

OPERATION

GENERAL

Series 300 recorder/reproducers are intended for multi-track operation. Tape motion is controlled by two pushbuttons START and STOP, and a mode selector switch for selecting PLAY, REWIND and FAST FWD functions. A RECORD pushbutton on the tape transport provides a means to select the record functions of all amplifiers simultaneously (concurrent recording). Record buttons are also located on each amplifier, providing a means for recording on any individual track or combination of tracks in the system. The equipment will accommodate the NAB 10½-inch diameter tape reels. The 14-inch diameter reel equipment is obtainable by arrangement with Ampex Professional Products Contract Engineering.

Either of two capstan drive motor speeds can be selected at the LOW-HIGH TAPE SPEED switch which is also on the tape transport.

On the front panel of the electronic assem-

bly are controls for setting RECORD LEVEL and (reproduce) PLAYBACK LEVEL, selecting 7½ ips NAB or 15 ips AME EQUALIZATION, selecting three input arrangements by means of the INPUT TRAN. R SWITCH, and switching the vu meter at the METER and OUTPUT switch so that (reproduce) PLAYBACK, RECORD, BIAS and ERASE LEVEL(s) can be read. A phone jack (PHONES) for monitoring, a RECORD button, a RECORD INDICATOR light, and a POWER OFF-ON switch are also mounted on the electronic assembly front panel.

Another MONITOR AMPLIFIER phone jack and a line termination (LINE TERM) OFF-ON switch are located on the back of the amplifier-chassis.

In operating your Tape Transport, the same size reel hubs should be used on both the supply and takeup sides, or the braking action might spill tape as one side brakes faster than the other (if different size reel hubs are employed).

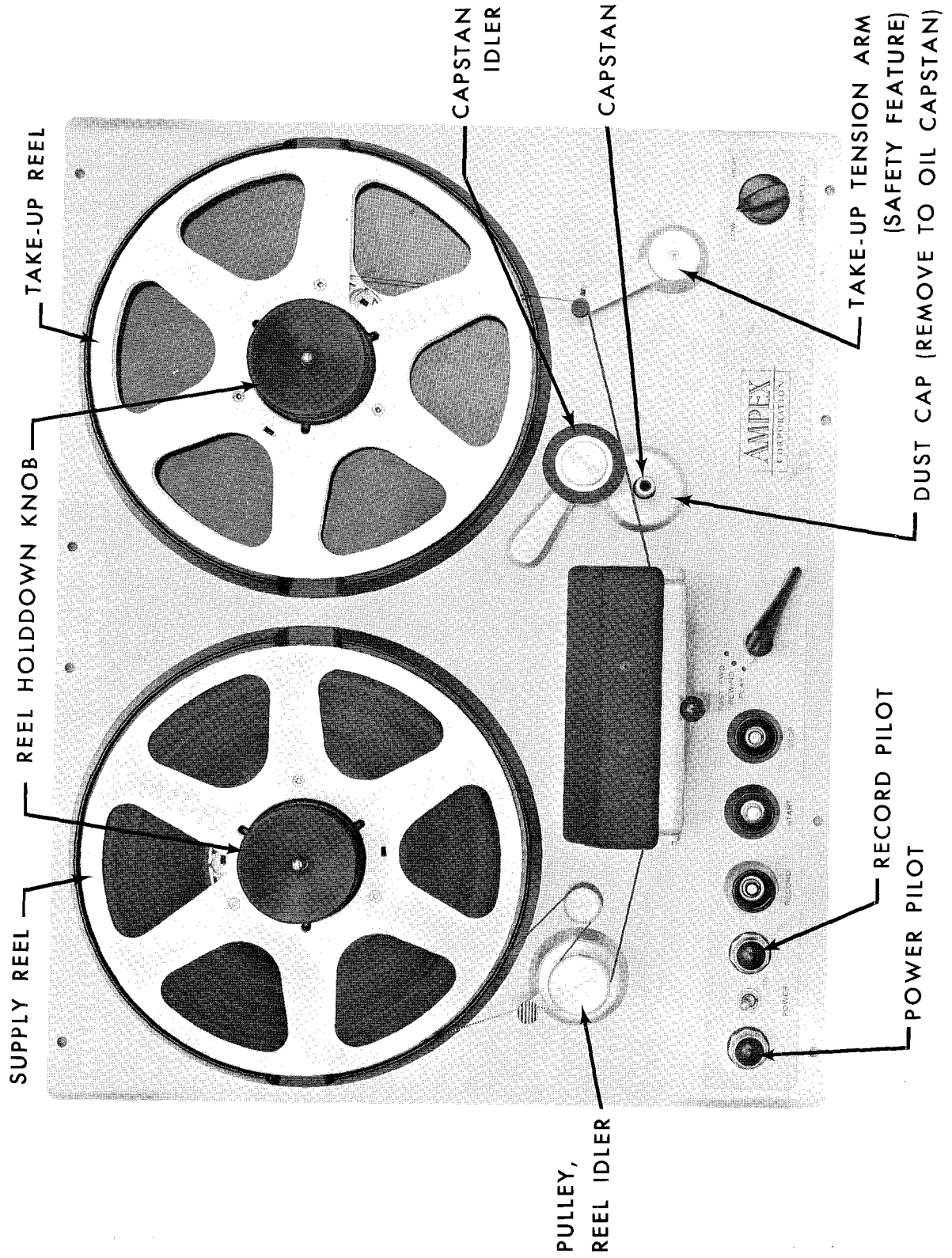
SUMMARY OF CONTROLS, SWITCHES AND INDICATORS

