

# bel canto

## e.One™ series



## USER'S GUIDE

# DAC3vB™

Upsampling Audio DAC  
with Ultra-Clock™

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# Important Safety Information

Explanation of symbols used in this manual or on the rear/underside of the apparatus:



This symbol is intended to alert the user to the presence of uninsulated dangerous voltages within the enclosure of sufficient magnitude to cause electric shock.



This symbol is intended to alert the user to the presence of important operation, maintenance and servicing information in the instruction and service manuals.

## CAUTION

- To reduce the risks of electric shock, do not remove the cover.
- No user serviceable parts inside.
- Refer servicing to qualified service personnel.
- Replace the mains fuse in the plug with one of the same type and rating.
- Disconnect supply cord before changing fuse.

## WARNING

To reduce the risks of fire or electric shock, do not open chassis or expose this apparatus to water or moisture.

# Safety Instructions

- Read, keep and follow these instructions.
- Heed all warnings.
- Do not use the apparatus near water, ie near a bathtub, kitchen sink, laundry tub, in a wet basement, near a swimming pool etc.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the Manufacturer's instructions. Site the apparatus so that its location or position does not interfere with its proper ventilation. For example, the apparatus should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings, or placed in a built in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
- Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet; consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and at the point where they exit from the apparatus.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug has been damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Mains plug: Use the mains plug to disconnect the apparatus from the mains supply. The mains plug must be accessible at all times. Use the mains switch (if applicable) when the apparatus is not in use.
- Objects and liquid entry: Do not let objects or liquids fall into the apparatus. Do not expose the apparatus to dripping or splashing. Do not place a vessel containing liquid on top of the apparatus.
- No naked flame sources, such as lighted candles, should be placed on the apparatus.
- The apparatus has been designed for use in moderate and tropical climates

# In The U.K.

## Fuse replacement:

This appliance is fitted with a non-rewireable 10 amp mains plug. The plug contains a 10 amp fuse. If the fuse has blown it can be replaced as follows:

- Pull out the black fuse cover/carrier.
- Remove and dispose of the blown fuse.
- Fit a new 10 amp BS1362 approved fuse into the carrier and push the carrier back into the plug.

Always ensure the fuse cover is fitted. If the fuse cover is missing do not use the plug. Contact your Bel Canto retailer to obtain a replacement fuse cover. Fuses are for fire protection and do not protect against electric shock.



**WARNING: THIS APPLIANCE MUST BE GROUNDED.**

## CE DECLARATION

Bel Canto Design Ltd. declare that this product is in conformance with the Low Voltage Directive 73/23/EEC and Electromagnetic Compatibility 89/336/EEC as amended by 92/31/EEC and 93/68/EEC.

The conformity of the designated product with the provisions of Directive number 73/23/EEC (LVD) is proved by full compliance with the following standards:

EN60065 2002 General requirements

The conformity of the designated product with the provisions of Directive number 89/336/EEC (EMC) is proved by full compliance with the following standards:

EN55013 2001 Conducted emissions  
EN55013 2001 Absorbed emissions  
EN55020 2002 Immunity

The conformity of the designated product with the provisions of Directive number 2005/32/EC ecodesign requirements is proved by full compliance with the 'off mode' setting power of 0.0 Watts.

## FCC NOTICE

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does

cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### Green By Design

All Bel Canto products make use of compact and efficient design principles. Our products use less resources per unit to produce better performance than ever before. Everything from reduced packaging volume, to less weight in transport helps to reduce the overall environmental impact of bringing our products into the market.

**Our products make very efficient use of electricity.** Low energy usage and compact size ensure that the physical and environmental footprints of all Bel Canto products are minimized. Quality and performance play into this approach as all of our products are designed to remain vital and valid performers for many years. Should you want to upgrade to one of our new products, we even offer trade-in value for your old Bel Canto product to ensure that it is recycled in the most efficient and responsible manner.

