OPERATING INSTRUCTIONS

NAVSHIPS 94230

Equipment Development Group

TYPE 1551-B

SOUND-LEVEL METER

E78

768-L

GENERAL RADIO COMPANY

GR 1551-B Sound Level Meter.max

TABLE OF CONTENTS

OPERATING INSTRUCTIONS

TYPE 1551-B

SOUND-LEVEL METER

Form 768-L
April, 1960

SERIAL NO. _____

MICROPHONE SERIAL NO. _____

MICROPHONE SENSITIVITY _____ db re 1v/μbar

GENERAL RADIO COMPANY

WEST CONCORD, MASSACHUSETTS, USA

SPECIFICATIONS

Sound-Level Range:	24 to 150 db above 0.0002 μbar (0.0002 dyne/cm^2) at 1000 cps.
Frequency Characteristics:	Four frequency-response characteristics are available: The A, B and C weighting characteristics are those specified, between 25 and 8000 cps, in ASA Specification Z24.3-1944. The fourth (20 kc) response characteristic affords flat response from 20 cps to 20 kc, for use with wide-range microphones such as the Type 1551-P1 Condenser Microphone System.
Microphone:	Rochelle-salt crystal diaphragm type, essentially non-directional.
Sound-Level Indication:	Sound level is indicated by algebraic sum of readings of attenuator switch and meter. Meter range is 16 db, and attenuator range is 110 db in 10-db steps.
Output:	Output of 1 volt across 20,000 ohms available at telephone jack on panel, for use with analyzers or recorders.
Meter Response:	Fast or slow meter response selected by switch. In FAST, meter ballistics agree with current ASA standards. In SLOW, meter is heavily damped to show average level of rapidly fluctuating sounds.
Calibration:	Panel adjustment for amplifier calibration. Internal adjustment permits calibration in terms of microphone sensitivity. Type 1552-B Sound-Level Calibrator available for overall calibration checks.
Accuracy:	When amplifier sensitivity is standardized, the absolute accuracy of sound-level measurements is within ±1 db for average machinery noises in accordance with ASA standards.
Temperature and Humidity Effects:	Readings are independent (within 1 db) of temperature and humidity over normal range of room conditions.
Batteries:	Two 1-1/2-v flashlight (D) cells (Eveready 950 or equivalent), and one Eveready 467-B or equivalent battery are supplied.
AC Operation:	Type 1262-B Power Supply available for operation from ac power line.

SPECIFICATIONS (cont.)

Tubes:	Four CK512AX, two CK6418, and one RCA Type 2N105 transistor, supplied.
Accessories Supplied:	Telephone plug.
Accessories Available:	Type 1551-P2 Leather Carrying Case. Microphones, analyzers, ac power supply, and recorder, described in latest General Radio Catalog and in Sound Bulletin.
Dimensions:	Length 9-1/4 in, width 7-1/4 in, depth 6-1/8 in, over-all.
Weight:	7-5/8 lb with batteries.

General Radio EXPERIMENTER reference: Vol 32, No 16, October, 1958.

Licensed under patents of the American Telephone and Telegraph Company.

TYPICAL INTERNAL SIGNAL-TO-NOISE RATIOS
C WEIGHTING
(OCTAVE-BAND NOISE LEVELS – DB BELOW FULL SCALE)

Attenuator Setting-db	FREQUENCY RANGE								
	Over-all 20-10,000	20-75	75-150	150-300	300-600	600-1200	1200-2400	2400-4800	4800-10,000
30	-20	-26	-31	-33	-32	-31	-29	-28	-27
70-140	-58	-66	-71	-72	-71	-69	-67	-65	-62

Figure 1.
Type 1551-B Sound-Level Meter, with Type 1262-B Power Supply Attached.

TYPE 1551-B
SOUND-LEVEL METER

Section 1
INTRODUCTION

1.1 PURPOSE. The Type 1551-B Sound-Level Meter (Figure 1) is the basic instrument of the General Radio sound-measuring system. This instrument conforms to all requirements of the ASA American Standard for Sound-Level Meters for measurement of noise and other sounds (Z2.43-1944). An accurate, portable, low-priced meter, it indicates the sound-pressure level at its microphone in terms of a standard reference level (0.0002 μbar at 1000 cps).

In addition to its primary use as a Sound-Level Meter, the Type 1551-B can be used as a highly sensitive ac voltmeter. With the microphone sensitivity adjustment (paragraph 3.8) set at -55.5 and the attenuator switch set at 30, the meter has a full-scale sensitivity of 30 microvolts. Voltages to be measured can be applied to the microphone connector through a Cannon female connector. Full details on this application may be found in the General Radio Experimenter for January, 1957.

1.2 DESCRIPTION.

1.2.1 GENERAL. The major components of the Sound-Level Meter are a nondirectional microphone, a calibrated attenuator, an amplifier, an indicating meter, and weighting networks to modify the amplifier response to approximate human response to pure tones at specified sound levels.

1.2.2 CONTROLS AND CONNECTORS. The controls and connectors on the panel of the Sound-Level Meter are listed in Table 1, page 2.

1.3 POWER SUPPLY.

1.3.1 BATTERIES. Two Type D flashlight batteries supply the filament (A) power, and one 67-1/2-volt portable-radio-type B battery supplies the plate (B) power for the instrument. Contact is made to each battery by spring terminals, and all batteries are secured by a screw-down bracket.

TABLE 1. CONTROLS AND CONNECTORS

Name	Type	Function
Attenuator	12-position selector switch	Selects meter range.
CAL	Thumb-set adjustment	Electrical internal calibration or gain adjustment.
METER-BATTERIES	5-position selector switch	Selects fast or slow meter response; provides battery checks.
WEIGHTING	5-position selector switch	Selects weighting.
OUT	Phone jack	Output connection.
On-Off	Switch built into microphone arm	Turns instrument on and off (with battery power only).
None	6-terminal Jones receptacle	Connection to Type 1262-B Power Supply.

1.3.2 AC POWER SUPPLY. The Type 1262-B Power Supply (refer to paragraph 4) can be used to operate the Sound-Level Meter from a 115-volt ac line. When the Type 1262-B is used, its own power switch, rather than the microphone switch on the Type 1551-B, controls application of power to the Sound-Level Meter.

1.4 CARRYING CASE. Available for use with the Sound-Level Meter is a leather carrying case with shoulder straps. A hole in the back of this case matches the tapped hole in the back of the Sound-Level Meter so that the instrument can be secured in the case for field use. The cover flaps of the case are equipped with a luggage-type fastener to keep them closed over the panel and with snap buttons to hold them open when the instrument is in use.

Section 2

OPERATING PROCEDURE

2.1 PRELIMINARY CHECKS.

2.1.1 BATTERY CHECK. To check batteries, set the METER BATTERIES switch to FIL-1, turn the instrument on by raising the microphone,

and check that the meter pointer is within the area marked BAT on the meter face. Turn the METER BATTERIES switch to FIL-2 and then to PL, similarly checking that the meter pointer falls in the white BAT area for each position.

Filament batteries should last 6 to 7 days at 8 hours a day, or 30 to 35 days at 2 hours a day. Plate batteries should last 12 to 14 days at 8 hours a day, or 60 to 70 days at 2 hours a day.

2.1.2 CALIBRATION CHECK. Before using the Sound-Level Meter, make the following simple calibration check. (This check calibrates the amplifier of the Sound-Level Meter, but does not include a check on the microphone.)

a. Turn the instrument on.

b. Set the attenuator switch to 130 CAL (i.e., with the pointer on the knob toward the window).

c. Set the WEIGHTING switch to CAL, and check that the meter pointer falls within the white area marked CAL on the meter face. If not, place it there by adjusting the CAL thumbset control.

2.1.3 ACOUSTICAL CALIBRATION WITH THE TYPE 1552-B CALIBRATOR. The following over-all acoustical calibration can be made at 400 cps with the Type 1552-B Sound-Level Calibrator and Type 1307-A Transistor Oscillator. This calibration checks the microphone sensitivity as well as the amplifier, and should be made whenever doubt exists about the condition of the microphone.

