



L1.5 Line Preamplifier

User Manual

V1.0



Dear Client,

We are honored that you have chosen the CH L1.5 Line Preamplifier. Our team has put all of our efforts into designing and manufacturing this top quality versatile and future-proof product and is proud to present it to you. We hope your L1.5 will bring you uncountable hours of emotion from your musical collection.

But before starting your musical journey, we kindly ask you to pay attention to the information contained in this manual. The L1.5, as you will discover in the following pages, is a Swiss precision product designed for ultimate performance and flexibility. However, reaching sonic excellence requires your unit to be setup and operated correctly and this is what this manual is all about. If you have any questions or require assistance, please don't hesitate to contact your authorized dealer.

We hope you will enjoy your L1.5 Line Preamplifier for many years.

The Concert has just begun...

Cossy F.





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1 Introduction

CH products are proudly designed and manufactured in Switzerland by CH Precision Sàrl. Our engineers have combined their know-how, expertise, and ingenuity to bring you the L1.5, a high-performance, modular, two-channel line preamplifier with upgradability, featuring an Ethernet control interface and firmware updates via USB. Like all CH Precision products, the L1.5 is versatile thanks to its multiple balanced XLR and single-ended RCA input and output connections.

Because of its combination of purely analog signal path and digital control, your L1.5 offers a number of operational features that are unique and probably unfamiliar.

One of them is its proprietary DC-compensation scheme. In addition to the removal of all DC introduced by the discrete transistor-based electronic stages, these servo-DC are also capable of compensating more than 100mV DC coming from an upstream source, let it be a DAC or a phono stage.

For that reason it is essential that you fully understand every aspect of the L1.5's operation if you are to enjoy its maximum possible performance.

Please also note that the L1.5 can be used with or without additional X1 power supplies, allowing one or two-box configurations. The basic instruction for handling and placing units is identical in all cases.



L1.5 Line Preamplifier



2 Installation guide

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

However, because of the sheer range of options available it is easy to overlook something unless you approach setup and configuration in a systematic way. If you take the time to follow the manual, it will ensure that you become completely familiar with the L1.5's many options and that your Line Preamplifier delivers the best possible performance.

2.1 Safety notice

Make sure to observe the following rules:

- Always handle with care. The L1.5 unit is heavy, so have someone help you when moving it around. Improper handling of the load could lead to risk of injury.
- Install your L1.5 on a stable base.
- Do not install your L1.5 unit near water.
- Do not expose the unit to any kind of liquid.
- Use only a fully grounded AC power cord (with – live, neutral and ground).
- The building as well as the socket on which the L1.5 will be installed must be connected to earth.
- Do not install in direct sun light or near any heat source such as radiators or other sources of significant heat.
- Do not install in a confined space and make sure sufficient air can flow around the unit.
- Do not operate under high ambient temperatures ($>35^{\circ}\text{C}$) or with extremely high humidity ($>85\%$) such as in humid cellars.
- Only use options and accessories specified or recommended by the manufacturer.
- Do not open the unit nor try to service it by yourself. Do not try to install any option board by yourself. Always refer to a qualified technician for service, maintenance or upgrades. Failure to do so will void the unit's warranty.



- Symbols used:



High
Voltage



Physical
Earth



Operator's
manual



Warning



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



Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.



Apparatet må tilkoples jordet stikkontakt.



Apparaten skall anslutas till jordat uttag.



2.2 Unpacking

The L1.5's box is large and contain both the component and all of its accessories. You will need an open, preferably carpeted area in which to unpack it. Please also ensure that the rack or support space on which the L1.5 will be placed has been cleared and cleaned before you start. The carton consists of an inner box and outer sleeve.

- Once you open the inner box, remove the Quick Start Guide, the Topology Diagram, the power cord, the blue suction cup and the top layer of white foam packaging. Inside you will see the component chassis and various accessories.
- With a helper, carefully lift the L1.5 out of the box and place it to one side. Then carefully remove the plastic bag in which it is sealed.
- Remove the small, brown Accessory Pack and place it with the L1.5. Also remove the four composite leveling/grounding spikes. These are inserted into the lower foam block, are easy to miss.
- We recommend storing the Accessory Pack in a readily accessible place, so don't put it back in the carton with the plastic bag when resealing it.

2.3 Package contents

Your L1.5 should arrive in one substantial carton. Once unpacked, this carton and packaging materials should be stored safely in case you ever need to transport your unit. When moving or transporting the L1.5, this should always be done in the original packaging.

The carton should contain:

- | | |
|--|---|
| ■ The L1.5 Line Preamplifier | ■ An accessory box containing: |
| ■ A Quick Start Guide and Topology Diagram | – an infrared remote control |
| ■ Four two-part hardened aluminium/polymer spikes | – a spike adjustment screwdriver |
| ■ A suction cup (used to remove the four top covers) | – a Torx T-10 screwdriver |
| ■ The mains power cord (adapted to location) | – four support discs |
| | – four stacking caps |
| | – a USB stick containing the latest CH Precision firmware |

In case of damage to the L1.5 chassis or missing components, please contact your authorized dealer immediately. If your L1.5 is still very cold from transport, please let it warm up to room temperature in order to avoid condensation developing inside it.



2.4 Placing your L1.5 and installing the spikes

Before positioning your L1.5, it is worth taking the time to make a few preliminary decisions.

- Determine the location of your L1.5. To fully benefit from its performance, and due to its nature, it is best to keep it relatively far from any other AC power source. For example, avoid placing it near a power supply or a power strip.
- Decide how many (and which) inputs you will use. Familiarizing yourself with (and making a note of) their position on the rear panel will be extremely useful when you come to actually make connections and name/configure those inputs.
- Decide whether you will use the CH Precision supplied leveling / grounding spikes. Please note that the CH Precision casework is designed to support weight and ground energy in the corners only. If you choose to use third party supports they should be positioned in the same location as the unit's original feet and we do not recommend stacking components except using the supplied spikes and caps.
- If you do plan to use the CH spikes, use the blue suction cup to remove the four circular covers in the top plate (by pressing the suction cup down and unscrewing the covers). Gently insert the aluminium spikes into each exposed shaft and use the short red screwdriver to turn them enough to engage the threads at the bottom of each spike. Each internal thread is coated with a thin layer of grease during assembly to prevent galling between it and the aluminium spike, but adding a thin coating of grease to each thread before insertion is still a good idea, making adjustment easier and more precise.
- Do not screw the spikes in too far at this point or they will protrude from the feet and potentially damage the supporting surface. Do not replace the top-caps yet.
- Check that the voltage selector switch on the unit is set to the correct local voltage and that the power switch is off (the "0" side depressed).

Now you are ready to place your L1.5. The chassis is heavy and the feet are fitted with rubber rings to protect the supporting surface, which makes it hard to slide the unit. Having a partner to help lift and place the devices will make things considerably easier.

