MSB TECHNOLOGY

The Cascade DAC
User Guide

Check our website for the most recent user guides,
firmware and drivers at:
www.msbtechnology.com/support

Technical support email is:
Hello@msbtechnology.com

07.17.2024

The Cascade DAC Support Page

All Cascade DAC support topics, as well as a full PDF version of this user guide, can be found online by scanning the following QR Code or by visiting the URL listed below.

www.msbtechnology.com/dacs/cascade-support/

Cascade Series YouTube Playlist

Any Cascade DAC support videos, as well as other related product videos, can be found online by scanning the following QR Code or by visiting the URL listed below.

www.youtube.com/@msbtechnology

This user guide is modeled after the following firmware revisions:
The Cascade DAC Software: 1.0.1.0
The Cascade DAC Hardware 1.0.1.1

Setup and Quick Start

The Cascade DAC interface is simple with few user controls. The input source defaults to auto switching and the display will let you know if you have an active input. Make the necessary connections, power on your system and turn the volume knob up until you hear music. A full video version of the quick start guide can be found online by scanning the following QR Code or by visiting the URL listed below.


www.msbtechnology.com/dacs/cascade-support/

Step 1.
Unbox the Cascade DAC units and place them into their desired locations in your audio system. These units can be stacked or, for best performance, place them on individual shelves for better isolation.

Step 2.
When connecting to the powerbase, you'll have one Summit Power cable. Connect the supplied Summit Power cable to the power connector located on the powerbase and the power connector on the Analog Converter.
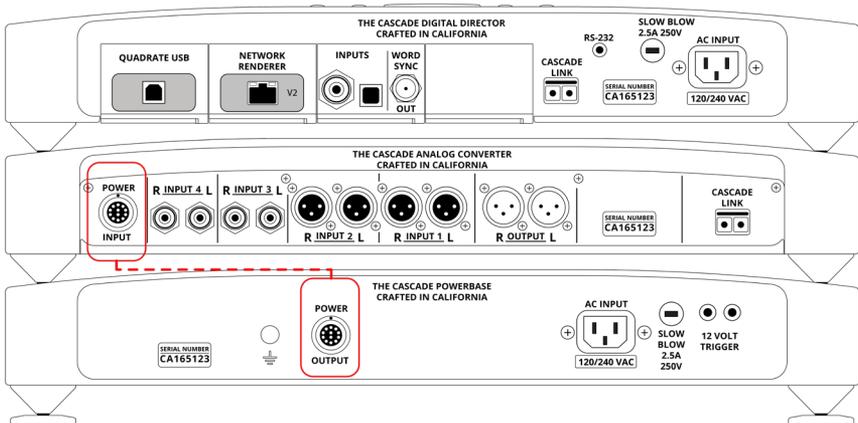

How to Disconnect Summit Power Cables
To disconnect a Summit Power cable, simply pinch the collar portion of the cable and pull the collar of the cable directly back from the jack panel. No twisting or rotating is required to disconnect the cable. The collar should slide back to release the locking feature and then pull free from the jack panel.

Step 3.
Use the included single mode fiber cable to connect the Cascade Link on the Digital Director to the Cascade Link on the Analog Converter.
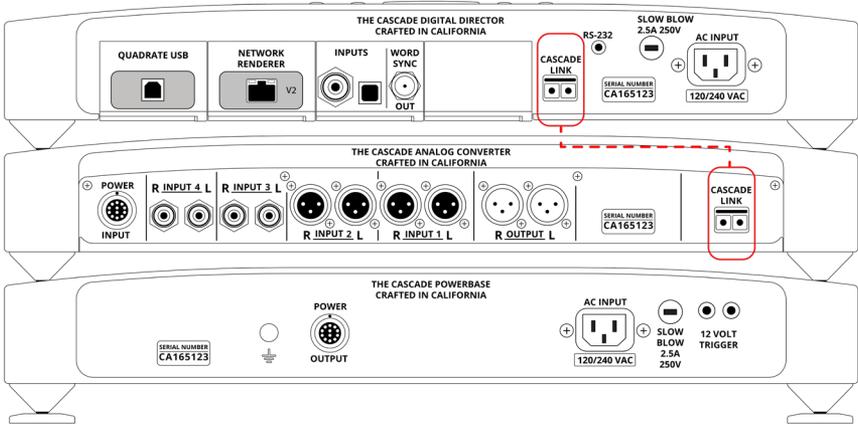

