M10 Two-Channel Reference Power Amplifier

User Manual

Dear Valued Customer,

We are honored that you chose the M10 Two-Channel Reference Power Amplifier. Our team has made every effort in the design and manufacture of this top quality versatile and future-proof product and is proud to present it to you. We hope your M10 amplifier will bring you uncountable hours of emotional connection with your music collection.

But before you embark on your musical journey, we kindly request your attention to the information contained in this manual. The M10, 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 M10 power amplifier for many years.

The Concert has just begun...

Cossy F.

Heeb T.

Table of contents

1 Introduction

1.1 Output modes 4
1.2 Global audio options 4
1.3 Input-specific options 4
1.4 More user configurable options 5
1.5 The purpose of this manual 5

2 Setting up your M10

2.1 Safety notice 6
2.2 Unpacking 6
2.3 Package contents 7
2.4 Placing your amplifier, connecting the two chassis together and installing the spikes 7
2.5 Stacking the M10 (or not) 9
2.6 Connections 10
2.6.1 USB port 12
2.6.2 Ethernet port 12
2.6.3 Local area network considerations 12
2.6.4 Ground lift 12
2.6.5 Inputs 12
2.6.6 Outputs 13
2.6.7 AC Power 13

3 How to configure and operate your M10 14

3.1 Front panel controls 14
3.2 Normal mode 15
3.3 Shortcuts 16
3.4 Menu mode 17
3.5 Menu options 17
3.5.1 Audio settings menu 19
3.5.2 Input-specific settings menu 20
3.5.3 Display settings menu 20
3.5.4 Shortcut menu 21
3.5.5 Network menu 21
3.5.6 Factory settings menu 22

4 Firmware update

4.1 Preparing the USB stick 23
4.2 Updating the unit's firmware 23
4.3 Emergency firmware update procedure 24

5 Troubleshooting 25

6 Specifications 26

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 and protection to ensure the highest possible levels of performance, operational consistency and versatility.

As a result, your M10 offers a number of operational features that are unique and probably unfamiliar. For that reason it is essential that you fully understand every aspect of the M10's operation if you are to enjoy its maximum possible performance.

1.1 Output modes

- Stereo mode: Standard stereo configuration, the left channel input is fed to the left amplification channel and the right channel input is fed to the right amplification channel. A single M10 drives a stereo setup.
- Passive bi-amp mode: Both amplification channels are fed from a single input, with independent gain and local / global feedback ratio; ideal for loudspeakers equipped with two or more independent binding posts, allowing maximum flexibility. Two or more M10 are needed for a stereo setup.
- Active bi-amp mode: To be used with an external low-level cross-over between the preamplifier and the M10 amplifiers. The external crossover splits each channels of the original audio signal into different frequency sub-bands to be amplified independently to control the different drivers composing each loudspeaker. This mode allows each M10 to provide two identical amplification channels (like in stereo mode), but with independent gain and feedback settings. Two or more M10, each equipped with two input boards, are needed for a stereo setup.
- High-current mono mode: A single amplification channel is driven but utilizing the entire power supply, allowing 1'600 WRMS into a 1Ω load; ideal for low-impedance or reactive loudspeaker loads. Two or more M10 are needed for a stereo setup.
- Bridged mono mode: Bridged operation combining both channels to deliver 1'100 W WRMS into an 8Ω load; ideal for higher-impedance loudspeaker loads. Two or more M10s are needed for a stereo set up.

1.2 Global audio options

- Input type selection (balanced XLR with ultra-short signal path, single-ended RCA or BNC)
- Global feedback ratio (0% to 100% in 1% steps)
- Amplifier gain adjustment, 6dB range in 0.5dB steps

1.3 Input-specific options

- Status: active, hidden or bypass
- Impedance: high (94kΩ/47kΩ) or low (600Ω/300Ω)
- Low pass filter to add noise immunity from source
- Absolute phase polarity

1.4 More user configurable options

- Display: color, content and brightness
- Define shortcut functions
- Network configuration
- Firmware version and update

1.5 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 way. If you take the time to follow the manual, it will ensure that you become completely familiar with the M10's many options and that your amplifier delivers the best possible performance.

2 Setting up your M10

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 M10 in order to protect yourself, your new equipment and your system.

- Always handle with care. The M10 amplifier components are extremely heavy, so have someone to help you when unpacking, re-packing or moving them around. **It is neither safe nor sensible to attempt to pack, unpack or move them on your own. You risk seriously damaging both your amplifiers and your health!**
- Install both chassis of your M10 amplifier on strong, stable supports capable of holding their considerable weight. It is best to clear/prepare the supporting surfaces in advance.
- Do not install your M10 amplifier 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.
- 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.

2.2 Unpacking

The M10's cartons are large and contain both the components and all of their accessories. You will need a large, preferably carpeted area in which to unpack them. Please also ensure that the rack, platform or support space on which the M10 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 M10 component out of the box and place it to one side. Then carefully remove the plastic bag in which it is sealed. Alternatively, open the carton, fold the flaps out of the way and gently turn the whole box over. You can then lift the cardboard carton off of the internal packing, remove the foam base (that is now on top) and gently turn the unit onto its feet. This saves lifting the heavy chassis off of the ground.
- 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 levelling/grounding spikes.
- 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.

2.3 Package contents

Your M10 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 M10 units, this should always be done in the original packaging.

The audio chassis carton should contain:

- The M10 amplifier
- Four composite titanium/polymer spikes
- A suction cup (used to remove the four top covers)
- An accessory box containing:
  - 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 M10 power supply with four captive umbilical cables
- Two 20A power cords
- 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 M10 units are still very cold from transport, please let them warm to room temperature in order to avoid condensation developing inside them.

2.4 Placing your amplifier, connecting the two chassis together and installing the spikes

Before positioning your M10 units, it is worth taking the time to make a few preliminary decisions.

- Decide which inputs 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 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 lift the four magnetic 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.

