Serial No.: _____

Date Received: _____

INSTRUCTION MANUAL

FOR

Model 280 Series Recorders/Reproducers

and

Model 275 Series Reproducers

Scully

SCULLY RECORDING INSTRUMENTS CO.

DIVISION OF DICTAPHONE CORP.

480 BUNNELL STREET

BRIDGEPORT, CONN. 06607

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TABLE OF CONTENTS

(Continued)

TABLE OF CONTENTS (Cont)

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Cont)

SECTION 1

GENERAL INFORMATION

1.1. DESCRIPTION

The Scully 280 Series Recorder/Reproducer is a professional magnetic tape recorder of the highest quality, designed primarily for use in recording studios, broadcast stations and other applications requiring exacting performance specifications. (See figure 1-1.)

The complete unit consists of a tape transport mechanism and amplifier assembly. The equipment may be mounted in a standard 19-inch equipment rack and is also supplied in a console or in a portable carrying case.

The head configurations available include monophonic full or half-track and two-track stereo for quarter-inch tape width. The 280 is also available for half-inch tape widths in two, three and four-channel configurations. Tape speeds available are 3 3/4 - 7 1/2 ips, 7 1/2 - 15 ips. Tape speeds of 15 - 30 ips can be supplied on special order.

The electronics assembly of the 280 is mounted on a 3 1/2 x 19 panel, and the system is fully transistorized. CCIR equalization may be obtained when ordering.

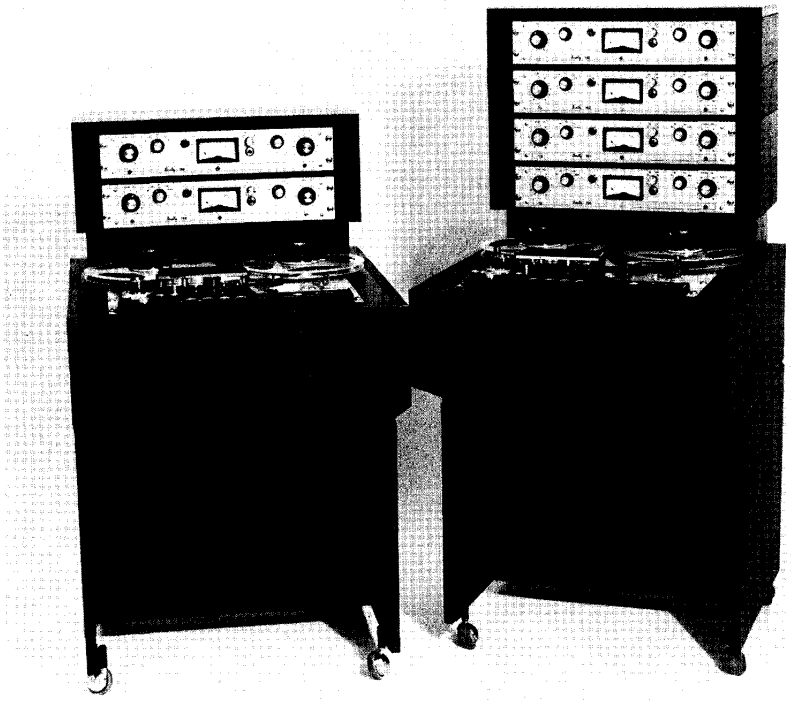


Figure 1-1. Models 280-2 and 280-4 Console Tape Recorders

1.2. TECHNICAL SUMMARY

TAPE SPEEDS: 3 3/4 - 7 1/2 ips, 7 1/2 - 15 ips; other speeds on special request.

MULTI-CHANNEL CONFIGURATIONS: 1/4 inch, 1 or 2 channels; 1/2 inch, 3 or 4 channels; other tape widths and channels on special request.

FREQUENCY RESPONSE: ±2db 35 Hz to 18 KHz 15 ips, ±2 db 50 Hz to 15 KHz at 7 1/2 ips, ±2db 50 Hz to 7.5 KHz at 3 3/4 ips.

SIGNAL TO NOISE RATIO: Peak record to noise (30 Hz to 15 KHz band) using 3M type 201 tape or equivalent.

	Weighted	Unwtd.
7 1/2 and 15 ips full track .	70 db	65 db
Stereo or half track	65 db	60 db

FLUTTER AND WOW

15 ips: 0.08% RMS or better
7 1/2 ips: 0.1% RMS or better
3 3/4 ips: 0.2% RMS or better
All components between 0.5 and 250 Hz included.

STARTING TIME: Tape reaches full play speed in 0.1 second.

STOPPING TIME: Tape moves less than 1 1/2" after depressing stop (15 ips).

TIMING ACCURACY: 99.9%

REWIND TIME: Approximately 75 seconds for 2400 foot NAB reel.

REEL SIZES: Up to 11-1/8"; 14" on special order.

TAPE TRANSPORT CONTROLS: Power on and off, record, individual reel size switches, rewind, fast forward, stop, start, speed change switch, edit.

AMPLIFIER CONTROLS

Visible Controls: Record level, function switch, monitoring and meter switch, playback level, load termination switch.

Maintenance Controls: (located under dress strip): Noise balance, playback equalization, record equalization low speed, record equalization high speed, linearity test push button, linearity control, record-calibrate, reference set, bias adjust, bias calibrate, bias tuning.

PLAYBACK AMPLIFIER DISTORTION: Less than 0.5% total harmonic distortion at +18 dbm.

EQUALIZATION: Follows NAB curves. Capstan speed switch selects appropriate equalization. CCIR equalization available on special order.

ERASE FREQUENCY: 60 KHz

BIAS FREQUENCY: 180 KHz

OUTPUTS: +4 or +8 dbm from 600-ohm balanced line.

INPUTS: Bridging (600-ohm balanced or unbalanced line) microphone, low impedance (150-250 ohms).

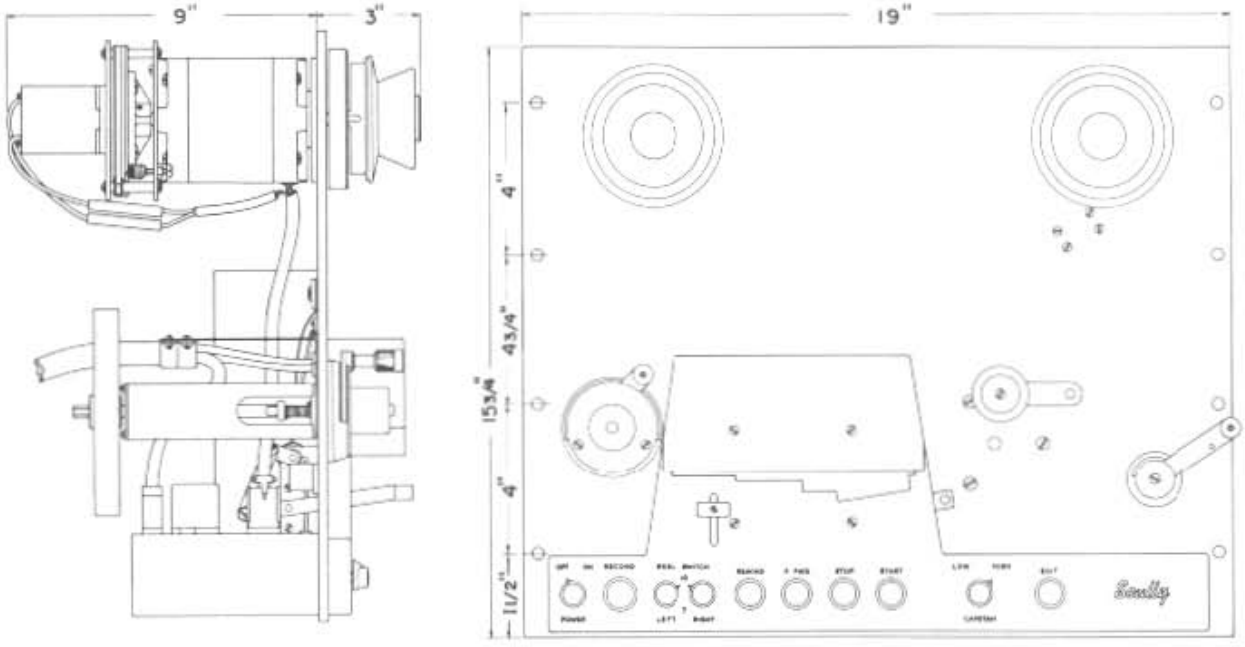
INPUT IMPEDANCE: 10K ohms.

REMOTE CONTROLS: Record, rewind, fast forward, stop, play.

POWER REQUIREMENT: 117 volts ac, 50/60 cycles, 275 watts.

SECTION 2

INSTALLATION



Side View

Front View

Figure 2-1. Deck Layout

2.1. UNPACKING

The tape transport and amplifier are regularly shipped in two cartons. The two flywheels, power cord (plug in), EIA centers (Scully, if ordered), mounting hardware, Allen wrenches, and alignment tool are located in a hardware bag, which will be found in the carton containing the transport mechanism. An instruction manual is also contained in the shipping carton.

2.2. MOUNTING

The 280 is designed to fit in a standard 19-inch equipment rack, cabinet or console. The space requirement is 15-3/4" for the tape transport and 3-1/2" for the amplifier, each unit extending 9" behind the panel. The recommended rack placement is for the amplifier to be mounted directly below the tape transport, or within the limit of the four-foot connecting cables.

2.2.1. Rack Mounting

a. Lift the transport mechanism out of the carton using the two shipping straps looped around it for this purpose. Remove straps.

b. Mount the transport in the equipment rack, using the panel mounting hardware supplied. Tighten securely.

c. Remove flywheels from hardware bag and mount on the respective capstan motor and stabilizer shafts. In some cases the flywheels are specifically marked for capstan or stabilizer mounting. Flywheels which carry no markings are interchangeable and may be mounted on either shaft.

d. Remove amplifier(s) from carton and mount in rack below the tape transport, using the mounting hardware supplied. In multichanel units, mount channel 1 amplifier on top. Then mount remaining amplifiers below in numerical order. Amplifier channel markings may be found on the rear of each amplifier.

2.2.2. Mounting Consoles

a. Console cabinets are shipped in three containers — the console cabinet, the tape transport and the amplifier(s). Set the large carton on the floor, with the arrow pointing up. Open the large carton by slitting the tape, opening the flaps and removing the console cabinet. Set the cabinet upright on the floor. Remove riser from lower front of cabinet. Position electronics cabinet above riser and secure with bolts supplied.

b. Remove the tape transport mechanism from the carton, using the two shipping straps looped around it for this purpose. Remove straps and mount transport into the cutout on the top surface. Tighten mounting screws.

c. Mount amplifiers in the space provided on the console. For multi-channel units, mount channel 4 at bottom and follow with remaining units above it in numerical order.

d. Remove flywheels from hardware bag and mount on the respective capstan motor and stabilizer shafts. In some cases the flywheels are specifically marked for capstan or stabilizer mounting. Flywheels which carry no markings are interchangeable and may be mounted on either shaft.

2.2.3. Carrying Case

Carrying case models are furnished in two cartons. One carton contains the tape transport, completely mounted except for the flywheels. The second carton contains the amplifier(s) mounted in carrying case.

2.3. CABLE INTERCONNECTION (See figure 8-16.)

In mono units the interconnecting cable consists of the amplifier power section and the magnetic head section. In the two-channel equipment, the cable consists of the requisite power

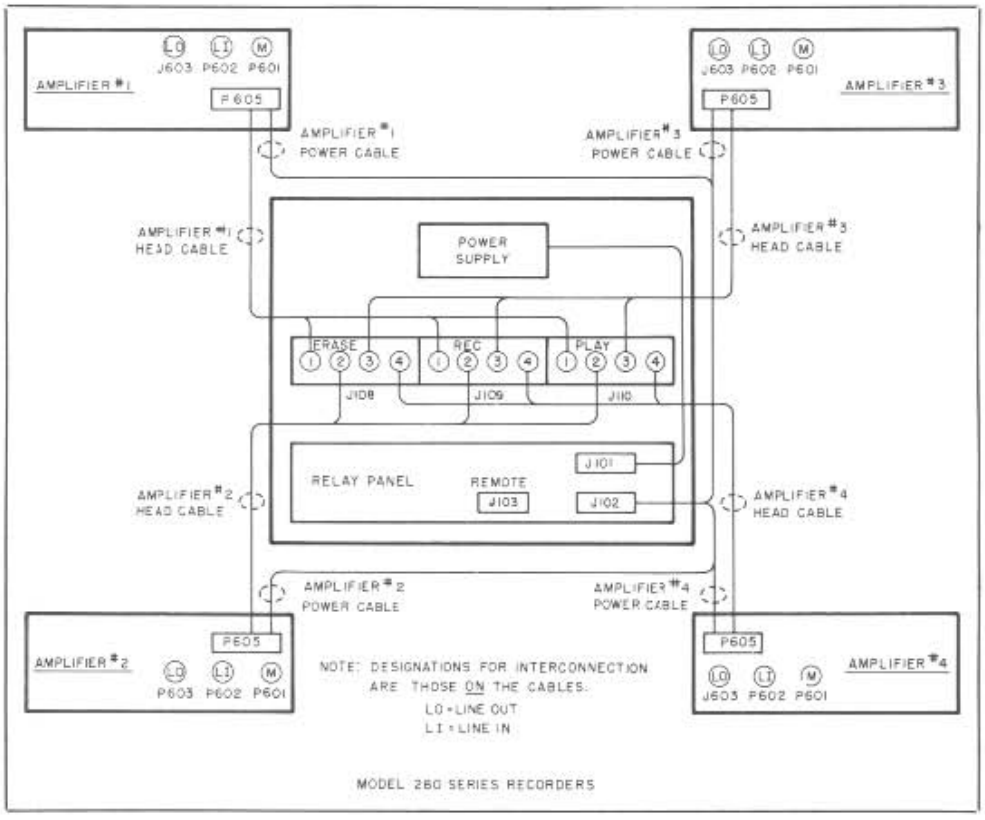


Figure 2-2. Interconnecting Diagram

and head sections. Before assembling the units, consult the interconnecting diagram (fig. 2-3) for the proper installation of cables.

Connect the small plug P102 to the relay panel under the tape transport and the large 32-pin connector P605 to the back of the amplifier. In multi-channel units the 32-pin connectors are marked channel 1, 2, etc. to mate with their respective amplifiers, which are similarily identified.

2.4. POWER CONNECTION

For normal operation, connect the power cable from the AC power input connector on the transport mounted supply to a 115-120 volt AC, 60-cycle power outlet to assure proper equipment grounding.

2.5. OUTPUT (See figure 2-3.)

A female type XLR connector is supplied. This connector is plugged into the Output Receptacle J603, normally +4dbm into a 600-ohm load. However, provision has been made for output level metering of +8 dbm.

2.6. INPUTS (See figure 2-3.)

2.6.1. Line

A three-pin male XLR connector for the line input is required. It mates with "Line" Receptacle J602 in the rear of the amplifier assembly. This balanced bridging line input has a nominal impedance of 10,000 ohms and is suitable for bridging 600 ohm lines with nominal levels from -10 dbm to +10 dbm.

2.6.2. Microphone

A similar three-pin male XLR connector for the microphone input J601 on the rear of the amplifier assembly is also required. Any low-impedance microphone from 150 to 250 ohms can be accommodated with nominal levels up to -30 dbm. The use of high-impedance microphones is not recommended.

2.7. REMOTE

The Scully 280 Remote Control Unit, Catalog 502210100 can be supplied to provide remote operation in the Play, Rewind, Fast Forward, Stop and Record modes. The Record function operates after manual pre-selection of the line or mic mode on the amplifier panel. When the remote control unit is not being used, the dummy plug P103 must be plugged into the remote control receptacle J103 on the tape transport control panel.

2.8. PHONES

A phone jack for high impedance headphones is provided on the front of the amplifier panel. The phones may be used to monitor the playback or reproduce output as well as the record amplifier inputs from the line or microphone input.

2.9. LINE TERMINATION

The Line Termination switch on the electronics panel above the phone jack provides a 600-ohm termination on the line output when the switch is in the ON position. The unit is unterminated in the OFF position.

2.10. PERFORMANCE CHECKS

After installation, a series of performance checks should be made. Before proceeding with these, turn the amplifier mode selector switch to the DE-MAG position and de-magnetize the heads! No checks should be made without first doing this.

The instructions for the performance checks listed below will be found in the Performance Checks and Alignment portion of the Electronic Section (Section V).

1. De-magnetization of heads
2. Playback level
3. Playback alignment and frequency response
4. Record alignment and calibration
5. Overall record frequency response
6. Record noise balance
7. Erase adjustment
8. Linearity adjustment
9. Flutter and wow measurement

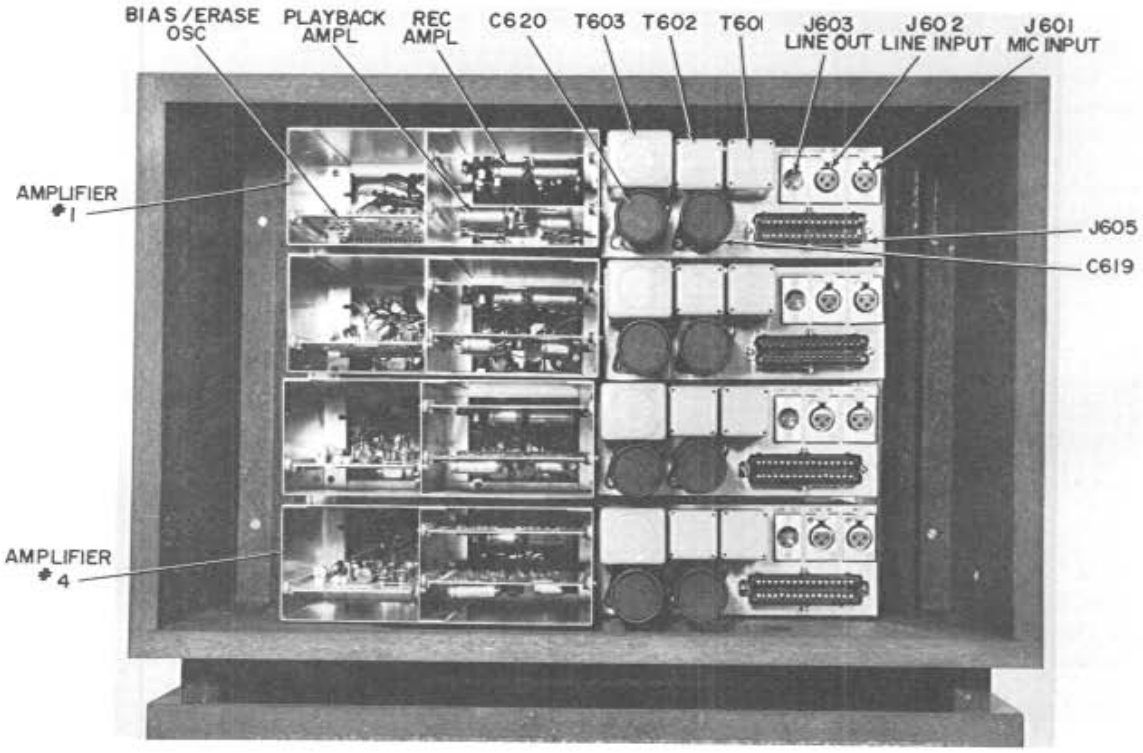


Figure 2-3. Rear of Amplifiers

SECTION 3

OPERATING INSTRUCTIONS

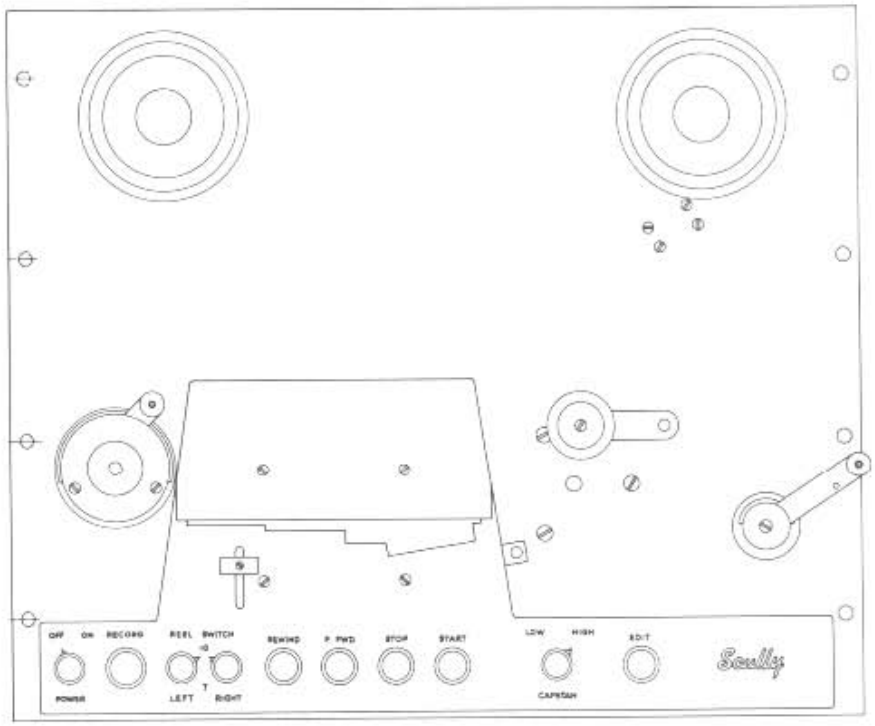


Figure 3-1. Tape Transport Control Panel

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 pushbutton 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 compatability 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

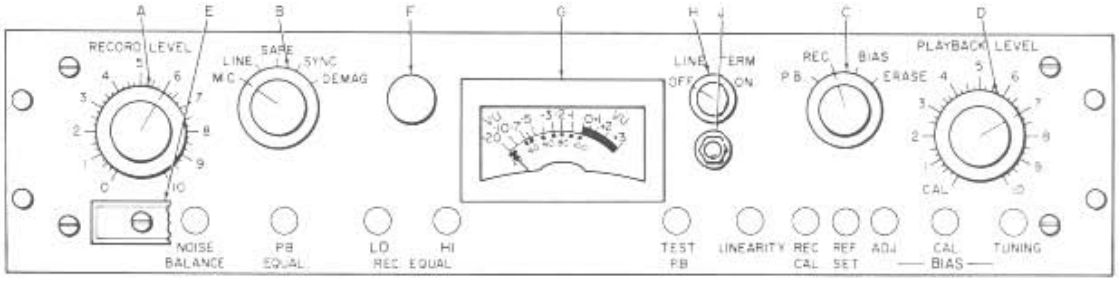


Figure 3-2. Electronics Assembly Front Panel

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-

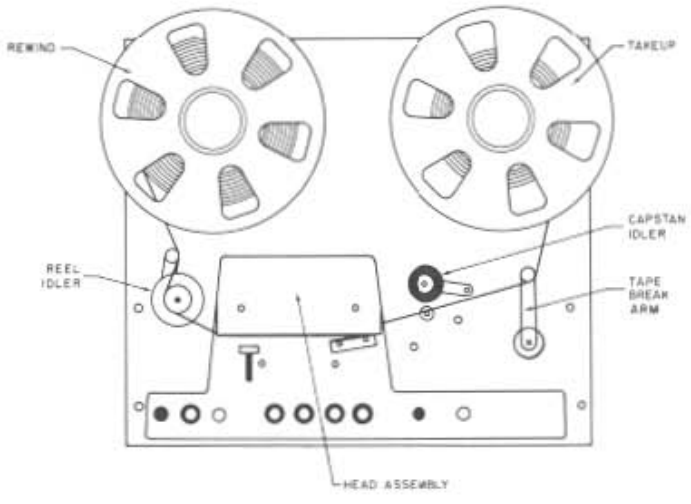


Figure 3-3. Tape Threading Path

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.

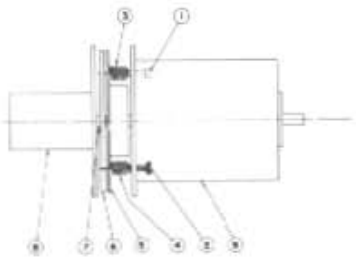


Figure 4-1. Disc Brake Outline

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.

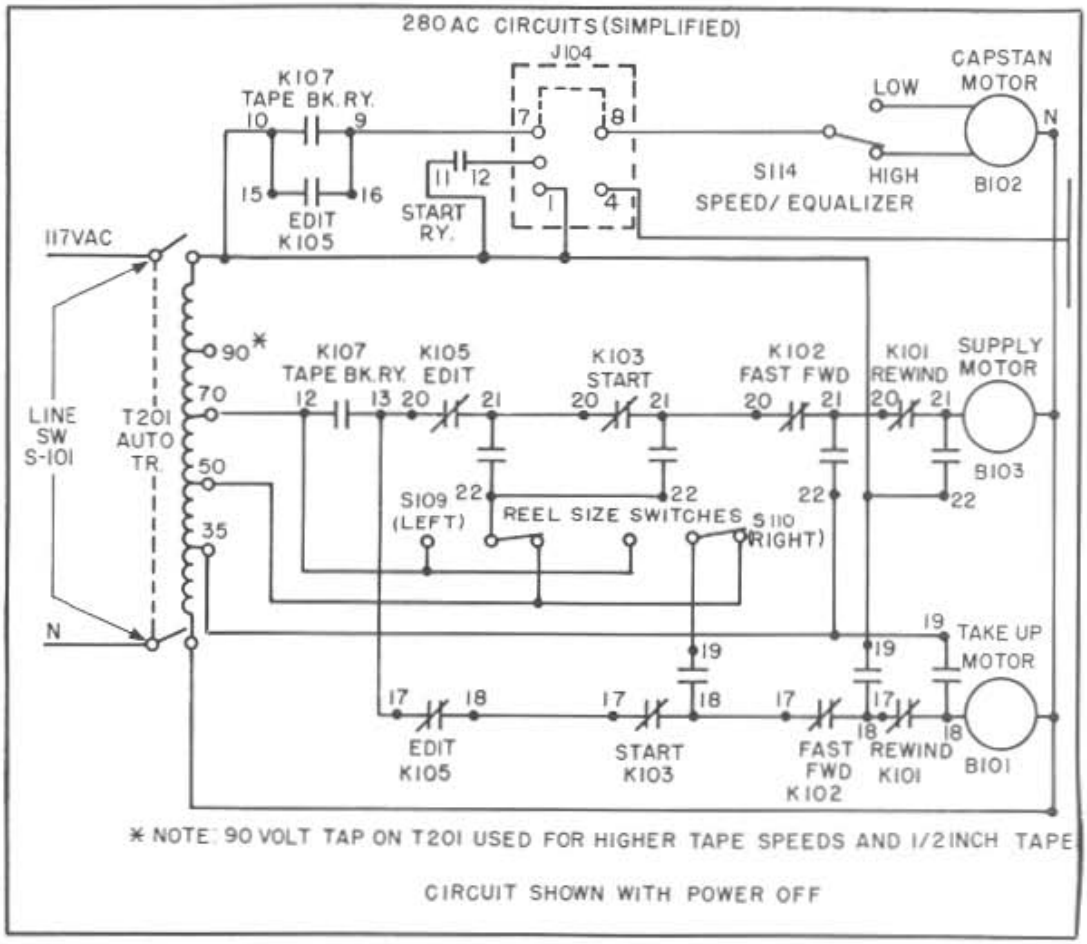


Figure 4-2. Model 280 AC Circuits — Simplified

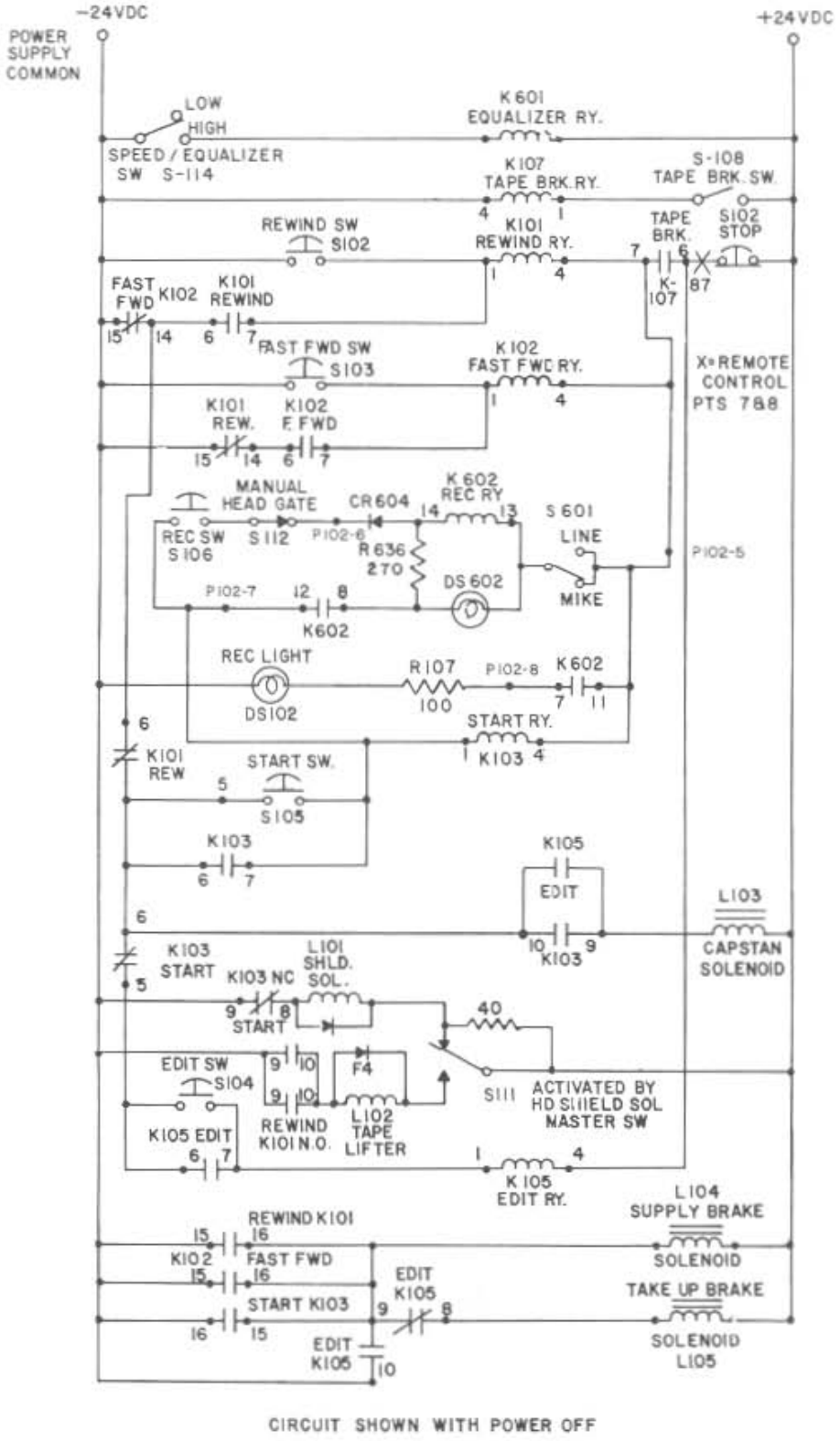


Figure 4-3. Model 280 DC Circuits — Simplified

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 energized 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 overriden 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.

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).

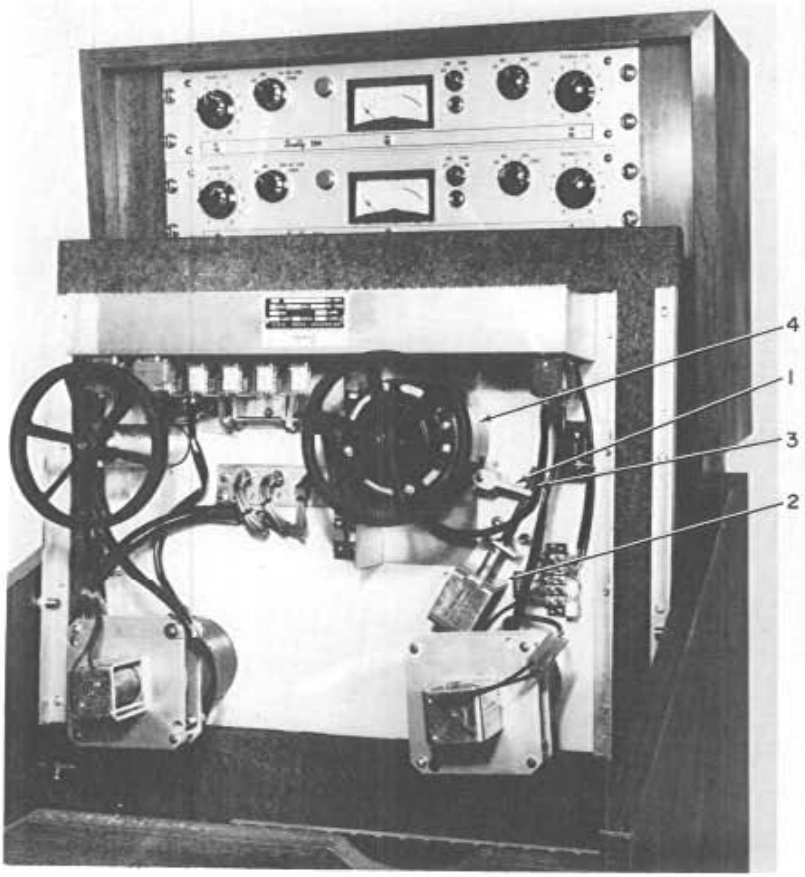
c. A 0-5 lb tension scale should be attached to the cap screw on the pinch roller. Place the transport in the Playback mode, then, while the tape is in motion, slowly pull the pinch roller away from the capstan shaft. Note the tension scale reading at the point where tape motion ceases.

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 holdes. 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 prealigned. 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.

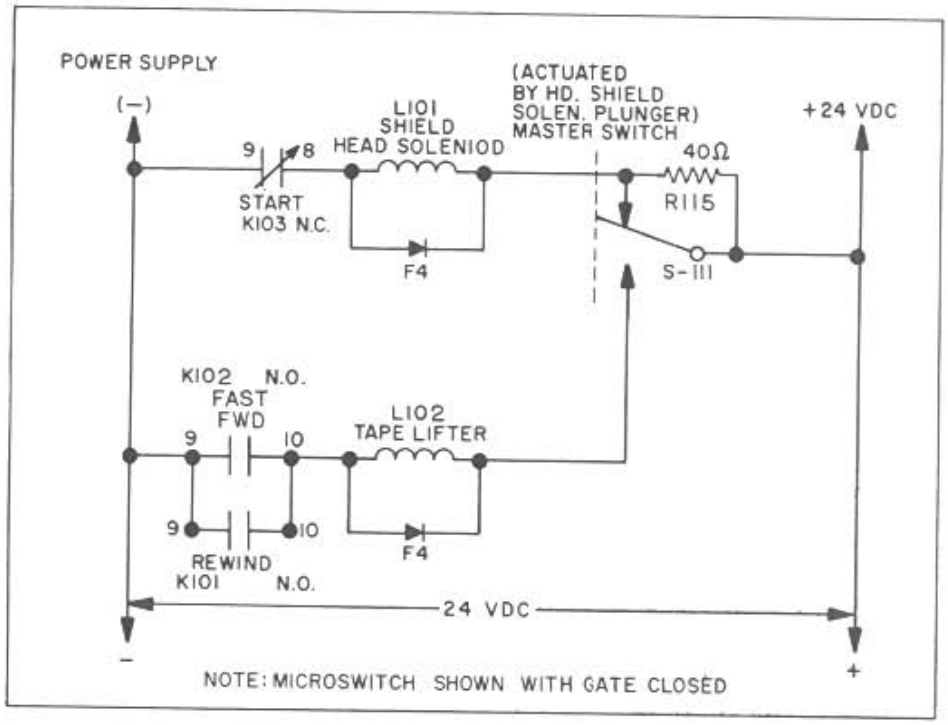


Figure 4-5. Automatic Tape Lifter, Schematic Diagram

TABLE II. MECHANICAL TROUBLESHOOTING

Symptom	Probable Cause	Correction
STARTING		
Transport fails to start in PB., F. FWD, or REWIND (power on).	1. Blown fuse (power ac or control dc).	1. Replace fuse. Check that fuse does not blow again.
	2. Remote plug not inserted.	2. Insert remote plug.
	3. Tape not porperly threaded around tension arm.	3. Rethread as shown in tape threading diagram.
	4. Capstan pressure roller fails to engage capstan shaft. (This could occur in PB.)	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. Capstan motor not running.	5. Check that motor is plugged in. If so, suspect motor, or check wiring in base of plug. Check plug J104.
	6. Brakes do not release on torque motor(s).	6. Motor not plugged in. If it is, check solenoid connections. Check wiring in plug or base of socket.
	7. Torque motor doesn't start.	7. Check motor capacitor. Spin motor by hand; if starts, change capacitor.
	8. Failure in dc section of power supply.	8. Check rectifier, filters, wiring, and transformer T202.
	9. Relay failure.	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.

