SECTION 7

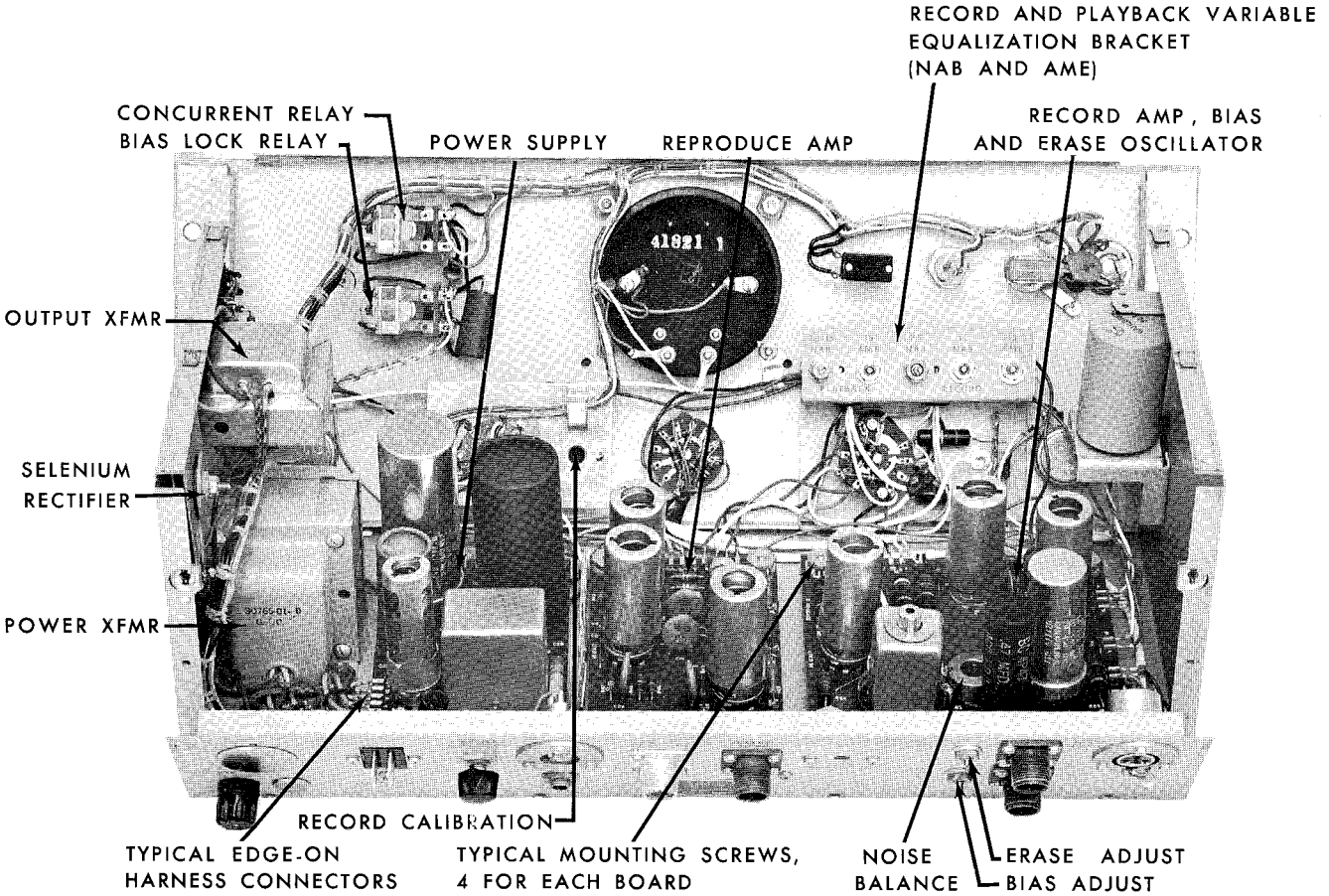
ELECTRONIC ASSEMBLY

NOTE

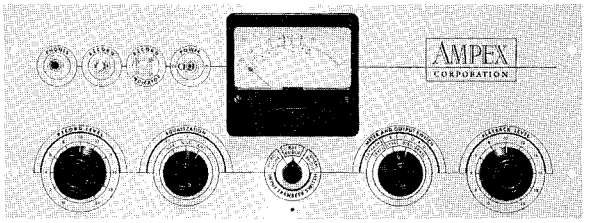
This manual is primarily intended for use with Catalog No. 30960 electronic assemblies. Schematic and parts lists for earlier models using Catalog No. 30750 electronic assemblies are included.

GENERAL

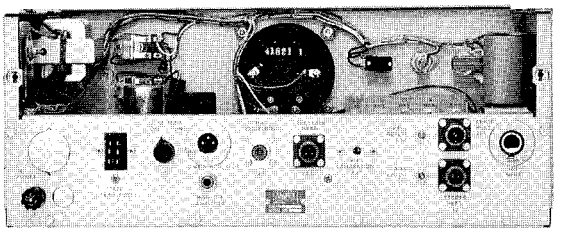
The electronic assembly consists of a single chassis on which are mounted three sub-assemblies of etched board construction—the record amplifier with bias and erase oscillator, the reproduce amplifier, and the power supply. Each subassembly is an etched board entirety which can be taken from the main assembly by disconnecting the edge-on harness connectors and removing four mounting nuts.



LOCATION OF ELECTRONIC SUBASSEMBLIES



AMPLIFIER CHASSIS, FRONT PANEL



AMPLIFIER CHASSIS, REAR VIEW

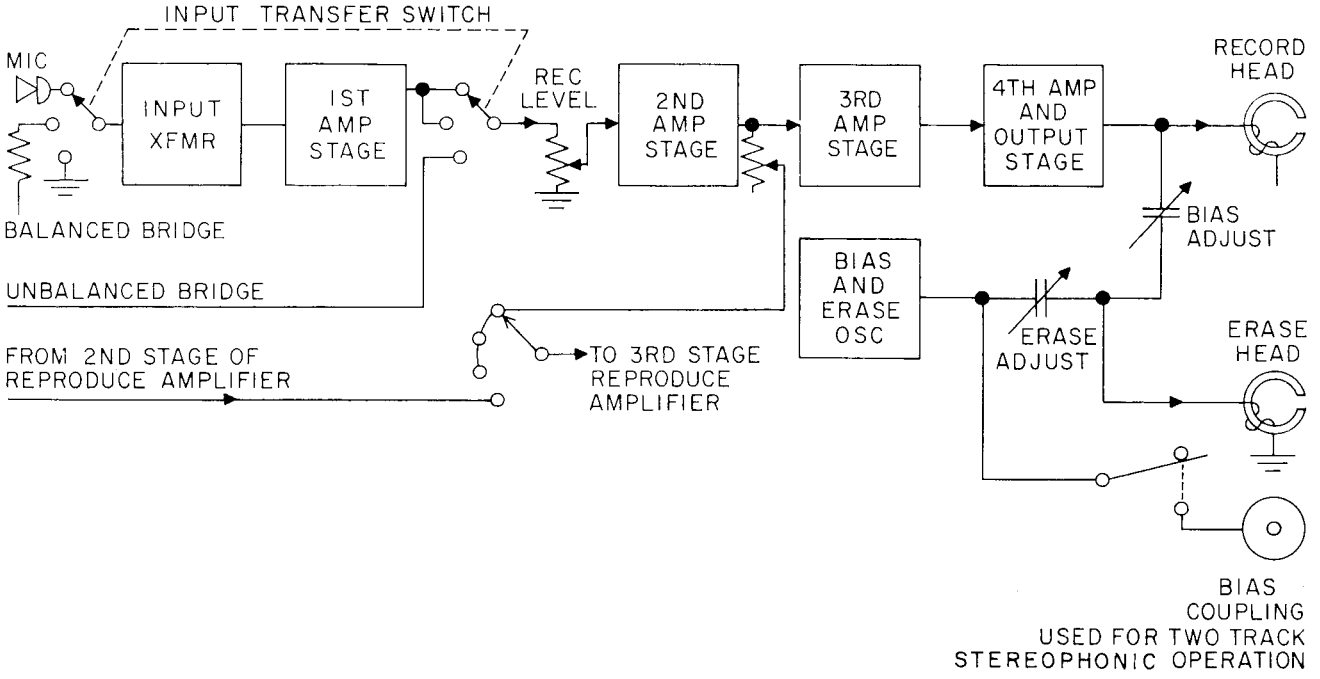
On the face panel facilities are available for setting record and reproduce levels, selecting high or low speed equalization circuitry, making input transfers for microphone, balanced bridge or unbalanced inputs, and switching meter and output circuitry. Visual monitoring of reproduce record, bias and erase levels can be done at the vu meter on the face panel. Two phone jacks for aural monitoring are provided. one on the face panel and another on the back of the electronic chassis. Power on-off is controlled at the front of the assembly. A control for the record function, signified by an accompanying indicator light, completes the front panel arrangement.

Accessible on the back of the electronic assembly chassis are all connecting and interconnections provisions for line input, line output, connections to the tape transport, head connections and bias coupling. One screw-type fuse post and a line termination selector switch are also provided on the chassis back panel.

RECORD AMPLIFIER

The record section of the electronic assembly is a four stage, high gain, resistance coupled amplifier using transformer input coupling for microphone or balanced bridge, and by-passing the transformer and the first stage when the unbalanced bridge input is selected. Two dual triodes, 1V1 and 1V2 and their related circuitry, form the four stages of amplification.

When the microphone INPUT is selected the signal from 5J1 is impressed across the primary of input transformer 6T1 and delivered through the secondary to the grid of 1V1.



BLOCK DIAGRAM RECORD CIRCUIT

In the balanced bridge arrangement, the signal passes through resistor network 4R1, 4R4 and 4R5 to input transformer 6T1 with resistors 4R2 and 4R3 providing the balance above ground. From the secondary of transformer 6T1 the signal then appears at the grid of 1V1.

Using the unbalanced bridge arrangement, transformer 6T1 and the first stage of 1V1 are by-passed, the signal appearing at the grid of the second stage through resistor 4R5 and across potentiometer 4R9 with resistor 4R3 and 4R4 completing the circuit to ground.

At the first stage, bias and negative feedback are achieved by means of unbypassed resistor 1R7. When this first stage is used, the amplified signal is coupled through capacitor 1C1 and potentiometer 4R9 and resistor 1R8, in parallel, to the grid of the second stage where further amplification takes place. Potentiometer 4R9 provides a means for setting RECORD LEVEL. Bias and negative feedback in the second stage are attained by unbypassed resistor 1R11. Capacitor 1C2A and resistor 1R13 form a plate decoupling network. Capacitors 1C3 and 1C4 and potentiometer 4R12 (RECORD CALIBRATE) provide record calibration circuitry.

NOTE

When reading meter indications with the METER AND OUTPUT SWITCH in the record position, only the first two stages of the record amplifier and the last three stages of the reproduce amplifier are connected in the circuit, omitting record pre-emphasis and reproduce equalization circuitry so that meter indications will reflect only the flat portions of each amplifier.

The signal now is coupled to the grid of the third stage by capacitor 1C5, bias and negative feedback is provided through unbypassed resistor 1R16. Further amplification takes place in this third stage and pre-emphasis circuitry for HIGH and LOW tape speeds is provided at components 1R17, 4C47, 4C41, 4C42, 4R67 and 4C48 which provide the necessary high frequency rise. At the low end of the frequency spectrum, an effective 3 db gain is furnished by the resistor/capacitor combination 1R18 and 1C8. With 15 inches per second (ips) AME position, 4C40, provides variation in the pre-emphasis in the 5 to 15 kc region.

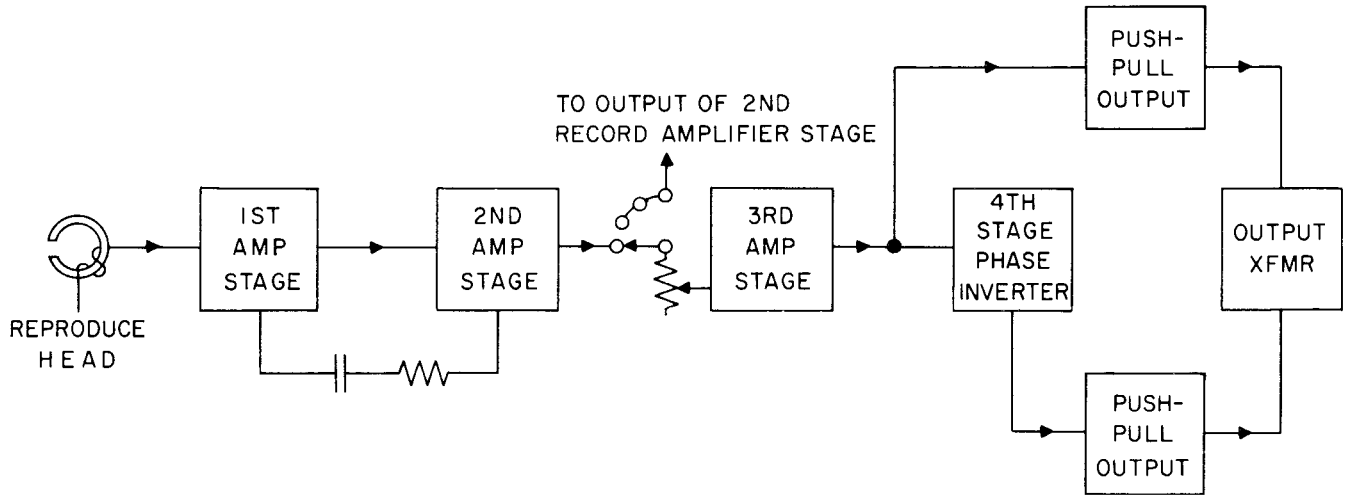
In the fourth stage, coupled to the third stage by capacitor 1C9, the signal is applied to the grid of 1V2. Bias and negative feedback is supplied by unbypassed resistor 1R21. The fourth stage is designed to act as a constant current amplifier in order to feed the reactive load presented by the record head. The output of this fourth stage is mixed with the signal from the bias and erase oscillator and delivered to the record head.

Plate voltage for the first three stages is supplied whenever POWER switch 4S5 is in the ON position. For plate voltage supply to the final stage, the equipment must be in the record mode at which time relay contacts 3K1C complete the necessary circuitry.

REPRODUCE AMPLIFIER

The reproduce section of the electronic assembly is a five stage, resistance coupled, audio amplifier. Three dual triodes are used to provide three stages of amplification, phase inversion and a push-pull output amplifier.

Signals on the moving magnetic tape induce voltages in the reproduce head. When high impedance heads are used, this induced voltage appears across resistor 2R25 and then on the grid of 2V3. When low impedance heads are used the signal is first passed through step-up transformer 6T2. Bias on this first stage is derived from the voltage divider network consisting of resistors 2R26 and 2R28 plus tube current through resistor 2R28. Capacitor 3C16a and resistor 3R32 form a plate decoupling network. The amplified output of this first stage is coupled to the second stage grid through capacitor 2C14. Capacitor 3C16b and resistor 3R35 form a plate decoupling network. In the 7½ and 15 NAB position, reproduce equalization is achieved by means of capacitor 2C15 and resistors 2R28, 2R29 and 4R69. 4R69 controls the high frequency shelf. In the 15 (ips) AME position a bridge T filter connected between the 2nd stage and 4R36 provides the additional dip required to produce the curve. A variation for the AME reproduce curve is supplied by 4C44 in the 7 kc and 15 kc region. The variable repro-



BLOCK DIAGRAM REPRODUCE CIRCUIT

duce equalizers 4C44 and 4R69 are used to compensate for head variations to furnish the flat-

> ***CAUTION***
>
> *The reproduce variable equalizers (4C44 and 4R69) should not be used to compensate for variable in tape.*

test possible response when reproducing a standard tape.

The signal now is delivered to amplifier stage 2V4, the tube receiving the signal through coupling capacitor 2C17, PLAYBACK LEVEL potentiometer 4R36 and switch 4S3a. The output of 2V4a is coupled through 2C19 to one grid of the push-pull output stage, and a portion of this output is coupled through capacitor 2C18 to phase inverter 2V4b. Both signals, now 180 degrees out of phase with each other, are fed through coupling capacitors to the respective grids of push-pull amplifier 2V5 and then to the primary of center tapped output transformer 6T3.

After the signal reaches the secondary of output transformer 6T3, it is delivered to the LINE TERM switch 5S4 for selection of resistor 5R48 to obtain a nominal 600 ohm line output termination when an external load is supplied.

Again, the signal can be monitored at 4J6 PHONES or at the vu meter using the PLAYBACK position of the METER and OUTPUT SWITCH.

Transformer strapping and cabling connections for various outputs are discussed in SECTION 2 INSTALLATION.

BIAS AND ERASE OSCILLATOR

A dual triode tube 1V6, connected as a push-pull oscillator, provides high frequency bias and erase signal. Both halves of the tube are resistance coupled triode amplifiers, the output of each plate coupled to the grid of the other triode section. Any signal on the grid of either tube will be amplified in the plate circuit and coupled to the grid of the other tube. The signal then will appear at the plate of the second tube and be coupled back to the grid of the first tube in phase with the original signal. Frequency of oscillation is approximately 100 kc.

