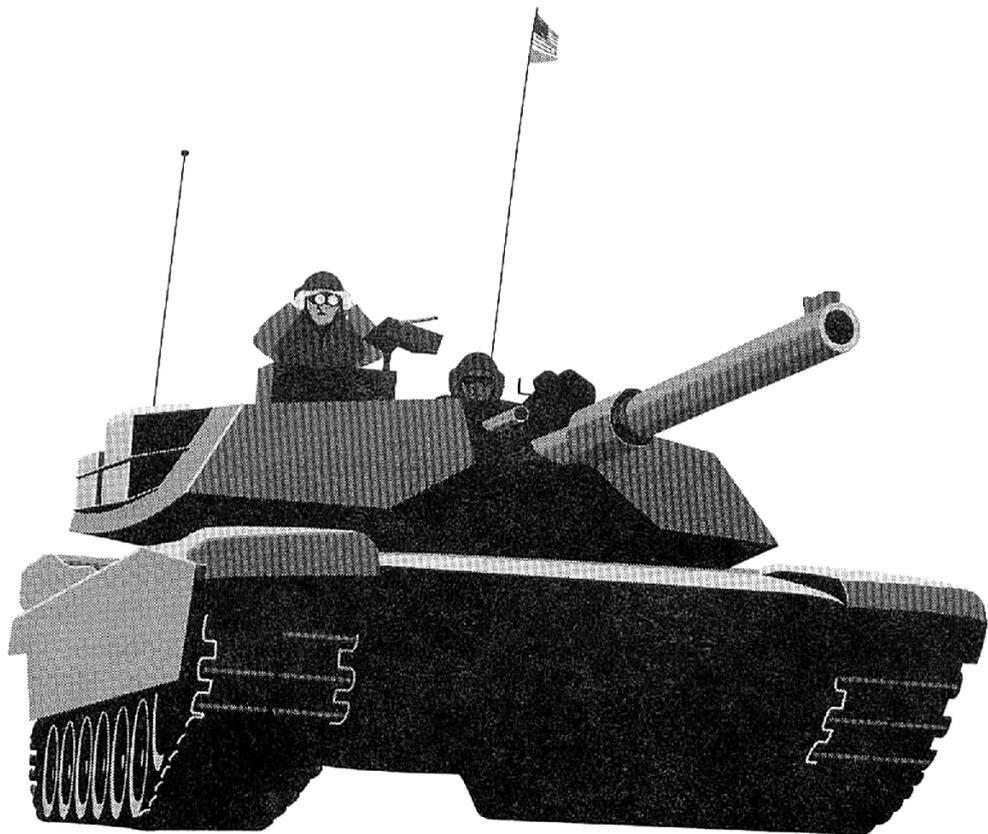


STEEL THUNDER™

AMERICAN BATTLE ★ TANK SIMULATION



**Tank Commander's Briefing Manual
for Commadore 64/128**

U.S. Document #6258-88/D

STEEL THUNDER



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THEY'RE COMING

Five, eight, ten miles away, a rumble echoes across the green hills of central Germany. At first, it sounds like a thunderclap, a summer storm rolling down from the eastern mountains. But now, there's a siren squawking overhead, and a grim, intense look on the General's face as he paces the tarmac. As you head for the tanks, the booming moves closer — this time, there's no mistaking the sound of heavy artillery. The moment the world has feared for decades has finally arrived.

They're coming.

You settle into the commander's seat atop your sleek M1A1 Abrams. Master power on. Engine power on. Gunsight on. Your four-man crew moves effortlessly through the startup sequence like this was just another NATO practice maneuver. Sixty tons of steel come alive with a low hum, as smooth and quiet as your grandma's old tail-fin Cadillac. Glowing control panels put two million dollars of the world's most sophisticated technology at your fingertips.

You check the map again. Looks like half of Moscow's showing up for this picnic: the satellite shot shows dozens of Soviet T-80s, T62s, some BTR-70 infantry carriers, and a whole menagerie of Zoo anti-aircraft guns — all defending the medium-range nuclear missile site you're assigned to knock out.

No problem. Even before you head out for the hills, the outcome has already been decided. You're a crack crew of skilled tankers, running the most awesome military vehicle in history. Faster, more powerful than anything the other side has even dreamed of. A devastating war machine that rolls out of the west like steel thunder.



SECTION ONE: Start-Up

GETTING STARTED

- 1 Turn on your disk drive and computer. Put joystick in Port 2. Insert the **Steel Thunder** program disk in the drive, label side up, and close the drive door.
- 2 Type **LOAD "*" ,8,1** and press **Return**. The game loads in a few seconds.
- 3 Place the enclosed keyboard overlay on your keyboard. The overlay helps you learn **Steel Thunder's** commands, and enables you to react quickly to situations without having to refer to this manual.
- 4 The opening screens show **Steel Thunder's** tank arsenal. To move through these screens quickly, press the **space bar** or **fire button**.

CAUTION!

- DO NOT remove the **Steel Thunder** disk from the drive while the light is on
- DO NOT attempt to run **Steel Thunder** with the **Shift Lock** key engaged

HQ warns that all tank personnel found in violation of these regulations will be immediately relieved of command.

QUICK START

The following step-by-step instructions take you through the game set-up and tank start-up procedures as quickly as possible. For more detailed information, please refer to the next section of this manual.

▶ HOW TO SET UP THE GAME

As a general rule, you can press **Return** or the **fire button** to move through the setup screens. The resulting scenario is based on default options.

- 1 When the sentry confronts you, refer to the enclosed Sentry Password Chart. Use the joystick to move the pencil to the box next to the right answer, and press the **fire button** to select it. If you answer the question correctly, you enter the General's Office. If you don't enter the right answer within 45 seconds, the sentry places you under arrest, and you must re-boot.
- 2 Type your name, and press **Return**.
- 3 If this is your first-ever **Steel Thunder** mission, you are assigned to the Cuban front. At the Welcome to Cuba prompt, press **Return** to view the Tank Commander's roster.
- 4 Press the **fire button** to add your name to the roster.
- 5 The General presents you with your mission choices. Press **Return** to continue.
- 6 To accept a mission, press the **fire button**. If you'd like to see the map, press

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QUICK START continued

- F3.** If you'd like to review the tank specifications, press **F7**. Press **F5** to exit either of these screens.
- Press the **fire button** to accept the M1A1 Abrams tank.
- Choose your ammo. For your first game, simply press the **fire button** three times to take the standard package. Every tank has three screens of ammo and armor.
- When the General appears again, press **Return** to enter the game.

▶ HOW TO START UP YOUR TANK

Once you're inside your tank, the next step is to get it running. Use the following sequence of keyboard commands to prepare your tank for battle:

- Press the top **Left Arrow** key to turn on the Master Power.
- Press **1** to start your engine.
- Press **6** to move to the Commander's Station.
- Press **C=** to turn on the Turret Power.
- Press **Z** to arm your smoke grenades.
- Press **C** to turn on Commander's mini-turret hydraulics.
- Press **5** to go to the Gunner's Station.
- Press **B** to turn on the Turret Hydraulics.
- Press **V** to turn on your Gun Stabilization system.
- Press **N** to turn on the Ballistics Computer.
- Press the comma **[,]** key to toggle the Thermal Sight on.
- Press **F7** to load a HEAT round into your Main Gun, so you're ready to fire.
- You're now ready for battle. Press **9** to look at the map. The tank icon represents your current location — in this case, HQ. You are heading for the primary mission target, which is circled. The red and blue Xs represent the two main checkpoints you use to set your course to the target.
- Move the joystick to position the blue X. The path between HQ and the blue X is the first leg of your trip. Press the **fire button**.
- Next, move the joystick to position the red X. The line between the blue X and the red X is the second leg. From the red X, your driver will proceed toward the target. You can go to the map and move the Xs (thus changing your course) at any time during the game.
- When your initial course is set, press **4** to return to the Driver's Station.
- Push the joystick Up to set your forward speed.



COMBAT MANEUVERS

During the mission, there are a few sequences you will use frequently to keep yourself out of trouble. Here's how to handle some common situations:

► FIRE ON THE ENEMY — COMPUTERIZED GUNNER

- 1 If you're not at the Commander's Station, press **6** to get there.
- 2 Get the target in your gunsight, and press **Return** to identify it.
- 3 Check to make sure the gunner is loading the right shell type. If he's got it wrong, press **F7** to change the ammo.
- 4 Press the period (**.**) key to switch to 10x gunsight magnification. This makes it easier to aim accurately.
- 5 Press the **space bar**, and your computerized gunner engages the enemy. Press the **space bar** again to order the gunner to cease fire — either because you decide not to shoot, or because you want to assume manual control of the main gun.

► FIRE ON THE ENEMY — MANUAL CONTROL

- 1 Press **5** to go to the Gunner's Station.
- 2 Get the target in the gunsight, using the 3x setting. When you've got it, press **Return**.
- 3 Press **F7**, and select your ammo.
- 4 Press **F5** to activate the rangefinder and get a valid range. (This isn't necessary on the M3 Bradley.)
- 5 Press the period (**.**) key to switch the sight magnification to 10x.
- 6 If you slow down the tank's slew rate, it's easier to center the target in the crosshairs. Press the **Right Shift** key if you want to do this.
- 7 When a box appears in the lower left of the gunsight, the shell is loaded and ready. Press the **fire button** to shoot. If the target is moving, shoot slightly ahead of its current position.

► LAUNCH A TOW-2 MISSILE (M3 Bradley only)

- 1 Press **5** to go to the Gunner's Station.
- 2 Press **C** to raise the TOW missile launcher from its armored compartment on the side of your M3.
- 3 Get the target in your gunsight, and press the period (**.**) key to switch to 12x magnification.
- 4 Center the target in your crosshairs. Press the **fire button** to launch a missile.
- 5 Use the joystick to keep the target precisely in the center of your gunsight until the TOW-2 reaches it. The missile doesn't travel nearly as fast as a shell.
- 6 Once the target is destroyed, press **C** again to lower the TOW launcher unit.

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RETREAT FROM A BAD SITUATION

- 1 Press **Z** to arm your smoke grenade launcher.
- 2 Press **F1** or **Del** to create a smoke screen.
- 3 Press **£** . This orders your driver to go backwards.
- 4 Press the comma (**,**) key to turn on your thermal sight.
- 5 Use your guns to shoot at oncoming vehicles. With your thermal sight on, you can see them, but they can't see you.
- 6 Watch your rear to ensure that you don't back up into an enemy tank company.



SECTION TWO: At Headquarters

This section provides in-depth information about **Steel Thunder's** systems and procedures. HQ recommends that you review it carefully to thoroughly familiarize yourself with military operations and your tank's features and capabilities.

SECURITY

You must gain entry to the field command headquarters and pick up your orders before you'll be permitted to go out and blast through enemy lines. At the base's main gate, a sentry interrogates you.