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.	1. Oil in shaft.	1. Clean with dry, soft cloth.
	2. Insufficient roller pressure on capstan shaft.	2. Check capstan pressure roller solenoid and adjustment. Replace if necessary.
	3. Capstan not perpendicular to top plate.	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	1. Dirt deposits on capstan shafts, pressure roller, stabilizer pulley, or heads.	1. Clean with dry, soft cloth.
	2. Low tape tension.	2. Check that reel tension switches are properly set.
	3. Brakes dragging.	3. Check that supply brake is not dragging. Adjust brake if necessary.
	4. Insufficient capstan roller pressure.	4. Adjust pressure roller tensions or pressure roller link assembly.
	5. Tape guide fingers misaligned.	5. Check and reset properly.
	6. Heads not properly aligned.	6. Align heads.
	7. Defective capstan motor (capstan shaft bent, bearing failure, etc.).	7. Replace motor.

SECTION 5

ELECTRONICS ASSEMBLY

5.1. GENERAL DESCRIPTION

The electronics assembly of the Model 280 Recorder is contained in a 3-1/2" x 19" x 10" deep chassis. All adjustments are accessible from the front panel. Those not commonly used are covered by the metal across the lower part of the panel. This strip is removed by loosening the captive screws holding it to the panel. The record and playback amplifiers and bias-erase oscillator sections are located on three etched boards and may be removed from the back of the assembly merely by pulling them out. Only solid-state circuitry is used. A complete system block diagram appears in figure 5-1.

5.1.1. Record Amplifier (See figure 8-12.)

The record amplifier consists of a solid-state resistance-coupled amplifier, which brings live input signals up to the level required for the recording. For microphone input, two additional stages are provided on the same printed circuit board. They are switched in by means of the mode selector switch S601, located on the amplifier panel.

The two transistors which comprise the record amplifier proper, Q801 and Q802, use local feedback for stability and low distortion. CR 801 and CR802 are transistor-cased diodes used in the linearity extending circuit. See Linearity Control, paragraph 5.1.5.

L801 in conjunction with C805 and the coupling network on the chassis L602 and C613 form an impedance matching network between the collector of Q802 and the record head. This matching network favors the high frequency response so that a portion of the necessary record pre-emphasis is produced here. The remaining portion of the record pre-emphasis is produced by the coupling network between the record gain control R603 and the base input of Q801. This equalization is coupled to the speed change switch S114, automatically selecting proper equalization for either speed.

The microphone amplifier consists of Q853 and Q854. Both local and overall feedback are used here. One section of the record gain control varies the AC emitter resistance of Q853 so as to reduce its gain for strong signals.

This removes the limitation on dynamic range that presented a problem in the earlier stages of the art.

5.1.2. Bias and Erase Oscillator (See figure 8-12.)

The bias oscillator card consists of two stages. Q701 is the 60 kc oscillator which drives the erase head. Q702 is a frequency multiplier which provides bias power at 180 kc to the record head. By this means it is possible to gain the advantage of efficient erasure with relatively little heating of the erase head, plus the advantage of a higher than usual bias frequency which leads to a higher signal-to-noise ratio.

CR701 and CR702 are a diode switch, permitting synchronization between the various oscillators of a multitrack machine while allowing one or more of the channels to be in a "non-record" condition with no chance of high frequency energy getting into the wrong places. When the machine is taken out of the Record mode by depressing the Stop or one of the Fast buttons, the energy supplied to the erase and record heads dies out gradually over a period of about 0.1 second. This is accomplished by the gradual decay of voltage across C619 when its supply is interrupted by the dropout of the record relay.

The synchronization of bias oscillators in a multi-track machine is maintained throughout this period by the delay network consisting of CR703 and C702 on the oscillator board. This delay network insures that the voltage which activates the diode switch CR701 and CR702 decay even more slowly than the voltage across C619.

T703, the multiplier tank circuit, is tuned to resonance during factory adjustment and should not require any further attention. T702 may have to be re-adjusted if an erase head of materially different inductance than the original is used.

It will be noted that bias synchronization is accomplished on the primary of T701 for each

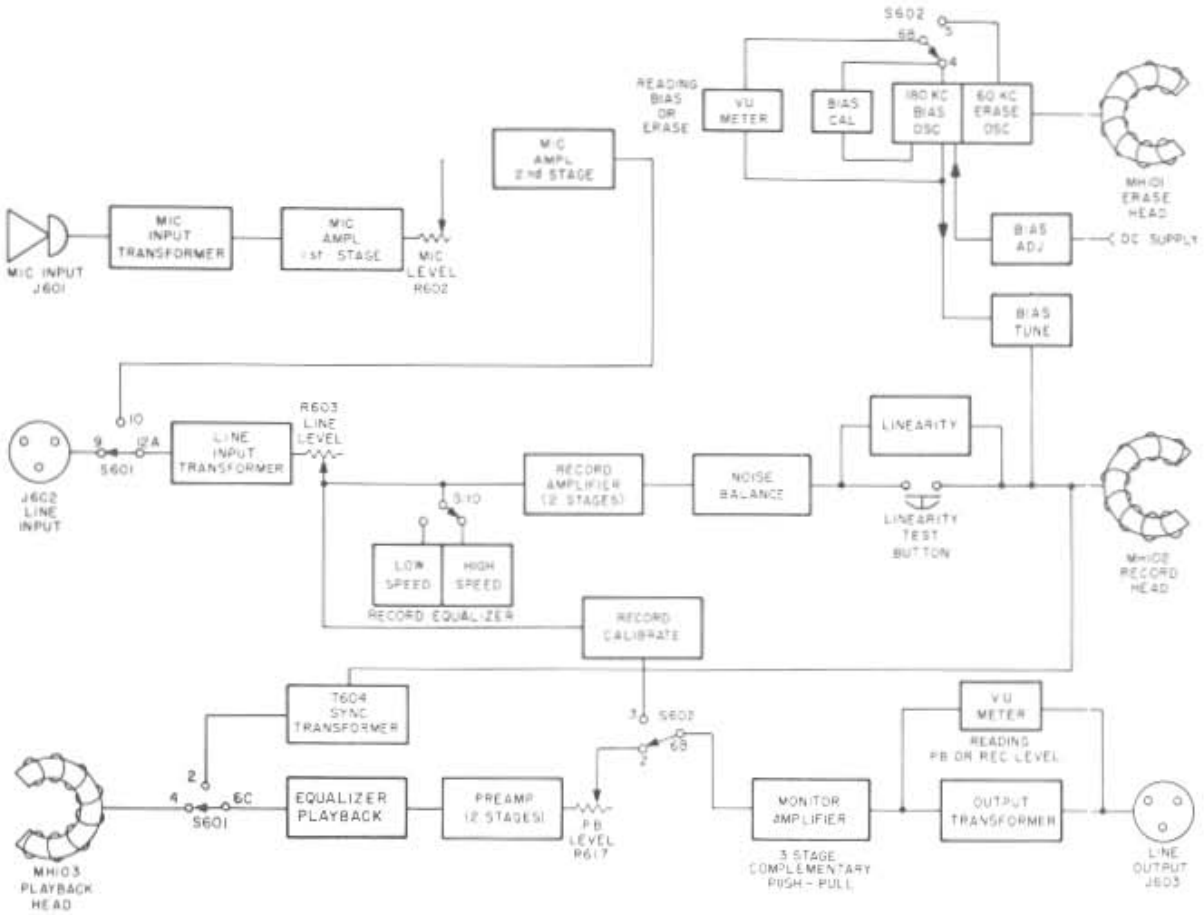


Figure 5-1. Model 280 System Block Diagram

oscillator. This eliminates the possibility that vagaries originating in one oscillator may affect the operation of the other oscillators in a multi-track machine. It also eliminates the problem of noise balance control interaction between channels.

Having a bias amplifier multiplier separate from the erase generator permits bias adjustment potentiometer R617 to be a purely DC bias control. There is no problem of bias radiation from the wiring to this control.

The network L702 and C713 in the output of the bias generator helps (with the bias tuning network L604 and C617) to insure the purest possible bias waveform. It would appear that a noise balance control is no longer needed with the arrangement. However, experience has shown that this control is useful in compensating for small residual magnetization of the record head, which is difficult to remove entirely. Any slight leakage in coupling capacitors C806 and C807 between the record amplifier and the record head will have a very similar effect. Therefore, the noise balance control introduces a small flow of DC (less than 1/2 ma) through the record head for compensation. Any time the noise balance control nulls far from its center position, it should be assumed that the record head requires de-magnetization.

5.1.3. Wiring on the Electronics Chassis (See figure 8-12.)

The electronics chassis contains a transistor, Q601, which, in conjunction with zener diode CR603, provides a source of well-filtered -18-v DC stabilized power for the operation of all the sections of the electronics. In this way, minor variations of the AC line voltage are prevented from varying the amplifier gains and the bias level.

5.1.4. Playback Amplifier (See figure 8-12.)

The playback amplifier is a two-section, five-stage audio amplifier. The signal from the playback head, after high frequency equalization, passes through the first section stages,

Q901 and Q902. These stages employ local feedback for gain stability, distortion reduction and playback equalization. The signal then passes through Playback Level control R616 and Monitoring switch S602 to the second, or monitoring section of the amplifier. This section has three stages – a grounded emitter stage Q903, followed by an emitter follower Q904 to provide drive for the complementary push-pull output transistors Q905 and Q906, the output transformer T603 and feedback network. The signal from the output transformer feeds through the bias filter to the LINE OUT jack, monitoring jack and VU meter with its sensitivity setting network (+4 or +8 dbm). Amplifiers are normally supplied with the VU meter reading of zero corresponding to +4 dbm.

5.1.5. Linearity Control

In a properly adjusted tape recorder, nearly all the harmonic and intermodulation distortion is caused by the approach to saturation of the magnetic tape used. The Scully 280 uses a linearity extending circuit which permits recordings to be made at normal levels with greatly reduced distortion, or at somewhat higher levels without exceeding the usual amount of distortion.

The record amplifier card contains two diodes, CR801 and CR802, whose forward conductance increases with signal level so as to minimize the drooping tendency of the overall transfer characteristics. This can be called predistortion which is complementary to that which is inherent in the tape. It has the effect of cancelling out the distortion which would otherwise be caused by the non-linear relationship of remanent flux on the tape to the audio-frequency driving current.

As the voltage sensed by the diodes CR801, 802 increases above threshold in either direction, the diode conductance increases, cutting down on the amount of inverse feedback provided by emitter degeneration in Q802, and boosting the signal by the amount required for linearity. Now the shape of the compensation required is quite constant with changes in recording head characteristics, oxide formulation, etc. However the threshold point will be shifted by a change in recording head sensitivity (new head of different inductance) or a major change of tape characteristic e.g. low noise to high output tape. Therefore the Linearity adjusting pot., R618 is provided so that the current level which corresponds to the "knee" of the transfer characteristic can be matched to the threshold voltage of CR801, 802 where the diode conductivity starts increasing.

This adjustment can be made most accurately with a distortion analyzer, but, where one is not available, the optimum setting can be approximated by setting the pot. so that the diodes cause an increase of 0.8 db in the level of a single-frequency tone at peak record level as indicated on the playback VU meter.

The linearization of the transfer characteristic produced by this adjustment is much more than this at the peak of the signal waveform, of course, but 0.8 db is the indication produced on a normal (average responding) VU meter.

5.1.6. Synchronization

5.1.6.1. Description

Three and four-channel half-inch Model 280 recorders have built-in selective sync, permitting switching of any record channel to play back cueing function while recording on other channels. This enables the operator to monitor in exact synchronization with previously recorded material on other channels.

This circuit is standard on all three and four-channel half-inch Model 280 recorders and is available at extra cost on other models. Connections in multi-channel units with the sync feature are shown on figure 5-2.

5.1.6.2. Operation

Set the function switch S601 on the amplifier panel to SYNC position. All previously recorded material on that channel may now be monitored in synchronization with material being recorded on other channels.

CAUTION

Be sure to switch function switch S601 back to normal microphone or line position when sync work is completed. Unit will not record in SYNC position.

5.1.7. Power Supply (See figure 8-6.)

The power supply provides two 24-volt DC outputs from the full-wave semiconductor diode rectifiers. The control and transistor voltage sources have one common terminal coming from the center tap of the 48-volt secondary winding in transformer T202. There is additional filtering for the transistor electronics DC source in the amplifier assembly.

Transformer T201 is tapped to supply the AC voltages required for the various modes of tape transport operation. This method of making available the lower AC voltages avoids the additional heating normally encountered when large voltage dropping resistors are used.

Both T201 and T202 are toroidal wound transformers. This contains their respective fields and materially reduces a major source of hum found in tape transport power supplies.

The AC power switch disconnects both sides of the incoming AC power line, to assure complete isolation during servicing operation. Connector P201 plugs into the relay control panel connector J101.

The AC line and both of the 24 volt DC sources are individually protected by fuses. The fuse requirements in the power supply are as follows:

F201	117 volt AC line	3 amp
F202	24 volt DC control voltage	5 amp
F203	24 volt DC electronics	3 amp

5.2. ALIGNMENT AND PERFORMANCE CHECKS

The following is the complete list of alignment and performance checks that should be performed on the Scully Model 280 Recorder/Reproducer at the time the equipment is received and at any other time that such a procedure is deemed desirable by the user. (See fig. 3-2 for location of controls on Electronics Assembly.)

1. Demagnetization of heads (5.2.2).
2. Playback alignment and frequency response (5.2.3).
3. Record adjustments and calibration (5.2.4). These adjustments include overall frequency response and signal/noise measurement.
4. Record noise balance (5.2.5).
5. Erase adjustment (5.2.6).
6. Linearity adjustment (5.2.7).
7. Flutter measurement (5.2.8).

In multi-track machines, these procedures must be repeated for each channel.

5.2.1. Test Equipment Required

Standard alignment tape
Audio Oscillator, Hewlett Packard Model 200C or equivalent
AC Vacuum Tube Volt Meter, Hewlett Packard Model 400D or equivalent
Wave analyzer (if available)
Band pass filter, Bias filter } (Ref. figure 5-3.)
Flutter Meter, Sentinel FL-3-D, Micom Model 8100 or equivalent
Alignment tool (Scully p/n 061008276)

5.2.2. De-magnetization of Heads

Before de-magnetizing the heads, turn the function switch to the DEMAG position. The tape guides and capstan shaft should also be de-magnetized periodically.

5.2.3. Playback Alignment and Playback Amplifier Noise

a. Be sure the termination switch on the amplifier panel is properly set before adjusting PLAYBACK LEVEL. If this is a multi-channel recorder, all of the following tests should be repeated for each channel.

b. Use a standard alignment tape at the high tape speed.

c. Place the output selector on the electronics front panel at PB. Remove the dress strip (figure 3-2) for access to calibration adjustments and place the PLAYBACK LEVEL control in the CAL position.

d. Begin tape motion by pushing the START switch, and monitor the output with the external AC VTVM and speaker amplifier.

e. As the first tone or reference is heard, adjust the REF. SET control (R627) for a zero reading on the VU meter. This now represents a calibrated +4dbm output reference.

f. Following the first tone on the standard tape are a series of tones at frequencies used for head and equalization adjustments. The second tone (15 kHz) is used for playback head alignment. Loosen the single button head mounting bolt slightly, and rotate the head until maximum output is obtained. Once set, this rotation adjustment need only be checked periodically.

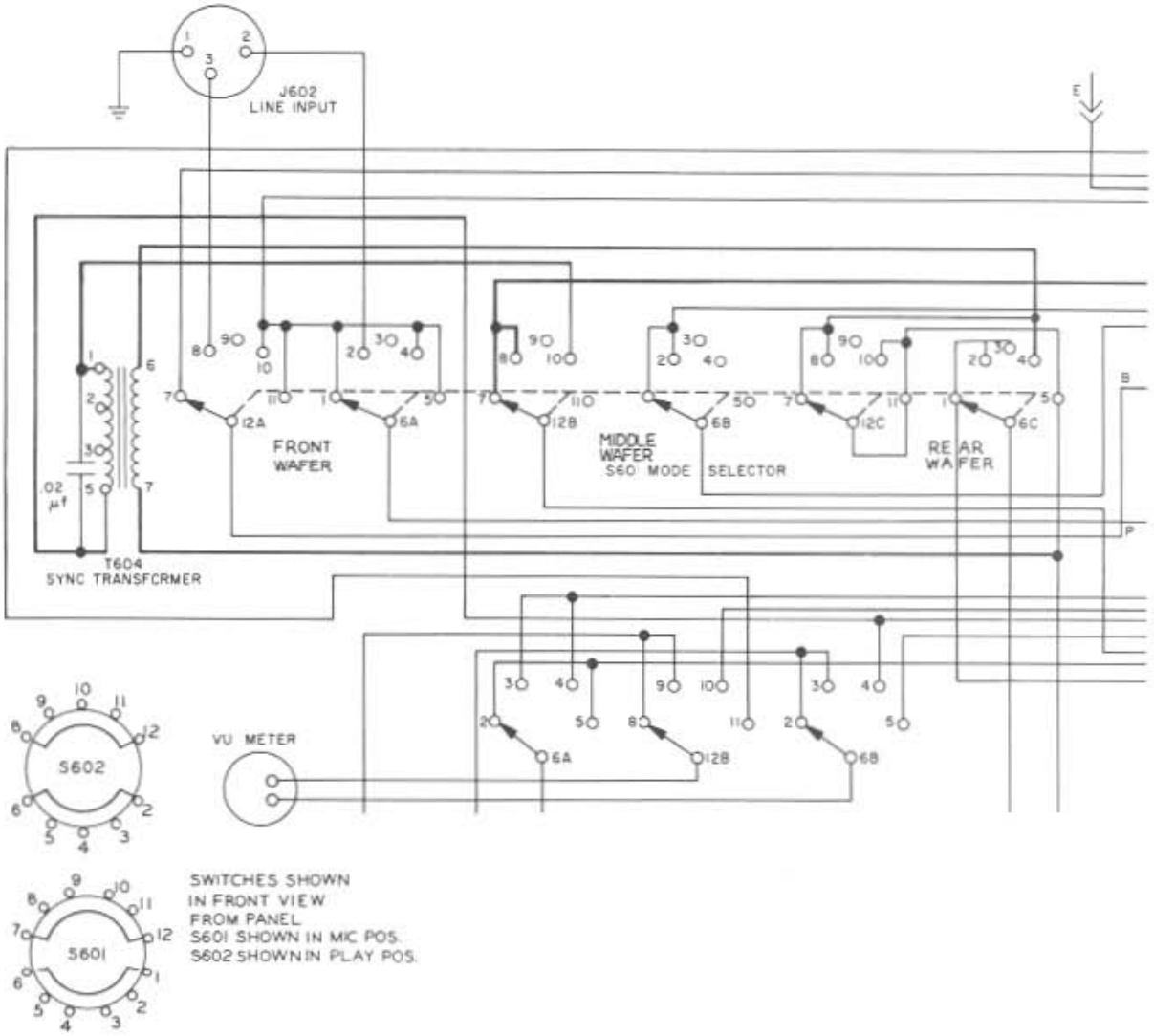


Figure 5-2. Connections in Multi-Channel Machines with Sync Feature

Visually check the heads (with hum shield down) to observe that the heads are perpendicular to the tape and also properly centered. If a zenith adjustment is required, see paragraph 4.5.5 for the adjustment procedure. The slotted azimuth adjusting screws (2) may now also be peaked for maximum output.

g. The playback equalizer (R619) is to be adjusted at 10 kHz for 0 dbm. The following tones on the alignment tape are used to check the playback frequency response.

NOTE

When a standard full-track tape is reproduced by a half- or multi-track head, readings for frequencies below 700 Hz will be higher than normal, due to "fringing effect."

5.2.4. Record Adjustments and Frequency Response

a. Thread a reel of blank tape of the type normally used in the recorder/reproducer. Place the unit in operation in the Record mode in the high-speed range.

b. With the machine in the Record mode, check that the erase reading on the VU meter is 100% or better. (This corresponds to the zero point on the VU meter). Now switch the meter to the BIAS position and set the Bias Adjust control (R620) for a convenient reading. Next, rotate the Bias Tuning control (C617) for a maximum reading on the VU meter. Transformer T703, located on the bias card at the rear of the amplifier, may also be peaked at this time. (Use the alignment tool supplied.)

c. Apply a 1000-Hz tone into the record amplifier at a 0-dbm reference level on the VU meter. (The monitor switch must be in the PB. position.) Adjust the BIAS ADJUST pot (R620) for a peak reading. At 7-1/2 ips, use a 400 Hz tone and at 3-3/4 ips use a 250 Hz tone.

d. Sweep the oscillator to 15 kHz. Check the record head for rotation and azimuth adjustment. Peak for maximum output. (If not previously checked, playback head rotation may also now be optimized.) Reset the oscillator frequency to 1 kHz.

e. Switch the VU meter to the BIAS position. Adjust the BIAS CAL. pot. (R621 for a (0) zero reading on the VU meter.

f. Switch the VU meter back to PB. Adjust the RECORD LEVEL control for a (0) zero VU meter reading. Switch the VU meter to REC., and adjust the RECORD CALIBRATE pot (R606) so that it, too, produces a zero (0-dbm) reading on the VU meter.

g. Sweep the oscillator to 10 kHz. Adjust the high RECORD EQUALIZER (R610) for 0 dbm (15 ips). At 3-3/4 and 7-1/2 ips speeds, the input level should be dropped 20 db below the reference level to avoid tape saturation at the higher frequencies. Slowly sweep the oscillator from 18 kHz to 35 Hz (15 ips) and adjust the record equalizer for best frequency response. For 3-3/4 ips machines, the procedure is the same as for 7-1/2 ips, except that the frequency for the maximum adjustment is 7.5 kHz.

5.2.5. Record Noise Balance

a. With the machine in the RECORD mode and the monitor switch in the PB. position, close the record gain control and raise the monitor gain so that tape noise can be heard.

b. Adjust the NOISE BALANCE control (R629) for minimum audible noise (popping or gravelly sounds). If a distortion analyzer is available, this adjustment can be precisely made by recording a 1,000-Hz tone while adjusting the noise balance for minimum distortion reading on the analyzer.

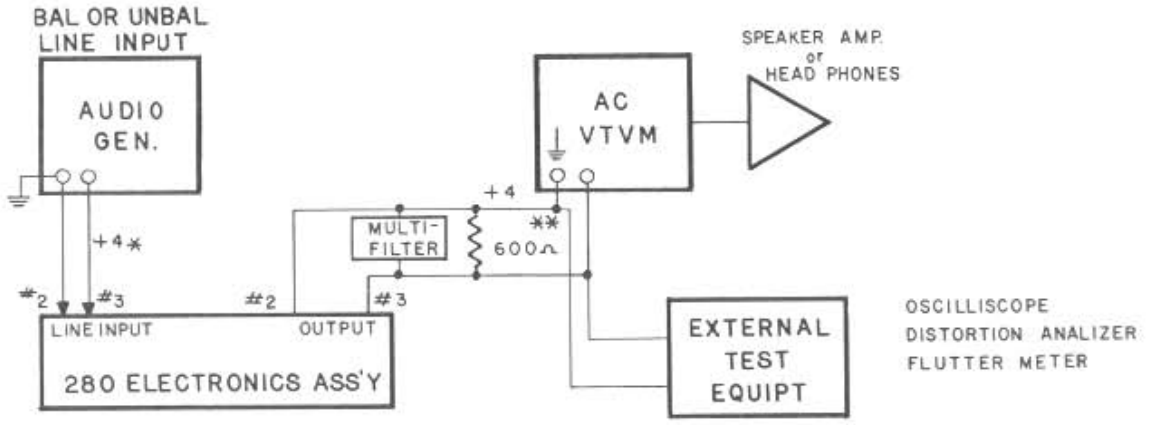
c. If the noise balance control will not reach a null, or if the null is more than 45 degrees from the center position, one or more of the heads may be in a magnetized condition. This must be corrected before proceeding further. The bias card can also be checked for a symmetrical bias waveform.

d. The overall distortion may also be measured at this time by recording a 500-Hz tone and measuring the second and third harmonics. High second-harmonic output is a reliable indication of a magnetized head.

5.2.6. Erase Adjustment

a. Connect a 400-Hz filter in the output line feeding the external AC VTVM (See figures 5-3 and 5-4.)

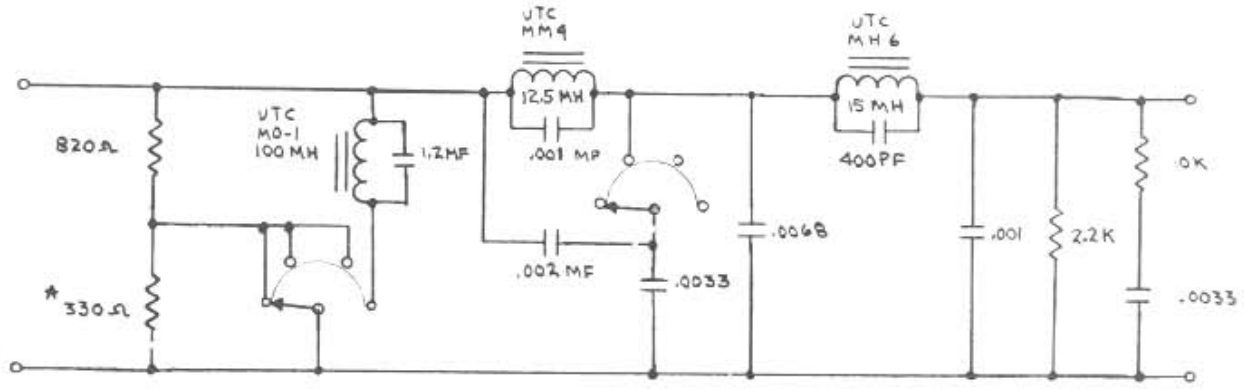
b. Record a 400-Hz tone at +10 db (+6 dbm above 0 dbm on the VU meter).



NOTES:

1. * = FOR 3-3/4 AND 7-1/2 IPS SET AUDIO GEN FOR -20 db
2. ** = 600 ohm RESISTOR NOT REQUIRED WHEN USING MULTI-FILTER
3. MULTI-FILTER OPTICNAL

Figure 5-3. Model 280 Electronics Test Setup



POS 1. 0-20,000 CPS
2. 0-15,000 CPS
3. 0-20,000 CPS
4. 400 CPS

* 330Ω RESISTOR IS SELECTED FOR UNITY GAIN AT 400 CPS PEAK

Figure 5-4. Multifilter, Schematic Diagram

c. Rewind the tape. Turn the RECORD LEVEL control fully ccw and operate the machine in the RECORD mode. While observing the depth of erasure on the external ac VTVM, rotate the erase head for maximum erasure. Typical readings are 68-70 db (full-track), 67-68 db (half-track), and 65 db (quarter track).

5.2.7. Linearity Adjustment Procedures

NOTE

This unit has been shipped with the linearity control adjusted for optimum benefit. These procedures are provided for servicing and information.

5.2.7.1. Procedure No. 1.

a. After bias and noise balance has been set, play back a test tape of standard operating level with the playback gain control set so the VU meter reads -6.

b. Thread up a reel of tape of the type to be used, put the machine in the record mode, and increase the input signal until the playback VU meter reads 0 on the scale. (A 1000-Hz tone should be used).

c. You are now recording a signal at peak record level. Depress the test pushbutton and note the drop in VU meter reading. This will be 0.8 db when the linearity adjusting pot. is properly set.

d. If you get less than 0.8 db drop, rotate the LIN pot counterclockwise, increase the Record Gain, setting it so as to keep the VU meter reading zero, and retest.

e. If the VU meter drop-off is more than 0.8 db when you depress the test button, rotate the LIN post clockwise, reduce the Record Gain so as to keep the VU meter at "0", and retest.

f. Record calibration must be reset after linearity adjustment is made. Thread up the test tape with standard operating level again and bring up the playback gain control to produce zero on the playback VU meter.

g. Then, while recording 1,000 cps tone on tape of the type to be used, with the VU meter on Playback, set the Record Gain for the zero reading on the meter. A choice is now available to the user. You may either record at normal levels, or at a higher level with a better signal-to-noise ratio.

b. If the linearity circuit is to be used only to reduce distortion at normal levels, switch the VU meter to Record and set the Record Calibration control so that the meter again reads zero.

i. If it is desired to record at higher than normal levels so as to achieve a better than usual signal-to-noise ratio, then with the machine set up to record 1,000 cps tone at standard operating level as described above, set the Record Calibration control for a reading of -2 on the record VU meter. This will cause program peaks to be recorded 2 db higher than has been possible in the past, with no increase in distortion, and a 2 db increase in the available signal-to-noise ratio.

5.2.7.2. Procedure No. 2 (Alternate Method).

The following linearity adjustment procedure is less accurate than procedure no. 1 above, but may be adequate and more convenient.

a. After checking the Record frequency response, (paragraph 5.2.4), reset the test oscillator to 1,000 Hz at zero reference level on the VU meter. The meter selector should be set for the Playback mode.

b. Turn the linearity control behind dress strip fully clockwise. Reset the Record level control to indicate -3 on the VU meter.

c. Turn the linearity control counterclockwise until the VU meter again reads zero VU.

d. Pressing the linearity test button should decrease the meter reading approximately 0.4 db.

NOTE

If the equipment required to adjust the linearity circuit is not available, turn the LIN pot. all the way clockwise. This will essentially de-activate the circuit and leave a normally operating recorder.

5.2.8. Flutter Measurement

Periodic flutter measurement will give the user a good indication of the mechanical condition of the recorder.

a. Using the Sentinel FL-3D, Micom 8100 (or equivalent), connect the 3-kHz output from the flutter meter to the line INPUT. Adjust the RECORD LEVEL control for 0 dbm.

b. Operate the machine in the RECORD mode, adjust the PB. gain to 0 dbm, and connect the 3-kHz output to the flutter meter. Calibrate as required.

c. After recording on a portion of the tape, rewind and play back. Observe the flutter meter reading. Excessive flutter may be caused by a defective capstan motor (check lubrication), noisy bearings, improper capstan idler pressure, or low line voltage.

d. When making flutter measurements at high and low speeds, it is important that the capstan motor be turned off and allowed to completely stop before re-starting at the desired speed.

SECTION 6A

MODEL 280 WITH MOTION SENSING

6A1.1 DESCRIPTION

The Scully Model 280 Recorder/Reproducer with Motion Sensing contains automatic tape motion-sensing circuits which permit any operator to control the equipment without danger of tape stretch or breakage on STOP or when switching from one mode to another. It is not necessary to wait for the motion of the tape to cease before initiating operation in a different mode.

The motion-sensing circuits are located in the relay control and tape deck subassemblies of the tape transport.

Except for the motion-sensing provision and the use of an appropriately different remote control unit, the Model 280 with Motion Sensing is identical to the basic Model 280 described earlier in this manual. All of the differences are covered in the remaining paragraphs of the present section.

The remaining paragraphs of this section are direct substitutions for the similarly numbered paragraphs in sections 1 through 5 of this manual. All other paragraphs in sections 1 through 5 are wholly applicable to the Model 280 with Motion Sensing.

6A2.7 REMOTE CONTROL

The Scully 280 Deluxe Remote Control Unit, Catalog No. 504210100-01, is required for remote-control operation of the Model 280 with Motion Sensing. See Figure 8-18 in the Reference Drawings section for the schematic diagram of this remote control unit. (Other statements pertaining to the remote-control feature, in paragraph 2.7 of the basic Model 280 instructions, are equally applicable to the Model 280 with Motion Sensing.)

6A3.3 OPERATING PROCEDURE

6A3.3.1. Preliminary

a. Tape Threading. Thread tape as shown in figure 6A-1. (The rest of the instructions in paragraphs 3.3.1 through 3.3.3 of this manual are equally applicable to the Model 280 with Motion Sensing.) See also Figure 6A-2.

Figure 6A-1. Photograph of Motion-Sensing Transport

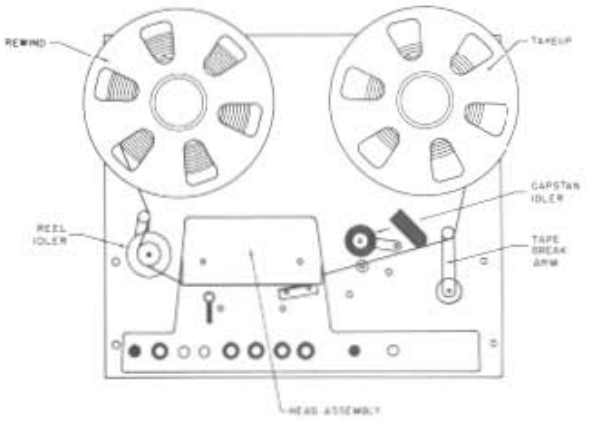


Figure 6A-2. Tape Threading Path (Model 280 with Motion Sensing)

6A3.3.4. Stopping the Unit

Paragraph 3.3.4 in Section 3 of this manual applies to the Model 280 with Motion Sensing except for the following differences:

a. If operation is started in the Play mode with no tape threaded, it will be necessary to actuate the motion sensor (figure 6A-2) by hand to return the equipment to the Stop condition.

b. Once the machine is in operation, it will not be necessary to wait for tape motion to cease before pressing the REWIND, F. FWD, or START button.

6A4.1 TAPE TRANSPORT DESCRIPTION

6A4.1.1. Tape Drive

Any motion-sensing Model 280 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 Playback, 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.

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.

6A4.1.2. Brake System (See figures 4-1, 6A-3, 8-1, 8-6, and 8-8.)

The Model 280 brake system is basically electrical. It consists of two solenoid operated brake shoes for the supply and take-up torque motors, a sensing circuit to recognize the direction of tape travel, and a resistance-capacitance delay network. Mechanical braking is used only to hold the motors in the stopped condition and to prevent free-wheeling of tape reels in the event of a power failure.

