

**UNITED STATES MARINE CORPS
THE BASIC SCHOOL
MARINE CORPS TRAINING COMMAND
CAMP BARRETT, VIRGINIA 22134-5019**

**M249 LIGHT
MACHINEGUN
B3M4138
Student Handout**

M249 Light Machinegun

In this Lesson We will discuss the history of the M249, describe the characteristics of the weapon, ammunition, and discuss employment considerations. We will also cover the proper handling of this weapon, to include proper immediate and remedial actions and care and cleaning.

This lesson discusses the following topics:

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Learning Objectives

TERMINAL LEARNING OBJECTIVE(S)

1. Given an SL-3 complete M249 light machinegun, tripod, vehicle mount components, authorized cleaning gear, and lubricants, perform operator maintenance for an M249 light machinegun and associated components, to ensure the weapon and components are operational. (TBS-LMG-1001)
2. Given an SL-3 complete M249 light machinegun, crew, fire command, and 12 rounds of ammunition, while wearing the assault load, operate an M249 light machinegun, to engage targets in accordance with the fire command. (TBS-LMG-1003)
3. Given a SL-3 complete M249 light machinegun loaded with ammunition and a malfunction or stoppage, while wearing a fighting load, perform immediate action on an M249 light machinegun, to return the weapon into action. (TBS-LMG-1004)
4. Given an SL-3 complete M249 light machinegun with a malfunction or stoppage not corrected by immediate action, crew, and 6 rounds of ammunition, while wearing a fighting load, perform remedial action for an M249 light machinegun, to return the weapon into action. (TBS-LMG-1006)

5. Given an SL-3 complete M249 light machinegun, Squad Day Optic (SDO), crew, 100 rounds of ammunition, and a target at 300 meters, while wearing a fighting load, zero an M249 light machinegun with Squad Day Optic (SDO), to achieve point of aim/point of impact. (TBS-LMG-1007)

ENABLING LEARNING OBJECTIVE(S)

1. Given an SL-3 complete M249 light machinegun, tripod, vehicle mount components, authorized cleaning gear, and lubricants, perform operator maintenance for an M249 light machinegun and associated components, to ensure the weapon and components are operational. (TBS-LMG-1001a)
2. Given an M249 light machinegun, disassemble and assemble the M249 within 7 minutes. (TBS-LMG-1001b)
3. Given an SL-3 complete M249 light machinegun, inspect the M249 to ensure serviceability. (TBS-LMG-1001c)
4. Given an M249 light machinegun, load the M249 to enable target engagement. (TBS-LMG-1003a)
5. Given an M249 light machinegun, unload the M249 to remove all sources of ammunition. (TBS-LMG-1003b)
6. Given an M249 light machinegun with a hot barrel, change barrels on the M249 to continue engaging targets. (TBS-LMG-1003c)
7. Given a SL-3 complete M249 light machinegun loaded with ammunition and a malfunction or stoppage, announce "misfire" to alert nearby personnel. (TBS-LMG-1004a)
8. Given a SL-3 complete M249 light machinegun loaded with ammunition and a malfunction or stoppage, while wearing the assault load, wait 5 seconds to guard against a hangfire. (TBS-LMG-1004b)
9. Given a SL-3 complete M249 light machinegun loaded with ammunition and a malfunction or stoppage, while wearing the assault load, pull the charging handle to the rear to guard against cookoff. (TBS-LMG-1004c)
10. Given a SL-3 complete M249 light machinegun loaded with ammunition observe for feeding and ejecting of ammunition to verify clearance of stoppage. (TBS-LMG-1004d)
11. Given an M249 light machinegun with a hot barrel, perform remedial action by waiting 15 minutes for possibility of cookoff and to allow the barrel to cool. (TBS-LMG-1006a)
12. Given an SL-3 complete M249 light machinegun with a malfunction or stoppage not corrected by immediate action, identify the cause of failure to function to determine further action. (TBS-LMG-1006b)
13. Given ammunition for the M249 light machinegun, inspect the ammunition to ensure serviceability. (TBS-LMG-1006c)
14. Given an SL-3 complete M249 light machinegun, Squad Day Optic (SDO), crew, 25 rounds of ammunition, select proper targetry to facilitate field zeroing the machinegun. (TBS-LMG-1007a)
15. Given an SL-3 complete M249 light machinegun, Squad Day Optic (SDO), crew, 25 rounds of ammunition, and a target at 300 meters, while wearing the assault load, determine point of aim/point of impact to enable corrections. (TBS-LMG-1007b)
16. Given an SL-3 complete M249 light machinegun, Squad Day Optic (SDO), crew, 25 rounds of ammunition, and a target at 300 meters, while wearing the assault load, engage targets to collect accuracy data. (TBS-LMG-1007c)
17. Given an SL-3 complete M249 light machinegun, Squad Day Optic (SDO), crew, 25 rounds of ammunition, and a target at 300 meters, while wearing the assault load, after initial target engagement, make corrections to ensure accuracy of the weapon. (TBS-LMG-1007d)

M249 Light Machinegun

History & Description

History

The M249 light machinegun 5.56mm is a result of a Marine Corps and Army development program to provide combat units with an automatic weapon of extended range and greater accuracy than the Browning automatic rifle. Fabrique Nationale of Herstal, Belgium developed the M249 in 1974 after the Defense Department announced its requirement for a light, automatic weapon to supplement the firepower of the 5.56mm M16A2 rifle.

In the Marine Corps, combat, combat service support, and combat support units as well as Marine Corps security forces use the M249. Previously, in Marine infantry battalions, the M249 was found in each fire team, manned by the automatic rifleman (totaling nine per rifle platoon). With the introduction of the M27 Infantry Automatic Rifle, the M249 has since been designated to a more traditional machinegun role, to be employed at the commander's discretion as a light machinegun.

The M249 has recently been upgraded to modify a few selected parts of the weapon. Where feasible, these modifications have been explained in this handout. Those modifications not explained in this handout will be noted, and the appropriate pages in the new operator's manual (TM 08671A-10/1A with change A) will be referenced.

Description

The M249 is a gas-operated, belt/magazine-fed, air-cooled, automatic, shoulder-fired weapon. Like the M240B machinegun, the M249 fires from the open-bolt position. It can fire ammunition from an M16 magazine as well as from a linked belt. Utilizing M855/SS109 ammunition, the M249 provides the Marine Corps with a light automatic weapon capable of providing increased firepower and much greater effective ranges over threat weapons of similar caliber.

Characteristics

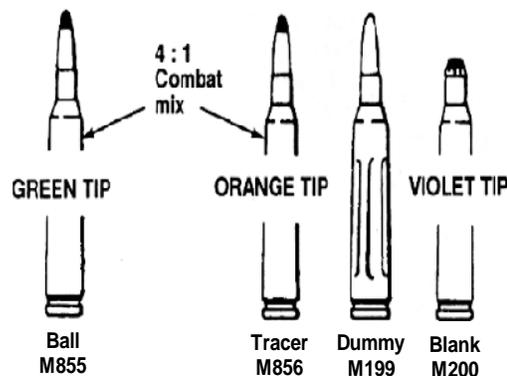
Length of Weapon	1.035 m	40.37in
Weight (Un-Loaded)	7.72kg	18.30lbs
Weight 200 rd w/drum	3.14kg	6.71lbs
Weight (Loaded) w/drum	10.86kg	25.01lbs

Capabilities

Maximum Range:	3600m
Point Target	800m
Area Target	1000m
Grazing Fire	600m
Tracer Burnout	900m

Ammunition

The M249 uses several different types of 5.56-mm standard military ammunition. Only authorized ammunition that is manufactured to US and NATO specifications should be used (see diagram below).



Cartridge, 5.56-mm ball M855 (DODIC A059) The M855 cartridge has a gilding, metal-jacketed, lead alloy core bullet with a steel penetrator. The primer and case are waterproof. A disintegrating metallic split-linked belt links the ammunition for firing from the ammunition box. In an emergency, the M855 round can also be loaded and fired from the M16 20- or 30-round magazine. The M855 round

- Is identified by a green tip
- Has a projectile weight of 62 grains
- Is 2.3 cm long
- Is the NATO standard round
- Is effective against personnel and light materials, not vehicles

Cartridge, 5.56-mm tracer, M856 (DODIC A063) The M856 cartridge is used for adjustments after observation, incendiary effects, and signaling. When tracer rounds are fired, they are mixed with ball ammunition in a ratio of four ball rounds to one tracer round. The DODIC for ball and tracer mix is A064.

