I1 Universal Integrated Amplifier

User Manual

Dear Valued Customer,

We are honored that you chose the I1 Universal Integrated Amplifier for your audio system. Our team devoted every effort to design and manufacture this highest-quality versatile and future-proof product and is proud to present it to you. We wish you hours of enjoyment from your music collection with the I1 Universal Integrated Amplifier installed in your system.

Before you embark on your musical journey, we kindly request your special attention regarding the information contained in this manual. The I1, as you will discover in the following pages, is a Swiss precision product designed for ultimate performance and flexibility. However, reaching sonic excellence from your audio system requires your unit to be set up and operated correctly and this 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 I1 for many years to come.

The Concert has just begun...

Cossy F.

Heeb T.

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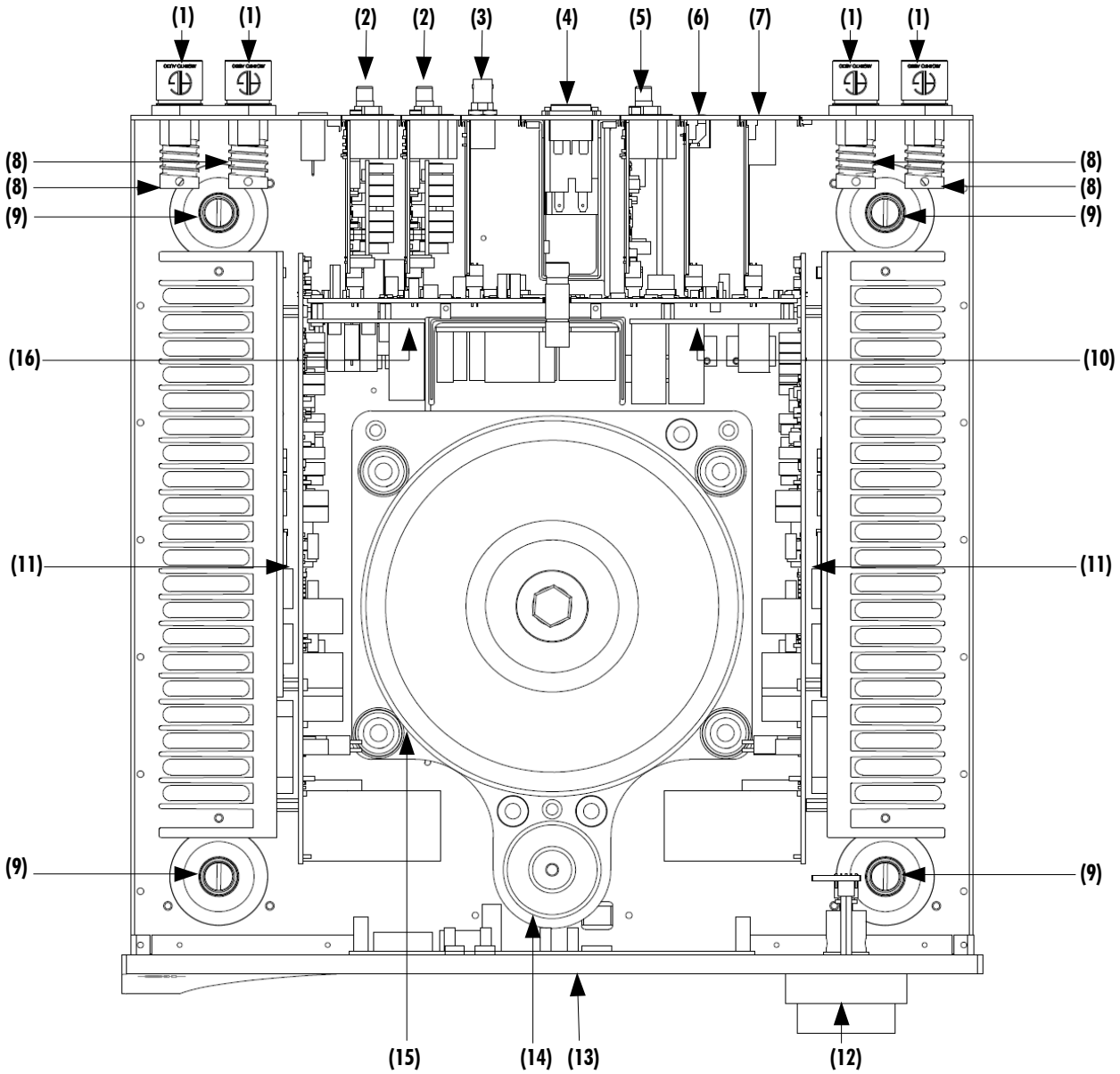
1 Product highlights

CH products are proudly designed and manufactured in Switzerland by CH Precision Sàrl. Our engineers put together all their know-how, expertise and ingeniousness to bring you the I1, a top performance future-proof modular stereo integrated amplifier with Ethernet control capabilities and USB flash-drive firmware update. The I1 is the gateway to the CH world. It combines the soul and essence of four products from the 1-Series of products: The P1 phono stage, The C1 converter, the L1 preamplifier and the A1 power amplifier. Like the C1, the hub of the I1 is digital. The analog inputs (line and phono) are converted into the digital domain while the digital inputs are up-sampled. The digital stream is processed and finally converted to the analog domain at 352.8kHz/384kHz. The 2-channel amplifier is a purely analog power stage with a class A input stage and a class AB output stage. It is derived from the A1 amplifier circuitry and therefore features the ExactBias circuitry as well as the unique variable global vs local feedback ratio.

Like all of CH Precision products, the I1 is highly versatile and modular. The base model comes with four digital inputs, three analog line inputs, an integrated digital to analog converter, a hybrid volume control and the two channels of power amplification. However, the back of the unit is fitted with slots into which optional input boards can be fitted. The I1 can be customized to the requirements of a specific system. Option boards can be either factory-fitted or added easily at a later stage. Many option boards are available: Digital input HD boards providing CH Link HD, AES/EBU, coaxial S/PDIF and optical TOSLINK inputs, Ethernet Audio Streaming, USB Audio Streaming, current-mode phono inputs dedicated to MC cartridges and External clock synchronization input and output board.

Versatility is apparent in the way the I1 can play center stage in an evolving and growing audio system. The approach taken by CH Precision is to enable I1 users to expand and refine their system from a single-box solution to a more complex and more refined system:

- Connect the I1 preamplifier balanced outputs to an A1 or M1 2-channel power Amplifier and enable loudspeaker bi-amplification.
- Connect a D1 CD/SACD Drive using the proprietary CH-Link input and create the ideal transmission path between disc and digital to analog converter.
- Connect a T1 10MHz Time Reference to the input of the I1 External clock synchronization option board and benefit from the T1 ultra-accurate and stable clock reference.
- Use a C1 digital to analog converter to extract the digital to analog conversion out of the I1. All the I1 digital inputs boards, including the Ethernet and USB audio streaming board and the external clock synchronization are removed from the I1and fitted at the back of the C1. The C1 analog outputs are connected to one of the I1 Analog input configured as a Processor input (see chapter 6.4). By doing so, the I1 turns into a pure analog 2-channel power amplifier.



I1 main components

(1) Audio speaker terminals

(2) Factory-fitted monaural analog input boards. Can be optionally equipped with current mode phonostage module

(3) Optional clock in/out synchronization board

(4) Mains switch and power cord receptacle (on back panel)

(5) Factory-fitted digital input HD board

(6) Input slot. Can be optional y fitted with a second digital input HD board or a USB audio input board

(7) USB (firmware update) and RJ-45 (control and optional Ethernet audio streaming) board

(8) Output coil for HF immunity

(9) Adjustment shafts and screws

(10) Digital power supply regulation board

(11) Heatsink-mounted monaural amplifier boards

(12) Dual concentric push control knob

(13) Display (on front panel)

(14) Standby power transformer (ensures green mode standby)

(15) Main power transformer

(16) Analog power supply regulation board

1.1 Modular architecture and slot-in boards

The slot-in boards section consists of a vertically-mounted backplane board where optional boards can be plugged into. Optional boards provide audio functionality and connectivity to other pieces of equipment. There are six types of slot-in boards:

- PHONO_I1: analog input piggyback module that provides current-mode phono inputs dedicated to MC cartridges
- DIGITAL_IN_HD: provides CH Link HD, AES/EBU, coaxial S/PDIF and optical TOSLINK digital inputs (one board is factory fitted)
- USB_IN: enables bit-exact, ultra low jitter playback of high resolution audio files directly from a computer
- SYNC_IO: provides advanced clock synchronization options (1 clock in, 2 clocks out)
- ETHERNET_IN: used for Ethernet audio streaming. Connects to a UPnP/DNLA compatible server (eg. NAS). Browse music from a tablet using the CH Control app
- CONTROL: provides a USB port for software upgrade and an Ethernet port for command

There are five slots in the I1. Two of them can be populated with any combination of DIGITAL_IN_HD and USB_IN boards. One of them is dedicated to the optional SYNC_IO board. Another one is factory fitted with a CONTROL_IN board but can be upgraded to a ETHERNET_IN board to enable Ethernet audio streaming capability. The last slot is factory fitted with stereo analog lines inputs and can be upgraded to add the PHONO_I1 board. See chapter 2.5.

1.2 Amplifier feedback control

One of the I1's most unique features is its user-controllable amplifier feedback. This feature controls the ratio between the global and the local feedback applied in the I1's amplification stage. Global feedback takes a portion of the output signal after the power stage and feeds it back to the input of the amplifier. This ensures a very low output impedance and low distortion figures. Local feedback, on the other hand, does not include the output stage and lets the latter operate in open loop mode. This favors small signal details and timing.

As a rule of thumb, a higher ratio of global feedback is preferred for grip and control in the low frequencies whereas a lower ratio is preferred for speed and details in the high frequencies. This rule is however not absolute as each speaker and cross-over is different and we highly recommend to experiment with various settings to find the best match with the connected loudspeakers, especially if the I1 is driving a complete full bandwidth loudspeaker.

In multi-amplification systems, different feedback settings are commonly used for the various speaker sections opening a whole new level of performance. We recommend to start with pure local feedback and increase the global feedback until the bass are controlled enough to your personal taste. Feedback settings can be adjusted on the fly from the I1 front panel menus or from the CH Control app.

1.3 Power amplifier bias adjustment

The I1 provides an advanced bias control circuitry (ExactBias) that not only follows slow temperature variations, but also accurately takes into account all the dynamic aspects induced by transients in the musical content.

1.4 System clocks

The first requirement to achieve perfect timing is that audio data are fed into the DAC chips, synchronous to a jitter-free clock. This is why two high-precision low-drift audio crystal clock oscillator (22.5792 MHz for 44.1 kHz multiples and 24.576 MHz for 48 kHz multiples) are located only a few cm away from the DAC chips. The clocking section has its owns dedicated power supply.

In order to be synchronous to the incoming audio signal, the crystal oscillators (VCXO) are fine-tuned using a voltage controlled feedback computed by a proprietary algorithm. Performances of this "digital phase-locked loop" (digital PLL) has a jitter rejection below 0.1 Hz, while frequency tracking is achieved through sub 0.1 PPM correction steps. Phase alignment is also guaranteed with a +/-2.5 microsecond accuracy.

1.5 Volume control

The I1 integrated amplifier has a hybrid volume control. The word hybrid describes a volume control set both in the analog domain as well as in the digital domain. It is a combination of fine steps applied in the digital domain and derived from the C1 D/A controller software algorithms in between coarse analog attenuation steps using the technology developed in the L1 line preamplifier.

Please note that the I1 can be also be configured as a pure 2-channel power amplifier where the audio signal remains in the analog domain with no A/D nor D/A conversion at all. In this mode the volume is fixed and the level is equivalent to a volume control set to **no attenuation**! This mode is to be used with an external volume control unit connected upstream to the I1.

1.6 Rigorous metal work construction

The I1 chassis is made of high-grade aluminum alloy with no visible screws on the front, top and side panels. First class mechanical and chemical surface treatments provide its luxury finish. Pin assembly of all chassis elements enables smooth joints between metal parts while screws every 6cm ensure protection against electromagnetic interference.

The unit rests on four stainless steel feet. Each foot is fitted with an elastomer ring to sit on delicate surfaces but is also equipped with height adjustable steel spikes to fine tune the unit's position. Horizontal leveling is accomplished using the provided screwdriver through the four adjustment shafts accessible from the top of the unit. Most importantly, the steel spikes serve as vibration evacuation channels. When used with the provided CH Support discs, they create the most effective way to channel unwanted vibrations away from the unit.