- The L1.5 is supplied with a set of four support discs. These have a groove machined in the upper face that fits over the rubber ring in the underside of each foot. Lift each corner of the chassis in turn and position the disc beneath each foot. The groove that interfaces with the rubber ring will ensure that the footer disc stays in place if you slide the unit.
- As well as making the units easier to position, the support discs can also offer a superior interface between the grounding spikes and the supporting surface. The spikes are designed to drain internally generated energy away from sensitive circuitry and into a dispersive support structure, but if the supporting surface is extremely hard or forms an impedance mismatch with the spike tips, the material and footprint of the support discs can function as a lossy mechanical buffer, easing the passage of mechanical energy out of the unit. As a rule, the support discs work well with very hard surfaces, but results will vary with system and supporting surface. Once set up and warmed up, compare the sound of the unit(s) with and without the discs in place.
- Use the red screwdriver to wind down each of the four spikes until you feel that they touch the surface underneath. You will feel a slight resistance due to the chassis' weight. Then turn each spike by the same amount, for instance one more full turn. This should ensure that the load is evenly applied on all four spikes.
- It is worth using a spirit level to ensure that the L1.5 is perfectly level. If it is not, adjust the spikes with the screwdriver. Once this is done, simply check that all four spikes show the same resistance to turning. This means that the spikes are rigidly coupled to the supporting surface/discs and equally loaded.
- Replace the top caps, using the suction cup to ensure that they are tightly into place.



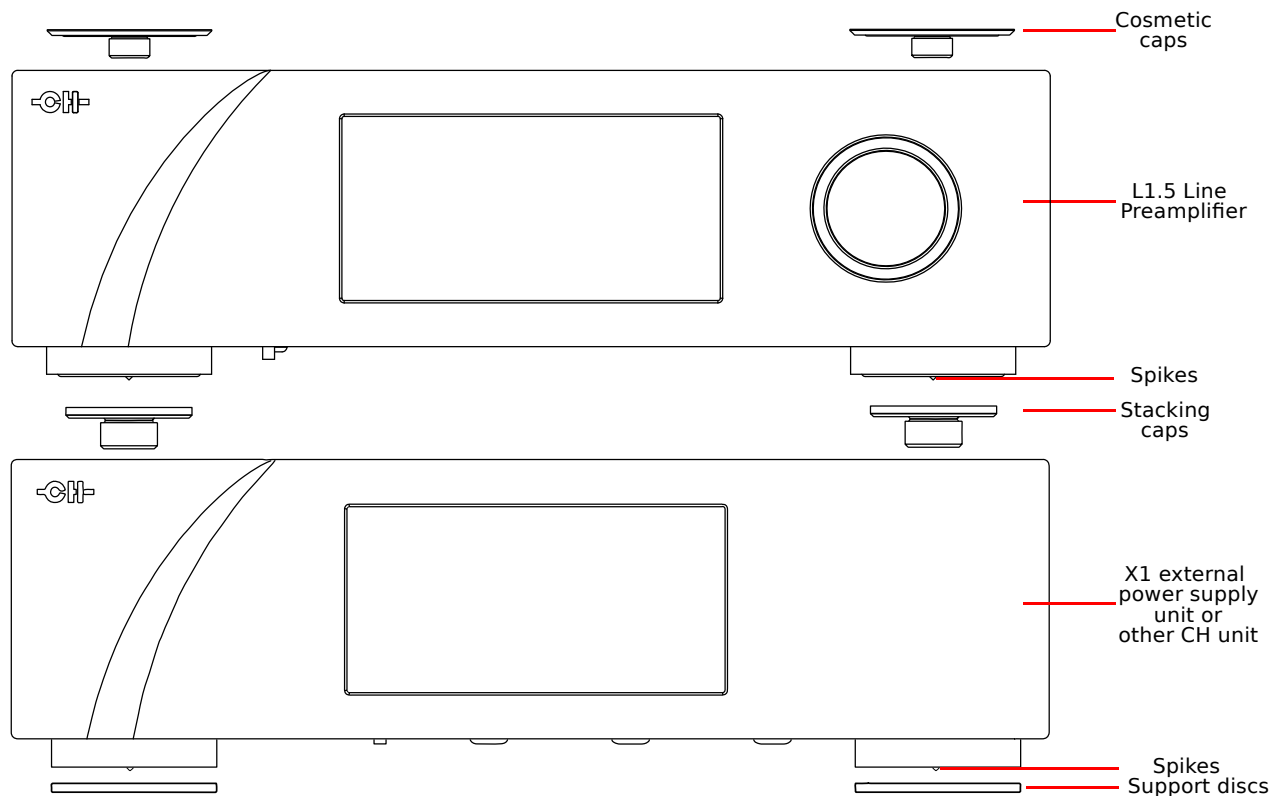
2.5 Stacking the L1.5 (or not)

Also included in the accessory packs is a set of stacking caps. These polymer inserts allow owners to stack the L1.5 chassis on top of other CH components. The spikes and interface caps will ensure mechanical grounding of the stacked chassis. However, this will inevitably compromise performance to some extent and should only be done when space is at an absolute premium.

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

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

Stacking the L1.5





3 Power Supply

All models in the CH Precision 1 series are equipped with an optimized, dedicated internal power supply. However, it is possible to power the 1 series units (except the T1 and the amplifiers) with an external power supply (X1). This upgrade allows for significantly improved performance.

In this chapter you can find all the information related to the power supply of your L1.5:

- Mains supply
- Fuses and operating voltage
- Power supply connection (standalone or with X1)

3.1 Mains supply

The L1.5 includes the power cord for your region. If you wish to use another power cord, make sure to use a fully grounded AC power cord (one with three terminals – live, neutral and **ground**).

Make sure that the mains voltage selection of the unit matches your local mains voltage.

Make sure your L1.5 power supply is disconnected from the AC supply/wall socket in the following cases:

- When cleaning.
- During thunderstorm, unplug both the power cord and the Ethernet cable.
- When left unused for a long period.
- Ensure that the AC supply socket to which the unit is connected is accessible.

When making connections, we recommend switching off all components of the chain using the main switches, but leaving the power chords connected to ensure grounding.

3.2 Fuses and operating voltage

The fuses are safety components for the device; we advise you, when replacing fuses, to buy them from a reputable manufacturer with all the required certifications. (UL, VDE, CB, ...)

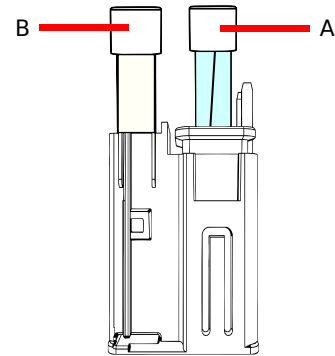
To change the fuses, switch off the L1.5 and remove the power cable.
The fuse holder is located to the left of the IEC power input.

