

DYNAUDIO

Control 01 and 02 Installation Guide

Table of contents

- Safety information 4
- General description 6
- Before you start 8
 - Mechanical installation and low fan noise 9
 - Network configuration 10
- Control software installation. 11
 - Installing the DADman remote control program 12
 - Connect your Control 01 or 02 to DADman 13
 - Assigning the IP address for the computer and the Control 01 and 02 14
 - Installation of Thunder | Core driver for macOS 16
 - Installation of Thunder | Core ASIO driver on Windows PC. 17
- Operation. 18
 - Front panel layout 19
 - Rear panel connections 20
 - Digital I/O and Network Connections 21
 - Dual MADI SFP I/O mini-module (optional) 21
 - Dual Gigabit Ethernet RJ45 connectors 21
 - Thunderbolt 3 connectors. 22
 - MADI connectors 22
 - Sync connectors 22
 - ADAT Connectors. 22
 - AES3 Output Connections (D-sub Connector) 22
 - Analogue I/O Connections on Control 02 and optional DAD I/O Cards. 24
 - Reconfig button. 25
 - Reconfig mode. 25



- Specifications 26
 - Audio Specifications 26
 - Digital I/O and Synchronisation..... 27
 - Electrical Specifications 28
 - Mechanical Specifications 29
 - Environmental Specifications 29



Safety information

WARNING

Read all safety and installation instructions, as well as explanations of graphic symbols, before using the product.

WARNING

When using electric products, basic precautions should be followed.

Read the Important Safety Instructions:

https://link.dynaudio.com/hubfs/Safety_Instructions/Important_Safety_Instructions_Control_01-02.pdf

WARNING

Improper connection of the equipment-grounding can result in a risk of electric shock. Do not modify the plug provided with the product. If it does not fit the outlet, have a proper outlet installed by a qualified electrician. Do not use an adapter that defeats the function of the equipment-grounding conductor. If you are in doubt as to whether the product is properly grounded, consult with a qualified serviceman or electrician.

The product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current, reducing the risk of electric shock. This product is equipped with a power supply cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriately installed and grounded outlet in accordance with all local codes and ordinances.

WARNING

- This product, either alone or in combination with an amplifier and speakers or headphones, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
- The product should be located so that its location or position does not interfere with its proper ventilation.
- The power-supply cord of the product should be unplugged from the outlet when left unused for an extended period of time. When unplugging the power supply, do not pull on the cord, but grasp it by the plug.
- Care should be taken so that objects do not fall and liquids are not spilt into the enclosure through openings.

SERVICE

- Do not attempt to service the product beyond that described in the user maintenance instructions. All other servicing should be referred to qualified service personnel.

- The product should be serviced by qualified service personnel when:
 - The power supply cord or plug has been damaged, or
 - Objects have fallen, or liquid has spilt into the product, or
 - The product has been exposed to rain, or
 - The product does not appear to be operating normally or exhibits a marked change in performance, or
 - The product has been dropped, or the enclosure damaged.

 **WARNING**

Hazardous moving parts inside the unit. Keep fingers and other body parts away.

Dynaudio A/S

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General description

Congratulations, and thank you for choosing the Thunder|Core-enabled **Control 01/02** AES/EBU Monitor Processor.

The Dynaudio Control 01 and Control 02 are extremely capable Monitor controllers, processors, and digital audio interfaces, which are ideal for your sound studio as pristine and versatile tools for playback on analogue and AES/EBU-enabled speakers.

Control 01 has two native stereo headphone outputs and 8 AES/EBU outputs (16 digital channels). Control 02 adds 8 analogue line outputs for a combined 24 output channels.

The internal routing engine provides a 1024 × 1024 matrix, allowing all inputs and outputs to be patched in any combination. In addition, a 512 × 64 channel summing processor and a 1024 filter SPQ equaliser are also available for room tuning and standards compliance.

Control 01 and 02 support sample rates ranging from 44.1 kHz to 348 kHz and a 28-bit floating-point resolution. They have a Thunderbolt 3 interface with 256 bidirectional channels for connection to the host computer and can also provide 15W power on each port for powering peripheral devices. Digital I/O is provided for 256 channels of Dante™, 64 channels of MADI, 16 channels of ADAT, four channels of S/PDIF, and 16 channels of AES output. Control 02 has eight additional analogue line outputs.

NOTE:

Control 01 and 02 are operated via the DADman control software. The control is handled via the Thunderbolt connection or Ethernet if Thunderbolt is not connected to the unit. The DADman software can be downloaded here: <https://www.dynaudio.com/>

Below is a diagram of the overall functionality.

