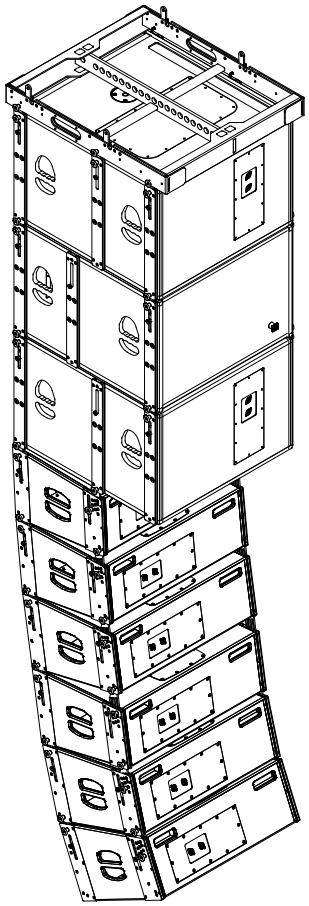
tecnare
SOUND SYSTEMS
Since 1984

Operation Manual

Rev. 1.0 - 2025



Array Series

PCCbox - Series

Self Powered Loudspeakers

Keep these important operating instructions.
Check www.tecnare.com for updates.

General Information
PCCbox - Array Series - Operation Manual
Ver.: 1.0_EN 03/2025
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The accuracy of the information within this manual has been thoroughly verified at the time of publication. Nonetheless, no assurance is provided regarding its correctness.

Exel Acoustics SL accepts no responsibility for any errors or inaccuracies that may appear in this manual or the products and software described in it. Technical specifications, dimensions, weights and properties do not represent guaranteed qualities. As manufacturers we reserve the right to make alterations and modifications within the framework of legal provisions, as well as changes aimed at improving quality.

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IMPORTANT SAFETY INSTRUCTIONS

Before using our product, be sure to carefully read the manual and safe Instructions. Keep this document with the device at all times.

1. **Read these instructions**

2. **Keep these instructions**

3. **Heed all warnings**

4. **Follow all operating instructions** – Use the product only as specified

5. **Environmental precautions**:
   1.1. Do not expose the product to direct rain, sea spray, or excessive moisture
   1.2. Do not install near heat sources (e.g., radiators, stoves, or other heat-producing apparatus)

1. **Attachments/accessories** – Use only manufacturer-specified parts (e.g., dollys, stands, tripods). When moving the product on a dolly, take care to avoid tip-over injuries

2. **Cleaning** – Use only a dry cloth. Do not use liquid cleaners or aerosolsIf the equipment is used in a manner not specified by the Exel Acoustic SL, the protection of the equipment may be impaired

3. **Servicing:**
   1.3. Do not attempt servicing unless qualified. Refer all repairs to authorised personnel
   1.4. Service is required if the product has been damaged (e.g., liquid spills, falls, exposure to moisture, or abnormal operation)
   1.5. Contact *Exel Acoustics SL* for advanced servicing issues

1. **Rigging and installation:**
   1.6. Read the Array Series Rigging Manual before installation
   1.7. Use only rigging accessories and procedures described in the manual
   1.8. Ensure loudspeakers are placed on stable surfaces. When stacking, secure enclosures with straps to prevent movement

CAUTION: Rigging should only be done by experience professionals.

1. **Magnetic fields –** This speaker enclosure is capable of creating a strong magnetic field. Please use caution around the enclosure with data storage devices such as phones, computers or hard drives

2. **Handles** – Use only for transporting the system. Do not support weight beyond the product's design

3. **Hearing damage warning:**
   1.9. Prolonged exposure to sound pressure levels (SPL) exceeding 90 dB can cause permanent hearing damage
   1.10. Professional systems can produce harmful SPLs. Limit exposure time (e.g., ≤8h at 90 dB(A), ≤30min at 110 dB(A))
   1.11. Never stand directly in front of loudspeakers operating at high volumes

Source: EU Directive relating to the assessment and management of noise 2002/49/CE

1. **Compliance** – If used in a manner not specified by Exel Acoustic, product safety protections may be impaired

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SYMBOLS USED

CAUTION: This symbol indicates a potential risk of electric shock or harm to persons and equipment. Instructions accompanied by this symbol must be strictly observed.

CAUTION: This symbol highlights essential operational procedures that must be carefully followed to ensure proper equipment function and prevent performance issues.

EARTH: This IEC 5017a symbol identifies the protective earth terminal, which must be permanently connected to the electrical safety ground system.

TOOLS REQUIRED: This symbol indicates when specific tools are necessary for safe installation or operation of the product.

Helpful Information: This symbol denotes supplementary guidance to optimise equipment performance or streamline operation.

Electronic Instructions for Use (eIFU): This symbol indicates that the full product manual is accessible digitally via the QR code printed on the unit.

Hot Surface Warning: This symbol alerts users that surfaces may reach hazardous temperatures during/after operation. Avoid contact with marked areas

WARNING: Risk of injury from dropped components during handling. Never stand beneath suspended loads. Wear hard hat and safety footwear. Secure all tools and parts when working at height.

AC Power Inlet: This symbol identifies the mains power input socket, designed for safe connection to electrical supply.

Analog Audio Input / Looping Output: These XLR connectors provide balanced analogue signal connectivity

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DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY

EXEL ACOUSTICS SL

CL Montes de Toledo, 33. Pol. Ind. Señorío de Illescas. 45200 – Illescas (Toledo), España (Spain).

RII_AEE/WEEE: 9178; ENV/2023/000014126

Declara que los productos de la familia ***ARRAY PCCbox-Series*** y sus respectivas opciones, cumple con las Directivas:

Declare under our sole responsibility that the Array PCCbox-Series family of products, comply with relating Directives:

(1) Directiva de Baja Tensión - 2014/35/UE
(2) Directiva de Compatibilidad Electromagnética - 2014/30/UE
(3) Directiva RoHS - 2011/65/UE
(4) Directiva RAEE - 2012/19/UE

(1) Low Voltage Directive 2014/35/EU
(2) EMC 2014/30/EU
(3) RoHS Directive 2011/65/UE
(4) WEEE Directive 2012/19/UE

Y es conforme a las siguientes Normas Armonizadas Europeas:

In Accordance with Harmonized European Norms:

(1) **EN 60065:2014/COR3:2018** Audio, video and similar electronic apparatus - Safety requirements

(2) **EN 55032:2015+A11:2020** Electromagnetic compatibility of multimedia equipment - Emission requirements

(3) **EN IEC61000-3-2:2019+A2:2024** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

(4) **EN 61000-3-3: 2013+A1:2019+A2:2021** Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection

(5) **EN 55035:2017+A11:2020** Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 2 : immunity

(4) **EN 63000:2022** Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

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Attention

FCC SUPPLIER'S DECLARATION OF CONFORMITY (SDoC)

We, *Exel Acoustics SL* of CL Montes de Toledo 33, P.I. Monte Boyal, 45200, Illescas, Toledo, Spain, declare under our sole responsibility that the ***PCC-NET Technology*** range of products complies with Part 15 of the FCC Rules. Products covered by this declaration have model numbers of the form PCCbox-MPXX where "XX" denotes the variant identifier.

FCC NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15, Subpart B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when operated in a [commercial/residential] environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used per the manual, may cause interference to radio communications. Operation in residential areas may require the user to correct interference at their own expense.

