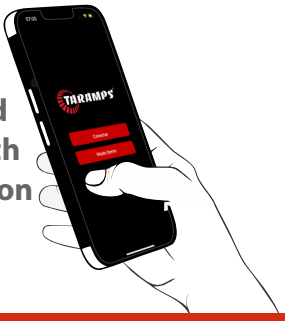
Instruction manual

TARAMPS®

PRO 2.4BT DSP

DIGITAL AUDIO PROCESSOR

App controlled processor and Bluetooth connection



The installation of this product must be made by a qualified professional.

www.taramps.com.br

Index

Introduction

Thank you for choosing a Taramps product. The PRO 2.4BT is a digital audio processor with Bluetooth connectivity, allowing full control of settings via smartphone or tablet through a dedicated app. The app provides an intuitive interface, enabling users to make real-time adjustments quickly and easily.

Featuring a high-performance 24-bit / 48KHz DSP, the PRO 2.4BT offers a wide range of precise settings and configurations. It includes crossover filters, time alignment, gain control, phase inversion, limiter, signal routing, as well as both graphic and parametric equalizers designed to optimize the performance of your audio system.

Please read this manual carefully before making any connections or using the product. If you have any questions, contact our technical support at www.taramps.com.br.

In the box

- 1 PRO 2.4BT processor
- 1 Powe supply connector
- 1 Wire harness
- 1 Bluetooth antenna

Safety requirements

- To ensure proper use, please read this manual before using your processor. It is important that you are familiar with the PRECAUTIONS listed here.

- Installation of this equipment must be performed by a qualified professional.
- Use proper tools to install this equipment.
- This equipment must be used with 12V batteries. Always check the voltage before installation.
- The equipment must be installed in a firm place and away from heat sources.
- Never install it in places exposed to dust, humidity or water. Be sure to install it away from the fuel tank, fuel lines, heat sources or other parts of the vehicle.
- Be sure to install a protective fuse or circuit breaker near the battery. Follow the current recommended in this manual. Improper use of the fuse or circuit breaker can cause overheating, smoke, product damage, injury or burns.
- Avoid running cables over or through sharp edges. Use rubber or plastic grommets to protect cables that pass through the vehicle body.
- The automotive sound system can generate high sound pressure levels. Avoid continuous exposure to levels above 85dB to prevent permanent hearing loss.

Important recommendations

A wiring gauge of 1.5 mm^2 is recommended for the positive/negative cables and 0.50 mm^2 for the remote cable.
For protection, a 1A fuse should be installed near the positive pole of the battery. See more details on page 16 of this manual.

1 - ⊖ Negative power supply: Connect to the negative pole of the battery.
2 - Remote input: Connect to the remote output of the media receiver or multimedia receiver.
3 - Remote output: To activate the amplifier(s).
4 - ⊕ Power Positive: Connect to the positive pole of the battery (12V).

⚠ Security

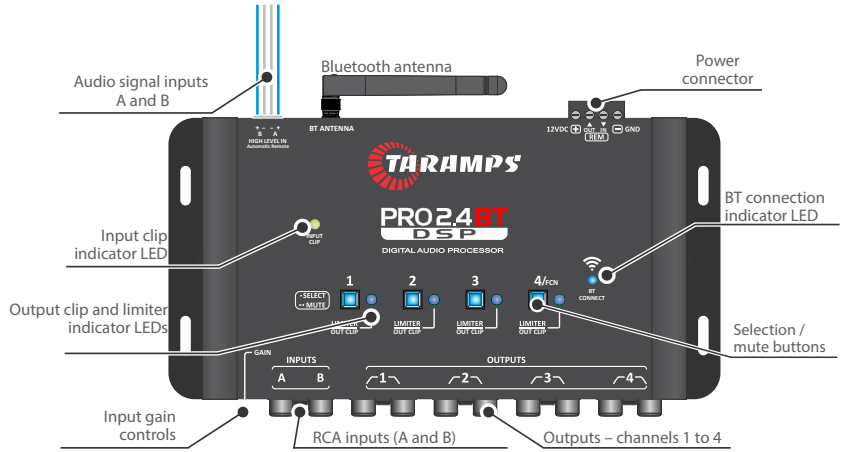
Throughout this manual, pay attention to safety symbols.

⚠ CAUTION This symbol **CAUTION**, which alert users to important instructions. Ignoring these warnings may result in injury or damage to the product.

Taramps reserves the right to change the content of this manual without prior notice and without the obligation to apply these changes to previously manufactured units.

DSP overview

The **PRO 2.4BT** offers several advanced features designed to optimize your audio system's performance. Below is an overview of the most important components and functions:



Input Gain Control: MAX: Accepts signals up to 2V RMS (standard sensitivity);

MIN: Accepts signals up to 9V RMS without distortion (low sensitivity).

Signal Inputs:

RCA Input: Accepts low-level, high-impedance signal (ideal for RCA outputs of head units).

High-level input: Accepts high-level, low-impedance signals.