Front side of the unit

Rear side of the unit

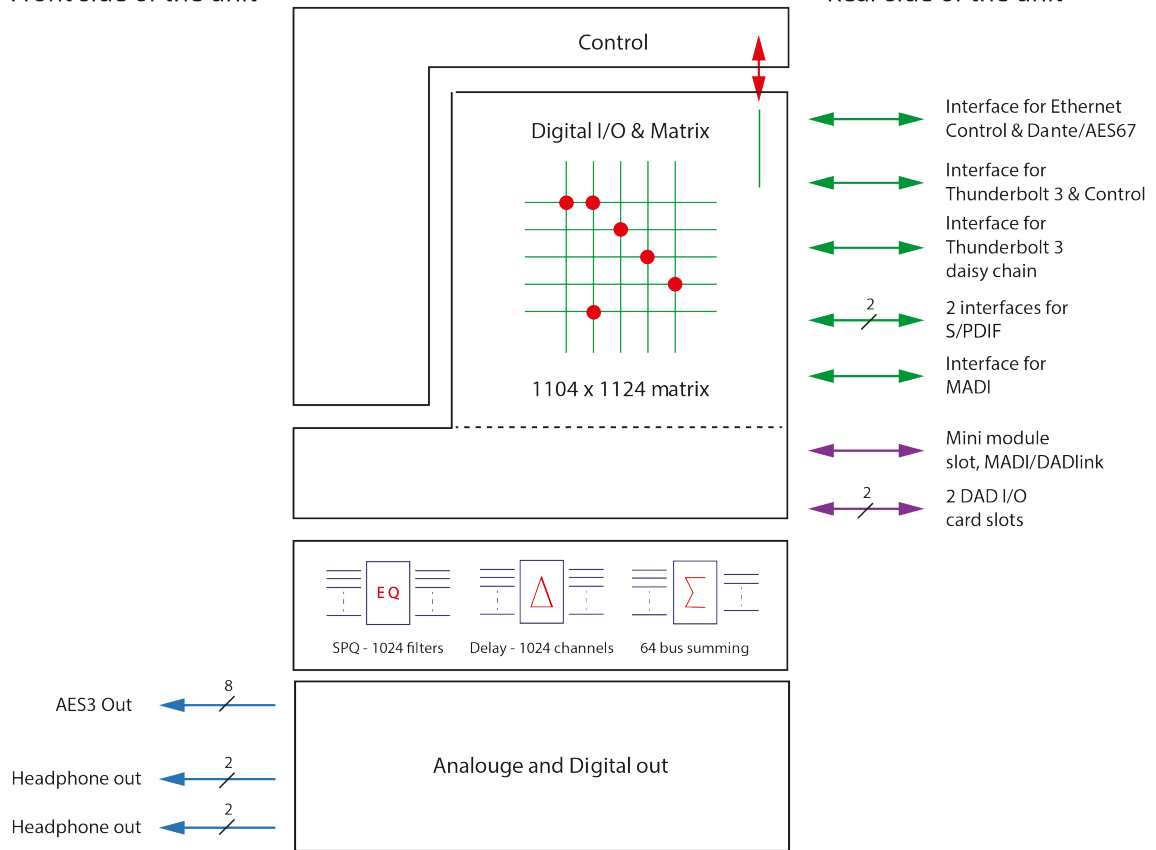


Figure 1: Block diagram of the unit



Before you start

Place your Control 01/02 on a hard and dry surface or mount it into a 19-inch rack and leave plenty of room for ventilation.

To meet the EMC requirements of directives EN 55032 and FCC 47 CFR part 15, and to obtain the highest performance of the Control 01, you must use good-quality and correctly shielded cables for all external connections when installing Control 01. For the power connection, a regular unshielded power cable with a proper protective earth conductor can be used.

Make sure that your sound system is at a safe volume level.

Mechanical installation and low fan noise

Control 01 and 02 are fitted with two very quiet fans to ensure optimum operating temperature. Under normal operating conditions and with correct installation, the fans are inaudible in the studio environment. The fans are temperature-controlled, i.e., the rotation speed, and thereby noise depends on the temperature inside Control 01/02.

The optimal air flow is through the ventilation openings in the front panel to the rear of the unit. When the unit is installed, considerations must be made to ensure proper air circulation for the air leaving the rear of the unit. The speed of the low-noise fan will be automatically increased to maintain a low internal temperature if there is insufficient airflow. If the internal temperature exceeds 60°C / 140°F, a temperature alarm will appear in the DADman software and is also indicated by the red error LED on the front panel.

Network configuration

Control 01 and 02 are equipped with two Gigabit Ethernet connectors, and internally they feature an Ethernet switch, a controller part, and a part for the IP Audio option powered by Dante™. The network connectors can operate as two “parallel” connectors for the internal switch, or as dual connectors for redundant IP audio operation. In this case, controlling the unit is done via Net port 1.

Control 01 and 02 have two or three different IP addresses:

- One for the unit control via DADman (Main CPU).
- A second for the primary Dante IP audio in single mode.
- An optional third IP for the secondary Dante IP audio in redundant mode if that is utilised on the Net 2 connector.

The factory default IP setting of the controller port (Main CPU) of the Control 01 is DHCP. This IP address can be changed manually via DADman or set to be automatically assigned by a DHCP server / router on the network.

Control software installation

The DADman control program operates on any Windows- or macOS-based computer and is frequently updated to ensure compliance with the latest OS versions.

This section will take you through the installation procedure for the DADman computer control program. Control 01 and 02 are controlled from a PC or MAC via the Thunderbolt 3 connection or by a network connection.