- 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 rotary switch on the M10 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 elastomer rings to protect the supporting surface, which makes it hard to slide the units. **Having a partner or two to lift and help place each chassis should be considered essential.**

- Place the power supply first, carefully planning the path to be taken by the four umbilicals before positioning the unit.
- Gently place the umbilicals into position to be connected to the audio chassis, noting which is which. **Do not cross connect the umbilicals.**
- Move the audio unit as close as possible to the rack/support so that you can connect the umbilicals before moving it back into position. Connect the four umbilicals to their corresponding sockets (they are color coded with rings on the sockets and heatshrink on the umbilicals). The plugs on the umbilicals will only insert in one position / orientation, so turn the connector in the socket until you feel it engage and then gently push it home to lock it in place.

DO NOT force the umbilical connectors into the sockets.
This will risk damaging the connecting pins and disable your M10.

- If you feel resistance when you insert the connector, disconnect the umbilical and start again. You will be able to feel when the umbilical is in the correct position as it will produce a locking sound.
- The M10 is supplied with a set of support discs. These have a groove machined in the upper face that fits over the elastomer ring in the underside of each foot. Carefully lift each corner of the chassis in turn and position the chosen disc beneath each foot. The groove that interfaces with the elastomer 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 M10 units are perfectly level. If they are not at this point of the setup, 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 discs and equally loaded.
- Replace the top caps. Their magnetic coupling will hold them in place.

2.5 Stacking the M10 (or not)

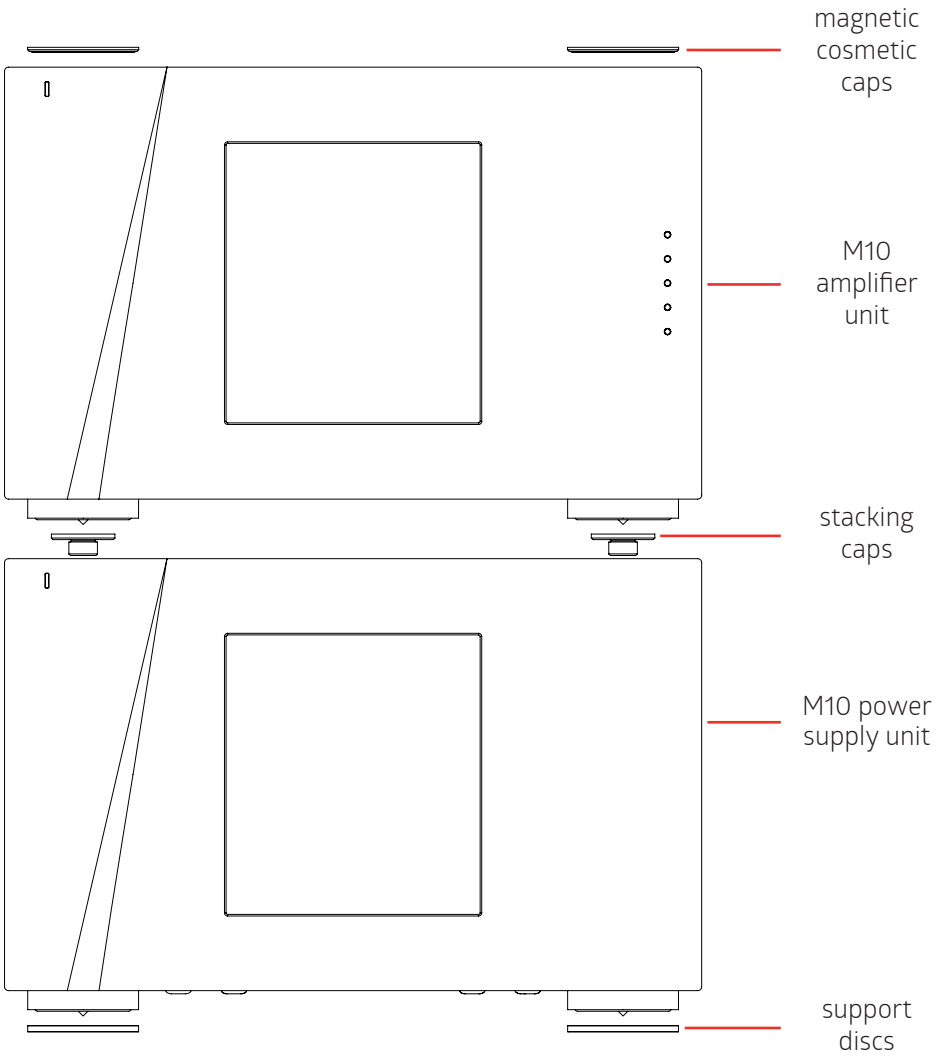
Also included in the accessory packs is a set of small, dimpled stacking caps for each unit. These polymer inserts allow owners to stack the M10 units on top of each other. However, this will inevitably compromise performance and should only be done when space is at an absolute premium.

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. But 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.

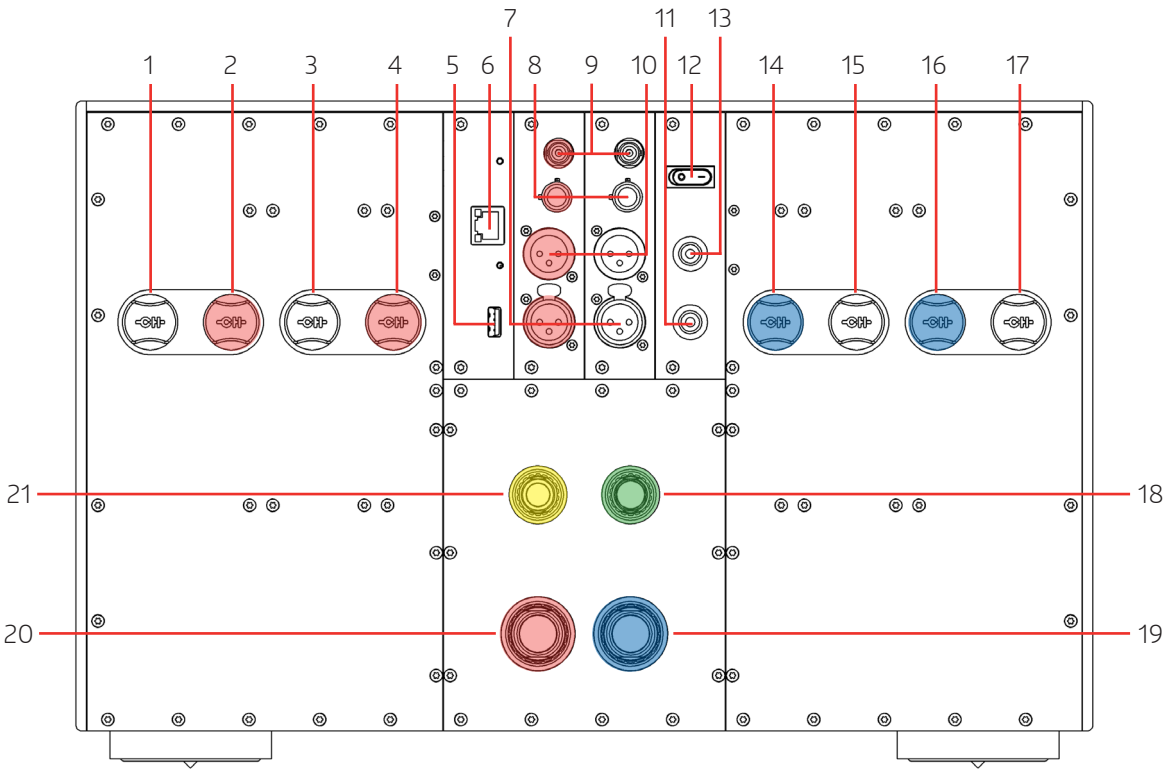
- You may choose to use the support discs below the bottom unit if the sound is preferred.
- If stacking M10 units, you should place the audio chassis on top of the power supply.

