Thank you for choosing EMM Labs...

Warranty

EMM Labs warrants the DAC2 product against defects in material and workmanship under normal use and service for a period of time specified by the product's serial number from the date of first delivery to the owner. The warranty time period is 5 years. Warranty is limited to the original owner and is non-transferable.

EMM Labs will pay for return shipping charges back to the owner when the product is sent to EMM Labs within the first 90 days after purchase (US and Canada end-users only). Otherwise, owner will be responsible for all shipping charges to and from EMM Labs.

For all warranty claims, a copy of the original invoice must accompany the product.

Opening the product or modifying it in any way by the owner, including but not limited to cryogenic treatment, will void any warranty.

Please contact EMM Labs *(support@emmlabs.com)* for RMA number and shipping instructions before shipping any product to EMM Labs.

EMM Labs products are sold worldwide through authorized dealers with restricted territories. EMM Labs product purchased from non-authorized dealers or from a dealer selling outside his / her authorized territory will automatically void product warranty.

DAC2 AUDIO CONVERTER

The DAC2 is a high-performance stereo D/A converter with a wide variety of user selectable digital inputs. It has evolved from EMM Labs acclaimed converter systems which are used worldwide in professional studios to create some of the finest recordings.

The DAC2 provides conversion from a wide variety of digital input formats, including USB Audio for computers, media systems and digital audio playback machines making it an extremely flexible converter system that can act as a standalone conversion hub to a host of digital sources.

The DAC2 has:

- EMM Labs proprietary internal MDAT algorithm to up-sample and condition digital audio to twice the SACD/DSD sample rate.
- Ed Meitner's proprietary discrete Dual Differential DAC circuit.
- Uses our exclusive aerospace grade composite laminate circuit boards.

The DAC2, when paired with an EMM Labs transport, performs as an unparalleled CD/SACD playback system.

Features & Specifications

2-Channel D/A conversions:

- from PCM (44.1kHz, 48kHz, 88.2kHz, 96kHz) to analog
- from DSD to analog

Supported digital input formats:

- AES/EBU (1 connector)
- SPDIF (Coax)
- Two Optical TOSLink SPDIF
- EMM OptiLink
- USB Audio

Analog outputs and impedances:

- Balanced on XLR (100Ω)
- Unbalanced on RCA (50Ω)

User selectable levels

Low position:

- XLR outputs: 4V (+14.38dBu)
- RCA outputs: 2V (+8.353dBu)

High position:

- XLR outputs: 7.2V (+19.38dBu)
- RCA outputs: 3.6V (+13.34dBu)

Note: XLR analog outputs are balanced with pin 2 hot, pin 3 cold and pin 1 ground.