Step 4.
Connect the balanced analog outputs of the Analog Converter to the power amplifier(s) or preamplifier. If using an external preamplifier, make sure to bypass the volume control by using the "Preamp Off" setting found under "Startup Volume" in the menu settings.
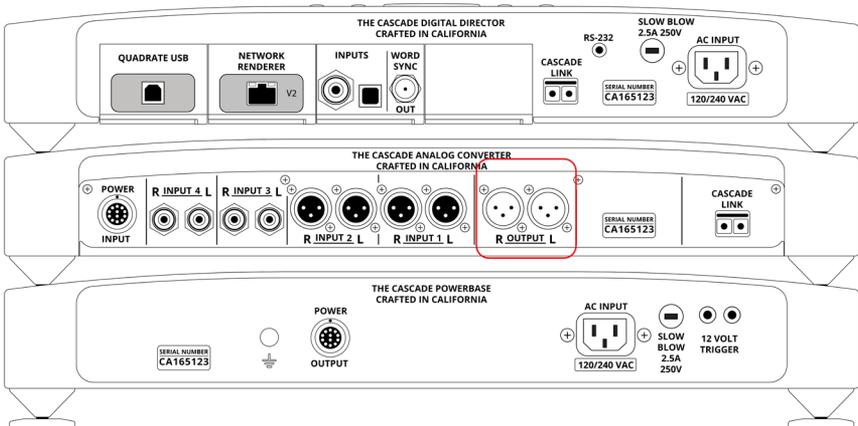
Step 5.
Connect all of your desired digital audio sources to the matching digital inputs on your Digital Director. The Digital Director will automatically switch to any active digital input source. Once a source has been switched to, the Frequency of the incoming digital source will be displayed on the unit.
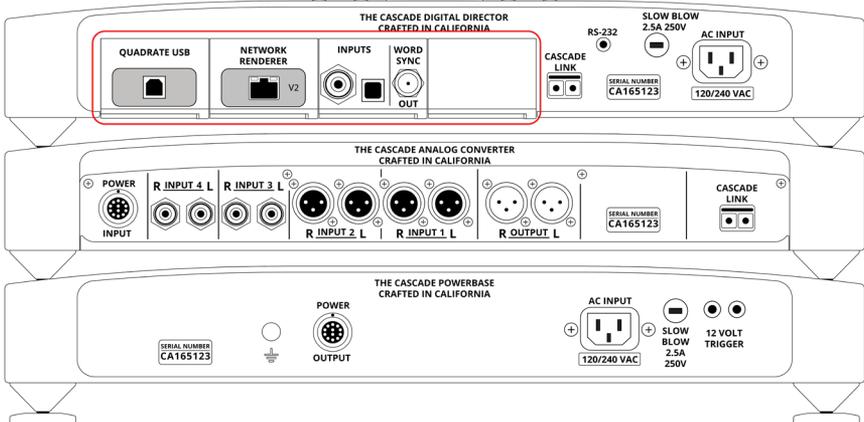
Step 6.
Connect the Powerbase and Digital Director to your power mains with the supplied IEC cables. The unit will automatically switch to the required mains voltage.
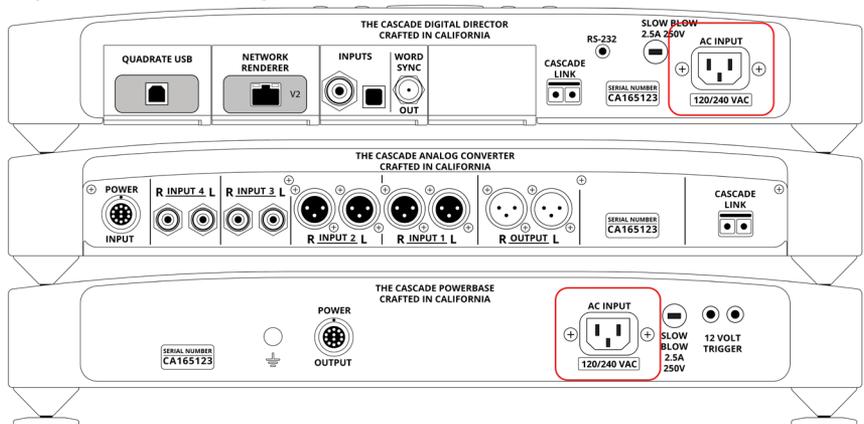

Step 7.
At this point, the Digital Director will automatically turn on, but without detecting the Analog Converter, it will shortly go into standby mode. Turn on your Analog Converter using the button on the front of your Powerbase. The Digital Director will automatically power on once it has detected the Analog Converter. You are now ready to play music with your Cascade DAC.