The sensing circuit consists of the sensing switch assembly (S113) which is located in the tape guidance system between the take-up motor and the capstan idler, a pair of sensing relays K108 and K109 for logic control under

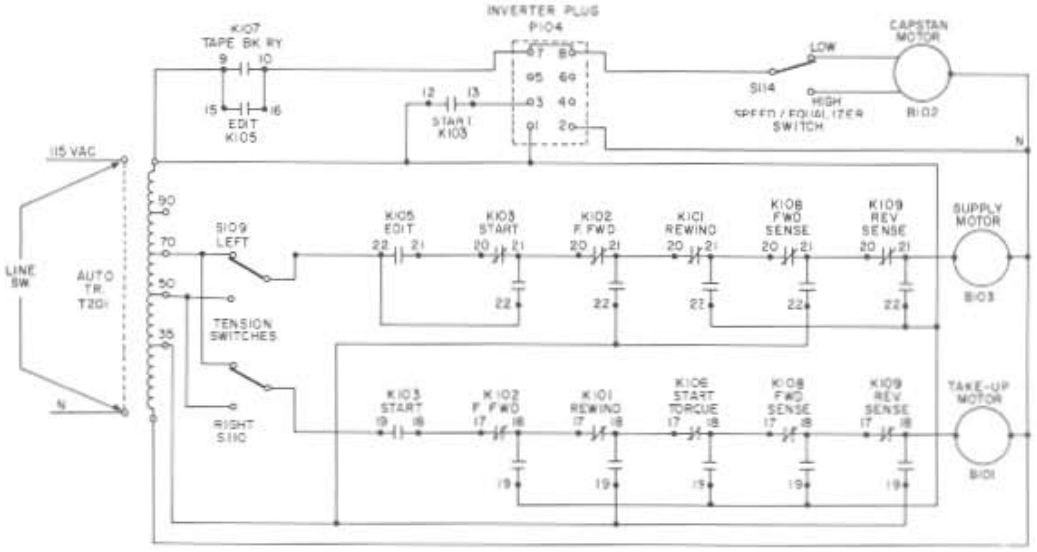


Figure 6A-3. Model 280 with Motion Sensing, AC Circuits - Simplified

forward and reverse tape-travel conditions, an RC network, and a capstan solenoid relay K110 which performs supplementary control functions for the active sensing relay. The brake shoe solenoids are L104 and L105 (figure 8-8) and the RC network consists of R121 and C124.

In any mode except edit, the brake shoes are released by energizing L104 and L105 when tape-transport operation is initiated. Later, when the STOP button is pressed, the sensing circuit reverses the direction of tape travel by changing the voltage connections to the two torque motors. Meanwhile, the same circuit holds out the brake shoes until the tape has stopped and begun to move in the opposite direction. When the opposite movement begins, L104, L105, and the torque motors are de-energized, and the motors are braked. During the tape reversal, full line voltage is applied to the appropriate motor and drag (holdback) voltage to the other motor. This insures a smooth stop. At the start of the switching transfer, the RC circuit supplies coil current to the sensing circuit until the appropriate sensing relays are locked in.

NOTES

No sensing action is involved in the Edit mode. In this case, the take-up motor brake shoe remains applied and the supply motor brake shoe is re-applied at the moment the STOP button is pressed. (See paragraph 6A4. 2. 5.)

Figure 4-1, Disc Brake Outline, in the standard Model 280 instructions is equally applicable to the Model 280 with Motion Sensing. (There are no differences in the brakes themselves.)

The sensing switch S113, which assumes either of two positions determined by the direction of tape travel, is the controlling element of the sensing circuit. Depending on its position, this switch energizes the forward sense relay K108 or reverse sense relay K109 when the STOP switch S107 is pressed. At that time, the RC circuit supplies the actuating voltage and prevents the brake-shoe solenoids from being de-energized before the sense relay operates. Once energized, the sense relay locks itself in and performs the appropriate voltage switching for the two motors while also keeping the brake-shoe solenoids energized. When the tape begins to move in the opposite direction, the sensing switch moves to the opposite position, breaks the locked circuit, and returns the sense relay to its normally de-energized condition. This causes the brake-shoe solenoid circuits to be opened as well as the voltage connections to the two motors.

The capstan solenoid relay K110 is energized at any time either sense relay is operated, and shares the same locked circuit. For the functions of this relay and other sensing circuit details, see paragraph 6A4. 2.

The mechanical adjustment of the brake shoes is not critical, but should be balanced and set for easy cueing.

6A4. 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 or 70 volts AC. 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 take-up receives full line voltage from the power supply.

NOTE

Paragraphs 4. 1. 4, 4. 1. 5, and 4. 1. 6 of this manual are equally applicable to the Model 280 with Motion Sensing. Therefore, no counterparts of these paragraphs are provided here.

6A4. 1. 7. Control and Power Circuits (See figures 6A-3, 8-6, and 8-8.)

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 socket J103 on the control chassis.

Tape transport controls, except the tape break switch S108, are 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.

6A4.2. OPERATION
(See figures 6A-3, 8-6, and 8-8.)

6A4.2.1. Turn On

Standby power is applied to the tape recorder/reproducer by actuating the POWER switch S101 (fig. 8-8). 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. On the activation of the 24-vdc control power supply, the head shield solenoid L101 is energized, whereupon the head shield immediately drops down and remains in the lowered position. At the bottom of its travel, the head shield actuates the head shield microswitch S111, which then closes one side of the tape lift solenoid circuit (L102) and places a resistor, R115 in series with L101. This resistor protects the head-shield solenoid coils from being overheated when the machine remains at rest in the standby condition for an extended time. If tape has been threaded, the tape break relay K107 is also energized when the 24-vdc control power supply is activated.

6A4.2.2. Start and Record

6A4.2.2.1. Start

The START pushbutton switch S105 is used to start the movement of the tape for a playback or record operation of the machine. This switch energizes the start relay K103 which then locks itself in through its own contacts 6 and 7. The START lamp DS103 immediately lights when the START switch is pressed and remains lighted as long as the start relay is energized. Meanwhile, the following other events take place:

The brake-shoe solenoids L104 and L105 are energized through K103-15, 16, and remove braking friction from the take-up and supply drives.

The capstan solenoid L103 is energized through K103-9, 10 and engages the capstan pressure roller. The start torque relay K106 is momentarily energized through K103-6, 7 but drops out when C122 becomes charged. Here the charging time constant is determined by C122 and R116. This action briefly applies full line voltage to the take-up motor via K106-18, 19, thus overcoming the inertia of the take-up reel.

The head shield solenoid L101 is de-energized by the opening of the normally closed start relay contacts 8 and 9. As the result, the shield is released and mechanically sprung upward, and the head shield microswitch S111 returns to its original position. In this condition, S111 disconnects the positive side of the circuit to L102 and shorts out the limiting resistor R115 on the positive side of L101.

Since the coil of K103 is energized in series with normally closed contacts of the rewind and fast forward relays K101 and K102 and normally open contacts of the tape break relay K107, the start relay drops out when the REWIND or FAST FORWARD pushbutton switch is pressed or when a tape break occurs. The start-relay dropout produced by the STOP switch S107 is discussed in subparagraph 6A4.2.6.

6A4.2.2.2. Record

The RECORD mode switch S106 is interlocked with the start relay on K103-6, 7. The START button must be pushed before the record mode can take effect in the amplifier. No tape-transport function is initiated or controlled by the record circuit.

The RECORD switch S106 on the tape-transport control panel energizes the record relay K602, which permits bias and erase energy to be applied to their respective magnetic heads. The RECORD lights DS102 and DS601 are lighted 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 high-speed equalization. Low-speed equalization normally is provided by the relay when de-energized.

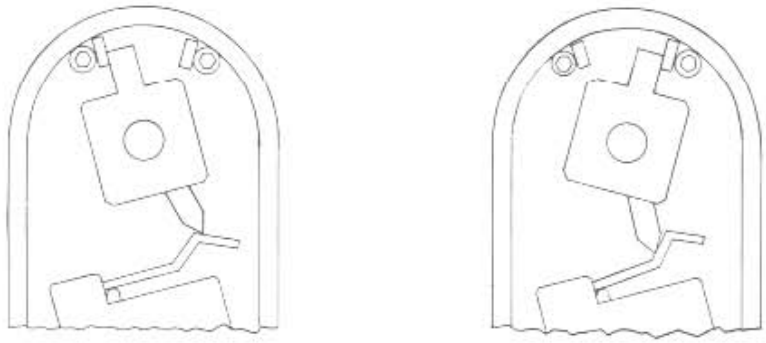


Figure 6A-4. Motion Sensing Adjustment

6A4.2.3. Tape Lift and Motion Sensor Microswitches

6A4.2.3.1. Tape Lift Microswitch

The tape lift microswitch S112 serves to make a distinction between the start mode of operation and either the reverse or fast forward winding mode. In the start mode (head shield up), the tape lift microswitch places an open circuit in the path of the capstan solenoid relay contacts K110-12, 13, which then cannot energize the tape lift solenoid L102 on stop. In either winding mode (head shield down), S112 is closed. This permits the closure of K110-12, 13 to keep L102 energized, and thus to continue to hold the tape away from the heads during the stop operation. (See also 6A4.2.3.2, 6A4.2.4, 6A4.2.5, and 6A4.2.6.)

6A4.2.3.2. Motion Sensor Microswitch

The motion sensor microswitch S113 serves to determine the direction of tape travel and to set the relay logic circuits for dynamic braking. As shown in figure 6A-3, a definite toggling action occurs in either the Forward or Rewind mode. Some slight overtravel normally occurs after the switch has been actuated.

6A4.2.4. Rewind and Fast Forward

6A4.2.4.1. Rewind

Pressing the REWIND switch S102 energizes the rewind relay K101, which then locks itself in through its own contacts 6 and 7 and the normally closed contacts 14 and 15 of the fast forward relay K102. This applies full line voltage to the tape supply motor (contacts 21 and 22) and holdback voltage to the take-up motor (contacts 18 and 19). Brake shoes are released (15 and 16) and the tape lift solenoid L102 is energized through K101-12, 13 and the head shield microswitch S111; thereupon the tape is lifted safely away from the heads. The microswitch S111 insures that L102 is not energized, however, until the head shield has dropped below the tape path, since the shield has to be bottomed to actuate the microswitch and thus close the positive side of the tape-lift solenoid circuit. The sensing switch S113 assumes the appropriate position for reverse tape travel, but has no electrical effect at this time.

6A4.2.4.2. Fast Forward

The effects of the FAST FORWARD switch S103 are similar to the rewind conditions just described, but have the opposite sense. In this case, the fast forward relay K102 is locked on, full line voltage is applied to the take-up motor, and holdback voltage is applied to the supply motor. Brake shoes are released and the tape lift solenoid is energized as in the rewind mode, but the events are controlled by the fast forward relay. The sensing switch S113 assumes the opposite position, but (again) has no electrical effect at this time.

6A4.2.5. Edit

The EDIT pushbutton (switch S104) energizes the edit relay K105 through normally

closed contacts of the capstan solenoid relay K110. The edit relay then locks itself in through its own contacts 6 and 7 and applies drive voltage to the supply motor through contacts 21 and 22. Contacts 9 and 10 of K105 release the brake shoe from the supply motor, while contacts 8 and 9 keep the take-up motor braked by opening the negative side of the circuit to L105. As the result, tape is immediately paid out from the supply reel without being wound on the take-up reel. (This allows the tape break switch S108 to open and thereby disable the sensing circuit described in subparagraph 4.2.6; however, no sensing is necessary in the edit mode.) Contacts 12 and 13 of the edit relay close to energize the capstan solenoid L103. The capstan motor is energized through K105-15, 16, which bypass the now-open contacts 9 and 10 of the tape break relay K107. Contacts 18 and 19 of K105 place an effective short across the delay capacitor C124 to permit rapid discharge with a resulting quick removal of operating voltage from L104 at the time the STOP button is pressed; this causes the supply brake to be applied.

6A4.2.6. Stop

The STOP switch S107 has two functions: one to open the common for the mode-switching-relay coils and the other to operate the sense relays K108 through K110. The sense relays to be energized are determined by the position of the sensing switch S113, which depends on the direction of tape travel.

6A4.2.6.1. Start to Stop

In the start mode, the tape travels forward. Pressing the STOP switch de-energizes the start relay K103 and energizes the reverse sense relay K109. The latter event is insured by the charge on C124 in the brake delay network, which also keeps the brake-shoe solenoids energized during the switching transfer between the two relays. The capacitor discharge is delayed by R121. The sense relay K109 then locks itself in through its own contacts 6, 7 and 12, 13, the sensing switch S113, and normally closed contacts of the rewind and fast forward relays K101 and K102. Meanwhile, the capstan solenoid relay K110 is energized through CR109 and also locked in. In this condition, the brake-shoe solenoid feed circuit is switched from K103-15, 16 to K109-12, 13; the normal run voltage is removed from both torque motors; full line voltage is applied to the supply motor, and holdback voltage is applied to the take-up motor. (See figure 6A-3 or 8-8.) The capstan solenoid relay contacts 9 and 10 and the start relay contacts 8 and 9 energize the head shield solenoid L101, while the start relay contacts 9 and 10 and capstan solenoid relay contacts 5 and 6 de-energize the capstan solenoid L103. Contacts 21 and 22 of K110 close to discharge the start torque charging capacitor C122 immediately. As soon as the direction of tape travel is reversed, the sensing switch moves to the opposite position and thus breaks the sensing-relay holding circuit at K109-6, 7. This applies the brake shoes by de-energizing the brake shoe solenoids and brings the tape transport to rest. The tape stop obtained from the use of the STOP switch is smooth, and the reverse tape travel needed to reverse the sensing switch is quite small.

6A4.2.6.2. Rewind to Stop

When in the rewind mode, the relay K101 is de-energized by the use of the STOP switch S107, the rewind relay interlock contacts 8 and 9 return to their normally closed condition and allow the sensing circuit to pass a pulse of current from C124 through the back contacts of the STOP button switch S107. Since the tape motion at this time is in the reverse direction, the forward sensing relay K108 is energized and locks itself in through its own contacts 6, 7 and 12, 13 and the sensing switch S113. Thereafter the circuit events are the similar to those described in subparagraph 6A4.2.6.1. However, the capstan solenoid relay K110 is energized via CR108, the rewind relay removes the full line voltage from the supply motor, and the forward sensing relay applies full line voltage to the take-up motor. The brakes are applied and the tape transport rests when S113 breaks the circuit to K108 at the time the tape begins to move in the opposite direction. While the holding circuit is actuated, the tape lift solenoid L102 is kept energized by the switching transfer from K101-12, 13 to K108-12, 13, since the tape lift microswitch S112 is closed at this time. (See subparagraph 6A4.2.3.1.) When the tape motion stops, the tape lift microswitch returns to its home position.

6A4.2.6.3. Fast Forward to Stop

In this case, the action is the same as described for Rewind to Stop in sub-paragraph 6A4.2.6.2. above, except that the fast forward relay K102 and reverse sense relay K109 are substituted for K101 and K108, the voltage switching actions at the motors are interchanged, and the tape motions are in opposite directions.

6A4. 2. 6. 4. Fast Forward or Rewind-Stop-Rewind or Fast Forward

Switching to the rewind or fast forward mode after the STOP button has been pressed is possible because the rewind or fast forward interlocking contacts (8 and 9) will open and disconnect the sensing relay circuit and return the equipment to a normal winding mode.

6A4. 2. 6. 5. Winding Mode to Start Mode

To switch the machine from either winding mode to the start mode, it is only necessary to press the STOP button and then the START button. This may be done in rapid succession because the machine will first come to a stop as previously described (subparagraphs 6A4. 2. 6. 2 and 6A4. 2. 6. 3.) and then will immediately operate in the start mode. When the START button is pressed while the tape is still in motion, the start relay is energized before the stop cycle has been completed. In this case, the head shield solenoid remains energized through the capstan solenoid relay contacts K110-9, 10, the tape lift solenoid remains energized through K110-12, 13 and S112, and the capstan solenoid is kept de-energized by K110-5,6 until the sensing relays are normalized by the tape controlled action of S113. Meanwhile, contacts 14 and 15 of K108 or K109 keep the start torque relay disabled. When the sensing relays are normalized, the sense holding circuit is opened and operation begins in the start mode as described in subparagraph 6A4. 2. 2. At that time, the capstan solenoid relay K110 releases the head shield solenoid L101 and tape lift solenoid L102, energizes the capstan solenoid L103, and removes the effective short from C122 and R116. Simultaneously, the sensing circuit closes the negative side of the current path to the coil of the start torque relay K106, and, since the start holding circuit is already closed, full line voltage is momentarily applied to the take-up motor.

MECHANICAL TROUBLESHOOTING

If the tape transport in the Model 280 with Motion Sensing fails to stop when the STOP button is pressed, readjust the motion sensor S113 and check continuity through this switch (fig. 6A-4). Readjust or replace, as necessary. For other mechanical troubleshooting suggestions, see table II in section 4 of this manual.

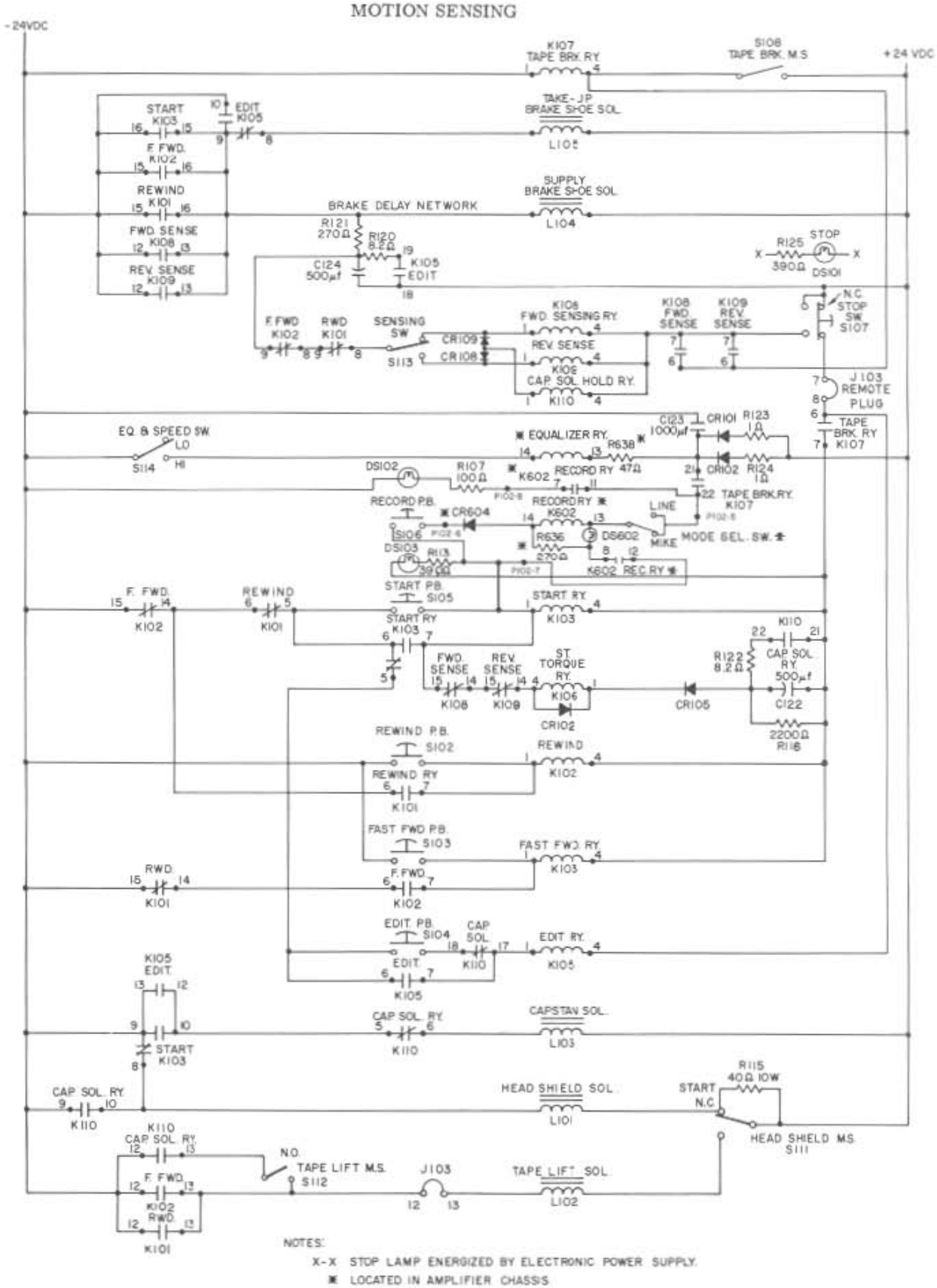


Figure 6A-5. Model 280 with Motion Sensing, DC Circuits - Simplified

SECTION 6B

MODEL 280/SP-14

6B1.1 DESCRIPTION

The Model 280/SP-14 Recorder/Reproducer is similar to the basic Model 280 covered in sections 1 through 5 of this manual, differing only in reel sizes and the improved control of tape tension. Early Model 280/SP-14 equipments are designed for 14- and 10-1/2-inch tape reels only, but later versions also accommodate 7-inch reels. In the latest versions, supply reels and takeup reels of unequal sizes can be employed in any mode of operation.

The following paragraphs cover the differences between the Model 280/SP-14 and the basic Model 280, and correspond with the similarly numbered paragraphs in sections 1 - 5. For equipments without motion sensing, all other paragraphs in sections 1 - 5 are completely applicable to the Model 280/SP-14, but figure 8-9 in the Reference Drawings section should be used in lieu of figure 8-7. For equipments with motion sensing, additional differences are covered in section 6A, and figure 8-10 in the Reference Drawings section should be used in lieu of figure 8-7.

6B3.2 CONTROLS AND INDICATORS

The REEL tension-selector switches (S109, S110) on the tape deck of the Model 280/SP-14 are three-position switches that permit individual adjustments for 7-, 10-1/2-, and 14-inch reels. Any combination of reels may be used if the operating steps in paragraph 6B3.3 below are performed.

6B3.3 OPERATING PROCEDURE

a. Set REEL switches to the correct positions for the reels actually on the machine. Example:

14-inch supply reel - Set to HI.
(10-1/2-inch supply reel - Set to midposition)
7-inch takeup reel - Set to LO.

b. Do not change these settings while tape is in motion.

c. When operating in the Fast Forward or Rewind mode and using dissimilar reels, braking must be accomplished by dynamic means before the STOP button is pressed. If in Fast Forward, slow-down the tape by pressing REWIND; then, when the motion is almost stopped, press the STOP button. If in Rewind, slow-down the tape by pressing F. FWD; then, when the motion is almost stopped, press the STOP button.

NOTE

If the 280/SP-14 is equipped with motion-sensing provisions, you may disregard step c above and go to STOP immediately from either the Fast Forward or Rewind mode.

6B4. TAPE TRANSPORT

The control system (figure 8-9 or 8-10) has all of the elements necessary to insure proper tape tension in all modes of operation. (See also the simplified diagrams, figures 6B-1 and 6B-2.) 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 (7- and 10-1/2-inch reels) or 70 volts AC (14-inch reels). In either of the fast modes, the torque motor acting as supply operates under reduced voltage (35 volts AC); meanwhile the motor acting as takeup receives full line voltage (115 volts AC) from the power supply for the 14-inch or 10-1/2-inch REEL switch position (HI or MED) or 70 volts AC from the power supply for the 7-inch REEL switch position (LO).

NOTE

Early Model 280/SP-14 equipments have two-position tension selector switches.

The START pushbutton S105 is used to start the movement of the tape for a Record or Playback operation of the machine. This switch energizes the start relay K103, which then locks itself in through its own contacts 6, 7. (See figure 6-B1.) Meanwhile the following other events take place:

The brake shoe solenoids L104 and L105 are energized through K103-15, 16 and remove braking friction from the takeup and supply drives.

The capstan solenoid L103 is energized through K103-9, 10 and engages the capstan pressure roller.

The start torque relay K106 is momentarily energized but drops out when C122 becomes charged. Here the charging time constant is determined by C122 and R116. This action briefly applies full line voltage to the takeup motor via K106-18, 19, thus overcoming the inertia of the takeup reel.

The head shield solenoid L101 is deenergized by the opening of the normally closed start relay contacts 8, 9, and, as the result, the shield is released and mechanically springs upward while the head-shield microswitch S111 returns to its original position. In this condition, S111 disconnects the positive side of the circuit to L102 and shorts out the limiting resistor R115 on the positive side of L101.

When the REWIND switch S102 is actuated, K101 is energized and holds in through its own contacts 6, 7 and the normally closed contacts of the STOP switch. High torque is then applied to the supply motor through K101-21, 22 and the REEL tension selector switch S109. For the HI (14-inch) and MED (10-1/2-inch) positions, full line voltage is present. For the LO (7-inch) position, 70 volts AC is applied. Low torque (35 volts AC) is applied to the takeup motor via K101-18, 19. The brakes are released when the solenoids L104 and L105 are energized through K101-15, 16.

When the F. FWD switch S103 is actuated, K102 is energized and holds in through its own contacts 6, 7 and the normally closed contacts of the STOP switch. High torque is applied to the takeup motor through K102-18, 19 and the REEL tension selector switch S110. For the HI (14-inch) and MED (10-1/2-inch) positions, full line voltage is present. For the LO (7-inch) position, 70 volts AC is applied. Low torque (35 volts AC) is applied to the takeup motor via K101-18, 19. The brakes are released when the brake solenoids L104 and L105 are energized through K102.

NOTE

A pair of plastic wind guards is supplied for use with 14-inch reels when fast rewind would otherwise cause an irregular tape pack. Install guards either above or below the reels.

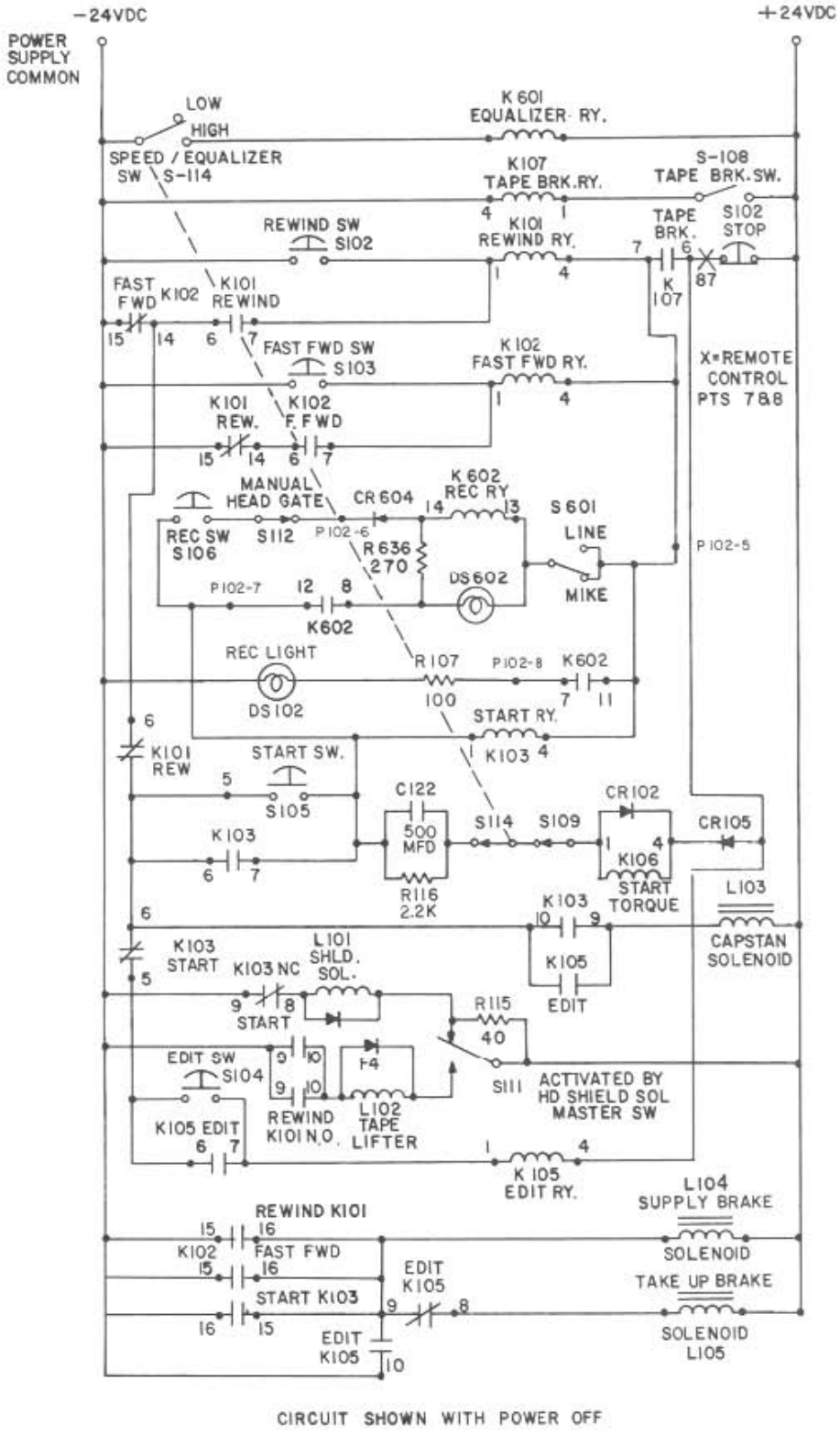
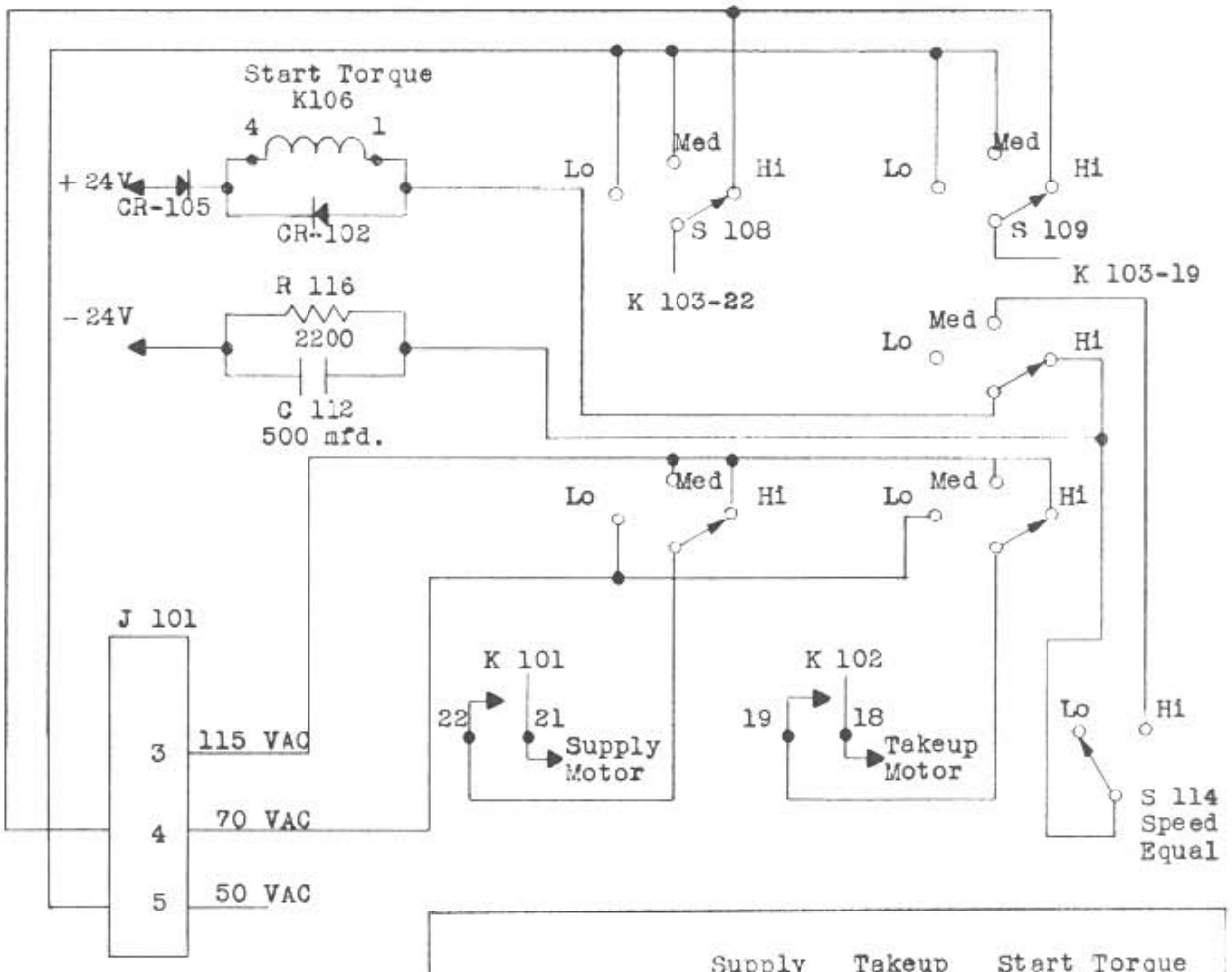


Figure 6B-1. Model 280/SP-14 DC Control Circuits - Simplified



			Supply	Takeup	Start Torque
PB	7"	Lo	50V	50V	No
	7"	Hi	50V	50V	No
	10"	Lo	50V	50V	No
	10"	Hi	50V	50V	Yes
	14"	Hi	70V	70V	Yes
	14"	Hi	70V	70V	Yes
Fast Fwd.	7"	Hi/Lo	35V	70V	No
	10"	Hi/Lo	35V	110V	No
	14"	Hi/Lo	35V	110V	No
Rewind	7"	Hi/Lo	70V	35V	No
	10"	Hi/Lo	110V	35V	No
	14"	Hi/Lo	110V	35V	No

Figure 6B-2. Model 280/SP-14 Tension Control Circuit - Simplified

SECTION 6C

MODEL 275 SERIES REPRODUCER

6C1.1 DESCRIPTION

The Model 275 Series Reproducer is a high quality playback machine for use in recording studios, broadcast stations, and other applications requiring exacting performance specifications.

The tape transport is similar to that of the Model 280 covered in sections 1 - 5 of this manual except that there are no Record facilities. The Model 275 can be obtained with manual or automatic head shields and tape lifters. Playback head configurations and tape speeds are identical to the Model 280.

The electronics assembly of the Model 275, like that of the Model 280, is mounted on a 3-1/2 x 19-inch panel. It contains preamplifiers and power amplifiers, is fully transistorized, and differs from the electronics assembly of the Model 280 chiefly in the absence of recording circuits.

The following paragraphs cover the difference between the Model 275 and the Model 280, and generally correspond with the similarly numbered paragraphs in sections 1 - 5 of this manual. Except for these differences, the instructions in sections 1 - 5 apply equally to the Model 275, but the following figures in the Reference Drawings section should be used in lieu of those listed opposite (below):

For Model 275 See	In Lieu of:
Figure 8-11	Figure 8-7
Figure 8-14	Figure 8-12
Figure 8-15	Figure 8-13
Figure 8-17	Figure 8-16

6C1.2 TECHNICAL SUMMARY

For the Model 275 tape transport, the technical summary in section 1, paragraph 1.2 of this manual is applicable except for the specifications pertaining to reel sizes and the omission of a RECORD control. Reel sizes up to 11-1/2 inches (rather than 11-1/8 inches) are accommodated in the standard Model 275 tape transport. (Fourteen-inch reel accommodations can be obtained on special order.) For other specifications, the following list is substituted for the Model 275:

TAPE TRANSPORT CONTROLS: Power on and off, monitor, individual reel size switches, rewind, fast forward, stop, start, speed change switch, edit, gain.