- Has a 63.7-grain bullet without a steel penetrator
- Is identified by an orange tip

Cartridge, 5.56-mm dummy M199 (A060) The M199 cartridge can be identified by the six grooves along the side of the case beginning about one-half inch from its head. It contains no propellant or primer. The primer well is open to prevent damage to the firing pin. The dummy round is used during

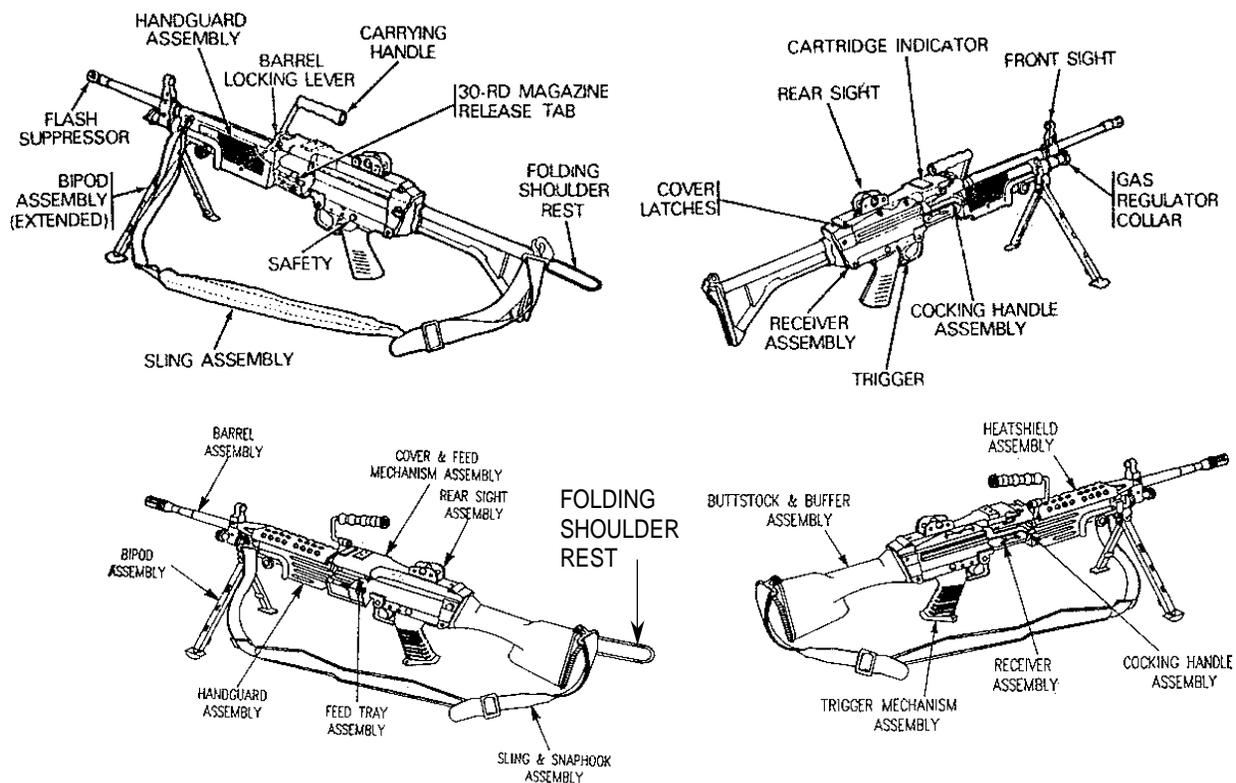
- Mechanical training

- Dry-fire exercises
- Function checks

Cartridge, 5.56-mm blank M200 (M2 link, A075) The blank cartridge has no projectile. The case mouth is closed with a seven-petal rosette crimp and has a violet tip.

The original M200 blank cartridge had a white tip. Field use of this cartridge resulted in residue buildup, which caused malfunctions. Only the violet-tipped M200 cartridge should be used. The blank round is used during training when simulated live fire is desired. An M15A2 blank-firing attachment must be used to fire this ammunition.

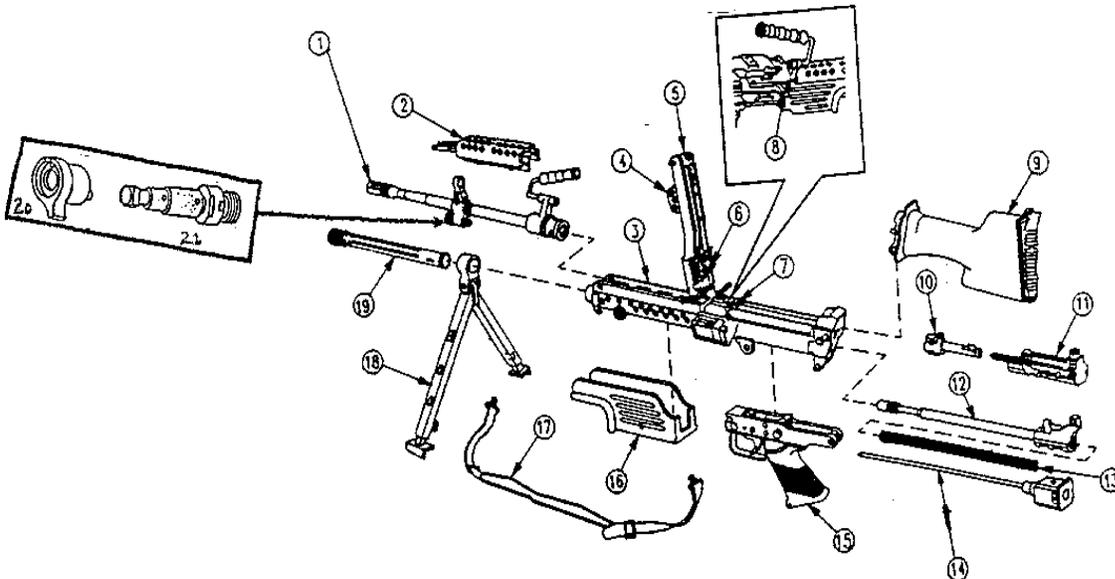
Components



Location of Major Components. The table below identifies the M249 major components in the diagram on the following page.

1. Barrel	8. Cocking Handle	15. Trigger mechanism assembly
2. Heat shield	9. Buffer and butt stock assembly	16. Hand guard
3. Receiver assembly	10. Bolt assembly	17. Sling and snap hook assembly
4. Rear sight assembly	11. Slide assembly	18. Bipod assembly

5. Cover and feed mechanism assembly	12. Piston assembly	19. Gas cylinder
6. Feed pawl assembly	13. Drive spring	20. Gas collar
7. Feed tray assembly	14. Operating rod	21. Gas regulator

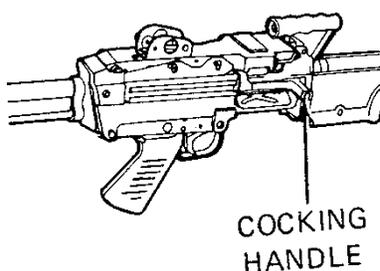


Clearing the M249

Prior to handling any weapon, ensure that it is not loaded. Follow the steps in the table below to clear the M249 in accordance with TM 08671A-10/1A with change A.

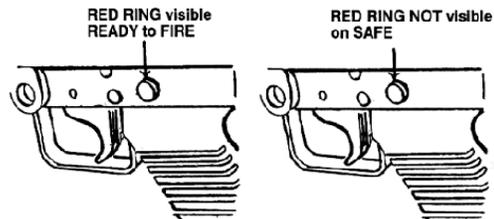
STEP 1

Pull the cocking handle to the rear (palm up) and lock the bolt to the rear. Maintain positive control of the cocking handle (see diagram on next page).



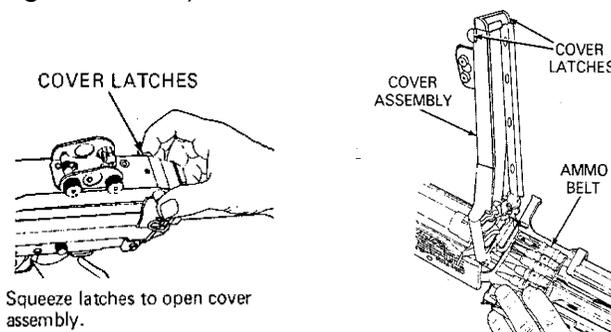
Step 2

Push the safety from left (loading side) to right (ejection side). Red should *not* be visible on the safety (see diagram below).

