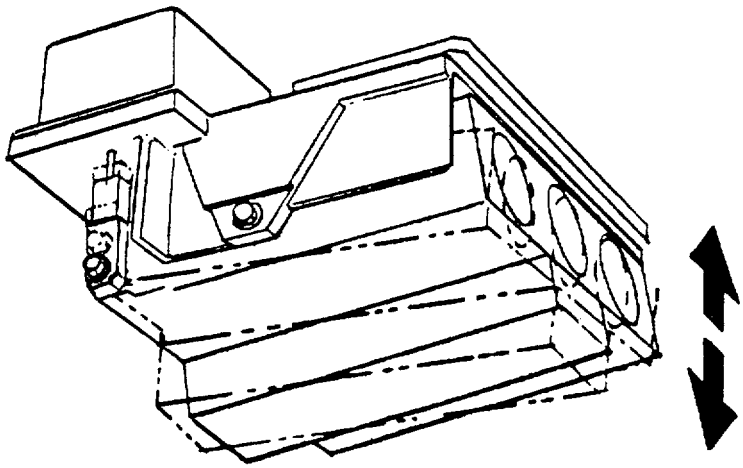
Verify that turret MOUNT DRIVE BREAKER is OFF.

Ask a crew member to watch the transmitter housing.

Fire transmitter for 6 seconds.

Crew member should observe the transmitter and verify that it physically moves up and down in a nodding motion. (The motion is very slight.)

If no motion detected: Go to Troubleshooting, page 3-3.



NOTE

The target used for the transmitter test boresighting must be at a distance of at least 1500 meters. Any suitable target can be utilized, however, it is recommended that the MILES Multiple Range Alignment Device (MRAD) be used for any laser transmitter testing.

Set up MRAD at a range of at least 1500 meters.

Turn INDICATOR SELECT switch (1) to LONG RANGE.

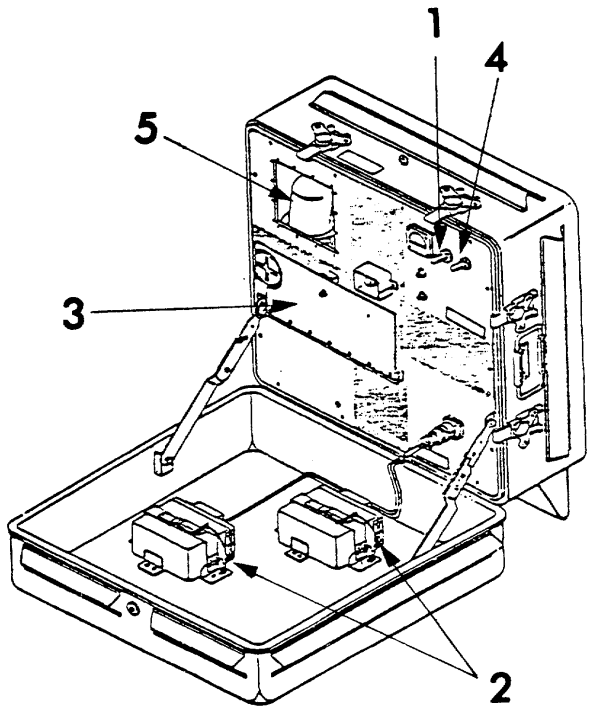
Install four BA-200U batteries (2).

Unlatch and swing hinged panel assembly (3) to the DOWN position.

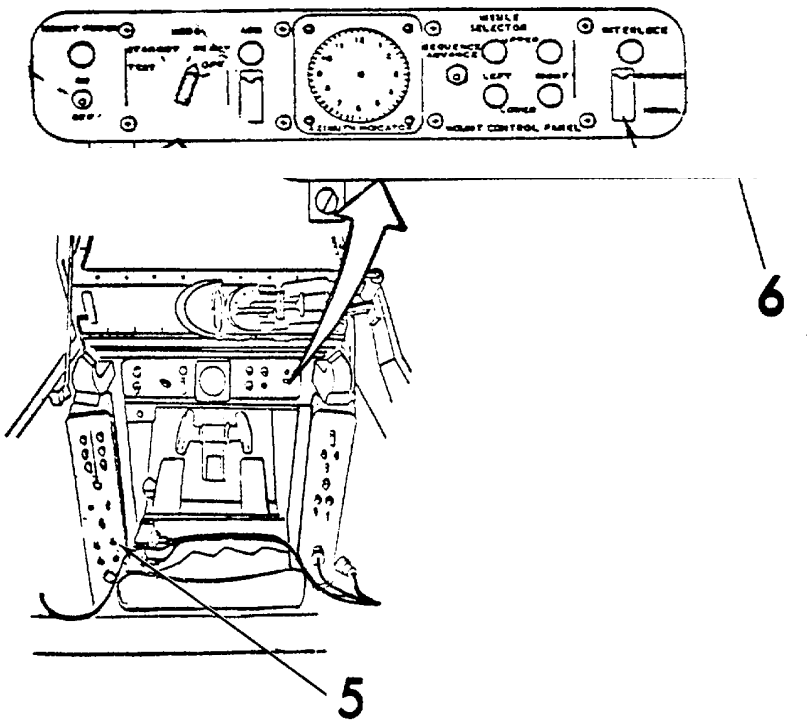
Turn POWER switch (4) ON.

Aim and fire CHAPARRAL transmitter at center of target.

The Strobe Light (5), on alignment device flashes each time a laser pulse from the MILES CHAPARRAL transmitter is received. If the Strobe Light does not flash, check transmitter alignment and retest.



Test Task 3: Transmitter Test (Cont).



CAUTION

When performing the following test, do not leave the ARM switch in the ARM position for more than 10 seconds. Damage to circuit components can result.

NOTE

It may be necessary to set INTERLOCK switch to OVERRIDE if an interlock condition exists.

Using the normal turret sights, aim and fire at the MRAD (7).

Hold action switches and then trigger CHAPARRAL for 6 seconds. Look for light on the alignment device to flash.

NOTE

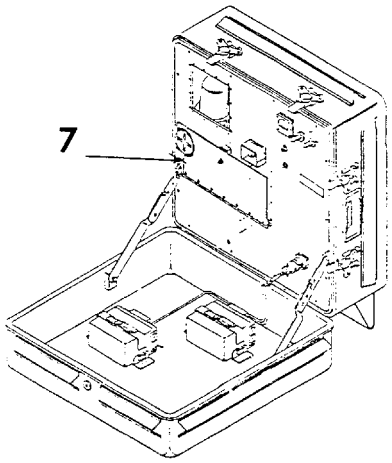
Make sure alignment device is located at a distance of at least 1500 meters.

WARNING

Insure all personnel are clear of the turret prior to energizing MOUNT DRIVE BREAKER.

Turn MOUNT DRIVE BREAKER (5) to ON.

If there is an interlock in the system, turn INTERLOCK switch (6) to ON.



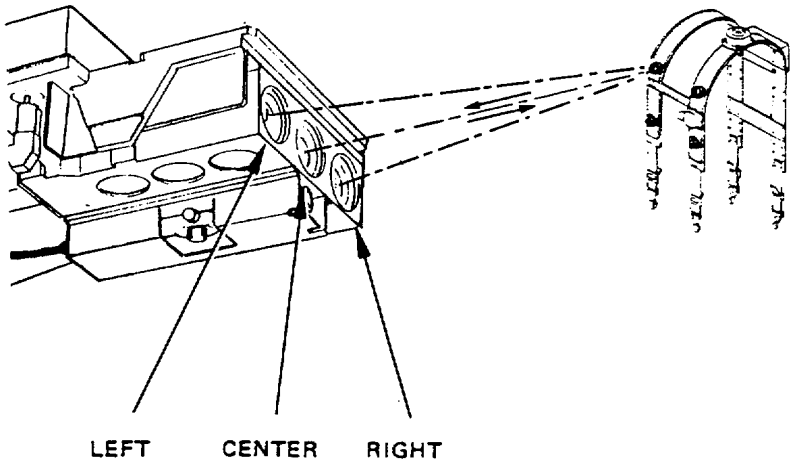
If you cannot get a HIT indication on MRAD, reboresight the transmitter following procedures given in Alignment Procedure, pages 2-68 and 2-69, and retest.

NOTE

During transit, the motor drive assembly in the transmitter may have moved from its neutral position causing the first boresighting procedure to be inaccurate. It is very important to boresight the transmitter a second time if you do not get a hit indication. After reboresighting, aim and fire transmitter at MRAD.

If no HIT indication, a Man Worn Laser Detector (MWLD) torso harness should be used in place of the Multiple Range Alignment Device. These harnesses are supplied with the MILES 113 APC system.

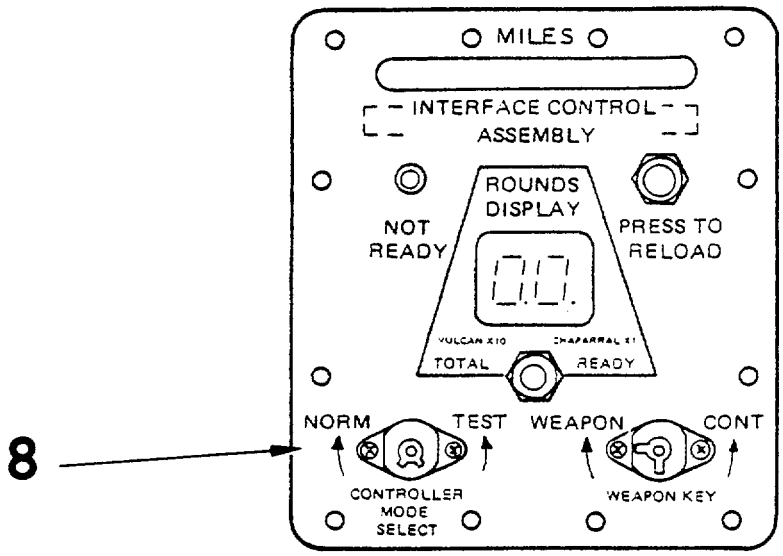
Use procedures from this task to fire the transmitter while a Soldier holds a detector on the torso harness in front of the transmitter. An alarm on the harness should sound. The alarm is silenced by inserting a MILES supplied Yellow Weapon Key into a key receptacle on the harness and turning in a counterclockwise direction.



HIT INDICATION

LEFT	CENTER	RIGHT	YES	NO
*	*	*		
*	*			
	*	*		
*		*		

Test Task 3: Transmitter Test (Cont).



If there is no HIT indication, ask Controller to check out equipment and reset CONTROLLER MODE SELECT switch (8) by placing switch in the NORM position.

If there is a hit indication, repeat firing test while covering CENTER and LEFT laser tube with a helmet, hand, or other opaque material. Note whether there is a HIT indication.

Repeat firing test while covering CENTER and RIGHT laser tubes. Note whether there is a HIT indication.

Repeat firing test while covering LEFT and RIGHT laser tubes. Note whether there is a HIT indication.

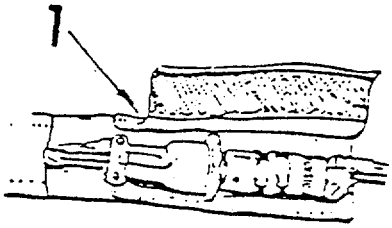
If a HIT indication was received for all tests, all laser tubes are firing correctly.

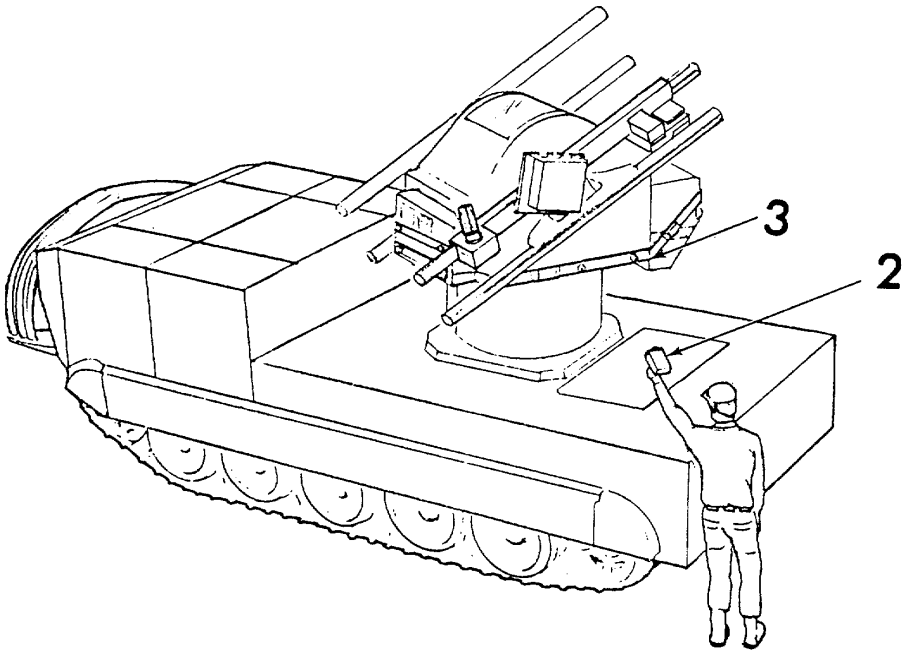
If a HIT indication was not received for any of the tests, go to troubleshooting, Sections 2 (1) or 2 (2) on page 3-20.

Test Task 4: Detector Belt Test

Lower turret mount.

Check that all cable connections(1) to the detector belt segments are tight





Ask controller to check the turrent belt segments by aiming controller gun (2) at a detector (3) from a range of three feet and firing in the "NEAR MISS" mode. Each time he fires, the CVKU light should flash two times

If light does not flash: Go to Troubleshooting, Page 3-3.

NOTE

It is OK for one detector on each belt segment to be bad.

Check each belt segment by firing at all of the detectors.

Lower the turret mount.

Connect J19 to P19 on the belts cable assembly and J21 to P21 on the turret power cable assembly. Ask Controller to check vehicle belt segments per above.

If CVKI light does not flash, go to Troubleshooting, Page 3-3.

When all belt segments working, you have completed this task.

OPERATING PROCEDURE

OPERATIONAL TASKS - LIST

Task	Title	Page
1.	Loading ATWESS Cartridges	2-82
2.	Firing CHAPARRAL/MILES System	2-84
3.	Observing Your Target	2-88
4.	Recognizing Enemy Fire	2-89
5.	Resetting After a "KILL"	2-91
6.	Moving CHAPARRAL During an Exercise	2-92

Operational Task 1: Loading ATWESS Cartridges

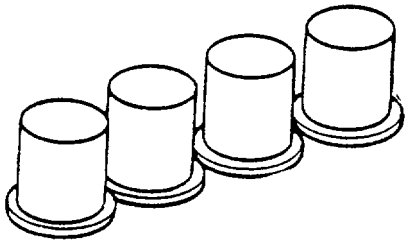
WARNING

Never arm the ATWESS until you are ready for a mission.

Never place hand over Armed and Loaded WESS device.

Handle ATWESS cartridges with the same care you use with any live ammunition. A severe jolt to the ATWESS may cause the cartridge to go off.

If task requires Vehicle Equipment Power to be turned ON, ensure Vehicle Equipment Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.



NOTE

Four ATWESS cartridges are required. One for each ATWESS device in the WESS assembly tube.

Place WESS safety switch (1) in SAFE position.

Push each SAFE/ARM shaft (2) into SAFE position.

Move breech lock levers (3) to OPEN position.

Open breech doors (5) as far as they go. This cocks the ATWESS. Visually check to see if the firing pins are protruding. If unsure, use one hand to feel if each firing pin has retracted to its full length. If a firing pin is protruding, or has not retracted to its full length, tag the WESS as unsafe, and return it to the point of issue.

Insert an ATWESS cartridge (4) in each firing chamber.

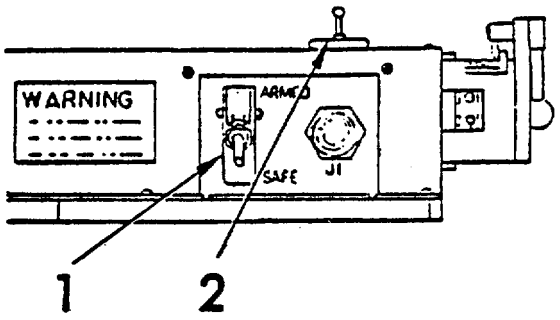
WARNING

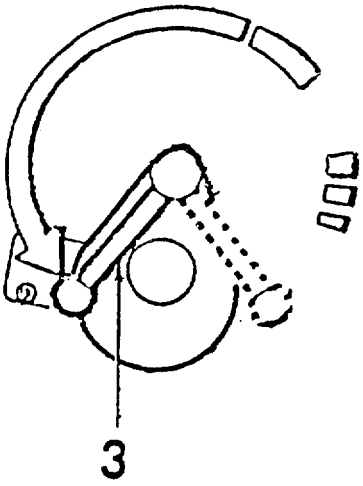
Failure to follow these instructions could result in personnel being burned by the backblast escaping through the hole in the center of the breech door.

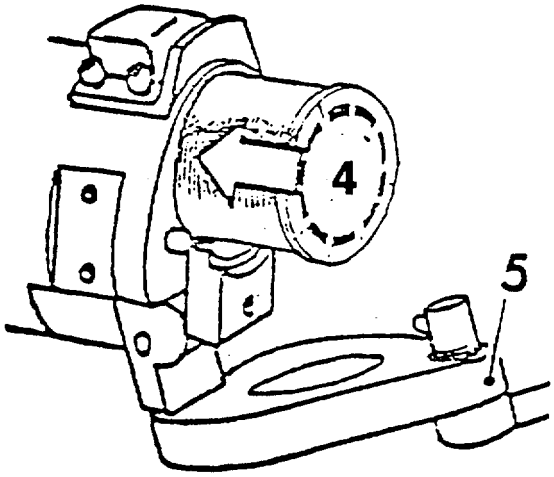
Stand to the side of the WESS. Use your right hand to close the breech doors (5) by moving the breech locking levers (3) to the closed position.

Pull four SAFE/ARM shafts (2) up to the ARM position and place WESS SAFE/ARMED switch in ARMED position.

If you decide not to fire, place WESS SAFE/ARMED switch (1) in SAFE position and push all four SAFE/ARM shafts (2) to SAFE position. Open breech doors (5) and remove ATWESS cartridges (4).





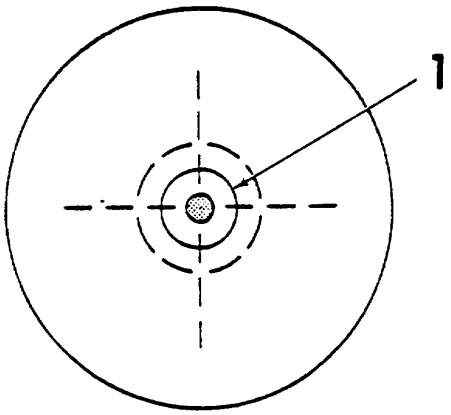


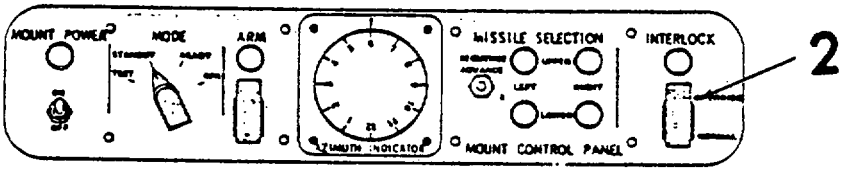
Operational Task 2: Firing CHAPARRAL/MILES System

WARNING

Use EAR PLUGS or approved HEARING PROTECTION. Keep them clean and ready to use. The MILES CHAPARRAL System uses ATWESS devices to simulate the sight and sound of an actual missile launch.

The MILES CHAPARRAL System is fired in the normal manner and the normal sighting reticle (1) is used. If there is an interlock in the system, turn INTERLOCK switch to ON (2). Actuate the turret hand control pistol grips and look through the optical sight to acquire your target. Track the target normally, and listen for the missile tone. To achieve a high probability of KILL, the Gunner must properly range the target, then continue to track target until the turret superelevates.





After each firing, reset the SAFE/ARM shaft (3) on each ATWESS.

An ATWESS cartridge will ignite to simulate each missile launch.

IF WESS DOES NOT FIRE:

- Place WESS safety lever in SAFE position.

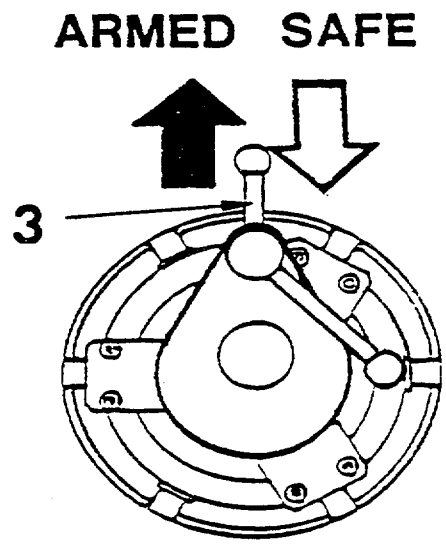
- Remove ATWESS cartridge from WESS device.

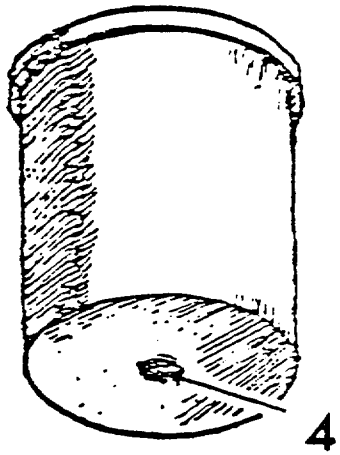
Inspect the cartridge primer (4). If dented, treat the cartridge as a DUD REPORT THE DUD CARTRIDGE TO YOUR NCOIC FOR DISPOSAL.

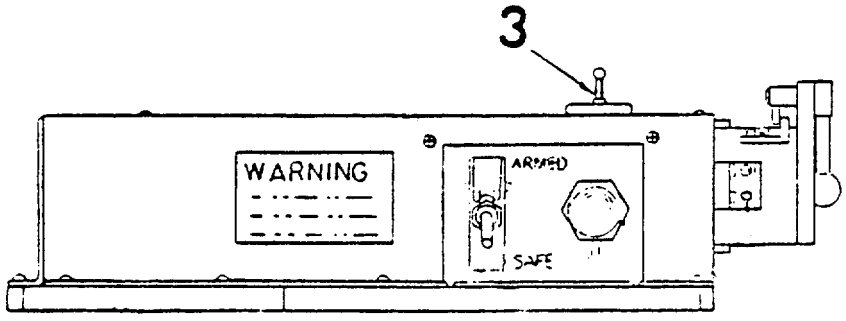
WARNING

Observe 10 second delay after first arming.

- Reload ATWESS cartridge, repeat firing sequence. If WESS does not fire, report on DA Form 2402 and replace the defective equipment.





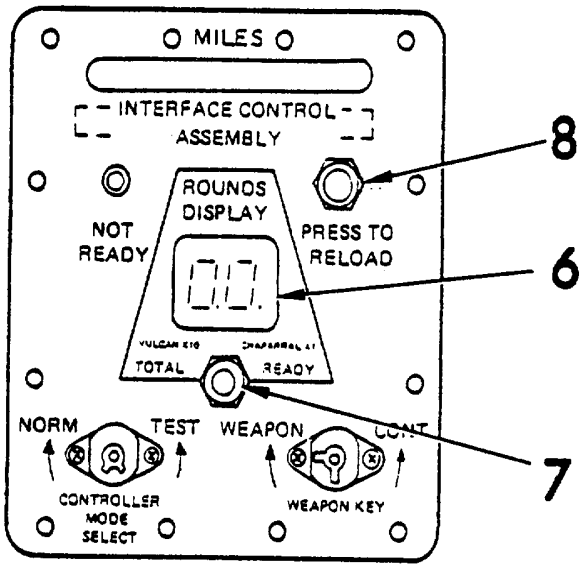


Operational Task 2: Firing CHAPARRAL/MILES System (Cont).

