

User's Guide

bel canto



# CD-2<sup>TM</sup>

## e.One<sup>TM</sup> Series

CD Transport/Player

Bel Canto Design, LTD.  
221 North First Street  
Minneapolis, MN 55401  
Phone: (612) 317.4550  
Fax: (612) 359.9358  
[www.belcantodesign.com](http://www.belcantodesign.com)  
[Info@belcantodesign.com](mailto:Info@belcantodesign.com)  
©2007 Bel Canto Design, LTD

Thank you for purchasing the Bel Canto Design CD-2. Your CD-2 sets a benchmark for design, quality and sonic performance, continuing Bel Canto's heritage of musicality and realism.

# CD-2

## CD Transport/Player

### TABLE OF CONTENTS

Warranty .....	3
Unpacking .....	4
Power Connection .....	4
Initial Setup and Placement .....	5
Design Features and Conditioning .....	5
Front Panel Control Operation .....	6 - 7
Remote Control Operation .....	8 - 9
Remote Control .....	10
Operation as Digital Transport .....	11
Operation as CD Player .....	11
Changing Sample Rate .....	12
Operation Notes .....	13
Rear Panel/Front Panel .....	14
Specifications .....	15

## Warranty Information

Please take a moment to fill out your warranty registration sheet. Returning this registration validates your warranty. This information will not be sold or released outside Bel Canto. Your comments and suggestions help us continue to improve upon our products and services.

Bel Canto products are automatically covered by a 90 day factory warranty. With no additional cost, you have the option to extend your warranty by completing and returning the enclosed warranty registration form within 30 days of purchase, along with a copy of the original sales receipt from an authorized Bel Canto dealer. This will ensure prompt warranty coverage. This warranty is only valid to the original

owner who has returned the warranty sheet along with a copy of the original sales receipt, covering all internal parts and workmanship. This warranty is void if damage is due to abuse, neglect, or unauthorized modification. The cost associated with the return of this unit is the sole responsibility of the owner.

Bel Canto products are uniquely identified with a serial number on the back panel of each unit. This number is required to validate your warranty. Please reference the serial number if service is required. If you have any questions, comments, or if we can be of service, please contact us Monday through Friday 9:00 a.m. - 5:00 p.m. CT/USA.

## Unpacking your CD-2

CD-2 box contents include the following:

- 1 (one) - CD-2 CD player
- 1 (one) - Magnetic Puck
- 1 (one) - BNC to RCA Adapter for the SPDIF output
- 1 (one) - CD-2 User's Guide and Warranty Sheet
- 1 (one) - 12V Universal Power Supply and Power cord
- 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.

**Never Pack the CD-2 with the Magnetic Puck on the Turntable.**



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

## Power Connection

The power supply for the CD-2 is a universal supply. 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.



### Warning!

Do not connect power to this cd player yet!

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

## Placement and Initial Setup

Because the CD-2 runs cool it can be placed in many system locations without compromise. We do not recommend placing weights or other objects directly on the CD-2. This may mar or scratch the chassis finish. Do not use harsh chemicals when cleaning the outside of your CD-2.

Placement on top of your audio furniture or on a shelf with at least 6 inches of clearance above the CD-2 will insure that you can access the top loading CD transport mechanism. Placement in a relatively sheltered environment will insure that the CD-2 can operate unimpeded by dust or animals.



**IMPORTANT:** Make all connections and settings before powering your unit.

## Design Features

The Bel Canto CD-2 is designed to recover the digital audio data from a CD error-free and with extremely low jitter

- Ultra-Clock™ architecture recovers the data with minimal clock jitter
- CD-PRO2 top load mechanism for quality and longevity
- 24/96 upsampling maximizes dynamic range potential from inboard and outboard DACs
- 4-layer PC board design for superior signal routing, grounding and power supply routing
- Outboard regulated power supply provides firm foundation for multiple local regulators
- Multi-stage power supplies for precise power to the sensitive analog circuitry

- 24/192 integrated DAC with 112dB of dynamic range
- Ultra low noise second stage independent regulation for the analog sections
- High speed isolation transformers on AES and SPDIF digital outputs for optimum interface to outboard DAC
- Selectable Fixed or Variable analog outputs can drive amplifier directly
- 4Vrms Balanced and 2Vrms single ended analog outputs
- Single front panel control for simple operation
- Comprehensive drive functions available from full-system remote control
- Ultra-efficient *Green Technology* design with 3W standby and 5W operating power dissipation

## Conditioning

The CD-2's sonic performance will start to stabilize after 100 hours of continuous power up. For optimum per-

formance keep the CD-2 powered up at all times.

