



L1 Dual Monaural Line Preamp

User Manual





Dear Valued Customer,

We are honored that you chose the L1 Dual Monaural Line Preamplifier. Our team made every effort to design and manufacture this top quality versatile and future-proof product and is proud to present it to you. We hope your L1 preamplifier will bring you uncountable hours of emotion from your music collection.

But before you embark on your musical journey, we kindly request your attention to the information contained in this manual. The L1, 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 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 L1 preamplifier for many years.

The Concert has just begun...

Cossy F.

A handwritten signature in blue ink, consisting of a stylized 'C' followed by a sharp, downward-pointing stroke.

Heeb T.

A handwritten signature in blue ink, featuring a circular loop followed by a horizontal line that ends in a small upward tick.





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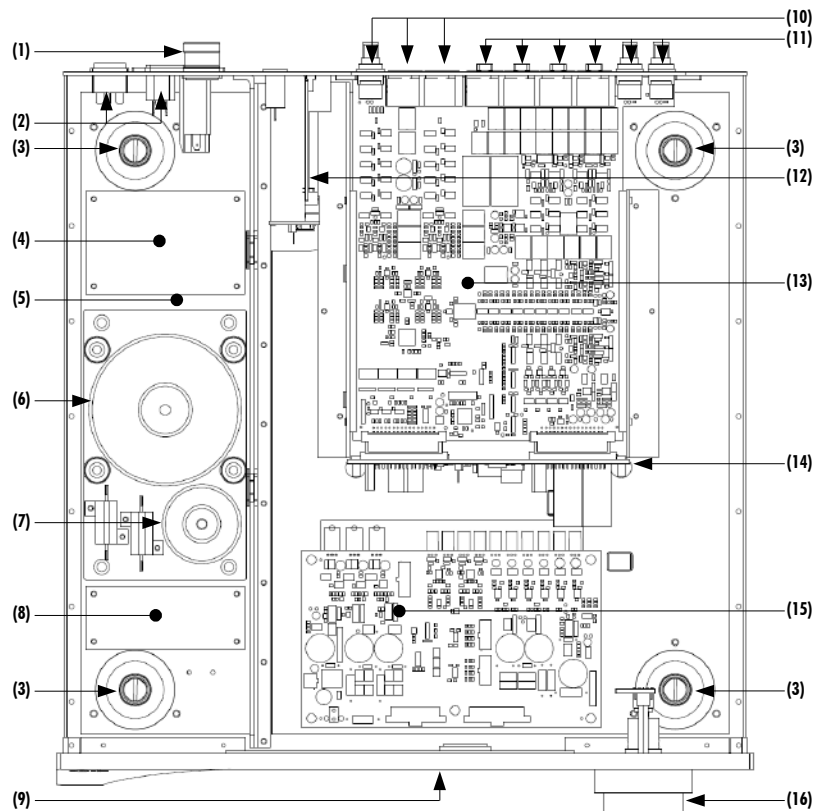
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1 Technical highlights

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 L1, a top performance future-proof modular two channel preamplifier with USB flash-drive firmware update and Ethernet control capabilities. Like all CH Precision products, the L1 is highly versatile: 3 configurations are possible: Dual Monaural (the L1 holds two channels in a single chassis), Monaural (two L1s work together, each one processing a single channel, one board in each chassis) and finally the Monaural Extended (two L1s work together, each one processing a single channel, however with two boards in each L1 chassis, allowing twice the amount of inputs). All these configurations can be further enhanced by adding the X1 External power supply.

The L1 is a fully symmetrical design, pure Class A discrete transistor based circuitry. This results in ultra low noise, high bandwidth and high slew rate performances. The signal stays in the analog domain all the way through. By default, the L1 is configured for no series capacitor throughout the signal chain. The volume control is based on a discrete 20 bits R-2R resistor network circuit topology, providing a range of 118dB in 0.5 steps. The output stage is designed to be able to deliver ample current to drive heavy loads and/or multiple pieces of equipment simultaneously. The L1 uses tight tolerance, high-grade metal film resistors throughout the audio signal path.

Balanced XLR, single-ended RCA and BNC connectors are available at both the input and output. All the inputs can be configured as high-impedance input, or a 600 Ohm load can be engaged on balanced inputs (300 Ohm for single-ended inputs) to reduce reflections as well as to improve external noise immunity, therefore improving the overall signal transmission.



L1 main components



- (1) External power supply input. For X1 optional external power supply only
- (2) Mains switch and power cord receptacle (on back panel)
- (3) Adjustment shafts and screws
- (4) Mains filter board
- (5) Power supply section
- (6) Main power transformer
- (7) Standby power transformer (ensures green mode standby)
- (8) Front panel power supply board
- (9) Display (on front panel)
- (10) Balanced and single-ended outputs
- (11) Balanced and single-ended inputs
- (12) Control board (USB plug for firmware update and Ethernet RJ-45 plug for control from Android App)
- (13) Single-channel preamplification board (one or two per unit)
- (14) Backplane board
- (15) Power supply regulation board
- (16) Dual concentric control knob with pushbutton

1.1 Unmatched flexibility

The L1 offers unmatched system integration flexibility. Not only can it be used in multiple configurations (Dual Monaural, Monaural, and Monaural Extended) but it also allows adjustments to match the impedance of the upstream unit, improving the overall signal transmission with the surrounding pieces of equipment.

1.1.1 Configurations

A single L1 can be fitted with one or two channel boards, depending on the desired configuration. The following configurations can be realized:

- **Dual monaural:** In this configuration, a single L1 is used to hold the two channels (Left and Right, Center and Sub or Left and Right surround). Two boards are fitted inside its chassis, each one independently processing a single channel. The mains power supply section is common to both the board, however separate dedicated DC regulation circuits are provided to each board.
- **True monaural:** In this configuration, two L1s are used to hold a single channel each (Left resp. Right, Center resp. Sub or Left resp. Right surround). One board is fitted inside each chassis, each L1 processing a single audio channel. In this configuration, the entire power supply of the L1 is dedicated to one channel, further enhancing the system performances.
- **True monaural extended:** The configuration is identical to the True Monaural configuration, with the addition of a second board in each chassis. The two boards in a chassis work together, as if it was only one board with twice as many inputs (and outputs). This configuration will be used when more inputs are required than the amount a single board can provide.

For ultimate results, one/two X1 External Power Supply unit(s) can be connected to the L1(s) in all the above configurations, adding a second stage of power supply regulation to the preamplifiers, further improving the system performances.



1.1.2 Input stage

The L1 input stage is equipped with both balanced and single-ended types of connections, 4x XLR, 2x RCA and 2x BNC. A high bandwidth, high performances discrete amplifier buffers the signal prior to applying the volume. A DC blocking capacitor can be engaged to remove unwanted DC offset coming from sources connected to the L1's inputs. For more information about this feature, please refer to section 1.2 Advanced DC offset cancellation.

1.1.3 Volume control

The L1 volume control is based on a discrete 20 bits R-2R resistor network circuit topology, providing a range of 118dB in 0.5 steps. The volume set by the user from the front panel rotary knob or from the remote control is translated by the main controller into commands that open or close analog switches, creating a different combination of resistors for each of the volume steps, therefore applying the required attenuation. A gain of up to 18dBs is available for sources providing low output levels. A Mute function is also available.

1.1.4 Output stage

The L1 output stage is equipped with both balanced and single-ended types of connections, 2x XLR, 1x RCA and 1x BNC. A powerful, high bandwidth, high performances discrete amplifier provides with ample current to drive one or more outputs simultaneously.

1.2 Advanced DC offset cancellation

DC (continuous) voltage in an R-2R resistor network circuit topology translates into audible clicks in the audio signal when a volume change is applied. In order to remove the clicks, DC offsets must be canceled. The L1 features an advanced DC offset cancellation system allowing to reduce the DC voltages to insignificant levels, preventing audible clicks from happening. The DC offset cancellation system works in parallel with the audio path. It acts on the DC component of the audio signal only, leaving the audio content unaltered, but DC free. Eight pick up points are measured and corrected in real time throughout the signal path, ensuring all stages including the L1 outputs are DC free.

DC offset wise, if there is one thing the L1 cannot control, it is the DC inherited from the pieces of equipment connected to its inputs. Although care has been taken to try and counteract a fair amount of DC offset from upstream pieces of equipment connected to its inputs, if these pieces of equipment exhibit high levels of DC at their outputs, the L1 will reach a state where it can't counteract the inherited DC any more. If this condition happens, clicks might start to become audible when a volume change is applied. The only way to remove the excessive DC offset is to add a capacitor in series with the signal path. The L1 front panel display indicates that it cannot counteract DC any further and recommends to engage the DC blocking capacitor. By default, there is no capacitor in series inside the signal chain, however the large value high-grade polypropylene capacitor can be engaged when excessive DC coming from the upstream piece of equipment has been detected at the input. Please note that engaging the capacitor is a recommendation only, it is up to the user to engage the capacitor or not. It is done from the unit's menu, but in no circumstances will the unit engage the DC blocking capacitor automatically. The DC blocking capacitor is engaged on a single input basis, it is not a global setting for all the inputs.

1.3 Careful metal work construction

The L1 preamplifier 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 the luxury finish of the L1. Pin assembly of all chassis elements enables



smooth joints between metal parts while screws every 6cm ensure protection against electromagnetic interferences.

Four stainless steel feet support the unit. Each foot ends with an elastomer ring to sit on delicate surfaces but is also equipped with height adjustable hardened steel spikes to fine tune the unit position. Horizontal leveling is accomplished using the provided screwdriver through the four adjustment shafts accessible from the top of the unit. Moreover, the steel spikes serve as vibration evacuation channels in a stack of units. Special covers are provided to interface with the spikes of the unit above. Any vibration 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 for vibrations evacuation.

1.4 Power supply

The power supply of the L1 is a linear supply with multiple independent local regulations circuits.

The largest mains transformer is an oversized toroidal transformer and is used to supply power to the local regulation circuits, which in turns, supply both preamplifier boards. The transformer also supplies power to the digital areas of the amplifier (front panel display, microcontroller and DSPs that control and monitor the unit).

Discrete (power-transistor and operational amplifier based) ultra low noise regulators are used throughout the power supply to ensure the purest low noise DC feed possible to the different audio sections. Each preamplifier board enjoys dedicated analog regulators.

The second, smaller toroidal transformer inside the L1 is used as the Standby transformer to ensure green Standby mode, meeting the latest energy saving regulations.

Both transformers have static shields between primaries and secondaries. They are mounted on a separate steel plate which is isolated from the main base steel plate by silent blocks to prevent vibration transmission to the rest of the unit.