With the Sound-Level Meter on and the WEIGHTING switch set to the C position, place the Calibrator over the microphone, and apply a signal of exactly 2.0 volts at 400 cycles to the Calibrator. (The Type 1307-A Transistor Oscillator is a convenient source of such a signal.) The Sound-Level Meter should read 121 ±1 db. (Refer to paragraph 2.2 for method of reading meter.) If the meter does not read 121 ±1 db, set it there by adjusting the CAL thumbset control.

The above calibration will be made free of charge to any Sound-Level Meter brought to one of the General Radio offices listed elsewhere in this manual.

2.2 OPERATING PROCEDURE.

a. Turn the instrument on by raising the microphone (battery power) or by turning on the Type 1262-B (ac power).

b. Adjust the WEIGHTING switch for the desired frequency response. Refer to paragraph 2.3.

c. Adjust the attenuator switch for an on-scale deflection of the indicating meter. The sound-level in decibels is the algebraic sum of the readings of attenuator dial and meter.

d. Set the METER BATTERIES switch to FAST or SLOW depending on the type of meter response desired. The fast response is suitable

for most noise measurements and for measuring minimum and maximum values of fluctuating sounds. The SLOW position provides a high degree of damping for measuring the average value of fluctuating sounds.

2.3 SELECTION OF WEIGHTING NETWORK. Many early noise criteria specified weighted sound levels, using this rule of thumb: A weighting for sound levels from 24 to 55 db, B for levels from 55 to 85 db, and C for levels from 85 to 140 db. (The appropriate range was selected after a preliminary C-weighted measurement.) More recent opinions favor selection of weighting network on the basis of the type of noise measurement; for instance, A weighting is often preferred for speech-interference measurements, while B is recommended for surveys of traffic noise. In the absence of specific weighting requirements, it is usually helpful to take measurements on all three weighting networks. For a full discussion of weighting networks, refer to the General Radio Handbook of Noise Measurement. Response curves for the various weighting networks, equalized for microphone response, are given in Figure 2.

If the Sound-Level Meter is to be used with an analyzer or recorder, set the WEIGHTING switch to 20 kc or to C. When an extended-range microphone is used in place of the microphone supplied with the instrument, use the 20 kc position.

2.4 SOUND ANALYSIS AND RECORDING. The low-distortion output amplifier circuit of the Sound-Level Meter was designed specially for use with the Type 1550-A Octave-Band Analyzer and Type 1554-A Sound and Vibration Analyzer. Other analyzers, such as the Type 736-A Wave Analyzer, can also be used. Connect the input of the analyzer or recorder

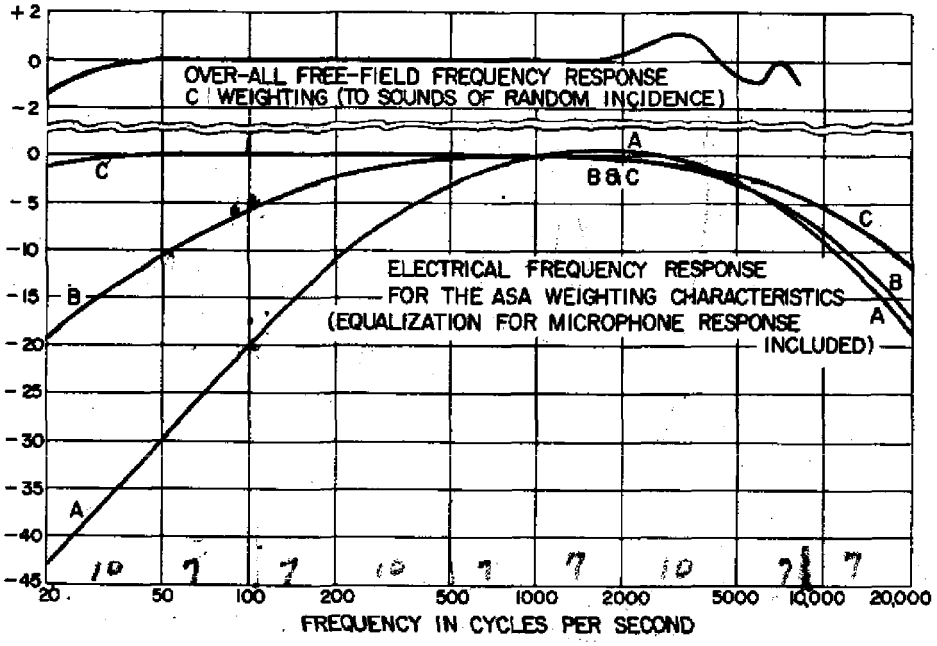

Figure 2. Typical Acoustical and Electrical Response Curves for Type 1551-B.

to the OUTPUT phone jack on the Sound-Level Meter. For greatest accuracy, the impedance connected to the output circuit of the Sound-Level Meter should be about 20,000 to 25,000 ohms (as it is with the 1550-A and 760-B). If the analyzer input is higher, it should be shunted with a suitable resistor. The output impedance is 7000 ohms, and output voltage is 1.0 v into 20,000 ohms, 1.2 v open-circuit.

The output system of the Sound-Level Meter can be used to drive a Type 1521-A Graphic Level Recorder to obtain permanent records of sound measurements, or to operate a magnetic tape recorder to obtain field records that may be studied and analyzed later in the laboratory.

When recording or analyzing, set the attenuator switch so that the meter reads +6 db or more if possible, so that the maximum dynamic range can be utilized. If the meter reading falls below +6 db, it is sometimes desirable to set the attenuator switch one step lower, even if the meter pointer goes off scale as a result.

The internal calibration system of the Sound-Level Meter makes available, at the OUT jack, the 1000-cps signal useful for setting the level of an analyzer or recorder to match that of the Sound-Level Meter.

2.5 EXTENSION CABLE. The Type 1560-P73* 25-foot extension cable can be used to permit operation of the microphone at some distance from the meter. The extension cable introduces some slight error, correction for which is marked on a tag supplied with the cable. The degree of error is a function of microphone temperature, owing to the capacitance variation of a Rochelle salt crystal microphone with temperature. Effects of temperature on response with and without cable are shown in Figure 3.

2.6 DYNAMIC MICROPHONE AND CABLE. The inconvenience and possible errors caused by use of a Rochelle-salt microphone can be side-

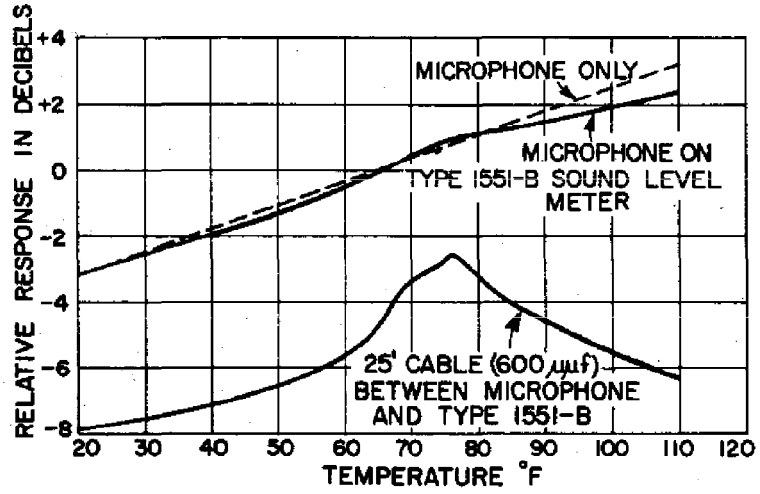

Figure 3. Variation in Response as a Function of Temperature for Type 1560-P1 Microphone. (Curves are shown for: open-circuit output voltage of microphone; microphone output to Sound-Level Meter (no cable); and microphone output to Sound-Level Meter with 25-ft extension cable (Type 1560-P73).

