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**Model SDP1**

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Preface
Please take the time to carefully read this instruction manual prior to installation or use of your SDP1 Spacial Definition Processor. Because it is a highly advanced electronic instrument, there are several facts and procedures you should know before you place it in operation.

Introduction
The Audio Research SDP1 is the first in a series of products bearing the Spacial Definition* copyright. Designed to complement and enhance any existing two-channel audio system, the SDP1 multichannel music processor achieves a five-channel matrix from two (stereo) channels of information without degrading the reproduction of music or adding needless ergonomic complexity.

The SDP1 features both single-ended and balanced inputs and outputs (three outputs for connections to center and rear channel amplifiers). It is connected to a set of main outputs from the existing stereo preamplifier: once the center and rear channel levels are set, the main preamp volume control becomes the master control.

The SDP1 is housed in a first-rate Audio Research mechanical package with a 3 1/2" H. by 19" W. faceplate. It has rotary controls for adjustment of level (volume) of center, rear-right and rear-left channels; a fourth rotary allows choice of time delay for the rear channels from a menu of 5 options ranging from 22 ms to 45 ms. Center and rear channels are operated at full frequency bandwidth, with a minimum of signal manipulation: this helps insure tonal accuracy, transparency and best dynamics. Delay is achieved through advanced digital technology, (F.C.C. approved), while gain circuitry (12 dB overall) is fully analog. Front L and R channels remain completely un-processed for maximum fidelity to the source. Muting is automatic at turn-on and in brown-out conditions.

While designed to meet strict sonic criteria for music reproduction, the SDP1 processor also provides High Definition* and maximum resolution in video or theater applications. You will hear much less processing distortion and lower noise, with far superior intelligibility of dialogue and music tracks. In addition, localization of rear-channel effects is very good, since there is less noise and distortion to "blur" these sonic highlights. Coherence of the entire sonic envelope and simple ease of operation are the hallmarks of the SDP1, whether used with movies or music.

The SDP1 is a truly unique product in design and function. Unlike any other currently available, Sonically, you will find it has the purity, openness and neutrality that have become the hallmark of Audio Research.

Accessories
Spare Fuses:
2 – 1/2 Amp MDQ slo-blo (100 & 120v)
2 – 1/4 Amp MDQ slo-blo (220 & 240v)
2 – Shorting jumpers for single-ended operation.

Warnings
1. To prevent fire, or shock hazard, do not expose your SDP1 to rain or moisture.
2. This unit contains voltages which can cause serious injury or death. Do not operate with cover removed. Refer servicing to your authorized Audio Research dealer or other qualified personnel.
3. The power cord on your SDP1 is equipped with a heavy gauge, 3-conductor cable and a standard three-prong grounding plug. For absolute protection, do not defeat the ground power plug. This provides powerline grounding of the SDP1 chassis to provide absolute protection from electrical shock.
4. For continued protection against fire hazard, replace the fuse only with the same type and rating as specified at the fuse holder.

Packaging
Save all packaging in a dry place away from fire hazard. Your SDP1 is a precision electronic instrument and should be properly cartoned any time shipment is made. You may not have occasion to return your unit to the factory for service. But if that should prove necessary, or other occasion requiring shipment occurs, the original packaging will protect your SDP1 from unnecessary damage or delay.
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Description of Controls
DELAY: Detents indicate selection of 5 delay options ranging from 22 milliseconds to 45 ms. This control allows the user to "fine-tune" the amount of delay to the rear speakers. As a rule of thumb, initial trial settings should be 10 digits higher than the number of feet from front speakers to rear speakers. Example: if your front speakers are 12 feet from the rear speakers, try 22 ms as the delay setting.
Left Rear/Right Rear: Level controls to vary the volume in the rear channels.
Center: Level control to vary the volume in center channel.

POWER SWITCH: Supplies power from AC wall outlet to SDP1 when in "Power" position. Although not strictly necessary, it is nonetheless good practice to put the SDP1 in "Mute" before turning on power for maximum protection of your power amplifier(s) and speakers.

