

TECHNICAL MANUAL

OPERATOR'S MANUAL

**M1 TURRET
ELECTRICAL AND HYDRAULIC
TROUBLESHOOTING TRAINER,
DEVICE 17-68/2
(NSN 6910-01-151-7776)**

HEADQUARTERS, DEPARTMENT OF THE ARMY

WARNING

Use film cleaner in well ventilated area. Avoid contact with eyes or skin. Wash affected area with warm water when contact occurs.

When removing oil based foreign matter do not use wax and grease remover near spark or open flame. Use only in well ventilated area. Avoid contact with eyes or skin. Wash affected area with warm water when contact occurs.

At least two persons are needed to lift display panel. Never try to change panel alone.

Rubber cement thinner is flammable. Extinguish all smoking materials before using. Exposure to open flames or smoking materials could result in injury to personnel.

For further information on first aid, see FM 21-11.

Operator's Manual

M1 TURRET ELECTRICAL AND HYDRAULIC
 TROUBLESHOOTING TRAINER, DEVICE 17-68/2
 (NSN 6910-01-151-7776)

TABLE OF CONTENTS

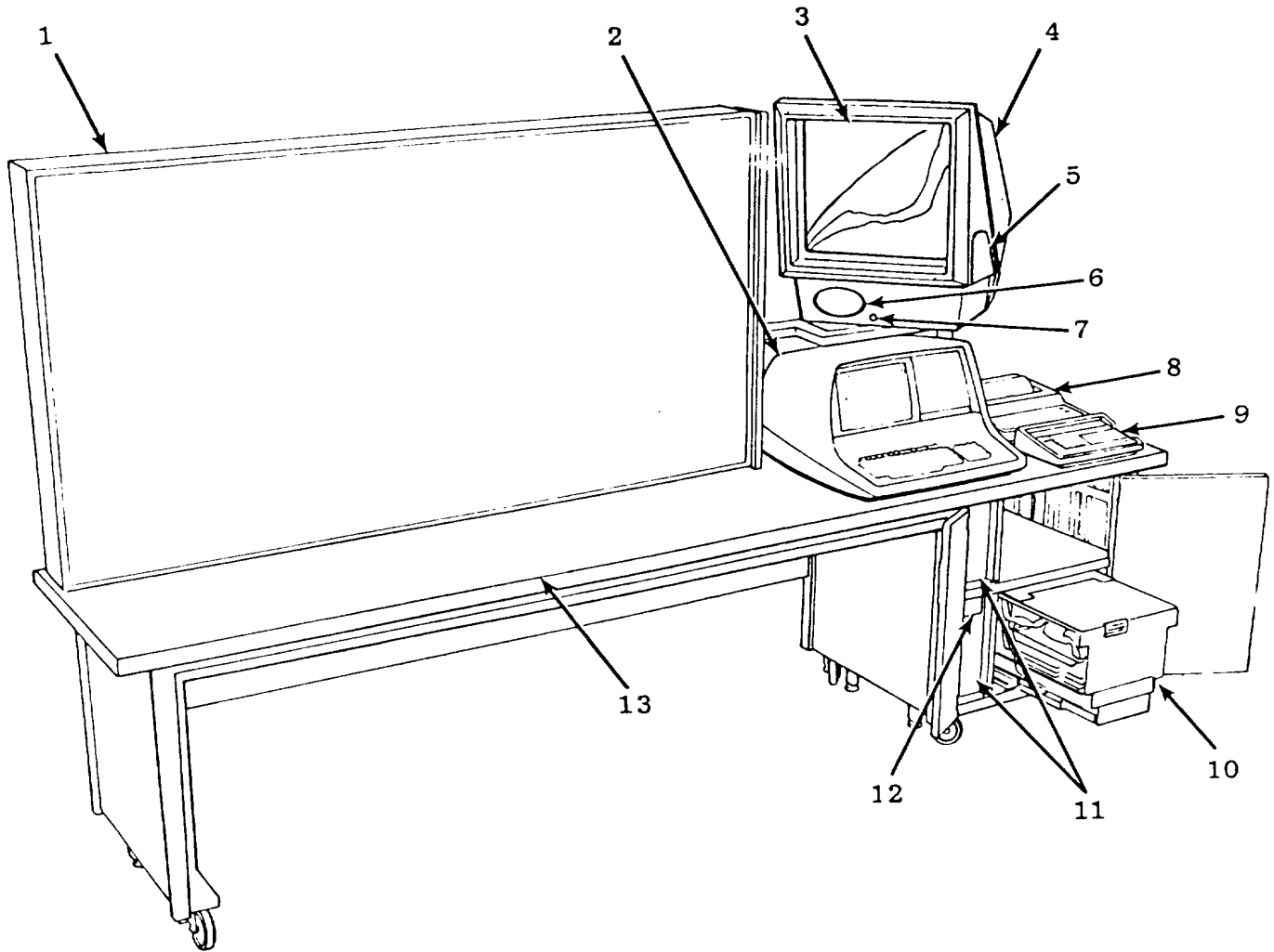
			<u>Paragraph</u>	<u>Page</u>
CHAPTER	1.	INTRODUCTION		
Section	I.	General		
		Scope	1-1	1-1
		Forms and Records	1-2	1-1
		Reporting of Errors	1-3	1-1
	II.	Description and Data		
		Description	1-4	1-1
		Limitations	1-5	1-6
		Tabulated Data.....	1-6	1-7
CHAPTER	2.	OPERATING INSTRUCTIONS		
Section	I.	Controls and Indicators		
		Controls and Indicators	2-1	2-1
	II.	Preparation for Operation		
		Preliminary Inspection.....	2-2	2-35
		Warmup.....	2-3	2-44
		Operational Checkout.....	2-4	2-44
	III.	Operation of the Training Device		
		Preoperational Procedures	2-5	2-47
		Operational Procedures	2-6	2-47
		Post-operational Procedures	2-7	2-55
CHAPTER	3.	OPERATOR/CREW MAINTENANCE INSTRUCTIONS		
		Preventive Maintenance Checks and Services.....	3-1	3-1
		PMCS Table.....	3-2	3-1
		Manhours	3-3	3-1
		Expendable/Durable Supplies and Materials	3-4	3-1
APPENDIX	A.	REFERENCES.....		A-1
APPENDIX	B.	OPERATING CONDITIONS		
		General	B-1	B-1
		Explanation of table.....	B-2	B-1
APPENDIX	C.	M1 OPERATIONAL CHECKS AND TROUBLESHOOTING PROCEDURES		
		General	C-1	C-1
		Explanation of tables	C-2	C-1

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1-1	M1 Turret Electrical and Hydraulic Troubleshooting Trainer, Composite View	1-0
1-2	Computer.....	1-2
1-3	Viewer Assembly.....	1-3
1-4	Cathode Ray Tube (CRT) Terminal	1-4
1-5	Control Console	1-5
1-6	Printer.....	1-5
1-7	Aural Device	1-6
2-1	Control Console Controls and Indicators	2-1
2-2	Printer Controls and Indicators	2-4
2-3	CRT Controls and Indicators.....	2-5
2-4	Viewer Assembly Controls and Indicators	2-6
2-5	Trainer Cabling Diagram	2-36
2-6	Display Panel Removal Diagram	2-38
2-7	Projection Disk Installation Diagram	2-39
2-8	Diskette Drive Units and Flexible Diskette Installation	2-41
2-9	Loading Paper in Printer.....	2-42
2-10	Student Record	2-55
FO-1	Display Panel Component Location Diagram.....	FP-1

LIST OF TABLE

Number	<u>Title</u>	<u>Page</u>
2-1	Control Console Controls and Indicators.....	2-2
2-2	Display Panel Components	2-11
2-3	Display Panel Mode Switch Operation.....	2-32
2-4	Mode Switch/Component Switch Functions	2-33
2-5	Normal Preoperational Switch Setup	2-35
2-6	Slides	2-45
2-7	Procedures for Each Operational Mode	2-48
2-8	Procedural Steps and Associated Controls	2-56
3-1	Preventive Maintenance Checks and Services	3-2
3-2	Expendable/Durable Supplies and Materials List	3-5
B	Malfunction Exercises	B-2
C-1	M1 Operational Checks.....	C-2
C-2	M1 Operator's Troubleshooting Procedures	C-55
C-3	STE-M1/FVS Preoperational Procedures	C-60
C-4	STE-M1/FVS Operational Procedures	C-62
C-5	DSESTS Operating Procedures.....	C-66



- | | |
|---|---|
| 1. Display panel (see fig. FO-1 for detail) | 8. Printer |
| 2. CRT terminal | 9. Control console |
| 3. Viewing screen | 10. Card cage and computer power assembly |
| 4. Viewer and projection assembly | 11. Flexible diskette drives |
| 5. Projector access door | 12. Power circuit breakers |
| 6. Speaker | 13. Desktop |
| 7. Headphone jack | |

Figure 1-1. M1 Turret Electrical and Hydraulic Troubleshooting Trainer, Composite View

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. **Scope.** This manual is for use when operating and maintaining the M1 Turret Electrical and Hydraulic Troubleshooting Trainer, Device 17-68/2. It includes procedures for operating, cleaning, testing, inspecting, and adjusting the trainer at the operator/crew level.

1-2. **Forms and Records.** Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA PAM 738-750.

1-3. **Reporting of Errors.** Reports of errors, omissions, and recommendations for improving this publication by the individual user are encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual, and forwarded direct to: Commander, US Army Armament, Munitions and Chemical Command, ATTN: DRSMC-MAS-TA(R), Rock Island, IL 61299. A reply will be furnished to you.

Section II. DESCRIPTION AND DATA

1-4. **Description.** Device 17-68/2 is a freestanding, computer-based, simulation type troubleshooting trainer. The trainer can be operated in three modes: demonstration, practice and test. The demonstration mode is used by the instructor to demonstrate use of the trainer and to prepare the trainer for use by the student. The practice mode is used by the student to practice troubleshooting instructor selected malfunctions. The test mode is used to evaluate student performance in isolating malfunctions introduced by the instructor. Figure 1-1 is a composite view of the trainer showing major assemblies. Assemblies are described in paragraphs a through g below.

a. **Display Panel.** The display panel (fig. FO-1) is an upright plane surface containing a combination of pictures, controls, and displays that simulate vehicle system components, controls, and displays. The panel also contains special controls and displays to allow the student to perform operational checks and troubleshooting. Malfunctions contained in the computer simulation program can be introduced in the simulated system by means of the control console. Only one malfunction can be incorporated into the simulation at a time. Actions taken at the panel change digital displays on the control console.

b. **Computer.** The computer (fig. 1-2) monitors the condition of system indicators and switches. It modifies the simulation in accordance with programmed directions received from the control console. The computer also changes displays on the control console and the display panel in accordance with student actions. The computer is composed of the card cage, computer power supply assembly, and two flexible diskette drives. The flexible diskette, which is inserted in the upper drive by the instructor, contains the computer program. Paragraph 2-2e gives directions for loading the flexible diskette in the drive unit.

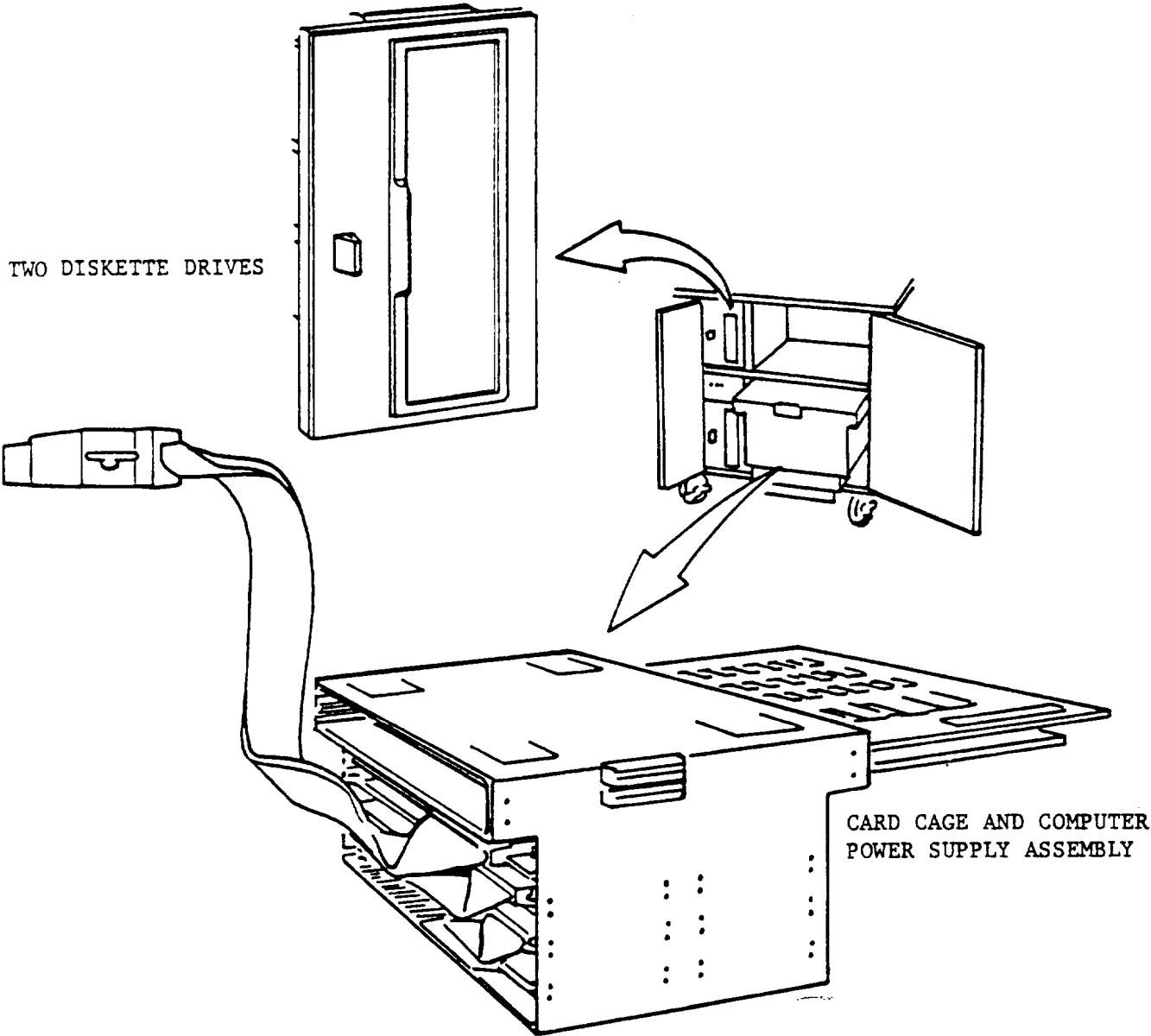


Figure 1-2. Computer

c. Viewer Assembly. Inside the viewer assembly (fig. 1-3), the projector projects a slide on the screen in accordance with actions taken on the display panel and control console. The slides are pictures, word messages, or a combination of both. They provide information about components, malfunctions, tests, actions, and hazards. The control program determines when to show a particular slide and how long to leave the projection lamp on. Paragraph 2-2c gives directions for loading a projection disk (fig. 2-7).

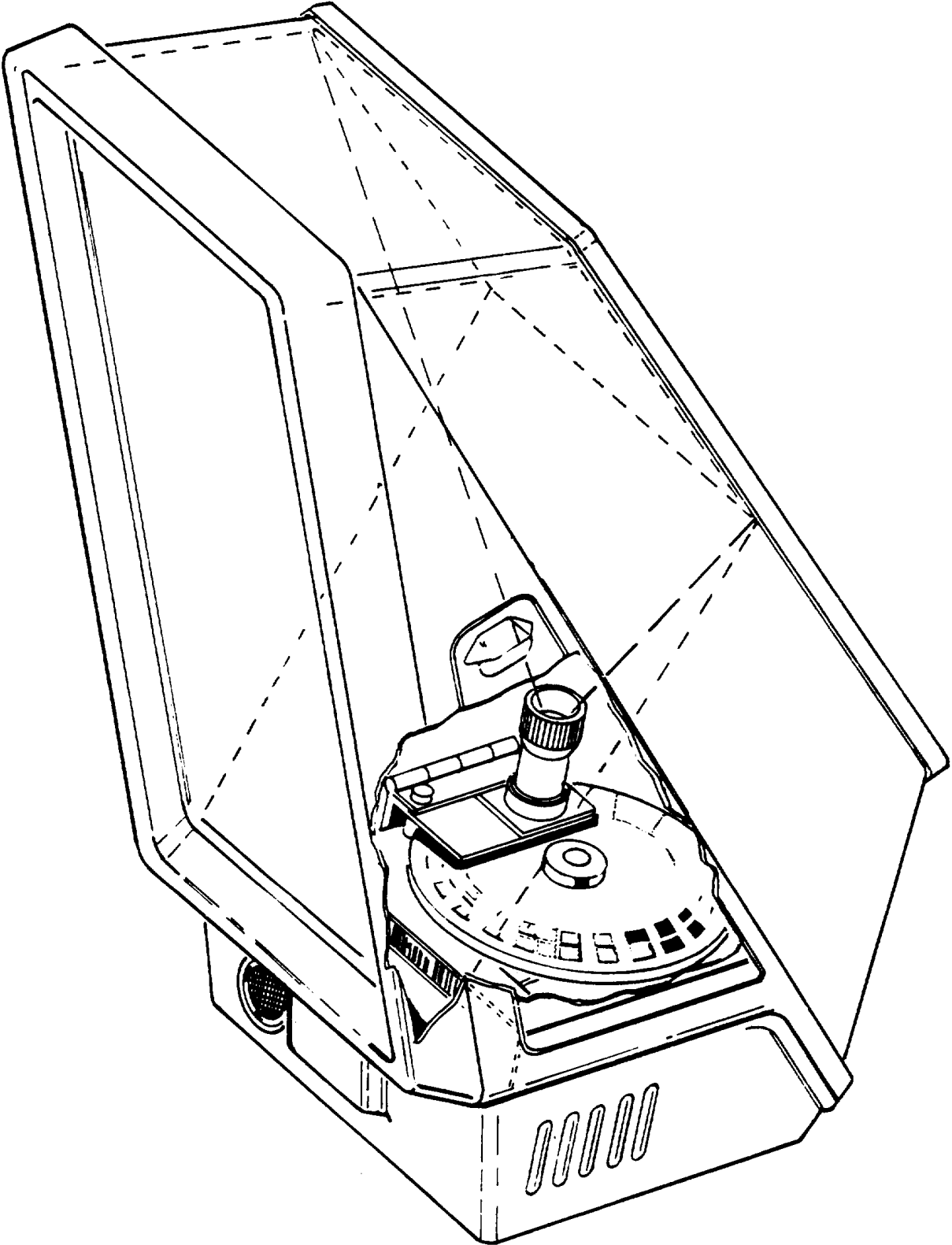


Figure 1-3. Viewer Assembly

d. Cathode Ray Tube (CRT) Terminal. (Input/Output device.)

(1) CRT. The CRT (fig. 1-4) presents a description of the symptom(s), providing the operator/student a reference from which to begin troubleshooting. The computer monitors trainee progress for proper sequence of task actions and elapsed time and provides the student with work instruction on the CRT if he deviates from the proper procedure. Using printed instructions, procedures, and malfunction symptoms, the CRT cues and guides the trainee. Upon completion of troubleshooting, the CRT, when cued by the instructor, displays student performance information.

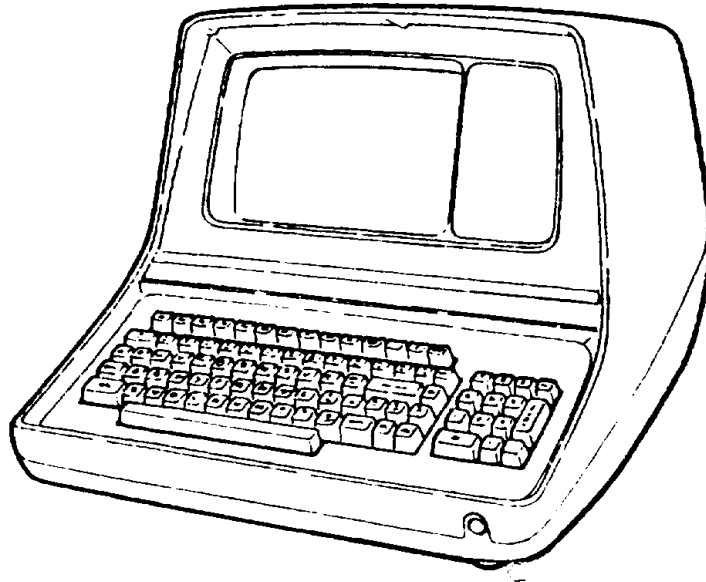


Figure 1-4. Cathode Ray Tube (CRT) Terminal

(2) Keyboard. The keyboard is used to change modes of operation, enter student identification, freeze and unfreeze the simulation, and cue the computer to output a student performance record to the CRT or printer.

f. Control Console. The control console (fig. 1-5) is used to control the operation of the system and monitor student performance. The control console is also used to apply power to the system, test the system, set the time standard, and introduce malfunctions into the system. During set-up procedures, it displays the fault group and fault number being set up and the time standard entered. During operation, it registers tests performed, corrective actions taken, and elapsed time.

g. Printer. The printer (fig. 1-6) records student progress in a permanent form when activated from the control console. Chapter 2 contains printer operating instructions.

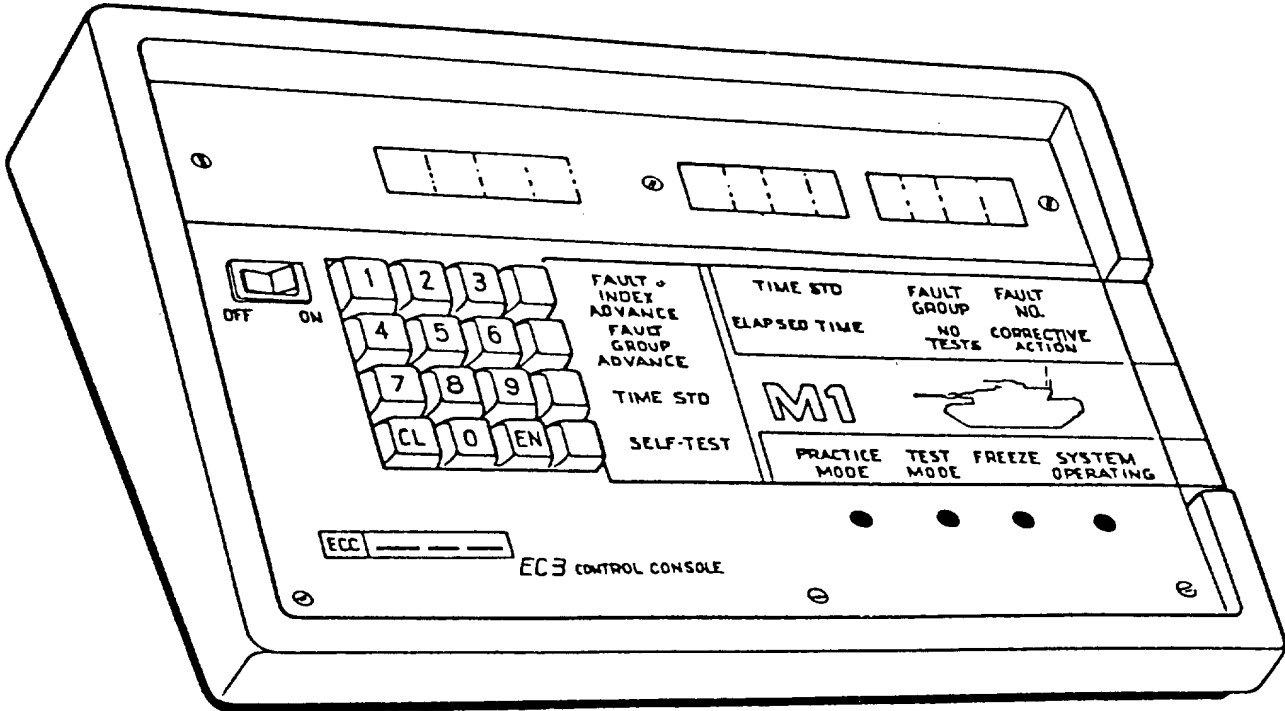


Figure 1-5. Control Console

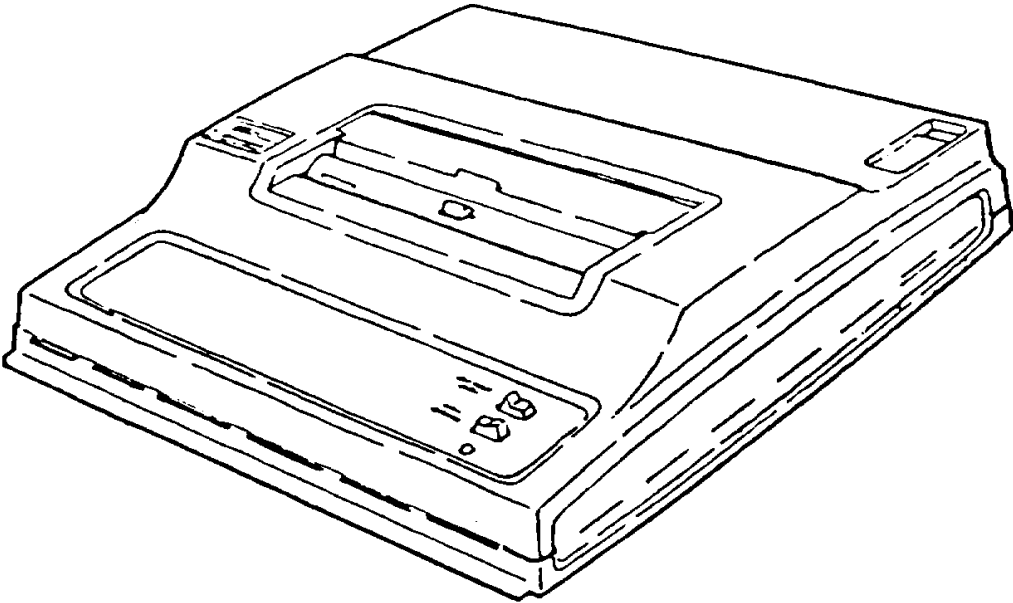


Figure 1-6. Printer

h. Aural Device. The aural device (fig. 1-7) consists of a printed circuit board (part of computer), a speaker, and headphones that provide sound effects simulating the noises that occur in the tank. Three sounds are generated by the aural device:

- (1) Auxiliary hydraulic motor.
- (2) Coax solenoid clicking.
- (3) Turret vent blower.

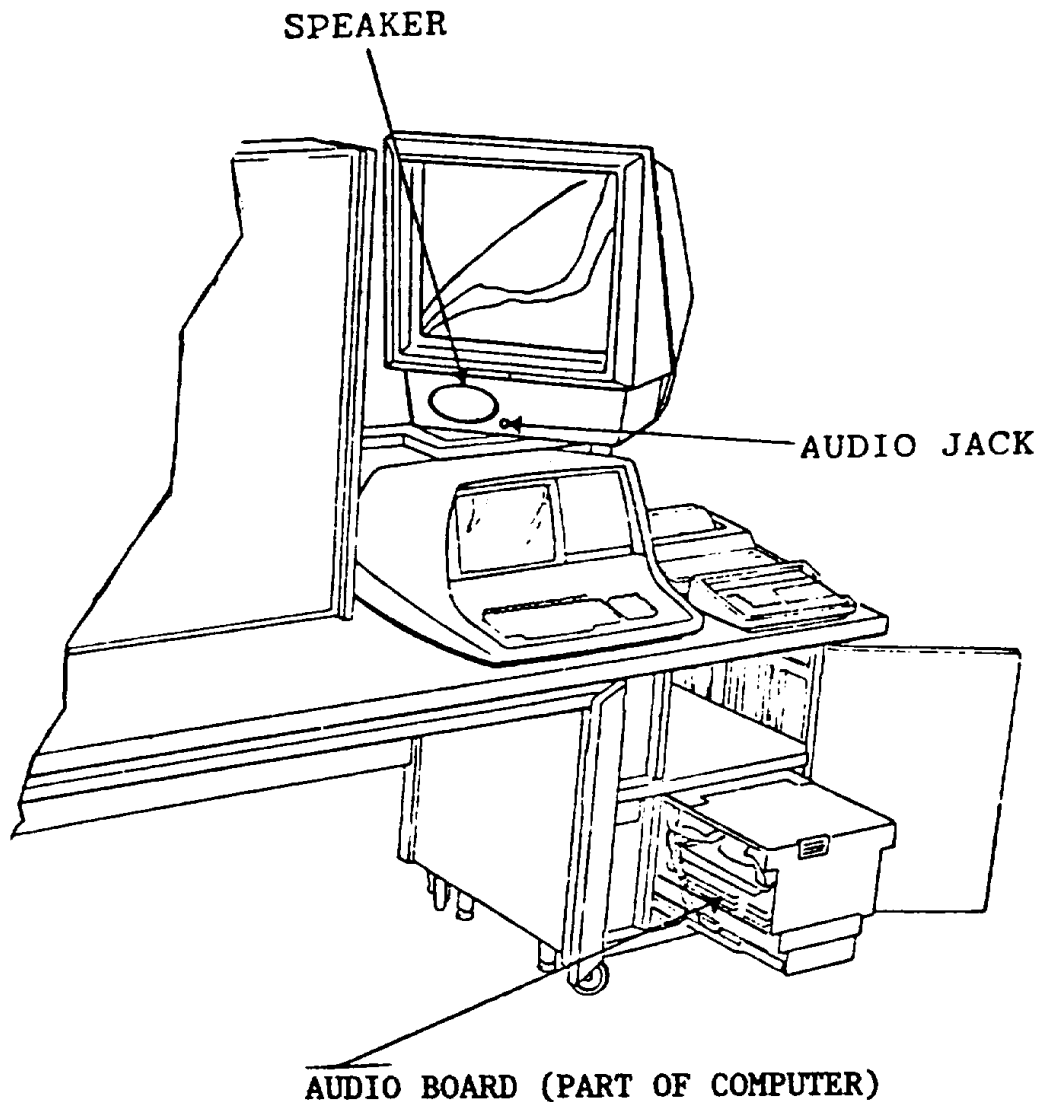


Figure 1-7. Aural Device

1-5. Limitations. The trainer is limited to training personnel to perform maintenance on the M1 tank turret systems. Many three-dimensional tank components, including control handles, are represented by pictures on a plane surface. Because the control handles cannot be manipulated, their functions are simulated by rotary and pushbutton switches. Meters mounted on the plane surface are not functional measuring devices. They can only be used to obtain simulated readings at display panel test jacks.

1-6. Tabulated Data.

a. Equipment Overall Sizes and Weights.

- (1) Length: 120 in. (304.8cm).
- (2) Height: 71 in. (180.34cm).
- (3) Depth: 29 in. (73.66cm).
- (4) Weight: 485 lb (220kg).

b. General Operating Characteristics.

- (1) Operating voltage: 115 vac, 60 Hz (US); 115 vac, 50 Hz (Europe) (change of operating voltage frequency requires adaptation of disk drive. Notify organizational maintenance).
- (2) Current requirement: 15 Amperes.
- (3) Grounding: three-pronged, grounded electrical outlet.
- (4) Heat load: approximately 1,100 watts.

c. Printer Operating Characteristics.

- (1) Printing data: 10 or 30 characters per second (cps).
- (2) Character set: 69 printable uppercase characters.
- (3) Line length: 8 inches.
- (4) Character spacing: 10 characters per inch.
- (5) Line spacing: 6 lines per inch.
- (6) Carriage return/line feed: automatic at column 81.

d. Diskette Drive Operating Characteristics.

- (1) Power inputs: 115 vac, adaptable to 50 or 60 Hz.
24 vdc ($\pm 10\%$)
5 vdc ($\pm 10\%$)
- (2) Diskette: 8 x 8 inches (including jacket), 1 magnetic oxide recording surface.

e. CRT Terminal Operating Characteristics.

- (1) Power input: 115 vac, 60 Hz (US); 115 vac, 50 Hz (Europe).
- (2) Display: 24 lines by 80 characters per line.

*Estimated

f. Projector Operating Characteristics.

- (1) Power input: 115 vac, 60 Hz (US); 115 vac, 50 Hz (Europe).
- (2) Fuse: 250 vac, 5 amp.
- (3) Disk capacity: 150 transparencies.
- (4) Control: Automatic.

g. Control Console Operating Characteristics.

