



Bettermaker

Mastering Equalizer User's Guide

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The Bettermaker crew would like to thank all the people that were deeply involved in the development of our first products, from EQ230P till this day.

Thanks to all the Beta-testers that gave us hands-on tips and all people involved in the conceptual stage. We hope we have listened to you carefully so as to produce an ideal tool in the hands of every engineer.

Thank you guys!

I would like to personally thank my development team, the past and the present as their passion to work and bright minds made all that happen. I would not take all my wild concepts to the point they are now without you guys.

Marek Walaszek

I. Introduction

Congratulations on your purchase of the Bettermaker Mastering Equalizer - all analog sound with the flexibility of digital control! Welcome to the family! The hybrid audio equalizer now in your possession is the result of years of research and development in emerging digital control technologies. The final hand-built result is currently glowing happily in your rack (lucky You). The Mastering Equalizer brings the flexibility, ease of use, and instant recall-ability of software plug-ins to the realm of High Fidelity analog processing, like no other analog equalizer on the market.

The Company

Addicted to Music has begun in 2004 in Warsaw, Poland as a recording and mixing studio. Long before it was a hardware company, we were deeply involved in the international music and recording scene. This is not a company run by scientists who crunch numbers all day, we are a company run by engineers who live, eat, and breathe music (like You do). We know good sound, and know first-hand what it takes on both sides of the glass to capture the perfect take. We developed the Mastering Equalizer to go from the perfect take, and make it even better!

Bettermaker Mastering Equalizer

..was designed to have the greatest flexibility of any analog EQ, while still allowing absolute recall and repeatability. We often found the strengths of software plug-ins wasn't their sound, but the ability to quickly audition different settings. This allowed us to make faster, better informed musical choices. The ability to jump back and forth between (sometimes vastly different) settings allowed us to keep a clear vision of the sonic goal in mind, while quickly making decisions on the best setting to use. However, we recognized the sonic superiority of our analog gear compared to their digital counterparts. In countless shoot-outs, the analog versions always won. Since we're a company that cares about better sound over processing speed, our engineers would take the extra time to use a full analog chain because it simply sounds better. We developed the Bettermaker Mastering Equalizer to give us the speed of plug-ins, but the fidelity of analog domain.

In the traditional analog world the time spent in the act of having to set and reset potentiometers and buttons to audition between settings often skewed our choices. More time was spent tweaking knobs trying to recover an earlier setting than was spent listening. The limited resolution of the mechanical parts often meant only very coarse adjustments were possible (previously only solvable by very expensive mechanical switches). A difficult situation to say the least, but the greater fidelity, openness, and depth of the analog gear was always worth it to our ears.

Even after years of advancement in digital algorithms, the older analog versions always sounded better. With these goals in mind, we strove to create a hybrid equalizer that was the best of both worlds: a true analog equalizer based on classic designs, but with the repeatability, fine resolution, and consistency of digital plug-ins. Enter the inspiration for the Bettermaker Mastering Equalizer!

We've put a large amount of time, effort, money, and listening tests into the research and development of the analog stages of the Bettermaker Mastering Equalizer. We feel that it represents one of the best values, highest fidelity, and newest methods of working available in audio today. We set out to make a product that broke new ground, a equalizer with the highest sonic quality, ease of use, and a full pallet of sound shaping tools to allow engineers to make the best-sounding record. In the following pages, we'll share this knowledge, show how the controls work and interact to provide a complete sound - sculpting system.

Choosing modern components and design practices over older traditional methods helped maintain the wide frequency response and low noise-floor necessary for today's recording practices. Wherever possible we choose over-spec'd components to ensure trouble free operation and a long product life. Where feasible we increased the gain resolution and frequency range to ensure the greatest flexibility no matter what source (from tracking to 2-bus and mastering applications). Most importantly we listened first, changed, tested and then listened again. We hope you enjoy your Bettermaker Mastering Equalizer.

Now go make some music Better!

II. Important safety information

Before you turn the unit on

Before turning the unit on for the first time, remember to set it to correct AC voltage (115V or 230V) depending on your location. Always use quality AC power cord with safety (earth) pin and ensure that the power outlet in the wall has the earth connection too. It is important for safety reasons, but also helps to keep the unit's noise levels low.

Safety Warnings

Do not operate this unit in the presence of rain, liquids or condensing moisture. Liquid entering the product enclosure presents the risk of electric shock injury.

Do not operate the Bettermaker Mastering Equalizer in any place near water. Always be sure to protect the unit from dust, particles, water, beer, groupies, and stage divers.

For normal operation it is not necessary to access the interior of the Mastering Equalizer. The only user serviceable part is the AC fuse located in the compartment below the AC mains socket.

Always remove the AC power cord from the socket before attempting to change the fuse (0.63A slow-blow fuse).

