

SECTION 3
OPERATING INSTRUCTIONS

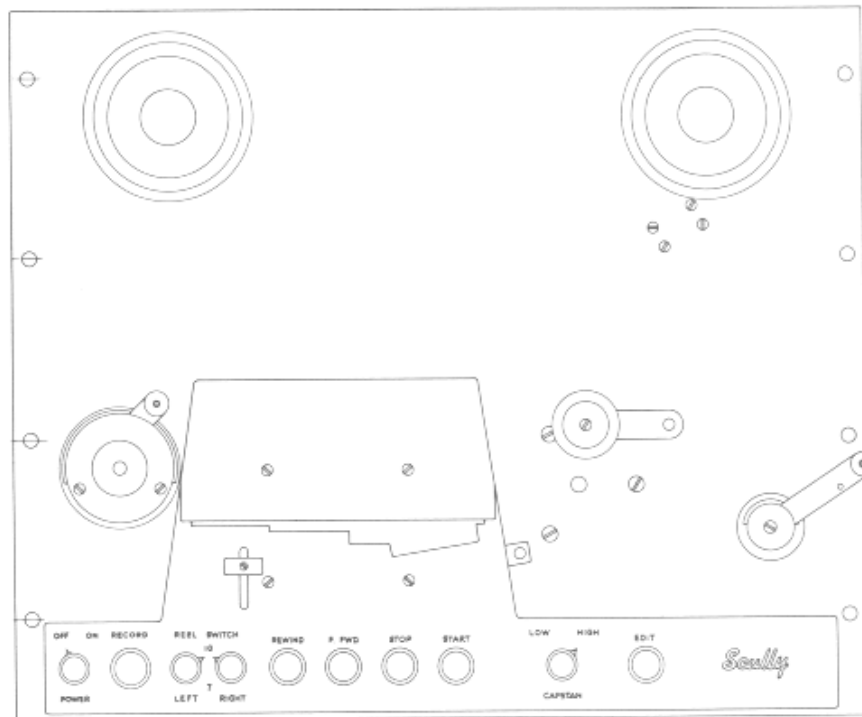


Figure 3-1. Tape Transport Control Panel

3.1. GENERAL

The operating controls for the 280 Series tape transports are located on the operations control panel on the bottom of the tape transport mechanism (see fig. 3-1). These are from left to right, the AC Power Switch, Recessed Record Switch, Left and Right Reel Tension Switches, Rewind, Fast Forward, Stop, Start, Capstan Speed Switch and Edit. Equalization is switched with capstan speed.

The amplifier panel controls are shown in fig. 3-2. From left to right, these are the Record Level Control (A), Function Switch (B), Monitor Switch (C), and Playback Level Control (D). The Record Indicator Pilot Light (F), VU Meter (G), Line Termination Switch (H), and Phone Jack (I) are also located on the amplifier control panel.

Other amplifier adjustments, which are not normally made except when changing the type of tape used or in servicing the recorder, are located underneath the panel dress strip (E). This strip may be removed by loosening the three captive screws.

3.2. CONTROLS AND INDICATORS

3.2.1. Tape Transport Operation Control Panel
(See figure 3-1.)

a. Power Switch— Electronic and mechanical assembly power control. The pilot lamps mounted in the STOP button on the operations control panel and the VU meter on the amplifier assembly are both illuminated when the AC Power Switch is in the ON position.

b. Record— A red illuminated push-button controls the record function when the mode switch on the amplifier panel is in the LINE or MIC position. The button, together with the red record pilot lamp on the amplifier panel, remains illuminated as long as the machine is in the record mode.

c. Reel Size Switches for Left & Right Reels— These are a pair of double throw switches which permit individual adjustment of tape tension for 7 inch and 10-1/2 inch reels in Start mode only. This does not permit braking in Fast Forward or Rewind with dissimilar reels.

d. Rewind — The left blue pushbutton switch operates the machine in the Rewind or Fast Reverse mode.

e. Fast Forward — The right blue pushbutton switch operates the machine in the Fast Forward mode.

f. Stop — The white illuminated pushbutton switch discontinues all operating functions when depressed. This button continues to be illuminated as long as the AC power switch is in the ON position and thus acts as the tape transport pilot light.

g. Start — A green pushbutton switch which controls tape motion in the play mode also provides power necessary for the RECORD function.

h. Capstan Speed Switch — This switch selects the high or low speed of the drive motor (normally a two-speed motor) and also selects the proper record and playback equalization in the amplifiers.

i. Edit — A yellow pushbutton switch which, when actuated permits tape to move in the start mode without winding onto the takeup reel. The tape brake arm is also inoperative.

j. External drive to capstan motor — A socket is provided on the under side of the relay chassis to allow external drive to the capstan motor. This can be used,

- (1) As a means of connecting a more accurate 60 cycle source to the capstan motor. This may be desired in instrumentation type recording, and where the local power frequency is not reliable
- (2) To create special effects, by off speed playback or recording, or
- (3) For synchronous playback of film sound tracks.

A 150 watt amplifier with an output impedance of 150 ohms is suitable for driving the capstan motor. (For intermittent operation

lower power amplifiers may be used. The motor circuit is available on pins 4 and 8, pin 4 is common with one side of the AC line.)

If connections are made to pins other than 4 and 8 the wiring should be checked for compatibility before applying power. Not more than 1 amp should be drawn from pin 3, and not more than 2 amps total from pins 1, 3 and 7. Pins 5 and 6 provide 24 volts at 100 ma in the record mode.

