Berkeley Audio Design® Alpha DAC® Reference Series 3

The Alpha DAC Reference Series 3 has breakthrough technology that redefines the potential of digital audio quality. In addition to its unprecedented PCM audio quality, the Alpha DAC Reference Series 3 also features MQA Rendering of unequaled audio quality. Please take a few minutes to familiarize yourself with this User Guide before connecting power to the Alpha DAC Reference Series 3.

INSTALLATION

The Alpha DAC Reference Series 3 should be installed in a space with several inches of clearance above, behind and on both sides of the chassis to provide adequate ventilation. Avoid placement directly above other equipment that produces significant heat. **NOTE: Due to the very high thermal mass of the Alpha DAC Reference Series 3, please allow 12 hours after first powering on before performing critical listening.**

Power Connection

The Alpha DAC Reference Series 3 is designed to run continuously when connected to AC mains power to maximize audio fidelity. There is no power switch and as soon as AC power is connected the unit is powered on. Units for sale in the United States are set internally for 120VAC operation. Your Alpha DAC Reference Series 3 dealer can select 240VAC operation for use outside of the United States by resetting an internal switch in the power supply. **NOTE: If 240VAC operation is selected the internal FUSE MUST BE CHANGED from a .40 Amp Slow Blow (Littelfuse 0215.400HXP) for 120VAC to a .20 Amp Slow Blow (Littelfuse 0215.200HXP) for 240VAC.** If the fuse fails it must be replaced with the same value and type. Failure to do so will void the warranty.

Signal Connections

Alpha DAC Reference Series 3 Rear Panel

The Alpha DAC Reference Series 3 has four two channel digital signal inputs: **AES** - XLR connector, 110Ω termination; **SPDIF1** - BNC connector, 75Ω termination; **SPDIF2** - BNC connector, 75Ω termination; **TOSLINK** - optical connector.
High quality cables with the correct impedance for each input should be used. For the best possible audio fidelity only one input at a time should be fed with an active signal.

The Alpha DAC Reference Series 3 has four analog signal outputs - **RIGHT** and **LEFT** balanced on pin 2 positive XLR connectors and **RIGHT** and **LEFT** unbalanced on RCA connectors. All outputs are always active and may be used simultaneously. IR remote control of all functions including volume and balance allows direct connection to power amplifiers. The analog outputs are designed to drive long cable lengths and connecting directly to a power amplifier avoids any loss of fidelity from routing signals through a preamplifier.

Note: If oversized, “audiophile” type input or output cables are used, especially those that are very stiff or heavy, care should be taken to properly support them to avoid putting excessive strain on the panel connectors.

OPERATION

Alpha DAC Reference Series 3 Front Panel

Front Panel Controls & Indicators

- **AES**, **SPDIF1**, **SPDIF2** and **TOSLINK** LED’s indicate selected input
- **Input** button selects AES, SPDIF1, SPDIF2 or TOSLINK inputs
- **LOCK** LED - amber indicates input signal lock, green indicates Precision Clocking
- **HDCD** LED indicates HDCD code is detected
- **PHASE** button sets absolute phase
- **INVERT** LED indicates inverted absolute phase
- 3 digit LED display of **STEREO** volume, **LEFT** & **RIGHT** gain, **S**ample **RATE**, **FILTER** type, **MQA** data, and **MUTE**
- **+** & **−** buttons set volume level and select Filter type
- **MODE** button selects Stereo, Left, Right, Sampling Rate and Filter display modes
- **DIM** button selects four different display brightness levels

Alpha DAC Reference Series 3 Remote Control

The remote control has similar controls to the front panel except for the addition of **L** & **R** balance buttons, dedicated **AES, SPDIF1, SPDIF2** and **TOS** input select buttons and a **MUTE** button. Also, the **+** & **−** buttons on the remote control only adjust volume. Pushing the **MODE** button momentarily displays the MQA original sample rate if there is an MQA signal, then balance (if offset) and volume in all display modes and at all display brightness levels. If the **MODE** button is pushed and held, balance is reset to 0.

