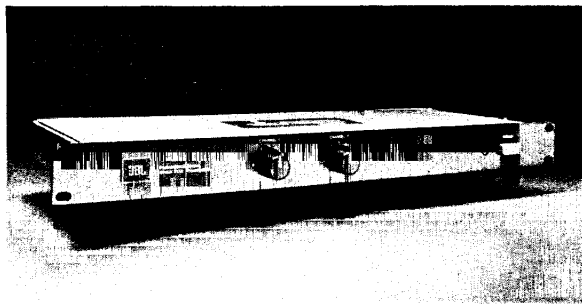


JBL 5152 INSTALLATION AND SERVICE MANUAL



Architectural Specifications

The preamplifier shall have two input channels with separately adjustable gain controls accessible on the front panel. Each input channel shall accommodate an unbalanced high impedance microphone or line input, or a balanced high or low impedance microphone or line input with an optional accessory plug-in transformer. One input channel shall also accommodate a magnetic phono cartridge input.

The preamplifier shall be capable of operating in either of two modes. In the MIX mode, both input channels shall be mixed together with full gain available to each at all times. In the OVERRIDE mode, CHANNEL 1 shall be switched on and CHANNEL 2 shall be reduced in gain by 15 dBm when the TRIP terminal is connected to GND.

The preamplifier shall be capable of +18 dBm output level into an unbalanced 600 Ω load (direct output) and +24 dBm output level into a balanced 600 Ω load (transformer output). Frequency response in the audio band shall be flat within ±1 dB and distortion shall be <0.2%, 30 Hz - 20 kHz. The preamplifier shall occupy one standard EIA rack space and shall operate on 100 - 120 V AC or 200 - 240 V AC, 50/60 Hz.

Installation

The 5152 is suitable either for rack mounting in one EIA standard rack space (1²³/₃₂"") without additional bracing or ventilation, or for counter-top placement. All external connections, MIX/OVERRIDE switch and matching/bridging transformer options are available on the rear panel, Figure 1.

NOTE: All low-level amplification circuitry can be adversely affected by strong magnetic fields. For this reason, it is recommended that the unit be located at least seven inches from any power amplifier or similar source of electromagnetic radiation.

Ventilation

The 5152 generates minimal heat during normal usage. However, because transistors are heat sensitive, the 5152 should not be placed adjacent to heat-generating equipment or in areas where the ambient temperature exceeds 50°C (122°F) without adequate ventilation.

PRODUCT SPECIFICATION

	Direct Out	Transformer Out
Gain		
Low Impedance Microphone (with 5195 transformer)	62 dB	68 dB
High Impedance Microphone (no transformer)	45 dB	51 dB
Line (with 5195 transformer)	25 dB	31 dB
Line (no transformer)	21 dB	27 dB
Phono	47 dB @ 1 kHz	53 dB @ 1 kHz
Maximum Output Level		
Balanced		+24 dBm @ 600 Ω
Unbalanced	+18 dBm @ 600 Ω	
Frequency Response	20 Hz to 20 kHz, +0, -1 dB (@ +18 dBm)	
THD	<0.2%, 30 Hz to 20 kHz	
Equivalent Input Noise	-125 dB ref. 0.775 V unweighted, low impedance microphone input, 150 Ω source, either channel, maximum volume, 20 kHz equivalent noise bandwidth	
Input Impedance		
Low Impedance Microphone	1 kΩ	
High Impedance Microphone	56 kΩ	
Line	15 kΩ Or 600 Ω with terminating resistor	
Phono (channel 2 only)	56 kΩ	
Power Requirements	120/240 V AC, 50/60 Hz	
Power Consumption	6 W, normal	
Maximum Ambient Operating Temperature	50°C	122°F
Clearance Dimensions		
Front Panel	44 mm x 483 mm	1 ²³ / ₃₂ in x 19 in
Depth of Controls	20 mm	¾ in
Depth Behind Panel (no transformer)	216 mm	8½ in
Depth Behind Panel (with 5195 transformer)	251 mm	9¾ in
Mounting	1 EIA standard rack space	
Weight		
Net	3.6 kg	8 lb
Shipping	4.8 kg	10.5 lb
Accessory		5195 matching/bridging transformer