- 1 You can either draw on your extensive knowledge of ammunition and weaponry to answer his questions, or you can refer to the enclosed Sentry Password Chart (U.S Document #5945A/76-S).
- 2 Use the joystick to move the pencil to the left of the box next to the correct answer, and press the **fire button** to select. If you answer the question correctly, you are escorted to the General's Office. If you don't, you are escorted to the stockade. To bail yourself out, re-boot the system.

IDENTIFY YOURSELF

In the General's office, you are first requested to identify yourself.

If you want to gloat over your glorious career, or find out about the other up-and-coming commanders, press **F1** to view the Personnel Files. All current tank commanders are listed here (up to 14 on a disk), with their individual battle stats, rank, and medals and commendations. This information is updated automatically after each mission. Move the joystick Up or Down to cycle through these records.

Press **F1** again to return to the General's Office. To identify yourself, simply type your name (but *not* your rank: the General can read your stripes quite well) and press **Return**.

- If you are already in the file, the General welcomes you. If you're cleared for combat in more than one theater, he asks you to select the region in which you want to serve
- If you are a new commander, the General asks: "How should I update my roster?" You now have the opportunity to change the information on the Tank Commander's roster. Press **Return** at this prompt to view the roster. Move the joystick to select one of the following options, and press the **fire button** to choose:
 - ADD Add a new commander to the list
 - REPLACE Replace one commander's name with another
 - REDO Return to the General's Office. (If you make a mistake, you can start over again from here.)

Press **F1** to view the Personnel Files again, if you want. Press **F1** again to return to the Tank Commander's roster.

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CHOOSE YOUR MISSION (AND YOUR TANK)

You gain rank and earn medals by completing missions. Every mission you undertake has a corresponding promotion rank. If you complete the mission successfully, you are automatically promoted to that rank.

The General can offer you assignments in one of three fronts, depending on your previous experience and achievements. For your first several missions, he'll assign you to Cuba. Once you attain the rank of Second Lieutenant, you are given the opportunity to join the elite troops in Syria. Only top tankers — those who've reached the rank of Major or above — are entrusted with the sensitive and dangerous missions on the West German front.

Once you have your front assignment, the General outlines the current missions. You have between 2 and 8 missions available to you, depending on your experience. Move the joystick Up or Down to cycle through the assignment files. At each file, you can:

- Read a brief description of the mission
- Press **F3** to view the map of the mission area. The circled icon is your primary mission target. Press **F5** to return to the assignment file
- Press **F7** to view tank specifications. Use the joystick to cycle through your choices. Press **F5** to return to the assignment file
- Accept the mission
- Choose your tank. You can find additional information on the M1A1 Abrams, M60A3, M3 Bradley, and M48A5 Patton in the Equipment Reference section in this manual

The first mission of each scenario is a practice mission in which you are invulnerable to enemy fire. This helps you get the lay of the land, and familiarize yourself with the enemy armor you're up against.

SELECT YOUR CREW

Most modern tanks, including the four in **Steel Thunder**, contain so much equipment that it takes three or four skilled crew members working together to make them run. As tank commander, it's your job to make tactical decisions, and see to it that your gunner, driver, and loader interact efficiently under battle conditions.

After you select your tank, the General displays the Duty Rosters from which you choose your crew. (If you're going on a practice mission, the General chooses your crew for you.)

Gunner Your gunner is responsible for the tank's major weapons systems, including the sighting equipment, main gun, and co-axial machine gun. He's also the man to ask when you're trying to decide if an approaching vehicle is friendly or hostile.

The first Duty Roster shows available gunners. To make the best choice, first take note if you're on a night or day mission. The chart gives an A, B, C, or D rating to each gunner's accuracy on both day and night missions. Move the joystick to select your gunner, and press the **fire button**.



Driver A good driver can take your tank smoothly and quickly over rough terrain, quietly sneak up on targets, and outmaneuver anything the enemy throws at you. Much of your safety depends on how fast he can make the beast move, and how good he is at evasive driving.

The Drivers' Duty Roster automatically appears after you select your gunner. Move the joystick to select your driver, and press the **fire button**.

Loader The last duty roster shows the available loaders. In all tanks but the M3, reload speed is the most important factor in choosing a loader.

(In the M3, this crew member just loads machine guns and TOWs.) A fast loader makes the critical difference in how much time elapses between shots.

The Switch Type Speed column shows how fast the loader can change shell types — for example, to switch from a HEAT round to a HEP round.

Move the joystick to select your loader, and press the **fire button**.

ARM YOUR TANK

After you've chosen your crew, the General presents the Loading Files, which show the various equipment options for your tank. For in-depth information on each tank — vehicle specifications, weapons system, ammo type, and armor — refer to the Equipment Reference section of this manual.

The Loading File for each tank consists of three screens. At any of these screens, you can press **F7** to get a more detailed explanation of the ordnance specs. Press **F5** to return to the Loading Files.

Screen 1 From the first screen, choose the ammunition you want to carry for the main gun. To change the number of rounds:

1. Move the joystick to the checkbox of the ammo you want to change
2. Move the joystick Left to decrease the number of rounds of that type, or move Right to increase the number
3. When you're done, move to **OK** and press the **fire button**.

The tank comes fully loaded. If you want to change cargo, you must decrease the number of rounds of one type before you can increase the number of rounds of another.

Screen 2 From the second screen, load your secondary weapons — machine guns and missile launchers. Use the instructions above to increase and decrease numbers, and load your selections.

Screen 3 From the third screen, select your external applique armor. You may pick only one type of armor for your tank. The Equipment Reference section of this manual details the relative advantages and disadvantages of each option.

Your tank is now fully staffed and equipped. When you press the **fire button** for the last time, the General appears to give you last-minute instructions. Press **Return** to climb into your tank.

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SECTION THREE: Tank Operation

The tanks in the **Steel Thunder** arsenal are complex vehicles, equipped with dozens of sophisticated systems and devices. These systems are controlled from three separate stations within the tank: one for the driver, one for the gunner, and one for the commander. This section takes an in-depth look at the equipment at each of the three stations.

Each onscreen station is accurately modeled after the actual interior of the tank being simulated. Though the four tanks contain similar types of equipment, the station layouts vary greatly from tank to tank. With the screen illustrations on the following pages, the keyboard overlay, and a little practice, it won't be long before you can quickly blast oncoming Soviet T-80s off the horizon.

Your primary role is that of tank commander. When you are at the Commander's Station, the driver and gunner are computer-controlled, following your pre-set orders to the best of their abilities. When you become familiar with all the systems and commands throughout the tank, you can issue most battle commands without leaving the Commander's Station. Your computerized driver and gunner will respond, and their station screens automatically change to reflect your new orders.

When you move to the Driver's Station or the Gunner's Station, you no longer act as commander — you're in that crewman's boots. From these screens, you can manually operate the tank's major weapons, or take the driver's steering yoke into your own two hands.

Your fourth crew member, the loader, is completely computer-controlled. His performance is determined by his competence rating, which you take into account when you select him.

Refer to the Quick Start section at the front of this manual for a brief, step-by-step sequence of instructions for starting up all the systems described below.

STATUS SUMMARY SCREENS

At any point during combat, you might want to view your Damage Report Screen, Stores Screen, and Mission Map. The mission pauses while you refer to any of these three screens. To resume, press **4** to return to the Driver's Station; **5** to return to the Gunner's Station; or **6** to return to the Commander's Station.

DAMAGE REPORT SCREEN

Press **7** to view a summary of the status of all your tank systems. On each of the three station screens, the left and right dashboard panels are equipped with lights that tell you the status of the tank's major systems:

- Green lights on the panel indicate that all systems are go
- A yellow light indicates that a system has incurred damage, though it's still partly functional



- A red light indicates that one of the tank's systems has been destroyed

The round light at the lower edge of the right panel flashes when you incur new damage. When you're under heavy fire, refer to the Damage Screen frequently to find out which systems you can still use.

Generally, small shells only damage exposed systems: your small guns, sights, and tank treads. Heavier ammunition can decimate fragile components, and take a major toll on your engine, transmission, main gun, or crew. You cannot repair damage behind enemy lines: if your tank becomes immobilized, use any resources you have left to blast as many hostile units as you can — and then press **Control** to abandon the vehicle.

STORES SCREEN

Press **9** to see how much ammunition you've got left in your stores shelves. The list on the top half of the screen doesn't include shells already loaded into your main gun or missile launcher. The lower part of the screen shows how many enemy targets you've destroyed so far.

MAP

Press **9** to view your position, and the surrounding area. Units that belong to US forces appear in blue; units that appear in yellow belong to the enemy. The map is periodically updated with the most current satellite information. Here's what the map symbols mean:

	Armor	Formations comprising mainly heavy tanks: T80s, T62s, T55s and so forth
	Artillery	Long range artillery, rockets, and mortars
	Mechanized Infantry	Formations comprising mainly APCs
	Convoy	Tightly packed formations that could include almost anything
	Unknown Force	Something's out here, but we don't know exactly what
	Nuclear/Bacterial/Chemical unit	A series of bunkers housing nuclear, bacterial, or chemical artillery shells
	155mm Heavy Artillery	Long-range self-propelled artillery unit

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MAP continued

	Headquarters	Bunkers that serve as the enemy's local nerve center
	Fuel/Oil Station	Storage tanks
	SAM Site	An anti-aircraft unit
	Ammunition Dump	Bunkers used for ammunition storage
	Nuclear Missile Launchers	SS-22 launchers
	Communications Post	Bunkers serving as communication centers, which coordinate enemy movements
	Spy	Observation bunkers
	Tank	Your current position on the map
	The Target Circle	The Target Circle shows the position of your primary mission target
	Large X	The two large Xs represent two checkpoints you pass on the way to the main target. You can use move these two Xs to set and change your driver's course: see the Driver's Station section below

TANK OPERATION

ABOUT THE STATIONS

The following features are part of every station:

Periscope — Each station has three periscopes, which give the crew member a glimpse of the outside world. Periscopes use narrow prisms, mounted in invulnerable slots, to bring in a limited 180-degree view of the surrounding terrain. Though the prisms tend to distort the world so that things appear smaller than they really are, they're aligned with a slight overlap, so objects pass directly from one periscope to another without disappearing in between.



For a close-up view of a distant object, use the gunsights at the Commander's Station and Gunner's Station. These sights magnify the small area around the gun's target area. These two stations are also equipped with night and thermal sights, which are explained below.

Because the Commander's Station is the highest point on the tank, you can see farthest through his periscopes. The gunner is only slightly lower. The driver sits down in the tank's hull, and doesn't get to enjoy the panoramic views.

Message Line The main line of communication with your crew. Your orders and their responses appear just below the periscope windows, replacing the usual clock and compass displays.

Mission Clock A real-time clock that starts when you leave HQ. There is no time limit on missions — though you can run out of gas.

Compasses Because the Gunner's Station is located in the main turret, and the Commander's Station is in a separate mini-turret, each of these stations come equipped with two compasses. The one under the center periscope shows the direction the turret is facing; the one on the left shows which direction the entire tank is currently facing. With a little practice, you can use these compasses to determine the orientation of the hull, the turret, and the mini-turret.