*Also supplied as part of the Type 1560-P34 Tripod and 25-ft cable assembly.

stepped by the use of a dynamic microphone with transformer, 25-foot cable, and tripod, all of which is available as the Type 759-P25 Dynamic Microphone Assembly. A 100-foot cable is also available.

2.7 WIDE-RANGE MICROPHONES. The over-all frequency response characteristic of the Type 1551-B, with the WEIGHTING switch set at 20 kc, is essentially flat from 20 cps to 20 kc. (See Figure 4.) This permits use of such wide-range microphones as those used in the Types 1551-P1L and 1551-P1H Condenser Microphone Systems.

The Type 1551-P1L uses the Altec 21-BR-150 condenser microphone, useful over the sound-pressure range from 50 to 150 db. The Type 1551-P1H uses the Altec Type 21-BR-180 microphone, useful from about 70 to 170 db. (When using the Type 1551-P1H, set the meter to 101 rather than 121 db in the calibration described in paragraph 2.1.3, and thereafter add 20 db to the meter readings.) These microphones have a good frequency response from 20 cps to 18 kc.

Also useful with the Type 1551-B over the range from 80 to 200 db is the Massa Type M-141B Standard Microphone, a piezoelectric microphone available from the Massa Laboratories Inc, Hingham, Mass. Its response is reasonably uniform up to 30 kc.

2.8 INTERCONNECTING ADAPTORS. Sound-level-meter accessories that antedate the Type 1551-B Sound-Level Meter are equipped with Amphenol microphone connectors, which require adaptors for use with the Type 1551-B's Cannon microphone connectors. Adaptors required to connect various accessories to the Sound-Level Meter are listed below.

TABLE 2.

TO CONNECT A	TO A	USE A
Type 759-P25 Dynamic Microphone Assembly	Type 1551-B SLM	Type 1560-P94 Adaptor and Cable Assembly. (Type 1560-P91 Adaptor can be used with cable of 759-P25.)
Type 1551-P1 Condenser Microphone Assembly	Type 1551-B SLM	Type 1560-P94 Adaptor and Cable Assembly.
Type 759-P36 Vibration Control Box	Type 1551-B SLM	Type 1560-P91 Adaptor. (Type 1560-P94 can be used to replace 759-P36 cable if latter is not permanently attached to control box.)
Type 1551-B Microphone	Type 1551-A SLM	Type 1560-P92 Adaptor.

2.9 USE OF HEADPHONES. If desired, a set of headphones can be plugged into the OUTPUT jack to monitor the sound being measured.

2.10 BACKGROUND NOISE. When possible, sound measurements should be made with negligible background noise - at least 10 db below the level being measured. However, this is not always possible, and Figure 5 is convenient in determination of errors caused by background noise.

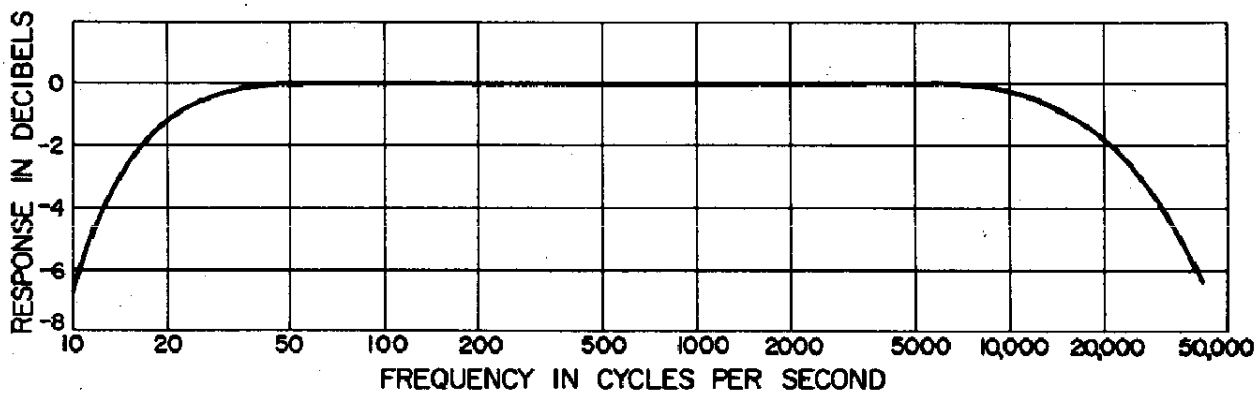

Figure 4.
Frequency Response of Type 1551-B Amplifier with WEIGHTING switch at 20 kc.

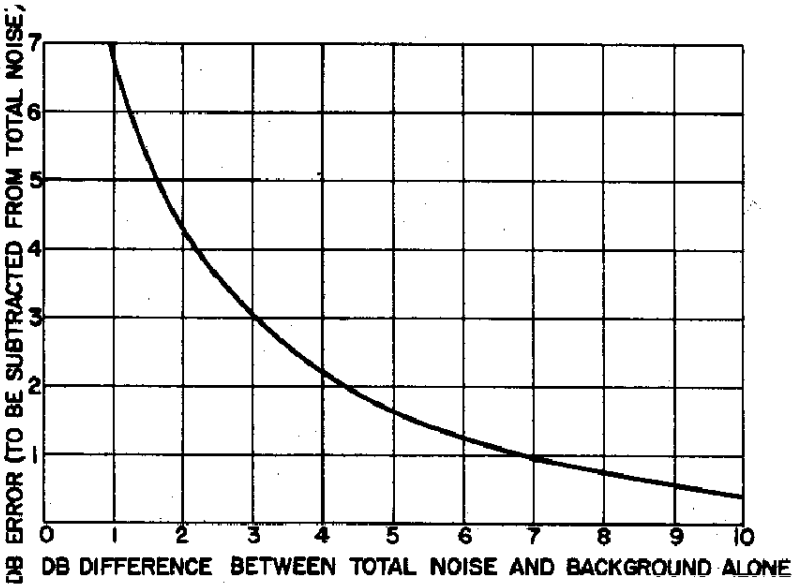

Figure 5.
Effect of Background
Noise on Measurement.

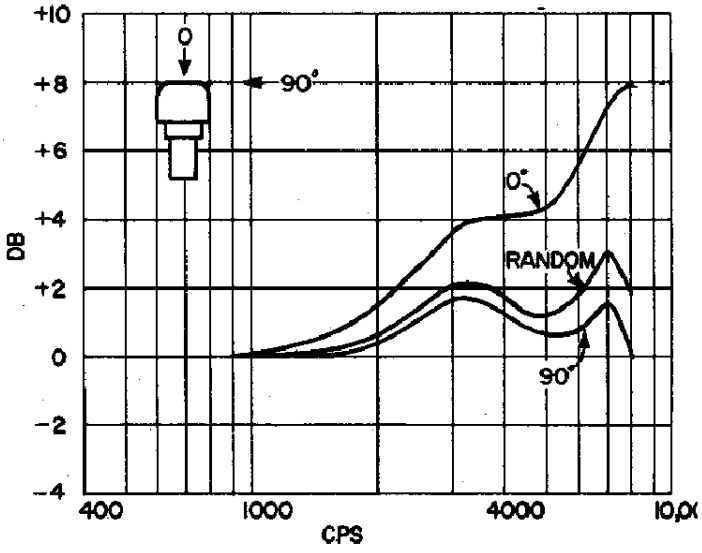

Figure 5a.
Frequency Response as a
Function of Incidence,
Type 1560-P1 Microphone.

2.11 MICROPHONICS. When high-intensity sound fields are being measured, it is good practice to use the microphone on the end of a cable (refer to paragraph 2.5) and to keep the Sound-Level Meter well removed from the sound field. This is especially true if the high-level noise contains frequencies of 1000 cps or higher. The following quick check will determine whether the tubes in the Type 1551-B are being excited microphonically: remove the microphone head, set the WEIGHTING switch to A, and check that there is no meter reading with the attenuator switch set at 70 db or higher.