<i>Item</i>	<i>Schematic Reference Symbol</i>	<i>Location</i>	<i>Function</i>
POWER switch	S801	Tape Transport	Controls all power to the entire system. When this switch is on, capstan rotates* (if tape is properly threaded) and all electronic assembly vu meters will light provided the individual amplifier power switches are on.
POWER INDICATOR	A801	Tape Transport Control Cluster	Lights when main power switch is on.
POWER OFF-ON SWITCH	S-5	Electronic Assembly front panel	Controls power to the electronic assembly. The v-u meter lamps light when main power is on, and are unaffected by the safety switch, remaining lighted till the power is turned off, either at this switch or the main power switch on the tape transport.
TAPE SPEED	S502 and S503	Tape Transport Control Cluster	Determines speed of the capstan drive motor by high or low speed winding. Used in conjunction with EQUALIZATION switch S2.
EQUALIZATION 7½ NAB 15 NAB 15 AME	S2	Electronic Assembly front panel	Used to select appropriate equalization circuitry for tape speed chosen.
METER AND OUTPUT SWITCH (Four position switch)	S3	Electronic Assembly front panel 1. PLAYBACK LEVEL 2. RECORD LEVEL 3. BIAS 4. ERASE	Line output of recorder switched to tape playback. Meter reads output level. Line output of recorder switched to amplified record input signal. Meter reads output level proportional to the signal being recorded on the tape. A reading of "O" on the meter corresponds to normal recording level (1% distortion). Line output of recorder remains switched to amplified record input signal. Meter reads bias current. Line output of recorder remains switched to amplified record input signal. Meter reads erase current.
RECORD LEVEL	R9	Electronic Assembly front panel	Adjusts record level.

*When the SLOW START function is used, the capstan will not rotate until the START button is pressed.

SUMMARY OF CONTROLS, SWITCHES AND INDICATORS (Contd.)