The Driver's Station, located in the main hull, has one compass that shows the tank's heading.

The M3 Bradley has no mini-turret. The commander shares the turret with the gunner.

DRIVER'S STATION

While you're at the Driver's Station, the tank is under your manual control. Move the joystick:

- Up to accelerate
- Down to decelerate, or go in reverse
- Left and Right to turn

The **fire button** is your brake. When you leave the Driver's Station, the computer takes over the steering.

Gauges & Indicator Lights

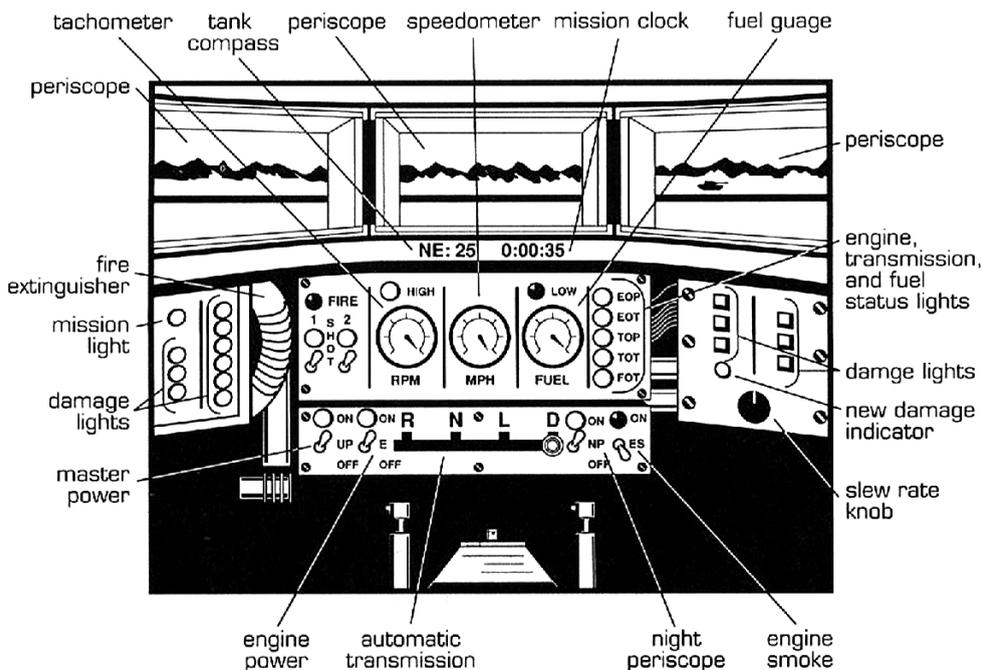
On your Driver's Station panels, you have the following gauges and warning lights:

- Shift knob — all the tanks have automatic transmissions. This knob shows which gear you're in
- Speedometer — 0-60mph, with division lines every 10mph
- Tachometer — a nearby red light comes on when the RPMs are too high
- A fuel gauge — a nearby red light comes on when you're low on fuel

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DRIVER'S STATION continued

- Five engine, transmission, and fuel status lights:
 - EOP — engine oil pressure
 - EOT — engine oil temperature
 - TOP — transmission oil pressure
 - TOT — transmission oil temperature
 - FOT — fuel over temperature
- Two banks of damage lights — one on the left, one on the right. Each light corresponds with one of the subsystems listed on the Damage Report Screen. The round New Damage Indicator light flashes when you incur new damage
- A Mission Light that turns green when you successfully complete your mission objective



M1A1 Abrams Driver's Station



Keyboard Commands

You can issue the commands below from ANY crew member's station. However, these indicator lights and switches only appear at the Driver's Station:

4 **Access Driver's Station** Press this to view the Driver's Station.

< **Master Power On/Off** The tank's main power switch. Turn this on to power up the tank. Turn it off, and every powered system on the tank quits.

1 **Engine Power On/Off** Powers up the engine. It takes a few seconds to warm up.

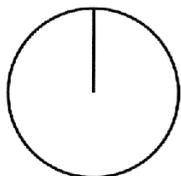
2 **Night Periscope On/Off** A special device which fits over the driver's periscopes, enabling him to see well enough to drive in the dark. It makes night missions a lot easier on the driver, but it doesn't affect the view from the other periscopes on the tank.

Inst/Del **Engine Smoke On/Off** Smoke grenades are fine, if you're not planning on staying hidden very long. To create a mobile, longer-term screen, the engine smoke system sprays fuel onto your tank's hot exhaust manifolds, raising a dense smoke cloud that follows you around the battlefield.

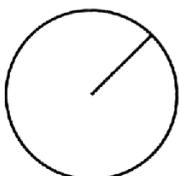
The system has two disadvantages: one, you have to move very slowly, or in reverse, to avoid outrunning your smokescreen; and two, it guzzles incredible amounts of fuel.

Clr **Home Extinguish Fire** All modern US tanks are equipped with Halon gas fire extinguisher systems. The system senses heat levels throughout the tank, and a red flashing light alerts you when you've got a fire on board. Use this command to deploy the extinguisher system. Don't get carried away, though: the extinguishers hold only enough Halon to douse two fires per mission.

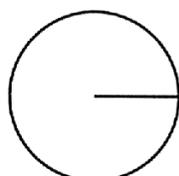
Shift **Slew Rate** This three-way toggle controls how fast the tank, the main turret, and the mini-turret turn in response to your joystick commands. Press the **Shift** key once to make slow turns, a second time to make slower turns, and a third time to make fast turns. The Slew Rate knob on the right panel shows your current slew rate setting:



fast



medium



slow

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To Set and Change Course

Each mission consists of two intermediate checkpoints, and the main target. As Commander, it's your job to choose the checkpoints that determine the driver's course, and set the tank's speed. Your computer-simulated driver will then steer the tank to the checkpoints in their proper order.

To set the speed, push forward on the joystick. When you leave the Driver's Station, the driver takes over and maintains the speed you set. He won't change this speed unless you tell him to go backwards, or if he lacks the skill to handle the tank at high speeds.

- 1 To set your course, press **9** to view the battlefield map.
- 2 To set the first leg of your journey, use the joystick to move the blue X to the first checkpoint position. Your driver will automatically set a course between HQ and this X. Press the **fire button**.
- 3 Now, move the joystick to position the red X. This establishes the second leg of the trip. When your driver gets to the blue X, he automatically heads for this second checkpoint. From the red X, he drives toward the primary target goal. Press the **fire button**.
- 4 Press **4** to return to the Driver's Station.

You can move the Xs at any time during the mission to change your driver's course and avoid enemy units. The driver is under orders to follow the general course you've established on the map; but he always drives evasively, so he may slightly deviate from the course from time to time.

Giving Commands To Your Driver

You can issue the following commands from the Commander's Station or Gunner's Station ONLY. (When you're the one sitting at the Driver's Station, you *are* the driver: your job is to take orders, not give them.)

Your computer driver knows five basic driving techniques. Press the following keys to direct him:



0 Next Goal/Go Straight A toggle switch that directs the driver to

- Follow the Xs, and proceed to the primary target; or
- Drive in a straight line — a useful tactic when you're trying to accurately shoot an unstabilized gun.



+ Close On Target Directs the driver to close in on the target currently in the gunsight.



- Circle An evasive move. Your driver simply drives around in a small circle. This is a holding pattern that keeps you in a specific vicinity: you're not moving toward the goal, and not retreating.



£ Backwards An important evasive maneuver when under heavy fire. Switch to your thermal sight, lay smoke, and pick off enemy armor as you back away out of sight.

If your driver is killed in action, he does not respond to your orders.



COMMANDER'S STATION

When you're at the Commander's Station, use your joystick to:

- Turn the commander's turret or mini-turret left or right
- Raise or lower the gun
- Aim the gun

Your gunsight is mounted so that it points wherever the gun points. So, as you move the joystick, the sight moves, too. Press the **fire button** to fire the gun.

Indicator Lights

The following lights keep you informed about your tank's systems:

- **Crew Status Lights** Show you what's going on with your crew. If a light turns yellow, the crew member is injured. If the light is red, your crewman is dead.
- **Damage Lights** Two banks of small lights: one on the left, one on the right. Each light corresponds with one of the subsystems listed on the Damage Report Screen. The round New Damage Indicator light flashes when you incur new damage.
- **Mission Lights** Turns green when you successfully complete your mission objective.
- **Ammunition & Fire Rate Selection Lights** (M3 only) The main gun on the M3 Bradley has a unique light configuration that shows both the current ammunition type, and the fire rate.

The three AP lights on the top row indicates that an armor-piercing round is currently selected.

- The left light goes on when you choose a single-shot fire rate
- The center light indicates a fire rate of 100 rounds per minute
- The right light indicates a fire rate of 200 rounds per minute

The three HE lights on the bottom row indicate that you've selected a high explosive round

- The left light goes on when you choose a single-shot fire rate
- The center light indicates a fire rate of 100 rounds per minute
- The right light indicates a fire rate of 200 rounds per minute

All other lights on your control panel correspond with the keyboard commands described in the figure on the next page.



turret and mini-turret hydraulics and the gun stabilization system when the engine is off. The Auxiliary Power system enables you to continue fighting from a stationary position when your engine has been disabled in battle.

C Mini-Turret Hydraulics On/Off (not on M3 Bradley) On the three heavy tanks, the Commander's Station is located in a miniature turret mounted on top of the main turret. The mini-turret is armed with a .50cal machine gun, which is equipped with its own sight.

As commander, you can turn the turret and aim the gun independently of the main turret (although if the main turret rotates, you go with it). Your gun isn't stabilized, but the power traverse feature lets you quickly turn the gun and sight to the left or right.

If the main power and auxiliary power are both disabled, press this key to disengage the hydraulics. You can then use the gun's manual (joystick-controlled) hand cranks instead.

On the M3 Bradley, this command raises and lowers your TOW launcher. See Gunner's Station commands.

F1 Fire Smoke Grenade Salvo (not available on M48A5) This command sends a volley of smoke grenades 100 yards in front of your tank, creating an instant — and very temporary — smokescreen that you can drive into. Before issuing this command, you must first arm the grenade launchers (see above). It's also a good idea to turn on your thermal sight.

You can fire consecutive two salvos of smoke grenades. When they're gone, you have to wait until the loader re-loads the grenade launchers again.

F3 Gun Select Toggle The gunner controls two co-axial weapons: a .30cal anti-personnel machine gun and a 25mm, 105mm, or 120mm main gun. Though they're mounted so that they both always point the same direction, they have different ranges, and different purposes.

You must turn on the Commander Control Override before you can use this feature. This gives you control of the gunner's weapons. Next, use this toggle to select the gun you want to fire.

On the M3 Bradley, the commander always controls the gunner's weapons, so you don't have to activate the override before using this key.

F5 Target Range (not available on M3 Bradley) The M1A1 Abrams and the M60A3 have laser rangefinders, and the M48A5 Patton has an optical coincidence rangefinder. Press **F5** to start the rangefinding process. The laser rangefinder takes about 1/3 of a second before feeding the information into the ballistics computer. The coincidence rangefinder takes a little longer. When the range is determined, the figure appears in the bottom center of the gunsight. Always take the range before firing the main gun: it greatly increases the odds of a good hit.