2.12 VIBRATION PICKUP. It is often possible to measure the vibration amplitude, velocity, or acceleration of radiating surfaces. Useful vibration measurements can often be obtained where high ambient sound levels make acoustical measurement impossible. For vibration frequencies between 20 and 1000 cps, the Type 1551-B will operate as a vibration meter when used with a Type 759-P35 Vibration Pickup and Type 759-P36 Control Box. Refer to the General Radio Handbook of Noise Measurement for further information on vibration measurement.

Section 3
SERVICE AND MAINTENANCE

3.1 GENERAL. The two-year warranty given with every General Radio instrument attests the quality of materials and workmanship in our products. When difficulties do occur, our service engineers will assist in any way possible.

In case of difficulties that cannot be eliminated by the use of these service instructions, please write or phone our Service Department, giving full information of the trouble and of steps taken to remedy it. Be sure to mention the serial and type numbers of the instrument.

Before returning an instrument to General Radio for service, please write to our Service Department or nearest district office (see back cover), requesting a Returned Material Tag. Use of this tag will insure proper handling and identification. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay.

3.2 REMOVAL OF INSTRUMENT FROM CABINET. To remove the instrument from its cabinet, remove the two large black screws from the bottom of the cabinet and lift the cover off.

3.3 TUBE FAILURE. As tubes age, one or more of them may become open-circuited. Check the filament resistance with an ohmmeter between

pins 3 and 5 of the tube base (see Figure 7). Make sure that the ohmmeter current through the filaments is less than 10 ma.

3.4 TUBE REPLACEMENT. For access to tubes, remove the two Phillips-head screws that attach the cover of the amplifier compartment, and lift off the cover. The tubes are held in place between rubber pads on the amplifier shelf and on the inside of the cover.

When replacing a tube, cut the leads on the new tube to between 5/16 and 3/8 inch before inserting the tube in the socket. Install the tube so that the red dot on the tube base is on the right.

3.5 BATTERY REPLACEMENT. To replace any of the batteries, remove the black screw that secures the holding bracket. (See Figure 8.) After the bracket is removed, the batteries can be withdrawn and replaced. Observe proper polarity as marked when replacing batteries.

3.6 REPLACEMENT OF BIAS CELL. For access to the bias cell, remove the two studs and washers from the ends of the amplifier etched-circuit board. Pivot the amplifier shelf upward to expose the bias cell.

To remove the bias cell, first pull the contacting clip sideways and away from the bias cell. The bias cell can then be unscrewed and replaced. When returning the amplifier shelf to its original position, be careful that all wires are free and that none will be pinched between shield and chassis.

3.7 SOLDERING OF CONNECTIONS TO CABLE WIRES. The plastic insulation on the wires in cables and on many interconnecting leads melts easily, and extreme caution is advised in soldering connections. If the wire is held with pliers near the spot to be soldered, heat will be carried away from the insulation, helping to avoid melted cables.

3.8 MICROPHONE SENSITIVITY ADJUSTMENT. An internal sensitivity control is adjusted in the General Radio laboratory to match the characteristics of the microphone sent with each meter. If a microphone with a different sensitivity is substituted for that furnished, set this adjustment (see Figure 8) to indicate the new microphone sensitivity. Also, a check of acoustical calibration should be made by the method outlined in paragraph 2.1.3.

3.9 INTERNAL NOISE. Internal noise should not normally affect readings with the attenuator switch set at 40 or higher. If desired, the following procedure can be used to determine how much noise is generated in the instrument. Remove the microphone, and connect an 800-μμf capacitor across terminals 1 and 3 of the microphone socket. This capacitor and its connecting leads must be completely shielded in a metal can connected to either the metal part of the microphone socket or to terminal 1, which is grounded. The connection is identical to that shown in Figure 6, except that a short circuit replaces the oscillator.

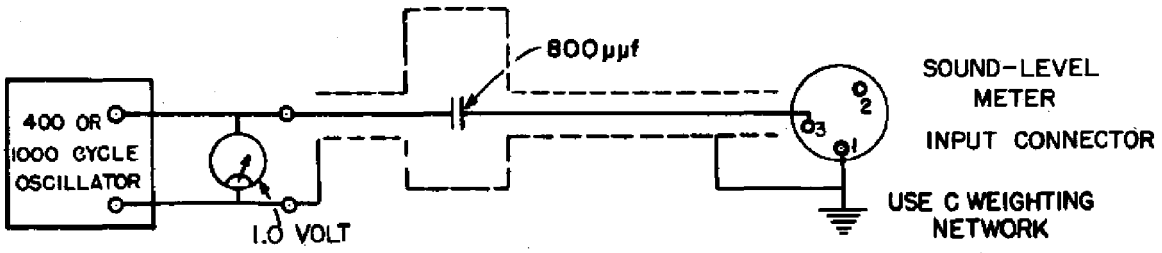

Figure 6. Circuit for Calibrating Amplifier Gain.

Be certain that there is no external pickup of any stray fields. The meter on the instrument should not read above -6 with the attenuator switch set at 30, the WEIGHTING switch at C, and the METER BATTERIES switch at FAST.

Internal noise can be caused by the bias cell, B50, or by the batteries. Tube noise is generally caused only by V50 or V52, which can be interchanged with V51 or V53 or replaced if less noise is required. It may be necessary to try several tubes to achieve a satisfactory reduction in noise. Typical noise levels are given at the front of this manual.

3.10 AMPLIFIER GAIN. With the Sound-Level Meter set for normal operation with C weighting, apply a 1.0-volt, 400- or 1000-cycle signal to the microphone socket through a shielded 800-μμf capacitor, as shown in Figure 6. The meter reading should agree with that given below for the sensitivity of the microphone used. (Microphone sensitivity is listed at the front of this manual, as well as on a label inside the instrument.)

1560-P1 (98B99) Microphone Sensitivity db re 1 volt/μbar	Type 1551-B reading
-60	134
-59	133
-58	132
-57	131
-56	130
-55	129

3.11 TEST VOLTAGES AND RESISTANCES. The following table lists dc voltages and resistances measured between tube socket pins and ground.

TUBE (TYPE)	PIN	FUNC-TION	VOLTS DC		RES TO GND
			BTRY	1262-B	
V50 (CK512AX)	1	P	15.0	15.5	890 k
	2	S	15.0	15.5	890 k
	3	C	0.71	0.7	16
	4	G	-1.40	-1.41	*
	5	C	0	0	0
V51 (CK512AX)	1	P	16.0	16.1	320 k
	2	S	14.1	14.2	940 k
	3	C	1.45	1.41	0
	4	G	0	0	1 M
	5	C	0.72	0.71	16
V52 (CK512AX)	1	P	9.4	9.1	850 k
	2	S	9.4	9.1	850 k
	3	C	0.76	0.76	16
	4	G	-0.48	-0.48	18 M
	5	C	0	0	0
V53 (CK512AX)	1	P	21.5	20.5	340 k
	2	S	14.9	14.3	1.21 M
	3	C	1.44	1.4	0
	4	G	0	0	18 M
	5	C	0.76	0.73	16
V54 (CK6418)	1	P	17.2	16.3	123 k
	2	S	17.6	17.0	400 k
	3	C	1.48	1.42	0
	4	G	-0.35	-0.35	18 M
	5	C	0	0	0
V55 (CK6418)	1	P	14.5	13.9	100 k
	2	S	21.5	20.7	270 k
	3	C	1.47	1.37	0
	4	G	-0.22	-0.22	18 M
	5	C	0	0	0
TR1 (2N105)	1	E	14.3	13.0	30 k
	2	B	14.2	12.9	96 k
	3	C	0	0	0
RX51	K		40.2	39.7	—
S02	4		65.0	59	—

Voltages to GND, measured with DC VTVM, with:
- S1 set to 130 CAL
- S2 set to A
- S3 set to METER FAST

Resistance readings taken with batteries removed, and with S02 terminals 2, 3, and 4 grounded.

*Do not attempt to measure (bias cell in circuit).