### RoHS and WEEE

All of our current products are designed and produced to RoHS standards, ensuring that dangerous materials do not enter the waste stream. Lead free electronics assemblies and environmentally safe finishing and production methods are utilized to ensure that our products and processes are environmentally safe.

### Bel Canto Recycles

Bel Canto has always been a forward thinking company. In the same way that we are focused on the development of high-end audio products, we are also conscious of what we leave behind. For many years we have implemented environmentally sound measures to make the most efficient use of resources and keep our impact at a minimum.

We reuse or recycle more than 99% of the packing materials for our incoming parts shipments. Each year we divert massive amounts of cardboard, paper, plastic film, and Styrofoam from landfills. Our plastic and Styrofoam is delivered directly to local facilities that process it on site for use in their manufacturing. Steel, aluminum, and other metal waste products are delivered to local metal scrap yards for recycling back into the production stream.

We also participate in Waste Management's e-Cycling program. All electronic waste is processed in the US, with hazardous material being separated from non-hazardous, at ISO 9001 and ISO 14001 certified regional processing centers.

Our commitment to responsible production processes ensures that the absolute minimum of material used in the making of our products enters the waste stream.

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## Warranty Information

Bel Canto products are automatically covered by a 90 day factory warranty that covers all internal parts and labor. Register online ([http://www.belcantodesign.com/Belcanto\\_Warranty.html](http://www.belcantodesign.com/Belcanto_Warranty.html)) within 30 days of purchase from an authorized dealer to automatically extend your warranty for 2 years starting from the date of purchase. If you do not have web access, please contact your dealer for assistance. Upon fully completing registration, within 5 business days you will receive an email that officially validates your warranty. Your information will be used for internal use only and will not be sold or released outside Bel Canto. Your comments and suggestions are appreciated and help us continually improve our products and services.

The warranty is only valid to the original owner and is non-transferable. Damage caused by unauthorized modification, abuse, or neglect of product will void your warranty. Any cost associated with return of product is the sole responsibility of the owner. All returns require a return authorization number issued after completing the RMA form in the support section of our website. If you have any questions, please feel free to contact us online at [info@belcantodesign.com](mailto:info@belcantodesign.com).

## Unpacking Your DAC3vB

DAC3vB packaging contains the following:

- 1 (one) – DAC3vB
- 1 (one) – DAC3vB User's Guide
- 1 (one) – VB Interconnect Power Cable
- 1 (one) – Remote Control

Carefully unpack each piece and check for shipping damage. If there is any damage, or if anything is missing, please contact your dealer, distributor or Bel Canto Design.

**IMPORTANT:** Save all packing materials as they are specially designed to protect the unit during transportation or shipping. If the packing becomes lost or damaged, please contact your dealer, distributor or Bel Canto before attempting to transport your unit.

## Power Connection

The power supply on the DAC3vB is preset for the proper power voltage. The power cable should have the correct plug for your local power system. If you believe this to not be true, please contact your dealer immediately.

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



### **WARNING!**

Do not connect power to this product yet!

# Setup & Placement

Because the DAC3VB runs cool, it can be placed in many system locations without compromise. We do not recommend placing weights or other objects directly on the DAC3VB. This may scratch or mar the chassis finish. Do not use harsh chemicals when cleaning the outside of your DAC3VB.

Single Ended RCA and Balanced XLR connectors are available. XLR jacks allow balanced hookup using the standard North American pin configuration:

Pin 1 Ground  
Pin 2 Signal +  
Pin 3 Signal -



## IMPORTANT!

Make all connections before powering your unit!

