

## SECTION 3

### OPERATION

This section of the manual provides locations and functions of the recorder/reproducer operating controls and indicators, a preoperational procedure, and operating instructions for the various modes of operation.

#### 3-1. CONTROLS AND INDICATORS

The location and function of each control and indicator are shown in the following tables. Table 3-1 shows those on the tape transport. Table 3-2 lists the transport controls on the recorder control panel. Table 3-3 lists the signal system controls on the recorder control panel, and Table 3-4 lists those on the input/output assembly (accessory).

#### 3-2. PRE-OPERATING PROCEDURES

See Figure 3-1 and perform the following preoperational procedure.

1. Clean and demagnetize components in the tape path as described in the Maintenance section of the manual.
2. Set the POWER switch to the ON position. All safe and repro indicators light, the stop and EDIT indicators light and the tape timer indicates zero (0 00 00).
3. Set speed-select rotary switch to desired tape speed; 3.75, 7.5, 15, or 30 in/s. If a speed is selected that the signal system has not been set for, the LOCKOUT indicator lights, play and record modes for that speed are inoperative, and the audio output(s) of the basic recorder/reproducer are muted. If an input/output assembly is connected, the assembly will switch to input signal monitoring.
4. Install reel of tape on supply turntable and empty reel on takeup turntable as shown in

Figure 3-1. Reels up to 14 inches (16.54 cm) in diameter and in any size combination may be used. (Note: If reels larger than 11-1/2 inches (29.21 cm) are used, reel motors must be in the "outer" position. Refer to paragraph 2-22).

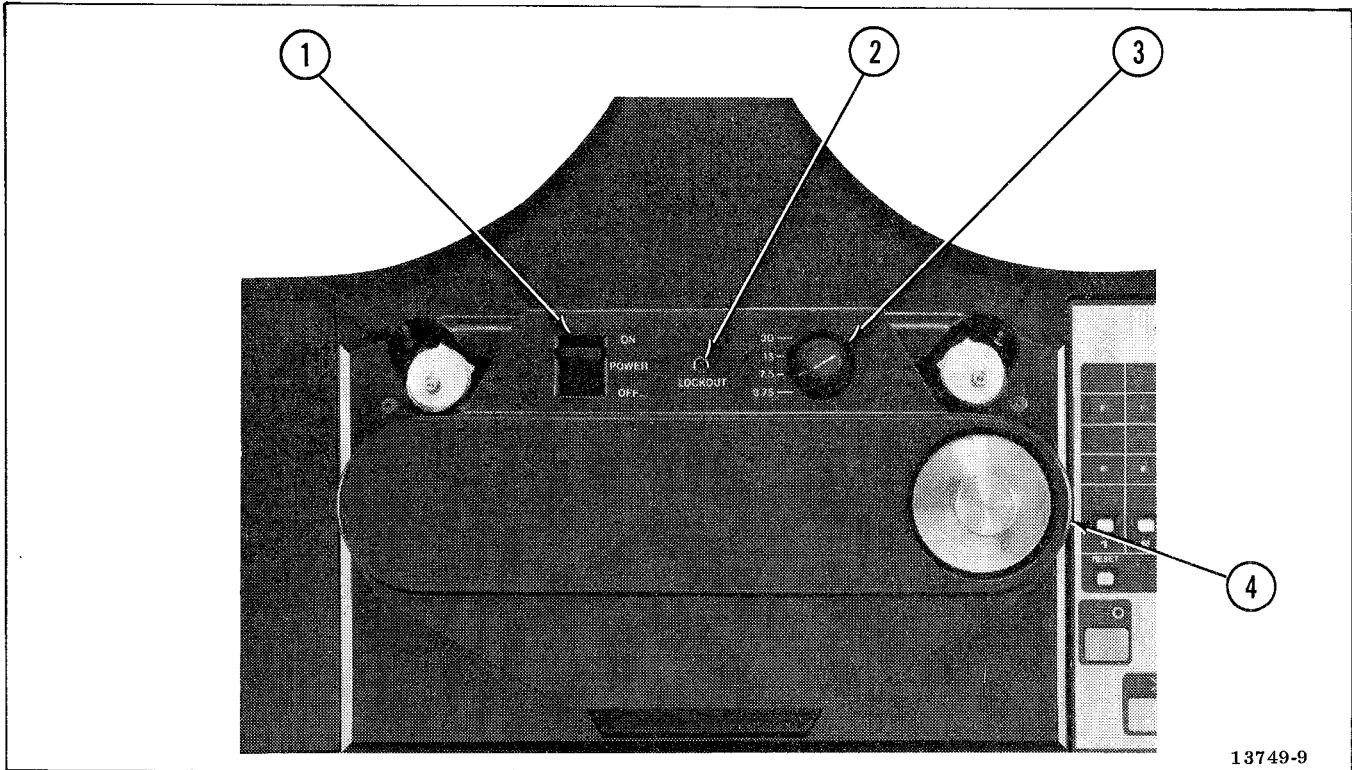
5. Lower head shield by pressing shield downward until it locks.
6. Thread tape on transport as shown in Figure 3-1. The tape path is from the supply reel, around the inside of the supply constant-tension arm, around the tape timer wheel, across the head assembly, around the capstan, around the inside of the takeup constant-tension arm, and onto the takeup reel.
7. Turn one reel to remove all tape slack.

