

CHAPTER 2

OPERATING INSTRUCTIONS

SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2.1 INSTRUCTOR/OPERATOR STATION (IOS).

2.1.1 Instructor/Operator (I/O) Control Panel. The following controls and indicators are on the I/O Control Panels, shown in Figure 2-1 and Figure 2-1a (Note that for Training Device 17/162B, the I/O Control Panel is split into an upper and lower chassis).

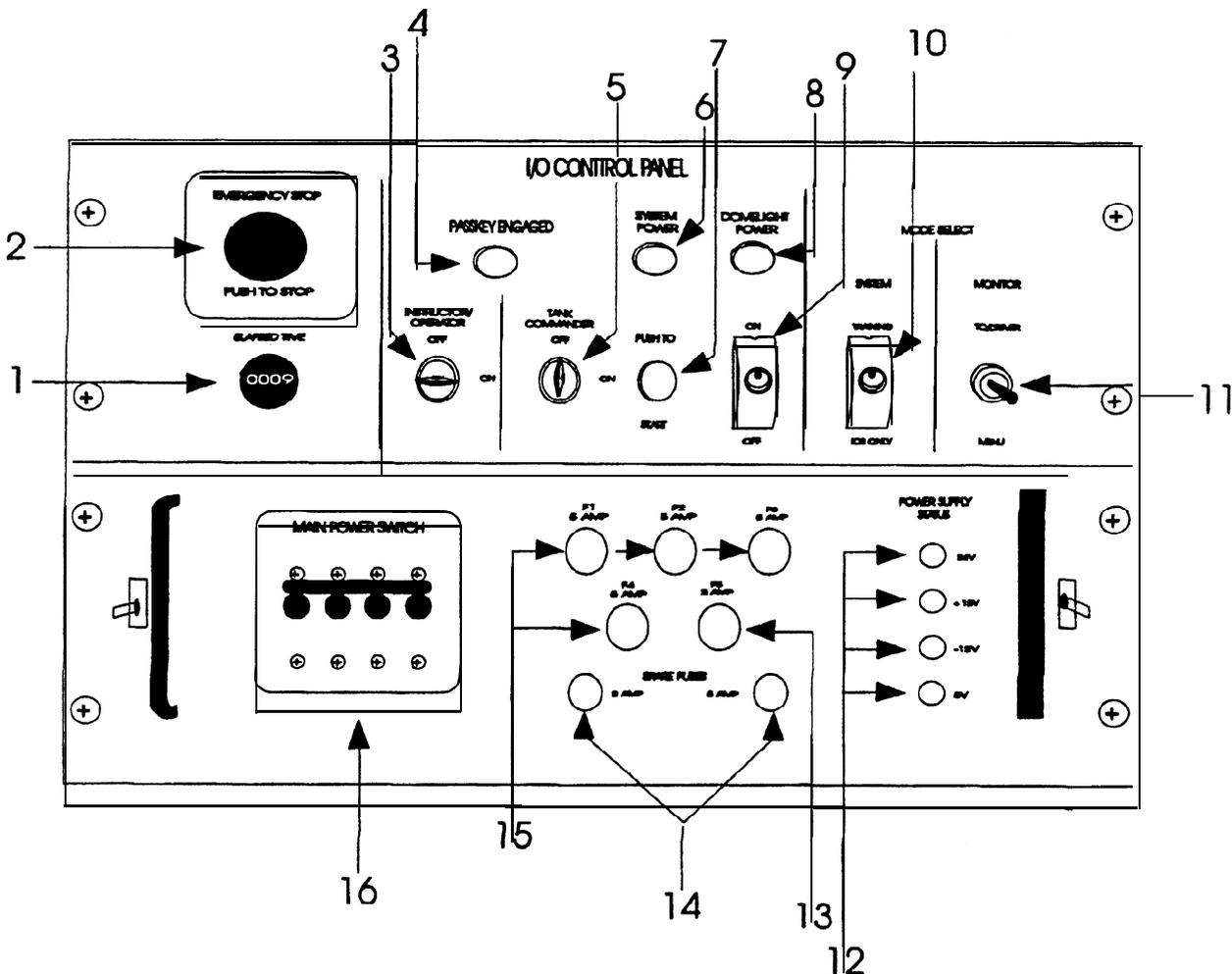


Figure 2-1. I/O Control Panel (TD 17/162A)

Key	Control/Indicator	Function
1	ELAPSED TIME Indicator	Displays total IOS operating hours and tenths of hours.
2	EMERGENCY STOP button	Turns off all power to the system at any point during operation of the simulator.
<div style="border: 1px solid black; padding: 10px; margin: 0 auto; width: fit-content;"> <p>CAUTION</p> </div> <p>Activating the EMERGENCY STOP button will not normally affect the simulator's operating system. If the EMERGENCY STOP button is activated while the system is saving training results to the performance database, only those training results will be affected. After restarting the system, check the performance results. If the performance database cannot be accessed or if error messages appear, the performance database has been corrupted. If the database is corrupted, reload the database from backup media. If the database is not corrupted, proceed with training.</p>		
3	Instructor/Operator Passkey	In ON position, with the Tank Commander passkey in the OFF position, gives control of the exercise simulation to the I/O. (Records Management functions can be accessed only with the passkeys in these positions.) In OFF position with the Tank Commander passkey in the ON position, gives control of the exercise simulation to the Tank Commander (TC).
4	PASSKEY ENGAGED Light	Upon system start-up lights (white) when a passkey (Instructor/Operator or Tank Commander) is inserted and turned to the three o'clock position. Dims when SYSTEM POWER light lights. During system operation, lights when pressed.
5	Tank Commander Passkey	In the ON position, with the Instructor/Operator passkey in the OFF position, gives control of the exercise simulation to the TC. In the OFF position, with the Instructor/Operator passkey in the ON position, gives control of the exercise simulation to the I/O. (Records Management functions can be accessed only with the passkeys in these positions.)
6	SYSTEM POWER Light	Lights (green) when power is applied to the system.
7	PUSH TO START Button	Depresses to apply power to all components.
8	DOMELIGHT POWER Light	Lights (green) when power is applied to the Domelight harness. During system operation, lights when pressed.
9	DOMELIGHT Power ON/OFF Switch	Applies power to 24V power supply, powering the domelight harness.
10	SYSTEM MODE SELECT Switch	In TRAINING position, allows the I/O or TC to run the IOS with the completely installed AFIST. In IOS ONLY position, allows the I/O to operate in a "stand-alone" mode, so the I/O can review training records or conduct training at the IOS, without AFIST components mounted on the tank.

Key	Control/Indicator	Function
11	MONITOR MODE SELECT Switch	Allows the I/O to select the display presented on the left-hand monitor at the IOS. In MENU position, displays the operator's menu at system start-up and also displays the Real-Time Display screen, allowing the I/O to monitor control inputs and determine the status of an ongoing exercise. In TC/DRIVER position, simultaneously displays TC and Driver views.
12	POWER SUPPLY STATUS Lights 24V +12V -12V 5V	Lights when power applied to 24-V power system. Lights when power applied to +12-V power system. Lights when power applied to -12-V power system. Lights when power applied to 5-V power system.
13	2-AMP Fuses	Contains 2-amp fuses.
14	Spare Fuse Receptacles	Hold spare 2- and 5-amp fuses for the IOS.
15	5-AMP Fuses	Contain 5-amp fuses.
16	MAIN POWER Switch	In on position (up), applies power to the 24-Volt (V), +12-V, -12-V, and 5-V power systems.

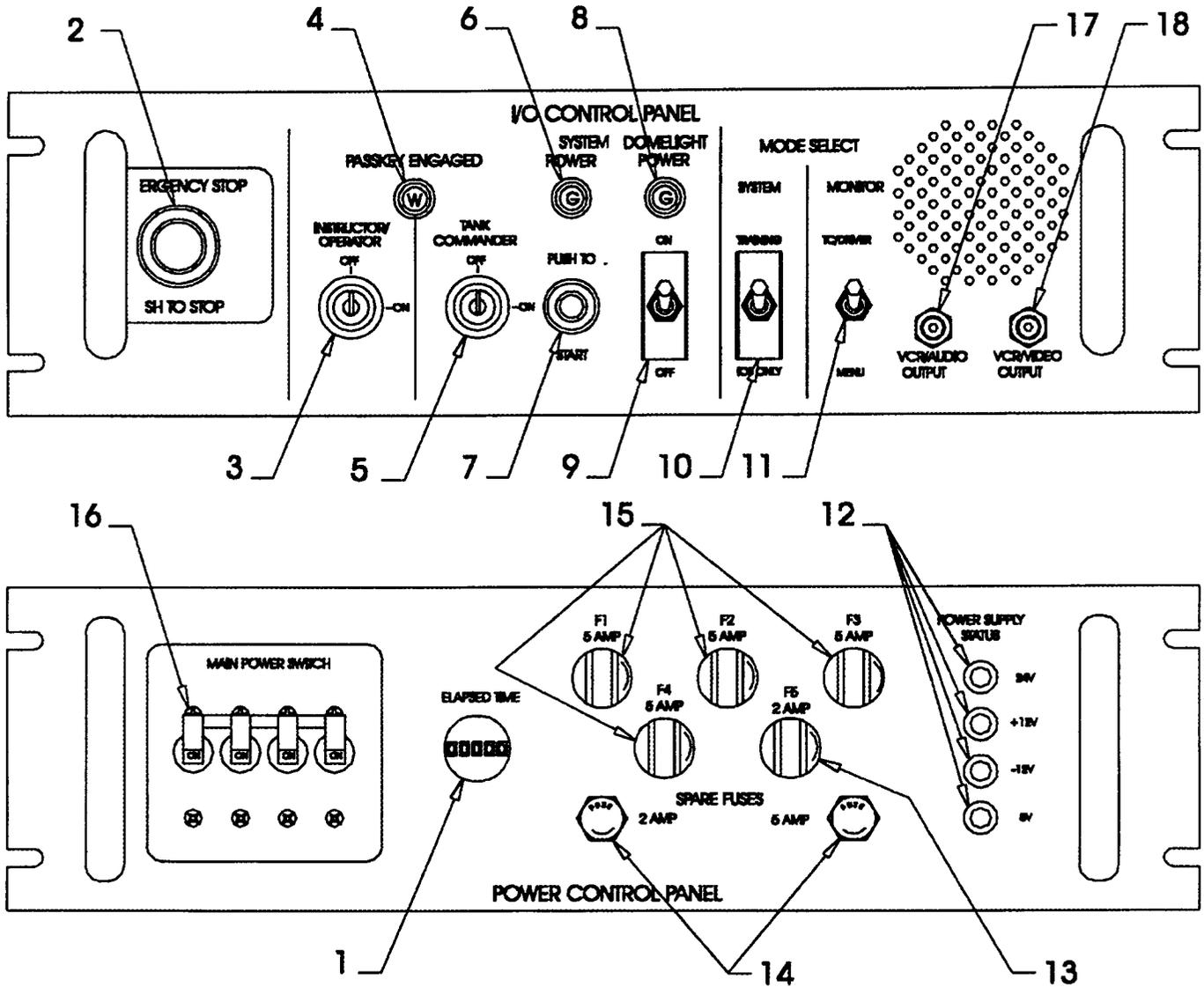


Figure 2-1a. I/O Control Panel (TD 17/162B)

Key	Control/Indicator	Function
1	ELAPSED TIME Indicator	Displays total IOS operating hours and tenths of hours.
2	EMERGENCY STOP button	Turns off all power to the system at any point during operation of the simulator.

Key	Control/Indicator	Function
<div style="border: 1px solid black; width: 150px; margin: 0 auto; padding: 5px; display: inline-block;">CAUTION</div> <p>Activating the EMERGENCY STOP button will not normally affect the simulator's operating system. If the EMERGENCY STOP button is activated while the system is saving training results to the performance database, only those training results will be affected. After restarting the system, check the performance results. If the performance database cannot be accessed or if error messages appear, the performance database has been corrupted. If the database is corrupted, reload the database from backup media. If the database is not corrupted, proceed with training.</p>		
3	Instructor/Operator Passkey	In ON position, with the Tank Commander passkey in the OFF position, gives control of the exercise simulation to the I/O. (Records Management functions can be accessed only with the passkeys in these positions.) In OFF position with the Tank Commander passkey in the ON position, gives control of the exercise simulation to the Tank Commander (TC).
4	PASSKEY ENGAGED Light	Upon system start-up lights (white) when a passkey (Instructor/Operator or Tank Commander) is inserted and turned to the three o'clock position. Dims when SYSTEM POWER light lights. During system operation, lights when pressed.
5	Tank Commander Passkey	In the ON position, with the Instructor/Operator passkey in the OFF position, gives control of the exercise simulation to the TC. In the OFF position, with the Instructor/Operator passkey in the ON position, gives control of the exercise simulation to the I/O. (Records Management functions can be accessed only with the passkeys in these positions.)
6	SYSTEM POWER Light	Lights (green) when power is applied to the system.
7	PUSH TO START Button	Depresses to apply power to all components.
8	DOMELIGHT POWER Light	Lights (green) when power is applied to the Domelight harness. During system operation, lights when pressed.
9	DOMELIGHT Power ON/OFF Switch	Applies power to 24V power supply, powering the domelight harness.
10	SYSTEM MODE SELECT Switch	In TRAINING position, allows the I/O or TC to run the IOS with the completely installed AFIST. In IOS ONLY position, allows the I/O to operate in a "stand-alone" mode, so the I/O can review training records or conduct training at the IOS, without AFIST components mounted on the tank.

Key	Control/Indicator	Function
11	MONITOR MODE SELECT Switch	Allows the I/O to select the display presented on the left-hand monitor at the IOS. In MENU position, displays the operator's menu at system start-up and also displays the Real-Time Display screen, allowing the I/O to monitor control inputs and determine the status of an ongoing exercise. In TC/DRIVER position, simultaneously displays TC and Driver views.
12	POWER SUPPLY STATUS Lights 24V +12V -12V 5V	Lights when power applied to 24-V power system. Lights when power applied to +12-V power system. Lights when power applied to -12-V power system. Lights when power applied to 5-V power system.
13	2-AMP Fuses	Contains 2-amp fuses.
14	Spare Fuse Receptacles	Hold spare 2- and 5-amp fuses for the IOS.
15	5-AMP Fuses	Contain 5-amp fuses.
16	MAIN POWER Switch	In on position (up), applies power to the 24-Volt (V), +12-V, -12-V, and 5-V power systems.
17	VCR/AUDIO OUTPUT	Used to connect VCR audio connector to record simulation task performance.
18	VCR/VIDEO OUTPUT	Used to connect videocassette recorder (VCR) video connector to record simulation task performance.

2.1.2 System Controller (Host Computer). The following controls and indicators, shown in Figure 2-2 are located on the front of the system controller.