MUTE/OPERATE SWITCH: In "Mute" position, shorts the main outputs of the processor. This switch should always be activated between listening uses or switching of inputs. This simple precaution will prevent inadvertent misuse of your SDP1 and help protect your power amplifier(s) and speakers from unexpected transient signal pulses. In "Operate" position, this switch allows the signal to pass normally to the outputs.

POWER/MUTING CIRCUIT LED: Glows green to indicate unit is on and receiving power from the power supply. Note that for approximately 30 seconds after start-up or in "Mute" mode, this LED will glow more dimly, indicating proper operation of the muting circuit. In the "Operate" mode (after warm-up) the LED brightens and your SDP1 is ready for normal operation.

Connections
INPUT CONNECTORS: The SDP1 is designed to work in conjunction with a stereo preamplifier, in the case of preamplifiers with multiple pairs of main outputs, leave your main amp and speakers connected as they are, and connect your preamp to the SDP1 input connectors with a secondary set of output connectors.

OUTPUT CONNECTORS: The SDP1 can be connected to amps with balanced or unbalanced inputs (XLR or RCA). Connect these to the 3 appropriate channels in a 5 channel system (center front, right rear, left rear). In the case of preamps with only one set of main outputs, use the "pass thru" option to route a second set of interconnects to your front left and right amplifier and connect the center and rears as above. Alternately, the pass thru can drive the inputs of amplifiers for unprocessed stereo sub-woofers.

Use shorting jumpers as shown when connecting single-ended inputs.
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NOTE: The XLR connector pin leads are as follows: 1-shield; 2-positive; 3-negative. If used with a power amplifier which utilizes different pin leads for positive, negative and/or shield, the signal being fed to the loudspeakers will be incorrect. Please consult your Audio Research dealer.

At the performance level of the SDP1, high-quality audio signal interconnect cables are critical to preserving maximum fidelity. Audio Research interconnect cables are highly recommended for connection to your power amplifier(s) and to other ancillary equipment. See your authorized Audio Research dealer for recommended lengths.

Installation Instructions
While the SDP1 does not dissipate an unusual amount of heat, it is important that it be provided with reasonable airflow to assure long, trouble-free operation. In addition, the following installation guidelines will help insure maximum sonic performance as well as reliable service.

1. Upright and horizontal mounting is suggested if extended operation (longer than one hour) is contemplated.
2. Do not "stack" the SDP1 on top of a power amplifier, not only could this cause overheating, but "hum" may be introduced into the SDP1 from the proximity of the amplifier's power transformer.
3. Do not place or operate your SDP1 on a soft or irregular surface such as a rug. This will prevent proper ventilation.
4. Do not operate your SDP1 without the top and bottom covers installed. These are required both for safety as well as shielding from interference (except in service operations).
5. If rack mounting is employed, use Audio Research Rack Mount Ventilators (RMV-3) below and above your SDP1.
6. If side-by-side mounting with other equipment is employed, place the SDP1 to the left of the other chassis, so as to provide maximum spacing between the transformer of the SDP1 and the other component.
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Operating Procedure

Start-Up:
1. Make sure Power switch is set to "Off" position: Mute switch should be in "Mute" position.
2. Secure all rear-panel connections between SDP1, pre-amplifier and amplifiers. Note: Given the advanced performance capabilities of the SDP1, it is extremely important that high-quality interconnects be used for connection to ancillary electronics. Audio Research brand interconnects, in either unshielded or RFI-shielded configurations, are strongly recommended. Your authorized Audio Research dealer can assist you in determining optimal lengths for your system.
3. Plug 3-prong powerline cord from rear of SDP1 into grounded AC wall receptacle.
4. Turn Power switch to "On." Green LED will glow dimly for approximately 30 seconds while power supply stabilizes, indicating operation of automatic muting circuit. After this warm-up muting period, the LED will brighten when "Operate" is selected, indicating that your SDP1 is ready for operation.

Note: For superior sonic performance, a warm-up period of at least one hour is recommended. In addition, your SDP1 may be safely left "on" continuously for maximum performance at all times.
5. Rotate delay to the preferred setting. Set levels for center, left rear and right rear. Most listeners feel the best settings are subtle, to the point of inaudibility until the SDP1 is muted.
6. Activate input source, then deactivate Mute switch.