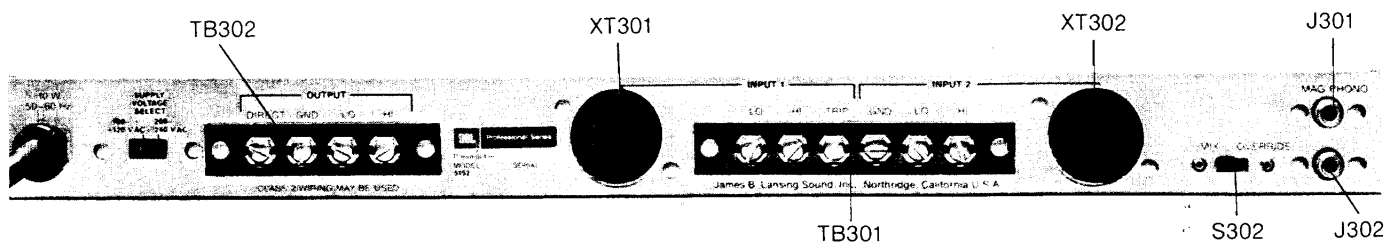


Figure 1

Input Connections

Input connections may be either direct-coupled or transformer-isolated at the input terminal strip, TB301, or the two RCA-type phono jacks, J301 and J302, Figure 1. Direct coupling is accomplished by connecting the inner lead of a shield cable to HI of INPUT 1 or INPUT 2 and the shield lead to LO of INPUT 1 or INPUT 2, Figure 3. For transformer-isolated inputs, JBL 5195 matching/bridging transformers must be plugged into the 9-pin sockets, XT301 or XT302.

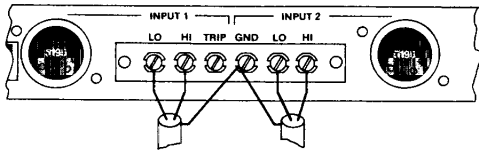
An assortment of jumpers is included with the unit to facilitate all interconnections shown in Figures 3 and 6.

Mode Selection

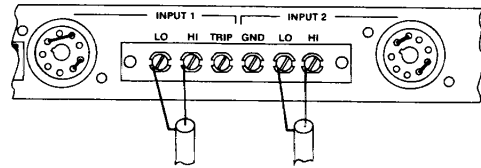
The preamplifier is designed to operate either of two modes, selectable by means of the OVERRIDE/MIX switch, as shown in Figure 1.

MIX—INPUT 1 and INPUT 2 are mixed as determined by settings of their level controls, with full gain available at each input.

OVERRIDE—INPUT 1 is normally muted and INPUT 2 is fully operational. When the override is triggered by grounding the TRIP terminal of INPUT 1, INPUT 1 becomes fully operational and INPUT 2 is reduced in gain by 15 dB.



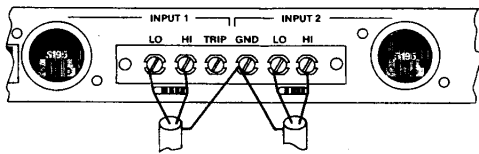
Balanced
Low Impedance
Microphone or
High Impedance
Line



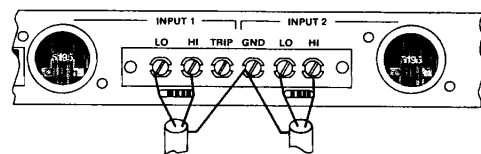
Unbalanced
High Impedance
Microphone
or Line

Figure 2

Figure 3



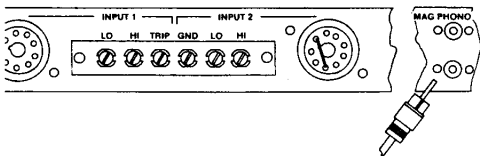
Balanced
Low Impedance
Line



Balanced
Low Impedance
Line with 14 dB
Extra Gain
(Input Level less
than -20 dBm)

Figure 4

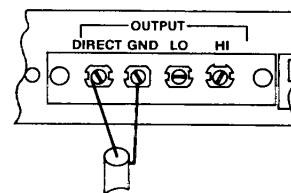
Figure 5



Phono Jack
May be Used
for Unbalanced
High Impedance
Microphone, Line
or Magnetic Phono
(channel 2 only)

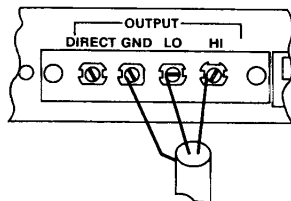
Figure 6

Figures 7a and 7b show the optional output wiring connections.