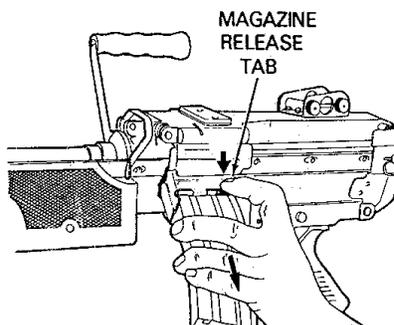
**Step 3**

If the weapon has been firing

- Belted ammunition, raise the feed cover assembly and remove the belted ammunition (see diagram below)



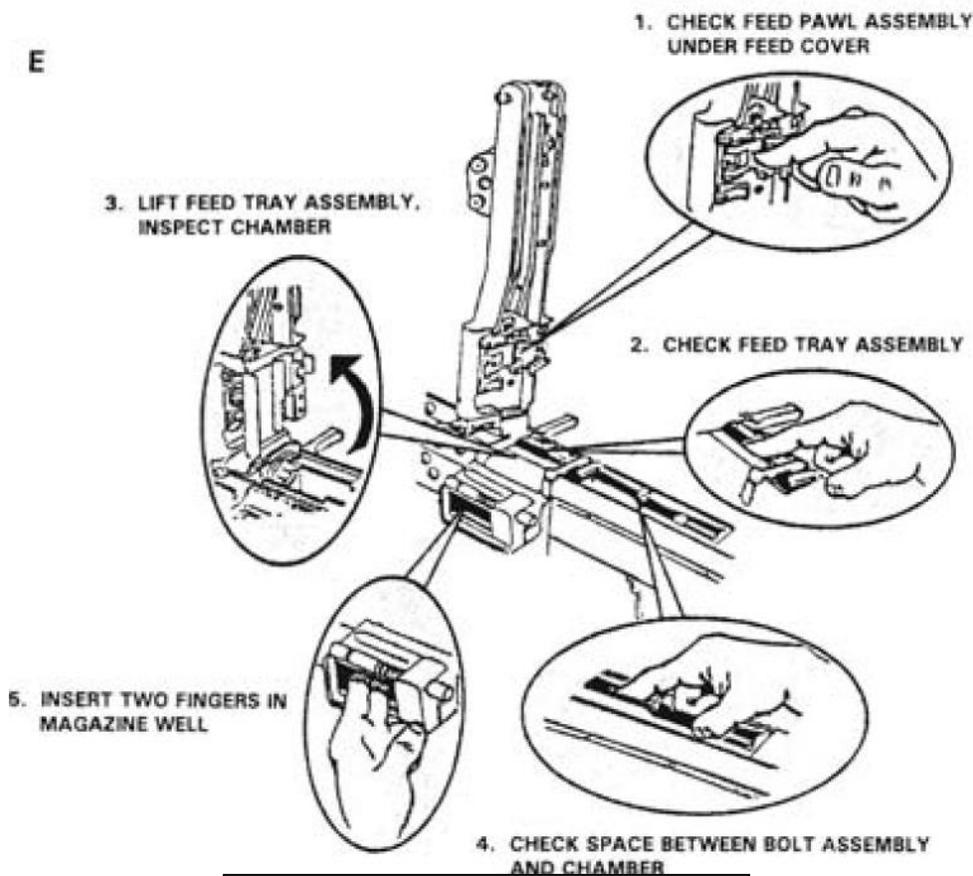
- From a magazine, depress the magazine release tab and remove the magazine (see diagram below) and raise the feed cover assembly



Step 4

Conduct the **FIVE-POINT SAFETY CHECK** for brass, links, or ammunition.

1. Check the feed pawl assembly under the feed cover.
2. Check the feed tray assembly.
3. Lift the feed tray assembly and inspect the chamber (visually and physically).
4. Check the space between the bolt assembly and the chamber (visually and physically).
5. Insert two fingers of the left hand into the magazine well to extract any ammunition or brass.

**CAUTION**

Brass or links in the magazine well may cause stoppages.

Step 5

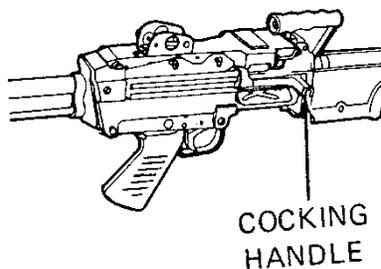
When the chamber and receiver are clear, close the feed cover assembly and lock it.

Step 6

Push the safety from right to left (red now visible).

Step 7

While maintaining control of the cocking handle, press the trigger and ease the bolt forward by manually riding the cocking handle forward.

**Disassembly**

Disassembly for the M249 consists only of field stripping for first echelon (operator) maintenance. Operators are not authorized to use any tools other than authorized cleaning gear to disassemble the weapon. When disassembling the M249, lay parts out from left to right or right to left in the order disassembled so that the weapon can be easily reassembled in reverse order.

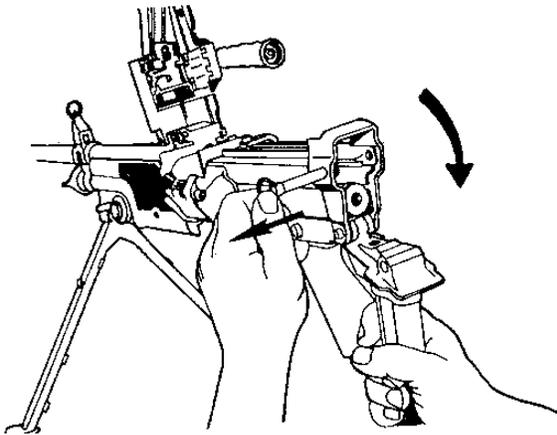
The steps to disassemble the M249 are listed on the following pages.

NOTE: In the procedure below, if you do not have a cleaning rod available, you may use the operating rod instead.

Be sure the weapon is in Condition 4 (see page [19](#) of this student handout) before disassembling it.

Step 1

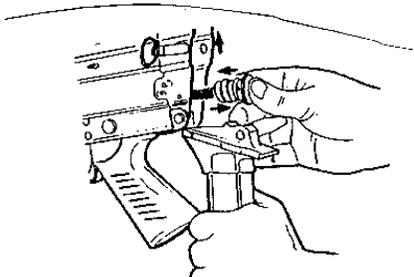
After ensuring that the weapon is clear, pull the upper retaining pin at the rear of the receiver to the left and allow the buffer and butt stock assembly to pivot downward (see diagram below).



Buffer and butt stock
assembly rotated
downward.

Step 2

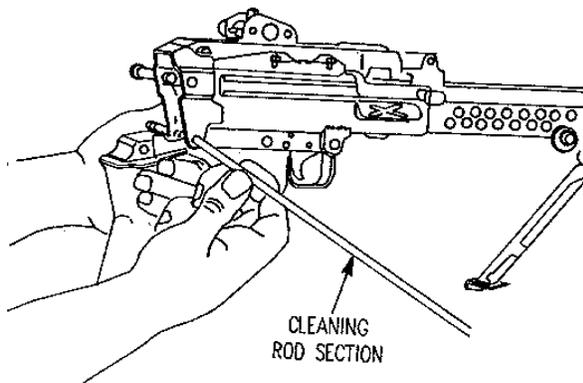
Remove the operating rod assembly from the receiver by pressing inward and up on the rear of the operating rod with one thumb. Slowly let the drive spring expand and remove it from the receiver. Separate the drive spring and operating rod (see diagram below).



Step 3

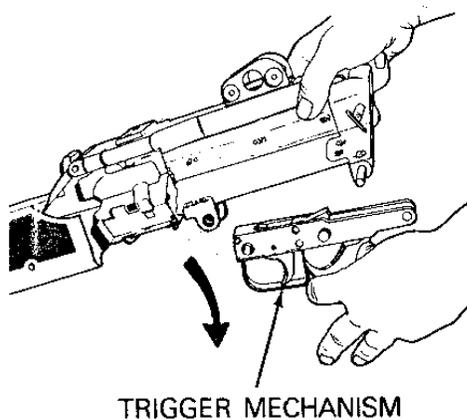
Remove the buffer and butt stock assembly from the receiver by pressing the lower retaining pin from the right to the left (see diagram below).

NOTE: Notice that the pin can be pressed outward far enough to let the stock fall free but can still hold the trigger mechanism assembly in place; this is important for assembly.



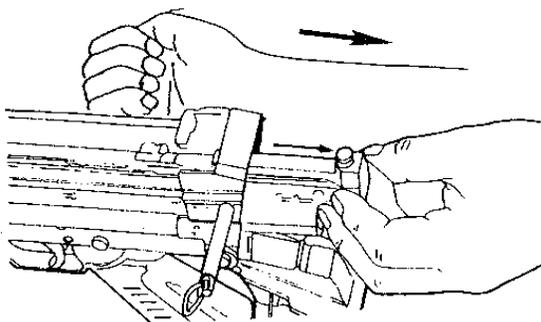
Step 4

Pull the lower retaining pin to the left as far as possible (pin will not completely clear the receiver), and remove the trigger mechanism assembly by pulling downward and to the rear on the handgrip (see diagram below).