The ICA display (6) indicates the total number of rounds remaining (1 to 12) and the number of missiles ready for firing (1 to 4). If there are no rounds remaining or no missiles ready, the display will indicate a "0." A TOTAL/READY button (7) selects which information will be displayed.

The system will simulate a firing rate of one missile every 8 seconds.

The system has a built-in 2-minute reload time delay. After a missile has been fired, the gunner may press the PRESS TO RELOAD button (8) on ICA. After a 2 minute delay, another missile will be loaded. Reloading can be performed any time the tactical situation allows. During reloading, the system cannot be fired.



The NOT READY light (9) on the ICA illuminates during the following conditions:

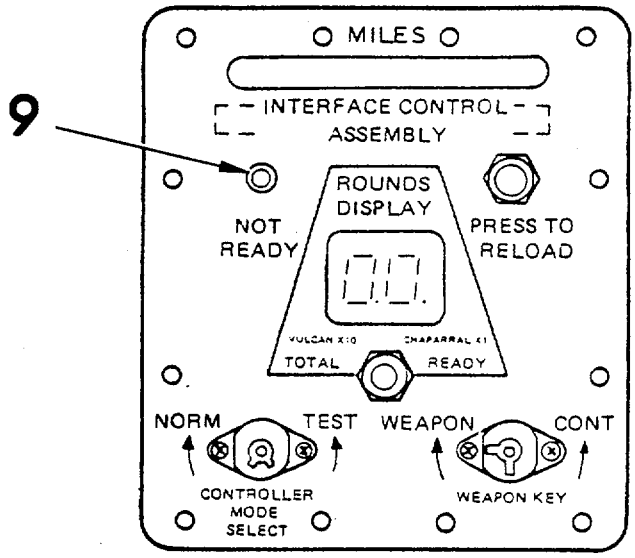
During reloading

When no missiles are loaded and ready for firing

When the system has expended its limit of 12 missiles

System has been "KILLED" by an opponent

Weapon Key is not installed System requires resetting by the Controller.



MILES-equipped CHAPARRAL can be fired without firing the ATWESS cartridges. Normally this is only necessary during Testing and/or Troubleshooting of system. The Controller must set system for this "Dry-Fire" or Test Firing Mode.

Operational Task 3: Observing Your Target

The effect of your MILES-equipped weapon fire can be evaluated by observing your target during training exercise.

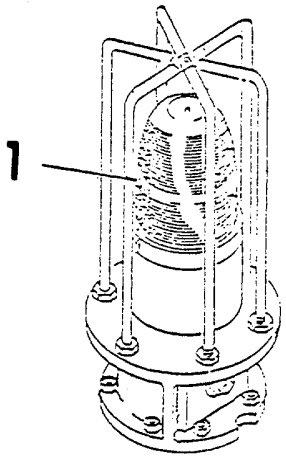
If detectors on your target are hit by laser fire, alarms sound in the aircraft intercom and a strobe light, also attached to the outside of the aircraft, begins to flash.

If the actuator is hit with laser fire sufficient to "KILL" it, the strobe light will flash continuously and a smoke device attached to the outside of the aircraft is ignited.

If you "HIT" but do not "KILL" an aircraft, the aircraft crew is warned by four to six beeping tones on their intercom and the strobe light will flash four to six times.

Operational Task 4: Recognizing Enemy Fire.

1. If you are hit by laser fire, CVKI light (1) will flash. You will also hear tones on the intercom unit. A brief alarm (2 CVKI flashes and 2 intercom beeps) means a "NEAR MISS." Repeated 4 to 6 intercom tones and 4 to 6 CVKI flashes mean a "HIT." Continuous CVKI flashing and INTERCOM TONE indicates a "KILL."

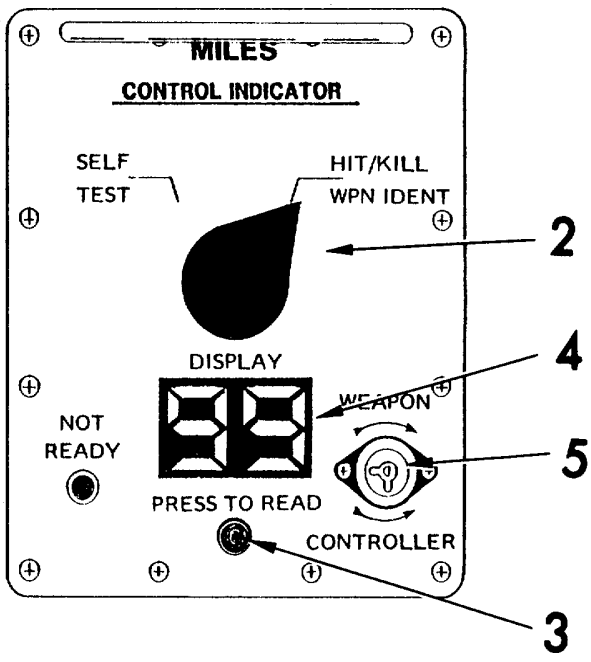


2. To determine what kind of weapon has fired on you, turn the switch (2) on the control console to HIT/KILL position.

   Press PRESS TO READ button (3).

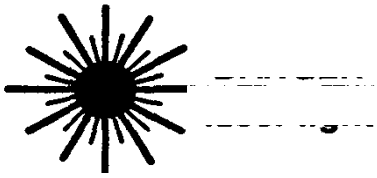
   Display (4) will show a number. Use the chart below to match number on display with type of weapon firing on you.

Display Number	Weapon
00	Controller Gun
07	TOW or Shillelagh
08	DRAGON
12	105 mm
13	152 mm
14	2.75 inch Rocket
15	VIPER
16	120 mm
22	25 mm
23	VULCAN
24	M2/M85
25	CHAPARRAL
26	Stinger
27	M16 or M60 Machine Gun
99	Self-kill



3. "SELF-KILL" results when Orange Weapon Key is put in the control console receptacle (5) when you have not been "KILLED" by the laser fire. When the key is inserted and turned to WEAPON position, the number 99 will show, and the CVKI light will flash continuously. When key is removed, a continuous tone will be heard in the intercom. You must then call the Controller to reset your system.

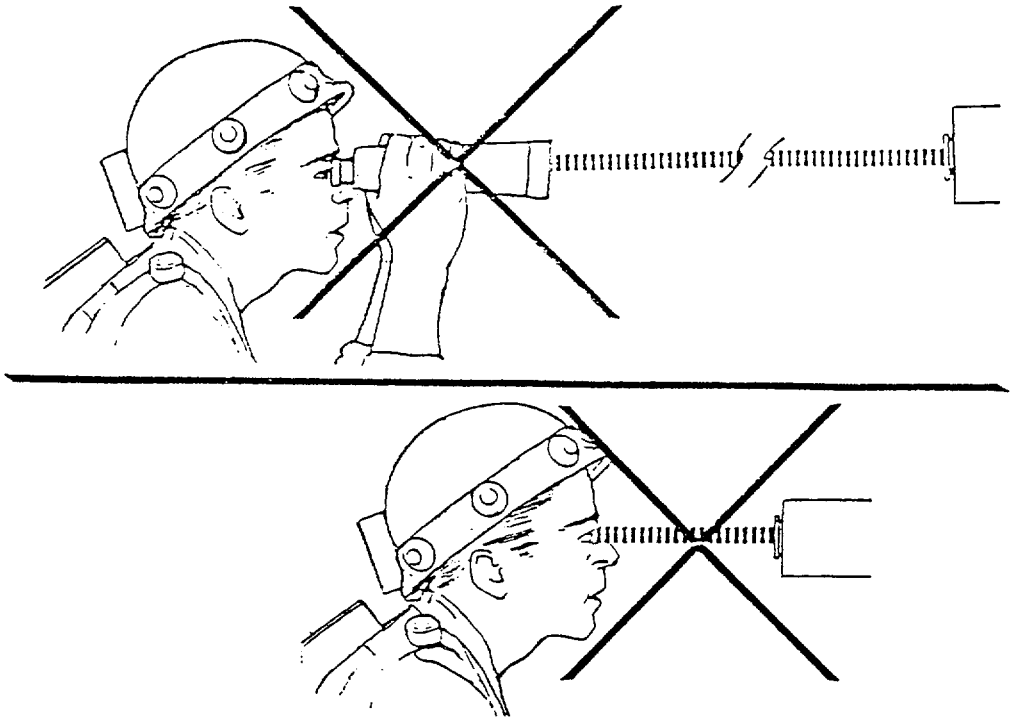
Operational Task 4: Recognizing Enemy Fire (Cont).



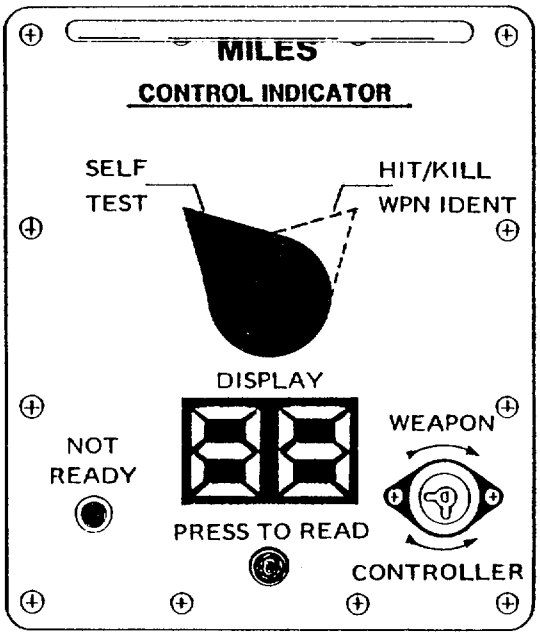
WARNING

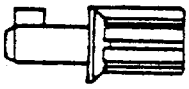
Although laser light emitted by MILES laser transmitters is considered eye safe by the Bureau of Radiological Health, suitable precautions must be taken to avoid possible eye damage from overexposure to this radiated energy. Precautionary measures include the following:

- **Avoid viewing laser emitter at close range (less than 12 meters). Increasing the eye-to laser distance greatly reduces the risks of overexposure.**
- **Avoid viewing emitter directly along optical axis of radiated beam.**
- **Especially avoid viewing emitter through magnifying optics at engagement ranges of less than 75 meters for STINGER, VULCAN. and TOW. and 110 meters for the CHAPARRAL.**
- **Avoid allowing personnel with optics of higher transmission or magnifying power than normal tank optics to view STINGER. VULCAN, or TOW within 150 meters or the CHAPARRAL within 330 meters.**



Operational Task 5: Resetting After a "KILL"





If your vehicle is "KILLED," the CHAPARRAL transmitter is automatically turned off and you can no longer fire missiles.

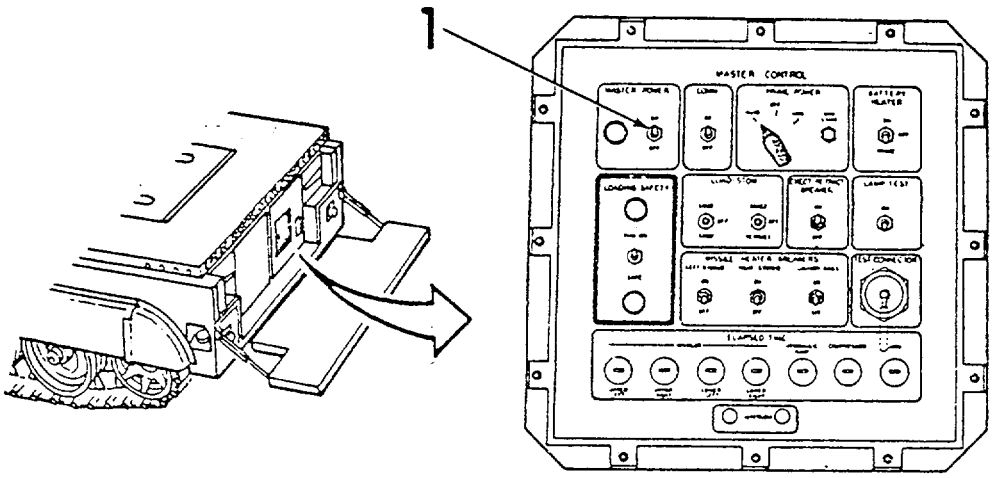
To silence your intercom alarm after a "KILL," remove Orange Weapon Key from ICA.

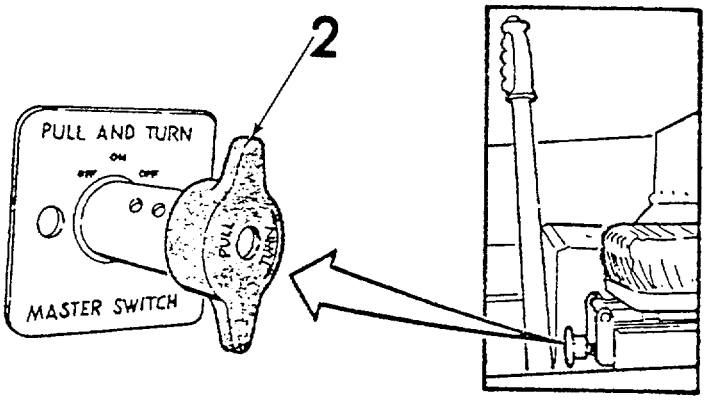
Insert Orange Weapon Key in the Control Console (CIA) and turn off intercom alarm. IF YOU REMOVE THE KEY FROM CONTROL CONSOLE, THE ALARM WILL BEGIN AGAIN. The CVKI light continues to flash. It can be turned off only by the Controller.

To reset, remove Orange Weapon Key. Intercom alarm sounds. Ask controller to reset system.

Turn indicator switch to HIT/KILL. Then turn to SELF TEST. Press display button. Display should show the number 88. If no 88 is displayed ask Controller to check out equipment using the MILES Systems Test Set.

Operational Task 6: Moving CHAPARRAL During an Exercise.





The M54 CHAPARRAL launching station is normally operated with the master control panel MASTER POWER switch (1) ON. If your tactical situation requires you to move the MILES CHAPARRAL System during an exercise, it will be necessary to turn turret MASTER POWER switch (1) OFF.

During movement, electrical power is obtained from the M730 Carrier Vehicle. M730 Master Power switch (2) must be turned ON. Power for the MILES system is now obtained from dome light connection. It is necessary to connect MILES DETECTOR/POWER cable assembly to other MILES system cables below step on turret rear. These connections are unconnected when the Master Control Panel Master Power switch (1) is turned ON again.

POSTOPERATIONAL TASKS - LIST

Task	Title	Page
1.	ATWESS Postoperational Task	2-93
2.	Inside Postoperational Tasks	2-94
3.	Outside Postoperational Tasks	2-94
4.	Transit Case Packing Instructions	2-95
5.	Return Equipment	2-95

NOTE

If you need additional information on completing a Postoperational Task, turn to referenced section. Postoperational Task will be the reverse of referenced section.

Postoperational Task 1: ATWESS Postoperational Task.

Remove any unfired ATWESS cartridges.

Postoperational Task 2: Inside Postoperational Tasks.

Disconnect MILES cables from battery boxes. ICA, communications panel and trigger cable. See inside Tasks 4 and 6..

Remove battery boxes. Remove batteries from each battery box and inspect battery boxes. See Inside Tasks 5 and 6.

Remove and inspect ICA. See Inside Tasks 2 and 3.

NOTE

Replace the CHAPARRAL hand control trigger cable in the hand control receptacle. Reinstall headset plug in communications panel.

Postoperational Task 3: Outside Postoperational Tasks.

Disconnect cables from all four detector belts.

Disconnect or loosen all fastener ties, pads, brackets, and other cable securing devices so that the cabling is free of vehicle.

Disconnect cables to the transmitter, WESS, CVKI, and CIA.

Remove transmitter, WESS, CVKI. and CIA from Rail Assembly.

Remove Rail Assembly.

Remove three detector belts.

NOTE

Do not remove fastener tape that is glued to vehicle.

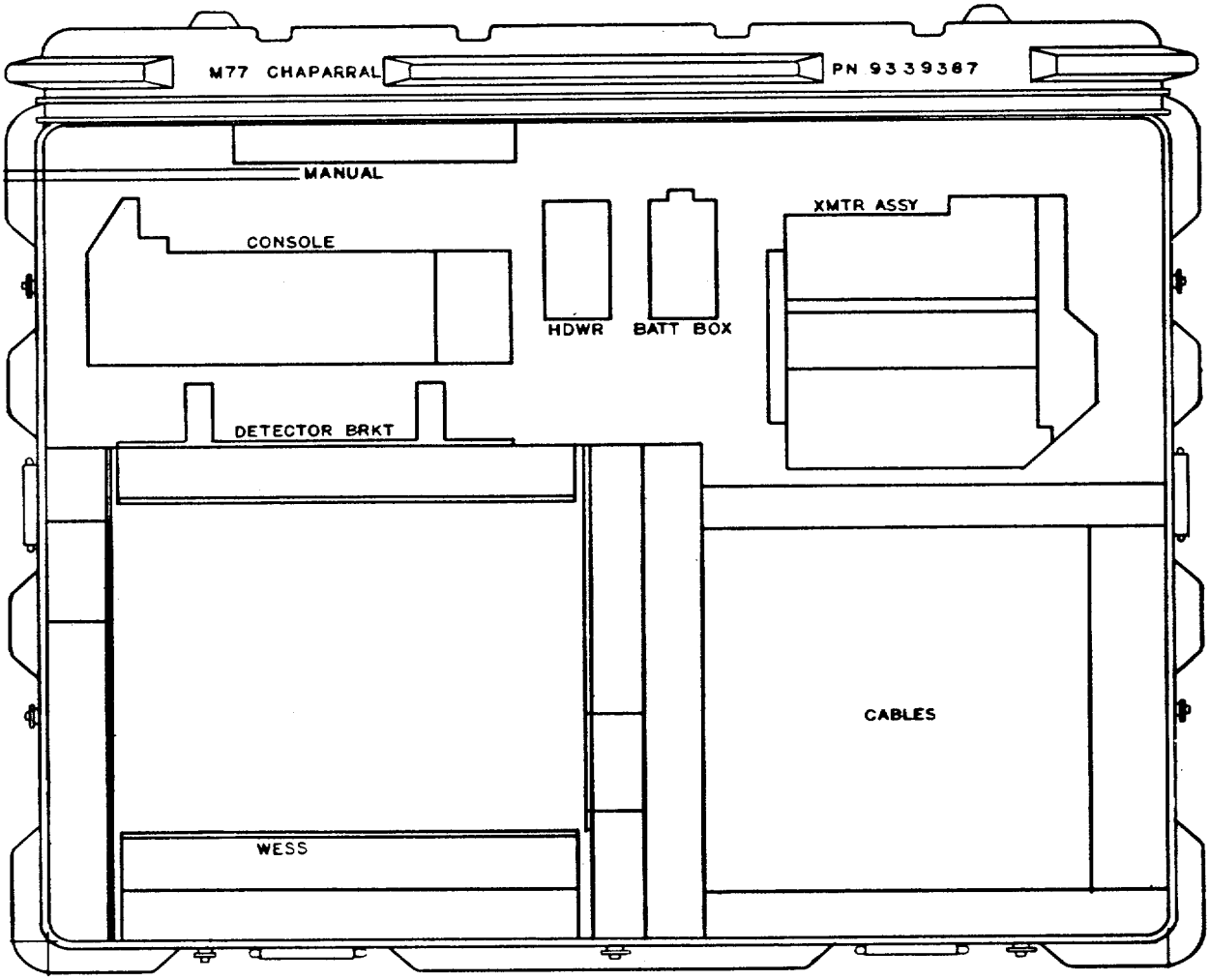
Remove Purge Plug and/or Training Missile.

Replace bracket on CVKI.

Postoperational Task 4: Transit Case Packing Instructions.

Replace M113 APC transit case. See TM 9-1265-370-10-3 for instructions.

Place MILES AGES/AD CHAPARRAL equipment in storage locations as indicated in transit case.



The CHAPARRAL Rail Assembly is packed in its own separate transit case.

Postoperational Task 5: Return Equipment.

Return all equipment to your NCOIC.

Include: MILES M113 transit case with equipment

MILES CHAPARRAL transit case with equipment

Unused ATWESS cartridges

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

Under unusual conditions, operational procedures for the MILES equipment have the same limitations as the CHAPARRAL Weapon System.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

SECTION I. LUBRICATION INSTRUCTIONS

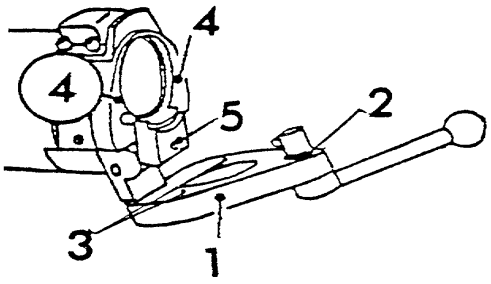
The ATWESS devices require Operator lubrication in the MILES CHAPARRAL Weapon System. These lubricating instructions are mandatory.

Before use and as needed during operation of the ATWESS devices. perform the following procedures:

Use CLP, brush and rags (see Items 4, 5 and 7, Appendix D) to clean powder from breech door (1) breech lock lever (2) and contacts (3) in breech door.

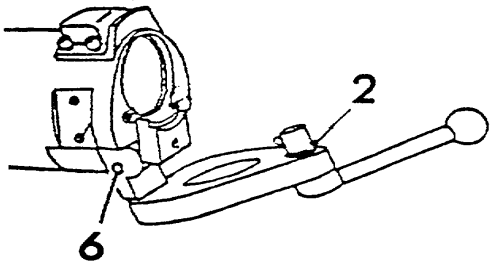
Use CLP to clean powder from terminals (4) in breech block. Also. clean entire breech block.

Use CLP to clean powder from cartridge extractor (5).



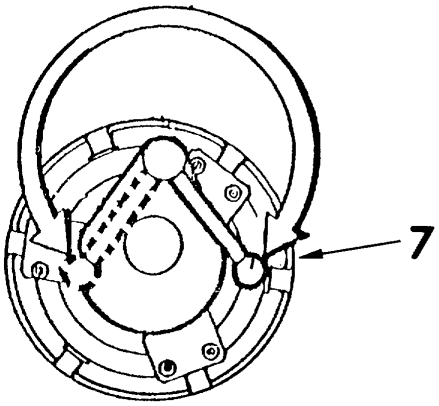
Put drop of CLP at breech door hinge (6) and breech lock lever (2).

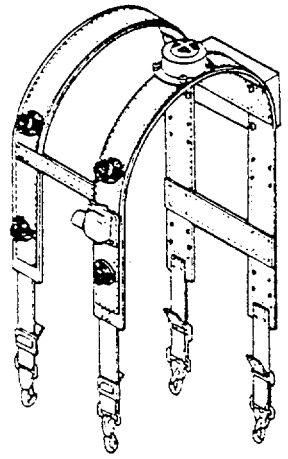
Close breech door and move lever to CLOSED position (7).



