

by SFC Marc E. Price

Since the introduction of the M242, 25-mm automatic cannon in 1980, detailed training materials on its principles of operation, cycle of function, and gear flow are not readily available to non-commissioned officers (NCOs) in the force. Army Training Manual (TM) 9-1005-200-23&P/Marine Corps TM

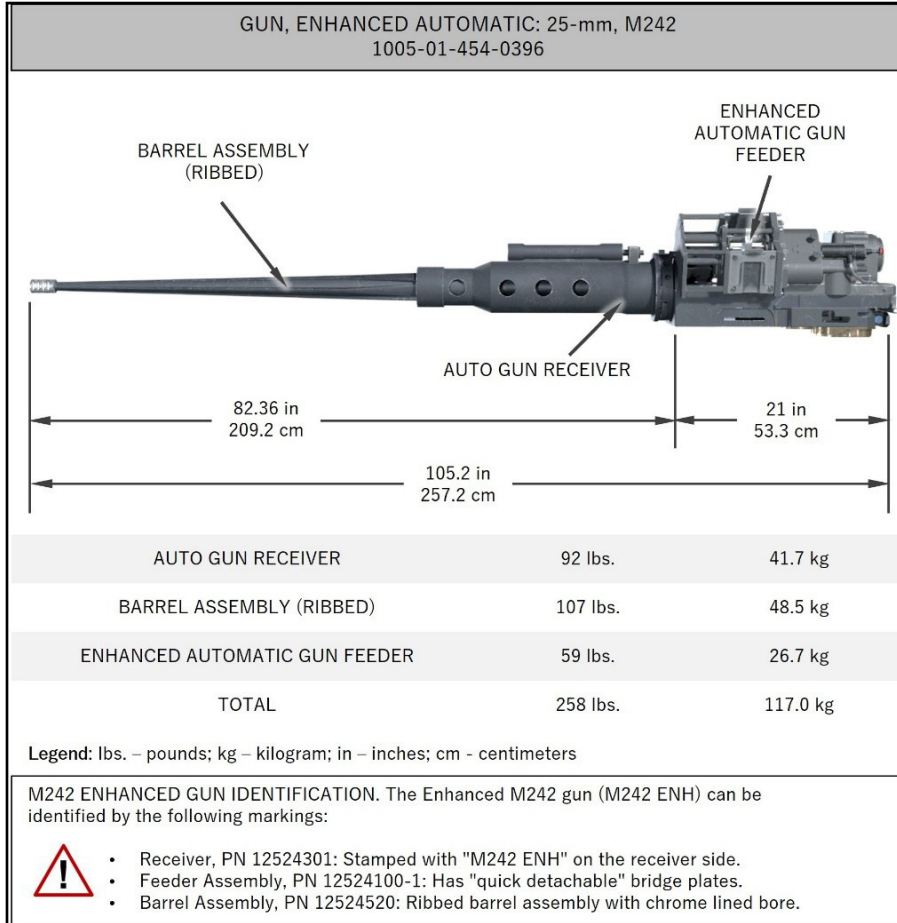
08672A-23&P is meant to be used as a technical manual for unit and direct support maintenance for the M242, containing detailed information about the various components and functions of the M242. However, since June 11, 2001, there have been no updates to Army TM 9-1005-200-23&P/Marine Corps TM 08672A-23&P, and no official publication had been created as a reference or training resource for Bradley

commanders and Bradley gunners.

Overview

Training Circular (TC) 3-20.31-242, *Mastery: Gun Theory, M242* which is currently available through the Army Publishing Directorate (APD), was created as a primary reference designed to provide Bradley commanders and Bradley gunners mastery-level understanding in a comprehensive, yet easy to understand format.^{1,2} This TC is specifically designed to provide the Bradley commander and Bradley gunners a detailed text reference of "how" this complex autocannon works. It describes the interaction, movement, and function of each gear, lever, switch, and component of the gun in a step-by-step manner. It will provide Bradley commanders and Bradley gunners a mastery-level understanding of the M242 and highlights the importance of understanding the equipment that Bradley crewmembers operate during training and combat operations. This TC allows Bradley Master Gunners (MG) and Bradley commanders to provide mastery-level instruction to their crews before, during, and after their scheduled gunnery density. It is meant to be easy to read for those who are unfamiliar with the M242 and displays graphics to enhance the readers' understanding of the text that accompany it.

