C10 Digital to Analog Converter

User Manual

V1.0

Dear Client,

We are honored that you have chosen the CH C10 Digital to Analog Converter. Our team has put all of our efforts into designing and manufacturing this top quality versatile and future-proof product and is proud to present it to you. We hope your C10 will bring you uncountable hours of emotion from your musical collection.

But before starting your musical journey, we kindly ask you to pay attention to the information contained in this manual. The C10, as you will discover in the following pages, is a Swiss precision product designed for ultimate performance and flexibility. However, reaching sonic excellence requires your unit to be setup and operated correctly and this is what this manual is all about. If you have any questions or require assistance, please don't hesitate to contact your authorized dealer.

We hope you will enjoy your C10 Digital to Analog Converter for many years.

The Concert has just begun...

Cossy F.

Heeb T.

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1 Introduction

CH products are designed and manufactured in Switzerland by CH Precision Sàrl. We use sophisticated digital processing combined with fully discrete, fully balanced, fully complementary, ultra-short signal path analog circuitry and extensive software monitoring and control to ensure the highest possible levels of performance, operational consistency and versatility.

As a result, your C10 offers a number of operational features that are unique and probably unfamiliar. For that reason it is essential that you fully understand every aspect of the C10's operation and options if you are to enjoy its maximum possible performance.

As a 'card-cage' design, users can specify what inputs they require when ordering the C10, and can add additional digital inputs at a later date as required. Please also note that the C10 can be used with single dedicated power supply (C10 standard) or it can be used with dual dedicated power supplies (C10 Mono). The C10 can also be combined with the T1/T10 Time Reference clock and a CH Precision CD/SACD player/transport, allowing users to enhance or expand performance according to their musical needs and ambitions. The basic instructions for handling and placing the units are identical in all cases. Configuring multi-enclosure systems will be covered in the appropriate section of this manual.

C10 Digital to Analog Converter

2 Installation guide

This manual will lead you through each step of the installation and setup procedure, in a clear and logical sequence. Although the operation and options might seem complex, they will quickly become second nature;

However, because of the sheer range of options available it is easy to overlook something unless you approach setup and configuration in a systematic way. If you take the time to follow the manual, it will ensure that you become completely familiar with the C10's many options and that your DAC/Converter delivers the best possible performance.

2.1 Safety notice

Make sure to observe the following rules:

- Always handle with care. The C10 units are very heavy, so have someone help you when moving them around. Improper handling of the load could lead to risk of injury.
- Install your C10 on a stable base.
- Do not install your C10 unit near water.
- Do not expose the unit to any kind of liquid.
- Use only a fully grounded AC power cord (with – live, neutral and ground).
- The building as well as the socket on which the C10 will be installed must be connected to earth.

- Do not install in direct sun light or near any heat source such as radiators or other sources of significant heat.
- Do not install in a confined space and make sure sufficient air can flow around the unit.
- Do not operate under high ambient temperatures (>35°C) or with extremely high humidity (>85%) such as in humid cellars.
- Only use options and accessories specified or recommended by the manufacturer.
- Do not open the unit nor try to service it by yourself. Do not try to install any option board by yourself. Always refer to a qualified technician for service, maintenance or upgrades. Failure to do so will void the unit's warranty.
- Symbols used:


High Voltage


Physical Earth


Operator's manual


Warning


Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.


Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.


Apparatet må tilkoples jordet stikkontakt.


Apparaten skall anslutas till jordat uttag.

2.2 Unpacking

The C10's cartons are large and contain both the components and all of their accessories. You will need an open, preferably carpeted area in which to unpack them. Please also ensure that the rack or support space on which the C10 will be placed has been cleared and cleaned before you start. At this point it is also worth ensuring that the connectors on any interconnect cables are cleaned and that the power to your system is turned off. Each carton consists of an inner box and outer sleeve. It is easiest to empty one box at a time, before reassembling it to save space.

- Once you open the inner box, remove Quick Start Guide, Topology Diagram the power cord, the blue suction cup and the top layer of white foam packaging. Inside you will see the component chassis and various accessories.
- With a helper, carefully lift the C10 out of the box and place it to one side. Then carefully remove the plastic bag in which it is sealed.
- Remove the small, brown Accessory Pack and place it with the C10. Also remove the four composite leveling/grounding spikes. These are inserted into the lower foam block, are easy to miss.
- We recommend storing the Accessory Pack in a readily accessible place, so don't put it back in the carton with the plastic bag when resealing it.

2.3 Package contents

Your C10 should arrive in two substantial cartons. Once unpacked these cartons and packaging materials should be stored safely in case you ever need to transport your units. When moving or transporting the C10 units, this should always be done in the original packaging.

The audio chassis carton should contain:

- The C10 Digital to Analog Converter
- A Quick Start Guide and Topology Diagram
- Four two-part hardened titanium/polymer spikes
- A suction cup (used to remove the four top covers)
- An accessory box containing:
  - an infrared remote control
  - a spike adjustment screwdriver
  - a Torx T-10 screwdriver
  - four support discs
  - four stacking caps
  - a USB stick containing the latest CH Precision firmware

The power supply chassis carton should contain:

- The C10 Power Supply
- Four two-part hardened titanium/polymer spikes
- The mains power cord (adapted to location)
- Four cables to connect the audio unit to its power supply.
- An accessory box containing:
  - four support discs
  - four stacking caps

In case of damage to either C10 chassis or missing components, please contact your authorized dealer immediately. If your C10 units are still very cold from transport, please let them warm up to room temperature in order to avoid condensation developing inside them.

2.4 Placing your C10 and installing the spikes

Before positioning your C10, it is worth taking the time to make a few preliminary decisions.

- Decide how many (and which) inputs you will use. Familiarizing yourself with (and making a note of) their position on the rear panel will be extremely useful when you come to actually make connections and name/configure those inputs.
- Decide whether you will use the CH Precision supplied levelling / grounding spikes. If an alternative system is to be used, please note that the lower part of each foot that is held by three screws can be removed to provide an easier access to the M10×1.5 central thread where a third-party system can be attached. Please note that the CH Precision casework is designed to support weight and ground energy in the corners only. If you choose to use third party supports they should be positioned in the same location as the unit's original feet and we do not recommend stacking components except using the supplied spikes and caps.
- If you do plan to use the CH spikes, use the blue suction cup to remove the four circular covers in the top plate of each unit. Gently insert the hardened titanium composite spikes into each exposed shaft and use the short red screwdriver to turn them enough to engage the threads at the bottom of each spike. Each internal thread is coated with a thin layer of grease during assembly to prevent galling between it and the titanium spike, but adding a thin coating of grease to each thread before insertion is still a good idea, making adjustment easier and more precise.
- Do not screw the spikes in too far at this point or they will protrude from the feet and potentially damage the supporting surface. Do not replace the top-caps yet.
- Check that the voltage selector switch on the unit is set to the correct local voltage and that the power switch is off (the "0" side depressed).

Now you are ready to place your C10. The chassis are heavy and the feet are fitted with rubber rings to protect the supporting surface, which makes it hard to slide the unit. Having a partner to help lift and place the devices will make things considerably easier.

For performance reasons linked to the radiation of the power supply, it is preferable to keep the power supply chassis and the audio part as far apart as possible.

- Place the power supply first, carefully planning the path to be taken by the two umbilicals before positioning the unit.
- Gently pull the umbilicals into position to be connected to the audio chassis, noting which is which thanks to the color identification rings.
- Move the audio unit as close as possible to the rack/support so that you can connect the umbilicals before moving it back into position. Connect the left umbilical to the left input socket and the right umbilical to the right input socket. The plugs on the umbilicals will only connect in one position, so turn the connector in the socket until you feel it engage and then gently push it home until you hear a locking sound.

DO NOT force the umbilical connectors into the sockets.

This will risk damaging the connecting pins and disable your C10.

- If you feel resistance when you insert the connector, check that you are trying to connect the proper pairs of umbilicals and connectors together. Please note that the two connectors have the same diameter but a different number of pins, so it is not possible to plug an umbilical in the wrong connector.
- Each C10 chassis is supplied with a set of four support discs. These have a groove machined in the upper face that fits over the rubber ring in the underside of each foot. Lift each corner of the chassis in turn and position the disc beneath each foot. The groove that interfaces with the rubber ring will ensure that the footer disc stays in place if you slide the unit.

- As well as making the units easier to position, the support discs can also offer a superior interface between the grounding spikes and the supporting surface. The spikes are designed to drain internally generated energy away from sensitive circuitry and into a dispersive support structure, but if the supporting surface is extremely hard or forms an impedance mismatch with the spike tips, the material and footprint of the support discs can function as a lossy mechanical buffer, easing the passage of mechanical energy out of the unit. As a rule, the support discs work well with very hard surfaces, but results will vary with system and supporting surface. Once set up and warmed up, compare the sound of the unit(s) with and without the discs in place.
- Use the red screwdriver to wind down each of the four spikes until you feel that they touch the surface underneath. You will feel a slight resistance due to the chassis' weight. Then turn each spike by the same amount, for instance one more full turn. This should ensure that the load is evenly applied on all four spikes.
- It is worth using a spirit level to ensure that the C10 is perfectly level. If it is not, adjust the spikes with the screwdriver. Once this is done, simply check that all four spikes show the same resistance to turning. This means that the spikes are rigidly coupled to the supporting surface/discs and equally loaded.
- Replace the top caps, using the suction cup to ensure that they are tightly into place.

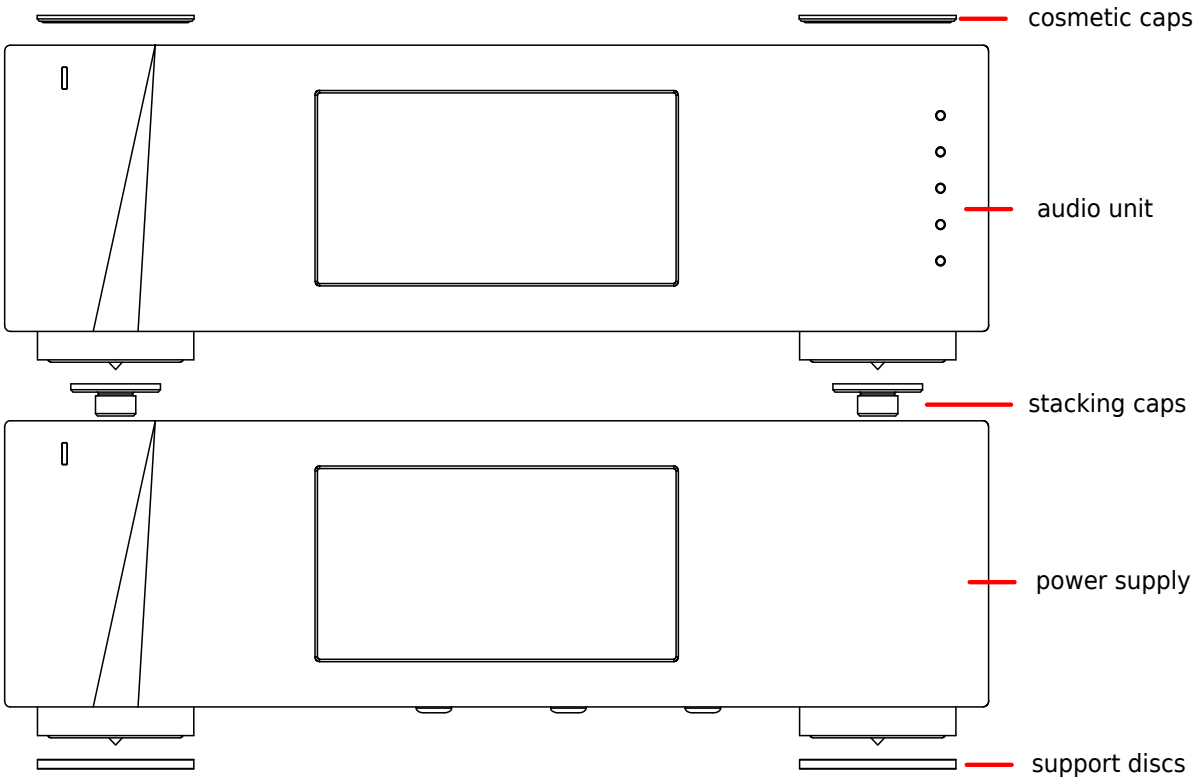
2.5 Stacking the C10 (or not)

Also included in the accessory packs is a set of stacking caps. These polymer inserts allow owners to stack the C10 chassis on top of other CH 1/10 Series components. The spikes and interface caps will ensure mechanical grounding of the stacked chassis. However, this will inevitably compromise performance to some extent and should only be done when space is at an absolute premium.