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



2 Read carefully before use

2.1 Package content

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

- The L1 preamplifier
- 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 adjustment screwdriver
 - a Torx T10 screwdriver
 - four stacking covers
 - a USB stick containing the latest CH Precision firmwares.
 - four CH Support Discs

Please store the packaging material for future use. Check your L1 preamplifier for any apparent damage. In case of a damage, please contact your authorized dealer. If your L1 preamplifier is still very cold from transport, please let it warm to room temperature in order to avoid condensation inside the unit.

2.2 Safety notice

Make sure to observe the following rules:

- Install your L1 preamplifier on a stable base
- Do not install your L1 preamplifier near water
- Always handle with care. The L1 preamplifier is fairly heavy, so have someone to help you when moving it around
- Do not expose the unit to any kind of 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 the unit.
- Do not operate under high ambient temperature ($>40^{\circ}\text{C}$) or in extremely high humidity conditions
- Only use options and accessories specified or recommended by the manufacturer
- Do not open the unit nor try to service it by yourself. Always refer to a qualified technician for service, maintenance or upgrades. Failure to do so will void the unit's warranty

2.3 User manual

Please read this manual carefully before making connections or operating your L1 preamplifier. 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.

2.4 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 your L1 preamplifier is disconnected from the AC wall socket in the following cases:

- When making connections (it is also recommended to disconnect the rest of the system from the AC wall socket)
- When cleaning the unit
- During thunderstorms
- When unused for a long period of time

2.5 Transport and packaging

The L1 preamplifier must always be stored in its original packaging for transportation. Doing so will ensure an optimal level of protection of your unit. Therefore, keep all packaging in a dry and clean place for future use.

Besides, we recommend to remove the adjustment spikes and to put them in the packaging prior transportation. Vibrations during transport may cause the adjustment spikes to move from their fully retracted position. There is risk of scratching the installation base if the spikes are not fully retracted when installing the unit.

2.6 Cleaning

Use a soft, dry cloth for cleaning. Never use any solvent or liquids as they may damage the surface or infiltrate the unit. Please use an ultra-soft piece of fabric designed to clean glasses for the front display area.



2.7 Maintenance and servicing

The L1 preamplifier contains no user serviceable parts. Do not try to open, modify or repair your L1 by yourself. This will void any warranty. Your L1 preamplifier must be checked by a qualified technician in any of the following cases:

- The unit is not functioning properly
- The power cords or mains plug at the back of the unit is damaged
- The unit was dropped to the floor or presents external damage
- The L1 preamplifier has been exposed to liquids or unknown substances



3 Installation

3.1 Unpacking

Unpack your L1 preamplifier and store the packaging for future use. Be careful when lifting the L1 as the unit is heavy (over 20kg). Get someone to help you if necessary. When unpacking and installing the L1, take care not to damage the high quality surface treatments.

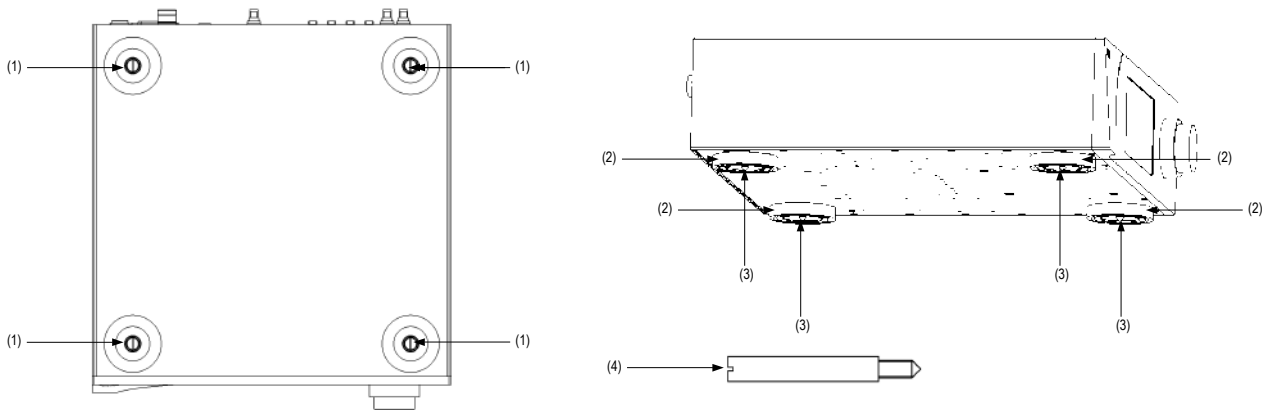
3.2 Unit positioning

When delivered from factory, the L1 line preamplifier's four feet sit on elastomer rings, ensuring both scratch-protection for the base on which the unit sits, as well as safe anti-slipping unit positioning.

But a more advanced vibration-channeling mechanical coupling can be implemented, thanks to the steel spikes and the polymer support discs provided with the L1. To use this optimal coupling, simply go through the following steps:

1. Place the L1 unit on a stable base at its approximate final position, for instance in your preferred audio rack. Make sure cooling air is able to freely flow around the unit.
2. Gently lift the unit's corners and insert a support disc under each foot. The foot's elastomer ring should disappear in the support disc's groove when properly placed. Carefully check all four feet perfectly fit in each support disc before pursuing any further. The unit should stably rest on its feet at that point.
3. Unscrew the four top covers from the L1's shafts with the provided suction cup. Be careful not to scratch their delicate finish.
4. Insert the adjustment spikes into each adjustment shaft.
5. Softly screw clockwise each adjustment spikes into the shaft with the provided screwdriver, until any resistance is felt (just before the unit's corner starts to lift).
6. Then screw clockwise each spike by the same amount (for instance two full turns).
7. If the base is flat, the unit should be stable and horizontal. If not, correct the unit's stability and horizontality by turning clockwise or anti-clockwise the required spikes.

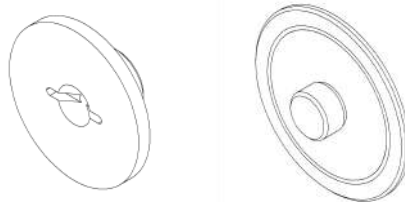
If no CH Precision unit is to be stacked on top of the L1, screw the four top covers back. Otherwise, screw the four polymer stacking caps instead, and gently lay down the unit to be stacked on top of it. Be very careful that both units are perfectly aligned in order not to scratch the L1's top plate with the other unit's feet. Repeat steps 3 to 8.



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

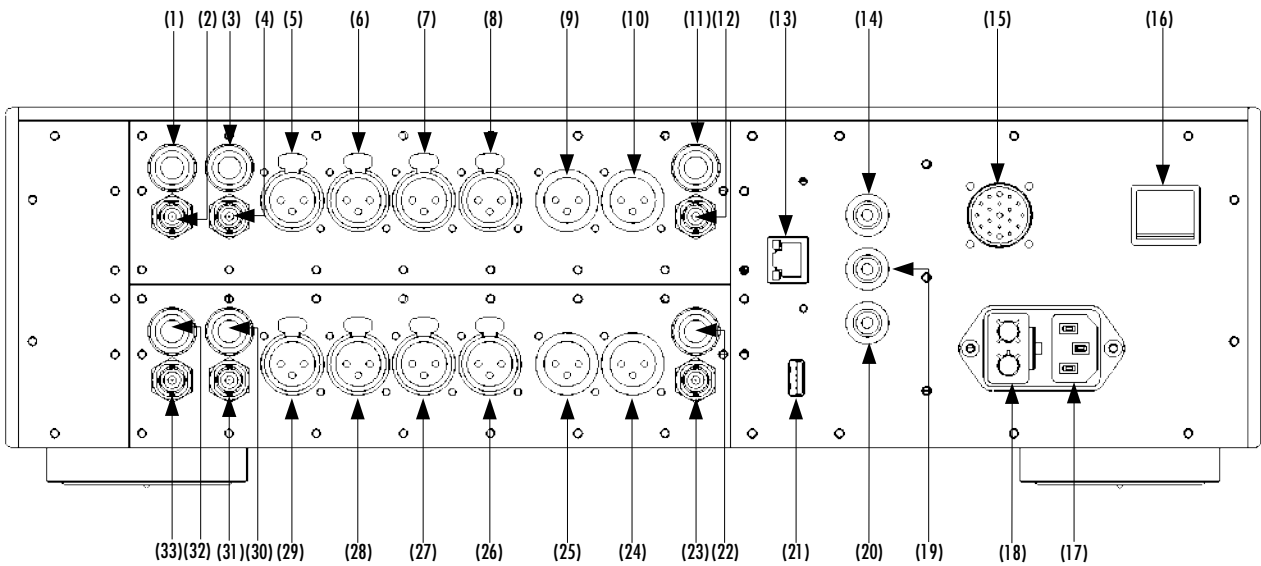
Never stack any component other than CH's on your L1. Never use the aluminum shaft covers (top covers) when another CH component is to be stacked on top of your L1.



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

3.3 Connections

This section provides information about how to connect a dual-monaural L1 preamplifier to your system. For details about how to integrate your L1 in a specific setup, please refer to the preamplifier configuration section of this user manual. If you don't feel confident with the connections to be applied, please contact your authorized dealer for assistance.



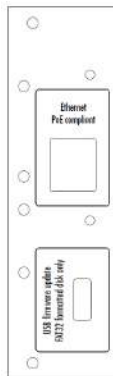
L1 rear panel connections

- (1) RCA 1 left input
- (2) BNC 1 left input
- (3) RCA 2 left input
- (4) BNC 2 left input
- (5) XLR 1 left input
- (6) XLR 2 left input
- (7) XLR 3 left input
- (8) XLR 4 left input
- (9) XLR 1 left output
- (10) XLR 2 left output
- (11) RCA left output
- (12) BNC left output
- (13) Ethernet port for command interface
- (14) Analog ground connector 1 (Black)
- (15) External power supply connector for X1 power supply option
- (16) Power on/off switch
- (17) Power cord receptacle
- (18) Power fuse and voltage selection
- (19) Analog ground connector 2 (Black). Can be connected to digital ground (Earth) using the provided jumper
- (20) Earth connector (Yellow-green). Internally connected to digital ground
- (21) USB port for software upgrades
- (22) RCA right output
- (23) BNC right output
- (24) XLR 2 right output
- (25) XLR 1 right output
- (26) XLR 4 right input
- (27) XLR 3 right input
- (28) XLR 2 right input
- (29) XLR 1 right input
- (30) XLR 1 right input
- (31) XLR 2 right input
- (32) XLR 3 right input
- (33) XLR 4 right input

- (30) RCA 2 right input
- (31) BNC 2 right input
- (32) RCA 1 right input
- (33) BNC 1 right input

3.3.1 CONTROL section

The CONTROL section provides a USB port for software upgrades and an Ethernet port for controlling the unit over an Ethernet network. The following drawing shows the layout of the CONTROL section of the back panel:



CONTROL section of the back panel

3.3.1.1 USB port

The USB port on the CONTROL section is dedicated to upgrading the firmware of the L1 unit. Do not use it for any other purposes. For more information on unit firmware update, please refer to the relevant section in this manual.

