

**3A STEREO·DISK RECORDER
AND
RA-1574-B AMPLIFIER**

TECHNICAL INFORMATION BULLETIN

Westrex

3A STERODISK RECORDER AND RA-1574-B AMPLIFIER

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Westrex Corporation

HOLLYWOOD DIVISION

TECHNICAL INFORMATION BULLETIN OPERATING AND MAINTENANCE INSTRUCTIONS FOR 3A STEREO DISK RECORDER AND RA-1574-B AMPLIFIER

1.0 Use

The Westrex 3A StereoDisk Recorder records two stereophonic channels in a single groove with a single stylus. The axes of the two recordings are at 90° to one another, each being at 45° with the horizontal plane of the record. By the use of appropriate input circuits, the vertical-lateral type of stereophonic record may also be recorded. By proper polarizing of the input circuits to the recorder, standard lateral records may also be cut with the 3A StereoDisk Recorder.

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3.0 General Data

Input Impedances:

Amplifier: 2-600 ohms balanced or unbalanced inputs.

Recorder: Drive coils—5.6 ohms.
Feedback coils—11 ohms.

Amplifier Power Output: Approximately 75 watts maximum.

Frequency Response: 3A Recorder with RA-1615-A Equalizers and with two RA-1574-B Amplifiers, provides essentially constant velocity recording, 40 to 15000 cps. With RA-1617-A in place of RA-1615-A, provides constant velocity recording modified by RIAA recording characteristic.

Sensitivity: A 1000-cycle input level of approximately 0 dbm to RA-1574-B Amplifier pro-

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3.0 General Data (Continued)

	duces a recording velocity of 5 cm per sec. with maximum feedback setting.
Monitor Level Output:	Approximately -15 dbm at 1000 cps for 5-cm-per-sec. velocity component.
Monitor Equalization in Amplifier:	RIAA.
Controls:	Advance ball adjusting screws. Adjustable feedback (normal operation is with maximum feedback). Low-frequency equalization of 0 to +3 db at 70 cps (in five steps). High-frequency equalization of 0 to -5 db at 10,000 cps (continuously adjustable).
Power Supply:	2 RA-1567-B required.

4.0 Description

4.1 3A StereoDisk Recorder

The 3A StereoDisk Recorder contains two coil assemblies, each assembly being associated with one channel. Each coil assembly contains a drive coil and a feedback coil located in annular gaps in separate pole pieces, the pole pieces being attached to a single common magnet. The coil assemblies are attached to the stylus holder through links which are designed to be stiff longitudinally but flexible laterally. Figure 1 is a bottom view of the recorder with the principal items of interest called out. The stylus holder accepts a tapered-shank stylus. The R-77106 Tool may be ordered separately to mount and remove the stylus. A feather-edge microgroove tapered stylus per ASP-77232(2) is furnished with the recorder.

The advance-ball mounting is shown in Figure 1. Two thumbscrews provide vertical and lateral adjustment of the advance ball. The former controls the depth of cut and the latter centers the path of the advance ball within the area of removed material. An advance ball is furnished with the recorder. It is coded P-95103 Advance Ball.

The recorder is supplied with facilities for hot-stylus recording. The ASO-77251 Power Supply or the equivalent is required. A single cord attached to the power supply and terminated in a No. 219 "Herman Smith" Banana Plug connects to the jack at the end of the recorder arm.

Connections between the recorder and the amplifiers are made through a pair of cords with five pin plugs, which mate with two receptacles mounted on the RA-1323 Recorder Holder. One end of each cord is connected to and is part of an RA-1574-B Amplifier. The plug from the number one or left-channel amplifier (equivalent to the outside track on stereo tape) is to be mated with the receptacle designated "Left" and located on the recorder holder. Similarly the plug from the number two or right-channel amplifier is to be mated with the receptacle designated "Right". When so connected, the left-channel signal will be recorded on the inside of the groove and the right-channel signal will be recorded on the outside of the groove.

The connecting block, containing the two receptacles, is mounted on the recorder arm during storage or shipment. It is to be mounted on the top of the RA-1323 Recorder Holder when the recorder is in use, as outlined in Section 5.12. The recorder is furnished in a carrying case.

4.2 RA-1323 Recorder Holder

The RA-1323 Recorder Holder is used for mounting the 3A Recorder. It provides for vertical motion of the recording head and for raising and lowering the head at the beginning and end of recording. The weight of the recording head is counter-balanced by a coil spring

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4.0 Description (Continued)

so that the force on the advance ball may be adjusted to any desired value. Accurate ball bearings allow the head to follow variations in the surface of the record blank with extremely small friction. The recorder is raised or lowered by means of the lever which takes the form of a cam operating against a hard surface. The cam is shaped so that the recorder head will be lowered gently onto the record blank without introducing vibration.

The cone-pointed screws which hold the movable saddle may be adjusted and locked to eliminate lateral motion of the saddle. The RA-1323 Recorder Holder is not supplied with the recorder and must be ordered separately.

4.3 Mounting Adapters

The L-94813 Recorder Holder Adapter is used to make the 3A Recorder assume the same relative position as the 2B Recorder. The ASO-71389-2 Adapter is required for mounting the recorder on an RA-1389 Disk Recording Machine or on a Scully Lathe. These items are not furnished with the recorder and if required they must be ordered separately.

4.4 Hot Stylus Recording

Stylus heating facilities have been provided in the 3A Recorder. As shown in Figure 1 these consist of two small terminals to which may be attached the leads from a simple heater coil energized with 6 volts from an a-c source. The heater coil is designed to slide over the stylus after it has been set in the stylus holder, and the coil is held in place by the natural spring tension of the coil leads. The coil consists of $7\frac{1}{2}$ turns of resistance wire of 0.005" diameter having a resistance of 32 ohms per foot and close-wound on a .038" mandrel such as the shank of a No. 62 drill. The coil is easily installed or removed for stylus cleaning or replacement.

The ASO-77251 Power Supply may be ordered separately to supply power to the heating coil. Its circuit schematic is shown in Figure 2. One

side of the circuit is through the banana plug PG-1 which is connected to the jack on the recorder arm. The other side of the circuit is through the ground lug which may be fastened under one of the cable-clamp screws on the adapter plate. Feather-edged styli are used for hot-stylus recording.

It will be observed that as current is applied to the heater coil, the noise level at any particular diameter of cut will decrease as the current is increased up to about one ampere. It is not desirable to increase the current beyond this value as too much heat may cause burned chips to adhere so tightly to the stylus that their removal may cause the destruction of the stylus. *The suction pump should be operating whenever the heater coil is energized to avoid adhesion of burned chips to the stylus.*

5.0 Installation

Caution: A strong magnetic field surrounds the 3A Recorder which may be harmful in the following respects unless simple precautions are taken:

- (a) Avoid bringing the recorder near iron dust or filings as this material may become lodged in the coil gaps of the pole pieces and create serious difficulties.
- (b) Watches may be magnetized.
- (c) The recorder may be pulled from the hand or tools may be drawn forcibly against the stylus or advance-ball assembly.
- (d) The recorder will be drawn down with excessive force toward a turntable platter of magnetic material.

The effective stray field decreases rapidly with distance and it is unlikely that mechanisms will be disturbed at distances greater than 8 inches.

5.1 Mechanical

5.11 Recorder Preparations

It is assumed that the recording stylus and advance ball are already mounted in the re-

3A STERIODISK RECORDER AND RA-1574-B AMPLIFIER

5.0 Installation (Continued)

recorder. If this is not the case instructions for mounting or removing these items are given in Section 7.1.

5.12 Mounting on Machine

It is assumed that a suitable disk recording machine is in readiness for the installation of the 3A Recorder and accessories. Operating instructions for the RA-1389 Disk Recording Machine may be used for reference. The ASO-71389-2 Adapter or equivalent should be attached to the carriage. Suction equipment should also be available for use. The threaded stud of the L-94813 Recorder Holder Adapter is inserted in the front hole ($\frac{3}{32}$ " Dia.) of the ASO-71389-2 Adapter and is clamped in place by tightening the large knurled nut supplied with the RA-1323 Recorder Holder. During this operation the recorder holder adapter should be pressed down to insure contact with the machined lip of the adapter.

