



Technical Notes, Volume 1 Number 12B

Polarity Conventions of JBL Transducers and Systems

Introduction:

For most of JBL's existence, the company has designed many transducers and systems with a polarity convention opposite to the rest of the industry. The typical JBL transducer exhibited a backward motion of the cone when a positive-going signal was applied to the red input terminal, and this convention was normally carried over into systems.

This situation began to change when JBL first introduced systems intended primarily for musical instrument (MI) applications. Since these systems traditionally used 1/4" phone plugs for signal input, there was no easy way for the user to invert the input signal polarity. However, there was a need for JBL's MI products to be consistent with the rest of the industry, since there is considerable mixing and matching of systems of different manufacturers in the field.

As time has gone on, there have been many pressures, both internal and external, for JBL to convert over to the "positive-to-red" standard which is followed by the rest of the loudspeaker industry. Such a prospect has never been taken lightly, simply because no company has more functioning transducers in the professional field than JBL has. A sudden polarity change of JBL drivers would cause chaos in the field.

Nevertheless, JBL has decided to make an orderly transition to the positive-to-red standard, in accordance with the practice recommended by the AES, EIA, IEC, and other standards organizations. This will come about over the next few years, with polarity changes being effected only in new system and transducer models. That is to say, no current models will be changed to the new polarity convention during their remaining catalog life.

For this transition to be orderly, it is essential that all users of JBL products have access to a complete listing of polarity of current products and that all new and updated specification sheets carry a clear indication of polarity. This version of Technical Notes Volume 1 Number 12 will be the first of many that will spell out all polarity conventions. It will be reissued at relatively short intervals so that there will be a single source of information on all current JBL products. In addition, all low-frequency transducers which are of positive polarity will carry a small sticker which indicates this.

Terminology:

Positive systems: A system or transducer is said to be positive if a positive-going voltage applied to its red (non-black) input terminal caused a positive pressure at the output of the device. For cone transducers, the cone will move outward and can be easily seen. For compression drivers, a positive-going pressure can be measured at the driver's exit.

Many systems and transducers do not have color-coded input terminals, and in these cases one terminal is usually labeled with a + sign. Consistent with the positive standard, a positive-going signal at the positive terminal will result in outward motion of the cone.

In the case of systems with 1/4" phone plug inputs, a positive going voltage on the tip of the plug will cause outward motion of the low-frequency cone.

Negative systems: A system or transducer is said to be negative if a positive-going voltage applied to its red (non-black) input terminal causes a negative pressure at the output of the device.

JBL Systems and Transducers:

The following is a comprehensive listing of all current JBL systems and transducers by product category. Within each category, models are indicated as positive or negative.

SR Series; all models positive:

SR4704	SR4718
SR4715N	SR4725
SR4722	SR4732
SR4732	SR4732N
SR4735	SR4738

MR Series; all models positive:

MR802	MR805
MR812	MR815
MR818	MR822
MR825	MR826
MR835	MR838

Cabaret Series; all models positive:

4602B
4604B

Musical Instrument transducers:

The following models are negative:

E110-8	E120-8, -16
E130-8	E140-8
E155-4, -8	

The following models are positive:

M121-8
M151-8

Control Monitors; all models are positive:

4312AL, R	Control 1
Control Micro	Control 1AW/70
Control SB Micro	Control 5
Control 1 Plus	Control 10L, R
Control SB-1	
Control SB-5	
Control 12SR	

Studio Monitors:

The following models are negative:

4406	4408
4410L, R	4412L, R
4425L, R	4430L, R
4435L, R	

The following models are positive:

4206 4208

Compression Drivers; the following models are negative:

2402H	2404H
2405H	2426H, J
2427H, J	2446H, J
2450H, J	2485J

Cone Transducers; the following models are negative:

LE8T-H	2105H
2118H, J	2123H, J
2202H	2206H
2220H, J	2226H, J
2235H	2240G, H
2241G, H	2245H

Coaxial Transducers; the following models are positive:

2142H 2152H
2155H

Industrial Products; all industrial products with spade lug attachment follow positive industry standards:

8110H	8120H
8130H	8140H
8110HT	8120HT
8130HT	8140HT

Sound Reinforcement and Theater Systems; the following models are negative:

4670C	4671A
4673A	4675B
4675B-2	4675B-4LF
4675B-8LF	4670C-HF
4675B-HF	

Loaded Low Frequency Systems; the following models are negative:

4646A	4647A
4648A	4648A-8
4648TH	

Subwoofer Systems:

The following models are negative:

4642 4642-4
4645

The following TCB models produce a positive-going pressure at the output of the upper tuned chamber when a positive-going signal is applied to the red input terminal. (Strictly speaking, these systems do not fit either positive or negative polarity conventions):

4682	4685
4688	4688-4

Enclosed Utility Systems:

The following models are positive:

SLT-1	4612OK
8216A	8216AT

The following models are negative:

4660A	4671OKA
8330	

Wall Speaker Systems; all models are positive:

8305P2	8305P6
8305S6	8305MK6
8306P2	8306P6
8306S6	8306MK6

Concert Series; all models are accessed through multi-pin plugs which are harness-wired to power amplifiers. The overall polarity of the systems is positive, with a positive-going signal on Pin-2 at the input of the amplifiers causing a positive-going motion of the low frequency loudspeaker cones:

4802A	4805A
4825A	4828A
4842A	4845A
4850A	4851A
4852A	4853A
4870A	4871A
4872A	4873A

Architectural Series: These new loudspeaker systems can be configured in several ways, including standard input terminals as well as barrier strips. The poling convention for all models is positive.

Applications:

JBL has always recommended that absolute polarity standards be maintained throughout an audio system, from microphone input to loudspeaker output. Since most microphone and electronics manufacturers adhere to the "pin-2 hot" convention, this ensures that a positive-going signal at the input of a microphone will produce a positive-going signal at the non-ground output of a power amplifier. If JBL negative convention loudspeakers are used, the required polarity inversion should be made at the loudspeaker's input terminals themselves. **Note carefully: making the polarity inversion anywhere else in the system is an invitation to confusion.**

A few examples are presented. Many times, JBL negative convention screen loudspeakers are used with positive convention surround loudspeakers. Bi-amplification often compounds the problem. Figure 1 shows how such a system should be wired:

Figure 1.

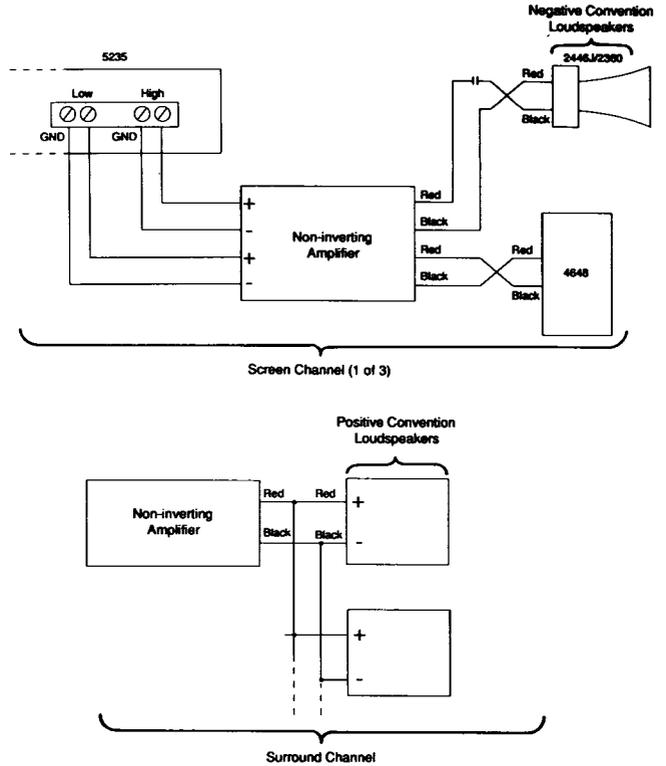


Figure 2 shows details of connecting a JBL 4670C in proper polarity. In this system, because of the short length of the high frequency horn, it is recommended that the HF section of the system be wired in opposite polarity with the LF section in order to get proper summation at the crossover point. Since the LF section of the system is inverted at the amplifier's output, it is obvious that the feed to the HF section must remain non-inverted.

Figure 2.