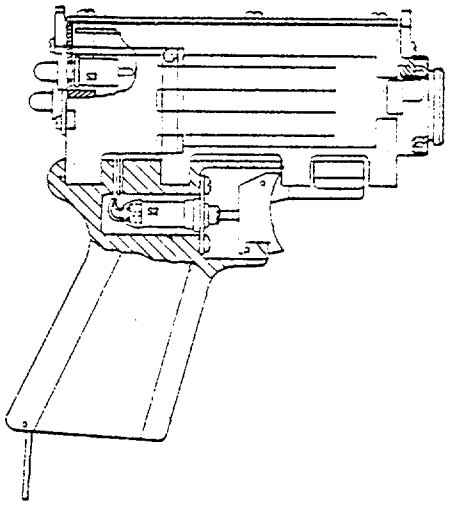
Open

Closed

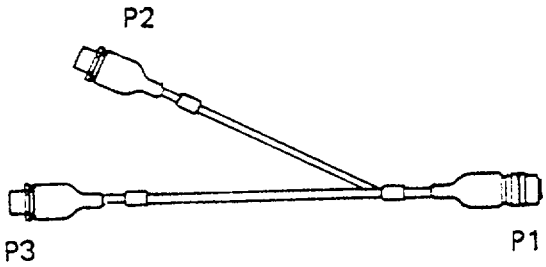




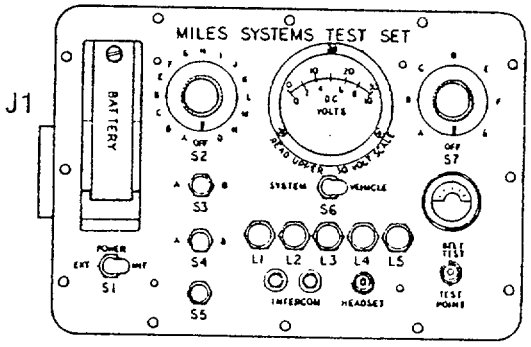
TORO
HARNESS



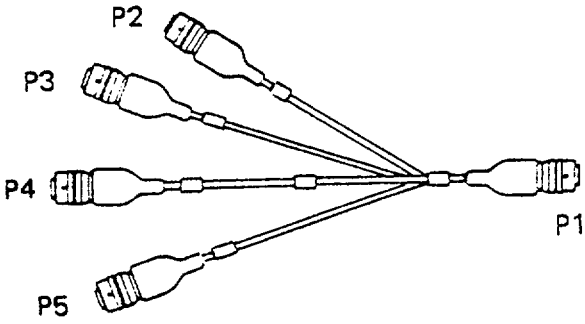
CONTROLLER GUN



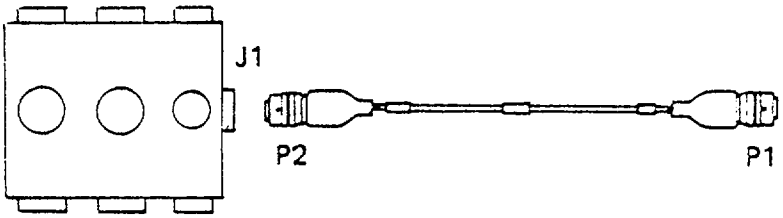
Test Set Detector Cable



*Miles System Test Set
*(Preliminary Design



Test Set Interface Cable



Test Set Junction

Test Set Interconnect cable

Figure 3-1. MILES CHAPARRAL Troubleshooting Equipment

SECTION II. TROUBLESHOOTING PROCEDURES

Tables 3-1 and 3-3 list the common malfunctions which you may find during the Operation or Maintenance of the MILES Simulator System for the CHAPARRAL Weapon System or its components.

You should perform the Tests/Inspections and Corrective Actions in the order listed.

Table 3-2 lists corrective actions by removing and replacing components.

Table 3-4 requires use of troubleshooting test equipment shown in figure 3-1.

This manual cannot list all malfunctions that may occur, nor all Tests or Inspections and Corrective Actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your Supervisor.

Troubleshooting procedures in table 3-4 require the assistance of a Controller, a MILES System Test Set (MSTS) (Section II, Appendix C), and Controller Gun (Section II, Appendix C). A Man Worn Laser Detector (MWLD) torso harness is also required. This is supplied as a part of the M113 APC MILES equipment (Section II, Appendix C). The Controller will supply all necessary test equipment and conduct troubleshooting procedures. The CHAPARRAL crew will assist the Controller. Figure 3-2 is a component connection diagram and should be used as a reference.

WARNING

If task requires Vehicle Equipment Power to be turned ON, ensure Vehicle Equipment Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.

NOTE

If no Test Set is available, go to Table 3-2, page 3-6. If a MILES System Test Set (MSTS) is available, go to Table 3-4, page 3-19.

NOTE

All defective equipment must have DA Form 2402 attached at turn-in.

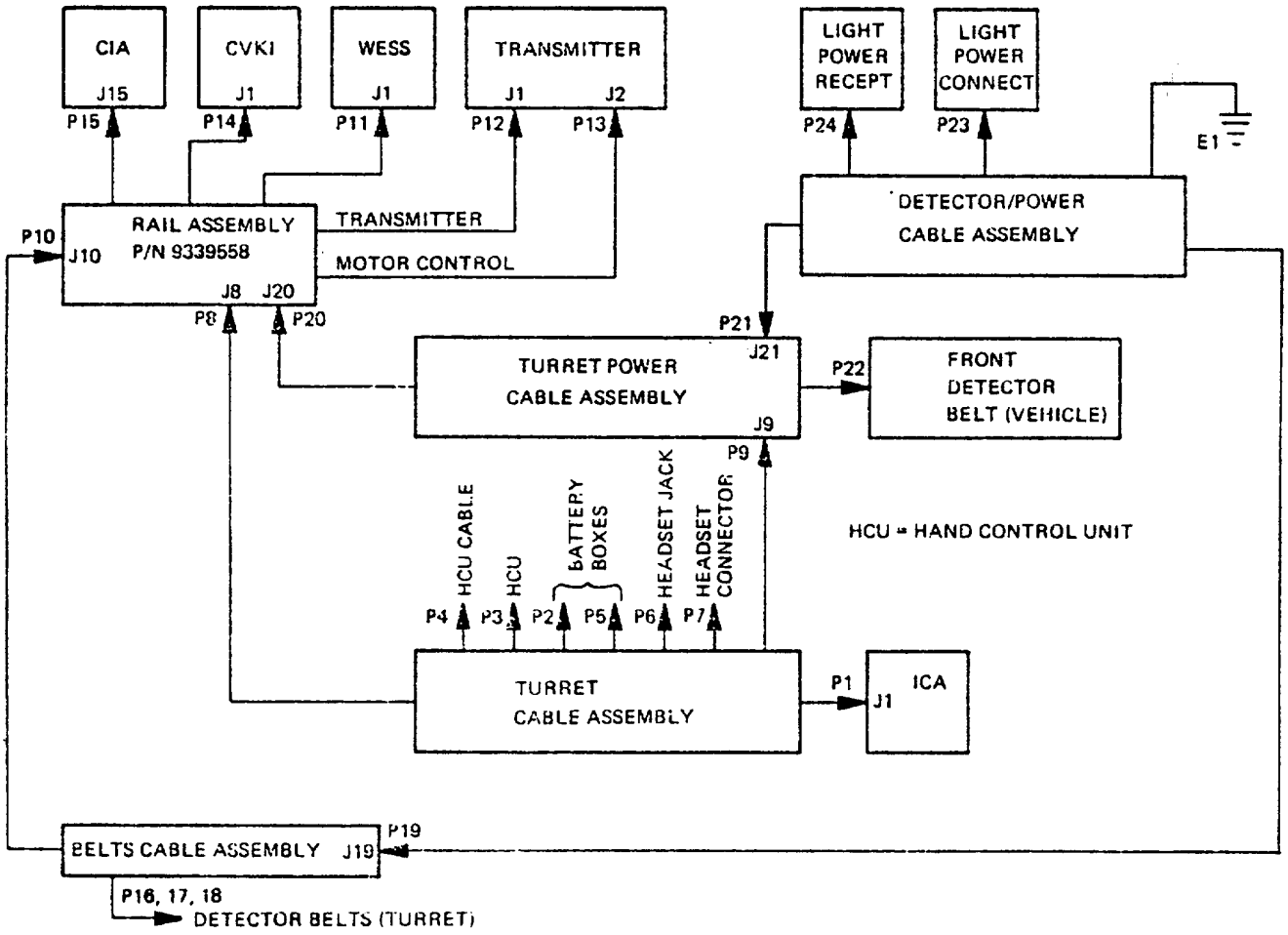


Figure 3-2. CHAPARRAL Interconnect Diagram

Table 3-1. SYMPTOM INDEX
(NO TEST SET)

Unit		Symptom	Troubleshooting Procedure Page
1. Interface Control Assembly (ICA) Test	(1)	Display Is Blank	3-6
	(2)	Incorrect ROUNDS DISPLAY Indication	3-7
	(3)	ROUNDS DISPLAY Indication Does Not Change	3-7
	(4)	Firing Indicators Do Not Light	3-7
	(5)	ICA Does Not Trigger	3-8
	(6)	CHAPARRAL Rail Does Not Superelevate	3-9
	(7)	No Simulated Missile Acquisition Tone	3-9
	(8)	Missiles Cannot Be Reloaded	3-10
	(9)	NOT READY Light Always ON	3-10
2. CHAPARRAL Transmitter Test	(1)	One or Two Laser Tubes Inoperative	3-11
	(2)	All Laser Tubes Inoperative	3-11
	(3)	Transmitter Fails to Oscillate	3-11
3. CHAPARRAL Weapon Effect Signature Simulator (WESS) Test	(1)	Failure of ATWESS Device(s) To Operate	3-12
4. Control Indicator Assembly (CIA) Test	(1)	Display Is Blank	3-13
	(2)	Display Does Not Indicate 88	3-14
	(3)	Weapon Identification Code Is Not Displayed	3-14
	(4)	NOT READY Light Does Not Illuminate	3-15
5. Detector Belts Test	(1)	Turret Detector Belt(s)	3-15
	(2)	Front Vehicle Detector Belt	3-15
6. Combat Vehicle Kill Indicator (CVKI) Test	(1)	Failure Of CVKI To Operate	3-16
7. Intercom Test	(1)	No Intercom Audio Tone	3-17

Table 3-2. Troubleshooting - No MILES System Test Set

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

NOTE

During this Troubleshooting procedure, any item that is replaced - that is, removed from service should be tagged with a DA Form 2402.

With the exception of the CVKI, the following Troubleshooting procedures are common to all malfunctions listed. These should be performed before attempting procedures listed for each piece of AGES/AD equipment.

Disconnect connector(s) from unit being tested. Wait one second and reconnect.
If malfunction is corrected, return system to service.

If unit still malfunctions, disconnect Battery Boxes from Turret cable, connectors P2 and P5. Wait one second and reconnect.

If malfunction is corrected, return system to service.

If unit still malfunctions, remove batteries from both Battery Boxes. Replace with new batteries.

If malfunction is corrected, return system to service.

If unit still malfunctions, remove Battery Boxes. Replace with Battery Boxes known to be usable. Insert new batteries.

If malfunction is corrected, return system to service.

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST

(1) Display Is Blank

Remove ICA. Replace with ICA known to be operable. Check display reading..
If display indicates 00, return system to service.

If display is blank, reinstall former ICA. Remove WESS. Replace with WESS known to be usable. Check display reading.

If display indicates 00, return system to service.

If display is blank, reinstall former WESS. Remove Transmitter Assembly. Replace with assembly known to be operable. Check display reading.

If display indicates 00, return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

If display is blank, reinstall former Transmitter Assembly. Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Check display reading.

If display indicates 00, return system to service.

If display is blank, reinstall former Turret Cable Assembly.

Replace defective Rail Cable Assembly. Return system service.

(2) Incorrect ROUNDS DISPLAY Indication

Insert Controller Key into WEAPON key receptacle on ICA. Turn to CONTROLLER position. Turn back and remove key.

Check ROUNDS DISPLAY indication for Total Rounds = 12

Ready Rounds = 4

If ROUNDS DISPLAY indication is correct, return system to service.

If ROUNDS DISPLAY indication is incorrect, remove Turret Cable Assembly. Replace with cable assembly known to be usable. Check ROUNDS DISPLAY indication.

If ROUNDS DISPLAY indication is correct, return system to service.

If ROUNDS DISPLAY indication is incorrect, reinstall former Turret Cable Assembly. Replace defective ICA. Return system to service.

(3) ROUNDS DISPLAY Indication Does Not Change

Failure of ROUNDS DISPLAY indication to change indicates a malfunction in the ICA.

Replace defective ICA. Return system to service.

(4) Firing Indicators Do Not Light

Failure of the Firing Indicators (decimal points on the display) to light indicates a malfunction in the ICA.

Replace defective ICA. Return system to service.

Table 3-2. Troubleshooting - No MILES System Test Set (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(5) ICA Does Not Trigger

Verify NOT READY light is OFF on ICA.

If ON, reset both ICA and CIA with the Controller Key. Insert Weapon (Orange) Key into ICA Weapon key receptacle. Rotate clockwise.

If still ON, proceed to Section (9) NOT READY Light Always ON (page 3-10).

Remove ICA. Replace with ICA known to be operable. Check that ICA triggers in both TEST and ICA NORM modes.

If ICA triggers in both modes, return system to service.

If ICA fails to trigger in both modes, replace former ICA. Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Check that ICA triggers in both modes.

If ICA triggers in both modes, return system to service.

If ICA triggers in TEST mode but not in NORM mode, replace former Turret Cable Assembly. Remove WESS. Replace with WESS known to be operational. Check that ICA triggers in both modes.

If ICA triggers in both modes, return system to service.

If ICA triggers in TEST mode and not in NORM mode, replace former WESS. Remove Rail Cable Assembly. Replace with cable assembly known to be usable. Check that ICA triggers in both modes.

If ICA triggers in both modes, return system to service.

If ICA triggers in TEST mode and not in NORM mode, replace former Rail Cable Assembly. Verify CHAPARRAL Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct malfunction (refer to TM 9-1425-1586-10). Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(6) CHAPARRAL Rail Does Not Superelevate

WARNING

Ensure that all personnel stand clear of CHAPARRAL turret. Sudden superelevation can cause Severe Injury.

If CHAPARRAL Rail fails to superelevate, remove ICA. Replace with ICA known to be operational. Retest system.

If CHAPARRAL Rail superelevates, return system to service.

If CHAPARRAL Rail fails to superelevate, replace former ICA. Remove Turret Cable Assembly. Replace with a cable assembly known to be usable

If CHAPARRAL Rail superelevates, return system to service.

If CHAPARRAL Rail fails to superelevate, replace Turret Cable Assembly. Verify CHAPARRAL Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct malfunction (refer to TM 9-1425-1586.10). Return system to service.

(7) No Simulated Missile Acquisition Tone

Exchange Vehicle headset with a headset known to be usable.

Insert Controller Key into WEAPON key receptacle on ICA. Turn counterclockwise to CONTROLLER position. Turn back and remove key. Check for simulated Missile Acquisition Tone. Repeat this procedure several times.

If tone is present, return system to service.

If tone is not present, replace former headset. Remove ICA. Replace with ICA known to be operational. Check for tone.

If tone is present, return system to service.

Table 3-2. Troubleshooting - No MILES System Test Set (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(7) No Simulated Missile Acquisition Tone (Cont)

If tone is not present, replace former ICA.

Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Check for tone.

If tone is not present, replace Turret Cable Assembly. Verify CHAPARRAL Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction. Return system to service.

(8) Missiles Cannot Be Reloaded

Failure of READY ROUNDS DISPLAY indication to increase within two minutes after PRESS TO RELOAD pushbutton is depressed indicates a malfunction in ICA.

Replace defective ICA. Return system to service.

(9) NOT READY Light Always ON

Remove ICA. Replace with ICA known to be operable. Check for NOT READY light OFF.

If NOT READY light is OFF, return system to service.

If NOT READY light is ON, reinstall former ICA. Remove CIA. Replace with CIA known to be operational. Check for NOT READY light OFF.

If NOT READY light is OFF, return system to service.

If NOT READY light is ON, reinstall former CIA. Remove Turret Cable Assembly. Replace with cable assembly known to be operational. Check for NOT READY light OFF.

If NOT READY light is OFF, return system to service.

If NOT READY light is ON, reinstall former Turret Cable Assembly.

Replace defective Rail Assembly. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. CHAPARRAL TRANSMITTER TEST

(1) One or Two Laser Tubes Inoperative

One or two laser tubes inoperative indicates a malfunction in the transmitter. Replace transmitter. Return system to service.

(2) All Laser Tubes Inoperative

Remove Transmitter Assembly. Replace with assembly known to be operative. Retest transmitter.

If transmitter operates correctly, return system to service.

If transmitter is inoperative, replace former transmitter. Remove ICA. Replace with ICA known to be operative. Retest transmitter.

If transmitter operates correctly, return system to service.

If transmitter is inoperative, replace former ICA. Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Retest transmitter.

If transmitter operates correctly, return system to service.

If transmitter is inoperative, replace former Turret Cable Assembly.

Remove defective Rail Assembly. Return system to service.

(3) Transmitter Fails To Oscillate

WARNING

Ensure Mount Drive breaker on CHAPARRAL Weapon System is OFF. Failure to comply can result in Injury to Personnel.

Remove Transmitter Assembly. Replace with assembly known to be operable. Retest transmitter.

If transmitter oscillates, return system to service.

Table 3-2. Troubleshooting - No MILES System Test Set (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. CHAPARRAL TRANSMITTER TEST (CONT)

(3) Transmitter Fails To Oscillate (Cont)

If transmitter fails to oscillate, reinstall former Transmitter Assembly. Remove ICA. Replace with ICA known to be operable. Retest transmitter.

If transmitter oscillates, return system to service.

If transmitter fails to oscillate, reinstall former ICA. Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Retest transmitter.

If transmitter oscillates, return system to service.

If transmitter fails to oscillate, reinstall former Turret Cable Assembly.

Replace defective Rail Cable Assembly and return system to service.

3. CHAPARRAL WEAPON EFFECT SIGNATURE SIMULATOR (WESS) TEST

(1) Failure of ATWESS Device(s) To Operate

WARNING

Ensure Mount Drive breaker on CHAPARRAL Weapon System is OFF. Failure to comply can result in Injury to Personnel.

NOTE

If more than one ATWESS Device is inoperative, repeat the following procedures for each inoperative ATWESS Device.

Place Mount Drive Breaker in OFF position.

Verify inoperative ATWESS Device PULL TO ARM shaft is in the ARM position. Retest WESS.

If WESS operates, return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

If WESS fails to operate, remove ATWESS cartridge from inoperative ATWESS Device. Check the cartridge primer.

If primer is dented, ATWESS cartridge is a dud. Dispose of cartridge in accordance with local EOD procedures.

If WESS fails to operate, remove ICA. Replace with ICA known to be operative. Retest WESS Device.

If WESS operates, return system to service.

If WESS fails to operate, reinstall former ICA. Remove WESS Device. Replace with a WESS Device known to be operative. Retest WESS Device.

If WESS operates, return system to service.

If WESS fails to operate, reinstall former WESS Device. Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Retest WESS Device.

If WESS operates, return system to service.

If WESS fails to operate, reinstall former Turret Cable Assembly.

Remove defective Rail Cable Assembly. Return system to service.

4. CONTROL INDICATOR ASSEMBLY (CIA) TEST

(1) Display Is Blank

If display is blank, remove CIA. Replace with CIA known to be operative. Check CIA display.

If display indicates 00, return system to service.

If display is blank, reinstall former CIA. Remove CVKI. Replace with CVKI known to be operative. Check CIA display.

If display indicates 00, return system to service.

If display is blank, reinstall former CVKI. Remove Turret Power Cable Assembly. Replace with cable assembly known to be usable. Check CIA display.

If display indicates 00, return system to service.

Table 3-2. Troubleshooting - No MILES System Test Set (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. CONTROL INDICATOR ASSEMBLY (CIA) TEST (CONT)

(1) Display Is Blank (Cont)

If display is blank, reinstall former Turret Power Cable Assembly. Remove Detector/Power Cable Assembly. Replace with cable assembly known to be usable. Check CIA display.

If display indicates 00, return system to service.

If display is blank, reinstall former Detector/Power Cable Assembly. Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Check CIA display.

If display indicates 00, return system to service.

If display is blank, reinstall former Turret Cable Assembly. Disconnect each Detector Belt Assembly, one at a time. For each assembly, check CIA display.

During any remove/replace step, if display indicates 00, replace defective belt assembly. Return system to service.

If display is blank, reconnect each Detector Belt Assembly.

Replace Rail Cable Assembly. Return system to service.

(2) Display Does Not Indicate 88

Insert Controller Key into WEAPON key receptacle on CIA. Turn counterclockwise to CONTROLLER position. Turn back and remove key.

Turn CIA switch to HIT/KILL then to SELF TEST. Push PRESS TO READ pushbutton. Check CIA display.

If display indicates 88, return system to service.

Failure of the CIA to display 88 indicates a malfunction in the CIA.

Replace CIA. Return system to service.

(3) Weapon Identification Code Is Not Displayed

Failure of the CIA to display a Weapon Identification Code indicates a malfunction in the CIA.

Replace CIA. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(4) NOT READY Light Does Not Illuminate

Failure of the NOT READY light to illuminate when a KILL response is indicated by the CVKI indicates a malfunction in the CIA.

Replace CIA. Return system to service.

5. DETECTOR BELTS TEST

(1) Turret Detector Belt(s)

Remove suspected detector belt(s). Replace with detector belt(s) known to be usable. Retest system.

If detector belt(s) respond correctly, return system to service.

If detector belt(s) fail to respond correctly, replace former detector belt(s). Remove Belts Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If detector belt(s) respond correctly, return system to service.

If detector belt(s) fail to respond correctly, replace former Belts Cable Assembly.

Replace defective Rail Assembly. Return system to service.

(2) Front Vehicle Detector Belt

Remove Front Detector Belt. Replace with detector belt known to be usable. Retest system.

If detector belt(s) respond correctly, return system to service.

If detector belt fails to respond correctly, replace former detector belt.

Replace defective Detector/Power Cable Assembly. Return system to service.

Table 3-2. Troubleshooting - No MILES System Test Set (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

6. COMBAT VEHICLE KILL INDICATOR (CVKI) TEST

(1) Failure Of CVKI To Operate

Check that Turret Power is ON.

Remove CVKI. Replace with CVKI known to be operational. Retest system.

If CVKI operates correctly, return system to service.

If CVKI fails to operate correctly, replace former CVKI. Remove CIA. Replace with CIA known to be operational. Retest system.

If CVKI operates correctly, return system to service.

If CVKI fails to operate correctly, replace former CIA. Remove Rail Assembly. Replace with an assembly known to be usable. Retest system.

If CVKI operates correctly, return system to service.

If CVKI fails to operate correctly, replace former Rail Assembly. Verify CHAPARRAL Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 9.1425-1586-10). Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. INTERCOM TEST

(1) No Intercom Audio Tone

Replace headset with headset known to be usable.

Insert Weapon (Orange) Key into WEAPON key receptacle on CIA. Turn clockwise to SELF KILL the system. Turn back and remove key.

Listen for Audio Tone on the headset.

If Audio Tone is heard, return system to service.

If no Audio Tone is heard, remove CIA. Replace with CIA known to be operative. Retest system.

If Audio Tone is heard, return system to service.

If no Audio Tone is heard, replace CIA. Remove Turret Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If Audio Tone is heard, return system to service.

If Audio Tone is not heard, replace Turret Cable Assembly.

Replace defective Rail Assembly. Return system to service.

Table 3-3. SYMPTOM INDEX
(WITH MSTS)

Unit	Symptom	Troubleshooting Procedure Page
1. Interface Control Assembly (ICA) Test	(1) Display Is Blank	3-19
	(1.1) Display Is Blank - WESS/XMTR	3-21
	(2) Incorrect ROUNDS DISPLAY Indication	3-22
	(3) ROUNDS DISPLAY Indication Does Not Change	3-23
	(4) Firing Indicators Do Not Light	3-23
	(5) ICA Does Not Trigger	3-23
	(5.1) ICA Does Not Trigger In Either ICA NORM Or TEST Modes 3-24	
	(5.2) ICA Does Not Trigger In NORM Mode, Does Trigger In TEST Mode	3-26
	(6) CHAPARRAL Rail Does Not Superelevate	3-29
	(7) No Simulated Missile Acquisition Tone	3-31
	(8) Missiles Cannot Be Reloaded	3-32
	(9) NOT READY Light Always ON	3-33
2. CHAPARRAL Transmitter Test	(1) One or Two Laser Tubes Inoperative	3-35
	(2) All Laser Tubes Inoperative	3-35
	(2.1) All Laser Tubes Inoperative - Low Voltage	3-38
	(3) Transmitter Fails to Oscillate	3-39
	(3.1) Transmitter Fails To Oscillate/Voltage Correct	3-43
3. CHAPARRAL Weapon Simulator (WESS) Test	(1) Failure of ATWESS Device(s) To Operate	3-44
	(2) All ATWESS Inoperative	3-45
	(2.1) All ATWESS Inoperative/Voltage Incorrect	3-52
4. Control Indicator Assembly (CIA) Test	(1) Display Is Blank	3-53
	(1.1) Display Is Blank - CVKI	3-55
	(2) Display Does Not Indicate 88	3-57
	(3) Weapon Identification Code Is Not Displayed	3-58
	(4) NOT READY Light Does Not Illuminate	3-59
5. Detector Belts Test (1)	One Turret Detector Belt Faulty	3-59
	(2) Front Detector Belt Faulty	3-60
	(2.1) Front Detector Belt Faulty/Incorrect Voltage	3-62
	(3) All Detector Belts Faulty	3-63
	(3.1) All Detector Belts Faulty - Controller Gun Test	3-64
6. Combat Vehicle Kill Indicator (CVKI) Test	(1) Failure Of CVKI To Operate	3-65
	(1.1) Failure of CVKI To Operate- Voltage Check	3-68
	(2) CVKI Inoperative - Travel Mode (CVKI Operates When Not In Travel Mode)	3-69
7. Intercom Test	(1) No Intercom Audio Tone	3-70

Table 3-4. Troubleshooting - With MSTS

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

NOTE

During this Troubleshooting procedure, any item that is replaced - that is, removed from service - should be tagged with a DA Form 2402.