FCC CAUTION:

Changes or modifications not expressly approved by the manufacturer may void the user's authority to operate this equipment.

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1. INTRODUCTION

1.1. Welcome to Tecnare®

Thank you for choosing the Tecnare® ***Array PCCbox Series*** – a premium "**Made in Spain**" professional audio solution from Exel Acoustics SL.

To maximise the performance and longevity of your **PCCbox system**, please read this manual carefully before installation or operation.

Engineered for touring-grade reliability and exceptional sonic clarity, the PCCbox Series combines cutting-edge design with rigorous Spanish craftsmanship.

Technical Support & Updates

For assistance or product information, contact our team:

- **Phone: +34 603 276 232**
- **Email:** support@tecnare.com
- **Website:** www.tecnare.com

Continuous Improvement

Exel Acoustics SL reserves the right to update PCCbox Series specifications or documentation to reflect technological advancements. Always check our website for the latest version.

We appreciate your trust in **Tecnare®** and wish you outstanding performances.

> *Rigging elements or procedures are not included. Please refer to the Array Series rigging assembly guide*

1.2. Overview the Array-PCCbox Series

The Tecnare® **Array PCCbox Series** represents the pinnacle of Spanish-engineered, self-powered sound reinforcement, combining **full-range curvilinear arrays** and **high-output subwoofers** into a seamless, scalable ecosystem. Designed for professionals who demand tour-grade reliability and plug-and-play sophistication, this series comprises:

- **CLa21:** The compact yet mighty line array element with 142 dB SPL and 75° constant directivity
- **CLa21Plus:** Enhanced version with extended frequency response and increased power handling
- **SW-18VR:** The powerhouse subwoofer, designed for flyable integration with PCCbox arrays without transition hardware.

UNCOMPROMISED PERFORMANCE

Born from Exel Acoustics' **three decades of transducer innovation**, the PCCbox Series delivers:

- **Integrated Class-D + DSP**: Each enclosure features optimized amplification and Tecnare's proprietary processing (including FIR Filtering, RMS&Peak limiter, multiband compressor), eliminating external racks.
- **Array rigging**: With 0°–13° adjustable vertical dispersion and unified presets, the CLa21/CLa21Plus adapt to venues from theaters to stadiums.
- **Subwoofer Synergy**: The SW-18VR shares the series' rigging design and DSP integration, enabling effortless full-range systems.

2. AMPLIFIER MODULE

The PCCbox Series redefines self-powered performance with its fully integrated **Class-D amplification and DSP platform**, engineered for both plug-and-play simplicity and advanced system tuning. Each enclosure features a **high-efficiency Class-D power stage** (92% efficiency at 1/3 power) precisely matched to its transducers, delivering optimal headroom while minimizing thermal stress.

At the heart of the system lies Tecnare's **PulseLock® protection suite** – a proprietary DSP algorithm that continuously monitors and safeguards against thermal overload and mechanical excursion, ensuring reliable operation even during demanding peak loads. The onboard processing provides complete user control over input EQ (with parametric and a set of filters), time alignment (0.01ms resolution), and output level staging (+12dB/-80 adjustment range), making the PCCbox equally suited for quick deployments and finely-tuned installations.

An intuitive LCD interface provides instant access to critical functions, from preset selection (including venue-optimized configurations like "small array" or "cardioid subwoofer") to real-time monitoring of amplifier temperature and power draw. For system integration, **PCC-Net Control** enables networked operation through standard Ethernet connectivity, supporting daisy-chaining of up to 64 units.

This self-contained approach eliminates the need for external processors while maintaining the flexibility to adapt to any application, from portable rigs to permanent installations. The amplifier module's robust design ensures stable operation in environments up to 50°C, backed by Tecnare's signature Spanish engineering quality.

The result is a no-compromise amplification solution that combines the convenience of power operation with the precisión expected from Tecnare's professional systems.

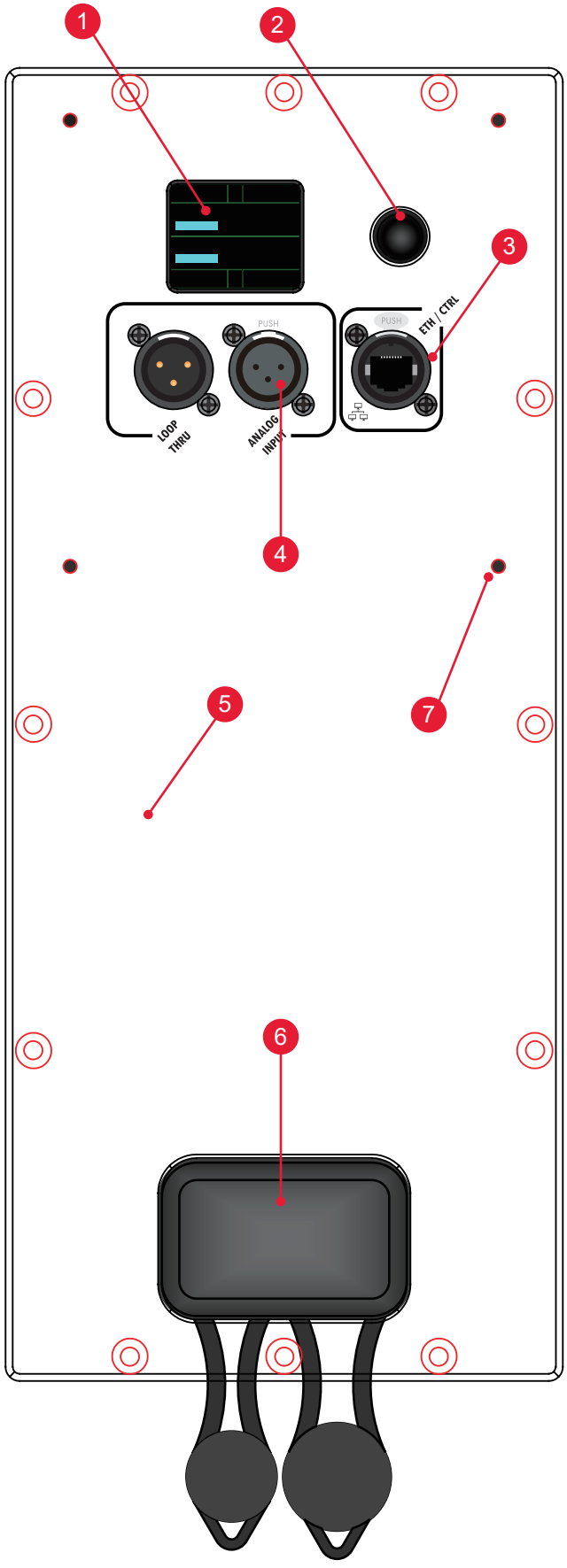


Figure 1. PCCbox MP14 Module / User Panel

2.1. MP4 REAR PANEL

All Array PCCbox Series enclosures (**CLa21, CLa21Plus, SW-18VR**) feature the unified **MP14 Power Module amplifier**, designed for professional touring and installation use.

1. **LDC Screen.** The colour LCD interface provides access to all speaker operating modes, DSP parameters and networking settings. The display is controlled via a single rotary encoder for navigation and parameter adjustment. For detailed operating instructions and advanced functionality, please refer to Section XX - LCD Interface.

2. **Encoder.** The rotary encoder navigates LCD menus and adjusts volume—turn to scroll/change values, press to select.

