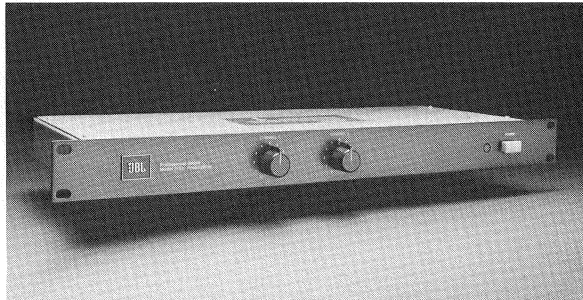


JBL 5152 INSTALLATION AND SERVICE MANUAL



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 600Ω load (direct output) and +24 dBm output level into a balanced 600Ω 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 (1²₃/₂"") 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 ² ₃ / ₂ 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

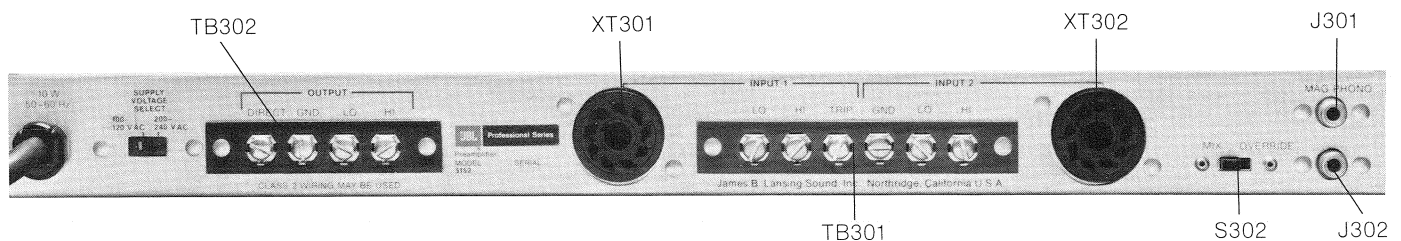
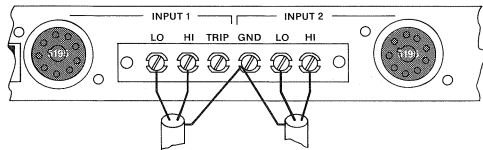


Figure 1

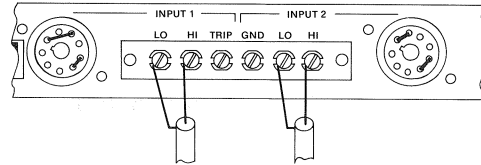
Input Connections

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.



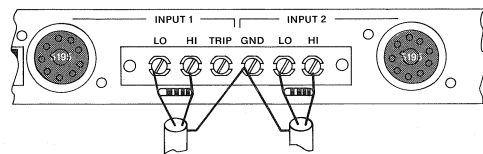
Balanced
Low Impedance
Microphone or
High Impedance
Line



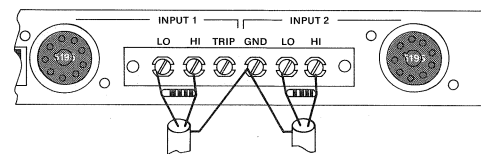
Unbalanced
High Impedance
Microphone
or Line

Figure 2

Figure 3



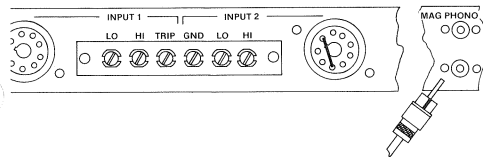
Balanced
Low Impedance
Line



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

Figure 4

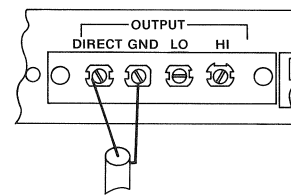
Figure 5



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

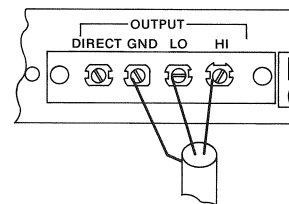
Figure 6

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



DIRECT OUTPUT

Figure 7a



BALANCED OUTPUT

Figure 7b

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.

Output Connections

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

WARNING
THIS SECTION OF THE MANUAL
CONTAINS SERVICE INSTRUCTIONS
FOR USE BY QUALIFIED SERVICE
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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
	—	1	—	White
	—	—	Yes	Green
Europe	1	—	—	Blue
	—	1	—	Brown
	—	—	Yes	Green/White

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

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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.