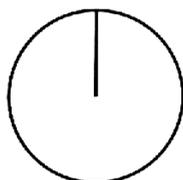
STEEL THUNDER

F7

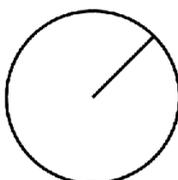
Ammunition Select The Equipment Reference section of this manual describes the wide variety of shell types available for your guns. Use this key to select which type of round you want to fire. Choose carefully: it won't do you much good, for example, to shoot an APERS round at a bunker. In all tanks except the M3 Bradley, a small box appears in the lower left of the gunsight when the shell you chose is loaded and ready to fire.

Right Shift

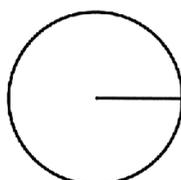
Slew Rate This three-way toggle controls how fast the tank, the main turret, and the mini-turret turn in response to your joystick commands. Press the **Shift** key once to make slow turns, a second time to make slower turns, and a third time to make fast turns. The Slew Rate knob on the right control panel shows your current slew rate:



fast



medium



slow



Commander Gunsight Override (not available on M3) This toggle switch allows you to view the world through the gunner's gunsight, instead of your own .50cal gunsight. Use this command when you assume control of the main gun from the Commander's Station.



Commander Control Override (not available on M3) This toggle switch allows you to take control of the tank's main and co-axial guns without leaving the Commander's Station. When the override is activated, use the joystick to aim the main gun, and the **fire button** to fire it. Press the toggle again to return to your .50cal machine gun.

NOTE: If you previously pressed the **space bar** to direct the gunner to aim the gun, press it again to countermand that order before attempting to use the override.

Return

Identify Target When you have a vehicle in your sight, you can ask the gunner to identify it. All the vehicles in **Steel Thunder** are accurate digitizations of the real thing: see Section Six for more specific information about Soviet armor. Use this command often: shooting at friendly armor is one of the better ways to get yourself court-martialed.

Your gunner's identification skills are limited. If there are several objects clustered near the area you're scanning with the gunsight, he'll only identify the one nearest the tank — so, if some infantry are hiding behind some rubble, he'll only tell you about the rubble. For this reason, you should learn to identify the various targets yourself, even when they're far away.



Space Bar Destroy Target/Cease Fire If you're not firing, this commands the Gunner to commence firing, with the objective of destroying the sighted target. If the Gunner is currently shooting, this is the cease-fire command.

GUNNER'S STATION

When you're at the Gunner's Station, use your joystick to:

- Turn the turret left or right
- Raise or lower the gun
- Aim the gun

Your gunsight is mounted so that it points wherever the gun points. So, as you move the joystick, the sight moves, too. Press the **fire button** to fire the selected gun.

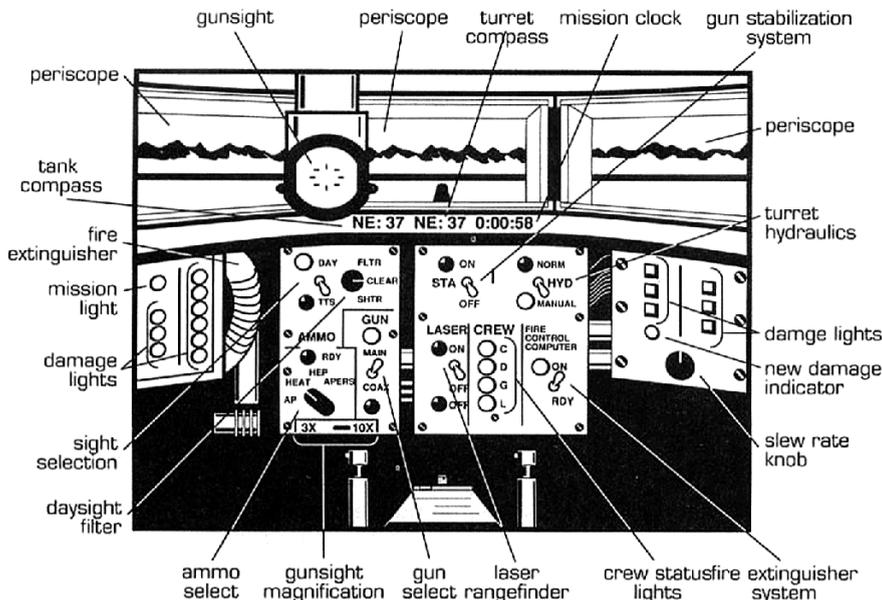
During battle, the commander has two options. You can either take control of the gun yourself, or let the computer-simulated gunner fire on a target that you designate. Your gunner's speed and accuracy depend on his ability, which you took into account when you chose him for your crew. After you've gained some battle experience, you will probably want to control the guns yourself a majority of the time.

Indicator Lights

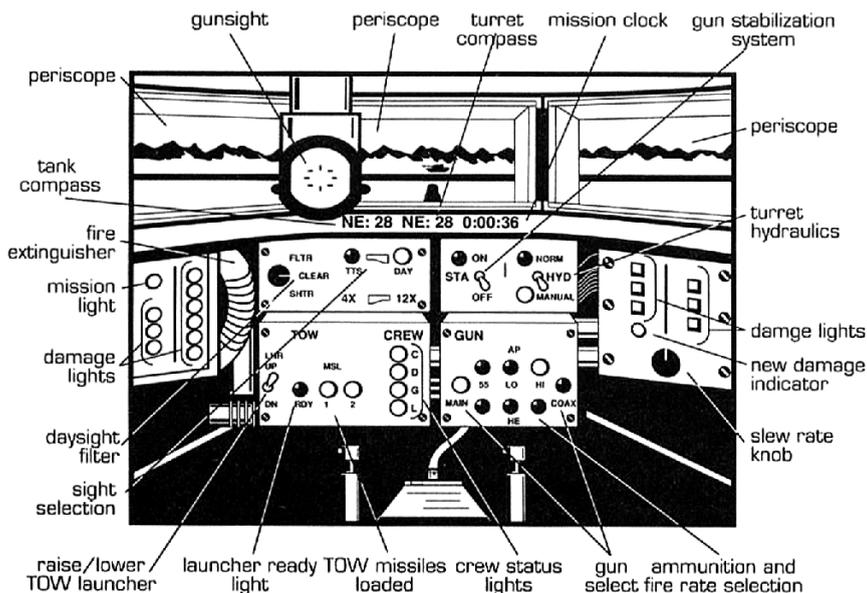
Your control panel includes the following indicator lights:

- **Damage Lights** Your left and right dashboard panels contain two banks of damage lights. Each light corresponds with one of the subsystems listed on the Damage Report Screen. The round New Damage Indicator light flashes when you incur new damage
- **Mission Light** Turns green when you successfully complete your mission objective

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M60A3 Gunner's Station



M3 Bradley Gunner's Station



Keyboard Commands

You can issue the commands below from ANY crew member's station. However, the indicator lights and switches only appear at the Gunner's Station.

S **Access Gunner's Station** Press this to view the Gunner's Station.

C **TOW Launcher Up/Down** (M3 only) TOW-2 missiles are launched from an armored unit mounted on the side of the M3 Bradley. Press this key to raise the launcher unit before you fire the missile. When the launcher is in firing position, a green light comes on. Press the **fire button** to launch a missile, and use the joystick to guide it all the way to its target. Always use 10x gunsight magnification to guide the missile.

Because TOW missiles are wire-guided, the tank must remain stationary while the missiles are in flight. The tank automatically stops when you raise the launcher: after the TOW missile detonates, be sure to lower the launcher before you try to drive away.

V **Gun Stabilization On/Off** (not available on M48A5) The tank underneath you is booming over hill, over dale at 50 miles per hour — and you, the gunner, are up top trying to get a clean hit at a BMP-2 that's nearly 2 miles away. The stabilization system uses hydraulics and motion sensors to keep your gun on target, no matter what's going on down below.

Because the M48A5 Patton doesn't have a stabilization system, you have to stop the tank to fire accurately over long ranges. If your gunner is good, he can make reasonably accurate shots while moving slowly.

B **Turret Hydraulics On/Off** This system moves the main turret, and aims the main gun. You must turn on either the engine or auxiliary power before this command will work. Turret motion is controlled hydraulically in all tanks except the M3 Bradley, which uses electric motors.

All tanks are also equipped with the old-style hand-crank gun mounts. If the tank's power sources are disabled in combat, turn off the turret hydraulics and use your joystick as a crank to turn the turret and aim the gun.

N **Ballistics Computer On/Off** (not available on M3 Bradley) The fire control computer corrects and enhances your aim, taking into account the range, the flight characteristics of the shell you've chosen, wind speed and direction, barometric pressure, air temperature, barrel droop, and gun wear. In tests conducted with the M1A1 Abrams, this system provided a 97% hit probability at a range of 3000 yards. Don't leave home without it.

M **Sight Filter** A three-way toggle that controls the filters on your main gun's day sight. The options include Clear (normal optics), Filter (high-density filter), and Shutter (close the sight to protect it).

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Sight Day/TTS Toggle The Day Sight is an optical gunsight that gives you close-up views of distant targets. You can use it with several filters, which are explained immediately above.

The TTS is a highly advanced thermal sight that enables you to see through smoke, fog, or darkness. It gives you a tremendous tactical advantage, especially when you're on night missions or using your smoke-screens. To date, no Soviet-built tank is known to have anything like it.

This switch affects the Gunner's Station sight only. It does not change the setting of the commander's .50cal sight. Note also that the sensors for the TTS and the Day Sight are separate: even if one gets blasted, the other may still work.

Sight Magnification This switch toggles between two sight magnification settings: 3x and 10x (4x and 12x on the M3 Bradley). Use the 3x setting to select your target and take coarse aim; then switch to 10x to refine the aim and fire. A small box appears in the lower right of the gunsight when you select 10x magnification.

This command has no effect on the commander's .50cal machine gun sight, which is always at 3x.

F3 Gun Select As the gunner, you have two co-axial weapons to choose from: a .30cal anti-personnel machine gun and a 25mm, 105mm, or 120mm main gun. Though they're mounted so that both always point in the same direction, they have different ranges, and different purposes. Use this toggle to select the gun you want to fire.

F5 Target Range (not available on M3 Bradley) The M1A1 Abrams and the M60A3 have laser rangefinders, and the M48A5 Patton has an optical coincidence rangefinder. Always take the range before firing the main gun: it greatly increases the odds of a good hit.

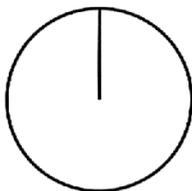
Press **F5** to start the rangefinding process. The laser rangefinder takes about 1/3 of a second before feeding the information into the ballistics computer. The coincidence rangefinder takes a little longer. When the range is determined, the figure appears in the bottom center of the gunsight.

