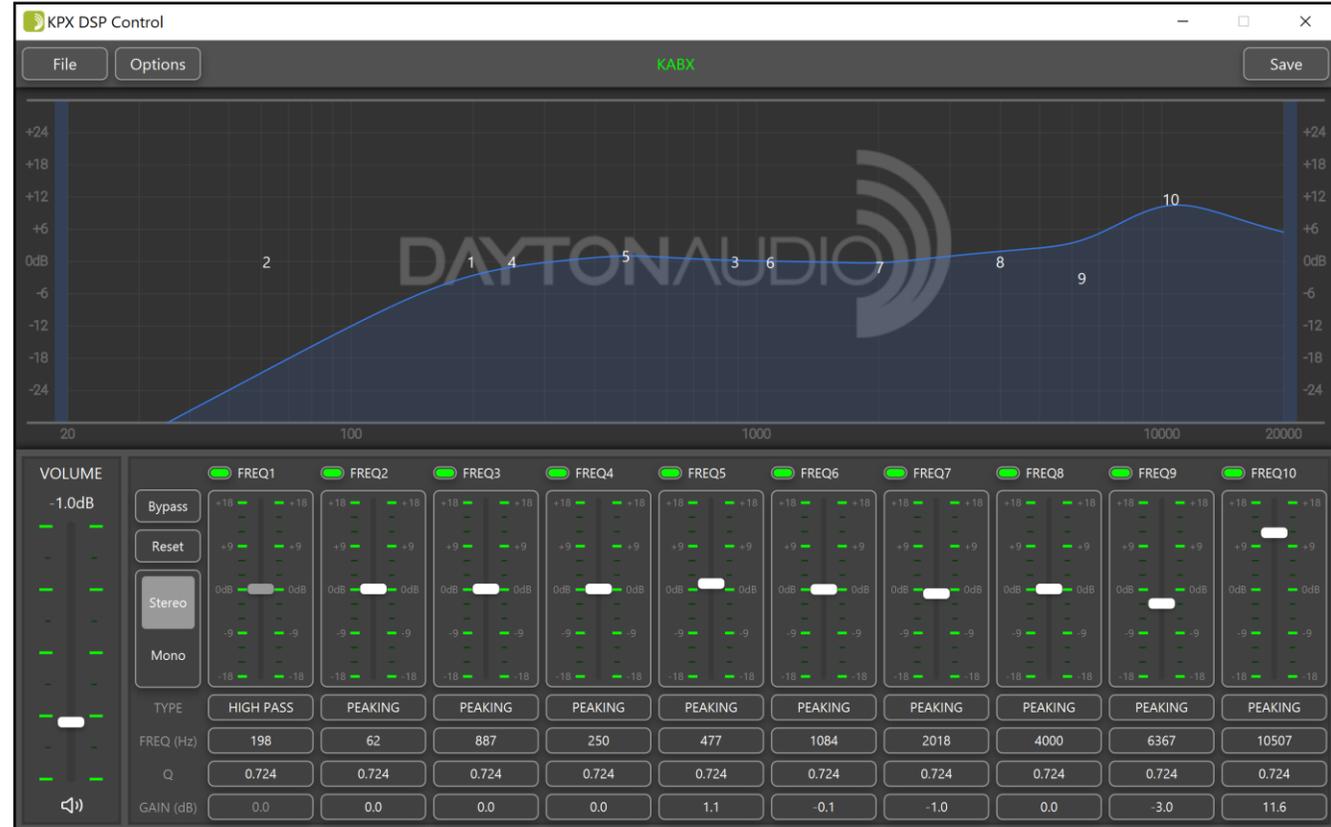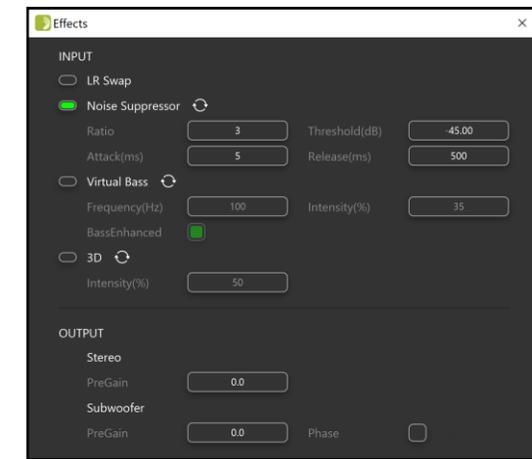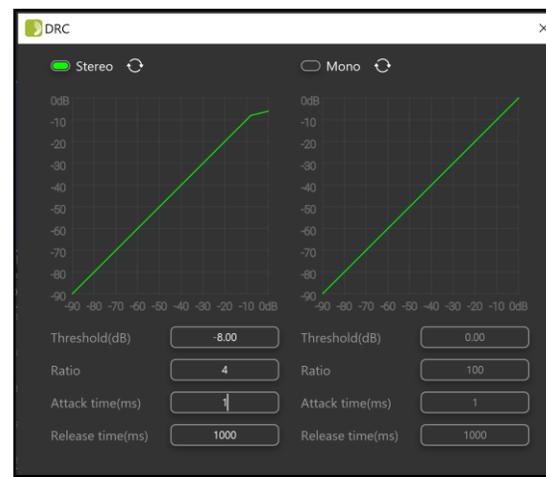# KABX DSP Control Software Guide