- (1) Power input: 115 vac, 60 Hz (US); 115 vac, 50 Hz (Europe).
- (2) Display: Hexadecimal.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INDICATORS

2-1. Controls and Indicators.

a. Control Console. The controls and indicators shown on figure 2-1 are listed in item number order in table 2-1. The description column contains a physical description of each item shown and the function column describes the operation of each item.

- b. Printer (fig. 2-2).
- c. Cathode Ray Tube (CRT) Terminal (fig. 2-3).
- d. Viewer Assembly (fig. 2-4).

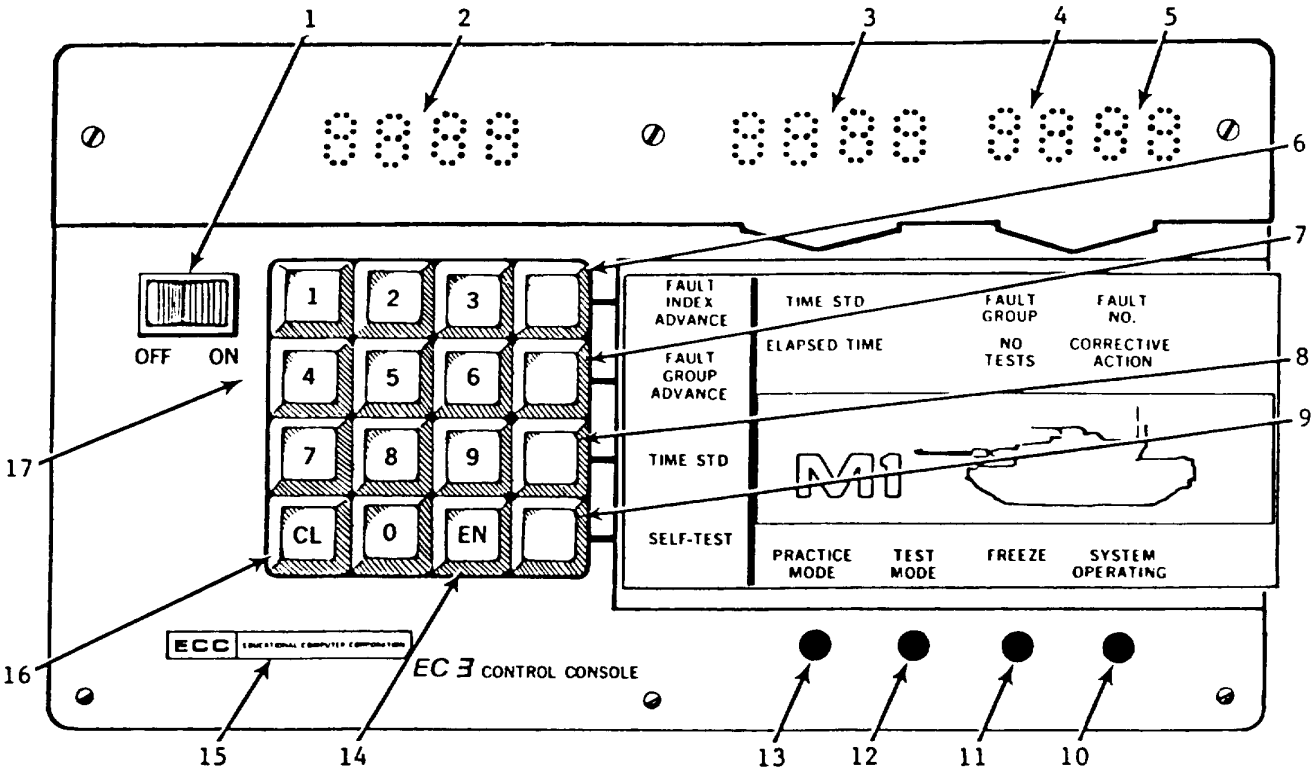


Figure 2-1. Control Console Controls and Indicators

Table 2-1. Control Console Controls and Indicators

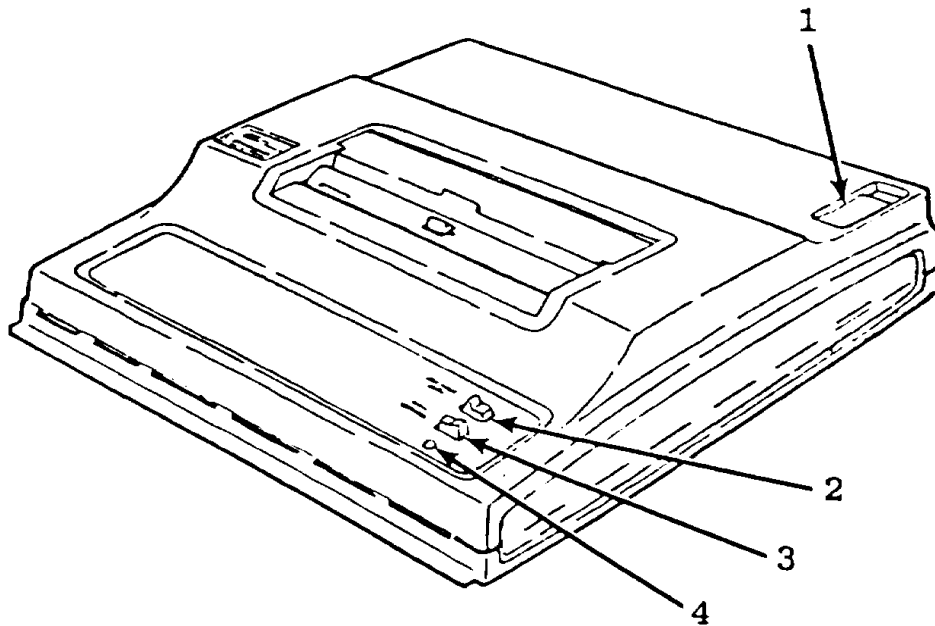
Item No. Fig. 2-1	Name	Description	Function
1.	OFF ON switch	Push-toggle switch	Controls power to trainer.
2.	EN (enter) window	Four numeric light-emitting diode displays (LED)	Indicates entry selected on numerical keyboard.
3.	ELAPSED TIME/ TIME STD window		Shows time elapsed since malfunction started/or, in demonstration mode-freeze condition (demo-freeze), shows the time standard for the fault entered. TIME STD may be modified as described in item 8 below.
4.	NO TESTS/FAULT GROUP window	Left 2 digits of 4-digit display	Shows number of tests performed by student/or, in demo-freeze, displays the number of fault group being selected or examined.
5.	CORRECTIVE ACTION/FAULT NO. window	Right 2 digits of 4-digit display	Indicates number of actions taken attempting to correct simulation malfunction/or, in demo-freeze, shows number of fault being selected or examined.
6.	FAULT INDEX AD- VANCE	Labeled key switch	In the demonstration mode freeze state, successive pressing of this switch allows the instructor to step through the current fault group, examining and/or changing malfunctions assigned to a fault group and corresponding time standard.
7.	FAULT GROUP AD- VANCE	Labeled key switch	In the demonstration mode freeze state, pressing this key allows the instructor to obtain access to and examine or modify the fault group.

Table 2-1. Control Console Controls and Indicators-Continued

Item No. Fig. 2-1	Name	Description	Function
8.	TIME STD	Labeled key switch	In the demonstration mode freeze state, the time standard for the fault shown in the fault group window may be keyed in (in minutes and tenths) and entered by pressing this key.
9.	SELF-TEST	Labeled key switch	In the freeze state, pressing this key makes the trainer title slide display on the projection screen, all panel lamps go out, all servos and meters move to their extreme counterclockwise positions, and all character displays blank. Pressing the key a second time makes the TESTING ALL INDICATORS slide appear on the projection screen, all panel lamps light, all servos and meters move to their extreme clockwise positions, and all character displays exhibit test patterns. The self-test is ended by pressing the go/freeze key, placing the trainer back in the go state.
10.	SYSTEM OPERATING	Light-emitting diode	Flashes when program is running.
11.	FREEZE indicator	Light-emitting diode	Lights when program is in the FREEZE operating state.
12.	TEST MODE indicator	Light-emitting diode	Lights when trainer is in the TEST MODE. This mode is selected by entering a code privileged to the instructor and pressing the appropriate mode key on the CRT keyboard.
13.	PRACTICE MODE indicator	Light-emitting diode	Lights when trainer is in the PRACTICE MODE. This mode is selected as is the TEST MODE (item 12 above).

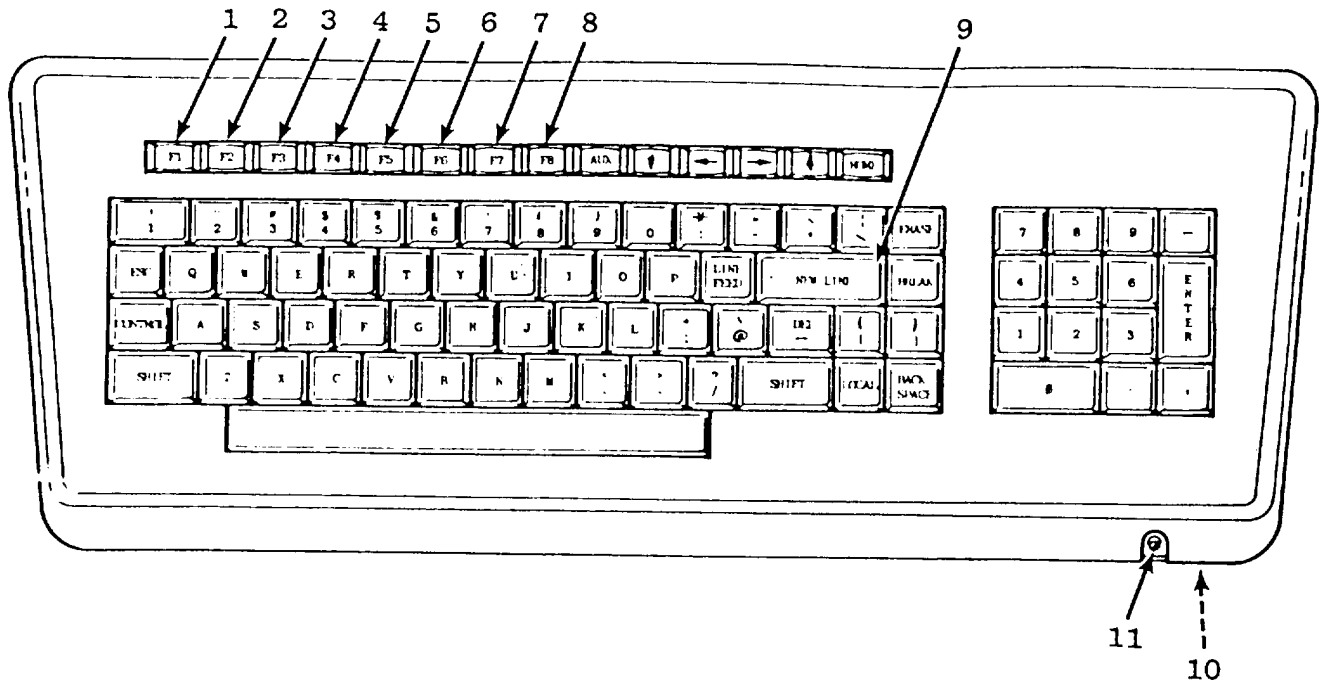
Table 2-1. Control Console Controls and Indicators-Continued

Item No. Fig. 2-1	Name	Description	Function
14.	EN (enter)	Labeled key switch	Pressed to enter fault numbers in a fault group.
15.	Power-on indicator	Neon lamps under translucent cover	Light when ON/OFF switch is turned ON.
16.	CL (clear)	Labeled key switch	If pressed before EN, clears entry. When pressed after keying 99, clears all simulation parameters and any existing faults and fault tables.
17.	Entry keys	Numbered keys	Pressed to select a malfunction for entry.



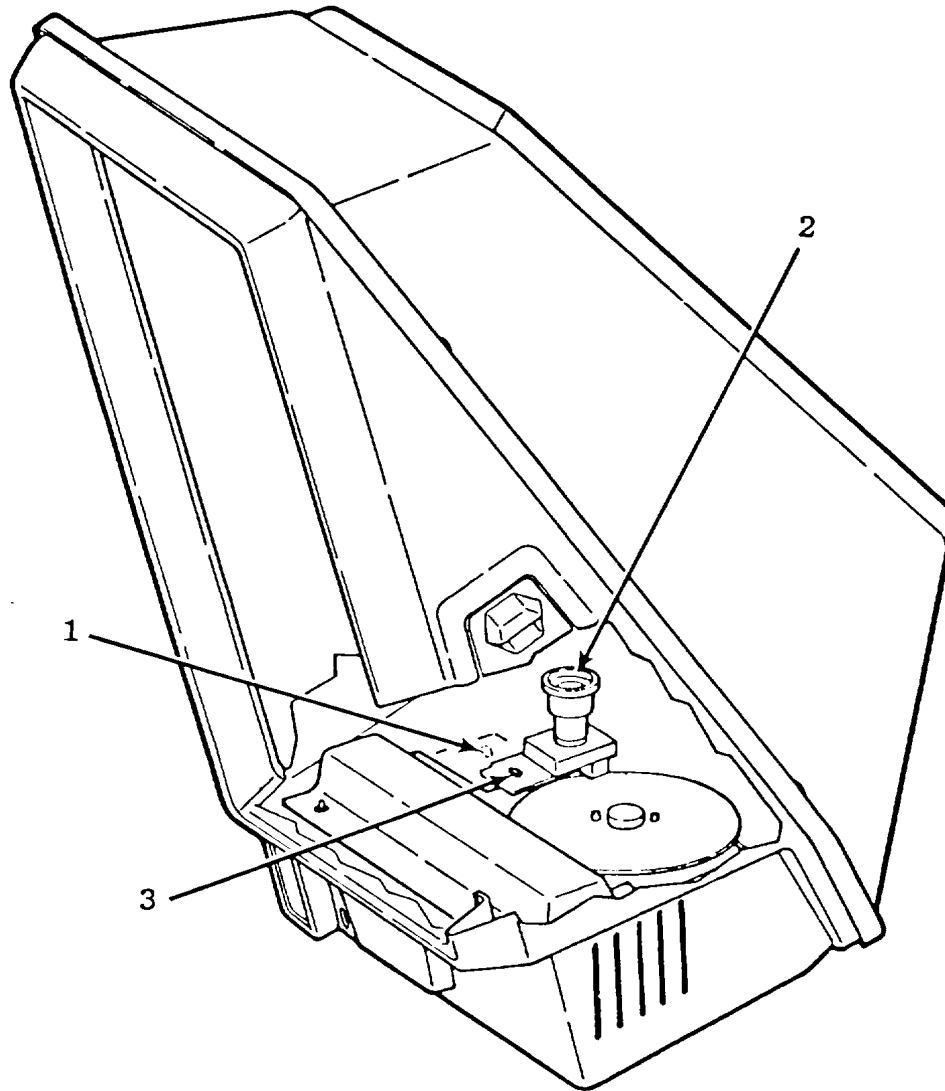
1. Power switch (on/off). Slide switch. Turns printer on and off.
2. PAPER ADV switch. When pressed and held, causes paper to feed over printhead and out the window.
3. LOW SPEED switch. When pressed to left, printer is set to 10 characters-per-second (CPS). When pressed to right, printer is set to 30 CPS. This switch should always be in the LOW SPEED position.
4. Power indicator. Lights to show printer is on.

Figure 2-2. Printer Controls and Indicators



1. F1--demonstration mode key. Places trainer in demonstration mode.
2. F2--practice mode key. Places trainer in practice mode.
3. F3--test mode key. Places trainer in test mode.
4. F4--go/freeze key. Functions as an alternate-action switch that, when pressed, alternates the trainer between the "go" and "freeze" operating states. In the "freeze" state, the trainer simulation freezes, the elapsed time counter stops, and, when in the demonstration mode, malfunction tables may be entered or modified.
5. F5--identification key. Pressing this key makes the trainer store alphanumeric characters that will be used as a student identification.
6. F6--record A key. Pressing this key makes a student performance record display on the screen.
7. F7--record B key. Pressing this key makes a copy of the student performance record print on the printer.
8. F8--individual instructor-privileged code key. Pressing this key after making a line entry on the keyboard causes the trainer to store the last three characters entered. These characters may be used as an individual IPC until trainer is turned off.
9. NEW LINE. Pressing this key causes the next character entered to appear at left margin of CRT screen.
10. Power switch. Turns CRT terminal on and off.
11. Power indicator. Lights to show terminal is on.

Figure 2-3. CRT Controls and Indicators



1. Switch. Pressed to light projector lamp. Lamp remains lit as long as switch is held.
2. Lens. Turned with hand to focus projected image on screen.
3. Lens mount retaining lock. Pressed to release lens mount so that projection disk may be installed or removed. Pressed again to lock lens mount.

Figure 2-4. Viewer Assembly Controls and Indicators

e. Display Panel. Figure FO-1 shows the display panel with a grid system superimposed to facilitate locating panel components. Table 2-2 lists all display panel components and their functions and describes their panel representations. The "Item No." column of the table contains grid designations for figure FO-1. To locate a component, find the number on top of the illustration and follow the grid line down to the grid line from the letter. To identify a panel component, identify the grid location on the figure and refer to the table. The "Name" column of table 2-2 identifies each item by the name of the M1 Tank item being simulated.

The "Description" column gives a physical description of the item, and the "Function" column tells what the item does. The display panel contains five types of program controls and indicators: the PERFORM OPERATIONAL CHECK switch, student malfunction controls, condition controls (CC), mode switches (MS), and component switches (CS). Functions are as follows:

(1) PERFORM OPERATIONAL CHECK (V7, fig. FO-1). When the panel activates, this pushbutton switch/lamp begins flashing. Pressing the switch makes it go out and begins the troubleshooting exercise. The ELAPSED TIME (3, fig. 2-1) indicator starts and, if a malfunction exists, the system exhibits the malfunction.

(2) Student malfunction controls.

(a) ADVANCE (V3). Pressing this switch clears any existing malfunction and advances the training to the next fault in the fault group.

(b) RESET (V2). Pressing this switch restarts the simulation. It does not clear the malfunction. The RESET switch allows the student to begin troubleshooting the malfunction again. This switch operates only in the practice mode.

(3) CC. Each CC is a yellow translucent pushbutton switch/lamp that simulates an action and/or a device. Some are alternate action and some are momentary action.

(a) CONNECT/DISCONNECT GROUND CLIP (U35). Latched CC; simulates connecting GROUND CLIP from DSESTS to chassis of unit under test. Pressing the switch a second time turns off the lamp and simulates disconnecting the GROUND CLIP from the chassis.

(b) CONNECT/DISCONNECT TNB-W2 TEST CABLE (L36). Latched CC; simulates connecting the TNB-W2 test cable between DSESTS and the turret networks box. Pressing the switch a second time turns off the lamp and simulates disconnecting the TNB-W2 cable.

(c) CONNECT/DISCONNECT CWS-W3 TEST CABLE (N36). Latched CC; simulates connecting the CWS-W3 test cable between DSESTS and the commander's weapon station power control unit. Pressing the switch a second time turns off the lamp and simulates disconnecting the CWS-W3 test cable.

(d) CONNECT/DISCONNECT GTD-W4 TEST CABLE (P36). Latched CC; simulates connecting the LOS-W7 test cable between DSESTS and the line of sight electronics unit. Pressing the switch a second time turns off the lamp and simulates disconnecting the LOS-W7 test cable.

(e) CONNECT/DISCONNECT LOS-W7 TEST CABLE (S36). Latched CC; simulates connecting the LOS-W7 test cable between DSESTS and the line of sight electronics unit. Pressing the switch a second time turns off the lamp and simulates disconnecting the LOS-W7 test cable.

(f) CONNECT TO CA1 (P24). Latched CC; simulates connecting cable CX306 from the VTM to the NATO adapter on the hull power distribution box. Pressing the pushbutton a second time turns off the lamp and simulates disconnecting cable CX306 from the NATO adapter.

(g) CX/BOB CABLE (M27). Latched CC; part of test-cabling setup. Selecting a type of cable (CX) or the BOB cable on the thumbwheel switches and pressing this CC simulates connecting the selected cable to the test-cabling setup. Pressing the CC a second time turns off the lamp and disconnects the cable.

(h) CA/TA (M28). Latched CC; part of test-cabling setup. Selecting an adapter type on the thumbwheel switches and pressing this CC simulates connecting the selected cable adapter (CA) or test adapter (TA) to the test-cabling setup. Pressing the CC a second time turns off the lamp and disconnects the adapter.

(i) CA (N28). Latched CC; part of test-cabling setup. Selecting an adapter type on the thumbwheel switches and pressing the CC simulates connecting the selected adapter to the test-cabling setup. Pressing the CC a second time turns off the lamp and disconnects the adapter.

(j) CX/BOB CABLE ADAPTER (M28). Latched CC; part of test-cabling setup. Selecting a type of cable (CX) or BOB cable adapter on the thumbwheel switches and pressing the CC simulates connecting the selected cable or adapter to the test-cabling setup. Pressing this CC a second time turns off the lamp and disconnects the cable or adapter.

(k) CONNECT TO TNB UTILITY OUTLET (N24). Latched CC; simulates connecting cable CX306 from the VTM to the utility outlet on the turret networks box. Pressing the lighted pushbutton again simulates disconnecting cable CX306 from the utility outlet. The integral lamp will go out.

(l) CONNECT W1 (P20). Latched CC; simulates connecting cable W1 from the VTM to the CIB. Pressing the lighted pushbutton again simulates disconnecting cable W1. The integral lamp will go out.

(m) APPLY POWER (T35). Latched CC; simulates turning on a power supply. Pressing the switch a second time turns off the lamp and simulates turning off the power supply.

(n) ENGAGE TURRET AZIMUTH LOCK (D33). Latched CC; simulates mechanically locking the turret to prevent traversing. Pressing the switch a second time turns off the lamp and simulates unlocking the turret azimuth lock.

(o) ENGAGE ELEVATION TRAVEL LOCK (C18). Latched CC; simulates mechanically locking the main gun. Pressing the switch a second time turns off the lamp and simulates unlocking the main gun.

(p) DEPRESS PALM SWITCH. (E7) Momentary CC; used to simulate depressing the commander's palm switch. Releasing the lighted switch causes its integral lamp to go out and simulates releasing the commander's palm switch.

(q) DEPRESS CWS PALM SWITCH (F11). Momentary CC; simulates depressing the commander's weapon station palm switch. Releasing the lighted switch causes its integral lamp to go out and simulates releasing the palm switch.

(r) DEPRESS GUNNER'S LEFT PALM SWITCH (T14). Momentary CC; simulates depressing gunner's left palm switch. Releasing the lighted switch causes its integral lamp to go out and simulates releasing the palm switch.

(s) DEPRESS GUNNER'S RIGHT PALM SWITCH (U9). Momentary CC; simulates depressing gunner's right palm switch. Releasing the lighted switch causes its integral lamp to go out and simulates releasing the palm switch.

(t) DEPRESS MANUAL ELEVATION CRANK PALM SWITCH (V15). Momentary CC; simulates depressing the manual elevation crank handle palm switch. Releasing the lighted switch causes its integral lamp to go out and simulates releasing the palm switch.

(u) DEPRESS MANUAL TRAVERSE CRANK PALM SWITCH (S9). Momentary CC; simulates depressing the manual traverse crank handle palm switch. Releasing the lighted switch causes its integral lamp to go out and simulates releasing the palm switch.

(v) ARM MAIN GUN (G23). Latched CC; when the integral lamp is lit, simulates the main gun spend case ejection guard in the extended position and main gun armed. Pressing the switch a second time causes its integral lamp to go out and simulates the main gun spent case ejection guard in the forward position and main gun disarmed.

(w) INSTALL FIRING CIRCUIT TESTER (C22). Latched CC; simulates installing the firing circuit tester. Pressing the switch a second time causes its integral lamp to go out and simulates removing the firing circuit tester.

(x) ACTUATE BLASTING MACHINE (R13). Momentary CC; simulates cranking the blasting machine. Releasing the lighted switch causes its integral lamp to go out and simulates stopping the cranking action.

(y) STATUS (M26). Latched CC; when pressed for the first time, CRT screen displays a graphic representation of current test-cabling setup for CIB-J1 and CIB-J2. When pressed a second time, displays same setup for CIB-J3 and BOB.

(z) RESET (M27). Momentary CC; part of test-cabling setup. Readies (clears) cable setup for next cable configuration. After a previous cable connection/ configuration has been made, this CC should be pressed before the next cable hookup may be attempted. Pressing this CC will cause all MS/CS associated with the test-cabling setup to go out.

(aa) RUN ENGINE (V6). Latched CC; simulates running the M1 engine. Pressing the lighted pushbutton a second time simulates turning off the engine. Its integral lamp will go out.

(4) Mode Switches (MS) and Component Switches (CS).

(a) There are two types of MS: those used to perform maintenance actions and those used to connect/disconnect the unit under test (UUT).

1. INSPECT (V5). Pressing this MS makes the projector display picture and/or word slides defining perceptive information about specific components. This information is used in operating or troubleshooting the system. When the INSPECT MS is pressed, it and all CS for which inspection information is available will light. Pressing a lighted CS will make all other CS go out and the projector display specific inspection information for the associated component(s). Pressing the same CS again will make the projected slide disappear and relight all CS capable of being inspected. Pressing the lighted INSPECT MS, or another MS, ends the inspection state.

2. REPLACE (V4). Pressing a CS after this MS is pressed simulates performing the selected action on the selected system component. All other CS associated with the MS go out. The projector displays an appropriate slide if the operator tries to replace a component when conditions are hazardous. Removing pressure from the CS makes all other associated CS light.

3. CONNECT/DISCONNECT SYSTEM CABLES (V4). This mode simulates connecting/ disconnecting a particular unit under test (UUT) or component to/from the system cables. Pressing the CONNECT/DISCONNECT SYSTEM CABLES MS places all CS associated with the particular MS in one of two states. If the component is connected, the CS lights steadily. If it is disconnected, the CS flashes on and off at a 1Hz rate. Pressing any of these CS shall simulate reversing the component's state. The CS will light steadily or flash to show its new state. All components will remain in their states after the connect/disconnect operation is ended and the simulation will behave accordingly. This mode makes the connected/disconnected state of components visible and allows the connected/disconnected state of components to be changed.

4. CONNECT TO SYSTEM CABLES/LRU (M29). Part of test-cabling setup; this mode allows test cables and cable adapters (as required) to be connected from the CIB or BOB to a particular component or its associated system cable. When this MS is pressed, all associated CS will flash. Pressing a flashing CS will connect that component or system cable to the test cable setup and the CS will light steadily. Pressing the CS again will disconnect the component or cable and the light will resume flashing. (If a CS will not stop flashing when pressed, the system cable is still connected to the component. The system cable must be disconnected before the test cable can be connected. See 3 above to disconnect system cable.)

5. CONNECT TO LRU/SYSTEM CABLES (N29). Part of test-cabling setup; this mode operates essentially the same as 4 above. Either this MS or the CONNECT TO SYSTEM CABLES/LRU will make a test-cable connection to a component or its associated system cable. By using both MS, the test setup may be simultaneously connected to a component and to its system cable.

6. CONNECT/DISCONNECT TO CIB/BOB (M26). Part of test-cabling setup; this mode allows test cables and cable adapters (as required) to be connected from the particular component or its associated system cable to the CIB (J1, J2, or J3) or the BOB. When this MS is pressed all associated CS will flash. Pressing a flashing CS will connect that CIB or BOB jack to the test-cabling setup currently configured and the CS will light steadily. Pressing the CS again will disconnect the component or cable and the light will resume flashing.

(b) CS. CS are white, translucent, pushbutton switches/lamps. Each CS represents a component or assembly and is located next to that component or assembly. A CS is pressed after an MS to select the component upon which that operation is to be performed, or to connect or disconnect the component for testing.

(c) MS plus CS. The response to pressing a CS depends on which MS was pressed. Table 2-3 describes the operation of each MS. Table 2-4 shows which CS are associated with each MS.

(5) Test Equipment. The panel contains simulated test sets that can be used to troubleshoot the system using procedures in M1 Tank maintenance manuals.