# Design Features

The Bel Canto DAC3VB represents a powerful statement in high performance audio data converters. Its superb audio performance and transparency renders it the modern standard in DAC design:

- Ultra-Clock™ master reference clock provides superb dynamics, spatial resolution and accuracy of timbre
- 125dB dynamic range ensures uncompromised audio quality
- 5 digital inputs including AES, SPDIF-BNC, SPDIF-RCA, USB and TOSLINK
- 4-layer PC board design for superior signal routing, grounding and power supply routing
- Latest generation of low-noise, low-distortion, high speed, class A biased, fully balanced audio circuits provide superb measured and subjective audio quality
- Multi-stage power supplies for precise power to the sensitive analog and digital circuitry
- Independent analog and digital power transformers and power supplies for optimum isolation and system grounding
- Digital level control with 4.5Vrms balanced outputs for driving a power amp directly, providing the greatest system transparency and dynamic performance
- Single-knob user interface provides simple, intuitive control function
- Dual stage de-jitter architecture ensures optimum jitter performance
- 24/192 DAC operation and slow roll-off analog and digital filters for optimum phase performance, enhanced spatial imaging and natural harmonic structure
- Select audio-grade passive components throughout analog current conversion, filtering and fully balanced output buffer section for best sonic performance
- Full galvanic isolation on all digital inputs for optimum rejection of ground and common mode noise

# Single Knob Control Functions & Display

## Upon Power Up:

When switched on, the DAC3vB will display its software revision. The AES input will be selected and Soft Mute will be active. The volume will be set to 65 even if the fixed/variable button is in Fixed mode.

## Front Panel Control Knob:

The control knob is a continuously rotating control with a push-switch function.

## Variable Output Mode:

The DAC3vB Variable Output operating mode, selected from the rear panel Fixed/Variable output switch, allows you to change volume level by rotating the knob. The volume down function (counter-clockwise rotation) is very rapid and allows quick changes in the volume level. Volume up (clockwise rotation) functions rapidly up to a displayed volume level of 65.0. Note that there is a pause at 65.0 and then the volume up function continues more slowly. This operation makes it difficult to accidentally set a volume level that is too high.

## Input Selection Mode:

Pressing the control knob in briefly will toggle into the input selection mode. The selected input will be displayed for 5 seconds. During this time you can rotate the control knob to scroll to the desired input. Pressing the knob again will select the indicated input. The volume level will automatically ramp down and up during this selection process. If the control knob is not pressed for 5 seconds, the indicated input will automatically be selected and the DAC3vB will return to the default volume control mode. Inputs are indicated as: AES, SP1 (SPDIF1), SP2 (SPDIF2), OPT (TOSLINK), and USB.

## Fixed Output Operating Mode:

Pressing the rear panel Fixed/Variable Output switch to the IN position will set the DAC3vB in a fixed output operating mode. This mode is used when driving an analog preamp or integrated amplifier input. The volume control function is then provided by the associated preamplifier or integrated amplifier.

To use the Fixed Output mode, first set the switch to the Variable (OUT) position. Set the output level to 100.0 for a 2.25Vrms maximum level from the RCA outputs or 4.5Vrms level for the Balanced XLR outputs. A lower level can be set if desired. After the level is set, push the button back into the Fixed (IN) position. The front panel display will now show the selected input. Rotating the knob will scroll to different inputs and the Volume and Mute functions on the remote will not function.

## Front Panel Digital Lock Indicator:

When no digital input signal is present on an input the first decimal point on the display will blink on and off. For example the display will show: 65.0 and the first decimal point will be slowly blinking. If this occurs, check that the correct input is selected and then check that the digital source is connected, active and functioning correctly.

## CONDITIONING

The sonic performance of the DAC3vB will begin to stabilize after 100 hours of continuous power up.



# Remote Control

The DAC3vB Remote Control has a comprehensive set of control features that are not available on the front panel.

To access **all DAC3vB control features** press the button marked **DAC** on the remote control. The Main CD controls will still operate in the DAC, PRE and Tuner modes.