Digital Director User Interface

|	
Menu Button ≡	The Menu button is single purpose: it will enter the setup menu at the top of the menu tree. If in the setup menu (it doesn't matter where), this button will exit the setup menu and return to the normal audio listening function.
Arrow Buttons ‹ ›	The right and left arrows switch inputs. The 'Auto' mode will be in the list of inputs. If 'Auto' is selected, the unit will automatically switch inputs based on priority (Input slot D being the highest priority and slot A being the lowest priority). When a source with a higher priority becomes active, the unit will automatically switch to the new, higher priority input. Toggling through the inputs manually will defeat any auto switching. When in the setup menu, the arrows move right and left through the menu structure.
Circle Button ○	The circle button is used for muting your DAC audio output. While in the menu, this button can also be used as an enter command.
Volume Knob	This knob adjusts the volume between 0 and 106. It also navigates the menu options.
Display	The display shows the Input, bit-depth, sample rate, and/or volume level.
Manual Reset	**Holding down any one of the buttons for 10 seconds will force your director to restart.**
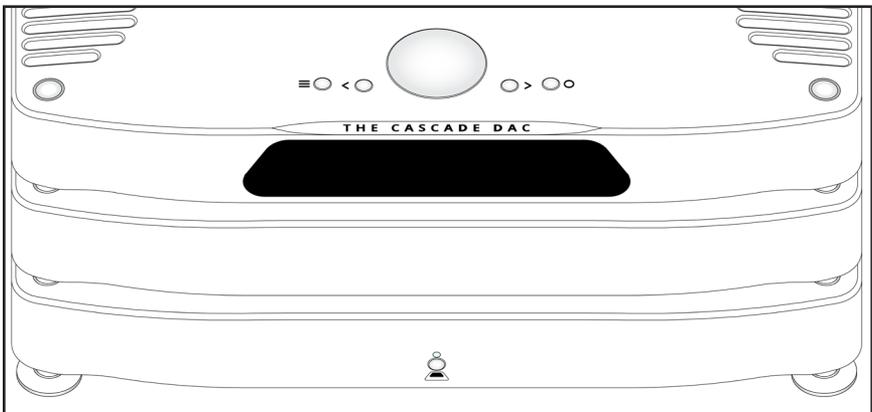
Display Variations and Information

There are two variations of the display depending on what information you would like to have visible at any given time. There are also a few details that can be found on the display indicating certain options or settings have been chosen. These details are displayed the same way, but they can change location depending on what display format is chosen in your settings menu.

The display also features three selectable dimming modes. Each of these modes, as well as a brief description, can be found in the menu options listed in this manual.

Display - Detailed

This version of the display will show you bit-depth and sample rate on the top left, the current input on the bottom left, and the current volume on the right.
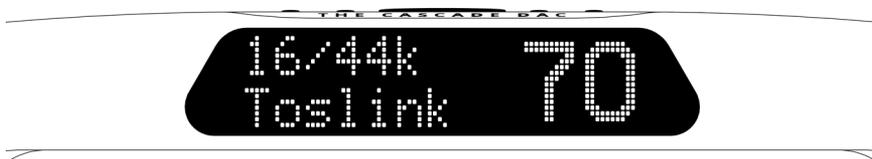
Display - Volume only

This version of the display will show you only the large volume numbers in the center of the display. The display will momentarily show the detailed information whenever the current input, bit-depth, or sample rate changes, before going back to the centered large volume numbers.
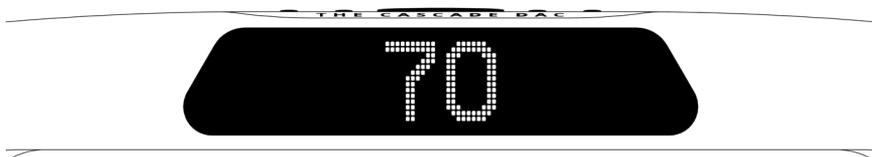
Manually Selected Inputs

The display will show a small arrow before the current input to indicate that this input has been manually selected. When an input is chosen manually, the system will not auto switch to any other inputs until the auto-select feature has either been chosen again (the arrow is not displayed) or the system has been turned off.
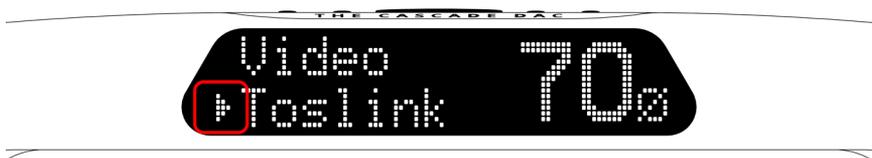
The Powerbase

The powerbase will detect the input voltage and switch to 120 volt or 240 volt operation as needed. It is also available in a fixed 100 volt configuration. The powerbase has over-voltage protection that will help protect the unit.

Fuse

 - 2.5A 250V SLO BLO - 5 mm x 20 mm mini fuse on the jack panel.

The Powerbase User Interface

There is one button on the front of the powerbase—as well as two control features just under the powerbase—on the bottom front edge.

LED indications	**White** - Power On **Red** - Power off **White/Red** - Unit is in "Normal" mode, but the 12v trigger has turned it off. **Flashing Red** - The unit is over voltaged or has over heated and has gone into protection. (Once the problem has been resolved, be sure to cycle the unit's power.)
Display brightness	This is a spinning wheel to control the brightness for the power indicator light.
Power control	**Normal** - This sets the powerbase as the 12 volt trigger master. **Linked** - This sets the powerbase as the 12 volt trigger slave. The 'Normal' powerbase will control this unit.

