

# *Sanders Sound Systems*

## **Digital Preamplifier**

### **OWNERS MANUAL**

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# INSTALLATION

## INPUT CONNECTIONS

Signal input is made through gold-plated RCA (unbalanced), XLR (balanced), S/PDIF, or USB connectors. A total of seven inputs are available. The first five inputs (Balanced, Phono, CD, Video, and Aux) are "main" inputs. The last one (Processor) is a "pass through" for a video processor.

The first five inputs automatically cancel when you press another. The Processor button overrides all of the main five inputs. You select or de-select it by "toggling" its button (pressing the button repeatedly).

To use a turntable and play vinyl LP records, use the Phono input. Prior to installing the unit, you may wish to set the gain and input loading (both resistance and capacitance) for each channel.

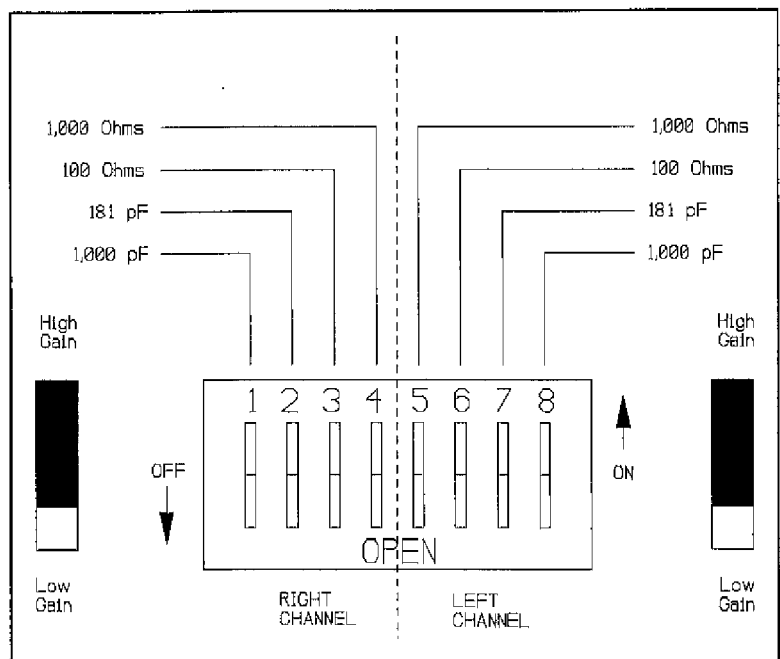
The default gain is "High", such as would be used with a moving-coil cartridge. The "Low" setting will reduce the gain by 20 dB, if necessary, for higher output, moving-magnet cartridges.

The default resistance loading is 50,000 ohms (50 K $\Omega$ ). The default capacitive loading is 50 pF.

If you wish to change the default phono settings, you remove the lid and throw some switches that you will find inside. To do so, first unplug the unit and remove the cover using the supplied Allen key. Use care to avoid scratching the finish.

Inside you will see a large circuit board with several switches located on the left side (the volume control side). A simplified view of the phono switches (with some notes and arrows) on the circuit board is shown to the right.

Locate the large block of eight rocker switches. There is a grey/red slide switch near each side of the switch block.



Left Side of Circuit Board

To increase the gain, slide the individual grey/red slide switches towards the middle of the board. To reduce the gain, slide the switches towards the left edge of the preamplifier chassis.

The switch block with eight miniature switches is used to set the input loading for each channel. Half of the switches are used for each channel. The first four switches (marked 1-4 on the block) control the loading for the right channel. The other four switches (marked 5-8) control the loading on the left channel.

Each switch connects a resistor or capacitor in parallel with the input and so adjusts the load value "seen" by the cartridge. Refer to the diagram to determine the values that need to be switched in for your cartridge.

Note that these values are not critical and do not need to exactly match the recommendations of your cartridge's manufacturer. Simply pick the value that most closely matches.

## **OUTPUT CONNECTIONS**

There one set of balanced and two sets of single-ended main output connections available. The volume control adjusts the levels of all of them. You may use all the outputs simultaneously to drive two different amplifiers, electronic crossovers, DSP, etc.

There is one set of unbalanced, fixed-level outputs available. These are intended to be used to feed a recorder. Whichever input you select will appear at this output and can be recorded. You can use the level control to adjust the loudness of the system without it affecting the recording.

