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P10 Dual Monaural Twin-Chassis Phono-Stage

User Manual

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Dear Valued Customer,

We are honored that you chose the P10 Dual Monaural Phono-stage. Our team has made every effort in the design and manufacture of this top quality versatile, past and future-proof product and is proud to present it to you. We hope your P10 phono-stage will bring you uncountable hours of emotional connection with your record collection.

But before you embark on your musical journey, we kindly request your attention to the information contained in this manual. The P10, as you will discover in the following pages, is a Swiss precision product designed for ultimate performance and flexibility. However, delivering that ground breaking sonic and musical excellence requires your unit to be setup and operated correctly. That is what this manual is all about. If you have any questions or require assistance, please don't hesitate to contact your authorized dealer.

Once properly installed and configured, we are confident that you will enjoy your P10 phono-stage for many years.

The Concert has just begun...

Cossy F.

Heeb T.

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1 Introduction

CH products are designed and manufactured in Switzerland by CH Precision Sàrl. We use fully discrete, fully balanced, fully complementary, ultra-short signal path circuits – but we combine them with sophisticated software control, monitoring, protection and set-up aids to ensure the highest possible levels of performance, operational consistency, ease of use and versatility. In the case of the P10, as the cartridge generates a single-ended signal, the output stage of the P10 is fully balanced, but not the overall signal path.

Your P10 offers a number of operational features and set-up aids (the Gain and Loading Wizards) that are unique and probably unfamiliar. For that reason it is essential that you fully understand every aspect of the P10's operation if you are to enjoy its maximum possible performance and ease of use.

1.1 Global audio options
These settings will affect the performance of all inputs.

- Mute: muted or unmuted

- Absolute phase polarity: In phase or out of phase

- Phono EQ curve: RIAA (with choice of EMI, Columbia, Decca, Teldec/DGG, NAB, Capitol or Philips with optional EQ cards). Neumann Pole (On/Off for any curve)

- Channel mode: stereo or mono (n/a to 4-box P10)

- Global or local feedback

1.2 Input-specific options

- Input configuration: normal or disabled

- Gain: set gain level for input

- Impedance: set input impedance for MM/MC inputs

- Filters: none or high-pass (rumble)

- Name: designate a name or identity to each input or connected cartridge

1.3 More user configurable options

- Display: front LED on/off. Color, brightness and auto off for main display.

- Define shortcut functions: select number of and designate shortcuts

- Network configuration

- Firmware version and update

1.4 The purpose of this manual
This manual will lead you through each step of the installation and set up procedure, in a clear and logical sequence. Although the operation and options might seem complex, they will quickly become second nature.But because of the sheer range of options available it is easy to overlook something unless you approach set up and configuration in a systematic fashion. If you take the time to follow the manual, it will ensure that you become completely familiar with the P10's many options and that your phono-stage delivers the best possible performance.

2 Setting up your P10

2.1 Safety notice

Like any piece of sensitive audio electronics, there are certain precautions that you should take in handling and installing your CH Precision P10 in order to protect yourself, your new equipment and your system.

- Always handle with care. The P10 phono-stage components are heavy, so have someone to help you when unpacking, re-packing or moving them around.

- Install both chassis of your P10 phono-stage on strong, stable supports capable of holding their weight. It is best to clear/prepare the supporting surfaces in advance.

- Do not install your P10 phono-stage near water. Do not expose the units to any kind of liquid.

- Do not install them under direct sunlight or near any heat source, such as a radiator or other apparatus generating heat.

- Do not install them in a confined space and make sure there is sufficient ventilation and airflow around and beneath each unit.

- Do not operate them under high ambient temperature (>40°C) or in extremely high humidity conditions (>85%) such as humid cellars. Only use options and accessories specified or recommended by CH Precision.

- Do not open the units or try to service them yourself. Always refer to a qualified technician for service, maintenance or upgrades. Failure to do so will void the unit's warranty

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

In Finland: Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.

In Norway: Apparatet må tilkoples jordet stikkontakt.

In Sweden: Apparaten skall anslutas till jordat uttag.

2.2 Changing fuses and operating voltage

- To change the fuses, switch off the P10 and remove the power cable.
  The fuse holder is located below the IEC power input on the Power Supply chassis.
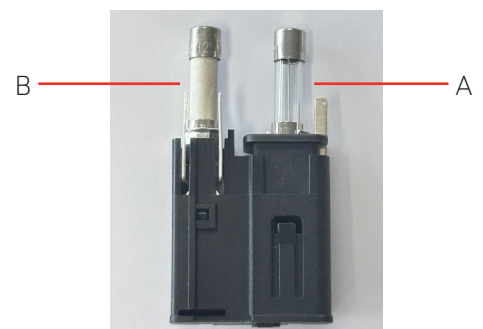 See diagram on page 16 (Arrow 3)

Fuse values vary with operating voltage:

230VAC – Fuse A : T50mA/250Vac. Fuse B : T2.5A/250Vac

100/115VAC – Fuse A : T100mA/250Vac. Fuse B : T5A/250Vac

- Never change the selectable voltage during operation.
  To change operating voltage, switch off the P10 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 P10 Power Supply 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.
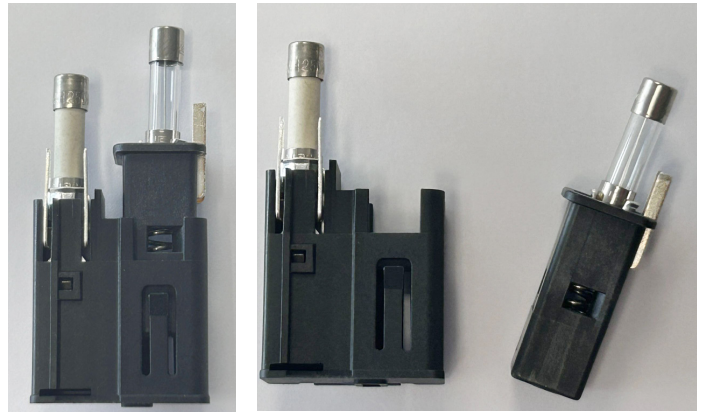
2.3 Mains supply

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.

Do not connect your P10 phono-stage power supply unit to the AC supply/wall socket before connecting the umbilicals between the power supply unit and audio chassis.

We recommend disconnecting the P10 from the AC supply in the following cases:

- When making connections (we also recommend disconnecting the rest of the system from the AC supply when installing signal and speaker cables).
- When cleaning.
- During thunderstorms.
- When left unused for a long period.

2.4 Packaging and future transport

The P10 phono-stage must always be packed in its original carton for transportation. Doing so will ensure the optimal level of protection for your unit. Therefore, keep all the packaging material in a dry and clean place for future use.

Finally we recommend removal of the adjustable spikes, putting them into the holes provided in the packaging foam for transportation. Indeed, vibrations during transport may cause the adjustment spikes to move from their fully retracted position. There is then a risk of scratching the supporting surface when re-installing the unit.

2.5 Cleaning

Use a soft, dry towel or cloth for cleaning. Never use any solvent or liquids as they may damage the surface treatment or penetrate inside the units.

The window should only be cleaned with a micro-fiber cloth, like those used for cleaning glasses, as the plexiglass window is easily scratched, even by paper-tissues.

2.6 Maintenance and service

The P10 phono-stage contains no user serviceable parts. Do not try to open, modify or repair your P10 by yourself. This will void any warranty. Your P10 phono-stage should be checked by a qualified technician if:

- The unit is not functioning properly.

- The mains cable, the power cord receptacle, the umbilical cables or their receptacles are damaged.

- The unit shows signs of having been dropped or presents external damage.

- The P10 phono-stage has been exposed to liquids (such as rain) or unknown substances.

3 Installing your P10 components

3.1 Unpacking

The P10's cartons are large and contain both the components and all of their accessories. You will need an open, preferably carpeted area in which to unpack them. Please also ensure that the rack or support space on which the P10 will be placed has been cleared and cleaned before you start. At this point it is also worth ensuring that the connectors on any interconnect cables are cleaned and that the power to your system is turned off. Each carton consists of an inner box and outer sleeve. It is easiest to empty one box at a time, before reassembling it to save space.

Once you open the inner box, remove the top layer of white foam packaging. Inside you will see the component chassis and various accessories.

