Field Manual
No. 44-18-1

***FM 44-18-1**

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 31 December 1984

S T I N G E R
TEAM OPERATIONS

* This field manual supersedes FM 44-18-1, 20 October 1980.

STINGER TEAM OPERATIONS

Table of Contents

"As part of the Army standardization program, the terms squad and team may be changed to crew. When implemented by ARs, TOEs, etcetera, the terms will be used in subsequent changes to this revised publication."

When used in this publication, "he," "him," "his," and "men" represent both the masculine and feminine genders unless otherwise stated.

Preface

The purpose of this manual is to provide guidance for the Stinger team in support of air defense operations. It is also written to support the training of individuals to function as members of a Stinger team.

When skilled individuals are molded into efficient, smooth-functioning teams, their capability to accomplish assigned missions is greatly increased. The effectiveness of Stinger varies directly with the individual skills of each team member and the collective proficiency of each team. The key to both is training.

This manual focuses on the techniques and procedures used by the Stinger team to engage and destroy hostile targets.

FM 44-18-1 consists of two parts:

Part I describes the Stinger system and tells how to use the weapon to shoot down aircraft. This part also describes how the team operates in combat.

Part II discusses the means and methods of training soldiers to operate the system.

This manual should be used with the system technical manual (TM 9-1425-429-12) which tells how the system functions and how to maintain it. Information found in the technical manual, such as that on maintenance and emergency destruction procedures, is not repeated in this manual.

This is a companion manual to FM 44-18, which tells how Stinger will be employed at the platoon and section levels, along with other air defense artillery (ADA) weapons, as an integral part of the combined arms team.

The tactical doctrine and procedures contained in FM 44-18 will be of little use if the Stinger team cannot effectively engage enemy aircraft. It does little good to have the Stinger team properly positioned unless the team chief and the gunner, working together, can engage and kill an enemy aircraft when called upon to do so. This requires training in engagement procedures, as outlined in this field manual.

The material contained in this field manual is applicable to both nuclear and nonnuclear warfare without modification.

Checklists shown on pages 8 through 17 of Chapter 17, are recoin. mended checklist formats. Those shown are samples for your guidance.

Users of FM 44-18-1 are encouraged to submit recommended changes or specific comments to improve the publication. Comments should be keyed to the specific page and line of text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be prepared on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded directly to:

Commandant
US Army Air Defense Artillery School
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Fort Bliss, Texas 79916-7155.

PART I

THE STINGER WEAPON SYSTEM

CHAPTER 1

System Description

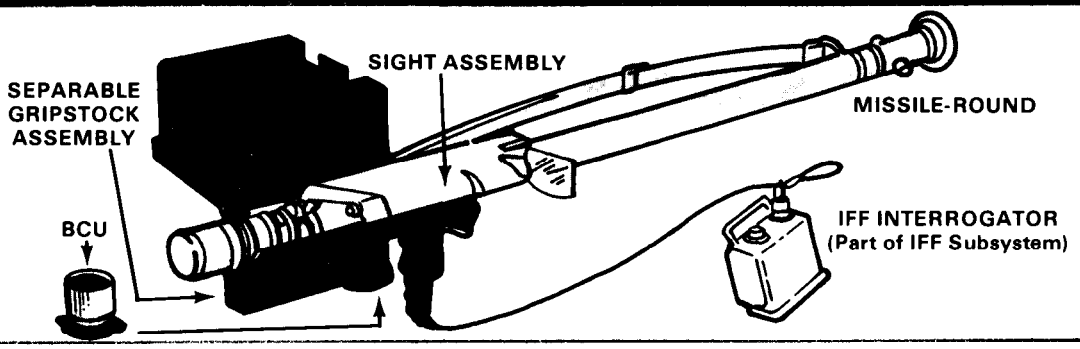
The Stinger weapon is a man-portable, shoulder-fired, infrared radiation (IR) homing (heat-seeking), guided missile system. It requires no control from the gunner after firing. Stinger has an identification, friend or foe (IFF), subsystem which aids the gunner and team chief in identifying friendly aircraft. Operations at night or in adverse weather conditions are somewhat restricted by the gunner's ability to see and identify the target. Stinger provides short-range air defense for maneuver units and the less mobile combat support units. The Stinger system is designed to counter high-speed, low-level, ground attack aircraft. Stinger is also a lethal weapon against helicopter, observation, and transport aircraft.

CONTENTS

READY-ROUND

The Stinger missile-round consists of a Stinger missile sealed in a disposable launch tube assembly. The Stinger weapon-round is made up of a missile-round mated to a separable gripstock assembly. When a battery/-coolant unit (BCU) is inserted into the weapon-round to provide prelaunch power to the system, it becomes a ready-round. For IFF capability, an IFF interrogator is connected to the gripstock assembly as illustrated below.