Image 1. M242 Bushmaster component weight description chart. (U.S. Army graphic)



Investing Into the Future of the Bradley Master Gunner

TC 3-20.31-242 was designed by Bradley MGs for Bradley MGs, enabling unit-level, subject-matter expert (SME)

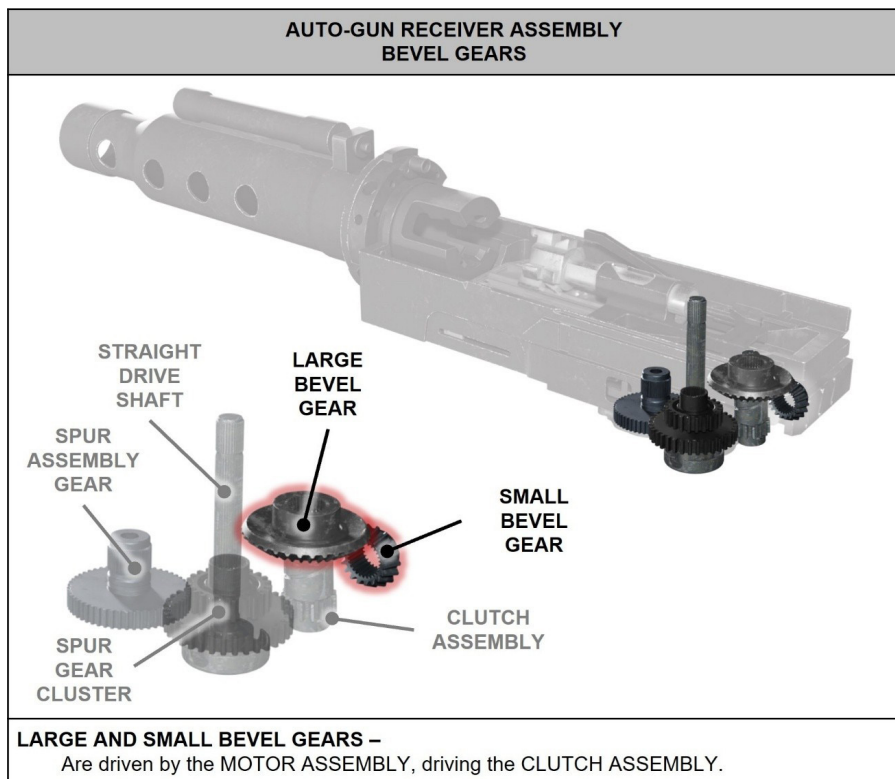


Figure 2. 3D rendering illustrating the large and small bevel gears. (U.S. Army graphic)

led instruction to a mastery-level understanding. This manual is a primary reference for units conducting sabot academy lessons to improve unit lethality. TC 3-20.31-242 is written in a progressional format, beginning with introducing the reader to the history and lineage of the M242, 25-mm automatic cannon, highlighting the development process that occurred before the creation of this automatic cannon. Chapter 2 transitions into depicting and describing the different gears, switches, levers, and components of the M242 and how they interact with each other during normal gun functions. This is followed by Chapter 3, describing the overarching theory of operation of the M242 by describing how the muzzle brake, bolt and carrier assembly, mechanical safety interlock system (MSIS), dual-feed system, and power train operates, and describes how double feeds are prevented. Chapter 4 and Chapter 5 then describe the cycles of function and how the electrical system functions, and what occurs when each sensor is displayed through the bolt position indicator (BPI). To enhance Bradley crewmembers ability to maintain the M242, Chapters 6-8 focus on pre-combat

procedures, troubleshooting procedures (specifically highlighting how to identify and remediate symptoms that prevent firing operations), and how to properly clean and lubricate every component of the M242. Appendix A then provides services information, with graphical training aid (GTA) 17-06-242 – M242 operational readiness reference, being made available and designed for unit standard operation procedure integration.³ Bradley commanders and Bradley gunners can print these GTAs with ½ page portrait formatting so that they may be integrated into the Bradley crew’s pre-to-fire checklists and services checklists. GTA 17-06-242 is available through the Central Army Registry (CAR).⁴ Appendix B provides diagrams and instructions for proper storing of the M242, while also including diagrams for construction of gun stands. Finally, Appendix C provides Bradley commanders and Bradley gunners the most important terms and definitions to solidify a mastery-level understanding of the M242, in an easy-to-read format.

3D Modeling

This GTA features higher quality images using 3-dimensional models and

easily identifiable callouts of the different components of the M242. These callouts help readers identify where the component is located within the feeder or receiver assemblies, and where they are located amongst other smaller components. A brief explanation of each component is provided within the graphic, while a more detailed description is provided in the main text.

Gear Flow Chart

The gear flow chart has been recreated, with the intent of replacing the old hand drawn style callouts with accurate picture representations of the different gears included in the receiver and feeder assemblies. Additionally, the gear flow chart has been broken down into two separate graphics, that depict the gears that are contained within the feeder assembly and what gears are contained within the receiver assembly, respectively. The gear flow chart is one of the most crucial concepts to understand when operating the M242, as it can assist Bradley commanders and Bradley gunners in understanding why and how a malfunction has occurred. Timing of the gears of the M242 is a crucial step of pre-combat procedures, and TC 3-20.31-242 describes why it is such an important event that must not be overlooked when preparing for firing operations.