Front of Unit

LED Indicator

Power Button

IR Sensor

Power Control

Normal   Linked

Display Brightness

Darker   Brighter
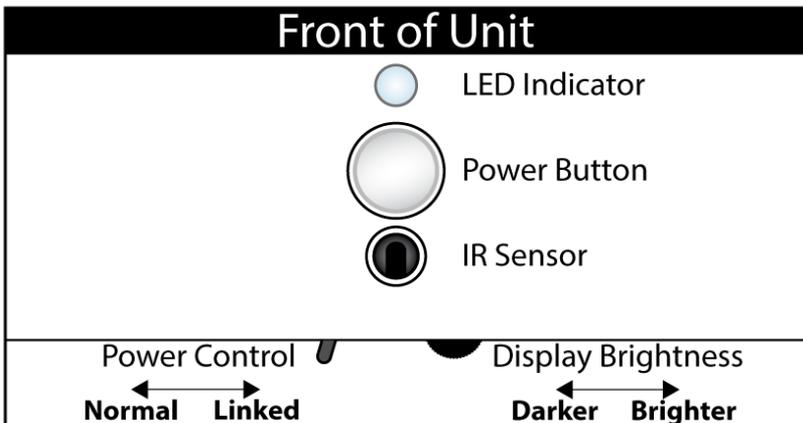
The MSB Remote

1	Power On/Off	Powerbase on and off. When the powerbase is linked to an amplifier or MSB product via the 12 volt trigger system, this button will turn off the entire system.

2	Indicator LED	**While in use:**
		    White - Command Sent
		    Red and White - Command Sent
		     and Low Battery
		    Red Flashing - Needs Charging
		While charging:
		    Red - Charging
		    White - Fully Charged

3	Input	Toggles directly through DAC inputs
4	Phase Invert	Toggles phase invert (Ø - on display)
5	Video Mode	Toggles video mode ("Video" - on display)
6	Display Mode	Toggles between the three display modes.
7	Volume/Scroll	The center scroll wheel controls DAC volume and scrolls when in the menu.
8	Mute/Select	DAC mute and select when in the menu.
9	Backward	Skip backward *(Renderer and MSB Transport only)*
10	Play/Pause	Play and pause *(Renderer and MSB Transport only)*
11	Forward	Skip forward *(Renderer and MSB Transport only)*

12	DAC Menu	Enter DAC menu
		While in menu:
		    Up - Volume wheel up
		    Down - Volume wheel down
		    Enter - Mute (Center button)
		    Return - DAC menu button

13	Stop	Stop media *(Renderer and MSB Transport only)*
14	Repeat	Track or playlist repeat *(Renderer and MSB Transport only)*
15	Charging Port	Micro-USB to charge the remote battery

LED Indicator (2)

Power On/Off (1)

Phase Invert (4)

Volume/ Scroll (7)

Backward (9)

DAC Menu (12)