PREAMPLIFIER ADJUSTMENTS (located on rear of chassis): Playback high frequency equalization, preamplifier gain.

PREAMPLIFIER DISTORTION: Less than 0.5% total harmonic distortion at +18 dbm.

MAXIMUM PREAMPLIFIER OUTPUT: +18 dbm.

PREAMPLIFIER OUTPUT IMPEDANCE: 600 ohms.

POWER AMPLIFIER ADJUSTMENTS: (Located with tape transport controls).

POWER AMPLIFIER DISTORTION: 1% total harmonic distortion at rated output.

POWER AMPLIFIER OUTPUT: 3 Watts into 8 or 16 ohms.

POWER REQUIREMENTS: 117 Volts AC 50/60 cycles, 275 watts.

6C2.3. CABLE INTERCONNECTION

For mono units, the interconnecting cable consists of the amplifier power section and the magnetic head section. In the two-channel equipment, the cable consists of the requisite power and head sections. Before assembling the units, consult the interconnecting diagram (figure 6C-1) for the proper installation of cables.

Connect the small plug to the relay panel under the tape transport and the large 16-pin connector to the back of the amplifier. In multichannel units the 16-pin connectors are marked channel 1, 2, etc. to mate with their respective amplifiers, which are similarly identified.

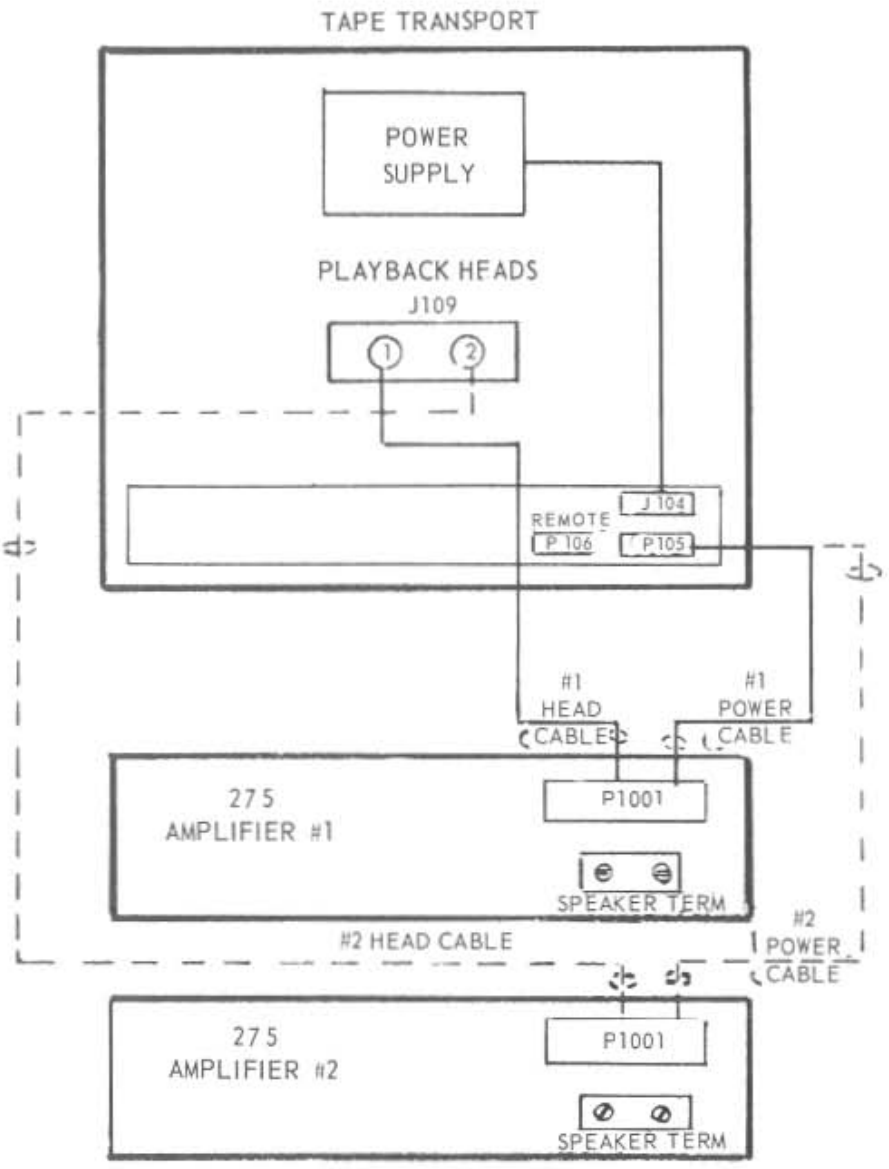


Figure 6C-1. Interconnecting Cabling, Model 275

5C2.6. INPUTS

There are no inputs other than recordings on magnetic tape.

6C3. OPERATING INSTRUCTIONS

The operating controls on the Model 275 are identical to those of the Model 280 with the exception of the omission of the RECORD switch (S106) and Record lamp (DS102). These have been replaced by a recessed monitor jack and a monitor gain control. All other operating instructions in section 3 of this manual are applicable to the Model 275.

6C4. TAPE TRANSPORT

Except for Record functions and the description of the head assembly, the coverage in section 4 of this manual applies to the Model 275. There are no record functions and the head

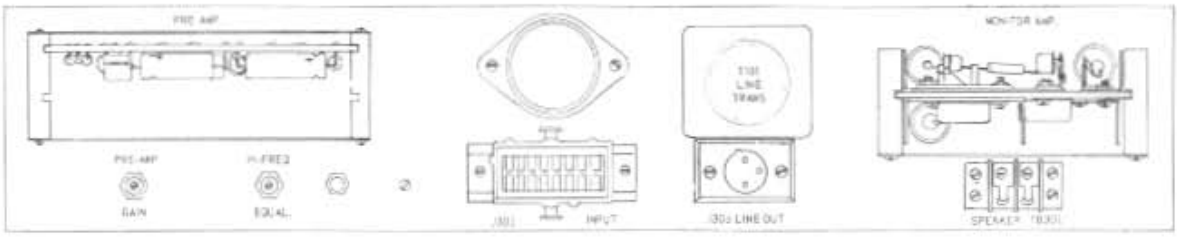


Figure 6C-2. Electronics Assembly Panel, Model 275

assembly is equipped with only one active head, which is used for playback. This playback head is identical to the basic Model 280 playback head described in section 4. Also provided with the Model 275 head assembly are two dummy heads.

6C5.1. ELECTRONICS ASSEMBLY
(See figure 8-14.)

The electronics assembly of the 275 Reproducer is a self-contained 3-1/2" x 19" x 10" deep chassis. Included in this unit are a preamplifier, preamplifier gain, high-frequency equalization adjustment, preamplifier output, interconnecting provisions, and a power amplifier. A maximum preamplifier output of +18 dbm is available from the male XLR connector on the chassis. See figure 6C-2.

6C5.2. PLAYBACK PREAMPLIFIER

The playback preamplifier is a two-section, five-stage audio amplifier. The signal from the playback head, after high-frequency equalization, passes through the first-section stages. These employ local feedback for gain stability, distortion reduction, and playback equalization. The signal then travels from the "preamp gain" control to the second or line section of the amplifier. This portion of the amplifier contains three stages: (1) a grounded emitter stage, (2) an emitter follower to provide a drive for the complementary push-pull output transistors, and (3) an output transformer and feedback network. The signal from the output transformer feeds the LINE OUT jack, the power amplifier, and the headphone monitor.

6C5.3. POWER AMPLIFIER

The power amplifier is a solid-state, plug-in module capable of supplying three watts of power into an 8- or 16-ohm speaker (speaker not provided).

All voltage gain from this amplifier is derived from Q1001. From this point on, the current gain is provided by Q1002 - Q1005, which are connected as a standard symmetrical quasi-complementary output stage. Each of these output transistors is mounted on its own heat sink, thus providing the maximum thermal resistance. With this, the best possible operating-point stabilization at high ambient temperatures results. It should be observed that neither of these heat sinks can be grounded. The upper transistor (Q1002) sink has a DC operating potential of 20-30 VDC. The heat sink of the lower output transistor Q1004 has a voltage equal to one-half that of the other heat sink, Q1002 ±2 VDC.

To insure minimum distortion of low-level signals, the output stage is operated as a class AB amplifier. The quiescent collector current at the output stage is normally 100 to 200 ma. This can be checked by observing a voltage drop of 0.1 to 0.2 volt across the 1-ohm resistor R1001.

SECTION 7

MASTER PARTS LISTS

Figure and Ref	Quantity Per Assembly 1 Ch FT	2 Ch 1/2T	2 Ch 2 T	2 Ch QT	3 Ch	4 Ch	Description	Scully Part No.	Recommended Spares Qty† A	B
8-2							HEAD ASSEMBLIES			
	1						Head assembly, full track	502010000-01		
		1					Head assembly, Single channel 1/2 track	-02		
			1				Head assembly, dual channel, 2 track	-03		
				1			Head assembly, dual channel, quarter track	-04		
					1		Head assembly, three channels	-05		
						1	Head assembly, four channels	-06		
(-15)	1	1	1	1	1	1	Head bridge assembly	502010100		
-13	2	2	2	2			Guide, carbide tape 1/4 inch	502010102-01		2
					2	2	Guide, carbide tape 1/2 inch	502010104-01		
	3	3	3	3	3	3	Screw, machine, 8-32 x 1/2 (fh)	051181625		
-2	6	6	6	6	6	6	Screw, azimuth adj., 6-32 x 1/4	051150825		
-4	6	6	6	6	6	6	Screw, zenith adj., 6-32 x 1/4	051150865		
	3	3	3	3	3	3	Screw, button head, 10/32 x 3/8	051221295		
-9	1	1	1	1	1	1	Housing, co-netic	502010108		
-7	1	1	1	1	1	1	Filter, ATL scrape	502010300-01		1
	2	2	2	2	2	2	Bearing, scrape filter	080073118		

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e. g. , overseas installations).

Figure and Ref	Quantity Per Assembly						Description	Scully Part No.	Recommended Spares Qty†	
	1 Ch FT	2 Ch 1/2T	2 Ch 2 T	2 Ch QT	3 Ch	4 Ch			A	B
							HEAD STACK ASSEMBLIES			
-3	1						Erase, full track	502230000-01		
		1					Erase, 1/2 track	-02		
			1				Erase, 2 track	-03		
				1			Erase, quarter track	-04		
					1		Erase, 3 channel	-05		
						1	Erase, 4 channel	-06		
-6	1						Record, full track	502240000-01		
		1					Record, 1/2 track	-02		
			1				Record, 2 track	-03		
				1			Record, quarter track	-04		
					1		Record, 3 channel	-05		
						1	Record, 4 channel	-06		
-10	1						Playback, full track	502250000-01		
		1					Playback, 1/2 track	-02		
			1				Playback, 2 track	-03		
				1			Playback, quarter track	-04		
					1		Playback, 3 channel	-05		
						1	Playback, 4 channel	-06		
	1	1					Cable, head power, interconnect 1/2 ft.	502140000-01		
			1	1			Cable, head power, two channel	-02		
					1		Cable, head power, three channel	-03		
						1	Cable, head power, four channel	-04		
	3	3	3	3			Connector, head, female (J108-J110)	035020902		1
	3	3	3	3			Connector, head, male (P108-P110)	035010901		1

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	B
4-4		CAPSTAN MOTOR AND CAPSTAN IDLER ASSEMBLY			
-1		Roller assy, pressure, 1/4 in. with cap, shaft, and matched bearings	501050200		1
		Roller, pressure 1/4 in., with matched bearings (service replacement)	501050200-01	1	1
		Roller assy, pressure, 1/2 in. with cap, shaft and matched bearings	502050200		
		Roller pressure, 1/2 in. with matched bearings (service replacement)	502050200-01	1	1
		Pressure roller arm assembly	502050400		
		Bearing, pressure roller	080036225	1	2
		Shaft, pressure roller, 1/4 in.	501050203		
		Shaft, pressure roller, 1/2 in.	502050203		
		Housing, bearing, pressure roller	502050100		
-2		Solenoid assembly	026131518		1
		Spring, return	502050309		
-4		CAPSTAN MOTOR ASSEMBLY			
		3-3/4 - 7-1/2, ips, 60 Hz, Ashland	502050600-01		
		3-3/4 - 7-1/2, ips, 50 Hz, Ashland	-05		
		7-1/2 - 15, ips, 60 Hz, Ashland	-02		1
		7-1/2 - 15, ips, 60 Hz, Bodine	-18		
		7-1/2 - 15, ips, 50 Hz, Ashland	-04		1
		7-1/2 - 15, ips, 50 Hz, Bodine	-17		
		3-3/4 - 7-1/2 - 15 ips, 60 Hz, Beau	-30		
		Flywheel, cast iron	502050003		
		Flywheel, machined	502050005		
		Flywheel, aluminium	501050002		
8-1		TORQUE MOTOR ASSEMBLY	502060000-02		
-1	1	Knob, hold down	046040003		
-2	1	Hub, reel centering	046040004		
-3	1	Reel platform assembly	502060600		
-4	1	Plate, torque motor brake	502060301		
-5	1	Motor, torque	502060100		1
-6	1	Brake disc assembly	502060500		1
-7	1	Brake plate assembly with felts	502060400		2
-8	1	Brake plate solenoid assembly	502060200		1
		Solenoid, brake	026131483	1	1
-9	2	Nut, brake spring adjusting	502060304		
-10	2	Spring, brake	502060303		2
-11	2	Guide, teflon, brake	502060404		4
	2	Connector, motor solenoid	035090213		
-12	4	Connector	035090112		
-13	1	Plunger, brake plate	502060405		1
-14	1	Plunger, felt	502060203		2
		280/SP-14 only:			
		Torque motor assembly (complete)	502060000-03		
		Torque motor assembly less brake assembly	502060100-01		
		Platform, reel, with cork	501060606		
		Scully reel knob assembly less platform and 7" center	501060700		
		Spring for 1/8" ball	501060804		
		7" center assembly	501061000		
		Spring	501061002		2
		Guard, wind, plastic (10-1/2 and 14" reels)	502060800		2

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	B
8-1		REEL STABILIZER ASSEMBLY	502030000-01		
-15	1	Arm, reel stabilizer tension	502030301		
-16	1	Guide, tape 1/4"	501030302		1
-16		Guide, tape 1/2"	502030302		1
-16		Guide assembly, adjustable	502030400		
-17	1	Pulley, reel stabilizer	502030201		
-18	1	Spring, tension	502030102		
-19	1	Collar, spring adjusting	502030103		
-20	1	Shaft, stabilizer	502030202		
-21	1	Bearing, reel stabilizer, top	080075031	1	2
-22	1	Bearing, lower	080031035	1	2
		Collar, bearing	502030503		
-23	1	Retainer, lower bearing, curved	060131031	1	1
-24	1	Retainer, lower bearing, flat	060133031	1	1
-25	1	Flywheel, cast iron	502050003		
8-1		MANUAL TAPE LIFT ASSEMBLY	502010400		
-26		Tape lift toggle assembly	502010400		
-(26)		Spring, leaf	502010504		1
-27		Manual tape lift scrape filter assembly	502010300-01		1
-28		Rod, guide, Pyrex	502010305	1	1
-29		Knob, dress	502010405		
8-5		AUTOMATIC TAPE LIFTER ASSEMBLY			
-1		Knob, tape lifter	502010406-01		
-5		Rod, ATL, glass	502010404-01		
-13		Bumper, felt, large	502010415-01		
-14		Plunger, solenoid	502010413-02		
		ATL solenoid assy with plunger and linkage	502010400-01		
-15		Solenoid (L102) with connector	502010430-01		1
-16, 17		Airpot, tape lifter, with piston	077031250		1
		Switch, (microswitch) (S112)	030202022		
		Bracket, microswitch	502010406-02		
8-4		AUTOMATIC FRONT HEAD SHIELD ASSEMBLY			
-1		Hinge	078011601		
-(1)		Nut, penn	502010605		
-3		Front head shield assy	502010600		
-9		Microswitch assembly	502010700		
-(9)		Switch (microswitch)	030202022		1
		Front shield solenoid assy with plunger and linkage	502010400-02		
-11		Solenoid with connector	502010430-02		1
-12		Airpot with piston	077031250	1	1
		Spring	502010408-02		
8-3		TAPE BREAK ARM ASSEMBLY	502160000		
-1		Arm, tape break	502160101		
-2		Microswitch, tape break	030202011		1
-3		Guide, tape 1/4"	501030302		1
		Guide, tape 1/2"	50203030		1
		Guide, tape adjustable	502030400		
-4		Bearing, sleeve	081003725		
-5		Spring	502030102		
-6		Collar, spring adjustment	502030103		

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	Recommended Spares Qty† B
6A-4		SENSING POST ASSEMBLY	502070000		
		Housing, bottom bearing	504070301		
		Bearing	080073118		2
		Housing, top bearing	504070001		
		Roller	502070201		
		Switch actuating collar	504070302		
		Bumper, felt	504070306		
		Limit screw assembly	504070305		
		Microswitch assembly	504070307	1	1

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Quantity Per Assembly -01	-02	-03	-07	-08	Description	Scully Part No.	Recommended Spares Qty† A	B
8-7 thru 8-11						CONTROL PANEL RELAY CHASSIS			
	1					Relay panel, std 275	502120000-01		
		1				Relay panel, std 280	502120000-02		
			1			Relay panel, std 280/SP-14	-03		
				1		Relay panel, 280/SP-14 with motion sensing	502120000-07		
					1	Relay panel, 280 with sensing	-08		
B101, B103	2	2			2	(See TORQUE MOTOR ASSEMBLY)	502060000-02		
			2	2			-03		
B102	1	1	1	1	1	(See CAPSTAN MOTOR ASSEMBLY)	5020506000		
C101	1	1	1	1	1	Capacitor, 5 mfd	015056126		
C102, C103	2	2			2	Capacitor, 4 mfd, 330 v	015046126		
			2	2		Capacitor, 12.5 mfd, 330v	015127126		
C104-C107, C109, C110-C118, C125-C128	14	14	14	14	14	Capacitor 0.1 mfd	010015177		1
C108	1	1	1	1	1	Capacitor, 0.33 mfd	018335104		
C119, C120, C121	3	3	3	3	3	Capacitor, 2 mfd	014026105		1
C122, C123	1	1	1	2	2	Capacitor, 500 mfd	0121508076		
C124				1	1	Capacitor, 1,000 mfd	012108076		
CR101-CR109	4	4	4	9	9	Diode, F4, 1N2483	028204483		2
DS101, DS102, DS103	1	2	2	3	3	Lamp bulb, indicator, #335	045010335		2
J101	1	1	1	1	1	Connector, power input	035131501		
J102	1	1	1	1	1	Connector, electronics	035021501		
J103	1	1	1			Connector, remote, 9 pin	035020902		
				1	1	Connector, remote, 25 pin	035022501		
J104	1					Monitor, connector	035170101		
K101-K110	6	6	6	9	9	Relay, 6pdt	023130306	1	2
L103						(See PRESSURE ROLLER ASSEMBLY)	502050200		
L104, 105						(See TORQUE MOTOR ASSEMBLY)	502060000		
P103	1	1	1			Plug (dummy replacement for remote control), 9 pin	502120501		
				1	1	Plug (dummy replacement for remote control), 25 pin	502120502		
P104						Plug, dummy inverter input	502120600		
R101-R104, R106-R109, R117-R119	6	7	7	11	11	Resistor, 100 ohms	001101024		
R105	1	1	1	1	1	Resistor 2 ohms, ww	002020064		
R110	1	1	1	1	1	Resistor, 5 ohms, 5w	002050064		
R111, R112	2	2	2	2	2	Resistor, 56 ohms	001560024		
R113, R126	2	2	2	2	2	Resistor, 220 ohms	001221024		
R114	1	1	1	1	1	Resistor, 10K	001103024		
R115		1	1	1	1	Resistor, 40 ohms, 5w	002400085		
R116	1	1	1	1	1	Resistor, 2,200 ohms	001222024		
R120, R122				2	2	Resistor, 8.2 ohms	001829024		
R121				1	1	Resistor, 270 ohms, 2w	001271044		
R123, R124				2	2	Resistor, 1 ohm	002010033		
R125	1	1	1	1	1	Resistor, 390 ohms, 1w	001391034		
R130	1					Potentiometer	009502034		
S101	1	1	1	1	1	Switch, power	030104041		1
S102, S103, S104, S105	4	4	4	3	3	Switch, pushbutton (unilluminated)	030203021		1

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Quantity Per Assembly -01	-02	-03	-07	-08	Description	Scully Part No.	Recommended Spares Qty† A	B
S105, S106, S107	1	2	2	3	3	Switch, pushbutton (illuminated)	030203023		1
S108	1	1	1	1	1	Switch, tape break	030202011		1
S109, S110	2	2			2	Switch, tension	030104021		
S109			1	1		Switch, tension (280/SP-14 only)	030104072		1
S110			1	1		Switch, tension (280/SP-14 only)	030104073		
S114		1	1			Switch, speed equalization (2 spd)	030104061		1
	1			1	1	Switch, speed equalization (2 spd)	030104063	1	1
						Switch, speed equalization (3 spd)	030104072		
S111, S112		1	1	2	2	Switch (microswitch)	030202022		1
S113				1	1	Switch (microswitch) (motion sensor)	504070307		1
	0	1	1	1	1	Pushbutton, red	046030039		
	2	2	2	2	2	Pushbutton, blue	046030074		
	1	1	1	1	1	Pushbutton, white	046030040		
	1	1	1	1	1	Pushbutton, green	046030075		
	1	1	1	1	1	Pushbutton, yellow	046030073		
	1	1	1	1	1	Cover, head, metal	502010001		
						Spacer	502000102		
	1	1	1	1	1	Panel, dress, front horizontal lettering	502010800-01		
	1	1	1	1	1	Panel, dress, front vertical lettering	-02		
	4	4	4	4	4	Knob, selector	046010004		

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	Recommended Spares Qty† B
		POWER SUPPLY	502100000		
C201-C203		Capacitor 1,000 mfd	012019076		
CR201-CR204		Diode, 1N1342A	028207342	1	2
F201, F203		Fuse, line, electronics, 3 amp	048010103	2	2
F202		Fuse, relay, 5 amp	048010105	1	1
R201		Resistor 1 ohm, 10 w	002010084		
T201		Transformer (AC supply)	020100001		1
T202		Transformer (DC supply)	020100002		1
	1	Ac power cord assembly	502100500		1
8-14, 8-15		PLAYBACK AMPLIFIER ASSEMBLY††	503110001		
	1	Card, preamplifier, Model 566	501110100		1
	1	Card, power amplifier	505111000		1
C308		Capacitor, 0.068 mfd	018684104		
C319, C320		Capacitor, 1,000 mfd, 50 v	012019076		
C321		Capacitor, 500 mfd, 50 v	012508076		
C323		Capacitor, 10 mfd, 12 v	012017036		
CR301		Diode, Zener, 1N1594	028403594		1
J301		Connector, power input	035021601		
J303		Connector, line output	035080332		
R318		Resistor, 47K, 1/2 w	001470172		
R319		Potentiometer, 1 meg ohm	005104044		
R326		Resistor, 560 ohms, 1/2 w	001561024		
R333		Potentiometer, 10K	005103044		
R334		Resistor, 80 ohms, centertapped, ww	003400064		1
T303		Transformer, output	020304001		
TB301		Terminal strip	035060201		
	1	Cable, interconnect - mono	503140000-01		
	1	Cable, interconnect - 2 track	-02		
	1	Cable, interconnect - 3 track	-03		
	1	Cable, interconnect - 4 track	-04		
8-18	1 (opt)	REMOTE CONTROL, DELUXE †††	504210100-01		
DS401, DS402, DS403		Lamp, indicator, #335	045010335		
P403		Connector, 25-pin	035012501		
R401, R402		Resistor, 220 ohms	001221024		
R403		Resistor, 100 ohms	001101024		
S402-S404		Switch (fast forward, rewind, and ATL)	030203021		1
S405, S407		Switch (STOP, START)	030203041		1
S406		Switch (record)	030203023		
	1	Cover, connector	033031212		
	1	Lens, white	046030040		
	1	Lens, green	046030075		
	2	Lens, blue	046030074		
	1	Lens, yellow	046030073		
	1	Lens, red	046030039		

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

†† Part of Electronics Assembly, Scully part no. 503110001. (Model 275)

††† Used with motion sense control units (-07, -08) only.

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	B
8-12, 8-13		ELECTRONICS ASSEMBLY			
	1 ††	Chassis, electronics (non-sync):			
		NAB 3-3/4 - 7-1/2	502110000-01		
		NAB 7-1/2 - 15	-02		
		NAB 15 - 30	-03		
		CCIR 3-3/4 - 7-1/2	-04		
		CCIR 7-1/2 - 15	-05		
		CCIR 15 - 30	-06		
		NAB 3-3/4 - 7-1/2 - 15	-08		
		CCIR 3-3/4 - 7-1/2 - 15	-09		
		Chassis, electronics (with standard sync):			
		NAB 3-3/4 - 7-1/2	502110000-11		
		NAB 7-1/2 - 15	-12		
		NAB 15 - 30	-13		
		CCIR 3-3/4 - 7-1/2	-14		
		CCIR 7-1/2 - 15	-15		
		CCIR 15 - 30	-16		
		NAB 3-3/4 - 7-1/2 - 15	-18		
		CCIR 3-3/4 - 7-1/2 - 15	-19		
	1	Card, record	502110800		1
	1	Card, bias	502110700		1
	1	Card, playback	502111000		1
C601		Capacitor, 0.002 mfd	010023175		
C602		Capacitor, 0.0068 mfd	018683104		
C603, C642		Capacitor, 0.01 mfd	018014153		
C604		Capacitor, 2 mfd	014026105		
C605		Capacitor, 0.01 mfd	011014104		
C606, C633, C641		Capacitor, 0.068 mfd	018684104		
C608, C609, C611, C613		Capacitor, (part of T605)	502111500		
C610		Capacitor, 0.27 mfd	018275104		
C612		Capacitor, 0.047 mfd	018474104		
C614		Capacitor, 0.001 mfd	010013175		
C617		Capacitor, trimmer 800-2300 mmfd	017803106		
C618		Capacitor, 0.02 mfd	010025067		
C619, C620		Capacitor, 1,000 mfd, 50 v	012019078		
C623		Capacitor, 250 mfd, 25 v	012258076		
C632		Capacitor, 0.0015 mfd	011153104		
CR603		Diode, Zener, VR18A	028402018		1
CR604		Diode, F4, 1N2483	028204483		1
DS601, DS602		Lamp, indicator, #1828	045011828	2	2
		Record light assy	045050604		
J601, J602		Connector, input	035080331		
J603		Connector, output	035080332		
J604		Connector, monitor	035170101		
J605		Connector, power/signal	035023201		
J606, J608		Connector, rec, PB.	035152201		
J607		Connector, bias	035151501		
K601, K602, K603		Relay, record equalization	023130304		1
	3	Socket, relay	035021401		
L602		Coil, 820 uhy	021020143		
L603		Coil, 270 uhy	021020137		
L604		Coil, 500 uhy	021020114		
M601		Meter, VU	044000001		
Q601		Transistor, 2N2869	027286901		1
R602		Potentiometer, 5K/2.5K (Record level)	007252502		1
R603, R604		(See T605)			
R605		Resistor, 6.8K, 1/2 w	001682024		
R606, R607, R629		Potentiometer, 10K	006203025		
R608, R627		Potentiometer, 5K	006502025		
R610, R611		Potentiometer, 1K	006102025		

†† Non-Sync amplifiers may be modified to standard sync by means of Sync Kit, Cat. 502110502.

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	Recommended Spares Qty† B
R612		Resistor, 3.6K	001362023		
R613, R614, R654		Resistor, 1K, 1/2 w	001102023		
R615		Resistor, variable (Helipot), 2K	006202034		
R617		Potentiometer, 5K (Playback level)	009502034		
R618		Resistor, 47K, 5%	001470172		
R619		Potentiometer, 1 megohm	006105025		1
R620		Potentiometer, 1K	006102024		
R621, R628		Potentiometer, 200 ohms	006201025		
R622, R633, R638		Resistor, 150 ohms, 1 w	001151034		
R623		Resistor, 20 ohms, ww	002200074		
R624		Resistor, 5 ohms, 8 w	002050074		
R625		Resistor, 180 ohms, 1/2 w	001181024		
R626		Resistor, 470 ohms, 5%, 1/2 w	001471023		
R631		Resistor, 39 ohms	001390024		
R636		Resistor, 270 ohms, 1/2 w, 5%	001271024		
R637		Resistor, 10 ohms, 1/2 w	001100024		
R641, R642		Resistor, 3.3K	001332024		
R652		Resistor, 220 ohms, 5%, 1/2 w	001221023		
R653		Resistor, 220 ohms, 5%, 1/2 w, zinc	001221172		
R656		Resistor, 100 ohms, 1/2 w	001101023		
R657		Resistor, 4.7K (factory selected)	N/A		
S601	1	Switch assembly, mode select	502111700		1
	2	Wafer, switch, 5 pos	034302052	1	
	1	Switch, rotary 5-pos wafer (shorting)	034302051	1	
	1	Shield	502110102		
	1	Detent, switch	036050001		
S602	1	Switch assembly, meter select	502111600		1
	2	Wafer, switch, 4 pos	034302042	1	
	1	Detent, switch	036040001		
S603		Switch, linearity	030203022		
S604		Switch, termination	030104022		
T601		Transformer, microphone	020301001		
T602		Transformer, line	020301002		
T603		Transformer, output	020304001		
T604		Transformer, sync	020305003		
T605		Transformer, bias trap	502111500		
	1	Panel, front	502110101		
	1	Strip, dress	502110103		
	1	Knob (line termination)	046010001		
	2	Knob (mode, meter select)	046010002		
	2	Knob (level control)	046010003		
8-12, 8-13	1	BIAS CARD	502110700		
C701		Capacitor, 680 pf	013682153		
C702		Capacitor, 75 mfd	012757046		
C703, C705		Capacitor, 0.01 mfd	018014153		
C704		Capacitor, 0.1 mfd	010015067		
C706		Capacitor, 0.47 mfd	019475067		
C707, C710		Capacitor, 0.033 mfd	018334104		
C708		Capacitor, 0.0015 mfd	011153104		
C709		Capacitor, 0.015 mfd	018154104		
C711		Capacitor, 0.047 mfd	018474104		
C712		Capacitor, 0.33 mfd	019335067		
C713		Capacitor, 2700 pf, ±5%, mica	013273153		
C714		Capacitor, 22 pf, ±5%, mica	013221153		
C715		Capacitor, 68 pf, ±5%, mica	013681153		
CR701, CR702, CR703		Diode, 1N270	028102270		1
L701		Inductor, 10 mhy	021020156		
L702		Inductor, 10 mhy	021040142		
Q701		Transistor, 2N2102	027210201		1

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	B
Q702		Transistor, 2N2270	027227005		
R701		Resistor, 1K, 1/2 w	001102023		
R702		Resistor, 100 ohms	001101023		
R703		Resistor, 1.2K, 5%, 1/2 w	001122023		
R704		Resistor, 2.7K, 5%, 1/2 w	001272023		
R705		Resistor, 10 ohms, 1 w	001100034		
R706		Resistor, 8.2K, 1/2 w	001822024		
R707		Resistor, 15K, 1/2 w	001153024		
R708		Resistor, 33 ohms	001330024		
R709		Trimpot, 5K	006053026		
T701		Transformer	502110701		
T702		Transformer	502110702		
T703		Transformer	021020315		
		Transipad	025010033		
8-12, 8-13	1	RECORD CARD	502110800		
C801, C803		Capacitor, 25 mfd, 12 v	012257036		
C802, C804, C852		Capacitor, 200 mfd, 3 v	012207006		
C805		Capacitor, 0.01 mfd	011014104		
C806		Capacitor, 50 mfd, 12 v	012507036		
C807. C851, C853, C854		Capacitor, 100 mfd, 12 v	012018036		
C855		Capacitor, 10 mfd, 12 v	012017036		
C856		Capacitor, 1 mfd, 3 v	010016007		
CR801		Transistor, 2N508	027050804		
CR851		Diode, 1N457	028202457		1
Q801, Q853, Q854		Transistor, 2N508	027050804		2
Q802		Transistor, 2N527	027052704		1
L801		Choke, 10,000 µHY	021040142		
R801, R851, R856		Resistor, 4.7K, 1/2 w	001472024		
R802		Resistor, 33K, 1/2 w	001333024		
R803		Resistor, 1.8K, 1/2 w	001182024		
R804		Resistor, 330 ohms, 1/2 w	001331024		
R805, R854		Resistor, 47 ohms, 5%, 1/2 w	001470023		
R806		Resistor, 1.5K, 1/2 w	001152024		
R807		Resistor, 4.7K, 5%, 1/2 w	001472023		
R808		Resistor, 82 ohms, 1/2 w	001820024		
R809		Resistor, 56 ohms, 5%, 1/2 w	001560023		
R810		Resistor, 56 ohms, 1/2 w	001560024		
R811, R813, R853		Resistor, 1K, 1/2 w	001102024		
R812, R814, R855, R860		Resistor, 22K, 1/2 w	001223024		
R857		Resistor, 270 ohms, 5%, 1/2 w	001271023		
R858		Resistor, 1K, 5%, 1/2 w	001102023		
R859, R852		Resistor, 10K, 1/2 w	001103024		
R861		Resistor, 47K, 1/2 w	001473024		
8-12, 8-13	1	PLAYBACK CARD, MODEL 368	502111000		
C901		Capacitor, 10 mfd, 12 v	016017226		
C905		Capacitor, 10 mfd, 12 v	012017036		
C902		Capacitor, 0.01 mfd	010014175		
C903		Capacitor, 470 pfd	010473157		
C904		Capacitor, 25 mfd, 12 v	012257036		
C906, C911		Capacitor, 150 mfd, 3 v	012158006		
C907		Capacitor, 100 mfd, 12 v	012018036		
C909		Capacitor, 0.001 mfd, 100 v	010013175		
C910		Capacitor, 200 mfd, 3 v	012207006		
C912		Capacitor, 0.0033 mfd	010332175		
C913, C914		Capacitor, 50 mfd, 12 v	012507036		
C915, C916		Capacitor, 300 mfd, 3 v	012308006		

† For two recorders/reproducers. Tha A quantites are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