#### CAUTION

**DO NOT TOUCH THE CONSTANT-TENSION ARMS WHEN RECORDER/REPRODUCER IS IN THE ELECTRICAL THREAD CONDITION. TO DO SO WILL INTRODUCE A REEL SERVO ERROR AND POSSIBLY CAUSE TAPE DAMAGE.**

8. While holding the stop pushbutton pressed, turn either reel to slacken tape and then tighten tape with a short quick movement to apply tension to the constant-tension arms. This action causes the reel servos to activate and recorder/reproducer enters electrical thread mode. The electrical thread mode is indicated by the EDIT indicator light going out. (To deactivate the thread mode, press EDIT pushbutton when tape is stopped. Reel servos will disengage and tape may be removed from transport if desired.)
9. Release head shield by pressing shield downward.

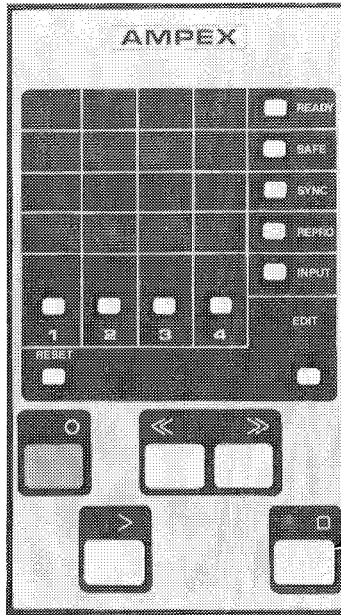
Table 3-1. Tape Transport Controls and Indicators



13749-9

INDEX NO.	NAME	FUNCTION
1	POWER switch	Used to turn ac power to the recorder on and off. When power is first applied, all Safe and Repro indicators light, Stop and EDIT indicators light, and tape timer indicates zero (0 00 00).
2	LOCKOUT INDICATOR	Lights when a speed is selected that the signal system has not been set up for. Play and record modes for the incorrect speeds are locked out of operation. (Note: Indicator also lights for 2 to 3 seconds after power is first applied.)
3.	Speed-Select rotary switch	Used to select tape speed; 3.75, 7.5, 15, or 30 inches-per-second (9.52, 19.05, 38.1, or 76.2 cm/s)
4.	Capstan Edit knob	When tape is stopped in thread mode, the capstan edit knob may be turned by hand in either direction to move tape from reel to reel under reel-servo control.