3. **EtherCon Connector.** A single rugged EtherCon socket provides network connectivity for system control via PCC-Net. This port supports standard Ethernet cables (Cat5e/Cat6 or higher) for *Remote monitoring/control*, *Firmware updates*, *Integration* with existing network infrastructure.

4. **XLR Connectors.** The PCCbox features balanced XLR input (female) and output (male) connectors, supporting +4dBu line-level signals. The input bypasses DSP for zero-latency output passthrough, while the output maintains signal transmission even during power loss (fail-safe).

5. **Amplifier Heatsink.** The PCCbox employs a sophisticated hybrid cooling solution combining passive aluminium heatsink fins with a variable-speed forced-air system. A single internally mounted fan draws air through the cabinet's reflex port, working in tandem with the extensive heatsink array to maintain optimal operating temperatures without external fans.

6. **Power Connector.** The PCCbox utilises Neutrik powerCON TRUE1® connectors for robust power distribution, featuring IP65-rated sealed construction and UL 50E-certified UV resistance. The input connector simultaneously functions as the mains ON/OFF switch while the output enables daisy-chaining of additional units. These gold-contacted connectors support 20A continuous current with reinforced strain relief for touring applications.

7. **Mount point for Rain Cover.** Four M5-threaded mounting points (ISO 4762) allow secure attachment of the optional PCCbox Rain Cover, providing IP54-rated protection for the LCD screen, control surfaces, and rear-panel connectors during outdoor use.

3. DSP OVERVIEW

The **PCCbox Series** features a sophisticated onboard DSP system powered by an Analog Devices processor, giving you full control over your sound. The user has access to eight parametric EQs for precise tonal shaping, up to 600 milliseconds of delay for perfect timing alignment, and a suite of monitoring tools – all easily accessible through the intuitive interface.

With studio-grade 48 kHz/24-bit processing, your audio remains crystal clear at every stage. The advanced Pulse-Lock® limiter suite protects your system while maintaining optimal performance. Plus, seamless compatibility with Tecnare's professional audio ecosystem means your PCCbox integrates effortlessly into existing setups.

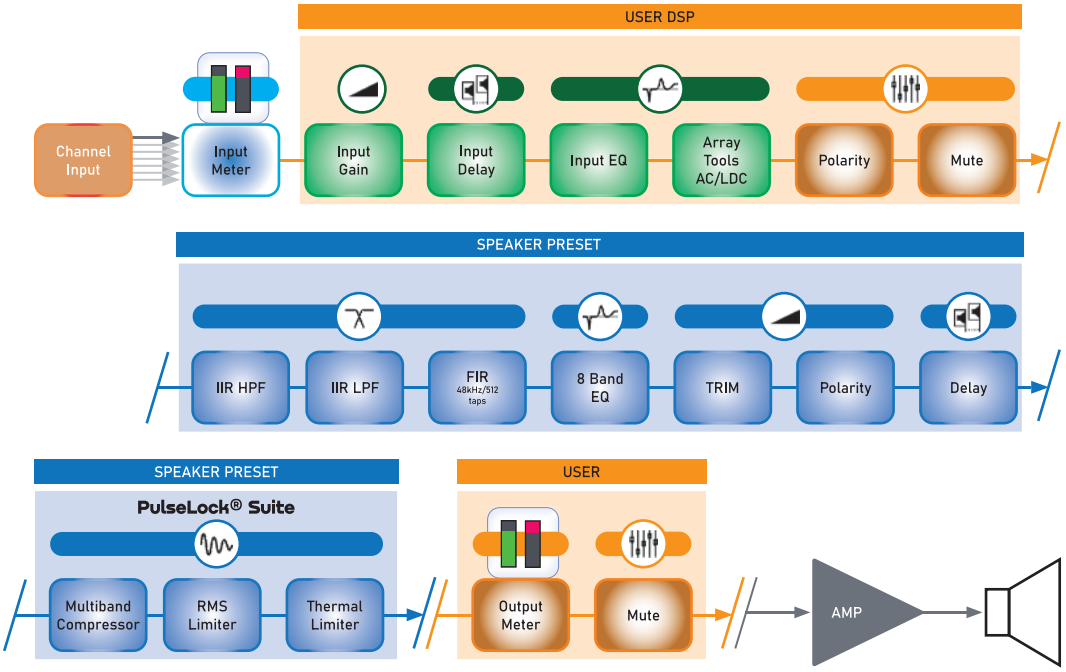


Figure 2. DSP Processing Block Diagram

4. POWER REQUIREMENTS

To achieve optimal performance from your PCCbox system, careful attention to power delivery is essential. These loudspeakers demand clean, stable mains power to maintain their full dynamic range – particularly during peak performance. You'll need to consider both voltage stability and current capacity in your venue's electrical design to ensure the system can deliver its maximum acoustic potential without compromise.

Always adhere to local electrical regulations when installing permanent systems, and use certified power components that match the PCCbox's technical specifications.

CAUTION: *Before connecting to mains power, always verify:*

- *Neutral-to-Earth voltage <5V AC (measured under load)*
- *Wiring configuration: Single-phase (Line-Neutral-Earth) only*
- *Ground integrity: ≤0.1Ω resistance to building earth*

CAUTION: *Earthing/Grounding Requirements. Incorrect earthing between loudspeakers and system components may cause:*

- **Audible interference** *(hum/buzz) in audio signals*
- **Circuit damage** *to sensitive I/O stages*

CAUTION: Earth/Ground Connection Safety: *The earth/ground conductor is essential for safe operation and must never be disconnected.*

The PCCbox Series features an intelligent universal power supply with active Power Factor Correction (PFC), automatically adapting to mains voltages from 100V to 240V AC worldwide. This advanced design ensures efficient operation across different electrical infrastructures while protecting your investment.

When operating with the PulseLock limiter engaged, the system functions as a constant-power load - meaning current draw will naturally increase if the supply voltage drops. For optimal performance with 230V systems, we recommend keeping your power cable's total roundtrip resistance below 5Ω. This prevents the voltage at the amplifier's inlet from falling below the critical 160V threshold during peak demands or when PulseLock is active, ensuring uninterrupted performance while safeguarding your equipment.

CAUTION: *The PCCbox requires stable mains power between 100-240V AC to operate safely. Voltage outside this range may cause, permanent amplifier damage, system malfunction, voided warranty.*

Tip: *Use a true-RMS multimeter to confirm stable supply within 90-264V range.*

4.1. Power Connectors

Your PCCbox features rugged Neutrik powerCON TRUE1 connectors designed for professional touring use. These 3-pin, 16A-rated connectors (20A for USA) combine power transmission with intelligent switching - serving as both your mains connection and ON/OFF control in one robust package.

The IP65-rated design withstands harsh environments, with UV-resistant materials meeting UL 50E standards for outdoor reliability. The innovative "connect under load" (CBC) capability allows safe mating even during operation, while the loop-through output enables daisy-chaining multiple units from a single power source.

