

# bel canto

## SEP1

**Single Ended Triode Tube Preamplifier**

**User's Guide and  
Operating Information**

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# SEP1

## Balanced Compatible Single-Ended Triode Tube Preamplifier

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# *Dedicated to Technical Virtuosity and Beauty of Music*

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*Bel Canto Design grew from the quest to achieve the ultimate musical satisfaction from an audio system. This quest began with the discovery of the inherent sonic qualities and musical performance potential of a nearly forgotten technology, the single-ended triode amplifier. The ability of this type of amplifier to recreate the musical experience and evoke a powerful emotional response in the listener, much like the live event, inspired the development of the SET line of amplifiers through the ultimate expression of this technology. The SET circuit was developed for use as both a cornerstone for a modern audio system and as a reference tool to explore the reasons behind the single-ended triode amplifier's uniquely musical attributes.*

*For more than ten years this effort has continued and the result is a unique line of fine audio amplifiers and preamplifier that are designed to embody the unparalleled musical reproduction of the single-ended triode architecture. Bel Canto Design's goal for the SET/SEP Line is simply to provide the most expressive and powerful musical experience outside of the live event and bring some of the greatest musicians and their performances into the intimacy of your home.*

*The **SEP1** represents the potential of single-ended triode technology when amalgamated with the very newest circuit architectures and parts. The SEP1 is the finest example of our motto "Dedicated to Technical Virtuosity and the Beauty of Music." We hope you enjoy this fine musical instrument for many years to come.*

*Bel Canto Design*

# Design Features

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The SEP1 gain stage is a zero loop-feedback single-ended triode design. This gain stage provides high gain and low noise with very low distortion and low output impedance for load drive. It uses a pair of dual 6DJ8/6922 triodes having long life and ready availability. The output is coupled through a selected Polypropylene film and foil capacitor. **The single-ended nature of the SEP1 with its single gain stage leads to an inverting output for all inputs except the loop through function.** This means that for non-inverting output at your loudspeakers you will need to invert the loudspeaker connections. **Connect the positive (+) power amplifier output to the negative (-) speaker terminal and the negative (-) power amplifier output to the positive (+) speaker terminal to restore correct absolute phase.**

The SEP1 power supply uses a separate current source driven shunt regulator for each channel's gain stage. This supply architecture provides the stability and isolation of battery power without the inconvenience and expense.

Volume control is accomplished with a precision Crystal 3310 stepped analog attenuator adjusted by a microcontroller. This device provides extremely low noise and distortion coupled with high accuracy.

We have found the sonic quality to be better than the best potentiometers or switched attenuators with longer life and no mechanical wear.

The input processing provides two (2) true balanced input connections and two (2) RCA jack connections plus 1 (one) Tape In. The Tape Output is an RCA output with an active audio-grade buffer preamplifier to isolate the internal signal bus from the tape output. The main outputs are a single-ended RCA and a pseudo-balanced connection for use with balanced cables and power amplifier inputs. The pseudo-balanced connections provide much of the advantages of a true balanced output without the added signal processing and extra parts needed to convert the single ended signal to a balanced signal. This additional signal processing and necessary parts would easily compromise the sonic purity inherent in the SEP1 architecture.

The elegant simplicity of the signal path and gain stage allows the **SEP1** to preserve all the audio signal quality.

## Warm Up

The **SEP1's** sonic performance will start to stabilize after approximately forty (40) hours of continuous power up. Complete sonic break-in is achieved after approximately 200-300 hours of play. Break-in can be accomplished by placing your CD player or Tuner or other source to continuously play into your preamplifier; the amplifier must be connecte but does not need to be on to break-in your preamplifier.

# Unpacking

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This box should contain the following parts:

- 1 - **SEP1** User's Guide
- 1 - Power Cable for connection to utility power [1.85m, 6' long]
- 1 - **SEP1** audio preamplifier
- 1 - Remote control & 2 AA batteries
- 1 - Bel Canto Owner's Warranty & Registration Card (If purchased outside the US please contact your dealer/distributor for warranty information.)

Carefully unpack each piece and check for shipping damage. If there is any damage, or if

any piece is missing, please contact your dealer or Bel Canto Design. **Save all packing materials** as the packing is specially designed to protect the preamplifier for shipping or transporting it. If you lose or damage the packing materials and carton, please contact your dealer or distributor before attempting to transport the preamplifier.