Many Alpha DAC Reference Series 3 functions such as input sampling rate selection, MQA rendering and HDCD decoding occur automatically. Once the Alpha DAC Reference Series 3 is properly installed the most commonly used controls are volume, balance (remote only), mute (remote only) and input select.

Volume Adjustment
Volume is adjusted in 0.1dB steps by pushing the **+** or **−** buttons on the remote control or front panel in **STEREO** or **S**ample **RATE** modes. Pushing and holding down either of the buttons adjusts the volume level more rapidly. Volume level is shown on the 3 digit display in dB. 60.0 is maximum level and 00.0 is minimum level. 54.0 is the recommended level if a preamplifier is used after the Alpha DAC Reference Series 2. When AC power is removed the volume level resets to 25.0 for safety. Note: In **LEFT**, **RIGHT** or **FILTER** modes the front panel **+** & **−** buttons perform different functions. Please see detailed information on this page and page 4.

Balance Adjustment
Balance is adjusted in 0.1dB steps by pushing the **L** and **R** buttons on the remote control. Pushing and holding down either of the buttons adjusts balance more rapidly. Balance is meant to be a program dependent setting not a system set up adjustment, so selecting a different input resets balance to 0. If balance is offset to one channel, the higher channel volume is displayed when adjusting volume.

Left & Right Gain
Left & right gain is adjusted in 0.05dB steps by selecting **LEFT** or **RIGHT** display modes and pushing the front panel **+** or **−** buttons. Left & right gain is displayed with 3½ digit resolution. A decimal point is added to the right of the third digit to indicate .05dB. **Note:** Unlike the **L** & **R** balance controls on the remote control, left & right gain are fine resolution adjustments for system set up and do not reset when inputs are changed. If the left & right gains are different, the higher channel volume is displayed when adjusting volume.

Output Muting
Pushing the **MUTE** button on the remote control mutes the analog outputs. Pushing the **MUTE** button again or pushing the **+** button on the remote control or front panel un-mutes the outputs. When the outputs are muted a decimal point appears following the leftmost digit of the 3 digit display.

Input Selection
Inputs are selected by pushing the button for the desired input on the remote control or by repeatedly pushing the **Input** button on the front panel until the LED for the desired input lights. The four digital inputs are: **AES** - female XLR connector, 110Ω termination; **SPDIF1** - BNC connector, 75Ω termination; **SPDIF2** - BNC connector, 75Ω termination; **TOSLINK** - Toslink optical connector.

Absolute Phase
Pushing the **PHASE** button on the remote control or front panel inverts absolute phase, pushing the **PHASE** button again returns absolute phase to normal. The **INVERT** LED lights when absolute phase is inverted.

Display Mode
Pushing the front panel **MODE** button repeatedly selects **STEREO** volume, **LEFT** gain, **RIGHT** gain, **S**ample **RATE**, and **FILTER** display modes for the 3-digit display. Pushing and holding down the **MODE** button steps through all display modes.

Sample Rate
S. RATE is the default display mode and displays the sampling rate of the digital input signal with 3½ digit resolution. If the sample rate rounds to between the 3 displayed digits, a decimal point is added to the right of the third digit; 44.056kHz = 44.0. , 176.4kHz = 176. . Adjusting volume or balance in **S. RATE** display mode momentarily displays volume or balance. With an MQA Core input signal, **MQA** is displayed instead of the sampling rate. (See **MQA** below).

Digital Filter Selection
For the best possible audio fidelity the default interpolation filter, Filter 1 (1.16 or 1.24) should be used. Filter 2 (2.16 or 2.24) is a minimum phase type with minimum pre-ringing. Digital interpolation filters 1 or 2 can be selected by selecting the **Filter** display mode and pushing the front panel **+** or **−** buttons. Filter selections are stored in memory.

At 44.1kHz (the sampling rate of Red Book standard compatible HDCD encoded CD's) there are 16-bit LSB and 24-bit LSB HDCD code detect versions of each filter, e.g. 1.16 & 1.24. The main difference between the .16 and .24 versions of the 44.1kHz filters is the bit the filter looks for HDCD LSB code in. In all other ways, except for peak output level, they are identical. (See **HDCD** below). All other sampling rates have .24 24-bit LSB HDCD code detect versions only.

