RAM Audio Pi2 3K-5K Professional Power Amplifiers Pi Series User Manual

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RAM Audio Pi2 3K-5K Professional Power Amplifiers Pi Series

Professional Power Amplifiers

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- **Pi2 3K-5K**
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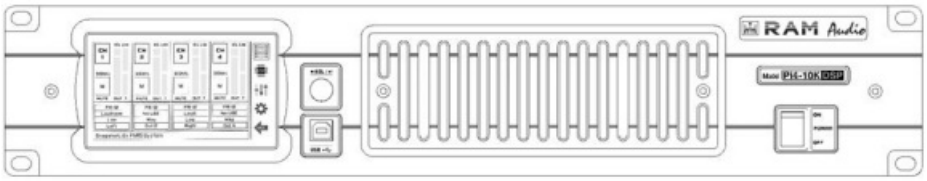


SAFETY PRECAUTIONS

- The lightning and arrowhead symbol warns about the presence of uninsulated dangerous voltage.
- This symbol indicates that there may be hot parts on the front panel of the device.
- When the device is installed, the plug connected to the socket-outlet shall be easily accessible.
- This device must be grounded/earthed.
- Connections of the amplifier to the loudspeakers shall be done by a skilled person.
- Read this manual before using the device.

MOUNTING INSTRUCTIONS

- Take into account that airflow to cool these devices is from their rear side to their front side.
- Please make sure that there are no objects at the front or rear of the device (has to have a completely open space at the front and at the back) to ensure an optimal airflow and a correct functio-ning of the cooling system.
- Objects at the right and left sides of the device have to be far more than 2 centime-tres.

General Information

- Pi is a multipurpose series of power amps for touring and installation applications, based on the legendary QuantaPulse™ switching mode power supply with an innovative class H 3 steps topology.
- It includes a completely renewed PMS™ which incorporates a set of protection systems that works in real-time continuously maintaining all variables of the amp within safe working thresholds always.
- Pi amps have been designed with a non-symmetrical class H topology which allows working with very high voltages given incredible headroom and a great punch.
- All these characteristics make the Pi amplifier an interesting device to work with asymmetric loads to squeeze every last drop of power in each way of the sound system.
- Pi series has an extra-large 4.3″ display with capacitive touch panel whereby it is possible to control and manage every parameter of the amp and its powerful FIR DSP, also con-trolled by our RAM_OCS software.

Main Characteristics

- Unmatched audio quality hi-efficiency Class H 3-steps design.

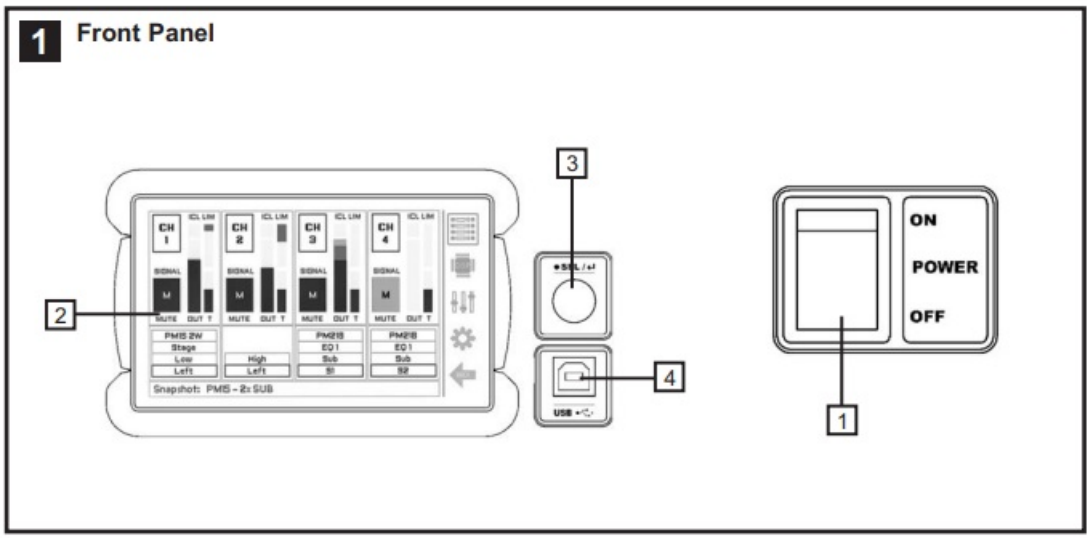
- 2/4 Channels models from 3000W up to 10000W.
- Last generation QuantaPulse™ SMPS
- High voltage output for high headroom performances.
- Advanced Power Management System (PMS EVO™) with high effective protections system acting in real-time.
- Up-side-down design to avoid fan dust accumulation.
- Industry-standard Neutrik® XLR and Speakon® connectors.
- Powerful and fast response cooling system.
- 64 bits double-precision 96kHz FIR DSP
- Extra-large 4.3″ IPS display, capacitive touch panel user interface.
- Dante™ and AES3 inputs versions.
- Two Ethernet ports for daisy chain connection.
- USB port for firmware update and DSP control.

