AMPEX

4890163-01

AG-300 and AG-305 Recorder/Reproducer

Operation and Maintenance Manual

ISSUED: 1 FEBRUARY 1966

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Section 1

DESCRIPTION

1.1 GENERAL

Ampex Models AG-300 and AG-305 Magnetic Tape Recorders and Reproducers are derived from the Ampex Series 300 equipment. Basically, the transport is the same as the famous Ampex Model 300, long recognized as a standard in the professional recording field. Added to this transport are new, all solid-state, electronic assemblies which combine high quality performance and long, dependable, operating life.

The Model AG-300 (see Fig. 1-1) is a recorder and reproducer. The Model AG-305 is a reproduce-only equipment. Both models are available for use with 1/4-inch tape (one or two channels) or with 1/2-inch tape (three or four channels).

Two mounting arrangements are available. The equipment may be ordered mounted in an Ampex console as shown in Fig. 1-1, or unmounted for installation in racks or in custom consoles.

1.2 TAPE TRANSPORT

The tape transport (see Fig. 1-2) handles reels 10-1/2 inches in diameter. Tape width can be either 1/4-inch or 1/2-inch, as specified by the customer.

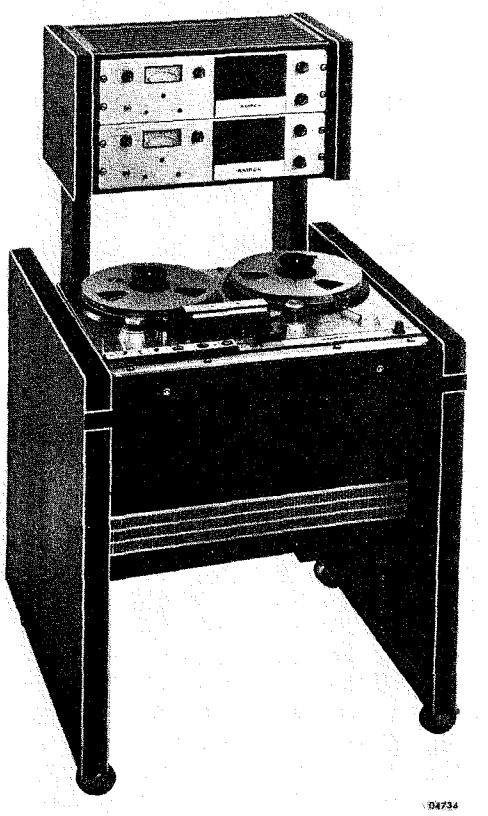

Fig. 1-1 Ampex Model AG-300, Console Mounted

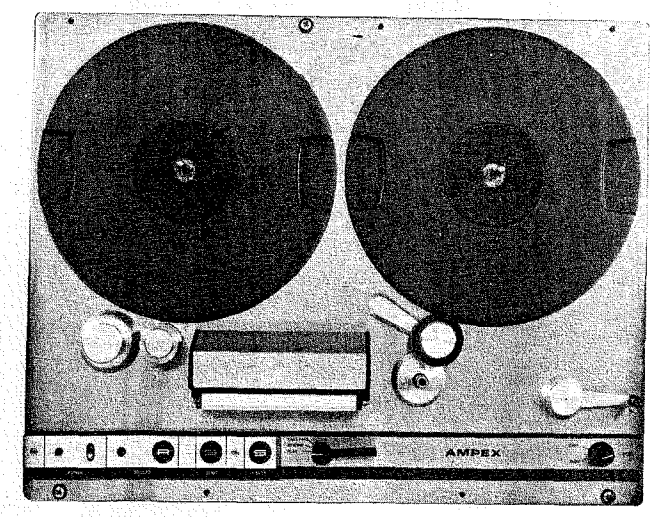

Fig. 1-2 Tape Transport, ½-inch

Two tape speeds are available on each tape transport. Standard speed pairs are 3-3/4 - 7-1/2 inches per second (ips), 7-1/2 - 15 ips, and 15 - 30 ips.

Tape motion, and mode of operation is controlled by a rotary selector switch and three pushbuttons (RECORD, START, STOP) on the transport. Tape speed is selected by another rotary switch and power application to the entire system is controlled by a toggle switch. Equalization in the electronic assemblies is automatically changed in accordance with the tape speed selected.

Manually operated tape lifters, actuated when the head gate is opened, remove the tape from contact with the heads during fastwinding operations.

1.3 ELECTRONIC ASSEMBLIES

On record/reproduce equipment, one electronic assembly (see Fig. 1-3) is provided for each channel. This assembly contains all circuitry for recording and reproducing one channel of program material. Plug-in equalizer modules are inserted in receptacles beneath a cover on the front panel; equalization is switched automatically when tape speed is selected at the tape transport. A record selector switch allows recording on any or all channels, or places the electronics in a "safe" condition where no recording is possible. A vu meter on each assembly provides visual monitoring of record, reproduce, and bias levels on that channel. Power for the electronics is provided by a power supply which is an integral part of the assembly.

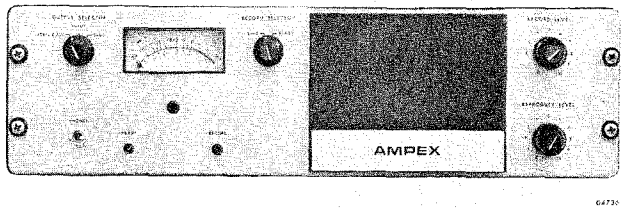

Fig. 1-3 Record/Reproduce Electronic Assembly

The electronic circuitry for reproduce-only equipment is divided into individual audio and power supply modules. Each power supply module will accommodate either one or two audio modules. One power supply and two audio modules mount on a chassis which is the same size as the record/reproduce module described in the previous paragraph (see Fig. 1-4).

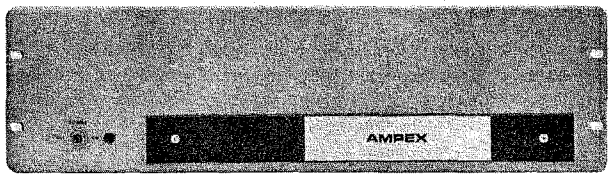

Fig. 1-4 Reproduce-only Electronic Assembly

All assemblies can be strapped to provide either a +8 dbm or a +4 dbm operating level output into a 600 ohm line.

1.4 HEAD ASSEMBLIES

Standard head assemblies for record/reproduce equipment contain three head stacks -- erase, record, and reproduce. Each stack may contain one or more heads, depending on the number of channels which will be recorded or reproduced.

Heads for use with 1/4-inch tape can be for either single channel (full track or half track) or two channel operation. Heads for 1/2-inch tape can be for either three channel or four channel operation.

Heads for reproduce-only equipment contain one (reproduce) head stack. As described previously, there can be one, two, three, or four reproduce heads in this stack, depending upon track configuration and tape width.

1.5 ACCESSORY EQUIPMENT

1.5.1 Input

On record/reproduce equipment, an accessory receptacle and input selector switch are mounted on the back panel of the electronic assembly for optional plug-in units. No accessory unit is required if the equipment is to be fed from an unbalanced line; the input selector switch is simply placed in the UNBAL BRIDGE position.

If a balanced line input is used, either of two input transformers must be plugged into the receptacle. One of these optional transformers (Catalog No. 4580116-01) is a balanced bridging unit with unity gain; the other (Catalog No. 4580116-02) is a balanced matching unit with 14 db gain. Using either of these accessories requires that the input selector switch be placed in the ACCESSORY position.

A microphone preamplifier (Catalog No. 4010040-01) can also be inserted in the accessory receptacle to allow recording directly from a microphone. A switch on the preamplifier selects either 60 or 40 db gain for this unit. The input selector switch is placed in the ACCESSORY position when the preamplifier is used.

1.5.2 Remote Control

The starting and stopping of play and record modes can be controlled from a remote location. Ampex does not supply a remote control unit as an accessory, but it can be easily constructed as explained in Section 2.

If the remote control function is not used, the dummy plug (supplied) must be inserted in receptacle J804S or the transport will not operate.

1.5.3 Motor Drive Amplifier

A motor drive amplifier can be plugged into receptacle J805 at the back of the transport to provide a precise a-c drive for the capstan drive motor. Power to the amplifier is taken at pins 1 and 4 (neutral) of J805, and the precision drive frequency is returned at pins 5 (neutral) and 8. The dummy plug (provided) can be used as a mating connector by removing the jumper.

If a motor drive amplifier is not used, the dummy plug (as supplied) must be inserted in receptacle J805 or the capstan motor will not operate.

1.5.4 Sel-Sync* Assembly

Use of this optional accessory with three or four channel equipment allows the recording of sound on sound, where different tracks on the tape may be recorded at different times while maintaining perfect synchronization. Speaking generally, this is accomplished by recording the first track (or tracks) in the normal manner, then defeating the record function on that track. The record head which recorded the first track is switched to the playback electronic circuit, where it acts temporarily as a playback head. A subsequent record run can then be made on another channel, monitoring the first recording. Since the record heads are precisely aligned in one stack, there will be no time lag between the head through which the first recording is monitored and the head that is making the second recording. The two recordings can therefore be made in perfect synchronization. The procedure can be used to record all tracks on the tape at different times.

*TM, Ampex Corporation

1.6 SPECIFICATIONS

1.6.1 Tape Transport

Tape Width	1/4-inch or 1/2-inch, as ordered
Tape Speeds	Two Speeds: 3-3/4 and 7-1/2 ips or 7-1/2 and 15 ips or 15 and 30 ips.
Maximum Reel Size	10-1/2-inch NAB, will operate with 7-inch EIA reels if tape tension is reduced (refer to Section 4).
Start Time (Using Fast Start)	1/4-inch tape: 0.1 second 1/2-inch tape: 0.5 second
Flutter and Wow Measured According to ASA Z57.1 - 1954, measuring all flutter components from 0.5 to 200 Hz	30 ips: Not more than 0.05% rms 15 ips: Not more than 0.07% rms 7-1/2 ips: Not more than 0.14% rms 3-3/4 ips: Not more than 0.21% rms
Speed Accuracy	±0.2%, which corresponds to 3.6 seconds in a 30 minute recording.

1.6.2 Electronics

Input	100,000 ohms unbalanced. Will accept input signal levels as low as -18 dbm for normal recording level.
Output	Will feed a 600 ohm line, balanced or unbalanced, with a nominal output level of +8 dbm or +4 dbm (depending on internal strapping.) Maximum playback output level before clipping is at least +28 dbm.
Overall Frequency Response (500 Hz reference)	30 ips: ±2 db 50 to 20,000 Hz 15 ips: ±2 db 30 to 18,000 Hz 7-1/2 ips: ±2 db 40 to 10,000 Hz +2 - 4 db 30 to 15,000 Hz 3-3/4 ips: ±2 db 50 to 7,500 Hz

Overall Signal-to-Noise Ratio

Head	Tape Width	30 ips	15 ips	7-1/2 ips	3-3/4 ips
Full Track	1/4 inch	60 db	60 db	60 db	55 db
Half Track	1/4 inch	57 db	57 db	57 db	50 db
Two Track	1/4 inch	57 db	57 db	57 db	50 db
Three Track	1/2 inch	60 db	60 db	60 db	-
Four Track	1/2 inch	57 db	57 db	57 db	-

Signal-to-noise is measured from peak record level (which is 6 db above normal operating level) to unweighted noise. Noise is measured while erasing a 500 Hz tone which is recorded at peak record level, using a filter (refer to Section 5) to attenuate noise outside of the audio spectrum.

	Even-Order Distortion	The second harmonic distortion of a 500 Hz signal recorded at normal record level is less than 0.4%.
1.6.3	General	
	Power Requirements	105 - 125 volts a-c, 60 Hz, single phase (Equipment available for 50 Hz operation).
	Power Consumption	Tape Transport: Approximately 2.5 amperes at 117 volts. Electronic Assembly: Approximately 0.15 ampere at 117 volts, for each assembly.
	Magnetic Tape	Specifications are based on the use of professional quality magnetic tape, such as Ampex No. 631 or equivalent.

Section 2

INSTALLATION

2.1 UNPACKING

2.1.1 Console Mounted Equipment

Equipment ordered with the console is shipped with all assemblies mounted on the console, and connections completed between those assemblies. The console lies flat on its back in the shipping package, with the tape transport rotated 90° in the console so that it is in the horizontal position during transit.

Open the shipping container completely, and be sure the casters are screwed fully in so that the studs will not be bent when the recorder is tilted to the upright position. Place a board in position to block the casters. Grasp the console at the rear members between the electronic housing and the tape transport (see Fig. 2-1) and raise the console up and forward so that it comes to the vertical position, resting on the four casters.

A bolt on each side of the transport frame available from the back of the console, secures the transport in position during transit. Manually support the transport and remove the two bolts.

WARNING

THE TRANSPORT IS HINGED OFF CENTER. PERSONAL INJURY COULD RESULT IF THE TRANSPORT IS NOT FIRMLY SUPPORTED WHEN RETAINING BOLTS ARE REMOVED.

Loosen the knurled knob of the screw on the left inner side of the console. Position the transport horizontally, so that the screw will mate with one of the threaded holes, and tighten.

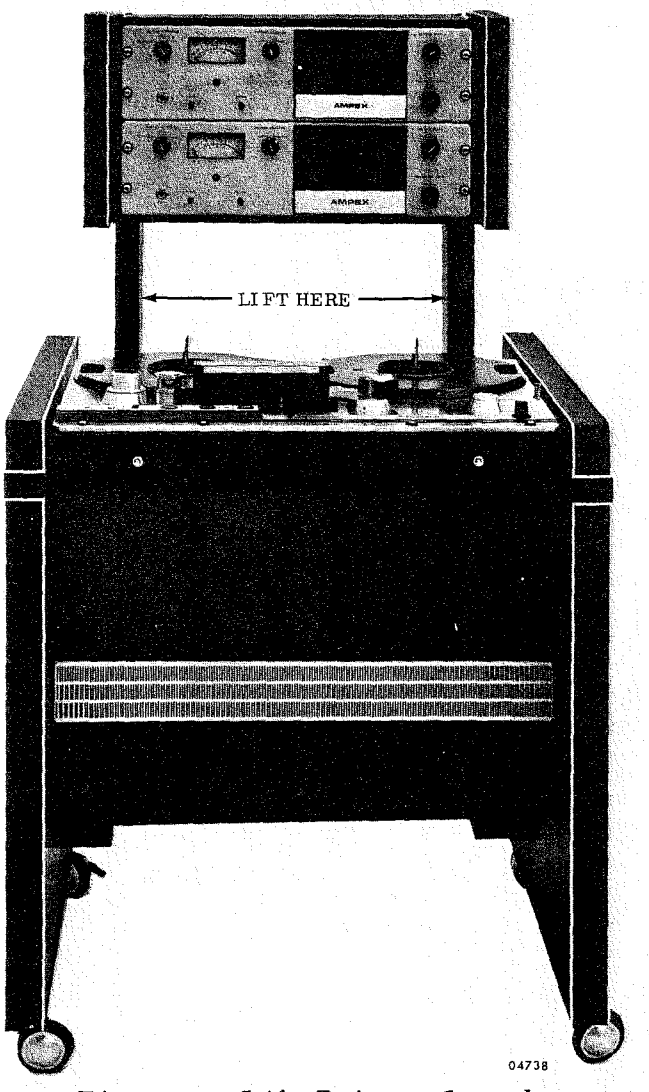

Fig. 2-1 Lift Points, Console Mounted Equipment

Examine the equipment for any sign of damage incurred in transit. If any such damage is noted, report it immediately to your Ampex distributor and the transportation company involved.

2.1.2 Unmounted Equipment

Unmounted equipment is shipped with the tape transport and electronic assemblies packaged separately. Unpack each case, checking for shipping damage. If any has occurred, report it immediately to your Ampex distributor and the transportation company involved.

2.2 MOUNTING

When the equipment is ordered with the console, all assemblies are mounted in position at the factory.

Other equipment can be mounted in standard 19-inch racks, or in custom cabinets. Mounting dimensions are given on Fig. 2-2. The major limitations in such mounting is that tape transport and electronic assemblies must be located so that it is not necessary to lengthen the head cables as supplied. Adequate ventilation must be provided.

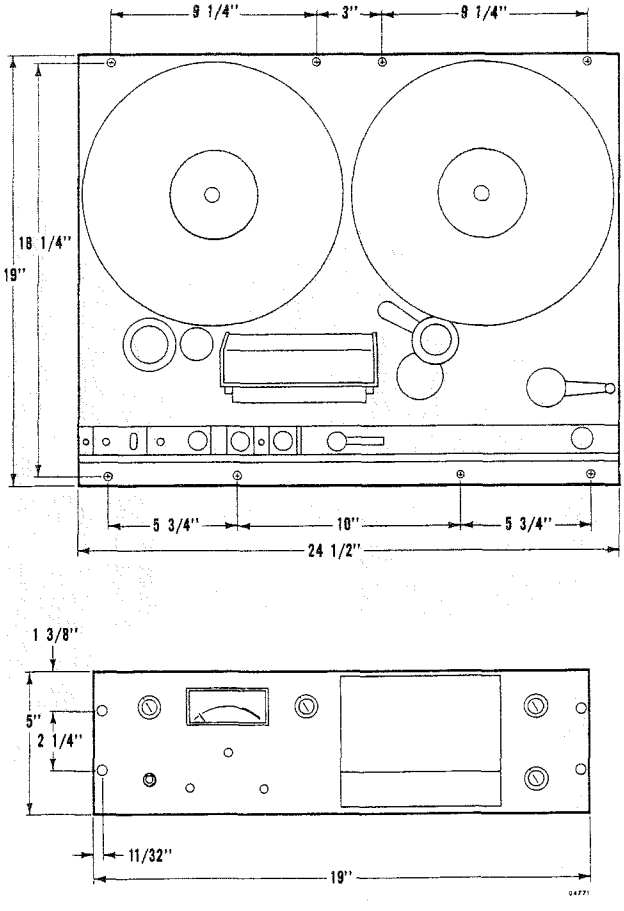

Fig. 2-2 Mounting Dimensions

2.3 INTERCONNECTING THE ASSEMBLIES

2.3.1 Console Mounted Equipment

All assemblies shipped in a console are interconnected at the factory. It is therefore necessary only to connect the signal leads (refer to paragraph 2.4) and the power cable (refer to paragraph 2.5). If because of maintenance or other reasons it becomes necessary to interconnect assemblies in the console, follow the instructions given in paragraph 2.3.2 (without Sel-Sync) or 2.3.3 (with Sel-Sync). Route the cables as at the factory, with control and bias lines in the right upright (as viewed from the back of the equipment). Signal and head cables are run through the left upright.

Receptacles referenced are shown in Figs. 2-3, 2-4, and 2-5.

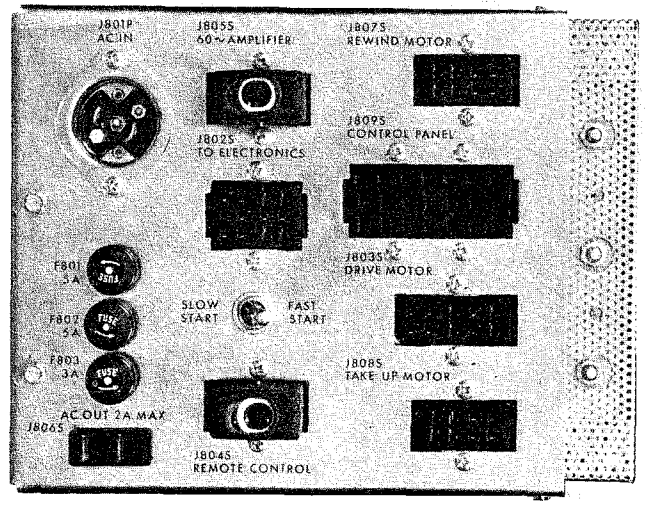

Fig. 2-3 Tape Transport Connector Panel

2.3.2 Unmounted Equipment without Sel-Sync

After mounting such equipment, make the following connections between the assemblies.

a. Connect the control cable, Catalog No. 4050392, from receptacle J802S on the transport control box to J9 at the back of the electronic assembly. If this is a multi-channel equipment, this cable will have two, three, or four breakouts to correspond to the number of channels. Connect it to J9 at all electronic assemblies.

b. Connect the captive head cables to the applicable connectors on the back of each electronic assembly. If this is a multi-channel equipment, the cables are marked with the head track to which they are connected. Track 1 is furthest from the top plate of the transport.

c. If this is a multi-channel equipment, connect the bias cable, Catalog No. 4050160, between BIAS COUPLING connectors J12 on all electronic assemblies. For two channel equipment one bias cable is supplied, which is connected directly between J12 on the two assemblies. For three channel equipment, two bias cables and one "T" adaptor are provided; insert the adaptor in J12 on the middle assembly and the two cables from the adaptor to the other two assemblies. On four channel equipment three cables and two adaptors are supplied; insert the two adaptors in J12 on the middle two assemblies and connect the three cables.

2.3.3 Unmounted Equipment with Sel-Sync

a. Connect the control cable, Catalog No. 4050392, from receptacle J802S on the transport control box to J1P at the back of the Sel-Sync assembly.

b. Connect the control cables, Catalog No. 4050393, from J9 on each electronic assembly to J2S through J4S (three channel equipment) or J2S through J5S (four channel equipment). These cables are supplied in different lengths, one for each channel, to allow convenient connections between the Sel-Sync and electronic assemblies.

c. Connect the record head cables, captive at the tape transport to J6P, J10P, and J14P (three channel equipment) or to J6P, J10P, J14P, and J18P (four channel equipment). These connectors correspond to tracks 1 through 3 or 1 through 4 respectively.

d. Connect the separate record head cables furnished with the equipment from Sel-Sync connectors J8P, J12P, and J16P (three channel equipment) or J8P, J12P, J16P, and J20P (four channel equipment) to record head connector J8 at each electronic assembly. These cables are again supplied in different lengths, one for each channel. Connectors correspond to channels 1 through 3 or 1 through 4 respectively.

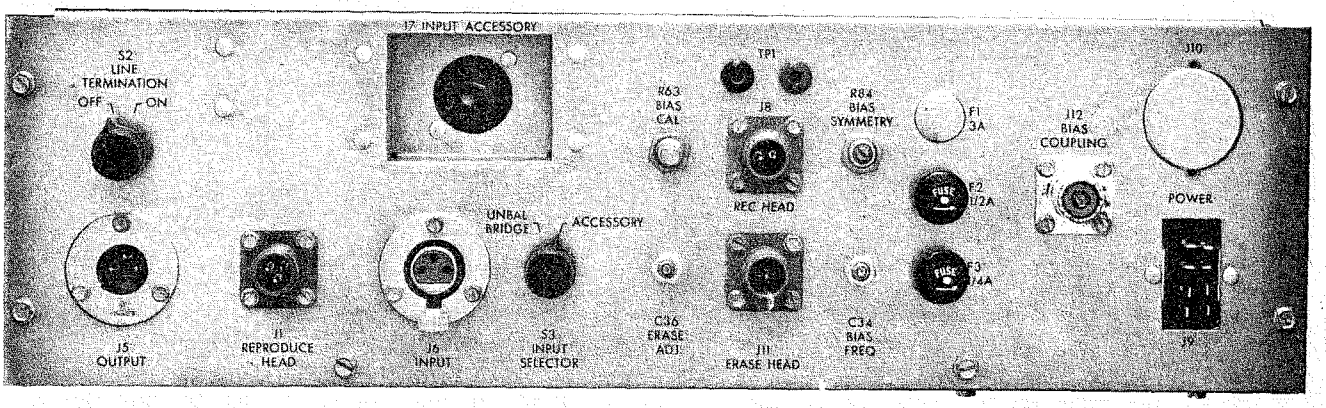

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Fig. 2-4 Rear View, Record/Reproduce Electronic Assembly

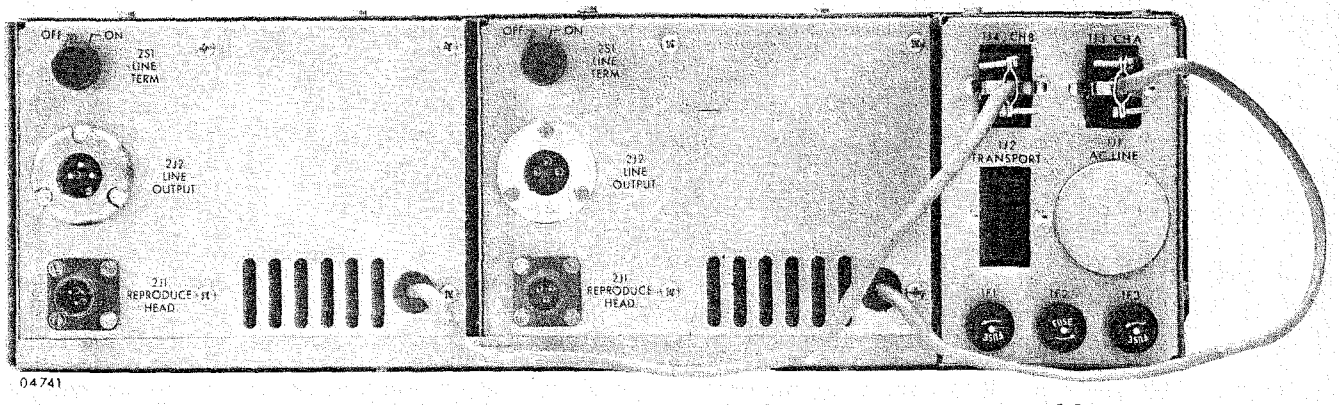

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Fig. 2-5 Rear View, Reproduce-only Electronic Assembly

e. Connect the playback head cables, captive at the tape transport, to Sel-Sync connectors J7P, J11P, and J15P (three channel equipment) or J7P, J11P, J15P, and J19P, (four channel equipment). Connectors correspond to tracks 1 through 3 or 1 through 4 respectively.

f. Connect the separate playback head connectors from Sel-Sync connectors J9P, J13P, and J17P (three channel equipment) or J9P, J13P, J17P, and J21P (four channel equipment) to playback head connector J1 on each electronic assembly. Connectors correspond to channels 1 through 3 or 1 through 4 respectively. One cable is supplied for each channel.

g. Connect the bias cable between electronic assemblies as described in paragraph 2.3.2 (c).

2.4 CONNECTING SIGNAL LINES

2.4.1 General

Input and output receptacles are standard XL connectors, female and male respectively, located on the back panel of the electronics assembly. Mating plugs for these receptacles are provided with the equipment.

On console mounted equipment, remove the back panels from the electronic housing and the transport housing. Insert the signal lines through the hole on the inward side of the left upright (as viewed from the back of the recorder) that supports the electronic housing. Route the lines up through this hollow upright, then fan them out from the rear of the upright to the applicable electronic assembly. (After entering the upright, these lines follow the same general path as the head cables.) Note that the power cable should also be connected before reinstalling the back panels (refer to paragraph 2.5).

2.4.2 Input Connection and Switching

To connect an unbalanced line input, wire the signal leads to pins 2 (ground) and 3, and the shield to pin 1; then jumper pin 2 to pin 1. With this connection, place the INPUT SELECTOR switch on the back of the electronic assemblies in the UNBAL BRIDGE position.

To connect a balanced line or microphone input, wire the signal leads to pins 2 and 3, and the shield to pin 1 (ground); do not jumper pins 2 and 1. With this connection, place the INPUT SELECTOR switch in the ACCESSORY position. One of the optional input transformers or the optional microphone preamplifier (refer to Section 1) must be inserted in octal socket J7 (INPUT ACCESSORY) at the back of the electronic assemblies whenever a balanced line input is used.

2.4.3 Output Connection, Strapping, and Switching

To obtain an unbalanced line output, wire the signal leads to pins 2 (ground) and 3, and the shield to pin 1; then jumper pins 1 and 2.

For a balanced line output, wire the signal leads to pins 2 and 3 and the shield to pin 1; do not jumper pins 1 and 2.

The equipment is shipped from the factory strapped for a +8 dbm operating level output into a 600 ohm line. This can be changed to a +4 dbm operating level output by removing the top service cover from the electronic assembly and restrapping the terminal board in the upper back corner (above the LINE TERMINATION switch). Restrap the board as indicated on the schematic diagrams (see Figs. 7-3 or 7-6).

In most instances, the LINE TERMINATION switch on the back panel of the electronic assemblies is to be left in the OFF position except during tests and adjustments. However, if the equipment is to drive a high impedance load (2000 ohms or more) leave that switch in the ON position.

2.5 CONNECTING POWER

The power cable, which is provided, connects from receptacle J801P on the back of the tape transport to the power source. On console mounted equipment, the back panel of the transport housing must be removed. Route the power cable through the right-hand oblong hole in the console cross member to connector J801 on the transport.

2.6 INSTALLING PLUG-IN EQUALIZERS

Receptacles for the plug-in equalizer modules of record/reproduce equipment are located behind a cover, secured by two screws to the front panel of the electronic assemblies (see Fig. 2-6). The low speed equalizer is inserted in the left-hand receptacle (as viewed from the front), the high speed equalizer in the right-hand receptacle. Equalizer modules are marked for the tape speed with which they are to be used, and for the type of equalization (NAB, CCIR, etc.).

On reproduce-only equipment, the equalizer circuits are built into the electronic assembly, so no plug-in modules are employed.

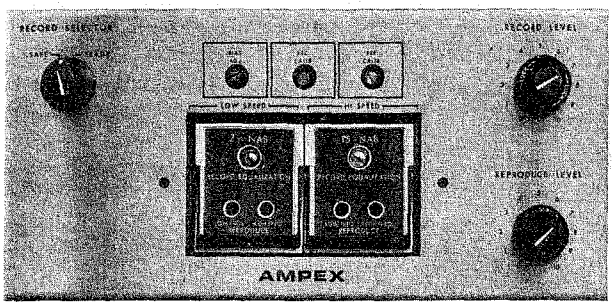

Fig. 2-6 Plug-in Equalizer Modules

2.7 INSTALLING ACCESSORY ITEMS OR DUMMY PLUGS

2.7.1 Electronic Assemblies

As previously noted, either of two transformers (for a balanced line input) or a microphone preamplifier can be inserted in octal socket J7 on the back panel of the electronic assembly. When any such accessory is used, the INPUT SELECTOR switch is placed in the ACCESSORY position. No dummy plug is required if an accessory is not used; the INPUT SELECTOR switch is simply placed in the UNBAL BRIDGE position. The microphone preamplifier has a switch which selects either 40 or 60 db gain in this unit, when the preamplifier is used, place this switch in the position applicable to the microphone being used.

2.7.2 Tape Transport

2.7.2.1 Motor Drive Amplifier

A precision drive amplifier for the capstan motor can be connected at J805S on the tape transport. The a-c power to the amplifier is taken at pins 1 and 4 of this connector, and the precision frequency a-c drive for the capstan motor is delivered to pins 5 and 8.

If a motor drive amplifier is not employed, a dummy plug (provided) must be inserted in J805S or the capstan motor will not operate.

2.7.2.2 Remote Control

A remote control unit can be connected to receptacle J804S on the tape transport control box. Ampex does not offer this item as an accessory unit, but one can be easily constructed by following the circuit shown in Fig. 2-7. The dummy

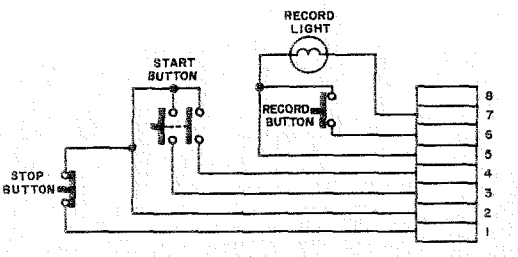

Fig. 2-7 Suggested Remote Control Circuit

plug provided with the transport can be used as a mating connector by removing the jumper.

In fabricating a remote control unit, Class I wiring must be used. Switches are available from Ampex under part numbers 120-025 (START), 4620144-10 (RECORD), and 4620144-20 (STOP). If purchased from vendors, these switches must be equivalent to Arco Electric switch number 2MD3-1A (two each, with mounting bracket A-14) for the start function, A.H. and H. switch 82795 (normally open) for the record function, and A.H. and H. switch 82795 (normally closed) for the stop function. The record indicator lamp must be 120 volts, 6 watts, with U.L. approved base. All of this is in accordance with U. L. requirements.

If a remote control unit is not used, the dummy plug (as furnished) must be inserted in J804S or the equipment will not operate.

2.8 PREPARING FOR OPERATION

2.8.1 Shipping Lock and Motor Return Spring

A shipping lock is installed to prevent the drive motor pulley from contacting the rubber tire of the capstan flywheel during transit. This lock is located, with the drive motor return spring, on a bracket at the unmounted end of the drive motor (see Fig. 2-8). Remove this lock before attempting to operate the equipment (the capstan will not rotate unless the lock is removed).

CAUTION

IF THE EQUIPMENT IS EVER RE-SHIPPED, INSTALL THIS SHIPPING LOCK. THE TIRE ON THE CAPSTAN FLYWHEEL MAY BE DAMAGED IF THIS IS NOT DONE.

Also, a stronger drive motor return spring (see Fig. 2-8) is required if the transport is to be operated in the vertical position, such as in a rack. The correct spring for vertical operation is provided with the equipment; if the transport is to operate in this position, remove the

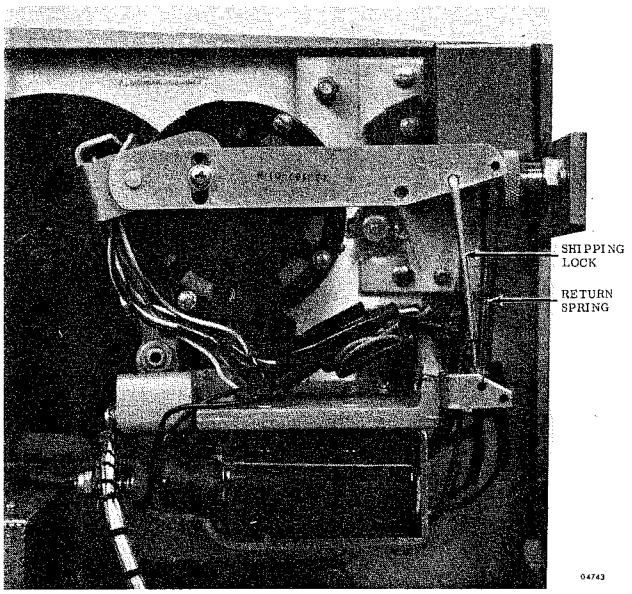

Fig. 2-8 Shipping Lock and Motor Return Spring

spring on the equipment and replace it with the other spring.

2.8.2 Fast/Slow Start Switch

This switch is located on the tape transport control box. In the FAST START position, the capstan will be in rotation whenever power is applied to the equipment. In the SLOW START position, the capstan will not start to rotate until the START pushbutton is pressed for the play or record modes. Place the switch in the desired position.

2.8.3 Reel Idler Flywheel

The reel idler flywheel is not mounted on the transport when the equipment is shipped from the factory. Slip it over the reel idler shaft (see Fig. 4-6), so that the set screw is over the flat on the shaft. Do not press it tightly against the idler bearing, leave one or two thousandths of an inch clearance between the bearing and flywheel. Tighten the set screw to secure the idler in position. If the equipment is ever re-shipped, remove the flywheel to prevent vibration in transit from damaging the idler bearings.

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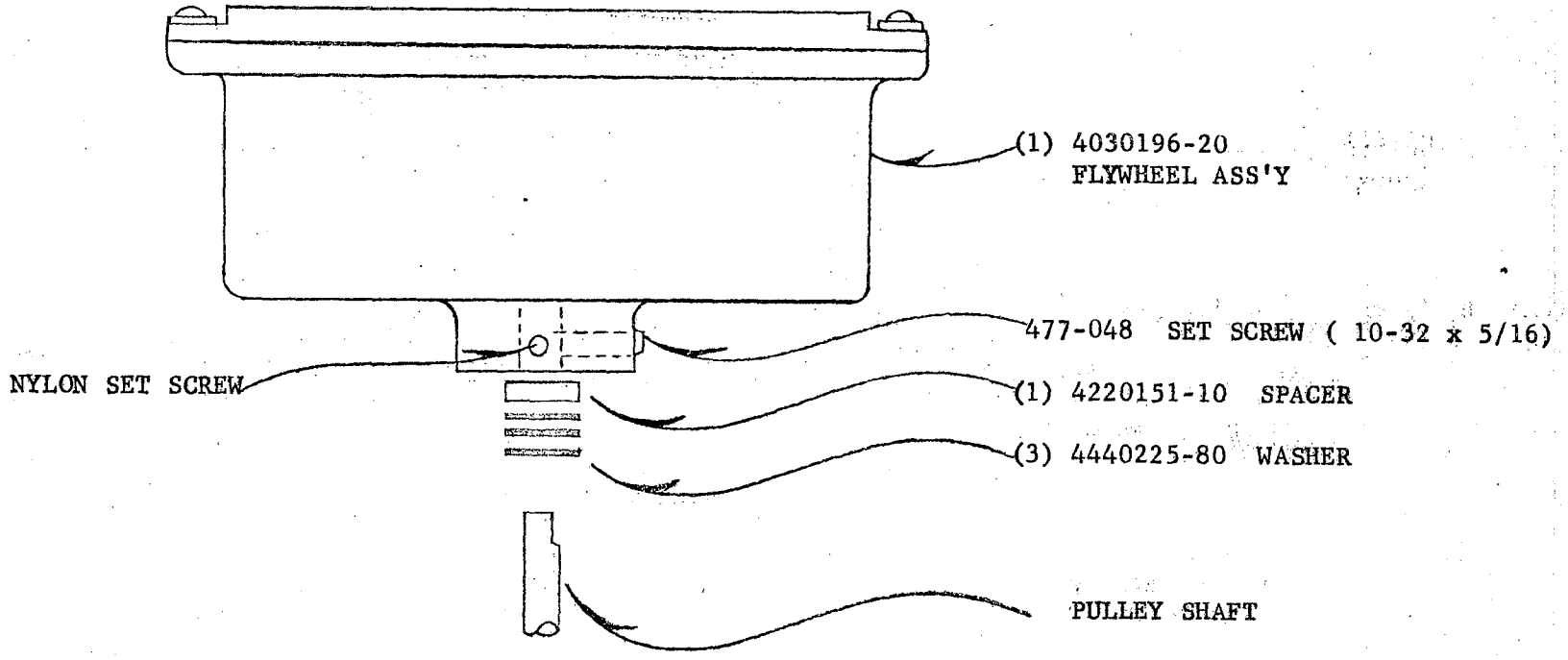
ASSEMBLY INSTRUCTIONS

NOTE: For shipping transport assembly- remove flywheel assembly and protective wrap to prevent damage to Idler Pulley and loss of Pulley Spacer Washer, tape in place to transport face. Tape spacer and washers to Pulley Shaft.



For installation assemble Flywheel to Reel Idler Pulley as shown. Inspect for burrs and do not force flywheel on Pulley Shaft.

See operation and instruction manual Para. 4.4.1 page 4.8 for location.