Fuses value vary with operating voltage: (fuses' size is 5x20mm)

- 230V_{AC} – Fuse A : T50mA/250V_{AC}. Fuse B : T1.6A/250V_{AC}
- 100/115V_{AC} – Fuse A : T100mA/250V_{AC}. Fuse B : T3.15A/250V_{AC}

Never change the selectable voltage during operation.
To change operating voltage, switch off the L1.5 and remove the power cable.

Before changing the operating voltage first check the local voltage.

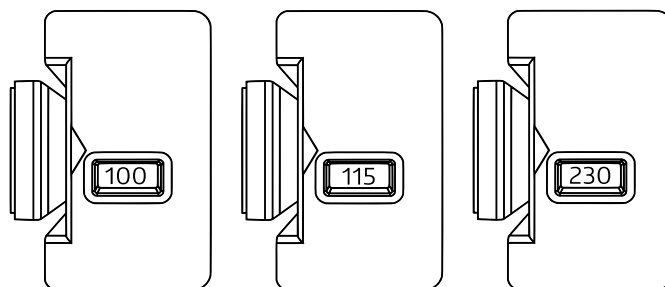
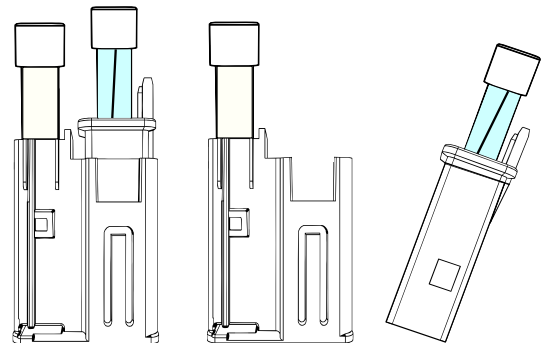


To change the operating voltage, remove the fuse holder from the L1.5 chassis.

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

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

You can now reinsert the fuse holder.



Voltage selector adjustment

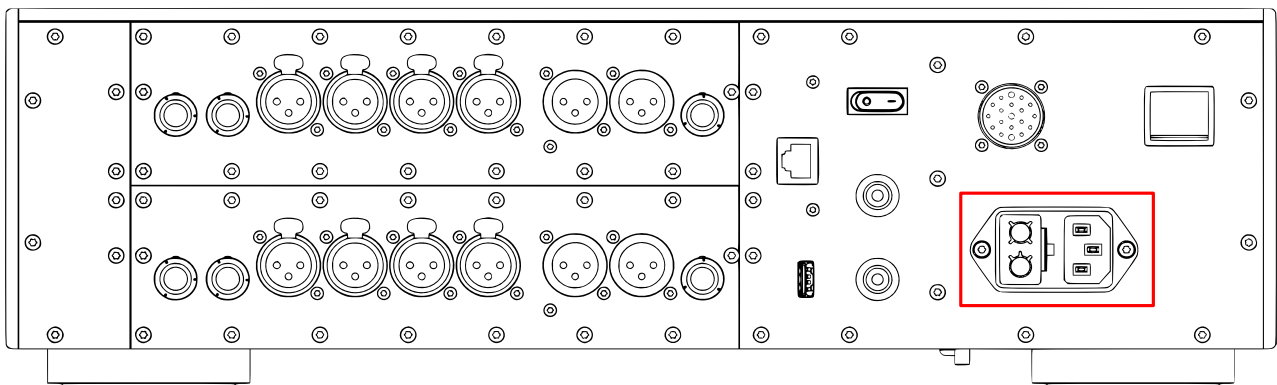
The L1.5 will be delivered to you with a voltage setting already defined according to the “normal” voltage in your country. **If you use a different voltage, it will be up to you to ensure that you have the correct voltage setting.**

3.3 Power supply connection (standalone or with X1)

All handling of the power cable must be done with the power switch(es) in the "0" position.

3.3.1 Standalone

In standalone mode, after verifying that the voltage selector is in the correct position according to your location, simply plug in the power cable supplied with your L1.5.

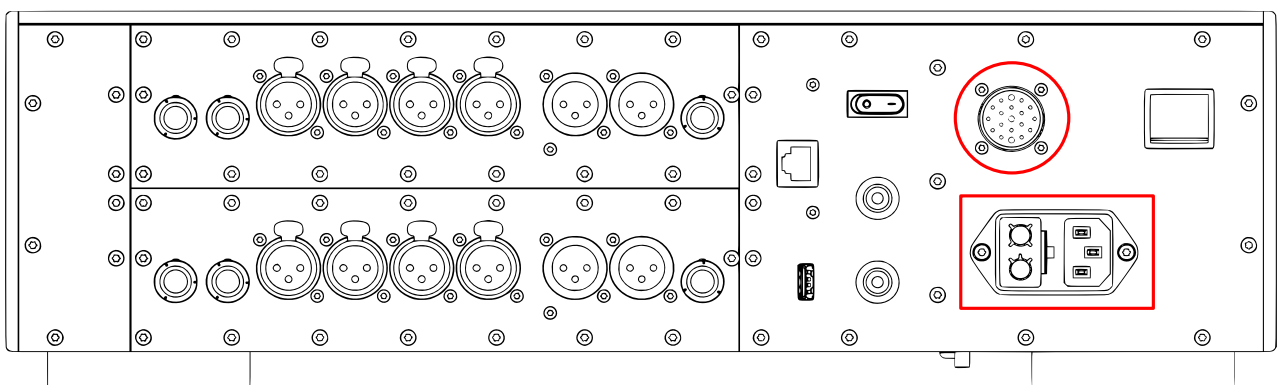


Standalone L1.5

3.3.2 With X1

When using an X1 external power supply with your L1.5, it is important to keep the AC power cord and add the X1 external power cable.

The external power cable is equipped with a keying feature and a threaded locking system.



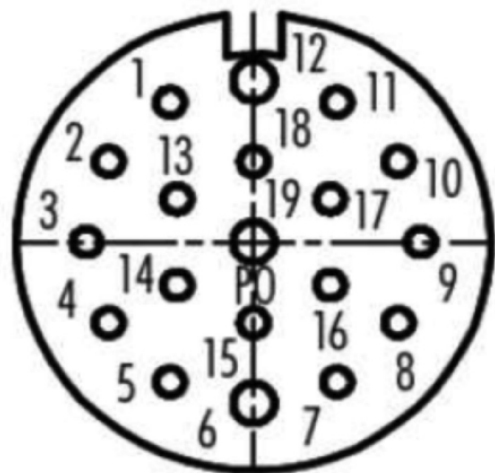
L1.5 with X1

Pay attention to the orientation of the power cable between your L1.5 and your X1. (Male on the X1 side, and female on the L1.5 side.) To optimize the improvement provided by the X1, it is important to keep it away from the L1.5. If you have a wide rack, it is preferable to place the X1 next to the L1.5 rather than above or below it.