The optimum support for any CH unit is to mechanically ground it to a stable, dispersive structure, either using the supplied spikes or an after-market solution. If lack of space absolutely mandates the stacking of CH components, then using the supplied spikes and stacking caps will provide the best possible solution.

The stacking caps simply screw into the top of the spike wells, taking the place of the cosmetic caps. When a second unit is stood on top of them, its spikes can be wound down into the wells in the caps, providing a stable, safe and easily managed stacking option that improves mechanical termination and satisfies aesthetic and practical considerations. Make sure that you retain the cosmetic top caps and store them safely as you may well require them in the future if (or rather, when) your system or circumstances change.

Stacking the C10



3 Power Supply

All CH Precision 10 Series are created with optimized, dedicated external power supplies. This design allows for much better performance. It is important to connect the power supply to the audio unit carefully.

In this chapter you can find all the information related to the power supply of your C10:

- Mains supply
- Fuses and operating voltage
- Audio unit to power supply connection.

3.1 Mains supply

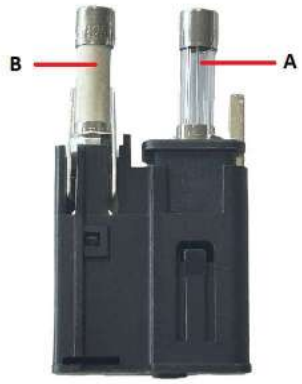
The C10 includes the power cord for your region. If you wish to use another power cord, make sure to use a fully grounded AC power cord (one with three terminals – live, neutral and **ground**).
Make sure that the mains voltage selection of the unit matches your local mains voltage.

Make sure your C10 power supply is disconnected from the AC supply/wall socket in the following cases:

- When making connections (we also recommended disconnecting the rest of the system from the AC supply when installing signal and speaker cables).
- When cleaning.
- During thunder storms.
- When left unused for a long period.
- Ensure that the AC supply socket to which the unit is connected is accessible.

3.2 Fuses and operating voltage

To change the fuses, switch off the C10 and remove the power cable.
The fuse holder is located to the right of the IEC power input.



Fuse values vary with operating voltage:

- 230VAC – Fuse A : T50mA/250Vac. Fuse B : T2.5A/250Vac
- 100/115VAC – Fuse A : T100mA/250Vac. Fuse B : T5A/250Vac

Never change the selectable voltage during operation.
To change operating voltage, switch off the C10 and remove the power cable.

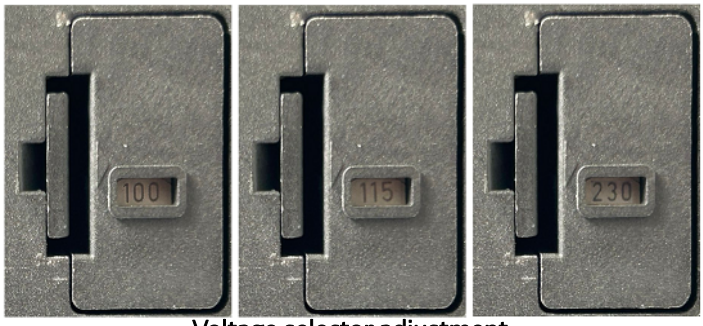
Before changing the operating voltage first check the local voltage.

To change the operating voltage, remove the fuse holder from the C10 chassis.

Fuse A (see picture above) is located in a sleeve that can be slid out of the body of the fuse holder: by turning the sleeve and reinserting it, the orientation of the contact pins is altered, switching the operating voltage. The selected voltage will appear in the small window in the base of the fuse holder.

Make sure that if required, you change the fuse values to match the new voltage (as above).

You can now reinsert the fuse holder.



Voltage selector adjustment

The C10 will be delivered to you with a voltage setting already defined according to the “normal” voltage in your country. If you use a different voltage, it will be up to you to ensure that you have the correct voltage setting.

3.3 Audio unit to power supply connection

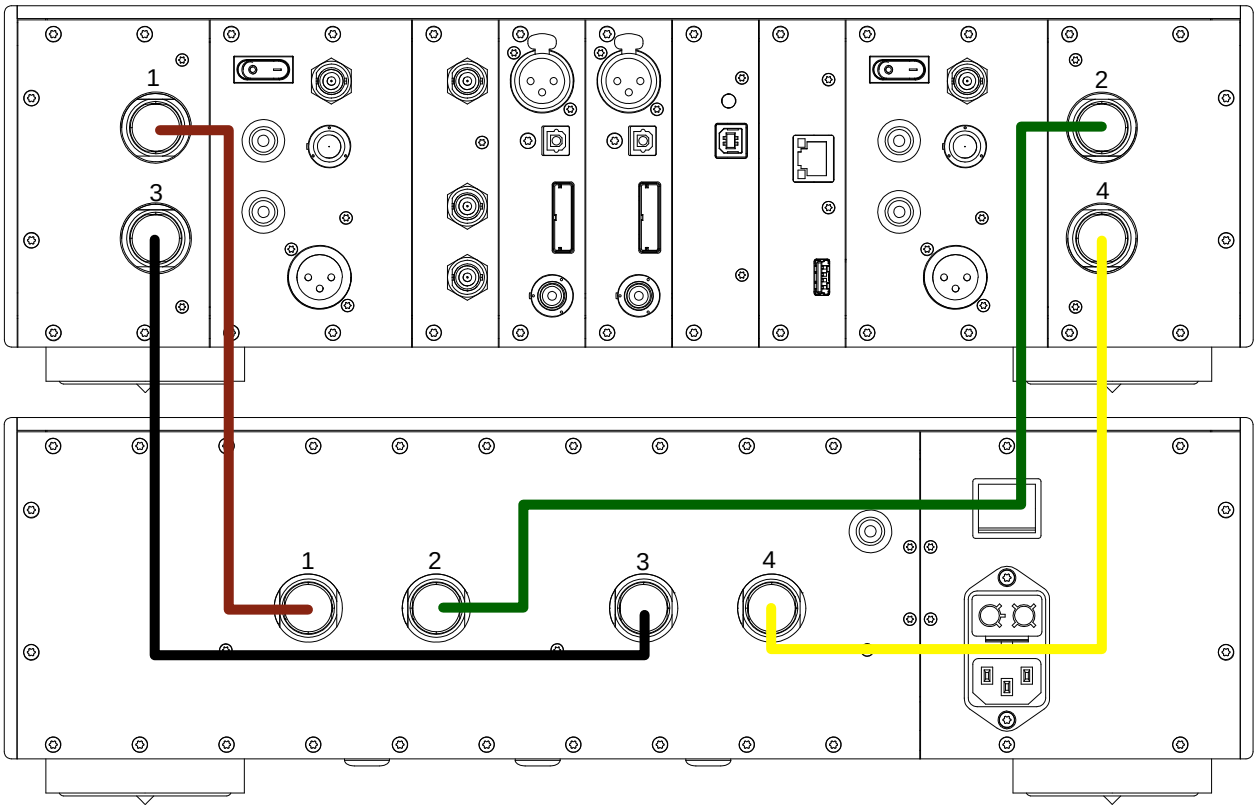
3.3.1 Power wiring

For proper connection of your power supply, follow the wiring below.

① Right Analog Power Supply, 12 pins, Brown
② Left Analog Power Supply, 12 pins, Green
③ Right Control Power Supply, 18 pins, White (Black on documentation)
④ Left Control Power Supply, 18 pins, Yellow

3.3.2 C10 Standard

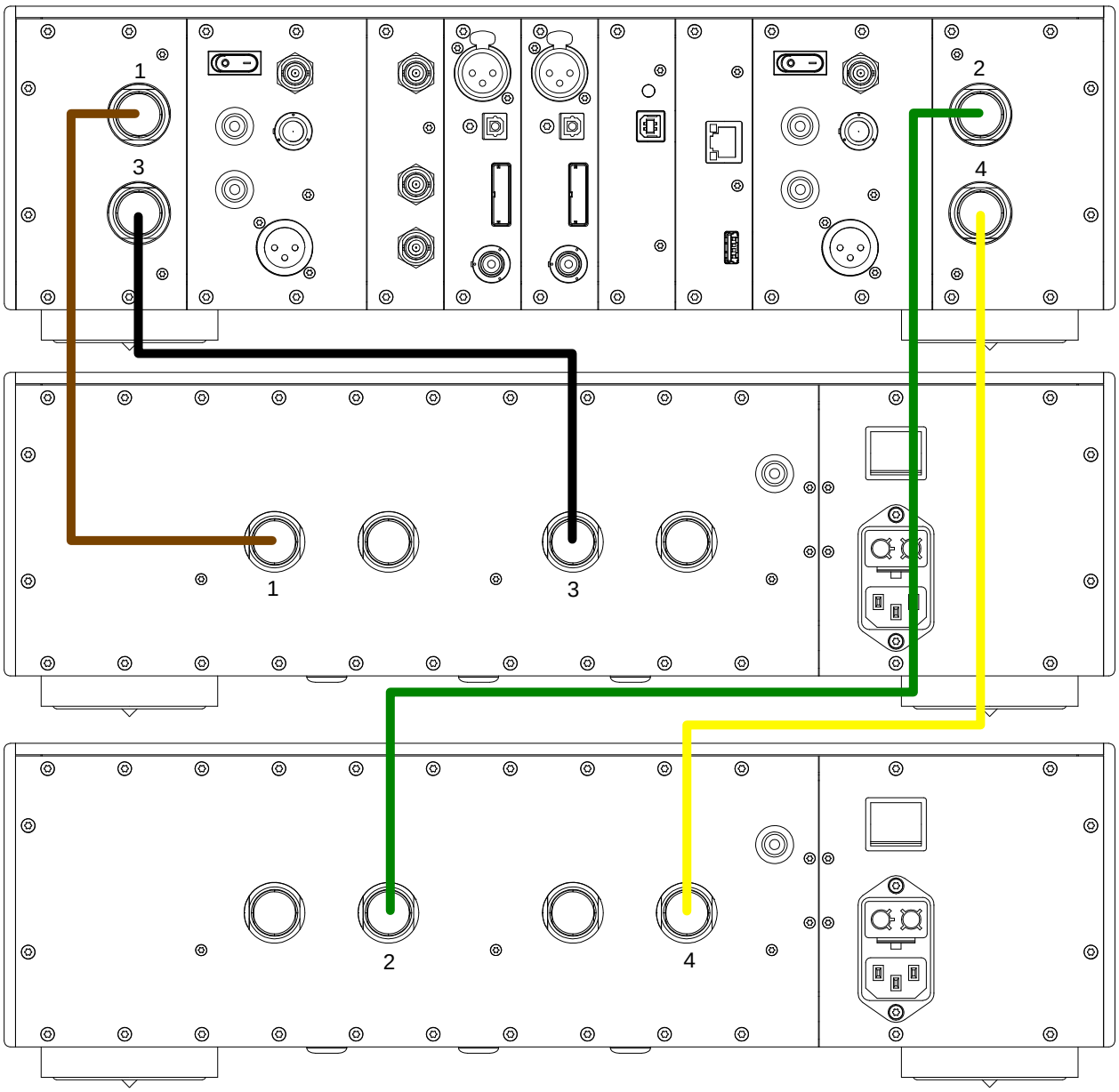
C10 wiring with one power supply.



