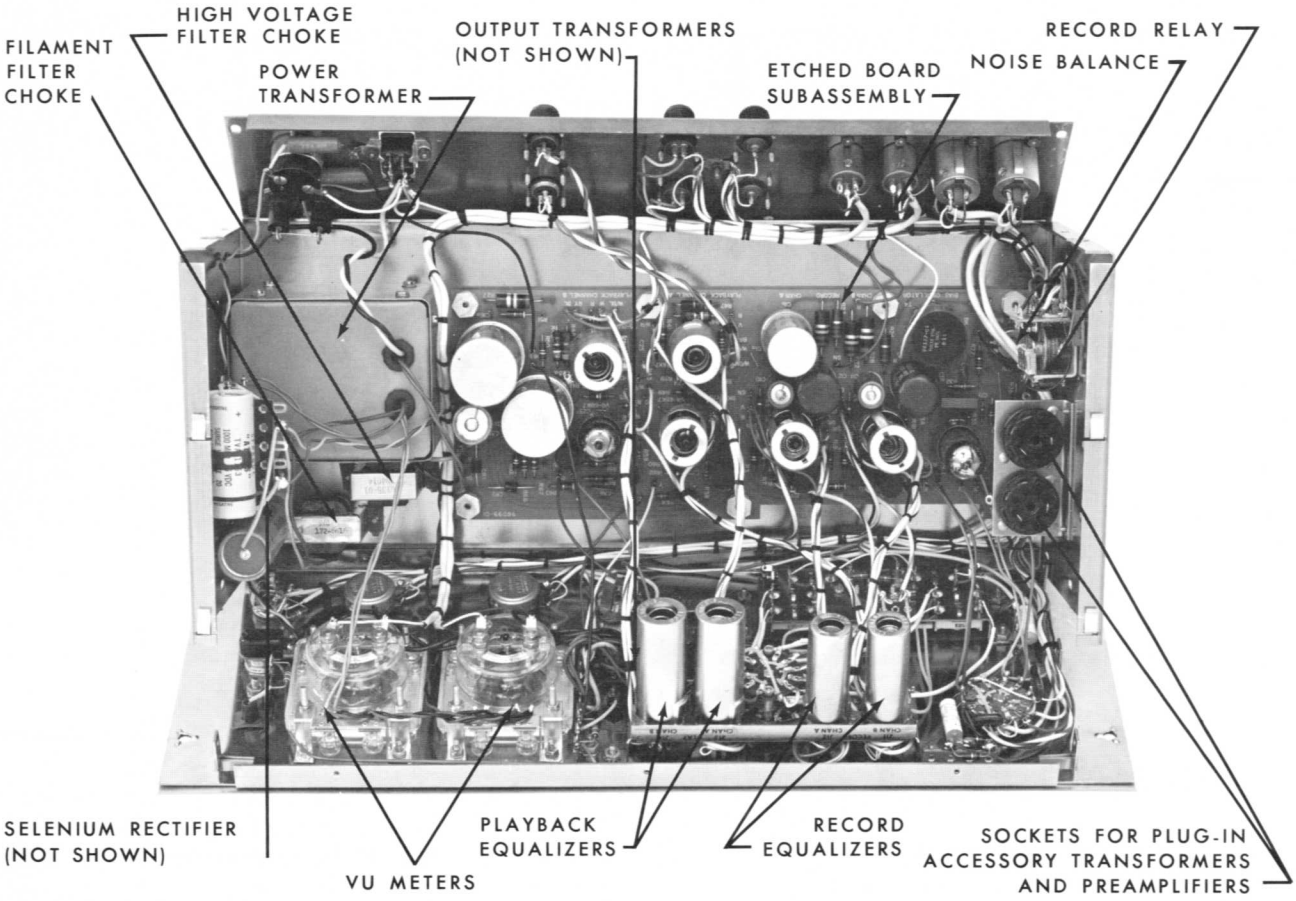
ELECTRONIC ASSEMBLY

GENERAL

The electronic assembly consists of a single chassis on which is mounted an etched board subassembly containing two record amplifiers, two reproduce amplifiers, a bias and erase oscillator, and the power supply. On the face panel, facilities are available for setting record levels, selecting high or low speed equalization circuitry, and switching output circuitry. Visual monitoring of reproduce and record levels is provided by the two vu meters on the face panel. Two phone jacks for aural monitoring are provided on the face panel. Power on-off is controlled at the front of the assembly. A control for the record function, signified by accompanying indicator lights, and a record channel selector completes the front panel arrangement.

On the back panel of the electronic assembly chassis are all connecting and inter-connecting provisions for power input, line input, line output, power to the tape transport, and head connections. Two screw-type fuse posts are also provided on the chassis back panel.

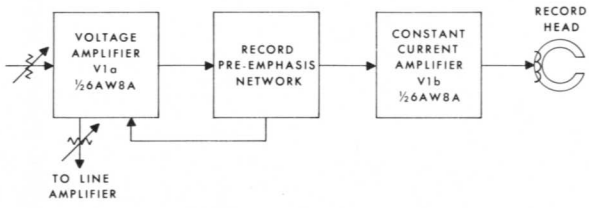


Location of electronic subassemblies

RECORD AMPLIFIER

The two record sections of the electronic assembly each consist of a two stage, high gain, resistance coupled amplifier. Two triode-pentrodes, V1 and V2 and their associated circuitry, form the stages of amplification for both channels. To simplify the discussion, only channel "A", V1 and its related circuitry, will be described. Channel "B" is identical except for reference symbol numbers.

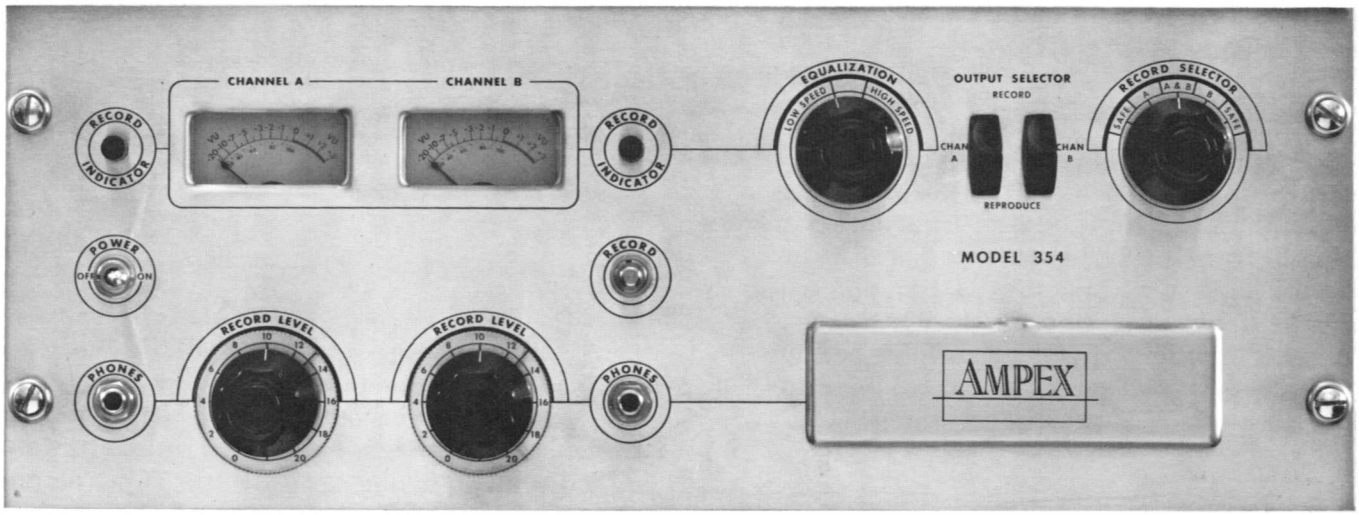
When using an unbalanced-bridging line input, the signal from J1 appears at the grid of tube V1a through transformer socket J15, dummy plug P15, potentiometer R1, and resistor R3. Potentiometer R1 provides a means of setting RECORD LEVEL. Bias is attained by unbypassed resistor R5. Capacitor C1a and resistor R51 form a plate decoupling network for the first stage of both channels. Capacitor C2, resistor R11 and potentiometer R13 (REC*ord* CALI-B*rate*) provide record calibration circuitry. Resistors R3 and R7 establish negative feedback around V1a. Capacitor C2 in conjunction with resistors R7, R11 and potentiometer R13 provides low frequency pre-emphasis.



Block diagram, record circuit

NOTE

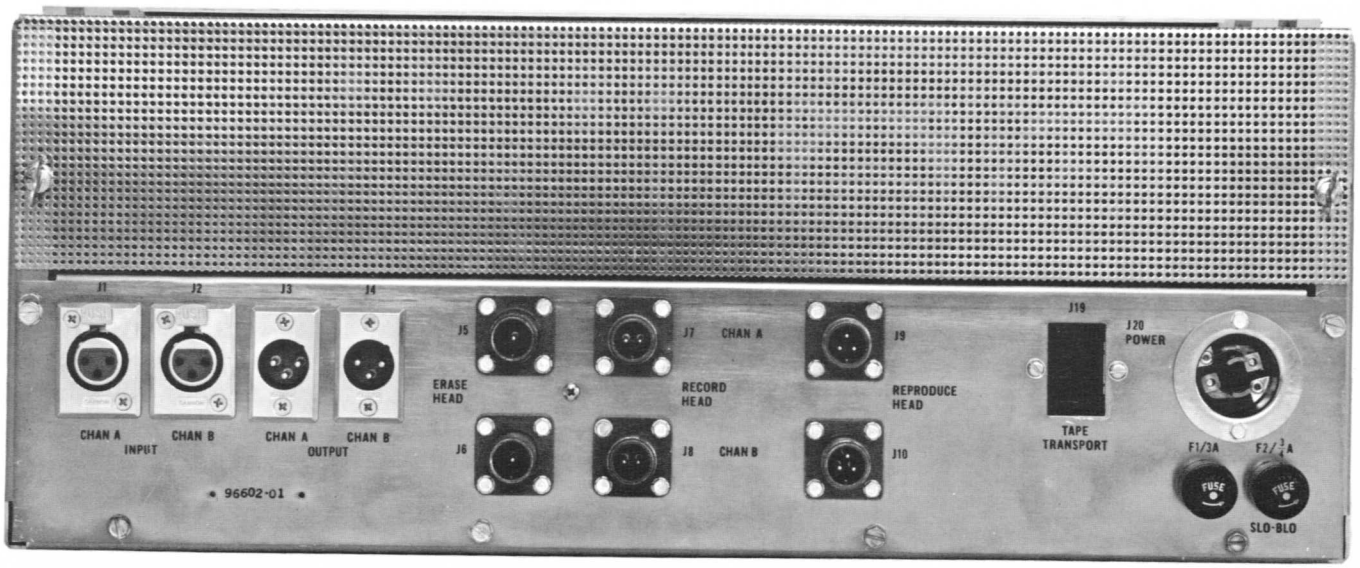
When reading vu meter indications with the OUTPUT SELECTOR switch



Amplifier chassis, front panel

in the RECORD position, only the first stage of the record amplifier and the last two stages of the reproduce amplifier are connected in the circuit. This omits record pre-emphasis and reproduce equalization circuitry so that meter indications will reflect only the flat response of each amplifier.

The signal is now coupled to the grid of tube V1b through capacitor C4, the plug-in pre-emphasis network, and resistor R17. Negative feedback is provided through unbypassed resistor R19. Bias for tube V1b is provided by the difference in voltages developed across resistor R5 and resistor R19 by returning the control grid of V1b to the cathode of V1a through a resistance in the plug-in pre-emphasis network. The plug-in pre-emphasis circuitry for high and low tape speeds provide the necessary high frequency pre-emphasis to the control grid of tube V1b. Tube V1b delivers an audio signal current



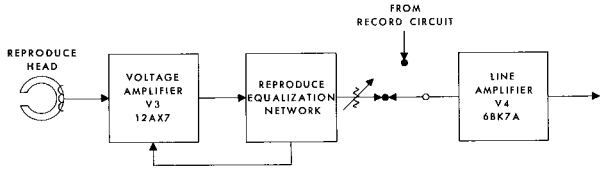
Amplifier chassis, rear view

to the record head that is directly proportional to the signal voltage at the control grid. A 100 kc bias signal current from the bias and erase oscillator output is coupled into the record head through capacitor C14.

In the balanced-bridging line input arrangement, operation is identical to that for unbalanced-bridging input except that an accessory plug-in transformer is used in place of dummy plug P15 so that one side of the signal input line will not be connected to chassis ground. When a microphone is used with the equipment an accessory plug-in transistorized preamplifier is used in place of the dummy plug.

REPRODUCE AMPLIFIER

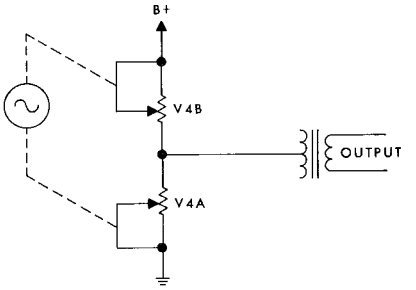
The reproduce section of the electronic assembly is a resistance coupled audio amplifier. Two dual triodes are used to provide two stages of amplification and a single-ended push-pull output for each channel.



Block diagram, reproduce circuit

Signals on the moving magnetic tape induce voltages in the reproduce head. This induced voltage appears across resistor R37 and then the grid of tube V3a. Bias on this first stage is derived from the voltage divider network consisting of resistors R49, R47 and R45. The amplifier output of this first stage is coupled to the second stage grid through capacitor C24. Contact bias is used on V3b. Capacitor C23a and resistor R52 form a plate decoupling network for the first two stages. Reproduce equalization is achieved by means of the plug-in equalizer network.

The signal is now delivered to the push-pull output amplifier V4, the tube receiving the signal through coupling capacitor C26, P*lay*B*ack* LEVEL potentiometer R54 and OUTPUT SELECTOR switch S2 when the switch is in the REPRODUCE position.