Finally, for units that are stacked on top of each other, stacking covers are provided to interface with the spikes of the unit above (see section 5.2). Vibrations from the upper unit is transmitted by the stacking cover to the shaft of the lower unit and from there to the lower unit's feet or spikes, forming a privileged path to channel vibrations away from the unit.

1.7 Power supply

The power supply of the I1 is a linear supply with multiple independent local regulations. It is based on an oversized magnetically shielded toroidal 1000 VA mains transformer. A secondary (also toroidal) transformer is used as Standby transformer to ensure green Standby mode, meeting the latest energy saving regulations. Both transformers have static shields between primary and secondary windings. They are mounted on a separate plate which is isolated from the main base plate by silent blocks.

4-poles capacitors are used for rectification. These capacitors exhibit exceptionally low ESR, high speed and high capacitance, providing instantaneous response to current demanded by the audio output stage.

Discrete ultra-low noise regulators are used throughout the power supply to ensure the purest low-noise DC feeds possible to the different audio sections. The input stages of the power section are also fully regulated to avoid any coupling distortion.

Input AC voltage to the power supply can be set to 100V, 115V or 230V AC depending on your local mains voltage.

2 I1 option boards

The I1 modular architecture enables the unit to be tailored to the requirements of a system. The base model comes factory fitted with one DIGITAL_IN_HD option. The analog line input section (not considered an option) is also factory fitted.

The I1 also comes factory fitted with the CONTROL_IN board. It provides a USB port for software updates and an Ethernet port for controlling the unit over a network. It can be upgraded to the ETHERNET_IN option board, adding the Ethernet audio streaming capability.

2.1 Digital inputs and CH Link HD (DIGITAL_IN_HD)

The DIGITAL_IN_HD board provides AES-EBU, S/PDIF and Optical TOSLINK standard digital inputs that can transmit 16 and 24 bits PCM audio at sample rates of 44.1, 48, 88.2, 96, 176.4 and 192 kHz and DoP encapsulated 1 bit DSD at 2.8224 MHz. Besides, the DIGITAL_IN_HD board holds the CH Link HD proprietary format. CH Link HD carries high resolution audio and control data over a single link between CH units and supports both PCM (up to 768kHz, 32bits) and DSD64/128.

One DIGITAL_IN_HD board is factory fitted at the back of the unit. If more digital inputs are needed, a second DIGITAL_IN_HD board can be fitted in the remaining Digital input slot.

2.2 Ethernet audio streaming input (ETHERNET_IN)

Being an upgrade to the CONTROL_IN board, the ETHERNET_IN board also provides a USB port for software upgrade and an Ethernet port to remotely access all the I1 settings through the CH Control Android app, when connected to a local ethernet network. But this board also allows to play music stored on a UPnP/DLNA compatible local server, as well as music from streaming services such as Tidal and Qobuz (a valid subscription is required for such services), if the local network has Internet access. The ETHERNET_IN board supports 16 to 32 bits PCM audio at sample rates up to 384 kHz, WAV, AIFF, FLAC, ALAC, AAC, MP3 formats; DSD files up DSD128 in DSF and DFF formats (and up to DSD256 in DFF formats).

2.3 USB audio input (USB_IN)

The USB_IN board provides asynchronous USB audio input. Asynchronous mode means that the I1 is clock master and the computer is clock slave. Therefore no jitter is added by the computer. Moreover, the digital receiving devices on this board are powered by the USB port and are galvanically isolated from the rest of the I1. The USB input can be configured to operate as audio class 1.0 (no computer driver required, sample rates up to 96kHz) or as audio class 2.0 (installation of a provided driver can be required on some operating systems, PCM audio sample rates up to 384kHz and up to DSD128 in DoP are supported). A custom Microsoft Windows driver can be downloaded from CH Precision's website, or a standard Windows driver is available in Windows 10. Apple macOS and most Linux-based systems do not require additional driver installation.

2.4 External clock synchronization (SYNC_IO)

The SYNC_IO board provides advanced synchronization options for the I1 when used with a CD transport with clock input capability (like a Sync_I/O-equipped D1) and/or an external clock generator (like the T1). It includes a clock input on a BNC connector with a selectable 75 Ohm or high impedance termination. Supported input frequencies are 44.1, 48, 88.2, 96, 176.4 and 196 kHz, 22.5792 and 24.576 MHz, 2.8224 MHz, 100 kHz and 10 MHz.

Two 75 Ohm Wordclock outputs complete the input/output capabilities of the SYNC_IO board.

In a system where the I1 fitted with the SYNC_IO board is synchronized by a T1 Time Reference unit, the I1 needs to be set as clock slave by selecting SYNCHRO BNC 75 from the I1 clock source menu. Connect a 75 Ohm BNC cable (typically the CH Reference Clock-Link cable) between one of the T1 outputs and the I1 SYNC_IO board input connector. See chapter 3.3 for more information.

In a system where a D1 connects via CH Link HD to the I1 (and both units are fitted with the SYNC_IO board), the recommended configuration is to set the I1 as clock master by selecting INTERNAL from the I1 clock source menu and by selecting SYNCHRO BNC 75 from the D1 clock source menu. Connect a 75 Ohm BNC cable (typically the CH Reference Clock-Link cable) between one of the I1 SYNC_IO board outputs and the D1 SYNC_IO board input connector. See chapter 3.1 for more information.

2.5 MC cartridges phono input (PHONO_I1)

The PHONO_I1 option board provides a current-mode phono stage input to the I1. A current-mode input reads the current generated by the cartridge (not its voltage). Current-mode inputs are dedicated to MC cartridges. The current from the cartridge is amplified by a discrete transistor-based trans-impedance amplifier. Using a current-mode input provides a superior signal-to-noise ratio compared to conventional voltage inputs, better immunity and no necessity to apply impedance loading to the phono input. The gain of the trans-impedance amplifier is intrinsically dependent on the cartridge's ability to deliver current and is therefore highly dependent on the cartridge internal resistance. The lower the cartridge internal resistance, the higher the current it can deliver, the higher the gain.

The phono input stage has an input gain setting that can be applied to further amplify the signal of low current cartridges. This gain setting is independent of the global volume control and is located upstream from the volume control, in the phono input section of the unit. **Be aware that a high gain setting combined to a high current cartridge could result in the signal clipping independently of the global volume control applied**. If this happens, reduce the input gain to a lower value. The gain setting is accessible from the I1 INPUTS menu.

The current-mode analog input stage is followed by and analog to digital converter digitizing the signal at a fixed 384kHz sampling rate. Playback equalization is applied to the signal to compensate the equalization applied at the record cutting stage. The industry standard equalization curve is named RIAA. Numerous other equalization curves were used prior to RIAA. The I1 offers a total of 6 playback equalization filters to cover the major curves that were used prior to standardization: RIAA, Extended RIAA (eRIAA), Emi, Columbia, Decca and Teldec. The selected playback equalization curve is applied by signal processors using proprietary software filter algorithms allowing the greatest level of accuracy to the equalization applied. Finally, the equalized signal joins the usual internal path and is converted to the analog domain before reaching the I1 amplification stage.

The PHONO_I1 is an add-on board to the I1 factory-fitted analog section. It is mounted on the analog input board in a piggyback configuration. It uses the same physical audio input connectors as the ones used by the line inputs. Through the I1 menus, the user can reconfigure the RCA input connectors to become a line or a phono input (or a Processor input, see chapter 6.4).

This gives maximum flexibility to the user:

- The two single-ended analog inputs connectors can be used as two line inputs, or two phono inputs or any of the line/phono combinations in between.
- The inputs can be reconfigured at all times.

Be extremely careful when reconfiguring an input from line level to either phono or processor level as the overall gain in the system will dramatically increase. Connecting a line level source to a phono configured input of the I1 may damage the source, the loudspeakers and your ears. Always mute the I1 as well as all connected sources when reconfiguring the I1 analog input types, and double-check connections before unmuting.

The PHONO_I1 option board comes with a 4mm banana plug. The ground lead from a turntable can be screwed to the banana plug which in turns can be inserted into the I1 black or yellow-green back panel sockets (see chapter 6.10).

3 System setup examples

Below are three examples of setups that can be realized with the I1.

3.1 Sources connection: I1 + Ethernet streaming + Phono + D1 setup

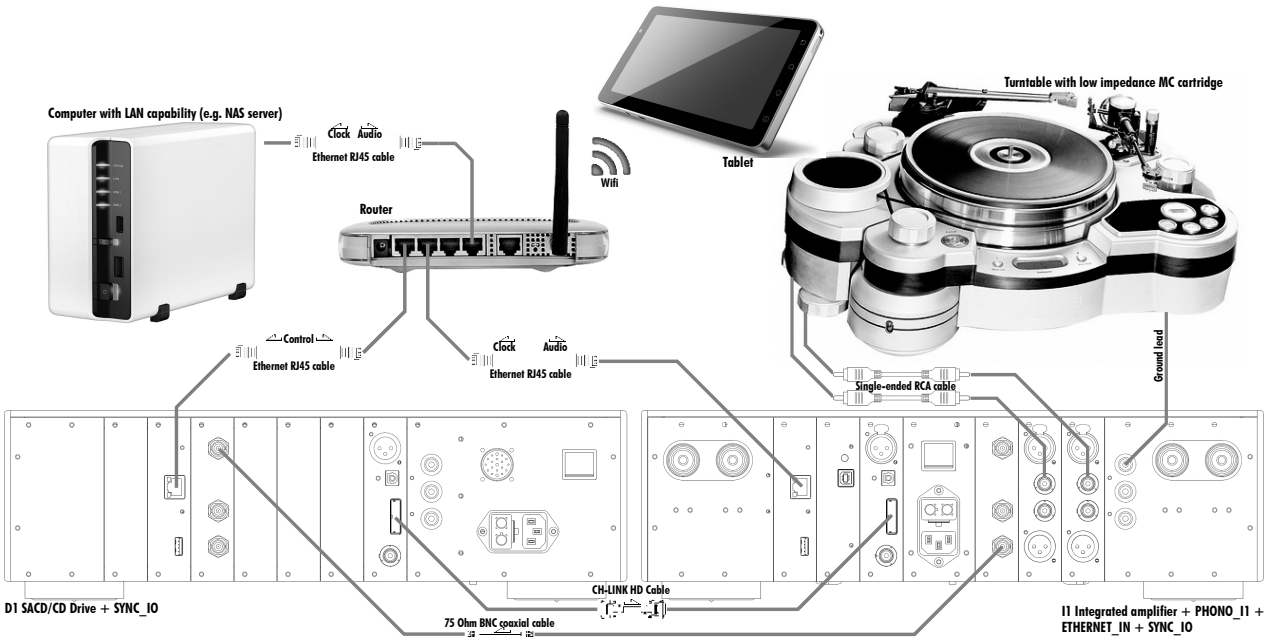
In this setup, the I1 is populated with the ETHERNET_IN option board as well as the PHONO_I1 option board.

The Ethernet_IN board allows the I1 to be connected to a NAS drive via an Ethernet router. Music libraries can be browsed, playlists created and music files can be played back using the CH Control app as remote.

The Phono_I1 board provides up to two current mode inputs dedicated to MC cartridges. The RCA physical connectors are shared between line and phono input. Through the I1 menus, the user can reconfigure the input to be used as a line input or a phono input.

For the best audio performance, we recommend to connect the D1 SACD/CD Drive to the I1 using the proprietary CH Link HD cable.

If both the I1 and the D1 are fitted with a SYNC_IO option board, then the I1 should be set as clock mater (clock source set to INTERNAL) and the D1 should be set to clock slave (clock source set to SYNCHRO BNC 75) and the connection should be done as shown below.