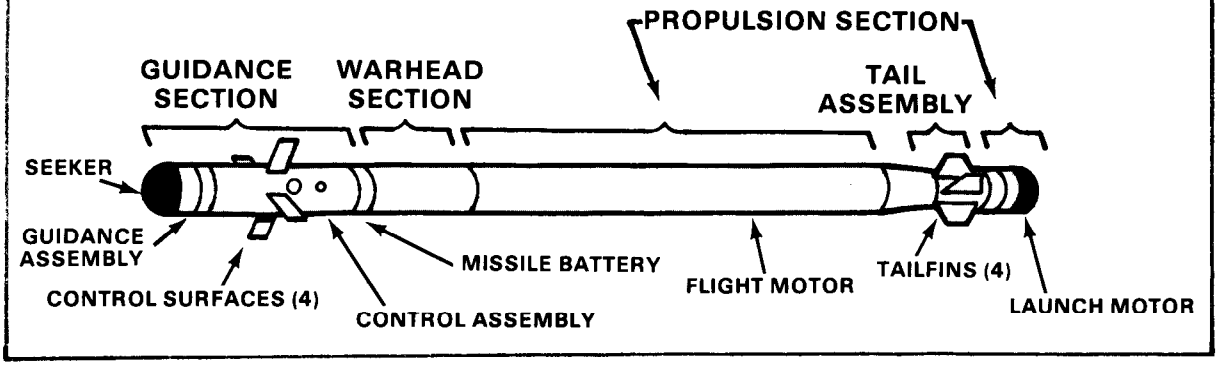
STINGER READY-ROUND W/IFF INTERROGATOR



MISSILE-ROUND

Major components that make up the missile are shown in the Stinger Missile-Round illustration.

STINGER MISSILE-ROUND



The guidance section of the missile consists of a guidance assembly, a control assembly, a missile battery, and four control surfaces. The guidance assembly processes target IR and provides guidance commands for the missile during flight. The seeker tracks

the IR source automatically after the gyro is uncaged and during missile flight. The control assembly converts the guidance commands into movement of control surfaces which direct the flight of the missile. The missile battery provides the in-flight power for the Stinger guided missile.

The warhead section consists of a fuze assembly and a quantity of explosives, all within a cylindrical case. After the flight motor ignites, the fuze arms the warhead. The fuze can detonate the warhead in two ways: by means of a low impact switch or by a hard target sensor. Should target intercept not occur within 15-19 seconds after launch, a self-destruct circuit initiates warhead detonation. Safety features are included to insure that the missile is safe for shipping and handling.

The propulsion for the missile is provided by a separable launch motor and a dual thrust flight motor.

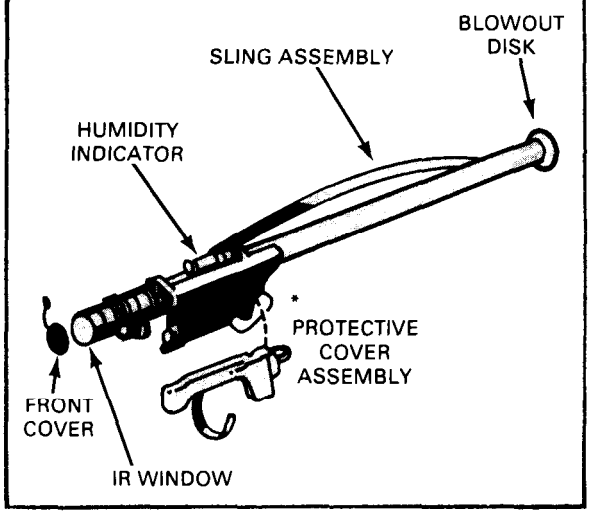
The launch (eject) motor provides initial thrust that ejects the missile from the launch tube. It allows the missile to coast a safe distance (about 9 meters/29 feet) from the gunner prior to ignition of the flight motor. The launch motor is expended and separated from the flight motor before the missile is out of the launch tube. The expended launch motor leaves the launch tube and falls a safe distance forward of the gunner. Also, at separation, a lanyard attached to the launch motor pulls the shorting plug from the flight motor ignition circuit, thus enabling the flight motor.

The flight motor provides propulsion for the missile during flight. The flight motor fires after the missile coasts for a safe distance from the gunner. Thrust for the flight motor is provided in two phases: boost and sustain. Initially, both burn simultaneously. The boost phase rapidly accelerates the missile to its top speed. The boost phase ends, but the sustain phase continues. The sustain phase maintains the missile speed for a time sufficient to complete the mission.

The tail assembly of the Stinger missile consists of four folding tailfins that provide roll and missile stability. Within the launch tube, the fins are in a folded position. As the missile leaves the launch tube, the fins are erected by spring action and by the force generated by missile spin, and then locked into place.

The launch tube is a fiberglass tube which provides the main support for all parts of the launcher. Both ends of the launch tube are sealed with breakable disks. The IR window (front disk) is transparent to IR. Both the IR window and the blowout disk (rear) break when the missile is fired. A desiccant cartridge\ humidity indicator on the launch tube indicates whether moisture has entered the tube.