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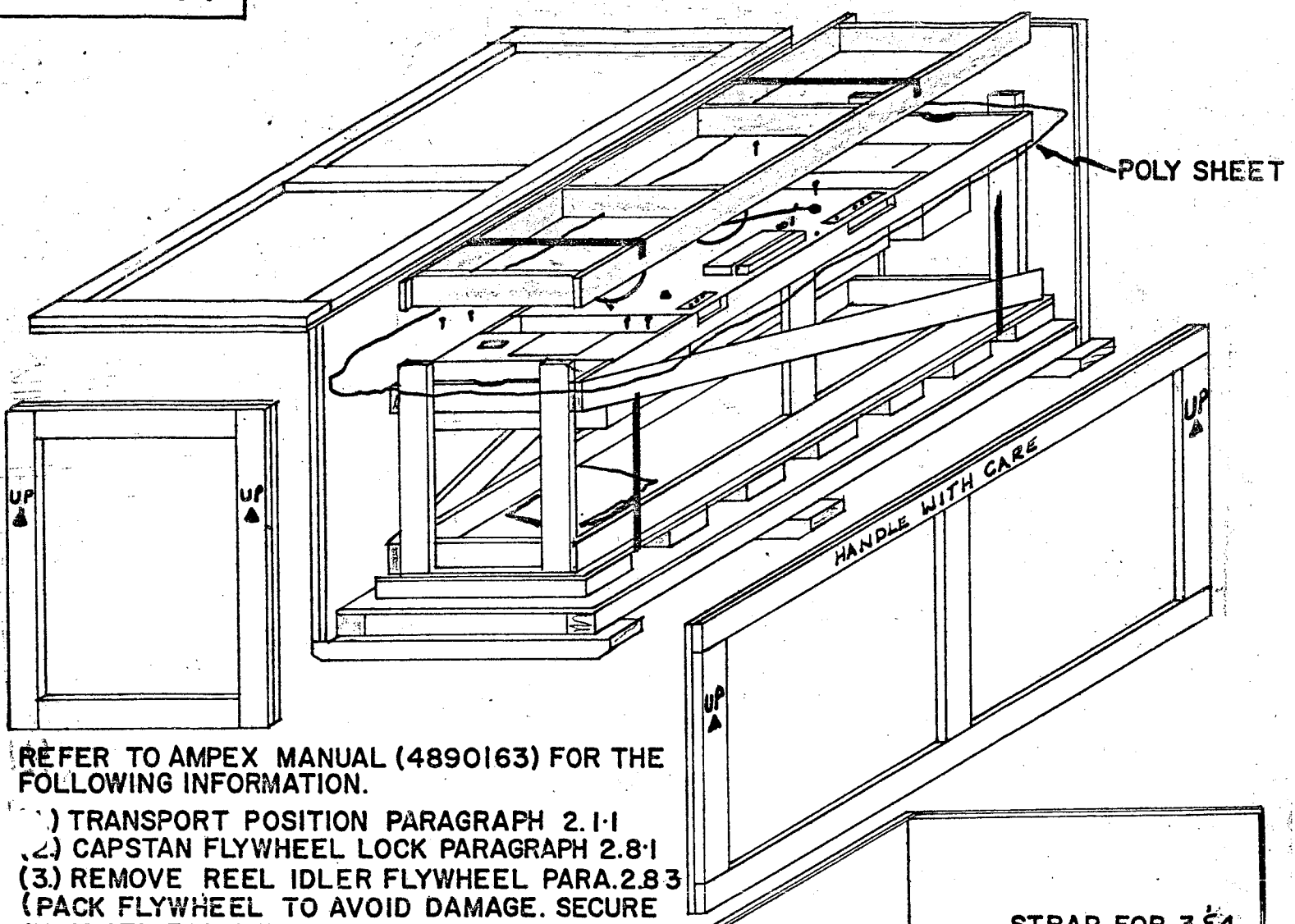
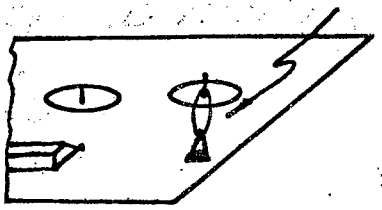
LEAVE INSTRUCTIONS WITH CONTAINER TO INSURE PROPER REPACKAGING

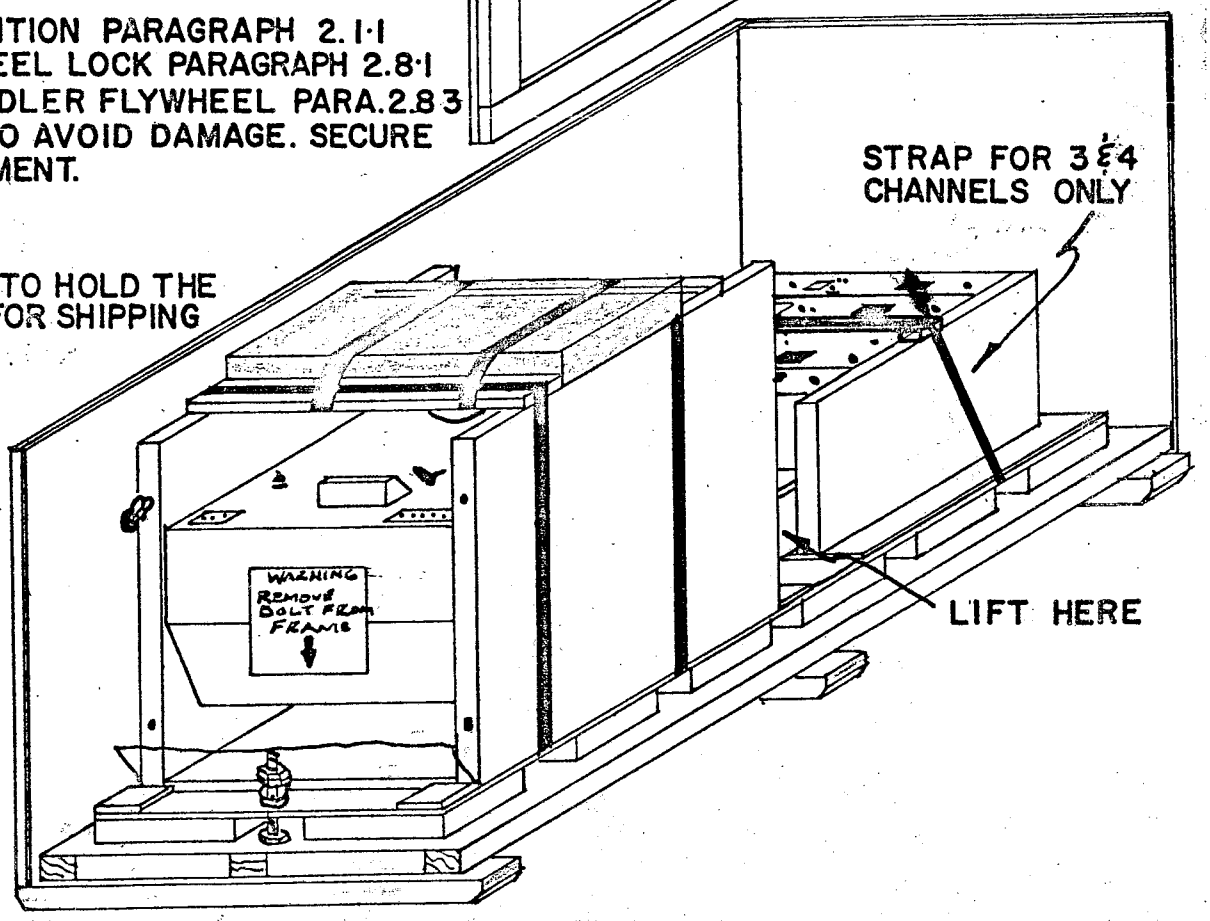


REFER TO AMPEX MANUAL (4890163) FOR THE FOLLOWING INFORMATION.

(1.) TRANSPORT POSITION PARAGRAPH 2.1-1
(2.) CAPSTAN FLYWHEEL LOCK PARAGRAPH 2.8-1
(3.) REMOVE REEL IDLER FLYWHEEL PARA. 2.8 3
(PACK FLYWHEEL TO AVOID DAMAGE. SECURE IN CRATE FOR SHIPMENT.

USE A RUBBER BAND TO HOLD THE TENSION ARM SNUG FOR SHIPPING





RELOCK BASE NUT AFTER INSTALLING CONSOLE

Section 3

OPERATION

3.1 OPERATING CONTROLS AND INDICATORS

3.1.1 Tape Transport (See Fig. 3-1)

POWER toggle switch	Controls application of a-c power to tape transport and all electronic assemblies.
RECORD pushbutton	Places pre-selected channels in the record mode. Has no effect unless the electronic record selector is in the READY position and tape is in motion in the play mode.
RECORD indicator light	Illuminated when equipment is operating in the record mode.
START pushbutton	Starts tape in motion in the mode selected by the mode selector switch.
STOP pushbutton	Stops tape motion in any mode. Drops out record function when appplicable.
Mode Selector rotary switch	Selects mode -- Play, Rewind, or Fast Forward -- in which tape motion will be placed by the START pushbutton.
SPEED rotary switch	Selects FAST or SLOW tape speed. Electronic equalization automatically changed with speed selection.

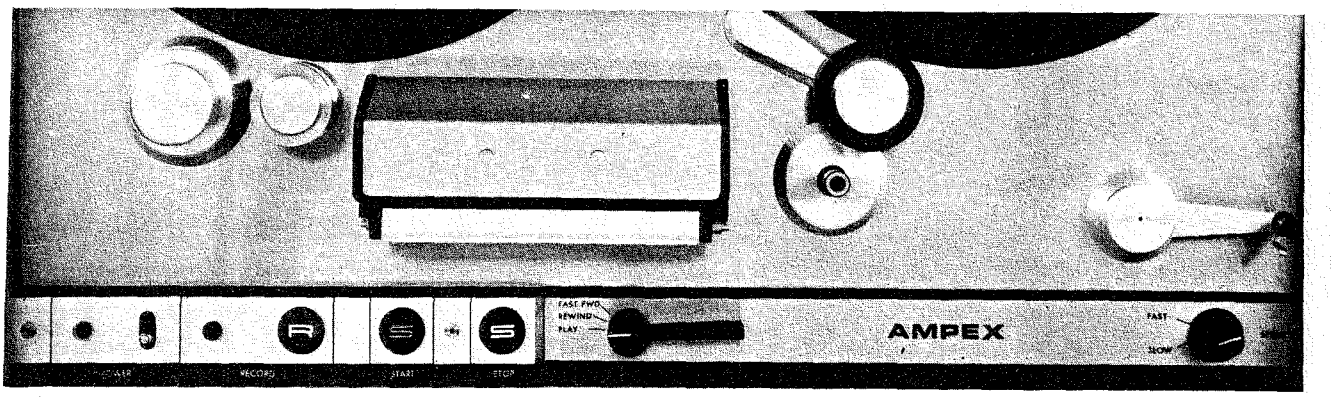


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Fig. 3-1 Operating Controls and Indicators, Tape Transport

3.1.2 Record/Reproduce Electronic Assembly (See Fig. 3-2)

OUTPUT SELECTOR rotary switch	Selects signal "reproduced" from tape, the "input" record signal, or the "bias" current for monitoring on vu meter. Connects reproduced or record signal to output connector and monitor jack.
RECORD SELECTOR rotary switch	Selects "safe" condition where channel cannot be placed in record mode, or "ready" condition where channel can be placed in record mode.
READY indicator light	Indicates channel is ready to start recording.
RECORD indicator light	Indicates channel is operating in the record mode.
VU meter	Visually indicates reproduce, record, or bias level as selected by the output selector switch. Meter lights act as power indicator.
RECORD LEVEL rotary control	Adjust record level.
REPRODUCE LEVEL rotary control	Adjusts reproduce level.

3.1.3 Reproduce-only Electronic Assembly

POWER toggle switch	Controls application of a-c line power to electronic assembly. Has no effect unless power at tape transport is turned on.
VU meters (optional accessory)	Visually indicates reproduce level when supplied. One vu meter for each audio module in the assembly
REPRODUCE LEVEL	Behind cover on front panel. Usually adjusted for correct playback level from tape recorded at normal record level and left in that position. One reproduce level control for each audio module in the assembly.

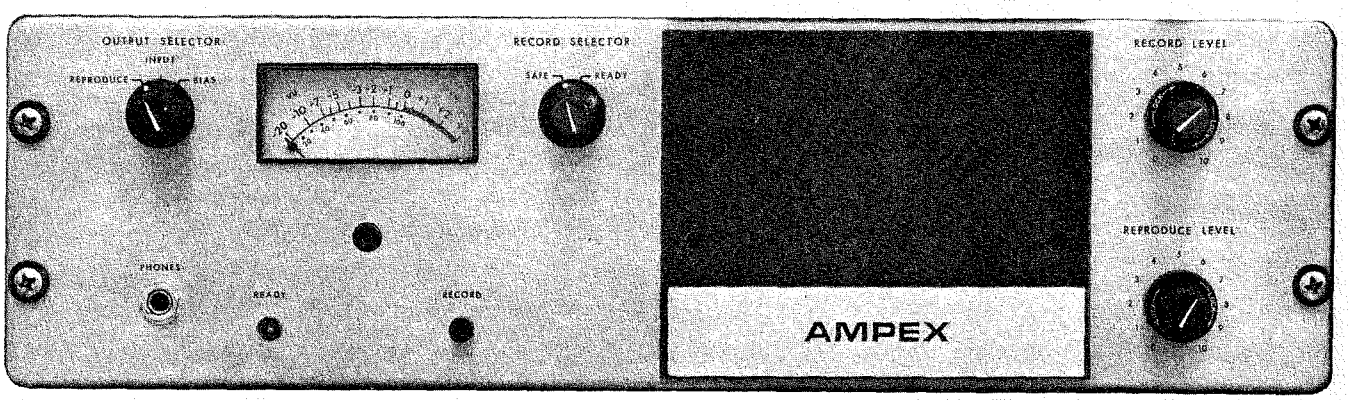


Fig. 3-2 Operating Controls and Indicators, Record/Reproduce Electronic Assembly

3.2 TAPE THREADING

The tape threading path is shown in Fig. 3-3. Open the head gate and thread the tape on the guides. When threading is completed with the tape anchored to the takeup reel hub, turn the takeup reel manually until the supply reel starts to rotate; this removes all tape slack and ensures that the takeup tension arm is not contacting the safety switch.

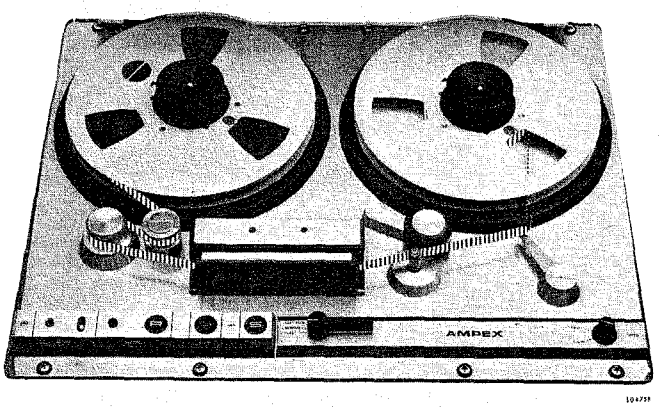


Fig. 3-3 Tape Threading Path

3.3 SELECTING TAPE SPEED

Standard tape speed pairs available on this equipment are 3-3/4 - 7-1/2 ips, 7-1/2 - 15 ips, and 15 - 30 ips. Depending on the particular recorder and the tape speed desired, place the SPEED rotary switch in the FAST or SLOW position.

NOTE

Vibration from the drive motor will be reduced if power is removed from the transport when speed switching is required.

3.4 APPLYING POWER

To apply power to the complete system, simply place the POWER toggle switch on the tape transport in the on (up) position. (On reproduce-only equipment, a power toggle switch on each electronic assembly must also be placed in the ON position to apply power to the electronics.)

3.5 RECORDING

3.5.1 Without Using Sel-Sync

Step 1: Thread blank tape, or tape recorded with material not necessary to save, on the recorder (refer to paragraph 3.2).

NOTE

If a previously recorded tape was recorded on equipment with a different head configuration it is possible that the old recording will not be completely erased. Such tape must be bulk erased before being re-recorded.

Step 2: Select the tape speed desired (refer to paragraph 3.3).

Step 3: Apply power to the equipment (refer to paragraph 3.4).

Step 4: At the electronic assembly, place the RECORD SELECTOR switches in the READY position on the channels which are to be recorded (the READY indicators will be illuminated on those channels). If certain channels are not to record,

leave the RECORD SELECTOR for those channels in the SAFE position.

tep 5: At the electronic assembly, place the OUTPUT SELECTOR switch in the INPUT position on channels which are to record. Using a test signal or rehearsal run, adjust the RECORD LEVEL controls on those channels so that the vu meter indicator swings to 0 on the meter dial on most program peaks (maximum peaks can result in a swing to +2 or +3 on the meter). Lock the controls in that position.

NOTE

If an optional Sel-Sync assembly is connected into the system, but is not to be used, place all front panel switches on that assembly in the NORMAL position.

Step 6: At the tape transport, place the mode selector switch in the PLAY position. Press the START pushbutton, then the RECORD pushbutton. All channels which were in the ready condition will be placed in the record mode (the record indicators on those channels and on the tape transport will be illuminated).

NOTE

In monitoring the record run, the input signal can be compared with the signal actually being recorded on the tape by turning the OUTPUT SELECTOR switch on the electronic assemblies from the INPUT to the REPRODUCE position and vice versa.

Step 7: At the completion of the recording, press the STOP pushbutton on the tape transport to stop tape motion (and drop out the record mode).

3.5.2 Using Sel-Sync

Sound-on-sound recording, using the optional Sel-Sync assembly, requires additional switching procedures to those in the normal recording process.

Step 1: Repeat Steps 1 through 3, paragraph 3.5.1.

Step 2: At the electronic assemblies select the channel(s) on which the first run is to be recorded by placing the appropriate RECORD SELECTOR switch(es) in the READY position. Leave this switch on all other channels in the SAFE position.

Step 3: At the electronic assembly for the channel(s) which will record the first run, place the OUTPUT SELECTOR switch(es) in the INPUT position. Use a test signal or rehearsal run to adjust the RECORD LEVEL controls on those channels so that the vu meter indicator swings to 0 on most program peaks (maximum peaks can result in a swing to +2 or +3 on the meter). Lock the controls in that position.

Step 4: At the Sel-Sync assembly, place all front panel controls in the NORMAL position.

Step 5: At the tape transport, place the mode selector switch in the PLAY position. Press the START pushbutton, then the RECORD pushbutton. The channels selected in Step 2 will be placed in the record mode for the first run. Monitoring can be accomplished to same as in normal recording.

Step 6: At the completion of the first run, press the STOP pushbutton on the tape transport to stop tape motion and drop out the record mode. Rewind the tape to the beginning of the recording.

Step 7: At the Sel-Sync assembly turn the controls for those channel(s) which recorded the first run to the SYNC position. Leave all other controls on that assembly in the NORMAL position.

Step 8: Select the channel(s) which will record the second run by placing the appropriate RECORD SELECTOR switch(es) in the READY position. Turn these switches on other electronic assemblies to the SAFE position.

NOTE

Switching the Sel-Sync controls to the SYNC position (Step 7) defeats the record function on those channels. Therefore, it is permissible to leave the RECORD SELECTOR switch(es) for the channel(s) which recorded previous runs in the READY position.

Step 9: Provide the performer a headset monitor for the channel(s) previously recorded.

Step 10: Set the record level for the channels which will record the second run (refer to Step 3).

Step 11: Start tape in motion in the record mode (refer to step 5).

Step 12: The performer will hear the first recording, and can sing or play in unison with it. At the completion of the second sound run, press the STOP pushbutton to stop tape motion and drop out the record mode.

Step 13: Proceed in this manner as required, being sure to switch the appropriate Sel-Sync controls to the SYNC position as the respective channels are recorded.

3.6 REPRODUCING (PLAYBACK)

Step 1: Thread the recorded tape on the transport (refer to paragraph 3.2).

Step 2: Select the tape speed that corresponds to the speed at which the tape was recorded (refer to paragraph 3.3) and apply power to the equipment (refer to paragraph 3.4).

Step 3: At the electronic assemblies, place all RECORD SELECTOR switches in the SAFE position to prevent accidentally putting the equipment in the record mode and so erasing the tape.

Step 4: At the electronic assemblies, place all OUTPUT SELECTOR switches in the REPRODUCE position.

NOTE

This switch must be positioned as described or there will be no reproduce output.

Step 5: At the tape transport, place the mode selector switch in the PLAY position and press the START pushbutton. Tape will be placed in motion in the reproduce mode. Note that the REPRODUCE LEVEL control will probably be locked in the position which gives proper playback level from a tape recorded at normal operating level. If not, adjust this control to obtain the desired level.

Step 6: To stop tape motion and remove the equipment from the reproduce mode, press the STOP pushbutton on the tape transport.

3.7 USING FASTWINDING MODES

Tape can be quickly shuttled from one reel to the other by using the fastwinding modes. To enter either the rewind or the fast forward mode, place the mode selector switch in the REWIND or FAST FWD position and press the START pushbutton. Once either fastwinding mode is started, it is possible to switch back and forth between rewind and fast forward by switching the mode selector from one position to the other (there is no need to use the stop-start sequence). To remove the equipment from fastwinding, press the STOP pushbutton (or turn the mode selector to the PLAY position). If tape is allowed to run off either reel, automatic stop will occur.

It is recommended that the head gate be opened, and the tape thus removed from contact with the heads when fastwinding.

CAUTION

DO NOT GO FROM A FASTWINDING MODE TO THE PLAY MODE IN SUCH RAPID SEQUENCE THAT TAPE MOTION CANNOT STOP BEFORE THE CAPSTAN IDLER CLAMPS THE TAPE TO THE CAPSTAN. TAPE WILL PROBABLY BE BROKEN OR STRETCHED IF IT IS IN MOTION WHEN THE PLAY MODE IS STARTED.

3.8 POSITIONING TRANSPORT IN CONSOLE

When the equipment is mounted in the Ampex console, the position of the transport can be changed in three increments from horizontal to slanting toward the operator at an approximate 15° angle. To change the position, open the hinged cover directly below the forward edge of the transport, by pressing the two buttons. Manually support the transport and unscrew the knurled knob at the right inner side of the console (see Fig. 3-4).

WARNING

THE TRANSPORT IS HINGED OFF-CENTER. FIRMLY SUPPORT THE TRANSPORT WHILE UNSCREWING THE KNOB, BECAUSE PERSONAL INJURY MIGHT RESULT IF THE TRANSPORT SUDDENLY PIVOTS.

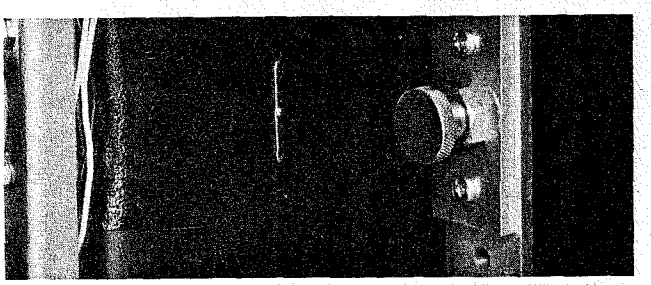


Fig. 3-4 Transport Positioning Screw

Position the transport at the desired angle (so the positioning screw mates with one of the threaded inserts) and retighten the positioning screw. Close the hinge cover, and fasten it in position by pressing the two buttons.

Section 4

TRANSPORT MAINTENANCE

4.1 ROUTINE MAINTENANCE

4.1.1 Cleaning

Cleaning components in the tape path is described in Section 6. It is extremely important that such cleaning be accomplished on a daily basis, or after each eight-hour operating period.

Visually inspect all components at the back of the transport each month. Use a small brush, or a small vacuum cleaner, to remove any accumulations of dirt or dust. If more comprehensive cleaning is required, a clean, lintless cloth moistened with Iso-Propyl alcohol may be used.

CAUTION

DO NOT USE THE BLOWER ACTION OF A VACUUM CLEANER OR ANY OTHER COMPRESSED AIR DEVICE IN CLEANING, BECAUSE DUST MIGHT BE BLOWN INTO BEARINGS OR OTHER ROTATING PARTS. ALSO, IF ALCOHOL IS USED, DO NOT ALLOW IT TO DRIP OR SPRAY INTO SUCH CRITICAL PARTS.

4.1.2 Head Demagnetization

Demagnetization of the heads, explained in Section 6, must be accomplished on a daily basis, or oftener if there is any suspicion that such action is necessary.

4.1.3 Lubrication

4.1.3.1 General

Lubrication of the capstan drive motor, the capstan, and the capstan idler bearing is required each three months or after 1, 000-hour operating period, whichever occurs first. No lubrication of any other component is required.

Ampex lubricating oil (Part No. 4010825), Caloil OC-11, or Shell Turbo #29, can be used.

4.1.3.2 Lubricating Drive Motor

Two oil cups, one from each motor end bell, are provided on the capstan drive motor. Insert four drops of the lubricant (refer to para-

graph 4.1.3.1) in each cup. Do not over-lubricate; wipe off any excess oil.

4.1.3.3 Lubricating Capstan Assembly

Step 1: Loosen the set screw which secures the capstan idler to the arm, and remove the idler.

Step 2: Loosen the set screw which secures the capstan dust cap, and remove the cap.

Step 3: Remove the felt washer exposed in Step 2.

Step 4: Fill the small hole in the upper bearing of the capstan with the recommended lubricant (refer to paragraph 4.1.3.1). Do not over-lubricate; wipe off any excess oil.

Step 5: Replace the felt washer, capstan dust cap, and capstan idler.

NOTE

The capstan idler must be properly positioned in relation to the tape, so thread tape on the equipment and center the idler on the tape. Visual alignment is adequate. Check idler pressure (refer to paragraph 4.2.4 after replacement).

4.1.3.4 Lubricating Capstan Idler Bearing

Step 1: Use a knife blade, or some similar tool to pry the dust cap from the middle of the idler.

Step 2: Place three drops of the recommended lubricant (refer to paragraph 4.1.3.1) directly on the felt washer exposed in Step 1. Do not over-lubricate; wipe off any excess oil.

CAUTION

IF ANY OIL IS SPILLED ON THE RUBBER TIRE OF THE IDLER, CLEAN IT OFF IMMEDIATELY -- USING ISO-PROPYL ALCOHOL. OIL WILL CAUSE DETERIORATION ON THE TIRE.

Step 3: Replace the capstan idler dust cap.

4.2 CHECKOUT AND ADJUSTMENT

4.2.1 Test Equipment Required

Spring scales, as required to measure 1/2 - 1-1/2 ounce, 6 - 11 ounces, 12-21 ounces, 4-1/2 - 5-1/2 pounds.

Length of cord or twine, approximately 30 inches long, with loop tied in one end.

Empty reel, NAB, 10-1/2 inch

Ampex Standard Flutter Tape

30 ips	(Special order)
15 ips	01-31336-01
7-1/2 ips	01-31326-01
3-3/4 ips	01-31316-01

Flutter meter, D & R Model FL3D or equivalent.

Usual tools used by technician.

4.2.2 Takeup and Supply Tension

Tape tension is measured indirectly by determining the takeup and supply reel motor torques in the play mode. These torques are adjusted by positioning sliders on resistors located on the control box at the back of the transport. If EIA reels are to be used, adjust the torques to the low side of the tolerances quoted (as measured on NAB hub).

Step 1: Apply power to the equipment and place an empty NAB reel on the supply turntable.

Step 2: Wind the length of cord or twine counterclockwise on the hub of the empty reel, leaving the loop in the cord at the free end.

Step 3: Use pressure sensitive tape or a rubber band to hold the takeup tension arm away from its rest position, so that it does not contact the safety switch.

Step 4: Insert the hook on the appropriate spring scale (see Step 5) in the loop on the cord. Hold the scale stationary, place the mode selector switch in the PLAY position, and press the START pushbutton.

Step 5: Still holding the scale stationary, tap lightly on the reel (to ensure a true reading) and note the scale indication. It should be between 6 and 7-1/2 ounces for a 1/4-inch tape transport, between 8 and 11 ounces for a 1/2-inch tape transport.

NOTE

To gain access to the resistors refer-

enced in Steps 6, 7, and 8; remove the perforated cover at the end of the control box toward the center of the transport.

Step 6: If the indication in Step 5 is incorrect, adjust the slider on HOLDBACK resistor R801 (see Fig. 4-1) to obtain the quoted torque.

Step 7: Repeat Steps 1 through 6 at the takeup turntable. Note that the cord should be wrapped clockwise on the reel hub, and that adjustment is made at the slider of TAKEUP resistor R803 (see Fig. 4-1). Torque indications should be the same as at the supply turntable.

Step 8: With the same test setup as in Step 7, place the mode selector switch in the REWIND position and press the START pushbutton. Hold the scale stationary, tap lightly on the reel, and note the scale indication. It should be between 1/2 and 1-1/2 ounces. Any adjustment required is made at FAST MODE HOLDBACK resistor R802 (see Fig. 4-1).

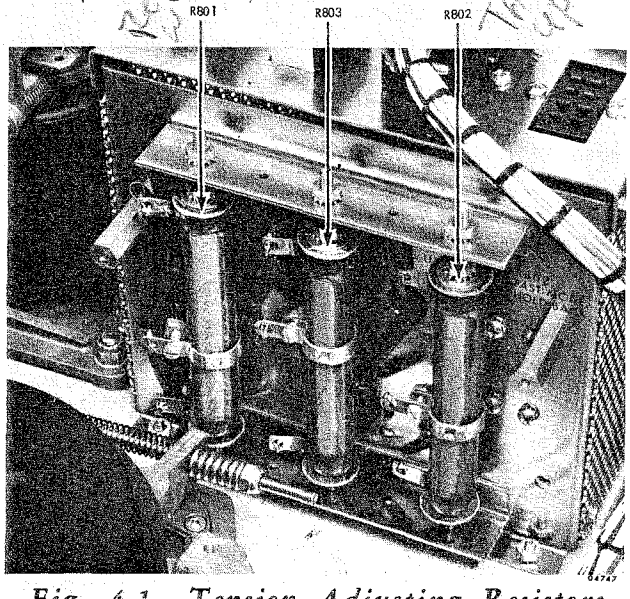


Fig. 4-1 Tension Adjusting Resistors

4.2.3 Brakes

Brakes are checked and adjusted with no power applied to the equipment. Since the braking force is different for each direction of rotation (to provide the brake differential) the force must be checked and adjusted for each direction.

Step 1: Place an empty NAB reel on the supply turntable.

Step 2: Wind the cord or twine counterclockwise on the reel hub, leaving the loop at the free end of the cord.

Step 3: Insert the hook on the appropriate spring scale (see Step 4) through the loop at the end of the cord.

Step 4: Being sure the cord does not touch either reel flange, pull on the scale to make the reel rotate counterclockwise. Take the reading with the scale in slow, steady motion. It should be from 12 to 17 ounces for 1/4-inch tape transports, from 16 to 21 ounces for 1/2-inch tape transports.

NOTE

The initial force required to start the reel in rotation will be excessively high. Do not take the reading until the reel is in slow, steady rotation.

Step 5: If the indication in Step 4 is incorrect, adjustment for this "high" force is made at the two points shown in Fig. 4-2. Run the two nuts in to increase braking force, out to decrease. Be sure both nuts are turned an equal number of turns.

Step 6: Wrap the cord on the supply reel in the clockwise direction and repeat Steps 3 and 4, using the appropriate scale. The indication should be 40% (±1 ounce) of that obtained for the counterclockwise rotation. If necessary, adjust the "low" braking force at the point indicated in Fig 4-2.

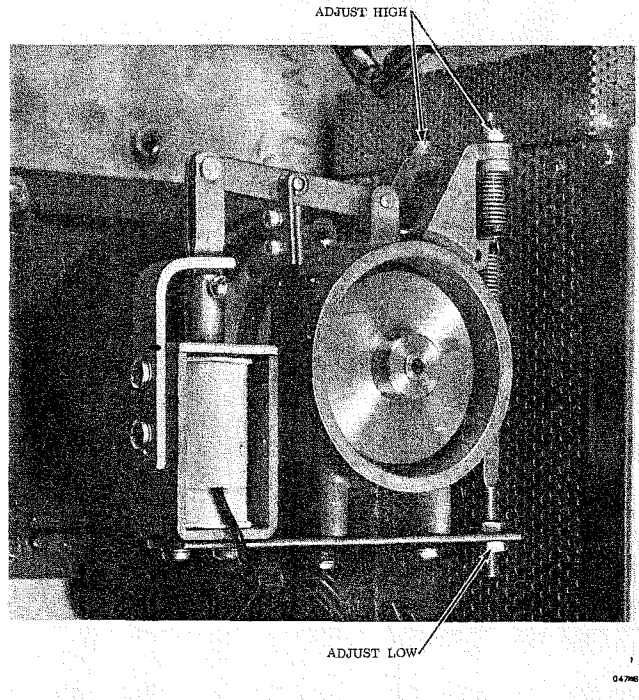


Fig. 4-2 Brake Adjustment Points

Step 7: Repeat the entire procedure at the

takeup turntable. Note that the high braking force acts when this reel is rotated clockwise. Indications should be within the same tolerances quoted for the supply brake.

4.2.4 Capstan Idler Force

The force of the capstan idler against the capstan is determined by a pressure spring on the capstan solenoid. It is adjusted by a lock nut on the capstan solenoid spade bolt. If the recorder is operated in areas where line voltage is low, read the discussion following the step-by-step procedure before making any adjustments.

Step 1: Apply power to the equipment and use pressure-sensitive tape or a rubber band to hold the takeup tension arm away from its rest position (so it does not contact the safety switch).

Step 2: Tie the two ends of the cord or twine together, so that it forms a continuous loop. Place one end of the loop over the capstan idler and position it on the idler shaft (between the idler and arm, see Fig. 4-3).

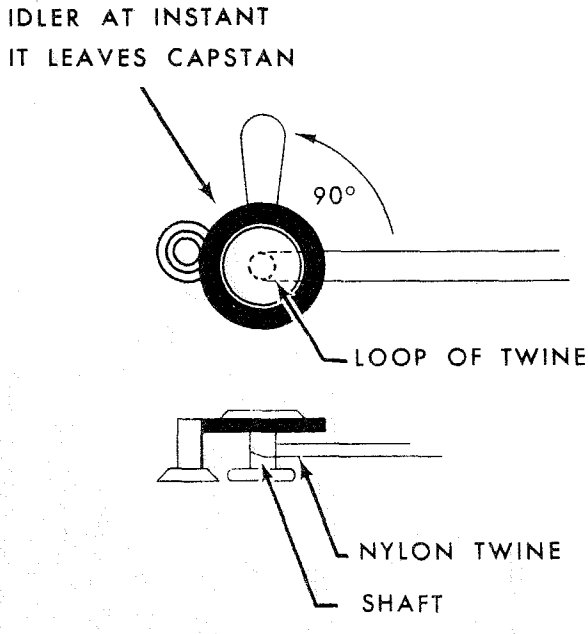


Fig. 4-3 Measuring Capstan Idler Force

Step 3: Place the mode selector switch in the PLAY position and press the START pushbutton. The idler will move to contact the capstan and both will rotate.

Step 4: Insert the hook on the appropriate spring scale (see Step 5) through the loop of cord, and pull the cord taut at a 90° angle to the idler arm.

Step 5: Pull on the scale and take the reading just as the idler loses contact with the capstan (the idler will stop rotating at that point). The scale indication should be 5 pounds (±1/2 pound) for 3-3/4 - 7-1/2 ips equipment, or between 5 and 8 pounds for 7-1/2 - 15 and 15 - 30 ips equipment.

Step 6: If the indication in Step 5 is incorrect, adjust the lock nut (see Fig. 4-4) as required to achieve a reading within tolerances. Running the nut in will increase pressure, out will decrease.

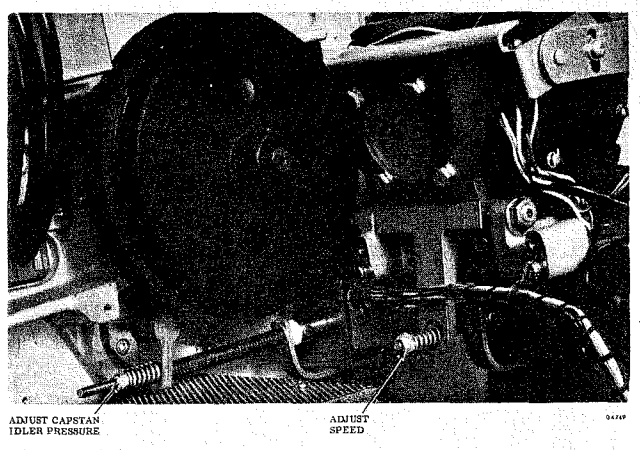


Fig. 4-4 Capstan Idler and Tape Speed Adjustment Points

Step 7: After the adjustment is completed, check that the solenoid will bottom (if not, the idler can be easily pushed away from the capstan). If the solenoid does not bottom, the locknut must be run out until bottoming is possible.

The resistance of the solenoid will rise with temperature during operation, and the voltage required to bottom the solenoid will be greater when it is hot. In areas where power line regulation is poor it is advisable to allow the equipment to operate continuously in the play mode for approximately 30 minutes before making any adjustments to the capstan solenoid. At the factory the solenoid is checked to assure it will bottom at line voltages of 90 volts (cold) and 105 volts (hot).

4.2.5 Flutter and Wow

This check requires that the electronics assembly be previously aligned (see Section 5). An Ampex Standard Flutter Test Tape, applicable to the tape speed involved, and a flutter meter such as the D & R Model FL3-D, are also required.

Ampex Standard Flutter Test Tapes are prepared on very precise equipment, result-

ing in rms flutter content of less than .03% on these tapes. For all practical purposes, this can be disregarded when making flutter measurements. Flutter test tapes are made for a specific tape speed and, since flutter meters accept only 3,000 Hz signals, they cannot be used at other speeds.

Flutter meters are sensitive to some extent to amplitude modulation, such as could occur with poor head-to-tape contact or with signal dropouts. Heads must therefore be cleaned and demagnetized before flutter measurements are taken.

As the flutter tapes are used over a long period of time, the flutter indication will rise -- even though the flutter of the equipment remains unchanged. This is caused by increased dropouts, demagnetization of the recorded signal by repeated passes over the heads, and physical deformation of the tape due to tensions, changes in temperature and humidity, etc.

Test tapes should not be rewound before storage, because the tape pack and tension within the reel might cause physical damage to the tape -- such as edge damage, stretching, etc. Extremes in temperature and humidity must be avoided in storage areas, and the tape must not be stored near sources of magnetic fields -- such as motors, generators, permanent magnet loudspeakers, etc.

Flutter measurement is made as follows:

Step 1: At all electronic assemblies, place the RECORD SELECTOR switch in the SAFE position. Apply power to the equipment.

Step 2: Connect the flutter meter to the OUTPUT connector of the applicable channel (which channel makes no difference, as long as the electronics are properly aligned).

Step 3: Thread the flutter test tape on the transport, by putting the flutter tape reel on the takeup turntable and rewinding to an empty reel on the supply turntable. (Open the head gate while rewinding so the tape lifters remove the flutter tape from contact with the heads.)

CAUTION

BE SURE ALL RECORD SELECTOR SWITCHES ARE IN THE SAFE POSITION. THIS WILL PREVENT ACCIDENTALLY ENTERING THE RECORD MODE AND THUS ERASING THE TEST TAPE.

Step 4: Start tape in motion in the reproduce mode. Adjust the REPRODUCE LEVEL control on the electronic assembly as required to achieve a 0 vu indication on the vu meter.

Step 5: Adjust the flutter meter level as described in the instruction manual for that equipment.

Step 6: Switch the flutter meter to the discriminator adjustment, and adjust the trimmer for a minimum reading on the flutter meter.

Step 7: Switch the flutter meter to readout at 0.5 to 250 Hz, and read the flutter as indicated on the flutter meter. Flutter specifications are given in Section 1.

Step 8: When the measurements are completed, allow the tape to continue in motion in the reproduce mode until the tape is completely wound on the takeup reel. Store the test tape in that condition.

Excess flutter can be caused by any component in the tape transport that affects tape motion, and is manifestly impossible to delineate specific causes and remedies. However, such causes include:

Accumulations of dirt or oxide on components in tape threading path.

Drivemotor: Not in synchronism (low line voltage), excessive takeup tenstion, defective motor capacitor, bearings in need of lubrication (or defective bearings), motor shaft bent, capstan flywheel tire defective.

Supply Motor: Excessive or erratic holdback tension, dragging brake, shafts bent.

Capstan Idler: Defective rubber tire or bearing in need of lubrication, wrong capstan idler force against capstan.

Reel Idler: Shaft bent, flywheel unbalanced.

Head Assembly: Poor tape guiding.

Tape Scrape: Warped or damaged reels.

If a sound and vibration analyzer (such as General Radio's Type 1564-A) is avail-

COMPONENT	ROTATIONAL PERIOD (Hz)			
	3-3/4 ips	7-1/2 ips	15 ips	30 ips
Drive Motor	30	60/30	60/30	60
Capstan and Flywheel	2.5	5	10	20
Capstan Idler	0.6	1.2	2.4	4.8
Reel Idler	0.8	1.6	3.2	6.4

Table 4-1. Rotational Periods of Components

able, excessive flutter can be isolated to certain frequencies by connecting the analyzer to the output of the flutter meter. Comparing the results with the rotational periods given on Table 4-1, may then isolate the offending assembly.

Note that if the flutter disturbance is caused by components in the supply motor assembly, the frequency of the flutter will vary -- being relatively low when the supply-reel tape pack is large and progressively increasing with reel velocity as the pack diminishes. It is seldom that the takeup motor assembly introduces flutter, because it is effectively isolated from the heads by the capstan and capstan idler; if it should, the frequency would vary inversely to that of the supply motor -- being relatively high with a small tape pack on the takeup reel and progressively decreasing as the pack increased.

4.2.6 Tape Speed

This equipment utilizes an indirect drive to the capstan. The drive motor pulley is brought into contact with the rubber tire on the capstan flywheel, and thus drives the flywheel (which is attached to the capstan). This configuration allows slight adjustment of tape speed, by varying the pressure of the motor pulley against the capstan flywheel. This pressure is controlled by a lock nut on the capstan solenoid.

A strobosticker, Ampex Part No. 4170128-10 (60 cycle equipment) or 4170128-20 (50 cycle equipment), is provided with each recorder to check tape speed. Place the strobosticker on the end of the capstan, thread tape, and start the equipment in the reproduce mode. View the rotating strobosticker under a 60 Hz or 50 Hz light (as applicable to the particular recorder). If the capstan speed is exactly correct, the spokes on the strobe will appear stationary; if not, they will appear to drift clockwise (speed fast) or counterclockwise (speed slow). The percentage of speed error can be determined by counting the number of spokes which appear to pass a fixed point in a given time. Tape speed error is 0.1% for each seven spokes which pass a fixed point in one minute (on 50 cycle equipment the error is 0.1% for each six spokes).