Table 2-2. Display Panel Components

Item No. Fig. FO-1	Name	Description	Function
E7	View of Commander's Weapon Station (CWS)		
E11	CWS AZIMUTH DRIVE	Picture with Component Switch (CS).	Used with MS, refer to table 2-4.
E11	CWS AZIMUTH DRIVE MOTOR/BRAKE	Picture with CS.	Used with MS, refer to table 2-4.
F11	DEPRESS CWS PALM SWITCH	Picture with CC.	SFS, refer to para 2-1e(3)(q).
F10	CWS POWER CONTROL HANDLE	Picture with CS.	Used with MS, refer to table 2-4.
G10	COMMANDER'S CONTROL ASSEMBLY	Picture with CS.	Used with MS, refer to table 2-4.
B7	MANUAL/POWER lever	2-position, 300 rotary switch, with special handle, black.	Simulates switching CWS azimuth drive from MANUAL to POWER mode.
C4	Commander's weapon station azimuth servo indicator	Stepper motor-driven indicator.	Indicates CWS azimuth.
E3	CWS MANUAL AZIMUTH CONTROL	5-position rotary switch; spring-loaded to center, no detents, special handle, black.	Simulates manually traversing CWS.
E5	COMMANDER'S NBC HEATER	Picture with CS.	Used with MS, refer to table 2-4.
E7	DEPRESS PALM SWITCH	Picture with CC.	SFS, refer to para 2-1e(3) (p).
F8	RANGE switch	Red pushbutton with skirt.	
E8	TRIGGER switch	Red pushbutton with skirt.	Pressed to fire gun or coaxial machine gun.
H11	AZIMUTH CONTROL	5-position, 300 rotary; spring-loaded to center, special handle, black.	Traverses turret.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
H12	ELEVATION CONTROL	5-position, 300 rotary spring-loaded to center, special handle, black.	Elevates/depresses main gun.
G8	1W105-J3	Picture with CS.	Used with MS, refer to table 2-4.
F9	Thumb switch	3-position toggle; spring-loaded to center, special gray handle.	Simulates power traverse at CWS. Works with palm switch.
E8	CWS GEARBOX SWITCH 1W105-P6	Picture with CS.	Used with MS, refer to table 2-4.
K4	CWS POWER CONTROL UNIT (PCU)	Picture with CS.	Used with MS, refer to table 2-4.
E3	1W105-P3	Picture with CS.	Used with MS, refer to table 2-4.
H5	Transistor Q2	Picture with CS.	Used with MS, refer to table 2-4.
H5	Transistor Q1	Picture with CS.	Used with MS, refer to table 2-4.
H4	SERVO AMPLIFIER AR1	Picture with CS.	Used with MS, refer to table 2-4.
K7	Q4 Transistor	Picture with CS.	Used with MS, refer to table 2-4.
K6	Q3 Transistor	Picture with CS.	Used with MS, refer to table 2-4.
L6	AI Circuit card	Picture with CS.	Used with MS, refer to table 2-4.
L5	TJ1	Picture with CS.	Used with MS, refer to table 2-4.
M5	J1	Picture with CS.	Used with MS, refer to table 2-4.
R4	COMMANDER'S CONTROL PANEL (TCP)	Picture with CS.	Used with MS, refer to table 2-4.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
R6	VEHICLE MASTER POWER ON/OFF switch	3-position lock-lever toggle, momentary up and down.	Turns tank power off and on.
P7	S2 S2 test points	Picture with CS.	Used with MS, refer to table 2-4.
P7	4	Gray jack.	Test point.
P7	5	Gray jack.	Test point.
P7	6	Gray jack.	Used to make measurements using simulated test equipment.
P6	VEHICLE MASTER POWER indicator	Lamp, green dome.	Lights when VEHICLE MASTER POWER switch is turned on.
R5	TURRET POWER ON/OFF switch	3-position toggle, momentary up and down.	Turns turret power off and on.
S7	S3	Picture with CS.	Used with MS, refer to table 2-4.
S7	S3 test points		
R8	1	Gray jack.	Test point.
R7	2	Gray jack.	Test point.
S8	4	Gray jack.	Test point.
S7	5	Gray jack.	Test point.
S7	6	Gray jack.	Test point.
P5	TURRET POWER indicator	Lamp, green dome.	Lights when TURRET POWER switch is turned on.
P5	MANUAL RANGE BATTLE SGT switch	Black pushbutton with skirt.	Directs ballistic computer to use preset range value or selected ammunition instead of automatic range inputs.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
R5	ADD/DROP switch	3-position toggle, momentary up and down.	Manually adjusts range input to computer after BATTLE SGT pushbutton is pressed.
R4	AUX HYDR POWER ON/OFF switch	3-position toggle, momentary up and down.	Turns on or shuts off auxiliary hydraulic system when vehicle master power is on and vehicle is not running.
N3	S9	Picture with CS.	Used with MS, refer to table 2-4.
N3	S9 test points		
N4	4	Gray jack.	Test point.
N3	5	Gray jack.	Test point.
N3	6	Gray jack.	Test point.
P4	AUX HYDR POWER indicator	Lamp, green dome.	Lights when auxiliary hydraulic system is on.
P3	GRENADES SALVO 1	Red pushbutton with skirt.	Fires six grenades, three from each side.
P3	GRENADES SALVO 2	Red pushbutton with skirt.	Fires six grenades, three from each side.
R3	READY/SAFE switch	2-position toggle, momentary up.	Arms or disarms smoke grenades firing circuit.
P2	PANEL LIGHTS TEST	Black pushbutton with skirt.	Turns on all commander's and loader's panel lights to maximum brightness.
	WARNING indicators		
S6	ENGINE FIRE indicator	Lamp, red dome.	Flashes to warn of fire in the engine compartment.
T6	Engine fire	Dart with CS.	Used with MS, refer to table 2-4.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
S5	CKT BKR OPEN indicator	Lamp, yellow dome.	Lights if any manually reset turret circuit breaker is open.
S3	FIRE CONTROL MALF indicator	Lamp, red dome.	Lights if malfunction occurs in fire control system or electrical cable is disconnected.
S3	Fire control malf	Dart with CS.	Used with MS, refer to table 2-4.
T3	J1	Picture with CS.	Used with MS, refer to table 2-4.
T6	A	Gray jack.	Test point.
T6	K	Gray jack.	Test point.
T6	L	Gray jack.	Test point.
T6	M	Gray jack.	Test point.
T5	N	Gray jack.	Test point.
T5	P	Gray jack.	Test point.
T5	R	Gray jack.	Test point.
T4	S	Gray jack.	Test point.
T4	T	Gray jack.	Test point.
T4	U	Gray jack.	Test point.
T4	V	Gray jack.	Test point.
T3	W	Gray jack.	Test point.
U6	X	Gray jack.	Test point.
U6	Y	Gray jack.	Test point.
U6	Z	Gray jack.	Test point.
U5	<u>a</u>	Gray jack.	Test point.
U5	<u>b</u>	Gray jack.	Test point.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
U5	<u>c</u>	Gray jack.	Test point.
U5	<u>d</u>	Gray jack.	Test point.
U4	<u>n</u>	Gray jack.	Test point.
U4	<u>p</u>	Gray jack.	Test point.
U4	<u>q</u>	Gray jack.	Test point.
U3	<u>r</u>	Gray jack.	Test point.
N8	GPS LOWER CONTROL PANEL	Picture with CS.	Used with MS, refer to table 2-4.
J10	PANEL LIGHTS TEST switch	Black pushbutton with skirt.	Turns all GPS and TIS indicator lights to full brightness.
K9	FIRE CONTROL MODE EMER/NORMAL/MANUAL switch	3-position toggle.	Selects normal, emer- gency or manual fire control mode.
J9	EMER indicator	Lamp, yellow dome.	Shows emergency fire control mode selected.
K10	NORMAL indicator	Lamp, green dome.	Shows normal fire control mode selected.
K9	MANUAL indicator	Lamp, white dome.	Shows manual fire control mode selected.
K11	Filter selector CLEAR/FLTR/SHTR	3-position, 1200 rotary switch.	Positions filter clear window, or shutter in GPS day optic system.
N10	NORMAL MODE DRIFT EL adjust	Push-to-turn, 12- position, 300 rotary with detents and stops removed, and a hex knob.	Corrects for normal drift in stabilized (normal) sighting system.
N11	NORMAL MODE DRIFT AZ adjust	Push-to-turn, 12- position, 300 rotary with detents and stops removed, and a round knob.	Corrects for turret azimuth drift in stabilized (normal) sighting system.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
P9	GUN SELECT MAIN/ TRIGGER SAFE/COAX switch	3-position toggle.	Selects main gun or coaxial machine gun firing system circuits or trigger safe so neither gun will fire.
P9	MAIN indicator	Lamp, green dome.	Shows selection of main gun circuits.
P9	TRIGGER SAFE indicator	Lamp, white dome.	Shows selection of trigger safe position.
R9	COAX indicator	Lamp, green dome.	Shows selection of coaxial machine gun firing circuits.
R10	AMMUNITION SELECT SABOT/HEP/BH/HEAT switch	4-position, 30° rotary with stops and a special knob.	Inputs ammunition type data into ballistic computer when GUN SELECT switch is set to MAIN.
P10	SABOT indicator	Lamp, green dome.	Shows selection of SABOT.
P10	HEP indicator	Lamp, green dome.	Shows selection of HEP.
P10	BH indicator	Lamp, green dome.	Shows selection of BH.
P10	HEAT indicator	Lamp, green dome.	Shows selection of HEAT.
S9	DEPRESS MANUAL TRAVERSE CRANK PALM SWITCH	Picture with CC.	SFS, refer to para 2-1e(3)(u).
T8	MANUAL AZIMUTH DRIVE switch	5-position rotary switch; spring-loaded to center, special handle, black.	Traverses turret.
R13	ACTUATE BLASTING MACHINE	Label with CC.	SFS, refer to para 2-1e(3)(x).
H14	HYDRAULIC PRESSURE gage	0-3000 psi 250° movement gage.	Indicates hydraulic pressure.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
V11	GUNNER'S POWER CONTROL HANDLES	Picture with CS.	Used with MS, refer to table 2-4.
U9	DEPRESS GUNNER'S RIGHT PALM SWITCH	Picture with CC.	SFS, refer to para 2-1e(3)(s).
S11	Right TRIGGER switch	Red pushbutton with skirt.	Press to fire main gun or coaxial machine gun.
T12	Right RANGE switch	Black pushbutton with skirt.	Pressed to operate laser rangefinder.
S13	Left TRIGGER switch	Red pushbutton with skirt.	Fires main gun or coaxial machine gun.
T12	Left RANGE switch	Black pushbutton with skirt.	Pressed to operate laser rangefinder.
T14	DEPRESS GUNNER'S LEFT PALM SWITCH	Picture with CC.	SFS, refer to para 2-1e(3)(r).
V15	DEPRESS MANUAL ELEVATION CRANK PALM SWITCH	Picture with CC.	SFS, refer to para 2-1e(3)(t).
V16	MANUAL ELEVATION DRIVE	5-position rotary switch; spring-loaded to center, special handle, black.	Elevates and depresses main gun.
V9	ELEVATION CONTROL	5-position rotary switch; spring-loaded to center, special handle, black.	Elevates and depresses main gun.
V8	AZIMUTH CONTROL	5-position rotary switch; spring-loaded to center, special handle, black.	Traverses turret.
D15	Turret azimuth indicator	Stepper motor-driven device.	Indicates traversing of turret.
F15	Gun elevation indicator	Stepper motor-driven device.	Indicates elevation of main gun.
C22	INSTALL FIRING CIRCUIT TESTER	Picture with CC.	SFS, refer to para 2-1e(3)(w).

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
C22	FIRING CIRCUIT TESTER	Picture with CS.	Used with MS, refer to table 2-4.
E21	Firing circuit tester lamp.	Lamp, clear dome.	Lights to indicate firing circuit working.
C18	ENGAGE ELEVATION TRAVEL LOCK	Picture with CC.	SFS, refer to para 2-1e(3)(o).
D18	COAX MACHINE GUN FIRES indicator	Lamp, amber; trainer-peculiar	Lights to show coaxial machine gun firing.
F18	COAX SOLENOID	Picture with CS.	Used with MS, refer to table 2-4.
G18	MAIN GUN SAFETY SWITCH	Picture with CS.	Used with MS, refer to table 2-4.
K18	GUN/TURRET DRIVE ELECTRONICS UNIT (GTD)	Picture with CS.	Used with MS, refer to table 2-4.
K16	J4	Jack on GTD, pictured.	Test point.
H17	J3	Jack on GTD, pictured.	Test point.
H15	A1 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
H17	J1	Jack on GTD, pictured.	Test point.
H15	J2	Jack on GTD, pictured.	Test point.
K15	A3 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
K15	A2 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
L18	LINE OF SIGHT ELECTRONICS UNIT (LOS)	Picture with CS.	Used with MS, refer to table 2-4.
L16	A1 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
L16	A2 circuit card	Picture with CS.	Used with MS, refer to table 2-4.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
L15	A9 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
L15	A8 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
M15	A7 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
M15	A6 circuit card	Picture with CS.	Used with MS refer to table 2-4.
M15	A5 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
N15	A4 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
N15	A3 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
N17	<u>b</u> on J2	Gray jack.	Test point.
N18	G on J1	Gray jack.	Test point.
N18	BB on J1	Gray jack.	Test point.
M19	1 on J3	Gray jack.	Test point.
M19	6 on J3	Gray jack.	Test point.
M19	40 on J3	Gray jack.	Test point.
G23	ARM MAIN GUN	Picture with CC.	SFS, refer to para 2-1e(3)(v).
C25	LOADER'S PANEL (LP)	Picture with CS.	Used with MS, refer to table 2-4.
D26	TURRET BLOWER ON/OFF switch	2-position toggle.	Controls power to turret blower.
E26	GUN/TURRET DRIVE EL UNCPL/POWERED/MANUAL switch	3-position locking toggle, in all 3 positions.	Places main gun and turret drive in powered, manual, or elevation uncoupled conditions.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
E26	EL UNCPL indicator	Lamp, dome white.	Lights to show elevation uncoupled.
E27	POWERED indicator	Lamp, dome yellow.	Lights to show powered drive.
F26	MANUAL indicator	Lamp, dome white.	Lights to show manual drive.
D27	MAIN GUN STATUS ARMED indicator	Lamp, dome yellow.	Lights to show main gun is armed.
E27	MAIN GUN STATUS SAFE indicator	Lamp, dome white.	Lights to show main gun is safe.
H27	TURRET NETWORKS BOX (TNB)	Picture with CS.	Used with MS, refer to table 2-4.
K28	UTILITY OUTLET ON/OFF switch	2-position toggle.	Turns utility outlet off and on.
H25	TEST 1	Picture with CS.	Used with MS, refer to table 2-4.
H25	TEST 2	Picture with CS.	Used with MS, refer to table 2-4.
J24	J2	Picture with CS.	Used with MS, refer to table 2-4.
J23	g on 1W106-P1	Gray jack.	Test point.
J23	k on 1W106-P1	Gray jack.	Test point.
K24	J8	Picture with CS.	Used with MS, refer to table 2-4.
K24	Test point Y	Gray jack.	Test point.
K23	Test point Z on 1W102-P1	Gray jack.	Test point.
K24	J11	Picture with CS.	Used with MS, refer to table 2-4.
L24	J10	Picture with CS.	Used with MS, refer to table 2-4.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
J24	J9	Picture with CS.	Used with MS, refer to table 2-4.
K26	J5	Picture with CS.	Used with MS, refer to table 2-4.
M25	A4 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
M25	A3 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
M25	A2 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
M24	A1 circuit card	Picture with CS.	Used with MS, refer to table 2-4.
L30	K3 relay	Picture with CS.	Used with MS, refer to table 2-4.
L33	K2 relay	Picture with CS.	Used with MS, refer to table 2-4.
L33	Q1 thyristor	Picture with CS.	Used with MS, refer to table 2-4.
M33	K1 relay	Picture with CS.	Used with MS, refer to table 2-4.
K33	K4 relay	Picture with CS.	Used with MS, refer to table 2-4.
K33	K5 relay	Picture with CS.	Used with MS, refer to table 2-4.
K34	K6 relay	Picture with CS.	Used with MS, refer to table 2-4.
K33	K8 relay	Picture with CS.	Used with MS, refer to table 2-4.
K33	K7 relay	Picture with CS.	Used with MS, refer to table 2-4.
2-22			

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
J33	K9 relay	Picture with CS.	Used with MS, refer to table 2-4.
J33	K10 relay	Picture with CS.	Used with MS, refer to table 2-4.
J34	K11 relay	Picture with CS.	Used with MS, refer to table 2-4.
J33	K13 relay	Picture with CS.	Used with MS, refer to table 2-4.
C30	2 ON/OFF circuit breaker	2-position toggle switch.	Protects Commander's CBR heater.
C29	3 ON/OFF circuit breaker	2-position toggle switch.	Protects Gunner's CBR heater.
C29	4 ON/OFF circuit breaker	2-position toggle switch.	Protects Loader's CBR heater.
C29	5 ON/OFF circuit breaker	Circuit breaker switch.	Protects Commander's weapon station.
C28	6 ON/OFF circuit breaker	2-position toggle switch.	Protects Communications system.
D29	9 ON/OFF circuit breaker	2-position toggle switch.	Protects grenade control.
D29	10 ON/OFF circuit breaker	2-position toggle switch.	Protects turret dome lights.
D29	11 ON/OFF circuit breaker	2-position toggle switch.	Protects turret blower control.
D28	12 ON/OFF circuit breaker	2-position toggle switch.	Protects bustle ammo compartment.
E30	13 ON/OFF circuit breaker	Circuit breaker switch.	Protects turret power control.
D31	13	Picture with CS.	Used with MS, refer to table 2-4.
D31	Jack 1	Gray jack.	Test point.
D31	Jack 2	Gray jack.	Test point.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
E30	14 circuit breaker	2-position toggle switch.	Protects grenade salvo 1.
E29	15 circuit breaker	2-position toggle switch.	Protects grenade salvo 2.
E29	16 circuit breaker	2-position toggle switch.	Protects coaxial machine gun.
E29	17 circuit breaker	2-position toggle switch.	Protects hydraulic power valves.
E28	18 circuit breaker	2-position toggle switch.	Protects gunner's auxiliary sight.
E30	19 circuit breaker	2-position toggle switch.	Protects main gun primer.
E31	19	Picture with CS.	Used with MS, refer to table 2-4.
E31	Jack 1	Gray jack.	Test point.
E31	Jack 2	Gray jack.	Test point.
E31	Jack 3	Gray jack.	Test point.
E31	Jack 4	Gray jack.	Test point.
E31	Jack 5	Gray jack.	Test point.
E31	Jack 6	Gray jack.	Test point.
E29	20 circuit breaker	2-position toggle switch.	Protects coax/main gun control.
E29	21 circuit	2-position toggle switch.	Protects gunner's primary sight.
E28	22 circuit breaker	2-position toggle switch.	Protects thermal imaging system.
F29	25 circuit breaker	2-position toggle switch.	Protects laser rangefinder.
F29	26 circuit breaker	2-position toggle switch.	Protects fire control distributor.
		2-24	

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
F29	27 circuit breaker	2-position toggle switch.	Protects crosswind sensor.
F28	28 circuit breaker	2-position toggle switch.	Protects computer and cant sensor.
G31	LAMP RESET (S1)	Black pushbutton with skirt.	Resets circuit breaker lamp.
G29	29 circuit breaker	2-position toggle switch.	Protects line of sight data link.
G29	30 circuit breaker	2-position toggle switch.	Protects gun/turret drive controls.
H29	30	Picture with CS.	Used with MS, refer to table 2-4.
H29	Test point 1	Gray jack.	Test point.
H29	Test point 2	Gray jack.	Test point.
G29	31 circuit breaker	2-position toggle switch.	Protects gun/turret drive electronics.
G28	32 circuit breaker	2-position toggle switch.	Protects fire control mode control.
D33	ENGAGE TURRET AZIMUTH LOCK	Picture with CC.	SFS, refer to para 2-1e(3)(n).
D31	LOADER'S KNEE SWITCH	Picture with CS.	Used with MS, refer to table 2-4.
F36	GUN TRUNION RESOLVER	Picture with CS.	Used with MS, refer to table 2-4.
H36	AZIMUTH SERVO	Picture with CS.	Used with MS, refer to table 2-4.
J35	TURRET HYDRAULIC POWER DISTRIBUTION VALVE	Picture with CS.	Used with MS, refer to table 2-4.
J35	ELEVATION SERVO	Picture with CS.	Used with MS, refer to table 2-4.
H33	MAIN ACCUMULATOR	Picture with CS.	Used with MS, refer to table 2-4.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
G32	TURRET VENT BLOWER	Picture with CS.	Used with MS, refer to table 2-4.
E37	TJ1	Picture with CS.	Used with MS, refer to table 2-4.
L36	CONNECT/DISCONNECT TNB-W2 TEST CABLE	Picture with CC.	SFS, refer to para 2-1e(3)(b).
N36	CONNECT/DISCONNECT CWS-W3 TEST CABLE	Picture with CC.	SFS, refer to para 2-1e(3)(c).
P36	CONNECT/DISCONNECT GTD-W4 TEST CABLE	Picture with CC.	SFS, refer to para 2-1e(3)(d).
S36	CONNECT/DISCONNECT LOS-W7 TEST CABLE	Picture with CC.	SFS, refer to para 2-1e(3)(e).
T35	DIRECT SUPPORT ELEC- TRICAL SYSTEM TEST SET APPLY POWER	Picture with CC.	SFS, refer to para 2-1e(3)(m).
U35	CONNECT/DISCONNECT GROUND CLIP	Picture with CC.	SFS, refer to para 2-1e(3)(a).
R33	POWER ON/OFF switch	2-position toggle.	Turns Direct Support Electrical System Test Set (DSESTS) off and on.
R33	POWER indicator	Lamp, green translucent dome lens.	Indicates power applied to DSESTS.
R28	Message window	60-character, alphanumeric display	Displays test information.
T29	YES switch	Black pushbutton with skirt.	Pressed to indicate a YES answer.
S28	ANSWER REQUIRED indicator	Lamp, white translucent dome lens.	Indicates YES or NO answer is required.
T28	NO switch	Black pushbutton with skirt.	Pressed to indicate a NO answer.
T27	STOP switch	Black pushbutton with skirt.	Pressed to interrupt test procedure and return to start of test.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
S26	SELF TEST FAIL indicator	Lamp, red translucent dome lens.	Indicates DSESTS failed self-test.
	CONTROLLABLE INTER-FACE BOX (CIB)		
P23	Controllable interface box J1	Picture with CS.	Used with MS, refer to table 2-4.
P23	Controllable interface box J2	Picture with CS.	Used with MS, refer to table 2-4.
M21	Controllable interface box J3	Picture with CS.	Used with MS, refer to table 2-4.
R23	BREAKOUT BOX (BOB) connection	Picture with CS.	Used with MS, refer to table 2-4.
M27	CX/BOB CABLE	Label with CC.	SFS, refer to para 2-1e(3)(g).
M28	CX/BOB CABLE ADAPTER	Label with CC.	SFS, refer to para 2-1e(3)(j).
M28	CA/TA	label with CC.	SFS, refer to para 2-1e(3)(h).
N28	CA	Label with CC.	SFS, refer to para 2-1e(3) (i).
M29	CONNECT TO SYSTEM CABLES/LRU	Picture with MS.	SFS, refer to para 2-1e(4)(a)4.
N29	CONNECT TO LRU/SYSTEM CABLES	Picture with MS.	SFS, refer to para 2-1e(4) (a)5.
N27	Right-most digit	Thumbwheel switch.	Selects third digit of cable or adapter type to be connected or disconnected.
N27	Middle digit	Thumbwheel switch.	Selects second digit of cable or adapter type to be connected or disconnected.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
N27	Left-most digit	Thumbwheel switch.	Selects first digit of cable of adapter type to be connected or disconnected.
M26	STATUS	Label with CC.	SFS, refer to para 2-1e(3)(x).
M26	CONNECT/DISCONNECT TO CIB/BOB	Label with MS.	SFS, refer to para 2-1e(4)(a)4.
M27	RESET	Label with CC.	SFS, refer to para 2-1e(3) (z).
M23	ON/OFF power switch	2-position toggle.	Turns CIB on and off.
P24	CONNECT TO CA1	Label with CC.	SFS, refer to para 2-1e(3)(f).
N24	CONNECT TO TNB UTILITY OUTLET	Label with CC.	SFS, refer to para 2-1e(3)(k).
P20	CONNECT W1	Label with CC.	SFS, refer to para 2-1e(3)(1).
	DIGITAL MULTIMETER		
N30	POWER ON/OFF switch	Green square, push-button switch; input wired to 'in' position.	Turns digital multi-meter on and off.
N30	V/kQ/S jack	Red jack.	Test probe connection point.
N30	COMMON jack	Black jack.	Test probe connection point.
N31	AC/DC switch	White square, push-button switch; input wired to 'in' position.	Selects AC or DC in voltmeter mode.
N32	V switch	White square, push-button switch; input wired to 'in' position.	Selects voltmeter mode.
31	mA switch	White square, push-button switch; input wired to 'in' position.	Selects ammeter mode.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
N32	k Ω switch	White square, push-button switch; input wired to 'in' position.	Selects indicated range.
N32	200 Ω switch	Gray square, push-button switch; input wired to 'in' position.	Selects indicated range.
N32	2 range switch	Gray square, push-button switch; input wired to 'in' position.	Selects indicated range.
N31	20 range switch	Gray square, push-button switch; input wired to 'in' position.	Selects indicated range.
N31	200 range switch	Gray square, push button switch; input wired to 'in' position.	Selects indicated range.
N31	2000 range switch	Gray square, push-button switch; input wired to 'in' position.	Selects indicated range.
N30	20 Ω m range switch	Gray square, push-button switch; input wired to 'in' position.	Selects indicated range.
N34	Digital window	7-segment, red digital display.	Shows reading.
	BREAKOUT BOX (BOB)		
R22	9	White jack	Test point.
S25	10	Blue jack.	Test point.
S24	11	Orange jack.	Test point.
S24	13	Orange jack.	Test point.
S24	14	Orange jack.	Test point.
S23	16	Orange jack.	Test point.
S23	17	Orange jack.	Test point.
S23	18	Orange jack.	Test point.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
S22	19	Orange jack.	Test point.
S23	24	White jack.	Test point.
S22	29	White jack.	Test point.
S24	33	Orange jack.	Test point.
S23	35	Blue jack.	Test point.
T23	45	Blue jack.	Test point.
T25	60	Blue jack.	Test point.
T23	66	White jack.	Test point.
T23	67	White jack.	Test point.
U24	83	White jack.	Test point.
U23	89	White jack.	Test point.
	All other jacks from 1 to 129 not listed above.	Common address jacks.	Test points.
	VEHICLE TEST METER (VTM)		
S18	Digital window	4-digit, 7-segment display.	Display message.
U19	PUSH ON/PULL OFF power switch	Push-pull switch.	Turns VTM off and on.
U18	TEST SELECT left thumb switch	10-digit thumbwheel.	Tens digit of test set.
U18	TEST SELECT right thumb switch	10-digit thumbwheel.	Units digit of test set.
U17	TEST	Black pushbutton.	Initiates test selected with thumb switches.
S20	Black jack	Black.	Test probe connection point.
S20	Red jack	Red.	Test probe connection point.

Table 2-2. Display Panel Components-Continued

Item No. Fig. FO-1	Name	Description	Function
	SET COMMUNICATOR		
S16	RETEST key	Red pushbutton switch.	Resets communicator.
S16	0 thru 9 numbered keys	Gray pushbutton switch.	Used to enter 0 thru 9.
S16	CAL key	Green pushbutton switch.	Used to do a zero signal offset correction.
S16	SINGLE STEP key	Red pushbutton switch.	Used to step thru test one step at a time.
S16	YES key	White pushbutton switch.	Enter YES response.
S15	NO key	White pushbutton switch.	Enters NO response.
T16	GO key	Red pushbutton switch.	Enters GO response.
T15	CLEAR key	Red pushbutton switch.	Clears all entries.
T15	STOP key	Red pushbutton switch	Enters STOP response.
R15	Digital window	5x7 dot matrix alphanumeric display.	Shows message.
V7	PERFORM OPERATIONAL CHECK	Label with MS.	SFS, refer to para 2-1e(4)(a)7.
V6	RUN ENGINE	Label with CC.	SFS, refer to para 2-1e(3) (aa).
V5	INSPECT	Label with MS.	SFS, refer to para 2-1e(4)(a)1.
V4	REPLACE	Label with MS.	SFS, refer to para 2-1e(4)(a)2.
V4	CONNECT/DISCONNECT SYSTEM CABLES	Label with CC.	SFS, refer to para 2-1e(4)(a)3.
V3	ADVANCE	Label with CC.	Advances simulation to next malfunction.
V2	RESET	Label with CC.	Resets to start of malfunction.

Table 2-3. Display Panel Mode Switch Operation

Step	Action	Expected Result
1	Press INSPECT mode switch (MS).	All component switches (CS) associated with INSPECT mode light.
a	Press first CS associated with INSPECT mode, as listed in table 2-4.	All other CS lamps go out and projector displays correct information.
b	Press same CS again.	Inspection information is removed from screen and all other CS associated with INSPECT mode light.
c	Perform steps 1a and 1b for each CS associated with INSPECT mode (table 2-4).	
d	Press the INSPECT MS to end the INSPECT mode.	All MS and CS lamps go out and projector turns off.
2	Press REPLACE MS.	All CS associated with REPLACE mode light.
a	Press and hold first CS associated with REPLACE mode (table 2-4).	All other associated CS go out.
b	Remove pressure from CS.	All other associated CS light.
c	Press the REPLACE MS to end the REPLACE mode.	All CS associated with REPLACE mode go out.
3	Press CONNECT/DISCONNECT SYSTEM CABLES MS.	All associated CS will light.
a	Press each associated CS, in turn (table 2-4).	If light is steady, it will start flashing (Disconnect condition). If flashing, it becomes steady (Connect condition).
b	Press CONNECT/DISCONNECT SYSTEM CABLES MS to end mode.	All associated CS go out.
4	Repeat step 3 procedures for CONNECT/DISCONNECT TO CIB/BOB, CONNECT TO SYSTEM CABLES/LRU, and CONNECT TO LRU/SYSTEM CABLES modes.	

Table 2-4. Mode Switch/Component Switch Functions

Component Switch	*IN	*RE	*SC	*SC/ LRU	*LRU/ SC	*CIB/ BOB
AZIMUTH SERVO	X					
COAX SOLENOID	X					
COMMANDER'S CONTROL ASSEMBLY	X					
COMMANDER'S CONTROL PANEL	X	X				
COMMANDER'S NBC HEATER	X					
CWS AZIMUTH DRIVE	X					
CWS AZIMUTH DRIVE MOTOR/BRAKE	X					
CWS GEARBOX SWITCH			X	X	X	
CWS POWER CONTROL HANDLE	X					
CWS POWER CONTROL UNIT	X	X				
CWS-PCU CIRCUIT CARD AI	X	X				
CWS-PCU SERVO AMPLIFIER AR1		X				
CWS-PCU TJ1				X	X	
CWS-PCU J1			X	X	X	
CWS-PCU TRANSISTOR Q1	X					
CWS-PCU TRANSISTOR Q2	X					
CWS-PCU TRANSISTOR Q3	X					
CWS-PCU TRANSISTOR Q4	X					
ELEVATION SERVO	X					
ENGINE FIRE INDICATOR		X				
FIRE CONTROL MALF		X				
FIRING CIRCUIT TESTER	X					
GPS LOWER CONTROL PANEL	X					
GTD CIRCUIT CARD AI	X	X				
GTD CIRCUIT CARD A2	X	X				
GTD CIRCUIT CARD A3	X	X				
GUN TRUNNION RESOLVER	X					
GUN/TURRET DRIVE ELECTRONICS UNIT	X					
GUNNER'S CONTROL ASSEMBLY	X					
LINE OF SIGHT ELECTRONICS UNIT	X					
LOADER'S PANEL	X					
LOADER'S KNEE SWITCH	X					
LOS CIRCUIT CARD AI	X	X				
LOS CIRCUIT CARD A2	X					
LOS CIRCUIT CARD A3	X	X				
LOS CIRCUIT CARD A4	X					
LOS CIRCUIT CARD A5	X					
LOS CIRCUIT CARD A6	X					
LOS CIRCUIT CARD A7	X					
LOS CIRCUIT CARD A8	X	X				
LOS CIRCUIT CARD A9	X					
MAIN GUN SAFETY SWITCH S2	X			X		

*IN-INSPECT; RE-REPLACE; SC - CONNECT/DISCONNECT SYSTEM CABLES; SC/LRU - CONNECT TO SYSTEM CABLES/LRU; LRU/SC - CONNECT TO LRU/SYSTEM CABLES; CIB/BOB - CONNECT/DISCONNECT TO CIB/BOB.

Table 2-4. Mode Switch/Component Switch Functions-Continued

Component Switch	*IN	*RE	*SC	*SC/ LRU	*LRU/ SC	*CIB/ BOB
S3		X				
S9		X				
TCP J1			X			
TNB CIRCUIT BREAKER 13		X				
TNB CIRCUIT BREAKER 19		X				
TNB CIRCUIT BREAKER 30		X				
TNB CIRCUIT CARD A1	X	X				
TNB CIRCUIT CARD A2	X					
TNB CIRCUIT CARD A3	X	X				
TNB CIRCUIT CARD A4	X	X				
TNB J2			X	X	X	
TNB J5			X	X	X	
TNB J8			X	X	X	
TNB J9			X	X	X	
TNB J10			X	X	X	
TNB J11			X	X	X	
TNB RELAY K1	X	X				
TNB RELAY K10	X					
TNB RELAY K11	X	X				
TNB RELAY K13	X					
TNB RELAY K2	X	X				
TNB RELAY K3	X	X				
TNB RELAY K4	X	X				
TNB RELAY K5	X	X				
TNB RELAY K6	X					
TNB RELAY K7	X	X				
TNB RELAY K8	X					
TNB RELAY K9	X					
TNB TEST 1				X	X	
TNB TEST 2				X	X	
TNB THYRISTOR Q1	X	X				
TURRET HYDRAULIC POWER DISTRIBUTION VALVE	X					
TURRET NETWORKS BOX	X	X				
TURRET VENT BLOWER	X					
1W105-J3			X	X	X	
1W105-P3			X	X	X	
CIB-J1						X
C1B-J2						X
CIB-J3						X
BOB						X
HNB TJ1				X	X	

*IN-INSPECT; RE-REPLACE; SC - CONNECT/DISCONNECT SYSTEM CABLES; SC/LRU - CONNECT TO SYSTEM CABLES/LRU; LRU/SC - CONNECT TO LRU/SYSTEM CABLES; CIB/BOB - CONNECT/DISCONNECT TO CIB/BOB.

Section II. PREPARATION FOR OPERATION

2-2. Preliminary Inspection.