F7 Ammunition Select The Equipment Reference section of this manual describes the wide variety of shell types available for your guns. Use this key to select which type of round you want to fire. Choose carefully: it won't do you much good, for example, to shoot an APERS round at a bunker.

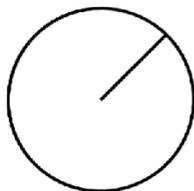
In all tanks except the M3 Bradley, a small box appears in the lower left of the gunsight when the shell you chose is loaded and ready to fire.



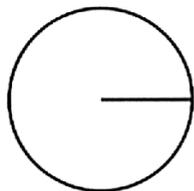
Right Shift Slew Rate This three-way toggle controls how fast the tank, the main turret, and the mini-turret turn in response to your joystick commands. Press the **Shift** key once to make slow turns, a second time to make slower turns, and a third time to make fast turns. The Slew Rate knob on the right control panel uses the following settings to show you the current rate:



fast



medium



slow

Miscellaneous Commands

These commands don't correspond with any of the dashboard panels. A message on the text line tells you when the command is activated or deactivated.

Control

Return to HQ Press this to abort the current scenario when disaster looms, or to return to Headquarters after you've completed your mission objective.

Run/Stop

Pause The one feature that real-life tanks are *not* equipped with. It's most useful when you're learning your tank's systems and procedures.

STEEL THUNDER

SECTION FOUR: Strategy & Tactics

The old-timers in the **Steel Thunder** tank battalion asked HQ if they could pass along some practical advice as part of this manual. The General agreed. Here's their contribution, based on decades of field experience:

DRIVING

- Modern battlefields are even more dangerous than modern freeways, so drive defensively. A shell takes 2-3 seconds to reach its target, so a tank that speeds along a wildly erratic course and never stops moving isn't nearly as likely to get hit. Remember that older tanks aren't as fast or maneuverable as the newer ones, and the armor isn't as durable.

ENEMY ENCOUNTERS

- In encounters with relatively harmless vehicles like BTR-70s, use your .50cal machine gun instead of wasting the big shells. The smaller gun can usually destroy an unarmored or lightly armored target very quickly. Since these targets usually don't carry enough firepower to threaten you, you can move in close for the kill.
- No matter how good his ratings look, your computer-simulated gunner's capabilities are limited. Rely on him for your first few missions, while you're getting the feel of the other tank systems; but you'll soon get to a point where you'll prefer to set up and make the shots yourself. Dispatching T-80s at 3500 yards is beyond the gunner's skill, so it's up to you.
- As you move forward, scan the horizon with the 3x scope. Usually, you'll see them before they see you. When you find a target, don't react to it until your gunner positively identifies it (blowing away friendly armor is considered very bad form). Then, select your shell type, and flip to 10x to aim. The 3X scope is not as accurately aligned with the gun barrel as the 10X scope.

Your guns have a longer range than theirs do: use this advantage to pick them off before they can close in on you.

- If you're trusting the computer gunner, you can issue the order to fire on a target, then use the commander's 3x scope to continue scanning for new targets while he's making the shot.
- You may notice that time speeds up when you are far from any enemy vehicles. This is because the computer compresses time when you're moving quickly through unoccupied territory, and then automatically slows things down to real time when hostile forces appear. Because of this feature, you can move fairly quickly on the map from HQ to the front, but much more slowly as you fight your way through and behind enemy lines.
- Your tank is big, well-armored, and literally carries a ton of firepower — but it's still not a great idea to go roaring right into the middle of a crowd of enemy armor. (Remember Custer.) Instead, slow down while they're still a good distance away. Take out as many as you can at long range. Approach the pack slowly,



picking off a few at a time — and always be ready to switch to your thermal sight, lay smoke, and back out if things get too exciting. Your superior gun range is a big tactical advantage, but you can't make the most of it if you zoom in at 60mph, thus allowing enemy tanks to get close enough to reduce you to rubble.

▶ AIMING

- If the target's moving, don't shoot at where it is — shoot at where it will be a few seconds from now, when your shell catches up with it. The amount of lead time depends on how far the shell has to travel, and how fast your tank is moving relative to the target. You may find it helpful to press the **[+]** key to instruct the driver to close on the target, making it easier to hit.
- Another way to make aiming easier: Press **O** to direct the driver to drive in a straight line. This makes you more vulnerable to enemy fire, but also helps you get a better fix on the target. Don't forget to press **O** again after destroying the target, so the driver can resume his usual meandering course.
- Remember: not every shell that hits a target destroys it — or even does serious damage. (Fortunately for you, this works both ways.) If your shell lands on the edges of the target, it may be deflected by angled armor, or blast a hole in a non-critical area. Only dead-center hits inflict major damage, and then only a percentage of the time. Smaller shells must hit more accurately to be effective.
- Each shell type has its own effective range. If you try to hit a target that's out of the shell's range, you'll probably miss.
- Some tanks are more accurate than others: an M48A5 has a hit rate of 62% at 2500 yards, while (under optimal conditions) an M1A1 Abrams will connect with the target 97% of the time at 3000 yards. To improve your chances, make sure to take a range reading before each shot, and *always* use the 10x scope to refine your aim before shooting. It may seem quicker to dispense with these formalities, but you'll probably just end up wasting ammunition.

▶ EQUIPMENT

- The stabilization system can compensate for a lot of motion — but there *is* a limit. The system works by raising or lowering the gun to compensate for changes in the tank's level. It can't move the gun past the gun mount's physical elevation and declination capacity.
If you're aiming near the horizon, and your driver's taking you on a brisk cross-country joyride, the target may appear to bounce around in the sight. This is a signal that the stabilization system has reached its limits. If you take the shot under these conditions, you will probably miss.
- Shoot your machine guns in bursts. This not only keeps your gun from overheating, it gives you time between bursts to check and see if you're actually hitting the target. As a result, you'll waste less ammo and spend less time reloading.
- Always be aware of your current slew rate and gunsight power setting. The gun moves very slowly at low slew rate and high power, so you may want to switch to a higher slew rate and 3x magnification when you're scanning for your next target. Make it a habit to change these settings after you destroy any target.

STEEL THUNDER

SECTION FIVE:

Equipment Reference

➤ TANKS

The M1A1 Abrams

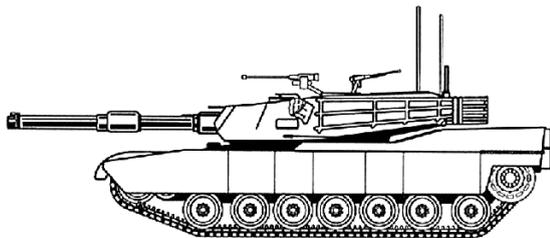
The M1A1 is the tank of the future — the fastest, most technologically advanced, best-armored battle tank in the history of armored warfare. Designed during the 1970s and put into production at Chrysler's tank plant in 1980, this will be the US's main battle tank through the turn of the century.

Defense: The M1A1 is built for speed, accuracy, and crew survivability. Chobham armor plate on the hull and turret deflects shaped-charge warheads; a fireproof bulkhead separates the crew compartment from the ammo compartment; and the Halon extinguisher system douses fires immediately. The British-designed smoke system generates instant smoke screens. Protective blow-out panels and a complete NBC (nuclear-biological-chemical) air filtration system add to the M1A1's invincibility on the modern battlefield.

Offense: In addition to the stabilized, computer-controlled 120mm main gun, the M1A1 carries a .30cal machine gun (mounted coaxially with the main gun); a .50cal machine gun at the commander's station, and another .30cal gun at the loader's station. The tank's most valuable asset may well be the high-tech thermal sight, which cuts through night and smoke (and, at a cost of \$200,000, accounts for 1/10 of the tank's \$2 million sticker price).

The reliable, low-maintenance turbine engine can burn gasoline, diesel, and jet fuel. Though the 45mph maximum speed listed below is an official government figure, it's not the last word. Tankers in the field like to take the governor off the engine, enabling them to crank the tank up to 60-70mph cross-country— and as high as 90mph on smooth roads.

Crew: 4
Weight: 60 tons
Length: 32' 1"
Width: 12'
Height: 7'10"
Engine: AGT-T 1500hp turbine
Cruising Speed: 45mph
Range: 275 miles
Armor: Ceramic-and-steel Chobham armor (made in the UK)
Main Gun: XM256 120mm smooth-bore gun (made in Germany)
Cost: \$2 million



M1A1 Abrams



The M60A3

An updated and modernized version of the M48 Patton series tanks, the first M60 rolled out of Chrysler's Detroit Tank Arsenal in 1960. Until recently, the M60A3 formed the backbone of the US tank force; now, it's quickly becoming the mainstay of Reserve and National Guard units. Most M60A3s are M60A1s that were refitted with more modern weaponry and defense systems during the 1970s. Though the M60A3 is gradually being replaced by the M1A1, it's a popular export tank, and will likely remain in service around the world for decades to come.

Defense: The M60A3 is equipped with spaced, layered steel plate armor that gives it a slight defensive advantage over Soviet T55s and T62s. It was the first production tank to be outfitted with the thermal sight system (TTS). Other defensive features include a smokescreen system, complete NBC air filtration system, and infrared driving lights.

Offense: The stabilized 105mm main gun is mounted coaxially with a .30cal machine gun. There's also a .50cal machine gun in the commander's cupola. The Hughes laser rangefinder and the solid-state ballistics computer further enhance the tank's accuracy.

The M60A3 has less resilient armor than the M1A1, and moves considerably slower. However, it also carries about 50% more heavy ammo for the main gun.

Like the M1A1 Abrams, the M60A3's official speed rating is an understatement: tankers say that the M60A3 is capable of freeway speeds between 50 and 60mph.

Crew: 4

Weight: 54 tons

Length: 21"

Width: 11' 11"

Height: 10'9"

Engine:

AVDS-1790-2A 750hp gasoline engine

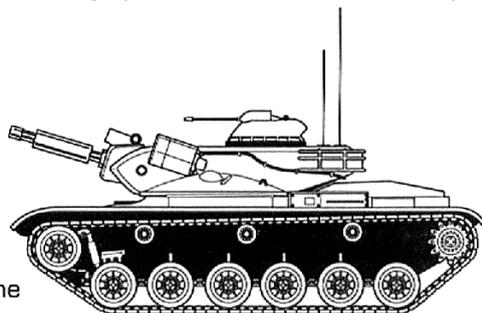
Cruising Speed: 30mph

Range: 300 miles

Armor: 4.8" of layered steel armor

Main Gun: M68 105mm rifled gun (made in UK)

Cost: \$600,000



M60A3

M2 Bradley Infantry Fighting Vehicle /M3 Bradley Cavalry Fighting Vehicle

Developed by FMC in 1972 as a replacement for the standard M-113A1 armored personnel carrier, the M2 and M3 Bradley Fighting Vehicles merge the functions of light-armor APCs with the armament of heavy front-line tanks. The resulting hybrid is an entirely new kind of fighting vehicle — part battlefield taxi, part lightweight tank.