Table 3-2. Recorder Control Panel, Transport Controls and Indicators



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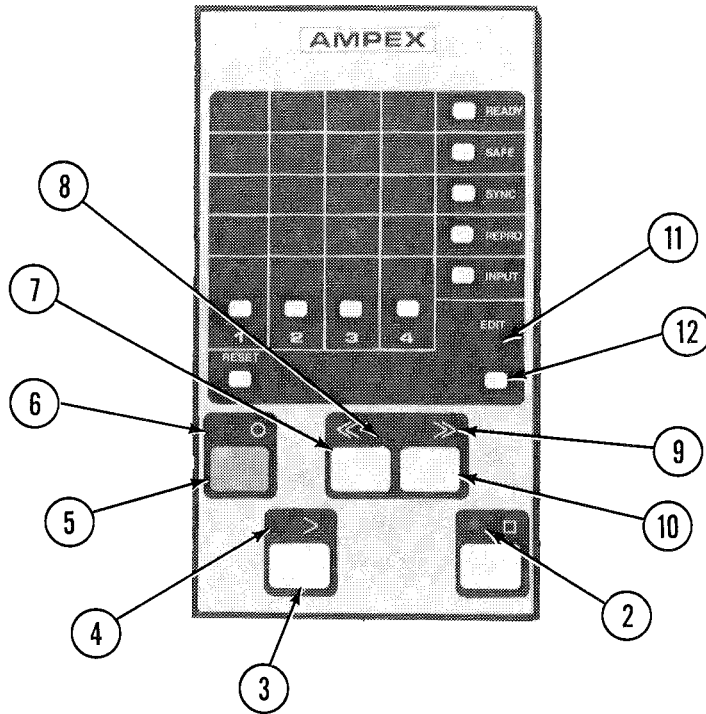
INDEX NO.	NAME	FUNCTION
1	 Stop pushbutton switch	<p>Used to initiate the following functions:</p> <p><i>Thread.</i> After tape is manually threaded on the transport and tape slack removed, either reel is quickly turned by hand to apply tension to the tension arms while the stop pushbutton is simultaneously pressed. This causes reel servos to activate and place transport in a thread condition. Thread condition is indicated by EDIT indicator light (index no. 11, this table) going out.</p> <p><i>Stop.</i> Switch stops tape transport motion and cancels existing mode of operation. Note: When any channel is in record mode, tape motion does not stop until record signal has decayed.</p> <p><i>Stop Record.</i> Also used to stop recording without stopping transport if record pushbutton (index no. 5) is held pressed while stop pushbutton is momentarily pressed.</p> <p><i>Momentary Record.</i> Also used in conjunction with play and record pushbuttons (index no. 3 and 5, this table). If stop and record pushbuttons are held pressed, record mode is entered when play pushbutton is pressed and held. Record mode stops when play pushbutton is released, but transport motion continues.</p>

Table 3-2. Recorder Control Panel, Transport Controls and Indicators (Continued)



13690-5


INDEX NO.	NAME	FUNCTION
2	Stop indicator (yellow)	Lights when ac power is first applied and when stop mode is active.
3	 Play pushbutton switch	<p>Used to select play mode or used simultaneously with record pushbutton (index no. 5) to select record mode.</p> <p>Pressing the play pushbutton during fast forward or rewind mode causes recorder to enter play mode.</p> <p>Also used to initiate one of the following modes:</p> <p><i>Momentary record.</i> Used to select momentary record mode (see index no. 1).</p> <p><i>Spooling.</i> Simultaneously pressing play pushbutton and a fast forward or rewind pushbutton (index no. 7 or 10) causes transport to enter spool mode.</p>
4	Play indicator (green)	Lights when play or spool mode is selected and capstan servo is locked.

Table 3-2. Recorder Control Panel, Transport Controls and Indicators (Continued)




