Operation Manual

CDi DriveCore Series
Power Amplifiers



- 2|300
- 2|600
- 4|300
- 4|600
- 2|1200
- 4|1200
- 2|300BL
- 2|600BL
- 4|300BL
- 4|600BL
- 2|1200BL
- 4|1200BL

Product Registration: Register your new product at www.warranty.harmanpro.com.

Obtaining Other Language Versions: To obtain information in another language about the use of this product, please contact your local Crown Distributor. If you need assistance locating your local distributor, please contact Crown at 574-294-8000 or visit www.crownaudio.com.

This manual does not include all of the details of design, production, or variations of the equipment. Nor does it cover every possible situation which may arise during installation, operation, or maintenance.

The information provided in this manual was deemed accurate as of the publication date. However, updates to this information may have occurred. To obtain the latest version of this manual, please visit the Crown website at www.crownaudio.com.

Trademark Notice: Com-Tech, BCA, Crown, Crown Audio, Amcron and Multi-Mode are registered trademarks of Crown International. DriveCore, DriveCore Install, IQwic, PIP and PIP2 are trademarks of Crown International. Other trademarks are the property of their respective owners.

Some models may be exported under the name Amcron®

© 2017 by HARMAN International®, Inc. 1718 W. Mishawaka Rd., Elkhart, Indiana 46517-9439 U.S.A. Telephone: 574-294-8000 5074176-B – 08/17

Table of Contents

Welcome 1
Features 1
How to Use This Manual 1

Installing the Amp 2
Unpacking 2
Additional Materials 2
Installing the Amplifier 2
Proper Cooling 2

Front Panel Overview 3

Rear Panel Overview 4

Hardware Setup 5
Connecting the AC Power Cord 5
Power Up Procedure 5
Precautions 6
Wiring Input Connectors 7
Wiring Output Connectors 7

Front Panel Menus & Navigation Overview 8
Menu Structure 8
The Home Screen 9

Adjusting Channel Volume 10

Configuring the Amp 11
About Input & Output Configuration 11
Using the Guided Setup 12
Configuring Amp Wiring & Bridge Mode 13
Assigning Input Sources 14
Configuring Output Modes 15
Configuring DSP 15
Delay 16
PEQ (Parametric EQ) 17
Crossover 18
Limiter 19
Configuring Speaker Tunings 20
Configuring Output Fader Linking 21
Configuring BLU link Settings 22

Installing Audio Architect & Configuring the Network 23
Introduction to HiQnet Audio Architect 23
Configuring Amplifier Network Settings 24
Configuring the Network from the Front Panel 24
Configuring the Network using NetSetter 25
The NetSetter Grid 27

Using HiQnet Audio Architect 31
Launching the Audio Architect Software 31
Offline & Online Operation Explained 32
Going Online 33
Matching Devices 33
Main CDi DriveCore Control Panel 34
Amplifier Information 35
Configuring Inputs & Outputs in Audio Architect 36
Assigning Input Sources in Audio Architect 36
Configuring Inputs 37
Configuring BLU link Clock 38
Configuring BLU link Outputs 38
Configuring Amp Wiring & Output Modes in Audio Architect 39
Cascading Inputs 39
Configuring Outputs for Bridge Mono Operation 40
Configuring Outputs for Low Z/High Z Operation 40
Configuring Speaker Tunings in Audio Architect 41
Crossover Panel 42
FIR Filters 42
Input/Output EQ Panels 43
Input/Output Delay Panels 44
LevelMAX Panel 45
About the Transducer Thermal Limiter 46
Signal Generator Panel 46
Managing Device & Preset Files 47
Programming BSS Contrio Ethernet Wall Controllers 49
Saving & Opening Audio Architect Venue Files 53
The Event Log 54

Application Examples 55
Dual Mode, Low Z (2Ω, 4Ω, 8Ω, or 16Ω) 55
Bridge Mono Mode, Low Z (4Ω, 8Ω, or 16Ω) 56
Dual Mode, High Z (70Vrms/100Vrms) 57
Bridge Mono Mode, High Z (140Vrms/200Vrms) 58

Using BLU link 59
BLU link Specifications 59
BLU link Latency 59
Making BLU link Connections 59
BLU link Port LED Indicators 60
Mastership 61
Fault Tolerance 61
BLU link Status 62

Device Presets 63
Saving Device Presets 63
Loading Device Presets 64

System Settings 65
Lighting/Display Options 65
Security/Front Panel Lockout 66
Amp Gain Mode 67
Power Modes 67
Amplifier Diagnostics 68

Using the GPIO Control Port 69
GPIO Pinout, Specification, Use, & Configuration 69

Using the AUX Port 70
Sleep 70
Amp Status 70

Power Saving Modes 71
Auto Channel Disable (ACD) 71
Auto Power Down (APD) 71

System Protection 72
Faults 72
Thermal Limit 72
Auto-Insertion High-Pass Filters 72
AC Under/Over-Voltage Protection 72
Fan-Cooled Chassis 72
Universal Switching Power Supply 73

Troubleshooting 74

Signal Path Block Diagram 76

Factory Reset 77

Specifications 78
Output Power: Dual Mode – All Channels Driven 78
Output Power: Bridge Mono Mode – All Channels Driven 78
Input Sensitivity 78
Performance Specifications 79
Dimensions 80

AC Power Draw & Thermal Dissipation 81
CDi DriveCore 2|300 / 2|300BL 81
CDi DriveCore 4|300 / 4|300BL 82
CDi DriveCore 2|600 / 2|600BL 83
CDi DriveCore 4|600 / 4|600BL 84
CDi DriveCore 2|1200 / 2|1200BL 85
CDi DriveCore 4|1200 / 4|1200BL 86

Warranty (United States Only) 87

Service 88
Worldwide Service 88
US and Canada Service 88
Service at a US or Canada Service Center 88
Factory Service 88
Factory Service Shipping Instructions 89
Packing Instructions 89
Estimate Approval 89
Payment of Non-Warranty Repairs 89

Service Return Authorization Request 90

Open Source Disclaimer for HARMAN Products 91

GNU General Public License Version 2 94

GNU General Public License Version 3 99

Welcome

Thank you for purchasing a Crown CDi DriveCore installation amplifier, one in a complete line of high-performance amplifiers based on exclusive DriveCore technology. The CDi DriveCore Series amplifiers are designed, engineered, and manufactured to the industry's highest quality standards and offer system integrators with the advanced features and flexibility required for challenging 21st-century installed-sound applications. Versatile, compact, and highly energy-efficient, CDi DriveCore Series amplifiers continue the unbroken Crown tradition of leadership in professional and commercial power amplifier technology.

Features

- Exclusive multi-patented DriveCore™ Technology – The patented DriveCore integrated circuit combines hundreds of discrete circuits into one chip for better performance, lower power consumption, and improved reliability
- BLU link digital audio transport – Up to 256 Channels of digital audio over Category 5e cabling (available on BLU link CDi DriveCore models)
- Supports configuration and control using HiQnet® Audio Architect™
- Monitoring and control over TCP/IP
- Color LCD and front panel user interface for amplifier configuration, control, and monitoring
- Programmable GPIO (general purpose input/output) control port
- Digital signal processing (Input/output EQ filters, crossover, input/output delay, LevelMAX™ limiters)
- Support for importing of FIR filter coefficients
- 20 device presets – 1 factory and 19 user
- 96kHz/32-bit floating-point signal processing
- Universal power supply with PFC for reduced current draw and industry-leading efficiency
- Power saving modes
- Remote power off – Sleep mode activated via AUX port
- 70Vrms/100Vrms direct drive
- Each channel independently configurable for low z or high z operation
- Advanced protection circuits – Amplifier and loads are protected against shorted outputs, DC, mismatched loads, overheating, over/under-voltage, and high-frequency overload
- Three year, no-fault transferable warranty – Your investment is fully protected
- Complies with GreenEdge™ by HARMAN – Environmentally friendly practices in design, manufacturing, and packaging complement energy-efficient operation
- Support for BSS Audio® Soundweb™ Contrio™ Ethernet wall controllers
- Included speaker tunings for various JBL® speaker models

How to Use This Manual

This manual provides the necessary information to safely and correctly setup and operate your Crown product. It does not cover every aspect of installation, setup, or operation that might occur under every condition. For additional information, please contact technical support, your system installer, or retailer.

We strongly recommend you read all instructions, warnings, and cautions contained in this manual. Also, for your protection, please register your product at www.warranty.harmanpro.com. And save your bill of sale — it's your official proof of purchase.

If viewing this manual from a computer or mobile device that supports interactive PDFs, the Table of Contents, page references, figure references, and URLs are all interactive and can be clicked on or pressed to navigate to the corresponding page or web URL.

Installing the Amp

Unpacking

Unpack your amplifier and inspect for any damage that may have occurred during transit. If damage is found, notify the shipping company immediately. Only you can initiate a claim for shipping damage, though Crown will be happy to help as needed. If the product arrived showing signs of damage, save the shipping carton for the shipper's inspection.

We also recommend that you save all packing materials for use if you ever need to transport the unit. Never ship the unit without the factory carton and packing materials.

Additional Materials

For installation, you will need the following (not supplied):

- Input wiring cables
- Output wiring cables
- Flathead screwdriver
- Phillips screwdriver
- Rack for mounting amplifier (or a stable surface for stacking)
- Category 5e or higher cabling

WARNING: Before you start to set up your amplifier, read and observe the Important Safety Instructions included in the box. These instructions can also be downloaded from the product page at www.crownaudio.com.

Installing the Amplifier

CAUTION: Before you begin, make sure your amplifier is disconnected from the power source.

Mount the unit in a standard 19-inch (48.3 cm) equipment rack (EIA RS-310B). You can also place a single amp on a solid, stable surface or stack multiple amps.

NOTE: Amplifiers should be supported at both the front and rear of the rack.

See ***"Dimensions" on page 80*** for information on amplifier dimensions.

Proper Cooling

When using an equipment rack, mount units directly on top of each other. Close any open spaces in the rack with blank panels. (Open spaces will reduce cooling efficiency.) DO NOT block front or rear air vents.

The rack should be a minimum of 2 inches (5.1 cm) away from the amplifier, and the back of the rack should be a minimum of 4 inches (10.2 cm) from the amplifier back panel.

Air flow is front to back as illustrated in ***Figure 1***.

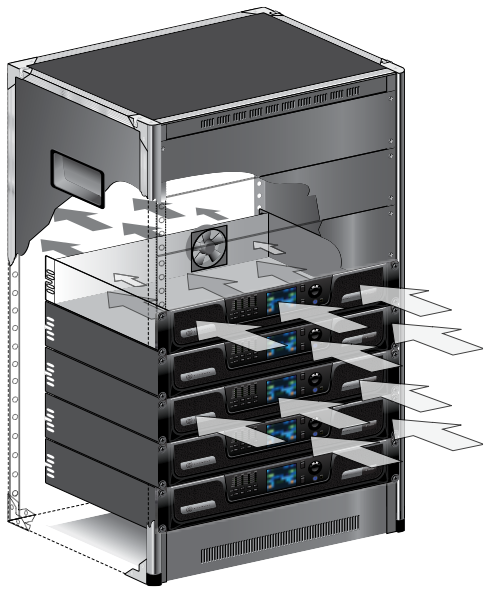


Figure 1: *Proper rack venting*

Front Panel Overview

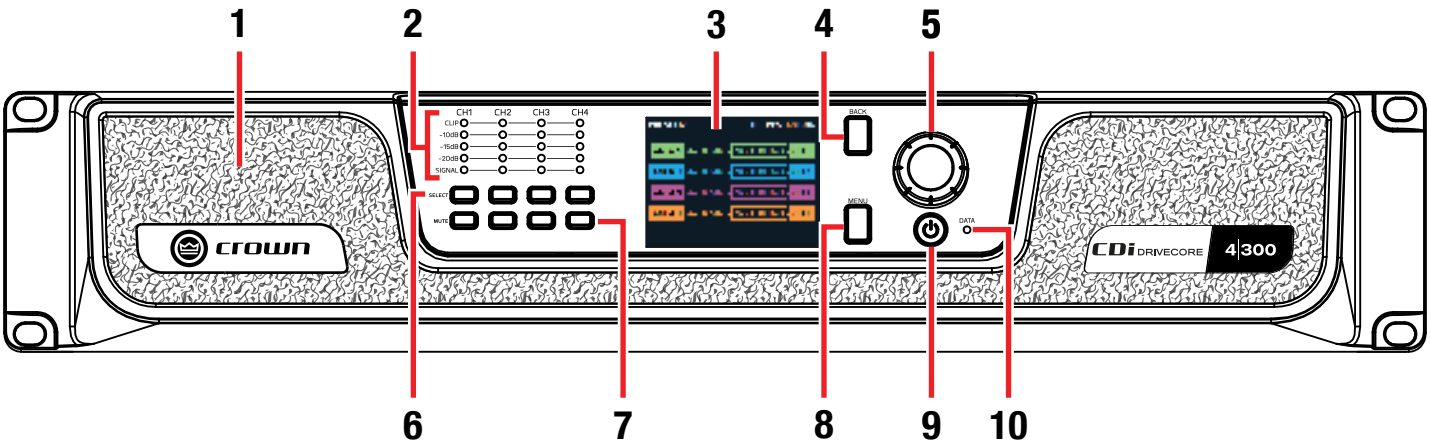


Figure 2: *4|300 front panel shown*

1. **Cooling Vents/Air Filters**
   Provides cooling air flow. Do not block or cover these vents. Air filters are removable.
2. **Signal Level LED Indicators**
   These LEDs indicate channel signal level as follows:
   - **Clip LED –** Lights yellow if the input clips or red if the output clips. Note that an output clip will always take priority over an input clip.
   - **-10dB LED –** Lights green when the output signal reaches a level that is 10dB below full scale output of the amp.
   - **-15dB LED –** Lights green when the output signal reaches a level that is 15dB below full scale output of the amp.
   - **-20dB LED –** Lights green when the output signal reaches a level that is 20dB below full scale output of the amp.
   - **Signal LED –** Lights green when signal is sensed at the input. The threshold for lighting this LED is -40dBu.

   NOTE: The full scale output of the amplifier may change depending on the Low Z/High Z setting, as well as the amplifier model. See ***"Configuring Outputs for Low Z/High Z Operation" on page 40*** for more information.
3. **LCD (Display)**
   This color LCD provides product information and visual feedback for operating the CDi DriveCore amplifier from the front panel.
4. **Back Button**
   Press this button to navigate back one level when navigating menus.
5. **Encoder**
   This encoder supports rotary and pushbutton operation. It is used to navigate the CDi DriveCore's menus and select on-screen options. It is also used to adjust individual channel or overall system volume.
6. **Channel Select Buttons**
   Pressing one of these buttons will select the corresponding channel; turning the **ENCODER** will then control the volume of the selected channel.

   Pressing and holding a **CHANNEL SELECT** button for 2 seconds from the Home screen will display a Channel Details screen for that channel. The Channel Details screen shows additional details for the selected channel, including configured input source, output mode, status, channel temperature, and channel volume. Note that channel volume can also be controlled from this screen by turning the Encoder.
7. **Channel Mute Buttons**
   Pressing each of these buttons will mute/unmute the corresponding amplifier output channel. Note that when a channel is muted, the front panel SIGNAL LEDs will still light to indicate input signal level presence, the CLIP LEDs will still light to indicate input clipping, and the LCD will flash "Mute".
8. **Menu Button**
   Pressing this button will enter the Main menu, where amplifier settings can be edited.
9. **Power Button**
   Turns the amplifier power on or off. The Power button has an integrated power symbol that illuminates blue when the power is on and green when the power is off. To prevent the unit from accidentally being powered off, the Power button must be pressed and held for 2 seconds when powering off.

   NOTE: The Power button is disabled when using the AUX port Sleep circuit. See ***"Using the AUX Port" on page 70*** for more information.
10. **Data LED**
    This LED will illuminate yellow when there is valid HiQnet data being transmitted to/from the amplifier.

NOTE: 4-channel model shown. Indications per channel pair are identical for 2-channel models.

Rear Panel Overview

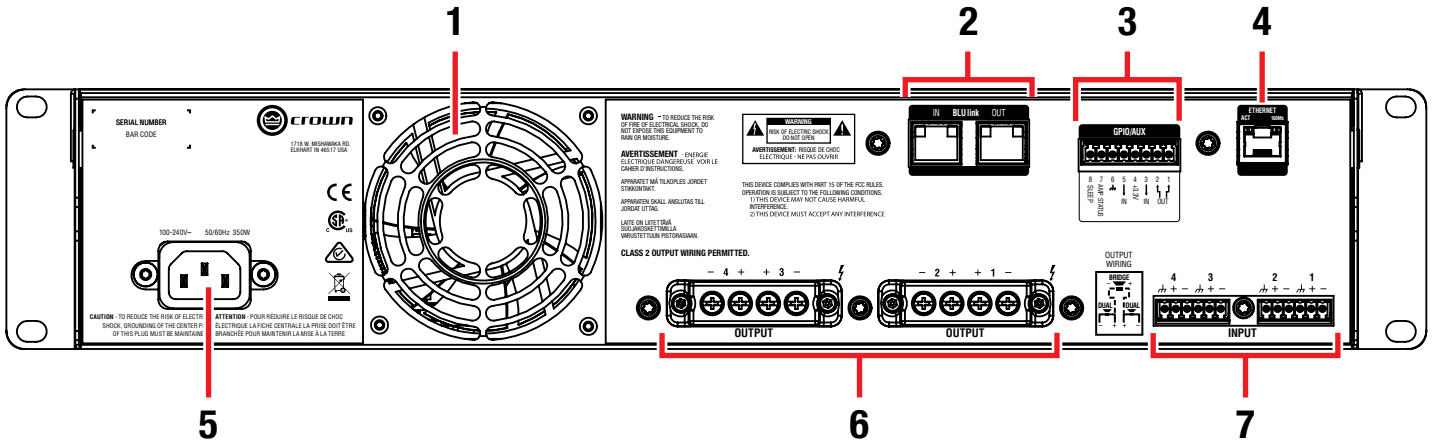


Figure 3: *4|300BL rear panel shown*

1. **Cooling Fan Outlet**
   Outlet for cooling air flow. Do not block or cover this outlet.

2. **BLU link Input/Output Ports***
   These two RJ45 connectors are used for BLU link audio transport and are available only on the BLU link CDi DriveCore amplifier models. BLU link provides up to 256 channels of digital audio over Category 5e wiring. For information on the port LED indicators, see ***"BLU link Port LED Indicators" on page 60***.

   NOTE: BLU link audio will not pass through an Ethernet switch or router. BLU link connections must be made directly between BLU link devices.

3. **General Purpose Input/Output (GPIO)**
   This 8-pin block connector combines the 2-in, 2-out GPIO with the SLEEP and AMP STATUS pins from the AUX circuit. See ***"Using the GPIO Control Port" on page 69*** and ***"Using the AUX Port" on page 70*** for further information on configuring and using these ports.

4. **Ethernet (Network Control) Port***
   Connect this RJ45 port to a computer or network for monitoring and controlling the amplifier over Category 5e wiring via the Audio Architect software. The integrated LEDs in this Ethernet port will light as follows:

   - **Yellow LED**
     This LED lights when a network connection is established with the computer or network, and will flash to indicate network activity.
   - **Green LED**
     This LED indicates network speed and will light when connected to a 100 Mb network or not light when connected to a 10 Mb network.

   NOTE: The Ethernet port is for network control only and will not transmit or receive BLU link audio.

5. **AC Power Inlet**
   Connect the included AC power cord to this standard 15A, IEC type 320 inlet. Supported mains voltage range is 100-240V~.

6. **Output Terminal (Barrier Block) Connectors**
   One four-pole, touch-proof terminal strip per channel pair. Accepts up to 10 AWG wire or terminal forks. See ***"Wiring Output Connectors" on page 7*** for information on wiring these connectors.

7. **Audio Input (Terminal Block) Connectors**
   Connect your audio source outputs to these inputs using the provided plug-in connectors. One 6-pin plug-in connector can be used per input pair. These inputs are high impedance, balanced connections. See ***"Wiring Input Connectors" on page 7*** for information on wiring these connectors.

***WARNING:** Only connect to networks that remain inside the building.

Hardware Setup

Connecting the AC Power Cord

IMPORTANT: The amplifier output mode must be properly configured for the application before connecting the speakers and powering on the amplifier. By default, all outputs are configured for Low Z operation. See ***"Configuring the Amp" on page 11*** for more information.

Connect your amplifier to the AC mains power outlet using the supplied AC power cord. First, connect the IEC end of the cord to the IEC connector on the amplifier. Then plug the other end of the cord to the AC mains.

WARNING: The third prong of the power connector (ground) is an important safety feature. Do not attempt to disable this ground connection by using an adapter or other methods.

Make certain the AC mains voltage and current ratings are sufficient to deliver full power to all amplifiers. CDi DriveCore Series amplifiers use a universal power supply. The AC voltage requirements are 100V-240V~, 50/60Hz (±10%). If the AC line voltage varies outside of this acceptable range, the amplifier's power supply will turn off and the blue Power LED will flash. The amplifier will turn back on when the AC line voltage returns to safe operating levels.

Power Up Procedure

When turning on the amplifier for the first time:

1. Ensure all connections are disconnected with the exception of the power cord.
2. Press the amplifier's **POWER** button. The Power indicator will light blue and the amplifier will boot as long as sufficient mains power is provided.
3. Once boot up is complete, turn the **ENCODER** counter-clockwise until all amp levels are set to -80dB in the front panel LCD.
4. Configure the amplifier as described in ***"Configuring the Amp" on page 11***.

   NOTE: The amplifier output mode must be properly configured for the application before connecting the speakers and powering on the amplifier. By default, all outputs are configured for Low Z operation.
5. Once the amplifier has been properly configured for the application, turn off the power — by pressing and holding the Power button for 2 seconds — then disconnect the power cord.
6. Turn down the level of your audio source.
7. Make all connections as described in ***"Wiring Input Connectors"*** and ***"Wiring Output Connectors" on page 7.***
8. Once all connections have been made, reconnect the power cord and turn on the amplifier power.
9. Turn your audio source up to an optimum level. Refer to all device meters and ensure that at no point in the signal chain is the signal being clipped in any way. If any of the amplifier's Clip indicators light yellow, reduce the source level until the Clip LEDs no longer light.
10. Turn the amplifier's **ENCODER** clockwise until the desired loudness or power level is achieved, while making sure the amplifier's clip LEDs do not light.

IMPORTANT: Always turn off the amplifier — by pressing and holding the Power button for 2 seconds — and disconnect the power cord before making any wiring or installation changes.

IMPORTANT: When powering a fully configured PA system, always turn the amplifiers on last and off first.

For help with determining your system's optimum gain structure (signal levels) please refer to the Crown Amplifier Application Guide, available online at www.crownaudio.com.

Precautions

Your amplifier is protected from internal and external faults, but you should still take the following precautions for optimum performance and safety:

1. Configure the amplifier for proper operation, including input and output wiring hookup. Improper wiring can result in serious operating difficulties. For information on wiring and configuration, please consult **"*Wiring Input Connectors*"** and **"*Wiring Output Connectors*" *on page 7***. For advanced setup techniques, consult Crown's Amplifier Application Guide available online at www.crownaudio.com.
2. Use care when making connections, selecting signal sources, and controlling the output level. The load you save may be your own!
3. Do not short the ground lead of an output cable to the input signal ground. This may form a ground loop and cause oscillations.
4.  **Never connect the output to a power supply, battery, or power main. Electrical shock may result.**
5. Tampering with the circuitry or making unauthorized circuit changes may be hazardous and invalidate all agency listings.
6. Do not operate the amplifier with the Clip LEDs constantly flashing.
7. Do not overdrive the mixer, which will cause clipped signal to be sent to the amplifier. Such signals will be reproduced with extreme accuracy, and loudspeaker damage may result.
8. Do not operate the amplifier with less than the rated load impedance. Due to the amplifier's output protection, such a configuration may result in premature clipping and speaker damage.

REMEMBER: Crown is not liable for damage that results from overdriving other system components.

Wiring Input Connectors

Crown recommends using pre-built or professionally wired balanced cables (two-conductor plus shield). Balanced wiring provides better rejection of unwanted noise and hum, however, unbalanced line may also be used.

Use 6-pin plug-in cable ends at the amp input connectors. A male connector is supplied for each input of your model of amplifier. Additional connectors are available from Crown (P/N 5024623).

Figure 4 shows connector pin assignments for balanced wiring and ***Figure 5*** shows connector pin assignments for unbalanced wiring. Note that for bridge mono operation, only the odd-numbered input channels (1,3) should be wired for each bridged pair.

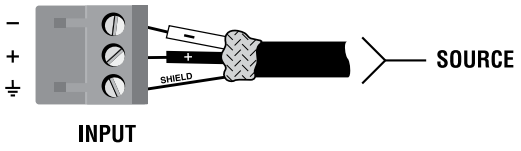


Figure 4: *Balanced wiring*

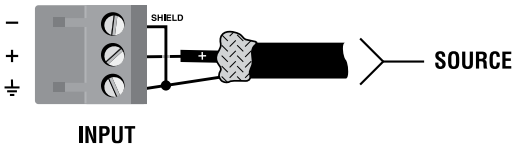


Figure 5: *Unbalanced wiring*

Wiring Output Connectors

IMPORTANT: The amplifier output mode (Low Z, 70V, 100V) must be properly configured for the application before connecting the speakers. By default, all outputs are configured for Low Z operation. See **"*Configuring the Amp*" *on page 11*** for more information.

Before making any output connections, ensure the power cord is disconnected from the amplifier and carefully review the total impedance for loudspeakers connected to each amplifier output. If multiple loudspeakers are connected to an output in Low Z mode (i.e., in series, parallel, or series-parallel), be certain the total system impedance is within allowed specification for the output. When multiple loudspeakers are connected to one output in High Z mode, be certain total tapped power is below the rated power output for the channel. See **"*Specifications*" *on page 78*** for supported load specifications.

NOTE: The Crown-designed output cover does not need to be removed to connect the output wiring.

Crown recommends using the included terminal fork connectors and two-conductor or four-conductor, heavy gauge speaker wire. You may use terminal forks up to 10 AWG or bare wire for your output connectors (see ***Figure 6***). For best results, Crown recommends Panduit part #PV10-6LF-L or equivalent terminal fork. For bare wire, it is highly recommended that output wiring is tinned. To reduce strain on input and output wiring, Crown recommends the use of horizontal lacer bars. For best results, Crown recommends Middle Atlantic® part# LBP-4R90 or equivalent horizontal lacer bar.

For low-impedance loads, refer to the table below and select the appropriate size of wire based on the distance from amplifier to speaker.

Distance	Wire Size
Up to 25 ft. (7.6m)	16 AWG
26-40 ft. (7.9-12.2m)	14 AWG
41-60 ft. (12.5-18.3m)	12 AWG
> 60 ft (18.3m)	10 AWG

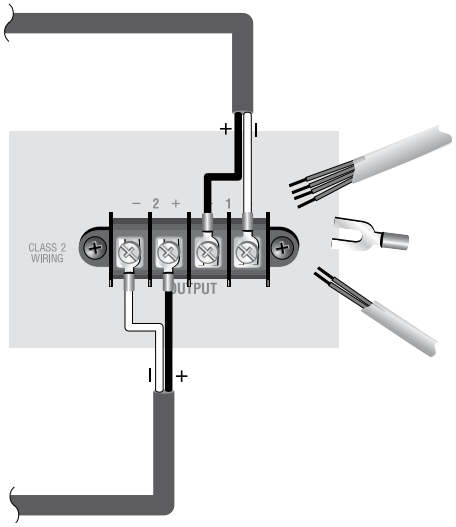


Figure 6: *Wiring output connectors*

CAUTION: Never use shielded cable for output wiring.

CAUTION: Never connect the speaker return to the chassis of the amplifier, or damage to the amplifier may result.

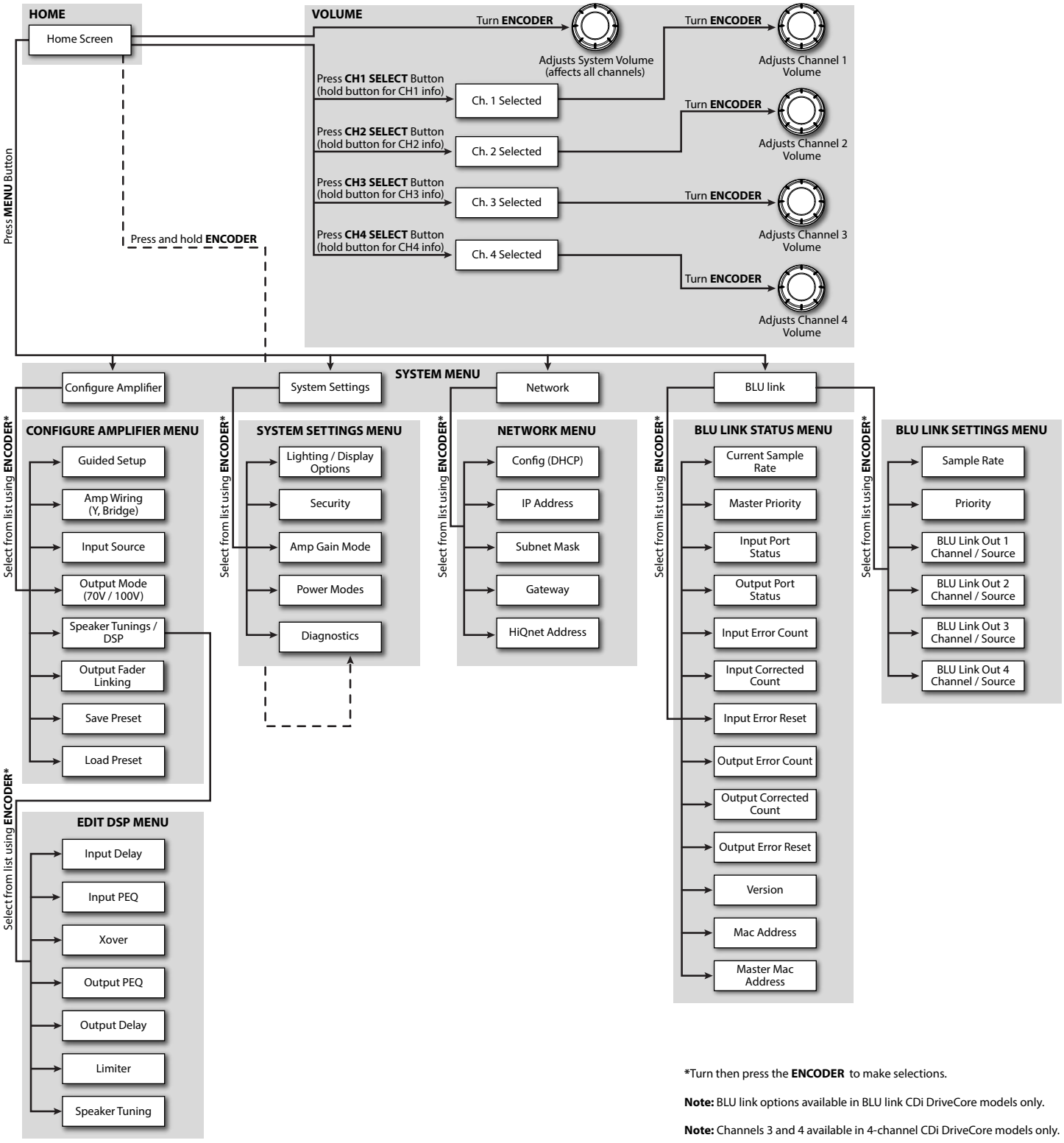
NOTE: Custom wiring should only be performed by qualified personnel. Class 2 output wiring is required.

For application-specific output connection diagrams, including how to wire outputs for bridge mono operation, see **"*Application Examples*" *on page 55***.

Front Panel Menus & Navigation Overview

Menu Structure

The below diagram shows the CDi DriveCore's front panel menu structure, as well as how to navigate and control channel volume.



***Turn then press the **ENCODER** to make selections.

Note: BLU link options available in BLU link CDi DriveCore models only.

Note: Channels 3 and 4 available in 4-channel CDi DriveCore models only.

Figure 7: *Menu structure diagram*

The Home Screen

The Home screen (shown in ***Figure 8***) is the first screen displayed in the CDi DriveCore's front panel display once the amplifier has completed the boot sequence.

From the Home screen, the **ENCODER** can be turned to adjust system volume or pressed and held to access the Diagnostics screen, the **CHANNEL SELECT** buttons can be pressed (or held) to adjust individual channel volume using the **ENCODER**, or the **MENU** button can be pressed to enter the Main menu to configure and view information about the amplifier.

The Home screen shows at-a-glance amplifier configuration information, as shown in ***Figure 9***. Here you can see the currently loaded device preset, device IP address, CDi DriveCore configuration, channel volume settings, and more.

NOTE: Throughout sections of this manual, some illustrations and text will refer to channel pair 1-2 only. Note that connections and settings for channels 3-4 (available on 4-channel CDi DriveCore models) are identical. Each channel can be configured independently in all models.

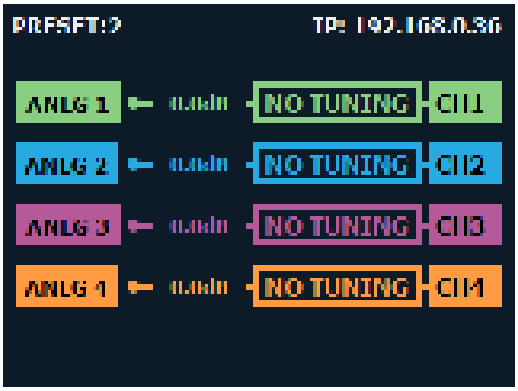


Figure 8: *Home screen*

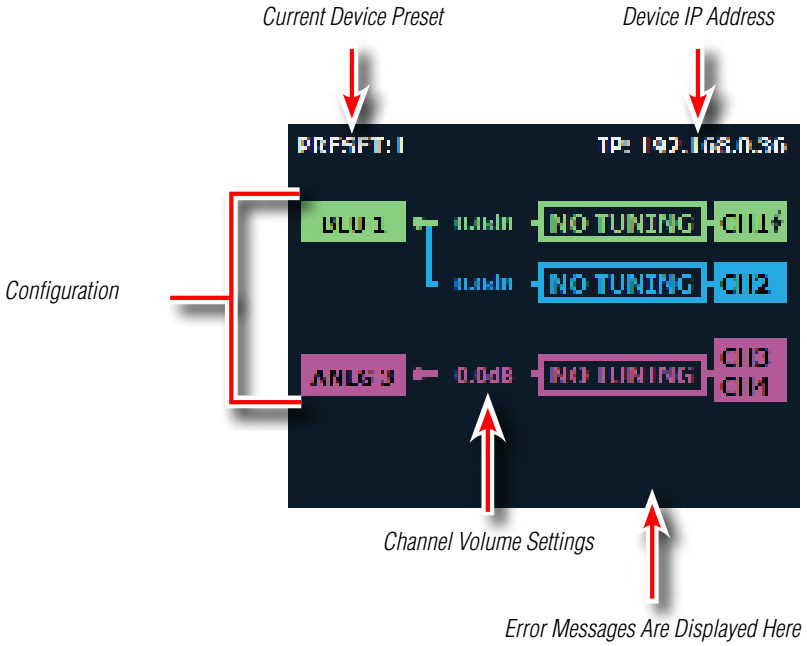


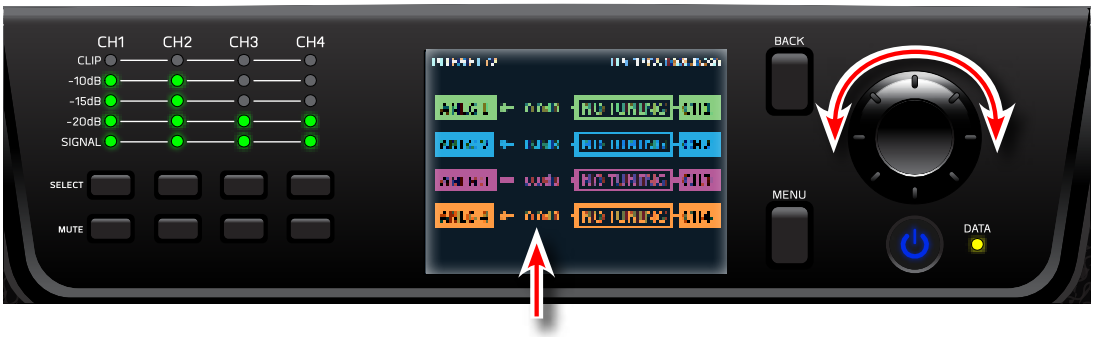
Figure 9: *Home screen layout*

Adjusting Channel Volume

Channel volume can either be controlled globally or independently per channel. The volume range is from -80dB to 0dB. For gain structure purposes, it is important to note that volume adjustment occurs at the end of the DSP signal chain and before output limiting.