- For control via a network connection, the PC / Mac and Control 01 or 02 units must be connected on the same subnet, e.g. 255.255.●●●.●●●.
- For control via Thunderbolt 3, the DAD Thunderbolt 3 driver must be installed.

Installing the DADman remote control program

1. Visit <https://www.dynaudio.com/control>, select your product, and click Download on the product page. Please note that there are two separate program downloads: one for Windows and one for macOS.
2. Install the DADman software following the provided instructions from the installer.
3. Create a shortcut for the DADman program on the desktop.
4. Double-click on the DADman icon and launch the DADman application.

Connect your Control 01 or 02 to DADman

Control 01 and 02 can be controlled via Thunderbolt or Ethernet. At the first start-up, the DADman window may be blank as no units are yet connected. In the top menu bar, select Tools > Device List, and the window will display a list of the discovered units. If the unit is connected via Thunderbolt, this will appear in the list. If there is no Thunderbolt connection, the units can be connected via Ethernet. If a unit on the Ethernet does not appear in the list, apply "Refresh" to discover the Control 01 over Ethernet. The Device List window is shown in Figure 1. A unit will always be discovered, but depending on your network configuration, it must be set to either DHCP or Manual IP addressing. The unit type displayed is "PROCNT".

In order to attach the unit to DADman, the connect box has to be checked.

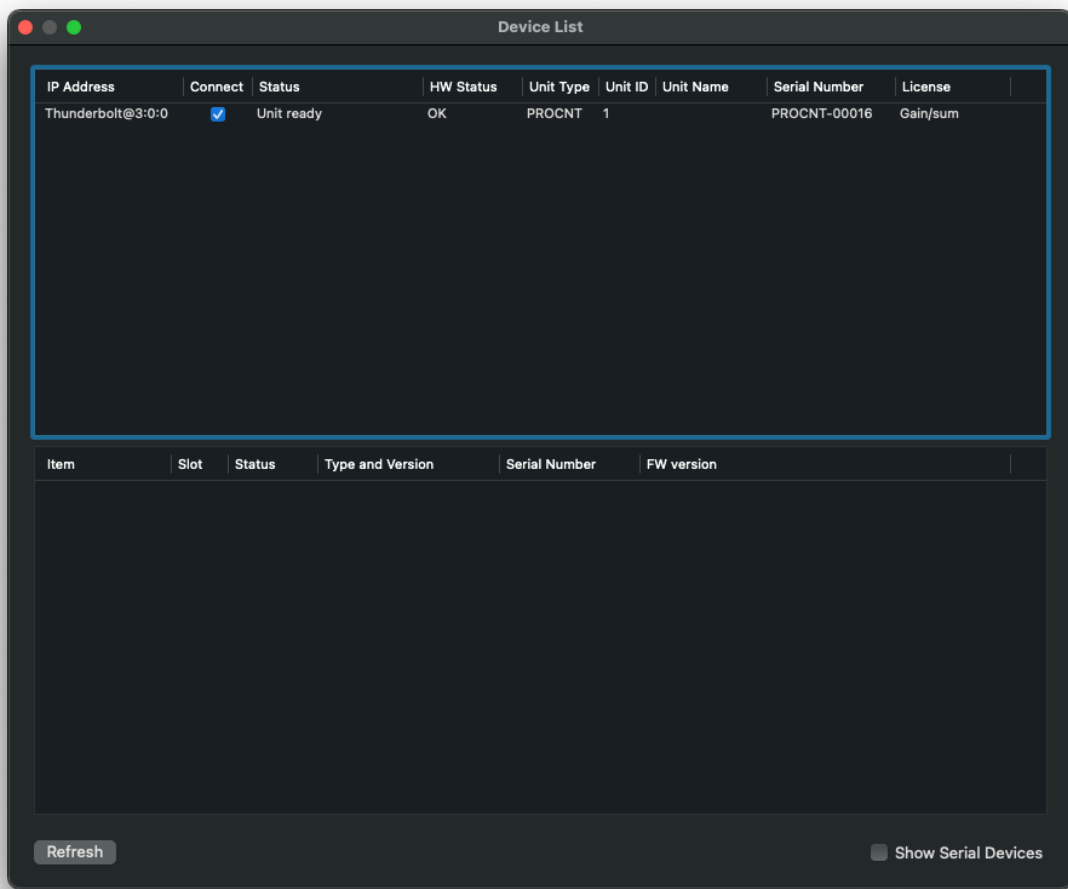


Figure 2: DADman Device list

NOTE:

If the DAD Thunder|Core Thunderbolt driver is installed on the computer where DADman is running, the software will automatically connect via Thunderbolt to Control 01 or 02 and not via Ethernet.



Assigning the IP address for the computer and the Control 01 and 02

When the DADman program is installed, you can finalise the network configuration of Control 01 or 02. You have the option of using fixed IP addresses or IP addresses assigned via DHCP. DHCP can be auto-assigned via the Ethernet port by itself or via an external DHCP server, which provides IP addresses for all units on your network.

Fixed IP address

You must have a preferred range of IP addresses and a network mask for the computer network, as well as the connected Control 01 and 02 units.