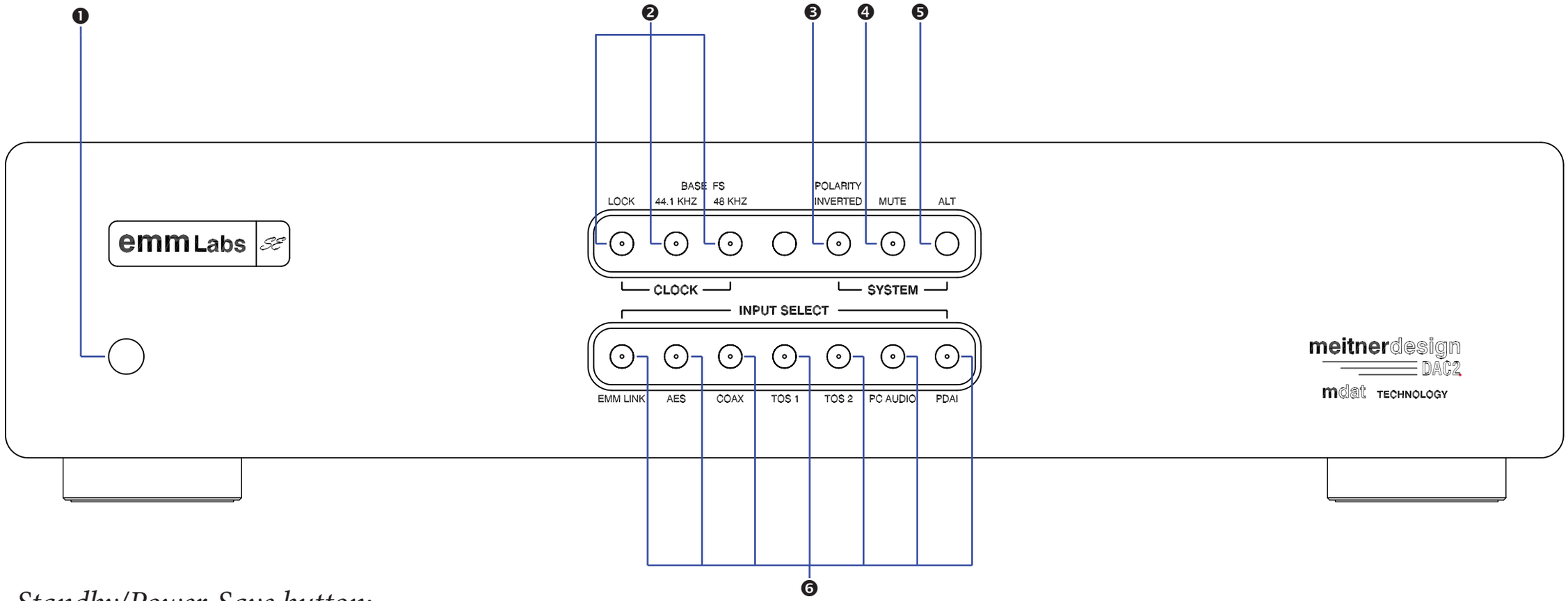
Features & Specifications

System control via wired Infrared remote and serial RS-232 ports *(see Appendix A)*

Power supply:

- Power factor corrected
- Factory set to 100V or 115V or 230V, 50/60Hz operation
- Power consumption: 50W
- Remote control: Infrared
- Dimensions W x D x H: 435 x 400 x 92mm
- Weight: 12kg

Front Panel & Functions



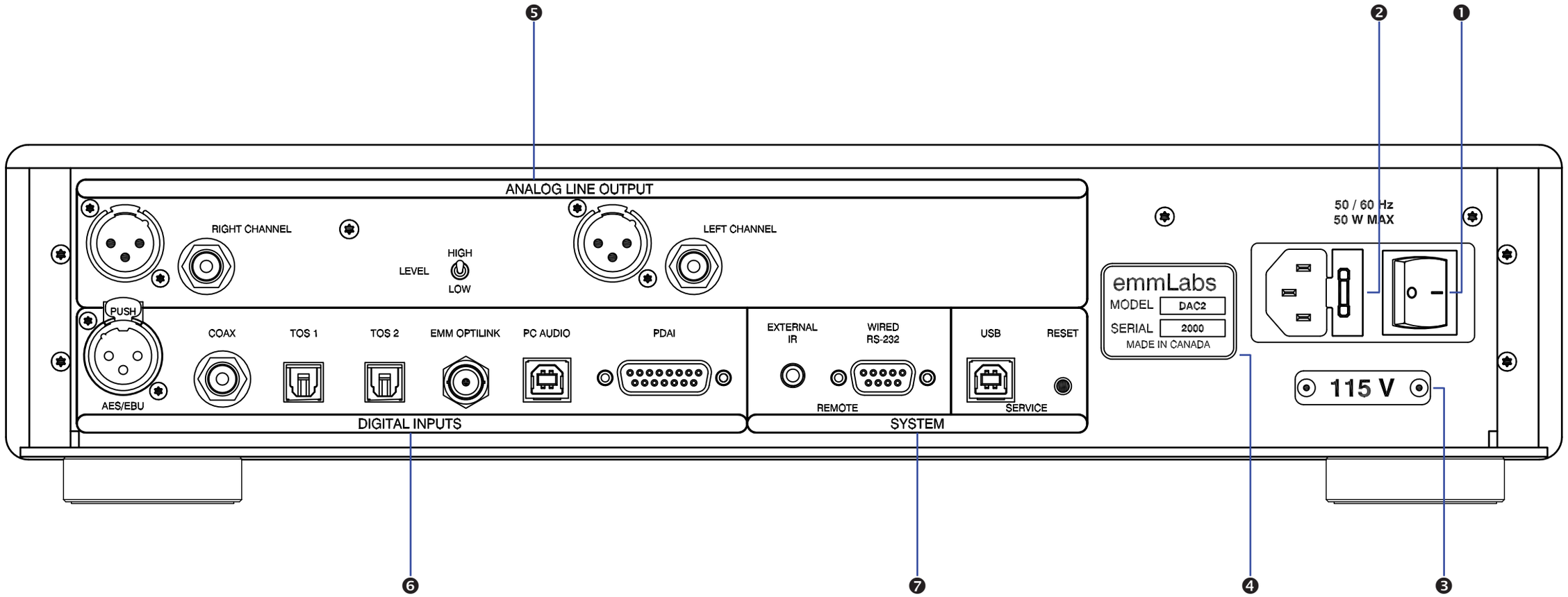
1. *Standby/Power-Save button:*
   Toggles the operation between on and power-save mode. In power save mode the remote control and all front panel functions become inactive.
2. *Clock Control Indicators:*
   LOCK: This indicator is lit when the unit detects valid digital clock at the selected digital audio input. For normal operation with digital audio inputs this indicator has to be lit or else all audio outputs will be muted.
   44.1kHz / 48kHz: These indicate the base frequency for the selected digital audio input. Eg. digital inputs with sample frequencies of 44.1kHz or 88.2kHz the 44.1kHz indicator will be lit. For digital inputs with sample frequencies of 48kHz or 96kHz the 48kHz indicator will be lit.