This input also enables Auto Turn-On: The DSP automatically powers on when a signal is detected. In this case, connecting the REMOTE IN wire is not necessary.

Note: *Auto turn-on is compatible with most head units, but some models may not trigger it due to internal circuitry. If auto turn-on doesn't work, connect the REMOTE IN wire manually.*

Input Clip Indicator LED: This LED signals that the input signal has reached the maximum level accepted by the processor, which can result in signal distortion. If it lights up, reduce the output level of the signal source and readjust the system's gain structure accordingly.

Limiter / Output Clip Indicator LEDs: These LEDs serve a dual purpose:

When the limiter is disabled, they indicate that the output signal has reached the maximum allowable level (clipping).

When the limiter is enabled, they signal that the limiter is actively engaging—meaning the output signal has reached or exceeded the threshold set in the limiter parameters.

BT Connect LED: Indicates active Bluetooth pairing.

Power Connector: Refer to page 16 for wiring instructions.

Bluetooth Antenna: For optimal performance, mount the antenna in an open area away from metal parts or electrical wires to prevent signal loss.

Getting started

To start using your PRO 2.4BT, follow these steps:

1- Install the DSP following the wiring diagram provided on page 16.

2- Download the TARAMPS PRO app from the Google Play Store (Android) or App Store (iOS).

Minimum requirements: Android 8.1 / iOS 16.

DISPONÍVEL NO Google Play

CLICK TO BE DIRECTED

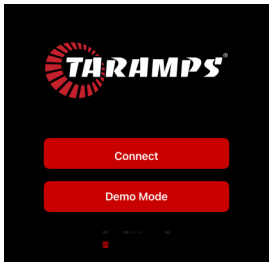
Download on the App Store

3- Power on the DSP. The "BT Connect" LED will begin flashing.

4- Open the TARAMPS PRO app.

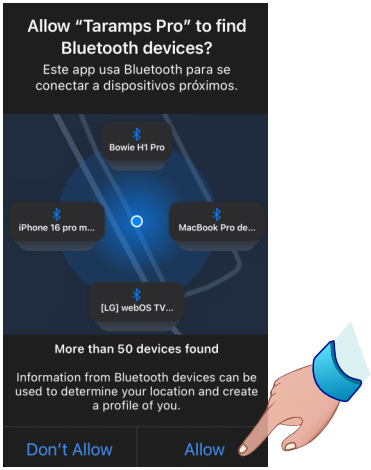
Select Connect to pair with the DSP via Bluetooth.

Or select "Demo Mode" to explore the app without a connection.

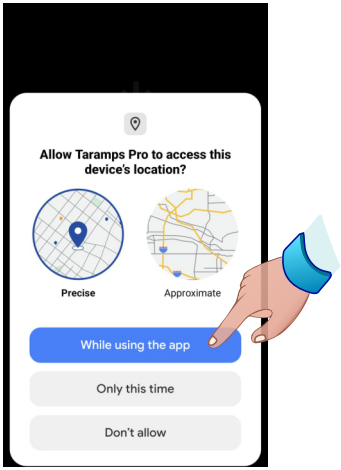


Grant Bluetooth permissions when prompted by the app.

IOS

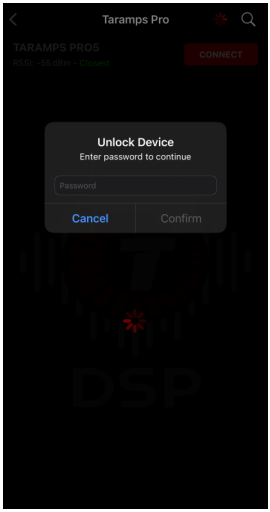


Android

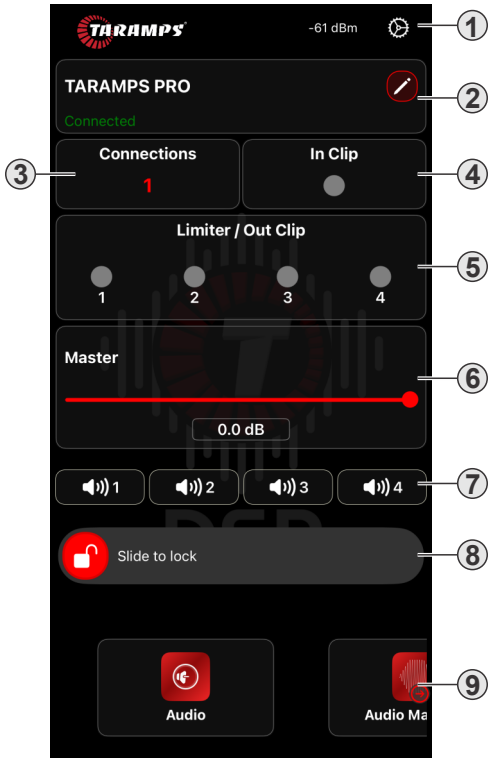


Select the DSP from the list of available units.
For easier identification:
Move your phone closer to the desired processor; "Closest" will appear.
Turn off other nearby units.
Rename each unit in the app for clarity when using multiple units.