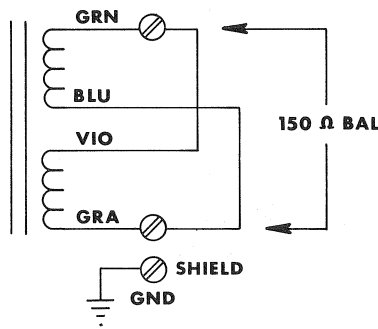


Figure 8.

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.

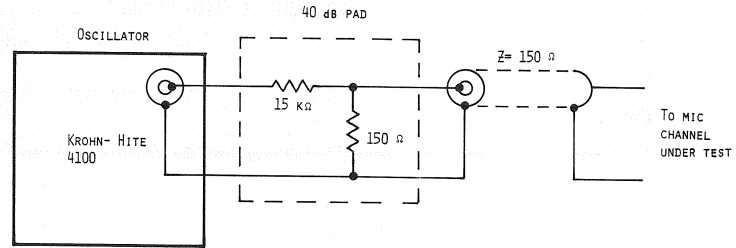


FIGURE 9, 40 dB,
150 Ω PAD

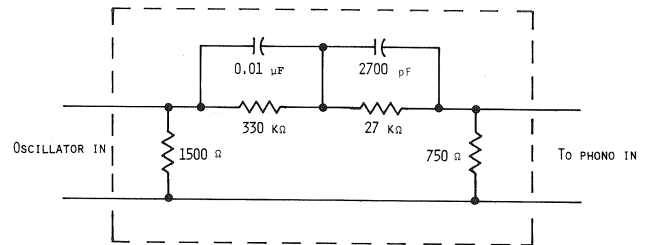


FIGURE 10, REVERSE RIAA
EQUALIZATION NETWORK

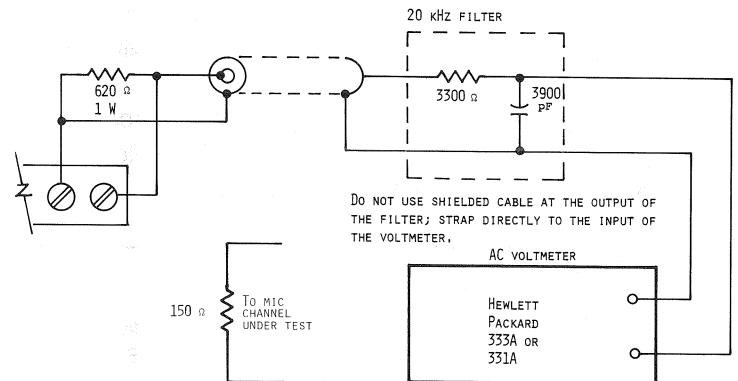


FIGURE 11, 20 kHz FILTER

ALTERNATE OSCILLATOR SETUP: Z = 600 Ω

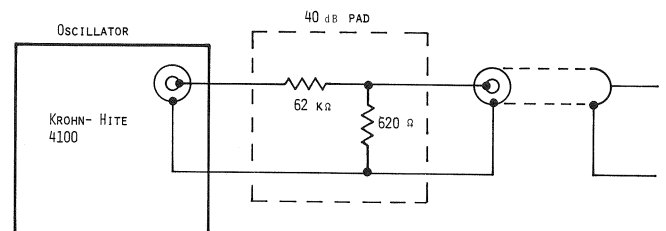


FIGURE 12, 40 dB,
600 Ω PAD

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 600 Ω 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
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
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: $A_v(\text{db}) = 20 \text{ Log}_{10} \left(\frac{20}{0.1} \right)$	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.

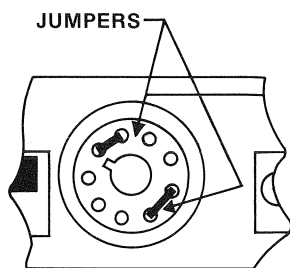


Figure 13

WARNING

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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.

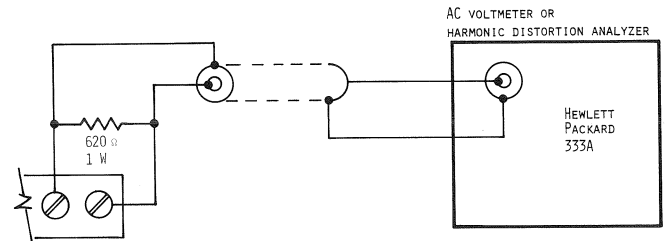


FIGURE 14, THD TEST SET UP

Figure 14, THD test set up.

Microphone Equivalent Noise

(-125 dB Ref. 0.775 V unweighted, 150 Ω 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

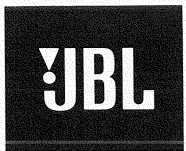
10. The calculated equivalent input noise figure should be -125 dB (Ref. 0 dBm) or better.

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
	+86.9 mV	TRIP DETECTOR GROUNDED



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