Controls: Where and What?

Front Panel

Main Power Switch:

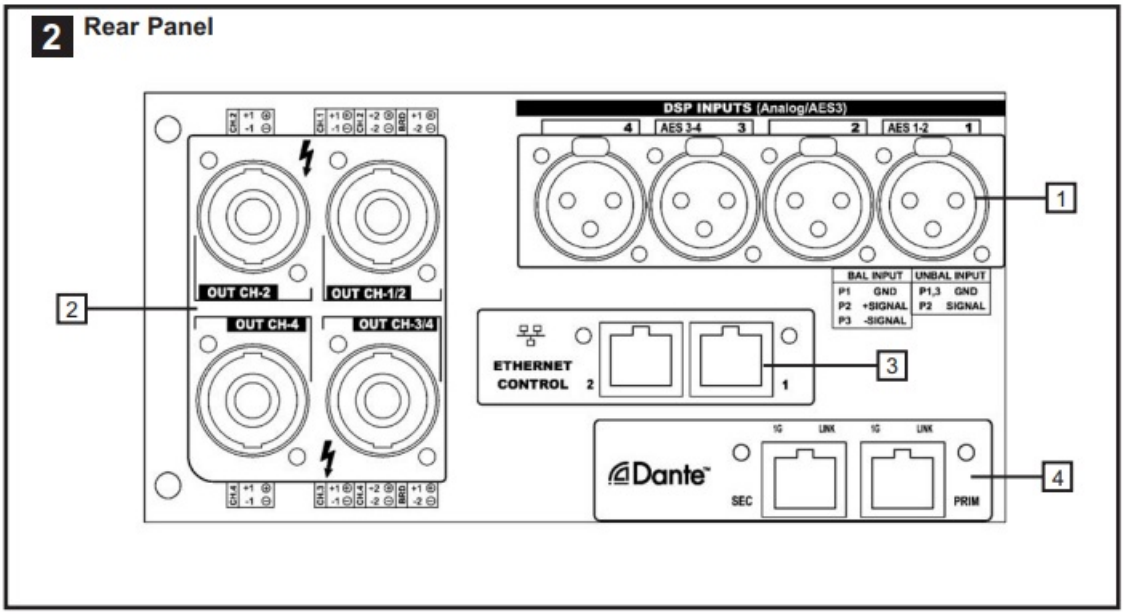
- The position I Connect the amplifier's current feed.
- Position O disconnects the Power.
- Display: See pages 10, 11, and 12.
- Encoder: to control de display menus.
- USB Connector: for firmware update and DSP control.



Rear Panel

- Signal Input: Female Neutrik® XLR Connectors for the amplifier's signal input.
- Speaker connectors: Neutrik® Speakon to connect the speakers.
- Ethernet ports: for daisy chain connection.

- Dante Inputs (only in Pi+Dante version): Digital Inputs Dante™ Networking (AES67 and DDM compatible).
- Mains Power Cord: to connect the amplifier to the mains network. The color code is:
- Blue: Neutral
- Brown: Live, single phase
- Yellow-green: Protective Earth



Installation and Operation

Connections

The Power switch must always be on the “Off” position before plugging the amp to a properly earthed mains socket (170-265V AC). The color code is:

- Blue: Neutral
- Brown: Live, single phase
- Yellow-green: Protective Earth
- The input signal fed to the amplifier can be either balanced or unbalanced. The drawing below describes both ways to wire an XLR connector for the purpose.
- Balanced Signal: Connect pin 1 to Ground, pin 2 to Signal + (hot), and pin 3 to Signal – (cold).
- Unbalanced Signal: Connect Pin 1 to Ground, pin 2 to Signal and pin 3 to Ground.

Important!: If a connection is done with an unbalanced line and pin 3 on the XLR is not connected to the ground, a 6 dB loss occurs in the line, and only a quarter of the amplifier power is produced.

The amplifier can operate on two different configurations: DUAL, or BRIDGE. The connections for the two modes are different.