**Display:** Toggles through several display options.

1. Normal mode with Level Displayed
2. Input Sample Rate Displayed for several seconds, example 44.1 or 96 or LOS indicating Loss of Signal or no digital input detected.
3. Display Off: Display comes on for several seconds whenever a status change is detected

**Mute:** When in variable output mode this will switch the analog outputs from Soft to Hard Mute and Un-muted modes. Soft mute is indicated by two decimal points in the far right of the display. Hard mute is indicated by 4 decimals on the display.

**VOL+:** Increases the volume setting in Variable Output mode. This will Punch Through to any Bel Canto unit in Variable Output mode. The display will show the volume level while changing.

**VOL-:** Decreases the volume setting in Variable Output mode. This will Punch Through to any Bel Canto unit in Variable Output mode. The display will show the volume level while changing.

**CH/SCAN+:** This will toggle the input selection up in number and wrap around. Note that the first press of this control will show the active input selection.

**CH/SCAN-:** This will toggle the input selection down in number and wrap around. Note that the first press of this control will show the active input selection.

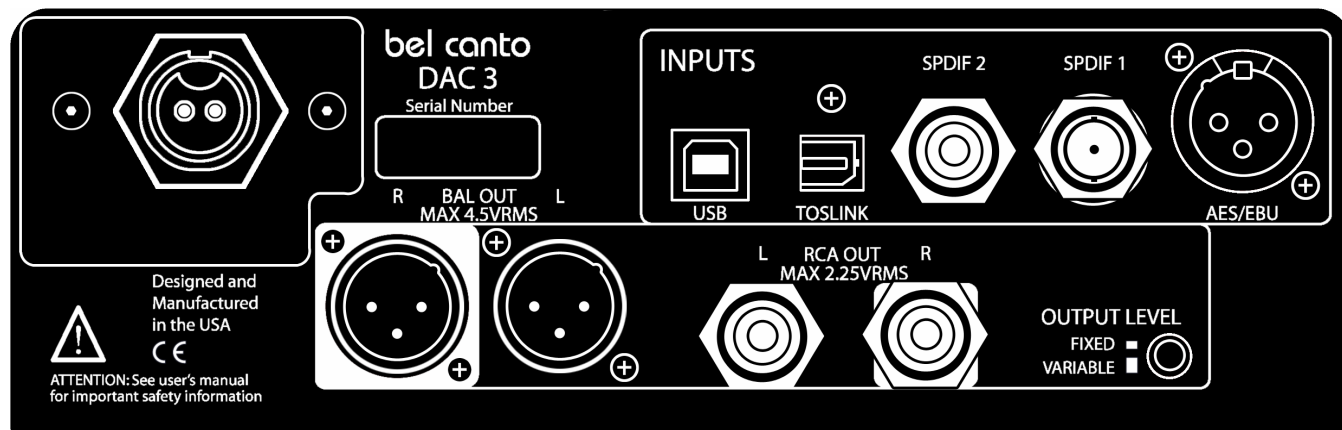
**Number Buttons:** Use for direct input selection.