Before mounting the RA-1323 Recorder Holder, it should be inspected to determine if it has been modified to provide a No. 10-32 tapped hole in the top between the upper detail of the dash pot and the spring mounting bracket for mounting the connecting block of the 3A Recorder. If this modification has not been performed, a No. 10-32 tapped hole $\frac{1}{2}$ inch deep must be provided as follows:

Drill and tap the hole on the center line midway between the upper detail of the dash pot and the spring mounting bracket of the recorder holder. The space between these items is approximately $\frac{1}{2}$ inch. If the connecting block will not enter this space, loosen the mounting screws of the dash-pot detail and move it so that the block enters. Drill the hole $\frac{1}{2}$ inch from the rear edge of the recorder holder, so that the edge of the block will line up with the holder.

The threaded stud of the RA-1323 Recorder Holder is inserted in the hole in the L-94813 Recorder Holder Adapter and the nut supplied with the recorder holder adapter is tightened.

During this operation the recorder holder should be pressed down to insure contact with the machined lip of the recorder holder adapter. The recorder is then mounted in the recorder holder and the connecting block containing two receptacles is mounted on top of the recorder holder. The two upper screws of the holder when tightened sufficiently will hold the recorder in place. During these operations the recording head should be at one side of the turntable to avoid possible damage to the stylus or the advance ball. The recorder should be moved forward or back until the stylus is on a line between the center pin and the center of the carriage.

5.13 Adjustments

The height of the recorder holder should be adjusted to place the recorder in a horizontal position while recording.

The counter-balance spring is then adjusted to provide the proper vertical force on the advance ball. This adjustment is made by first turning the thumbscrew that controls the counter-balance spring tension counterclockwise to insure that the advance ball is resting on the disk. The thumbscrew is next turned clockwise until the advance ball barely clears the disk. The thumbscrew is then turned counterclockwise about $\frac{1}{3}$ turn. The resulting pressure will be found satisfactory in most cases.

When the above adjustments are made correctly the stylus should be vertical when it touches the record blank and the recorder arm should be horizontal. The stylus should be in line with the center pin to within $\pm \frac{1}{16}$ inch. The advance ball should be adjusted laterally by means of the lateral-adjustment small thumbscrew on the recorder so that it leads the stylus by one or two groove pitches, and so that the track it leaves will fall within the cut groove. The width of the cut groove is controlled by the large thumbscrew on the recorder. Test cuts should be made at the desired groove pitch and width to determine that the grooves are clean and uniformly spaced and that no advance ball marks or chatter are introduced.

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5.0 Installation (Continued)

5.14 Suction Equipment

The 3A Recorder requires a suction equipment to remove the cut chips. Connection should be made to the suction tube on the recorder.

5.2 Electrical

The RA-1574-B Amplifier is described in detail in Section 8. The amplifiers should be installed close to the recorder with which they will be associated. The normal length of the cables which connect the recorder to the amplifiers is 8 ft. Tests have shown that special cable lengths up to 20 ft. are satisfactory.

Each amplifier requires an RA-1567-B Power Supply for its operation. If the amplifiers and power supplies are to be mounted close together, their relative positions are important if the signal-to-noise capability of the amplifiers is to be realized. When mounted adjacent to each other in a rack, the power supplies should be mounted above the amplifiers to minimize hum pickup.

The recorder requires two amplifiers and power supplies, one for each channel.

RA-1541-A Amplifiers may be used instead of the RA-1574-B Amplifiers. The RA-1541-A Amplifier contains its own power supply, but has a lower power output and no monitor amplifier.

Applying direct current to the amplifier filaments and mounting the power supply at least 1 ft. from the amplifier will reduce the hum level still more for very special recordings.

The amplifiers and power supplies should be interconnected, an external ground should be applied and a 115-volt, 50 or 60-cycle, single-phase, a-c power source should be connected as shown in Figure 3. In addition, the recording machine should be grounded. The RA-1567-B Power Supply is described in a separate bulletin. The amplifier and power supply are equipped with safety switches which open one

side of the 115-volt line when either front panel is removed. However, a considerable proportion of the 600 volts remains at terminal 24 of TS2 in the amplifier for some time after the power supply is turned off. As a precautionary measure, this terminal should be shorted to the chassis before attempting to work on the circuit.

It may be found desirable to interconnect the 115-volt leads to the ASO-77251 Power Supply and to the suction equipment so that the suction equipment must be in operation when the heater coil on the stylus is energized for hot-stylus recording. Aside from this, the power supply for hot-stylus recording is connected as outlined in Section 4.4.

The case of the recorder receives its ground through the ground on the recording machine. The fuse F-1 in the amplifier should be in place at all times and its value should not be changed.

The RA-1615-A Equalizer which contains two identical equalizer sections is required for the operation of the 3A StereoDisk Recorder. Each section of the equalizer supplements the feedback loop to provide an essentially constant velocity characteristic for one channel of the 3A StereoDisk Recorder, with a constant-voltage input to each equalizer section. The frequency characteristic of the RA-1615-A Equalizer is shown in Figure 4, and its schematic circuit is shown in Figure 5. The insertion loss of the equalizer at 1000 cps is approximately ~~18.5~~₂₅ db.

Each section of the RA-1615-A Equalizer should be followed by an appropriate amplifier stage which in turn is followed by the RIAA or equivalent pre-equalizer and the RA-1574-B or RA-1541-A Amplifier.

The connections to the input terminals of the two recording amplifiers should be so polarized that in-phase signals on the two tracks on the master record are in-phase at the amplifier input terminals. Under these conditions, in-phase signals in the two channels should result in a lateral recording of the record groove. This is in accordance with the proposed standard recording procedure and minimizes the ampli-

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5.0 Installation (Continued)

tude limitation placed upon the system by the vertical component of the recording, thus permitting somewhat higher levels to be recorded.

The RA-1617-A Equalizer contains two identical equalizer sections, each of which combines the frequency characteristic of the RA-1615-A with the RIAA characteristic. It can therefore be used in place of one RA-1615-A and two RIAA equalizers at a considerable saving in system gain requirements. The frequency characteristic of the RA-1517-A Equalizer is shown in Figure 6 and its schematic circuit is shown in Figure 7. The insertion loss of the equalizer at 1000 cps is approximately 20.7 db.

Volume-indicator, direct-monitor and bridging facilities will also be required depending on the installation arrangement.

6.0 Test and Operation

6.1 Recorder Response Calibration

The 3A Recorder without feedback has a resonance rise of approximately 23 db in the vicinity of 1600 cps. The application of the RA-1615-A Equalizer and the correct amount of feedback results in a recorder modulation characteristic which is flat ± 2 db from 40 to 15000 cps, except for a narrow dip at about 11 kc. This condition is normally obtained with the use of maximum feedback.

The low-frequency equalizer in the recording amplifier has five steps. Turning the control switch clockwise raises the response at 70 cps approximately $\frac{3}{4}$ db per step.

The high-frequency equalizer in the recording amplifier is continuously variable. Turning the control clockwise lowers the response at 10000 cps a maximum of 5 db.

The following procedures and explanations describe an electrical method of calibrating the equalizer, recorder and amplifier.

To test for sensitivity, the low-frequency and high-frequency controls should be set at their

extreme counterclockwise position which cuts out equalization. The feedback control should be set at its extreme clockwise position for maximum feedback. The output of the monitor amplifier should be terminated at terminals 4 and 6 of TS-1 with 600 ohms. A vacuum-tube voltmeter should be connected across terminals 7 and 8 of TS-1. Send a 1000-cps signal from a 600-ohm sending source at a level of 0 ± 2 dbm into the input of the RA-1574-B Amplifier at terminals 1 and 3 of TS-1. The vacuum-tube voltmeter should indicate a feedback voltage of 0.012 volts. This value of feedback voltage represents a stylus velocity of approximately 5 centimeters per second.

6.2 Amplifier-Recorder Sensitivity Tests

For the purpose of recording, the feedback controls on the RA-1574-B Amplifiers should be set fully clockwise for maximum feedback. Tests for determining the sensitivity of each of the two amplifiers and the recorder should include the making of a test record in which a constant 1-kc level is applied to the input of each amplifier. The records should then be reproduced and the levels of each channel should be read on a volume indicator. The variable attenuators ahead of each RA-1574-B Amplifier should then be adjusted to correct for the difference in recorded levels in the two channels as determined by reproduction. It may also be desirable to check the sensitivity of several recorders with a given pair of amplifiers so that if necessary an interchange of recorders can be made with a minimum of delay.

The normal variation in the 1-kc sensitivity of the 3A Recorders as supplied to the field is generally well within ± 1 db.

6.3 System Line-Up

It is expected that the principal application of the 3A StereoDisk Recorder will be for the transfer operation from stereophonic master recordings on film or tape. The use of RA-1593-A Amplifiers and their associated RA-1594-A Control Units will be found useful in

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6.0 Test and Operation (Continued)

a system to provide compression with peak chopping or limiting with peak chopping.