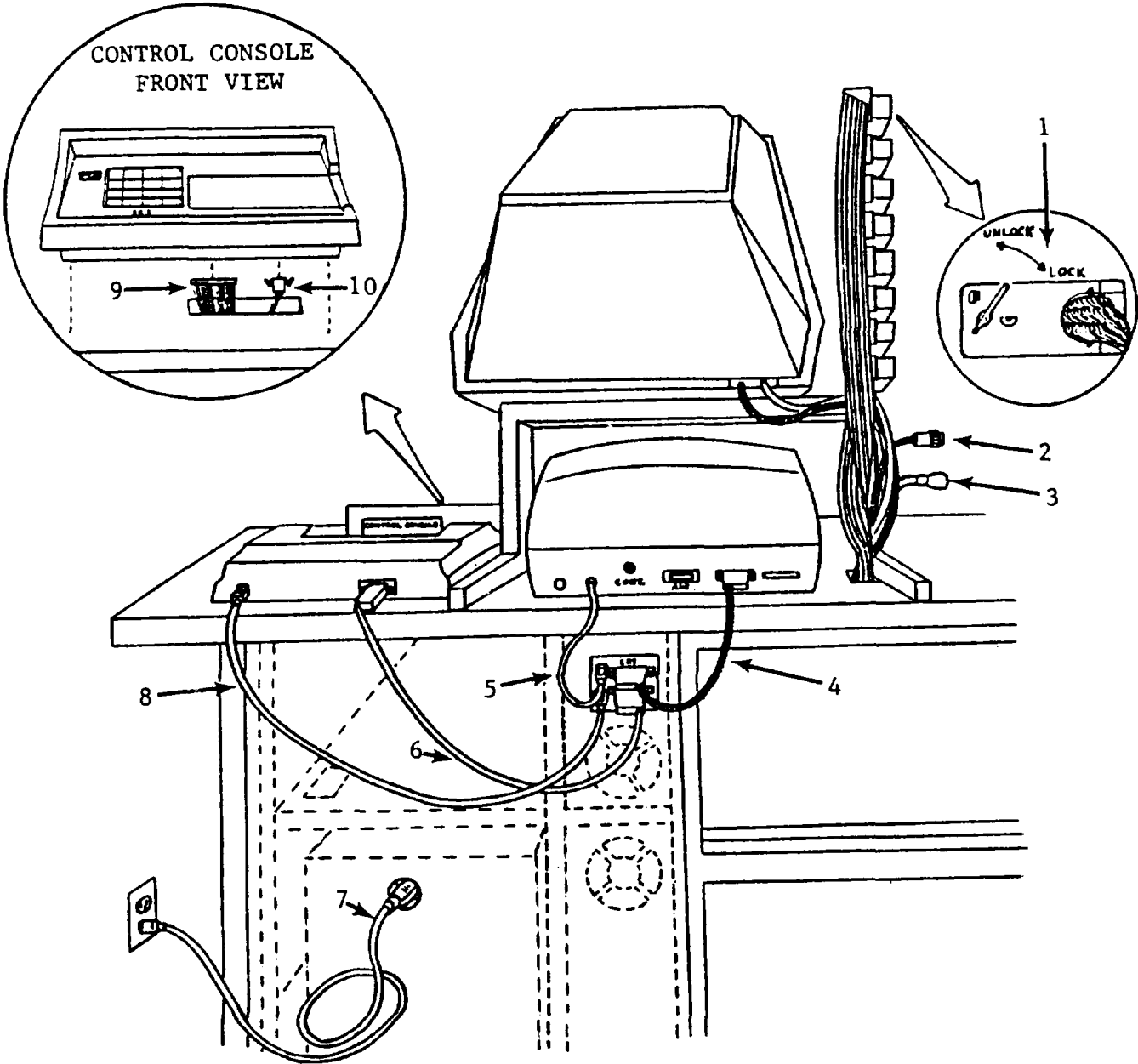
a. Walkaround Inspection. Be sure all cables are connected to the proper receptacles (fig. 2-5), all doors are closed, air vents are not blocked, and trainer is plugged into a 115 vac outlet. Inspect interconnecting cables for damaged connectors and broken or frayed wires. Be sure switches listed in table 2-5 are in the appropriate starting positions.

Table 2-5. Normal Preoperational Switch Setup

Switch	Component	Position
	<u>DISPLAY PANEL*</u>	
VEHICLE MASTER POWER	(R6, fig. FO-1)	OFF
All TNB circuit breakers	(D29)	ON
TNB UTILITY OUTLET	(K28)	ON
TURRET POWER	(R5)	OFF
TURRET BLOWER	(D26)	OFF
FIRE CONTROL MODE	(K9)	NORMAL
DSESTS ON/OFF	(R33)	OFF
VTM PUSH ON/PULL OFF	(U19)	OFF
	<u>CONTROL CONSOLE</u>	
OFF ON switch	(1, fig. 2-1)	OFF
	<u>PRINTER</u>	
Power switch	(1, fig. 2-2)	On
LOW SPEED switch	(3)	LOW
	<u>POWER CIRCUIT BREAKERS</u> (12, fig. 1-1)	
CB1		ON
CB2		ON
CB3		ON
CB4		ON
	<u>CRT TERMINAL</u>	
Power switch	(10, fig. 2-3)	On

*These switches are set to simulate the normal preoperational condition of the vehicle.

b. Changing Display Panel. The panel is not normally removed unless it is to be used with a different simulator. If it is necessary to remove the panel, the projection disk and training flexible diskette must also be changed.



- 1. Panel signal connectors (8)
- 2. Panel power connector (P1)
- 3. Auxiliary power connector
- 4. CRT signal connector
- 5. CRT power connector
- 6. Printer signal connector
- 7. AC power input connector
- 8. Printer power connector
- 9. Control console signal connector (front view)
- 10. Control console power connector (front view)

Figure 2-5. Trainer Cabling Diagram

WARNING

At least two persons are required to lift panel. Never try to change panel alone.

(1) To Remove:

- (a) Turn off electrical power and disconnect power plug from wall outlet.
- (b) Disconnect Input/Output (I/O) connectors (4, fig. 2-6).
- (c) Disconnect P1 (5).
- (d) Disconnect auxiliary power connector (3, fig. 2-5).
- (e) Release panel by unscrewing mounting knob (6, fig. 2-6).
- (f) Slide panel away from viewer assembly until panel clears mounting studs (3).
- (g) Lift panel.

(2) To install:

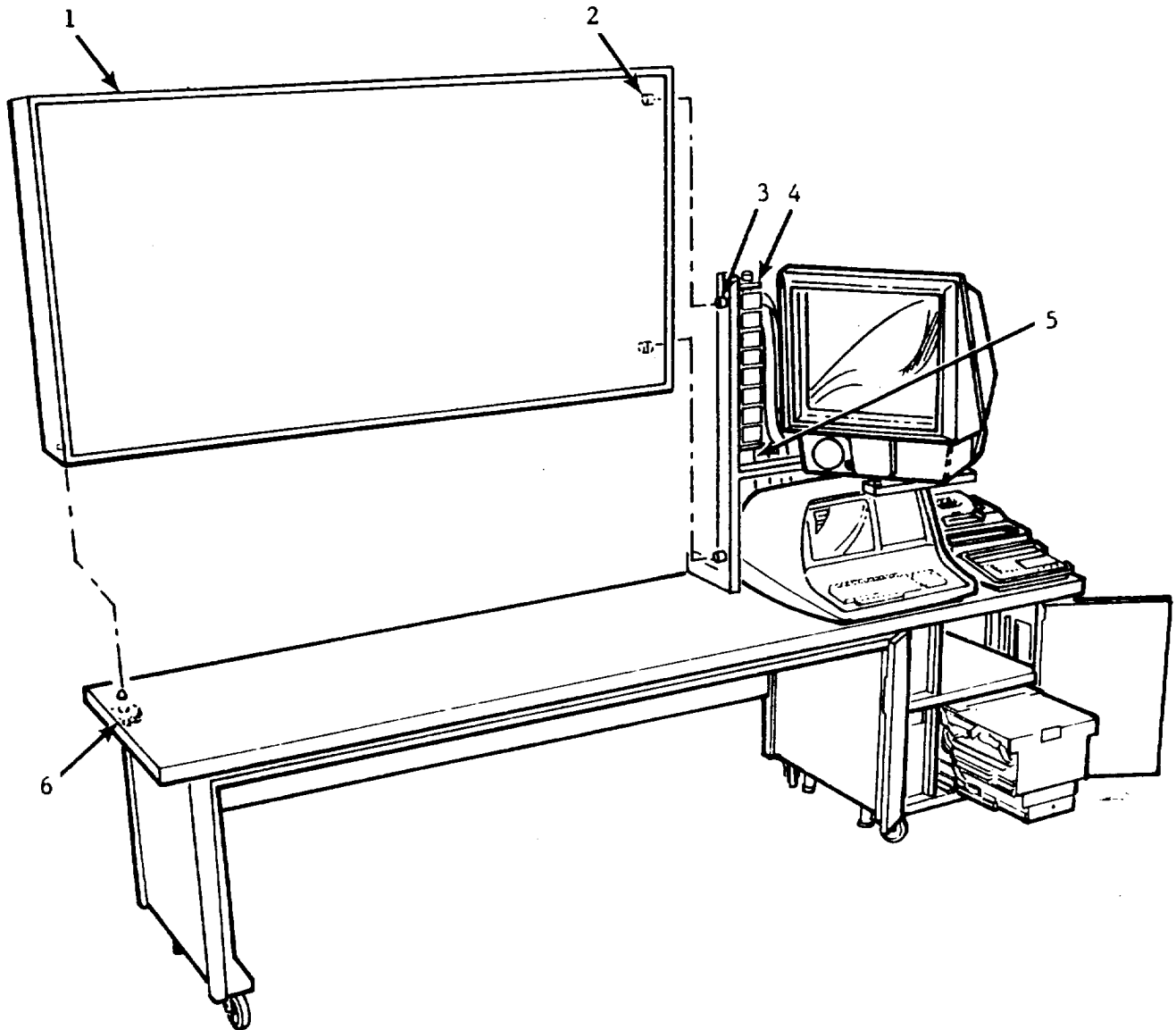
- (a) Place panel on table and slide toward viewer assembly until mounting studs (3) on support arm engage holes (2) in panel end.
- (b) Line up holes and screw in knob (6).
- (c) Connect P1 (5).
- (d) Connect auxiliary power connector (3, fig. 2-1).
- (e) Connect cable assembly and close latches on I/O connectors (4, fig. 2-6).
- (f) Connect power plug to wall outlet.

c. Loading Projector. The projection disk is loaded when equipment is installed. It is not normally removed. If it is necessary to install a projection disk, refer to figure 2-7 and proceed as follows:

CAUTION

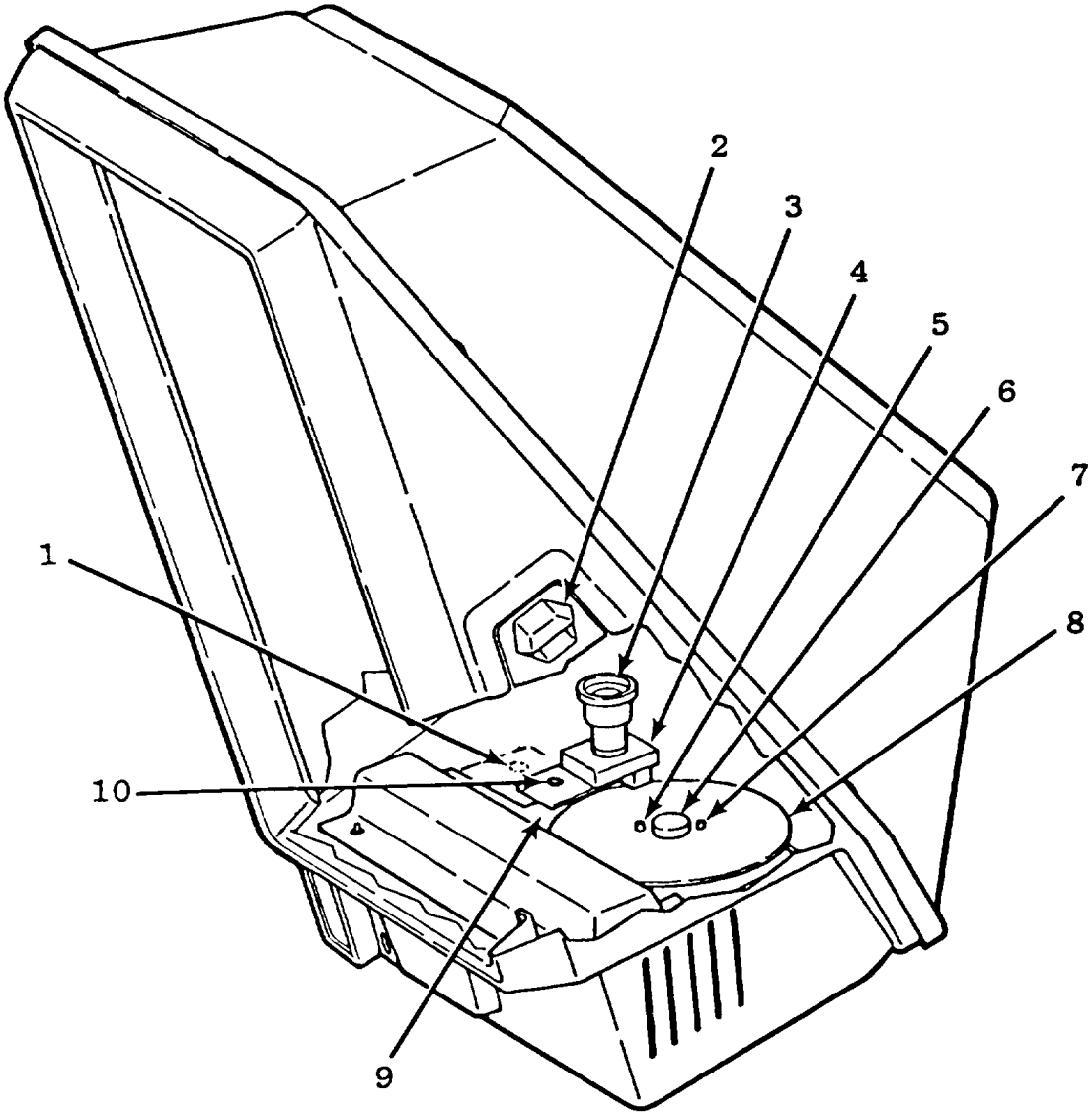
Do not touch mirror with fingers or abrasive materials. It is very susceptible to scratching and fingerprinting. Oils and acids on fingers can cause discoloration of mirror coating.

- (1) Open projector compartment access door (2).
- (2) Press (release) lens mount retaining lock (10).
- (3) Raise lens mount (4).



- 1. Display panel
- 2. Mounting holes
- 3. Mounting studs
- 4. I/O connectors J1 through J9 (connector mast)
- 5. P1
- 6. Mounting knob

Figure 2-6. Display Panel Removal Diagram



- 1. Red lamp switch (hidden)
- 2. Access door
- 3. Lens
- 4. Lens mount
- 5. Large pin
- 6. Projector spindle
- 7. Small pin
- 8. Projection disk
- 9. Projector
- 10. Lens mount retaining lock

Figure 2-7. Projection Disk Installation Diagram

- (4) Install projection disk.
 - (a) Remove disk from envelope.
 - (b) Place disk (8) on projector spindle (6) with label up.
 - (c) Aline small and large holes in disk with small (7) and large (5) locating pins on projector (9).
 - (d) Lower lens mount (4).

(e) Press (lock) lens mount retaining lock (10).

(5) Close projector compartment access door (2).

d. Unloading Projector.

(1) Open projector compartment access door (2).

(2) Press (release) lens mount retaining lock (10).

(3) Raise lens mount (4).

(4) Remove disk (8) from projector.

(5) Close projector compartment access door (2).

e. Loading Flexible Diskette. The diskette drive units are in the left side of the electronics cabinet. The training diskette goes in the upper unit. To install diskettes, see figure 2-8 and proceed as follows:

CAUTION

Do not use a writing device that deposits flakes (e.g., lead or grease pencil) to write on diskette jacket label. Keep inner envelope on diskette even when in drive unit. Do not fasten paper clips to diskette jacket edges.

Do not touch diskette surface exposed by jacket slot.

Do not clean diskette in any manner.

Keep diskette away from magnetic fields and materials that may be magnetized.

Protect diskette from liquids, dust, and metallic substances at all times. Bottoms of two cabinet doors are equipped with magnetic latches. Do not allow diskette to touch these latches.

(1) Set control console OFF ON switch (1, fig. 2-1) to ON.

(2) Open diskette drive access door (6, fig. 2-8).

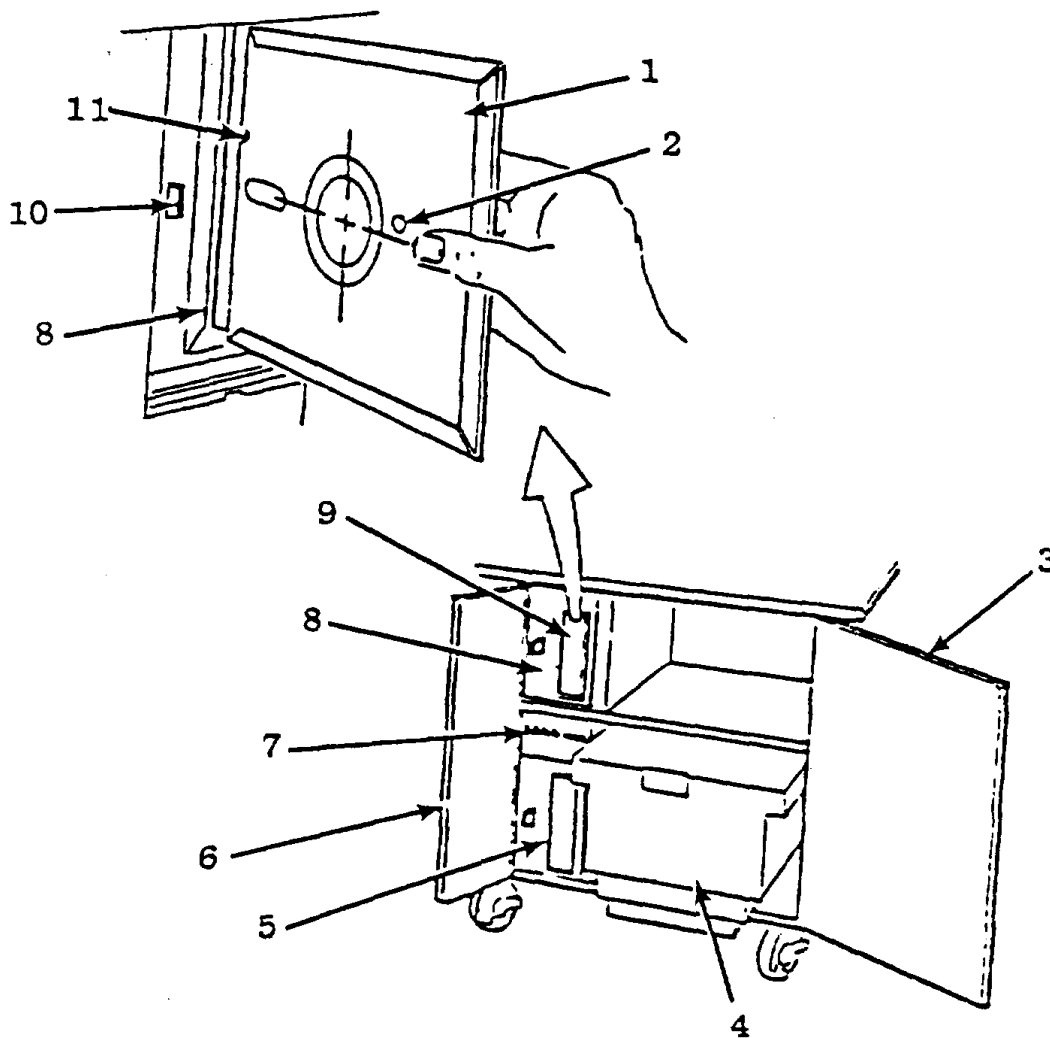
(3) Press latch (10) on upper diskette drive (8) to left; diskette drive unit door (9) pops open.

(4) Correctly orient diskette (1). Insert diskette as follows:

(a) Remove diskette from protective envelope.

(b) Note that diskette (1) is oriented so jacket slot (11) goes in first and reference aperture (2) is above an imaginary center line. The computer cannot read from disk if reference aperture is down.

(c) Insert diskette all the way into upper diskette drive (8).



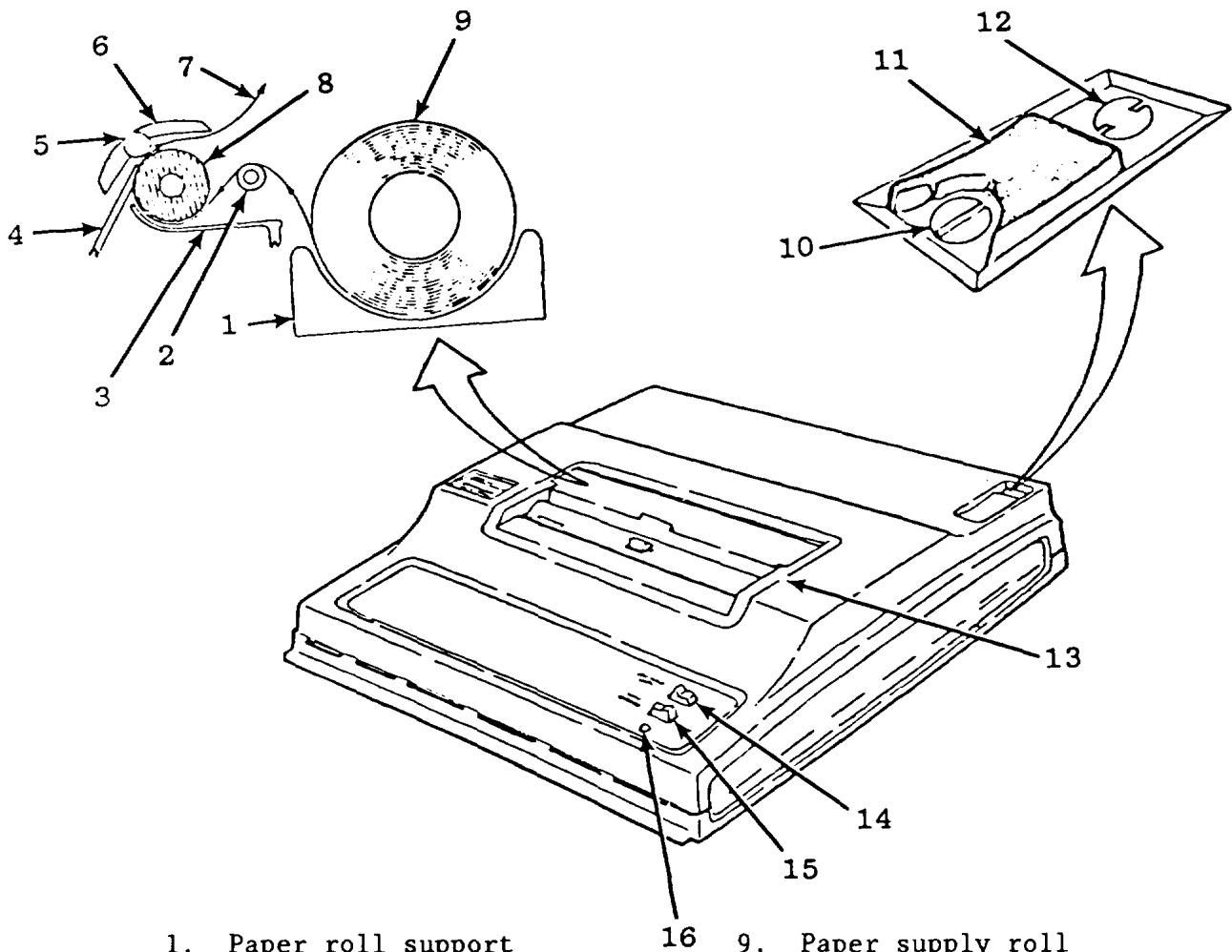
- | | |
|---|-------------------------------|
| 1. Flexible diskette | 6. Diskette drive access door |
| 2. Reference aperture | 7. Circuit breaker panel |
| 3. Electronics access door | 8. Diskette drive No. 1 |
| 4. Card cage and computer power supply assembly | 9. Diskette drive unit door |
| 5. Diskette drive No. 2 | 10. Door release latch |
| | 11. Diskette jacket slot |

Figure 2-8. Diskette Drive Units and Flexible Diskette Installation

(d) Close diskette drive unit door (9).

f. Unloading Flexible Diskette.

- (1) Open diskette drive access door (6, fig. 2-8).
- (2) Press latch (10) on upper diskette drive (8) to left; diskette drive unit door (9) pops open.
- (3) Grasp edge of diskette and pull straight out.
- (4) Replace diskette in protective envelope.



- | | |
|-----------------------|---------------------------|
| 1. Paper roll support | 9. Paper supply roll |
| 2. Dancing roller | 10. On symbol |
| 3. Paper chute | 11. Slide switch (on/off) |
| 4. Printhead | 12. Off symbol |
| 5. Pinch roller | 13. Paper door |
| 6. Window | 14. PAPER ADV switch |
| 7. Paper | 15. LOW SPEED switch |
| 8. Platen | 16. Power indicator |

Figure 2-9. Loading Paper in Printer

g. If printer needs paper, load paper as follows:

- (1) Set printer on off slide switch to on (11, fig. 2-9).
- (2) Lift paper door (13).
- (3) If a usable amount of paper remains on paper supply roll, grasp used roll (9) and lift it from paper compartment. Tear paper halfway between roll and dancing roller (2), then remove roll. If no paper remains, simply remove empty core.
- (4) Press and hold PAPER ADV switch (14) so that any remaining paper is ejected from paper chute.

NOTE

Printhead should be cleaned each time paper is changed.

- (5) Using denatured alcohol (1, table 3-2), wet a 2-inch wide strip across a sheet of bond paper (6, table 3-2).
- (6) Feed paper over dancing roller (2, fig. 2-9) and down through paper chute (3) until it appears behind window (6). Paper does not slide behind printhead (4) because printhead is pressed against platen (8).
- (7) Print five lines on bond paper across 2-inch strip dampened with alcohol. Then advance paper to a dry area and print two more lines.

NOTE

Printhead will not print visible image on bond paper.

- (8) Press and hold PAPER ADV switch (14) until bond paper is ejected from paper chute.

CAUTION

To prevent damage to thermal printhead, use thermographic printing paper.

- (9) Grasp new paper roll so that loose end of paper is toward you with end pointing up.
- (10) Place paper roll (7, table 3-2) on paper roll support (1, fig. 2-9), checking that roll can rotate freely.
- (11) Grasp both corners of loose end of paper and gently pull up about 6 inches.
- (12) Insert paper in same manner as described for bond paper in (para (6) above).

CAUTION

When holding PAPER ADV switch, do not let end of paper feed around and back under platen.

- (13) Press and hold PAPER ADV switch (14) until paper feeds behind printhead (4) and then under window (6).

NOTE

If paper does not feed freely, gently push paper down paper chute (3) and simultaneously press and hold PAPER ADV switch (14).

- (14) Tear off excess paper by pulling forward over tear-off edge of window.

2-3. Warmup.

- a. Power-on indicator (15, fig. 2-1) lights, center window (3) counts up from 0 through F and CRT shows PASS. After 15 seconds, if DE01 displays in ELAPSED TIME window (3), diskette drive door is not closed. Shut off power, be sure door is closed and turn on power. If diskette drive door will not remain closed, notify organizational maintenance.

NOTE

If CRT comes up blank or with FAIL indication, turn control console OFF for 30 seconds, then turn ON. Repeat, if necessary. If problem still exists, notify organizational maintenance.

- b. If a loading error is present, two codes, that do not match, will appear within 15 seconds in the ELAPSED TIME window (3) and the corrective ACTION window (5). Try another diskette. If diskette being used is not the correct one, an INCORRECT FLEXIBLE DISKETTE slide will appear within 30 seconds. At the same time, the following characters will appear on the control console: BADD 1D00 0000. Change the diskette.
 - c. When program has loaded, SYSTEM OPERATING indicator (10) flashes, FAULT GROUP (4) and FAULT NO. (5) display 01, FREEZE indicator (11) lights, PERFORM OPERATIONAL CHECK flashes on display panel, and DEMONSTRATION MODE displays on CRT. If DE and a number display in ELAPSED TIME window (3), or if CRT displays an error message, try another diskette. If program still will not load, notify organizational maintenance.
- 2-4. Operational Checkout. This daily readiness check takes less than five minutes to complete. If trainer fails to respond as described below and the problem can not be corrected, notify organizational maintenance.

- a. Insert diskette into flexible diskette drives and energize trainer in accordance with procedures of paragraphs 2-2a and 2-3 a thru c.
- b. Press control console SELF-TEST key (9, fig. 2-1). Projector displays title slide (2, table 2-6) and closed simulated circuit breakers deenergize.
- c. Press SELF-TEST key again. Trainer responds as follows:
 - (1) Projector displays TESTING ALL INDICATORS/FOCUS slide. If slide is not in focus, open access door (5, fig. 1-1) and rotate lens (2, fig. 2-4).
 - (2) All display panel lamps light and displays show test patterns.
- d. Press PERFORM OPERATIONAL CHECK on display panel. Trainer daily readiness check is complete. System is in normal condition.

Table 2-6. Slides

Number	¹ Type	² Callup	Description/Title
1	W	A	INCORRECT FLEXIBLE DISKETTE
2	P/W	A	M1 tank, with caption: M1 TURRET ELECTRICAL AND HYDRAULIC TROUBLESHOOTING TRAINER
3	W	A	TESTING ALL INDICATORS
4	W	O	SYSTEM NORMAL
5	W	O	MAINTENANCE INCOMPLETE
6	W	A	<u>WARNING: DANGEROUS ACTION</u> (red)
7	W	A	THIS FUNCTION NOT SIMULATED
8	W	A	ASSUME CONNECTORS ARE TIGHT
9	W	A	ASSUME NO DAMAGE
10	W	A	ASSUME SETCOM INSTRUCTION HAS BEEN COMPLETED
11	W	A	DISCONNECT CONNECTOR
12	W	A	RANGE CHANGES AT 50M/SEC
13	W	A	RANGE CHANGES AT 500M/SEC
14	W	A	FILTER IN FIELD OF VIEW
15	P	I	Hull networks box showing TJ1
16			Not used
17	P	I	Traverse servo
18	P	I	Elevation servo
19	P	I	Main accumulator
20	P	I	Loader's panel
21			Not used
22	P	I	Gun trunnion resolver
23	P	I	Hydraulic power distribution valve

^{1, 2} See notes at end of table.

Table 2-6. Slides-Continued

Number	¹ Type	² Callup	Description/Title
24	P	I	Gun turret drive electronics unit
25	P	I	Gun turret drive electronics unit showing circuit cards A1 through A3
26	P	I	Line-of-sight electronics unit
27	P	I	Line-of-sight electronics unit showing circuit cards A1 through A9
28	P	I	CWS power control unit
29	P	I	CWS power control unit showing transistors and power supply
30	P	I	Turret networks box
31	P	I	Turret networks box showing circuit cards A1 through A9
32	P	I	Turret networks box showing relays
33	P	I	Turret networks box showing thyristor Q1
34	P	I	Turret vent blower
35	P	I	Commander's control panel
36	P	I	CWS azimuth drive assembly
37	P	I	CWS power control handle
38	P	I	Gunner's power control handles
39	P	I	Gunner's primary sight
40	P	I	Commander's control assembly
41	P	I	Commander's NBC heater
42	P	I	CWS azimuth drive motor/brake
43	P	I	Main gun safety switch
44	P	I	Firing circuit tester
45	P	I	Loader's knee switch

^{1,2} See notes at end of table.

Table 2-6. Slides-Continued

Number	¹ Type	² Callup	Description/Title
46 47 thru 150	P	I	Coax solenoid Not used

¹Type: P - picture; P/W - picture with caption; W - word message.

²Callup: A - automatic; I - INSPECT MS; O - PERFORM OPERATIONAL CHECK MS.

Section III. OPERATION OF THE TRAINING DEVICE

2-5. Pre-operational Procedures. Before actual operation begins, the instructor and/or the student must be familiar with the operation of the trainer. This includes the location and function of all controls and indicators on the display panel. Simulated components should be compared with their counterparts on the actual turret.

2-6. Operational Procedures. The instructor controls and monitors the operation of the trainer using the pushbuttons and displays on the control console (fig. 2-1) and the CRT keyboard (fig. 2-3). The student (or the instructor) troubleshoots the display panel using the panel controls and indicators and M1 troubleshooting procedures. The trainer operates in three modes: (F1) demonstration mode, (F2) practice mode, and (F3) test mode. Trainer modes are selected on the CRT keyboard (fig. 2-3) by the instructor. Press NEW LINE. Enter an instructor-privileged code (IPC); then press the desired mode key (F1, F2, and F3). (Demonstration mode is assumed automatically on completion of program load/readiness checks and can be reentered as required.) In any mode of operation, the trainer can operate in a normal condition or can simulate any one of 63 malfunctions. Only one malfunction will be simulated at a time.

NOTE

To operate CRT keys, always press NEW LINE before keying the instructor-privileged code (IPC). The IPC must be keyed before each entry. When the trainer is first activated, ECC is used as the IPC. To change the IPC, see paragraph 2-6a(4).

a. Demonstration Mode. In the demonstration mode, the freeze condition is used to preset the trainer. During presetting, the control console (fig. 2-2) is used to store selected malfunctions as faults arranged into fault groups. The arrangement of malfunctions as faults and fault groups is determined by the instructor. These groups of faults will be presented to the student in the preset order each time a fault group is selected. The demonstration mode is also used, in the unfrozen condition, to demonstrate the trainer to a student or class. Table 2-7 gives step-by-step procedures.

