

# PRO-NOTE

## INTRODUCTION

This Pro-Note marks the beginning of a new format. We plan to publish these tomes on a bi-monthly basis, providing you with useful information on products and applications.

We invite and welcome your input to this publication. We would like to know about your experiences, problems, suggestions, ideas, modifications and even amusing occurrences. Your colleagues can benefit from you and vice versa, and we can learn about your needs and problems at the same time.

## PRODUCTS

We've released quite a number of products since the last issue was published. For the record, we will briefly mention what they are. Let us know if you need any additional information.

### Studio Monitors



The 4350 has been joined by a family of monitors reflecting our increased understanding of the physics of audio transducers and systems.

The 4343 is a single-woofer full-size four-way system with the same bandwidth as the 4350 but less maximum SPL, lower power handling, smaller size and lower cost.

The 4333A is a full-size three-way system installed in a cabinet similar in size to our old standby 4320. The 4333A has the same bandwidth and SPL as the 4343, but because it has only three transducers, it is not quite as accurate as the four-ways. However, it's smaller and less expensive.

The 4331A is a full-size two-way system intended as an improved replacement for the 4320. It doesn't have quite the top end response of the 4333A, but it is significantly smoother than the 4320.

The 4315 is a compact four-way system with the same bandwidth and accuracy of the full-size four-way systems in a small package with lower maximum SPL and less cost.

Last, but certainly not least, we have the 4301 Broadcast Monitor, an extremely compact, high-performance system rapidly gaining acceptance in both radio and television applications. See below for additional data on this mighty little system.

All of the new monitors are finished on all four sides and may be installed horizontally or vertically. The 4331A, 4333A and 4343 are also user-switchable for bi-amplified or full passive operation.

### Enclosed Systems

The 4682 is a line array exhibiting extremely high power handling capacity (300 W continuous sine wave), high sensitivity (105 dB, 1 W, 1 m), and a new double-walled crosslinked polyethylene enclosure which is practically indestructible. The 4682 has four K110's, two 2402 ring radiators and a special network to provide system response to 15-kHz.

### Low Frequency Loudspeakers

The 2203A and 2231A are medium-efficiency woofers designed for high-accuracy monitoring in recording studios and other critical applications where maximum bandwidth is more important than maximum SPL. Both use our new mass control ring to achieve optimum cone weight and maximum transient accuracy. The 2203A is the 12-inch (300-mm) woofer used in the 4315 monitor, and the 2231A is the 15-inch (380-mm) woofer used in all of our full-size monitors including the 4350, where it replaces the older 2230A's originally used.

The 2213 supersedes the 2212 as the woofer in the 4311. This new speaker has an improved frame construction and similar response.

### High Frequency Drivers

The 2402 is actually an old friend in a new dress—the 075 with a black horn and the same mounting flange as on the recent 2405's. Compared to the 2405, the 2402 has a lower possible crossover frequency (2.5-kHz) and higher sensitivity (61 dB) at the expense of response above 15-kHz and dispersion.

### High Frequency Power Packs





The 2901 replaces the HL180F Power Pack. Consisting of a 2461 driver on a 2301 horn/lens with a 3-kHz high-pass network, the 2901 is designed to add extra brightness to musical instrument loudspeakers for musicians who want extra top end on their sound.

The 2902 is the high frequency section used in the 4682. It consists of two 2402's and a 3-kHz, 18 dB per octave high-pass network. The 2902 is suitable for amplified acoustic instruments, reinforcement and playback systems, but is not recommended for direct reproduction of electric musical instruments, since the extra bandwidth compared to the 2901 emphasizes the noise level of most instrument amplifiers.

### Horn/Lens Combinations

The 2312 is a 1-inch (25-mm) throat horn used in conjunction with the 2308 lens. Its length and flare have been optimized for 800-Hz crossover when mounted on the same baffle as a 15-inch (380-mm) woofer. The 2312 and 2308 are used in the 4331A and 4333A.