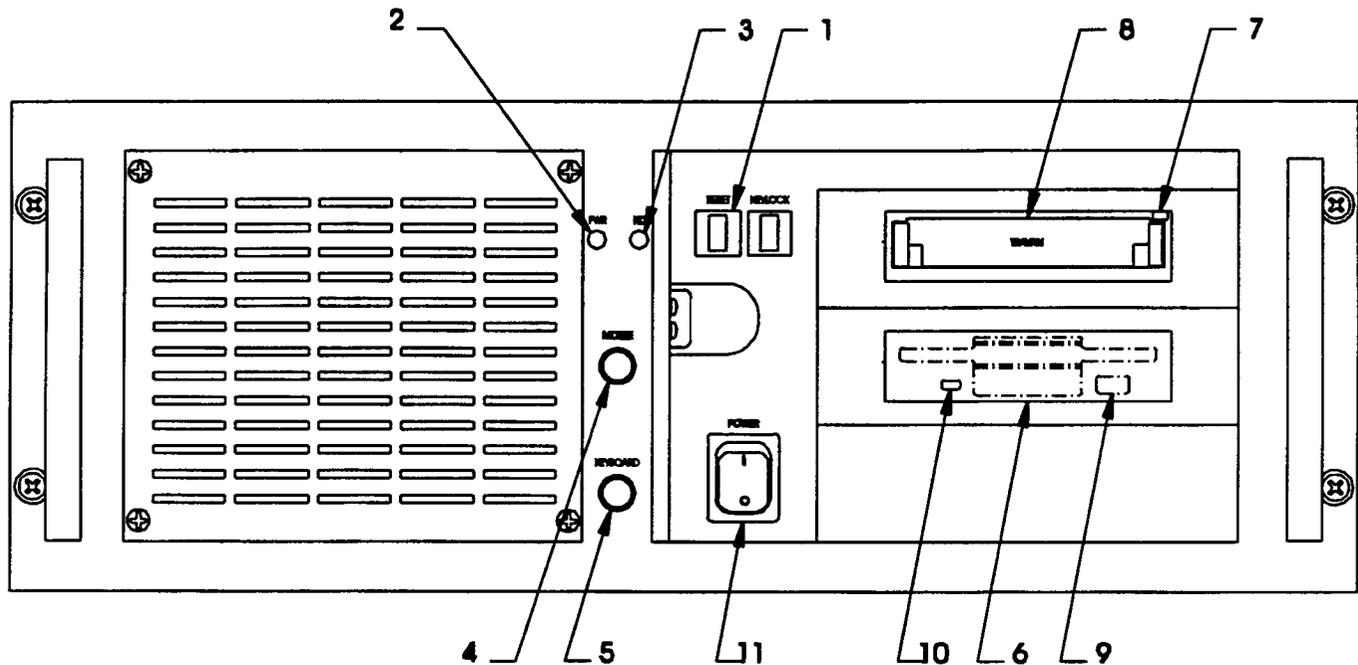


Figure 2-2. System Controller Controls and Indicators

Key	Control/Indicator	Function
1	RESET Button	Presses to reboot the system.
2	POWER Light	Lights when power is applied to the unit.
3	DISK Light	Lights when the system controller hard disk drive is accessed.
4	PS/2 Mouse Connector	Allows PS/2 mouse to be connected.
5	PS/2 Keyboard Connector	Allows PS/2 keyboard to be connected.
6	3.5-inch Disk Drive	Accepts 3.5-inch floppy disks.
7	Tape Drive Light	Lights when the tape drive is accessed
8	Tape Drive	Accepts TR-1 compatible backup tapes.
9	Eject Button	Presses to release disk from floppy disk drive.
10	Floppy Drive Light	Lights when the floppy disk drive is accessed.
11	ON/OFF Switch	Toggles power off (O) and on ().

2.1.3 Printer. The following controls and indicators are on the Printer Control Panel, on the side and front of the printer and shown in Figure 2-3:

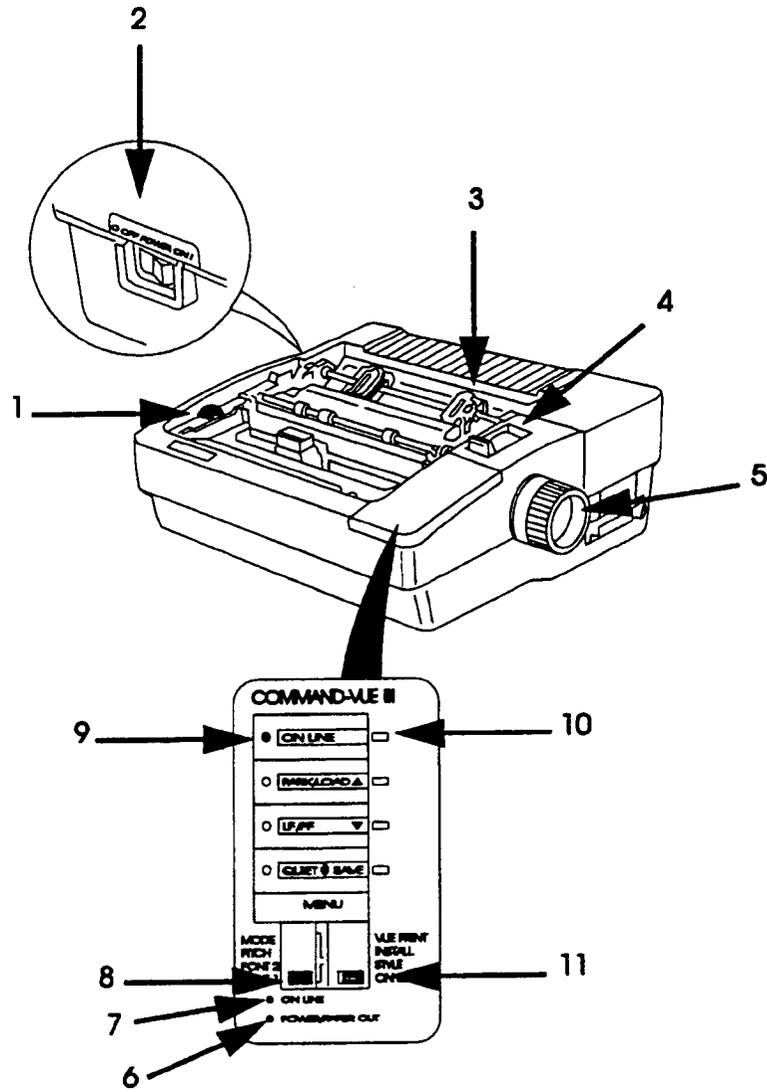


Figure 2-3. Printer Controls and Indicators

CAUTION

Do not use printer controls to interrupt a print job. Using any method to interrupt or cancel a processing print request causes irretrievable loss of the current exercise data.

Key	Control/Indicator	Function
1	Paper Thickness Lever	Turns backward to move printhead closer to platen for thinner paper, turns forward to move printhead away from platen for thicker paper. Remains at 0 for normal operation.
2	On/Off Switch	Toggles power off (O) and on (I).
3	Tractor Feeder	Adjusts paper tautness.
4	Paper Select Lever	Moves forward to select continuous-form printing, backward to select single-sheet printing.
5	Paper Feeder Knob	Turns to move paper up and down over platen.
6	POWER/PAPER OUT	Lights when power supplied to printer. Flashes when printer is out of paper.
7	ON LINE Light	Lights when printer is on-line (normal operating mode).
8	STYLE slide switch	With Menu slide button in STYLE position, slides up and down to display STYLE menu groups. Remains in FONT 1 position for normal operation.
9	Menu Lights	Light when menu option in windows are turned on. In printer On Line mode, flash sequences may indicate printer problems (see troubleshooting procedures in Chapter 3, Section II),
10	Option Windows and Option Keys	Displays options available on menus selected by slide switches. Keys press to turn options in windows on/off according to menu displayed.
11	MENU slide switch	Slides up and down to display various menu groups and options described below. Remains in ON LINE position for normal operation. Must be in STYLE position to move STYLE slide switch.
	ON LINE Menu	Displays the following functions used during normal operation.
	ONLINE	Presses to turn printer on and off line.
	PARK/LOAD	When held more than 2 seconds in On Line mode, moves paper to top-of-form (first line on page). In Off Line mode, moves continuous paper between parked, top-of-form, and tear bar positions.
	LF/FF	When held more than 2 seconds in On Line mode, moves paper to top-of-form position. In Off Line mode, advances paper one line. When held more than 2 seconds in Off line mode, advances continuous-form paper to the tear bar position or ejects single-sheet paper.
	QUIET/SAVE	In On Line mode, presses to turn Quiet mode (reduces printing noise) on/off

NOTE

The following menus and option keys are present and Do not need to be used to print AFIST reports. They Are presented here for general information only.

Key	Control/Indicator	Function
	FONT 1 Menu	With Menu slide switch in STYLE position and STYLE slide switch in FONT 1 position, displays the following typeface options:
	DRAFT	Selects Draft typeface.
	HI-SPEED	Selects Hi-Speed typeface.
	ROMAN	Selects Roman typeface.
	SANS SERIF	Selects Sans Serif typeface.
	FONT 2 Menu	With Menu slide switch in STYLE position and STYLE slide switch in FONT 2 position, displays the following typeface options:
	COURIER	Selects Courier typeface.
	PRESTIGE	Selects Prestige typeface.
	SCRIPT	Selects Script typeface.
	ORATOR	Selects Orator typeface.
	PITCH Menu	With Menu slide switch in STYLE position and STYLE slide switch in position, displays the following size options:
	10 CPI	Selects printing at 10 characters-per-inch (CPI).
	12 CPI	Selects printing at 12 CPI.
	15 CPI	Selects printing at 15 CPI.
	PROPORTIONAL	Selects proportional printing.
	MODE Menu	With Menu slide switch in STYLE position and STYLE slide switch in MODE position the following options, which cannot be cancelled with software commands are available:
	EMPHASIZED	Prints selected typeface in bold.
	EXPANDED	Prints selected typeface double-wide, double-high.
	FONT LOCK	Causes printer to ignore software font commands. Printer uses only font select through control panel.

NOTE

The COLOR RIBBON button can be used only with the optional Color Kit supplied by the manufacturer. The Color Kit is not part Of AFIST equipment.

Key	Control/Indicator	Function
	CONDENSED	Prints selected typeface in reduced spacing and size.
	INSTALL MENU	Displays optional accessories and envelope-printing mode.
	COLOR RIBBON	When held for more than 1 second in On Line mode, allows color printing setup and use. In Off Line mode, selects optional color ribbon. This option must be selected whenever the color ribbon is installed.
	ASF	Selects optional automatic sheet feeder.
	ENVELOPE	Allows envelope printing.
	COPY MODE	Allows printing multipart forms.
	VuePrint Menu	Displays options to change printer default settings.
	MENU	When held for 3 seconds, selects VuePrint menu mode, presenting sequence of printed menus on which to change default settings. Advances through menu sequence when pressed..
	SELECT	Moves printhead to next item in current menu.
	SAVE	In VuePrint mode, saves selected item in the current menu as default setting. When not in VuePrint menu mode, saves the settings selected outside VuePrint mode as default..
	PRINT	When held for 3 seconds, prints default settings with current default settings emphasized.

2.1.4 Glidepoint Keyboard. The keyboard (Figure 2-4), located on a pull-out shelf below the I/O Control Panel, allows the I/O to control the training by selecting, initiating, controlling, and recording tasks at the IOS.

The I/O uses the keyboard to type in text for I/O comments when evaluating crews, updating crew records, or performing database maintenance. Function keys are operational only while the simulation is running. The following function keys are used to control the simulation:

(1) Function Keys F1 - F12

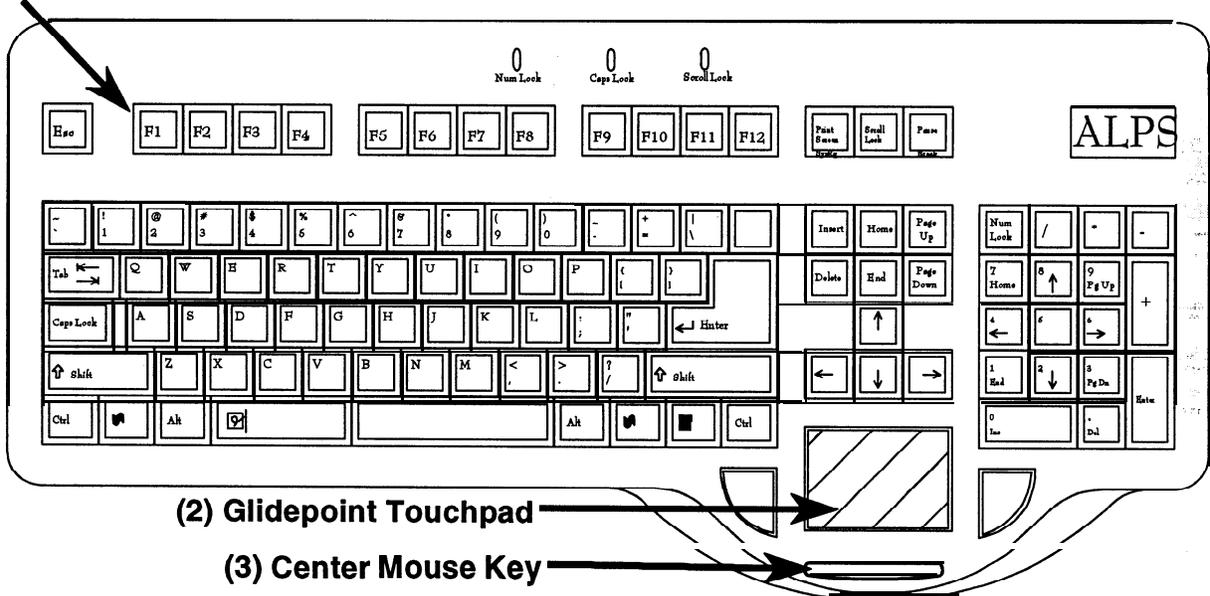


Figure 2-4. Glidepoint Keyboard

KEY	Control/Indicator	Function
1	Function Keys	
	F1 - ALERT	Records Alert errors.
	F2 - AMMO/WEAPON	Records Ammo/Weapon errors.
	F3 - DESC	Records Description errors.
	F4 - IDENT	Records Identification errors.
	F5 - RANGE/SIGHT RND	Records Range/Sight errors.
	F6 - LD/CLR	Records Round Load and Breech Path Clear errors.
	F7 - EXEC CMD, REPLAY	Records Execution Command by the TC errors. When exercise has been frozen with the Shift-F1 keys, plays back the crew's performance on the current exercise.
	F8 - CMD EXEC, REPEAT	Records TC/Gunner Command Execution errors. When exercise has been frozen with the Shift-F1 keys, returns the exercise to its start and reruns it.
	F9 - OBSERVATION & SUBSEQUENT COMMAND	Records Observation and Subsequent Command errors.

KEY	Control/Indicator	Function
	F10 - CREW SAFETY, TERMINATE F11 - NBC MASK F12 - SEARCH Shift-F1 - FREEZE/ UNFREEZE Shift-F6 - EXIT	Records Crew Safety errors. When exercise has been frozen with the Shift-F1 keys, terminates the currently selected exercise without the option of saving any performance data. Records Not Masked During NBC errors. Records Not Searching Between Engagements errors. Toggles to stop (freeze) and resume (unfreeze) exercise. In Freeze mode, operator has option to replay, repeat, or terminate exercise. Exits the exercise mode, saving performance data and displaying Exercise Critique Summary Screen.
2	Glidepoint Touchpad Mouse	Moves the position of the cursor on the screen.
3	Touchpad Mouse Key(s)	Center button highlights and selects the screen element beneath the cursor. Other mouse keys are not used.

2.1.5 **IOS Monitors.** The following controls and indicators are located on the front of the IOS monitors and are shown in Figure 2-5, 2-5a, and 2-5b.