<i>Item</i>	<i>Schematic Reference Symbol</i>	<i>Location</i>	<i>Function</i>
PLAYBACK LEVEL	R36	Electronic Assembly front panel	Adjusts reproduce level.
VU METER	M1	Electronic Assembly front panel	Provides a means for visually monitoring record input level, reproduce level, and bias and erase.
INPUT TRANSFER SWITCH	S1	Electronic Assembly front panel	Provides a means for selecting the appropriate input circuitry to record with a microphone or from a balanced or unbalanced line.
LINE TERM	S4	Electronic Assembly front panel	Controls output termination of the reproduce amplifier. In the ON position a 560 ohm resistor is across the output. In the OFF position, the resistor is out of the circuit and the amplifier must then feed a 600 ohm device.
START button	S805	Tape Transport Control Cluster	Starts tape in mode selected by the mode selector switch S802.
RECORD button	S804	Tape Transport Control Cluster	Controls record function of all electronic assemblies concurrently.
RECORD indicator	A802	Tape Transport Control Cluster	Lights only when <i>all</i> electronic assemblies have been energized by S804.
RECORD button	S6	Electronic Assembly front panel	Controls the record relay in the individual electronic assembly. Power is connected to the bias oscillator when this button is pressed. PLAY button must be pressed to put the tape in motion before the record button will have any effect.
FAST FWD REWIND PLAY mode selector switch	S802	Tape Transport Control Cluster	Provides a means to set the tape in motion for recording, reproducing, rewinding and fast forward modes.
STOP button	S803	Tape Transport Control Cluster	When this button is pressed, the brake solenoids and all relays are de-energized.



TAPE THREADING PATH

OPERATING TECHNIQUES

Threading the Tape

Thread the tape as shown in the illustration—TAPE THREADING PATHS. Unwind and inspect all new factory wound reels of tape by running them through in the FAST FORWARD mode.

New tapes might be looped to the hub in such a manner that the tape will not come free of the reel at the end. This will prevent the safety switch (S501) from disengaging the capstan idler and the capstan, which results in a flat being worn on the capstan idler wheel. (Any adhesive material accumulation on the reel hub may also keep the tap from coming free at the end of the reel, and should therefore be removed with solvent.)

Reel hold-down knobs, catalog number 9093 are furnished for ¼ and ½-inch tape equipment, and hold-down nuts, catalog number 5881 for 1-inch operation.

Power

Power to the tape transport and electronic assemblies is supplied through the main power switch S801 (each amplifier has a power switch S5).

Speed Switches

There are two switches associated with operating speed. The tape speed switch S503 determines the speed of the capstan drive motor, and the equalization switch 4S2 changes the equalization in the amplifiers appropriately.

Tape Motion

The tape motion is controlled at the tape transport control cluster by two push-buttons—PLAY and START, a mode selector switch—FAST FWD, REWIND and PLAY, a LOW-HIGH tape speed switch, and one other switch on the tape transport connector panel—FAST START/SLOW START.

FAST START/SLOW START switch S806 on the tape transport connector panel should normally be placed in the FAST START position when operating at all speeds of the Model 300. The capstan drive motor will then operate at all times when the tape is threaded.

With this switch in the SLOW START position, the capstan drive motor will operate only after the START button is pressed. This feature is provided so that the capstan motor will not operate if the equipment is to be left in a STANDBY condition for long periods.

LOW HIGH TAPE SPEED

The tape speed switch S503 determines the speed of the capstan drive motor and is used in conjunction with equalization switch 4S2.

START

To start the equipment in any mode of operation, press the START button S805.

PLAY OR RECORD

Tape motion during recording or reproduction is the same. Place the mode selector switch in the PLAY position and press the START button. The tape will start in motion at the speed selected by the LOW-HIGH TAPE SPEED SWITCH and reproduction will take place. Press the RECORD button to place the equipment in the record mode.

STOP

Pressing the STOP button causes all tape motion to cease, and shuts off recording by removing the power from the last stage in the record amplifier.

FAST FWD

To operate in the fast forward mode place the selector in the FAST FWD position and press the START button.

REWIND

Place the mode selector switch in the REWIND position and press the START button.

When editing or cueing the tape, the selector switch makes possible changing from fast forward to rewind (and vice-versa) without using the STOP and START buttons.

NOTE

In either fast forward or rewind on equipment using ¼-inch tape, it is desirable to remove the tape from direct contact with the heads by opening the head assembly gate.

Editing or Cueing

Indexing the tape as in editing or cueing, or when approaching the end of the reel, can be accomplished by switching the mode selector positions from FAST FWD to REWIND, reducing the tape motion to a slow travel and then depressing the STOP button when the desired point is reached.