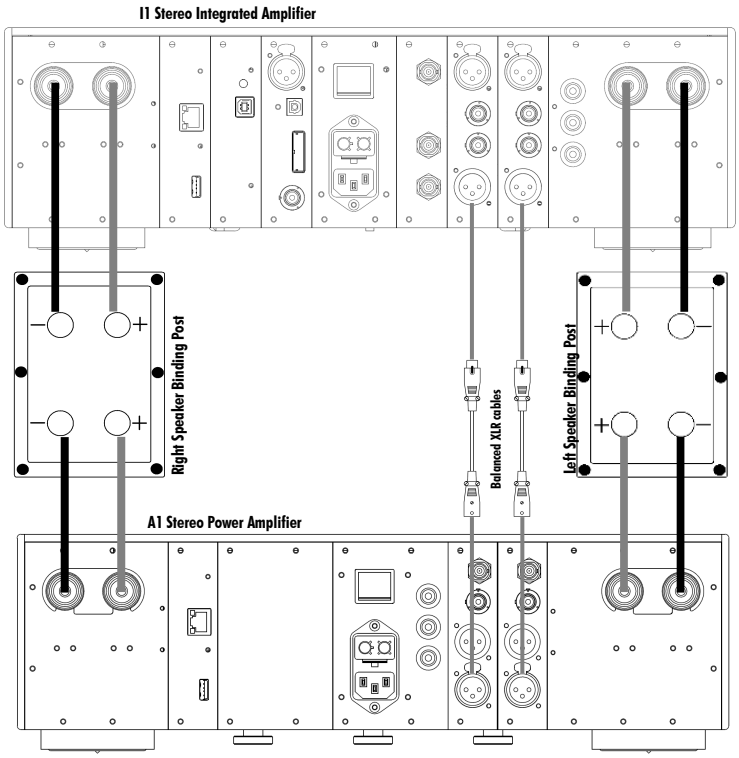


I1 + Ethernet streaming + Phono + D1 setup

3.2 Bi-amplification: I1 + A1 setup

This setup allows the audio system to bi-amplify loudspeakers. An A1/M1 is used to create the second set of amplification stages. Bass and trebles are powered separately, the I1 supplying the trebles while the A1/M1 powers the bass.

The XLR Pre Outputs are used to link the I1 preamplification output stage to the A1/M1 inputs.



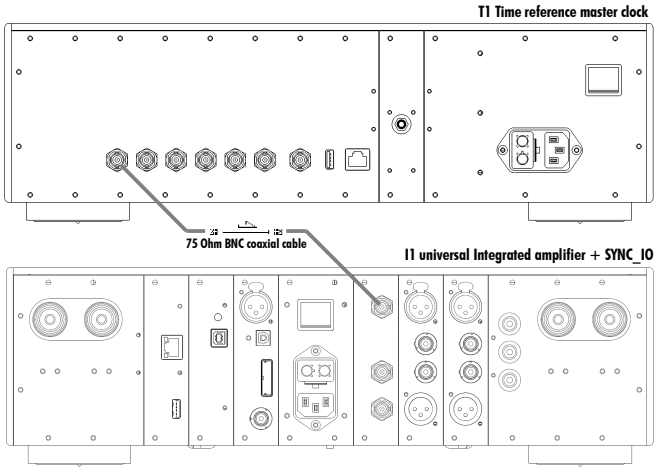
I1 + A1 setup

3.3 Improved clock accuracy: I1 + T1 setup

In this setup, the I1 needs to be equipped with the SYNC_IO option board.

Connect the T1 BNC output 1 to the I1 SYNC input using a low capacitance 75 Ohms coaxial cable (typically the CH Clock_link Reference cable) and terminate the cable by activating the clock source to **Sync BNC 75 Ohm** from the I1 menu.

If unused, disable the T1 BNC outputs 2 to 6 in order to minimize electromagnetic radiations.



T1 + I1 setup

4 Read carefully before use

Please read this manual carefully before making connections or operating your I1. After reading this manual, please store it in an accessible place for future reference. If after reading this manual you feel unsure about how to make connections or how to operate the unit, please contact your authorized dealer for assistance.

4.1 Package content

Make sure that the package content is complete. If not, please contact your authorized dealer. Your package contains:

- The I1 Universal Integrated Amplifier unit
- A power cord
- Four adjustment steel spikes
- A suction cup (used to unscrew the top covers)
- An accessory box containing:
  - an infrared remote control
  - a spike height-adjustment screwdriver
  - a Torx 10 screwdriver
  - four stacking covers
  - a USB flash-drive containing the latest CH Precision pieces of firmware
  - four CH Support Discs

Please store the packaging for future use. Check your I1 for any apparent damage. In case of a damage, immediately contact your authorized dealer. If your I1 is cold due to transport, please let it warm up to room temperature before powering it up.

4.2 Safety notice

Make sure to observe the following safety rules:

- The I1 is very heavy, so have someone to help you when moving it
- Always keep the unit horizontal when handling it
- Install your unit on a stable and sturdy base
- Do not install your I1 near water
- Do not expose the unit to any liquid
- Do not install it under direct sunlight or near any heat source such as radiators or other apparatus generating heat
- Do not install it in a confined space and make sure there is sufficient airflow around the unit, including under and behind the unit
- Do not operate the I1 under high ambient temperature (>35°C) or in extremely high humidity conditions
- Only use options and accessories specified or recommended by CH Precision

- Do not open the unit nor try to service it. Always refer to a qualified technician for service, maintenance or upgrades. Failure to do so will void the unit's warranty.

4.3 Mains supply

Before connecting the mains power cord, make sure that the mains voltage selection at the back of the unit matches your local mains voltage.

Make sure that your I1 Universal Integrated Amplifier is disconnected from the AC wall socket in the following cases:

- When cleaning the unit
- During thunderstorms
- When unused for long periods of time

Besides, make sure your I1 is turned off when making connections (it is also highly recommended to turn off the rest of the system).

4.4 Transport and packaging

The I1 must always be stored in its original packaging for transportation. Doing so will ensure an optimal level of protection for your unit. Please store all packaging in a dry and clean area for future use.

Besides, we recommend to remove the adjustment spikes and to store them in the packaging prior transportation. Vibrations during transport may cause the adjustment spikes to move from their retracted position; there could be a risk of scratching the piece of furniture the unit is installed onto if the spikes are not fully retracted.

4.5 Cleaning

Use a soft, dry cloth to clean your unit. Never use any solvent or liquids as they might damage the surface or infiltrate the unit. Please use an ultra-soft piece of fabric (for example a cloth designed to clean eyeglasses) to clean the front display area.

4.6 Maintenance and Service

The I1 Universal Integrated Amplifier contains no user-serviceable parts. Do not try to open, modify or repair your I1. This will void any warranty. Your I1 Universal Integrated Amplifier must be checked by a qualified and approved technician for any of the following cases:

- The unit is malfunctioning
- The power cord or mains plug at the back of the unit is damaged
- The unit was dropped on the floor or presents external damage
- The I1 has been exposed to liquids or unknown substances

5 Installation

5.1 Unpacking

Unpack your I1 Universal Integrated Amplifier and store the packaging for future reference. The I1 is very heavy so have someone to help you when removing it from its packaging.

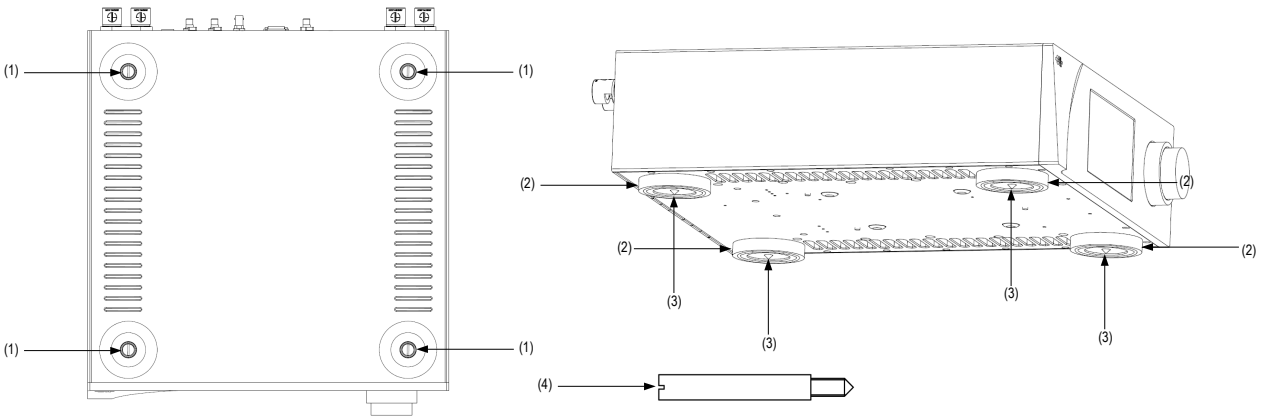
5.2 Unit positioning

When delivered from factory, the I1 integrated amplifier rests on elastomer rings, ensuring both scratch-protection for the base on which the unit sits as well as safe anti-slipping positioning.

A more advanced vibration-channeling mechanical coupling can however be implemented, thanks to the steel spikes and the polymer CH Support discs provided with the I1. To use this optimal coupling, simply go through the following steps:

1. Place the I1 unit on a stable base at its approximate final position, for instance on an audio rack. Make sure air is able to flow freely around the unit.
2. One by one, gently lift the unit's corners and insert a CH support disc under each foot. The elastomer rings of the feet should disappear in the support discs' groove when properly positioned.
3. Unscrew the four top covers from the I1's shafts using the provided suction cup.
4. Insert the adjustment spikes into each adjustment shaft.
5. Gently screw clockwise each adjustment spike into the shaft with the provided screwdriver until some resistance is felt (just before the unit starts being lifted by the spike).
6. Then screw clockwise each spike by the same amount (for instance two full turns).
7. Use a spirit level and apply correction to the spikes until the unit rests horizontally and solidly on its four feet.

If no CH Precision unit is to be stacked on top of the I1, screw the four top covers back. Otherwise, screw the four polymer stacking caps instead, and gently lay down the unit to be stacked on top of it. Repeat steps 3 to 7 with the upper unit.



Adjustment shafts, feet and spikes

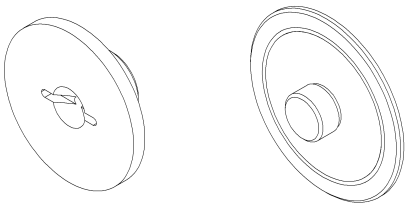
(1) Adjustment shafts. Insert the adjustment spikes and use the provided screwdriver to secure and adjust individual spikes

(2) Feet

(3) Adjustment spike heads (when inserted into the adjustment shafts)

(4) Adjustment spike

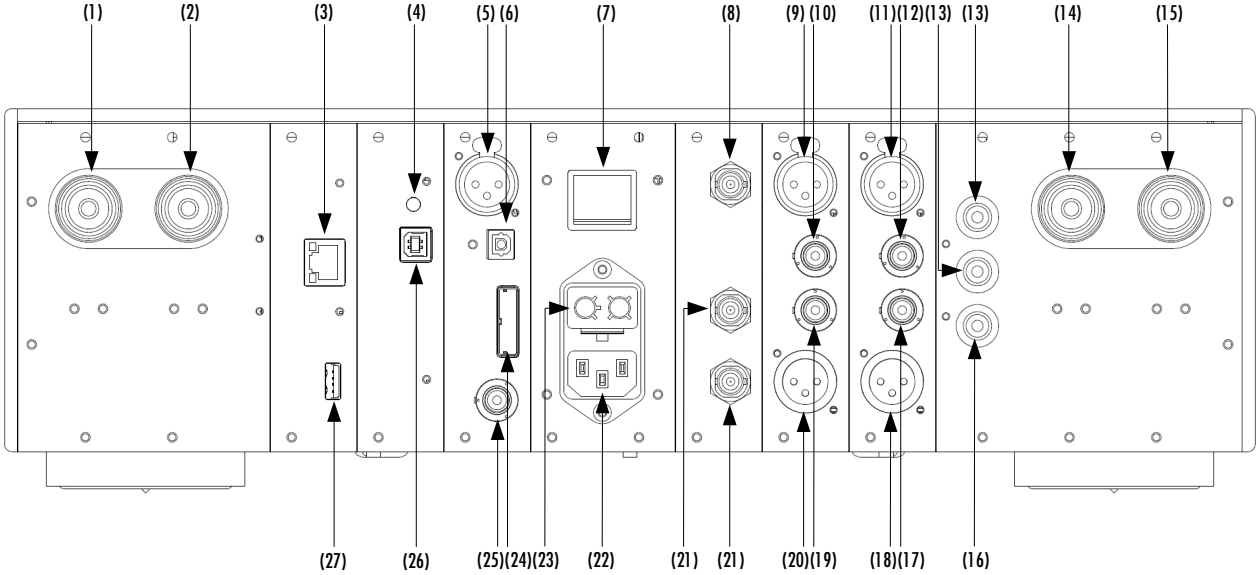
Never stack any component other than CH ones on your I1. Always use the stacking covers when another CH component is to be stacked on top of the I1.



Top covers (left: stacking cover, right: top cover)

6 Connections

This section provides information on how to connect the I1 to the rest of your audio system.