Although a discussion of the factors involved in arranging the setup of a system is outside the scope of this instruction, these factors must be understood and correlated by the Recording Department in order to obtain the best results from the system. The "system line-up" must establish settings of gain controls, such that definite volume-indicator deflections and loud-speaker volume may be referred to some point of the system such as a bridging bus, and also to define modulation of the stylus. The previous calibrations and sensitivity tests are helpful in a preliminary line-up of the system, but since that work was done without equalizers a re-check is desirable including the equalizers for providing the characteristics preferred. The insertion loss of these equalizers is different at various frequencies, and when combined with the energy-frequency distribution of the music as heard by various microphones the resulting signal is quite different from the flat or constant levels of tones used in the initial tests. These signals contain components which are not only constantly changing in intensity but relative levels of the low and high frequencies have been altered to conform with the physical requirements of the disk recording and reproducing methods. In general frequencies between about 50 and 500 cps should be recorded at approximately the same amplitude, whereas higher frequencies should be quite uniform in average velocity and decreasing in amplitude.

No exact correlation can be established between oscillator test tones and signals produced by musical instruments or voice. However, an approximation can be made which is a compromise between over-cutting and distortion during loud passages and over-riding background noise during soft passages.

6.4 Operation

Information required for operating the 3A Recorder and the RA-1574-B Amplifiers is given in considerable detail in other sections

of this bulletin. Very useful experience in operation may be gained in performing preliminary or routine tests such as the recorder calibration and sensitivity checks. After having made the preliminary tests and adjustments correctly, successful operation is primarily the result of practicing the basic procedures and giving attention to each step of the process.

1. Determine and check the setting of the recording machine controls such as:

- (a) Turntable speed.
- (b) Pitch of grooves.

2. For standard 3-mil microgroove recordings, do not use more than 225 grooves per inch, because with a one-mil-diameter reproducing stylus, the groove width should not become less than 1.41 inch.

3. For preliminary tests, it may be found desirable to read the current in the leads to the drive coils in the 3A Recorder. A reading of the current in one of the two drive coils will be found to be adequate. This may be accomplished by connecting a 0.1-ohm resistor in series with the leads to one of the coils, and taking the voltage drop across this resistor. A 0.1-volt full scale may be used, whereby a reading of full scale represents one ampere or about 5 watts in the drive coil. A normal recording at 225 grooves per inch will show about 0.3-ampere maximum swings on a Ballantine meter.

7.0 Maintenance

No maintenance should be required other than to insure that the cutting stylus is in good condition. It is highly desirable to avoid exposing the recorder to excessive dust, particularly iron dust.

7.1 Stylus and Advance Ball

An ASP-77232(2) Stylus for micro-groove, hot-stylus recording and a P-95103 Advance Ball are supplied mounted in the recorder.

An ASP-77106 Tool is required for removing and mounting the stylus in the stylus holder. The stylus may be mounted in the following manner:

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7.0 Maintenance (Continued)

Open the jaws of the tool by releasing the knurled thumbscrew. Mount the stylus in the tool by approaching the stylus with the end of the tool and when the parallel end of the stylus is within the hole in the tool, slightly tighten the thumbscrew. The flat side of the stylus is to be parallel with the end of the tool.

Carefully bring the tool down on the recorder and insert the tapered shank of the stylus into the stylus holder and orient the cutting surface of the stylus. Then press the stylus lightly into place. Thumbnail pressure is about the correct amount required. Loosen the thumbscrew and remove the tool by drawing it away from the side of the stylus. To rotate or remove the stylus approach it from the side with the end of the opened tool and lightly clamp the tool on the stylus. A slight lateral twisting motion of the tool pulling up at the same time will release the stylus.

The P-95103 Advance Ball has been cemented in the holder with shellac heated with a small soldering iron. The advance ball has a shoulder for location vertically and is not critical in other respects.

7.2 Heater Coil (Hot-Stylus Recording)

When it is necessary to change or replace the stylus in the recorder, the old heater coil is discarded and a new one is formed and mounted on the stylus after it has been set in the stylus holder. The recommended procedure is as follows:

Use about 6 inches of approximately 0.005-inch diameter enamelled resistance wire which leaves sufficiently long leads for installation in the 3A Recorder. Close wind $7\frac{1}{2}$ turns on a 0.038-inch mandrel such as the shank of a No. 62 drill. The mandrel is held preferably in a small chuck or similar mounting. It is not necessary to have a tight fit of the coil on the stylus.

After the coil is placed on the stylus and approximately centered on the extended portion of the sapphire, attach the left-hand lead to the

ground or left-hand terminal as the recorder is viewed, bottom up. Then carefully tighten the right-hand lead under the other terminal.

Caution: The lead will probably "crawl" as the screw is tightened, thus placing excessive pull on the stylus and may break the stylus. If more than a very light force is exerted on the stylus loosen the screw, provide some slack in the lead, and retighten the screw. The coil will stay in place without any appreciable tension on the leads.

8.0 RA-1574-B Amplifier

An RA-1574-B Amplifier is used to drive each channel which operates the 3A Recorder. The amplifier provides a feedback circuit which includes a separate coil on the recorder in its loop. The feedback loop in connection with the RA-1615-A Equalizer, stabilizes the recorder response and provides essentially constant velocity recording. The amplifier contains adjustable high-frequency and low-frequency equalization and a monitor amplifier with the RIAA reproducing characteristic. An RA-1567-B Power Supply is required for the operation of each amplifier.

The RA-1541-A Amplifier which includes its own power supply may be used in place of the RA-1574-B Amplifier.

8.1 Description

The schematic circuit of the RA-1574-B Amplifier is shown in Figure 3. The 600-ohm input circuit is intended to operate from either a 600-ohm balanced or unbalanced circuit. In the secondary circuit of the input transformer there are five steps of low-frequency equalization controlled by a selector switch. A continuously adjustable equalizer attenuates the high-frequency range from 0 to 5 db at 10000 cps. The circuit goes to the grid of an inverter stage V2B which drives a push-pull gain stage V3. V3 in turn drives the push-pull parallel power stage, V4, V5, V6, V7. The secondary of the output transformer T2 is connected to operate into a 4-ohm circuit.

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8.0 RA-1574-B Amplifier (Continued)

The circuit from the feedback coil in the 3A Recorder goes to the feedback gain adjustment, P-1. The circuit from P-1 goes to a gain stage V2A and then to the grid of V2B which acts as a mixer as well as an inverter.

The output of the feedback coil also goes to V1A and to V1B which provide two stages of monitor gain. The transformer in the output of the monitor amplifier goes to terminal strip TS1 and provides either a 50-ohm or a 600-ohm output. The nominal monitor output level is -15 dbm.

The input network of the monitor amplifier provides the RIAA reproducing equalization. V8 and V9 regulate the 300 volts on the screen grids of the four tubes in the output stage. If either V8 or V9 is removed the plate supply to the amplifier is opened.

The time-delay relay S-1 is adjusted to operate with a time delay when the amplifier is cold of 20 to 30 seconds to permit the heaters to reach operating temperature before the plate voltage is applied to the tubes.

The interconnection diagram for the RA-1574-B Amplifier and the RA-1567-B Power Supply is shown in the schematic circuit in Figure 3.

A cable and plug are included in the amplifier. They connect the output of the amplifier to one of the drive coils of the 3A Recorder and the output of one of the feedback coils in the recorder to the amplifier. A 1-ampere fuse (Catalog No. 8AG Fuse, Littelfuse) is included in the output circuit as protection for the recorder. This fuse should be replaced only with one having the same current rating.

8.2 Amplifier Maintenance

Significant point-to-ground voltages are shown on the schematic circuit for the amplifier in Figure 3.

The wiring diagram of the amplifier is shown in Figure 8.

The amplifier should require very little maintenance. However, periodic tests of gain, fre-

quency response, noise and the condition of tubes are desirable to insure that optimum performance is being realized. In general selection of tubes in the V2 position is indicated for minimum microphonic noise. Selection of tubes in the V3, V4, V5, V6 and V7 positions should be made for minimum hum. The use of direct current for the filaments of V3 through V7 eliminates the selection for tubes for minimum hum.

8.21 Feedback Circuit Gain and Frequency Response

Connect the equipment as shown in Figure 9. Make the following settings on the gain set and oscillator:

Input:	+10 dbm
Frequency:	1000 cps
Output Z:	30 ohms
Load Z:	600 ohms
Output VI Multiplier:	+10
Attenuator:	35 db

Rotate the feedback control P-1 to the extreme clockwise position.