Make sure that you retain the cosmetic top caps from the lower unit(s) and store them safely as you may well require them in the future if (or rather, when) your system or circumstances change.



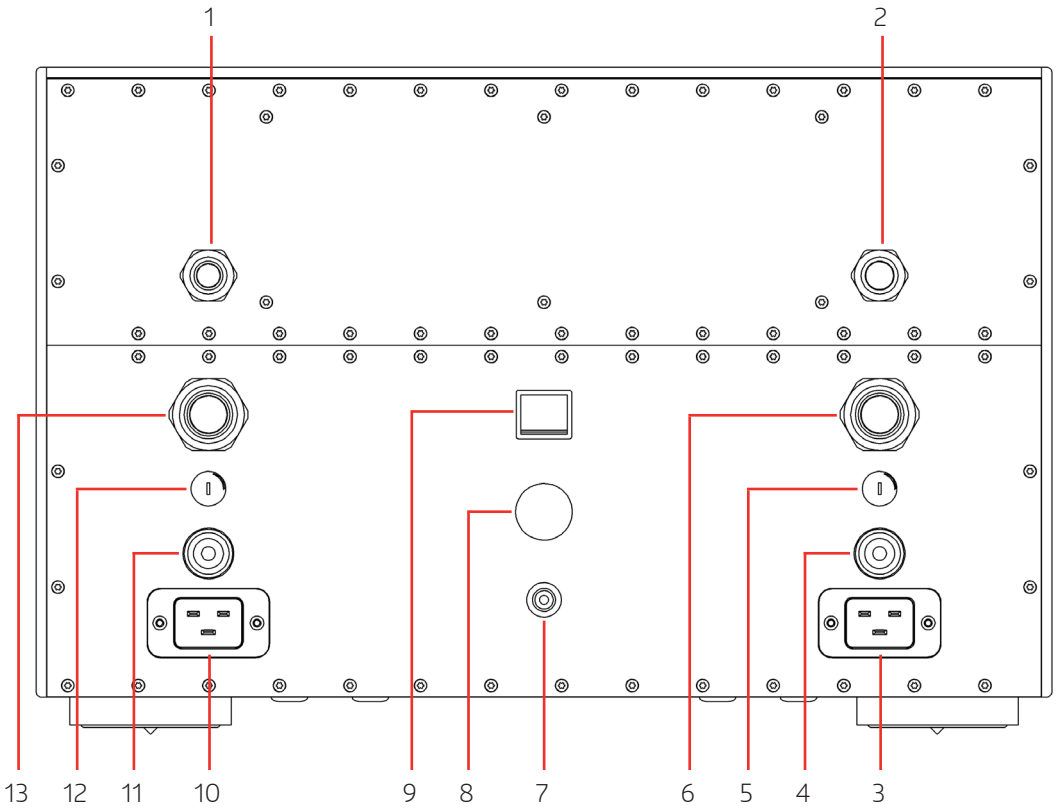
2.6 Connections

With the two (or four) M10 units placed and levelled, you are now ready to connect your signal cables. The rear panel layout is shown below:



M10 audio unit rear panel connections

1. Right channel negative loudspeaker terminal #2 (customized Argento Audio connector)
2. Right channel positive (or bridged mono positive) loudspeaker terminal #2 (customized Argento Audio connector)
3. Right channel negative loudspeaker terminal #1 (customized Argento Audio connector)
4. Right channel positive (or bridged mono positive) loudspeaker terminal #1 (customized Argento Audio connector)
5. USB port for software upgrades [CONTROL board]
6. Ethernet port for network remote control [CONTROL board]
7. Balanced XLR analog inputs (R & L)
8. Single-ended RCA analog inputs (R & L)
9. Single-ended BNC analog inputs (R & L)
10. Balanced XLR analogue outputs (R & L) for amplifier daisy chain connection
11. Earth socket. Internally connected to digital ground and chassis
12. Ground lift: switch on to connect signal ground (analog GND) to earth (digital GND)
13. Signal ground (analog GND) socket
14. Left channel positive (or bridged mono negative) loudspeaker terminal #1 (customized Argento Audio connector)
15. Left channel negative loudspeaker terminal #1 (customized Argento Audio connector)
16. Left channel positive (or bridged mono negative) loudspeaker terminal #2 (customized Argento Audio connector)
17. Left channel negative loudspeaker terminal #2 (customized Argento Audio connector)
18. Analog power supply socket, to be connected to corresponding cable from power supply unit
19. 2nd high voltage rail socket, to be connected to corresponding cable from power supply unit
20. 1st high voltage rail socket, to be connected to corresponding cable from power supply unit
21. Control (digital) power supply socket, to be connected to corresponding cable from power supply unit



M10 power supply unit rear panel connections

1. Control (digital) power supply umbilical cable, to be connected to the corresponding socket in the audio unit
2. Analog power supply umbilical cable, to be connected to the corresponding socket in the audio unit
3. Left 20A IEC power cord receptacle. Both left and right need to be connected
4. Left high power section fuse (T10A for 230V mains, T20A for 100V and 115V mains)
5. Low power section fuse (T1.6A for 230V mains, T3.15A for 100V and 115V mains)
6. 2nd high voltage rail umbilical cable, to be connected to the corresponding socket in the audio unit
7. Earth socket. Internally connected to digital ground and chassis
8. Mains voltage selector. Make sure it matches your country's power grid voltage
9. Mains power On/Off switch
10. Right 20A IEC power cord receptacle. Both left and right need to be connected
11. Right high power section fuse (T10A for 230V mains, T20A for 100V and 115V mains)
12. Standby section fuse (T250mA for 230V mains, T500mA for 100V and 115V mains)
13. 1st high voltage rail umbilical cable, to be connected to the corresponding socket in the audio unit

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.