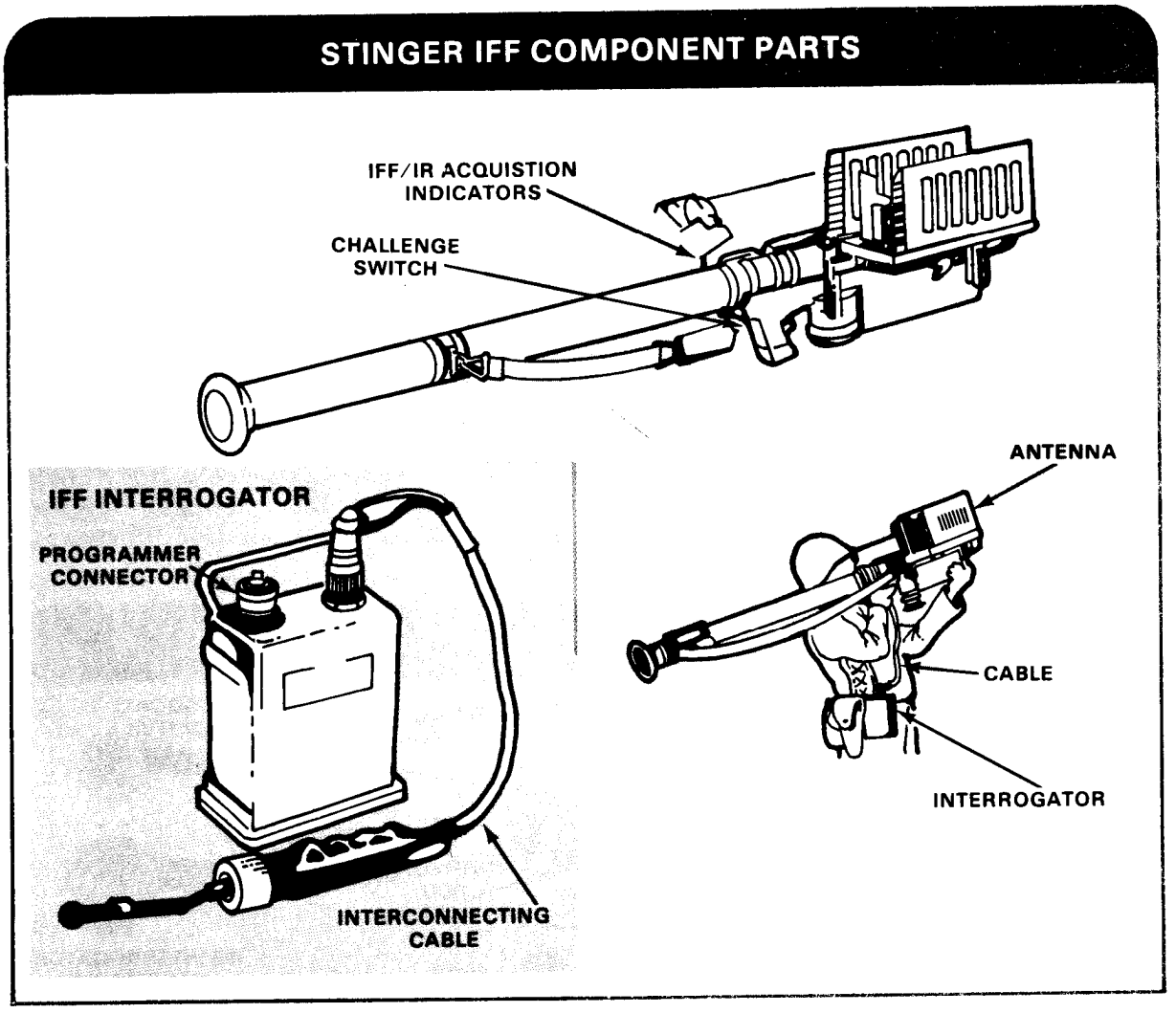
LAUNCH TUBE ASSEMBLY



*The protective cover assemblies should be retained for possible use in the event it becomes necessary to back pack weapons without the gripstock assemblies attached.

IFF SUBSYSTEM

Stinger is equipped with an IFF subsystem to aid in the identification of aircraft. The IFF sytem classifies aircraft as either friendly or unknown. It does not identify hostile aircraft (see Hostile Criteria, chapter 4). The IFF components are shown in the illustration and are described in the following paragraphs.