When not in use, included rubber seals maintain the enclosure's weatherproof integrity. ***Remember, these connectors are your first line of defence against moisture and debris - always ensure covers are properly fitted during transport or outdoor storage.***

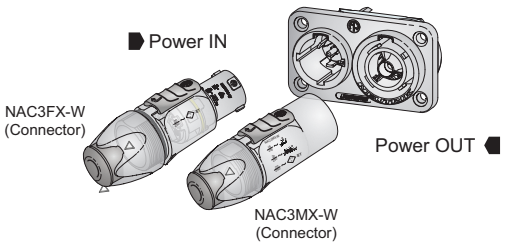


Figure 3. Power Inlet, Neutrik powerCON True1 TOP Connector

CAUTION: *Outdoor Protection Requirements: The inlet's IP65 and UL50E certifications only apply when either:*

- *Properly mated with a Neutrik powerCON TRUE1 TOP cable connector, or*
- *Securely covered with the included sealing cap.*

CAUTION: *Moisture Prevention*

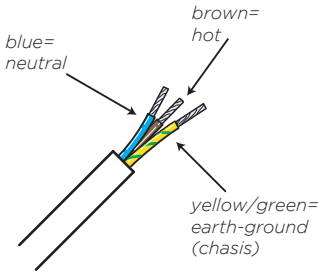
Before fitting the sealing cap, always inspect and dry it thoroughly if moisture is present. Introducing liquid to the connector may compromise weatherproofing and electrical safety.

CAUTION: *Before plugging in, always inspect your PCCbox's AC inlet for secure fitting and any signs of damage like cracks or corrosion.*

4.2. Power Cable Assembly

Each PCCbox includes one Neutrik powerCON TRUE1 input connector empowers you to create tailored power cables that perfectly match your installation requirements.

When assembling powerCON TRUE1 cables for global use, follow this colour-to-terminal mapping regardless of local plug variations:



If your plug's terminal markings differ from standard colour codes, follow these universal wiring principles:

- Connect the **blue** wire to the terminal marked with an N
- Connect the **brown** wire to the terminal marked with an L
- Connect the **green** and **yellow** wire to the terminal marked with an E (or ⏚) or coloured green (or green and yellow).

CAUTION: *For PCCbox power cables, all conductors must be, at least, 2.5mm2 (12AWG)*

Note: *Visit the Neutrik website (neutrik.com) to Download the official guide* **BDA 697 V5 – powerCON TRUE1 manual**

4.3. Power Loop Capacity

The number of PCCbox loudspeakers you can safely daisy-chain depends on your mains voltage, speaker types (subwoofers draw more current), and circuit breaker rating. Higher voltages (e.g., 230V) allow more units per line by reducing current draw. While overloading won't damage speakers, it will trip your breaker – cutting audio until reset.

4.4. Circuit Protection Requirements

RCCB or RCBOs (Residual Current Circuit Breakers with Overcurrent protection) are essential for PCCbox systems, combining earth leakage detection and overload safeguards. Tecnare recommends these certified devices:

- **European installations: ETI KZS-1M 1p+N (Type C, 16A/30mA, 6kA)**
- **US: Eaton QCR2020 (2-pole, 20A, 120/240V)**

Always match these specifications when selecting protection devices to prevent nuisance tripping while maintaining safety.

NOTE: RCCB Sensitivity: *Some residual current circuit breakers (RCCBs) may nuisance-trip due to high-frequency noise between line and neutral conductors, or capacitance imbalances in cabling. For PCCbox systems:*

- *Specify HFI-resistant RCCBs (e.g., Type B or B+)*
- *Consult a certified electrician to assess line-to-earth capacitance*
- *Group audio power circuits separately from lighting/AC*

Always verify your RCCB's frequency tolerance with the manufacturer.

4.5. Powering On PCCbox

Your PCCbox offers two intelligent power management options, configurable via the rear LCD (see Section XX) or PCC-Net software:

- **Always On Mode:** Keeps the system permanently ON.

- **Auto Standby (Default):** Smartly reduces power consumption during periods of inactivity. When audio falls below a set threshold for a defined duration, the system enters low-power state while remaining signal-aware. The amplifier wakes instantly when audio returns, making it perfect for permanently installed systems.

Tip: *PCC-Net software lets you fine-tune standby thresholds and timing for your specific use case.*

Electrical Safety Guidelines: *For safe operation of your PCCbox system:*

- *Power Cable Inspection: Never operate the unit with damaged cabling – inspect for frayed insulation or broken conductors before each use.*
- *Environmental Checks: Verify connectors remain free of moisture/debris, and ensure adequate ventilation around power components.*

5. AMPLIFICATION AND AUDIO CONNECTIVITY

Your PCCbox features dual balanced 3-pin XLR connections for professional audio integration. The line-level input accepts signals up to +21dBu and has an input impedance of 20kΩ impedance, compatible with external audio equipment such as mixing consoles and processors.

Connection Guidelines:
The XLRs follow standard balanced wiring:

- Pin 1: Chassis earth (1kΩ impedance with ESD protection)
- Pin 2: Signal hot (+)
- Pin 3: Signal cold (–)
- Case: Combined earth ground for AC safety and shielding

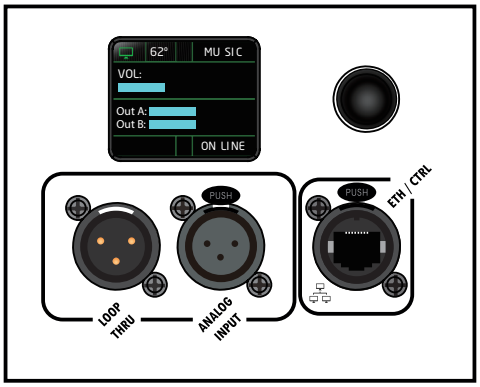


Figure 4. PCCbox User Panel, Audio Input

Always use fully wired balanced cables (pins 1-3 connected at both ends) to prevent ground loops. Avoid linking signal ground to the case, as this may introduce hum.

The parallel output XLR (male) enables straightforward daisy-chaining of multiple PCCbox units, maintaining signal integrity throughout your audio system. This unbuffered pass-through connection remains active even when the speaker is powered off.

NOTE: Noise Troubleshooting
If the PCCbox emits unwanted noise, begin by disconnecting the audio input cable. If the noise stops, potential causes may include issues with the integrity of the audio cable (balanced connections are recommended), poor output quality from the source equipment, instability in the mains power supply, or insufficient continuity in the earth grounding.

5.1. Calculating Analog Input Load Impedance

When daisy-chaining PCCbox units, ensure your source device (e.g., mixing console) can drive the cumulative load without distortion. As a rule of thumb:

Impedance Ratio

Maintain at least a 10:1 ratio between the total input impedance of your speaker chain and the output impedance of your source.

Calculation Method

Divide 20kΩ (a single PCCbox's input impedance) by the number of connected units.

For example:

Consider a mixing console with a 100Ω output impedance driving a daisy-chain of PCCbox loudspeakers. To maintain the recommended 10:1 impedance ratio, the combined input impedance of all connected PCCbox units should total at least 1kΩ. Given each PCCbox presents a 20kΩ input impedance, this allows for a maximum of 20 units in the chain (20kΩ ÷ 1kΩ = 20). Always remember - this theoretical maximum depends on your specific source equipment's capabilities and the cumulative cable length in your setup.

5.2. Amplifier Cooling System

The PCCbox combines passive convection cooling (via aluminium heatsink) with an automatic variable-speed fan for demanding conditions. The fan activates only when needed – during high temperatures or sustained peak output – ensuring reliable performance while maintaining quiet operation. This maintenance-free system adapts seamlessly to your usage environment.