3.3.1.2 Ethernet port

The Ethernet port has two major purposes:

- It allows the control of the L1 preamplifier settings through a standard Ethernet network. Connect the L1 Ethernet port to an Ethernet Router using an Ethernet RJ45 Category 5 or better cable. Using the CH Android App, the L1 settings can be accessed and adjusted on the fly via a tablet.
- In both Monaural and Monaural Extended configurations, two L1 chassis are used. In order to set the volume or to select a new input, the two units must talk to each other. They are set in a Master and Slave arrangement. One unit becomes slave of the other unit and receives commands from it. The two units exchange information using the Ethernet connectors located on the back panel. Both L1s should be connected to a router (that has a DHCP server). The two units must be set to Master, respectively Slave, using the units' set of menus available via the front panel pushbuttons and display. Please refer to section 4 of this manual for more information on how to set up both units.

3.3.2 Single-channel preamplification board

The single-channel preamplifier board holds the audio path creating the preamplifier itself. It is a monaural path, one channel is processed on a single board (Left or Right in stereo configurations, Center, Sub, Left surround or Right surround in multichannel



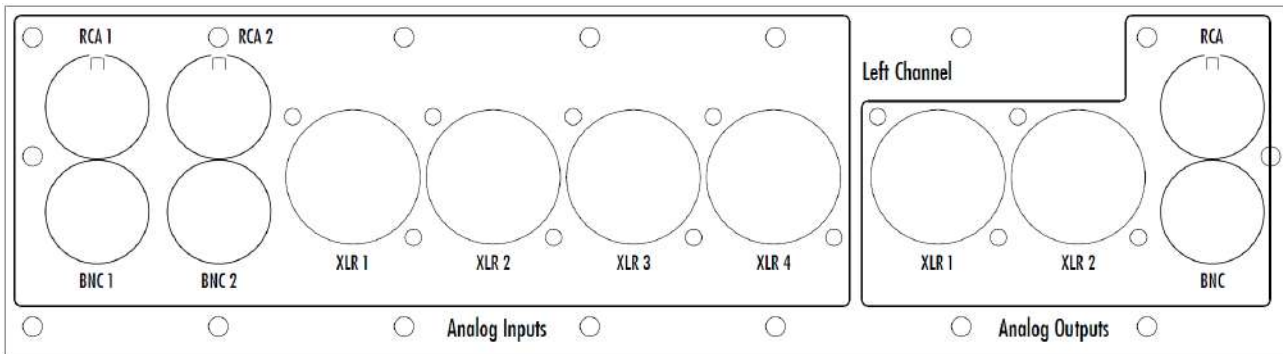
configurations). The preamplifier board contains the input stage, the volume control circuitry and the output buffer. It also holds the DC offset cancellation circuitry, allowing to reduce clicks to near zero levels.

It features selectable analog inputs on three different types of connectors: balanced XLR, single-ended RCA and BNC. The inputs can be configured for high-impedance or 600 Ohms load (for balanced inputs) and 300 Ohms (for single-ended inputs). It allows an optimal signal transmission when connected to upstream pieces of equipment with 50 or 75 Ohm output impedance. The 600/300 Ohms load is engaged on a single input basis, it is not a global setting for all the inputs.

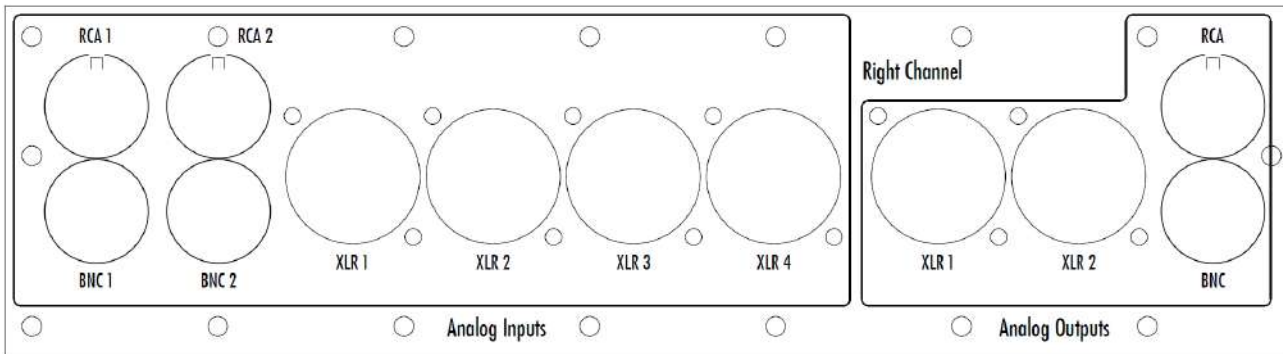
For best transmission and immunity to external noise, the L1 input should be connected to the upstream unit using a balanced XLR cable like the CH Balanced Link cable.

Connect your sources to the inputs of the single-channel preamplifier board. The name of the inputs displayed on the front panel screen can be customized for better clarity (please refer to section 4 of this manual for more information on how to change the default input names). If more inputs are needed, the True Monaural Extended configuration is the way forward. Please refer to section 1.1.1 of this manual for more information.

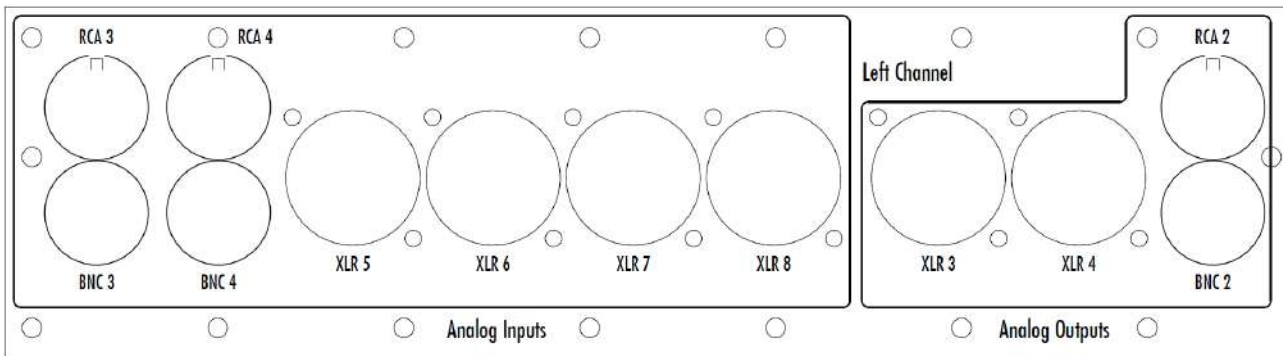
The outputs are driven by a discrete buffer, capable of supplying ample current to drive even the most demanding amplifier's input stages or long modulation cables all the way to distant monoblocs. The multiple outputs are in parallel, allowing to connect multiple amplifiers in a multi-amplification system.



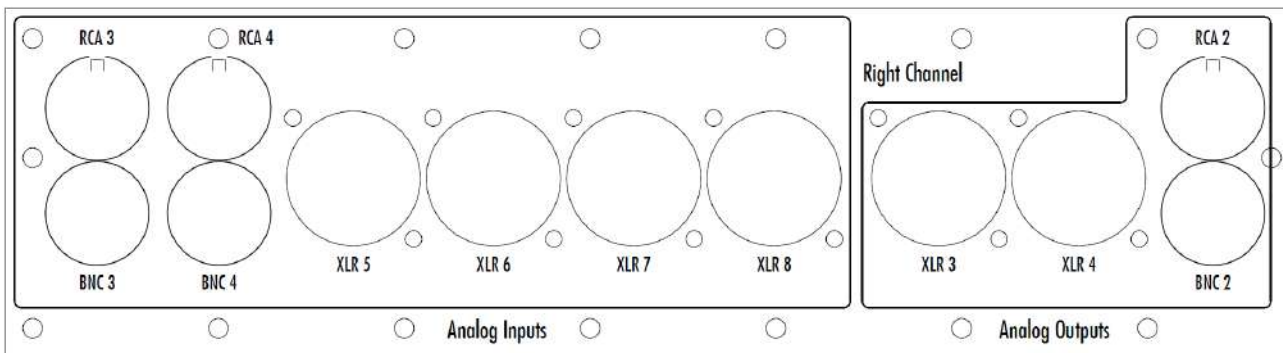
Left channel board Layout



Right channel board Layout



Extended left channel board layout



Extended right channel board layout

3.3.3 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. Connect the power cord to the power cord receptacle and plug the power plug to a wall socket only after all other connections have been made.

3.3.4 External DC power supply connector

This connector allows to connect the X1 External power supply. A custom made interconnect cable delivered with the X1 plugs into this connector, allowing to reach the next step in power supply regulation. At power up, when the L1 detects that the cable has been plugged, it leaves its mains section off and connects to the X1 instead. Please note that the L1 AC socket must remain plugged to the AC wall socket. It is used only when the unit is in standby mode, supplying the standby transformer, consequently allowing the unit to power up.