To adjust system (global) volume:

1. From the Home screen, turn the **ENCODER**. The volumes for all channels will be adjusted respectively.



NOTE: When adjusting system volume, all independent channel volume settings are adjusted relative to each other. This means that the minimum/maximum global volume limits are governed by the channel with the highest or lowest volume setting.

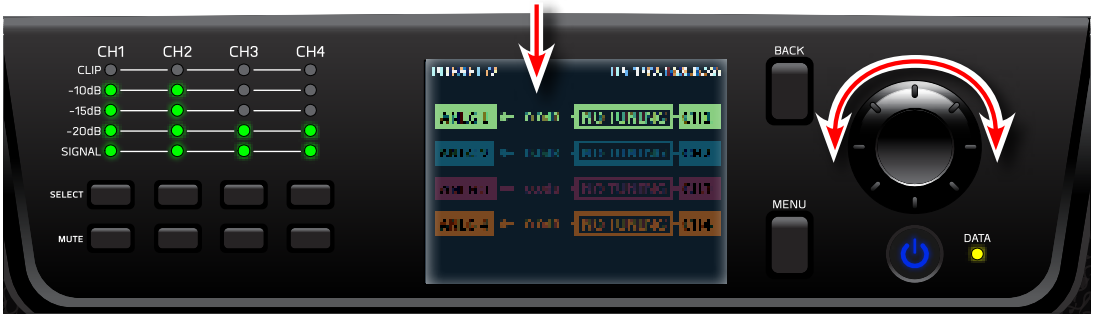
To adjust the volume of a particular channel:

1. Select one of the channels using the corresponding **SELECT** button — the selected channel will now be highlighted in the display.



TIP: An alternative method for adjusting channel volume is to press and hold one of the channel **SELECT** buttons to bring up the Channel screen.

2. Turn the **ENCODER** to adjust the selected channel's volume.



3. When done, press the **BACK** button to deselect the channel.

Configuring the Amp

This section of the manual describes how to configure the CDi DriveCore amplifier for your application using the front panel user interface. This includes assigning input channels, editing internal routing and DSP settings, and configuring output mode settings. CDi DriveCore Series amplifiers can be configured using the built-in Guided Setup or manually using the individual menu options in the Configure Amplifier menu. Configuration can also be performed from a PC using HiQnet Audio Architect. For information on configuring the CDi DriveCore amplifiers using Audio Architect, see ***"Installing Audio Architect & Configuring the Network" on page 23***.

About Input & Output Configuration

The CDi DriveCore amplifiers ship from the factory with each output channel sourced from its respective analog input (e.g., analog input 1 goes to output 1, etc.), as shown in ***Figure 10***.

When viewing the Home screen, signal flow is represented by lines that traverse from the input source (leftmost box) to the channel output (rightmost box).

Additional amplifier configuration information can be seen at-a-glance on the Home screen, as shown in ***Figure 11***.

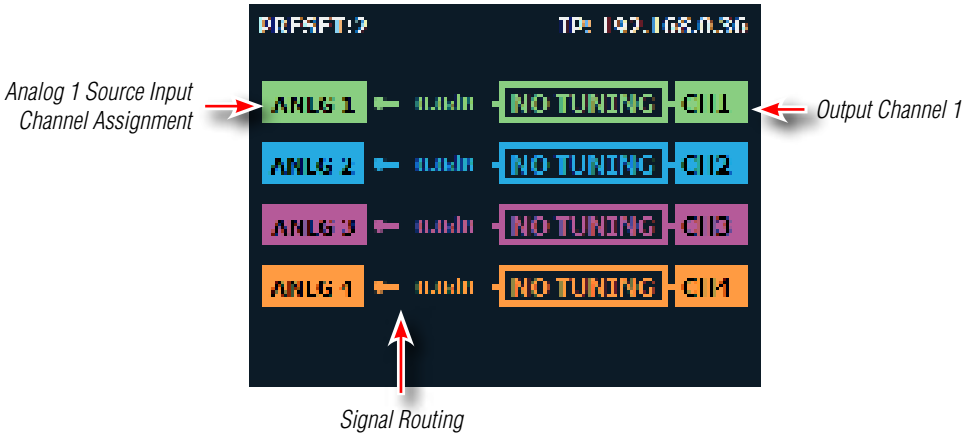


Figure 10: *Default CDi DriveCore configuration*

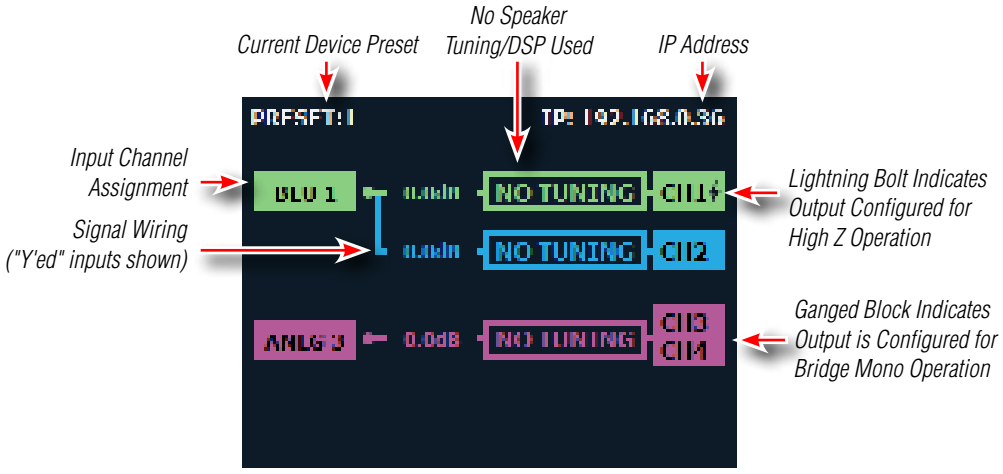


Figure 11: *CDi DriveCore configuration example viewed from the front panel Home screen*

Using the Guided Setup

The Guided Setup walks you through all the steps to configure the amplifier. This includes assigning input channels, configuring internal DSP wiring and settings, and configuring output operation.

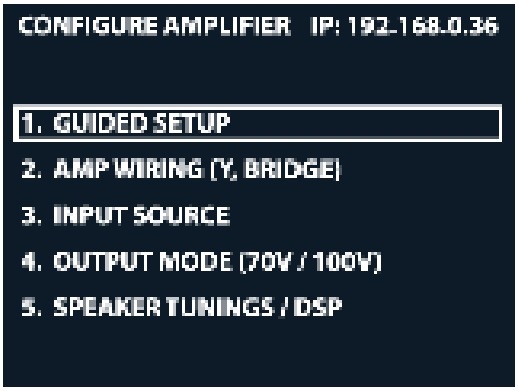


Figure 12: *Configure Amplifier menu*

To configure the amplifier using the Guided Setup:

1. From the Home screen, press the **MENU** button.
2. Select the “Configure Amplifier” option from the menu using the **ENCODER**.
3. Select the "Guided Setup" option from the menu.
4. Follow the on-screen steps, making selections with the **ENCODER**. If you wish to exit the Guided Setup at any time, press the **MENU** button.

NOTE: After completing the Guided Setup, configuration settings will be retained after power cycling the amp. However, it's a good idea to save the configuration. The configuration must be saved before loading another device preset or the settings will be lost. See ***"Saving Device Presets" on page 63*** for information on saving device presets.

Configuring Amp Wiring & Bridge Mode

From the Amp Wiring Setup screen (see ***Figure 13***), input wiring can be configured. Here you can configure an input to feed multiple outputs (referred to as "Y'ing" the signal).

Bridge mono operation can also be configured from this screen. Bridging a pair of amplifier outputs will increase the power and voltage available at the output.

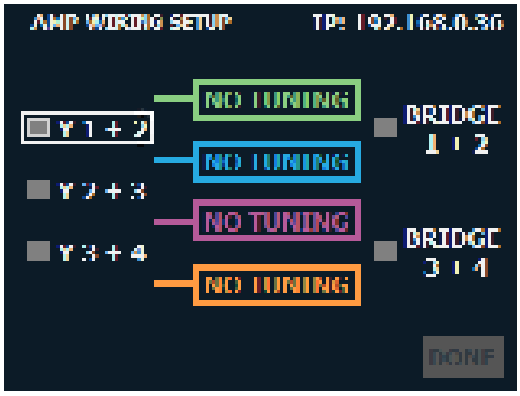


Figure 13: *Amp Wiring Setup screen*

To configure input wiring and/or bridge mode manually:

1. From the Home screen, press the **MENU** button.
2. Select the “Configure Amplifier” option from the menu using the **ENCODER**.
3. Select the "Amp Wiring" option from the menu.
4. Select the desired options for your application, making selections with the **ENCODER**.
5. When done, select "Done" at the bottom of the screen.

Available input options:

- **Y 1+2**
- **Y 2+3***
- **Y 3+4***

Available output options:

- **Bridge 1+2**
- **Bridge 3+4***

For information on configuring signal routing and bridge mode settings in Audio Architect, see ***"Configuring Amp Wiring & Output Modes in Audio Architect" on page 39***.

***Channel 3 and 4 options available in 4-channel CDi DriveCore models only.

Assigning Input Sources

Input sources can be assigned from the Input Source screen (see ***Figure 14***). The default preset (Preset 1) is configured with all analog inputs feeding their respective output channels.

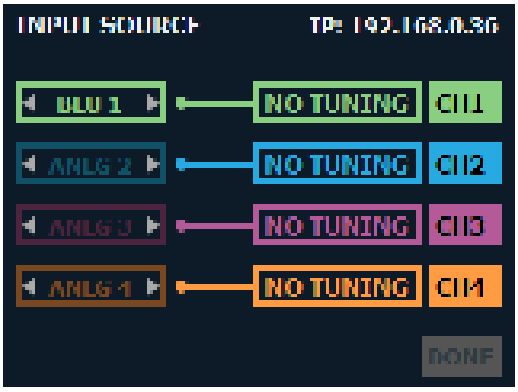


Figure 14: *Input Source screen*

To assign input sources manually:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Input Source" option.
4. Use the **ENCODER** to select each input channel block and edit the input channel source assignment.

   TIP: When assigning a BLU link input channel, the "BLU" option must first be selected from the list, then the **ENCODER** must be pressed. Turning the **ENCODER** will then select the desired BLU link channel from the list.
5. When done, select "Done" at the bottom of the screen.

Available options:

- **Analog 1**
- **Analog 2**
- **Analog 1+2 (mono summed)**
- **Analog 3***
- **Analog 4***
- **Analog 3+4* (mono summed)**
- **Any available BLU link channel****
- **None**

For information on assigning input sources in Audio Architect, see ***"Assigning Input Sources in Audio Architect" on page 36***.

*Channel 3 and 4 options available in 4-channel CDi DriveCore models only.

**BLU link options available in BLU link CDi DriveCore models only. BLU link channels 129-256 not available when using a BLU link bus operating at a 96kHz sample rate.

Configuring Output Modes

From the Output Mode Setup screen (see ***Figure 15***), outputs can be configured for Low Z or High Z operation. By default, the CDi DriveCore amplifiers are configured for Low Z (2/4/8Ω) operation on all outputs.

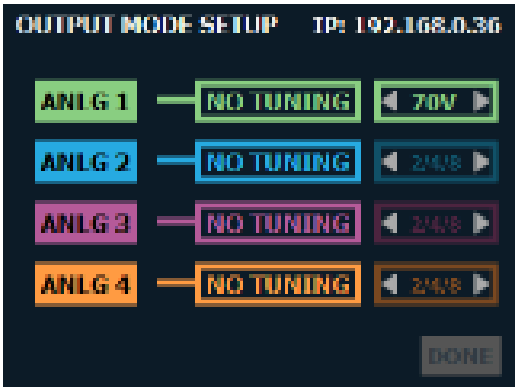


Figure 15: *Output Mode Setup screen*

To configure output mode settings manually:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Output Mode (70V/100V)" option from the menu.
4. Use the **ENCODER** to navigate, make selections, and edit settings.
5. When done, select "Done" at the bottom of the screen.

Available options:

- **2/4/8 (LoZ), 70V, 100V**
  Configures the output for the application type. Select the "2/4/8" option for conventional low-impedance (2/4/8Ω) passive speakers, or choose the appropriate voltage setting if configuring the output for a high-impedance (constant-voltage) install application.

  NOTE: If a pair of outputs are configured for bridge mono operation, selecting the 70V option will provide 140V and selecting the 100V option will provide 200V.

For additional information on output modes and configuring output mode settings in Audio Architect, see ***"Configuring Amp Wiring & Output Modes in Audio Architect" on page 39.***

Configuring DSP

From the Speaker Tunings/DSP menu (see ***Figure 16***) crossover, delay, and limiter settings can be adjusted to optimize the loudspeakers. Speaker tunings can also be selected for certain JBL models to easily optimize DSP settings for a particular loudspeaker model. Note that this screen shows the status of each DSP module (block). When a module is darkened, it is bypassed. When a module is bright, it is enabled.



Figure 16: *Speaker Tunings/DSP screen*

To edit speaker tuning/DSP settings manually:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Speaker Tunings/DSP" option from the menu.
4. Use the **ENCODER** to select the module you wish to edit.
5. Use the **ENCODER** to navigate, make selections, and edit settings.
6. When done, select "Done" at the bottom of the screen.

Delay

The CDi DriveCore amplifiers have an Input Delay (pre-crossover) and Output Delay (post-crossover) DSP module for each channel. Each is selectable when navigating the Speaker Tunings/DSP screen (see ***Figure 16***). Once an Input or Output Delay module has been selected, delay settings can be edited from the Delay screen (see ***Figure 17***).

The Output Delay can be used to time-align the various drivers in a multi-way speaker system or for close-proximity zone delay (to compensate for the slap-delay artifacts caused when bleed from an adjacent zone is audible). A total of up to 100ms of delay time is available in each Output Delay. The Input Delay can be used for delaying the system to the stage backline, delay fills, zone delay, or whenever more delay time is required than the Output Delay has to offer. The Input Delays provide an additional 1 second of delay time for each channel. Delay can be adjusted in milliseconds, feet, or meters.

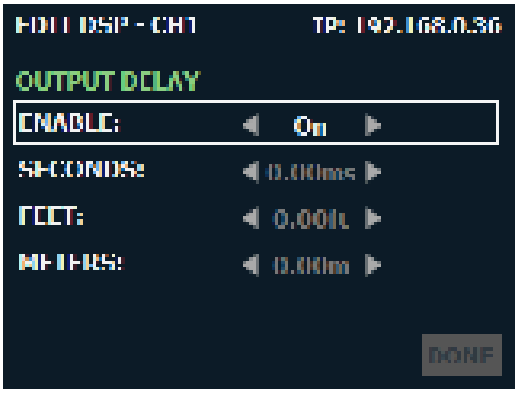


Figure 17: *Delay screen*

To edit delay settings manually:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Speaker Tunings/DSP" option from the menu.
4. Select the "Input Delay" or "Output Delay" icon for the channel you wish to edit.
5. Use the **ENCODER** to navigate, make selections, and edit settings.
6. When done, select "Done" at the bottom of the screen.

Available options/parameters:

- **Enable (Off, On)**
  Turns the Delay on or off.
- **Seconds (Input Delay: 0 – 1sec, Output Delay: 0 – 100ms)**
  Adjusts the delay time in milliseconds.
- **Feet (Input Delay: 0 – 1127ft, Output Delay: 0 – 112.7ft)**
  Adjusts the delay time in feet.
- **Meters (Input Delay: 0 – 343m, Output Delay: 0 – 34.3m)**
  Adjusts the delay time in meters.

For information on editing these settings in Audio Architect, see ***"Input/Output Delay Panels" on page 44***.

PEQ (Parametric EQ)

PEQ settings can be edited from the PEQ screen (see ***Figure 18***). Input and Output PEQs are available. The Output (post-crossover) PEQs are typically used for speaker tuning settings, and the Input (pre-crossover) PEQs provide additional EQ filtering for the system if required.

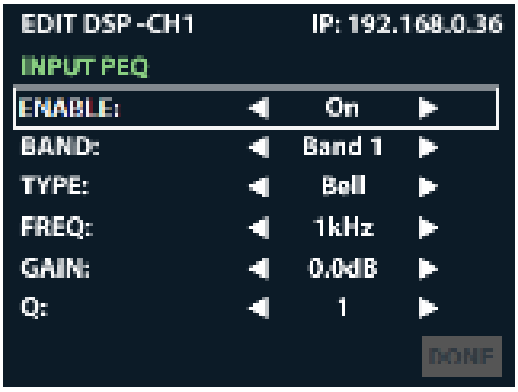


Figure 18: *PEQ screen*

To edit PEQ settings manually:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Speaker Tunings/DSP" option from the menu.
4. Select the pre or post-crossover "PEQ" icon for the channel you wish to edit.
5. Use the **ENCODER** to navigate, make selections, and edit settings.
6. When done, select "Done" at the bottom of the screen.

Available options/parameters:

- **Enable (Off, On)**
  Turns the PEQ on or off.
- **Band (Band 1 – Band 8)**
  Selects the filter band for editing.
- **Type**
  Selects the type of filter for the band. See available filter types listed below.
- **Frequency (20Hz – 22kHz)**
  Sets the center/corner frequency of the band.
- **Gain (±20dB)**
  Sets the amount of gain (boost/cut) applied to the band.
- **Slope (3 – 15 dB/Oct)**
  Sets the slope rate of the band for Shelf-type filters (only visible when a Shelf filter is selected).
- **Width (0.10 – 32)**
  Sets the width of the band for Bell-type filters, or adjusts the resonant peak for 2nd Order Lowpass/Highpass filters (only visible when one of the aforementioned filter types is selected).

Available filter types:

- Bell
- Low Shelf
- High Shelf
- LP BW1 (Butterworth 6dB/oct lowpass filter)
- HP BW1 (Butterworth 6dB/oct highpass filter)
- LP 2nd Order (6-12dB/oct lowpass filter with variable resonant peak using the Width parameter)
- HP 2nd Order (6-12dB/oct highpass filter with variable resonant peak using the Width parameter)
- Allpass 1 (90º phase shift)
- Allpass 2 (180º phase shift)

See ***"Input/Output EQ Panels" on page 43*** for information on editing the PEQs in Audio Architect.

Crossover

Crossover filter settings can be edited from the Crossover screen (see ***Figure 19***). Crossover filters are used to restrict the range of frequencies sent to a loudspeaker or driver for protection and sound optimization.

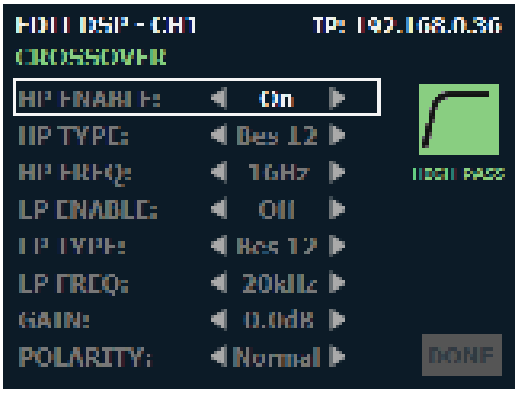


Figure 19: *Crossover screen*

To edit crossover settings manually:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Speaker Tunings/DSP" option from the menu.
4. Select the "XOVER" icon for the channel you wish to edit.
5. Use the **ENCODER** to navigate, make selections, and edit settings.
6. When done, select "Done" at the bottom of the screen.

Available options/parameters:

- **HP Enable (Off, On)**
  Enables or disables the high-pass filter.
- **HP Type (Bessel 12 – 48dB/octave, Butterworth 6 – 48dB/octave, Linkwitz-Riley 12 – 48dB/octave)**
  Selects the high-pass filter's type and slope rate in dB/octave.
- **HP Freq (16Hz – 20kHz)**
  Sets the high-pass filter's corner frequency.
- **LP Enable (Off, On)**
  Enables or disables the low-pass filter.
- **LP Type (Bessel 12 – 48dB/octave, Butterworth 6 – 48dB/octave, Linkwitz-Riley 12 – 48dB/octave)**
  Selects the low-pass filter's type and slope rate in dB/octave.
- **LP Freq (16Hz – 20kHz)**
  Sets the low-pass filter's corner frequency.
- **Gain (-60 to 24dB)**
  Adjusts the crossover output gain, pre limiter.
- **Polarity (Normal, Inverted)**
  Selects between normal or inverted polarity for the selected output.

See ***"Crossover Panel" on page 42*** for information on editing the Crossover in Audio Architect.

Limiter

The CDi DriveCore Series amplifiers include the LevelMAX™ suite of limiters. Limiter settings can be edited from the Limiter screen (see ***Figure 20***). Limiters are used to set a "ceiling" on the output level to protect drivers from over-excursion. The thermal limiters in the CDi DriveCore Series amplifiers can also protect against thermal driver failure (overheating).

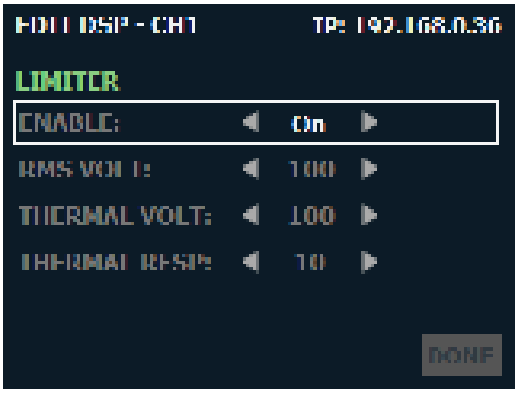


Figure 20: *Limiter screen*

To edit limiter settings manually:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Speaker Tunings/DSP" option from the menu.
4. Select the "Limit" icon for the channel you wish to edit.
5. Use the **ENCODER** to navigate, make selections, and edit settings.
6. When done, select "Done" at the bottom of the screen.

Available options/parameters:

- **Enable (Off, On)**
  Turns the Limiter on or off.
- **RMS Voltage (1 – 400VRMS)**
  Sets the RMS voltage limit for the output.
- **Thermal Voltage (1 – 500V)**
  Sets the long-term output power limit of the amplifier to what the loudspeaker load can handle without overheating and going into thermal compression. This is based on the AES power/voltage ratings of drivers outlined in the AES2-2012 standard.
- **Thermal Response (1 – 600 sec)**
  Sets the time it takes for the thermal limiter to adjust output voltage. This is based on the AES power/voltage ratings of drivers outlined in the AES2-2012 standard.

NOTE: The LevelMax limiters include sidechain EQ for advanced speaker tunings. Sidechain EQ parameters are not user adjustable.

Additional limiter parameters are available in Audio Architect. For more information, see ***"LevelMAX Panel" on page 45***.

For more information on the LevelMAX limiters and how to set the parameters, see the LevelMAX white paper available at www.crownaudio.com.

Configuring Speaker Tunings

Speaker tunings can be selected when navigating the Guided Setup or at the end of each channel from the Speaker Tunings/DSP screen (see ***Figure 21***).

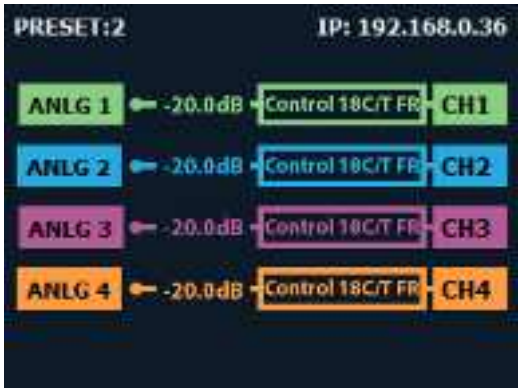
Speaker tunings apply DSP settings specific to a particular speaker, making it easy to optimize a speaker's performance.



Figure 21: *Selecting a speaker tuning*

To select a speaker tuning for a channel:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Speaker Tunings/DSP" option from the menu.
4. Scroll to the end of the channel for which you are selecting a speaker tuning—a box will appear that reads "No Tuning".
5. Press the **ENCODER**. A list of available speaker tunings will appear on the screen.
6. Use the **ENCODER** to navigate the list then press the **ENCODER** to select the matching speaker series. Additional prompts will appear to allow selection of the specific speaker model and additional options depending on the tuning selected.
7. A confirmation prompt will appear that provides additional information on the tuning. Use the **ENCODER** to apply or cancel the selection.
8. Repeat for any additional channels.
9. When done, select "Done" at the bottom of the screen.
10. The screenshot below shows an example of how the Home screen will look after speaker tunings have been configured.



See ***"Configuring Speaker Tunings in Audio Architect" on page 41*** for information about configuring speaker tunings in Audio Architect.

Configuring Output Fader Linking

The Output Fader Linking screen (see ***Figure 22***) allows the amplifier's output channel levels and mutes to be linked for ganged operation.

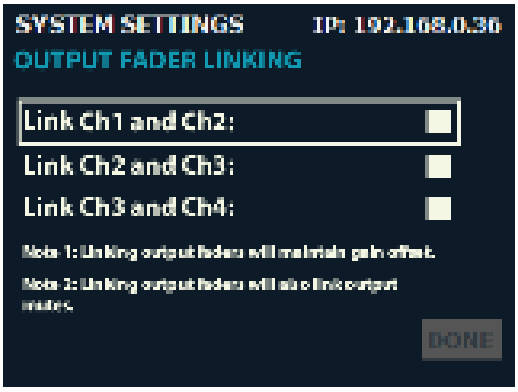


Figure 22: *Output Fader Linking screen*

To edit the Output Fader Linking settings:

1. From the Home screen, press the **MENU** button.
2. Select the "System Settings" option from the menu using the **ENCODER**.
3. Select the "Output Fader Linking" option from the menu, then press the **ENCODER**.
4. Turn the **ENCODER** to select the desired option, then press the **ENCODER** to toggle whether the option is enabled (checked) or disabled (unchecked).
5. When done, use the **ENCODER** to select "Done" at the bottom of the screen.

NOTE: The output level faders can also be linked using Audio Architect. See***"Main CDi DriveCore Control Panel" on page 34*** for more information.

Available options:

- **Link Ch1 and Ch2**
  Links channel 1 and channel 2 output level faders for ganged operation.
- **Link Ch2 and Ch3**
  Links channel 2 and channel 3 output level faders for ganged operation. This option is only available in 4-channel amp models.
- **Link Ch3 and Ch4**
  Links channel 3 and channel 4 output level faders for ganged operation. This option is only available in 4-channel amp models.

TIP: Checking multiple checkboxes allows adjacent channels to be linked. For example, checking the "Link Ch1 and Ch2" checkbox and the "Link Ch2 and Ch3" checkbox will link channels 1, 2, and 3 together. Checking all checkboxes will link all channels together.

Configuring BLU link Settings

The BLU link Settings menu is only available in BLU link CDi DriveCore models. From the BLU link Settings menu (see ***Figure 23***), BLU link sample rate, clock priority, and outputs can be configured.

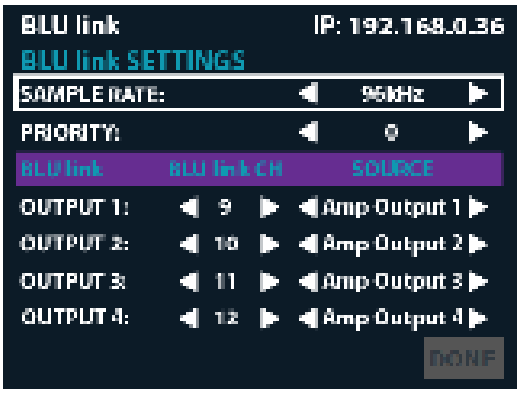


Figure 23: *BLU link Settings menu*

To configure BLU link settings:

1. From the Home screen, press the **MENU** button.
2. Select the "BLU link" option from the menu using the **ENCODER**.
3. Select the "BLU link Settings" option from the menu.
4. Select the desired options for your application, making selections with the **ENCODER**.
5. When done, select "Done" at the bottom of the screen.

Available options:

- **Sample Rate (48kHz, 96kHz)**
  Sets the BLU link sample rate in the amplifier. Sample rate can be set to 48kHz (default) or 96kHz. When set to 48kHz, the amplifier can access BLU link channels 1-256. When set to 96kHz, the amplifier can access BLU link channels 1-128.

  NOTE: The sample rate must be set to match all other devices on the BLU link bus in order to pass BLU link audio.

  NOTE: The CDi DriveCore amplifiers process audio using a fixed 96kHz internal sampling rate. When using a BLU link sample rate of 48kHz, the audio signal from the BLU link bus will be sample rate converted from 48kHz up to 96kHz when entering the amp, and any audio signals sent from the amp back to the BLU link bus will be converted from 96kHz down to 48kHz.

  NOTE: If the amp is configured to use any BLU link channels between 129-256 and the sample rate is then changed from 48kHz to 96kHz, all BLU link assignments above 128 will default back to an "unassigned" state since they will no longer be applicable at 96kHz.

- **Priority (0-254)**
  Determines which device on the BLU link bus will provide audio clock for the entire bus. The higher the value, the higher the priority. Under certain conditions, such as when two devices have the same Priority settings, other factors may be used to determine BLU link clock priority (see***"Mastership" on page 61*** for more information).

- **BLU link Channel Output 1-4* (Off, 1-254 @ 48kHz / 1-128 @ 96kHz)**
  The CDi DriveCore amplifiers are capable of outputting up to 2 channels (2-channel models) or 4 channels (4-channel models) of audio onto the BLU link bus. These options allow you to assign the desired BLU link output channels. Channels 1-256 are available when using a 48kHz BLU link sample rate and channels 1-128 are available when using a 96kHz BLU link sample rate.

- **BLU link Source Output 1-4***
  These options allow you to select the source to route to each BLU link output channel, with the following options available:
  - Analog Input 1-4***** (routes the pre-processed audio signal from the input)
  - Amp Output 1-4***** (routes the same audio signal present at the amplifier outputs)

For information on routing BLU link channels to the amplifier's inputs, see ***"Assigning Input Sources" on page 14***.

For information on configuring BLU link output settings in Audio Architect, see ***"Configuring BLU link Outputs" on page 38***.

*****Channel 3 and 4 options available in 4-channel CDi DriveCore models only.

Installing Audio Architect & Configuring the Network

Introduction to HiQnet Audio Architect

CDi DriveCore amplifiers can be set up from either the front panel or from the HiQnet Audio Architect software program. Access to some settings and functionality are only available from Audio Architect.

The latest version of Audio Architect can be downloaded at www.audioarchitect.harmanpro.com/en-US/software. To communicate with Audio Architect, the amplifier must be connected to a TCP\IP network via the rear panel Ethernet port and, in some cases, configured for the network.

NOTE: The BLU link ports available on BLU link CDi DriveCore models cannot be used for network control and monitoring of the amplifier.

When Audio Architect is first loaded, the software will scan the network for HiQnet devices. All devices that are discovered on the network will be found under the Device Tree menu in the left-hand side of the Main Audio Architect window (see ***Figure 24***).

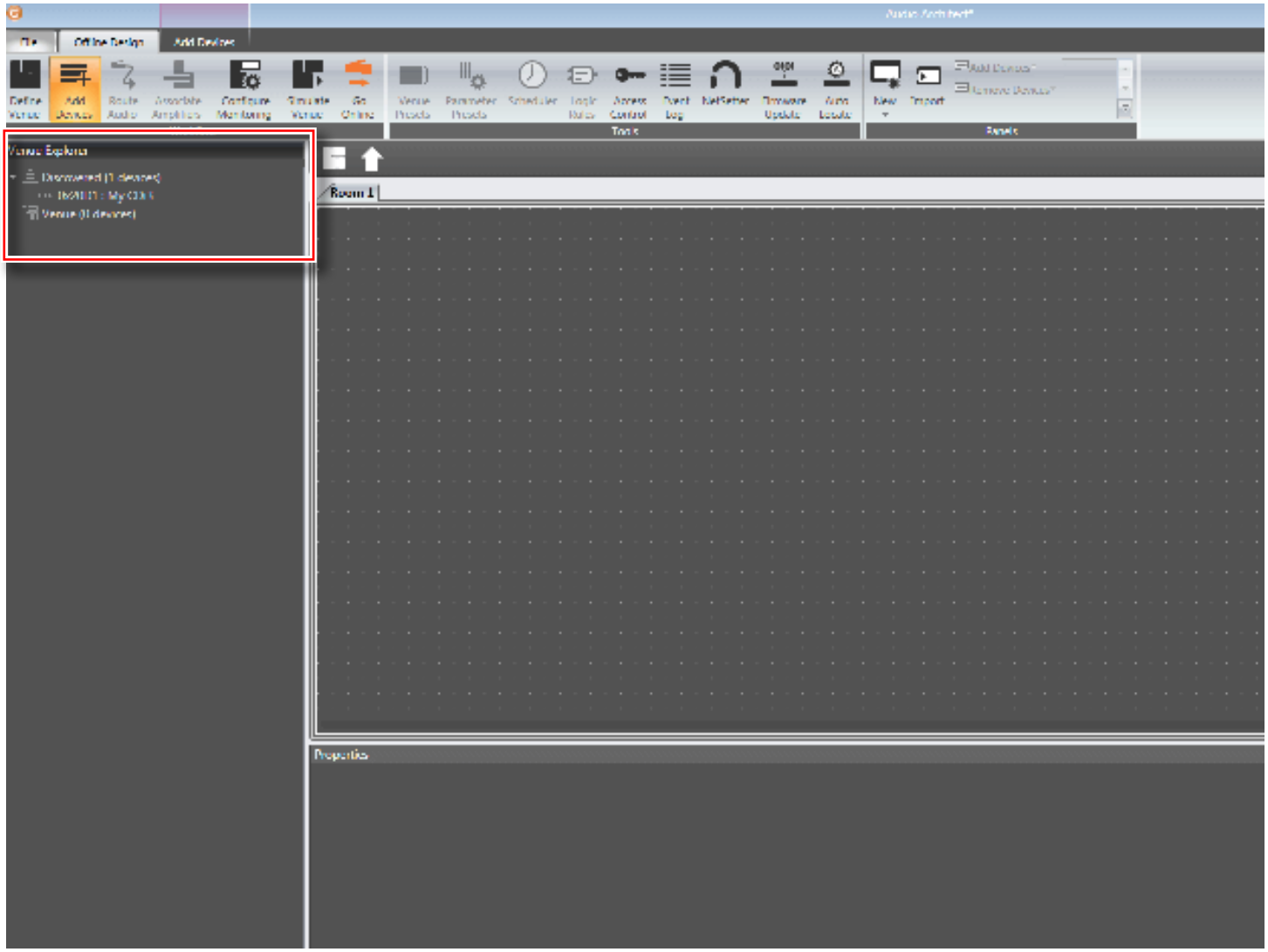


Figure 24: *Device Tree menu*

NOTE: If devices are not discovered and displayed in the Device Tree menu as shown above, the device and/or network may not be configured correctly. See ***"Configuring Amplifier Network Settings" on page 24*** for information on configuring network settings.

Configuring Amplifier Network Settings

Network settings can be configured from either the CDi DriveCore's front panel or from the NetSetter software application. DHCP is enabled by default, allowing the CDi DriveCore amplifiers to automatically obtain an IP address when connecting to an Ethernet switch or router with an active DHCP server, or when using Auto-IP.