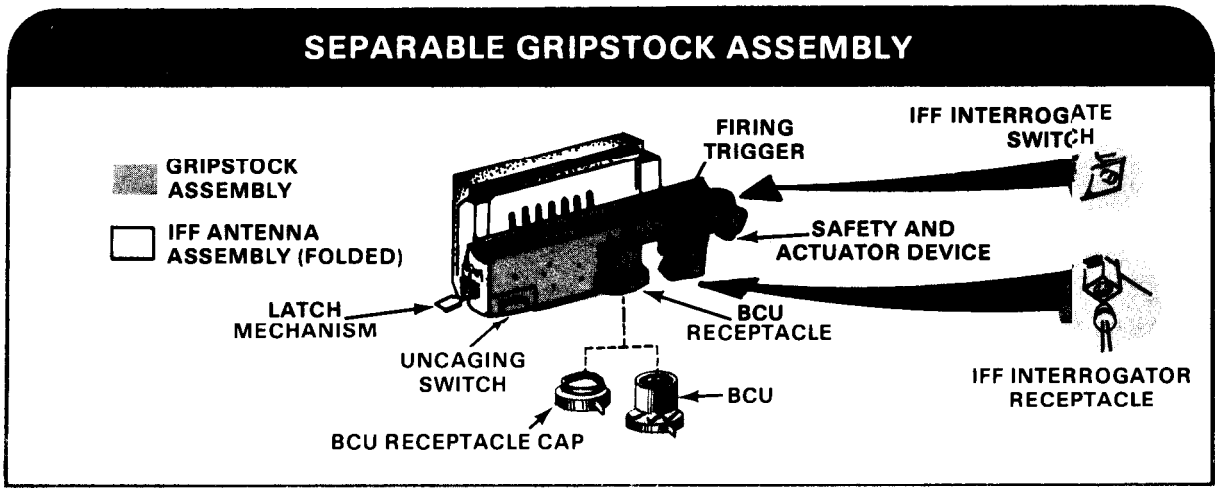
The gunner initiates the IFF sequence by pressing the IFF INTERROGATE switch on the gripstock assembly. Once the gunner issues a challenge, the rest of the sequence is automatic. The IFF interrogator, attached to the gunner's belt, sends a coded challenge (via an IFF antenna) to the aircraft. Aircraft with Mark X or Mark XII transponders will automatically decode if the interrogator is programmed with Modes 4 and 3. Mode 3 is built into the interrogator; however, if during programming the Mode 4 position is used, Mode 3 (Mark X) will not be challenged until the 2 or 4 days of Mode 4 coded have expired.

The aircraft's transponder then prepares and sends a coded reply. The reply is received by the Stinger IFF antenna and is routed to the interrogator for decoding. The interrogator converts the reply into an audible tone which is then routed via the interconnecting cable to the gunner as a friendly tone. If the aircraft's transponder sends an incorrect reply to the IFF challenge, the reply is processed by the IFF system into an unknown tone. Additionally, aircraft not equipped with the transponders will not reply to the challenge, and this is also interpreted into an unknown tone. The gunner hears the friendly or unknown tone in his right earphone immediately after challenging the aircraft. The tones are further described in chapter 4.

The IFF challenge is coded in either a complex, crypto secure Mode 4 form or a simpler Mode 3 form. All US combat aircraft and helicopters are equipped with transponders to provide friendly Mode 4 and 3 replies. However, some aircraft operating in the combat zone, to include US commercial aircraft and some aircraft belonging to our allies, are not capable of providing friendly Mode 4 replies. They can only provide friendly Mode 3 replies. Thus, since the Mode 4 code is secure, a friendly Mode 4 reply is considered a true friend reply. A friendly Mode 3 reply is considered only as a possible friend reply.

GRIPSTOCK ASSEMBLY

The separate gripstock assembly contains all the necessary circuits and assemblies that allow the gunner to interrogate aircraft and to prepare and launch missiles. The gripstock is attached to and removed from a launch tube by means of a latch. Located on the gripstock assembly are the safety and actuator device, UNCAGING switch, firing trigger, IFF antenna assembly, IFF INTERROGATE switch, IFF interrogator connector, and BCU receptacle (see illustration below).



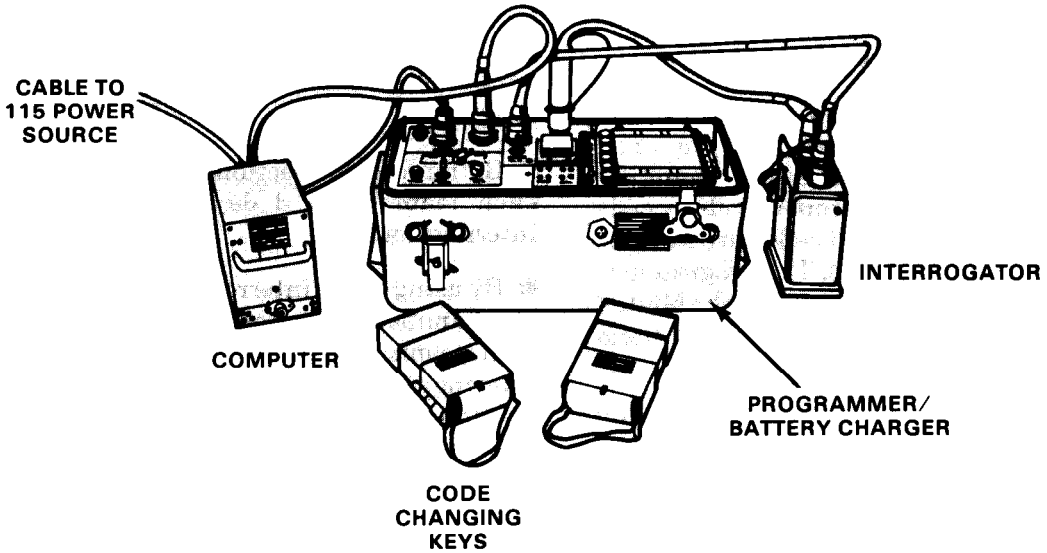
The antenna assembly folds into a holder on the right side of the gripstock assembly when not in use. When it is deployed and the interrogator is connected to the gripstock, it is capable of interrogating aircraft and receiving coded replies. After a missile is fired, the separable gripstock assembly is removed from the launch tube assembly for reuse. The separable gripstock assembly can be reused until failure.