With a helper, carefully lift the P10 component 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 its unit. Also remove the power cord and suction cup (if present) and the four, black, levelling/grounding spikes that are set into the foam.

We recommend storing the Accessory Packs in a readily accessible place, so don't put them back in the cartons with the plastic bags when resealing them.

3.2 Package contents

Your P10 should arrive in two substantial cartons. Once unpacked these cartons and packaging materials should be stored safely in case you ever need to transport your units. When moving or transporting the P10 units, this should always be done in the original packaging.

The audio chassis carton should contain:

- The P10 Phono-stage
- Four composite titanium/polymer spikes
- A suction cup (used to remove the four top covers)
- An accessory box containing:
    - an infrared remote control
    - a spike adjustment screwdriver
    - a Torx T-10 screwdriver
    - four support discs
    - four smaller, dimpled stacking caps
    - a USB stick containing the latest CH Precision firmware

The power supply chassis carton should contain:

- The P10 power supply with two captive umbilical cables

- A power cord

- Four composite titanium/polymer spikes

- An accessory box containing:
  - four support discs
  - four smaller, dimpled stacking caps

In case of damage to either chassis, or missing components, please contact your authorized dealer immediately. If your P10 units are still very cold from transport, please let them warm to room temperature in order to avoid condensation developing inside them.

3.3 Placing your P10, connecting the two chassis together and installing the spikes

Before positioning your P10 units, it is worth taking the time to make a few preliminary decisions. Decide how many (and which) inputs and what connections you will use. Familiarizing yourself with (and making a note of) their position on the rear of the audio chassis will be extremely useful when you come to actually make connections and allocate/configure those inputs.

Decide whether you will use the CH Precision supplied levelling / grounding spikes. If an alternative system is to be used, please note that the lower part of each foot that is held by three screws can be removed to provide an easier access to the M10×1.5 central thread where a third-party system can be attached. Please note that the CH Precision casework is designed to support weight and ground energy in the corners only. If you choose to use third party supports they should be positioned in the same location as the unit's original feet.

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 lift/remove the four circular covers in the top plate of each unit. Gently insert the titanium composite spikes into each exposed shaft and use the short red screwdriver to turn them enough to engage the threads at the bottom of each spike. Each internal thread is coated with a thin layer of grease during assembly to prevent galling between it and the titanium spike. Adding an extra layer of grease or even better, CopaSlip to the threads will ensure proper operation and ease set up.

- 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 on the P10 power supply 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 the units. Each chassis is heavy and the feet are fitted with rubber rings to protect the supporting surface, which makes it hard to slide the units. Having a partner to lift and help place each chassis will make things considerably easier, as will placing the feet on the support discs (see below).

- Place the power supply first, carefully planning the path to be taken by the two umbilicals before positioning the unit.

- Gently pull the umbilicals into position to be connected to the audio chassis, noting which is which thanks to the color-coded identification rings.

- Move the audio unit as close as possible to the rack/support so that you can thread the umbilicals through the rack (if necessary) before moving it back into position. Connect the left umbilical to the left input socket and the right umbilical to the right input socket. The plugs on the umbilicals will only connect in one position. Turn the connector in the socket until you feel it engage and then gently push it home until you hear a locking sound.

DO NOT force the umbilical connectors into the sockets. This will risk damaging the connecting pins and disable your P10.

If you feel resistance when you insert the connector, check that you are trying to connect the proper pairs of umbilicals and connectors together. Please note that the two connectors have the same diameter but a different number of pins, so it is not possible to plug an umbilical into the wrong socket.

3.4 Positioning the P10 chassis components

Each P10 chassis is supplied with a set of four support discs. These have a groove machined in the upper face that fits over the rubber ring in the underside of each foot. Lift each corner of the chassis in turn and position the disc beneath each foot. The groove that interfaces with the rubber ring will ensure that the footer disc stays in place if you slide the unit.

As well as making the units easier to position, the support discs can also offer a superior interface between the grounding spikes and the supporting surface. The spikes are designed to drain internally generated energy away from sensitive circuitry and into a dispersive support structure, but if the supporting surface is extremely hard or forms an impedance mismatch with the spike tips, the material and footprint of the support discs can function as a lossy mechanical buffer, easing the passage of mechanical energy out of the unit. As a rule, the support discs work well with very hard surfaces, but results will vary with system and supporting surface. Once set up and warmed up, compare the sound of the unit(s) with and without the discs in place.

- Use the red screwdriver to wind down each of the four spikes until they touch the surface (or disc) 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 P10 units are perfectly level. If they are 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 and equally loaded.

- Replace the top caps. Their magnetic coupling will hold them in place.

3.5 Stacking the P10 (or not)

Also included in the accessory packs is a set of small, dimpled stacking caps for each unit. These polymer inserts allow owners to stack the P10 units on top of each other, or on other CH components. However, this will inevitably compromise performance and should only be done when space is at an absolute premium.

Stacking these units is also not advised because of the very sensitive nature of input signals that the P10 audio unit handles: Because it is essentially a magnetic field amplifier, the P10 audio unit and the cables linking the cartridge to the phono-stage must be kept as far as possible from any magnetic field. So leaving enough room between the P10 audio unit and its power supply, or any device with transformers of electronic circuits is highly recommended in order to achieve the best possible performance.

The optimum support for any CH unit is to mechanically ground it to a stable support surface that can absorb and dissipate mechanical energy, either using the supplied spikes or an after-market solution, as described above. But if lack of space makes it absolutely essential to stack 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 P10 (or not)

cosmetic caps

P10 audio unit

stacking caps

P10 power supply

support discs
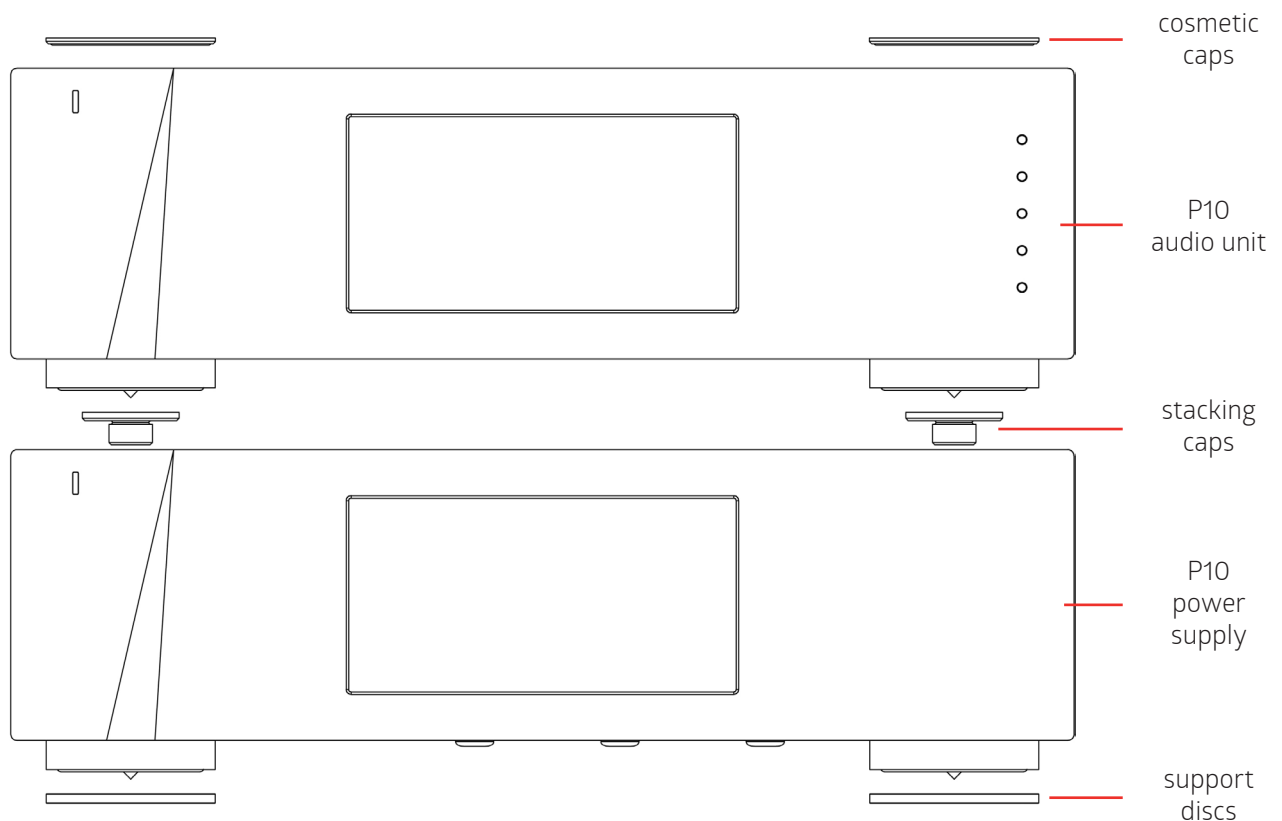
4 Matching your cartridge to the optimum input

Your P10 offers a choice of inputs and input types: inputs MC1 and MC2 operate in current mode.; inputs MM/MC1 and MM/MC2 operate in the more common voltage mode. Each input can be individually configured to match the connected cartridge. Each input type suits cartridges with different electrical characteristics.