Actual tape speed, rather than the speed of rotation on the capstan, can be checked using a tape strobe -- such as the Dubbings Electronics Tape Strobe Model AA. This is a hand-held strobe wheel device which is pressed against the tape, moving in the reproduce mode. For accurate measurement, it must be held against the tape between the head assembly and the capstan, so that the moving tape drives the strobe wheel. The percentage of speed error is determined in the same manner as with the strobosticker.

If it is determined that adjustment of tape speed is required, proceed as follows:

Step 1: Place the equipment in the reproduce mode, and back off the lock nut on the drive solenoid (see Fig. 4-4) until the drive motor pulley does not contact the capstan flywheel (capstan is not driven).

Step 2: Watching the strobe, start running the solenoid lock nut in. Capstan speed will increase as the motor pulley is brought into firmer contact with the flywheel. Continue turning the lock nut in as long as speed is increasing.

Step 3: When peak capstan speed is attained, it will be faster than synchronous speed. Slowly turn the lock nut further in until speed drops to the correct rate as indicated by the strobe.

NOTE

When the adjustment is in the correct range, running the lock nut further in will decrease speed, backing it out

will increase speed. If these indications are reversed, the adjustment has been made on the wrong side of the peak.

4.3 REPLACEMENT OF PARTS

4.3.1 General

All subassemblies of the tape transport can be easily removed from the top plate. Use the parts lists and the assembly drawings in the Parts Lists and Drawings section of this manual as a guide in determining how far each subassembly may be disassembled, because the replacement of some components requires precision work which should not be attempted in the field. If faults should become evident in such components, the entire subassembly should be returned to your Ampex dealer or to the factory for overhaul.

NOTE

Ampex can accept no responsibility for care or return of unidentified parts returned to the factory. Always write Ampex Service Engineering for a properly authorized return tag before shipping.

When packing motors which are to be returned, take particular care to protect the motor shafts from being bent in transit.

To replace the brake band proceed as follows (numbers in parentheses refer to items and figure numbers in Section 7).

Step 1: Remove the brake tension spring (10:7-19) from the brake lever (4:7-19).

Step 2: Remove the two screws holding the capacitor bracket (9:7-18). Disconnect the wires to the capacitor at the knife disconnect points, and remove the capacitor.

Step 3: Remove the three screws that secure the brake housing to the motor, disconnect the solenoid leads at the knife disconnect points, and remove the entire brake assembly from the motor.

Step 4: Remove the two socket head cap screws (26:7-19) that secure the end of the brake band near the two "high side" brake adjustment points (furthest from the solenoid). A clamp will also come free.

Step 5: Loosen, but do not remove, the two socket head cap screws that clamp the other end of the brake band (nearest the solenoid). Using care not to lose the leaf spring, slide that end of the band from the clamp.

Step 6: Remove the brake band.

Step 7: Position the new brake band through the holes in the housing. Replace the two cap screws and clamp removed in Step 4, tightening the screws.

Step 8: Slip the slotted end of the brake band between the leaf spring (9:7-19) and the band link (3:7-19). Run the two cap screws in until they are snug but the band will still slip.

Step 9: Check that the solenoid stop (7:7-19) is positioned so that the travel of the solenoid plunger is limited to 3/16 inch.

Step 10: Replace the brake assembly on the motor, manually actuating the solenoid to allow the brake band to slip over the drum.

Step 11: Replace the spring removed in Step 1.

Step 12: Manually actuate the solenoid, and slide the slotted end of the band in or out of the linkage so that the band flattens against the housing without buckling. Tighten the two cap screws. (This determines the maximum looseness of the band around the drum.)

Step 13: Release the solenoid. The brake band should limit the travel of the solenoid plunger so that there is a clearance of from 1/16 to 3/32 inch between the plunger and the solenoid stop. If not, the slotted end of the band must be slid further into the clamp (effectively shortening the band). The final adjustment must result in the proper clearance between the solenoid stop and plunger (solenoid deactuated) and free rotation of the drum with no drag when the solenoid is actuated. Also, there must be no buckling of the band (indicating the band is too long) when the solenoid is actuated.

Step 14: Check and adjust brake tensions (refer to paragraph 4.2.3.).

Step 15: Reconnect the solenoid leads. Replace the capacitor and reconnect its leads.

4.4 PRINCIPLES OF OPERATION

4.4.1 General

The tape transport mechanism (Fig. 4-5) provides tape motion for all modes of operation. Interaction of four basic assemblies and their associated components -- the tape supply system, the tape takeup system, the tape

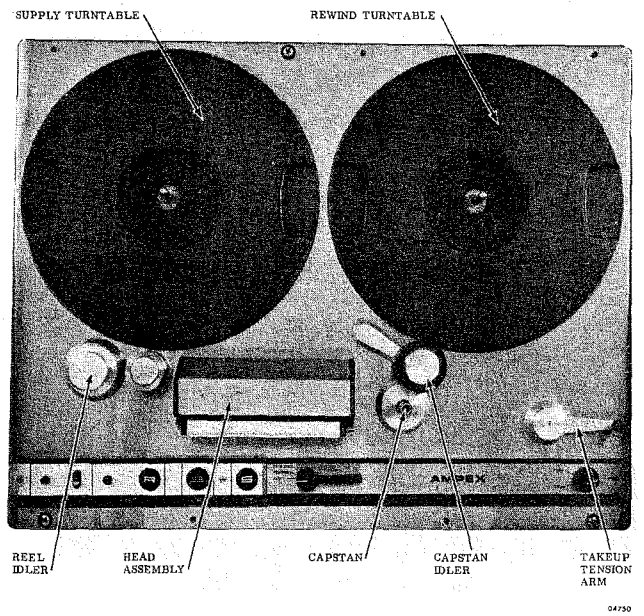


Fig. 4-5 Tape Transport, Top

drive system, and the control circuit -- insures smooth, positive movement of the tape across the head assembly, and proper tape tension.

Location of components at the back of the tape transport is shown in Fig. 4-6. The assemblies which make up the tape transport are interconnected at the control box connector panel (see Fig. 2-3). This panel is hinged and can be swung up as shown in Fig. 4-7 by removing two screws at the top outer edge.

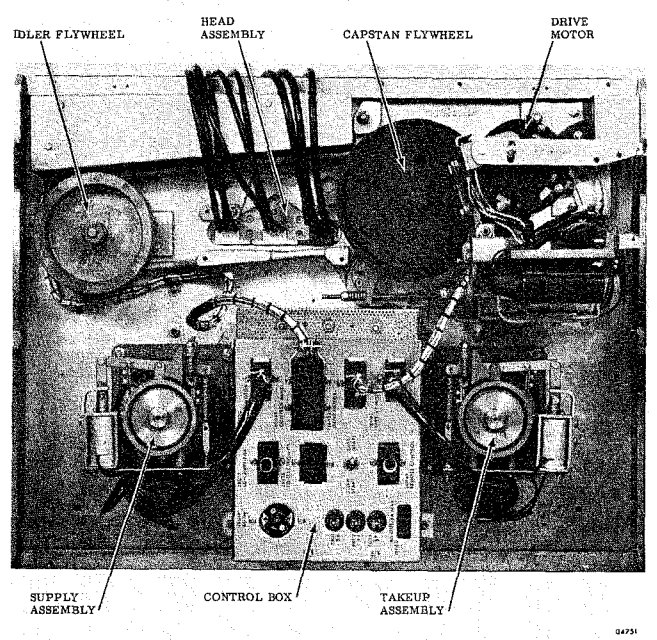


Fig. 4-6 Tape Transport, Bottom

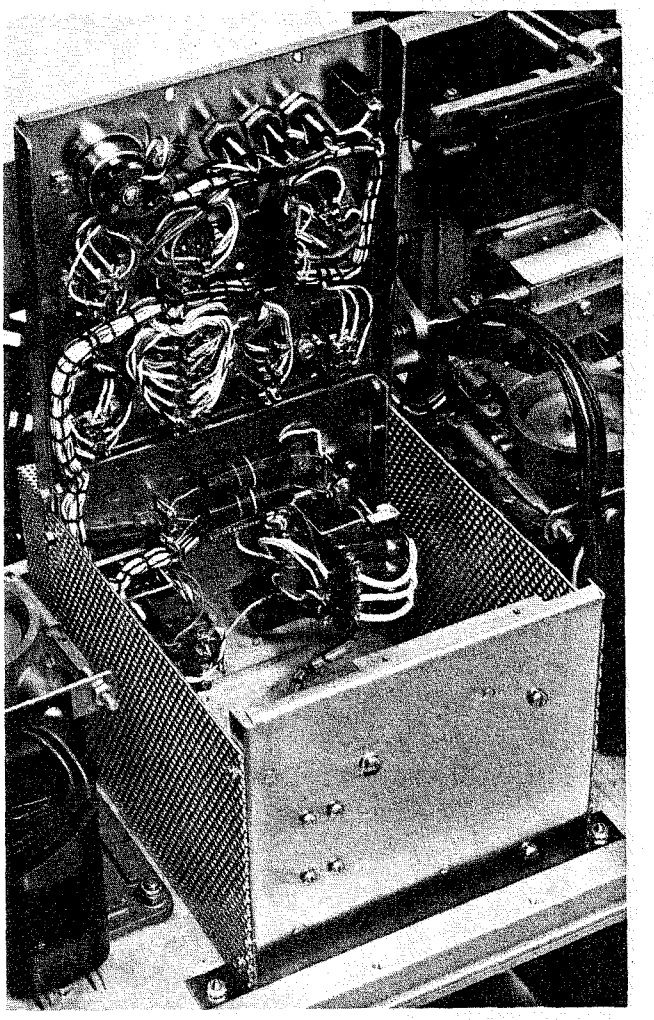


Fig. 4-7 Control Box, Connector Panel Open

4.4.2 Tape Supply and Takeup Systems

From the supply reel, on the left side of the tape transport as the operator faces the equipment, tape is delivered to the takeup reel in the play or fast forward modes. Tape is rewound onto the supply reel in the rewind mode. Tape tensioning is maintained during all modes by the opposing action of the two reel motors.

On the takeup side of the tape transport, a tension arm assembly with a spring-pivot-mounted arm performs two main functions. First, it provides a small tape storage loop which prevents tape breakage during the starting and stopping of tape motion. Second, it is used to stop the equipment if tension is lost (due to tape breakage, at the end of the tape, etc.) by actuating safety switch S501.

Both the tape supply and takeup as-

semblies are composed of induction torque motors (B601 supply-rewind, B701 takeup), a turntable mounted directly on each motor shaft, a brake housing assembly, and a flange for mounting the entire assembly. The brake housings are mirror images of each other, and so the assemblies are not interchangeable although the motors are identical. The brakes are solenoid operated, remaining in the braking position until the brake solenoids, K601 and K701 are energized -- at which time the brakes are released. The supply and takeup motors are so connected that when power is applied to them with no tape threaded, the turntables would rotate in opposite directions -- the tape supply turntable clockwise, and the tape takeup turntable counterclockwise.

During all operating modes, the two torque motors act as tensioning devices.

In the fast forward mode, the torque of the supply (rewind) motor is reduced by placing resistors R801, R802, and R803 in series with the motor. In the rewind mode those resistors are in series with the takeup motor. One motor thus operates at full torque, the other at reduced torque, and the tape is pulled from the reel with lesser torque. The tape is held under tension as it is pulled from the reel by the opposing torque of the trailing reel motor.

In the reproduce or record modes, both torque motors operate at the same reduced torque, adjusted by resistors R801 and R803. The capstan, with the idler clamping the tape against it, then determines the tape speed, and the tensioning system supplies tape or takes it up as metered by the capstan drive. From the point of view of the tape supply turntable, the capstan and idler action exerts sufficient pull on the tape to overcome the opposing torque (holdback tension) of the supply motor. From the point of view of the tape takeup turntable, the capstan and idler action is feeding the tape to it; the tape is held under tension because the takeup rate exceeds the feed rate (a tape loop will be thrown on the right side of the capstan whenever any malfunction causes the feed rate to exceed the takeup rate).

If a tape loop is thrown, or the tape breaks, the takeup tension arm will actuate safety switch S501 and stop the equipment. The takeup tension arm is not a part of the tape tension system. Its function is to prevent tape slack, especially when starting, and to operate the safety switch.

The reel idler assembly smooths out transients introduced by the supply reel system. For example, when starting the tape in the reproduce mode, the momentary strain transmitted through the tape to the tape supply turntable when the capstan idler forces the tape against the capstan is considerable. Under some circumstances, this impulse would tend to stretch or break the tape. Any momentary decrease in holdback tension might be sufficient to start a transient oscillation in the tape tension system, which would be reflected as a periodic variation in the distance of the tape from the heads. This variation might be of sufficient magnitude to appear as an undesirable fluctuation in the signal level at the start of recording or reproduction. The reel idler arm absorbs most of the starting strain, and prevents or minimizes transient oscillation. The high inertia of the reel idler pulley and flywheel provides additional stability in the tape tension system, by smoothing out such transients as motor torque fluctuations and irregularities due to faulty tape wrap on the supply reel.

4.4.3 Tape Drive System

The tape drive system is composed of the drive motor, the capstan and flywheel, the capstan idler arm and idler, and the tape guides at the tape entrance and exit within the head assembly.

The purpose of the tape drive system is to transport the tape across the heads at a uniform speed during the record and reproduce processes. A hysteresis synchronous capstan drive motor and a capstan idler are employed. The drive motor has two sets of windings to provide two tape speeds, either of which can be selected at speed switch S503. The speed switch also controls the actuation of the equalization relay in the electronic assembly.

An indirect drive system is employed, with the drive motor assembly and capstan assembly separate entities. The drive motor is mounted on a hinged bracket which is held by spring action so that the motor pulley does not contact the capstan flywheel except when the motor is operating. When the drive motor is operating, a drive solenoid (K502) is energized and pulls the motor assembly into the drive position against the capstan flywheel.

When the START pushbutton is pressed, in the record or reproduce modes, a capstan idler solenoid (K501) moves the capstan idler to the capstan. The tape is thus held in firm contact with the capstan which drives it at the selected speed.

The drive motor return spring, which

holds the motor from contact with the capstan flywheel, is fastened to a spring arm on the top of the motor. Note that a stronger return spring is required when the transport is operated in the vertical position than that used when it is operated horizontally.

A FAST START-SLOW START switch is provided on the control box at the back of the transport. When this switch is placed in the FAST START position, drive solenoid K502 and drive motor relay K803 are energized whenever power is applied and tape is properly threaded. Relay contacts of K803 apply power to the drive motor, and solenoid K502 moves the motor so that its pulley contacts the capstan flywheel. The capstan will thus be rotating, and tape can quickly be brought up to speed when the START pushbutton is pressed. In the SLOW START position of this switch, the capstan will not start in rotation until the START pushbutton is pressed.

4.4.4 Brake Operation

Smooth brake operation is important in maintaining proper tape tension when stopping the tape. Because the holdback tension, supplied by the trailing turntable motor torque, is lost after the STOP pushbutton is pressed, maintenance of tape tension then becomes a function of brake operation. The braking force acting on the turntable from which the tape is being pulled (trailing turntable) in any of the modes of operation must exceed the braking force acting on the turntable taking up the tape (the leading turntable) to prevent tape loops forming. This differential is determined by springs at opposite ends of the brake band.

When the brake solenoid is de-energized, the brake tension spring (acting on the brake lever) draws the brake band against the drum. The ratio of the braking force in one direction to the braking force in the other -- the brake differential -- is approximately two to one on this equipment.

4.4.5 Control Circuit

4.4.5.1 General

The following discussion can be followed by referring to Figs. 7-1 and 7-2 in the Parts Lists and Drawings section. The explanation will be on a functional basis, treating each operating condition. Numbers in parentheses refer to line numbers marked on the simplified control circuit diagram of Fig. 7-2.

4.4.5.2 Application of Power

Line power is connected to the transport at J801. Both sides of the line are fused by F801 and F802 and switched by power switch S801 (line 1, Fig. 7-2). When switch S801 is in the "on" position, power is routed through fuse F803 (line 2) to the power supply in the electronic assembly. Power indicator DS801 (line 3) is illuminated and power is available at auxiliary outlet J806 (line 4).

If tape is properly threaded so that safety switch S501 is closed, and fast/slow start switch S806 (line 9) is in the fast start position, fast start relay K803 (line 9A) and drive solenoid K502 (line 9B) are energized. Relay contact set K803A (line 5) then connects line power to drive motor B501 which operates at the speed selected by speed switch S503. Drive solenoid K502 (line 9B) pulls the motor so that its pulley contacts the capstan flywheel, and the capstan rotates. (No tape motion will occur until the capstan idler solenoid is actuated in the play or record modes.)

Note that the a-c line voltage is rectified by CR801 and filtered by R804/C810 (between lines 6 and 7). Thus d-c power is used to energize all relays and solenoids.

In all succeeding discussions, it will be assumed that power is applied and that tape is properly threaded.

4.4.5.3 Entering Reproduce (Play) Mode

Mode selector switch S802 is a three-position rotary control which utilizes three poles shown on lines 6A, 6B, and 8 of Fig. 7-2. To enter the reproduce mode, this switch must be placed in the PLAY position and START pushbutton S805 (lines 8A and 8C) must be pressed.

When these actions occur, play relay K801 (line 8A) is energized. Contact set K801B (line 8B) forms a holding circuit for the relay. Contact set K801A (line 8C) completes the circuit to mode relay K802 which is energized and held by its contact set K802B. Note that both of these relay coils are in series with normally closed STOP switch S803 (line 8A).

Relay contact sets K802C and K801C (line 10) close the circuit to capstan idler solenoid K501 (line 10A), and reel motor brake solenoids K601 and K701 (lines 10C and 10D), energizing those solenoids. If the fast/slow start switch (line 9) is in the slow start position, these two contact sets also complete the circuit to fast start relay K803 and drive solenoid (K502.) The action of these two components is then the same as that explained for the fast start in paragraph 4.4.5.2.

When the brake solenoids are energized, the brakes on the reel motors are released, and the energized capstan idler solenoid moves the capstan idler to clamp the tape to the rotating capstan.

Relay contact set K802A (line 6) applies power through two poles of S802 (lines 6A and 6B) and variable resistors R801 and R802 are adjusted to apply correct holdback and takeup tension respectively.

Brakes are thus released and tape is placed in motion under correct tension in the reproduce mode.

NOTE

The record pushbutton (line 10B) is not a tape motion control. After the reproduce mode is started as explained, d-c power is available at the RECORD pushbutton. This power is delivered to the record circuit in the electronic assembly when the pushbutton is pressed.

4.4.5.4 Entering Fast Forward Mode

To enter the fast forward mode, the mode selector switch (lines 6A, 6B, and 8) must be placed in the FAST FORWARD position, and the START pushbutton (lines 8A and 8C) must be pressed. When these actions occur, mode relay K802 (line 8C) is energized.

Relay contact set K802B (line 8D) forms a holding circuit for the relay. Contact set K802C (line 10) completes the circuit to the reel motor brake solenoids K601 and K701 (lines 10C and 10D), energizing those solenoids and releasing the brakes. Contact set K802A (line 6) completes the circuit to the takeup motor (which operates under full power) and through resistors R803, R802, and R801 to the supply (rewind) motor which thus operates under reduced power. Resistor R802 is adjusted to provide correct tension.

The brakes are thus released and the higher torque of the takeup motor results in the tape being pulled from the supply reel to the takeup reel.

4.4.5.5 Entering Rewind Mode

The action here is similar to that explained for the fast forward mode. The difference is that in the REWIND position of mode selector switch S802 (lines 6A, 6B, and 8), full power is applied to the rewind motor and R801, R802, and R803 are placed in series with the takeup motor. The higher torque of the rewind motor results in tape being pulled from the takeup to the supply reel.

NOTE

After the equipment is started in either fastwinding mode, it can be switched to the other without going through the stop-start sequence. Tape will simply slow to a stop and then reverse direction. If the mode selector switch is moved from a fastwinding position to the play position, tape motion will stop and will not start until the START pushbutton is pressed.

4.4.5.6 Stopping

Relay coils K801 and K802 and their holding contacts (lines 8A, B, C, and D) are in series with normally closed STOP pushbutton S803 (line 8A). They will be de-energized whenever that pushbutton is pressed (opened).

Together, these two relays control all tape motion functions, and the record mode in the electronics. Therefore, when the STOP pushbutton is pressed in any mode, tape motion will stop (and the record mode will drop out if it is operating).

4.4.5.7 Other Circuits

In addition to selecting drive motor speed (line 5), speed switch S503 controls the equalization relay in the electronics assemblies. As shown in line 11 (Fig. 7-2), a +23 volt line is returned to the transport from the electronic power supply. When switch S503 is in the low speed position, that +23 volts is routed back to the equalization relay in the electronics.

Also, the rectified line voltage is delivered to the electronics assemblies (line 7) to light the READY indicator when the electronics are ready to record.

Section 5

ELECTRONIC MAINTENANCE

5.1 PREVENTIVE MAINTENANCE

Preventive maintenance of the electronic assembly consists only of keeping the assembly clean. Remove the covers at frequent intervals and remove any accumulations of dirt and dust, using a small brush or vacuum cleaner. Do not use the blower action of a vacuum cleaner (or any other compressed air device) in cleaning, because particles of dust might be blown into critical areas -- such as bearings -- on the tape transport.

5.2 CHECKOUT AND ADJUSTMENT

5.2.1 General

The checkout and adjustment procedures which follow are described for a record/reproduce equipment. There should be little difficulty in relating these instructions to the relatively simple adjustment of a reproduce-only unit.

In aligning the equipment, the playback function is first aligned to a standard by using an Ampex Standard Tape. The record function is then aligned using the playback circuit as a reference.

Standard alignment tapes are precisely recorded in an Ampex laboratory under stringently-controlled conditions. They must be handled and stored with proper care if they are to retain their usefulness over extended periods of time. Heads and tape guides should be cleaned and demagnetized before the standard tape is installed on the equipment, and the tape should not be stored where temperature and humidity extremes occur. Also, the tape should be stored under the tape tension encountered in a normal play run, not after being rewound. After extended use the response will begin to fade -- for example, the head azimuth tone on the standard tape may be down as much as 2 db.

When the standard tape is first run, it should be moved in the fast forward mode to the takeup side, then rewound to another reel (not the standard tape reel). The standard tape reel is then placed on the takeup turntable and tape threaded to it. This allows storage on the original reel without rewinding. Subsequent runs are made by putting the standard tape on the takeup turntable and rewinding to an empty reel on the supply turntable before proceeding with the reproduce alignment.

5.2.2 Test Equipment Required

D-C Voltmeter, 20,000 ohms-per-volt

A-C Vacuum Tube Voltmeter, Hewlett-Packard Model 400D or equivalent

Ampex Standard Alignment Tapes as applicable.

30 ips (17.5 μsec) No. 4690085-01 (1/2 inch tape)

15 ips NAB No. 01-31311-01 (1/4-inch), 01-31311-05 (1/2-inch)

15 ips CCIR No. 01-31313-01 (1/4-inch), 01-31313-05 (1/2-inch)

15 ips AME No. 01-31312-01 (1/4-inch), 01-31312-05 (1/2-inch)

7-1/2 ips NAB No. 01-31321-01 (1/4 inch), 01-31321-05 (1/2-inch)

7-1/2 ips CCIR No. 01-31323-01 1/4-inch), 01-31323-05 (1/2-inch)

3-3/4 ips (120 μsec) No. 01-31331-01 (1/4-inch)

3-3/4 ips (200 μsec) No. 01-31334-01 (1/4-inch)

(Other Standard Alignment Tapes available on special order)

*Current probe (for vtvm)

*Electronic Counter

Signal Generator, Hewlett-Packard Model 200C or equivalent

*Bias Filter (See Fig. 5-3)

Noise Filter (See Fig. 5-4)

*Wave Analyzer

Normal tools used by technician

*If available

5.2.3 Test Conditions

LINE TERMINATION switch on back of electronics in ON position to terminate equipment during all checks.

INPUT SELECTOR switch on back of electronics assembly in UNBAL BRIDGE position during all checks.

Heads cleaned and demagnetized before starting checks.

Top and bottom covers installed on electronics during checks.

All record tests made with professional grade magnetic tape such as Ampex No. 631 or equivalent.

5.2.4 Voltage Regulator Adjustment

Proper operation of the voltage regulator can be checked at the octal socket for accessories (J7) at the back of the electronic assemblies.

Step 1: At the transport, select the low tape speed.

Step 2: Use pressure-sensitive tape to hold the takeup tension arm away from its rest position so that it does not contact the safety switch.

Step 3: Place the RECORD SELECTOR switches for all electronic assemblies in the READY position. Place the mode selector switch in the PLAY position, and press the START and RECORD pushbuttons. (The equipment will be in the record mode with the capstan idler against the capstan, and both reel motors operating.)

Step 4: Check the voltage from pin 7 (positive) of the octal socket to chassis ground, using the d-c voltmeter. It should be 23 volts (±1 volt).

If the need for adjustment is indicated, remove the top service cover from the electronics assembly to gain access to the printed circuit board of that assembly. Repeat Steps 1, 2, and 3 previously described, checking the voltage from terminal 48 (positive) of the printed circuit board to chassis ground. Adjust R77 (See Fig. 5-1) on the printed circuit board to achieve a 23-volt indication (±1/2 volt) on the voltmeter.

Repeat the procedure for all other electronic assemblies.

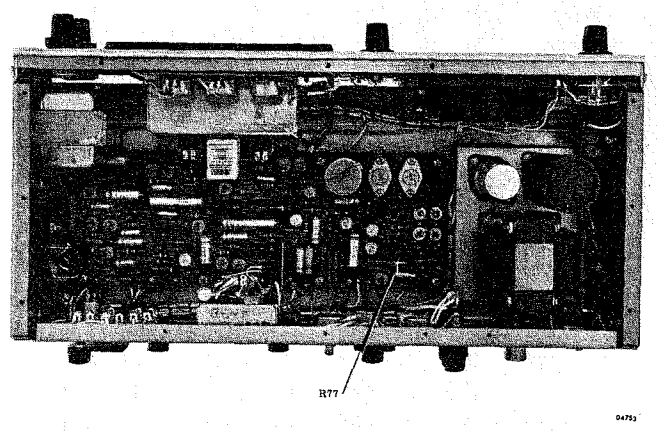


Fig. 5-1 Voltage Regulator Adjustment Point

5.2.5 Reproduce Alignment

Step 1: At the back of the electronic assembly, connect the vtvm to the line OUTPUT connector. Terminate the output by placing the LINE TERMINATION switch in the ON position.

Step 2: Remove the head cover by removing the two screws on the top of the cover and carefully lifting it up and off.

Step 3: Thread the applicable Ampex Alignment Test Tape (refer to paragraph 5.2.2) on the tape transport.

CAUTION

WHENEVER A STANDARD TAPE IS THREADED ON THE TRANSPORT, CHECK THAT THE RECORD SELECTOR SWITCHES ON ALL ELECTRONIC ASSEMBLIES ARE IN THE SAFE POSITION.

Step 4: Select tape speed and place the OUTPUT SELECTOR switch (not provided on reproduce-only equipment) in the REPRODUCE position. Start the standard tape in motion in the reproduce mode.

Step 5: When the first tone on the standard tape is reproduced, adjust the REPRODUCE LEVEL control to achieve any convenient indication on the vtvm.

Step 6: The next tone is for use with the reproduce head azimuth adjustment. As this signal is reproduced, adjust the reproduce head azimuth (see Fig. 5-2) to achieve a maximum indication on the vtvm. If the head azimuth is far out of adjustment, minor peaks will be observed on each side of the correct setting; the correct adjustment will be unmistakeable, however, for it will result in a vtvm indication obviously higher than the minor peaks.

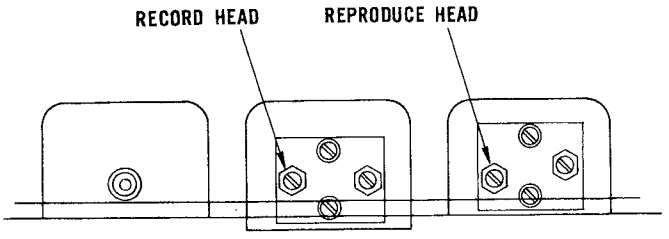


Fig. 5-2 Head Azimuth Adjustment Points

CAUTION

DO NOT TAMPER WITH ANY SCREW ON THE HEAD ASSEMBLY OTHER THAN THE ONE FOR AZIMUTH ADJUSTMENT.

Step 7: If this is a multi-channel equipment repeat Steps 1, 4, 5, and 6 for the other channels. If the head azimuth does not peak at exactly the same setting, a compromise adjustment between the heads in the stack must be made.

Step 8: After completing the reproduce head azimuth adjustment, rewind the standard tape to the beginning of the first tone and replace the head cover.

Step 9: Remove the cover on the front panel of the electronics assembly by removing the two screws which secure it to the panel. Start the tape in motion in the reproduce mode.

Step 10: As the first tone is reproduced, adjust the REPRODUCE LEVEL control to obtain a convenient reference indication, such as -2 dbm or -6 dbm.

Step 11: Check response as the balance of the tones on the standard tape are reproduced. Adjust the appropriate REPRODUCE HIGH FREQUENCY equalizer as required to achieve the flattest possible response (within specifications). However, do not adjust the equalizer more than ±2 db from the theoretical curves shown on Figs. 7-7, 7-8, and 7-9.

NOTE

When half track or multi-track heads are employed, readings below 700 Hz (7-1/2, 15, and 30 ips) or 500 Hz (3-3/4 ips) are invalid when reproducing a standard tape. These tapes are recorded full track, and the "fringing" effect that occurs results in high indications at lower frequencies. This effect does not occur when tapes are recorded and reproduced using heads of the same configuration.

Step 12: As the operating level tone is reproduced, turn the REPRODUCE LEVEL control to the CAL mark. Adjust the REP CAL control as necessary to achieve a +8 or +4 dbm indication on the vtvm (level will depend on whether the equipment is strapped for a +8 or +4 dbm operating level output). The equipment vu meter should indicate 0, ±3/4 db.

NOTE

On reproduce-only equipment, there is no REP CALIB control. As the operating level tone is reproduced, simply adjust the REPRODUCE LEVEL control for the quoted output. The control is located beneath the cover on the front panel.

Step 13: If the Sel-Sync accessory is connected in the system, place the appropriate control on that assembly in the SYNC position. Rewind the standard tape to the beginning of the operating level tone. Start tape in motion in the play mode. The vtvm indication should be the same as in Step 12. If not, adjust the applicable Sel-Sync level control (screwdriver adjustments accessible through the back panel of the Sel-Sync unit) to achieve the correct indication.

Step 14: Allow the tape to continue in motion in the reproduce mode until it is completely wound on the supply reel.

Step 15: Repeat Steps 3, 9, 10, 11, 13, and 14, for the second speed, using the appropriate standard alignment test tape.

Step 16: Repeat Steps 3, 9, 10, 11, 13, 14, and 15, for all other electronic assemblies.

5.2.6 Record Bias Oscillator Frequency and Erase Current Adjustment

This adjustment, which is not applicable to reproduce-only equipment, is made at the factory using a current probe, electronic counter, and vtvm, and placing one channel at a time in the record mode. If such equipment is available check the erase current in the electronic assembly at the back of the erase head connector (with the erase head connected); it should be 60 milliamperes (±5 ma). Then check the frequency, which should be 100,000 Hz (±5,000 Hz). If adjustment is required, set ERASE ADJ control C36 to achieve the 60 ma erase current and BIAS FREQ control C34 so that the frequency is as close as possible to 100,000 Hz. Then readjust C36 for correct erase current.

NOTE

If this is a multi-channel recorder, all bias oscillator frequencies must be identical within 1,000 Hz.

If the test equipment used at the factory is not available, do not tamper with the adjustment of C34 or C36 unless erase efficiency is impaired or a beat frequency (when simultaneously recording and reproducing on more than one channel) becomes noticeable. In either case, adjust ERASE ADJ control C36 for a 40 volt (±1 volt) erase level, measuring with the vtvm at the back of the erase head connector (with the erase head connected). On multi-channel equipment, adjust BIAS FREQ control C34 to eliminate the beat frequency, then re-check the setting of C36.

5.2.7 Record Bias Adjustment

NOTE

On this and other record adjustments, blank tape is specified. Tape used can be either blank (bulk erased) or recorded with information not necessary to save (it will be erased during the record process). However, always bulk erase the tape if it was recorded with a head configuration different from that on the equipment under test (the original recording might not be completely erased on the equipment).

This is a critical adjustment which must be made with the type of tape which will normally be used. It is not applicable to reproduce-only equipment.

Step 1: At the electronic assembly for the channel to be tested, place the RECORD SELECTOR switch in the READY position and the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 2: Apply power to the equipment and select tape speed.

Step 3: Connect the signal generator to pins 1 and 3 of the line INPUT connector for the channel under test. Set it to a nominal 1 volt level at 250 Hz (3-3/4 ips speed), 500 Hz (7-1/2 ips speed), 1,000 Hz (15 ips speed), or 2,000 Hz (30 ips speed).

Step 4: Connect the vtvm to the line OUTPUT of the channel under test.

Step 5: Thread blank tape on the equipment.

Step 6: Place the tape in motion in the record mode. Adjust the RECORD LEVEL control to achieve a convenient vtvm indication.

NOTE

Record only on the channel being tested.

Step 7: While thus simultaneously recording and reproducing, adjust the BIAS ADJ control for a peak vtvm indication.

Step 8: Turn the OUTPUT SELECTOR switch to the BIAS position. Adjust the BIAS CAL control, on the back panel of the electronic assembly, so that the vu meter indicates 0.

Leave test equipment connected for subsequent test procedures.

5.2.8 Record Level Adjustment and Calibration

The reproduce level must be adjusted (see paragraph 5.2.5) before starting this procedure, which is not applicable to reproduce-only equipment.

Step 1: Repeat Steps 1 through 5 of the record bias adjustment procedure (refer to paragraph 5.2.7). Set the signal generator to 500 Hz at a nominal 1 volt level.

Step 2: Start tape in motion in the record mode.

Step 3: While thus simultaneously recording and reproducing, turn the RECORD LEVEL control to achieve either a +8 or +4 dbm indication on the vtvm (level will depend on whether the particular equipment is strapped for a +8 or +4 dbm operating level output).

Step 4: Turn the OUTPUT SELECTOR switch to the INPUT position, and adjust the REC CAL control for a 0 indication on the vu meter.

Step 5: Repeat the procedure for all other channels.

Leave test equipment connected for subsequent checks.

5.2.9 Record Head Azimuth Adjustment

This adjustment is not applicable to reproduce-only equipment.

Step 1: Repeat Steps 1 through 5 of the record bias adjustment procedure (refer to paragraph 5.2.7). Set the signal generator to 15,000 Hz at a nominal 1 volt level. Place the OUTPUT SELECTOR switch in the INPUT position and adjust the RECORD LEVEL control to obtain a -10 indication on the vu meter.

Step 2: Remove the head cover by removing the two screws at the top of the cover and carefully lifting it off.

Step 3: Place tape in motion in the record mode. Place the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 4: While thus simultaneously recording and reproducing, adjust the record head azimuth screw (see Fig. 5-2) to achieve a maximum vtvm indication. There may be minor peaks if the azimuth is far out of adjustment, but correct setting will result in an output obviously higher than the minor peaks.

CAUTION

DO NOT TAMPER WITH ANY SCREW ON THE HEAD OTHER THAN THE ONE FOR AZIMUTH ADJUSTMENT.

Step 5: Repeat the procedure for other channels if this is a multi-channel equipment. If the azimuth does not peak at exactly the same setting, a compromise adjustment between the heads in the stack must be made.

Step 6: Replace the head cover.

Leave test equipment connected for subsequent checks.

5.2.10 Low Frequency Reproduce Equalization Adjustment

Step 1: Repeat Steps 1 through 5 of the record bias adjustment procedure. Set the signal generator to 500 Hz at a nominal 1 volt level.

Step 2: Place tape in motion in the record mode. Simultaneously record and reproduce at normal level.

Step 3: Change the frequency of the signal generator as required and adjust the applicable REPRODUCE LOW FREQUENCY equalizer for the flattest possible response from 250 to 30 Hz in accordance with specifications. This is accomplished by adjusting for equal levels of the positive head bump peaks and negative head bump dips.

Step 4: Repeat Steps 2 and 3 for the second speed, adjusting the appropriate reproduce low frequency equalizer.

Step 5: Repeat the entire procedure for all other channels.

On reproduce-only equipment, record frequencies from 250 to 30 Hz on a properly adjusted record unit which has the same head configuration as the reproducer. Adjust the low fre-

TAPE SPEED	1/4-INCH TAPE (HEAD)	RESPONSE 50 Hz	1/2-INCH TAPE (HEAD)	RESPONSE 50 Hz
3-3/4 ips	Full Track	0 db	-	-
	Half Track	+1 db	-	-
	Two Track	+1 db	-	-
7-1/2 ips	Full Track	0 db	-	-
	Half Track	+2 db	Three Track	+2 db
	Two Track	+2 db	Four Track	+2 db
15 ips	Full Track	0 db	-	-
	Half Track	+2.5 db	Three Track	+2.5 db
	Two Track	+2 db	Four Track	+2 db
30 ips	Full Track	0 db	-	-
	Half Track	+2.5 db	Three Track	+2.5 db
	Two Track	+2 db	Four Track	+2 db

Table 5-1. Low Frequency Equalization Using Standard Alignment Tape

quency equalizer while reproducing this tape. If a record unit is not available, thread the appropriate standard alignment tape on the equipment and adjust the low frequency equalizer for the output indication shown on Table 5-1 when the 50 Hz tone is reproduced.

5.2.11 Record Equalization Adjustment

This procedure, which is not applicable to reproduce-only equipment, is most easily made by using a bias filter (see Fig. 5-3). If such a filter cannot be constructed, a trial-and-error method must be employed where the tape is first recorded as in Steps 2, 3, and 4 at different settings of the record equalization, then reproduced to determine proper setting.

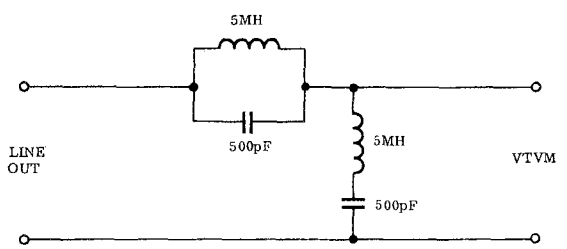


Fig. 5-3 Bias Filter

Step 1: Repeat Steps 1 through 5 of the record bias adjustment procedure (refer to paragraph 5.2.7) inserting the bias filter between the OUTPUT connector and the vtvm. Set the signal generator to 500 Hz at a nominal 1-volt level.

Step 2: Place the OUTPUT SELECTOR switch in the INPUT position and adjust the RECORD LEVEL control for a -10 or a -14 dbm output as indicated on the vtvm (level will depend on whether the equipment is strapped for a +8 or +4 dbm operating level output). Return the OUTPUT SELECTOR switch to the REPRODUCE position.

Step 3: Place tape in motion in the record mode.

Step 4: While thus simultaneously recording and reproducing, change the frequency of the signal generator as required, and adjust the RECORD EQUALIZATION control for the flattest possible high frequency response, in reference to 500 Hz and in accordance with specifications.

Step 5: Repeat Steps 2, 3, and 4 for the second speed.

Step 6: Repeat the entire procedure for all other channels.

5.2.12 Distortion and Noise Balance Adjustment

This adjustment, which is not applicable to reproduce-only equipment, is made at the factory using a signal generator with a second harmonic distortion less than 0.2%, and a wave analyzer. Bias symmetry control R84 is adjusted for minimum second harmonic distortion of a 500 Hz signal at 7-1/2 ips, placing only one channel at a time in the record mode.

If the test equipment used at the factory is unavailable, do not tamper with the adjustment of R84 unless some component in the bias and erase oscillator is changed. After completing such corrective maintenance, simultaneously record and reproduce with no signal input while monitoring the output through an additional high gain amplifier and loudspeaker or headset. Adjust BIAS SYMMETRY control R84 for a minimum popping or hissing noise.

NOTE

If the symmetry control has no audible effect, simply leave it in the midposition.

5.2.13 Sel-Sync Bias Trap Adjustment

This adjustment is applicable only to record/reproduce systems which incorporate the Sel-Sync accessory. In such systems, the bias frequency from a channel that is recording may leak to an adjacent channel operating in the Sel-Sync mode. Even though nothing is being recorded on the latter channel, the bias would mask the normal vu meter indication -- making it impossible to obtain a true visual monitor of the Sel-Sync playback function. The bias trap adjustment is provided to null any such bias leakage, and thus make visual monitoring possible.

The trap is adjusted at the factory, and there should be no need for re-adjustment. However, if bias from adjacent recording channels causes an indication on the vu meter for any channel operating under Sel-Sync, the situation can be easily corrected. Simply place the channel(s) adjacent to the one being tested in the record mode, with no input signal. (Note that if the channel under test is a center channel, both adjacent channels should be placed in record.) Put the channel under test in the Sel-Sync mode. The BIAS TRAP trimmer capacitors are available at the back of the Sel-Sync assembly; adjust the appropriate trimmer to null the indication on the vu meter.