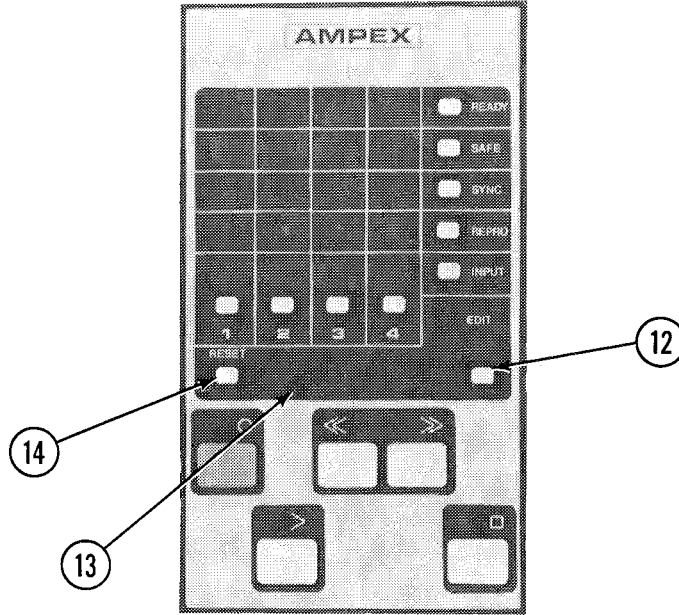
INDEX NO.	NAME	FUNCTION
5	 Record pushbutton switch	<p>Used in conjunction with play pushbutton (index no. 4). Simultaneously pressing play pushbutton and record pushbutton initiates record mode of channel(s) in ready mode.</p> <p>Also used to select momentary record mode (see index no. 1, this table).</p>
6	Master Record indicator (red)	Lights when any channel is recording
7	 Rewind pushbutton switch	<p>Used to select rewind mode. Also used to select spool mode in the rewind direction when the play pushbutton (index no. 3) and the rewind pushbutton are pressed simultaneously.</p>
8	Rewind indicator (yellow)	Lights when rewind or rewind spool mode is selected.
9	Fast Forward indicator (yellow)	Lights when fast forward or forward spool mode is selected.
10	 Fast Forward pushbutton switch	<p>Used to select fast forward mode. Also used to select spool mode in the forward direction when the play pushbutton (index no. 3) and the fast forward pushbutton are pressed simultaneously.</p>
11	EDIT indicator (yellow)	Lights when power is first applied to recorder. Light goes out when stop pushbutton is pressed and thread condition is obtained (refer to index no. 1). Indicator also lights in edit modes of operation.
12	EDIT pushbutton switch	<p>If tape motion is stopped, pressing EDIT causes recorder to go into unthread condition (reel servos disengage) and tape may be removed from transport if desired.</p> <p>Also used to initiate one of the following edit modes:</p> <p><i>Stop/Edit:</i> If tape is stopped, pressing EDIT disengages reel servos for tape threading, editing, or manual tape movement.</p> <p><i>Play/Edit:</i> If play or record mode is active, pressing EDIT pushbutton causes the following action: Tape motion continues in play mode; power is removed from takeup reel; and takeup tension-arm roller engages capstan causing tape to be spilled at takeup side of transport.</p> <p>If in Play/Edit mode and stop pushbutton is pressed, tape will stop, edit mode will be retained, and tape can again be spilled by pressing play pushbutton. To cancel play/edit mode, press stop pushbutton and after tape stops, press EDIT.</p>

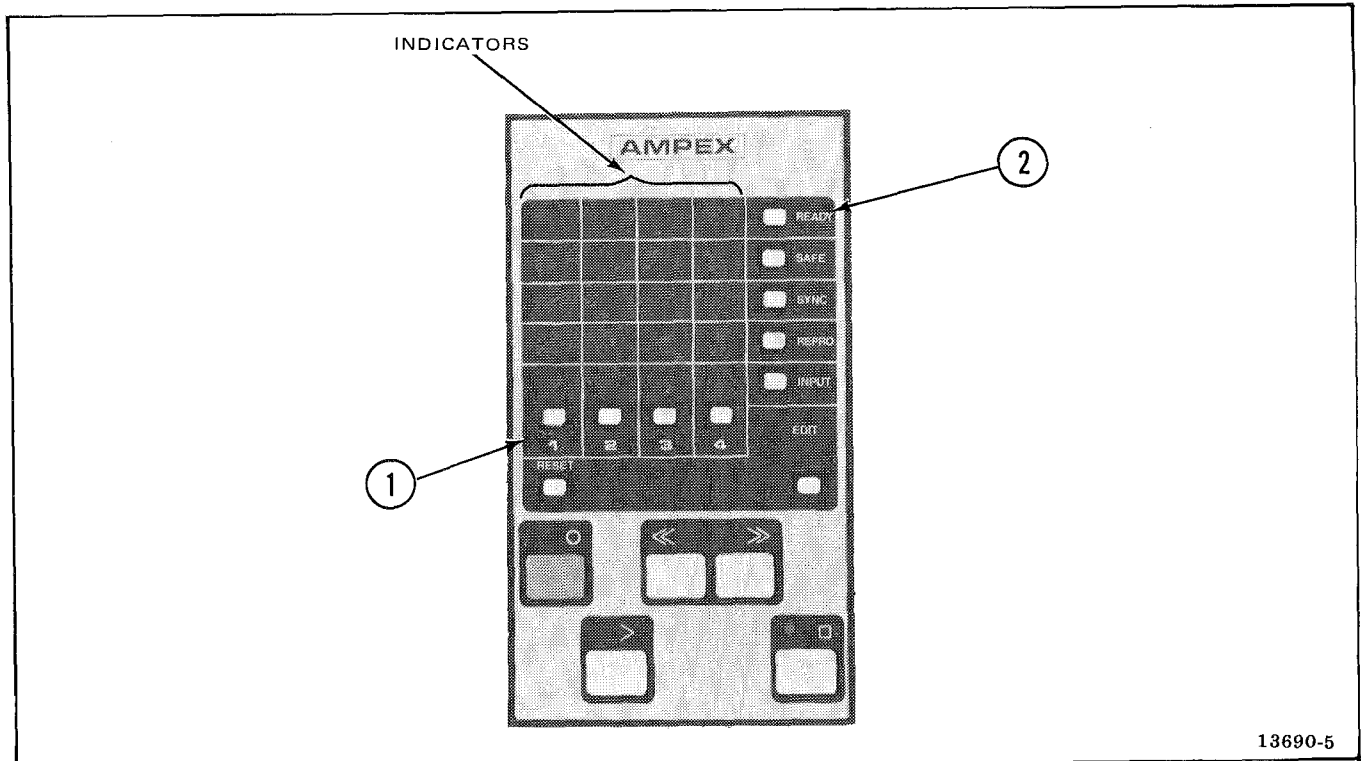
Table 3-2. Recorder Control Panel, Transport Controls and Indicators (Continued)