I1 rear panel connections

(1) Right channel negative speaker terminal
(2) Right channel positive speaker terminal
(3) Ethernet port for command interface [CONTROL board] or for Ethernet audio streaming and commands [optional NETWORK board]
(4) USB audio status LED [optional USB_IN board]
(5) AES-EBU digital input [DIGITAL_IN_HD board]
(6) Optical TOSLINK digital input [DIGITAL_IN_HD board]
(7) Mains power on/off switch
(8) BNC clock input. Provides 75 Ohm or high impedance input [optional SNYC_IO board]
(9) Right channel analog Line / Processor input 1 (balanced XLR) [ANALOG_IN board]
(10) Right channel analog Line / Phono (optional) / Processor input 2 (single-ended RCA) [ANALOG_IN board]
(11) Left channel analog Line / Processor input 1 (balanced XLR) [ANALOG_IN board]
(12) Left channel analog Line / Phono (optional) / Processor input 2 (single-ended RCA) [ANALOG_IN board]
(13) Analog audio ground connectors. Can be used to connect a turntable analog ground (using the provided banana plug)
(14) Left channel positive speaker terminal
(15) Left channel negative speaker terminal
(16) Earth connector. Internally connected to digital ground. Can be connected to analog ground using provided jumper
(17) Left channel analog Line / Phono (optional) / Processor input 3 (single-ended RCA) [ANALOG_IN board]
(18) Left channel preamplifier analog output (balanced XLR) [ANALOG_IN board]
(19) Right channel analog Line / Phono (optional) / Processor input 3 (single-ended RCA) [ANALOG_IN board]
(20) Right channel preamplifier analog output (balanced XLR) [ANALOG_IN board]
(21) BNC clock outputs [optional SNYC_IO board]
(22) Power cord receptacle

(23) Power fuse and voltage selection

(24) CH Link HD digital input [DIGITAL_IN_HD board]

(25) Coaxial S/PDIF digital input [DIGITAL_IN_HD board]

(26) USB audio input [optional USB_IN board]

(27) USB port for software upgrades [CONTROL board or optional ETHERNET_IN board]

6.1 Loudspeakers outputs

The loudspeaker outputs are high-voltage, high-current connectors allowing to connect to loudspeakers. There are two pairs of loudspeaker binding posts carrying the left and right audio channels. The binding posts can accommodate both spade and 4mm banana loudspeaker cable connectors. When using spades, the binding post screw secures the cable connector against the conductive part of the binding post. When using banana connectors, remove the screw from the binding post. The conductive area is exposed and a 4mm hole can be accessed to connect a banana plug.

Never alter connections to the loudspeakers with the I1 powered on. Once connected, make sure that the loudspeaker cables are securely tightened and cannot touch the I1 chassis. A short-circuit would be created if the loudspeaker cable connector was simultaneously touching the binding post and the I1 chassis (connected to Earth). The short-circuit would also take place if the negative loudspeaker cable (disconnected from the binding post) would touch the I1 chassis while the positive speaker cable is still connected to the speaker binding post. In any case, such a short-circuit could create permanent damage to the amplifier.

6.2 Preamplifier output

Should an additional 2-channel amplifier be used to bi-amplify a pair of loudspeakers, the stereo preamplifier outputs on balanced XLR are available to connect the I1 and the power amplifier. The I1 's volume is applied to both its loudspeaker output and preamplifier output. The gain of the I1 amplification stage is identical to the default gain of CH Precision's A1 and M1 for seamless integration. However, if bass and treble relative level needed adjusting, the A1 and M1 power amplifiers provide fine gain adjustment capability.

Please refer to chapter 3.2 for connection information for that setup.

6.3 Analog line and phono inputs

The I1 comes factory fitted with a set of three analog line inputs, one balanced XLR input and two single-ended RCA inputs.

An optional phono option board can be added to the I1. When fitted, the phono option uses the same physical RCA connectors as the ones used by the line inputs. Through the I1 menus, the user can configure these single-ended connectors to become line or phono input (or Bypass input, see chapter 6.4). This gives maximum flexibility to the user:

- The two RCA single-ended connectors can be used as two additional line inputs, or two phono inputs or any combinations of line and phono.
- The inputs can be reconfigured at all times as a system evolves.

Be very careful when configuring an input from line level to either phono or Bypass, as the I1 internal gain dramatically increases. Connecting a line level source to a phono configured input of the I1 may damage the source, the loudspeakers and your ears. Make sure that no source is playing and that your I1 is muted when you reconfigure your input types. Double-check before unmuting your I1.

6.4 Bypass input

The Bypass input creates a purely analog path that bypasses the digital heart of the I1 and connects a Bypass-configured analog input directly to the 2-channel analog power amplifier. Be aware that configuring an input as Bypass means that no volume is applied any more and the level is equivalent to no attenuation (0dB). Be sure to apply attenuation in the upstream device!

Usually an I1 analog input is configured as Bypass to use the I1 purely as a power amplifier.

The Bypass input uses the same physical connectors as the ones used by the line inputs. Through the I1 menus, the user can preconfigure the connectors to become a line or a Bypass input (or a phono input, see chapter 6.3).

6.5 Digital audio inputs (DIGITAL_IN_HD)

This board, factory fitted, provides the digital inputs of the I1. If more digital inputs are needed, a second board can be fitted. Please refer to chapter 2.1 for more information.

6.6 Type B USB port (USB_IN)

This optional board enables the I1 with USB audio streaming capability. Please refer to chapter 2.3 for more information.

6.7 BNC input and outputs (SYNC_IO)

This optional board enables the I1 with external clock synchronizing capability. Please refer to chapter 2.4 for more information.

6.8 Ethernet port

The Ethernet port is used to control the I1 unit settings via the CH Control app running on an Android tablet. Simply connect the I1 Ethernet port to a standard Ethernet router (equipped with a wireless access point so it can communicate with the tablet). Use an Ethernet RJ45 Category 5 or better cable. Using the CH Android app, the I1 settings can be accessed and adjusted on the fly. If the ETHERNET_IN option boards is fitted, the Ethernet port adds UPnP/DLNA audio streaming capability to the I1. If the Ethernet network has access to the Internet, the ETHERNET_IN option board also gives access to streaming services such Tidal and Qobuz (a valid subscription is needed to use these services). Please refer to chapter 2.2 for more information.

6.9 Type A USB port

The I1 unit runs a firmware that dictates the unit's operation. The USB port is used to perform update to the I1 firmware. The firmware update is carried out via a USB flash-drive containing the latest version of firmware. The USB flash-drive is inserted at the back of the unit and the update start command is activated via unit's menus.

Please note that the USB port has no other purposes than to update the I1 unit firmware. For more information about how to update the I1 firmware, please refer to chapter 9 of this manual.

6.10 Ground connections

The back panel of the I1 unit is fitted with three 4mm banana sockets. The black sockets are connected to audio ground while the yellow and green socket is connected to mains earth. When fitted between the black and yellow-green sockets, the banana jumper links audio ground to earth.

In a system containing multiple CH units, only one banana jumper becomes relevant. By essence the audio ground has to be earthed. It is best to connect it in one single point to avoid ground loops and therefore prevent hum. We recommend to earth the hub of the system, which usually is the preamplifier or an integrated amplifier. So the I1 should have the jumper connecting the

black and the yellow-green banana sockets while all the other units in the system should have their jumpers between the two black banana sockets. The two black banana sockets are connected together internally. Therefore connecting the jumper between the two black sockets is exactly the same as not connecting the jumper at all. We provide two black sockets so users know where to "store" the jumper. All in all, a system should only ever need one jumper. In some instances where a system combines CH equipment and pieces of equipment from other brands that would be earthed internally at all times, there could be no need to connect a single jumper behind CH units.

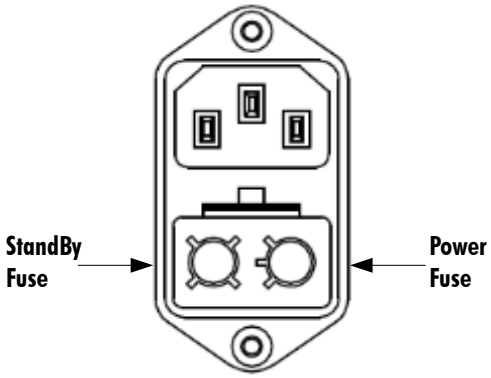
Besides, the three banana sockets can also be used to connect the ground of the turntable (when the PHONO_I1 option board is fitted). See chapter 2.5 for more information.

6.11 Mains socket and voltage selection

Make sure that the voltage selector at the back of the unit is set to the correct mains voltage with respect to the AC voltage at your location. Connect the power cord to the unit's mains socket and the power cord's plug to a wall socket.

6.12 Fuses

Two fuses are located at the back of the unit. They are located inside the mains power socket, inside the voltage selection tray.



I1 fuses location

Both fuses are slow-blow fuses (T type), 5mm in diameter and 20mm in length. The fuses' blowing values depend on the mains voltage at your location.

230V AC:

- Standby fuse: 250mA/250V
- Power fuse: 10A/250V

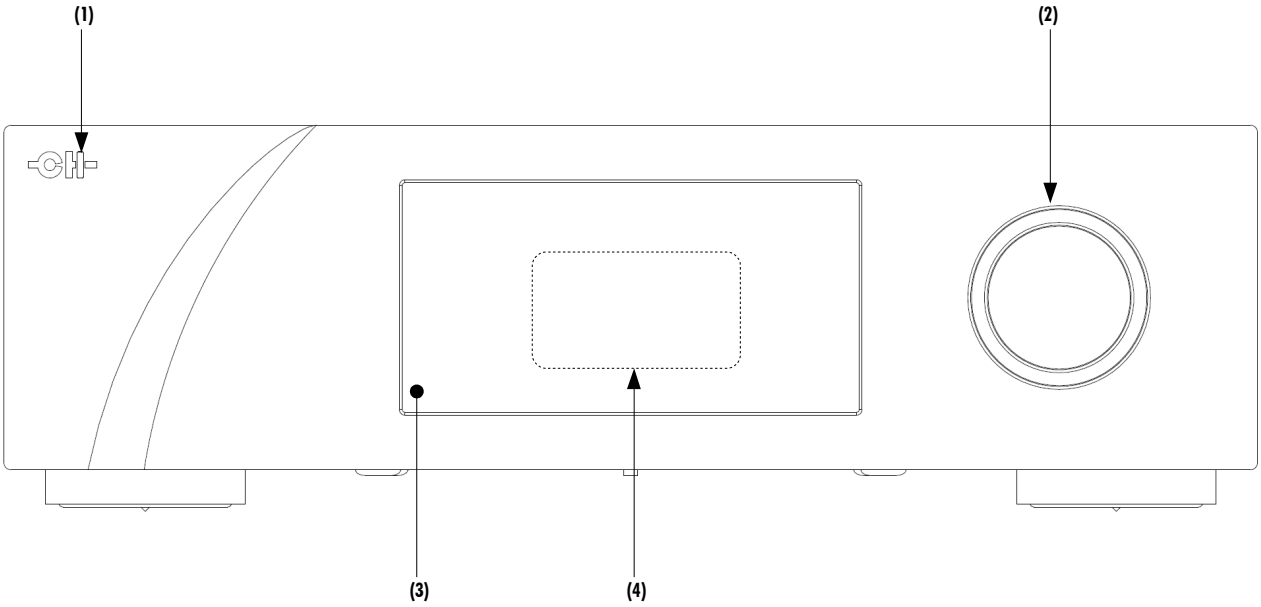
115-110V AC:

- Standby fuse: 500mA/250V
- Power fuse: 16A/250V

7 Operation

The I1 Universal Integrated Amplifier is operated either from the unit's front panel or from a tablet running the CH Control app.