CAUTION: *Maintain at least 15cm clearance behind the PCCbox cabinet to ensure adequate airflow and prevent overheating. This space allows the cooling system to operate at peak efficiency.*

CAUTION: *During extended high-power operation, the PCCbox's heat sink may reach 80°C (176°F). Allow at least 15 minutes cooling time before handling to prevent burns. Always check the surface temperature before maintenance or transport.*

6. NETWORKING FUNDAMENTALS

The PCCbox Series operates on standard TCP/IP protocols, requiring standard network addressing for communication between devices and PCC-Net software. Each unit must be configured with:

- A unique **IP address** (static or DHCP-assigned)
- Appropriate **subnet mask** for your network architecture
- Valid **gateway** settings for cross-subnet management

6.1. IP Address Management

Every PCCbox device requires a unique IP address within your network's subnet to enable proper communication between devices and control systems. These addresses can be assigned:

- **Manually** (static configuration for fixed installations)
- **Automatically** (via DHCP for plug-and-play setups)

Once configured and verified (with no conflicts), you won't need to memorise individual addresses – the ***PCC-Net*** software will handle device discovery and management seamlessly.

IP Address Example: 192.168.05.001

6.2. Understanding Subnet Masks

The subnet mask plays a critical role in network communication by distinguishing between the network and host portions of an IP address. For proper operation of your PCCbox system, all connected devices must share identical subnet mask settings - this ensures seamless communication without requiring complex routing setups.

The PCCbox series simplifies network configuration through intelligent automatic detection of subnet parameters. In most cases, the system will self-configure appropriately without user intervention. Should any IP conflicts arise, the PCC-Net interface will provide clear notifications and guidance for resolution.

Subnet Mask Example: 255.255.0.0

6.3. Network Configuration for PCCbox Devices

Your PCCbox offers flexible IP addressing through two modes, configurable via the rear LCD or PCC-Net software:

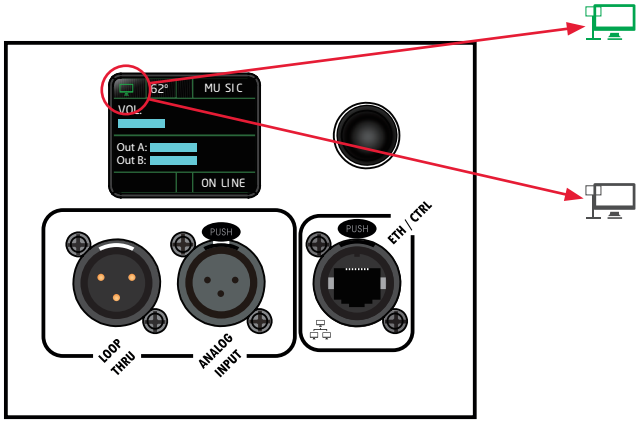
DHCP (Recommended) - The automatic choice for most installations, DHCP lets a server assign IP addresses and subnet masks dynamically. Without a DHCP server, PCCbox units intelligently self-configure using APIPA (Automatic Private IP Addressing) standards - ideal for standalone systems or temporary networks.

Static IP – In this mode, the user must manually configure the IP address and subnet mask for each PCC-box device, as well as for the control device on the network. All devices must share the same subnet mask and be assigned a unique IP address within its range. The IP address and subnet mask can be entered either through the rear LCD panel or using the PCC-Net software.

6.4. Ethernet Connectivity

The PCCbox Series features rugged Neutrik etherCON®-encapsulated RJ45 ports for reliable network communication. These ports handle all control and telemetry data between the amplifier modules and devices running Tecnare PCC-Net software.

While standard RJ45 connectors work perfectly for fixed installations, the etherCON interface provides reinforced strain relief and IP-rated protection for touring environments. Both connection types support real-time monitoring and configuration at theatre-grade latency.



Network Status Indicator

The top-left icon displays real-time network connectivity:

- **Brilliant green:** The module is successfully connected to the network and visible in PCC-Net software.
- **Dark grey:** No network connection detected; the device won't appear in PCC-Net until linked.

> *For troubleshooting, verify Ethernet cabling and switch port status when the grey icon persists.*

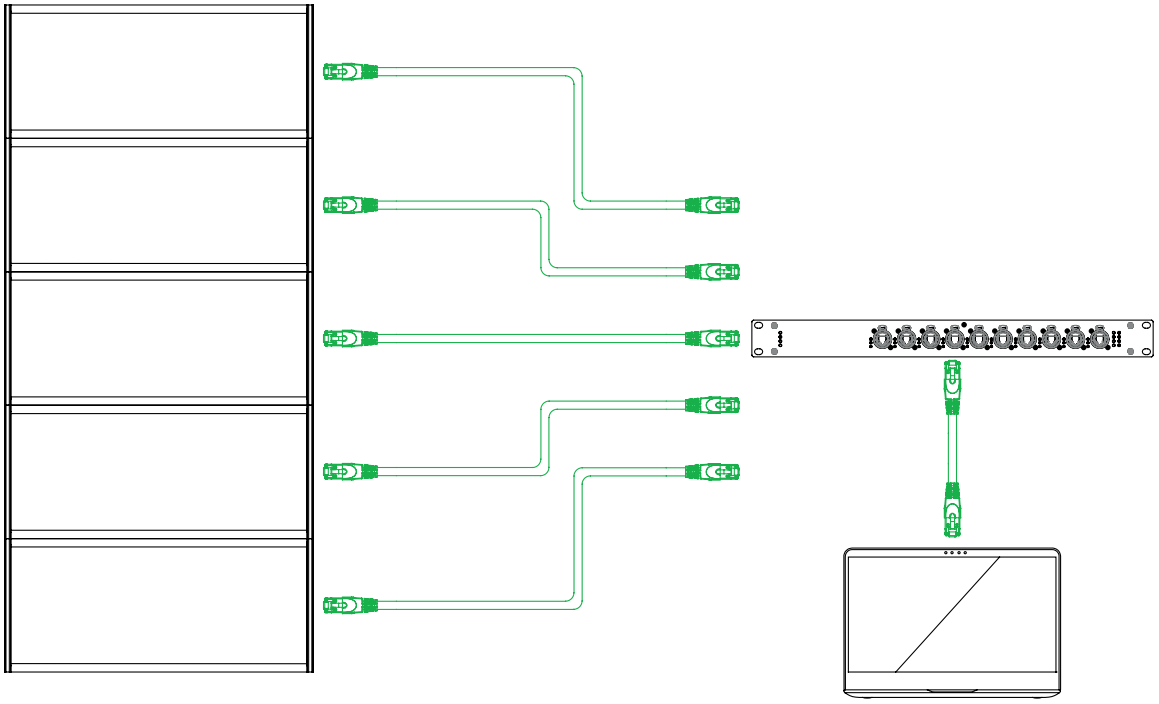
6.5. Star Topology Requirement

The PCCbox MP14 amplifier modules must be connected using a star network topology. This configuration ensures:

- Reliable low-latency communication (≤1ms)
- Stable power delivery to all units
- Simplified troubleshooting

Implementation:

- Connect each MP14 directly to a central Gigabit switch
- Use Cat6 cables for runs exceeding 15 metres
- Enable QoS prioritisation for PCC-Net traffic



7. LOUDSPEAKER PRESET

Your ***PCCbox Series*** loudspeakers include six optimised factory presets, professionally tuned by Tecnare engineers for various applications. These embedded presets deliver instant performance for common scenarios while maintaining system protection.

Additionally, two user presets allow custom configurations:

- **Factory presets:** Fixed for reliability (non-editable)
- **User presets:** Save your preferred processing settings

Access and select all presets conveniently through either:

- The rear LCD panel menu
- PCC-Net software (Preset → Device Preset)

User adjustments are stored securely for immediate and future recall.

