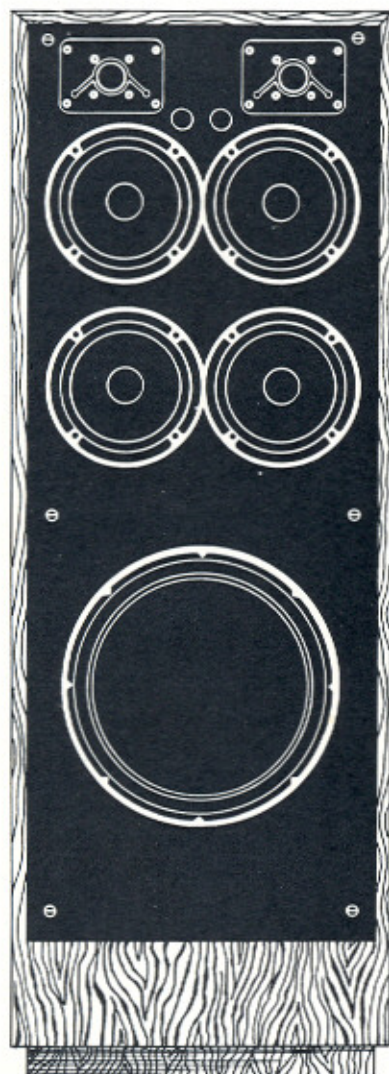


**polk audio**

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Stereo/Dimensional Array 1<sub>T.M.</sub>  
Reference Monitor System (SDA-1)<sub>T.M.</sub>

# Instruction Manual



**IMPORTANT:** Please read instructions completely before proceeding.

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Stereo/Dimensional Array 1<sup>T.M.</sup>  
Reference Monitor System (SDA-1)<sup>T.M.</sup>

Congratulations on your purchase of the Polk Audio SDA-1, Stereo/Dimensional Array 1. The SDA-1 employs a unique, newly developed technology (patent pending) which offers a major breakthrough in the quality of high-fidelity reproduction. Careful design, frequent and critical testing, and use of only the finest materials and components insure prolonged physical integrity and trouble free operation. Please read and follow the instructions carefully. They will help you to understand the operation of the SDA-1 and to realize the full potential of this extraordinary system.

If you have any questions or comments please do not hesitate to call us directly or contact your nearest Polk Audio dealer. In addition a complete technical paper on the SDA-1 is available on request, for a nominal fee of \$2.50.

## Inspecting For Shipping Damage:

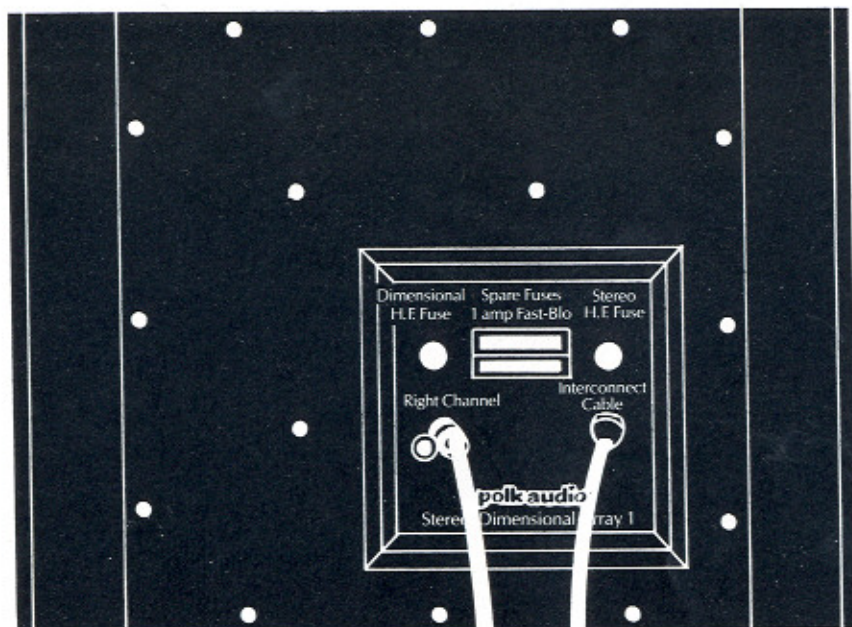
When you unpack your SDA-1, inspect it for shipping damage. Each unit leaves our plant after thorough inspection and in perfect condition. Therefore, any visible or concealed damage must of necessity have occurred in handling after it left the plant. If you obtained a delivery of the speaker directly from a Polk Audio dealer, it should be returned to him for inspection. If you received your speakers via public transportation, report the damage at once to the shipping company and follow the directions for returning the system to the factory.