### **DO NOT ATTEMPT to OPERATE the CD-2 WITHOUT a CD in PLACE**

If you attempt to take the CD-2 out of standby when no CD is present it will go back into standby. The CD Laser is inactive whenever the CD-2 is in Stop or Standby mode. The Laser will not operate without a CD and the Magnetic Puck on the turntable. You can ONLY take the CD-2 output of Standby with a CD in place on the unit and the Magnetic Puck on the CD.

### **NEVER REMOVE the CD-2 MAGNETIC PUCK while the CD is SPINNING**

**NEVER PRESS DOWN on the CD-2 turntable as this will damage the turntable mechanism.**

**NEVER DROP the MAGNETIC PUCK or ANY OTHER OBJECT on the TURNTABLE**

**NEVER PACK or SHIP the CD-2 with the MAGNETIC PUCK on the TURNTABLE**

Undo pressure or shock to the turntable will damage the mechanism. Repair of the mechanism for this damage is not covered under the CD-2 warranty.

Also, **NEVER TOUCH the LENS of the CD MECHANISM** or clean it with anything other than specific cloth

designed for cleaning Optical Disc player lenses. You can use a small puff of clean air to remove minor dust buildup or just play a CD and the motion of the CD should keep the lens clear of dust. If you are concerned about dust buildup in your environment you can leave a blank CD in place to cover the mechanism when not using the CD-2.

### **REPAIR of the CD-2 MECHANISM DUE to MISHANDLING is NOT COVERED by the CD-2 WARRANTY**

Following these guidelines will result in many years of reliable operation. The CD-2 mechanism is a professional grade device and is inherently a high reliability device.

**Note that there are no user serviceable parts inside the CD-2 chassis.**

Opening the chassis will void the warranty.

**There are no fuses inside the CD-2.**

Use only with the supplied power supply. Use with a different supply will void the warranty.

If you have a problem with the operation of your CD-2 contact Bel Canto Design or your dealer/distributor for service.

### CD-2 Operating Mode Display:

Several Operating Modes are displayed using the left-most 7-segment display:

Two Vertical Lines Indicate Pause, a Square indicates Stop, a Blinking Segmented Square indicates Play.

Standby is indicated by two dashes - -

### CD-2 in Fixed Output Mode (Fixed/Variable IN):

Upon application of power the CD-2 goes through a display check and comes up in Standby, indicated by two dashes on the display - -.

Place a CD on the CD-2 and then place the magnetic puck on the CD. It will automatically center and clamp itself in place.

Press the center of the front panel control for 2-3 seconds, you will then see the firmware revision displayed for a couple of seconds and the CD will spin while 4 dashes are displayed. Once the CD Table Of Contents is read the display will indicate the total CD time and the number of tracks.

A 01 display indicating track 1 with 2 vertical dashes || in the left hand mode indicator display will indicate that the CD-2 is in Pause mode and is ready to play the CD.

Initiate **Play** by pressing the front panel control once. Scan to a new track by

rotating the control. This works while in Pause, Play or Stop modes.

To **Pause** while playing press the control once.

To **Stop** at any time press the control twice. The CD-2 will remain on the current track on re-start the track when Play is started.

A center press on the control will be acknowledged by the display brightening momentarily.

When in Play mode the mode indicator shows a square with sequenced blinking segments.

Stop is indicated by a stationary square. The CD will be stopped. In Play and Pause modes the CD will continue to rotate.

### CD-2 in Variable Output Mode (Fixed/Variable OUT):

Operation will be the same as above except that rotating the front panel control while in Stop or Play mode will indicate the volume level and then change the volume up or down as the control is rotated.

Rotating the control in Pause mode will change the track number to be played. The volume display will stay lit for several seconds and then the display will go back to the mode indicator/track number display.

## CD-2 Remote Control Operation

The CD-2 Remote Control has a comprehensive set of control features that are not available on the front panel control.

To access **all CD-2 control features** press the button marked **CD** on the remote control. e. One Dac or Preamp functions can be controlled by selecting DAC or PRE on the remote. The Main CD controls will still operate in the DAC and PRE modes.

**Standby:** Toggles the CD-2 into and out of Standby.

**Display:** Toggles the Display on and off. When in Off mode the Display will come on momentarily when changing the CD-2 operation.

**Mute:** When in variable output mode this will toggle 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 . . and Hard mute is indicated by 4 decimals on the display . . . .

**Pause ||:** This toggles the Pause mode on and off. The Mode Indicator will show the pause or play mode as appropriate.

**Stop:** The solid square indicates Stop and will place the CD-2 in Stop mode

when pressed. The CD-2 will remain on the current track and re-start the track when Play is pressed.

**PLAY>:** This button initiates playback of the track that is displayed.

**VOL>:** This increases the volume setting in Variable Output mode. It has no function in Fixed Output Mode. The display will show the volume level while changing.