With 117 volts d-c terminating at pin 3 of 5J7, Bias Lock relay (4K3) and RECORD relay (3K1) are energized when RECORD button (4S6) is pressed. Capacitor 4C43 charges and the combination of capacitor 4C43 and rectifier 4CR2 delays the opening of 4K3 until 3K1 opens. Contact set 4K3a connects the bias oscillators of all the electronic assemblies together through resistor 4R70 (220 ohms) for

operation of two or more electronic simultaneously.

The oscillator output is fed through relay contacts 4K3B to variable capacitor 5C33 ERASE ADJUST, where erase current adjustments are made, and then to the ERASE HEAD. From 5C33 it follows another path through variable capacitor 5C13 BIAS ADJUST where bias current adjustments take place. The bias signal is then mixed with the record signal and delivered to the record head.

NOISE BALANCE control, potentiometer 1R63, in the oscillator grid circuits is adjusted to correct for any asymmetry in waveform which would case random noise during reproduction and distortion while recording.

Plate voltage is supplied through contact K1C only when the equipment is in the record mode.

POWER SUPPLY

Vacuum tube 3V7, connected as a conventional full wave rectifier, supplies plate power for all tubes in the electronic assembly, and it also supplies the record indicator light, Selenium rectifier CR1, connected as a conventional full wave rectifier provides d-c heater voltage for 1V1, 1V2 and 2V3.

The center tap of the 2V3 tube heater provides a ground for the d-c filaments, and this tube must be in its socket for proper operation in any mode. A-c power input is supplied from the tape transport through 5J7 and is controlled by switch 4S5 POWER. The power is fed through fuse 5F1 and impressed across the primary of power transformer 6T4.

There are four secondary windings on the power transformer—three for heater supply and one for high voltage. One heater winding serves rectifier tube 3V7, one center-tapped winding provides 12.6 volt d-c heater voltage after rectification, one winding supplies 12.6 and 6.3 volt a-c voltage, and the other center-tapped winding furnishes high voltage. An rc network consisting of the four section capacitor 3C16 and resistors 3R54, 3R55 and 3R56 provides filtering action. Relay contact 3K1B shorts resistor 3R54 in the record mode to provide a nearly constant B+ supply in any mode of operation.

Through record relay 3K1C, B+ is applied to the bias oscillator and the last stage of the record amplifier. Whenever the PLAY button on the tape transport is pressed, 115 volt d-c is available at pin 3 of 5J7, and when RECORD button 4S6 is pressed, the 115 volt d-c is applied to the record relay coil. As long as 115 volt d-c is available at pin 3 of 5J7, contact 3K1A holds the relay energized. When the STOP button on the tape transport is pressed, the 115 volt d-c no longer reaches pin 3 of 5J7 and relay 3K1 is de-energized and drops out. Relay 4K2 is energized whenever d-c is supplied to pin 5 of 5J7 by pressing RECORD button S804 on the tape transport. Concurrent RECORD RELAY 4K2 in turn energizes 3K1 and 4K3. BIAS LOCK RELAY 4K3 is then held energized through its arm contacts to pin 3 of plug 5J7.

ALIGNMENT AND PERFORMANCE CHECKS

Equipment Required

Ampex Standard Alignment Tape

Speed	*Width*	*Catalog Number Ampex*
7½ Inches per Second (NAB)	¼ inch tape	31321-01
15 Inches per Second (NAB)	¼ inch tape	31311-01
15 Inches per Second (AME)	¼ inch tape	31312-01
7½ Inches per Second (NAB)	½ inch tape	31321-05
15 Inches per Second (NAB)	½ inch tape	31311-05
15 Inches per Second (AME)	½ inch tape	31312-05

A-c Vacuum Tube Voltmeter capable of indicating rms voltages of .004 or less.
Audio Oscillator with stable output from 50 cps to 15 kc.
Earphones or Speaker for Monitoring Aurally.
Nutdriver number 8 (¼ inch).
Reel of unrecorded tape.
Long Screwdriver (approximately 7 inch bit).
Small Screwdriver.

Reproduce Alignment

Step 1: Remove the head cover.
Step 2: With the equipment connected as shown and all power switches in the ON position, thread an Ampex standard tape for the appropriate speed along the prescribed path.

CAUTION

The standard alignment tape used in the following procedures may be partially erased if the record and reproduce heads are permanently magnetized. Demagnitize the heads before proceeding. Do not replace the head cover on the head assembly.

Step 3: Set the EQUALIZATION switch to the desired speed.

Step 4: Place the METER AND OUTPUT switch in the PLAYBACK position.

Step 5: Terminate the output in a nominal 600 ohms (LINE TERM switch in the ON position or use a 600 ohm external load).

Step 6: Start the standard tape. The 15 inches per second standard tapes have all tones recorded at operating level (level that produces approximately 1% distortion). The 7½ inch per second tapes have all tones recorded 10 db below operating level except for the last reference level which is recorded at operating level. The first tone on all standard tapes is a reference level, 700 cycles for 7½ and 15 inches per second. For 15 inches per second, adjust the playback level control so the VU meter reads zero or a VTVM across the output reads +8 dbm. For 7½ inches per second, adjust the playback level control to a convenient meter reading for checking alignment and response.

Step 7: The next tone will be 15,000 cycles for adjusting reproduce head alignment. Take the number 8 nut driver and adjust the left hand stop nut on the reproduce head for maximum output on VU meter or VTVM. If all channels do not peak at the same setting, make a compromise adjustment. If the peak is broad, adjust for minimum output variation.

NOTE

The Model 300-2M uses fixed base heads so azimuth adjustment is not necessary.

NOTE

If the head azimuth is far out of alignment (possible if inexperienced personnel without proper equipment have attempted alignment procedures) minor peaks may be observed on both sides of the maximum. The proper setting is 15 to 20 db higher than these peaks.

Step 8: Tones from 15,000 cycles to 50 cycles now will be reproduced from the standard tape. Adjust the appropriate variable equalizer (4R69 for 7½ and 15 NAB) to give the flattest possible high frequency response. For 15 ips AME, using an AME standard tape, adjust 4C44 so the tapes above 5 kc will reproduce as flat as possible. If an AME tape is not available, the 15 ips NAB tape can be used. In this case the response should follow the curve shown in back of Section 7.

CAUTION

The equalizers should not be used to compensate for system deficiencies (dirty leads, bad alignment, etc). In general, the playback equalizer should not be moved more than 2 db from the standard curve.

NOTE

When reproducing Ampex standard alignment tapes on multi-track equipment the bass end of the frequency spectrum will rise in response. The actual amount of rise will vary with the width and location of the track. This phenomena is present because the reproduce head "sees" additional flux on each side of the head at long wavelengths since the standard tapes are recorded across the complete width of the tape. This fringing effect is not present when recording a track the same width as the reproduce head. The electronics should not be readjusted to compensate for this rise.

Step 9: *Reproduce level control calibration*— The next tone to be heard on the 7½

inch per second standard tape is a reference tone at operating level. Adjust the playback level control to obtain a zero reading on the VU meter or a +8 dbm (1.95V) output on a VTVM. On the 15 inch per second standard tape, all tones are at operating level, so this calibration was made in Step 5.

NOTE

Do not change this playback level setting for the remainder of the adjustments.

Reproduce Amplifier Noise Measurement

Step 1: After performing the previous alignment checks, stop the tape motion.

Step 2: Read the stopped tape noise measurement on the VTVM. Noise should be below the level specified in performance characteristics. Inaudible low frequency bounce can cause the meter to read higher than performance characteristics tolerances. Disregard these momentary readings because they are frequencies far below the operating range.

Record Amplifier Erase Current Adjustment

Step 1: After the equipment has been properly installed and connected, and all POWER switches are in the ON position, thread blank tape along the prescribed path.

Step 2: Place the INPUT TRANSFER switch in the UNBAL BRIDGE position.

Step 3: Set the METER AND OUTPUT switch to the ERASE function.

Step 4: Center the noise balance potentiometers. When the user faces the front panel, the slot should parallel the face plate.

Step 5: Place one channel at a time in the record mode.

Step 6: Using a small screwdriver set the ERASE ADJUST trimmer on the back of the electronic chassis to obtain zero VU meter readings at 117 volt a-c line voltage.

NOTE

When the METER AND OUTPUT switch is in the ERASE position, meter readings must be made with only one amplifier in the record mode because if all amplifiers are recording, false readings will be taken. Erase current will be directly proportional to line voltage and the vu meter readings will reflect any changes from the 117 a-c line voltage.

Record Amplifier Bias Adjustment

NOTE

This adjustment should be made using the brand of tape that normally will be used on the equipment.

Step 1: Place the METER AND OUTPUT switch in the PLAYBACK position.

Step 2: Place the equipment in the record mode at the 7½ inch per second speed.

Step 3: Place the INPUT TRANSFER switch in the UNBALANCED position and connect the audio oscillator into the RECORD LINE INPUT (pins 1 and 3).

Step 4: Set the oscillator frequency at 500 cycles per second (cps) and approximately 1 volt for 7½ inches per second (ips).

NOTE

Bias is set at a specific wave length. If it is desired to set bias at 15 inch tape speed, use a frequency of 1000 cps.

Step 5: Place the RECORD LEVEL knob at a position that will obtain an on-scale meter reading.

Step 6: With a small screwdriver set the BIAS ADJUST trimmer for a maximum reading on the vu meter. An accurate way to set peak bias is to adjust the BIAS control clockwise until the 500 cycle signal drops ½ db below maximum reading. Note the current reading by placing the METER OUTPUT switch in BIAS position. Turn the BIAS control counterclockwise until

the 500 cycle signal drops ½ db and note that current reading. Set the BIAS at the median of these two readings.

Record Level Calibration

NOTE

The reproduce level must be calibrated using standard tape (7½ or 15 ips NAB) before calibrating the record level (see Reproduce Level Control Calibration).

Step 1: Set the audio oscillator to 250 cps. Leave the METER AND OUTPUT switch in the PLAYBACK position.

Step 2: Press the RECORD button (S804).

Step 3: Set the RECORD LEVEL knob to a position that will obtain a zero reading on the vu meter.

Step 4: Place the METER AND OUTPUT switch in the RECORD LEVEL position.

Step 5: Using a long shank screw driver (to avoid burns from the electronic tubes), adjust the record calibration potentiometer (4R12) for a zero vu reading.

Record Azimuth Adjustment

NOTE

There is no azimuth adjustment on 300-2M.

Step 1: Set the oscillator to 15,000 cycles at 15 inches per second or 10,000 at 7½ inches per second (ips).

Step 2: Place the METER AND OUTPUT switch in the RECORD LEVEL position.

Step 3: Set the RECORD LEVEL knob to obtain a vu meter reading of approximately −10: Place PLAYBACK LEVEL control at 16 on the dial.

Step 4: Place the METER AND OUTPUT switch in the PLAYBACK position.

Step 5: Press the RECORD button (S804).

Step 6: With the nut driver rotate the adjustment nut on the left side of the record head (as the user faces the front of the equipment) to obtain a maximum VTVM reading. Several peaks will appear, but the maximum peak is obvious because it is much greater than the minor peaks. If all channels do not peak at the same point make an optimum adjustment.

CAUTION

The right hand nuts are factory set. Do not adjust them.

Overall Frequency Response and Equalizer Adjustment

To avoid tape saturation of the high frequency signals which might be caused by the record pre-emphasis, frequency response at tape speeds of 15 inches per second (ips) tape speed should be made at least 10 db below operating level (−2 dbm); at tape speeds of 3¾ and 7½ ips frequency response should be made at least 20 db below operating level (−12 dbm). The vu meter may be used for checking 15 ips response by turning up the PLAYBACK LEVEL control. However, for checking tape speeds of 7½ and 3¾ inches per second frequency response a vacuum tube volt meter (VTVM) connected across the output will be more accurate, since there is not enough playback gain to make a signal recorded 20 db below operating level read zero on the vu meter.

Step 1: Place the METER AND OUTPUT switch in the RECORD LEVEL position.

Step 2: At the desired tape speed, set the oscillator for 250 cycles and adjust RECORD LEVEL control to obtain a vtvm reading of −12 dbm. (.195 volts) for tape speeds of 7½ and 3¾ inches per second (ips) and −2 dbm (.62 volts) for tape speed of 15 inches per second.

Step 3: Place the METER AND OUTPUT switch in the PLAYBACK LEVEL position.

Step 4: Press the RECORD button (S804).

Step 5: Make a response check by sweeping the oscillator through the frequency range. Because there are variations among tapes of different manufacturers, the appropriate record equalizers may be adjusted to give the flattest possible response with the tape being used. The BIAS control may

also be used to vary the high frequency response, however, it should be remembered that the bias has much more effect at low speeds (3¾ and 7½ inches per second) than at the higher speeds. If bias is used to smooth out high frequency response at 15 inches per second, it may easily throw 7½ ips out of specification.

Record Noise Balance Adjustment

Step 1: Re-establish the reproduce (PLAYBACK LEVEL) volume control setting as described earlier in this section under *Reproduce Level Control Calibration.*

Step 2: Position the RECORD LEVEL knob at the zero calibration point.

Step 3: Disconnect any input. Place one channel at a time in the RECORD mode. DO NO attempt this adjustment with more than one channel in RECORD.

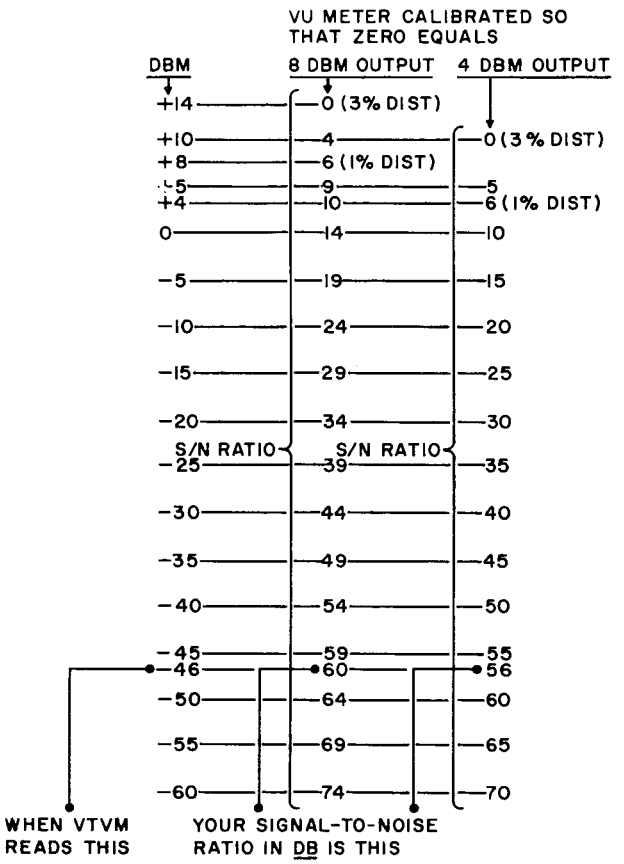
Step 4: Plug a set of earphones into the monitor jack and listen for the minimum noise location while adjusting the noise balance control.

NOTE

If the slot of the noise balance adjustment is more than 45 degrees from a line parallel to the plane of the face plate, troubleshooting is indicated. If the noise tends to null at either adjustment extreme, it indicates excessive leakage in capacitor 1C10, trouble in the oscillator circuitry or magnetized heads.

Record Noise Measurement

To translate vtvm readings into specific signal-to-noise ratios when the vu meter is so calibrated that zero vu corresponds to +8 dbm output, add 6 db to obtain the output value from the 3% distortion level, arriving at a total of 14 dbm. Having made this computation, bear in mind that, although the noise reading taken on the vtvm is dbm, the measurement is a *ratio* which must include the 14 dbm computed to arrive at the 3% distortion level. Therefore, the vtvm reading must be converted to the signal-to-noise *ratio.*



SIGNAL-TO-NOISE RATIO COMPUTATIONS

Example: +14 (dbm, includes +8 dbm output and 6 db up to 3% distortion level)
−46 (dbm, vtvm reading)
60 db signal-to-noise ratio (although the signs are different, the values are added to get a ratio)

Any reading below 60 db meets performance characteristics specifications and satisfies the signal-to-noise ratio definition.

When the vu meter is so calibrated that zero vu corresponds to +4 dbm output add 6 db to obtain the output value from the 3% distortion level arriving at a total of 10 dbm.

Example: +10 (dbm, 4+6)
−46 (dbm, vtvm reading)
56 (db, signal-to-noise ratio)

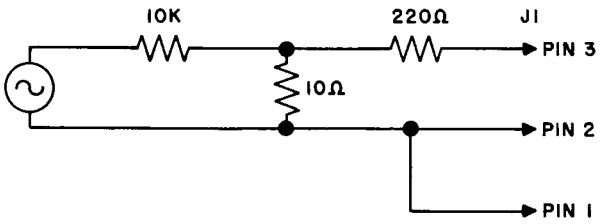
Ampex signal-to-noise ratio specifications on audio instruments define in decibels the ratio existing between the level of a steady 1000 cycle

tone, recorded at a level at which distortion produced by the approach of tape saturation equals 3% total rms, and that level of total rms noise, in the band from 30 to 15,000 cycles, which exists in reproduction under the same gain conditions.