The following are typical voltage readings measured across the 5-ohm load resistor:

Frequency (cps)	Output (volts)
1000	M(2.5 ± 0.5 volts)
100	M - 0.5 ± 0.3
50	M - 1.5 ± 0.5
5000	M + 0.2 ± 0.3
10000	M + 0.6 ± 0.3

8.22 Signal Circuit Gain and Frequency Response

Connect the equipment as shown in Figure 10. The cable to the recorder need not be removed, but the recorder must not be plugged in. Adjust the transmission set and oscillator as follows:

Input:	+10 dbm
Frequency:	1000 cps
Output Z:	600 ohms
Attenuation:	12 db

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8.0 RA-1574-B Amplifier (Continued)

Set the low and high-frequency equalizers and the feedback control P-1 to their extreme counterclockwise positions.

The following are typical readings measured across the 5-ohm load resistor:

<i>Frequency (cps)</i>	<i>Output</i>
1000	M(2.5 ± 0.25 volts)
500	M + 0.1 ± 0.2
100	M - 0.2 ± 0.3
50	M - 1.5 ± 0.5
30	M - 4 ± 1
5000	M ± 0.3
10000	M + 0.2 ± 0.5
20000	M + 1.5 ± 1

8.23 Noise

Using the test circuit shown in Figure 10, replace the input to terminals 1 and 3 with a 600-ohm resistor. The voltage, measured across the 5-ohm load resistor should not exceed 0.003 volts.

8.24 Monitor Circuit Gain and Frequency Response

Connect the equipment as shown in Figure 9, but move the vacuum-tube voltmeter to be in parallel with the load jack of the gain set. Make the following settings on the gain set and oscillator:

Frequency:	1000 cps
Gain Set Attenuator:	28 db
Gain Set Input:	+16 dbm
Gain Set Load Z:	600 ohms
Gain Set Source Z:	30 ohms
Gain Set Load VI:	+10

The following are typical values of output as measured on the vacuum-tube voltmeter:

<i>Frequency (cps)</i>	<i>Output</i>
1000	M(-1.5 to -4.5 dbm)
100	M + 11.5 ± 0.5 db
50	M + 13.5 ± 0.5 db
5000	M - 9.5 ± 0.5 db
10000	M - 14.75 ± 1.0 db