Once connected, the **BT Connect LED** continuously lit.
Enter the default password: **1234**; Change it in the the **Password / Lock** menu for security (see page 15).



APP main screen functions



1-) Connection Manager: Connect/disconnect DSP (up to 4 units simultaneously).

2-) DSP Name: Tap to rename icon to rename the DSP.

3-) Active Connections: Displays how many units are currently paired.

4-) Input Clip Monitor: Indicates if the input signal is clipping.

5-) Limiter / Output Clip LEDs: Indicate limiter activation and output clipping.

6-) Master Volume Control: Adjusts overall system output level.

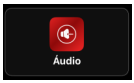
7-) Output Gain and Mute: Tap to adjust gain; and long press to mute.

8-) Screen Lock: Swipe right to prevent accidental changes.

9-) Main Menu Access: Swipe left to open advanced audio settings.

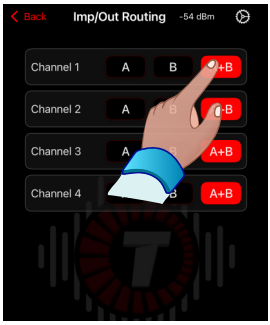
Note: the app is fully responsive and supports both portrait and landscape modes. Horizontal orientation is recommended for features like the Graphic EQ and Crossover for clearer visualization.

Main menu audio



In the audio menu you will find controls and settings related to audio processing, such as.

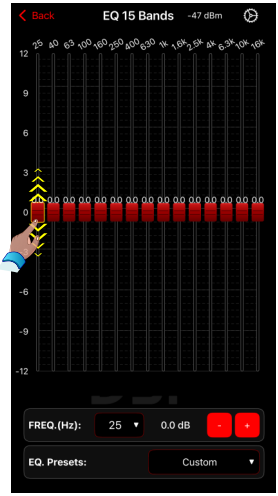
-Input/output routing: Define how inputs A, B, or A+B are routed to outputs 1 to 4. Use the selector keys to assign signals to each output.



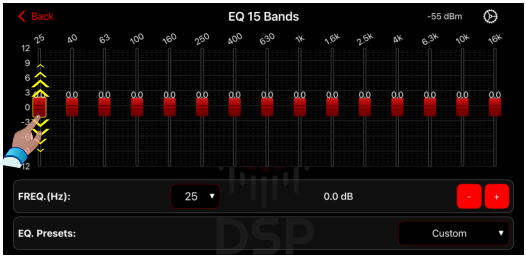
-Input graphic equalizer: 15-Band graphic EQ. It can be adjusted from -12 to +12dB, in precise steps of 0.1dB. Adjust it by selecting the band and dragging the knob or by directly typing its parameter using + and – buttons.

EQ PRESETS: You can also select an equalization preset from the list.

Portrait mode



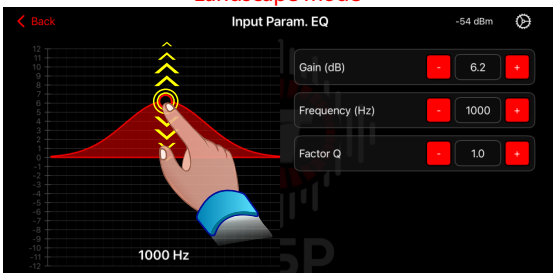
Landscape mode

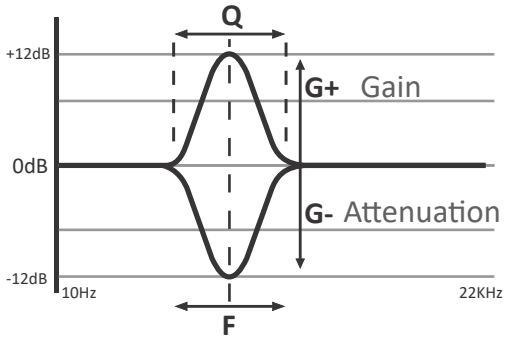


-Input parametric EQ: Allows precise adjustments of Frequency, Gain and Q Factor. Drag the point on the graph to adjust the Gain, the other parameters are defined by typing
the value or adjusting using the buttons on the side of the parameter (+ and -).