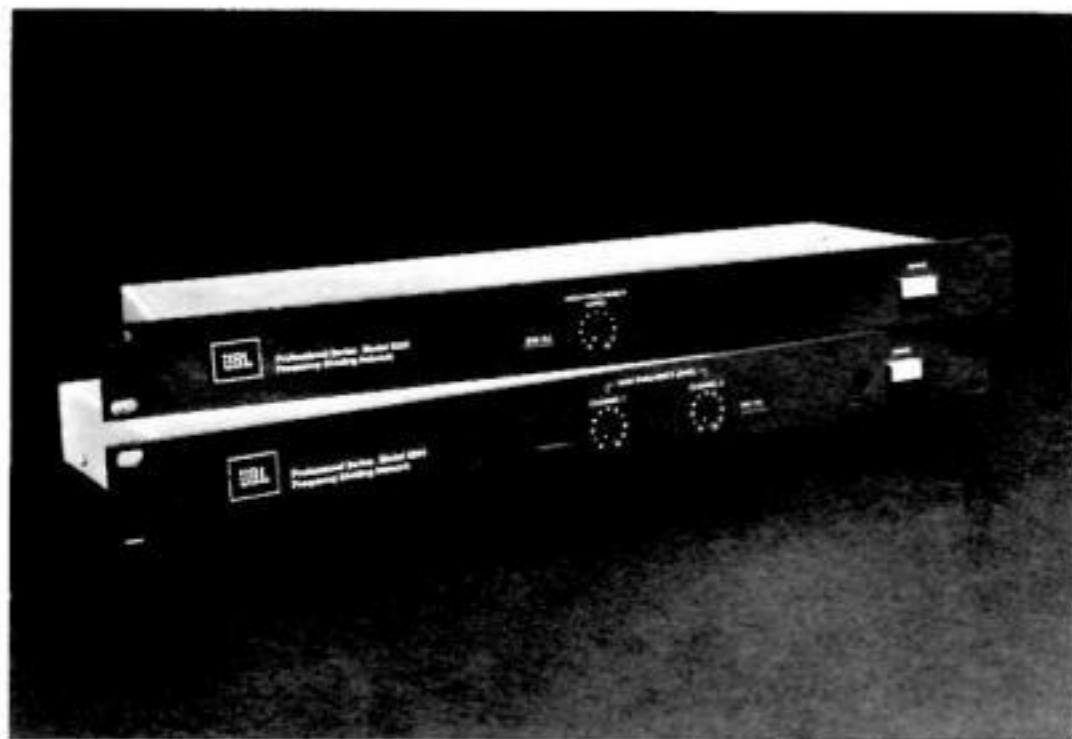
### Passive Networks

The 3106 is an 8-kHz network designed to integrate the 2405 or 2402 with the 2420. It is recommended for converting two-way studio monitors such as the 4320, 4325, 4330, 4331 and 4331A into three-way systems. Installations using the 2440 and an ultra-high frequency transducer should continue to use the 3105 network.

### Horn Adaptors

The 2330 has been reinstated into our line. This adaptor will mate a JBL 2-inch (50-mm) throat driver to an Altec horn with a 1.4-inch (36-mm) throat.

### Electronic Products



The 5233 and 5234 are low-level active dividing networks which replace the 5231 and 5232 respectively. They have the following improvements: differential inputs, outputs capable of driving 600- $\Omega$  lines, suppressed turn-on transients and switchable 110/220 main voltage.

The 6021 and 6022 are all-new 200-W amplifiers which replace the 6020. See below for more details on these exciting new products.



The 6233 is a dual-channel power amplifier which can deliver 300 W per channel with both channels driven into 4- $\Omega$  loads. In bridge configuration, it will deliver 700 W continuous sine wave into 8- $\Omega$ . It is small (5 1/4 inches, 133-mm high), lightweight (less than 35 pounds, 16-kg), extremely rugged and reliable and has distortion low enough for the most critical studio monitoring (less than .05% THD, 20-Hz - 20-kHz at full output, both channels driven into 4- $\Omega$ ).