7.1. CLa21/CLa21Plus Array Operating Modes

The PCCbox Array Series provides four dedicated operating modes to optimise performance based on array size and application. Each mode intelligently adjusts the system's tonal balance to compensate for low-frequency variations caused by speaker coupling in different configurations.

Selection is available through:

- The rear LCD panel menu
- PCC-Net software (Preset → Device Preset)

Full Range Preset [CLa21_FR / CLa21+_FR]

The CLa21_FR and CLa21Plus_FR presets deliver a nominally flat frequency response, optimised for standalone operation or nearfield applications. These configurations maintain the system's full bandwidth capabilities without array-specific processing, making them ideal for:

- **Small Venues**
- **Monitor**
- **Front Fill**
- **Delay System**

The FR presets provide a neutral starting point for systems requiring minimal tonal adjustment.

Small Array Preset [CLa21_SA / CLa21+_SA]

The CLa21_SA and CLa21Plus_SA presets are optimised for compact arrays of 2-3 cabinets, typically pole-mounted or above subwoofers. This configuration applies gentle LF shelving to compensate for low-mid buildup.

Ideal for portable setups and venues where space constraints prevent larger arrays, while maintaining the PCCbox's full bandwidth capabilities

Array Preset [CLa21_ARRAY / CLa21+_ARRAY]

This preset serves as the primary operating mode for arrays of four or more PCCbox cabinets, engineered to deliver uniform coverage across the target audience area. The configuration automatically applies high-frequency shelving to counteract low-mid buildup characteristic of focused array geometries. For extended systems, the preset seamlessly integrates with the optional Array Coupling [***AC***] filter to provide additional low-frequency control.

By maintaining the system's full bandwidth capabilities while compensating for array interactions, this mode ensures consistent tonal balance across all listening positions. The preset is equally effective in both flown and ground-stacked configurations where precise impact point alignment is required.

High-Pass Filter Configuration

The Full Range (FR) and Small Array (SA) presets offer two HPF variants to match system deployment:

Full-Range Mode [FR Preset / SA Preset]

Extends the system's low-frequency response to its natural limit, ideal for standalone operation without subwoofers. This setting preserves the full acoustic bandwidth for applications requiring extended bass reproduction.

80Hz Mode [*_80 preset(5th & 6th)]

Optimised for systems with subwoofers, this option provides:

- Increased headroom for maximum SPL output
- Cleaner midrange clarity by reducing LF intermodulation
- Seamless integration with SW-18VR subwoofers

These correspond to presets 4 and 5.

Array Preset Calibration

When using the ***Array preset (4th)***, fine-tune the low-frequency response via the Low Shelf filter in PCC-Net's calibration window to match your subwoofer deployment.

Fill Preset (HPF @125Hz)

The sixth factory preset applies a 125Hz high-pass filter, specifically designed for frontfill applications where subwoofers or ample low-frequency energy already exist in the main system. This configuration:

- Removes problematic LF content that could muddy vocal clarity
- Reduces amplifier strain by eliminating unnecessary bass reproduction
- Enhances intelligibility by focusing on critical midrange frequencies

Ideal for frontfill zones, balcony delays, or any supplemental speakers where precise midrange articulation is paramount.

7.2. SW-18VR Operating Modes

The SW-18VR subwoofer offers three preset LPF options for flexible system tuning:

- **60Hz Mode (Preset 1):** Extended low-frequency reproduction for cinematic applications
- **80Hz Mode (Preset 2):** Balanced response for music reinforcement
- **100Hz Mode (Preset 3):** Tight coupling with mid-bass elements in high-SPL systems

Select via the rear LCD or PCC-Net software to match your main array's configuration.

Cardioid Subwoofer Configuration

Presets 4-6 mirror the standard LPF modes (60Hz/80Hz/100Hz) while activating the SW-18VR's cardioid processing. When deployed in properly spaced arrays:

- Two or three subwoofers create directional bass control
- Rear attenuation reduces stage levels by 8-12dB
- Phase-optimised filtering maintains frontal energy

These presets require specific cabinet orientations - refer to Section XX for array positioning guidelines and deployment examples to maximise cardioid effectiveness.

The Cardioid Preset serves as a starting point to achieve a cardioid pattern when using two or three coplanar loudspeakers (in either a ground-stacked or flown array), with one loudspeaker facing the opposite direction. Polarity and delay processing are applied to the rear-facing loudspeaker, cancelling the output of the front-facing loudspeakers behind the array. To ensure an optimal cardioid pattern, we recommend using FFT software and applying additional processing as needed.

CAUTION: PRESET COMPATIBILITY IN FORWARD CONFIGURATIONS.

- **Never mix different presets** *(e.g., 60Hz/80Hz/100Hz) in a forward-facing subwoofer array. Inconsistent processing will degrade phase coherence and system performance.*
- **Never apply cardioid presets** *(4-6) to forward-facing cabinets. Cardioid processing is designed exclusively for rear-facing configurations and will cause destructive interference if misused.*

8. CALIBRATION: Array EQ Filters

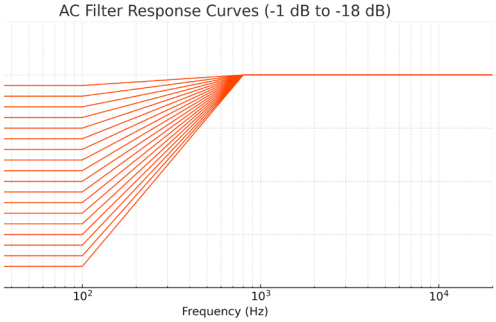
The PCCbox Array Series incorporates two dedicated, user-adjustable filters for rapid tonal optimisation of array systems. These purpose-designed filters streamline the tuning process while maintaining system integrity. Apply adjustments via PCC-Net software, or configure cabinets individually using the rear-panel LCD interface.

8.1. Array Coupling Filter (AC)

The Array Coupling (AC) filter works in tandem with the system's array presets to control the mid and low-frequency energy buildup caused by acoustic coupling between cabinets in an array. This helps achieve a more accurate tonal response while maintaining system coherence.

The AC filter should always be applied uniformly across all cabinets within the array to preserve phase alignment. The optimal AC setting depends on several factors including the physical configuration of the array (ground-stacked or flown, shape of the array), the acoustic characteristics of the venue, and the desired tonal balance.

For best results, make gradual adjustments to the AC filter (typically within ±3dB range) while monitoring the system response using FFT analysis tools.



8.2. LONG DISTANCE COMPENSATION (LDC)

The **Long Distance Compensation (LDC)** filter combines FIR-based EQ processing with per-cabinet gain adjustment to counteract high-frequency air absorption effects in Line Source deployments. This advanced processing ensures spectral consistency across all audience zones, regardless of throw distance.

Each cabinet's LDC settings should be individually configured based on its position in the array and target coverage area:

- **Long-throw cabinets** (40m+) typically require +2dB to +6dB of HF boost to compensate for atmospheric attenuation.

- **Short-throw cabinets** (under 15m) often benefit from -1dB to -3dB HF reduction to maintain tonal balance with distant elements.

Implementation Notes:

1. **FIR Precision:** The linear-phase EQ preserves transient response while correcting air absorption curves.
2. **Gain Staging:** Adjust in 0.5dB steps while monitoring with dual FFT/RTA measurement.
3. **Array Integration:** Always verify summation with adjacent cabinets after applying LDC.

