

U. S. Army Military History Institute  
Carlisle Barracks, Pa. 17013

WAR DEPARTMENT TECHNICAL MANUAL

\*TM 9-710 — ~~RESTRICTED~~

BASIC HALF-TRACK VEHICLES  
(WHITE, AUTOCAR, AND  
DIAMOND T)



WAR DEPARTMENT

23 February 1944  
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\*This manual supersedes TM 9-710A, 16 Sept 1943; TM 9-708, 9 Feb 1943; TB 710-10, 1 Jul 1942; TB 710-17, 2 Sept 1942; TB 710A-19, 12 Nov 1942; TB 712-1, 1 Jul 1942; TB 712-2, 25 Jun 1942; TB 715-2, 1 Jul 1942; TB 715-3, 25 Jun 1942. This manual also supersedes pertinent information from TB 700-26, 12 Dec 1942; TB 700-47, 12 Apr 1943; TB 700-63, 10 Jun 1943; TB 700-65, 10 Jun 1943; TB 700-74, 1 Jul 1943; TB 700-82, 21 Jul 1943; TB 700-83, 23 Jul 1943; TB 700-88, 6 Aug 1943.

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# PART ONE—VEHICLE OPERATING INSTRUCTIONS

## Section I

### INTRODUCTION

	Paragraph
Scope .....	1

#### I. SCOPE.

a. This technical manual is published for the information and guidance of the using arm personnel charged with the operation, maintenance, and minor repair of this materiel.

b. The specific vehicles derived from the basic half-track which is covered by this manual are designated:

- (1) Car M2 and M2A1.
- (2) Personnel Carrier M3 and M3A1.
- (3) 81-mm Mortar Carriers M4 and M4A1.
- (4) 75-mm Gun Motor Carriage M3 and M3A1.
- (5) 75-mm Howitzer Motor Carriage T30.
- (6) 105-mm Howitzer Motor Carriage T19.
- (7) Multiple Gun Motor Carriage M13.
- (8) Multiple Gun Motor Carriage M15 and M15A1.
- (9) Multiple Gun Motor Carriage M16.
- (10) 81-mm Mortar Carrier M21.

c. In addition to a description of the basic half-track vehicle, this manual contains technical information required for the identification, use, and care of the specific vehicles listed in subparagraph b above, and similar vehicles. This manual is divided into three parts. Part One, Section I through Section VIII, gives vehicle operating instructions. Part Two, Section IX through Section XXXIV, gives vehicle maintenance instructions to using arm personnel charged with the responsibility of doing maintenance work within their jurisdiction. Part Two also includes instructions for preparing the vehicles for shipment and temporary storage. Part Three, Section XXXV, gives armament data.

d. In all cases where the nature of the repair, modifications, or adjustment is beyond the scope or facilities of the unit, the responsible Ordnance Service should be informed so that trained personnel with suitable tools and equipment may be provided, or proper instructions issued.

**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**

**Section II**

**DESCRIPTION AND TABULATED DATA**

	Paragraph
Description .....	2
Differences among models .....	3
Tabulated data .....	4

**2. DESCRIPTION.**

a. The armored vehicles covered in this manual are the half-track type, consisting of a wheel suspension in the front, and a bogie and track suspension in the rear. The chassis is essentially the same on all the models with the main differences being in the armor plated body, converting the vehicle to best advantage for its specific duty. The chassis equipped with heavier armament are reinforced with extra frame members to carry the additional load. A roller or winch is mounted on the front end of the frame. The vehicles have doors located at advantageous positions, or side panels which fold down to gain gun depression. The vehicle has front and rear drive and is powered by a six cylinder gasoline engine.

**3. DIFFERENCES AMONG MODELS.**

a. Car M2 (figs. 1 and 2). This vehicle has a seating arrangement for a crew of ten. A driver's seat, commander's seat, and one other seat are in the driver's compartment. Arrangement of all seats is shown in figure 39. A gun rail extends throughout the inside of the body allowing the movement of the guns mounted on skates to command full 360 degrees rotation. There is no rear door on this model, but it has two large ammunition storage compartments with outside doors, located just behind the driver's compartment. A lid on each stowage chest opens from inside the vehicle, allowing removal of ammunition boxes from the top shelf. Access to the remaining shelves is reached from outside the vehicle. The gas tanks are located inside the vehicle body at the rear sides. A radio mast is located at the side of the rear center seat. There are no rifle scabbards or gun pedestals on this model and it comes equipped with a roller or a winch at the front end of the vehicle. The M2 armament consists of one caliber .30 and one caliber .50 machine gun and a caliber .45 submachine gun. A top view may be seen by referring to figure 39.

b. Car M2A1 (figs. 3 and 4). This vehicle is the same as the Car M2 with the addition of a ring mount on the front side of the driver's compartment. It has one caliber .50 machine gun in ring mount. There are also three pintles for caliber .30 machine guns, located one on each side, and one in rear.