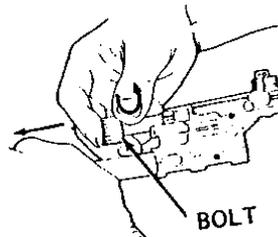
Step 5

To remove the piston, bolt, and slide assemblies, pull the cocking handle to the rear. Finish pulling the piston, bolt, and slide assemblies to the rear with finger pressure and pull them from the rear of the receiver (see diagram below).



Step 6

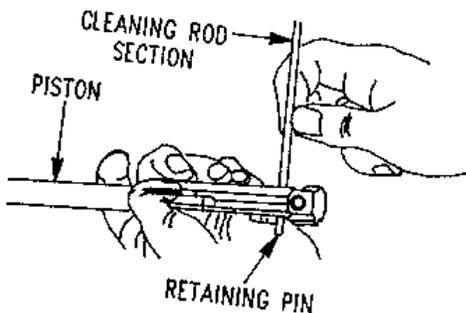
Separate the bolt from the slide assembly by rotating it counterclockwise (looking at the face of the bolt) and pulling it forward (see diagram below).



CAUTION: When bolt is removed, the firing pin spring is free; be careful not to lose it.

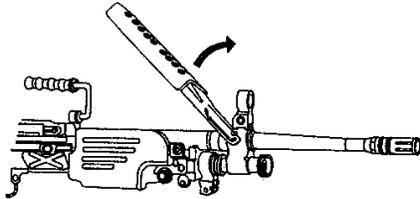
Step 7

To separate the slide assembly from the piston, press the retaining pin from the right to the left. Once the pin is shifted, lift the slide assembly upward from the piston. The operating rod may be used to help press the retaining pin (see diagram below).

**Step 8**

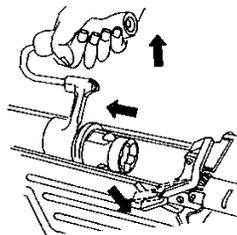
To remove the barrel from the receiver (see diagram below),

- Close the cover and feed mechanism assembly
- Depress the barrel-locking lever with your left hand
- Lift the carrying handle using your right hand
- Push the barrel forward



Step 9

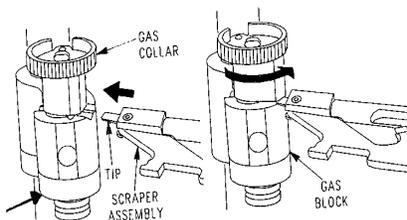
To remove the heat shield, hold the weapon firmly, grasp the heat shield just forward of the barrel handle, and lift the heat shield off the barrel (see diagram below).



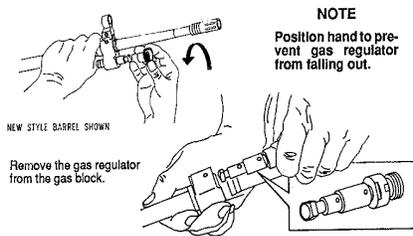
CAUTION: Barrels must not be interchanged with those from other M249s unless direct support personnel have certified the headspace for that weapon.

Step 10

Remove the gas regulator from the barrel by positioning the regulator lever between normal and maximum (lever pointing downward away from barrel). With the new barrel, position the gas collar to allow the scraper tool to be installed. Place the tip of the scraper tool in the notch in the front left of the gas block. Holding the tip of the scraper tool in this position, rotate the collar detent up and over the tip and onto the top of the gas block (see diagram below).

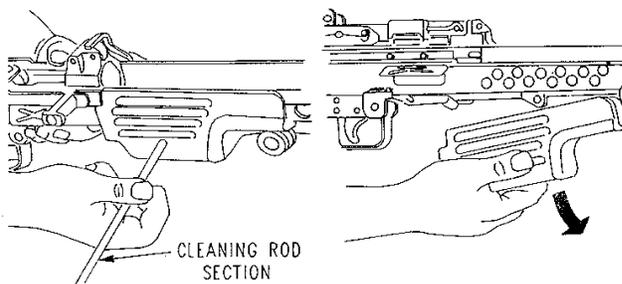


Pull forward on the gas collar and separate it from the gas block (see diagram below).



Step 11

Remove the hand guard by pressing the retaining pin from right to left with the operating rod. (The pin will not separate completely from the handguard.) Pull down on the rear of the handguard and separate it from the receiver (see diagram below).



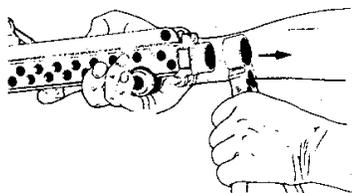
Step 12

Remove the bipod and gas cylinder by turning the gas cylinder to the left or right until you hear a click. Pull the gas cylinder forward and separate it from the bipod (see diagram below).

GAS CYLINDER REMOVAL



BIPOD REMOVAL



Assembly

Assembly. To reassemble the M249, reverse the disassembly procedures. The following details are important in reassembling the weapon:

- Ensure that the bipod yoke is placed on the end of the receiver, big opening first.
- When re-inserting the gas cylinder into the receiver, some manipulation will be required with the fingers of the free hand to get the base of the cylinder to line up with the receiver. Be sure to turn the gas cylinder until it clicks and is locked in place.
- When replacing the trigger assembly, push the retaining pin inboard just far enough to catch and hold the trigger assembly in place. If you push it too far, you will block the stock recess, and you cannot put the buffer and butt stock assembly in place until the pin is pulled outward.
- When reassembling the gas regulator, ensure that the lug on the rear of the regulator lines up with the lug on the rear of the gas block. Place the gas regulator collar over the front of the gas regulator and align the tapered lug of the regulator with the tapered recess of the collar. Hold the rear of the regulator, press down on the regulator collar, rotate the collar clockwise, and lock it in place. The new collar follows the same procedures. Refer to the TM for additional information on the upgraded M249 (new TM page 3-53).
- When placing the piston, bolt, and slide assemblies in the receiver, be sure that the slide recesses on the sides of the slide assembly are aligned with the slide rails of the receiver.
- See the TM for the proper procedures to install the drive spring and operating rod for the upgraded M249 (new TM page 3-61).
- See TM for the proper procedures to install the heat shield for the upgraded M249 (new TM page 3-63).

Function Check. After assembly has been completed, you must perform a function check. Remember that function checks are only to check proper reassembly procedures. Function checks are not meant to take the place of actual live fire operational tests to be done before movement if the tactical situation permits. Follow the steps below to perform M249 function checks.

Step 1

Grasp the cocking handle with the right hand, palm up, and pull the bolt to the rear locking it in place.

Step 2

While continuing to hold the resistance on the cocking handle, use the left hand to move the safety to the SAFE position.

Step 3

Pull the trigger. (The weapon should not fire.)

Step 4

Move the safety to the FIRE position.

Step 5

While continuing to hold resistance on the cocking handle, use the left hand to pull the trigger and ease the bolt forward to prevent it from slamming into the chamber area and damaging the face of the bolt.

Step 6

If the weapon fails the function check, check for missing parts or the reassembly procedures. (Before disassembling the weapon, make sure it is positioned where the guide rod and spring cannot cause bodily harm if the bolt is locked to the rear.)

CAUTION: The bolt must be eased forward to prevent damage to the cover and feed mechanism assembly and operating rod group.

NOTE: The cover and feed mechanism assembly can be closed with the bolt in either the forward or the rearward position.