Table 2-7. Procedures for Each Operational Mode

Step	Instructor (I) or Student (S)	Procedure	Expected Response
<p>NOTE</p> <p>Always press NEW LINE before making a line entry.</p> <p>I. <u>Demonstration Mode.</u> <u>Part A. Fault Insertion</u></p> <p>NOTE</p> <p>When diskette is first loaded, trainer activates in demonstration mode-freeze condition and steps 1 and 2 below may be omitted.</p>			
1	I	Key in instructor-privileged code (IPC); then press demonstration mode key F1 (1, fig. 2-3) on CRT keyboard.	DEMONSTRATION MODE displays on CRT screen.
2	I	Key in instructor-privileged code (IPC); then press go/freeze key F4 (4, fig. 2-3) on CRT keyboard.	FREEZE indicator (11, fig. 2-1) lights and 01 displays in FAULT GROUP window (4) and FAULT NO. window (5).
3	I	Press FAULT GROUP ADVANCE key (7, fig. 2-1) to select a fault group.	Number advances in FAULT GROUP window (4). FAULT NO. window resets to 01.
*4	I	Press FAULT INDEX ADVANCE CE key (6) to select a number.	Number advances in FAULT NO. display (5).
5	I	Select a malfunction from appendix B and press keys corresponding to malfunction number (17).	Number appears in EN (enter) window (2).
6	I	Press EN (14).	Malfunction is stored in fault group and fault number selected in steps 3 and 4.
<p>* When FAULT NO. is advanced, the associated malfunction will display in EN window and the time standard will display, if these have been previously entered.</p>			

Table 2-7. Procedures for Each Operational Mode-Continued

Step	Instructor (I) or Student (S)	Procedure	Expected Response
7	I	I. <u>Demonstration Mode-Continued</u> Key in (17), in minutes and tenths, the time standard for fault. Then, press TIME STD key (8).	Number appears in TIME STD window (3).
8	I	Repeat steps 4 through 7 to insert another malfunction and time standard in the same fault group.	Same as 4 through 7 above.
9	I	Repeat steps 3 through 8 to insert malfunctions in other fault groups.	Same as 3 through 8 above.
10	I	Key in IPC, then key in new IPC F8 (8, fig. 2-3).	CRT screen will now operate only with new IPC.
11	I	Key in IPC, then advance to step 12, demonstration mode, or step 17, practice mode, or step 24, test mode (1, 2, and 3, fig. 2-3).	CRT and master control console indicate mode.
12	I	<p style="text-align: center;"><u>Part B. Demonstration</u></p> Press PERFORM OPERATIONAL-CHECK pushbutton switch on display panel.	System exhibits malfunction symptoms in accordance with first fault of FAULT GROUP. ELAPSED TIME display (3, fig. 2-1) starts. FREEZE indicator (11) goes out. ELAPSED TIME (3), NO TESTS (4), and CORRECTIVE ACTION (5) display information.

Table 2-7. Procedures for Each Operational Mode-Continued

Step	Instructor (I) or Student (S)	Procedure	Expected Response
		<p>I. <u>Demonstration Mode-Continued</u></p> <p style="text-align: center;">NOTE</p> <p>Before performing step 13, make sure each display panel switch listed in table 2-5 is in its normal pre-operational condition.</p>	
13	I	<p>Demonstrate performing operational checks (TM 9-2350-255-10-2) and troubleshooting (TM 9-2350-255-20-2-2) simulation. (Instructor may proceed at his own pace without concern for computer monitoring or overtime penalties).</p>	<p>When malfunction is cleared by appropriate action, system operates normally and ELAPSED TIME (3) stops.</p>
14		<p>Use FAULT controls on display panel to reset fault or advance to next fault.</p>	<p>Simulated fault resets or advances.</p>
15	I	<p>To advance to another fault group, key in IPC, press go/freeze key F4 (4, fig. 2-3), and then press FAULT GROUP ADVANCE key (7, fig. 2-1).</p>	<p>Number advances in FAULT GROUP window (4, fig. 2-1). FAULT NO. resets to 01.</p>
16		<p>Repeat steps 12 through 14 above.</p>	<p>Same as steps 12 through 14 above.</p>
17	I	<p>II. <u>Practice Mode.</u></p> <p>Key in IPC; then press practice mode key (2, fig. 2-3).</p>	<p>PRACTICE MODE displays on CRT screen.</p>
*18	I	<p>Key in student ID number and IPC; then press identification key F5 (5, fig. 2-3).</p>	

*Can be done in demo mode during preset procedures.

Table 2-7. Procedures for Each Operational Mode-Continued

Step	Instructor (I) or Student (S)	Procedure	Expected Response
19	S	<p>II. <u>Practice Mode-Continued</u></p> <p>Press PERFORM OPERATIONAL CHECK pushbutton switch on display panel.</p> <p style="text-align: center;">NOTE</p> <p>Before performing step 20, make sure each display panel switch listed in table 2-5 is in its normal pre-operational condition.</p>	<p>System exhibits malfunction symptoms in accordance with FAULT GROUP and FAULT NO. last displayed in freeze condition. ELAPSED TIME display (3, fig. 2-1) starts. FREEZE indicator (11) goes out. Control console displays ELAPSED TIME (3), NO TESTS (4), and CORRECTIVE-ACTION (5).</p>
20	S	<p>Perform operational check using TM 9-2350-255-10-2 and trouble-shoot simulation using TM 9-2350-255-20-2-2 series.</p>	<p>When malfunction is cleared, system operates normally and ELAPSED TIME (3) stops.</p>
21	S	<p>Use FAULT controls on display panel to reset fault or advance to next fault.</p>	<p>Fault resets or next fault is simulated.</p>
22	I	<p>Key in IPC and press record F6 or record F7 key (6 or 7, fig. 2-3).</p>	<p>CRT (record F6) or printer (record F7) displays student identification code and attempted faults. For each fault, the elapsed time, whether or not the procedure was completed, and any procedural errors display (fig. 2-10).</p>
23	I	<p>To select another fault group, key in IPC, press go/freeze key F4 (4, fig. 2-3), and press FAULT GROUP ADVANCE key (7, fig. 2-1).</p>	<p>Number advances in FAULT GROUP window (4, fig. 2-1). FAULT NO. (5) resets to 01.</p>

Table 2-7. Procedures for Each Operational Mode-Continued

Step	Instructor (I) or Student (S)	Procedure	Expected Response
30	I	I. <u>Test Mode-Continued</u> To select another fault group, key in IPC, press go/freeze key F4 (4, fig. 2-3), and press FAULT GROUP ADVANCE key (7, fig. 2-1).	Number advances in FAULT GROUP window (4, fig. 2-1). FAULT NO. (5) resets to 01.

(1) Trainer Presetting. The trainer must be in the demonstration mode freeze condition (demo-freeze) to make initial presets and to examine or change presets. The trainer comes up in demo-freeze when it is initially activated. It may be placed in the freeze condition at any time by first entering the instructor-privileged code, then, pressing the go/freeze key F4 (4, fig. 2-3). In demo-freeze, the instructor may select up to 20 malfunctions, and place them in up to four fault groups, set time standards for each malfunction and change the instructor-privileged code.

(a) Fault group selection. When demo-freeze is first entered, 01 will display in the FAULT GROUP window (4, fig. 2-1) of the control console. Each time FAULT GROUP ADVANCE (7) is pressed, the FAULT GROUP display will advance one number until 04 is reached. The next press will cause 01 to display again. Successive pressing of this key will cause the display to cycle 01 through 04.

(b) Fault Selection. When demo-freeze is first entered (initial activation), 01 will display in FAULT NO. window (5). Any other time demo-freeze is entered, the fault number that is presently being simulated will be shown. Each time FAULT INDEX ADVANCE (6) is pressed, the FAULT NO display will advance one number. Successive pressing of this key will cause the display to cycle 01 through 05.

(2) Malfunction Selection. When a fault group and fault number have been selected (para (a) and (b) above), one of the malfunctions listed by number in table B may be entered in that fault group and fault number. The malfunction may be selected and inserted in any order. A malfunction may be repeated within the same group or in another group. To enter a malfunction in the fault group and fault number being displayed, press the keys corresponding to the malfunction number. The number will display in the EN window (2, fig. 2-1). Then, press EN (14) and the malfunction will be stored in that fault group and fault number. Any time the displays are returned to that FAULT GROUP and FAULT NO. the same malfunction number will display in the EN window. Any time the display panel is active (unfrozen) and this particular fault group and fault number are operating, the trainer will exhibit the symptom associated with this malfunction.

(3) **Time Standard Selection.** To set a time standard for the fault group and the fault number displayed, press the time desired in minutes and tenths. The selected number will appear in the EN window (2) in place of the malfunction number. Then, press TIME STD (8). The number will move to the TIME STD window (3) and the malfunction number will reappear in the EN window. Now anytime that fault number is displayed, the time standard selected will display in the TIME STD window.

NOTE

Remember to press NEW LINE before each entry.

(4) **Changing Instructor-Privileged Code (IPC).** When the trainer is initially activated, the IPC is ECC. This IPC may be changed so that the instructor using the trainer may have his own individual IPC. Once the instructor has changed the IPC no operation may be performed on the CRT terminal (fig. 2-3) unless this individual IPC is first entered. To change the IPC, key in new 3 character IPC; key in old IPC; then, press F8(8).

b. **Practice Mode.** The practice mode may be entered after desired malfunctions are inserted as described in the demonstration mode (para a above). In the practice mode, the student may troubleshoot any fault group selected in demo-freeze, but faults and time standards may not be changed. To select another fault group, the trainer must be returned to demo-freeze. At any time, the student may reset the current fault or advance to the next fault within the fault group by pressing RESET (1V, fig. FO-1) or ADVANCE (2V). The student's performance is monitored during troubleshooting and the student is guided by CRT and viewer displays to help him learn as he proceeds in a self-paced exercise. Table 2-7 gives step-by-step procedures. A student performance printout (fig. 2-10) may be obtained at any point. The printout supplies the student's assigned ID code, current malfunction, elapsed time since the student began troubleshooting the malfunction, whether or not the entire troubleshooting procedure was completed, and the procedural step number at which an error was committed. Table 2-8 lists each procedural step number with the control which is to be manipulated. The step number corresponding to the correct control will print out under ERRORS (fig. 2-10), if the student has performed an action other than the required action at any point in the procedures.

c. **Test Mode.** The test mode is similar to the practice mode described in paragraph b above. Two distinct differences exist, however.

(1) In this mode, no feedback to assist the student is provided by the CRT or viewer except displays of components that are part of the M1 subsystem simulation. The student must progress on the basis of subsystem performance alone.

(2) The student may advance to the next fault at any time but is not able to reset the current fault. For step-by-step procedures, see table 2-7.

d. **Freezing the Trainer.** The instructor may freeze the trainer at any point. All counters stop and actions taken on the control console or display panel have no effect. The instructor then may demonstrate procedures or take any other action without invalidating the student's performance to that point.

2-7. Post-operational Procedures. Set the control console switch OFF.

NOTE

Allow 30 seconds after turning power OFF before reapplying power.

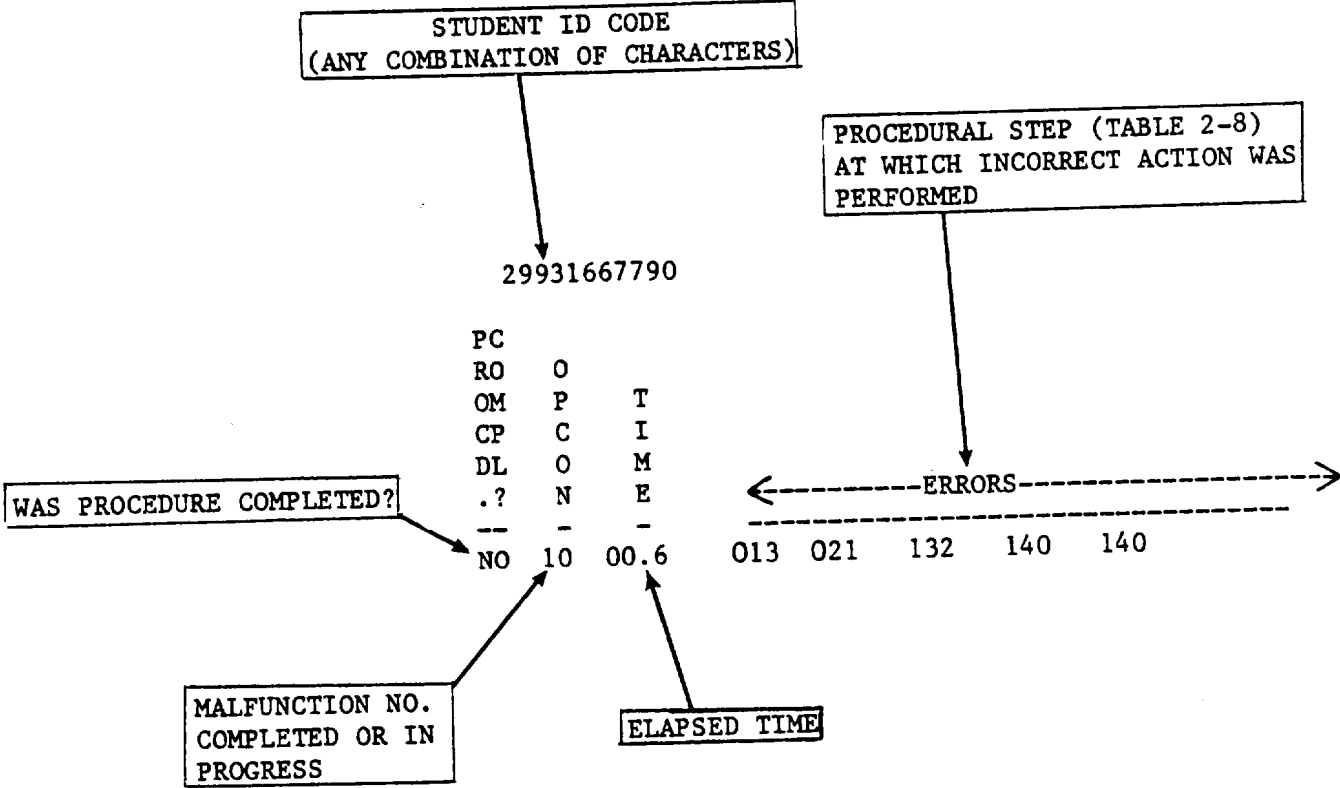


Figure 2-10. Student Record

Table 2-8. Procedural Steps and Associated Controls

Step No.	*Control	Step No.	*Control
1	NOT USED	47	TNB CB16
2	VEHICLE MASTER POWER ON	48	TNB CB21
3	VEHICLE MASTER POWER OFF	49	TNB CB5
4	TURRET POWER ON	50	RUN ENGINE
5	TURRET POWER OFF	51	MASTER POWER ON EQUATION
6	ADD/DROP SWITCH, ADD	52	NOT USED
7	ADD/DROP SWITCH, DROP	53	NOT USED
8	AUX HYDR, POWER ON	54	DUMMY VARIABLE DO NOT REMOVE
9	AUX HYDR, POWER OFF	55	SETCOM RETEST
10	FIRE CONTROL EMERG	56	SETCOM 1
11	FIRE CONTROL MANUAL	57	SETCOM 2
12	CWS THUMB SWITCH LEFT	58	SETCOM 3
13	CWS THUMB SWITCH RIGHT	59	SETCOM CAL
14	GUN SELECT MAIN	60	SETCOM 4
15	GUN SELECT COAX	61	SETCOM 5
16	CIB ON/OFF	62	SETCOM 6
17	DSESTS POWER SWITCH	63	SETCOM SINGLE SHOT
18	TNB CB29	64	SETCOM 7
19	TNB CB30	65	SETCOM 8
20	TNB CB32	66	SETCOM 9
21	UTILITY OUTLET SWITCH	67	SETCOM YES
22	NOT USED	68	SETCOM 0
23	TNB CB25	69	SETCOM NO
24	TNB CB14	70	SETCOM GO
25	TNB CB15	71	SETCOM CLEAR
26	TNB CB17	72	SETCOM STOP
27	TNB CB18	73	NOT USED
28	TNB CB20	74	NOT USED
29	TNB CB26	75	VTM TEST SWITCH
30	TNB CB27	76	MANUAL RANGE BATTLE SGT
31	TNB CB22	77	NOT USED
32	TNB CB28	78	NOT USED
33	GTD SWITCH EL UNCPL	79	NOT USED
34	GTD SWITCH MANUAL	80	NOT USED
35	TNB CB9	81	DSESTS YES
36	TNB CB10	82	DSESTS NO
37	TNB CB11	83	DSESTS STOP
38	TNB CB12	84	NOT USED
39	TNB CB2	85	NOT USED
40	TNB CB3	86	NOT USED
41	TNB CB4	87	NOT USED
42	TNB CB6	88	NOT USED
43	TURRET VENT BLOWER ON	89	NOT USED
44	TNB CB31	90	NOT USED
45	TNB CB19	91	NOT USED
46	TNB CB13	92	NOT USED

*See list of symbols and abbreviations at end of table.

Table 2-8. Procedural Steps and Associated Controls-Continued

Step No.	*Control	Step No.	*Control
93	RDY/SAFE SW RDY, SALVO 1 PRSD	139	LOS A1
94	RDY/SAFE SW RDY, SALVO 2 PRSD	140	TNB
95	TNB LAMP RESET (S1)	141	LOS A3
96	CB31 AND CB32 OFF	142	LOS A8
97	GUNNER'S RIGHT PALM	143	TNB AI
98	GUNNER'S RIGHT PALM AND TRIGGER	144	TNB A3
99	GUNNER'S RIGHT PALM AND RANGE	145	TNB A4
100	GUNNER'S LEFT PALM	146	TNB K1
101	GUNNER'S LEFT PALM AND TRIGGER	147	TNB K2
102	GUNNER'S LEFT PALM AND RANGE	148	TNB K3
103	CWS PALM	149	TNB K4
104	CWS PALM AND TRIGGER	150	TNB K5
105	CWS PALM AND RANGE	151	TNB K7
106	GUNNER'S LEFT OR RIGHT PALM SW	152	TNB K11
107	NOT USED	153	TNB Q1
108	NOT USED	154	TNB CB13
109	NOT USED	155	TNB CB19
110	MANUAL/POWER IN POWER	156	TNB CB30
111	AMMO SELECT SABOT	157	TNB A2
112	AMMO SELECT HEP	158	LOS A4
113	AMMO SELECT BH	159	LOS A5
114	FILTER SELECT CLEAR	160	LOS A6
115	FILTER SELECT SHUTTER	161	LOS A7
116	FILTER SELECT FILTER	162	LOS A9
117	TNB J8	163	LOS A2
118	TCP J1	164	PCU Q1
119	TNB J5	165	PCU Q2
120	TNB J2	166	PCU Q3
121	CWS GEARBOX SWITCH	167	PCU Q4
122	1W105-J3	168	TNB K8
123	TNB J10	169	TNB K6
124	1W105-P3	170	TNB K10
125	GUN/TURRET DRIVE ELECTS UNIT	171	TNB K13
126	LINE OF SIGHT ELECTS UNIT	172	TNB K9
127	TURRET NETWORKS BOX	173	CONNECT CX603
128	CWS POWER CONTROL UNIT	174	ENGAGE EL TRAVEL LOCK
129	TCP	175	DSESTS APPLY POWER
130	S2 ON TCP	176	CON/DIS GROUNDS CLIP
131	S3 ON TCP	177	CON/DIS LOS-W7
132	S9 ON TCP	178	CON/DIS GTD-W4
133	CWS POWER CONTROL UNIT	179	CON/DIS CWS-W3
134	CWS PCU A1	180	CON/DIS TNB-W2
135	CWS PCU AR1	181	CONNECT TO CA1
136	GTD A1	182	CON TO TNB UTILITY OUTLET
137	GTD A2	183	CONNECT W1
138	GTD A3	184	ARM MAIN GUN

*See list of symbols and abbreviations at end of table.

Table 2-8. Procedural Steps and Associated Controls-Continued

Step No.	*Control	Step No.	*Control
185	ENGAGE TURRET AZ LOCK	222	CX304≡DBA CX206≡CA423, CA425≡
186	INSTALL FIRING CIRCUIT TESTER		TNB-J10
187	ONE SET OF MONITORED TST POINTS	223	NOT USED
188	NOT USED	224	CX304≡DBA CX206-P3, DBA CX206-P1≡
189	NOT USED		≡CA529, DBA CX206-P2≡CA530,
190	NOT USED		CA529≡TNB-J8, CA530≡1W102-P1
191	MANUAL EL CRANK PALM SWITCH	225	CIB-J2≡CX301≡TNB-TJ2
192	MANUAL AZ CRANK PALM SWITCH	226	CX305-DBA206≡CA504
193	BLASTING MACHINE	227	CX305EDBA206≡CA504, CA504≡
194	TIME DELAY VARIABLE 1W200-PI (TNB-J5)		1W200-P1 (TNB-J5)
195	DSESTS YES OR NO	228	NOT USED
196	ALL CB ON	229	NOT USED
197	ALL CB OFF	230	CIB-J1CX205, CIB-J2≡CX205,
			CIB-J3-CX205, CX205ETNB-TJ1 or
198	CB13 AND 26 ON		CX205≡TNB-TJ2 or CX205≡GPS or
199	MANUAL/POWER IN MANUAL		CX205≡LOS or CX205≡GTD
200	VTM TEST 66	231	CX305≡CIB-J2, TA301≡CX305
201	VTM TEST 99	232	BOB CABLE #1≡ADAPTER #1≡TNB-TJ1
202	VTM TEST 00	233	BOB CABLE #1≡ADAPTER #1≡CWS PCU-TJ1
203	CIB-J1CX305≡CA302≡TNB-TJ1	234	CNBB03 BOB CABLE #1≡ADAPTER #1≡
204	CIB-J2-CX304≡CA301≡TNB-TJ1		TNB-TJ2
205	CIB-J1CX304≡DBA206≡CA530≡	235	DISCONNECT TNB J11
	1W102-P1	236	MALF 01 NO GO
206	CIB-J2≡CX305≡DBA206≡CA421-	237	MALF 01 GO
	1W102-P2	238	MALF 04 NO GO
207	CX304≡CA301↔HNB-TJ1, CX304-	239	MALF 04 GO
	DBA CX206-P3, DBA CX206-P1≡	240	MALF 11 NO GO
	CA529-P2, DBA CX206-P2≡	241	MALF 11 GO
	CA530-P2, CA529-P1≡TNB-J8,	242	MALF 29 NO GO
	CA530-P1≡1W102-P1	243	MALF 29 GO
208	NOT USED	244	MALF 31 NO GO
209	CIB-J1≡CX206-P3≡CA530≡W102-P1	245	MALF 31 GO
210	NOT USED	246	MALF 33 NO GO
211	CIB-J2≡CX206≡CA421≡1W102-P2	247	MALF 33 GO
212	CX304≡CIB-J1, TA301≡CX304,	248	MALF 41 NO GO
	CIB-J1≡CX304≡CA301≡HNB-TJ1	249	MALF 41 GO
213	CIB-J2≡CX305≡CA302≡TNB-TJ1	250	MALF 47 NO GO
214	CIB-J2≡CX304ECA306≡CWS PCU-TJ1	251	MALF 47 GO
215	NOT USED	252	MALF 49 NO GO
216	CX304≡DBA CX206-P3, CA425≡	253	MALF 49 GO
	DBA CX206-P1, CA425rTNB-J10	254	MALF 51 NO GO
217	NOT USED	255	MALF 51 GO
218	CX305≡DBA CX206≡CA426≡1W105-P1	256	DISCONNECT TNB J9
219	NOT USED	257	GND CLIP OR CABLE
220	CX304≡DBA CX206≡CA423≡1W105-P3	258	LOS W-7 CABLE
221	NOT USED	259	GTD W-4 CABLE

*See list of symbols and abbreviations at end of table.

Table 2-8. Procedural Steps and Associated Controls-Continued

Step No.	*Control	Step No.	*Control
260	CWS W-3 CABLE		
261	TNB W-2 CABLE		

*List of symbols and abbreviations:

AZ - Azimuth
 BH - Bee Hive
 BOB - Breakout Box
 CAL - Calibrate
 CB - Circuit Breaker
 CIB - Controllable Interface Box
 CWS - Commander's Weapon Station
 DBA - Diagnostic Breakout Assembly
 EL - Elevation
 GPS - Gunner's Primary Sight
 GTD - Gun Turret Drive
 HEP - High Explosive Plastic
 HNB - Hull Networks Box
 LGCH - Left Gunner's Control Handle
 LOS - Line of Sight
 MAN - Manual
 PCU - Power Control Unit
 RGCH - Right Gunner's Control Handle
 TCP - Commander's Control Panel
 TNB - Turret Networks Box
 VTM - Vehicle Test Meter
 ≡ - Connected
 ↔ - Disconnected

2-59/(2-60 blank)

CHAPTER 3

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

3-1. Preventive Maintenance Checks and Services. Preventive maintenance is the systematic care, inspection, and service of equipment to maintain it in a serviceable condition and to detect faults and failures before extensive and time-consuming repair or replacement is required. See TM 38-750 for complete information on forms and procedures for preventive maintenance services. Operator/crew maintenance services are defined by, and restricted to, the following general procedures unless approval to perform additional services has been given by the supporting maintenance organization.

- (1) Cleaning. Clean to remove old lubricant, dirt, and other foreign matter.
- (2) Inspecting. Inspect for loose, missing, or broken components.

3-2. PMCS Table. The PMCS chart (table 3-1) outlines functions to be performed at specific intervals. These checks and services are used to maintain the equipment in good operating condition. If defects cannot be remedied by performing the corrective action indicated, notify organizational maintenance. Records and reports of these checks and services must be made according to TM 38-750.

3-3. Man-hours. Figures shown in the "Work time (M/H)" column are averages for procedures listed. Individual times may vary from these figures depending on conditions and discrepancies found.

3-4. Expendable/Durable Supplies and Materials. Table 3-2 lists expendable/durable supplies and materials used in the maintenance of the trainer.

Table 3-1. Preventive Maintenance Checks and Services

D-Daily

W-Weekly

M-Monthly

Interval and Sequence no.			Item to be Inspected Procedure	Work Time (M/H)
D	W	M		
1			<p>SYSTEM OPERATION</p> <p>Perform daily operational checkout in accordance with chapter 2, para 2-4.</p>	0.3
	1		<p>GENERAL CLEANLINESS OF EQUIPMENT</p> <p>Inspect exterior of all assemblies. Exterior surfaces should be clean, free of dust, dirt, grease, and fungus.</p> <p>Dust exterior surface using a clean, lint-free cloth (4, table 3-2).</p>	0.1
		1	<p>DISPLAY PANEL FACE</p> <p>Check panel for dents, defects, and loose or damaged components. Inspect lamps, meters, and digital displays for cracked, scratched, fogged, or broken lenses, and for burned out bulbs.</p> <p>Tighten switches and lamps using finger pressure only.</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Use film cleaner in well ventilated area. Avoid contact with eyes or skin. Wash affected area with warm water when contact occurs.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not use liquids (including water) other than film cleaner to clean display panel because they may damage it.</p> <p>Clean grease smudges and other foreign matter from display panel using small amount of film cleaner (3, table 3-2) and clean lint-free cloth (4).</p> <p>Remove any final streaking by polishing with clean, dry cloth (4).</p>	0.2

Table 3-1. Preventive Maintenance Checks and Services-Continued

D-Daily

W-Weekly

M-Monthly

Interval and Sequence no.			Item to be Inspected Procedure	Work Time (M/H)
D	W	M		
		2	<p>EXTERIOR (BLUE PLASTIC) SURFACES</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not use soap and water on display panel face or on keyboards.</p> <p>Clean exterior surfaces by washing with mild soap (9, table 3-2) and water, rinsing with clean water, and wiping dry with a lint-free cloth (4).</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Do not use wax and grease remover near spark or open flame. Use only in well ventilated area. Avoid contact with eyes or skin. Wash affected area with warm water when contact occurs.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not use substitutes for the recommended cleaning agent to clean exterior surfaces because some agents will dissolve the plastic surface.</p> <p>To remove grease smudges and other oil-based foreign matter, use wax and grease remover (8, table 3-2) and a clean lint-free cloth (4). Follow by washing with mild soap (9) and water, rinsing with clean water, and wiping dry with another clean lint-free cloth.</p>	0.2
		3	<p>KEYBOARDS</p> <p>Clean keys by wiping with a clean lint-free cloth.</p>	0.1
		4	<p>PROJECTION SCREEN</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Never use commercial window cleaner or household cleaning abrasives on projection screen.</p> <p>Visually inspect screen for dust or other foreign matter. Clean only if required.</p>	0.3

Table 3-1. Preventive Maintenance Checks and Services-Continued

D-Daily			W-Weekly	M-Monthly
Interval and Sequence no.			Item to be Inspected	Work Time (M/H)
D	W	M	Procedure	
			<p>Remove dust from screen using brush (2, table 3-2).</p> <p>Clean dirt from screen using a small amount of mild soap (9), warm water, and a lint-free cloth (4). Rinse with clean water and blot dry with another lint-free cloth.</p> <p>Clean hard to remove marks from screen by using an artgum eraser (5) to gently wipe area. Follow this procedure, if necessary, with an application of screen repair spray (10) to cover blemished area.</p> <p style="text-align: center;"><u>WARNING</u></p> <p style="text-align: center;">Rubber cement thinner is flammable. Extinguish all smoking materials before using. Exposure to open flames or smoking materials could result in injury to personnel.</p> <p>Clean oil-based marks using a small amount of rubber cement thinner (11) and a lint-free cloth (4). Then, wash with mild soap and water, rinse, and blot dry with another lint-free cloth.</p>	

<i>Table 3-2. Expendable/Durable Supplies and Materials List</i>				
ITEM NO	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
1	C	6810-00-753-4993	Alcohol, denatured (81348) TT1735	PT
2	C	N/A	Brush, camel's hair (72925) 3017 No. 8	EA
3	C	N/A	Cleaner, film (19139) 1956986	PT
4	C	8305-00-267-3015	Cloth, lint-free (81348) CCCC440	BL
5	C	N/A	Eraser, artgum (80988) No. 211	EA
6	C	N/A	Paper, bond (84263) 755-051-7	BX
7	C	N/A	Paper, thermographic print (01295) 972603	RL
8	C	N/A	Remover, wax and grease (71943) DX-330	PT
9	C	N/A	Soap, liquid (86223) 04172	PT
10	C	N/A	Spray, screen repair (52152) 78-6112-0300-7	PT
11	C	N/A	Thinner, rubber cement (87709) Code No. 203	PT

3-5/(3-6 blank)

APPENDIX A

REFERENCES

FM 21-11	First Aid for Soldiers
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
TM 9-1200-206-34-1-1	Draft Direct Support and General Support Maintenance Manual for Sighting and Fire Control Components 105-MM Gun, M1, 15 March 1982
TM 9-2350-255-10-2	Draft Operator's Manual for Tank, Combat, Full Tracked 105-MM Gun, M1, Volume 2, November 1981
TM 9-2350-255-10-3	Draft Operator's Manual for Tank, Combat, Full Tracked 105-MM Gun, M1, Volume 3, November 1981
TM 9-2350-255-20-2-2-1	Draft Organizational Maintenance Manual for Tank, Combat, Full Tracked 105-MM Gun, M1 Turret (2350-01-061-2445), 30 April 1981
TM 9-2350-255-20-2-2-2	Draft Organizational Maintenance Manual for Tank, Combat, Full Tracked 105-MM Gun, M1 Turret (2350-01-061-2445), 30 April 1981
TM 9-2350-255-20-2-2-3	Draft Organizational Maintenance Manual for Tank, Combat, Full Tracked 105-MM Gun, M1 Turret (2350-01-061-2445), 30 April 1981
TM 9-2350-255-34-2-1	Draft Direct Support and General Support Maintenance Manual, Volume 1, Troubleshooting Tank, Combat, Full Tracked 105-MM Gun, M1, Turret (2350-01-061-2445) General Abrams, 1 February 1982
TM 9-4910-572-14&P	Draft Operator's, Organizational, Direct Support, and General Support Maintenance Manual including Repair Parts and Special Tools List for Test Set STE/M1, 31 July 1981

A-1/(A-2 blank)

APPENDIX B
OPERATING CONDITIONS

INTRODUCTION

B-1. General. Simulated malfunctions specified in this appendix are introduced into the trainer by the instructor. Following the introduction of a malfunction, the student will press PERFORM OPERATIONAL CHECK. The student then performs an operational check using TM 9-2350-255-10-2, and troubleshoots the system using TM 9-2350-255-20-2 series, TM 9-1200-206-34-1-1, and TM 9-2350-255-34-2-1 as required. Procedures for introducing a malfunction into the system are covered in detail in table 2-7.

B-2. Explanation of Table. Table B contains 53 malfunction exercises. Each exercise begins with the introduction of a malfunction. The operator is then referred to M1 Technical Manual procedures to isolate the fault. Each exercise ends with a repair action and a check of the operational system.