3.2.2. Electronics Assembly Front Panel (See figure 3-2.)

a. Record Level — Provides for the control of the record amplifier level as indicated by the VU meter when the monitor switch is in the record position.

b. Function Switch — A five-position switch that selects MIC or LINE input for the record amplifier, SAFE to prevent accidental erasure, SYNC for channel synchronization capability, and DEMAG which isolates the magnetic heads from the electronics, allowing the operator to demagnetize the heads without risk of transistor damage. The SYNC position is normally functional only on three and four channel models.

c. Monitor Switch — A four-position switch that selects the play or record electronic functions and allows visual monitoring of their respective levels on the VU meter. The third position provides audible monitoring of the record amplifier and visual monitoring of the recorder bias level on the meter. The fourth position provides an audible monitoring of the play amplifier and a visual monitoring of the erase level.

d. Playback Level — The Playback Level Control includes a Calibrate position for setting desired reference level. This is marked CAL on the dial of the playback level control. This CAL position is utilized in conjunction with the reference set trimmer, identified as REF SET

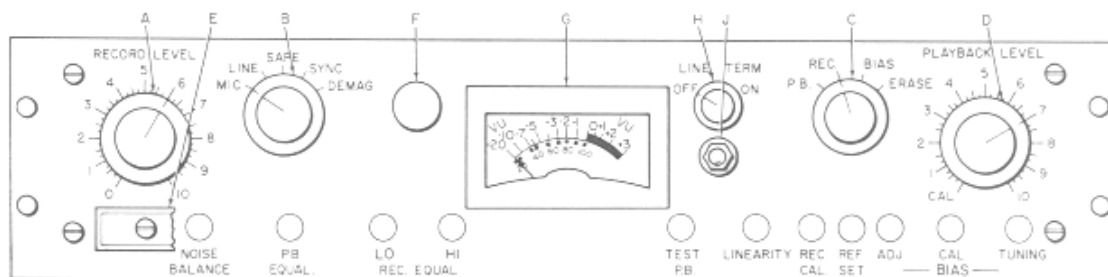


Figure 3-2. Electronics Assembly Front Panel

OPERATING INSTRUCTIONS

on the alignment and calibration control strip. The purpose of this is to allow a readily available reference to operating level. In order to utilize this feature, turn the playback level control to the CAL position. Adjust reference tone from alignment tape to read "0" (or desired level) by adjusting reference set trimmer (REF SET). The playback level control can be adjusted at will, with the opportunity to return instantly to operating level by turning playback level control to the CAL position. Load termination requirements remain the same.

e. Alignment and Calibration Adjustments — Under the front panel dress strip (fastened by three screws) are a series of controls that should not be adjusted except by experienced operators, and then only when going through the complete test and check procedures on the machine which are outlined below. These controls, reading from left to right, are Noise Balance, Playback Equalization, Low Speed Record Equalization, High Speed Record Equalization, Linearity Test Pushbutton, Linearity Control, Record Calibration, Playback Level Reference Pot, Bias Adjustment, Bias Calibration, and Bias Tuning. A complete description of these controls will be found in the Alignment and Performance Checks portion of the Electronics section (Section V) of this manual. A combination alignment tool is furnished for these adjustments.

3.3. OPERATING PROCEDURE

3.3.1. Preliminary (See figure 3-3.)

a. Tape Threading — Place a reel of tape on the supply (left) reel hub and thread

as indicated in the tape threading diagram (fig. 3-3). Tape is properly threaded when it is between the Capstan and the Pressure Roller.

b. Power — Power for all operations is controlled by the AC power switch on the operations control panel of the tape transport mechanism.

c. Tape Transport Operation — The motion of the tape is controlled by means of the colored pushbutton switches on the operations control of the tape transport mechanism. The color coding of the buttons is:

Record	Red (illuminated)
Rewind	Blue
Fast Forward	Blue
Stop	White (illuminated)
Start	Green
Edit	Yellow

3.3.2. Playback (Reproducing)

After properly threading the tape, set the Monitor switch on the Electronics Panel to Playback. Select the desired tape speed, and reel sizes by means of the Capstan Speed and Reel Size switches on the control panel. Press the green Start button. **Note:** With manually operated tape lifter the tape lifter must be raised to its upper position.

3.3.3. Recording

Select the tape speed (this will automati-

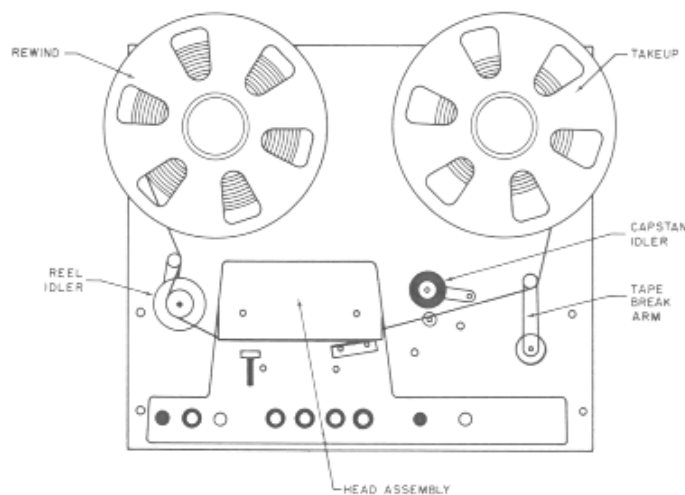


Figure 3-3. Tape Threading Path

cally select the proper Record and Playback equalization) and set the monitor switch on the electronics panel to Rec. Press the green START button to start tape motion and then press the red RECORD button. When in Record, the red button is illuminated. The machine cannot be started by pushing the RECORD switch only, as no tape motion is controlled by it. The RECORD button will remain lighted as long as the machine is in the Record mode. The machine will drop out of Record if the machine is stopped or if the function switch is turned to the SAFE, SYNC or DE-MAG position.

NOTE

For manually operated Tape lifters only, the tape lifter control arm actuates a record interlock switch which makes it impossible to go into the record mode if the tape is off the heads. If, when recording, the tape lifter arm

is used to lift the tape off the heads, the record function is not disabled (cut off).

CAUTION

Do not press the START button immediately after the STOP button is actuated when tape has been moving in a high-speed mode. Let the tape cease motion first or the pinching action of the pressure roller will cause tape breakage.

3.3.4. Stopping the Unit

Pressing the Stop button will halt tape motion from any mode. The 280 will automatically stop if the tape runs off the reels or breaks. This is provided for by the Tape Break Arm, located on the right side of the tape transport, immediately beyond the Capstan drive.