III. Construction of the Mastering Equalizer

The sound of the Equalizer is of course based on the quality of its analog audio path. But all the control and user interactions are performed in the digital domain. This allows us to incorporate options and possibilities not found in any standard analog EQ:

- Save and recall presets from on-board memory (400 slots available)
- Instant reset of all parameters
- Rapid, precise and repeatable adjustments
- Precisely linked stereo operation with the ease of a single control
- DAW automation and recall of all available parameters

Front panel and LCD touchscreen

The front panel of the Mastering Equalizer is build around big **LCD touchscreen**, that allows you to control almost all functions available in the device. Apart from that, you can also monitor input/output levels, see the equalization curve or store and recall presets using on-screen QWERTY keyboard.



On both sides of the LCD screen you will find **four knobs** placed on endless rotary encoders. These knobs are labeled LEVEL, P1, P2 and P3. The big **LEVEL** knob adjusts the output level of MEQ. The others allow to control particular filters selected on the touchscreen. All knobs are velocity-sensitive for fine increment/decrements when turned slowly.

The **ENGAGE** button allows you to turn the audio processing on (the button is lit) or bypass the unit (relay based true bypass). When you turn the Mastering Equalizer off completely (with **MAINS** switch) it will still pass unprocessed audio.

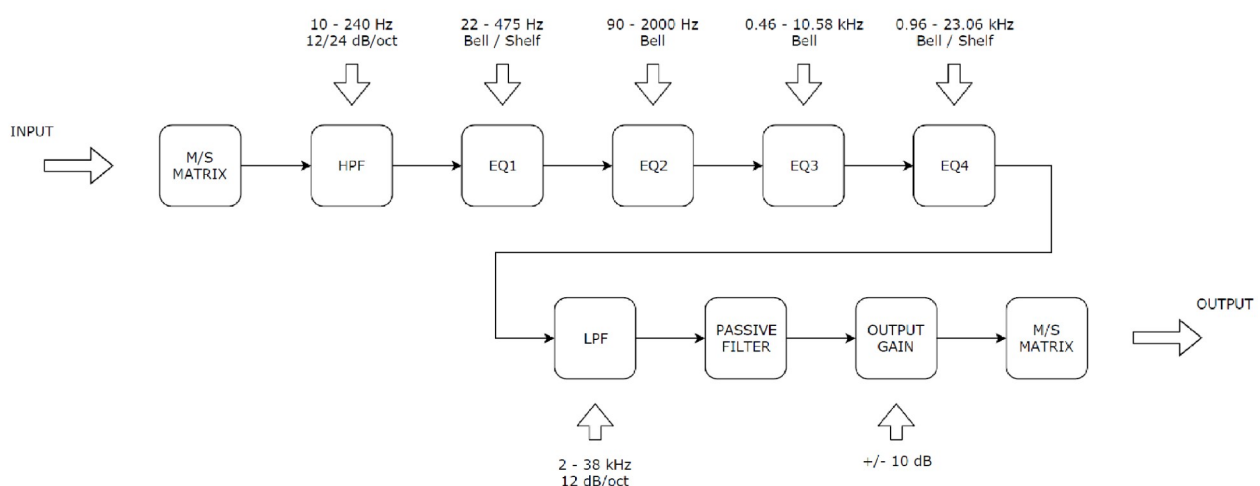
Analog section

Great care and thought went into the development and implementation of the analog section of the Bettermaker Mastering Equalizer. High quality capacitors and low noise op-amps are used in the analog path. Relays were used, whenever creating the shortest path for the audio signal was necessary.

The analog section consist of high quality input/output buffers capable of passing thru high level audio signals, multiple active and passive filters, M/S matrix and precise gain stage for fine adjustments.

All these modules are controlled by the digital section of the Mastering Equalizer, so no mechanical switches or knobs are required to adjust any of the filters.

Internal signal path



As you can see in the diagram above, the signal flow of the Mastering Equalizer is quite straightforward. After input buffers and optional M/S matrix, the signal is equalized by following filters:

- 12 or 24dB/oct high-pass filter with adjustable cutoff frequency (10Hz – 240 Hz). This filter also has adjustable resonance.
- Active parametric filters with 15dB boost/cut range and variable Q (0.2 - 7):
 - EQ1: 22 Hz – 470 Hz (bell or shelf)
 - EQ2: 90 Hz – 2 kHz (bell)
 - EQ3: 480 Hz – 10k Hz (bell)
 - EQ4: 1 kHz – 23 kHz (bell or shelf)
- 12dB/oct low-pass filter with adjustable cutoff frequency (2 – 38 kHz)
- passive filter with extended hi-boost section (air bands: 20 and 28 kHz)

Then the signal can be boosted or attenuated up to 10dB, before it hits optional M/S to stereo matrix and output buffers. Please note that whole unit can work in stereo, M/S or dual-mono mode, where both channels are 100% independent.