Cycle of Function

The table on the following page lists the sequence for the cycle of functioning of the M249 light machinegun

<u>Cycle of Function</u>	<u>Description</u>
Feeding	Feeding takes place as the operator places a belt of ammunition on the feed tray or inserts a loaded magazine in the magazine well. Whichever method is used, the results are the same. A cartridge is placed in the path of the bolt so that as the bolt is driven forward from the force of the expanding driving spring, the face of the bolt makes contact with the rim of the first cartridge and strips it from the links or magazine. As the bolt continues forward, the cam roller on top of the bolt forces the feed cam, in the cover assembly, to the left positioning the feed pawl over the next cartridge to be chambered. When the burning gases of the fired cartridge cause the bolt to move to the rear, the feed cam lever and feed pawl are forced to the right causing the next round in the feed tray to be pulled to the right and placed in the feed tray groove ready for chambering.
Chambering	Chambering occurs as the bolt continues to move forward and forces the cartridge into the barrel chamber.
Locking	Locking occurs as chambering takes place. The locking lugs of the bolt pass through the locking recesses cut into the chamber. When the locking lugs and bolt face make contact with the rear of the chamber, the forward movement of the bolt stops. The slide assembly pushes the rotating lug of the bolt to the right. This rotation of the bolt causes the locking lugs to disalign with the locking recesses, and locking takes place.
Firing	After locking has occurred the piston and slide assemblies continue forward slightly. This forward movement ends when the slide assembly forces the firing pin through the face of the bolt. The firing pin then strikes the primer of the cartridge, and firing takes place.
Unlocking	Unlocking begins when expanding gases from the ignited propellant are vented off through the gas port in the gas regulator. The pressure of the expanding gases is directed rearward through the gas cylinder and forces the piston assembly, slide assembly, and bolt to the rear. As the slide assembly moves to the rear, the camming recess forces the camming lug of the bolt to the left causing the locking lugs on the bolt to align with the locking recesses in the chamber. The slide assembly continues to move to the rear, and the bolt is withdrawn from the chamber.
Extracting	The extraction claw on the face of the bolt grips the cartridge case tightly by engaging the extraction groove. Thus, as the bolt moves rearward, the cartridge case is pulled from the chamber.

<u>Cycle of Function</u>	<u>Description</u>
Ejecting	The extractor claw grips the lower right portion of the cartridge rim. As the spent casing or cartridge is pulled to the rear, the ejector strikes the upper left of the base of the cartridge, just as the bolt face clears the rear of the ejection port, causing the cartridge case to pivot over the extraction claw and to be thrown clear of the receiver through the ejection port.
Cocking	As the bolt continues its movement to the rear, the piston assembly compresses the drive spring. Cocking is completed when the spring is fully compressed, just before it begins to expand and drive the operating parts forward again.

Handling the M249 Light Machinegun

Condition Codes. The table below describes the condition codes for the M249 light machinegun.

<u>Condition</u>	<u>Description</u>
1	<ul style="list-style-type: none"> • Ammunition in position on feed tray or magazine inserted • Bolt locked to the rear • Safety on
2	Not applicable to the M249
3	<ul style="list-style-type: none"> • Ammunition in position on feed tray or magazine inserted • Chamber empty • Bolt forward • Safety off
4	<ul style="list-style-type: none"> • Feed tray clear of ammunition (magazine removed) • Chamber empty • Bolt forward • Safety off

Unloading. To execute the command, "UNLOAD," taking the weapon from Condition 1 to Condition 4, follow the steps in the table below.

<u>Step</u>	<u>Action</u>	
	<u>Belt-Fed Technique</u>	<u>Magazine-Fed Technique</u>
1	Ensure the bolt is locked to the rear and the weapon is on safe. Maintain positive control of cocking handle.	Ensure the bolt is locked to the rear and the weapon is on safe. Maintain positive control of cocking handle.
2	Open the feed cover.	Remove the magazine from the weapon and retain it on your person.
3	Remove all ammunition and belt links.	Open the feed cover.
4	Conduct five-point safety check for brass, links, or ammunition.	Conduct five-point safety check for brass, links, or ammunition.

Step	Action	
	Belt-Fed Technique	Magazine-Fed Technique
5	Take the weapon off SAFE.	Take the weapon off SAFE.
6	While maintaining control of the cocking handle, pull the trigger and ease the bolt forward to the closed position.	While maintaining control of the cocking handle, pull the trigger and ease the bolt forward to the closed position.
7	Close the feed cover.	Close the feed cover.

Loading. To execute the command, "LOAD," taking the weapon from condition 4 to condition 3, follow the steps in the table below.

Step	Action	
	Belt-Fed Technique	Magazine-Fed Technique
1	Ensure the weapon is condition 4.	Ensure the weapon is condition 4.
2	Attach a 200-round box of ammunition to the underside of the receiver. NOTE: The underside of the receiver has a dovetail locking recess that will accept the dovetail lug on the ammo box.	Withdraw the magazine from the magazine pouch.
3	Align the recess and lugs; push them together until they lock.	Check the top of the magazine to ensure it is loaded.
4	Pull outward on the ammo box to ensure that it is locked in place.	Insert the magazine into the magazine well and push inward until the magazine latch clicks
5	Locate the green belt tab on the top of the ammo box and pull up on it. NOTE: The belted ammo is affixed to this tab and will be pulled from the ammo box.	Tug downward on the magazine to ensure that it is held in the weapon by the magazine catch.
6	Open the feed cover and place the belt of ammunition on top of the feed tray with the open side of the links facing downward. NOTE: Place the first round against the cartridge stop. Place the belt tab to the right of the cartridge stop.	Close the magazine pouch.
7	Hold the belt in place; shut the feed cover making sure it locks in place.	If the bolt is forward (weapon can be loaded with the bolt closed or open), pull the cocking handle to lock the bolt to the rear and push the cocking handle forward until it clicks.
8	If the bolt is forward (weapon can be loaded with the bolt closed or	Place the weapon on SAFE.

	open), pull the cocking handle to lock the bolt to the rear and push the cocking handle forward until it clicks.	
9	Place the weapon on SAFE.	

Make Ready. To execute the command, "MAKE READY," taking the weapon from condition 3 to condition 1, follow the steps in the table below.

Step	Action
1	Pull the cocking handle fully to the rear.
2	Push the cocking handle fully forward to the locked position.
3	Place the weapon on SAFE.

***NOTE:** The preferred method of "MAKE READY" is to go from condition 4 directly to condition 1, skipping condition 3 and minimizing damage to the weapon that is caused by placing ammunition on the feed tray with the bolt forward. Condition 3 has tactical viability and should be used only when the situation dictates. To go directly to condition 1 from condition 4, the command, "MAKE READY," is given, skipping the command, "LOAD."

To execute the command, "MAKE READY," taking the weapon from condition 4 directly to condition 1, follow the steps in the table below.

Step	Action	
	Belt-Fed Technique	Magazine-Fed Technique
1	Ensure weapon is in condition 4.	Ensure weapon is in condition 4.
2	Pull cocking handle fully to the rear.	Pull cocking handle fully to the rear.
3	Push cocking handle fully forward to the locked position.	Push cocking handle fully forward to the locked position.
4	Place the weapon on SAFE.	Place weapon on SAFE.
5	Attach a 200-round box of ammunition to the underside of the receiver. NOTE: The underside of the receiver has a dovetail locking recess that will accept the dovetail lug on the ammo box.	Withdraw the magazine from the magazine pouch.
6	Align the recess and lugs; push them together until they lock.	Check the top of the magazine to ensure it is loaded.
7	Pull outward on the ammo box to ensure that it is locked in place.	Insert the magazine into the magazine well and push inward until the magazine latch clicks
8	Locate the green belt tab on the top of the ammo box and pull up on it.	Tug downward on the magazine to ensure that it is held in the weapon by the magazine catch.

	NOTE: The belted ammo is affixed to this tab and will be pulled from the ammo box.	
9	Open the feed cover and place the belt of ammunition on top of the feed tray with the open side of the links facing downward. NOTE: Place the first round against the cartridge stop. Place the belt tab to the right of the cartridge stop.	Close the magazine pouch.
10	Hold the belt in place; shut the feed cover making sure it locks in place.	

Firing. To execute the command, "FIRE,"

Step	Action
1	Take the weapon off SAFE.
2	Place finger on trigger.
3	Aim in on target and engage target.

Unload/Show Clear. To execute the command, "UNLOAD, SHOW CLEAR," taking the weapon from Condition 1 to Condition 4, follow the steps in the table below.