Portrait mode

Landscape mode





-Crossover: This section allows you to define the filters applied to each processor output channel, setting HPF (High Pass Filter) and LPF (Low Pass Filter) frequency cuts up to -48dB/Octave, using either Linkwitz-Riley (LR) or Butterworth (BT) types.

a) Output Channel: Select the channels (channel 1; channel 2; channel 3; channel 4) on the top of the app;

b) Adjust the filter points directly by dragging the circles on the graph (left circle = HPF, right circle = LPF);

c) You can also set and fine-tune the HPF and LPF frequencies using the + and – buttons;

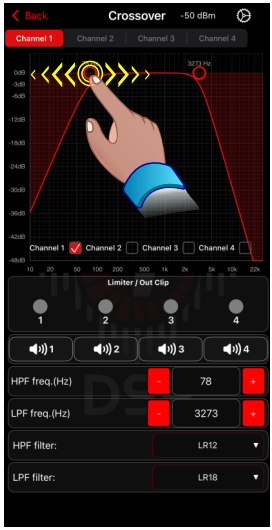
d) Select the filter type - the response curve will be updated automatically to reflect the chosen filter attenuation;

e) You can check the curves from all the channels by marking the checkboxes below;

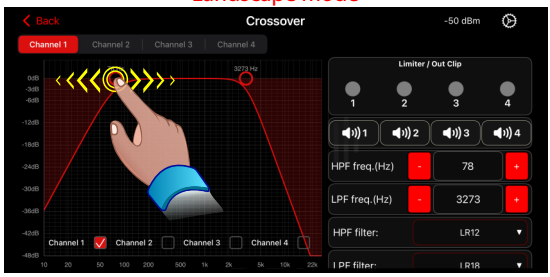
f) Each output channel's limiter LED status is displayed directly below the graph;

g) Use the MUTE buttons to disable output channels.

Portrait mode



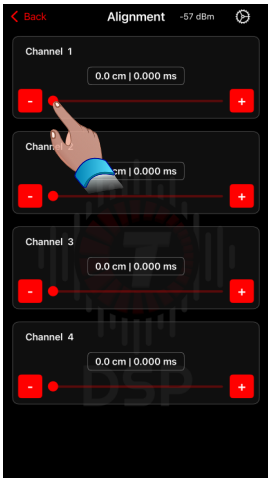
Landscape mode



OFF: Crossover off
LR12 Linkwitz - Rilley c/ -12dB/octave
LR18 Linkwitz - Rilley c/ -18dB/octave
LR24 Linkwitz - Rilley c/ -24dB/octave
LR30 Linkwitz - Rilley c/ -30dB/octave
LR36 Linkwitz - Rilley c/ -36dB/octave
LR42 Linkwitz - Rilley c/ -42dB/octave
LR48 Linkwitz - Rilley c/ -48dB/octave

OFF: Crossover off
BT6 Butterworth c/ -6dB/octave
BT12 Butterworth c/ -12dB/octave
BT18 Butterworth c/ -18dB/octave
BT24 Butterworth c/ -24dB/octave
BT30 Butterworth c/ -30dB/octave
BT36 Butterworth c/ -36dB/octave
BT42 Butterworth c/ -42dB/octave
BT48 Butterworth c/ -48dB/octave

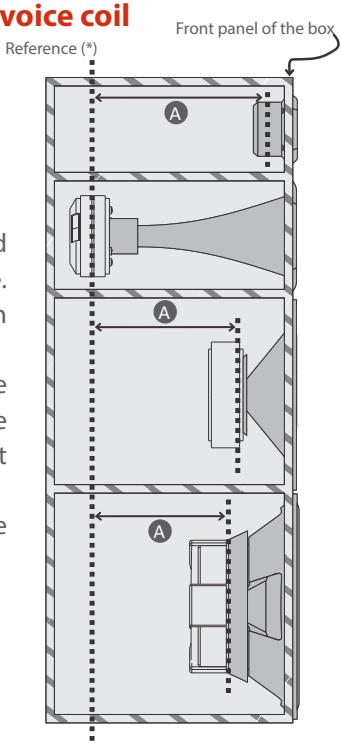
-Delay alignment: Synchronize audio signals from different speakers or audio sources so that they reach the listener at the same time.



Because the voice coils of different transducers—such as woofers, midrange drivers, and tweeters—are not positioned on the same physical plane, time delays can occur between frequency ranges. This misalignment can negatively impact accurate sound reproduction. The Alignment function delays the signals sent to the other transducers so they match the arrival time of the one with the deepest coil position, helping restore accurate sound reproduction.

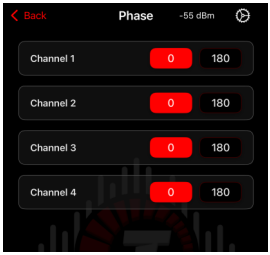
Use the furthest driver coil as reference
Enter delay values (in centimeters) for each output based on measured difference

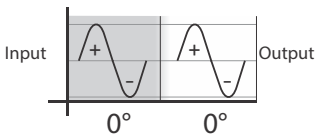
Setting the reference voice coil for alignment

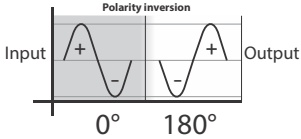


1. Identify the reference voice coil (*) this is the one positioned furthest back from the front baffle of the speaker enclosure. (In the example, the reference point is the center of the horn driver's coil.)
2. Measure the distance from this reference coil to each of the other drivers. This distance is referred to as Ⓐ . Enter the closest matching value (in centimeters) for each output channel.
3. Repeat this process for all output channels. Use the corresponding buttons to select them.