Please note that each P10 input can be connected to either an RCA or an XLR terminated tonearm. XLR pin 2 and 3 are connected to the hot and cold leads of the cartridge's coil (internally connected to the RCA pin and ring, respectively), while pin 1 is for shielding purposes (connected by default to analog ground in the P10).

Any unused P10 input(s) can be turned off. This will make input scrolling and selection easier, while reducing power consumption as the unused input module will not be powered in this case. To turn off an input, please refer to chapter 7.3 (input specific options).

4.1 MC1 and MC2 current sensing inputs

A current mode input reads the current generated by the cartridge (not its voltage). Current mode inputs are usually dedicated to MC cartridges but also work well with the (very few) low-output MM cartridges available, such as those from SoundSmith. The current from the cartridge is amplified by a discrete transistor based trans-impedance amplifier. Using a current mode input provides a superior signal to noise ratio compared to a conventional voltage input, better immunity and by its very nature, no requirement to adjust and optimize impedance. The gain of the trans-impedance amplifier is intrinsically dependent on the internal impedance of the cartridge. The lower the internal impedance of the cartridge, the higher the gain that results. For this reason, your P10 provides multiple gain settings, adjustable in 3dB steps. Although a current mode input will work with a cartridge whose internal impedance measures 50Ω, this is not an appropriate match. In general, the current mode inputs will be ideal for cartridges with an internal impedance of below 10Ω. With a cartridge between 10Ω and 20Ω internal impedance then you should compare performance between the current and voltage mode inputs. Cartridges with an internal impedance above 20Ω will normally give their best performance with the voltage mode inputs – but as always, experimentation is the order of the day.

In order to help users achieve the optimum gain value and signal to noise performance, CH Precision provides the Gain Wizard, a process that measures the signal-to-noise performance of the system (cartridge and P10 input) in conjunction with the supplied 7" 45 RPM disc.

4.2 MM/MC1 and MM/MC2 voltage sensing inputs

A voltage mode input reads the voltage generated by the cartridge. The voltage mode inputs can be used with any MM or MC cartridges, as well as with step-up transformers. The cartridge output signal is amplified by a discrete, solid-state voltage amplifier. To accommodate the widest range of partnering cartridges and SUTs, gain can be adjusted from +41 to +74dB (+6dB on balanced outputs) in 3dB steps. Each voltage mode input is fitted with a user-variable resistive load (variable between 5Ω and 100 kΩ), allowing users to adjust cartridge impedance loading to provide the optimum (flattest) frequency response, free of high frequency ringing.

In order to help users achieve the optimum impedance load value and gain for each input, in addition to the Gain Wizard (detailed above) CH Precision provides the Loading Wizard, a process that measures the frequency response of the system (cartridge, cables and P10 input) and displays the results of different loading values as a series of graphs showing the flatness of the system.

4.3 The 50kHz 'Neumann Pole'

In addition to the two zeros (turnover frequencies) and the pole normalized in the RIAA (or other) pre-emphasis curve used in cutting records, in practice production plants had to stop the ever-increasing gain at high-frequency above the audio band in order to prevent cutting equipment from overheating and cutting heads from ringing. This was done in various ways, but generally involved adding a second, high frequency pole to roll off the extreme high end – normally at around 50kHz. It was a technique used by various different lathe manufacturers, but became known as the "Neumann pole". Adding the 50kHz pole to the pre-emphasis curve suggests the use of a corresponding 50kHz zero in the de-emphasis/replay curve – often referred to as the "enhanced-RIAA" or eRIAA curve. The P10 allows users to add the 50kHz zero for any disc or curve on a record-by-record basis.

5 Power, audio and control connections

With the two (or four) P10 units placed and levelled, you are now ready to connect them to your system and the AC power. The rear panel layout is shown below:
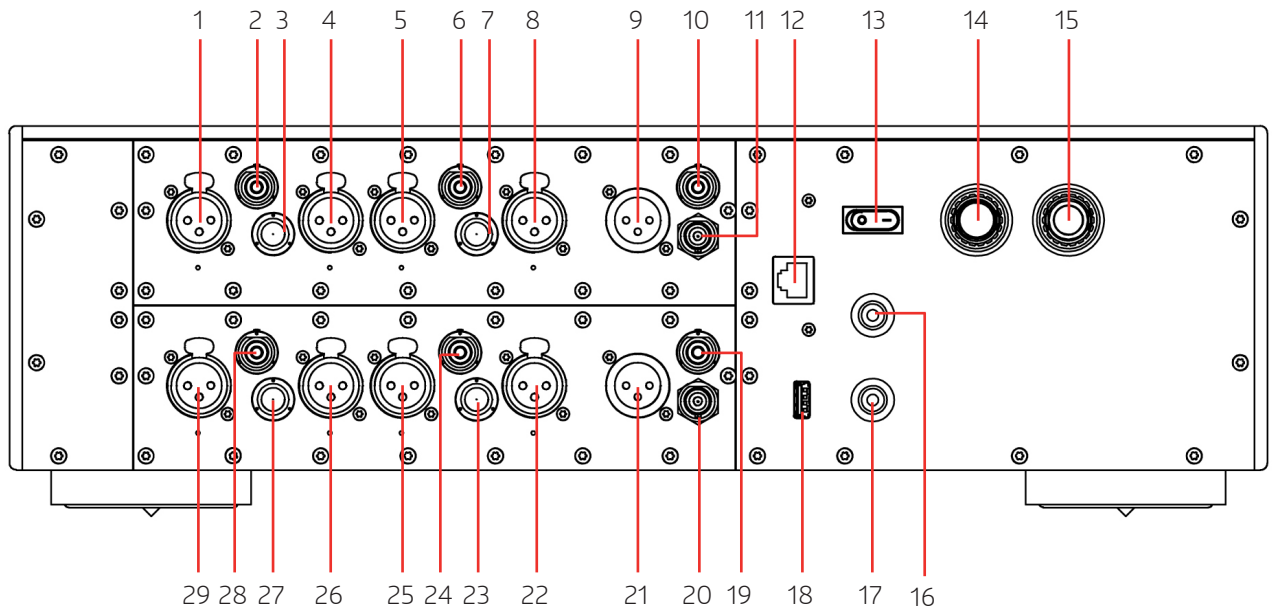
P10 audio unit rear panel connections

(1) MC 1 XLR left input
(2) MC 1 RCA left input
(3) MC 2 RCA left input
(4) MC 2 XLR left input
(5) MM/MC 1 XLR left input
(6) MM/MC 1 RCA left input
(7) MM/MC 2 RCA left input
(8) MM/MC 2 XLR left input
(9) XLR left output
(10) RCA left output
(11) BNC left output
(12) Ethernet port for network connection/Control App
(13) Ground lift switch
(14) Multi pin socket for analog PSU connection (blue)
(15) Multi pin socket for control PSU connection (red)

(16) Signal ground connection
(17) Chassis ground connection
(18) USB port for firmware upgrades only
(19) RCA right output
(20) BNC right output
(21) XLR right output
(22) MM/MC 2 XLR right input
(23) MM/MC 2 RCA right input
(24) MM/MC 1 RCA right input
(25) MM/MC 1 XLR right input
(26) MC 2 XLR right input
(27) MC 2 RCA right input
(28) MC 1 RCA right input
(29) MC 1 XLR right input