The BCU is used to energize the weapon's electrical circuits and to cool the IR detector in the missile's seeker prior to launch. It contains a thermal battery and pressurized argon gas coolant. Prior to use, the BCU is inserted into the BCU receptacle and tightened one-quarter turn. It is activated when the safety and actuator device on the gripstock is pressed forward, outward, and downward (until a click is heard) and then released. Once activated, the BCU supplies electrical power and seeker coolant to the weapon for 45 seconds or until missile launch. The BCU is not reusable after it is activated. Either two or three BCUs are supplied with each weapon-round and missile-round (depending on year of issue).

IFF SUPPORT EQUIPMENT

Support equipment for the IFF system is available at section headquarters. This equipment includes a programmer/battery charger AN/GSX-1, computer KIR-lA/TSEC (with power supply model ZAC A/1), and two code changing keys KIK-18/TSEC. The computer and code changing keys (when set with classified code) are classified CONFIDENTIAL, and must be safeguarded as outlined in AR 380-40. The interrogator (specifically, the reply evaluator module within the interrogator) is also classified CONFIDENTIAL and proper security measures for it must be taken. An IFF subsystem training set is available for training purposes and is described in chapter 13.

IFF SUPPORT EQUIPMENT



The programmer/battery charger programs the IFF interrogator and charges the interrogator batteries. Each function may be done separately or both may be done at the same time. Section headquarters personnel normally program and recharge the interrogator and battery. A brief description of each function follows. The -10 operator's manual and the KAM225C/TSEC may be consulted for more detailed interrogator programming and battery charging procedures. Also, the code book (AKAK) contains coded key numbers and instructions for destruction of the code book. The code book is kept at custodial level. Custodians will extract and annotate the code tables with the effective dates to support the situation.

BATTERY CHARGING

The battery charger can charge up to six interrogator batteries at one time. It takes a minimum of 4 hours to fully charge the batteries. Additional charge time will not hurt the batteries. A freshly charged battery is installed in the interrogator prior to programming.

INTERROGATOR PROGRAMMING

After a charged battery is installed, the IFF interrogator is manually programmed for 4 days of operation. The code changing key is used to insert the proper Mode 4 codes into the computer (Mode 3 codes are already built into the interrogator). The programmer provides the means for extracting the Mode 4 codes from the computer and inserting them into the interrogator.

Either one of two programs is selected by operating a function switch on the programmer. For either program, a 4-day countdown period is started in the interrogator by the programmer. At the end of the 4-day period, an automatic time clock stops. The interrogator switches to Mode 3 operation and continues operating in Mode 3 until the batteries are discharged or until the interrogator is reprogrammed.

In the Mode 4/3 position (the normal setting used for programming), the interrogator is programmed to interrogate in Modes 4 and 3. Initial interrogation is made in Mode 4. If there is no Mode 4 reply by the aircraft or the reply is incorrect, the interrogator automatically switches to Mode 3 and interrogates again.

In the Mode 4 position, the interrogator is programmed to interrogate in Mode 4 only. The interrogator will not automatically interrogate in Mode 3 after an incorrect Mode 4 reply. Certain situations may require that the interrogator be programmed for Mode 4 only operation. Tactical standing operating procedures (TSOP) dictate where the interrogators will be programmed in this matter.

Programming is done every 2 or 3 days, depending upon the tactical situation. The interrogator may be programmed—

- By having each team turn in its interrogator to section headquarters every 3 days or less. It can be exchanged for another, if available, or it can be programmed and then returned to the team.

- By having the section headquarters visit each team every 3 days to program the interrogator.

- By using spare interrogators. These can be programmed at section headquarters, taken to the teams, and exchanged there. The team's interrogator would then be taken to section headquarters, programmed, and held for another team exchange. The exchange can be done by liaison visits. For further information on how to set the code changer key and load the computer, refer to Limited Maintenance Manuals KIR-lA/TSEC; KII-lA/TSEC; and KAM 225C/ SEC.