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INDEX NO.	NAME	FUNCTION
12 (Continued)		<i>Shuttle/Edit:</i> If fast forward, rewind, or a spool mode is active, pressing EDIT pushbutton will cause tape lifters to retract while pushbutton is held pressed.
13	Tape Timer display	When power in on, the display shows in hours, minutes, and seconds (or minutes, seconds, and tenths of seconds after changing jumpers — see Installation section) the distance that the tape has moved from zero (tape position when tape timer RESET pushbutton is pressed or recorder/ reproducer power is turned on).
14	Tape Timer RESET pushbutton switch	Used to reset the tape timer display to zero (0 00 00).

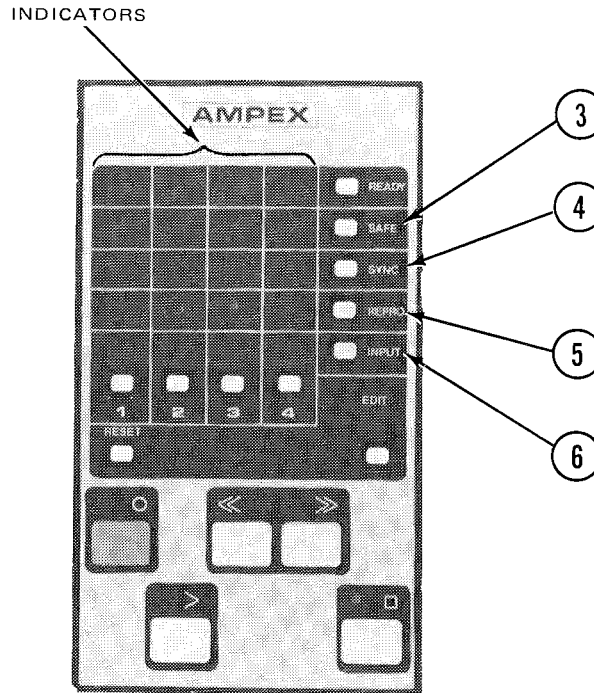
Table 3-3. Recorder Control Panel, Signal System Controls and Indicators



13690-5

INDEX NO.	NAME	FUNCTION
1	Channel Select pushbutton switches (4)	Switches permit channel (1, 2, 3, 4) selection for various modes of operation. Used in conjunction with the READY, SAFE, SYNC, REPRO, and INPUT pushbutton switches (index no. 2 – 6).
2.	READY pushbutton switch and Ready (yellow) and Record (red) Channel 1 – 4 indicators	<p>Used in conjunction with channel select pushbutton switch (index no. 1 of this table). In ready, channel is enabled for entering record mode.</p> <p>Ready indicator(s) light when READY pushbutton switch and corresponding channel select pushbutton switch (index no. 1, this table) are simultaneously pressed. Record mode is entered by simultaneously pressing play and record pushbutton switches (index no. 3 and 5, Table 3-2). When record mode is entered, ready (yellow) indicator goes out and record (red) indicator lights, indicating the channel(s) in record mode.</p> <p>If channel is in record mode and READY pushbutton and same channel select pushbutton switch are simultaneously pressed, the channel will go out of record and will return to ready mode. Record mode may be reentered by simultaneously pressing play and record pushbutton switches (index no. 3 and 5, Table 3-2). Tape motion and status of other channels are not affected by this action.</p>