c. Personnel Carrier M3 (figs. 5 and 6). This vehicle has a seating arrangement for a crew of 13 men. There are three seats in the driver's compartment and the other ten are arranged in two rows of five each, backed up against the fuel tanks and body sides. The fuel tanks are

DESCRIPTION AND TABULATED DATA



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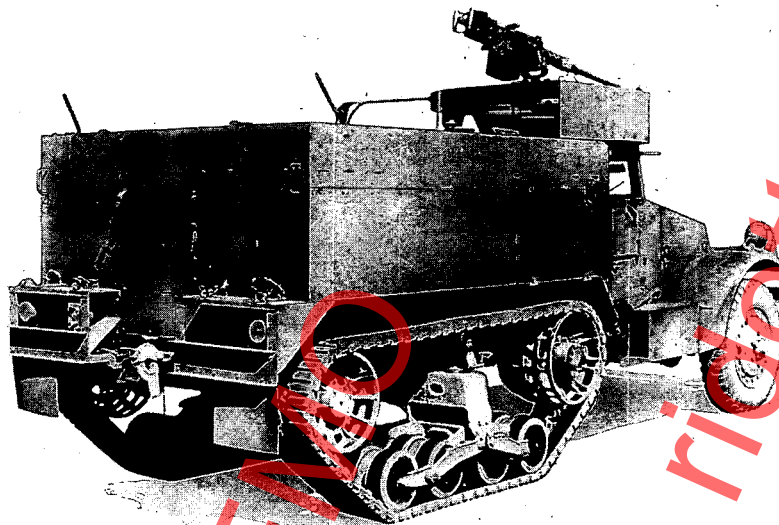
Figure 1—Car M2 (Right Front)



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Figure 2—Car M2 (Left Rear)

**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**



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**Figure 3—Car M2A1 (Right Rear)**



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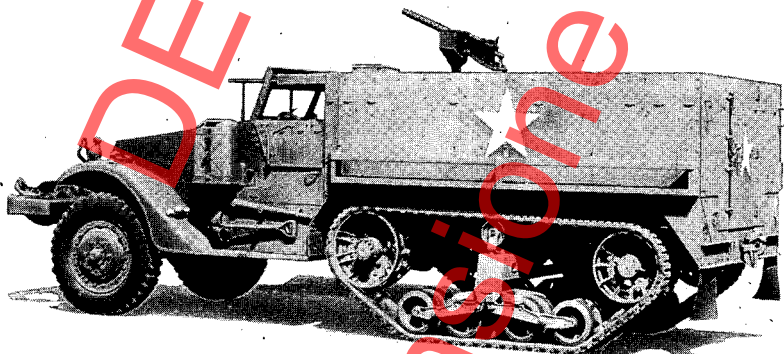
**Figure 4—Car M2A1 (Left Rear)**

DESCRIPTION AND TABULATED DATA



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Figure 5—Personnel Carrier M3 (Right Front)

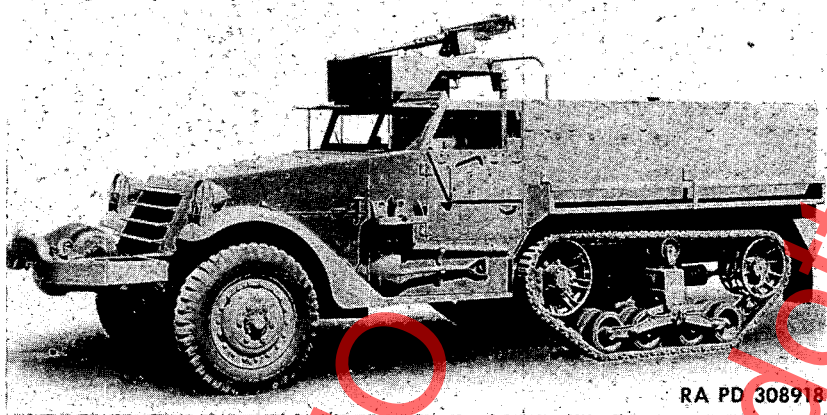


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Figure 6—Personnel Carrier M3 (Left Rear)