PARTS LIST

	PART NO. (Note A)			
	RESISTORS (NOTE B)			
R1	22.9 M	±1%	1 w	REF-3-2
R2	2.17 M	±1%	1/2 w	REF-70
R3	333 k	±1%	1/8 w	REF-60
R4	1.0 M	±1%	1/8 w	REF-60
R5	659 k	±1%	1/8 w	REF-60
R6	73.2 k	±1%	1/8 w	REF-60
R7	500 k	±1%	1/8 w	REF-60
R8	159 k	±1%	1/8 w	REF-60
R9	108 k	±1%	1/8 w	REF-60
R10	50 k	±1%	1/8 w	REF-60
R11	154 k	±1%	1/8 w	REF-60
R12	15.9 k	±1%	1/8 w	REF-60
R13	169 k	±1%	1/8 w	REF-60
R14	7.32 k	±1%	1/8 w	REF-60
R15	63.3 k	±1%	1/8 w	REF-60
R16	216 k	±1%	1/8 w	REF-60
R17	100 k	±1%	1/8 w	REF-60
R18	100 k	±5%	1/2 w	REC-20BF
R20	110 k	±5%	1/2 w	REC-20BF
R21	68 k	±5%	1/2 w	REC-20BF
R22	22 M	±5%	1/2 w	REC-20BF
R23	270 k	±5%	1/2 w	REC-20BF
R24	3 k	±5%	1/2 w	REC-20BF
R25	11 k	±5%	1/2 w	REC-20BF
R26	2 k	±5%	1/2 w	REC-20BF
R27	3 k	±5%	1/2 w	REC-20BF
R28	16.9 k	±1%	1/8 w	REF-60
R29	16.9 k	±1%	1/8 w	REF-60
R30	820 k	±5%	1/2 w	REC-20BF
R31	20 k	±5%	1/2 w	REC-20BF
R32	43 k	±5%	1/2 w	REC-20BF
R33	24 k	±5%	1/2 w	REC-20BF
R34	50 k	±10%		POSC-11
R35	330 k	±5%	1/2 w	REC-20BF
R36	24 k	±5%	1/2 w	REC-20BF
R37	1 k	±5%	1/2 w	REC-20BF
R38	100 k	±10%		POSC-23
R39	100 k	±20%		POSC-22
R50	430 k	±5%	1/2 w	REC-20BF
R51	110 k	±5%	1/2 w	REC-20BF
R52	1 M	±5%	1/2 w	REC-20BF
R53	910 k	±5%	1/2 w	REC-20BF
R54	33 k	±5%	1/2 w	REC-20BF
R55	290 k	±1%	1/8 w	REF-60
R56	18 M	±5%	1/2 w	REC-20BF
R57	750 k	±5%	1/2 w	REC-20BF
R58	100 k	±5%	1/2 w	REC-20BF
R59	18 M	±5%	1/2 w	REC-20BF
R60	680 k	±5%	1/2 w	REC-20BF
R61	1.2 M	±5%	1/2 w	REC-20BF
R62	330 k	±5%	1/2 w	REC-20BF
R63	18 M	±5%	1/2 w	REC-20BF
R64	390 k	±5%	1/2 w	REC-20BF
R65	110 k	±5%	1/2 w	REC-20BF
R66	2.5 k	±10%		POSC-24

	PART NO. (Note A)			
R67	390	±5%	1/2 w	REC-20BF
R68	10 k	±5%	1/2 w	REC-20BF
R69	220 k	±5%	1/2 w	REC-20BF
R70	18 M	±5%	1/2 w	REC-20BF
R71	1.6 M	±5%	1/2 w	REC-20BF
R72	300 k	±5%	1/2 w	REC-20BF
R73	100 k	±5%	1/2 w	REC-20BF
R74	120 k	±5%	1/2 w	REC-20BF
R75	470 k	±5%	1/2 w	REC-20BF
R76	10 k	±5%	1/2 w	REC-20BF
R77	20 k	±5%	1/2 w	REC-20BF
	CAPACITORS (NOTE C)			
C1	330μμf	±2%	500 dcwv	COM-20E
C2	1-4μμf			1551-40
C3	7-45μμf			COT-12
C4	30μμf	±2%	500 dcwv	COM-20E
C5	90.9μμf	±2%	500 dcwv	COM-20E
C7	0.00315	±2%	500 dcwv	COM-30E
C8	220μμf	±2%	500 dcwv	COM-20E
C9	220μμf	±2%	500 dcwv	COM-20E
C10	0.05	±5%	100 dcwv	COW-17
C11	220μμf	±2%	500 dcwv	COM-20E
C12	0.47	±10%	100 dcwv	COW-17
C13	50		15 dcwv	COE-47
C14				
C15	12μμf	±5%	500 dcwv	COC-21NPO
C16	35μμf	±2%	500 dcwv	COM-20E
C17	240μμf	±2%	500 dcwv	COM-20E
C18	430μμf	±2%	500 dcwv	COM-20E
C19	0.001	±5%	500 dcwv	COM-5D
C20	0.001	±5%	500 dcwv	COM-5D
C21	0.0012	±5%	500 dcwv	COM-5D
C22	0.001	±5%	500 dcwv	COM-5D
C50	0.1	±10%	100 dcwv	COW-17
C51	1	±10%	100 dcwv	COW-17
C52	40		50 dcwv	COE-34
C53	0.22	±10%	100 dcwv	COW-17
C54	0.1	±10%	100 dcwv	COW-17
C55	0.22	±10%	100 dcwv	COW-17
C56	0.22	±10%	100 dcwv	COW-17
C57	30		150 dcwv	COE-31
C58	0.01	±10%	100 dcwv	COW-17
C59	0.1	±10%	100 dcwv	COW-17
C60	0.1	±10%	100 dcwv	COW-17
C61	0.01	±10%	100 dcwv	COW-17
C62	0.22	±10%	100 dcwv	COW-17
C63	0.47	±10%	100 dcwv	COW-17
C64	0.22	±10%	100 dcwv	COW-17
C65	1	±10%	100 dcwv	COW-17
C66	0.047	±10%	100 dcwv	COW-17
C67	0.47	±10%	100 dcwv	COW-17
C68	0.47	±10%	100 dcwv	COW-17
C69	0.47	±10%	100 dcwv	COW-17
C70	16		150 dcwv	COE-4
C71	3.3μμf	±10%	500 dcwv	COC-1