Information Bulletin 9.0 Associated Technical

RA-1567-Type Power Supply

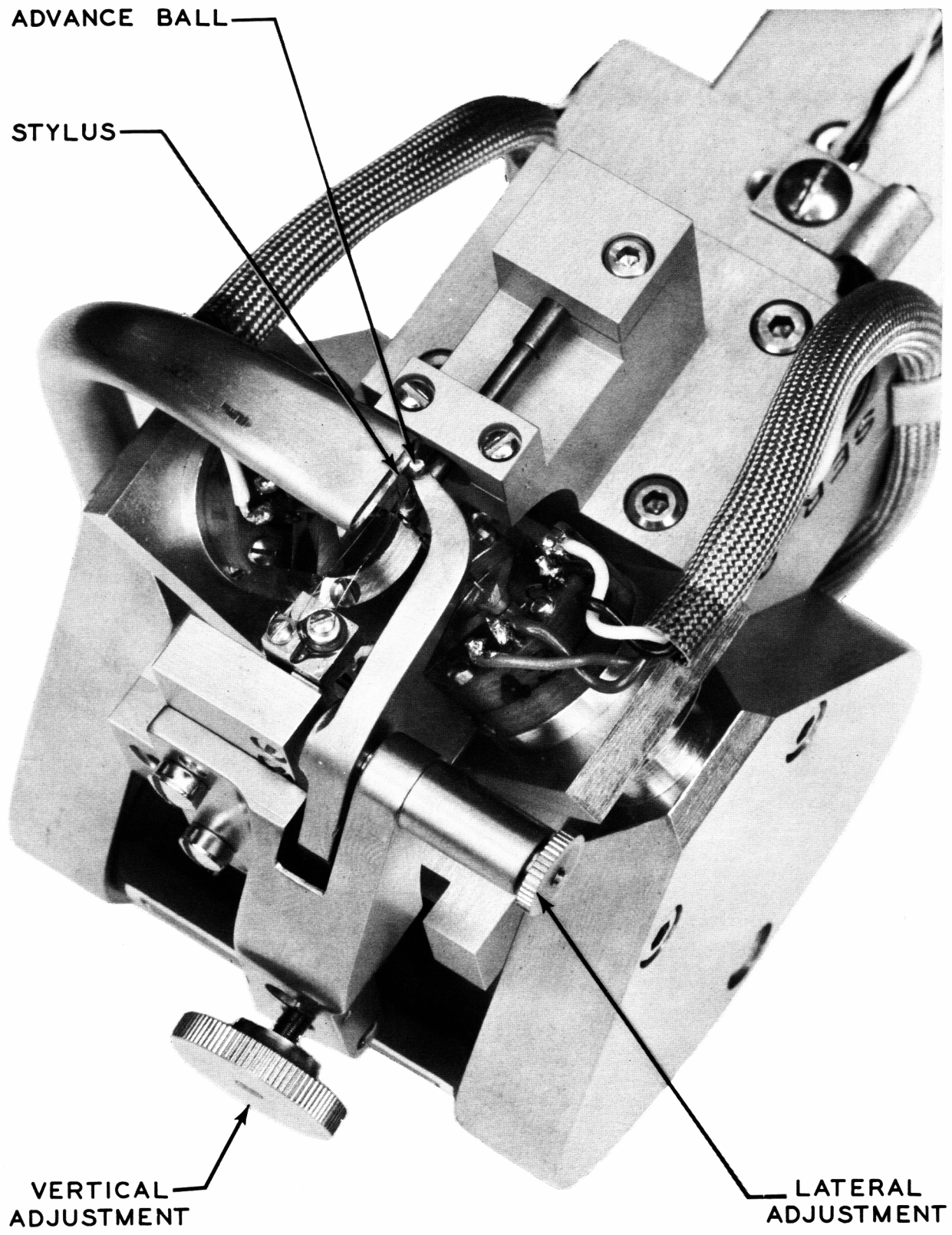


Figure 1 Bottom View of 3A StereoDisk Recorder

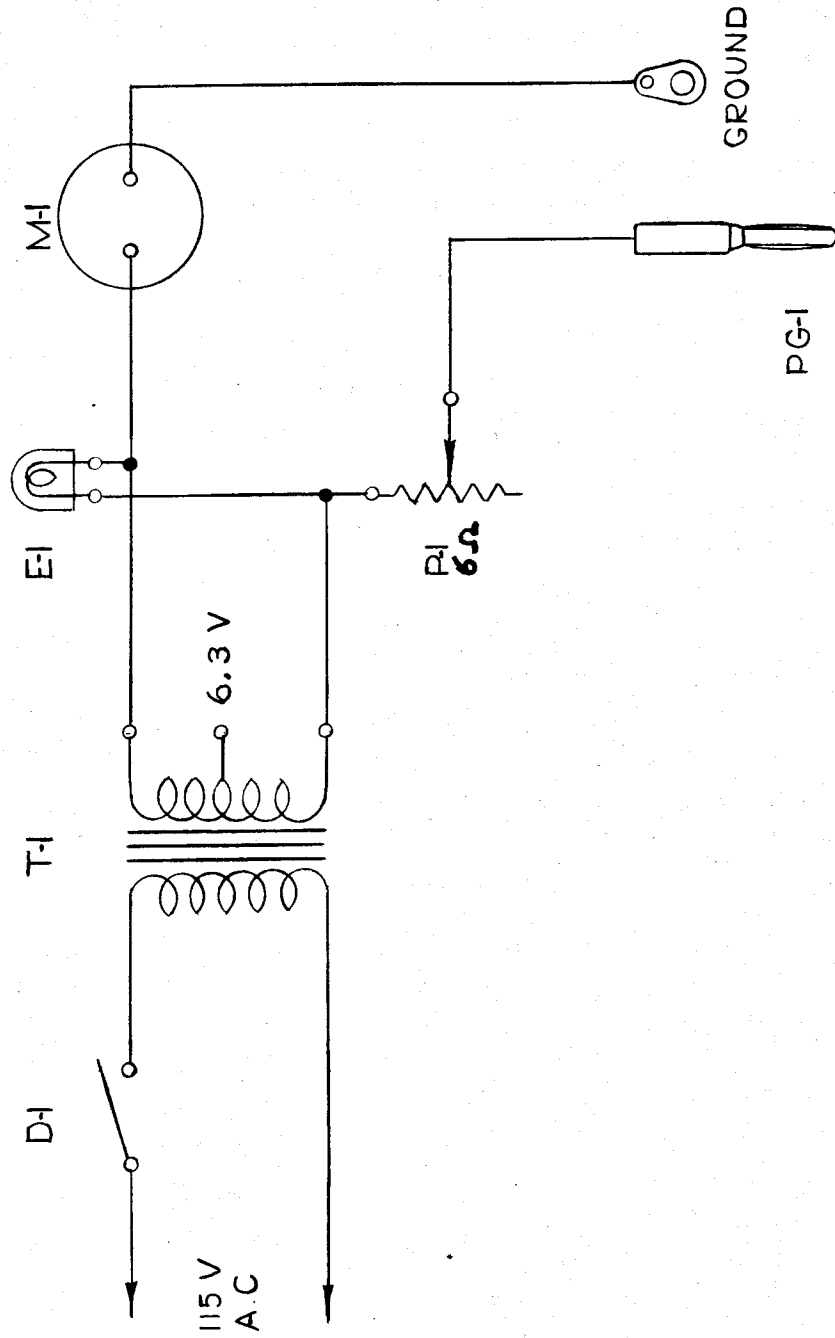


Figure 2 Schematic Circuit of ASO-77251 Power Supply

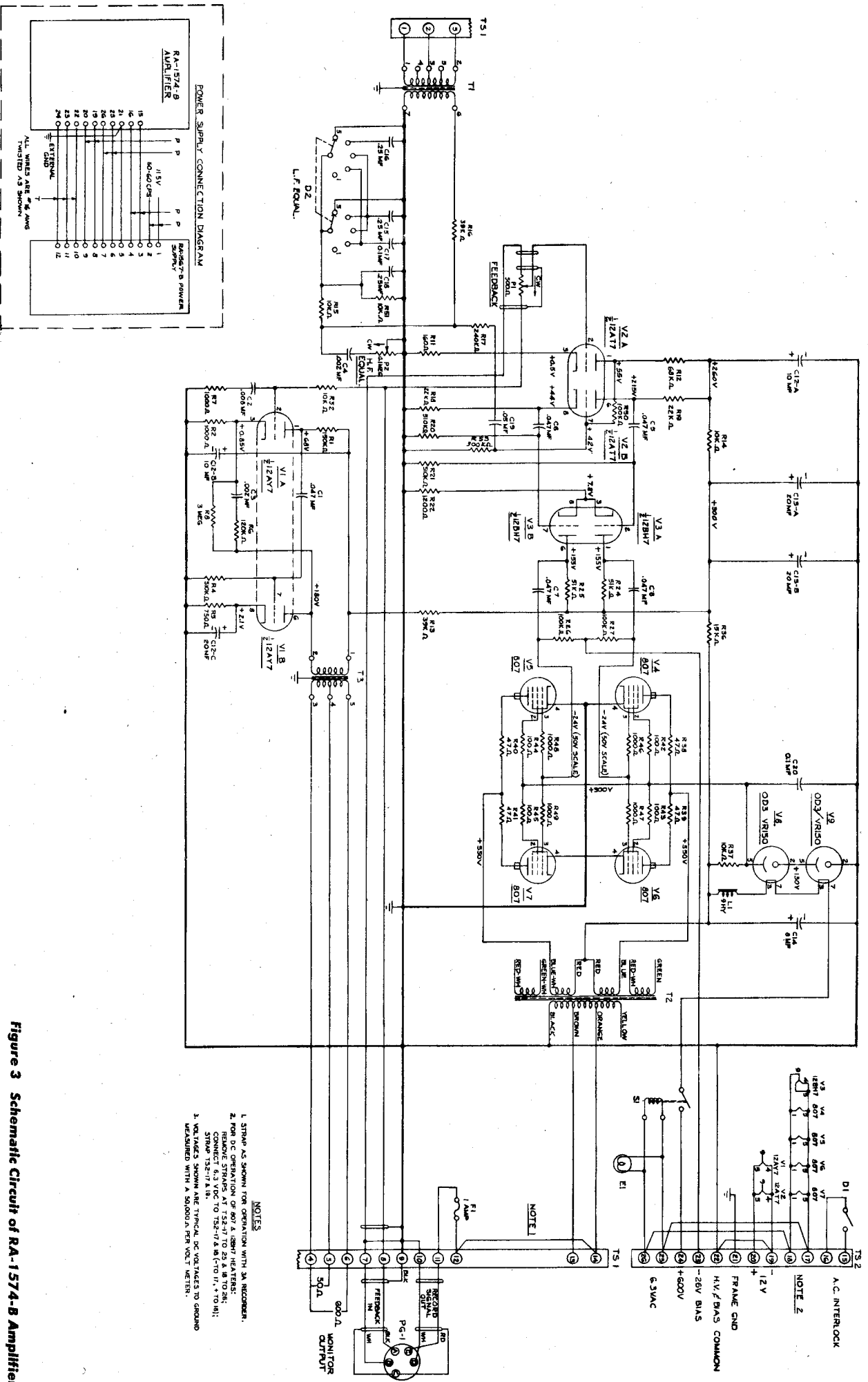
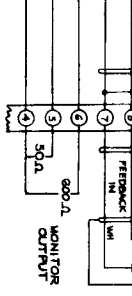


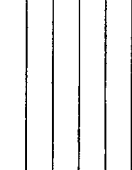
Figure 3 Schematic Circuit of RA-1574-B Amplifier

- NOTES**
1. STRAP AS SHOWN FOR OPERATION WITH 2A RECORDER.
 2. FOR DC STRAP ON OF 500 A. 750 A. 1000 A. 1500 A. 2000 A. 2500 A. 3000 A. 3500 A. 4000 A. 4500 A. 5000 A. 5500 A. 6000 A. 6500 A. 7000 A. 7500 A. 8000 A. 8500 A. 9000 A. 9500 A. 10000 A. STRAP 13-27 A. 18.
 3. VOLTAGES SHOWN ARE TYPICAL DC VOLTAGES TO GROUND MEASURED WITH A 50,000 Ω PER VOLT METER.