**<VOL:** This decreases the volume setting in Variable Output mode. It has no function in Fixed Output Mode. The display will show the volume level while changing.

**| <<:** Track Decrement to reduce the track number for playback.

**>> |:** Track Increment to increase the track number for playback.

**<<:** To slow playback speed in real time. Pressing twice will reduce speed further, press Play to resume normal playback.

**>>:** To increase playback speed in real time. Pressing twice will increase speed further, press Play to resume normal playback.

**Rpt1:** This will allow repeated playback of the current track while in play mode. The Mode Indicator changes from the bottom left corner to the top left corner to indicate this mode. Press Rpt1 to turn the repeat mode off. Stopping playback will also turn the repeat mode off.

**Rpt All:** This will allow repeated playback of the entire CD while in play mode. The Mode Indicator changes from the bottom left corner to a full height Mode Indicator to indicate this mode. Press Rpt All to turn the repeat mode off. Stopping playback will also turn the repeat mode off.

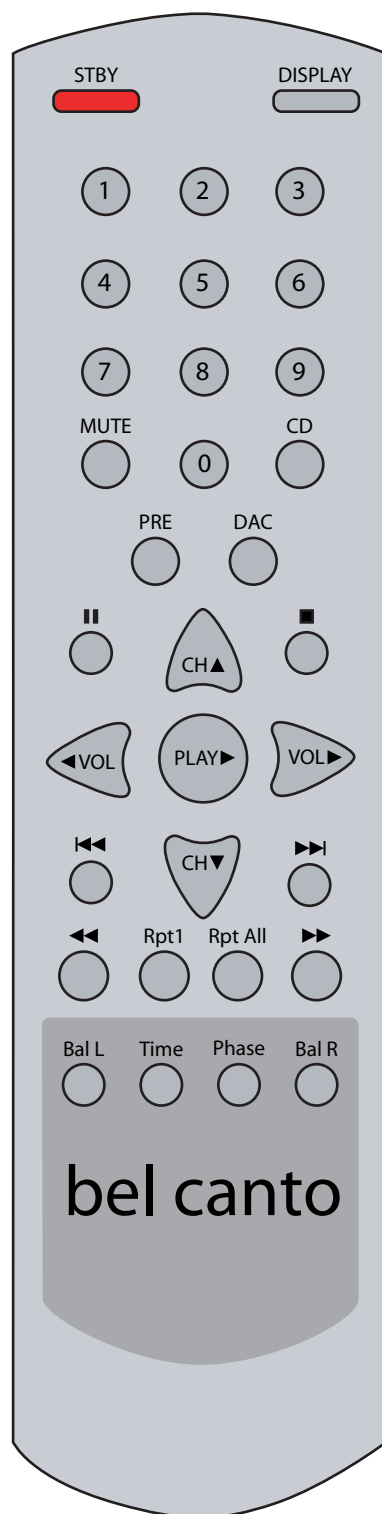
**TIME:** This allows placing the Display in a mode that shows the track time played while the CD is playing or Paused. Pressing the TIME button will change the Display back to standard mode.

**Number Buttons:** The 1-9 and 0 buttons can be used to randomly select any track number for playback. Track 10 and above are directly selected by keying in the number. If you try to select a track beyond the number of tracks on the CD no action will result and the current track will continue playing.

No other remote buttons are active for use with the CD-2.



## CD-2 Remote Control



## CD-2 Operation as Digital Transport

The CD-2 produces a low jitter 24/96 data-stream from any of the 3 digital outputs. 110 ohm AES/EBU balanced, 75 ohm BNC SPDIF or the high speed TOSLINK output can be used as required. Any or all of the outputs can be connected to any digital playback device.

While using the CD-2 as a Digital Source you can disable the analog output section by selecting Variable Output,

scrolling the Volume control level to 0.0 then pressing the Fixed/Variable button IN to the Fixed position.

Note that if your external DAC does not accept 96kHz data then you can set the sample rate to 48kHz. See page 12 for further information.

A BNC to RCA female adapter is included for use with RCA terminated cables on the SPDIF digital output.

## CD-2 Operation as CD Player

The high dynamic range analog outputs of the CD-2 can be used to drive an amplifier directly. This is best achieved by using the 4Vrms balanced outputs directly into the balanced inputs of your power amplifier.

Place the Fixed/Variable button in the OUT position. You can then control the volume level of your CD playback through the volume control of the CD-2. The RCA outputs can also be used directly into the RCA jack of an amplifier with 6 dB lower output level.

For use into an analog preamplifier scroll the volume level to 100.0 and press the Fixed/Variable button to the IN position and use the volume control on the analog preamplifier to control system level.