2.6.1 USB port

The USB port is used to upgrade the M10 firmware. 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.

2.6.2 Ethernet port

The Ethernet port is used for connecting the M10 to a local network router that will allow control of the M10, its functions and configuration through the CH Control App, loaded on an Android device. This allows the user to adjust critical settings (such as channel gain and global feedback ratio) from the listening position and can be enormously helpful when it comes to system set up and tuning.

2.6.3 Local area network considerations

We strongly recommend that you construct a dedicated local network for both music streaming and system control functions. 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 precious audio setup as possible.

2.6.4 Ground lift

The grounding switch allows owners to combine or separate the signal and chassis ground. In a complete CH system, this allows you to configure a single point, star grounding arrangement for the signal grounds. It can also prove useful in a situation where ground-loops generate hum.

2.6.5 Inputs

- Make sure that the M10 is switched off and disconnected from the wall socket.
- The modular input topology of the M10 means that each amplifier chassis can carry a pair of input cards for stereo or active bi-amplified operation, or a single left or right input card (always located in the left hand side slot) for mono or passive bi-amp operation. Each input card offers a choice of balanced XLR or single-ended RCA or BNC inputs. There is also a balanced XLR output to daisy chain amplifiers in multi-amp systems.
- For each input, you can select either high-Z (High Impedance, 94kΩ or 47kΩ) or 600Ω/300Ω settings for each input. The High-Z setting will draw no current from the preamplifier, DAC or external crossover and will deliver the greatest dynamic range and authority. The 600Ω (balanced) or 300Ω (single-ended) connections will offer better rejection of induced noise and should be selected if noise floor becomes an audible problem.
- Some source components (for instance some DAC with little filtering on their output stage) can produce high frequency modulation noise that can damage the loudspeakers if a high bandwidth (DC to 500 kHz) amplifier such as the M10 is used. To overcome this issue, the bandwidth of the M10 can be limited to 120 kHz thanks to a low pass filter that can be activated independently for any of its input. This low-pass filter is not recommended with analog sources nor with CH Precision DACs.
- Connect the source interconnects to the input you have chosen. If your M10 is configured in passive bi-amp, bridged or mono mode, ensure that its unique input board is fitted in the correct (left hand side) slot. Stereo or active bi-amp configurations use both inputs boards.

2.6.6 Outputs

- The M10 is equipped with two pairs of binding posts – blue and black on the left channel (right side as seen from behind): red and black on the right channel (left side as seen from the back). I**n stereo or bi-amp modes, red and blue are the positive connections, black the negative connections.**
- Consult the system topology diagrams and identify which layout your system corresponds to. Then carefully connect your speaker cables as shown in the illustrations. Note that **for bridged operation, you will connect a single speaker cable to the red and blue terminals only**. In this mode the red terminal is connected to the positive terminal on the speaker, the blue to the negative.
- Make sure to properly tighten your speaker cable terminals, both at the amplifier end and at the speaker end. This is especially true if you use heavy cables with spades terminals, whose weight tend to create a lot of tension at the sensitive connection point. This will both ensure optimal power transmission and avoid accidents if a speaker cable end disconnects from the binding post and touches a metallic surface that allows a return path for the current flow. If the speaker cable features a bulky metallic part, even anodized, double check that this part cannot touch the amplifier's back nor the speaker's enclosure.

2.6.7 AC Power

- With all the signal inputs and outputs connected, you can now connect the two 20A IEC power cords to the input sockets on the M10 power supply and switch the units on. You should see the red bar in the CH logo in the top-left corner of each front panel illuminate.

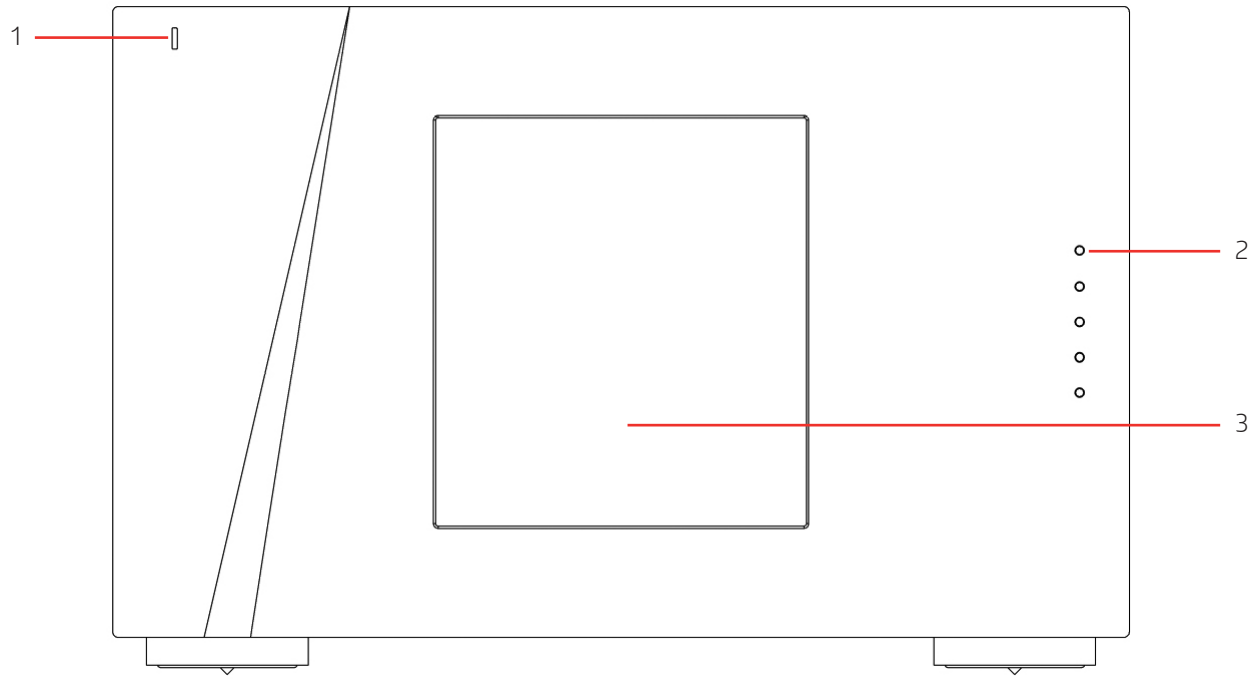
Your M10 is now in standby mode and ready to be turned on and configured.

