

**\*TM 9-2350-304-10**

**HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 27 April 1990**

**OPERATOR'S MANUAL**

**HOWITZER, HEAVY, SELF-PROPELLED  
8-INCH, M110A2**

**(2350-01-041-4590) (EIC: 3E3)**

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DEPARTMENT OF THE ARMY  
APRIL 1990**

\*This manual supersedes TM 9-2350-304-10, 25 October 1979, including all changes.

TECHNICAL MANUAL

TM 9-2350-304-10

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**(CURRENT AS OF 30 September 1993)**

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**REPORTING ERRORS AND RECOMMENDING IMPROVEMENT**

You can help improve this manual. If you find any mistakes or if you know of a way to improve these 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 directly to Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

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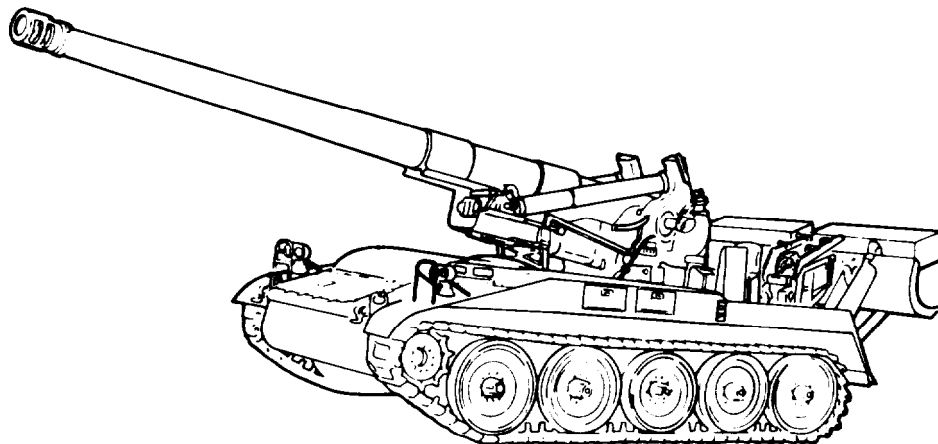
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# CHAPTER 1 INTRODUCTION

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## Section I. GENERAL INFORMATION



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### SCOPE

This manual contains data normally found in the technical manual and the field manual. It is for your use in operating and maintaining the M110A2 8-inch Self-Propelled Heavy Howitzer. The M110A2

Howitzer is a highly mobile field artillery piece capable of long range firing missions. Special purpose kits are provided to aid operations in cold climates. This manual also includes a section drill.

**MAINTENANCE FORMS AND RECORDS**

Department of the Army forms and procedures used for equipment maintenance will be those required by DA PAM 738-750, The Army Maintenance Management System (TAMMS). Keep your maintenance forms current at all times. For complete instructions on how to prepare the forms, refer to DA PAM 738-750.

**REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S)**

If your M110A2 Howitzer 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 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We'll send you a reply.

**CORROSION PREVENTION AND CONTROL (CPC)**

a. Corrosion Prevention and Control (CPC) of Army material is a continuing

concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future.

b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

c. If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure that the information is identified as a CPC problem.

d. The form should be submitted to: **Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAS/Customer Feedback Center, Rock Island, IL 61299-6000.**

**Section II. EQUIPMENT DESCRIPTION**

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## EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

### PURPOSE

The M110A2 Howitzer is a weapon that defends against close-in or long-range ground targets.

improved roads. It can traverse rough terrain, muddy or marshy ground, sand, and snow or ice. The M110A2 Howitzer can ford streams up to 42 in. (106.7 cm) deep.

### CAPABILITIES AND FEATURES

The M110A2 is an unarmored, full-tracked, heavy, self-propelled, 8-inch (203 mm) howitzer. This diesel-powered artillery piece is highly mobile, maneuverable, and may be air transported. The vehicle is capable of long-range high-speed operation on

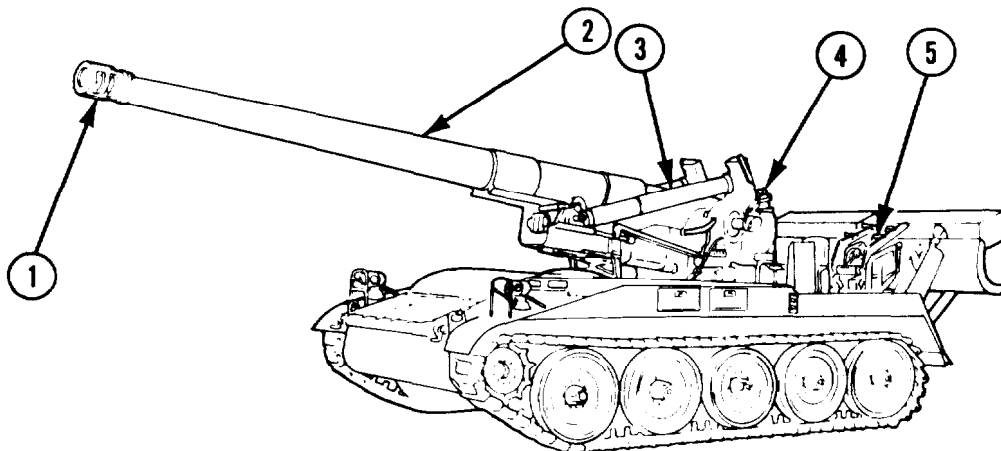
A hydraulic suspension lockout system and spade assembly help provide a stable platform for firing the cannon. The cannon elevating and traversing mechanisms and the projectile loader and rammer are also hydraulically powered. However, they may be manually operated in case of a power failure.

## LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

The following pages show the location and give a brief description of the components and accessories that the crew must be

familiar with to effectively operate the M110A2 Howitzer.

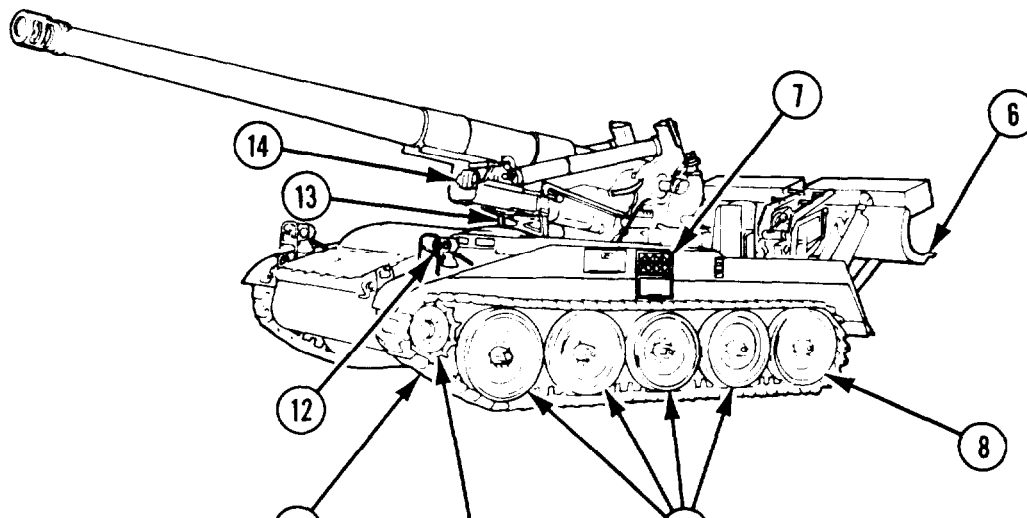
### M110A2 HOWITZER—LEFT FRONT VIEW



- |  |  |
|--|--|
| <p><b>1 MUZZLE BRAKE.</b> The muzzle brake reduces recoil force.</p> <p><b>2 CANNON.</b> The cannon M201A1 is a long barrel 8-inch howitzer equipped with a muzzle brake.</p> <p><b>3 EQUILIBRATOR.</b> The equilibrator balances the cannon while it is being elevated or depressed. The tube should be as easy to elevate as it is to depress.</p> | <p><b>4 PANORAMIC TELESCOPE (PANTEL) AND MOUNT.</b> The panoramic telescope is used for sighting the cannon for indirect fire. It can also be used for sighting the cannon for direct fire.</p> <p><b>5 LOADER AND RAMMER MECHANISM.</b> The loader and rammer mechanism lifts the projectile and rams it into the chamber. It is hydraulically powered, but can be operated manually.</p> |
|--|--|

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

M110A2 HOWITZER- LEFT FRONT VIEW-CONTINUED



**6** SPADE. The spade transfers recoil shock to the ground and prevents rear movement. It is raised or lowered by two hydraulic cylinders.

**7** ENGINE AIR FILTERS. The two engine air filters provide clean intake air for the engine.

**8** TRAILING IDLER ROAD WHEEL. The two pairs of trailing idler road wheels support, guide, and maintain tension for the tracks.

**9** ROAD WHEEL. The eight pairs of road wheels provide support and guide the tracks.

**10** DRIVE SPROCKET. The right and left drive sprockets are mounted on the final drives to drive each track.

**11** TRACK. The right and left tracks consist of rubber-padded steel track shoes and are driven by the drive sprockets.