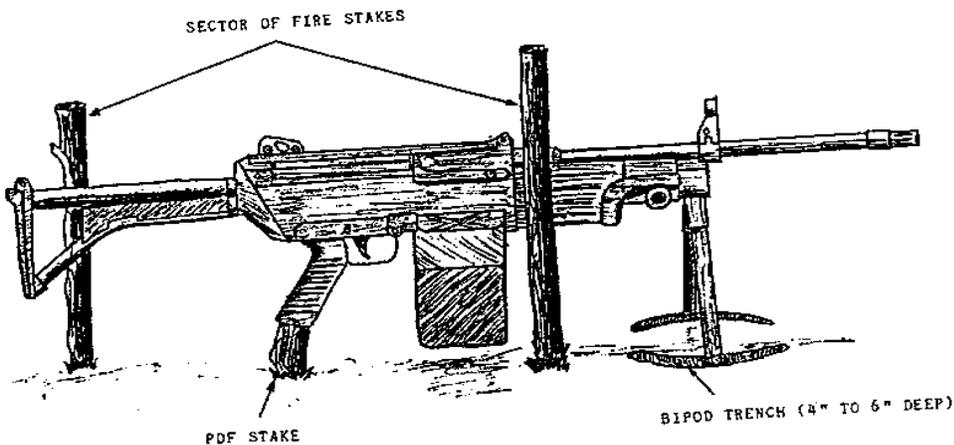
Step	Action	
	Belt-Fed Technique	Magazine-Fed Technique
1	Pull the cocking handle and lock the bolt to the rear. Maintain positive control of cocking handle.	Pull cocking handle to rear. Maintain positive control of cocking handle.
2	Put the weapon on SAFE.	Put the weapon on SAFE.
3	Open the feed cover.	Remove the magazine from the weapon and retain it on your person.
4	Remove all ammunition and belt links.	Open the feed cover.
5	Conduct five-point safety check for brass, links, or ammunition.	Conduct five-point safety check for brass, links, or ammunition.
6	Have a second individual inspect the chamber to ensure no ammunition is present.	Have a second individual inspect the chamber to ensure no ammunition is present.
7	Take the weapon off SAFE.	Take the weapon off SAFE.
8	While maintaining control of the cocking handle, pull the trigger and ease the bolt forward to the closed position.	While maintaining control of the cocking handle, pull the trigger and ease the bolt forward to the closed position.
9	Close the feed cover.	Close the feed cover.

CAUTION: After a live-fire exercise with the M249 light machinegun, *all* M249s should be broken down so that the

- Operating rod assembly and piston assembly are removed
- Receiver is visually and physically inspected for rounds that may have lodged there during firing
- Magazine well is inspected for live rounds or empty casings.

M249 Aiming Stakes. Guidelines for using aiming stakes (see diagram below) are listed below.

- When the bipod legs are utilized, do *not* emplace a yoke stake. Dig a trench 4 to 6 inches deep for the bipod.
- Emplace right and left sector stakes near the stock of the weapon. Position the sector stake to the right further forward near where the ammunition drum is located to prevent any obstruction to the firing hand.
- Use a shorter stake as a PDF stake. The pistol grip will rest on the stake to ensure proper direction and elevation.



Changing the Barrel

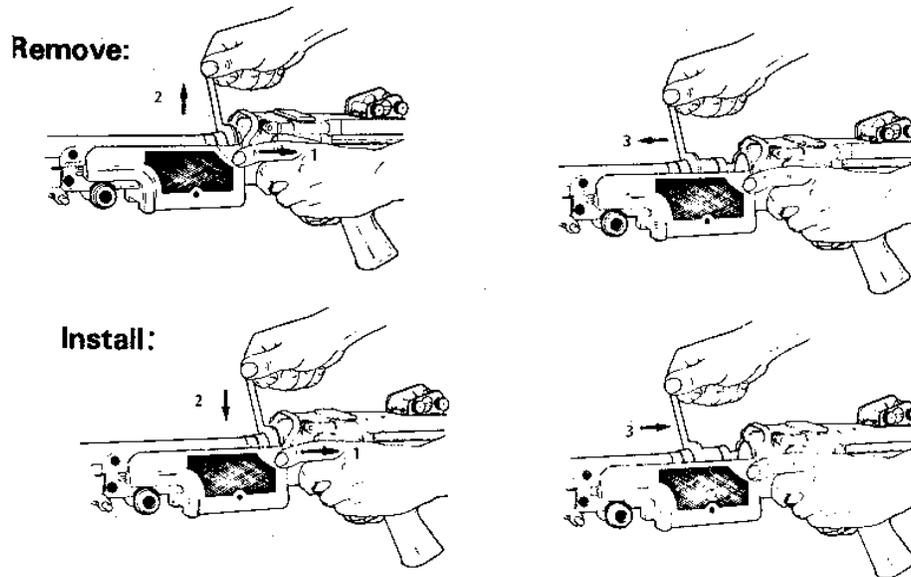
Rates of Fire.

Sustained rate	85 rds/min
Rapid rate	200 rds/min
Cyclic rate	850 rds/min

Changing the Barrel. Each M249 has two barrel assemblies in order to extend the life of the barrels, retain accuracy, and allow for continuous firing over long periods of time. Changing barrels is not restricted to only hot barrel conditions. The table below describes common conditions that require a barrel change.

Hot barrel	200 rds or more in two minutes or less (any rate of fire)
Sustained rate	500 rds fired within ten minutes
Rapid rate	200 rds fired within two minutes
Cyclic rate	850 rds fired within one minute

The steps to change barrels are listed on the following page.



Step 1

Be sure that the bolt is not forward (the locking lugs will be engaged in the locking recesses of the chamber, making removal/installation impossible).

Step 2

Clear the weapon, but leave the bolt locked to the rear.

Step 3

Put the weapon on SAFE.

Step 4

Depress the barrel locking lever, grasp the barrel handle with the other hand, and pull forward and up on the barrel to remove it from the receiver.

Step 5

Handle the barrel carefully and avoid touching it.

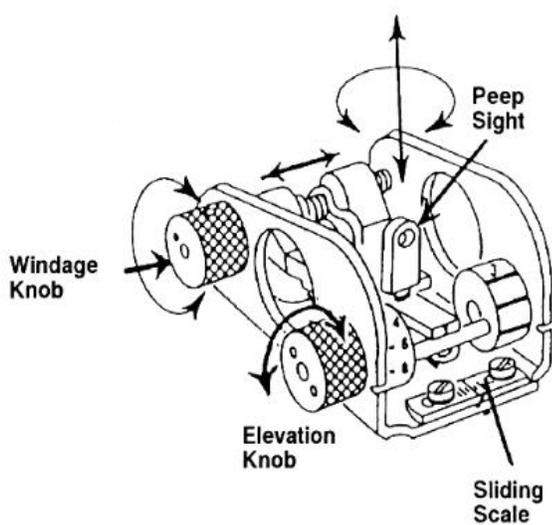
Step 6

Install the cool barrel in the reverse order; be sure it is locked in place before attempting to fire.

Zeroing Procedures

Mechanical Zero. Before field zeroing, you must set mechanical zero on the sights of the weapon. The table below lists the steps to set mechanical zero.

Step	Action
1	Rotate the windage knob (front knob, see diagram below) until the sight aperture is all the way to the left or right. <div data-bbox="630 814 1073 1226" style="text-align: center;"> <p>The diagram illustrates the mechanical components of a rifle sight. It shows a side view of the sight assembly. On the left, there is a 'Windage Knob' with a textured surface and a curved arrow indicating its rotation. Below it is the 'Elevation Knob', also with a textured surface and a curved arrow. At the top, the 'Peep Sight' is shown with a vertical arrow pointing upwards. At the bottom right, the 'Sliding Scale' is indicated with a horizontal arrow pointing to the right. The diagram shows how these knobs and the scale interact to adjust the sight's alignment.</p> </div>
2	While counting the number of clicks, rotate the knob all the way back until the sight aperture is on the other side.
3	Divide the number counted in Step 2 by two.
4	Count back the number of clicks calculated in Step 3. <u>NOTE:</u> For example, say you counted 24 clicks from full right windage to full left windage. Then mechanical zero is 12; 24 divided by 2. You would count back 12 clicks from full left windage

Step	Action
5	<p>Rotate the rear sight aperture (using the elevation knob, see diagram below) clockwise until it will not turn any further.</p>  <p>The diagram shows a side view of the rear sight mechanism. It includes a Peep Sight at the top, a Sliding Scale below it, an Elevation Knob at the bottom, and a Windage Knob on the left. Arrows indicate the direction of rotation for each component.</p>
6	While counting the number of rotations, rotate the aperture counterclockwise until it stops.
7	Divide the number counted in Step 6 by two.
8	Rotate the aperture clockwise the number of clicks calculated in Step 7.
9	Mechanical zero is now set for both windage and elevation

Field Zero. The table below lists the steps to follow to field zero the M249.