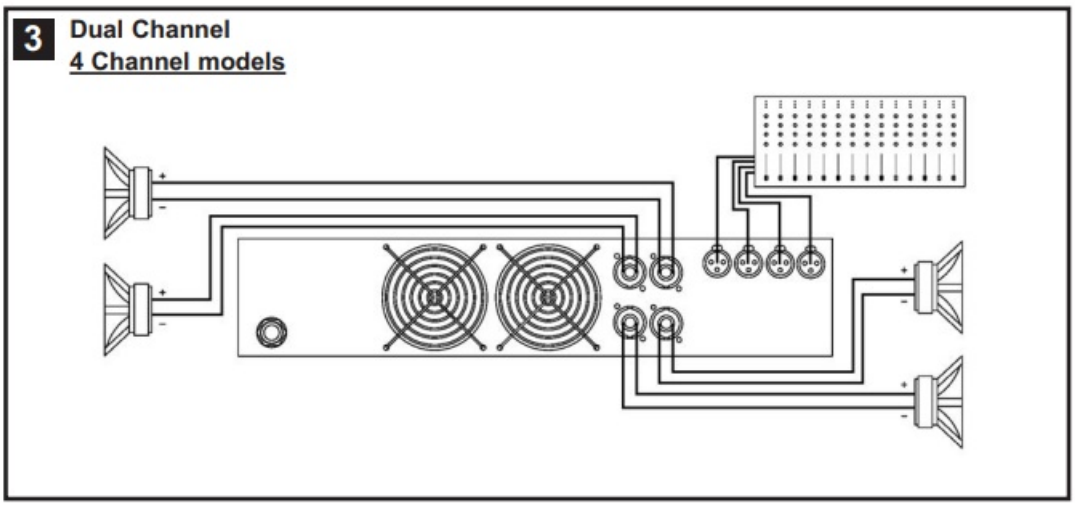
DUAL Channel Mode

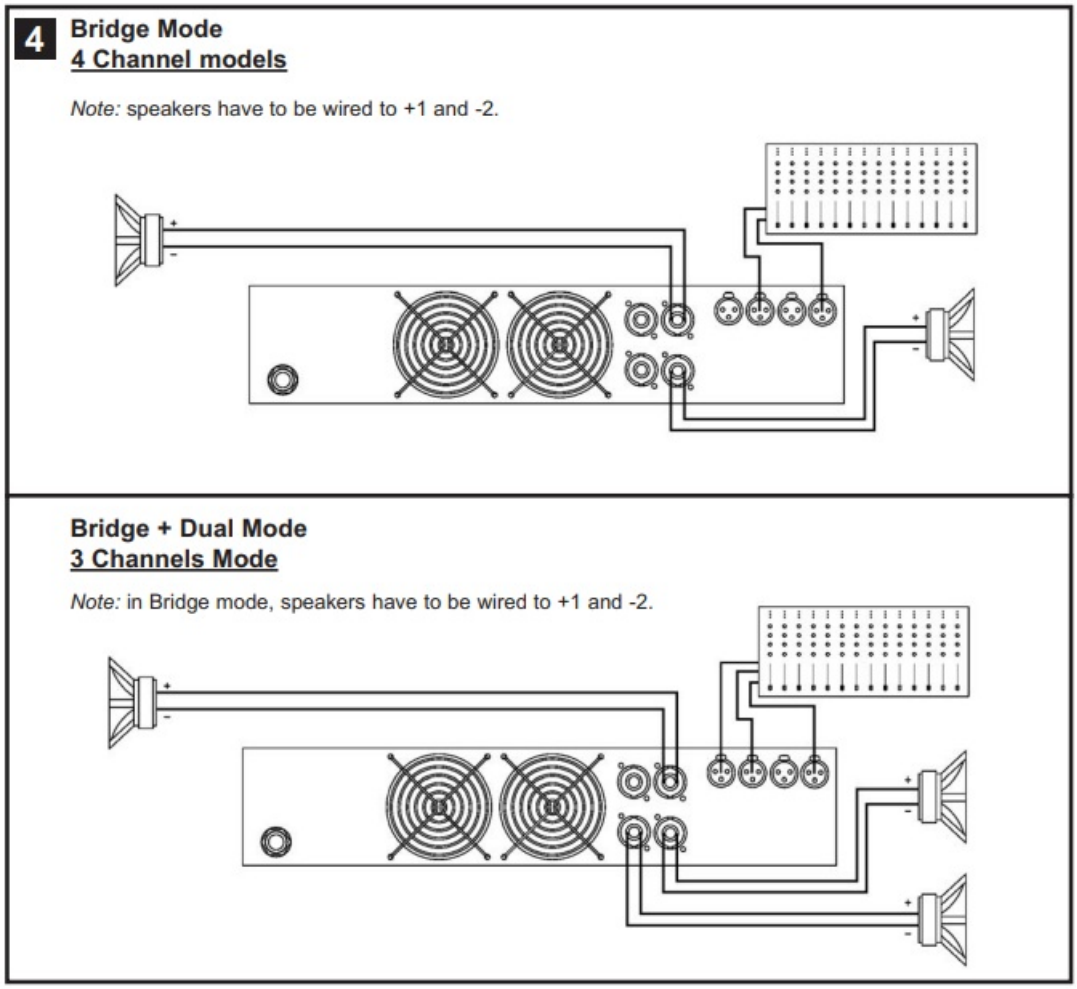
- By means of the display, set the Amplifier Mode to “DUAL”.
- Connect the signal lines to the female XLR connectors on all channels.
- Connect the speakers’ lines to the corresponding Speakon on the amp respecting the polarity.
- Use the level control knob on the front panel to adjust each channel independently.