-Phase control: Invert output signal phase by selecting 180° option.







-Limiter: Acts as a limiter for the maximum signal level of the processor output, so as not to exceed the power limit supported for each system transducer.

Limiter parameters:

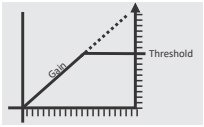
Auto: Sets the Attack and Release parameters automatically, according to the channel frequency cutoff (HPF). Otherwise, you can set the Attack and Release manually.

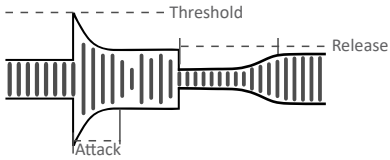
Threshold – Point when the limiter begins to act (indicated by the RED LED on each output channel in the DSP and by the RED indicator at Limiter/Out Clip into App screen). Drag the point across the graphic to set the threshold, or use the field and +/-. To turn off the limiter, press the button + until OFF appears.

Attack, or Attack time – Time needed to limiter reduce the gain after the signal reaches the threshold. Set the value using the field and +/-.

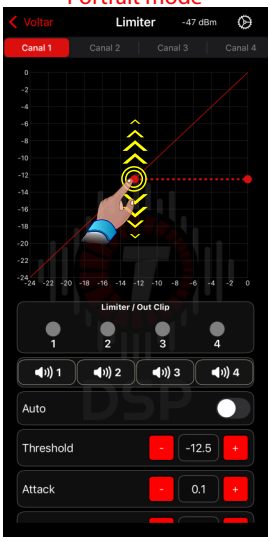
Release, or Release time – Time needed to limiter return to the original gain after the signal drops below the threshold. Set the value using the field and +/-.

Select the output channel on the above tabs (channel 1, channel 2, channel 3, channel 4) ; and mute each one with the corresponding button .

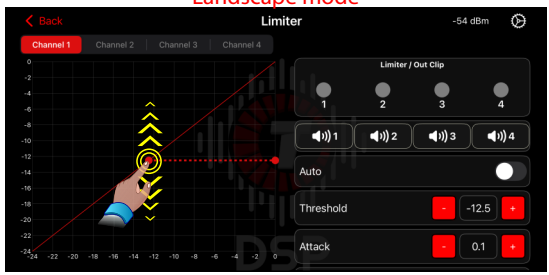




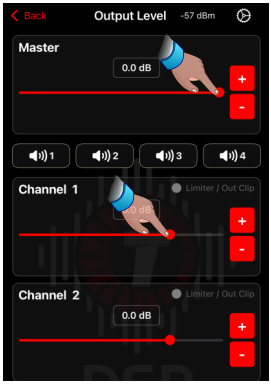
Portrait mode



Landscape mode

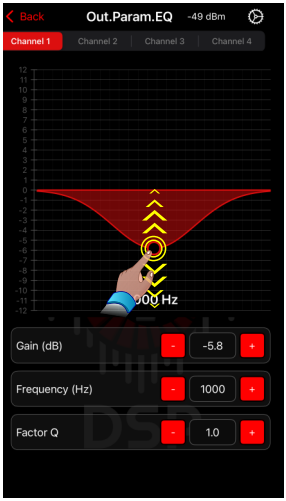


-**Output level:** You can adjust the Master (General) volume, as well as the volumes of the respective outputs, by dragging the point or more precisely using + and -. Volume or gain adjustments take effect only after you stop touching the screen. Each output channel features a limiter/clip LED.

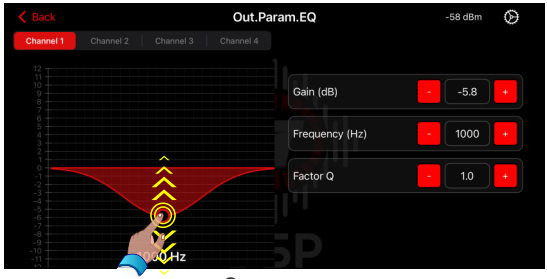


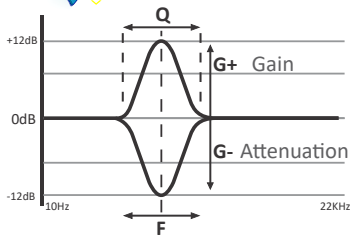
-**Output parametric EQ:** Allows precise adjustments of Frequency, Gain and Q Factor. Drag the point on the graph to adjust the Gain, the other parameters are set by typing in the value or adjusting it using the buttons + and -. Select the output by the tabs (Channel 1, Channel 2, Channel 3, Channel 4), or on the DSP's 1~4 keys.