Ampex audio instruments normally are calibrated so that the vu meter reads zero level when reproducing a steady 1000 cycle tone the level of which produces 1% total rms distortion, due to the approach of tape saturation.

A recorded 1000 cycle tone at the 3% distortion level will be 6 db higher in level than a recorded 1000 cycle tape at the 1% level.

Step 1: Place the METER AND OUTPUT switch in the RECORD LEVEL position.
Step 2: Set the oscillator to 400 cps.
Step 3: Adjust the RECORD LEVEL control to obtain a vtvm reading 6 db above operating level (+14 dbm for equipment with 8 dbm output).
Step 4: Record the 400 cps on a section of tape, noting where the recording begins for later reference.
Step 5: Disconnect the oscillator.
Step 6: Set the RECORD LEVEL control to zero.
Step 7: Rewind to the beginning of the 400 cps recording.
Step 8: Erase the tape by recording with zero signal.
Step 9: Rewind again to the beginning of the recording.
Step 10: Read the vtvm and check the reading against the table.



MICROPHONE RESPONSE SET-UP

Microphone Response

Connect an audio oscillator as shown in the illustration and make the response check by sweeping the oscillator through the frequency range to be checked.

MAINTENANCE AND TROUBLESHOOTING

General Maintenance Information

Faithful adherence to the recommended ROUTINE MAINTENANCE found in SECTION 5 TAPE TRANSPORT MECHANISM and careful performance checks will insure excellent equipment operation. When the cleaning, lubricating and demagnetizing procedures are followed as prescribed and the system is set up according to the instructions in this manual, equipment performance should meet the high Ampex standards.

Neglect of maintenance procedures, such as failure to clean the capstan, the head faces and the tape guides daily can cause deficiencies that are reflected in the amplifiers. For instance, poor tape-to-head contact, due to tape oxide accumulations, will diminish high end frequency response.

Rewinding or moving the tape in the fast forward mode with the head assembly gate closed eventually will wear grooves in the heads, causing a similar result.

Improper head azimuth adjustment will also affect high frequency response.

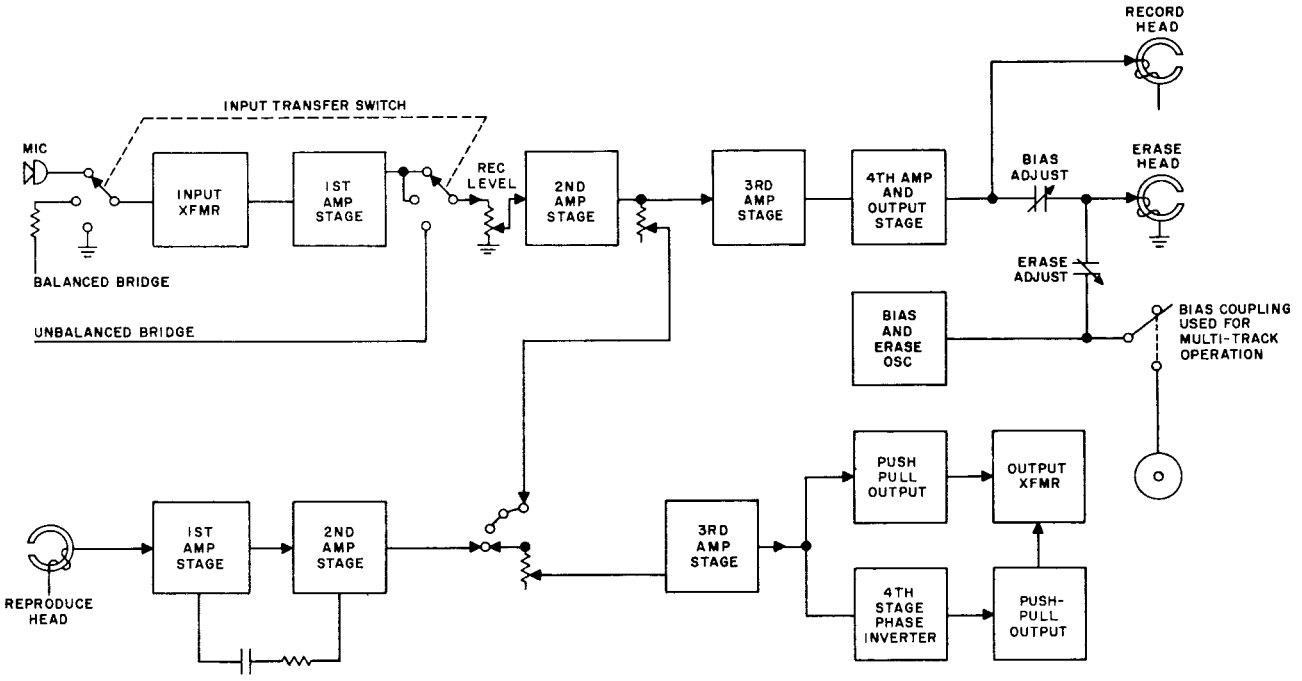
When the user suspects amplifier faults, the above information should be considered, and, if satisfied that the cause is in the amplifier, he then can begin troubleshooting.

Progressive Maintenance of the Amplifiers

Depending on equipment, check B+ voltage at junction of 3R55 and 3R58 and make a check of tube emission. Make sure tubes are returned to same socket. Check DC filament voltage to note aging of 6CB1. 3R60 may be reduced in value or shorted out as rectifier ages. Clean the relay contacts by inserting a piece of high quality bond paper between contacts and pulling it back and forth several times.

Corrective Maintenance

The first step in any corrective maintenance procedure is localizing the faulty circuit. If a tape recorded on the equipment itself does not reproduce correctly, the trouble can be in

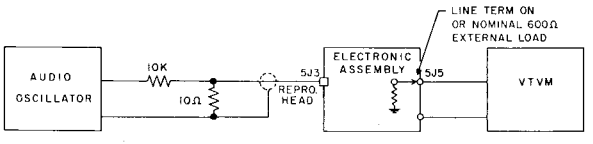


SYSTEM BLOCK DIAGRAM

either the record or the reproduce circuit. In this case, the faulty circuit can be identified by reproducing a standard alignment tape or a commercially recorded tape; if, while reproducing the standard tape, trouble still exists the fault is in the reproduce circuit, if the reproduce function is normal, the fault is in the record circuit. A run through of the alignment and performance checks for the offending circuit will further isolate the trouble or may rectify it, and the faulty component or mechanical device then should be identified easily.

Troubleshooting the Reproduce Amplifier

A circuit for troubleshooting the reproduce amplifier is shown below (see also, —PARTS LOCATION POWER SUPPLY AND REPRODUCE AMPLIFIER, and foldout SCHEMATIC DIAGRAM—ELECTRONIC ASSEMBLIES).

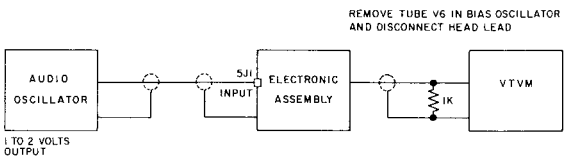


TROUBLESHOOTING THE REPRODUCE AMPLIFIER

Disconnect the head cable at 5J3 when using this circuit. Advance an audio oscillator probe progressively through each stage (checking at the grid and plate of each stage) until the point at which a signal is available at the output. The trouble then could be in the stage immediately preceding that point. When the faulty stage is located, the individual components can be isolated by a check of resistances and voltages. Typical voltage values are shown on the foldout schematic diagram. After the completion of any troubleshooting procedures, using the circuit shown above, check the reproduce amplifier response against the appropriate curve to insure that the equipment conforms to performance characteristics.

Troubleshooting the Record Amplifier

The circuit for troubleshooting the record amplifier is shown below (see also PARTS LO-



TROUBLESHOOTING THE RECORD AMPLIFIER

CATION RECORD AMPLIFIER, BIAS AND ERASE OSCILLATOR and foldout SCHEMATIC DIAGRAM—ELECTRONIC ASSEMBLIES).

Proceed as in troubleshooting the reproduce amplifier. Typical voltage readings are shown on the foldout schematic diagram. Using the circuit below, check the record amplifier against the appropriate response curve. Remove tube 1V6, and disconnect the record head lead before checking amplifier response.

Servicing and Repairing Printed Circuits

Because of the uniform wiring layout and translucent boards, printed circuits can be traced more easily than conventional circuits, troubleshooting is less difficult, and any qualified person will be able to service and repair the equipment including replacement of components by following the instructions, suggestions and procedures in this section. The translucency of the board makes locating connections and test points easier if a light bulb is placed underneath the circuit to be traced. Continuity checks and measurement of resistors, coils and some types of capacitors can be made at the component side of the etched board. Very small breaks in wiring can be located by means of a magnifying glass. The parts location illustrations and the schematic diagram in this section can be used to advantage when tracing circuitry, especially where tube sockets are concerned. Pin numbers are plainly marked.

Equipment and Tools Required

Diagonal cutters
Long-nosed pliers
Pocket knife
¼-inch nut driver
Solder pick
Small wire brush
Pencil soldering iron
60/40 resin core solder

Precautions

Be careful when removing components from the board to avoid damaging the components themselves or the copper foil wiring. If damage occurs, small breaks can be joined with solder, a new foil can be cut to simulate the damaged sections, and large breaks can be repaired with hook-up wire. When applying new foil, first remove all coatings such as flux, grease and wax from the damaged portion and place the adhesive side of the foil toward the board. With the tip of the smooth wedge-shaped soldering iron heat the new foil, sliding the tip slowly along the copper surface for about a minute to cure the bond.

Excessive pressure can crack the boards. Access to certain components may not be possible when the boards are in the chassis. To remove the board from the chassis, remove the four mounting nuts carefully. When disconnecting the edge-on harness connectors, make certain that the diagonal pliers grasping the individual connector will not strike and break an adjacent component. To prevent this type of damage, insert a screw driver or similar protective device between the diagonal pliers and the vulnerable component. A vise with protected jaws can be used to hold the boards while servicing. Avoid excessive pressure against the boards when using the vise.

Another source of damage can come from overheating during the soldering process. Excessive heat can cause breaks in the bond between the board and foil, necessitating costly repair of the foil connections. Use 60/40 resin core solder, the melting points of which is 375 degrees F. Some soldering irons are available with tip temperature of 650 degrees F., but the more skilled repair man can speed up the soldering process by using an iron with a tip temperature in the neighborhood of 750 degrees F.

Removing a Resistor

A convenient method of removing resistors is to clip the leads with cutters, leaving sufficient wire at each point so that wiring terminals remain. New components can be soldered to these remnant leads.

Replacing the Resistor

Make mechanical joints by wrapping a turn of each new resistor wire around the remnant wires left from the old component. Perform the soldering quickly and efficiently.

Solder Method of Removing and Replacing Components

On the wiring side of the board at the com-

ponent to be replaced, heat the connections with an iron until the solder melts. Quickly remove the iron and brush away the solder using the wire brush. Two or more heating passes may be required; but take special care to avoid excessive heat.

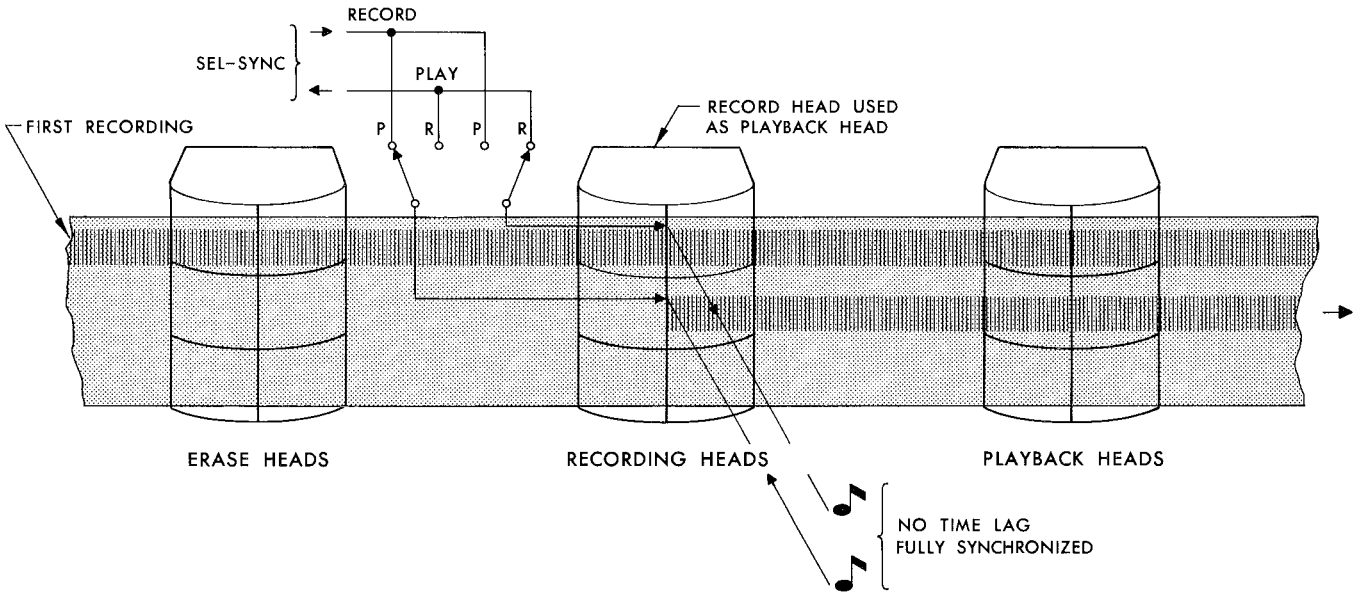
SEL-SYNC (SELECTIVE SYNCHRONISM)

Ampex Multi-Channel Recorders are available with a feature that makes it possible to add new material in complete synchronism with previous recordings at any time. This device, called Sel-Sync, has the facility of permitting multiple re-recording (sound-on-sound) of any or all channels. The carefully designed circuit transfer panel is connected in series with the head cables of a multi-channel recorder. This panel enables the record head of any channel to function as a playback head for that channel whenever it is desired to monitor a previously recorded track while a new recording is being made (in exact synchronism) on a different track. This means that this temporary "playback" head which is actually a record head is directly above or below the head used to record the new material, thus there is no *time lag* between what is played back and what is recorded.

When switching from the normal position to Sel-Sync, the record circuitry (both electronics and tape transport) are locked out.

Below is a simplified drawing showing Sel-Sync operation.