BRIDGE Channel Mode

- By means of the display, set the configuration mode to “BRIDGE”
- Connect a signal line to input female XLR Channel “A” (or Ch-C in 4 channel models).
- Connect the speaker line to the Channel A Speakon (or Ch-C in 4 channel models) wired to +1 and -2. In this way pin, +1 is positive.
- Use Channel-A (or Ch-C in 4 channel modes) control knob to adjust the amp’s output.

WARNING! The “-“ pins, do not have to be Ground!



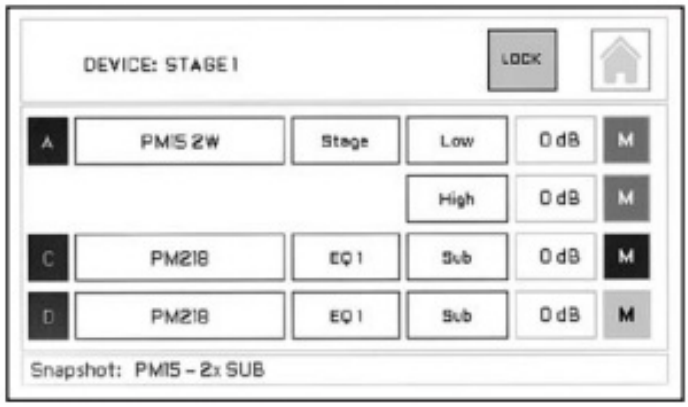


Configuration

By means of the display, the user can con-figure amplifier and DSP parameters and monitor them. There are six different screens as follows:

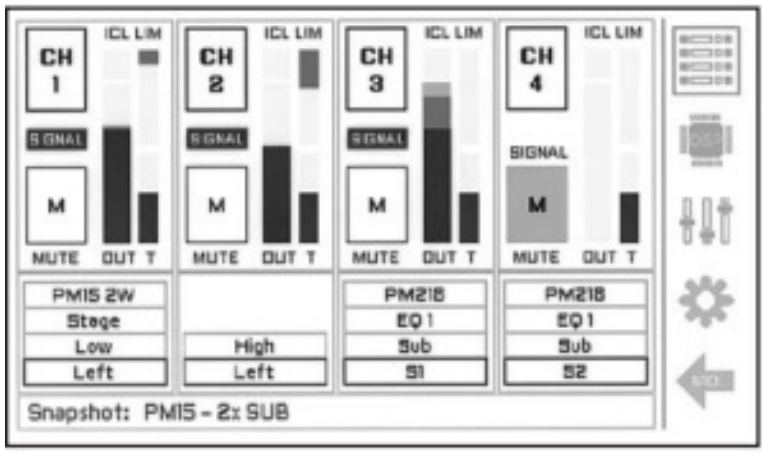
Default Screen

- Device Name: assigned by the user via RAM_OCS
- Lock Button: to lock the touch screen
- Home Button: to access to Home screen
- System Input Signal: shines green with signal presence
- System Preset, Mode, and Way names of the current process
- Level Control for amplifier channel output
- Output Mute / Signal: shines green with output signal presence Snapshot: shows the name of current Snapshot (if loaded one)