Portrait mode



Landscape mode





-Audio Manager: Used for the adjustment and testing of audio systems, the audio manager offers the following operating modes:

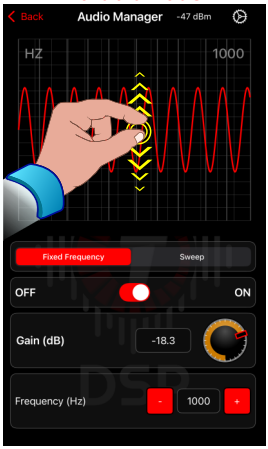
ON / OFF: Turns on or off the signal generator.

Fixed Frequency mode: You can adjust the amplitude using pinch gestures (open or close two fingers vertically - only when the audio manager is on), by entering a value in the Gain (dB) field or by the rotary button.

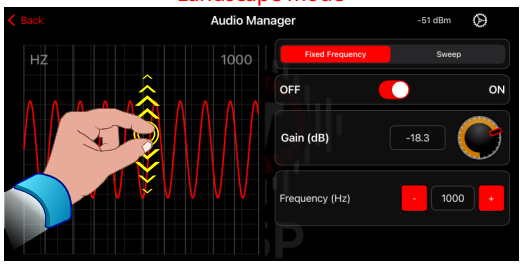
In Sweep mode: set the starting and ending frequencies by dragging the dashed lines vertically. You can also increase or decrease the signal amplitude by using a two-finger pinch gesture on the graph.

For more precise adjustments, use the + / – buttons. To start the sweep, select the speed (slow, mid, fast).

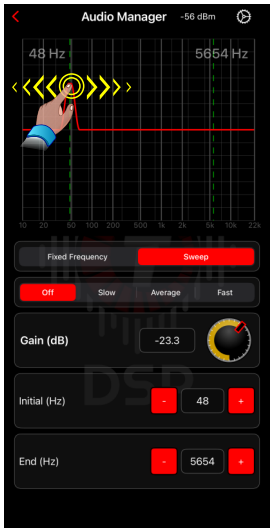
Portrait mode



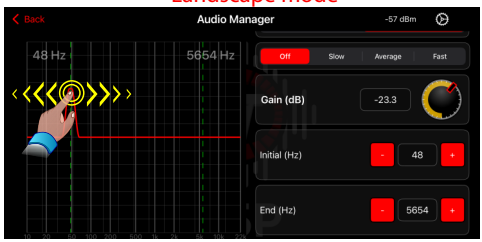
Landscape mode



Portrait mode



Landscape mode



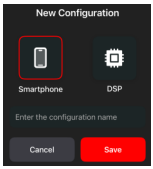
-**Save / load configurations:** Store and manage your settings via the app: It allows you to save settings for later recovery or backup, as well as export/import settings presets. There is also a sharing option, so the file can be transmitted to another person via instant messaging applications.

Settings can be saved in two ways: On the DSP itself (up to 3 memories) and on the Smartphone / Tablet (Up to 15 memories).

Swipe the memory name horizontally (left or right) to reveal the following options: Load, Export, Rename, and Delete.

For the device's internal memory, only the Load option is available.

To save a new configuration, tap +New.



Apply saved settings from your smartphone or tablet by choosing SMARTPHONE and pressing the button.

Reset/Restore : This screen also allows you to erase the DSP settings.

Reset Audio Settings: Restores only the audio adjustments to their factory defaults while preserving all other settings (such as memory slots and password).

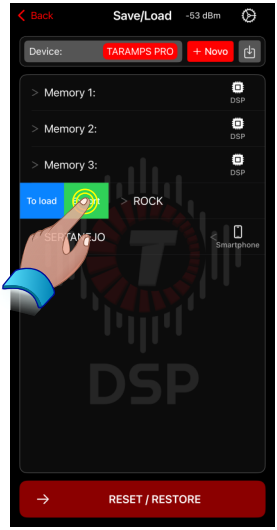
Restore Factory Defaults: Completely resets the DSP to its original factory state, erasing all settings, saved memories, and passwords. ⚠ caution this action is irreversible.

Save to Device: Up to 3 internal memory slots.

Save to Smartphone/Tablet: Up to 15 presets.

Options: Upload, Export, Rename, Delete.

Share settings via apps.



Factory Reset from DSP: You can also perform a factory reset without the app (on the DSP itself):

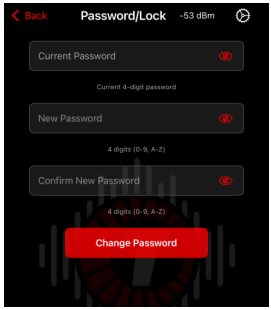
With the device powered off, press and hold keys 1 and 2 simultaneously.

Hold them until keys 3 and 4 start flashing alternately.

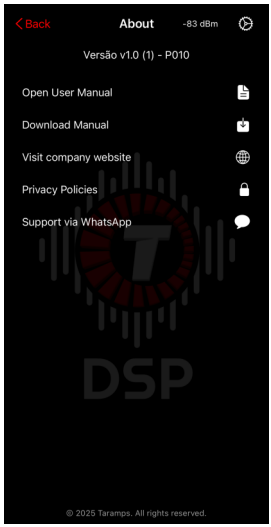
Press key 4/FCN to confirm the reset, or key 3 to cancel.