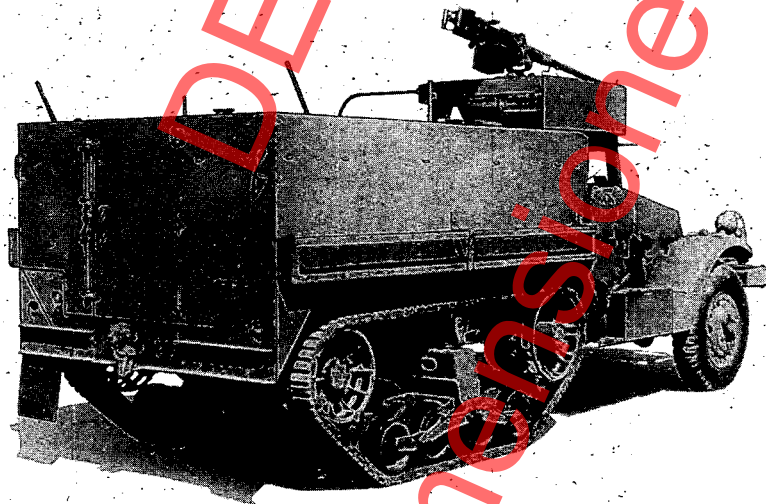


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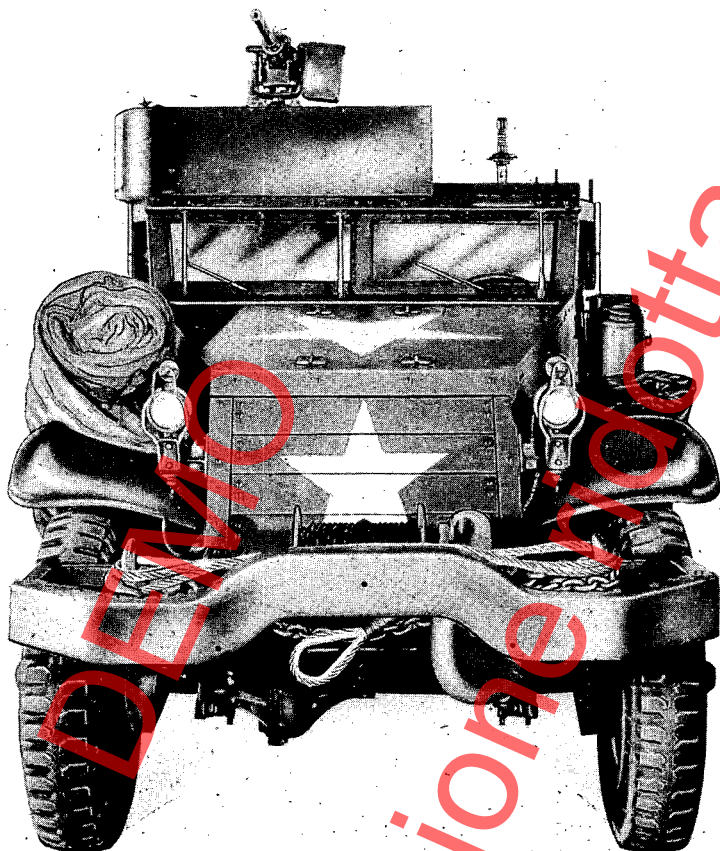
**Figure 7—Personnel Carrier M3A1 (Left Front)**



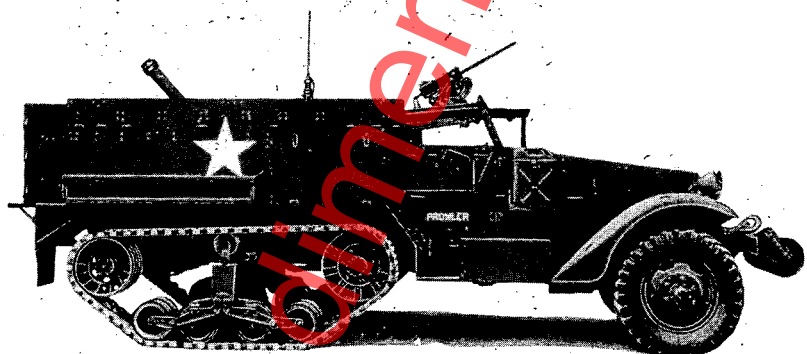
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**Figure 8—Personnel Carrier M3A1 (Right Rear)**

## DESCRIPTION AND TABULATED DATA



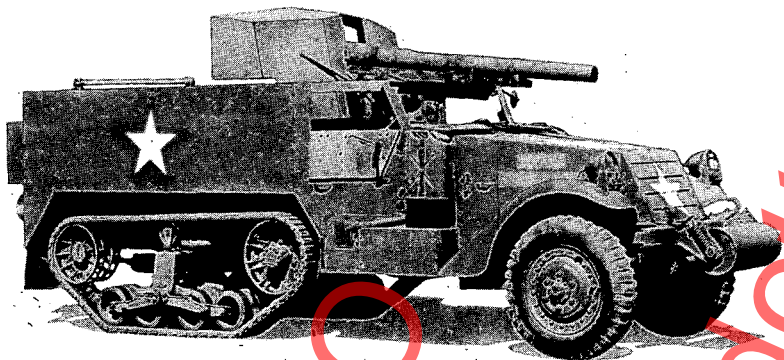
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**Figure 9—Personnel Carrier M3A1. (Front)**

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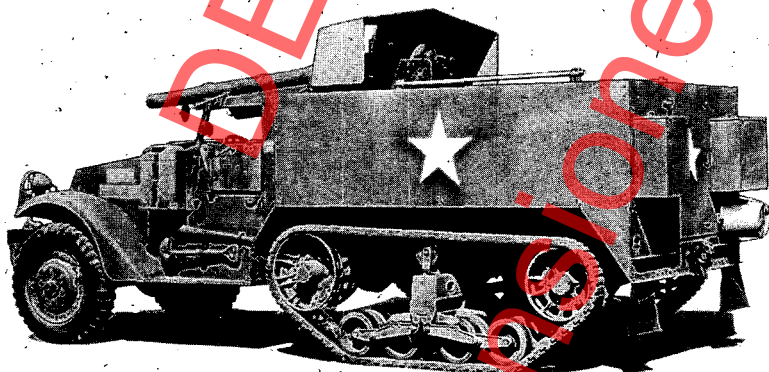
**Figure 10—81-mm Mortar Carrier M4A1 (Right Side)**