## Set-Up Instructions:

1. Each SDA-1 weighs about 85 lbs. If possible, have another person on hand to help in removing the speakers from their boxes. Note the method in which they are packed and save the packaging. There should be an interconnect cable packed with the right speaker.
2. Now, check the rear of each cabinet. You should have one left and one right speaker.
3. Start by placing the two speaker cabinets with the left cabinet on the left as you face the front of the speakers, about the same distance apart (inside edge to inside edge) as you will be sitting from the speakers (defined as the distance your head is from a line drawn across the front of each speaker). This will result in the most dramatic three dimensional imaging, detail and focus. If you sit further back the image becomes somewhat narrower, much like sitting further back in a concert hall.
4. Locate the interconnect cable supplied packed with the right channel speaker. Walk around to the back of either speaker and locate the round connector socket on the rear panel (see Fig. 1). Plug-in either end of the interconnect cable (both ends are the same) using the molded ridges to align the connector correctly. Do not force the connector. Use gentle pressure to push the connector in until it snaps into place. To remove the connector, squeeze the ridged sides and pull gently.
5. Walk across to the other speaker and connect the other end of the interconnect cable in the same manner as described in step 4.



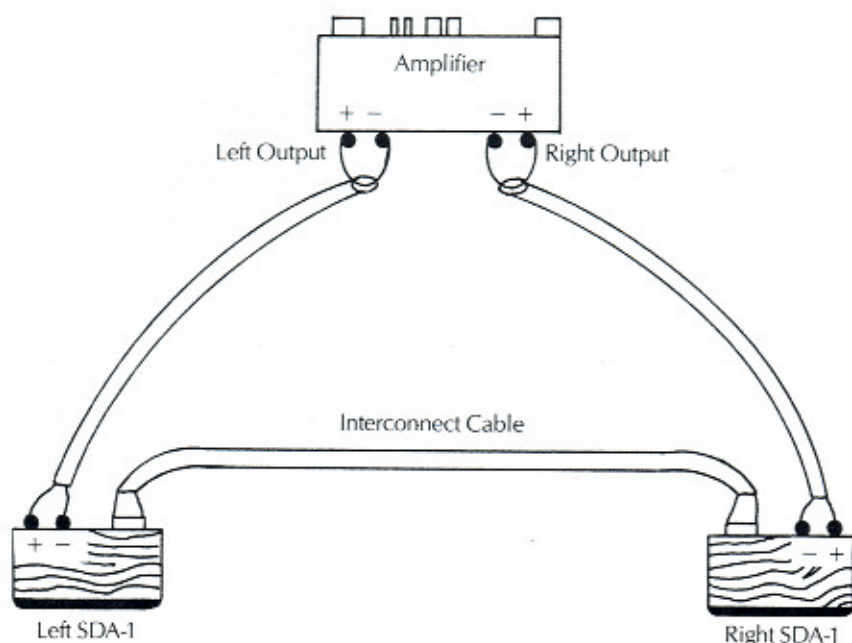
Figure 1 REAR PANEL CONNECTIONS



6. Now you are ready to connect the amplifier to the speakers. But first, there is one word of caution. **WARNING: THE SDA-1 MUST BE USED WITH COMMON GROUND AMPLIFIERS ONLY! USE OF NON-COMMON GROUND AMPLIFIERS MAY RESULT IN DAMAGE TO THE AMPLIFIER.** Now that this has been said you will want to know if your amplifier is common ground or not. All major brands of receivers are common grounded and virtually all integrated and separate amplifiers are common grounded. A very few amplifiers are not common grounded and are usually marked with some warning near the output terminals. If you have doubts, call your local hi-fi store or call Polk Audio directly.
7. Find the amplifier outputs. They will be marked + (plus) and - (minus) or will be colored red and black. Red corresponds to + (plus) and black corresponds to - (minus). Using whatever speaker cable you have, connect the left channel amplifier outputs to the left speaker making certain to connect the red or + (plus) output to the red terminal on the speaker. Connect the black or - (minus) amplifier output to the black terminal on the speaker.

Using another length of speaker cable connect the right channel amplifier outputs to the right speaker in the same way. See Fig. 2 to check your connections.

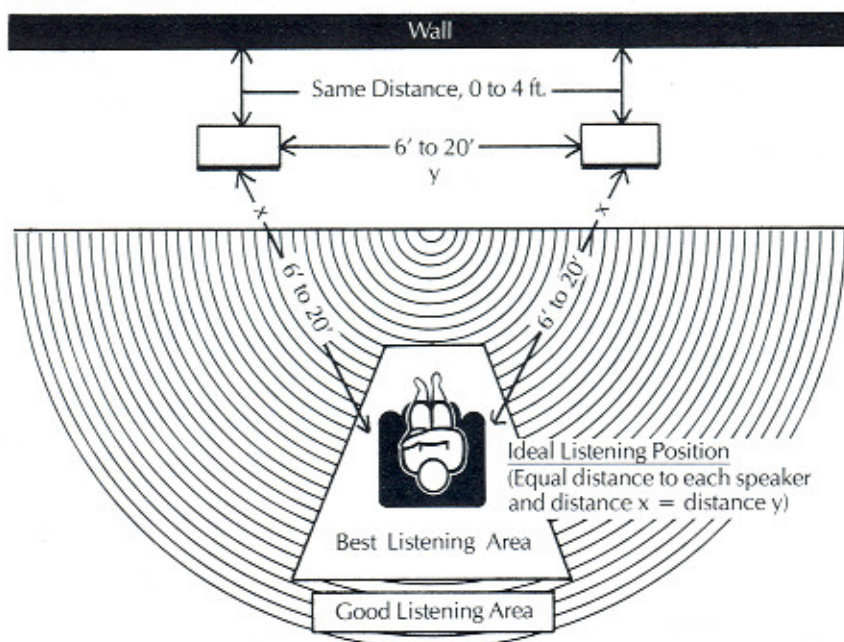
Figure 2 AMPLIFIER-SPEAKER CONNECTIONS AND INTERCONNECT CABLE