DIRECT OUTPUT

Figure 7a



BALANCED OUTPUT

Figure 7b

Output Connections

Either transformer-isolated or direct output connections are provided at the OUPUT terminal strip, TB302, Figure 1.

WARNING

THIS SECTION OF THE MANUAL
CONTAINS SERVICE INSTRUCTIONS
FOR USE BY QUALIFIED SERVICE
PERSONNEL ONLY.

The following procedures are designed to assist in the isolation of malfunctions. The operations described should be undertaken only after an investigation of all external connections and adjustments has indicated, beyond reasonable doubt, that the problem is actually within the unit.

Component Access

The 5152 contains only one printed circuit board. All components are mounted directly on the circuit board with the exception of the output transformer, power transformer, on/off switch, pilot lamp, level controls, supply voltage select switch, input and output terminal strips, mix/override switch and the 9-pin sockets.

To reach the circuit board for testing, servicing or input selection, only the top cover must be removed (eight sheet metal screws). Removal of the circuit board from the chassis requires popping out six snaps.

Voltage Conversion

The 5152 can be operated from either a 100-120 V AC or 200-240 V AC, 50/60 Hz source. The SUPPLY VOLTAGE SELECT switch, S301, converts the unit from one operating voltage range to the other. Use the following procedures to convert the preamplifier to a different voltage range:

1. Disconnect the 5152 from the power source.
2. Slide the SUPPLY VOLTAGE SELECT switch to the appropriate line voltage range.

3. Change the line cord and attachment plug to match the power source receptacle or use a 120-to-240 V adapter (not provided). The attachment plug and/or line cord used for 240 V AC mode in the U.S., Canada and Japan shall be both U.L. listed and C.S.A. Certified. For use in other countries, line cord selection should be based on local regulations governing 240 V AC 50/60 Hz supply source.

U.L. and C.S.A. Voltage Wiring Code

Country	Switch, S301, Terminal	Switch, S201, Terminal	Ground, E401	Wire Color
U.S. and Japan	1	—	—	Black White
	—	1	—	Green
	—	—	Yes	Blue
Europe	1	—	—	Brown
	—	1	—	Green/Yellow
	—	—	Yes	

CAUTION: This unit may be damaged if operated with the supply voltage select switch set incorrectly for the line voltage applied.

Selector Switch

Table 1 shows the various input sources, terminations and jumper options for the 5152. See Figures 2-6 for available interconnections.

TABLE 1

Input	Connector	Input Selector Switch Position (Internal Adjustment)	Accessory Transformer	Transformer Socket Jumper Connections	Termination Resistor
Balanced Low Impedance Microphone	Terminal Strip	MIC	5195	None	None
Unbalanced High Impedance Microphone	Terminal Strip	MIC	None	4-5 7-9	None
	Phono Jacks (Channel 2 only)	MIC	None	3-9	None
Balanced High Impedance Line	Terminal Strip	LINE	5195	None	None
Balanced Low Impedance Line	Terminal Strip	LINE	5195	None	620-ohm ½-watt
Balanced Low Impedance Line with 14 dB Extra Gain (Input Level Less Than -20 dBm)	Terminal Strip	MIC	5195	None	1800-ohm ¼-watt
Unbalanced High Impedance Line	Terminal Strip	LINE	None	4-5 8-9	None
	Phono Jacks (Channel 2 only)	LINE	None	3-9	None
Magnetic Phono (Channel 2 only)	Phono Jacks	PHONO	None	3-9	None

WARNING
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PERSONNEL ONLY.

Output Conversion

For 150 Ω output, the following procedure should be used to parallel the windings of the output transformer, T402, Figure 8.

1. Disconnect the unit from the power source.
2. Clip the BLUE and VIOLET output transformer leads from the printed circuit board at points #27 and #28.
3. Solder the BLUE transformer wire to the GREEN wire at the OUTPUT terminal strip, TB302, marked HI.
4. Solder the VIOLET transformer wire to the GRAY wire at the OUTPUT terminal strip, TB302, marked LO.