**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**



RA PD 313990

**Figure 11—75-mm Gun Motor Carriage M3 (Right Front)**



RA PD 313991

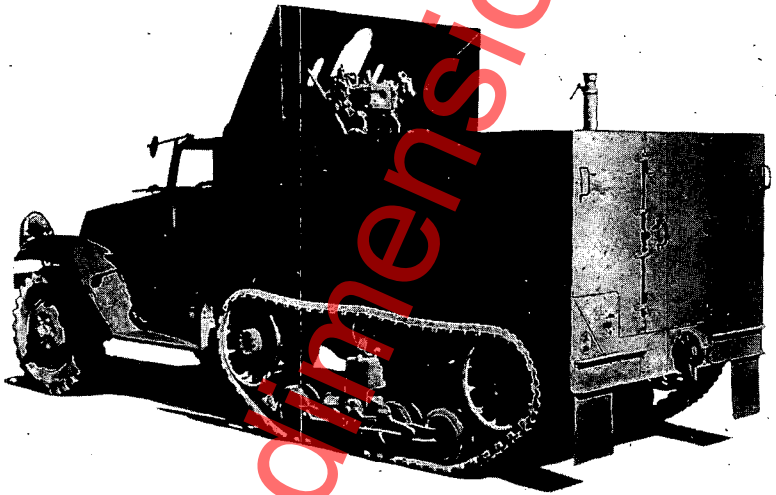
**Figure 12—75-mm Gun Motor Carriage M3 (Left Front)**

DESCRIPTION AND TABULATED DATA



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Figure 13—75-mm Howitzer Motor Carriage T30 (Right Front)

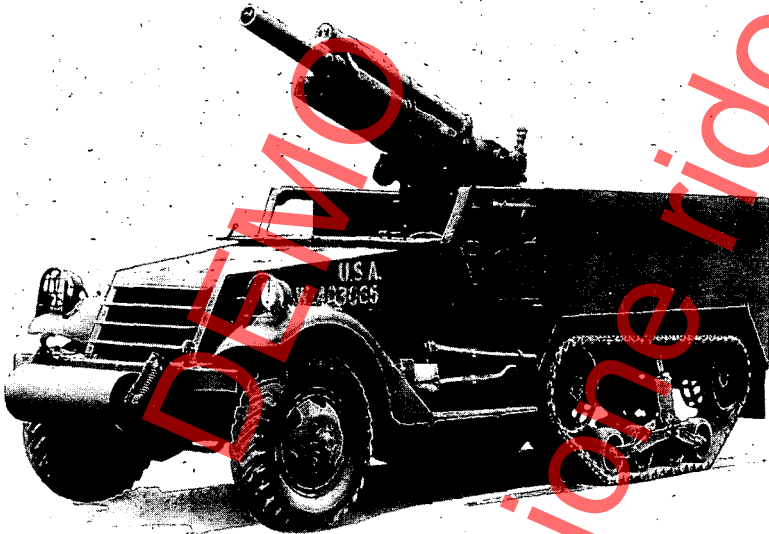


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Figure 14—75-mm Howitzer Motor Carriage T30 (Left Rear)

**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**

located just behind the driver's compartment at the sides of the vehicle. There is no gun rail or radio mast inside the body of this vehicle, but it has one pedestal, mounting a caliber .30 machine gun, located just behind the center seat of the driver's compartment (fig. 40). A door is located at the rear of this model, and it also has rifle scabbard mounts, six on each side, along the sides in the space at the back of the side seats. A top view may be seen by referring to figure 40.



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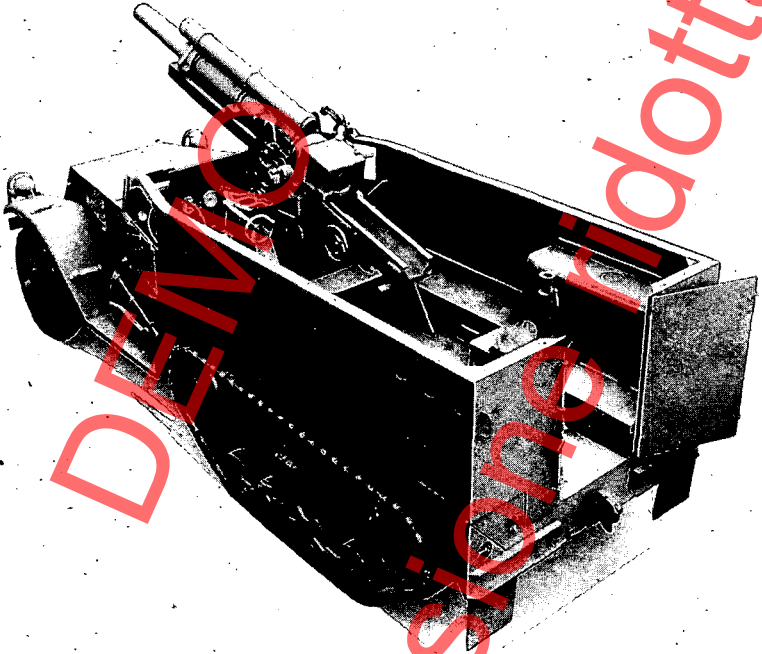
**Figure 15—105-mm Howitzer Motor Carriage T19 (Left Front)**