You will note that as well as the array of conventional inputs and outputs, there are a number of other sockets available which are used for control and update functions.
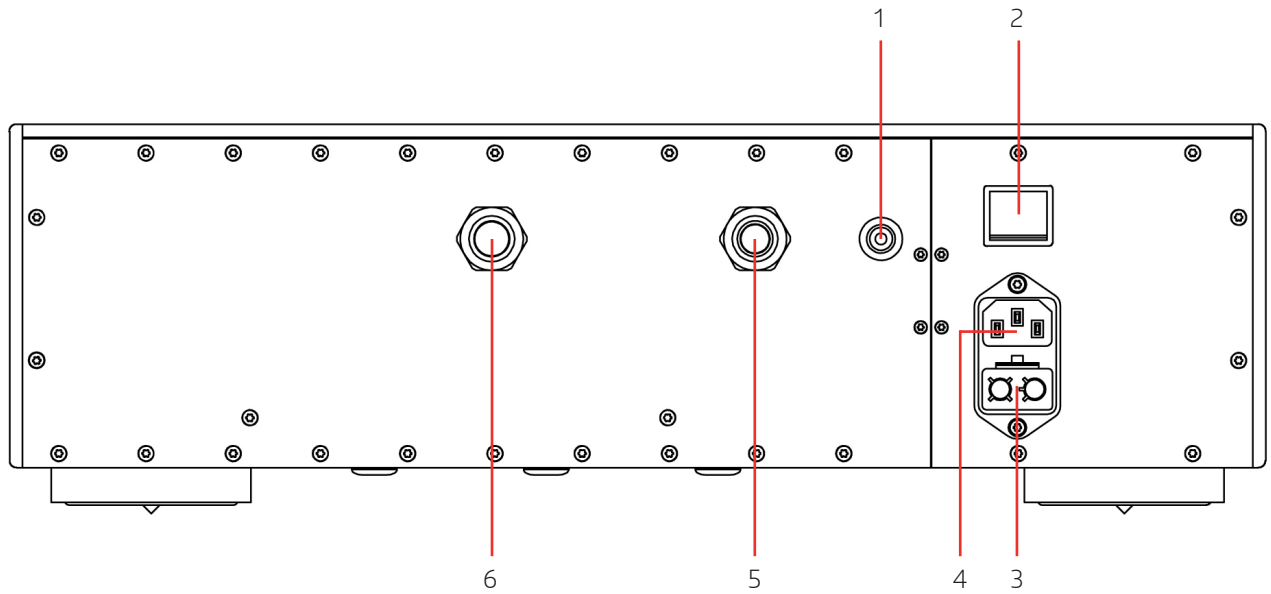
P10 power supply rear panel connections

(1) Chassis ground terminal
(2) On/Off switch
(3) Fuse holder and voltage selector

(4) IEC AC input
(5) Control DC Umbilical with multi-pin connector (red)
(6) Analog DC Umbilical with multi-pin connector (blue)

5.1 USB port

The USB port is not a digital audio input. It is dedicated to upgrading the firmware of the P10. Do not use it for any other purposes. For more information please refer to the firmware update instructions in the dedicated chapter of this manual.

5.2 Ethernet port

The Ethernet port is used for two closely related functions.

Connection to a local network router allows control of the P10, its functions and configuration through the CH Control App, loaded on an Android device.

In True Monaural configuration (standard or extended) the connection to an Ethernet network allows the two separate audio chassis to communicate in a Master/Client relationship, so that control settings track each other. One unit should be set as 'Master' and the other as 'Client', in the 'Network / Role' menu.

In a situation where a four–chassis P10 is not connected to a network, an RJ45 Mirror lead (NOT a standard RJ45 lead) connected between the two audio units will allow control synchronicity. In this case, select 'Direct-Link' in the 'Network / IP Settings' menu of both audio units.

5.3 Local area network considerations

We recommend that you construct a dedicated local network for both system control functions and music streaming. It can be operated from locally located network switches, galvanically isolated from your main household network using affordable and readily available optical converters. This will improve the responsiveness of your setup, and keep as much high frequency noise out of your audio system's ground plane as possible.

5.4 Ground lift

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

5.5 Inputs

Make sure that the P10 is switched off and disconnected from the wall socket.

Connect each set of tonearm leads to the input you have chosen. On a Dual Monaural P10 the left inputs are the top sockets and the right inputs are the lower ones. In a four-chassis, True Monaural (or True Monaural Extended) set up, you will connect the left inputs to one chassis and the right inputs to the other. You have four sets of inputs (and twice as many in the four- chassis, Extended configuration).

The 4mm banana plug with a butterfly nut allows for multiple ground connections. It can be removed from the rear of the P10 for easier connection of multiple grounds and selection of the grounding point (chassis or signal ground).

The inputs are all numbered. When making connections, ensure that you note which turntable or tonearm/cartridge is connected to which input, so that you can identify each one correctly in the configuration menu. You can later name each P10 input to identify the connected turntable or tonearm/cartridge and hide/disable the ones you won't use for now.

5.6 Outputs

The P10 is equipped with one pair of balanced XLR, RCA and 50Ω BNC outputs. This allows for connection to all standard line-stages.

If you need additional outputs (for instance, to use one set of turntables to run two separate systems) then the four-chassis extended configuration will provide twice the number.

5.7 AC Power

With all the signal inputs and outputs connected, you can now connect the IEC power cord to the input socket on the P10 power supply and switch the units on. First switch on the rocker switch on the rear of the power supply unit. You should see the red bar in the CH logo in the top-left corner of each front panel illuminate. Your P10 is now in standby mode and ready to be turned on and configured.

6 How to configure and operate your P10

The P10 phono-stage can be operated in any of three different ways:

- From the front-panel buttons
- From the CH-Control App (Android only)
- From the supplied IR remote control (for switching basic settings only)

The initial set up should be done using the front panel buttons and the menus shown on the display. Once configured for connection to and control by the CH-Control App, all parameters can be adjusted or re-set remotely.
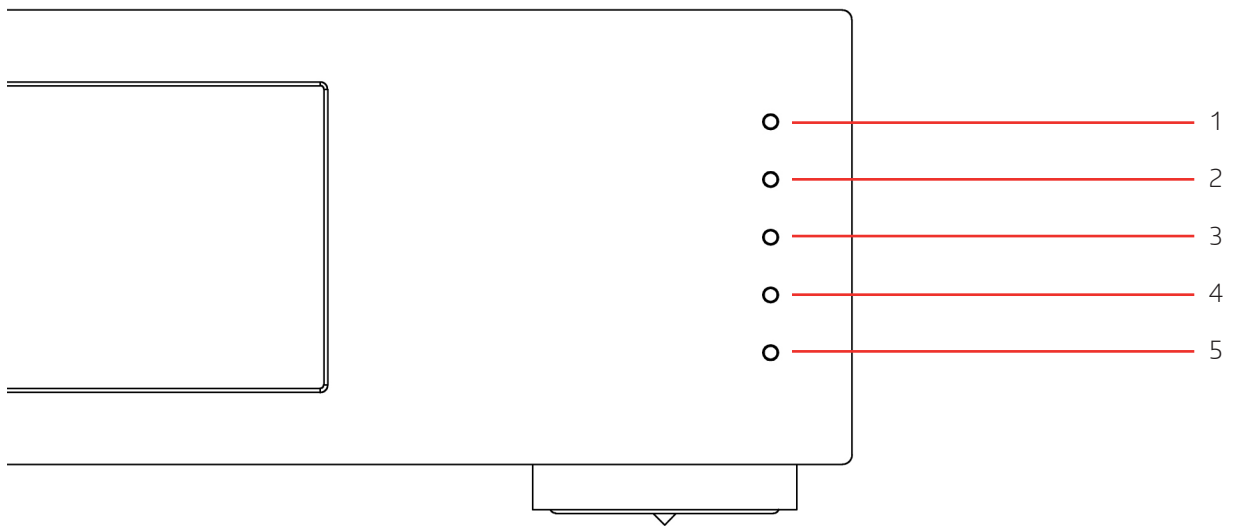
Button 1. Mute(NP) Operate/Standby (LP)   Button 4. Down
Button 2. Up   Button 5. Cancel/Exit
Button 3. Next/OK

In use, your P10 has two operating modes: Normal mode and Menu mode.