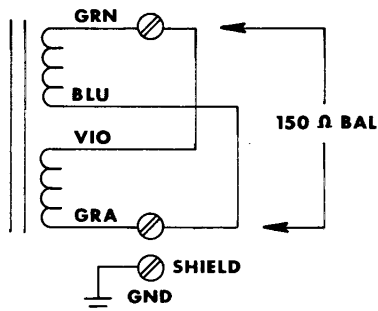


Figure 8.

The 5152 has been designed so that both the direct and transformer outputs may be used simultaneously.

Proof of Performance

All performance checks are in-cabinet procedures to be used for checking specifications after repair or for incoming quality control inspection.

NOTE: All measurements should be made with the unit and test equipment power cords connected to a normal 120 V AC or 240 V AC 50/60 Hz line source.

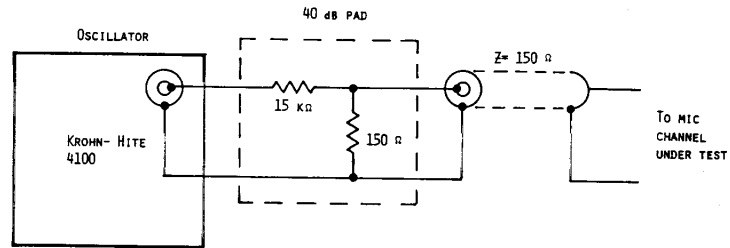


FIGURE 9, 40 dB,
150 Ω PAD

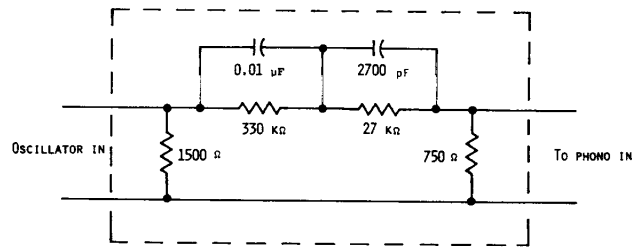


FIGURE 10, REVERSE RIAA
EQUALIZATION NETWORK

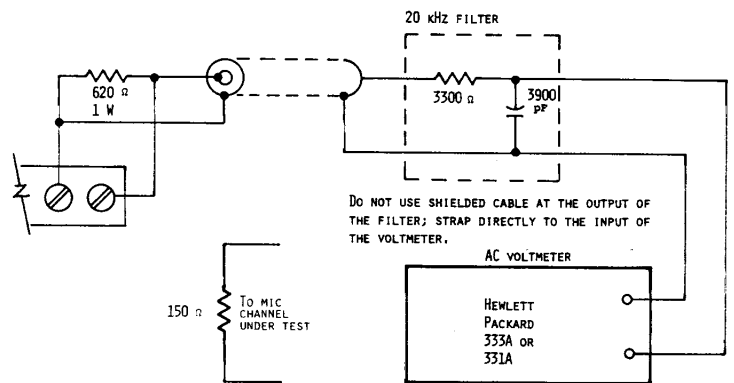


FIGURE 11, 20 kHz FILTER

ALTERNATE OSCILLATOR SETUP: Z = 600 Ω

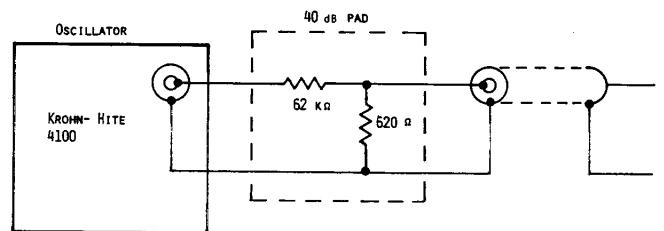


FIGURE 12, 40 dB,
600 Ω PAD

The following test equipment is recommended:

- AUDIO TEST OSCILLATOR
- HARMONIC DISTORTION ANALYZER
- 40 dB PAD (150 Ω)
- REVERSE RIAA EQUALIZATION NETWORK
- 20 kHz FILTER
- ALTERNATE 40 dB PAD (600 Ω)

- Krohn-Hite 4100, or equivalent.
- Hewlett-Packard model 333A, or equivalent.
- See Figure 9
- See Figure 10
- See Figure 11
- See Figure 12

Frequency Response

(20 Hz - 20 kHz, +0, -1 dB @ +18 dBm, into 600Ω Ref. 1 kHz.)