d. **Personnel Carrier M3A1** (figs. 7 and 8). This vehicle is the same as the Personnel Carrier M3 with the addition of a gun ring mount on the top right side of the driver's compartment.

e. **81-mm Mortar Carriers M4 and M4A1** (fig. 9). These vehicles carry a crew of eight men with the usual seating arrangement for three in the driver's compartment. Each vehicle has a gun ring running completely around the inside of the body, mounting one caliber .50 machine gun on a skate mount. A caliber .45 submachine gun and one 81-mm mortar complete the armament. There is an extra door at the rear of the vehicle and two extra doors for the stowage compartments at the front sides of the body. The gas tanks are located at the rear sides of the body.

## DESCRIPTION AND TABULATED DATA

f. **75-mm Gun Motor Carriage M3 and M3A1** (figs. 11 and 12). These vehicles carry a crew of five men, seating two in the driver's compartment, one on each side of the body at breech of gun, and one against rear door. The armament consists of one 75-mm gun with an armor plate hood which covers the breech of the gun and moves with the pointing of the gun. The gas tanks are mounted in the rear at each side of vehicle body. A top view may be seen by referring to figure 42.



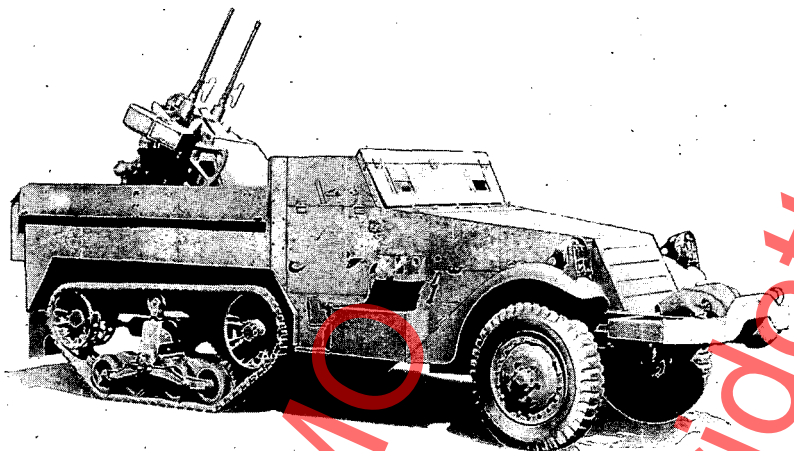
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**Figure 16—105-mm Howitzer Motor Carriage T19 (Left Rear)**

g. **75-mm Howitzer Motor Carriage T30** (figs. 13 and 14). This vehicle has a rear door and a gun pedestal mount at the rear center which carries a machine gun. There is no gun rail inside the body and the gas tanks are mounted in the rear at the sides. An armor plate hood covers the breech of the 75-mm howitzer. A crew of five men is carried.

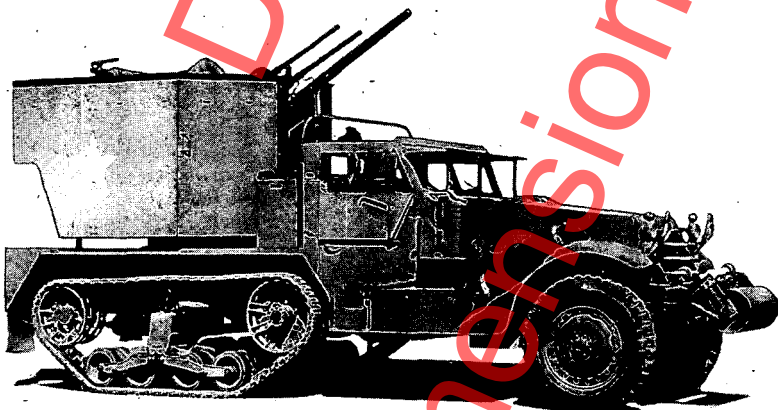
h. **105-mm Howitzer Motor Carriage T19** (figs. 15 and 16). This vehicle has a rear door and a gun pedestal mount at the rear center which carries a machine gun. There is no gun rail inside the body and the gas tanks are mounted in the rear at the sides. An armor plate hood covers the breech of the 105-mm howitzer. A crew of six men is carried.