SELF-CHECK

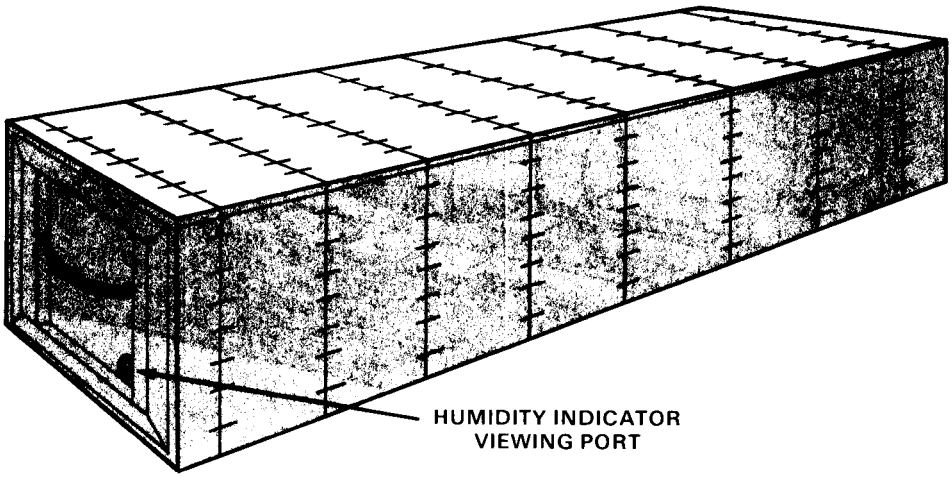
Another function of the programmer is to self-check the interrogator after data transfer. An audio signal confirms that the interrogator is operational and has accepted the program selected by the programmer. An additional test should be made by coordinating with a known friendly aircraft having an operational and correctly coded Mode 4 transponder. The friendly aircraft is interrogated to verify that the interrogator's Mode 4 codes are correct.

SHIPPING AND STORAGE CONTAINERS

The following paragraphs describe the shipping and storage containers for the Stinger weapon system.

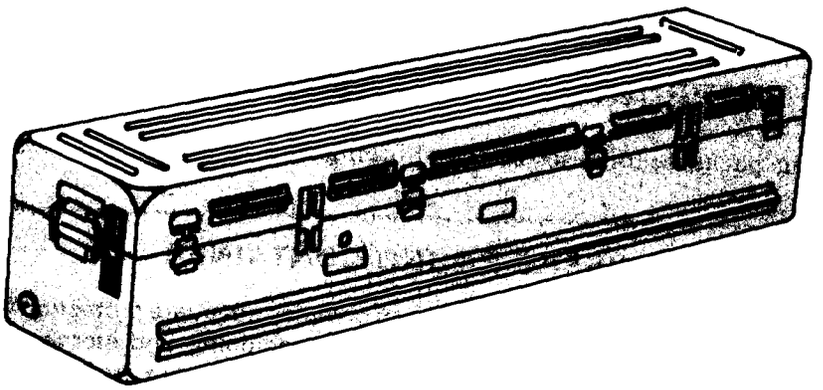
MISSILE-ROUND CONTAINER

This container is a wooden box which provides adequate protection for one missile-round and two or three BCUs during shipping and storage. It also contains one set of ear plugs. These items, in a cardboard box, are wrapped in a sealed barrier bag, with desiccant, for protection against the environment. A humidity indicator is enclosed in the bag to indicate moisture content. The bag is inside a fiber-board liner which is inside the wooden box. Two of these boxes, containing missile-rounds, are issued to each team as the remaining part of their basic load. As rounds are expended, the gunner simply opens a missile-round container, removes the missile round, mates the gripstock assembly from the expended round to the new missile round, and installs a BCU. He then has a new ready-round to use, if needed. Empty missile-round containers and dunnage are kept to maintain the shape of the load in the trailer until resupply. At this time, the empty containers are replaced with full containers.