5.3 OVERALL PERFORMANCE CHECKS

5.3.1 Test Equipment Required

Signal Generator, Hewlett-Packard Model 200C or equivalent

*Bias filter (see Fig. 5-3)

A-C Vacuum Tube Voltmeter, Hewlett-Packard Model 400D or equivalent

Bandpass Filter (see Fig. 5-4)

*Wave Analyzer

*If available.

5.3.2 Test Conditions

LINE TERMINATION switch on back of electronics in ON position to terminate equipment during all checks.

INPUT SELECTOR switch on back of electronics in UNBAL BRIDGE position during all checks.

Heads cleaned and demagnetized before starting checks.

Top and bottom covers installed on electronics during checks.

All record tests made with professional grade magnetic tape such as Ampex No. 631 or equivalent.

5.3.3 Overall Frequency Response Check

This check can be made while simultaneously recording and reproducing if the bias filter (see Fig. 5-3) is available. If this is not the case, record the tape, rewind and then make the response run.

On reproduce-only equipment, the response check can be made by recording the tape on a properly adjusted recorder with the same track configuration as the reproducer. If such a recorder is unavailable, make the check with a standard tape (refer to paragraph 5.2.5) keeping in mind the low frequency limitations noted for such a tape.

Step 1: Connect the signal generator to pins 1 and 3 of the line INPUT connector for the channel under test. Set it to 500 Hz at a nominal 1-volt level.

Step 2: Connect the bias filter to the corresponding line OUTPUT connector, and connect the vtvm to the output of the filter.

Step 3: Place the OUTPUT SELECTOR switch in the INPUT position and adjust the RECORD LEVEL control for a -10 or -14 dbm output (3-3/4 and 7-1/2 ips) or a 0 or -4 dbm (15 and 30 ips) as indicated on the vtvm (level is dependent on whether the equipment is strapped for a +8 or +4 dbm operating level output). Then turn the OUTPUT SELECTOR switch to the REPRODUCE position.

Step 4: Place the RECORD SELECTOR switch for the channel being tested in the READY condition.

Step 5: Thread blank tape on the equipment and select tape speed.

Step 6: Place tape in motion in the record mode.

Step 7: While thus simultaneously recording and reproducing, change the signal generator frequency in discrete steps from the low to high frequency limits for the speed involved. The response, as indicated on the vtvm, should be within the tolerances quoted in the specifications (refer to Section 1).

Step 8: Select the second speed and repeat Steps 6 and 7.

Step 9: Repeat the entire procedure for all other channels.

Poor frequency response can result from any of the causes listed below:

a. Heads in need of demagnetization (refer to Section 6).

b. Heads in need of cleaning (refer to Section 6).

c. Head azimuths incorrectly adjusted (refer to paragraphs 5.2.5 and 5.2.9).

d. Bias level incorrectly adjusted (refer to paragraph 5.2.7).

e. Reproduce equalization incorrectly adjusted (refer to paragraphs 5.2.5 and 5.2.10).

f. Record calibration incorrectly adjusted (refer to paragraph 5.2.8).

g. Record equalization incorrectly adjusted (refer to paragraph 5.2.11).

h. Play holdback tension incorrectly adjusted (refer to Section 4).

i. Magnetic tape not professional quality.

j. Signal generator output not flat over response spectrum.

5.3.4 Overall Signal-to-Noise Check

To make this check it is required that an output bandpass filter be employed. A schematic diagram of the necessary filter is shown on Fig. 5-4.

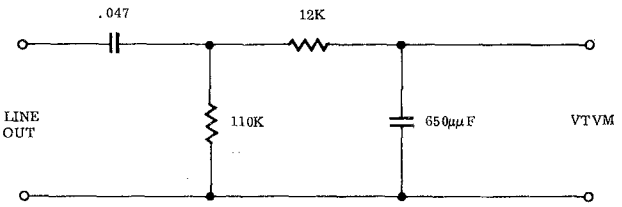


Fig. 5-4 Bandpass Noise Filter

Step 1: Connect the signal generator to pins 1 and 3 of the line INPUT connector for the channel under test. Set it to 500 Hz at a nominal 1-volt level.

Step 2: Connect the bandpass filter to the corresponding line OUTPUT connector, and the vtvm to the output of the filter.

Step 3: Place the OUTPUT SELECTOR switch in the INPUT position and adjust the RECORD LEVEL control for a +14 or +10 dbm output (depending on whether the equipment is strapped for a +8 or +4 dbm operating level output).

Step 4: Place the RECORD SELECTOR switch in the READY position.

Step 5: Thread blank tape on the equipment and select tape speed. Close the head gate.

Step 6: Place tape in motion in the record mode and record a section of the tape with the 500 Hz signal.

Step 7: Rewind the tape to the beginning of the recording made in Step 6. Remove the signal generator. Place the OUTPUT SELECTOR switch in the REPRODUCE position. Close the head gate.

Step 8: Start tape in motion in the record mode with no input signal. The noise level, while thus erasing the 500 Hz recording, will be indicated on the vtvm.

NOTE

The signal-to-noise ratio is computed from peak record level, which is 6 db higher than normal record level. Therefore, add 14 db (+8 dbm output) or 10 db (+4 dbm output) to the vtvm indication in Step 8 to determine the actual signal-to-noise ratio.

Step 9: Repeat Steps 6, 7, and 8 for the second speed.

Step 10: Repeat the entire procedure for all other channels.

The signal-to-noise ratio should meet specifications (refer to Section 1).

An inadequate signal-to-noise ratio can result from any of these causes:

a. Heads in need of demagnetization (refer to Section 6).

b. Heads in need of cleaning (refer to Section 6).

c. Incorrect bias symmetry adjustment (refer to paragraph 5.2.12).

d. Magnetic tape not professional quality.

e. External fields from nearby motors, generators, etc.

f. Head cables rubbing against moving parts on transport.

g. Making noise run with head gate open.

To check reproduce noise, remove the tape from the equipment. Connect the vtvm through the filter (see Fig. 5-4) to the line output connector and hold the takeup tension arm away from its rest position (so that it does not contact the safety switch). Press the PLAY pushbutton and read the noise on the vtvm. Under these circumstances the signal-to-noise should be as shown in Table 5-2.

TAPE SPEED	1/4-INCH TAPE (HEAD)	REPRODUCE SIGNAL/NOISE FROM 3% LEVEL	1/2-INCH TAPE (HEAD)	REPRODUCE SIGNAL/NOISE FROM 3% LEVEL
3-3/4 ips	Full Track	58 db	-	-
	Half Track	53 db	-	-
	Two Track	53 db	-	-
7-1/2 ips	Full Track	63 db	-	-
	Half Track	60 db	Three Track	64 db
	Two Track	60 db	Four Track	62 db
15 ips	Full Track	63 db	-	-
	Half Track	60 db	Three Track	64 db
	Two Track	60 db	Four Track	62 db
30 ips	Full Track	63 db	-	-
	Half Track	60 db	Three Track	64 db
	Two Track	60 db	Four Track	62 db

Table 5-2. Reproduce Noise

5.3.5 Overall Distortion Check

An accurate check of distortion on this equipment requires the use of a wave analyzer to measure individual distortion products. (An instrument which measures total harmonic distortion will be influenced by tape noise and modulation noise in addition to actual distortion.) Also, the signal generator must have very low distortion (less than 0.1%) or addition and cancellation effects can occur.

To check distortion, record a 500 Hz signal on blank tape at normal operating level. On playback, the second harmonic component should not exceed 0.4%, the third harmonic should be between 0.6% and 1.1%.

The most common cause of any higher second harmonic distortion reading is a magnetized record head, but it could also result from a malfunctioning record or reproduce amplifier, or a non-symmetrical bias waveform.

Third harmonic distortion is dependent on the type of magnetic tape employed, the bias setting, and the accuracy with which the "normal operating level" is adjusted. A typical roll of tape will have a 500 Hz third harmonic content of 0.8% at operating level, but this might range as high as 1.1%.

5.4 PRINCIPLES OF OPERATION

5.4.1 General

This discussion can be followed most easily by referring to the block diagrams of Figs. 5-5 and 5-6, and the schematic diagrams of Figs. 7-3 through 7-6. Because there is considerable difference in the reproduce circuit between the record/reproduce and reproduce-only equipment, the two will be described separately.

On the record/reproduce assembly, numbers preceding the reference symbol refer to the physical location of the component. Symbols preceded by 1 (1Q1, 1R31, etc.) indicate the component is on the printed circuit board. A 2 indicates location on the front panel, 3 on the left panel (when facing the front), 4 on the back panel, 5 on the right panel, and 6 on the power supply.

On reproduce-only equipment, a 1 preceding the reference symbol indicates that the component is located in the power supply module, a 2 denotes location in an audio module.

5.4.2 Power Supply

Line power from the tape transport is connected to the electronic assembly at 4J9, and is then connected through fuse 4F2 across the primary of power transformer 6T3.

One secondary winding of transformer 6T3 is connected to the lights on the vu meter, which act as a power indicator. The other secondary winding is across a bridge rectifier, consisting of diodes 1CR3 through 1CR6. After rectification, power is routed to a voltage regulator circuit.

In the voltage regulator, the reference voltage is established by zener diode 1CR10, and the sampling voltage is taken at variable resistor 1R77 (which provides the voltage adjustment). If the output voltage tends to vary with load, the conductance of transistor 1Q22 will change. This in turn affects the conductance of transistors 1Q21 and 3Q20, connected in a Darlington circuit, so that the voltage is returned to the normal level.

Transistor 1Q19 acts as a constant current source. Diode 1CR9 and resistor 1R74 provide overload protection. If the current through 1R74, combined with that through 1R73, results in a voltage sufficient to break down 1CR9, transistor 1Q19 will be biased toward cutoff. This in turn will underbias the rest of the transistors in the regulator.

A +23 volt regulated output is delivered to the speed switch on the tape transport, then returned to the electronics and used to energize equalization relay 2K1 in the low speed position of that switch. It is also routed to all stages in the reproduce amplifier, the octal socket for accessory input units, and the first three stages in the record amplifier.

When the channel is in the record mode, one contact set of record relay 3K2 connects the power to the final two stages of the record amplifier, and through series transistor 1Q23 and fuse 4F3 to the bias oscillator. Those circuits thus will operate only when the channel is recording.

NOTE

The power supply in a reproduce-only unit employs a very simple voltage regulator consisting of a bridge rectifier, series power transistor, and a zener diode.

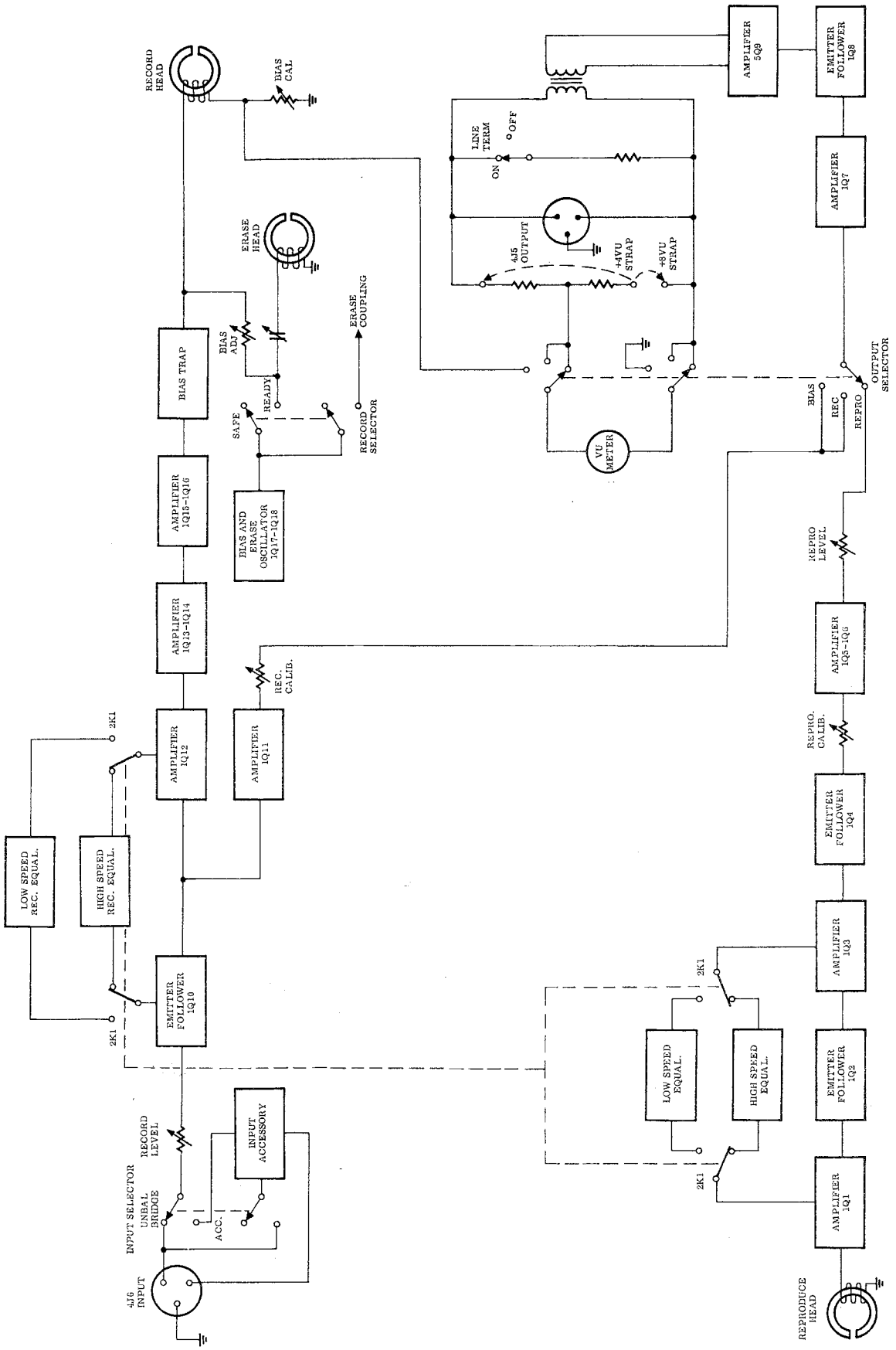


Fig. 5-5 Block Diagram, Record/Reproduce Electronic Circuit

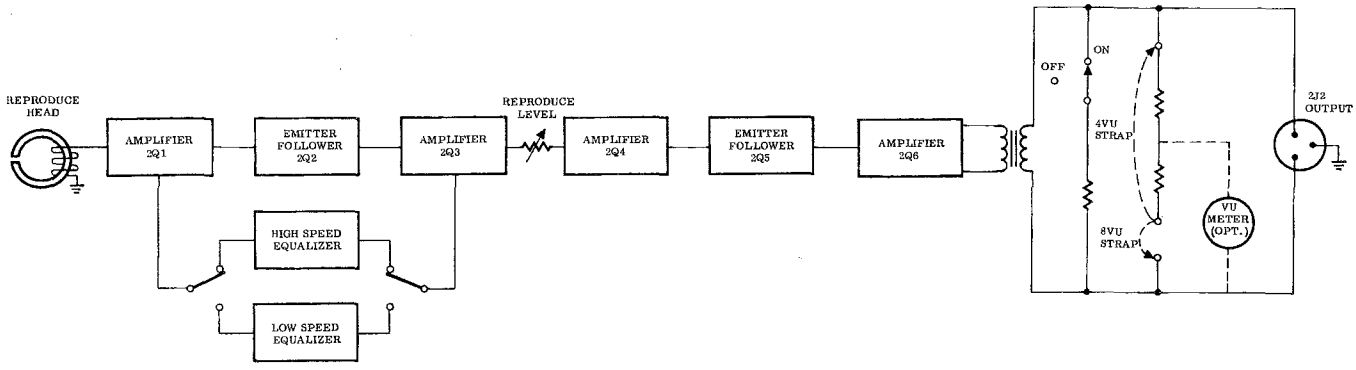


Fig. 5-6 Block Diagram, Reproduce-only Electronic Circuit

5.4.3 Record Control Circuit

The RECORD pushbutton is located on the tape transport. To enter the record mode, RECORD SELECTOR switch 2S5 on the electronic assembly must be in the READY position (on multi-channel equipment, any or all channels may be placed in the ready condition). In this condition, READY indicator 2I2 is illuminated (power is connected to this light from the tape transport). After tape is started in motion at the tape transport, pressing the RECORD pushbutton will place any channel which is in the ready condition into the record mode.

When the pushbutton is pressed, record relay 3K2 is energized by power from the tape transport. One of its contact sets forms a holding circuit across the record pushbutton on the transport, and another contact set switches power to the record and bias oscillator circuits. The equipment will thus be placed in the record mode, on the channels which were placed in the ready condition (any channel which is left in the "safe" condition will not be recording).

Indicator lights 2I2 and 2I1 show when a channel is in the ready condition or in the record mode respectively.

5.4.4 Record Circuit

The signal to be recorded is connected to the equipment at INPUT connector 4J6. From there it is connected to the INPUT SELECTOR switch 4S3. If the recording is from an unbalanced line, this switch is placed in the UNBAL BRIDGE position. If it is from a balanced line or microphone, the switch is placed in the ACCESSORY position and the proper accessory plug-in unit (transformer or microphone preamplifier, see Section 1) is inserted in octal socket 4J7.

From the selector switch or accessory unit, the signal is routed through RECORD LEVEL control 2R38 to the base of emitter-follower stage 1Q10. From the emitter of 1Q10 the signal path splits. One path leads through the record calibrating amplifier 1Q11, whose gain is adjusted by RECORD CALIBRATE control 2R45, through contacts of the OUTPUT SELECTOR switch 2S1 to the line amplifier -- through which it proceeds to the monitor jack, vu meter, and OUTPUT connector for monitoring purposes.

The second signal path from 1Q10 is through resistor 1R42 to the base of the amplifier stage 1Q12. Note that record equalization consists of a variable capacitor (in the plug-in equalizers) selected by contacts of equalization relay 2K1; this capacitor is connected in parallel with 1R42 to provide the necessary high frequency pre-emphasis.

After amplification in 1Q12 the signal is connected to 1Q13 and 1Q14, which form a Darlington amplifier circuit. In such a circuit, the first transistor in the circuit (1Q13) provides a low impedance source for the second (1Q14). The resultant amplifier is characterized by very low noise. From this amplifier the signal proceeds to a constant current amplifier stage formed by 1Q15 and 1Q16.

In this constant current stage, transistor 1Q15 acts as an active load resistance for the collector of 1Q16, providing a relatively low d-c resistance and a relatively high a-c resistance. In the audio frequency range, therefore, the collector of 1Q16 works into an impedance which is sufficiently high to provide a constant current source for the record head, yet allows full utilization of the d-c operating voltage available.

From this stage the signal is routed through a bias trap, consisting of choke 1L1 and capacitor 1C27, to the record head. Operating voltage is delivered to 1Q13, 1Q14, 1Q15, and 1Q16 only when the channel is in the record mode, so those stages are inactive in any other mode.

The bias and erase oscillator, consisting of transistors 1Q17 and 1Q18, is a push-pull circuit, connected as a tuned flip-flop. Operating voltage is delivered only when the channel is in the record mode. Symmetry of the output waveform is adjusted at 4R84. Frequency is adjusted at variable capacitor 4C34. The transformer-coupled output is delivered to the RECORD SELECTOR switch 2S5. When this switch is in the READY position, the oscillator output is routed through BIAS ADJUST resistor 2R68 to the record head where it is mixed with the signal. It is also connected through ERASE ADJUST capacitor 4C36 to the erase head and to the erase coupling jack 4J12. On multi-channel equipment the erase coupling jacks are employed to connect the oscillators and thus lock their frequencies together; this prevents any beat frequency from being generated. When the RECORD SELECTOR switch is in the SAFE position, the oscillator transformer, record head, erase head, and coupling circuit are disconnected.

5.4.5 Reproduce Circuit (Record/Reproduce Equipment)

The signal from the reproduce head enters the electronic assembly at 4J1 and is amplified by stage 1Q1. It is then routed through emitter follower 1Q2 to another amplifier (1Q3). The high speed or low speed equalization circuit, as selected by contacts of equalization relay 2K1, is connected from the collector of 1Q3 back to the emitter of 1Q1, and d-c feedback is provided through 1R4 between these two stages.

Transistor 1Q4 is another emitter follower, followed by REProduce CALIBration control 2R15. The signal then proceeds to a Darlington amplifier, formed by transistors 1Q5 and 1Q6. In this circuit 1Q5 acts as a low impedance source for 1Q6 to produce amplification of the signal with low noise.

After amplification in 1Q5/1Q6, the amplitude is adjusted by REPRODUCE LEVEL control 2R21 and the signal then proceeds through contacts of the OUTPUT SELECTOR switch to amplifier stage 1Q7 in the line amplifier circuit. The signal is next routed through emitter follower 1Q8 to the output amplifier stage 5Q9.

A monitor jack is connected in the collector circuit of 5Q9. Note that there is a small amount of d-c (approximately 1 volt) present at this jack. Headsets with impedances of 300 ohms or more may be used to monitor the signal.

The output signal is coupled through transformer 5T1 to the line OUTPUT connector 4J5. LINE TERMINATION switch 4S2 connects resistor 4R36 across the transformer secondary during test and adjustment procedures, or removes it during normal operation. If the equipment is operated into a high impedance load (2,000 ohms or more) switch 4S2 should be left in the ON position.

Visual monitoring of the signal is provided at the vu meter. Note that, depending on the position of the OUTPUT SELECTOR switch, the meter will indicate REPRODUCE level, record (INPUT) level, or BIAS level. (This switch also determines whether the reproduce or record signal is present at the monitor jack and the output connector.) The placement of straps in the meter circuit determines whether the meter indicates 0 at a +8 db level or a +4 db level. With the +8 db strapping, resistors 4R33 and 4R34 are connected as a voltage divider across the secondary of transformer 5T1, with the meter connection taken at the junction of the two resistors. For a +4 db output, the strapping connects 4R33 and 4R34 in parallel on one side of the line, and the meter is connected in series with this circuit.

In the BIAS position of the OUTPUT SELECTOR switch, resistor 2R37 is connected to the vu meter (it is shorted in any other switch position). This is simply to provide proper working impedance for the meter, when it is connected to the bias circuit.

5.4.6 Reproduce Circuit (Reproduce-only Equipment)

The signal reproduced from the tape enters the assembly at 2J1, and is amplified in stage 2Q1. It then proceeds through emitter follower stage 2Q2 to another amplifier 2Q3. High speed or low speed equalization, selected by contacts of equalization relay 2K1, is connected from the collector of 2Q3 back to the emitter of 2Q1. D-C feedback is also provided between these two stages through resistor 2R9.

Amplitude of the signal is adjusted by REPRODUCE LEVEL control 2R14, followed by amplifier stage 2Q4. Emitter follower 2Q5 and output amplifier 2Q6 complete the circuit.

The output signal is coupled through transformer 2T1 to the line OUTPUT connector 2J2. The vu meter on this assembly is an optional accessory; meter strapping is the same as that explained in paragraph 5.4.4.

Section 6

HEAD ASSEMBLY

6.1 GENERAL

Standard head assemblies contain three head stacks -- erase, record, and reproduce in that order from left to right as viewed from the front. Each stack for 1/4-inch tape can contain one head (full track or half track) or two heads (two tracks); each stack for 1/2-inch tape can contain three heads or four heads.

The head gate, on the front of the assembly, contains the playback and record shield covers, and controls the tape lifters. The tape lifter removes the tape from contact with the heads when the gate is opened; it is intended for use when tape is being transported in either fast-winding mode.

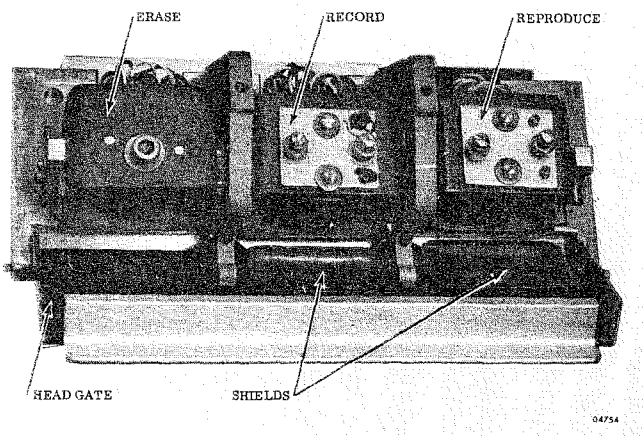


Fig. 6-1 Typical Head Assembly

6.2 MAINTENANCE OF HEAD ASSEMBLY

6.2.1 Cleaning

Oxide from the magnetic tape will be deposited on the head assembly, and must be removed if the equipment is to operate to high standards. Heads, tape guides, and other components in the tape threading path, should be cleaned after each eight hour operating period, or oftener if visual inspection so indicates.

CAUTION

USE ONLY THE RECOMMENDED SOLVENT TO CLEAN THE HEADS, AS SOME SOLVENTS WILL DAMAGE THESE PRECISE ASSEMBLIES. DO NOT LET THE SOLUTION DRIP OR SPRAY ON PLASTIC FINISHES OR PARTS, OR ON THE TIRE OF THE CAPSTAN IDLER. ALSO, DO NOT USE METAL TOOLS WHICH MIGHT SCRATCH THE HEAD ASSEMBLY.

Step 1: Fully open the head gate.

Step 2: Moisten a cotton swab on a small stick (Q-tip) with Ampex Head Cleaner, Catalog No. 01-0823 or 087-007, which consists of Xylene and 0.1% Aerosol. Clean each head.

Step 3: Clean the tape guiding elements, the capstan, and the capstan idler with denatured alcohol.

NOTE

The head cleaning solution can be used to clean all metallic components (not the capstan idler) if excessive oxide deposits are encountered.

6.2.2 Demagnetizing

Heads occasionally acquire a degree of permanent magnetization which can result in increased noise and distortion and the partial erasure of high frequency signals on recorded tapes. Demagnetize the heads after each eight hour operating period, or more often if there is any suspicion that the procedure is required. Demagnetization is easily accomplished using an Ampex Head Demagnetizer, Catalog No. 4010820.

Step 1: Turn power off and remove any tape that is on or near the equipment (tape will be partially erased by the action of the demagnetizer).

Step 2: Cover the tips of the demagnetizer with electrician's tape (or some similar pressure sensitive tape) to prevent scratching the heads, and plug the demagnetizer into a source of 110-120 volt a-c power.

Step 3: Bring the tips of the demagnetizer into very light contact with the head, positioned so the tips straddle the gap in the center of the head.

Step 4: With a slow, smooth motion, run the tips up and down the stack several times. Then slowly withdraw the demagnetizer (slow withdrawal is required for effective demagnetization).

Step 5: Repeat Steps 3 and 4 at all head stacks, and at the tape guides.

Step 6: Withdraw the demagnetizer at least three feet from the recorder before unplugging it from the power source.

MODEL AG-300

SINGLE CHANNEL RECORDER/REPRODUCER

1/4-inch Tape, Full Track

01	02	03	04	09	10	11	12		Ampex Part No.
x								Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz, Unmounted	4010051-01
	x							Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz, Unmounted	4010051-02
		x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz, Console Mount	4010051-03
			x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz, Console Mount	4010051-04
				x				Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 60 Hz , Unmounted	4010051-09
					x			Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 50 Hz , Unmounted	4010051-10
						x		Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 60 Hz , Console Mount	4010051-11
							x	Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 50 Hz , Console Mount	4010051-12
1	1	1	1	1	1	1	1	Electronics Assembly (without equalizers)	4020251-02
1	1	1	1					Equalizer Assembly, 15 ips, NAB	4020252-01
1	1	1	1	1	1	1	1	Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
				1	1	1	1	Equalizer Assembly, 3-3/4 ips, 120 μs or 200 μs	4020252-03
1	1	1	1	1	1	1	1	Head Assembly, Full Track	4020261-02
1		1						Tape Transport Assembly, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1		1					Tape Transport Assembly, 7-1/2 - 15 ips, 50 Hz	4020267-04
				1		1		Tape Transport Assembly, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1		1	Tape Transport Assembly, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-01
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
		1	1			1	1	Panel Assembly, blank	4040857-01
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
		1	1			1	1	Panel, Front Facing, blank	4290563-01
1	1	1	1	1	1	1	1	Reel, 1/4-inch, 10-1/2-inch diameter	4690003-10
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
1	1	1	1	1	1	1	1	Connector, plug, female, 3 contact	144-003
1	1	1	1	1	1	1	1	Connector, plug, male, 3 contact	145-009

MODEL AG-300

SINGLE CHANNEL RECORDER/REPRODUCER

1/4-inch Tape, Half Track

05	06	07	08	13	14	15	16		Ampex Part No.
x								Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz, Unmounted	4010051-05
	x							Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz, Unmounted	4010051-06
		x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz, Console Mount	4010051-07
			x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz, Console Mount	4010051-08
				x				Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 60 Hz, Unmounted	4010051-13
					x			Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 50 Hz, Unmounted	4010051-14
						x		Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 60 Hz, Console Mount	4010051-15
							x	Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 50 Hz, Console Mount	4010051-16
1	1	1	1	1	1	1	1	Electronics Assembly (without equalizers)	4020251-02
1	1	1	1					Equalizer Assembly, 15 ips, NAB	4020252-01
1	1	1	1	1	1	1	1	Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
				1	1	1	1	Equalizer Assembly, 3-3/4 ips, 120 μs or 200 μs	4020252-03
1	1	1	1	1	1	1	1	Head Assembly, Half Track	4020261-01
1		1						Tape Transport Assembly, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1		1					Tape Transport Assembly, 7-1/2 - 15 ips, 50 Hz	4020267-04
				1		1		Tape Transport Assembly, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1		1	Tape Transport Assembly, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-01
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
		1	1			1	1	Panel Assembly, blank	4040857-01
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
		1	1			1	1	Panel, Front Facing, blank	4290563-01
1	1	1	1	1	1	1	1	Reel, 1/4-inch, 10-1/2-inch diameter	4690003-10
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
1	1	1	1	1	1	1	1	Connector, plug, female, 3 contact	144-003
1	1	1	1	1	1	1	1	Connector, plug, male, 3 contact	145-009

MODEL AG-300

TWO CHANNEL RECORDER/REPRODUCER

1/4-inch Tape, Unmounted

01	02	05	06	09	10		Ampex Part No.
x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz	4010052-01
	x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz	4010052-02
		x				Recorder/Reproducer, 15 - 30 ips, 60 Hz	4010052-05
			x			Recorder/Reproducer, 15 - 30 ips, 50 Hz	4010052-06
				x		Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 60 Hz	4010052-09
					x	Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 50 Hz	4010052-10
2	2	2	2	2	2	Electronics Assembly (without equalizers)	4020251-02
2	2	2	2			Equalizer Assembly, 15 ips, NAB	4020252-01
2	2			2	2	Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
				2	2	Equalizer Assembly, 3-3/4 ips, 120 μs or 200 μs	4020252-03
		2	2			Equalizer Assembly, 30 ips, 17.5 μs	4020252-06
1	1	1	1	1	1	Head Assembly, Two Track	4020262-01
1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-04
		1				Tape Transport, 15 - 30 ips, 60 Hz	4020267-07
			1			Tape Transport, 15 - 30 ips, 50 Hz	4020267-08
				1		Tape Transport, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1	Tape Transport, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
2	2	2	2	2	2	Reel Knob Assembly	4040492-10
1	1	1	1	1	1	Cable Assembly, Bias Interconnecting	4050160-02
1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-02
1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	Reel, 1/4-inch, 10-1/2-inch diameter	4690003-10
1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
2	2	2	2	2	2	Connector, plug, female, 3 contact	144-003
2	2	2	2	2	2	Connector, plug, male, 3 contact	145-009

MODEL AG-300

TWO CHANNEL RECORDER/REPRODUCER

1/4-inch Tape, Console Mounted

03	04	07	08	11	12		Ampex Part No.
x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz	4010052-03
	x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz	4010052-04
		x				Recorder/Reproducer, 15 - 30 ips, 60 Hz	4010052-07
			x			Recorder/Reproducer, 15 - 30 ips, 50 Hz	4010052-08
				x		Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 60 Hz	4010052-11
					x	Recorder/Reproducer, 3-3/4 - 7-1/2 ips, 50 Hz	4010052-12
2	2	2	2	2	2	Electronics Assembly (without equalizers)	4020251-02
2	2	2	2			Equalizer Assembly, 15 ips, NAB	4020252-01
2	2			2	2	Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
				2	2	Equalizer Assembly, 3-3/4 ips, 120 μs or 200 μs	4020252-03
		2	2			Equalizer Assembly, 30 ips, 17.5 μs	4020252-06
1	1	1	1	1	1	Head Assembly, Two Track	4020262-01
1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-04
		1				Tape Transport, 15 - 30 ips, 60 Hz	4020267-07
			1			Tape Transport, 15 - 30 ips, 50 Hz	4020267-08
				1		Tape Transport, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1	Tape Transport, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
1	1	1	1	1	1	Console Assembly	4030235-01
2	2	2	2	2	2	Reel Knob Assembly	4040492-10
1	1	1	1	1	1	Cable Assembly, Bias Interconnecting	4050160-02
1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-02
1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	Reel, 1/4-inch, 10-1/2-inch diamater	4690003-10
1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
2	2	2	2	2	2	Connector, plug, female, 3 contact	144-003
2	2	2	2	2	2	Connector, plug, male, 3 contact	145-009

MODEL AG-300
THREE CHANNEL RECORDER/REPRODUCER
1/2-Inch Tape, Without Sel Sync

01	02	03	04	05	06	07	08		Ampex Part No.
x								Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz , Unmounted	4010053-01
	x							Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz , Unmounted	4010053-02
		x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz , Console Mount	4010053-03
			x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz , Console Mount	4010053-04
				x				Recorder/Reproducer, 15 - 30 ips, 60 Hz , Unmounted	4010053-05
					x			Recorder/Reproducer, 15 - 30 ips, 50 Hz , Unmounted	4010053-06
						x		Recorder/Reproducer, 15 - 30 ips, 60 Hz , Console Mount	4010053-07
							x	Recorder/Reproducer, 15 - 30 ips, 50 Hz , Console Mount	4010053-08
3	3	3	3	3	3	3	3	Electronics Assembly, (without equalizers)	4020251-02
3	3	3	3	3	3	3	3	Equalizer Assembly, 15 ips, NAB	4020252-01
3	3	3	3					Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
				3	3	3	3	Equalizer Assembly, 30 ips, 17.5 μs	4020252-06
1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-05
	1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-06
				1		1		Tape Transport, 15 - 30 ips, 60 Hz	4020267-09
					1		1	Tape Transport, 15 - 30 ips, 50 Hz	4020267-10
1	1	1	1	1	1	1	1	Head Assembly, three track	4020263-01
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-02
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
		1	1			1	1	Panel Assembly, blank	4040857-01
2	2	2	2	2	2	2	2	Cable Assembly, Bias Interconnecting	4050160-04
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-03
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
		1	1			1	1	Panel, Front Facing, blank	4290563-01
1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10 1/2-inch diameter	4690003-20
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
3	3	3	3	3	3	3	3	Connector, plug, female, 3 contact	144-003
3	3	3	3	3	3	3	3	Connector, plug, male, 3 contact	145-009
1	1	1	1	1	1	1	1	Adaptor, Tee, Coaxial	169-012
3	3	3	3	3	3	3	3	Adaptor Assembly, Low Impedance Heads	4020223-02

MODEL AG-300
THREE CHANNEL RECORDER/REPRODUCER
1/2-Inch Tape, With Sel Sync

09	10	11	12	13	14	15	16		Ampex Part No.
x								Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz , Unmounted	4010053-09
	x							Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz , Unmounted	4010053-10
		x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz , Console Mount	4010053-11
			x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz , Console Mount	4010053-12
				x				Recorder/Reproducer, 15 - 30 ips, 60 Hz , Unmounted	4010053-13
					x			Recorder/Reproducer, 15 - 30 ips, 50 Hz , Unmounted	4010053-14
						x		Recorder/Reproducer, 15 - 30 ips, 60 Hz , Console Mount	4010053-15
							x	Recorder/Reproducer, 15 - 30 ips, 50 Hz , Console Mount	4010053-16
3	3	3	3	3	3	3	3	Electronics Assembly (without equalizers)	4020251-02
3	3	3	3	3	3	3	3	Equalizer Assembly, 15 ips, NAB	4020252-01
3	3	3	3					Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
				3	3	3	3	Equalizer Assembly, 30 ips, 17.5 μs	4020252-06
1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-05
	1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-06
				1		1		Tape Transport, 15 - 30 ips, 60 Hz	4020267-09
					1		1	Tape Transport, 15 - 30 ips, 50 Hz	4020267-10
1	1	1	1	1	1	1	1	Sel Sync Assembly	4020268-01
1	1	1	1	1	1	1	1	Head Assembly, three track	4020263-01
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-02
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
2	2	2	2	2	2	2	2	Cable Assembly, Bias Interconnecting	4050160-04
1	1	1	1	1	1	1	1	Cable Assembly, Record Head	4050207-18
1	1	1	1	1	1	1	1	Cable Assembly, Record Head	4050207-19
1	1	1	1	1	1	1	1	Cable Assembly, Record Head	4050207-20
2	2	2	2	2	2	2	2	Cable Assembly, Playback Head	4050208-10
1	1	1	1	1	1	1	1	Cable Assembly, Playback Head	4050208-20
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050393-02
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050393-03
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050393-04
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10-1/2-inch diameter	4690003-20
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
3	3	3	3	3	3	3	3	Connector, plug, female, 3 contact	144-003
3	3	3	3	3	3	3	3	Connector, plug, male, 3 contact	145-009
1	1	1	1	1	1	1	1	Adaptor, Tee, Coaxial	169-012
3	3	3	3	3	3	3	3	Adaptor Assembly, Low Impedance Heads	4020223-02

MODEL AG-300
FOUR CHANNEL RECORDER/REPRODUCER
1/2-Inch Tape, Without Sel Sync

	01	02	03	04	05	06	07	08		Ampex Part No.
	x								Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz, Unmounted	4010054-01
		x							Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz, Unmounted	4010054-02
			x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz, Console Mount	4010054-03
				x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz, Console Mount	4010054-04
					x				Recorder/Reproducer, 15 - 30 ips, 60 Hz, Unmounted	4010054-05
						x			Recorder/Reproducer, 15 - 30 ips, 50 Hz, Unmounted	4010054-06
							x		Recorder/Reproducer, 15 - 30 ips, 60 Hz, Console Mount	4010054-07
								x	Recorder/Reproducer, 15 - 30 ips, 50 Hz, Console Mount	4010054-08
	4	4	4	4	4	4	4	4	Adaptor Assembly, Low Impedance Head	4020223-02
	4	4	4	4	4	4	4	4	Electronics Assembly (without equalizers)	4020251-02
	4	4	4	4	4	4	4	4	Equalizer Assembly, 15 ips, NAB	4020252-01
	4	4	4	4					Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
					4	4	4	4	Equalizer Assembly, 30 ips, 17.5 μs	4020252-06
	1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-05
		1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-06
					1		1		Tape Transport, 15 - 30 ips, 60 Hz	4020267-09
						1		1	Tape Transport, 15 - 30 ips, 50 Hz	4020267-10
	1	1	1	1	1	1	1	1	Head Assembly, Four Track	4020264-01
	2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
			1	1			1	1	Console Assembly	4030235-02
	2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
	3	3	3	3	3	3	3	3	Cable Assembly, Bias Interconnecting	4050160-04
	1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-04
	1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
	2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
	1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
	1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10-1/2-inch diameter	4690003-20
	1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
	4	4	4	4	4	4	4	4	Connector, plug, female, 3 contact	144-003
	4	4	4	4	4	4	4	4	Connector, plug, male, 3 contact	145-009
	2	2	2	2	2	2	2	2	Adaptor, Tee, coaxial	169-012