**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**



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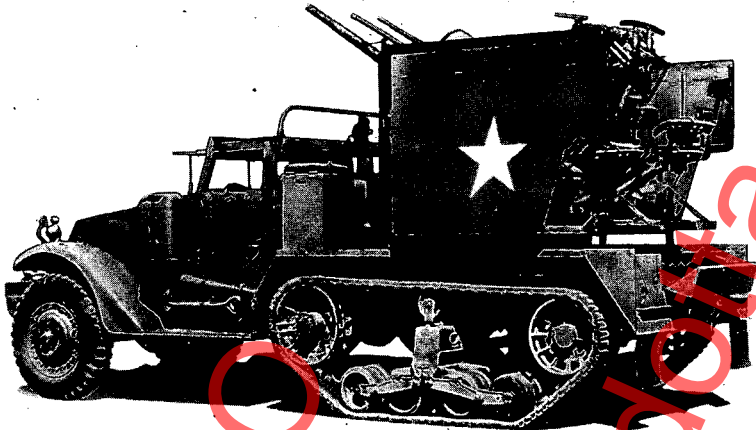
**Figure 17—Multiple Gun Motor Carriage M13 (Right Front)**



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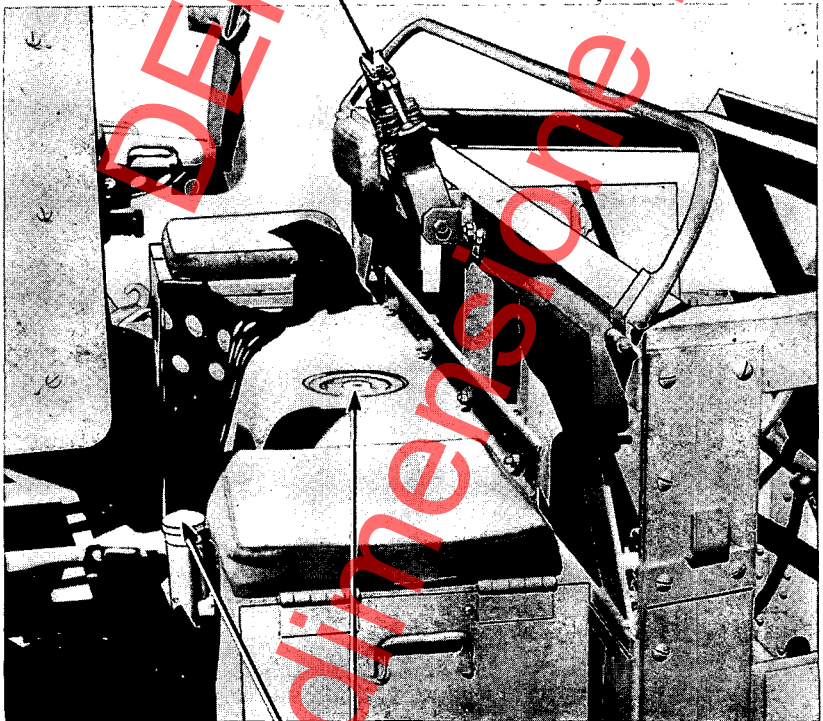
**Figure 18—Multiple Gun Motor Carriage M15 (Right Front)**

DESCRIPTION AND TABULATED DATA



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Figure 19—Multiple Gun Motor Carriage M15 (Left Rear)  
GUN SUPPORT



FILLER CAPS

RA PD 313999

Figure 20—Gun Support and Fuel Tank Filler Caps M15



**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**

i. **Multiple Gun Motor Carriage M13** (fig. 17). This vehicle has an electrically operated gun turret, carrying its own battery charging unit. The turret mounts two caliber .50 machine guns and turns a full 360 degrees. There is no gun rail, pedestal mount, or rear door on this model. There are folding panels at the two sides and rear end of the body. The gas tanks are mounted just to the rear of the driver's compartment on each side of the body. This vehicle carries a crew of five men.

j. **Multiple Gun Motor Carriage M15 and M15A1** (figs. 18 and 19). This vehicle has a manually operated gun turret mounting three synchronized guns. The turret turns a full 360 degrees, mounting one .37-mm automatic cannon and two caliber .50 machine guns. The driver's compartment and gun turret are separate units on this model. Two gas tanks are located at the center of the vehicle, the upper tank just behind the driver's compartment, and the lower tank is below the level of the floor just to the rear of the upper tank. The filler spout of the lower tank rises at the left-hand rear corner of the upper tank (fig. 20). A gun support (fig. 20), located on the rear of the driver's compartment, and two turret locks (fig. 21), lock the turret and cannon in position while traveling. This vehicle carries a crew of seven men. The M15A1 is a later model; the main difference is a change in mounting the cannon and two machine guns at a common level (the cannon is below the level of the machine guns in the M15). A top view of the M15 may be seen by referring to figure 43.

k. **Multiple Gun Motor Carriage M16** (figs. 22 and 23). This vehicle resembles the M13 Multiple Gun Motor Carriage. It has an electrically operated gun turret with four caliber .50 machine guns in place of two as on the M13. The folding side and rear panels have a dip or section cut out of their top edge to permit more gun depression. The M13 becomes an M16 with the above changes incorporated. A top view may be seen by referring to figure 44.

l. **81-mm Mortar Carrier M21 (Forward Firing)** (fig. 24). This vehicle carries a crew of six men. Its armament consists of an 81-mm mortar which fires forward only; one caliber .50 machine gun and pedestal mounting; one caliber .45 submachine gun.