Standard power scheme

3.3.3 C10 Mono

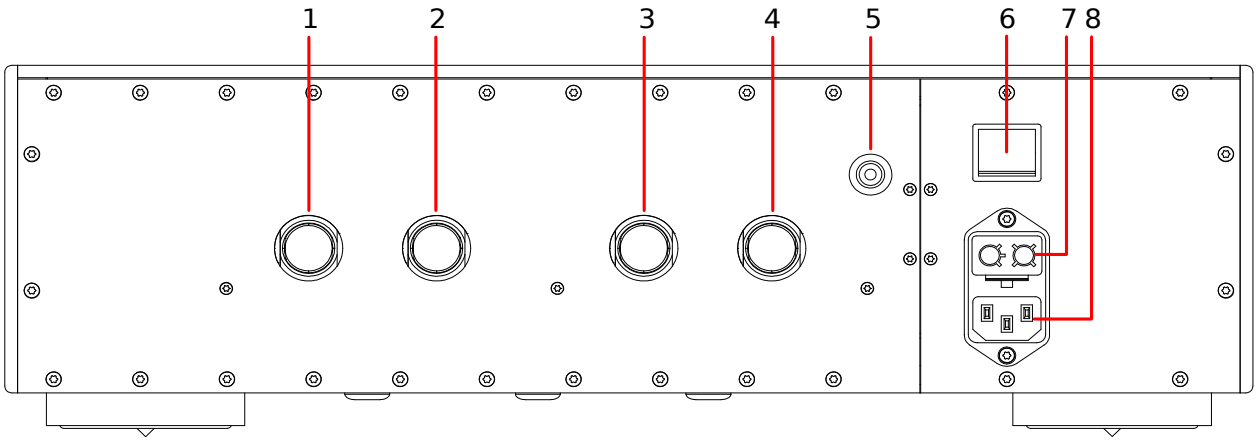
C10 wiring with two power supplies.



Mono power scheme

4 Connections

You are now ready to connect your C10 to your system. Given the differences between systems and the modular nature of the C10, with its range of input options, your range of source components and system configuration will almost certainly differ from the example below. However, we have selected a 'fully-loaded' C10 to show the widest range of connections.

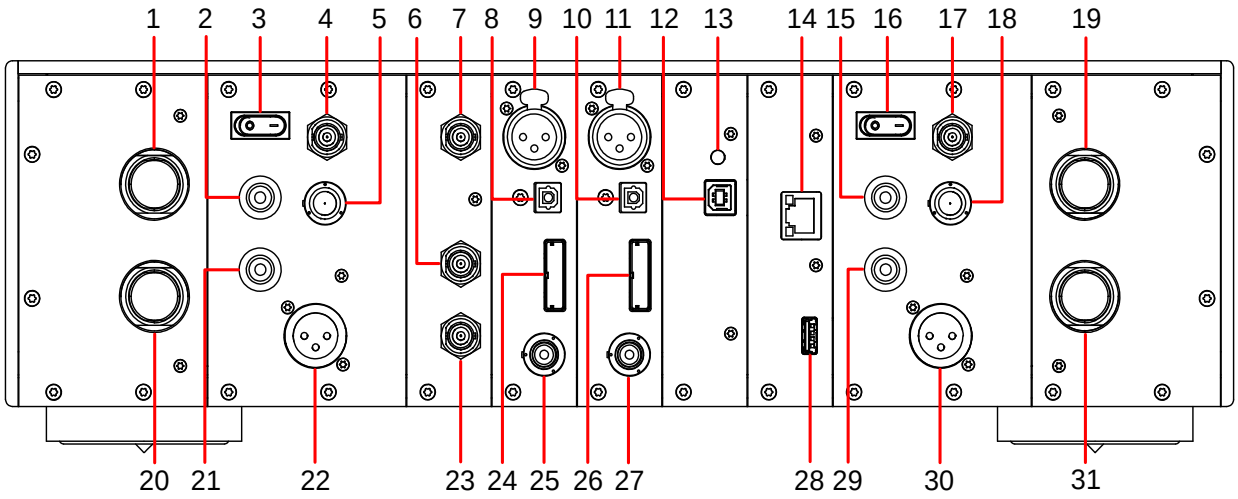


Rear panel connections, power supply part

1. Right analog power supply
2. Left analog power supply
3. Right control power supply
4. Left control power supply
5. Digital ground / chassis earth connector. Can be used as an earth reference voltage level
6. Power on/off switch
7. Power fuse and voltage selection
8. Power cord socket

WARNING

The ground sockets (yellow/green) are not used to transfer power (audio unit and power supply). It should only be used as a reference voltage level.



Rear panel connections, audio part

1. Right analog power supply
2. Right analog ground connector. Can be connected to another ground in your audio system if needed
3. Right ground lift: switch on to connect signal ground (analog ground) to earth (digital ground)
4. Right 50 Ω BNC single-ended analog output for right channel
5. Right 75 Ω RCA single-ended analog output for right channel
6. BNC 75 Ω clock output 1. [optional CLOCK_SYNC board]
7. BNC clock input. Provides 75Ω or 50Ω input. [optional CLOC_SYNC board]
8. TOSLINK (S/PDIF) digital input [DIGITAL_IN_HD #1 board, here fitted in Slot 3]
9. AES-EBU digital input [DIGITAL_IN_HD #1 board, here fitted in Slot 3]
10. TOSLINK (S/PDIF) digital input [DIGITAL_IN_HD #2 board, here fitted in Slot 2]
11. AES-EBU digital input [DIGITAL_IN_HD #2 board, here fitted in Slot 2]
12. USB audio input socket [optional USB_IN board, here fitted in Slot 1]
13. USB audio status LED (Orange: playing, Green: ready: Red: booting: Off: unpowered) [optional USB_IN board]
14. Ethernet port for command interface [CONTROL board] or for audio playback and commands [optional ETHERNET-IN HD board]
15. Left Analog ground connector. Can be connected to another ground in your audio system if needed.
16. Left ground lift: switch on to connect signal ground (analog ground) to earth (digital ground)
17. Left 50 Ω BNC single-ended analog output for right channel
18. Left 75 Ω RCA single-ended analog output for right channel
19. Left analog power supply
20. Right control power supply
21. Right digital ground / chassis earth connector. Can be connected to another ground in your audio system if needed
22. XLR balanced analog output for right channel
23. BNC 75 Ω clock output 2. [optional CLOCK_SYNC board]
24. CH Link HD digital input [DIGITAL_IN_HD #1 board, here fitted in Slot 3]
25. Coaxial (S/PDIF) digital input [DIGITAL_IN_HD #1 board, here fitted in Slot 3]
26. CH Link HD digital input [DIGITAL_IN_HD #1 board, here fitted in Slot 2]
27. Coaxial (S/PDIF) digital input [DIGITAL_IN_HD #1 board, here fitted in Slot 2]
28. USB port for software upgrades. [CONTROL board or optional ETHERNET-IN HD board]
29. Left digital ground / chassis earth connector. Can be connected to another ground in your audio system if needed
30. XLR balanced analog output for left channel
31. Left control power supply

4.1 ETHERNET-IN HD

This board connects the C10 to the dedicated audio network and allows you to stream music and/or locally stored files as well as access the CH Control app, which allows you to adjust or set any system parameter from a compatible Android tablet. It converts the C10 into a network renderer capable of playing local audio files from a UPnP/DLNA server (such as a NAS), music from online streaming services (such as Tidal or Qobuz), as well as music from a Roon server, all of it through a single physical connection to a local area network. Connection should be to the dedicated audio system, internet connected Ethernet switch and that switch should be placed as close to the system as possible. There is an increasing number of audiophile grade Ethernet switches and cables available and these will make a significant contribution to the sonic and musical quality of file replay. Please speak to your dealer about the best hardware solution for your system and situation. For information regarding format and data rate compatibility, please see the relevant section of the C10's specifications.

There is also a USB type A connector on the ETHERNET-IN HD board. This is NOT enabled for USB file replay and serves only as an access point for Firmware upgrades, using the supplied USB stick. To allow USB audio replay, you need to specify/fit the optional USB-IN card for your C10 (please see below).

4.2 CONTROL BOARD

If the C10 is not fitted with the ETHERNET-IN HD board, then the CONTROL BOARD will be fitted instead. This also carries an Ethernet socket, but in this case it is to allow connection to the CH Control app via the system control network, which allows remote control of all system parameters via a compatible Android tablet. Each C10 will have either an ETHERNET-IN HD board OR a CONTROL BOARD. It is not possible to mount both. Once again, CONTROL BOARD includes a USB type A socket to enable Firmware upgrades using the supplied USB stick. It does NOT facilitate USB file replay.

4.3 DIGITAL-IN HD

Your C10 comes factory fitted with one DIGITAL-IN HD board. This gives you connections for balanced digital (AES/EBU on XLR), coaxial digital (S/PDIF on RCA), optical (TosLink) and our proprietary CH-LINK HD high-resolution digital input. You can connect multiple sources simultaneously and the C10 allows you to switch between them. The CH-LINK HD can be used to accept high-resolution data from a similarly equipped source, such as native DSD or MQA from SACDs or MQA-CDs played on a CH Precision CD/SACD transport. If you need additional digital inputs, you can mount another DIGITAL-IN HD board (or even two) in the C10's option slots – please see below. For information regarding format and data rate compatibility, please see the relevant section of the C10's specifications.

4.4 USB-IN

This optional board can be mounted in either of the two available option slots (Slots 1 and 2) and allows the C10 to accept high-resolution files from a USB source. For information regarding format, operating system and data rate compatibility, please see the relevant section of the C10's specifications.

4.5 CLOCK_SYNC

The CLOCK_SYNC board allows for external clock synchronization, either with an external master clock (such as the T1/T10 Time Reference) or with a second unit with a clock synchronization capability. That might be a CHP CD/SACD player/transport or another digital source component.

The CLOCK_SYNC board provides a BNC clock input that can be configured as 75 Ω input impedance (recommended with the CH Precision T1/T10) or as 50 Ω input impedance through the C10's menu. Supported input frequencies on this connector are all standard audio Wordclocks (44.1, 48, 88.2, 96, 176.4 192, 352.8, 384, 705.6 and 768 kHz), audio Masterclocks (22.5792 and 24.576 MHz), DSD bitclock (2.8224 MHz) and atomic-clock multiples (100 kHz and 10 MHz).

The CLOCK_SYNC board also provides a pair of 75 Ω or 50 Ω clock output connectors. Use these connectors to synchronize an external device to your C10. The use of high-quality, genuine 75Ω or 50Ω BNC cables will also help maximize performance.

4.6 Positioning and number of optional input boards

The two slots to the left of the factory-fitted DIGITAL-IN HD board can be used to install selected, optional inputs. These options can be chosen from the DIGITAL-IN HD (should you require additional digital inputs) or the USB-IN , in any combination of the two. Alternatively, one or both of the option slots can be left for later use, in which case they will be covered with a blanking plate.

4.7 ANALOG OUTPUTS

Your C10 is fitted with independent left and right channel DACs, each with its own set of analog outputs. Each channel offers a balanced XLR socket, a single-ended RCA and a 50Ω output on BNC.