Configuring the Network from the Front Panel

To configure the amplifier's network settings from the front panel:

1. From the Home screen, press the **MENU** button.
2. Select the "Network" option from the menu using the **ENCODER**.
3. Use the **ENCODER** to select and edit network settings.
4. When done, select "Save" then "Done" at the bottom of the screen for the changes to take affect.

TIP: To quickly configure multiple HiQnet devices, connect all the devices and configuration computer to the same network and use the NetSetter software application (see ***"Configuring the Network using NetSetter" on page 25***).

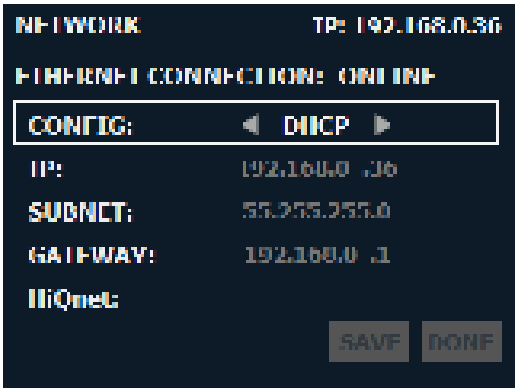


Figure 25: *Network screen*

Available options/parameters:

- **Config (DHCP, Static)**
  Turns DHCP on or off. Select "DHCP" to allow the amplifier to automatically obtain an IP address from a DHCP server or via Auto-IP. Select "Static" to manually configure the amplifier's network settings.
- **IP**
  Allows for viewing and editing of the amplifier's IP address.
- **Subnet**
  Allows for viewing and editing of the amplifier's subnet mask.
- **Gateway**
  Allows for viewing and editing of the gateway address, if required to access the network. If using a router, the gateway address will typically be the router address.
- **HiQnet**
  Allows for viewing and editing of the HiQnet node address. Each device on a HiQnet network must have a unique node address.

For additional information on network configuration, please visit www.audioarchitect.harmanpro.com.

Configuring the Network using NetSetter

NetSetter is a software tool which enables you to discover HiQnet devices and reconfigure their network settings in real time, from one central location. Its function is to configure a system of devices to interoperate correctly on the same network and resolve conflicts quickly and easily. The latest version of NetSetter can be downloaded at www.audioarchitect.harmanpro.com/en-US/software.

The top of the NetSetter window displays overall operational functions that are available. At the bottom of the NetSetter window is an informational section that lists the number of discovered devices and the IP address of the DHCP server (if available). There is also information regarding the PC HiQnet Address, IP Address, and Subnet Mask.

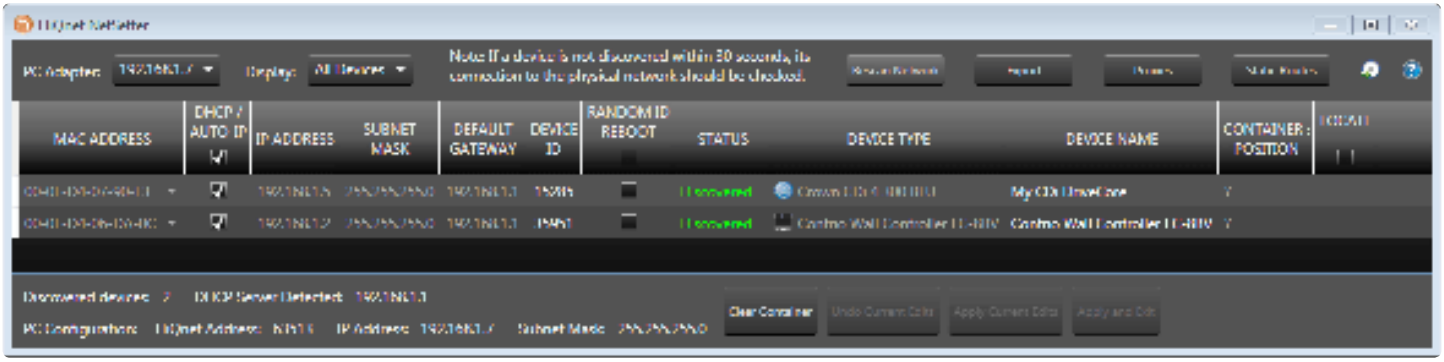


Figure 26: *NetSetter window*

1. **PC Adapter**
   Use this dropdown menu to select the Network Interface Card (NIC) that NetSetter will use to attempt to discover HiQnet devices. All available NIC's are listed by IP Address. Selecting a new NIC will force a rescan of the network to which the new NIC is connected.
2. **Display**
   The options available in this dropdown menu will filter the device list as follows:
   a. **All Devices**
      This is the default setting. All discovered devices are displayed.
   b. **HiQnet ID conflicts**
      Only discovered devices with HiQnet address conflicts are displayed.
   c. **IP address conflicts**
      Only discovered devices with IP address conflicts are displayed.
   d. **All conflicts**
      Only discovered devices with either HiQnet address conflicts or IP address conflicts are displayed.
   e. **Locked**
      Only devices in a Locked configuration will be displayed.
   f. **Discovering**
      Only devices in the process of being discovered will be displayed.
   g. **Discovered**
      Only discovered devices with no conflicts will be displayed.
   h. **DHCP/Auto-IP**
      All devices which have been discovered with DHCP/Auto-IP enabled and those which have been set to use DHCP/Auto-IP on applying the edits are displayed.
3. **Rescan Network**
   Clicking this button re-scans the network to which the currently selected NIC is connected.
4. **Export**
   Clicking this button brings up a "Save As" window, allowing you to save the HiQnet Addresses and IP Configurations of all devices on the network as a .CSV (Comma Separated Values) formatted file. This allows you to archive the information and open it in a spreadsheet program such as Microsoft® Excel®.

5. **Proxies**
   This feature is used to connect to devices that cannot automatically be located by Audio Architect due to network configuration or security measures via proxy connections.
6. **Static Routes**
   This feature is used to set up a static route and connect directly to a device located on a different subnet than the PC.
7. **Clear Container**
   Resets the Container/Position Venue data of the selected device. The action occurs on either "Apply Current Edits" or "Apply and Exit" so that changes may be undone with the **Undo Current Edits** button.
8. **Undo Current Edits**
   Resets any open edits in the grid to the values as currently on the network.
9. **Apply Current Edits**
   Confirms any open edits in the grid. Devices update accordingly until connection is re-established with HiQnet NetSetter.
10. **Apply and Exit**
    Confirms and saves any open edits in the grid. Devices update accordingly until connection is re-established with HiQnet.

NOTE: If you have made changes to NetSetter and attempt to exit the program, the confirmation window shown in ***Figure 27*** will appear. Clicking **OK** will apply the edits you have made since opening NetSetter. Clicking **Cancel** will return you to the program.

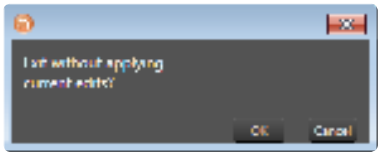


Figure 27: *Confirmation window*

The NetSetter Grid

The NetSetter grid is divided into the 12 sections described below.

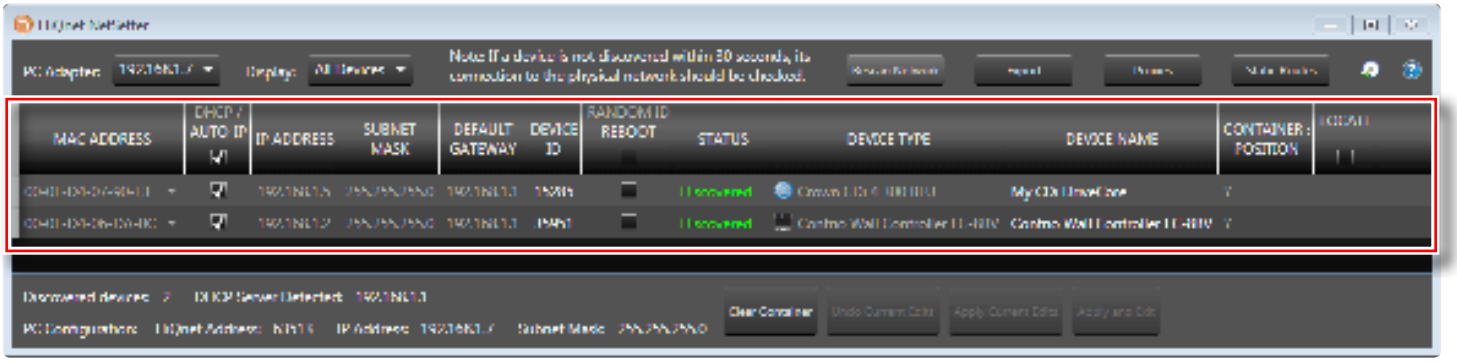


Figure 28: *NetSetter grid*

1. MAC Address

Displays the MAC address of the discovered device. The data in this field cannot be edited.

NOTE: If more than one MAC address is discovered for a single device (e.g., HiQnet device MAC address, AVB card MAC address, etc.), the field will be represented as a dropdown menu and the desired MAC address can be selected from the list. For a device connected to the same control network with two control MAC addresses, the MAC address field will be displayed in red.

2. DHCP/Auto-IP

If the discovered device is configured to use DHCP/Auto-IP, this checkbox will be checked. If the discovered device is not using DHCP/Auto-IP, you may check the box so it will do so on applying edits. The device row will then become selected. The device will attempt to have its IP settings configured by DHCP on applying the edits; if no DHCP server is present, the device will attempt to have IP settings configured by Auto-IP.

All devices in the current filter view may be configured with DHCP/Auto-IP enabled by checking the checkbox in the column header — the individual checkboxes for all devices will become checked. If a single individual checkbox for a device is subsequently unchecked, the column header DHCP/Auto-IP checkbox will be automatically unchecked. Conversely, all devices in the current filter view can be configured with DHCP/Auto-IP disabled by unchecking the checkbox in the column header.

DHCP server status will be among the information displayed at the bottom of the NetSetter window. If a DHCP server is not detected, the information will read "DHCP server not detected". Note that checking a device's DHCP/Auto-IP checkbox has no immediate effect on the column sort order.

NOTE: Once edits have been made, it is critical to click the **Apply Current Edits** or **Apply and Exit** buttons for the changes to take affect.

3. IP Address

Displays the IP address of the discovered device. A valid IP address may be edited inline. If the edited value scopes the device out of the current Display filter, it will not be visible.

NOTE: A discovered device with an IP address that conflicts with that of another, already discovered device will be displayed in red. A conflicting IP address may be edited inline if you wish to change the device IP address on applying current edits. If DHCP/Auto-IP is enabled, the IP address field may not be edited inline.

NOTE: Once edits have been made, it is critical to click the **Apply Current Edits** or **Apply and Exit** buttons for the changes to take affect.

4. Subnet Mask

Displays the Subnet Mask of the discovered device. The Subnet Mask may be edited inline. The device row will be ordered accordingly with the current column sort immediately on successful editing of the field. The device row will remain selected.

NOTE: If DHCP/Auto-IP is enabled, the Subnet Mask field may not be edited inline.

NOTE: Once edits have been made, it is critical to click the **Apply Current Edits** or **Apply and Exit** buttons for the changes to take affect.

5. Default Gateway

Displays the Default Gateway of the discovered device. The Default Gateway may be edited inline. The device row will be ordered accordingly with the current column sort immediately on successful editing of the field. The device row will remain selected.

NOTE: If DHCP/Auto-IP is enabled, the Default Gateway field may not be edited inline.

If the device is being rediscovered, then the following behavior will occur:

- When the device is not selected, the device Default Gateway address field is displayed but is grayed out.
- When the device is selected and highlighted in orange, the field is represented in dark gray.

NOTE: Once edits have been made, it is critical to click the **Apply Current Edits** or **Apply and Exit** buttons for the changes to take affect.

6. Device ID

Displays the HiQnet address of the discovered device. This field may be edited inline if you want to change the device HiQnet address. If the edited value scopes the device out of the current Display filter, it will not be visible and no devices will be selected. If devices are discovered with a conflicting HiQnet address, then the following will occur:

- The HiQnet ID field of a discovered device will be displayed in pink when a HiQnet address conflicts with that of another, already discovered HiQnet address.
- When the device is selected and highlighted in orange, the field is represented in red.
- The HiQnet address is not displayed, instead a dash is displayed as grayed out.

NOTE: A conflicting HiQnet address may be edited inline if you want to change the device HiQnet address.

NOTE: Devices are not discoverable at the IP level. A device which is not discoverable at the IP level (invalid IP address, etc.) will not be able to report a HiQnet address. In this instance, the HiQnet ID field will display a "?" to indicate that the field may exist but that the software does not have enough discoverability of the device to determine the value. A blank field or "-" implies the value is null and the HiQnet ID field may not be edited inline.

NOTE: Once edits have been made, it is critical to click the **Apply Current Edits** or **Apply and Exit** buttons for the changes to take affect.

7. Random ID Reboot

When enabled, the device will be given a random HiQnet address. If you want to set the HiQnet address of a device to a random ID, check the Random ID checkbox. If the checkbox is unchecked before applying current edits, the prior HiQnet ID value will be restored.

All devices in the current filter view may be set to Random HiQnet ID by checking the checkbox in the column header — the individual checkboxes for all devices will become checked. If any individual checkbox is subsequently unchecked, the column header Random ID checkbox will automatically be unchecked. Conversely, if all devices in the current filter view are set to Random ID on and the Random HiQnet ID column header checkbox is checked, all devices may be set to Random ID off by unchecking the column header checkbox — the individual checkboxes for all devices will become unchecked.

NOTE: Devices are not discoverable at the IP level. A device which is not discoverable at the IP level (invalid IP address, etc.) will not be able to report a HiQnet address. In this instance, the Random ID checkbox will be unavailable.

8. Status

Displays the current discovery status of the device. The Status field may not be edited. Discovery status hierarchy is as follows:

a. Discovered

If a device has a unique IP address and a unique HiQnet address, this condition will be shown unless the device is access controlled. When the device is not selected, the "Discovered" label is represented in green.

The "Discovered" status is determined by the following conditions:

- The device is discoverable at the MAC address level.
- The device has a valid and unique IP address (manual or DHCP/Auto-IP).
- The device has a unique HiQnet address.

- The device is not access controlled.

b. IP Conflict

If a device has an IP address conflict, this error will be shown regardless of other status notifications. When the device is not selected, the "IP conflict" label is represented in blue.

The "IP conflict" status is determined by the following conditions:

- The device is discoverable at the MAC address level.
- The device has an IP address that conflicts with another device which has already been discovered by NetSetter.

c. HiQnet Conflict

If a device has a unique IP address yet has a HiQnet address conflict, this error will be shown regardless of other status notifications. When the device is not selected, the "HiQnet conflict" label is represented in red.

The "HiQnet conflict" status is determined by the following conditions:

- The device is discoverable at the MAC address level.
- The device has a valid and unique IP address (manual or DHCP/Auto-IP).
- The device has a HiQnet address that conflicts with another device which has already been discovered by NetSetter.

d. Locked

If a device has a unique IP address and a unique HiQnet address, this condition will be shown if the device is access controlled. When the device is not selected, the "Locked" label is represented in yellow.

The "Locked" status is determined by the following conditions:

- The device is discoverable at the MAC address level.
- The device has a valid and unique IP address (manual or DHCP/Auto-IP).
- The device has a unique HiQnet address.
- The device is access controlled.

When a device has been discovered in a Locked state and any field is attempted to be edited for the first time, a dialog prompting for the Admin password will appear. Only a successful login with the Admin password will enable all fields to be edited. This state may need to be reset on rediscovery after applying current edits, requiring the Admin password to be entered again.

e. Discovering

This condition will be displayed if the device has had changes made to its IP configuration or HiQnet address and HiQnet NetSetter is waiting to re-establish connection. When a device being rediscovered is not selected, all fields within the device row are displayed but grayed out.

The "Discovering" status is determined by the following conditions:

- The device had been previously discovered at the MAC address level.
- Edits had been made to one or more fields.
- The device is being rediscovered after applying current edits.

NOTE: Since the sort order automatically updates when a field within the sorted column is updated, the rediscovered device will occupy the same row on rediscovery. The exception is when DHCP/Auto-IP or Random ID has been set prior to applying current edits, in which case the rediscovered device will occupy the appropriate row in the current column sort order.

9. Device Type

The device class name is displayed here, as reported by the discovered device. To the left of each device class name, the brand icon is displayed. The software application name is displayed for discovered PCs running an instance of HiQnet software. HiQnet software programs include System Architect, Audio Architect, and Performance Manager.

NOTE: The Device Type field may not be edited inline.

NOTE: Devices are not discoverable at the IP or HiQnet level. A device which is not discoverable at the IP level (invalid IP address, etc.) or HiQnet address level (HiQnet address conflict, etc.) will not be able to report its class name. In this instance, the Device Type field will display a "?" to indicate that the field may exist but that the software does not have enough discoverability of the device to determine the value. A blank field or "-" implies the value is null.

10. Device Name

The user-definable Device Name is displayed here, as reported by the discovered device.

NOTE: This field may be edited inline if you want to change the Device Name. This field may not be edited for discovered PCs running an instance of HiQnet software.

NOTE: Devices are not discoverable at the IP or HiQnet level. A device which is not discoverable at the IP level (invalid IP address, etc.) or HiQnet address level (HiQnet address conflict, etc.) will not be able to report its Device Name. In this instance, the Device Name field will display a "?" to indicate that the field may exist but that the software does not have enough discoverability of the device to determine the value. A blank field or "-" implies the value is null.

NOTE: Once edits have been made, it is critical to click the **Apply Current Edits** or **Apply and Exit** buttons for the changes to take affect.

11. Container : Position

The Container and Position Venue Data is displayed here (separated by a colon), as reported by the discovered device. The field is left blank for discovered PCs running an instance of HiQnet software. HiQnet software programs include System Architect, Audio Architect, and Performance Manager.

TIP: A selected device may have its Venue Data cleared (including all Building, Floor, and Room Venue data) by pressing the **Clear Container** button. This action takes place on applying current edits only and can be undone with the **Undo Current Edits** button.

NOTE: The Container/Position Venue Data may not be edited inline.

NOTE: Devices are not discoverable at the IP or HiQnet level. A device which is not discoverable at the IP level (invalid IP address, etc.) or HiQnet address level (HiQnet address conflict, etc.) will not be able to report its Container : Position data. In this instance, the Container : Position field will display a "?" to indicate that the field may exist but that the software does not have enough discoverability of the device to determine the value. A blank field or "-" implies the value is null.

12. Locate

The Locate feature allows a device to be easily identified within a network full of HiQnet devices. Clicking in the Locate column for a device will put the corresponding networked device into a Locate state — the Locate icon will be displayed on-screen and something will happen on the device to indicate the Locate state is active (e.g., an LCD or LED will flash, etc.). Clicking an active Locate icon will disable the Locate state for the device. Disabling the Locate state from the device will clear the icon. Devices may be put into a Locate state independently from selection so that more than one device can be located at any one time.

Using HiQnet Audio Architect

Crown CDi DriveCore amplifiers have Digital Signal Processing built in. When using a CDi DriveCore amp, the loudspeaker processing (crossovers, limiters, EQs, and delays) are in the onboard DSP, making discrete rackmount loudspeaker processing devices unnecessary. This drastically reduces setup time, commissioning, rack space, and costs. The CDi DriveCore's internal DSP can be used to perform the following:

- Configure signal flow
- Optimize system gain structure
- Configure DSP settings (set driver levels, crossover bands, delays, equalization, and limiting for your particular speakers)
- Configure output bridging, high Z/low Z operation, and much more

Much of the CDi DriveCore's DSP can be monitored and controlled from the front panel. However, additional control and functionality can be achieved via a networked PC running the HiQnet Audio Architect software. The following sections describe how to start using Audio Architect to configure CDi DriveCore Series amplifiers. For additional information on using Audio Architect, please refer to the Audio Architect help file.

Launching the Audio Architect Software

After launching Audio Architect, a prompt will appear if the connected HiQnet devices are properly configured for the network and discovered (see ***Figure 29***). Checking the "Add discovered devices to the Venue automatically" checkbox can save a step when getting started.

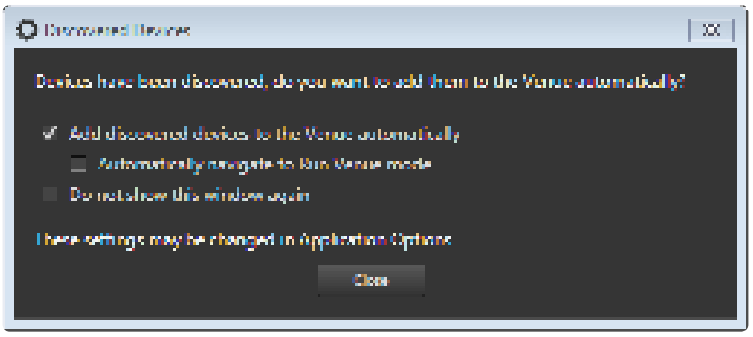


Figure 29: *Discovered Devices prompt*

Offline & Online Operation Explained

Audio Architect has two defined modes of operation: Offline and Online. When operating in Offline mode, system setting changes made in Audio Architect will not be reflected in the system hardware devices in real time; offline changes must be sent to the system devices in a second step, at which point device settings will be updated. Conversely, when operating in Online mode, any changes made in Audio Architect will be reflected in the system devices in real time.



Figure 30: *Main Audio Architect window*

When operating in Offline mode, the Offline Design ribbon is presented at the top of the Main Audio Architect window. From this window, discovered devices can be added to the venue by clicking on them in the Devices tab on the left and dragging them into the Room window on the right (see ***Figure 30***). Note that when a device is added to the venue, it is automatically removed from the "Discovered" device list. If the "Add discovered devices to the Venue automatically" checkbox was checked upon launching Audio Architect, as previously mentioned, discovered devices were already added to the Venue and this step is not necessary.

Each device added to the venue will have an IP address listed to the left of the amplifier image and a Name ID to the right (see ***Figure 31***). The Name ID can be edited in the Properties menu at the bottom of the window. The number to the left of the Name ID is the HiQnet Device Address. The green circle indicates that the amplifier has been discovered on the network.



Figure 31: *Device information*

TIP: Double clicking a device image will open the device's Main Control panel (see ***"Main CDi DriveCore Control Panel" on page 34*** for more information).

Going Online

You will have to go online in Audio Architect before any changes can be made to device settings.

To go online:

1. From the Offline Design ribbon at the top of the Main Audio Architect window, click the **Go Online** button. The Offline Design and Add Devices ribbons will now be replaced with the Online Operate ribbon and, in some cases, the Match Devices ribbon.
2. When going online, the following scenarios are possible:
   a. If one or more devices in the venue are not matched AND corresponding devices are available on the network, going online lands in Match Devices mode.

      NOTE: Before you can go online with a device, it must be "matched". See ***"Matching Devices" on page 33*** for more information.

   b. If all the devices in the venue are matched, going online lands in Synchronize Venue mode. In Synchronize Venue mode, **Receive** and **Send** icons will appear for each device in the venue, as well as for a rack if more than one device has been added (see ***Figure 32***). This provides the ability to send/receive data either to/from a single device, or to/from all devices within the rack with a single click.



Figure 32: *Send and Receive icons*

   c. If no devices require matching or synchronization, going online lands in Run Venue mode. In this mode, Audio Architect is online with the devices in the venue and real-time setting changes can be made.

Matching Devices

The Match Devices ribbon appears at the top of the Main Audio Architect window after clicking on the **Go Online** button from the Offline Design ribbon, then clicking the **Match Devices** button from the Online Operate ribbon.

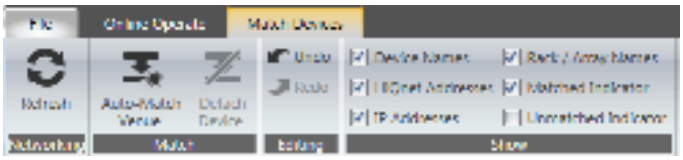


Figure 33: *Match Devices ribbon*

The Match Devices feature allows devices within the venue design to be associated with the hardware devices on the network. If a device image in the venue says "UNMATCHED", the device must be matched before it can be associated and controlled with Audio Architect. This can usually be accomplished by simply clicking the **Auto-Match Venue** button (see ***Figure 33***).

In the Match Devices ribbon, the following options are available:

- **Networking**
  Clicking the **Refresh** button will temporarily take Audio Architect offline, then restart the network.
- **Match**
  Clicking the **Auto-Match Venue** button will automatically match devices on the network with the devices in the Audio Architect venue. Selecting a device then clicking the **Detach** button removes the device's virtual connection with Audio Architect.
- **Editing**
  Clicking the **Undo** button will undo the last change made and revert back to the previous state. Clicking the **Redo** button will redo the last action that was undone.
- **Show**
  Any checked items in this section will be displayed alongside the appropriate devices in the Main Audio Architect window. The available items include Device Names, Rack/Array Names, HiQnet Addresses, IP Addresses, Matched Indicator, and Unmatched Indicator.

Main CDi DriveCore Control Panel

Double-clicking the CDi DriveCore image from the Room window (see ***Figure 31***) will open the Main CDi DriveCore Control panel. ***Figure 34*** shows the 4-channel version of the Main CDi DriveCore Control panel. The CDi DriveCore amplifiers include Digital Signal Processing (DSP), multiple input/output routing options, and a comprehensive diagnostics feature set. All of these features can be accessed from the Main CDi DriveCore Control panel.

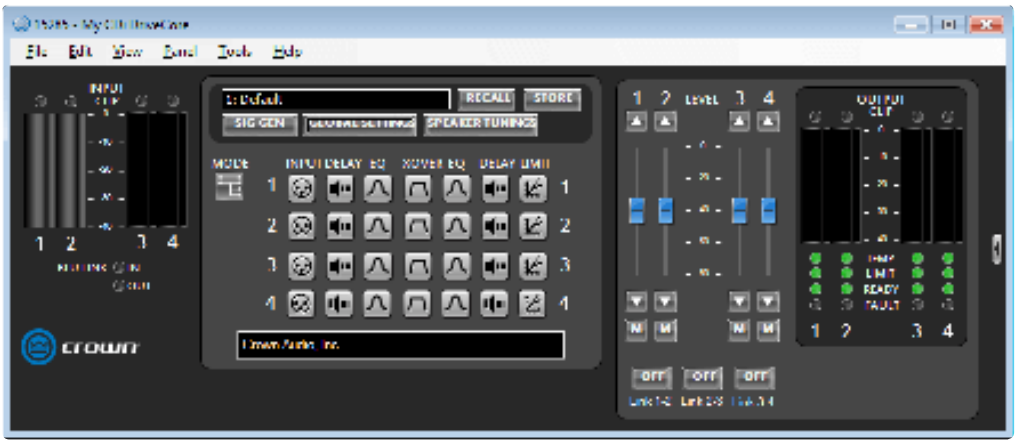


Figure 34: *Main CDi DriveCore Control panel (4-channel amp model shown)*

1. **Level Faders**
   These faders set the output signal level of each channel and correspond with the levels set using the front panel **ENCODER**.
2. **Link Buttons**
   Links the Level faders and Mute buttons for ganged operation.
3. **Mute Buttons**
   Mutes the corresponding output channel.
4. **Input Meters**
   These meters display input signal level, and range from -40dBFS to 0dBFS. Each input channel has the following monitors:
   - Peak and RMS Meters: The wider left meter shows RMS level and the right meter shows peak level.
   - Clip Indicator: Lights to indicate input clipping.
5. **Output Meters**
   These meters display output signal level, and range from -40dBFS to 0dBFS. The meters are scaled so that 0dBFS is referenced to the full rated output voltage of the amplifier. Each output channel has the following monitors:
   - Peak and RMS Meters: The wider left meter shows RMS level and the right meter shows peak level.
   - Clip Indicator: Lights to indicate output clipping.
6. **Indicators**
   a. **BLU Link (In/Out):** Available only on BLU link CDi DriveCore models, these indicators light when the BLU link input and output ports have established a link with the BLU link bus.
   b. **Temp:** Indicates the temperature of an amplifier channel and provides warning when an amplifier channel is too high and near shutdown. These indicators may light one of the following colors:
      - Green: Thermal temperature is less than 80° C.
      - Yellow: Thermal temperature is between 80-100° C.
      - Red: Thermal temperature is greater than 100° C.

   c. **Limit:** Lights when the amplifier's output signal is being limited by the clip limiter, LevelMAX peak/rms/thermal speaker limiters, or the amp thermal protection limiter.
   d. **Ready:** Lights when the amplifier is on and ready to supply power.
   e. **Fault:** Lights when the amplifier detects a fault and enters a fault state. See **"*System Protection*" *on page 72*** for more information on the various types of possible faults.
7. **DSP Buttons**
   Double-clicking any of these buttons will open the corresponding DSP control panel, where DSP settings can be edited.
8. **Other Buttons**
   a. **Basic/Normal View (Arrow Button):** Collapses or expands the window.
   b. **Mode:** Opens the Amplifier Mode Settings panel, where input wiring and output operation can be configured.
   c. **Signal Generator:** Opens the Signal Generator panel.
   d. **Global Settings:** Opens the Global Settings panel (see **"*Amplifier Information*" *on page 35***).
   e. **Speaker Tunings:** Allows a speaker tuning to be selected for each output to optimize DSP settings for particular speaker models.
   f. **Recall:** Loads a device preset.
   g. **Store:** Stores a device preset.

Many of these functions will be further explained on the following pages.

Amplifier Information

The Global Settings panel can be accessed by clicking the **Global Settings** button from the Main CDi DriveCore Control panel (***Figure 35***). The Global Settings panel (***Figure 36***) displays amplifier information such as current firmware version, power supply temperature, channel temperature, and more.



Figure 35: *Global Settings button*

The following functions can also be configured from the Global Settings panel:



Figure 36: *Global Settings panel*

1. **Output Labels**
   These fields allow user-defined names to be entered for the analog output channels for reference.
2. **Front Panel Lockout**
   When turned on, the front panel controls will be locked to prevent tampering. The exception is the Power button, which will remain functional.

   TIP: The front panel controls can also be locked directly from the front panel, however, if the front panel has been locked from Audio Architect, it must be unlocked from Audio Architect. See **"*Security/Front Panel Lockout*" *on page 66*** for more information on locking/unlocking the front panel controls from the front panel.
3. **Front Panel Blackout Mode**
   Turns the front panel display on or off.
4. **Amp Status Port**
   Selects whether a 2Hz square wave heartbeat or +5VDC signal is sent to the Amp Status pin on the AUX port — either can be used to remotely determine amp health/status.
5. **Mute Input**
   Determines which output channels will be muted when using GPIO Input 1 (pin 3). By default, a high condition will cause all checked input channels to mute. Checking the Invert checkbox will invert the polarity/functionality, meaning a low condition will cause all checked inputs to mute.
6. **Fault Output**
   Inverts the polarity/functionality of GPIO Output 1 (pin 1). When checked, GPIO Output 1 will indicate an amp fault when in a low state, rather than the default high state. See **"*System Protection*" *on page 72*** for more information on faults.
7. **Preset Recall Input**
   Loads one of two presets depending on the high/low state of Input 2 (pin 5) on the GPIO port. By default, these values are set to 0, which disables the function.
8. **Manual Aux Output**
   When this button is switched on, GPIO pin 2 (Output 2) will go high; when the button is off the state will be low. This provides a general purpose output which can be used to control many external devices such as relays, indicators, PLC system controllers, or any other 3rd party device with logic control inputs. This button can be controlled from its default loacation on the Global Settings panel, from a user-created custom control panel, using logic functions in Audio Architect, or from a compatible HiQnet wall controller. The state of this button and the resulting output are stored/recalled along with device presets.
9. **Power Modes**
   Use these settings to turn the APD and ACD power saving modes on or off and adjust the behavior of the ACD feature. See **"*Power Saving Modes*" *on page 71*** for more information.

For more information on using the GPIO control port, see **"*Using the GPIO Control Port*" *on page 69***.

Configuring Inputs & Outputs in Audio Architect

Assigning Input Sources in Audio Architect

All channels of the CDi DriveCore signal processing share a single Input Selector panel (shown in ***Figure 38***). From this panel, you can select the audio signal that will be routed to each amplifier channel and adjust the levels entering each channel's DSP chain.



Figure 37: *Input button*

The Input Selector panel can be accessed by clicking any of the **INPUT** buttons from the Main CDi DriveCore Control panel (see ***Figure 37***).

1. **Levels, Meters, & Clip Indicators**
   The level faders are used to adjust signal levels entering the DSP chains from the various input sources. The meters in this panel display both peak and RMS levels — the wider left meter shows RMS level and the right meter shows peak level for each channel. The clip indicators light to indicate clipping at the signal point just before the loudspeaker management processing (delays, EQ, crossover, etc.).



Figure 38: *Input Selector panel (BLU link CDi DriveCore model shown)*

2. **Input Selector Dropdown Menus**
   From these dropdown menus, input channel assignments can be selected for each channel. Analog inputs are available for selection in all CDi DriveCore amp models. Mono summed analog options are also available. Additional BLU link channel options are available in BLU link CDi DriveCore amp models. When assigning BLU link channels, a second dropdown menu will appear, where the desired BLU link channel can be selected, as shown in ***Figure 38***. These BLU link channel assignment dropdown menus provide an easier method for assigning BLU link channels, however, note that BLU link channels can also be assigned from the BLU link Input Channel Assignment window (see ***Figure 41***).
3. **Input Labels**
   These fields allow user-defined names to be entered for the analog input channels, which can be used for reference and added to custom control panels.
4. **Input Configuration and Output Configuration Buttons**
   Clicking the **Input Configuration** button opens the Input Configuration panel, where input levels and analog gain structure can be adjusted (see ***"Configuring Inputs" on page 37*** for more information). Clicking the Output Configuration button (available only in BLU link amp models) opens the BLU link Output Configuration panel, where the amplifier's BLU link output channels can be configured (see ***"Configuring BLU link Outputs" on page 38*** for more information).
5. **Triggered Source Selects Button**
   Pressing this button will open the Triggered Source Selects panel (see ***Figure 39***). This panel makes it easier to program a BSS Contrio Ethernet wall controller to recall up to four source selection states (Trigger A-D), along with input gain settings and on-screen controller labels. See ***"Programming BSS Contrio Ethernet Wall Controllers" on page 49*** for more information on using this panel and configuring Contrio wall controllers.

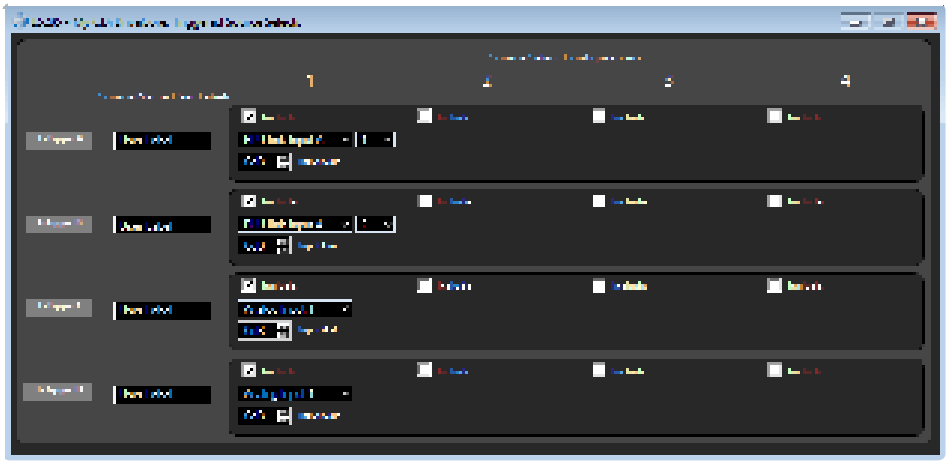


Figure 39: *Triggered Source Selects panel*

Configuring Inputs

The Input Configuration panel can be accessed by clicking the **Input Configuration** button from the Input Selector panel (see ***Figure 38***).

