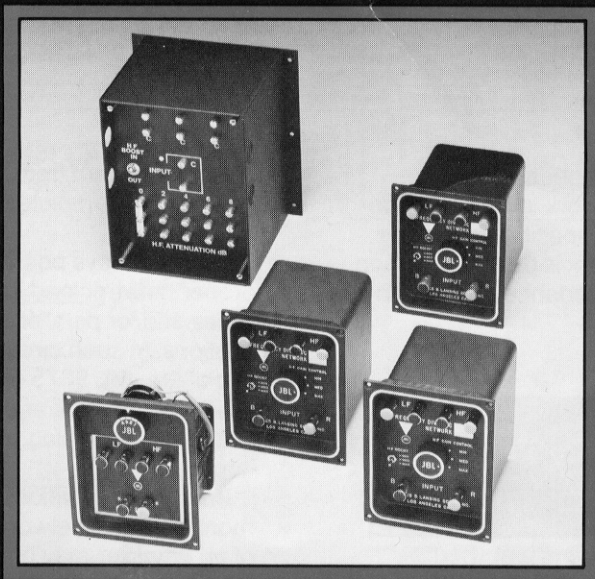


3105 3120A
3110A 3160
3115A

FREQUENCY DIVIDING NETWORK INSTRUCTION MANUAL



Introduction

JBL Professional Series high level passive frequency dividing networks are precision devices made with highest quality components throughout: non-inductive, non-polarized capacitors having high AC current capacity, built expressly for use in dividing networks; individually calibrated low-loss inductors; and heavy duty switches and resistors.

These networks have 12 dB per octave parallel L-C circuits. Additional conjugate elements are used to cancel out the inductive reactance of the low frequency loudspeaker. Since the 3105 crossover is above 5 kHz, additional conjugates are not needed.

The 3105, 3110A, 3115A, and 3120A are general application networks. The 3160 is a high power unit designed primarily for theater, auditorium, or reinforcement applications.

The 3105 is optimized for any JBL 16 ohm compression driver with a single 2402H, 2404H, or 2405H tweeter.

Applications

JBL frequency dividing networks can be used with many different combinations of drivers. The choice of network should be made on the basis of desired crossover frequency, power handling capacity, and impedance of both the low and high frequency drivers.

Specifications

Model	Crossover Frequency	Power Capacity Continuous Program ¹	Continuous Pink Noise ²	Impedance Low Frequency	High Frequency	High Frequency Gain (Attenuation)	High Frequency Boost
3105 ³	7000 Hz	70 watts	35 watts	16 ohms	8 ohms	Continuously Variable	N/A
3110A	800 Hz	300 watts	150 watts	8 ohms	16 ohms	6-8-10 dB, Switch	Minimum, Medium, Maximum, Switch
3115A	500 Hz	300 watts	150 watts	8 ohms	16 ohms	6-8-10 dB, Switch	Minimum, Medium, Maximum, Switch
3120A	1250 Hz	300 watts	150 watts	8 ohms	16 ohms	6-8-10 dB, Switch	Minimum, Medium, Maximum, Switch
3160	500 Hz	600 watts	300 watts	4 ohms	16 ohms	0-2-4-6-8 dB, Strap	In (Maximum), Out (Minimum), Switch

1. Continuous program power capacity is defined as 3 dB greater than continuous pink noise power.

2. Continuous pink noise power rating is based on a test signal of filtered random noise conforming to international standard IEC 268-5 (pink noise with 12 dB per octave rolloff below 40 Hz and above 5,000 Hz with a peak to average ratio of 6 dB), two hours duration.

3. The 3105 is optimized for a single 2402H, 2404H, or 2405H tweeter installed in a system with any 16 ohm JBL compression driver.

Matching the impedance of the drivers to the network is highly important, because the specified crossover point of the network is dependent upon correct driver impedances, as shown in Figure 1.

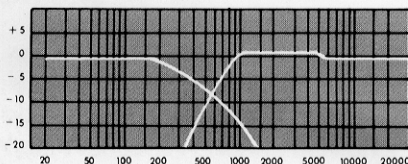
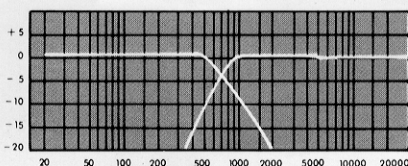


Figure 1. Properly and Improperly Matched Driver/Network Combinations (LF Driver impedance lower than required by network)

Selection of the network is based on the acoustical performance characteristics, acoustic loading, and properly matched impedances. JBL networks and drivers are designed to work together. Some drivers have actual impedances in their crossover regions which differ enough from the rated impedance to create mismatches with JBL networks, and their response can

be quite different from what might otherwise be predicted.