The Mastering Equalizer allow you to monitor the input and output levels (in peak or RMS modes) and display RTA graph of processed signal.

IV. General Operation

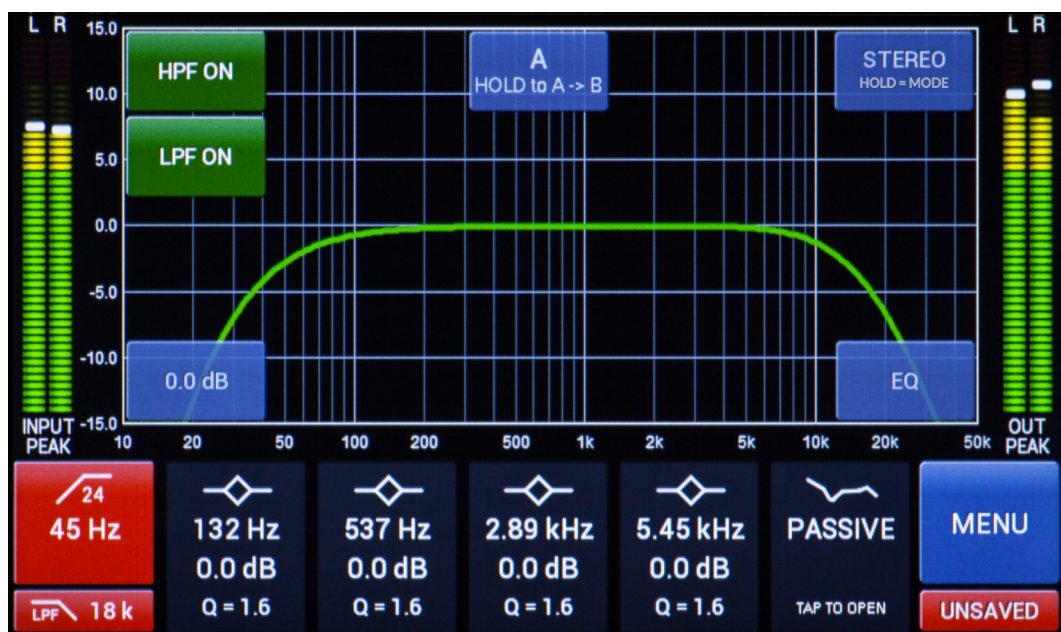
The guide below will walk you thru all the screens and functions available in the Mastering Equalizer.

Connecting the Mastering Equalizer to your system

Apart from selecting the correct AC voltage and connecting AC plug to the wall socket (with grounding pin) you will also need:

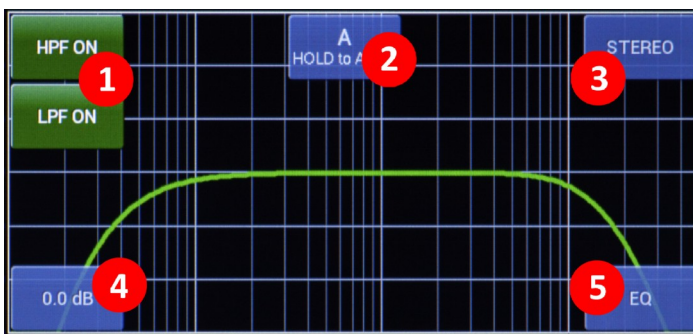
- to connect the USB LINK to your MAC/PC. It is recommended to use quality USB cable that is no longer than 1.5m or additional USB hubs might be required. The USB LINK will allow you to control the unit from your favorite DAW via VST/AAX/AU Bettermaker control plug-in and perform the firmware update in the future.
- to connect XLR inputs and outputs. Using balanced, quality cables and signal sources is essential here to provide best possible signal quality with very low noise floor. Markings on the back of the unit will make this process very straightforward.

Main Screen



After powering the unit on, you will be transferred to the Mastering Equalizer main screen. Here you will spend 99% of the time with your MEQ. The layout is divided between **three main parts**:

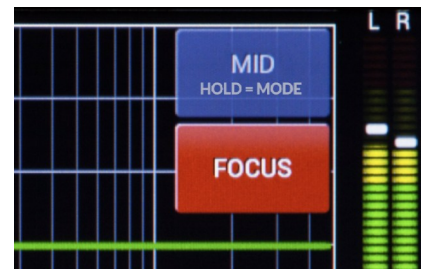
- input and output meters (you can switch them in peak or RMS mode in MAIN MENU)
- row of buttons in the bottom part of the screen, allowing access to specific filters and MAIN MENU button. There is also **UNSAVED** tile that will turn red if you modify the preset loaded from internal non-volatile memory.
- Main window that can display either real-time equalization curve or RTA. It also has a bunch of different button that we will discuss now:



1. filter ON/OFF – allows to enable selected filter

2. A/B switch – to compare two independent settings. Hold it to copy between. In our example preset A will be copied to B.