(3) Input

(5) Video Mode

(6) Display Mode

(8) Mute/Select

(11) Forward

(10) Pause/Play

(14) Repeat

(13) Stop

MSB
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(15) Charging Port
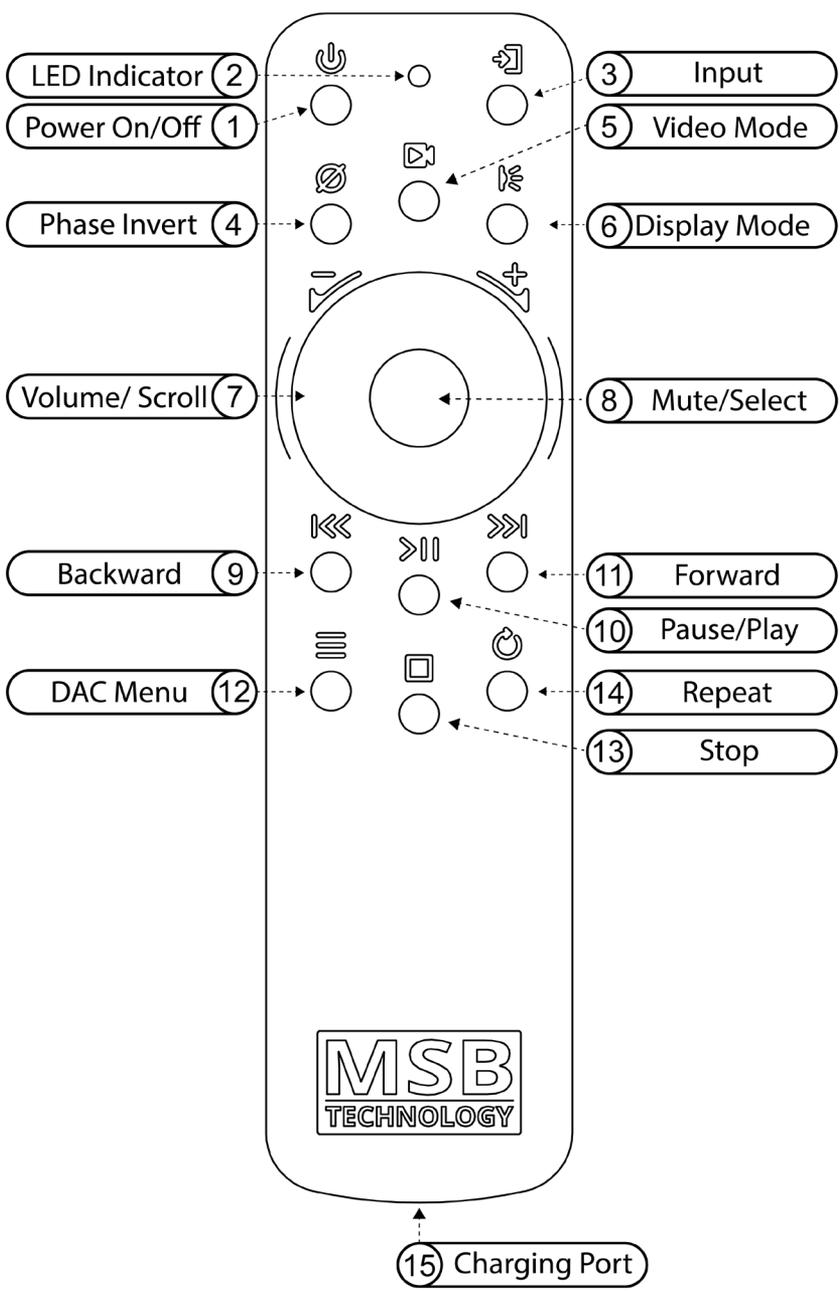
Saving Menu and Startup Settings

When changing settings in the menu, use the enter button in the center of your volume wheel on the remote or the right arrow on the Digital Director to confirm settings in the menu. In oder to save the changes you have made in the menu, use the "menu button" to exit the menu completely.

The Digital Director will not save any of your settings until you exit the menu.

Certain buttons on your remote will change settings on your system without navigating the menu, such as: Phase Invert, Display Modes, and Video Mode. However, these settings reset every time the system is reset or powered off. If you would like these settings to persist through resets or power offs, you simply have to choose the action button setting that you wish to make the default. Then, enter and exit the menu by double clicking the Menu button on your remote or Digital Director.

If at any point the system seems to be improperly setup or you want to start fresh with your settings and functions, there is a "Reset" option near the end of the menu. Simply select this and confirm "YES" before leaving the menu.

Phase Invert

The Phase Invert button is located on the remote to allow the user an easy way to invert the audio phase. This is a situational feature that is not always needed, but it can be used to fix certain recording or system setup requirements.

Video Mode

The Video Mode button is located on the remote to reduce signal latency and compensate for lip-sync delays when using the DAC for video playback. This should only be used for video playback as it increases unwanted jitter in the system.

The Cascade DAC Menu

Display Brightness

1 - 10 (Default 7)
Brightness of display

Display Mode

Auto Dimming (Default)
Display dims, brightens momentarily when information changes

Auto Off
Display is off, turns on momentarily when information changes

Always On
Display always on

Note: Setting your display to "Auto Dimming" or "Auto Off" helps reduce the chances of burn-in on your display. This can also be done with a button on the remote.

Display Info

Detailed (Default)
Displays sample rate, bit-depth, input, and volume

Volume Only
Displays centered volume only

Startup Volume

0 - 100 (Default 70)
Set startup volume from 0 - 100

Preamp Off
Preamp amp off and volume control bypassed

Note: If you choose to use the DAC with an external preamp, we recommend turning the preamp off. To do this, turn the knob past 100 to "Preamp Off".

Input Select
Input switching modes

Smart Inputs (Default)
Allows manual selection of active and previously active inputs

All Inputs
Allows manual selection of all installed inputs

Note - Analog Inputs: *Analog inputs can only be selected if enabled in the settings menu.*

Renderer Remote
Renderer playback remote control setup

Note: Option only shown when renderer module installed.

On (Default)
Playback buttons on remote will control audio playback as normal

Off
Turns renderer controls on remote off to allow control over an MSB transport only. For systems equipped with both a renderer and MSB Transport

Analog Inputs
Analog XLR 1
Analog XLR 2
Analog RCA 3
Analog RCA 4

Disabled (Default)
Analog input disabled and not selectable

On - Volume
Analog input on and preamp controls volume level

On - Bypassed
Analog input on and the volume control is bybassed

Port A
Installed module info
Lowest priority for auto select

Port B
Installed module info
Second lowest priority for auto select

Port C
Installed module info
Second highest priority for auto select

Port D
Installed module info
Highest priority for auto select

Note: each of the port screens will show information about the module that is currently installed in that slot. You can find things like the version number of the module as well as the IP address of any network renderer you currently have installed. However; some modules only display the module name.