Note that if you are only using the analog outputs on the CD-2 you may want to try setting the sample rate to 192kHz for optimum sound quality. See page 12 for further information.

The default 96kHz sample rate setting can be modified by using the remote control. While the 96kHz sample rate is optimum for many applications there are several conditions which may benefit from either the lower 48kHz or higher 192kHz settings.

1) If using the CD-2 with an external DAC that will not accept the 96kHz sample rate then set the CD-2 sample rate to 48kHz.

2) If using the CD-2 analog outputs then you can optimize the sonic performance of the internal DAC by operating the CD-2 at the higher 192kHz sample rate.

**The digital outputs are disabled when the 192 rate is chosen.**

3) If using the CD-2 as the transport for driving a Bel Canto Dac3 we recommend that you leave the sample rate setting at the factory 96kHz setting.

Note that in all Sample Rate settings the bit depth for the CD-2 output is 24 bits.

### Changing the Sample Rate setting:

- 1) Put the CD-2 in Standby
- 2) With the remote in the CD mode press the lower 4 buttons in sequence (Bal L, TIME, PHASE, Bal R)
- 3) The display will show the current sample rate setting (96 is the factory setting)
- 4) Use the CH up and CH down arrow buttons to scroll to a different setting (48-96 or 192)
- 5) Either press the Standby button to save the setting and take the CD-2 out of standby or wait for the display to time out and take the CD-2 out of standby.

The CD-2 will now be operating at the chosen sample rate.

**The 192kHz setting is used only when using the CD-2 analog outputs.**

The precision machined and polished turntable axis is designed to center the magnetic puck for stable rotation, minimizing a potential source of low frequency jitter. This axis is polished to prevent scratching of the CD surface because of contact with the axis when placing or removing a CD from the turntable.

You can store the magnetic puck either on the top surface of the CD-2 top cover or on the turntable axis when not playing a CD.

You could use a blank CD-rom as a cover over the CD mechanism when not using the CD-2.

Because of the comprehensive de-jitter circuitry in the CD-2 we have found that the CD-2 is not sensitive to ambient light. The low level jitter of the audio output

data stream is primarily dependent on the Ultra-Clock jitter specification.

There will be low level pops on the analog outputs when disconnecting or reconnecting the external power supply. The CD-2 incorporates a hard mute circuit to minimize these pops but there is some residual level. To avoid any pops mute the preamplifier or power down the amplifier that the CD-2 is connected to whenever attaching or disconnecting the power supply for the CD-2.

Note that mechanical noises from the CD-2 linear tracking mechanism are normal when changing tracks and that there is a very low level motor noise while playing the CD. The CD rotating speed also will change as the CD plays to the outside tracks. The CD rotation slows on the higher numbered tracks.

## CD-2 Front and Back Panel



## CD-2 Specifications

Disc Compatibility . . . . . CD-DA (Red Book IEC908), CD-R and CD-RW discs

### Digital Outputs

Maximum Data Rate/Bit Depth . . . . . 96Khz/24bit

Digital Output types . . . . . AES/EBU XLR, SPDIF BNC, TOSLINK

AES/EBU Digital Output Level . . . . . 2.7V p-p

PDIF Digital Output Level . . . . . 1.2V p-p

All Digital outputs are galvanically isolated

### Analog DAC Outputs

Data Rate/Bit Depth . . . . . 96Khz/24bit

Output Levels . . . . . Single Ended RCA 2Vrms, Balanced XLR 4Vrms

Dynamic Range . . . . . 112dB A-Weighted

THD+N: . . . . . <0.002%

Output Impedance . . . . . RCA 100ohms, XLR 200 ohms

Frequency Response . . . . . 20Hz-20Khz +/-0.1 dB

### Ultra-Clock

Accuracy . . . . . 0.0001%

Jitter . . . . . 1pS rms

### Features

Slow roll-off linear phase digital filter

Fixed or adjustable analog output

External regulated power supply

CD-Pro2LF mechanism

Idle power draw . . . . . 5 Watts

Power Requirements . . . . . 120 VAC 50-60 Hz or 220-240 VAC 50-60 Hz

Dimensions . . . . . 8.5" W x 12.5" D x 4.5" H (216 mm x 318 mm x 115 mm)

Weight . . . . . 18lbs. (8.2 kg)

Bel Canto Design, LTD.  
221 North First Street  
Minneapolis, MN 55401  
Phone: (612) 317.4550  
Fax: (612) 359.9358  
[www.belcantodesign.com](http://www.belcantodesign.com)  
[Info@belcantodesign.com](mailto:Info@belcantodesign.com)  
© 2007 Bel Canto Design, LTD  
CD-2™ is a trademark of Bel Canto Design, LTD