4 External power supply connector

The external power supply connector allows you to add the optional CH Precision X1 power supply to your L1.5 to further enhance its performance. When the X1 is used, it completely replaces the L1.5's internal power supply, minimizing noise, reducing the noise-floor and increasing dynamic range and audio quality. With the X1 connected, the (small) standby transformer of the L1.5 remains active to ensure the unit's wake up functionality, so its power cord must be left in place.

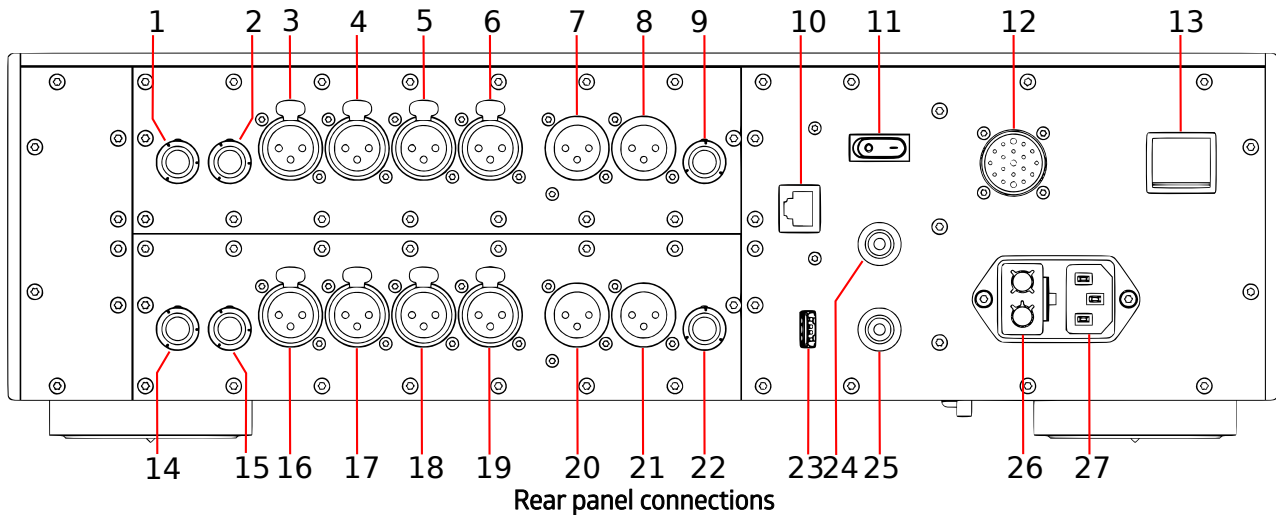
	X1 Voltage	Power Max
Pos. 1	+8V Digital	20W
Pos. 2	-8V Digital	20W
Pos. 3	GND Digital	-
Pos. 4	-8V Analog	20W
Pos. 5	-19V Analog	40W
Pos. 6	GND Analog	-
Pos. 7	+19V Analog	40W
Pos. 8	+8V Analog	20W
Pos. 9	+11.7V Analog	40W
Pos. 10	+5.5V Digital	55W
Pos. 11	+3.4V Digital	75W
Pos. 12	GND Digital	-
Pos. 13	GND Digital	-
Pos. 14	Command	-
Pos. 15	+10.5V Analog	50W
Pos. 16	Command	-
Pos. 17	GND Digital	-
Pos. 18	+8 Digital	20W
Pos. 19	GND Analog	-



Front view

5 Connections

You are now ready to connect your L1.5 to your system. Here are the connections for your L1.5.



- | | |
|---|---------------------------------------|
| 1. RCA 1 left input | 14. RCA 1 right input |
| 2. RCA 2 left input | 15. RCA 2 right input |
| 3. XLR 1 left input | 16. XLR 1 right input |
| 4. XLR 2 left input | 17. XLR 2 right input |
| 5. XLR 3 left input | 18. XLR 3 right input |
| 6. XLR 4 left input | 19. XLR 4 right input |
| 7. XLR 1 left output | 20. XLR 1 left output |
| 8. XLR 2 left output | 21. XLR 2 left output |
| 9. RCA left output | 22. RCA left output |
| 10. Ethernet port for command interface [CONTROL board] | 23. USB port for firmware update only |
| 11. Ground lift. Switch on to connect signal ground (analog ground) to earth. | 24. Signal ground connection |
| 12. Multi pin socket for X1 PSU connection | 25. Chassis (earth) ground connection |
| 13. On/Off switch | 26. Fuse holder and voltage selector |
| | 27. IEC AC input |



5.1 Analog inputs

Your L1.5 has a total of 6 line level analog inputs: 4 XLR and 2 RCA. These 6 inputs are individual and selectable from any of the preamplifier's interface (front encoder, infrared remote control, iOS or Android app).

Balanced (XLR)

The impedance of each balanced (XLR) input can be set to $94\text{k}\Omega$ or 600Ω . High impedance ($94\text{k}\Omega$) usually works best, especially in terms of dynamic range, but when cables are very long and running in a noisy electromagnetic environment, lowering the impedance of the link (to 600Ω) can help reduce the noise that could otherwise be picked up.

The maximum input level is 16V_{rms} for a balanced input.

Single-ended (RCA)

The impedance of each single-ended (RCA) input can be set to $47\text{k}\Omega$ or 300Ω . High impedance ($47\text{k}\Omega$) usually works best, especially in terms of dynamic range, but when cables are very long and running in a noisy electromagnetic environment, lowering the impedance of the link (to 300Ω) can help reduce the noise that could otherwise be picked up. Single-ended connections are more prone to noise pick-up than balanced link.

The maximum input level is 8V_{rms} for a single-ended input.

5.2 Analog outputs

The L1.5 is equipped with two pairs of balanced XLR and one pair of RCA outputs. This provides plenty of flexibility to connect your power amplifiers, even for bi-amplification. All three output share the same high-current differential output buffer.

The connection of the L1.5 to your system will depend on the number (and type) of amplifiers you are using.

5.3 Control board

The control board features an Ethernet port, allowing connection to the CH Control app via the system's control network. This app enables remote control of all system parameters from a tablet or smartphone (Android or Apple iOS). The control board includes a USB Type-A port for firmware updates using the included USB flash drive. It does not support reading audio files.

5.4 Grounding

Depending on the product version, the rear side may feature different mechanisms.