Technical Advisory

- Maximum HF adjustment range: ±8dB (20Hz-20kHz)
- Recommended starting point: +3dB/100m for outdoor deployments
- Not required for arrays under 15m total throw distance

WARNING: LATENCY CONSIDERATIONS WHEN USING LDC FILTER
Critical Notice for System Alignment

The activation of the **Long Distance Compensation (LDC)** filter introduces additional signal latency (typically 0.8–1.5ms per cabinet) due to its FIR processing architecture. This requires strict implementation protocols:

Mandatory Uniform Application

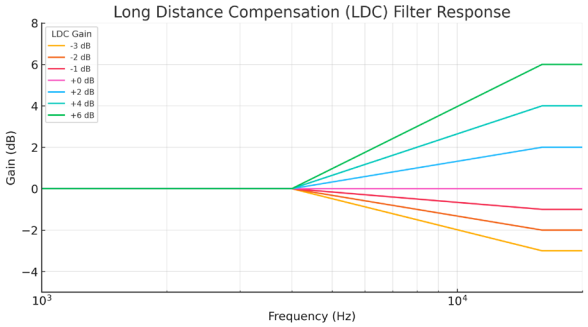
- If LDC is activated on any single cabinet within an array, it must be activated on all cabinets in the system.

- Failure to do so will create phase misalignment between processed and unprocessed signals, resulting in:
  - Comb filtering artifacts (3–12dB cancellation notches)
  - Smeared transient response
  - Reduced system headroom

Verification Procedure

- Always confirm LDC status via:
  - PCC-Net's calibration window
  - Phase analysis measurements (FFT software 1/24 oct resolution recommended)

- Re-setting the entire system after LDC activation using a FFT software.



The LDC's linear-phase FIR filters require buffer delays to maintain frequency response linearity. This latency becomes destructive when mixed with uncompensated signals.

Consequences of Non-Compliance

- **Audible comb filtering (most severe 2–8kHz)**
- **15–25% reduction in system output potential**

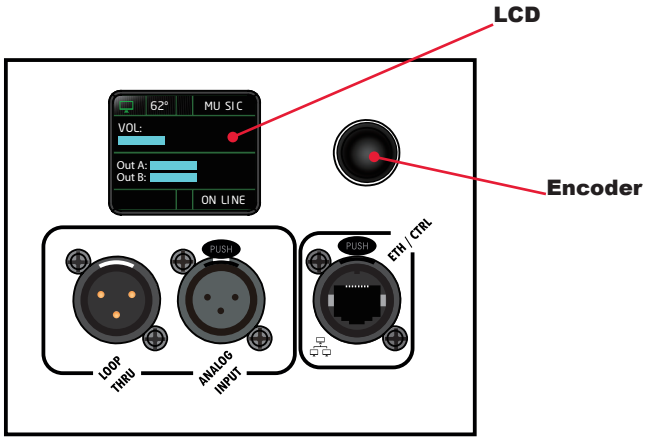
NOTE: *This requirement applies regardless of throw distance - even short-throw cabinets must engage LDC if the array uses it.*

9. LCD SCREEN OPERATION

The rear-panel LCD screen provides direct access to critical loudspeaker parameters, including operating modes (presets) and network configuration. Navigation and parameter adjustments are performed using the rotary encoder.

To operate the interface, rotate the encoder to browse through menus and parameters. When the desired setting is highlighted or framed with a green rectangle, press the encoder to activate edit mode. Adjust the value by rotating the encoder, then confirm the selection by pressing the encoder again. Note that the encoder button serves dual functions: a short press acts as an “Enter” command, while selecting the “Back” option cancels the current operation and returns to the previous menu level.

For optimal responsiveness, allow a brief pause (approximately 0.5 seconds) after each encoder press to ensure the system registers the input. Avoid rapid consecutive presses, as this may trigger unintended menu skipping



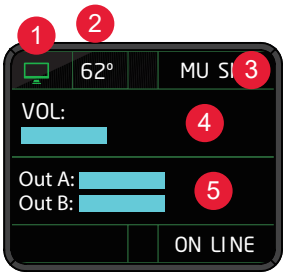
LCD Functions Overview

- Preset
- Audio
- Monitor
- Settings
- Info

9.1. Overview screens

The Home Screen

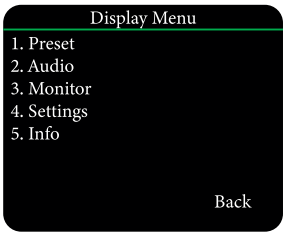
The home menu appears after amplifier power-up and serves as the main navigation hub / Info. Access it at any time by pressing ‘Back’ from submenus. This screen displays essential system status.



1. **Network Status**
2. **Module Temperature**
3. **Current Preset**
4. **Input Volume/VU**
5. **Output VU**

Display Menu

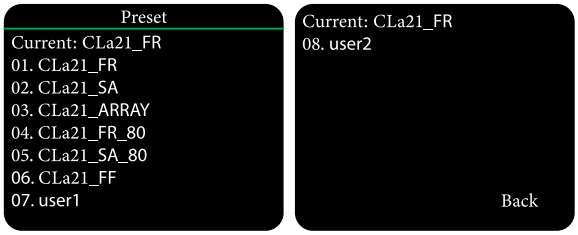
From the Home screen, pressing the encoder activates the main menu interface. This central control hub provides access to all system submenus through the following operation:



- **Preset**
- **Audio**
- **Monitor**
- **Setting**
- **Info**

9.2. DSP Menu

Preset Menu



The **Preset** submenu allows the selection and loading of optimised DSP configurations for different use cases. Navigate by rotating the encoder to browse through the available preset options; the currently highlighted selection is shown at the centre of the display.

To activate a preset, press the encoder when the desired option is highlighted. The system will prompt with "*Recall the preset?*". Upon confirmation, the complete DSP configuration package will be loaded, including all associated processing parameters.

Audio Menu

The Audio Menu provides comprehensive control over signal processing parameters, accessible through the encoder interface.

Input Sensitivity

Input Sensitivity adjustment ranges from 0.5V to 2.00V, with real-time value preview during encoder rotation. Changes are applied immediately upon pressing the encoder.

Mute's

Mute Functions operate at both input and output stages. When engaged (selected via encoder press), the system initiates a 50ms fade-out to prevent audible artifacts. In bi-amplified configurations, output mutes are available per channel.

Input Delay

Input Delay offers 0-600ms compensation in 0.1ms increments. Parameter adjustment follows a two-step process: initial encoder press activates the editing mode, followed by value selection and confirmation with a second press.

Array Processing

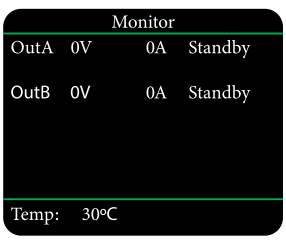
Array Processing (AC/LDC filters) are managed through dedicated submenus, allowing 0.5dB resolution adjustments. These filters remain inactive until explicitly enabled, with all changes requiring manual application via encoder confirmation.

Reset ALL

DSP Reset restores factory defaults through a two-stage security protocol. After selecting "*Reset All*", users must confirm with a secondary "*YES*" selection, triggering an irreversible parameter wipe. The system reboots automatically post-reset, requiring approximately 5 seconds for full reinitialisation.