Table 2 outlines the test set-up and sequence for measuring frequency response of the 5152.

TABLE 2

Frequency Response Test and Operational Sequence.	Line	Line	Mic	Phono
Connect test oscillator to input.	1	1		
Connect test oscillator to input using Figure 9 or Figure 12.			1	
Connect test oscillator to input using Figure 10.				1
Set MIC/LINE or PHONO/LINE/MIC switch to MIC.			2	
Set MIC/LINE or PHONO/LINE/MIC switch to LINE.	2	2		
Set PHONO/LINE/MIC switch to PHONO.				2
Connect the AC voltmeter and a 620 Ω, 1 W load resistor across output terminals marked DIRECT and GND.	3	3	3	3
Connect the AC voltmeter and a 620 Ω, 1 W load resistor across output terminals marked HI and LO.		3		
Set CHANNEL 1 or CHANNEL 2 level control to maximum. Set the test oscillator to 2 kHz and adjust the amplitude to indicate +18 dBm across the DIRECT and GND terminals of the OUTPUT strip.	4	4	4	4
Set CHANNEL 1 or CHANNEL 2 level control to maximum. Set the test oscillator to 2 kHz and adjust the amplitude to indicate +24 dBm across the HI and LO terminals of the OUTPUT strip.		4		
Voltage gain of the system can be checked by substituting the value in the formula: $A_v(\text{db}) = 20 \text{ Log}_{10} \left(\frac{e_o}{e_{in}} \right)$	5	5	5	5
Input voltage of the system can be measured by connecting the AC voltmeter at the INPUT terminals.	6	6	6	6

NOTE: To use Table 2, read down and across. Numbers under LINE, MIC and PHONO represent test sequence.

THD

(≤ 0.2%, 30 Hz - 20 kHz).

Using the test set-up, Figures 9 and 14:

1. Set the MIC/LINE or PHONO/LINE/MIC switch to LINE.
2. Set the MIX/OVERRIDE switch to MIX.
3. Install jumpers between terminals #4 and #5 and between terminals #8 and #9 of each 9-pin socket, XT301 and XT302, Figure 13.

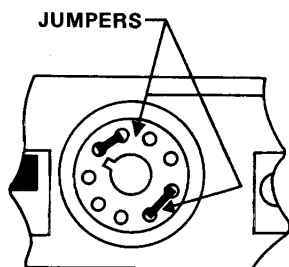


Figure 13

WARNING

THIS SECTION OF THE MANUAL CONTAINS SERVICE INSTRUCTIONS FOR USE BY QUALIFIED SERVICE PERSONNEL ONLY.

4. Set the CHANNEL 1 or CHANNEL 2 level control, depending on which channel is under test, to maximum.
5. Set the oscillator level for a +18 dBm (direct output) or +24 dBm (transformer output).
6. Measure the distortion of the preamplifier at 30 Hz, 200 Hz, 2 kHz and 20 kHz.

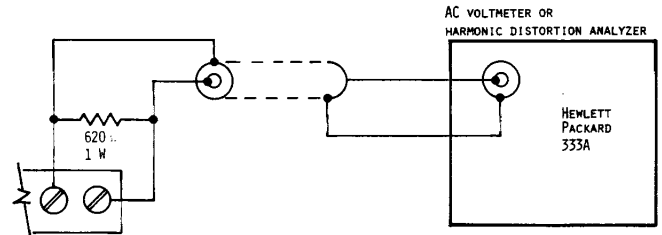


FIGURE 14, THD TEST SET UP

Figure 14, THD test set up.

Microphone Equivalent Noise

(-125 dB Ref. 0.775 V unweighted, 150Ω source 20 kHz equivalent bandwidth).