- With three terminals (two analog grounds and one earth) and a jumper allowing the connection between analog ground and earth
- With two terminals (one analog ground and one earth) and a switch to connect the analog ground to earth

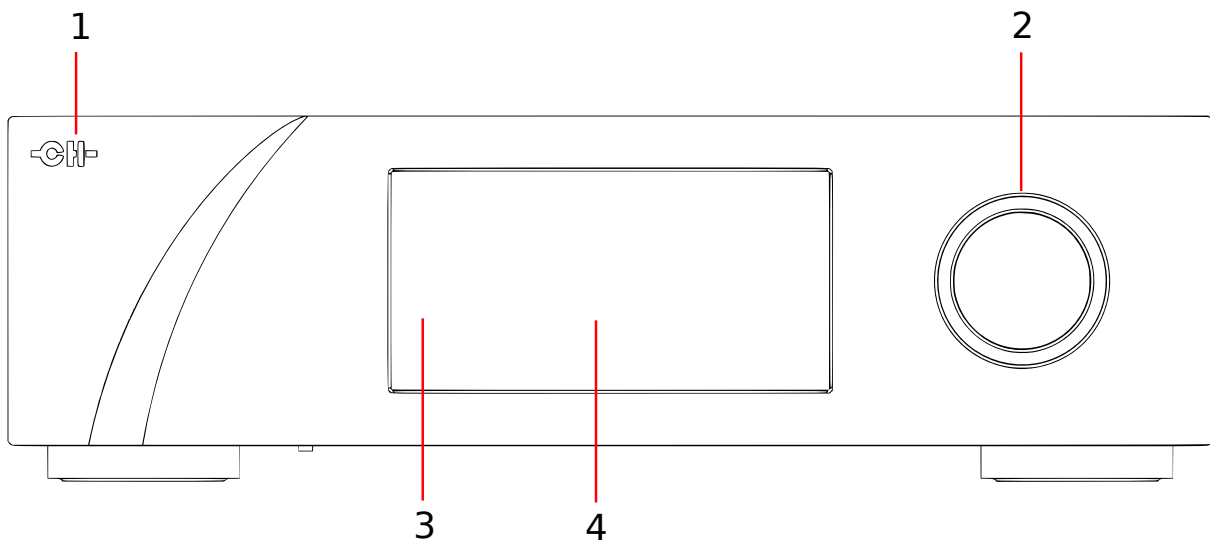
The grounding jumper (or ground lift) allows owners to combine or separate the signal and chassis ground. In any audio system, it is generally best to connect the signal and chassis grounds at one point only, usually in the preamplifier, in order to break ground loops and prevent potential hum.

6 Operation

The L1.5 Line Preamplifier can be operated from the front panel, from the infra-red remote control or from CH Control app (Android or Apple). Feedback to the user is provided by a high-definition display with customizable colors. Setup operations are handled from the front panel or the CH Control app.

6.1 Front panel controls

6.1.1 Front panel



Front panel elements

- | | |
|---|--|
| 1. Standby LED | 3. IR remote control receiver |
| 2. Dual concentric encoder with push function | 4. Display area (high-definition AMOLED display) |

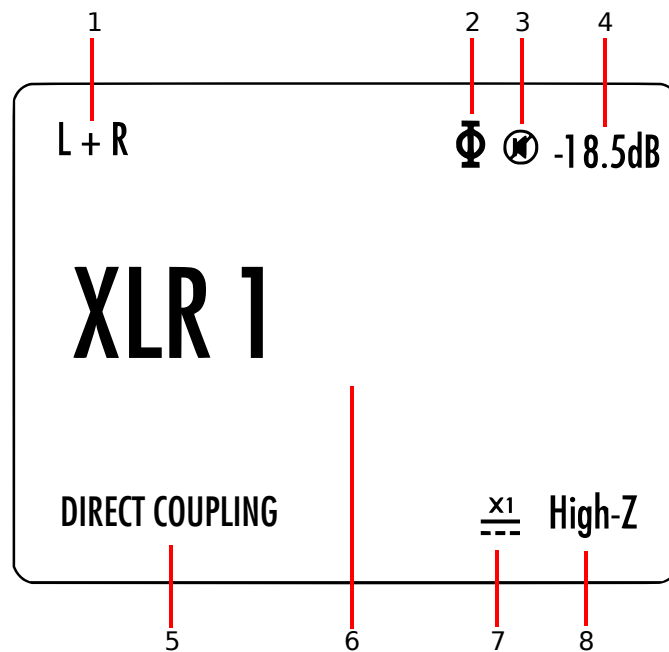
The standby LED lights up when the unit is in standby. It is normally turned-off during operation and lights briefly whenever it receives a valid IR remote control command. The LED can also be programmed to remain on during operation. The display is a high-definition 24-bit RGB panel with a very wide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

6.2 Operating modes

The L1.5 Line Preamplifier has two main operating modes: Normal mode and Menu mode. Normal mode is used to access standard preamplifier functions (input selection, volume,...) whereas Menu mode is used to configure the unit. The L1.5 also includes Shortcuts for quick access to selected functions. Shortcuts are user programmable and most Menu mode items can be selected as Shortcuts.

6.2.1 Normal mode

In Normal mode, the screen will display standard preamplifier functions (if Display mode = Status) or a large volume control progression bar (if Display mode = Volume). When powered-on, the L1.5 starts in Normal mode. The status display looks as follows:



Typical screen in Normal mode (Display mode = Status)

- Channels handled by the preamplifier.
- Analog audio output signal polarity (phase) indication. If the Φ symbol is present, polarity is reversed.
- Mute ($\otimes$) or Mono ($\square$), if $\otimes$ is displayed, the L1.5 output is muted. $\square$ will indicate that the L1.5 is running in mono mode, summing L & R channels.
- Indicates the current volume level.
- Indicates that no capacitor is in the signal path.
- Input source name. Each input can be renamed through the L1.5's menu.
- External power supply indication. When an external power supply is connected and engaged, $\underline{x}$ symbol is displayed and internal power supply is turned off.
- Impedance termination indication. High-Z is displayed when the 300 Ω termination resistors are not engaged.



The displayed items depend on user settings. In the example above, the L1.5 selects the XLR 1 input with a High-Z impedance. The volume is set at -18.5 dB. The output is currently muted. The audio signal polarity is inverted. The displayed items are similar for other configurations.

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

User Control Knob Action	L1.5 State	L1.5 Action
[NP] Normal Push	Standby On	Wake from Standby Enter Shortcuts mode
[LP] Long Push	Standby On	Wake from Standby Go to Standby
[C>>] Centre Rotate Right	On	Increase volume (1 st by 0.5dB steps, then faster)
[<<C] Centre Rotate Left	On	Decrease volume (1 st by 0.5dB steps, then faster)
[E>>] External Rotate Right	On	Select next available input
[<<E] External Rotate Left	On	Select previous available input



