



REFERENCE

**DIGITAL TO ANALOG CONVERTER**

Serial Number \_\_\_\_\_

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## **INTRODUCTION**

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Congratulations on choosing the Cello Reference Digital to Analog Converter (DAC.) Your unit has been individually handmade from the finest parts and materials. The DAC utilizes proprietary Cello circuitry that represents true state-of-the-art in audio electronics and is designed to perform to specifications for decades of musical enjoyment. We want your Reference DAC to provide you with complete satisfaction. Please read this manual carefully and care for your Reference DAC so that it will retain its value, beauty and performance. If you have any questions, contact your authorized Cello Designer or call the factory. It is our wish to assist you in any way possible to facilitate your musical enjoyment.

### **Product Concept and Description**

The Reference DAC was developed by Cello in cooperation with Apogee Electronics. It is a fully-featured, 20 bit, high resolution D/A converter offering users the finest quality reproduction from a full range of digital source material. The Reference DAC has been engineered to meet the requirements of the most demanding professional user as well as those of the residential music lover or film devotee. It consists of the finest digital electronics and the Apogee Electronics patented UV22 Super CD Encoding system combined with Cello's analog excellence. It is the recommended component for all systems utilizing digital source material.

Fundamental to the design of the Cello Reference DAC is our recognition that both digital and analog excellence are required to create a digital audio converter capable of delivering the highest performance, lack of coloration, and faithfulness to the highest quality digital input signals.

### **| Compatibility**

The Reference DAC is virtually compatible with all high quality digital sources and preamplifiers from other manufacturers. In fact, Cello engineers designed the Reference DAC specifically to be compatible with a wide variety of available equipment.

## INTRODUCTION

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### **Unpacking**

The packing boxes for the Reference DAC should arrive in good condition. Please inspect for damage to the carton, although this is most unlikely due to the strength of the carton construction. Open packing carefully and save all foam pieces and boxes for reuse in the event that the unit must be shipped in the future. Should the boxes become lost, please contact the factory for replacement cartons.

Each carton should contain:

- 1 Reference DAC
- 1 AC Line Cord
- 1 Warranty Card
- 1 Owner's Manual

### **Installation**

Be certain that the Reference DAC is installed so that it has proper ventilation. Room air temperature should not exceed 122 degrees F. (50 degrees C.).

1. Connect the left and right analog cables to the appropriate outputs on the rear panel and to your preamplifier, integrated amplifier or receiver.
2. Connect the digital cable to either AES/EBU or the coax connector on the rear panel and to your digital source equipment.
3. Connect the AC line cord to the rear panel and to your power outlet or power strip.
4. Select the front panel POWER selector switch to ON.
5. Your Reference DAC should now be functioning. If multiple inputs are connected, check to see if they all function.

### **Cable and Connector Selection**

The Reference DAC is connected by AC line cord to your power source and by interconnect cables to your digital source and your preamplifier.

Connection can be made from the digital source (s) - CD, Video Player and/or DAT - by cable with either unbalanced coax or balanced AES/EBU connections.

Connection to your preamplifier is recommended to be made using CELLO STRING 1 cable with either unbalanced RCA connectors or balanced Fischer connectors.

## **Operation**

### *A. INPUT*

The Reference DAC has six digital inputs (four AES/EBU inputs on gold plated XLR connectors and two S/PDIF inputs on gold plated RCA connectors) with built-in automatic digital selection. The lowest number input with a signal present is automatically selected by the Reference DAC on power up. If signal disappears from the selected input, the unit will search for the next highest-numbered input which has a signal present (looping around if input 6 is reached without signal acquisition). In addition, an input can be selected manually by push-button.

Illuminated indicators above each input selection button indicate the presence of signal and a legend indicates the input number, which illuminates when selected.

Three input sampling rates are provided: 32, 44.1 and 48 kHz. The sample rate is selected automatically. An illuminated legend indicates the current sample rate.

As most digital signal sources presently provide only 16-bit precision, a resolution indicator is provided which automatically displays "16" for 16-bit signals and "high" for signals with higher precision.