B-1

Table B. Malfunction Exercises

No. 1

Simulation: VEHICLE MASTER POWER cannot be turned on from commander's control panel.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 01.

Operator Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step A.
2. Perform troubleshooting procedure 28 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10, 11.
4. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: FAULTY TCP OR 1W102 120033.
5. Refer to Follow-On Procedure, figure 8-9.	Follow steps 1, 2, 4.
6. Replace Commander's Control Panel.	
7. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

Simulation: Commander's control panel found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1

Instructor Action: At Master Console Keyboard, enter: 02.

Operator Actions	Trainer System Responses
1. Refer to figure 8-28.	Follow steps 1, 2, 4, 15.
2. Replace Commander's Control Panel switch S2 (VEHICLE MASTER POWER).	
3. Return to Block 2 of figure 8-28.	Follow steps 2, 3, 5, 7, 9, 11, 14. System checks normal.

Table B. Malfunction Exercises-Continued

No. 3

Simulation: VEHICLE MASTER POWER cannot be turned on from commander's control panel.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-1, Changes 1-6

Instructor Action: At Master Console Keyboard, enter: 03.

Operator Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step A.
2. Perform troubleshooting procedure 28 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 9.
4. Refer to ATP, figure 17-1.	Follow steps 1, 2, 4.
5. Replace Commander's Control Panel.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 4

Simulation: TURRET POWER light and turret power do not come on when TURRET POWER switch is set to ON; vehicle master power is OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 04.

Operator Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step C.
2. Perform troubleshooting procedure 29 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10, 11.
4. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: FAULTY TCP 120015.
5. Replace Commander's Control Panel.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 5

Simulation: Commander's control panel found faulty during vehicle trouble shooting.

References: TM 9-2350-255-34-2-1, Changes 1

Instructor Action: At Master Console Keyboard, enter: 05.

Operator Actions	Trainer System Responses
1. Refer to figure 8-28.	Follow steps 1, 2, 4, 15.
2. Replace Commander's Control Panel switch S3 (TURRET POWER).	
3. Return to Block 2 of figure 8-28.	Follow steps 2, 3, 5, 7, 9, 11, 14. System checks normal.

Table B. Malfunction Exercises-Continued

No. 6

Simulation: TURRET POWER light and turret power do not come on when TURRET POWER switch is set to ON; vehicle master power is OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-1, Changes 1-6

Instructor Action: At Master Console Keyboard, enter: 06.

Operator Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step C.
2. Perform troubleshooting procedure 29 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 9.
4. Refer to ATP, figure 17-3.	Follow steps 1, 3, 14, 16, 17, 19.
5. Replace Commander's Control Panel.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 7

Simulation: Auxiliary hydraulic power pack and AUX HYDR POWER light do not come on.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 07.

Operator Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step F.
2. Perform troubleshooting procedure 30 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 9-198.	Follow steps 1-3, 6, 54, 55, 59, 60, 62, 63.
4. Refer to STE-M1 flowchart TEST 1040.	SETCOM message reads: FAULTY TCP OR 1W102 104019.
5. Refer to Follow-On Procedure, figure 9-208.	Follow steps 1, 2, 4.
6. Replace Commander's Control Panel.	
7. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 8

Simulation: Commander's control panel found faulty during vehicle trouble-shooting.

References: TM 9-2350-255-34-2-1, Changes 1

Instructor Action: At Master Console Keyboard, enter: 08.

Operator Actions	Trainer System Responses
1. Refer to figure 8-28.	Follow steps 1, 2, 4, 15.
2. Replace Commander's Control Panel switch S9 (AUX HYDR POWER).	
3. Return to Block 2 of figure 8-28.	Follow steps 2, 3, 5, 7, 9, 11, 14. System checks normal.

Table B. Malfunction Exercises-Continued

No. 9

Simulation: Commander's weapon station does not track smoothly at low speeds.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-2, Changes 1-5
 STE-MI FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 09.

Operator Actions	Trainer System Responses
1. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Fails at step E.
2. Refer to 11-1.	Follow steps 1-3, 10, 12, 14, 15, 33, 34, 36, 37.
3. Refer to STE-M1 flowchart TEST 1300.	SETCOM message reads: FAULTY PCU OR 1W105 130027.
4. Refer to Follow-On Procedure, figure 11-11.	Follow steps 1, 2, 4.
5. Replace Commander's Weapon Station Power Control Unit.	
6. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 10

Simulation: Commander's weapon station power control unit found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 CW2 12301930

Instructor Action: At Master Console Keyboard, enter: 10.

Student Actions	Trainer System Responses
1. Refer to figure 9-3.	Follow steps 1, 2, 3.
2. Refer to figure 9-4.	Follow steps 1, 2.
3. Refer to flow diagram 12301930.	DSESTS message reads: REPLACE A1 CWS 102.
4. Replace printed circuit card A1.	
5. Repeat CWS-PCU test. Checks normal.	

Table B. Malfunction Exercises-Continued

No. 11

Simulation: Cannot traverse commander's weapon station in POWER mode; MANUAL mode is OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-2, Changes 1-5
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 11.

Student Actions	Trainer System Responses
1. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Fails at step E.
2. Perform troubleshooting procedure 76 of the maintenance instructions.	Fails at step b.
3. Refer to 11-1.	Follow steps 1, 2, 4, 5, 33, 34, 36, 37.
4. Refer to STE-M1 flowchart TEST 1300.	SETCOM message reads: FAULTY PCU 130038.
5. Replace Commander's Weapon Station Power Control Unit.	
6. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 12

Simulation: Commander's weapon station power control unit found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 CW2 12301930

Instructor Action: At Master Console Keyboard, enter: 12.

Student Actions	Trainer System Responses
1. Refer to figure 9-3.	Follow steps 1, 2, 3.
2. Refer to figure 9-4.	Follow steps 1, 2.
3. Refer to flow diagram 12301930.	DSESTS message reads: FAULTY AR1, A1 CWS 201.
4. Refer to figure 9-8.	Follow steps 1, 2.
5. Replace servo amplifier AR1.	
6. Repeat CWS-PCU test, figure 9-4.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 13

Simulation: Gun/turret drive electronics unit found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 GTD 12301929

Instructor Action: At Master Console Keyboard, enter: 13.

Student Actions	Trainer System Responses
1. Refer to figure 10-1.	Follow steps 1, 2, 3.
2. Refer to figure 10-2.	Follow steps 1, 2, 3, 4.
3. Refer to flow diagram 12301929.	DSESTS message reads: REPLACE A1 GTD 102.
4. Refer to figure 10-4.	Follow step 1.
5. Replace power supply A1.	
6. Repeat GTD-EU test, figure 10-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 14

Simulation: Gun/turret drive electronics unit found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 CW2 12301929

Instructor Action: At Master Console Keyboard, enter: 14.

Student Actions	Trainer System Responses
1. Refer to figure 10-1.	Follow steps 1, 2, 3.
2. Refer to figure 10-2.	Follow steps 1, 2, 3, 4.
3. Refer to flow diagram 12301929.	DSESTS message reads: REPLACE A2 GTD 103.
4. Refer to figure 10-5.	Follow step 1.
5. Replace elevation board A2.	
6. Repeat GTD-EU test, figure 10-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 15

Simulation: Gun/turret drive electronics unit found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 GTD 12301929

Instructor Action: At Master Console Keyboard, enter: 15.

Student Actions	Trainer System Responses
1. Refer to figure 10-1.	Follow steps 1, 2, 3.
2. Refer to figure 10-2.	Follow steps 1, 2, 3, 4.
3. Refer to flow diagram 12301929.	DSESTS message reads: FAULTY A2 * A3 GTD 205.
4. Refer to figure 10-11.	Follow step 1.
5. Replace elevation board A2.	
6. Repeat GTD-EU test, figure 10-2.	Follow steps 1, 2, 3, 4.
7. Repeat step 3 above.	
8. Refer to figure 10-11.	Follow steps 1, 2, 3.
9. Replace elevation board A2 then replace azimuth board A3.	
10. Repeat GTD-EU test, figure 10-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 16

Simulation: Line of sight electronics unit found faulty during vehicle troubleshooting.

References: TM 9-1200-206-34-1-1
M1 DSESTS FLOWCHARTS PROG. 5 LOS 12301928

Instructor Action: At Master Console Keyboard, enter: 16.

Student Actions	Trainer System Responses
1. Refer to figure 8-27.	Follow steps 1, 2, 3.
2. Refer to figure 8-28.	Follow steps 1, 2.
3. Refer to flow diagram 12301928.	DSESTS message reads: REPLACE A1 LOS 102.
4. Replace A1 board.	
5. Repeat LOS-EU test, figure 8-28.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 17

Simulation: Auxiliary hydraulic powerpack and AUX HYDR POWER light do not come on.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-1, Changes 1-6

Instructor Action: At Master Console Keyboard, enter: 17.

Student Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step F.
2. Perform troubleshooting procedure 30 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 9-198.	Follow steps 1-3, 6, 54, 55, 59, 61.
4. Refer to ATP, figure 17-43.	Follow steps 1, 3, 4.
5. Replace Commander's Control Panel.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 18

Simulation: Commander's weapon station does not track smoothly at low speeds.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-2, Changes 1-5

Instructor Action: At Master Console Keyboard, enter: 18.

Student Actions	Trainer System Responses
1. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Fails at step E.
2. Refer to 11-1.	Follow steps 1-3, 10, 12, 14, 15, 33, 35.
3. Refer to ATP, figure 17-136.	Follow steps 1, 2.
4. Replace Commander's Weapon Station Power Control Unit.	
5. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 19

Simulation: Cannot traverse commander's weapon station in POWER mode; MANUAL mode OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-2, Changes 1-5

Instructor Action: At Master Console Keyboard, enter: 19.

Student Actions	Trainer System Responses
1. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Fails at step E.
2. Perform troubleshooting procedure 76 of maintenance instructions.	Fails at step b.
3. Refer to figure 11-1.	Follow steps 1, 2, 4, 5, 33, 35.
4. Refer to ATP, figure 17-133.	Follow steps 1, 2, 4, 6, 8, 10.
5. Replace Commander's Weapon Station Power Control Unit.	
6. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 20

Simulation: FIRE CONTROL MALF light does not come on when a harness is disconnected or when PANEL LIGHTS TEST pushbutton is pressed

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-2, Changes 1-5

Instructor Action: At Master Console Keyboard, enter: 20.

Student Actions	Trainer System Responses
1. Student's symptom recognition is assisted by instructor.	
2. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step G.
3. Refer to figure 10-1.	Follow steps 1-3, 7, 9.
4. Refer to ATP, figure 17-90.	Follow steps 1, 2.
5. Replace Turret Networks Box.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 21

Simulation: TURRET POWER light and turret power do not come on when turret power switch is set to ON. Vehicle master power is OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-1, Changes 1-6

Instructor Action: At Master Console Keyboard, enter: 21.

Student Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step C.
2. Perform troubleshooting procedure 29 of maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 9.
4. Refer to ATP, figure 17-3.	Follow steps 1, 3, 14, 16, 18, 23, 24.
5. Replace Commander's Control Panel.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 22

Simulation: Commander and gunner cannot fire main gun from control handles.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-1, Changes 1-6

Instructor Action: At Master Console Keyboard, enter: 22.

Student Actions	Trainer System Responses
1. Students symptom recognition is assisted by instructor.	
2. Perform troubleshooting procedure 104 of maintenance instructions.	Fails at step 1.
3. Refer to figure 8-13.	Follow steps 1-3, 10, 11, 18, 20, 21, 25.
4. Refer to figure 9-5.	Follow steps 1-3, 4, 10, 11, 13 16, 17.
5. Refer to para 8-3 for proper ATP figure.	
6. Refer to ATP, figure 17-9.	Follow steps 1, 2.
7. Replace Turret Networks Box.	
8. Perform TEST FIRING CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECKS) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 23

Simulation: Line of sight electronics unit found faulty during vehicle troubleshooting.

References: TM 9-1200-206-34-1-1
M1 DSESTS FLOWCHARTS PROG. 5 LOS 12301928

Instructor Action: At Master Console Keyboard, enter: 23

Student Actions	Trainer System Responses
1. Refer to figure 8-27.	Follow steps 1, 2, 3.
2. Refer to figure 8-28.	Follow steps 1, 2.
3. Refer to flow diagram 12301928.	DSESTS message reads: REPLACE A3 LOS 105.
4. Replace A3 board.	
5. Repeat LOS-EU test, figure 8-28.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 24

Simulation: Line of sight electronics unit found faulty during vehicle troubleshooting.

References: TM 9-1200-206-34-1-1
M1 DSESTS FLOWCHARTS PROG. 5 LOS 12301928

Instructor Action: At Master Console Keyboard, enter: 24.

Student Actions	Trainer System Responses
1. Refer to figure 8-27.	Follow steps 1, 2, 3.
2. Refer to figure 8-28.	Follow steps 1, 2.
3. Refer to flow diagram 12301928.	DSESTS message reads: FAULTY A3 * A8 LOS 208.
4. Refer to figure 8-37.	Follow step 1.
5. Replace circuit card A3.	
6. Repeat LOS-EU test, figure 8-28.	Follow steps 1, 2.
7. Repeat step 3.	
8. Refer to figure 8-37.	Follow steps 1, 2, 4.
9. Replace circuit card A3 then replace gyro wheel supply circuit card A8.	
10. Repeat LOS-EU test, figure 8-28.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 25

Simulation: FIRE CONTROL MALF light does not come on when a harness is disconnected or when PANEL LIGHTS TEST pushbutton is pressed.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-2, Changes 1-5
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 25.

Student Actions	Trainer System Responses
1. Student's symptom recognition is assisted by instructor.	
2. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step G.
3. Refer to figure 10-1.	Follow steps 1-3, 7, 8, 10, 11.
4. Refer to STE-M1 flowchart TEST 1210.	SETCOM message reads: FAULTY TNB 121031.
5. Replace Turret Networks Box.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 26

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 26.

Student Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE A1 TNB 102.
4. Replace printed circuit card A1.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 27

Simulation: Any one light on commander's control panel does not come on when PANEL LIGHTS TEST pushbutton is pressed.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-MI FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 27.

Student Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step G.
2. Replace ENGINE FIRE bulb.	
3. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step G.
4. Refer to paragraph 6-1.	
5. Replace Turret Networks Box.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 28

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 28.

Student Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE A3 TNB 104.
4. Replace printed circuit card A3.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 29

Simulation: TURRET POWER light and turret power do not come on when TURRET POWER switch is set to ON.
 Vehicle master power OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 29.

Student Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step C.
2. Perform troubleshooting procedure 29 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10, 11.
4. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: FAULTY TNB 120018.
5. Replace Turret Networks Box.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 30

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 30.

Student Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE A4 TNB 105.
4. Replace printed circuit card A4.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 31

Simulation: TURRET POWER light and turret power do not come on when TURRET POWER switch is set to ON.
 Vehicle master power is OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 31.

Student Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step C.
2. Perform troubleshooting procedure 29 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10, 11.
4. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: FAULTY TNB 120021.
5. Replace Turret Networks Box.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 32

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 32.

Student Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927. TNB 106.	DSESTS message reads: REPLACE K1
4. Replace relay K1.	
5. Repeat TNB test.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 33

Simulation: Commander and gunner cannot fire main gun from control handles.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 33.

Student Actions	Trainer System Responses
1. Perform TEST FIRING CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECK) operational check.	Fails at step L.
2. Perform troubleshooting procedure 104 of the maintenance instructions.	Fails at step 1.
3. Refer to figure 8-13.	Follow steps 1-3, 10, 11, 18, 20, 21, 25.
4. Refer to figure 9-5.	Follow steps 1, 2, 4, 10, 11, 13, 16, 18-21, 23, 25.
5. Refer to STE-MI flowchart TEST 1400.	SETCOM message reads: FAULTY VEH/ TURRET PWR CNTL 140032.
6. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10, 11.
7. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: NO FAULTS FOUND
8. Refer back to figure 8-13, step 26.	Follow steps 26, 27, 29, 32, 83, 84, 86, 87.
9. Refer to STE-MI flowchart TEST 1220.	SETCOM message reads: FAULTY TNB 122024.
10. Replace Turret Networks Box.	
11. Perform TEST FIRING CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECKS) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 34

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 34.

Student Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE K2 TNB 106.
4. Replace relay K2.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 35

Simulation: Turret blower does not operate when TURRET BLOWER switch is ON, but operates when GUN SELECT switch is set to COAX position.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 35.

Student Actions	Trainer System Responses
1. Perform OPERATE LOADER'S PANEL operational check.	Fails at step F.
2. Perform troubleshooting procedure 117 of the maintenance instructions.	Fails at step b.
3. Refer to figure 8-59.	Follow steps 1, 2, 4, 7, 8.
4. Replace Turret Networks Box.	
5. Perform OPERATE LOADER'S PANEL operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 36

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 36.

Student Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE K3 TNB 106.
4. Replace relay K3.	
5. Repeat TNB test figure 8-2. Checks normal.	

Table B. Malfunction Exercises-Continued

No. 37

Simulation: Gunner and commander cannot traverse turret in NORMAL mode. Gunner and commander cannot traverse turret in EMERGENCY mode.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 37.

Student Actions	Trainer System Responses
1. Perform OPERATE GUNNER'S POWER CONTROL HANDLES operational check.	Fails at step D.
2. Perform troubleshooting procedure 98 of the maintenance instructions.	Fails at step 4b.
3. Refer to AZIMUTH paragraph 6-1.	
4. Replace Turret Networks Box.	
5. Perform OPERATE GUNNER'S POWER CONTROL HANDLES operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 38

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 38.

Student Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE K4 TNB 106.
4. Replace relay K4.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 39

Simulation: Main gun does not elevate or depress in NORMAL or EMERGENCY mode. OK in MANUAL mode.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-2, Changes 1-5

Instructor Action: At Master Console Keyboard, enter: 39.

Student Actions	Trainer System Responses
1. Perform OPERATE GUNNER'S POWER CONTROL HANDLES operational check.	Fails at step E.
2. Perform troubleshooting procedure 97 of the maintenance instructions.	Fails at step 4b.
3. Refer to figure 10-37.	Follow steps 1-3, 5, 7, 9, 12, 22, 23.
4. Refer to ATP, figure 17-55.	Follow steps 1, 2.
5. Replace Turret Networks Box.	
6. Perform OPERATE GUNNER'S POWER CONTROL HANDLES operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 40

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 40.

Operator Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE K5 TNB 106.
4. Replace relay K5.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 41

Simulation: Cannot traverse commander's weapon station in POWER mode; MANUAL mode OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-2, Changes 1-5
 STE-Mi FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 41.

Operator Actions	Trainer System Responses
1. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Fails at step E.
2. Perform troubleshooting procedure 76 of maintenance instructions.	Fails at step b.
3. Refer to figure 11-1.	Follow steps 1, 2, 4, 5, 33, 34,36.
4. Refer to STE-M1 flowchart TEST 1300.	SETCOM message reads: FAULTY TNB 130023.
5. Replace Turret Networks Box.	
6. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 42

Simulation: Cannot traverse commander's weapon station in POWER mode; MANUAL mode OK.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-2, Changes 1-5
 TM 9-2350-255-20-2-2-3, Changes 1-4

Instructor Action: At Master Console Keyboard, enter: 42.

Operator Actions	Trainer System Responses
1. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Fails at step E.
2. Perform troubleshooting procedure 76 of the maintenance instructions.	Fails at step b.
3. Refer to figure 11-1.	Follow steps 1, 2, 4, 5, 33, 35.
4. Refer to ATP, figure 17-133.	Follow steps 1, 3, 22, 23.
5. Replace Turret Networks Box.	
6. Perform OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 43

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 43.

Operator Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE K7 TNB 106.
4. Replace relay K7.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 44

Simulation: Commander and gunner cannot fire coax machine gun.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-MI FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 44.

Operator Actions	Trainer System Responses
1. Perform OPERATE COAXIAL MACHINE GUN (FIRE COAXIAL MACHINE GUN) operational check.	Fails at step H.
2. Perform OPERATE COAXIAL MACHINE GUN (PERFORM FAILURE TO FIRE) operational check.	Fails at step B.
3. Refer to figure 8-13.	Follow steps 1-3, 10, 11, 18, 19,
4. Refer to STE-M1 flowchart TEST 1220.	33, 34, 44, 46, 47, 83, 84, 86. SETCOM message reads: FAULTY TNB 122205.
5. Replace Turret Networks Box.	
6. Perform OPERATE COAXIAL MACHINE GUN (FIRE COAXIAL MACHINE GUN) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 45

Simulation: Commander and gunner cannot fire coax machine gun.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-3, Changes 1-4
 TM 9-2350-255-20-2-2-1, Changes 1-6

Instructor Action: At Master Console Keyboard, enter: 45.

Operator Actions	Trainer System Responses
1. Perform OPERATE COAXIAL MACHINE GUN (FIRE COAXIAL MACHINE GUN) operational check.	Fails at step H.
2. Perform OPERATE COAXIAL MACHINE GUN (PERFORM FAILURE TO FIRE) operational check.	Fails at step B.
3. Refer to figure 8-13.	Follow steps 1-3, 10, 11, 18, 19, 33, 34, 44, 46, 47, 83, 85.
4. Refer to ATP, figure 17-14.	Follow steps 1, 3, 5, 12, 13.
5. Replace Turret Networks Box.	
6. Perform OPERATE COAXIAL MACHINE GUN (FIRE COAXIAL MACHINE GUN) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 46

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 46.

Operator Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE K11 TNB 106.
4. Replace relay K11.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 47

Simulation: Commander and gunner cannot fire main gun from control handles.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 47.

Operator Actions	Trainer System Responses
1. Perform TEST FIRING CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECK) operational check.	Fails at step L.
2. Perform troubleshooting procedure 104 of the maintenance instructions.	Fails at step 1.
3. Refer to figure 8-13.	Follow steps 1-3, 10, 11, 18, 20, 21, 25.
4. Refer to figure 9-5.	Follow steps 1-3, 5, 16, 18-20.
5. Refer to STE-M1 flowchart TEST 1400.	SETCOM message reads: FAULTY VEH/ TURRET PWR CNTL 140047.
6. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10.
7. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: NO FAULTS FOUND
8. Refer back to figure 8-13, step 26.	Follow steps 26, 27, 29, 32, 83, 84, 86, 87.
9. Refer to STE-Mi flowchart TEST 1200.	SETCOM message reads: FAULTY TNB 122005.
10. Replace Turret Networks Box.	
11. Perform TEST FIRING CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECKS) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 48

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 48.

Operator Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927. TNB 108.	DSESTS message reads: REPLACE Q1
4. Replace thyristor Q1.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 49

Simulation: TURRET POWER light and turret power do not come on when TURRET POWER switch is set to ON.
VEHICLE MASTER POWER is OK.

References: TM 9-2350-255-10-2
TM 9-2350-255-20-2-2-1, Changes 1-6
STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 49.

Operator Actions	Trainer System Responses
1. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Fails at step C.
2. Perform troubleshooting procedure 29 of the maintenance instructions.	Fails at step 2b.
3. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10.
4. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: FAULTY TNB 120046.
5. Replace Turret Networks Box.	
6. Perform PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 50

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 50.

Operator Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE CB13 TNB 107.
4. Replace CB13.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 51

Simulation: Commander and gunner cannot fire main gun from control handles.

References: TM 9-2350-255-10-2
 TM 9-2350-255-20-2-2-1, Changes 1-6
 STE-M1 FLOWCHARTS REVISION 9.0

Instructor Action: At Master Console Keyboard, enter: 51.

Operator Actions	Trainer System Responses
1. Perform TEST FIRING CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECK) operational check.	Fails at step L.
2. Perform troubleshooting procedure 104 of the maintenance instructions.	Fails at step 1.
3. Refer to figure 8-13.	Follow steps 1-3, 10, 11, 18, 20, 21, 25.
4. Refer to figure 9-5.	Follow steps 1-3, 5, 16, 18-20.
5. Refer to STE-M1 flowchart TEST 1400.	SETCOM message reads: FAULTY VEH/ TURRET PWR CNTL 140022.
6. Refer to figure 8-1.	Follow steps 1-3, 7, 8, 10, 11.
7. Refer to STE-M1 flowchart TEST 1200.	SETCOM message reads: NO FAULTS FOUND
8. Refer back to figure 8-13, step 26.	Follow steps 26, 27, 29, 32, 83, 84, 86, 87.
9. Refer to STE-MI flowchart TEST 1220.	SETCOM message reads: FAULTY TNB 122003.
10. Replace Turret Networks Box.	
11. Perform TEST FIRING CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECKS) operational check.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 52

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
 • M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 52.

Operator Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE CB19 TNB 107.
4. Replace CB19.	
5. Repeat TNB test, figure 8-2.	Checks normal.

Table B. Malfunction Exercises-Continued

No. 53

Simulation: Turret networks box found faulty during vehicle troubleshooting.

References: TM 9-2350-255-34-2-1, Change 1
M1 DSESTS FLOWCHARTS PROG. 5 TNB 12301927

Instructor Action: At Master Console Keyboard, enter: 53.

Operator Actions	Trainer System Responses
1. Refer to figure 8-1.	Follow steps 1, 2, 3.
2. Refer to figure 8-2.	Follow steps 1, 2.
3. Refer to flow diagram 12301927.	DSESTS message reads: REPLACE CB30 TNB 107.
4. Replace CB30.	
5. Repeat TNB test, figure 8-2.	Checks normal.

APPENDIX C**M1 OPERATIONAL CHECKS AND TROUBLESHOOTING PROCEDURES**

INTRODUCTION

C-1. General. This appendix provides information to use when testing the simulated systems. The content follows closely that of the tank operator and maintenance technical manuals (TM).

C-2. Explanation of Tables.

a. Table C-1 lists turret operational checks and table C-2 lists operator's vehicle troubleshooting procedures. The "Equipment function" column describes actions to be performed and indicators to be observed just as they occur in TM 9-2350-255-10-2 and -3 which are used by the student. In cases when the trainer function is not identical to the equipment function, an entry in the "Trainer function" column describes the difference. When a malfunction occurs during the operational check, and it is beyond the scope of operator's maintenance, the student will troubleshoot the system using TM 9-2350-255-20-2-2.

b. Tables C-3 and C-4 list the operating procedures for the STE-M1/FVS test set simulation. When the STE-M1/FVS is used during troubleshooting, these tables will help the instructor monitor the student's actions. In cases where the trainer function is not identical to the equipment function, an entry in the "Trainer function" column describes the difference.

c. Table C-5 lists the operating procedures for the DSESTS. When the DSESTS display shows a fault message the student must consult the fault message index in TM 9-1200-206-34-1-1 or TM 9-2350-255-34-2-1 for the required maintenance action.

Table C-1. M1 Operational Checks

Equipment Function	Trainer Function
<p style="text-align: center;">COMMANDER'S STATION</p> <p>PREPARE STATION FOR OPERATION (ENTER TANK COMMANDER'S STATION)</p> <p>GENERAL</p> <p>The commander is responsible for knowing the operation of the other crew station, with special attention to any warnings and cautions that apply.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Avoid excessive speed when operating the tank over terrain that is unusually rough and when crossing ditches. Damage to track and suspension components could occur if excessive speed is used.</p> <p>A. Climb on tank using track skirt step and hand hold at left front, or using skirt step at right front of hull</p> <p>B. Unlock and open loader's hatch</p> <p>C. Enter tank through loader's hatch feet first Step on loader's seat post then on turret floor.</p> <p>D. Make sure that GUN/TURRET DRIVE switch on loader's panel is down in MANUAL position.</p> <p>E. Make sure spent case position guard is forward in safe position.</p> <p>F. Go to tank commander's station.</p> <p>G. Make sure that safety on commander's weapon station (CWS) elevation crank is to the left and the word SAFE is showing.</p>	<p>A. Assume</p> <p>B. Assume</p> <p>C. Assume</p> <p>E. Ensure ARM MAIN GUN CC is not lit.</p> <p>G. Assume</p>

PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET)**NOTE**

- **Vehicle master power can also be controlled from the driver's station.**
- **Vehicle master power and turret power will come on when TURRET POWER switch is moved to the ON position.**

A. If only vehicle master power is needed, pull out, set, and hold VEHICLE MASTER POWER Switch on commander's Control panel to ON until VEHICLE MASTER POWER light goes on, then let go. If light does not come on, do troubleshooting

WARNING

If CWS POWER/MANUAL lever is in POWER position when turret power is turned on, CWS will move and could injure personnel.

- B. Make sure CWS POWER/MANUAL lever is in POWER position.
- C. If turret equipment is going to be used, set and hold TURRET POWER switch to ON until VEHICLE MASTER POWER light and TURRET POWER light comes on.
- D. Make sure ENGINE FIRE . CKT BKR OPEN , FIRE CONTROL MALF and LOW BAT CHG warning lights are out. If lit do troubleshooting

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>PREPARE STATION FOR OPERATION (POWER UP COMMANDER'S STATION AND TURRET) - Continued</p> <p>E. If tank engine is running, make sure AUX HYDR PWR light is off.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">To set AUX HYDR PWR off, set off switch to OFF position until AUX HYDR PWR light goes off, then let go</p> <p>F. If tank engine is not running, set AUX HYDR PWR switch to ON position until AUX HYDR PWR light comes on, then let go. If light does not come on, do troubleshooting</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Panel light. controls on commander's panel also control lights on loader's panel.</p> <p>G. Press PANEL LIGHTS test pushbutton and make sure that all lights on commander's and loader's panels light. If not, replace bad lamps</p> <p>H. Adjust brightness of commander's and loader's panel lights by switching VEHICLE MASTER POWER light and turning knob clockwise to brighten and counterclockwise to dim.</p>	<p>H. Shown fully clockwise.</p>

OPERATE COMMANDER'S MANUAL RANGE CONTROLS

- A. Power up commander's station and turret
- B. Set indexed battle ranges into computer
- C. Press MANUAL RANGE BATTLE SGT button on commander's panel to automatically feed manually indexed battle range into fire control system

NOTE

The battle light range displayed will be for ammunition selected and/or type of weapon selected on gunner's primary sight (GPS)

- D. To make range changes to manually indexed range using ADD-DROP switch do the following:

NOTE

The range showing on gunner's primary sight (GPS) and commander's GPS extenuation will be changing in ten meter steps.

1. For small adjustments to range move switch to ADD or DROP position to make range changes at a speed of 50 meters a second.
2. For large adjustments to range switch is held in the ADD Or DROP position for more than 4 seconds to make range changes at a speed of 500 meters a second.
and.
3. To return to the original range indexed. press the MANUAL RANGE BATTLE SGT button

- B. Assume

1. Slide 12 (RANGE CHANGES AT 50M/SEC) displays.
2. Slide 13 (RANGE CHANGES AT 500M/SEC) displays.

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>OPERATE POWER CONTROL HANDLE</p>	
<p>A. Power up commander’s station and turret</p>	
<p>B. Unlock turret traverse lock</p>	<p>B. Ensure ENGAGE TURRET AZIMUTH LOCK CC is not lit.</p>
<p>C. Unlock main gun elevation travel lock</p>	<p>C. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is not lit.</p>
<p>D. Set GUN/TURRET DRIVE switch on loader’s panel to POWERED</p>	
<p>E. Set FIRE CONTROL MODE switch on GPS upper panel to NORMAL or EMERGENCY</p>	
<p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Squeezing palm switch on commander’s control handle removes control of turret from gunner’s handle and gives control to the commander. This action also starts the stabilization system if GPS FIRE CONTROL MODE switch is in NORMAL • The palm switch on commander’s control handle must be squeezed for the handle . button , and trigger to operate. 	
<p>F. Grasp power control handle with right hand and squeeze the palm switch</p>	
<p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • The further left or right you move power control handle the faster the turret traverses. • When traversing turret in normal mode to lay main gun on a target with a high tracking rate, gunner’s GPS or TIS reticle may overshoot target before gunner can start tracking. Commander should anticipate turret deceleration time and start slowing turret rate before target comes into gunner’s sight 	

G. Move power control handle left to traverse the turret left and right to traverse turret right.

NOTE

The further forward or backward you move the power control handle the faster the main gun and coaxial machinegun will elevate or depress

H. Move power control handle forward to depress main gun or coaxial machinegun, or pull back on handle to elevate weapons.

NOTE

RANGE switch on laser range-finders (LRF) panel of GPS must be set to ARM 1ST or ARM LAST RTN

I. Operate laser range finder by pressing button on top of power control handle

NOTE

GUN SELECT switch on GPS lower panel must be sat to either MAIN or COAX as needed.