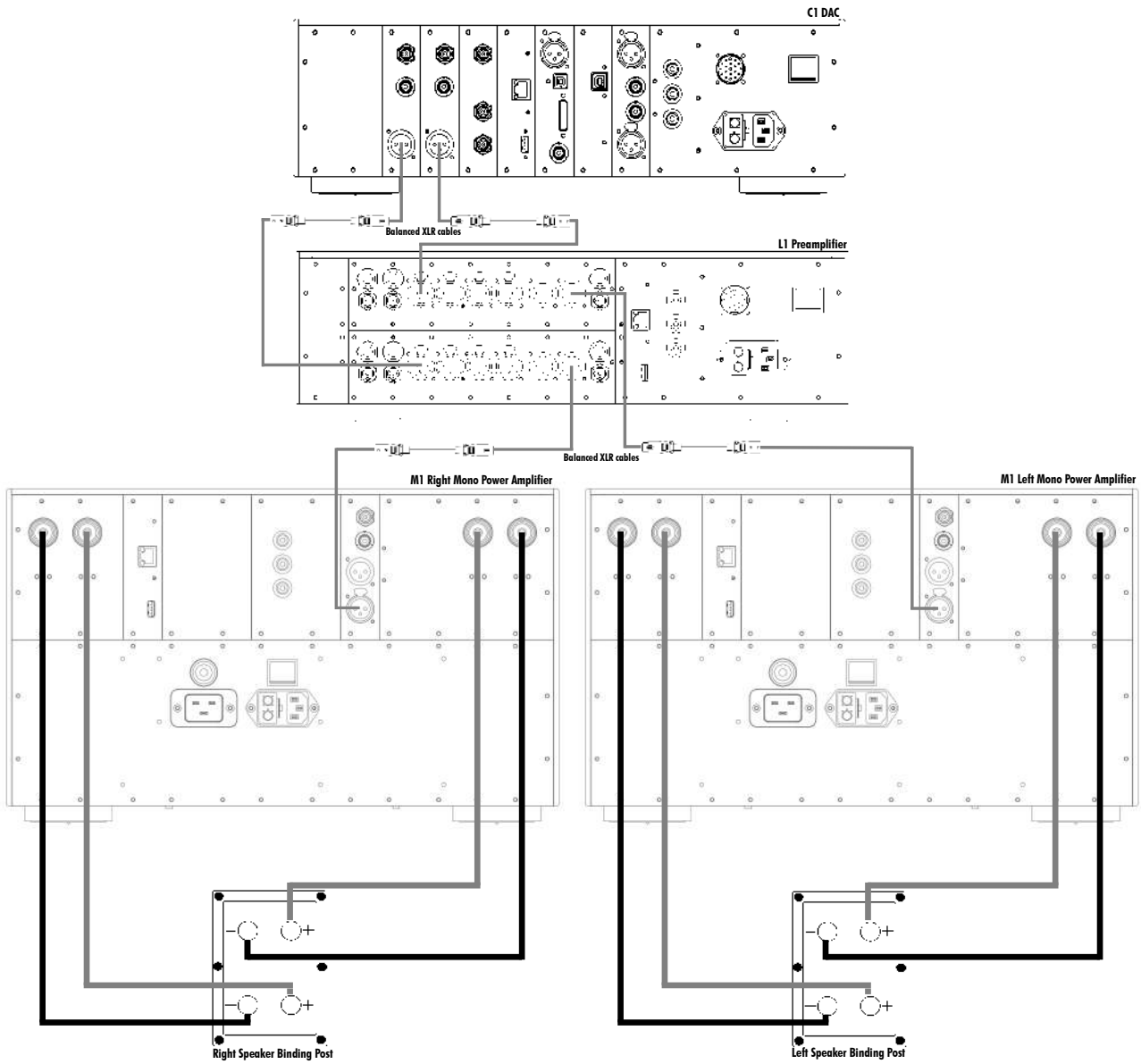
3.4 Preamplifier configuration

This section describes most standard setups in which one or more L1s can be integrated into. Please note than in any of these configurations, one or more X1 external power supplies can be added to further improve sonic performances.



3.4.1 Dual monaural configuration

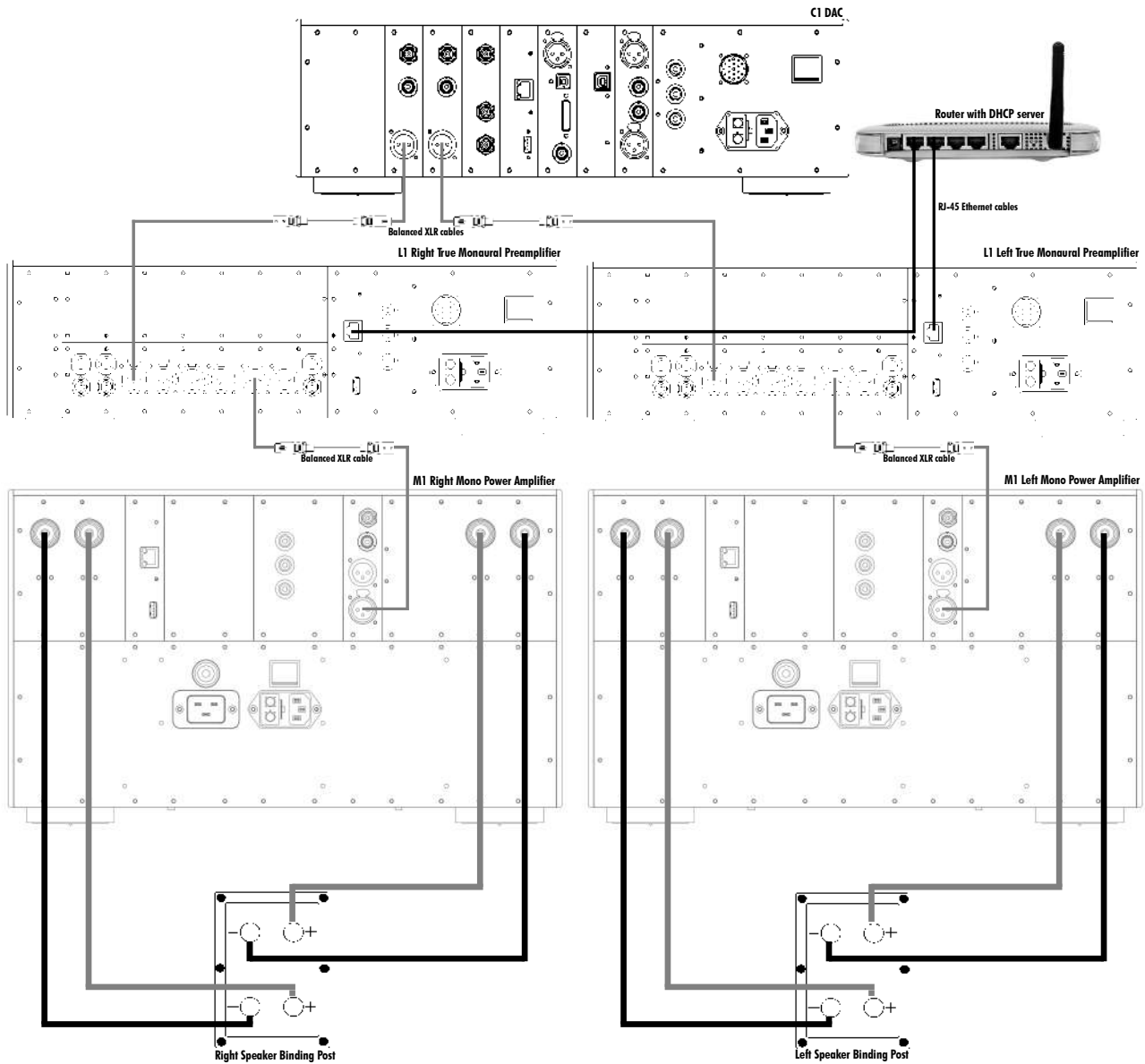
In this configuration, a single L1 is used to hold two channels (Left and Right, Center and Sub or Left and Right surround). Two boards are fitted inside a single chassis, each one independently processing a single channel.



Dual monaural mode

3.4.2 True monaural configuration

In this configuration, two L1s are used to hold a single channel each (Left resp. Right, Center resp. Sub or Left resp. Right surround). One board is fitted inside each chassis, each L1 processing a single audio channel.

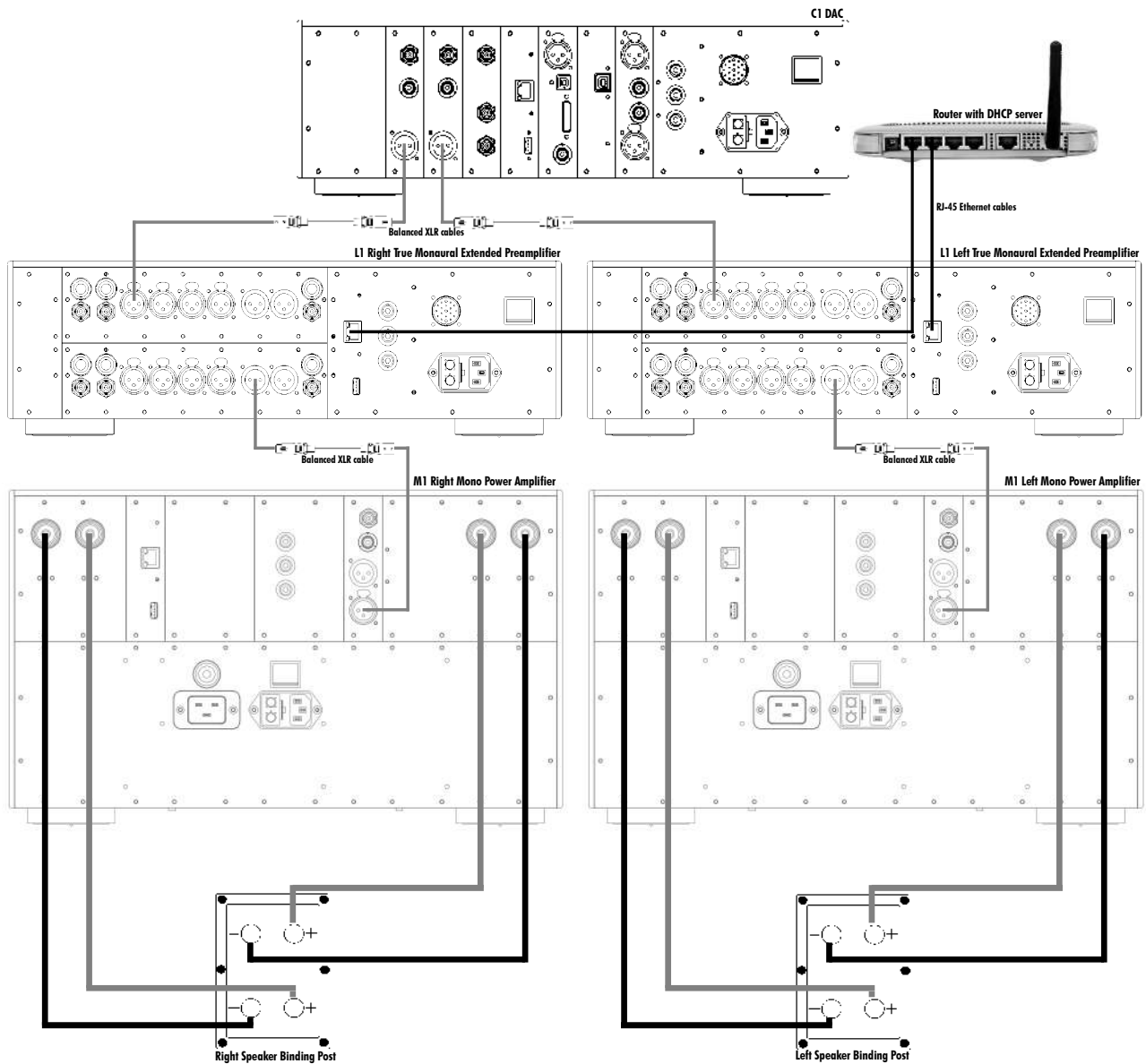


True monaural configuration



3.4.3 True monaural extended configuration

The configuration is identical to the True Monaural configuration, with the addition of a second board in each chassis. The two boards in a chassis work together, as if it was only one board with twice as many inputs (and outputs). This configuration will be used when more inputs are required than the amount a single board can provide.