SECTION 4

TAPE TRANSPORT

4.1. DESCRIPTION

4.1.1. Tape Drive

The Model 280 Recorder/Reproducer employs a three-motor drive system — a two-speed hysteresis synchronous capstan drive motor and two induction-type torque motors. The capstan motor and the solenoid actuated pressure roller drive the tape at a uniform speed in the reproduce, record, and edit modes. The capstan motor has two sets of windings to provide a high and a low tape speed, either of which may be selected by the capstan Speed Switch, located on the control panel of the tape transport. For the Model 280 with Motion Sensing, or the Model 280/SP-14, also refer to Section 6A or 6B respectively.

When the Start button is pressed, the capstan solenoid and brake solenoids are energized. The capstan solenoid engages the rubber pressure roller to the capstan by means of a mechanical linkage, pressing the tape between the roller and capstan firmly. The capstan motor provides the constant tape speed; constant tape motion is assured by the clamping action of the pressure roller.

In the Fast modes (forward and rewind), the torque motors drive the tape and the capstan motor and pressure rollers are inactive. The motor acting as takeup runs with full voltage; the one on the supply side operates with low voltage so as to provide proper tape tension and prevent a loose wind.

4.1.2. Brake System (See figs. 4-1 and 8-1.)

The Scully brake system is a disc type employing an electrically controlled differential. There is AC in the torque motors at all times, including the STOP position, as long as there is tape correctly threaded in the machine.

Braking force is a function of the springs (3, 4). It may be adjusted by turning the adjusting screws (1, 2). The springs are normally set so that they will just overcome the low AC voltage on the torque motors. In the play and fast modes of operation, the brake solenoids are fully energized, permitting free rotation of the reel tables. The brake shoe (6) is fastened to the solenoid plunger, but is free to align itself squarely against the rotating disc (5) which is integral with the torque motor.

Mechanically, the takeup and supply assemblies are identical. There is no provision for mechanical braking differential as a function of rotational sense. The differential is obtained electrically by feeding reduced torque voltage to the reel motors when brakes are energized (brake solenoids de-energized).

With the brakes on in the Fast Fwd. mode, the takeup reel motor overcomes some of the braking force while the supply reel motor adds to the braking force, the differential being obtained from the rotation of the motors. The opposite is true in the Rewind mode.

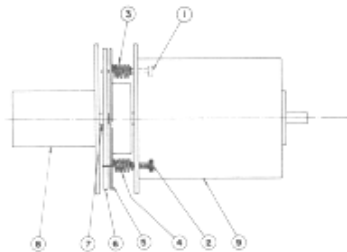


Figure 4-1. Disc Brake Outline

TAPE TRANSPORT

4.1.3. Tape Tension

The control system contains all the elements necessary to provide proper tape tension in all modes of operation.

In the start mode, the voltage supplied to the torque motors is governed by the position of the individual reel switches, being either 50 volts AC for small reels or 70 volts AC for large reels. In the fast mode, the torque motor serving the reel acting as the supply operates under reduced voltage (35 volts) while the motor for the reel acting as takeup receives full-line voltage from the power supply.

NOTE: For half-inch tape, 70 and 90 volts are used instead of 50 and 70 volts.

4.1.4. Reel Stabilizer Assembly (See fig. 8-1.)

The reel stabilizer ass'y protects the tape motion over the heads by acting as a filter and minimizer of mechanical transients in the tape transport, particularly those originating in the supply reel system. Oscillations (flutter) caused when tape motion is started are reduced by the absorbing action of the reel idler arm.

4.1.5. Scrape Filter

High frequency flutter, commonly called "scrape," or FM noise, is caused by longitudinal vibration of unsupported lengths of tape, and is generally in the 3 to 5 kc range. It appears as an unpleasant background noise when mid-frequency ranges are recorded and reproduced. This FM scrape is materially reduced by the introduction of a small-diameter rotating member into contact with the tape as close to the heads as possible.

A high frequency or scrape filter is located on the head assembly between the record and playback heads (see fig. 8-2). It is an integral part of the tape lifter arm, and is in longitudinal contact with the tape when the tape lifter is inoperative.

4.1.6. Other Features

The tape break arm absorbs starting loops and stopping shocks and actuates the tape break switch S108 located directly beneath the arm under the panel. This switch stops the machine by deenergizing the relays and cutting of all AC power in the transport.

4.1.7. Control and Power Circuits

(See figs. 4-2, 4-3 and 8-6.)

All of the tape transport control power circuits are contained in the electrical control chassis which is mounted directly behind the tape transport main panel. This assembly also contains all the switches, relays, and capacitors which control tape transport operation in all modes. All motor assemblies and interconnecting cables plug into the chassis individually. All high voltage ac connections are protected, either in connectors or by covered relays.

When not being operated by remote control, dummy plug P103 must be inserted into the connector J103 on the control chassis.

Tape transport controls, except the tape break switch S108, located under the tape transport main panel, are mounted on one edge of the control chassis and are accessible from the top of the machine through the Operations Control Panel.

4.2 OPERATION (See figs. 4-2, 4-3, 8-6, 8-7.)

4.2.1 Turn On

Standby power is applied to the tape recorder/reproducer by actuating the POWER switch S101 (fig. 8-7). In its ON position, this switch activates the internal power supplies, lights the STOP pushbutton lamp DS101, and lights all meter lamps in the electronics circuits. If tape has been threaded, the tape break relay K107 is also energized when the 24-vdc control power supply (fig. 8-6) is activated.

4.2.2. Start and Record

4.2.2.1. Start

When START button S105 is pressed, start relay K103 and capstan solenoid L103 are energized. The holding circuit is through the normally closed STOP switch S107 and relays K103, K101 (rewind) and K102 (fast forward). This circuit prevents the transport from being switched from the fast modes to play with consequent breaking, spilling, or stretching of the tape.

CAUTION

Do not press the START button immediately after the STOP button is actuated when tape has been driven at high speed. Let the tape motion cease or the pinching action of the pressure roller will cause tape breakage.

NOTE

The above does not apply to the Model 280 (or 280/SP-14) with Motion Sensing.

Power reaches the torque motors through contacts K103 (21, 22) for the supply motor B103, and K103 (18, 19) for the takeup motor B101. The ac voltage will be either 70 vac (high) or 50 vac (low) depending on the position of the two

tension switches S109, S110. Brake solenoids L104 (supply) and L105 (take-up) are energized by K103 (9, 10).