Step	Action
1	Place a range setting of 300m on the rear sight elevation scale.
2	With mechanical zero set, fire a 3- to 5-round burst at a target 300m away.
3	<p>Adjust the rear sight for windage and elevation until the impact of the burst is centered on the target.</p> <p>NOTE: Do <i>not</i> use the elevation adjustment knob to correct elevation. To correct elevation, rotate the rear sight aperture in the desired direction:</p> <ul style="list-style-type: none"> • Clockwise to lower the impact of the burst • Counterclockwise to raise the impact of the burst <p>When adjusting both the windage knob and rear sight aperture, one click moves the burst two inches for every 100m of range.</p>

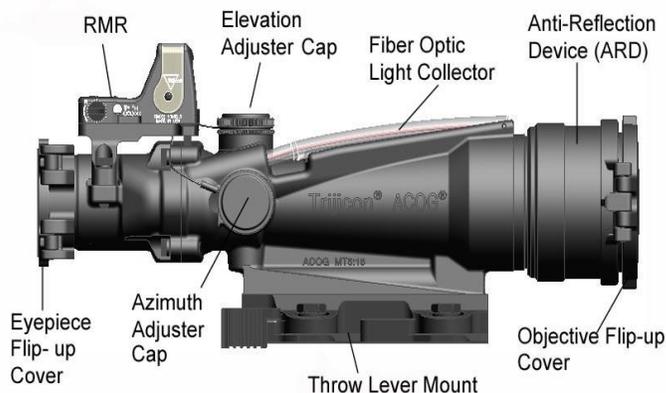
NOTE: The weapon can be zeroed at any range as long as the range set on the rear sight elevation scale corresponds with the actual range to the target. The table below shows at various distances what one click moves the strike.

Distance from Target (in meters)	One click moves the strike...	
	In Centimeters	In Inches
100	5	2
200	10	4
300	15	6

400	20	8
500	25	10
600	30	12
700	35	14
800	40	16
900	45	18

Aiming Devices

The SU-258 / PVQ SDO is a full mission profile sighting system designed for the M249 light machinegun with 14.5" or 19.5" barrel. It provides the operator with quick target acquisition at close combat ranges utilizing the Ruggedized Miniature Reflex (RMR) sight or the 3.5x TA11SDO. Both optics are dual-illuminated through the use of Tritium and fiber-optic which allows them to function without the use of batteries. The fiber-optic gathers ambient light and illuminates the reticle during daylight conditions and the tritium will illuminate the aiming point in total darkness. The illuminated reticles will allow the operator to keep both eyes open while engaging targets and maintain maximum situational awareness. The TA11SDO also provides enhanced target identification and increased hit probability out to 1000 meters utilizing the 3.5x magnification and the Bullet Drop Compensator (BDC).



TA11 Squad Day Optic (SDO)

Objective Lens	35mm
Magnification	3.5x
Eye Relief	2.4 in
Exit Pupil	10mm
Field of View	5.5 degrees 31.5 ft @ 100 meters
Adjustments	1 click = .1 mil at 100m (5 clicks = 2" at 100m)
Length	8.7 in
Weight	1.34 lbs
Reticle	Horseshoe Dot w/ BDC
Waterproof	66 ft
Tritium	0.1 curies

	Useful up to 15 years.
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Ruggedized Miniature Reflex (RMR) Site

Sight Window	22mm x 16mm
Magnification	1x
Reticle Pattern	9.0 MOA dot
Power Supply	Fiber Optic and Tritium
Length	45mm
Weight	1.2oz
Adjustments	1 MOA per click (1 click = 1" at 100m)
Housing Material	Forged Aluminum
Waterproof	66 ft for 2hrs
Tritium	0.25 curies
	Useful up to 15 years.

The following steps can be used to zero the SDO

Step	Action	Diagram
1	Conduct an Initial Laser Boresight (LBS) of the weapon looking through the SDO (vice the RMR) IAW LBS manufacturer steps	
2	At a distance of 33m fire three (3) rounds at a BZO or field expedient BZO target using the 33m point of aim	
3	Adjust the point of aim to the point on the target where the impacts of the rounds were achieved	
4	Repeat steps 2 and 3 with three additional rounds	
5	With 4 rounds for confirmation, repeat steps 2 and 3 making any final adjustments	
6	Move the SAW to 100m	
7	Repeat steps 2 to 5 (groups of 3, 3 and 4 rds) with up to 10 rds total to confirm the weapon is zeroed at 100m with the appropriate point of aim	
8	Still at a distance of 100m, stabilize the weapon so that the 100m point of aim is observed through the SDO	
9	Move the RMR reticle using the adjustment screws so that it has the same point of aim as the SDO	
10	The SDO and the RMR are now zeroed for 100m. Adjustments for range can be made with appropriate use of the bullet drop compensator in the SDO	

Malfunctions and Stoppages

Definitions.

1. **Malfunction:** a failure of the gun to function satisfactorily; the gun will fire, but fires improperly.
2. **Stoppage:** any interruption in the cycle of functioning caused by faulty action of the weapon or defective ammunition.
3. **Misfire:** the failure of a chambered round to fire. Can be due to an ammunition defect or a faulty firing mechanism.
4. **Hang fire:** occurs when the cartridge primer has detonated after being struck by the firing pin but some problem with the propellant powder causes it to burn too slowly, which delays the firing of the projectile.
 - a. Five seconds is allotted before investigating further because injury to personnel and damage to equipment could occur if the round went off with the feed cover open.
5. **Cook off:** occurs when the heat of the barrel is high enough to cause the propellant powder inside the round to ignite even though the primer has not been struck.

Runaway Gun Procedures. A runaway gun is a weapon that continues to fire when the trigger is released. A runaway gun is normally caused by a worn trigger sear but can also be a result of a dirty or worn gas system. To stop a runaway gun, follow the steps listed in the table below.

Step	Action												
1	Keep weapon pointed down range.												
2	If you are firing from a <ul style="list-style-type: none"> • Magazine or near the end of a 200-round belt, let the weapon continue to fire until the ammunition is expended • 200-round belt and you are not near the end of the ammunition belt, <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>Doctrinal Method</th> <th>Alternative Method</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Grab cocking handle (palm up), pull it all the way back, and hold.</td> <td>Snap the belt in half.</td> </tr> <tr> <td>2</td> <td>Push the safety to the right (red not visible).</td> <td>Remove unused portion.</td> </tr> <tr> <td>3</td> <td>Clear the weapon (raise cover, remove ammunition, inspect chamber, ride bolt home).</td> <td>Let remaining rounds continue to fire.</td> </tr> </tbody> </table>	Step	Doctrinal Method	Alternative Method	1	Grab cocking handle (palm up), pull it all the way back, and hold.	Snap the belt in half.	2	Push the safety to the right (red not visible).	Remove unused portion.	3	Clear the weapon (raise cover, remove ammunition, inspect chamber, ride bolt home).	Let remaining rounds continue to fire.
Step	Doctrinal Method	Alternative Method											
1	Grab cocking handle (palm up), pull it all the way back, and hold.	Snap the belt in half.											
2	Push the safety to the right (red not visible).	Remove unused portion.											
3	Clear the weapon (raise cover, remove ammunition, inspect chamber, ride bolt home).	Let remaining rounds continue to fire.											

Immediate Action Procedures. If a stoppage of the M249 light machinegun occurs, follow the steps in the table below.

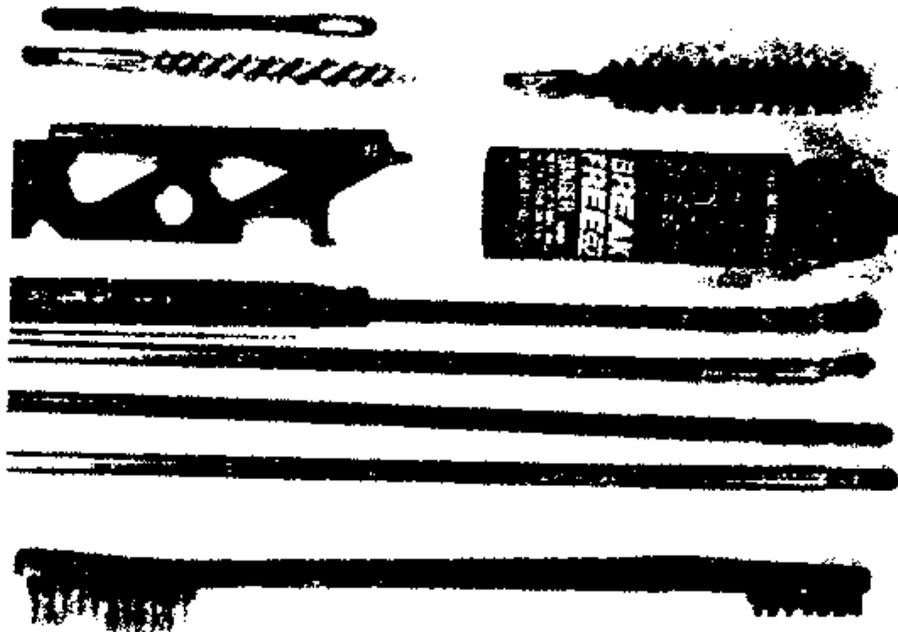
Step	Action
1	Shout, "Misfire!" Wait five seconds to guard against a hang fire.
2	<p>Within the next five seconds (to guard against a cook off), pull and lock the cocking handle to the rear, while observing the ejection port to see if a cartridge case, belt link, or round is ejected. If ejection:</p> <ul style="list-style-type: none"> • does occur, push the cocking handle to its forward position, take aim on the target, and attempt to fire. If the weapon does not fire, perform remedial action. • does not occur, perform remedial action.