J. Fire main gun or coax machinegun by squeezing trigger on front of power control handle

G. Press DEPRESS PALM SWITCH CC. Move AZIMUTH servo the CONTROL left or right and observe the azimuth indicator.

H. Press DEPRESS PALM SWITCH CC. Move ELEVATION CONTROL up or down and observe the gun elevation indicator.

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>OPERATE MAIN GUN (FIRE MAIN GUN)</p> <p>Prepare to Fire</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Commander's' power control handle may be used to fire main gun. When firing main gun from commander's station, use commander's GPS extension for sighting on target</p> <p>Fire in Normal Mode</p> <p>Follow procedures for gunner's normal mode firing but use commander's power control handle and commander's GPS extension</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">If main gun falls to fire, PERFORM FAILURE TO FIRE PROCEDURES</p> <p>Fire in Emergency Mode</p> <p>Follow procedures for gunner's emergency mode firing but use commander's power control handle and commander's GPS extension</p>	

OPERATE COMMANDER'S WEAPON STATION (OPERATE IN POWER MODE)

- A. Power up commander's station and turret.

WARNING

Make sure area around commander's weapon station (CWS) is clear of crewmember and loose equipment before traversing. When traversing commander's weapon, be careful not to hit loader's weapon, loader's hatch if open, or loader. Damage or injury to loader could occur.

- B. Move POWER/MANUAL lever to POWER position. It may be necessary to move traverse ring to engage POWER position.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>OPERATE COMMANDER'S WEAPON station (OPERATE IN POWER MODE - Continued</p>	
<p>C grasp azimuth control handle with right hand</p> <p>D. Look into CWS sight or forward unity periscope- n required</p> <p>E Traverse CWS by squeezing palm switch on control handle and pushing thumb control left to go left or right to go right.</p>	<p>C. Assume</p> <p>D. Assume</p> <p>E. Press DEPRESS CWS PALM SWITCH CC. Push thumb Control to left or right and observe the CWS azimuth servo indicator.</p>
<p>WARNING</p>	
<p>The elevation crank knob is used to fire commander's weapon. Before operation, make sure safety is positioned so the word SAFE is showing to keep from accidentally firing machine gun and injuring someone.</p>	
<p>F. Grasp CWS elevation crank knob wit left hand.</p> <p>G. Elevate commander's weapon by pushing in and turning elevation crank counterclockwise.</p> <p>H. Depress commander's weapon by pushing in and turning elevation crank clockwise.</p> <p>I. Set safety switch to FIRE to arm commander's weapon.</p> <p>J. Pull down on elevation crank knob to fire commander's weapon. Release knob to stop firing.</p> <p>K Set safety switch to SAFE</p>	<p>F. Assume</p> <p>G. Assume</p> <p>H. Assume</p> <p>I. Assume</p> <p>J. Assume</p> <p>K. Assume</p>

OPERATE COMMANDER'S WEAPON STATION (OPERATE IN MANUAL MODE)**WARNING**

- **Make sure area around commander's weapon station (CWS) is clear of crewmembers and loose equipment before traversing. When traversing commanders weapon be careful not to hit loader's weapon, loaders hatch, if open, or loader. Damage to equipment or injury to loader could occur.**
- **Do not place POWER/MANUAL lever in MANUAL position, unless necessary for operation. When in MANUAL position, commander's weapon station may traverse freely, causing injury to crewmembers or damage to equipment.**

NOTE

Manuel operation is provided as a backup if power mode fails.

- A Grasp manual traverse ring with right hand
- B. Move POWER/MANUAL lever to MANUAL potion
It may be necessary to move traverse ring to engage MANUAL position.

A. Assume

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>OPERATE COMMANDERS WEAPON STATION (OPERATE IN MANUAL MODE) - Continued</p>	
<p style="text-align: center;">WARNING</p> <p>The elevation crank knob is used to fire commander's weapon Before operation make sure safety is positioned so the word SAFE is showing to keep from firing machine gun and injuring someone.</p>	
<p>C. Grasp CWS elevation crank knob with left hand.</p>	<p>C. Assume.</p>
<p>D. Look into CWS sight or forward unity periscope as required</p>	<p>D. Assume.</p>
<p style="text-align: center;">NOTE</p> <p>If manual traverse ring slips when traverse CWS, turn tape adjusting knob clockwise until slipping stops.</p>	
<p>E. Traverse CWS to the right by moving manual traverse ring to the right</p>	<p>E. Move the CWS MANUAL AZIMUTH CONTROL Knob to the right and observe the CWS azimuth servo indicator.</p>
<p>F. Traverse CWS to the left by moving manual traverse ring to the left</p>	<p>F. Move the CWS MANUAL AZIMUTH CONTROL Knob to the left and observe the CWS azimuth servo indicator.</p>
<p>G. Elevate commander's weapon by pushing in and turning elevation Crank counterclockwise.</p>	<p>G. Assume.</p>
<p>H. Depress commander's weapon by pushing in and turning elevation crank clockwise.</p>	<p>H. Assume.</p>
<p>I. Slide safety switch to FIRE to arm commander's weapon.</p>	<p>I. Assume.</p>
<p>J. Pull down on elevation crank knob to fire commander's weapon Release knob to stop firing.</p>	<p>J. Assume.</p>
<p>K. Slide safety switch to SAFE to secure from firing commander's weapon.</p>	<p>K. Assume.</p>

**OPERATE M250 GRENADE LAUNCHER SYSTEM
(FIRE GRENADE DISCHARGERS)**

- A. Load grenade dischargers
- B. Power up commander's station and turret

WARNING

- **Due to potential hazard of burning red phosphorus (RP) pellets being blown into open hatches firing grenades with open hatches into strong headwinds, or while moving rapidly forward should be avoided whenever possible. Crew compartment should be free of combustible to minimize fuel for any pellets which do fall into tank.**
 - **All personnel outside tank must stay at least 200 meters yards) from tank during firing.**
- C. Move and hold GRENADES READY/SAFE switch on commander's panel to READY.

NOTE

SALVO 1 fire three Grenades each from right and left discharges. To fire all twelve grenades push both SALVO 1 and SALVO 2 at the same time

- D. Push SALVO 1 and/or SALVO 2 pushbuttons on commander's panel Let go of pushbuttons
- E. Let go of GRENADES READY/SAFE switch It will automatically return to SAFE position.

- A. Assume

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>POWER DOWN AND SECURE STATION (SECURE COMMANDER'S STATION AND TURRET)</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Loader should POWER DOWN LOADER'S STATION and gunner should POWER DOWN GUNNER'S STATION before tank commander does this task.</p> <p>A. Move CWS MANUAL/POWER lever to POWER It may be necessary to move traverse ring to engage POWER position.</p> <p>B. Make sure MANUAL light on GPS is lit</p> <p>C. Make sure MANUAL light on loader's panel is lit</p> <p>D. Make sure elevation travel lock is locked</p> <p>E. Make sure spent case ejection guard is forward in safe position.</p> <p>F. Make sure turret traverse lock is LOCKED</p> <p>G. Disconnect CVC cord from intercom box</p> <p>H. Close commander's hatch</p>	<p>D. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is lit.</p> <p>E. Ensure ARM MAIN GUN CC is not lit.</p> <p>F. Ensure ENGAGE TURRET AZIMUTH LOCK CC is lit.</p> <p>G. Assume</p> <p>H. Assume</p>

POWER DOWN AND SECURE STATION (POWER DOWN COMMANDER'S STATION AND TURRET)

- A. Turn domelight switch all the way counterclockwise to turn domelight OFF.
- B. Make sure AUX HYDR power switch is set to OFF, and that AUX HYDR POWER indicator light is not lit

CAUTION

- Never turn **VEHICLE MASTER POWER** switch to OFF if engine is running. Damage to engine can result
- If hull systems have been operated the driver shall power down the tank to make sure that the driver's master panel switches are in the proper position before the **VEHICLE MASTER POWER** switch is set to OFF. Damage to engine can result

NOTE

- Make sure all other crew stations are ready for vehicle master power and turret power switches to be turned off.
- **TURRET POWER** and **TURRET POWER** light go off when **VEHICLE MASTER POWER** switch is turned off.
- When engine is not running. **AUX HYDR POWER** and **AUX HYDR POWER** light also go off when **VEHICLE MASTER POWER** switch is turned off.

- A. Assume

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>POWER DOWN AND SECURE STATION (POWER DOWN COMMANDERS STATION AND TURRET) -- CONTINUED</p> <p>C. Set and hold VEHICLE MASTER POWER switch to OFF. When light goes out release switch. If light does not go out, notify organizational maintenance.</p> <p style="text-align: center;">NOTE</p> <p>Do IMMEDIATE ACTION FOR VEHICLE MASTER POWER FAILURE TO POWER DOWN if organizational maintenance is not available.</p>	

GUNNER'S STATION**PREPARE STATION FOR OPERATION (ENTER GUNNER'S STATION)**

- A. Climb on tank using track skirt step and hand hold at left front or using skirt step at right front of hull.
- B. Unlock and open loader's hatch
- C. Enter tank through loader's hatch feet first Stop on loader's seat post then on turret floor.
- D. Make sure that GUN/TURRET DRIVE switch on loader's pane is down in MANUAL position.
- E. Make sure spent case ejection guard is forward in safe position
- F. Go to gunner's station.

A. Assume

B. Assume

C. Assume

E. Ensure that ARM MAIN GUN CC is not lit.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>PREPARE STATION FOR OPERATION (POWER UP GUNNER'S STATION)</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Turret power must be on for equipment at gunner's station to work • Fire control system is designed to function normally at 1830 vdc. Operating system at lower voltages may result in erratic performance. • If engine is not running AUX HYDR POWER switch on commanders control panel must be sat to ON <p>A. Push PANEL LIGHTS TEST pushbutton. Check that all lights on GPS upper and lower panels and TIS panel light, then let go of pushbutton. If any lights) was not lit replace bad lamps)</p> <p>B. Adjust brightness of the GPS and TIS panel lights by turning PANEL LIGHTS knob clockwise to brighten and counterclockwise to dim.</p> <p style="text-align: center;">CAUTION</p> <p>If loud high pitched squealing noise is heard or hydraulic pressure droop suddenly to 500 psi or less large hydraulic leak could be present. Inform tank commander that turret power should be shutoff immediately and engine shut down as soon as possible to prevent damage to engine driven hydraulic pump</p>	<p>B. Shown fully clockwise,</p>

PREPARE STATION FOR OPERATION (POWER UP GUNNER'S STATION)- (Continued)

- C. Check hydraulic pressure gage as follow:
1. Gage should be steady and show 1500 to 1700 IW.
 2. If gage shows 1700 to 2000 psi continue mission but notify organizational maintenance as soon as possible. It is safe to operate fire control system in NORMAL mode
 3. If gage shows 1100 to 1500 psi, continue mission but notify organizational maintenance as soon as possible. Use EMERGENCY mode to operate fire control system
 4. If gage shows more than 2000 or less than 100 psi, tell driver to shut down engine and notify organizational maintenance.
- D. Unlatch and open cover on computer control panel.
- E. Set computer control panel power switch to ON. If PWR light does not light replace bad lamp

Steps D. thru H. covered on Turret Organizational Maintenance Trainer.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>PREPARE STATION FOR OPERATION (POWER UP GUNNER'S STATION) - Continued</p>	
<p>F. Push and hold TEST pushbutton on computer control panel. If any of the lights do not light do the following:</p> <ol style="list-style-type: none"> 1. If all computer control panel lights do not light, notify organizational maintenance. 2. If any of the five display window numbers do not light or show a number other than the figure eight. notify organizational maintenance. 3. If display window numbers show figure eight but any other light does not light, replace bad lamp 	
<p>G. Release TEST pushbutton</p>	
<p>H. Close and latch cover of computer control panel</p>	
<p>NOTE The cool down period for the Thermal Imaging System (TIS) takes 5 to 15 minute If the TIS is to be operated, setting THERMAL MODE switch to STBY will start cool down while GPS adjustments and computer self test are being done.</p>	
<p>I. Set THERMAL MODE switch to STBY.</p>	<p>I. Assume</p>
<p>J. Make sure main gun elevation travel lock is unlocked</p>	<p>J. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is not lit.</p>
<p>K. Have loader unlock turret traverse lock</p>	<p>K. Ensure ENGAGE TURRET AZIMUTH LOCK CC is n t lit.</p>

PREPARE STATION FOR OPERATION (POWER UP GUNNER'S STATION) -- CONTINUED

L. Set FIRE CONTROL MODE switch to MANUAL Check that indicator light comes on.

M. Have loader set GUN/TURRET DRIVE switch on loader's panel to POWERED

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>PREPARE STATION FOR OPERATION (PERFORM GPS FUNCTIONAL CHECK)</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • If you discover a problem during the checks, refer to the troubleshooting procedures any additional action will require organizational maintenance test equipment • Fire control system is designed to function normally at 18-30 vdc. Operating system at lower voltages may result in erratic performance. <p>A. Set DEFROSTER switch to ON. Check that indicator light come on. Set DEFROSTER switch to OFF.</p> <p style="text-align: center;">WARNING</p> <p>Main gun may move abruptly if palm switches on gunner's or commander's power control handles are squeezed when FIRE CONTROL MODE switch is set to NORMAL and turret power is set to ON and GUN/TURRET DRIVE on ladder's panel is set to POWERED. Abrupt movement could injure someone if any part of their body is under or over the main gun</p> <p>B. Have loader set GUN/TURRET drive switch to POWERED</p> <p>C. Set FIRE CONTROL MODE switch to NORMAL Make sure green NORMAL indicator light comes on.</p>	<p>A. Assume</p>

D. Set FIRE CONTROL MODE switch to EMERGENCY. Make sure amber EMERGENCY indicator light comes on.

E. Set FIRE CONTROL MODE switch to MANUAL. Make sure white MANUAL indicator light comes on.

NOTE

When GUN SELECT switch is set to COAX position, turret blower will come on.

F. Set GUN SELECT switch to COAX. Check that green COAX indicator light comes on and that turret blower is operating.

G. Set GUN SELECT switch to TRIGGER SAFE. Check that white TRIGGER SAFE indicator light comes on.

H. Set GUN SELECT switch to MAIN. Check that green MAIN indicator light comes on.

I. Rotate AMMUNITION SELECT switch to HEAT, BH, HEP, SABOT. Check that green indicator light for each type of ammunition comes on when switch is in that position.

J. Open both GPS ballistic doors

K. Make sure FLTR/CLEAR/SHTR switch is set to CLEAR and look into GPS eyepiece. View should be clear.

J. Assume

K. Assume view is clear.

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>PREPARE STATION FOR OPERATION (PERFORM GPS FUNCTIONAL CHECKS) -- CONTINUED</p>	
<p>L. Move MAGNIFICATION lever from 10X to 3X and back to 10X. Make sure view in eyepiece changes magnification.</p>	<p>L. Pictured in 10x. Assume view.</p>
<p>M. Rotate FLTR/CLEAR/STR switch to FLTR. Make sure filter is present in view through eyepiece</p>	<p>M. Slide 14 (FILTER IN FIELD OF VIEW) displays.</p>
<p>N. Rotate FLTR/CLEAR/SHTR switch to SHTR. Make sure daylight view is blocked out in eyepiece</p>	<p>N. Assume view is shuttered.</p>
<p>O. Rotate FLTR/CLEAR/SHTR switch to CLEAR. Make sure daylight view in eyepiece is again clear.</p>	<p>O. Assume view is clear.</p>

OPERATE GUNNER'S POWER CONTROL HANDLES

- A. Power up gunner's station
- B. Set FIRE CONTROL MODE switch on GPS to NORMAL or EMERGENCY and check that associated light is lit.

NOTE

- Squeezing palm switches on gunner's power control handles tart the mobilization system If FIRE CONTROL MODE switch is set to NORMAL only.
- Either palm switch on gunners power control handles must be squeezed for handle buttons and triggers to operate.

- C. Grasp power control handles and squeeze either or bath palm switches

NOTE

- The further counterclockwise or clockwise handles are turned the faster turret traverses.
- When traversing turret over back deck with handle a deck clearance switch automatically cause main gun to elevate if it is depressed too low to clear back deck

- D. Turn the handles clockwise to traverse turret right and counterclockwise to traverse turret left

NOTE

The further forward or backward you move handles the further main gun and coaxial machinegun will elevate or depress.

- C. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC or both.

- D. While pressing the palm switch(es), turn the AZIMUTH CONTROL Knob left or right and observe the turret azimuth indication.

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>OPERATE GUNNER'S POWER CONTROL HANDLES - Continued</p> <p>E. Rotate handles back to *elevate weapons and rotate handles forward to depress weapons.</p> <p style="text-align: center;">NOTE</p> <p>Range switch on the laser range finder (LRF) must be wt to ARM 1ST or ARM LAST RTN</p> <p>F. Operation the Laser range finder by pr sing either or both buttons on top of power control handles</p> <p style="text-align: center;">NOTE</p> <p>GUN SELECT Itch on GPS panel must be set to either MAIN or COAX as needed</p> <p>G. Fire main gun or coaxial machinegun by squeezing either or both triggers on power control handles</p>	<p>E. While pressing the palm switch(es), turn the ELEVATION CONTROL Knob up or down and observe the gun elevation indicator.</p> <p>F. Steps F. and G. covered on Turret Organizational Maintenance Trainer.</p>

OPERATE GUNNER'S MANUAL ELEVATION CRANK

- A. Make sure main gun elevation travel lock is unlocked
- B. Grasp and squeeze handle and palm switch to move SWITCH main gun as follows:
 - 1. To elevate main gun and coaxial machinegun, crank clockwise.
 - 2. To lower main gun and coaxial machinegun, crank counterclockwise.
- C. Stow crank handle by releasing palm switch, and rotating handle until the stowed lock latches. SWITCH CC.

- A. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is not lit.
- B. Press DEPRESS MANUAL ELEVATION CRANK PALM CC.
 - 1. Turn the MANUAL ELEVATION DRIVE Knob up and observe the gun elevation indicator.
 - 2. Turn the MANUAL ELEVATION DRIVE Knob down and observe the gun elevation indicator.

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>OPERATE GUNNER'S MANUAL TRAVERSE CRANK</p>	
<p>A. Make sure turret traverse lock is unlocked</p>	<p>A. Ensure ENGAGE TURRET AZIMUTH LOCK CC is not lit.</p>
<p style="text-align: center;">WARNING</p> <p>Palm switch releases magnetic brake. When palm switch is squeezed, turret may move, causing sudden movement of handle. Firmly grip handle before squeezing palm switch or crew member could be injured.</p> <p style="text-align: center;">NOTE</p> <p>Palm switch must be squeezed for handle to operate. If switch is not squeezed. Handle rotates freely.</p>	
<p>B. Grasp and squeeze handle and palm switch to SWITCH traverse follows:</p> <ol style="list-style-type: none"> 1. To traverse right, crank clockwise. 2. To traverse left, crank counterclockwise. 	<p>B. Press DEPRESS MANUAL TRAVERSE CRANK PALM turret as CC.</p> <ol style="list-style-type: none"> 1. Turn the MANUAL AZIMUTH DRIVE Knob to the right and observe the turret azimuth indicator. 2. Turn the MANUAL AZIMUTH DRIVE Knob to the left
<p style="text-align: center;">WARNING</p> <p>Make sure palm switch releases when handle is released. If switch stays engaged and turret is traversed. handle can rotate and might injure your leg.</p>	
<p>C. Release handle and palm switch to disengage from traverse mechanism.</p> <p style="text-align: center;">CC.</p>	<p>C. Release DEPRESS MANUAL TRAVERSE CRANK PALM SWITCH</p>

OPERATE MAIN GUN ELEVATION TRAVEL LOCK

- A. Set FIRE CONTROL MODE switch on GPS to MANUAL
- B. Do following to unlock main gun elevation travel lock
 - 1. Press and hold button on end of lock pin
 - 2. Take out lock pin from main gun bracket
 - 3. Swing main gun elevation travel lock up into roof bracket
 - 4. Align holes in gun elevation travel lock and roof bracket
 - 5. Put lock pin into roof bracket
- C. Do following to lock main gun elevation travel lock
 - 1. push and hold button on end of lock pin
 - 2. Take out lock pin from roof bracket
 - 3. Swing main. gun elevation travel lock down into main gun bracket

NOTE

Gunner may have to manually elevate or depress main gun to help line up holes in main gun elevation travel lock and main gun bracket

- 4. Line up holes in main gun elevation travel lock and main gun bracket
- 5. Put lock Pin into main gun bracket

- B. Ensure that ENGAGE ELEVATION TRAVEL LOCK CC is not lit.
- C. Ensure that ENGAGE ELEVATION TRAVEL LOCK CC is lit.

- 4. Assume
- 5. Assume

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>TEST FIRE CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECK)</p>	
<p>A. Power up gunner's station</p>	
<p>B. Have loader set GUN/TURRET DRIVE switch on loader's panel to MANUAL and check that MANUAL indicator light comes on.</p>	
<p>C. Have loader make sure main gun breech block is in closed position</p>	<p>C. Assume</p>
<p>WARNING</p> <p>Make sure all weapon are clear before doing firing circuit check Weapons could be accidentally and kill someone</p>	
<p>D. Get firing circuit tester from commander station and place firing circuit tester between rear of gun tube and face of breech block with light to the rear.</p>	<p>D. Press INSTALL FIRING CIRCUIT TESTER CC. Lamp lites.</p>
<p>E. Have loader move spent case ejection guard to armed position and check that ARMED indicator light on loader's panel lights</p>	<p>E. Press ARM MAIN GUN CC. Lamp lites.</p>
<p>F. Have loader check turret networks box to make sure circuit breakers CB 19, CB20. and CB29 are set to ON.</p>	
<p>G. Set GUN SELECT switch to MAIN and check that MAIN indicator light is lit</p>	

NOTE

If circuit tester indicator light does not light when it should notify organizational maintenance

- H. Operate the blasting machine Circuit tester indicator light should flash.
- I. Grasp manual elevation crank handle Squeeze palm switch and press trigger Circuit tester indicator light should light each time trigger is pressed

WARNING

Make sure main gun tub. Turret and breech are clear before going an with firing circuit check. Gun and/or turret may move and could car Injury to personnel.

- J. Tell loader to set GUN/TURRET DRIVE switch to POWERED and check that POWERED indicator light.
- K. Set FIRE CONTROL MODE switch to NORMAL and check that NORMAL indicator light is lit
- L. Squeeze both power control handle palm switches and squeeze left handle trigger Tester light should light

H. Press ACTUATE BLASTING MACHINE CC.

I. Assume.

L. Press DEPRESS GUNNER'S LEFT PALM SWITCH CC and DEPRESS GUNNER'S RIGHT PALM SWITCH CC.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>TEST FIRE CONTROL SYSTEM (PERFORM FIRING CIRCUITS CHECK) - Continued</p>	
<p>M. Repeat step L squeezing right handle trigger Tester light should light.</p>	
<p>N. Release palm switches</p>	
<p>O. Have loader lock turret traverse lock</p>	<p>O. Press ENGAGE TURRET AZIMUTH LOCK CC. Lamp lites.</p>
<p style="text-align: center;">NOTE if circuit tester indicator light lights or flashes during inhibit tests. notify organizational maintenance.</p>	
<p>P. Grasp palm switches and rotate power control handles to the left and squeeze left and then right trigger Light should not light</p>	<p>P. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC. Turn AZIMUTH CONTROL Knob to the right and press either TRIGGER switch.</p>
<p>Q. Grasp palm switches and rotate power control handles to the right and squeeze left and then right trigger Light should not light</p>	<p>Q. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC. Turn AZIMUTH CONTROL Knob to the right and press either TRIGGER switch.</p>
<p>R. Have loader unlock turret traverse lock</p>	<p>R. Ensure ENGAGE TURRET AZIMUTH LOCK CC is not lit.</p>
<p>S. Lock main gun elevation travel lock</p>	<p>S. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is lit.</p>
<p>T. Pull power control handles back a little trying to elevate weapons and grasp palm switches and squeeze left Hand die trigger then squeeze right handle trigger Light should not flash.</p>	<p>T. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC. Turn ELEVATION CONTROL Knob and press either TRIGGER switch.</p>

- U. Unlock main gun elevation travel lock
- V. Set GUN SELECT switch to center position (TRIGGER SAFE) and check that TRIGGER SAFE indicator light is lit
- W. Grasp palm switches and squeeze left handle trigger then squeeze right handle trigger. Light should not light
- X. Set GUN SELECT switch to MAIN and check that MAIN indicator light is lit
- Y. Have loader set GUN/TURRET DRIVE watch to MANUAL position and check that MANUAL indicator light comes on.
- Z. Grasp palm switches and squeeze left handle trigger than Squeeze light handle trigger Light s should not light
- AA. Remove firing circuit tester and saw in commander's station
- AB Have loader move spent case ejection guard to the a (forward) position. Check that SAFE indicator light is lit

- U. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is not lit.
- W. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC then press either right or left TRIGGER.
- Z. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC then press either right or left TRIGGER.
- AA. Ensure INSTALL FIRING CIRCUIT TESTER CC is not lit.
- AB. Ensure ARM MAIN GUN CC is not lit.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>PERFORM HYDRAULIC ZERO PRESSURE CHECK</p>	
<p>A. Power up gunner's station</p>	
<p>B. Make sum tank engine is shut down</p>	<p>B. Ensure RUN ENGINE CC is not lit.</p>
<p>C. Set AUX HYDR POWER switch on commander's control panel to OFF</p>	
<p>NOTE</p>	
<p>Commander's power control handle can also] be used to perform hydraulic zero pressure chock</p>	
<p>O. Raise and lower main gun using power control handles</p>	
<p>E. Watch hydraulic pressure gage Pressure should slowly decrease to 750-700 psi and then drop rapidly to zero pressure. If pressure drops rapidly above 750 psi or slowly below 700 psi. notify organizational maintenance.</p>	
<p>F. Set AUX HYDR POWER switch on commander's control panel to ON Listen for hydraulic pump operation and check that pump shuts off when pressure reaches 1500-1700 psi on gage. If pump does not shut off between 1500 and 1700 psi. set AUX HYDR POWER switch to OFF and notify organizational maintenance.</p>	

OPERATE GUNNER'S PRIMARY SIGHT (GPS)

- A. Power up gunner's station
- B. Perform GPS functional check
- C. Make sure GPS DAY ballistic door is open

NOTE

Defroster only works with daylight side of GPS.

- D. Set DEFROSTER switch to ON when frost affects vision through GPS eyepiece

NOTE

Reticle seen in GPS eyepiece should be bright enough to be visible. but should be kept as dim as possible to keep from interfering with seeing and identifying target

- E. Turn RETICLE KNOB clockwise to increase brightness and counterclockwise to decrease brightness of reticle.
- F. Press and hold PANEL LIGHTS -TEST button periodically during operations to make sure all GPS and TIS lights are working.
- G. Adjust brightness of GPS and TIS panel lights by turning PANEL LIGHTS knob clockwise to brighten and counterclockwise to dim.
- H. Set MRS lever to IN to check MRS
- I. Turn grooved eyepiece housing ring clockwise, or counterclockwise, as necessary to focus reticle in GPS eyepiece

C. Assume

D. Assume

E. Assume

G. Shown fully clockwise.

H. Pictured in OUT adjustment

I. Assume

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>OPERATE GUNNER'S PRIMARY SIGHT (GPS)- Continued</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Actual fire control system mode selected is shown by FIRE CONTROL MODE lights not by position of FIRE CONTROL MODE switch <p>J. Set FIRE CONTROL MODE switch to one of the desired operating modes:</p> <ol style="list-style-type: none"> 1. NORMAL provides stabilized power control of main gun and coaxial machinegun for engaging targets while your tank is moving or stationary. NORMAL mode will work 30 seconds after turret power is turned on. The GUN/TURRET DRIVE switch on loader's panel must be in POWERED (POWERED Lamp lit, or EL UNCPL (EL UNCPL lamp lit Hydraulic pressure gage should show 1500 to 1700 psi. Below 1500 psi operation in NORMAL mode may become erratic. 2. EMERGENCY - provides unstabilized power control of main gun and coaxial machinegun for engaging targets from a station-any position. Increased reticle motion will be seen if tank is in motion. 3. MANUAL - disables power controls. Gun and turret can be moved only with manual turret and elevation crank handles. 	

NOTE

Gun and turret can be moved by manual turner and elevation crank handles .with any FIRE-CONTROL MODE light lit Hydraulic power to the turret ejectors is shut off when manual traverse crank palm lever is squeezed.

- K. Use NORMAL MODE DRIFT knobs to null out reticle drift
- L. Turn FLTR/CLEAR/SHTR switch to one of these desired positions:
1. FLTR - for filtering out bright light
 2. CLEAR - for normal day viewing.
 3. SHTR - used only with Thermal Imaging System (TIS).
The clear view is blocked and thermal channel will appear in the GPS eyepiece

NOTE

- **GUN SELECT** switch selects main gun or coaxial machinegun firing. When switch is in the center position, white **TRIGGER SAFE** light indicates main gun or coaxial machinegun cannot be fired electrically.
- **GUN SELECT** switch automatically goes to center **TRIGGER SAFE** position when **TURRET POWER** switch on the commander's panel or driver's master panel is set to **OFF**.
- **GUN SELECT** switch should be kept in **TRIGGER SAFE** when not engaging targets or performing some test or check

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
OPERATE GUNNER'S PRIMARY SIGHT (GPS) - Continued	
<p>M. Set GUN SELECT switch to desired position.</p> <ol style="list-style-type: none"> 1. MAIN for firing main gun. 2. COAX for firing coaxial machinegun. 3. TRIGGER SAFE when not engaging targets. 	
<p>N. Move MAGNIFICATION lever to desired position (3X or 10X}).</p>	<p>N. Pictured in 10x.</p>
<p>O. When GUN SELECT switch is set to MAIN, set AMMUNITION SELECT switch to desired ammunition.</p>	
<p>P. If equipment is not to be used further, power down gunner's station</p>	

OPERATE MAIN GUN (FIRE MAIN GUN)

Operate Blasting Machine

NOTE

The blasting machine is normally used when the turret's electrical system will not fire main gun.

- A. Load main gun
- B. Lay main gun on selected target
- C. To fire main gun, vigorously turn blasting machine handle clockwise two to four time

PREPARE WEAPON FOR TRAVEL (PREPARE MAIN GUN)**Prepare Main Gun for Travel**

- A. Set GUN SELECT twitch to TRIGGER SAFE.
- B. Clear main gun
- C. Lock main gun elevation travel lock

- A. Assume
- B. Assume
- C. Press ACTUATE BLASTING MACHINE CC.

- C. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is lit.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>OPERATE COAXIAL MACHINEGUN (FIRE COAXIAL MACHINEGUN)</p>	
<p>A. Install coax machinegun</p>	<p>A. Assume.</p>
<p>B. Power up gunner's station</p>	
<p>C. Open gunner's primary sight (GPS) DAY ballistic door</p>	<p>C. Assume.</p>
<p style="text-align: center;">WARNING</p> <p>Be sure main gun and coaxial machine gun are aimed down range throughout loading and firing operations. Personnel can be Injured or killed</p>	
<p>D. Load coax machinegun</p>	<p>D. Assume</p>
<p>E. Place safety on machinegun to F.</p>	<p>E. Assume</p>
<p style="text-align: center;">WARNING</p> <p>Turret blower must be on and coax smoke box must be in latched position when firing coax machinegun. Fumes from firing can be harmful to crew.</p>	
<p>F. Set GUN SELECT switch on GPS to COAX Make sure COAX light comes on. Turret blower should come on automatically. If not, do troubleshooting</p>	
<p>G. Use power or manual controls to lay center of GPS reticle on target.</p>	<p>G. Assume</p>

NOTE

Fire coax machinegun in 20 to 25 round bursts, with 4.5 Seconds between burst. For rapid firing, reduce time between bursts to 2 to 3 seconds

H. To fire coax machinegun electrically squeeze palm switch and tangier on one or both power control handles or on manual elevation crank

I. To fire coax machinegun manually press button on rear of solenoid

NOTE

- **If coax machinegun fails to fire see operate coaxial machinegun (perform failure to fire).**
- **If coax machinegun does not mop firing (runaway firing) when trigger is released pull back on charging handle and hold.**

J. To cease firing, release trigger Set GUN SELECT switch to TRIGGER SAFE. Make sure COAX light goes off and TRIGGER SAFE light comes on. Turret blower should go off automatically. If not, go to troubleshooting

K. Place safety on coax machinegun to 'S'.

L. Clear coax machinegun if no longer needed

H. Press DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC and either TRIGGER switch. Observe COAX MACHINE GUN FIRES indicator.