8. Now you are nearly ready to listen. However, in order to work properly the SDA-1 cabinets must be positioned correctly. The speakers must face straight forward and be exactly the same distance from the wall (or flat against the wall). Do not angle the speakers inward or outward. See Fig. 3 for typical set-up and read section on Room Placement for further experimentation.

**NOTE:** Fuller and more dramatic bass response will be achieved with the speakers close to or up against the rear wall.

Figure 3 TYPICAL ROOM PLACEMENT



### System Check-Out:

1. Start with the speakers placed at least 4 ft. apart, facing straight forward and exactly the same distance from the wall.
2. Place a chair in the listening area centered between the speakers, as shown in Fig. 3. The chair should be exactly the same distance from both speakers and, for best results, the distance from the chair to either speaker should be greater than or equal to the distance between the two speakers. Use a tape measure for the purpose of this check-out procedure to verify that the chair is in precisely the correct position.
3. Choose a good stereo record or tape with several instruments or vocalists performing at once.



4. While playing the record or tape turn the balance control all the way to the left. Walk close to each speaker in turn. Both speakers should be producing sound with the left somewhat louder. Turning the balance to the right; both speakers again should produce sound but now with the right side louder.
5. Return the balance to the center position and set the amplifier selector switch or button for "MONO" operation. (If there is no Mono switch use a monaural record or tape.) Sit down in the chair (Step 1). The sound should seem to come from directly between the speakers with full bass response.
6. Return the amplifier to stereo operation, make certain that your record is stereo and sit in the chair to listen for a few minutes. You should hear some sounds that appear to come from an area outside the two speakers as well as sounds that appear to come from between the speakers. By manipulating the balance control you should be able to move the apparent sound source from far outside the left speaker to far outside the right speaker.

If your speakers do not perform as explained above proceed to the Troubleshooting section and also read the section on SDA Technology.

### **Speaker Hookup Wire:**

We recommend that you use #16 gauge wire or larger to connect the speakers to the amplifier. This will ensure that the full power and damping capabilities of your amplifier will be available to the speakers. Heavier gauge wire will give improved performance especially where long runs are involved.

For the best performance we recommend the use of special speaker cables particularly those of the low-inductance, transmission line type.

### **Room Placement:**

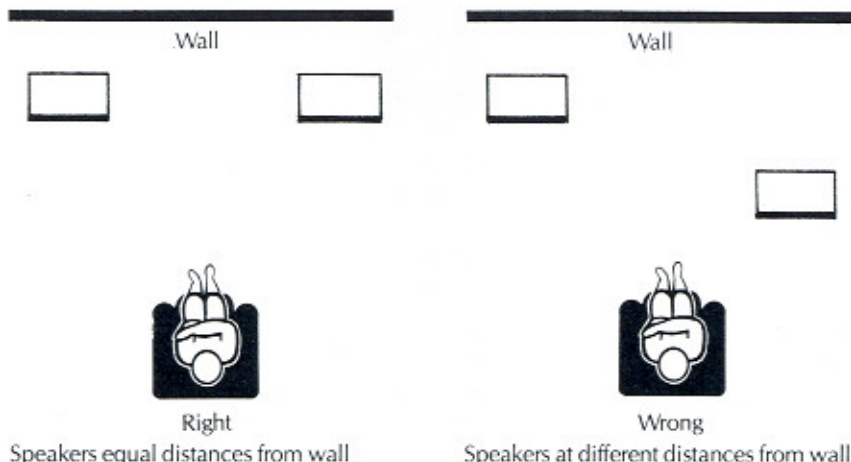
The decision on where to place the speakers is a matter of personal preference as well as acoustics. The unique design of the SDA-1 makes it unusually free of room dependent acoustic effects. However, careful attention to the set-up instructions and placement suggestions is essential to the correct functioning of the SDA-1.

Both sonic balance and stereo imaging can be influenced by room position. The following are suggestions to help you obtain the best compromise between aesthetics and performance in your listening room.