Remedial Action Procedures. If performing immediate action fails to return the M249 light machinegun to action, follow the steps in the table below.

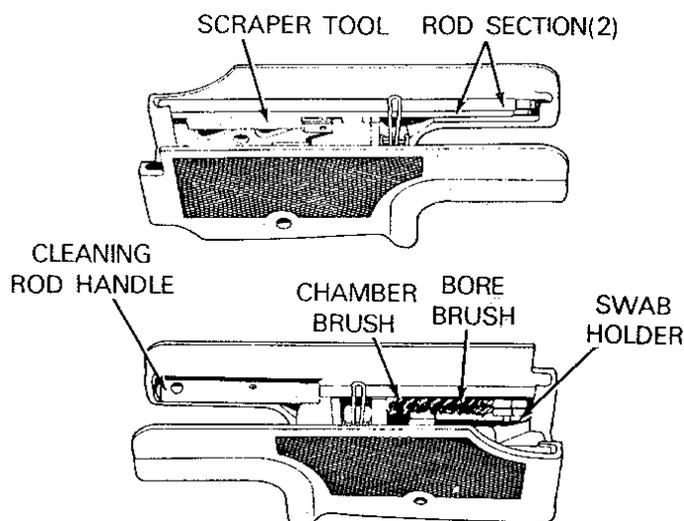
Step	Action
1	Determine if you have a hot or cold barrel
2	<p>If the barrel is:</p> <ul style="list-style-type: none"> • Cold: <ol style="list-style-type: none"> 1. Pull the cocking handle to the rear (palm up), maintaining positive control of the cocking handle. 2. Place the weapon on SAFE. 3. Ensure weapon is away from face and open the feed cover. 4. Perform five-point safety check. 5. Reload and continue to fire. 6. If the weapon fails to fire, clear the weapon and inspect both the weapon and ammunition. • Hot: do not open the cover assembly. Push the safety to the right (red not visible), keep the weapon pointed down range and let it cool for 15 minutes. After 15 minutes, continue as you would for cold barrel procedures.

Care and Cleaning

Care and Cleaning. Like any other weapon, the M249 light machinegun requires proper maintenance to operate reliably. Only use authorized cleaning agents and equipment (see diagram on following page) to conduct this maintenance.



Each M249 is designed to hold cleaning tools in the hand guard (see diagram below).



The sections below cover the use of these tools to conduct first echelon care and cleaning. Before cleaning the M249, field strip the weapon and lay the parts out in order of disassembly.

Cleaning and Maintenance of the Barrels. To clean the barrels of the M249 light machinegun, follow the same barrel cleaning procedures listed for the M16A2 (see Annex P, B2200 Weapons Handling and Safety student handout, section 3).

NOTE: Do *not* attempt to exercise the front sight. Adjustment of the front sight is not operator-authorized.

Each M249 will have one spare barrel. The barrels will not have serial numbers or any identifying marks. Each unit should have both barrels for each M249 marked in such a manner that they can be readily "married" to the M249 with which originally issued.

Barrels should *not* be switched among other M249s. The wear on the barrel extension of each M249 will be slightly different; switching barrels from another weapon will cause the weapon to function with a different headspace. Under these conditions a stoppage or malfunction will be likely. (Headspace is the distance between the face of the bolt, when locked, and the rear of the chamber. Headspace is normally very small and usually measured in thousandths of an inch.)

Make every effort to ensure that both barrels receive the same amount of use so that the wear of both barrels will remain uniform and the headspace will not change.

Cleaning the Receiver and Feed Cover Assembly. To clean the receiver and cover assembly use

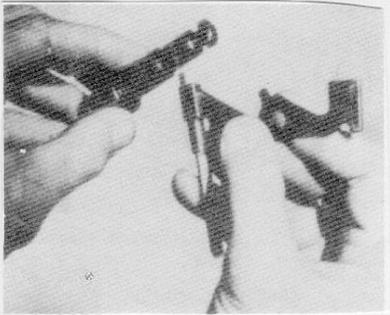
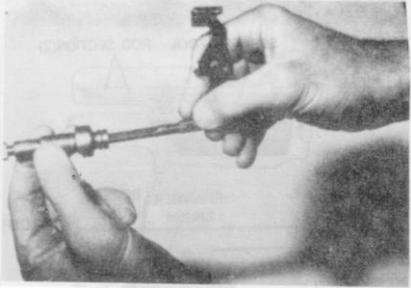
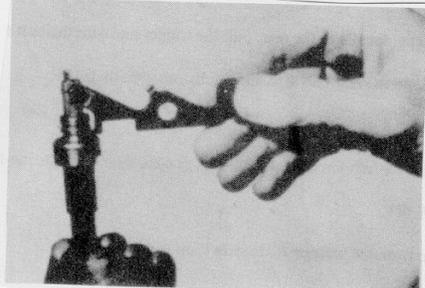
- CLP
- A general purpose brush (tooth brush)
- An M60E3 machinegun receiver brush (if available)

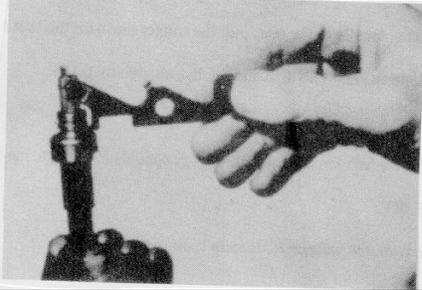
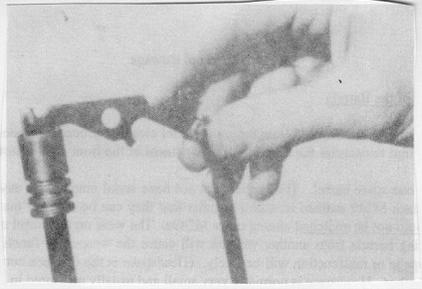
to complete the steps in the following table.

Step	Action
1	Wipe the receiver clean; leave a light coat of CLP on the surface.
2	Leave a moderate coat of CLP on the <ul style="list-style-type: none"> • Slide rails • Surface of the receiver • Moving parts of the cover assembly
3	Place a light coat of CLP on the rear sight and exercise the windage and elevation knobs.

Cleaning the Gas System. To clean the gas system (regulator, cylinder, gas block, and piston) use CLP or cleaning solvents such as rifle bore cleaner (RBC). Do *not* use any type of oil to clean or lubricate the gas system. Wipe the gas system dry. To utilize the scraper tool to clean the gas system follow the steps in the table below.

Step	Action
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Step	Action
1	<p>Clean the gas ports as shown in the diagram below.</p>  A black and white photograph showing a person's hands cleaning the gas ports of a rifle. The person is using a small brush or tool to clean the ports on the rifle's gas system.
2	<p>Clean the central hole as shown in the diagram below.</p>  A black and white photograph showing a person's hands cleaning the central hole of a rifle. The person is using a long, thin tool to clean the hole.
3	<p>Clean the regulator grooves.</p>
4	<p>Clean the internal diameter of the gas cylinder as shown in the diagram below.</p>  A black and white photograph showing a person's hands cleaning the internal diameter of the gas cylinder of a rifle. The person is using a long, thin tool to clean the cylinder.
5	<p>Clean the internal grooves of the gas cylinder as shown in the diagram below.</p>  A black and white photograph showing a person's hands cleaning the internal grooves of the gas cylinder of a rifle. The person is using a long, thin tool to clean the grooves.

Step	Action
6	Clean the piston grooves as shown in the diagram below. 
7	Clean the face of the pistons as shown in the diagram below. 

Summary

Munitions are an important asset at the squad and platoon level. Employed correctly, the AT-4, grenades, and pyrotechnics are all combat multipliers that can increase any unit's effectiveness on the battlefield.

The M203 portion covered the history, description and the role of the M203 40 mm grenade launcher within the Marine Corps. Additional topics discussed included both offensive and defensive employment considerations of the M203, the types of ammunition available and their uses, and proper handling procedures to include assembly and disassembly, immediate and remedial actions, and proper firing positions, including the required additions to an M16 firing position needed to accommodate the M203.

The M249 Portion covered the history of the M249 and described the characteristics of the weapon, ammunition and employment considerations. We also covered the proper handling of this weapon, to include proper immediate and remedial actions, and care and cleaning.