6.1 Control actions in normal mode

In general use, the five front panel buttons can be used to switch the P10 from standby to operate, select inputs, alter operating parameters, select short-cut functions or enter the Menu mode.

Normal mode display elements

(1) Operating mode (in dual monaural) or handled channel (in true monaural) or

(2) Indicates if output stage uses global feedback (GLOBAL-FB) or local feedback (nothing is displayed in this case).

(3) Absolute phase polarity indication. If the (Φ) symbol is present, polarity is reversed.

(4) Mute or Mono. If the ⊗ present, the P10 output is muted. A single dot in a square will indicate that the P10

is running in mono mode, summing L and R channels.

(5) Impedance setting for MM/MC inputs.

(6) Selected record replay EQ curve. Shows use of Neumann pole (e- prefix) and selected curve if optional curves are installed. Whole display also changes color (auto or user selectable shades) to indicate alternative curves.

(7) Input source name. Each input source can be renamed through the P10's menu.

6.2 To initiate operate or standby

Push the top button to turn the unit on from standby. Push it for three seconds (long push, "LP" in this manual) to turn the P10 back to standby.

6.3 To select an input

Press the Up or Down buttons to cycle through the inputs.

6.4 To engage shortcuts (high pass filter, EQ curves, phase, etc.)

Short push on the Middle/OK button to cycle through shortcut options. Display will show selected shortcut function: Use Up and Down buttons to alter parameter value. Note that the current input is automatically pre-selected for all input-specific parameters that are configured through a shortcut.

6.5 Switching the EQ curves

If the optional phono EQ cards are fitted to your unit, you can change the EQ curve, before or during play, using the menu/front-panel buttons on the P10, the hand-held IR remote, or the CH-Control App.

If the EQ Option Boards were factory-fitted to your unit at the time of purchase:

- Using the buttons – your P10 will have a pre-defined shortcut: press the middle button until the EQ screen appears. Use the Up and Down buttons to select the required curve. Press the bottom button to exit. The P10 will mute for several seconds as it switches to the new EQ curve. The color of the screen will change to indicate which curve is selected.

- Using the IR remote control – the two central buttons (3 and 4) cycle up or down the list of curves. Again the color of the screen will change as the new curve is engaged. Using the hand-held IR remote allows users to compare different EQ curves (and correct absolute phase) easily and quickly from the listening seat

- Using the CH-Control App – select the P10 icon on the left side of the screen and you will gain access to all of the unit's parameters, including a menu of available curves.

- Finally – you can always use the P10's buttons and the main audio menu to change the curve, although this isn't the most user-friendly solution…

If the EQ Option Boards were fitted to your unit after purchase:

- The Option Boards will operate in exactly the same way but, you will need to perform a factory re-set or create a shortcut in order to access the EQ curves via the P10 audio-unit's buttons as described above. The Option Boards should be installed by a qualified service technician and they should ensure that the required shortcut is operational.

6.6 Selecting the Neumann pole

To engage the Neumann pole, you will need to use the IR remote control (long push on the middle button of the remote), the CH-Control App or navigate to the correct setting in the Audio menu. You can of course implement a shortcut to engage the Neumann Pole if you prefer to use the P10 audio unit's buttons to perform the task.

6.7 Selecting the anti-rumble high-pass filter

The P10 anti-rumble setting adds a second-order, high-pass filter to attenuate frequencies below 7Hz, designed to eliminate unwanted low frequency information generated by the cutting/pressing process, record eccentricity or warps. You can set it as a permanent filter on any input, or simply select it as required from the Input settings menu for each input.

6.8 To enter menu mode

After cycling through the last shortcut, you will see a screen labeled Detailed Setup on the display. Once you reach the Detailed Setup screen, push the Up button to enter Menu Mode.

7   Navigating the setup menus

Once you enter Menu Mode, the various menu options are shown on the display and navigated using the Up, Down and Middle/OK (select) buttons.

```
                    SETUP

    AUDIO          >  Mute
    INPUTS            Phase polarity
    DISPLAY           Phone EQ
    SHORTCUTS         Channel mode
    NETWORK           Feedback
    FACTORY
```
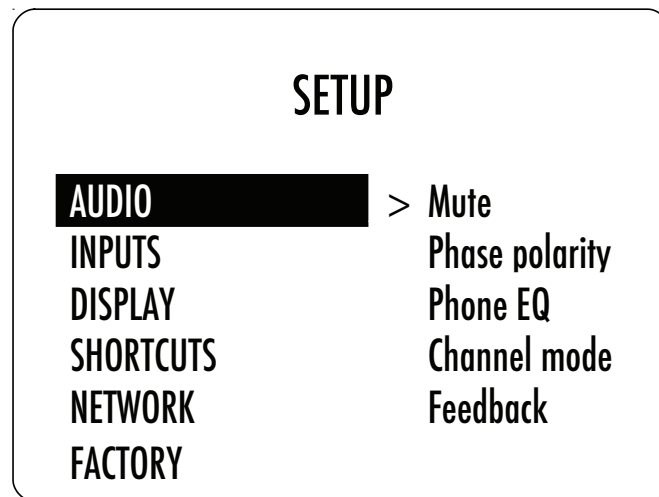
P10 SETUP screen items

The display shown above is the main Menu, with the various sub-menus shown in the left column and the parameters adjustable in the selected menu (in this case the Audio Settings menu) in the right column.

The Up and Down buttons move the menu selection up and down the left column of the screen (the selected sub-menu/ parameter is highlighted). As each sub-menu/parameter is selected, the options available will be shown in the right column.

Once the correct menu/parameter has been selected, a push on the Middle button will enter that selection. Once you have navigated to the correct menu and set the required parameter, another push on the Middle button will store that setting.

Note that some parameters are input-specific, while others are global. For instance, you can individually adjust the input gain of each P10 input, while the feedback setup or absolute phase polarity are global parameters that affect operation of all inputs. All input-specific parameters are located in the INPUTS menu.

7.1 Menu options

If you study the menu tree laid out below, you can see the various options and where to find them. It may look confusing to start with, but it soon becomes clear and easy to navigate.

Below the menu tree is a list of the various sub-menu options and their significance. These options are the key to configuring your P10, delivering the best performance, personalized user interface and connection with your system. It is worth studying the various options and their importance as they will directly affect your enjoyment of your system.

7.2 Audio Settings menu

■ Mute
Mutes or unmutes the audio output.

■ Phase polarity
Allows you to reverse the absolute phase of the audio output.

■ Phono EQ
Optional Curves and Neumann Pole
The P10 gives the owner the opportunity to use alternative EQ curves for record replay. This requires the fitting of the EQ option boards, which can be done at the time of purchase or added later. In addition to the standard RIAA curve, the option boards add specific curves for older EMI, Columbia, Decca, Teldec/DGG, NAB, Capitol/AES and Philips recordings. In addition, users can choose to add the Neumann pole to the RIAA or any optional curve if desired (see below).

■ The Neumann Pole
As noted above, cutting lathe manufacturers often added a high-frequency pole to their lathe electronics, to help prevent overheating and ringing in the cutter head itself. Although there is little detail as to the exact measures taken by the various lathe manufacturers, it is generally accepted that in many cases it was some variation on a 50kHz pole – a solution that has become known as the 'Neumann Pole'. The P10 makes it easy to select the 50kHz roll-off for any disc or curve on a record-by-record basis. Selecting the Neumann pole can have a significant sonic affect on some records and is well-worth experimenting with.

■ Channel mode
Left and right input signals can be summed together to generate a monaural signal. Default value of this parameter is stereo. Obviously, this feature is not available with a four chassis, true monaural P10 setup, as there is no easy way to combine the monaural channels of the left and right P10 chassis.

■ Feedback
Selects if the P10's output stage features local or global feedback.
Local feedback setting (the default setting on the P10) allows greater dynamic and musical freedom.
Global feedback setting delivers greater control and precision. When selected, GLOBAL-FB shows in the status display screen.
We recommend comparing them and selecting the one you enjoy the most in your system. Your preferred choice may vary with the music program chosen.

7.3 Input-specific settings menu

This menu allows you to set individual parameters for the inputs that you are using and disable any inputs that are not in use.

■ Type
Disabled or normal. (Disabling an input removes it from the switch cycle, but also shuts down its associated power supply, reducing power consumption.)