It is not always possible to develop proper network load impedances with series and/or parallel driver interconnections. In such circumstances, the use of the JBL 9375 autoformer between the network and drivers can be helpful in developing proper load impedances.

In some applications, connection of more than one network to the output of an amplifier may be required. Autoformers can be used for this application if the amplifier does not have the proper output impedances to match the network combination.

Power Capacity

JBL rates power handling capacity on the basis of continuous program, which is defined as 3 dB greater than the continuous rating. The continuous program rating is a conservative expression of the ability of the network and associated transducers to handle normal speech and music program material.

Continuous pink noise power ratings are based on a test signal of filtered random noise conforming to international standard IEC 268-5 (pink noise with 12 dB per octave rolloff below 40 Hz and above 5,000 Hz with a peak to average ratio of 6 dB), two hours

duration.

Installation

Mounting

General Application—General application networks can be mounted within a panel cutout or used as freestanding units. The mounting flange is fitted with a white vinyl gasket to maintain an air tight seal when the network is mounted in an enclosure panel, and is drilled for four 4 mm (#6) screws. A template is provided for the mounting cutout.

If the network is mounted in a low frequency enclosure, which is the most common usage, the cutout must be accurate within the specified tolerances, and the gasket must be properly positioned on the mounting flange. Mounting screws should be tightened just enough to prevent air leaks which would result in degradation of low frequency performance or spurious noises.

High Power—The high power networks are designed for surface mounting. The flange is drilled for six 4 mm (#6) screws; a mounting template is provided. The network case is 154 mm (6 in) high. Allow sufficient clearance above the case for cover removal, which will be required when making wiring connections or setting high frequency attenuation. Note the four 22 mm (0.875 in) holes in the container sides for wiring convenience.

Connection

JBL networks and transducers are designed so that if the red terminal of each transducer is connected to the appropriate high terminal on the network (as shown in Figs. 2, 3 and 4) the system will be electrically in phase and diaphragm movements will be consistent. However, this arrangement may not result in proper acoustical phasing.

The connection resulting in proper acoustical phasing of any combination of components is difficult to determine in advance of assembly. Proper acous-

tical phasing of low and high frequency transducers will be that electrical phasing which produces maximum acoustic output through the crossover region. In general, if the diaphragms of the various transducers are in the same physical plane or arc, in-phase electrical connection will probably result in proper acoustical phasing. If the diaphragms are not in the same plane or arc, proper phasing should be determined experimentally, based on analysis of pink noise or subjective evaluation of program material.

For network connections up to 15 m (50 ft), 1.3 mm (#16 AWG) insulated wire is the minimum size recommended. Heavier gauge wire is recommended for greater distances: 1.6 mm (#14 AWG) from 15 m to 30 m (50 ft to 100 ft) and 2 mm (#12 AWG) from 30 m to 60 m (100 ft to 200 ft).

Important: When connecting or disconnecting networks or transducers, the amplifier must be turned off. Making connections while the amplifier is operating could seriously damage the network or loudspeakers, and void the warranties.

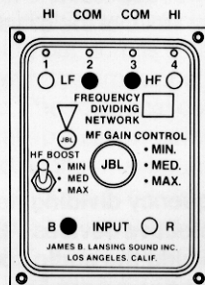


Figure 2. General Application Network Connection

Connections to general application networks are made at spring-loaded terminals. Press down on the terminals and insert the wires. Do not twist the terminals. Note that the wire holes do not go completely through these terminals. The small holes above the terminals allow for passage of the transducer wires from within enclosures.

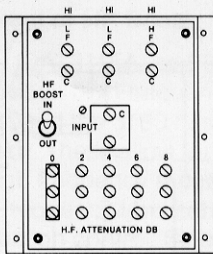


Figure 3. High Power Network Connection

Connections to the high power networks are made at screw terminals located under the top cover plate. Note that there are four common terminals, designated "C." These terminals are connected internally. The two LF high terminals are also internally connected, for convenience in wiring parallel low frequency transducers.