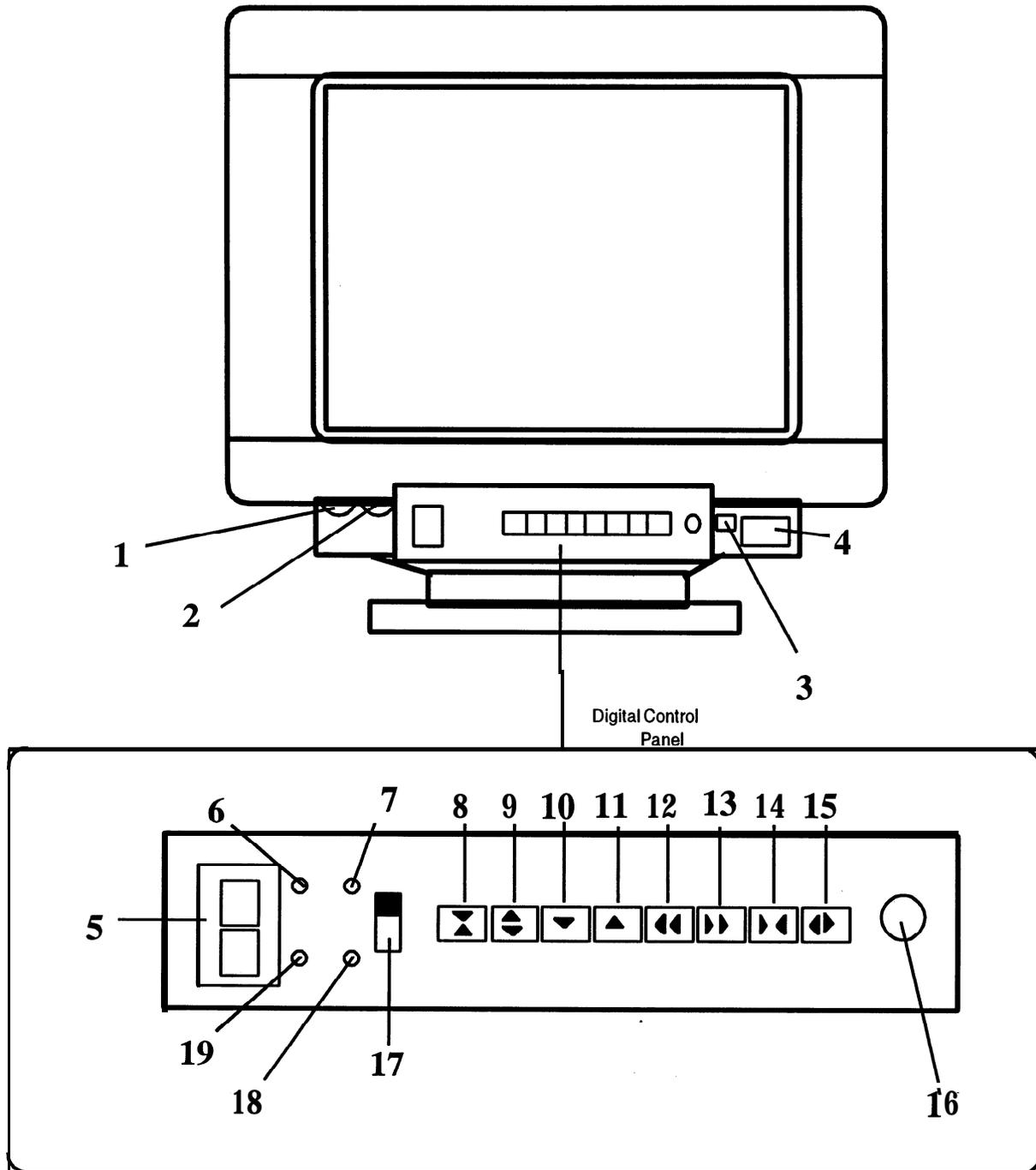


Figure 2-5. IOS and Driver Monitor 14-inch (MAG) Controls and Indicators

Key	Control/Indicator	Function
1	Brightness Knob	Turns to adjust image brightness.
2	Contrast Knob	Turns to adjust image contrast.
3	Power Light	Lights when power turned on.
4	ON/OFF Switch	Presses power on (I) and off (O).
5	Mode Indicator	Displays mode of present display. Normal display is 9.
6	Composite Synch Light	Lights when input has composite synch signal.
7	User Status Light	Lights when monitor in user-programmed display mode.
8	▼ ▲ (Vertical Size, 1)	Presses to reduce vertical size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 1.
9	▲ , (Vertical Size, 2)	Presses to increase vertical size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 2.
10	▼ (Vertical Position, 3)	Presses to lower vertical position. With Preset Status Selector in down position, presses to store settings for user-defined mode 3.
11	▲ (Vertical Position, 4)	Presses to raise vertical position. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 4.
12	◀◀ (Horizontal Phase, 5)	Presses to move horizontal phase left. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 5.
13	▶▶ (Horizontal Phase, 6)	Presses to move horizontal phase right. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 6.
14	▶◀ (Horizontal Size, 7)	Presses to reduce horizontal size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 7.
15	◀▶ (Horizontal Size, 8)	Presses to increase horizontal size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 8.
16	Program/Recall Button	With Preset/User Status Selector in up position, presses to reset all settings to manufacturer defaults. With Preset/User Status Selector in down position, allows current settings to be stored into memory using buttons 1 through 8.
17	Preset/User Status Selector	Shifts up to use manufacturer's default display setting. Shifts down to use user-programmed default display setting modes. Remains in Preset (up) position for normal operation.
18	Out-of Range Light	Lights when input signal is out of frequency range.
19	Synch-on Green Light	Lights when input has composite synch signal on green.

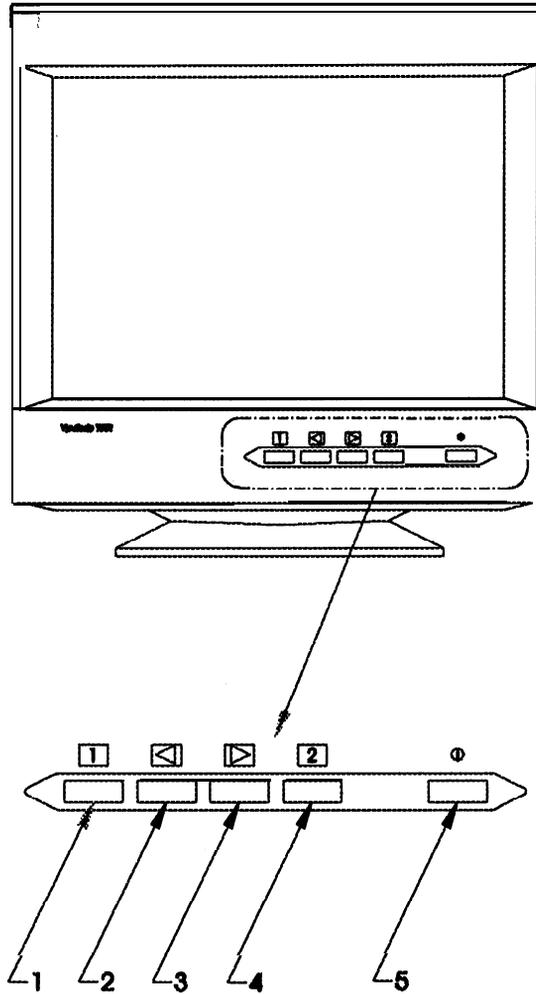


Figure 2-5a. IOS and Driver's Monitor 15-inch (Viewsonic) Controls and Indicators.

KEY	Control/Indicator	Function
1	Main Menu Display	Press to access the main menu.
2	Left Scroll/adjust	Scrolls through menu, adjusts level of selected item.
3	Right Scroll/adjust	Scrolls through menu, adjusts level of selected item.
4	Select	Selects Menu item.
5	Power Switch	Turns monitor on & off.

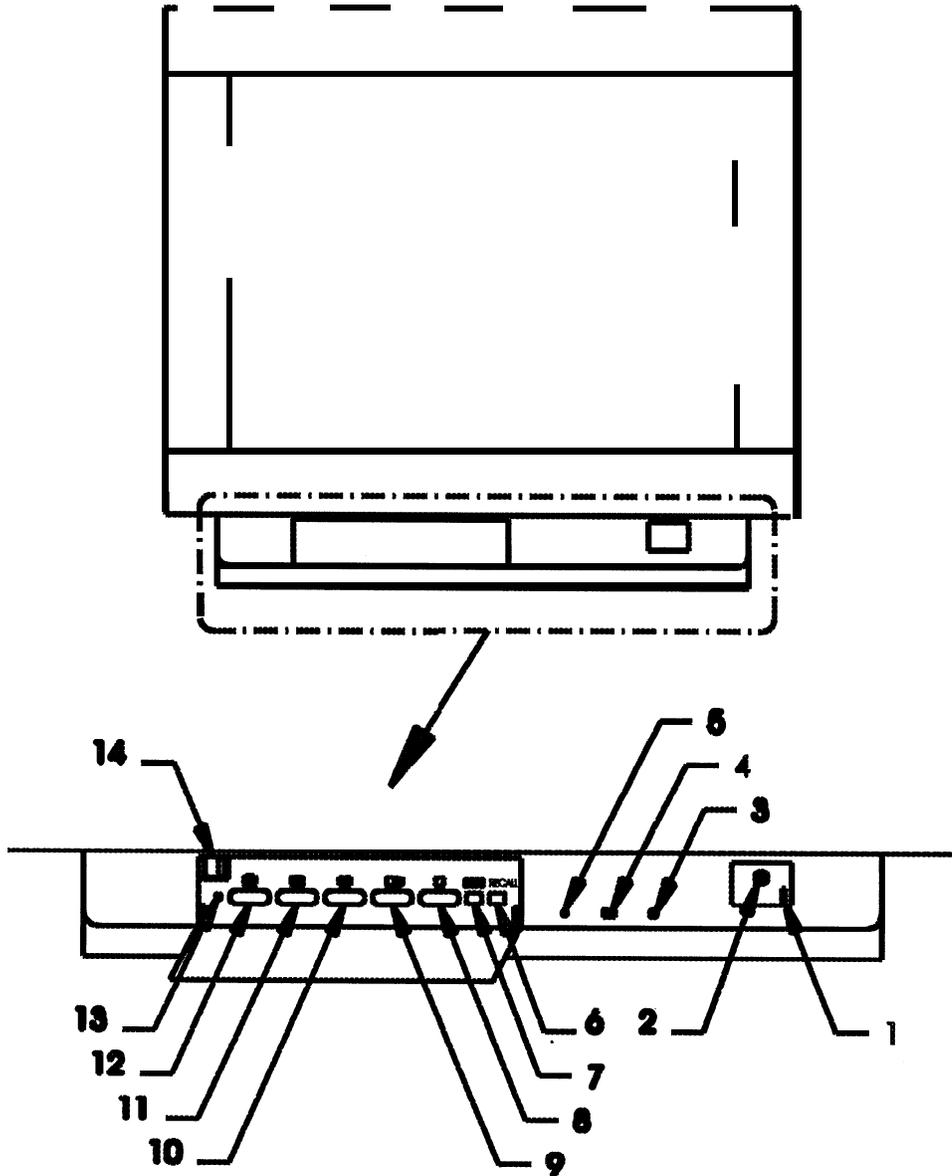


Figure 2-5b. IOS and Driver's Monitor 15-inch (Shamrock) Controls and Indicators

Key	Control/Indicator ,	Function
1	Power Indicator	Light is green during normal operation, light is orange in power save.
2	Power Switch	Turns Monitor on & off.
3	Contrast Adjustment	Used to adjust contrast.
4	Rotation/Tilt Adjustment	Used to adjust picture tilt.
5	Brightness Adjustment	Used to adjust brightness.
6	Recall Key	Press to recall the factory preset timing mode.
7	Save Key	Press this key and status LED will flash 4 times. All adjustments will be saved in memory.
8	Vertical Pincushion Adjust.	Used to adjust picture horizontal side pincushion distortion.
9	H-Phase Adjustment	Used to adjust horizontal position of picture.
10	H-Size Adjustment	Used to adjust horizontal size of picture.
11	V-Size Adjustment	Used to adjust picture height.
12	V-Center Adjustment	Used to adjust vertical position of picture.
13	New Mode Indicator	Indicator lights when new timing mode is detected.
14	Door Lock/Open	Press the upper left corner of the door to open.

2.1.6 Audio Preamp Mixer Unit. The Audio Preamp Mixer Unit (Figure 2-6 and 2-6a), located directly above the Peavey S/P unit, generates the tank sounds that accompany simulated exercises.

Three controls on the face of the unit are used to control the volume monitored by the crew and the I/O.

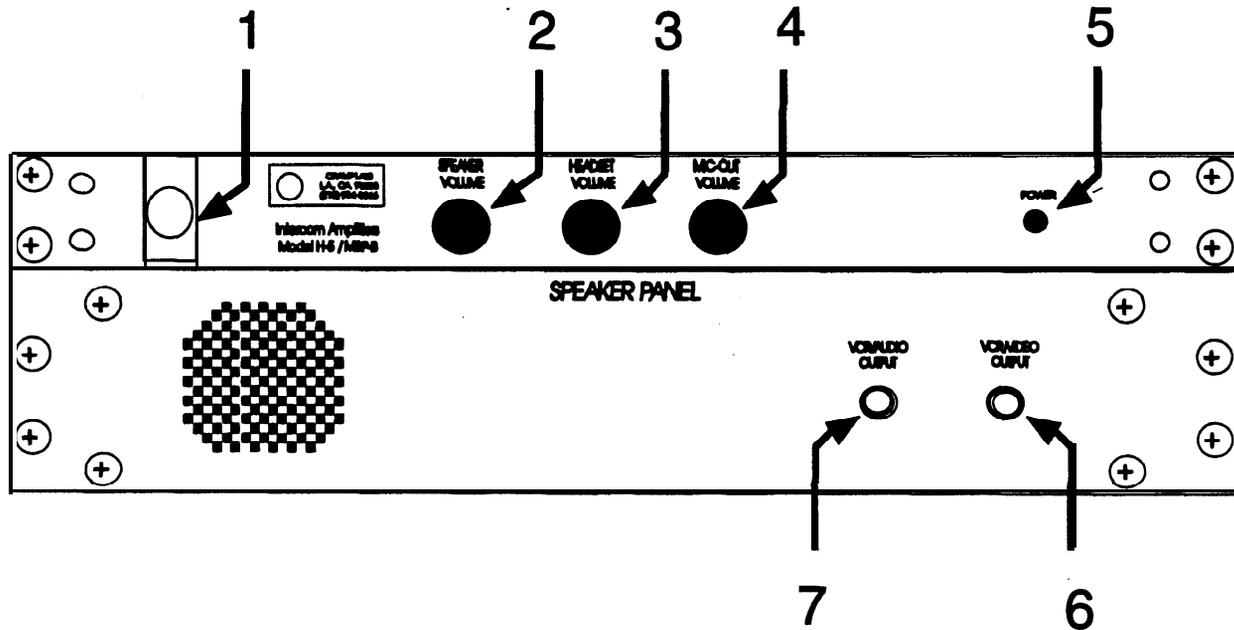


Figure 2-6. Audio Preamp Mixer Unit (TD 17/162A)

Key	Control/Indicator	Function
1	Headset Jack	Used to connect IOS headset to provide communication between I/O and crew.
2	SPEAKER VOLUME Knob	Turns to control volume of the IOS speaker and the Speaker/Amplifier inside the tank.
3	HEADSET VOLUME Knob	Turns to control volume of the IOS speaker, the Speaker/Amplifier inside the tank, the headset speakers, and the tank intercom input from the CVC microphone.
4	MIC OUT VOLUME Knob	Turns to control the sensitivity of the headset microphone.
5	POWER Light	Lights when power applied to the unit.
6	VCR/VIDEO OUTPUT	Used to connect videocassette recorder (VCR) video connector to record simulation task performance.
7	VCR/AUDIO OUTPUT	Used to connect VCR audio connector to record simulation task performance.

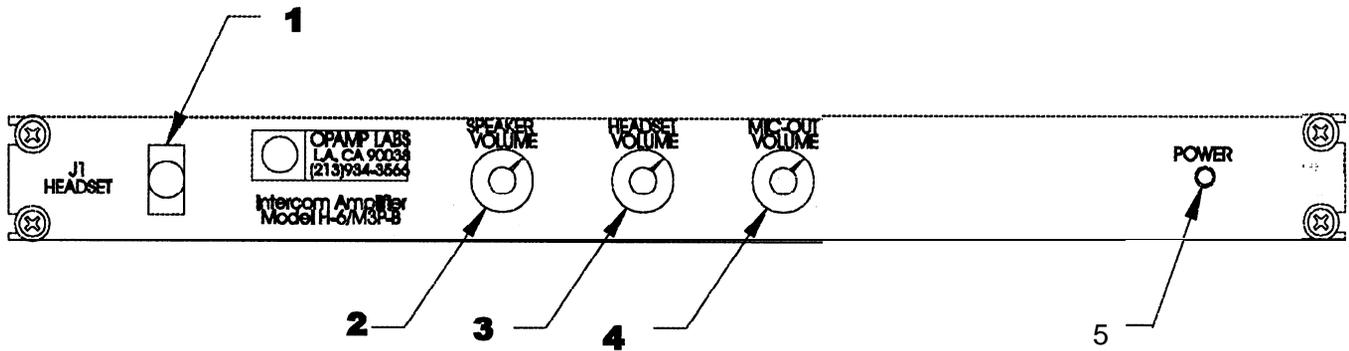


Figure 2-6a. Audio Preamp Mixer Unit (TD 17/162B)

Key	Control/Indicator	Function
1	Headset Jack	Used to connect IOS headset to provide communication between I/O and crew.
2	SPEAKER VOLUME Knob	Turns to control volume of the IOS speaker and the Speaker/Amplifier inside the tank.
3	HEADSET VOLUME Knob	Turns to control volume of the IOS speaker, the Speaker/Amplifier inside the tank, the headset speakers, and the tank intercom input from the CVC microphone.
4	MIC OUT VOLUME Knob	Turns to control the sensitivity of the headset microphone.
5	POWER Light	Lights when power applied to the unit.