1. Configure your computer's IP address and network mask via the computer control panel to e.g. 10.0.7.25 | 255.255.255.0

Select Control 01 or 02 in the DADman Settings / Device List menu by right-clicking on the unit line and selecting "Network settings".

2. In DADman, configure each Control 01 or 02 in turn with a unique IP address and the preferred network mask, e.g. 10.0.7.21 | 255.255.255.0. In this window, you can also configure the Dante IP audio network settings.

When you are done, you can connect more than one Control 01 or 02 to the network, and they will appear in the DADman Device List.

Automatic IP address

To automatically assign IP addresses to Control 01 and 02, you must have a network with a DHCP server that will allocate the IP addresses; otherwise, the IP addresses will be self-assigned.

Configure your computer's IP address via the computer control panel to use DHCP. Select the Control 01 or 02 in the DADman Tools / Device List menu by right-clicking on the unit line and selecting "Network settings". If you have more Control 01 or 02 units connected, they will all be configured with an IP address via DHCP.

Once the DHCP system has allocated an IP address to the unit, it will appear in the DADman Device List with the name PROCNT.

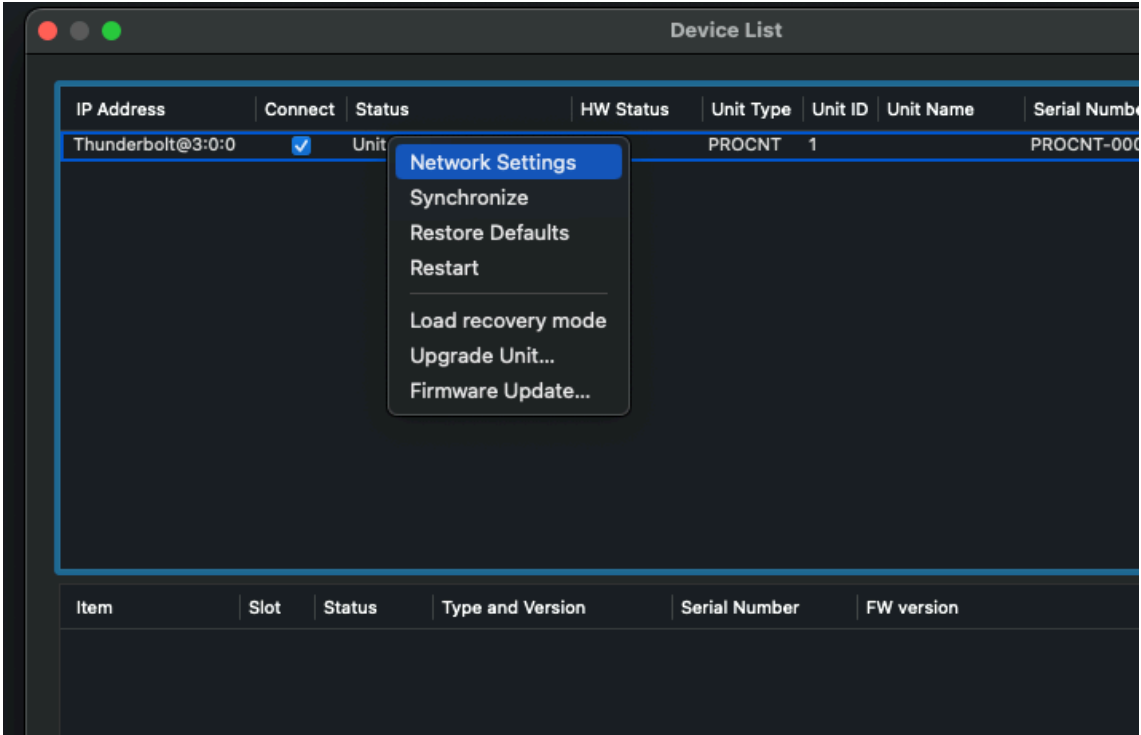


Figure 3: DADman Device list with settings

NOTE:

To ensure the proper function of Control 01 and 02, the routing and sample rate configuration must be set correctly via DADman.



Installation of Thunder | Core driver for macOS

The driver software must be installed completely before it can function correctly.

When you install the driver, it is of no importance whether units or other peripheral devices are connected to the Thunderbolt 3 / USB-C port on the computer. In the process described below, no devices are connected before installation.

This is the installation sequence:

1. Copy the driver .pkg file to the computer desktop and double-click to start the installation.
2. Follow the installation instructions. Click *Next* and then *Install*.
3. Enter Administrator password and click *Install*.
4. If the driver has not been installed before on the computer, you get the message "System extension blocked". Click on *Open Security Preferences*.
5. In the "Security and Privacy" window, you may have to click on the lock symbol in the bottom left corner, unlock settings, and click *Allow*.
6. Restart the Computer and open the Thunderbolt 3 driver application, and connect the Control 01 or 02 Thunder|Core interface to the USB-C / Thunderbolt 3 port on the Computer. Ensure you are using a high-speed (20 Gbps) Thunderbolt 3 USB-C cable.