Overview

- The KABX DSP Control software is compatible with new generation Bluetooth 5.0 w/aptX HD KAB amplifiers when combined with a KPX programmer. This software offers easy but extensive DSP customization with no experience required.

- The software provides simple control of 10 band of PEQ, High Pass Filters, Low Pass Filters, Compressor / Limiters, Bass Effects and More

- KPX Programmer connection is only needed temporarily, DSP presets can be saved to the KAB amplifier itself and the programmer can be removed. This also means that one programmer can program as many amplifiers as needed.

Overview
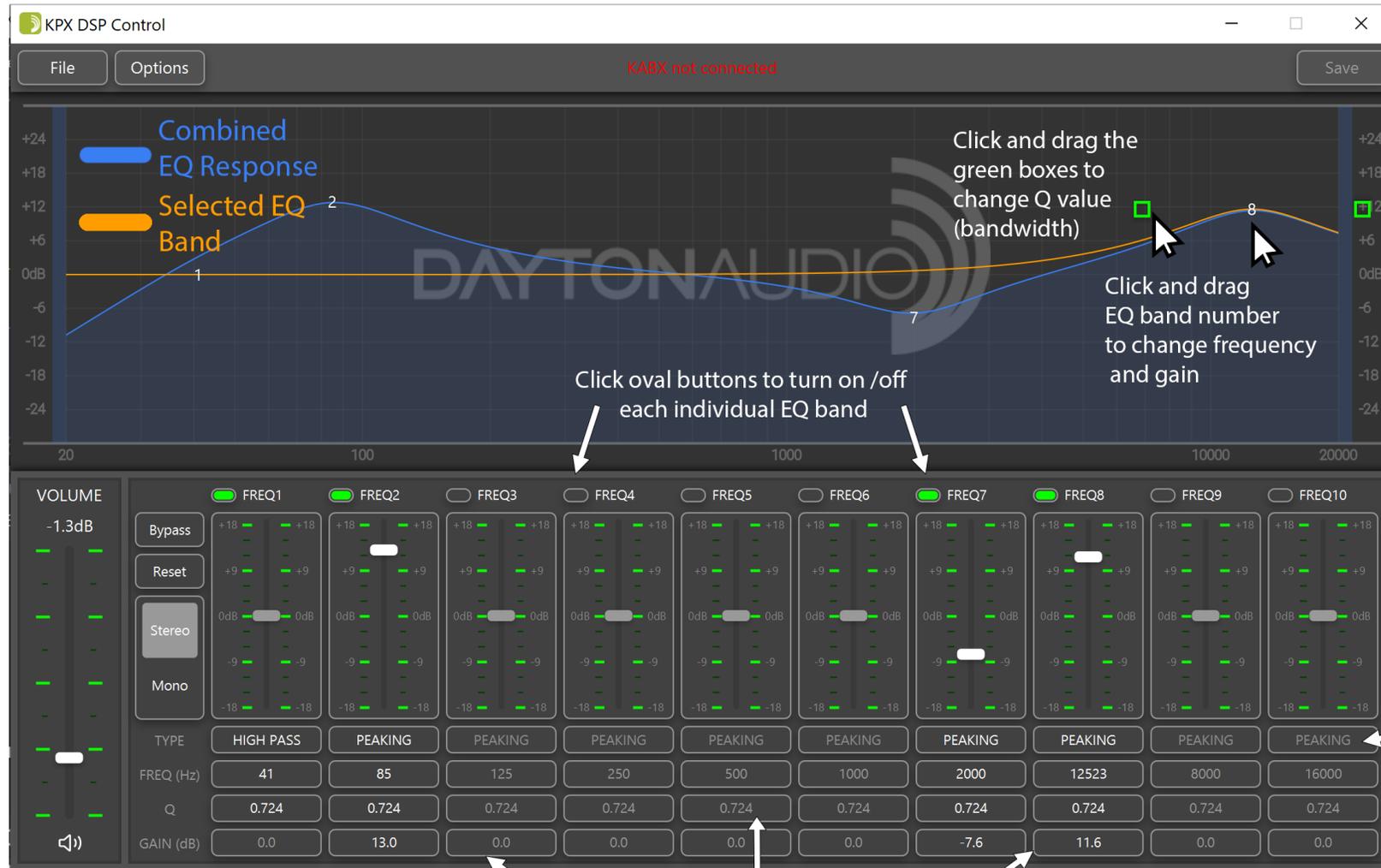
Save EQ Settings to memory so the EQ profile is retained after a power cycle