Product Idenfication
Serial number, manufacture date and distributor name

Software
Firmware version #

Hardware
Hardware version #

Reset
Factory reset settings

Note: When resetting to factory settings, you must select confirm and exit the menu settings for the changes to take effect.

About the Input Module Slots

The Digital Director has four input module slots. They are labeled A through D. Input modules can be placed in any position. Each module is completely self-contained. It is recognized by the Digital Director and identified on the display. When the module is not in use, it is disabled.
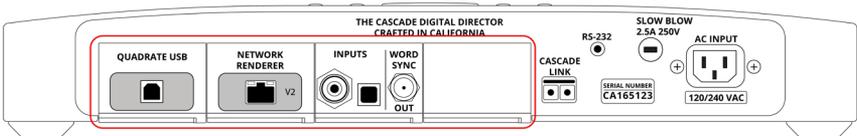
Module Handling

It is important that you refrain from touching the circuit board or rear connector of any input module when removing or installing any input modules in your Digital Director. You should only handle it by the metal case of the module, or the front edge of the module where the cam arm is located. **Improper handling of your modules can result in static shock and damage to the module and/or DAC.**
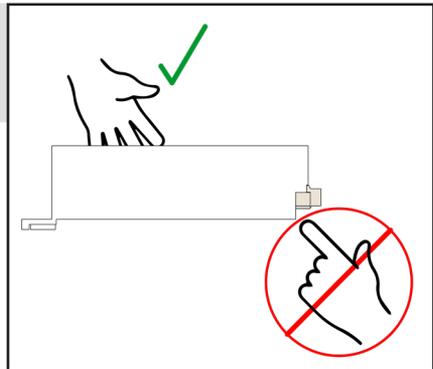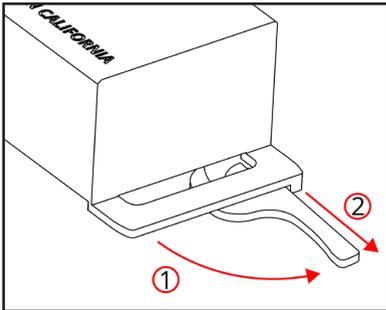
Removing and Installing Modules

Removal and installation of modules is a tool-free process that is easily performed at the back of the unit. Under the lower lip of each module is a lever. Simply pull the lever out and away until it is perpendicular with the back of the unit. Then, gently, but firmly pull the module and lever until the module releases. Slide it out of the unit. Refer to the "Module Handling" portion of your manual before attempting.

Available Input Modules

If the digital inputs in the Digital Director do not fulfill your full digital input requirements, a list of the currently available modules and their intended uses are listed below. A full digital list of these inputs, as well as a comprehensive list of pros and cons for each input format, can be found online by scanning the following QR Code or by visiting the URL listed below.


www.msbtechnology.com/dacs/digital-inputs/

Pro ISL	MSB proprietary interface for use with MSB sources. This module provides one input.
Renderer	A renderer interface for use on a home network or server. (See Renderer manual for operation and setup details.)
MQA USB	A single USB interface for playback via a computer-based source. (See USB manual for operation and setup details.)
Optical/Coaxial S/PDIF	A Toslink and Coaxial digital input with a word-sync output.
XLR S/PDIF	A single XLR digital input with a word sync output.
ProI^{2}S	MSB's proprietary interface for use with classic MSB transports. This module provides two inputs.

Burn-In

The feedback we receive leads us to recommend at least 100 hours of burn-in on this product. Customers generally report improvement in up to one month.
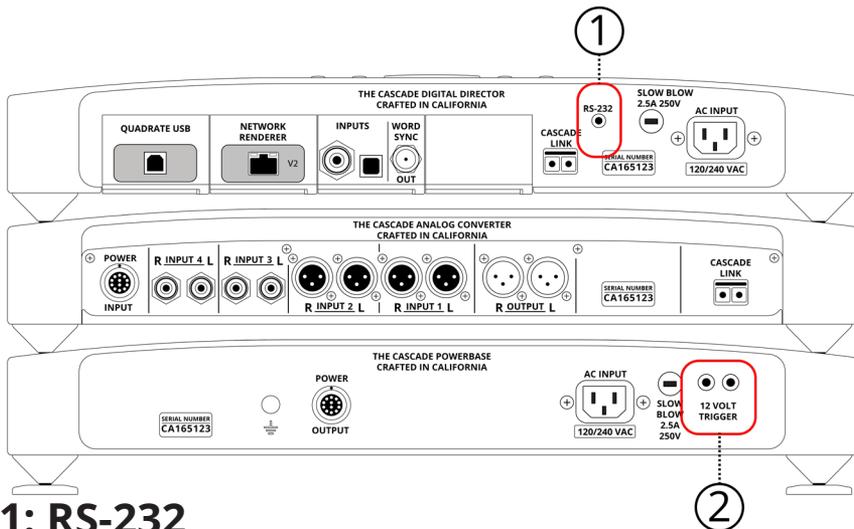
1: RS-232