Placement Suggestions:

1. DO NOT ANGLE THE SPEAKERS INWARD OR OUTWARD. The design of the SDA-1 requires that the speakers face straight forward, as they would if placed flat against a wall.
2. Keep both speakers in the same plane and equal distances from the wall as shown in Fig. 4.

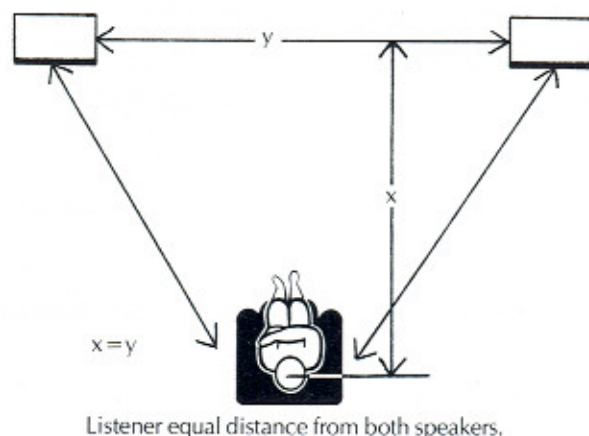
Figure 4



3. Sonic balance is usually best when speakers are far from corners. The speakers can usually be placed right against the rear wall if desired, and this will usually result in fuller more dramatic bass. Placement in or near corners or near side walls usually interferes with proper 3D performance.
4. Listening position is best along the axis equidistant from the two speakers as shown in Fig. 5. The most dramatic three dimensional image will be obtained when your head is the same distance from the speakers as the speakers are separated apart. Sitting further back will result in a narrower sound field.
5. The SDA-1 is unique in offering a convincing stereo image from nearly any listening position. However, the stereo/dimensional imagery obtained in the ideal listening position is well worth experiencing and may startle even the most casual listener.



Figure 5



## Amplifiers and the SDA-1:

Although the SDA-1 is highly efficient and compatible with most amplifiers a few specific things should be observed to assure the best performance from your system.

First, the amplifier used must be of the common ground type. Virtually all receivers and amplifiers are constructed in this way with the amplifier chassis serving as the common ground between channels. When using separate monophonic amplifiers it is a good idea to connect a wire between the two chassis' to ensure a common ground. If you think that your amplifier may not be common grounded call Polk Audio or your local Hi-Fi dealer, to find out for certain.

Second, the SDA-1 is a very "easy" load for amplifiers to drive. This means that amplifiers of moderate power capabilities may offer much greater dynamic range than you would expect when used with the SDA-1.

The load is nearly a pure resistance in normal operation but varies dynamically with the balance of signals between the two channels. This means that amplifiers that are comfortable driving low impedances and do not have excessive current limiting will be better suited to the SDA-1 especially at higher listening levels.

## **Listening Levels and Amplifier Power:**

The SDA-1 is a highly efficient system and will easily achieve high listening levels with moderate amounts of power. However, it will perform best with the reserve of power offered by large amplifiers so long as this power is not abused.

When properly set up, the SDA-1 will handle the output of large amplifiers on program material. However the greatest chance of damage to any speaker occurs when the amplifier, regardless of size, is overdriven. Generally this occurs only with small or moderate powered amplifiers. Surprisingly, the possibility of damage is usually greater with small amplifiers than with large ones.

**In most cases when audible distortion is heard at high levels it is caused by the overdriven amplifier and not by the speaker. It is absolutely critical to understand that regardless of amplifier size or speaker power rating, when you turn the volume control past the point where distortion becomes audible you are risking damage to both the speaker and amplifier.**

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**A blown tweeter fuse is usually a symptom of an overdriven amplifier. Do not under any circumstances replace the tweeter fuse with one of a larger value.**

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**A large amp able to deliver more clean power will enable the speakers to go louder without blowing the fuse.**

To see how this may happen, consider that the amplifier is a device which allows a controlled amount of power to flow from the AC wall outlet to the speaker. If the volume control is advanced too far the amp may lose control of the flow and dump much of the power of the AC outlet into your loudspeaker. The power rating of an amplifier is a measure of how much clean power it will safely produce. However, many amplifiers are able to produce distorted power several times greater than their rated power.