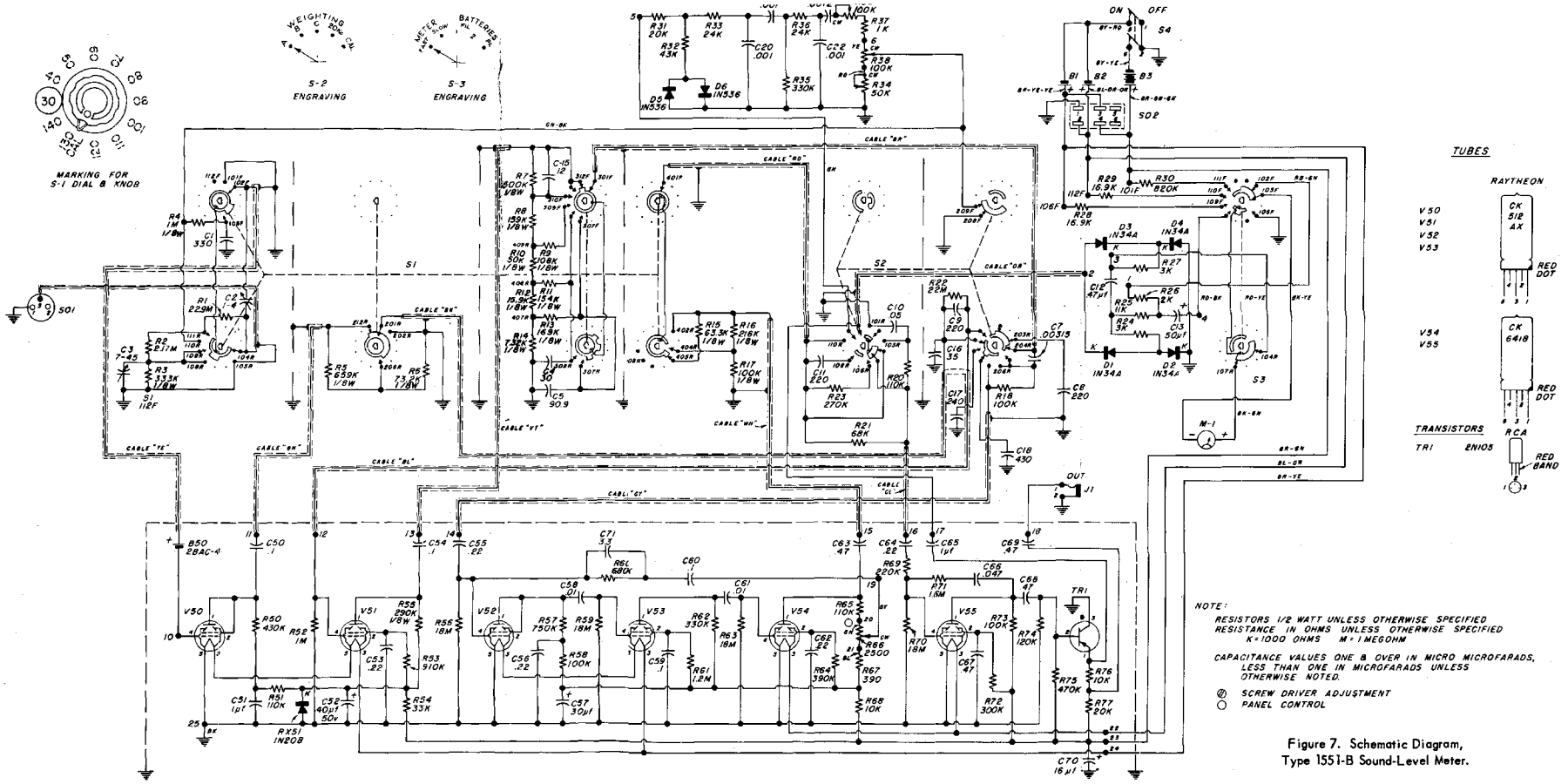

Figure 7. Schematic Diagram, Type 1551-B Sound-Level Meter.

PARTS LIST (cont.)

	PART NO. (Note A)			PART NO. (Note A)	
B1	BATTERY, 1-1/2 v	D Cell	D4	DIODE	1N34-A
B2	BATTERY, 1-1/2 v	D Cell	D5	DIODE	1N536
B3	BATTERY, 67-1/2 v	Eveready 467 or equivalent	D6	DIODE	1N536
			M1	METER 100μa dc	MEDS-105
			RX51	DIODE 42 v ±5%	1N208
B50	BATTERY, 1-1/2 v	2BAC-4	S1	SWITCH, Rotary	SWRW-160
D1	DIODE	1N34-A	S2	SWITCH, Rotary	SWRW-152
D2	DIODE	1N34-A	S3	SWITCH, Rotary	SWRW-153
D3	DIODE	1N34-A	S4	SWITCH, dpst	1551-B-45

(A) GR Type designations for resistors and capacitors are as follows:

COC - Capacitor, ceramic	COW - Capacitor, wax
COE - Capacitor, electrolytic	POSC - Potentiometer, composition
COM - Capacitor, mica	REC - Resistor, composition
COT - Capacitor, trimmer	REF - Resistor, film

(B) All resistances are in ohms except as otherwise indicated by k (kilohms) or M (megohms).

(C) All capacitances are in microfarads except as otherwise indicated by μμf (micromicrofarads).

When ordering replacement components, be sure to include complete description as well as Part Number. (Example: R85, 51 k ±10%, 1/2 w, REC-20BF.)

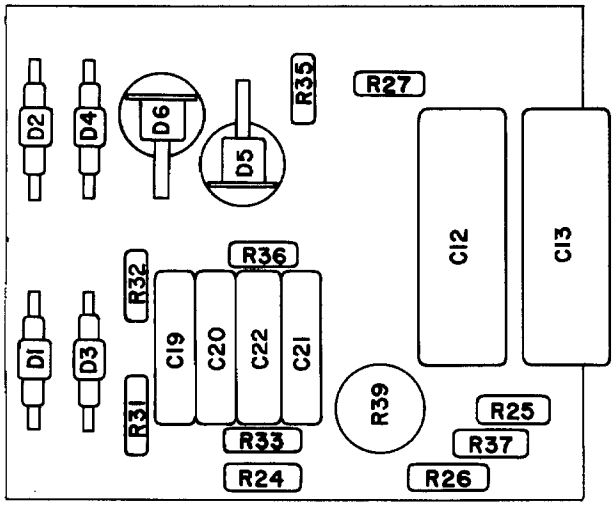

Figure 9. Component Layout on Etched Board.

PARTS LIST (cont.)

	PART NO. (Note A)			PART NO. (Note A)	
)1	BATTERY, 1-1/2 v	D Cell	D4	DIODE	1N34-A
)2	BATTERY, 1-1/2 v	D Cell	D5	DIODE	1N536
)3	BATTERY, 67-1/2 v	Eveready 467 or equivalent	D6	DIODE	1N536
			M1	METER 100μa dc	MEDS-105
			RX51	DIODE 42 v ±5%	1N208
)50	BATTERY, 1-1/2 v	2BAC-4	S1	SWITCH, Rotary	SWRW-160
)1	DIODE	1N34-A	S2	SWITCH, Rotary	SWRW-152
)2	DIODE	1N34-A	S3	SWITCH, Rotary	SWRW-153
)3	DIODE	1N34-A	S4	SWITCH, dpst	1551-B-45

(A) GR Type designations for resistors and capacitors are as follows:

COC - Capacitor, ceramic
COE - Capacitor, electrolytic
COM - Capacitor, mica
COT - Capacitor, trimmer
COW - Capacitor, wax
POSC - Potentiometer, composition
REC - Resistor, composition
REF - Resistor, film

(B) All resistances are in ohms except as otherwise indicated by k (kilohms) or M (megohms).

(C) All capacitances are in microfarads except as otherwise indicated by μμf (micromicrofarads).

When ordering replacement components, be sure to include complete description as well as Part Number. (Example: R85, 51 k ±10%, 1/2 w, REC-20BF.)

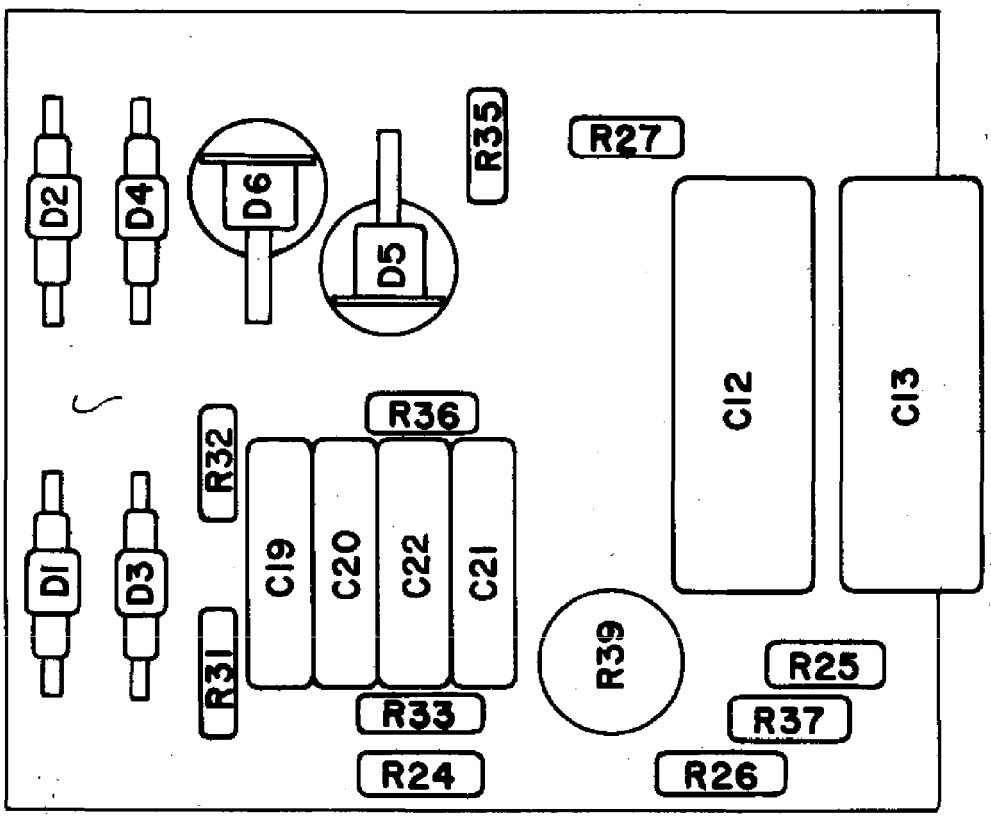

Figure 9. Component Layout on Etched Board.