Simplified Schematic, Line Output Amplifier

Operation of the output stage is similar to the operation of the potentiometers in the simplified schematic diagram with the input signal voltage controlling the position of the arms of both potentiometers. As the signal voltage goes positive, the effective resistance of the potentiometer marked "V4A" decreases and the effective resistance of the potentiometer marked "V4B" increases. As the signal voltage goes negative, the opposite occurs.

Load proportional current feedback is applied from the bottom of the transformer T2 primary winding to the junction of resistors R60 and R64 to provide output stability. Negative voltage feedback is applied from the top of the transformer primary winding to the grid of tube V4A through capacitor C37 and resistor R58 to reduce distortion. Capacitor C28 provides a bypass that compensates for high frequency losses.

BIAS AND ERASE OSCILLATOR

A dual triode tube V7, connected as a push-pull oscillator, provides high frequency bias and erase currents. The output of each plate is coupled to the grid of the other triode section through taps on the oscillator transformer primary. Any signal on the grid of either tube section will be amplified in the plate circuit of that section and coupled to the grid of the other tube section. The signal then will appear at the second plate and be coupled back to the first grid in phase with the original signal. Frequency of oscillation of approximately 100 kc is determined by the inductance of the primary of transformer T4 and the effective capacity across the primary.

The oscillator output is fed through RECORD SELECTOR switch S4 and through capacitors C21 (for channel A) and C22 (for channel B) to the two-channel erase head. The oscillator

ouput is also fed to BIAS ADJ*ust* variable capacitors C14 (for channel A) and C15 (for channel B) where record bias current adjustments take place. The bias signals are then mixed with the record signals and delivered to the two-channel record head. Plate voltage is supplied to the center tap of oscillator transformer T4 through relay contact K1B only when the equipment is in the record mode.

NOISE BALANCE control, potentiometer R31, in the oscillator cathode circuits is adjusted to correct for any asymmetry in the waveform, which would cause random noise during reproduction and distortion while recording.

POWER SUPPLY

Silicon rectifiers CR1 and CR2 are used in a conventional full-wave voltage doubler rectifier circuit to supply plate power for all tubes in the electronic assembly as well as the RECORD INDICATOR lights DS1 and DS2. Selenium rectifier CR3 is connected as a conventional full wave center tap rectifier to provide dc filament voltage for all tubes except V7.

The center tap of the V5 tube filament provides a ground for the dc filaments. Even though this tube is only used for the reproduction of channel two, it must be in its socket for proper operation of all functions. Ac power input is connected at J20 POWER receptacle and is controlled by POWER switch S6. The power is fed through fuse F2 and impressed across the primary of power transformer T1 and also through fuse F1 to the tape transport.

There are three secondary windings on the power transformer—two for filament supply and one for high voltage. One filament winding serves oscillator tube V7 and the panel lights, the second filament winding provides 12.6 volts dc after rectification, and the other winding furnishes high voltages for the plate supply. The plate supply ripple is filtered by a capacitance-input choke filter formed by choke L1, capacitors C16b, C16c, and C35; additional filtering is supplied by the decoupling capacitors.

High voltage is applied to the bias oscillator through record relay K1b. Whenever the PLAY button on the tape transport is pressed, approximately 150 volts dc is available at pin 3 of J19. When the RECORD SELECTOR switch S4 is in the "A", "A&B" or "B" position and when the RECORD button S5 is pressed, the dc voltage is applied to the record relay coil. As long as the dc voltage is available at pin 3 of J19 and as long as the RECORD SELECTOR switch is in one of the positions mentioned above, contact K1a holds the record relay energized. When the STOP button on the tape transport is pressed or when the RECORD SELECTOR switch is turned to one of the SAFE positions, the dc voltage no longer reaches the relay coil, the relay is de-energized and drops out.

NOTE

The RECORD SELECTOR switch can be turned from one position to another during the recording process provided that it is not turned to one of the SAFE positions. However, for click-free performance it is preferable to pre-select the setting of the RECORD SELECTOR for the mode of operation desired.

ALIGNMENT AND PERFORMANCE CHECKS

General:

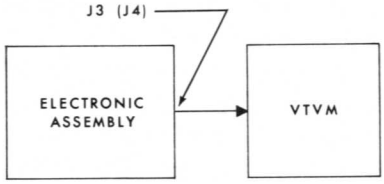
In the following alignment and performance checks, each channel should be treated separately except where noted. In cases where, in the middle of a procedure, the second channel must be checked simultaneously with the first channel, all steps preceding should be performed on both channels.

Equipment Required:

AMPEX Standard Alignment Tapes for ¼-inch machines:

Speed	*Catalog Number*
3¾ inches per second	31331-01
7½ inches per second	31321-01
15 inches per second (NAB)	31311-01
15 inches per second (AME)	31312-01

Ac Vacuum Tube Voltmeter capable of indicating rms voltages of 0.004 or less.
Audio Oscillator with stable output from 50 cps to 15 kc.
Earphones or Speaker - Amplifier for aural monitoring.
Nutdriver, number 8 (¼ inch).
Reel of unrecorded tape.
Small screwdriver.



Block diagram, reproduce alignment connections

Reproduce Alignment:

CAUTION

The standard alignment tape used in the following procedures may be partially erased if the record and reproduce heads are permanently magnetized. Demagnetize the heads before proceeding.

Step 1: Lift the head cover.

Step 2: With the equipment connected as shown and all power switches in the ON position, thread the appropriate AMPEX standard alignment tape along the prescribed path.

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

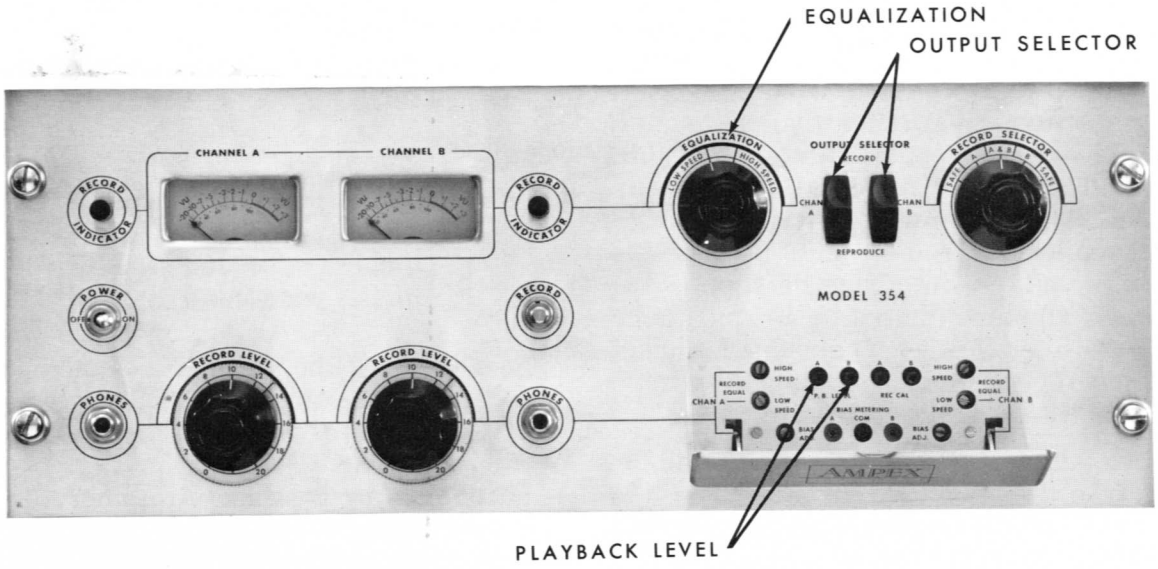
Step 4: Place the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 5: Start the standard tape. The first tone on all standard tapes is a reference level, 700 cycles for 7½ and 15 inches per second, and 500 cycles for 3¾ inches per second. Adjust the P*lay*B*ack* LEVEL control to a convenient meter reading for checking alignment and response.

Step 6: The next tone will be 15,000 cycles at 7½ and 15 inches per second, and 7500 cycles at 3¾ inches per second 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 the peak is broad adjust for minimum output variation. Because there are two heads in the head stack, make the azimuth adjustment for an average maximum meter indication, adjusting first one head and then the other, and finally adjusting for the average maximum meter indication.

NOTE

If the head azimuth is far out of alignment (possible if inexperienced personnel without proper equipment have



Reproduce alignment controls

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 7: Depending on tape speed, tones from 15,000 cycles to 30 cycles now will be reproduced from the standard tape. High frequency response (above 300 cycles) should not vary more than 2 db from the standard curve.

NOTE

When reproducing AMPEX *standard alignment tapes on multitrack 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.*

Step 8: The next tone to be heard on the 3¾ and 7½ inch per second standard tapes is a reference tone at operating level. (For 15 inches per second, rewind the standard tape to the first tone.) Adjust the *PlayBack* LEVEL control to obtain a zero reading on the vu meter or a +4 dbm output on a VTVM.

NOTE

Do not change this playback level setting for the remainder of the adjustments. Remove the standard tape upon completion of the reproduce alignment.

Reproduce Amplifier Noise Measurement:

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

Step 2: Read the noise level on the VTVM. Noise should be below the level specified in the 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 Bias Adjustment:

NOTE

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

Step 1: Place the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 2: Place the equipment in the record mode at 7½ ips tape speed.

Step 3: Set the oscillator frequency at 500 cycles per second (cps) with an output of approximately 1 volt.

NOTE

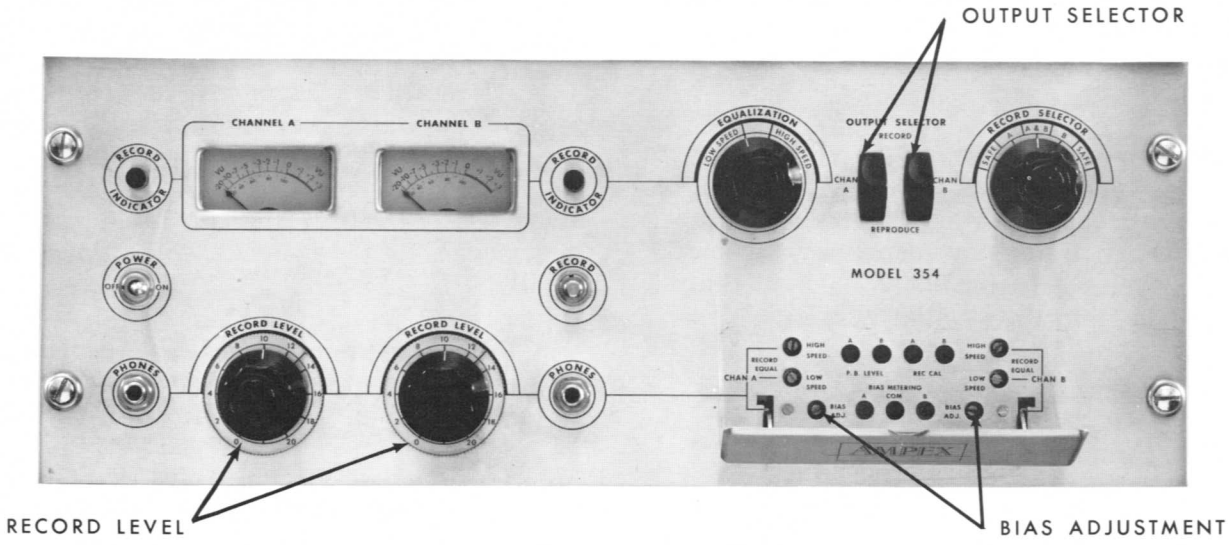
Bias is set at a specific wavelength. If it is desired to set bias at 15 inch tape speed, use a frequency of 1000 cps.

Step 4: Set the RECORD LEVEL control at a position that will obtain an on-scale vu meter reading.

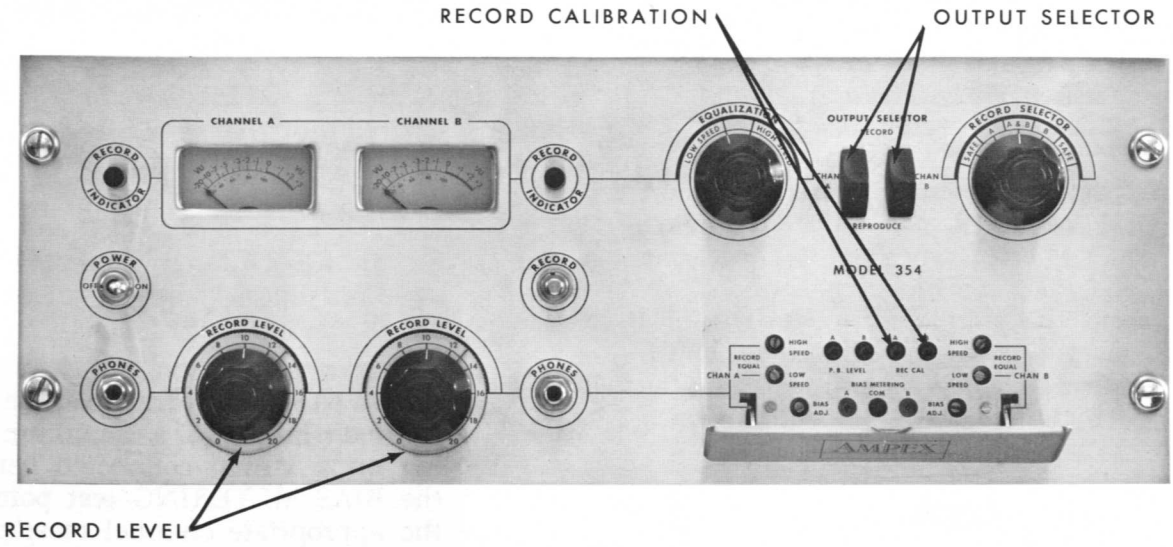
Step 5: Set peak bias by adjust the BIAS AD *Just* control clockwise until the 500 cycle signal drops ½ db below the maximum reading on the vu meter. Note the current reading on the VTVM, (current = voltage on meter −100). Turn the bias control counterclockwise until the 500 cycle signal again drops ½ db and note the current reading on the VTVM. Set the bias control at the median of these two readings.