STEEL THUNDER

M3 Bradley continued

The two models are virtually identical: the only differences lie in the way the crew and ammunition stores are laid out inside the tank. The M2 carries seven TOW missiles, 900 25mm rounds, and seven infantry; the M3 carries 12 TOWs, 1500 25mm rounds, and a crew of five. In **Steel Thunder**, you command an M3, but will also encounter friendly M2s on the battlefield.

Defense: The M3's design makes extensive use of aluminum armor. However, contrary to popular belief, it also contains plenty of steel — including foam-filled steel laminate armor plating that covers the front, sides, and rear of the strong, lightweight aluminum hull. Though the plating is HEAT-resistant, remember that the Bradley wasn't intended to serve as a front-line heavy tank, and won't take as much fire as an M1A1.

The M3 comes equipped with an NBC air filter system, smoke screen generator, and Halon fire protection system.

Offense: In the field, Bradley CFV units work in tandem with M1A1 units. The heavy-armor M1A1s lead the attack, fending off big anti-armor weapons. The Bradleys come behind, using TOW missiles to provide cover fire. The M2's passengers can stay inside the tank and shoot from the firing ports, or dismount and continue the attack on foot.

In your **Steel Thunder** missions, you won't have any M1A1s to run interference for you. Instead, rely on your 25mm Bushmaster main gun, which is mounted coaxially with a .30cal machine gun; your TOW launchers; and your driver's speed and cunning.

As with the M1A1, the Pentagon's released speed estimates for the M3 are on the low side. With a competent driver at the controls, expect to exceed the US 55mph speed limit — with a little extra to spare.

Crew: 3 crew, 7 passengers
(M2); 5 crew (M3)

Weight: 25 tons

Length: 21' 2"

Width: 10' 6"

Height: 9'9"

Engine:

VTA-903T 506hp gasoline engine

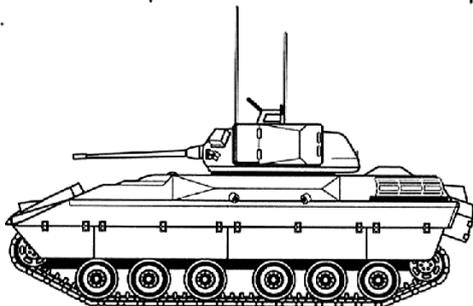
Cruising Speed: 44mph

Range: 300 miles

Armor: Laminated steel layered armor, bolted to a lightweight aluminum hull

Main Gun: M242 25mm Bushmaster chain gun. Also carries 12 TOW missiles.

Cost: \$600,000



M3 Bradley



The M48A5 Patton

The M48A5 medium tank is the final upgrade of the M48 Patton series, which traces its origins back to World War II. Most of the existing M48s were manufactured by Chrysler and Ford during the 1950s, and variations of the M48 saw heavy use in Vietnam. In the 1970s, about 2,000 mothballed M48s were modernized into the M48A5. This upgrade has received favorable comment from Israeli commanders who put it up against Soviet-equipped Syrian forces in the 1973 Yom Kippur War. It is currently used by US troops patrolling the North Korean border, and until recently served as the main battle tank of the US National Guard.

Defense: The M48A5 uses a cast armor hull that's effective against small rounds, but very vulnerable to HEAT and Sabot rounds (unless you apply applique armor). The power train is very similar to that of its successor, the M60, and is separated from the crew by a fireproof bulkhead.

Offense: As part of the 1970s upgrade program, the M48A5s were re-fitted with the same 105mm main gun used on the M60A3. This gun is not stabilized, so you must come to a complete stop if you want to fire it accurately at anything beyond point-blank range. A .30cal M60D machine gun is mounted coaxially with the main gun. The loader has another .30cal gun, and the commander's station has a .50cal machine gun.

Crew: 4

Weight: 54 tons

Length: 20' 6"

Width: 11' 11"

Height: 10' 1"

Engine:

AVDS-1790-2A 643hp
gasoline engine

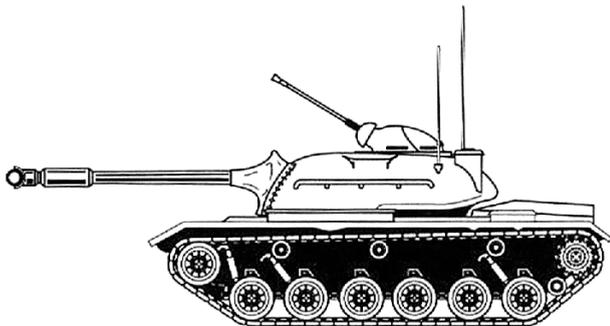
Cruising Speed: 30mph

Range: 300 miles

Armor: 4.8" cast steel armor

Main Gun: M68 105mm rifled gun (made in UK)

Cost: \$350,000



M48A5 Patton

WEAPONS SYSTEMS

M68 105mm Main Tank Gun

With an effective range of over two miles, this British-made gun has become the NATO standard. If you've got a skilled loader on your crew, you can fire 3 rounds in 10 seconds. In contrast, its Soviet counterpart (which comes equipped with an auto-loader) takes 9 seconds to reload once.

STEEL THUNDER

WEAPONS SYSTEMS continued

Tanks Equipped with the 105mm: M60A3, M48A5

Effective Range: 0-3640+ yards

Firing Rate: Can be reloaded and fired 10-20 times per minute

Ammunition: M833 APFSDS, M483A1 HEAT, M393 HEP, M494E3 APERS

XM256 120mm Main Tank Gun

A new gun of German design, which uses powerful 120mm rounds. Most of the design specifications are classified information, but it appears to have more power than the 105mm gun, with similar or better range and accuracy.

Tanks Equipped with the 120mm: M1A1 Abrams

Effective Range: classified

Firing Rate: classified

Ammunition: M830 APFSDS, M829 HEAT, M828 HEP, M849 APERS

M242 25mm Bushmaster Hughes Chain Gun

This is the big gun on the M3. It can blow away almost anything, with the notable exception of heavy tanks and bunkers.

Tanks Equipped with the 25mm: M3 Bradley

Effective Range: 0-2500 yards

Firing Rate: Three settings — 1, 100, or 200 rounds per minute

Ammunition: 25mm AP and HE rounds

TOW-2 Launcher

In addition to the Bushmaster, the M3 carries a twin-launcher system for TOW-2 missiles. At a top speed in excess of 625mph, the TOW-2 is capable of ripping 2-foot holes in the heaviest Soviet armor — making it the ultimate anti-tank weapon.

Despite its tremendous power, the TOW-2 system has two limitations. First, the TOW (like all wire-guided missiles) leaves a trail of white smoke along its path, advertising your position to all enemy observers. Second, because the TOW launcher doesn't include a stabilization system, the sighting optics are nearly useless when the tank is in motion. Further, the wire guidance system is extremely sensitive to jostling. For these reasons, you must stop the tank before launching a TOW missile, and stay put until it reaches the target — thus increasing your own vulnerability to enemy fire.

Tanks Equipped with the TOW-2: M3 Bradley

Effective Range: 71 - 4000 yards (nearly 2.3 miles)

Ammunition: TOW-2 wire-guided missiles

M2HB or M85 .50 caliber Heavy Machine Gun

This is the smaller gun mounted on the commander's cupola of the M1A1, the M60A3, and the M48A5. Its API rounds can penetrate 1" steel armor plate at 1000 yards, making it an effective weapon against light armor and low-flying aircraft. The machine gun sight has only a 3x setting.



Tanks Equipped with the .50cal: M1A1 Abrams, M60A3, M48A5 Patton
Effective Range: 0-1996 yards
Maximum Range: 7470 yards (4.25 miles)
Firing Rate: 600 rounds per minute
Ammunition: bullets

M240 or M73 .30 caliber Machine Gun

The smallest gun in the Steel Thunder arsenal is strictly an anti-infantry weapon. It is usually mounted so it is coaxial to (pointing the same direction as) the main gun.

Tanks Equipped with the .30cal: M1A1 Abrams, M60A3, M3 Bradley, M48A5 Patton
Effective Range: 0-2250 yards
Maximum Range: 4600 yards (over 2.5 miles)
Firing Rate: 900 rounds per minute
Ammunition: bullets

Gun Stabilization Systems

On the M60A3, M1A1 Abrams, and M3 Bradley, the main gun is stabilized to ensure accurate hits, even while the tank is moving over rough terrain at high speeds. The M60A3 and M1A1 Abrams use hydraulic stabilization systems; the M3 Bradley uses an electronic stabilizer. Stabilizers give you a tremendous advantage in the field — though experienced commanders know first-hand that there's a limit to how much motion the system can compensate for.

The M48A5 Patton does not have a stabilization system. With the rare exception of a few of the newer T72 and T80 models, Soviet-built tanks don't have them, either. These tanks must slow down or stop to shoot accurately — a necessity that turns them into 60-ton sitting ducks.

AMMUNITION

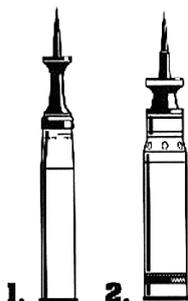
The guns discussed above use a wide variety of ammunition, each designed for a specific application:

1. M833 APFSDS (105mm)

2. M829 APFSDS (120mm)

APFSDS stands for **Armor-Piercing Fin-Stabilized Discarding Sabot**. The most effective anti-tank round made. A small, dense core of depleted uranium sheds its light metal casing as the round leaves the gun barrel. The penetrator then moves toward the target at 6127 feet per second. The Sabot's fins and high velocity make it extremely accurate, even at ranges over 2 miles.

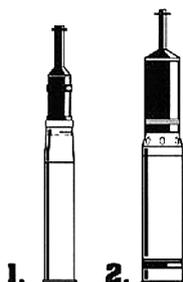
The uranium penetrator hits the target so hard and so fast that it can punch a hole through 15" of steel plate. The remnant pieces of the core (along with the shards of armor taken with it)



STEEL THUNDER

AMMUNITION continued

ricochet around inside the target at speeds in excess of 3000 feet per second, causing extensive damage to both equipment and crew.



1. M483AI HEAT (105mm)

2. M830 HEAT (120mm)

HEAT is an acronym for **High-Explosive Anti-Tank** ammo. Tankers in the field use it mainly against light armor, trucks, and helicopters. HEAT rounds are designed to detonate just outside of the target, forming a directed flame jet that can burn a hole through 17" of steel. Once detonated, it sends a spray of molten fragments careening around inside the vehicle.

With a muzzle speed of 4398 feet per second, HEAT rounds aren't as fast as some of the other choices. Because of the way they detonate, these rounds lose a great deal of effectiveness if they hit the target at anything other than a 90-degree angle.

M393 HEP (105mm)

M828 HEP (120mm)

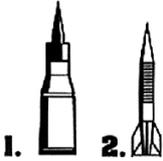
HEP [high-explosive plastic] rounds are designed to form a blob of plastic explosive on the outside of the target. When the explosive detonates, the shock waves shatter the interior surface of the armor, sending shards of metal flying around the inside the target. Tankers use this round to blow up bunkers and thin-skinned or flammable targets, and to disable the treads of heavy tanks.