7.1 Front panel



Front panel elements

(1) Standby LED

(2) User control knob (dual concentric rotatory knob with push function)

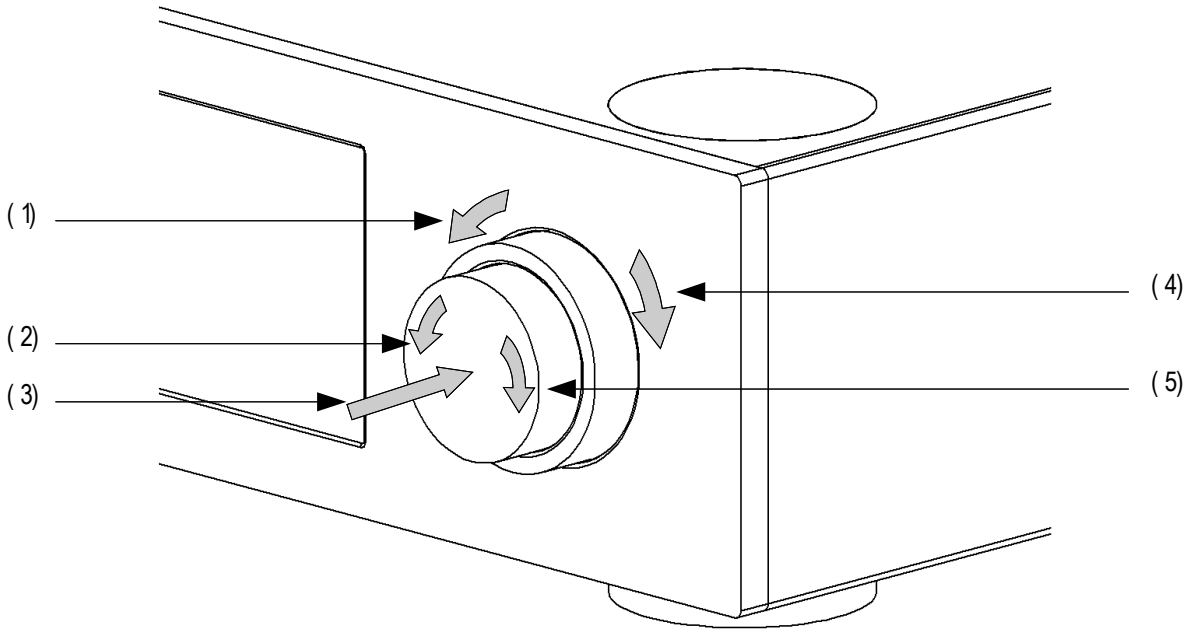
(3) IR remote control receiver

(4) Display area (high-definition AMOLED display)

The standby LED lights up when the unit is in standby. It is turned off by default during operation and shortly lights up whenever it receives an IR remote control command. The LED can also be programmed to remain ON during operation. The display is a high-definition panel with very wide viewing angle, high contrast and high brightness ensuring optimal reading comfort. The color and brightness of the display can be configured according to one's taste.

7.2 User control knob

The user control knob is the main user input device. It is build around a dual concentric rotatory knob with push function. Both the central and the external part of the knob can be moved to the left or the right independently, giving four movements: External Rotate Left/Right [<<E]/[E>>] and Central Rotate Left/Right [<<C]/[C>>]. The central part of the knob also supports a push functionality. There are two types of push: Normal Push [NP] and Long Push [LP]. For a Normal Push, just press the central part of the knob and release it immediately. For a Long Push, press and hold the central part of the knob for at least two seconds.



User control knob movements

(1) External ring rotate Left [<<E]

(2) Central knob rotate Left [<<C]

(3) Central knob push. There are two types of push: Normal Push [NP] and Long Push [LP]

(4) External ring rotate Right [E>>]

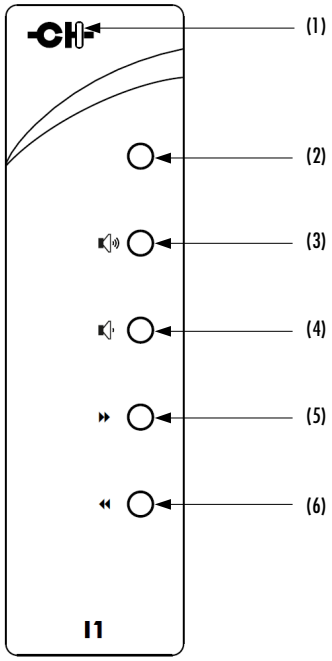
(5) Central knob rotate Right [C>>]

User Action Code	Description
[<<C]	Central Left: Rotate central knob to the left
[C>>]	Central Right: Rotate central knob to the right
[<<E]	External Left: Rotate external ring to the left
[E>>]	External Right: Rotate external ring to the right
[NP]	Normal Push: push and release central knob
[LP]	Long Push: push central knob and maintain for 2s before release

User action codes

7.3 Remote control operation

The I1 universal integrated amplifier is delivered with an infrared remote to control the unit's basic operation. The provided remote control is not intended to be used to configure the unit. All the settings of the I1 can be accessed from the unit's front panel or by using the CH Control app.



I1 universal integrated amplifier remote control

(1) Remote control activity LED

(2) Mute/Standby (long push) button

(3) Volume up button

(4) Volume down button

(5) Next input button / Phase polarity inversion (long push)

(6) Previous input button / Mono-Stereo (long push)

The remote control activity LED illuminates while a button is pushed on the remote. The remote control buttons are dual functions distinguished by Normal Push [NP] and Long Push [LP]. For a Normal Push [NP], the button is released immediately after pressing. A Long Push [NP] requires the button to be pushed for at least a couple of seconds.

Remote control functions are triggered according to the following table:

Remote Control Button	Normal Push [NP]	Long Push [LP]
MUTE	Mute/Unmute (also wakes-up from STANDBY)	Sets unit into STANDBY or wakes it up
VOLUME UP	+0.5 dB	Increase volume by larger steps
VOLUME DOWN	-0.5 dB	Decrease volume by larger steps
NEXT INPUT (»)	Select next input	Absolute phase inversion
PREVIOUS INPUT («)	Select previous input	Mono/Stereo toggle

Remote control functions

7.4 Changing the remote control batteries

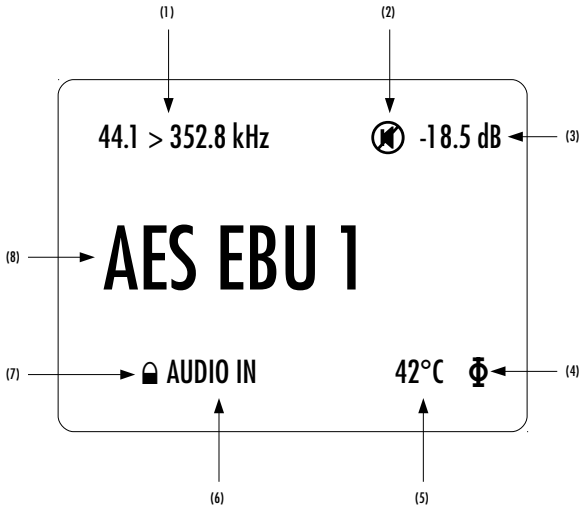
If the remote control activity LED does not turn on when pressing a button, it is likely that the remote control batteries need changing. To replace the batteries, remove the back plate of the remote control by removing the four cross-head screws. Swap the batteries for new ones (make sure to respect battery polarity), put the back cover back in place and tighten the screws. Two AAA batteries are required. Please recycle the old batteries or use rechargeable batteries.

7.5 Operating modes

The I1 Universal Integrated Amplifier has three operating modes: Normal mode, Shortcut modes and Menu mode. Normal mode is used to display the I1 main status whereas Menu mode is used to fully configure the unit. Shortcut mode is designed for quick access to selected Menu mode items. Shortcuts are user programmable and most Menu mode items can be selected as Shortcuts.

7.5.1 Normal mode

Normal mode is used to display the I1 main status, volume bar or temperature gauges. When powered on, the I1 starts in normal mode. Status display when the I1 is in normal mode can look as follows:



Normal mode display elements

(1) Sampling frequency, phono equalization curve or input type.
(2) Mute indication. Blank field when not muted.
(3) Volume level.
(4) Phase inversion indication. Blank field when phase is not reversed.
(5) Internal temperature.
(6) Current clock source indication.
(7) Locking indication. Padlock symbol is closed when the I1 is lock to its clock source.
(8) Input source name. Each input source can be renamed.

Displayed elements depend on the user settings. In the example above, the I1 locks to a 44.1kHz digital audio stream coming on its AES ABU 1 input. The volume is set to -18.5dB, but the unit is muted. If not muted, the phase would be reversed. Finally, the I1 internal temperature is 42°C.

The following table shows the actions of the user control knob in Normal mode.

User Control Knob Action	Unit State	Unit Action
[NP] Normal Push	STANDBY Any other state	Wake from STANDBY Enter Shortcuts mode
[LP] Long Push	STANDBY Any other state	Wake from STANDBY Go to STANDBY
[C>>] Center Rotate Right	Any state	Increase volume (1st by 0.5 dB steps, then faster)
[<<C] Center Rotate Left	Any state	Decrease volume (1st by 0.5 dB steps, then faster)
[E>>] External Rotate Right	Any state	Select next available input
[<<E] External Rotate Left	Any state	Select previous available input

User control knob actions in Normal mode

7.5.2 Shortcut Mode

The I1 universal integrated amplifier settings are accessible through a set of menus as described in the next sections. However, to allow quick access to the most frequently used configuration menu items, the I1 offers the concept of Shortcuts. Shortcuts are fully programmable and the user may choose almost 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.

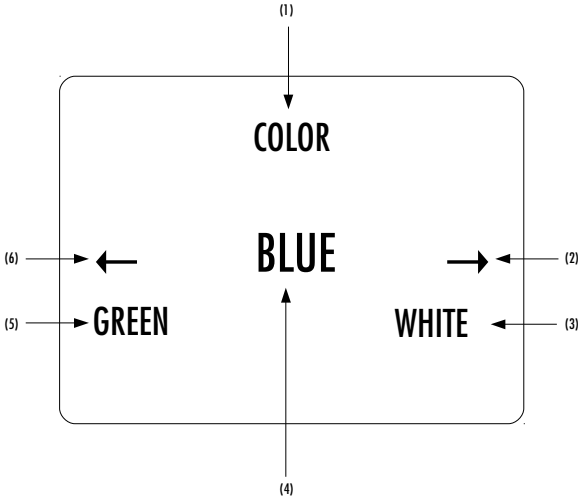
Shortcuts are accessed from Normal mode by a Normal Push [NP]. Additional Normal Push [NP] skips to the next Shortcut. The last Shortcut is always dedicated to entering the Menu mode (SETUP). On this last Shortcut, a Normal Push [NP] will return to Normal Mode and an External Rotate Right [E>>] (or Central Rotate Right [C>>]) will enter the Menu mode. The individual parameter for a given Shortcut is modified using External Rotate Left [<<E] (or Central Rotate Left [<<C]) and/or External Rotate Right [E>>] (or Central Rotate Right [C>>]). If there is no user action for about 10s the unit will revert to Normal mode.

Following table shows the actions of the user control knob for Shortcuts.

User Control Knob Action	Unit State	Unit Action
[NP] Normal Push	Shortcut (except last) Last Shortcut (SETUP) or after current Shortcut has been modified	Skip to next Shortcut Exit Shortcuts mode (Normal mode)
[LP] Long Push	Any state	As in Normal mode
[C>>] Central Rotate Right	Shortcuts (except last) Last Shortcut (SETUP)	Modify parameter up (when available) Enter Menu mode
[<<C] Central Rotate Left	Shortcuts	Modify parameter down (when available)
[E>>] External Rotate Right	Shortcuts (except last) Last Shortcut (SETUP)	Modify parameter up (when available) Enter Menu mode
[<<E] External Rotate Left	Shortcuts	Modify parameter down (when available)

User control knob actions for Shortcuts

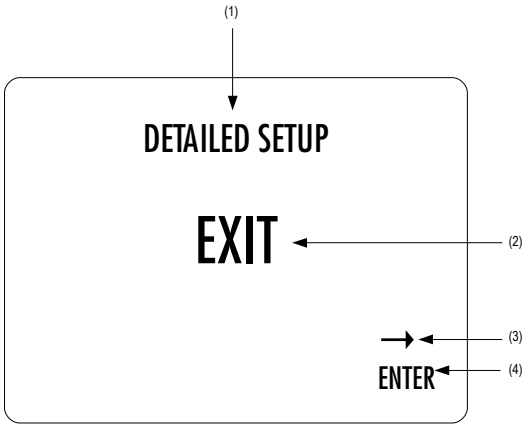
The COLOR Shortcut gives a good illustration of how to navigate a Shortcut screen. Navigating other Shortcuts is similar.