2.1.7 Sampler/Playback Synthesizer. The following controls and indicators are located on the Sampler/Playback Synthesizer (S/P), shown in Figure 2-7:

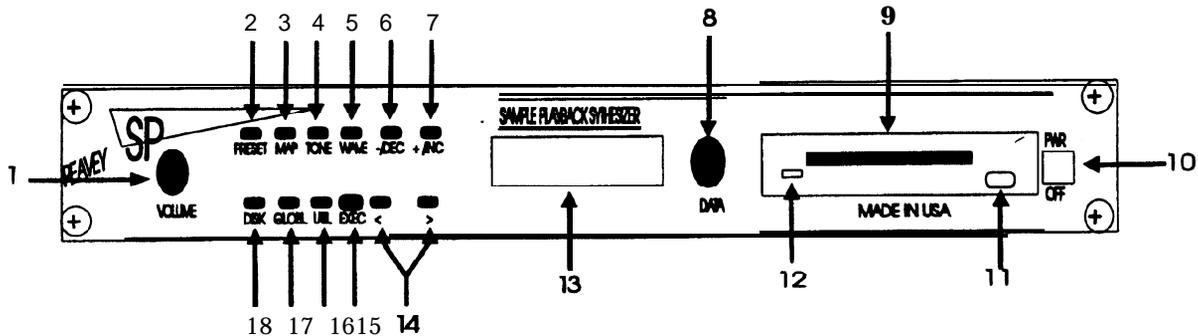


Figure 2-7. Sampler/Playback Synthesizer Controls and Indicators

Key	Control/Indicator	Function
1	VOLUME Knob	Turns to adjust volume of sound effects generated by unit.
2	PRESET Button	Presses to access and display Preset menu screens and options.
3	MAP Button	Presses to access and display Map menu screens and options.
4	TONE Button	Presses to access and display Tone menu screens and options.
5	WAVE Button	Presses to access and display Wave menu screens and options.
6	-/DEC Button	With cursor in top left corner of Liquid Crystal Display (LCD), presses to display previous screen in menu. Presses to decrease value of selected parameter.
7	+/INC Button	With cursor in top left corner of LCD, presses to display next screen in menu. Presses to increase value of selected parameter.
8	DATA Wheel (Knob)	Turns to scroll through menus and screens. Turns clockwise to increase value of selected parameter and counterclockwise to decrease value of selected parameter.
9	Floppy Disk Drive	Holds 3.5-inch Peavey-formatted floppy diskette.
10	PWR/OFF Switch and Light	Toggles power on (PWR) and OFF. Lights when power applied to unit.
11	Eject Button	Presses to release disk from floppy disk drive.
12	Drive Access Light	Lights when unit floppy disk drive accessed.
13	Liquid Crystal Display (LCD)	Displays name of current sound effect, menus and screens.
14	Arrow Keys	Move cursor in direction indicated to select individual screen parameters.
15	EXEC Button	Presses to access submenu of displayed screen, or to continue or complete specific functions.
16	UTIL Button	Presses to access and display Utility menu screens and options.
17	GLOBAL Button	Presses to access and display Global menu screens and options.
18	DISK Button	Presses to access and display Disk menu screens and options.

2.1.8 Image Generator (IG). The following controls are on the IG Control Panel on the lower front of the IG and are shown in Figure 2-8.

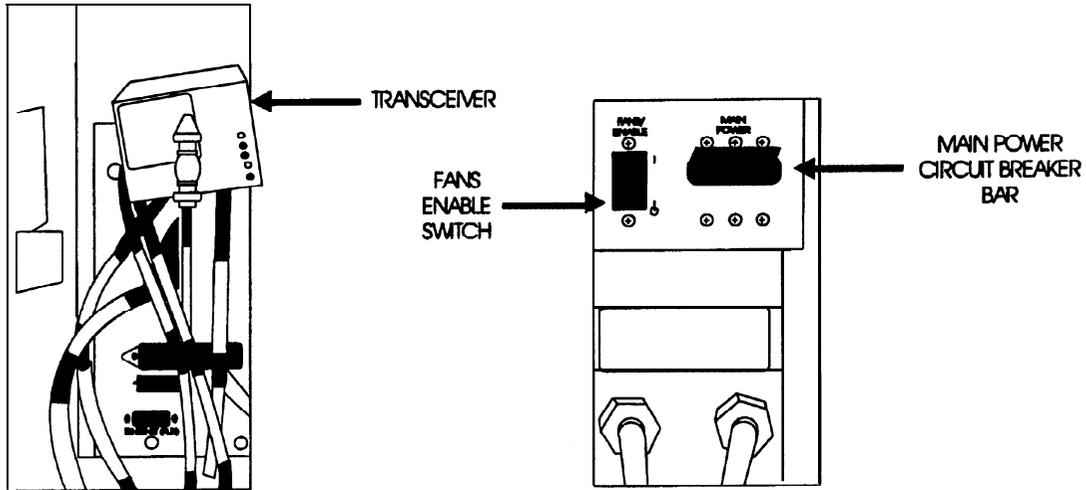


Figure 2-8. IG Control Panel

Control/Indicator	Function
MAIN POWER Circuit Breaker Bar	ON (up) supplies power to the IG. OFF (down) cuts power to the IG.
FANS ENABLE Switch.	Toggles to turn IG fans ON (I) and OFF (O).
Transceiver	Five rapidly blinking lights indicating data transmission.

2.2 OPTICAL ASSEMBLIES (MONITORS).

The following controls and indicators are located on the front and rear of the Gunner's Primary Sight (GPS), Gunner's Auxiliary Sight (GAS) and Commander's Weapon's

Station (CWS) monitors, as shown in Figures 2-9, 2-9a, and 2-10. The Driver monitors are identical to the IOS monitors described in 2.1.5.

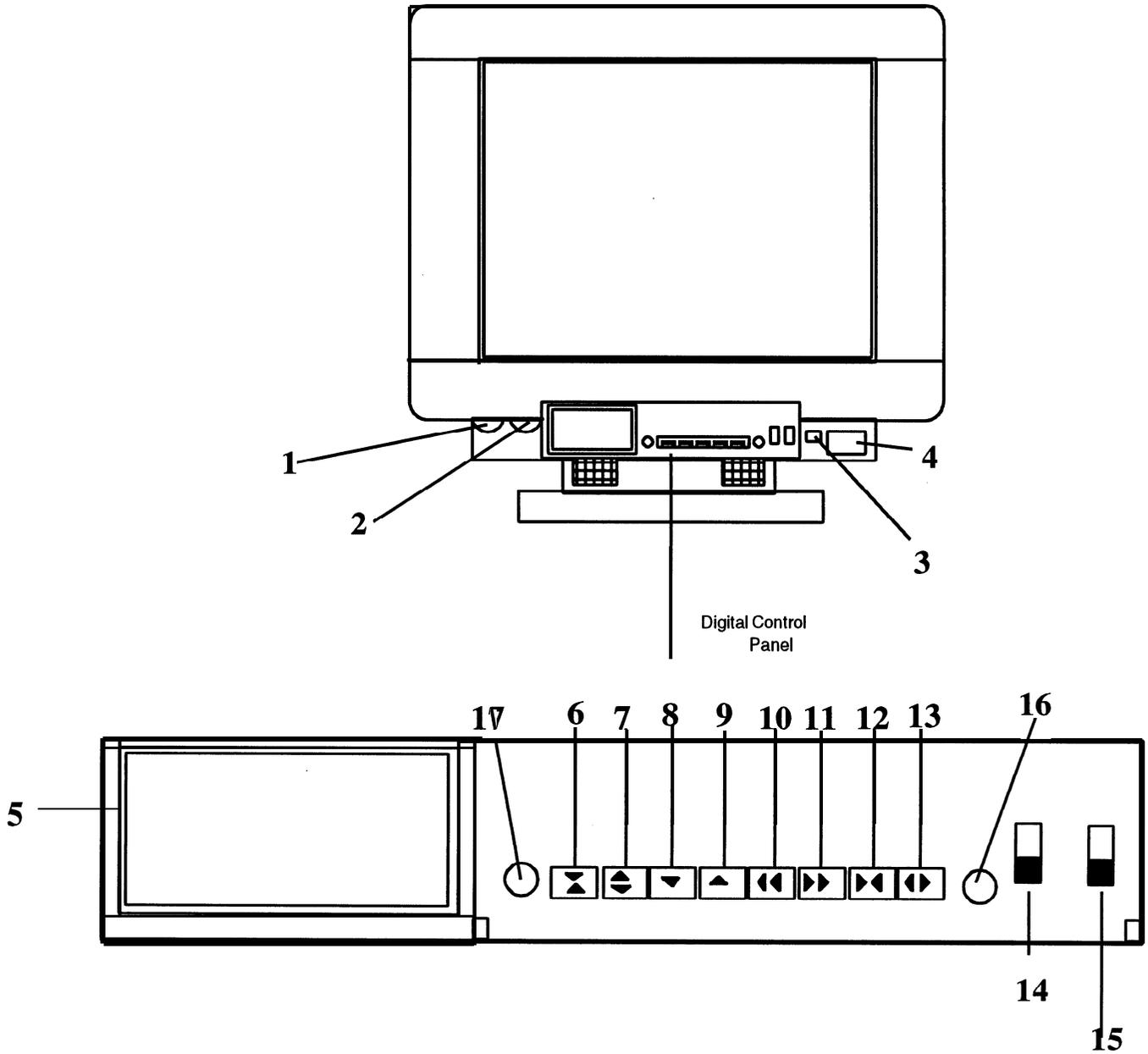


Figure 2-9. GPS, GAS, CWS (MAG) Monitor Controls and Indicators (Front)

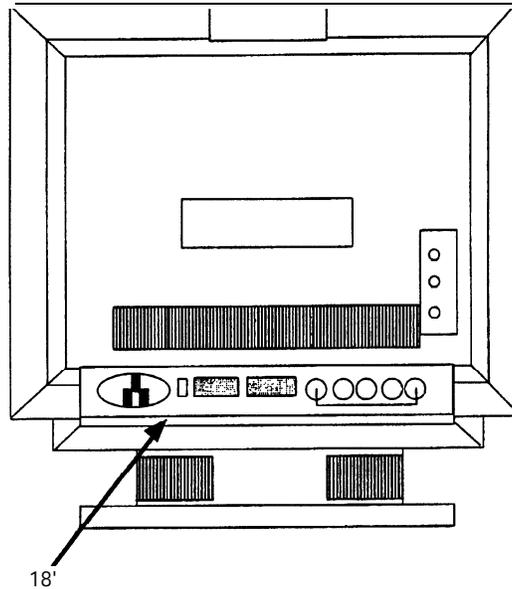


Figure 2-9a GPS, GAS, CWS (MAG) Monitor Controls and Indicators (Rear)

Key	Control/Indicator	Function
1	Brightness Knob	Turns to adjust image brightness.
2	Contrast Knob	Turns to adjust image contrast.
3	Power Light	Lights when power turned on.
4	ON/OFF Switch	Presses power on (I) and off (O).
5	LCD	Displays current graphic mode. Normal display is Normal CAD/CAM 1024 x 68Hz. With Program/Recall Selector in down position, displays modes 1 through 8 with "A" over currently available user-defined modes.
6	▼ ▲ (Vertical Size, 1)	Presses to reduce vertical size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 1.
7	▲ , (Vertical Size, 2)	Presses to increase vertical size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 2.
8	▼ (Vertical Position, 3)	Presses to lower vertical position. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 3.

Key	Control/Indicator	Function
9	▲ (Vertical Position, 4)	Presses to raise vertical position. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 4.
10	◀ (Horizontal Phase, 5)	Presses to move horizontal phase left. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 5.
11	▶ (Horizontal Phase, 6)	Presses to move horizontal phase right. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 6.
12	▶◀ (Horizontal Size, 7)	Presses to reduce horizontal size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 7.
13	◀▶ (Horizontal Size, 8)	Presses to increase horizontal size. With Preset/User Status Selector in down position, presses to store settings for user-defined mode 8.
14	Preset/User Status Selector	Shifts up to use manufacturer's preset default display setting. Shifts down to use user-programmed default display setting modes. Remains in Preset (up) position for normal operation.
15	BNC/D-SUB Selector	Indicates which connectors are to be used: one of the two 15-pin D-Sub connectors or the BNC connector. Remains in the D-SUB (down) position for normal operation.
16	Program/Recall Button	With Preset/User Status Selector in up position, presses to reset all settings to manufacturer defaults. With Preset/User Status Selector in down position, allows current settings to be stored into memory using buttons 1 through 8.
17	Degauss	Presses to manually degauss Cathode-Ray Tube (CRT).
18	75 Ohm/Hi Impedance Switch	Must be set to Hi Impedance when using interface card with video output under 0.5 Volts peak-to-peak.

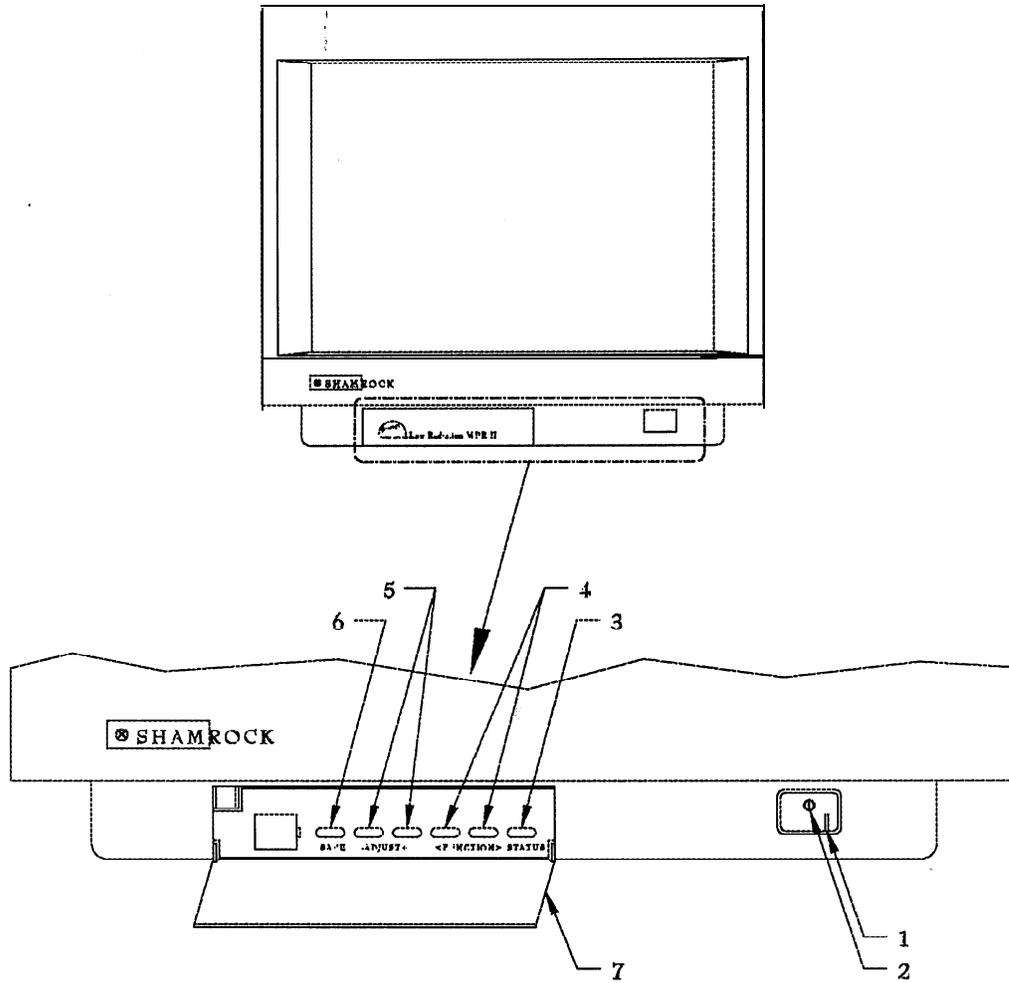


Figure 2-10. GPS, GAS, CWS (Shamrock) Monitor Controls and Indicators (no controls or indicators are located on the rear of Shamrock Monitors)

Key	Control/Indicator	Function
1	Power Indicator	Light is green during normal operation, light is orange in power save.
2	Power Switch	Turns Monitor on & off.
3	Status select switch	Selects from page 1 or page 2 images (press twice to access adjustment menu)
4	Function Switches	Selects the function to be adjusted on the adjustment menu.
5	Adjust Switch	Increases or decreases the selected function adjustment bar.
6	Save Switch	Saves the adjustments that have made on a function.
7	Door Lock/Open	Press the upper left corner of the door to open.