Figure and Ref	Qty Per Assy	Description	Scully Part No.	Recommended Spares Qty† A	B
C917, C918		Capacitor, 0.01 mfd	011014104		
Q901-Q904		Transistor, 2N4250	027425002		1
Q905		Transistor, 2N697	027069704		1
Q906		Transistor, 2N527	027052704		1
R901, R905		Resistor, 1 megohm, 1/2 w, zinc	001105172		
R902		Resistor, 27 ohms, 5%	001270023		
R903		Resistor, 220 ohms, 5%	001221023		
R904		Resistor, 82 ohms, 1/2 w	001820024		
R906		Resistor, 220K, 1/2 w	001224024		
R907		Resistor, 100K, zinc	001104172		
R908		Resistor, 2.7K, 5%	001272023		
R909		Resistor, 1200 ohms, 5%	001122023		
R910		Resistor, 5.6K	001562024		
R911, R912		Resistor, 100K	001104024		
R913		Resistor, 15K	001153024		
R914		Resistor, 47K	001473024		
R915		Resistor, 270 ohms	001271024		
R916		Resistor, 1K	001102024		
R917		Resistor, 4.7K, 5%	001472023		
R918		Resistor, 2.2K	001222024		
R919		Resistor, 47 ohms	001470023		
R920		Resistor, 1.5K	001152024		
R921		Resistor, 2.2K, 5%	001222023		
R922, R927, R928		Resistor, 8.2K, 5%	001822023		
R929, R930		Resistor, 47 ohms	001470024		
R931		Resistor, 220 ohms, zinc	001221172		
8-14, 8-15	1	PREAMPLIFIER MODEL 566 (Used in Model 275 only)	501110100		
C901		Capacitor, 10 mfd, 12 v	016017226		
C902		Capacitor, 0.01 mfd, disc	010014175		
C903, C909		Capacitor, 0.001 mfd, 100 v	010013175		
C904		Capacitor, 25 mfd, 12 v	012257036		
C905, C908		Capacitor, 10 mfd, 12 v	012017036		
C906, C911		Capacitor, 150 mfd, 3 v	012158006		
C907		Capacitor, 100 mfd, 12 v	012018036		
C910		Capacitor, 200 mfd, 3 v	012207006		
C912		Capacitor, 0.0033 mfd	010332175		
C913, C914		Capacitor, 50 mfd, 12 v	012507036		
C915, C916		Capacitor, 300 mfd, 12 v	012308006		
C917, C918		Capacitor, 0.01 mfd	011014104		
Q901, Q902, Q903, Q904		Transistor, 2N4250	027425002		2
Q905		Transistor, 2N697	027069704		1
Q906		Transistor, 2N527	027052704		1
R901, R905		Resistor, 1 megohm, 1/2 w	001105024		
R902		Resistor, 330 ohms, 5%, 1/2 w	001331023		
R903		Resistor, 220 ohms, 5%	001221023		
R904		Resistor, 470 ohms, 1/2 w	001471024		
R906		Resistor, 220K, 1/2 w	001224024		
R907		Resistor, 100K	001104024		
R908		Resistor, 2.7K, 5%, 1/2 w	001272023		
R909		Resistor, 820 ohms, 5%, 1/2 w	001821023		
R910		Resistor, 5.6K	001562024		
R911, R912		Resistor, 100K	001104024		
R913		Resistor, 15K, 1/2 w	001153024		
R914		Resistor, 47K	001473024		
R915		Resistor, 270 ohms	001271024		
R916		Resistor, 1K	001102024		

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

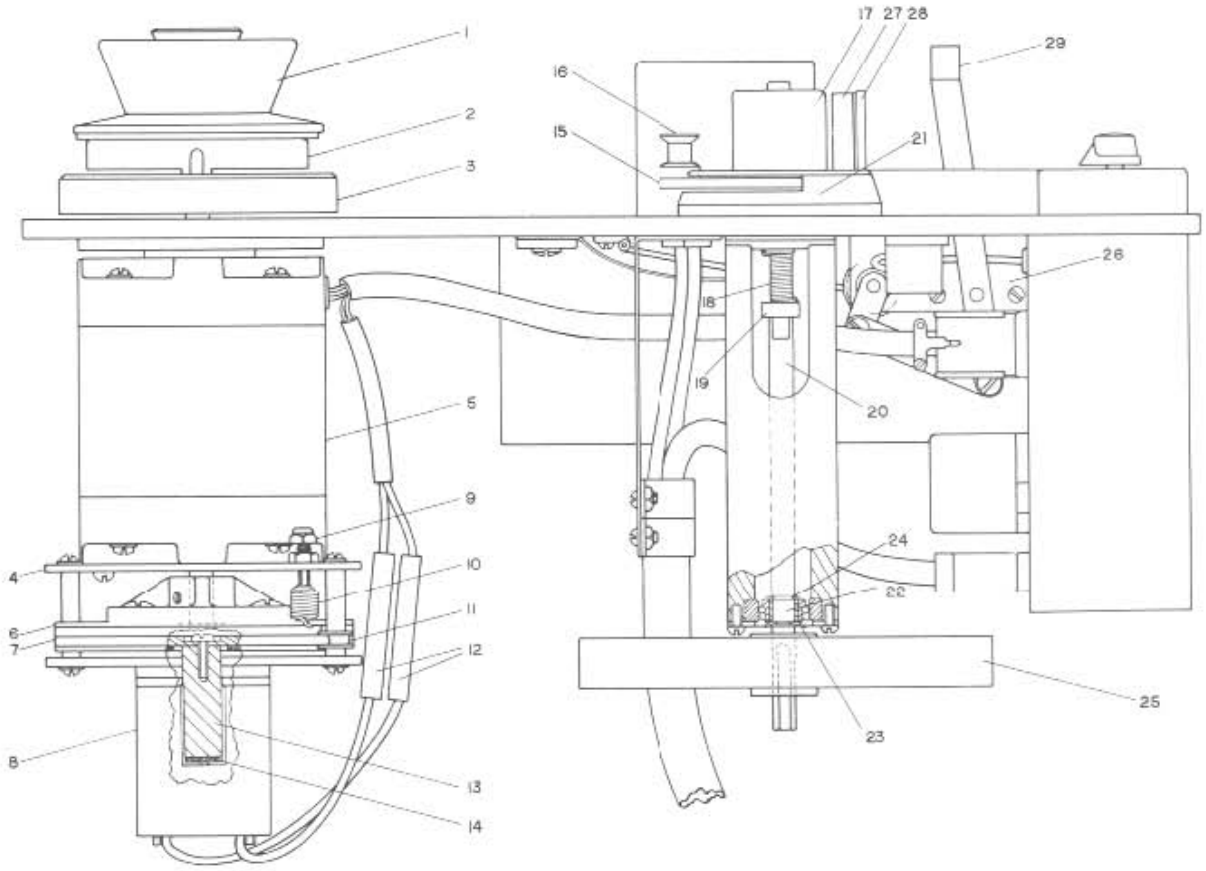
Figure and Ref	Qty Per Assy	Description	Scully Part No	Recommended Spares Qty† A	Recommended Spares Qty† B
R917		Resistor, 4.7K, 5%	001472023		
R918		Resistor, 2.2K	001222024		
R919		Resistor, 47K, 5%	001470023		
R920		Resistor, 1.5K	001152024		
R921		Resistor, 2.2K, 5%	001222023		
R922		Resistor, 8.2K, 5%	001822023		
R923		Resistor, 1.5K, 5%	001152023		
R924, R925		Resistor, 56 ohms, 5%	001560023		
R926		Resistor, 150 ohms	001151024		
R927, R928		Resistor, 8.2K, 5%, 1/2 w	001822023		
R929, R930		Resistor, 47 ohms	001470024		
R931		Resistor, 220 ohms, 5%	001221023		
8-14, 8-15	1	POWER AMPLIFIER (Used in Model 275 only)	505111000		
C1001		Capacitor, 10 mfd, 12 v	012017036		
C1002		Capacitor, 150 mfd, 50 v	012158076		
CR1001		Diode, 1N457	028202457		1
CR1002		Diode, 1N270	028102270		1
CR1003		Diode, F4, 1N2483	028204483		1
R1001, R1004		Resistor, 1 ohm, 1.5 w	002010033		
R1002		Resistor, 220	001221023		
R1003, R1005		Resistor, 2.7K, 5%, 1/2 w	001272023		
R1006		Resistor, 150 ohms, 1/2 w	001151024		
R1007		Resistor, 100 ohms, 1/2 w	001101024		
R1008		Resistor, 1.5K, 1/2 w	001152024		
R1009		Resistor, 10K, 1/2 w	001103024		
R1010		Resistor, 680 ohms, 1/2 w	001681024		
R1011		Resistor, 270 ohms, 1/2 w	001271024		
R1012		Resistor, 33K, 1/2 w	001333024		
Q1001, Q1005		Transistor, 2N527	027052704		1
Q1002, Q1004		Transistor, 2N2147	027214701		1
Q1003		Transistor, 2N2270	027227005		1
		ACCESSORY PARTS			
		Remote control unit (with 20-ft cable)	502210100		
		Remote control unit, deluxe††	504210100-01		
		Extender, playback card	502111400		1
		Extender, record card	502111300		1
		Extender, oscillator card	502111200		1
		Manual, instruction (280, 275)	000502000		
		Oil, lubricating 2-oz, bottle	082000001	1	2
		Alignment tool	061008276		1
		Wrench set, allen	061000605		1
		Case, portable, transport/electronics (2 track)	502500000		
		Case, portable, transport/electronics (4 track)	-01		
		Case, portable, transport only	502500100		
		Case, portable, electronics only	502500200		
		Case, head assy, 1/4 - 1/2"	502700000		

† For two recorders/reproducers. The A quantities are recommended for ordinary support. The B quantities are recommended for heavy support (e.g., overseas installations).

†† Used with motion Sense Control units (-07, -08) only.

SECTION 8

REFERENCE DRAWINGS



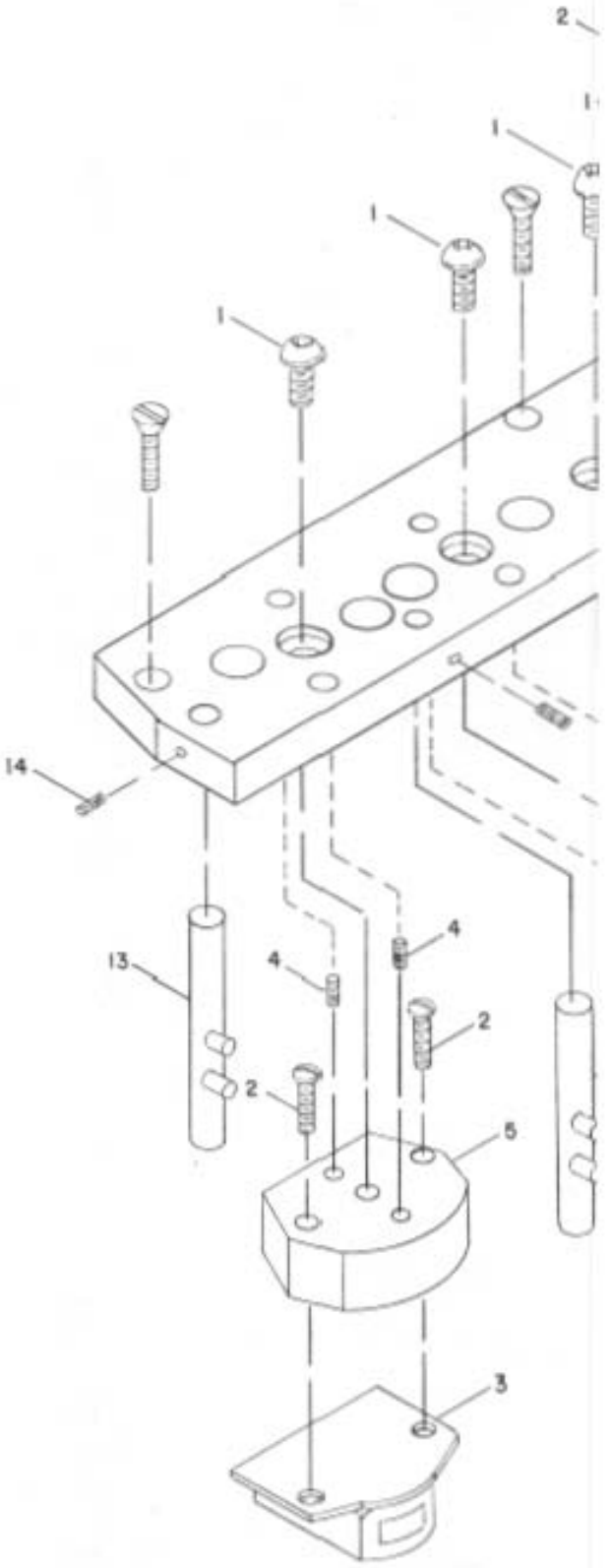
LEGEND

1. Hold down knob
2. Reel centering hub
3. Reel platform assy
4. Torque motor brake plate
5. Torque motor
6. Brake disc assy
7. Brake plate assy
8. Brake plate solenoid assy
9. Brake spring adjustment nut
10. Brake spring
11. Teflon brake guide
12. Motor solenoid connector
13. Brake plate plunger
14. Felt plunger
15. Reel stabilizer tension arm
16. Tape guide, 1/4 inch
17. Reel stabilizer pulley
18. Tension spring
19. Spring adjustment collar
20. Stabilizer shaft
21. Reel stabilizer top bearing
22. Reel stabilizer lower bearing
23. Lower bearing retainer, curved
24. Lower bearing retainer, flat
25. Flywheel, cast iron
26. Tape lift toggle assy
27. Manual tape lifter guide assy
28. Pyrex guide rod
29. Dress knob

Figure 8-1. Side View of Tape Transport

LEGEND

1. Machine screw
2. Machine screw, azimuth adj
3. Erase head stack assy
4. Machine screw, zenith adj
5. Erase or record head mounting sub-plate
6. Record head stack assy
7. Scrape filter assy
9. Co-netic housing
10. Playback head stack assy
11. Playback head mounting sub-plate
13. Carbide tape guide
14. Set screw
15. Head bridge assy top plate



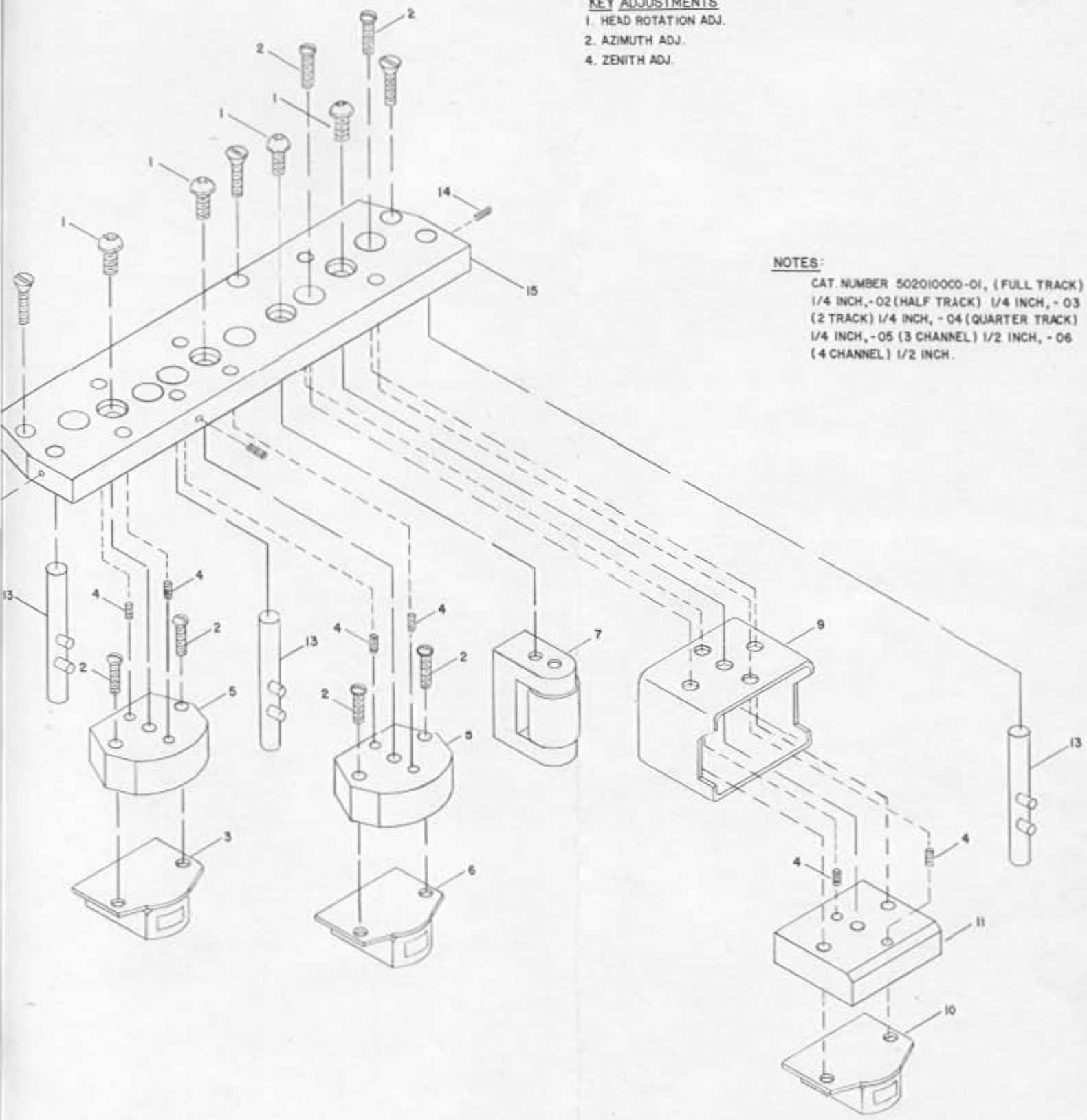
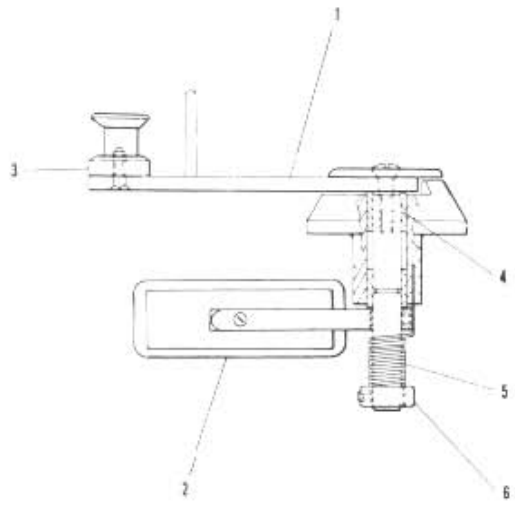


Figure 8-2. Magnetic Head Assembly, Exploded View



LEGEND

1. Tape break arm
2. Tape break microswitch
3. Tape guide, 1/4 inch
4. Sleeve bearing
5. Spring
6. Spring adjusting collar

Figure 8-3. Tape Break Arm Assembly

Automatic Front Shield Assembly

1. Automatic front shield hinge
2. Automatic front shield spring retainer screw
3. Front shield
4. Automatic front shield hinge plate
5. Automatic front shield positioning screw
6. Automatic front shield spring retainer
7. Automatic front shield spring
8. Automatic front shield plunger
9. Automatic front shield micro switch
10. Automatic front shield micro switch mounting plate
11. Automatic front shield solenoid
12. Automatic front shield air pot
13. Automatic front shield air port adjusting valve

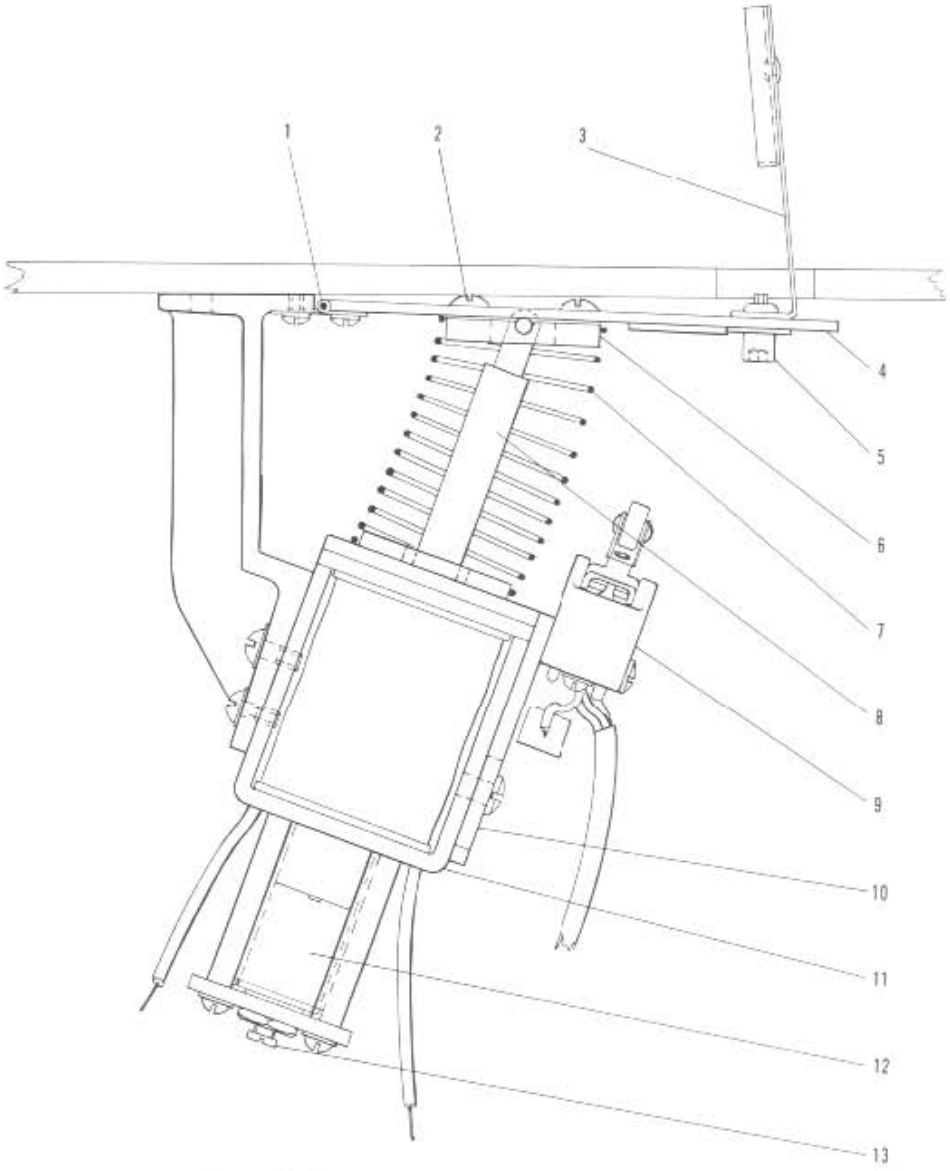


Figure 8-4. Automatic Front Shield Assembly

Automatic Tape Lifter Assembly

1. Automatic tape lifter defeat knob
2. Automatic tape lifter defeat lever
3. Automatic tape lifter defeat lever linkage
4. Automatic tape lifter arm
5. Automatic tape lifter finger
6. Automatic tape lifter bearing housing
7. Automatic tape lifter connecting rod
8. Automatic tape lifter actuating arm
9. Automatic tape lifter compression spring
10. Automatic tape lifter plunger stop
11. Automatic tape lifter small felt pads
12. Automatic tape lifter plunger stop collar
13. Automatic tape lifter large felt pads
14. Automatic tape lifter solenoid plunger
15. Automatic tape lifter solenoid
16. Automatic tape lifter damping piston
17. Automatic tape lifter damping adjustment

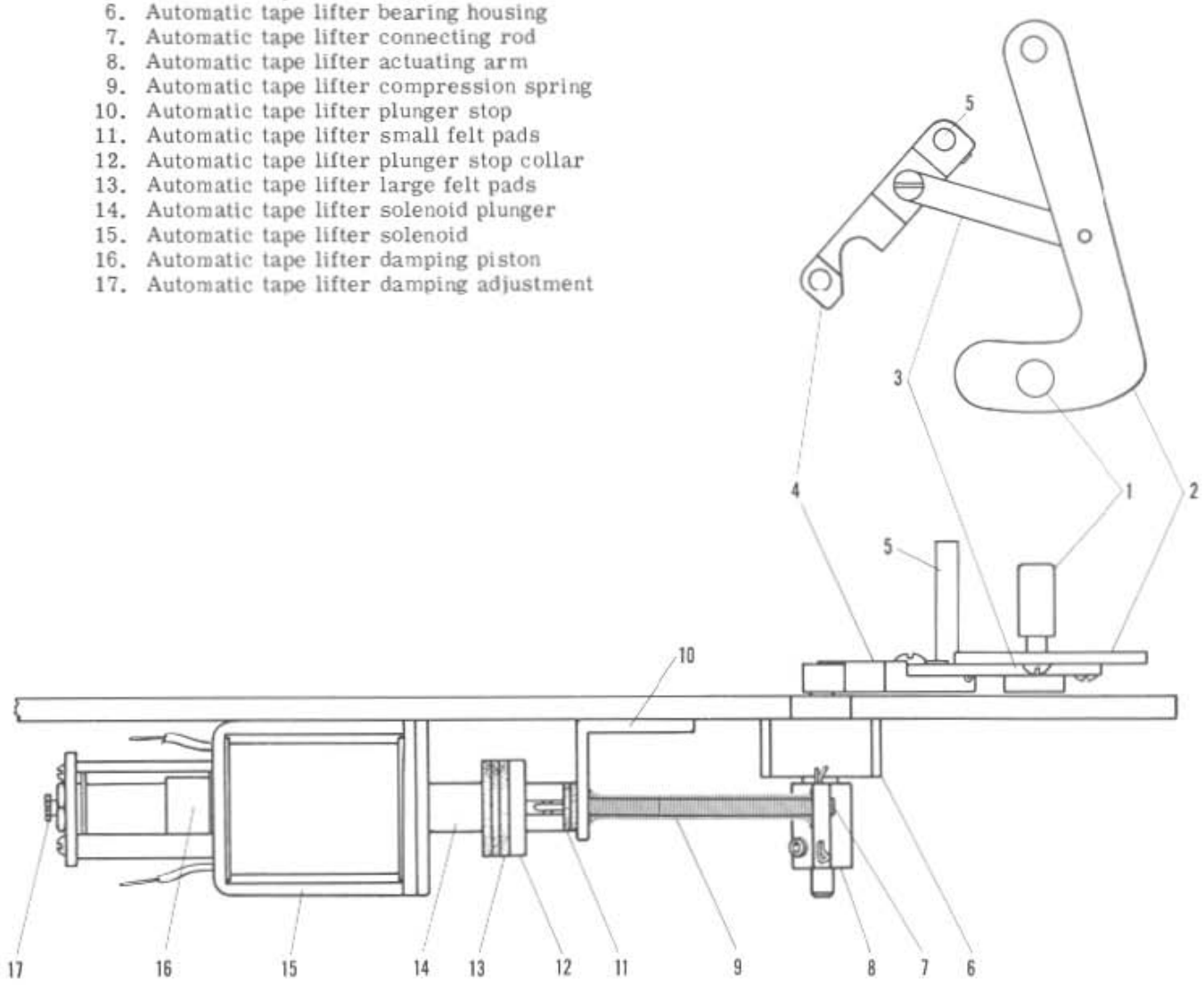


Figure 8-5. Automatic Tape Lifter Assembly

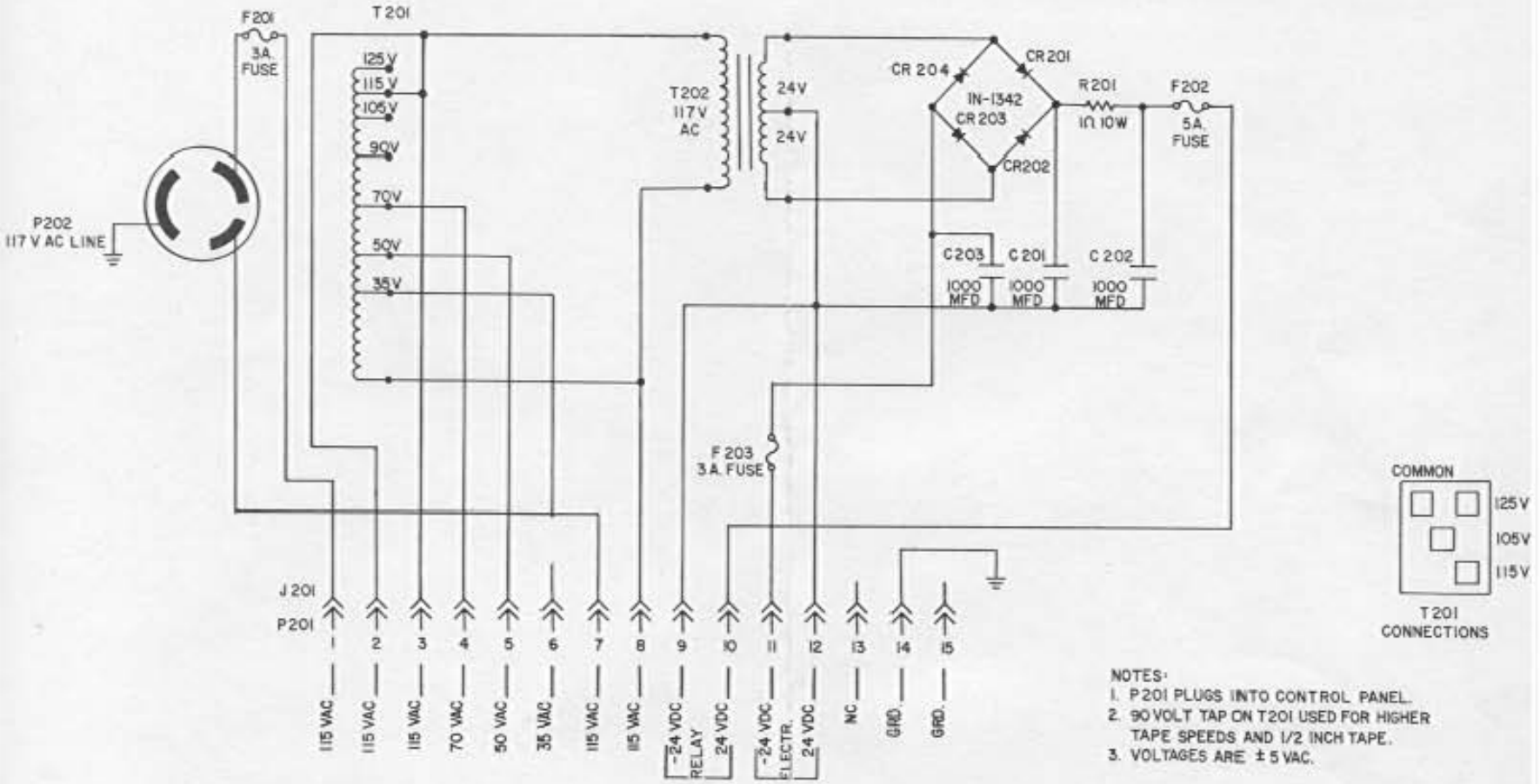
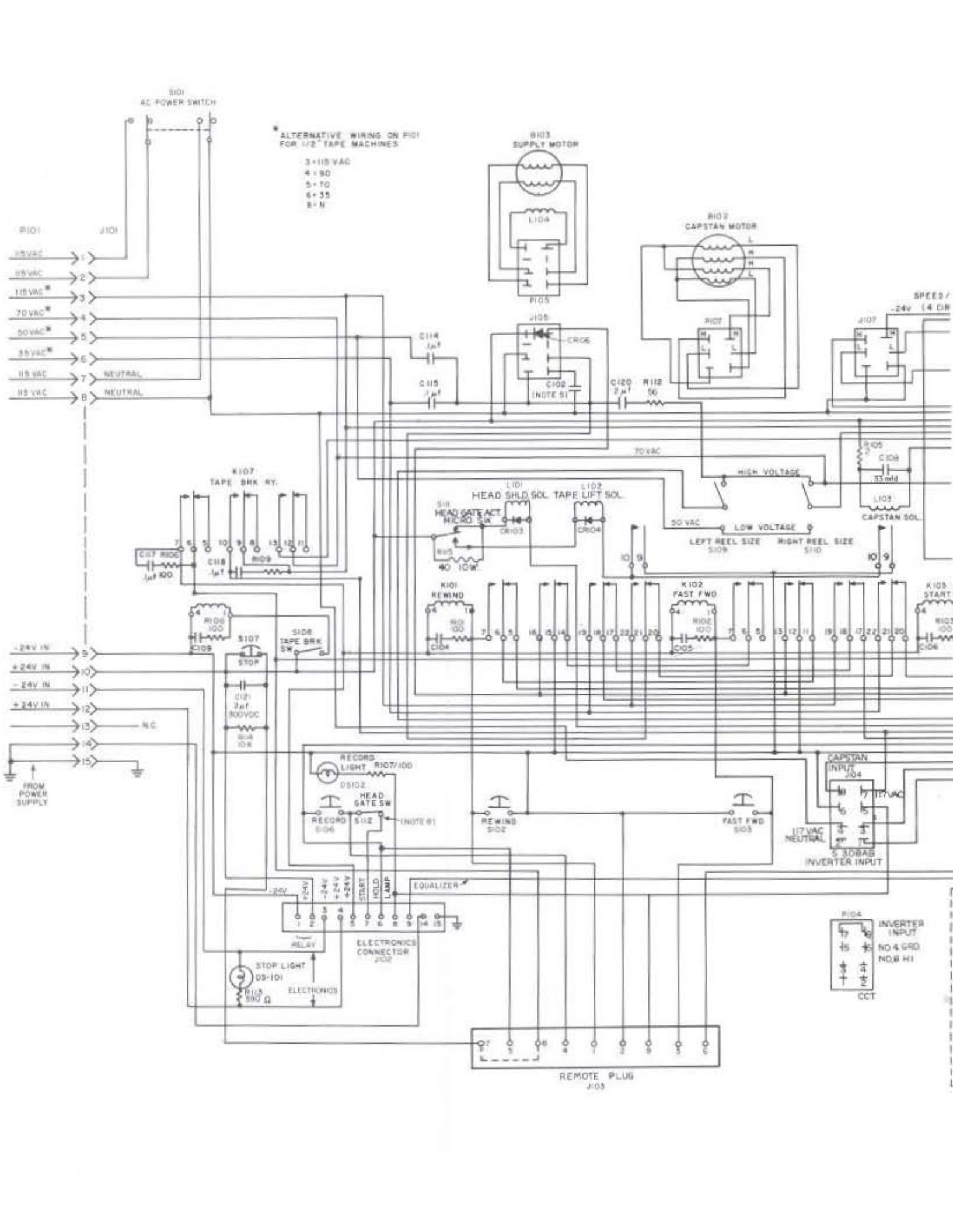
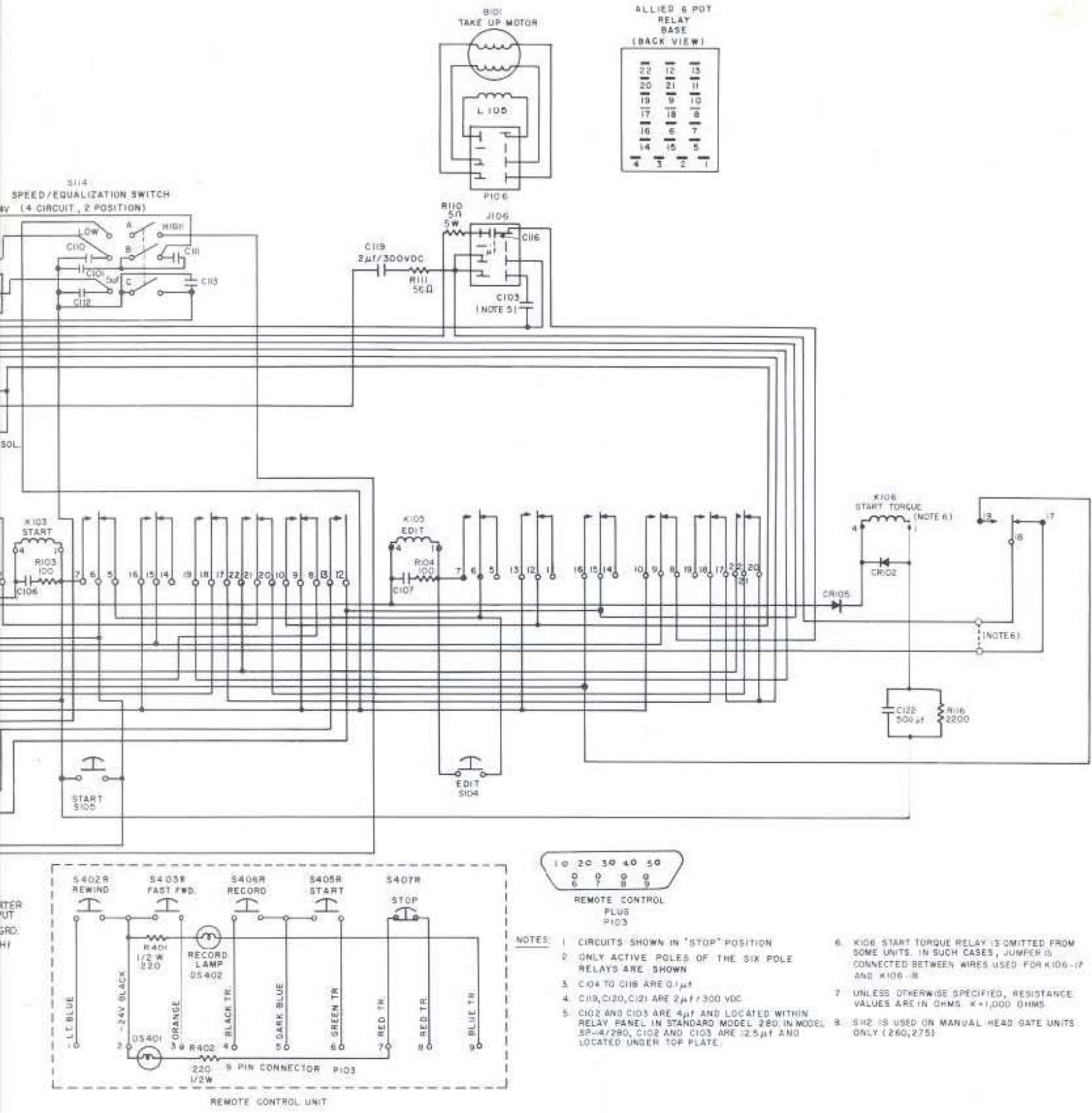