For more information on how to install and configure the Thunderbolt 3 driver, please refer to the Thunder|Core installation guide at <https://www.dynaudio.com>.

Once the driver is installed, the device can be attached via the setup window.

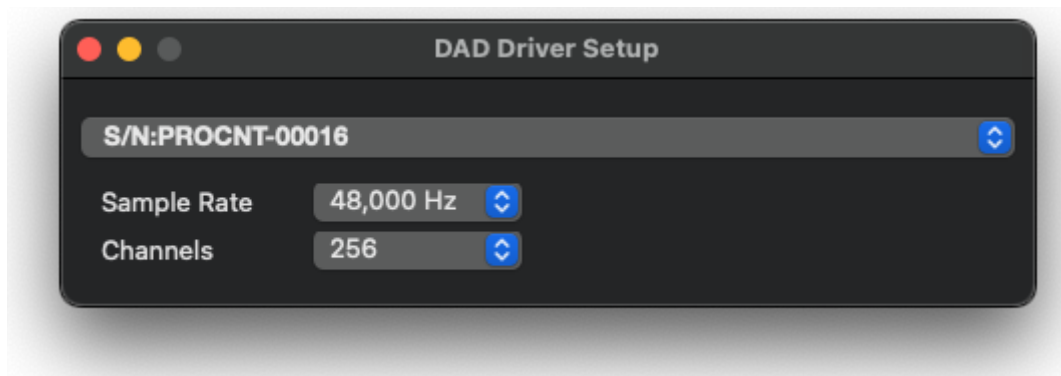


Figure 4: DAD Driver setup window for macOS

Installation of Thunder | Core ASIO driver on Windows PC

The driver software must be installed completely to function correctly.

When you install the driver, it is of no importance whether units or other peripheral devices are connected to the Thunderbolt 3 / USB-C port on the computer. In the process described below, no devices are connected before installation.

This is the installation sequence:

1. Copy the driver .msi Windows installer file to the computer desktop and double-click to start the installation.
2. Follow the installation instructions. Click Next and then Install.
3. Once the driver is installed, open your audio application and choose the Digital Audio Denmark ASIO driver.
4. To configure the ASIO driver, open the ASIO dialogue window in the audio configuration section of your audio application.
5. Configuration can be done on the parameters shown in Figure 5.

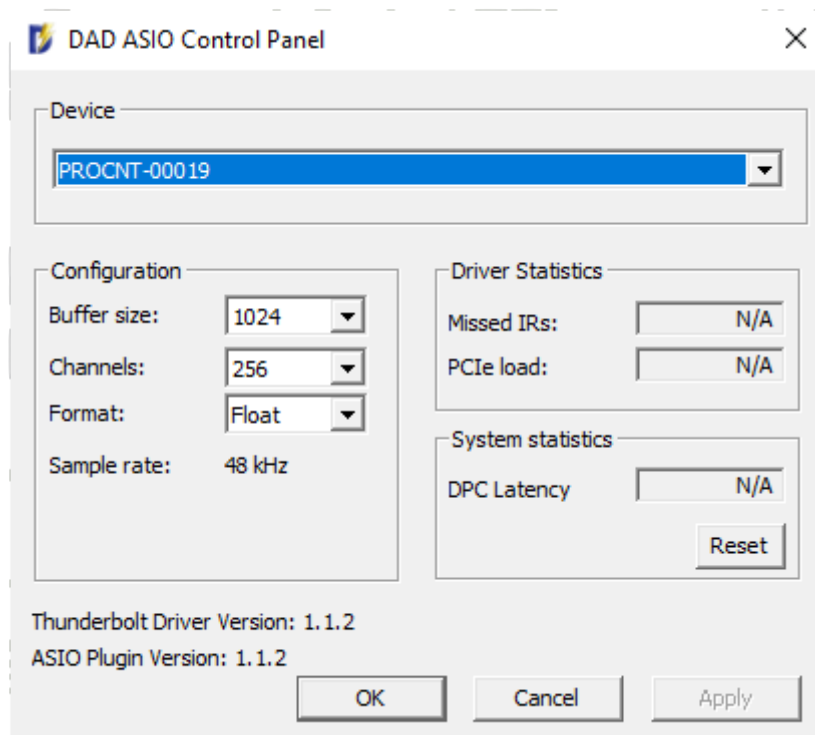


Figure 5: ASIO driver configuration window

NOTE:

The DAD ASIO control panel is accessible as a stand-alone configuration window or, if your DAW audio application supports this, from inside the audio configuration dialogue.

Operation

Control 01 and 02 are controlled from a Mac or Windows computer via the Thunderbolt connection or the Ethernet port on the rear panel (Net 1) and configured by the DADman software running on the computer. On the front panel, you can monitor some of the primary settings.

On the right side of the unit, there are two ¼-inch stereo jack connectors for headphones. The headphone level and configuration are managed via the DADman software, where the outputs can be attached as headphone monitor outputs managed by the Pro|Mon monitor profile in the DADman software, enabling very flexible monitoring configurations, as well as integration to the Control Link monitor operation module and Avid EUCON™ for control from Avid EUCON-enabled devices.