Combined EQ Response

Selected EQ Band

Click and drag the green boxes to change Q value (bandwidth)

Click and drag EQ band number to change frequency and gain

Click oval buttons to turn on /off each individual EQ band

Disable all EQ filter bands

Reset all EQ values and enable all bands

Control EQ of the stereo amplified outputs

Control EQ of the mono line level output (J25)

Click to change filter type

Manually enter EQ values

What do I need to get started?

- A KPX Programming Board
- A KABX DSP Control compatible KAB amplifier. This includes KAB amplifiers with Bluetooth 5.0 w/aptX HD.
  - KAB-250v4 (2x50W), KAB-230v4(2x30W), KAB-100Mv2(1x100W)
- A USB cable with one end being USB Type C.
  - The other end can be either type A or type C, depending on what type of port you have on your computer
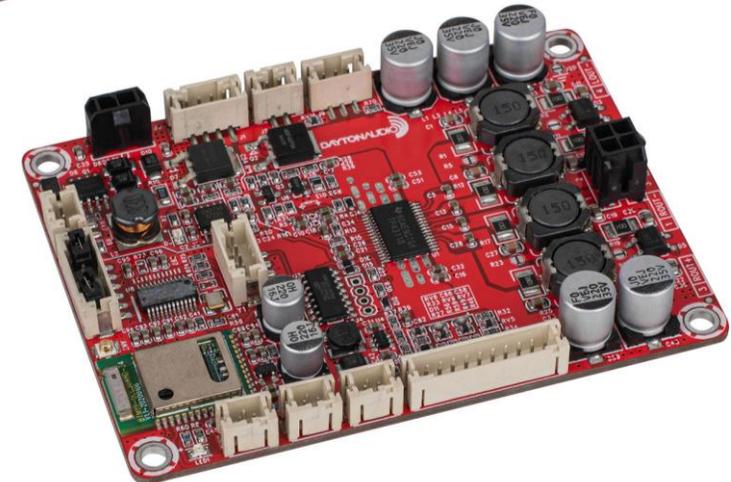- A Windows PC with available USB port and permissions to install the KABX Software

KAB-250v4

KPX Programmer

KAB-230v4

Connection Process

- Connection of the KPX programmer to your KABX compatible amplifier is simple, but for more details see the KPX User Manual.

1. **Set your KPX programmer to "KABX" mode** (see back of board)

2. Connect your KPX programmer to your Windows PC with a USB type C cable

3. Connect your KABX compatible amplifier to your KPX programmer using the 4-pin connector included with the KPX programmer.