Because of the way it works, a HEP round doesn't require high muzzle velocity or an accurate contact angle. However, because the HEP explosion isn't directed, it does need to hit a hard, armored surface to be effective. HEP rounds move at a rate of 4208 feet per second. They're not as stable in flight as HEAT or Sabot rounds, and are therefore not as accurate at long ranges.

M494E3 APERS (105mm)

M849 APERS (120mm)

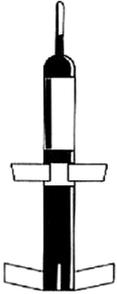
Commonly called Beehive rounds, these anti-personnel rounds create a lethal cone of 2"-3" needle-like aluminum spikes called flechettes, which move at a high velocity through nearly everything. Use your APERS rounds to neutralize infantry units that start lobbing missiles at you.



1. Armor-Piercing (AP) and 2. High-Explosive (HE) Rounds (25mm)

The 25mm AP round is actually a smaller version of the Sabot round. Its depleted uranium penetrator can put it through 3" steel armor at 1000 yards — more than enough to make instant Swiss cheese of light armor like the Soviet BMP.

The 25mm HE round is a high-explosive incendiary round used effectively against softer, non-armored targets like trucks, infantry, and buildings.



TOW-2 Missile

This heavy anti-tank missile was developed by Hughes, and is used by a wide variety of ground- and air-based vehicles. Like the HEAT round, the large shaped charge detonates a directed flame jet that can melt a 2-foot hole in thick armor plate — or punch new windows in a 3' thick concrete bunker. Two fine wires connect it to the guidance system mounted on the tank. The TOW-2 can cover up to 4000 yards at a speed of 625mph.

CHOOSE YOUR WEAPON

Here are some tips that can help you use your ammunition more effectively:

- Don't waste big rounds on light targets, unless you want to bring new meaning to the word overkill.
- Watch your Stores list (remember, the action pauses and none of your keyboard commands are operational while you view the list), and budget your ammunition so you don't run out of heavy artillery before you get to the target.
- The following chart can help you choose the right round for your particular situation:

Ammo Type	Infantry	Unarmored <i>(Trucks, etc.)</i>	Light Armor <i>(BMP-2, BTR-70)</i>	Heavy Tanks <i>(T62/72/74/80)</i>	Bunkers
M3 AP 25mm	S	S	M	I	I
M3 HE 25mm	S	M	S	I	I
TOW Missile	V	V	V	V	V
APFSDS Round	S	S	S	V	S
HEAT Round	S	V	V	M	M
HEP Round	S	V	M	I	V
APERS Round	V	V	I	I	I
.50cal Machine Gun	S	M	S	I	I
.30cal Machine Gun	S	S	I	I	I

I = Ineffective S = Slightly Effective M = Moderately Effective V = Very Effective

STEEL THUNDER

➤ ARMOR & DEFENSIVE SYSTEMS

Heavy Armor Historically, the best way to increase a tank's survivability was to increase the thickness of the steel plate armor, and to shape the tank's exterior to deflect incoming rounds (note the M48A5 Patton's boat-shaped hull). With the development of armor-shattering HEP rounds, tank designers started applying the plate in layers: the broken fragments of exterior armor simply bang into the inner layer, without penetrating through to the interior of the vehicle. The M1A1 Abrams, M48A5 Patton, and M60A3 all rely on molded, layered heavy armor as a major defensive feature.

Chobham Armor For a few years, it looked like the proliferation of shaped-charge weapons — HEAT rounds, TOW-2 missiles, and even a few relatively cheap and simple hand-launched rounds — would make any kind of tank warfare completely futile. These powerful rounds blasted right through the thickest layered armor, with devastating consequences. Then the British introduced Chobham armor, ceramic-and-steel armor that's highly resistant to the intense heat of shaped-charge rounds.

Chobham armor is used throughout the M1A1 Abrams. To test it, the US Army fired every known Soviet anti-tank weapon at the front of the M1A1, and there were no penetrations. The crew simply fixed the treads (which *are* vulnerable) and drove the tank over to a practice range. The sides and back of the M1A1 are not as heavily armored as the front, but can be expected to withstand considerable blasting.

Light Armor Lightly-armored vehicles (including the M3 Bradley) aren't designed to withstand anything bigger than machine gun bullets. For large anti-tank rounds, a better defense is to stay out of their way.

Applique Armor The easiest way to enhance your tank's defenses is to simply pack more stuff on the outside: extra steel, spare tank treads, piles of sand bags. HEP rounds are defeated if they hit this sort of external junk. HEAT rounds may be rendered less effective, or more effective, depending on what and where they hit. Exterior decoration is pretty useless against Sabot rounds and large missiles.

Blazer Reactive Armor A type of applique armor comprising a series of explosive boxes stuck on the tank's shell. Though the boxes are designed to withstand stray bullets and AP rounds, they detonate instantly under the blast tongue of a HEAT or other shaped-charge missile. The exploding box dissipates the missile's energy, preventing it from burning through the tank's armor.

Blazer Reactive Armor is extremely effective against infantry-launched anti-tank missiles, rifle rounds, and most artillery rounds. Newer reactive armor systems include depleted uranium plates that can even deflect Sabot and other uranium-core rounds. It is very expensive, but very effective against everything except the largest enemy tanks.



Smoke Defenses US tanks are equipped with high-tech thermal sights that see fairly well through smoke. No Warsaw Pact nation uses these sights — probably because, at \$200,000 each, they might be considered a luxury item. Using smoke mortars and fuel-smoke systems, commanders can throw up a quick smoke screen, hide in it, and use the thermal sight to pick off the blinded enemy tanks.

Smoke mortars fire smoke-producing grenades out in front of the tank, creating an instant smokescreen that you can drive into. This tactic works best if you can remain relatively stationary: if you go more than a few dozen yards, you'll drive right out of your screen.

Your tank can also produce a more mobile smoke screen by pouring fuel onto the hot exhaust manifold. This uses large amounts of fuel, and works best when you're stationary or moving slowly in reverse. If you go forward quickly, you risk getting ahead of your defensive cloud.

Fire Extinguishers Modern tanks have elaborate Halon fire extinguisher systems, complete with sensors that automatically detect and extinguish any fire. The system on the M3 Bradley is so quick that a direct hit to the fuel tank won't result in an all-out fire. The Halon system carries enough extinguisher to suppress 2 fires per mission.

The M1A1 Abrams has separate ammunition and fuel compartments that are designed to blast out and away from the tank when ignited, thus protecting the crew.

STEEL THUNDER

SECTION FIVE: Know Your Enemy

All the enemy equipment in Steel Thunder is modeled after actual Soviet hardware, which (in general) doesn't approach the standards of accuracy, reliability, and durability found in American-made equipment. This difference is even more acute when you're dealing with exported Soviet vehicles, which are usually stripped of any expensive gadgetry (gun stabilizers, laser rangefinders, high-tech sights) before leaving the USSR.

Because they're at a technological disadvantage, the Soviets emphasize quantity over quality, and economy over crew survival rates. For example, blast panels, which protect the crew if the ammunition or fuel stores should catch fire, are still unknown — one well-directed hit can make an entire tank brew up in flames. Many of these older Soviet tanks are still in service in Europe, where there are three Soviet-built tanks for every American one.

The Soviets' newest front-line tanks, developed in the 1970s, have closed the technological gap on several fronts. Though the T80 still isn't quite as maneuverable or reliable as its American counterpart, it's a vast improvement over its predecessors, and can be one mean bear in combat.

► TANKS

Though they may be cramped, slow, and low-tech, Soviet tanks are usually durable and well-designed, with heavy armor and big (if somewhat inaccurate) guns. Here's what you're up against:

T72/T74/T80

These are the Soviets' newest and best front-line tanks. They come equipped with HEAT-resistant armor, and a nasty 125mm gun. And they're fast enough to give an M1A1 Abrams a short chase. Your only real tactical advantage against these tanks is your smoke screen, since they don't come with thermal sights.



Weight: 39 tons

Length: 29' 6"

Width: 10'

Height: 7' 5"

Cruising Speed: 50mph

Armor: layered steel

Main Gun: 125mm smoothbore; also carries .50cal and .30cal machine guns

T74/T80



T62A

A widely-exported tank with heavy armor and big guns. Though it's not as modern as the T80, it's still formidable.

Weight: 37 tons

Length: 30' 8"

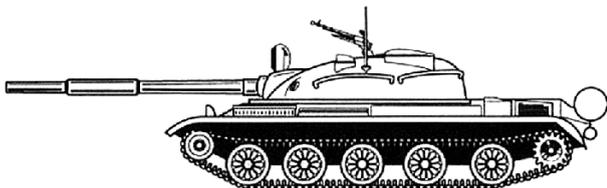
Width: 11'

Height: 7' 11"

Cruising Speed: 34mph

Armor: 170mm

Main Gun: 115mm smoothbore; also carries .50cal and .30cal machine guns.



T-62

T55

The Soviet military never throws anything away, which is why you'll still encounter these WWII-vintage dinosaurs on today's battlefields. It's been widely exported, and has reasonably effective heavy armor.

Weight: 36 tons

Length: 29' 7"

Width: 10' 9"

Height: 7' 10"

Cruising Speed: 30mph

Armor: 170mm

Main Gun: 100mm



T-55

PT-76

A light, thinly-armored reconnaissance tank.

Weight: 14 tons

Length: 25'

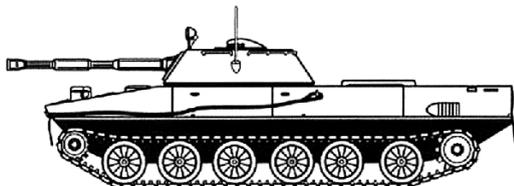
Width: 10' 5"

Height: 7' 5"

Cruising Speed: 27mph

Armor: .5"

Main Gun: 76mm



PT-76

STEEL THUNDER

ARMORED PERSONNEL CARRIERS

BTR-70 A fast, eight-wheeled, light-armor infantry carrier, made in great numbers and used by many nations throughout the world. Its armor is pretty flimsy, it's notorious for transmission problems, and it doesn't handle well off-road. With a .50cal machine gun and a 30mm grenade launcher, the BTR-70 doesn't pose a major threat — though it may inflict serious damage on delicate equipment like treads and gunsights.

Weight: 10 tons

Length: 24' 10"

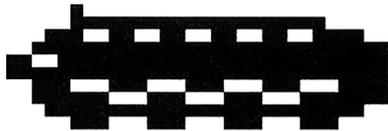
Width: 9' 3"

Height: 6' 9"

Cruising Speed: 50mph

Armor: light steel plate

Main Gun: 12.7mm



BMP-2 The fast, lightly-armored "Bimp" is the latest Soviet APC. Equipped with a turreted 30mm autocannon and an AT-5 Spandrel Anti-Tank Guided Weapon, its firepower is roughly equal to that of the M3 Bradley — though, in order to fire the big gun, the gunner is obliged to stand exposed on top of the tank. The BMP-2 is amphibious, and carries up to six infantry.