1: AES 2: SPDIF1 3: SPDIF2 4: TOSLINK 5: USB





## Rear Panel Connections



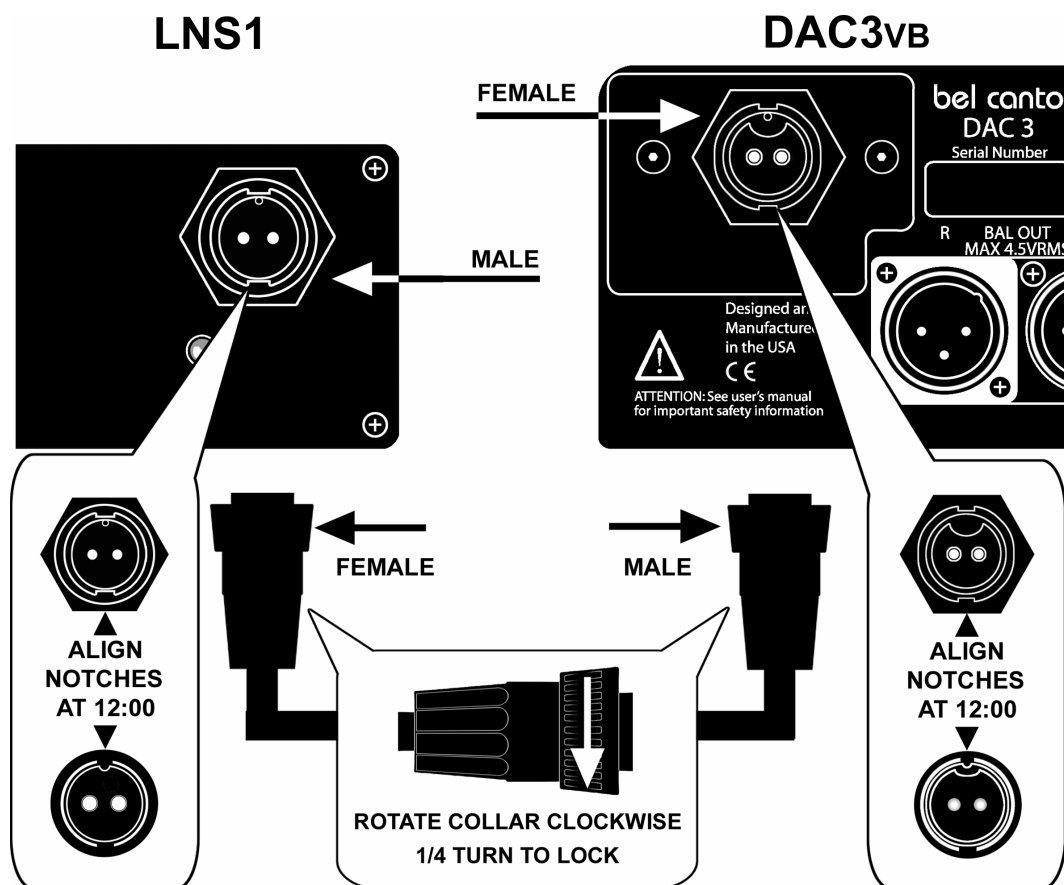
**IMPORTANT:** If using the DAC3vB directly into a power amplifier, ensure that the Fixed/Variable Output button is in the OUT (variable) position. Operation in Fixed Mode directly into the amplifier could cause extreme output levels, clipping and damage to the loudspeakers, amplifiers or your ears!

Beginning in the upper left:

- VB Power interconnect jack to interface with either the VBS1 or LNS1 power supplies
- USB Input can be connected to a computer for playback of any audio format up to a 16/48 data rate. The system will automatically recognize the DAC3vB as an audio converter when using Windows 98 or later and any version of Macintosh OSX
- TOSLINK Input accepts any standard plastic or glass fiber optical TOSLINK cable and operates to 24/192 data rate
- SPDIF1 and SPDIF2 accept BNC or RCA connections from any 75 ohm SPDIF source and operates up to and including a 24/192 data rate
- AES/EBU Input accepts any AES/EBU standard 110 ohm digital source and operates up to at least a 24/192 data rate
- XLR 4.5Vrms or RCA 2.25Vrms outputs are used for directly driving a power amplifier in Variable Output Mode or a preamplifier input when in Fixed Output Mode
- Output Level Button selects Fixed or Variable Output Mode

When all connections to and from the unit have been made then double check everything before plugging the DAC3vB into the power source. After turning on, the DAC3vB will go through its display check and show the software revision number. The unit will be in Soft Mute with the AES input selected. The volume will be set to 65 even if the fixed/variable button is in Fixed mode