DESCRIPTION AND TABULATED DATA



TURRET LOCK

RA PD 314000

Figure 21—Turret Lock M15



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Figure 22—Multiple Gun Motor Carriage M16 (Right Front)

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**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**

**4. TABULATED DATA.**

**a. Vehicle Specifications.**

		Car M2	Car M2A1	Personnel Carrier M3	Personnel Carrier M3A1	81-mm Mortar Carrier M4	81-mm Mortar Carrier M4A1
Wheelbase	in.	135½	135½	135½	135½	135½	135½
Length (Roller)	in.	234	234¾	242⅝	242⅝	243⅞	243⅞
(Winch)	in.	241	241⅝	249⅝	249⅝	250⅝	250⅝
Width	in.	87	87½	87½	87½	77½	87½
Height	in.	89	95⅞	89	95⅞	89⅞	89⅞
Wheel size	in.	20x7	20x7	20x7	20x7	20x7	20x7
Tire size (front)	in.	8.25x20	8.25x20	8.25x20	8.25x20	8.25x20	8.25x20
Tire type		Combat	Combat	Combat	Combat	Combat	Combat
Tread	in.	63 <sup>13</sup> / <sub>16</sub>	63 <sup>13</sup> / <sub>16</sub>	63 <sup>13</sup> / <sub>16</sub>	63 <sup>13</sup> / <sub>16</sub>	63 <sup>13</sup> / <sub>16</sub>	63 <sup>13</sup> / <sub>16</sub>
Crew		10	10	13	13	6	6
Weight (gross)		19,195	19,600	17,650	20,500	17,350	18,000
Ground press. (unit) 16 per sq in.		45					

Ground clearance	in.	17⅞	11⅜	17⅞	11⅜	17⅞	17⅞
Pintle height	in.	28	28	28	28	28	28
Octane rating of fuel (gasoline)		72	72	72	72	72	72
Approach angle (Roller)	deg	37	37	37	37	37	37
(Winch)	deg	32	32	32	32	32	32
Departure angle	deg	35	35	35	35	35	35

**b. Performance.**

		Mph					
Speeds allowable without front wheels driving (transfer case in high range)	(1st gear)	9.15	9.15	9.15	9.15	9.15	9.15
	(2nd gear)	17.3	17.3	17.3	17.3	17.3	17.3
	(3rd gear)	26.2	26.2	26.2	26.2	26.2	26.2
	(4th gear)	45	45	45	45	45	45
Speeds allowable with front wheels driving (transfer case in low range)	(1st gear)	3.68	3.68	3.68	3.68	3.68	3.68
	(2nd gear)	6.96	6.96	6.96	6.96	6.96	6.96
	(3rd gear)	10.45	10.45	10.45	10.45	10.45	10.45
	(4th gear)	18.05	18.05	18.05	18.05	18.05	18.05
Min. turning circle (diam.)	ft	59	59	59	59	60	60
Maximum fording depth	in.	32	32	32	32	32	32
Towing facilities (front)		Two tow hooks	Two tow hooks	Two tow hooks	Two tow hooks	Two tow hooks	Two tow hooks
	(rear)	Pintle	Pintle	Pintle	Pintle	Pintle	Pintle
Max. grade ascend. ability	pct	60	60	60	60	60	60
Max. governed engine speed	rpm	3,000					
Miles per gallon (approx.)		3½	3½	3½	3½	3½	3½
Cruising range (approx.)	mi	200	220	200	220	200	200

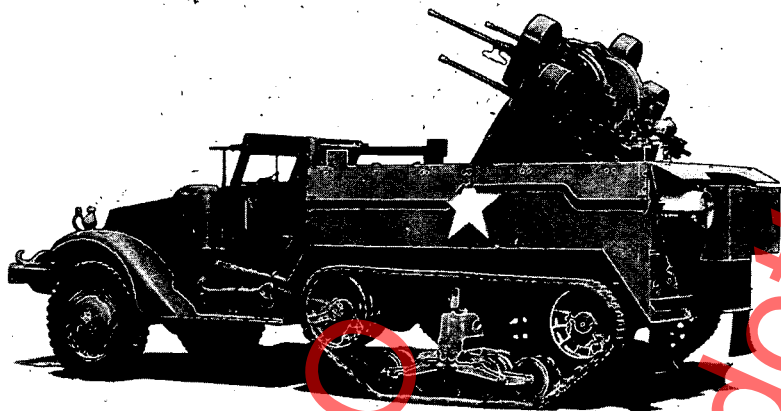
**c. Capacities.**

Trans. cap. (less P.T.O.)	qt	7½	7½	7½	7½	7½	7½
Trans. case cap. (with P.T.O.)	qt	9	9	9	9	9	9
Front axle capacity	qt	3½	3½	3½	3½	3½	3½
Rear axle capacity	qt	9	9	9	9	9	9
Fuel capacity	gal	60	60	60	60	60	60
Cooling system capacity	gal	6½	6½	6½	6½	6½	6½
Crankcase capacity	qt	12	12	12	12	12	12