4.2.2.2 **Record**

The Record switch S106 on the tape transport control panel energizes the record relay K602, which permits bias and erase current to be fed to their respective magnetic heads. The record lights DS102 and DS601 are lit when K602 is energized.

Record and playback equalization is switched with tape speed and both are controlled by the capstan speed switch S114. This switch activates the equalizer relay K601 in the amplifier and provides for high-speed equalization. Low-speed equalization normally is provided by the relay when de-energized.

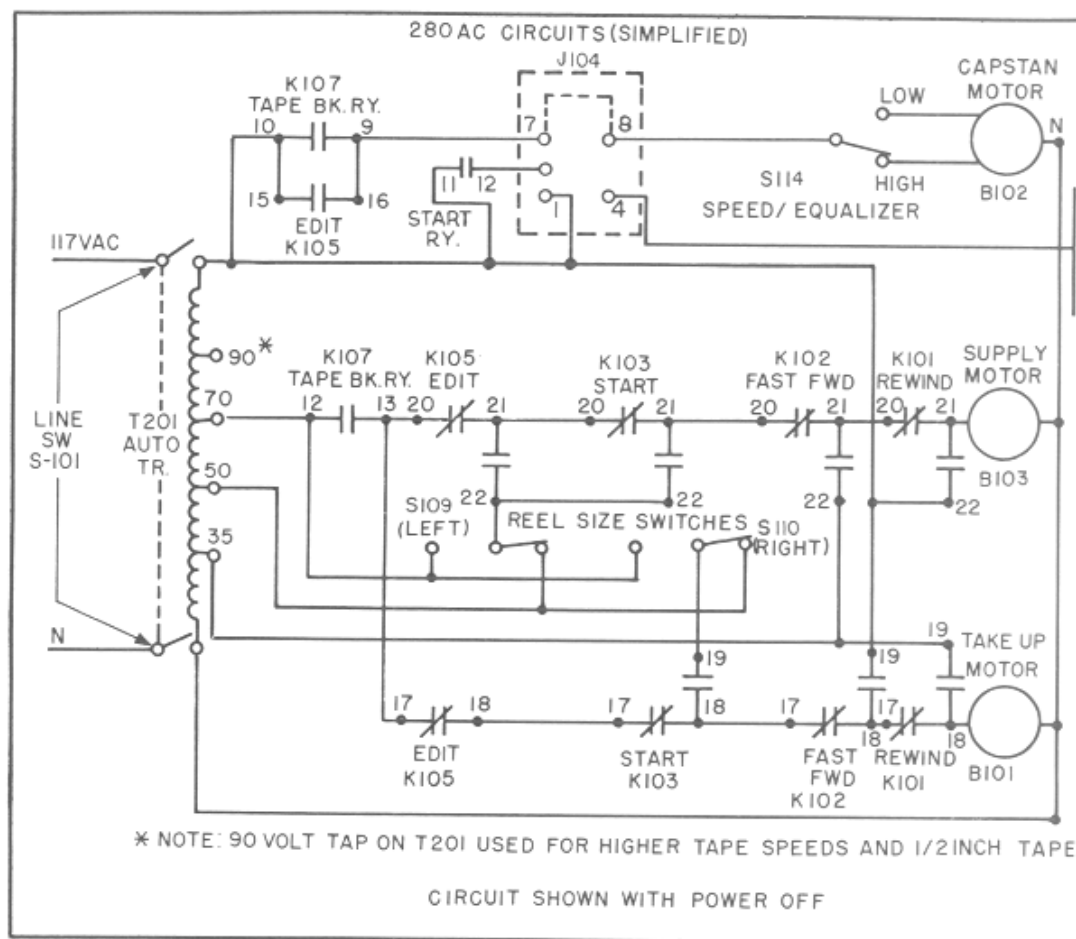
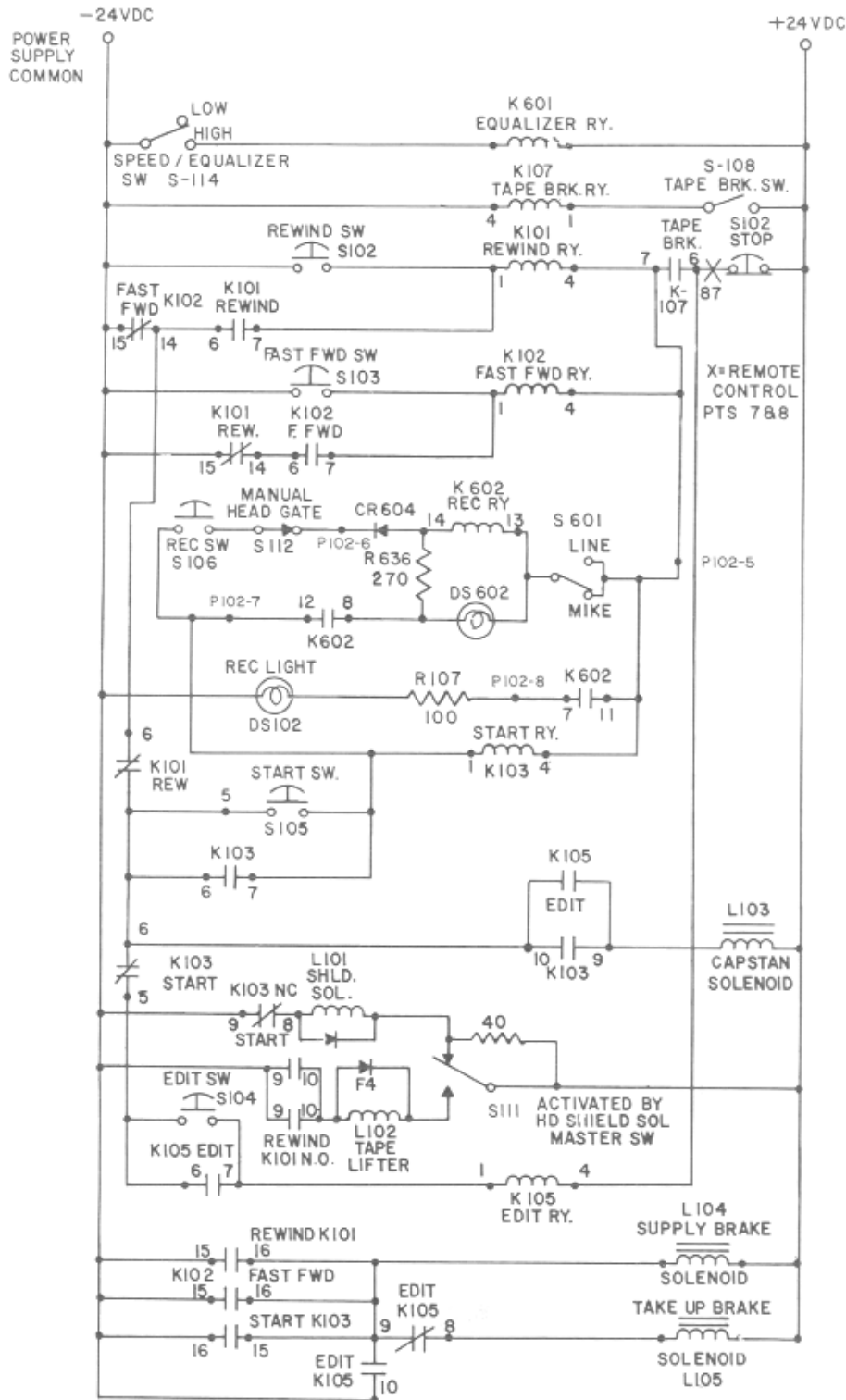