### DISCONTINUED PRODUCTS

A number of products have been dropped since the last Pro-Note:

#### Studio Monitors

The 4325 has been dropped from our line because of limited demand. The 4320 has been replaced by the 4331A.

#### Low Frequency Horns

The special gray finish on all of the low frequency horns has been dropped, also because of limited demand. The standard black finish remains available.

#### Loudspeakers

The 2216, which was the woofer in the 4325, and the 2125 have been discontinued, again because of limited demand. The 2212, which is the woofer in the 4311, has been superseded by the 2213. The 2230A, used in the original 4350, has been dropped in favor of the 2231A. All 4- $\Omega$  K Series loudspeakers have been discontinued because of extremely low sales.

#### Compression Drivers

The 2460 speech-range compression driver has been deleted, since the 2461 offers improved performance at a similar price.

#### High Frequency Power Packs

The HL180F has been superseded by the 2901, described in the New Products section of this issue.

#### Electronic Products

The 5101B has been discontinued and will be replaced soon by the two-input 5152. Stay tuned for further details.

The 5231 and 5232 have been replaced by the 5233 and 5234. The special crossover cards for the 4330,



4332 and 4350 will not be produced because no significant advantage was found over the standard 250-Hz and 800-Hz cards.

The 6020 has been replaced by the 6021 and 6022 amplifiers described below. The 6010B is being replaced by the 6011 and 6012 and is no longer available.

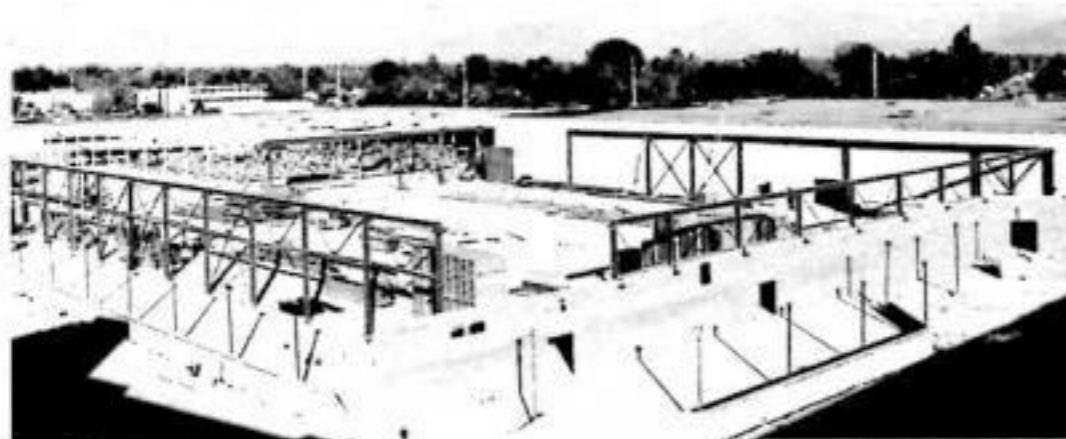
The 7124 AGC unit and 7126 compressor have been discontinued because of limited demand.

## NEW LOCATION FOR JBL

We are proud to announce the acquisition of a new site for JBL, at 8500 Balboa Boulevard, Northridge, California 91329. As you have noticed in the past few years, our ability to supply products has not kept up with the demand, simply because we ran out of space in our present facilities, even working double shifts. With our projected growth making future prospects even worse, we set out some time ago to find a site which would allow us to gather our five different locations in the Los Angeles area back together again, with sufficient room for further expansion.

We have found this site, which consists of more than forty acres in the San Fernando Valley. This was formerly an RCA microwave design facility, and the existing buildings are now adapted for our use. We are now building new facilities on the site for our transducer and furniture manufacturing, shipping and service departments.