## **POWER CONNECTIONS**

Insert the power cord into the AC LINE INPUT on the back panel and then connect it to an appropriate power source. After switching on the preamp, press the "USB" selector button to initialize the digital electronics. The preamp is then ready for use.

The preamp is best left on continually. By leaving the electronics on, they stay warm and are always in their optimum operating state and ready for immediate use. Also, the preamp's memory requires continuous power to "remember" any custom settings you may decide to use.

Switching electronics on and off is abusive to them. It is much gentler and better for them to leave them on. They will last indefinitely when left on. The preamp uses just a few watts of power so power consumption is not an issue. All indicator lights are light-emitting diodes (LEDs), including the digital display, so they will last a very long time.

The operating voltage of this unit is adjustable so that it may be used worldwide. To switch between 100 volt and 200 volt operating ranges, remove the lid and look for the round, black cylinders near the power transformer on the right side of the circuit board.

Most of these are capacitors, but one has white writing on its top. This is the voltage selector switch. If you carefully inspect the writing, you will see that it says "120" and "240" and there is a small arrowhead pointing to one of these.

To change the voltage range, insert a straight-bladed screwdriver into the slot in the center of the voltage selector and rotate the middle section until the arrow head is pointing to the correct voltage. This is actually a snap-action switch, so you will hear a "snap" as the switch moves to the new position.

Note that a voltage regulated power supply is used, so the voltage selector operates in ranges. In other words, the "240" position will work correctly for mains voltages between 220 and 240. The "120" position will work for mains voltages between 100 and 120.

## **ELECTRICAL PROTECTION**

Although not essential, it is a good idea to use a surge protector to prevent damage to your expensive equipment in the event of an electrical storm or other causes of abnormally high mains voltage. These are inexpensive and can be obtained from any hardware store.

Note that surge protectors do not insert anything in the power line, so will not adversely affect the sound of your audio system (they work by shunting excessive voltage to ground, so only operate when dangerously high voltages are present). You do not need to use an expensive line conditioner, but if you do, these normally will have surge protection built in so you do not need to use additional surge protection.

If you live in an area where there are frequent power interruptions, you can connect the preamp to a UPS (Uninterruptable Power Supply) such as is commonly used to protect computers. These are inexpensive and will keep your preamp running during brief power outages. This will prevent it from losing any settings you may have programmed into it. A UPS also has a built-in surge protector.

# OPERATION

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The Sanders Preamplifier is a very sophisticated, computer-operated unit that has many functions. Despite its complexity, it appears very simple. Great care and thought were put into making it “user friendly” and ergonomically well-designed. All of the following functions are available from the front panel controls and by remote control. Each function is listed below with directions on how to operate it.

## INPUT SELECTION

Press the appropriately labeled button on the front panel to select a source. When activated, a small, blue LED above the switch will light. The five “main” inputs (Balanced, Phono, CD, S/PDIF, and USB) operate together so that selecting any one of these inputs switches out the others.

The “Processor” button toggles between your video processor and whatever main input is selected. The Processor function passes the signal directly through the preamp at unity gain. In other words, the level control has no effect on it. This way, you can feed the front main channels of your home theater video processor into the Processor input of the preamp, and the preamp will then drive the front left and right speakers at the level you specified on your video processor.

You will not need to adjust the level of the preamp when using the Processor input. Instead, you will adjust the levels using your video processor.

Note that all the analog inputs — with the exception of the Phono input — operate at line level (approximately 1 volt). You may use any line-level component with them. The Phono input is designed with high gain and RIAA equalization, so is only suitable for playing vinyl LP records.

## MONO

Use this switch to toggle between monaural and stereo. The light indicates the mono position. This function is useful for checking to see that your speakers are in phase (a precise center image should be present in mono if the speakers are in phase) and for checking system left/right balance. Using the mono position will also reduce the noise and distortion from FM tuners.

## VOLUME

This knob adjusts the output level of the preamp in precise 1 dB steps across a range of 100 dB. This control rotates continually — it is not limited to the 280° rotation of conventional rotary controls. The control is detented so you can feel each 1 dB step. The digital readout shows the output level in 1 dB increments between the numbers “00” and “99.”