MQA
When a valid MQA Core decoded signal is present on the selected digital input, **MQA** is displayed on the 3 digit, seven segment LED display instead of the input signal sample rate (see photo below) and MQA Rendering is performed. Streaming applications like Tidal should NOT be set to Passthrough MQA which turns off MQA Core decoding that is required for MQA Rendering. Pushing the **MODE** button on the remote control temporarily shows the MQA original sample rate on the 3 digit LED display.

HDCD
The **HDCD** LED lights when HDCD code is detected in the LSB of the digital input signal and HDCD decoding is automatically performed. With 44.1kHz sampling rate signals 16-bit LSB HDCD code is detected by default, e.g. filter 1.16. 24 bit LSB, 44.1kHz HDCD code detection can be selected in **Filter** display mode, e.g. filter 1.24. At sampling rates other than 44.1kHz only 24 bit LSB HDCD code is detected and only 24-bit LSB HDCD code detect filters ending in .24 are provided. **Note: Selecting 24 bit LSB HDCD code detection at 44.1kHz turns off HDCD amplitude decoding and increases output level by 6dB.**

Display Dim
Pushing the **Dim** button on the remote control or front panel adjusts the display brightness.

Power On/Off Sequence
If the analog signal outputs of the Alpha DAC Reference Series 3 are connected directly to power amplifiers it should be powered on for 15 seconds or longer before the power amplifiers

are powered on. Before disconnecting power to the Alpha DAC Reference Series 3 the power amplifiers should be powered off first. The Alpha DAC Reference Series 3 is designed to power on and off without producing output noises that could damage power amplifiers or loudspeakers. However, this power on and off sequence should be followed for maximum protection of associated components.

Upgrading Firmware
Alpha DAC Reference Series 3 firmware is upgradeable by playing a special encrypted WAV file through any digital signal input. When the Alpha DAC Reference Series 3 is powered on the current firmware version is displayed.

SPECIFICATIONS

- Input sampling rate: 32kHz to 192kHz
- Ultra low phase noise Precision Clocking at 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz and 192kHz sampling rates ± 100 ppm
- Input word length: 24-bit
- Two channel analog stereo outputs: XLR balanced with pin 2 positive and RCA unbalanced
- Digital Inputs: AES - XLR, 110Ω; SPDIF1 - BNC, 75Ω; SPDIF2 - BNC, 75Ω; TOSLINK – Toslink optical connector
- MQA rendering automatically detects MQA Core decoded signals and performs MQA Rendering to MQA original sample rates from 44.1kHz to 384kHz and above
- HDCD decoding detects 16-bit flag at 44.1kHz or 24-bit flag at all sampling rates
- Multiple digital filter options
- Balanced analog output level: +18dBu (6.15Vrms) maximum = output level 60, +12dBu (3.1Vrms) = output level 54, or lower recommended
- Unbalanced analog output level: 3.25Vrms maximum = output level 60, 2Vrms = output level 54, or lower recommended
- Digital volume & balance control: 0.1dB/step with .05dB/step L/R gain trim, 60dB range
- Frequency response at ≥ 88.2kHz sampling rates: ± 0.1dB from < 0.1Hz to 35 kHz, - 3dB at 59kHz for 176.4kHz and 192kHz sampling rates
- Distortion at recommended levels: all products ≤ -120dBFS
- THD+N at maximum level: < -110dBFS
- Firmware field upgradeable through signal inputs
- Enclosure dimensions: 3.5”H X 17.5”W x 12.5”D
- Weight: 30 lbs.
- Mains power: 100/120/240VAC, 50/60Hz
- Power consumption: 25W

If you have questions or encounter an issue not covered in this User Guide, please contact your Berkeley Audio Design Alpha DAC Reference Series 3 dealer.

Or you may contact Berkeley Audio Design by email at: info@berkeleyaudiodesign.com or by phone at: 510-277-0512.

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