I. Assume

K. Assume

L. Assume

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
POWER DOWN AND SECURE STATION (POWER DOWN GUNNER'S STATION)	
A. Make sure computer control panel door is closed and latched.	A. Assume
B. Make sure THERMAL MODE switch and THERMAL TEST switch are set to OFF.	B. Assume
C. Set GUN SELECT switch to TRIGGER SAFE	
D. Set laser range finder RANGE switch to SAFE	D. Pictured in SAFE position.
E. Close GPS ballistic doors	E. Assume
F. If used. move gunner's chest rest to its stowed position.	F. Assume
G. Lock main gun elevation travel lock	G. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is lit.
H. Traverse turret by power or manually so driver can exit tank through turret	H. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC. Turn AZIMUTH CONTROL Knob either right or left as needed.
I. Lock turret traverse lock	I. Ensure ENGAGE TURRET AZIMUTH LOCK CC is lit.
J. Disconnect CVC helmet from intercom box	J. Assume
K. Turn domelight off	K. Assume

POWER DOWN AND SECURE STATION (EXIT TANK)

- A. Make sure spent case ejection guard is forward in safe position.
- B. Make sure turret traverse lock is locked
- C. Exit tank through loader's hatch.
- D. Close and lock loader's hatch
- E. Dismount tank from right or left front side of hull.

OPERATE MAIN GUN (PERFORM FAILURE TO FIRE)**WARNING**

- **Keep personnel clear of muzzle and path of recoil of main gun. Round may fire without warning**
- **If round chambered in hot gun cannot be removed or fired within 3 minutes, all personnel will evacuate tank until gun is Cool. If cook-off does not occur by the time tube is cool (2 hours), remove round. Under no circumstances will a round be fired that has been allowed to remain a hot gun tube.**

NOTE

- **HOT GUN - A gun which can cause water to boil, sizzle, or steam when placed periodically at location of projectile within empty chamber.**
- **MISFIRE - A failure to fire which may be due to a faulty firing mechanism or a faulty element in the propelling charge of the round.**
- **HANGFIRE - A delay in the detonation of the propelling charge of the round at time of firing. The amount of delay is unpredictable**
- **COOK-OFF - A round that is fired by the heat of the gun, rather than the trigger. A cook-off may occur early or late.**

- A. Ensure ARM MAIN GUN CC is not lit.
- B. Ensure ENGAGE TURRET AZIMUTH LOCK CC is lit.
- C. Assume
- D. Assume
- E. Assume

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
OPERATE MAIN GUN (PERFORM FAILURE TO FIRE) - Continued	
A. Announce MISFIRE to alert other crewmembers of failure to fire. Keep gun aimed at target	
B. Try to fire using second trigger on gunner's power control handles then try using trigger on commander's control handle. Announce MISFIRE each time gun fails to fire.	B. Press either DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC and either TRIGGER. Press DEPRESS PALM SWITCH CC on COMMANDER'S CONTROL ASSEMBLY and TRIGGER.
C. Try to fire using trigger on manual elevation crank handle.	C. Assume misfire.
D. Set GUN SELECT switch to TRIGGER SAFE (center position). Try to fire using MANUAL FIRING handle (blasting machine) by turning handle clockwise vigorously two to four times	D. Press ACTUATE BLASTING MACHINE
E. Wait 2 minutes for possibility of hang fire.	
F. Have loader open breech manually Round will be pulled out part way by extractors. Turn round one half turn. Reload round in chamber.	F. Assume
G. Move GUN SELECT switch to MAIN. Try to fire using any trigger.	
<p>WARNING</p> <p>If gun is hot and round is not removed within one minute of last misfire, leave round in chamber. Have crew evacuate tank and take cover. Let weapon cool for two hours</p>	
H. If round will not fire in steps A through F, consider round faulty and remove from breech	
I. After round is removed from breech, check firing circuits	

OPERATE COAXIAL MACHINEGUN (PERFORM FAILURE TO FIRE)

WARNING

- If- machinegun has fired 200 or more rounds within 2 minutes It is considered a **HOT GUN** and can accidentally fire and cause injury or death
- Because of possibility of a cook off, never try to remove a round that is chambered in a very hot weapon All personnel shall remain clear of weapon until weapon has cooled.
- Keep weapon aimed down range throughout entire procedure. Accidental firing could cause injury or death.

A If machinegun stops firing while trigger is still pressed, or cannot be fired manually, do following immediate action:

1. Alert crew by announcing 'stoppage'.
2. Wait 5 seconds for possibility of a hangfire.
3. After 5 seconds, pull back on charger handle and then let go.
4. Try to fire machinegun again

WARNING

For a HOT GUN (200 or more rounds fired in 2 minutes) you must wait 15 minute after second stoppage before attempting to open cover and clear the weapon.

5. If machinegun will not fire, clear weapon
6. Re-load machinegun
7. Try to fire machinegun again

B. If machinegun still does not fire clear weapon and notify organizational maintenance.

- 3 Assume
4. Ensure GUN SELECT switch is at COAX and that COAX light is on. Press DEPRESS GUNNER'S LEFT PALM SWITCH CC or DEPRESS GUNNER'S RIGHT PALM SWITCH CC and either TRIGGER switch. Observe COAX MACHINE GUN FIRES

indicator.

5. Assume
 6. Assume-
 7. same as step 4.
- B. Assume clear weapon.

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p style="text-align: center;">LOADER'S STATION</p> <p>PREPARE STATION FOR OPERATION (ENTER LOADER'S STATION)</p> <p>A. Enter tank feet first through loader's hatch. Step on loader's seat post. Then on turn floor.</p> <p>B. Make sure ready ammunition compartment door knee switch is up.</p> <p>C. Check ammunition door track areas and take out any objects in the track.</p> <p>D. Make sure spent case ejection guard is in forward (safe) portion.</p> <p>E. Make sure main gun breech is closed.</p> <p>F. After all crewmembers have entered their stations unlock turret traverse lock.</p> <p>G. Have gunner unlock main gun elevation lock.</p>	<p>A. Assume</p> <p>B. Assume</p> <p>C. Assume</p> <p>D. Ensure ARM MAIN GUN CC is not lit.</p> <p>E. Assume</p> <p>F. Assume crewmembers at station. Ensure ENGAGE TURRET AZIMUTH LOCK CC is not lit.</p> <p>G. Ensure ENGAGE ELEVATION TRAVEL LOCK CC is not lit.</p>

PREPARE STATION FOR OPERATION (POWER UP LOADER'S STATION)**NOTE****Loader's panel light are tested from commander's panel**

- A. Make sure TURRET POWER green light on commander's control panel is on
- B. Check that MAINGUN STATUS SAFE light is lit If light is not lit do troubleshooting
- C. Make sure TURRET BLOWER switch is set to OFF.
- D. Make sure GUN/TURRET DRIVE switch is set to MANUAL, and light is lit If light is not lit do troubleshooting
- E. Install antennas)
- F. Turn amplifier on as follows:
 - 1. Set MAIN PWR switch to NORM.
 - 2. Set POWER CKT BKR switch to ON.
 - 3. Check that POWER CKT BKR POWER light is lit If light is not lit, do troubleshooting
- 4. Set INT ACCENT switch to ON.
- 5. Set RADIO TRANS switch to CDR + CREW.

NOTE

See OPERATE COMMUNICATIONS SYSTEM. for operation of other positions on the INT ACCENT switch and RADIO TRANS switch

E. Assume

F. Assume

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
<p>OPERATE LOADER'S PANEL</p> <p>A. Make sure green TURRET POWER light on commander's control panel is on</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">MAIN GUN STATUS light are controlled by position ejection guard</p> <p>B. Pull ejection guard to rear.</p> <p>C. Check that yellow ARMED light is lit. If light is not lit, do troubleshooting</p> <p>D. Push ejection guard forward.</p> <p style="text-align: center;">WARNING</p> <p style="text-align: center;">TURRET BLOWER must be ON when 105mm gun or coaxial machinegun is being fired. Breathing fumes from firing can make you sick.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">TURRET BLOWER comes on automatically when GUN SELECT switch on gunner's primary sight panel is set to COAX</p> <p>F. Turn TURRET BLOWER switch to ON for manual use.</p> <p>G. Turn TURRET BLOWER switch to OFF for automatic use.</p>	<p>B. Ensure ARM MAIN GUN CC is lit.</p> <p>D. Ensure ARM MAIN UN CC is not lit.</p>

NOTE

GUN/TURRET DRIVE switch selects POWERED or MANUAL operation of main gun and turret

H. Do following for MANUAL main gun and turret operation:

1. Set GUN/TURRET DRIVE switch to MANUAL
2. Check that MANUAL light is lit If light is not lit. do troubleshooting.

NOTE

Leave GUN/TURRET DRIVE switch in MANUAL position when leaving tank.

I. Do following for POWERED main gun and turret operation:**NOTE**

POWERED position allows gunner and tank commander to operate fire control system in stabilized mode

1. Set GUN/TURRET DRIVE switch to POWERED.
2. Check that POWERED light is lit If light is not lit do troubleshooting.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>OPERATE LOADER'S PANEL - Continued</p> <p style="text-align: center;">WARNING</p> <p>If 105mm gun is below zero degrees elevation and FIRE CONTROL MODE switch on gunner's primary sight is in NORMAL, when EL UNCPL is selected, gun will move to zero degrees when gunner's or tank commander's palm switches are squeezed. Keep body away from breech, it can injure you.</p> <p>J. Do following to interrupt POWERED operation for loading main gun or coaxial machinegun:</p> <p style="text-align: center;">NOTE</p> <p>If ejection guard , is moved to rear (armed position). the fire control system will return to power mode even if GUN/TURRET DRIVE switch is set to EL UNCPL</p> <ol style="list-style-type: none"> 1. Push ejection guard forward. 2. Check that white SAFE light is lit If light is not lit, do troubleshooting 3. Set GUN/TURRET DRIVE switch to EL UNCPL 4. Check that EL UNCPL light is lit If light is not lit, do troubleshooting 	<ol style="list-style-type: none"> 1. Ensure ARM MAIN GUN CC is not lit.

OPERATE TURRET TRAVERSE LOCK (UNLOCK TRAVERSE LOCK)

- A. Lift up handle
- B. Turn handle toward loader position to UNLOCKED position make sure handle locks in place and the word UNLOCKED is showing).

**OPERATE TURRET TRAVERSE LOCK
(LOCK TRAVERSE LOCK)**

NOTE

Turret may have to be traversed slightly left or right for handle to drop into detent position

- A. Lift up handle
- B. Turn handle clockwise to LOCKED position
- C. Check that handle is down into detent position. If not. move turret slightly.

- A. Ensure ENGAGE TURRET AZIMUTH LOCK CC is not lit.

- A. Ensure ENGAGE TURRET AZIMUTH LOCK CC is lit.

Table C-1. M1 Operational Checks -Continued

Equipment Function	Trainer Function
<p>CHECK TURRET NETWORKS BOX - TNB</p> <p>A. Grasp and Swing circuit breaker cover on turret network box towards you to open.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Placard on inside of circuit breaker cover shows what circuits each circuit breaker protects..</p> <p>B. Set all circuit breaker switches to ON.</p> <p>C. Push on LAMP RESET button after circuit breaker witches have been set to ON.</p> <p>D. Push circuit breaker cover to closed -position</p> <p>E. If CKT BKR OPEN light on commander's control panel is lit do troubleshooting</p>	<p>A. Assume</p> <p>D. Assume</p>

POWER DOWN AND SECURE STATION (POWER DOWN LOADER'S STATION)**NOTE**

Loader should not power down his position until turret has been traversed for driver's exit

- | | | | |
|----|--|----|--|
| A. | Move knee switch to stowed position. | A. | Assume |
| B. | Make sure hull ammunition door is closed | B. | Assume |
| C. | Lock turret traverse lock | C. | Ensure ENGAGE TURRET AZIMUTH LOCK CC is lit. |
| D. | Clear main gun | D. | Assume |
| E. | Make sure ejection guard is forward. | E. | Ensure ARM MAIN GUN CC is not lit. |
| F. | Make sure main gun breech block is closed | F. | Assume |
| G. | Set GUN/TURRET DRIVE switch to MANUAL | | |
| H. | Set TURRET BLOWER switch to OFF. | | |
| I. | Check that MAIN GUN STATUS SAFE light is lit. If not, do troubleshooting | | |
| J. | Stow loader's guards | J. | Assume |
| K. | Make sure semi-ready ammunition door is closed. | K. | Assume |
| L. | Make sure ready ammunition door is closed | L. | Assume |
| M. | Stow coaxial ammunition belt, in ready box | M. | Assume |
| N. | Set amplifier MAIN PWR switch to OFF. | N. | Assume |
| O. | Disconnect CVC from intercom box | O. | Assume |

Table C-1. M1 Operational Checks-Continued

Equipment Function	Trainer Function
POWER DOWN AND SECURE STATION (CLOSE AND LOCK LOADER'S HATCH)	
A. Make sure all crewmembers have exited tank.	A. Assume
B. Make sure VEHICLE MASTER POWER light is OFF.	
C. Make sure machinegun mount is in STOW position.	C. Assume
D. Grasp latch handle using right hand	D. Assume
E. Reach into hatch opening and grasp lock handle using left hand	E. Assume
F. Pull lock handle towards you	F. Assume
G. Close hatch	G. Assume
H. Put in and close padlock through hole in brackets	H. Assume
L. Dismount tank over front slope.	I. Assume

Table C-2. M1 Operator's Troubleshooting Procedures

Equipment Function	Trainer Function
<p>MALFUNCTION</p> <p>TEST OR INSPECTION</p> <p>CORRECTIVE ACTION</p>	
<p>28. VEHICLE MASTER POWER LIGHT NOT LIT AT COMMANDER'S PANEL.</p> <p>Step 1. Check turret networks box circuit breakers CB 13 and C831</p> <p style="text-align: center;">NOTE</p> <p>If any circuit breaker is at OFF position and CKT BKR OPEN light is not lit go to SYMPTOM 23 after completing SYMPTOM 28.</p> <p>a. If either circuit breaker is at OFF position, set to ON, then go to step 2.</p> <p>b. If both circuit breakers are at ON position, go to step 2.</p> <p>Step 2. Press PANEL LIGHTS TEST button and check indicator light.</p> <p>a. If light does not light, replace lamp</p> <p>b. If light lights, notify organizational maintenance.</p>	
<p>29. TURRET POWER LIGHT DOES NOT LIGHT.</p> <p>Step 1. Check turret networks box circuit breaker CB 13</p> <p style="text-align: center;">NOTE</p> <p>If any circuit breaker is at OFF position and CKT BKR OPEN light is not lit go to SYMPTOM 23 after completing SYMPTOM 29.</p> <p>a. If circuit breaker is at OFF position, set to ON, then go to step 2.</p> <p>b. If circuit breaker is at ON position, go to step 2.</p> <p>Step 2. Press PANEL LIGHTS TEST button and check indicator light</p> <p>a. If light does not light, replace lamp</p> <p>b. If light lights, notify organizational maintenance.</p>	

Table C-2. M1 Operator's Troubleshooting Procedures - Continued

Equipment Function	Trainer Function
<p>MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION</p>	
<p>30. AUX HYDR POWER LIGHT DOES NOT LIGHT.</p> <p>Step 1. Check turret networks box circuit breaker CB30</p> <p style="text-align: center;">NOTE</p> <p>If any circuit breaker is at OFF position and CKT BKR OPEN light is not lit, go to SYMPTOM 23 after completing SYMPTOM 30.</p> <p>a. If circuit breaker is at OFF position, set to ON, then go to step 2</p> <p>b. If circuit breaker is at ON position, go to step 2.</p> <p>Step 2. Press PANEL LIGHTS TEST button and check indicator light.</p> <p>a. If light does not light, replace lamp</p> <p>b. If light lights, notify organizational maintenance.</p>	
<p>76. COMMANDER'S WEAPON STATION DOES NOT TRAVERSE IN POWER MODE.</p> <p>Check turret networks box circuit breaker CB5</p> <p style="text-align: center;">NOTE</p> <p>If any circuit breaker is at OFF position and CKT BKR OPEN light is not lit, go to SYMPTOM 23 after completing SYMPTOM 76.</p> <p>a. If circuit breaker is at OFF position, set to ON.</p> <p>b. If circuit breaker is at ON position, notify organizational maintenance.</p>	

97. MAIN GUN WILL NOT ELEVATE OR DEPRESS WHEN GPS FIRE CONTROL MODE SWITCH SET TO NORMAL OR EMERGENCY.

Step 1. Make sure GUN/TURRET DRIVE switch on loader's panel is set to POWERED.

Step 2. Make sure main gun elevation travel lock is unlocked

Step 3. Check for material jammed between gun shield and turret.

a. If material is jammed between gun shield and turret, remove material.

b. If gun shield/turret junction is clear, go to step 4.

Step 4. Try to elevate and depress main gun using commander's power control handle.

a. If gun moves, notify organizational maintenance that gunner's power control handle is faulty.

b. If gun does not move, notify organizational maintenance.

Assume no material is jammed.

98. TURRET WILL NOT TRAVERSE WHEN FIRE CONTROL MODE SWITCH ON GPS SET TO NORMAL OR EMERGENCY.

Step 1. Make sure turret traverse lock is unlocked

Step 2. Make sure GUN/TURRET DRIVE switch on loader's panel is set to POWERED.

Step 3. Check for material jammed between hull and turret.

a. If material is jammed between hull and turret, remove material.

b. If hull/turret junction is clear, go to step 4.

Assume no material is jammed.

Table C-2. M1 Operator's Troubleshooting Procedures - Continued

Equipment Function	Trainer Function
<p>MALFUNCTION</p> <p>TEST OR INSPECTION</p> <p>CORRECTIVE ACTION</p> <hr/> <p>Step 4. Try to traverse turret using commander's power control handle.</p> <p>a. If turret moves, notify organizational maintenance that gunner's power control handle is faulty.</p> <p>b. If turret does not move, notify organizational maintenance.</p> <p>104. UNABLE TO FIRE MAIN GUN WITH GUNNER'S HANDLE.</p> <p>Step 1. Perform failure to fire procedure</p> <p>Step 2. Check turret networks box circuit breakers CB19, CB20, and CB29</p> <p style="text-align: center;">NOTE</p> <p>If any circuit breaker is at OFF position and CKT BKR OPEN light is not lit, go to SYMPTOM 23 after completing SYMPTOM 104.</p> <p>a. If any circuit breaker is at OFF position, set to ON. If gun will not fire, perform failure to fire procedures and go to step 3.</p> <p>b. If all circuit breakers are at ON position, go to step 3.</p> <p>Step 3. Check that GUN/TURRET DRIVE switch is set to POWERED.</p> <p>a. Make sure turret traverse lock is unlocked</p> <p>b. Make sure main gun elevation travel lock is unlocked</p>	

- Step 4. Check that the following computer control panel lights are not lit: BORESIGHT, ZERO, MRS, and TEST.
- a. If BORESIGHT, ZERO, and TEST lamps are lit, press and release each one. If lamps remain lit, notify organizational maintenance.
 - b. If MRS light is lit, make sure MRS lever is in the OUT position. If light remains lit, notify organizational maintenance.
 - c. If BORESIGHT, ZERO, TEST, and MRS lamps are out and malfunction is still present, notify organizational maintenance.

Step 5. Perform firing circuits check

117. TURRET BLOWER DOES NOT WORK.

Check turret networks box circuit breaker CB 1 1

NOTE

If any circuit breaker is at OFF position and CKT BKR OPEN light is not lit go to SYMPTOM 23 after completing SYMPTOM 117.

- a. If circuit breaker is at OFF, set to ON.
- b. If circuit breaker is at ON position, notify organizational maintenance.

Assume computer control panel lights are OK.

Table C-3. STE-M1/FVS Preoperational Procedures

Equipment Function	Trainer Function
<p>The following is derived from DEP TM 9-4910-572-14&P, Test Set STE/M1:</p> <p>Connect cables.</p> <p>Connect test set to power source.</p> <ol style="list-style-type: none"> 1. Remove cap from slave receptacle in M1 tank. 2. Plug NATO adapter into slave receptacle. 3. Plug P1 connector of CX306 cable into J2 connector of NATO adapter. <p>Turn power on; start self-test.</p> <ol style="list-style-type: none"> 1. Set ON/OFF switch on controllable interface box to ON. 2. Push circuit breaker on vehicle test meter to ON. 3. Check that display on vehicle test meter reads .8.8.8.8; then changes to ---- 4. Dial 66 into TEST SELECT switches on vehicle test meter. 5. Press and release TEST switch. 6. Check that display reads 0066. 7. Dial 99 into TEST SELECT switches on vehicle test meter. 8. Press and release TEST switch. 9. Wait for display to read PASS. 	<p>Press CONNECT CX603 CC. Press CONNECT W1 CC.</p> <p>Assume.</p> <p>Assume.</p> <p>Press CONNECT TO CA1 CC; lamp lights.</p>

NOTE

At this point in the test, numbers appear on the display. Wait for display to read PASS; then continue.

10. Dial 00 into TEST SELECT switches on vehicle test meter.

11. Press and release TEST switch.

12. Check that display on set communicator reads:

STE-M1 REL 9.0

CLEAR UNIT.

NOTE

Continue self-test by doing the steps in table C-4 in sequence. From this point on, all testing is done using the set communicator.

Table C-4. STE-M1/FVS Operational Procedures

Step	Operator Action	Set Communicator Display	Operator/Action Remarks	Trainer Function
1.	Press CLEAR key	ENTER TEST NUMBER:		
2.	Press 6 key three times	ENTER TEST NUMBER: 666		
3.	Press GO key SELF TEST	TEST 666		
4.	Press GO key	REMOVE CABLES FROM CIB J1, J2, AND J3	Check that no cables are connected to CIB J1, J2, and J3	Press STATUS CC on cable connect diagram. Disconnect any cables that are connected to the CIB.
5.	Press GO key	TEST IN PROGRESS. PLEASE WAIT.		
6.	Wait for display to change	VTM OK		
7.	Press GO key	BUTTON TEST: PRESS RETEST		
8.	Press RETEST key	BUTTON TEST: PRESS 7		
9.	Press 7 key PRESS 8	BUTTON TEST:		
10.	Press 8 key PRESS 9	BUTTON TEST:		
11.	Press 9 key	BUTTON TEST: PRESS CAL		

12.	Press CAL key	BUTTON TEST: PRESS 4
13.	Press 4 Key	BUTTON TEST: PRESS 5
14.	Press 5 key	BUTTON TEST: PRESS 6
15.	Press 6 key	BUTTON TEST: PRESS SINGLE STEP
16.	Press SINGLE STEP key	BUTTON TEST: PRESS 1
17.	Press 1 key	BUTTON TEST: PRESS 2
18.	Press 2 key	BUTTON TEST: PRESS 3
19.	Press 3 key	BUTTON TEST: PRESS YES
20.	Press YES key	BUTTON TEST: PRESS 0
21.	Press 0 key	BUTTON TEST: PRESS NO
22.	Press NO key	BUTTON TEST: PRESS CLEAR
23.	Press CLEAR key	BUTTON TEST: PRESS GO
24.	Press GO Key	DISPLAY TEST: 0123456789
25.	Press GO key	ABCDEFGHIJKLM NOPQRSTUVWXYZ

Table C-4. STE-M1/FVS Operational Procedures-Continued

Step	Operator Action	Set Communicator Display	Operator/Action Remarks	Trainer Function
26.	Press GO key	abcdefghijklmnop qrstuvwxyz		
27.	Press GO key	19 dots on first line 19 dots on second line	
28.	Press GO key	----- -----	19 dashes on first line 19 dashes on second line	
29.	Press GO key	INSPECT CIB CONNECTORS J1 & J2.		
30.	Press GO key	ARE PINS BENT OR BROKEN?	Look at CIB connectors J1 and J2 for bent or broken pins. If no pins are bent or broken, continue test at step 33.	Assume no pins are bent or broken.
31.	Press NO key	TEST IN PROGRESS. PLEASE WAIT.		
32.	Wait for display to change	CONNECT CX304 TO CIB J1.		Dial in 304 on thumb switches of cable connect diagram. Press CX/BOB CABLE CC. Press CONNECT/DISCONNECT TO CIB/BOB MS. Press CIB J1 CS.
33.	Press GO key	CONNECT PLUG TA301 TO CX304.		Dial in 301 on thumb switches of cable connect diagram. Press CA/TA CC.
34.	Press GO key	TEST IN PROGRESS. PLEASE WAIT.		

35.	Wait for display to change	REMOVE CX304 AND PLUG TA301.		Dial 304 on thumb switches of cable connect diagram. Press CX/BOB CABLE CC. Press CONNECT/DISCONNECT TO CIB/BOB MS.
36.	Remove CX304 and plug TA301			Dial in 301 on thumb switches of cable connect diagram. Press CA/TA CC. Press CIB J1 CS.
37.	Press GO key	CONNECT CX305 TO CIB J2.		Dial is 305 on thumb switches of cable connect diagram. Press CX/BOB CABLE CC. Press CONNECT/DISCONNECT TO CIB/BOB MS; press CIB J2 CS.
38.	Press GO key	Connect PLUG TA301 TO CX305.		Dial in 301 in thumb switches of cable connect diagram. Press CA/TA CC.
39.	Press GO key	TEST IN PROGRESS. PLEASE WAIT.		
40.	Wait for display to change	REMOVE PLUG TA301 FROM CX305.		Dial in 301 on thumb switches of cable connect diagram. Press CA/TA CC.
41.	Press GO key	TEST IN PROGRESS. PLEASE WAIT.		
42.	Wait for display to change	CIB CABLES OK.		Dial in 305 on thumb switches of cable connect diagram. Press CX/BOB CABLE CC. Press CONNECT/DISCONNECT TO CIB/BOB MS; press CIB J2 CS.
43.	Press GO key	TEST FINISHED. PUSH STOP AND CLEAR.		
44.	Press STOP key			
45.	Press CLEAR key	ENTER TEST NUMBER:	Enter test number as directed by TM 9-2350-255-20	

Table C-5. DSESTS Operating Procedures

Equipment Function				Trainer Function
<p>The following is derived from TM 9-1200-206-34-1-1, dated 15 March 1982, DSESTS Procedures:</p> <ol style="list-style-type: none"> 1. Set test set ON/OFF circuit breaker to OFF. 2. Set power supply ON/OFF switch to OFF. 3. Plug in power cable PWR-W1 connector P1 to test set connector POWER UJ1. 4. Connect cable PWR W1 leads to power supply output terminals (white lead to positive (+), black lead to negative (-), and lead with crocodile clip to LRU case ground). 5. Set power supply ON/OFF switch to ON. 6. Set test set ON/OFF circuit breaker to ON. <p>Self-test and test selection:</p> <ol style="list-style-type: none"> 7. Perform the following steps to do the test set self-test and to select the desired troubleshooting procedure. 				<p>Press APPLY POWER CC.</p>
Step	Display Message	Panel Lamps On	Operator Action/Remarks	
a.	SELF TEST?	POWER, ANSWER REQUIRED	<p>Press YES pushbutton. Note--If self-test is not wanted, press NO and go to step 12.</p>	

b.	DISCONNECT ALL TEST CABLES PRESS YES	POWER	Press YES pushbutton after all test cables are disconnected. Note--ANSWER REQUIRED lamp lights after 10 seconds if YES pushbutton is not pressed. Message flashes after YES pushbutton is pressed if any test cable connected.	Ensure all CONNECT TEST CABLE CC are disconnected; then press YES pushbutton.
c.	SELF TEST IN PROGRESS	POWER, SELF TEST FAIL	SELF TEST FAIL lamp goes out after 3 seconds. Display reads SELF TEST IN PROGRESS for 10 seconds.	
d.	PRESS NO	POWER	Press NO pushbutton. Note--ANSWER REQUIRED lamp lights after 10 seconds if NO pushbutton is not pressed.	
e.	PRESS STOP	POWER	Press STOP pushbutton. Note--ANSWER REQUIRED lamp lights after 10 seconds if STOP pushbutton is not pressed.	
f.	ARE ALL LAMPS ON	POWER, ANSWER REQUIRED, SELF TEST FAIL	Press YES pushbutton if all lamps are on.	
g.	***** ALL SEGMENTS ON IN LINE 1	POWER, ANSWER REQUIRED	Press YES pushbutton if all segments are on in line 1.	
h.	ALL SEGMENTS ***** ON IN LINE 2	POWER, ANSWER REQUIRED	Press YES pushbutton if all segments are on in line 2.	

*Twenty characters with all segments lighted.

Table C-5. DSESTS Operating Procedures-Continued

	Display	Equipment Function	Operator Action/ Remarks	Trainer Function
Step	Message	Panel Lamps On		
i.	ALL SEGMENTS ON IN LINE 3 *****	POWER, ANSWER REQUIRED	Press YES pushbutton if all segments are on in line 3.	
j.	SELF TEST IN PROGRESS	POWER	Display reads SELF TEST IN PROGRESS for 20 seconds.	
k.	TEST SET OK PRESS YES FOR MENU	POWER	Press YES pushbutton.	
			The following three actions apply to each of steps 12-23.	
l.	TNB TEST?	POWER, ANSWER REQUIRED	Press YES pushbutton if test shown on the display is to be completed.	If YES pushbutton is pressed for tests not appropriate to this trainer, then slide THIS FUNCTION NOT SIMULATED displays.
m.	CWS-PCU TEST?	POWER, ANSWER REQUIRED		
n.	GTD-EU TEST?	POWER, ANSWER REQUIRED	Refer to TM 9-1200-206-34-1-1, chapter 8, for troubleshooting of components identified as faulty by the DSESTS.	
o.	CEU TEST?	POWER, ANSWER REQUIRED		
p.	CCP TEST?	POWER, ANSWER REQUIRED	Press NO pushbutton to continue test selection.	
q.	LOS-EU TEST?	POWER, ANSWER REQUIRED		

*Twenty characters with all segments lighted.

r.	LRF TEST?	POWER, ANSWER REQUIRED	
s.	HNB TEST?	POWER, ANSWER REQUIRED	
t.	HDB TEST?	POWER, ANSWER REQUIRED	
u.	DIP TEST?	POWER, ANSWER REQUIRED	
v.	DMP TEST?	POWER, ANSWER REQUIRED	
w.	ECU TEST?	POWER, ANSWER REQUIRED	If the ECU test is not wanted, press NO pushbutton. The display returns to start of test selection and reads SELF TEST? with ANSWER REQUIRED lamp on.

8.	Connect cable (UUT) to test set connector.		Press CONNECT CC for appropriate unit under test (UUT).
9.	Connect ground clip to (UUT) chassis ground.		Press CONNECT/DISCONNECT GROUND CLIP CC.
10.	Follow test set display.		
11.	Does display reads (UUT) OK! RERUN TEST?		
12.	If answer to step 11 is YES, unit is not faulty. Rerun test to verify operation.		
13.	If answer to step 11 is NO, go to troubleshooting fault message actions, TM 9-2350-255-34-2-1. Do actions listed in table to correct fault. Repeat test.		

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Official: Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

Distribution: See Special Distribution.

* U.S. GOVERNMENT PRINTING OFFICE: 1984- 754-045:4035

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters =
0.3937 Inches
1 Meter = 100 Centimeters = 1,000 Millimeters =
39.37 Inches
1 Kilometer = 1,000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

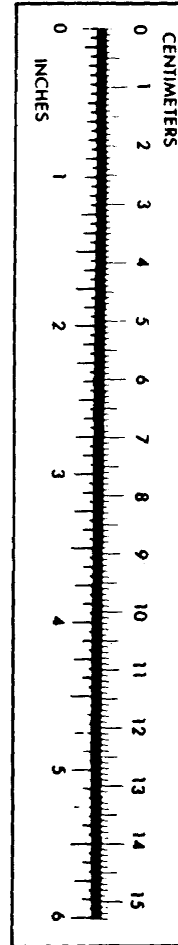
$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
 $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams =
0.035 Ounces
1 Kilogram = 1,000 Grams = 2.2 lb.
1 Metric Ton = 1,000 Kilograms = 1 Megagram =
1.1 Short Tons


APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds Per Square Inch	Kilopascals	6.895
Miles Per Gallon	Kilometers Per Liter	0.425
Miles Per Hour	Kilometers Per Hour	1.609
TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds Per Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621



TA089991

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



SOMETHING WRONG WITH THIS PUBLICATION?

THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

BE EXACT... PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

TEAR ALONG PERFORATED LINE

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS
• ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