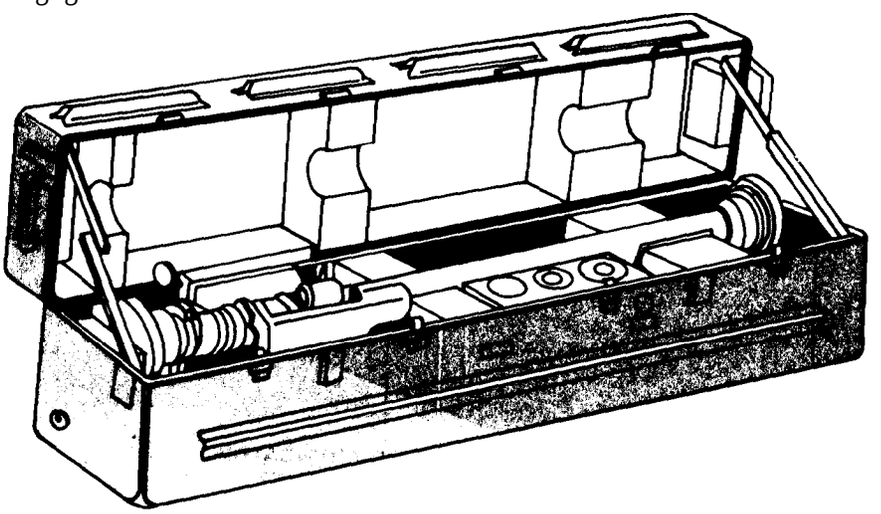
WEAPON-ROUND CONTAINER

This container is an aluminum box which provides environmental protection for one weapon round and several BCUs during shipping and storage. Inside each container is one set of ear plugs. The container is equipped with four latches, handles for two-man carry, a pressure relief valve, humidity indicator, and a BCU storage area (for either three or five BCUs). Four of these containers with weapons are issued to each team as part of its basic load. The containers will be reused.



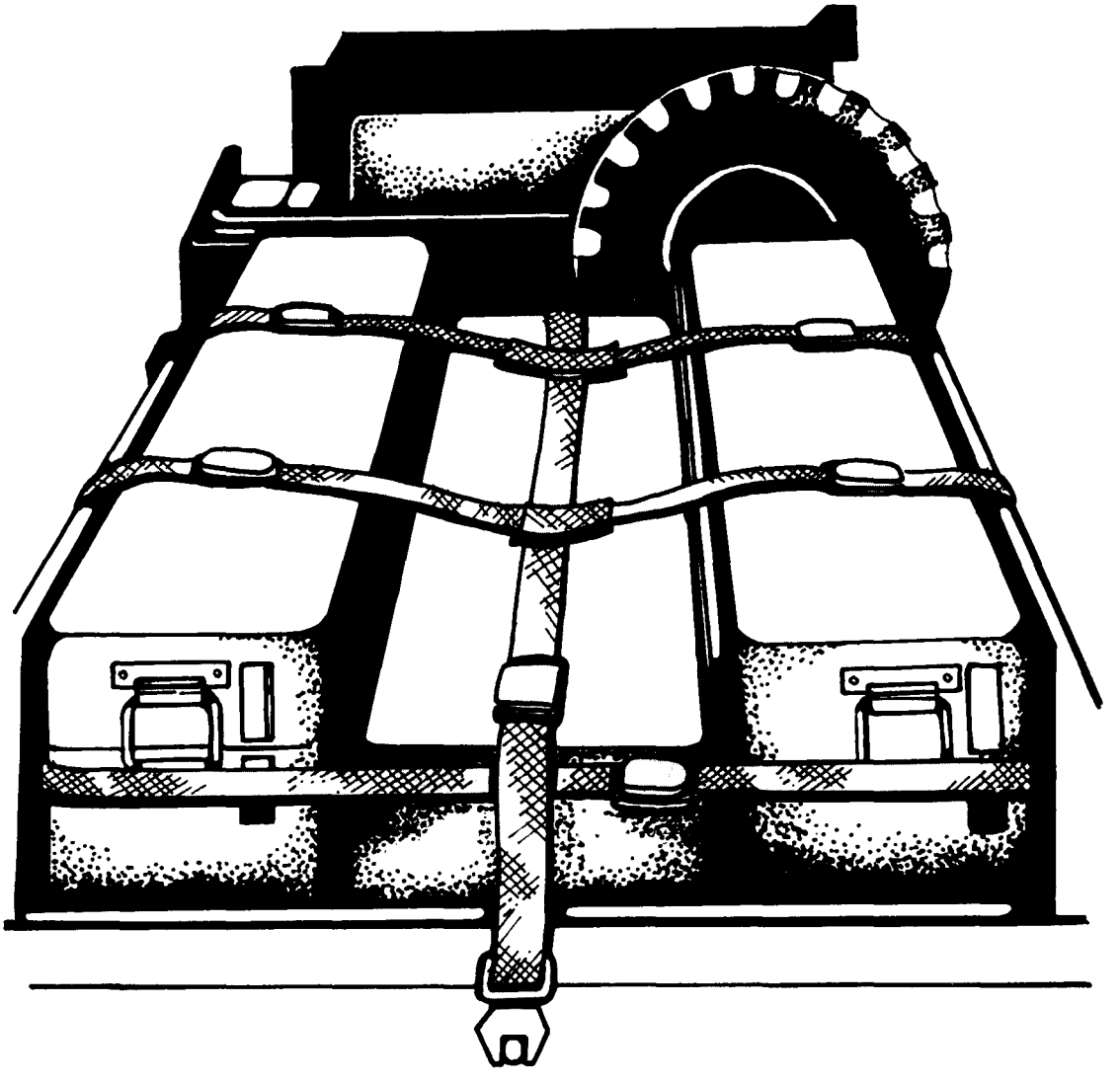
READY RACK

A container is converted to a ready rack by releasing the latches which make the ready round (a weapon-round with BCU installed) readily accessible. When used as a ready rack, the closed container provides limited environmental protection for the ready round. The ready rack setup helps provide the capability for a gunner to open the container, remove, shoulder, and prepare the weapon for engagement within 10 seconds.