SEL-SYNC MAKES SYNCHRONIZATION EASY



MULTICHANNEL

MODEL 300-3 and 300-4

SEL-SYNC

(used with 351 Electronics)

PART DESCRIPTION	*AMPEX PART NUMBER*
THREE TRACK SEL-SYNC	30685-1
CHASSIS	30683-01
COVER	30739-02
KNOB	230-031
PANEL, Backing	30684-01
PANEL, Facing	30687-01
PLATE, Identification	11750-01
SHIELD	30787-01
SWITCH	20933-01
TRANSFORMER, Interstage	563-007
WASHER, Fiber	503-006
CAPACITOR, Ceramic; .005 uf, 1000V 20%	030-076
CONNECTOR, Receptacle; Male, 3 Contacts	143-008
CONNECTOR, Receptacle; Male, 2 Contacts	143-009
CONNECTOR, Receptacle; Female, 6 Contacts	146-004
CONNECTOR, Receptacle; Male, 6 Contacts	147-011
CABLE, Interconnecting; Tape Transport (Sel-Sync)	30853-01
CABLE, Interconnecting; Tape Transport (Sel-Sync)	30853-02
CABLE, Interconnecting; reproduce (playback) (Sel-Sync)	30745-01
CABLE, Interconnecting; reproduce (playback) (Sel-Sync)	30745-02
CABLE, Interconnecting; reproduce (playback) (Sel-Sync)	30745-03
CABLE, Interconnecting; record (Sel-Sync)	30008-12
CABLE, Interconnecting; record (Sel-Sync)	30008-13
CABLE, Interconnecting; record (Sel-Sync)	30008-14
CABLE, Interconnecting; Power (Sel-Sync)	30852-01
CABLE, Interconnecting; Bias (Sel-Sync)	14943-02 or -04
ADAPTOR TEE, Bias (Sel-Sync)	169-012
FOUR TRACK SEL-SYNC	30940-01
CHASSIS	30934-01
COVER	30739-02
KNOB	230-031
PANEL, Backing	30936-01
PANEL, Facing	30935-01
PLATE, Indentification	11750-01
SHIELD	30787-01
SWITCH	30933-01
CAPACITOR, Ceramic; .005 uf, 1000V, 20%	030-076
CONNECTOR, Receptacle; Male, 3 contacts	143-008
CONNECTOR, Receptacle; Male, 2 contacts	143-009
CONNECTOR, Receptacle; Female, 6 contacts	146-004
CONNECTOR, Receptacle; Female, 18 contacts	147-011
CABLE, Interconnecting; Tape Transport (Sel-Sync)	30853-05
CABLE, Interconnecting; Tape Transport (Sel-Sync)	30853-06
CABLE, Interconnecting; Tape Transport (Sel-Sync)	30853-07
CABLE, Interconnecting; Tape Transport (Sel-Sync)	30853-08
CABLE, Interconnecting; reproduce (playback) (Sel-Sync)	31069-02
CABLE, Interconnecting; reproduce (playback) (Sel-Sync)	31069-03
CABLE, Interconnecting; reproduce (playback) (Sel-Sync)	31069-04
CABLE, Interconnecting; reproduce (playback) (Sel-Sync)	31069-05
CABLE, Interconnecting; record (Sel-Sync)	31070-01
CABLE, Interconnecting; record (Sel-Sync)	31070-03
CABLE, Interconnecting; record (Sel-Sync)	31070-04
CABLE, Interconnecting; record (Sel-Sync)	31070-05

MULTICHANNEL

MODEL 300-3 and 300-4

SEL-SYNC

(used with 351 Electronics)

(continued)

PART DESCRIPTION	*AMPEX PART NUMBER*
THREE TRACK SEL-SYNC	
CABLE, Extension erase (Sel-Sync)	30825-06
CABLE, Extension erase (Sel-Sync)	30825-07
CABLE, Extension erase (Sel-Sync)	30825-08
CABLE, Extension erase (Sel-Sync)	30825-09
CABLE, Interconnecting; Power (Sel-Sync)	30852-01
CABLE, Interconnecting; Bias (Sel-Sync)	14943-02 or -04
CABLE, Interconnecting; Bias (Sel-Sync)	14943-03
ADAPTOR TEE; Bias (Sel-Sync)	169-012

ELECTRONIC ASSEMBLY PARTS LIST
MULTICHANNEL MODEL 300-2, 300-3, AND 300-4
CATALOG NUMBER 30960-05 AND 30960-06

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1C1	CAPACITOR, fixed: paper, .15 uf ±20%, 400 vdcw; Cornell Dubilier Part No. BC4P15 ±20%	035-205
1C2	CAPACITOR: electrolytic -- 10 uf, 450 volt; 20 uf, 450 volt; 10 uf, 350 volt --	30770-01
1C3	CAPACITOR, fixed: ceramic, .02 uf +80% -20%, 500 vdcw, Sprague Part No. 36C205	030-059
1C4	Same as 1C3	030-059
1C5	Same as 1C3	030-059
1C8	CAPACITOR, paper: tubular, .1 mfd, +10%, 400 vdcw; MIL-C-25: CPO5A3EE104K	035-067
1C9	Same as 1C3	030-059
1C10	CAPACITOR, fixed: paper, .47 uf ±20%, 400 vdcw; Cornell Dubilier Part No. BC4P47 ±20%	035-206
5C13	CAPACITOR, variable: mica, 15-130 mmfd, 175 vdcw; El Menco Part No. 302 (type 30)	038-002
2C14	Same as 1C3	030-059
2C15	CAPACITOR, fixed: mica, 750 uuf ±5%, 500 vdcw; El Menco Part No. CM20C751J	034-144
3C16	CAPACITOR, electrolytic -- 15 uf, 350 volt; 15 uf, 350 volt; 75 uf, 450 volt; 20 uf, 450 volt --	30769-02
2C17	CAPACITOR, paper: tubular, .15 mfd, ±20%, 400 vdcw; Sprague Part No. 89P15404	035-205
2C18	Same as 1C3	030-059
2C19	Same as 1C3	030-059
2C20	CAPACITOR, fixed: ceramic, 150 uuf, ±20%, 500 vdcw; Sprague Part No. 40C218	030-046
2C21	Same as 1C3	030-059
2C22	CAPACITOR, ceramic: disc, .1 mfd, +80 -20%, 50 vdcw; Sprague Part No. 33641	030-063
4C23	CAPACITOR, fixed: ceramic, 2X .001 uf, 500 vdcw; Erie Part No. 812-.001	030-004
5C24	CAPACITOR, paper: tubular, .0047 mfd, ±20%, 600 vdcw; Sprague Part No. 73P47206	035-028
5C25	Same as 5C24	035-028
3C26	CAPACITOR, fixed: electrolytic, 20 uf, 450 vdcw; Cornell Dubilier Part No. BR10422	031-144
3C27	Same as 1C3	030-059
3C28	CAPACITOR: electrolytic, 4000 uf, 15 volt	30769-01
3C29	CAPACITOR, fixed: ceramic, .01 uf, ±20%, 1000 vdcw; Sprague Part No. 33C35A	030-045
3C30	Same as 3C29	030-045
1C32	CAPACITOR, mica: axial, .00035 mfd, ±1% 500 vdcw; Cornell Dubilier Part No. 5A5T35	034-169
4C40	CAPACITOR, variable: mica, 100-550 mmfd, 175 vdcw; El Menco Part No. Type 30	038-009
5C33	CAPACITOR, variable: mica, 275-970 mmfd, 175 vdcw; El Menco Part No. 306 (type 30)	038-003
5C34	CAPACITOR, mica: axial, .00082 mfd, ±5%, 300 vdcw; MIL-C-5A: CM20C821J	034-016
1C35	Same as 1C32	034-169
1C36	CAPACITOR, fixed: mica, .001 uf ±5%, 500 vdcw; Cornell Dubilier Part No. SAT535	034-147
4C37	CAPACITOR, fixed: ceramic, .01 uf, 500 vdcw; Erie Part No. 811-01	030-002

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
5C39	CAPACITOR, mica: axial, .000033 mfd ±5%, 500 vdcw; Cornell Dubilier Part No. 22A5Q33	034-168
4C41	Same as 4C40	038-009
4C42	CAPACITOR, paper: tubular, .0051 mfd, ±5%, 400 vdcw; Sprague Part No. 109P512J4	035-283
4C43	CAPACITOR, electrolytic: tubular, 10 mfd, -10+150% 150 vdcw; Cornell Dubilier Part No. BBR-10-150	031-157
4C44	CAPACITOR, variable: mica, 450-1390 mmfd, 350 vdcw; El Menco Part No. 308	038-014
4C45	CAPACITOR, paper: tubular, .012 mfd, ±5%, 200 vdcw; Sprague Part No. 109P12552	035-246
4C47	CAPACITOR, variable: mica, 550-1600 mmfd, 250 vdcw; El Menco Part No. 309	038-015
4C48	CAPACITOR, mica: axial, .00068 mfd, ±5%, 500 vdcw; MIL-C-5A: CM25D681J	034-013
6CR1	RECTIFIER, selenium; single phase, center tap, 26 volt ac rms max. in -- 1.25 amp dc max. out; General Electric Part No. 6RS5WH5	581-001
4CR2	RECTIFIER, selenium; half wave, max input 90V. ac; 4 cell, as rms max. in -- .025 amp dc max. out; General Electric Part No. 6RS20PH4RAD1	582-031
5F1	FUSE, 1/2 amp; 250 volt, slow blow; little fuse; Littlefuse Part No. 313.500	070-026
4I1	POST LIGHT, 1/4 watt neon without internal resistor; Drake Mfg. Part No. 105	132-003
5J1	CONNECTOR, receptacle; female, 3 contact; Cannon Part No. XL-3-13	146-007
5J2	CONNECTOR, receptacle; male, 2 contact; AN3102A-10SL-4P	143-009
5J3	CONNECTOR, receptacle; male, 3 contact; AN3102A-10S-3P	143-008
5J4	PHONE JACK, open circuit type, 2 conductor; Switchcraft Part No. 11	148-015
5J5	CONNECTOR, receptacle; male, 3 contact; Cannon Part No. XL-3-14	147-004
4J6	Same as 5J4	148-015
5J7	CONNECTOR, receptacle; male, 6 contact; Jones Part No. P-306AB	147-011
5J9	CONNECTOR, receptacle; female, 1 contact; Amphenol Part No. 83-1R	146-067
5J10	CONNECTOR, receptacle; male, 1 contact; AN3102A-105-2P	143-010
3K1	RELAY, record: 115V dc coil	30763-01
4K2	RELAY, concurrent record; 115V dc coil	020-066
4K3	RELAY, bias lock; 115V dc coil	020-066
4M1	METER, vu: frosted lamps 6.3 volt, .3 amp	30667-01
4R1	RESISTOR, fixed: carbon, .1 meg ohm ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF104K	041-072
4R2	RESISTOR, fixed: carbon, 100 ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF101K	041-038
4R3	Same as 4R2	041-038
4R4	RESISTOR, fixed: carbon, 20K ohms, ±5%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF202J	041-356
4R5	RESISTOR, fixed: carbon, 82K ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF823K	041-071
1R6	RESISTOR, fixed: film, .1 meg ±1%, $\frac{1}{2}$ watt; Electra Part No. Type DC-$\frac{1}{2}$	042-092
1R7	RESISTOR, fixed: film, 2700 ohm, $\frac{1}{2}$ watt, 10%, MIL-R-10509A, RN15R2701F	042-123

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1R8	RESISTOR, fixed: carbon, 1 meg, $\frac{1}{2}$ watt; MIL-R-11A, RC20GF105K	041-031
4R9	RESISTOR, variable: carbon, .1 meg, 2 watts; Allen Bradley Part No. JA1041	044-015
1R10	RESISTOR, fixed: carbon, .1 meg, $\frac{1}{2}$ watt; MIL-R-11A, RC20GF104K	041-072
1R11	RESISTOR, fixed: carbon, 3.3K ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF332K	041-054
4R12	RESISTOR, variable: carbon, .25 meg, 1/4 watt, 20%; CTC Part No. Type PM-45	044-179
1R13	RESISTOR, fixed: carbon, 27K ohms, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF273K	041-065
1R14	RESISTOR, fixed: carbon, .33 meg, $\frac{1}{2}$ watt; MIL-R-11A, RC20GF334K	041-078
1R15	Same as 1R8	041-031
1R16	RESISTOR, fixed: carbon, 1500 ohms, $\frac{1}{2}$ watt; MIL-R-11A, RC20GF152K	041-050
1R17	RESISTOR, fixed: carbon, 47K ohms, ±5%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF473J	041-020
1R18	RESISTOR, fixed: carbon, .12 meg, $\frac{1}{2}$ watt, 5%; MIL-R-11A, RC20GF124J	041-318
1R19	RESISTOR, fixed: carbon, 22K ohm, 1 watt, 10%; MIL-R-11A, RC32GF223K124J	041-162
1R20	Same as 1R8	041-031
1R21	RESISTOR, fixed: carbon, 220 ohms, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF221K	041-040
1R22	RESISTOR, fixed: carbon, 2.2K ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF222K	041-052
1R23	RESISTOR, fixed: carbon, 8200 ohms, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF822K	041-059
5R24	RESISTOR, variable: wirewound, 500 ohm, 2 watts, 20%; Claro Part No. 39-500	044-178
2R25	RESISTOR, fixed: carbon, .33 meg ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF334K	041-078
2R26	RESISTOR, fixed: carbon, .47 meg, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF474K	041-080
2R27	RESISTOR, fixed: film, .33 meg ±1%, $\frac{1}{2}$ watt; Electra Part No. Type DC-$\frac{1}{2}$	042-100
2R28	RESISTOR, fixed: film, 1500 ohm, $\frac{1}{2}$ watt, 1%; Electra Part No. DC-$\frac{1}{2}$	042-076
2R29	RESISTOR, fixed: carbon, 8.2 meg ohm, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF825K	041-381
2R31	RESISTOR, fixed: film, 68K ohm, $\frac{1}{2}$ watt, 1%; Electra Part No. Type DC-$\frac{1}{2}$	042-088
3R32	RESISTOR, fixed: carbon, 39K ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF393K	041-067
2R33	RESISTOR, fixed: carbon, 10 meg ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF106K	041-090
2R34	RESISTOR, fixed: carbon, .22 meg, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF224K	041-076
3R35	Same as 1R13	041-065
4R36	RESISTOR, variable: carbon, .25 meg, 2 watts, 10%; Allen Bradley Part No. CA2541, SK3056	044-128
2R37	Same as 1R8	041-031
2R38	Same as 1R16	041-050
2R39	Same as 1R8	041-031
2R40	RESISTOR, fixed carbon, 82K ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF823K	041-071

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
2R41	Same as 1R16	041-050
2R42	Same as 2R34	041-076
2R43	Same as 2R34	041-076
2R44	Same as 1R8	041-031
2R45	Same as 1R8	041-031
2R46	RESISTOR, fixed: carbon, 1K ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF102K	041-048
2R47	RESISTOR, fixed: carbon, 15k ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC206F	041-062
5R48	RESISTOR, fixed: carbon, 560 ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF561K	041-045
2R49	Same as 3R32	041-067
6R50	RESISTOR, fixed: carbon, 1.5K ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF152K	041-050
6R51	RESISTOR, fixed: carbon, 4.7K ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF472J	041-013
6R52	RESISTOR, fixed: carbon, 8.2K ohm, $\frac{1}{2}$ watt, 5%; MIL-R-11A, RC20GF822J	041-309
6R53	RESISTOR, fixed: carbon, 820 ohm, $\frac{1}{2}$ watt, 5%; MIL-R-11A, RC20GF821J	041-317
3R54	RESISTOR, fixed: carbon, 1.5K ohm, 1 watt, 10%; MIL-R-11A, RC32GF152K	041-148
3R55	Same as 3R54	041-148
3R56	Same as 4R2	041-038
3R57	Same as 4R2	041-038
3R58	RESISTOR, fixed: carbon, 15K ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF153K	041-062
1R59	RESISTOR, fixed: carbon, 1.5K ohm, 2 watts, 10%; MIL-R-11A, RC42GF152K	041-204
3R60	RESISTOR, fixed: wirewound, 1.5 ohm, 1 watt, 10%; IRC Type BW-1	043-286
1R61	RESISTOR, fixed: carbon, 4.7K ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF472K	041-056
1R62	Same as 1R61	041-056
1R63	RESISTOR, variable: carbon, 10K ohm, 044-171, 1/4 watt, 30%, Chicago Telephone Supply Part No. UPM-45 SPEC3471	044-171
1R64	RESISTOR, fixed: carbon, 8.2 ohm, 1 watt, 5%; MIL-R-11A, RC32GF825j	041-319
1R65	Same as 2R34	041-076
4R67	RESISTOR, fixed: carbon, 12K ohms, ±5%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF123J	041-420
4R69	RESISTOR, variable; carbon, .1 meg, 2/10 watt, 20%; Chicago Telephone Supply Type 70 (LT)	044-186
4R70	RESISTOR, fixed: carbon, .220 ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF221K	041-040
4R71	RESISTOR, fixed: carbon, 15K ohms, ±5%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF153J	041-254
4R72	RESISTOR, fixed: carbon, 4700 ohm, $\frac{1}{2}$ watt, 10%; MIL-R-11A, RC20GF472K	041-056
4R73	RESISTOR, fixed: carbon, .22 meg ohms, ±10%; 2 watts; MIL-R-11: RC20GF224K	042-228
2R75	RESISTOR, fixed: carbon, .68 meg ohms, ±10%, $\frac{1}{2}$ watt; MIL-R-11: RC20GF684K	041-082
4R76	Same as 4R72	041-056
4S1	SWITCH, rotary: INPUT TRANSFER, 3 position	30760-01
4S2	SWITCH, rotary: EQUALIZATION, 3 position	30891-01
4S3	SWITCH, rotary: METER AND OUTPUT, 4 position	30762-01
5S4	SWITCH, rotary: LINE TERM, 3P4T; Oak Part No. 590p6-23	122-016
4S5	SWITCH, toggle: POWER, SPST; Carling Part No. 110-B-73	120-005

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
4S6	SWITCH, rotary: RECORD, pushbutton SPST, normally open; Arrow H and H Part No. 3391BSA	120-013
6T1	TRANSFORMER, microphone input	17331-01
5T2	TRANSFORMER, input	6299-01
	Low Impedance Heads Only	
6T3	TRANSFORMER, output	30633-01
6T4	TRANSFORMER, power	30634-01
1T5	TRANSFORMER, oscillator	30766-01
1V1	TUBE, electron: 12AX7, miniature, 9 pin; Telefunken Part Number	012-024
1V2	TUBE, electron: 12AT7, miniature, 9 pin; RCA Part Number	012-034
2V3	Same as 1V1	012-024
2V4	Same as 1V1	012-024
2V5	TUBE, electron: 12AU7, miniature, 9 pin; RCA Part Number	012-107
1V6	Same as 2V5	012-107
3V7	Same as 2V5	012-107
	*BOARD ASSEMBLY, power supply	30754-01
	*BOARD ASSEMBLY, record: $7\frac{1}{2}$-15 ips	30963-03
	*BOARD ASSEMBLY, reproduce: $7\frac{1}{2}$-15 ips	30962-03
	FACING PANEL	5711-03
	HARNESS ASSEMBLY	30966-03
	KNOB, large, skirted: Reproduce & Record Level Control	230-004
	KNOB, small, skirted: Equalization and Output	230-003
	KNOB, small with pointer: Input and Line Termination	230-008
	POST, fuse: F1 and F2	085-001
	NUT, sleeve, sub chassis mount	21078-01
	SHIELD, tube, for all except V7	160-012
	SHIELD, tube: V7	160-043
	SHOCKMOUNT	350-015
	SOCKET, tube: 7 pin	150-067
	SOCKET, tube: 9 pin	30818-01
	EQUALIZER BRACKET ASSEMBLY (COMPLETE)	30920-02
	KNOB ASSEMBLY: editing	1917-00
	KNOB ASSEMBLY: holddown (for 1/4-inch and $\frac{1}{2}$-inch machines)	9093-00
	KNOB ASSEMBLY: holddown (for 1-inch machines)	5881-00
	REEL ADAPTOR	973-00
	CABLE ASSEMBLY, power interconnecting (300-2)	30821-01
	CABLE ASSEMBLY, bias (300-3)	14943-04
	CABLE ASSEMBLY, bias (300-4)	14943-03
	CABLE ASSEMBLY, bias (300-2)	14943-02
	CABLE ASSEMBLY, power interconnecting(300-3)	30851-01
	CORD SET	084-005
	ADAPTOR TEE: coax	169-012
	PANEL, backing (7 inch)	6962-00
	PANEL, facing (7 inch)	6963-00
	PANEL, backing	30828-01
	PANEL, facing	30829-01
	CONNECTOR, plug: female, 3 contact; Cannon Part No. XL-3-11	144-003
	CONNECTOR, plug: male, 3 contact; Cannon Part No. XL-3-12	145-009
	SPACER, base plate head assembly	5888-00
	BASE, editing knob assembly	1916-00