NOTE

Provided that the head assembly and the type of tape is not changed, the current reading found in step 5 may be used to set the bias current.



Record Amplifier bias adjustment controls



Record level calibration controls

Record Level Calibration:

NOTE

The reproduce level must be calibrated using standard tape before calibrating the record level (see Reproduce Alignment).

Step 1: Set the audio oscillator to 500 cps. Leave the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 2: Place the equipment in the record mode at 7½ ips tape speed.

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

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

Step 5: Adjust the REC*ord* CALIB*rate* potentiometer for a zero vu reading.

Record Azimuth Adjustment:

Step 1: Set the audio oscillator at 500 cps.

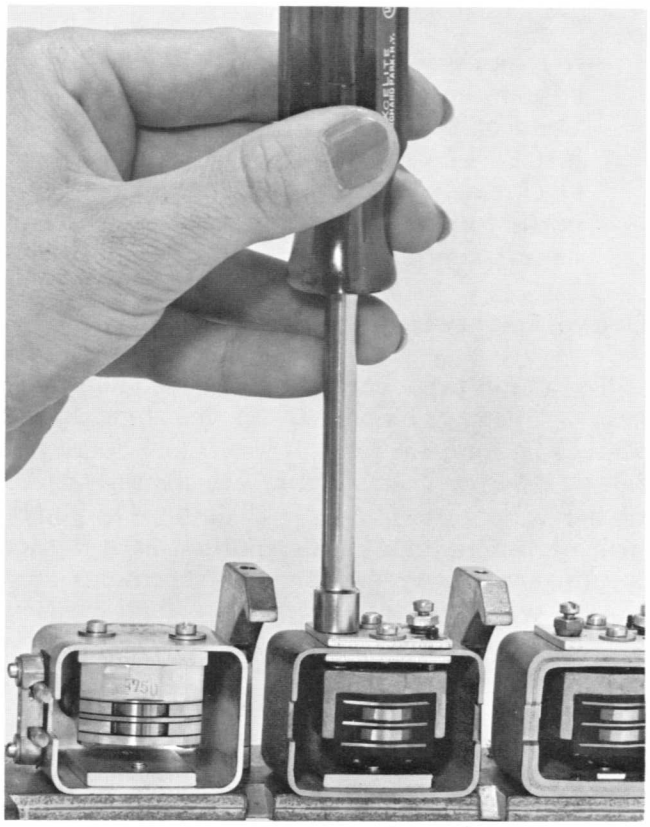
Step 2: Place the OUTPUT SELECTOR switch in the RECORD position.

Step 3: Set the RECORD LEVEL control to obtain a vu meter reading of approximately −20 (−16 dbm on VTVM).

Step 4: Place the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 5: Set the audio oscillator to 7500 cps for 3¾ ips, 15 kc for 7½ or 15 ips.

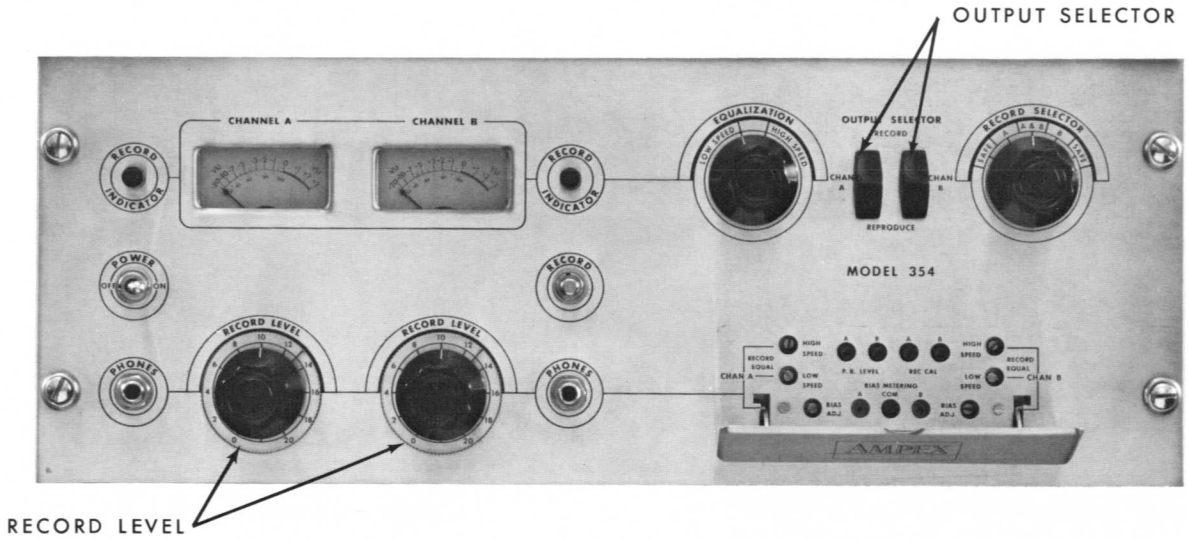
Step 6: With the nut driver, rotate the adjustment nut on the left side of the record head (as the user faces the front of the equipment) to obtain a maximum VTVM reading. Several peaks may appear, but the maximum peak is obvious because it is much greater than the minor peaks.



Record head azimuth adjustment

CAUTION

The right hand nuts are factory set. DO NOT ADJUST THEM.



Record head azimuth controls

NOTE

If it is desired to make this azimuth adjustment using the VU meter instead of the VTVM, place the PLAYBACK LEVEL control in the full clockwise position and adjust the azimuth nut to obtain a maximum VU meter reading.

Overall Frequency Response:

To avoid tape compression, frequency response measurements at 15 ips tape speed should be made at least 10 db below operating level (−6 dbm), at 3¾ and 7½ ips at least 20 db below operating level (−16 dbm). The standard alignment tapes are recorded at a higher level to facilitate reproduce measurements only on the vu meter.

Step 1: Place the OUTPUT SELECTOR switch in the RECORD position.

Step 2: Set the audio oscillator at 500 cycles and adjust the RECORD LEVEL control to obtain a VTVM reading of approximately −16 dbm.

Step 3: Place the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 4: Place the equipment in the record mode at the desired operating speed.

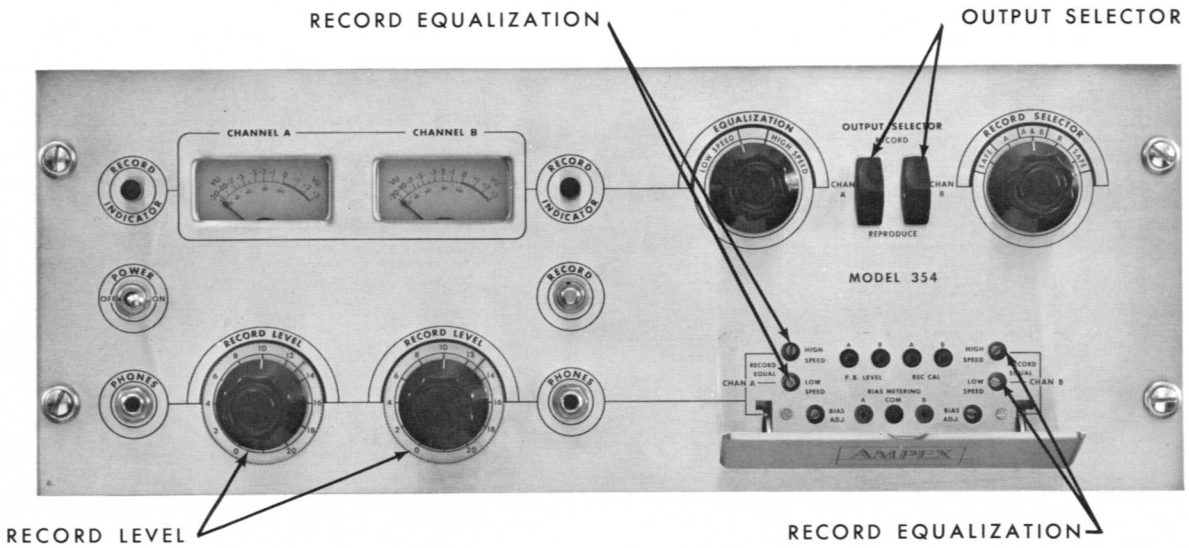
Step 5: Make a frequency response check by using at least ten discrete frequencies between 50 and 15,000 cycles. The high frequency response may vary with tapes of different manufacturers. This machine was adjusted at the factory to give optimum performance within specifications with an average tape. The REC*ord* EQUAL*izer* controls may be re-adjusted to give the flattest possible response with the tape you intend to use. The bias setting will also change the high frequency response, especially at the lower tape speeds (3¾ and 7½ ips). Before adjusting the REC*ord* EQUAL*izers* be certain that the bias has been correctly adjusted as previously described.

CAUTION

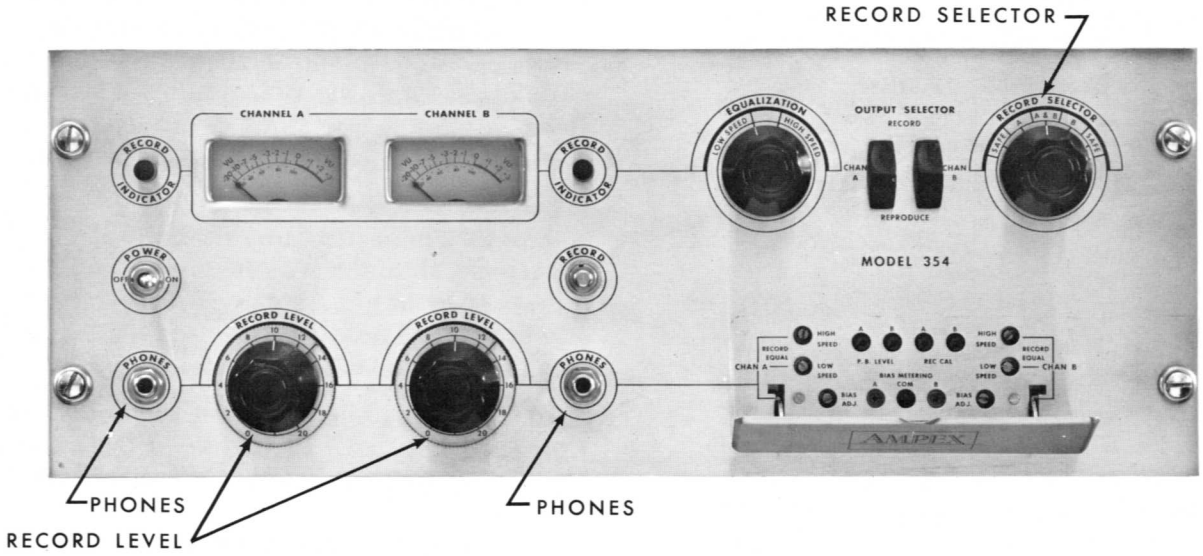
Changing bias may change the RECord level CALIBration which may require re-adjustment as described earlier in this section.

Record Noise Balance Adjustment:

Step 1: Position the RECORD LEVEL control for channel one completely counterclockwise.



Frequency response adjustment controls



Noise balance adjustment controls

Step 2: Disconnect any input.

Step 3: Place the RECORD SELECTOR switch in the "A" position.

Step 4: Place the equipment in the record mode.

Step 5: Plug a set of headphones into the monitor jack for channel one and listen for the minimum noise location while adjusting the noise balance control. Note the position of the slot on the noise balance control.

Step 6: Stop the recorder.

Step 7: Perform steps 1 through 6 for channel "B".

Step 8: Set the noise balance control to the position midway between the positions found in step 5. The control slot should be within 45 degrees of a line paralleling the face panel of the chassis.

NOTE

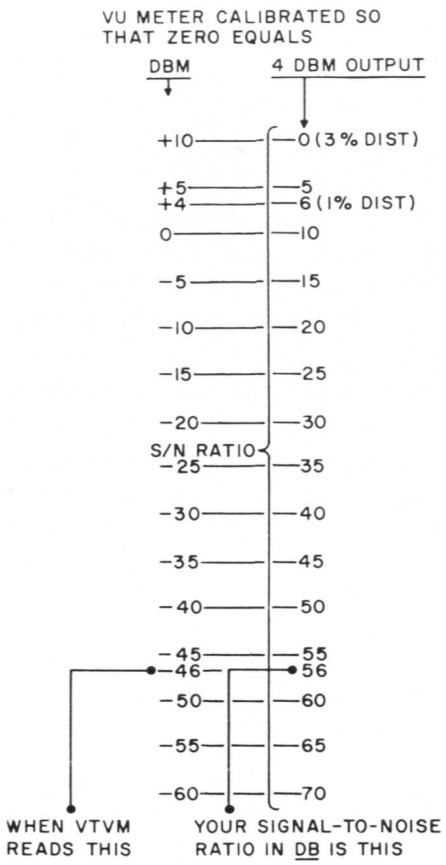
This adjustment is not critical and noise will normally not be heard. This adjustment can, however, be used to balance out second harmonic distortion in the oscillator using a wave analyzer. If noise is present and cannot be nulled in either steps 5 or 8, it indicates excessive leakage in capacitor C12 or C13, trouble in the oscillator circuitry, or magnetized heads and troubleshooting is indicated.

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 +4 dbm output, add 6 db to obtain the output value from the 3% distortion level, arriving at a total of 10 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 10 dbm computed to arrive at the 3% distortion level. Therefore, the VTVM reading must be converted to the signal-to-noise *ratio*.

Example: 10 (dbm, includes 4 dbm normal level and 6 dbm to the 3% distortion level)
−50 (dbm, vtvm reading)
60 db signal-to-noise ratio

Any reading below −50 dbm meets performance characteristics specifications of 60 db signal-to-noise and satisfies the signal-to-noise ratio definition.



Signal-to-noise ratio computations

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 the same tone recorded at the 1% distortion level.