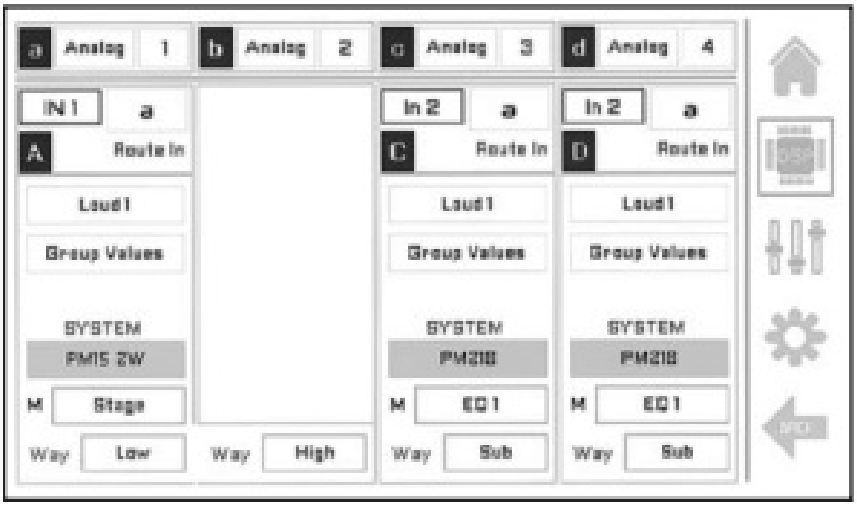
Home Screen

- Way Output Signal: shines green with signal presence
- Mute Button: mutes the amplifier channel output
- Output Channel Level
- ICL Indicator: shines when clip limiter system is working
- LIM: shows RMS/Peak limiters compression level
- T: shows the channel temperature (percentage)
- System Preset/Mode/Way/User ID Out names of current process Snapshot: shows the name of current Snapshot (if loaded one) Default Screen Icon: button to access to the Default screen.



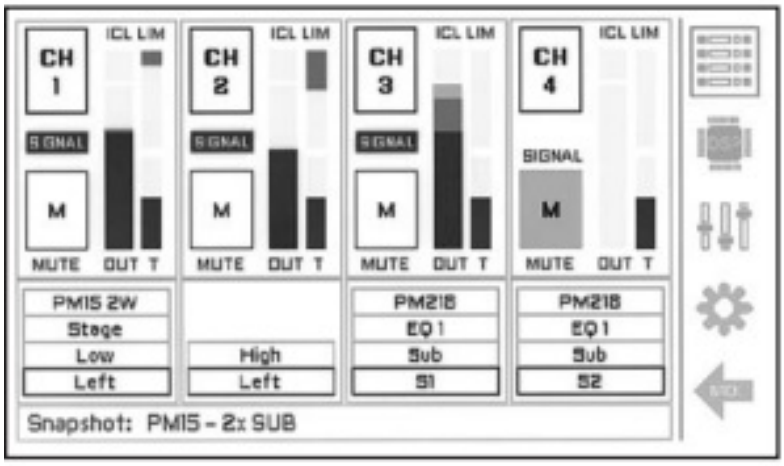
DSP Edit Screen

- Source Input: to select the analog/digital source input
- System Input: to select the input of each system
- User ID Input Label: shows the name assigned by the user User EQ: to select the input EQ User Memory
- Group Values: shows the control groups values (green if present) JOIN (optional): to join different outputs to a single input System Preset Selector
- M: to select the Mode EQ
- Way: to optionally select the output way.



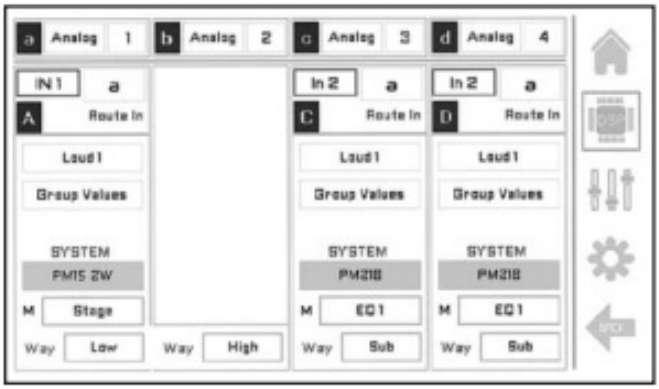
User Input Setting Screen

- User ID Input Label: shows the name assigned by the user User EQ Access Button (see 4.1)
- In: Input Level VU meter
- GAIN IN: to change the input gain
- DELAY: to change the input delay (ms)
- MINUTE: to mute input
- Rev: to change input polarity