# Connecting The LNS1



- The DAC3vB must be powered by either the VBS1 or the LNS1. If using the VBS1, please refer to the VBS1 User's Guide for connectivity. If using the LNS1, please read the following:
- The LNS1 is designed to power Bel Canto VB equipped products only. Use of any cable other than the supplied power interconnect may damage either the LNS1 or VB equipped unit and will void any warranty. Certain non-VB equipped Bel Canto units can be factory upgraded. To begin the upgrade process, fill out the RMA form in the Support Section of our website.
- When connecting your VB unit to the LNS1, be careful to observe the alignment notches on both units power receptacles and the power interconnect cable.
- When inserting the power interconnect cable, align the notch on the cable end and the alignment teeth on the outer sleeve to the 12 o'clock position. This will allow the interconnect cable to fully seat and ensure that the plug mates correctly with the power receptacle.
- Once the power interconnect cable is fully seated in the receptacle, lock in the power interconnect cable by turning the outer sleeve clockwise one quarter turn. Proper seating of the LNS1 cable will ensure safe and secure operation of the LNS1 and all connected components.
- The LNS1 has been designed to run on non-regulated, non-filtered AC Mains. Usage of any additional isolation or filtration from the AC Mains supply may compromise LNS1 performance.

# Tips For Operation

## Output Connections

We strongly recommend that you use the Balanced XLR output to drive your e.One amplifier. Because of the DC coupled nature of the DAC3vB there is a small residual DC offset on the outputs. This is typically less than 10mV (0.01 Volts) and will be compatible with any Bel Canto amplifier or any vacuum tube or solid state amplifier with AC coupling or DC servo control. If using a Bel Canto preamp there will be no small click or pop when selecting the input. Other preamplifiers that do not ramp the volume up or down may produce a small click when selecting the DAC3vB input.

## Power Up

**We recommend leaving the DAC3vB powered at all times** as the sonic quality is best after several hundred hours of play.

## Connection to a Computer

The USB port can be used for up to 16/48 data. For connection at 24/192 or higher data rates, we recommend using a quality sound card with SPDIF, AES/EBU or glass TOSLINK connection. For more details on optimizing computer audio sources please refer to our on-line guide at: [www.belcantodesign.com](http://www.belcantodesign.com)

## What to do if there is hum or ground noise

The design of the DAC3 greatly reduces the chance for ground loop induced hum and noise. We recommend using the balanced outputs for best performance-the balanced outputs can drive long lines to 10 meter length.

Connect all power cables of the audio system to a common outlet box or power conditioner unit. Having the audio system components share a common ground will greatly reduce the possibility for ground current noise being introduced into the audio signal path.

## Volume Control Punch Through

The Volume Up, Down and Mute functions on the remote control will affect any Bel Canto unit in Variable Output mode regardless of whether PRE, DAC, CD or TUNER is selected. It is recommended that only the device with volume control closest to the power amps be in Variable Output mode. Any other devices that are capable of volume control should be in Fixed Volume mode.

# Specifications

## Digital Section:

16/32 to 24/192 Inputs:	AES 110ohm XLR, SPDIF 75ohm BNC and RCA, TOSLINK
16/32 to 16/48 Input:	USB
All inputs are galvanically isolated from the internal circuit and chassis grounds.	
Master Clock jitter:	2 picoseconds RMS, 25 picoseconds Peak-Peak

## Analog Section:

Maximum Output:	4.5Vrms balanced XLR, 2.25Vrms RCA
Output Impedance:	200 ohms balanced XLR, 500 ohms RCA
Frequency Response:	20Hz-20kHz, +/- 0.5dB
THD+N:	0.0015%, 4.5Vrms balanced Out, 1KHz
IMD (CCIF):	0.0005%, 19:20KHz
Output Noise:	3uVrms A-weighted 20Hz-20KHz
Dynamic Range:	125 dB A-weighted 20Hz-20KHz

## General:

Idle power draw:	15 Watts
Power Requirements:	120 VAC 50-60 Hz or 220-240 VAC 50-60 Hz
Dimensions:	8.5" W x 12.5" D x 3" H (216 mm x 318 mm x 75 mm)
Weight:	14lbs. (6.5 kg)

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