3. EQ MODE selector – **hold it** to show the selection. You can choose between STEREO, M/S or dual-mono mode. In M/S and dual-mono new button **FOCUS** will appear – it allows you to listen to selected channel only. To switch between channels tap on **MID, SIDE, LEFT** or **RIGHT** button. The label on the button will indicate the selected channel. Please note that if you switch from M/S or dual-mono mode to stereo, the channel that is not selected will be replaced with selected one, as in stereo mode both channels need to have the same filter settings.

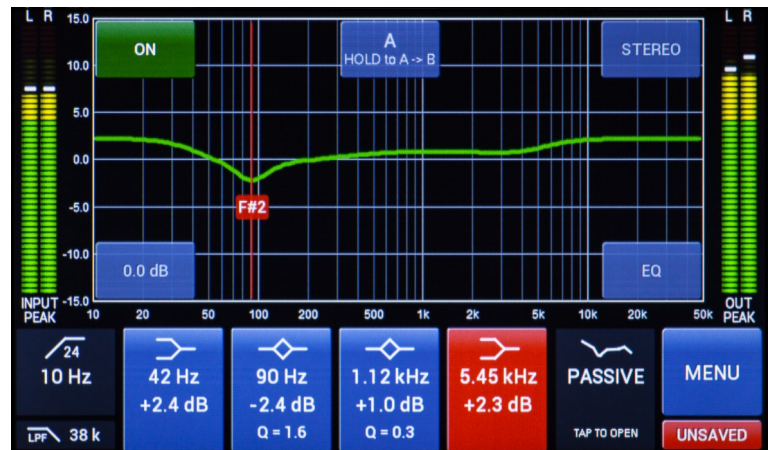


4. OUTPUT GAIN – shows the amount of output gain set by LEVEL knob.

5. EQ/RTA switch – allows you to display either real-time equalization curve or RTA graph.

Adjusting Filters

By pressing on **HPF/LPF**, **EQ1**, **EQ2**, **EQ3**, **EQ4** and **PASSIVE** filter tiles you can adjust each of them quickly and precisely. Selected filter is highlighted **RED**. If the filter is active, but not necessary selected for adjustments it's highlighted **BLUE**.



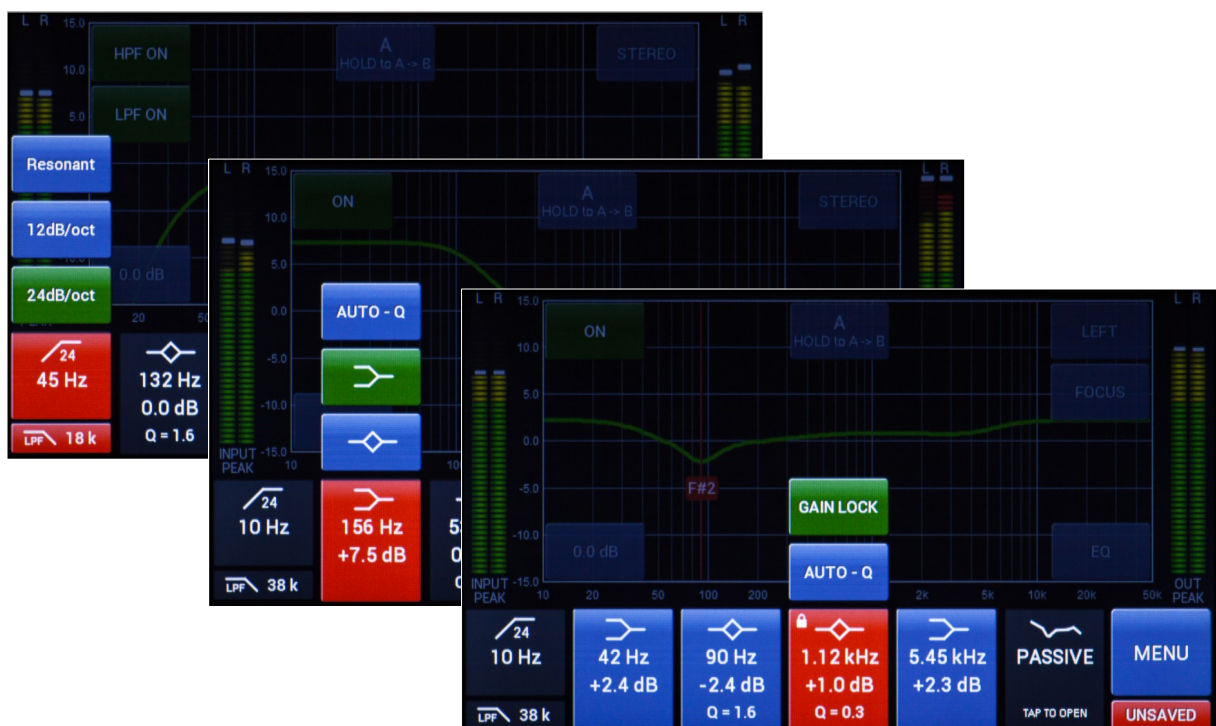
You can turn every filter **ON** or **OFF** in top left corner of the EQ/RTA window. Use knobs