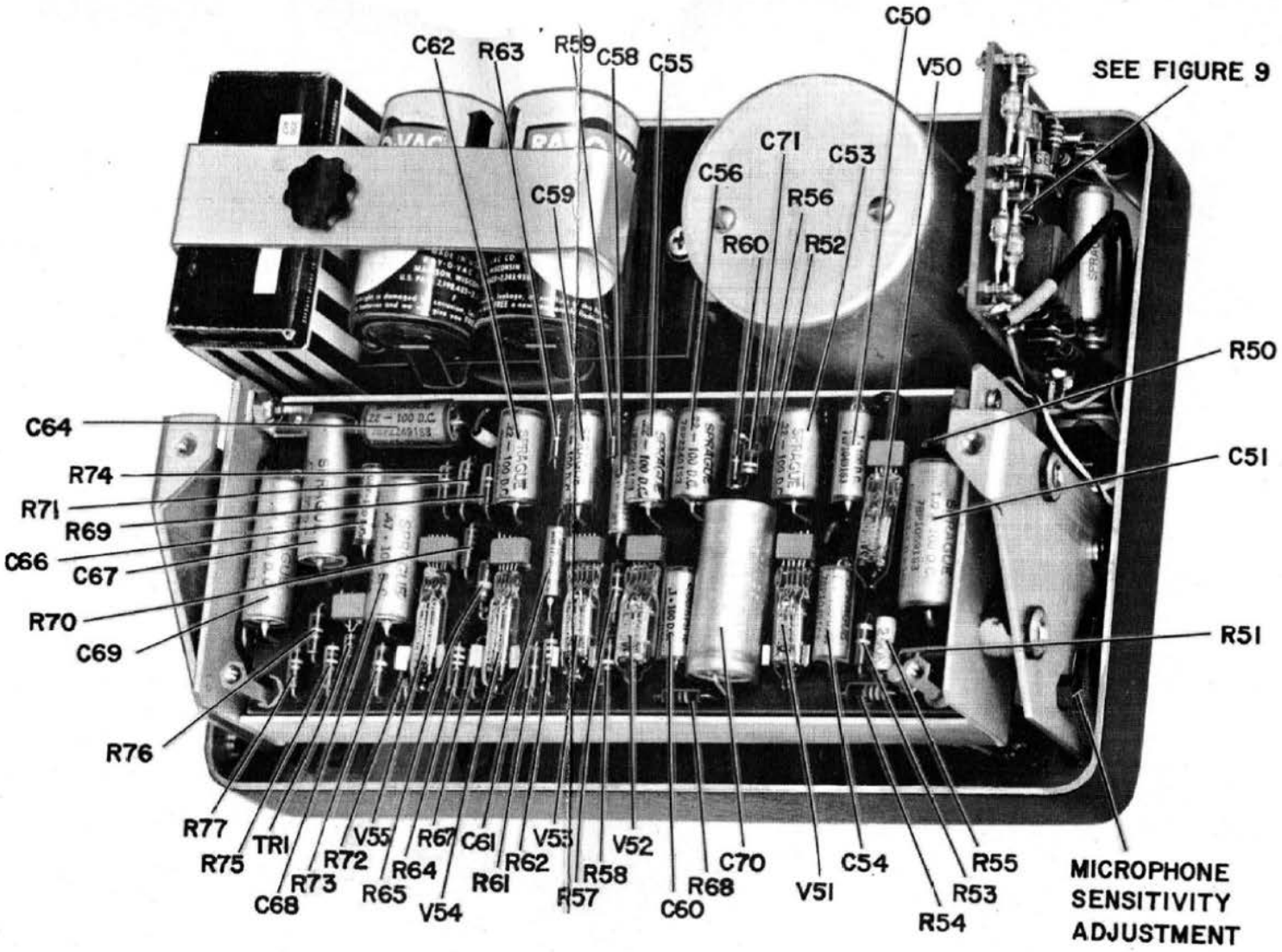

Figure 8.
Interior View, Type 1551-B
Sound-Level Meter.

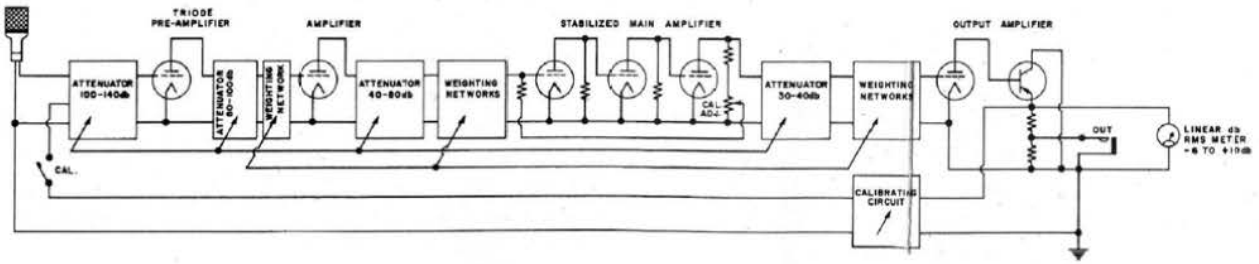

Figure 10.
Elementary Block Diagram.

Section 4

TYPE 1262-B POWER SUPPLY

4.1 INSTALLATION. Before using the Type 1262-B Power Supply, remove the batteries from the Sound-Level Meter (refer to paragraph 3.5), and replace the Sound-Level Meter in its case.

To attach the power supply to the Sound-Level Meter, it is necessary first to remove the cover from the power supply. To do this, loosen the two 10-32 screws at the ends of the power supply. Then slide the cover off, i.e., away from the engraved panel of the power supply.

Two 1/4-28 binder-head screws are used to attach the power supply to the Sound-Level Meter. Insert these screws through holes in the back of the power supply and mating threaded holes in the Sound-Level Meter. The six-terminal male connector in the power supply should slip into the receptacle on the Sound-Level Meter.

4.2 OPERATION. Connect the Type 1262-B input plug to a 105-125 (or 210-250)-volt, 50-60-cps power source. Turn the power supply and Sound-Level Meter on by means of the power supply on-off switch. (The Sound-Level Meter's on-off switch functions only when the instrument is battery-operated.) To check for proper operation, set the METER BATTERIES switch to PL and FIL, checking that for each position the meter pointer falls within the white BAT area on the meter face.

4.3 SERVICE AND MAINTENANCE. Refer to paragraph 3.1.

4.4 NOISE LEVEL. The internal noise level of the Sound-Level Meter depends on the quality of the power line supplying the Type 1262-B Power Supply. With a good line (i.e., no transient humps or frequency components below 50 cps), the noise level will be 28 db or less for the 20-kc weighting position, below 26 db with C weighting, and below 24 db with A or B weighting.

If the Sound-Level Meter is operated in an area where the line voltage fluctuates abruptly and repeatedly (e.g. near devices such as spot welders), the internal noise level will appear to be higher than the values listed above.