Our new telephone number is (213) 893-8411. Our telex number for international customers remains 674993, with a new answerback of JBLNTGE. For domestic telex communications, the telex number is 691473, with an answerback of JBL SND NTGE. Incidentally, we have the honor of having our own Zip Code! 91329 is exclusively assigned to JBL, for the USPS's own mysterious reasons.



## 4301 BROADCAST MONITOR

We have had many discussions with broadcast engineers, both in the U.S.A. and abroad. These engineers asked us for monitors with flat response and low distortion through the FM audio band, so that they could hear potential high frequency splatter, cue tone leakage and power-consuming distortion clearly. They wanted a small system which would fit into cramped audio and edit

booths and which could be placed into a standard EIA rack. And, not least, they wanted a system which was inexpensive, so that they would not have to fight too hard with management for budget.

The synthesis of these discussions became the basis for our new baby, the 4301 Broadcast Monitor. This system has performance capability which has surprised many experienced listeners. We have been accused of using equalizers, sub-woofers and other tricks when we have demonstrated these units at various shows—people didn't believe that a small system could produce such solid bottom and clean top without some gimmick. Needless to say, we don't need to play games. This system is  $\pm 3$  dB, 45 Hz-15,000 Hz, with less than 0.5% third harmonic distortion from 100 Hz-15,000 Hz at half rated power. It is rated at 15 W continuous sine wave and may be used with amplifiers which have up to 60 W continuous sine wave output capability. When driven by a typical 10 W broadcast monitor amplifier, it can generate 98 dB in a 6'x 10'x 8' (2m x 3m x 2.5m) audio booth.

In addition to its applications in the broadcast studio, the 4301 is also ideal for remote broadcast and recording service. It is also finding enthusiastic acceptance in recording studio, quality control and office monitor service.

In response to requests from European broadcasters in particular, as well as from U.S. broadcasters who are dissatisfied with the monitor amplifiers provided in the average broadcast board, we are currently developing a new version of the 4301 with a 10-W power amplifier installed in the back of the enclosure. Of course, this amplifier will be of the superb quality expected from our new electronic products. Availability of this new version should be in mid-1978.

As with our other products, hearing is believing. We strongly recommend that you have these units available for demonstration to your customers. They will be delighted, and so will you.





## 6021 AND 6022 POWER AMPLIFIERS

The latest in our continuing series of new electronic products are the 6021 and 6022 200-W power amplifiers. These replace the 6020 and are the first of a new set of amplifiers which will soon replace the 6006B and 6010B.

The difference between the 6021 and 6022 is that the 6021 is supplied with a remarkably good output transformer whose response is  $-3$  dB at 67 kHz. The 6022 has no output transformer for installations where the extra flexibility of a transformer is not required.

Reliability and serviceability are the hallmarks of these superb new amplifiers. The entire amplification circuit is on one printed circuit board attached to the inside of the massive heat sink mounted on the rear of the amplifier. This module can be removed for service by removing four screws and removing two connectors which carry audio and power to the module. It is not necessary to remove the amplifier from the rack in order to remove and replace modules.

This heat sink, incidentally, is adequate to provide cooling for the amplifier without a fan, so that it can operate quietly as well as safely. Both units will meet FTC preconditioning requirements.

The 6022 can be field-converted to a 6021 at any time with the installation of a 60-6022 transformer assembly, which may be accomplished with only a screwdriver. No soldering is required.

If required, the 6021 may be directly coupled to the load, bypassing the transformer, by removing a strap between two screw terminals on the rear panel. Once again, no soldering required.