4.8 Power cord receptacle and voltage selection

Make sure that the voltage selection is set to the correct value with respect to the AC voltage in your location and that the power switch is in the Off position (0 side of the switch depressed). Connect the IEC plug to the power cord receptacle and plug the power plug into the AC wall outlet or distribution block.

4.9 Grounding

The grounding switch allows owners to combine or separate the signal and chassis ground. In any audio system, it is generally best to combine the signal and chassis grounds at one point only, usually in the preamplifier, in order to break ground loops and kill potential hum. But if the connection is made on the C10. It is necessary to switch the two switches. they must always be in the same position. both “on” or both “off”.

4.10 A word about cables...

Although it is now widely accepted that audiophiles cables can make a valuable contribution to system performance, there is still one aspect of system cabling where many users remain sceptical. There is a widely held belief that digital cables “only carry ones and noughts” and that therefore they can’t make a difference. This is not the case. Digital cables actually carry voltage square waves (an analog signal) and are thus not only prone to distortion but different forms of distortion to the conventional analog cables in your system. They are particularly susceptible to impedance variation and yet few low-grade digital cables achieve much better than ±10% tolerance when it comes to their impedance rating, while the number of audiophile connectors that comply with 75Ω or 110Ω digital connection standards is vanishingly small.

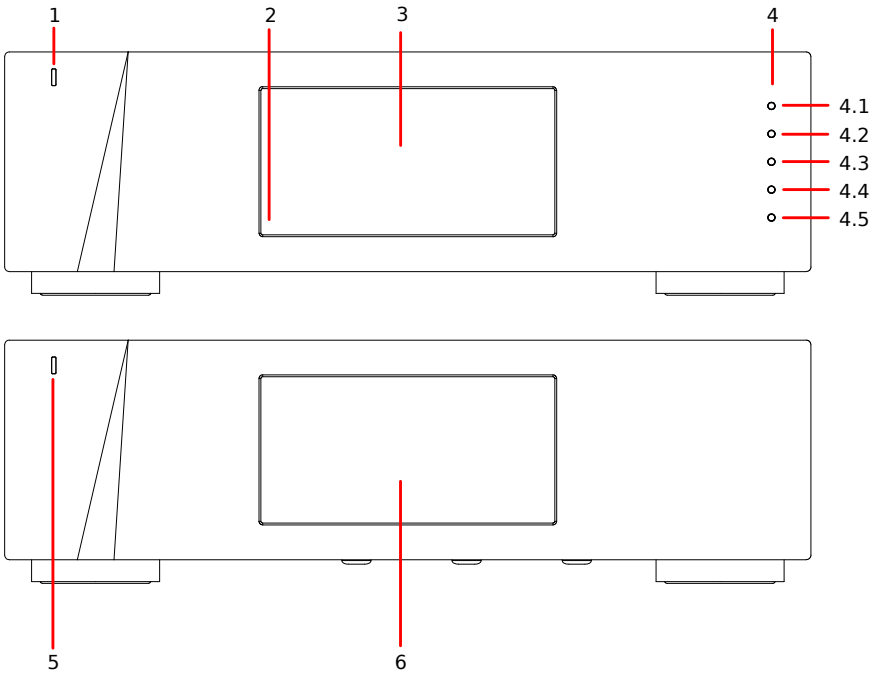
Our CH-LINK HD is carefully engineered to maximize performance when it comes to digital data transfer. If you are using the AES/EBU, S/PDIF or TosLink inputs to your C10, connecting it via Ethernet or USB cabling, or using clock cables between units, then we strongly advise that you experiment or consult with your dealer over your choice of cables. Using high-quality, properly engineered digital cabling with accurately realized impedance characteristics cannot increase the performance of the C10 – but using poor quality digital cabling will definitely erode performance and undermine your investment.

5 Operation

The C10 Digital to Analog Converter can be operated from the front panel, from the IR remote control or from CH Control Android app. Feedback to the user is provided by a high-definition display with customizable colors. Setup operations are handled from the front panel or the CH Control Android app.

5.1 Front panel controls

5.1.1 Front panel



Front panel elements

1. Standby LED (audio chassis)
2. IR remote control receiver
3. Display area (high-definition AMOLED display)
4. User control knob (Normal push → NP/Long push → LP)
   - 4.1 Mute (NP) / Operate/standby (LP)
   - 4.2 Up
   - 4.3 Next/OK
   - 4.4 Down
   - 4.5 Cancel/Exit
5. Standby LED (power supply chassis)
6. Cosmetic display (nothing to display)

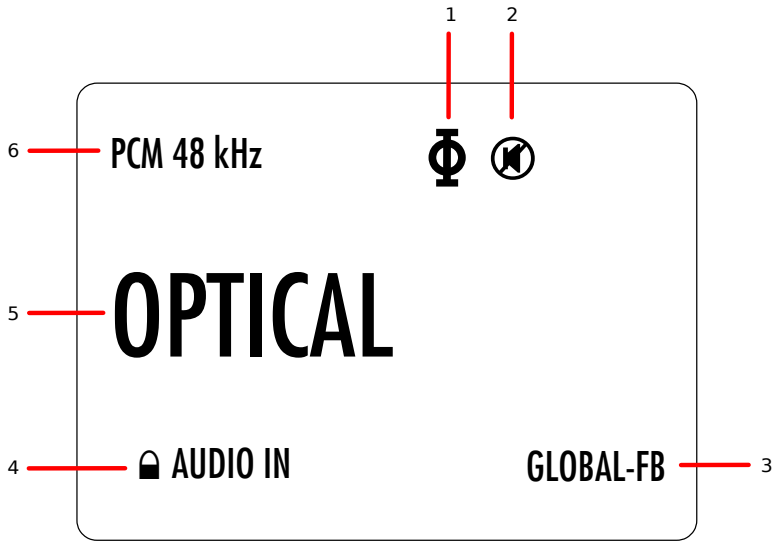
The standby LED lights up when the unit is in standby. It is normally turned-off during operation and lights briefly whenever it receives a valid IR remote control command. The LED can also be programmed to remain on during operation. The display is a high-definition 24-bit RGB panel with a very wide viewing angle, high contrast and high brightness that ensure optimal legibility. The color and brightness of the display can be configured according to the user's taste/requirements and different colors can be chosen for PCM, DSD, MQA and MQA Studio.

5.2 Operating modes

The C10 Digital to Analog Converter has two main operating modes: Status mode and Menu mode. Status mode is used to access standard DAC controls (input selection, mute,...) whereas Menu mode is used to configure the unit. The C10 also includes Shortcuts for quick access to selected Menu mode items. Shortcuts are user programmable and most Menu mode items can be selected as Shortcuts.

5.2.1 Status mode

Status display mode is used for displayed the standard DAC functions. When powered-on, the C10 starts in Status display mode. The display looks as follows:



Status mode elements

1. Analog audio output signal polarity (phase) indication. If the Φ symbol is present, polarity is reversed.
2. Mute indication. If the ⊗ symbol is present, the output is muted. On Mono, the □ symbol is present in the same place if the C10 is not muted.
3. Indicate the C10 is used as a pure DAC only.
4. Indicates that global feedback is enabled, otherwise the C10 is in local feedback mode.
5. Clock source indication (internal, audio in, or clock frequency when an external clock is selected as the clock source). Lock indication (🔒 or 🔓) tells if the unit is locked to a clock source or not.
6. Input source name. Each input source can be renamed through the C10's menu.
7. Data type (PCM, DSD, MQA or MQA Studio) and the incoming audio stream's original sample rate. The DAC internal sample rate conversion is 64x FS (2.8224 or 3.072 MHz) DSQ phase array.

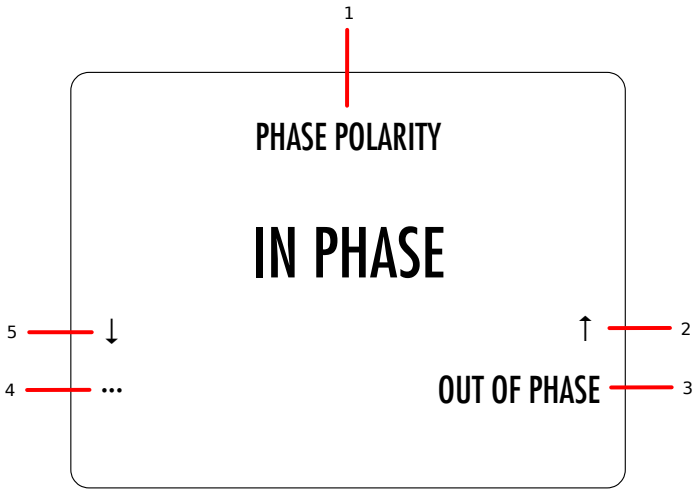
Displayed elements depend on the installed option boards and user settings. In the example above, the C10 is playing PCM audio coming from its first Optical input at the rate of 48 kHz. The output is currently muted. The C10 has locked its 24.576 MHz (512 x 48 kHz) DCXO to the incoming audio stream. The polarity of the audio signal is inverted. The global feedback is enabled. Displayed elements for other configurations are similar.

5.2.2 Shortcuts

The C10 Digital to Analog Converter is configured by a set of menus as described in the next sections. To allow quick access to the most frequently used configuration menu items, the C10 offers the concept of Shortcuts. Shortcuts are fully programmable and the user may choose any configuration parameter as a Shortcut. There are up to 6 user programmable Shortcuts. To learn how to program individual Shortcuts, please refer to the SHORTCUTS menu item in the next section.

Shortcuts are accessed from Status mode by pressing the "Ok" button. Press the “OK” button again to move to the next shortcut. The last Shortcut is always dedicated to accessing Menu mode (Setup). On the latter shortcut, "Cancel" button will return to normal mode and "Ok" button will enter Menu mode. The individual setting of a given shortcut is changed using "Up" and "Down" button. If there is no user action for approximately 10 seconds, the unit will return to normal mode.

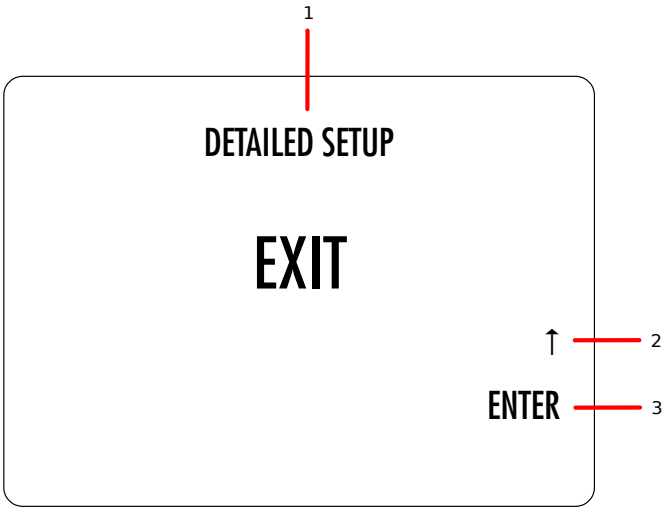
The PHASE POLARITY Shortcut gives a good illustration of how to navigate a Shortcut screen. Navigating other Shortcuts is similar.



Phase polarity Shortcut elements

1. Shortcut title (parameter, for other Shortcuts, title changes accordingly)
2. Arrow "Up" indicating next value, if applicable.
3. Next parameter value if “Up” button is applied (parameter up)
4. Current parameter value (for other Shortcuts the current value of the parameter is displayed on this line)
5. Next parameter value if “Down” button is applied (parameter down)
6. Arrow “Down” indicating previous value if applies.