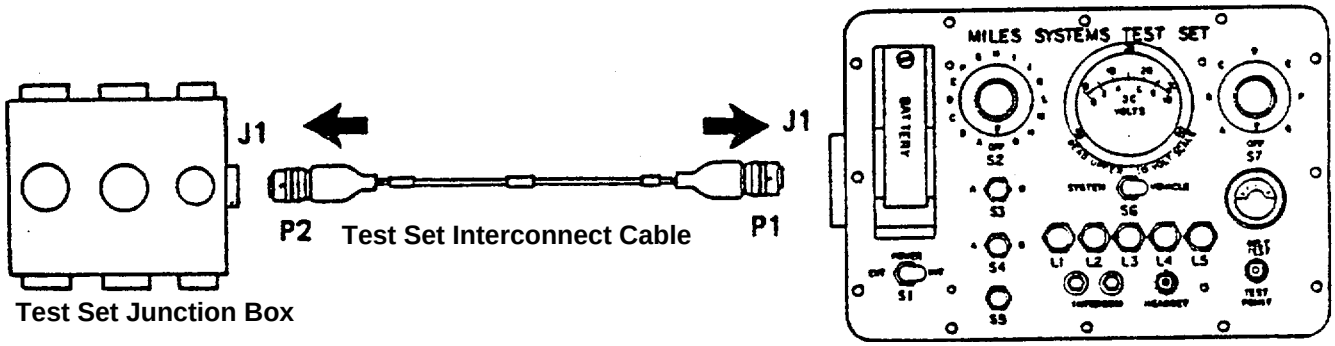
1. INTERFACE CONTROL ASSEMBLY (ICA) TEST

(1) Display is blank

Disconnect Turret Cable, connector P1 from ICA. Pause for one second and reconnect. Check ICA display.

If display indicates 00, return system to service.

If display is blank, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Disconnect Turret Cable, connector P1, from ICA. Connect to Test Set Junction Box, connector J10.

Test Set Junction Box

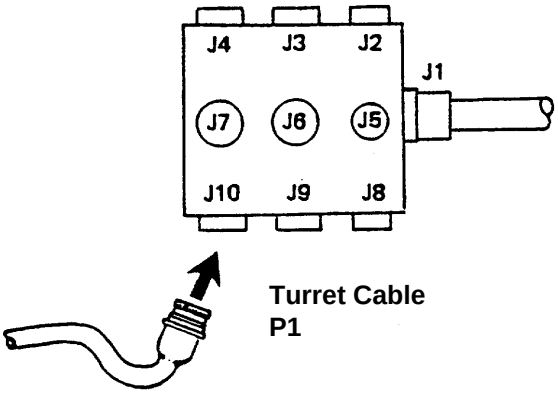


Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(1) Display Is Blank (Cont)

Place test set switch S1 to EXT.

Place test set switch S6 to SYSTEM.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective ICA. Return system to service.

If voltage reading is less than 8.5 volts, disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8. NOT READY light will light.

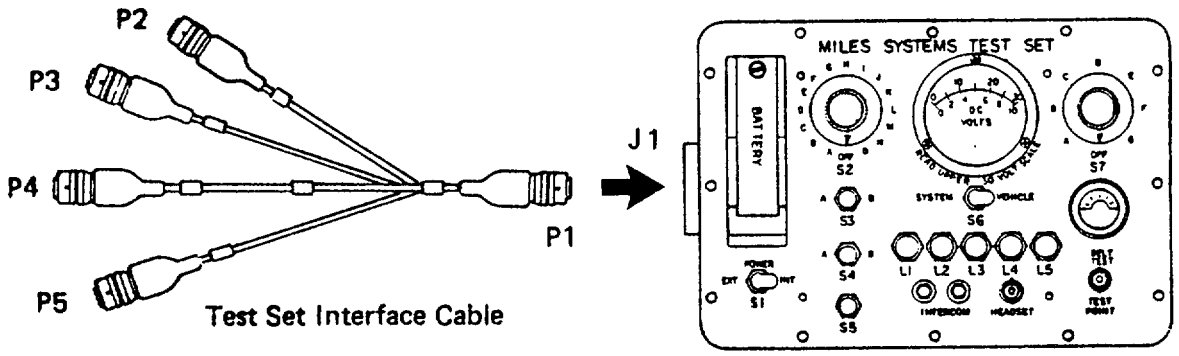
Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, proceed to (1.1) Display Is Blank-WESS/XMTR (page 3-21).

If voltage reading is less than 8.5 volts, disconnect Turret Cable, connector P1, from Test Set Junction Box. Reconnect to ICA. NOT READY light will light.

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.



MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Disconnect Turret Cable, connector P2, from battery box. Connect battery box to Test Set Interface Cable, connector P4.

Place test set switch S6 to SYSTEM.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective Turret Cable. Return system to service.

If voltage reading is less than 8.5 volts, install two new 6 V batteries in the battery box.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, discard old batteries. Return system to service.

If voltage reading is less than 8.5 volts, replace defective battery box. Return system to service.

(1.1) Display Is Blank-WESS/XMTR

Reconnect Turret Cable, connector P8, to Rail Assembly Cable, connector J8.

Disconnect Transmitter and WESS, ONE AT A TIME. Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective assembly (Transmitter or WESS) that was disconnected for test. Return system to service.

If voltage reading is less than 8.5 volts, replace defective Rail Assembly Cable. Return system to service.

Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(2) Incorrect ROUNDS DISPLAY Indication

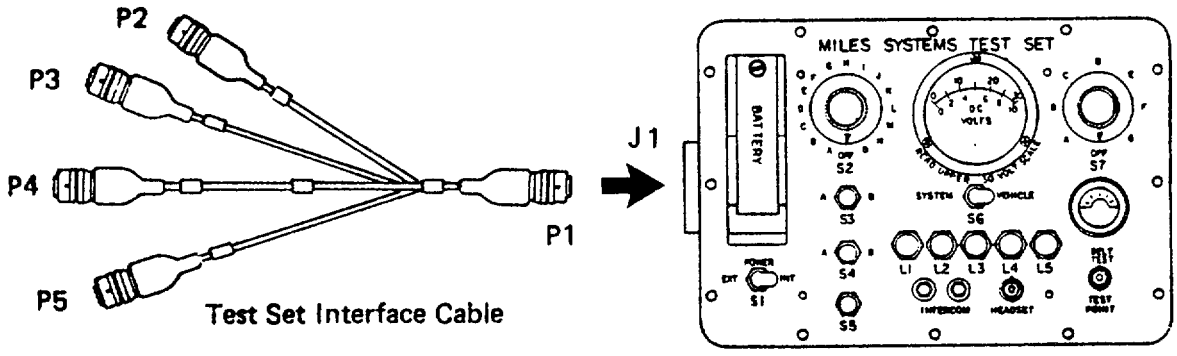
Insert Controller Key into WEAPON key receptacle on ICA. Turn to CONTROLLER position. Turn back and remove key.

Check ROUNDS DISPLAY indication for Total Rounds = 12

Ready Rounds = 4

If ROUNDS DISPLAY indication is correct, return system to service.

If ROUNDS DISPLAY indication is incorrect, connect Test Set Interface Cable,. connector P1, to test set, connector J1.



Place test set switch S1 to EXT.

Disconnect battery box from Turret Cable, connector P2. Connect battery box to Test Set Interface Cable, connector P4.

Place test set switch S6 to SYSTEM.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective ICA. Return system to service.

If voltage reading is less than 8.5 volts, discard old batteries. Install two new batteries. Return system to service.

(3) ROUNDS DISPLAY Indication Does Not Change

Failure of ROUNDS DISPLAY indication to change indicates a malfunction of the ICA.

Replace defective ICA. Return system to service.

(4) Firing Indicators Do Not Light

Failure of the Firing Indicators (decimal points on the display) to light indicates a malfunction of the ICA.

Replace defective ICA. Return system to service.

(5) ICA Does Not Trigger

Verify NOT READY light OFF on ICA.

If ON, reset both ICA and CIA with Controller Key. Insert Weapon (Orange) Key into ICA. Rotate clockwise.

If NOT READY light is ON, proceed to section (9) NOT READY Light Always ON (page 3-33).

Actuate system in both TEST and NORM modes.

If system fails to trigger in both modes, proceed to (5.1) ICA Does Not Trigger In Either ICA NORM or TEST modes (page 3-24).

If system triggers in TEST mode but fails to trigger in NORM mode, proceed to (5.2) ICA Does Not Trigger In NORM Mode, Does Trigger In TEST Mode (page 3-26).

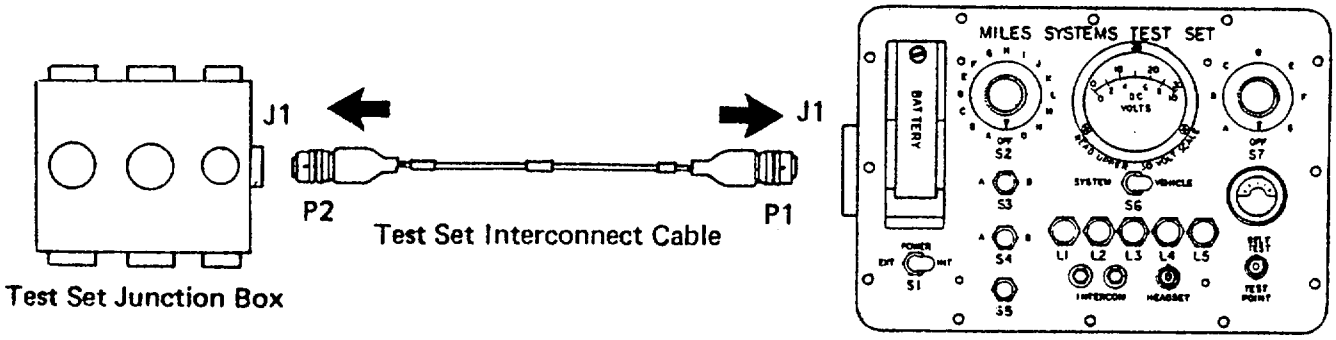
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

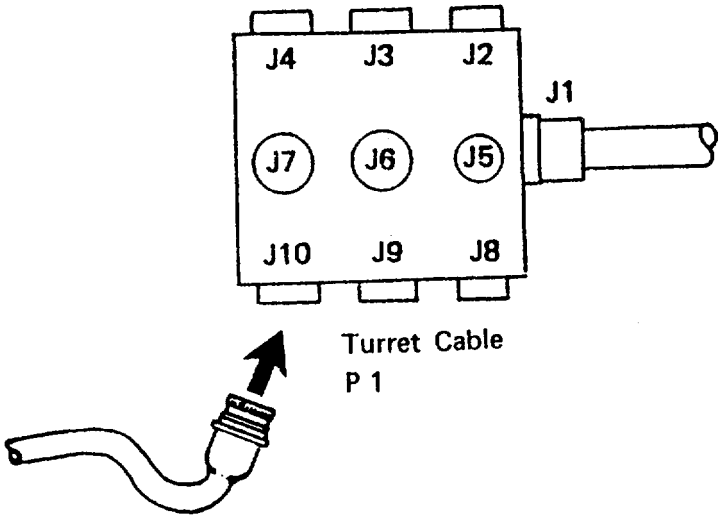
(5.1) ICA Does Not Trigger In Either ICA NORM Or TEST Modes

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Disconnect Turret Cable, connector P1, from ICA. Connect to connector J10 on Test Set Junction Box.

Test Set Junction Box



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Place test set switch S1 to EXT.

Place test set switch S6 to VEHICLE.

Verify Mount Power ON.

Verify MODE Switch is set to OPERATE.

Verify key switch ON.

Verify missile "Armed."

WARNING

Failure to set Mount Drive Breaker switch to OFF can result in injury to personnel.

Verify Mount Drive Breaker switch OFF.

Place test set switch S2 to K.

Trigger CHAPARRAL Weapon System. Read voltage on voltmeter.
If voltage reading is 18 to 30 volts, replace defective ICA. Return system to service.

If voltage reading is less than 18 volts, verify CHAPARRAL Weapon System is operational.

If weapon system is operational, replace Turret Cable. Return system to service.

If weapon system is not operational, correct weapon system malfunctions (refer to TM 9-1425-1586-10). Return system to service.

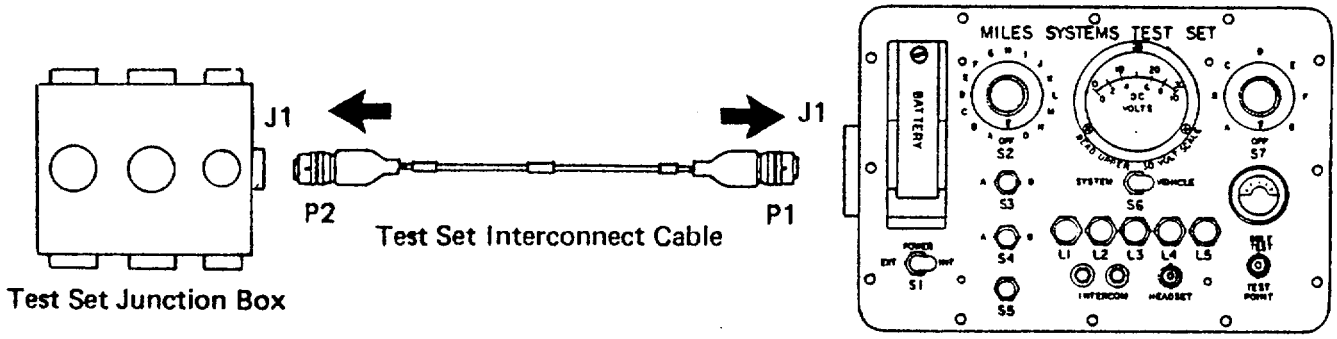
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

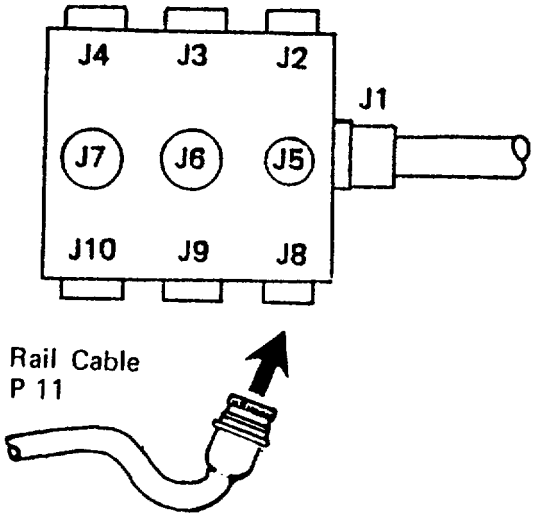
(5.2) ICA Does Not Trigger In NORM Mode, Does Trigger In TEST Mode

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Disconnect Rail Assembly Cable, connector P11, from WESS. Connect to Test Set Junction Box, connector J8.

Test Set Junction Box



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Place test set switch S2 to D.

Place Mount Drive Breaker to OFF.

Insure sufficient laser rounds remain for testing. If not, reset ICA.

Trigger the CHAPARRAL Weapon System. Check ICA display.

If Firing Indicators (decimal points on ICA display) appear, replace defective WESS. Return system to service.

If Firing Indicators do not appear, disconnect Rail Assembly Cable from Test Set Junction Box and reconnect to WESS.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

Connect Turret Cable, connector P8, to Test Set Junction Box, connector J9. (Light L1 on test set will come ON. This indication has no effect on troubleshooting procedures.)

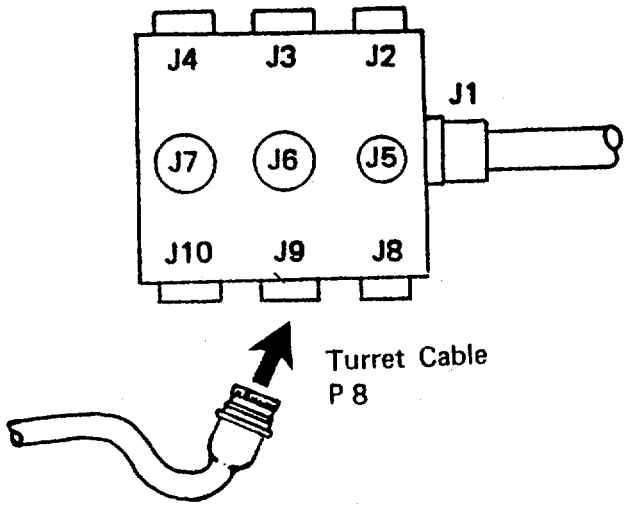


Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(5.2) ICA Does Not Trigger In NORM Mode, Does Trigger In TEST Mode (Cont)

Insure sufficient laser rounds remain for testing. If not, reset ICA.

WARNING

Stand clear of the WESS Assembly when the ATWESS is fired. Back blast can cause Severe Injury.

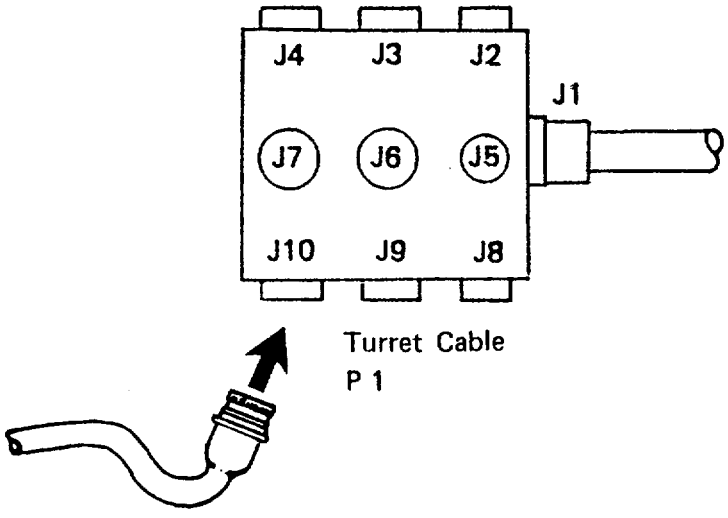
Trigger CHAPARRAL Weapon System. Check ICA display.

If Firing Indicators (decimal points on ICA display) appear, replace defective Rail Assembly. Return system to service.

If Firing Indicators do not appear, disconnect Turret Cable from Test Set Junction Box. Reconnect to Rail Assembly Cable, connector J8.

Disconnect Turret Cable, connector P1, from ICA. Connect to Test Set Junction Box, connector J10.

Test Set Junction Box



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Load a "LIVE" ATWESS cartridge into uppermost ATWESS device in WESS assembly.

Pull the SAFE/ARM shaft on uppermost ATWESS. Place WESS SAFE/ARMED switch to ARM.

Place test set switch S2 to D.

Depress test set switch S5. This will fire the armed ATWESS. Check indicator light L4.

If lamp L4 flashes ON/OFF, replace defective ICA. Return system to service.

If lamp L4 does not flash ON/OFF, replace defective Turret Cable. Return system to service.

(6) CHAPARRAL Rail Does Not Superelevate

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable. connector P2, to Test Set Junction Box.

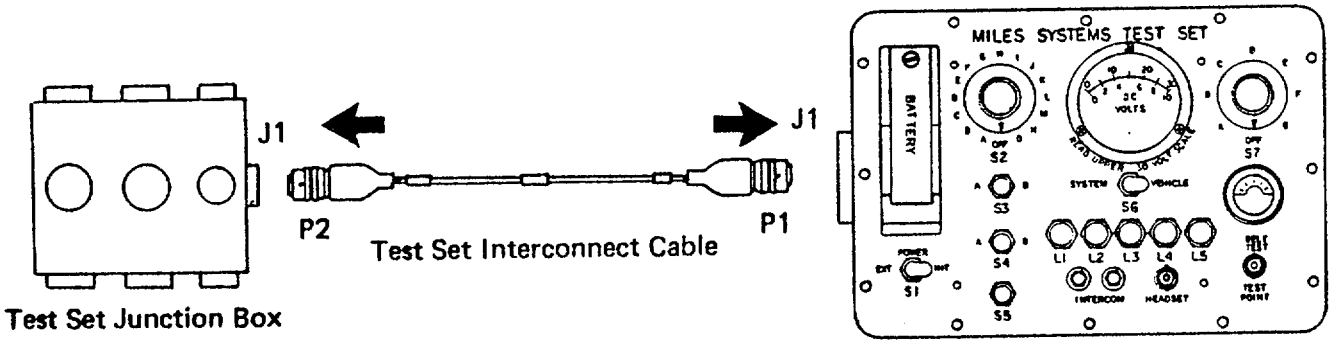


Table 3-4. Troubleshooting - With MSTS (Cont)

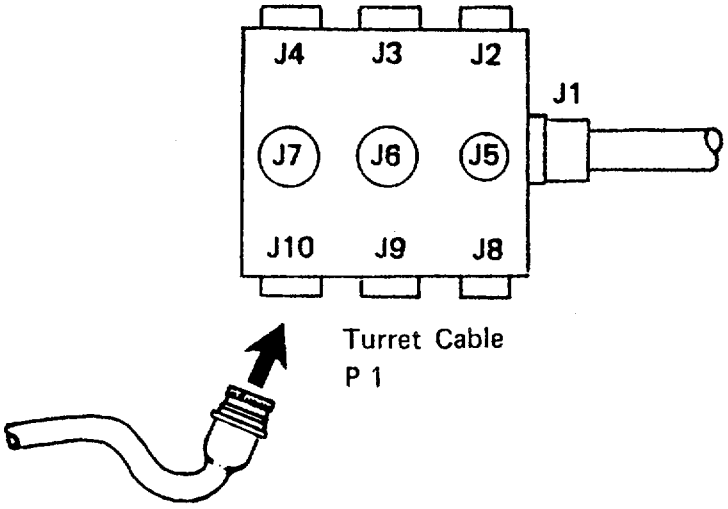
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(6) CHAPARRAL Rail Does Not Superelevate (Cont)

Disconnect Turret Cable, connector P1, from ICA. Connect to Test Set Junction Box, connector J10.

Test Set Junction Box



Place test set switch S1 to EXT.

WARNING

Make sure personnel are clear of CHAPARRAL turret. Sudden superelevation can cause Severe Injury.

Place test set switch S6 to VEHICLE.

Place test set switch S2 to K.

Trigger CHAPARRAL Weapon System. Watch CHAPARRAL Rails and test set voltmeter.

If rails superelevate and voltmeter indicates 18 to 30 volts, replace defective ICA. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

If rails fail to superelevate or voltmeter indicates less than 18 volts, disconnect Turret Cable, connectors P3 and P4, from CHAPARRAL Hand Control Unit and Hand Control Cable.

Reconnect Hand Control Unit to Hand Control Cable.

Trigger CHAPARRAL Weapon System. Watch the CHAPARRAL rails.

If rails superelevate, replace defective Turret Cable. Return system to service.