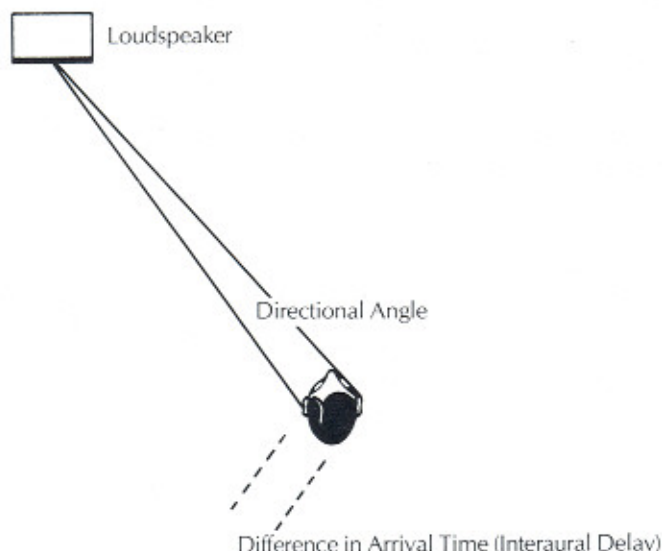
## **SDA Technology: How does it work?**

The principle design goals of the SDA-1 include the reproduction of a much more realistic sonic image. This is particularly important in separating one instrument from another and in recreating an accurate impression of the original hall (or studio) acoustics where the recording was made. Traditional loudspeaker design has focused on frequency response, distortion, transient response, dynamic range, phase, impedance, etc., in an attempt to make the reproduction of music as free from coloration as possible. Various other loudspeaker designs have used combinations of reflected and omnidirectional sound to create an illusion that the sound is not coming from the speakers themselves. While paying careful attention to all of the traditional parameters for good loudspeaker design the SDA-1

goes much further in making the reproduced sound completely free of the loudspeakers themselves. In doing so the SDA-1 eliminates the problems of acoustic smearing and difficult room placement associated with reflecting or omni loudspeakers, while offering all the musicality and detail of traditional systems. In addition it literally opens up a new dimension in the reproduction of music.

The SDA-1 achieves these qualities through the application of technology based on a fundamental analysis of the recording process and the hearing mechanism. In order to create a convincing sonic illusion the loudspeakers must first be made to acoustically disappear. The method used by the SDA-1 to accomplish this is deceptively simple and relies on the fact that a listener uses both ears to determine the direction of any sound. Specifically, a sound traveling to the listener from any direction other than straight ahead (or behind) arrives at the two ears at slightly different times (see Fig. 6).

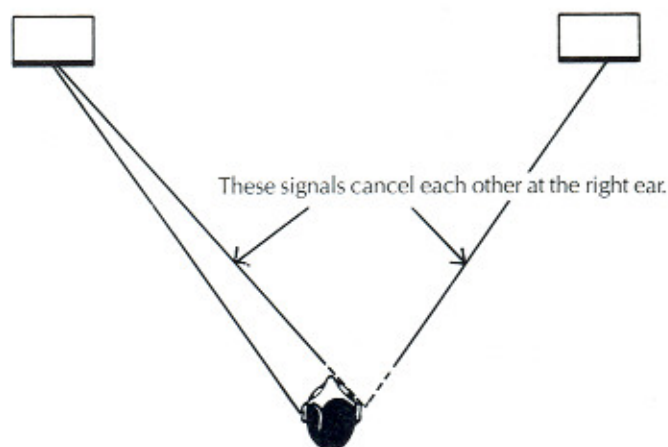
Figure 6



The brain interprets the amount of difference in arrival time (Interaural Delay) as a directional angle for the sound source. The SDA-1, however, produces an acoustic signal from each speaker which eliminates the directional information pertaining to the locations of the loudspeakers themselves.

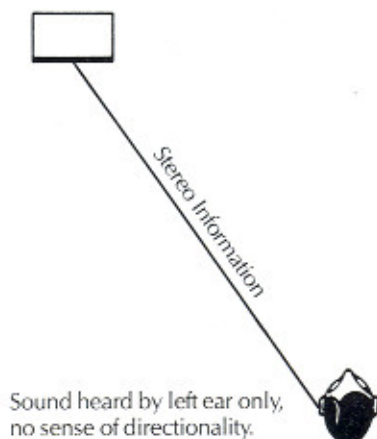
For example: A sound produced by the left speaker reaches the listener's left ear first. It continues to the right ear but as it reaches the right ear it is cancelled by a signal arriving from the right speaker (see Fig. 7).

Figure 7



As shown in Fig. 8 this leaves a situation where the left ear hears only the left speaker and conversely for the right. A sound heard only in one ear does not normally occur in nature (unless the sound is quite close to one ear) but if it did it would be a "directionless" sound.

Figure 8 DIRECTIONLESS SOUND

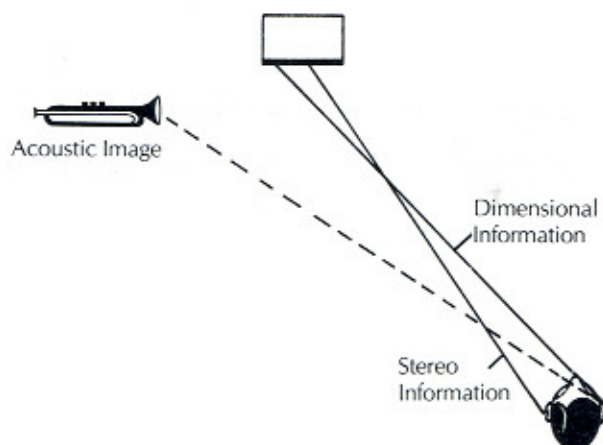




This means that the listener cannot hear the direction of either speaker. Effectively, the speakers are made to acoustically disappear.