COLOR Shortcut display elements

(1) Shortcut title (Parameter, for other Shortcuts, title changes accordingly)
(2) Arrow indicating External Rotate Right [E>>] if applies. The item below indicates the next parameter value (up direction)
(3) Next Parameter Value if External Rotate Right [E>>] 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 External Rotate Left [<<E] is applied (parameter down)
(6) Arrow indicating External Rotate Left [<<E] if applies. The item below indicates the next parameter value (down direction)

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



DETAILED SETUP Shortcut screen

(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 Normal mode)
(3) Arrow indicating External Rotate Right [E>>] (or Central Rotate Right [C>>])
(4) Next parameter value. If External Rotate Right [E>>] is applied, the unit enters into Menu mode

7.5.3 Menu mode

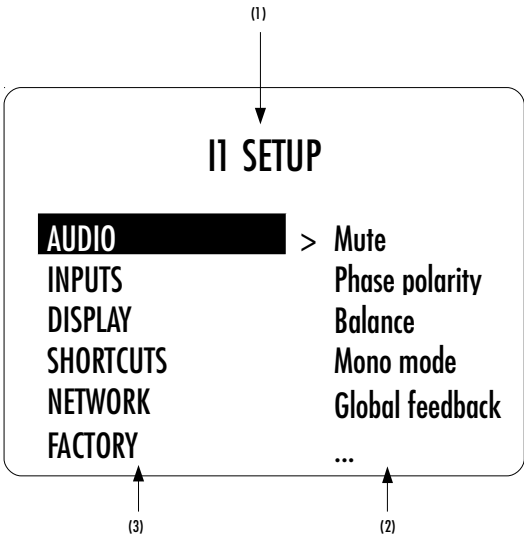
The Menu mode allows the Configuration and Setup of the I1. Menu mode is entered from the last Shortcut item (see above). From Normal mode, enter the Shortcut mode by applying a Normal Push [NP]. By successive Normal Pushes [NP], step to the last Shortcut item (DETAILED SETUP) and apply an External Rotate Right [E>>] to enter the Menu mode.

Navigation in Menu mode is based on Central Rotate Left/Right [<<C]/[C>>] to select a given menu item and External Rotate Left/Right [<<E]/[E>>] to change menu level.

User Control Knob Action	Unit Action
[NP] Normal Push	Enter next menu level or Validate choice (save setting)
[LP] Long Push	Puts the unit into Standby
[C>>] Center Rotate Right	Move to next menu item downward
[<<C] Center Rotate Left	Move to next menu item upward
[E>>] External Rotate Right	Enter next menu level
[<<E] External Rotate Left	Return to previous menu level without saving

User control knob actions in Menu mode

The following illustration shows the elements of a the I1 SETUP Menu page, the entry point of the I1 menu structure.



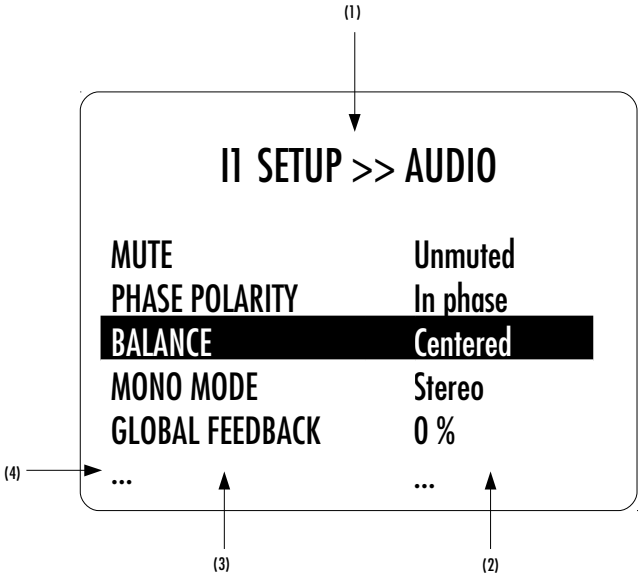
I1 SETUP screen items

(1) Menu title. When entering a menu item, the title also shows the parent menu. If the AUDIO menu is entered, the title line would display I1 SETUP >> AUDIO.

(2) Shows the available parameters when entering the currently highlighted menu item. In this example, GENERAL SETTINGS is highlighted and the second column shows the parameters available in the AUDIO menu.

(3) The list of items in the current menu. Navigate from one item to the other using Central Rotate Left/Right [<<C]/[C>>]. To enter the highlighted menu item, use External Rotate Right [E>>] (or a Normal Push [NP]). To go to the previous menu level use External Rotate Left [<<E]. In this example, External Rotate Left [<<E] exits the Menu mode and sets the unit back to Normal mode.

Once a menu item is selected by External Rotate Right [E>>], parameters for the corresponding menu item can be navigated and accessed. As an example, the following drawing shows the display elements of the I1 SETUP >> AUDIO sub-menu.



I1 SETUP >> AUDIO menu items

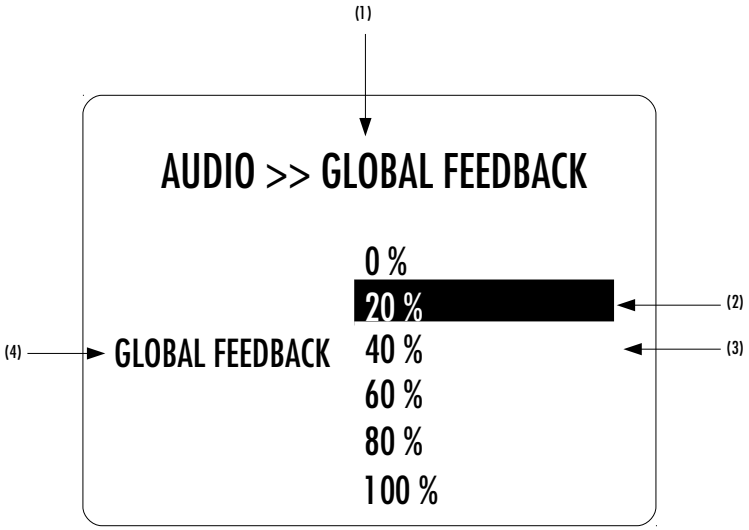
(1) Menu title. I1 SETUP >> AUDIO shows that the parent menu is I1 SETUP. By applying External Rotate Left [<<E], the unit returns to the parent menu.

(2) This is the Parameter Value column. For each item in the Parameter column, the Parameter Value item on the same line indicates the current value of the Parameter.

(3) This is the Parameter column. The currently active Parameter is highlighted. Use Central Rotate Left/Right [<<C]/[C>>] to navigate from Parameter to Parameter.

(4) If the first or last item in the Parameter column is indicated by '...' it means that there are additional Parameters not displayed currently on-screen. Use Central Rotate Left/Right [<<C]/[C>>] to navigate towards the '...' to make the corresponding Parameters appear on screen.

Once a terminal Parameter (e.g. a Parameter not giving access to a further sub-menu) is selected by External Rotate Right [E>>], the I1 displays the corresponding Parameter adjustment screen. The following example shows the AUDIO >> GLOBAL FEEDBACK Parameter adjustment screen. Other Parameters are similar but may show more (or less) choices for Parameter value. Once a Parameter is set to the desired value, a Normal Push [NP] saves the new Parameter Value and gets back to the parent level (save and exit). On the other hand, an External Rotate Left [<<E] gets back to the parent menu (in the case of this example: AUDIO), but possible modifications of the Parameter Value are discarded (exit without saving).



AUDIO >> GLOBAL FEEDBACK menu items

(1) Menu title. AUDIO >> GLOBAL FEEDBACK shows that the parent menu is AUDIO. To access the parent menu, use External Rotate Left [<<E]

(2) The current Parameter Value is highlighted. Use Central Rotate Left/Right [<<C]/[C>>] to navigate through Parameter Values

(3) Other possible Parameter Value(s). Number of other Parameter Value(s) depends on Parameter

(4) Parameter for which the Parameter Value can be modified in the current menu.

8 The I1 menus

Configuration of your I1 is accomplished by setting up parameters in the Menu mode (see chapter 7 on how to access the Menu mode and how to navigate through menu items).

Please note that configuring your I1 can also be done on a tablet using the CH Control Android app. Please refer to chapter 6.8 for more information about how to link the I1 to your tablet. Besides, for more information about the CH Control app, please visit our Facebook page (www.facebook.com/chprecision) where you can watch a video describing the main features of the CH app.

There are six main menus used to configure the I1:

- AUDIO: Allows to adjust global sound related parameters
- INPUTS: Allows to adjust input-specific parameters
- DISPLAY: Allows to adjust the front panel display related parameters
- SHORTCUTS: Allows to assign and modify Shortcuts for user interface customization
- NETWORK: Provides information about the Ethernet network setup and enables its configuration
- FACTORY: Provides software and hardware configuration information. Allows firmware update and lists options installed in the I1. Also allows to return to default factory settings

8.1 AUDIO menu

PARAMETER	PARAMETER VALUES	REQUIRED OPTIONS	REMARKS
MUTE	Muted Unmuted	-	None
PHASE POLARITY	In phase Out of phase	-	Not available when I1 is configured as power amp. Not available for processor type input.
BALANCE	L/R +/-6dB by 0.5 dB steps	-	Not available when I1 is configured as power amp. Not available for processor type input.
MONO MODE	Stereo Mono	-	Not available when I1 is configured as power amp. Not available for processor type input.
GLOBAL FEEDBACK	0% - 100% by 20% steps	-	Global versus local feedback ratio in the amplification stage: 0% global feedback means fully local feedback 100% global feedback means no local feedback
FILTER TYPE	Minimal phase Linear phase	-	DSD to PCM and upsampling filter type. Minimal phase filter has no pre-ringing while linear phase has constant group delay. Only applied to digital inputs
PHONO CURVE	RIAA eRIAA EMI	PHONO_I1 option	RIAA is the standard phono equalization curve used since the 1950s. Enhanced RIAA (eRIAA) adds the Neumann pole to the RIAA

	COLUMBIA DECCA TELDEC		equalization filer. Other phono equalization curves were used by various labels before RIAA standardization.
MAX START VOLUME	-50 dB to -20 dB by 10 dB steps	-	The I1 startup volume is the lowest of the following: - Last listening volume before standby - MAX START VOLUME parameter value
MAX VOLUME	-30 dB to 0 dB by 10 dB steps, or no limitation (up to +24 dB)	-	Limits the output volume of the I1
USB AUDIO CLASS	1.0 (up to 96 kHz) 2.0 (above 96 kHz)	USB_IN option	More detail in chapter 2.3
USB AUDIO POWER	Auto shutdown Always on	USB_IN option	Auto shutdown allows automatic power off of the USB audio board (including its DSP) when another input is selected to minimize noise. In that case, the connected computer looses link to the I1 and its playback will stop as another input is selected. Keeping USB powered allows quicker playback switching between USB an other I1 inputs.

8.2 INPUT menu

PARAMETER	PARAMETER VALUES	REQUIRED OPTIONS	REMARKS
TYPE	Disabled Normal / Line Processor Phono	- - - PHONO_I1 option	Hides a specific input from selection choice Volume controlled digital input or line level analog input Volume is bypassed (pure analog path for analog inputs) High gain I/V phono buffer applied
CLOCK SOURCE	Internal clock Audio in clock Sample rate converter Sync BNC High Z Sync BNC 75 Ohm	- - - SYNC_IO option SYNC_IO option	Available clock source depends on input type
GAIN	+/-18dB by 0.5 dB steps	-	Only available for analog inputs
HP FILTER	HP filter off HP filter on	PHONO_I1 option	Subsonic phono high-pass filter. Only available for phono-configured analog inputs
NAME	*Any string*	-	Used to rename any input of the I1

8.3 DISPLAY menu

PARAMETER	PARAMETER VALUES	REMARKS
DISPLAY MODE	Status Volume Temperature Off	Selects what to display when the unit is idle for several seconds: general status page, volume bar, temperature gauges or turn the display off.
LED ON/OFF	On Off	Allows to select if the front panel LED is on or off when the I1 is on
BRIGHTNESS NORMAL	10% to 100% by 10% steps	Sets the display brightness when the unit is operated
BRIGHTNESS DIMMED	0% to 30% by 10% steps	Sets the display brightness when the unit is left idle for several seconds
COLOR ANALOG	Red Green Blue White Yellow Magenta Cyan Custom color Edit custom color	Selects the color of the displayed texts when an analog / PCM / DSD source is played. Custom color is a user definable color. To Edit the custom color select the Edit custom color Value. Sub-menus allow to individually configure Red, Green and Blue components (RGB) of the custom color.
COLOR PCM		
COLOR DSD		
GAMMA SCALE	RBG and global brightness gamma curve correction,+/-30%	Fine adjustment the gamma scale of the RGB components of the display. Allows to have perfectly dark background and to match other CH Precision unit's display color, even at low brightness

8.4 SHORTCUTS menu

PARAMETER	PARAMETER VALUES	REMARKS
SHORTCUT 1	Most Parameters of the AUDIO and DISPLAY menus or None	If SHORTCUT 1 is not defined, Parameter value for SHORTCUT 1 is set to 'None'. SHORTCUT 2 to 6 are not displayed in this case.
SHORTCUT 2	Most Parameters of the AUDIO and DISPLAY menus or None	If SHORTCUT 2 is not defined, Parameter value for SHORTCUT 2 is set to 'None'. SHORTCUT 3 to 6 are not displayed in this case.
SHORTCUT 3	Most Parameters of the AUDIO and DISPLAY menus or None	If SHORTCUT 3 is not defined, Parameter value for SHORTCUT 3 is set to 'None'. SHORTCUT 4 to 6 are not displayed in this case.
SHORTCUT 4	Most Parameters of the AUDIO and DISPLAY menus or None	If SHORTCUT 4 is not defined, Parameter value for SHORTCUT 4 is set to 'None'. SHORTCUT 5 and 6 are not displayed in this case.
SHORTCUT 5	Most Parameters of the AUDIO and DISPLAY menus or None	If SHORTCUT 5 is not defined, Parameter value for SHORTCUT 5 is set to 'None'. SHORTCUT 6 is not displayed in this case.
SHORTCUT 6	Most Parameters of the AUDIO and DISPLAY menus or None	If SHORTCUT 6 is not defined, Parameter value for SHORTCUT 6 is set to 'None'.