MODEL AG-300

FOUR CHANNEL RECORDER/REPRODUCER

1/2-inch Tape, With Sel Sync

09	10	11	12	13	14	15	16		Ampex Part No.
x								Recorder/Reproducer, 7-1/2 -15 ips, 60 Hz, Unmounted	4010054-09
	x							Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz , Unmounted	4010054-10
		x						Recorder/Reproducer, 7-1/2 - 15 ips, 60 Hz , Console Mount	4010054-11
			x					Recorder/Reproducer, 7-1/2 - 15 ips, 50 Hz , Console Mount	4010054-12
				x				Recorder/Reproducer, 15 - 30 ips, 60 Hz , Unmounted	4010054-13
					x			Recorder/Reproducer, 15 - 30 ips, 50 Hz , Unmounted	4010054-14
						x		Recorder/Reproducer, 15 - 30 ips, 60 Hz , Console Mount	4010054-15
							x	Recorder/Reproducer, 15 - 30 ips, 50 Hz , Console Mount	4010054-16
4	4	4	4	4	4	4	4	Adaptor Assembly, Low Impedance Head	4020223-02
4	4	4	4	4	4	4	4	Electronics Assembly, (without equalizers)	4020251-02
4	4	4	4	4	4	4	4	Equalizer Assembly, 15 ips, NAB	4020252-01
4	4	4	4					Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
				4	4	4	4	Equalizer Assembly, 30 ips, 17.5 μs	4020252-06
1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-05
	1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-06
				1		1		Tape Transport, 15 - 30 ips, 60 Hz	4020267-09
					1		1	Tape Transport, 15 - 30 ips, 50 Hz	4020267-10
1	1	1	1	1	1	1	1	Sel-Sync Assembly	4020268-02
1	1	1	1	1	1	1	1	Head Assembly, Four Track	4020264-01
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly (Modified)	4030256-01
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
3	3	3	3	3	3	3	3	Cable Assembly, Bias Interconnecting	4050160-04
1	1	1	1	1	1	1	1	Cable Assembly, Record Head	4050207-14
1	1	1	1	1	1	1	1	Cable Assembly, Record Head	4050207-18
1	1	1	1	1	1	1	1	Cable Assembly, Record Head	4050207-19
1	1	1	1	1	1	1	1	Cable Assembly, Record Head	4050207-20
2	2	2	2	2	2	2	2	Cable Assembly, Playback Head	4050217-06
1	1	1	1	1	1	1	1	Cable Assembly, Playback Head	4050217-07
1	1	1	1	1	1	1	1	Cable Assembly, Playback Head	4050217-18
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050393-01
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050393-02
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050393-03
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050393-04
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10-1/2-inch diameter	4690003-20
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
4	4	4	4	4	4	4	4	Connector, plug, female, 3 contacts	144-003
4	4	4	4	4	4	4	4	Connector, plug, male, 3 contacts	145-009
2	2	2	2	2	2	2	2	Adapter, Tee, Coaxial	169-012

MODEL AG-305

SINGLE CHANNEL REPRODUCER

1/4-inch Tape, Full Track

01	02	03	04	09	10	11	12		Ampex Part No.
x								Reproducer only, 7-1/2 - 15 ips, 60 Hz , Unmounted	4010055-01
	x							Reproducer only, 7-1/2 - 15 ips, 50 Hz , Unmounted	4010055-02
		x						Reproducer only, 7-1/2 - 15 ips, 60 Hz , Console Mount	4010055-03
			x					Reproducer only, 7-1/2 - 15 ips, 50 Hz , Console Mount	4010055-04
				x				Reproducer only, 3-3/4 - 7-1/2 ips, 60 Hz , Unmounted	4010055-09
					x			Reproducer only, 3-3/4 - 7-1/2 ips, 50 Hz , Unmounted	4010055-10
						x		Reproducer only, 3-3/4 - 7-1/2 ips, 60 Hz , Console Mount	4010055-11
							x	Reproducer only, 3-3/4 - 7-1/2 ips, 50 Hz , Console Mount	4010055-12
1	1	1	1	1	1	1	1	Head Assembly, Full Track, Reproduce	4020261-04
1	1	1	1	1	1	1	1	Electronics Assembly	4020265-03
				1		1		Tape Transport, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1		1	Tape Transport, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-04
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-01
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
		1	1			1	1	Panel Assembly, blank	4040857-01
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
		1	1			1	1	Panel, Front Facing, black	4290563-01
1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10-1/2-inch diameter	4690003-10
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
1	1	1	1	1	1	1	1	Connector, plug, female, 3 contact	144-003

MODEL AG-305

SINGLE CHANNEL REPRODUCER

1/4-inch Tape, Half Track

05	06	07	08	13	14	15	16		Ampex Part No.
x								Reproducer only, 7-1/2 - 15 ips, 60 Hz, Unmounted	4010055-05
	x							Reproducer only, 7-1/2 - 15 ips, 50 Hz, Unmounted	4010055-06
		x						Reproducer only, 7-1/2 - 15 ips, 60 Hz, Console Mount	4010055-07
			x					Reproducer only, 7-1/2 - 15 ips, 50 Hz, Console Mount	4010055-08
				x				Reproducer only, 3-3/4 - 7-1/2 ips, 60 Hz, Unmounted	4010055-13
					x			Reproducer only, 3-3/4 - 7-1/2 ips, 50 Hz, Unmounted	4010055-14
						x		Reproducer only, 3-3/4 - 7-1/2 ips, 60 Hz, Console Mount	4010055-15
							x	Reproducer only, 3-3/4 - 7-1/2 ips, 50 Hz, Console Mount	4010055-16
1	1	1	1	1	1	1	1	Head Assembly, Half Track, Reproducer	4020261-04
1	1	1	1	1	1	1	1	Electronics Assembly	4020265-03
				1		1		Tape Transport, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1		1	Tape Transport, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-04
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-01
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
		1	1			1	1	Panel Assembly, blank	4040857-01
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
		1	1			1	1	Panel, Front Facing, black	4290563-01
1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10-1/2-inch diameter	4690003-10
1	1	1	1	1	1	1	1	Cord set, 8-foot, black	084-005
1	1	1	1	1	1	1	1	Connector, plug, female, 3 contact	144-003

MODEL AG-305

TWO CHANNEL REPRODUCER

1/4-inch Tape, Console Mounted

03	04	07	08	11	12		Ampex Part No.
x						Reproducer - only, 7-1/2 - 15 ips, 60 Hz	4010056-03
	x					Reproducer - only, 7-1/2 - 15 ips, 50 Hz	4010056-04
		x				Reproducer - only, 15 - 30 ips, 60 Hz	4010056-07
			x			Reproducer - only, 15 - 30 ips, 50 Hz	4010056-08
				x		Reproducer - only, 3-3/4 - 7-1/2 ips, 60 Hz	4010056-11
					x	Reproducer - only, 3-3/4 - 7-1/2 ips, 50 Hz	4010056-12
1	1	1	1	1	1	Head Assembly, Two Track, Reproducer	4020262-01
1	1	1	1	1	1	Electronics Assembly	4020265-04
				1		Tape Transport, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1	Tape Transport, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-04
		1				Tape Transport, 15 - 30 ips, 60 Hz	4020267-07
			1			Tape Transport, 15 - 30 ips, 50 Hz	4020267-08
2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
1	1	1	1	1	1	Console Assembly	4030235-01
1	1	1	1	1	1	Panel Assembly, blank	4040857-01
1	1	1	1	1	1	Panel, Front Facing, blank	4290563-01
2	2	2	2	2	2	Reel Knob Assembly	4040492-10
1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	Reel, 1/4-inch, 10-1/2-inch diameter	4690003-10
1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
2	2	2	2	2	2	Connector, plug, female, 3 contact	144-003

MODEL AG-305

TWO CHANNEL REPRODUCER
1/4-inch Tape, Unmounted

01	02	05	06	09	10		Ampex Part No.
x						Reproducer - only, 7-1/2 - 15 ips, 60 Hz	4010056-01
	x					Reproducer - only, 7-1/2 - 15 ips, 50 Hz	4010056-02
		x				Reproducer - only, 15 - 30 ips, 60 Hz	4010056-05
			x			Reproducer - only, 15 - 30 ips, 50 Hz	4010056-06
				x		Reproducer - only, 3-3/4 - 7-1/2 ips, 60 Hz	4010056-09
					x	Reproducer - only, 3-3/4 - 7-1/2 ips, 50 Hz	4010056-10
1	1	1	1	1	1	Head Assembly, Two Track, Reproducer	4020262-01
1	1	1	1	1	1	Electronics Assembly	4020265-04
				1		Tape Transport, 3-3/4 - 7-1/2 ips, 60 Hz	4020267-01
					1	Tape Transport, 3-3/4 - 7-1/2 ips, 50 Hz	4020267-02
1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-03
	1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-04
		1				Tape Transport, 15 - 30 ips, 60 Hz	4020267-07
			1			Tape Transport, 15 - 30 ips, 50 Hz	4020267-08
2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
2	2	2	2	2	2	Reel Knob Assembly	4040492-10
1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-01
1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	Reel, 1/4-inch, 10-1/2-inch diameter	4690003-10
1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
2	2	2	2	2	2	Connector, plug, female, 3 contact	144-003

MODEL AG-305

THREE CHANNEL REPRODUCER

1/2-inch Tape

01	02	03	04	05	06	07	08		Ampex Part No.
x								Reproducer only, 7-1/2 - 15 ips, 60 Hz , Unmounted	4010057-01
	x							Reproducer only, 7-1/2 - 15 ips, 50 Hz , Unmounted	4010057-02
		x						Reproducer only, 7-1/2 - 15 ips, 60 Hz , Console Mount	4010057-03
			x					Reproducer only, 7-1/2 - 15 ips, 50 Hz , Console Mount	4010057-04
				x				Reproducer only, 15 - 30 ips, 60 Hz, Unmounted	4010057-05
					x			Reproducer only, 15 - 30 ips, 50 Hz, Unmounted	4010057-06
						x		Reproducer only, 15 - 30 ips, 60 Hz, Console Mount	4010057-07
							x	Reproducer only, 15 - 30 ips, 50 Hz, Console Mount	4010057-08
1	1	1	1	1	1	1	1	Electronic Assembly	4020265-03
1	1	1	1	1	1	1	1	Electronic Assembly	4020265-04
1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-05
	1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-06
				1		1		Tape Transport, 15 - 30 ips, 60 Hz	4020267-09
					1		1	Tape Transport, 15 - 30 ips, 50 Hz	4020267-10
1	1	1	1	1	1	1	1	Head Assembly, Three Track, Reproduce	4020263-02
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-01
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-02
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10-1/2-inch diameter	4690003-20
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
3	3	3	3	3	3	3	3	Connector, plug, female, 3 contact	144-003
3	3	3	3	3	3	3	3	Adaptor Assembly, Low Impedance Head	4020223-02

MODEL AG-305

FOUR CHANNEL REPRODUCER

1/2-inch Tape

01	02	03	04	05	06	07	08		Ampex Part No.
x								Reproducer only, 7-1/2 - 15 ips, 60 Hz , Unmounted	4010058-01
	x							Reproducer only, 7-1/2 - 15 ips, 50 Hz , Unmounted	4010058-02
		x						Reproducer only, 7-1/2 - 15 ips, 60 Hz , Console Mount	4010058-03
			x					Reproducer only, 7-1/2 - 15 ips, 50 Hz , Console Mount	4010058-04
				x				Reproducer only, 15 - 30 ips, 60 Hz, Unmounted	4010058-05
					x			Reproducer only, 15 - 30 ips, 50 Hz, Unmounted	4010058-06
						x		Reproducer only, 15 - 30 ips, 60 Hz, Console Mount	4010058-07
							x	Reproducer only, 15 - 30 ips, 50 Hz, Console Mount	4010058-08
4	4	4	4	4	4	4	4	Adaptor Assembly, Low Impedance Head	4020223-02
2	2	2	2	2	2	2	2	Electronics Assembly	4020265-04
1		1						Tape Transport, 7-1/2 - 15 ips, 60 Hz	4020267-05
	1		1					Tape Transport, 7-1/2 - 15 ips, 50 Hz	4020267-06
				1		1		Tape Transport, 15 - 30 ips, 60 Hz	4020267-09
					1		1	Tape Transport, 15 - 30 ips, 50 Hz	4020267-10
1	1	1	1	1	1	1	1	Head Assembly, Four Track, reproduce	4020264-02
2	2	2	2	2	2	2	2	Knob Assembly, Editing	4030145-10
		1	1			1	1	Console Assembly	4030235-01
2	2	2	2	2	2	2	2	Reel Knob Assembly	4040492-10
1	1	1	1	1	1	1	1	Cable Assembly, Power Interconnecting	4050392-02
1	1	1	1	1	1	1	1	Instruction Manual	4890163-01
2	2	2	2	2	2	2	2	Knob, Reel Hold Down	4100137-10
1	1	1	1	1	1	1	1	Spring, Drive Motor Return, Rack Mount	4270180-01
1	1	1	1	1	1	1	1	Reel, 1/2-inch, 10-1/2-inch diameter	4690003-20
1	1	1	1	1	1	1	1	Cord Set, 8-foot, black	084-005
4	4	4	4	4	4	4	4	Connector, plug, female, 3 contact	144-003

TAPE TRANSPORT ASSEMBLY

60 Hz

Fig. No.	Item No.	-01	-03	-05	-07	-09		Ampex Part No.
		x					Tape Transport Assembly, 1/4-inch Tape, 3-3/4 - 7-1/2 ips	4020267-01
			x				Tape Transport Assembly, 1/4-inch Tape, 7-1/2 - 15 ips	4020267-03
				x			Tape Transport Assembly, 1/2-inch Tape, 7-1/2 - 15 ips	4020267-05
					x		Tape Transport Assembly, 1/4-inch Tape, 15 - 30 ips	4020267-07
						x	Tape Transport Assembly, 1/2-inch Tape, 15 - 30 ips	4020267-09
7-10	1	-	1	1	1	1	Capstan Assembly	4030127-30
7-10	2	1	-	-	-	-	Capstan Assembly	4030127-40
7-10	3	1	1	1	-	-	Drive Motor Assembly	4030130-14
7-10	4	-	-	-	1	1	Drive Motor Assembly	4030130-15
7-12	36	1	1	1	-	-	Motor Assembly	4030131-14
7-12	37	-	-	-	1	1	Motor Assembly	4030131-15
		1	1	1	-	-	Pulley, drive	4250120-10
		-	-	-	1	1	Pulley, drive	4250120-20
		1	1	1	1	1	Motor, sleeve bearing, 1800/3600 rpm, 60 Hz	4590072-10
		6	6	6	6	6	Solderless Connector	171-008
7-12	14	1	1	1	1	1	Hinge, motor mounting	4120057-10
7-12	16	1	1	1	1	1	Arm, spring	4230167-10
7-12	17	1	1	1	1	1	Bracket, hinge	4260190-30
7-12	18	1	1	1	-	-	Bracket, hinge	4260191-10
7-12	21	1	1	1	1	1	Bracket, spring arm	4260192-20
7-10	7	-	1	1	1	1	Capstan Idler Assembly	4030203-10
7-10	8	1	-	-	-	-	Capstan Idler Assembly	4030203-50
		-	1	1	1	1	Wheel Assembly	4040404-10
		1	-	-	-	-	Wheel Assembly	4040404-90
		1	1	1	1	1	Cap, capstan idler	4100166-10
		1	1	1	1	1	Shaft	4210189-10
		1	1	1	1	1	Lock Ring	4320112-10
		1	1	1	1	1	Washer, felt	4440239-10
7-10	9	1	1	-	1	-	Transport Subassembly, 1/4-inch tape	4030255-01
7-10	10	-	-	1	-	1	Transport Subassembly, 1/2-inch tape	4030255-02
7-13	1	1	1	1	1	1	Top Plate Subassembly	4030126-40
7-13	2	1	1	1	1	1	Support Assembly, drive solenoid	4030132-50
7-15	16	1	1	1	1	1	Capacitor Assembly	4040591-02
7-15	3	2	2	2	2	2	Stop Arm, Solenoid	4220139-20
7-15	4	1	1	1	1	1	Hook, lock	4230168-10
7-15	6	1	1	1	1	1	Bracket, support	4260193-10
7-15	7	1	1	1	1	1	Bracket, spring	4260194-10
7-15	8	1	1	1	1	1	Spring, capstan idler adjust	4270162-10
7-15	9	1	1	1	1	1	Spring, solenoid adjust (drive motor)	4270175-10
7-15	10	1	1	1	1	1	Spring, solenoid return	4270176-10
7-15	11	1	1	1	1	1	Spring, lock hook	4270177-10
7-15	12	1	1	1	1	1	Eyebolt, capstan idler solenoid	4440496-10
7-15	13	1	1	1	1	1	Eyebolt, drive motor solenoid	4440496-20
7-15	14	1	1	1	1	1	Stud, motor stop	4400515-10
7-15	15	2	2	2	2	2	Solenoid, drive assembly	4590063-10
7-13	3	-	-	1	-	1	Rotary Guide, 1/2-inch tape	4030135-20
7-13	4	1	1	1	1	1	Switch Assembly, drive	4030139-30
7-16	3	1	1	1	1	1	Bracket, drive switch assembly	4260197-20
7-16	4	1	1	1	1	1	Switch, dual toggle, speed	4620195-01
7-16	5	1	1	1	1	1	Cover, speed switch	4290627-01
7-16	7	1	1	1	1	1	Microswitch, SPDT, safety	120-062
7-16	16	1	1	1	1	1	Insulator, speed switch cover	4170281-01
7-16	17	1	1	1	1	1	Shield, microswitch	4170184-01
7-13	5	1	1	-	1	-	Takeup Tension Arm Assembly, 1/4-inch tape	4030242-01
7-13	6	-	-	1	-	1	Takeup Tension Arm Assembly, 1/2-inch tape	4030242-02
7-17	1	1	1	1	1	1	Arm Assembly	4040405-40
7-17	2	-	-	1	-	1	Guide, 1/2-inch tape	4210183-10
7-17	3	1	1	-	1	-	Guide, 1/4-inch tape	4210183-20
7-17	5	1	1	1	1	1	Shaft	4210185-10
7-17	6	1	1	1	1	1	Collar, shaft	4220138-10
7-17	7	1	1	1	1	1	Hook, tape guide	4230158-10
7-17	8	1	1	1	1	1	Cap	4250193-01
7-17	9	1	1	1	1	1	Spring, arm return	4270158-10
7-13	7	1	1	-	1	-	Rewind Assembly (G. E.), 1/4-inch tape	4030247-07
							Alternate Rewind Assembly, 1/4-inch tape	4030247-05
7-13	8	-	-	1	-	1	Rewind Assembly (G. E.), 1/2-inch tape	4030247-04
							Alternate Rewind Assembly, 1/2-inch tape	4030247-06
7-18	1	1	1	-	1	-	Brake Assembly, rewind	4030114-20
7-18	2	-	-	1	-	1	Brake Assembly, rewind	4030114-40
7-19	1	1	1	1	1	1	Band, brake	4040414-10
7-19	2	2	2	2	2	2	Spacer	4220141-10
7-19	3	2	2	2	2	2	Link, brake band	4230161-10
7-19	4	1	1	1	1	1	Lever, brake	4230162-10
7-19	5	2	2	2	2	2	Link, solenoid	4230163-10
7-19	6	1	1	1	1	1	Bracket, solenoid	4260183-10
7-19	7	1	1	1	1	1	Stop, solenoid	4260184-10

Fig. No.	Item No.	-01	-03	-05	-07	-09		Ampex Part No.
7-19	8	2	2	2	2	2	Spring, compression	4270163-10
7-19	9	1	1	1	1	1	Spring, leaf	4270164-10
7-19	10	1	1	1	1	1	Spring, brake	4270178-10
7-19	11	1	1	1	1	1	Cross Head, brake	4330109-10
7-19	12	1	1	1	1	1	Anchor	4330110-10
7-19	13	1	1	1	1	1	Housing, brake	4330112-10
7-19	14	2	2	2	2	2	Clamp, band link	4330113-10
7-19	15	1	1	1	1	1	Bolt, spade	4400496-60
7-19	16	1	1	1	1	1	Solenoid	4590067-10
7-19	20	2	2	2	2	2	Solderless Connector	171-008
7-18	5	1	1	1	1	1	Torque Motor Assembly, G. E.	4040804-50
							Alternate Torque Motor Assembly, Ashland or IMC	4040804-70
7-20	1	1	1	1	1	1	Drum, brake	4250112-10
7-20	2	1	1	1	1	1	Flange, motor	4330115-10
7-20	3	1	1	1	1	1	Turntable	4250189-02
7-20	4	1	1	1	1	1	Motor, G. E.	4590107-10
							Alternate Motor, Ashland or IMC	4590073-20
7-18	9	1	1	1	1	1	Capacitor Assembly, 10 mfd (G. E. motor)	4050361-10
							Capacitor Assembly, 5 mfd (Ashland or IMC motor)	4050336-20
7-18	10						Pad, turntable	4130163-01
7-18	12	1	1	1	1	1	Drive Plate, reel	4320128-10
7-18	17	1	1	1	1	1	Connector, male, 8 contact	145-013
7-18	18	4	4	4	4	4	Solderless Connector	171-008
7-13	9	1	1	-	1	-	Takeup Assembly, (G. E.) 1/4-inch tape	4030248-06
							Alternate Takeup Assembly, 1/4-inch tape	4030248-03
7-13	10	-	-	1	-	1	Takeup Assembly, (G. E.) 1/2-inch tape	4030248-04
							Alternate Takeup Assembly, 1/2-inch tape	4030248-05
		1	1	-	1	-	Brake Assembly, takeup	4030114-10
		-	-	1	-	1	Brake Assembly, takeup	4030114-30
							(All parts same as rewind brake)	
		1	1	1	1	1	Torque Motor Assembly, G. E.	4040804-50
							Alternate Torque Motor Assembly, Ashland or IMC	4040804-70
							(All parts same as rewind motor)	
							(All other parts same as on rewind assembly)	
7-14	11	1	1	1	1	1	Pushbutton Assembly (START)	4040884-05
7-14	12	1	1	1	1	1	Pushbutton Assembly (STOP)	4040884-06
7-14	13	1	1	1	1	1	Pushbutton Assembly (REC)	4040884-07
7-14	15	1	1	1	1	1	Knob, control	4100179-01
7-13	16	2	2	2	2	2	Guard, reel	4110245-20
7-14	17	1	1	1	1	1	Jewel, pilot light (amber)	4110258-01
7-14	18	1	1	1	1	1	Jewel, pilot light (red)	4110258-02
7-14	19	1	1	1	1	1	Escutcheon, pushbutton	4110259-01
7-14	20	1	1	1	1	1	Escutcheon Plate	4040929-01
7-14	22	1	1	1	1	1	Arm, solenoid	4230160-10
7-14	24	2	2	2	2	2	Spring, pushbutton (start, stop)	4270241-01
7-14	25	1	1	1	1	1	Spring, pushbutton (record)	4270247-01
7-14	26	1	1	1	1	1	Arm, capstan idler	4330106-10
7-13	28	8	8	8	8	8	Screw, reel guard	4400611-10
7-14	29	1	1	1	1	1	Washer, thrust, iamicoid	4440025-80
7-14	30	A/R	A/R	A/R	A/R	A/R	Washer, shim, . 005 thick	4440113-10
7-14	31	A/R	A/R	A/R	A/R	A/R	Washer, shim, . 010 thick	4440113-20
7-14	32	A/R	A/R	A/R	A/R	A/R	Washer, shim, . 003 thick	4440113-50
7-14	33	2	2	2	2	2	Base Assembly, pilot light	4630187-01
7-14	35	1	1	1	1	1	Knob, speed switch	6000006-20
7-14	36	1	1	1	1	1	Upper Cover Bracket, control panel	4260283-01
7-14	37	1	1	1	1	1	Lower Cover Bracket, control panel	4260284-01
7-14	38	1	1	1	1	1	Control Box Assembly (see separate parts list)	4020007-01
7-14	42	2	2	2	2	2	Lamp, T4-1/2, 120V	060-006
7-14	45	1	1	1	1	1	Switch, pushbutton, SPST, n. o.	120-013
7-14	46	1	1	1	1	1	Switch, pushbutton, SPST, n. c.	120-014
7-14	47	1	1	1	1	1	Switch, pushbutton, DPDT, n. o.	120-025
7-14	48	1	1	1	1	1	Switch, toggle, DPST	120-003
7-14	49	1	1	1	1	1	Switch, 3 pole, 3 position	122-029
7-14	50	1	1	1	1	1	Panel Bushing and Nut	266-002
		3	3	3	3	3	Capacitor, disc, . 01 mfd	030-002
		1	1	1	1	1	Capacitor, paper tubular, 0. 1 mfd	055-053
7-10	11	1	-	-	-	-	Reel Idler Assembly	4040407-16
7-10	12	-	1	-	1	-	Reel Idler Assembly	4040407-17
7-10	13	-	-	1	-	1	Reel Idler Assembly	4040407-18
		1	1	-	1	-	Tape Guide, 1/4-inch tape	4210188-20
		1	1	-	1	-	Arm	4230159-10
		1	1	-	1	-	Spring	4270160-10
		1	-	-	-	-	Pulley Assembly	4040408-60
		-	1	1	1	1	Pulley Assembly	4040408-70
7-10	14	1	1	1	1	1	Cap, capstan	4100131-30
7-10	16	1	1	1	-	-	Flywheel	4250115-10
7-10	17	-	-	-	1	1	Flywheel	4250121-10

Fig. No.	Item No.	-01	-03	-05	-07	-09		Ampex Part No.
7-11	18	-	-	-	1	1	Spacer, reel idler	4220151-01
7-10	19	1	1	1	1	1	Spring, drive motor return	4270179-10
7-11	20	1	1	1	1	1	Washer, retaining	4440248-10
7-10	21	1	1	1	1	1	Screen, control box	4290614-01
7-10	22	1	1	1	1	1	Screen, control panel	4040066-01
							ITEMS OF STANDARD HARDWARE, WIRE, ETC., NOT LISTED	

TAPE TRANSPORT ASSEMBLY
50 Hz

Fig. No.	Item No.	-02	-04	-06	-08	-10		Ampex Part No.
		x					Tape Transport Assembly, 1/4-inch tape, 3-3/4 - 7-1/2 ips	4020267-02
			x				Tape Transport Assembly, 1/4-inch tape, 7-1/2 - 15 ips	4020267-04
				x			Tape Transport Assembly, 1/2-inch tape, 7-1/2 - 15 ips	4020267-06
					x		Tape Transport Assembly, 1/4-inch tape, 15 - 30 ips	4020267-08
						x	Tape Transport Assembly, 1/2-inch tape, 15 - 30 ips	4020267-10
7-10	1	-	1	1	1	1	Capstan Assembly	4030127-30
7-10	2	1	-	-	-	-	Capstan Assembly	4030127-40
7-10	5	1	1	1	-	-	Drive Motor Assembly	4030130-16
7-10	6	-	-	-	1	1	Drive Motor Assembly	4030130-17
7-12	38	1	1	1	-	-	Motor Assembly	4030131-16
7-12	39	-	-	-	1	1	Motor Assembly	4030131-17
		1	1	1	-	-	Pulley, drive	4250120-30
		-	-	-	1	1	Pulley, drive	4250120-40
		1	1	1	1	1	Motor, sleeve bearing, 50 Hz	4590072-20
		6	6	6	6	6	Solderless Connector	171-008
7-12	14	1	1	1	1	1	Hinge, motor mounting	4120057-10
7-12	16	1	1	1	1	1	Arm, spring	4230167-10
7-12	17	-	-	-	1	1	Bracket, hinge	4260190-30
7-12	18	1	1	1	-	-	Bracket, hinge	4260191-10
7-12	21	1	1	1	1	1	Bracket, spring arm	4260192-20
7-10	7	-	1	1	1	1	Capstan Idler Assembly	4030203-10
7-10	8	1	-	-	-	-	Capstan Idler Assembly	4030203-50
		-	1	1	1	1	Wheel Assembly	4040404-10
		1	-	-	-	-	Wheel Assembly	4040404-90
		1	1	1	1	1	Cap, capstan idler	4100166-10
		1	1	1	1	1	Shaft	4210189-10
		1	1	1	1	1	Lock Ring	4320112-10
		1	1	1	1	1	Washer, felt	4440239-10
7-10	9	1	1	-	1	-	Transport Subassembly, 1/4-inch tape	4030255-01
7-10	10	-	-	1	-	1	Transport Subassembly, 1/2-inch tape	4030255-02
7-13	1	1	1	1	1	1	Top Plate Subassembly	4030126-40
7-13	2	1	1	1	1	1	Support Assembly, drive solenoid	4030132-50
7-15	16	1	1	1	1	1	Capacitor Assembly	4040591-02
7-15	3	2	2	2	2	2	Stop Arm, solenoid	4220139-20
7-15	4	1	1	1	1	1	Hook, lock	4230168-10
7-15	6	1	1	1	1	1	Bracket, support	4260193-10
7-15	7	1	1	1	1	1	Bracket, spring	4260194-10
7-15	8	1	1	1	1	1	Spring, capstan idler adjust	4270162-10
7-15	9	1	1	1	1	1	Spring, solenoid adjust (drive motor)	4270175-10
7-15	10	1	1	1	1	1	Spring, solenoid return	4270176-10
7-15	11	1	1	1	1	1	Spring, lock hook	4270177-10
7-15	12	1	1	1	1	1	Eyebolt, capstan idler solenoid	4440496-10
7-15	13	1	1	1	1	1	Eyebolt, drive motor solenoid	4440496-20
7-15	14	1	1	1	1	1	Stud, motor stop	4440515-10
7-15	15	2	2	2	2	2	Solenoid, drive assembly	4590063-10
7-13	3	-	-	1	-	1	Rotary Guide, 1/2-inch tape	4030135-20
7-13	4	1	1	1	1	1	Switch Assembly, drive	4030139-30
7-16	3	1	1	1	1	1	Bracket, drive switch assembly	4260197-20
7-16	4	1	1	1	1	1	Switch, dual toggle, SPEED	4260195-01
7-16	5	1	1	1	1	1	Cover, speed switch	4260627-01
7-16	7	1	1	1	1	1	Microswitch, SPDT, safety	120-062
7-16	16	1	1	1	1	1	Insulator, speed switch cover	4170281-01
7-16	17	1	1	1	1	1	Shield, microswitch	4170184-01
7-13	5	1	1	-	1	-	Takeup Tension Arm Assembly, 1/4-inch tape	4030242-01
7-13	6	-	-	1	-	1	Takeup Tension Arm Assembly, 1/2-inch tape	4030242-02
7-17	1	1	1	1	1	1	Arm Assembly	4040405-40
7-17	2	-	-	1	-	1	Guide, 1/2-inch tape	4210183-10
7-17	3	1	1	-	1	-	Guide, 1/4-inch tape	4210183-20
7-17	5	1	1	1	1	1	Shaft	4210185-10
7-17	6	1	1	1	1	1	Collar, shaft	4220138-10
7-17	7	1	1	1	1	1	Hook, tape guide	4230158-10
7-17	8	1	1	1	1	1	Cap	4250193-01
7-17	9	1	1	1	1	1	Spring arm return	4270158-10
7-13	7	1	1	-	1	-	Rewind Assembly (G.E.), 1/4-inch tape	4030247-07
							Alternate Rewind Assembly, 1/4-inch tape	4030247-05
7-13	8	-	-	1	-	1	Rewind Assembly (G.E.), 1/2-inch tape	4030247-04
							Alternate Rewind Assembly, 1/2-inch tape	4030247-06
7-18	1	1	1	-	1	-	Brake Assembly, rewind	4030114-20
7-18	2	-	-	1	-	1	Brake Assembly, rewind	4030114-40
7-19	1	1	1	1	1	1	Band, brake	4040414-10
7-19	2	2	2	2	2	2	Spacer	4220141-10
7-19	3	2	2	2	2	2	Link, brake band	4230161-10
7-19	4	1	1	1	1	1	Lever, brake	4230162-10
7-19	5	2	2	2	2	2	Link, solenoid	4230163-10
7-19	6	1	1	1	1	1	Bracket, solenoid	4260183-10
7-19	7	1	1	1	1	1	Stop, solenoid	4260184-10
7-19	8	2	2	2	2	2	Spring, compression	4270163-10

Fig. No.	Item No.	-02	-04	-06	-08	-10		Ampex Part No.
7-19	9	1	1	1	1	1	Spring, leaf	4270164-10
7-19	10	1	1	1	1	1	Spring, brake	4270178-10
7-19	11	1	1	1	1	1	Cross Head, brake	4330109-10
7-19	12	1	1	1	1	1	Anchor	4330110-10
7-19	13	1	1	1	1	1	Housing, brake	4330112-10
7-19	14	2	2	2	2	2	Clamp, band link	4330113-10
7-19	15	1	1	1	1	1	Bolt, spade	4400496-60
7-19	16	1	1	1	1	1	Solenoid	4590067-10
7-19	20	2	2	2	2	2	Solderless Connector	171-008
7-18	5	1	1	1	1	1	Torque Motor Assembly, G.E.	4040804-50
							Alternate Torque Motor Assembly, Ashland or IMC	4040804-70
7-20	1	1	1	1	1	1	Drum, brake	4250112-10
7-20	2	1	1	1	1	1	Flange, motor	4330115-10
7-20	3	1	1	1	1	1	Turntable	4250189-02
7-20	4	1	1	1	1	1	Motor, G.E.	4590107-10
							Alternate Motor, Ashland or IMC	4590073-20
7-18	9	1	1	1	1	1	Capacitor Assembly, 10 mfd (G.E. motor)	4050361-10
							Capacitor Assembly, 5 mfd (Ashland or IMC motor)	4050336-20
7-18	10						Pad, turntable	4130163-01
7-18	12	1	1	1	1	1	Drive Plate, reel	4320128-10
7-18	17	1	1	1	1	1	Connector, male, 8 contact	145-013
7-18	18	4	4	4	4	4	Solderless Connector	171-008
7-13	9	1	1	-	1	-	Takeup Assembly, (G.E.) 1/4-inch tape	4030248-06
							Alternate Takeup Assembly, 1/4-inch tape	4030248-03
7-13	10	-	-	1	-	1	Takeup Assembly, (G.E.) 1/2-inch tape	4030248-04
							Alternate Takeup Assembly, 1/2-inch tape	4030248-05
		1	1	-	1	-	Brake Assembly, takeup	4030114-10
		-	-	1	-	1	Brake Assembly, takeup	4030114-30
							(all parts same as rewind brake)	
		1	1	1	1	1	Torque Motor Assembly, G.E.	4040804-50
							Alternate Torque Motor Assembly, Ashland or IMC	4040804-70
							(all parts same as rewind motor)	
							(all other parts same as on rewind assembly)	
7-14	11	1	1	1	1	1	Pushbutton Assembly (START)	4040884-05
7-14	12	1	1	1	1	1	Pushbutton Assembly (STOP)	4040884-06
7-14	13	1	1	1	1	1	Pushbutton Assembly (REC)	4040884-07
7-14	15	1	1	1	1	1	Knob, control	4100179-01
7-13	16	2	2	2	2	2	Guard, reel	4110245-20
7-14	17	1	1	1	1	1	Jewel, pilot light (amber)	4110258-01
7-14	18	1	1	1	1	1	Jewel, pilot light (red)	4110258-02
7-14	19	1	1	1	1	1	Escutcheon, pushbutton	4110259-01
7-14	20	1	1	1	1	1	Escutcheon Plate	4040929-01
7-14	22	1	1	1	1	1	Arm, solenoid	4230160-10
7-14	24	2	2	2	2	2	Spring, pushbutton (start, stop)	4270241-01
7-14	25	1	1	1	1	1	Spring, pushbutton (record)	4270247-01
7-14	26	1	1	1	1	1	Arm, capstan idler	4330106-10
7-13	28	8	8	8	8	8	Screw, reel guard	4400611-10
7-14	29	1	1	1	1	1	Washer, thrust, Iamicoid	4440025-80
7-14	30	A/R	A/R	A/R	A/R	A/R	Washer, shim, .005 thick	4440113-10
7-14	31	A/R	A/R	A/R	A/R	A/R	Washer, shim, .010 thick	4440113-20
7-14	32	A/R	A/R	A/R	A/R	A/R	Washer, shim, .003 thick	4440113-50
7-14	33	2	2	2	2	2	Base Assembly, pilot light	4630187-01
7-14	35	1	1	1	1	1	Knob, speed switch	6000006-20
7-14	36	1	1	1	1	1	Upper Cover Bracket, control panel	4260283-01
7-14	37	1	1	1	1	1	Lower Cover Bracket, control panel	4260284-01
7-13	38	1	1	1	1	1	Control Box Assembly (see separate parts list)	4020007-01
7-14	42	2	2	2	2	2	Lamp, T4 1/2, 120V	060-006
7-14	45	1	1	1	1	1	Switch, pushbutton, SPST, N.O.	120-013
7-14	46	1	1	1	1	1	Switch, pushbutton, SPST, N.C.	120-014
7-14	47	1	1	1	1	1	Switch, pushbutton, OPDT, N.O.	120-025
7-14	48	1	1	1	1	1	Switch, toggle, DPST	120-003
7-14	49	1	1	1	1	1	Switch, 3 pole, 3 position	122-029
7-14	50	1	1	1	1	1	Panel Bushing and Nut	266-002
		3	3	3	3	3	Capacitor, disc, .01 mfd	030-002
		1	1	1	1	1	Capacitor, paper tubular, 0.1 mfd	055-053
7-10	11	1	-	-	-	-	Reel Idler Assembly	4040407-16
7-10	12	-	1	-	1	-	Reel Idler Assembly	4040407-17
7-10	13	-	-	1	-	1	Reel Idler Assembly	4040407-18
		1	1	-	1	-	Tape Guide, 1/4-inch tape	4210188-20
		1	1	-	1	-	Arm	4230159-10
		1	1	-	1	-	Spring	4270160-10
		1	-	-	-	-	Pulley Assembly	4040408-60
		-	1	1	1	1	Pulley Assembly	4040408-70
7-10	14	1	1	1	1	1	Cap, capstan	4100131-30
7-10	16	1	1	1	-	-	Flywheel	4250115-10
7-10	17	-	-	-	1	1	Flywheel	4250121-10
7-11	18	-	-	-	1	1	Spacer, reel idler	4220151-01

Fig. No.	Item No.	-02	-04	-06	-08	-10		Ampex Part No.
7-10	19	1	1	1	1	1	Spring, drive motor return	4270179-10
7-11	20	1	1	1	1	1	Washer, retaining	4440248-10
7-10	21	1	1	1	1	1	Screen, control box	4290614-01
7-10	22	1	1	1	1	1	Screen, control panel	4040066-01

ITEMS OF STANDARD HARDWARE,
WIRE, ETC., NOT LISTED.