⚠ This procedure will return the device to its factory state and cannot be undone.

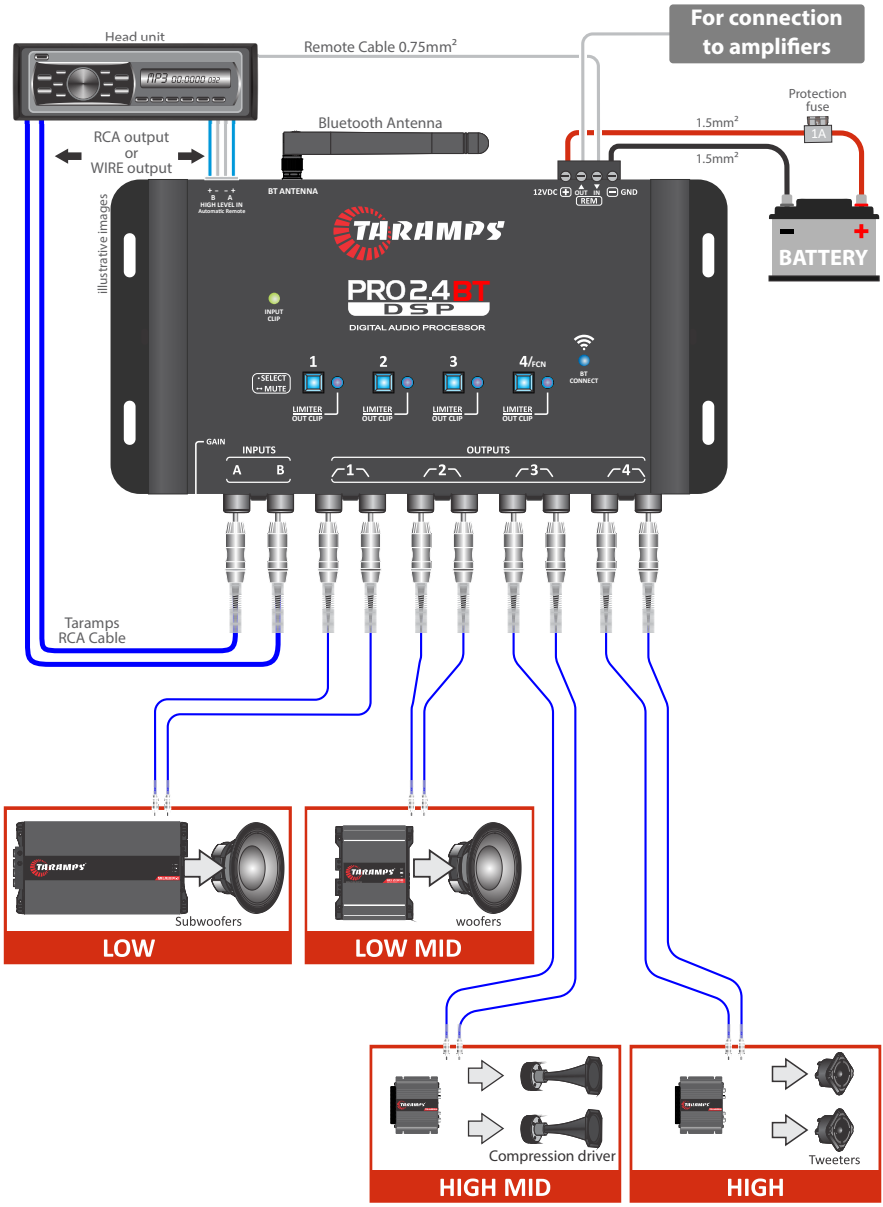
-Password / lock settings:
Default password: 1234.
Change it in the Password / Lock menu.
App access is also protected by the phone's native security (PIN, Face ID, etc.).
Forgot the password? Perform a factory reset and reload saved settings. (The saved settings must be stored on smartphone previously).



-About section : Firmware and App versions
Open User Manual
Download Manual
Visit company website
Privacy Policies
Support via WhatApp



Connection of DSP inputs and outputs



WARNING Always observe correct polarity. Use a 1A fuse on the positive power supply line for protection.