■ Gain
Sets the gain at 1kHz for each input according to the connected cartridge (see additional guidance in section 10 below).

■ Impedance
Set the impedance for each voltage mode input (MM/MC 1 or 2) according to the connected cartridge (see additional guidance in sections 10.2 and 12 below).

- Filter

  Set the High Pass Filter when required. The default setting for this parameter is full bandwidth, but engaging the high-pass filter allows users to eliminate 'rumble' cut into some records, caused by eccentricity or excessive warping. If present, these low-frequency distortions can erode sound quality, absorb output power and in extreme cases, cause damage to loudspeakers. If excessive low-frequency 'rumble' is present, use the high-pass filter to solve the problem.

- Name

  Select identity for source/cartridge connected using up to 12 letters or numerals (including spaces). Text is entered using the Up, Down and Middle buttons. Scroll through the alpha/numeric listing until you have the letter, number, spaceor punctuation required. Press the Middle button to save that selection and shift the cursor to the next space. Don't forget to save the name with the Middle button when complete. Alternatively, you may want to rename your P10 inputs directly from the keyboard of the CH Control App.

- Gain Wizard

  Run the Gain Wizard to set a gain value providing the best signal-to-noise ratio (any input)..

- Loading Wizard

  Run the Loading Wizard to optimize impedance load setting for voltage mode inputs (MM/MC 1 or 2).

7.4 Display settings menu

- Display mode

  Allows the user to change display brightness and whether or not the display remains on or switches off after a short time.

- Front LED

  Allows the user to turn the red power LED off when the units are active rather than in standby.

- Display brightness and gamma

  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.

- Display brightness (dimmed)

  Allows you to set the brightness of the display when dimmed between operations (10 – 30%), and to fine tune the low brightness gamma curves to perfectly match the brightness and color or other displays.

- Display color

  Lets the user select the display color from one of seven standard colors, or set their own RGB defined color. If the optional EQ curves are fitted, the display will automatically change color to reflect the different curves. The factory-defined color for each curve was selected to reflect the color of the record label in question (where possible) but can be user adjusted to suit personal preference.

7.5 Shortcut menu

The P10 allows you to establish up to six shortcuts, taking you directly to almost any parameter in any menu. The P10 is preprogrammed with the High Pass Filter and EQ curves (if available) as shortcuts one and two. After scrolling through the defined shortcuts (you can set a total of six different shortcuts), the next screen that the P10 displays is the entry port to the P10 menu, titled Detailed Setup.

7.6 Network menu

- Status
  Shows a list of compatible devices detected on the LAN.

- Role
  When physically connected to a network, the P10 can ignore this network (offline) or connect to it as either the master unit (it will transmit push-button commands to all compatible client units) or as a client (it will ignore push-button entries and receive commands only from the master device). This networking facility allows system-wide sharing of commands among CH products (such as mute or power up/down).

- Room number
  Defines the room in which the P10 is located for multi-room applications.
  This prevents CH Precision units connected to the same network but located in different systems/rooms from interacting with each other.

- IP settings
  Auto should be selected if the P10 is connected to a router with a DHCP server feature.
  Direct-Link should be selected when an RJ45 Mirror lead directly connects a Master P10 to a Client P10 in four-box configuration. More advanced settings are available if needed.

- Wake-on-LAN
  If 'No' is selected, the P10 cannot be switched on from the CH-Control App.
  If 'Only If PoE' is selected, connecting the P10 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 P10 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 P10 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 P10 on even when you turn off the rest of your system.

7.7 Factory settings menu

- Serial Number
  Displays the serial number of your P10. This serial number is also written on a sticker at the back of your P10.

- Firmware version
  Indicates the version of the firmware that the P10 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 will inform you of updates, indicating that a device is not up to date by displaying its name in orange instead of red.

- Update firmware
  Selecting Update launches the P10 firmware update process. A USB flash disc drive with a valid set of firmware must be inserted in the USB-A port. Please refer to the corresponding section of this manual for more detail on the firmware update procedure.

- Factory reset
  Resets all parameters to their default factory values. This can be useful if you have made some changes that you don't know how to revert. Note that it is also possible to reset small subsets of parameters to their default values from other locations in the menu tree.

- **Installed options**
  Lists the hardware configuration of your P10, including whether the optional EQ boards are installed.

- **IR remote**
  Pair IR remote control: By default any P10 will respond to a command sent by any P10 remote control. In some situations, this code can be identical to the one of another appliance. Pairing a specific remote control with a specific P10 allows them to communicate on a private channel.

8 The CH-Control App

All CH Precision components can be controlled via an Android App loaded onto a compatible device (SmartPhone or Tablet). In order to use the Control App, a unit must be hard-wired to a wireless network router (although please note that the network does not need to be connected to the internet). The Control App gives access to all aspects of unit set up (including gain, loading and input naming via a keyboard) from the listening seat. It can be particularly useful during set up, even if you do not intend to use it as a permanent part of your system. In this case it is easy to install a temporary network.

9 Handheld IR remote control

The P10 phono-stage is delivered with an infra-red remote to drive the unit's basic operational functions.

The provided remote control is not intended to be used to configure the unit. It can be magnetically attached to the side panel of the P10 audio unit for storage
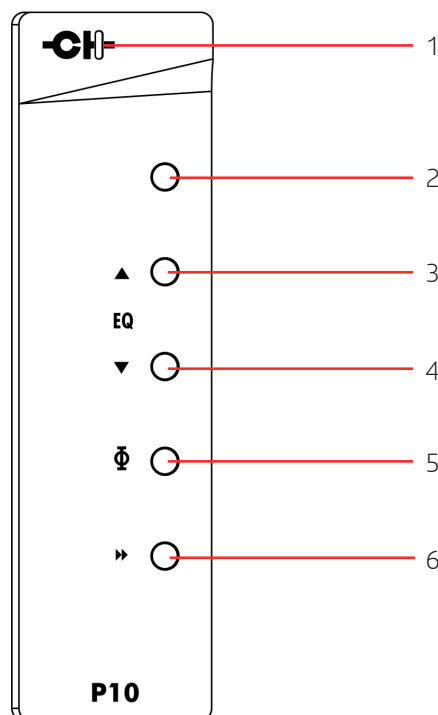
P10 remote control

(1) Remote control activity LED
(2) Mute [NP] / Standby [LP] button
(3) EQ curve selection [NP] / High Pass Filter [LP] button
(4) EQ curve selection [NP] / Neumann pole selection [LP] button
(5) Absolute phase polarity inversion [NP] / mono/stereo selection [LP] button
(6) Input selection [NP] / Local/global feedback [LP] button

9.1 Batteries

If the Remote Activity LED fails to light then you will need to change the batteries in the handset.

The T-10 torx screws that hold the black bottom plate can be removed with the provided screwdriver.
The remote takes two AAA batteries.

10 Phono-input optimization

Before connecting your turntable(s), arm(s) and cartridge(s) to the P10, it is worth establishing a few initial performance/electrical parameters. These can normally be found in the specifications supplied by the cartridge manufacturer and if no Specification sheet is available, can usually be discovered online, either at the manufacturer's website or on one of the various analog data bases.

The key value that you are looking for is the internal impedance of the cartridge.

- If this is in the range 0-5Ω then the cartridge will almost certainly work best into a current mode input, (MC1 or 2).

- If this is in the range 5-10 Ω then the cartridge will most probably work best into a current mode input, (MC1 or 2).

- If this is in the range 10-20Ω then the cartridge may well still work best into a current mode input, but it is worth comparing performance between the current and voltage mode inputs.

- If this is above 20Ω then the cartridge will probably work best into a voltage mode input, (MM/MC1 or 2).

- If you are using an external step-up transformer (SUT) this should be connected to one of the voltage mode inputs (MM/MC1 or 2).

- If you are using a high-output MC or MM cartridge (output >2.0mV) this should be connected to one of the voltage mode inputs (MM/MC1 or 2).

10.1 Getting the best performance from the current-sensing inputs

If you choose to connect your cartridge to a current-sensing input, the only adjustment that you will need to make is to set the gain. This can be set between +12 and +33dB, in 3dB steps, so extremely fine tuning is possible and worthwhile. You can establish the optimum signal to noise setting using the Gain Wizard, or you can simply listen to the result, but either way, the final choice should be made by listening to your preferred music.