8.5 NETWORK SETTINGS menu

PARAMETER	PARAMETER VALUES	REQUIRED OPTIONS	REMARKS
STATUS	IP address Product type MAC address	Connection to a router via its RJ-45 Ethernet port	List of CH Precision devices and Android remote controls detected by the I1 (product type, IP and MAC addresses) Read Only parameters
ROLE	Offline Power master Master Slave Custom	Connection to a router via its RJ-45 Ethernet port	When physically connected to a network, the I1 can ignore this network (offline) or connect to it as being a master (it will transmit IR received commands to slaves) or as a slave (it will ignore IR commands and receive ethenet commands from a master device). Power master shuts all online devices down upon its own shut down.
ROOM NUMBER	1 … 7	Connection to a router via its RJ-45 Ethernet port	Define the room in which room the I1 is for multiroom applications. This prevents CH Precision units connected to the same network but located in different systems/rooms to interact with each others.
IP SETTINGS	Auto (DHCP) Direct-Link Manual	Connection to a router via its RJ-45 Ethernet port	Auto should be selected if the I1 is connected to a router with DHCP server feature. Choice available only with default CONTOL board. Auto (DHCP) always selected with a ETHERNET_IN option board as it is required for UPnP.
WAKE-ON-LAN	No Only if PoE Yes (only available with CONTOL board)	Connection to a router via its RJ-45 Ethernet port	If No is selected, the I1 can't be woken up by the app. Standby mode will consume less than 0.5W. When Only if PoE is selected, the I1 can only be waken by the app if connected to a Power-over-Ethernet switch. Standby mode will draw less than 0.5W from the mains plug. If Yes is selected, the I1 can always be woken up by the app. Standby mode will draw a couple of watts from the mains plug.
POWER OFF COMMAND	No Yes	Connection to a router via its RJ-45 Ethernet port	When “No” is selected, the I1 ignores “power off” commands received through the network.
NETWORK KNOWLEDGE	Clear	-	Clears the I1's memory of other CH Precision devices it has discovered through the TCP/UDP proprietary protocol.

8.6 FACTORY menu

PARAMETER	RELATED ACTION/VALUE	REMARKS
FIRMWARE VERSION	*Firmware version*	*Firmware version* indicates the version of the current firmware. Format is *x.y.* Read only parameter.
UPDATE FIRMWARE	Update	Selecting 'Update' launches the I1 firmware update process. A USB flash disc drive with a valid set of firmware must be inserted in the Type A USB port.
FACTORY RESET	Reset	Selecting 'Reset' returns the I1 to its factory settings.
SERIAL NUMBER	*Serial number*	*Serial number* indicates the serial number of the I1. Read only parameter.
INSTALLED OPTIONS	ETHERNET: Control, Streaming ANALOG: Line in/out, Phono + Line in/out DIGITAL 1, 2: Digital in 1, 2, USB in 1, 2, -	Automatically updated as configuration evolves Read only parameter.
REMOTE CONTROL CODES	No remote RC5 Pre3 RC5 Pre2 PC5 Pre1	Selects to which set of RC5 commands the I1 will respond. Pre3 is the default I1 infrared remote control setting. Pre2 is the default C1 infrared remote control setting. Pre1 is the default L1 infrared remote control setting.
AMPLIFIER MODE	Integrated amp Power amp	When a preamplifier is used upfront of the I1, the latter can be reconfigured as a pure power amplifier.

9 Firmware update

9.1 Preparing the USB flash-drive

The firmware of every CH Precision unit 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 flash-drive with files containing the new firmware. Please use the one provided in the accessory box of the I1. It is a FAT32 formatted USB 2.0 flash-drive. Please note that some USB flash-drives might not be detected by the I1 USB port.

The following procedure describes how to load the USB flash-drive with the correct files:

1. Delete any older `I1_xxx.yyy` file from the root folder of the USB flash-drive that will be used for firmware update, as only one valid I1 firmware must be present in this folder.
2. Download the latest I1 firmware file from www.ch-precision.com
3. Decompress the `I1_xxx.zip` file and copy the decompressed files to the root of your USB flash-drive. After doing so, your USB flash-drive should contain the following files:

- `I1_xxx.ds1`
- `I1_xxx.fp1`
- `I1_xxx.mc1`
- `I1_xxx.ol1`

where '`xxx`' indicates the firmware revision.

Make sure all these files are present at the root of your USB flash-drive. Any missing file will make the firmware update procedure fail, while multiple versions of the same unit's firmware can lead to unstable I1 behavior after update.

9.2 Updating the unit firmware

1. Perform the operations described in section 9.1.
2. Connect the USB flash-drive to the USB port located at the back of your I1 unit.
3. Navigate to the FACTORY SETTINGS menu (see section 7) and select the UPDATE FIRMWARE item.
4. Start the Firmware Update process by pushing the encoder push button. Please note that the unit will perform a Reset (the display briefly turns off and on) during the procedure.
5. Once the firmware update is complete, the unit automatically goes into Standby. Remove the USB flash-drive 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 flash-drive.

Note: The firmware update process lasts 10-15 minutes, **do NOT interrupt it!**

When performing a firmware update, do NOT touch the front panel 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. In case anything went wrong during a firmware update and the unit is malfunctioning, apply the emergency firmware update procedure described in the next section.

9.3 Emergency firmware update procedure

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

1. Perform the operations described in section 9.1
2. Power the unit off (back panel mains power switch to OFF)
3. Push and keep the front panel 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 turned the unit on.
4. The unit performs the emergency firmware update. Once the operation is complete, the unit automatically goes into Standby. Remove the USB flash-drive 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 flash-drive
5. If the emergency firmware update procedure fails, try the same procedure again using a different USB flash-drive. If the failure persists, turn off your unit and contact your authorized dealer for assistance.

Note: The emergency firmware update procedure lasts 10-15 minutes, **do NOT interrupt it!**

10 Clocking considerations

Many audio sources can be connected to the I1. Depending on their type and your I1 options, various clocking scheme can be realized. When set incorrectly, clocking schemes can result in no sound coming out of the system, sound that disappears after some time or sub-optimal performances delivered by your system.

We detailed below a few examples of clocking configurations. Although we used CH pieces of equipment in these examples, the general clocking considerations could be applied to any piece of digital equipment. This chapter is quite technical, but we kindly ask you to take the time to read it carefully in an effort to get the best sound out of your CH system.

10.1 Only ever one clock master in a system

In any configuration, there must always be no more and no less than one clock master in a system. The clock master is the unit delivering clocks to the rest of the system. In CH digital products, the unit becoming the clock master uses its internal clocks and should have its clock source set to INTERNAL. The clock master can be a CH product or it can be an external clock generator like the T1.

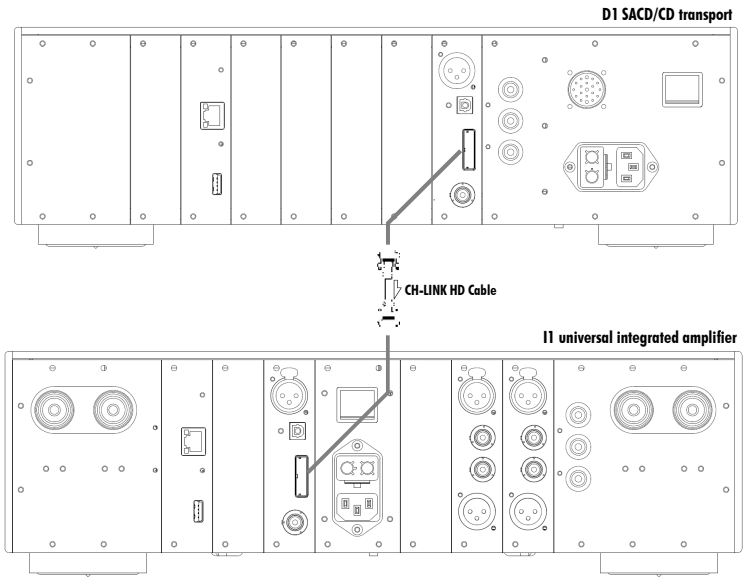
If more than one clock master is used, the system is no more synchronized and after some time units will display a clocking error message (CLOCKING ERR displayed on the front panel display).

If there isn't any clock master, each unit will try to synchronize to a unit that is clock slave itself. This kind of system is unstable and may either never output sound or unlock after some time.

10.2 I1 without SYNC_IO board

For more information on the SYNC_IO option board, please refer to chapter 2.4.

When an I1 with no SYNC_IO board is used with a D1 SACD/CD drive, both audio data and clocks go from the D1 to the I1, whether the signal is conveyed via S/PDIF, AES/EBU, optical TOSLINK or the proprietary CH Link HD.



I1 – D1 using CH Link HD, no SYNC_IO board

In this configuration, the I1 will retrieve clocks from the incoming signal. The I1 and D1 clock sources should be set as follow:

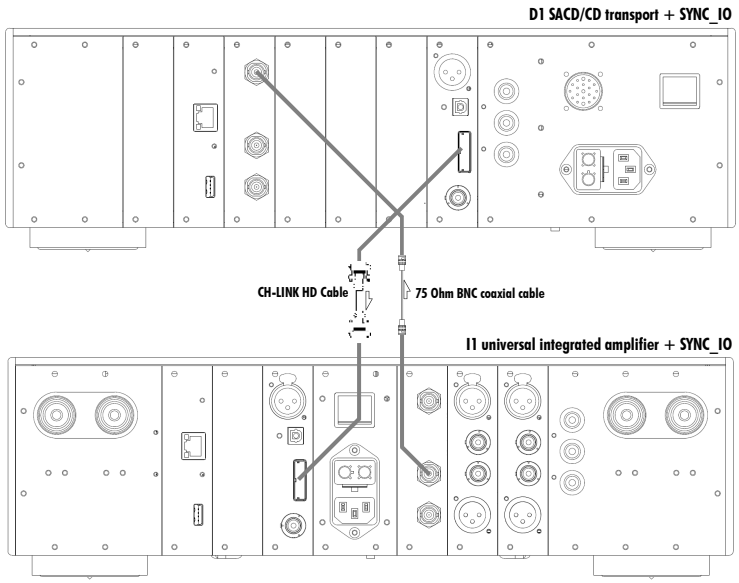
- D1: INTERNAL
- I1 (for the input the D1 is connected to): AUDIO IN

Some non CH pieces of equipment either don't comply with the AES standard and/or have a considerable amount of jitter. If the I1 wasn't able to lock (open padlock, no sound) onto the incoming audio signal but would detect the incoming sampling frequency, the clock source should be set to "SRC" for this input. The I1 will add an asynchronous sample rate conversion stage that has a wider locking range.

10.3 I1 and D1 transport with SYNC_IO board

For more information on the SYNC_IO option board, please refer to chapter 2.4.