ELECTRONIC ASSEMBLY PARTS LIST
MULTICHANNEL MODEL 300-2, 300-3 AND 300-4
CATALOG NUMBER 30750-09 AND 30750-10

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1C1	CAPACITOR, **fixed:** paper, .15 uf ± 20%, 400 vdcw; Cornell Dubilier Part No. BC4P15 ± 20%	035-205
1C2	CAPACITOR: electrolytic -- 10 uf, 450 volt; 20 uf, 450 volt; 10 uf, 350 volt --	30770-01
1C3	CAPACITOR, **fixed:** ceramic, .02 uf +80% -20%, 500 vdcw, Sprague Part No. 36C205	030-059
1C4	Same as C3	
1C5	Same as C3	
1C6	CAPACITOR, **fixed:** paper, .0047 uf ± 5%, 400 vdcw; Cornell Dubilier Part No. ST4D47	035-026
1C8	CAPACITOR, **fixed:** paper, .02 uf ± 5%, 400 vdcw; Cornell Dubilier Part No. Type PJ	035-020
1C9	Same as C3	
1C10	CAPACITOR, **fixed:** paper, .47 uf ± 20%, 400 vdcw; Cornell Dubilier Part No. BC4P47 ± 20%	035-206
1C11	Same as C6 (.0047)	
1C11	CAPACITOR, **fixed:** paper, .0082 uf ±5%, 200 vdcw; Cornell Dubilier Part No. 109P	035-030
1C12	CAPACITOR, **fixed:** paper, .0022 uf ± 5%, 400 vdcw; Sprague Part No. 109P22254	035-204
5C13	CAPACITOR, variable: mica, 15-130 uuf, 175 vdcw; El Menco Part No. 302 (type 30)	038-005
2C14	Same as C3	
2C15	CAPACITOR, fixed: mica, 750 uuf ± 5%, 500 vdcw; El Menco Part No. CM20C751J	034-144
3C16	CAPACITOR, electrolytic -- 15 uf, 350 volt; 15 uf, 350 volt; 75 uf, 450 volt; 20 uf, 450 volt--	30769-02
2C17	CAPACITOR, fixed: paper, .1 uf ± 20%, 400 vdcw; CDST4P1 (20%)	035-069
2C18	Same as C3	
2C19	Same as C3	
2C20	CAPACITOR, fixed: ceramic, 150 uuf, ± 20%, 500 vdcw; Sprague Part No. 40C218	030-046
2C21	Same as C3	
2C22	CAPACITOR, fixed: ceramic, .05 uf +80% -20%, 500 vdcw; Sprague Part No. 5HK-S5	030-031
4C23	CAPACITOR, Fixed: ceramic, 2X .001 uf, 500 vdcw; Erie Part No. 812-.001	030-004
5C24	CAPACITOR, fixed: ceramic, .0047 uf, ± 2%, 500 vdcw; JAN-C-20A: CC36CH470G	030-028
5C25	Same as C24	
3C26	CAPACITOR, fixed: electrolytic, 20 uf, 450 vdcw; Cornell Dubilier Part No. BR10422	031-144
3C27	Same as C3	
3C28	CAPACITOR: electrolytic, 4000 uf, 15 volt	30769-01
3C29	CAPACITOR, fixed: ceramic, .01 uf, ± 20%, 1000 vdcw; Sprague Part No. 33C35A	030-045

When ordering replacement parts always include the following information: Equipment Type; Equipment Serial Number; Ampex Part or Catalog Number; and Description of Part. DO NOT simply use the schematic reference number.

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
3C30	Same as C29	
5C32	CAPACITOR, fixed: mica, 820 uuf, ± 5%, 300 vdcw; MIL-C-5A: CM20B821J	034-016
4C40	CAPACITOR, variable; mica, 275-970 uuf, 175 vdcw; El Menco: 306 Type 30	038-003
1C34	CAPACITOR, fixed: mica, 350 uuf 1%, 50 vdcw; Cornell Dubilier Part No. SA5T35	034-169
1C35	Same as 1C34	
1C36	CAPACITOR, fixed: mica, .001 uf ± 5%, 500 vdcw; Cornell Dubilier Part No. SAT535	034-147
4C37	CAPACITOR, fixed: ceramic, .01 uf, 500 vdcw; Erie Part No. 811-01	030-002
4C41	CAPACITOR, variable: mica, 450 -1390 uufd, 350 vdcw; El Menco: 308	038-014
4C42	CAPACITOR, paper: tubular, .012 mfd, 200 vdcw; Sprague Part No. 65p18352	035-246
4C43	CAPACITOR, electrolytic: tubular, 10 mfd, -10 +150%, 150 vdcw; Cornell Dubilier Part No. BBR-10-150	031-157
4C44	Same as 4C41	
4C45	Same as 4C42	
6CR1	RECTIFIER, selenium; single phase, center tap, 26 volt ac rms max. in -- 1.26 amp dc max. out; General Electric Part No. 6RS5WH5	581-001
4CR2	RECTIFIER, selenium; half wave, Max input 90V. ac; 4 cell, as rms max. in -- .025 amp dc max. out; General Electric Part No. 6RS20PH4RAD1	582-031
5F1	FUSE; 1/2 amp; 250 volt, slow blow; little fuse Littlefuse Part No. 313.500	070-026
4I1	POST LIGHT, 1/4 watt neon without internal resister; Drake Mfg. Part No. 105	132-003
5J1	CONNECTOR, receptacle; female, 3 contact; Cannon Part No. XL-3-13	146-007
5J2	CONNECTOR, receptacle; male, 2 contact; AN3102A-10SL-4P	143-009
5J3	CONNECTOR, receptacle; male, 3 contact; AN3102A-10S-3P	143-008
5J4	PHONE JACK, open circuit type, 2 conductor; Switchcraft Part No. 11	148-015
5J5	CONNECTOR, receptacle; male, 3 contact; Cannon Part No. XL-3-14	147-004
4J6	Same as 5J4	
5J7	CONNECTOR, receptacle; male, 6 contact; Jones Part No. P-306AB	147-011
5J9	CONNECTOR, receptacle; female, 1 contact; Amphenol Part No. 83-1R	146-067
5J10	CONNECTOR, receptacle; male, 1 contact; AN3102A-105-2P	143-010
3K1	RELAY, record: 115 V dc coil	30763-01
4K2	RELAY, concurrent record; 115 V dc coil	020-066
4K3	RELAY, bias lock; 115 V dc coil	020-066
1L1	CHOKE, rf; 20 mh, 125 ma	30767-01

When ordering replacement parts always include the following information: Equipment Type; Equipment Serial Number; Ampex Part or Catalog Number; and Description of Part. DO NOT simply use the schematic reference number.

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
4M1	METER, vu: frosted lamps 6.3 volt, .3 amp	30667-01
4R1	RESISTOR, fixed: carbon, .15 meg, 1/2 watt; MIL-R-11A, RC20GF154K	041-074
4R2	RESISTOR, fixed: carbon, 100 ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF101K	041-038
4R3	Same as R2	
4R4	RESISTOR, fixed: carbon, 33K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF333K	041-066
4R5	RESISTOR, fixed: carbon, .12 meg, 1/2 watt, 10%; MIL-R-11A, RC20GF124K	041-073
1R6	RESISTOR, fixed: film, .1 meg ± 1%, 1/2 watt; Electra Part No. Type DC-1/2	042-092
1R7	RESISTOR, fixed: film, 2700 ohm, 1/2 watt, 10%; MIL-R-10509A, RN15R2701F	042-123
1R8	RESISTOR, fixed: carbon, 1 meg, 1/2 watt; MIL-R-11A, RC20GF105K	041-031
4R9	RESISTOR, variable: carbon, .1 meg, 2 watts; Allen Bradley Part No. JA1041	044-015
1R10	RESISTOR, fixed: carbon, .1 meg, 1/2 watt; MIL-R-11A, RC20GF104K	041-072
1R11	RESISTOR, fixed: carbon, 4700 ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF472K	041-056
4R12	RESISTOR, variable: carbon, .25 meg, 1/4 watt, 20%; CTC Part No. type PM-45	044-179
1R13	RESISTOR, fixed: carbon, 27K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF273K	041-065
1R14	RESISTOR, fixed: carbon, .33 meg, 1/2 watt; MIL-R-11A, RC20GF334K	041-078
1R15	Same as R8	
1R16	RESISTOR, fixed: carbon, 1500 ohm, 1/2 watt; MIL-R-11A, RC20GF152K	041-050
1R17	RESISTOR, fixed: carbon, 22K ohm, 1/2 watt, 5%; MIL-R-11A, RC20GF223J	041-016
1R18	RESISTOR, fixed: carbon, .12 meg, 1/2 watt, 5%; MIL-R-11A, RC20GF124J	041-318
1R19	RESISTOR, fixed: carbon, 22K ohm, 1 watt, 10%; MIL-R-11A, RC32GF223K124J	041-162
1R20	Same as R8	
1R21	RESISTOR, fixed: carbon, 220 ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF221K	041-040
1R22	RESISTOR, fixed: carbon, 3700 ohm, 1/2 watt, 5%; MIL-R-11A, RC20GF272J	041-278
1R23	RESISTOR, fixed: carbon, 8200 ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF8 22K	041-059
5R24	RESISTOR, variable: wirewound, 500 ohm, 2 watts, 20%; Claro Part No. 39-500	044-178
2R25	RESISTOR, fixed: carbon, .33 meg, 1/4 watt, 10%; Allen Bradley Part No. Type CB	041-325
2R25	RESISTOR, fixed: carbon, .47 meg, 1/2 watt, 10%; MIL-R-11A, RC20GF474K (Low impedance heads)	041-080
2R26	RESISTOR, fixed: carbon, .47 meg, 1/2 watt, 10%; MIL-R-11A, RC20GF474K	041-080

When ordering replacement parts always include the following information: Equipment Type; Equipment Serial Number; Ampex Part or Catalog Number; and Description of Part. DO NOT simply use the schematic reference number.

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
2R27	RESISTOR, fixed: film, .33 meg ± 1%, 1/2 watt; Electra Part No. Type DC-1/2	042-100
2R28	RESISTOR, fixed: film: 1500 ohm, 1/2 watt, 1%; Electra Part No. DC-1/2	042-076
2R29	RESISTOR, fixed: film, 10 meg, 1/2 watt, 10%; MIL-R-11 RC20GF106K	041-090
2R31	RESISTOR, fixed: film, 68K ohm, 1/2 watt, 1%; Electra Part No. Type DC-1/2	042-088
3R32	RESISTOR, fixed: carbon, 39K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF393K	041-067
2R33	Same as R29	
2R34	RESISTOR, fixed: carbon, .22 meg, 1/2 watt, 10%; MIL-R-11A, RC20GF224K	041-076
3R35	Same as R13	
4R36	RESISTOR, variable: carbon, .25 meg, 2 watts, 10%; Allen Bradley Part No. CA2541, SD3056	044-128
2R37	Same as R8	
2R38	Same as R16	
2R39	Same as R8	
2R40	RESISTOR, fixed carbon, 82K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF823K	041-071
2R41	Same as R16	
2R42	Same as R34	
2R43	Same as R34	
2R44	Same as R8	
2R45	Same as R8	
2R46	RESISTOR, fixed: carbon, 1K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF102K	041-048
2R47	Same as R13	
5R48	RESISTOR, fixed: carbon, 560 ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF561K	041-045
2R49	Same as R32	
6R50	RESISTOR, fixed: carbon, 1.5K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF152K	041-050
6R51	RESISTOR, fixed: carbon, 4.7K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF472J	041-013
6R52	RESISTOR, fixed: carbon, 8.2K ohm, 1/2 watt, 5%; MIL-R-11A, RC20GF822J	041-309
6R53	RESISTOR, fixed: carbon, 820 ohm, 1/2 watt, 5%; MIL-R-11A, RC20GF821J	041-317
3R54	RESISTOR, fixed: carbon, 1.5K ohm, 1 watt, 10%; MIL-R-11A, RC32GF152K	041-148
3R55	Same as R54	
3R56	Same as R2	041-055
3R57	Same as R2	
3R58	RESISTOR, fixed: carbon, 15K ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF153K	041-062
1R59	RESISTOR, fixed: carbon, 1.5K ohm, 2 watts, 10%; MIL-R-11A, RC42GF152K	041-204
3R60	RESISTOR, fixed: wirewound, 1.5 ohm, 1 watt, 10%; IRC Type BW-1	043-286
1R61	Same as R11	
1R62	Same as R11	

When ordering replacement parts always include the following information: Equipment Type; Equipment Serial Number; Ampex Part or Catalog Number; and Description of Part. DO NOT simply use the schematic reference number.

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1R63	RESISTOR, variable: carbon, 10K ohm, 044-171, 1/4 watt, 30%, Chicago Telephone Supply Part No. UPM-45 SPEC3471	044-171
1R64	RESISTOR, fixed: carbon, 8.2 ohm, 1 watt, 5%; MIL-R-11A, RC32GF825J	041-319
1R65	Same as R34	
4R66	RESISTOR, variable: carbon, 10K ohm, 2/10 watt, 20%; Chicago Telephone Supply Type 70 (LT)	044-187
4R67	RESISTOR, fixed: carbon, 1200 ohm, 1/2 watt, 1%; MIL-R-10509A, RN15R1201F	042-126
4R68	RESISTOR, fixed: carbon, 750 ohm, 1/2 watt, 5%; MIL-R-11A, RC20GF751J	041-007
4R69	RESISTOR, variable: carbon, .1 meg, 2/10 watt, 20%; Chicago Telephone Supply Type 70 (LT)	044-186
4R70	RESISTOR, fixed: carbon, .220 ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF221K	041-040
4R71	RESISTOR, fixed: carbon, 20K ohm, 1/2 watt, 5%; MIL-R-11A, RC20GF202J	041-356
4R72	RESISTOR, fixed: carbon, 4700 ohm, 1/2 watt, 10%; MIL-R-11A, RC20GF472K	041-056
4R73	RESISTOR, fixed: carbon, 7500 ohm, 1/2 watt, 5%; MIL-R-11A, RC20GF752J	041-361
4S1	SWITCH, rotary: INPUT TRANSFER, 3 position	30760-01
4S2	SWITCH, rotary: EQUALIZATION, 3 position	30891-01
4S3	SWITCH, rotary: METER AND OUTPUT, 4 position	30762-01
5S4	SWITCH, rotary: LINE TERM, 3P4T; Oak Part No. 590p6-23	122-016
4S5	SWITCH, toggle: POWER, SPST; Carling Part No. 110-B-73	120-005
4S6	SWITCH, rotary: RECORD, pushbutton SPST, normally open; Arrow H and H Part No. 3391BSA	120-013
6T1	TRANSFORMER, microphone input	17331-01
5T2	TRANSFORMER, input Low Impedance Heads Only	6299
6T3	TRANSFORMER, output	30633-01
6T4	TRANSFORMER, power	30634-01
1T5	TRANSFORMER, oscillator	30766-01
1V1	TUBE, electron: 12AX7	012-105
1V2	TUBE, electron: 12AT7	012-034
2V3	Same as V1	
2V4	Same as V1	
2V5	TUBE, electron: 12AU7	012-107
1V6	Same as V5	
3V7	TUBE, electron: 6X4	012-050
	*BOARD ASSEMBLY, power supply	30754-01
	*BOARD ASSEMBLY, record: 7-1/2-15 ips	30755-03
	*BOARD ASSEMBLY, reproduce: 7-1/2-15 ips	30756-03
	FACING PANEL	5711-03
	HARNESS ASSEMBLY	30819-03
	KNOB, large, skirted: Reproduce and Record Level Control	230-004
	KNOB, small, skirted: Equalization and Output	230-003
	KNOB, small with pointer: Input and Line Termination	230-008
	POST, fuse: F1 and F2	085-001

When ordering replacement parts always include the following information: Equipment Type; Equipment Serial Number; Ampex Part or Catalog Number; and Description of Part. DO NOT simply use the schematic reference number.