Monitor Menu

The PCCbox loudspeaker system provides real-time telemetry monitoring through both the rear-panel LCD display and PCC-Net software interface. This diagnostic feature delivers comprehensive performance data for each output channel, including:



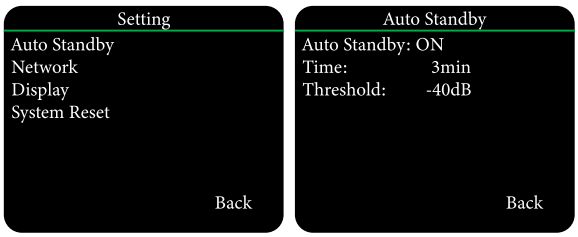
- Amplifier output voltage (Vrms)
- Active limiting status (peak/thermal)
- Current output level (dB)

All monitoring data transmits continuously via the network connection while the system remains powered. The LCD display refreshes values at 1-second intervals, with priority given to critical protection alerts when present.

> *Monitoring functions operate independently of audio processing and do not affect system performance. Values represent post-DSP, pre-transducer signal states.*

Setting Menu

Auto Standby

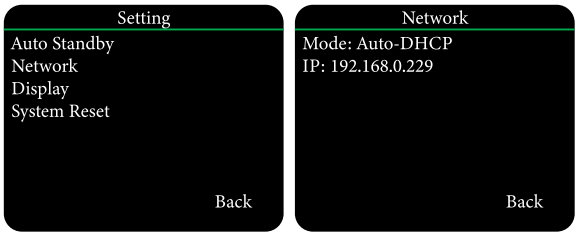


The Auto Standby function enables automatic power conservation when the system detects audio levels below a user-defined threshold for a specified time. Configuration is available through both the LCD interface and PCC-Net software.

Parameter Adjustment:

- Activation: Select 'On/Off' via encoder and confirm with press
- Time: Configure detection period (3-60 minutes in 1-minute increments)
- Threshold Level: Set trigger volume (-80dB to 0dB in 1dB steps)

Network



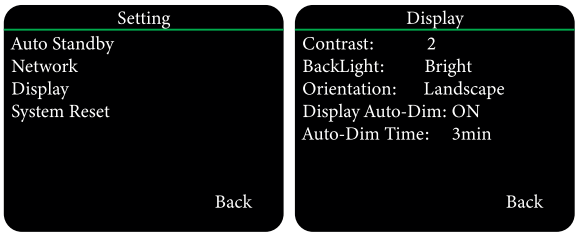
Network Mode Selection

Set the connection protocol via encoder. Rotate to highlight DHCP (automatic IP assignment) or Static (manual configuration). Press the encoder to confirm selection.

Static IP Address Configuration

The IPv4 address is set per octet (0-255) using this sequence: Select the target octet (highlighted), press encoder to activate editing mode, rotate to adjust value, press "OK" knob to confirm. Select Back to return to settings menu.

Display Setting



The display settings menu allows real-time adjustment of screen parameters.

Contrast: The contrast can be modified by rotating the encoder, with changes applied instantly for immediate visual feedback.

Backlight: backlight level is adjustable via encoder rotation, though this function remains active only when the Auto-Dim feature is disabled.

Orientation: The LCD orientation can be toggled between landscape and portrait modes to ensure optimal readability based on the loudspeaker's physical positioning. Select the desired orientation using the encoder and confirm with a press.

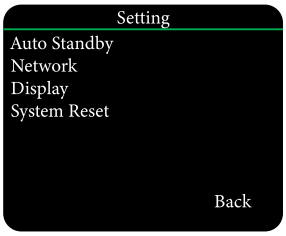
Auto-Dim: When *Auto-Dim* is enabled, the display will automatically deactivate after a user-defined period of inactivity. This setting can be toggled "*ON*" or "*OFF*" via the encoder.

Auto-Dim Time: If enabled, the Auto-Dim timer determines the delay (adjustable in real time by rotating the encoder) before the screen turns off following the last user interaction.

Pressing the Back button exits to the setting menu.

> **NOTE:** *Backlight adjustments will not take effect if Auto-Dim is active*

System Reset



This function restores all system parameters to their original factory defaults, including user settings, DSP configurations, network preferences, and stored presets. This action is irreversible and will permanently erase all customized configurations.

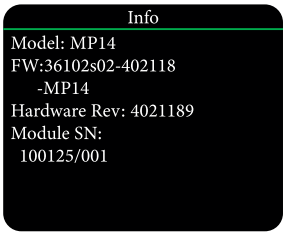
To perform a reset:

1. Select “System Reset” in the menu using the encoder and press to confirm.
2. On the confirmation screen, choose “YES” and press the encoder again to execute the reset.
    - To cancel, select “NO” or press the Back button to exit without changes.

> **NOTE:** *Network connectivity may require reconfiguration after a reset.*

Upon completion, the system will reboot automatically, restoring default settings.

Info



The Info submenu provides essential hardware and software identification data for system verification and troubleshooting.

- **PCC Module Model:** Displays the amplifier module designation (e.g., MP-14) for product identification.
- **Firmware Version (FW):** Indicates the currently installed DSP firmware revision, critical for compatibility checks.
- **Hardware Revision:** Shows the physical hardware version of the amplifier module.
- **Module Serial Number (SN):** Lists the unit’s unique factory-assigned identifier for service tracking.

10. Care and Maintenance

To ensure long-term reliability and performance of your PCCbox Self-Powered Loudspeaker, adhere to the following care guidelines:

Environmental Protection

- **Moisture Avoidance:** Do not expose the loudspeakers to rain or excessive humidity. If used outdoors, ensure they are adequately covered or sheltered during inclement weather.

- **Temperature Considerations:** Avoid operation in sub-freezing conditions. If unavoidable, gradually warm the voice coils by playing low-level audio for 15 minutes before high-power use.

Cleaning & Handling

- **Cabinet Maintenance:** Wipe the exterior with a **dry cloth** only when the unit is powered off.

- **Driver Protection:** Prevent moisture or debris from entering cabinet openings, particularly near drivers and ports.

Operational Longevity

- Allow proper ventilation around amplifier heat sinks.

- Periodically inspect connectors and cables for damage.

11. Technical Specifications

Model	*MP14 Module - PCC-NET Technology*
Type	2-channel, open-loop, class D
Power Amplifier	450W ch1 / 1800W ch2 rms@8ohm
Input Type	Balanced Differential Line
Input Level	6.02 dBV (2.00Vrms, 2.83V peak) @1kHz
Input Impedance	≥20kΩ(balance), ≥10kΩ(unbalance)
Input Sensitivity	35 dB
Input Overloading level:	Maximun input level 8.7Vrms (+21dBu)
ADC SNR	111 dB
DAC SNR	123 dB
Audio Resolution	24 bit
Sample Rate	48 kHz
DSP Capability	294 MIPS
Display	1.8” Full Colour TFT (Resolution 128x160)
Connector	Input: Female NC3FAH LOOP THRU: Male NC3MAH AC INPUT: PowerCon® TRUE1 TOP NAC3PX
Frequency Range	±1dB(10%output power rate,20Hz-20kHz)
Total Harmonic Distortion, THD	0.05%(10%output power rate,1kHz tipical value)
Heat Radiation	Convection with variable-speed Fan
Safety Voltage Range	100-240VAC, 50/60Hz
Dimensions (H x W x D)	374 x 159 x 93 (mm) // *14.72 x 6.25 x 3.66 (-in)*
Weight	2.8 kg. // *61.73 lbs*

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***Array Series** Operation manual*

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