Technical features

Processing:
Resolution.....24bits
Sampling rate.....48KHz

Inputs and Outputs:
Number of input channels.....2
Number of output channels.....4
Input/output routing:.....A, B, A+B
General gain adjustment:.....-80 a 0dB
Output gain adjustment:.....-45 a +15dB
Input impedance (RCA):.....10K ohms
Input impedance (high level):.....50 ohms
Output impedance:.....47 ohms
Maximum input level (RCA, Gain Min):.....25Vpp (9V RMS)
Maximum input level (RCA, Gain Max):.....5,6Vpp (2V RMS)
Maximum input level (High level):.....28Vpp (10V RMS)
Maximum output level:.....5,9Vpp (2,1V RMS)
Frequency response (-1dB).....10Hz a 22KHz
Total Harmonic Distortion.....0,01%
Signal / Noise Ratio:.....>90dB
Crosstalk (separation between channels).....>80dB

Input graphic equalizer, 15 bands, 2/3 octave and 12 presets:
Frequencies:.....25,40,63,100,160,250,400,630,1K,1.6K,
2.5K,4K,6.3K,10K,16KHz
Attenuation / Gain:.....-12dB to+12dB

Input Parametric EQ:
Central frequency:.....variable from 10Hz to 22KHz
Attenuation / Gain:.....-12dB a +12dB
Q factor adjustment :.....0,4 a 10

Crossover (HPF e LPF):
Cutoff frequency:.....variable from 10Hz to 22KHz
Linkwitz Rilley Filters.....-12,-18,-24,-30,-36,-42,-48dB/octave
Butterworth Filters.....-12,-18,-24,-30,-36,-42,-48dB/octave

Alignment (Delay):.....8,0mS (272cm)

Phase:.....0 / 180°

Adjustable Limiter:
Threshold:.....-24 to 0dB
Attack:.....0.1mS to 100mS
Release:.....1mS to1600mS

Output parametric EQ:
Central Frequency:.....variable from 10Hz to 22KHz
Attenuation / Gain:.....-12dB to +12dB
Q Factor Adjustment:.....0.4 to 10

MUTE Function.....Individual at each output

Audio generator (Sine waveform)
Frequency range:.....Variable from 10Hz to 22KHz
Gain:.....-60 to 0dB
Modes:.....Fixed Frequency / 3 speed sweep

Setting memory positions:.....Factory default + 3 assignable positions

Access protection:.....4 password digits (customizable)

Connectivity:.....5.4 BLE (Low-Energy)

Simultaneous connections:.....Up to 4 products

Typical range, with sight, without obstacles:.....25m

APP compatibility:.....Android 8.1 / IOS 16 and above

Supply Voltage:.....10 to 16VDC

Nominal consumption (12.6V):.....0.20A

Dimensions (WxHxD):.....198 x 35 x 130mm (7.80" x 1.38" x 5.12)

Weight:.....0.43Kg (0.95lb)

- The Bluetooth name and logo are owned by the Bluetooth SIG Inc.

- The Android name and logo are owned by Google LLC.

- The iOS name and logo are owned by Apple Inc.

- Typical range in line of sight, unobstructed, in an open environment. Actual product range depends on the installation environment and may be affected by obstacles such as metal surfaces, walls and other electronic equipment operating in the same place.

- The APP of the product may be updated from time to time. Taramps reserves the right to update, add, remove or enhance functionality without prior notice.

Warranty statement

TARAMPS, located at 30, Julio Budisk Hwy, Alfredo Marcondes - SP, Brazil, ZIP 19180-120, warrants this product against design, manufacturing, and assembly defects, as well as any inherent design flaws that render it unsuitable for its intended use, for a period of 12 months from the date of purchase.

In the event of a defect covered by this warranty, TARAMPS is responsible solely for the repair or replacement of the unit it has manufactured.

This warranty does not cover:

-Products damaged due to incorrect installation, water intrusion, or unauthorized handling;
-Broken or tampered warranty seal;
-Use under abnormal conditions;
-Defects caused by accessories, modifications, or equipment added to the product;
-Physical damage from drops, impacts, or acts of nature (e.g., floods, lightning);
-Incomplete or altered warranty card;
-Costs related to removal, reinstallation, or transportation of the equipment;
-Any damages or losses resulting from the product's malfunction or downtime.

Authorized service centers

For international support, visit:
https://www.taramps.com.br/en/rede-de-assistencias-tecnicas/
You can also contact our factory support directly:
Email: service@taramps.com.br
Phone: +55 18 3266-4050 / +55 18 99749-3391

Conformity information

Declaration of Conformity

CE

TARAMPS ELECTRONICS LTDA
Alfredo Marcondes - SP
Brazil

Hereby, Taramps Electronics Ltda declares that the product PRO 2.4BT complies with the Directive 2014/30/EU, according with the following harmonized standard:

-EN 50498:2010 *Electromagnetic compatibility (EMC) - Product family standard for aftermarket electronic equipment in vehicles*

The full text of the EU Declaration of Conformity is available at the Product Page on Internet.

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Agência Nacional de Telecomunicações
03497-25-09573

"This equipment is not entitled to protection against harmful interference and must not cause interference in duly authorized systems."

At the end of its useful life, this product should not be disposed of in household waste. Look for an electronic equipment collection or recycling center for correct disposal.

 +55 18 3266-4050

Manufactured by:
TARAMPS ELECTRONICS LTDA
TAX ID: 11.273.485/0001-03
Highway: Júlio Budisk, SN, KM 30
Alfredo Marcondes - SP
Made in Brazil
www.taramps.com.br

MN_PRO 2.4BT