Ref No.	Qty		Ampex Part No.
C801	6	Capacitor, paper; 0.1 mfd, ±20%, 600 vdcw	035-897
C802	x	Same as C801	035-897
C803	x	Same as C801	035-897
C804	-	(On transport subassembly)	
C805	-	(On transport subassembly)	
C806	-	(On transport subassembly)	
C807	x	Same as C801	035-897
C808	x	Same as C801	035-897
C809	x	Same as C801	035-897
C810	-	(On rewind motor assembly)	
C811	-	(On takeup motor assembly)	
C812	-	Capacitor, electrolytic, tubular; 150 mfd, -10 +100%, 180 vdcw	031-624
C813	-	(On drive motor assembly)	
CR801	1	Rectifier, selenium, half wave	582-001
CR802	3	Diode, silicon; 1N2864	013-339
CR803	x	Same as CR802	013-339
CR804	x	Same as CR802	013-339
F801	2	Fuse, fast blow; 5 amperes, 250 volts	070-007
F802	x	Same as F801	070-007
F803	1	Fuse, fast blow; 3 amperes, 250 volts	070-001
J801S	1	Connector, receptacle, power; 3 contacts, polarized, male	147-079
J802S	1	Connector, receptacle; 12 contacts, female	146-009
J803S	1	Connector, receptacle; 10 contacts, female	146-018
J804S	4	Connector, receptacle; 8 contacts, female	146-003
J805S	x	Same as J804S	146-003
J806S	1	Connector, receptacle, power outlet; 2 contacts, female	146-999
J807S	x	Same as J804S	146-003
J808S	x	Same as J804S	146-003
J809S	1	Connector, receptacle; 21 contacts, female	146-057
K801	1	Relay; 4PDT, 115 vdc coil	020-030
K802	2	Relay; 3PDT, 115 vdc coil	020-006
K803	x	Same as K802	020-006
K804	-	(On Rewind motor assembly)	
K805	-	(On Takeup motor assembly)	
K501	-	(On drive assembly)	
K502	-	(On drive assembly)	
R801	2	Resistor, adjustable, wirewound; 150 ohms, ±5%, 50W	040-011
R802	1	Resistor, adjustable, wirewound; 500 ohms, ±5%, 50W	040-014
R803	x	Same as R801	040-011
R804	1	Resistor, fixed, wirewound; 10 ohms, ±10%, 5W	043-156
S801	-	(On transport subassembly)	
S802	-	(On transport subassembly)	
S803	-	(On transport subassembly)	
S804	-	(On transport subassembly)	
S805	-	(On transport subassembly)	
S806	1	Switch, toggle, SPDT	120-011
S501	-	(On transport subassembly)	
S502	-	(On transport subassembly)	
		MISCELLANEOUS	
	2	Dummy plug	4050138-10
	3	Fuse Holder	085-001
	2	Shoulder Screw	4400310-10
	2	Standoff	4220237-01

Ref. No.	Loc.*	Qty.		Ampex Part No.
C1	1	2	Capacitor, electrolytic, tubular, 4 mfd, -10 +75%, 15 vdcw	031-424
C2	1	1	Capacitor, electrolytic; 25 mfd, -10 +75%, 3 vdcw	031-620
C3	1	1	Capacitor, mylar, .002 mfd, ±10%, 600 vdcw	055-024
C4	1	2	Capacitor, electrolytic, tubular; 50 mfd, -10 +75%, 3 vdcw	031-244
C5	1	2	Capacitor, electrolytic, tubular; 100 mfd, -10 +75%, 6 vdcw	031-166
C6	1	2	Capacitor, electrolytic, tubular; 50 mfd, -10 +100%, 25 vdcw	031-190
C7	1	4	Capacitor, electrolytic, tubular; 2 mfd, -10 +75%, 25 vdcw	031-646
C8	1	3	Capacitor, mylar; 0.22 mfd, ±10%, 100 vdcw	035-819
C9	1	5	Capacitor, mylar; 0.1 mfd, ±10%, 100 vdcw	035-831
C10	1	2	Capacitor, electrolytic, tubular; 100 mfd, -10 +75%, 25 vdcw	031-186
C11	1	x	Same as C7	031-646
C12	1	x	Same as C7	031-646
C13	1	x	Same as C8	035-819
C14	1	x	Same as C5	031-166
C15	2	5	Capacitor, ceramic, tubular; .01 mfd, 500 vdcw	030-002
C16	1	x	Same as C9	035-831
C17	1	x	Same as C9	035-831
C18	1	3	Capacitor, electrolytic, tubular; 10 mfd, -10 +75%, 25 vdcw	031-148
C19	1	x	Same as C8	035-819
C20	1	x	Same as C10	031-186
C21	1	1	Capacitor, plastic, 0.47 mfd, ±5%, 100 vdcw	055-035
C22				
C23	1	x	Same as C7	031-646
C24	1	x	Same as C9	035-831
C25	1	x	Same as C4	031-244
C26	1	x	Same as C18	031-148
C27	1	1	Capacitor, mic; 500 pfd, ±5%, 300 vdcw	034-933
C28	1	6	Capacitor, mylar; .01 mfd, ±5%, 100 vdcw	035-574
C29	1	x	Same as C28	035-574
C30	1	x	Same as C28	035-574
C31	1	x	Same as C28	035-574
C32	1	x	Same as C28	035-574
C33	1	1	Capacitor, mylar; .018 mfd, ±5%, 100 vdcw	055-028
C34	4	2	Capacitor, variable, mic; 1400-3055 pfd, 175 vdcw	038-011
C35	1	x	Same as C18	031-148
C36	4	x	Same as C34	038-011
C37	4	1	Capacitor, mica; .001 mfd, ±5%, 500 vdcw	034-707
C38	4	2	Capacitor, paper, tubular; .0047 mfd, ±20%, 600 vdcw	035-028
C39	4	x	Same as C38	035-028
C40	6	1	Capacitor, electrolytic; 1000 mfd, -10 +150%, 50 vdcw	031-705
C41	1	x	Same as C9	035-831
C42	1	x	Same as C1	031-424
C43	6	1	Capacitor, electrolytic; 500-500-100 mfd, 25 vdcw	031-707
C44	1	x	Same as C6	031-190
C45	1	x	Same as C28	035-574
C46	4	1	Capacitor, electrolytic; 100 mfd, -10 +75%, 25 vdcw	031-186
C47	4	x	Same as C15	030-002
C48	4	x	Same as C15	030-002
C49	4	x	Same as C15	030-002
C51	2	x	Same as C15	030-002
CR1	2	5	Diode, 1N2860	580-042
CR2	3	1	Diode, 1N2863	580-027
CR3	1	x	Same as CR1	580-042
CR4	1	x	Same as CR1	580-042
CR5	1	x	Same as CR1	580-042
CR6	1	x	Same as CR1	580-042
CR7	1	2	Diode, SG-22	013-041
CR8	1	x	Same as CR7	013-041
CR9	1	3	Diode, 1N67A	013-011
CR10	1	1	Diode, zener, LMZ-11-20	013-668
CR11	1	x	Same as CR9	013-011
CR12	1	x	Same as CR9	013-011
F2	4	1	Fuse, slow blow; 0.5 ampere, 125 volt	070-026
F3	4	1	Fuse, fast blow; 0.25 ampere, 250 volt	070-006
I1	2	1	Lamp, neon, Record indicator	060-999
I2	2	1	Lamp, neon, Ready indicator	060-996
I3	2	-	ON VU meter	-
I4	2	-	ON VU meter	-
J1	4	1	Connector, receptacle, 3 contact, male	143-008
J2	2	2	Connector, receptacle, 8 contact, female	146-003
J3	2	x	Same as J2	146-003
J4	2	1	Connector, jack, phone	148-015
J5	4	1	Connector, receptacle, 3 contact, male	147-004

*Location Guide
1. Printed Circuit Board
2. Front Panel
3. Left Panel (from front)
4. Back Panel
5. Right Panel
6. Power Supply

Ref. No.	Loc.*	Qty.		Ampex Part No.
J6	4	1	Connector, receptacle, 3 contact, female	146-007
J7	4	1	Connector, socket, octal	150-023
J8	4	1	Connector, receptacle, 2 contact, male	143-009
J9	4	1	Connector, receptacle, 8 contact, male	147-013
J11	4	1	Connector, receptacle, 1 contact, male	143-010
J12	4	1	Connector, receptacle, 1 contact, female	146-067
K1	2	1	Relay, 4 PDT, 24 volt dc; 2 amps resistive load, gold contacts	020-244
K2	3	1	Relay 2 PDT, (special)	4590050-10
L1	1	1	Inductor, coil; 5 mh, ±5%	051-342
L2	4	1	Inductor, choke; 1.2 mh	051-336
M1	2	1	Meter, VU	4140016-10
Q1	1	13	Transistor, silicon, T1415, 2N3707	014-560
Q2	1	x	Same as Q1	014-560
Q3	1	x	Same as Q1	014-560
Q4	1	x	Same as Q1	014-560
Q5	1	x	Same as Q1	014-560
Q6	1	x	Same as Q1	014-560
Q7	1	x	Same as Q1	014-560
Q8	1	2	Transistor, germanium 2N414	014-029
Q9	5	1	Transistor, germanium 2N1168	014-591
Q10	1	x	Same as Q1	014-560
Q11	1	x	Same as Q1	014-560
Q12	1	x	Same as Q1	014-560
Q13	1	x	Same as Q1	014-560
Q14	1	x	Same as Q1	014-560
Q15	1	4	Transistor, silicon, 2N697	014-090
Q16	1	x	Same as Q15	014-090
Q17	1	3	Transistor, silicon, 40250	014-587
Q18	1	x	Same as Q17	014-587
Q19	1	x	Same as Q8	014-029
Q20	3	x	Same as Q17	014-587
Q21	1	x	Same as Q15	014-090
Q22	1	x	Same as Q1	014-560
Q23	1	x	Same as Q15	014-090
R1	1	2	Resistor, fixed, composition, 330,000 ohms, ±10%, 1/2W	041-078
R2	1	1	Resistor, fixed, composition, 75,000 ohms, ±5%, 1/2W	041-253
R3	1	3	Resistor, fixed, composition, 68,000 ohms, ±10%, 1/2W	041-070
R4	1	2	Resistor, fixed, composition, 110,000 ohms, ±5%, 1/2W	041-024
R5	1	1	Resistor, fixed, composition, 100,000 ohms, ±10%, 1/2W	041-072
R6	1	1	Resistor, fixed, metal film, 1,000 ohms, ±1%, 1/4W	048-259
R7	1	2	Resistor, fixed, composition, 47,000 ohms, ±10%, 1/2W	041-068
R8	1	1	Resistor, fixed, composition, 240,000 ohms, ±5%, 1/2W	041-374
R9	1	1	Resistor, fixed, composition, 620,000 ohms, ±5%, 1/2W	041-900
R10	1	6	Resistor, fixed, compoistion, 2,200 ohms, ±10%, 1/2W	041-052
R11	1	1	Resistor, fixed, composition, 24,000 ohms, ±5%, 1/2W	041-498
R12	1	2	Resistor, fixed, composition, 220 ohms, ±10%, 1/2W	041-040
R13	1	1	Resistor, fixed, composition, 5,100 ohms, ±5%, 1/2W	041-001
R14	1	2	Resistor, fixed, composition, 22,000 ohms, ±10%, 1/2W	041-064
R15	2	1	Resistor, variable, 100,000 ohms, high torque	4520145-50
R16	1	2	Resistor, fixed, composition, 2 megohms, ±5%, 1/2W	041-382
R17	1	3	Resistor, fixed, composition, 360,000 ohms, ±5%, 1/2W	041-590
R18	1	4	Resistor, fixed, composition, 1,000 ohms, ±10%, 1/2W	041-048
R19	1	3	Resistor, fixed, composition, 4,700 ohms, ±10%, 1/2W	041-056
R20	1	1	Resistor, fixed, composition, 910 ohms, ±5%, 1/2W	041-522
R21	2	1	Resistor, variable, composition, 10,000 ohms, ±20%, 2W	044-233
R22	1	1	Resistor, fixed, composition, 1.1 megohm, ±5%, 1/2W	041-898
R23	1	x	Same as R17	041-590
R24	1	x	Same as R17	041-590
R25	1	x	Same as R10	041-052
R26	1	1	Resistor, fixed, composition, 180 ohms, ±10%, 1/2W	041-257
R27	1	1	Resistor, fixed, composition, 390 ohms, ±10%, 1/2W	041-043
R28	1	1	Resistor, fixed, composition, 680 ohms, ±10%, 1W	041-143
R29	1	x	Same as R10	041-052
R30	1	1	Resistor, fixed, composition, 470 ohms, ±10%, 1/2W	041-044
R31	1	x	Same as R12	041-040
R32	4	1	Resistor, fixed, composition, 10 ohms, ±5%, 1W	041-095
R33	4	1	Resistor, fixed, composition, 4,300 ohms, ±5%, 1/2W	041-012
R34	4	1	Resistor, fixed, composition, 9,100 ohms, ±5%, 1/2W	041-373
R35	4	1	Resistor, fixed, composition, 2,400 ohms, ±5%, 1/2W	041-316
R36	4	1	Resistor, fixed, composition, 680 ohms, ±10%, 1/2W	041-046
R37	2	1	Resistor, fixed, composition, 6,200 ohms, ±5%, 1/2W	041-455
R38	2	1	Resistor, variable, composition, 100,000 ohms, ±10%, 2W	044-015

*Location Guide
1. Printed Circuit Board
2. Front Panel
3. Left Panel (from front)
4. Back Panel
5. Right Panel
6. Power Supply

Ref. No.	Loc.*	Qty.		Ampex Part No.
R39	1	1	Resistor, Fixed, composition, 1 megohm, ±5%, 1/2W	041-286
R40	1	x	Same as R16	041-382
R41	1	x	Same as R14	041-064
R42	1	x	Same as R4	041-024
R43	1	x	Same as R19	041-056
R44	1	x	Same as R10	041-052
R45	2	2	Resistor, variable, 25,000 ohms, high torque	4250145-20
R46	1	1	Resistor, fixed, composition, 10,000 ohms, ±10%, 1/2W	041-060
R47	1	1	Resistor, fixed, composition, 390,000 ohms, ±10%, 1/2W	041-079
R48	1	2	Resistor, fixed, composition, 3,300 ohms, ±10%, 1/2W	041-054
R49	1	1	Resistor, fixed, composition, 33,000 ohms, ±10%, 1/2W	041-066
R50	1	1	Resistor, fixed, metal film, 1.21 megohms, ±1%, 1/2W	048-965
R51	1	x	Same as R3	041-070
R52	1	1	Resistor, fixed, composition, 7,500 ±5%, 1/2W	041-361
R53	1	1	Resistor, fixed, composition, 39,000 ohms, ±5%, 1/2W	041-018
R54	1	1	Resistor, fixed, composition, 4,300, ±5%, 1/2W	041-012
R55	1	1	Resistor, fixed, composition, 2.2 megohms, ±10%, 1/2W	041-086
R56	1	1	Resistor, fixed, composition, 470,000 ohms, ±10%, 1/2W	041-080
R57	1	x	Same as R7	041-068
R58	1	x	Same as R3	041-070
R59	1	x	Same as R48	041-054
R60	1	x	Same as R1	041-078
R61	1	1	Resistor, fixed, composition, 100 ohms, ±10%, 1/2W	041-038
R62	1	1	Resistor, fixed, composition, 150 ohms, ±10%, 1/2W	041-241
R63	4	1	Resistor, variable, 500 ohms, high torque	4520145-10
R64	1	2	Resistor, fixed, composition, 8,200 ohms, ±10%, 1/2W	041-059
R65	1	x	Same as R64	041-059
R66	1	1	Resistor, fixed, composition, 10 ohms, ±10%, 1/2W	041-032
R67	2	1	Resistor, fixed, composition, 2,700 ohms, ±10%, 1/2W	041-278
R68	2	x	Same as R45	4520145-20
R69	2	1	Resistor, fixed, composition, 220 ohms, ±10%, 1/2W	041-040
R70	2	2	Resistor, fixed, composition, 100,000 ohms, ±10%, 1/2W	041-072
R71	2	x	Same as R70	041-072
R72	1	x	Same as R19	041-056
R73	1	x	Same as R18	041-048
R74	1	1	Resistor, fixed, wirewound, 1.8 ohms, ±5%, 2W	047-828
R75	1	x	Same as R18	041-048
R76	1	x	Same as R10	041-052
R77	1	1	Resistor, variable, composition, 1,000 ohms, ±30%, 1/10W	044-370
R78	1	x	Same as R10	041-048
R79	1	1	Resistor, fixed, composition, 82 ohms, ±10%, 1/2W	041-037
R80	1	3	Resistor, fixed, composition, 68 ohms, ±10%, 1/2W	041-036
R81	1	x	Same as R18	041-048
R82	1	x	Same as R80	041-036
R83	1	x	Same as R80	041-036
R84	4	1	Resistor, variable, wirewound, 25 ohms	4520149-10
R85	4	1	Resistor, fixed, composition, 220 ohms, ±10%, 1/2W	041-040
S1	2	1	Switch, Output Selector	4620191-01
S2	4	1	Switch, Line Termination	122-016
S3	4	1	Switch, Input Selector	4620190-01
S5	2	1	Switch, Record Selector	4620192-01
T1	5	1	Transformer, output	4580192-01
T2	1	1	Transformer, bias and erase oscillator	560-090
T3	6	1	Transformer, power	4580191-01
TP1	4	1	Test Point, banana jack, black	146-385
TP1	4	1	Test Point, banana jack, red	146-385
	4	2	Fuse Post	
	4	2	Knob, black, with pointer	230-008
	2	1	Knob, black, plain	4100105-02
	2	1	Knob, black, skirt	4100105-06
	2	1	Knob, red top, plain	4100105-32
	2	1	Knob, red top, skirt	4100105-36
	2	1	Knob, Lock	230-071
	1	19	Socket, transistor, insulated	150-103

*Location Guide
1. Printed Circuit Board
2. Front Panel
3. Left Panel (from front)
4. Back Panel
5. Right Panel
6. Power Supply

Ref. No.	Loc.*	-01	-02		Ampex Part No.
		x		Single Channel Electronic Assembly	4020265-03
			x	Two Channel Electronic Assembly	4020265-04
		1	1	Power Supply Module	4050389-02
C1	1	2	2	Capacitor, paper; .0047 mfd, ±20%, 600 vdcw	035-028
C2	1	x	x	Same as C1	035-028
C3	1	1	1	Capacitor, electrolytic; 2,000 mfd, +150 - 10%, 50 vdcw	031-705
C4	1	1	1	Capacitor, electrolytic; 500 - 500 mfd, 50 vdcw	031-710
C5	1	2	2	Capacitor, ceramic disc; .01 mfd, 500 vdcw	030-002
C6	1	x	x	Same as C5	030-002
CR1	1	4	4	Diode, 1N2860	580-042
CR2	1	x	x	Same as CR1	580-042
CR3	1	x	x	Same as CR1	580-042
CR4	1	x	x	Same as CR1	580-042
CR5	1	1	1	Diode, zener; 24 volts, LMZ24A	013-676
DS1	1	1	1	Lamp, incandescent, pilot; #51	060-028
F1	1	1	1	Fuse, fast blow; 3 ampere, 250 volt	070-001
F2	1	2	2	Fuse, slow blow; 0.5 ampere, 125 volt	070-026
F3	1	x	x	Same as F2	070-026
J2	1	1	1	Connector, receptacle; 8 contacts, female	146-003
J3	1	2	2	Connector, receptacle; 6 contacts, female	146-004
J4	1	x	x	Same as J3	146-004
Q1	1	1	1	Transistor, silicon; 40250	014-587
R1	1	1	1	Resistor, fixed, comp; 270 ohms, ±10%, 1/2W	041-041
R2	1	1	1	Resistor, fixed, comp; 330 ohms, ±10%, 1/2W	041-042
S1	1	1	1	Switch, toggle, spst, power	120-005
T1	1	1	1	Transformer, power	4580191-01
	1	3	3	Fuse Post	085-001
	1	1	1	Hold in, pilot lamp (DS-1)	130-062
		1	2	Audio Module (quantities listed for each module)	4050390-01
C1	2	1	1	Capacitor, electrolytic; 25 mfd, -10 +75%, 3 vdcw	031-620
C2	2	1	1	Capacitor, paper; .002 mfd, 600 vdcw	055-024
C3	2	1	1	Capacitor, electrolytic; 50 mfd, -10 +75%, 3 vdcw	031-244
C4	2	1	1	Capacitor, electrolytic; 4 mfd, -10 +75%, 15 vdcw	031-424
C5	2	2	2	Capacitor, electrolytic; 2 mfd, -10 +75%, 25 vdcw	031-646
C6	2	2	2	Capacitor, electrolytic; 100 mfd, -10 +75%, 6 vdcw	031-166
C7	2	1	1	Capacitor, electrolytic; 50 mfd, -10 +100%, 25 vdcw	031-190
C8	2	1	1	Capacitor, mylar; 0.22 mfd, ±10%, 100 vdcw	035-819
C9	2	x	x	Same as C5	031-646
C10	2	x	x	Same as C6	031-166
C11	2	1	1	Capacitor, mylar; .022 mfd, ±10%, 100 vdcw	035-777
C12	2	2	2	Capacitor, mylar; .0036 mfd, ±5%, 600 vdcw	055-025
C13	2	x	x	Same as C12	055-025
CR1	2	1	1	Diode, 1N2860	580-042
J1	2	1	1	Connector, receptacle, 3 contact, male	143-008
J2	2	1	1	Connector, receptacle, 3 contact, male	147-004
K1	2	1	1	Relay, 4PDT; 24 VDC	020-244
Q1	2	4	4	Transistor, silicon; T.I. 415 (2N3707)	014-560
Q2	2	x	x	Same as Q1	014-560
Q3	2	x	x	Same as Q1	014-560
Q4	2	x	x	Same as Q1	014-560
Q5	2	1	1	Transistor, germanium; 2N414	014-029
Q6	2	1	1	Transistor, germanium; 2N1168	014-591
R1	2	3	3	Resistor, fixed, comp; 330,000 ohms, ±10%, 1/2W	041-078
R2	2	1	1	Resistor, fixed, comp; 68,000 ohms, ±10%, 1/2W	041-070
R3	2	1	1	Resistor, fixed, comp; 75,000 ohms, ±5%, 1/2W	041-253
R4	2	1	1	Resistor, fixed, comp; 100,000 ohms, ±10%, 1/2W	041-072
R5	2	1	1	Resistor, fixed, metal film; 1,000 ohms, ±1%, 1/4W	048-259
R6	2	1	1	Resistor, fixed, comp; 47,000 ohms, ±10%, 1/2W	041-068
R7	2	1	1	Resistor, fixed, comp; 620,000 ohms, ±5%, 1/2W	041-900
R8	2	1	1	Resistor, fixed, comp; 240,000 ohms, ±5%, 1/2W	041-374
R9	2	1	1	Resistor, fixed, comp; 110,000 ohms, ±5%, 1/2W	041-024
R10	2	3	3	Resistor, fixed, comp; 2,200 ohms, ±10%, 1/2W	041-052

*Location Guide

1. Power Supply Module
2. Audio Module

Ref. No.	Loc* -01	-02			Ampex Part No.
R11	2	1	1	Resistor, fixed, comp; 24,000 ohms, ±5%, 1/2W	041-498
R12	2	2	2	Resistor, fixed, comp; 220 ohms, ±10%, 1/2W	041-040
R13	2	1	1	Resistor, fixed, comp; 5,100 ohms, ±5%, 1/2W	041-001
R14	2	3	3	Resistor, variable, high torque; 100,000 ohms	4520145-50
R15	2	1	1	Resistor, fixed, comp; 1.1 megohm, ±5%, 1/2W	041-898
R16	2	2	2	Resistor, fixed, comp; 360,000 ohms, ±5%, 1/2W	041-590
R17	2	x	x	Same as R16	041-590
R18	2	x	x	Same as R10	041-052
R19	2	1	1	Resistor, fixed, comp; 180 ohms, ±10%, 1/2W	041-257
R20	2	1	1	Resistor, fixed, comp; 390 ohms, ±10%, 1/2W	041-043
R21	2	1	1	Resistor, fixed, comp; 680 ohms, ±10%, 1W	041-143
R22	2	x	x	Same as R10	041-052
R23	2	1	1	Resistor, fixed, comp; 470 ohms, ±10%, 1/2W	041-044
R24	2	x	x	Same as R12	041-040
R25	2	1	1	Resistor, fixed, comp; 10 ohms, ±5%, 1W	041-095
R26	2	1	1	Resistor, fixed, comp; 680 ohms, ±10%, 1/2W	041-046
R27	2	1	1	Resistor, fixed, comp; 4,300 ohms, ±5%, 1/2W	041-012
R28	2	1	1	Resistor, fixed, comp; 9,100 ohms, ±5%, 1/2W	041-373
R29	2	1	1	Resistor, fixed, comp; 2,400 ohms, ±5%, 1/2W	041-316
R30	2	2	2	Resistor, variable, high torque; 5 megohms	4520145-60
R31	2	x	x	Same as R1	041-078
R32	2	x	x	Same as R14	4520145-50
R33	2	x	x	Same as R30	4520145-60
R34	2	x	x	Same as R1	041-078
R35	2	x	x	Same as R14	4520145-50
S1	2	1	1	Switch, rotary, spdt	122-016
T1	2	1	1	Transformer, output	4580192-01
		1	1	Cover, chassis, audio	4290595-01
		5	5	Socket, transistor	150-103

PLUG-IN EQUALIZER ASSEMBLY
(Record/Reproduce Equipment)

Ref. No.	-01	-02	-03	-04	-05	-06		Ampex Part No.
	x						Equalizer Assembly, 15 ips, NAB	4020252-01
		x					Equalizer Assembly, 7-1/2 ips, NAB	4020252-02
			x				Equalizer Assembly, 3-3/4 ips, 120 or 200 microsecond	4020252-03
				x			Equalizer Assembly, 15 ips, CCIR	4020252-04
					x		Equalizer Assembly, 7-1/2 ips, CCIR	4020252-05
						x	Equalizer Assembly, 30 ips, 17-1/2 microsecond	4020252-06
	0	1	1	0	0	0	Capacitor, variable, mica; 350-1180 pfd, 250 vdcw	038-028
	1	0	0	1	0	0	Capacitor, variable, mica; 65-340 pfd, 250 vdcw	038-005
	0	0	0	0	1	0	Capacitor, variable, mica; 100-550 pfd, 250 vdcw	038-009
	0	0	0	0	0	1	Capacitor, variable, mica; 15-130 pfd, 250 vdcw	038-002
	1	1	1	1	1	1	Capacitor; 3600 pfd, ±5%, 600 vdcw	055-025
	0	1	0	0	1	1	Capacitor, ceramic disc; 33 pfd, ±5%, 500 vdcw	030-305
	0	0	0	1	0	0	Capacitor, ceramic disc; 56 pfd, ±5%, 500 vdcw	030-306
	0	0	0	1	1	1	Capacitor, electrolytic; 25 mfd, 3 vdcw	031-620
	1	1	1	1	1	1	Connector, plug; 8 contacts, male	147-006
	1	1	1	0	1	0	Resistor, variable, miniature; 100,000 ohms	4520146-10
	0	0	0	1	0	1	Resistor, variable, miniature; 25,000 ohms	4520146-30
	1	1	1	1	1	1	Resistor, variable, miniature; 5 megohms	4520146-40
	1	1	1	1	1	1	Housing, equalizer assembly	4040914-01

HEAD ASSEMBLY
Single Track, 1/4-inch Tape

Ref. No.	-01	-02	-03	-04		Ampex Part No.
	x				Head Assembly, half track, record/reproduce	4020261-01
		x			Head Assembly, full track, record/reproduce	4020261-02
			x		Head Assembly, half track, reproduce-only	4020261-03
				x	Head Assembly, full track, reproduce-only	4020261-04
	1	1	0	0	Gate Assembly	4030243-01
	0	0	1	1	Gate Assembly	4030243-02
	1	1	1	1	Cover Assembly, reproduce head	4040531-01
	1	1	0	0	Cover Assembly, record head	4040532-01
	1	1	1	1	Head Gate	4040887-01
	2	2	2	2	Tape Lifter Assembly	4040888-01
	2	2	1	1	Plate, head cover spring	4270155-10
	1	1	0	0	Base Plate Subassembly	4030244-01
	0	0	1	1	Base Plate Subassembly	4030244-02
	1	1	0	0	Can Assembly, record head	4040403-02
	1	1	0	0	Can Assembly, erase head	4040422-02
	1	1	1	1	Can Assembly, reproduce head	4040425-04
	2	2	2	2	Post, gate stop	4220228-01
	2	2	0	0	Plate, head clamping (record, erase)	4330120-10
	1	1	1	1	Base Plate	4330122-02
	1	1	1	1	Plate, head clamping (reproduce)	4330123-01
	0	0	1	1	Tape Guide	4210193-10
	1	0	1	0	Head Stack, reproduce, half track	4040438-51
	0	1	0	1	Head Stack, reproduce, full track	4040438-52
	1	0	0	0	Head Stack, record, half track	4040438-66
	0	1	0	0	Head Stack, record, full track	4040438-67
	0	1	0	0	Head Stack, erase, full track	4040829-01
	1	0	0	0	Head Stack, erase, half track	4040831-01
	1	1	1	1	Housing Assembly	4040885-01
	4	4	2	2	Spring, head adjusting	4270167-10
	1	1	1	1	Spring, head gate detent	4270242-01
	2	2	2	2	Drive Pin, head gate	403-006

HEAD ASSEMBLY
Two Track, 1/4-inch Tape

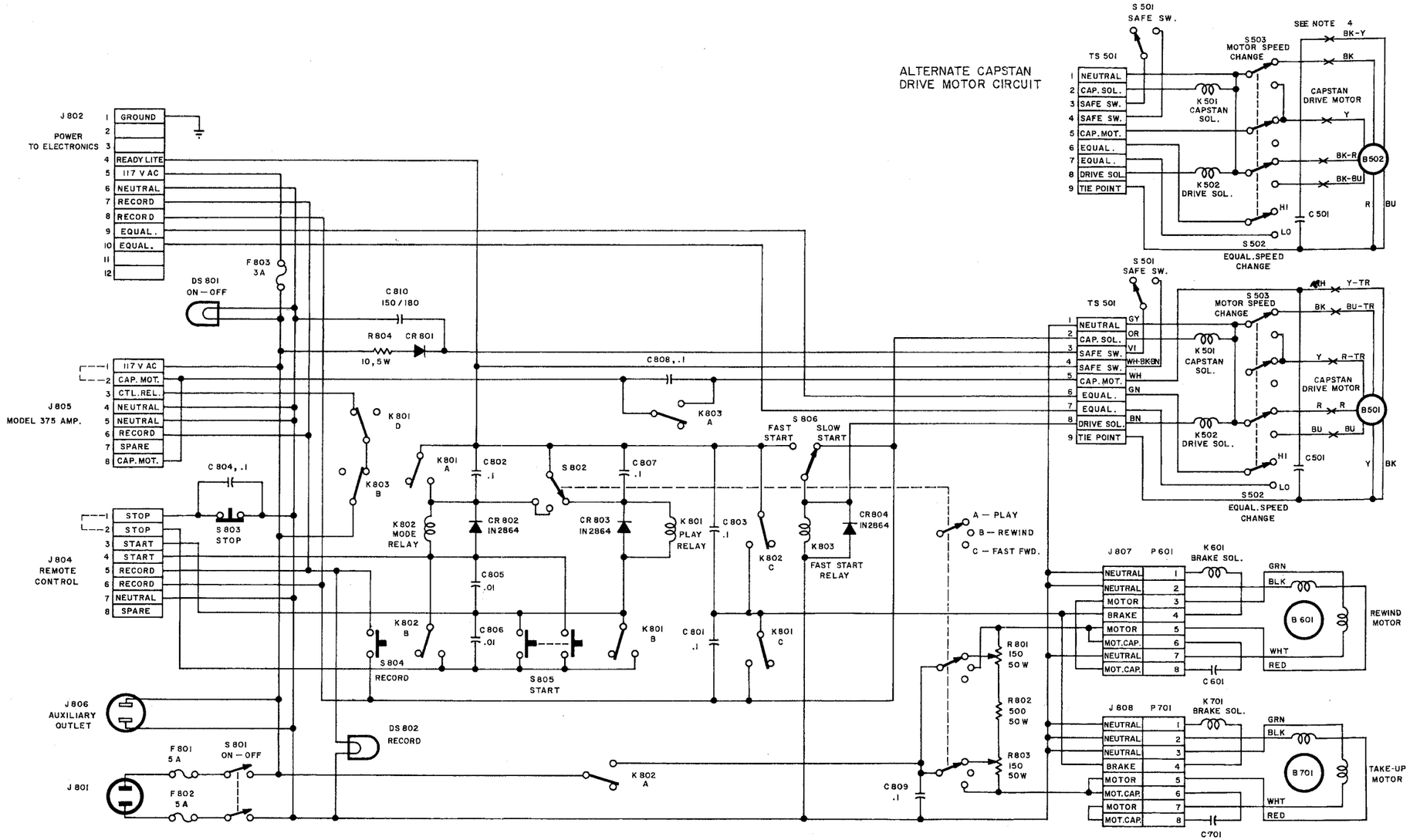
Ref. No.	-01	-02		Ampex Part No.
	x		Head Assembly, record/reproduce	4020262-01
		x	Head Assembly, reproduce-only	4020262-02
	1	0	Gate Assembly	4030243-01
	0	1	Gate Assembly	4030243-02
	1	1	Cover Assembly, reproduce head	4040531-01
	1	0	Cover Assembly, record head	4040532-01
	1	1	Head Gate	4040887-01
	2	2	Tape Lifter Assembly	4040888-01
	2	1	Plate, head cover spring	4270155-10
	1	0	Base Plate Subassembly	4030245-01
	0	1	Base Plate Subassembly	4030245-02
	1	0	Can Assembly, record head	4040403-02
	1	0	Can Assembly, erase head	4040422-02
	1	1	Can Assembly, reproduce head	4040425-04
	2	2	Post, gate stop	4220228-01
	2	0	Plate, head clamping (record, erase)	4330120-10
	1	1	Base Plate	4330122-02
	1	1	Plate, head clamping (reproduce)	4330123-01
	0	1	Tape Guide	4290193-10
	1	1	Head Stack, reproduce	4040437-01
	1	0	Head Stack, record	4040437-05
	1	0	Head Stack, erase	4040831-01
	1	1	Housing Assembly	4040885-01
	4	2	Spring, head adjusting	4270167-10
	1	1	Spring, head gate detent	4270242-01
	2	2	Drive Pin, head gate	403-006

HEAD ASSEMBLY
Three Track, 1/2-inch Tape

Ref. No.	-01	-02		Ampex Part No.
	x		Head Assembly, record/reproduce	4020263-01
		x	Head Assembly, reproduce-only	4020263-02
	1	0	Gate Assembly	4030243-01
	0	1	Gate Assembly	4030243-02
	1	1	Cover Assembly, reproduce head	4040531-01
	1	0	Cover Assembly, record head	4040532-01
	1	1	Head Gate	4040887-01
	2	2	Tape Lifter Assembly	4040888-01
	2	1	Plate, head cover spring	4270155-01
	1	0	Base Plate Subassembly	4030163-04
	0	1	Base Plate Subassembly	4030163-05
	1	1	Can Assembly, reproduce head	4040425-05
	1	0	Can Assembly, record head	4040403-03
	1	0	Can Assembly, erase head	4040422-03
	2	2	Post, gate stop	4220228-01
	3	1	Plate, head clamping	4330120-10
	1	1	Base Plate	4330162-02
	0	1	Tape Guide	4290193-20
	1	1	Head Stack, reproduce	4040534-04
	1	0	Head Stack, record	4040534-05
	1	0	Head Stack, erase	4040835-02
	1	1	Housing Assembly	4040885-01
	4	2	Spring, head adjusting	4270167-10
	1	1	Spring, head gate detent	4270242-02
	2	2	Drive Pin, head gate	403-006

HEAD ASSEMBLY
Four Track, 1/2-inch Tape

Ref. No.	-01	-02		Ampex Part No.
	x		Head Assembly, record/reproduce	4020264-01
		x	Head Assembly, reproduce-only	4020264-02
	1	0	Gate Assembly	4030243-01
	0	1	Gate Assembly	4030243-02
	1	1	Cover Assembly, reproduce head	4040531-01
	1	0	Cover Assembly, record head	4040532-01
	1	1	Head Gate	4040887-01
	2	2	Tape Lifter Assembly	4040888-01
	2	1	Plate, head cover spring	4270155-01
	1	0	Base Plate Subassembly	4030169-02
	0	1	Base Plate Subassembly	4030169-03
	1	1	Can Assembly, reproduce head	4040425-05
	1	0	Can Assembly, record head	4040403-03
	1	0	Can Assembly, erase head	4040422-03
	2	2	Post, gate stop	4220228-01
	2	0	Plate, head clamping (record, erase)	4330120-10
	1	1	Plate, head clamping (reproduce)	4330123-01
	1	1	Base Plate	4330162-02
	0	1	Tape Guide	4210193-20
	1	1	Head Stack, reproduce	4040558-01
	1	0	Head Stack, record	4040558-04
	1	0	Head Stack, erase	4040837-02
	1	1	Housing Assembly	4040885-01
	4	2	Spring, head adjusting	4270167-10
	1	1	Spring, head gate detent	4270242-02
	2	2	Drive Pin, head gate	403-006



NOTES —

1. ALL RESISTORS ARE IN OHMS ,
2. ALL CAPACITORS ARE IN MFD , 600 V , UNLESS OTHERWISE NOTED .
3. ALL RELAYS SHOWN DE-ENERGIZED .
4. "X" REPRESENTS MOTOR DISCONNECT SPLICES .
5. UNIT IS SUPPLIED WITH 4050138 PLUGS CONNECTED TO J 804 AND J 805 . THE 4050138 PLUG IS STRAPPED AS SHOWN .

