

*Congratulations.* In the Sonographe SX-1 you have acquired a precision audio crossover of extraordinary musicality. It is the result of a decade of research by conrad-johnson design into the application of solid state devices to the reproduction of recorded music. The circuit design has been executed with quality component parts and each unit has been painstakingly hand assembled. The completed instrument has been subjected to a rigorous quality inspection program.

Every effort has been made to provide you with an audio instrument capable of achieving a believable illusion of live music when listening to high quality recordings. This manual contains many important suggestions on how to realize the full potential of your SX-1. Please take a few minutes to read it.

## ***LIMITED WARRANTY FOR THE SONOGRAPHE SX-1***

1. **conrad-johnson design, inc.** warrants to the original purchaser that the Sonographe SX-1 will be free of defects in materials and workmanship for a period of two years from the date of original purchase.

2. **conrad-johnson** will repair defective units without charge for labor or parts subject to the following conditions:

a) The unit must not have been altered or damaged through misuse, abuse, negligence, accident, or improper operation.

b) The purchaser must provide evidence of purchase at the time service is requested.

c) All repairs must be undertaken at the factory or other service center designated by conrad-johnson design, inc. Units submitted for warranty repairs must be shipped in the factory packing carton to conrad johnson design or its designated service center, freight and insurance prepaid by the owner, and will be returned to the owner, freight and insurance prepaid by conrad-johnson design. Replacement cartons are available from the factory for a nominal charge.

d) Normal wear and maintenance are not covered by this warranty.

3. Where permitted by law, conrad-johnson design's liability shall be limited to that set forth in this warranty. No other warranty of any kind, expressed or implied, is made by conrad-johnson design, inc., and all implied warranties, including merchantability and fitness for a particular "purpose", which exceed the obligations and time limits set forth herein are hereby disclaimed. conrad-johnson design, inc. shall not be liable for incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you.

4. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Questions about warranty service should be addressed to:

Service Department  
conrad-johnson design, inc.  
2733 Merrilee Drive  
Fairfax, VA 22031

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# ***I*NSTALLATION**

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Because the SX-1 dissipates very little heat (less than 10 watts) ventilation is not an important consideration, allowing greater flexibility for custom or built-in installations. Of course, reasonable judgement must be exercised to see that the SX-1 does not obstruct ventilation required by amplifiers or other equipment in the system. In custom installations, the unit may be mounted either horizontally or vertically.

To minimize hum pickup, the SX-1 should be mounted well away from amplifier power transformers. All ac power cords should be dressed away from input cables- especially phono cables.

The SX-1 requires an ac power line providing between 90 and 130 volts at 50 to 60 Hz. Alternatively, the SX-1 can be reconnected internally for operation on 220 volt power lines. Consult your dealer for details about the conversion.

## ***CONNECTION***

Make sure the power is off to all of your audio equipment during the connection procedure. Connections made with the power on could result in damage to your audio components.

**INPUT:** This is the input to the crossover. Connected to the output of your preamplifier.

**HIGH FREQ:** This is the "high pass" output, and should be connected to the inputs of your mid-high frequency amplifier.

**LOW FREQ:** The "low pass" output , connect to the inputs of your low frequency amplifier.

**MONO LOW FREQ:** These two outputs are identical, and provide a monaural low frequency signal. If mono subwoofers are used, these outputs should be connected to the input of the low frequency amplifier.

**ALL FREQ. OUTPUT:** This set of outputs provides an unprocessed signal that matches the signal fed to the SX-1's inputs. Connect your

mid-high frequency amplifier to these outputs to run the mid-high speakers full range.

## **CONTROLS**

The only user operable control on the SX-1 is the bass level control on the front panel. This is used as a volume control for your bass output to match the bass level to the mid- high frequency speakers. There will be only one correct setting for a given system, and this setting is best found through trial and error by careful listening.