The Digital Director features an RS-232 control port on the back of the unit that can be used with whole home control systems and for home theater integration. A full list of commands and coding can be found using the QR code below.

www.msbtechnology.com/dacs/cascade-support/

2: 12 Volt Trigger

The 12 Volt Trigger port on the jack panel allows you to connect to other MSB Products and use one power button to control the power of all MSB products in your system. Connect the units you wish to control by chaining them together using 3.5mm stereo mini-jack cables. Then, using the power control switch under the front of the unit, set the primary powerbase to the "N" (normal) position and every other unit that has been connected to the system to the "L" (linked) position. When done correctly, the entire system will turn on and off together when using the power button on your primary powerbase or by using the power button on the MSB remote. A more detailed explanation and setup guide can be found online by scanning the following QR Code or by visiting the URL listed below.

www.msbtechnology.com/support/12-volt-trigger/

Updating Firmware

The following instructions are for updating the firmware in the Cascade DAC. Simply play the firmware files (which are .WAV audio files) like normal audio files to update your Cascade DAC. The most up-to-date instructions can be found online.

Updating Firmware

Begin by downloading the firmware. Add these files to your bit-perfect playback software. Please note, these must be played by a bit-perfect source. If the update fails, it is not being played bit-perfect. There are two updates within the same file. The file is several minutes long. Please do not interrupt the process and let the file finish to the end. When you play the file, you will hear instructions and two upgrade tones. Following each tone, you will either hear silence for about 30 seconds (this varies), or you will hear the message 'upgrade failed'. If all the upgrades fail, it is because you did not play the file bit-perfect. You may have computer upsampling on or digital volume control somewhere in your playback system. The screen on the Digital Director will confirm when the upgrade is happening. Detailed instructions can be found online by scanning the following QR Code or by visiting the URL listed below.

www.msbtechnology.com/dacs/cascade-support/

Bit-Perfect Source Testing

Files can be downloaded from the MSB website to verify bit-perfect playback on any transport. They are .WAV music test files that, when played, will be identified and checked by the Digital Director. It will be reported on the display if they are bit-perfect. If there is a problem with the test, it will play, but the display will not indicate any change. Be sure upsampling is turned off in any transport, as this prevents a file from remaining bit-perfect. This system will allow you to easily test your source, especially computer sources, to see if all your settings are correct. There are files at all sample rates for both 16-bit and 24-bit operation. Detailed instructions can be found online by scanning the following QR Code or by visiting the URL listed below.

www.msbtechnology.com/support/bit-perfect-testing/

Troubleshooting Error Codes

Error codes report on the display in the top left corner instead of sample rate.

"Pwr Err"
• Problem with the Analog Converter or Powerbase power. Contact MSB.

"Bad Power"
• Indicates that there is a problem with the power in the digital director. Contact MSB.

"Gnd Err"
• Problem with the isolated power shorting to ground. Most likely cause is that the Cascade Link SFP module release latch is open and touching the chassis.

"Clk Err"
• Problem with the clock. If this error message persists, or if the sound is distorted, contact MSB. (If it's momentary on power up, it can be ignored becasue the clock is warming up.)

"CRC Err"
• Problem with the Cascade link. Data corruption was detected. Replace the fiber cable and SFP modules. Contact MSB if problem is persistent.

"Frame Err"
• Problem with the Cascade link. Data corruption was detected. Replace the fiber cable and SFP modules. Contact MSB if problem is persistent.

"Link Err"
• Problem with the Cascade link. Data corruption was detected. Replace the fiber cable and SFP modules. Contact MSB if problem is persistent.

Display Messages

The following messages will be displayed during power up:

"Waiting for DAC"
*   On power up of the director, it's looking for a connected and powered on Analog Converter. If it persists, check that you have properly connected the Cascade Link and have powered on your Analog Converter.

The following messages will be displayed momentarily when the event is occurring :

"Powering Down"
*   Indicates the Analog Converter has been disconnected or turned off. The Digital Director will go into standby.

"Looking for DAC"
*   This message appears when you wake up the Digital Director and it can't find an attached and powered on Analog Converter. If it persists, check that you have properly connected the Cascade Link and have powered on your Analog Converter.

"Bit Pass"
*   This displays when the bit-perfect test file is played and the unit has verified the playback as bit-perfect.

"DSP Code"
*   This shows when the DAC has received a DSP code file update and the update is taking place. DO NOT POWER OFF THE UNIT.