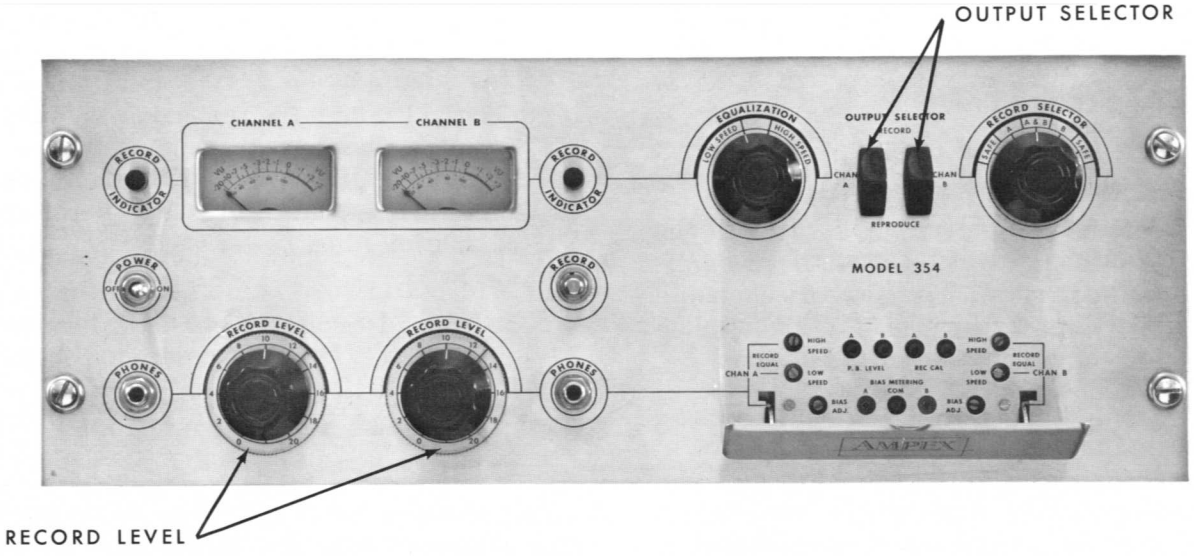
Step 1: Place the OUTPUT SELECTOR switch in the RECORD position.

Step 2: Set the audio oscillator at 1000 cps.

Step 3: Adjust the RECORD LEVEL control to obtain a VTVM reading 6 db above operating level (+10 dbm).

Step 4: Record the 1000 cps on a section of tape, noting where the recording begins for later reference.

Step 5: Disconnect the oscillator.



Noise measurement controls

Step 6: Set the RECORD LEVEL control to zero (fully counterclockwise).

Step 7: Rewind the tape to the beginning of the 1000 cps recording.

Step 8: Erase the tape by recording with no input signal.

Step 9: Rewind again to the beginning of the recording.

Step 10: Place the OUTPUT SELECTOR switch in the REPRODUCE position.

Step 11: Reproduce the tape, reading the VTVM, and checking the reading against the table.

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.

Improper head azimuth adjustment will also affect high frequency response.

When the user suspects 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

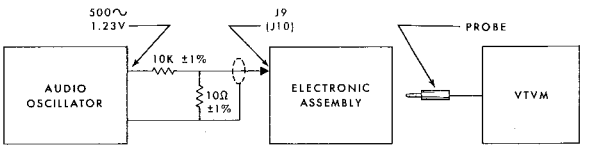
Check B+ voltage at junction of filter choke L1 and capacitor C16b; voltages measured will vary with line voltage, the voltages indicated on the schematic diagram were measured with a 117 volt line voltage. Check all tubes using a tube tester. Make certain that tubes are returned to same socket from which they were removed. Check dc filament voltage to note aging of CR3. Clean the relay contacts by inserting a burnishing tool between contacts and pull 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 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 PRINTED CIRCUIT BOARD SUBASSEMBLY, and fold out SCHEMATIC DIAGRAM—ELECTRONIC ASSEMBLY).



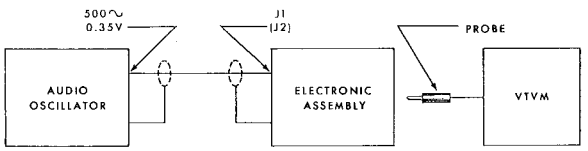
Troubleshooting the reproduce amplifier

Disconnect the head cable at J9 (or J10) when using this circuit. Using a vtvm probe and working back from the output toward the input, check at the grid and plate of each stage until the point at which a signal is indicated on the vtvm. The trouble then is probably in the stage immediately following 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 LOCATION PRINTED CIRCUIT BOARD SUB-ASSEMBLY, and foldout SCHEMATIC DIAGRAM — ELECTRONIC ASSEMBLY).



Troubleshooting the record amplifier

Proceed as in troubleshooting the reproduce amplifier. Typical voltage readings are shown on the foldout schematic diagram. Using the circuit above, check the record amplifier against the appropriate response curve. Response of the amplifier should be checked with the bias oscillator tube removed from its socket and the record relay energized.

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.

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, 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 point 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.

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

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 component 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.

Now the mechanical joint will be revealed. Insert a knife blade between the board and the exposed wire, and carefully raise the wire until it is perpendicular to the board and will come free in the next step. Again apply the soldering iron to the connection point while simultaneously moving the lead back and forth until it breaks free of the molten solder.

Take the replacement component, cut the leads to the desired length, insert them into the holes, bending the leads against the board to make mechanical connections, and solder the connections.

Replacing Electrolytic Capacitors, Relays and Coils

The replacement of these types of components can be accomplished as follows:

Step 1: With the soldering iron, heat each connection and brush away melted solder. Some parts may require prying the mounting lugs perpendicular to the board in order to brush away the melted solder.

Step 2: Trim the lugs as close as possible to the board.

Step 3: Again apply the soldering iron to the connections, brush away the melted solder.

Step 4: Insert replacement component and solder the connections.

Replacing of Tube Sockets

Step 1: With soldering iron, heat each contion and brush away melted solder. If the connections do not come free on the first pass, repeat the heating process until connections are broken.

Step 2: With a pen knife inserted between the socket lug and wiring foil, bend each lug upward — except the grounding lug.

Step 3: When all socket lugs have been freed from the wiring foil, heat the grounding lug until the solder melts and slowly pull the socket away from the board.

ORDERING PARTS

The purpose of the parts list is to aid you in ordering replacement parts. Ampex can offer fast and efficient service in providing normally replaceable parts of the components in the system when proper information is furnished. Parts listed according to the schematic reference symbol, a description of the part and the Ampex part number. The Ampex Corporation offers some replacement parts that are not necessarily exact replicas of those used on the original version of the equipment; but these parts are interchangeable with the original parts. The description column names the part, its composition, electrical value and manufacturer's number (or military specification when available)—and the AMPEX PART NUMBER.

Ampex part numbers are the exact designation for all parts used in Ampex equipment. For example, CAPACITOR, fixed: ceramic, .02 uf + 80%-20%, 500 vdcw; Sprague Part No. 36C205 will always bear the Ampex catalog number 030-059. THIS IS THE NUMBER YOU SHOULD USE WHEN ORDERING REPLACEMENT PARTS. The schematic reference number should NOT be used for ordering purposes as it will vary with different equipment types. Include the following information when ordering parts: Equipment Type, Equipment Serial Number, Ampex Part Number, Description of Part. Example: 4-030-059 capacitors for Series 354.

MODEL 354 ELECTRONIC ASSEMBLY PARTS LIST

Catalog Number 96601-01 thru -04

ELECTRONIC SUBASSEMBLY Catalog Number 96602-01

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1C1	CAPACITOR, Electrolytic: 3X15/450V	30770-03
1C2	CAPACITOR, Ceramic: disc, .05 mfd, 500 v, dcw, +80% -20%: Sprague Part No. 5HK-55	030-066
1C3	Same as 1C2	030-066
1C4	CAPACITOR, Paper: tubular, .068 mfd, ±10%, 400 vdcw: Sprague Part No. 89P68394	035-299
1C5	Same as 1C4	035-299
3C6	CAPACITOR, Variable: trimmer, 50-240 pfd, 175 vdcw: Arco Part No. 584	038-998
3C7	Same as 3C6	038-998
3C8	CAPACITOR, Variable: trimmer, 19-160 pfd, 175 vdcw: Arco Part No. 583	038-999
3C9	Same as 3C8	038-999
1C10	CAPACITOR, Electrolytic: tubular, 2 mfd, -10% +80%, 450 vdcw: Sprague Type DEE	031-991
1C11	Same as 1C10	031-991
1C12	CAPACITOR, Mylar: tubular, .47 mfd, ±20%, 400 vdcw: Goodall Type 600UPE	035-997
1C13	Same as 1C12	035-997
3C14	CAPACITOR, Variable: mica, 19-160 pfd, 175 vdcw: Arco Part No. 583	038-999
3C15	Same as 3C14	038-999
1C16	CAPACITOR, electrolytic: 40-10/450v, 40/250v	30769-05
1C17	CAPACITOR, Ceramic: 2000 pfd, 20%, 1000 vdcw: Sprague Formulation Part No. C-27 Case Size 33C	030-995
1C18	Same as 1C17	030-995
1C19	CAPACITOR, Mica: 300 pfd, 5%, 2000 vdcw: Cornell Dubilier Part No. 1AP20T3	034-990
3C20	CAPACITOR, Mica: .0012 mfd, 5%, 500 vdcw: Elmenco Part No. DM20F122J	034-230
3C21	Same as 3C20	034-230
1C23	CAPACITOR, Electrolytic: 4X 10/450 volts	30769-06
1C24	CAPACITOR, Ceramic: .02 mfd, +80% -20%, 500 vdcw: Sprague Part No. 36C205	030-059

REF.NO.	PART DESCRIPTION	AMPEX PART NO.
1C25	Same as 1C24	030-059
3C26	CAPACITOR, Mylar: tubular, .1 mfd, ±10%, 400 vdcw: Cornell Dubilier Part No. WMF4P1E	035-999
3C27	Same as 3C26	035-999
1C28	CAPACITOR, Ceramic: disc, 33 pfd, 1000 vdcw, ±5%: Sprague Part No. C27-40C	030-994
1C29	Same as 1C28	030-994
1C30	CAPACITOR, Electrolytic: 4 mfd, +150% -10%, 200 vdcw: Cornell Dubilier Part No. ECPB-EX9674	031-997
1C31	Same as 1C30	031-997
1C32	CAPACITOR, Electrolytic: tubular, 4 mfd, -10% +100%, 6 vdcw: Sprague Part No. 89D122	031-986
1C33	Same as 1C32	031-986
3C34	CAPACITOR, Ceramic: .01 mfd, 500 vdcw, Erie Part No. 811-.01	030-002
1C35	CAPACITOR, Electrolytic: tubular, 40 mfd, -10% +80%, 250 vdcw: Sprague Part No. type DEE	031-996
1C37	Same as 1C24	030-059
1C38	Same as 1C24	030-059
4C42	CAPACITOR, Electrolytic: tubular, 2000 mfd, 15 volts	96147-01
4C41	CAPACITOR, Electrolytic: tubular, 1000 mfd, -10% +250%, 15 vdcw: Cornell Dubilier Part No. BRHM-1510	031-034
2C43	CAPACITOR, paper: tubular, .0047 mfd, 20%, 600 vdcw: Sprague Part No. 73P47206	035-028
2C44	Same as 2C43	035-028
3C45	CAPACITOR, Paper: tubular, .047 mfd, 20%, 400 vdcw: Cornell Dubilier Part No. WMF4S47E	035-985
3C46	Same as 3C45	035-985
3C47	Same as 3C45	035-985
4C48	CAPACITOR, Ceramic: disc, .02 mfd, 500 vdcw: Erie Part No. 817-.02	030-001
3C49	CAPACITOR, Electrolytic: tubular, 25 mfd, 6 vdcw: Sprague Part No. 30D131A1	031-140
3C50	Same as 3C49	031-140
1CR1	DIODE, crystal: diffused silicon, 600 volts P.I.V.: Texas Instrument Part No. 1N2071	013-995

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1CR2	Same as 1CR1	013-995
4CR3	RECTIFIER, Selenium: single phase full wave center tap; 2.2 amps, 26v input: Radio Receptor Part No. C16S1C1E1G	582-999
3DS1	LAMP, Neon: miniature, red: Eldema Part No. type 1B9 Part 4774	060-999
3DS2	Same as DS1	060-999
3DS3	LAMP, Miniature: 6.3 vacw: 2 pin: General Electric Part No. 12	060-041
3DS4	Same as 3DS3	060-041
3DS5	Same as 3DS3	060-041
3DS6	Same as 3DS3	060-041
2F1	FUSE, Cartridge: 1/4 x 1-1/4, 3 amps, fast blow, 250V: Littelfuse Part No. 312003	070-001
2F2	FUSE, Cartridge: 1/4 x 1-1/4, .75 amps, slow-blow, 125V: Littelfuse Part No. 313.750	070-048
2J1	CONNECTOR, Receptacle: female, 3 contact: Cannon Part No. XLR-3-31	146-998
2J2	Same as 2J1	146-998
2J3	CONNECTOR, Receptacle: male, 3 contacts: Cannon Part No. XLR-3-32	147-999
2J4	Same as 2J4	147-999
2J5	CONNECTOR, Receptacle: male, 2 contacts: MS3102A-12S-3P	143-014
2J6	Same as 2J5	143-014
2J7	CONNECTOR, Receptacle: male, 2 contacts: MS3102A-10SL-4P	143-009
2J8	Same as 2J7	143-009
2J9	CONNECTOR, Receptacle: male, 3 contacts: MS-3102A-10S-3P	143-008
2J10	Same as 2J9	143-008
3J11	SOCKET, Turret: miniature, 7 pin: Vector Part No. 10-MB-12JW	150-013
3J12	Same as 3J11	150-013
3J13	SOCKET, Turret: miniature, 9 pin: Cinch Part No. 53F12621	150-020
3J14	Same as 3J13	150-020
4J15	SOCKET, Octal: mica: Cinch Part No. 12272 8 AM	150-010