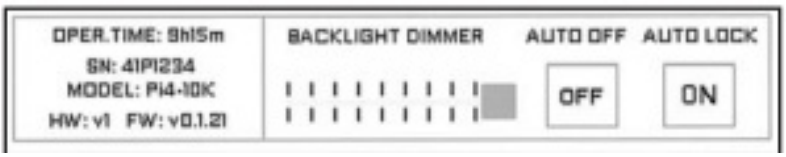
User EQ Screen

- EQ Memory Name
- EQ ON/OFF: to enable/disable User EQ
- On/Off HP 1-6: to access to specific filter and enable/disable it Type: to assign the filter type to the selected EQ
- FREQ: to assign the frequency to the selected EQ
- GAIN: to assign the gain to the selected EQ
- Q: to assign the Q to the selected EQ



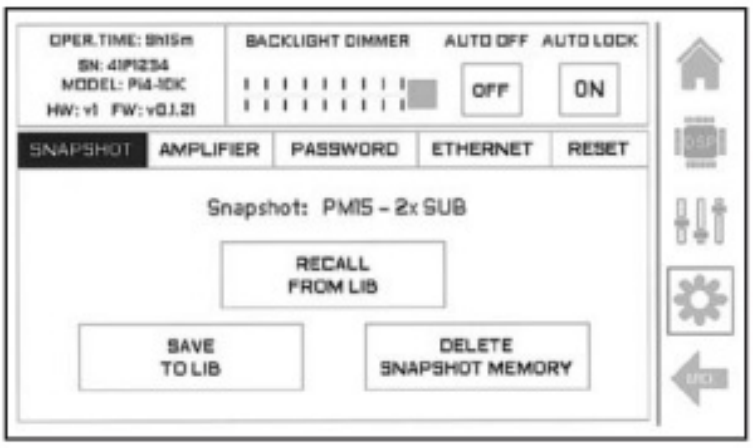
Amp Info & Screen Config: (top section)

- OPER. TIME: shows the amp operation time
- SN / MODEL: shows serial number and model of the amp
- HW / FW: shows the hardware and firmware versions BACKLIGHT DIMMER: to change the screen brightness
- AUTO-OFF: to automatically turn off the screen (selectable time) AUTO LOCK: to automatically lock the screen after the 60s



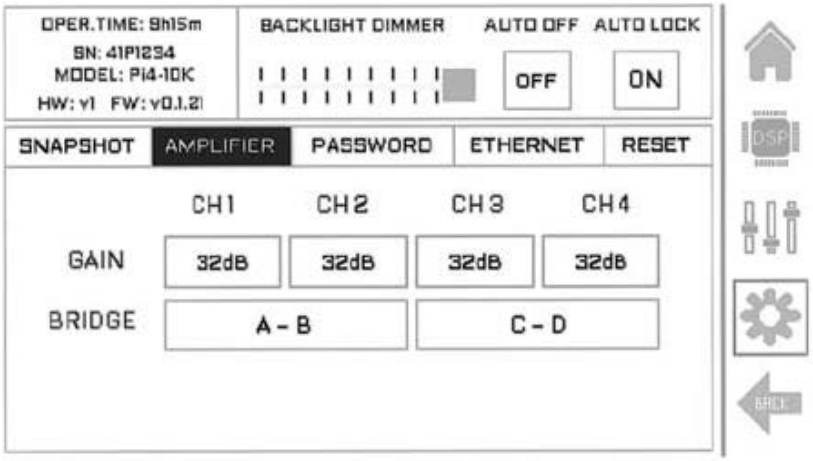
SNAPSHOT Tab

Snapshot: shows the name of current Snapshot (if loaded one) RECALL FROM LIB: to recall a Snapshot saved in the library SAVE TO LIB: to save current amp setup to a Snapshot
DELETE SNAPSHOT MEM: to remove a library Snapshot.



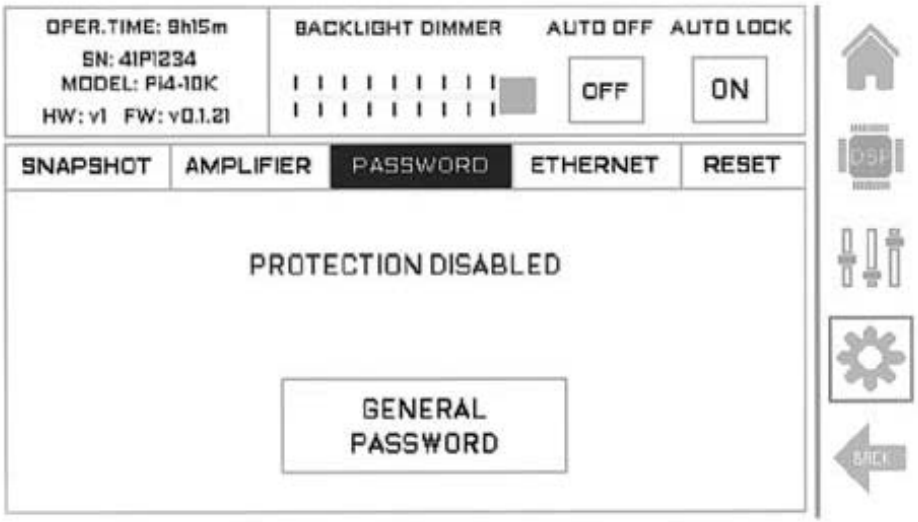
AMPLIFIER Tab

GAIN: to select amp gain (26dB to 44dB)
BRIDGE: to configure a pair of channels in Bridge mode 0dB FS IN (optional): To adjust the input digital reference.