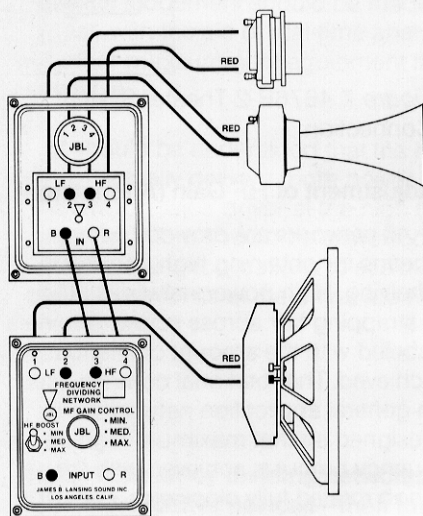


Figure 4. Three-Way System Connection

The connections shown for the components of a three-way system will result in correct electrical phasing. If the component voice coils, however, are not in the same plane or arc, proper acoustical phasing should be determined experimentally. Note that the attenuator of the mid-frequency network will vary the acoustic outputs of both midrange and high frequency drivers simultaneously.

Theater Systems Network Connections

Connections between JBL networks and theater sound systems follow the general scheme of those networks previously described. Specific wiring instructions are shown in Figs. 5, 6, and 7. Note: When wiring 4676B-1 and 4676B-2 theater systems, only 1.6 mm (#14 AWG) or larger wire should be used.

Recommended System Settings:

A. 4670B

3160 Network: Attenuator set at -8 dB HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-red; red-black*

B. 4671 System:

3110A Network: Attenuator set at MIN (-10 dB)
 HF boost set at MAX
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

C. 4672A System:

3110A Network: Attenuator set at MAX (-6 dB)
 HF boost set at MAX
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

D. 4673 System:

3115A Network: Attenuator set at MIN (-10 dB)
 HF boost set at MAX
 Wiring: LF: Black-black; red-red
 HF: Black-red; red-black*

E. 4674A System:

3115A Network: Attenuator set at MAX (-6 dB)
 HF boost set at MAX
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

F. 4675A System:

3160 Network: Attenuator set at -8 dB
 HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

G. 4675A-2 System:

3160 Network: Attenuator set at -4 dB
 HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

H. 4676B System:

3160 Network: Attenuator set at -4 dB
 HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

I. 4676A-2 System:

3160 Network: Attenuator set at -2 dB
 HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

NOTE: Please see details of system assembly and hook-up in JBL's Instruction Manual for Motion Picture Loudspeaker Systems. Mount all system components exactly in the positions shown. Note that models 4670B and 4673 require that the HF portion of the system be wired in inverse polarity relative to the LF portion of the system.

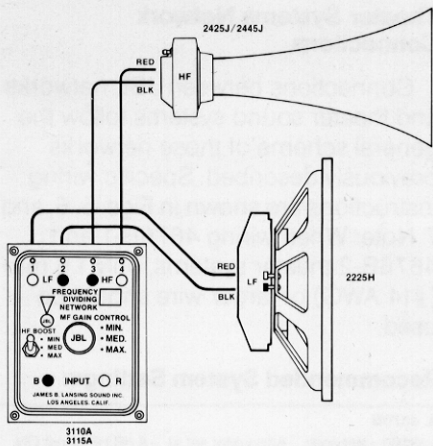


Figure 5. 4671/4673/4672A/4674A Theater System Connection

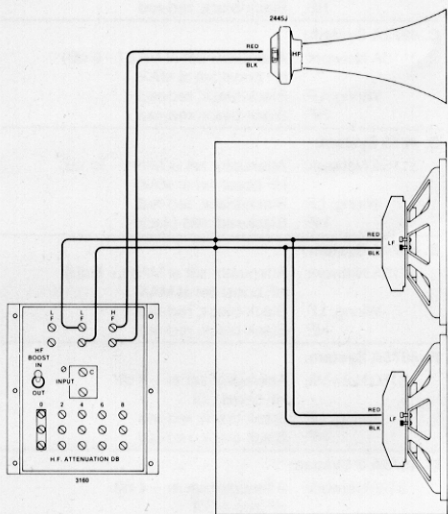


Figure 6. 4670B/4675A/4676B-1 Theater System Connection

Table 1. Attenuation of Network Step Controls

Model	Gain Control Setting		
	Min	Med	Max
3110A	10 dB	8 dB	6 dB
3115A	10 dB	8 dB	6 dB
3120A	10 dB	8 dB	6 dB