Muting Provisions:
The SDP1 has several provisions to help protect against misuse of the exceptional dynamic range and wide bandwidth that it offers. It is not subject to damage itself, but some power amplifiers and speakers are more limited in their ability to withstand signal extremes. These provisions, both manual and automatic, are designed not to interfere with a flawless listening experience of unprecedented realism, while giving reasonable protection against warm-up surges and power line interruptions. However, for absolute protection of associated equipment some operator understanding, and responsibility, is required.

The Mute/Operate Switch allows manual disabling of the SDP1 outputs during the switching of equipment. Use of this switch will minimize stress on your amplifier even if it is "off". It is also highly recommended that manual muting be employed during the initial 30 second warm-up period as well as during turn-off for maximum protection.

While it is true that the automatic muting will provide reasonably adequate protection against speaker burnout during these periods, it has limitations. At the 30 second point the automatic timer "releases" the output. Although this is normally adequate protection, utilization of the manual mute provision will completely avoid stress to your speakers.

Some solid-state power amplifiers have a DC offset present at their input connections. (This, of course, should not be.) Operation of the manual muting switch with such an amplifier connected will result in a "click" or "pop" in your loudspeaker (commensurate in level with the amount of the offset) each time the switch is activated. Repair or replacement of such amplifiers is suggested.

Shut-Down
1. Set "Mute" switch to "Mute" position.
2. Turn off power amplifier(s).
3. Turn off all input sources.
4. Set SDP1 Power Switch to "Off" position.
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Servicing
Because of its careful design and exacting standards of manufacture, your SDP1 should normally require only minimal routine service to maintain its high level of performance.

CAUTION: Your SDP1 contains sufficient levels of voltage and current to be lethal. Do not tamper with a component or part inside the unit. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

should service be necessary, please contact your Audio Research dealer, or Audio Research Customer Service (612) 939-0600.

Cleaning
To maintain the visual appearance of your SDP1, occasionally wipe the front panel and top cover surfaces with a soft damp (not wet) cloth. A mild, non-alkaline soap solution may be used to remove fingerprints or similar smudges. Cleaners containing abrasives should not be used as they will damage the “brushed” grain of the front panel finish. A pure bristle 2-inch paint brush is effective in removing dust.
Limited Warranty

Terms and Conditions

1. LIMITED WARRANTY
Audio Research warrants the product designated herein to be free of manufacturing defects in material and workmanship, subject to the conditions hereinafter set forth, for a period of three (3) years from the date of purchase by the original purchaser or no later than five (5) years from the date of shipment to the authorized Audio Research dealer, whichever comes first, excepting vacuum tubes which are warranted for 90 days only (See 6), and CD players or transports, which are warranted for two (2) years from date of purchase (four (4) years from date of shipment).

2. CONDITIONS
This Warranty is subject to the following conditions and limitations. The Warranty is void and inapplicable if the product has been used or handled other than in accordance with the instructions in the owner's manual, abused, or misused, damaged by accident or neglect or in being transported, or the defect is due to the product being repaired or tampered with by anyone other than Audio Research or an authorized Audio Research repair center. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the customer at his or her sole expense. Audio Research will pay return freight of its choice. A RETURNED PRODUCT MUST BE ACCOMPANIED BY A WRITTEN DESCRIPTION OF THE DEFECT AND A PHOTOCOPY OF THE ORIGINAL PURCHASE RECEIPT. This receipt must clearly list model and serial number, the date of purchase, the name and address of the purchaser and authorized dealer and the price paid by the purchaser. Audio Research reserves the right to modify the design of any product without obligation to purchasers of previously manufactured products and to change the prices or specifications of any product without notice or obligation to any person.

3. REMEDY
In the event the above product fails to meet the above Warranty and the above conditions have been met, the purchaser's sole remedy under this Limited Warranty shall be to return the product to Audio Research or an authorized Audio Research repair center where the defect will be rectified without charge for parts or labor, except vacuum tubes (See 6).

4. LIMITED TO ORIGINAL PURCHASER
This Warranty is for the sole benefit of the original purchaser of the covered product and shall not be transferred to a subsequent purchaser of the product.