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
4J16	Same as 4J15	150-010
3J17	JACK, Phone: 3 conductor, single closed circuit: Carter Part No. J4	148-024
3J18	Same as 3J17	188-024
2J19	CONNECTOR, Receptacle: female, 6 contacts, 10 amps, 730 v rms: Jones Part No. S-306-AB	146-004
2J20	CONNECTOR, Receptacle: male, 2 contacts, 10 amps, 250 v: Hubbell Part No. 7466	147-013
4K1	RELAY: 3 contact; 20 mfd, 2 HY, .030 amps, dc at 350 volts, 1/2 amp dc at 130 volts	96133-01
4L1	CHOKE: 5.5 HY., ±10% with 50 ma dc	96135-01
4L2	CHOKE: 15 MH with 1.4 amps	96126-01
3M1	VU METER, zero ±1/2 DB at 25°C	96130-01
3M2	Same as 3M1	96130-01
3R1	RESISTOR, Variable: carbon, .100 K ohms, 2 watt, 10%: Allen Bradley Part No. JA1N056S104AZ	044-015
3R2	Same as 3R1	044-015
1R3	RESISTOR, Fixed: carbon, 100 K ohms, 1/2 watt, 10%: MIL-R-11-RC20GF104K	041-022
1R4	Same as 1R3	041-072
1R5	RESISTOR, Fixed: carbon, 2.2K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF222K	041-052
1R6	Same as 1R5	041-052
1R7	RESISTOR, Fixed: composition, 750 K ohms, 1/2 watt, ±5%: Allen Bradley Part No. type ED	041-971
1R8	Same as 1R7	041-971
1R9	RESISTOR, Fixed: carbon, 47K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF473K	041-068
1R10	Same as 1R9	041-068
3R11	RESISTOR, Fixed: carbon, 220 K ohms, 1/2 watt, 20%: Allen Bradley Part No. Type E-B	041-243
3R12	Same as 3R11	041-243
3R13	TRIMMER, Potentiometer: linear taper, 250 K ohms, ±30%	96131-01
3R14	Same as 3R13	96131-01
1R17	RESISTOR, Fixed: composition, 1K ohms, 1/4 watt, 10%: Allen Bradley Part No. Type C-B	041-979

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1R18	Same as 1R17	041-979
1R19	RESISTOR, Fixed: carbon, 560 ohms, 1/2 watt, 10%: MIL-R-11:RC20GF561K	041-045
1R20	Same as 1R19	041-045
1R21	RESISTOR, Fixed: carbon, 22K ohms, 2 watts, 10%: MIL-R-11:RC42GF223K	041-216
1R22	Same as 1R21	041-216
1R23	RESISTOR, Fixed: carbon, 8.2K ohms, 1 watt, 10%: MIL-R-11:RC32GF822K	041-157
1R24	Same as 1R23	041-157
3R25	RESISTOR, Fixed: carbon, 47K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF474K	041-080
3R26	Same as 3R25	041-080
1R27	RESISTOR, Fixed: carbon, 100K ohms, 2 watts, 10%: MIL-R-11:RC42GF104K	041-224
1R28	Same as 1R27	041-224
3R29	RESISTOR, Fixed: carbon, 100 ohms, 1/2 watt, 5%: MIL-R-11:RC20GF101J	041-003
3R30	Same as 3R29	041-003
1R31	RESISTOR, Variable: linear taper, 1k Ohms, 3 watts, ±20%: Chicago Telephone Supply Type UPE-200	044-995
1R32	RESISTOR, Fixed: carbon, 22K ohms, 1/2 watt, 5%: MIL-R-11:RC20GF223J	041-016
1R33	Same as 1R32	041-016
1R34	RESISTOR, Fixed: composition, 1 K ohms, 1/4 watt, 10%: Allen Bradley Part Type C-B	041-979
1R35	Same as 1R34	041-979
1R36	RESISTOR, Fixed: carbon, 470 ohms, 1 watt, 10%: MIL-R-11:RC32GF471K	041-141
1R37	RESISTOR, Fixed: carbon, 330 K ohms, 1/2 watt, 5%: MIL-R-11:RC20GF334J	041-028
1R38	Same as 1R37	041-028
1R39	RESISTOR, Fixed: wirewound, 330 K ohms, 1/2 watt, ±2%: Cinema Part No. CE516E	043-995
1R40	Same as 1R39	043-995
1R41	RESISTOR, Fixed: carbon, 10 megohms, 1/2 watt, 10%: MIL-R-11:RC20GF106K	041-090
1R42	Same as 1R41	041-090

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
1R43	RESISTOR, Fixed: carbon, 220 K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF224K	041-076
1R44	Same as 1R43	041-076
1R45	RESISTOR, Fixed: wirewound, 24 ohms, 1/2 watt, ±5%: International Rectifier Corporation Type BW-1/2	043-996
1R46	Same as 1R45	043-996
1R47	RESISTOR, Fixed: wirewound, 820 ohms, 1/2 watt, ±5%: International Rectifier Corporation Type BW-1/2	043-997
1R48	Same as 1R47	043-997
1R49	RESISTOR, Fixed: carbon, 120 K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF124K	041-073
1R50	Same as 1R49	041-073
1R51	RESISTOR, Fixed: carbon, 4.7 K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF472K	041-056
1R52	Same as 1R3	041-072
1R53	Same as 1R3	041-072
3R54	Same as 3R13	96131-01
3R55	Same as 3R13	96131-01
1R56	RESISTOR, Fixed: carbon, 270 K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF274K	041-077
1R57	Same as 1R56	041-077
1R58	RESISTOR, Fixed: composition, 2.4 megohm, 1/4 watt, 10%: Allen Bradley Part No. Type C-B	041-967
1R59	Same as 1R58	041-967
1R60	RESISTOR, Fixed: carbon, 270 ohms, 1/2 watt, 10%: MIL-R-11:RC20GF271K	041-041
1R61	Same as 1R60	041-041
1R62	RESISTOR, Fixed: carbon, 470 ohms, 1/2 watt, 10%: MIL-R-11:RC20GF471K	041-044
1R63	Same as 1R62	041-044
1R64	RESISTOR, Fixed: carbon, 200 ohms, 1/2 watt, 5%: MIL-R-11:RC20GF201J	041-334
1R65	Same as 1R64	041-334
1R66	RESISTOR, Fixed: carbon, 3.3K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF332K	041-054
1R67	Same as 1R66	041-054

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
3R68	RESISTOR, Fixed: carbon, 12K ohms, 1/2 watt, 10%: MIL-R-11:RC20GF123K	041-061
3R69	Same as 3R68	041-061
3R70	Same as 3R68	041-061
3R71	Same as 3R68	041-061
1R72	RESISTOR, Fixed: carbon, 2.2K ohms, 1 watt, 10%: MIL-R-11:RC20GF222K	041-150
1R73	RESISTOR, Fixed: carbon, 470 ohms, 1 watt, 10%: MIL-R-11:RC32GF471K	041-141
1R75	RESISTOR, Fixed: composition, 1 megohm, 1/4 watt, 10%: Allen Bradley Part No. Type C-B	041-968
1R76	Same as 1R75	041-968
1R77	RESISTOR, Fixed: carbon, 470 ohms, 1/2 watt, 10%: MIL-R-11:RC20GF471K	041-044
3R78	RESISTOR, Fixed: carbon, 100 ohms, 1/2 watt, 10%: MIL-R-11:RC20GF101K	041-038
3R79	Same as 3R78	041-038
3R80	Same as 3R78	041-038
2R81	Same as 3R78	041-038
4R82	RESISTOR, Fixed: carbon, 150 K ohms, 1 watt, 10%: MIL-R-11:RC30GF154K	041-172
4R83	Same as 4R82	041-172
3S1	SWITCH, Equalization: 2 position, shorting, 30° throw	96138-01
3S2	SWITCH, Slide A-B: 2 pole, 2 position, non shorting	96139-02
3S3	Same as 3S2	96139-02
3S4	SWITCH, Channel selector Rec.: 5 position, non-shorting, 30° throw	96142-01
3S5	SWITCH, pushbutton: No., single pole, Arrow H and H Part No. 3391 EPA	120-013
3S6	SWITCH, toggle: SPST, 6 amp, 125V; 3 amp 250V, Arrow H and H Part No. 86994-N	120-005
4T1	TRANSFORMER, Power: 117V 50 or 60 cycle at 25° C = 3 ohms ±10%	96144-01
3T2	TRANSFORMER, Output: 600 ohms (2 to 1) input 1.3 HY., output +18 dbm less than 1% distortion at 50 to 15 kc	96137-01
3T3	Same as 3T2	96137-01
1T4	COIL, Oscillator: 6.4 MHY ±5%	96103-01

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
3TP1	JACK, Tip: red: E. F. Johnson Part No. 105-802	148-999
3TP2	Same as 3TP1	148-999
3TP3	JACK, Tip: black: E. F. Johnson Part No. 105-803	148-998
1V1	TUBE, Electron: 9 pin, 6AW8A: R.C.A. Part No.	021-099
1V2	Same as 1V1	012-099
1V3	TUBE, Electron: 9 pin, miniature, 12AX7: TeleFunken Part No.	012-024
1V4	TUBE, Electron: 9 pin, 6BK7A: General Electric Part No.	012-093
1V5	Same as 1V3	012-024
1V6	Same as 1V4	012-093
1V7	TUBE, Electron: 9 pin, miniature, 12BH7: R.C.A. Part No.	012-065
	BRACKET ASSEMBLY, Equalization (with sockets J11, J12, J13 and J14)	96092-01
	BRACKET ASSEMBLY, Plug-in input (with sockets J15 and J16)	96094-01
	NUT, Sleeve (circuit board mounting)	21078-01
	BOARD ASSEMBLY (includes all items with Prefix 1)	96057-01
	PLUG ASSEMBLY (Dummy) input	17420-01
	FUSEPOST, Finger operated short body: Littelfuse Part No. 342012	085-001
	HOLDER, Pilot Light	96140-01
	KNOB: 1-1/2 inch skirt, 1-1/8" wide: Harry Davies Part No.	230-003
	INDICATOR ASSEMBLY, Reset	50735-02
	SOCKET, Tube: 9 pin	30818-01
	SOCKET, Octal (board mounting)	150-078
	SHIELD, Tube: 9 pin 2-3/8"	160-020
	SHIELD, Tube: 7 pin 2-1/2"	160-999
	SHIELD, Tube: 9 pin 1-15/16"	160-012
	SHIELD, Tube: 9 pin, ventilated	160-998
	CABLE ASSEMBLY, Power line	2413-01
	CABLE ASSEMBLY, Transport power extension	3768-01
	CASE ASSEMBLY, Portable; electronics	4100-00

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
	CASE ASSEMBLY, Portable; transport	5727-00
	CABINET CONSOLE	
	Includes:	
	Cabinet	5797-00
	Rail, right hand	5792-00
	Rail, left hand	5793-00
	Knob, electronics mounting (4 required)	5798-00
	Spring, compression (2 required)	5700-00
	Screw, oval head 12-24 x 1-1/4 (8 required)	471-654
	Washer, finishing +12 (8 required)	506-002
	KNOB, Reel Editing (NAB reels)	1917-00
	KNOB, Reel-holddown (NAB reels)	9093-00
	KNOB, Reel-holddown (EIA reels)	30971-01
	CONNECTOR, Receptacle: output, 24 contacts: MS3102A-24-28P	144-003
	CONNECTOR, Receptacle: input, 2 contacts: MS3102A-10SL-4P	145-009
	HEAD ASSEMBLY	30028-02
	SCREW, Allen head; black, 6-32 x 3/8 (2 required)	471-476

3.75 (120 u sec)/7.5 NAB REPRODUCE EQUALIZER, Cat. No. 96110-01

	CAPACITOR, Mica: 750 pfd, 500 vdcw, 5%: Elmenco Part No. CM20C751J	034-144
	PLUG and SHIELD: 9 pin, Vector Part No. G2.1-8F	099-006
	RESISTOR, Fixed: carbon, 68 K ohms, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-088
	RESISTOR, Fixed: carbon, 160 K ohms, 1/2 watt, ±1%: Electra Part No. DC-112	042-993
	RESISTOR, Fixed: carbon, 82 K ohms, 1/2 watt, 1%: Electra Part No. DC-1/2	041-090

3.75 (200 u sec)/7.5 NAB REPRODUCE EQUALIZER, Cat. No. 96114-01

	CAPACITOR, Mica: 750 pfd, 500 vdcw, 5%: Elmenco Part No. CM20C751J	034-144
	PLUG and SHIELD: 9 pin: Vector Part No. G2.1-8F	099-006

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
	RESISTOR, Fixed: carbon, 10 megohm, 1/2 watt, 10%: MIL-R-11:RC20GF106K	041-090
	RESISTOR, Fixed: carbon, 68K ohms, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-088
	RESISTOR, Fixed: carbon, .27 megohm, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-098

3.75/7.5 NAB RECORD EQUALIZER, Cat. No. 96120-01

	CAPACITOR, Mica: 470 pfd, 500 vdcw, 5%: Elmenco Part No. CM15C470J	034-108
	PLUG and SHIELD: 7 pin: Vector Part No. G2.2-8F	099-005
	RESISTOR, Fixed: carbon, .33 megohm, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-100
	RESISTOR, Fixed: carbon, 47K ohms, 1/4 watt, 5%: MIL-R-11:RC07GF473J	041-411

7.5/15 NAB REPRODUCE EQUALIZER, Cat. No. 96111-01

	CAPACITOR, Mica: 750 pfd, 500 vdcw, 5%: Elmenco Part No. CM20C751J	034-144
	PLUG and SHIELD: 9 pin, Vector Part No. G2.1-8F	099-006
	RESISTOR, Fixed: composition, 6.8 megohm, 1/4 watt, 10%: Allen Bradley Part No. Type C-B	041-975
	RESISTOR, Fixed: carbon, 68 K ohms, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-088
	RESISTOR, Fixed: carbon, 22 megohm, 1/2 watt, 10%: MIL-R-11:RC20GF226K	041-315