Using the test set-up, Figure 11 or 12:

1. Set the MIC/LINE or PHONO/LINE/MIC switch to MIC and the MIX/OVERRIDE switch to MIX.
2. Install a 5195 transformer into INPUT 1 or INPUT 2.
3. Set the CHANNEL 1 or CHANNEL 2 level control to maximum and the channel not under test to minimum.
4. Set the oscillator to 2 kHz and adjust the output level of the 5152 to 0 dBm.
5. Measure the input signal. Typical readings are -71 dB, indicating a gain of 71 dB.
6. Install the 20 kHz filter, Figure 11.
7. Disconnect the oscillator from the preamplifier.
8. Measure the noise level at the output of the 5152. Typical readings are -54 dBm.
9. Add the input level and noise measurement to calculate the equivalent input noise.
EXAMPLE

-71 dB	Ref. 0 dBm	INPUT LEVEL
-54 dB	Ref. 0 dBm	NOISE LEVEL
<hr/>		
-125 dB	Ref. 0 dBm	EQUIVALENT INPUT NOISE
10. The calculated equivalent input noise figure should be -125 dB (Ref. 0 dBm) or better.

DC Voltage Measurements

All DC voltage measurements are with respect to ground and are made using a Fluke 8000A with a line voltage of 120 V AC.

Voltages shown with two readings on the schematic indicate the two states of the TRIP DETECTOR and FET GATE when properly operating.

EXAMPLE	+0.460 V	TRIP DETECTOR NOT GROUNDED
	<hr/>	
	+86.9 mV	TRIP DETECTOR GROUNDED

ELECTRICAL PARTS LIST, 5152

Circuit No.	JBL Part No.	Description	Tolerance
CAPACITORS			
All capacitors are in μ F unless otherwise noted.			
C1	48433	20 pF	Mica 5%
C2	54998	0.1 μ F	100 V
C3	48429	10 pF	Mica 5%
C4	54998	0.1 μ F	100 V
C5	48433	20 pF	Mica 5%
C6	36188	25 μ F	25 V
C7	48925	1200 pF	Mica 5%
C8	36188	25 μ F	25 V
C9	48141	4.7 μ F	63 V
C10	54998	0.1 μ F	100 V
C11	36188	25 μ F	25 V
C12	54998	0.1 μ F	100 V
C13	48429	10 pF	Mica 5%
C14	48429	10 pF	Mica 5%
C15	54998	0.1 μ F	100 V
C16	48504	100 μ F	25 V
C17	48504	100 μ F	25 V
C18	55172	330 μ F	4 V
C19	48433	20 pF	Mica 5%
C20	54998	0.1 μ F	100 V
C21	48429	10 pF	Mica 5%
C22	54998	0.1 μ F	100 V
C23	48433	20 pF	Mica 5%
C24	36188	25 μ F	25 V
C25	48925	1200 pF	Mica 5%
C26	48925	1200 pF	Mica 5%
C27	53048	0.0056 μ F	250 V
C28	36188	25 μ F	25 V
C29	54839	220 μ F	40 V
C30	54839	220 μ F	40 V
C31	54840	2200 μ F	6.3 V
C32	48504	100 μ F	25 V
C33	48504	100 μ F	25 V
C34	54998	0.1 μ F	100 V
C35	54998	0.1 μ F	100 V
C36	47795	4.7 μ F	35 V
C37	47795	4.7 μ F	35 V
C38	54998	0.1 μ F	100V
C201	13189	0.01 μ F	1400 V
RELAY			
K1	55726	DPDT	
RESISTORS			
Resistors are \pm 5% $\frac{1}{2}$ W unless otherwise indicated.			
R1	36499	56 k Ω	
R2	36473	4700 Ω	
R3	36459	1200 Ω	
R4	36473	4700 Ω	
R5	55171	4.7 Ω	
R6	36459	1200 Ω	
R7	36495	39 k Ω	
R8	36459	1200 Ω	
R9	36425	47 Ω	
R10	36425	47 Ω	
R11	36425	47 Ω	
R12	36753	47 Ω	1 W
R13	35621	100 k Ω	
R14	36499	56 k Ω	
R15	36459	1200 Ω	
R16	36499	56 k Ω	
R17	81055	1 M Ω	
R18	81055	1 M Ω	
R19	36487	18 k Ω	
R20	35621	100 k Ω	
R21	36459	1200 Ω	
R22	35605	22 k Ω	
R23	36487	18 k Ω	
R24	35621	100 k Ω	
R25	35621	100 k Ω	
R26	36425	47 Ω	
R27	35621	100 k Ω	
R28	36473	4700 Ω	
R29	36425	47 Ω	
R32	36467	2700 Ω	
R33	36467	2700 Ω	
R34	55171	4.7 Ω	
R35	55171	4.7 Ω	
R36	36425	47 Ω	
R38	36499	56 k Ω	
R39	36473	4700 Ω	
R40	36459	1200 Ω	

ELECTRICAL PARTS LIST, 5152 (Cont.)