If rails fail to superelevate, check out CHAPARRAL Weapon System (refer to TM 9-1425-1536-10).

(7) No Simulated Missile Acquisition Tone

Exchange vehicle headset with another headset known to be usable.

Disconnect Battery Box from Turret Cable, connector P2. Pause for one second and reconnect.

Insert Controller Key into WEAPON key receptacle on ICA. Turn counterclockwise to CONTROLLER position. Turn back and remove key. Listen for tone in vehicle headset. Repeat procedure if necessary.

If simulated missile acquisition tone is present. replace defective vehicle headset. Return system to service.

If simulated missile acquisition tone is not present, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.

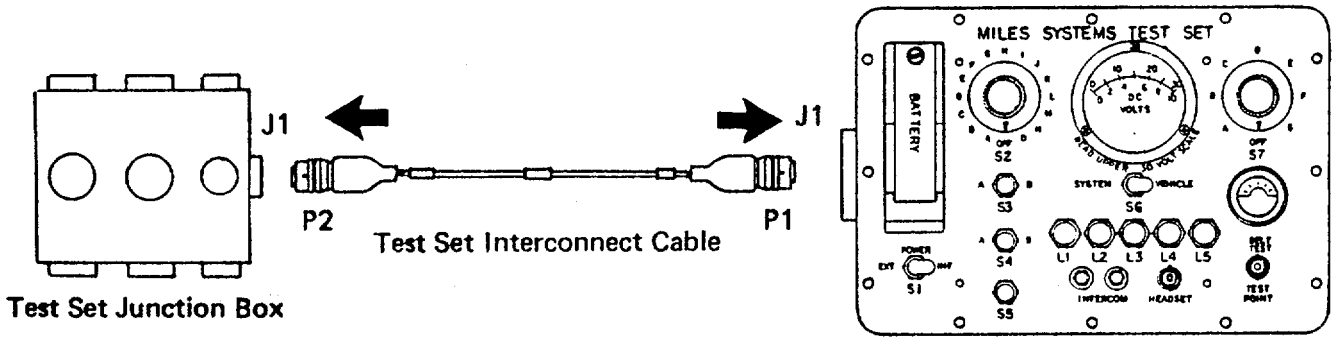


Table 3-4. Troubleshooting - With MSTS (Cont)

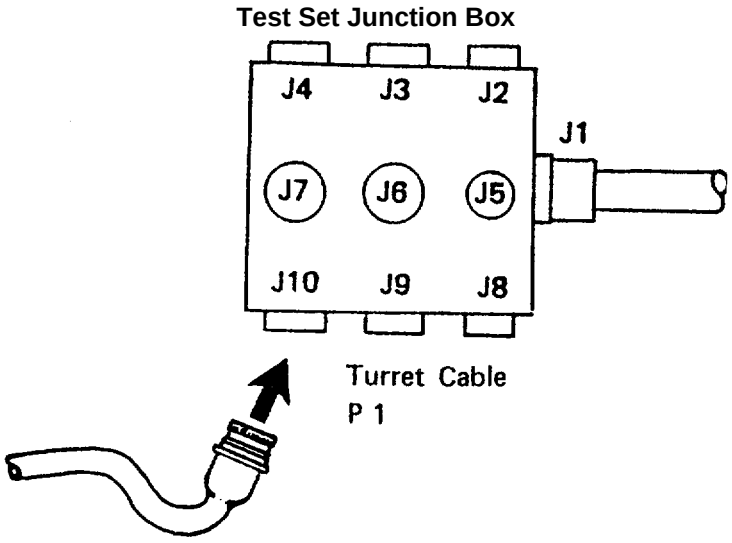
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(7) No Simulated Missile Acquisition Tone (Cont)

Place test set switch S1 to EXT.

Disconnect Turret Cable, connector P1, from ICA. Connect P1 to Test Set Junction Box, connector J10.



Place test set switch S7 to B. Listen to vehicle headset.

If AUDIO TONE is heard, replace defective ICA. Return system to service.

If no AUDIO TONE is present, replace defective Turret Cable. Return system to service.

(8) Missiles Cannot Be Reloaded

Failure of READY ROUNDS DISPLAY indication to increase, two minutes after the PRESS TO RELOAD pushbutton is depressed, indicates a problem with ICA.

Replace defective ICA. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(9) NOT READY Light Always ON

Before proceeding, check the following:

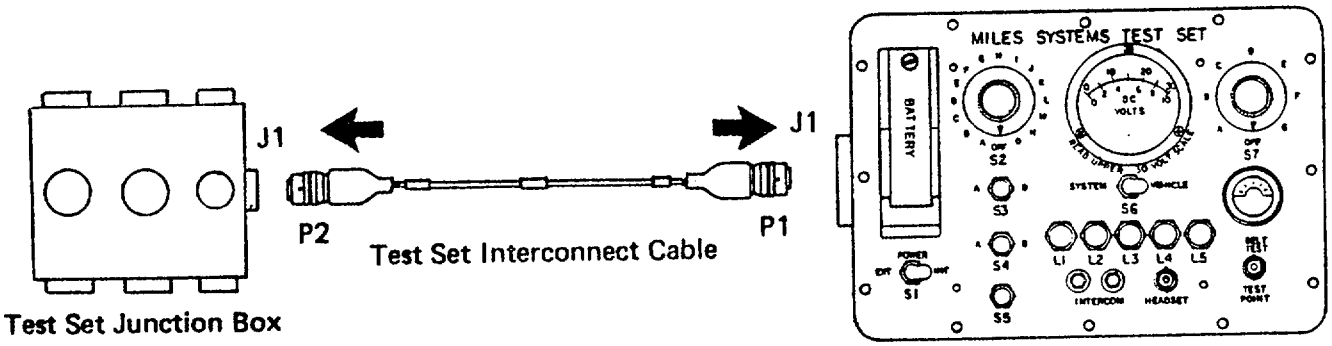
a. Vehicle (Orange) Key is inserted in WEAPON Key receptacle on ICA and rotated clockwise.

b. ROUNDS DISPLAY Indication indicates 1 or more on ICA.

c. NOT READY LED is OFF on ICA.

If ON, reset ICA with Controller Key.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Disconnect Turret Cable, connector P1, from ICA. Connect to Test Set Junction Cable, connector J10. Test Set Junction Box

Test Set Junction Box

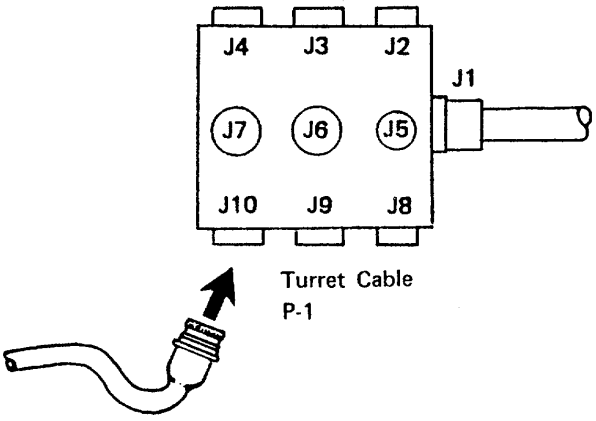


Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. INTERFACE CONTROL ASSEMBLY (ICA) TEST (CONT)

(9) NOT READY Light Always ON (Cont)

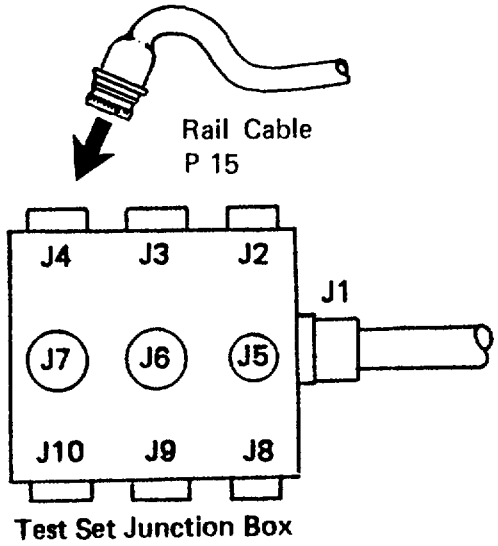
Check test set indicator light L5.

If light L5 is OFF, replace defective ICA. Return system to service.

If light L5 is ON, disconnect Turret Cable from Test Set Junction Box. Reconnect to ICA.

Reset ICA with Controller Key. Reinstall Vehicle (Orange) Key in WEAPON key receptacle. Turn key clockwise.

Disconnect Rail Assembly Cable, connector P15, from CIA. Connect to Test Set Junction Box, connector J4.



Check NOT READY light on ICA.

If NOT READY light is OFF, replace defective CIA. Return system to service.

If NOT READY light is ON, replace Rail Assembly. Recheck the NOT READY light on ICA.

If NOT READY light is ON, replace Turret Cable Assembly. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. CHAPARRAL TRANSMITTER TEST

(1) One or Two Laser Tubes Inoperative

One or two laser tubes inoperative indicates a malfunction of the Transmitter Assembly.

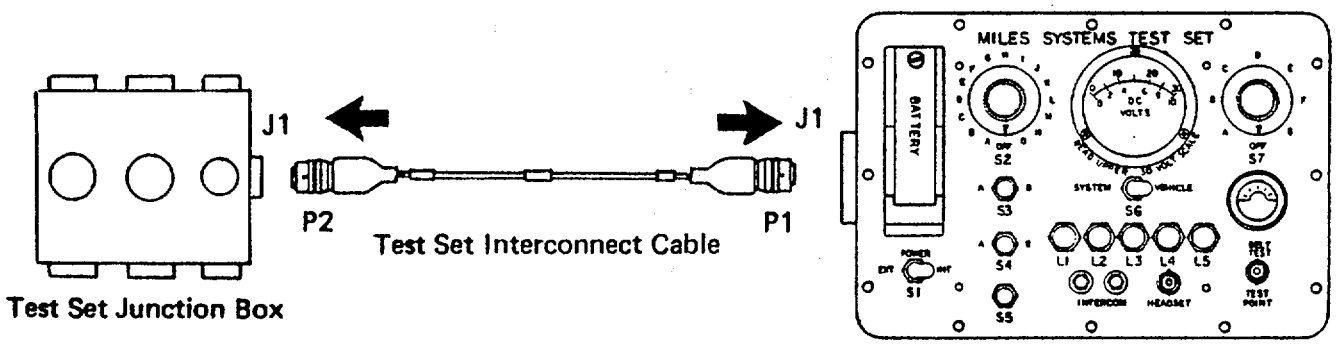
Replace defective Transmitter Assembly. Return system to service.

(2) All Laser Tubes Inoperative

WARNING

Failure to set Mount Drive Breaker to OFF can result in injury to personnel.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Place test set switch S1 to EXT

Disconnect Rail Assembly Cable, connector P12, from Transmitter Assembly.

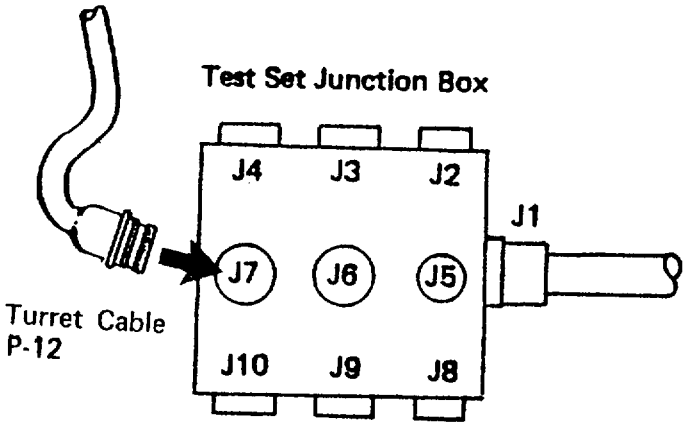
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. CHAPARRAL TRANSMITTER TEST (CONT)

(2) All Laser Tubes Inoperative (Cont)

Connect Rail Assembly Cable, connector P12, to Test Set Junction Box, connector J7.



Insert Controller Key into CONTROLLER MODE SELECT Key receptacle on ICA. Rotate Controller key counterclockwise. Remove key.

Insert Vehicle (Orange) Key into WEAPON Key receptacle. Rotate clockwise.

Trigger CHAPARRAL Weapon System. Check test set indicator lights L2 and L3.

If lights L2 and L3 are ON, replace defective Transmitter Assembly.
Return system to service.

If lights L2 and L3 do not come on, place test set switch S6 to SYSTEM.

Check voltage on test set voltmeter.

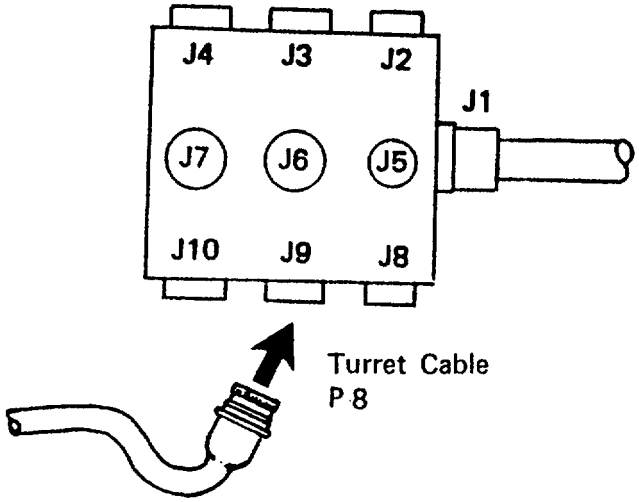
If voltmeter indicates less than 8.5 volts, proceed to (2.1) All Laser Tubes Inoperative - Low Voltage (page 3-38).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

If voltmeter indicates 8.5 to 13 volts, disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to Transmitter Assembly.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

Connect Turret Cable, connector P8, to Test Set Junction Box, connector J9. (Test set light L1 will flash ON. This indication has no effect on troubleshooting procedures.)



Trigger CHAPARRAL Weapon System. Check test set indicator lights L2 and L3.

If lights L2 and L3 come ON, replace defective Rail Assembly Cable.
Return system to service.

If lights L2 and L3 fail to come ON, disconnect Turret Cable from Test Set Junction Box. Reconnect to Rail Assembly Cable, connector J8. (Test set indicator light L1 will go OFF. This indication has no effect on troubleshooting procedures.)

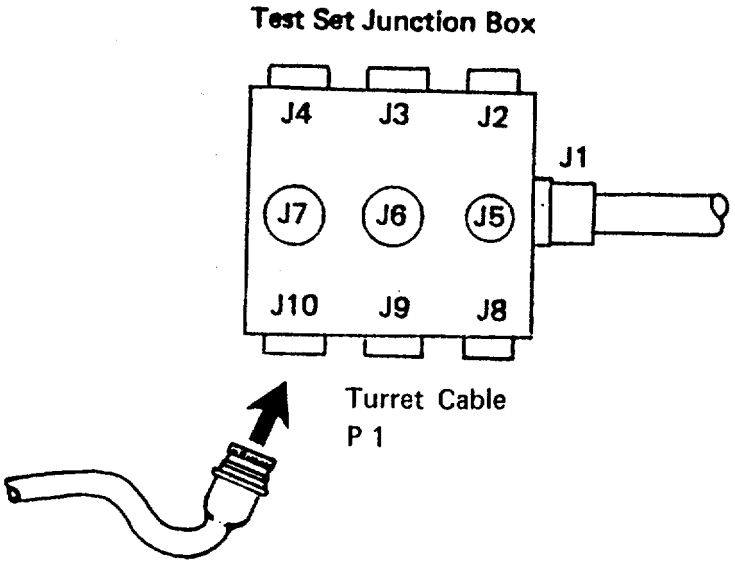
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. CHAPARRAL TRANSMITTER TEST (CONT)

(2) All Laser Tubes Inoperative (Cont)

Disconnect Turret Cable, connector P1, from ICA. Connect to Test Set Junction Box, connector J10.



Place a MWLD detector harness in front of transmitter.

Place test set switch S2 to B.

Momentarily place test set switch S3 to A.

Listen to MWLD detector harness response.

If MWLD alarm gives a "KILL" indication, replace defective ICA. Return system to service.

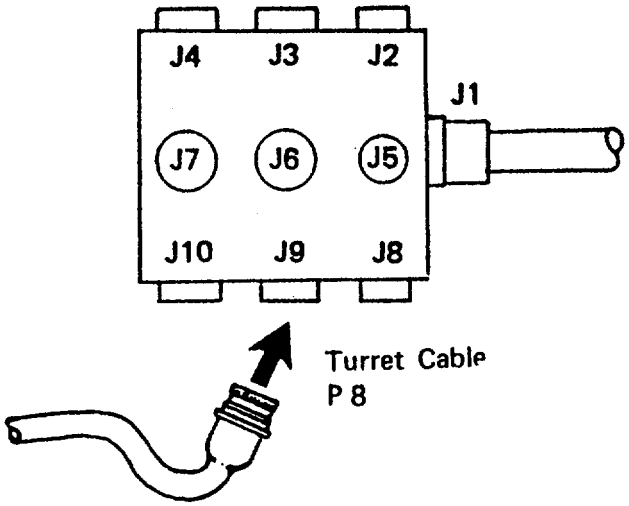
If MWLD alarm fails to give a "KILL" indication, replace defective Turret Cable. Return system to service.

(2.1) All Laser Tubes Inoperative- Low Voltage

Disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to Transmitter Assembly.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.
Connect P8 to Test Set Junction Box, connector J9.



(Test set indicator lamp L1 may come ON. This indication has no effect on troubleshooting procedures.)

Read voltage on test set voltmeter.

If voltmeter indicates 8.5 to 13 volts, replace defective Rail Assembly.
Return system to service.

If voltmeter indicates less than 8.5 volts, replace defective Turret Cable.
Return system to service.

(3) Transmitter Fails To Oscillate

WARNING

Failure to set Mount Drive Breaker to OFF can result in injury to personnel.

Verify CHAPARRAL System Mount Power is ON.

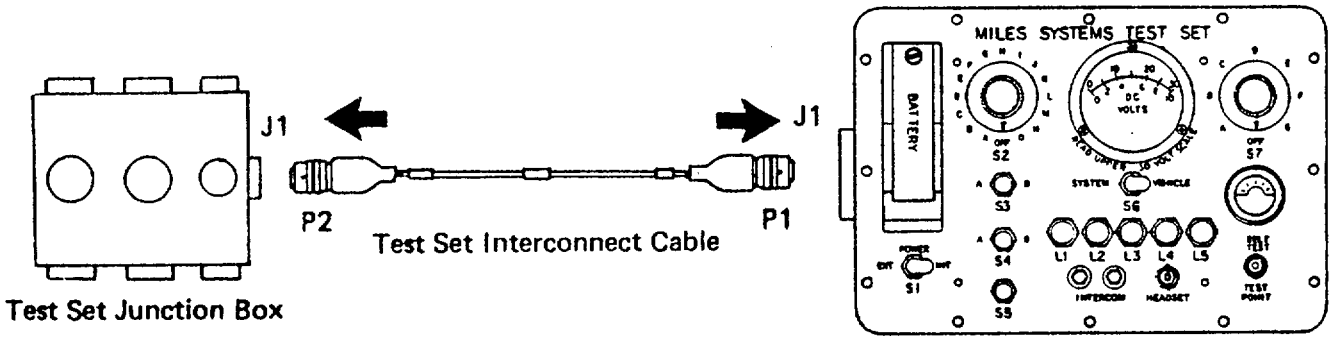
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. CHAPARRAL TRANSMITTER TEST (CONT)

(3) Transmitter Fails To Oscillate (Cont)

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.

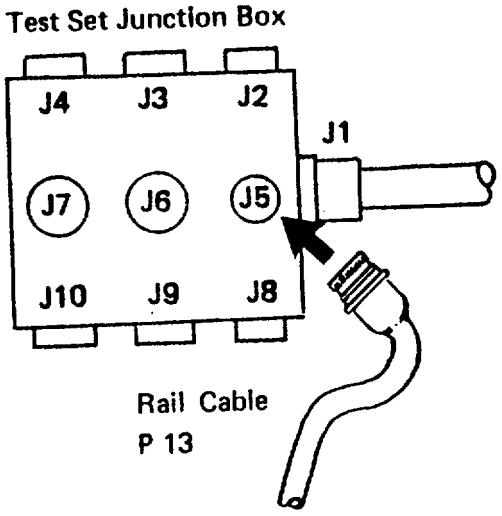


Place test set switch S6 to VEHICLE.

Place test set switch S2 to 0.

Disconnect Rail Assembly Cable, connector P13, from transmitter assembly.

Connect Rail Assembly Cable, connector P13, to connector J5 on test set.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Read voltage on voltmeter.

If indication is less than 18 volts, proceed to (3.1) Transmitter Fails To Oscillate/Voltage Correct (page 3-43).

If indication is 18 to 30 volts, insert 9 V battery in test set battery box. Place test set switch S1 to INT.

Place test set switch S7 to G.

Trigger CHAPARRAL Weapon System. Check test set indicator light L3.

If light L3 is ON, replace defective Transmitter Assembly. Return system to service.

If light L3 is not ON, disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to Transmitter Assembly.

Place test set switch S1 to EXT.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

Connect Turret Cable, connector P8, to connector J9 on Test Set Junction Box. (Test set indication light L1 will be ON. This indication does not affect troubleshooting procedures.)

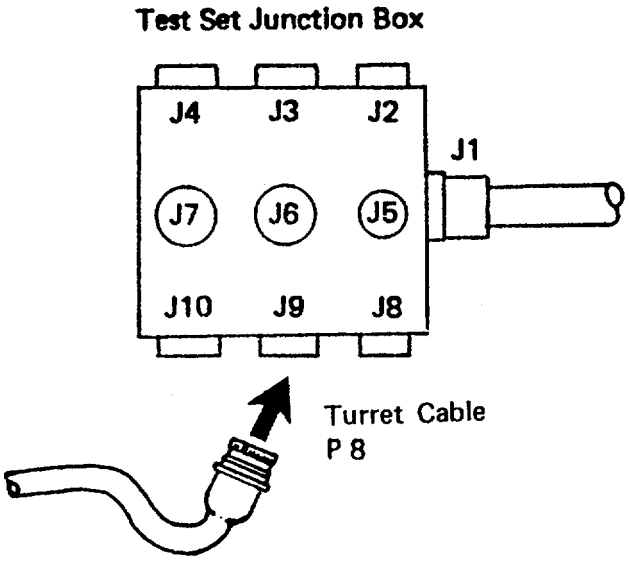


Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. CHAPARRAL TRANSMITTER TEST (CONTS

(3) Transmitter Fails To Oscillate (Cont)

Verify sufficient laser rounds remain to test system.

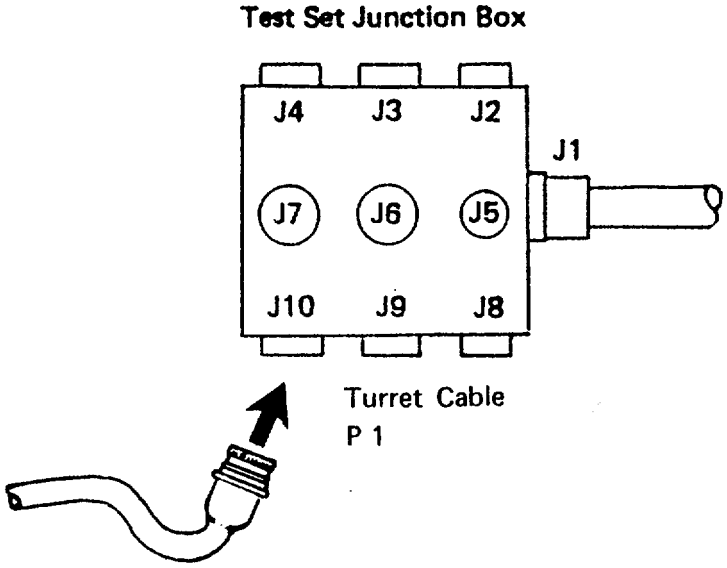
If not, reset ICA.