The last Shortcut (Setup) is always the same and cannot be removed or altered. It allows the Menu mode to access the detailed setup of the unit.



Setup Shortcut elements

1. Shortcut title. It indicates that Detailed Setup (Menu mode) can be entered at this stage

2. Current value of the parameter. Default action is to exit (go back to Status mode)

3. Arrow indicating “Up” button.

4. Next parameter value. If “Up” button is applied, the unit enters into Menu mode

5.3 Menu mode

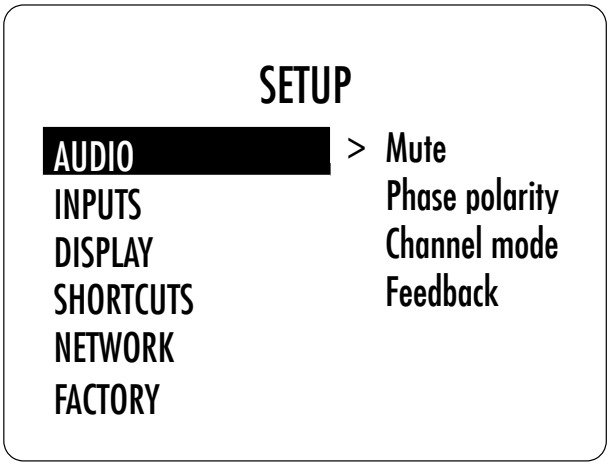
The Menu mode allows for Configuration and Setup of the C10 Digital to Analog Converter through a set of menus. Menu mode is entered from the last Shortcut item (see above). From Status mode, enter the Shortcut mode by "Ok" button is pushed. By successive "Ok", step to the last Shortcut item (Setup) and push "Up" button to enter the Menu mode.

Navigation in Menu mode is based on "Up" and "Down" button to select a given menu item and "Ok" and "Cancel" to change menu level.

5.3.1 Setup Menu

C10 Digital to Analog Converter menu structure.

The general setup menu is used to navigate into all settings.



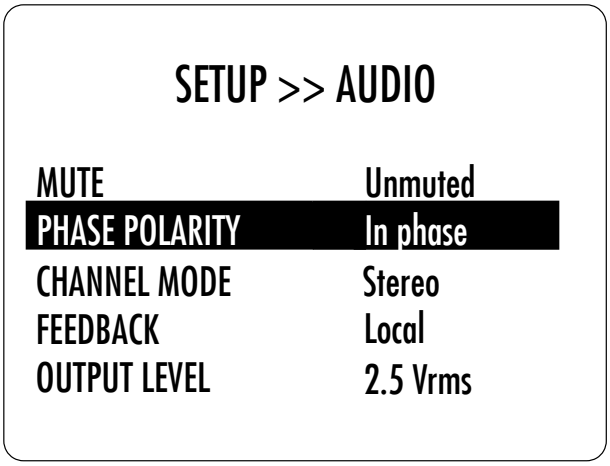
Main menu elements

There are six main menus used for configuring the C10:

- AUDIO: Allows user to adjust audio related parameters
- INPUTS: Allows user to adjust input specific parameters
- DISPLAY : Allows user to adjust display related parameters
- SHORTCUTS: Allows user to assign and modify Shortcuts in order to optimize the user interface
- NETWORK: Provides information about the network setup and configuration
- FACTORY: Indicates the software version and allows it to be updated. Shows installed option boards. Allows user and service technicians to return the unit to factory settings.

5.3.2 Audio Menu

The audio setup menu is used to adjust the different audio-related settings.



Audio menu elements

- Mute: Mutes or unmutes the audio output.
- Phase polarity : Allows users to reverse the absolute phase polarity of the audio output.
- Channel mode: Mono or stereo mode.
- Feedback: Local or global feedback.
- Output level: Select the output level between 5, 2.5 or 1 [Vrms]. **This value is the Single-ended outputs. On balanced output, the value is doubled.**

Clock Sync Option:

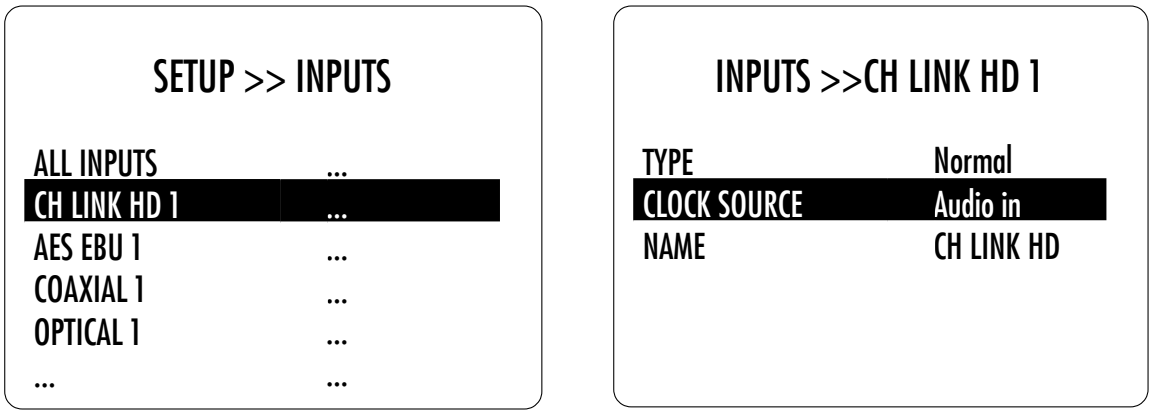
Audio menu elements with Clock Sync option

The Audio menu has two additional lines which allow you to manage the two outputs of the sync board. The two outputs can be configured as:

- Off: The output is off.
- Auto: The output depends on the “clock source” configuration of the selected input.
- Loopback: The signal present on the clock BNC input is buffered and fed to the ouput connector.
- Internal: The output is connected to the internal clock reference.

5.3.3 Inputs Menu

The inputs setup menu is used to configure each input-specific parameter.



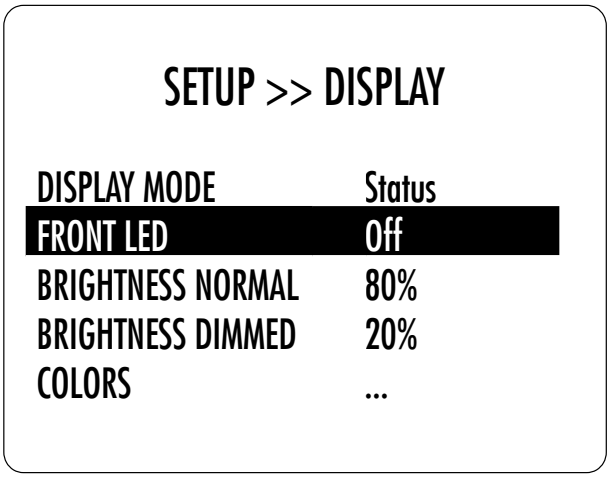
Inputs menu elements

First select the input you want to adjust. It is also possible to configure all inputs with a given parameter value at once by selecting "all inputs".

- Type: Disabled (this input is hidden), normal (Inputs can be selected by the Status menu).
- Clock source: Allows user to synchronize the C10 to an external clock, to the incoming audio stream, or to act as clock master. There is more information about optimizing clock configuration in the Advanced clocking chapter of this manual.
- Name: Renames each input and displays that name when the input is selected

5.3.4 Display Menu

The Display menu is used to change screen settings.

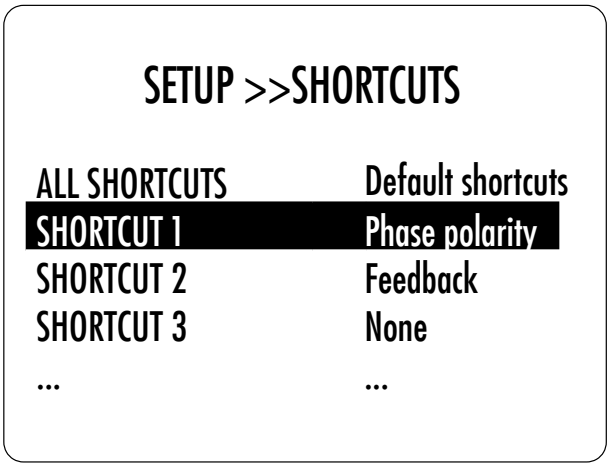


Display menu elements

- Display mode: The C10 screen can display a status page or be turned off.
- Front LED: Allows users to select whether the front panel LED is on or off when the C10 is operating.
- Brightness normal: Allows you to set the brightness of the display in operating mode (10 – 100%), and to fine tune the high brightness gamma curves to perfectly match the brightness and color of other displays.
- Brightness dimmed: Allows you to set the brightness of the display when dimmed between operations
(10 – 30%), and to fine tune the low brightness gamma curves to perfectly match the brightness and color or other displays.
- Colors: A different display color can be allocated for each different type of audio stream type (PCM, DSD, MQA, MQA Studio).
The color can be chosen from standard colors or a custom color can be made.

5.3.5 Shortcuts Menu

The Shortcuts menu allows you to customize your shortcuts.



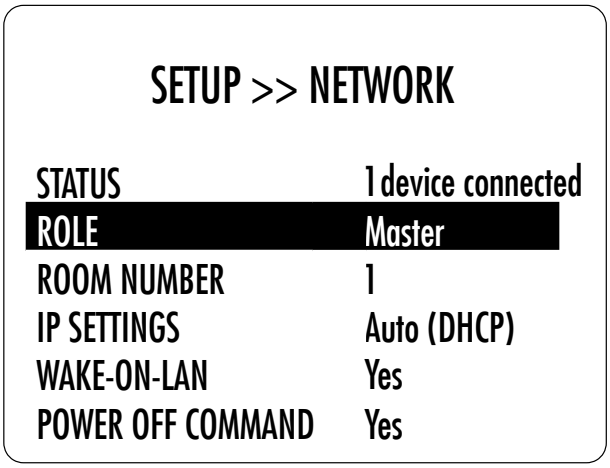
Shortcuts menu elements

- The C10 allows you to establish up to six shortcuts, taking you directly to almost any parameter in any menu.
- **If you use "Default shortcuts", the C10 is preprogrammed with Phase Polarity and Feedback as shortcuts one and two.**
- After scrolling through the last shortcut, the next screen that the C10 displays is the entry port to the C10 menu. The available shortcuts are as follows:

  1. None
  2. Phase polarity
  3. Channel mode
  4. Feedback
  5. Input clock source
  6. Display mode
  7. Front led
  8. Color

5.3.6 Network Menu

The Network menu allows you to obtain information about the network and configure its options.