Table 3-3. Recorder Control Panel, Signal System Controls and Indicators (Continued)



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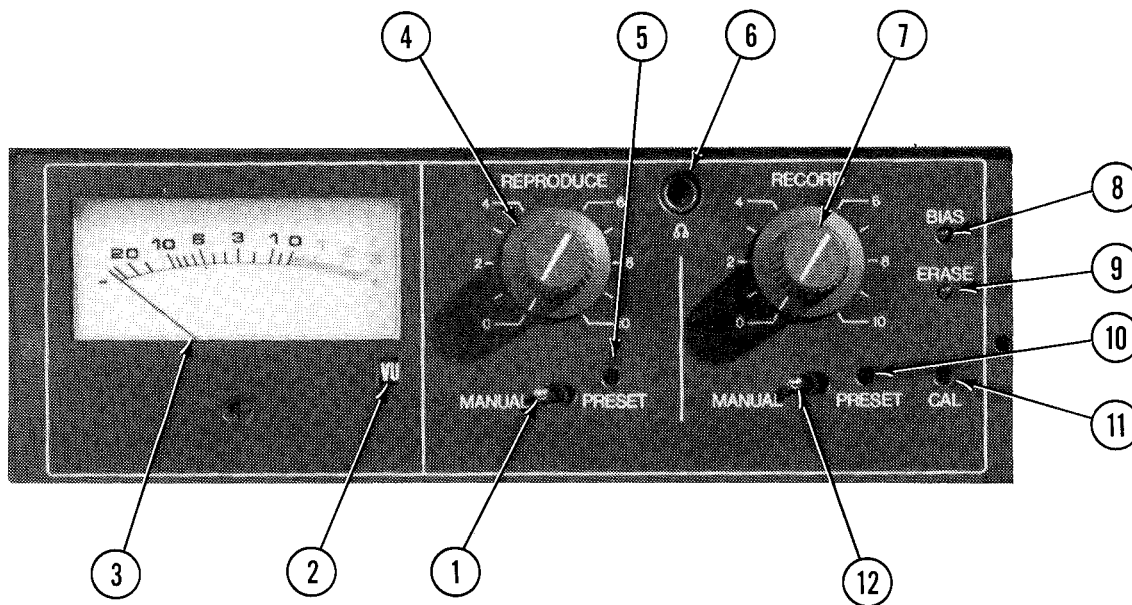
INDEX NO.	NAME	FUNCTION
3	SAFE pushbutton switch and Safe Channel 1 – 4 indicators (green)	<p>Used in conjunction with channel select pushbutton switch (index no. 1). In safe, channel is prevented from entering record mode.</p> <p>Safe indicator(s) light when power is initially applied or when SAFE pushbutton and corresponding channel select pushbutton switch (index no. 1) are simultaneously pressed. When lit, recording on channel indicated is inhibited.</p> <p>If channel is in record mode and SAFE pushbutton and same channel select pushbutton are simultaneously pressed, the channel will go out of record mode and enter safe mode. To reenter record mode, channel must first be placed into ready mode. Tape motion and status of other channels are not affected by this action.</p>
4	SYNC pushbutton switch and Sync Monitoring Channel 1 – 4 indicators (yellow)	<p>Used in conjunction with channel select pushbutton switch (index no. 1, this table) to select Sel-Sync mode. Sync indicator(s) light when SYNC pushbutton and corresponding channel select pushbutton are simultaneously pressed. When indicator is lit, signal on tape is reproduced by record head of selected channel(s). This reproduced signal is connected to audio output.</p>



Table 3-3. Recorder Control Panel, Signal System Controls and Indicators (Continued)