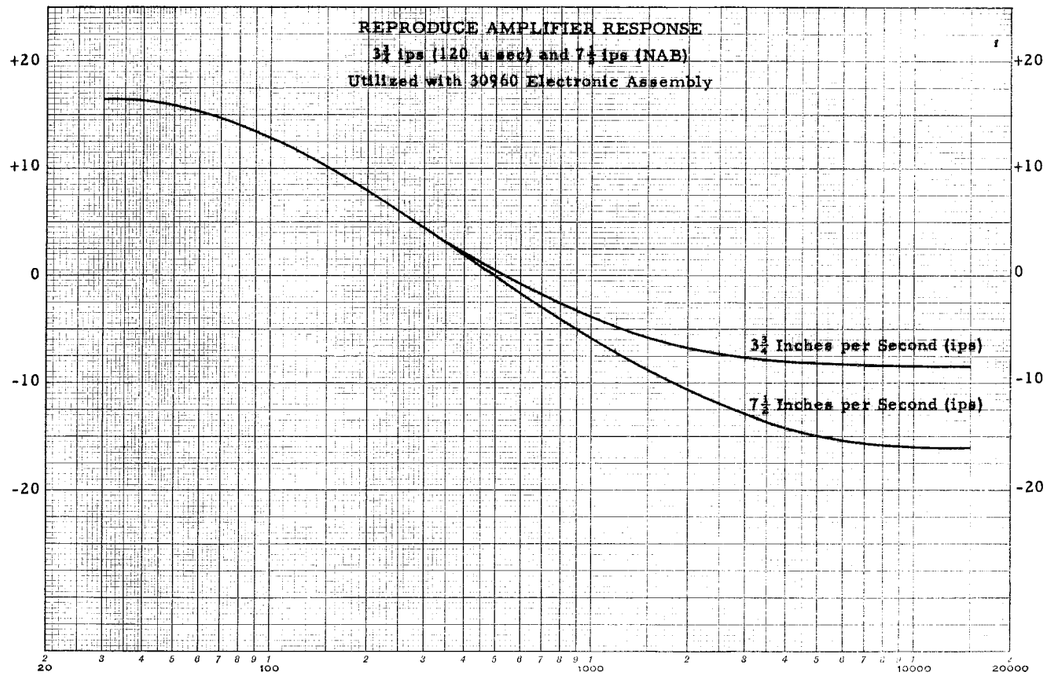
REF. NO.	PART DESCRIPTION	AMPEX PART NO.
	SHIELD, tube, for all except V7	160-012
	SHIELD, tube: V7	160-043
	SHOCKMOUNT	350-015
	SOCKET, tube: 7 pin	150-067
	SOCKET, tube: 9 pin	30818-01
	EQUALIZER BRACKET ASSEMBLY (COMPLETE)	30920-01

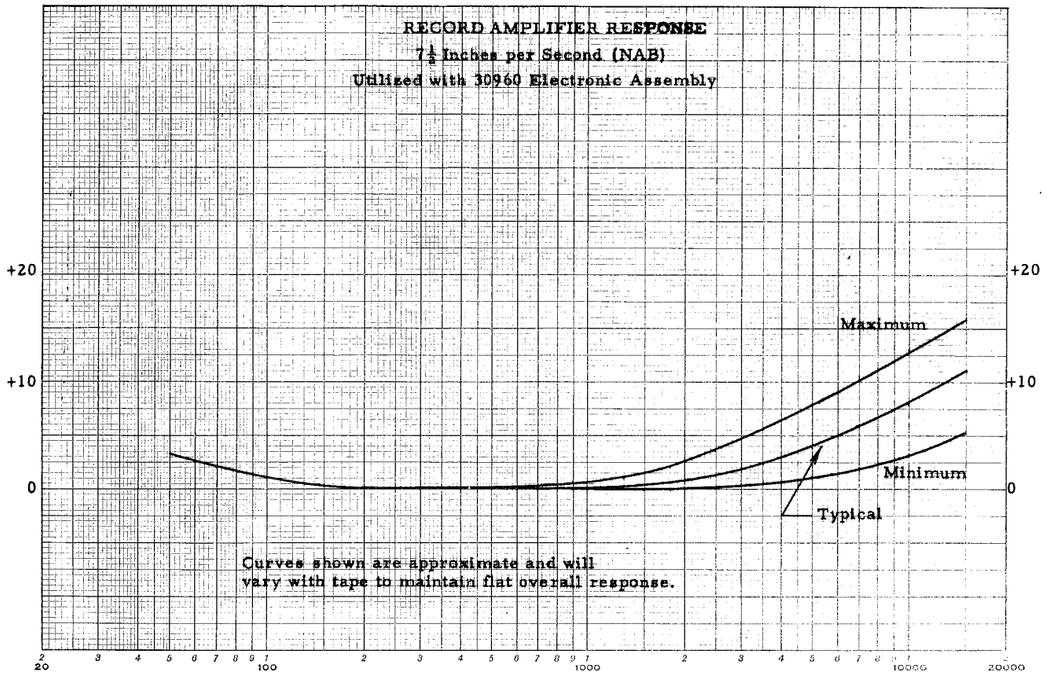
ACCESSORIES

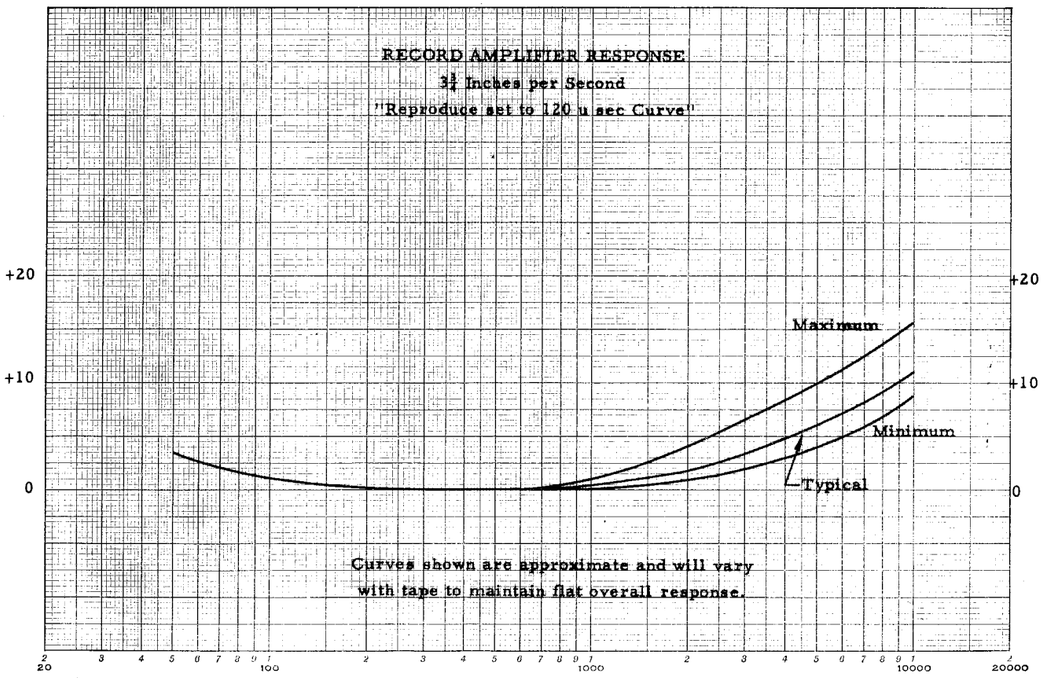
	KNOB ASSEMBLY: editing	1917-00
	KNOB ASSEMBLY: holddown (for 1/4-inch and 1/2-inch machines)	9093-00
	KNOB ASSEMBLY: holddown (for 1-inch machines)	5881-00
	REEL ADAPTOR	973-00
	CABLE ASSEMBLY, power interconnecting (300-2)	30841-01
	CABLE ASSEMBLY, bias (300-3)	14943-04
	CABLE ASSEMBLY, bias (300-4)	14943-03
	CABLE ASSEMBLY, bias (300-2)	14943-02
	CABLE ASSEMBLY, power interconnecting (300-3)	30851-01
	CORD SET	084-005
	ADAPTOR TEE: coax	169-012
	PANEL, backing (7 inch)	6962-00
	PANEL, facing (7 inch)	6963-00
	PANEL, backing	30828-01
	PANEL, facing	30829-01
	CONNECTOR, plug: female, 3 contact; Cannon Part No. XL-3-11	144-003
	CONNECTOR, plug: male, 3 contact; Cannon Part No. XL-3-12	145-009
	SPACER, base plate head assembly	5888-00

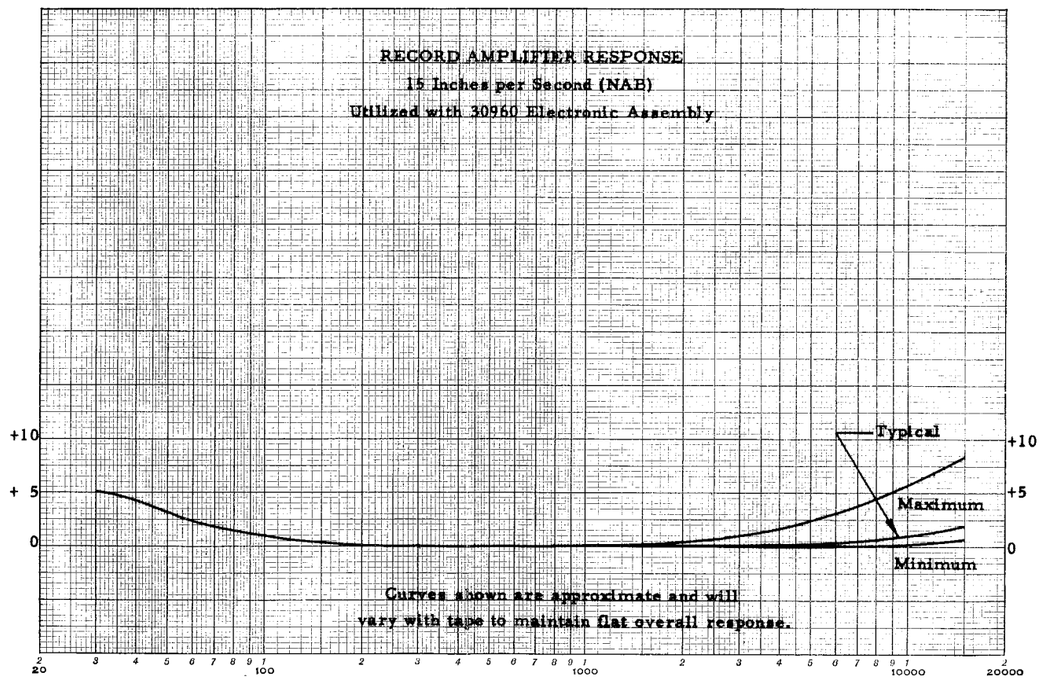
*Etched board assemblies are complete with all mounted components including tubes.

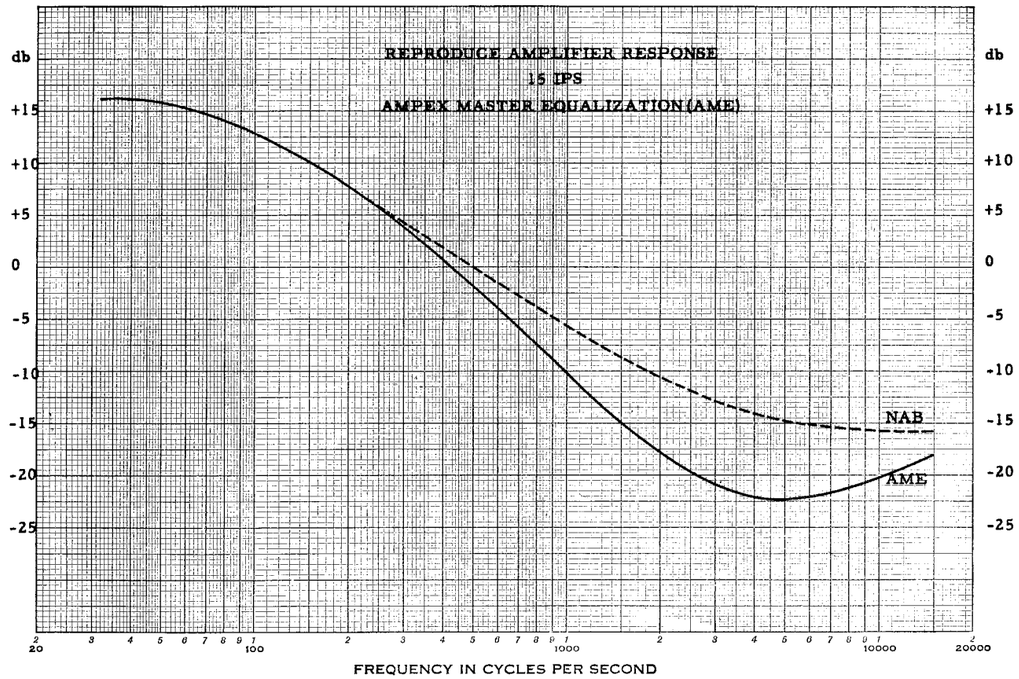
When ordering replacement parts always include the following information: Equipment Type; Equipment Serial Number; Ampex Part or Catalog Number; and Description of Part. DO NOT simply use the schematic reference number.

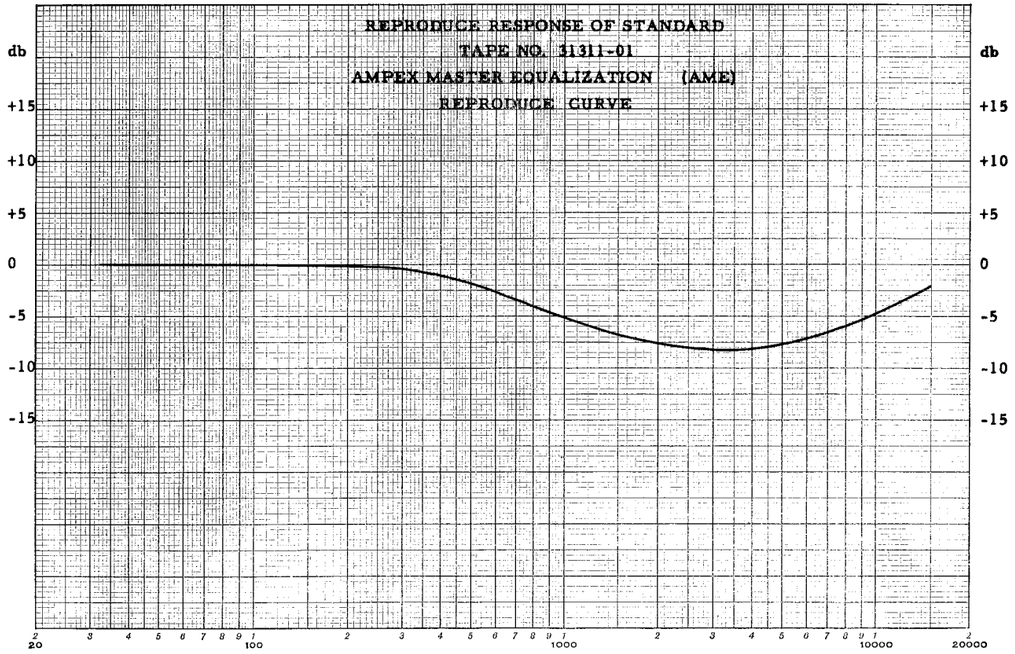

REPRODUCE AMPLIFIER RESPONSE
3¾ ips (120 u sec) and 7½ ips (NAB)
Utilized with 30960 Electronic Assembly
+20
+10
0
-10
-20
3¾ Inches per Second (ips)
7½ Inches per Second (ips)
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND

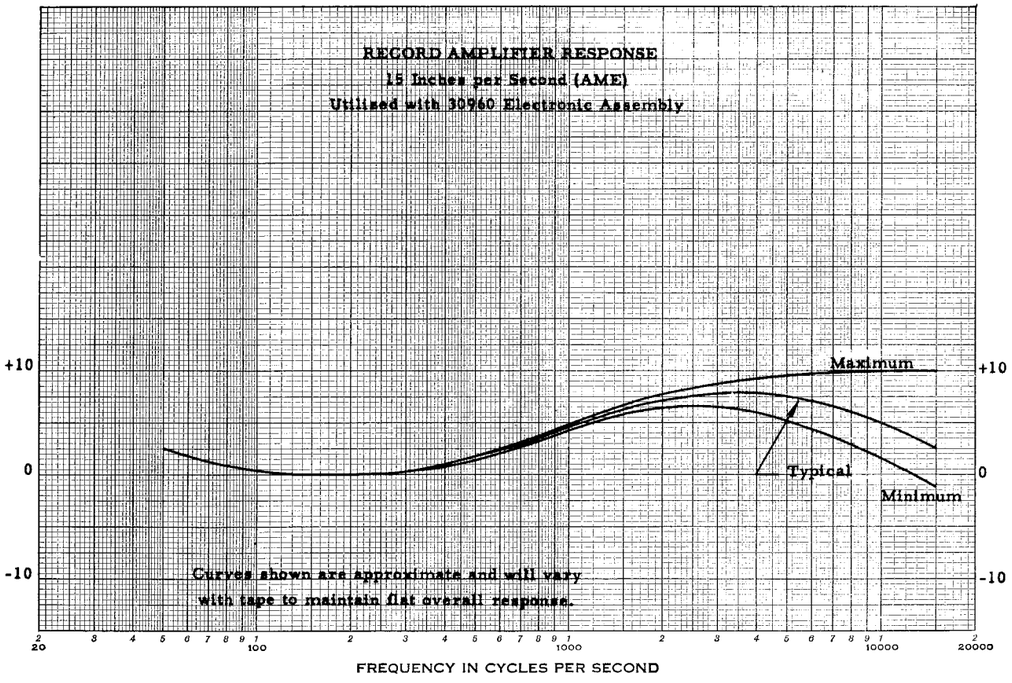

RECORD AMPLIFIER RESPONSE
7½ Inches per Second (NAB)
Utilized with 30960 Electronic Assembly
+20
+10
0
Maximum
Minimum
Typical
Curves shown are approximate and will
vary with tape to maintain flat overall response.
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND


RECORD AMPLIFIER RESPONSE
3¾ Inches per Second
"Reproduce set to 120 u sec Curve"
+20
+10
0
Maximum
Minimum
Typical
Curves shown are approximate and will vary
with tape to maintain flat overall response.
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND

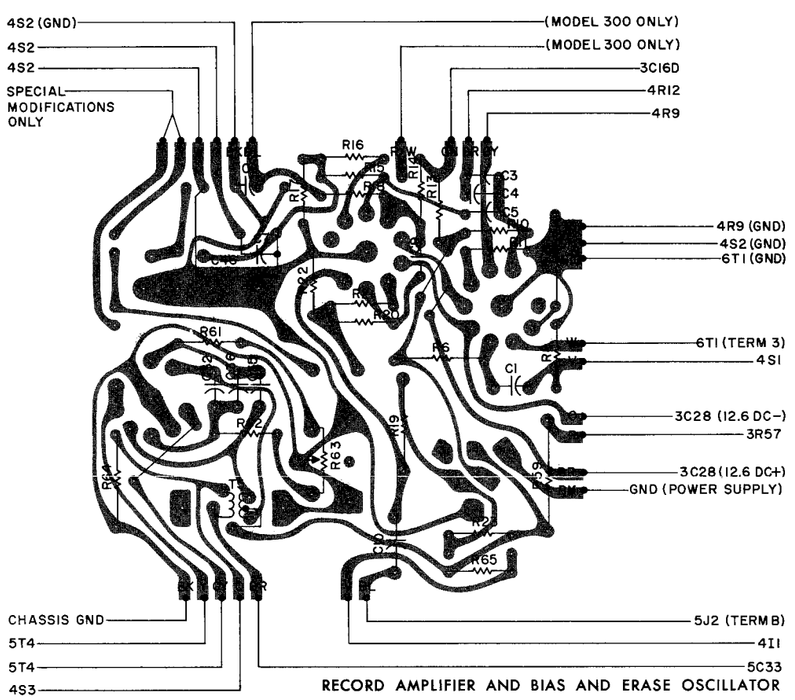

RECORD AMPLIFIER RESPONSE
15 Inches per Second (NAB)
Utilized with 30960 Electronic Assembly
+10
+ 5
0
Typical
Maximum
Minimum
Curves shown are approximate and will
vary with tape to maintain flat overall response.
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND


REPRODUCE AMPLIFIER RESPONSE
15 IPS
AMPEX MASTER EQUALIZATION (AME)
db
+15
+10
+5
0
-5
-10
-15
-20
-25
NAB
AME
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND


REPRODUCE RESPONSE OF STANDARD
TAPE NO. 31311-01
AMPEX MASTER EQUALIZATION (AME)
REPRODUCE CURVE
db
+15
+10
+5
0
-5
-10
-15
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND

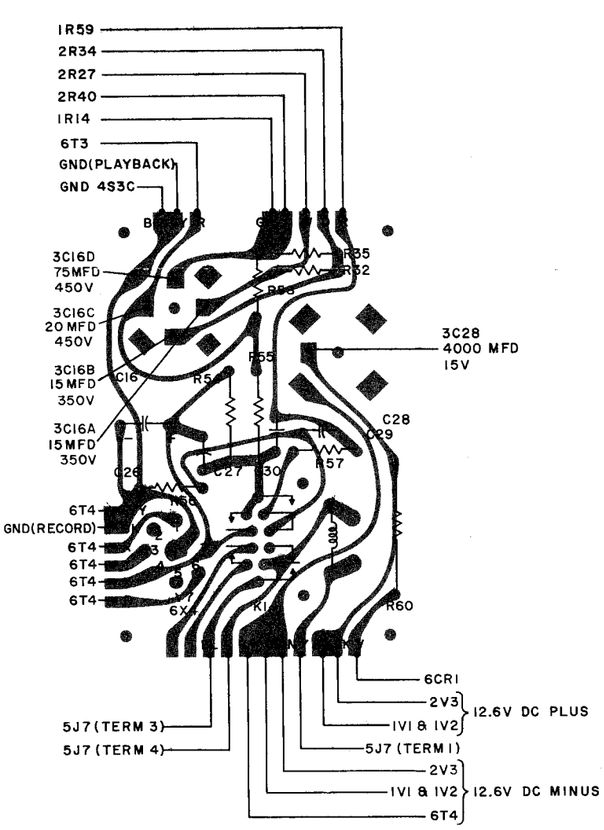

RECORD AMPLIFIER RESPONSE
15 Inches per Second (AME)
Utilized with 30760 Electronic Assembly
+10
0
-10
Maximum
Typical
Minimum
Curves shown are approximate and will vary
with tape to maintain flat overall response.
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND

UTILIZED WITH 30960 ELECTRONIC ASSEMBLIES ONLY



RECORD AMPLIFIER AND BIAS AND ERASE OSCILLATOR

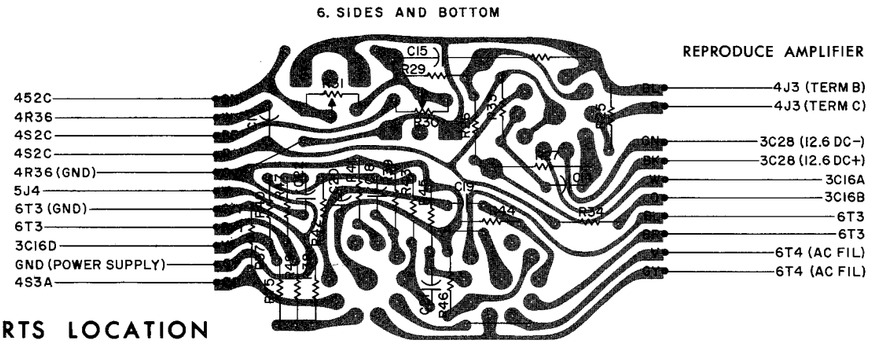
PARTS LOCATION
RECORD AMPLIFIER AND BIAS AND ERASE OSCILLATOR



UTILIZED WITH 30960 ELECTRONIC ASSEMBLIES ASSEMBLIES ONLY

LEGEND

THE FIRST NUMBERS SIGNIFY THE LOCATION.
1. RECORD AMPLIFIER BOARD
2. REPRODUCE AMPLIFIER BOARD
3. POWER SUPPLY BOARD
4. FRONT PANEL OF AMP. CHASSIS
5. BACK PANEL OF AMP. CHASSIS
6. SIDES AND BOTTOM



PARTS LOCATION
POWER SUPPLY AND REPRODUCE AMPLIFIER

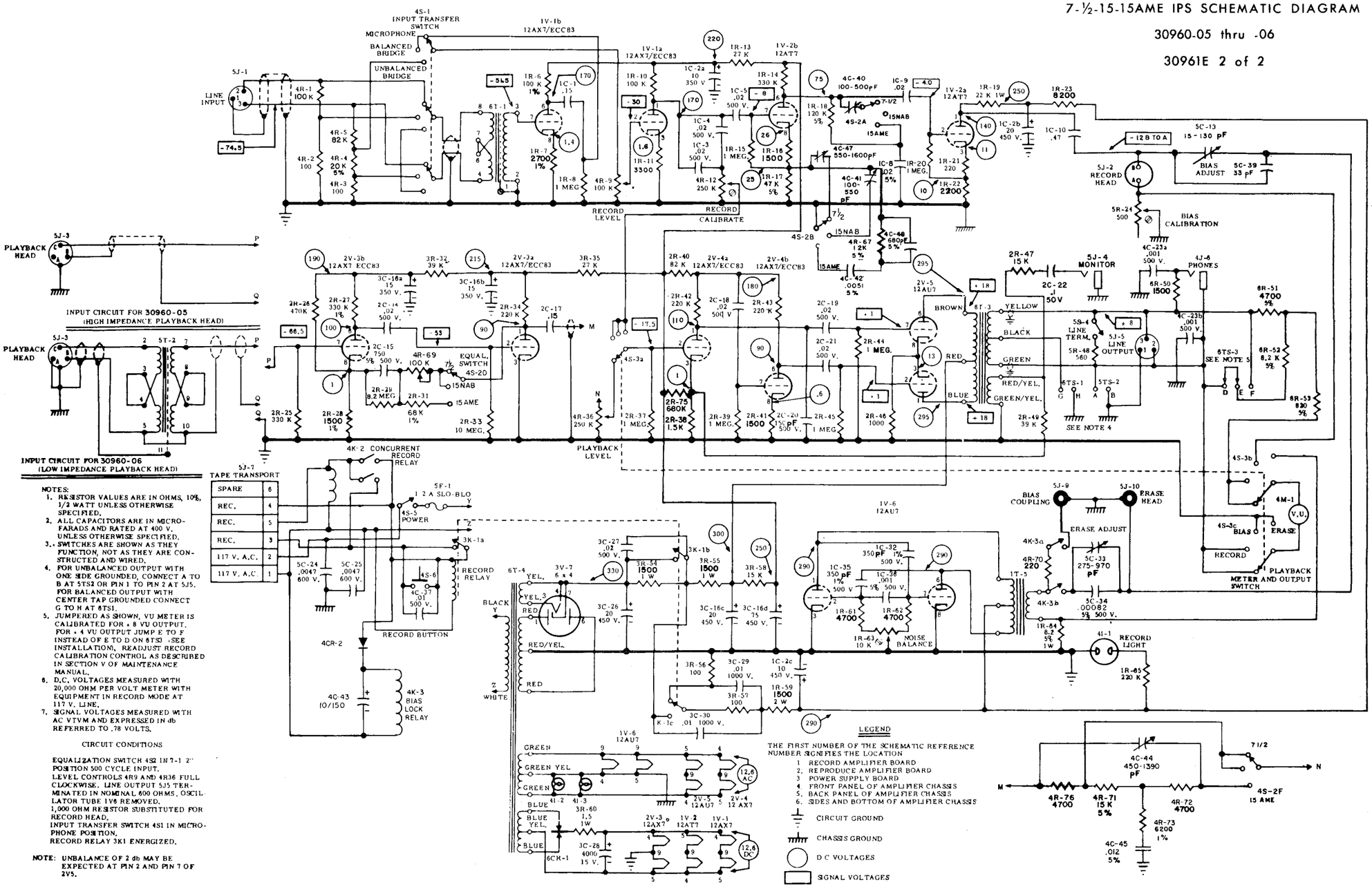
ELECTRONIC ASSEMBLY

2,3 and 4 TRACK RECORDER/REPRODUCER

7-½-15-15AME IPS SCHEMATIC DIAGRAM

30960-05 thru -06

30961E 2 of 2



NOTES:

1. RESISTOR VALUES ARE IN OHMS, 10%, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS ARE IN MICROFARADS AND RATED AT 400 V. UNLESS OTHERWISE SPECIFIED.
3. SWITCHES ARE SHOWN AS THEY FUNCTION, NOT AS THEY ARE CONSTRUCTED AND WIRED.
4. FOR UNBALANCED OUTPUT WITH ONE SIDE GROUNDED, CONNECT A TO B AT 5TS2 OR PIN 1 TO PIN 2 AT 5J5. FOR BALANCED OUTPUT WITH CENTER TAP GROUNDED CONNECT G TO H AT 6TS1.
5. JUMPERED AS SHOWN, VU METER IS CALIBRATED FOR + 8 VU OUTPUT. FOR + 4 VU OUTPUT JUMP E TO F INSTEAD OF E TO D ON 6TS3 (SEE INSTALLATION). READJUST RECORD CALIBRATION CONTROL AS DESCRIBED IN SECTION V OF MAINTENANCE MANUAL.
6. D.C. VOLTAGES MEASURED WITH 20,000 OHM PER VOLT METER WITH EQUIPMENT IN RECORD MODE AT 117 V. LINE.
7. SIGNAL VOLTAGES MEASURED WITH AC VTVM AND EXPRESSED IN db REFERRED TO .78 VOLTS.

CIRCUIT CONDITIONS

EQUALIZATION SWITCH 4S2 IN 7-1 2" POSITION 500 CYCLE INPUT.
LEVEL CONTROLS 4R9 AND 4R36 FULL CLOCKWISE. LINE OUTPUT 5J5 TERMINATED IN NOMINAL 600 OHMS. OSCILLATOR TUBE 1V6 REMOVED.
1,000 OHM RESISTOR SUBSTITUTED FOR RECORD HEAD.
INPUT TRANSFER SWITCH 4S1 IN MICROPHONE POSITION.
RECORD RELAY 3K1 ENERGIZED.

NOTE: UNBALANCE OF 2 db MAY BE EXPECTED AT PIN 2 AND PIN 7 OF 2V5.