The Input Configuration panel (***Figure 40***) allows you to adjust signal levels entering the amplifier from the various sources. The BLU link CDi DriveCore models will display additional BLU link (Network) inputs.

The meters in this panel display both peak and RMS input levels — the wider left meter shows RMS level and the right meter shows peak level for each channel. Input Mute buttons are available for each channel. Network Signal Status LEDs below each BLU link input channel provide confirmation of BLU link signal presence.

The Gain Mode option is used to set the maximum amount of gain the amplifier will provide. The available options are +26 dBu, +34 dBu, and +37 dBu. Note that changes to this setting will affect all channels.

Clicking the **Advanced Settings** button opens the Advanced Settings panel, where BLU link sample rate and mastership clock priority can be set. See **"*Configuring BLU link Clock*" *on page 38*** for more information.

If using one of the BLU link CDi DriveCore models, the **Audio Routing** button will be available in the Input Configuration panel (***Figure 40***). Clicking the **Audio Routing** button opens the BLU Link Input Channel Assignment window (see ***Figure 41***). This is the traditional Audio Architect window used for assigning BLU link channels. From this window, any available BLU link audio streams can be assigned to the CDi DriveCore's inputs. Note that CDI DriveCore amplifiers provide an easier method for assigning BLU link input channels directly from the Input Selector panel (see ***Figure 38***).

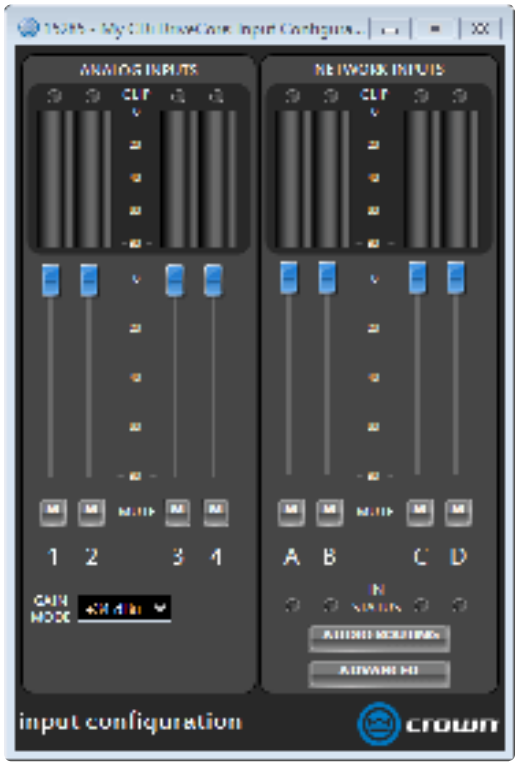


Figure 40: *Input Configuration panel (BLU link model shown)*

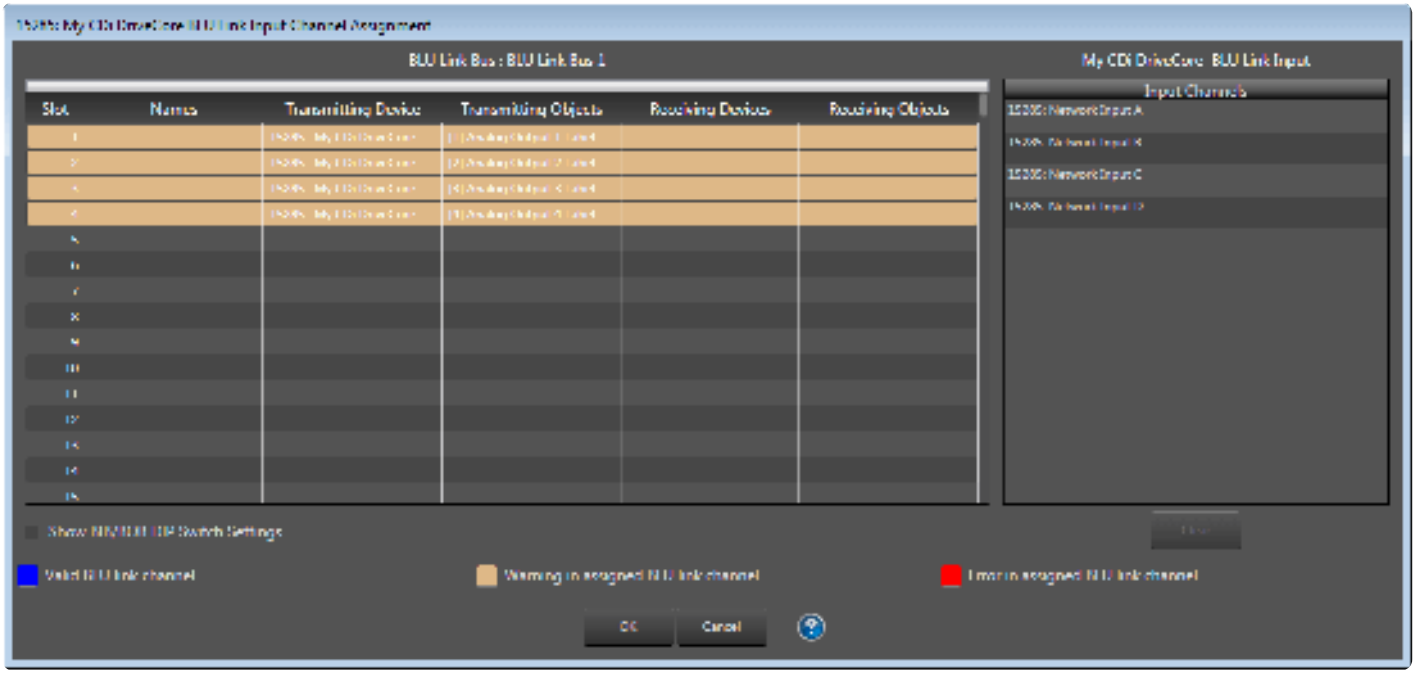


Figure 41: *BLU Link Input Channel Assignment window*

Configuring BLU link Clock

The Advanced Settings panel can be accessed by clicking the **Advanced Settings** button from either the Input Configuration panel (see ***Figure 40***) or from the Output Configuration panel (see ***Figure 43***). From the Advanced Settings panel, BLU link sample rate and mastership clock priority can be set. This panel also displays clock sync status and BLU link input/output connection status. Input/output errors and corrected errors are also displayed and can be reset from this panel. For more information on these parameters, see ***"Configuring BLU link Settings" on page 22*** and ***"BLU link Status" on page 62***.



Figure 42: *Advanced Settings panel*

Configuring BLU link Outputs

Clicking the **Output Configuration** button from the Input Selector panel (see ***Figure 38***) opens the BLU link Output Configuration panel (see ***Figure 43***). From this panel, audio source signals can be routed ("on-ramped") back onto the BLU link bus as follows:

- Pre-processed audio from the inputs can be routed to the BLU link bus.

  NOTE: The audio from the analog inputs will still pass through the amplifier input gain stage. This means the signals will be affected by the Gain Mode setting and the Input Level faders located in the Input Configuration panel (***Figure 40***) before being sent out to the BLU link bus.

- Amp output channels can be routed to the BLU link bus.

  NOTE: The output audio is bussed from a point at the end of the amp's signal processing chain and includes the Transducer Thermal Limiter. This is effectively analogous to taking the audio from the physical output of the amplifier, which feeds the loudspeaker, and routing it onto the BLU link bus.

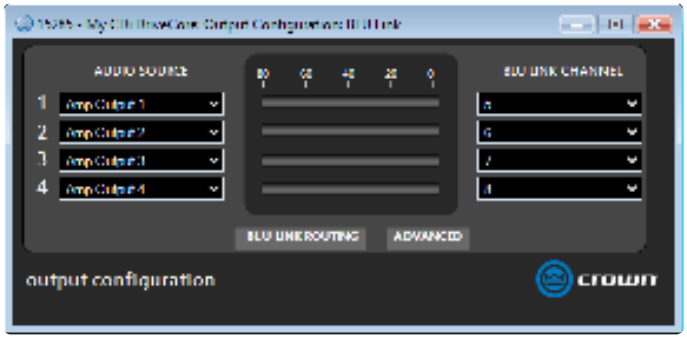


Figure 43: *BLU link Output Configuration panel*

To route amplifier audio onto the BLU link bus, select the audio source for each output channel using the Audio Source dropdown menus, then select which BLU link channel to route each signal to using the BLU link Channel dropdown menus.

NOTE: Audio Architect also provides the traditional BLU link Output Channel Assignment window (***Figure 44***) for routing BLU link audio onto the BLU link bus. Either method can be used to assign BLU link output channels.



Figure 44: *BLU Link Output Channel Assignment window*

Configuring Amp Wiring & Output Modes in Audio Architect

The CDi DriveCore amplifiers are very capable and flexible amplifiers. From the Amplifier Mode Settings panel, the following items can be configured:

- Inputs can be cascaded ("Y'ed") to multiple outputs.
- Output pairs can be bridged for mono operation.
- Outputs can be independently configured for Low Z or High Z (70V/100V) operation.



Figure 45: *Mode button*

The Amplifier Mode Settings panel can be accessed by double-clicking the **MODE** button from the Main CDi DriveCore Control panel (see ***Figure 45***).

Cascading Inputs

The ability to cascade inputs (or "Y" channels) makes the CDi DriveCore Series amps even more flexible. One input can be used to drive some or all of the amplifier outputs (see ***Figure 46***).

NOTE: By cascading the inputs, the corresponding input DSP functions for individual channels will be removed and only the output DSP functions will be available, as shown in ***Figure 47***.

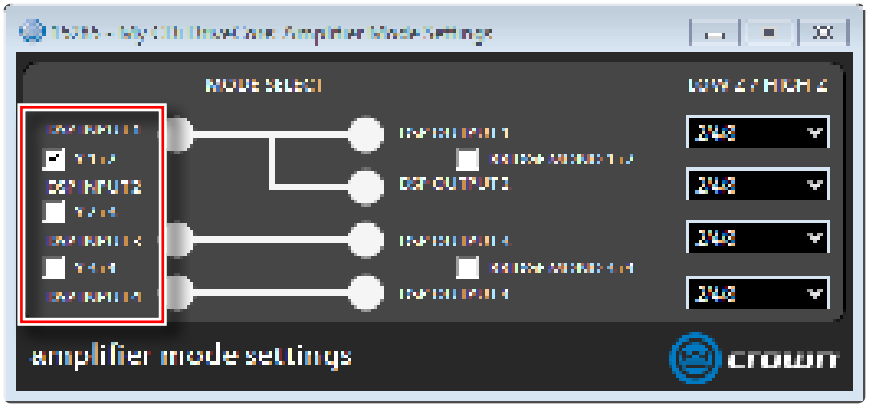


Figure 46: *Use the "Y" checkboxes to cascade input channels*



Figure 47: *With the "Y 1+2" box checked, both output Ch.1 and Ch.2 are fed by input Ch.1 and input processing is organized accordingly*

Configuring Outputs for Bridge Mono Operation

When more output power is required for the application, output channel pairs can be configured for bridge mono operation. This can be configured in the Amplifier Mode Settings panel (see ***Figure 48***).

When selecting the Bridge Mono option for an output pair, only the odd-numbered input channel will need to be wired.

NOTE: When configured for bridge mono operation, only one channel in the channel pair DSP will be available, as shown in ***Figure 49***.

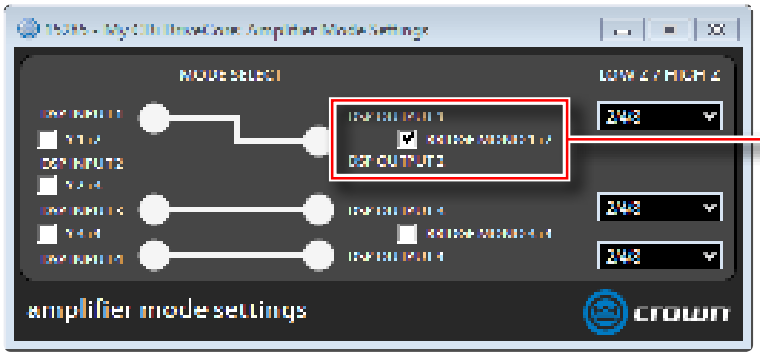


Figure 48: *Bridge mono configuration*

Configuring Outputs for Low Z/High Z Operation

The CDi DriveCore's output channels can be configured for Low Z or High Z operation. To configure the amplifier for High Z operation, select either the 70V or 100V option (see ***Figure 50***).



Figure 49: DSP chain configured for bridge mono operation

NOTE: If an amplifier output channel pair is configured for bridge mono operation and one of the High Z options is selected, the amplifier output will produce 140V or 200V (rather than 70V or 100V).

NOTE: When configured for High Z operation, a 35Hz high-pass filter will automatically be applied to the signal. When configured for Low Z operation, a 10Hz high-pass filter will automatically be applied to the signal.

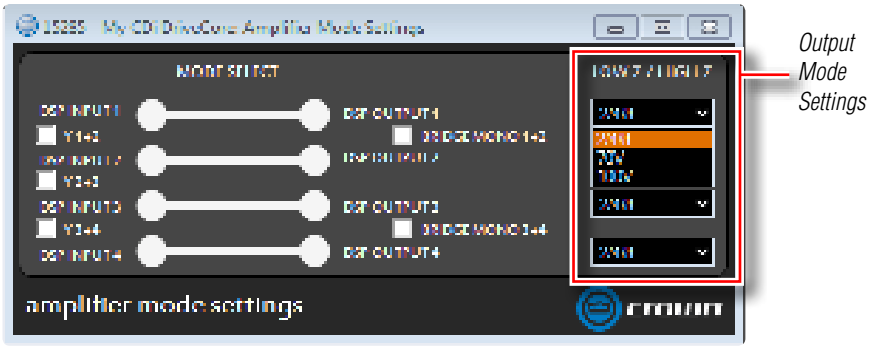


Figure 50: *Low Z/High Z configuration*

NOTE: The full scale output of the amplifier will change depending on the Low Z/High Z setting, as well as the amplifier model (see table).

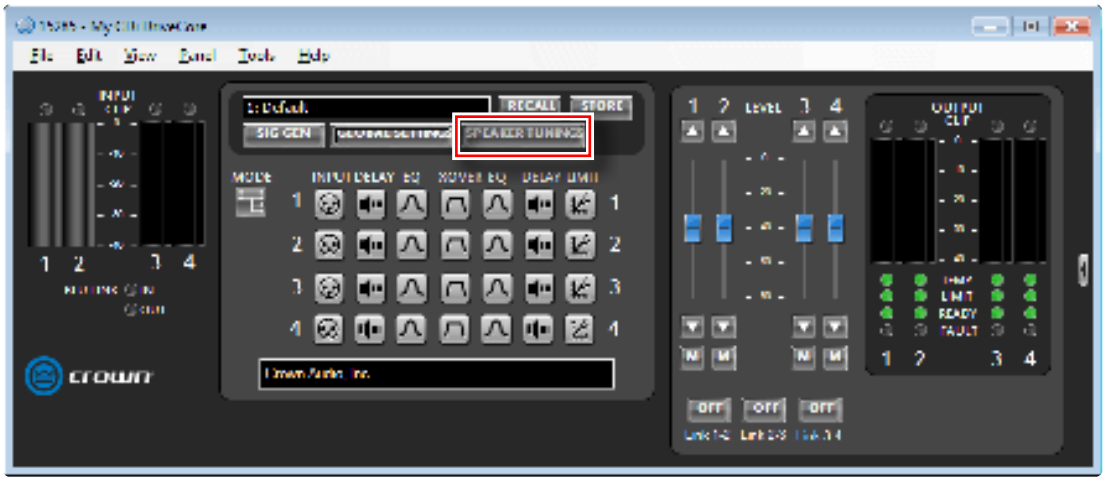
Low Z/High Z Setting	Full Scale Voltage RMS
Low Z Mode (300W models)	49
Low Z Mode (600W models)	69.9
High Z Mode (70V)	70
High Z Mode (100V)	100

Configuring Speaker Tunings in Audio Architect

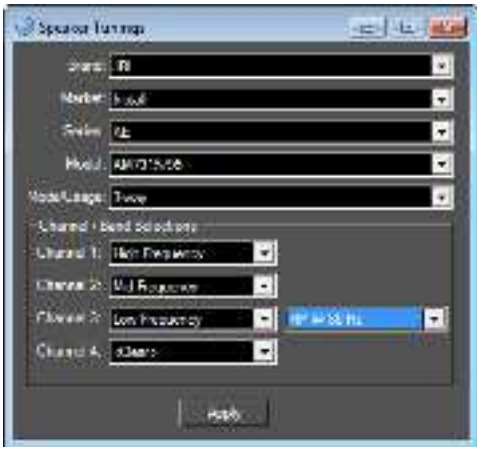
Speaker tunings apply DSP settings specific to a particular speaker, making it easy to optimize a speaker's performance.

To configure speaker tunings in Audio Architect:

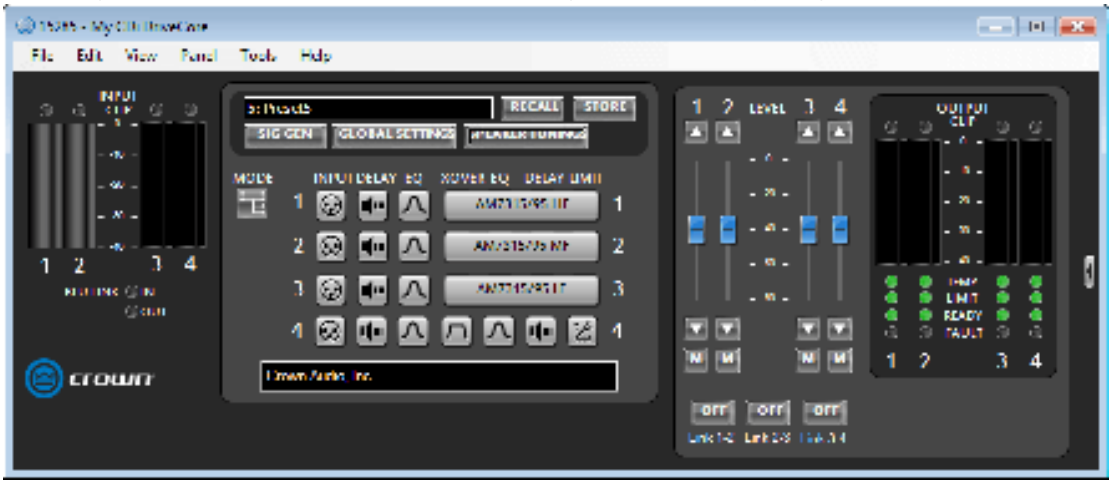
1. From the Main CDi DriveCore Control panel, click the **Speaker Tunings** button.



2. Select the speaker series, model, and desired options from the dropdown menus, then click the **Apply** button.



3. The example screenshot below shows the Main CDi Control panel with the configured speaker tunings.



TIP: To clear a tuning, double-click the tuning block in the configuration map and then press the **Clear** button.

Crossover Panel

The Crossover provides infinite impulse response (IIR) filters. Each filter has up to +24/-60dB of gain. The Crossover panel is used to edit the crossover settings and can be accessed by double-clicking the **XOVER** button from the Main CDi DriveCore Control panel (see ***Figure 51***).



Figure 51: *XOVER button*

NOTE: If speaker tunings have been configured for a channel, the Crossover panel will not be available for that channel.

Available low-pass/high-pass filter types:

- Bessel: 12dB/oct, 18dB/oct, 24dB/oct, 30dB/oct, 36dB/oct, 42dB/oct, 48dB/oct
- Butterworth: 6dB/oct, 12dB/oct, 18dB/oct, 24dB/oct, 30dB/oct, 36dB/oct, 42dB/oct, 48dB/oct
- Linkwitz-Riley: 12dB/oct, 24dB/oct, 36dB/oct, 48dB/oct

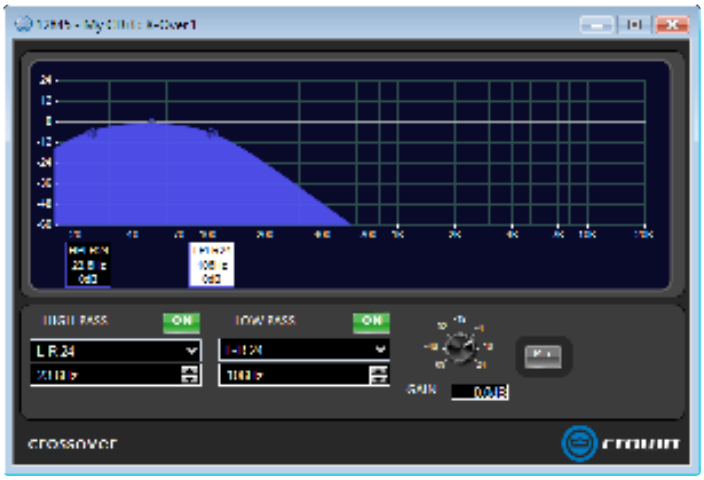


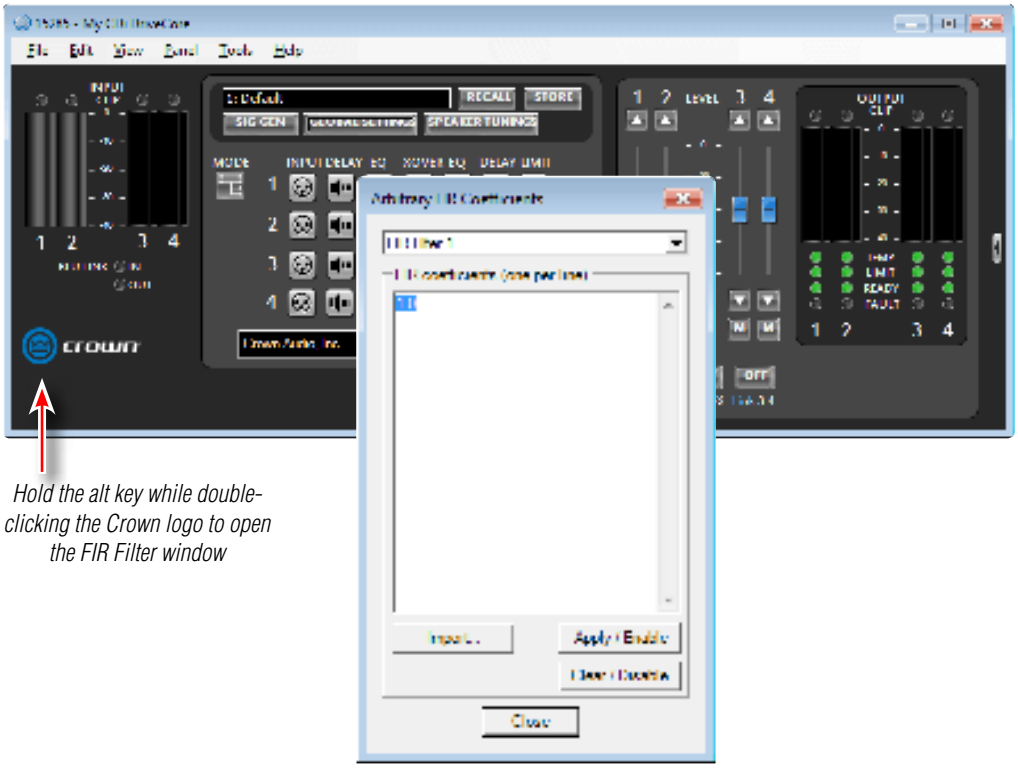
Figure 52: *X-Over panel*

FIR Filters

For advanced users, the Crown CDi DriveCore amplifiers provide support for importing or entering FIR filter coefficients. Support is provided for one FIR filter per amplifier channel using up to 1024 taps per filter.

The FIR filter window can be accessed by holding the alt key on the keyboard while double-clicking the Crown logo on the bottom-right corner of the Main CDi DriveCore Control panel (see ***Figure 53***).

For additional information on using FIR filters with the CDi DriveCore amplifiers, please contact Crown Technical Support.



Hold the alt key while double-clicking the Crown logo to open the FIR Filter window

Figure 53: *The FIR Filter window*

Input/Output EQ Panels

The CDi DriveCore amplifiers offer an Input (pre-Crossover) and Output (post-Crossover) EQ for each channel. The Output EQs are generally used for speaker tunings, and the Input EQs are used for additional filtering if required for the application. The Input EQ panel can be accessed by clicking the **Input EQ** button, and the Output EQ panel can be accessed by clicking the **Output EQ** button from the Main CDi DriveCore Control panel (see ***Figure 54***).



Figure 54: *Input and Output EQ buttons*

The Input and Output EQs each provide up to 8 bands per channel. You can select filter type, frequency, boost/cut, and width or slope. The EQ's frequency response can be edited by typing in parameters, using the **UP** and **DOWN** buttons, or clicking and dragging in the graph (see ***Figure 55***).

NOTE: If speaker tunings have been configured for a channel, the Output EQ panel will not be available for that channel.

Available options/parameters:

- **Off/On**
  Turns the EQ on or off.
- **Type**
  Selects the type of filter for the band. See available filter types listed below.
- **Slope (3 – 15 dB/Oct)**
  Sets the slope rate of the band for Shelf-type filters.
- **Frequency (3 – 15 dB/Oct)**
  Sets the center/corner frequency of the band.
- **Gain (±20dB)**
  Sets the amount of gain (boost/cut) applied to the band.
- **Width (0.10 – 32)**
  Sets the width of the band for Bell-type filters, or adjusts the resonant peak for 2nd Order Lowpass/Highpass filters.
- **Clear**
  Use these buttons to reset a band's settings back to default.

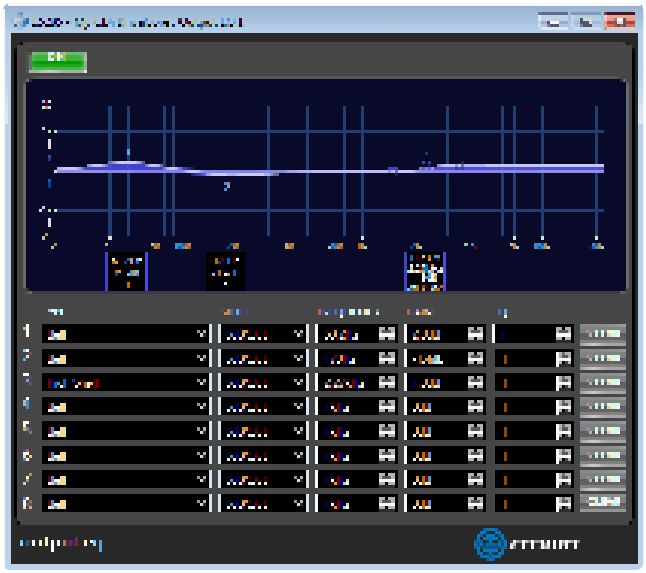


Figure 55: *EQ panel*

Available filter types:

- Bell
- Low Shelf
- High Shelf
- Lowpass BW1 (Butterworth 6dB/oct filter)
- Highpass BW1 (Butterworth 6dB/oct filter)
- Lowpass 2nd Order (6-12dB/oct filter with variable resonant peak using the Width parameter)
- Highpass 2nd Order (6-12dB/oct filter with variable resonant peak using the Width parameter)
- Allpass 1 (90º phase shift)
- Allpass 2 (180º phase shift)

Input/Output Delay Panels

The CDi DriveCore Series amplifiers offer an Input (pre-Crossover) and Output (post-Crossover) Delay for each channel. The Output delay is typically used for driver alignment and provides up to 100ms of delay time per channel. The Input Delay provides up to 1 second of additional delay time and can be used for delaying the system to the stage backline, delay fills, or whenever more delay time is required than the Output Delay has to offer. Delay can be adjusted in seconds, feet, or meters (see ***Figure 57***).



Figure 56: *Input and Output Delay buttons*

The Input Delay panel can be accessed by clicking the **Input Delay** button, and the Output Delay panel can be accessed by clicking the **Output Delay** button from the Main CDi DriveCore Control panel (see ***Figure 56***).

NOTE: If speaker tunings have been configured for a channel, the Output Delay panel will not be available for that channel.

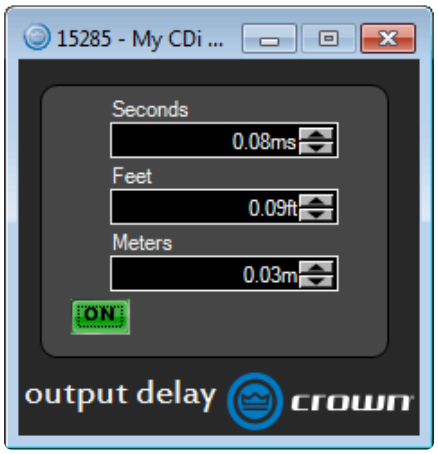


Figure 57: *Input Delay panel*

LevelMAX Panel

The LevelMAX panel contains the entire LevelMAX suite of limiters, which consist of a peak voltage limiter, RMS power limiter, and transducer thermal limiter (see ***Figure 59***).

The LevelMAX panel can be accessed by double-clicking the **LevelMAX** button from the Main CDi DriveCore Control panel (see ***Figure 58***).



Figure 58: *LevelMAX button*

NOTE: If speaker tunings have been configured for a channel, the LevelMAX panel will not be available for that channel.

Available options/parameters:

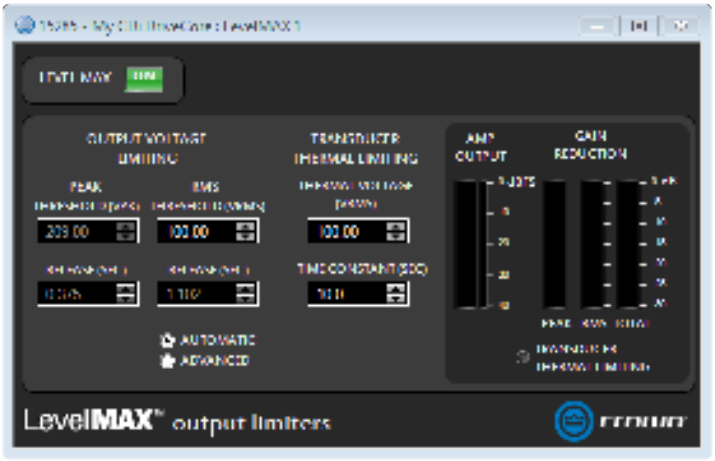


Figure 59: *LevelMAX panel*

- **LevelMAX (Off, On)**
  Turns the limiters on or off.
- **Mode (Auto, Advanced)**
  Sets whether certain parameters will be set automatically or available for manual configuration. The following Mode options are available:

  Auto Mode – When this option is selected, the software determines the best settings based on the signal characteristics. You can modify only the RMS Threshold, Thermal Threshold, and Thermal Time Constant. All other parameters will be set automatically.

  Advanced Mode – Selecting this option allows the parameters which are set automatically when "Auto" mode is selected to be manually adjusted. This includes Peak Threshold, Peak Release, and RMS Release.
- **Peak Threshold (1 – 200 VPK)**
  Sets the peak level, in absolute voltage, which the limiter will allow from the amplifier. In Automatic mode, the Peak Threshold value is automatically determined from the defined RMS threshold and the low pass frequency defined in the crossover.
- **Peak Release (0 – 10 seconds)**
  Sets the release time of the peak limiter. The release time is defined as the time it takes the limiter to increase the output signal by 20dB.
- **RMS Threshold (1 – 400 VRMS)**
  Sets the RMS level, in absolute voltage, which the limiter will allow from the amplifier. The RMS Threshold should be set to correspond to the short term (2 hour) power handling of the transducer or system.
- **RMS Release (0 – 10 seconds)**
  Sets the release time of the RMS limiter. The release time is defined as the time it takes the limiter to increase the output signal by 20dB.
- **Thermal Voltage (1 – 500V)**
  Sets the long-term output power limit of the amplifier to what the loudspeaker load can handle without overheating and going into thermal compression. This is based on the AES power/voltage ratings of drivers outlined in the AES2-2012 standard.
- **Thermal Response (1 – 600 sec)**
  Sets the time it takes for the thermal limiter to adjust output voltage. This is based on the AES power/voltage ratings of drivers outlined in the AES2-2012 standard.
- **Metering**
  These meters display levels in dBFS and include Amp Output (peak level on the left meter and RMS level on the right), Gain Reduction (peak, RMS, and total), and Thermal Limiting amount. The Transducer Thermal Limiting indicator lights to indicate the Thermal Threshold has been exceeded.

NOTE: The LevelMax limiters include sidechain EQ for advanced speaker tunings. Sidechain EQ parameters are not user adjustable.

For more information on the LevelMAX limiters and how to set the parameters, see the LevelMAX white paper available at www.crownaudio.com.

About the Transducer Thermal Limiter

The Transducer Thermal Limiter limits the long-term output power of the amplifier to what the loudspeaker load can handle without overheating and going into thermal compression. You can set the voltage level at which the thermal limiter engages, and the thermal response time. Your loudspeaker manufacturer might be able to provide this information.

Signal Generator Panel

The signal generator can be used to tune or troubleshoot loudspeakers connected to the amplifier. The Signal Generator panel (***Figure 61***) can be accessed by clicking the **Signal Generator** button from the Main CDi DriveCore Control panel (see ***Figure 60***).



Figure 60: *Signal Generator button*

Available options/parameters:

- **Signal Generator Button (Off, On)**
  Turns the signal generator on or off.
- **Amplitude Fader (-60dBFS to 0dBFS)**
  Adjusts the global level of the signal generator.
- **Mixer Faders (-80dBFS to 0dBFS)**
  Adjust the individual signal generator levels feeding each DSP chain.
- **Mute Buttons (Off, On)**
  Mutes the signal generator signal feeding each DSP chain.
- **Type (Pink, White, Sine)**
  Selects the type of signal to be generated.
- **Frequency (20Hz – 20kHz)**
  Selects the sine tone frequency when the "Sine" type has been selected.

NOTE: Signal Generator settings are stored with device presets.

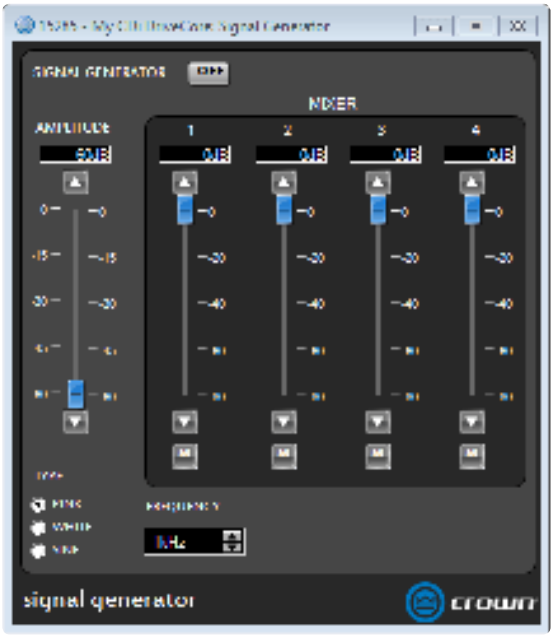


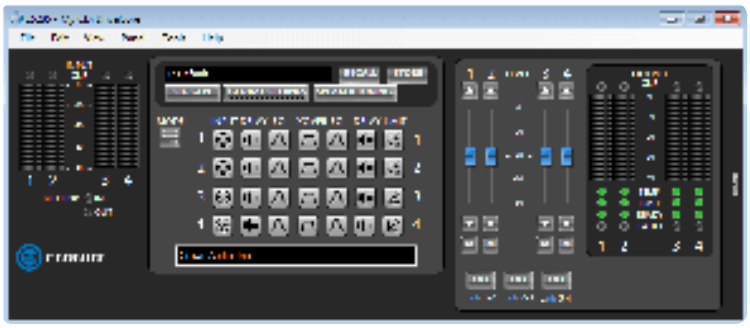
Figure 61: *Signal Generator panel (4-channel amp model shown)*

Managing Device & Preset Files

Using Audio Architect, a single amplifier preset can be backed up to a computer as a "preset file", or all amplifier presets and applicable settings can be backed up as a "device file". It is good practice to backup the amplifier's user presets and device settings for safe keeping whenever completing the setup and optimization of a loudspeaker system.