Front Panel & Functions

3. *POLARITY INVERTED button:*
   When this button is lit the polarity of all analog outputs are inverted. The inversion is performed in the digital domain.
4. *MUTE button:*
   When lit all outputs are muted. Pushing the button again unmutes the outputs.
5. ALT button (intended for future use)
6. *Digital input selector buttons:*
   - EMM LINK: Selects the EMM Optilink input for internconnection with an EMM Labs transport. The cables used are ST glass (multimode) supplied with the transport.
   - AES: Selects AES/EBU (XLR) format PCM digital input . Sample rates up to 96kHz are supported.
   - COAX: Selects SPDIF (RCA) format PCM audio from COAX connector. Sample rates up to 96kHz are supported.
   - TOS1: Selects SPDIF (TOSLINK) format PCM audio from TOS1 connector. Sample rates up to 96kHz are supported.
   - TOS2: Selects SPDIF (TOSLINK) format PCM audio from TOS2 connector. Sample rates up to 96kHz are supported.
   - PC AUDIO: Selects USB PCM audio (computer, media player, media server). 44.1kHz and 48kHz sample rates are supported.
   - PDAI - Switch and connector intended for future use.

PC Audio from USB input:
For best fidelity, care must be taken to ensure that as little processing is performed on the audio data by the computer. In both Windows and OSX systems, the use of low-latency ASIO device drivers are highly recommended.

Rear Panel & Functions



1. *Main Power Switch*
2. *Main Power connector and fuse holder:*
   Main fuse holder as well as included spare fuse is located within this compartment.
3. *Product VOLTAGE indicator:*
   Indicates working voltage of the DAC2. Only use with indicated line voltage.
4. *Product model and serial number indicator:*
   Warranty void if model/serial number indicator is not attached to unit, missing or damaged whereby serial number cannot be seen.

Rear Panel & Functions

5. *Analog Line Output:*
   - Left and Right Balanced (XLR) Connectors
   - Left and Right Un-Balanced (RCA) Connectors
   - Level High/Low switch (Output Line Level with 0dBfs signal on AES/EBU input):

     Low position: XLR outputs: 4V (+14.38dBu)
     RCA outputs: 2V (+8.353dBu)
     High position: XLR outputs: 7.2V (+19.38dBu)
     RCA outputs: 3.6V (+13.34dBu)
6. *Digital Inputs:*
   - EMM Optilink: input for interconnection with an EMM Labs transport.
   - AES/EBU: AES/EBU (XLR) PCM digital input.
   - COAX: SPDIF (RCA) format PCM audio.
   - TOS1: SPDIF (TOSLINK) format PCM audio.
   - TOS2: SPDIF (TOSLINK) format PCM audio.
   - PC AUDIO: USB PCM audio from a computer, media player, server
   - PDAI: Connector intended for future use.