5. DURATION OF WARRANTY
This Warranty expires on the third anniversary (second for CD players and transports) of the date of purchase or no later than the fifth anniversary (fourth for CD players and transports) of the date of shipment to the authorized Audio Research dealer, whichever comes first.

Warranty Outside the U.S.A.
Audio Research has authorized distribution in many countries of the world. In each country, the authorized importing retailer or distributor has accepted the responsibility for warranty of products sold by that retailer or distributor. Warranty service should normally be obtained from the importing retailer or distributor from whom you purchased your product.

6. VACUUM TUBES
Vacuum tubes are warranted for the original 90-day period only.

7. DEMONSTRATION EQUIPMENT
Equipment used by an authorized dealer for demonstration purposes is warranted to be free of manufacturing defects in materials and workmanship for a period of three (3) years from the date of shipment to the dealer or two (2) years in the case of CD players and transports. Vacuum tubes are warranted for 90 days. After the first year, demo equipment needing warranty service must be packed and returned to Audio Research by the dealer at his sole expense. Audio Research will pay return freight of its choice. A returned product must be accompanied by a written description of the defect on an AUDIO RESEARCH RETURNED GOODS AUTHORIZATION form. Dealer-owned demonstration equipment sold at retail within three (3) years of date of shipment to the dealer is warranted to the first retail customer to be free of manufacturing defects in materials and workmanship for the duration of the 3-Year Limited Warranty remaining (as measured from the date of shipment of the equipment to the dealer); this period of warranty is two (2) years in the case of CD players and transports. Vacuum tubes are not warranted for any period under these conditions of sale. In the event warranty service is needed under these conditions, the owner of the equipment must provide a copy of his purchase receipt, fulfilling the requirements described under "2. Conditions" above. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the custome at his or her sole expense. Audio Research will pay return freight of its choice.

8. MISCELLANEOUS
ANY IMPLIED WARRANTIES RELATING TO THE ABOVE PRODUCT SHALL BE LIMITED TO THE DURATION OF THIS WARRANTY. THE WARRANTY DOES NOT EXTEND TO ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR DAMAGES TO THE PURCHASER. Some states do not allow limitations on how long an implied warranty lasts or an exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

9. WARRANTOR
Inquiries regarding the above Limited Warranty may be sent to the following address:
Audio Research
5740 Green Circle Drive, Minnetonka, Minnesota 55343-4424
ATTN: Customer Services.

In the unlikely event of service required beyond the capability of the importer. Audio Research will fulfill the conditions of the warranty. Such product must be returned at the owner's expense to the Audio Research factory, together with a photocopy of the bill of sale for that product, a detailed description of the problem, and any information necessary for return shipment.
Specifications

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FREQUENCY RESPONSE: 2Hz to 400kHz. (-3dB point.) Center channel.

DISTORTION: Less than .01% at 2V RMS output. (Typically less than .002% at 1kHz.)

GAIN: 12dB maximum (6dB balanced to unbalanced, 18dB unbalanced to balanced).

INPUT IMPEDANCE: 1.5 Megohms unbalanced, 3 megohms balanced.

OUTPUT IMPEDANCE: 30 ohms unbalanced, 60 ohms balanced.

OUTPUT DC OFFSET: Less than 2mV dc.

OUTPUT BEFORE CLIP: 18V RMS out balanced 16V RMS into 600 ohm balanced load. Center channel.

NOISE: Less than 30 uV RMS unbalanced IHF weighted, Center Channel.

INPUTS: Left, Right (balanced & unbalanced).

OUTPUTS: Left, Right (pass through); Left Rear, Right Rear, Center Front (balanced & unbalanced).

GAIN CONTROLS: Left Rear, Right Rear, Center.

SWITCHES: Power, Mute.

POWER REQUIREMENTS: 100-135VAC 60Hz (200-270VAC 50/60Hz) 40 watts maximum.

DIMENSIONS: 19” (48 cm) W x 3½” (8.9 cm) H (standard rack panel) x 11¾” (29.8 cm) D Handles extend 1½” (3.8 cm) forward of the front panel. Rear chassis fittings extend 9/16” (1.4 cm).

WEIGHT: 11.4 lbs. (5.2 kg) Net; 21.4 lbs. (9.7 kg) Shipping.

Specifications subject to change without notice.

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