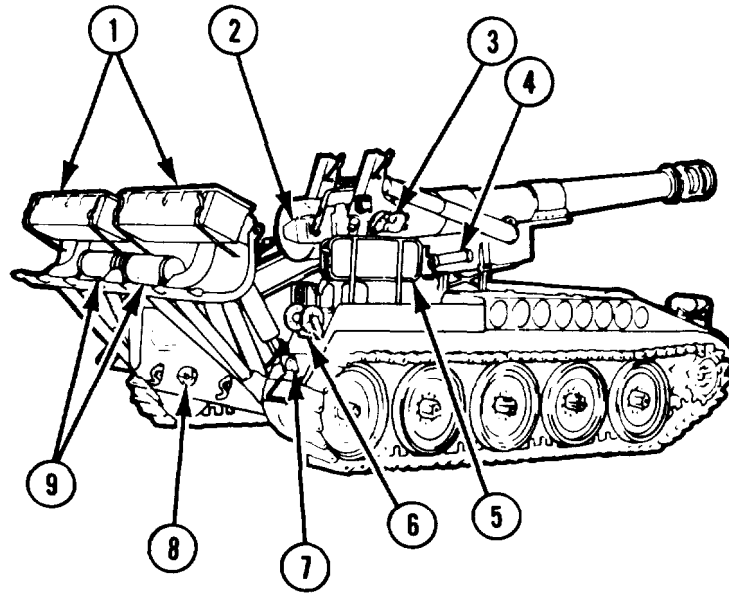
**12** HEADLAMP. The headlamps provide light for night driving under normal or blackout (infrared) conditions.

**13** TRAVEL LOCK AND SUPPORTS. The travel lock and supports secure the mount and cannon for travel (long support) or shipping (short support).

**14** GUN MOUNT. The gun mount supports the cannon, fire control equipment, and recoil mechanisms.

## LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

## M110A2 HOWITZER-RIGHT REAR VIEW

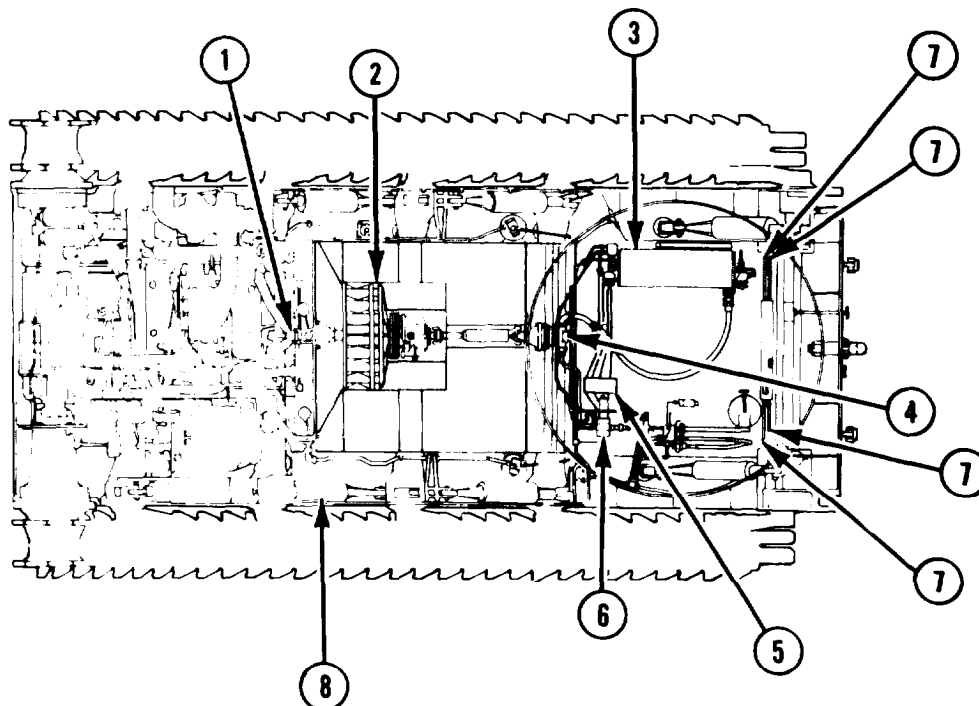


- |  |   |
|--|---|
| <p><b>1 SPADE BOX.</b> The two spade boxes provide storage for the components of the end item and basic issue items.</p>   | <p><b>5 PERSONNEL SEAT.</b> The personnel seat is for use by two crew members traveling with the vehicle.</p>                                   |
| <p><b>2 BREECH.</b> The rear of the cannon that includes the breechring, breechblock assembly, counterbalance, firing block, firing mechanism, and operating lever.</p>  | <p><b>6 WIRE REEL.</b> The wire reel provides storage for the communications wire.</p>  |
| <p><b>3 DIRECT FIRE TELESCOPE, MOUNT, AND ELEVATION QUADRANT.</b> This sighting equipment is used in sighting the cannon for direct fire. The elevation quadrant is also used in laying for indirect fire.</p> | <p><b>7 TAILLIGHT/STOPLIGHT.</b> Taillight/stoplights provide rear light for night driving under normal and blackout (infrared) conditions.</p> |
| <p><b>4 REPLENISHER.</b> The replenisher compensates for temperature changes and minor fluid loss in the recoil cylinder when the cannon is in battery.</p>  | <p><b>8 TOWING PINTLE.</b> The pintle is the point where the tow bar is attached during towing operations.</p>                                  |
|  | <p><b>9 PROPELLANT CHARGE.</b> Two propellant charges are stowed for travel.</p>  |



LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

M110A2 HOWITZER- TOP VIEW, CUTAWAY



**1** AUXILIARY DRIVE. When the engine is operating, the auxiliary drive powers the generator, cooling system fan, and (when the magnetic clutch is engaged) the hydraulic pump.

**2** FAN. The fan forces air through the powerplant compartment and the radiators to cool the engine.

**3** ACCUMULATOR. The accumulator is nitrogen charged. It maintains a supply of hydraulic oil at 1600 to 2400 psi (11,032 to 16,548 kPa) for powering hydraulic components.

**4** HYDRAULIC PUMP. The hydraulic pump provides hydraulic pressure when the engine is operating and the magnetic clutch is engaged to power all hydraulic components.

**5** LOCKOUT CYLINDER SHUTOFF VALVES. A shutoff valve has been installed in the hydraulic line to each lockout cylinder so that a faulty or leaking lockout cylinder can be isolated (blocked off) to allow firing the howitzer.

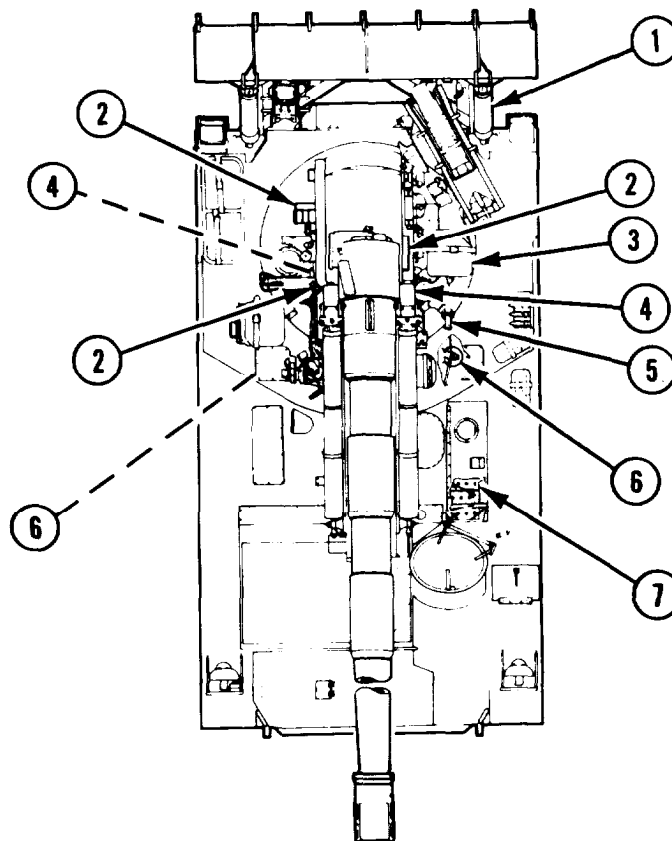
**6** HYDRAULIC FILTER. This filter removes particles from the hydraulic oil. An indicator light on the gunner's panel lights when the filter requires service.

**7** TORSION BAR. Each wheel is suspended by a torsion bar that acts as a spring.

**8** LOCKOUT CYLINDER. The eight lockout cylinders act as a shock absorber, bump stop, and suspension lockout device.

## LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

## M110A2 HOWITZER- TOP VIEW



- |   |   |
|---|---|
| <p><b>1 SPADE CYLINDER.</b> Two hydraulically powered spade cylinders raise or lower the spade.</p> <p><b>2 DATA DISPLAY GROUP.</b> The data display group components receive and display firing commands from the Battery Computer Unit.</p> <p><b>3 GUNNER'S SEAT.</b> This seat provides the gunner easy access to his controls.</p> <p><b>4 MOUNT HYDRAULIC FILTERS.</b> These filters remove particles in the hydraulic oil from the electrically driven pump and the hand pump.</p> | <p><b>5 TRAVERSING SYSTEM.</b> This system traverses the turret to the right or left. It is powered by hydraulic oil, but can be operated manually.</p> <p><b>6 FIXED FIRE EXTINGUISHER SYSTEM.</b> The fixed fire extinguisher system protects the vehicle and crew in the event of fire in the engine compartment.</p> <p><b>7 BATTERY.</b> The four batteries are connected in series parallel to provide 24 volts direct current (V dc) to power all electrical components.</p> |
|---|---|