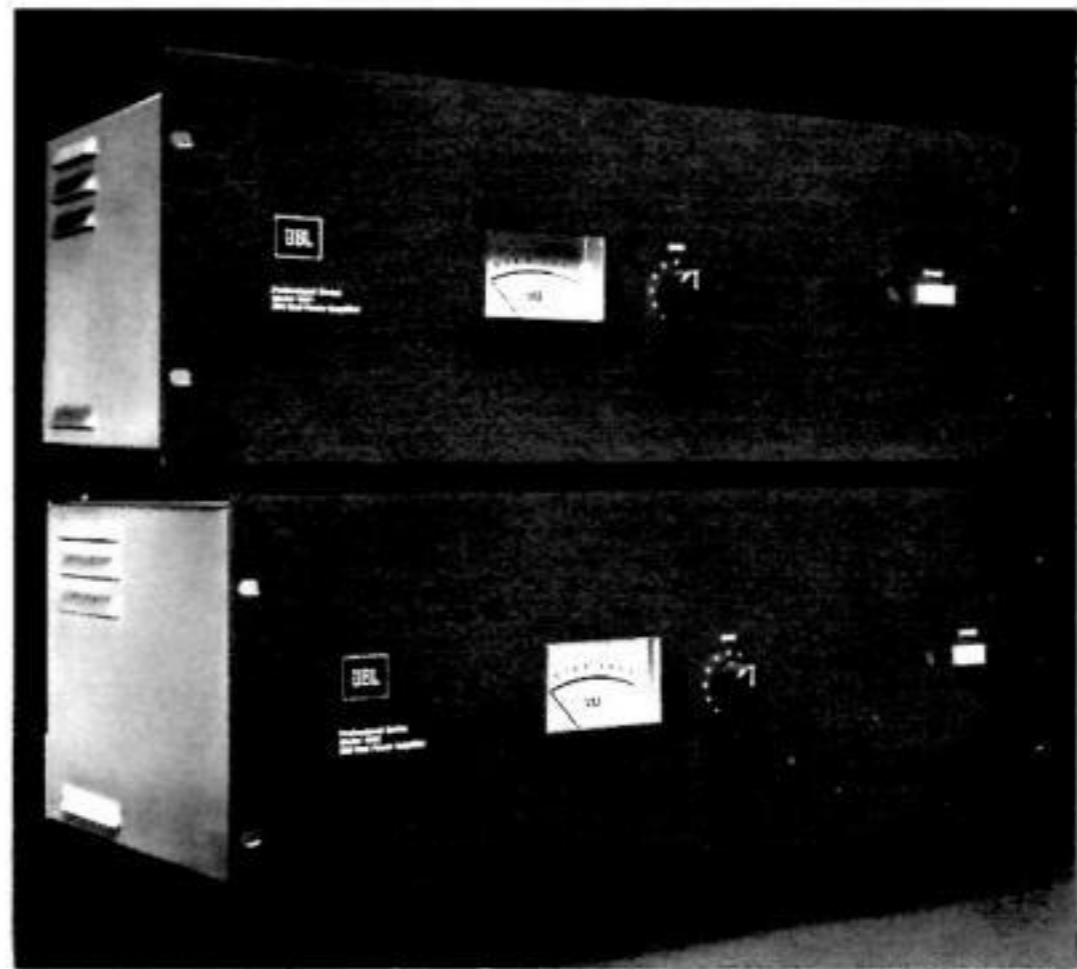
Should transformer-isolated bridging input circuitry be required, a 5195 transformer may be installed in a recessed socket on the rear panel without removing the unit from the rack. No tools required.

About the only time that soldering might be needed for installation is if low-level 600- $\Omega$  balanced matching input circuitry is used. One wire must be moved on the input socket to achieve this configuration.

Performance of these amplifiers is fully professional. The 6022 will deliver 200 W continuous sine waves into 4  $\Omega$ , and the 6021 will supply the same power level into 8- $\Omega$ , 16- $\Omega$ , and 70-V (25- $\Omega$ ) loads as well. Both amplifiers have front panel meters which are calibrated so that "0" level on continuous sine waves equals half-power output, giving 3 dB of headroom on normal speech program material and relating nicely to the "continuous program" rating of our drivers.