This volume control is not a conventional potentiometer — it is an optical device that controls a microprocessor. Unlike conventional stepped resistor-ladder attenuators, this microprocessor has no transient clicks or pops as you change the volume. Like a resistor-ladder, the level of each channel is closely matched so the left/right balance will remain constant as you adjust the level up and down. The tolerance is within 0.1%, which is vastly better than even the best conventional, stereo potentiometers.

## **BALANCE CONTROL**

The volume knob is used to control several functions in addition to overall volume. Pressing the knob momentarily, (like a large push-button) will cause the preamp to change modes.

In the window next to the number display are three indicator lights, "Main", "Left", and "Right." In the normal "Main" mode (indicated by a blue light), the knob functions to control the overall system volume, operating both channels simultaneously. Pressing the volume knob momentarily will switch to the next position ("Left"), and a color-coded, white light will appear under "Left", and the "Main" blue light will go out. Simultaneously, the number display will show "00", which means zero attenuation.

At this point, you may reduce the level of the left channel by turning the volume knob counter-clockwise as you normally would to reduce the overall volume. As you do, the numeric display will show you the number of dB you have reduced the left channel. Reducing the level of the left channel will shift the image toward the right.

Pressing the volume knob again will switch to the right channel, the color-coded red indicator light will appear under "Right", and the numeric display will again show "00" (or the previously set level for this channel). Adjust the level as desired. Reducing the level of the right channel will shift the image toward the left. Pressing the volume knob again will return to the "Main" control.

## **INPUT LEVEL CONTROLS and SYSTEM GAIN**

The level of each input can be adjusted so that you can match the levels of all the components in your system. This way, when you switch from one component to another, you won't get "blasted" with one and have to turn up the volume on another.

Adjusting an input is very similar to adjusting the system balance. To adjust an input, press and hold its selector button while you press the volume knob — then release them both. The number display will switch to "00" and the affected input light will flash, showing that you are in the "adjustment" mode. Now, using the volume knob, you can reduce or increase the level.

Note that unlike the balance adjustment, which only attenuates the sound, you can both increase and decrease the level of each input. You can increase the loudness by up to 18 dB or decrease it by as much as 99 dB. This also has the effect of controlling the total gain of the preamp.

This adjustment automatically modifies both the left/right source channels simultaneously. You do not have to adjust the left and right channels individually like the balance control.

To switch back to "Main", you may press the volume knob. Or you can simply do nothing and the function will "time out" in twenty seconds and return to "Main" by itself.

## **MUTE**

A mute function is available on the remote control transmitter. When muted, the number display will flash.

You can adjust the volume while the signal is muted. The number display will change to indicate the new setting. When you "un-mute" (by pressing the mute button again), the preamp will operate at the new level you selected.

## REMOTE CONTROL

To start the remote, install batteries in it. When you do, it will take a few seconds to initialize where you will see the "Welcome" screen. You will be given a choice to set up the unit or skip the set up. You may ignore this screen. Just wait 86 seconds and the remote will automatically switch the MAIN screen.

Alternatively, you can manually skip the set up. You will see a bright yellow "skip" label with an arrow pointing to the button to the right of the "Main" button. Press the skip button 4 times and you will be taken to the MAIN screen where you will see the devices that have been programmed for your use. The only device that is programmed from our factory is the Sanders digital preamp. Press the button next to the Sanders icon and you will be taken to the screen that operates it.

Input selection is by direct access and is done by pressing the button next to the input listed in the window. The first page of the menu contains the six main inputs, which include "BALANCE", (which is the balanced input), "PHONO", "CD", "SPDIF", "PROCESS" (the video processor input), and "USB."

To access the rest of the preamp's controls on the remote, press one of the page keys found at the bottom of the video screen, which will switch you to Page 2. At the top of the screen you will see "MODE" and "MONO".

The button labeled "MODE" refers to selecting the left/right channel balance and gain as described on the previous page. Pressing this button will have the same effect as pressing the volume control knob inward on the front of the preamp.

Once you have switched to either channel using this button, you can adjust its level using the "VOL" buttons. Press the "MODE" button once or twice to return to stereo operation. The "MONO" button toggles between stereo and monaural.

Most of us have a pile of conventional remote control transmitters we have to pick through every time we want to control any component in our systems. Rather than to add to "remote clutter", Sanders has supplied you with a very sophisticated, programmable remote that is manufactured by Universal Remote.