If, like the CH Precision L10 or L1, your line-stage pre-amplifier has variable input sensitivity, it is worth experimenting with the gain structure between the phono-stage and the line-stage.

10.2 Getting the best performance from the voltage-sensing inputs

If your cartridge is better suited to the voltage-sensing inputs of the P10, then you will need to adjust both the gain and impedance loading values. You should start by setting the impedance loading, as this affects the output level of the cartridge. Manufacturers will often recommend a loading range for their cartridges, but this is often too wide to be useful. We would suggest the following approach:

- Set the impedance load to a median value in the range recommended by the cartridge manufacturer. Don't worry – this value may well change, in some cases considerably.

- Having set the initial value for impedance loading, you can now set the gain (+42dB to +75dB), either by ear or using the Gain Wizard to achieve an initial setting. Final gain should be set by listening to your preferred music.

- Use the Loading Wizard (following the instructions below) to refine the loading value for the flattest frequency response. Loading the cartridge down has the affect of controlling the characteristic rising high-frequency output you find in all cartridges, so establishing the best value is important to also delivering the best balance of high frequency extension/energy and frequency balance.

- The P10 allows extremely fine adjustment of the loading values (5Ω to 100kΩ in very small steps) and experimenting within the optimum range can be extremely beneficial.

If, like the CH Precision L10 or L1, your line-stage pre-amplifier has variable input gain, it is worth experimenting with the gain structure between the phono-stage and the line-stage.

11 Using the Gain Wizard

- Select the input that you wish to adjust

- Select an initial impedance setting (if adjusting a voltage sensing input, MM/MC1 or MM/MC2). This should be a median value from the cartridge manufacturer's recommendations.

- Put Side 2 of the Set-Up Wizard 7" 45RPM disc on your turntable and prepare to play the first track.

- Select Gain Wizard in the Input's menu.

- Start the wizard using the Middle/OK button on the P10 audio unit. The screen will show the instructions outlined above. Start the record playing and start the acquisition process by pressing the Middle/OK button again.

- After a short time the screen will display the optimum gain setting. You can apply that setting to the input or use it as a guide/starting point for your own assessment by ear.

12 Using the Loading Wizard

- Select the voltage sensing input that you wish to adjust (MM/MC1 or 2).

- Put Side 1 of the Set-Up Wizard 7" 45RPM disc on your turntable and prepare to play the first track.

- Select Loading Wizard in the Input's menu.

```
MM/MC 2  >>  LOADING WIZARD

                  Start

LOADING WIZARD
```

Loading 1

The on-screen display will ask you to select the upper and lower limits of the testing range, using the Up, Down and Middle/OK buttons. Once you have defined the testing range, press next.


```
MM/MC 2  LOADING  WIZARD

Select the loading range to be analyzed.

Minimum loading:   5.00 Ω
Maximum loading:  100 kΩ

                              Next
```

Loading 2

The on-screen instructions will ask you to play Side 1 of the Set-up record and once it is playing, press the Middle/OK button to start the acquisition process. This will take a short time as the Loading Wizard measures the frequency response of the cartridge at 20 different points within the loading range.

MM/MC LOADING WIZARD

Place the CH calibration record on your turntableconnected to the P10 input MM/MC 2.
Play the record, side 1 (noise) at 45 RPM
Complete the gain wizard.
Press 'OK' when the record is playing or 'CANCEL' to abort.

Loading 3

MM/MC LOADING WIZARD

Please wait while acquiring data on MM/MC 2

Gain = +69 db
Loading = 3.20 k Ω

Loading 4

Once complete, the display will show the frequency response at each load setting, starting with the flattest response achieved. You can cycle through the different response curves using the Up and Down buttons.

-CH-

```
┌─────────────────────────────────────────┐
│                                         │
│       MM/MC  LOADING  WIZARD            │
│                                         │
│   Acquisition complete.                 │
│                                         │
│   Press 'UP' and 'DOWN' buttons to scroll│
│   through measurements.                 │
│   Press 'OK' to use the displayed loading│
│   value, 'CANCEL' to abort.             │
│                                         │
└─────────────────────────────────────────┘
```
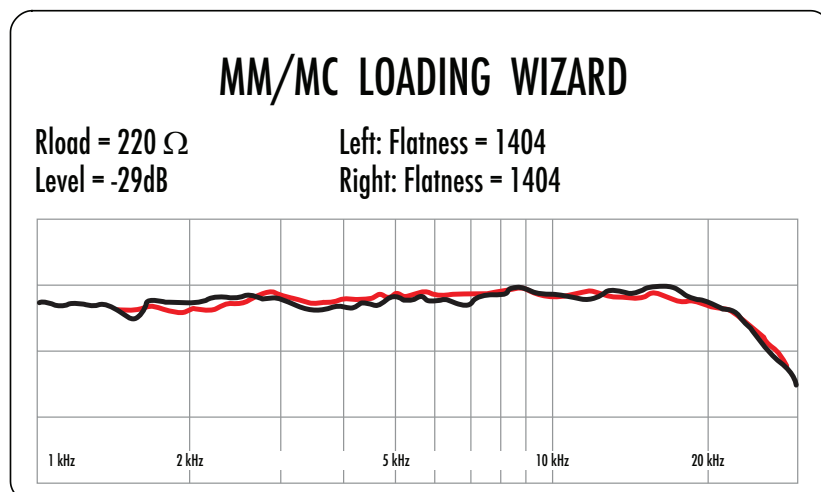
Loading 5

You can now select a particular response/impedance setting and apply it to the chosen input (by pressing the Middle/OK button), or you can use it as a guide to repeat the test with a narrower range of values, using the Bottom button to exit the program. You can repeat the process as often as you wish, but, normally two or three times is sufficient to achieve an excellent result.

Due to the extremely fine range of loading adjustment available with the P10, once you have set the load using the Loading Wizard, it is possible to further refine it over time by listening.

11.1 Interpreting the Loading Wizard display

The Loading Wizard generates frequency response curves for each cartridge, tonearm cable and load setting.

```
┌─────────────────────────────────────────┐
│                                         │
│        MM/MC  LOADING  WIZARD           │
│                                         │
│   Rload = 220 Ω        Left: Flatness = 1404   │
│   Level = -29dB        Right: Flatness = 1404  │
│                                         │
│   ┌───────────────────────────────┐    │
│   │                               │    │
│   │                               │    │
│   │                               │    │
│   │  1 kHz  2 kHz   5 kHz  10 kHz  20 kHz │
│   └───────────────────────────────┘    │
│                                         │
└─────────────────────────────────────────┘
```

Correctly loaded cartridge

The White line (Black on this diagram) traces the Left Channel output from 1Hz to 30kHz
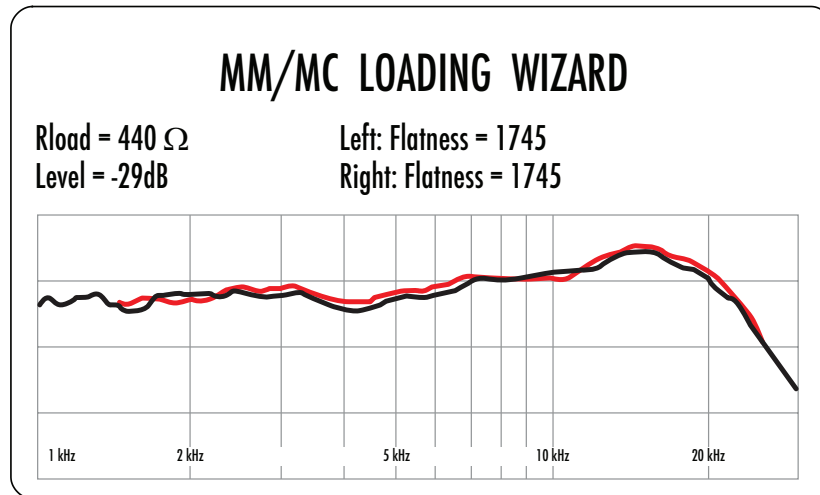
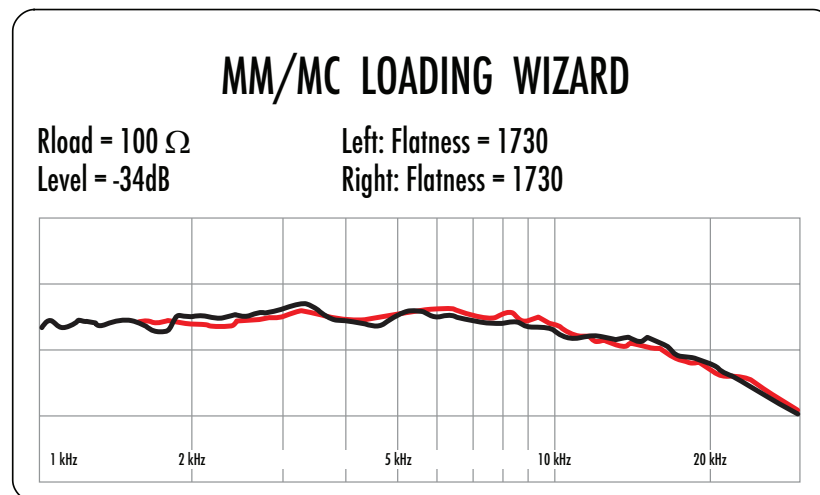The Red line traces the Right Channel output from 1kHz to 30kHz