Trigger CHAPARRAL Weapon System. Check test set indicator light L3.

If light L3 is ON, replace defective Rail Assembly. Return system to service.

If light L3 is not ON, disconnect Turret Cable from Test Set Junction Box. Reconnect to Rail Assembly Cable, connector J8.

Disconnect Turret Cable, connector P1, from ICA. Connect to Test Set Junction Box, connector J10.



Momentarily place test set switch S7 to G. Verify transmitter oscillates.

If transmitter oscillates, replace defective ICA. Return system to service.

If transmitter fails to oscillate, replace defective Turret Cable. Return system to service.

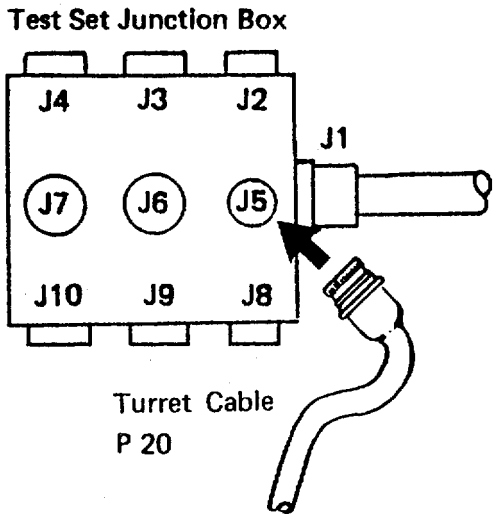
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(3.1) Transmitter Fails To Oscillate/Voltage Correct

Disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to Transmitter Assembly.

Disconnect Turret Cable, connector P20, from Rail Assembly Cable, connector J20.

Connect Turret Cable, connector P20, to Test Set Junction Box, connector J5.



Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective Rail Assembly.
Return system to service.

If voltage reading is less than 8.5 volts, verify CHAPARRAL Weapon System is operational.

If weapon system is operational, replace Turret Cable. Return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 91425-1586-10).
Return system to service.

Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. CHAPARRAL WEAPON SIMULATOR (WESS) TEST

(1) Failure Of ATWESS Device(s) To Operate

NOTE

If more than one ATWESS device is inoperative, repeat the following procedures for each inoperative ATWESS.

Verify that inoperative ATWESS device SAFE/ARM shaft was in the ARM position.

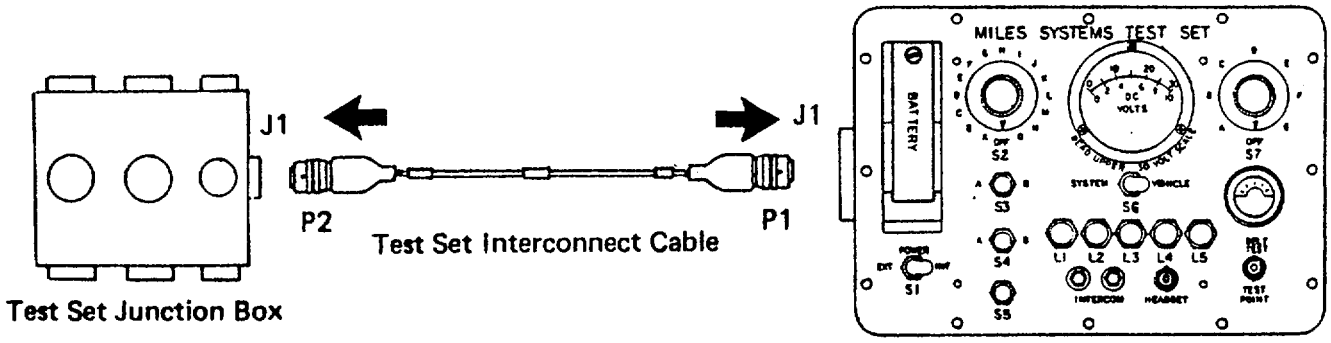
If not, place in ARM position and retest WESS.

If WESS Device is inoperative, remove ATWESS cartridge from inoperative ATWESS device.

Check cartridge primer.

If primer is dented, ATWESS cartridge is a dud. Dispose of cartridge in accordance with local EOD procedures.

If primer is not dented, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

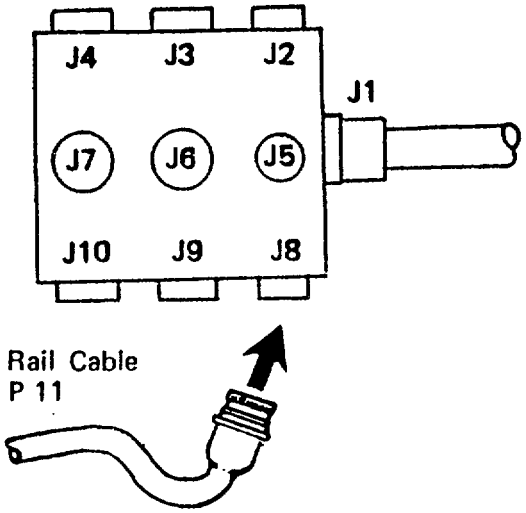
WARNING

Failure to set Mount Drive Breaker to OFF can ’result in injury to personnel.

Place Mount Drive breaker to OFF.

Place test set switch S1 to EXT.

Disconnect Rail Assembly Cable, connector P11, from WESS. Connect connector P11 to connector J8 on Test Set Junction Box.



Turn test set switch S2 to one of the following positions:

Position D for ATWESS # 1 (uppermost ATWESS)

Position E for ATWESS #2

Position F for ATWESS #3

Position G for ATWESS #4

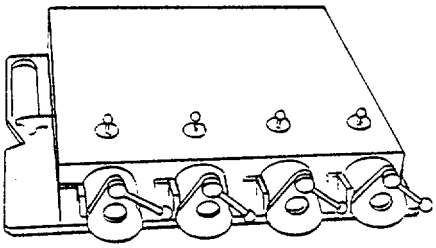


Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. CHAPARRAL WEAPON SIMULATOR (WESS) TEST (CONT)

(1) Failure Of ATWESS Device(s) To Operate (Cont)

Trigger CHAPARRAL Weapon System. Check test set indicator light L4.

If light L4 flashes ON/OFF, replace defective WESS. Return system to service.

If light L4 does not flash ON/OFF, place SAFE/ARM shaft on ATWESS and SAFE/ARMED switch on WESS to SAFE.

Disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to WESS.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

Connect Turret Cable, connector P8, to connector J9 on Test Set Junction Box. (Test set indicator light L1 will come ON. This has no effect on troubleshooting procedures.)

Verify test set switch S2 is in D, E, F or G position, corresponding to ATWESS tube tested.

Trigger CHAPARRAL Weapon System. (Test set indicator lights L2 and L3 will come on. These have no effect on troubleshooting procedures.)

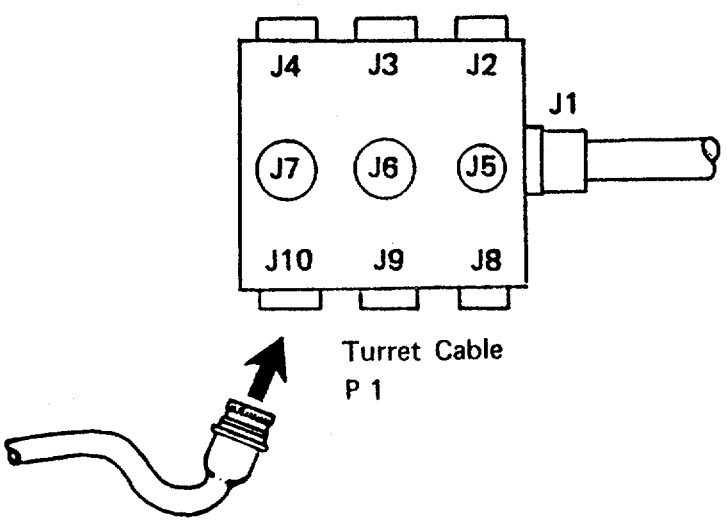
Check test set indicator light L4.

If light L4 flashes ON/OFF, replace defective Rail Assembly. Return system to service.

If light L4 fails to flash ON/OFF, disconnect Turret Cable from Test Set Junction Box. Reconnect to Rail Assembly Cable, connector J8.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect Turret Cable, connector P1, from ICA. Connect to Test Set Junction Box, connector J10.



Load a "live" ATWESS cartridge into inoperative ATWESS. Arm ATWESS by pulling up on SAFE/ARM shaft.

Arm WESS Assembly by placing the SAFE/ARMED switch in ARMED position.

Turn test set switch S2 to one of the following positions:

Position D for ATWESS 1

Position E for ATWESS 2

Position F for ATWESS 3

Position G for ATWESS 4

WARNING

Stand clear of the WESS Assembly when the ATWESS is fired. Back blast can cause serious injury to personnel.

Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. CHAPARRAL WEAPON SIMULATOR (WESS) TEST (CONT)

(1) Failure Of ATWESS Device(s) To Operate (Cont)

Depress test set switch S5. Verify ATWESS fires.

If ATWESS fires, replace defective ICA. Return system to service.

If ATWESS does not fire, replace defective Turret Cable. Return system to service.

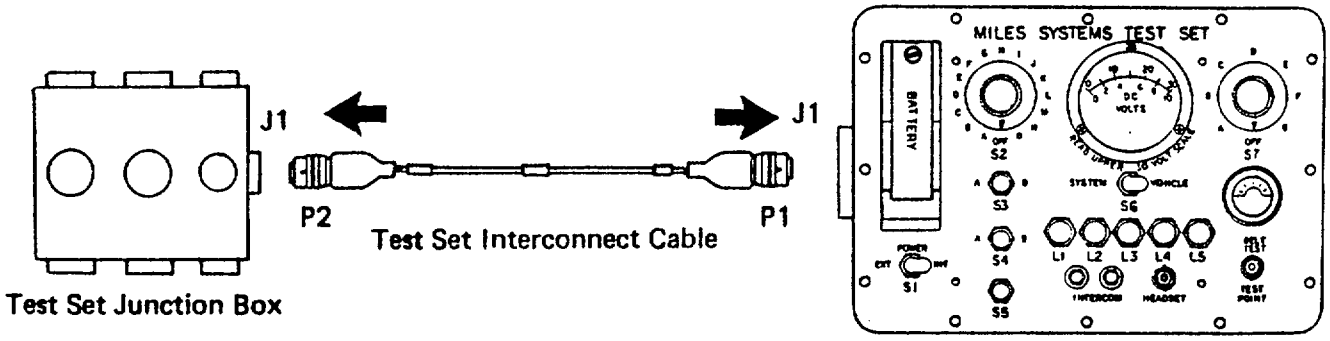
(2) All ATWESS Inoperative

WARNING

Failure to set Mount Drive Breaker to OFF can result in injury to personnel.

Place Mount Drive Breaker to OFF.

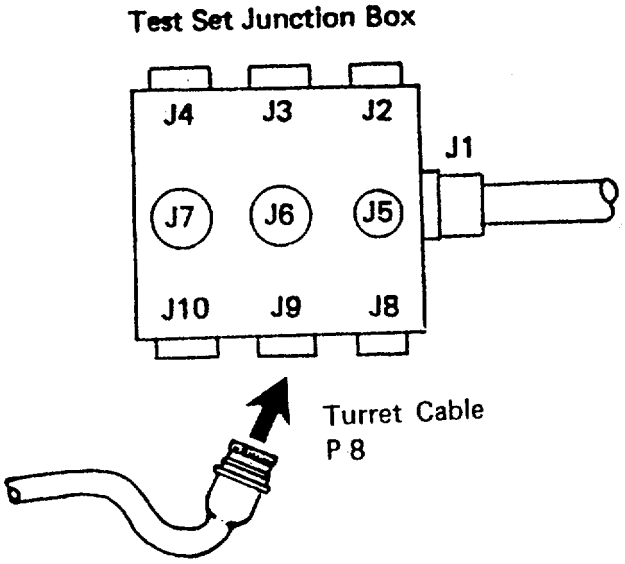
Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Place test set switch S1 to EXT.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect Rail Assembly Cable, connector P11, from WESS. Connect to connector J8 on Test Set Junction Box.



Place test set switch S6 to SYSTEM.

Read voltage on voltmeter,

If voltage reading is less than 8.5 volts, proceed to (2.1) All ATWESS Inoperative/Voltage Incorrect (page 3-52).

If voltage reading is correct, place test set switch S2 to D.

Verify sufficient laser rounds remain for testing.

If not, reset ICA.

Trigger CHAPARRAL Weapon System. Check test set indicator light L4.

If light L4 flashes ON/OFF, replace defective WESS. Return system to service.

If light L4 does not flash ON/OFF, disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to WESS.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

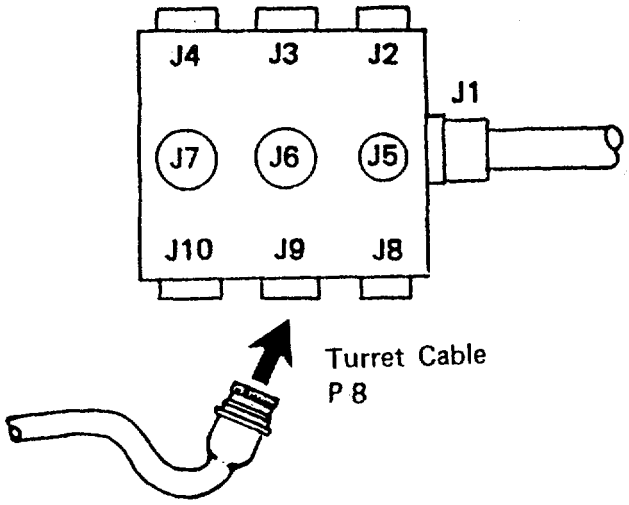
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. CHAPARRAL WEAPON SIMULATOR (WESS) TEST (CONT)

(2) All ATWESS Inoperative (Cont)

Connect Turret Cable, connector P8, to connector J9 on Test Set Interface Cable. (Test set indicator light L1 will come ON. This indication has no effect on troubleshooting procedures.)



Verify sufficient laser rounds remain for testing.

If not, reset ICA.

Trigger CHAPARRAL Weapon System. (Test set indicator lights L2 and L3 may flash ON. These indications have no effect on troubleshooting procedures.)

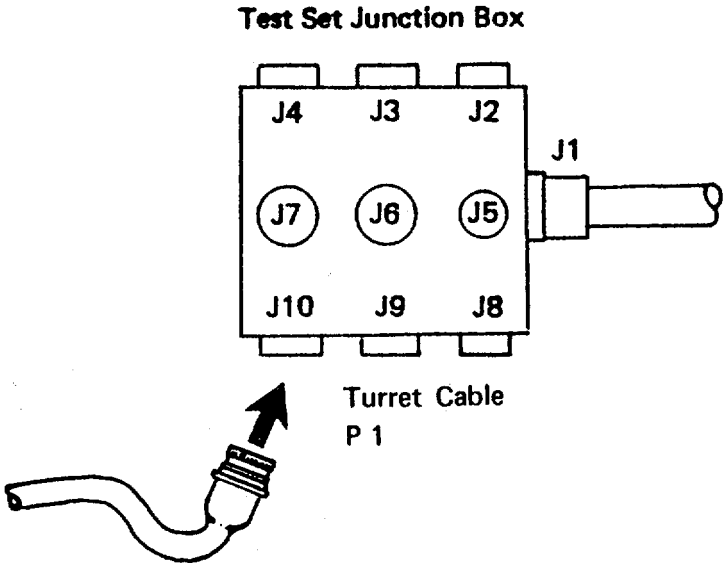
Check test set indicator light L4.

If light L4 flashes ON/OFF, replace defective Rail Assembly. Return system to service.

If light L4 does not flash ON/OFF, disconnect Turret Cable from Test Set Junction Box. Reconnect to Rail Assembly Cable, connector J8.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect Turret Cable, connector P1, from ICA. Connect to connector J10 on Test Set Junction Box.



Load a "live" ATWESS cartridge into ATWESS # 1 (uppermost ATWESS). Arm ATWESS by pulling up on SAFE/ARM shaft.

Verify test set switch S2 is in position "D".

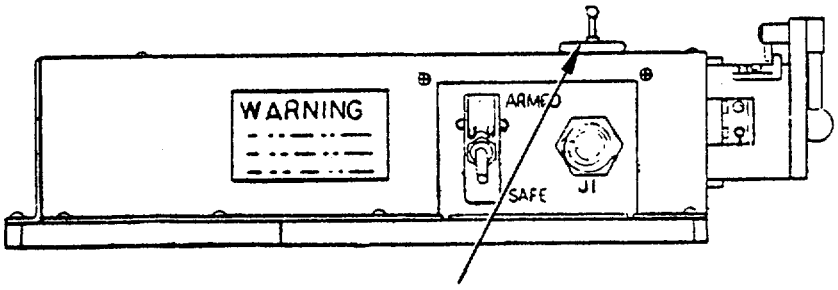


Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. CHAPARRAL WEAPON SIMULATOR (WESS) TEST (CONT)

(2) All ATWESS Inoperative (Cont)

Arm WESS by placing the SAFE/ARM switch in ARMED position.

WARNING

Stand clear of the WESS Assembly when the ATWESS is fired. Back blast can cause Severe Injury.

Depress test set switch S5. Verify ATWESS fires.

If ATWESS fires, replace defective ICA. Return system to service.

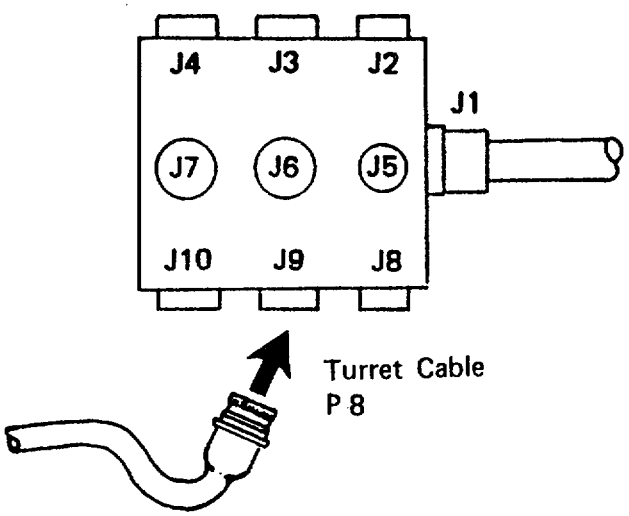
If ATWESS does not fire, replace defective Turret Cable. Return system to service.

(2.1) All ATWESS Inoperative/Voltage Incorrect

Disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to WESS.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

Connect Turret Cable, connector P8, to connector J9 on Test Set Junction Box.
Test Set Junction Box



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Check test set indicator light L1.

If light L1 comes ON, replace defective Rail Assembly. Return system to service.

If light L1 does not come ON, replace defective Turret Cable. Return system to service.

4. CONTROL INDICATOR ASSEMBLY (CIA) TEST

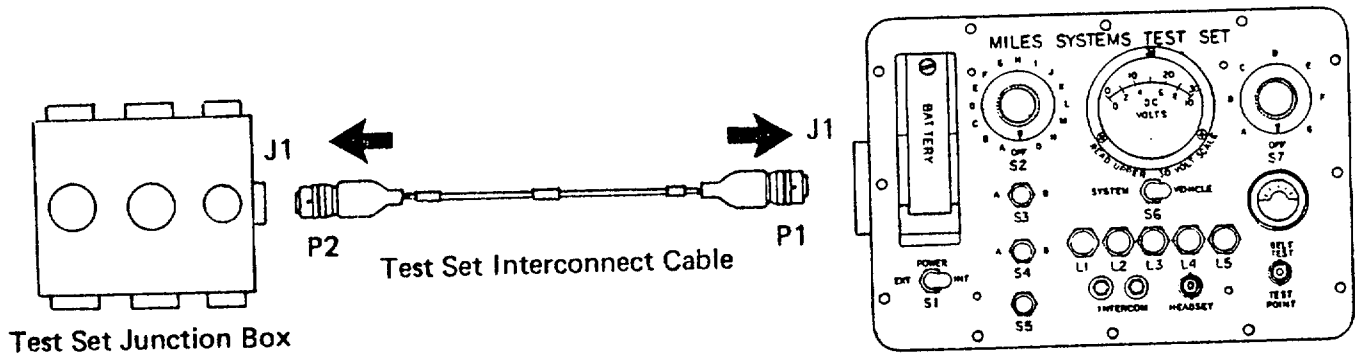
(1) Display Is Blank

Disconnect Turret Cable, connector P15, from CIA. Pause one second and reconnect.

Check CIA display.

If display indicates 00, return system to service.

If display is still blank, connect Test Set Interconnect Cable. connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box.



Place test set S1 to EXT.

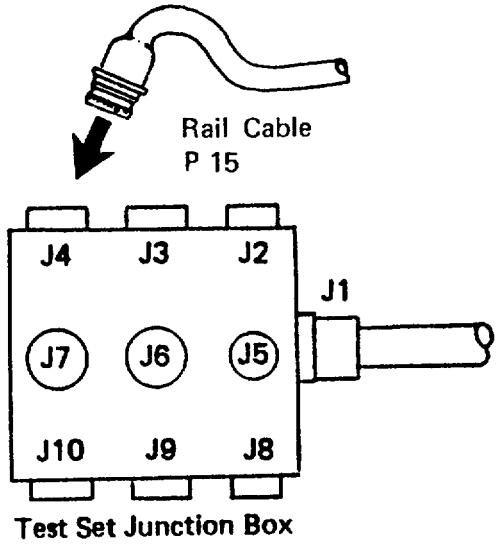
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. CONTROL INDICATOR ASSEMBLY (CIA) TEST (CONT)

(1) Display Is Blank (Cont)

Disconnect Rail Assembly Cable, connector P15, from CIA. Connect to Test Set Junction Box, connector J4.



Place test set switch S6 to SYSTEM.

Read voltage on the voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective CIA. Return system to service.

If voltage reading is less than 8.5 volts, disconnect Rail Assembly Cable, connector P10, from Turret Detection Cable, connector J10.

Read voltage on voltmeter.

If voltage reading is less than 8.5 volts, go to (1.1) Display Is Blank-CVKI (page 3-55).

If voltage reading is 8.5 to 13 volts, reconnect Rail Assembly Cable to Turret Detection Cable.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect each Detector Belt Assembly and Belts Cable, ONE AT A TIME. For each assembly, read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, the disconnected detector or Belts Cable assembly is defective. Replace assembly. Return system to service.

(1.1) Display Is Blank - CVKI

Disconnect Rail Assembly Cable, connector P14, from CVKI. Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective CVKI. Return system to service.

If voltage reading is less than 8.5 volts, disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to CIA.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

Connect Turret Cable, connector P8, to Test Set Junction Box. connector J9. (Test set indicator lamp L1 may be ON. This indication has no effect on troubleshooting procedures.)