2.3 SENSORS.

Each crew member trains at his assigned crew position, using the controls and indicators that are used during the normal operation of the tank. A combination of actual tank controls and facades (replicas) is used. In some areas, a facade of a device in the turret is attached to the tank when an actual indicator or control cannot be used. Simulator cables are attached to the controls and facades. The simulator can then sense the control inputs made by the crew member during the performance of a simulated task. Crew station controls and indicators used with AFIST sensors are discussed in the following paragraphs.

2.3.1 Tank Commander's (TC's) Station.

2.3.1.1 TC's Control Handle. The TC's Control Handle, shown in Figure 2-11, provides the TC the same control of the turret and the fire control system in simulated engagements that the TC has in actual live-fire engagements. Movement of the handle simulates a simultaneous movement of turret and gun sight visuals identical to actual tank movements. The activation of the handle overrides the Gunner's Power Control Handles. The following switches on the handle are active:

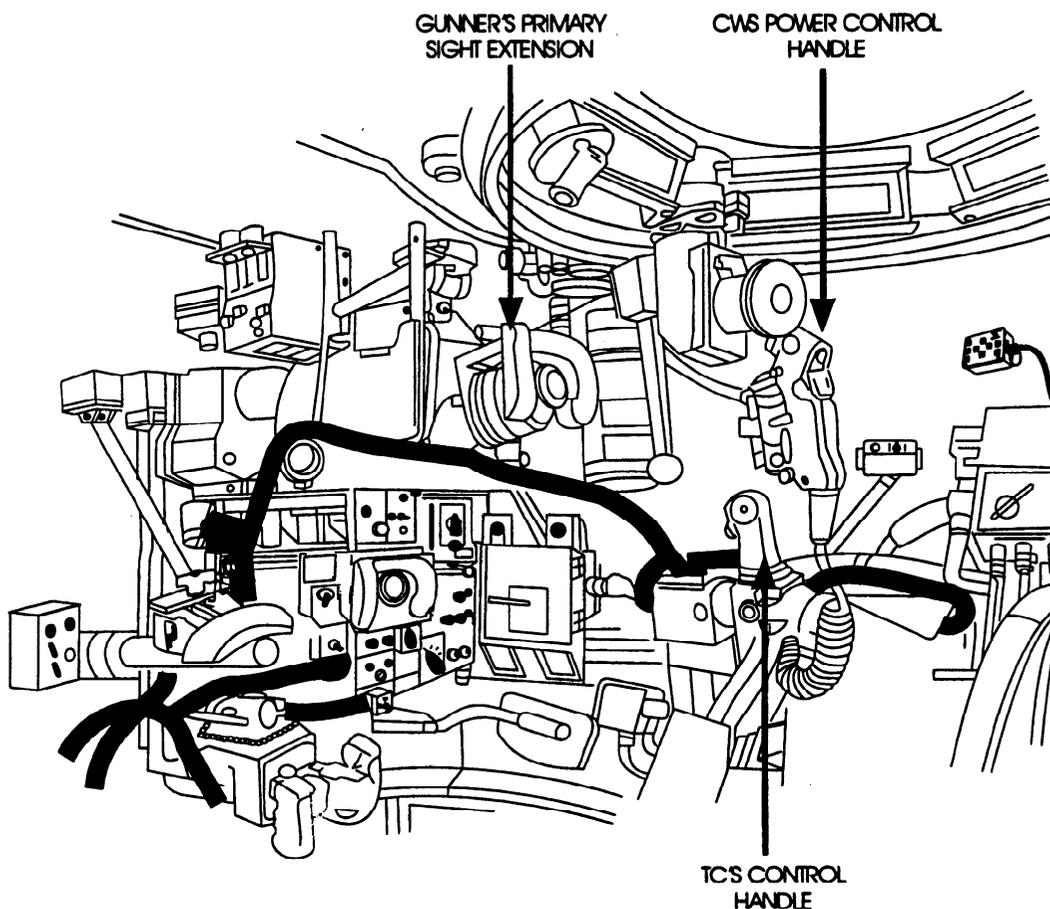


Figure 2-11. TC's Station

Control	Function
Palm Switch	<p>Allows other TC Control Handle functions to operate.</p> <p>Activates simulated Stabilized mode when Gunner's Fire Control Mode (FCM) Switch is in NORMAL position.</p> <p>When Gunner's FCM Switch in EMERGENCY position, palm switch has no affect on simulated stabilization.</p>
Lase/Lead Thumb Switch	<p>Activates lase/lead function. Applies correct lead to GPS daylight and Thermal Imaging System (TIS) reticles based on target speed and distance. TC Control Handle Palm Switch must be depressed for this switch to function.</p>
Trigger Switch	<p>Fires main gun or COAX machine gun (depending on position of GUN SELECT Switch on Gunner's GPS Control Panel).</p> <p>(If Loader's Ejection Guard is in SAFE (closed) position, main gun will not fire (MI).)</p> <p>(If Loader's SAFE/ARMED Handle in the SAFE (down) position, main gun will not fire (M1A1).)</p>

2.3.1.2 CWS Power Control Handle. Traversing the CWS is simulated when the TC moves the CWS Power Control handle, shown in Figure 2-11.

The simulated movement changes the view in the forward unity periscope window rather than actually moving the CWS. The following switches on the control handle are active:

Control	Function
Palm Switch	Must be depressed for other control handle controls to be activated.
Thumb Switch	Movement simulates lateral CWS movement.

2.3.1.3 Gunner's Primary Sight Extension (GPSE). The GPSE, shown in Figure 2-11, is active at all times. The TC has the same GPSE view as the Gunner. Complete failure of the GPS will cause complete failure of the GPSE. When the Gunner is looking through the GAS, the TC can observe the GAS view in the GPSE, but without the GAS or GPS reticles. This view is provided to the TC so the TC will not experience the disorienting effect of having the GPSE switch from full-view to black and back to full-view as the Gunner selects the sight.

2.3.1.4 Commander's Panel. The Commander's Panel, shown in Figures 2-12 and 2-13, is the actual tank panel connected to the commander's cable section of the tank interface harness. The simulator does not sense or illuminate all switches and lights. Only those specified will be active. The following simulator controls and indicators are active:

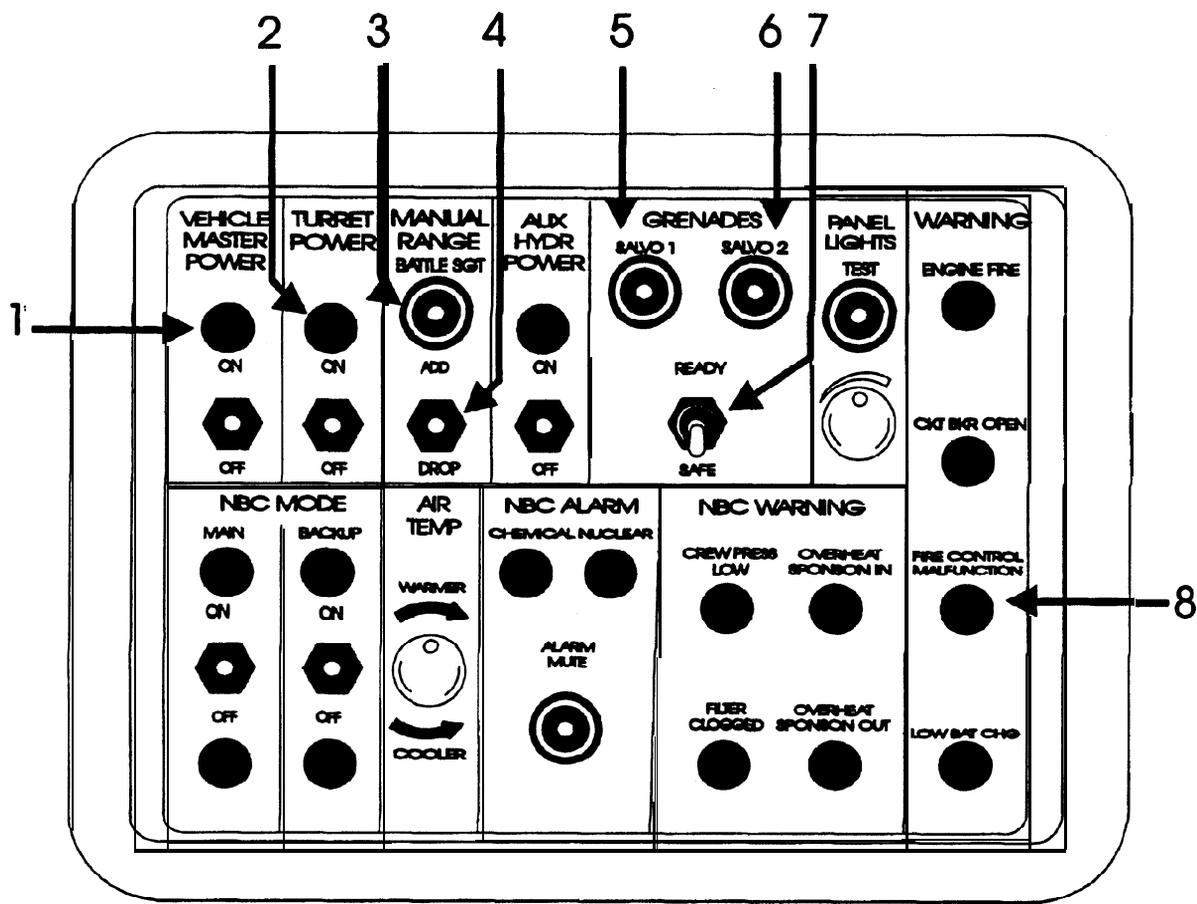


Figure 2-12. Commander's Panel (M1A1)

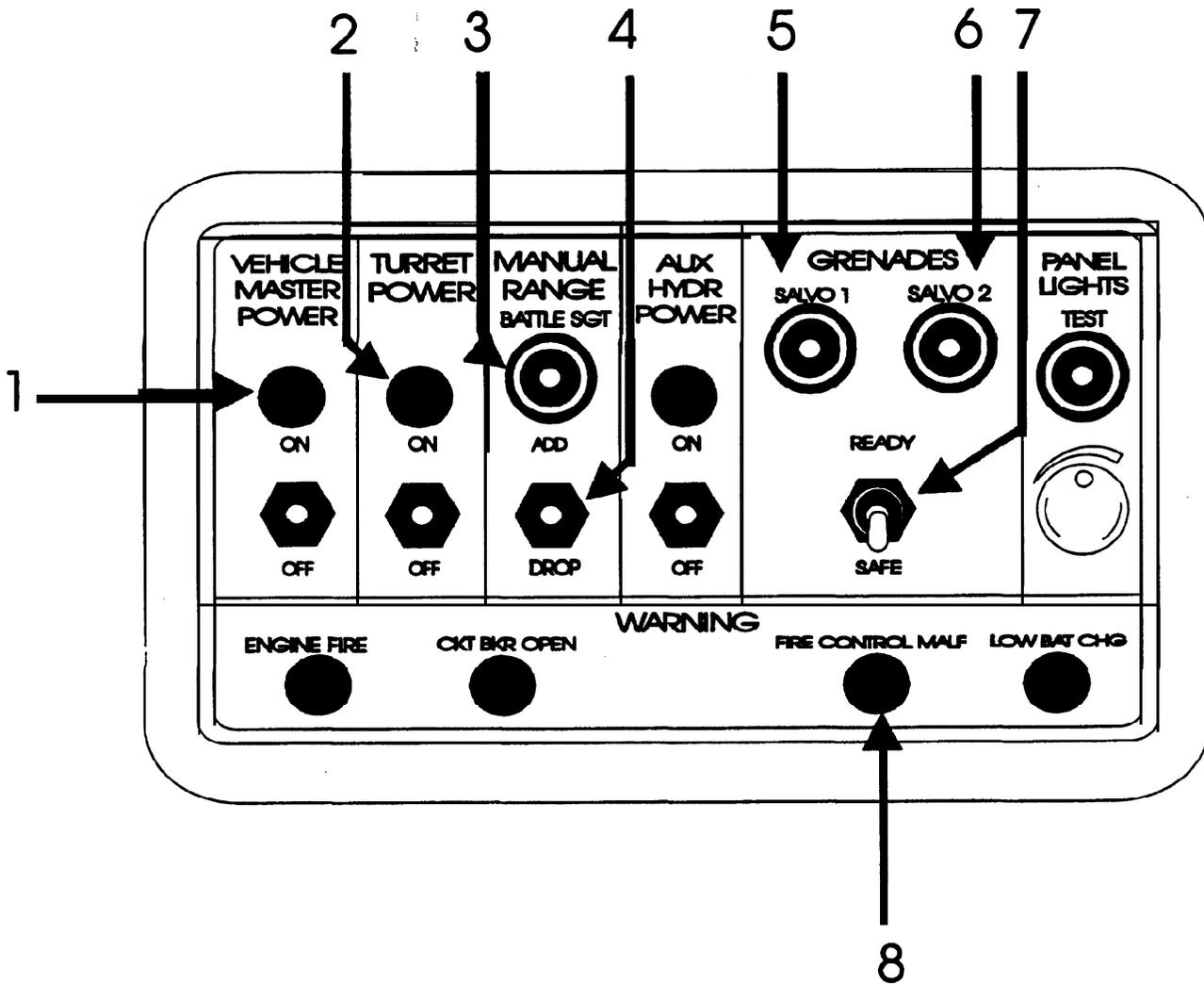


Figure 2-13. Commander's Panel (MI)

Key	Control/Indicator	Function
1	VEHICLE MASTER POWER Light	Indicates tank master power is on.
2	TURRET POWER Light	Indicates tank turret power is on.
3	MANUAL RANGE BATTLE SGT Push Button	Indexes the battle range used in ballistic calculations based on the Gunner's Ammunition Select Switch (HEAT or SABOT). Also induces lead for moving targets when the TC's or Gunner's Control Handle palm switches are depressed.
4	MANUAL RANGE ADD/DROP Switch	Increments or decrements current range indexed in the ballistic computer at 50 meters per second in lo-meter intervals. When held in either position over 4 seconds, increments range at 500 meters per second in lo-meter intervals. Disabled upon activation of Laser Range Finder (LRF) unit.
5	GRENADES SALVO 1	With READY/SAFE switch in READY position, presses to mask own tank and obscure GPS, GAS, CWS, and Driver's views with dense white smoke for 20 to 30 seconds. Smoke is transparent to TIS.

Key	Control/Indicator	Function
6	GRENADES SALVO 2	With READY/SAFE switch in READY position, presses to mask own tank and obscure GPS, GAS, CWS, and Driver's views with dense white smoke for 20 to 30 seconds. Smoke is transparent to TIS.
7	GRENADES READY/SAFE Switch	READY position allows functioning of GRENADES SALVO 1 and SALVO 2 push buttons.
8	FIRE CONTROL MALFUNCTION Light	Lights to indicate exercise induced fire control malfunction.

2.3.1.5 TC's Domelight. The TC's Domelight is powered by a connection from the 24-Volts direct current (Vdc) domelight harness from the IOS. This provides the TC the same light level and control available during normal operations.