Fig. 7-1 Tape Transport Schematic Diagram

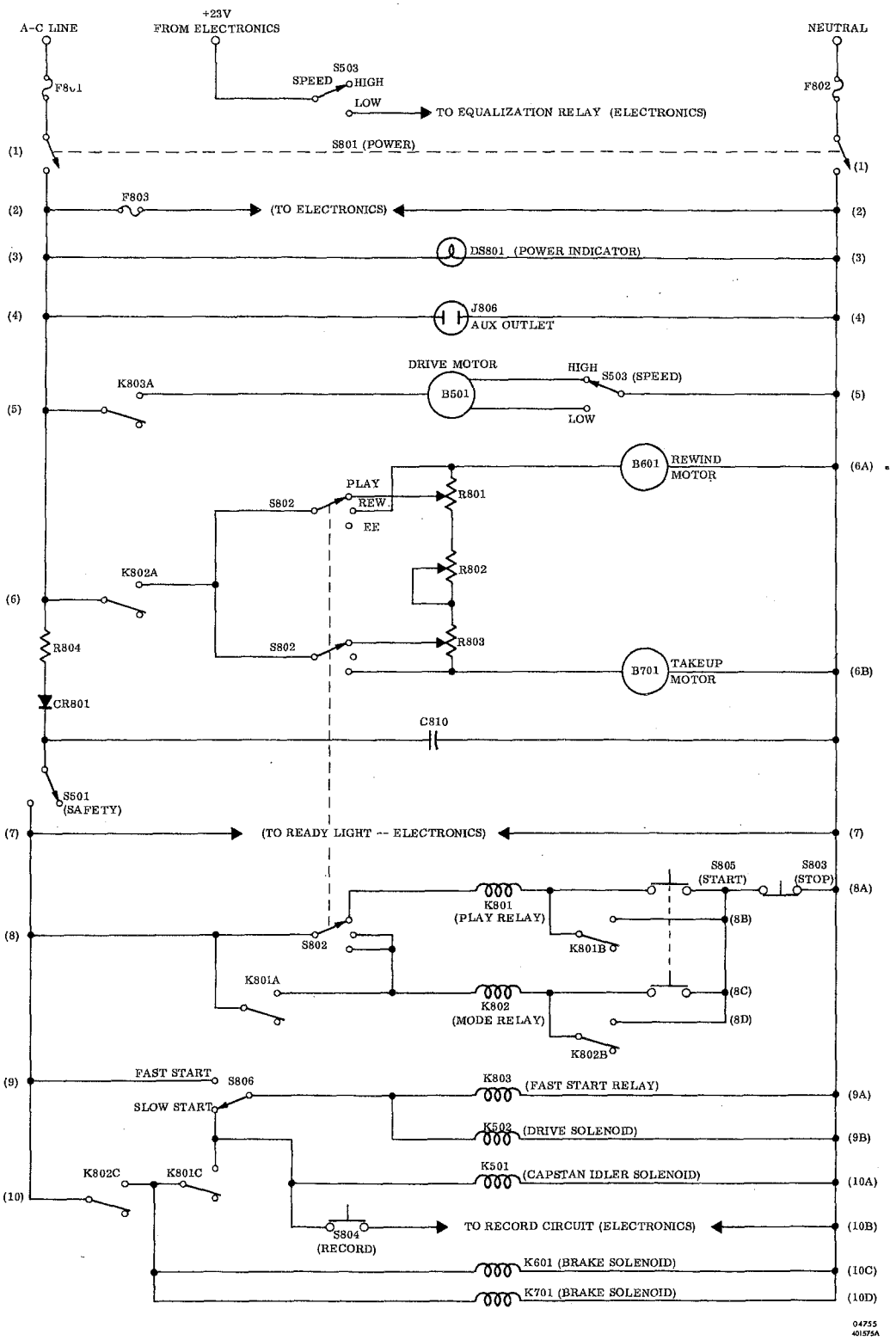


Fig. 7-2 Tape Transport Simplified Control Diagram

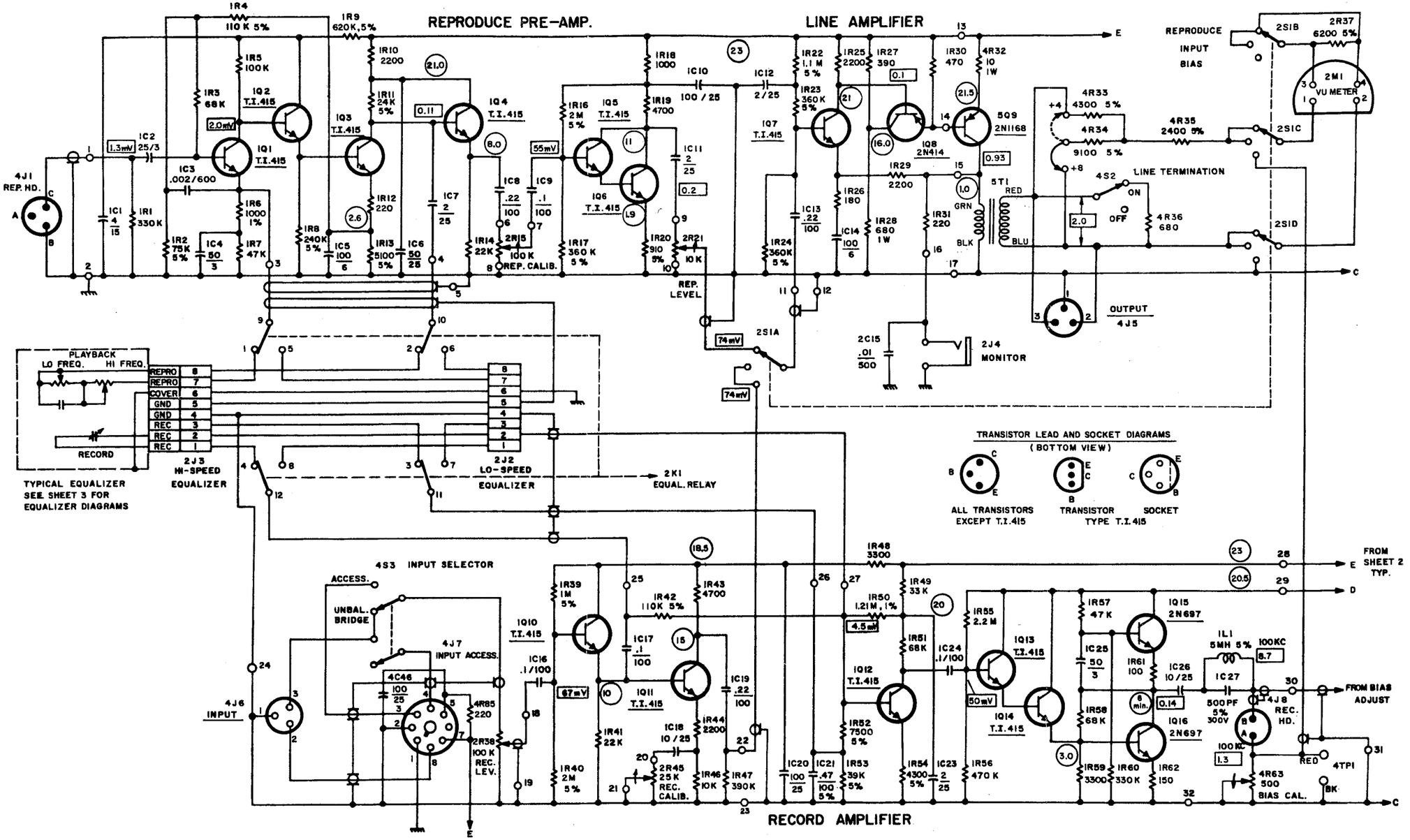


Fig 7-3 Record/Reproduce Circuit Schematic Diagram, Sheet 1

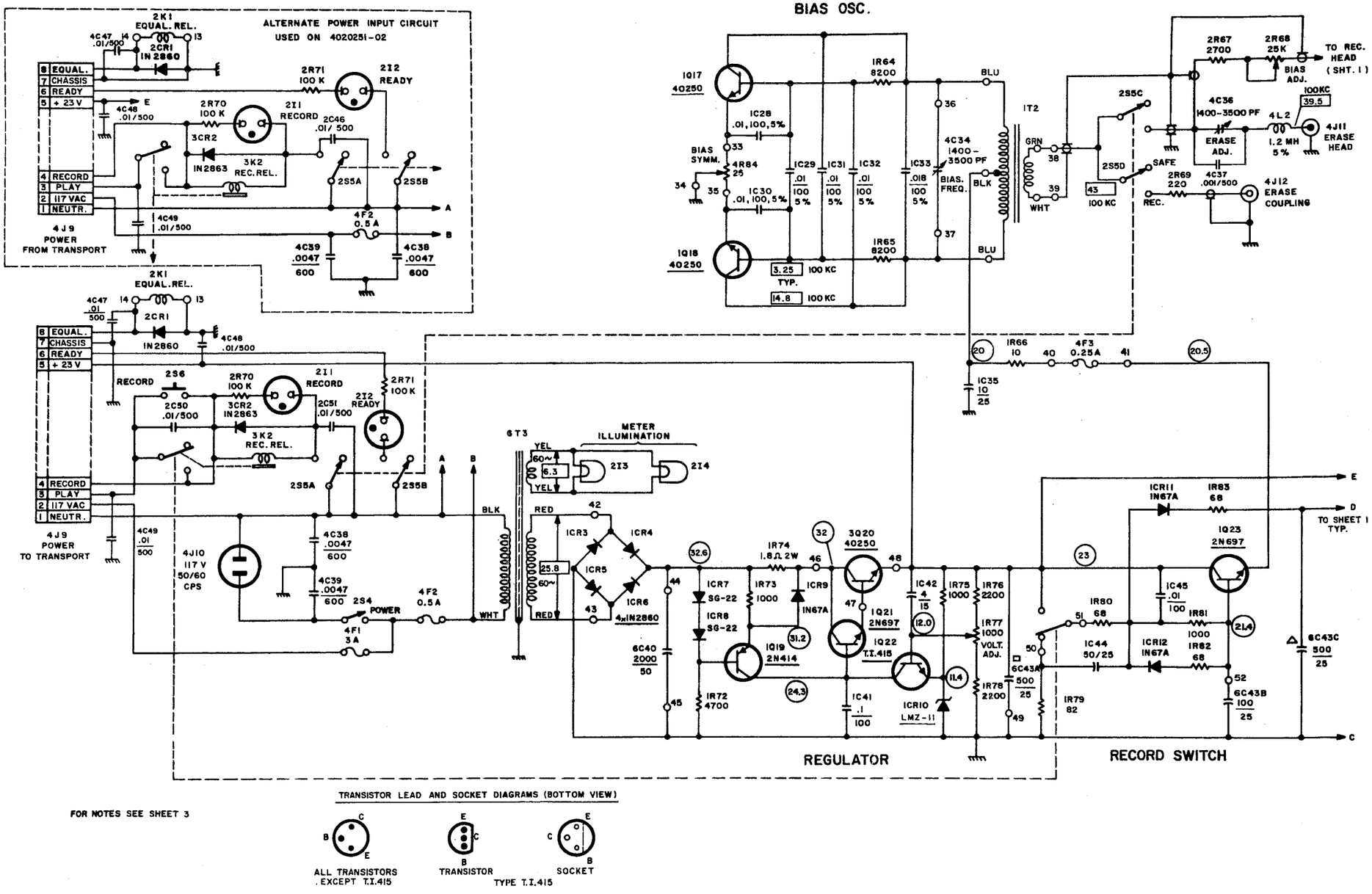
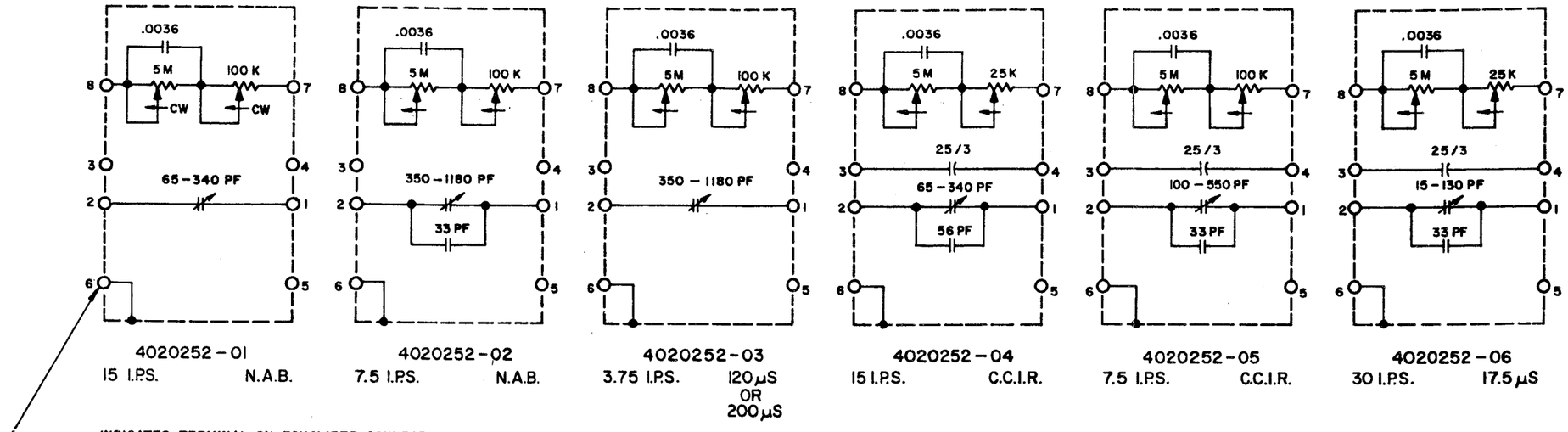


Fig. 7-4 Record/Reproduce Circuit Schematic Diagram, Sheet 2



NOTES –

1. ALL RESISTORS IN OHMS, 1/2 W, 10 %, UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN MFD, UNLESS OTHERWISE SPECIFIED.
3. COMPONENT LOCATION IS INDICATED BY FIRST DIGIT OF SCHEMATIC REFERENCE NUMBER:
   - 1 — PRINTED CIRCUIT BOARD
   - 2 — FRONT PANEL
   - 3 — LEFT PANEL (WHEN FACING FRONT)
   - 4 — BACK PANEL
   - 5 — RIGHT PANEL
   - 6 — POWER SUPPLY
4. ⊙ 15 INDICATES TERMINAL ON P.C. BOARD.
5. (23) INDICATES D.C. VOLTAGE TO GROUND, MEASURED WITH A 20,000 Ω / V METER.
6. INDICATES SIGNAL VOLTAGE TO GROUND OR OTHER LINE AS [7.5] INDICATED AT 500 CPS WITH 7.5 I.P.S. N.A.B. EQUALIZER IN USE. MEASURED WITH A 10 MΩ INPUT VTVM.
   60 CPS VOLTAGES MEASURED WITH A 5000 Ω / V METER.

Fig. 7-5 Record/Reproduce Circuit Schematic Diagram, Sheet 3

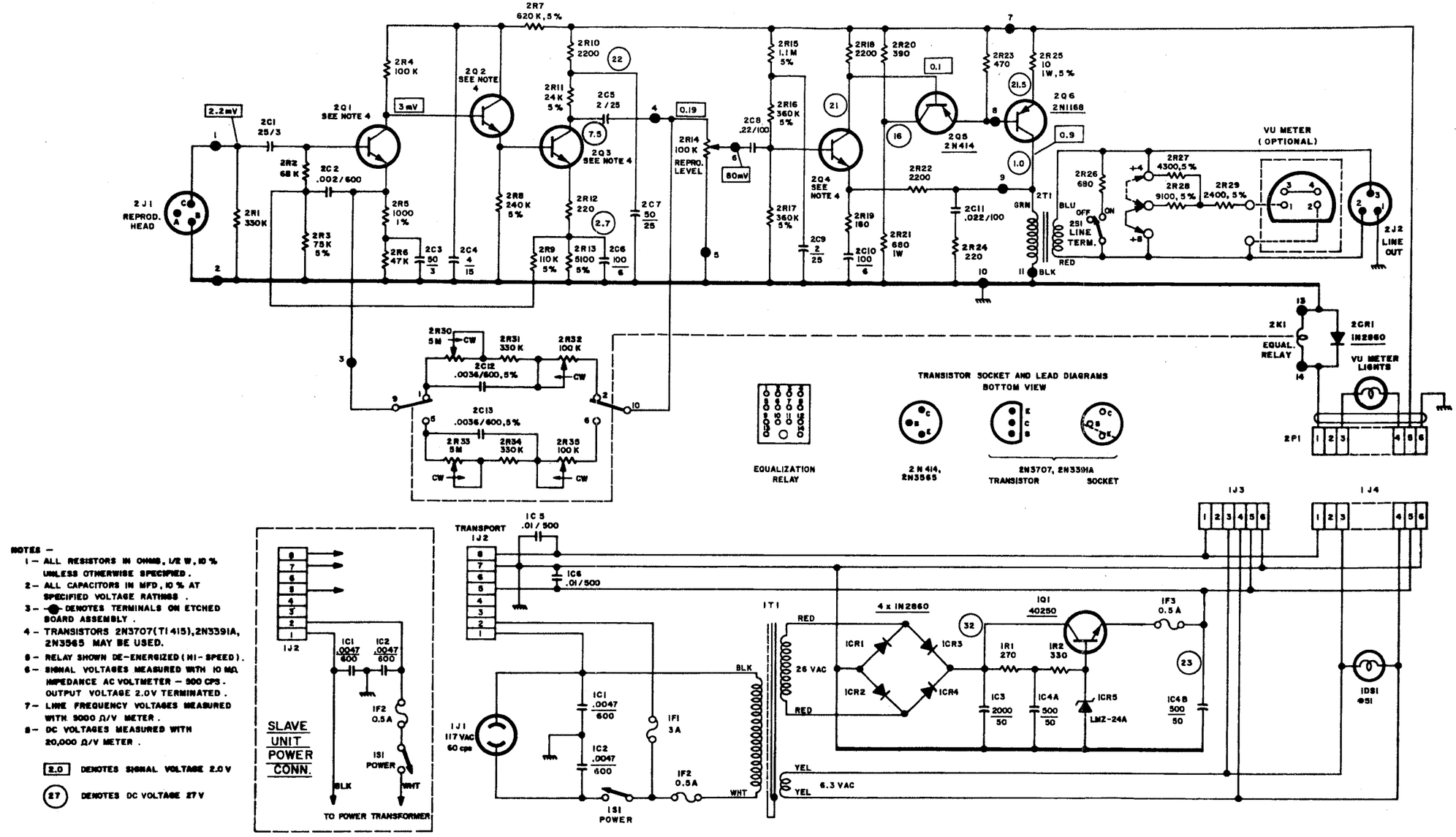
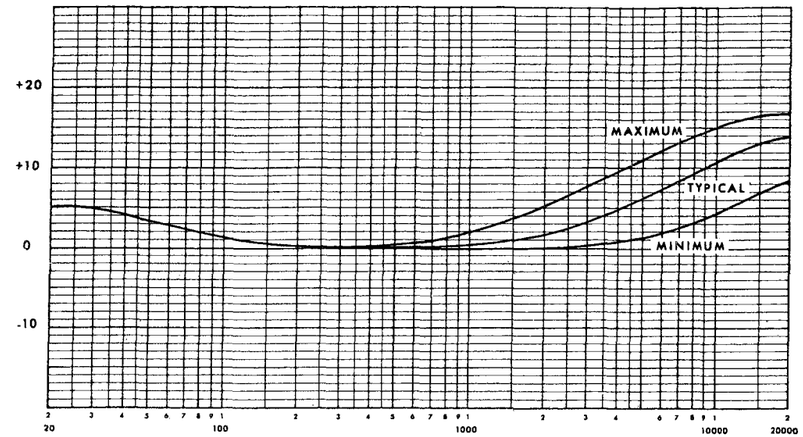


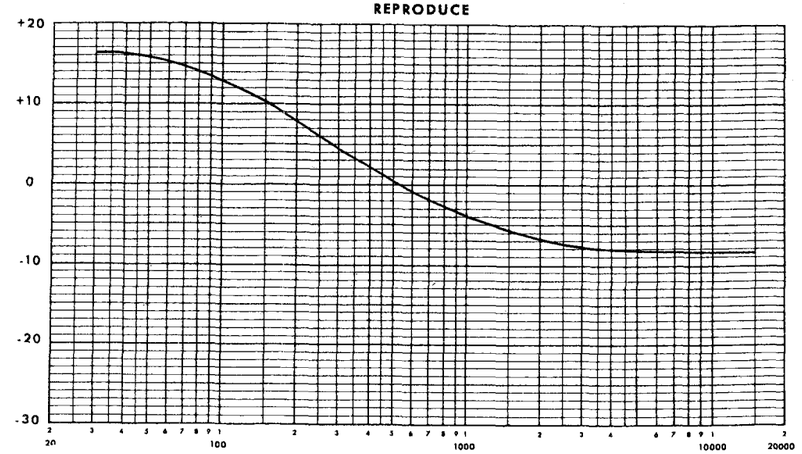
Fig. 7-6 Reproduce-only Circuit Schematic Diagram

RECORD

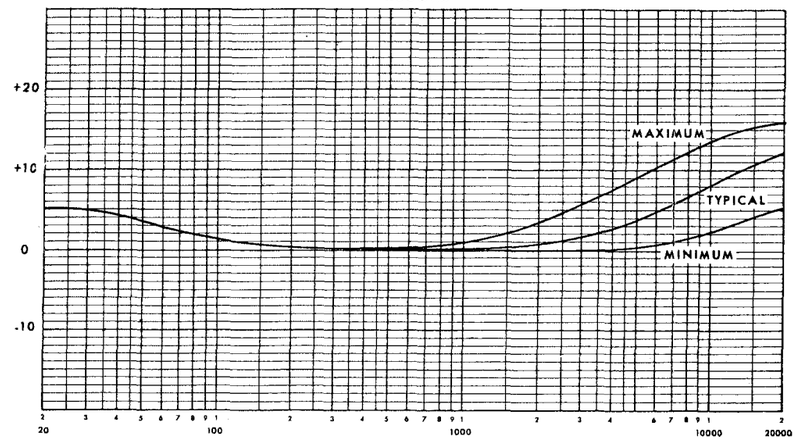


3¾ ips (120 usec)

REPRODUCE

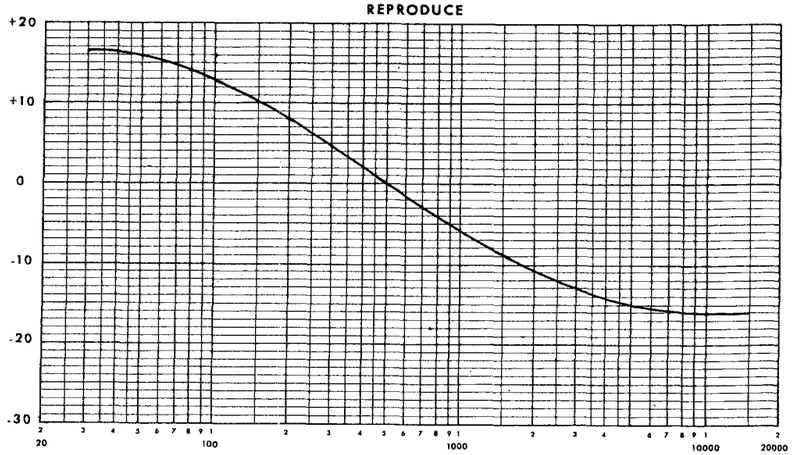


RECORD

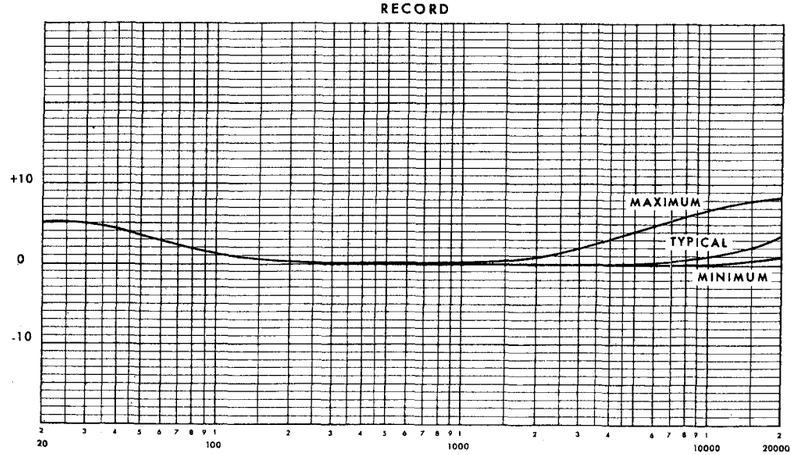


7½ ips NAB

REPRODUCE

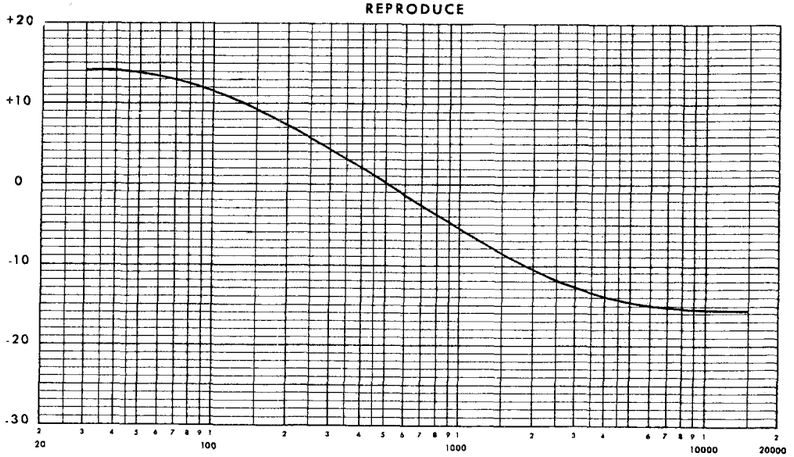


RECORD



15 ips NAB

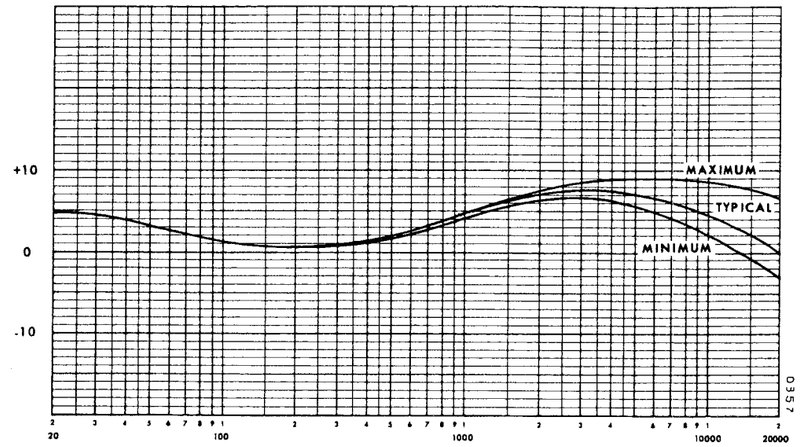
REPRODUCE



400978A

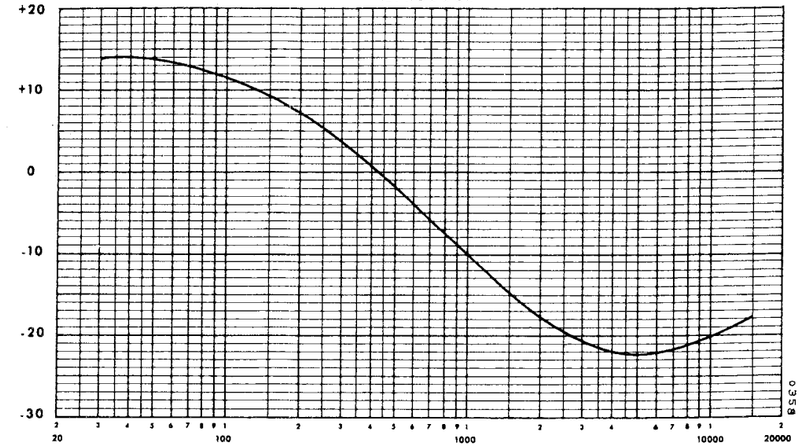
Fig. 7-7 Response Curves, Sheet 1

RECORD

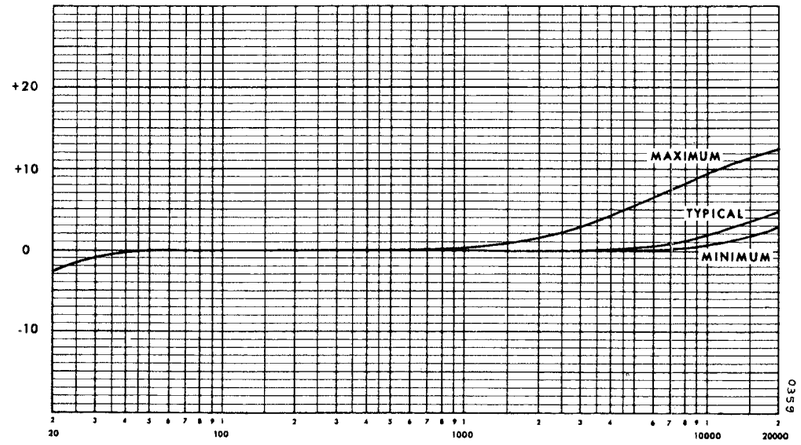


REPRODUCE

15 ips AME

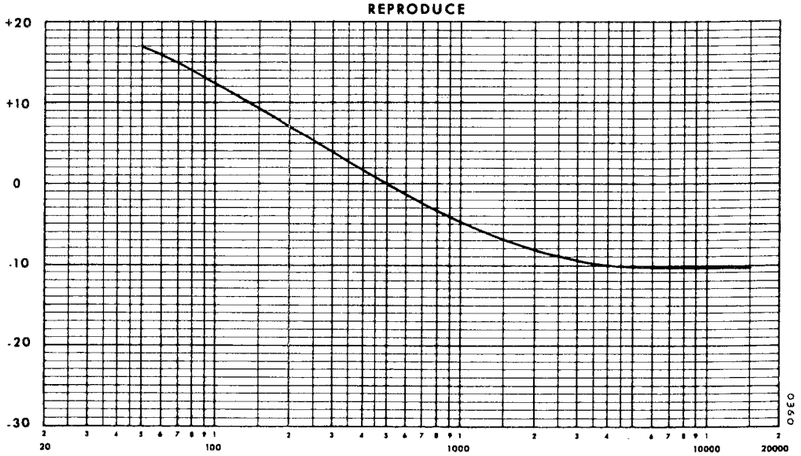


RECORD

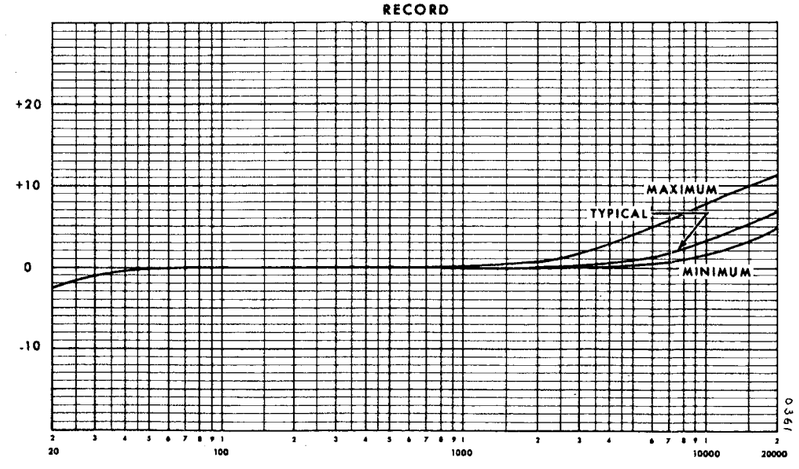


REPRODUCE

7½ ips CCIR

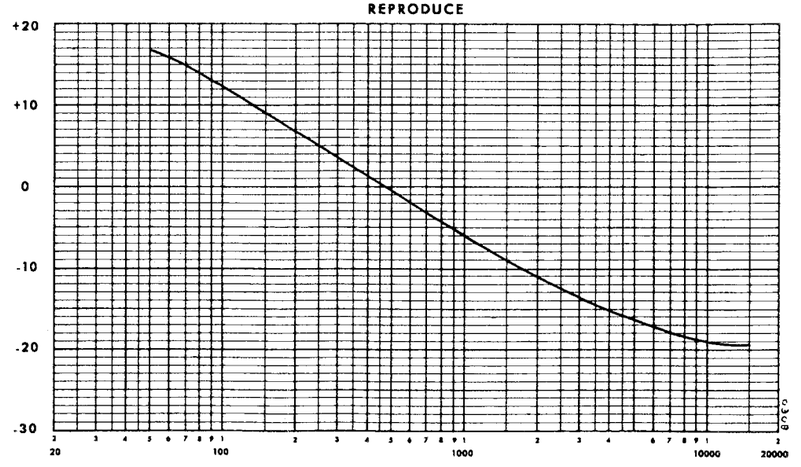


RECORD



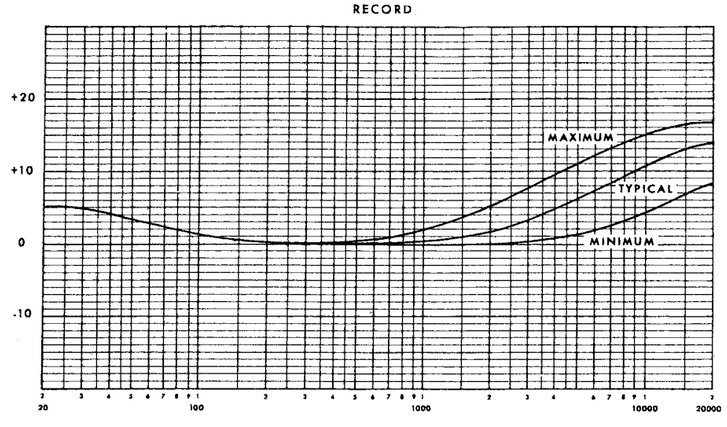
REPRODUCE

15 ips CCIR

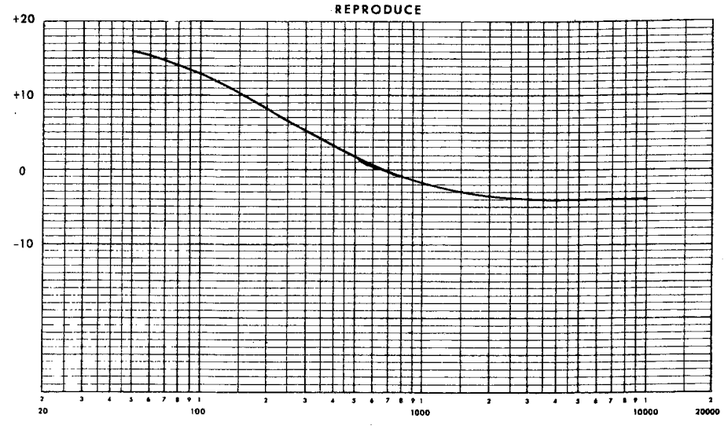


400979A

Fig. 7-8 Response Curves, Sheet 2



3¾ ips (200 usec)



401576A

Fig. 7-9 Response Curves, Sheet 3

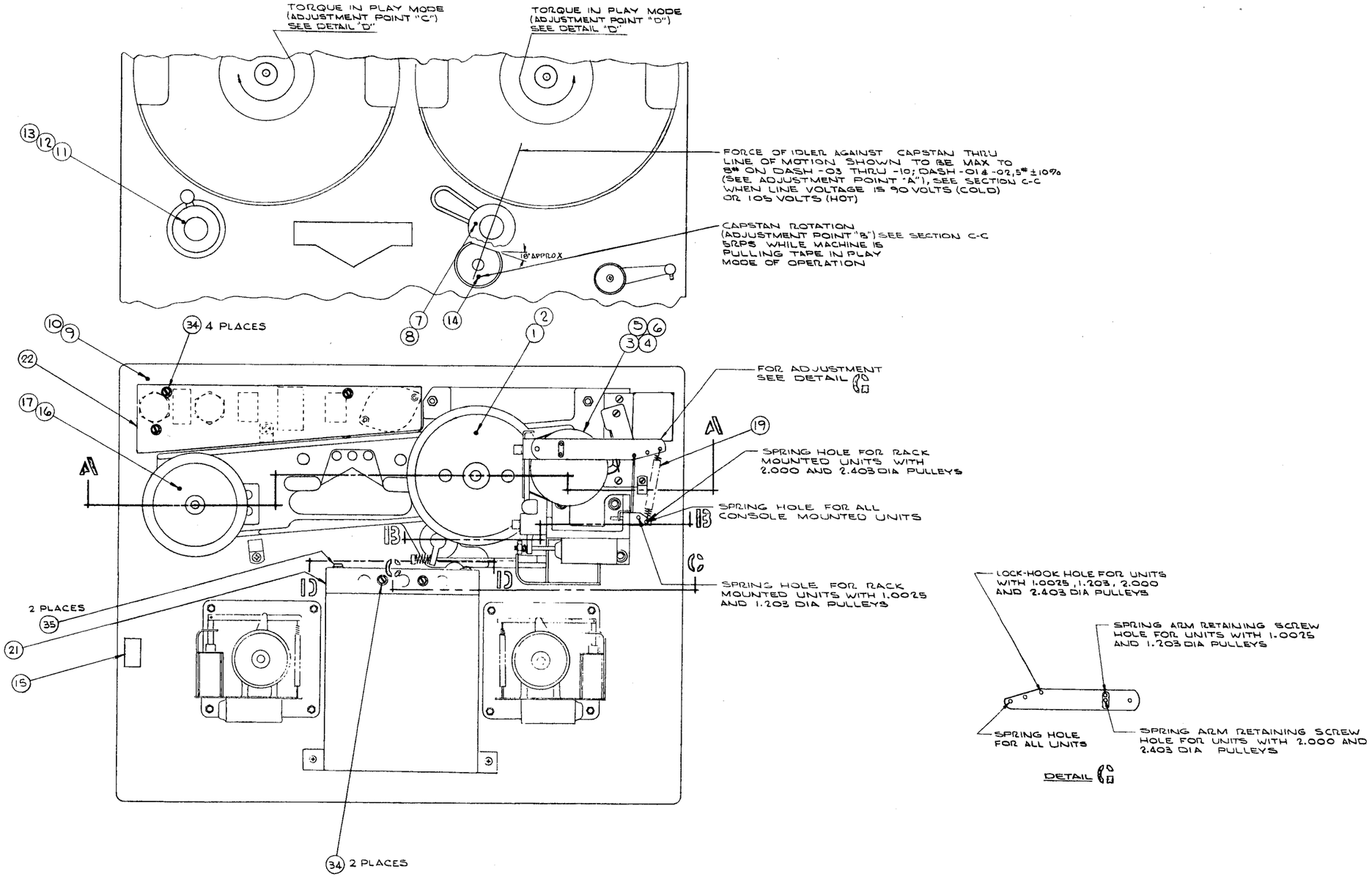
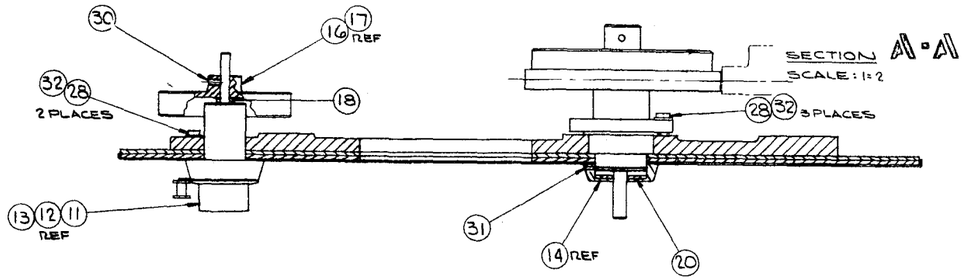
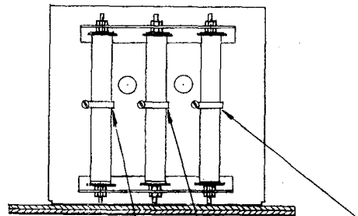


Fig. 7-10 Tape Transport Assembly, Sheet 1



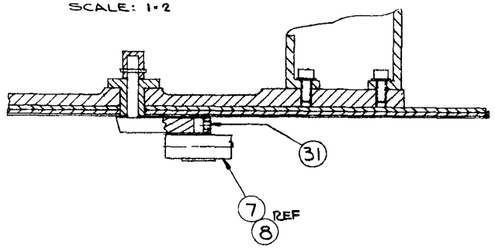
SECTION A-A
SCALE: 1-2

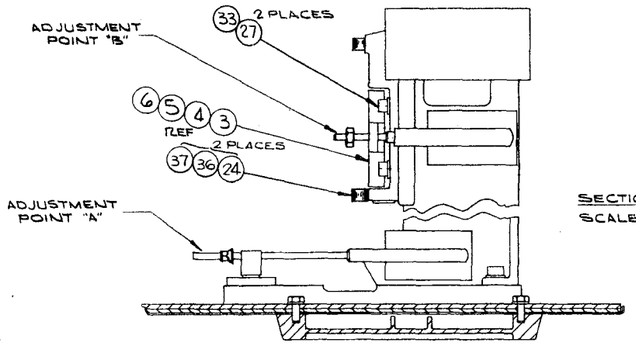
SECTION D - D



ADJUST TO MAXIMUM RESISTANCE -01 THRU -10.
ADJUSTMENT POINT "C"
ADJUSTMENT POINT "D"