Storage/Gun Stand for the M242

TC 3-20.31-242 also contains dimensions for M242 related equipment, such as dimensions of storage containers and gun stands. The storage crate dimensions provided can be used for securely packaging M242 components by units that are preparing to deploy their Bradley formations anywhere in the world. These crates reduce the abuse that the M242’s receive when they are simply bubble wrapped and strapped to the troop seat of a Bradley Fighting Vehicle (BFV). The gun stand is also provided and will enable more in-depth instruction at the platoon level, as well as providing a means to conduct more thorough weekly maintenance on the M242, keeping the weapon system off the back ramp of the

BFV. Gun stands are an especially crucial item that can enhance the training value of any class involving the M242, by allowing the instructor to bring the M242 out of the Bradley turret and allowing for a more hands-on program of instruction from SMEs.

These graphics provide the measurements and materials required, while the text provides the steps for creating these items, as well as what markings are required for transport and storage.

Sergeant First Class Marc E. Price currently serves as a Training Developer/Writer in the Weapons and Gunnery Branch, DOTD, at Fort Benning, GA. His previous positions include Brigade Master Gunner for HHT, 3ABCT, 1CD at Fort Hood, TX; Battalion Master Gunner for HHC, 1-12 CAV, 3ABCT, 1CD at

Fort Hood; Platoon Sergeant for 2nd Platoon, B TRP, 6-9 CAV, 3ABCT, 1CD at Fort Hood; Section Sergeant for B SEC, 2nd Platoon, B TRP, 6-9 CAV, 3ABCT, 1CD at Fort Hood; and Team Leader for B SEC, SCT PLT, HHC, 1-66 AR, 4ID at Fort Carson, CO. His military education includes the Maneuver Leaders' Maintenance Course, Cavalry Leader's Course, and Doctrine Developers Course at Fort Benning, as well as the Maneuver Senior Leader Course at Camp Shelby, MS, and the Bradley Master Gunner School at Fort Benning. SFC Price holds an associate's of arts in interdisciplinary studies from American Military University. His awards and recognitions include various commendations reflecting his service and expertise.

Notes

1 TC 3-20.31-242, Mastery: Gun Theory, M242, https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1031337

2 Army Publishing Directorate (2025, July). APD – Army Publishing Directorate. Retrieved from ArmyPubs: https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1031337

3 GTA 17-06-242 – M242 Operational Readiness Reference, from https://rdl.train.army.mil/catalog/#/search?search_terms=17-06-242

4 Central Army Registry (2025, July). CAR – Central Army Registry. Retrieved from https://rdl.train.army.mil/catalog/#/search?search_terms=17-06-242



General Frederick M. Franks Jr. Writing Competition Award



Submission Window
1 January - 31 March 2026

The General Frederick M. Franks Jr. Writing Competition Award is given annually to a program participant who submits the manuscript that best addresses the topic selected by the Commandant, U.S. Army Armor School (USAARMS). The competition will evaluate and recognize outstanding writers from across the force who demonstrate clarity and vision about the future of the mounted force through clear and concise writing.

The topics for the 2026 General Frederick M. Franks Jr. Writing Competition Award are:

- **How does the company/brigade/battery Executive Officer fight and enable the fight (before, during, and after the mission)?**
- **What are the optimal roles/responsibilities for the Executive Officer?**
- **How does this change in the future as the Army transforms?**

The nomination/submission window for this award is January - March 2026, with the winner being announced during the Armor Week events in May and official recognition during the Maneuver Warfighter Conference to be held in September 2026 at Fort Benning, GA. Submit nominations no later than **31 March 2026** to the Office of Chief of Armor, ATZK-AR, 1 Karker Street, Fort Benning, GA. 31905-4500 or via email at: usarmy.benning.mcoe.mbx.armor-ocoa.army.mil.

The competition is open to active or reserve component officers, warrant officers, noncommissioned officers, and Department of the Army civilians, regardless of branch or occupational speciality.

Nomination packets for Soldiers must include the STP and an 8x10 military photo (quality JPEG); for civilians, a one page summary of government service and an 8x10 photo (civilian attire with coat and tie).

Packets will be evaluated by the Armor School Deputy Commandant with the recommendation forwarded to the Armor Commandant for review and final approval.

For additional information contact the Office of the Chief of Armor coordinator at (706) 626-8265, usarmy.benning.mcoe.mbx.armor-ocoa@army.mil