6.2.2 Shortcuts

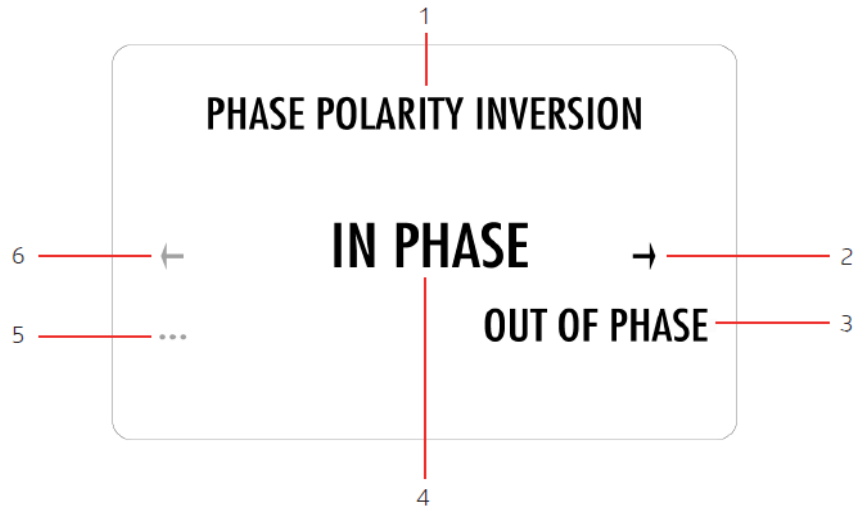
The L1.5 Line Preamplifier is configured by a set of menus as described in the next sections. To allow quick access to the most frequently used functions, the L1.5 offers the concept of Shortcuts. Shortcuts are fully programmable and the user may choose almost any configuration parameter as a Shortcut function. 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 10 seconds, the unit will revert to Normal mode.

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

User Control Knob Action	L1.5 State	L1.5 Action
[NP] Normal Push	Shortcut (except last) Last shortcut (SETUP) or after current shortcut has been modified	Skip to next Shortcut or exit if setting was altered Exit Shortcuts mode (Enter Normal mode)
[LP] Long Push	Standby Any other state	Wake from Standby Go to Standby
[C>>] Center Rotate Right	Shortcuts (except last) Last Shortcut (SETUP)	Modify parameter up (when available) Enter Menu mode
[<<C] Center 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)

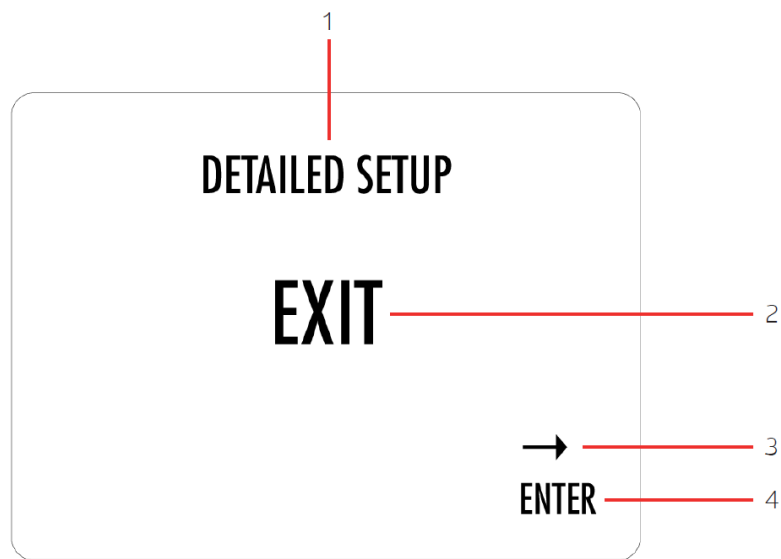
The PHASE POLARITY Shortcut gives a good illustration of how to navigate a Shortcut screen. Navigating other Shortcuts is similar.



Phase polarity Shortcut elements

1. Shortcut title (Parameter, for other Shortcuts, title changes accordingly).
2. Arrow 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 allows to access the detailed setup of the unit (Menu mode).



Setup Shortcut elements

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

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

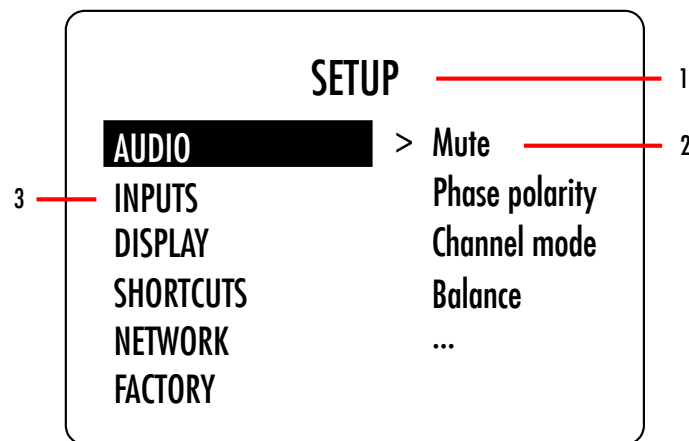
6.3 Menu mode

The Menu mode allows the Configuration and Setup of the L1.5 Line 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. If no shortcut is configured, a single Normal Push [NP] from the Normal mode will 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	L1.5 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

Following illustration shows the elements of the L1.5 SETUP Menu page, the entry point to the L1.5 menu structure.

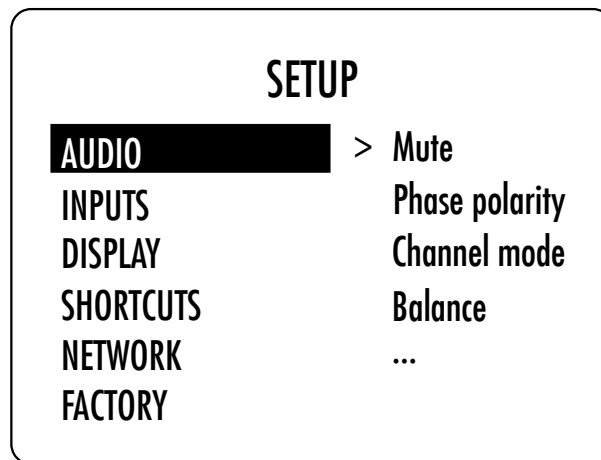


SETUP menu display elements

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 SETUP >> AUDIO.
2. Shows the accessible parameters when entering the currently highlighted menu item. In this example, AUDIO is highlighted and the second column shows the parameters accessible in the AUDIO menu.
3. 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.

6.3.1 Setup menu

The general setup menu is used to navigate to any setting.



Main menu elements

There are six main menus to configure the L1.5:

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



6.3.2 Audio menu

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

SETUP >> AUDIO	
MUTE	Unmuted
PHASE POLARITY	In phase
CHANNEL MODE	Stereo
BALANCE	Centred
MAX START VOLUME	-40 dB
MAX VOLUME	0 dB

Audio menu elements

- Mute: Mutes or unmutes the audio output.
- Phase polarity: Allows users to reverse the absolute phase polarity of the audio output.
- Channel mode: Mono or stereo mode.
- Balance: Left/Right balance adjustment in 0.5dB increments.
- Max start volume: Set the maximum volume at power on.
- Max volume: Set the maximum volume allowed.

6.3.3 Inputs Menu

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

SETUP >> INPUTS	
ALL INPUTS	...
XLR 1	...
XLR 2	...
XLR 3	...
XLR 4	...
...	...