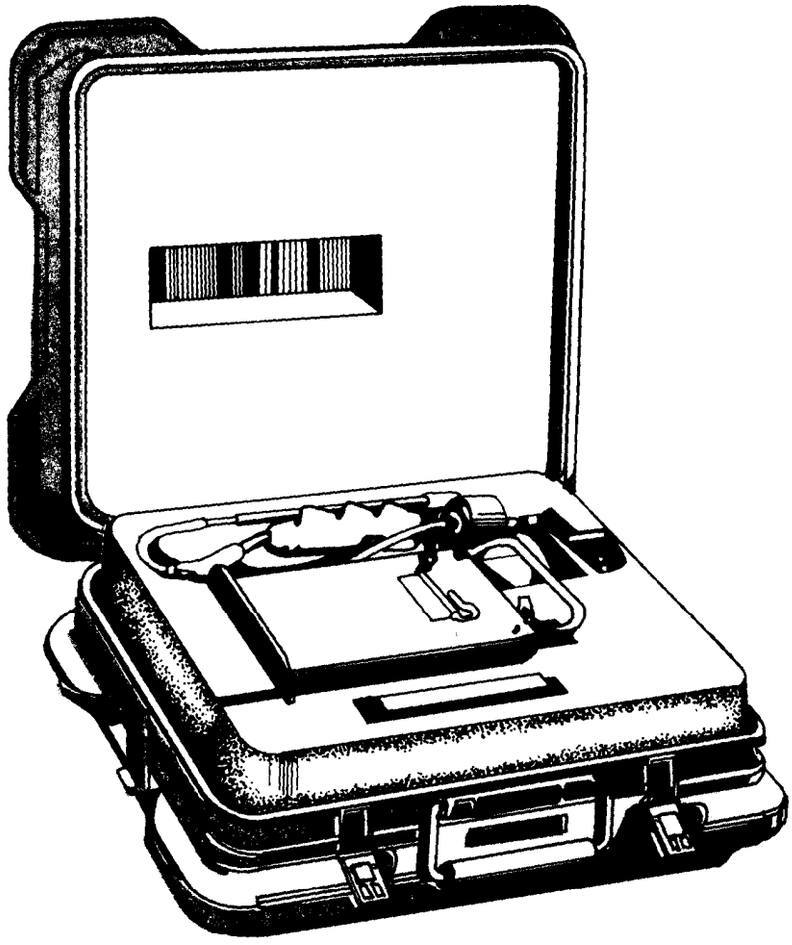
TRANSPORT HARNESS

The four weapon-round and two missile-round containers are secured within the M416 1/4-ton trailer by a nylon webbing assembly called a transport harness. A strap runs Lengthwise over the center of the 1/4-ton cargo trailer and fastens to either end of the trailer by strap fasteners. This strap passes through two more straps which connect to the sides of the trailer. The quick-release buckles allow immediate access to the weapons. Another strap passes through the first three straps and runs completely around the outside of the top three containers.



IFF INTERROGATOR CONTAINER

This fiberglass container stores the IFF interrogator, battery, and interconnecting cable. The container is not pressurized, but it does contain a pressure relief valve to release any pressure build-up within the container.



CHAPTER 2

Weapon Handling

Upon receipt of a Stinger weapon-round from the ammunition supply point (ASP), it must be checked to be sure it is suitable for firing. The weapon should be removed from the shipping and storage container and inspected in accordance with (IAW) the "services upon receipt" checks, which are found in TM 9-1425-429-12. This manual does not cover preventive maintenance checks and services (PMCS). However, this chapter does contain an abbreviated set of weapon checks which may be made under field conditions when the time and tactical situation permit. Such a time may be at (or near) the ASP or when converting a missile-round to a ready-round. In addition, this chapter describes weapon handling and safety precautions which must be followed by Stinger gunners to prevent injury to personnel and damage to equipment.

STINGER HANDLING PROCEDURES

When the Stinger team first receives a weapon, the markings on the container (case) should be checked to be sure that it contains the proper weapon. Yellow squares, on two diagonally opposite corners on the case and yellow data markings, indicate it contains a live round.

Containers for trainers are marked with blue colored squares for the tracking head trainer (THT) and bronze for the field handling trainer (FHT). In addition, the data markings are white and these containers have the word "INERT" on the top of the case.

The Stinger weapon-round and IFF interrogator containers are sealed to prevent environmental damage. Before either case is opened, the pressure relief valve should be pressed with the finger. When the rushing noise (if any) stops, the internal pressure of the case is

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