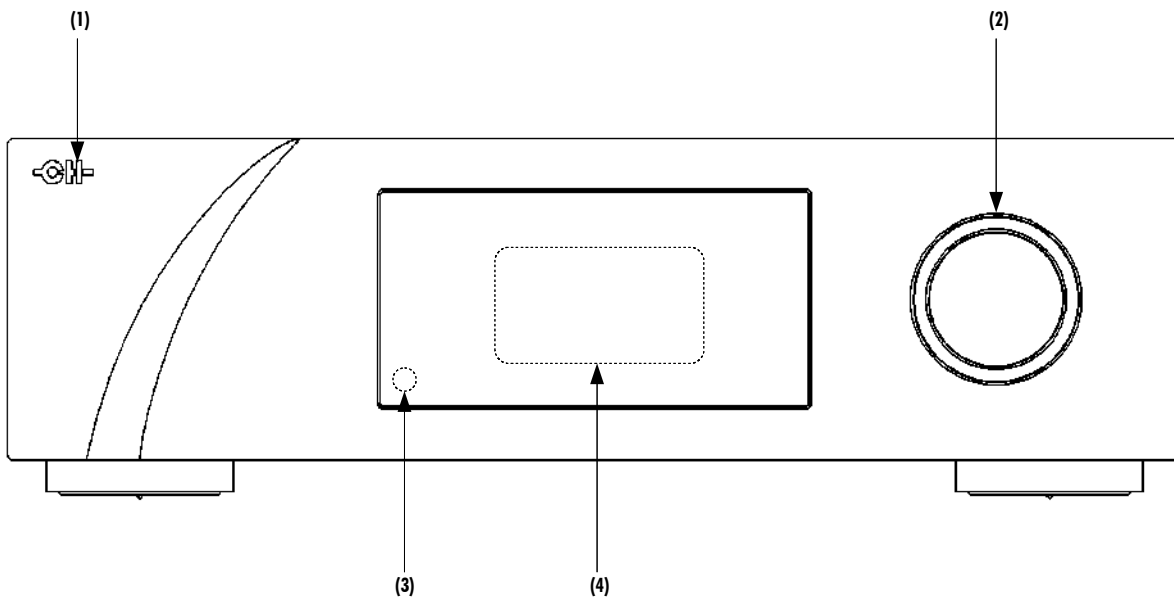
True monaural extended configuration

4 Operation

The L1 preamplifier is operated either from the unit's front panel, from the IR remote control or from CH Precision's Android app. Feedback to the user is provided by a high-definition AMOLED display with customizable colors. Setup operations are handled from the front panel and Android app.

4.1 Front panel controls

4.1.1 Front panel



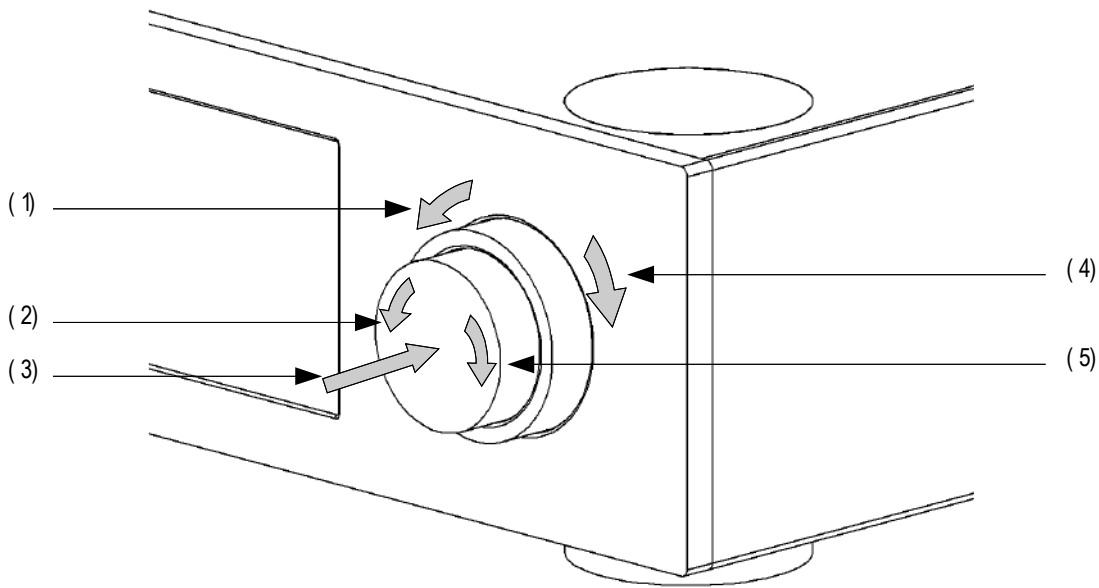
Front panel elements

- (1) Standby LED
- (2) User control knob (dual concentric rotatory knob with push function)
- (3) IR remote control receiver
- (4) Display area (high-definition display)

The standby LED lights up when the unit is in standby. It is normally turned off 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 the user's taste.

4.1.2 User control knob

The user control knob is the main user input device. It is built around a dual concentric rotatory knob with push function, mounted on a Teflon bearing. Both the central and the external part of the knob can be moved to the left or the right independently, giving four movements: rotate External Rotate Left/Right [$\ll E$]/[$E \gg$] and Central Rotate Left/Right [$\ll C$]/[$C \gg$]. 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 2 seconds or more.



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

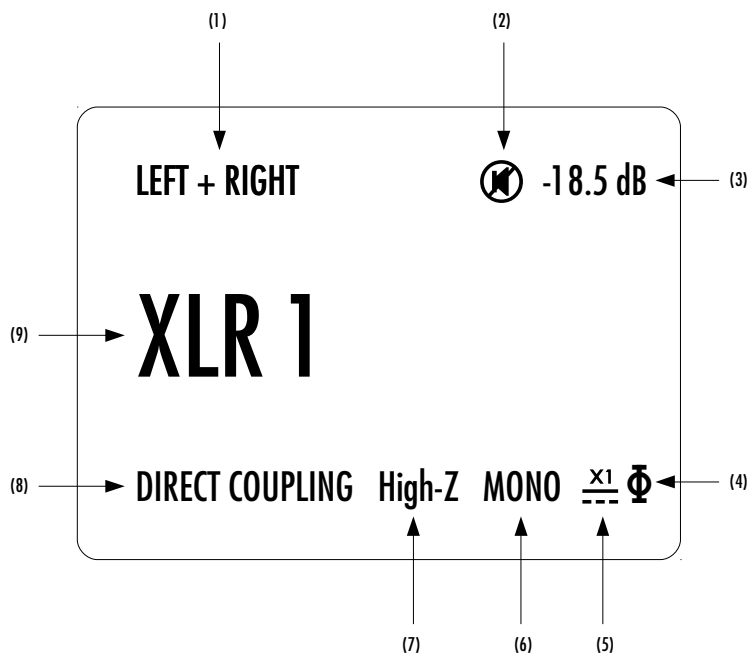
User Action Codes

4.2 Operating modes

The L1 preamplifier has two main operating modes: Normal mode and Menu mode. Normal mode is used to access standard preamplifier controls whereas Menu mode is used to configure the unit. The L1 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.

4.2.1 Normal mode

Normal mode is used for standard preamplifier functions. When powered-on, the L1 starts in Normal mode. The display looks as follows:



Normal mode display elements

- (1) Handled channel (in true monaural) or channel pair (in dual monaural)
- (2) Mute indication. If the Ⓜ symbol is present, the output is muted
- (3) Volume
- (4) Polarity (phase) indication. If the Φ symbol is present, polarity is reversed
- (5) External power supply indication. When an external power supply is connected and engaged, $\underline{\text{X1}}$ symbol is displayed and internal power supply is turned off
- (6) Monaural mode indication. If MONO is displayed, content of both channel are summed up (L+R) and output on both L and R output
- (7) Impedance termination indication. High-Z is displayed when no termination resistor is engaged, 600 or 300 Ohm when a termination resistor is activated
- (8) Input coupling state. Direct coupling means there is absolutely no capacitor in the signal path, DC blocking means the selected input goes through a high performance polypropylene capacitor
- (9) Input source name. Each input source can be renamed through L1's menu



Displayed elements depend on the user settings. In the example above, an X1-powered (X1 PSU symbol) L1 is set as a dual-monaural preamplifier (LEFT + RIGHT), input XLR 1 is selected without coupling capacitor (DIRECT COUPLING) nor resistor termination (High-Z). The audio content of both preamplifying boards (left and right) is inverted (Φ), summed up (MONO) and fed with an attenuation of 18.5 dB to each output (left and right). The output is actually muted (\otimes) so no signal will come out of the L1's outputs.

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 (1 st by 0.5 dB steps, then faster)
[<<C] Center Rotate Left	Any state	Decrease volume (1 st 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

4.2.2 Shortcuts

The L1 preamplifier 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 L1 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.