7. *System*

   Remote:
   - External IR: wired infra-red communication port
   - Wired RS232: RS232 communication port

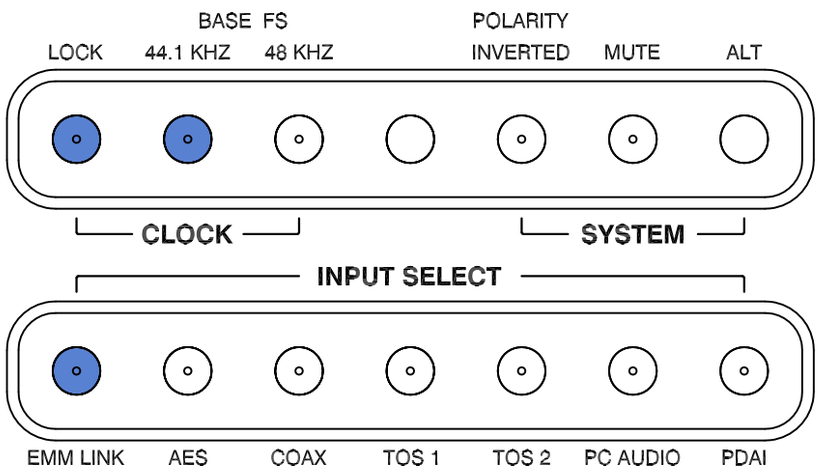
   Service:
   - USB: software update port please see Appendix A for details
   - RESET: Used to access the backup BIOS in connection with software upgrades via the USB port. Should not be used during normal operation. Please see Appendix A for details.

Basic Operations and Input Connections

1. *Memory:*
   After 10 seconds when no button has been pushed or changed, the DAC2 memorizes its momentary setup in permanent memory for later retrieval after the next powerup. It will be recalled immediately after the unit is turned on. Each individual input selection will keep its last configuration before powerdown.

   During normal operation each input selection will immediately memorize its configuration so that switching between different sources with different configurations can be accomplished with a single button selection.

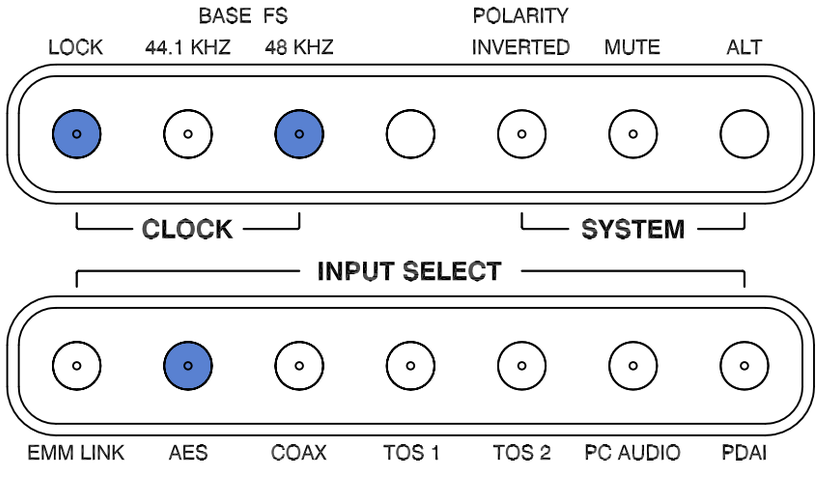
2. *DAC2 Input Connections*
   Just connect the appropriate digital source output to the specific DAC2 input, on the back of the DAC2 and select the appropriate digital source from either the front panel buttons or the remote control.



Typical front panel display when DAC2 is locked to 44.1kHz base frequency and the

Basic Operations and Input Connections

2. *DAC2 Input Connections (cont'd):*
   EMM Optilink is selected as the digital source (connected to an EMM Labs transport).



   Above is another example. Here the DAC2 is connected to an AES digital source with a base frequency of 48kHz (PCM 48kHz or 96kHz audio). For AES connections the DAC2 uses a single AES input to carry 2 channels of PCM audio up to 96kHz.