SECTION B-B
SCALE: 1-2





SECTION C - C
SCALE: 1-2

CONNECTOR DIAGRAM

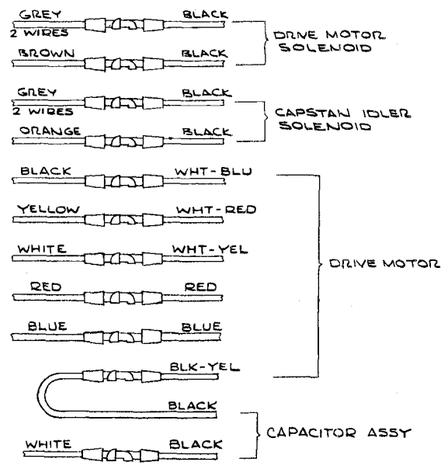


Fig. 7-11 Tape Transport Assembly, Sheet 2

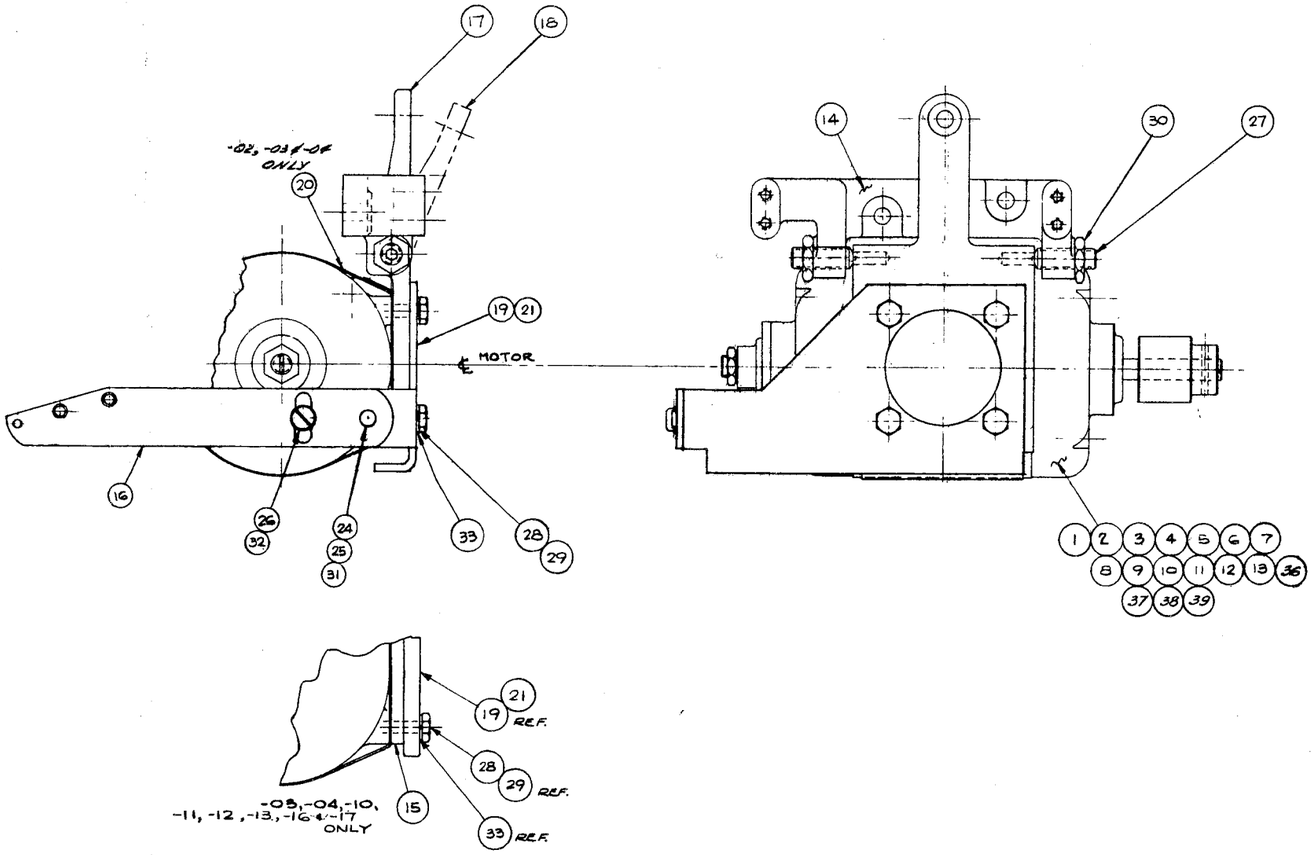


Fig. 7-12 Drive Motor Assembly

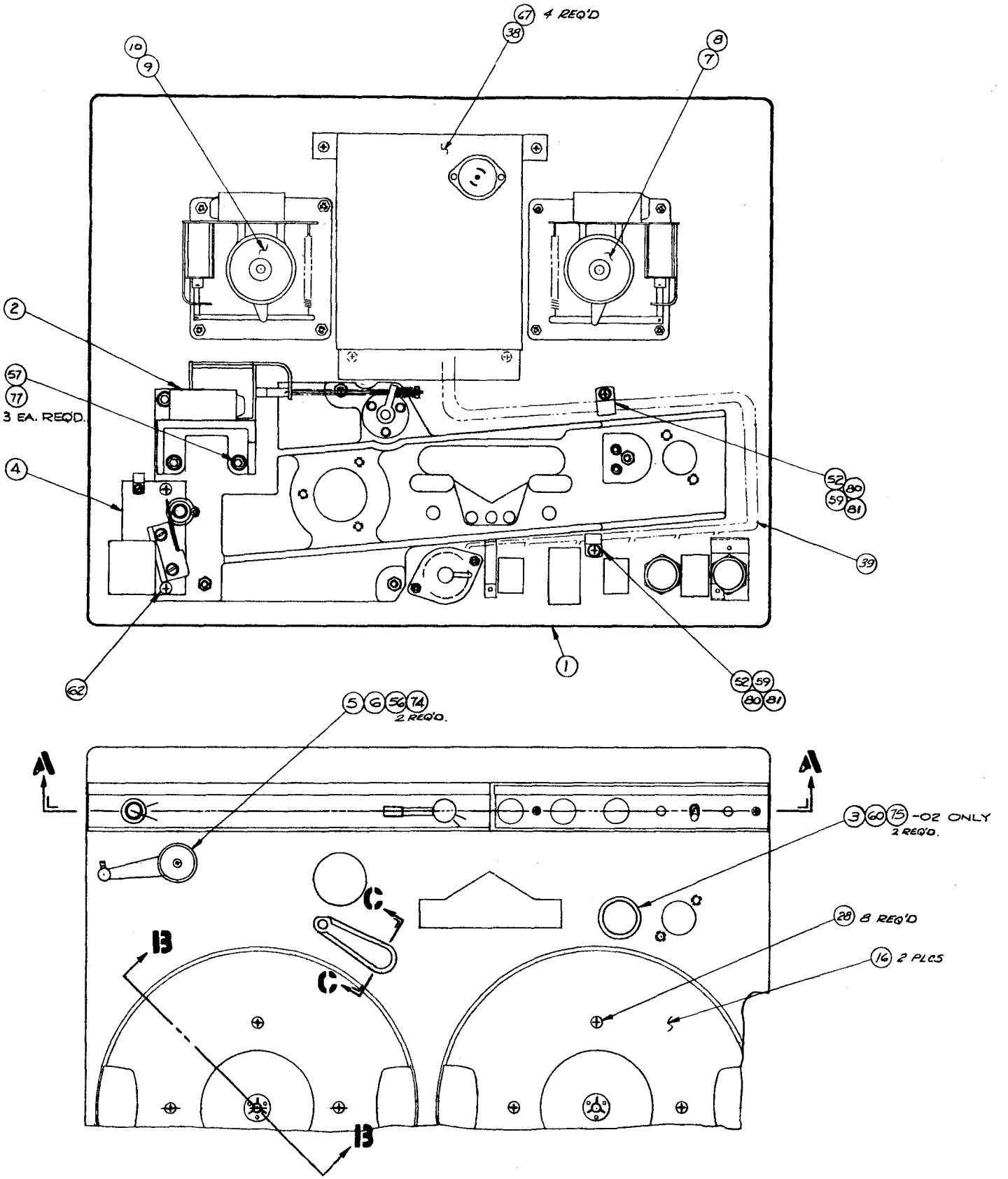
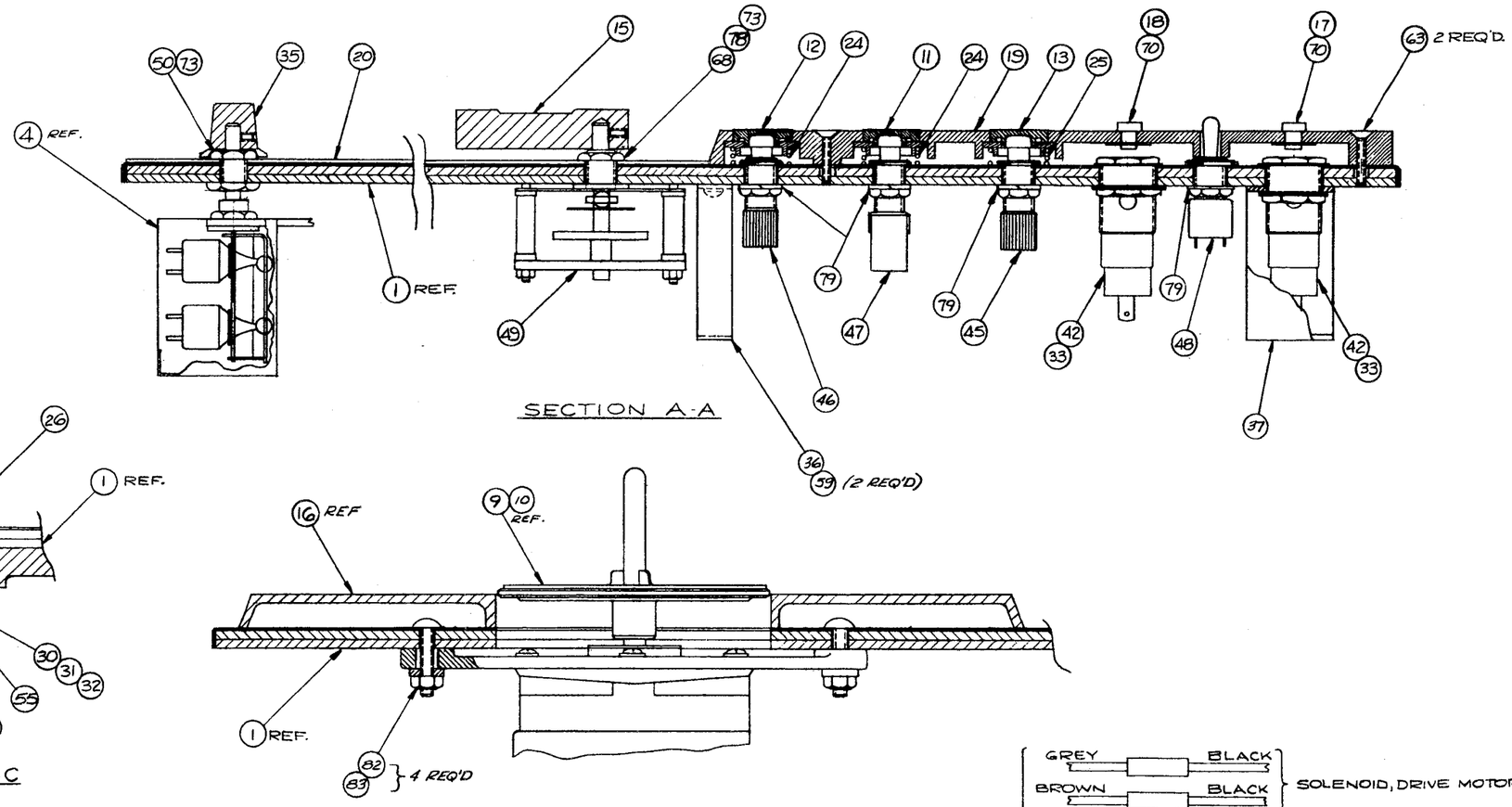
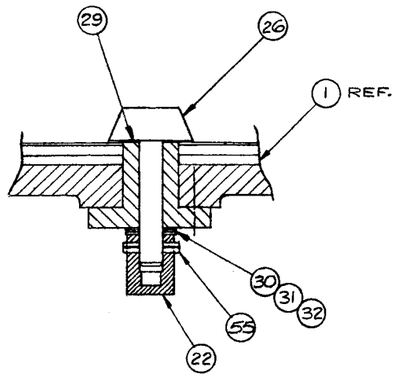


Fig. 7-13 Transport Subassembly, Sheet 1

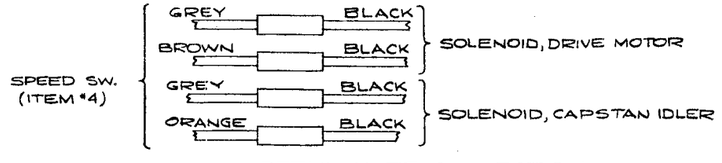


SECTION A-A



SECTION C-C

SECTION B-B



DETAIL, WIRE CONNECTION

Fig. 7-14 Transport Subassembly, Sheet 2

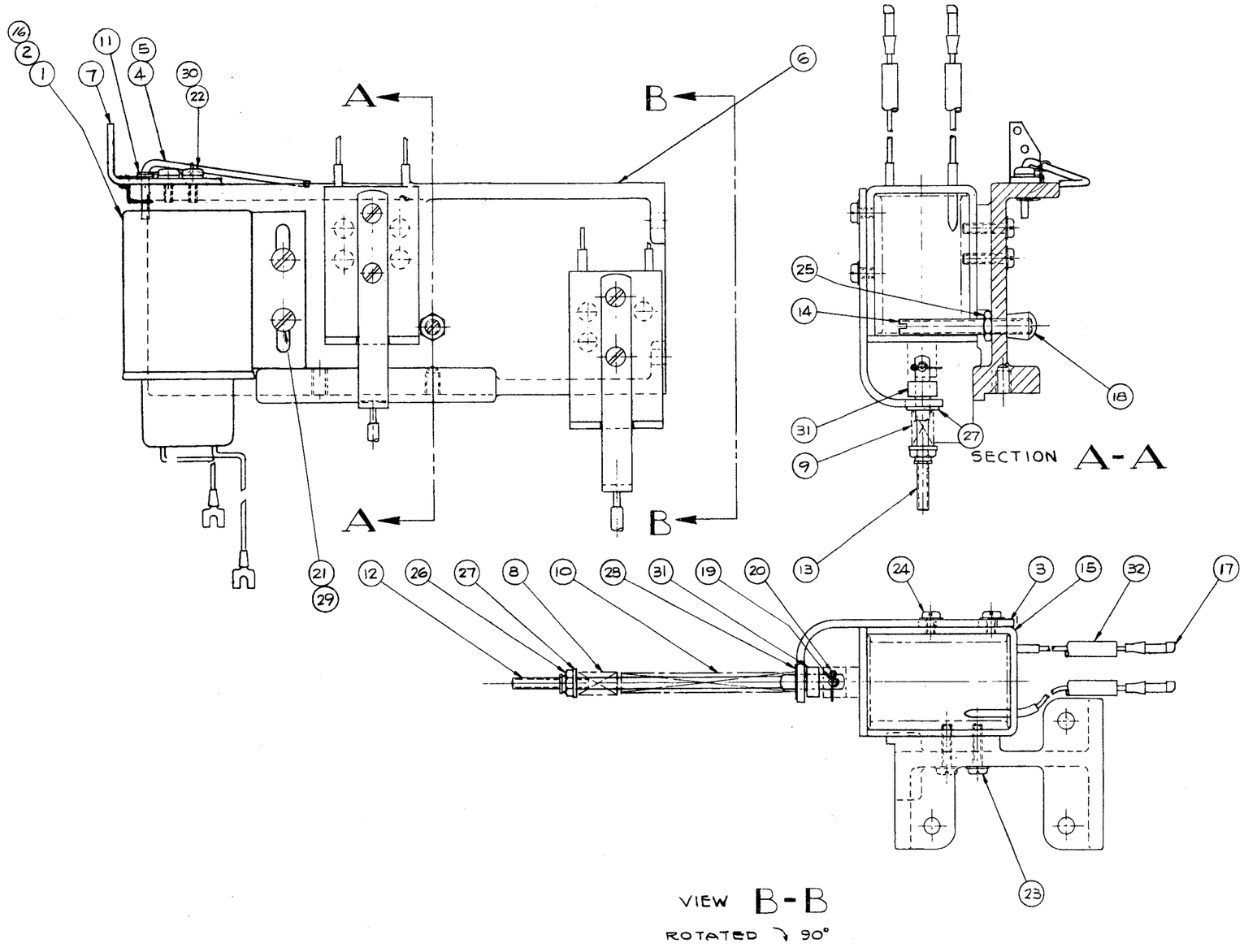


Fig. 7-15 Support Assembly, Drive Solenoid

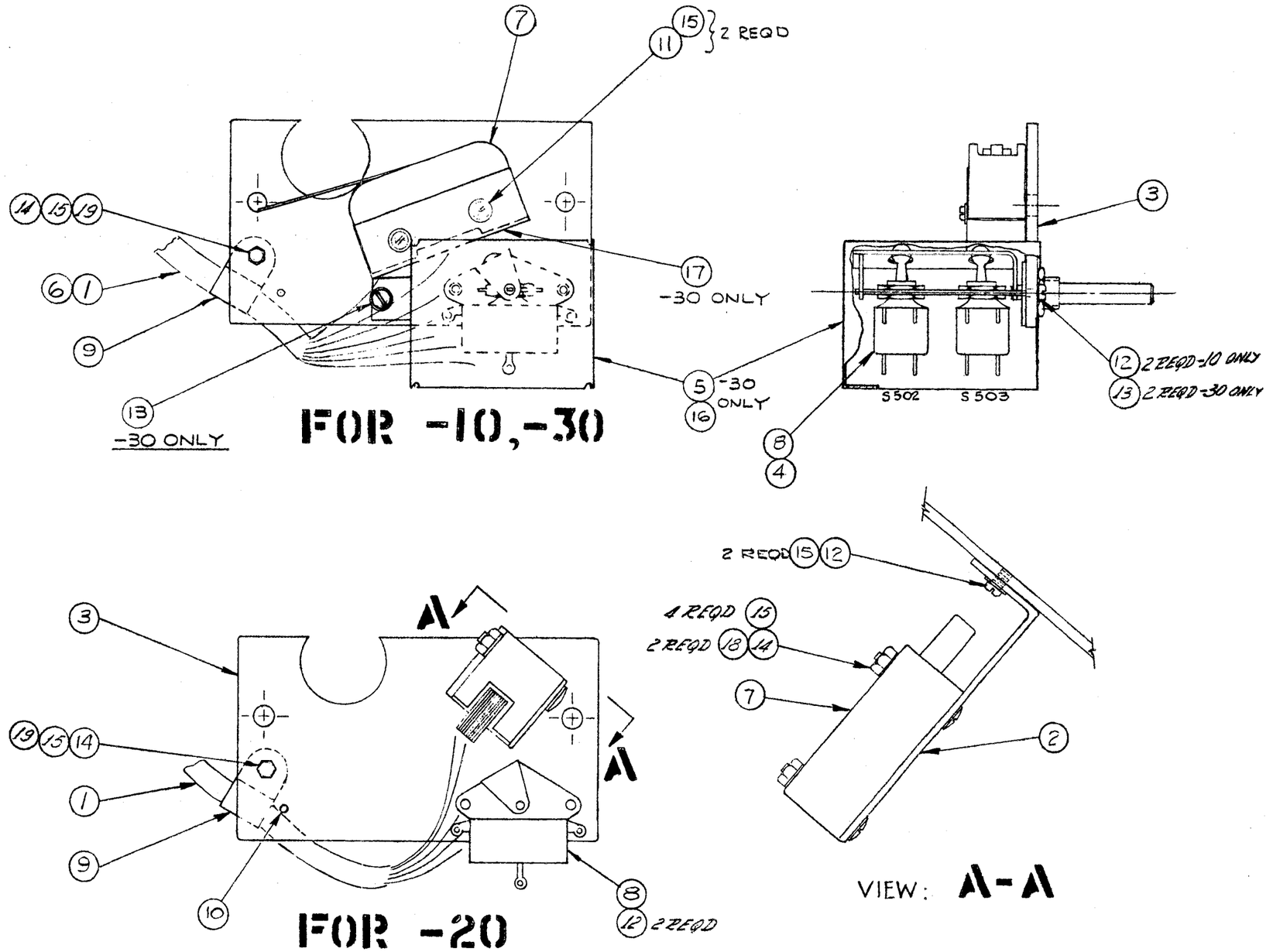


Fig. 7-16 Drive Switch Assembly

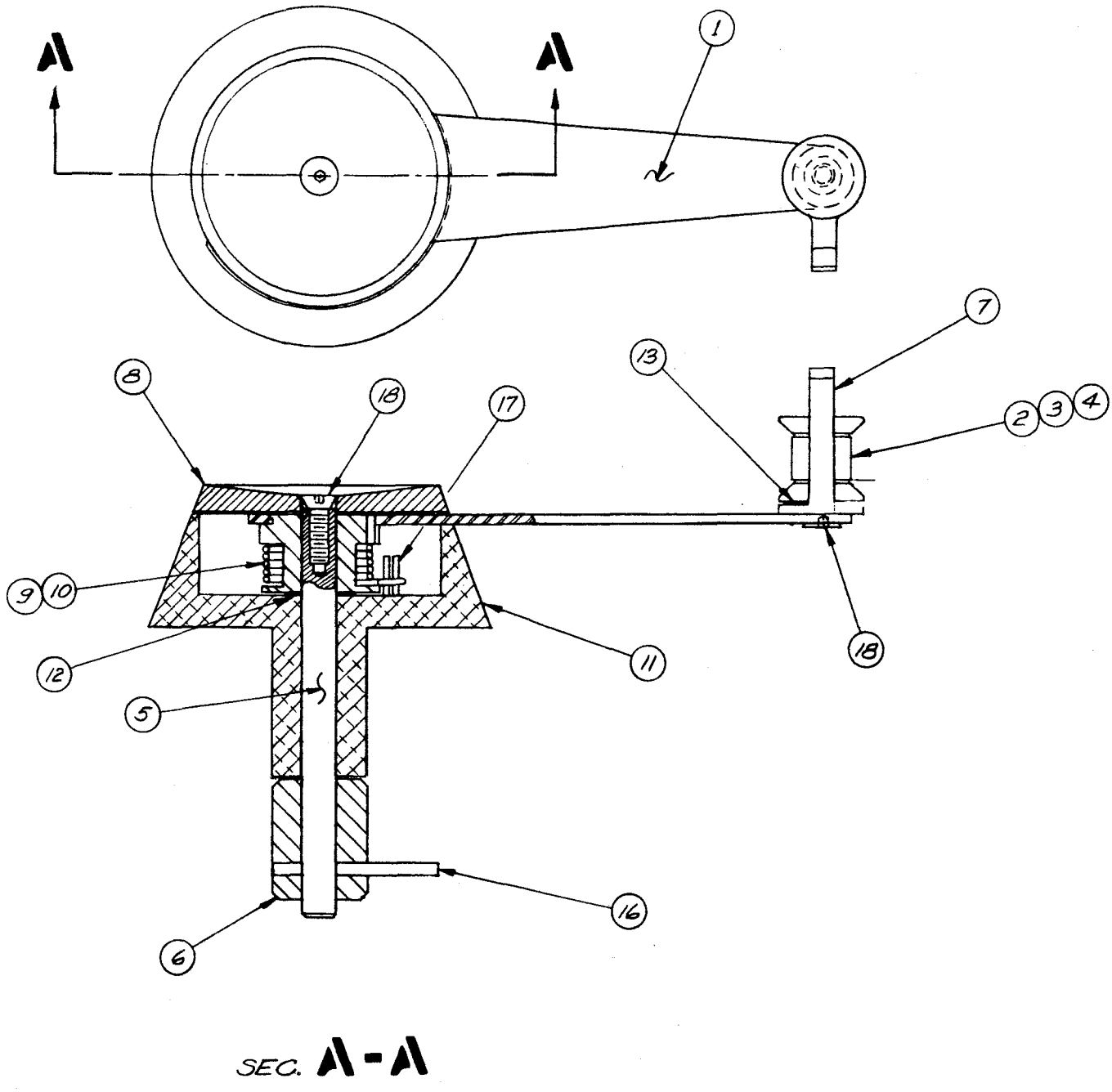
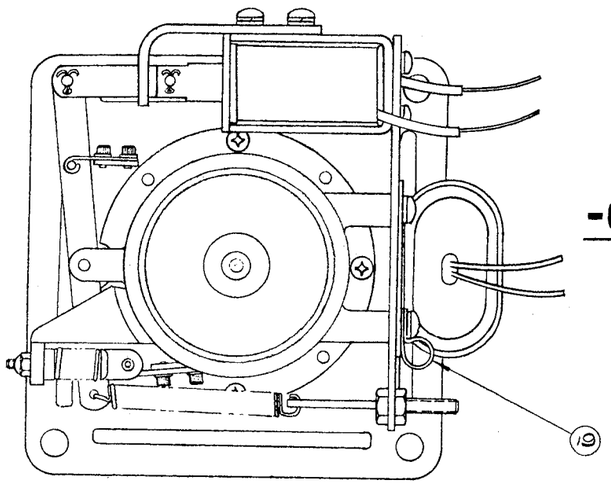


Fig. 7-17 Takeup Tension Arm Assembly



A-A VIEW

-04 & -07 SHOWN

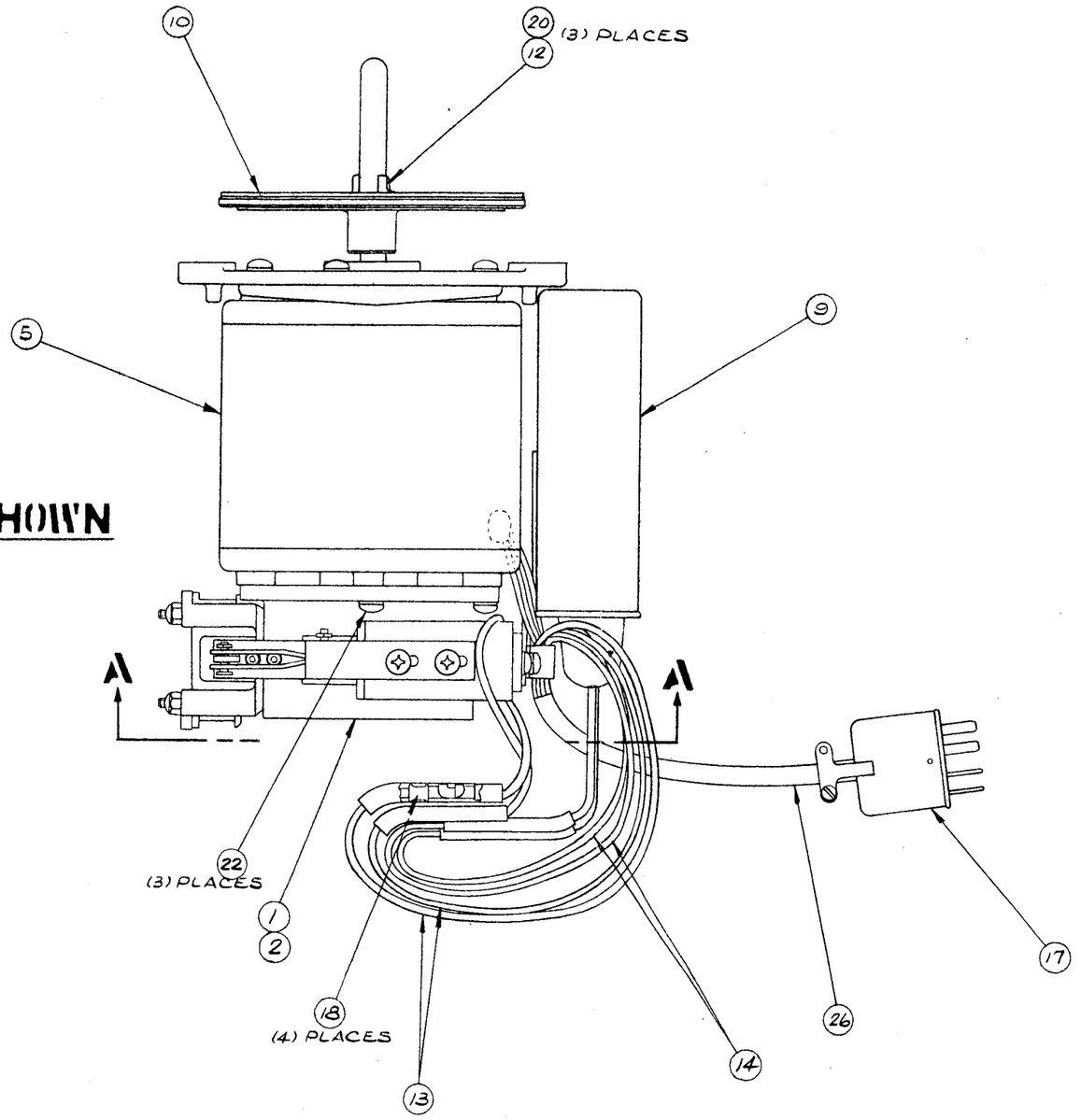


Fig. 7-18 Typical Reel Assembly (Rewind)

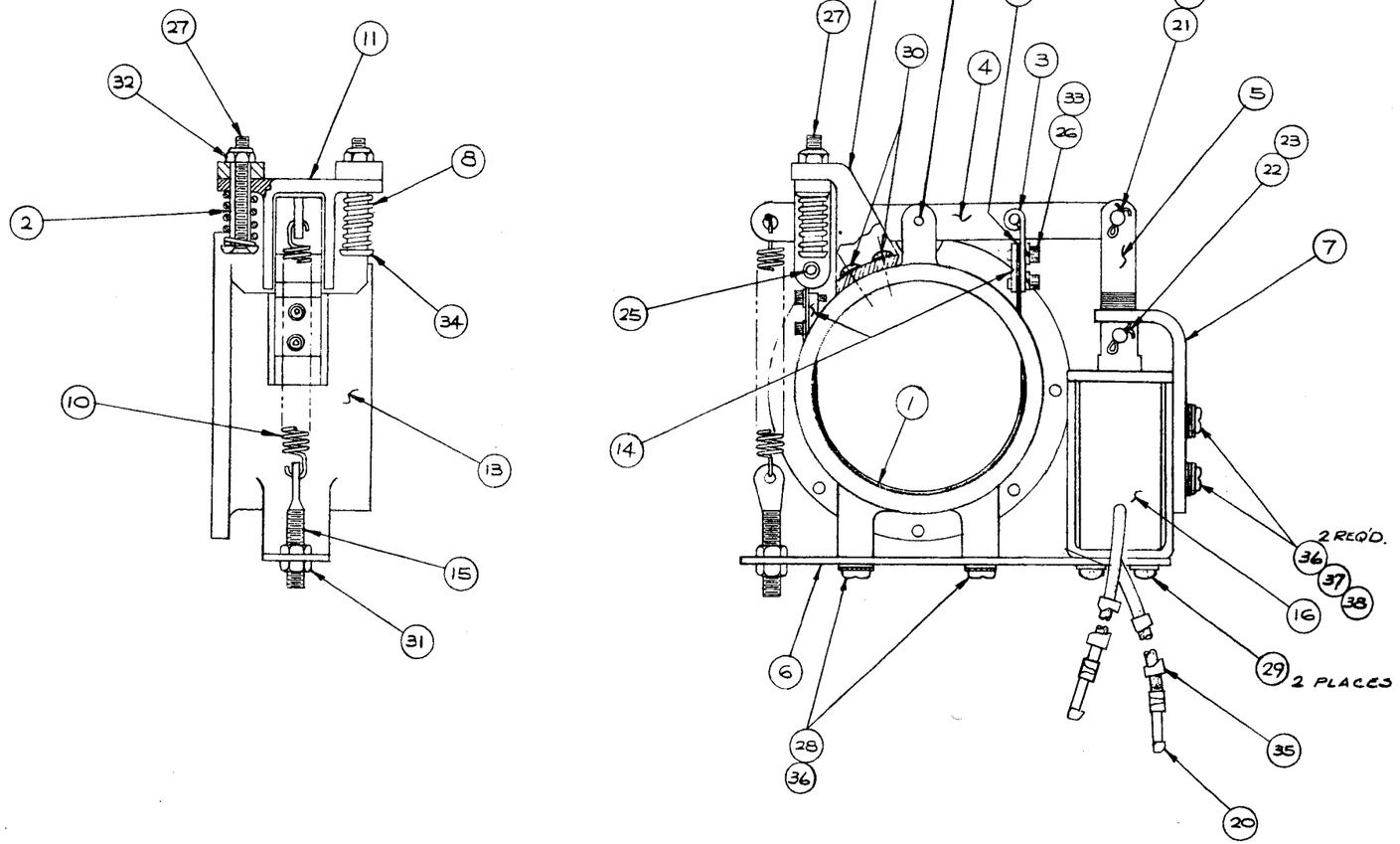
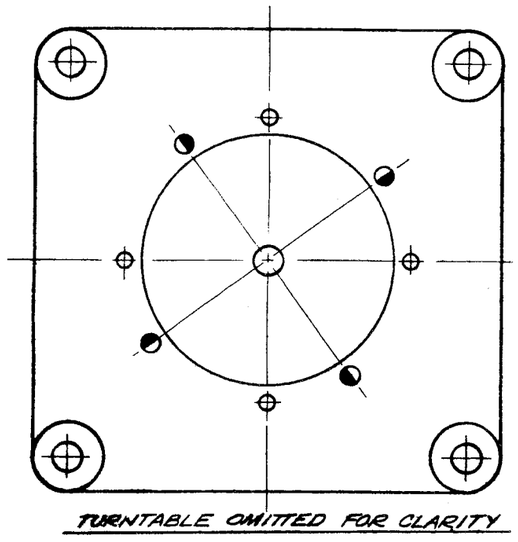


Fig. 7-19 Typical Brake Assembly (Rewind)



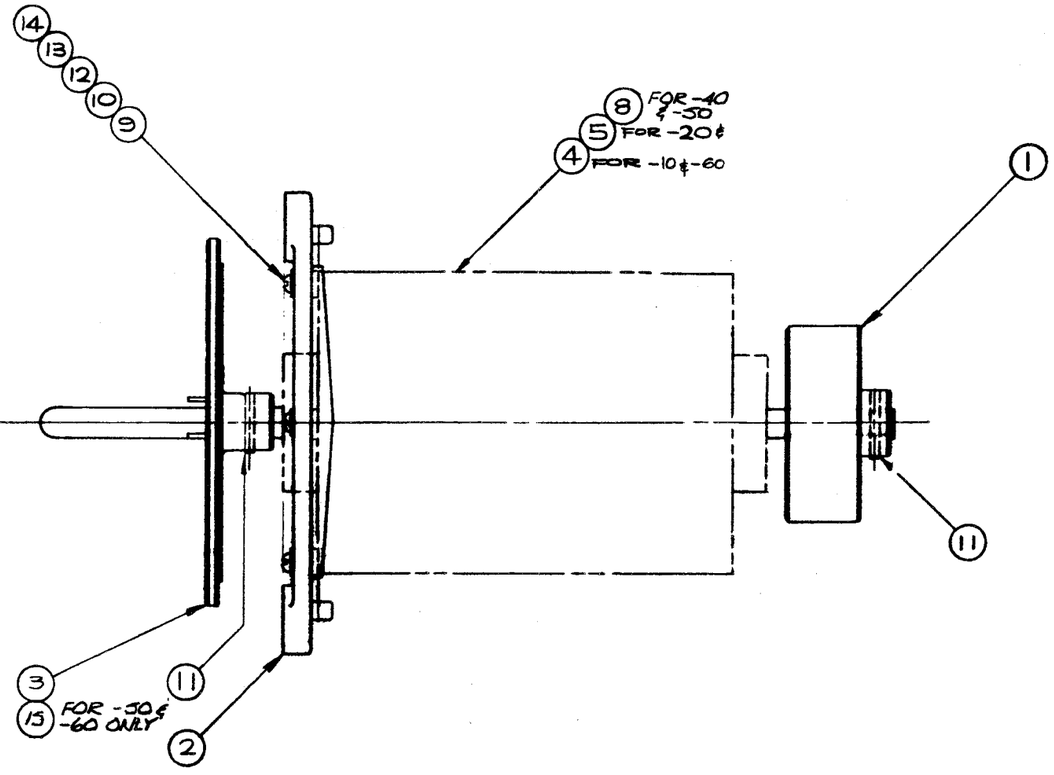
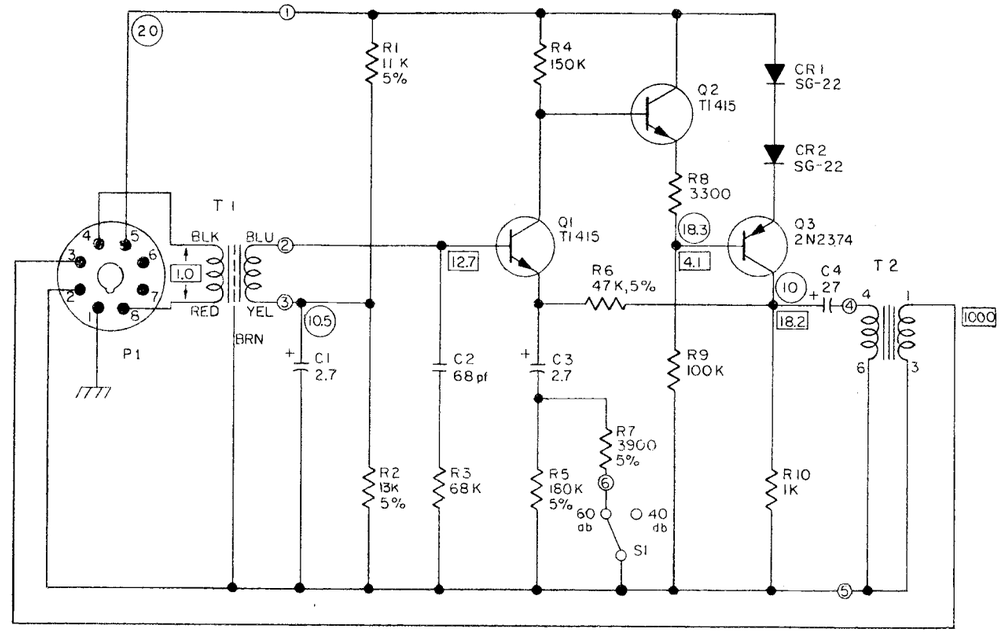


Fig. 7-20 Torque Motor Assembly

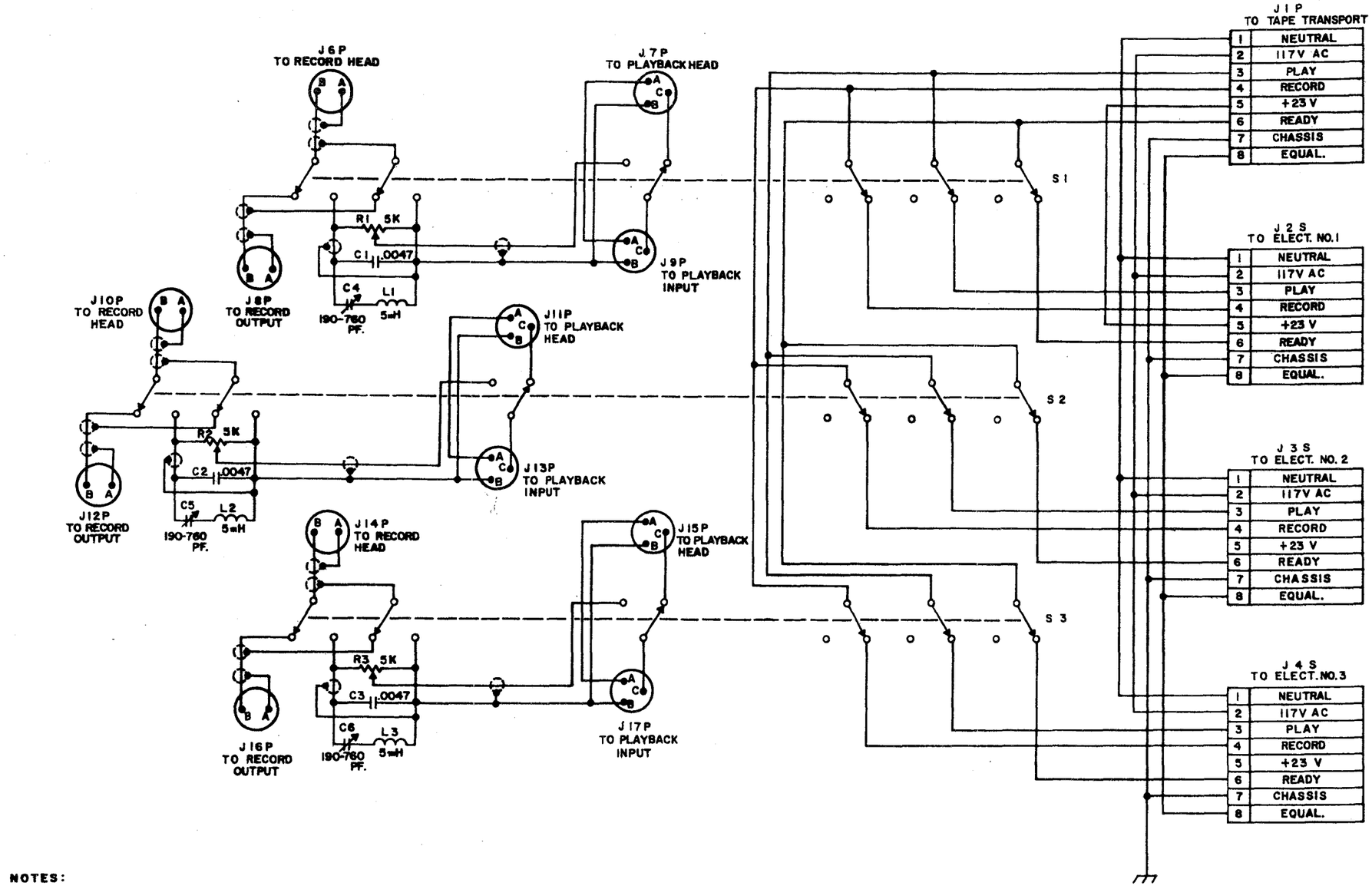
TRANSISTOR BASE DIAGRAM



NOTES:

1. ⏚ DENOTES SHIELD CAN.
2. ALL RESISTORS ARE IN OHMS ±10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
3. ALL CAPACITORS ARE IN MICROFARADS, 15 VOLT, UNLESS OTHERWISE SPECIFIED.
4. (20) INDICATES D.C VOLTAGE TO GROUND, MEASURED WITH A 20,000 Ω/V METER
5. [1.0] INDICATES RMS MILLIVOLTS TO GROUND AT 500 CPS WITH 'S1' IN 60 DB POSITION AND LOADED WITH 100K RESISTOR.
6. TRANSISTORS Q1 & Q2-T1415 IS INTERCHANGEABLE WITH 2N 3991 A.

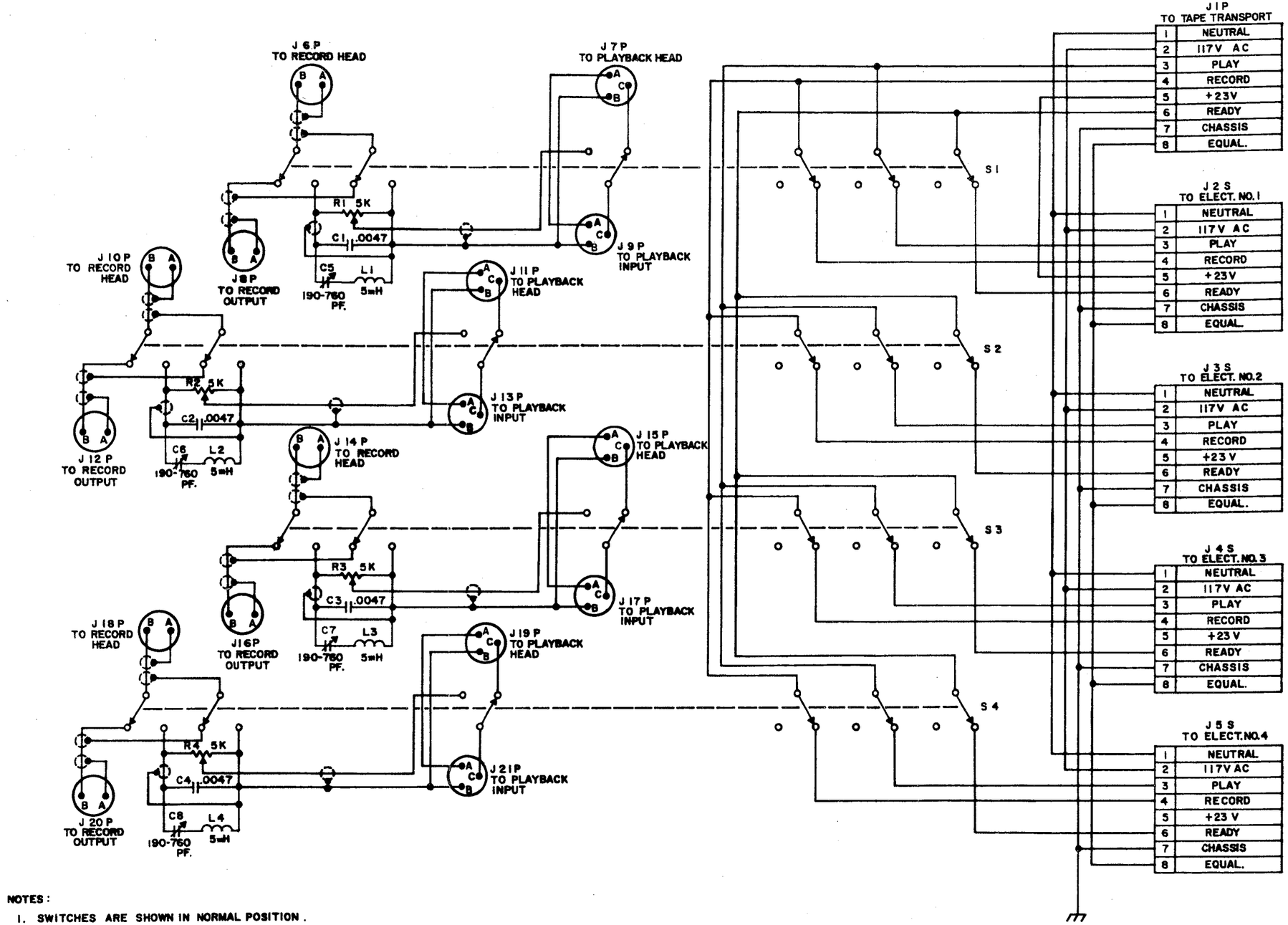
Fig. 7-21 Microphone Preamplifier Schematic Diagram



NOTES:

1. SWITCHES ARE SHOWN IN NORMAL POSITION.

Fig. 7-22 Three Channel Sel-sync Schematic Diagram



NOTES:

1. SWITCHES ARE SHOWN IN NORMAL POSITION.

Fig. 7-23 Four Channel Sel-sync Schematic Diagram