PASSWORD Tab

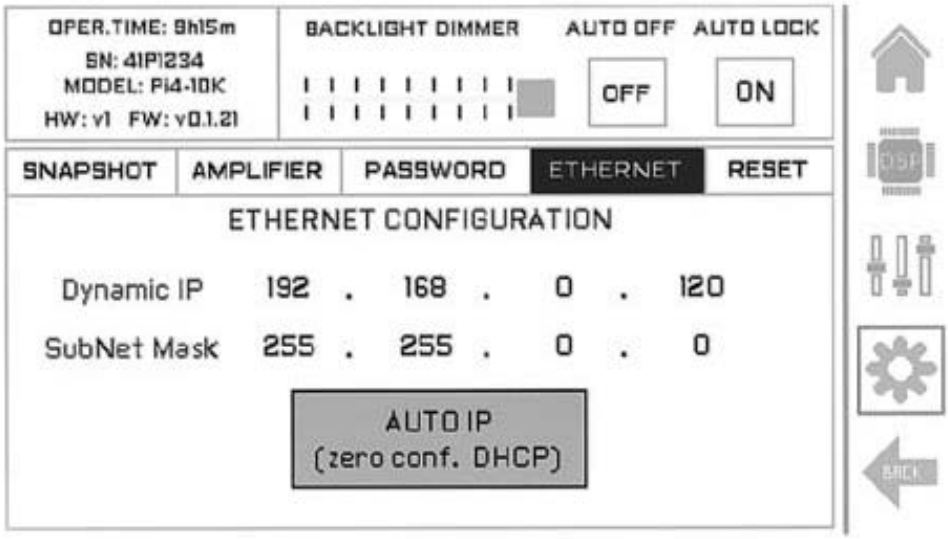
GENERAL PASSWORD: to enable/disable the general password. When enable you have to introduce a 4-digits password and confirm it. When it is the active user will limit access to the amp through the screen and RAM_OCS PC software.



ETHERNET Tab

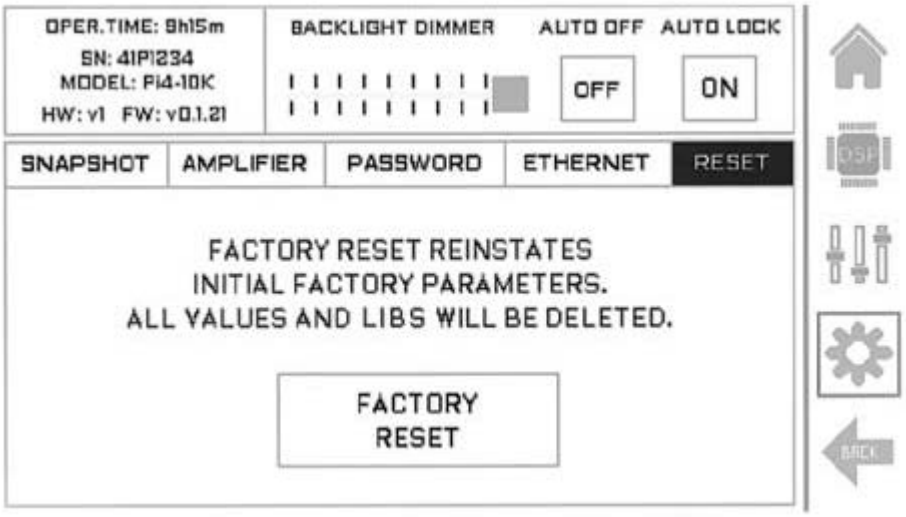
Dynamic IP / SubNet Mask: information of the current IP address AUTO IP: to enable/disable the dynamic IP function:

- When Auto IP is enabled, the amp will receive an IP from an external DHCP server. When no DHCP server is present in the network, the amp will self-designate an IP with the Zero config protocol.
- When Auto IP is disabled, you have to manually configure IP selecting each IP number and changing it with the encoder. To finish press the button APPLY IP.