Figure 4-2. Model 280 AC Circuits — Simplified

TAPE TRANSPORT



CIRCUIT SHOWN WITH POWER OFF

Figure 4-3. Model 280 DC Circuits — Simplified

4.2.3 Rewind

When the REWIND switch S102 is actuated, relay K101 is energized and holds via contacts K101 (6, 7) and the normally closed STOP switch. High torque (high voltage) is applied to the supply motor through K101, (21, 22); low torque (low voltage) is applied to the takeup motor via K101 (18, 19). The brakes are released when brake solenoids L104 and L105 are energized through K101 (15, 16).

4.2.4 Fast Forward

When the FAST FORWARD switch S103 is actuated, relay K102 is energized and holds via contacts K102 (6, 7) and the normally closed STOP switch. High torque (high voltage) is applied to the takeup motor through K102 (18, 19); low torque (low voltage) is applied to the supply motor via K102 (21, 22). The same conditions that apply to the Rewind mode now exist, but act in the opposite direction. The brakes are released when brake solenoids L104 and L105 are energized through K102 (12, 13).

4.2.5 Stop

When STOP button S107 is depressed, the brake solenoids and all relays are de-energized. The brakes are applied to both torque motors. The Scully system of providing differential by the use of low voltage to the torque motors is obtained through the back contacts of the appropriate relays.

The capstan motor B102 will continue to operate as long as there is tape on the reels and the tape is properly threaded. With no tape in the machine, the tape break switch S108 will open the circuit and cut power to the capstan motor by de-energizing the tape break relay K107. The low voltage ac on the torque motors for brake differential will also be removed by K107.

4.2.6. Edit

The edit function makes it possible for the operator to move the tape over the heads without having it taken up by the takeup motor (B101). This permits tape to spill freely out. In this mode, when the EDIT switch S104 is pressed, the edit relay K105 is energized. The hold circuit is the NC STOP switch S107 and the following relays: K103 (6, 7) (start), K101 (5, 6) (rewind), and K102 (11, 12) (fast forward).

The supply brake solenoid L104 is ener-

gized through K105 (9, 10), releasing the brake. At the same time, the takeup brake remains inoperative while K105 (8, 9) open. The capstan pressure roller solenoid L103 is energized through K105 (12, 13).

Capstan motor B102 derives its power through K105 (15, 26), bypassing the tape break arm relay K107 (9, 10), which is inoperative in this mode.

Supply motor B103 receives normal play voltage through K105 (21, 22), while the takeup motor B101 is without power when K105 (17, 28) opens.

4.2.7. Tape Break Arm (See figure 8-3.)

The tape break arm connects to a normally open microswitch, S108, located underneath the tape transport. When the tape is properly threaded through the machine, the position of the arm closes the switch and energizes the relay K107 which, in turn, passes power to the capstan motor B102 through K107 (9, 10) and passes low voltage ac to the torque motors B101 and B103 through K107 (12, 13) to provide braking differential. In the event of tape breakage or any malfunction that causes loss of tension on the tape arm, the tape break arm moves to the extreme position, opening S108 which, in turn, de-energizes K107 and its circuits. When the tape is fully wound on one reel, the tape break arm moves to the extreme position, opening S108 which, in turn, de-energizes K107 and its circuits.

4.2.8. Automatic Tape Lifter

4.2.8.1. Description

The Model 280 Recorder/Reproducer is normally supplied with an automatic tape lifter and playback head hum shield. Separate solenoids operate the tape lifter and hum shield. (Manually operated lifter and head shield are also available.)

Operation with these two features in various recorder functions is summarized in Table I. The automatic features may be overridden manually, if desired, as for cueing in fast modes.

4.2.8.2. Operation

A schematic diagram of the automatic tape lifter controls appears in figure 4-5. When the machine power is turned on, L101 pulls in

and the L101 plunger actuates the double-throw microswitch S111, which then connects the 40-ohm resistor R115 into the L101 solenoid circuit to reduce heating.

When the Start function is activated, the start relay K103 opens its contacts (8, 9), and the solenoid L101 is de-energized. The playback head hum shield is then positioned by a return spring on L101. The tape lift solenoid L102 is not operative in this function.

In either the Fast Forward or Rewind mode, L101 is energized by K103 (8, 9). Microswitch S111 is actuated and tape lift solenoid L102 is energized by contacts 9, 10 of K101 or K102.