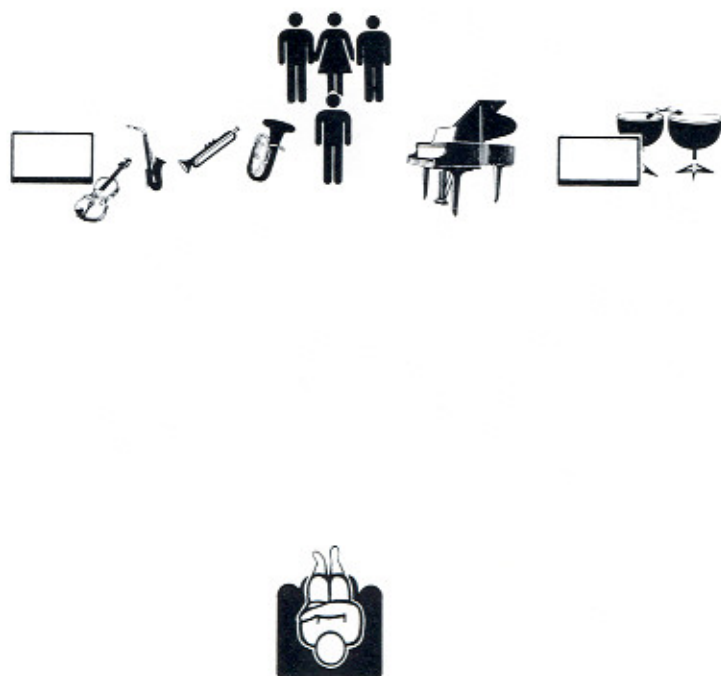
Once this has been accomplished, the original sonic image of the recording can be recreated with perfect freedom by introducing an additional acoustic signal in each channel containing the correct dimensional cues. This signal is a combination of both stereo channels and replaces the false directional information from the speaker which was cancelled out. The effect on sound source image is shown in Fig. 9.

Figure 9



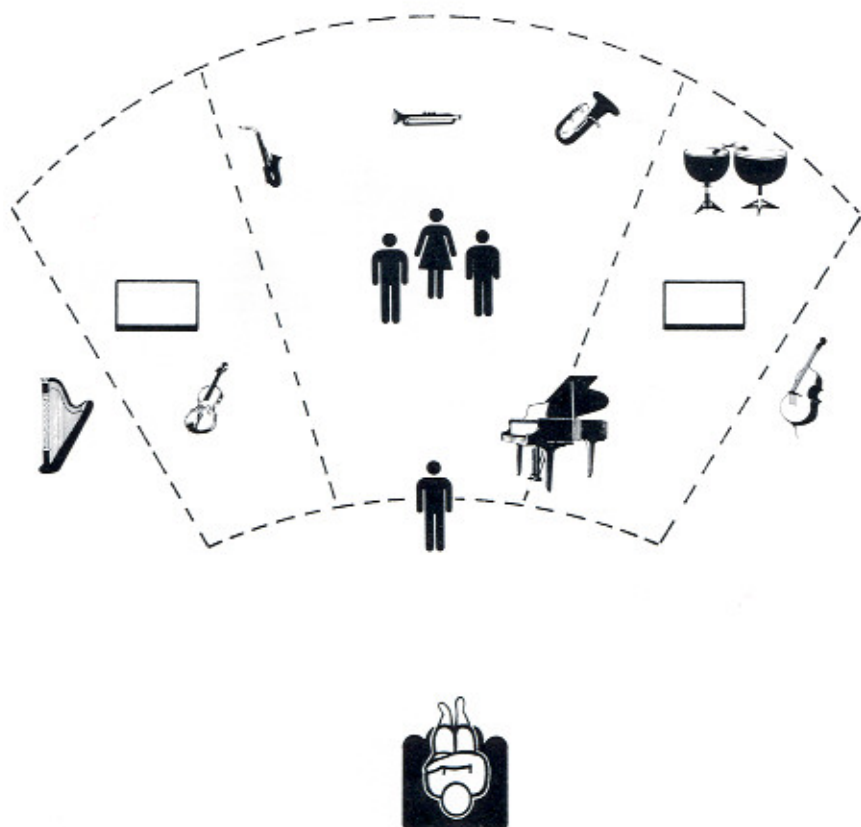
A comparison of normal stereo imaging with stereo/dimensional imaging is shown in Figs: 10 & 11.

Figure 10 NORMAL STEREO IMAGING



Normal stereo systems use two monaural speakers in an attempt to produce stereo. In contrast, it could be said that the SDA-1 is the first true "stereo" speaker system.