These units share their advanced chatter-free protection circuits with the superb 6233 dual-channel amplifier. Being free of chatter, these amplifiers will not produce a clipping spike on low frequency pulses which can destroy high frequency drivers. This circuitry protects the amplifier against all loads, including dead shorts, pure inductance and capacitance.

We invite comparisons with any other amplifier. The 6021 and 6022 sound outstandingly good and provide excellent value for any professional application.



## STUDIO MONITOR COMPONENTS

One of the questions frequently asked by dealers and consumers alike has been: "What are the components in the 43—monitor?" We have always answered this question when asked, but we have not previously published a listing because this would imply that the end user could duplicate the performance of a JBL studio monitor in another cabinet. This is not necessarily true.

Our new series of monitors have dividing networks which have been optimized for the particular transducers in the specific configuration as installed in the JBL enclosure designed for that system. Three-way systems are more critical than two-way systems, and four-way systems are particularly difficult to execute. For example, the spacing of components on the baffle of a four-way system markedly affects the response characteristics of the system, which is why we strongly recommend that the 52-5140 card in one of our active dividing networks be used when bi-amplifying the 4343 monitor. This card has been tailored for that system and any substitute will degrade the potential system performance.

The following table shows which components are used in each monitor, past and present. Note that some of the components, notably the dividing networks and cabinets, are not sold separately.

SYSTEM	WOOFER	MIDRANGE	HF DRIVER	HORN/LENS	UHF DRIVER	NETWORK
4301	116A	—	LE25-2	—	—	3103
4310	2212	2105	LE20-1	—	—	3111
4311	2212	LE5-2	LE25	—	—	3112
4311-A	2213	LE5-2	LE25	—	—	3112-A
4315	2203A	2108	2105	—	2405	3114
4315-A	2203A	2108	2105	—	2405	3114A
4320	2215B	—	2420	2307/2308	—	3110
4325-A	2216	—	2420	2307/2308	—	3122-A
4330	2231A	—	2420	2312/2308	—	3130
4331	2231A	—	2420	2312/2308	—	3131
4331A	2231A	—	2420	2312/2308	—	3131A
4332	2231A	—	2420	2312/2308	2405	3132
4333	2231A	—	2420	2312/2308	2405	3133
4333A	2231A	—	2420	2312/2308	2405	3133A
4340	2231A	2121	2420	2307/2308	2405	3140
4341	2231A	2121	2420	2307/2308	2405	3141
4343	2231A	2121	2420	2307/2308	2405	3143
4350	2230A	2202A	2440	2311/2308	2405	3107
4350-A	2231A	2202A	2440	2311/2308	2405	3107

Remember that we cannot provide plans for our proprietary cabinets. If customers want do-it-yourself studio monitors, because they think that they possess more knowledge about loudspeaker system design than we do or because they think they can save money on the cabinetry, we are not in a position to give extensive design assistance. There have been some successful custom monitor designs executed which involve JBL components, but most people do not have the test facilities or expertise to carry off such a feat.