Figure 6: Front panel layout

Front panel layout

1. Dynaudio Logo. Green LED indicates that the unit is turned on and flashes when going into standby (off).
2. On / Standby button. Note that the unit automatically returns to the latest power state (on or standby) if it is power cycled via the mains power. Press once to turn the unit on. Press and hold while the power LED is blinking to turn the unit into standby-off mode.
3. External sync source two-colour indicator. The green LED indicates that the external sync source is functioning properly, while the red LED indicates an insufficient sync signal.
4. Internal sync indicator. The green LED shows the internal or external sync source.
5. Error indicator: Red LED. Indication is related to hardware performance and can be triggered by temperature overload, fan error, DAD I/O card failure, or general internal boot error. A more specific error indication will be visible in DADman.
6. Two stereo and ¼-inch jack connectors for stereo headphone output.

Rear panel connections

Below is the layout of the rear panel of the Control 01 and 02.

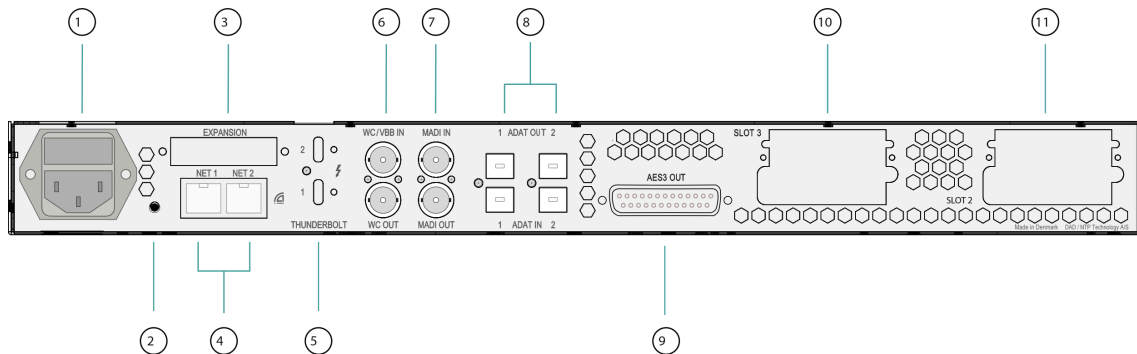


Figure 7: Rear panel layout

1. Mains power connector.
2. "Reconfig" button. Please refer to the section below for further details.
3. Expansion slot for optional dual MADI I/O mini module via optical or coaxial SFP modules. The module also supports our DADlink format.
4. RJ45 Ethernet connectors. Two ports for Control and Dante AoIP. Connectors can be set in switched or redundant mode for Dante. In redundant mode, the control network has to be connected to port 1.
5. Thunderbolt 3 interface for connection to a computer and for an expansion unit or other peripheral interfacing.
6. Word Clock or Video Black Burst synchronisation input (configurable), BNC connector, and Word Clock output.
7. MADI I/O BNC connectors.
8. Two sets of TOSLINK optical ADAT input and output connectors. Input can also be set to S/PDIF.
9. AES 3 output DB25 female connector.
10. Slot 3 for Optional multi-format DAD I/O Cards (Slot 1 is the internal card).
11. Slot 2 for Control 02 analogue line outputs.

Digital I/O and Network Connections

Dual MAD I SFP I/O mini-module (optional)

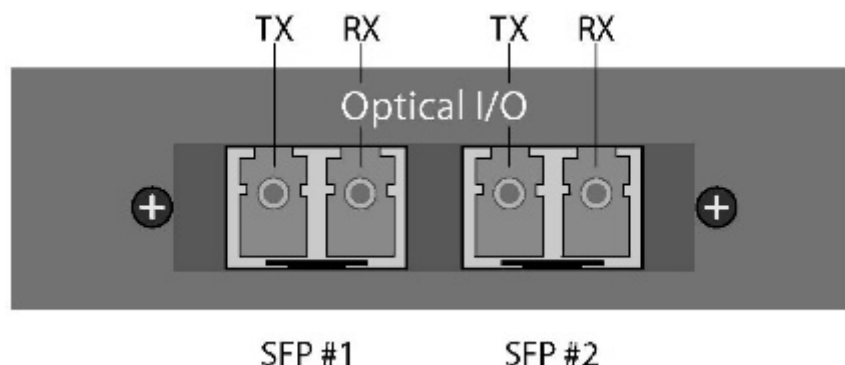


Figure 8: Dual MAD I SFP I/O mini-module

The Dual SFP module can operate as a MAD I interface or as DADlink. The Dual SFP module can be installed with one or two “[Small form-factor pluggable](#)” (SFP) transceiver modules supporting Optical LC connection or mini coax HD-BNC electrical connection. The mini coax HD-BNC electrical SFP connection works only with MAD I. The optical SFP modules are standard types that support single-mode or multi-mode optical fibres of various types, as well as different wavelengths.

For MAD I, typically 1300nm types are used. Each SFP module has a receiver and a transmitter part and can be used for MAD I audio I/O, DADlink, or a combination of both. When using DADlink optical SFP modules, they have to be Gigabit/1000BASE types. For MAD I optical SFP modules, there can be both 1000BASE and 100BASE types. The right part of the SFP connector is the receiver, and the left part is the transmitter.