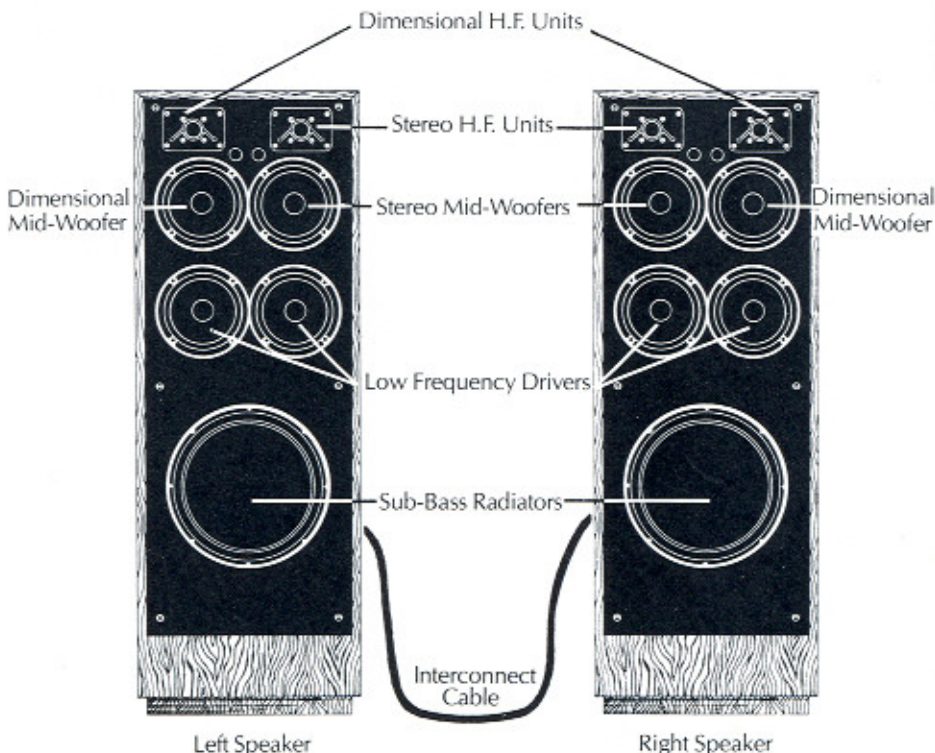
Figure 11 STEREO/DIMENSIONAL IMAGING



## Trouble Shooting:

The SDA-1 is a very unusual system and some understanding of its physical layout will be helpful in determining whether a problem lies with the speaker system or with the associated equipment. Looking at the speakers from the front with the grills off they will appear as shown in Fig. 12. Note that the cabinets are mirror imaged.

Figure 12



Follow the system check-out procedure described earlier in the manual to determine whether there is a problem specific to the Stereo/Dimensional effect. If so, follow Part II of the trouble shooting chart. If the problem seems to be generalized to the entire system use Part I.



## Trouble Shooting Chart; Part I:

### Problem

### Solution

- |   |  |
|---|--|
| 1. No sound from speakers   | 1a. Check connections to both speakers and all amplifier connections.<br>1b. Make sure amp is plugged in.  |
| 2. No high frequency output   | 2a. Check stereo and dimensional fuses on back panel of each speaker. Replace with 1 amp fast-blo.<br>2b. Make sure interconnect cable is securely and properly connected.   |
| 3. Bottoming of low-frequency drivers or excessive cone motion                                      | 3a. Turn off loudness contour control.<br>3b. Check for warped record.<br>3c. Use low-frequency filter on amp or pre-amp.<br>3d. Increase tracking force or effective mass of tone arm.<br>3e. Use sturdier mounting for turntable.    |
| 4. Unnatural bass emphasis  | 4a. Turn off loudness contour control.<br>4b. Place speakers farther from walls or corners.<br>4c. Reduce bass control on amp.   |
| 5. Howling occurs at high volumes (Acoustic Feedback)   | 5a. Place turntable farther from speakers.<br>5b. Sturdier mounting for turntable. (See also 4a, b, c)   |
| 6. Breakup or distortion on forceful recordings (especially horns, female vocals, piano etc.)       | 6a. If this occurs at all listening levels, check the stylus carefully for dirt.<br>6b. Increase tracking force. Tracking force should be set at the <u>maximum</u> recommended for that cartridge. Use several records to check this. |
| 7. Distortion at moderate listening levels  | 7a. Check amplifier connections and all rear panel connections on speakers. Check interconnect cable for correct connection.<br>7b. Amplifier may have excessively current limiting protection circuit. Have amplifier checked.        |
| 8. Distortion at very high listening levels (see section on "Listening Levels and Amplifier Power") | 8a. Listen at lower levels.<br>8b. Purchase larger amplifier.  |

- 9. High Frequency fuses blow repeatedly (see section on "Listening Levels and Amplifier Power")
  - 9a. Amplifier too small for listening level. Reduce volume setting.
  - 9b. Fuses should be 1 amp fast-blo. REPLACEMENT WITH ANY OTHER SIZE VOIDS WARRANTY.
  - 9c. Have amplifier checked for proper operation.
- 10. Not enough bass
  - 10a. Make sure speakers are in phase
  - 10b. Move speakers closer or up against rear wall.