3 How to configure and operate your M10

The M10 amplifier is operated either from the unit's front panel display and push buttons or from the CH Control app. The initial set up should be done using the front panel buttons and the menus shown on the display. Once configured for inclusion in the Control App, all parameters can be adjusted or re-set remotely.

3.1 Front panel controls

On the front panel of the M10 audio chassis you will find the following controls and displays:



M10 audio chassis front panel elements

1. Standby LED
2. Five user control push buttons
3. Display area (high-definition display)

The standby LED lights up when the unit is in standby. It is normally turned off during operation.
The LED can also be programmed to remain on during operation.

The main display is a user customizable, multi-color high-definition panel with very wide viewing angle, high contrast and high brightness, ensuring that it can be easily read from distance and at an angle.
The color and brightness of the display can be configured according to the user's taste and other equipment. It is set to dim to 30% brightness, once actual operations/adjustments have been completed, although this is also user configurable.

The push buttons located on the front panel of the M10 allow users to operate the amplifier as well as configure its various selectable parameters.

Button position	Button symbol	Description
1st (top position)	⏻	Standby (long push), Mute/Unmute (short push)
2nd	▲	Up
3rd	✔	OK
4th	▼	Down
5th	☒	Cancel

Front panel push buttons description

In use, your M10 has two operating modes: Normal mode and Menu mode.

- Normal mode is used to operate the amplifier. In this mode the M10 displays status (such as power and/or temperature).
- Menu mode is used to configure the unit. The M10 menus can be accessed through the Detailed Setup screen. Users can also use Shortcuts to quickly access preselected Menu items. Shortcuts are user programmable and most Menu mode items can be selected as Shortcuts.

3.2 Normal mode

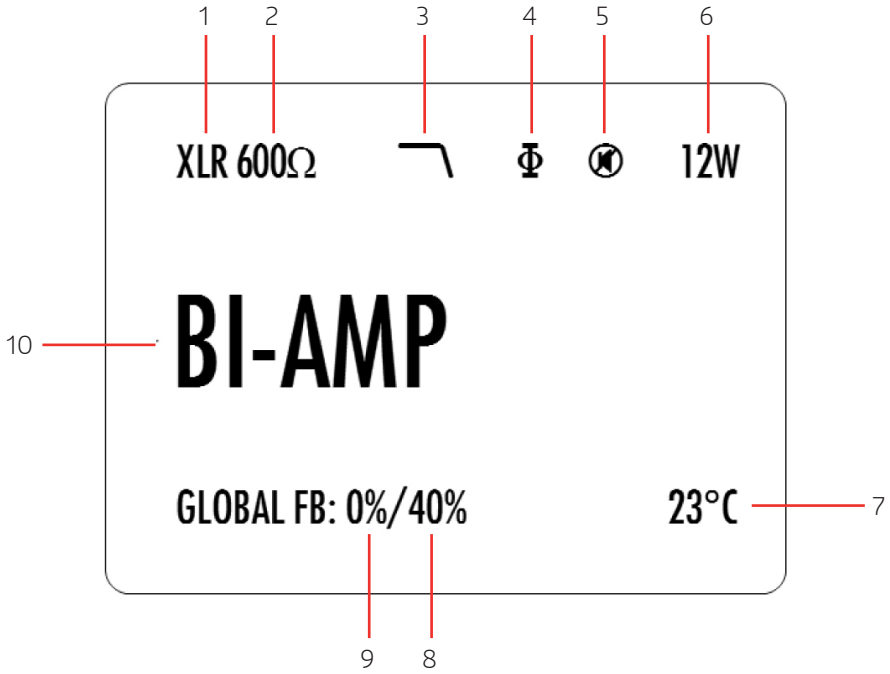
- In normal mode, the M10 can be configured to display its general status (operating mode [stereo/mono], input [XLR/BNC/RCA)] feedback ratio, peak power, internal temperature, etc.).
- It can also be set to display a peak power VU-meter, or a temperature gauge for each output channel. Once powered-on, the M10 will show a Startup display which indicates the charging progress of the main power supply. Once the supply is fully charged, the amplifier will automatically enter Normal mode.

The following table shows the actions of the front panel push buttons in Normal mode.

Front face push buttons	Unit State	Unit Action
⏻ short push	STANDBY Any other state	Wakes up from STANDBY Mutes/Unmutes outputs
⏻ long push	STANDBY Any other state	Wakes up from STANDBY Goes to STANDBY
▲	Any state	Enters Shortcuts mode
✔	Any state	Enters Shortcuts mode
▼	Any state	Enters Shortcuts mode
☒	Any state	No effect

M10 push buttons actions in Normal mode

The general status display of the M10 looks like this:



Normal mode display elements

1. Input selected
2. Input impedance termination
3. Indicates if the low-pass filter is engaged (¬ symbol) or not (nothing is displayed in this case).
4. Absolute phase polarity indication. If the Φ symbol is present, polarity is reversed
5. Mute indication. If the ⊗ symbol is present, the M10 output is muted
6. Instantaneous power indication. Gives a reading of the peak power (in Watts) supplied to the loudspeaker
7. Average temperature of the two output channels (in degree Celsius)
8. Global feedback applied to the channel 2 output board (only displayed in bi-amplification mode)
9. Global feedback applied to the channel 1 output board (in Bi-amplification modes) or to both output boards (in Stereo, Monaural or Bridged modes)
10, Amplifier mode (Stereo, Monaural, Active/Passive Bi-amplification or Bridged