2.3.1.6 TC's Keypad. When the system is under the TC's control (Secondary Operating Mode), the TC uses the Enter and arrow keys on this keypad, shown in Figure 2-14, to access all the functional capabilities of the system (except crew Records Management functions and Evaluation exercises) and to control training. The following function keys are used to control the simulation:

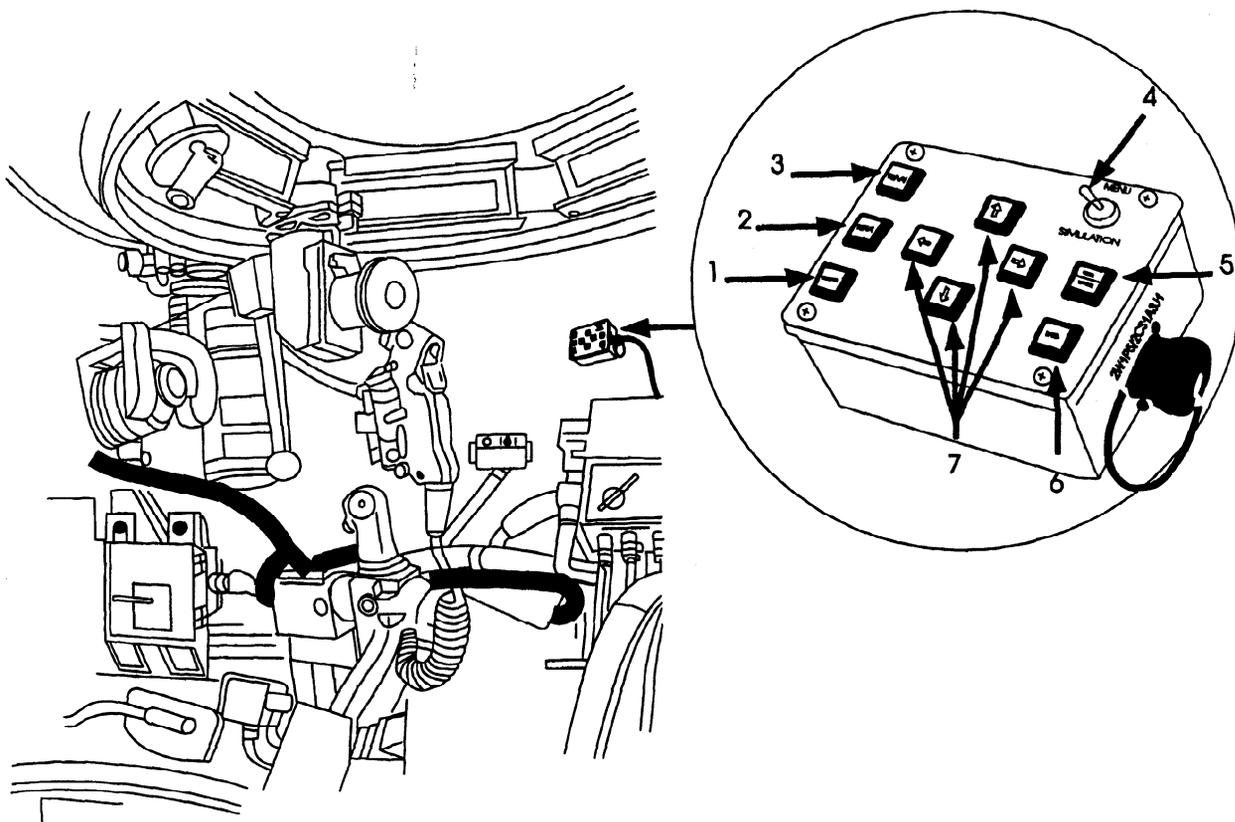


Figure 2-14. TC's Keypad

Key	Control/Indicator	Function
1	TERMINATE	Terminates the currently selected task and displays the Exercise Critique Summary Screen.
2	REPEAT	Returns the simulation to its start and reruns it.
3	REPLAY	Plays back the current or the last completed task.
4	SIMULATION/MENU Switch	Controls monitor display, Up position displays regular TC view of simulation. Down position displays AFIST menus and screens.
5	FREEZE/UNFREEZE	Stops the simulation, with the option of resuming the simulation. Once the simulation is frozen, this button resumes the action.
6	ENTER	Selects menu options under cursor.
7	Arrow Keys	Moves cursor on the screen in the direction of the arrow.

2.3.2 Gunner's Station.

2.3.2.1 GPS Control Panel. The GPS Control Panel, shown in Figure 2-15, is the actual tank panel connected to the Gunner's Crew Station cables. The simulator does not sense or illuminate all switches and lights. Only those specified are active and function normally.

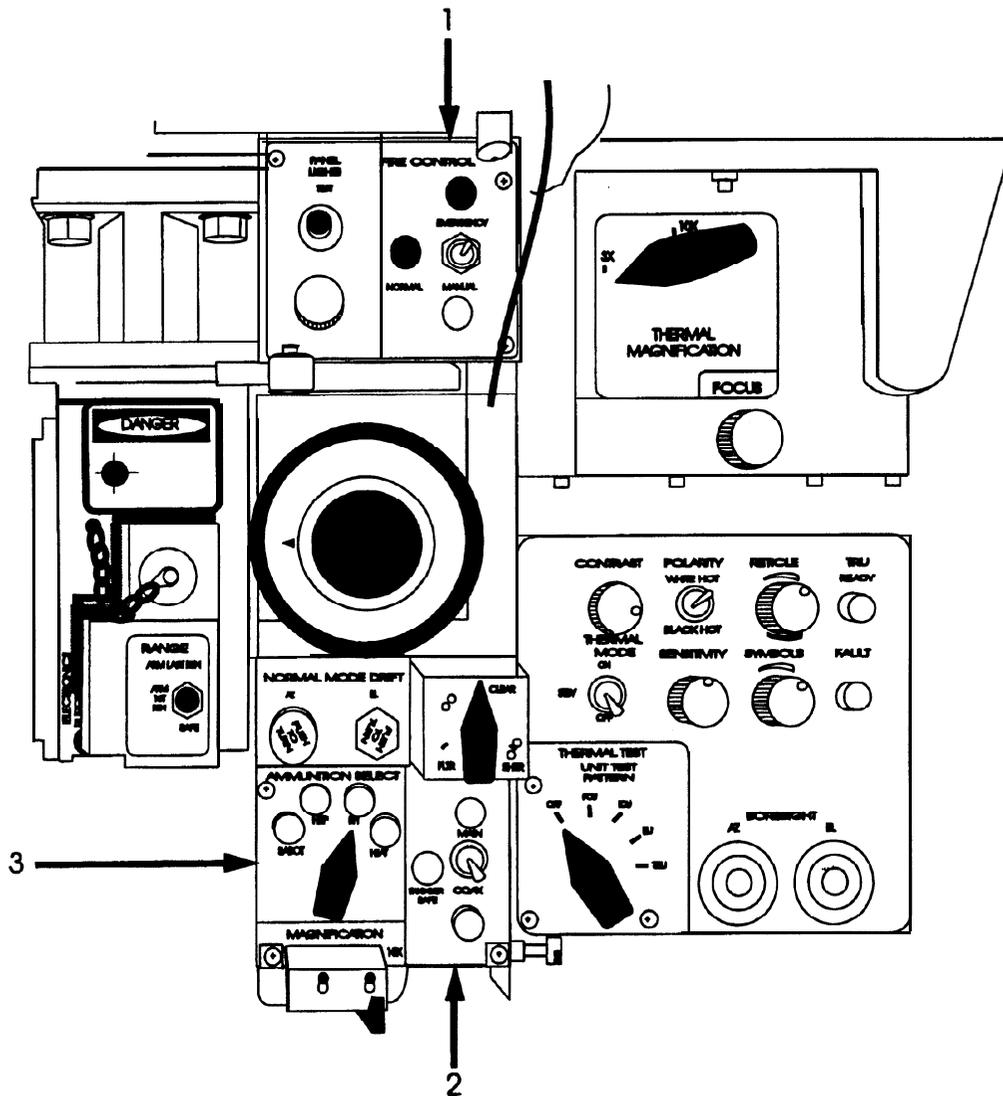


Figure 2-15. GPS Control Panel (Actual Tank Controls and Indicators)

Key	Control/Indicator	Function
1	FIRE CONTROL MODE Switch and Lights	<p>Toggles to select between NORMAL (stabilized) and EMERGENCY (unstabilized) FCMs.</p> <p>NORMAL and EMERGENCY positions light the appropriate light.</p> <p>MANUAL position causes an error symbol to display in the Gunner's sight.</p>
2	GUN SELECT Switch and Lights	Toggles to select MAIN, COAX, or SAFE gun selections. Appropriate light lights to indicate selection.
3	AMMUNITION SELECT Switch and Lights	Turns to select between four (M1) or two (M1A1) ammunition types. Appropriate light lights to show selection.

The FLTR/CLEAR/SHTR switch, GPS MAGNIFICATION lever, LRF switch, and Reticle Intensity Knob on the GPS Control Panel, shown in Figure 2-16, are replicated facades attached directly over actual panel controls.

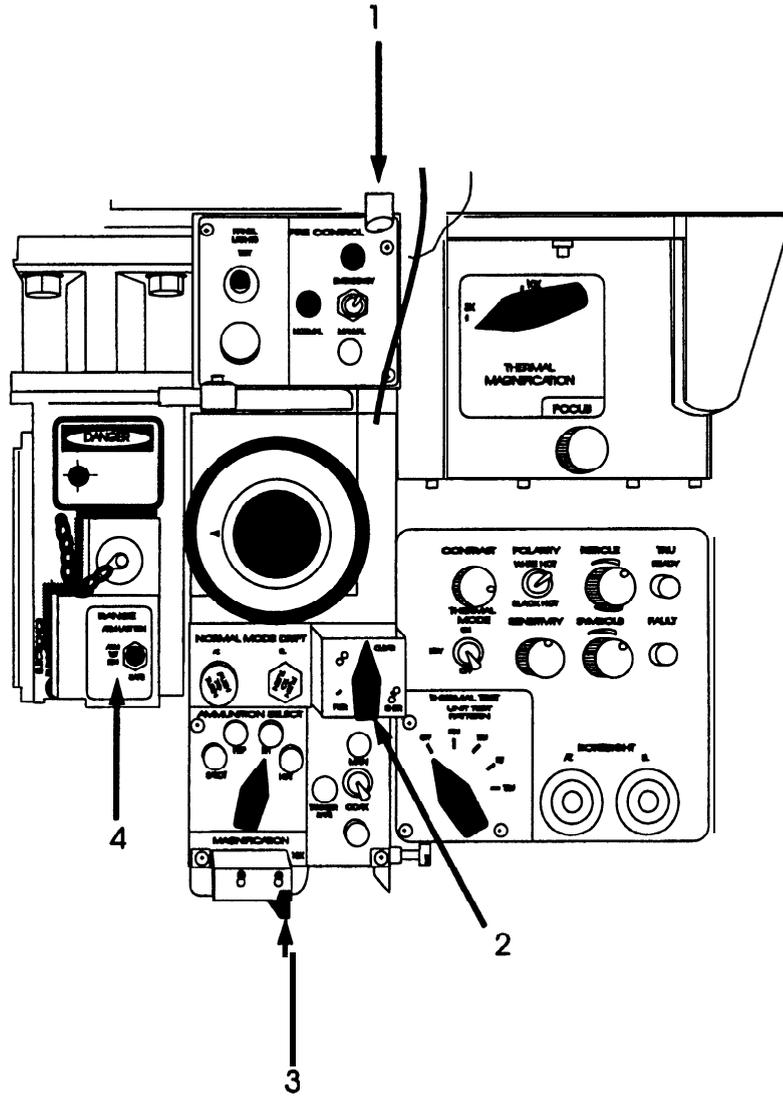


Figure 2-16. GPS Control Panel (Facades)

NOTE

The LRF is NOT actually activated during AFIST simulated gunnery engagements. Laser operation is simulated by the AFIST system. Therefore, safety procedures normally required for laser operation are not necessary.

Key	Control/Indicator	Function
1	GPS RETICLE Intensity Knob	Turns to increase or decrease the brightness of the GPS reticle.
2	FLTR/CLEAR/SHTR Switch	Turns to select appropriate displays in GPS monitor as follows: FILTER: Nonfunctioning. Displays same image as CLEAR position. CLEAR: Displays daylight image. SHTR: Displays simulated thermal image if THERMAL MODE Switch is in the ON position. Blacks out GPS image if THERMAL MODE Switch is in the OFF or STBY positions.
3	GPS MAGNIFICATION Lever	Slides to select either 3X or 10X daylight (GPS) image to display to the Gunner and TC.
4	LRF (RANGE) Switch	Toggles activate LRF functions. ARM 1ST RTN: Returns simulated first laser pulse. ARM LAST RTN: Returns simulated last laser pulse. SAFE: Sets laser to safe position.

2. 3. 2. 2 GAS Control Panel. The GAS Control Panel, shown in Figure 2-17, is the actual tank panel connected to the Gunner's Crew Station cable.

The simulator does not sense or illuminate all switches and lights. Only those specified below are active and functional.

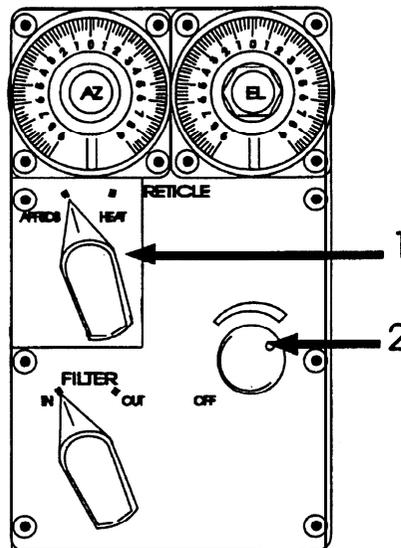


Figure 2-17. GAS Control Panel

Key	Control/Indicator	Function
1	GAS Reticle Select Switch	Turns to select the appropriate reticle for use: HEAT or SABOT/HEP (M1), MPAT/HEAT or KE/STAFF (M1A1).
2	GAS Reticle Illumination Knob	Turns to increase or decrease GAS reticle illumination.

2.3.2.3 Thermal Imaging System (TIS) Control Unit. The TIS Control Unit, shown in Figure 2-18, is the actual tank panel.

The simulator does not sense or illuminate all switches and lights. Only those specified below are active and functional.

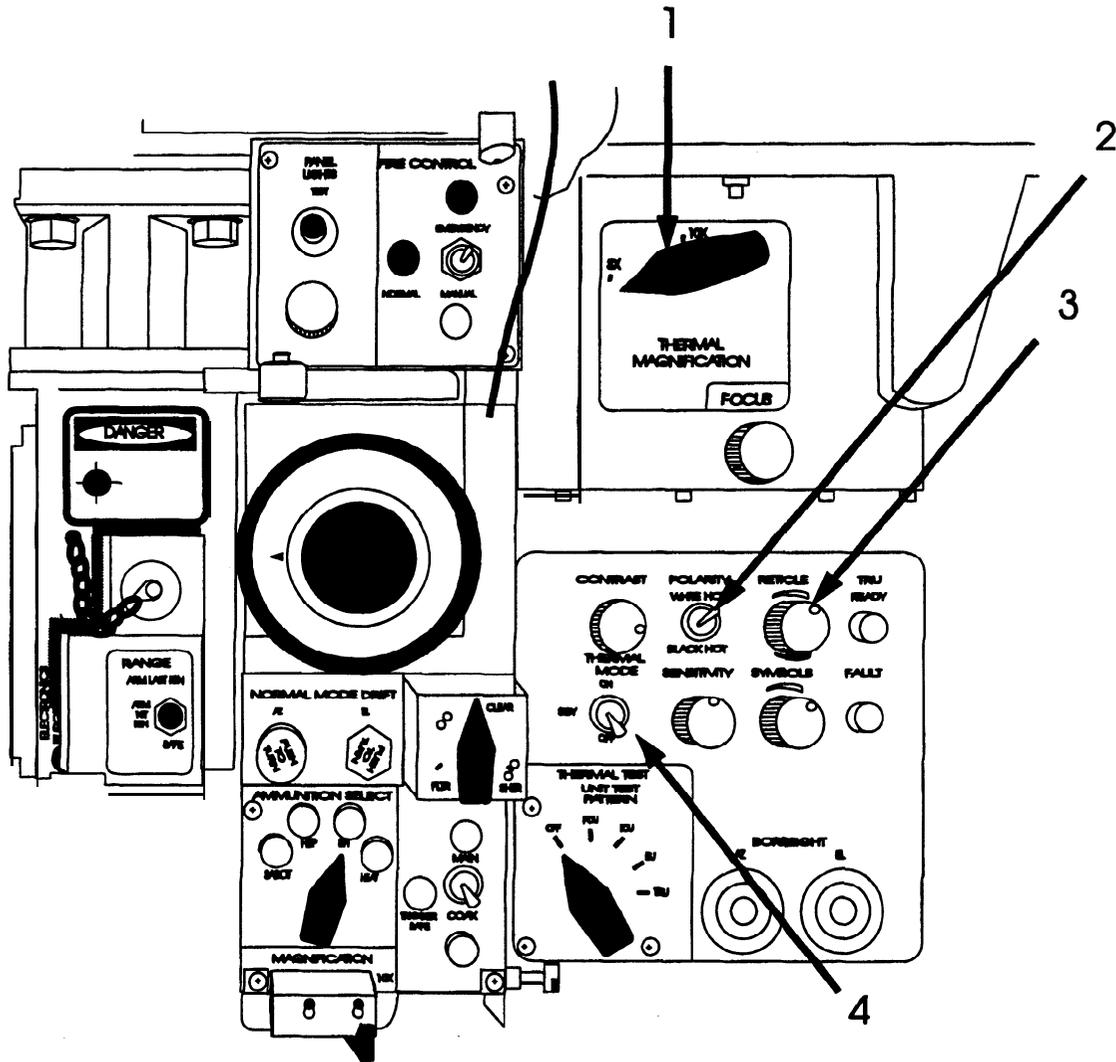


Figure 2-18 TIS Control Unit

Key	Control/Indicator	Function
1	THERMAL MAGNIFICATION lever	Turns to select thermal 3X or 10X image to display to the Gunner.
2	TIS POLARITY Switch	Toggles to select appropriate TIS imagery for display to Gunner. WHITE HOT displays white objects on green background. BLACK HOT displays black objects on green background.
3	TIS RETICLE Intensity Knob	Turns to increase or decrease brightness of the TIS reticle.
4	THERMAL MODE Switch	Selects simulated OFF, ON, or STBY TIS mode.