Circuit No.	JBL Part No.	Description
R41	36473	4700 Ω
R42	55171	4.7 Ω
R43	36459	1200 Ω
R44	36495	39 k Ω
R45	36459	1200 Ω
R46	36499	56 k Ω
R47	36524	620 k Ω
R48	36425	47 Ω
R49	36425	47 Ω
R50	36425	47 Ω
R51	36487	18 k Ω
R52	36499	56 k Ω
R53	36499	56 k Ω
R54	36467	2700 Ω
R55	36467	2700 Ω
R56	36453	680 Ω
R57	36459	1200 Ω
R58	36425	47 Ω
R201	58327	5 k Ω audio taper
R202	58327	5 k Ω audio taper
SEMICONDUCTOR DEVICES		
Q1	55727	2N4360
Q2	55728	2N5163
Q3	55727	2N4360
Q4	55728	2N5163
Q5	55411	MJE182
Q6	55412	MJE172
Q7	54842	PN4093
Q8	55412	MJE172
Q9	55411	MJE182
Q10	55412	MJE172
CR1	39869	1N4003
CR2	39869	1N4003
CR3	52544	1N914B
CR4	52544	1N914B
CR5	52544	1N914B
CR6	52544	1N914B
CR7	52544	1N914B
CR8	52544	1N914B
CR10	55648	Dual In-Line-Bridge
CR11	39869	1N4003
U1	52216	LM318H
U2	52216	LM318H
U3	52542	LM301
U4	52216	LM318H
VR1	52225	1N4746 ZENER
VR2	52225	1N4746 ZENER
CHASSIS PARTS		
	49820	Strain Relief
	55022	Lamp Switch Bracket
	55709	Insulator
	57062	10-32 x $\frac{3}{8}$ Screw (4 require)
	47941	Rubber Foot (4 required)
	34734	#4 PPHTS Black Screw (4
	51370	#10 Finish Washer (4 requ
	58325-03	Jumper (1, required)
	58325-02	Jumper (2 required)
	58325-01	Jumper (4 required)
HEAT SINKS		
	55482	
KNOBS		
	52887	Black
	54969	Gray (power switch)
LAMP		
DS201	54959	Green
PHONO JACKS		
J301	55716	
J302	55716	
POWER CORD		
W301	82477	
9 PIN SOCKETS		
XT301	85944	
XT302	85944	
SWITCHES		
S1	57065	DPDT
S2	55162	3P3T
S201	55355	
S302	55161	DPDT
TRANSFORMERS		
T401	51325	Power
T402	55163	Audio
TERMINAL STRIPS		
TB301	55717	6 Pos.
TB302	86422	4 Pos.