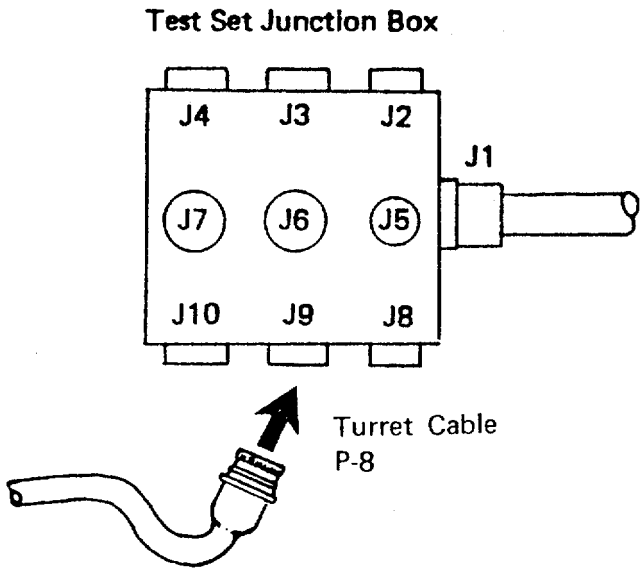


Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. CONTROL INDICATOR ASSEMBLY (CIA) TEST (CONT)

(1.1) Display Is Blank-CVKI (cont)

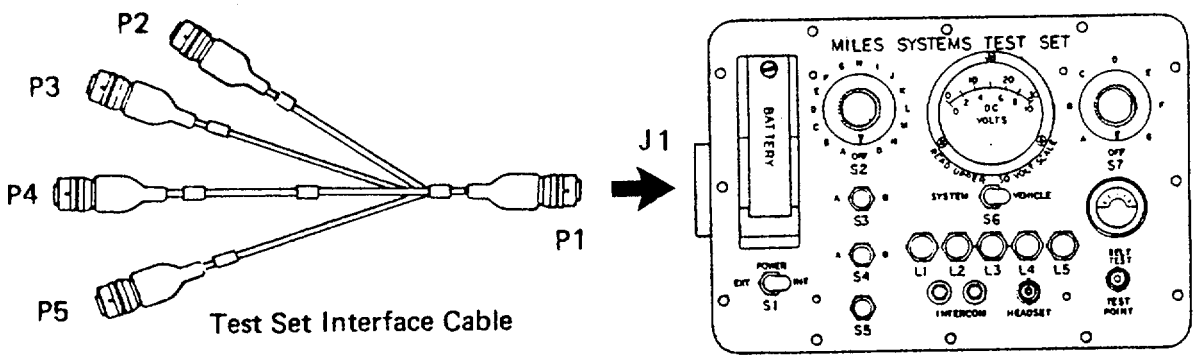
Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective Rail Assembly.
Return system to service.

If voltage reading is less than 8.5 volts, disconnect Turret Cable from Test Set Junction Box. Reconnect to Rail Assembly Cable, connector J8.

Disconnect the Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.



Disconnect Turret Cable, connector P5, from battery box. Connect battery box to Test Set Interface Cable, connector P4.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective Turret Cable.
Return system to service.

If voltage reading is less than 8.5 volts, install two new 6 V batteries in battery box.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, discard old batteries. Return system to service.

If voltage reading is less than 8.5 volts, replace defective battery box. Return system to service.

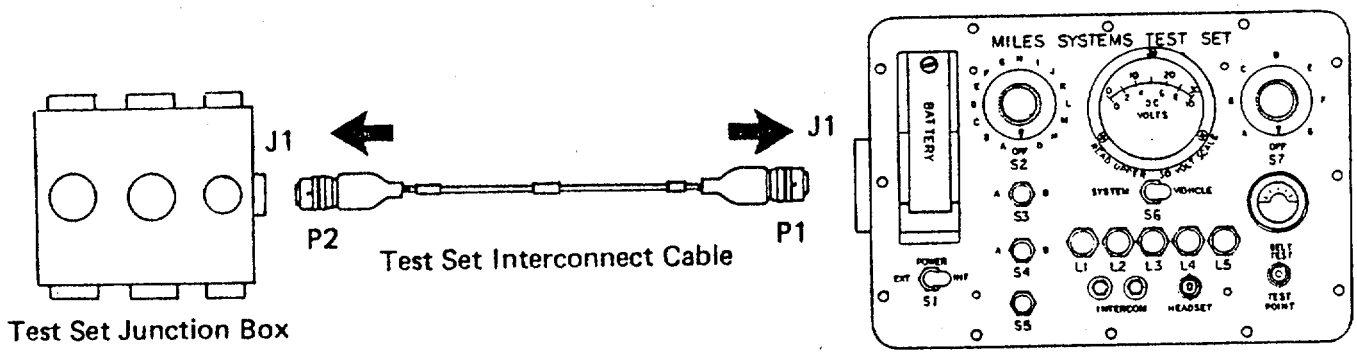
(2) Display Does Not Indicate 88

Insert Controller Key into WEAPON Key receptacle on CIA. Turn counterclockwise to CONTROLLER position. Turn back and remove key.

Turn CIA Console Switch to HIT/KILL. Turn to SELF TEST. Push PRESS TO READ. Check CIA display.

If display indicates 88, return system to service.

If display does not indicate 88, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Place test set switch S1 to EXT.

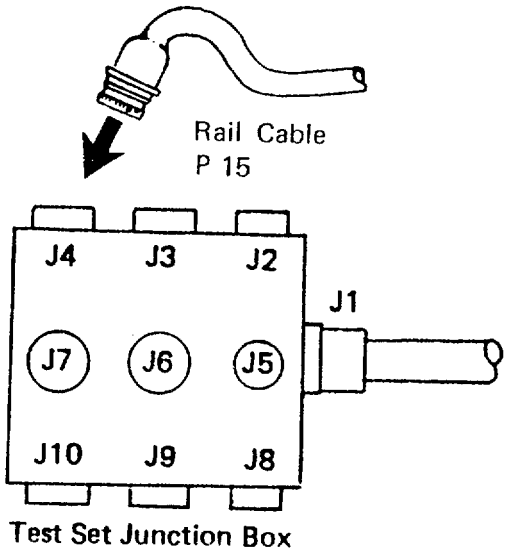
Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. CONTROL INDICATOR ASSEMBLY (CIA) TEST (CONT)

(2) Display Does Not Indicate 88 (Cont)

Disconnect Rail Assembly Cable, connector P15, from CIA. Connect to Test Set Junction Box. connector J4.



Place test set switch S6 to SYSTEM.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective CIA. Return system to service.

If voltage reading is less than 8.5 volts, discard old batteries. Install two new 6 V batteries. Return system to service.

(3) Weapon Identification Code Is Not Displayed

Failure of the CIA to display a Weapon Identification Code indicates a malfunction of the CIA.

Replace defective CIA. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(4) NOT READY Light Does Not Illuminate

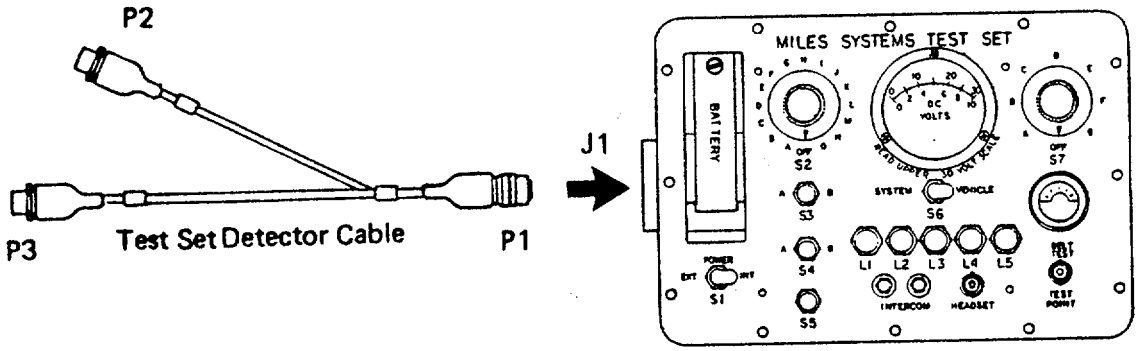
Failure of NOT READY light to light when a KILL response is indicated by CVKI indicates a malfunction of the CIA.

Replace defective CIA. Return system to service.

5. DETECTOR BELTS TEST

(1) One Turret Detector Belt Faulty

Connect Test Set Detector Cable, connector P1, to test set, connector J1.



Disconnect faulty detector belt,

Connect Test Set Detector Cable. connector P2. to faulty detector belt. Connect Test Set Detector Cable, connector P3, to Belts Cable connector previously attached to belt.

Place test set switch S6 to SYSTEM.

Place test set switch S1 to EXT.

Read voltage on voltmeter.

If voltage reading is less than 8.5 volts, replace defective Belts Cable.
Return system to service.

Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

5. DETECTOR BELTS TEST (CONT)

(1) One Turret Detector Belt Faulty (Cont)

If voltage reading is 8.5 to 13 volts, aim Controller Gun at suspect faulty detector belt. Fire a "NEAR MISS" signal. Check test set BELT TEST meter.

NOTE

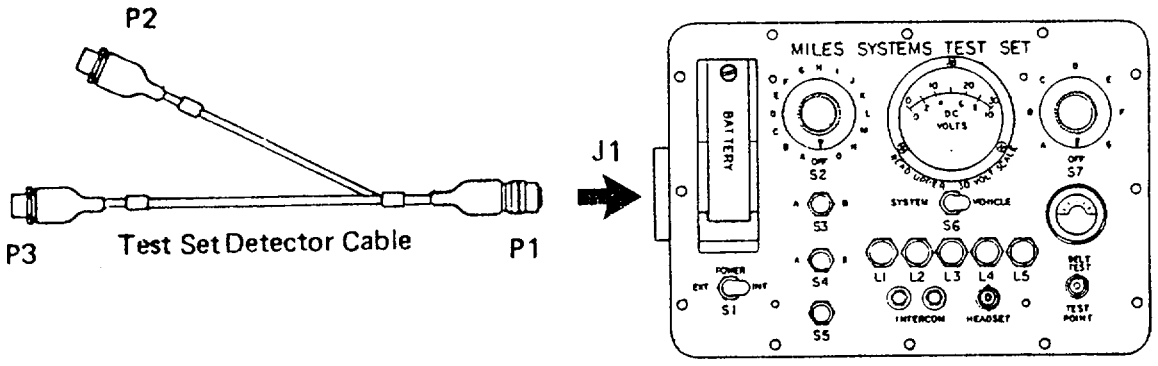
When firing Controller Gun at suspect faulty detector belts, maintain a minimum of 5 feet between Controller Gun and detector belts. At distances less than 5 feet, a FALSE rate reading is possible.

If BELT TEST meter indicates greater than 96, replace defective CVKI Cable. Return system to service.

If BELT TEST meter indicates less than 96, replace faulty detector belt. Return system to service.

(2) Front Detector Belt Faulty

Connect Test Set Detector Cable, connector P1, to test set, connector J1.



Place test set switch S6 to SYSTEM.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Place test set switch S1 to EXT.

Disconnect Front Detector Belt.

Connect Test Set Detector Cable, connector P2, to Front Detector Belt. Connect connector P3 to Detector/Power Cable.

Read voltage on voltmeter.

If voltage reading is less than 8.5 volts, proceed to Section (2.1) Front Detector Belt Faulty/Incorrect Voltage (page 3-62).

If voltmeter indicates 8.5 to 13 volts, aim Controller Gun at front belt. Fire a "NEAR MISS" signal. Check test set BELT TEST meter.

NOTE

When firing Controller Gun at front belts, maintain a minimum of 5 feet between Controller Gun and front belt. At distances less than 5 feet, a FALSE rate reading is possible.

If BELT TEST meter rate is less than 96, replace defective Detector Belt.
Return system to service.

If BELT TEST meter rate is greater than 96, disconnect Front Detector Belt and Detector/Power Cable from Test Set Detector Cable. Reconnect to each other.

Disconnect Belts Cable, connector P19, from Detector/Power Cable, connector J19.

Connect Test Set Detector Cable, connector P2, to Detector/Power Cable, connector J19, and P3 to Belts Cable, connector P19.

Fire a "NEAR MISS" signal by aiming Controller Gun at front belt. Check test set BELT TEST meter.

Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

5. DETECTOR BELTS TEST (CONT)

(2) Front Detector Belt Faulty (Cont)

If BELT TEST meter rate is greater than 96, replace defective Belts Cable. Return system to service.

If BELT TEST meter rate is less than 96, replace defective Detector/Power Cable. Return system to service.

(2.1) Front Detector Belt Faulty/Incorrect Voltage

Disconnect Front Detector Belt and Detector/Power Cable from Test Set Detector Cable. Reconnect to each other.

Disconnect Belts Cable, connector P19, from Detector/Power Cable, connector J19.

Connect Test Set Detector Cable, connector P2, to Detector/Power Cable, connector J19 and P3 to Belts Cable, connector P19.

Read voltage on voltmeter.

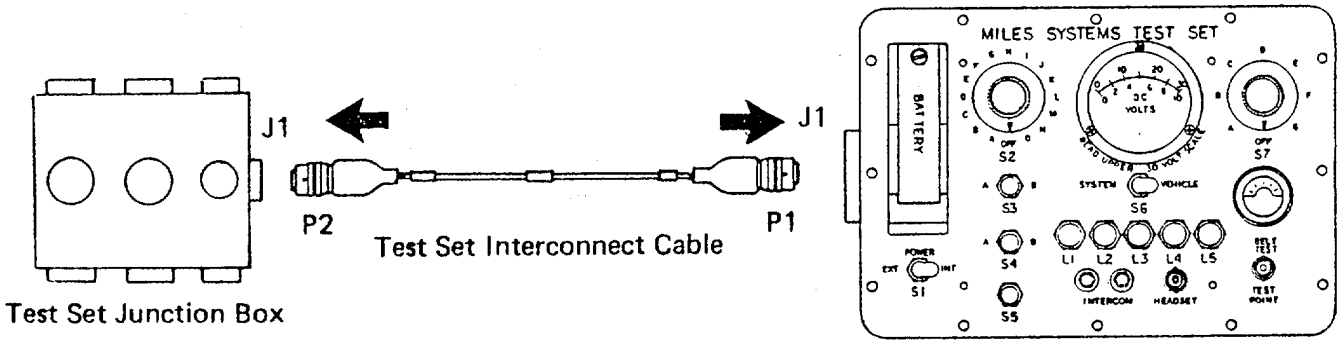
If voltage is 8.5 to 13 volts, replace defective Detector/Power Cable. Return system to service.

If voltage is less than 8.5 volts, replace defective Belts Cable. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(3) All Detector Belts Faulty

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Place test set switch S1 to EXT.

Disconnect Rail Assembly Cable, connector P15, from CIA. Connect to Test Set Junction Box, connector J4.

Read rate from detector belts on test set BELT TEST meter. See below to determine acceptable rate for 4 detector belts.

Detector Belt Rate		
Number of Belts	Full Sun	Shade
1	0-10	0-2
2	0-15	0-4
3	0-20	0-8
4	0-30	0-10

Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. DETECTOR BELTS TEST (CONT)

(3) All Detector Belts Faulty (Cont)

If rate is acceptable, go to (3.1) All Detector Belts Faulty-Controller Gun Test (see below).

If rate is unacceptable, disconnect one vehicle detector belt.

Read detector belt rate on BELT TEST meter. See Table 3-5 to determine acceptable rate for 3 detector belts.

If rate is now acceptable, replace detector belt that was disconnected. Return system to service.

If rate is unacceptable, reconnect detector belt previously disconnected. Repeat rate test on each of the remaining detector belts until the faulty belt is isolated.

If all belts are checked and rate is unacceptable, replace defective CVKI Cable. Return system to service.

(3.1) All Detector Belts Faulty-Controller Gun Test

Aim Controller Gun at detector belts. Fire a "NEAR MISS" signal. Check BELT TEST meter.

NOTE

When firing Controller Gun at detector belts, maintain a minimum of 5 feet between Controller Gun and detector belts. At distances less than 5 feet, a FALSE rate reading is possible.

If BELT TEST meter indicates greater than 96, replace defective CIA. Return system to service.

If BELT TEST meter indicates less than 96, disconnect one vehicle detector belt. Aim Controller Gun at remaining detector belts. Fire a "NEAR MISS" signal. Check BELT TEST meter.

If BELT TEST meter now reads greater than 96, replace disconnected detector belt. Return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

If BELT TEST meter indicates less than 96, reconnect detector belt. Repeat previous test for each of remaining vehicle detector belts.

If BELT TEST meter indicates greater than 96, replace belt that was disconnected previous to test. Return system to service.

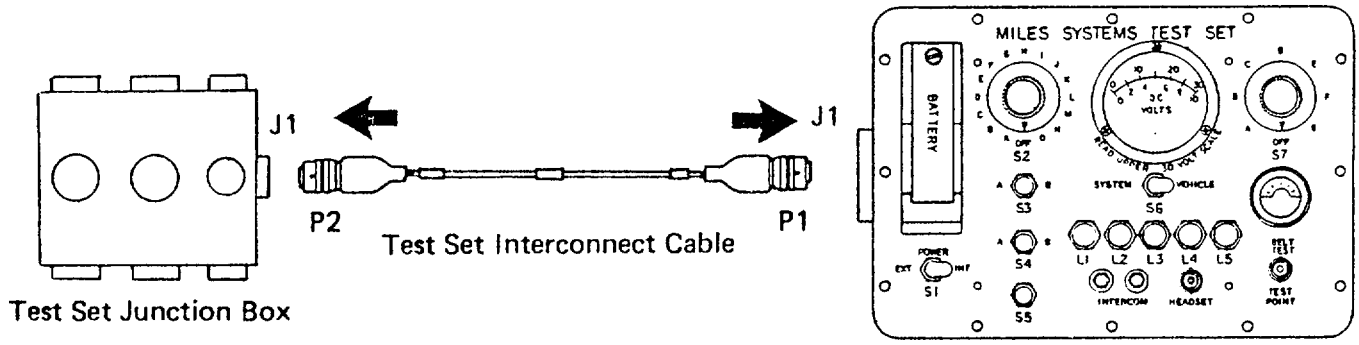
If BELT TEST meter continues to indicate less than 96 for all belts, replace defective CVKI Cable Assembly. Return system to service.

6. COMBAT VEHICLE KILL INDICATOR (C.KI) TEST

(1) Failure Of CVKI To Operate

Check that Turret Power switch is ON.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



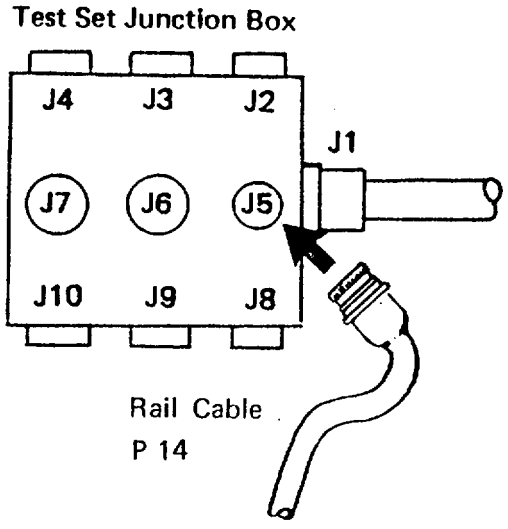
Disconnect Rail Assembly Cable, connector P14, from CVKI. Connect to Test Set Junction Box, connector J5.

Table 3-4. Troubleshooting - With MSTS (Cont.)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

6. COMBAT VEHICLE KILL INDICATOR (CVKI) TEST (CONT)

(1) Failure Of CVKI To Operate (Cont.)



Place test set switch S6 to VEHICLE.

Place test set switch S2 to 0.

Read voltage on voltmeter.

> If voltage reading is less than 18 volts, check CHAPARRAL electrical system for malfunction (refer to TM 9-1425-1586-10). Repair malfunction. Return system to service.

If there is no voltage reading, go to (1.1) Failure Of CVKI To Operate-Voltage Check (page 3-68).

If voltage reading is 18 to 32 volts, insert 9 V battery in test set. Set test set switch S1 to INT. Place test set switch S7 to E. Insert Vehicle (Orange) key into CIA WEAPON key receptacle. Turn CLOCKWISE to WEAPON.

Check test set indicator light L2.

If light L2 flashes ON/OFF, replace defective CVKI. Return system to service.

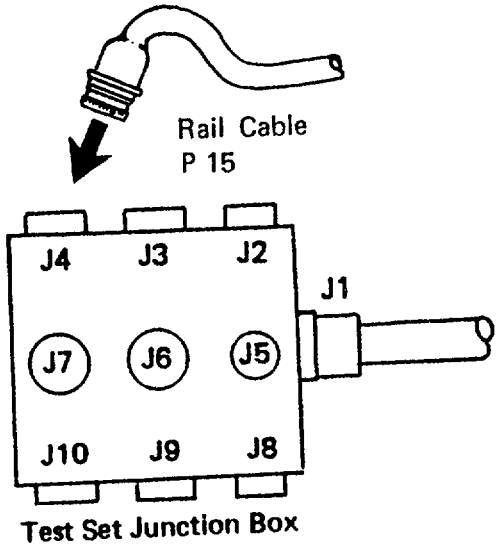
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

If light L2 does not flash ON/OFF, disconnect Rail Assembly Cable from Test Set Junction Box.

Reconnect Rail Assembly Cable, connector P14, to CVKI.

Place test set switch S6 to EXT.

Disconnect Rail Assembly Cable, connector P15, from CIA. Connect to Test Set Junction Box, connector J4.



Place test set switch S7 to G. Momentarily depress test set switch S5. Check CVKI.

If CVKI flashes, replace defective CIA. Return system to service.

If CVKI does not flash, replace defective Rail Assembly. Return system to service.

Table 3-4. Troubleshooting - With MSTS (Cont.)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

6. COMBAT VEHICLE KILL INDICATOR (CVKI) TEST (CONT)

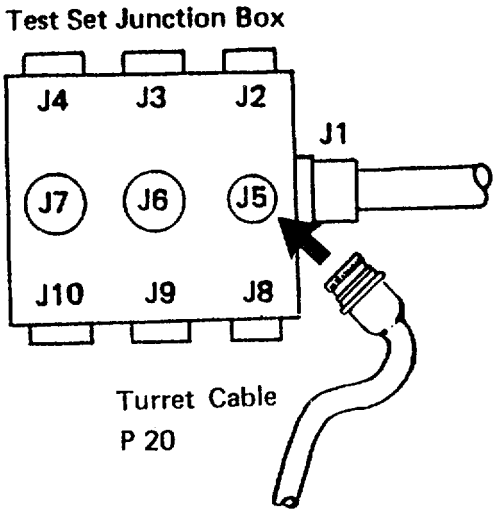
(1.1) Failure Of CVKI To Operate-Voltage Check

Verify Turret Cable connectors P3 and P4 are connected to Turret Hand Control Assembly.

Disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to CVKI.

Disconnect Turret Cable, connector P20, from Rail Assembly Cable, connector J20.

Connect Turret Cable, connector P20, to connector J5 on Test Set Junction Box.



Read voltage on voltmeter.

If voltage reading is 18 to 30 volts, replace defective Rail Assembly. Return system to service.

If voltage reading is less than 18 volts, inspect CHAPARRAL Weapon System for malfunction (refer to TM 9-1425-1586-10)

If weapon system is operational, replace Turret Cable. Return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 9-1425-1586-10). Return to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

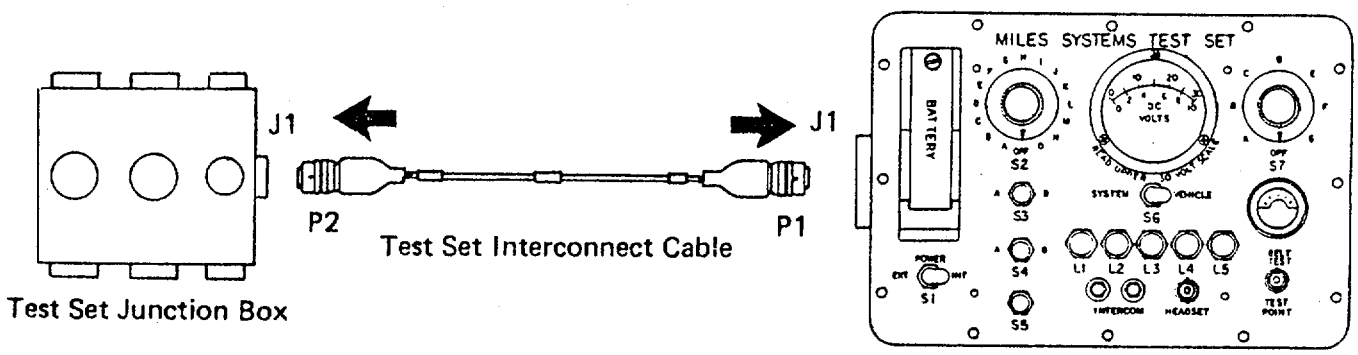
(2) CVKI Inoperative- Travel Mode (CVKI Operates When Not In Travel Mode)

Check that Vehicle Master Power is ON.

Check that Mount and Turret Power are ON.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1.

Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Disconnect Turret Power Cable, connector P21 from Detector/Power Cable, connector J21.