INPUTS >> XLR 1	
TYPE	Normal
GAIN	0 dB
IMPEDANCE	High-Z
NAME	XLR
CALIBRATION	Start

Inputs menu elements

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

- Type: Allows you to adjust the volume (normal), bypass the gain stage, or disable the input.
- Gain: Allows you to adjust the input gain.
- *Impedance : 94k Ω or 600 Ω (balanced) / 47k Ω or 300 Ω (Unbalanced).
- Name: Renames each input and displays that name when the input is selected.
- Calibration: Initiates DC calibration of the input, in order to compensate for the DC current of the connected source. Make sure both the connected device and the L1.5 are warmed up before doing so.

* 47k Ω /94k Ω means the input won't draw any current from the upstream device's output, delivering the best possible resolution and dynamics. 600 Ω /300 Ω 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. This eliminates induced noise at the cost of dynamic range and precision.

6.3.4 Display Menu

The Display menu is used to change screen settings.

SETUP >> DISPLAY	
DISPLAY MODE	Status
FRONT LED	Off
BRIGHTNESS NORMAL	80%
BRIGHTNESS DIMMED	20%
COLORS	...

Display menu elements

- Display mode: The L1.5 screen can display a status page, a volume control bar or be turned off.
- Front LED: Allows users to select whether the front panel LED is on or off when the L1.5 is operating.
- Brightness normal: Allows you to set the brightness of the display in operating mode (10 – 100%), and to fine tune the high brightness gamma curves to perfectly match the brightness and color of other displays.
- Brightness dimmed: Allows you to set the brightness of the display when dimmed between operations (10 – 40%), and to fine tune the low brightness gamma curves to perfectly match the brightness and color of other displays.
- Colors: The color of the display can be chosen from standard colors or a custom color can be created.



6.3.5 Shortcuts Menu

The Shortcuts menu allows you to customize your shortcuts.

SETUP >> SHORTCUTS	
ALL SHORTCUTS	Default shortcuts
SHORTCUT 1	Mute
SHORTCUT 2	Phase polarity
SHORTCUT 3	None

Shortcuts menu elements

- The L1.5 allows you to define up to six shortcuts, taking you directly to almost any parameter in any menu.
- If you use “Default shortcuts”, the L1.5 is preprogrammed with Mute and Phase Polarity as shortcuts one and two.
- After scrolling through the last shortcut, the next screen that the L1.5 displays is the entry port to the L1.5 menu. The available shortcuts are as follows:
 1. None
 2. Mute
 3. Phase polarity
 4. Channel mode
 5. Balance
 6. Input impedance
 7. Input gain
 8. Display mode
 9. Front LED
 10. Colors

6.3.6 Network Menu

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

SETUP >> NETWORK	
STATUS	1 device connected
ROLE	Master
ROOM NUMBER	1
IP SETTINGS	Auto (DHCP)
WAKE-ON-LAN	Yes
POWER OFF COMMAND	Yes

Shortcuts menu elements

- Status: Shows a list of compatible devices detected on the LAN.
- Role: When physically connected to a network, the L1.5 can ignore this network (offline) or connect to it as either the Master unit (it will transmit commands to all compatible client units) or as a Client (it will ignore entries and receive commands only from the master device). This networking facility allows system-wide sharing of commands among CH products (such as mute or power up/down).
- Room number: Defines the room in which the L1.5 is located for multi-room applications. This prevents CH Precision units connected to the same network but located in different systems/rooms to interact with each other.
- IP settings: Auto should be selected if the L1.5 is connected to a router with DHCP server feature. Direct-Link should be selected when an RJ45 Mirror lead directly connects a L1.5 to a single other CH Precision device. More advanced settings are available if needed.
- Wake-on-LAN: If 'No' is selected, the L1.5 cannot be switched on from the CH-Control App. If 'Only If POE' is selected, connecting the L1.5 to a Power Over Ethernet switch will allow it to be switched on via the CH-Control App (Standby consumption will be less than 0.5W). If 'Yes' is selected, the L1.5 can always be switched on by the CH-Control App (Standby consumption will be less than 2W).
- Power off command: If Yes is selected, the L1.5 will enter standby mode when it receives a Power Off command from the LAN. It will remain on if No is selected. This is useful if you want to keep your L1.5 on even when you turn off the rest of your system.

6.3.7 Factory Menu

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

SETUP >> FACTORY	
SERIAL NUMBER	XXXXXXXX
FIRMWARE VERSION	1.0
UPDATE FIRMWARE	Update
FACTORY RESET	Reset
INSTALLED OPTIONS	...
DEVICE CALIBRATION	Start
IR REMOTE	Pair

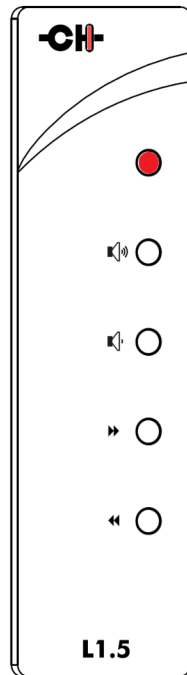
Shortcuts menu elements

- **Serial number:** Displays the serial number of your L1.5. This serial number is also written on a sticker at the back of your L1.5.
- **Firmware version:** Indicates the version of the firmware that the L1.5 is currently running. Periodically check CH Precision's website to see if a newer version is available. It could add new features or correct bugs. Note that the CH Control App indicates that a device is not up to date by displaying its name in orange instead of red.
- **Update firmware:** Selecting Update launches the L1.5 firmware update process. A USB flash disc drive with a valid set of firmware must be inserted in the A-shaped USB port. Please refer to the corresponding section of this manual for more detail on firmware update procedure.
- **Factory reset:** Resets all parameters to their default factory values. This can be useful if you made some changes that you don't know how to revert.
- **Installed options:** Lists the hardware configuration of your L1.5.
- **Device Calibration:** Launch automated self calibration to measure and compensate DC at all stage of the L1.5 signal path. This calibration process is conducted at CH Precision factory prior to packing any L1.5. In order to avoid overriding these factory measured valued with inaccurate ones, the L1.5 must be powered for at least 1 hour before this function is available, to ensure the L1.5 is warmed up and all internal stages have stabilized.
- **IR Remote:** Pair/Unpair infrared (IR) remote control. It is possible to pair the remote control to your L1.5 to prevent any unwanted effects with other machines using the same IR command. It is also possible to deactivate pairing if necessary.

7 Handheld remote control

7.1 Remote control operation

The L1.5 Line Preamplifier 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.