INDEX NO.	NAME	FUNCTION
4 (Continued)		<p>In in Sel-Sync mode and ready mode or record mode is entered, input signal being recorded is connected to audio output of that channel. Sync indicator light goes out and input indicator lights. If channel is removed from record mode, system returns to sync mode and sync indicator lights (unless repro or input monitoring were selected while in record mode).</p>
5	<p>REPRO pushbutton switch and Repro Monitoring Channel 1 – 4 indicators (yellow)</p>	<p>Used in conjunction with channel select pushbutton switch (index no. 1). In repro, signal being reproduced by reproduce head is connected to audio output.</p> <p>Repro indicator(s) light when power is initially applied or when REPRO pushbutton and corresponding channel select pushbutton switch (index no. 1) are simultaneously pressed. When lit, signal being reproduced by reproduce head is connected to audio output.</p>
6	<p>INPUT pushbutton switch and Input Monitoring Channel 1 – 4 indicators (yellow)</p>	<p>Used in conjunction with channel select pushbutton switch (index no. 1). Input signal to recorder is connected to audio output.</p> <p>Indicator(s) light when INPUT pushbutton and corresponding channel select pushbutton switch are simultaneously pressed. When lit, input signal to recorder is connected to audio output connector for monitoring purposes (E-E mode).</p> <p>Indicator also lights if record mode is entered while in sync mode.</p>

Table 3-4. Input/Output Module Accessory, Controls and Indicators



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INDEX NO.	NAME	FUNCTION
1	Reproduce MANUAL/ PRESET toggle switch	Switch used to select MANUAL or PRESET reproduce level. In MANUAL position, REPRODUCE level control (index no. 4) is used to vary reproduce level of associated channel.  In PRESET position, reproduce level is controlled by the setting of the reproduce calibrate control (index no. 5).
2	VU/PK indicator	Indicates type of meter operation selected, volume unit (VU) or peak signal level (PK).
3	VU/Peak meter	Indicates signal level present at audio output of associated channel. Internal switch permits selection of vu or peak signal level reading on meter.
4	REPRODUCE level control	Control used, when MANUAL/PRESET toggle switch (index no. 1) is in MANUAL position, to vary reproduce level of associated channel.
5	Reproduce PRESET adjustment control (R1)	Used to set reproduce line output operating level.

Table 3-4. Input/Output Module Accessory, Controls and Indicators (Continued)

INDEX NO.	NAME	FUNCTION
6	Phone jack	Receptacle for headphone plug. Audio of associated channel can be monitored on headphones (600 ohms or greater impedance).
7	RECORD level control	Control used, when MANUAL/PRESET toggle switch (index no. 12) is in MANUAL position, to vary record level of associated channel.
8	BIAS indicator	Indicator lights in record mode to indicate that bias signal is present at the record head.
9	ERASE indicator	Indicator lights in record mode to indicate that erase signal is present at the erase head.
10	Record PRESET adjustment control (R2)	Used to preset record input level.
11	Record CAL adjustment control (R3)	Used to set input monitoring level and meter indication to match reproduced level from tape.
12	Record MANUAL/PRESET toggle switch	Switch used to select MANUAL or PRESET record level. In MANUAL position, RECORD level control (index no. 7) is used to vary record level of associated channel. In PRESET position, record level is controlled by the setting of the record PRESET adjustment control (index no. 10).

### 3.3. OPERATING PROCEDURES

The following general information is applicable to all modes of operation.

1. If the tape runs completely off the supply or takeup reel, the recorder/reproducer automatically stops and enters unthread mode, and the tape timer display "freezes".
2. The following two groups of functions are mutually exclusive in that only one function in a group may be selected at one time: Record, Ready, or Safe; Sync, Repro, or input.

### 3.4. Recording

Proceed as follows:

1. Perform all steps of the pre-operating procedures.
2. Simultaneously press the channel select pushbutton switch and the READY pushbutton switch for each channel to be recorded. The associated ready indicator (yellow) will light.
3. Simultaneously press the channel select pushbutton switch and SAFE pushbutton switch for each channel that is not to be recorded. (Note: When the recorder is initially turned on, all channels will automatically be in safe mode.) The associated safe indicator (green) will light.
4. Simultaneously press the channel select pushbutton switch and the INPUT pushbutton switch for each channel selected for record mode.
5. Connect signal(s) to be recorded to the appropriate audio input connectors.