7.5/15 NAB RECORD EQUALIZER, Cat. No. 96121-01

	CAPACITOR, Mica: 150 pfd, 500 vdcw, 5%: MIL-C-5A: CM20C151J	034-049
	PLUG and SHIELD: 7 pin: Vector Part No. G2.2-8F	099-005
	RESISTOR, Fixed: carbon, .27 megohm, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-098

REF. NO.	PART DESCRIPTION	AMPEX PART NO.
	RESISTOR, Fixed: carbon, 36 K ohm, 1/2 watt, 5%: MIL-R-11:RC20GF363J	041-456

7.5 NAB/15 AME REPRODUCE EQUALIZER, Cat. No. 96112-01

	CAPACITOR, Mica: 750 pfd, 500 vdcw, 5%: Elmenco Part No. CM20C751J	034-144
	CAPACITOR, Mylar: tubular, 4.7 pfd, 200 vdcw, ±2%: Goodall Part No. Type 663-UW	035-992
	CAPACITOR, Mylar: tubular, 1 K pfd, 200 vdcw, ±2%: Goodall Part No. Type 663-UW	035-993
	PLUG and SHIELD: 9 pin: Vector Part No. G2.1-8F	099-006
	RESISTOR, Fixed: composition, 6.8 megohm, 1/4 watt, 10%: Allen Bradley Part No. Type C-B	041-975
	RESISTOR, Fixed: carbon, 47 K ohms, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-086
	RESISTOR, Fixed: carbon, 68 K ohms, 1/2 watt, 1%: MIL-R-10509A:RN15X6802F	042-136
	RESISTOR, Fixed: carbon, 12 K ohms, 1/2 watt, ±1%: Electra Part No. Type DC-1/2	042-990

7.5 NAB/15 AME RECORD EQUALIZER, Cat. No. 96122-01

	CAPACITOR, Mica: 100 pfd, 500 vdcw, 5%: Elmenco Part No. CM15E101J	034-140
	CAPACITOR, Mica: 430 pfd, 300 vdcw, 5%: Elmenco Part No. Type DM-15	034-991
	PLUG and SHIELD: 7 pin: Vector Part No. G2.2-8F	099-005
	RESISTOR, Fixed: carbon, .12 megohm, 1/2 watt, 1%: MIL-R-10509A:RN15R1203F	042-117
	RESISTOR, Fixed: carbon, .18 megohm, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-096
	RESISTOR, Fixed: carbon, .33 megohm, 1/2 watt, 1%:	042-100
	RESISTOR, Fixed: carbon, 47 K ohms, 1/4 watt, 5%: MIL-R-11:RC07GF473J	041-411

REF. NO.	PART DESCRIPTION	AMPEX PART NO.

7.5/15 CCIR REPRODUCE EQUALIZER, Cat. No. 96113-01

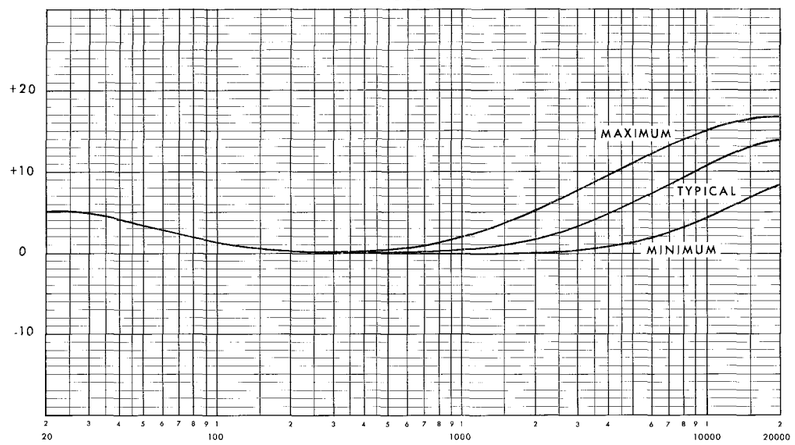
CAPACITOR, Mica: 750 pfd, 500 vdcw, 5%: Elmenco Part No. CM20C751J	034-144
PLUG and SHIELD: 9 pin: Vector Part No. G2.1-8F	099-006
RESISTOR, Fixed: carbon, 47 K ohms, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-086
RESISTOR, Fixed: carbon, .12 megohm, 1/2 watt, 1%: MIL-R-10509A:RN15R1203F	042-117
RESISTOR, Fixed: carbon, 2.4K ohms, 1/2 watt, 5%: MIL-R-11:RC20GF242J	041-315

7.5/15 CCIR RECORD EQUALIZER, Cat. No. 96123-01

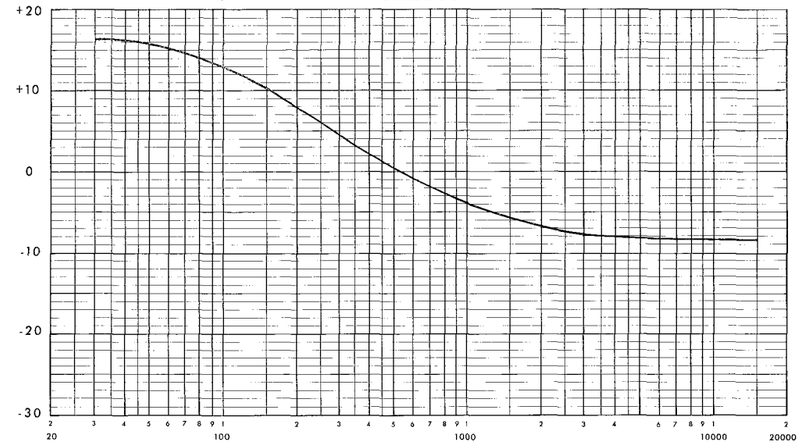
CAPACITOR, Electrolytic: tubular, 4 mfd, 6 vdcw; -10 +100%: Sprague Part No. TE-1083	031-229
CAPACITOR, Paper: tubular, .012 mfd., 100 vdcw, 10%: Cornell Dubilier Part No. WMF1512E	035-984
PLUG and SHIELD: 7 pin: Vector Part No. G2.2-8F	099-005
RESISTOR, Fixed: carbon, 47 K ohms, 1/4 watt, 5%: MIL-R-11:RC07GF473J	041-411
RESISTOR, Fixed: carbon, .237 megohm, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-983
RESISTOR, Fixed: carbon, 23.7K ohms, 1/2 watt, 1%: Electra Part No. Type DC-1/2	042-984

3¾ips (120 μ sec)

RECORD

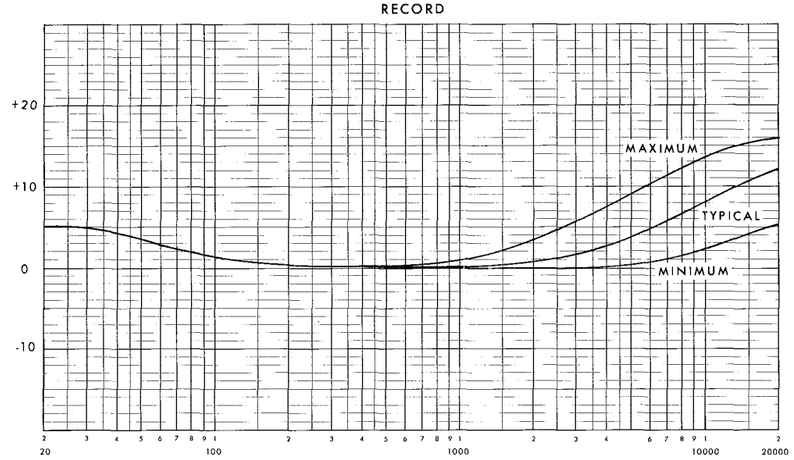


REPRODUCE

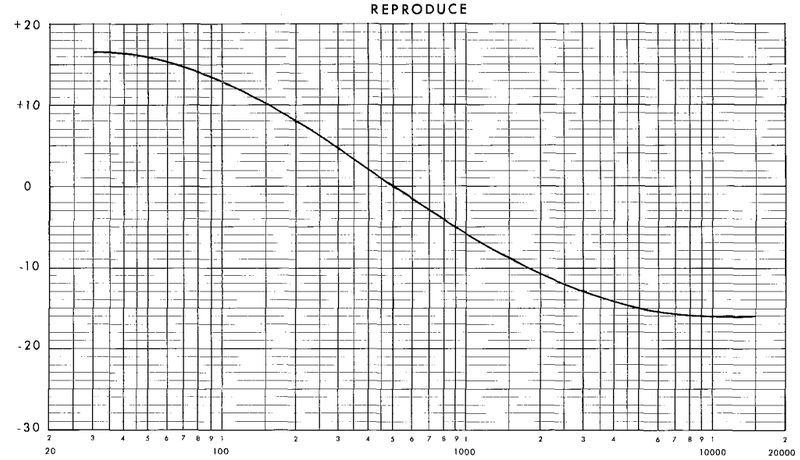


7½ips NAB (SEE NOTE 2)

RECORD

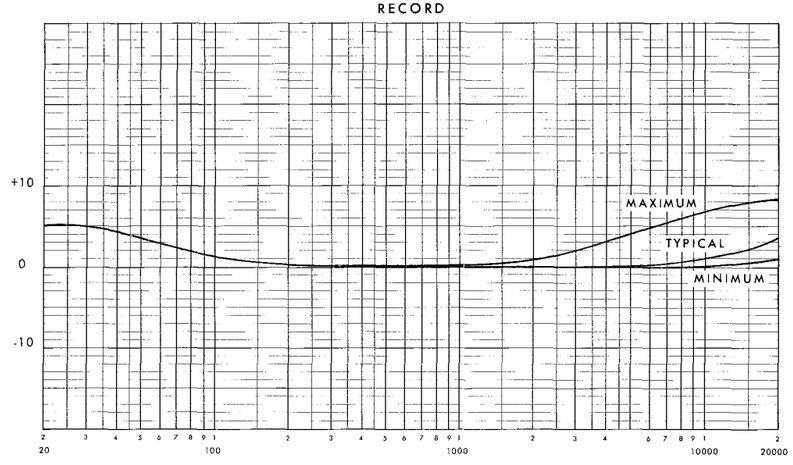


REPRODUCE

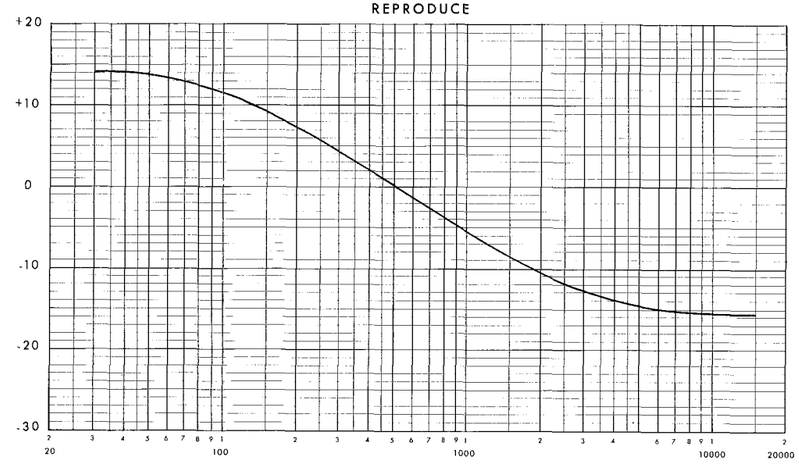


15ips NAB

RECORD



REPRODUCE



NOTE 1
RECORD CURVES SHOWN ARE APPROXIMATE AND WILL VARY WITH TAPE TO MAINTAIN FLAT OVERALL RESPONSE.

NOTE 2
USE THE 7½ NAB REPRODUCE CURVE FOR THE 3¾ (120 μ sec)/7½ NAB AND THE 7½ NAB/15 NAB EQUALIZERS. FOR THE 7½ NAB/15 AME EQUALIZERS USE THE 15 NAB REPRODUCE CURVE.

APPLICABLE RESPONSE CURVES (SHEET 1)

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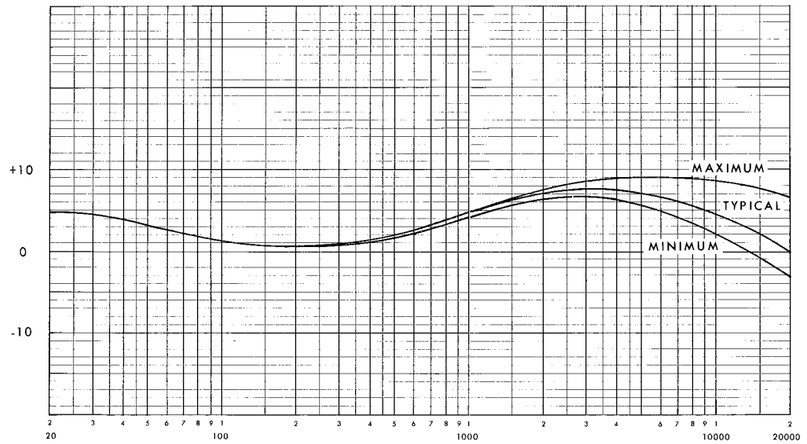
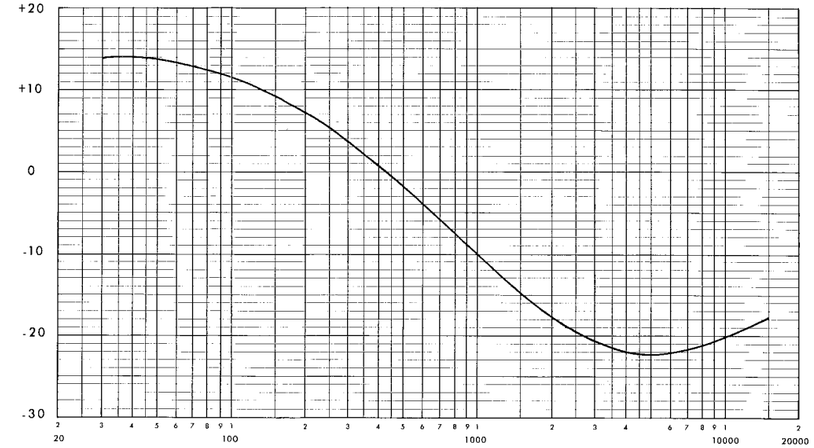
15ips AME