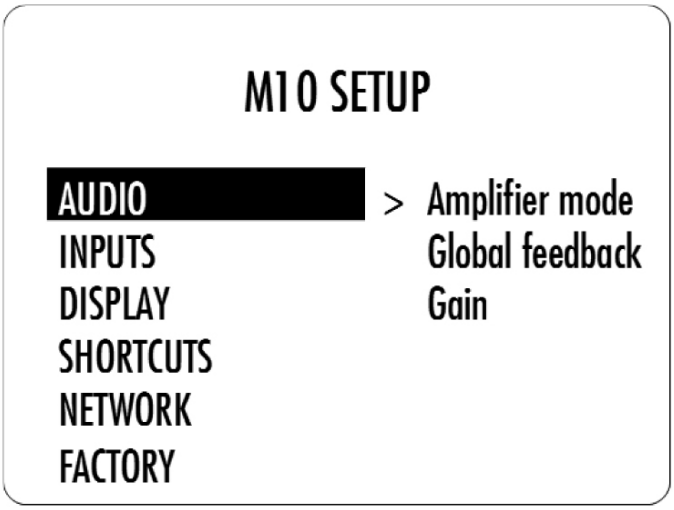
3.3 Shortcuts

The M10 amplifier settings are accessible through menus accessed via the five control buttons (or via the CH Control app) and viewed on the display. The amplifier also offers Shortcuts to the most frequently used configuration menu items. Shortcuts are user selectable and fully programmable.

- The user may choose any configuration parameter as a Shortcut. There are up to six user programmable Shortcuts.
- To learn how to program individual Shortcuts, please refer to the Shortcuts menu item in the next section.
- There are no pre-programmed shortcuts defined within the Factory default settings.
- To access user programmed shortcuts, press OK [✔].

3.4 Menu mode

The Menu mode allows the configuration and set up of the M10 amplifier. Menu mode is entered by pressing the OK [✔] button until DETAILED SETUP appears on the main display. Then press UP [▲] to actually access the available menus. If no shortcuts are configured, a simple press on the OK [✔] button will directly launch the M10 setup menus. The entry screen looks as follow:



M10 SETUP screen items

Navigation in the Menu mode is based on using the UP [▲] and DOWN [▼] buttons to highlight an item in the menu. The OK [✔] button will select that item and then the UP [▲] /DOWN [▼] buttons can be used to adjust the selected setting/value. **Don't forget to press the OK [✔] button once more to save the adjusted setting/ value.** You can use the CANCEL [⊠] to exit without saving.

M10 Front panel push buttons	Unit Action
STANDBY [⏻] Short Push	Mutes/Unmutes the unit
STANDBY [⏻] Long Push	Goes to STANDBY
UP [▲]	Moves to the next menu item upward
OK [✔]	Enter the next menu level or Validate a choice (save settings)
DOWN [▼]	Moves to the next menu item downward
CANCEL [⊠]	Returns to the previous menu level without saving