P1 for frequency, **P2** for gain and **P3** for **Q**

for all parametric filters. For HPF/LPF section the assignment is a bit different:

P1 for HPF cutoff, **P2** for HPF resonance and **P3** for LPF cutoff

Apart from these settings you can also access additional functions by **holding** the tile with particular filter.



For the HPF/LPF filter you can select **12dB or 24dB** slope and also add a **resonance** to the high-pass filter. For all parametric filters you can enable **AUTO-Q** function – for low boost/cut settings the filter slope will be very broad. This will provide very musical response from the Mastering Equalizer. More boost or cut you apply more sharp the frequency response of particular filter will be. This is handy when cutting off unwanted resonances from your mix.

For EQ1 and EQ4 you can also switch from **BELL** to **SHELF** filter shape by pressing on appropriate icon.

There is also unique function called **GAIN LOCK** available for all parametric filters. You can enable it if the MEQ works in dual-mono or M/S mode. To understand how it works imagine the following scenario:

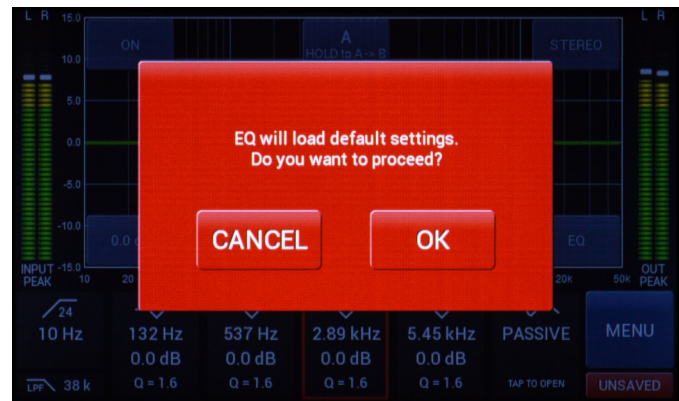
Your MEQ works in M/S mode and you mix is nearly finished. You have EQ3 filter set at around 1kHz with different gains for mid and side. But now you need to add 0.5dB on both channels. You can enable Gain Lock for EQ3 and then adjust the gain for just one channel – the other will follow in the background!

This function is also very useful if you have stereo source that has inconsistent frequency spectrum between channels. It can be old recording for example. You can set the Mastering Equalizer in dual-mono mode, fix all the problems between the channels and then apply Gain Lock. All further changes will be applied to both channels, to make mixing process faster and more convenient.

You can also adjust the parametric filters by holding your finger on the EQ curve for 2 seconds and then dragging up and down for cut/boost of left and right for frequency change. As this is very quick way to localize and remove unwanted resonances in your mix, we have called this function **Search&Destroy** :)