TABLE I. OPERATION OF AUTOMATIC FEATURES

Function	Tape Lifter	Hum Shield
Power on, transport in STOP	In	Retracted
Start and Record	In	In place
Fast Forward and Rewind	Extended	Retracted
Edit	In	Retracted

4.2.9. Manual Tape Lifter

On a Model 280 Recorder / Reproducer with a manually operated tape lifter, a microswitch S112 operated by the tape lifter linkage is used to lock out the Record mode while the tape is off the heads.

If, when recording, the tape lifter arm is used to lift the tape off the heads, the Record function is not disabled. The STOP pushbutton must be actuated for this to occur.

4.3 HEAD ASSEMBLY

The Model 280 Recorder / Reproducer normally comes equipped with a complement of three heads: erase, record, and playback. The heads are individually mounted on their own bases. The erase and record head mounts are identical and the playback mount is similar but provides shielding in the form of a mu metal can.

The record, playback, and erase head mounts contain the azimuth as well as the zenith and height adjustment screws.

All of the heads are mounted on the top plate (bridge) of the head assembly for easy accessibility. Head rotation adjustments are made by loosening the single screw mounting that fastens the head to the bridge sufficiently to turn the head.

The Scully 280 head assembly can be changed as a unit, or individual heads can be replaced. Each head has plug-in connectors, and has been pre-aligned.

4.4. MAINTENANCE

4.4.1. Cleaning

Clean the capstan, tape guides, head face, and pressure roller every two or three days, or daily if the usage is great. Use head cleaning solution to clean the head face and all other guide elements. Isopropyl alcohol is acceptable for this purpose. Use a clean swab stick or clean, lintless cloth on the head face.

4.4.2. Lubrication

The recommended oil to be used is Scully Lubricating Oil, Cat. 082000001 or a commercial equivalent. This Scully oil is available in 2-ounce containers. Acceptable commercial equivalents are Texaco Capella B or DTE medium SAE 20.

4.4.3. Capstan and Capstan Idler Bearings

The capstan motor requires lubrication every 3 months, or after 1,000 hours of use, whichever occurs first. To lubricate, use about 10 drops of oil in the hole through which the capstan shaft protrudes. If the transport has been rack mounted, it is recommended that the capstan motor be removed and held vertically while being lubricated. Manually rotate the shaft to work the oil in.

To lubricate the pressure roller bearings, the cap should be removed and two drops of oil placed on the pivot bearings.

Carefully clean the capstan shaft and pressure roller tire with isopropyl alcohol to remove any trace of oil.

All other bearings in the transport are

permanently lubricated sealed ball bearings and require no lubrication.

4.4.4. Automatic Head Shield Assembly

As indicated by inspection, the solenoid plunger (figure 8-4) may require periodic lubrication. Lubriplate or Dow Corning No. 44 may be used. A drop of oil should also be placed at this time on the solenoid hinge assembly.

4.4.5. Manual Head Gate and Tape Lifter Assembly

As indicated by inspections, the head gate assembly and its associated gear assembly may require periodic lubrication. Lubriplate or Dow Corning 44 may be used.

4.4.6. De-magnetization of Heads

De-magnetize heads regularly. Heads may become magnetized for many reasons, such as improper use of equipment, electrical faults in the amplifiers, or by contact with magnetized objects. Magnetization can result in an increased signal-to-noise ratio.

4.5. ADJUSTMENTS

4.5.1. Tension Posts (See figure 8-3.)

The adjustment of tension post springs on both the reel idler tension arm and the tape break arm is made by loosening the aluminum collar on the arm shaft and rotating the collar to increase or decrease tension. In the case of the tape break arm, there are two collars. Be sure to loosen the set screw on the round one — not the collar with the flat. This adjustment can be made for both arms from the underside of the transport and is normally optimized for best tape handling. The tape break arm should be set to operate the microswitch just before the arm hits its nylon stop.

4.5.2. Brake Adjustments

To adjust brakes (figure 4-1), proceed as follows:

a. Place two identical empty 10-inch reels on the machine.

b. Place a rubber band on the right-hand tape-break guide and loop it around the capstan speed switch so that the capstan motor will be running.

c. Release the brake springs on the supply reel motor by loosening the lock nut and screwing the acorn nut toward the brake solenoid. Turn nuts equally until the reel begins to rotate. Then tighten the brake springs equally until the rotation of the reel motor stops. Finally, tighten the brake spring adjustment screw one additional half turn. Follow the same procedure on the other reel motor.

d. Press the START button and allow reel motors to attain maximum speed. Press the STOP button and note whether the reels come to a stop at the same time. If they do not, tighten the brake springs on the reel motor that takes the longer time to stop. Repeat this start and stop procedure until both reels come to a stop at the same time. Tighten the lock nuts.

CAUTION

When lubricating the transport, allow no oil to reach the felt brake pads. This would cause the brakes to slip and deleteriously affect operation.

4.5.3. Pressure Roller Adjustment (See figure 4-4.)

The pressure adjustment is made by means of the nut at the end of the threaded rod, which provides the link to the solenoid and pressure roller arm. Tightening this nut increases the roller pressure. Excessive pressure places an unnecessary and undesirable load on the upper (sleeve) bearing of the capstan motor, and a point is reached where further turning of the nut will not permit the solenoid plunger to bottom. At this point, roller pressure drops rapidly, becoming inadequate to drive the tape without slippage. It is then necessary to back off the nut.

The rubber pressure roller bearing has been selected for minimum radial runout. The radii of the inner and outer raceways of this bearing are larger than the balls; hence, some rocking freedom can be felt. This freedom allows the face of the rubber pressure roller to become nearly parallel with the capstan and thereby minimize tape distortion from the scrubbing action between these two components when engaged. The pressure roller adjustment procedure is as follows:

a. Thread tape on the transport using equal-size reels. Operate in Fast Forward to the middle of the reel.