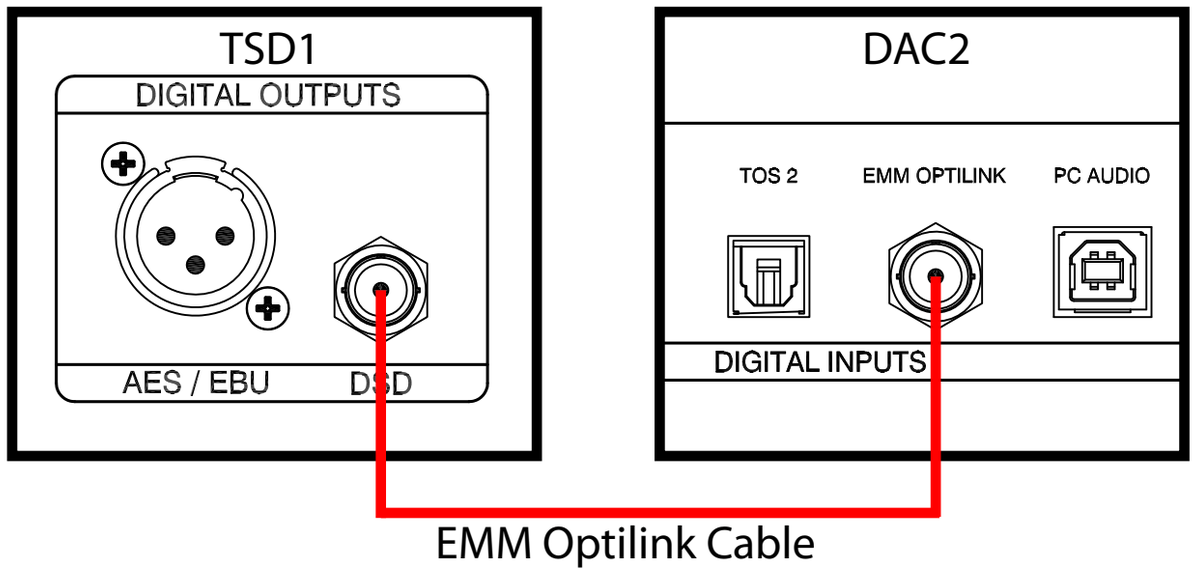
   NOTE: If the LOCK light is not ON then the DAC2 is not receiving appropriate digital audio from the digital source. The DAC2 will automatically mute all the outputs if it does not receive a proper digital audio signal from the selected source. Check the source setup and cable connections for problems.

3. Using the remote and pressing the "Display DAC" button turns off all the DAC2 LEDs except the LOCK light.

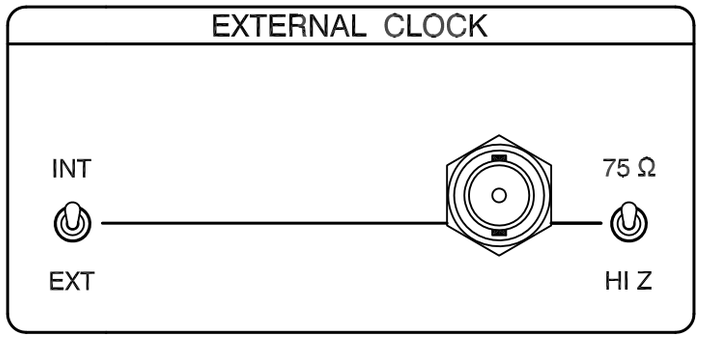
Basic Operations and Input Connections

4. *TSD1+DAC2 Quick Connect:*

Connect the EMM Optilink cable from the TSD1 to the DAC2



Make sure the TSD1 is External Clock switch is set to internal



Using either the remote or the front panel of the DAC2 select EMM Link.
The LOCK light and the 44.1kHz sync. light both should be lit on the DAC2.

Infrared Remote Control

The remote control provides combined functions for both the DAC2 and EMM Labs transport. The functions that are relevant to the DAC2:

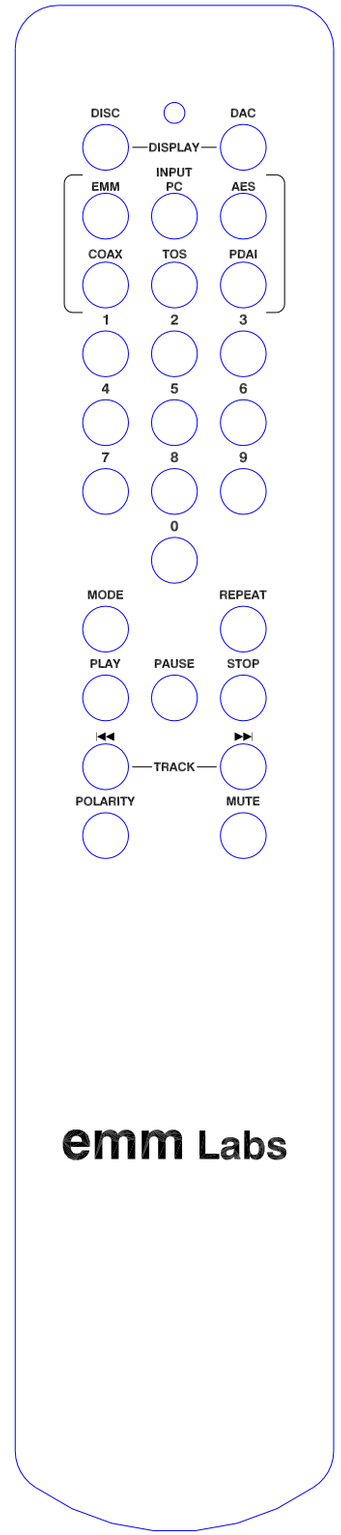
DAC: This function toggles the front panel LEDs ON or OFF on the DAC2 When in OFF mode only the LOCK LED would be lit.

INPUT: These buttons are used to select the digital source input:

- EMM : Selects the EMM Optilink input.
- AES : Selects AES/EBU format PCM digital audio via XLR
- COAX : Selects SPDIF format PCM digital audio via coax/RCA connector
- TOS : Toggles between TOSLINK SPDIF format PCM audio from either TOS1 or TOS2 connectors.
- USB : Selects USB PCM audio via USB interface.
- PDAI : Expansion port intended for future use.

POLARITY: Toggles the analog output polarity. Polarity inversion is performed in the digital domain.

MUTE: Mutes the outputs.



Serial Remote Control (RS232)

The DAC2 is equipped with a 9-pin RS232 port for system remote control via a serial cable (not provided by EMM Labs). Please use a standard RS232 cable. Do not use a null model cable, as this will not work. RS232 communication port settings:

- 19,200 baud
- 8 bits
- 1 stop bit
- no flow control
- no parity bit

Commands to the DAC2

All commands sent to the DAC2 consist of 3 ASCII characters (all lowercase) followed by a carraige return or <CR>. Repeating a <CR> will repeat the last command sent. Received commands are not stored in a stack. They need to be sent in intervals of at least 50ms to allow enough time for the DAC2 to execute a command before receiving the next one.

Command	Function
pol	Toggles the analog output polarity
mut	Mutes the outputs
emm	Selects the EMM Optilink input
aes	Selects AES/EBU format PCM digital audio via XLR
cox	Selects SPDIF format PCM digital audio via coax/RCA connector
to1	Selects TOSLINK format PCM digital audio via TOS1 connector
to2	Selects TOSLINK format PCM digital audio via TOS2 connector

Commands to the DAC2 (cont`d)

Command	Function
usb	Selects USB PCM audio via USB interface

Status bytes sent from DAC2

The DAC2 sends back 4 Bytes terminated with a <CR> whenever any status changes.

<Byte 0><Byte 1><Byte 2><Byte 3><CR>

Byte 0 ASCII ' 0 ' - Not Used
Byte 1 ASCII ' 0 ' - Not Used
Byte 2
- bit 0 Not Used
- bit 1 Not Used
- bit 2 Status of EMM Link input (0 when selected)
- bit 3 Status of USB input (0 when selected)
- bit 4 Status of AES input (0 when selected)
- bit 5 Status of Coax input (0 when selected)
- bit 6 Status of TOS1 input (0 when selected)
- bit 7 Status of TOS2 input (0 when selected)

Byte 3
- bit 0 Lock Status, 1 when locked
- bit 1 Not Used
- bit 2 0 when 44.1kHz selected as base sample frequency
- bit 3 0 when 48kHz selected as base sample frequency
- bit 4 Status of polarity of analog outputs (0 when inverted)

Status bytes sent from DAC2 (cont`d)

Byte 3

bit 5 Not Used
bit 6 Status of mute (0 when muted)
bit 7 Not Used

Byte 4 <CR> (0x0D)