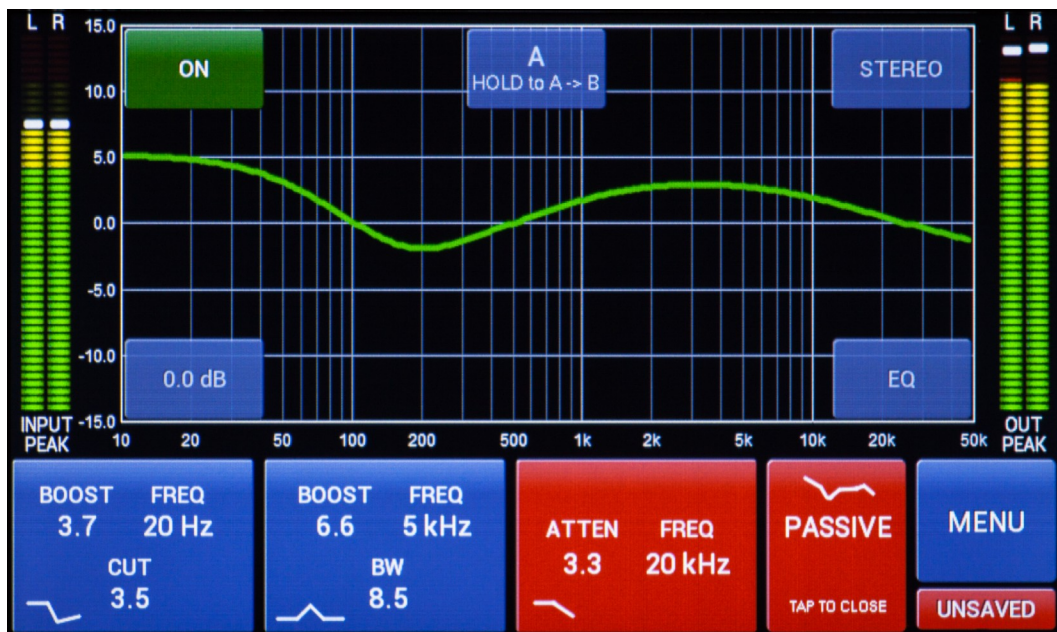


To **clear all filters** and reset the Mastering Equalizer to default state please double press **P3 knob** and confirm your choice. To reset selected filter only – use P2 knob instead.



Adjusting Passive Filter

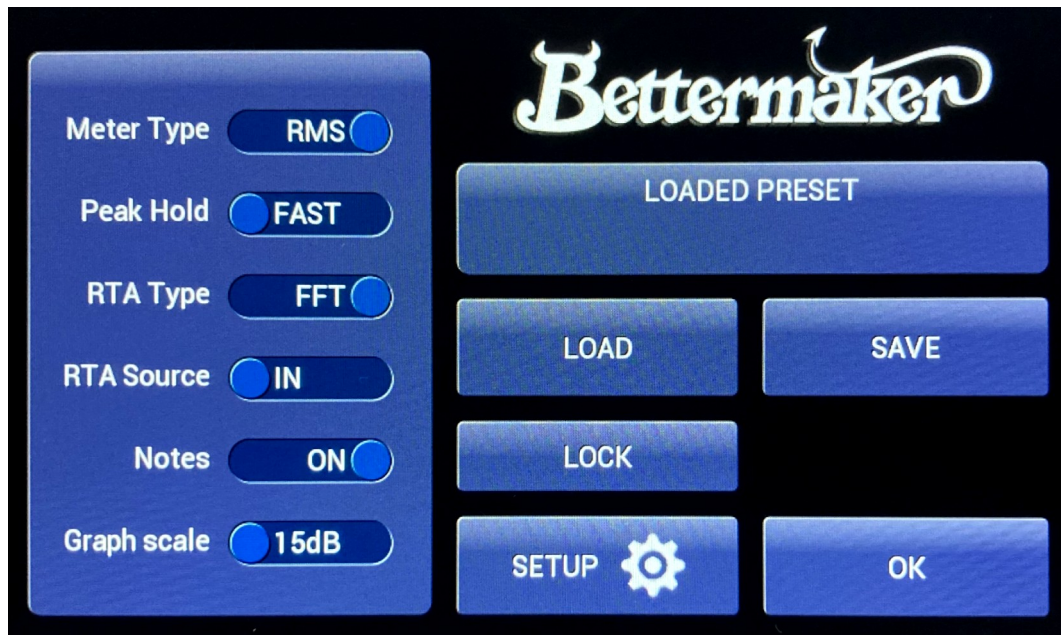
By pressing on **PASSIVE** button you access yet another set of filters, based on classic design, but with extended hi-boost frequency selection with 20 and 28 kHz bands added. Tap it again to go back to the rest of the filters.



There are three sections for this filter. Before you start the adjustment, you need to select which section the changes will apply to:

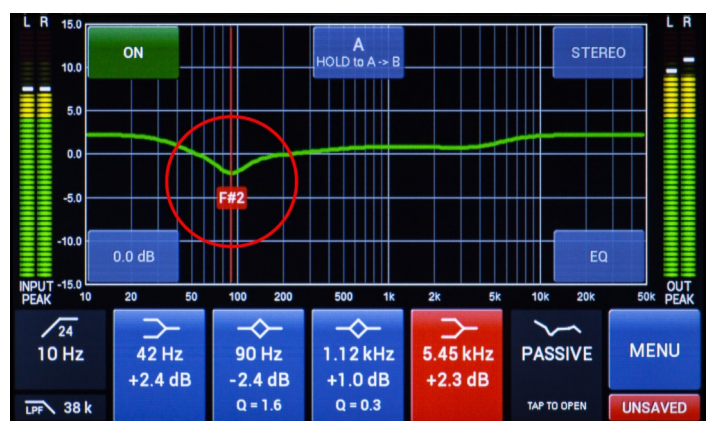
- **low cut/boost** – P1 knob will adjust the BOOST, P2 CUT and P3 – frequency
- **hi boost** – P1 adjusts the BOOST, P2 the BANDWIDTH, and P3 – frequency
- **hi cut** – P1 adjusts the ATTENUATION and P3 - frequency

Main Menu



To enter the MAIN MENU please tap **MENU** on the main screen. Here you can change the input and output level meter **TYPE** (PEAK or RMS) and the **PEAK HOLD** time constant. In RMS mode, the value in decibels is shown below the input/output level meters. If peak hold is set to **FAST** then the peak value markers will fall within 2 seconds after the signal disappears. In **INF** (infinity) mode, user can tap on one of the meters to reset the peak value markers.