2.3.2.4 Gunner's Power Control Handles. The Gunner's Power Control Handles, shown in **Figure 2-19**, provide the Gunner the same control of the turret and the fire control

system in simulated engagements that he has in actual live firing engagements. The manual triggers in the turret are inoperative. The following controls are active.

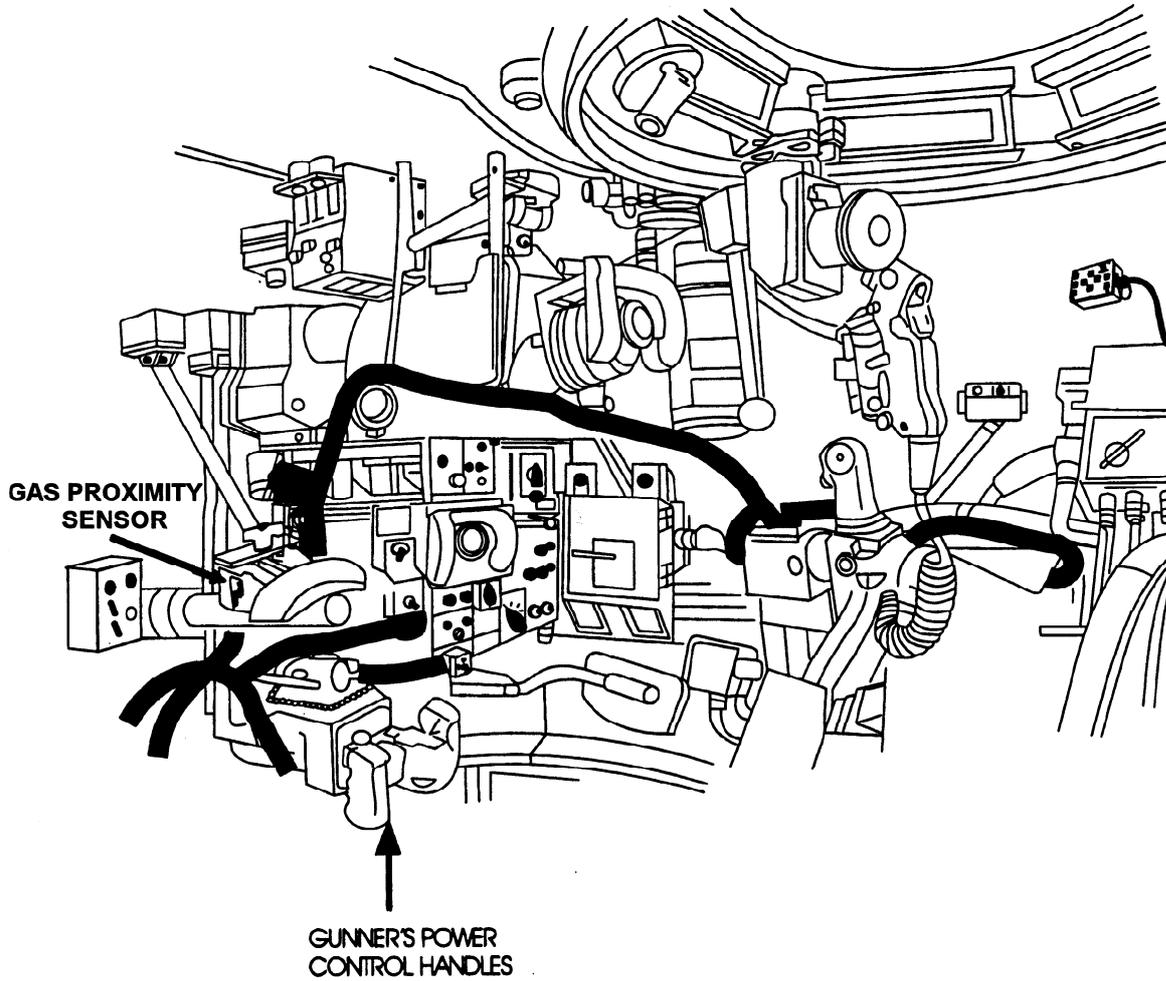


Figure 2-19. Gunner's Power Control Handles

Control/Indicator	Function
Control Handles	Movement simulates simultaneous vertical and horizontal movement of the turret and gun sight.
Palm Switches	Squeezing either one allows other control handle functions to be activated. Activates Stabilized mode when FCM Switch is in NORMAL position. When FCM Switch is in EMERGENCY position, does not affect simulated Unstabilized mode.
Thumb Switches	Initiates simulation of LRF operation.
Trigger Switches	Fires either main gun or COAX machine gun depending on position of GUN SELECT Switch. (If Loader's Ejection Guard is in SAFE (closed) position, main gun will not fire (M1).) (If Loader's SAFE/ARMED Handle in the SAFE (down) position, main gun will not fire (M1A1).)

2.3.2.5 GAS Proximity Sensor. The GAS Proximity Sensor, shown in Figure 2-19 allows the simulator to detect when the Gunner is using the GAS. The simulator provides a GAS view that is appropriate to the exercise on both the GAS and TC monitors.

2.3.2.6 Gunner's Domelight. The Gunner's Domelight is powered by a connection from the 24-Vdc Domelight harness from the IOS. This provides the Gunner the same light level and control available during normal operations.

2.3.3 Driver's Station. The Driver's station contains mechanical and electrical sensors. The simulator does not sense or illuminate all switches and lights. Only those specified will be active,

2.3.3.1 Steer-Throttle Control. The simulator employs an electromechanical sensor to sense steering input and an electronic sensor to sense throttle positions. These readings are input to the computer and the scenery, apparent vehicle movement, and audio effects change corresponding to the Driver's control settings of the Steer-Throttle Control, shown in Figure 2-20. Using the Steer-Throttle Control, the Driver can control simulated acceleration at realistic rates and desired speeds consistent with the gear and selected terrain.

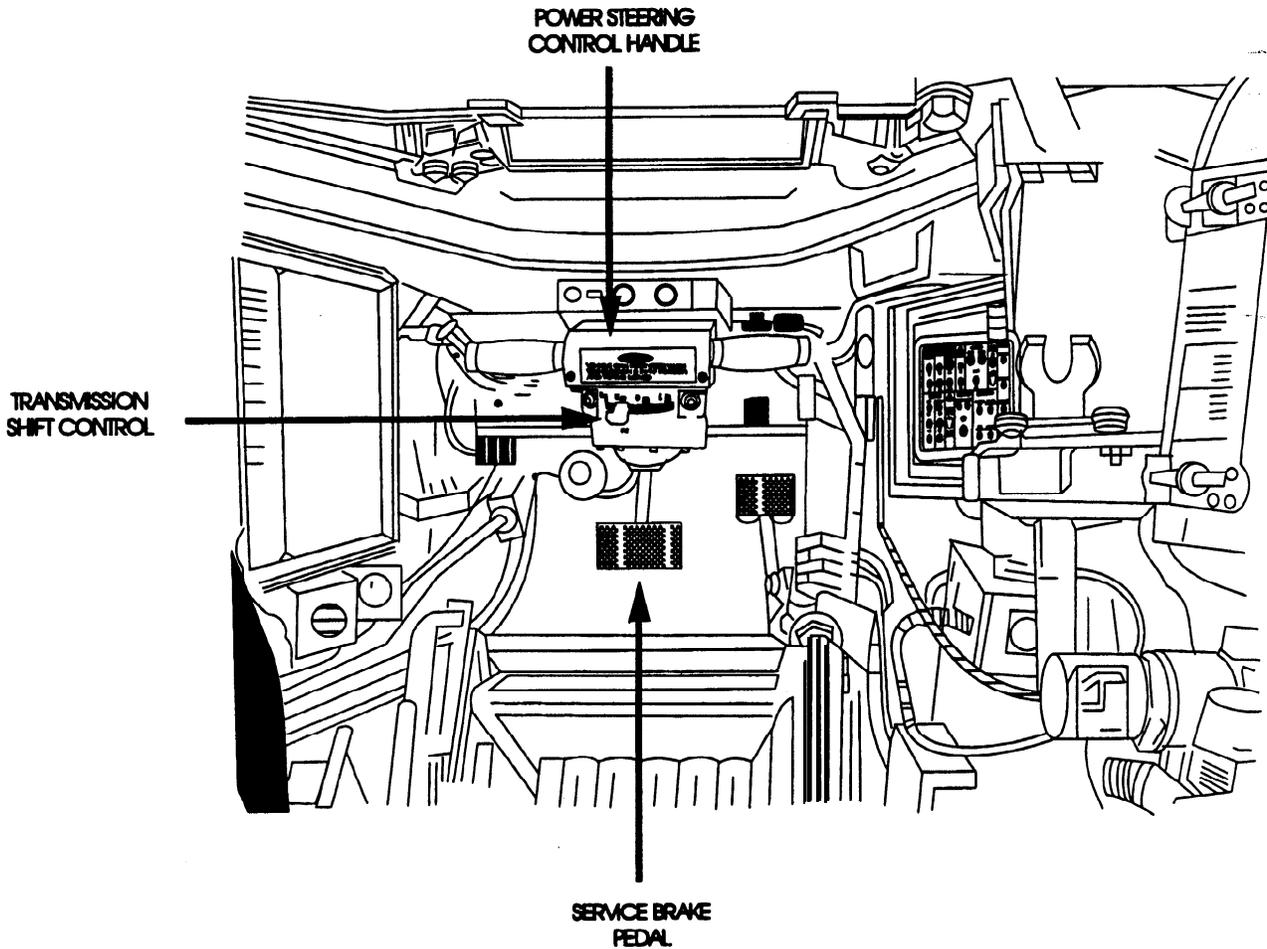


Figure 2-20. Steer-Throttle Control, Transmission Shift Control, and Service Brake Pedal

2.3.3.2 Service Brake Pedal. The simulator employs an electromechanical sensor to sense the Driver's application of the service brake, shown in Figure 2-20, and the degree of pressure applied when stopping. This sensing results in the appropriate change in the simulated vehicle movement.

2.3.3.3 Transmission Shift Lever. The simulator electronically senses the position of the Transmission Shift Lever, shown in Figure 2-20, and provides the appropriate simulated vehicle performance and audio of corresponding engine sound effects. Lever positions are selectable.

Setting	Function
D	Normal forward drive
L	Low forward drive
R	Reverse
PVT	Pivot
N	Neutral

2.3.3.4 Driver's Master Control Panel. The simulator reads the following switches on the Driver's Master Control Panel, shown in Figure 2-21, and provides the appropriate visual and audio effects to the IOS and the crew.

2.3.3.5 Driver's Domelight. The Driver's domelight is powered by the 24-Vdc domelight harness from the IOS. This provides the Driver the same light level and control available during normal operations.

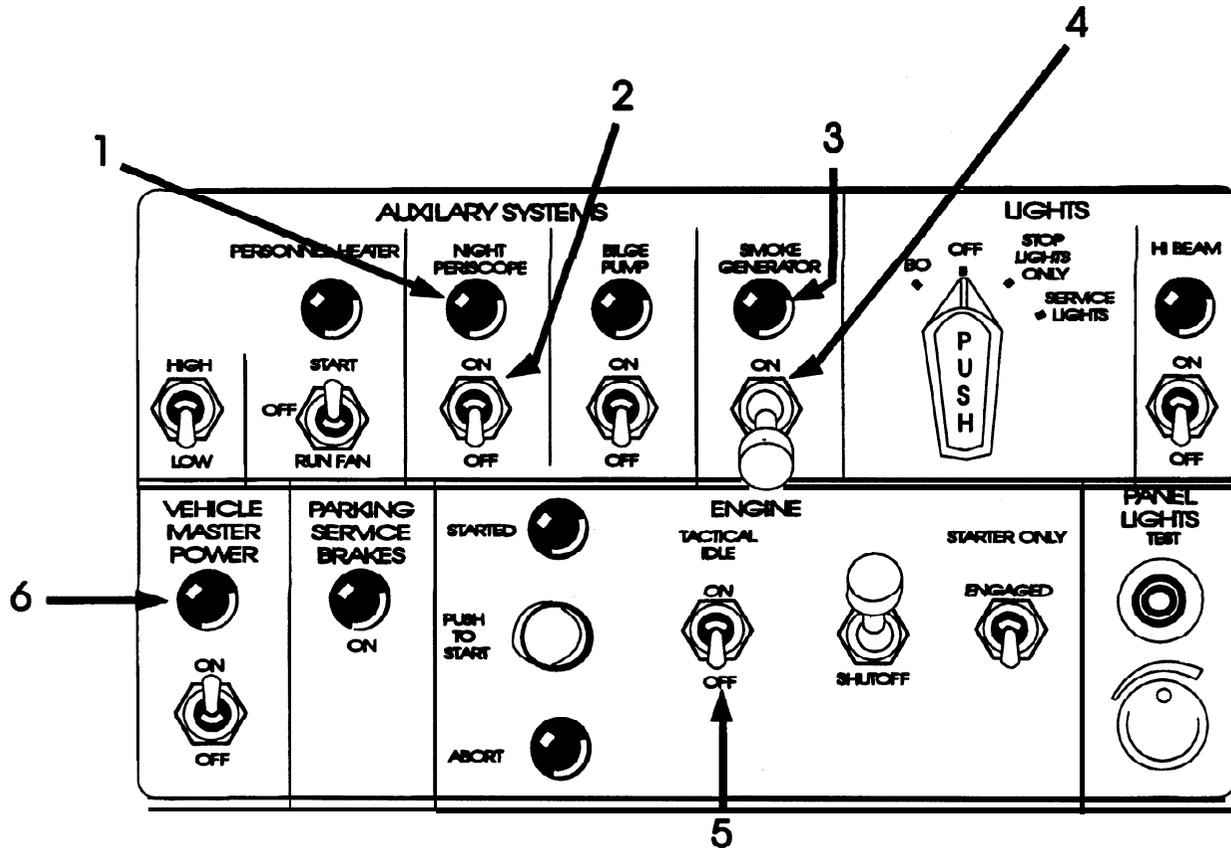


Figure 2-21. Driver's Master Control Panel

Key	Control/Indicator	Function
1	NIGHT PERISCOPE Light	Lights with switch in the ON position.
2	NIGHT PERISCOPE Switch	Toggles night visual simulation ON and OFF.
3	SMOKE GENERATOR Light	Lights with switch in ON position.
4	SMOKE GENERATOR Switch	Toggles SMOKE GENERATOR light ON and OFF.
5	TACTICAL IDLE Switch	Toggles simulated engine tactical idle OFF (engine idling at 900 ±30 revolutions per minute (RPM))and ON (engine running at 1300 ±50 RPM).
6	VEHICLE MASTER POWER Light	Lights during training.