"Updating..."
*   This shows when the DAC has received a micro-code file update and the update is taking place. DO NOT POWER OFF THE UNIT.

The Cascade DAC Warranty Registration

All MSB Technology products come with a standard 2-year warranty. Details are defined below. We offer an additional 3 years of extended warranty for the original owner (a total of 5 years) if the following warranty registration form is completed within one year of the manufacture date. Instructions can be found online by scanning the following QR Code or by visiting the URL listed below.

www.msbtechnology.com/support/msb_warranty/

The Cascade DAC Limited Warranty

Warranty includes:

• MSB warranty covers the unit against defects in materials and workmanship for a period of **_2 years_** from the original manufacture date.

• This warranty covers parts and labor only; it does not cover shipping charges or tax/duty. During the Warranty period, there will normally be no charge for parts or labor.

• During the warranty period, MSB will repair or, at our discretion, replace a faulty product.

• Warranty repairs must be carried out by MSB or our authorized dealer. Please contact your dealer if your unit requires service.

Warranty excludes:

• The Warranty does not cover standard wear and tear.

• The product is misused in any way.

• Any unauthorized modifications or repairs were performed.

• The product is not used in accordance with the Operating Conditions stated below.

• The product is serviced or repaired by someone other than MSB or an authorized dealer.

• The product is operated without a mains earth (or ground) connection.

• The unit is returned inadequately packed.

• MSB reserves the right to apply a service charge if the product returned for warranty repair is found to be operating correctly, or if the product is returned without a returns number (RMA) being issued.

Operating Conditions:

• Ambient temperature range: 32F to 90F, non-condensing.

• The supply voltage must remain within the AC voltage specified on the power base.

• Do not install the unit near heat sources such as radiators, air ducts, power amplifiers, or in direct, strong sunlight. This may cause the product to overheat.

Technical Support

If you are experiencing any issues with your MSB product, please contact your nearest dealer or try our support page at www.msbtechnology.com/support. Please be sure you have the most current edition of your products' firmware installed. If your issue persists, please feel free to contact MSB directly. Emails are usually responded to in 1-2 business days. **Email:** hello@msbtechnology.com

MSB Return Procedure (RMA)

If a customer, dealer, or distributor has a problem with an MSB product, they should email tech support before sending anything back to the factory. MSB will do their best to respond within 1-2 business days. Should it be clear that a product must be returned, tech support should be informed and all the following relevant information should be provided:

1	Product in question
2	Serial number
3	Exact configuration when symptom is observed, along with a list with the input used, source material, system connections, and amplifier
4	Customer name
5	Customer shipping address
6	Customer phone number and email
7	Special return shipping instructions

MSB will issue an RMA number and create an invoice with all details outlined, except the final price as the product has not yet been seen. This invoice will be emailed so all the above information can be checked and verified by the customer.

The product should be returned with the RMA number present on the box. Work can then begin immediately and the product can be sent back quickly.

Any repair that is difficult and cannot be completed in two weeks will be identified, and the customer will be informed when it is to be expected. Otherwise, the majority of repairs should be shipped back within two weeks if all the required information is present on the invoice.

Link to page:
www.msbtechnology.com/support/repairs/

Cascade DAC Specifications

Supported Formats (Input dependent)	44.1kHz to 3,072kHz PCM up to 32 bits 1xDSD, 2xDSD, 4xDSD, 8xDSD Supports DSD via DoP on all inputs
Digital Inputs	4x Advanced isolated input module slots
XLR Analog Inputs	50K Ohm Balanced 6Vrms Maximum Isolated when not selected
XLR Analog Outputs	3.32Vrms Maximum (Digital Input) 6Vrms Maximum (Analog Input) 75 Ohm Balanced
Volume Control	Purely passive constant impedance analog attenuation 1dB steps
Director Power Consumption	24W on 17W Standby
DAC/Powerbase Power Consumption	78W on .48W Standby
Chassis Specifications	Chassis width: 17.5 in (444.5 mm) Chassis depth: 15.5 in (393.7 mm) Unit height: 3.125 in (79.4 mm) Three unit stack height: 8.5 in (216 mm) Digital Director weight: 30.2 lbs (13.7 kg) Analog Converter weight: 31.9 lbs (14.5 kg) Powerbase weight: 36 lbs (16 kg)
Shipping Dimensions	Width: 23 in (584 mm) Depth: 20.5 in (520 mm) Height: 7.5 in (191 mm) Digital Director weight: 37 lbs (16.8 kg) Analog Converter weight: 39 lbs (17.7 kg) Powerbase weight: 43 lbs (19.5 kg)
Included Accessories	User guide MSB remote Micro USB charging cable 2x IEC power cables Cascade-Link fiber cable Summit power cable 12x Foot base
Warranty	2 years from original manufacture date +3 years with extended warranty registration