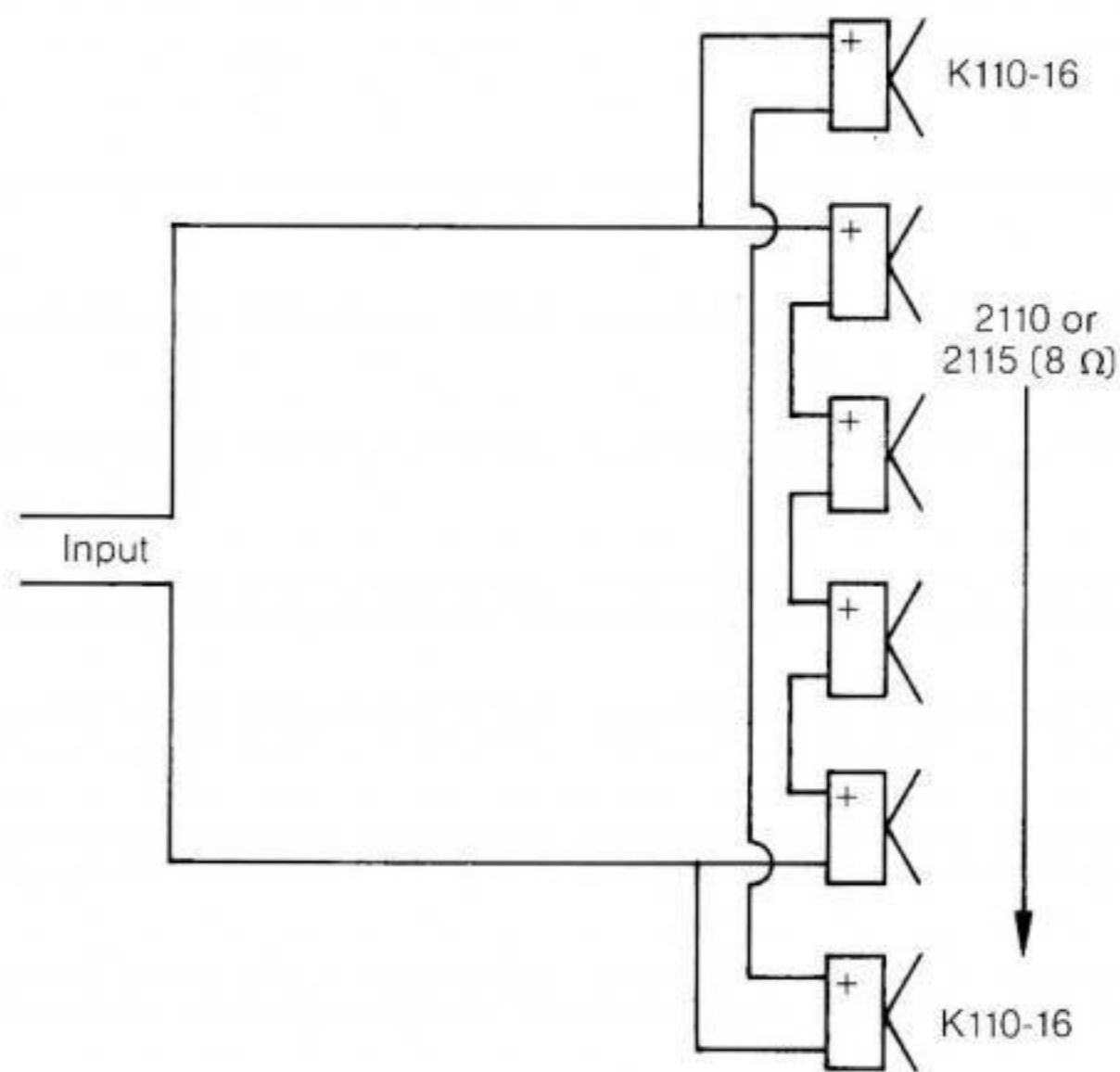
### VOCAL MASTER CONVERSIONS

The Shure Vocal Master is a very popular system which uses inexpensive mass-production loudspeaker components. Many musicians and clubs own these systems, but are not satisfied with the maximum output and sound quality available from these systems.

A few of our U.S. dealers have taken one or two Vocal Master systems from their rental stock or from trade-ins and have installed JBL components in the old enclosures. The results have been astounding. It's not hard to sell the owner of a Vocal Master on such a conversion if he hears the difference in a side-by-side demonstration. The increase in sensitivity, power handling, maximum sound output and clarity has to be demonstrated to be believed.

The components suggested for this conversion are:  
2 ea K110-16  
4 ea 2115A (8  $\Omega$ ) or 2110, depending on cost vs. quality tradeoffs required.

These components should be wired according to the diagram. We also suggest that the "Loudspeaker Components by JBL" nameplate supplied with the Enclosure Construction Kit be mounted on the front of the enclosure to identify what is inside it. "Powered by JBL" bumper stickers might be used on the sides for additional identification.



SHURE VOCAL MASTER CONVERSION