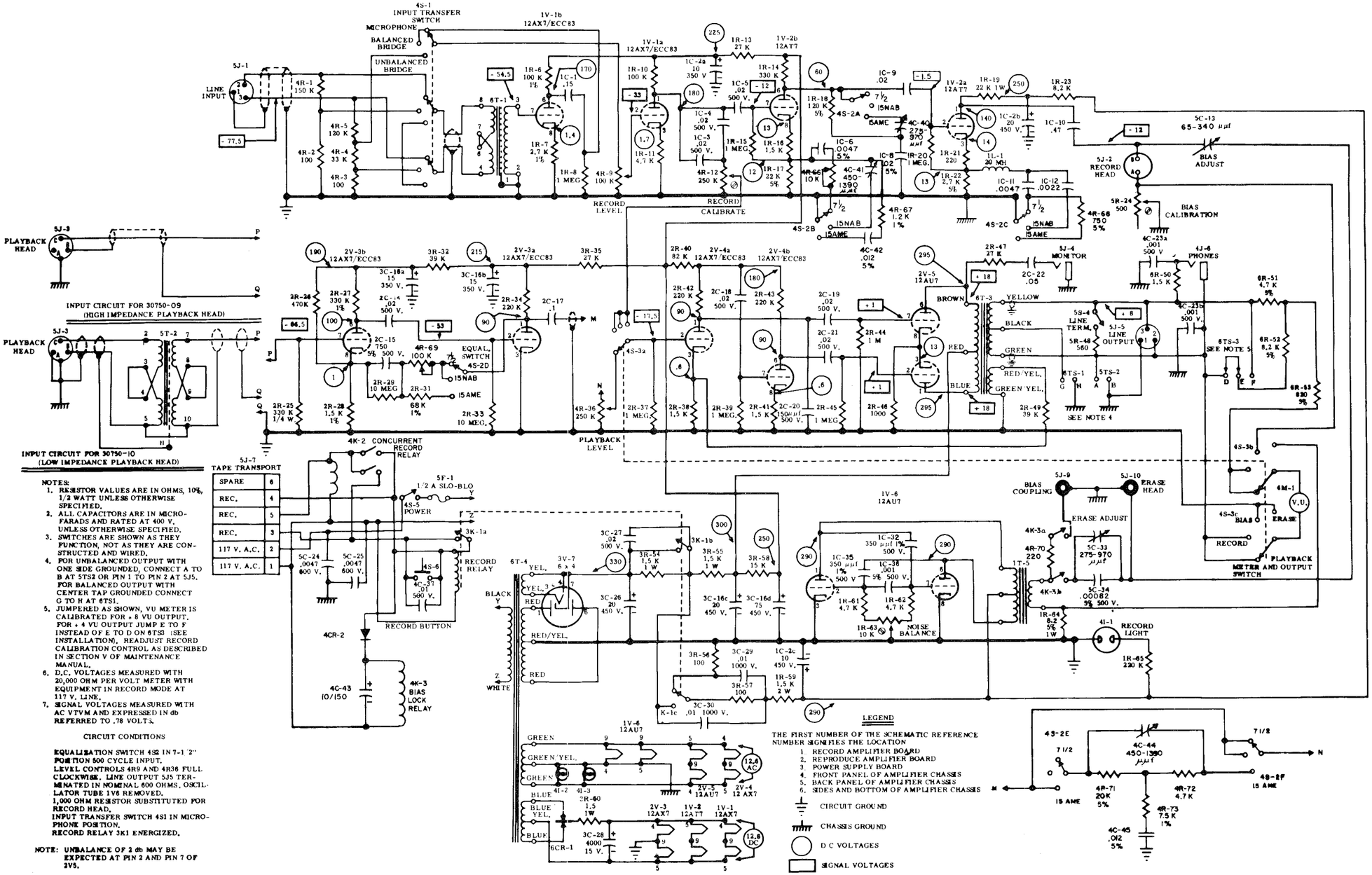
ELECTRONIC ASSEMBLY

2,3 and 4 TRACK RECORDER/REPRODUCER

7-½-15-15AME IPS SCHEMATIC DIAGRAM

30750-09 thru -10

30802L 2 of 2



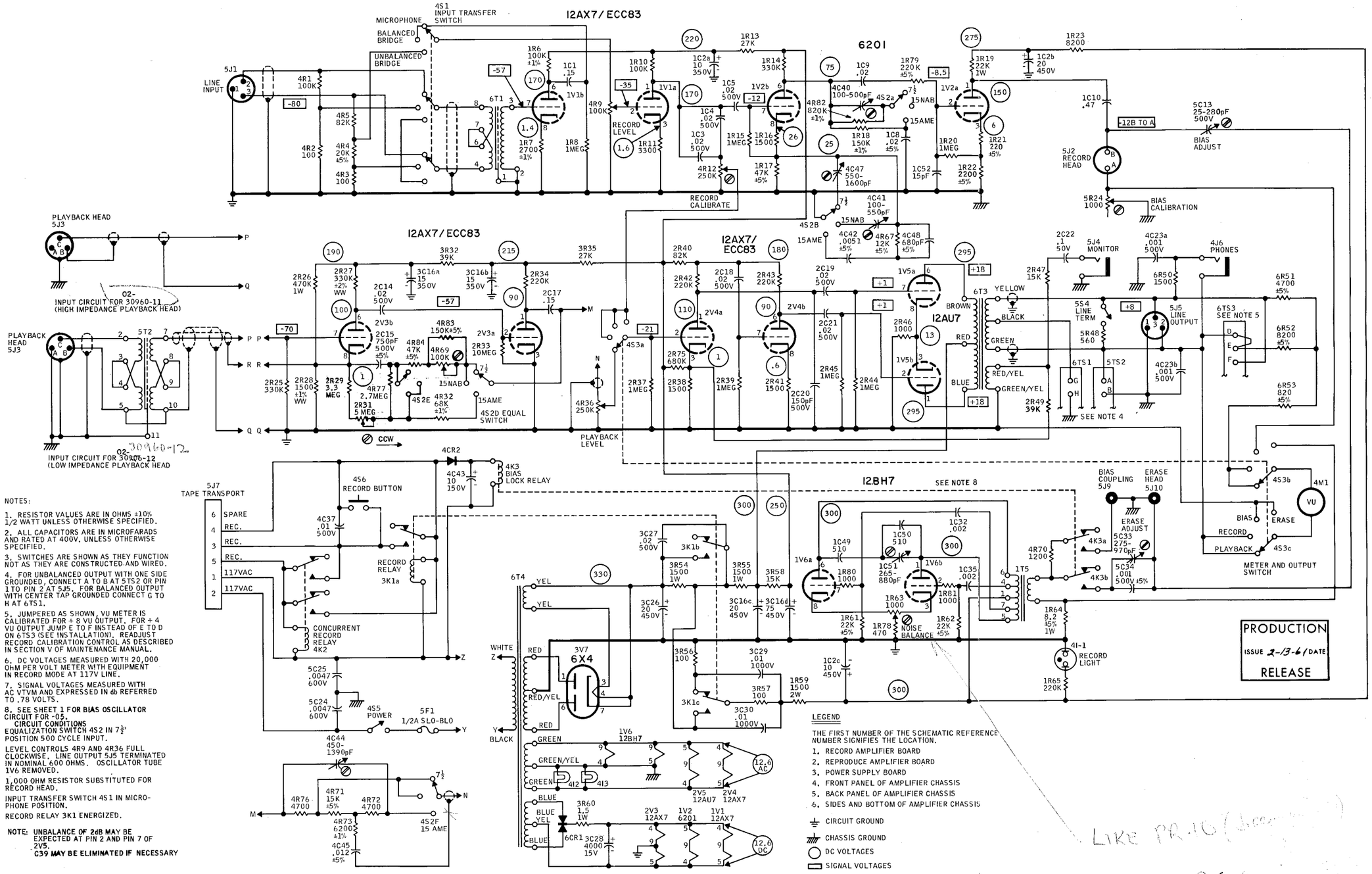
NOTES:

1. RESISTOR VALUES ARE IN OHMS, 10%, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS ARE IN MICROFARADS AND RATED AT 400 V. UNLESS OTHERWISE SPECIFIED.
3. SWITCHES ARE SHOWN AS THEY FUNCTION, NOT AS THEY ARE CONSTRUCTED AND WIRED.
4. FOR UNBALANCED OUTPUT WITH ONE SIDE GROUNDED, CONNECT A TO B AT 5TS2 OR PIN 1 TO PIN 2 AT 5J5. FOR BALANCED OUTPUT WITH CENTER TAP GROUNDED CONNECT G TO H AT 6TS1.
5. JUMPERED AS SHOWN, VU METER IS CALIBRATED FOR + 8 VU OUTPUT. FOR + 4 VU OUTPUT JUMP E TO F INSTEAD OF E TO D ON 6TS3 (SEE INSTALLATION). READJUST RECORD CALIBRATION CONTROL AS DESCRIBED IN SECTION V OF MAINTENANCE MANUAL.
6. D.C. VOLTAGES MEASURED WITH 20,000 OHM PER VOLT METER WITH EQUIPMENT IN RECORD MODE AT 117 V. LINE.
7. SIGNAL VOLTAGES MEASURED WITH AC VTVM AND EXPRESSED IN db REFERRED TO .78 VOLTS.

CIRCUIT CONDITIONS

EQUALIZATION SWITCH 4S2 IN 7-1 ⅞" POSITION 500 CYCLE INPUT.
LEVEL CONTROLS 4R9 AND 4R36 FULL CLOCKWISE. LINE OUTPUT 5J5 TERMINATED IN NOMINAL 600 OHMS. OSCILLATOR TUBE 1V6 REMOVED.
1,000 OHM RESISTOR SUBSTITUTED FOR RECORD HEAD.
INPUT TRANSFER SWITCH 4S1 IN MICROPHONE POSITION.
RECORD RELAY 3K1 ENERGIZED.

NOTE: UNBALANCE OF 2 db MAY BE EXPECTED AT PIN 2 AND PIN 7 OF 2V5.



NOTES:

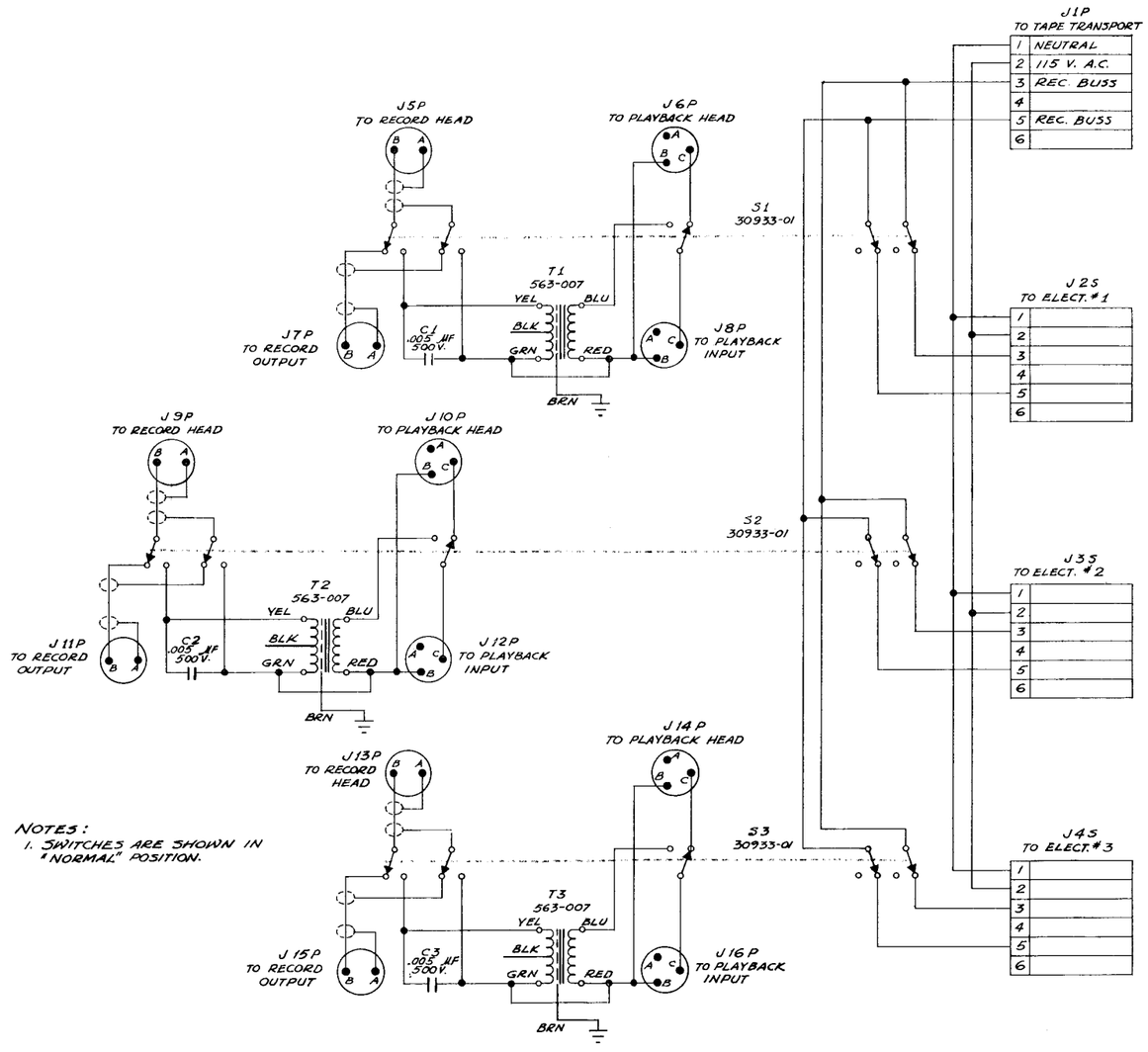
1. RESISTOR VALUES ARE IN OHMS ±10% 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS ARE IN MICROFARADS AND RATED AT 400V, UNLESS OTHERWISE SPECIFIED.
3. SWITCHES ARE SHOWN AS THEY FUNCTION NOT AS THEY ARE CONSTRUCTED AND WIRED.
4. FOR UNBALANCED OUTPUT WITH ONE SIDE GROUNDED, CONNECT A TO B AT 5T52 OR PIN 1 TO PIN 2 AT 5J5. FOR BALANCED OUTPUT WITH CENTER TAP GROUNDED CONNECT G TO H AT 6TS1.
5. JUMPERED AS SHOWN, VU METER IS CALIBRATED FOR +8 VU OUTPUT. FOR +4 VU OUTPUT JUMP E TO F INSTEAD OF E TO D ON 6TS3 (SEE INSTALLATION). READJUST RECORD CALIBRATION CONTROL AS DESCRIBED IN SECTION V OF MAINTENANCE MANUAL.
6. DC VOLTAGES MEASURED WITH 20,000 OHM PER VOLT METER WITH EQUIPMENT IN RECORD MODE AT 117V LINE.
7. SIGNAL VOLTAGES MEASURED WITH AC VTVM AND EXPRESSED IN db REFERRED TO .78 VOLTS.
8. SEE SHEET 1 FOR BIAS OSCILLATOR CIRCUIT FOR -05.
   CIRCUIT CONDITIONS
   EQUALIZATION SWITCH 4S2 IN 7½" POSITION 500 CYCLE INPUT.
   LEVEL CONTROLS 4R9 AND 4R36 FULL CLOCKWISE. LINE OUTPUT 5J5 TERMINATED IN NOMINAL 600 OHMS. OSCILLATOR TUBE 1V6 REMOVED.
   1,000 OHM RESISTOR SUBSTITUTED FOR RECORD HEAD.
   INPUT TRANSFER SWITCH 4S1 IN MICROPHONE POSITION.
   RECORD RELAY 3K1 ENERGIZED.

NOTE: UNBALANCE OF 2dB MAY BE EXPECTED AT PIN 2 AND PIN 7 OF 2V5.
C39 MAY BE ELIMINATED IF NECESSARY

LIKE PR-10 (boom)

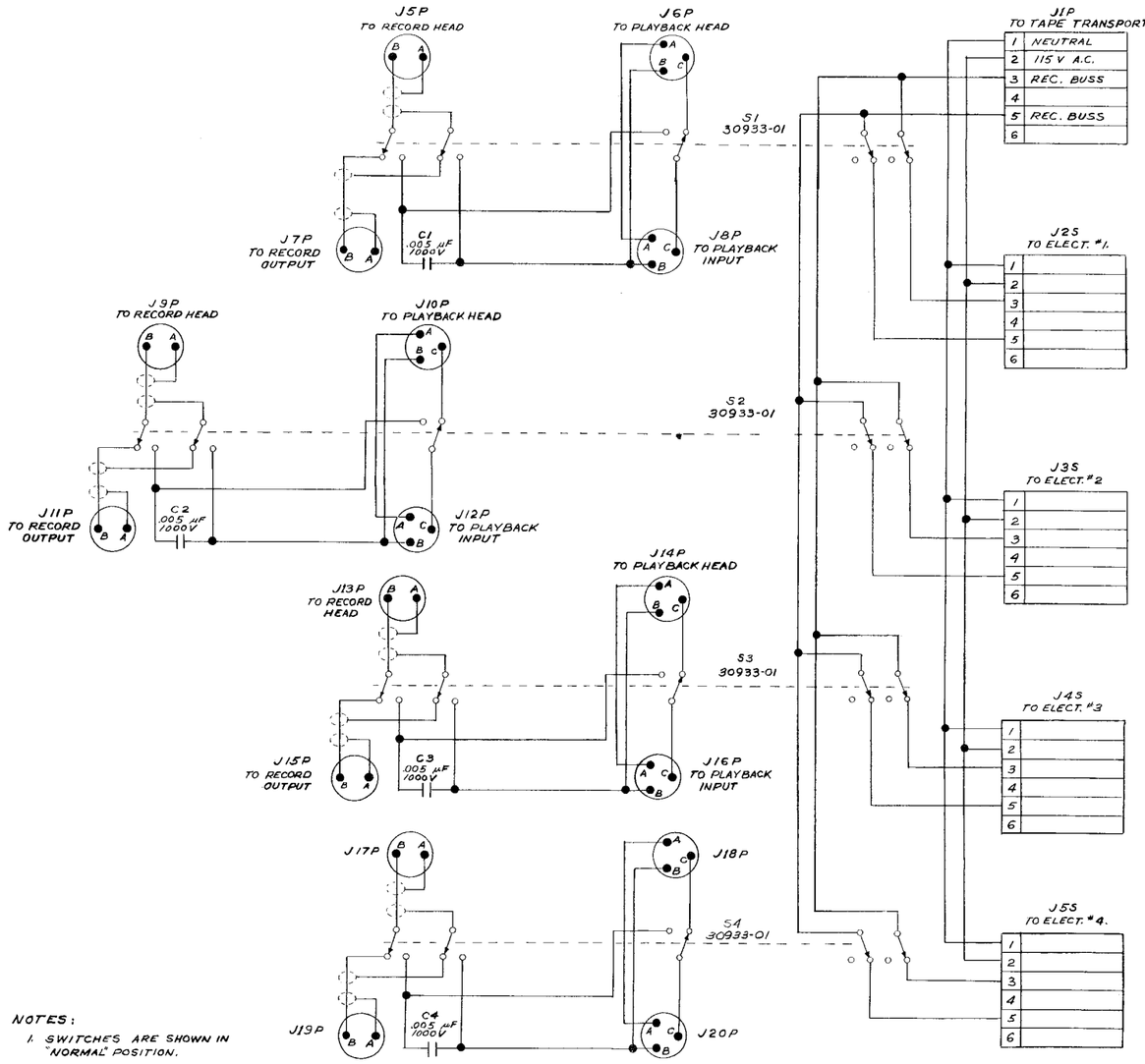
30960-12
-11

SCHEMATIC DIAGRAM
3 CHANNEL SEL-SYNC
30691B



NOTES:
1. SWITCHES ARE SHOWN IN "NORMAL" POSITION.

SCHEMATIC DIAGRAM
4 CHANNEL SEL-SYNC
LOW IMPEDANCE HEAD
31009A



NOTES:

1. SWITCHES ARE SHOWN IN "NORMAL" POSITION.