## Trouble Shooting Chart; Part II:

### Problem

- 1. Sound from one speaker only when balance control is turned to one side.
- 2. Image does not spread outside speakers
- 3. Image is balanced to one side or the other
- 4. No center image

### Solution

- 1a. Check interconnect cable for proper connection.
- 1b. Check to make certain that both speakers are connected in the proper phase.
- 1c. When balance control is turned all the way to one side or the other, the image should shift far to one side or the other. However, sound should still come from both speakers.
- 2a. Check Interconnect Cable.
- 2b. Sit closer to speakers
- 2c. Check fuses.
- 2d. Speakers should face straight forward, do not angle inward. For best results listener should be equidistant from the two speakers.
- 2e. Make sure amp is set to stereo and recording is in stereo.
- 2f. Check phase of speaker connections.
- 3a. Check amplifier balance control for center.
- 3b. Check phase of speaker connections.
- 3c. Check fuses.
- 4a. Check phase of speaker connections.
- 4b. Check stereo H.F. fuses.

## Physical Specifications:

Dimensions	12" d x 16" w x 43½" h
Shipping Weight per cabinet	85 lbs.
Driver Compliment	2 x MW7600 Mid L.F. 2 x MW7500 Mid L.F. 2 x SL1000 H.F. with litz wire voice coil 1 x D-1200-A Passive
D.C. Resistance	5 ohms
Fuses	1 amp, 3AG Fast-Blo Stereo & Dimensional, H.F. only.
Enclosure Type	
Low frequencies —	Passive Radiator
Stereo Mid-L.F. —	4th order vented
Dimensional Mid-L.F. —	4th order vented
Left-Right Mirror	
Imaged Cabinets	
Crossover Type (each cabinet)	
High Pass — #1	(Two each) 1st order Gaussian; 125 Hz
High Pass — #2a	(One each) 2nd order Gaussian; Resonance and Inductance Compensated; 2.5 KHz
High Pass — #2b	(One each) 2nd order Gaussian; Resonance Compensated; 2.5 KHz
Low Pass — #1	(One each) 2nd order, Impedance Compensated; 125 Hz
Low Pass — #2	(Two each) 2nd order Butterworth; 2.5 KHz
Dimensional Matrix —	One per system

### **Technical Assistance:**

It is our pleasure to offer the assistance of our technical staff any time you have a question or observation. Even if your question has nothing to do with loudspeakers we will be happy to help you with any aspect of your system set-up. Call your local Polk Audio dealer or call us directly.

### **Service:**

If for any reason you wish to have service work performed on your speaker, you may either contact your nearest authorized Polk Audio dealer or return it to the factory.

If you wish to return your SDA-1 to the factory for servicing, please write first describing your problem and requesting permission to return your speaker. You will receive a prompt reply by mail instructing you fully as to how this is to be done. Our address is:

Polk Audio, Inc.  
Warranty Service  
1915 Annapolis Road  
Baltimore, Md. 21230



## Limited Five-Year Warranty

Each SDA-1 Loudspeaker is warranted to the original purchaser to be free from defects in materials or workmanship for a period of 5 years from the date of purchase.

Defective units must be shipped prepaid insured to an Authorized Warranty Service Station or to the factory. If upon examination at the factory or Authorized Warranty Service Station it is determined that the unit was defective in materials or workmanship, the Authorized Warranty Service Station or Polk Audio will, at its discretion, repair or replace the unit at no cost to the consumer and return it via prepaid freight.

This warranty does not cover damage due to commercial use, or voltage inputs in excess of the rated maximum of the unit, or other abuse. It will be void if unauthorized service has been done on the unit or if the serial number tag is removed or defaced.

This warranty is in lieu of all other warranties, expressed or implied.

## **IMPORTANT!!**

### **New SafetyGuard™ Tweeter Protection**

Dear Polk Owner:

As part of our continuing efforts to improve our products, your speakers are equipped with SafetyGuard™, a remarkable new auto-reset protection device. SafetyGuard™ protects the tweeter(s) in your Polk loudspeaker from thermal overload due to excessive current, usually caused by an over-driven or "clipping" amplifier. It is internal to the crossover, and replaces the external fuse and fuseholder on previous models.

SafetyGuard™ protects the tweeter by temporarily interrupting the signal to the tweeter when it detects an overload situation. The signal will continue to be interrupted until the amplifier volume is reduced to a level low enough to allow SafetyGuard™ to reset itself. If the amplifier level is reduced to zero, the reset time is about thirty seconds.

See the instruction manual for precautions against over-driving your amplifier.