Connect Detector/Power Cable, connector J21 to Test Set Junction Box, connector J3.

Read voltage on voltmeter.

If voltage reading is 18 to 30 volts, replace defective Turret Power Cable. Return system to service.

If voltage reading is less than 18 volts, check CHAPARRAL's electrical system for malfunction (refer to TM 9-1425-1586-10). Repair malfunction. Return system to service.

If there is no voltage reading, check all Dome Light Travel Power Cable electrical connections at dome light. The Grounding Lug should be in contact with bare metal. Dome light will light when connections are properly made.

Table 3-4. Troubleshooting - With MSTS (Cont.)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

6. COMBAT VEHICLE KILL INDICATOR (CVKI) TEST (CONT)

(2) CVKI Inoperative- Travel Mode (CVKI Operates When Not In Travel Mode) (Cont.)

Reread voltage on voltmeter.

If voltage reading is 18 to 30 volts, return system to service.

If voltage reading is less than 18 volts, check CHAPARRAL electrical system for malfunction (refer to TM 9-1425-1586-10). Repair malfunction. Return system to service.

7. INTERCOM TEST

(1) No Intercom Audio Tone

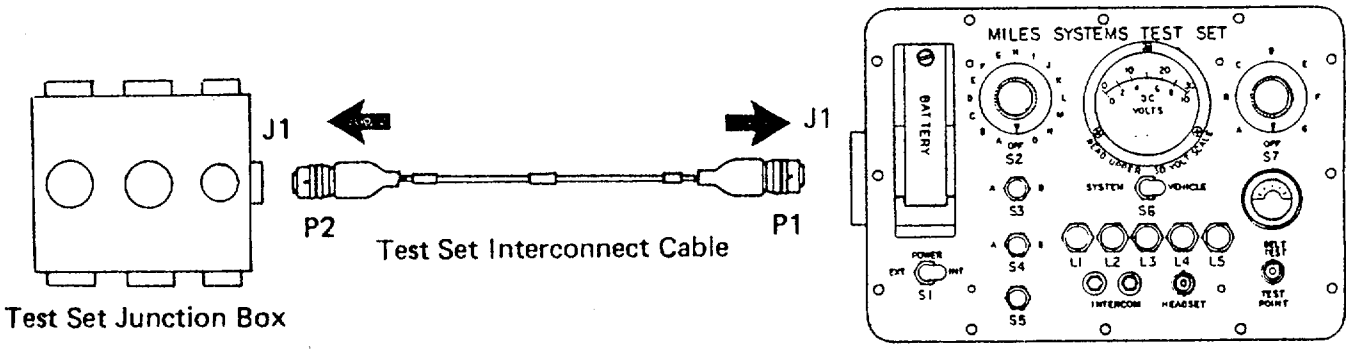
Replace existing headset with a headset known to be operational.

Insert Vehicle (Orange) key into WEAPON key receptacle on CIA. Turn clockwise to "SELF KILL" system. Turn back and remove key.

Listen on Headset.

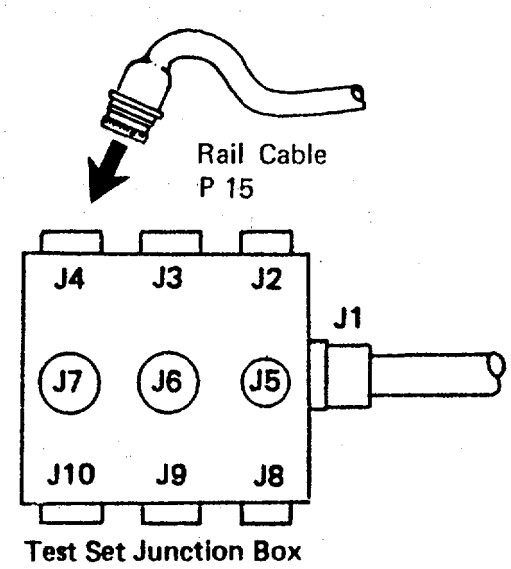
If AUDIO TONE is heard, replace defective vehicle headset. Return system to service.

If no AUDIO TONE is heard, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect Rail Assembly Cable, connector P15, from CIA. Connect to connector J4 on Test Set Junction Box.



Place test set switch S7 to B. (Note that test set indicator light L5 may come ON. This indication has no effect on troubleshooting procedures.) Listen on Headset.

If AUDIO TONE is heard, replace defective CIA. Return system to service.

If no AUDIO TONE is heard, place test set switch S6 to OFF.

Disconnect Rail Assembly Cable from Test Set Junction Box. Reconnect to CIA.

Disconnect Turret Cable, connector P8, from Rail Assembly Cable, connector J8.

Connect Turret Cable, connector P8, to Test Set Junction Box, connector J9.

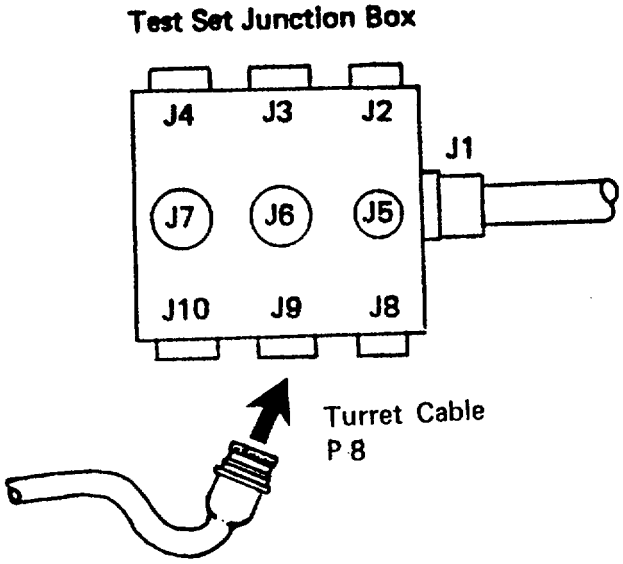
Table 3-4. Troubleshooting - With MSTS (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

7. INTERCOM TEST (CONT)

(1) No Intercom Audio Tone (Cont)

(Note that test set indicator lamp L5 may be ON. This indication has no effect on troubleshooting procedures.)



Place test set switch S6 to position B. Listen on Headset.

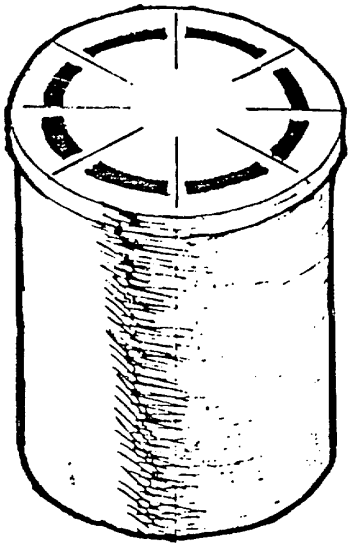
If AUDIO TONE is heard, replace defective Rail Assembly. Return system to service.

If no AUDIO TONE is heard, replace defective Turret Cable. Return system to service.

CHAPTER 4
AMMUNITION

SECTION I. MILES AGES/AD AUTHORIZED AMMUNITION (ATWESS)

The ATWESS Cartridge (Item 8, Appendix D) is the only type of cartridge authorized for use with MILES equipment installed on the CHAPARRAL Weapon System.



WARNING

Handle ATWESS cartridges with the same care you use with any live ammunition. A severe jolt to the ATWESS may cause the cartridge to go off.

Never arm the ATWESS until you are ready for a mission.

Never place hand over armed and loaded WESS device.

If ATWESS cartridge does not fire, be sure firing device is turned off before attempting to remove. Wait 5 minutes before removing.

If cartridge has cracks, tears, punctures in copper disk, or if cartridge primer is dented, return to your NCOIC for disposal IAW local EOD procedures.

If cartridge primer is not dented after attempting to fire, the ATWESS itself has not fired. Put another cartridge in ATWESS. Return unused cartridge to storage.

APPENDIX A
REFERENCES

A-1. SCOPE

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

A-2. FORMS

SF 368	Quality Deficiency Report
DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA Form 2062	Hand Receipt
DA Form 2402	Exchange Tag
DA Form 2404	Equipment Inspection and Maintenance Work Sheet

A-3. FIELD MANUALS

FM 21-11	Field Manual: First Aid for Soldiers

A-4. TECHNICAL MANUALS

TM 9-1265-208-10-HR	Hand Receipt For Simulator System Firing, Laser: For Chaparral Weapon System
TM 9-1265-370-10-3	Operators Manual Simulator System Firing, Laser: M63 for Ml13 APC
TM 9-1425-1586-10	Operators Manual for Improved Chaparral M48A1 Intercept-Aerial Guided Missile System

A-5. MISCELLANEOUS PUBLICATIONS

AR 310-2	Identification and Distribution of DA Publications
SB 11-6	Dry Battery Supply Data
DA PAMPHLET 738-750	The Army Maintenance Management System (TAMMS)

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

SECTION I. INTRODUCTION

B-1. SCOPE

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

B-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 (COEI). 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 (BII). These are the minimum essential items required to place the MILES Chaparral Weapon System in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the MILES Chaparral Weapon System 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.

B-3. EXPLANATION OF COLUMNS

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

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

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

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.

NOTE

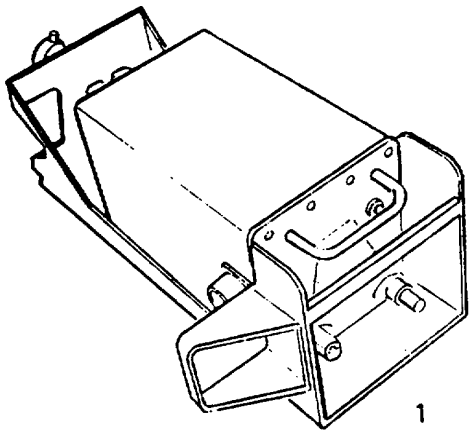
National stock numbers (NSNs) have not been assigned to all COEI, B11, and AAL items because these items are presently supported by contractor logistics support (CLS). When decision is made to assume Government support, NSNs will be assigned, and hand receipt entries (columns a, c, d, and e) will be furnished.

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).

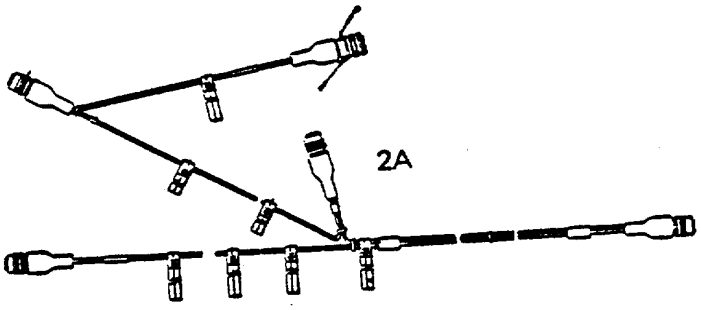
e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

SECTION II. COMPONENTS OF END ITEM

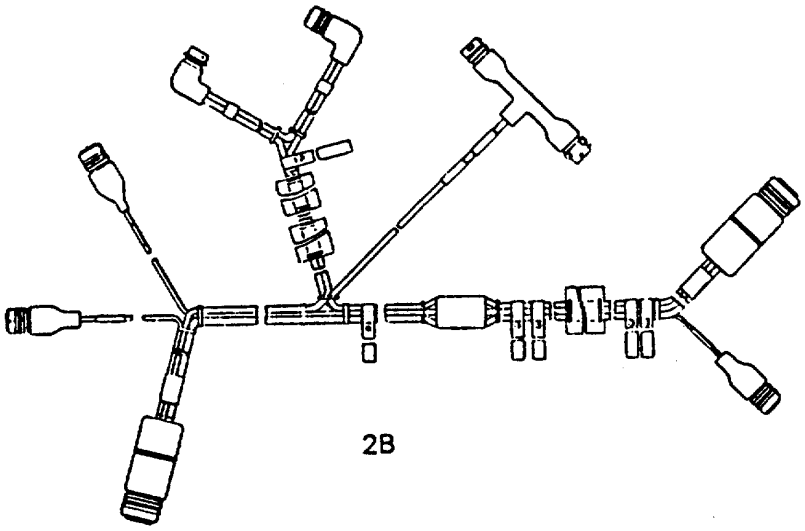
(1) Item Number	(2) National Stock Number	(3) Description CAGEC and Part No / Usable On Code	(4) U/M	(5) Qty Req.
1		Adapter Assy, Interface Control (19200) 9339398	EA	1
2		Adapter Set, Simulator System, Laser: Chaparral (19200) 9339552	EA	1
		Line Item / Part Number 9339552 consists of the following components:		
2A		Cable Assembly, Chaparral Belts (19200) 9339794	EA	1
2B		Cable Assembly, Chaparral Turret (19200) 9339795	EA	1
2C		Cable Assembly, Detector/Power (19200) 9358609	EA	1
2D		Cable Assembly, Turret Power (19200) 9358606	EA	1
2E		Detector Mounting Bracket Assembly (19200) 9358611	EA	2
2F	5310-00-477-6768	Nut, Hex 3/8-16 UNC-2B (96906) MS35649-2384	EA	2
2G	5305-00-021-3620	Screw, Cap, Hex Hd 1/4-20 UNC-2A X .88 LG (96906) MS35307-307	EA	8
2H	5305-00-478-0273	Screw, Cap, Hex Hd 3/8-16 UNC-2A X .50 LG (96906) MS35307-355	EA	2



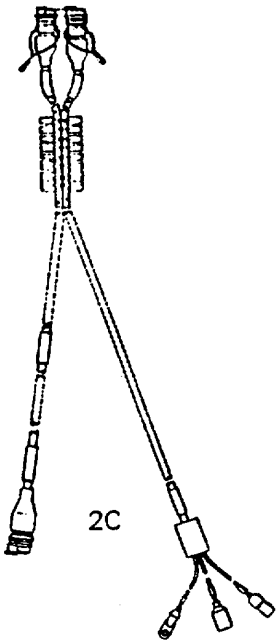
1



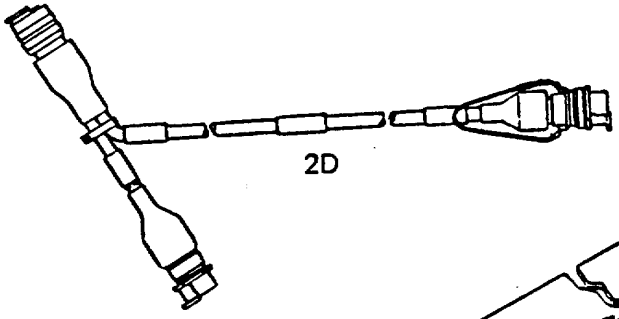
2A



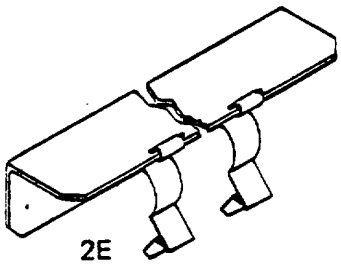
2B



2C



2D



2E

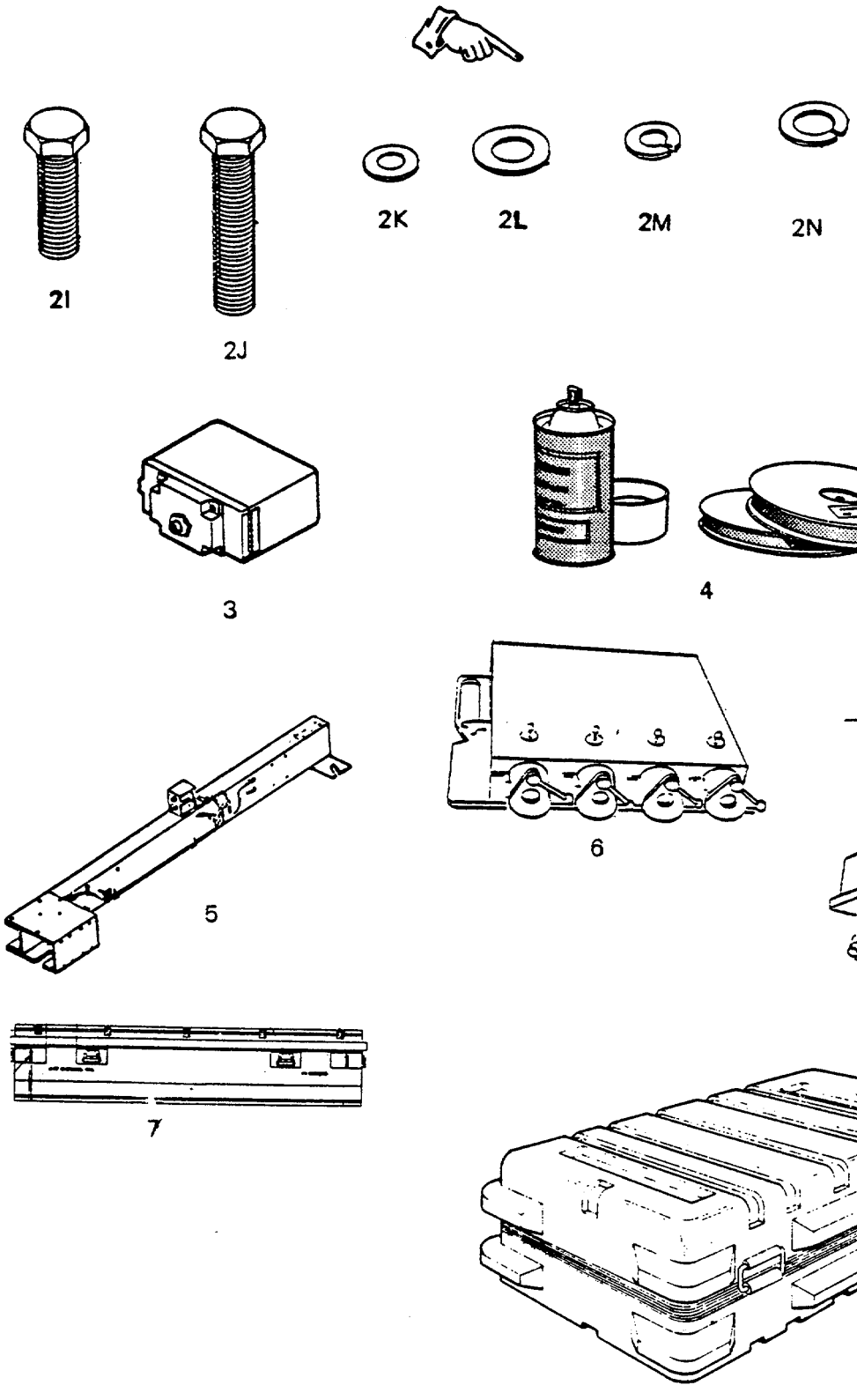
2F

2G

2H

SECTION II. COMPONENTS OF END ITEM (CONT)

(1) Item Number	(2) National Stock Number	(3) Description CAGEC and Part No	Usable On Code	(4) U/M	(5) Qty Req.
2I	5305-00-717-5467	Screw, Cap, Hex Hd 3/8-16 UNC.2A X 1.25 LG (96906) MS35307-362		EA	8
2J	5305-00-847-1159	Screw, Cap, Hex Hd 3/8-16 UNC-2A X 1.75 LG (96906) MS35307-365		EA	2
2K	5310-00-550-5054	Washer, Flat 1/4 (96906) MS15795-809		EA	8
2L	5310-00-773-7618	Washer, Flat 3/8 (96906) MS15795-814		EA	10
2M	5310-00-933-8121	Washer, Lock 1/4 (96906) MS35338-139		EA	8
2N	5310-00-984-7042	Washer, Lock No. 3/8 (96906) MS35338-141		EA	10
3		Battery Box Assembly (19200) 11749790		EA	1
4		Installation Kit, CHAPARRAL (19200) 9339559		EA	1
5		Rail Assy, Simulator System, Laser: Chaparral (19200) 9339555		EA	1
6		Simulator, Weapon Fire, CHAPARRAL (19200) 9339440		EA	1
7		Transit Case, Rail Assembly, CHAPARRAL (19200) 9339565		EA	1
8		Transit Case Assembly, CHAPARRAL (19200) 9339623		EA	1
9		Transmitter Assembly, Simulator System, Laser: CHAPARRAL (19200) 9339477		EA	1


2I
2J
2K
2L
2M
2N
3
4
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6
7
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9

SECTION III. BASIC ISSUE ITEMS

1 ea. TM 9-1265-201-10	Operator's Manual f /Simulator System, Firing, Laser: M77 f /Chaparral Weapon System

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

SECTION I. INTRODUCTION

C-1. SCOPE

This appendix lists additional items you are authorized for the support of the MILES Chaparral Weapon System.

C-2. GENERAL

This list identifies items that do not have to accompany the MILES Chaparral Weapon System and that do not have to be turned in with it. These items are all authorized to you by either CTA, MTOE, TDA, or JTA.

C-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) Item Number	(2) National Stock Number	(3) Description FSCM and Part Number Usable On Code	(4) U/M	(5) Qty Auth.
1	5860-01-155-5478	Alignment Device, Laser Transmitter, Multiple Range (19200) 9339389	EA	1
2	1265-01-092-0891	Controller's Gun, Simulator System, Laser (19200) 11748811	EA	1
3		MILES System Test Set (19200) 9358670	EA	1
4	1265-01-077-6082	Simulator System, Firing, Laser: M63 for M113 APC (19200) 11749272	EA	1
5	5120-00-243-9401	Hand Roller (24617) 6523520	EA	1

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the MILES CHAPARRAL Weapon System. 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.

D-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

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 III. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	C	6135-00-050-3280	* Battery, 6 Volt (80058) BA-200U	EA
2	C	8010-01-040-0947	Primer, Tape (19200) 11749034	CN
3	C	8315-01-111-7170	Tape, Fastener (19200) 11749428	YD
4	C	9150-01-079-6124	Cleaner, Lubricant and Preservative (CLP) (91349) MIL-L-63460	EA
5	C	7920-00-255-7536	Brush, Cleaning	EA
6	C	6640-00-240-5851	Paper, Lens Cleaning (81349) NNN-P-40	PK
7	C	7920-00-205-1711	Rag, Wiping: Cot DDD-R-30, CL 12, GR B	LB
8	C	1370-01-085-2601	Cartridge, Practice, M22 (19200) 11749630	CA

* Dry battery listed is used with the equipment. It will not be preshipped automatically but is to be requisitioned in quantities necessary for the particular organization in accordance with SB 11-6.

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By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches

1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches

1 Kilometer = 1,000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches

1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet

1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches

1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces

1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

5/9 (°F -32) = °C

212° Fahrenheit is equivalent to 100° Celsius

90° Fahrenheit is equivalent to 32.2° Celsius

32° Fahrenheit is equivalent to 0° Celsius

9/5 C° +32 = F°

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces

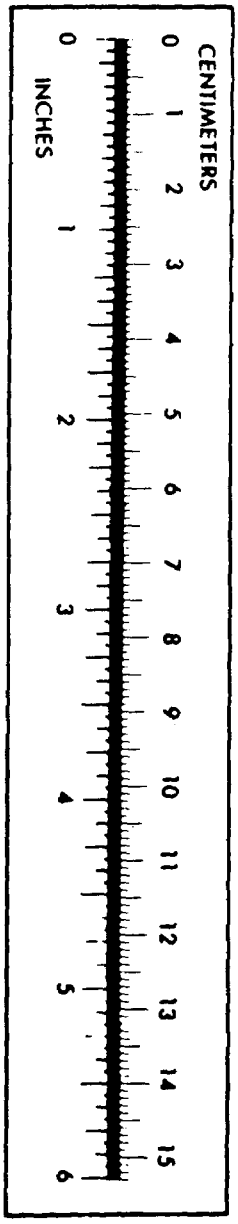
1 Kilogram = 1,000 Grams = 2.2 Lb.

1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds Per Square Inch	Kilopascals	6.895
Miles Per Gallon	Kilometers Per Liter	0.425
Miles Per Hour	Kilometers Per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds Per Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621



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