RESET Tab

FACTORY RESET: to reinstate initial factory parameters. Caution! All the amp configurations and libraries will be lost.



Protection Systems

PMS EVO™ – Power Management System

This is a complete set of protections that monitors the main amp parameters (load status, signal input, temperature, current, etc.) in order to draw from the power sup-ply only the precise amount of current required to maintain safe operation during hazardous or extreme working conditions.
This system controls the amount of power that the amp delivers under three basic circumstances:

1. The power-on sequence, where output is inhibited until the amp circuits are ready to operate. This routine is repeated at every restart, not just when the power switch is activated.
2. When internal temperatures rise to near thermal shutdown point due to unfavorable operating conditions. Here the system takes control, restricting current so as to maintain operational continuity at the precise power level which the amp is capable of withstanding at that particular moment.
3. Excessive current consumption. This event usually occurs under laboratory conditions (long-term sinusoidal

signal testing with dummy loads) or, for example, in field applications in conditions of prolonged acoustic howl-round. Here PMS EVO™ system takes control to avoid any damage to the speakers and to prevent the mains breaker from tripping or the fuses blowing.

ICL2™ – Intelligent Clip Limiter

The RAM Audio ICL2™ is an antislip system to avoid speaker failure and provide a more acceptable sound quality even when clipping occurs. With the ICL2™ system, you don't lose the music "punch" but the speakers are kept under control.

SSP™ – SOA Sentry Protection

SOA Sentry protection effectively limits the power that the amp could deliver into an incorrect load or to a direct short-circuit. This avoids power transistor failure.

Technical Specifications

Data

Technical Specifications

	Pi2-3K	Pi2-5K	Pi4-6K	Pi4-10K
Number of channels	2	2	4	4
Total output power	3000 W	5000 W	6000 W	10000 W
Output Power* (All ch.'s driven/single channel)				
2 ohms	2x 1450 W [2]	2x 2500 W [2]	4x 1450 W [2]	4x 2500 W [2]
	1x 1450 W [2]	1x 2500 W [2]	1x 1450 W [2]	1x 2500 W [2]
4 ohms	2x 1500 W	2x 2500 W	4x 1500 W	4x 2500 W [1]
	1x 1750 W	1x 2800 W	1x 1900 W	1x 3000 W
8 ohms	2x 1100 W	2x 1600 W	4x 1100 W	4x 1600 W
	1x 1150 W	1x 1700 W	1x 1200 W	1x 1800 W
4 ohms Bridged	2900 W [2]	5000 W [2]	2x 2900 W [2]	2x 5000 W [2]
8 ohms Bridged	3000 W	5000 W	2x 3000 W	2x 5000 W [1]
Hi-Z 70V	2x 1500 W	2x 2500 W [2]	4x 1500 W	4x 2500 W [2]
Hi-Z 100V	2x 800 W	2x 2500 W	4x 800 W	4x 2500 W [1]
Max output voltage	144 V_{peak}	176 V_{peak}	144 V_{peak}	176 V_{peak}
Max output current	38 A_{peak}	50 A_{peak}	38 A_{peak}	50 A_{peak}
Total Harmonic Distortion	<0.05%			
Crosstalk (20Hz-1kHz), typical	>70dB			
Voltage Gain	26dB to 44dB (1dB step)			
SNR	106 dBA	107.5 dBA	106 dBA	107.5 dBA
Required AC Mains				
Operating Voltage (50Hz-60Hz)	170V-265V AC / 90V-140V AC			
1/8 Rated Power (@230V, 4 ohms)	7 A	8 A	15 A	16 A
Dimensions W x H x D (mm)	483x89x320			
Weight Net (kg-Lbs)	6-13.2	8.5-18.7	8.5-18.7	8.5-18.7
Protections: Soft-start, Turn-on Turn-off transients, Muting at turn-on, Over-heating, DC, RF, Short-circuit, Open or mismatched loads, Overloaded power supply, ICL2™, PMS EVO™, and SSP™				

* IEC filtered pink noise signal (40Hz-5kHz, 12dB crest factor). 230V AC mains.

[1] PMS can limit output to prevent excessive current draw tripping the mains breaker.

[2] SSP can limit output to prevent excessive heating.

Dante™ AES67

Documents / Resources

	**RAM Audio Pi2 3K-5K Professional Power Amplifiers Pi Series** [pdf] User Manual Pi2 3K-5K, Pi4 6K-10K, Professional Power Amplifiers Pi Series

References

- **RAM Audio - Professional Power Amplifiers**
- **RAM Audio - Professional Power Amplifiers**