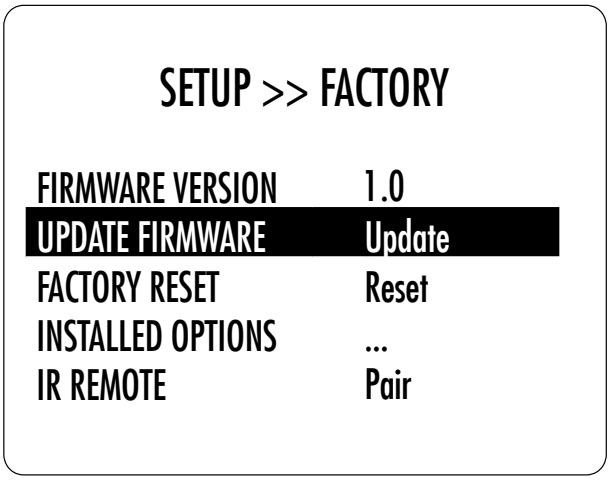


Shortcuts menu elements

- Status: Shows a list of compatible devices detected on the LAN.
- Role: When physically connected to a network, the C10 can ignore this network (offline) or connect to it as either the Master unit (it will transmit push-button commands to all compatible client units) or as a Client
  (it will ignore push-button entries and receive commands only from the master device). This networking facility allows system-wide sharing of commands among CH products (such as mute or power up/down)
- Room number: Defines the room in which the C10 is located for multi-room applications. This prevents
  CH Precision units connected to the same network but located in different systems/rooms to interact with each other.
- IP settings: Auto should be selected if the C10 is connected to a router with DHCP server feature. Direct-Link should be selected when an RJ45 Mirror lead directly connects a C10 to a single other CH Precision device. More advanced settings are available if needed.
- Wake-on-LAN: If 'No' is selected, the C10 cannot be switched on from the CH-Control App. If 'Only If POE' is selected, connecting the C10 to a Power Over Ethernet switch will allow it to be switched on via the CH-Control App (Standby consumption will be less than 0.5W). If 'Yes' is selected, the C10 can always be switched on by the CH-Control App (Standby consumption will be less than 2W).
- Power off command: If Yes is selected, the C10 will enter standby mode when it receives a Power Off command from the LAN. It will remain on if No is selected. This is useful if you want to keep your C10 on even when you turn off the rest of your system.

5.3.7 Factory Menu

The Factory menu provides information about firmware, options and remote control.



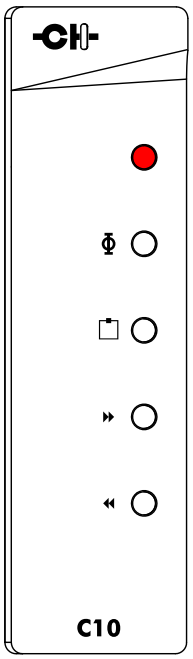
Shortcuts menu elements

- Serial number: Displays the serial number of your C10. This serial number is also written on a sticker at the back of your C10.
- Firmware version: Indicates the version of the firmware that the C10 is currently running. Periodically check CH Precision's website to see if a newer version is available. It could add new features or correct bugs. Note that the CH Control App indicates that a device is not up to date by displaying its name in orange instead of red.
- Update firmware: Selecting Update launches the C10 firmware update process. A USB flash disc drive with a valid set of firmware must be inserted in the A-shaped USB port. Please refer to the corresponding section of this manual for more detail on firmware update procedure.
- Factory reset: Resets all parameters to their default factory values. This can be useful if you made some changes that you don't know how to revert.
- Installed options: Lists the hardware configuration of your C10.
- IR Remote: Pair/Unpair IR remote control. It is possible to pair the remote control to your C10 to prevent any unwanted effects with other machines using the same IR command. It is also possible to deactivate pairing if necessary

6 Handheld remote control

6.1 Remote control operation

The C10 Digital to Analog Converter is delivered with an IR remote to control the unit's basic operations. The provided remote control is not intended to be used to configure the unit.



C10 remote control

The remote control activity LED illuminates when a button is pushed on the remote. The remote control buttons support dual functions by distinguishing between Normal Push [NP] and Long Push [LP] inputs. For a Normal Push [NP], the button is released immediately after pressing. A Long Push [NP] requires the button to be pressed for at least two seconds before being released.

Remote control functions are according to the following table:

Remote Control Button	Normal Push [NP]	Long Push [LP]
MUTE (red button)	Mute/Unmute (also wakes-up from STANDBY)	Sets unit into STANDBY or wakes it up
PHASE (Φ)	Phase in/Out of phase	-
MODE (□)	Stereo/Mono	-
NEXT INPUT (⏩)	Select next enabled input	-
PREVIOUS INPUT (⏪)	Select previous enabled input	Local/Global feedback

6.2 Changing the remote control batteries

If the Remote Activity LED fails to light then you will need to change the batteries in the handset.
The back cover can be removed using the Torx T-10 screwdriver supplied in the accessory pack.
The remote takes two LR03 batteries (AAA).

Warning: Do not ingest battery, Chemical Burn Hazard

The remote control supplied with this product contains LR03 batteries (AAA).

If one of those batteries is swallowed, it can cause severe internal burns in just 2 hours and could lead to death.
Keep new and used batteries away from children.

If the battery compartment does not close securely, stop using the product and keep it away from children. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

7 Advanced clocking

Many audio sources can be connected to the C10. Depending on their type, and your C10 options, different clocking schemes might be used, but errors in clock priority/configuration will result in no sound, periodic dropping of the signal or sub-optimal results.

Correct clock synchronization can make a huge difference to the musical results and communicative qualities you obtain from digital sources and it is essential to take the time and care to get these set up parameters right. Recommended use cases for various configurations are detailed in the following paragraphs. Even though this chapter is quite technical, we kindly ask you to take the time to read it in order to get the best sound out of your CH system. Do not hesitate to seek assistance from your authorized dealer, should you be unsure of the best configuration for your setup.

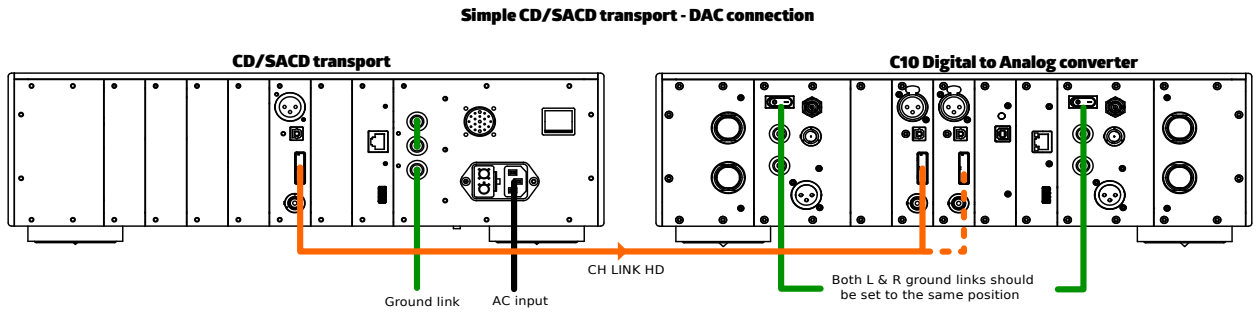
7.1 General clocking considerations

In any configuration, **there must always be no more and no less than one clock master** (unless an asynchronous sample rate converter isolates two clock masters). In the CH product range, the clock master is the unit clocked on its own internal clock (clock source parameter is INTERNAL) or an external clock generator such as the T1/T10. If more than one clock master is used/designated, the system cannot synchronize (at some point a unit will display CLOCKING ERR to let you know that the current clocking scheme is wrong). If the DAC is not working synchronously to its source, its input buffer will get completely full (if the source is slightly faster than the DAC) or completely empty (if the source is slightly slower than the DAC). Either situation will generate a CLOCKING ERR notification.

If there is no clock master, there will be no synchronization. This kind of system is not stable, and will either output no sound, or lose lock after some time. If the configured clock source (e.g. SYNCHRO BNC 75Ω) is not connected or has no synchronization signal, the C10 cannot lock (open padlock symbol displayed) and mutes its output.

7.2 Without CLOCK_SYNC board

When a C10's DIGITAL-IN HD inputs are used together with a CH CD/SACD transport (or other standard S/PDIF audio source such as network players) and no CLOCK_SYNC board is fitted, both audio data and clocking goes from the source to the DAC. More precisely, clocking is sent with the audio stream. It is either carried on dedicated lines in the CH Link HD (while audio data is carried on other lines in the same cable) or embedded in S/PDIF's bi-phase modulated signal. The schematic below shows the optimal way to connect such a system:



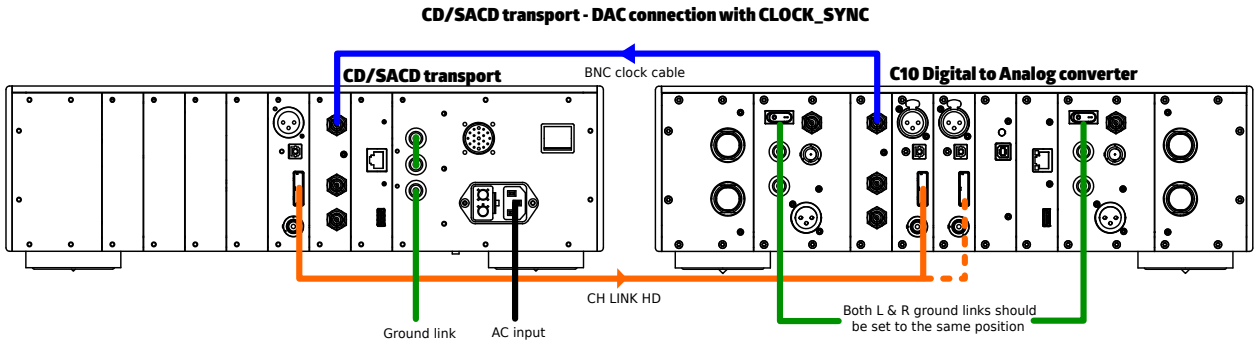
More generally, when a C10 has no CLOCK_SYNC board, it can only clock itself to the incoming audio stream (clock source is AUDIO IN) when playing a CH-Link HD, AES EBU, COAXIAL or OPTICAL input.

- CD/SACD transport clock source: INTERNAL
- C10 clock source (for this input): AUDIO IN

If in this configuration (clock source = AUDIO IN) the C10 is unable to lock (open padlock) on an incoming S/PDIF audio stream but properly detects its sampling frequency (a valid Fs is displayed instead of “Fs UNKNOWN” in the upper left corner of its display), it probably means that the S/PDIF source does not comply with AES standards and/or has too much jitter. To overcome this problem, set the clock source as Sample Rate Convertor (SRC) for this input. It will add an asynchronous sample rate conversion stage that has a wider locking range.

7.3 C10 with CD/SACD transport (both with CLOCK_SYNC board)

When both the C10 and the CD/SACD transport are equipped with a CLOCK_SYNC board, optimum performance is obtained when the C10 DAC is the clock master, and the CD/SACD transport is the clock slave. The audio stream goes from the CD/SACD transport to the C10, but the clock signal goes the other way. The schematic below shows how to connect such a system:

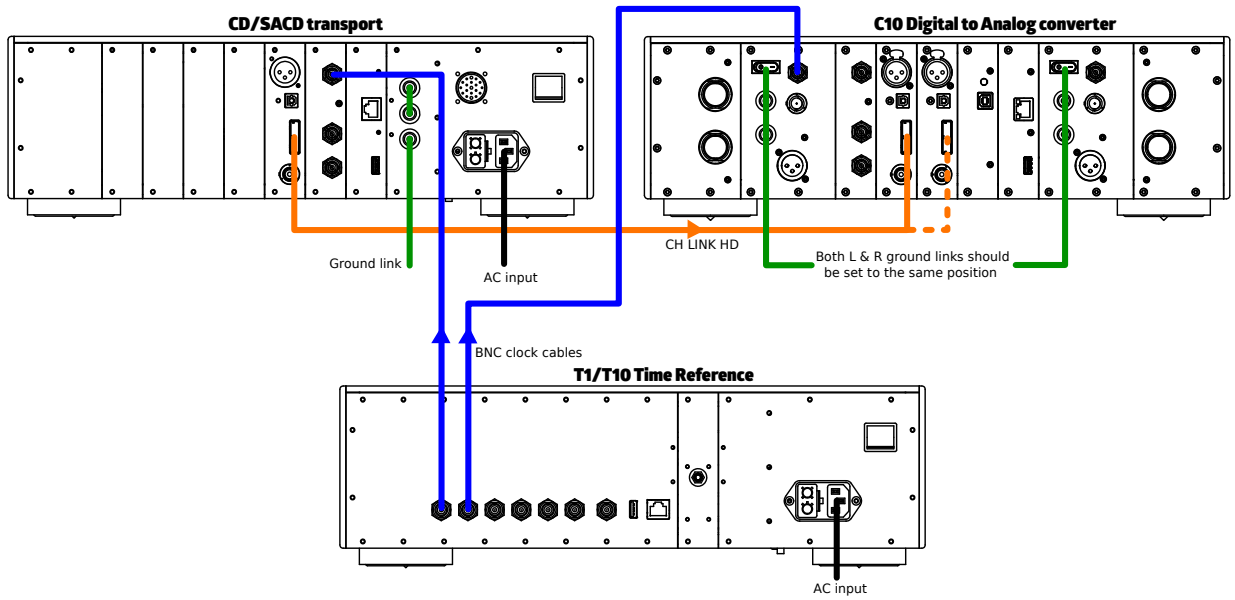


- CD/SACD transport clock source: SYNCHRO BNC 75Ω
- C10 clock source (for this input): INTERNAL
- C10 Synchro out: INTERNAL or Auto