TAPE TRANSPORT

b. Slightly loosen the screw on the cap of the capstan idler. Also loosen the Allen set screw on the capstan solenoid adjustment nut (below the top plate).

c. A 0-5 lb tension scale should be attached to the cap screw on the pinch roller. Place the transport in the Playback mode, then, while the tape is in motion, slowly pull the pinch roller away from the capstan shaft. Note the tension scale reading at the point where tape

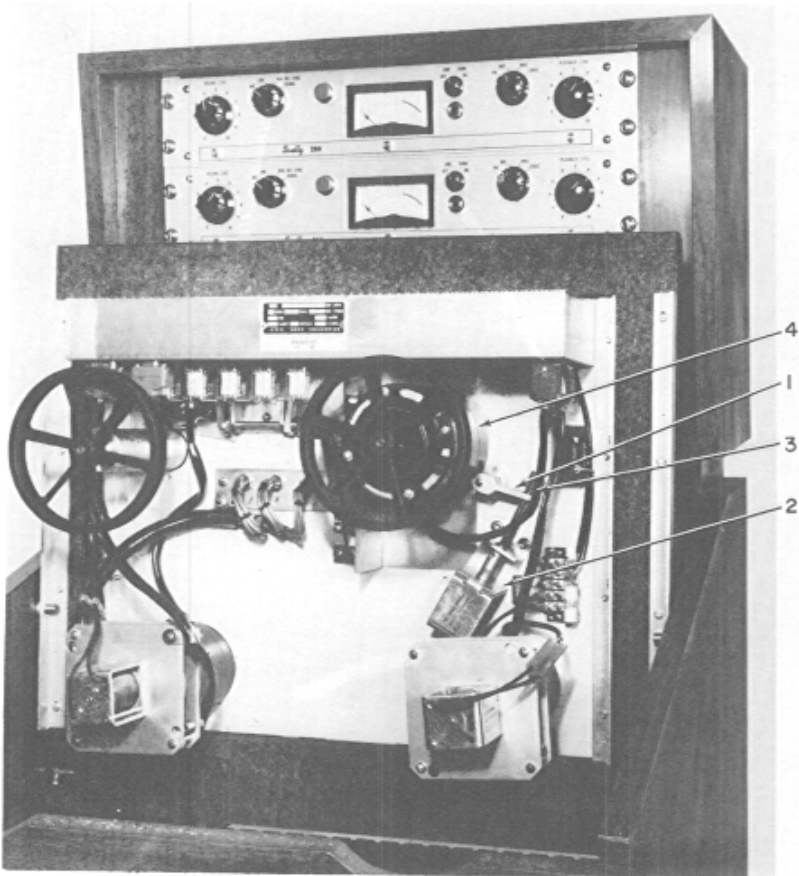
motion ceases.

d. Adjust the capstan solenoid for the following readings on the tension scale:

7-1/2 - 15 ips: 4 lb

3-3/4 - 7-1/2 ips: 3.5 lb

e. Tighten the Allen set screw on the solenoid adjustment nut. Remove the scale and tighten the cap screw on the capstan idler.



LEGEND

1. Pressure roller assembly with matched bearing
2. Solenoid assembly (L103)
3. Return spring
4. Capstan motor assembly (B102)

Figure 4-4. Rear of Tape Transport

4.5.4. Reel Stabilizer Disassembly and Assembly

Lubrication of the reel stabilizer bearings is not required; however, if disassembly for service or bearing replacement is required, proceed as follows. See figure 8-1 for parts locations.

- a. Remove flywheel.
- b. Remove the mounting bolts from the stabilizer assembly on underside of the transport.
- c. Remove the bottom "C" ring.
- d. Remove the bottom plate.
- e. Gently push shaft out, halfway.
- f. Remove inner "C" ring.
- g. Pull shaft with cap out slowly.
- h. Remove bottom bearing with inner spacer. Top bearing may remain on the shaft when removed or can be pushed out using the shaft. Retain inner spacer for rear bearing.
- i. Reverse the above procedure to install.

4.5.5. Tape Head Assembly Adjustments (See figure 8-2.)

The head bridge assembly consists of the head bridge top plate (15, figure 8-2), tape guides (13), head mounting sub-plates (5, 11), playback head (10), and co-netic housing (9). It also contains the record head (6), and erase head (3).

Azimuth is adjusted by means of the two round-head No. 6-32 screws (2) passing through access holes in the top plate (15) on either side of the center fastening screw (1).

Zenith is adjusted by means of two No. 6-32 Allen set screws (4) passing through access holes in the top plate (15) above and below a center fastening screw. Initially, when installing a magnetic head, the Allen set screws are released so that the base of the head is brought up solidly against the head mounting sub-plate (5 or 11) by tightening the azimuth screws. Turn the zenith set screws (4) until they make contact with the head base. From this point on, turn each zenith set screw an equal amount until proper

head height is reached. After the first half turn is made, the azimuth screws should be released by equal amounts to prevent the head base from being excessively distorted.

Tangency of the tape to a head is adjusted by loosening the 10-32 socket head cap screw (1) above the center of the head in the top plate (15) and rotating the head for maximum signal.

The erase, record, and playback head assemblies (3, 6, and 10) can be removed by unscrewing the 10-32 socket-head cap screw (1) and unplugging the head connector. The individual stacks can be removed by loosening the 6-32 azimuth screws (2). The entire head assembly can be removed for inspection by removing the three 8-32 flat-head screws holding the top plate (15) and unplugging the head cables. No realignment is required upon re-installation when neither the azimuth nor zenith adjustment has been changed.

The tape guide rods (13) have two 1/8-inch diameter glass or carbide guides which are cemented in 1/8-inch holes. To remove a guide rod, it is necessary to remove the three No. 8-32 flat head screws in the top plate (15) and lift the top plate assembly off the spacers. The height of the guide rods should not be changed. When assembled, the bottom of the rod should touch the tape deck. The set screws (14) at the ends and front of the top plate (15) hold the rods in place. To assure proper positioning of the rods, loosen the set screws and push each rod as far down as it will go; then fasten with the set screws.

Azimuth alignment of the playback head should be checked periodically to assure continued peak performance. (See Section 5.) This head is completely pre-installed at the factory and no changes are necessary except for the azimuth adjustment. Replacement stack assemblies are supplied completely assembled and pre-aligned. Mounting (1) and rotation check only are required for installation.

CAUTION

On Model 280 manual head gate transports, do not drive the tape in a fast mode with the head gate closed. This would result in excessive wearing and grooving of a magnetic head.

4.5.6. Automatic Tape Lifter

Unless the automatic tape lifter and head gate assembly (figure 8-5) has been disassembled, the only adjustments that may be required are located on the air-dashpot assembly.