When both the I1 and the D1 are equipped with a SYNC_IO board, optimum performance is obtained when the I1 becomes the clock master while the D1 becomes clock slave. The audio data goes from the D1 to the I1, but the synchronizing clock goes the other way. The picture below shows how to connect such a system:



I1 – D1 using CH Link HD, with SYNC_IO board

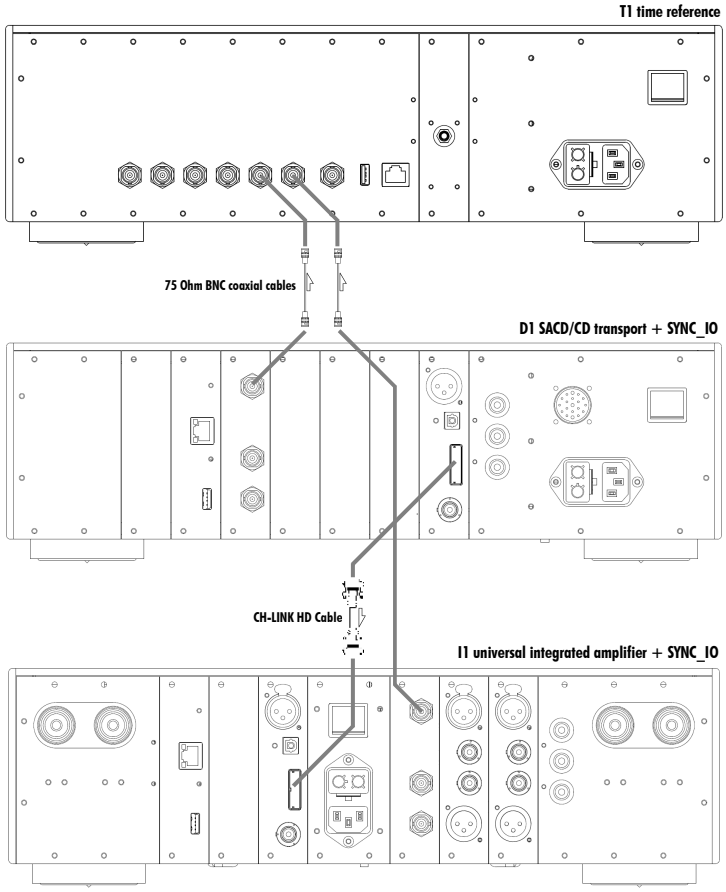
In this configuration, the I1 and D1 clock sources should be set as follow:

- D1: SYNCHRO BNC 75 Ohm
- I1 (for the input the D1 is connected to): INTERNAL

10.4 T1 + I1 and D1 with SYNC_IO board

For more information on the SYNC_IO option board, please refer to chapter 2.4.

When both the I1 and the D1 are equipped with a SYNC_IO board and a high accuracy, high stability external clock generator (like the CH Precision T1) is available, optimum performance is obtained when both the I1 and the D1 are clocked by the external clock generator who becomes the clock master of the system. Both I1 and D1 are clock slaves in this setup. The audio data goes from the D1 to the I1 and the synchronizing clock is distributed by the T1 to both units. The picture below shows how to connect such a system:



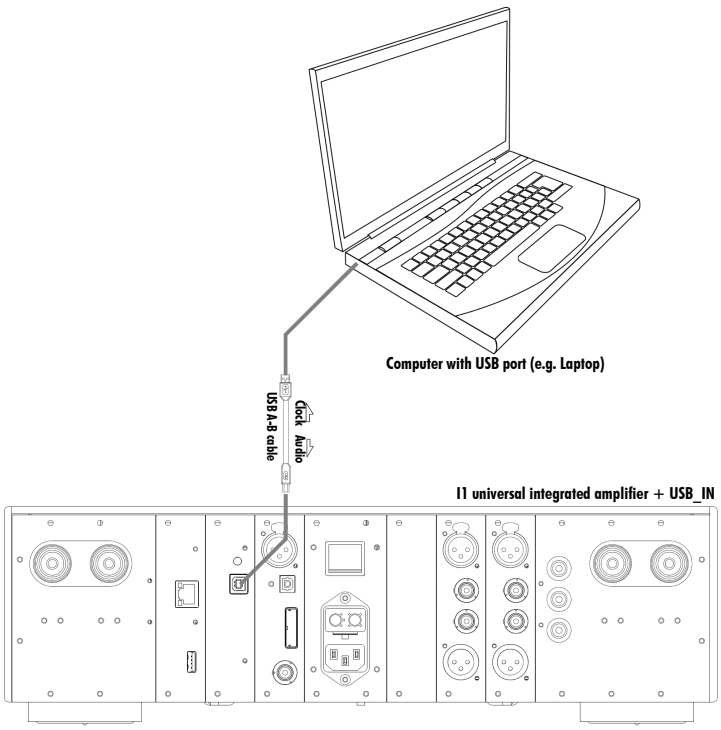
I1 – D1 – T1 using CH Link HD, with SYNC_IO board

In this configuration, the I1 and D1 clock sources should be set as follow:

- D1: SYNCHRO BNC 75 Ohm
- I1 (for the input the D1 is connected to): SYNCHRO BNC 75 Ohm

10.5 I1 with USB_IN board + Computer

When an I1 equipped with a USB_IN board is used together with a computer for audio files playback, a single cable links them together: a type A (computer side) to type B (I1 side) USB 2.0 cable. For more information on the USB_IN option board, please refer to chapter 2.3. Data flows from the computer to the I1, while the I1 sets the pace of the data transfer, thus being clock master. The picture below shows how to connect such a system:



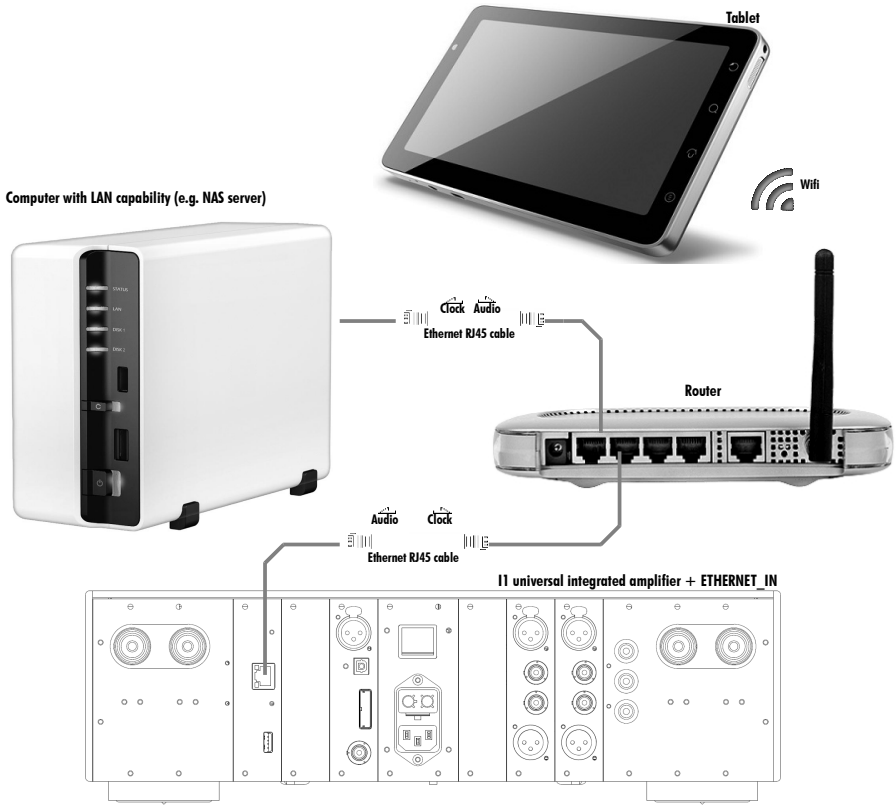
Computer to I1 with USB_IN board

In this configuration, the I1 clock source should be set to INTERNAL.

Please note that if a high accuracy, high stability external clock generator (like the CH Precision T1) is available, optimum performance is obtained when the I1 is clocked by the external clock generator which becomes the clock master of the system. The I1 becomes clock slave and its clock source for USB input should be set to SYNCHRO BNC 75 Ohm. The audio data goes from the computer to the I1 and the synchronizing clock flows from the T1 to the I1 which in turns synchronizes the computer stream.

10.6 I1 with ETHERNET_IN board + Computer

When an I1 equipped with an ETHERNET_IN board is used together with a network music server for audio files playback, both the server and the I1 must be connected to the same network. For more information on the ETHERNET_IN option board, please refer to chapter 2.2. UPnP protocol ensures that data flows from the music server to the I1 while the I1 sets the pace of the data transfer, thus being clock master. The picture below shows how to connect such a system:



Computer to I1 with ETHERNET_IN board

In this configuration, the I1 clock source should be set to INTERNAL.

Please note that if a high accuracy, high stability external clock generator (like the CH Precision T1) is available, optimum performance is obtained when the I1 is clocked by the external clock generator who becomes the clock master of the system. The I1 becomes a clock slave and its clock source for streaming input should be set to SYNCHRO BNC 75 Ohm. The audio data goes from the server to the I1 and the synchronizing clock flows from the T1 to the I1 which in turns synchronizes the server stream.

11 Troubleshooting

Error	Action
No power	Check the AC power cord Check the power switch at the back of the unit Check the mains fuses in the AC power cord receptacle
Remote control does not work	Move closer to the unit and try again. The I1 Standby LED should flicker when the remote is emitting Change the batteries inside the remote control if required (Remote control LED does not illuminate) Make sure the I1 is not configured as Slave on the network (Settings / Network / Config) Make sure in Factory Settings / Remote Control matches your RC5 remote control (Pre3 by default)
No sound (general)	Check that your source is playing Check that the system volume setting is not too low Check that the correct input is selected on your I1
No sound "⊗"	Your I1 is muted (display area 2 ⊗ must be off). Unmute using the red RC button
No sound "Fs UNKNOWN"	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 in chapter 12. Try switching to another input to verify that your I1 works well on other inputs.
No sound "INVALID SIGNAL IN"	The Incoming audio stream is non-PCM (e.g. AC3 or DTS). Valid signals are PCM on digital inputs and PCM and DSD on CH-Link and Ethernet streaming inputs.
No sound "⎍"	The I1 is not locked to its clock source If you are using a clocking scheme involving external clock in/out (SYNC_IO), make sure 75 Ohm BNC cable are properly connected and not damaged.
No sound "CLOCKING ERR."	The source (e.g. D1 SACD/CD drive) and the I1 are not synchronized. Please refer to Advanced clocking chapter 10 to make sure a valid clocking scheme is used. If you are using a clocking scheme involving external clock in/out (SYNC_IO optional board), make sure 75 Ohm BNC cable are properly connected and not damaged.
"ADC OFLOW" is displayed for a short time	The voltage is too high on an analog input of the I1. If it is only triggered by the landing of the needle of the cartridge on the record (which produces a short signal overshoot), it is perfectly normal. If this message appears in other conditions, it means that the global voltage level of the analog source is too high and should be decreased, or the phono input gain should be decreased.
"ADC OFLOW" is displayed for a long time while playing records.	If the phono subsonic high-pass filter is turned off, the rumble noise can lead to extremely high amplitude voltage swing at the input of the ADC, saturating it. In this case, turn the subsonic filter on as explained in chapter 8.2 or decrease the gain of the phono input.
Lost in the settings?	Restore the default factory settings (MAIN MENU → FACTORY → FACTORY RESET)
Firmware update fails	Perform the emergency software update procedure using the provided USB flash-drive

Troubleshooting

If the problem persists, disconnect the unit from the AC wall socket and from the rest of your system and contact your authorized dealer for assistance.

12 Specifications

General	
User control	Front panel dual concentric encoder and/or CH Control Android app
Display	480 × 272 pixels, 24 bits RGB AMOLED
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz
Power consumption (Standby)	< 1W
Power consumption (Normal operation)	Max 1200 Watts
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (W x D x H)	440mm x 440mm x 120mm (main body) 440mm x 520mm x 140mm (overall including connectors and front knob)
Weight	33kg
Firmware update / Control	USB port for firmware update / Ethernet based system control
Digital Audio Inputs	
AES/EBU, coaxial S/PDIF, optical TOSLINK	PCM up to 192kHz/24bits and DoP (DSD64 over PCM)
CH Link HD	PCM up to 768kHz/32bits and native DSD up to 5.6448MHz/1bit
Audio Streaming (optional)	
Ethernet	Connects to a UPnP/DLNA compatible server. Use CH Android app to control
USB	Enables bit-exact, ultra low jitter playback of high resolution audio file directly from a computer
Phono MC Input (optional)	
Input impedance	<100mΩ, current mode input (virtual ground input)
Line Level Analog Audio Inputs	
Input impedance	Balanced (XLR): 94kΩ Single-ended (RCA): 47kΩ
Maximum input level	Balanced (XLR): 8V RMS Single-ended (RCA): 4V RMS
Analog Audio Outputs	
Line level output (preamplifier output)	Balanced (XLR): Maximum 4V RMS, volume controlled output
Power output (loudspeaker output)	2x 100W RMS/8Ω, 2x 175W RMS/4Ω

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 Mana Ishoni

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

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.