L1.5 remote control

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

Remote control functions are according to the following table:

Remote Control Button	Normal Push [NP]	Long Push [LP]
MUTE (red button)	Mute/Unmute (also wakes-up from STANDBY)	Sets unit into STANDBY or wakes it up
VOLUME UP	Volume UP	Fast volume UP
VOLUME DOWN	Volume DOWN	Fast volume DOWN
NEXT INPUT (▶▶)	Select next enabled input	Absolute phase inversion
PREVIOUS INPUT (◀◀)	Select previous enabled input	-



7.2 Changing the remote control batteries

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

Warning: Do not ingest battery, Chemical Burn Hazard

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

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

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



8 Firmware update

8.1 Preparing the USB stick

The firmware of all the CH Precision units can be updated using the USB port located at the back of the unit. Before starting the firmware update, it is necessary to load a USB stick with files containing the new firmware. Use a FAT32 formatted USB 2.0 stick (there is one supplied with your L1.5, located in the Accessory Pack). Please note that some USB sticks might not be detected by the L1.5's USB port. The following procedure describes how to load the USB stick with the correct files:

1. Download the latest L1.5 firmware file from www.ch-precision.com.
2. Decompress the ".zip" folder and copy the decompressed files to the root of your USB stick.

Make sure all the files are present on your USB stick, and that there are no duplicates. It is easiest to delete older L1.5 firmware files from the stick before loading the new ones, as this saves any possible confusion. Any missing file will make the firmware update procedure fail, while multiple versions of the same unit's firmware can lead to unstable L1.5 behavior after update.

8.2 Updating the unit's firmware

1. Connect the USB stick to the USB port located at the back of your L1.5 unit.
2. Navigate to the FACTORY SETTINGS menu and select the UPDATE FIRMWARE item.
3. Start the Firmware Update process by pushing the central button. Please note that the unit will perform a Reset (the display briefly turns off and on) during the procedure.
4. Once the firmware update is complete, the unit automatically goes into Standby mode. You can now remove the USB stick and turn the unit on. The new firmware is now active. To verify that the firmware update is effective, navigate to the FACTORY SETTINGS menu and select the FIRMWARE VERSION item. The displayed firmware revision should match the firmware revision on the files copied to the USB stick.

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

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



8.3 Emergency firmware update procedure

WARNING, this procedure is not a normal update procedure, it is an emergency procedure in case of a problem with the standard update.

To perform a normal update, go to the setup menu, factory settings, then to firmware update and press the "OK" button.

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

1. Power the unit off (back panel mains power switch to OFF).
2. Connect the USB stick to the USB port located on the CONTROL board mounted on the back of your L1.5 unit.
3. Push and keep the encoder button pushed and power up the unit (back panel mains power switch to ON). Keep the encoder button pushed for a couple more seconds after you turn the unit on.
4. The unit performs the emergency firmware update. Once the operation is complete, the unit automatically goes into Standby mode. Remove the USB stick and turn the unit on. The new firmware is now active. To verify that the firmware update is effective, navigate to the FACTORY SETTINGS menu and select the FIRMWARE VERSION item. The displayed firmware revision should match the firmware revision on the files copied to the USB stick.
5. If the emergency firmware update procedure fails, try the same procedure again using a different USB stick. If the failure persists, turn off your unit and contact your authorized dealer for assistance.

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

8.4 Background firmware update

The L1.5 supports background firmware updates, which are triggered by the CH-Control application. To use this feature, the device needs to have a USB key attached - use the provided one. It is highly recommended to keep the USB key permanently attached to ensure that the device can receive automatic firmware updates in the future. The application will notify you when a new version is ready to be installed. You can install the firmware update either by shutting down the device from the application (either individually or whole system) or by going to the device's menu under 'Factory→Update firmware' setting.

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

Disabled: The entire transfer and check process is deactivated.

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

This feature is not available with the iOS Control app.



9 Troubleshooting

Error	Action
No power	Check the AC power cord. Check the power button at the back of the unit. Check the mains fuses on the AC power cord receptacle.
Remote control does not work	Check if the unit is connected to the AC supply and powered-on. Check that the distance to the unit is not too great. Move closer and try again. The L1.5's Standby LED should briefly illuminate Change the batteries in the remote control if required (Remote control LED does not illuminate). Make sure the L1.5 is not configured as a Slave on the network (Settings / Network / Config). Test the setting with or without remote control pairing.
No sound (general)	Check that your source is playing. Check that your amplifier is turned-on and speakers are connected. Check that the system volume setting is not too low. Check that the correct input is selected on your L1.5.
No sound (Ⓜ is displayed)	Your L1.5 is muted. Unmute using the first Remote Control button.
Corrupted sound	Check the setup of the selected input. Check the wiring of your inputs and outputs.
Lost in the settings?	Restore factory settings and start your setup again.
Firmware update fails	Try Emergency Software Update procedure. If it fails, download the latest L1.5 firmware from. www.ch-precision.com, prepare a software update on a FAT32 formatted USB stick and run the Emergency Software Update procedure again.
USB flash drive for firmware update is not detected by L1.5	Please try another brand of USB flash drive (e.g. the one provided with your L1.5).

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



10 Specifications

General

User control	Dual-concentric encoder with push function CH Control app (Android or iOS) Remote control
Power supply	Selectable 100V, 115V or 230V AC, 50Hz to 60Hz
Power consumption (Standby)	<0.5W
Power consumption (Normal)	60W
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Storage conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (L x D x H)	440mm x 440mm x 120mm (main body) 440mm x 440mm x 133mm (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, 94k Ω or 600 Ω load (user selectable)
Single-ended inputs	2x RCA connectors per board, 47k Ω or 300 Ω load (user selectable)
Maximum input level	+26dBu (16V _{rms}) balanced, +20dBu (8V _{rms}) single-ended

Analog outputs

Balanced outputs	2x XLR connectors per board
Single-ended outputs	1x RCA connector per board
Output and I/V stages	Local feedback
Maximum output level	+24dBu (12V _{rms}) balanced & +18dBu (6V _{rms}) single-ended
Volume control range	-99.5dB to +18dB in 0.5dB steps
Frequency response (-3dB point)	DC-700kHz
Signal to Noise Ratio (A-weighted)	>137dB, unity gain and at maximum output level
Total Harmonic Distortion + Noise	< 0,0008 % @ 22Hz-22kHz, A-weighted
Output noise (A-weighted)	< 2uV _{rms} (on balanced output), < 1.5uV _{rms} (on single-ended output)



Other features

Mode	Stereo or Mono
Phase	Absolute phase polarity inversion

Remote control

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

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

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

Enclosure designed by 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.

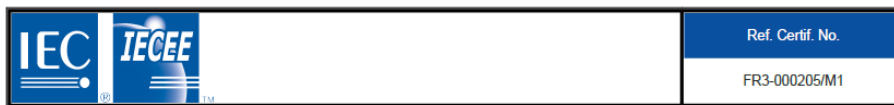
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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

Certification Body Scheme

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

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



Disposal – Environmental care

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



CH PRECISION SÀRL

Z.I. LE TRÉSI 6B · 1028 PRÉVERENGES · SWITZERLAND

+41 (0)21 701 9040 · info@ch-precision.com

www.ch-precision.com