7.4 C10 with CD/SACD transport (both with CLOCK_SYNC board) + External master clock (ie: T1/T10)

When both the CD/SACD transport and the C10 are equipped with a CLOCK_SYNC board, and an ultra-high stability clock generator such as the CH Precision T1/T10 10MHz Time Reference is available, optimum performance is obtained when both the CD/SACD transport and C10 lock themselves to the external clock generator. Direct clock connections from the T1/T10 to the individual devices are preferred over daisy-chaining. The audio stream goes from the CD/SACD transport to the C10, and the clock signal is distributed to both the CD/SACD transport and C10 from the T1/T10. The schematic below shows how to connect such a system:

CD/SACD transport - C10 - T1/T10 connection when CLOCK_SYNC equipped

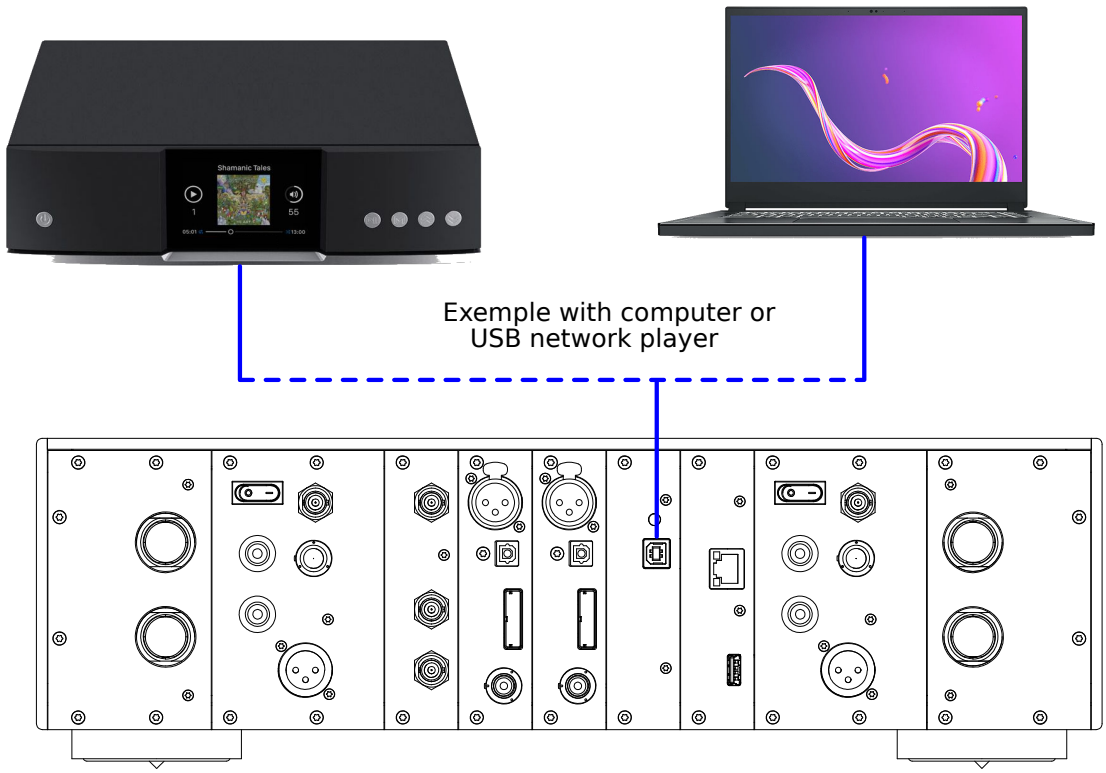


- CD/SACD transport clock source: SYNCHRO BNC 75Ω
- C10 clock source (for this input): SYNCHRO BNC 75Ω

If in this configuration the C10 is unable to lock (open padlock) on an incoming S/PDIF audio stream but properly detects its sampling frequency (a valid Fs is displayed instead of “Fs UNKNOWN” in the upper left corner of its display), it probably means that the S/PDIF source does not comply with AES standards and/or has too much jitter. To overcome this problem, set the clock source as Sample Rate Convertor (SRC) – Sync 75Ω for this input.

7.5 C10 with USB network player or computer

When a C10 equipped with a USB-IN board is used together with a network player or a computer for audio file playback, a type A (computer/server side) to type B (C10 side) USB 2.0 cable is used to connect the two. This single link enables data to flow from the computer or the network player to the C10, while the C10 dictates the pace of the data transfer, thus acting as the clock master. The Schematic below shows how to connect such a system:



USB Computer to C10 connection

- C10 clock source (for this input): INTERNAL
- C10 clock source when using T1/T10 (for this input): Synchro BNC 75Ω

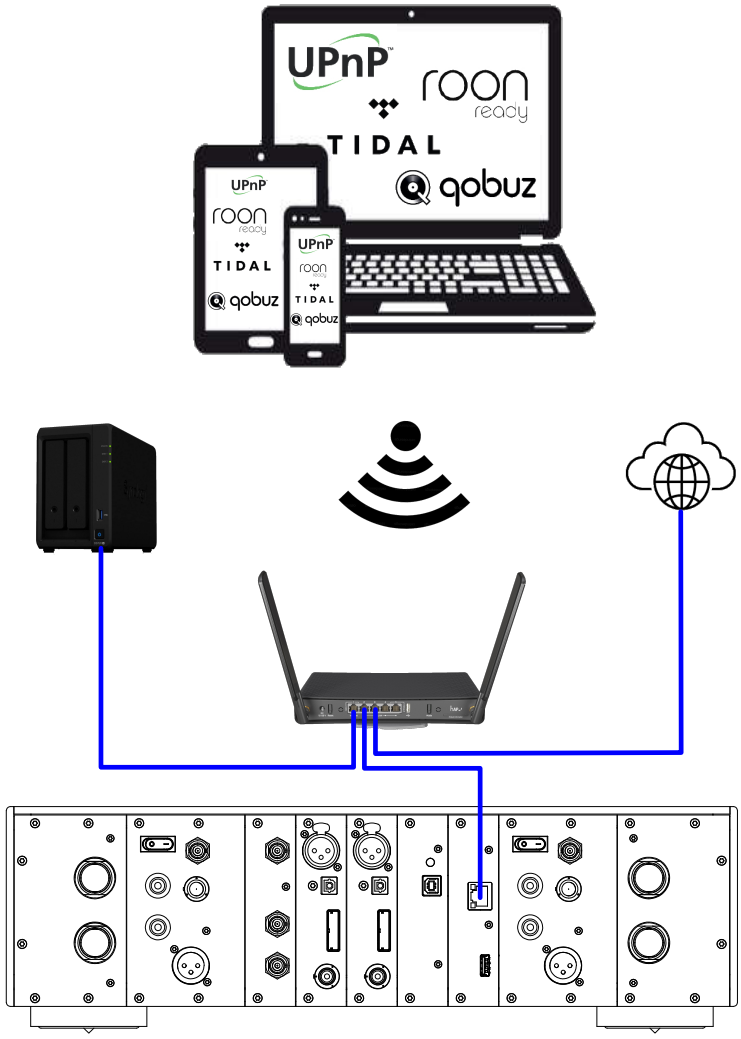
7.6 C10 for direct network playback (Ethernet streaming HD input)

The ETHERNET-IN HD board adds multiple inputs to the C10: Roon ready (to connect to a Roon server), STREAMING (to play music from a UPnP local server, from streaming services - such as Qobuz or Tidal - or from web radios) though UPnP protocol), Tidal (to play music directly from the Tidal app via Tidal connect), and more to come.

For all of these inputs, a single RJ-45 ethernet cable connects the C10 to the LAN (local area network).

This cable enables data to flow from the network to the C10, while the C10 dictates the pace of the data transfer, thus acting as clock master. A Roon Server attached to the same LAN as the C10 will recognize its ETHERNET-IN HD card as a Roon Ready end-point and allow the C10 to be selected as a Roon audio zone. Please check your source's instruction manual for optimal setup regarding clock priority and audio processing.

The schematic below shows how to connect such systems:



C10 connection to home network

- C10 clock source (for this input): INTERNAL
- C10 clock source when using T1/T10 (for this input): Synchro BNC 75Ω

8 Firmware update

8.1 Preparing the USB stick

The firmware of all the CH Precision units can be updated using the USB port located at the back of the unit. Before starting the firmware update, it is necessary to load a USB stick with files containing the new firmware. Use a FAT32 formatted USB 2.0 stick (there is one supplied with your C10, located in the Accessory Pack). Please note that some USB sticks might not be detected by the C10's USB port. The following procedure describes how to load the USB stick with the correct files:

1. Download the latest C10 firmware file from www.ch-precision.com.
2. Decompress the ".zip" folder and copy the decompressed files to the root of your USB stick.

Make sure all the files are present on your USB stick, and that there are no duplicates. It is easiest to delete older C10 firmware files from the stick before loading the new ones, as this saves any possible confusion. Any missing file will make the firmware update procedure fail, while multiple versions of the same unit's firmware can lead to unstable C10 behavior after update.

8.2 Updating the unit's firmware

1. Connect the USB stick to the USB port located at the back of your C10 unit.
2. Navigate to the FACTORY SETTINGS menu and select the UPDATE FIRMWARE item.
3. Start the Firmware Update process by pushing the encoder button. Please note that the unit will perform a Reset (the display briefly turns off and on) during the procedure.
4. Once the firmware update is complete, the unit automatically goes into Standby mode. Remove the USB stick and turn the unit on. The new firmware is now active. To verify that the firmware update is effective, navigate to the FACTORY SETTINGS menu and select the FIRMWARE VERSION item. The displayed firmware revision should match the firmware revision on the files copied to the USB stick.

Note: The firmware update process lasts 6-15 minutes, do NOT interrupt it!

When performing a firmware update, do NOT press or turn the unit's front panel button/encoder, do NOT unplug the unit from the AC wall socket and do NOT turn the mains power switch off. Interruption of the firmware update procedure may result in corrupted firmware and a malfunctioning unit. If something goes wrong during a firmware update and the unit is malfunctioning, apply the emergency firmware update procedure described below.

8.3 Emergency firmware update procedure

Perform the following Emergency Firmware Update procedure if your unit doesn't power up normally.

1. Power the unit off (back panel mains power switch to OFF).
2. Connect the USB stick to the USB port located on the ETHERNET-IN HD or CONTROL board mounted on the back of your C10 unit.
3. Push and keep the encoder button pushed and power up the unit (back panel mains power switch to ON). Keep the encoder button pushed for a couple more seconds after you turn the unit on.
4. The unit performs the emergency firmware update. Once the operation is complete, the unit automatically goes into Standby mode. Remove the USB stick and turn the unit on. The new firmware is now active. To verify that the firmware update is effective, navigate to the FACTORY SETTINGS menu and select the FIRMWARE VERSION item. The displayed firmware revision should match the firmware revision on the files copied to the USB stick.
5. If the emergency firmware update procedure fails, try the same procedure again using a different USB stick. If the failure persists, turn off your unit and contact your authorized dealer for assistance.