2.3.4 Loader's Station.

2.3.4.1 Ejection Guard (M1) or SAFE/ARMED Handle (M1A1).sitions of the SAFE/ARMED Handle in the M1A1 tank, shown in Figure 2-22, and the Ejection Guard in the M1 tanks, shown in Figure 2- 23, are sensed. .

The positioning of the handle affects the main gun firing process just as it actually does during normal tank operation as follows.

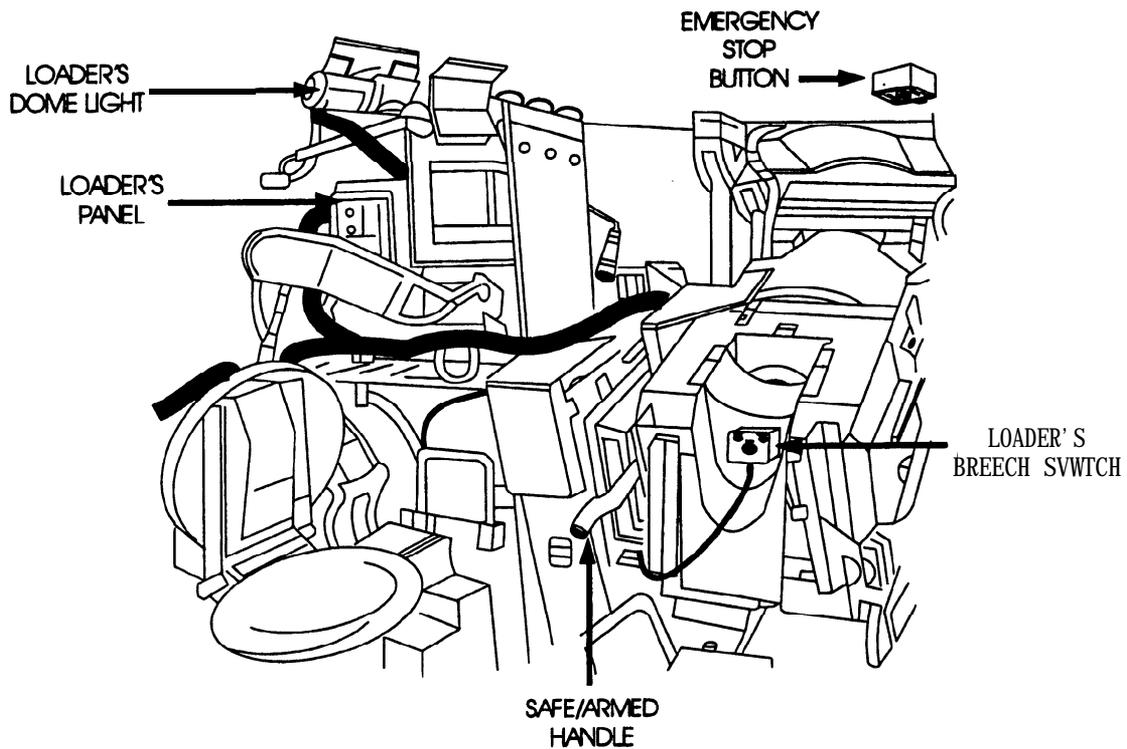


Figure 2-22. SAFE/ARMED Handle (M1A1)

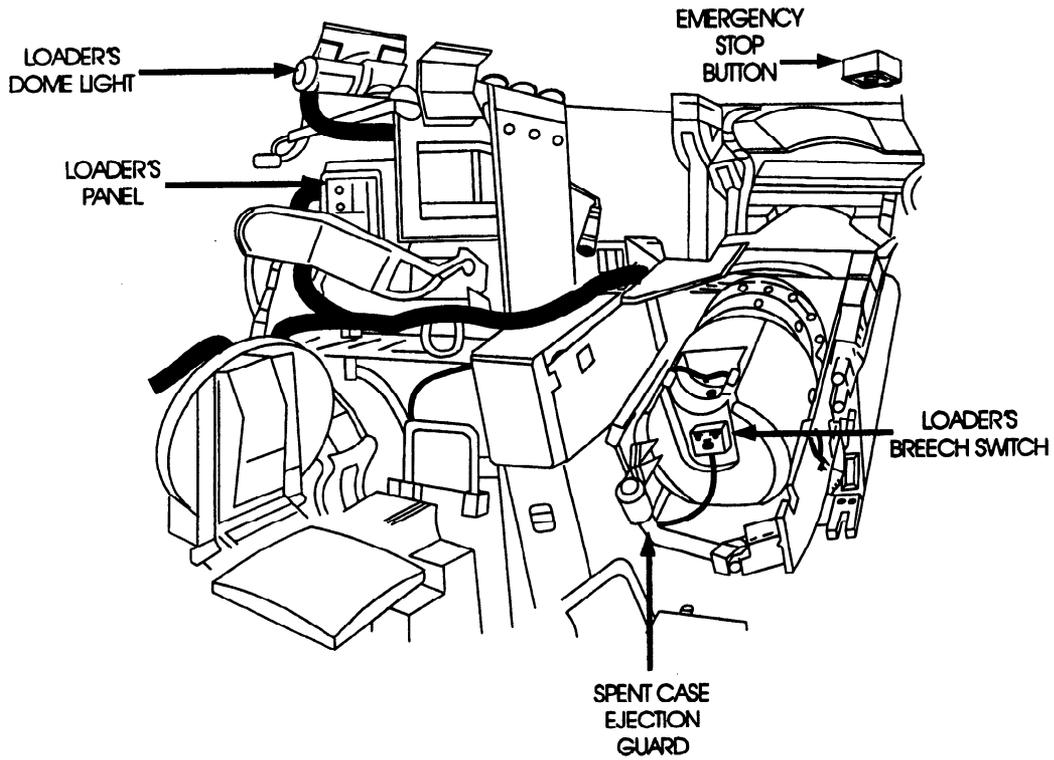


Figure 2-23. Ejection Guard (M1)

Position	Function
SAFE or closed	Illuminates SAFE light on Loader's Control Panel. Prevents simulated main gun firing.
ARMED or open	Illuminates ARMED light on Loader's Control Panel. Allows simulated main gun firing.

2.3.4.2 Loader's Control Panel. The simulator senses GUN/TURRET Drive switch positions, and provides these to the fire control system.

The armed or safe status of the main gun is reflected by the indicator lights. The GUN/TURRET Drive Switch and indicator lights are shown in Figure 2-24.

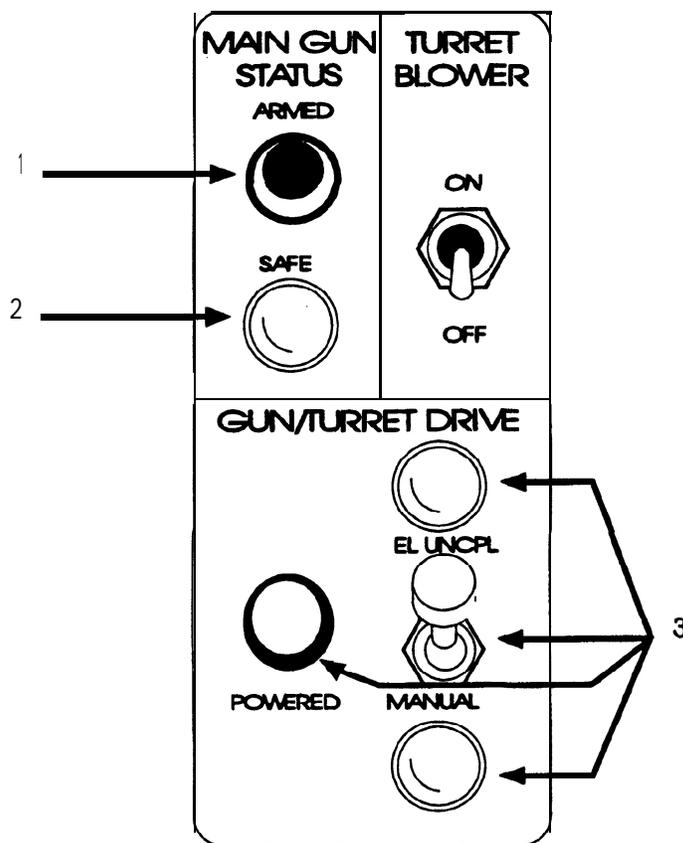


Figure 2-24. GUN/TURRET Drive Switch and Indicator Lights

Key	Control/Indicator	Function
1	ARMED Indicator Light	Lights to reflect armed status of main gun as selected by Ejection Guard or SAFE/ARMED Handle.
2	SAFE Indicator Light	Lights to reflect safe status of main gun as selected by Ejection Guard or SAFE/ARMED Handle.
3	GUN/TURRET DRIVE Switch and Indicator Lights	<p>Toggles the main gun simulation and the stabilization feature as follows:</p> <p>EL UNCPL: Main gun simulation uncoupled from elevation system when weapon is in SAFE position. Indicator light lights.</p> <p>POWERED: Main gun simulation controlled by full fire control system. Indicator light lights.</p> <p>MANUAL: Main gun powered operation not supported and error message displayed on the Gunner's monitor. Indicator light lights.</p>

2.3.4.3 Loader's Knee Switch. The simulator senses the Loader's Knee switch, shown in Figure 2-25. During training in the simulator trainer, the Loader's Knee switch will not open the ready ammunition bustle door, as it does in normal tank operation. The simulator is designed so that the Loader must press the knee switch in order to make an

ammunition selection from the AMMUNITION SELECT switch facade on the ready ammunition bustle door. If the main gun is empty, pressing this switch causes both switches on the AMMUNITION SELECT switch facade to become active and illuminates the AMMUNITION SELECT indicator lights.

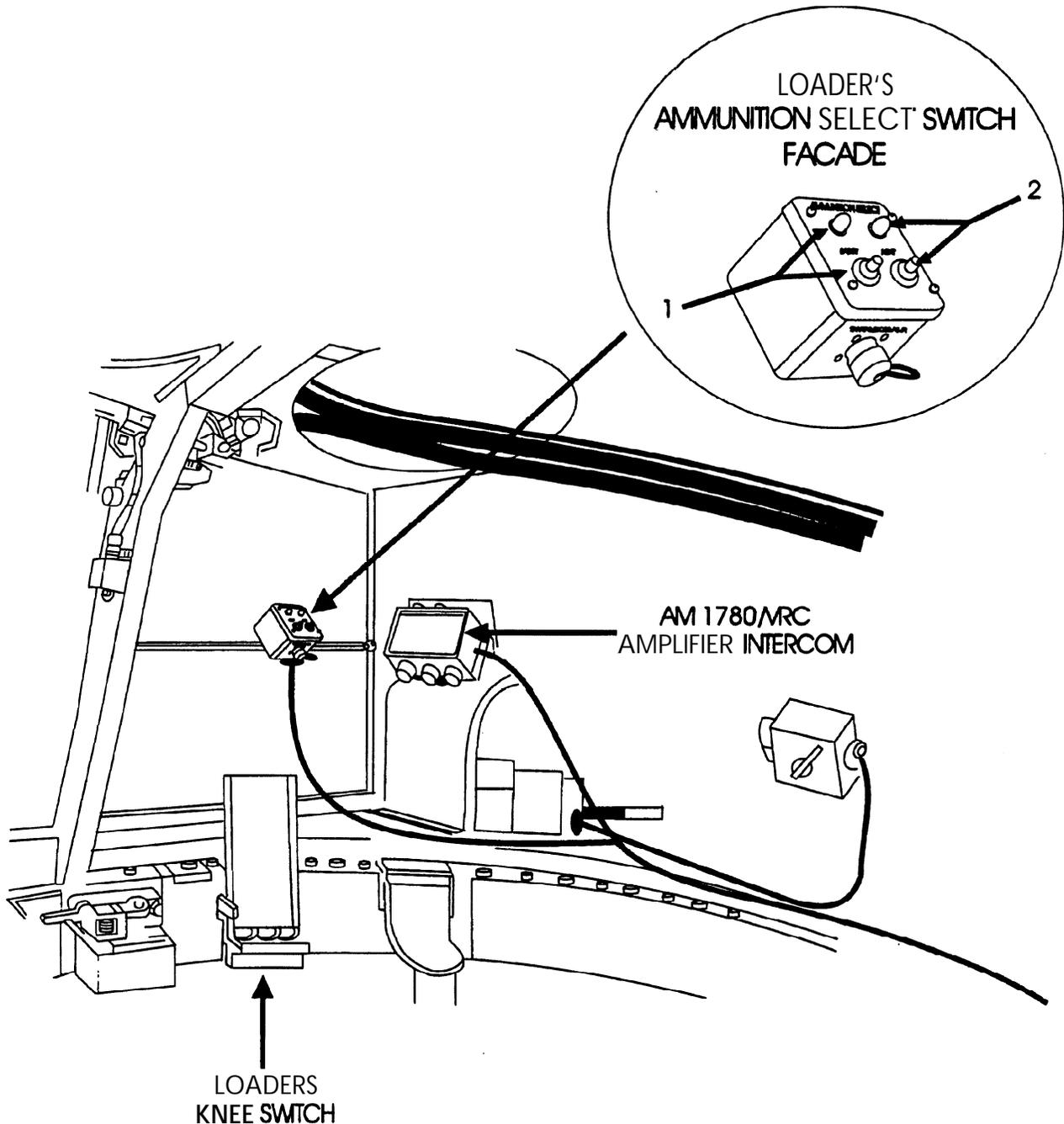


Figure 2-25. Loader's Station

2.3.4.4 AMMUNITION SELECT Switch Facade. The AMMUNITION SELECT Switch facade, shown in Figure 2-25, is appended in front of the ready ammunition bustle door. Since the ammunition ready doors do not function during simulation, the Loader cannot actually extract a round and load the main gun. The Loader simulates the loading and unloading processes using the Loader's Knee switch, Loader's AMMUNITION SELECT switch facade, and the Loader's Breech switch facade.

The following is the correct Loader's sequence to simulate loading the main gun.

- a. Place the GUN/TURRET Drive switch on the Loader's Panel in the EL UNCPL position.
- b. Place the main gun SAFE/ARMED Handle (M1A1) or Ejection Guard (MI) in the SAFE or closed position.
- c. Wait for the simulation to start, indicated by the sound of the turret brake.
- d. Depress the Loader's Knee Switch firmly. After 2 seconds (MI) or 3 seconds (M1A1) the ammunition door is heard opening. Both ammunition lights illuminate on the AMMUNITION SELECT switch facade.
- e. Keep the knee switch depressed and press the button for the desired round. The light for that round on the AMMUNITION SELECT switch facade goes out.
- f. Release the knee switch and listen for the sound of the ammunition door closing.
- g. Wait 2 seconds (MI) or 3 seconds (M1A1). The READY light illuminates on the Breech Switch facade.

- h. Press the Breech switch facade LOAD button to simulate closing the breech. The Breech switch facade LOADED light lights up.
- i. On the TC's command, place the SAFE/ARMED Handle (M1A1) or the Ejection Guard (MI) in the ARMED or open position.

The following is the correct Loader's sequence to simulate unloading the main gun.

- a. Place the SAFE/ARMED Handle (M1A1) or Ejection Guard (MI) in the SAFE or closed position.
- b. Press the Breech switch facade to simulate unloading the round. The LOADED light on the Breech switch facade goes out and the READY light lights up.
- c. Depress the knee switch firmly and wait 2 seconds (MI) or 3 seconds (M1A1) for the sound of the ammunition door opening.
- d. The light for the opposite type round from the last round loaded lights up on the AMMUNITION SELECT switch facade.
- e. Press the unlighted button (for the round to be unloaded) to simulate putting the round back into the ammo storage rack. The light for that round lights up on the AMMUNITION SELECT facade and the Breech switch READY light goes out.
- f. Select either type of round for loading, or release the knee switch. The lights on the AMMUNITION SELECT switch facade go out and the sound of the ammunition door is heard.

Key	Position	Function
1	SABOT Switch and Light	Simulate selection of SABOT round for loading or storing.
2	HEAT Switch and Light	Simulate selection of HEAT round for loading or storing.