Switches below let you choose the **RTA** measurement **SOURCE** and **TYPE** (FFT or bar). For mastering purposes you can switch to zoomed **GRAPH SCALE** (± 6 dB or ± 15 dB). **NOTES** will show or hide labels with musical notes on the main EQ screen. Applies to parametric filters only.



The next section in the menu is dedicated to saving and loading presets. By pressing **LOAD** icon, you will enter presets list. Move **P1 knob** to search the list, and press **LOAD** to recall selected preset.

After pressing **SAVE** in Main Menu, choose free slot by moving P1 knob and press **SAVE** again. Use onscreen keyboard to enter new name for the preset. You can also **RENAME** or **DELETE** unused preset.



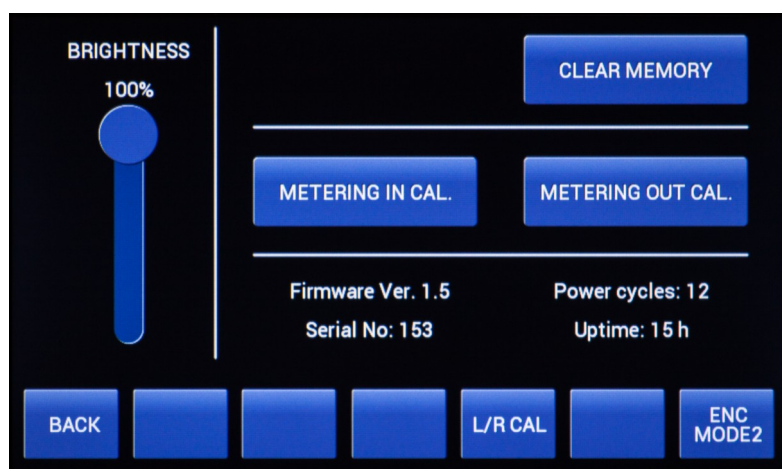
On the presets list you may notice the **RED or GREEN dot** beside the number and name. The dot shows up when the preset was loaded or saved. If you've loaded a preset, but haven't made any changes to it, the dot will be GREEN. But if any changes have been made, the dot will turn RED. You will also get **UNSAVED!** warning on main screen of the Mastering equalizer – this is a sign that you should save your preset again before you turn the unit off.

NOTE: apart from presets, the Mastering Equalizer will remember the last filter state, even when you reboot the unit. These settings however will be lost if you reset it to defaults (double press on P3 knob).

You can lock all the equalizer controls by pressing **LOCK** icon in the main menu. This allows you to avoid accidental changes made by unauthorized person.

To unlock the unit, hold P2 and P3 knobs together.

Settings



Press **SETUP** (gear) icon in the Main Menu to enter settings. Here you can adjust the **BRIGHTNESS** of the screen (touch and drag the virtual slider on the screen), check the firmware version, see the number of power cycles (how many times the unit was turned off and on),

check the serial number of your Mastering Equalizer and its up time.

If you wish to clear the presets memory, simply tap on **CLEAR MEMORY** and confirm your choice. You will see the progress on the screen. When the procedure is over the unit will restart itself.

IMPORTANT!

If you decide to erase the presets memory, you need to remember that you cannot undo this action. All your settings and presets will be gone!

For your convenience, **METERING INPUT** and **OUTPUT CALIBRATION** let's you match the levels shown by the Mastering Equalizer with the levels shown by your AD/DA converter. In other words: you need to show the equalizer where the digital 0dB is, so the reading will be accurate. Please use on-screen instructions to perform the calibration. Please note that changing calibration values doesn't change the audio gain staging at all – it only affects input and output audio level metering.

In this window you will also find controls for:

- **L/R CAL** – allows you to calibrate left and right channel audio levels of your Mastering EQ. Please note that this is independent from main output **LEVEL** adjustment.
- **ENC MODE** (1 or 2) – this feature allows the firmware to support older units and solve some encoder problems. Should not be changed unless the unit behaves unexpectedly.

V. DAW integration

The Bettermaker Mastering Equalizer can communicate with your DAW via USB connection. The unit appears as a HID device and can be managed via Bettermaker Mastering Equalizer Plugin.