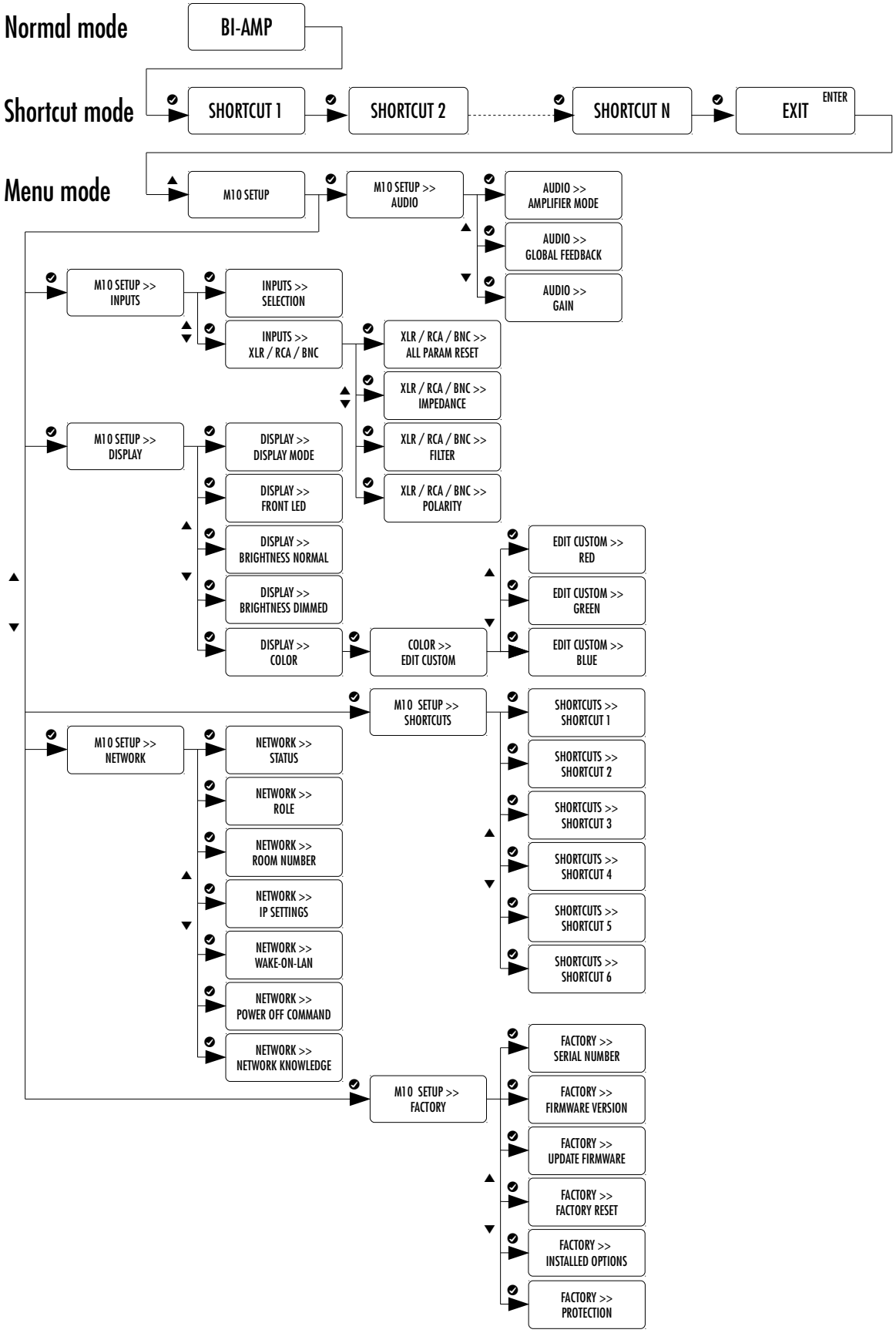
M10 push button actions in Menu mode

3.5 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 M10 to deliver the best performance, tailored user interface and coupling with your system. It is worth studying the various options and their importance as they will directly affect your enjoyment of your system.

M10 amplifier menu structure



3.5.1 Audio settings menu

- Amplifier mode
  Allows users to select between the different operating modes (stereo, active/passive bi-amp, monaural or bridged). With a single M10, you can only use the amplifier in stereo mode. However, with a pair of M10s there is a range of possible options, generally dictated by the matching speakers.
  - If your speakers are bi-wirable then you have the option to run them bi-amped. The passive bi-amp mode allows you use a single input but to adjust gain and feedback independently for each channel of the amplifier/section of the crossover.
  - If your speakers use an active crossover between the pre-amp and M10 amplifiers, you will need to use both inputs while still being able to control the individual channel parameters.
  - If your speakers are low impedance or present a reactive load, then monaural configuration will deliver the best results.
  - If your speakers are low sensitivity and/or high impedance, then bridged mode will be optimum.

- Global feedback
  Users can select the percentage global feedback (GFB) applied to the output stage. In the M10 the feedback ratio can be adjusted from 0% global (100% local) to 100% global (0% local), in 1% increments.
  Generally speaking, low levels of global feedback deliver the most musically expressive results, while increasing GFB increases control and precision, especially at low frequencies. There is always a balance to be struck between these qualities and in every system, that balance will occur at a different point.
  Start with the GFB set to 0%. If you feel that the bass would benefit from some extra grip, simply increase the global feedback until you're satisfied with the overall presentation. Do not add more global feedback than strictly necessary, as ultimately it will decrease those qualities that make the midrange and treble sound so fluid and natural.
  With a bi-amped or active setup, we recommend keeping the feedback setting for the mid/treble at 0%, while applying subtle adjustments in %-level to the low frequencies. You can experiment with these settings to arrive at the optimum value but note that: you may well reduce %GFB over time and that your preferred value may actually vary with the musical program.

- Gain
  The M10's overall gain is +24dB, with bridged mode adding an extra +6dB. The gain of each amplification channel can be tuned by up to 6dB, in 0.5dB increments. This allows several things:
  In a stereo setup, the nominal gain of the amplifier can be modified to make the preamplifier work in its optimal range while keeping the same total system gain.
  When used in conjunction with another amplifier model (or a separate sub-bass system), the M10's gain can be adjusted, ensuring consistency across the system.
  When using multiple M10s in a bi-amp configuration, setting independent gain for the different legs in the loudspeaker crossover allows relative bass to midrange/treble level adjustment, which can be a vital aid to speaker positioning and set-up.

3.5.2 Input-specific settings menu

- Input selection
  Each input board sports three connectors: A balanced XLR, a single-ended RCA and a single-ended BNC. The XLR provides the shortest signal path, and is therefore the recommended choice if the preamplifier features a balanced XLR output. Single-ended inputs both pass through an additional conditioning circuit.
- Impedance
  Sets individual impedance termination per input.
  High impedance (47kΩ for single-ended inputs, 94kΩ for balanced inputs) means this amplifier's input won't draw any current from the upstream device's output (usually a preamplifier), delivering the best possible resolution and authority.
  600Ω (300Ω for single-ended inputs) means a termination resistor is activated, increasing the noise immunity of the interconnect while drawing a bit of current from the upstream device's output. This eliminates induced noise at the cost of dynamic range and precision. It should only be used if noise floor is an audible problem.
- Low-pass filter
  The default bandwidth of the M10 is DC to 500 kHz. As some delta-sigma DACs with little output filtering can generate high frequency content that may damage loudspeaker tweeters when amplified by a wide bandwidth system, we provide the facility to add a low pass filter with a cutoff frequency of 120 kHz in the amplifier's signal path.
- Absolute phase polarity
  Allows you to reverse the absolute phase of the audio signal.

3.5.3 Display settings menu

- Display mode
  Allows the user to choose what information is displayed (status, power VU-meter or temperature gauge) and whether 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 or 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 display color from a choice of seven standard shades or a user defined RGB color.

3.5.4 Shortcut menu

The M10 allows you to establish up to six shortcuts, taking you directly to almost any parameter in any menu. The M10 has no pre-programmed shortcut. After scrolling through the latest shortcut, the next screen that the M10 display is the entry port to the M10 menu. It reads Detailed Setup.

3.5.5 Network menu

- Status
  Shows a list of compatible devices detected on the LAN.
- Role
  When physically connected to a network, the M10 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 M10 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 others.
- IP settings
  Auto should be selected if the M10 is connected to a router with DHCP server feature. More advanced settings are available if needed.
- Wake-on-LAN
  If No is selected, the M10 can't be woken up by the app. Standby mode will consume less than 0.5W.
  When Only if PoE is selected, the M10 can only be woken by the app if connected to a Power-over-Ethernet switch. Standby mode will draw less than 0.5W from the mains plug.
  If Yes is selected, the M10 can always be woken up by the app. Standby mode will draw less than a couple of watts from the mains plug.
- Power off command
  If Yes is selected, the M10 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 M10 on even when you turn off the rest of your system.
- Network knowledge
  The M10 keeps track of all discovered devices, in order to turn them on if it is set as a Power Master. If the audio system evolves, the list of devices can be cleared by this function.