### *B. OUTPUT*

Three different analog outputs are provided which may be used simultaneously - one gold plated set each of balanced Fischer, balanced XLR and unbalanced RCA.

*C. SELECTION SWITCHES (from left to right)*

ON/OFF	Provides power to unit; automatically selects sampling rate (usually 44.1 for CD players), resolution rate (high is selected for all material over 16 bits).
Inputs 1 -6	Allows for the manual selection of inputs, after power up. Will automatically select lowest input connected on power up.
Tone	Allows for setting system balance level. Level may be selected between 0 and -20 dB via dial on rear panel.
Mute	Mutes the output.
UV22	Takes UV22 encoder out of the Reference DAC signal path.

**LIMITED WARRANTY: Digital to Analog Converter**

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NOTE: This warranty varies substantially from the standard Cello, Ltd. product warranty. Please read carefully to determine extent of coverage.

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*A. PARTS*

Cello, Ltd. warranties all digital mechanical and electronic parts for one year and analog electronic parts for life.

*B. LABOR*

During the one year warranty period this product must be returned to the factory for repair. Thereafter, labor is the responsibility of the dealer or distributor. After year one digital and mechanical elements of units will be repaired at owner expense.

If the distributor is unable to perform the repair, Cello will pay return air freight from the factory by agreed upon carrier provided the unit was shipped to the factory with air freight prepaid.

Cello will not pay freight if units are returned without a Return Authorization number (RA#). Cello will not pay the freight if units are found to be in perfect working order.

*C. WARRANTY OF REPAIR WORK PERFORMED*

Any specific repairs or modifications effected by the factory or authorized service facility shall be guaranteed for 100% parts and labor for the remainder of the warranty period for the unit, except for analog electronic parts which carry a lifetime warranty.

*D. PRODUCT REGISTRATION AND TRANSFERABILITY*

Warranty periods shall begin when the goods are delivered to the retailer.

All products must be registered. When sold, new owners must be registered for the transfer of the warranty to be effected. All warranties are transferable to any

succession of subsequent registered owners. Please contact your nearest authorized Cello supplier or the Customer Service Department at the factory for details of subsequent owner warranty registration.

#### *E. TAMPERING, ABUSE AND/OR MISUSE*

Any unauthorized modifications, repairs or tampering, and/or any indications of obvious owner abuse, negligence or improper usage, as determined by Cello, Limited shall be grounds to void the warranty.

#### **Service**

If you believe your Cello equipment is not functioning properly, please call the Customer Service Department at the factory. If you need to return your component, you will be given an R/A (return authorization) number. This number must appear on the outside of the shipping box. Returns without R/A numbers will not be accepted. Returns received in original Cello packaging will be returned in original packing. Returns received in non-Cello packing will be returned in new Cello packaging at owner's expense. If you need replacement packing materials, please contact the Customer Service Department at the factory.

#### **l Maintenance**

The finish of the reference DAC is of brushed and anodized aluminum. Ammonia-based glass cleaner or alcohol and a soft cloth work well to restore the shine and remove finger prints. Be sure that the unit is off and unplugged before cleaning. Avoid getting excess cleaning fluid inside the unit. Take care when cleaning the front and rear panels. Excessively aggressive rubbing may remove the silkscreen lettering.



## SPECIFICATIONS

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Sampling Rates: 32 kHz, 44.1 kHz, 48 kHz

Decoding System: 20 bits, 8x Oversampling Rate

Functions: Source Selection

Digital Inputs: 2 coaxial, 4 balanced

Analog Outputs: 3 variable - 2 balanced, 1 single-ended

Total Harmonic Distortion plus Noise: -97dB @ 1kHz

Frequency response for 44.1kHz: 20Hz - 20kHz +/-0.5dB

S/N Ratio: 108.5dB, "A" weighted; 106dB flat

THD: <.005%, 20Hz - 20kHz

Internal Recovered Clock Jitter: <30 picoseconds RMS

Crosstalk: typically 110dB, 20Hz-20kHz

Dimensions: 19"W x 4"H x 12.5"D

Weight: 20 lbs (9.09 Kg)

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