***Your preamplifier comes with 2 6DJ8 (6922) triode tubes installed and ready to be used. If you have any questions or concerns about these tubes please refer to your official Bel Canto Design dealer or distributor.***

***The SEP1's power supply is preset for the proper national voltages before you receive it. The power cable should have the correct plug for your local power system. If you believe this is not true, please contact your dealer immediately.***

## Warning

### **Do not connect power to this preamplifier yet!**

***This preamplifier, like any electrical component, can be dangerous and cause injury unless correct handling procedures are observed and used. Before powering this preamplifier it is necessary to read and follow proper procedures concerning its setup and use.***

***Do not open up your SEP1 (do not remove the chassis covers) if the power cord is attached. There are no user serviceable parts except the triode tubes. Any tampering of internal parts will immediately void your warranty and could cause serious injury to you.***

***Complete and mail the Owner's Registration Card immediately in order to activate your warranty.***

# Initial Power-Up

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When the SEP1 is plugged in for the first time you will see the following:

- 1) Standby and Mute LED's will be on.
  - **At this point you may press the standby or mute button on the front panel, or corresponding button on the remote control, to initiate step 2 and bring the SEP1 out of standby mode.**
- 2) Standby LED will turn off, and the mute LED will remain as the only indicator active on the front panel display.
  - **During the next 20 seconds the preamp tube circuit will warm and become stable.**
- 3) 20 seconds after any button is pushed, all functions will become active, the LED volume indicator will show an initial setting of 60, and the input 1 indicator will be on.

In order to insure thermal stability, the SEP1 is designed to receive continuous utility power. **It is neither necessary nor desirable to completely disconnect this preamplifier from the main power. Please use the standby feature to turn off this piece of electronics!**

## Standby Mode

When your preamplifier is put in standby mode all internal circuits remain active with the exception of the high voltage tube supply, tube heaters remain on at a substantially reduced level. This insures that your preamplifier will remain at peak performance at all times. By avoiding constant thermal expansion and contraction this also insures the longest possible life for your audio equipment.

- **You may press mute or standby button to return the preamp to active mode.**

As with initial power up, when the preamp is returned to active mode from standby, 20 seconds will elapse before the tube circuit warms and become stable. After 20 seconds all functions will become active, LED volume indicator will show an initial setting of 60, and the input 1 indicator will be on.

# Front Panel Controls

- **Volume Up**

Increases the output gain in 0.5 dB increments from 0 to 100 with 100 being maximum gain. Unity Gain through the preamplifier is at an indicated level of 84.

- **Volume Down**

Decreases the output gain in 0.5 dB decrements.

- **Balance Left**

Decreases the gain of the right channel in 0.5db increments to a maximum of -6 dB.

- **Balance Right**

Increases the gain of the right channel in 0.5db increments to a maximum of +6 dB.

- **Mute**

The red LED above the mute button will illuminate when the preamplifier is in mute mode. Mute disconnects audio input, and hard mutes the main audio outputs.

- **Inputs**

One of the red LED's on the left side of the display panel will illuminate to show the selected input. The input button allows user to select between the source inputs labeled 1-4 on the back panel of the preamplifier. *Note: #5 is an internal input and is accessible only when the optional internal source is installed.*

- **Tape**

Activates the **input** labeled tape on the back panel of the preamplifier. *Note: the tape output connectors, regardless of the tape button being*

*selected on the front panel, will always output the signal of the main input (button 6) you have selected, **without going through the volume control (output will be full volume.)** Selecting the tape function can be used for a variety of functions:*

a) When the input of a tape deck is connected to the tape output of the preamplifier you may record any selected preamplifier source (CD, LP, Tuner, etc.)

b) Output to an external signal processor; surround sound processor, or equalizer. Proper setup of this loop may differ depending on the processor, refer to the owners manual of your processor for setup instruction.

c) Output to a separate audio system. By connecting the tape out of the preamplifier to any input on a second audio system you can listen to any source you have selected on the preamplifier, on both systems, at the same time.

- **Loop**

Activates the input marked Loop on the back panel of the preamplifier. This input bypasses the volume control and all other internal circuits and allows the loop-input signal to go directly to the preamplifier output. Uses include: pass-through for a CD player or other source with its own volume control and pass-through connection for an external surround sound processor.