The goal is to achieve the flattest response possible between 1kHz and 20kHz – without losing level.
Do not be confused by the small ripples or undulations in the traces. What you are looking for is the overall shape of the trace.

An optimally loaded cartridge should show a flat overall trace at a high amplitude and with a gentle roll-off from around the 20kHz mark.

The left and right flatness numbers are computed as the standard deviation of each channel's frequency response compared to a perfectly flat one. Therefore, the smaller the number, the flattest the frequency response.

MM/MC LOADING WIZARD

Rload = 440 Ω   Left: Flatness = 1745
Level = -29dB   Right: Flatness = 1745

Under-loaded cartridge

MM/MC LOADING WIZARD

Rload = 100 Ω   Left: Flatness = 1730
Level = -34dB   Right: Flatness = 1730

Over- loaded cartridge

An under-loaded cartridge will show a distinct hump in its response, normally somewhere between 5kHz and 20kHz. An over-loaded cartridge will show a depressed level, a general downward trend in its trace or both.

13 Returning to factory defaults

Please note that if you get lost in the menus, or you simply want to start over, your P10 can be reset to Factory default settings by using the RESET ALL SETTING item of the FACTORY SETTING menu. For a list of Factory default settings, please refer to the Specifications section.

14 Firmware update

14.1 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 P10 USB port. CH Precision recommends the use of the USB stick that is delivered in the accessory pack of the unit. The following procedure describes how to load the USB stick with the correct files:

- Download the latest P10 firmware file from www.ch-precision.com.

- Decompress the .zip file and copy the individual, decompressed files to the USB stick.

Make sure all the 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 P10 behavior after the update.

14.2 Updating the unit's firmware

- Perform the operations described in the section above.

- Insert the USB stick into the USB port located at the back of your P10 audio unit.

- Navigate to the FACTORY SETTINGS menu and select the UPDATE FIRMWARE item.

- Start the Firmware Update process by pushing the central button on the front panel. Please note that the unit can perform several resets (the display briefly turns off and on) during the procedure.

- Once the firmware update is complete, the unit automatically goes into Standby mode. The front red logo LED will switch from flashing mode to on mode. Remove the USB stick and turn the unit on. The new firmware is now active. To verify that the firmware update was effective, navigate to the FACTORY SETTINGS menu and select the FIRMWARE VERSION item. The displayed firmware revision should match the firmware revision of 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 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. 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.

14.3 Emergency firmware update procedure

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

- Perform the operations described in the section 'Preparing the USB stick' above.

- Power the unit off (back panel mains power switch to OFF on the power supply unit).

- Push the central knob of the audio unit and keep it pushed while powering up the power supply unit (flip back panel mains power switch to ON). Keep the central knob pushed in for a couple more seconds after turning the unit on.

- 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 was effective, navigate to the FACTORY SETTINGS menu and select the FIRMWARE VERSION item. The displayed firmware revision should match the firmware revision of the files copied to the USB stick.

- 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!**

15 Troubleshooting

Never try to reconnect an umbilical power cable or the mains power cable while your P10 is not fully off. If any power cable gets disconnected by mistake while your P10 is on, just let it safely automatically turn off. Do not try to interfere with the emergency power down procedure of the device. Then wait a couple of minutes before plugging the umbilical power cables back.

Error	Action
No power	Check that both umbilicals connecting the audio and the power supply units are firmly locked. Check the mains power cable of the power supply unit. Check the power switch at the back of the power supply unit Check the mains fuses on the back of the power supply unit
Remote control does not work	Check if the unit is connected to the AC wall outlet and powered on. Check if distance is too far to the P10 audio unit. Get closer and try again. P10's Standby LED should briefly illuminate. Change batteries in remote control if required (Remote control LED does not illuminate)
P10 is power up and correctly configured but there is no sound	Check that the system volume setting or the gain setting on the P10 input is not too low Check that the correct input is selected on your P10 phono-stage and line-stage pre-amplifier Your P10 could also be muted (display area 4 ⊗ must be off). Unmute using the red IR remote control button or the top button on the P10's front panel.
Software update fails	Try Emergency Software Update procedure If it fails, download the latest P10 firmware from www.ch-precision.com, prepare a software update image on a FAT32 formatted USB2.0 stick and run the Emergency Software Update procedure again
USB flash drive for firmware update is not detected by P10	Please try another brand of USB flash drive (e.g. Sandisk or the provided stick).
Lost in the settings?	Restore factory settings and start your setup again.

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.

16 Specifications

General

User control	Five tactile push buttons, CH Control Android app
Display	800×480 24bits RGB AMOLED
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz
Power consumption (Standby)	< 1W
Power consumption (Normal operation)	Max 400W
Operating conditions Temperature:	+5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions of each chassis (WxDxH)	440mm x 440mm x 120mm (main body) 440mm x 470mm x 132mm (overall including connectors and feet)
Weight Audio unit:	20kg
Power supply unit:	23 kg
Firmware update / Control	USB port for firmware update / Ethernet based system control

Inputs

2x MC current-sensing inputs, each available on both XLR and RCA connectors
2x MM/MC voltage-sensing inputs, each available on both XLR and RCA connectors
Unused inputs can be turned off

MC current-sensing inputs

Input impedance: < 100mΩ, virtual ground
Gain: +56dB to +77dB in 3dB steps, @1kHz, 10Ω cartridge (on single-ended output; +6dB on balanced output)
Equivalent input noise (EIN): < -144dBu / 1Ω termination, 22kHz BW, any gain

MM/MC voltage-sensing inputs

Input impedance: Variable from 100kΩ to 5Ω
Gain: +41dB to +74dB in 3dB steps, @1kHz (on single-ended output; +6dB on balanced output)
Equivalent input noise (EIN): <-142dBu / 1Ω termination, gain +53 to +74dB, 22kHz BW
Equivalent input noise (EIN): <-139dBu / 1Ω termination, gain +41 to +50dB, 22kHz BW

Equalization

Playback EQ curve accuracy: +/- 0.1dB
Standard EQ Curve: RIAA
Optionnal EQ curves: EMI, Columbia (LP), Decca (London), DGG (Teldec), NARTB (NAB), Capitol/AES and Philips
Ultrasonic: Neumann pole at 50kHz can be engaged with any EQ curve
Subsonic: Anti-rumble 2nd order high-pass filter at 7Hz can be engaged with any EQ curve

Other features

Local or global feedback in amplification stages
Stereo/Monaural mode
Absolute phase polarity inversion

Outputs

1x Balanced XLR (8V RMS max)
1x Single-ended RCA (4V RMS max)
1x Single-ended BNC (4V RMS max)

Total Harmonic Distortion + Noise (1kHz signal, output level 3V RMS, 22kHZ BW)

THD+N < 0.001%, MM/MC voltage input, gain < 50dB
THD: unmeasurable (below noise floor) for MM/MC voltage input, gain > 50dB
THD: unmeasurable (below noise floor) for MC current input, any 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 Momentum Industrial Design – www.momentum.ch

FCC-Notice

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

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

- adjust or relocate the receiving antenna

- increase the separation between the equipment and the receiver

- connect the equipment into a mains outlet on a circuit different from that to which the receiver is connected

- consult the dealer or an experienced ratio/TV technician for help

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.