To save a preset or device file in Audio Architect:

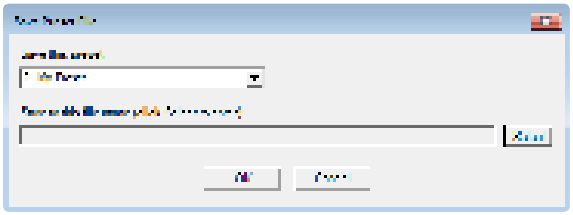
1. Go online with the device. You must be online during this operation or the saved settings will not reflect the settings in the actual device. See ***"Going Online" on page 33*** for instructions on going online.
2. Open the Main CDi DriveCore Control panel.



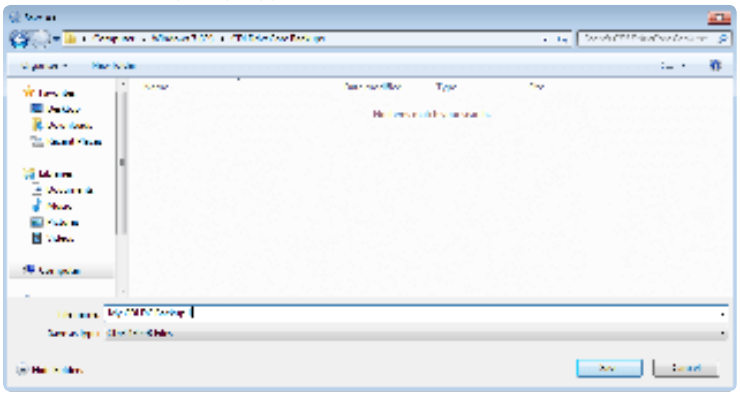
3. Select "File | Save | Device File" to save a device file. Or, select "File | Save | Preset File" to save a single preset as a preset file.



4. If saving a device file, proceed to the next step. If saving a preset file, the below window will appear. From the "Save this preset:" dropdown menu, select the preset you wish to save. Click Select, then select the desired folder location on the hard drive, name the file, then click Save. Now click OK. The preset file is now saved.



5. When the Save As prompt appears, select the desired folder location on the hard drive, name the file, then click Save. The device file is now saved.

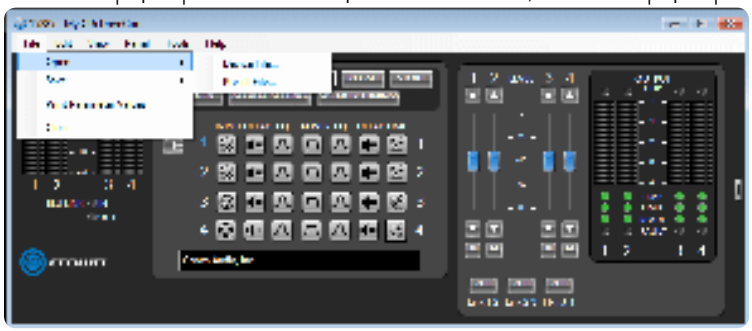


To open a preset or device file in Audio Architect:

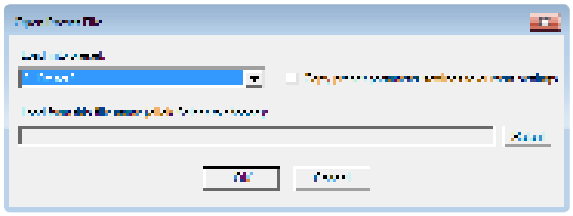
1. Go online with the device. You must be online for the settings to be sent down to the actual device. See **"Going Online" on page 33** for instructions on going online.
2. Open the Main CDi DriveCore Control panel.



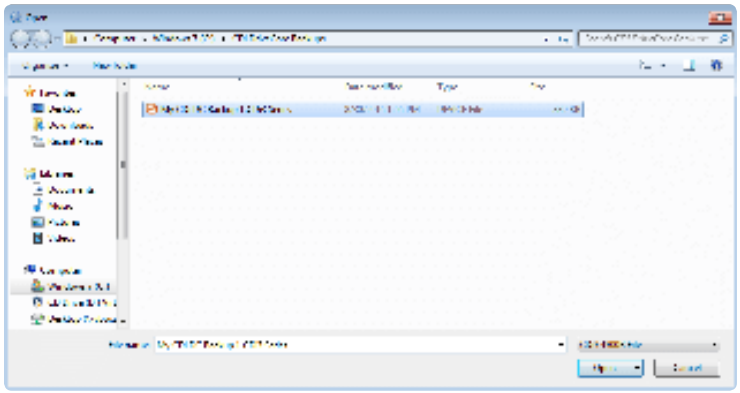
3. Select "File | Open | Device File" to open a device file. Or, select "File | Open | Preset File" to open a preset file.



4. If opening a device file, proceed to the next step. If opening a preset file, the below window will appear. From the "Load into preset:" dropdown menu, select the preset location to which you wish to load the preset. Click Select, navigate to the folder containing the preset file, select the file, then click Open. Now click OK. The preset file has now been loaded.



5. When the Open prompt appears, navigate to the folder containing the device file, select the file, then click Open. The device file has now been opened and all presets and applicable settings will be reflected in the device.



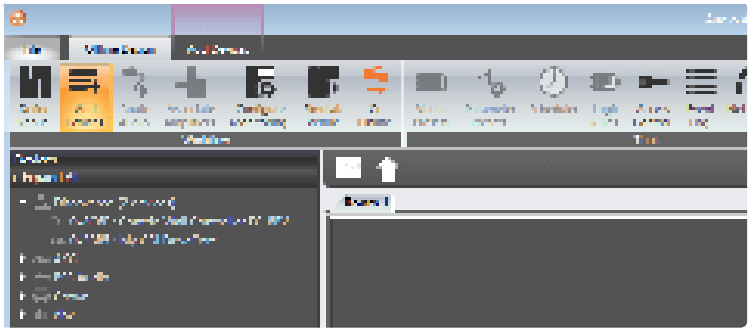
Programming BSS Contrio Ethernet Wall Controllers

The BSS Audio Soundweb Contrio Ethernet wall controllers can be used to control many of the parameters and functions in a CDi DriveCore amplifier. At the time of this writing, there are four Ethernet Contrio controller models available. Contrio controllers come in black or white, with US and EU versions available (black US models shown).

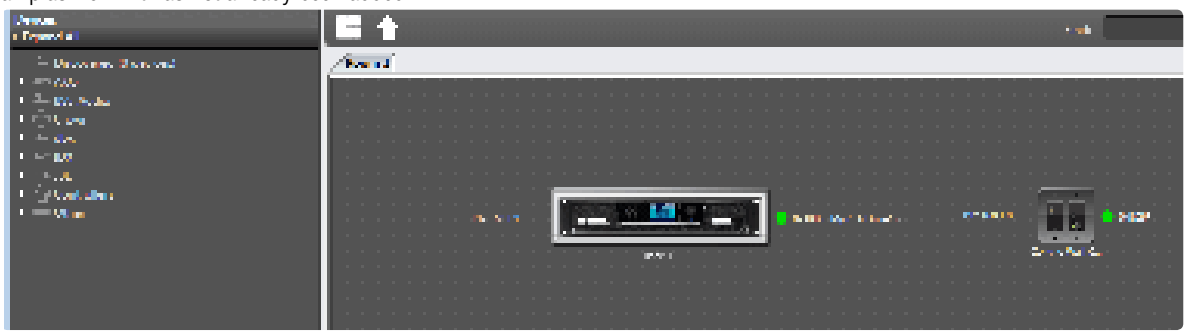
EC-V	EC-4B	EC-4BV	EC-8BV
			

To program a Contrio Ethernet wall controller:

1. Launch Audio Architect.
2. The Contrio controller must be on the same network as the CDi DriveCore amp and the computer running Audio Architect. If using a DHCP server, the network settings should be automatically configured correctly. If using static IP addressing, use the NetSetter application to configure the Contrio controller's network settings. See **"Configuring the Network using NetSetter" on page 25** for more information.
3. If the CDi DriveCore amp and Contrio wall controller are already visible in Audio Architect's Room window, skip to step 5. If they are not visible, select the "Devices" tab in the lower-left corner of the Main Audio Architect window. Any detected HiQnet devices will appear under the "Discovered" menu tree on the left.



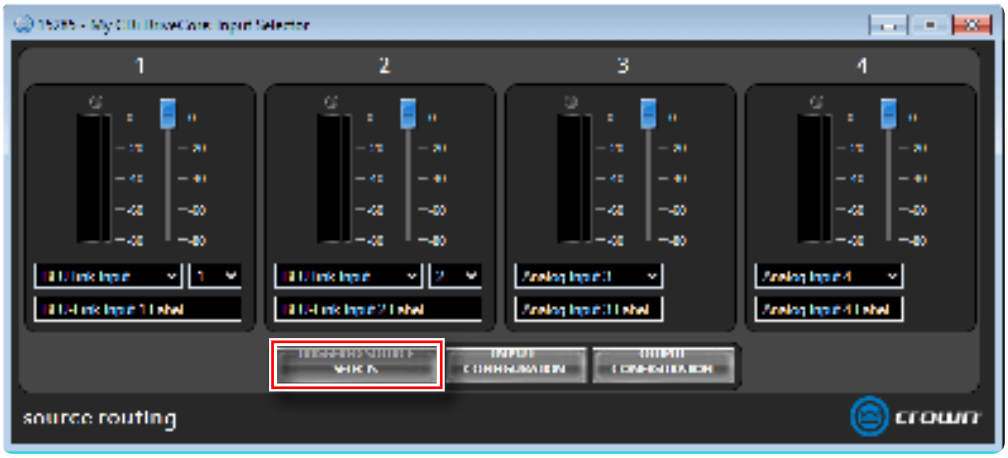
4. Add the Contrio controller to the Audio Architect venue by dragging it from the "Discovered" menu tree to the Room window. Add the CDi DriveCore amp as well if it has not already been added.



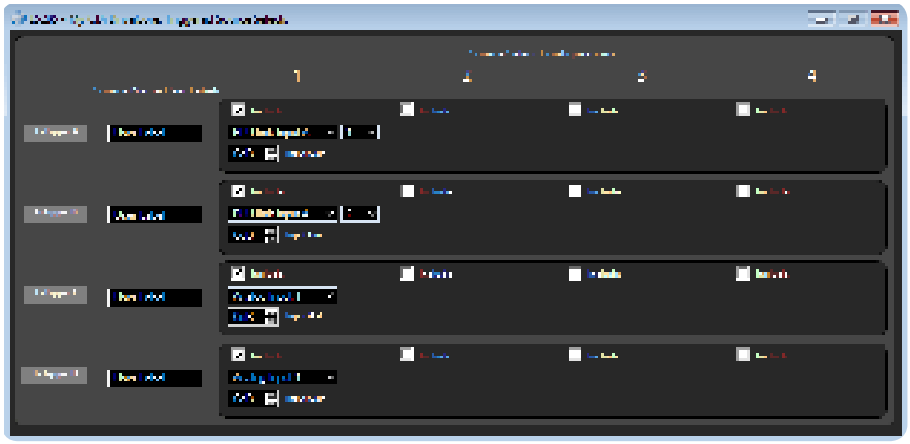
5. Double-click the amp image to open the Main CDi DriveCore Control panel.
6. Click on one of the Input buttons.



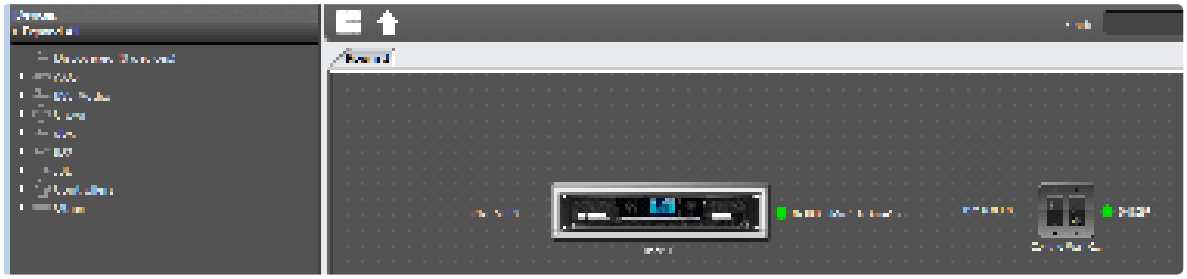
7. Click on Triggered Source Selects.



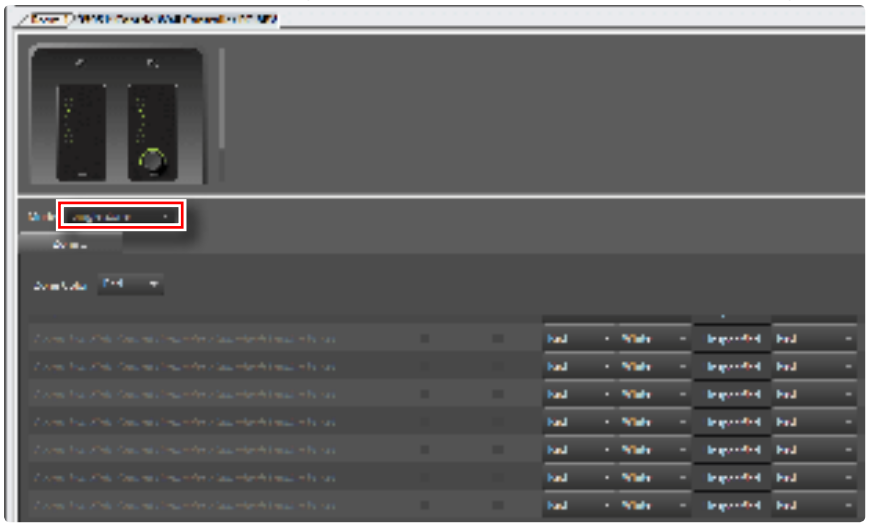
8. The Triggered Source Selects panel provides an easier, more efficient method for programming a Contrio wall controller to control input source selection of a CDi DriveCore amp. There are four different source selection states: Trigger A–Trigger D. The input channels are displayed along the top (4-channel amp model shown). Type a user label for each triggered state—these labels will be displayed on the Contrio controller's screen. Check the Include checkbox for each input channel that should be affected when recalling each triggered state. Set the desired input source and level for each input for each triggered state. Leave this panel open, close other open panels, then proceed to the next step.



9. Go back to the Room window and double-click the Contrio Wall Controller image to open the Contrio Wall Controller window.



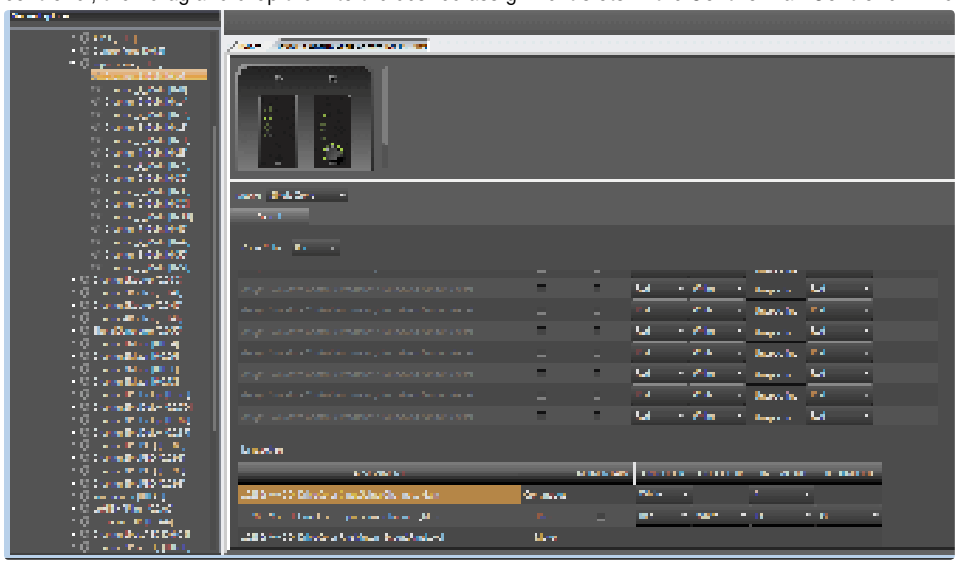
10. Select the desired mode at the top of the Contrio Wall Controller window. See the help file in Audio Architect for descriptions of the different modes.



11. Ctrl+click+drag the Trigger A button to the first assignment slot. Repeat for any other programmed triggers, dragging them into the remaining slots. Make any other desired program changes in the Contrio Wall Controller window, such as changing the controller's button or label colors.



12. To perform more complex programming of a Contrio wall controller, expand the menu tree on the left and find the parameters to assign to the controller, then drag and drop them to the desired assignment slots in the Contrio Wall Controller window.



TIP: An alternative method for assigning parameters to the Contrio controller is to go back to the Room window, open the CDi DriveCore panel that contains the controls to assign, then go back to the Contrio Wall Controller window and ctrl+click+drag each parameter from the CDi DriveCore panel to the desired controller assignment slot.

13. Once programing is complete, go back to the Room window and click "Go Online" in the Offline Design ribbon at the top of the window.

14. Press the "L" icon that covers the controller image to load the program changes to the controller. Press the receive "R" or send "S" icon that covers the CDi DriveCore amp image if prompted, as shown below.



TIP: Press "R" to receive settings from the amp or "S" to send the settings from Audio Architect to the amp. See ***"Going Online" on page 33*** for more information about going online.

15. The Contrio controller should now be programmed to control the CDi DriveCore amp. Open the amp's control panel, by double-clicking the CDi DriveCore amp image in the Room window, then verify that the Contrio controller is properly controlling the desired parameters. To make additional changes to the Contrio controller programming, repeat the aforementioned steps.



TIP: Additional controller settings are available in the Contrio Wall Controller Default Control panel (see ***Figure 62***). This panel can be accessed by right-clicking the Contrio Wall Controller image from the Room window and selecting "Show Default Control Panel". See the help file in Audio Architect for additional information on Contrio controller functionality and programming.



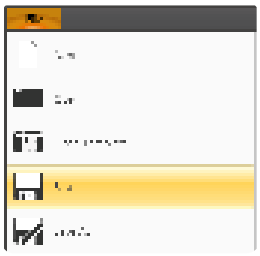
Figure 62: *Contrio Controller Default Control panel*

Saving & Opening Audio Architect Venue Files

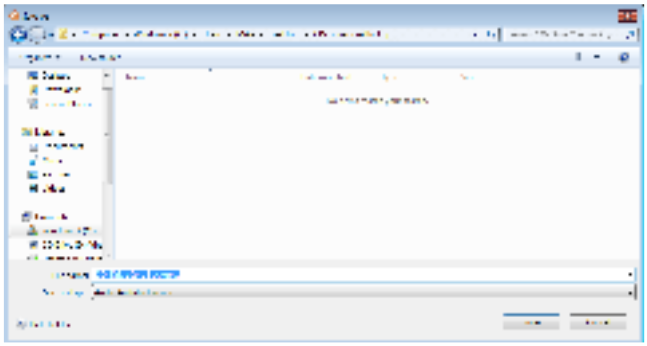
When finished programming HARMAN devices in Audio Architect, it is good practice to save the entire venue as a "Venue" file. This will save all Audio Architect configuration changes and the programming and settings for all devices in the current venue configuration to a single file for backup and recall.

To save a Venue file in Audio Architect:

1. In the upper left-hand corner of the Main Audio Architect window, select the File tab.
2. Select "Save" or "Save As" from the menu.

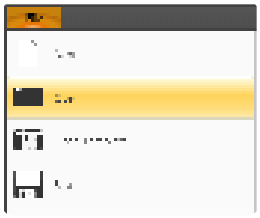


3. Select the desired location on the hard drive and name the file. Click the Save button.

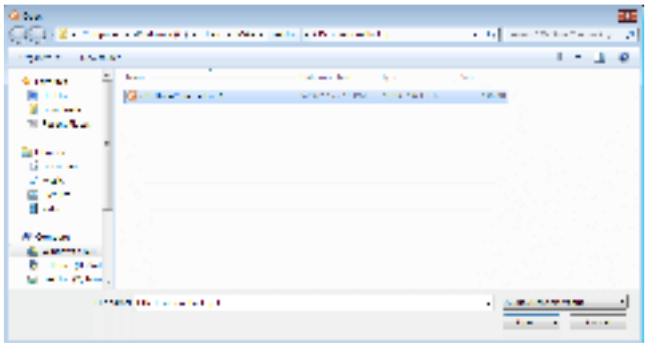


To open a Venue file in Audio Architect:

1. In the upper left-hand corner of the Main Audio Architect window, select the File tab.
2. Select "Open" from the menu.



3. Select the Venue file on the hard drive, then click the Open button.



The Event Log

The Event Log Viewer window (***Figure 65***) shows events that have occurred within Audio Architect and on HiQnet devices. The log can be used by individual devices to perform certain operations. It can also be used for troubleshooting purposes. The Event Log can be accessed from either the Offline ribbon (***Figure 63***) or Online ribbon (***Figure 64***).



Figure 63: *Accessing the Event Log from the Offline ribbon*

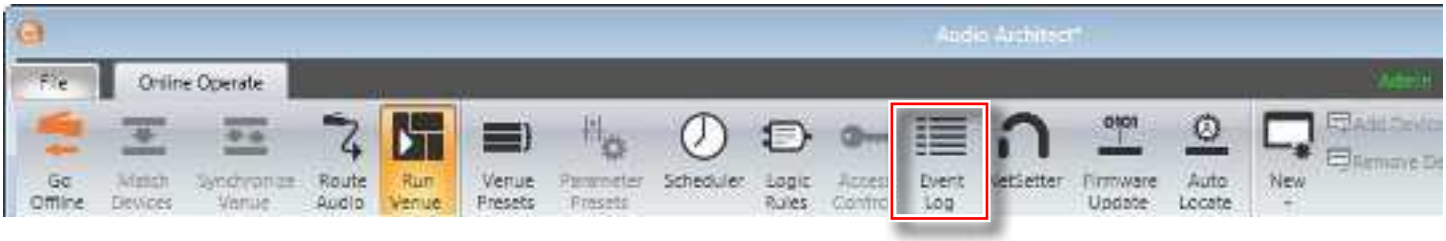


Figure 64: *Accessing the Event Log from the Online ribbon*

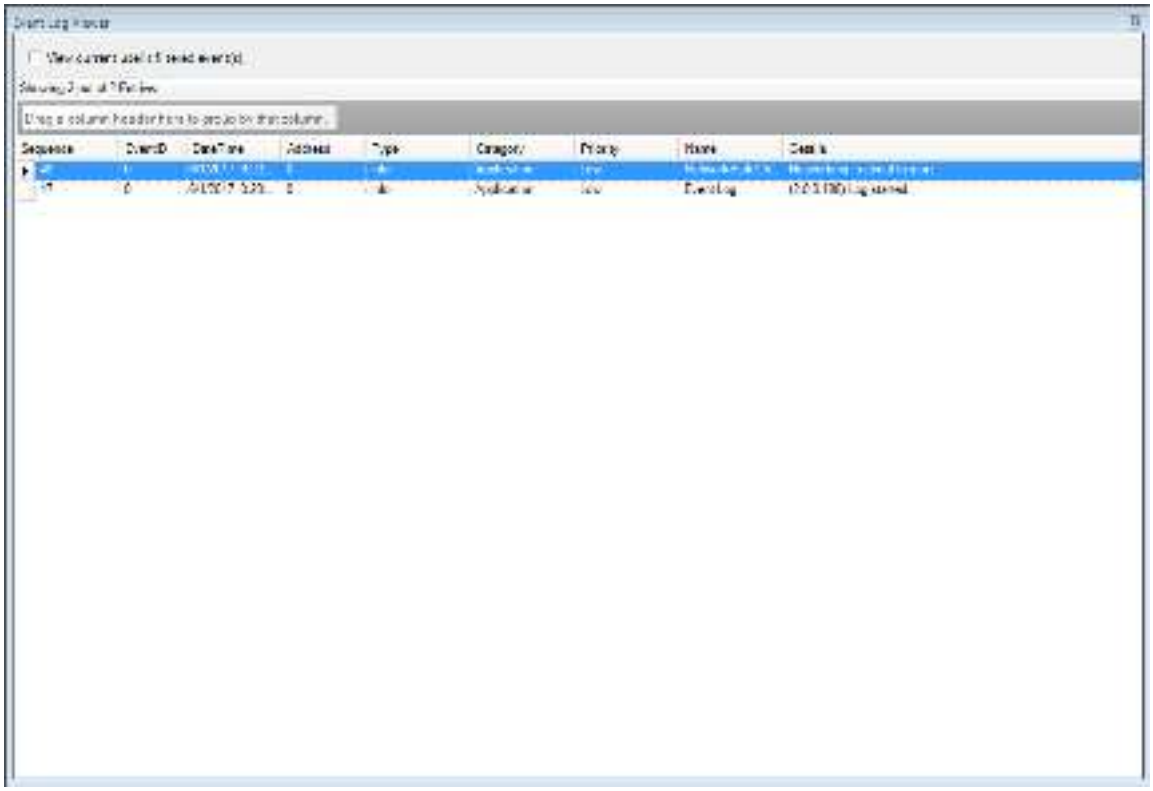


Figure 65: *The Event Log Viewer window*

For more information about the Event Log and editing Event Log settings, see the Audio Architect help file.

Application Examples

Dual Mode, Low Z (2Ω, 4Ω, 8Ω, or 16Ω)

Audio Architect software settings are shown in ***Figure 66***. Typical input/output wiring is shown in ***Figure 67***.

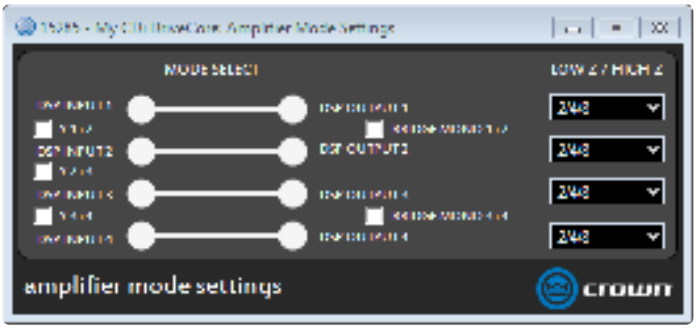


Figure 66: *Audio Architect amplifier mode settings*

INPUTS: Connect the input wires for each channel. See ***"Wiring Input Connectors" on page 7*** for further information on analog input wiring.

If the same input signal is to drive multiple outputs, the input signal can be "Y'ed" by checking the "Y" checkboxes (see ***Figure 66***). See ***"Configuring Amp Wiring & Bridge Mode" on page 13*** for more information.

If using the BLU link input, it is important to understand that BLU link is a digital audio bus and cannot be routed through an Ethernet switch or router. Category 5e or higher cabling must be used for all BLU link connections. To use the built-in BLU link fault protection, the BLU link output of the last device on the bus must be connected back to the BLU link input of the first device. For additional information on making BLU link connections and using BLU link, see ***"Using BLU link" on page 59***.

OUTPUTS: Maintain proper polarity (+/–) on output connectors. Connect the Channel 1 speaker's positive (+) lead to amplifier Channel 1 positive terminal; repeat for the negative (–) lead. Repeat Channel 2 wiring as for Channel 1, and for any subsequent channel pairs on multichannel models. See ***"Wiring Output Connectors" on page 7*** for additional information on output wiring.

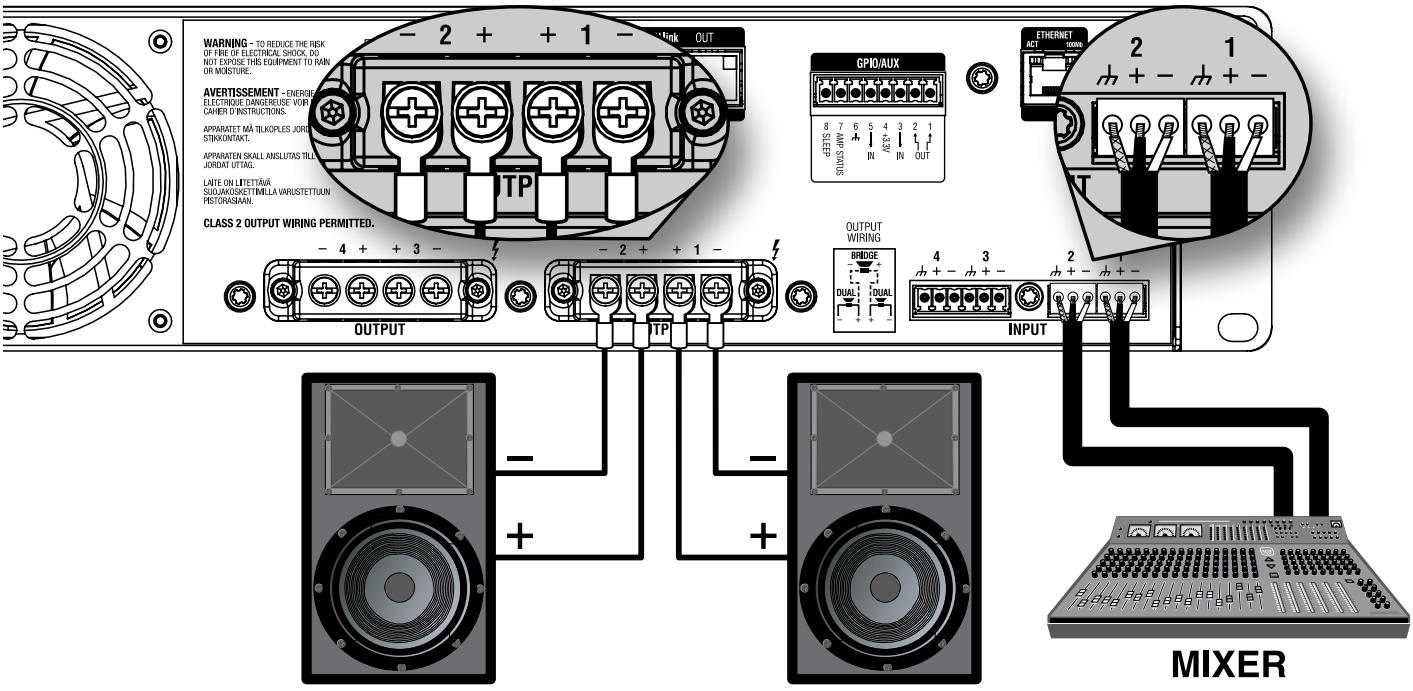


Figure 67: *System wiring in Dual mode*

NOTE: Always route the input and output wires in separate bundles.

WARNING: Only connect to networks that remain inside the building.

Bridge Mono Mode, Low Z (4Ω, 8Ω, or 16Ω)

Audio Architect software settings are shown in ***Figure 68***. Typical input/output wiring is shown in ***Figure 69***.

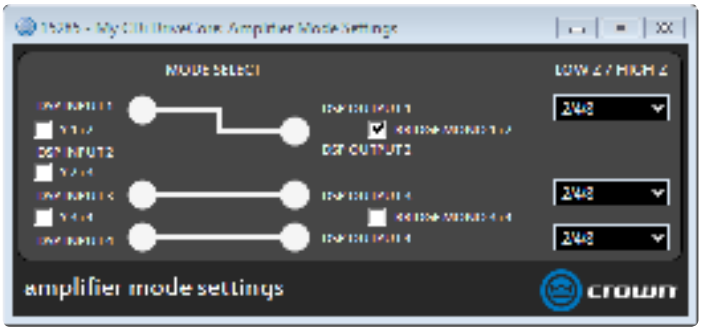


Figure 68: *Audio Architect amplifier mode settings*

INPUTS: If using analog inputs, connect to the odd-numbered input channels (1,3) only. Even-numbered inputs (2,4) are disabled when Bridge Mono mode is active. See ***"Wiring Input Connectors" on page 7*** for further information on analog input wiring.

If using the BLU link input, it is important to understand that BLU link is a digital audio bus and cannot be routed through an Ethernet switch or router. Category 5e or higher cabling must be used for all BLU link connections. To use the built-in BLU link fault protection, the BLU link output of the last device on the bus must be connected back to the BLU link input of the first device. For additional information on making BLU link connections and using BLU link, see ***"Using BLU link" on page 59***.

OUTPUTS: Connect the speaker across the positive (+) terminals of each channel pair. Do not use the negative (-) terminals of the channel pair when the pair is being operated in Bridge Mono mode. See ***"Wiring Output Connectors" on page 7*** for additional information on output wiring. See ***"Configuring Amp Wiring & Bridge Mode" on page 13*** for information on configuring an output pair for bridge mono operation.

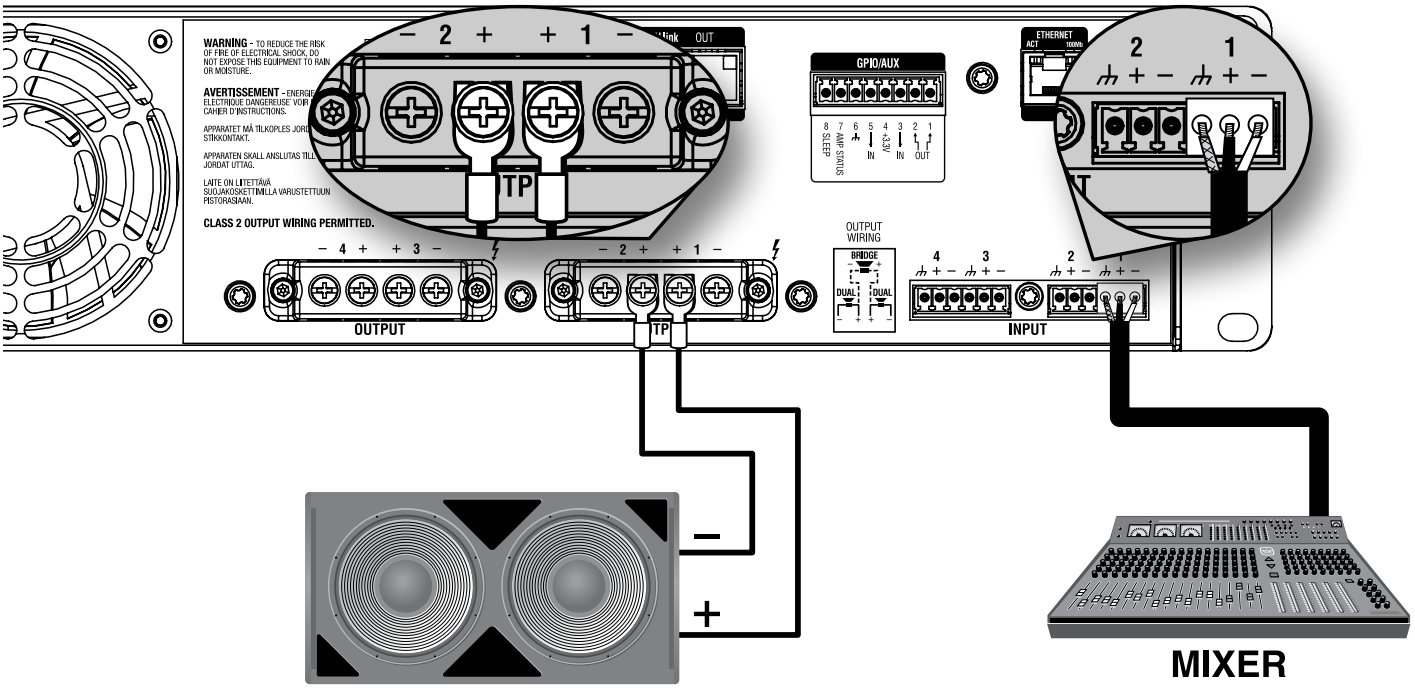


Figure 69: *System wiring in Bridge Mono mode*

NOTE: Always route the input and output wires in separate bundles.

WARNING: Only connect to networks that remain inside the building.

Dual Mode, High Z (70Vrms/100Vrms)

Audio Architect software settings are shown in ***Figure 70***. Typical input/output wiring is shown in ***Figure 71***.