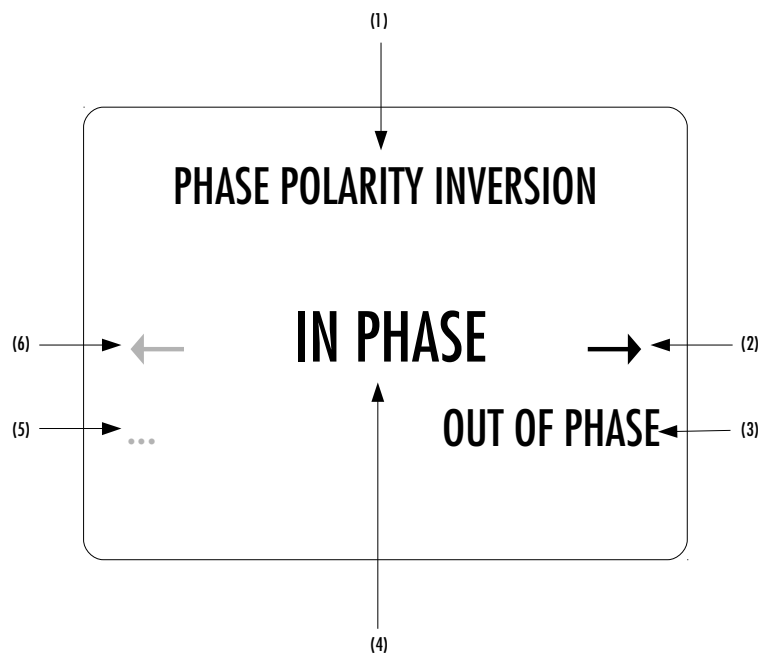
User Control Knob Action	Unit State	Unit Action
[NP] Normal Push	Shortcut (except last) Last Shortcut (SETUP) or after current Shortcut has been modified	Skip to next Shortcut Exit Shortcuts mode (Normal mode)
[LP] Long Push	Any state	As in Normal mode
[C>>] Central Rotate Right	Shortcuts (except last) 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

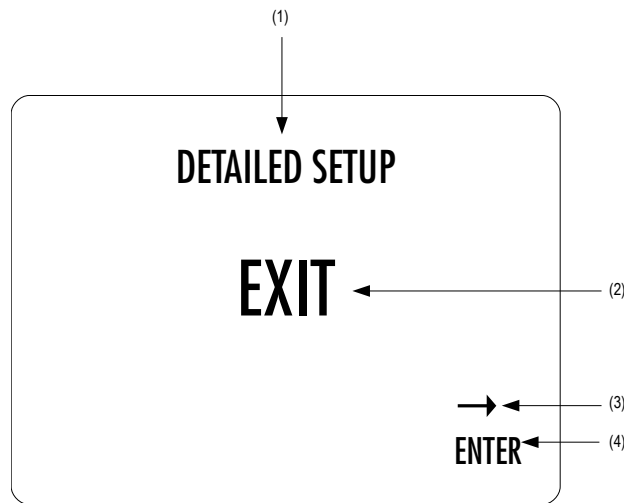
The PHASE POLARITY Shortcut gives a good illustration of how to navigate a Shortcut screen. Navigating other Shortcuts is similar.



PHASE POLARITY 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 the Menu mode to access 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

4.2.3 Menu mode

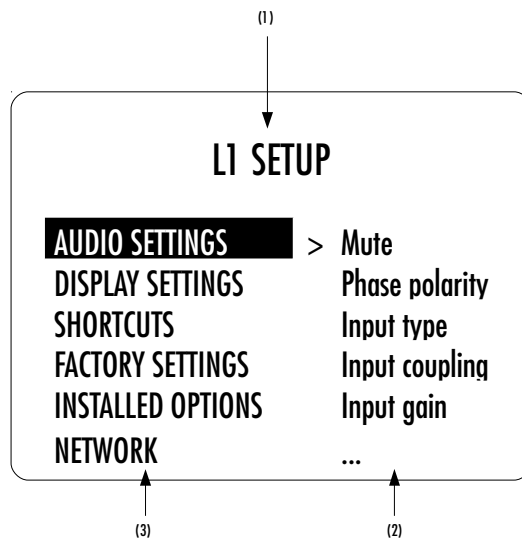
The Menu mode allows the Configuration and Setup of the L1 preamplifier through a set of menus. Menu mode is entered from the last Shortcut item (see above). From Normal mode, enter the Shortcut mode by applying a Normal Push [NP]. By successive Normal Pushes [NP], step to the last Shortcut item (DETAILED 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]/[C>>] to select a given menu item and External Rotate Left/Right [E<<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<<C] Center Rotate Left	Move to next menu item upward
[E>>] External Rotate Right	Enter next menu level
[E<<E] External Rotate Left	Return to previous menu level without saving

User control knob actions in Menu mode

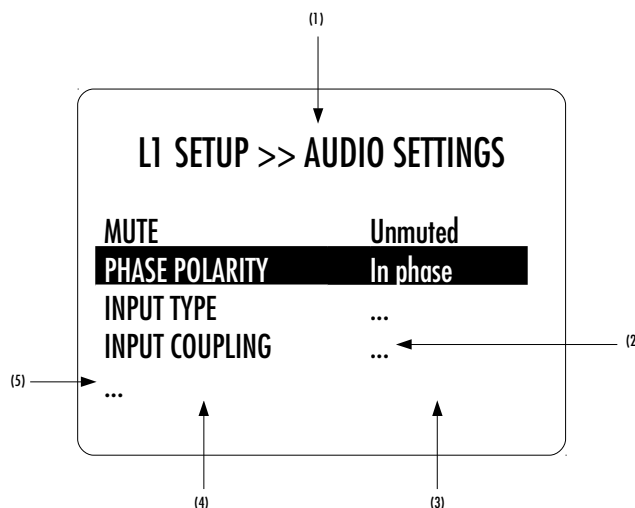
Following illustration shows the elements of a L1 SETUP Menu page, the entry point to the L1 menu structure.



L1 SETUP screen items

- (1) Menu title. When entering a menu item, the title also shows the parent menu. If the AUDIO SETTINGS menu is entered, the title line would display L1 SETUP >> AUDIO SETTINGS.
- (2) Shows the available parameters when entering the currently highlighted menu item. In this example, AUDIO SETTINGS is highlighted and the second column shows the parameters available in the AUDIO SETTINGS 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.

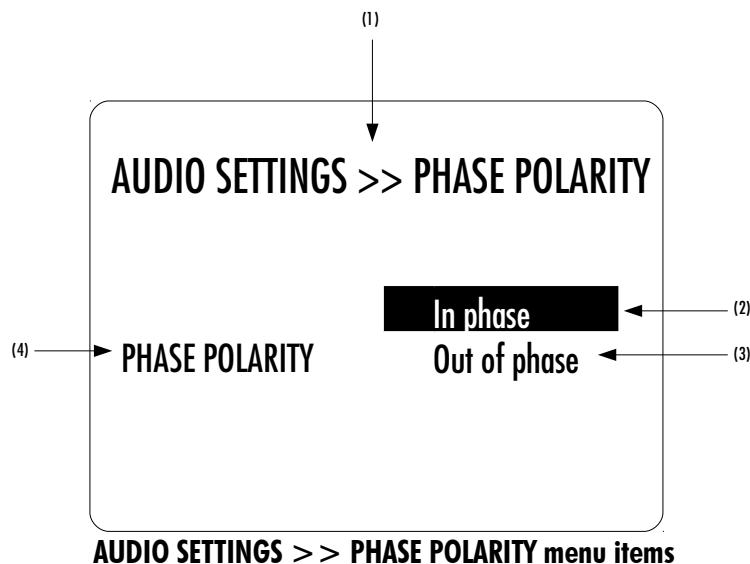
Once a menu item is selected by External Rotate Right [E>>], parameters for the corresponding menu item can be navigated and accessed. As an example, the following drawing shows the display elements of the L1 SETUP >> AUDIO SETTINGS sub-menu.



L1 SETUP >> AUDIO SETTINGS menu items

- (1) Menu title. L1 SETUP >> AUDIO SETTINGS shows that the parent menu is L1 SETUP. By applying External Rotate Left [<<E], the unit returns to the parent menu.
- (2) A Parameter Value of '...' indicates that the menu item gives access to one or more further sub-menu(s). Further sub-menus have the same structure as this example.
- (3) 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.
- (4) This is the Parameter column. The currently active Parameter is highlighted. Use Central Rotate Left/Right [<<C]/[C>>] to navigate from Parameter to Parameter.
- (5) 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 L1 displays the corresponding Parameter adjustment screen. The following example shows the AUDIO SETTINGS >> PHASE POLARITY 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 SETTINGS), but possible modifications of the Parameter Value are discarded (exit without saving).



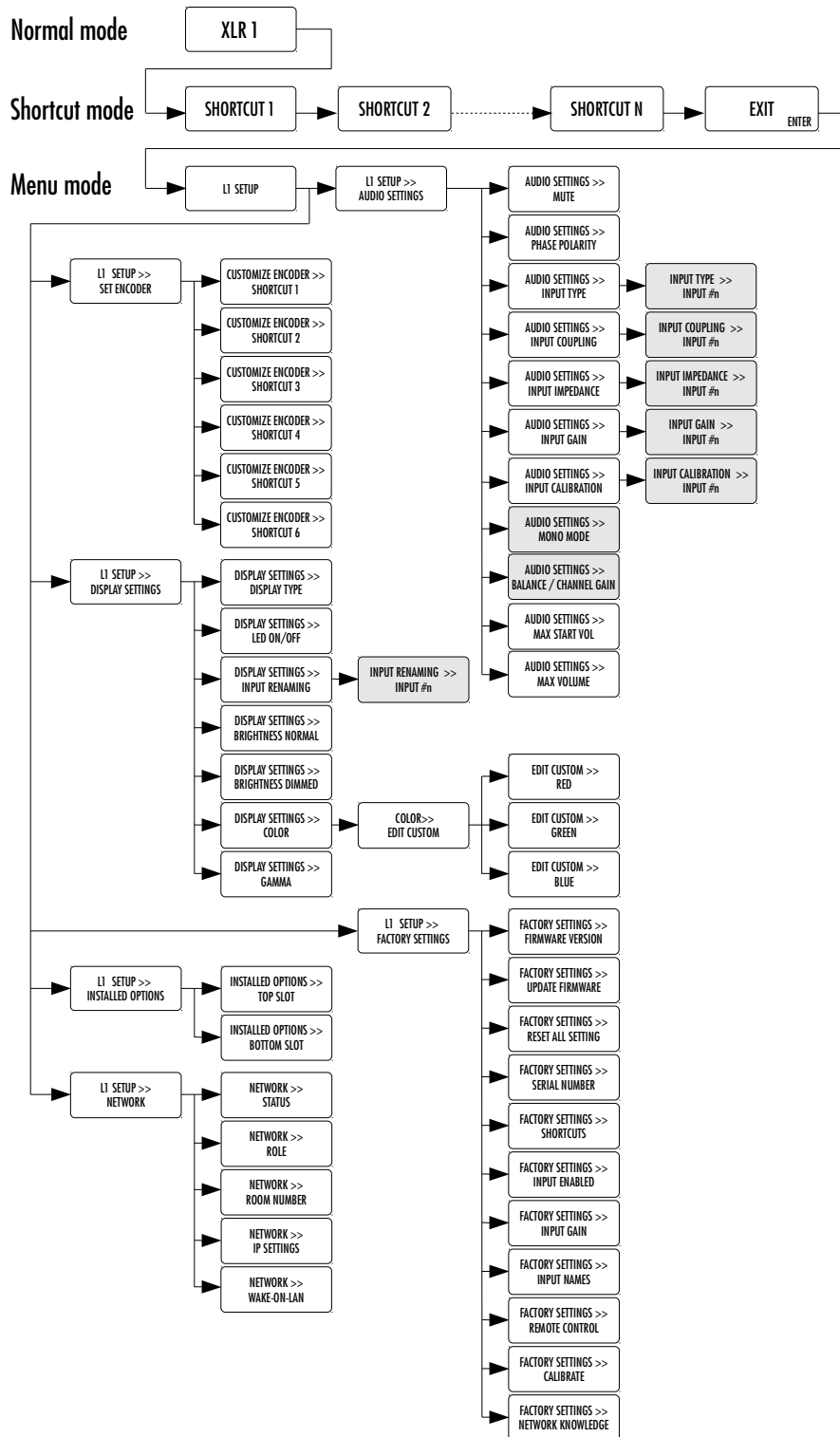
- (1) Menu title. AUDIO SETTINGS >> PHASE POLARITY shows that the parent menu is AUDIO SETTINGS. To access the parent menu, use External Rotate Left [<<E]
- (2) The current Parameter Value is highlighted. Use Central Rotate Left/Right [<<C]/[C>>] to navigate through Parameter Values
- (3) Other possible 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.