RECORD

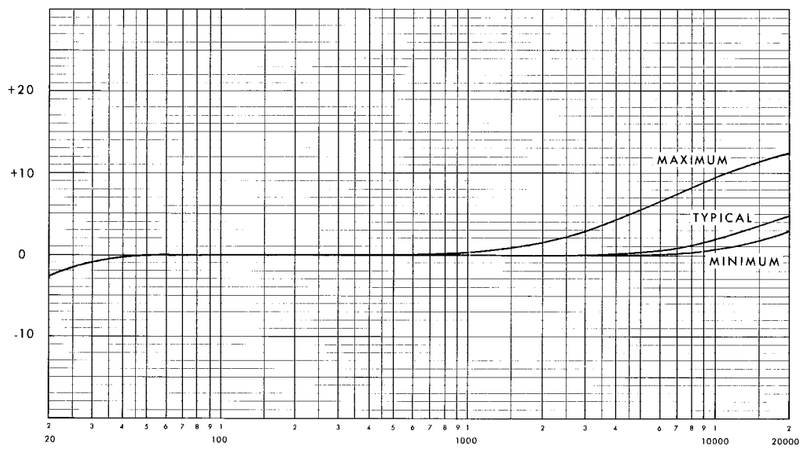


REPRODUCE

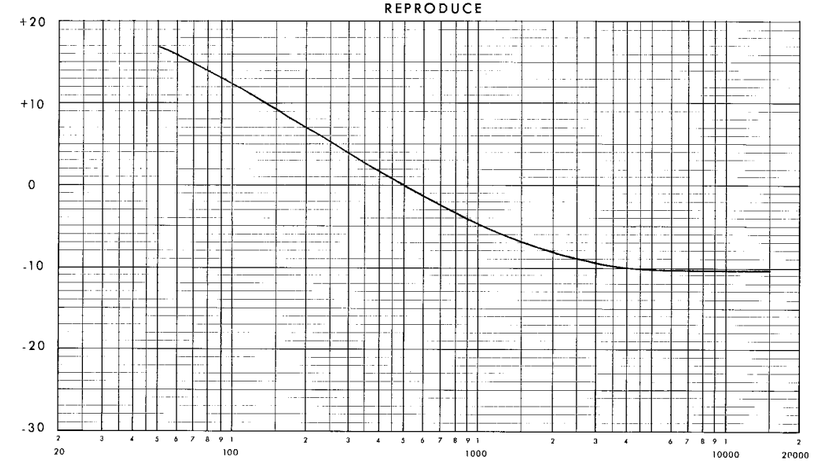


7½ips CCIR

RECORD

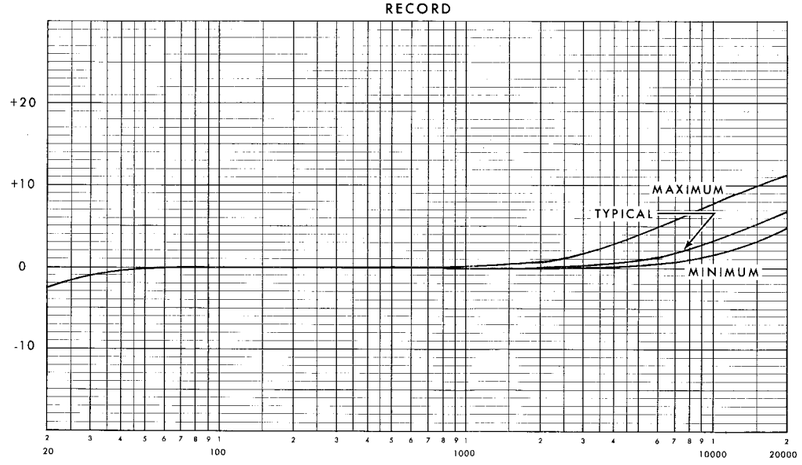


REPRODUCE

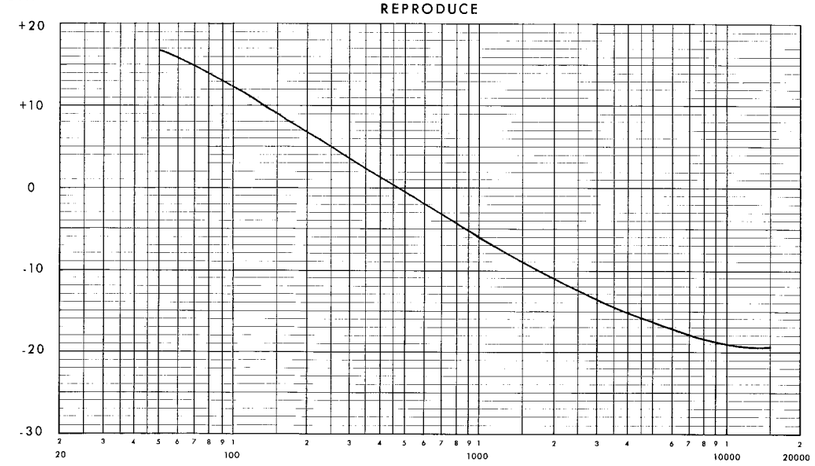


15ips CCIR

RECORD



REPRODUCE



NOTES:
(SEE SHEET 1)

APPLICABLE RESPONSE
CURVES (SHEET 2)

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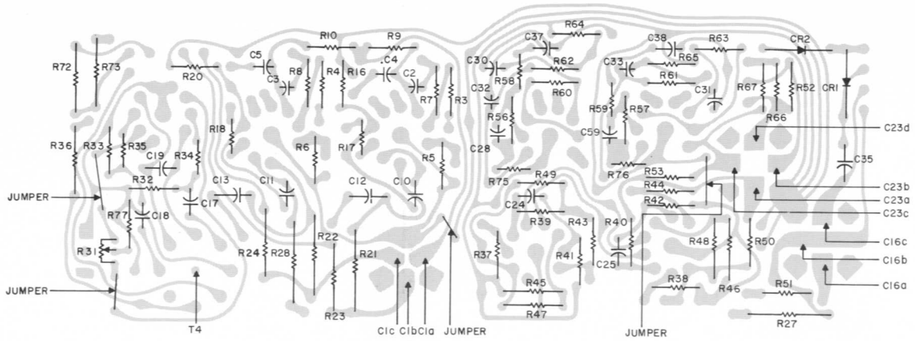
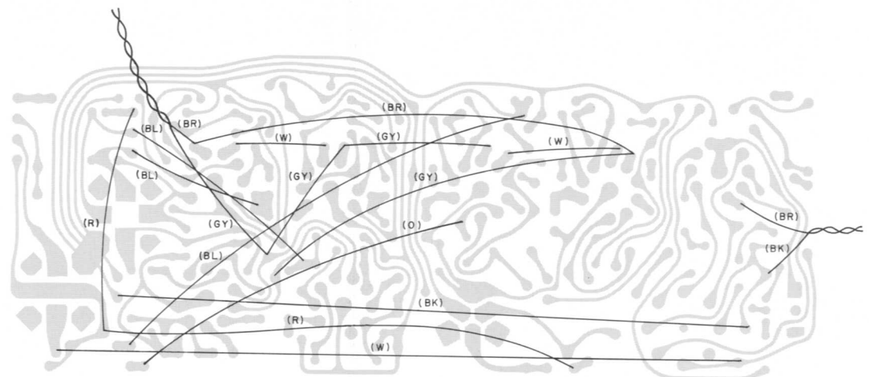
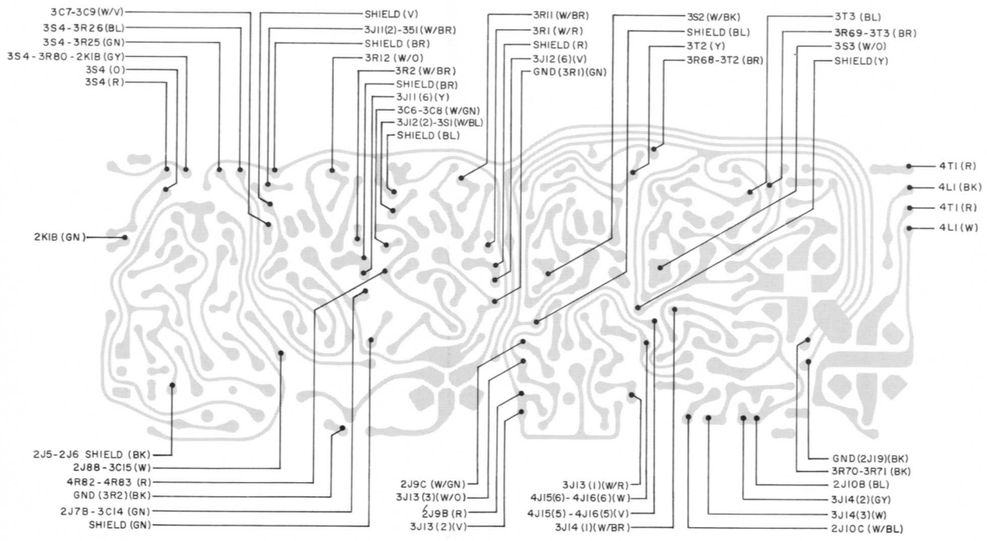


ETCHED BOARD COMPONENTS (TOP)*

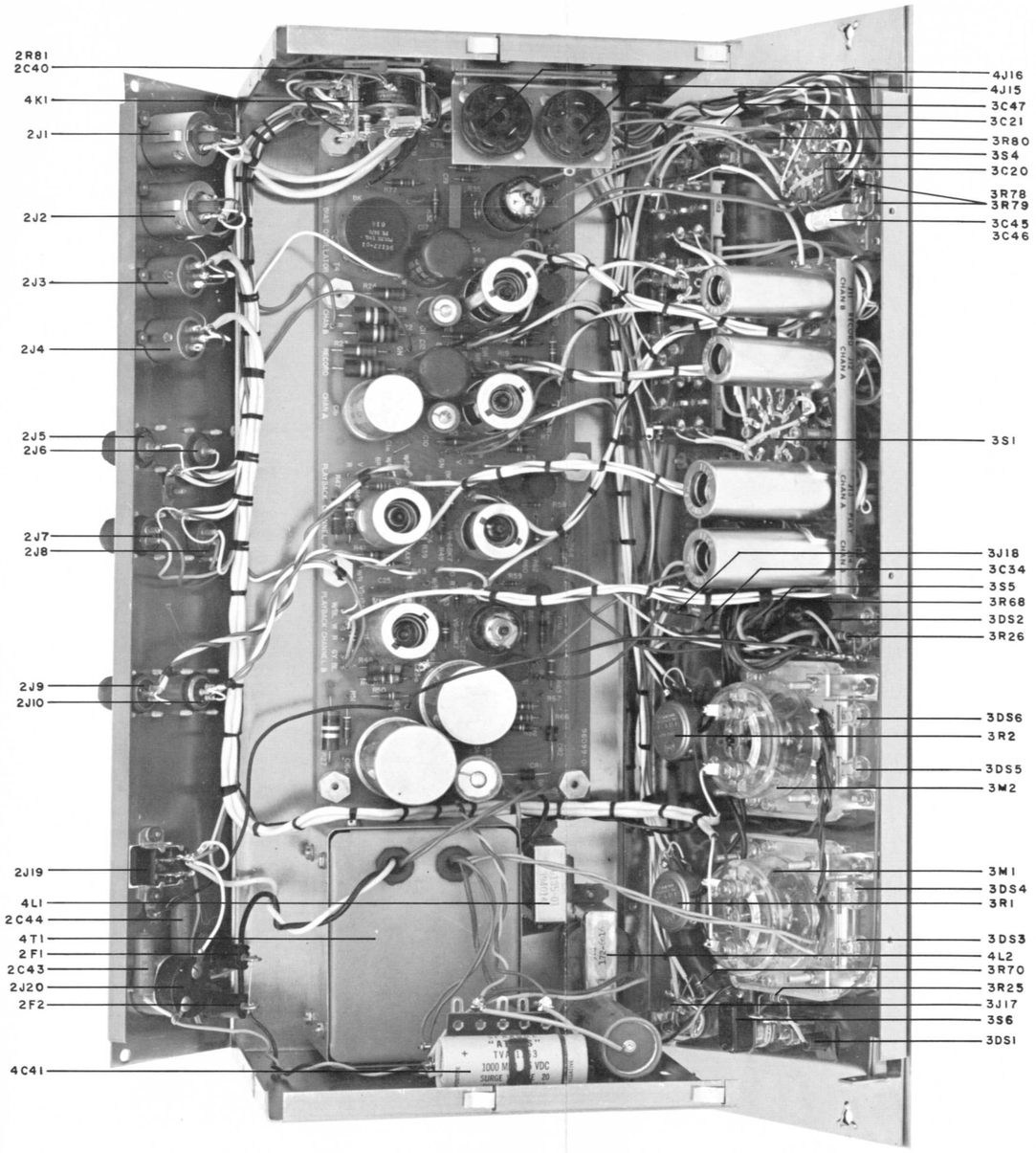


ETCHED BOARD JUMPERS (BOTTOM)