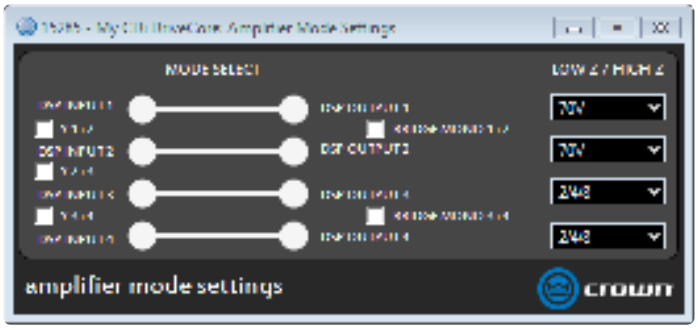


Figure 70: *Audio Architect amplifier mode settings*

INPUTS: Connect the input wires for each channel. See ***"Wiring Input Connectors" on page 7*** for further information on analog input wiring.

If the same input signal is to drive multiple outputs, the input signal can be "Y'ed" by checking the "Y" checkboxes (see ***Figure 70***). See ***"Configuring Amp Wiring & Bridge Mode" on page 13*** for more information.

If using the BLU link input, it is important to understand that BLU link is a digital audio bus and cannot be routed through an Ethernet switch or router. Category 5e or higher cabling must be used for all BLU link connections. To use the built-in BLU link fault protection, the BLU link output of the last device on the bus must be connected back to the BLU link input of the first device. For additional information on making BLU link connections and using BLU link, see ***"Using BLU link" on page 59***.

OUTPUTS: Maintain proper polarity (+/–) on output connectors. Connect the Channel 1 speaker's positive (+) lead to amplifier Channel 1 positive terminal; repeat for the negative (–) lead. Repeat Channel 2 wiring as for Channel 1, and for any subsequent channel pairs on multichannel models. See ***"Wiring Output Connectors" on page 7*** for additional information on output wiring.

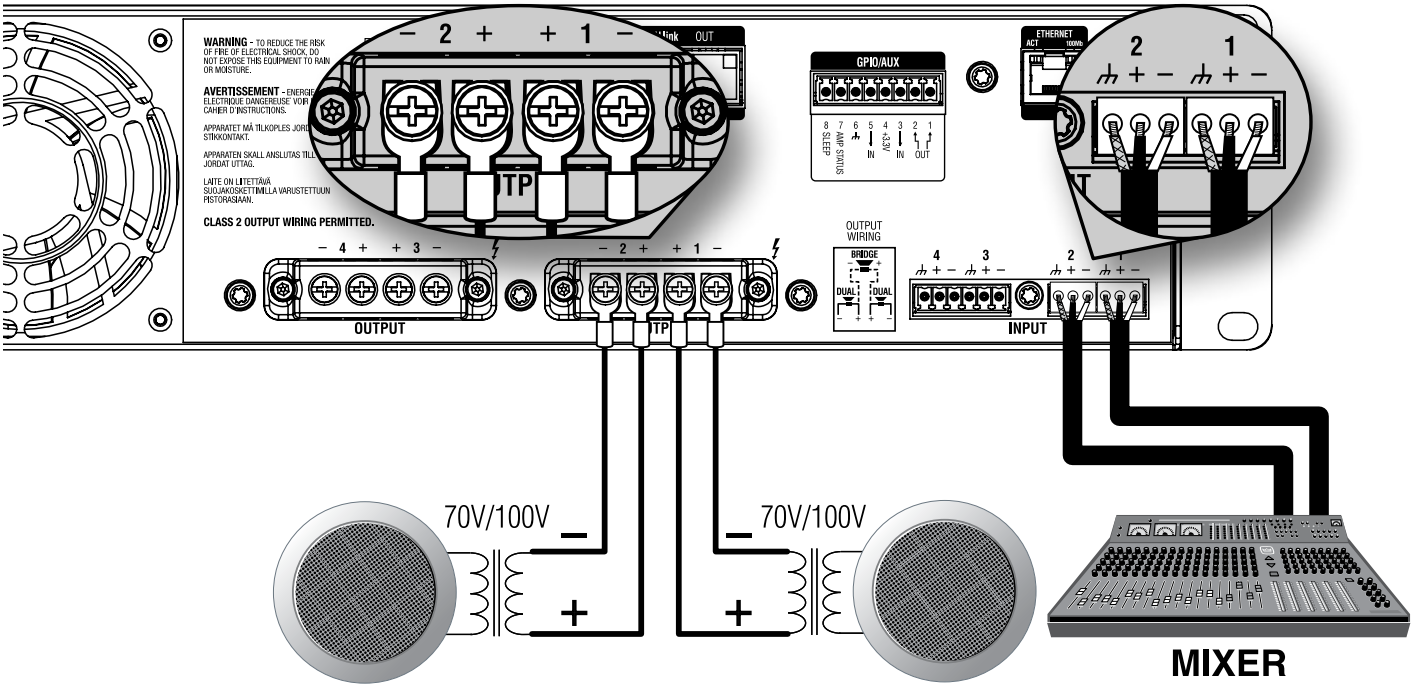


Figure 71: *System wiring for 70Vrms/100Vrms operation*

NOTE: A 35Hz high-pass filter is automatically set when an output channel is configured for High Z operation.

NOTE: Each output channel can be independently configured for High Z or Low Z operation. See ***"Configuring Outputs for Low Z/High Z Operation" on page 40*** for more information.

NOTE: Always route the input and output wires in separate bundles.

WARNING: Only connect to networks that remain inside the building.

Bridge Mono Mode, High Z (140Vrms/200Vrms)

Audio Architect software settings are shown in ***Figure 72***. Typical input/output wiring is shown in ***Figure 73***.

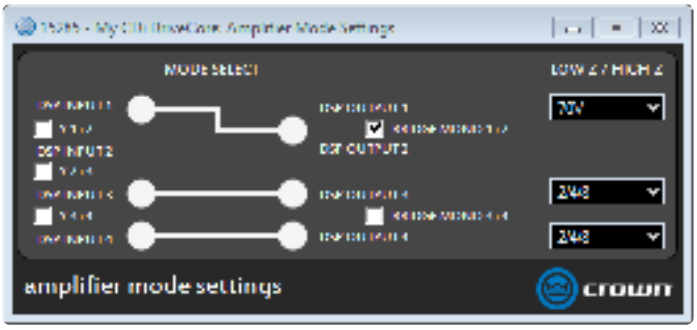


Figure 72: *Audio Architect amplifier mode settings*

INPUTS: If using analog inputs, connect to the odd-numbered input channels (1,3) only. Even-numbered inputs (2,4) are disabled when Bridge Mono mode is active. See ***"Wiring Input Connectors" on page 7*** for further information on analog input wiring.

If using the BLU link input, it is important to understand that BLU link is a digital audio bus and cannot be routed through an Ethernet switch or router. Category 5e or higher cabling must be used for all BLU link connections. To use the built-in BLU link fault protection, the BLU link output of the last device on the bus must be connected back to the BLU link input of the first device. For additional information on making BLU link connections and using BLU link, see ***"Using BLU link" on page 59***.

OUTPUTS: Connect the speaker across the positive (+) terminals of each channel pair. Do not use the negative (-) terminals of the channel pair when the pair is being operated in Bridge Mono mode. See ***"Wiring Output Connectors" on page 7*** for additional information on output wiring. See ***"Configuring Amp Wiring & Bridge Mode" on page 13*** for information on configuring an output pair for bridge mono operation. See ***"Configuring Output Modes" on page 15*** for information on configuring an output for High Z operation.

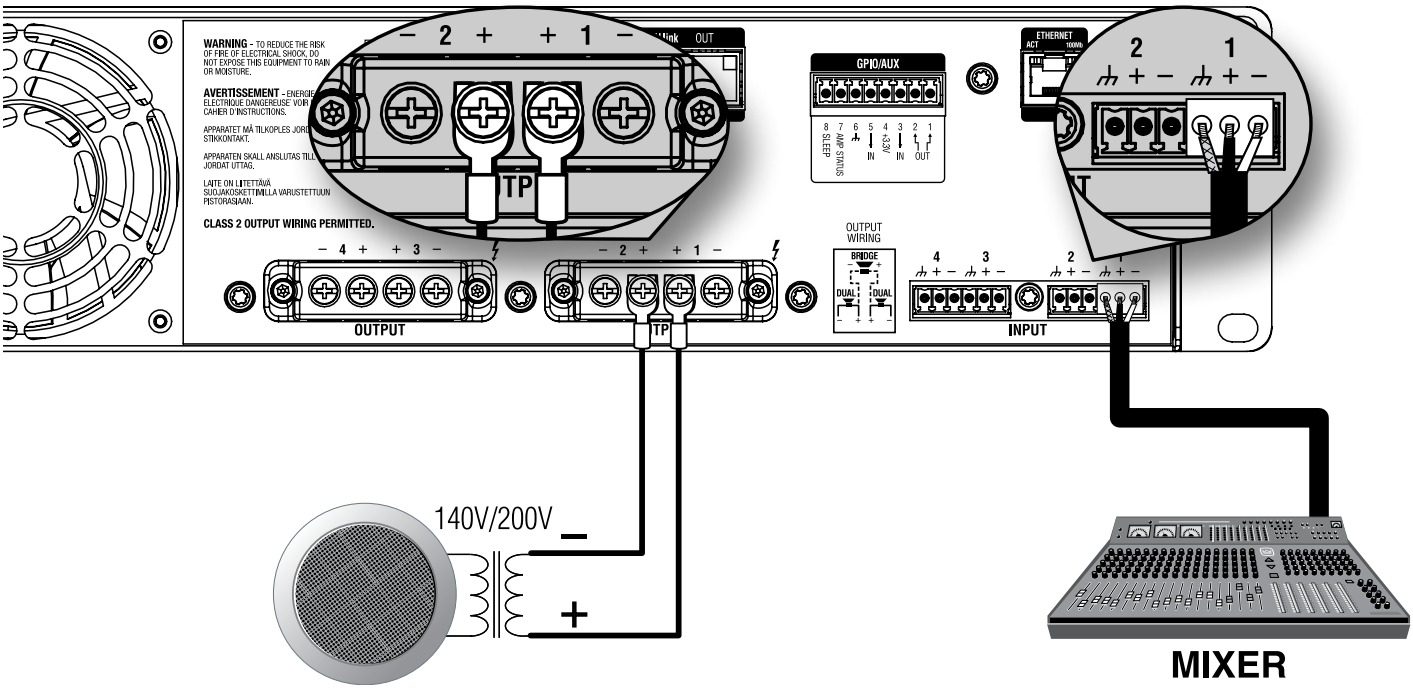


Figure 73: *System wiring for 140Vrms/200Vrms operation*

NOTE: A 35Hz filter is automatically set when an output channel is configured for High Z operation.

NOTE: Each output channel can be independently configured for High Z or Low Z operation. See ***"Configuring Outputs for Low Z/High Z Operation" on page 40*** for more information.

NOTE: Always route the input and output wires in separate bundles.

WARNING: Only connect to networks that remain inside the building.

Using BLU link

BLU link is a digital audio bus found on the BLU link CDi DriveCore amplifier models. BLU link devices are connected using standard Category 5e or higher cabling. This minimizes cable connections and reduces the amount of cable required, hence, cable cost. BLU link connections carry up to 256 channels of high-resolution digital audio at 48kHz, or 128 channels at 96kHz, both at 24-bit.

BLU link Specifications

- Based on Gigabit Ethernet technology
- Up to 100m over CAT5e cable between each point (>100m using fibre converters)
- 256 channels at 48kHz
- 128 channels at 96kHz
- 24-bit audio resolution
- Bus-like architecture — audio transmitted on a channel is available at all other devices on the bus automatically
- Wired in a loop for redundancy — recovers from a single cable break
- Up to 60 BLU link nodes (devices) can exist in a single BLU link system

BLU link Latency

Path	Total Latency (for selected path)
Analog Input to Amplifier Output	1.78ms
BLU link Input to BLU link Output (48kHz)	4.47ms
BLU link Input to BLU link Output (96kHz)	3.57ms

NOTE: Latency through the BLU link/analog mixed paths will be greater than the "Analog Input to Amplifier Output" path but less than the "BLU link Input to BLU link Output" paths.

Making BLU link Connections

On the rear panel of BLU link devices there are two BLU link ports: a BLU link input port and a BLU link output port. Devices are connected together by wiring the output port of the first device to the input port of the next, then repeating for each BLU link device on the bus. If redundancy is required, the last BLU link device on the bus should be connected back to the first. This allows audio to still pass through the BLU link ring when a single BLU link cable is compromised or disconnected.

If ferrites were included with the amplifier, they should be attached to the BLU link cables at the back of the amplifier as shown in ***Figure 74***. If no ferrites were included, they are not required.

NOTE: Only connect BLU link ports to other BLU link ports. Connecting BLU link ports to networking peripherals, such as an Ethernet switch or router, will not work.

See ***"Assigning Input Sources" on page 14*** for information on assigning BLU link input channels.

See ***"Configuring BLU link Settings" on page 22*** for information on assigning BLU link output channels and configuring the BLU link sample rate.

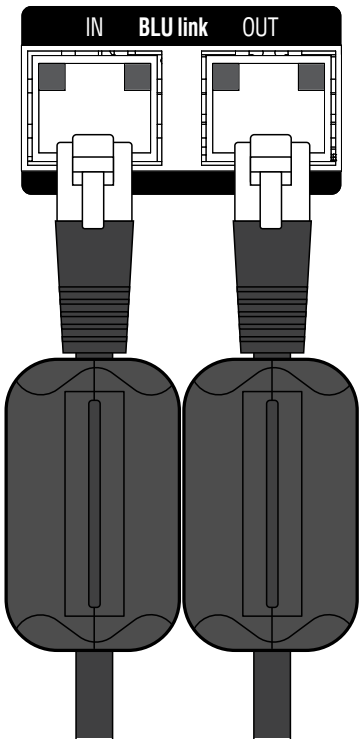
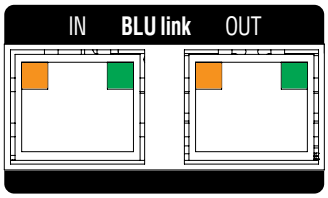


Figure 74: *Ferrites installed on BLU link cables*

BLU link Port LED Indicators

Each BLU link port has LEDs that indicate the following:

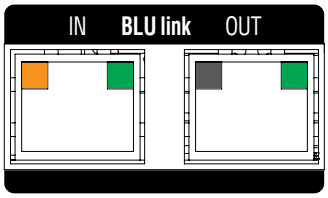
Both Yellow LEDs On



This indicates the device is the BLU link master (meaning it's providing the clock for the entire BLU link system).

The green LEDs light to indicate the port has established a link with the BLU link bus. If there are no cables connected, the green LEDs will not light.

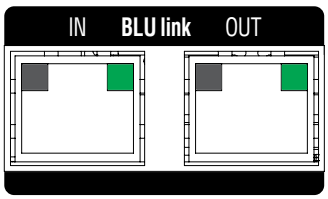
One Yellow LED On



This indicates the device is slaved to the BLU link clock received from the connected device.

The green LEDs light to indicate the port has established a link with the BLU link bus.

No Yellow LEDs On



This indicates the device is not receiving BLU link clock and will not pass audio. This either indicates the IN and OUT ports are swapped (an OUT port is connected to an OUT port and an IN port is connected to an IN port), or there is a mismatch between the BLU link sample rates of the amplifier and the connected device(s). See ***"Configuring BLU link Settings" on page 22*** for information on configuring the amplifier's BLU link sample rate.

The green LEDs light to indicate the port has established a link with the BLU link bus.

WARNING: Only connect to networks that remain inside the building.

Mastership

The BLU link bus requires one device on the bus to act as master. The master will provide the clock for all other devices on the bus. This means that the whole bus is synchronised to a single audio clock.

NOTE: The BLU link sample rate for all device's on a BLU link bus must be configured to match. By default, the CDi DriveCore amps are configured with the BLU link sample rate set to 96kHz.

In certain cases, it is possible to incorporate devices of more than one Ethernet transport type (i.e., AVB, CobraNet™, or Dante™) connected within the same BLU link system. In other words, if you're careful, you can design a Harman system which actually includes two or more transports. For example, it's possible for a Harman system to have CobraNet audio being converted to BLU link audio (BLU-800 and BLU-320 both have the ability to "bridge" CobraNet to/from BLU link), which is then converted to Dante audio (BLU-806 and BLU-326 both have the ability to "bridge" BLU link to/from Dante). It all depends on a given transport's ability to "slave" (AKA "re-clock") to a clock being generated by a separate transport.

Which transports support "slaving" to the clock of another transport?

Transport	Supports Slaving to Another Transport
AVB	No
BLU link	Yes
CobraNet	No
Dante	Yes

The previous table has critical implications on system design when combining two or more transports. Any system based on Soundweb London (including Architectural Media Systems) supports the multi-transport combinations shown in the following table.

Combined Transports	Clock Master
BLU link + AVB	AVB provides the clock
BLU link + CobraNet	CobraNet provides the clock
BLU link + Dante	Either BLU link or Dante provides the clock
BLU link + Dante + AVB	AVB provides the clock

Any multi-transport combination NOT specifically listed in the previous table is not allowed in Soundweb London systems (without being forced to use analog interconnects between transports). For example, BLU link + AVB + CobraNet is NOT allowed, because the AVB and CobraNet networks would each be synced to different clocks — their own.

Mastership is negotiated between all devices on the BLU link bus, and any change to the bus will trigger the negotiation to restart. The following rules determine which device on the BLU link bus will become clock master:

- If there is only one BLU link device connected to CobraNet/AVB then that device is master.
- If there are multiple BLU link devices connected to CobraNet/AVB, then they compare master priorities.
- If there are multiple BLU link devices on CobraNet/AVB with the same highest priority, then they use MAC address to decide which is master.
- If there are no BLU link devices connected to CobraNet/AVB, then they first compare master priorities. Next, if the priorities are the same, they compare MAC addresses.

Fault Tolerance

When the last BLU link device in a system is connected back to the first, the BLU link bus is capable of a degree of fault tolerance since each device receives the same audio from two other devices. If a single cable connection is broken, the devices which are no longer connected will detect the cable break: one device will detect that its BLU link in port is disconnected and the other will detect that its out port is disconnected. The devices will then re-route the audio so that it can again pass through the bus.

NOTE: When the cable is broken, the audio will take longer to reach its destination. This added delay is not compensated for in any way, but is a side-effect of the way the fault tolerance system functions.

BLU link Status

The BLU link Status menu displays BLU link information, which can be used to verify and troubleshoot the amplifier's BLU link connections and settings.

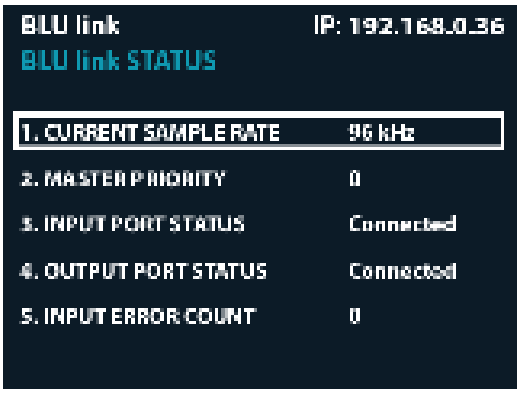


Figure 75: *BLU link Status menu*

To view BLU link status:

1. From the Home screen, press the **MENU** button.
2. Select the "BLU link" option from the menu using the **ENCODER**.
3. Select the "BLU link Status" option from the menu.
4. Use the **ENCODER** to scroll the menu.

Available options:

- **Current Sample Rate**
  Displays the current BLU link sample rate setting of the amplifier. This can be set in the BLU link Settings menu.
- **Master Priority**
  Displays the current BLU link Master Priority setting of the amplifier.
- **Input Port Status**
  Indicates whether or not an valid BLU link connection has been made to the BLU link input port. Under normal operating conditions, "Connected" will be displayed. If no valid connection is made to the BLU link bus, "Not Connected" will be displayed. If "Error" is displayed, this indicates the BLU link input and output cables may be swapped, or the BLU link sample rate of the amp does not match the sample rate of the connected BLU link bus.
- **Output Port Status**
  Indicates whether or not an valid BLU link connection has been made to the BLU link output port. Under normal operating conditions, "Connected" will be displayed. If no valid connection is made to the BLU link bus, "Not Connected" will be displayed. If "Error" is displayed, this indicates the BLU link input and output cables may be swapped, or the BLU link sample rate of the amp does not match the sample rate of the connected BLU link bus.
- **Input Error Count**
  Displays the number of BLU link input data errors that have occurred.
- **Input Corrected Count**
  Displays the number of BLU link input data errors corrected.
- **Input Error Reset**
  Press the **ENCODER** with this option selected to reset the Input Error Count and Input Corrected Count back to 0.
- **Output Error Count**
  Displays the number of BLU link output data errors that have occurred.
- **Output Corrected Count**
  Displays the number of BLU link output data errors corrected.
- **Output Error Reset**
  Press the **ENCODER** with this option selected to reset the Output Error Count and Output Corrected Count back to 0.
- **Version**
  Displays the current BLU link firmware version.
- **MAC Address**
  Displays the MAC address of the amplifier.
- **Master MAC Address**
  Displays the MAC address of the device providing the master clock for the entire BLU link bus.

Device Presets

Device presets allow configuration, DSP, channel assignment, gains, as well as other settings to be stored for later recall. A device preset can be used to configure the amp for a specific application and speaker model. For example, you might use one device preset that optimizes the amp's DSP for a JBL bi-amplified speaker setting. Or, you might use a device preset that sets up the DSP for a stereo pair of loudspeakers of your choice. Subtle changes can also be made between device presets, such as a change of input channel assignments. Device presets can be stored within the amplifier or backed up to a PC using Audio Architect.

Preset 1 is the factory default device preset and cannot be overwritten. It sets up the amplifier for pass-thru operation with no DSP features enabled. Presets 2-20 are user device presets and can be overwritten.

The following bullets outline which settings are stored to device presets and which are not:

Settings Stored to Device Presets

- DSP Settings
- Signal Generator Settings
- Levels
- Mutes
- Internal Amp Wiring (Y'ed inputs, dual-mono/bridge mode)
- Input Source Assignments (analog and BLU link)
- Amp Gain Mode
- Output Mode (Low Z, High Z)
- BLU link Output Assignments
- GPIO Manual Aux Output Setting (available in Audio Architect)

Settings NOT Stored to Device Presets

- Front Panel Lighting/Display Options
- Front Panel Security
- Network Settings
- BLU link Sample Rate
- BLU link Mastership Priority

Saving Device Presets

To save the current settings as a device preset from the front panel:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Save Preset" option.
4. Select "YES".
5. Select the Preset ID to which you wish to save the preset.
6. An on-screen keyboard will appear, allowing you to name the preset. Select "Done" when done.
7. Press the **ENCODER** to save the preset.

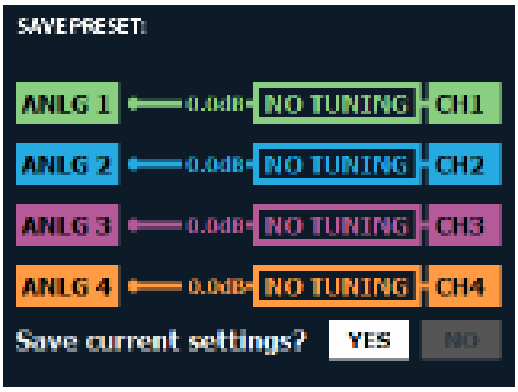


Figure 76: *Saving a device preset*

NOTE: Any unsaved settings will be retained in the amplifier after a power cycle. However, settings should be saved before loading another device preset if you wish to recall them at a later time, otherwise settings will be lost.

For information on saving device presets in Audio Architect, see ***"Main CDi DriveCore Control Panel" on page 34***.

Loading Device Presets

To load a device preset from the front panel:

1. From the Home screen, press the **MENU** button.
2. Select the "Configure Amplifier" option from the menu using the **ENCODER**.
3. Select the "Load Preset" option.
4. Use the **ENCODER** to navigate presets using the on-screen "PREV" and "NEXT" buttons. As each preset is selected, the preset number, name, and configuration will be displayed on-screen.
5. Once the desired preset has been selected, use the **ENCODER** to select "LOAD".

For information on loading device presets in Audio Architect, see ***"Main CDi DriveCore Control Panel" on page 34***.



Figure 77: *Loading a device preset*

System Settings

Lighting/Display Options

These options can be used to turn off the front panel LCD and LEDs, and change the on-screen color scheme.

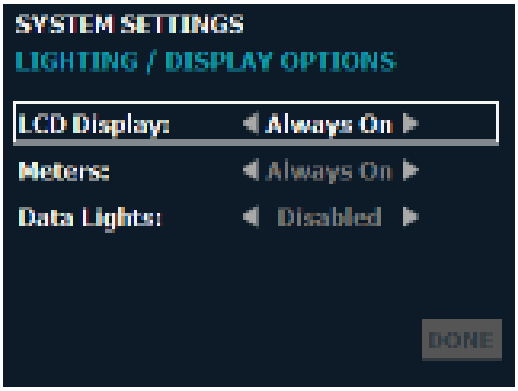


Figure 78: *Lighting Options menu*

To edit lighting options:

1. From the Home screen, press the **MENU** button.
2. Select the “System Settings” option from the menu using the **ENCODER**.
3. Select "Lighting/Display Options" from the menu.
4. Select the desired options, making selections with the **ENCODER**.
5. When done, select "Done" at the bottom of the screen.

Available options/parameters:

- **LCD Display (Always On, 30 sec, 5 min, 30 min)**
  This option allows the LCD to go to sleep after a specified time period of inactivity. Once asleep, any button press will wake up the LCD.

  NOTE: In the event of an error, such as a shorted output or thermal error, the LCD screen will turn on and indicate the issue, regardless of the selected lighting options.

- **Meters (Always On, 30 sec, 5 min, 30 min)**
  This option allows the signal level meters to turn off after a specified time period of inactivity.

  NOTE: The LED meters will still show clip indication when LEDs are turned off.

- **Data Lights (Disabled, Enabled)**
  This option allows the DATA LED to be turned off or on.

Security/Front Panel Lockout

The Front Panel Lockout feature allows front panel functionality to be locked out to prevent unauthorized tampering of the amplifier's settings. This feature can be enabled from the Security screen (see ***Figure 79***) or by simply pressing and holding the **CH1 SELECT** button and **ENCODER** simultaneously for 2 seconds from the Home screen.

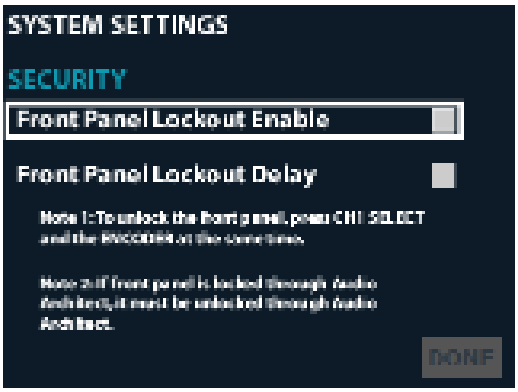


Figure 79: *Security screen*

To enable the Front Panel Lockout:

1. From the Home screen, press the **MENU** button.
2. Select the “System Settings” option from the menu using the **ENCODER**.
3. Select "Security" from the menu.
4. Enable the "Front Panel Lockout Enable" option using the **ENCODER**.

   NOTE: You can also enable the "Front Panel Lockout Delay" option which will cause the front panel to automatically re-lock after approximately 30 seconds each time the front panel is unlocked.
5. Using the **ENCODER**, select "Done" at the bottom of the screen. If the "Front Panel Lockout Delay" option was not enabled, a prompt will immediately appear on the LCD to indicate that the front panel is now locked. If the "Front Panel Lockout Delay" option was enabled, the front panel will be locked after approximately 30 seconds.

NOTE: The **POWER** button will still function when the Front Panel Lockout feature is enabled.

To disable the Front Panel Lockout:

1. Simultaneously press and hold the **CH1 SELECT** button and **ENCODER** for 2 seconds. A prompt will appear on the LCD to indicate the front panel is now unlocked. Note that the front panel will only remain unlocked for approximately 30 seconds if the "Front Panel Lockout Delay" option has been enabled.
2. From the Home screen, press the **MENU** button.
3. Select the “System Settings” option from the menu using the **ENCODER**.
4. Select "Security" from the menu.
5. Disable the "Front Panel Lockout Enable" option using the **ENCODER**.
6. Using the **ENCODER**, select "Done" at the bottom of the screen.

TIP: The front panel can also be locked from the Global Settings panel in Audio Architect. Note that if the front panel has been locked from Audio Architect, the above procedure will not work for unlocking it and it must be unlocked using Audio Architect. See ***"Amplifier Information" on page 35*** for information on locking/unlocking the front panel from Audio Architect.

Amp Gain Mode

The Amp Gain setting sets how much gain will be applied to the signal within the amplifier (from input to output) and can be set from the Amp Gain Mode screen.

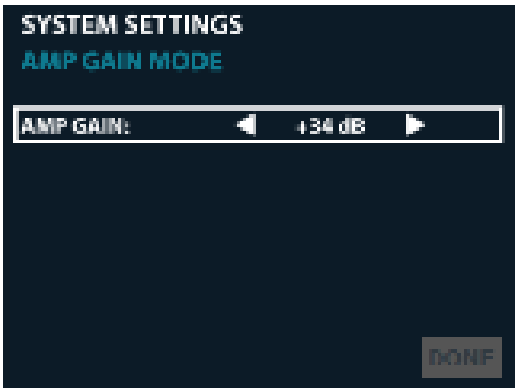


Figure 80: *Amp Gain Mode screen*

To edit the Amp Gain setting:

1. From the Home screen, press the **MENU** button.
2. Select the "System Settings" option from the menu using the **ENCODER**.
3. Select the "Amp Gain" option from the menu.
4. Press the **ENCODER** to edit the Amp Gain setting.
5. Turn the **ENCODER** to select the desired Amp Gain setting.
6. When done, press the **ENCODER** to make the selection then select "Done" at the bottom of the screen.

Available options:

- **Amp Gain (+37dB, +34dB, +26dB)**
  Sets how much gain will be applied to the signal within the amplifier (from input to output).

Power Modes

The APD and ACD power modes allow the CDi DriveCore amplifiers to conserve power consumption during periods of inactivity. The APD and ACD features are enabled by default from the factory.

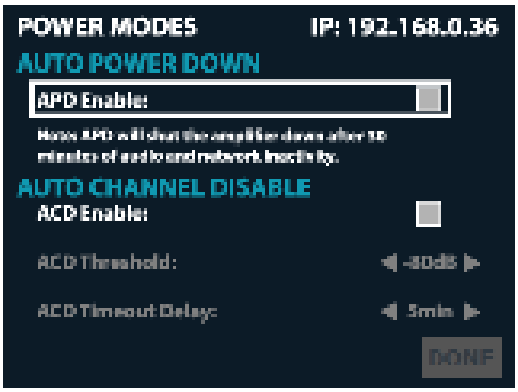


Figure 81: *Power Modes screen*

To edit power mode settings:

1. From the Home screen, press the **MENU** button.
2. Select the "System Settings" option from the menu using the **ENCODER**.
3. Select the "Power Modes" option from the menu.
4. Turn and press the **ENCODER** to select the desired settings.
5. When done, select "Done" at the bottom of the screen.

Available options:

- **APD Enable**
  Checking this checkbox enables the APD feature.
- **ACD Enable**
  Checking this checkbox enables the ACD feature.

See ***"Amplifier Information" on page 35*** for information on editing power mode settings in Audio Architect.

See ***"Power Saving Modes" on page 71*** for additional information on the APD and ACD features.

Amplifier Diagnostics

The Diagnostics screen provides a read-only list of amplifier information (see ***Figure 82***).

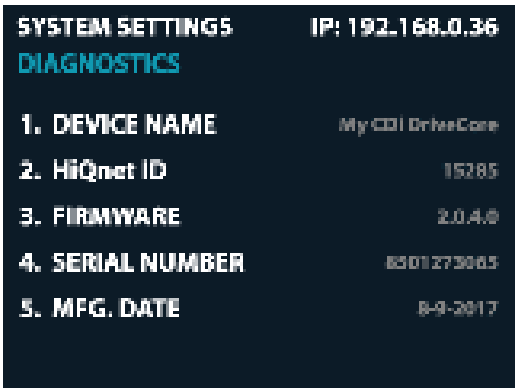


Figure 82: *Diagnostics screen*

To enter the Diagnostics screen:

1. From the Home screen, press and hold the **ENCODER** for ~2 seconds to navigate directly to the Diagnostics screen. Alternatively, you can press the **MENU** button and follow the proceeding steps.
2. Select the "System Settings" option from the menu using the **ENCODER**.
3. Select the "Diagnostics" option.
4. Use the **ENCODER** to scroll the menu.

Information displayed:

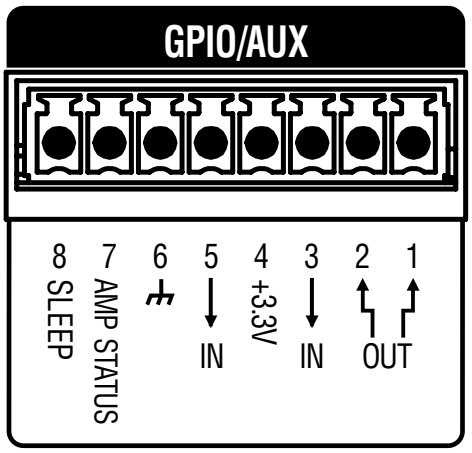
- Firmware Version
- AC Input Voltage
- Power Supply Temperature
- Channel 1 Temperature
- Channel 2 Temperature
- Channel 3***** Temperature
- Channel 4***** Temperature
- Serial Number
- Manufactured Date

*****Channel 3 and 4 options available in 4-channel CDi DriveCore models only.

Using the GPIO Control Port

CDi DriveCore amplifiers come with a 2-in, 2-out General Purpose In/Out (GPIO) control port in the form of a block connector. The Control port has multiple uses which include fault status reporting, device preset selection, output muting, and more. Control ports are configured using the Audio Architect software.

GPIO Pinout, Specification, Use, & Configuration



PIN 1 (Output 1): 0VDC to +3.3VDC output. Output impedance = 1KΩ pullup to +3.3V. This pin is used for fault reporting. If a fault occurs in the amplifier, this pin will change from a low/false state to a high/true state. Polarity can be inverted when reversed functionality is required. See ***"Amplifier Information" on page 35*** for information on inverting this output.

PIN 2 (Output 2): 0VDC to +3.3VDC output. Output impedance = 1KΩ pullup to +3.3V. This pin is used by Audio Architect and compatible HiQnet wall controllers for generic output control functions. The functionality of this output is tied to the **Manual Aux Output** button in the Global Settings panel in Audio Architect. See ***"Amplifier Information" on page 35*** for more information on the **Manual Aux Output** button.

PIN 3 (Input 1): 0VDC to +3.3VDC input. Logic = TTL thresholds. Analog = full scale 0-3.3V. Input impedance > 20KΩ. This pin is used to trigger input mutes. By default, a high/true state at the input will trigger the mutes. Polarity can be inverted when reversed functionality is required. Which input channels are muted can be programmed from the Global Settings panel in Audio Architect. See ***"Amplifier Information" on page 35*** for more information on configuring this input.

PIN 4 (3.3V): +3.3VDC output. LIMIT = 30mA. Output impedance = 100Ω to +3.3V. This pin provides the power source to drive the GPIO inputs. For example, a simple switch between this pin and pin 3 (Input 1) will mute/un-mute the designated input channels (a closed switch connects the 3.3V for high/true condition, an open switch allows the pin to float low for false condition).

PIN 5 (Input 2): 0VDC to +3.3VDC input. Logic = TTL thresholds. Analog = full scale 0-3.3V. Input impedance > 20KΩ. This pin is used to trigger preset changes between two stored presets depending on high/low state. Which presets are triggered can be configured from the Global Settings panel in Audio Architect. See ***"Amplifier Information" on page 35*** for more information on configuring this input port.