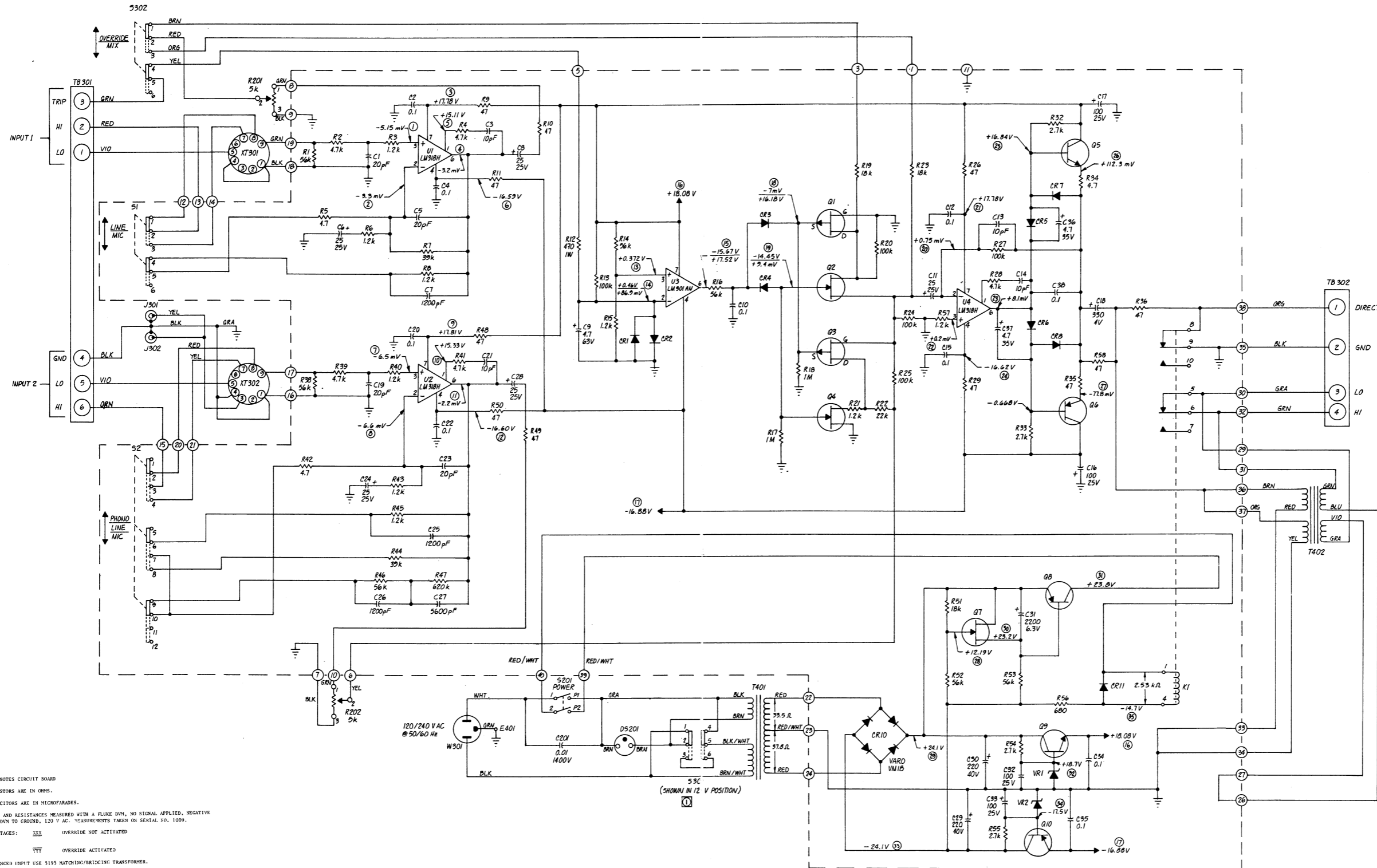
POT
POT

ZENER
ZENER

2

5

WARNING: This section of the manual contains service instructions for use by qualified service personnel only.



8. --- DENOTES CIRCUIT BOARD
7. ALL RESISTORS ARE IN OHMS.
6. ALL CAPACITORS ARE IN MICROFARADES.
5. VOLTAGES AND RESISTANCES MEASURED WITH A FLUKE DVM, NO SIGNAL APPLIED, NEGATIVE LEAD OF DVM TO GROUND, 120 V AC. MEASUREMENTS TAKEN ON SERIAL NO. 1009.
4. INITIAL VOLTAGES: OVERRIDE NOT ACTIVATED
 OVERRIDE ACTIVATED
3. FOR BALANCED INPUT USE 5195 MATCHING/BALANCING TRANSFORMER.
2. FOR UNBALANCED INPUT:

A) MIC	JUMPER: PIN 7 TO 9 PIN 4 TO 5
B) LINE	JUMPER: PIN 8 TO 9 PIN 4 TO 5
C) PHONO (TAP 2 ONLY)	JUMPER: PIN 3 TO 9
1. RESISTANCE MEASUREMENT, S301 IN 120 V POSITION, 220 Ω. S301 IN 240 V POSITION, BRN.

NOTES: UNLESS OTHERWISE SPECIFIED.

WARNING
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 CONTAINS SERVICE INSTRUCTIONS
 FOR USE BY QUALIFIED SERVICE
 PERSONNEL ONLY.