The following section gives detailed information about the menu structure and the various Parameters. Note that certain Parameter may or may not appear in the menu depending on installed boards.



4.3 Configuration

Configuration of your L1 preamplifier is accomplished by setting up parameters in the Menu mode (see previous section on how to access the Menu mode and how to navigate through menu items). The following diagram shows the complete menu structure (final items not shown). Grayed menu items are items which depend on installed optional slot-in boards.



L1 preamplifier menu structure



There are six main menus used to configure the L1 :

- **AUDIO SETTINGS:** Allows to adjust audio related parameters
- **DISPLAY SETTINGS:** Allows to adjust the front panel display related parameters
- **SHORTCUTS:** Allows to assign and modify Shortcuts for user interface customization
- **FACTORY SETTINGS:** Indicates the software version and allows to update it. Also allows to return to factory settings
- **INSTALLED BOARDS:** Indicates which boards are loaded and what audio channel they refers to
- **NETWORK:** Provides information about the network setup and enables its configuration

4.3.1 L1 configuration menu items

4.3.1.1 AUDIO SETTINGS

L1 SETUP >> AUDIO SETTINGS	
MUTE	Unmuted
PHASE POLARITY	In phase
INPUT TYPE	...
INPUT COUPLING	...
INPUT IMPEDANCE	...
...	...

The L1 SETUP >> AUDIO SETTINGS menu allows the configuration of the audio related Parameters of the unit. Accessible Parameters are:

- **MUTE:** Mutes or unmutes the audio output
- **PHASE POLARITY:** Allows to revert the phase of the audio output
- **INPUT TYPE:** Selects if an input is hidden, and/or volume controlled.
- **INPUT COUPLING:** Sets individual coupling type (DC vs AC) per input
- **INPUT IMPEDANCE:** Sets individual impedance termination per input
- **INPUT GAIN:** Sets individual gain/attenuation per input
- **INPUT CALIBRATION:** Launch individual calibration per input
- **MONO MODE:** Allows to sum both channel inputs to each output
- **BALANCE:** +/-6dB L/R balance correction
- **CHANNEL GAIN:** Apply up to 6dB gain/attenuation on the desired channel
- **MAX START VOL:** Sets maximum allowed volume at startup
- **MAX VOLUME:** Sets maximum allowed volume

The following table details the Parameters of the AUDIO SETTINGS menu:

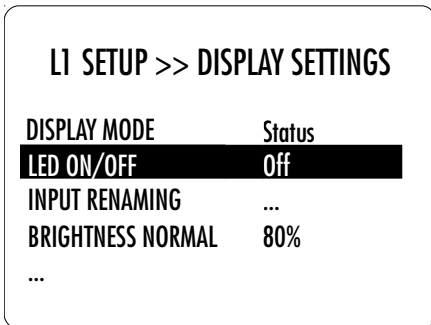
PARAMETER	PARAMETER VALUES	REQUIRED OPTIONS	REMARKS
MUTE	Muted Unmuted	None	None
PHASE POLARITY	In phase Out of phase	None	None
INPUT TYPE	Disabled	None	"Disabled" inputs cannot be selected anymore when



(individually selectable for each input)	Normal Processor		scrolling through inputs (with remote control or encoder). For "Processor" inputs, the L1's volume control is not applied (no attenuation!) Only available inputs (depends on hardware configuration) can be enabled/disabled in the menu
INPUT COUPLING (individually selectable for each input)	Direct coupling DC-blocking	None	Direct coupling means absolutely no capacitor is present on the signal path. DC-cancellation is taken care of by an advanced DSP-controlled analog stage. DC-Blocking means a coupling capacitor is connected to remove excessive DC from the upstream device.
INPUT IMPEDANCE (individually selectable for each input)	HighZ (high impedance) 600/300 Ohm	None	High impedance means the input won't draw any current from the upstream device's output. 600 Ohm (300 Ohm for single-ended inputs) means a termination resistor is activated, increasing the noise immunity of the interconnect while drawing a bit of current from the upstream device's output
INPUT GAIN (individually selectable for each input)	-24 dB to +24 dB by 0.5 dB steps	None	Allows all L1's input level to match, even if upstream component have different output levels.
INPUT CALIBRATION (individually selectable for each input)	Start calibration	None	Analyzes upstream device's DC level to best adapt its DC-cancellation scheme
MONO MODE	Stereo Mono	Dual-monaural configuration	Allows to sum both input channels and output it to all outputs
BALANCE	Left +6 dB to Right +6 dB by 0.5 dB steps	Dual-monaural L+R configuration	Adjust the L/R balance
CHANNEL GAIN	-6 dB to +6 dB by 0.5 dB steps	True-monaural, Ls+Rs or C+Sub configuration	Replaces balance setting when multiple L1s are used
MAX START VOL	-50 dB to -20 dB by 10 dB steps	None	The startup volume is the lowest of the following: - Last listening volume before standby - MAX START VOL parameter value
MAX VOLUME	-30 dB to 0 dB by 10 dB steps, or no limitation (up to +18 dB)	None	Limits the output volume of the L1

Details of the AUDIO SETTINGS menu

4.3.1.2 DISPLAY SETTINGS



The L1 SETUP >> DISPLAY SETTINGS menu allows configuration of the display related Parameters of the unit. Accessible Parameters are:

- DISPLAY MODE: Allows to chose what to display
- LED ON/OFF: Selects if the LED remains on when the L1 is on
- INPUT RENAMING: To customize the name of any input
- BRIGHTNESS NORMAL: Sets the normal display brightness
- BRIGHTNESS DIMMED: Sets the dimmed display brightness
- COLOR: Selects the display color
- GAMMA: Fine tunes the AMOLED's display RGB gamma curve

The following table details the Parameters of the DISPLAY SETTINGS menu:

PARAMETER	PARAMETER VALUES	REQUIRED OPTIONS	REMARKS
DISPLAY MODE	Status Volume Off	None	Selects what to display when the unit is idle for several seconds: General status page, L1 's volume or turn off the display.
LED ON/OFF	On Off	None	Allows to keep the LED on when the unit is on.
INPUT RENAMING	<i>Any string</i>	None	Used to rename any input in the L1
BRIGHTNESS NORMAL	10% 20% 30% ... 90% 100%	None	Sets the display brightness when the unit is operated.
BRIGHTNESS DIMMED	10% 20% 30%	None	Sets the display brightness when the unit is left idle for several seconds.
COLOR	Red Green Blue White Yellow Magenta Cyan Custom color Edit custom color	None	Selects the display color 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.



GAMMA	-RBG and global brightness gamma curve correction, +/-30%	None	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.
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Details of DISPLAY SETTINGS menu Parameters

4.3.1.3 SHORTCUTS

L1 SETUP >> SHORTCUTS	
SHORTCUT 1	Mute
SHORTCUT 2	Phase polarity
SHORTCUT 3	None

The L1 SETUP >> SHORTCUTS menu allows configuration of up to 6 Shortcuts. Accessible Parameters are:

- SHORTCUT1: Defines action for Shortcut #1
- SHORTCUT2: Defines action for Shortcut #2
- SHORTCUT3: Defines action for Shortcut #3
- SHORTCUT4: Defines action for Shortcut #4
- SHORTCUT5: Defines action for Shortcut #5
- SHORTCUT6: Defines action for Shortcut #6

Note that unused Shortcuts are not displayed. The first available (e.g. non defined) Shortcut has a Parameter Value of 'None' (the example on the left has 2 defined Shortcuts, hence Shortcut #3 has a Parameter Value of 'None')

The following table details the Parameters of the SHORTCUTS menu:

PARAMETER	PARAMETER VALUES	REMARKS
SHORTCUT 1	Any Parameter of the AUDIO SETTINGS and DISPLAY SETTINGS 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	Any Parameter of the AUDIO SETTINGS and DISPLAY SETTINGS 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	Any Parameter of the AUDIO SETTINGS and DISPLAY SETTINGS 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	Any Parameter of the AUDIO SETTINGS and DISPLAY SETTINGS 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	Any Parameter of the AUDIO SETTINGS and DISPLAY SETTINGS 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	Any Parameter of the AUDIO SETTINGS and DISPLAY SETTINGS menus or None	If SHORTCUT 6 is not defined, Parameter value for SHORTCUT 6 is set to 'None'.

Details of SHORTCUTS menu Parameters



4.3.1.4 FACTORY SETTINGS

L1 SETUP >> FACTORY SETTINGS

FIRMWARE VERSION	1.4
UPDATE FIRMWARE	Update
RESET ALL SETTINGS	Reset
SERIAL NUMBER	1 50601 01
SHORTCUTS	Default shortcuts
...	

The L1 SETUP >> FACTORY SETTINGS menu allows to get information about the current L1 firmware version, to update the L1 firmware and to reset the unit to its default configuration (or subset of settings).