PIN 6 (GND): Provides the ground potential for GPIO outputs and the AUX port.

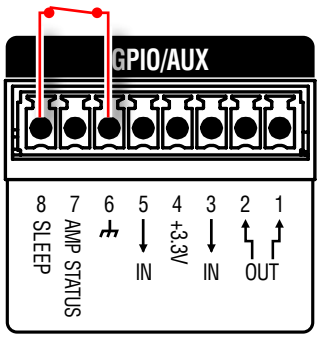
Using the AUX Port

The AUX port can be used for basic monitoring of the amplifier and for remote standby (sleep). The port is shared with the GPIO using an 8-pin block connector, with pin 6 used as ground.

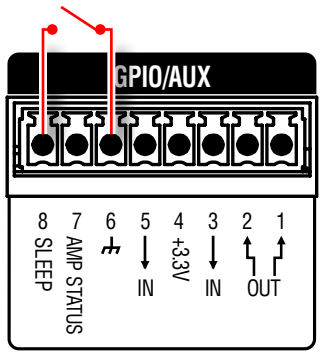
Sleep

The amplifier can be put to sleep by connecting pins 6 and 8 together on the AUX port. When applying this connection, the amplifier will shut down and remain asleep until the connection between pins 6 and 8 is opened. When the connection between pins 6 and 8 is open, the amplifier will revert to its last configuration and begin to output audio within ~15 seconds. Network communication will be re-established once the network interface card boots. While the amplifier is asleep, the front panel **POWER** button is disabled and, if pressed, the blue power indicator will blink briefly to indicate the device is asleep.

Sleep Closed



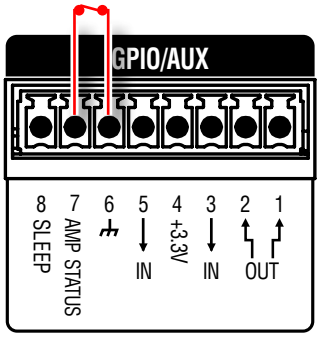
Sleep Open



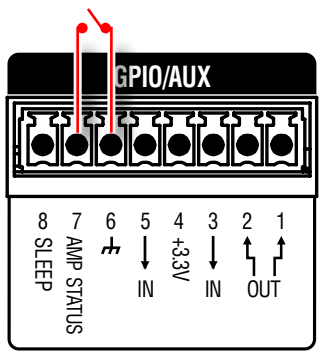
Amp Status

Amp Status can be used for basic monitoring of the amplifier. Monitoring of the amplifier can determine if the amplifier is operating within optimal parameters, or if the amplifier has been shut off or is in fault. Between pins 6 and 7, there will be either a +5VDC potential or a 2Hz square wave (heart beat). This option can be set from the Global Settings panel in Audio Architect, see **"*Amplifier Information*" *on page 35***.

Amp Status Closed



Amp Status Open



Power Saving Modes

The ACD and APD power saving modes allow the CDi DriveCore amplifiers to conserve power consumption during periods of inactivity. The ACD and APD features are enabled by default from the factory.

Auto Channel Disable (ACD)

The CDi DriveCore's individual amplifier channels will automatically disable after a period of channel inactivity. This will occur 30 minutes after audio is no longer present at the output of the DSP for a given channel. A channel will re-enable within 0.5 seconds of audio being sensed at the output of the DSP unless the amplifier has entered Auto Power Down (APD) mode.

NOTE: The ACD feature can be disabled or adjusted from the front panel (see ***"Power Modes" on page 67***) or from Audio Artchitect (see ***"Amplifier Information" on page 35***). Note that ACD will be re-enabled if the amplifier is factory reset or the default preset is loaded.

Auto Power Down (APD)

The APD feature allows a CDi DriveCore amplifier to automatically power down after a period of audio and network inactivity. The amplifier will enter APD mode 30 minutes after all of the following conditions are met:

- There is no signal level detected above approximately -50 dBu at any of the analog inputs
- There is no activity detected on the BLU link network (BLU link CDi DriveCore models only)
- The signal generator is not active
- There is no activity detected on the data network

Once the amplifier has entered APD mode, it will exit APD mode if one of the following conditions is met:

- The POWER button is pressed (the sleep pin on the Aux port must also be open (not active))
- Signal level is detected at any of the analog inputs (the sleep pin on the Aux port must also be open (not active))

The amplfier will take approximately 30 seconds to fully recover from APD mode.

NOTE: The APD timer setting is defaulted to 30 minutes from the factory. This timer setting is user adjustable, but it is not available from any preconfigured panels in Audio Architect or from the amplifier's front panel user interface. To access the APD timer setting, the "AmAPDTimeoutSec" SV (located under **[0x1]>AM3** in the Venue Explorer tree menu) must be added to a custom panel. Once the desired SV has been added to the custom panel, go online with the amplifier, run the custom panel, then adjust the setting. See the Audio Architect help file for information on using custom panels in Audio Architect. APD can be disabled from the front panel (see ***"Power Modes" on page 67***) or from Audio Artchitect (see ***"Amplifier Information" on page 35***). Note that APD will be re-enabled if the amplifier is factory reset or the default preset is loaded.

NOTE: 2-channel CDi DriveCore amplifiers manufactured before a certain date are not compatible with the APD feature. For more information, please contact Crown Technical Support.

System Protection

Faults

The amplifier will enter a fault state if it senses an unsafe condition. This protection is for both internal and external faults. In addition, be sure that the load connected to the amplifier is within the 2-16 Ohm limit (4-16 Ohm in Bridge Mono mode). If wiring and load are verified as correct and the fault condition persists, see **"Service" on page 88** for servicing information.

The following faults are possible:

Fault	Fault Type	Description
HF Detect	Channel	Excessive high frequency signal content has been sensed at the output of the amplifier.
DCLF	Channel	Excessive DC or low frequency signal content has been sensed at the output of the amplifier.
Short Circuit Detect	Channel	A short is detected at the output of the amplifier.
Thermal	Channel/Power Supply	An amp channel and/or the power supply has exceeded the maximum acceptable temperature threshold.
High Voltage Rail	Power Supply	The power supply's high voltage rails are no longer within a safe operating range for the amplifier or other components attached.
Low Voltage Rail	Power Supply	The power supply's low voltage rails are no longer within a safe operating range for the amplifier or other components attached.
AC Mains	Power Supply	The AC mains have reached an unsafe level.

Thermal Limit

If the amplifier power supply and/or any channels become too hot for safe operation, a thermal fault will occur. If a channel's temperature reaches 80° Celsius, a message will appear in the front panel display to indicate the onset of audio compression. The amplifier will continue to run in this state until either the temperature is reduced to a safe operating range, or if the temperature continues to rise, the channel will shut off to protect itself above 100° Celsius. The amplifier will exit the thermal fault state only when the temperature drops back below the thermal limit.

NOTE: If the thermal limit is exceeded while the front panel LCD is asleep, the display will wake up to indicate that thermal limiting is occurring.

Auto-Insertion High-Pass Filters

A 35Hz, 24dB/Octave Butterworth high-pass filter is inserted automatically when a channel is configured for High Z operation. A 10Hz, 24dB/Octave Butterworth high-pass filter is inserted automatically when a channel is configured for Low Z operation.

AC Under/Over-Voltage Protection

If the AC line voltage drops below 10% or rises above 10% of the nominal operating voltage of the amplifier, the amplifier's power supply will turn off and the blue Power LED will flash. The amplifier will turn back on when the AC line voltage returns to safe operating levels.

Fan-Cooled Chassis

CDi DriveCore Series amplifiers are cooled by quiet, variable-speed fans. Maximum fan noise level of the CDi DriveCore amplifier is 51dBA. The fans will pull air from the front of the amplifier to the rear.

The following fault conditions cause the fan to turn on full speed:

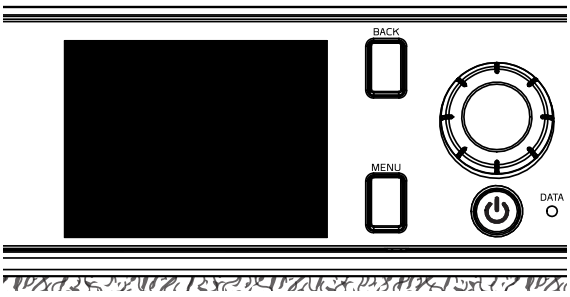
- High frequency fault (excessive high frequency signal content has been sensed at the output of the amplifier)
- Thermal fault (excessive power supply or channel temperature is detected)

NOTE: After a fault, the fan will remain on at full speed until the fault is cleared.

Universal Switching Power Supply

The CDi DriveCore Series amplifiers incorporate a switching power supply designed for extremely high efficiency and high output power. The supply includes Power Factor Correction (PFC) and a Series Resonant Converter (SRC), and accepts AC supply voltages from ~100V to ~240V. Microprocessor-controlled diagnostic and control capabilities both optimize performance and enhance long-term reliability.

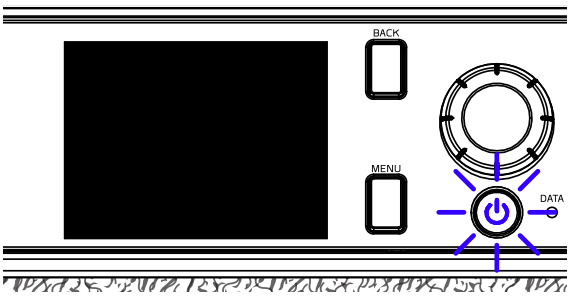
Troubleshooting



CONDITION: Power indicator and LCD are off.

POSSIBLE REASON

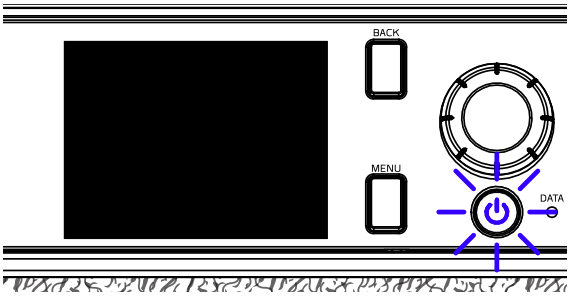
- The amplifier is not plugged in to the power receptacle.
- The amplifier has lost AC Power.
- The power supply fuse has tripped.



CONDITION: Power indicator is flashing blue indefinitely.

POSSIBLE REASON:

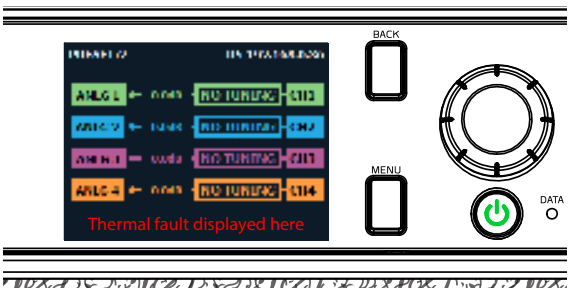
- The AC line voltage has dropped below 10% or has risen above 10% of the nominal line voltage of the power supply. See ***"System Protection" on page 72*** for information on AC under/over voltage protection.



CONDITION: When pressing the Power button, power won't turn on and Power indicator flashes blue briefly.

POSSIBLE REASON:

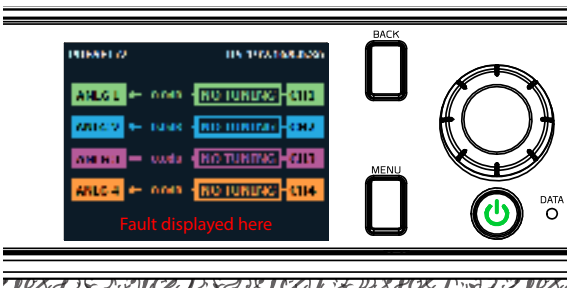
- The amplifier is asleep via the Aux port (contact closure) circuit. See ***"Using the AUX Port" on page 70*** for more information.



CONDITION: Thermal fault is indicated in the display.

POSSIBLE REASON:

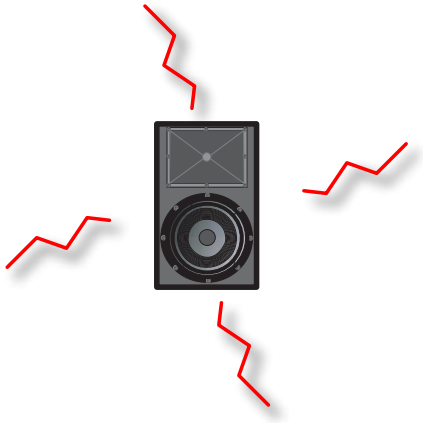
- The amplifier is becoming too hot for safe operation. Allow amplifier to cool. Check for loads less than 2Ω and for excessive input levels. Check for proper ventilation and proper output mode (2/4/8Ω, 70V, 100V) setting. See ***"Proper Cooling" on page 2*** for information on rack mounting and cooling. See ***"System Protection" on page 72*** for detailed information on thermal limits. See ***"Configuring Output Modes" on page 15*** for information on configuring the output mode.



CONDITION: Some other fault is indicated in the display.

POSSIBLE REASON:

- There are a number of conditions that result in a fault error being displayed: the operating temperature exceeds 100°C, excessive high or low frequencies are detected at the output, or an output short circuit is detected. These conditions should all be checked and attempted to be resolved before the amp is shipped back for service. See ***"System Protection" on page 72*** for more information on these protection features.

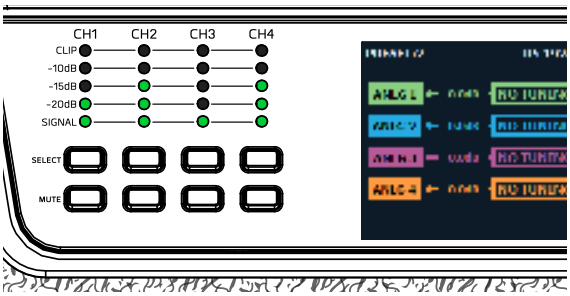


CONDITION: Distorted sound.

POSSIBLE REASON:

- Load is wired incorrectly or Dual/Bridge mode is configured incorrectly — both should be verified. See ***"Wiring Output Connectors" on page 7*** and ***"Configuring Outputs for Bridge Mono Operation" on page 40.***
- Input is overloaded by a signal level that is too high. Turn down the amplifier input level controls, or turn down the output of the source signal until the Clip LED goes out.

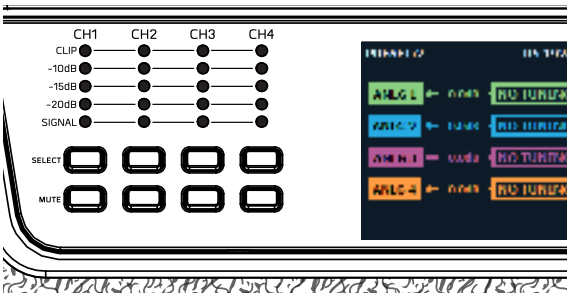
NOTE: If the signal sounds distorted even though the Clip LED is off, the signal may be distorted before it reaches the amplifier input. Check gain staging and output levels of the mixer or preamp.



CONDITION: No sound, even though the Power LED is lit blue and the level meters indicate the amp is receiving an input signal.

POSSIBLE REASON:

- Speaker not connected. Power off the amplifier, disconnect the AC power cord, then verify speaker connection.
- Open circuit due to speaker failure. From the front panel display, determine which channel has the short. Power down the amplifier then disconnect the AC power cable. Remove the shorted load from the channel (and possibly attached cables) and have it checked by a qualified technician. Reconnect the power cord and power up the amplifier. If the shorted condition remains after the load is removed, the unit should serviced. See ***"Service" on page 88***.



CONDITION: No input signal. Input signal indicator is not lighting, even though audio is being sent to the amplifier's input and the amp is powered on (blue Power indicator lit).

POSSIBLE REASON:

- Input signal level is very low. Double check the gain structure of the system and ensure that the amplifier's input trim levels are set accordingly.
- Input routing is not configured correctly for application. See ***"Assigning Input Sources" on page 14***.

Signal Path Block Diagram

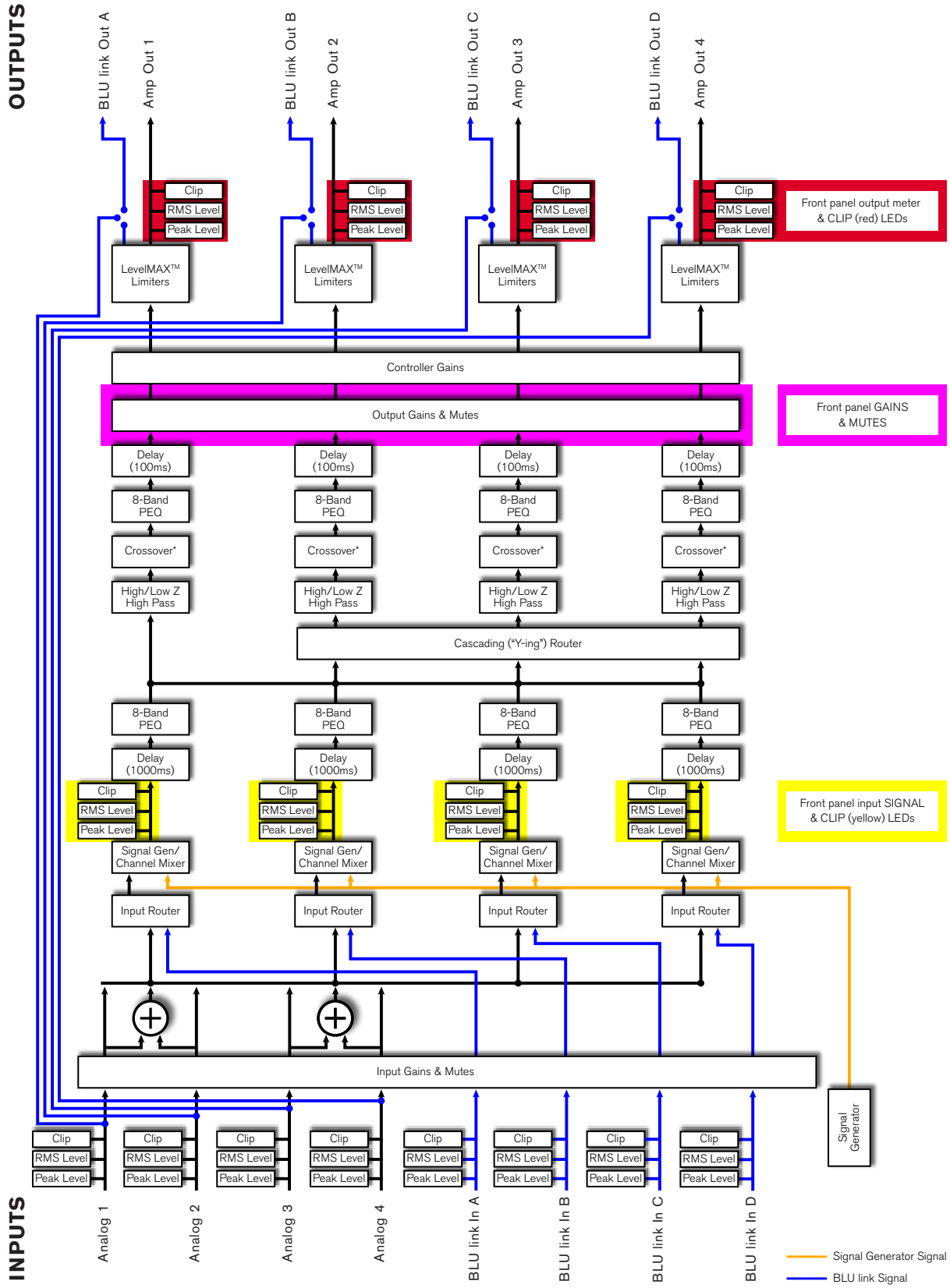


Figure 83: *Signal path block diagram (4-channel model with BLU link shown)*

Factory Reset

The Factory Reset allows a CDi DriveCore amplifier to be reverted back to its factory default state. When initiated, the Factory Reset will perform the following tasks:

- Erase all user presets (this includes all user DSP and configuration settings)
- Reset all system settings
- Reset all BLU link settings (applicable to BLU link CDi DriveCore models only)

To perform the Factory Reset procedure:

Warning! All user presets will be permanently deleted and all settings reverted back to their factory default state. This process is irreversible. If you have any user presets you wish to keep, they should be backed up using Audio Architect before performing the Factory Reset. See ***"Managing Device & Preset Files" on page 47*** for more information.

1. Power off the amplifier by pressing and holding the Power button for 2 seconds.
2. Press and hold the **CH1** and **CH2 SELECT** buttons while powering on the amp. Continue to hold these buttons until the LCD reads: "Press MENU to restore Factory Settings or any other button to exit". Now release the **SELECT** buttons.
3. Press and release the **MENU** button to start the Factory Reset procedure (pressing any other button will abort the Factory Reset procedure and the amp will boot up normally).
4. Once the Factory Reset procedure begins, the LCD will display the message: "Restoring factory defaults!" and when complete, the device will boot up normally.

Specifications

Output Power: Dual Mode – All Channels Driven

Amp Model	Channels	2Ω	4Ω	8Ω	16Ω	70Vrms	100Vrms
2|300 / 2|300BL	2	150W	300W	300W	150W	300W	300W
4|300 / 4|300BL	4	150W	300W	300W	150W	300W	300W
2|600 / 2|600BL	2	300W	600W	600W	300W	600W	600W
4|600 / 4|600BL	4	300W	600W	600W	300W	600W	600W
2|1200 / 2|1200BL	2	850W	1200W	1200W	600W	1200W	1200W
4|1200 / 4|1200BL	4	850W	1200W	1200W	600W	1200W	1200W

Minimum Guaranteed Power (1kHz, all channels driven, max distortion 0.5%, duration 0.5 seconds, 120 – 240Vrms ~50/60Hz)

Output Power: Bridge Mono Mode – All Channels Driven

Amp Model	4Ω	8Ω	16Ω	140Vrms	200Vrms
2|300 / 2|300BL	300W	600W	600W	600W	600W
4|300 / 4|300BL	300W	600W	600W	600W	600W
2|600 / 2|600BL	600W	1200W	1200W	1200W	1200W
4|600 / 4|600BL	600W	1200W	1200W	1200W	1200W
2|1200 / 2|1200BL	1200W	2400W	2400W	2400W	2400W
4|1200 / 4|1200BL	1200W	2400W	2400W	2400W	2400W

Minimum Guaranteed Power (1kHz, all channels driven, max distortion 0.5%, duration 0.5 seconds, 120 – 240Vrms ~50/60Hz)

Input Sensitivity

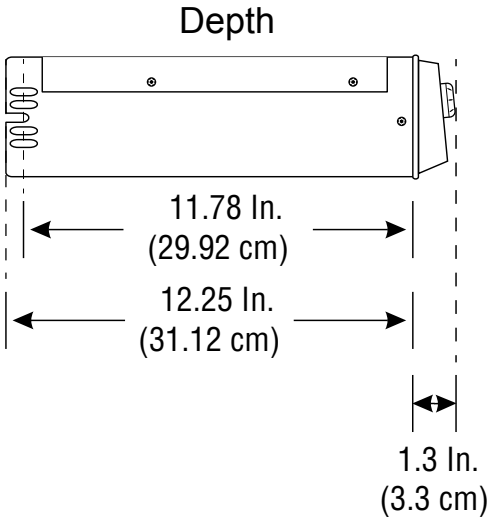
Amp Model	8Ω			70Vrms			100Vrms		
	37dB Gain Mode	34dB Gain Mode	26dB Gain Mode	37dB Gain Mode	34dB Gain Mode	26dB Gain Mode	37dB Gain Mode	34dB Gain Mode	26dB Gain Mode
2|300 / 2|300BL	0.7Vrms (-0.8dBu, -3.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	2.5Vrms (10.2dBu, 8.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	3.5Vrms (13.2dBu, 11.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	2.0Vrms (8.2dBu, 6.0dBV)	5.0Vrms (16.2dBu, 14.0dBV)
4|300 / 4|300BL	0.7Vrms (-0.8dBu, -3.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	2.5Vrms (10.2dBu, 8.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	3.5Vrms (13.2dBu, 11.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	2.0Vrms (8.2dBu, 6.0dBV)	5.0Vrms (16.2dBu, 14.0dBV)
2|600 / 2|600BL	0.7Vrms (-0.8dBu, -3.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	2.5Vrms (10.2dBu, 8.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	3.5Vrms (13.2dBu, 11.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	2.0Vrms (8.2dBu, 6.0dBV)	5.0Vrms (16.2dBu, 14.0dBV)
4|600 / 4|600BL	0.7Vrms (-0.8dBu, -3.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	2.5Vrms (10.2dBu, 8.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	3.5Vrms (13.2dBu, 11.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	2.0Vrms (8.2dBu, 6.0dBV)	5.0Vrms (16.2dBu, 14.0dBV)
2|1200 / 2|1200BL	0.7Vrms (-0.8dBu, -3.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	2.5Vrms (10.2dBu, 8.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	3.5Vrms (13.2dBu, 11.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	2.0Vrms (8.2dBu, 6.0dBV)	5.0Vrms (16.2dBu, 14.0dBV)
4|1200 / 4|1200BL	0.7Vrms (-0.8dBu, -3.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	2.5Vrms (10.2dBu, 8.0dBV)	1.0Vrms (2.2dBu, 0.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	3.5Vrms (13.2dBu, 11.0dBV)	1.4Vrms (5.2dBu, 3.0dBV)	2.0Vrms (8.2dBu, 6.0dBV)	5.0Vrms (16.2dBu, 14.0dBV)

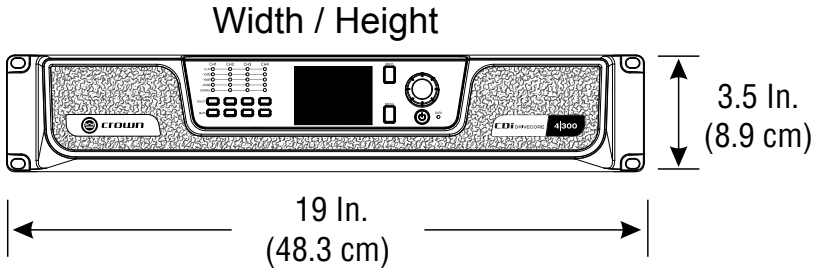
Performance Specifications

Specification Description	2|300 / 2|300BL	4|300 / 4|300BL	2|600 / 2|600BL	4|600 / 4|600BL	2|1200 / 2|1200BL	4|1200 / 4|1200BL
Digital Signal Processing	96kHz, 32-bit floating point	96kHz, 32-bit floating point	96kHz, 32-bit floating point	96kHz, 32-bit floating point	96kHz, 32-bit floating point	96kHz, 32-bit floating point
Voltage Gain (at maximum level setting) 4/8Ω, 70Vrms and 100Vrms Operation	34dB	34dB	34dB	34dB	34dB	34dB
Frequency Response (8Ω, 20Hz - 20kHz)	±0.5dB	±0.5dB	±0.5dB	±0.25dB	±0.25dB	±0.25dB
BLU link Signal-to-Noise Ratio (ref. rated power, 100V, 20Hz - 20kHz)	>108dB	>108dB	>108dB	>108dB	>108dB	>108dB
Total Harmonic Distortion (at full rated power, from 20Hz - 20kHz)	0.35%	0.35%	0.35%	0.35%	0.35%	0.35%
Analog Input Signal to Noise Ratio (ref. rated power, 100V, 20Hz - 20kHz)	>104dB	>104dB	>104dB	>104dB	>104dB	>104dB
Intermodulation Distortion (60Hz and 7kHz at 4:1, from -30dB to full rated power)	≤0.35%	≤0.35%	≤0.35%	≤0.35%	≤0.35%	≤0.35%
Damping Factor (20Hz to 100Hz)	>1000	>1000	>1000	>1000	>1000	>1000
Crosstalk (below rated power, 20Hz to 1kHz)	>80dB	>80dB	>80dB	>80dB	>80dB	>80dB
Common Mode Rejection (20Hz to 1kHz, typical)	>70dB	>70dB	>70dB	>70dB	>70dB	>70dB
DC Output Offset (with inputs shorted)	±10mV	±10mV	±10mV	±10mV	±10mV	±10mV
Input Impedance (Nominally balanced, nominally unbalanced)	20 kΩ balanced, 10 kΩ unblanced	20 kΩ balanced, 10 kΩ unblanced	20 kΩ balanced, 10 kΩ unblanced	10 kΩ balanced, 5 kΩ unblanced	10 kΩ balanced, 5 kΩ unblanced	10 kΩ balanced, 5 kΩ unblanced
Maximum Input Level (Low Amp Gain Mode)	+20dBU	+20dBU	+20dBU	+20dBU	+20dBU	+20dBU
Required AC Mains (±10%)	100V – 240V~ 50/60Hz	100V – 240V~ 50/60Hz	100V – 240V~ 50/60Hz	100V – 240V~ 50/60Hz	100V – 240V~ 50/60Hz	100V – 240V~ 50/60Hz
Cooling	Continuously variable speed forced air, front-to-back airflow	Continuously variable speed forced air, front-to-back airflow	Continuously variable speed forced air, front-to-back airflow	Continuously variable speed forced air, front-to-back airflow	Continuously variable speed forced air, front-to-back airflow	Continuously variable speed forced air, front-to-back airflow
Power Supply Connector	Standard IEC type 320 inlet for detachable connector 100 – 240 V~	Standard IEC type 320 inlet for detachable connector 100 – 240 V~	Standard IEC type 320 inlet for detachable connector 100 – 240 V~	15A IEC Connector, 100-240V	15A IEC Connector, 100-240V	20A IEC Connector, 100-240V
Load Impedance Stereo/Dual Mode	2Ω - 16Ω; 70Vrms and 100Vrms	2Ω - 16Ω; 70Vrms and 100Vrms	2Ω - 16Ω; 70Vrms and 100Vrms	2Ω - 16Ω; 70Vrms and 100Vrms	2Ω - 16Ω; 70Vrms and 100Vrms	2Ω - 16Ω; 70Vrms and 100Vrms
Load Impedance Bridge Mono	4Ω - 16Ω; 140Vrms and 200Vrms	4Ω - 16Ω; 140Vrms and 200Vrms	4Ω - 16Ω; 140Vrms and 200Vrms	4Ω - 16Ω; 140Vrms and 200Vrms	4Ω - 16Ω; 140Vrms and 200Vrms	4Ω - 16Ω; 140Vrms and 200Vrms
Maximum Fan Noise (re dB SPL @ 1M)	51dBA	51dBA	51dBA	51dBA	54dBA	54dBA
Weight	14.56 lbs (6.6 kg)	16.13 lbs (7.31 kg)	14.56 lbs (6.6 kg)	16.3 lbs (7.39 kg)	17.2 lbs (7.8 kg)	20.1 lbs (9.12 kg)

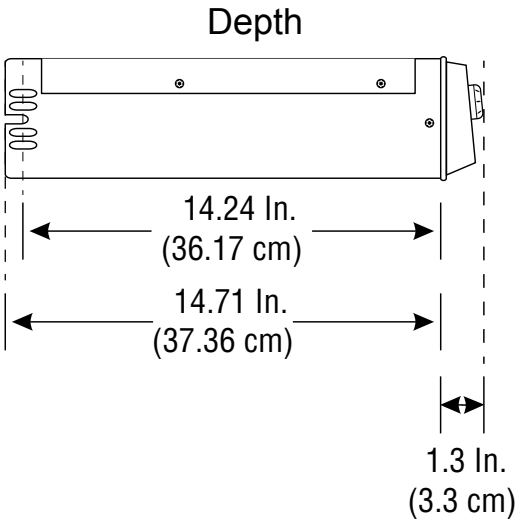
Dimensions

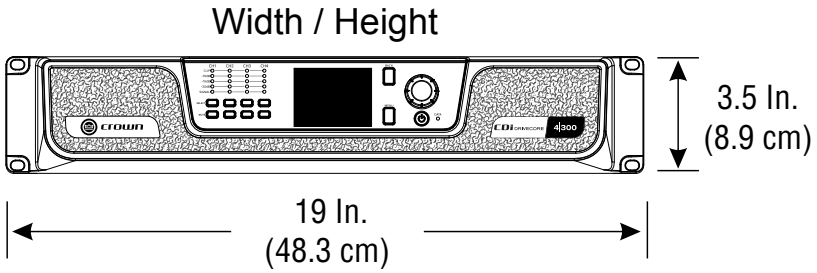
2|300 / 2|300BL / 4|300 / 4|300BL / 2|600 / 2|600BL / 4|600 / 4|600BL





2|1200 / 2|1200BL / 4|1200 / 4|1200BL





AC Power Draw & Thermal Dissipation

CDi DriveCore 2|300 / 2|300BL

Pink noise 12dB crest factor, bandwidth limited 22Hz to 22kHz.
Typical line impedance used.
Data based on all channels driven.

This product was safety certified to ±10% of the voltage range 100–240V~. This information is for reference only.

CDi DriveCore 2|300 / 2|300BL – Dual									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.6	73	251	63	0.4	102	347	88
1/8 Power Pink Noise Typical of program material just at clip	2Ω	1.1	91	310	78	0.7	119	405	102
	4Ω	1.4	97	331	83	0.8	118	403	102
	8Ω	1.4	86	295	74	0.8	108	368	93
	70V	1.3	83	282	71	0.8	102	350	88
	100V	1.3	80	272	69	0.8	102	347	87
1/3 Power Pink Noise Typical of program material at extreme clip	2Ω	1.9	123	419	106	1.1	140	479	121
	4Ω	2.8	138	471	119	1.5	150	512	129
	8Ω	2.6	116	397	100	1.4	125	428	108
	70V	2.5	110	377	95	1.4	115	391	99
	100V	2.5	99	337	85	1.3	381	381	96

CDi DriveCore 2|300 / 2|300BL – Bridged									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.6	73	250	63	0.4	102	348	88
1/8 Power Pink Noise Typical of program material just at clip	4Ω	1.4	92	313	79	0.8	112	382	96
	8Ω	1.3	84	286	72	0.8	107	365	92
	70V	1.3	79	271	68	0.8	102	349	88
	100V	1.3	79	271	68	0.8	101	345	87
1/3 Power Pink Noise Typical of program material at extreme clip	4Ω	2.8	127	432	109	1.5	138	471	119
	8Ω	2.7	112	381	96	1.4	123	419	106
	70V	2.5	101	344	87	1.3	111	378	95
	100V	2.5	99	338	85	1.3	111	378	95

CDi DriveCore 4|300 / 4|300BL

Pink noise 12dB crest factor, bandwidth limited 22Hz to 22kHz.
Typical line impedance used.
Data based on all channels driven.

This product was safety certified to ±10% of the voltage range 100–240V~. This information is for reference only.

CDi DriveCore 4|300 / 4|300BL – Dual									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.9	110	375	94	0.5	125	428	108
1/8 Power Pink Noise Typical of program material just at clip	2Ω	1.8	139	475	120	1.0	160	544	137
	4Ω	2.6	160	544	137	1.4	173	591	149
	8Ω	2.4	140	477	120	1.3	150	511	129
	70V	2.3	129	441	111	1.3	142	484	122
	100V	2.3	127	434	109	1.3	141	481	121
1/3 Power Pink Noise Typical of program material at extreme clip	2Ω	3.5	215	733	185	1.8	221	754	190
	4Ω	5.3	239	815	205	2.8	239	814	205
	8Ω	5.0	200	683	172	2.6	211	719	181
	70V	4.7	175	598	151	2.5	181	617	155
	100V	4.7	166	568	143	2.5	180	615	155

CDi DriveCore 4|300 / 4|300BL – Bridged									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.9	110	376	95	0.5	126	429	108
1/8 Power Pink Noise Typical of program material just at clip	4Ω	2.6	157	537	135	1.4	169	575	145
	8Ω	2.4	139	474	120	1.3	149	508	128
	70V	2.4	132	449	113	1.3	143	488	123
	100V	2.3	129	441	111	1.3	143	487	123
1/3 Power Pink Noise Typical of program material at extreme clip	4Ω	5.3	232	791	199	2.8	232	793	200
	8Ω	4.9	192	655	165	2.6	208	710	179
	70V	4.8	177	605	153	2.5	183	623	157
	100V	4.8	182	622	157	2.5	181	617	156

CDi DriveCore 2|600 / 2|600BL

Pink noise 12dB crest factor, bandwidth limited 22Hz to 22kHz.
Typical line impedance used.
Data based on all channels driven.