Figure 8-6. Dc Power Supply, Schematic Diagram

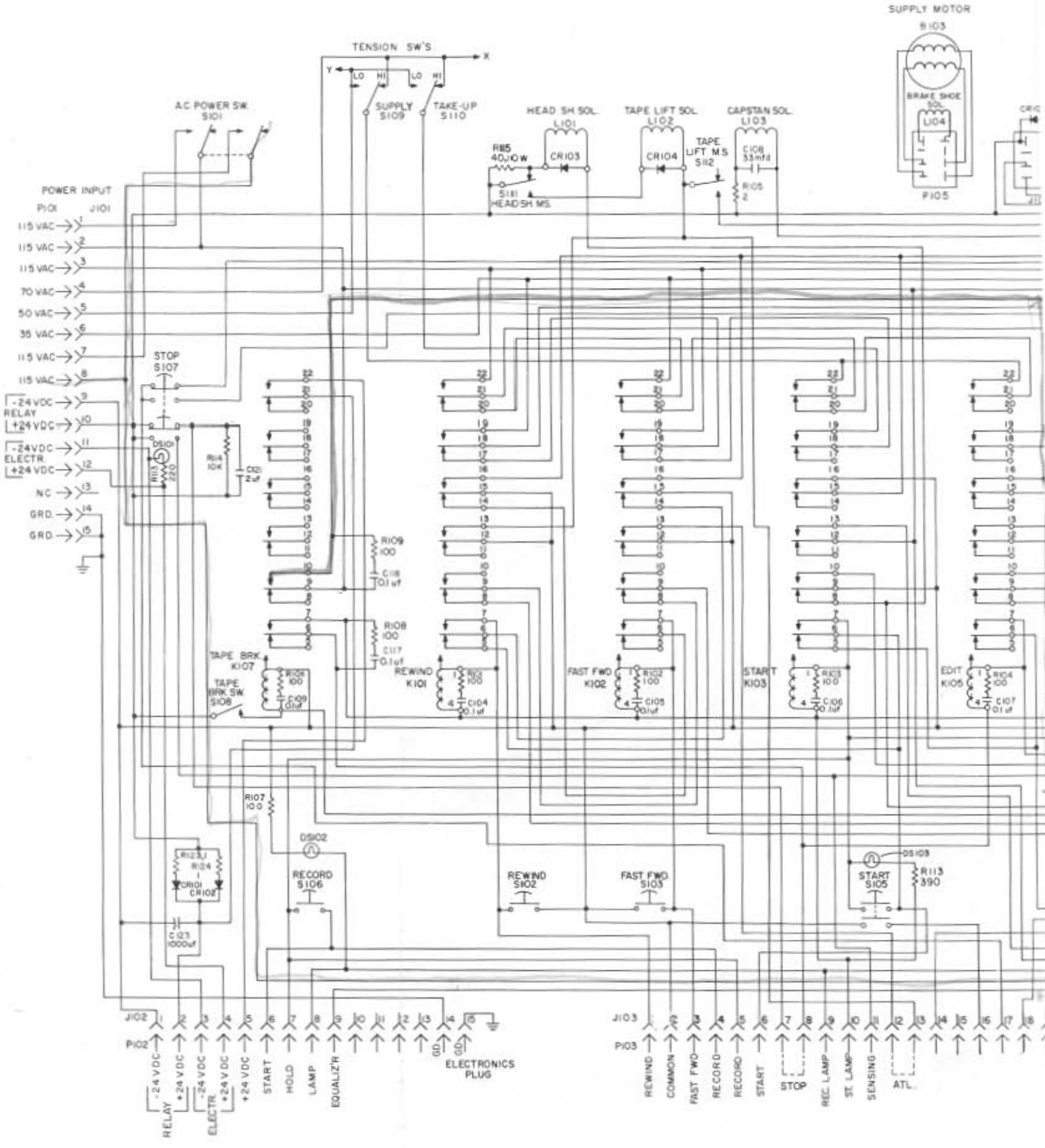

S101
AC POWER SWITCH
* ALTERNATIVE WIRING ON P101 FOR 1/2" TAPE MACHINES
3 = 115 VAC
4 = 90
5 = 70
6 = 35
8 = N
P101
J101
115 VAC
115 VAC
115 VAC *
70 VAC *
50 VAC *
35 VAC *
115 VAC
115 VAC
NEUTRAL
NEUTRAL
-24V IN
+24V IN
-24V IN
+24V IN
N.C.
FROM POWER SUPPLY
B103
SUPPLY MOTOR
L104
P105
B102
CAPSTAN MOTOR
P107
J107
J105
CR106
C114 .1µf
C115 .1µf
C102 (NOTE 5)
C120 2µf
R112 56
70 VAC
HIGH VOLTAGE
R105
C108
33 mfd
L103
CAPSTAN SOL.
K107
TAPE BRK RY.
L101
HEAD SHLD SOL.
L102
TAPE LIFT SOL.
S111
HEAD GATE ACT. MICRO SW.
CR103
CR104
50 VAC
LOW VOLTAGE
LEFT REEL SIZE S109
RIGHT REEL SIZE S110
R115 40 10W
C117 R106C .1µf 100
C118 .1µf
R109
K101 REWIND
K102 FAST FWD
K103 START
R106 100
C109
S107 STOP
S108 TAPE BRK SW
C121 2µf 500VDC
R104 10K
RECORD LIGHT R107/100
DS102
HEAD GATE SW
RECORD S106
S112
(NOTE 6)
REWIND S102
FAST FWD S103
CAPSTAN INPUT J104
117 VAC
117 VAC NEUTRAL
S 308AB
INVERTER INPUT
EQUALIZER
-24V
+24V
START
HOLD
LAMP
RELAY
ELECTRONICS CONNECTOR J102
STOP LIGHT DS-101
R113 510 Ω
ELECTRONICS
P104
INVERTER INPUT
NO.4 GRD.
NO.8 HI
CCT
REMOTE PLUG J103



NOTES:

1. CIRCUITS SHOWN IN "STOP" POSITION
2. ONLY ACTIVE POLES OF THE SIX POLE RELAYS ARE SHOWN
3. C104 TO C118 ARE 0.1μf
4. C119, C120, C121 ARE 2μf / 300 VDC
5. C102 AND C103 ARE 4μf AND LOCATED WITHIN RELAY PANEL IN STANDARD MODEL 280. IN MODEL SP-14/280, C102 AND C103 ARE 2.5μf AND LOCATED UNDER TOP PLATE.
6. K106 START TORQUE RELAY IS OMITTED FROM SOME UNITS. IN SUCH CASES, JUMPER IS CONNECTED BETWEEN WIRES USED FOR K106-17 AND K106-18.
7. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS. K=1,000 OHMS
8. S112 IS USED ON MANUAL HEAD GATE UNITS ONLY (260,275)

Figure 8-7. Model 280 and Early Model 280/SP-14 Power and Control Circuits, Schematic Diagram


SUPPLY MOTOR
B103
BRAKE SHOE SOL.
L104
P105
TENSION SW'S
X
Y
LO
HI
LO
HI
SUPPLY S109
TAKE-UP S110
A.C. POWER SW. S101
HEAD SH. SOL. L101
TAPE LIFT SOL. L102
CAPSTAN SOL. L103
R115 40Ω 10W
CR103
CR104
TAPE LIFT M.S. S112
C108 33mfd
R105 2
S111 HEAD SH. MS.
POWER INPUT
P101 J101
115 VAC
115 VAC
115 VAC
70 VAC
50 VAC
35 VAC
115 VAC
115 VAC
-24 VDC RELAY
+24 VDC
-24 VDC ELECTR.
+24 VDC
N.C.
GRD.
GRD.
STOP S107
DS101
R113 220
R114 10K
C101 2uf
R109 100
C118 0.1 uf
R108 100
C117 0.1uf
TAPE BRK K107
TAPE BRK SW. S108
R106 100
C109 0.1uf
REWIND K101
R101 100
C104 0.1uf
FAST FWD K102
R102 100
C105 0.1uf
START K103
R103 100
C106 0.1uf
EDIT K105
R104 100
C107 0.1 uf
R107 100
DS102
RECORD S106
R123,124
CR101
CR102
C123 1000uf
REWIND S102
FAST FWD S103
DS103
START S105
R113 390
J102
P102
-24 VDC RELAY
+24 VDC
-24 VDC ELECTR.
+24 VDC
+24 VDC
START
HOLD
LAMP
EQUALIZR
GD
GD
ELECTRONICS PLUG
J103
P103
REWIND
COMMON
FAST FWD
RECORD
RECORD
START
STOP
REC. LAMP
ST. LAMP
SENSING
ATL

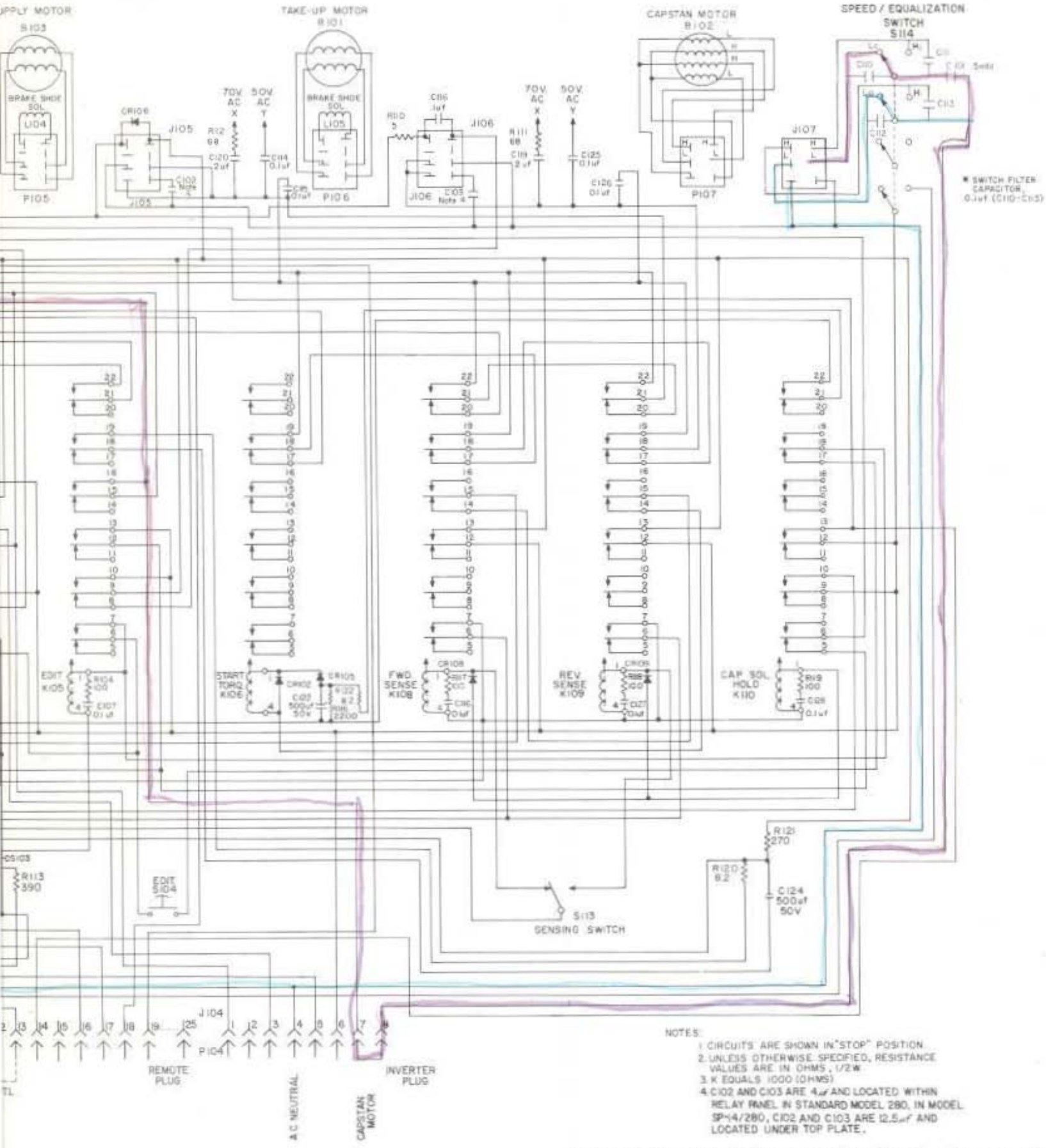
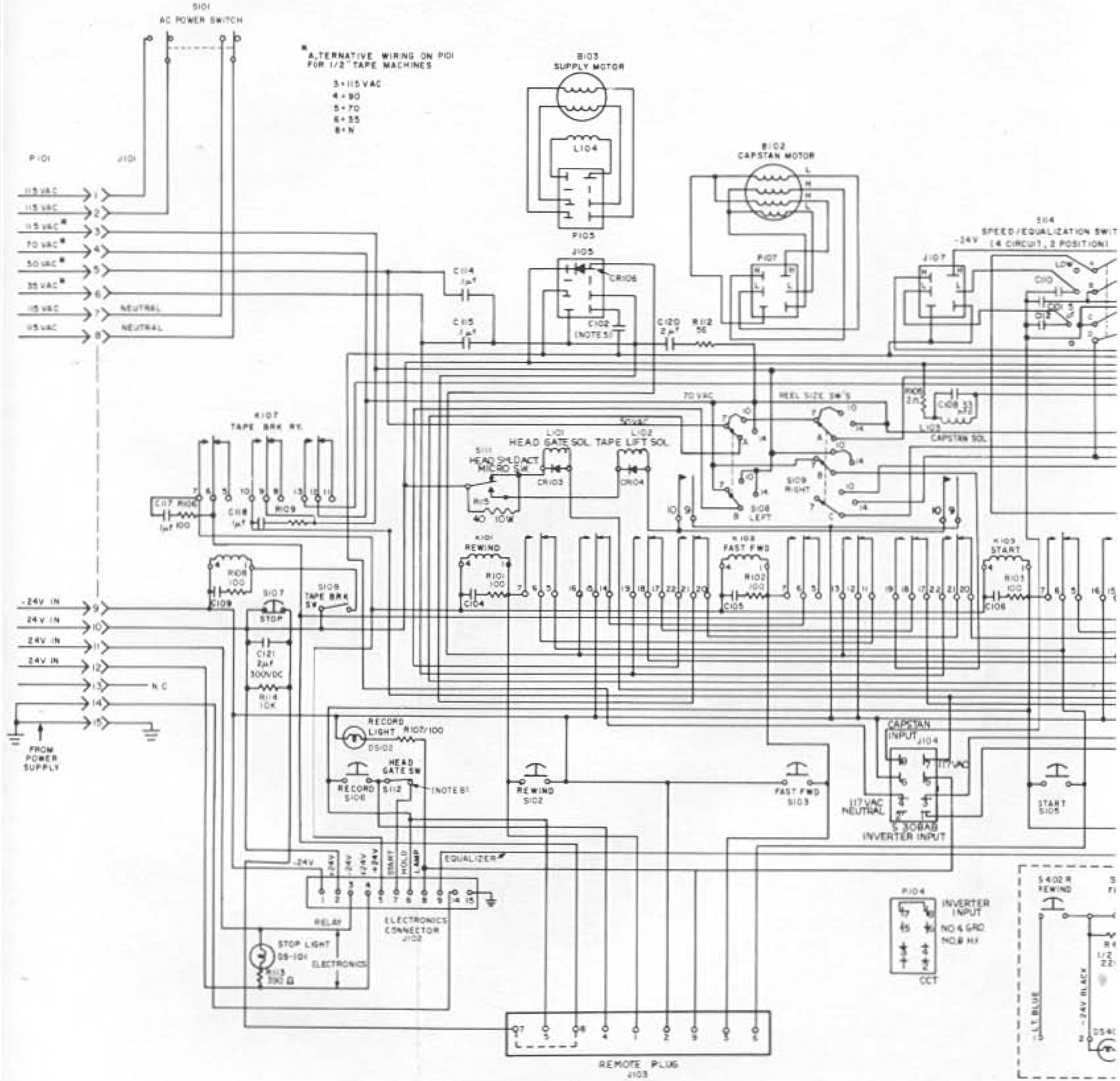
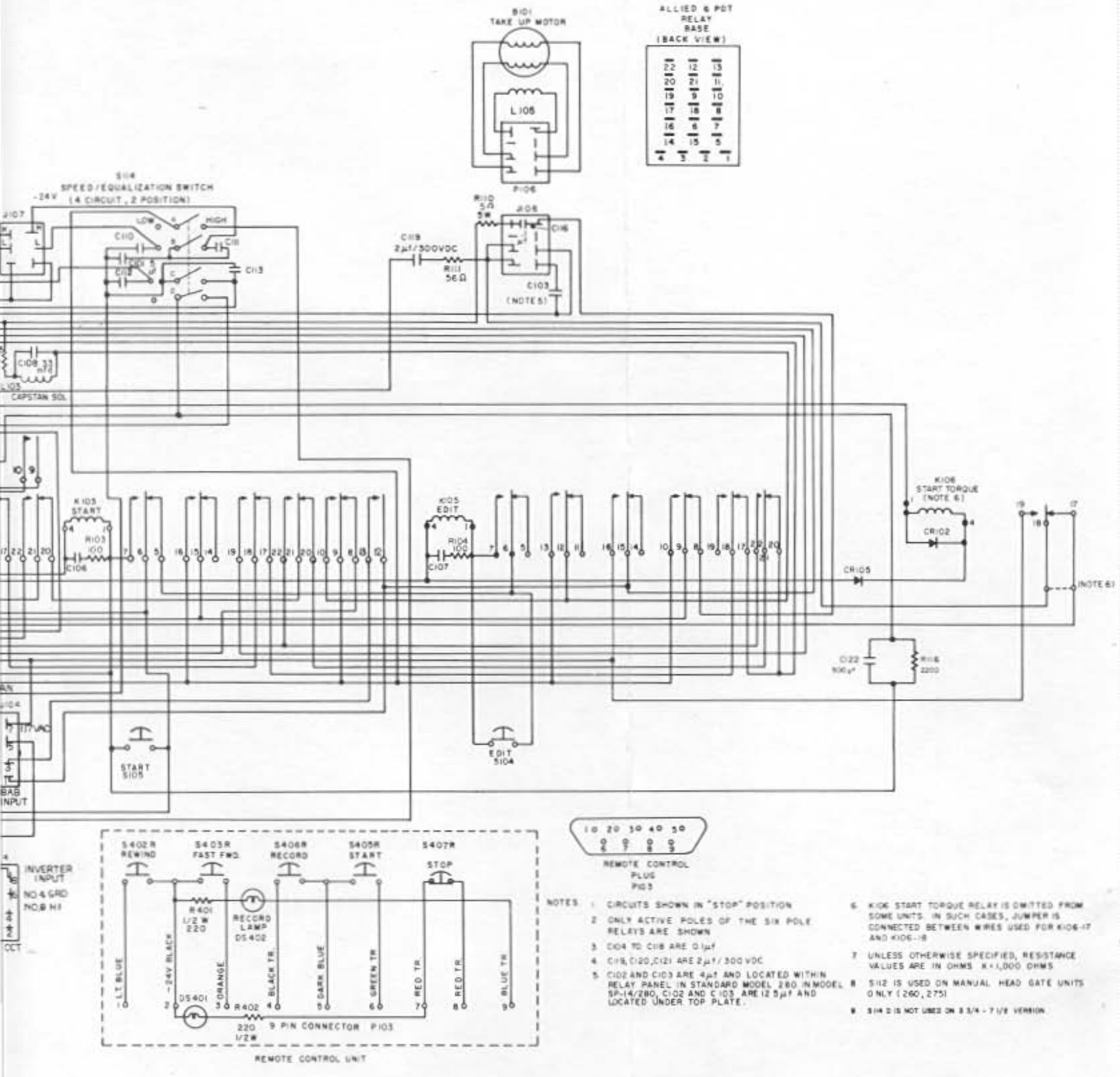


Figure 8-8. Model 280 with Motion Sensing, Power and Control Circuits, Schematic Diagram


S101
AC POWER SWITCH
* ALTERNATIVE WIRING ON P101 FOR 1/2" TAPE MACHINES
3=115 VAC
4=90
5=70
6=35
8=N
B103
SUPPLY MOTOR
L104
P105
J105
CR106
C102 (NOTE 5)
B102
CAPSTAN MOTOR
P107
P101
J101
115 VAC
115 VAC
115 VAC*
70 VAC*
50 VAC*
35 VAC*
115 VAC NEUTRAL
115 VAC NEUTRAL
C114 1µf
C115 1µf
C120 2µf
R112 56
S114
SPEED/EQUALIZATION SWITCH
(4 CIRCUIT, 2 POSITION)
-24V
J107
LOW
C110
C111
C112
70 VAC
REEL SIZE SW'S
R105 2Ω
C108 33 µf
L103
CAPSTAN SOL
K107
TAPE BRK RY.
L101
HEAD GATE SOL.
L102
TAPE LIFT SOL.
50 VAC
S111
HEAD SHLD ACT MICRO SW
CR103
CR104
R115 40 10W
S108 LEFT
S109 RIGHT
C117 R106 1µf 100
C118 1µf
R109
K101 REWIND
R101 100
C104
K102 FAST FWD
R102 100
C105
K103 START
R103 100
C106
R108 100
C109
S107 STOP
S108 TAPE BRK SW
-24V IN
24V IN
24V IN
24V IN
N.C.
FROM POWER SUPPLY
C121 2µf 300VDC
R114 10K
RECORD LIGHT
R107/100
DS102
RECORD S106
HEAD GATE SW S112
(NOTE 8)
REWIND S102
FAST FWD S103
CAPSTAN INPUT J104
117 VAC
117 VAC NEUTRAL
5 30BAB INVERTER INPUT
START S105
EQUALIZER
-24V
+24V
-24V
+24V
+24V
START
HOLD
LAMP
RELAY
ELECTRONICS
ELECTRONICS CONNECTOR J102
STOP LIGHT
DS-101
R113 390 Ω
P104
INVERTER INPUT
NO 4 GRD
NO 8 HI
CCT
S402 R REWIND
LT BLUE
-24V BLACK
REMOTE PLUG J103



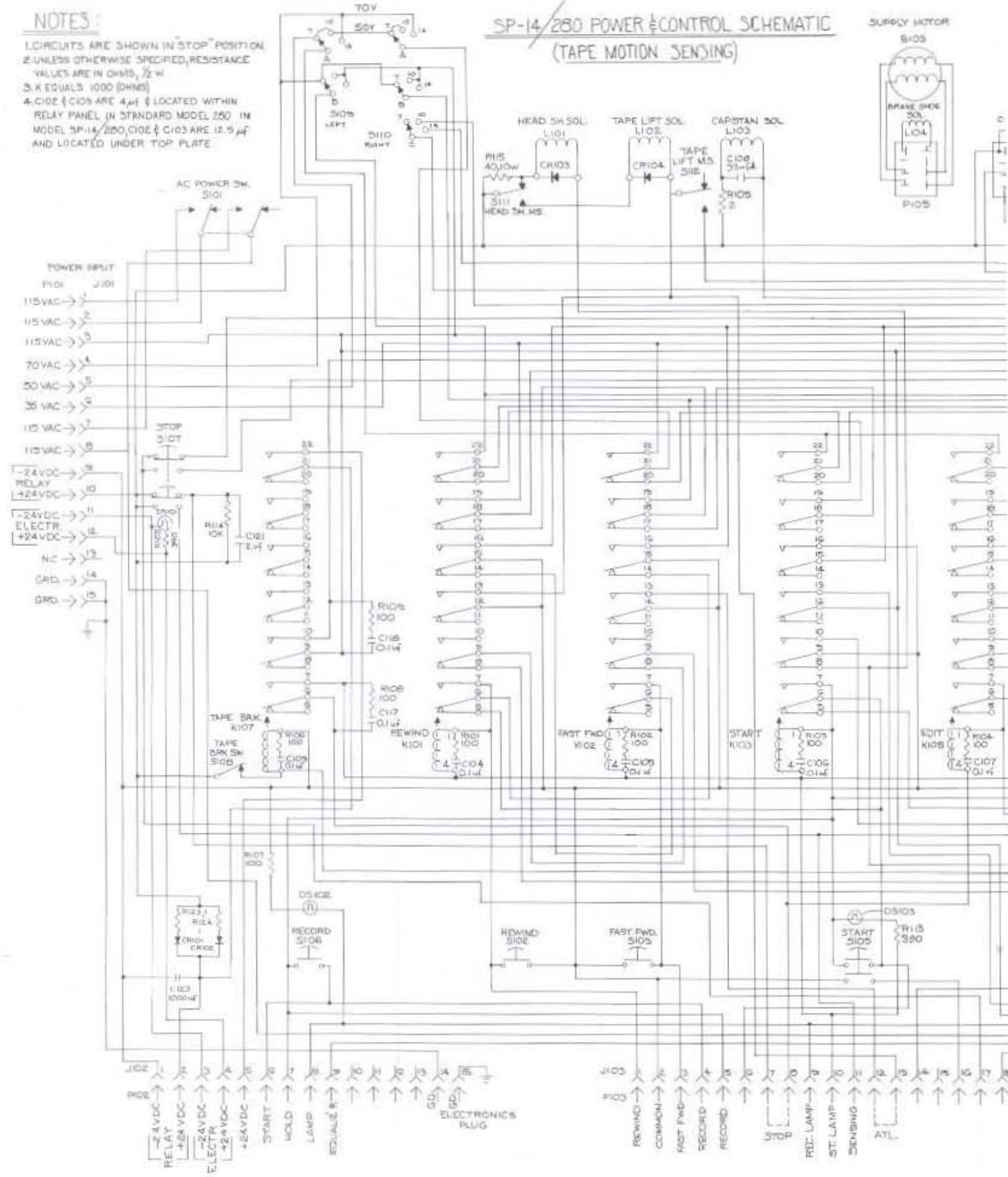
NOTES:

1. CIRCUITS SHOWN IN "STOP" POSITION
2. ONLY ACTIVE POLES OF THE SIX POLE RELAYS ARE SHOWN
3. C104 TO C118 ARE 0.1µf
4. C119, C120, C121 ARE 2µf/300 VDC
5. C102 AND C103 ARE 4µf AND LOCATED WITHIN RELAY PANEL IN STANDARD MODEL 280. IN MODEL SP-14/280, C102 AND C 103 ARE 12.5µf AND LOCATED UNDER TOP PLATE.
6. K106 START TORQUE RELAY IS OMITTED FROM SOME UNITS. IN SUCH CASES, JUMPER IS CONNECTED BETWEEN WIRES USED FOR K106-17 AND K106-18
7. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS. K=1,000 OHMS
8. S112 IS USED ON MANUAL HEAD GATE UNITS ONLY (260, 275)
9. S104 D IS NOT USED ON 3 3/4 - 7 1/2 VERSION.

Figure 8-9. Model 280/SP-14, Power and Control Circuits, Schematic Diagram

SP-14/280 POWER & CONTROL SCHEMATIC
(TAPE MOTION SENSING)

NOTES:
1. CIRCUITS ARE SHOWN IN "STOP" POSITION.
2. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, ½ W.
3. K EQUALS 1000 (OHMS).
4. C102 & C103 ARE 4 μf & LOCATED WITHIN RELAY PANEL IN STANDARD MODEL 280. IN MODEL SP-14/280, C102 & C103 ARE 12.5 μf AND LOCATED UNDER TOP PLATE.



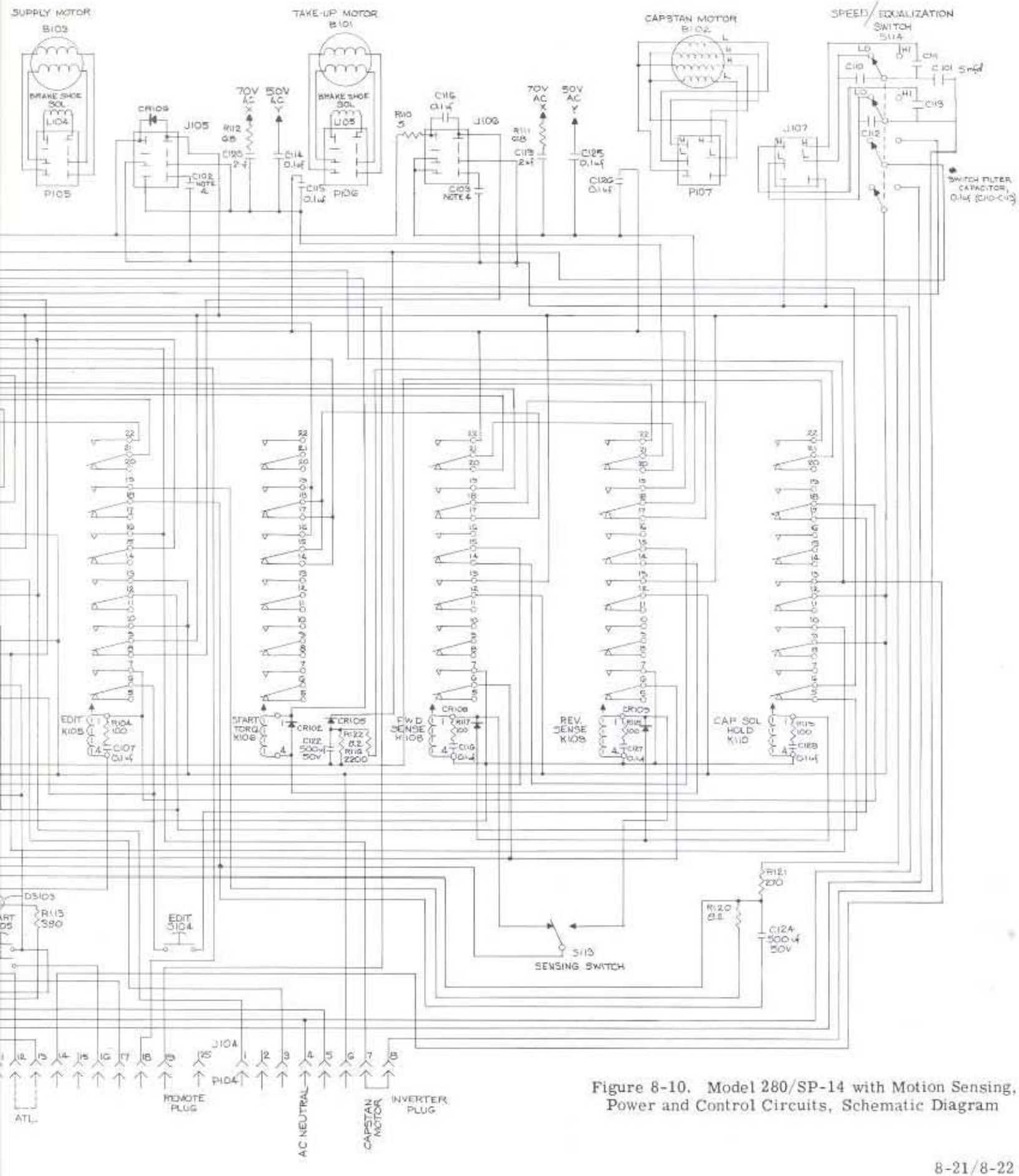
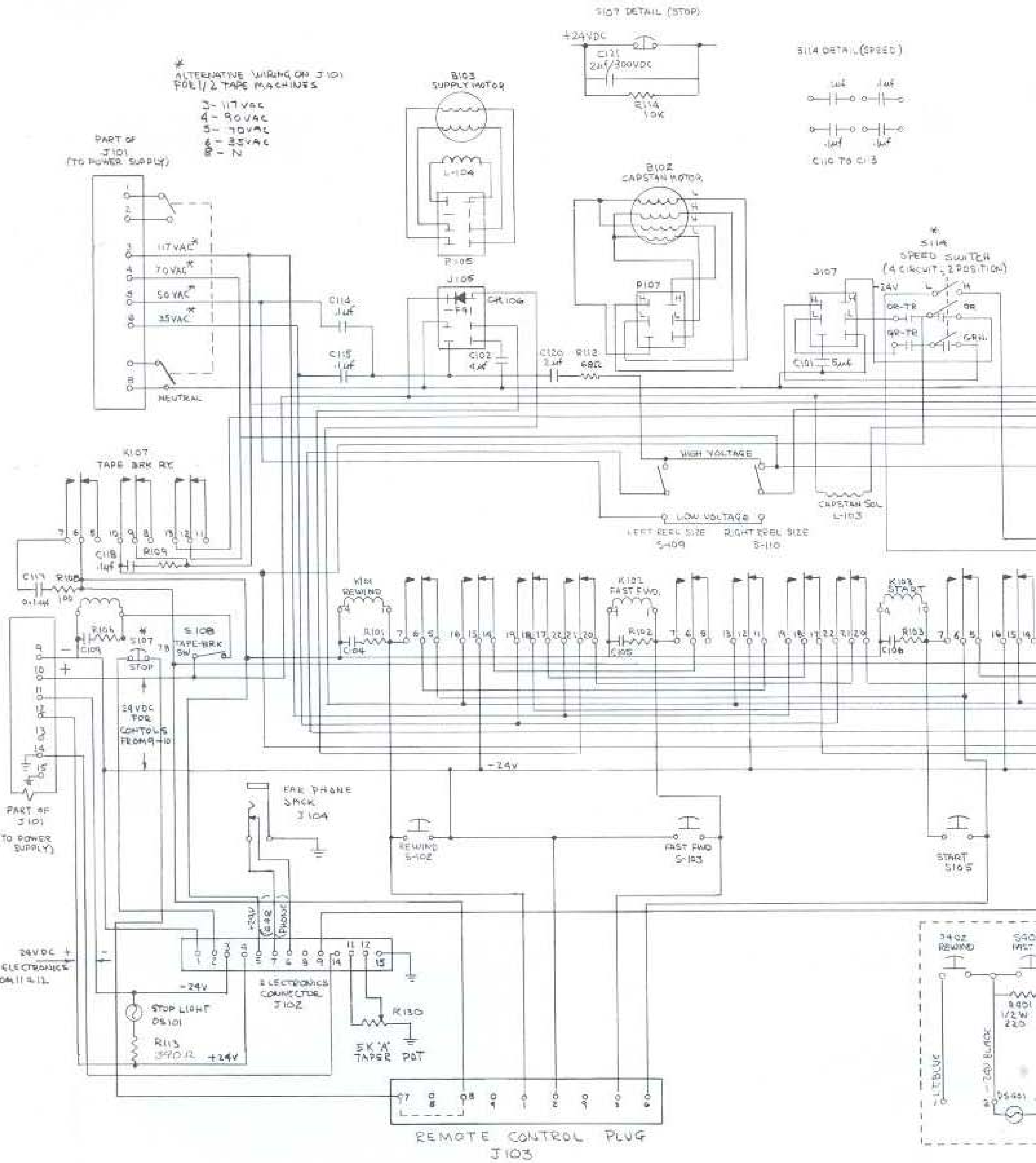