- **Standby**

When in standby mode all front panel lights are turned off, except for the standby LED. Most internal circuitry is active but the tube heater voltage is significantly reduced and the high voltage supply turned off. This setup will keep all internal parts at operating temperature while insuring maximum tube life.

# Rear Panel Connections

*\*Though we do not offer any cables ourselves, Bel Canto highly recommends the use of quality interconnect, speaker, and power cables . All cables do sound different due to the inherent electrical properties of the cable design and materials used. Please contact your Bel Canto dealer for an explanation and demonstration of what good cables can do in your system.*

The rear panel provides 5 total source inputs and 3 total source outputs, including RCA and XLR type connections. Beginning from the left side of the rear panel the connections are as follows:

- **XLR Output Jacks for Left and Right Channels**

These outputs go to your power amplifier or active crossover if it has XLR inputs. They use the standard Male XLR pinout pattern of:

- 1 - Gnd
- 2 - Plus Signal
- 3 - Minus Signal

- **RCA Output Jacks for Left and Right Channels**

These RCA outputs can be used instead of, or in addition to, the main XLR outputs to your power amplifier, active crossover, or sub-woofer.

- **Loop Input for Left and Right Channels**

Passes the input signal directly through to the main outputs and bypasses all internal circuitry. Used for sources with internal volume controls. This input bypasses the preamplifier for use with a surround sound processor.

- **Tape Output**

Buffers the signal from the source selected at the front of the preamplifier to drive the input of a separate piece of audio equipment. See explanation

under the **Tape** heading on the Front Panel Controls page.

- **Tape Input**

May be used as an input from any source including the source hooked up to the tape output, see explanation under the **Tape** heading on the Front Panel Connections page. **To use this input you must push the button labeled Tape on the front panel of the preamplifier.**

- **Balanced XLR Inputs #3 & #4**

These inputs come from a balanced signal sources (CD, LP, Digital Converter, etc.) A non-balanced source can be connected to these inputs using a specially constructed cable with an RCA plug on one end and an XLR Male connector on the other end, or RCA to XLR adapters can be used. Contact your retailer, cable supplier or Bel Canto Design for details on this. These female XLR inputs use the standard pinout pattern of:

- 1 - Gnd
- 2 - Plus Signal
- 3 - Minus Signal

- **RCA Inputs #1 & #2**

These inputs can be used only with sources with RCA type outputs and RCA type interconnect cables (CD, LP, TV, VCR, etc.)

## Placement of the SEP1 Within Your System

The **SEP1** may be situated within your system in any convenient manner desired. For easy access to the control buttons the most typical arrangement places the **SEP1** on the top of a rack or shelf unit. It is recommended to use a high quality type stand capable of dissipating or isolating vibration and resonance into or from the floor area, please contact your Bel Canto Dealer for details on isolation systems.

We do not recommend placing weights or other objects directly on the **SEP1**. This may mar or scratch the chassis finish.

## Service

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**Do not attempt internal service of your SEP1. This will immediately void your warranty.**

If service is ever needed, contact your dealer or Bel Canto Design directly.

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# Specifications

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Class of operation • Class A Single-ended Triode

Volume setting for unity gain • 84

RCA Input overload • 5 Volts RMS, 14V peak-peak

XLR Input overload • 10 Volts RMS, 24V peak-peak

Bandwidth Into >20K Ohms • 2 Hz-800 kHz

Signal to Noise Ratio re 1 Volt RMS out • 88 dB A weighted

Distortion at 1 Volts RMS Out • <0.009

% low order harmonic

Input configuration and impedance • RCA-20K Ohm, XLR-35k Ohm

Output Options • 2-XLR Balanced; 2-RCA; 1-buffered RCA Tape Out

Output Impedance • 150 ohms

Maximum Output Level • 20 volts rms

Gain Single-ended • 16 dB inverting

Gain Balanced • 16 dB inverting

Loop Through gain • 0dB non-inverting

Power Requirements • 100-120 VAC 50-60 Hz or 230-240 VAC 50-60 Hz 30VA

Size • 17.5"W x 15"D x 4.25"H (445mm x 381mm x 108mm) • Weight 18lbs. (8.2kg)