Note: The emergency firmware update procedure lasts 6-15 minutes, do NOT interrupt it!

8.4 Background firmware update

The C10 supports background firmware updates, which are triggered by the CH-Control application. To use this feature, the device needs to have a USB key attached - use the provided one. It is highly recommended to keep the USB key permanently attached to ensure that the device can receive automatic firmware updates in the future. The application will notify you when a new version is ready to be installed. You can install the firmware update either by shutting down the device from the application (either individually or whole system) or by going to the device's menu under 'Factory→Update firmware' setting.

Check only: The application checks for firmware updates on the website and informs you if a new version is available.

Disabled: The entire transfer and check process is deactivated.

Minimal Android version required for this feature is 5.1 (LOLLIPOP_MR1).

9 Troubleshooting

Error	Action
No power	Check the AC power cord Check the power cables between power source – audio part Check the power button at the back of the unit Check the mains fuses on the AC power cord receptacle
Remote control does not work	Check if the unit is connected to the AC supply and powered-on Check that the distance to the unit is not too great. Move closer and try again. The C10's Standby LED should briefly illuminate Change the batteries in the remote control if required (Remote control LED does not illuminate) Make sure the C10 is not configured as a Slave on the network (Settings /Network / Config) Test the setting with or without remote control pairing.
No sound (general)	Check that your source is playing Check that your amplifier is turned-on and speakers are connected Check that the system volume setting is not too low Check that the correct input is selected on your C10
No sound (⊘ is displayed)	Your C10 is muted. Unmute using first Remote Control button.
No sound (FS Unknown is displayed)	There is no incoming digital stream for the selected input, or it is at an unsupported sampling frequency. Check supported audio format in the specification table (chapter 10). Try switching to another input to verify that your C10 works well on other inputs.
No sound ("INVALID SIGNAL IN" is displayed)	Incoming audio stream is non-PCM (e.g. AC3 or DTS). Only play PCM, MQA or DoP on standard digital input, and PCM, MQA or DSD on CH-Link and ethernet streaming inputs.
No sound (🔗 is displayed)	C10 is not locked to its clock source (🔒) Please refer to advanced clocking chapter for details on valid clocking combinations If you are using a clocking scheme involving external clock in/out (CLOCK_SYNC option board), make sure that the 75 Ω BNC cable is properly connected and not damaged, and that the clock generator is turned on and properly configured.

Error	Action
No sound ("CLOCKING ERR." is displayed)	The source (e.g. CD/SACD drive) and the C10 are not synchronized Please refer to Advanced clocking chapter 7. to make sure a valid clocking scheme is used. If you are using a clocking scheme involving external clock in/ out (SYNC-IO option board), make sure that the 75 Ω BNC cable is properly connected and not damaged, and that the clock generator is turned on and properly configured.
Lost in the settings?	Restore factory settings and start your setup again
Firmware update fails	Try Emergency Software Update procedure If it fails, download the latest C10 firmware from www.ch-precision.com, prepare a software update on a FAT32 formatted USB stick and run the Emergency Software Update procedure again
USB flash drive for firmware update is not detected by C10	Please try another brand of USB flash drive (e.g. the one provided with your C10).

If the error cannot be corrected using the information from the above table, disconnect the unit from AC wall power and from the rest of you system and contact your authorized dealer.

10 Specifications

General digital input compatibility

Standard digital inputs

Each DIGITAL-IN HD board provides three standard digital inputs: AES-EBU (carrying consumer encoding), Coaxial (S/PDIF) and Optical (TOSLINK). Audio format supported are 16 or 24 bits, 44.1, 48, 88.2, 96, 176.4, 192 kHz sampling frequency.

CH Link HD digital audio interface

Each DIGITAL-IN HD board includes a CH Link HD proprietary digital audio interface. This interface carries both complete audio stream and control information. Use this link as the preferred interface when connecting your C10 to CH sources such as the SACD/CD unit.

The proprietary CH Link HD digital audio interface allows for high definition uncompressed digital audio transfer and supports both DSD and PCM (up to 705.6 / 768 kHz). For digital content protection reasons, the native DSD stream is cyphered on the CH Link HD interface. Of course, all CH sources and receivers (such as C10) use the same encoding/decoding key.

ETHERNET-IN HD Board

The optional ETHERNET-IN HD board allows connection of the C10 to a LAN (local area network).

If this LAN has internet access, it is possible to stream directly from your Tidal or Qobuz account, using the CH Control Android app or via Tidal connect

If you have a UPnP/DLNA server connected to your network (like minimserver running on a NAS), you can play your audio files directly to the C10. A UPnP controller (like the CH Control Android app or any third-party iOS and Android UPnP/DLNA controller app) acts as a front end to browse your music library and build playlists.

If a Roon server is connected to your network, select the Roon Ready input of the C10 and select the CH C10 as the audio output device in Roon's control software.

USB-IN board

The optional USB-IN board provides connectivity to a USB port on a computer. Audio is sent from the computer to the C10 at a rate that is synchronous to the C10's precision internal Masterclock.

All recent Apple, Windows and Linux computers, including audio file players now natively support USB Audio Class 2.0, allowing 24bit/384kHz files playback.

DSD files need USB Audio Class 2.0 to be active and they are packed into a 24bit/176.4kHz (for DSD64; 352.8kHz for DSD128) PCM carrier signal for bitstreaming. The C10 supports the DSD over PCM (DoP1.0) format, automatically unpacks it and converts the DSD bitstream without any loss.

General

Supported audio formats	**Standard digital inputs (AES-EBU, coaxial and optical):** - Stereo consumer S/PDIF encoded PCM; 16 to 24 bits; 44.1, 48, 88.2, 96, 176.4 or 192 kHz - Stereo DSD (DoP) 1bit; 2.8224 MHz (DSD64) - MQA encoded data **CH-Link HD:** - Stereo I2S PCM; 16 to 32 bits; 44.1, 48, 88.2, 96, 176.4, 192, 352.8 (DXD), 384 (DXD), 705.6 or 768 kHz - Stereo cyphered DSD 1bit; 2.8224 (DSD64) or 5.6448 MHz (DSD128) - MQA encoded data **USB (audio class 1.0):** - Stereo PCM; 16 to 24 bits; 44.1, 48, 88.2, 96 kHz - MQA encoded files **USB (audio class 2.0):** - Stereo PCM; 16 to 24 bits; 44.1, 48, 88.2, 96, 176.4, 192, 352.8 (DXD) and 384 (DXD) kHz - Stereo DSD (DoP) 1bit; 2.8224 MHz (DSD64) and 5.6448 MHz (DSD128) - MQA encoded files **ETHERNET-IN HD:** - Stereo PCM; 16 to 32 bits fixed and floating point; 44.1, 48, 88.2, 96, 176.4, 192, 352.8, 384 (DXD), 705.6 and 768 kHz, WAV, AIFF, FLAC, ALAC, MP3 and AAC files - Stereo DSD 1bit; 2.8224 (DSD64), 5.6448 (DSD128), 11.2896 (DSD256) and 22.5792 (DSD512) MHz, DFF and DSF files - MQA encoded files
User control	Five tactile push buttons CH Control Android app
Power supply	Selectable 100V, 115V or 230V AC, 50Hz to 60Hz
Power consumption (Standby)	<0.5W
Power consumption (Normal)	120W
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Storage conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (L x D x H)	Power unit: 440mm x 440mm x 133mm DAC unit: 440mm x 440mm x 133mm
Weight	Power supply unit: 23kg DAC unit: 20kg
Firmware update / Control	USB port for firmware update / Ethernet based system control

Analog output stage

Balanced outputs	XLR connectors
Single-ended outputs	RCA connectors BNC connectors
Output level (balanced)	10Vrms / 5Vrms / 2Vrms
Output level (Single-ended)	5Vrms / 2.5Vrms / 1Vrms
Frequency response (-3dB point)	DC-150kHz (balanced and unbalanced, digital filter and sample rate dependent)
Dynamic Range (DNR)	120dB (balanced and unbalanced)
Signal to Noise Ratio (SNR)	>117dB (balanced and unbalanced)
Total Harmonic Distortion + Noise (THD+N)	<0.003% (balanced and unbalanced)

Digital Audio inputs (DIGITAL_IN board, four stereo inputs per board)

CH LINK HD	Proprietary high-definition link supporting high-definition uncompressed audio and control. LVDS signaling for all I2S audio signals (incl. clocks).
AES-EBU (consumer format)	XLR connector, 0.5-5Vpp diff., 110 Ω PCM 16-24 bits / 44.1-192 kHz DSD (DoP) 1bit 2.8224 MHz
Coaxial (S/PDIF)	RCA connector, 0.1-1Vpp, 75 Ω PCM 16-24 bits / 44.1-192 kHz DSD (DoP) 1bit 2.8224 MHz
Optical TOSLINK (S/PDIF)	Standard TOSLINK optical connector PCM 16-24 bits / 44.1-192 kHz DSD (DoP) 1bit 2.8224 MHz

USB Audio input (USB_IN board, one connector per board)

USB Audio Class 1.0 (A-type plug)	Asynchronous playback (C10 master, computer slave) PCM 16-24 bits / 44.1-96 kHz
USB Audio Class 2.0 (A-type plug)	Asynchronous playback (C10 master, computer slave) PCM 16-24 bits / 44.1-384 kHz DSD (DoP) 1bit 2.8224-5.6448 MHz

ETHERNET-IN (HD board)

Audio file types	WAV, AIFF, FLAC, ALAC, MP3, AAC, DFF, DSF
Audio formats	Stereo PCM 16-24 bits / 44.1-384 kHz Stereo DSD 1bit / 2.8224-11.2896 MHz

Clock Sync board

Clock input	1x BNC connector, 0.5Vpp to 5Vpp, 75 Ω or 50 Ω input impedance Wordclock (44.1, 48, 88.2, 96, 176.4, 192, 352.8, 384, 705.6, 768 kHz), Masterclock (22.5792, 24.476 MHz), DSD bitclock (2.8224 MHz), High stability external clock (100 kHz, 10 MHz), 40% to 60% duty cycle square wave
Clock output	2x BNC connectors, 2Vpp, 75 Ω output impedance Buffered Clock input or Audio Wordclock 50% duty cycle square wave

Remote control

Remote control type	Infrared. Uses NEC codes. Range: 10m (line of sight)
Remote control batteries	2x LR03 type (AAA)

Design and Specifications are subject to change without notice. Weight and dimensions are approximate.

Illustrations are informative only and may differ from the actual production model.

Enclosure designed by Sven Adolph - Momentum Industrial Design - www.momentum.ch

FCC-Notice

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- adjust or relocate the receiving antenna
- increase the separation between the equipment and the receiver
- connect the equipment into a mains outlet on a circuit different from that to which the receiver is connected
- consult the dealer or an experienced ratio/TV technician for help

Certification Body Scheme

All CH Precision products have Body Certification (CB) certification based on the IEC 62368-1 electrical safety standard.

All certifications are visible on the official IECEE website (https://certificates.iecee.org/#/search)

Disposal – Environmental care

Directive 2002/96/EG of the European Parliament requires consumer electro-technical appliances to be disposed separately and have to be indicated with the following symbol. Should you dispose this component please do so in conformity with local and global legal and environmental regulations and according to best practices. We strongly encourage you to recycle any batteries used with this component.

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