Dual Gigabit Ethernet RJ45 connectors

The dual Ethernet connectors are used for remote control of the unit via DADman software over the network, as well as for Dante IP audio connections. Net 1 should be used for remote control and the primary Dante interface, while Net 2 can be used for either the secondary Dante interface or as a switched port for connecting other devices.

Pin 1	BI_DA+
Pin 2	BI_DA-
Pin 3	BI_DB+
Pin 4	BI_DC+
Pin 5	BI_DC-
Pin 6	BI_DB-Pin 7
Pin 8	BI_DD-

Table 1: Dual Gigabit Ethernet RJ45 connectors

Thunderbolt 3 connectors

Two USB-C type connectors for connecting via Thunderbolt 3. The two connectors have the same functionality. One can be connected to the computer, and the other to an additional audio interface for expansion or to a standard USB-C peripheral device that provides non-audio functionality. Two chassis holes enable the use of ThunderLok 3L Thunderbolt Connector Retention clips.

NOTE:

A high-speed Thunderbolt 3 cable has to be used for interconnection. The cable should be the following type: *Thunderbolt 3 20 Gbps or 40 Gbps USB-C cable*, and preferably Intel Certified.

MADI connectors

Coaxial BNC connector for input and output of MADI signals via 75 Ohm Coax cables.

Sync connectors

Coaxial BNC connector for Clock input synchronisation, and Word Clock output. The input clock format can be Word Clock or Video Black Burst (VBB).

ADAT Connectors

Two TOSLINK Inputs and two outputs support ADAT for 16 channels of IO. S/PDIF is supported on input only.

AES3 Output Connections (D-sub Connector)

There are 8 AES3 output connections, totalling 16 audio channels, available via a 25-pin D-sub female connector on the rear panel. The connections are balanced, as shown with **Tascam** pinning below.

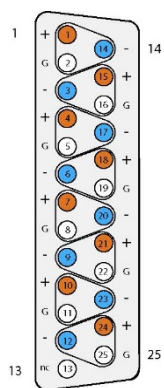


Figure 9: AES3 Output Connections

1	AES3 OUT 8 +	14	AES3 OUT 8
2	GND	15	AES3 OUT 7 +
3	AES3 OUT 7 -	16	GND
4	AES3 OUT 6 +	17	AES3 OUT 6 -
5	GND	18	AES3 OUT 5 +
6	AES3 OUT 5 -	19	GND
7	AES3 OUT 4 +	20	AES3 OUT 4 -

Table 2: AES3 Output Connections

8	GND	21	AES3 OUT 3 +
9	AES3 OUT 3 -	22	GND
10	AES3 OUT 2 +	23	AES3 OUT 2 -
11	GND	24	AES3 OUT 1 +
12	AES3 OUT 1-	25	GND
13	N.C.		



Analogue I/O Connections on Control 02 and optional DAD I/O Cards

The Control 02 has the analogue line output card installed, providing 8 outputs for analogue speakers.

There are two slots available for optional DAD I/O expansion cards. There are many options available, including 8-channel mic / line inputs, 8-channel line outputs, additional AES, SDI, and additional Dante IP ports. If an analogue card is installed, the pinout follows the Tascam standard.

1	AIN/OUT 8 +	14	AIN/OUT 8 -
2	GND	15	A/IN/OUT 7 +
3	AIN/OUT 7 -	16	GND
4	AIN/OUT 6 +	17	AIN/OUT 6 -
5	GND	18	AIN/OUT 5 +
6	AIN/OUT 5 -	19	GND
7	AIN/OUT 4 +	20	AIN/OUT 4 -
8	GND	21	AIN/OUT 3 +
9	AIN/OUT 3 -	22	GND
10	AIN/OUT 2 +	23	AIN/OUT 2 -
11	GND	24	AIN/OUT 1 +
12	AIN/OUT 1-	25	GND
13	N.C.		

Table 3: Analogue I/O Connections on Control 02 and optional DAD I/O Cards

Reconfig button

The “Reconfig” button on the back of the Control 01/02 should not be used during normal installation. It is generally intended as a last-resort recovery function in case something goes wrong during the programming of IP addresses or a software upgrade, e.g., an unintended power loss. It allows the Control 01/02 to start in various “basic” modes so it can be restored without having to be returned to the factory.

The “Reconfig” button is accessed via a hole in the rear panel using a pen or a similar pointed item. A green LED is visible through the hole. When the “Reconfig” button is activated, the LED will light up, indicating the two reconfig modes of the CONTROL 01.

Reconfig mode

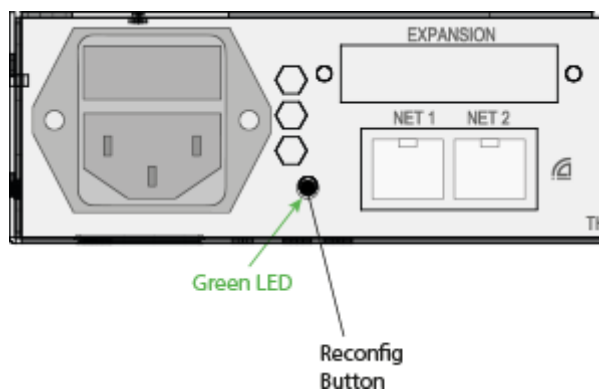


Figure 10: Reconfig button

Reconfig button pushed while the unit is powering up – Green LED turns ON.