DESCRIPTION AND TABULATED DATA

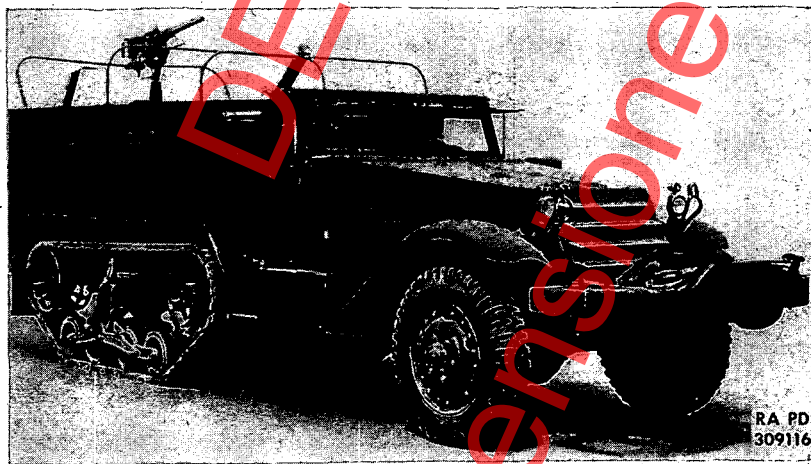
57-mm Gun Motor Carriage T48	75-mm Gun Motor Carriage M3	75-mm Gun Motor Carriage M3A1	75-mm How-itzer Motor Carriage T30	105-mm How-itzer Motor Carriage T19	Multiple Gun Motor Carriage M13	Multiple Gun Motor Carriage M15	Multiple Gun Motor Carriage M15A1	Multiple Gun Motor Carriage M16	81-mm Mortar Carrier M21
135 1/2	135 1/2	135 1/2	135 1/2	135 1/2	135 1/2	135 1/2	135 1/2	135 1/2	135 1/2
252 5/8	249 7/8	249 7/8	240 1/8	241 3/4	256	236 1/2	236 1/2	256	244 7/8
83	77 1/8	77 1/8	77 1/4	84 13/16	77 7/8	98	98	77 7/8	87 1/4
84	92	92	83 3/4	88	88	104	104	88	87
20x7	20x7	20x7	20x7	20x7	20x7	20x7	20x7	20x7	20x7
8.25x20	8.25x20	8.25x20	8.25x20	8.25x20	8.25x20	8.25x20	8.25x20	8.25x20	8.25x20
Combat	Combat	Combat	Combat	Combat	Combat	Combat	Combat	Combat	Combat
63 13/16	63 13/16	63 13/16	63 13/16	63 13/16	63 13/16	63 13/16	63 13/16	63 13/16	63 13/16
5	5	5	5	6	5	7	7	5	6
19,000	20,000	20,000	20,500	19,240	18,500	20,000	20,000	19,000	20,000
33.5	33.5	33.5	33.5	29.5	29.5	33.5	33.5	29.6	29.6
17 1/8	17 1/8	17 1/8	17 1/8	17 1/8	17 1/8	17 1/8	17 1/8	17 1/8	17 1/8
28	28	28	28	28	28	28	28	28	28
72	72	72	72	72	72	72	72	72	72
37	37	37	37	37	37	37	37	37	37
32	32	32	32	32	32	32	32	32	32
35	35	35	35	35	35	35	35	35	35
9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15
17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2
45	45	45	45	45	45	45	45	45	45
3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68
6.96	6.96	6.96	6.96	6.96	6.96	6.96	6.96	6.96	6.96
10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45
18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05
60	60	60	60	60	59	60	60	60	60
32	32	32	32	32	32	32	32	32	32
Two	Two	Two	Two	Two	Two	Two	Two	Two	Two
two	two	two	two	two	two	two	two	two	two
hooks	hooks	hooks	hooks	hooks	hooks	hooks	hooks	hooks	hooks
Pintle	Pintle	Pintle	Pintle	Pintle	Pintle	Pintle	Pintle	Pintle	Pintle
60	60	60	60	60	60	60	60	60	60
3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
200	200	200	200	200	200	200	200	200	200
7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
9	9	9	9	9	9	9	9	9	9
3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
9	9	9	9	9	9	9	9	9	9
60	60	60	60	60	60	60	60	60	60
6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2
12	12	12	12	12	12	12	12	12	12

**BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, and DIAMOND T)**



RA PD 314002-

**Figure 23—Multiple Gun Motor Carriage M16 (Left Rear)**



RA PD  
309116

**Figure 24—81-mm Mortar Carrier M21 (Forward Firing)**