PARTS LIST

			PART NO. (NOTE A)
RESISTORS (NOTE B)	R1	100 k ±5% 1/2 w	REC-20BF
	R2	200 ±5% 1/2 w	REC-20BF
	R3	200 ±5% 1/2 w	REC-20BF
	R4	43 ±5% 1/2 w	REC-20BF
	R5	47 ±5% 1/2 w	REC-20BF
	R6	180 ±5% 1/2 w	REC-20BF
	R7	1.5 k ±5% 1/2 w	REC-20BF
	R8	1.5 k ±5% 1/2 w	REC-20BF
	R9	33 k ±5% 1/2 w	REC-20BF
	R10	220 ±5% 1/2 w	REC-20BF
	R11	430 ±5% 1/2 w	REC-20BF
CAPACITORS (NOTE C)	C1A	300	COE-36
	C1B	300	
	C2A	1000	COE-59
	C2B	2000	
	C2C	1000	
	C3A	200	COEB-34
	C3B	100	
	C3C	100	
	C4A	300	COE-36
	C4B	300	
MISCELLANEOUS	P1	PILOT LAMP, 115 v	NE-51
	RX1	RECTIFIER	2RE-35
	RX2	RECTIFIER	2RE-34
	RX3	RECTIFIER	2RE-36
	RX4	RECTIFIER	2RE-32
	RX5	RECTIFIER	2RE-33
	S1	SWITCH, Toggle	SWT-33NP
	T1	TRANSFORMER	746-431

NOTES

(A) COE - Capacitor, electrolytic
COEB - Capacitor, electrolytic block
REC - Resistor, composition

(B) All resistances are in ohms except k = kilohms

(C) All capacitances are in microfarads.

When ordering replacement components, be sure to include complete description as well as Part Number. (Example: R85, 51 k ±10%, 1/2w, REC-20BF.)

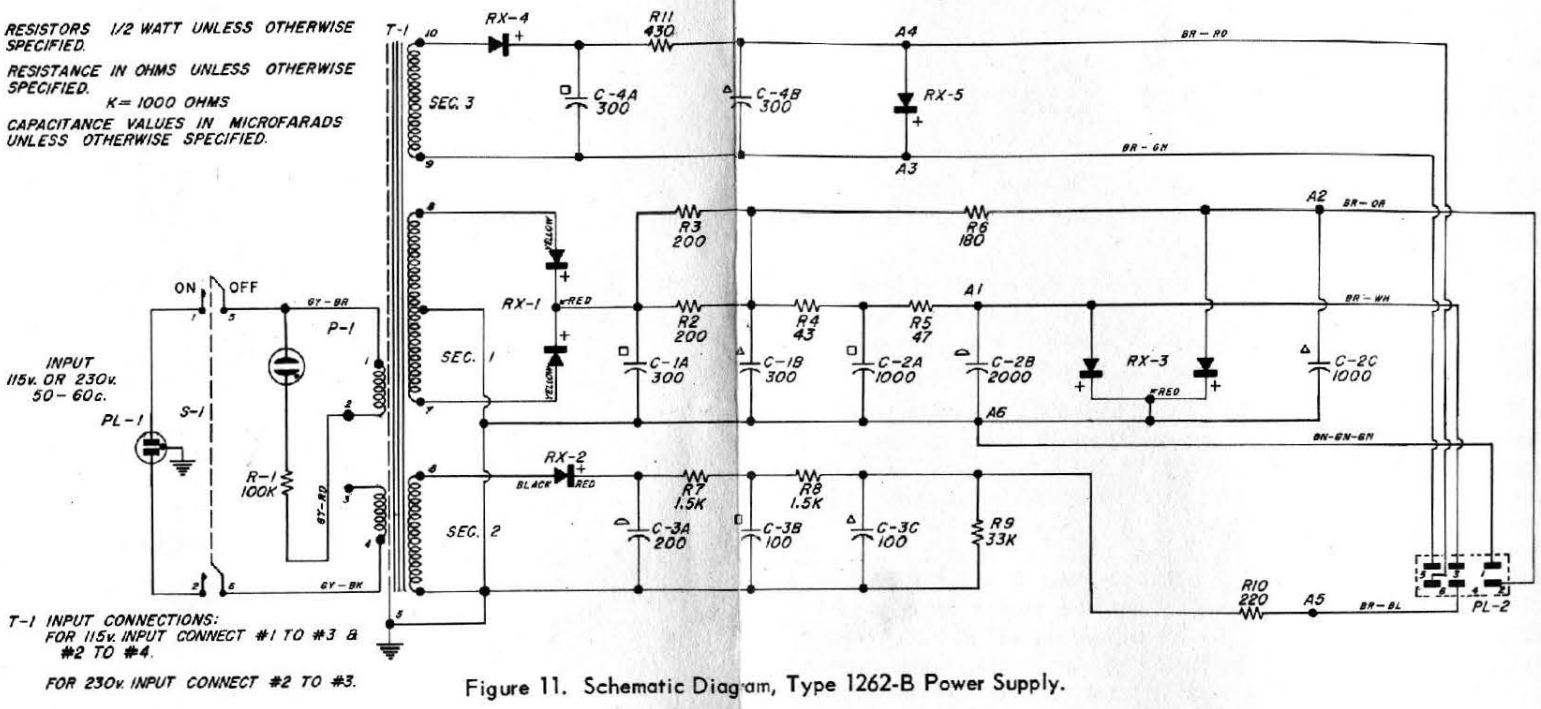

Figure 11. Schematic Diagram, Type 1262-B Power Supply.

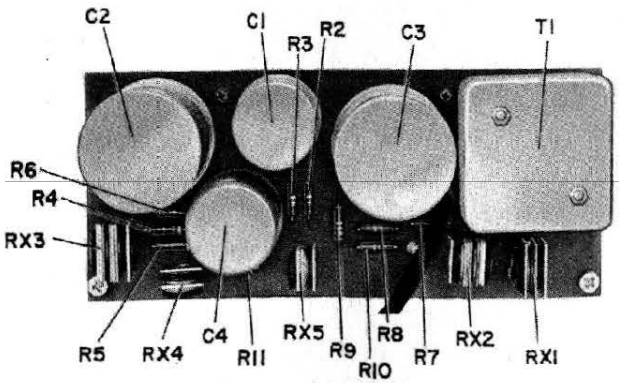

Figure 12. Layout of Components on Etched Board.

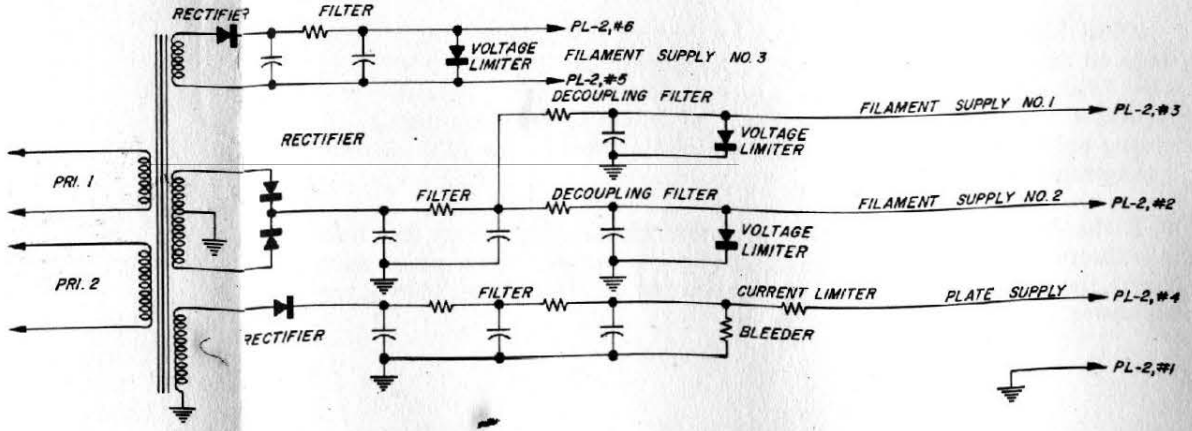

Figure 13. Elementary Schematic Diagram.