This product was safety certified to ±10% of the voltage range 100–240V~. This information is for reference only.

CDi DriveCore 2|600 / 2|600BL – Dual									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.6	69	235	59	0.4	91	312	79
1/8 Power Pink Noise Typical of program material just at clip	2Ω	1.6	112	384	97	0.9	124	424	107
	4Ω	2.2	119	406	102	1.2	130	443	112
	8Ω	2.1	102	348	88	1.2	119	407	103
	70V	2.1	107	366	92	1.1	116	398	100
	100V	2.0	94	322	81	1.1	105	359	90
1/3 Power Pink Noise Typical of program material at extreme clip	2Ω	3.2	179	610	154	1.6	178	608	153
	4Ω	4.9	195	665	168	2.6	210	715	180
	8Ω	4.6	164	559	141	2.5	176	600	151
	70V	4.5	149	509	128	2.4	171	582	147
	100V	4.7	182	622	157	2.3	153	521	131

CDi DriveCore 2|600 / 2|600BL – Bridged									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.6	69	235	59	0.4	91	311	78
1/8 Power Pink Noise Typical of program material just at clip	4Ω	2.3	118	404	102	1.2	126	431	109
	8Ω	2.1	102	350	88	1.2	113	386	97
	70V	2.1	108	367	93	1.2	113	387	97
	100V	2.1	95	323	81	1.1	108	368	93
1/3 Power Pink Noise Typical of program material at extreme clip	4Ω	5.1	199	680	171	2.6	199	678	171
	8Ω	4.7	168	573	144	2.5	171	583	147
	70V	4.7	162	553	139	2.4	167	571	144
	100V	4.5	147	502	126	2.4	153	521	131

CDi DriveCore 4|600 / 4|600BL

Pink noise 12dB crest factor, bandwidth limited 22Hz to 22kHz.
Typical line impedance used.
Data based on all channels driven.

This product was safety certified to ±10% of the voltage range 100–240V~. This information is for reference only.

CDi DriveCore 4|600 / 4|600BL – Dual									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.9	108	369	93	0.6	106	361	91
1/8 Power Pink Noise Typical of program material just at clip	2Ω	4.2	225	770	194	2.3	213	726	183
	4Ω	4.5	201	686	173	2.0	191	652	164
	8Ω	4.3	178	609	153	2.3	164	560	141
	70V	4.1	176	601	152	2.3	174	593	149
	100V	4.1	172	588	148	2.2	144	493	124
1/3 Power Pink Noise Typical of program material at extreme clip	2Ω	8.2	363	1238	312	4.8	379	1294	326
	4Ω	9.4	434	1483	374	4.5	330	1127	284
	8Ω	9.8	308	1053	265	5.0	273	933	235
	70V	9.5	310	1058	267	5.1	443	1512	381
	100V	5.0	178	609	154	2.7	169	578	146

CDi DriveCore 4|600 / 4|600BL – Bridged									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	1.0	108	368	93	0.6	108	369	93
1/8 Power Pink Noise Typical of program material just at clip	4Ω	4.4	206	703	177	2.3	196	669	169
	8Ω	4.1	173	589	149	2.3	181	617	155
	70V	4.1	185	631	159	2.3	174	593	150
	100V	4.0	162	551	139	2.1	154	527	133
1/3 Power Pink Noise Typical of program material at extreme clip	4Ω	9.7	386	1318	332	4.9	329	1122	283
	8Ω	8.8	299	1022	258	5.0	277	945	238
	70V	9.0	325	1109	280	4.9	291	993	250
	100V	8.8	277	945	238	4.7	238	814	205

CDi DriveCore 2|1200 / 2|1200BL

Pink noise 12dB crest factor, bandwidth limited 22Hz to 22kHz.
Typical line impedance used.
Data based on all channels driven.

This product was safety certified to ±10% of the voltage range 100–240V~. This information is for reference only.

CDi DriveCore 2|1200 / 2|1200BL – Dual									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.6	68	231	58	0.4	65	222	56
1/8 Power Pink Noise Typical of program material just at clip	2Ω	3.7	167	570	144	2.0	149	509	128
	4Ω	4.0	145	493	124	2.1	135	460	116
	8Ω	7.2	110	376	95	2.1	120	411	104
	70V	3.8	145	494	125	2.1	139	475	120
	100V	3.6	130	442	112	2.0	117	398	100
1/3 Power Pink Noise Typical of program material at extreme clip	2Ω	5.4	204	696	175	3.9	266	909	229
	4Ω	9.1	257	876	221	4.6	244	833	210
	8Ω	8.1	209	712	179	4.5	196	668	168
	70V	8.2	265	903	228	4.7	313	1068	269
	100V	9.1	250	852	215	4.2	205	701	177

CDi DriveCore 2|1200 / 2|1200BL – Bridged									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.6	68	231	58	0.4	65	222	56
1/8 Power Pink Noise Typical of program material just at clip	4Ω	4.0	162	552	139	2.1	145	496	125
	8Ω	3.8	130	443	112	2.0	124	423	107
	70V	3.9	155	530	134	2.0	140	478	120
	100V	3.5	132	450	113	2.1	138	472	119
1/3 Power Pink Noise Typical of program material at extreme clip	4Ω	8.8	285	971	245	4.5	236	805	203
	8Ω	8.7	235	801	202	4.7	213	728	183
	70V	8.9	303	1033	260	4.6	269	918	231
	100V	8.8	243	829	209	4.9	257	879	222

CDi DriveCore 4|1200 / 4|1200BL

Pink noise 12dB crest factor, bandwidth limited 22Hz to 22kHz.
Typical line impedance used.
Data based on all channels driven.

This product was safety certified to ±10% of the voltage range 100–240V~. This information is for reference only.

CDi DriveCore 4|1200 / 4|1200BL – Dual									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.4	37	126	32	0.6	105	358	90
1/8 Power Pink Noise Typical of program material just at clip	2Ω	6.8	293	1002	253	3.5	278	949	239
	4Ω	7.6	262	896	226	4.1	257	878	221
	8Ω	7.0	219	748	188	3.8	214	730	184
	70V	7.2	256	873	220	4.0	259	885	223
	100V	7.2	213	726	183	3.6	212	723	182
1/3 Power Pink Noise Typical of program material at extreme clip	2Ω	17.0	679	2316	584	7.8	538	1836	463
	4Ω	17.2	516	1761	444	2.5	470	1603	404
	8Ω	17.4	404	1378	347	8.7	400	1367	345
	70V	15.0	460	1568	395	9.2	546	1865	470
	100V	17.7	392	1337	337	8.8	398	1358	342

CDi DriveCore 4|1200 / 4|1200BL – Bridged									
		120 VAC / 60Hz				230 VAC / 50Hz			
Condition	Load	Line current (amps)	Power Dissipated as Heat			Line current (amps)	Power Dissipated as Heat		
			watts	BTU	kcal/hr		watts	BTU	kcal/hr
At Idle Awake	N/A	0.9	109	372	94	0.5	106	362	91
1/8 Power Pink Noise Typical of program material just at clip	4Ω	7.8	284	971	245	3.8	265	903	228
	8Ω	7.3	237	811	204	3.5	223	762	192
	70V	7.4	290	990	250	3.6	273	932	235
	100V	7.4	269	920	232	3.6	255	871	219
1/3 Power Pink Noise Typical of program material at extreme clip	4Ω	17.4	539	1840	464	8.0	446	1524	384
	8Ω	16.9	449	1532	386	7.6	425	1450	366
	70V	17.5	545	1858	468	7.7	549	1874	472
	100V	17.5	532	1817	458	7.2	490	1671	421

Warranty (United States Only)

SUMMARY OF WARRANTY

Crown International, 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW Crown product, for three years from the date of purchase by the original purchaser (the "warranty period") that the new Crown product is free of defects in materials and workmanship. We further warrant the new Crown product regardless of the reason for failure, except as excluded in this Warranty.



**Warranty is only valid within the United States of America. For information on Warranty outside of the U.S.A, please contact your local distributor.*

ITEMS EXCLUDED FROM THIS CROWN WARRANTY

This Crown Warranty is in effect only for failure of a new Crown product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, accident, negligence, or loss which is covered under any of your insurance contracts. This Crown Warranty also does not extend to the new Crown product if the serial number has been defaced, altered, or removed.

WHAT THE WARRANTOR WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair, replacement, or refund. We may not elect refund unless you agree, or unless we are unable to provide replacement, and repair is not practical or cannot be timely made. If a refund is elected, then you must make the defective or malfunctioning product available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at the factory. Warranty work for some products can only be performed at our factory. We will remedy the defect and ship the product from the service center or our factory within a reasonable time after receipt of the defective product at our authorized service center or our factory. All expenses in remedying the defect, including surface shipping costs in the United States, will be borne by us. (You must bear the expense of shipping the product between any foreign country and the port of entry in the United States including the return shipment, and all taxes, duties, and other customs fees for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service within the warranty period. All components must be shipped in a factory pack, which, if needed, may be obtained from us free of charge. Corrective action will be taken within a reasonable time of the date of receipt of the defective product by us or our authorized service center. If the repairs made by us or our authorized service center are not satisfactory, notify us or our authorized service center immediately.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES

YOU ARE NOT ENTITLED TO RECOVER FROM US ANY INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN THE NEW CROWN PRODUCT. THIS INCLUDES ANY DAMAGE TO ANOTHER PRODUCT OR PRODUCTS RESULTING FROM SUCH A DEFECT. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this Crown Warranty. This Crown Warranty is not extended by the length of time which you are deprived of the use of the new Crown product. Repairs and replacement parts provided under the terms of this Crown Warranty shall carry only the unexpired portion of this Crown Warranty.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER

THIS CROWN WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. No action to enforce this Crown Warranty shall be commenced after expiration of the warranty period.

THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS. 04/15

Service

Crown products are quality units that rarely require servicing. Before returning your unit for servicing, please contact Crown Technical Support to verify the need for servicing.

Warranty is only valid within the country in which the product was purchased.

This unit has very sophisticated circuitry which should only be serviced by a fully trained technician. This is one reason why each unit bears the following label:

***CAUTION:* To prevent electric shock, do not remove covers. No user serviceable parts inside. Refer servicing to a qualified technician.**

Complete the Service Return Authorization form in the back of this manual, when returning a Crown product to the factory or authorized service center. The form must be included with your product inside the box or in a packing slip envelope securely attached to the outside of the shipping carton. Do not send this form separately.

Worldwide Service

Service may be obtained from an authorized service center (contact your local Crown/Amcron representative or our office for a list of authorized service centers). To obtain service, simply present the bill of sale as proof of purchase along with the defective unit to an authorized service center. They will handle the necessary paperwork and repair.

Remember to transport your unit in the original factory pack.

US and Canada Service

Service may be obtained in one of two ways: from an authorized service center or from the factory. You may choose either. It is important that you have your copy of the bill of sale as your proof of purchase.

Service at a US or Canada Service Center

This method usually saves the most time and effort. Simply present your bill of sale along with the defective unit to an authorized service center to obtain service. They will handle the necessary paperwork and repair. Remember to transport the unit in the original factory pack. A list of authorized service centers in your area can be obtained from Crown Factory Service, or online from www.crownaudio.com/en/support/service_lookup

Factory Service

Crown accepts no responsibility for non-serviceable product that is sent to us for factory repair. It is the owner's responsibility to ensure that their product is serviceable prior to sending it to the factory.

A Service Return Authorization (SRA) is required for product being sent to the factory for repair. An SRA can be completed online at www.crownaudio.com/support/rma. If you do not have access to the web, please call Customer Service at 574.294.8200 or 800.342.6939 extension 8205 in North America, Puerto Rico and the Virgin Islands only.

For warranty service, we will pay for ground shipping both ways in the United States. Contact Customer Service to obtain prepaid shipping labels prior to sending the unit. Or, if you prefer, you may prepay the cost of shipping, and HARMAN will reimburse you. Send copies of the shipping receipts to HARMAN to receive reimbursement.

Your repaired unit will be returned via UPS ground. Please contact us if other arrangements are required.

Factory Service Shipping Instructions

1. Service Return Authorization (SRA) is required for product being sent to the factory for service. Please complete the SRA by going to www.crownaudio.com/support/rma. If you do not have access to our website, call 1.800.342.6939, extension 8205 and we will create the SRA for you.
2. See packing instructions that follow.
3. Ship product to:
   HARMAN Factory Service
   1718 W Mishawaka Rd.
   Elkhart, IN 46517
4. Use a bold black marker and write the SRA number on three sides of the box.
5. Record the SRA number for future reference. The SRA number can be used to check the repair status.

Packing Instructions

Important: These instructions must be followed. If they are not followed, HARMAN International, Inc. assumes no responsibility for damaged goods and/or accessories that are sent with your unit.

1. Fill out and include the Service Return Authorization Request in the back of this manual.
2. Do not ship any accessories (manuals, cords, hardware, etc.) with your unit. These items are not needed to service your product. We will not be responsible for these items.
3. When shipping your Crown product, it is important that it has adequate protection. We recommend you use the original pack material when returning the product for repair. If you do not have the original box, please call HARMAN at 800.342.6939 or 574.294.8210 and order new pack material. (Do not ship your unit in a wood or metal cabinet).
4. If you provide your own shipping pack, the minimum recommended requirements for materials are as follows:
   a. 275 P.S.I. burst test, double-wall carton that allows for 2-inch solid Styrofoam on all six sides of unit or 3 inches of plastic bubble wrap on all six sides of unit.
   b. Securely seal the package with an adequate carton sealing tape.
   c. Do not use light boxes or “peanuts”. Damage caused by poor packaging will not be covered under warranty.

Enclose the completed Service Return Authorization Request (or securely attach it to the outside of carton) and re-seal the shipping pack with a sturdy carton sealing tape.

Estimate Approval

Approval of estimate must be given within 30 days after being notified by HARMAN International. Units still in the possession of HARMAN after 30 days of the estimate will become the property of HARMAN International.

Payment of Non-Warranty Repairs

Payment on out-of-warranty repairs must be received within 30 days of the repair date. Units unclaimed after 30 days become the property of HARMAN International.

If you have any questions, please contact HARMAN.

HARMAN Factory Service
1718 W. Mishawaka Rd.,
Elkhart, Indiana 46517 U.S.A.

Telephone:
574-294-8200
800-342-6939 (North America, Puerto Rico, and Virgin Islands only)

Facsimile:
574-294-8301 (Technical Support)
574-294-8124 (Factory Service)

Web site:
www.crownaudio.com

Service Return Authorization Request

Shipping Address: HARMAN Factory Service, 1718 W. Mishawaka Rd., Elkhart, IN 46517
You may also request a service return authorization at www.crownaudio.com/support/rma

PLEASE PRINT CLEARLY

SRA #:_____(If sending product to Crown factory service)

Model:_____Serial Number: _____ Purchase Date: _____

PRODUCT RETURN INFORMATION

Individual or Business Name: _____

Phone #: _____ Fax #:_____ E-Mail:_____

Street Address (please, no P.O. Boxes): _____

City: _____ State/Prov:_____ Postal Code: _____ Country: _____

Nature of problem: _____

_____

_____

_____

_____

Other equipment in your system: _____

If warranty is expired, please provide method of payment. Proof of purchase may be required to validate warranty.

PAYMENT OPTIONS

☐ I have open account payment terms. Purchase order required. PO#: _____ ☐ COD

☐ Credit Card (Information below is required; however if you do not want to provide this information at this time, we will contact you when your unit is repaired for the information.)

Credit card information:

Type of credit card: ☐ MasterCard ☐ Visa ☐ American Express ☐ Discover

Type of credit card account: ☐ Personal/Consumer ☐ Business/Corporate

Card # _____ Exp. date: _____ *Card ID #: _____

*Card ID # is located on the back of the card following the credit card #, in the signature area. On American Express, it may be located on the front of the card. This number is required to process the charge to your account. If you do not want to provide it at this time, we will call you to obtain this number when the repair of your unit is complete.

Name on credit card: _____

Billing address of credit card: _____

_____

_____

Open Source Disclaimer for HARMAN Products

IMPORTANT READ CAREFULLY

This product includes several open source software libraries and tools. Open source software is governed by the terms and conditions of the applicable open source license. You are bound by the terms and conditions of the open source license in connection with your use and distribution of the software in this product.

The open source software, applicable licenses and other notices are identified in the table below. You agree to comply with all such licenses and other notices. If you do not agree to such terms, you may not install, download, or otherwise use the open source software other than as a component of this HARMAN product. General descriptions of Open Source license types can be found at www.opensource.org/licenses. Where specific open source license terms entitle you to the source or object code of this software, source or object code is available here: www.harman.com/opensource. If you have any questions about the open source software contained in this product, please email support@harman.com. In the subject line of your email, please reference: "Open Source Software".

Open Source Licenses and Copyright Notices

The following table lists the open source software included in this product. The web site and the open source license type for each tool is specified. The individual web sites contain the explicit license details for the library or tool.

Library / Tool	Web Site	License
buildroot	https://buildroot.org/	GNU GPLv2 GNU GPLv3 GNU LGPLv2
Lua	http://lua.org	MIT
zlib	http://boost.org	Boost License
augeas 1.4.0	http://augeas.net/	GNU LGPLv2.1
libfa	http://augeas.net/libfa/	GNU LGPLv2 or greater
dhcpcd 6.11.3	http://roy.marples.name/projects/dhcpcd/index	BSD
gdb and/or gdbserver 7.10.1	http://www.gnu.org/software/gdb/current/	GNU GPLv2
libxml2 2.9.3	http://xmlsoft.org/	MIT
BOOST 1.53.0	http://www.boost.org/	Boost Software License - Version 1.0 - August 17th, 2003
JSON 0.6.0-rc2	https://github.com/open-source-parsers/jsoncpp	MIT
tinyXML	https://sourceforge.net/projects/tinyxml/	zlib/libpng
ticpp (tinyXML++)	https://github.com/rjpcomputing/ticpp	MIT
sqlite 3.8.4.3	https://www.sqlite.org/	public domain
Qt qt-everywhere-opensource-src-4.8.6	https://download.qt.io/archive/qt/4.8/4.8.6/	GNU LGPLv2.1
lua	http://www.lua.org/about.html	MIT
at91bootstrap	http://www.at91.com/linux4sam/bin/view/Linux4SAM/AT91Bootstrap	2-clause BSD
uBoot	http://www.at91.com/linux4sam/bin/view/Linux4SAM/U-Boot	GNU GPLv2
Linux kernel 3.10	https://github.com/linux4sam/linux-at91	GNU GPLv2
busybox 1.20.2	http://www.busybox.net	GNU GPLv2
MTD utils 1.5.0	http://www.linux-mtd.infradead.org/	GNU GPLv2
MD5	http://userpages.umbc.edu/~mabzug1/cs/md5/md5.html	RSA Data Security, Inc. MD5 Message-Digest Algorithm

Library / Tool	Web Site	License
util-linux	www.kernel.org/pub/linux/utils/util-linux/	GNU GPLv2 GNU GPLv2+ GNU LGPLv2+ BSD
procps	http://procps.sf.net	GNU GPLv2 GNU LGPLv2
glibc 2.18	www.gnu.org/software/libc/	GNU GPLv2+ GNU LGPLv2.1+
iproute2	https://wiki.linuxfoundation.org/networking/iproute2	GNU GPLv2
wireless tools for linux	http://www.labs.hpe.com/personal/Jean_Tourrilhes/Linux/Tools.html	GNU GPLv2
abxtest	https://github.com/GiterLab/arm-201311/blob/master/arm-none-linux-gnueabi/libc/usr/bin/abxtest	GNU GPLv2
alsa	http://alsa-project.org/main/index.php/Main_Page	GNU GPLv3 GNU LGPLv3
bzip2	http://www.bzip.org/	BSD
directFB	http://www.directfb.org/	GNU LGPLv2.1
fontconfig	https://www.freedesktop.org/wiki/Software/fontconfig/	Copyright © 2000,2001,2002,2003,2004,2006,2007 Keith Packard Copyright © 2005 Patrick Lam Copyright © 2009 Roozbeh Pournader Copyright © 2008,2009 Red Hat, Inc. Copyright © 2008 Danilo Šegan Copyright © 2012 Google, Inc.
ffmpeg	https://ffmpeg.org/	GNU GPLv2+ GNU LGPLv2.1+
e2fsprogs	http://e2fsprogs.sourceforge.net/	GNU GPLv2
expat	http://www.libexpat.org/	MIT
libffi	https://sourceware.org/libffi/	MIT
freetype	https://www.freetype.org/license.html	GNU GPLv2
gio	https://developer.gnome.org/gio/stable/	GNU LGPLv2.1
GLib	wiki.gnome.org/Projects/GLib	GNU LGPLv2.1
libjpeg	ijg.org	Custom BSD-like
MPEG Audio Decoder	http://www.underbit.com/products/mad/	GNU GPLv2
ncurses	www.gnu.org/software/ncurses/ncurses.html	X11
I2C Tools for Linux	http://freecode.com/projects/i2ctools	GNU GPLv2
libstdc++	https://gcc.gnu.org/onlinedocs/libstdc++/	GNU GPLv3 + GCC Runtime Library Exception, v3.1
udev	www.freedesktop.org/software/systemd/man/udev.html	GNU GPLv2
zlib	http://www.zlib.net/	zlib
fbv	http://freecode.com/projects/fbv	GNU GPLv2
gdbus, gdbus-codegen	http://www.gtk.org/	GNU LGPLv2+

Library / Tool	Web Site	License
iperf	https://iperf.fr/	BSD
jpegtran	http://www.ijg.org/	MIT
usbutils	http://www.linuxfromscratch.org/blfs/view/svn/general/usbutils.html	GNU GPLv2+
libusb	http://www.linuxfromscratch.org/blfs/view/svn/general/libusb.html	GNU LGPLv2.1
Rng-tools	https://git.kernel.org/cgit/utils/kernel/rng-tools/rng-tools.git/	GNU GPLv2
OpenSSH	http://www.openssh.com/	BSD
ethtool	www.kernel.org/pub/software/network/ethtool/	GNU GPLv2
OpenSSL	https://www.openssl.org/	SSLeay OpenSSL
libpng	http://www.libpng.org/pub/png/libpng.html	libpng
fdformat	ftp://ftp.kernel.org/pub/linux/utils/util-linux-ng/	GNU GPLv2 GNU GPLv2+ GNU LGPLv2+ BSD
mii-diag	http://ftp.psu.ac.th/pub/scyld/mii-diag.c	GPLv2
top (included with Procps-ng)	https://sourceforge.net/projects/procps-ng/	GNU GPLv2 GNU LGPLv2
udevadm	https://kernel.googlesource.com/pub/scm/linux/hotplug/udev/+/118/udevadm.c	GPLv2
libproc-3.2.8.so	https://rpmfind.net/linux/RPM/sourceforge/m/ma/magicspecs/apt/3.0/x86_64/RPMS.p/procps-3.2.8-25.20110302gitmgc30.x86_64.html	GNU GPLv2+ GNU LGPLv2+
e2fsprogs	http://e2fsprogs.sourceforge.net/	GNU GPLv2 GNU LGPLv2

GNU General Public License Version 2

GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.

51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to

the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source

code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE

PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

one line to give the program's name and an idea of what it does.
Copyright (C) yyyy name of author

This program is free software; you can redistribute it and/or
modify it under the terms of the GNU General Public License
as published by the Free Software Foundation; either version 2
of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
GNU General Public License for more details.

You should have received a copy of the GNU General Public License
along with this program; if not, write to the Free Software
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA.

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details
type `show w'. This is free software, and you are welcome
to redistribute it under certain conditions; type `show c'
for details.

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright
interest in the program `Gnomovision'
(which makes passes at compilers) written
by James Hacker.

signature of Ty Coon, 1 April 1989
Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License.

GNU General Public License Version 3

GNU GENERAL PUBLIC LICENSE

Version 3, 29 June 2007

Copyright © 2007 Free Software Foundation, Inc. <http://fsf.org/>

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The GNU General Public License is a free, copyleft license for software and other kinds of works.

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program--to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for them if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs, and that you know you can do these things.

To protect your rights, we need to prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: responsibilities to respect the freedom of others.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

Developers that use the GNU GPL protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPL requires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS

0. Definitions.

“This License” refers to version 3 of the GNU General Public License.

“Copyright” also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as "you". "Licensees" and "recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based on the Program.

To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

1. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The "Corresponding Source" for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

2. Basic Permissions.

All rights granted under this License are granted for the term of copyright on the Program, and are irrevocable provided the stated conditions are met. This License explicitly affirms your unlimited permission to run the unmodified Program. The output from running a covered work is covered by this License only if the output, given its content, constitutes a covered work. This License acknowledges your rights of fair use or other equivalent, as provided by copyright law.

You may make, run and propagate covered works that you do not convey, without conditions so long as your license otherwise remains in force. You may convey covered works to others for the sole purpose of having them make modifications exclusively for you, or provide you with facilities for running those works, provided that you comply with the terms of this License in conveying all material for which you do not control copyright. Those thus making or running the covered works for you must do so exclusively on your behalf, under your direction and control, on terms that prohibit them from making any copies of your copyrighted material outside their relationship with you.

Conveying under any other circumstances is permitted solely under the conditions stated below. Sublicensing is not allowed; section 10 makes it unnecessary.

3. Protecting Users' Legal Rights From Anti-Circumvention Law.

No covered work shall be deemed part of an effective technological measure under any applicable law fulfilling obligations under article 11 of the WIPO copyright treaty adopted on 20 December 1996, or similar laws prohibiting or restricting circumvention of such measures.

When you convey a covered work, you waive any legal power to forbid circumvention of technological measures to the extent such circumvention is effected by exercising rights under this License with respect to the covered work, and you disclaim any intention to limit operation or modification of the work as a means of enforcing, against the work's users, your or third parties' legal rights to forbid circumvention of technological measures.

4. Conveying Verbatim Copies.

You may convey verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice; keep intact all notices stating that this License and any non-permissive terms added in accord with section 7 apply to the code; keep intact all notices of the absence of any warranty; and give all recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey, and you may offer support or warranty protection for a fee.

5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

a) The work must carry prominent notices stating that you modified it, and giving a relevant date.

b) The work must carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to “keep intact all notices”.

c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms, to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.

d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an “aggregate” if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation's users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.

b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.

c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.

d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the

Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A "User Product" is either (1) a "consumer product", which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, "normally used" refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

"Installation Information" for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

If you convey an object code work under this section in, or with, or specifically for use in, a User Product, and the conveying occurs as part of a transaction in which the right of possession and use of the User Product is transferred to the recipient in perpetuity or for a fixed term (regardless of how the transaction is characterized), the Corresponding Source conveyed under this section must be accompanied by the Installation Information. But this requirement does not apply if neither you nor any third party retains the ability to install modified object code on the User Product (for example, the work has been installed in ROM).

The requirement to provide Installation Information does not include a requirement to continue to provide support service, warranty, or updates for a work that has been modified or installed by the recipient, or for the User Product in which it has been modified or installed. Access to a network may be denied when the modification itself materially and adversely affects the operation of the network or violates the rules and protocols for communication across the network.

Corresponding Source conveyed, and Installation Information provided, in accord with this section must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.

7. Additional Terms.

"Additional permissions" are terms that supplement the terms of this License by making exceptions from one or more of its conditions. Additional permissions that are applicable to the entire Program shall be treated as though they were included in this License, to the extent that they are valid under applicable law. If additional permissions apply only to part of the Program, that part may be used separately under those permissions, but the entire Program remains governed by this License without regard to the additional permissions.

When you convey a copy of a covered work, you may at your option remove any additional permissions from that copy, or from any part of it. (Additional permissions may be written to require their own removal in certain cases when you modify the work.) You may place additional permissions on material, added by you to a covered work, for which you have or can give appropriate copyright permission.

Notwithstanding any other provision of this License, for material you add to a covered work, you may (if authorized by the copyright holders of that material) supplement the terms of this License with terms:

a) Disclaiming warranty or limiting liability differently from the terms of sections 15 and 16 of this License; or

b) Requiring preservation of specified reasonable legal notices or author attributions in that material or in the Appropriate Legal Notices displayed by works containing it; or

c) Prohibiting misrepresentation of the origin of that material, or requiring that modified versions of such material be marked in reasonable ways as different from the original version; or

d) Limiting the use for publicity purposes of names of licensors or authors of the material; or

e) Declining to grant rights under trademark law for use of some trade names, trademarks, or service marks; or

f) Requiring indemnification of licensors and authors of that material by anyone who conveys the material (or modified versions of it) with contractual assumptions of liability to the recipient, for any liability that these contractual assumptions directly impose on those licensors and authors.

All other non-permissive additional terms are considered “further restrictions” within the meaning of section 10. If the Program as you received it, or any part of it, contains a notice stating that it is governed by this License along with a term that is a further restriction, you may remove that term. If a license document contains a further restriction but permits relicensing or conveying under this License, you may add to a covered work material governed by the terms of that license document, provided that the further restriction does not survive such relicensing or conveying.

If you add terms to a covered work in accord with this section, you must place, in the relevant source files, a statement of the additional terms that apply to those files, or a notice indicating where to find the applicable terms.

Additional terms, permissive or non-permissive, may be stated in the form of a separately written license, or stated as exceptions; the above requirements apply either way.

8. Termination.

You may not propagate or modify a covered work except as expressly provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License (including any patent licenses granted under the third paragraph of section 11).

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, you do not qualify to receive new licenses for the same material under section 10.

9. Acceptance Not Required for Having Copies.

You are not required to accept this License in order to receive or run a copy of the Program. Ancillary propagation of a covered work occurring solely as a consequence of using peer-to-peer transmission to receive a copy likewise does not require acceptance. However, nothing other than this License grants you permission to propagate or modify any covered work. These actions infringe copyright if you do not accept this License. Therefore, by modifying or propagating a covered work, you indicate your acceptance of this License to do so.

10. Automatic Licensing of Downstream Recipients.

Each time you convey a covered work, the recipient automatically receives a license from the original licensors, to run, modify and propagate that work, subject to this License. You are not responsible for enforcing compliance by third parties with this License.

An “entity transaction” is a transaction transferring control of an organization, or substantially all assets of one, or subdividing an organization, or merging organizations. If propagation of a covered work results from an entity transaction, each party to that transaction who receives a copy of the work also receives whatever licenses to the work the party's predecessor in interest had or could give under the previous paragraph, plus a right to possession of the Corresponding Source of the work from the predecessor in interest, if the predecessor has it or can get it with reasonable efforts.

You may not impose any further restrictions on the exercise of the rights granted or affirmed under this License. For example, you may not impose a license fee, royalty, or other charge for exercise of rights granted under this License, and you may not initiate litigation (including a cross-claim or counterclaim in a lawsuit) alleging that any patent claim is infringed by making, using, selling, offering for sale, or importing the Program or any portion of it.

11. Patents.

A “contributor” is a copyright holder who authorizes use under this License of the Program or a work on which the Program is based. The work thus licensed is called the contributor's “contributor version”.

A contributor's “essential patent claims” are all patent claims owned or controlled by the contributor, whether already acquired or hereafter acquired, that would be infringed by some manner, permitted by this License, of making, using, or selling its contributor version, but do not include claims that would be infringed only as a consequence of further modification of the contributor version. For purposes of this definition, “control” includes the right to grant patent sublicenses in a manner consistent with the requirements of this License.

Each contributor grants you a non-exclusive, worldwide, royalty-free patent license under the contributor's essential patent claims, to make, use, sell, offer for sale, import and otherwise run, modify and propagate the contents of its contributor version.

In the following three paragraphs, a “patent license” is any express agreement or commitment, however denominated, not to enforce a patent (such as an express permission to practice a patent or covenant not to sue for patent infringement). To “grant” such a patent license to a party means to make such an agreement or commitment not to enforce a patent against the party.

If you convey a covered work, knowingly relying on a patent license, and the Corresponding Source of the work is not available for anyone to copy, free of charge and under the terms of this License, through a publicly available network server or other readily accessible means, then you must either (1) cause the Corresponding Source to be so available, or (2) arrange to deprive yourself of the benefit of the patent license for this particular work, or (3) arrange, in a manner consistent with the requirements of this License, to extend the patent license to downstream recipients. “Knowingly relying” means you have actual knowledge that, but for the patent license, your conveying the covered work in a country, or your recipient's use of the covered work in a country, would infringe one or more identifiable patents in that country that you have reason to believe are valid.

If, pursuant to or in connection with a single transaction or arrangement, you convey, or propagate by procuring conveyance of, a covered work, and grant a patent license to some of the parties receiving the covered work authorizing them to use, propagate, modify or convey a specific copy of the covered work, then the patent license you grant is automatically extended to all recipients of the covered work and works based on it.

A patent license is “discriminatory” if it does not include within the scope of its coverage, prohibits the exercise of, or is conditioned on the non-exercise of one or more of the rights that are specifically granted under this License. You may not convey a covered work if you are a party to an arrangement with a third party that is in the business of distributing software, under which you make payment to the third party based on the extent of your activity of conveying the work, and under which the third party grants, to any of the parties who would receive the covered work from you, a discriminatory patent license (a) in connection with copies of the covered work conveyed by you (or copies made from those copies), or (b) primarily for and in connection with specific products or compilations that contain the covered work, unless you entered into that arrangement, or that patent license was granted, prior to 28 March 2007.

Nothing in this License shall be construed as excluding or limiting any implied license or other defenses to infringement that may otherwise be available to you under applicable patent law.

12. No Surrender of Others' Freedom.

If conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot convey a covered work so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not convey it at all. For example, if you agree to terms that obligate you to collect a royalty for further conveying from those to whom you convey the Program, the only way you could satisfy both those terms and this License would be to refrain entirely from conveying the Program.

13. Use with the GNU Affero General Public License.

Notwithstanding any other provision of this License, you have permission to link or combine any covered work with a work licensed under version 3 of the GNU Affero General Public License into a single combined work, and to convey the resulting work. The terms of this License will continue to apply to the part which is the covered work, but the special requirements of the GNU Affero General Public License, section 13, concerning interaction through a network will apply to the combination as such.

14. Revised Versions of this License.

The Free Software Foundation may publish revised and/or new versions of the GNU General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies that a certain numbered version of the GNU General Public License “or any later version” applies to it, you have the option of following the terms and conditions either of that numbered version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of the GNU General Public License, you may choose any version ever published by the Free Software Foundation.

If the Program specifies that a proxy can decide which future versions of the GNU General Public License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Program.

Later license versions may give you additional or different permissions. However, no additional obligations are imposed on any author or copyright holder

as a result of your choosing to follow a later version.

15. Disclaimer of Warranty.

THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. Limitation of Liability.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

17. Interpretation of Sections 15 and 16.

If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively state the exclusion of warranty; and each file should have at least the “copyright” line and a pointer to where the full notice is found.

<one line to give the program's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>

This program is free software: you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation, either version 3 of the License, or
(at your option) any later version.

This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
GNU General Public License for more details.

You should have received a copy of the GNU General Public License
along with this program. If not, see <http://www.gnu.org/licenses/>.

Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short notice like this when it starts in an interactive mode:

<program> Copyright (C) <year> <name of author>
This program comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, your program's commands might be different; for a GUI interface, you would use an “about box”.

You should also get your employer (if you work as a programmer) or school, if any, to sign a “copyright disclaimer” for the program, if necessary. For more information on this, and how to apply and follow the GNU GPL, see <http://www.gnu.org/licenses/>.

The GNU General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License. But first, please read <http://www.gnu.org/philosophy/why-not-lgpl.html>.


crown®
by HARMAN