Please download the latest version of the plugin installer form our site:

<https://www.bettermaker.com/downloads>

Everything you set on the hardware will appear in the plugin and every change of the plugin will be followed by the Mastering Equalizer. All the settings will be stored in you session every time you save the project in your DAW.

The plugin appears in your DAW as an audio effect plugin. You can open it as an insert or anywhere in your Host (on mix bus for example). We recommend to keep the plugin on the track that you are currently editing, so it will be obvious for you what track is affected. Notice that the plugin only sends and receives parameter changes of the Mastering Equalizer, it does not affect the sound by itself - you need to insert your analog EQ physically via your D/A & A/D converter. The plugin will connect automatically with the EQ as soon as you load the session (you need to power up the unit first).

VI. Product Specification

- 100% analog audio signal path
- USB connectivity with MAC/PC
- all parameters are digitally controlled via touchscreen and/or DAW (with dedicated plugin)
- 399 presets with unique names, total recall, A/B comparison
- 5-inch capacitive touchscreen with backlight, four encoders with push-button action for ease of control
- stereo, dual-mono and mid/side operation modes with focus function
- stereo 12 or 24dB/oct high-pass filter with adjustable cutoff frequency (10Hz – 240 Hz; extended to 6Hz with the resonance enabled)
- four stereo parametric filters with 15dB boost/cut range, variable Q (0.2 - 7):
 - EQ1: 22Hz – 470Hz (bell/shelf)
 - EQ2: 90Hz – 2kHz (bell)
 - EQ3: 480Hz – 10kHz (bell)
 - EQ4: 1kHz – 23kHz (bell/shelf)
- stereo passive equalizer with extended hi-boost section (air bands: 20 and 28 kHz)
- stereo, 12dB/oct low-pass filter with adjustable cutoff frequency (2 – 38 kHz)
- adjustable output level (+/- 10dB)
- Frequency Search, Gain Lock, Note and Auto-Q functions
- on-board measurement of PEAK/RMS levels and RTA analyzer
- on-screen live representation of the equalization curve

Technical specification (may change without notice):

- Frequency response 20Hz to 20kHz (+/- 0.2 dB)
- Dynamic range: 102dB (+23dBu, 22kHz BW)
- THD+N: 0.03% @ +4 dBu, 0.06% @ +18 dBu, 20 kHz BW
- CMRR: max 85 dB @ 3 kHz, min 52 dB @ 20Hz, 20 kHz BW
- Crosstalk: min -100 dB @ 30Hz, max -65 dB @ 20kHz, +18 dBu, 20 kHz BW
- balanced stereo input (XLR), 23dBu max input level (THD < 0.2%)
- balanced stereo output (XLR), 23dBu max output level (THD < 0.2%)
- Operating Level: +4dBu
- Input impedance (differential): 48k Ω (for balanced signal)
- Output Impedance: 50 Ω + 50 Ω (electronically balanced)
- 2U enclosure, 230mm deep
- 115/230V switch
- advanced linear power supply with toroidal AC mains transformer
- Maximum power consumption: 20W
- Shipping weight: 5.5 kg

VII. RMA Warranty / Contact info

Warranty:

Addicted to Music warrants to the purchaser of a new Bettermaker Mastering Equalizer that the unit is free from manufacturing defects in materials and workmanship for a period of one (1) year from the original date of purchase.

Addicted to Music's sole obligation under this warranty shall be to provide, without charge, parts and labor necessary to remedy defects, if any, which appear within one (1) year from the original date of purchase.

All warranties expressed or implied by Addicted to Music, including warranties of merchantability and fitness, are limited to the period of this warranty.

Addicted to Music is not responsible for indirect, incidental or consequential damages arising from the use or failure of this product, including injury to persons or property. This warranty does not cover damage due to: misuse, abuse, modification, accident, or negligence.

The warranty does not apply if the unit is connected, installed or used otherwise than in accordance with the instructions furnished by Addicted to Music.

If the equipment requires warranty repair, return authorization must be obtained from Addicted to Music prior to shipment. Equipment should not be shipped until return authorization and proper shipping address is obtained from Addicted to Music. The equipment (with all its component parts and connecting cables) must be suitably packaged, including a note with the registered owners name, return address, telephone number, and description of the reason for return. The owner is responsible for all shipping charges, and it is suggested that the shipment be insured for its full value.

This limited warranty is in lieu of all other warranties, expressed or implied, and no representative or person is authorized to represent or assume for Addicted to Music any liability in connection with the sale of our products than set forth herein.

Contact information:

In case of failure, please contact Addicted to Music for RMA information to have your unit repaired under warranty.

Addicted To Music Sp. z o.o.

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Final Words

We hope you enjoy your new Bettermaker Mastering Equalizer! If you have any thoughts, ideas, concerns, notions, or brilliant revelations you would like to share about our products, please bring them to our attention at info@bettermaker.com.

Happy Better Making!

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