The Control 01/02 enters a recovery mode. In this mode, only a basic boot software is operative in the unit, and new software can be downloaded via the DADman software. This mode is used if the software in CONTROL 01 is not operational or malfunctioning for some reason. The IP address settings of the unit are the last setting used in the unit.

Reconfig IP short push while the unit is in reconfig mode and Green LED is on – Green LED turns OFF.

The Control 01/02 remains in reconfig mode as described above. The IP address settings of the unit are, however, set to DHCP. If there is no DHCP server on the network, the Control 01/02 will default to IP address 10.0.7.20 / 255.255.0.0 after approximately 2 minutes.

The selection of either of the two recovery modes is fixed after selection. The Control 01/02 will start with a basic boot software and IP configuration. It will not be operational until a proper firmware has been downloaded via the DADman software and the device has been restarted. By enabling recovery mode with the default IP address and network configuration, the unit can always be identified on a network via the default setup.

NOTE:

Note that the IP address referred to is the IP address of the controller/management interface of the unit. This is not the IP address of the IP audio interface if one is installed. This IP address cannot be accessed in Recovery or Restore Defaults mode.

Specifications

Audio Specifications

Analogue Headphone output	
Modulator resolution, format	32 × oversampling, 32-bit PCM
PCM (DXD) sample rates	44.1, 48, 88.2, 96, 174.4, 192, 352.8, 384 kHz
Dynamic range (A)	> 120 dB
THD+N(A)	< -100 dB @ -3 dB FS
Cross talk	< 110 dB
Headphone impedance	18 to 600 Ohms
Output impedance	< 1 Ohm
Maximum output level	Adjustable from -80 dBu to 19 dBu in steps of 0.1 dB
Analogue Line output (Control 02 only)	8 output channel pristine D/A conversion
Sample rates	44.1 to 384 kHz and DSD 64/128
Dynamic Range	> 125 dB
THD+N	< 115 dB @ -3 dB FS
	Gain staging made with relays

Digital I/O and Synchronisation

Digital I/O formats / Supported sample rate	
Dante™ IP audio and ADAT/SMUX	up to 192 kHz
Thunderbolt 3 and MADI	up to 384 kHz
DADLink	up to 384 kHz
Synchronisation	Word Clock, Video Black Burst, Dante, ADAT, and MADI
Network Interface	2 × 1000BASE-T, RJ45 connector, 4-pair connection
Thunderbolt 3 Interface	2 × USB-C type connectors, supporting link functionality and 15 W power on each port.
DADLink Interface	2 × SFP connectors for Gigabit SFP modules, supporting multi-mode LC optical fibre connections.
	Latency is below 1 microsecond between interconnected units.
	The overall latency is defined by the system delay set for all the units, which is usually 7 samples. All I/O connections across units are 100% aligned in phase.
Channels and Sample rates per link	128 channels @ 44.1 and 48 kHz
	64 channels @ 88.2 and 96 kHz
	32 channels @ 176.4 and 192 kHz
	16 channels @ 352.8 and 384 kHz

NOTE:

You can double the channel count by using two fibre links.

Electrical Specifications

Power consumption	
Digital section	15 W
DAD I/O Options	30 W maximum
Thunderbolt power	2 × 15 W maximum
Mains	90 W maximum
Input voltage	90 to 260 VAC
	100 to 240 VAC Nominal, 47 to 63 Hz
Mains fuse, mounted in an IEC connector	1 A, T1AH/250V
Safety compliance	
	IEC 62368-1:2020+A11 2020
	The power supply cord must be at least a light sheathed flexible cord according to IEC 60227 (designation 60227 IEC 52) and include a protective earth conductor with green-and-yellow insulation. Cross-sectional areas min. 3 × 0.75 mm ²
Mains line plug type	
110 to 125V	UL817 and CSA C22.2 no 42
220 to 230V	CEE 7 page VII, SR section 107-2-D1/IEC 83 page C4
240V	BS 1363 of 1984. Specification for 13A fused plugs and switched and unswitched socket outlets.

Mechanical Specifications

Chassis standard	19 inches, 1 rack unit
Chassis depth, without connectors mounted	32 cm / 12.6 inches
Chassis body width	43.5 cm / 17.2 inches
Weight	2.4 kg / 5.3 lbs.

Environmental Specifications

Operating Temperature	0 to 45° C / 32 to 113° F
Humidity	20 to 85% (non-condensing)
EMC compliance	
	- IEC 55032/CISPR 32
	- IEC 55035/CISPR35
	- IEC 61000-3-2
	- IEC 61000-3-3
	- VCCI-CISPR 32
	- ICES-003
	- AS/NZ CISPR32
	- FCC part 15, Subpart B

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