Figure 8-10. Model 280/SP-14 with Motion Sensing, Power and Control Circuits, Schematic Diagram


S107 DETAIL (STOP)
+24VDC
C121 2uf/300VDC
R114 10K
S114 DETAIL (SPEED)
C110 TO C113
* ALTERNATIVE WIRING ON J101 FOR 1/2 TAPE MACHINES
3 - 117VAC
4 - 90VAC
5 - 70VAC
6 - 35VAC
8 - N
B103 SUPPLY MOTOR
L-104
P105
J105
CR106
F91
C102
B102 CAPSTAN MOTOR
P107
J107
C101
S114 SPEED SWITCH (4 CIRCUIT - 2 POSITION)
PART OF J101 (TO POWER SUPPLY)
117VAC
70VAC
50VAC
35VAC
NEUTRAL
C114 .1uf
C115 .1uf
C120 2uf
R112 68Ω
HIGH VOLTAGE
LOW VOLTAGE
LEFT REEL SIZE S-109
RIGHT REEL SIZE S-110
CAPSTAN SOL L-103
K107 TAPE BRK RY
C118 .1uf
R109
C117
R108
R106
C109
S107 STOP
S108 TAPE-BRK SW
24VDC FOR CONTROLS FROM 9-10
K101 REWIND
R101
C104
K102 FAST FWD
R102
C105
K103 START
R103
C106
-24V
PART OF J101 (TO POWER SUPPLY)
EAR PHONE JACK J104
REWIND S-102
FAST FWD S-103
START S105
24VDC FOR ELECTRONICS (FROM 11 & 12)
ELECTRONICS CONNECTOR J102
STOP LIGHT DS101
R113 390Ω
+24V
R130
5K "A" TAPER POT
REMOTE CONTROL PLUG J103
S402 REWIND
R401 1/2W 220
DS401

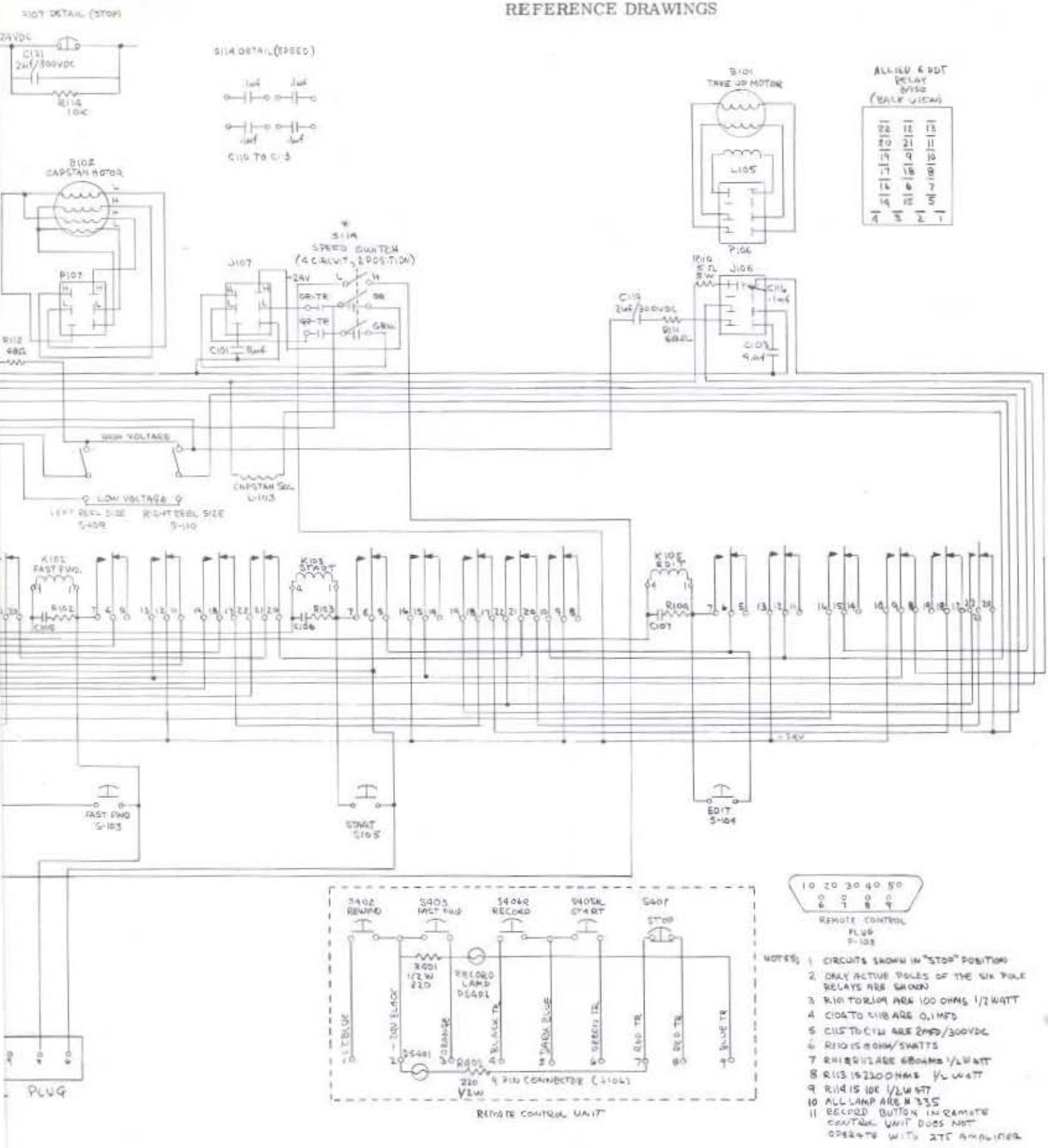
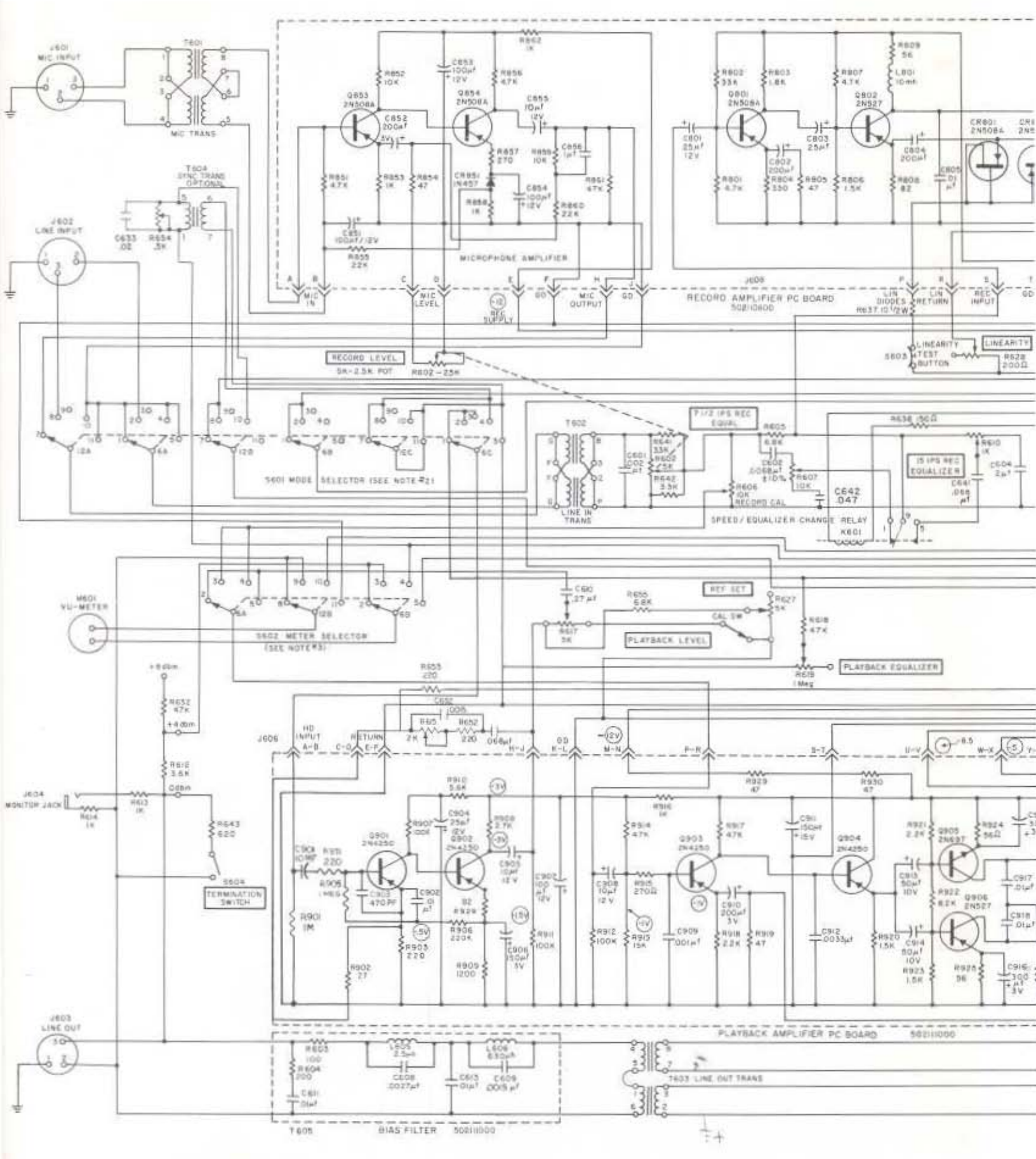


Figure 8-11. Model 275 Reproducer, Power and Control Circuits, Schematic Diagram


J601 MIC INPUT
T601
MIC TRANS
T604 SYNC TRANS OPTIONAL
J602 LINE INPUT
Q853 2N508A
Q854 2N508A
MICROPHONE AMPLIFIER
J606
RECORD AMPLIFIER PC BOARD 502110600
Q801 2N508A
Q802 2N527
MIC IN
MIC LEVEL
MIC OUTPUT
LIN DIODES R637 10 1/2W
LIN RETURN
REC INPUT
RECORD LEVEL
5K-2.5K POT
R602-25K
LINEARITY TEST BUTTON
LINEARITY
R628 200Ω
S601 MODE SELECTOR (SEE NOTE #2)
T602
LINE IN TRANS
7 1/2 IPS REC EQUAL
15 IPS REC EQUALIZER
SPEED / EQUALIZER CHANGE RELAY K601
M601 VU-METER
S602 METER SELECTOR (SEE NOTE #3)
REF SET
CAL SW
PLAYBACK LEVEL
PLAYBACK EQUALIZER
J604 MONITOR JACK
S604 TERMINATION SWITCH
J603 LINE OUT
PLAYBACK AMPLIFIER PC BOARD 502110000
T603 LINE OUT TRANS
T605 BIAS FILTER 502110000

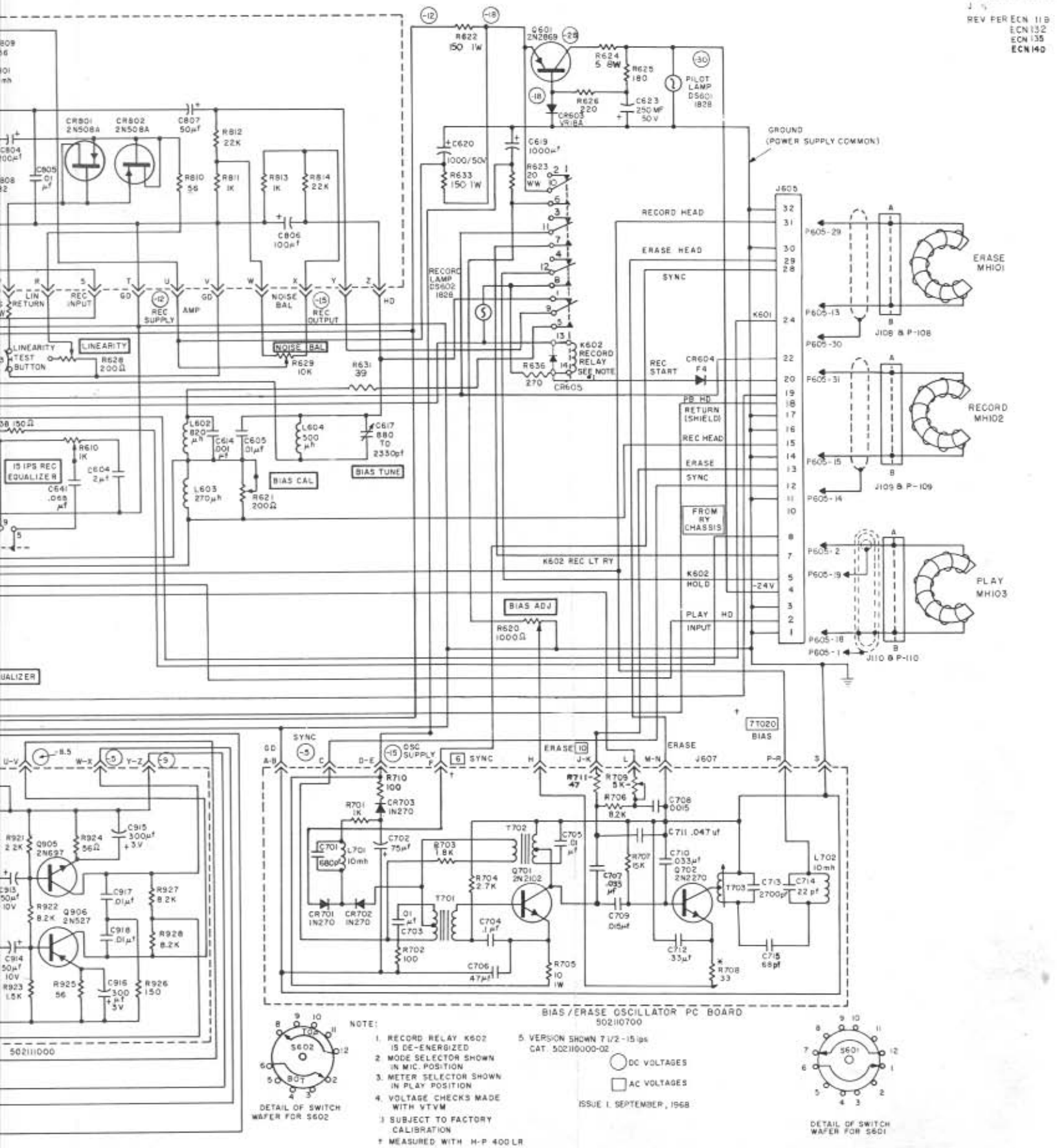
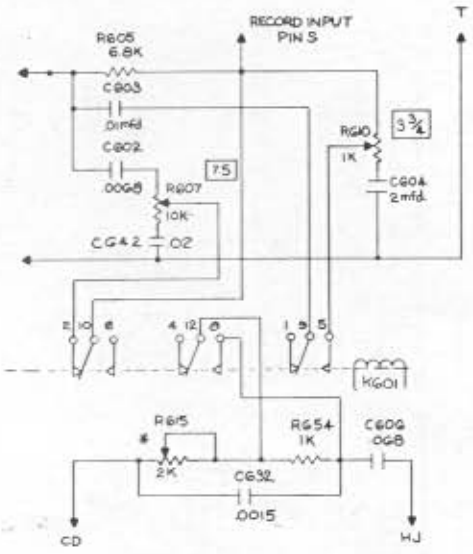
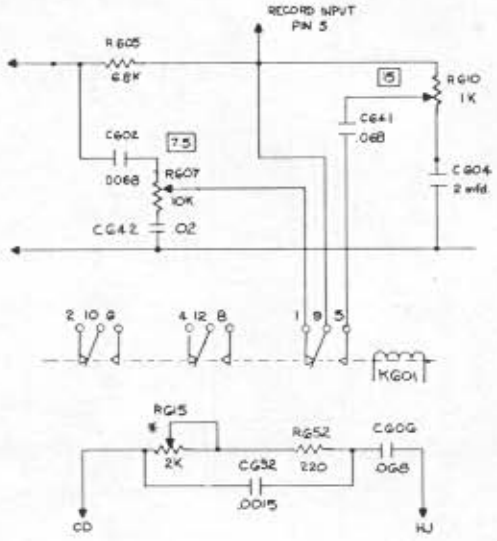


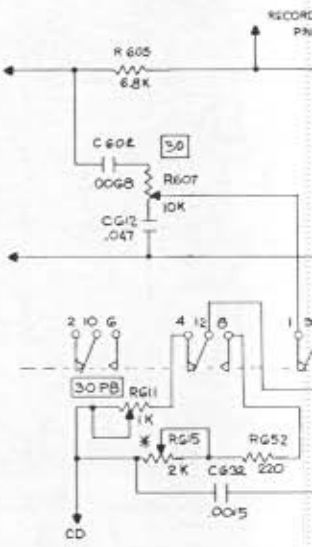
Figure 8-12. Electronics Schematic Diagram, All Versions of Model 280 (Sheet 1 of 2 Sheets)



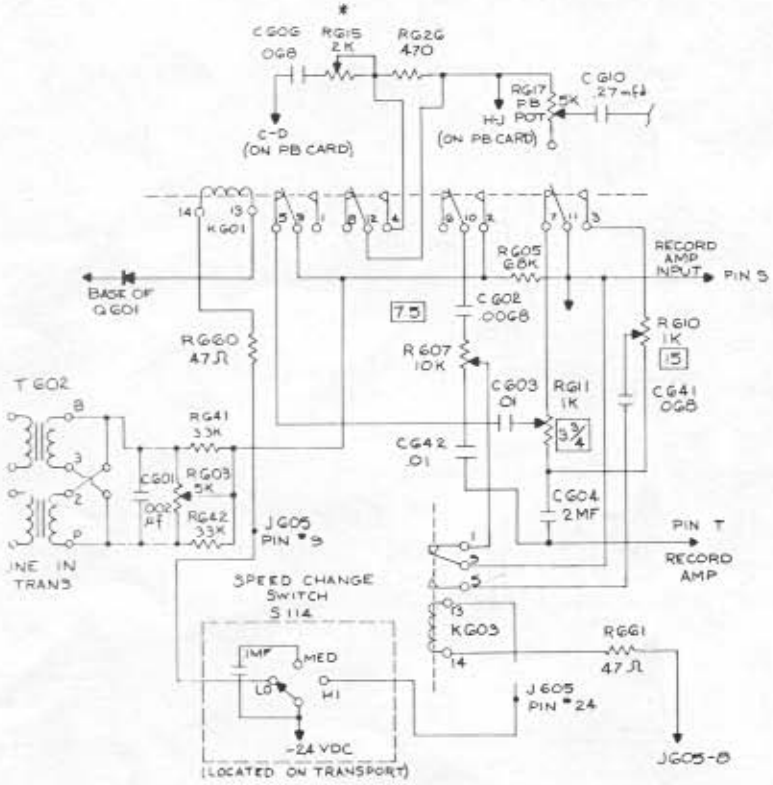
NAB 3¾-7½ CAT.-502110000-01



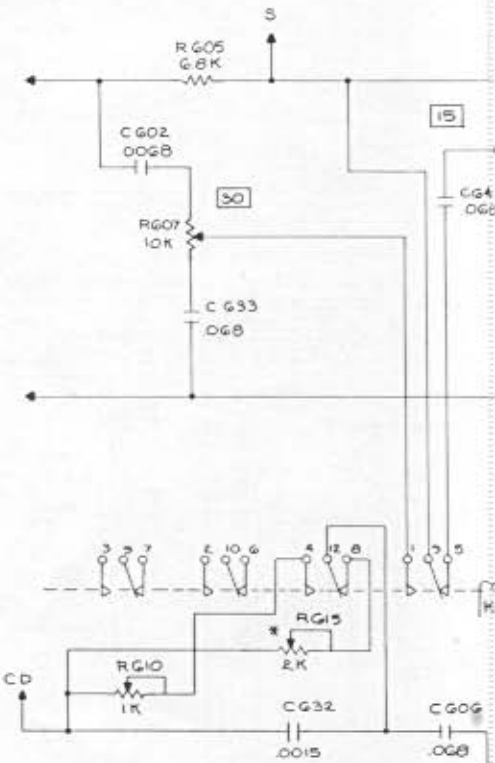
NAB 7½-15 CAT.-502110000-02



NAB 15-30 CAT.-502110000-C

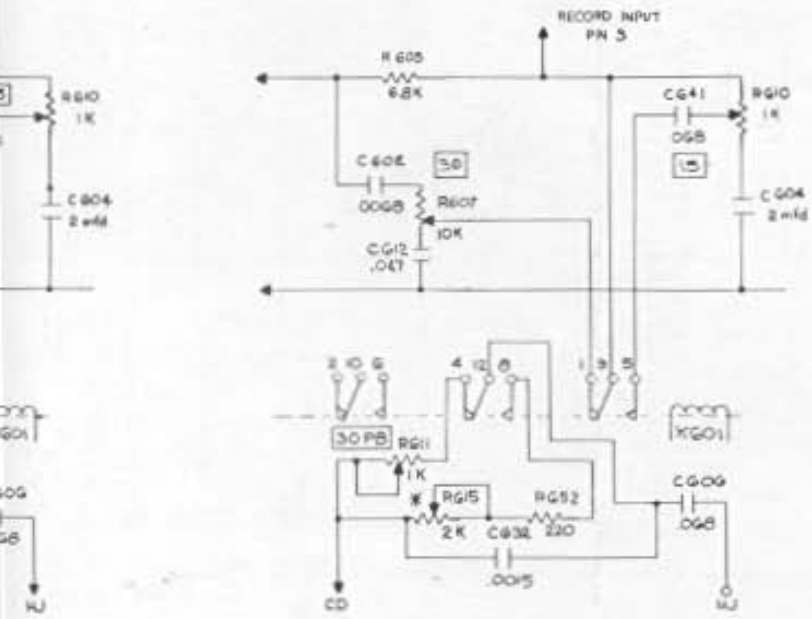


NAB 3¾-7½-15 IPS EQUALIZATION
CAT.- 502110000-08

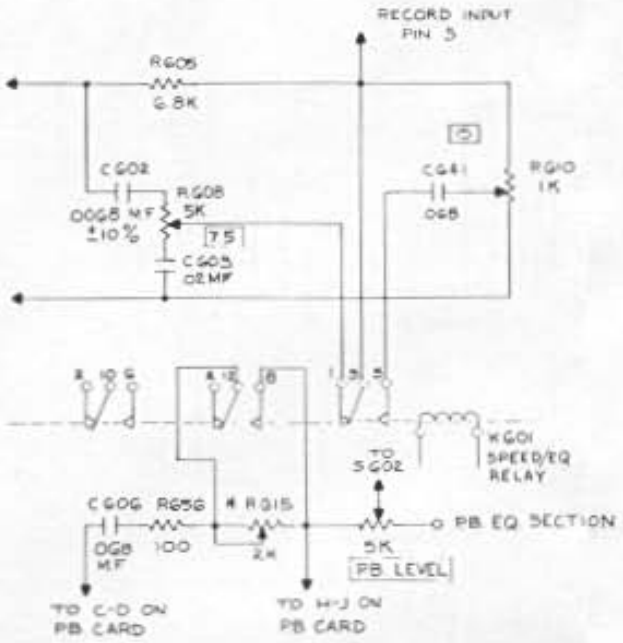


CCIR 15-30
CAT.- 502110000-06

Figure 8-12. Electronics Schematic Diagram, All Versions of Model 280 (Sheet 2 of 2 Sheets)

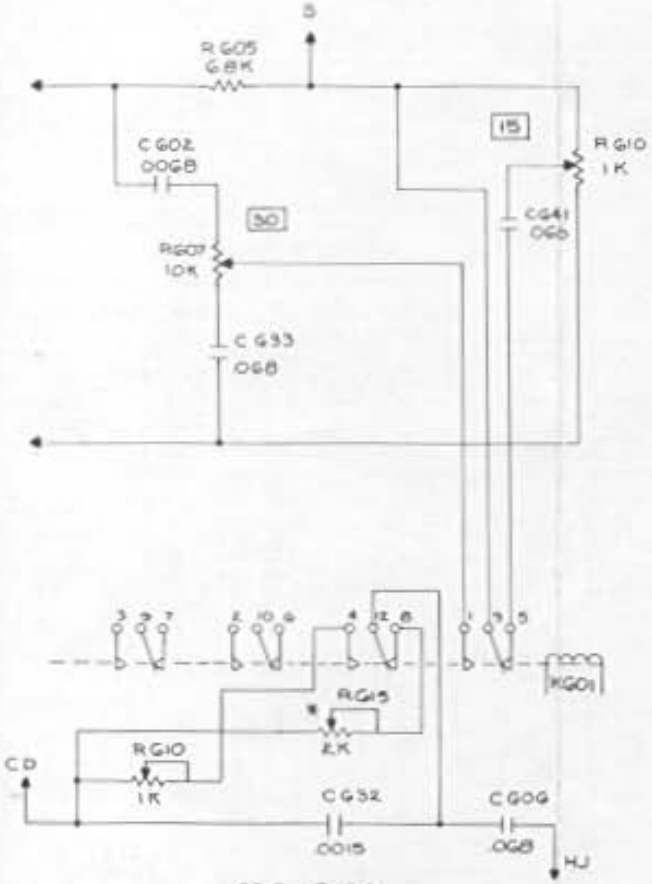


NAB 15-30 CAT- 502110000-03

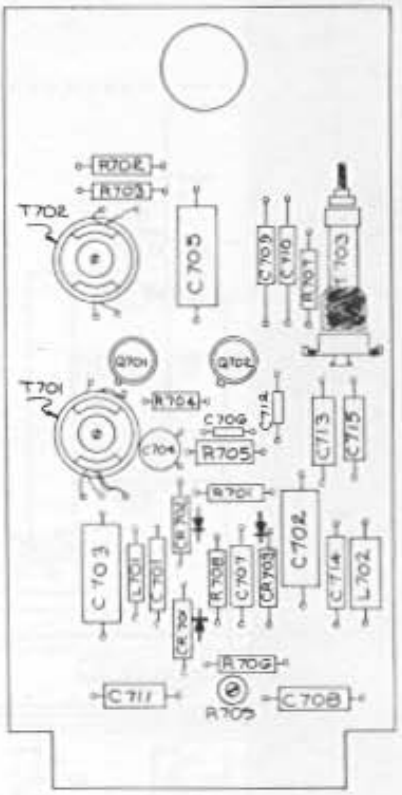


CCIR 7½-15 CAT.- 502110000-05

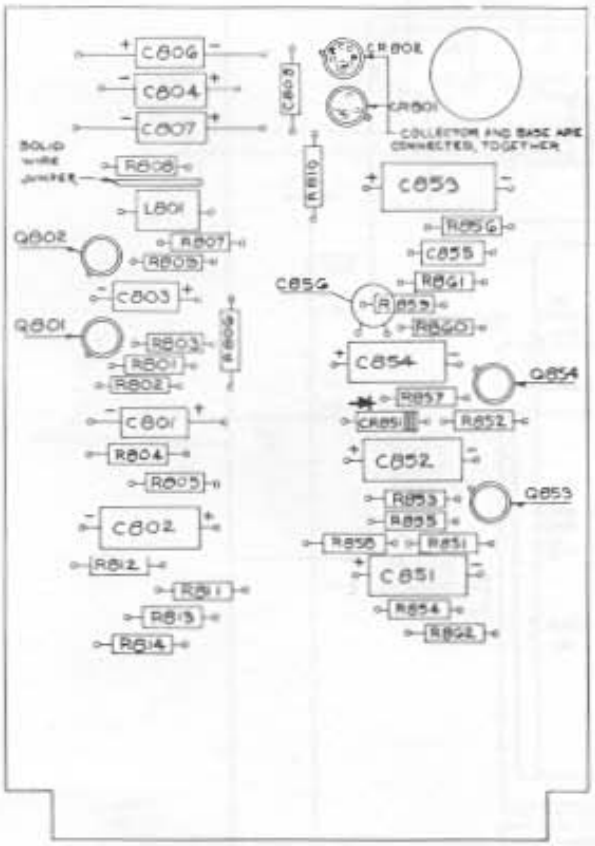
EQUALIZATION CIRCUITS
SHOWN IN NORMALLY
OFF POSITION



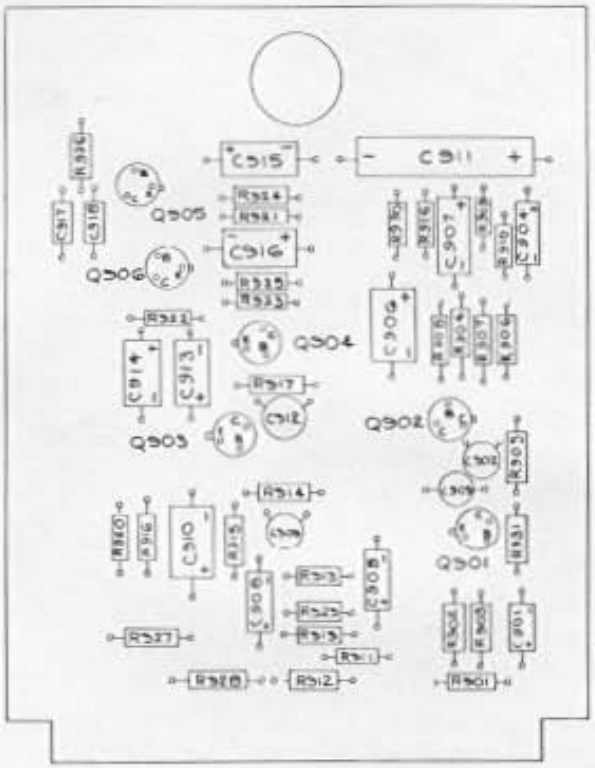
CCIR 15-30
CAT. - 502110000-06



BIAS OSCILLATOR P/N 502110700

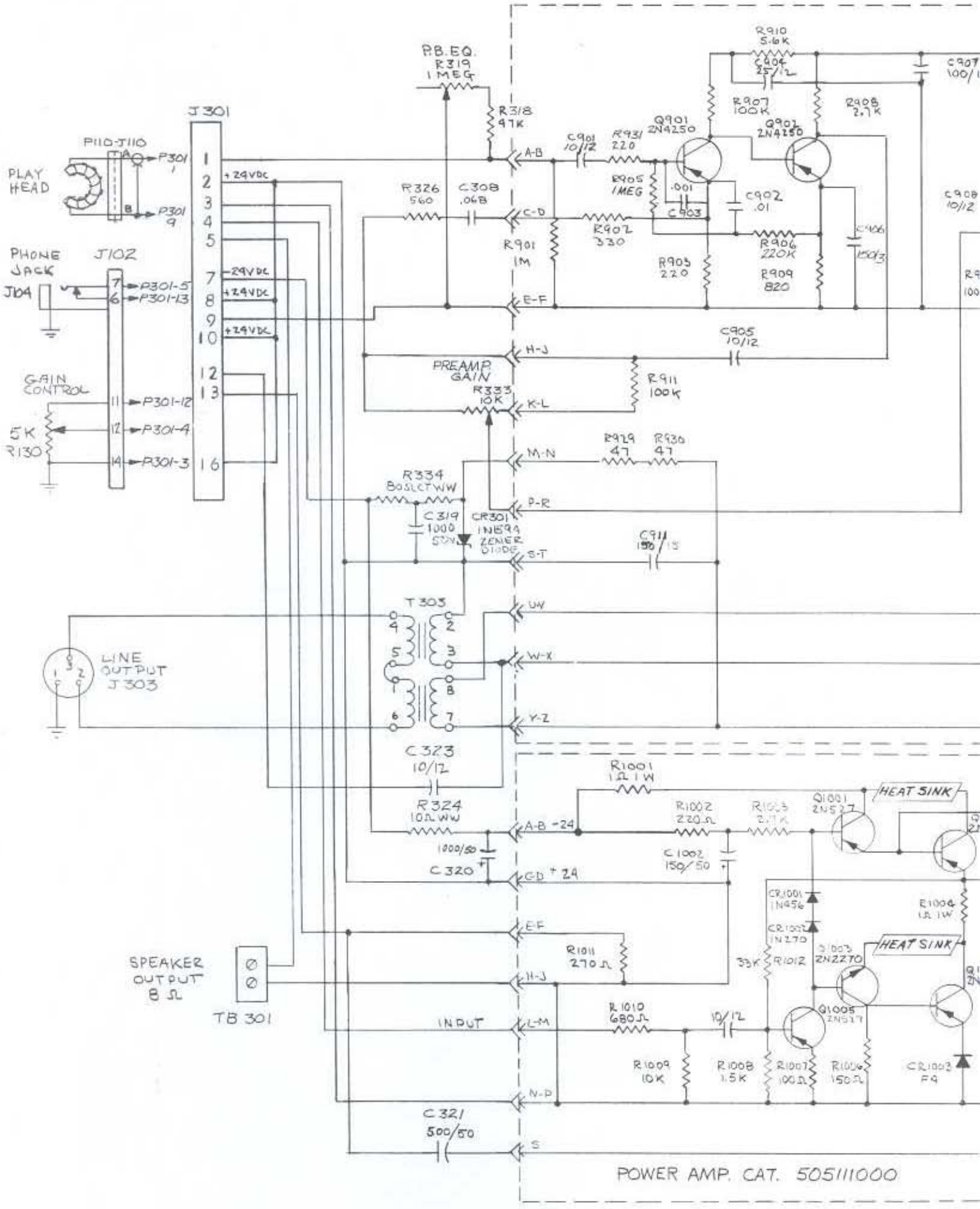


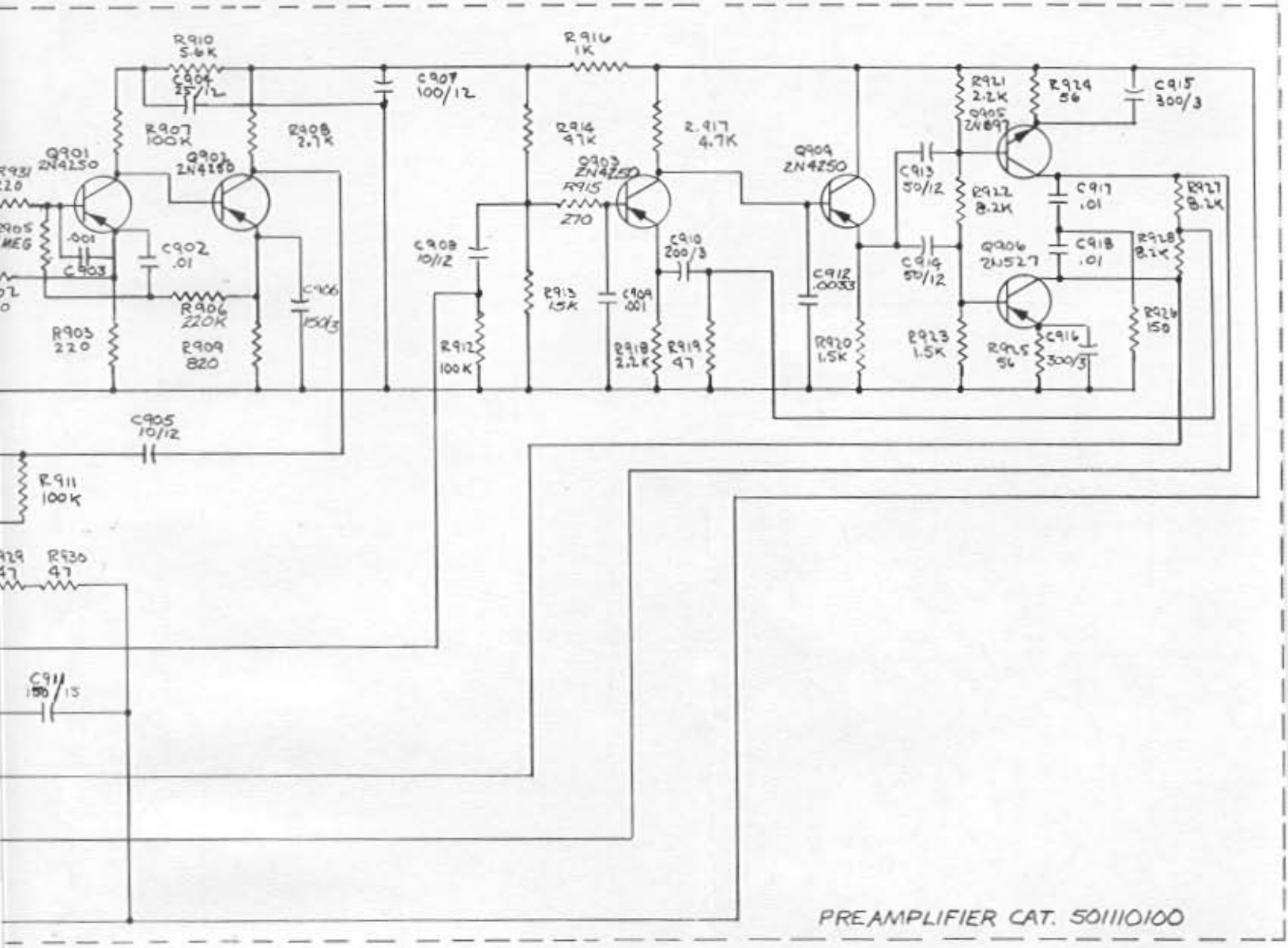
RECORD AMPLIFIER P/N 502110800



PLAYBACK AMPLIFIER P/N 502111000

Figure 8-13. Electronics Circuit Cards, All Models 280, Parts Location Diagrams


P.B. EQ.
R319
1 MEG
R318
47K
J301
P110-J110
PLAY HEAD
P301
1
9
+24VDC
-24VDC
PHONE JACK
J104
J102
P301-5
P301-13
GAIN CONTROL
5K
R130
P301-12
P301-4
P301-3
R326
560
C308
.06B
C-D
R901
1M
C901
10/12
R931
220
A-B
R905
1MEG
.001
C903
Q901
2N4250
Q902
2N4250
R910
5.6K
C904
25/12
R907
100K
R908
2.7K
C902
.01
C906
150/3
R906
220K
R905
220
R909
820
R907
330
E-F
C905
10/12
H-J
PREAMP GAIN
R333
10K
R911
100K
K-L
R929
47
R930
47
M-N
R334
BOSLCTWW
C319
1000
50V
CR301
1N694
ZENER DIODE
P-R
C911
150/15
S-T
T303
U-W
W-X
Y-Z
LINE OUTPUT
J303
C323
10/12
R1001
1Ω 1W
R324
10Ω WW
A-B -24
1000/50
C320
C-D +24
R1002
220Ω
C1002
150/50
Q1001
2N527
HEAT SINK
CR1001
1N456
CR1002
1N270
R1004
1Ω 1W
R1012
33K
Q1003
2N2270
HEAT SINK
E-F
R1011
270Ω
SPEAKER OUTPUT
8Ω
TB 301
H-J
INPUT
L-M
R1010
680Ω
10/12
Q1005
2N5179
R1009
10K
R1008
1.5K
R1007
100Ω
R1006
150Ω
CR1003
FG
N-P
C321
500/50
S
POWER AMP. CAT. 505111000