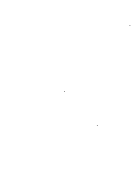
NOTE 1



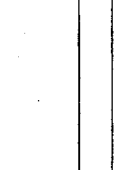
NOTE 2



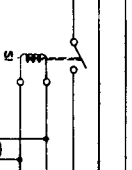
NOTE 3



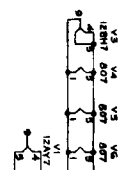
NOTE 4



NOTE 5



NOTE 6



NOTE 7



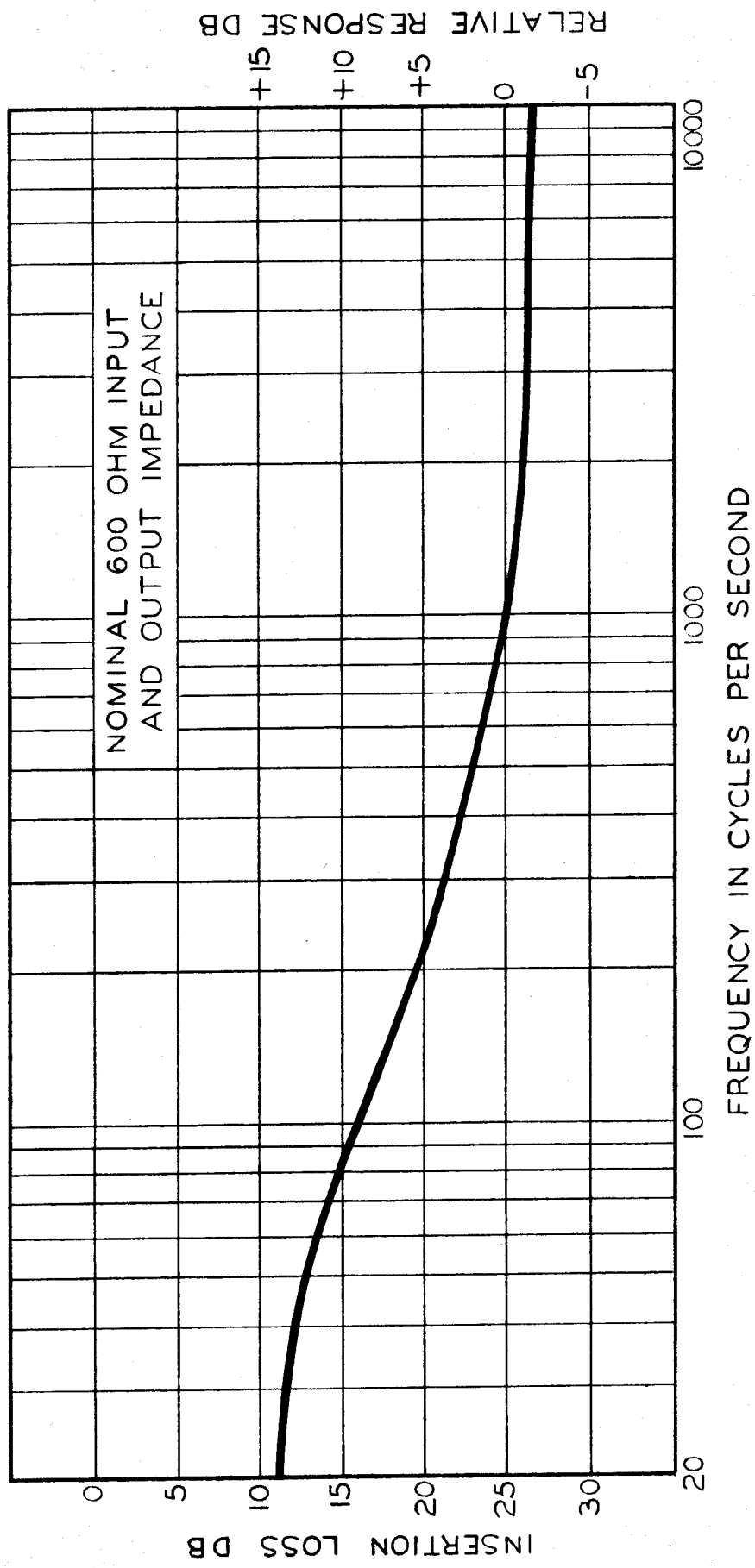