Weight: 12 tons

Length: 22' 2"

Width: 9' 9"

Height: 6' 6"

Cruising Speed: 34mph

Armor: light steel plate

Main Gun: 30mm; also carries

AT-5 missile launcher and a .30cal coaxial machine gun.



OTHER KEY TARGETS

Infantry They may be slow and tiny as targets go, but a small squad can pelt you with enough HEAT-type missiles to stop you in your tracks.

Trucks Like trucks everywhere: slow, unarmored carriers. Their drivers typically aren't skilled in combat maneuvers.

SS-22s A tactical nuclear missile transported on a large cargo vehicle. Because they're slow and unarmored, they don't pose much threat to you, but their cargo could be deadly to your army. Don't hesitate.

Oil Tanks Fuel supplies, stored in the usual way.



Communication Posts These are bunkers that house communications equipment. They relay all information between HQ and the troops.

Observation Bunkers Big Brother is watching you.

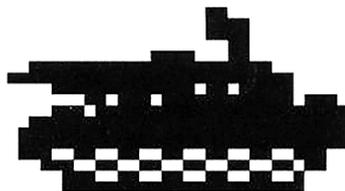
Ammunition Bunkers Storage depots for ammunition. Rockets red glare, bombs bursting in air: blow enough of these up, and the enemy can't continue the offensive.

Enemy Headquarters The local center of enemy activity. Hard to get to, harder to destroy. The ultimate medal mission.

WEAPONS

ZSU-23/4

Called *Shilka* by Soviet troops, and simply *Zoo* by American tankers; either way, it's a pilot's worst nightmare come true. This pernicious anti-aircraft weapon consists of four 23mm rapid-fire guns mounted on tracks. It comes complete with radar and optical sights, and fires 200-shell bursts at about 5-second intervals.



SA-9 Gaskin

A fast, lightly-armored BRDM-2 reconnaissance vehicle equipped with an SA-9 Gaskin SAM launcher and a supply of short-range anti-aircraft homing missiles. Gaskins are vulnerable to tank fire, and will quickly run for cover if they spot you nearby. They're not designed to blast tanks, so they pose no real threat to you...but the Air Force greatly appreciates it when you stop them.



SAU 152

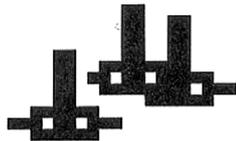
A thinly-armored, self-propelled 152mm gun, capable of hitting speeds over 30mph. It fires high-explosive, AP, and chemical shells at a range of about 14 miles. A nuclear warhead has also been developed for it. Your best defense is to blast it into oblivion with a HEAT missile.



STEEL THUNDER

FROG This is your gunner's shorthand for a slow-moving vehicle carrying a FROG-7 artillery rocket. FROG is the acronym for Free Rocket Over Ground — a short-range missile that can carry nuclear warheads, high-explosive charges, or (according to rumors) chemical weapons. It poses no threat to you, but can mean disaster for your army.

Mortars They're fairly mobile, easy to operate, and moderately effective. Mortars come in sizes ranging from 82mm to 240mm. You'll encounter the 120mm variety, which has a range of 6233 yards (over 3.5 miles).



SECTION SIX: The Missions

Your career with the **Steel Thunder** battalion encompasses nearly two dozen missions in three major theaters of operation. The following information is provided onscreen before you undertake each mission. We've duplicated it here for your reference.

▶ CUBA

1 Rest & Relaxation

Walk along the beach or stroll by the shops along Pacific Avenue. Experience the chill of the ocean, or the thrill of the rides at the Boardwalk.

If you prefer quiet, drive up Highway 9 and relax amidst the cathedral hush of the giant redwoods.

Have a clear, alert mind when you return, soldier.

2 Destroy An Enemy Mortar Post

Practice Mission

An enemy mortar position is giving our operations nothing but trouble.

Take an M3 Bradley loaded with HE 25mm rounds to wipe out the mortar post and its men.

Be careful! This is a real rat's nest. Their 120mm mortars are VERY potent.

You are invulnerable for this PRACTICE mission.

3 Stop An Advancing Enemy Patrol

Promotion Rank: Sergeant

An insurgent infantry force sneaks behind our lines. Several BTR-70s support their advance.

Take an M3 Bradley armed with AP 25mm rounds to destroy their light armor. Stock plenty of .30 caliber bullets to mop up their infantry. Stop them, fast!

4 Eliminate Enemy Scouts

Promotion Rank: Sergeant

Intelligence reports that Cuban scouts are closely monitoring our movements. This threatens our safety! Find their retreat bunkers and destroy them.

Take an M1A1 with lots of HEP rounds for the bunkers. Your coaxial machine gun will handle their infantry.



5 Destroy An Enemy Mortar Post

Promotion Rank: Staff Sergeant

An enemy mortar position is giving our operations nothing but trouble.

Take an M3 Bradley loaded with HE 25mm rounds to wipe out the mortar post and its men.

Be careful! This is a real rat's nest. Their 120mm mortars are VERY potent.

6 Ambush A Supply Convoy

Promotion Rank: Staff Sergeant

A light armor convoy of trucks, BTR-70s, and a BMP-2 approaches.

Your mission is to get in there and ambush them. HEAT rounds should annihilate the entire convoy. I recommend taking an M60A3.

This is a medal mission!

7 Disable Enemy Communications

Promotion Rank: Second Lieutenant

Blast the communications posts shown on the map. Cuban infantry, as well as Soviet BTR-70s, BMP-2s, and a T62A tank patrol the area.

Arm an M1A1 Abrams with HEAT rounds for the armored patrol, HEP rounds for the communications posts, and APERS for the infantry.

8 Disrupt An Armored Column

Promotion Rank: Second Lieutenant

A tank and armor column of T62As, PT-76s, BTR-70s and a T55 approaches the front. Hustle behind the enemy lines and attack them.

Better use an M1A1 with HEAT for the light armor, and APFSDS rounds for their heavy tanks. Good luck.

This is a medal mission!

SYRIA

1 Rest & Relaxation

Syria is a long way from home. The region continues to be an explosive training site for terrorism. We need well-rested men for all assignments here.

Whether you choose peace and quiet or excitement, be sure to come back ready for action, soldier.

2 Destroy Enemy Headquarters

Practice Mission

Enemy operations in the region are coordinated by a training base deep behind the front. Destroy their HQ so I can launch a major attack.

There are T80s, T62As, and BMP-2s in the area.

Load an M60A3 or an M1A1 with APFSDS, HEAT, and HEP.

You are invulnerable for this PRACTICE mission.

3 Destroy An Oil Depot

Promotion Rank: First Lieutenant

Disrupt the enemy and sever his fuel supply by going behind enemy lines and destroying a vital oil depot.

As far as we can tell, BMP-2s, a T62A, and a PT-76 guard the facility.

Take an M3 Bradley with HE and AP rounds. Use the TOW missile to kill the tank.

STEEL THUNDER

SYRIA continued

4 Blow Up An Ammunition Dump *Promotion Rank: First Lieutenant*

The bulk of the terrorist ammunition comes from five bunkers in the region shown on the map. Blaze in and blast each bunker sky high.

There may be a T80 in there, as well as other tanks and light armor.

Use an M60A3 with APFSDS, HEAT, and HEP rounds.

5 Ambush An Enemy Supply Convoy *Promotion Rank: Captain*

A heavily guarded supply convoy is on the move.

I want them stopped before they satisfy their mission.

The convoy has BMP-2s, a T62A, a BTR-70 and more!

Information is limited, so take an M60A3 or M1A1 with HEAT and APFSDS rounds.

6 Disable An Enemy SAM Installation *Promotion Rank: Captain*

Our planes are harassed by a SAM site. Launch a surprise attack and blow it off the planet!

We know of ZSU 23/4s there, but there must also be some heavy tanks, as well.

Take an M60A3 or M1A1 with HEAT and APFSDS rounds.

This is a medal mission!

7 Destroy Enemy Headquarters *Promotion Rank: Major*

Enemy operations in the region are coordinated by a training base deep behind the front. Destroy their HQ so I can launch a major attack.

There are T80s, T62As, and BMP-2s in the area.

Load an M60A3 or M1A1 with APFSDS, HEAT, and HEP.

This is a medal mission!

8 Defeat An Enemy Tank Company *Promotion Rank: Major*

A potentially dangerous tank company is flanking my units.

You must reverse this! Attack THEIR flank, disrupt and destroy them before they get behind my men.

Turn them to rubble with an M1A1 loaded to the gills with APFSDS rounds.

This is a medal mission!

WEST GERMANY

1 Rest & Relaxation

The German soil has been stained with much blood.

You and your men need to be absolutely alert and rested before being sent into battle here.

Spend time as you wish on the California coast, but be prepared for serious battle when you return.



2 Destroy Enemy Nuclear Missiles

Practice Mission

I want the medium-range nuclear missiles knocked out before they get used! This is a very sensitive mission.

Topnotch Soviet tanks patrol round the clock. Stay alert!

Use an M1A1 with plenty of HEAT and APFSDS rounds.

You are invulnerable for this PRACTICE mission.

3 Blow Up A Fuel Dump

Promotion Rank: Lt. Colonel

Your mission is to destroy a vital fuel dump. Zoom through the enemy lines with a Bradley on this one.

I suggest taking 25mm HE rounds to destroy the fuel tanks. Also, take some 25mm AP rounds for the BMP-2s.

Reserve your TOW missiles for the T62A we've spotted.

4 Disrupt Enemy Reinforcements

Promotion Rank: Lt. Colonel

A major armored convoy is approaching the front. It consists of BTR-70s, BMP-2s, a T62A and a T80.

Take an M60A3 and load her up. We're already outnumbered, so don't let ANY of them get through.

This is a medal mission!

5 Blow Up Tactical NBC Weapons

Promotion Rank: Colonel

A large stock of enemy Nuclear, Biological, and Chemical weapons has been identified. These long-range artillery shells are in 5 bunkers.

Take a fully-loaded M1A1 and destroy them. I will be monitoring your progress.

This is a medal mission!

6 Knock Out Enemy Heavy Artillery

Promotion Rank: Colonel

We are sustaining substantial losses from Soviet heavy artillery and long-range rockets.

Their FROG-7s and SAU 152s are guarded by T80s.

Get rid of them! Use an M1A1 appropriately armed.

This is a medal mission!

7 Destroy Enemy Nuclear Missiles

Promotion Rank: General

I want the medium-range nuclear missiles knocked out before they get used! This is a very sensitive mission.

Topnotch Soviet tanks patrol round the clock. Stay alert!

Use an M1A1 with plenty of HEAT and APFSDS rounds.

This is a medal mission!

8 Save Us From Certain Defeat

Promotion Rank: General

A Soviet tank company with many T-80s and other vehicles is flanking our lines. The balance of this conflict will lean in their direction if they are not stopped...forcefully!

Use whichever tank you want. Good luck!

This is a medal mission!