Reproduce (Playback)

To reproduce a previously recorded tape, turn the METER and OUTPUT SWITCH 4S3, to the extreme left position designated PLAYBACK LEVEL, then start the tape in motion as indicated under PLAY. A PLAYBACK LEVEL Control 4R36 has been provided on the front panel to adjust the tape level to plus 8 vu output (zero on the vu meter)

Record

To record a new program on previously recorded tape, or on blank tape, turn the METER and OUTPUT SWITCH 4S3 to the second position from the left which is designated RECORD LEVEL. Turn the RECORD LEVEL CONTROL 4R9 clockwise until the level reads 0 (zero) on the vu meter on the most intense program peaks.

The program can be audibly monitored through either the phone jack (PHONES) 4J6, Monitor 5J4, or the line out connector (LINE OUTPUT) 5J5 before the tape is in motion. This direct monitor feature allows the program to be set up through the machine without actually recording during the set up period.

NOTE

For correct meter calibration it is important that the line out be properly terminated in a nominal 600 ohms either external to the machine or by the use of the line out termination switch (LINE TERM) 5S4.

When the record level has been set properly, place the mode selector in the PLAY position, start the tape in motion and press the RECORD button on the tape transport. The tape transport record indicator will light and the indicators on all electronic assemblies will light, indicating that all tracks are in the RECORD mode (concurrent recording).

If it is desired to record using only specific amplifiers, place the mode selector on the tape transport in the PLAY position and press the individual record buttons of the selected amplifiers. The record indicators on the amplifiers will light, but the tape transport record indicator will not light (even though all individual amplifier record buttons in the system have been depressed).

The erase position of the METER and OUTPUT SWITCH provides metering of erase current. The erase current is not critical and has been factory adjusted to read approximately zero on the vu meter. Both erase and bias current will vary directly with line voltage. The bias current is more critical and is factory set to read zero at 117 volt line voltage, using an average tape. It should read between $-1/2$ and $+1/2$ for the optimum high frequency response at $7\frac{1}{2}$ and $3\frac{3}{4}$ inch tape speeds using a median tape. For the flattest possible response with a given tape, the bias can be reset as described in Section 7—ALIGNMENT AND PERFORMANCE CHECKS. Note the bias current reading for this particular tape and log it for future reference.

The bias is adjusted by means of the Bias Control R460, located on the electronic chassis. The meter calibration for bias measurement can be checked as indicated in Section 7.

The record calibration control on this equipment has been adjusted so that a mid frequency input signal that produces a zero vu reading with the METER and OUTPUT SWITCH in the RECORD position will produce the 1% distortion level on an average tape. If it is desired to maintain a level with the METER AND OUTPUT SWITCH in the PLAYBACK position, proceed as follows:

- Step 1: With the METER and OUTPUT SWITCH in the RECORD position, adjust the RECORD LEVEL control so that the vu meter reads zero on a steady mid-frequency signal.
- Step 2: Switch the METER and OUTPUT SWITCH to the PLAYBACK position.
- Step 3: Adjust the PLAYBACK LEVEL control so that the vu meter reads zero.

NOTE

Reproduce amplifier gain is approximately 2½ db lower in the 15 ips AME position than in the 7½ and 15 ips NAB positions. Therefore, when the level is to be monitored in the reproduce position, the PLAYBACK LEVEL control must be set to a higher setting in the AME position than in the NAB position.

Follow the above procedure for both AME and NAB equalization, marking the PLAYBACK LEVEL dial appropriately.

Separate Erase

Each track can be erased separately by placing the mode selector switch in the PLAY

position and, with no input to the record amplifier, pressing the START button, following with the RECORD button.

Half Track Operation (Dual Track Equipment)

Half Track recordings can be made on the 2-track equipment (with the exception of the 300-2M). Thread the blank tape to be recorded along the appropriate path, place the mode selector switch in the PLAY position, pressing the START button, following with the RECORD button of the amplifier and feeding the upper track (the track farthest from the tape transport). When the recording has been completed, press the STOP button and remove the reel of tape from the takeup side of the equipment, turn the reel over, and thread the tape along the proper path. *Again* press the RECORD button on the upper track amplifier.