3.5.6 Factory settings menu

- Serial number
  Displays the serial number of your M10. This serial number is also written on a sticker at the back of your M10.
- Firmware version
  Indicates the version of the firmware that the M10 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 M10 firmware update process. A USB flash disc drive with a valid set of firmware must be inserted in the A-shaped USB port. Please report 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. 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
  List the hardware configuration of your M10.
- Protection
  Output short-circuit, output-DC, over-heat and amplifier-fault detection circuitry protect both the amplifier and the connected loudspeakers. In some regions of the world, the power distribution grid can be so polluted that spurious power grid noise can trig false error, thus muting or powering down the amplifier. In such extreme cases, and if it is of major importance that the M10 runs uninterrupted, protections can be temporary disabled by the end user, at his own risk.

4 Firmware update

4.1 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 M10 USB port. CH Precision recommends the use of the USB sticks that is delivered in the accessory pack of the unit. The following procedure describes how to load the USB stick with the correct files:

1. Download the latest M10 firmware file from www.ch-precision.com.
2. Decompress the .zip file and copy the decompressed files to the root of your 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 M10 behavior after update.

4.2 Updating the unit's firmware

1. Perform the operations described in section 4.1
2. Connect the USB stick to the USB port located at the back of your M10 audio unit.
3. Navigate to the FACTORY SETTINGS menu and select the UPDATE FIRMWARE item.
4. Start the Firmware Update process by pushing the encoder button. Please note that the unit can perform several resets (the display briefly turns off and on) during the procedure.
5. 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.

4.3 Emergency firmware update procedure

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

1. Perform the operations described in section 4.1.
2. Power the unit off (back panel mains power switch to OFF on the power supply unit).
3. Push the standby/mute button and keep it pushed while powering up the unit (back panel mains power switch to ON).
   Keep the standby/mute button pushed in for a couple more seconds after turning 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 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.
5. If the emergency firmware update procedure fails, try the same procedure again using a different USB stick. If the failure persists, turn off your unit and contact your authorized dealer for assistance.

Note: The emergency firmware update procedure lasts 5-10 minutes, do NOT interrupt it!

5 Troubleshooting

Never try to reconnect an umbilical power cable or the mains power cable while your M10 is not fully off. If any power cable gets disconnected by mistake while your M10 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 about 5 minutes before plugging the umbilical power cables back.

Error	Action
No power	Check that all four umbilicals connecting the audio and the power supply units are firmly locked. Check the two mains power cable of the power supply unit. Check the power switch at the back of the power supply unit. Check all four mains fuses on the back of the power supply unit.
No sound (general)	Check that your source is playing. Check that your M10 is turned-on and speakers are connected properly according to the mode you want (stereo, mono, bi-amp, bridged). Check that the preamplifier's volume setting is not too low. Check that the correct input is selected on your preamplifier. Check that the correct input is selected on your M10 amplifier. Check that the correct amplifier mode selected matches your setup (stereo, mono, bi-amp, bridged).
No sound ("⊗" is displayed)	Your M10 is muted (symbol ⊗ must be off for the unit to output signal). Unmute using top front panel push button.
Your M10 does not properly recognizes its sole input board	Make sure the board is in the left-hand side slot (close to the Grounding module, not to the Control module), regardless of the channel it processes (left or right input board). If it is no the case, turn the M10 off, unplug it from the wall sockets and move the input board to its proper location.
Lost in the settings?	Restore factory settings and start your setup again.
Software update fails	Try Emergency Software Update procedure. If it fails, download the latest M10 firmware from www.ch-precision.com, prepare a software update image on the provided FAT32 formatted USB stick and follow the Emergency Software Update procedure again.
USB flash drive for firmware update is not detected by M10	Please try another brand of USB flash drive (e.g. Sandisk or the provided stick).

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.

6 Specifications

Output power

Stereo and Bi-amplification mode	2×300W_{RMS} / 8Ω, 2×550W_{RMS} / 4Ω, 2×900W_{RMS} / 2Ω
Monaural mode	1×600W_{RMS} / 4Ω, 1×1'000W_{RMS} / 2Ω, 1×1'600W_{RMS} / 1Ω
Bridged mode	1×1'100W_{RMS} / 8Ω, 1×1'700W_{RMS} / 4Ω, 1×2'500W_{RMS} / 2Ω

Analog inputs

Balanced	1x XLR (Vin = 3.6V_{RMS}, Zin = 94kΩ or 600Ω; pin1 = GND, pin2 = +, pin3 = -)
Single-ended	1x RCA + 1x BNC (Vin = 1.8VRMS, Zin = 47kΩ or 300Ω)

Amplification

Input stage	Ultra low noise, high slew rate, zero global feedback, full discrete class A design
Output stage	Ultra low noise, high slew rate, with adjustable feedback, full discrete class AB design
Feedback	Unique user programmable amplifier stage local/global feedback ratio in 1% steps
Gain	+18dB to +24dB, in 0.5dB steps (stereo, monaural and bi-amp modes) +24dB to +30dB, in 0.5dB steps (bridged mode)

Analog Audio outputs

Speaker terminals	4 pairs of customized Argento Audio binding posts
Total Harmonic Distortion + Noise (THD+N)	Less than 0.01% at 0% global feedback (100% local feedback) Less than 0.002% at 100% global feedback (0% local feedback) (1kHz signal, BW 22Hz-80kHz window, 50W_{RMS} under 8Ω, all operating modes)
Inter-modulation distortion (IMD SMPTE)	Less than 0.001%
Signal to Noise Ratio (SNR, unweighted)	Better than 132dB, stereo, monaural and bi-amp modes Better than 135dB, bridged mode
Bandwidth (-3dB point, 1W_{RMS} into 8Ω)	DC to 500kHz (low pass filter off) DC to 120kHz (low pass filter on)
Output noise (27Ω input terminated, 22Hz-22kHz measurement window)	Less than -95dBu (14 µV_{RMS}), stereo, bi-amp and monaural modes Less than -92dBu (20 µV_{RMS}), bridged mode

General

Display	800×480 24bits RGB
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz, <1W in Standby
Dimensions of each chassis (WxDxH)	440mm x 500mm x 272mm (main body) 440mm x 560mm x 285mm (overall, including connectors and feet)
Weight	Audio unit: 53kg Power supply unit: 78 kg
Software update	USB port for software update / Ethernet based system control

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.

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