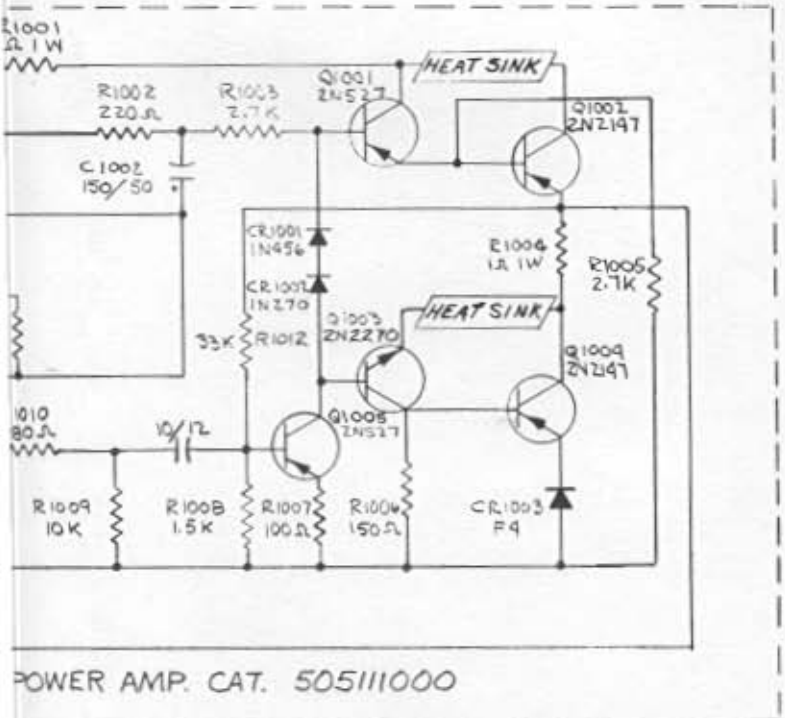
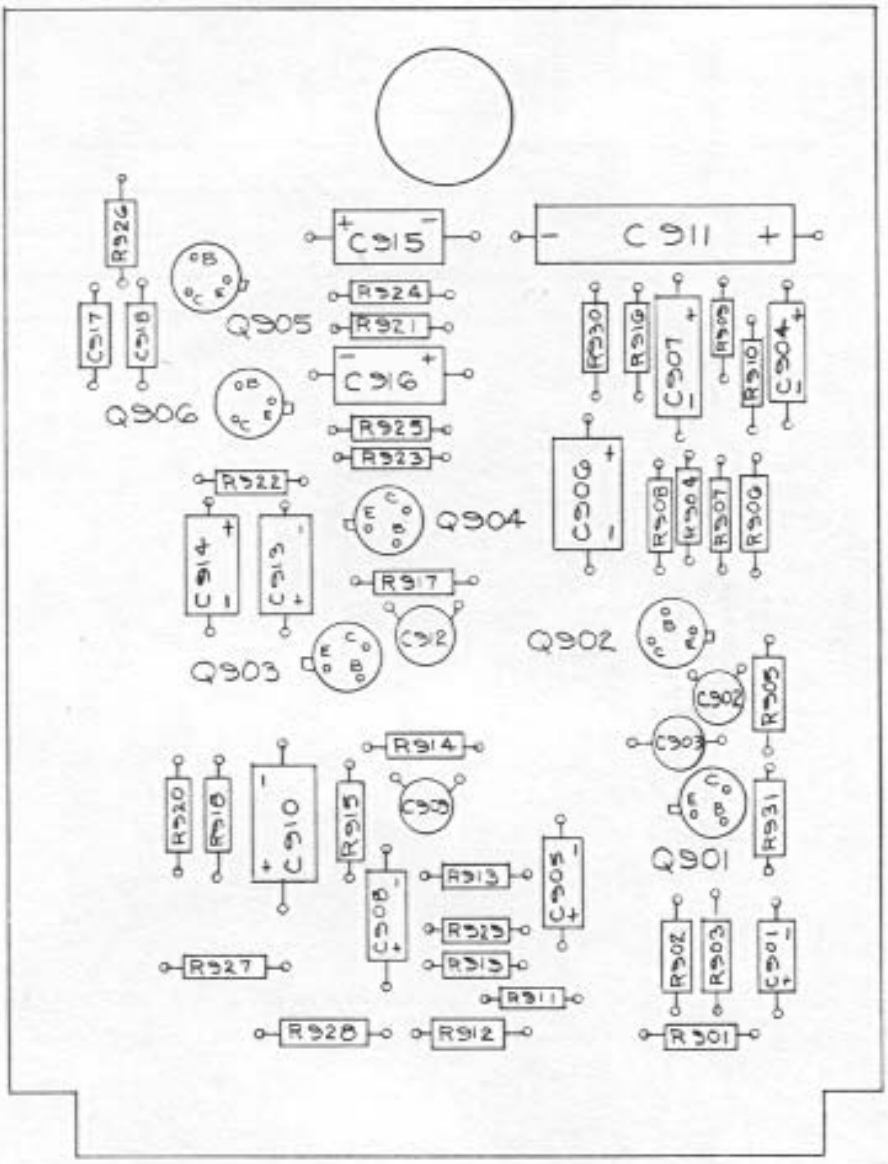
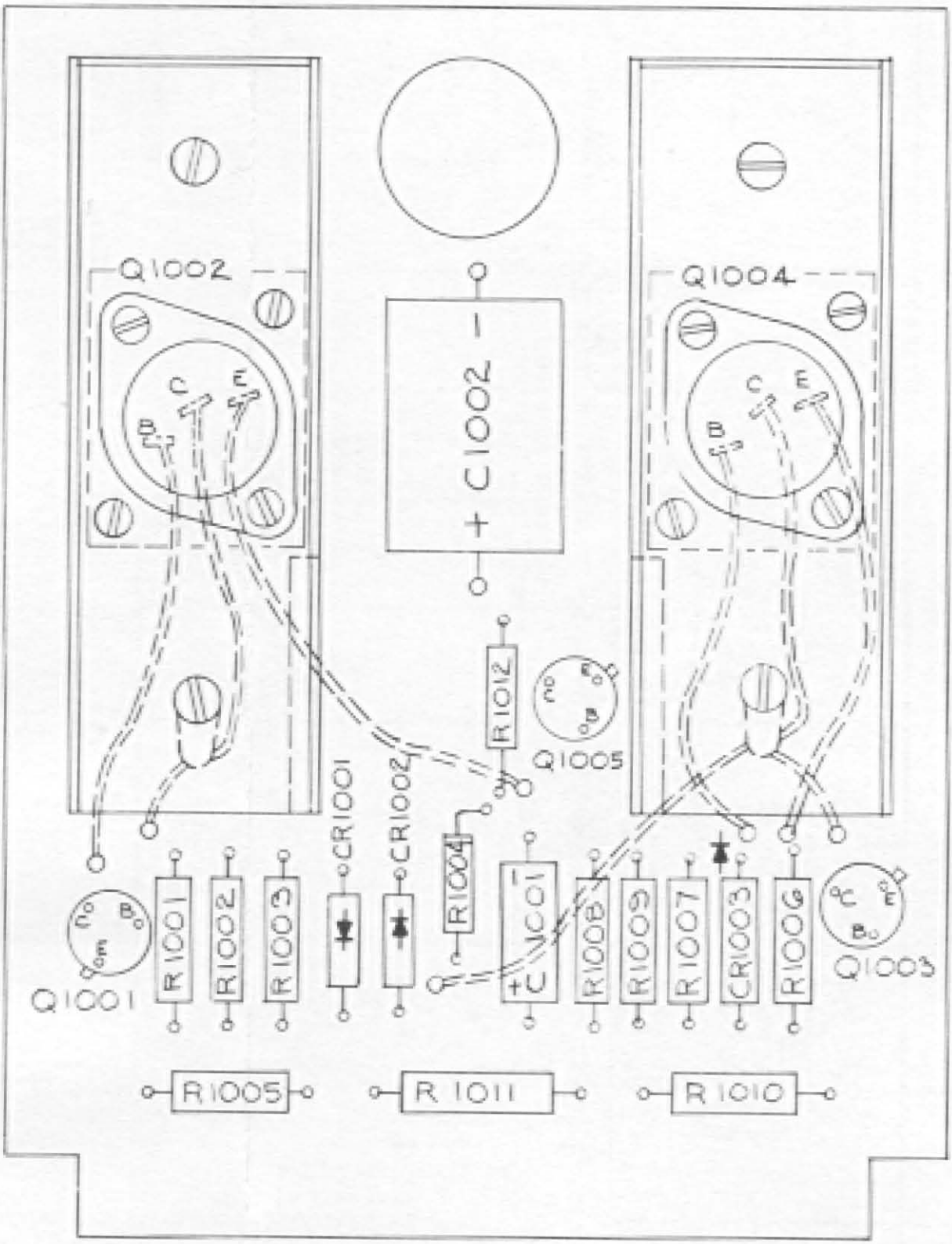


Figure 8-14. Model 275 Electronics Schematic Diagram

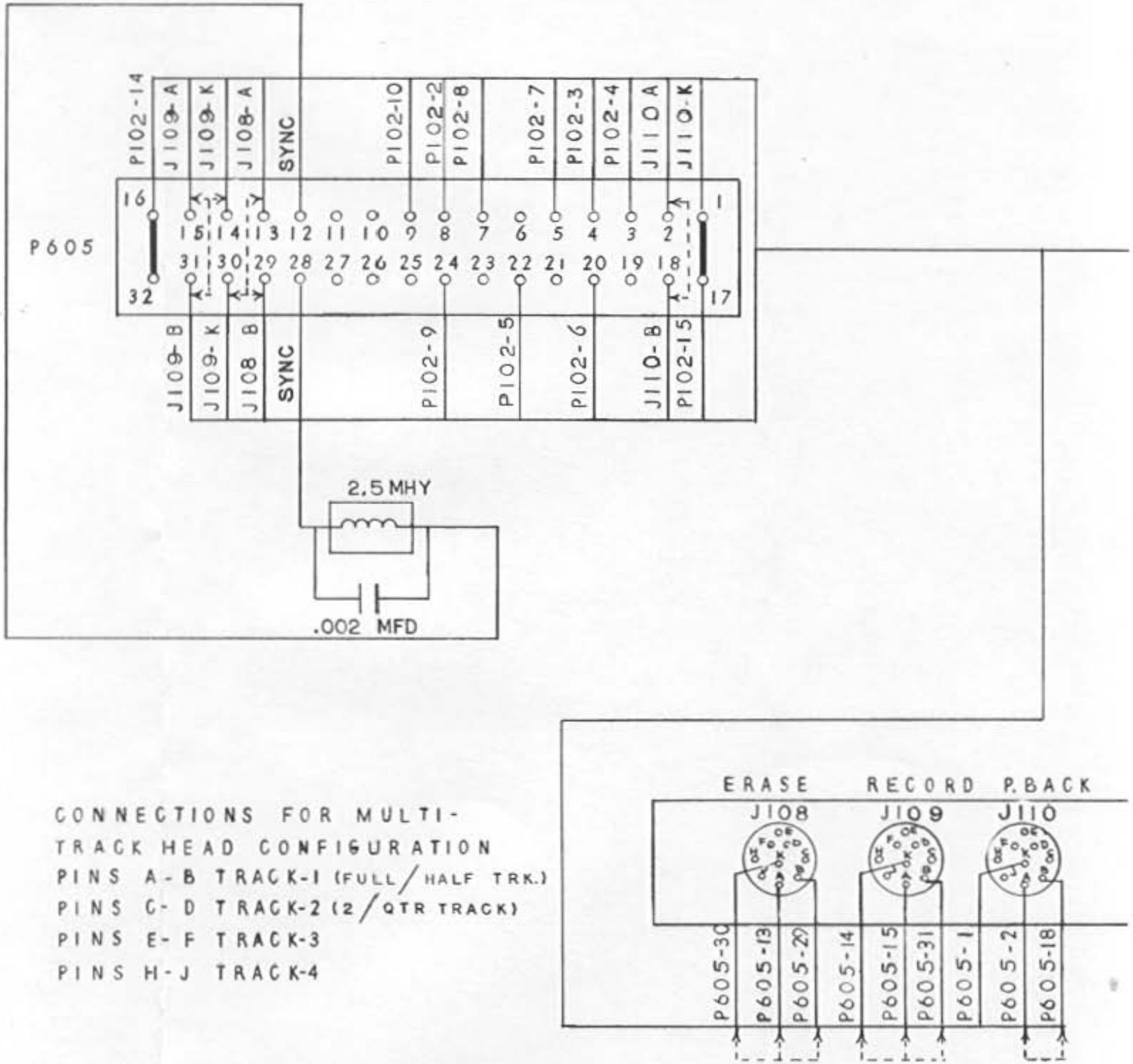


CAT. 501110100

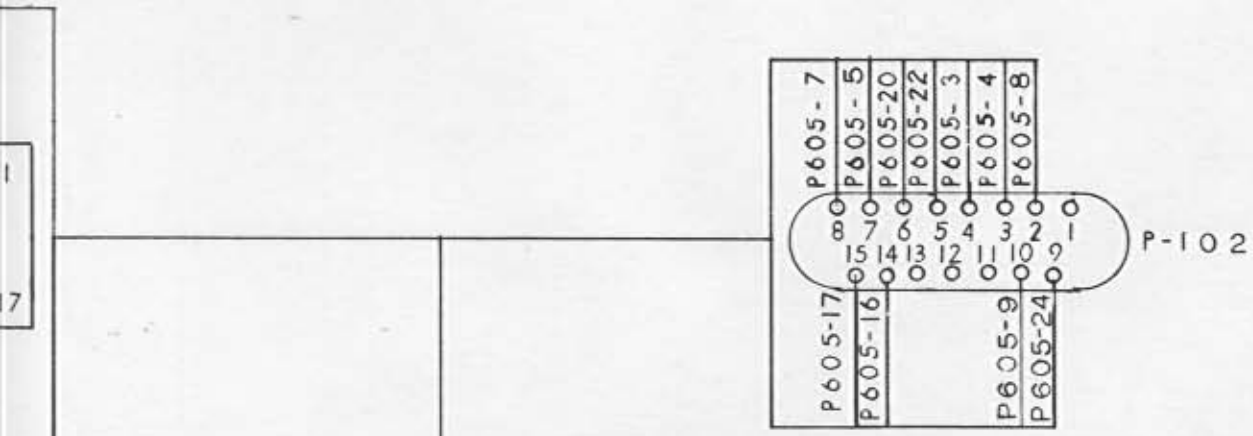
Figure 8-15. Model 275 Electronics Circuit Cards, Parts Location Diagrams



CAT. 505111000



CONNECTIONS FOR MULTI-
TRACK HEAD CONFIGURATION
PINS A-B TRACK-1 (FULL / HALF TRK.)
PINS C-D TRACK-2 (2 / QTR TRACK)
PINS E-F TRACK-3
PINS H-J TRACK-4



NOTES

1. ALL VIEWS SHOWN FROM WIRING SIDE.
2. DOTTED LINE INDICATES ONE CABLE.
3. HEAVY LINE INDICATES SOLID JUMPER.
4. 2.5MH CHOKE ADDED WITH .002MFD. CAPACITOR ON ALL MULTI-TRACK UNITS, FROM P605-12 TO P605-28. THESE COMPONENTS ARE LOCATED ON INTERCONNECTING CABLE BRACKET.
5. HEAD CONNECTIONS SHOWN ARE FOR MONO CABLES.
6. IN ALL MULTI-TRACK CABLES ALL POWER AND CONTROL CONNECTIONS ARE PARALLEL.
7. INSIDE SHIELD OF P.B. HEAD LEAD. IN CABLE TO J110 BUT NOT CONNECTED.

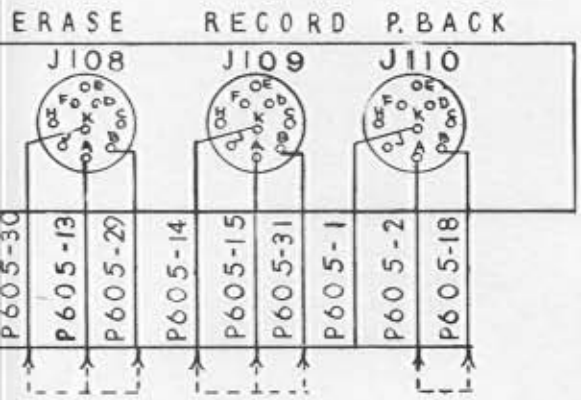


Figure 8-16. Interconnecting Cable Schematic, All Models 280

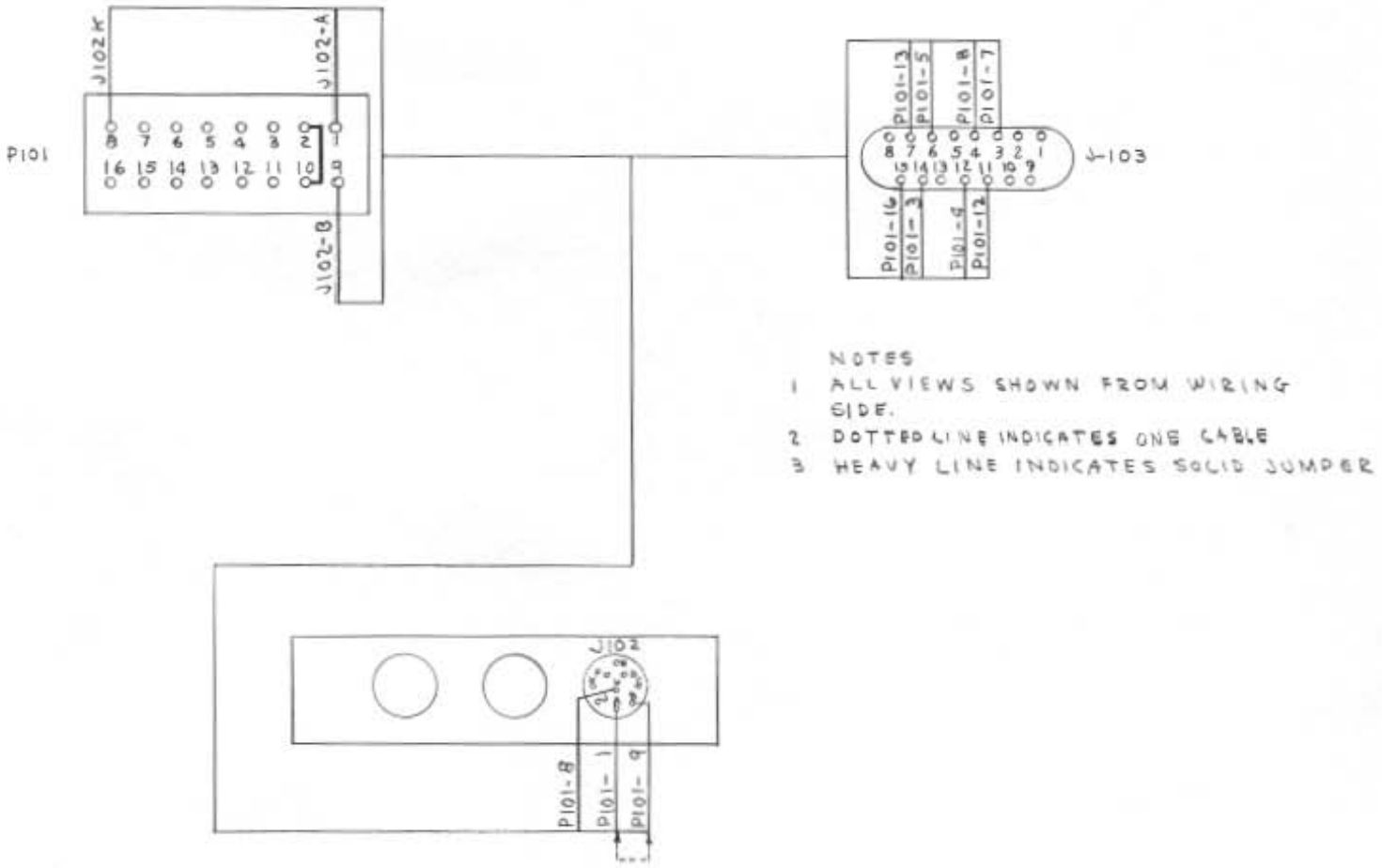
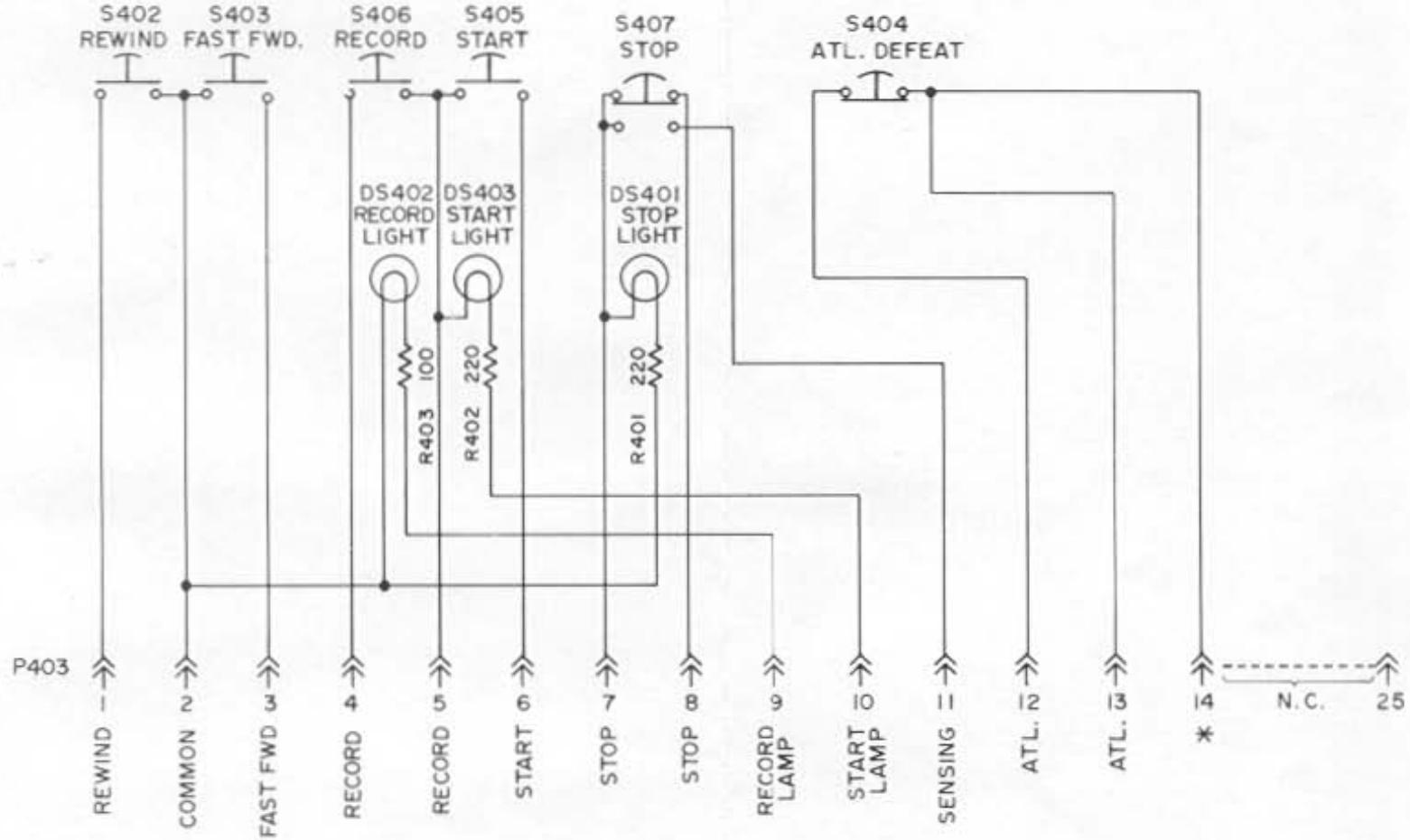


Figure 8-17. Model 275, Interconnecting Cable Schematic



NOTES:

1. RESISTOR VALUES ARE IN OHMS, 1/2 W
2. ALL LAMPS # 335

X SHORTS OUT T.L. MICROSWITCH ON DECK

Figure 8-18. DeLuxe Remote Control Unit, Cat. No. 504210100-01, Schematic Diagram (for Motion Sensing Models 280 and 280/SP-14)

PROFESSIONAL TAPE PRODUCTS WARRANTY

Motors and tape heads (reproduce, record and erase) are guaranteed for 90 days from delivery date and will be replaced at no charge. All other parts are guaranteed for one year, subject to a charge for labor only after a 90-day period.

WARRANTY CONDITIONS

1. Within ten days from delivery date, original using buyer shall have properly filled out and returned the warranty validation card to Scully.

2. Defective equipment must be returned, transportation charges prepaid, to dealer from which equipment was originally purchased, unless said dealer agrees to inspect or repair at user's premises.

3. This warranty is not valid if equipment has been repaired or altered in any method other than Scully approved techniques; if this equipment has been subjected to excessive current, misuse, negligence; or has had its serial number removed, altered or defaced in any manner.

4. Replacement parts supplied under this warranty carry only the unexpired portion of the original warranty.

SOLE WARRANTY

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on the part of the manufacturer. No person, including any dealer, representative or agent of Scully is authorized to assume for Scully any liability in its behalf or in its name, except to refer purchasers to this warranty. Scully shall not be liable for claims, demands, or damages of any nature, however denominated.

Scully reserves the right to modify or change the equipment, in whole or in part, at any time prior to delivery, in order to include refinements deemed appropriate by Scully, without incurring any liability to supply new equipment in accordance with earlier specifications, or to so modify or change any equipment previously delivered.

THE SERVICE AND RETURN OF WARRANTY COVERED EQUIPMENT

When necessary to return parts or equipment for replacement or repair, please wire, write or phone Scully Recording Instruments Company for return authorization, supplying the following:

A. Thoroughly identify the part in question by using the part number and description in the manual parts list.

B. Identify the type, model number, and serial number of the unit in which it is used.

C. Give the date of purchase and name of distributor or supplier.

D. Describe the nature of defect and reason for replacement or service.

The Scully Recording Instruments Company maintains a factory repair service department for In Warranty and Out Of Warranty repair of Scully equipment. It is intended to serve the customers who are not familiar with Scully equipment to make use of the Scully Service Consultation facilities, or whose difficulties cannot be solved by local service representatives or phone calls.

For all In Warranty units or parts, there will be no labor or handling charge if the unit or part complies with the terms and conditions of the Warranty, in the judgment of Scully Recording Instruments Company. Should the terms and conditions of the Warranty be violated, there will be a minimum labor and handling fee plus the cost of the parts replaced.

The Scully Recording Instruments Company will promptly supply the necessary replacement or service. PLEASE DO NOT return the original component until specifically requested to do so.

SUPPLEMENTARY TECHNICAL DATA AND INSTRUCTION MANUAL REVISIONS

Supplementary technical data in the nature of service bulletins engineering change notices, recommended modifications, etc. will be issued for the Models in this manual when appropriate.

Instruction manual revisions, supplements, or corrections will also be issued when warranted.

These data are issued in loose-leaf form and, when received, should be bound behind this page for convenient reference.

TO ASSURE YOUR EARLY INCLUSION ON OUR MAILING LIST, FILL OUT YOUR WARRANTY CARD AND RETURN IT IMMEDIATELY TO:

Scully Recording Instruments Co.
Division of Dictaphone Corp.
480 Bunnell Street
Bridgeport, Conn., 06607

Telephone 203-335-5146

Scully

✓ 280
— 284

SERIES FINAL TEST REPORT

Customer Seco Labs

Shop Order Number 3378

Serial Number 4901

Model 280-2

Tape Speed 7½-15

Date 5-24-42

CAUTION — Demagnetize heads before starting test procedure!

1. Playback Alignment Response

SPEED	HI	HI	HI	HI	HI	HI	HI	HI	LO	LO	LO	LO	LO	LO	LO	LO
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Ref tone	0	0							0	0						
15 Khz	-1/2	-1/2							-1	-1/4						
12 Khz	-1/4	-1/4							0	0						
10 Khz	0	0							0	0						
7.5 Khz	0	0							0	-1/4						
5 Khz	0	0							-1/4	-1/4						
2.5 Khz	0	0							-3/4	-3/4						
1 Khz	0	0							-1	-1						
500 Hz	-1/2	-1/2							-1	-1						
250 Hz	0	0							-1/2	-1/2						
100 Hz	-1/2	-1/4							0	-1/2						
50 Hz	1/4	1/2							-1	-1						
30 Hz	-2	-2							/	/						

2. Phase

	1	2	3	4	5	6	7	8
1KHZ	OK							
10KHZ								

3. Hum Level

1	2	3	4	5	6	7	8
-70	-70						

Remarks: Console; H&D from +10 d.b.m. at 1KC .1% .1%

Tested by: [illegible]

Supervisor: _____

Scully

Serial Number 4901

4. Overall Frequency Response

SPEED	HI 1	HI 2	HI 3	HI 4	HI 5	HI 6	HI 7	HI 8	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
15 Khz	1 3/4	1 3/4							-1	-1 1/4						
12 Khz	1/2	1/2							0	0						
10 Khz	0	0							0	0						
7.5 Khz	-1/2	-1/2							0	-1/4						
5 Khz	-1/2	-1/2							-1/4	-1/4						
2.5 Khz	0	0							-3/4	-3/4						
1 Khz	0	0							-1	-1						
500 Hz	-1/4	-1/4							-1	-1						
250 Hz	-1/4	0							-1/2	-1/2						
100 Hz	1/2	1							0	-1/2						
50 Hz	1 3/4	2							-1	-1						
30 Hz	-1	-1 1/2							/	/						

	1	2	3	4	5	6	7	8
5. Rec. S/N from +10								
6. Rec. Phase 1 KHZ	OK							
6. Rec. Phase 10 KHZ								
7. Bias Meter / Adj.	10 -2	20 -4	/	/	/	/	/	/
8. Rec. Transient In	-56	-58						
8. Rec. Transient Out	-53	-56						
9. Depth of Erase	-69	-72						
10. Erase Reading	0	0						
11. Erase Leakage at 10 Khz	-1/2	-1/2						
12. Sync Response at 10 Khz	/	/						
13. MIC In at 1 Khz	-5 1/2	-5 1/2						

14. Flutter - % RMS	High Speed .07 %	Low Speed .1 %	
15. Type & Serial No. of Heads	PB 420 N	R 714 N	E 554 N
16. Type & Serial No. of Motor	C 4462 A	T 7663 A	T 7719 A

	1	2	3	4	5	6	7	8
17. Amp. Serial No.	12067	12180						

Serial Number of Cards

TRACK NUMBER	PB	Rec.	Osc.
1	8955	12420	11225
2	8953	12450	11196
3			
4			
5			
6			
7			
8			