These dashpots are located on the rear

of solenoids L101 and L102 and control the rate at which the solenoids open or close. An adjustment screw at the rear of the dashpot may be used to make a rate adjustment. Clockwise rotation of the adjustment screws slows the solenoid; counterclockwise rotation increases the rate.

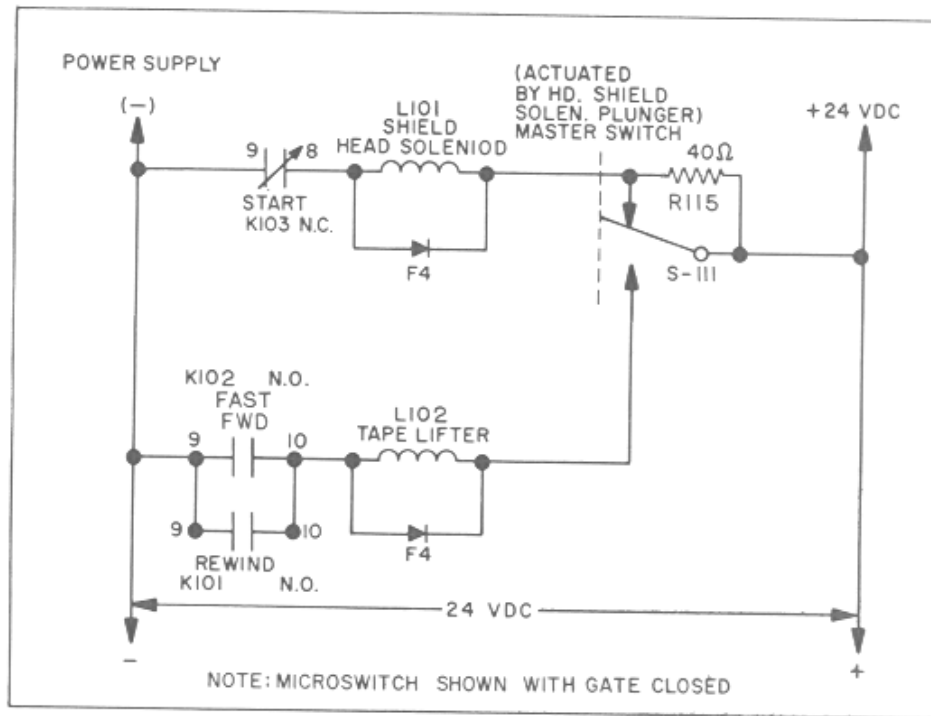


Figure 4-5. Automatic Tape Lifter, Schematic Diagram

TAPE TRANSPORT

TABLE II. MECHANICAL TROUBLESHOOTING

Symptom	Probable Cause	Correction
STARTING		
Transport fails to start in PB., F. FWD, or REWIND (power on).	<ol style="list-style-type: none"> 1. Blown fuse (power ac or control dc). 2. Remote plug not inserted. 3. Tape not properly threaded around tension arm. 4. Capstan pressure roller fails to engage capstan shaft. (This could occur in PB.) 5. Capstan motor not running. 6. Brakes do not release on torque motor(s). 7. Torque motor doesn't start. 8. Failure in dc section of power supply. 9. Relay failure. 	<ol style="list-style-type: none"> 1. Replace fuse. Check that fuse does not blow again. 2. Insert remote plug. 3. Rethread as shown in tape threading diagram. 4. Rocker arm misadjusted. (Held by two set screws on pivot lever.) Loosen screws and retighten after resetting pressure roller arm in proper position. Adjust roller pressure. 5. Check that motor is plugged in. If so, suspect motor, or check wiring in base of plug. Check plug J104. 6. Motor not plugged in. If it is, check solenoid connections. Check wiring in plug or base of socket. 7. Check motor capacitor. Spin motor by hand; if starts, change capacitor. 8. Check rectifier, filters, wiring, and transformer T202. 9. Check START, F. FWD, and/or REWIND relay(s) (as appropriate). Replace faulty relay.
Transport will not go into REWIND or will not go into F. FWD.	REWIND or F. FWD relay failure.	Replace faulty relay.
TAPE BREAKS		
Tape breaks when transport is stopped in F. FWD or REWIND.	Improper or unequal braking on supply or takeup motor.	Adjust brakes.

TAPE TRANSPORT

TABLE II. MECHANICAL TROUBLESHOOTING (Cont)

Symptom	Probable Cause	Correction
TAPE BREAKS (cont)		
Tape breaks and transport continues to run, spilling tape.	Tape tension microswitch or arm not functioning properly.	Check tape tension arm adjustment. Check cam adjustment. If trouble persists, replace microswitch.
TAPE SPILLS		
Tape spills when transport is in PB. or Record.	Takeup brake not releasing.	Check solenoids.
Tape runs up or down capstan shaft.	<ol style="list-style-type: none"> 1. Oil in shaft. 2. Insufficient roller pressure on capstan shaft. 3. Capstan not perpendicular to top plate. 	<ol style="list-style-type: none"> 1. Clean with dry, soft cloth. 2. Check capstan pressure roller solenoid and adjustment. Replace if necessary. 3. Realign motor perpendicularity with three motor mounting bolts.
Tape fails to stop in PB., F. FWD, or Rewind mode.	Motion sensor microswitch S113 needs adjustment.	Adjust or replace S113 as required.
FLUTTER AND WOW		
	<ol style="list-style-type: none"> 1. Dirt deposits on capstan shafts, pressure roller, stabilizer pulley, or heads. 2. Low tape tension. 3. Brakes dragging. 4. Insufficient capstan roller pressure. 5. Tape guide fingers misaligned. 6. Heads not properly aligned. 7. Defective capstan motor (capstan shaft bent, bearing failure, etc.). 	<ol style="list-style-type: none"> 1. Clean with dry, soft cloth. 2. Check that reel tension switches are properly set. 3. Check that supply brake is not dragging. Adjust brake if necessary. 4. Adjust pressure roller tensions or pressure roller link assembly. 5. Check and reset properly. 6. Align heads. 7. Replace motor.