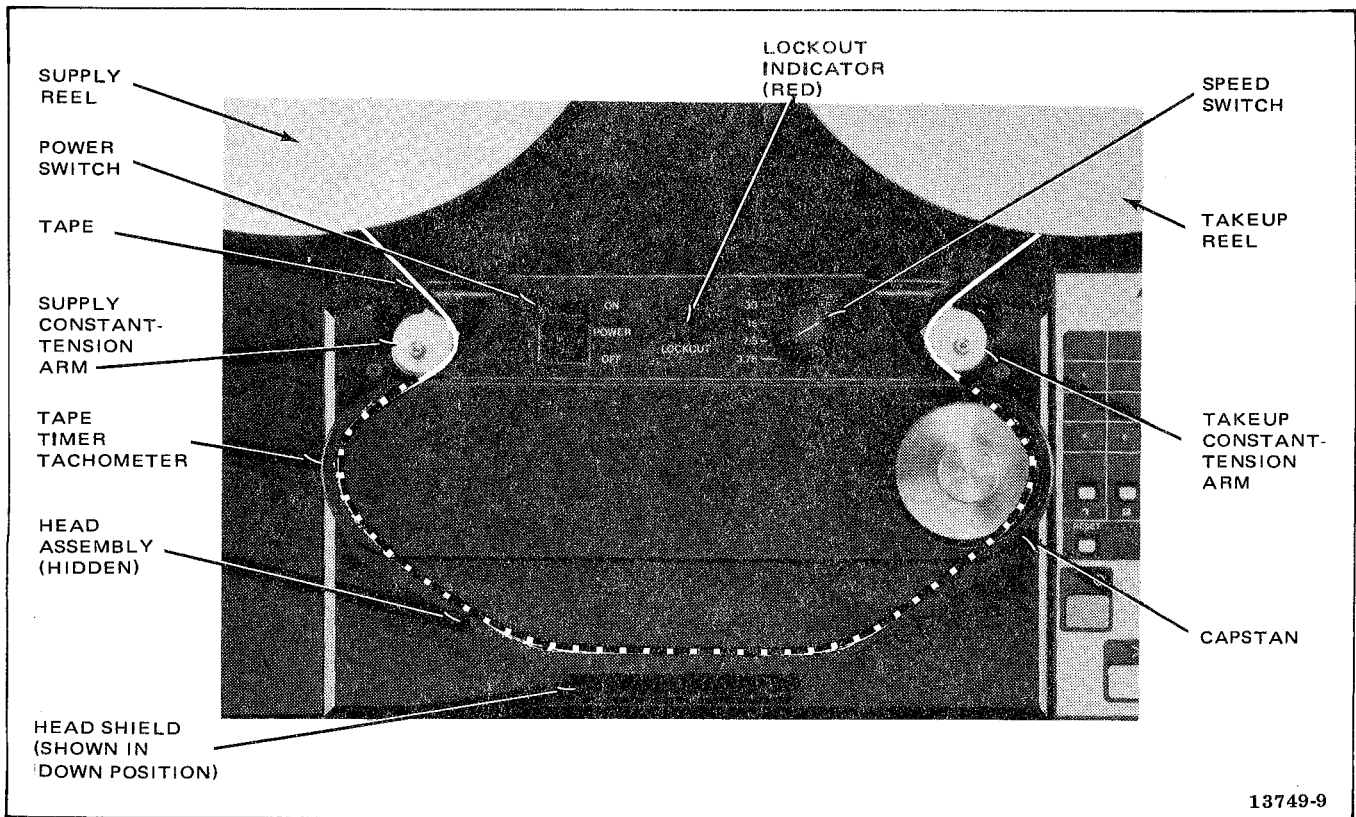


Figure 3-1. Tape Threading Path

6. If system is equipped with an input/output module assembly, perform one of the following steps for each channel to be recorded.
  - a. Set RECORD MANUAL/PRESET switch to PRESET and observe level meter for desired indication. If level is not correct, adjust level fed to input/output assembly or perform step b.
  - b. Set RECORD MANUAL/PRESET switch to MANUAL and adjust RECORD level control for desired indication on meter.
7. Simultaneously press play and record pushbutton switches to start tape motion and begin recording on selected channel(s). (An alternate method is to depress play pushbutton to start tape motion and then, while holding play pushbutton depressed, press record pushbutton.) The master record indicator (red) and the channel record indicator(s) will light.
8. If desired while recording, the input signal for each channel can be compared with the recorded signal on that channel by holding the channel selector pushbutton depressed and alternately pressing the associated INPUT and REPRO pushbutton switches.
9. When recording is complete, record mode may be terminated by performing any one of the following steps. (Note that internal logic control circuitry will delay any commanded change in tape motion direction or velocity until after all channels have completely terminated record mode.)
  - a. Press stop pushbutton to stop tape motion and deactivate record mode.