Figure 4 Frequency Characteristic of RA-1615-A Equalizer

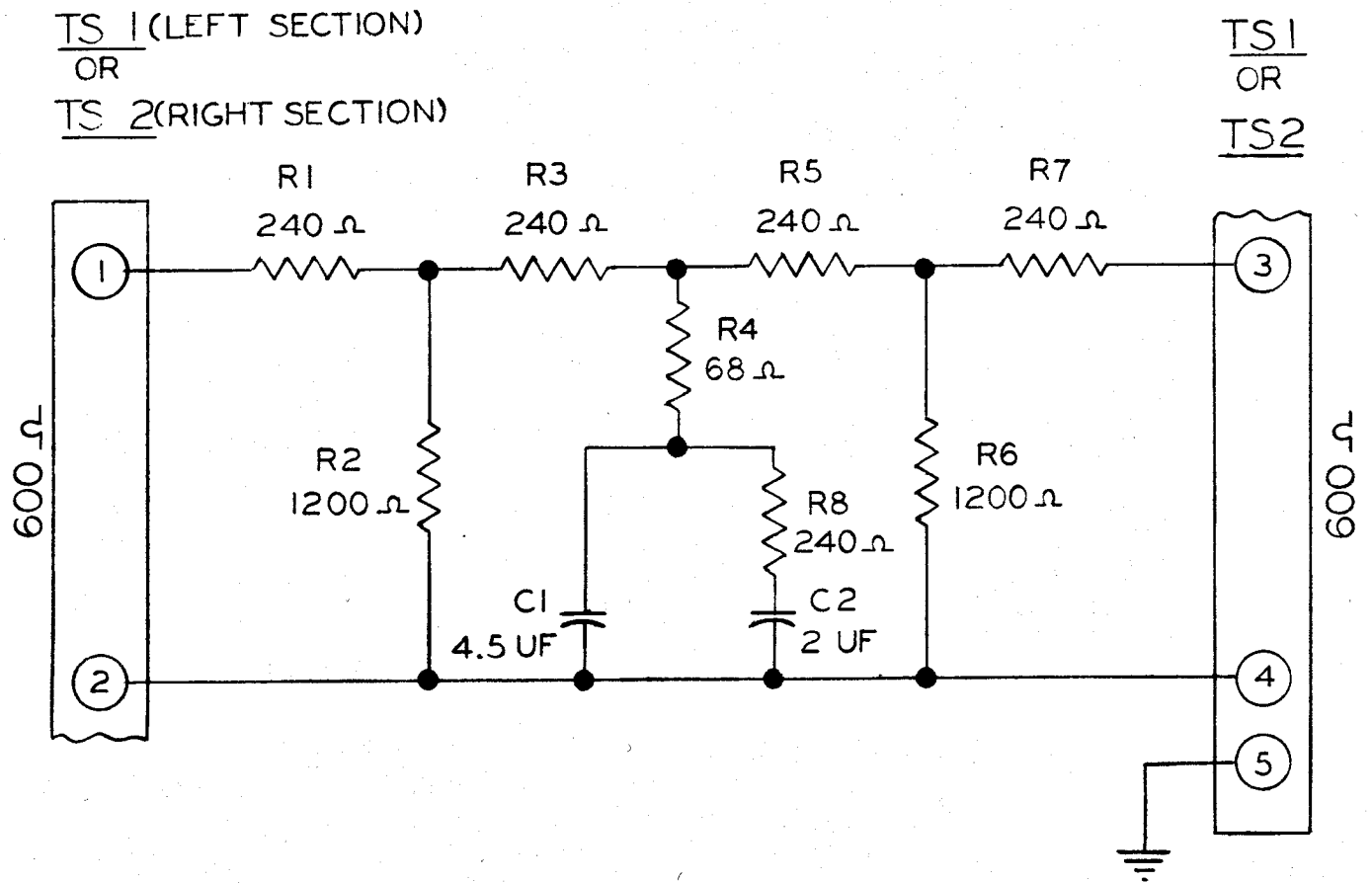


Figure 5 Schematic Circuit of RA-1615-A Equalizer

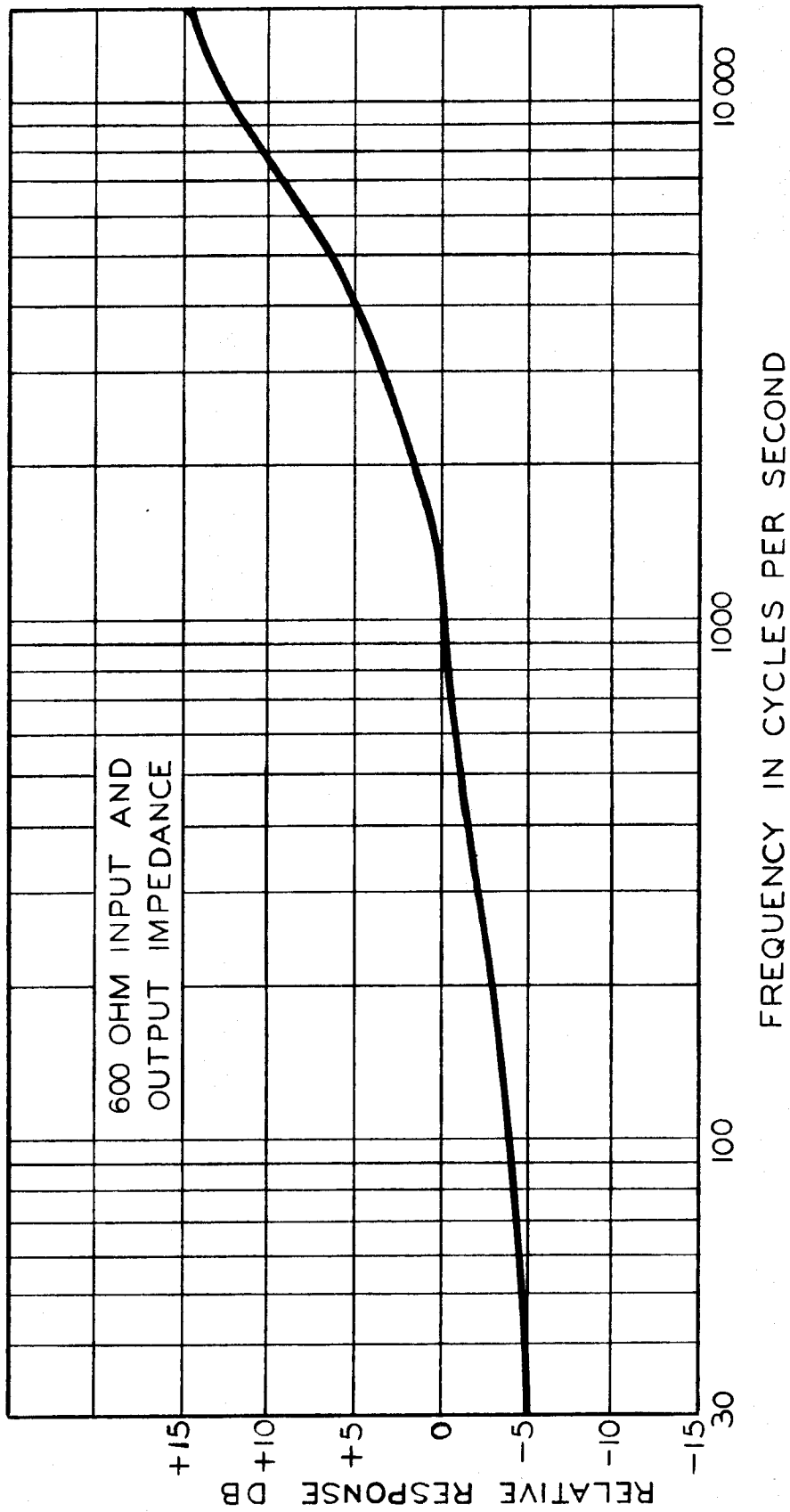


Figure 6 Frequency Characteristic of RA-1617-A Equalizer

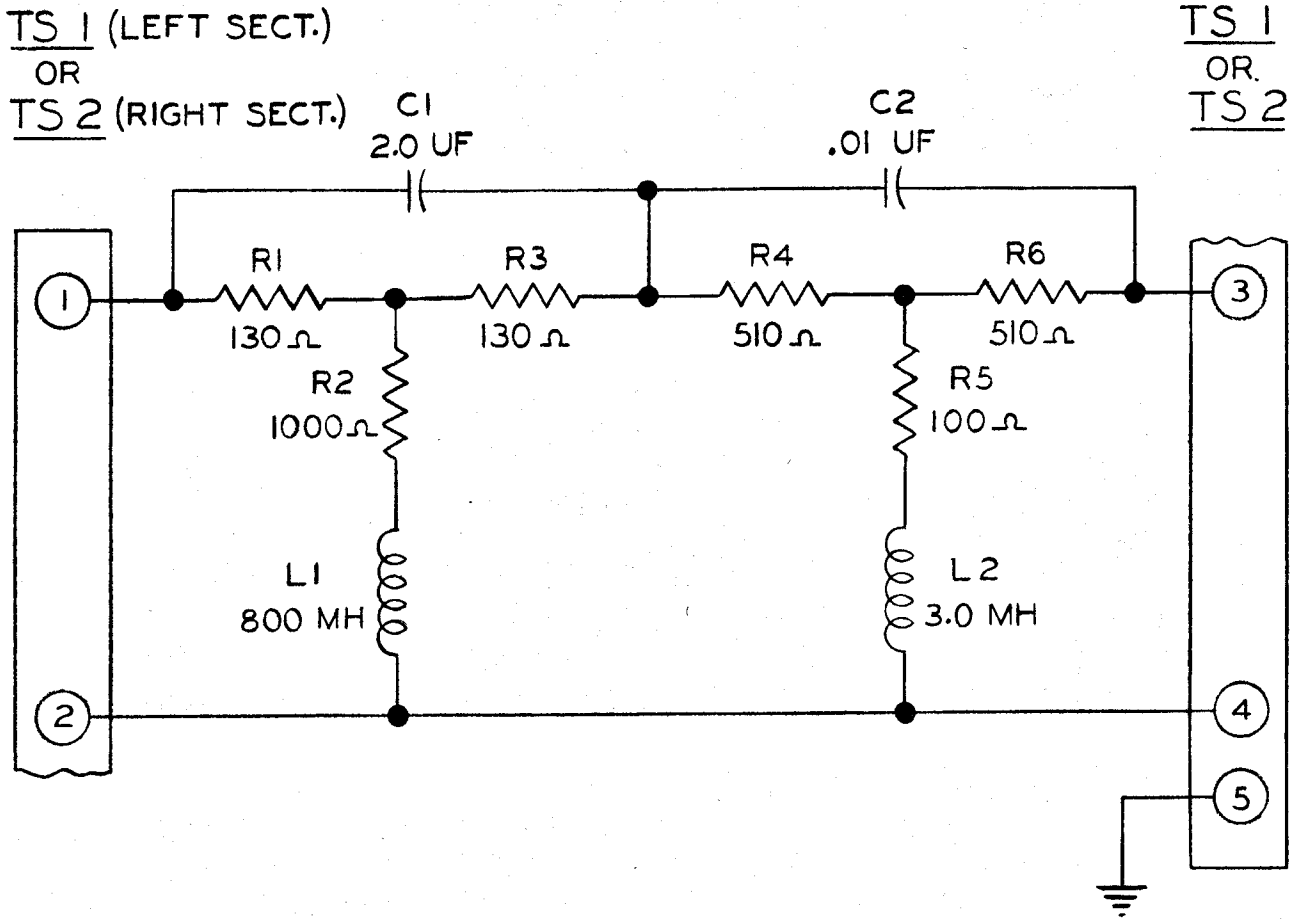


Figure 7 Schematic Circuit of RA-1617-A Equalizer