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## ***GETTING THE MOST FROM YOUR SX-1***

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The Sonographe SX-1 offers an exceptional level of sophistication and refinement in music reproduction, but it cannot transform an inferior stereo system. Only high quality amplifiers and loudspeaker systems will be capable of fully revealing the capabilities of this precision instrument.

Given a system of high quality components, there remain a number of important details which must be attended to.

### ***ABSOLUTE PHASE***

Musical notes are heard through the ear's response to waves of alternating rise and fall of air pressure. Musical transients are almost exclusively positive: that is, the initial effect is a rise in pressure. The ear is capable of distinguishing these positive transients from the musically unnatural alternative of a negative transient (an initial fall in air pressure). In terms of your stereo system, these transients are created by your loudspeakers. If the speakers respond to musical transients by first moving out, they are creating a rise in pressure, and the system is said to be "phase correct". If they respond by moving in, they create a fall in pressure and the system is said to be phase inverting. Each component in the stereo system is either phase correct or phase inverting (including the source and speakers-these are normally phase correct). It is of no consequence if an individual component is phase inverting, as long as the system as a whole is phase correct. This will be the case as long as the number of phase inversions is even (or zero).

The **SX-1** is phase correct. If your system has an odd number of inversions, then you must add one phase inversion. This is conveniently done by reversing the positive and negative connections to your speakers (be sure to reverse both channels).

If you are not sure about the phase of every piece in your system, you can establish correct absolute phase by careful listening. When the system is in correct phase, transients will be noticeably cleaner and more sharply defined. The effect is especially apparent on plucked string sounds. A final warning-not all recordings are phase correct (including some "audiophile" recordings), so listen to several before concluding your investigation of absolute phase.

### ***AC LINE POLARITY***

Each piece of electronic equipment in your system is subject to minute ac leakage currents to the chassis. Since the chassis of components in a system are usually connected via the ground side of the interconnect wires, these leakage currents are superimposed on the musical signals. It is possible to minimize these current flows by carefully selecting the way in which each component is plugged into the wall outlet. Because the power cord on the **SX-1** is not polarized, it can be plugged in two ways. It will normally sound better in one orientation than in the other. The same will be true of any electronic device in your system.

### ***THE IMPORTANCE OF WIRES***

Interconnect and speaker wires are an important element in your stereo system. Interconnects are available which will permit a reference quality system to blossom and fulfill its promise of musical reality. Others will strangle the system to the point where it becomes no better than average. To complicate matters, our experience suggests that the choice of interconnects will be system dependent- those that are ranked first on a given system may be a poor choice for a different system. Consult your Sonographe dealer for recommendations for your specific system.

### ***Warm up the SX-1 before listening:***

The sonic performance of the **SX-1** improves noticeably as the unit warms up. The midrange becomes more lucid, the highs smoother, and

the soundstage expands. The warm up period can be expected to last several hours. Consequently, we recommend that the SX-1 be left on at all times. The low power consumption of the unit makes this practical.

Questions: If you have questions about the installation or function of your **SX-1** do not hesitate to call Customer Service at (703) 698-8581.

## **SX1 SPECIFICATIONS**

### **gain:**

high pass (@ 1kHz) - 1.5dB

low pass (@ 20Hz) 0 to 22dB, continuously variable

**phase:** both high pass and low pass sections are phase correct

### **filters:**

high pass - a second order (12 dB per octave) Bessel filter with 3dB down point at 110 Hz.

low pass - a fourth order (24 dB per octave) Bessel filter, 3dB down at 110 Hz

**dimensions:** 18" x 3.75" x 11.5"

**weight:** 12 lbs

## ***SERVICE***

In the event your Sonographe SX-1 electronic crossover requires service, repack it with the original packing material and ship via United Parcel Service (UPS) to:

Service Department  
conrad-johnson design, inc.  
2733 Merrilee Drive  
Fairfax, VA 22031

Be sure to include a copy of your sales receipt from the original purchase, along with a note explaining the problem you are having in as much detail as possible. If the problem is intermittent, please indicate. If you do not have the original packing material, replacements are available from conrad-johnson design for a nominal charge.