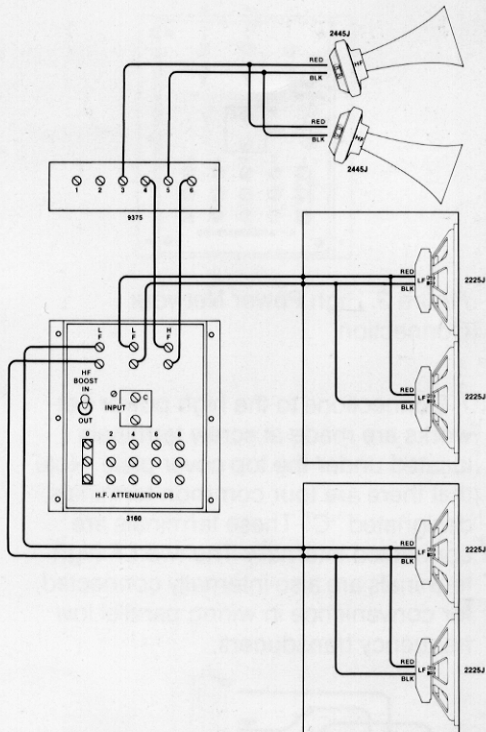


Figure 7. 4676B-2 Theater System Connection

Adjustment of HF Gain (Attenuation)

All networks are provided with a means for obtaining high frequency shelving. High power networks utilize a strapping bar across screw terminals labeled with the amount of attenuation achieved. The rotational controls used in general application networks are designed so that maximum high frequency output is achieved with the knob rotated fully clockwise. The 3105 is fitted with a continuously variable L-pad; the attenuation steps of the other controls are given in Table 1.

When connecting multiple drivers to a network, it may be necessary to separately adjust the acoustic output of individual drivers or groups of drivers. L-pads of the proper impedance and power handling capacity can be inserted in any leg of the system requiring attenuation in addition to that provided by the network. However, the total reflected impedance of all branches must match the network output impedance.

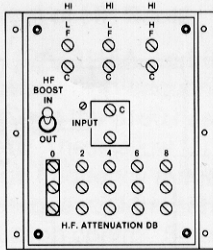


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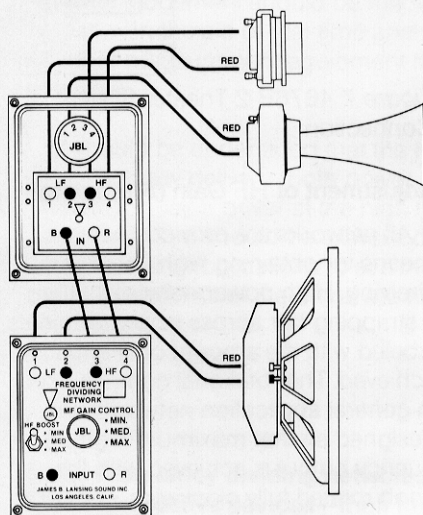


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C. 4672A System:

3110A Network: Attenuator set at MAX (-6 dB)
 HF boost set at MAX
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

D. 4673 System:

3115A Network: Attenuator set at MIN (-10 dB)
 HF boost set at MAX
 Wiring: LF: Black-black; red-red
 HF: Black-red; red-black*

E. 4674A System:

3115A Network: Attenuator set at MAX (-6 dB)
 HF boost set at MAX
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

F. 4675A System:

3160 Network: Attenuator set at -8 dB
 HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

G. 4675A-2 System:

3160 Network: Attenuator set at -4 dB
 HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

H. 4676B System:

3160 Network: Attenuator set at -4 dB
 HF boost ON
 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

I. 4676A-2 System:

3160 Network: Attenuator set at -2 dB
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 Wiring: LF: Black-black; red-red
 HF: Black-black; red-red

NOTE: Please see details of system assembly and hook-up in JBL's Instruction Manual for Motion Picture Loudspeaker Systems. Mount all system components exactly in the positions shown. Note that models 4670B and 4673 require that the HF portion of the system be wired in inverse polarity relative to the LF portion of the system.