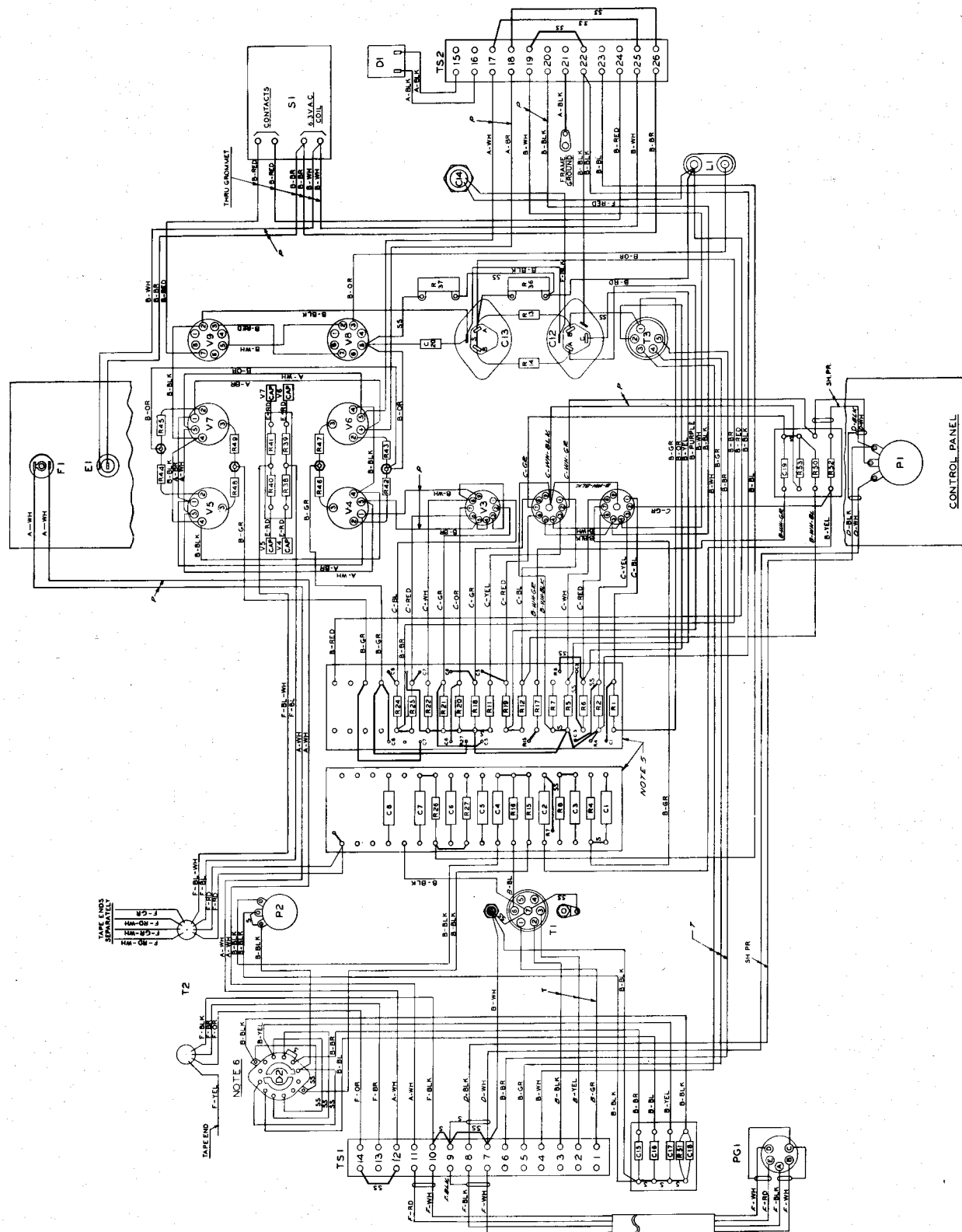


Figure 8 Wiring Diagram of RA-1574-B Amplifier

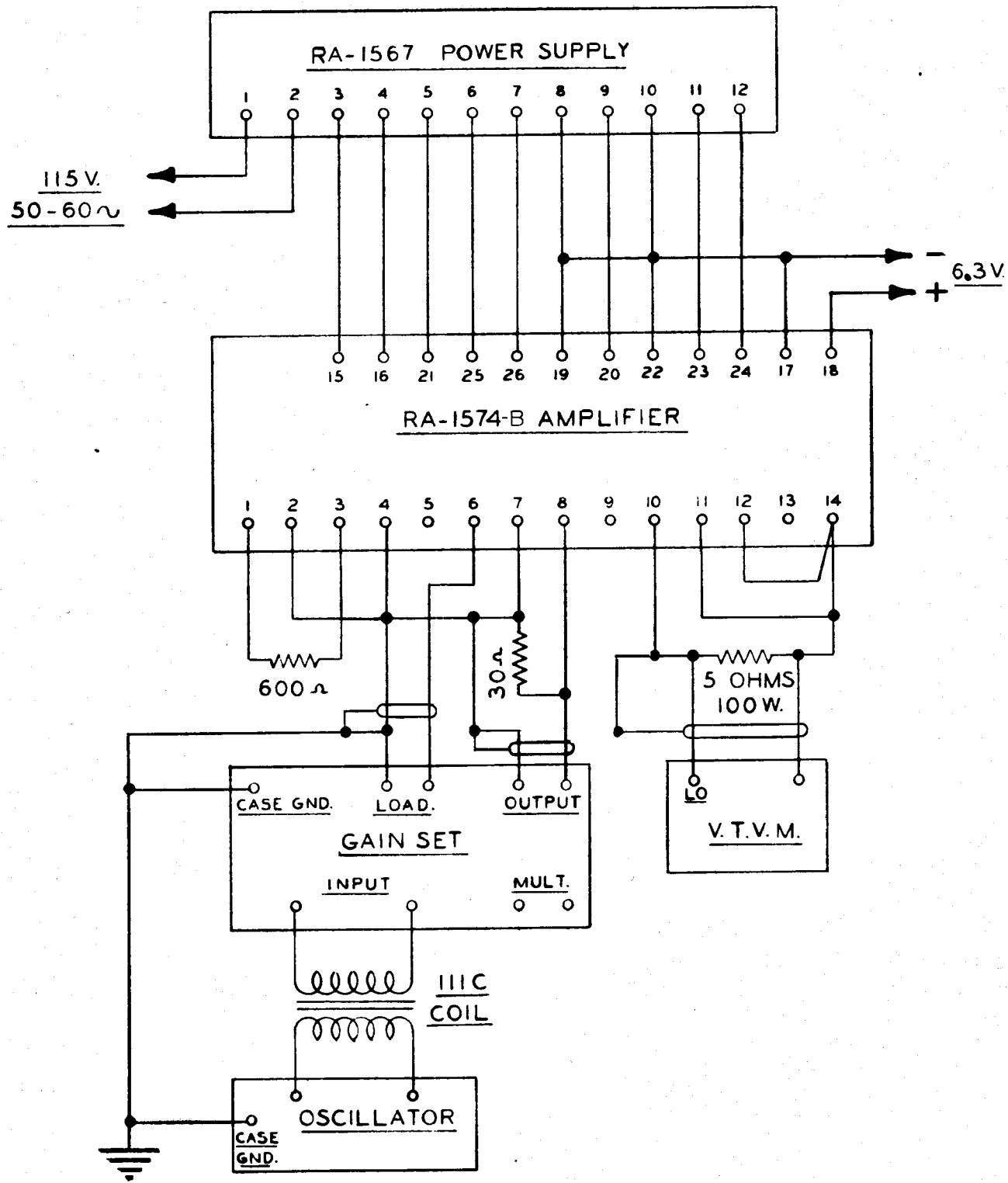


Figure 9 Testing Circuit for Feedback Response

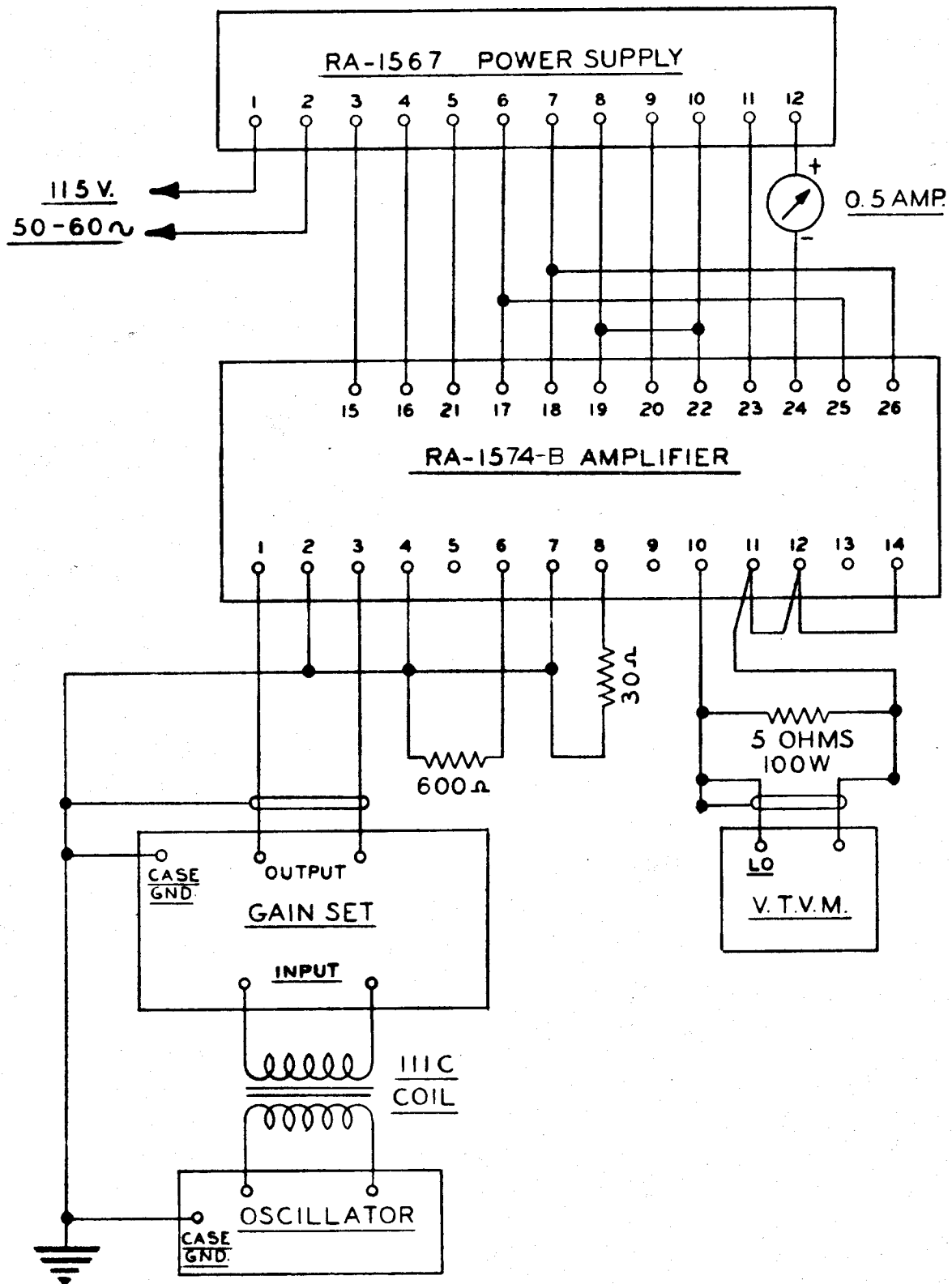


Figure 10 Testing Circuit for Signal Circuit Response