Accessible Parameters are:

- FIRMWARE VERSION: Current firmware version (read only)
- UPDATE FIRMWARE: Allows to update the unit's firmware
- RESET ALL SETTINGS: Returns the unit to factory settings
- SERIAL NUMBER: Display this L1 's serial number
- SHORTCUTS: Redefines all Shortcuts to factory default
- INPUT ENABLED: Allows to enable all inputs at once
- INPUT GAIN: Reset all input gain to 0 dB
- INPUT NAMES: Set default names to all inputs
- REMOTE CONTROL: Select to which set of RC5 commands the L1 responds
- CALIBRATE: Run self-calibration process
- NETWORK KNOWLEDGE: Clears all network knowledge in the device

The following table details the Parameters of the FACTORY SETTINGS menu:

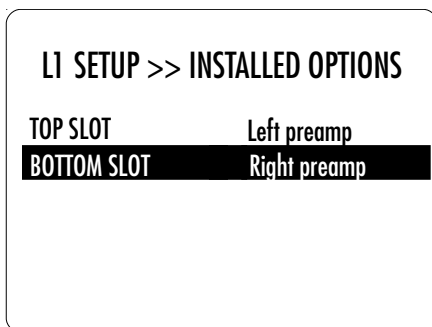
PARAMETER	RELATED ACTION/VALUE	REQUIRED OPTIONS	REMARKS
FIRMWARE VERSION	<i>Firmware version</i>	None	<i>Firmware version</i> indicates the version of the current firmware. Format is <i>x.y</i> . This parameter is read only.
UPDATE FIRMWARE	Update	None	Selecting 'Update' launches the L1 firmware update process. A USB flash disc drive with a valid set of firmware must be inserted in the A-shaped USB port
RESET ALL SETTINGS	Reset	None	Selecting 'Reset' returns the L1 to its factory settings. Factory settings are detailed in the Specifications section.
SERIAL NUMBER	<i>Serial number</i>	None	<i>Serial number</i> indicates the serial number of the L1. Format is <i>yymm06nn</i> . This parameter is read only.
SHORTCUTS	Default mapping	None	Selecting 'Default Mapping' returns the L1 's Shortcuts to their factory settings. Factory settings are detailed in the Specifications section.
INPUT ENABLE	Enable all	None	Selecting 'Enable all' will enable all available L1 inputs.
INPUT GAIN	Set default gain	None	Set back the gain/attenuation of all inputs to 0dB.
INPUT NAMES	Default names	None	Set back all input names to their default value
REMOTE CONTROL	None RC5 Pre1	None	Selects to which set of RC5 commands the L1 will respond to. Pre1 is the standard RC5 Preamplifier



	RC5 Pre2		set, Pre2 is an alternate RC5 Preamplifier set (Pre1 corresponds to the set of commands the L1 remote control sends by default and Pre2 to the set of commands the C1 remote control sends by default). When 'None' is selected, the L1 cannot be controlled by a remote control anymore.
CALIBRATE	Start calibration	L1 must be warmed-up	Launch automated self calibration to measure and compensate DC at all stages of the L1 signal path. This calibration process is conducted in CH Precision factory prior to packing any L1. In order to avoid overriding these factory measured valued with inaccurate ones, the L1 must be powered for at least 1 hour before this function is available, to ensure the L1 is warmed up and all internal stages have stabilized.
NETWORK KNOWLEDGE	Reset	None	Clears the L1 's memory of other CH Precision devices it has discovered through the TCP/UDP proprietary protocol.

Details of FACTORY SETTINGS menu Parameters

4.3.1.5 INSTALLED OPTIONS



The L1 SETUP >> INSTALLED OPTIONS menu provides read-only information about installed boards. Details are:

- TOP SLOT: Board installed in top slot (board type and channel)
- BOTTOM SLOT: Board installed in bottom slot (board type and channel)

The following table details the Parameters of the INSTALLED BOARD menu:

PARAMETER	PARAMETER VALUES	REMARKS
TOP SLOT	Left, Right, Left extended, Right extended, Left surround, Right surround, Center or Sub preamp	Parameters are Read Only
BOTTOM SLOT		

Details of INSTALLED OPTIONS menu Parameters



4.3.1.6 NETWORK

L1 SETUP >> NETWORK	
STATUS	1 device connected
ROLE	Master
ROOM NUMBER	1
IP SETTINGS	Auto (DHCP)
WAKE-ON-LAN	Only if PoE

The L1 SETUP >> NETWORK menu display the information and allows the customization of the network related Parameters of the unit. Accessible

Parameters are:

- STATUS: Listing of all CH products detected (product type, IP and MAC addresses)
- ROLE: Defines how the L1 interacts with other devices on the network
- ROOM NUMBER: Group units connected to a single network by room
- IP SETTINGS: Low-level network configuration
- WAKE-ON-LAN: Select if a unit can be powered on from the network

The following table details the Parameters of the NETWORK 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 L1 (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 (on the Control board).	When physically connected to a network, the L1 can ignore this network (offline) or connect to it as being the master (it will transmit IR received commands to all slave) or as a slave (it will ignore remote control commands and receive commands from the master device). This networking facility allows information sharing among CH products (such as sound level for multichannel configurations).
ROOM NUMBER	1 ... 7	Connection to a router via its RJ-45 Ethernet port	Define the room in which room the L1 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 L1 is connected to a router with DHCP server feature.
WAKE-ON-LAN	No Only if PoE Yes	Connection to a router via its RJ-45 Ethernet port	If No is selected, the L1 can't be woken up by the app. Standby mode will consume less than 0.5W. When Only if PoE is selected, the L1 can only be waken by the app if connected to a Power-over-

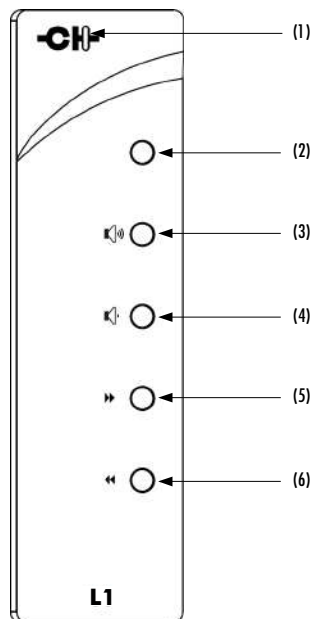
			<p>Ethernet switch. Standby mode will draw less than 0.5W from the mains plug. If Yes is selected, the L1 can always be woken up by the app. Standby mode will draw a couple of watts from the mains plug.</p>
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Details of NETWORK menu Parameters

4.4 Remote control

4.4.1 Remote control operation

The L1 controller 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.



L1 Preamplifier 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 / Phase polarity inversion (long push)

The remote control activity LED is illuminated while a button is pushed on the remote. The remote control buttons support dual functions by distinguishing Normal Push [NP] and Long Push [LP]. For a Normal Push [NP], the button is released immediately after pressing. A Long Push [LP] requires the button to be pressed for at least 2 seconds before being released.

Remote control functions are 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 enabled input	Phase inversion
PREVIOUS INPUT (◀)	Select previous enabled input	Phase inversion

Remote control functions

4.4.2 Changing the remote control batteries

If the LED does not turn on when pressing a button of the remote, it is likely that the remote control batteries need to be changed. To replace the batteries, remove the back cover of the remote control by removing the screws (M2.5 cross-shaped type, make sure to use appropriate screwdriver). Exchange the batteries for new ones (make sure to respect batteries polarity) and put the back cover back in place and tighten the screws. 2 AAA batteries are required.

4.5 Returning to factory defaults

All unit's settings can be reset to the Factory default values by using the RESET ALL SETTINGS item from the FACTORY SETTINGS menu. Specific groups of settings can also individually be reset by corresponding functions accessible from the FACTORY SETTINGS menu. For a list of Factory default settings, please refer to the Specifications section.



5 Firmware update

5.1 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. Please note that some USB sticks might not be detected by the L1 USB port. CH Precision recommends the use of Sandisk USB 2.0 sticks like the one delivered with the unit.

The following procedure describes how to load the USB stick with the correct files:

1. Download the latest L1 firmware file from www.ch-precision.com
2. Decompress the .zip file and copy the decompressed files to the root of your USB stick. After doing so, your USB stick should contain the following files:
 - L1_xxx.dsl
 - L1_xxx.mcl
 - L1_xxx.ol1

where 'xxx' indicates the firmware revision.

Make sure all these files are present at the root of your USB stick, and that only one version of these files is present. Any missing file will make the firmware update procedure fail, while multiple versions of the same unit's firmware can lead to unstable L1 behavior after update.

5.2 Updating the unit's firmware

1. Perform the operations described in section 5.1
2. Connect the USB stick to the USB port located at the back of your L1 unit
3. Navigate to the FACTORY SETTINGS menu (see section 4) and select the UPDATE FIRMWARE item
4. 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
5. 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 5-10 minutes, **do NOT interrupt it!**

When performing a firmware update, do NOT press or turn any of 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. In case something went wrong during a firmware update and the unit is malfunctioning, apply the emergency firmware update procedure described in the next section.

5.3 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 5.1
2. Power the unit off (back panel mains power switch to OFF)
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 turned 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 5-10 minutes, **do NOT interrupt it!**



6 Troubleshooting

Error	Action
No power	Check both AC power cords Check the power switch at the back of the unit Check the mains fuses on the AC power cord receptacle
No sound (general)	Check that your source is playing Check that your amplifier is turned-on and speakers are connected Check that the L1 's volume setting is not too low Check that the correct input is selected on your L1
No sound ("Ⓜ" is displayed)	Your L1 is muted (display area 2 Ⓜ must be off for the unit to output signal). Unmute using first RC button
Lost in the settings?	Restore factory settings and start your setup again
Software update fails	Try Emergency Software Update procedure If it fails, download the latest L1 firmware from www.ch-precision.com , prepare a software update image on a FAT32 formatted USB stick and follow the Emergency Software Update procedure again
USB flash drive for firmware update is not detected by L1	Please try another brand of USB flash drive (e.g. Sandisk).

Troubleshooting

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



7 Specifications

General	
User control	Dual concentric rotary knob with push function (control knob) and CH Control Android app
Display	480 x 272 24bits RGB AMOLED
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz
Power consumption (Standby)	< 1W
Power consumption (Normal operation)	Max 100W
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (L x D x H)	440mm x 440mm x 120mm (main body) 440mm x 492mm x 160mm (overall including connectors and feet)
Weight	20kg
Firmware update / Control	USB port for firmware update / Ethernet based system control
Analog inputs	
Balanced inputs	4x XLR connectors per board, 100k Ω or 600 Ω load (user selectable)
Single-ended inputs	2x RCA connectors per board, 50k Ω or 300 Ω load (user selectable) 2x BNC connectors per board, 50k Ω or 300 Ω load (user selectable)
Maximum input level	16Vrms (balanced), 8Vrms (unbalanced)
Analog outputs	
Balanced outputs	2x XLR connectors per board
Single-ended outputs	1x RCA connector per board, 1x BNC connector per board
Output level	Up to 16Vrms (balanced), Up to 8Vrms (unbalanced)
Frequency response (-3dB point)	DC-1MHz
Signal to Noise Ratio (SNR)	130dB, unity gain and at maximum input level
Total Harmonic Distortion + Noise (THD+N)	<0.001%, 1kHz, unity gain
Remote control	
Remote control type	Infrared. Uses RC5 codes. Range: 10m (line of sight)
Remote control batteries	2x AAA type

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 radio/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.