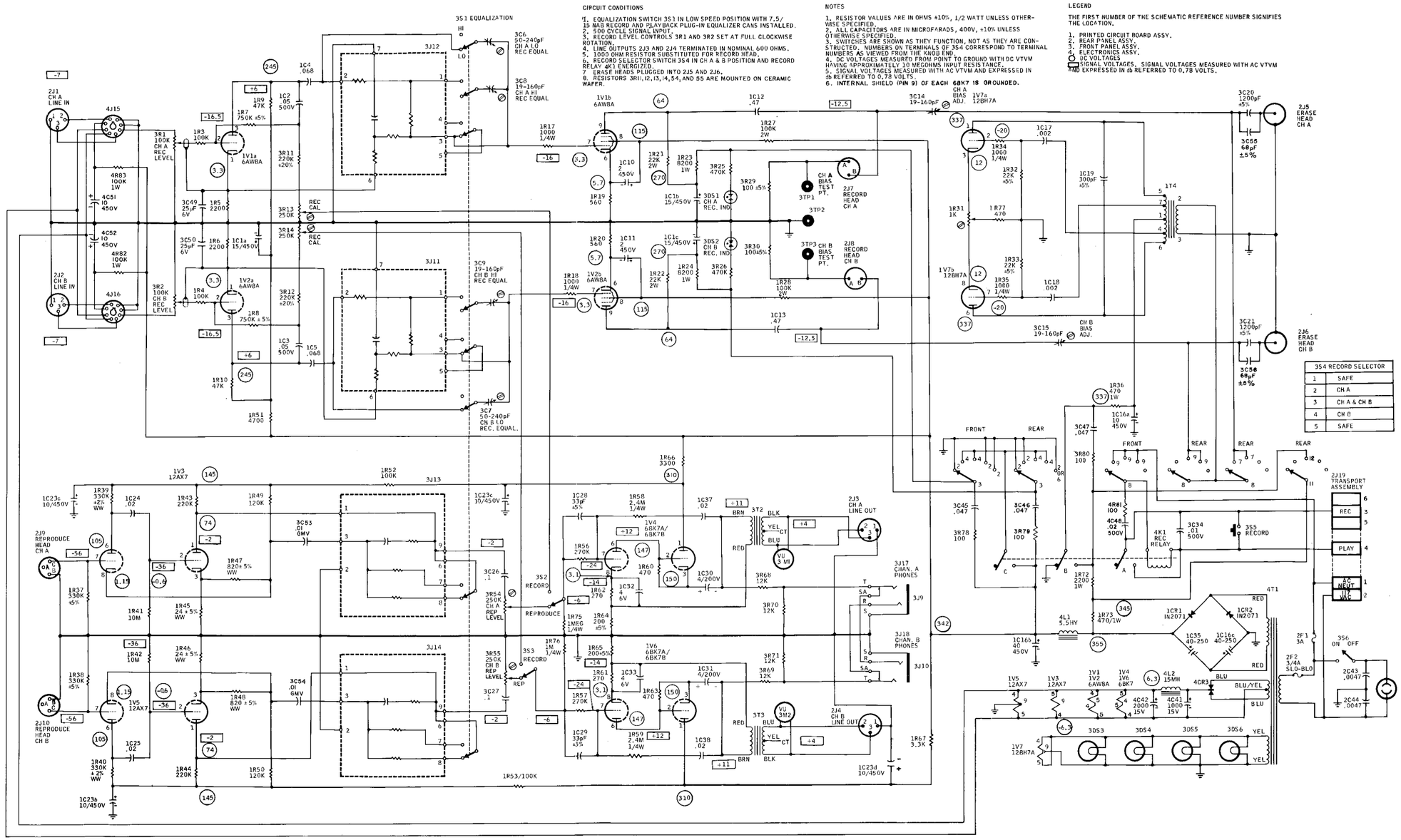
ETCHED BOARD CONNECTIONS (TOP)*

* CIRCUIT PATHS VIEWED THROUGH THE ETCHED BOARD.



CHASIS PARTS LOCATION

SCHEMATIC DIAGRAM - 354 ELECTRONIC ASSEMBLY
Catalog No. 96601-01 thru -04
D-96603
(Sheet 1 of 2)



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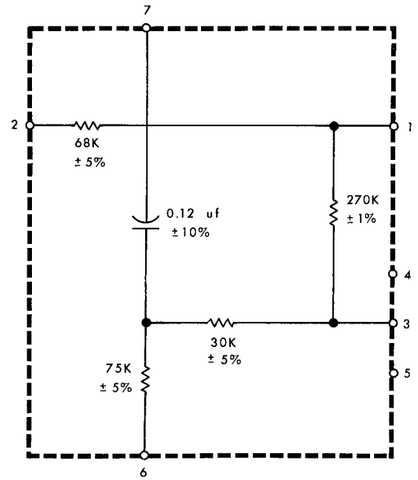
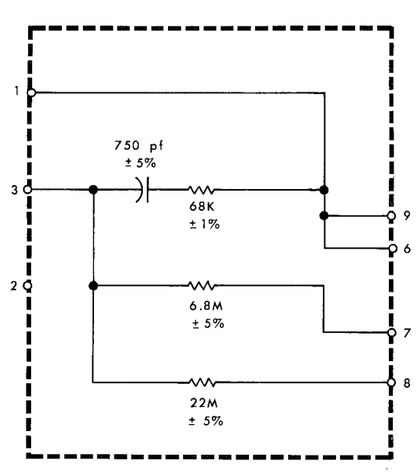
SCHEMATIC DIAGRAM
354 ELECTRONIC ASSEMBLY
Catalog No. 96601-01 thru -04
D-96603
(Sheet 2 of 2)

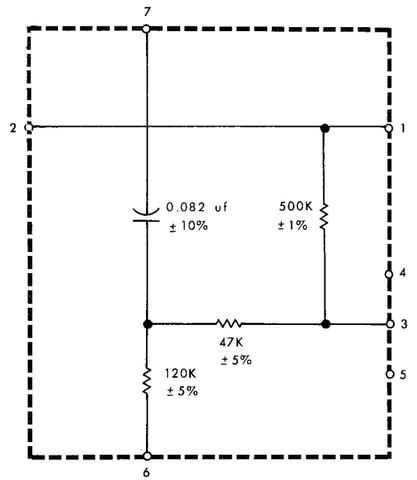
7.5/15 NAB RECORD



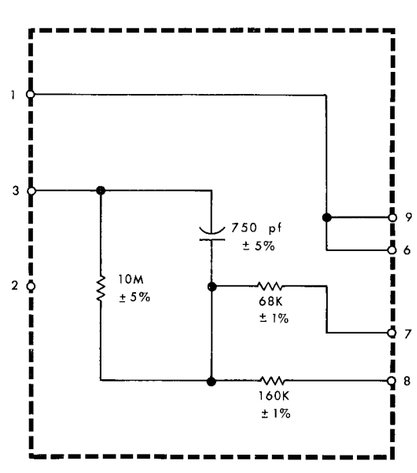
7.5/15 NAB REPRODUCE



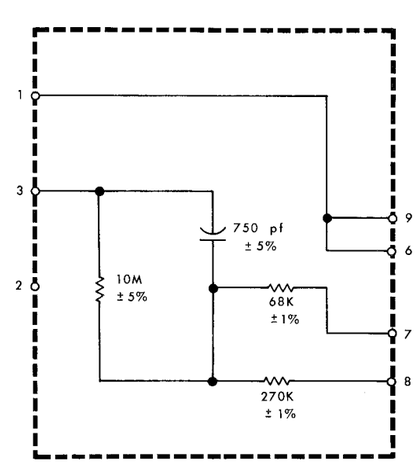
3.75/7.5 NAB RECORD



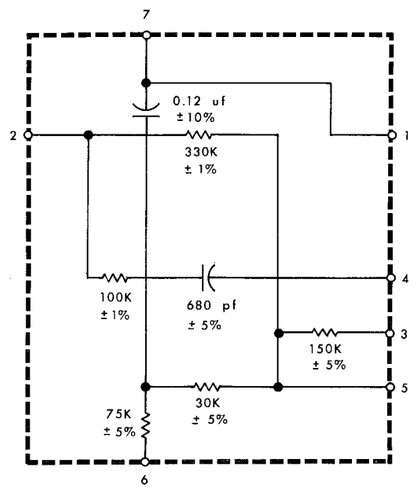
3.75 (120 u sec)/7.5 NAB REPRODUCE



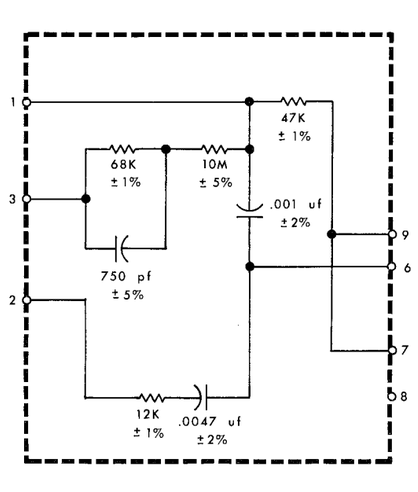
3.75 (200 u sec)/7.5 NAB REPRODUCE



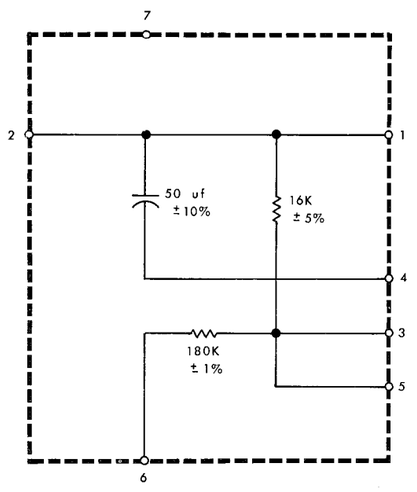
7.5 NAB/15 AME RECORD



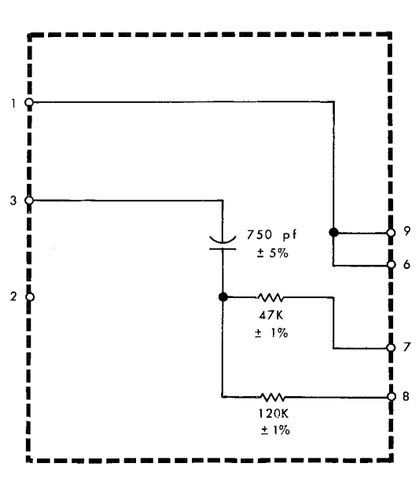
7.5 NAB/15 AME REPRODUCE



7.5/15 CCIR RECORD



7.5/15 CCIR REPRODUCE



NOTE:

The schematic diagrams shown here are of the plug-in equalizer assemblies for the 354 electronics. Typical plug-in equalizers are shown on the schematic diagram for the electronic assembly.

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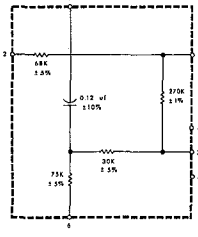
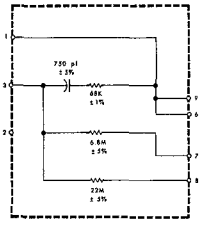
These equalizer schematics are included so that they may be cut out and posted on the main schematic diagram.

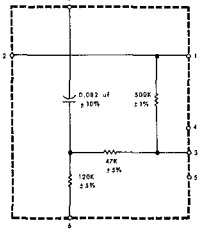
7.5/15 NAB RECORD



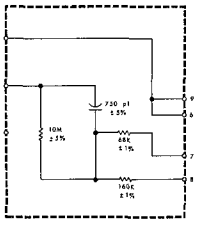
7.5/15 NAB REPRODUCE



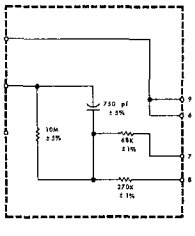
3.75/7.5 NAB RECORD



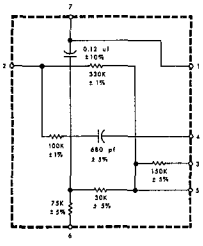
3.75 (120 u sec)/7.5 NAB REPRODUCE



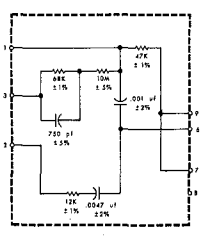
3.75 (200 u sec)/7.5 NAB REPRODUCE



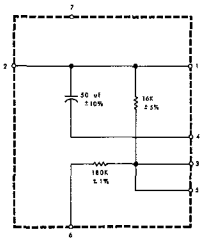
7.5 NAB/15 AME RECORD



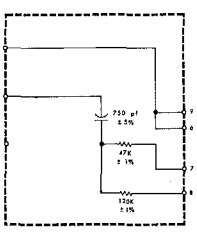
7.5 NAB/15 AME REPRODUCE



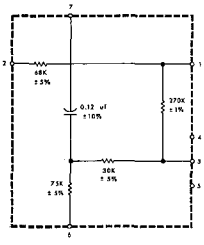
7.5/15 CCIR RECORD



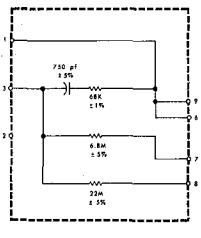
7.5/15 CCIR REPRODUCE



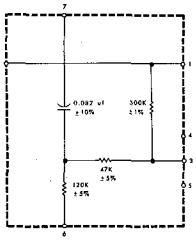
7.5/15 NAB RECORD



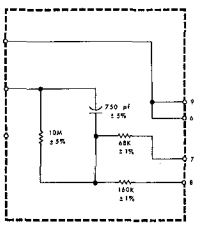
7.5/15 NAB REPRODUCE



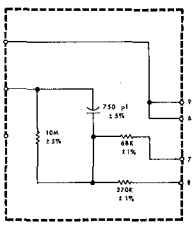
3.75/7.5 NAB RECORD



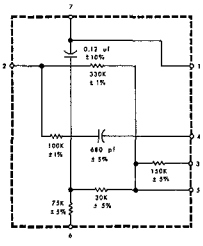
3.75 (120 u sec)/7.5 NAB REPRODUCE



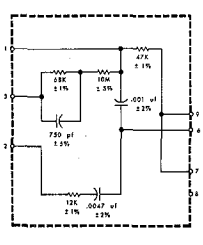
3.75 (200 u sec)/7.5 NAB REPRODUCE



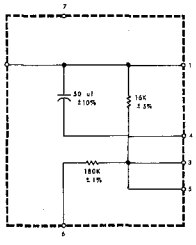
7.5 NAB/15 AME RECORD



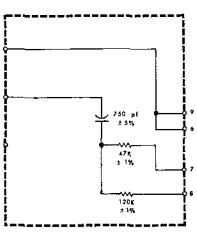
7.5 NAB/15 AME REPRODUCE



7.5/15 CCIR RECORD



7.5/15 CCIR REPRODUCE



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