This unit is a computer-controlled transmitter into which you can put the IR codes from *all* your remotes. You can do this using pre-programmed codes, or by using its learning feature. You can then control all the components in your audio/video system with this single remote and eliminate the pile of others.

To take full advantage of all the features available from this remote (including how to operate all your other components with it), read the comprehensive instructions in the MX-450 owner's manual that you can download or read on the manufacturer's website:

[www.universalremote.com/pdf/MX-450\\_owners\\_manual.pdf](http://www.universalremote.com/pdf/MX-450_owners_manual.pdf)

Alternatively, you can select the manual from the general download select page:

[www.universalremote.com/residential\\_downloads.php](http://www.universalremote.com/residential_downloads.php)

Should you need further technical support, you may call Universal Remote's Customer Service Center at 914 835-4484 or by e-mail at [techsupport@universalremote.com](mailto:techsupport@universalremote.com)

# CARE AND CLEANING

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If you wish to clean your preamplifier, use a liquid, spray-on furniture wax like Pledge and others. **Do not use any abrasive cleaners or chemical solvents such as "Ajax", acetone, or paint thinners.**

Use particular care not to damage the aluminum chassis. Aluminum is a medium hardness metal and although it is anodized, it can be easily scratched by the careless use of tools during installation, or by rough handling.

The unit may overheat and the finish may fade if exposed to direct, unfiltered sunlight or intense heat for prolonged periods.

Save your box and packing materials. They will be very helpful for moving or if you need to ship the unit for any reason.



# SPECIFICATIONS

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## CIRCUIT SPECIFICATIONS

INPUTS:	One balanced input using XLR connectors. One unbalanced phono input with switchable gain, adjustable input loading, and RIAA equalization. One unbalanced line level input. Unbalanced video processor input with fixed level at a unity gain as a pass-through. Digital USB and S/PDIF inputs.
OUTPUTS:	Two unbalanced, adjustable outputs at line level using RCA connectors. One balanced, adjustable output at line level using XLR connectors (Pin 2 hot). One unbalanced fixed level output at unity gain for recording using RCA connectors. All outputs may be used simultaneously.
FREQUENCY RESPONSE:	-3 dB at 5 Hz and 200 kHz
NOISE:	Greater than 90 dB below 1 volt reference
DISTORTION:	Less than 0.002% from 10 Hz to 40 KHz @ 5 volts peak into 600 $\Omega$ or higher, shunted by 1000 pF or less.
OUTPUT IMPEDANCE:	50 $\Omega$ , non-reactive, balanced or single-ended
INPUT IMPEDANCE:	47k $\Omega$ balanced or single-ended
GAIN:	18 dB (user adjustable)
MAXIMUM OUTPUT:	10 volts peak
CROSSTALK:	Greater than 70 dB from 20 Hz to 20 KHz
DIGITAL SPECS:	DAC Chip: ES9018 Native PCM Format Decode: 16/44.1KHz to 32bit 384KHz Native DSD Format Decode: DSD64, DSD128, DSD256 IOS support: Enabled through CCK Windows OS support: Enabled through LH Windows Driver MacOS Support: Plug and play S/PDIF Input: 44.1K to 216K linear PCM Digital Filter: Light Harmonic TCM (Time Coherence Mode) Audio Master Clock: TCXO Customized DUAL S/N ratio: 102 dB

**POWER SUPPLY**

Independently regulated with shielded toroidal transformer and 20,000  $\mu$ F of capacitance

**POWER**

CONSUMPTION: 10 watts

**DIMENSIONS**

HEIGHT: 2½" (6.35 cm)

WIDTH: 17" (44 cm)

DEPTH: 10½" (27 cm)

WEIGHT: 8 pounds (3.6 KG)

## WARRANTY

Sanders electronics and speakers are warranted to be free from defects in material and workmanship for as long as the original owner owns them.

During this period, Sanders will, at its option and without charges, either repair any part or assembly of parts that is found to be defective in material or workmanship, or replace the product with one of comparable quality, subject to the following limitations and exclusions:

This warranty shall not apply to any product which has been subject to misuse, abuse, negligence, or accident.

To obtain warranty service, contact the factory using the contact information listed below. The purchaser is responsible for shipping costs to the factory.

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Conifer, CO 80433  
USA  
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[www.sanderssound.com](http://www.sanderssound.com)