4. Launch the KABX software. It should connect immediately.
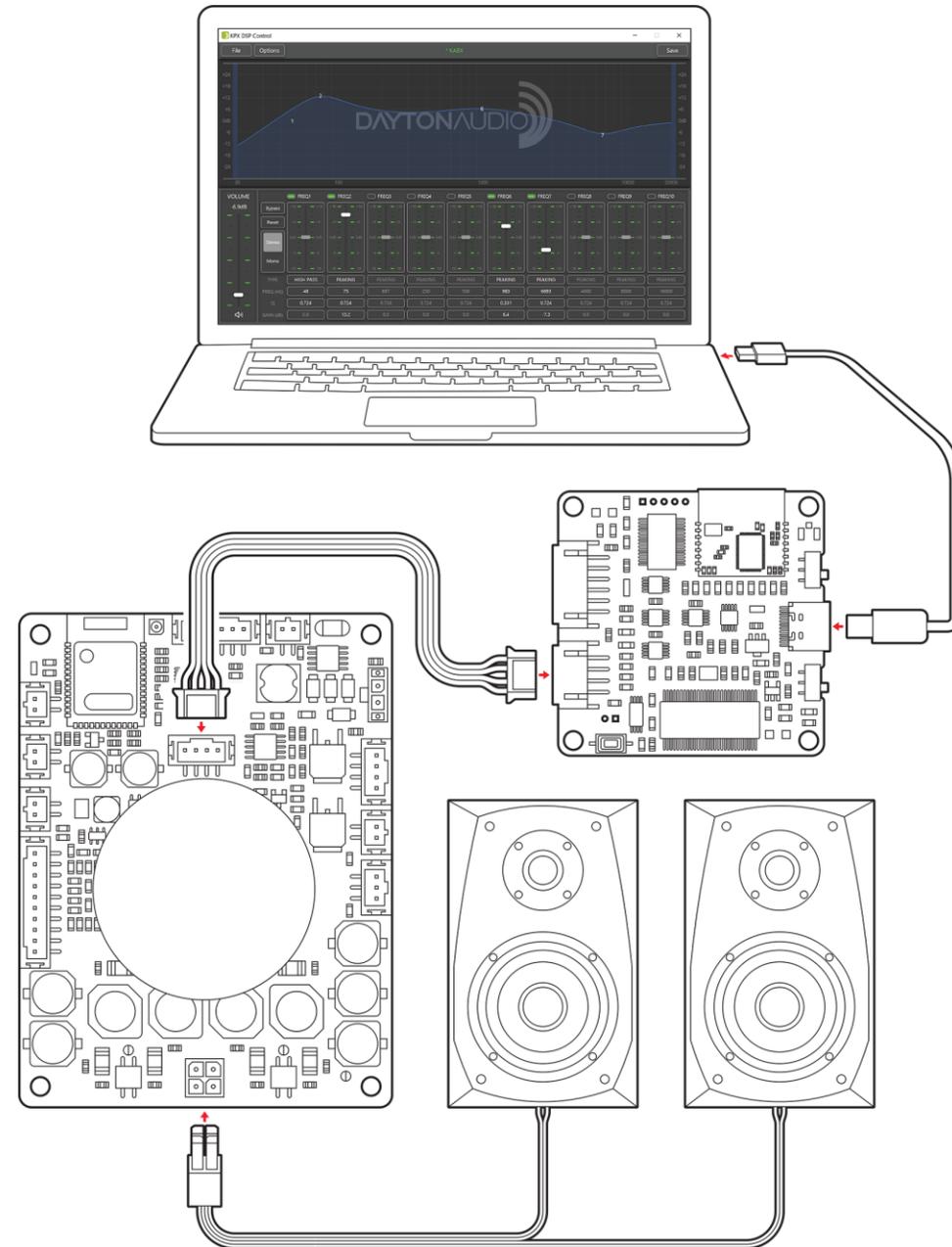
Saving to Non-Volatile Memory

(Retaining Settings After Power Cycle)

- While using the KABX Control software, changes to DSP will be able to be heard immediately, and those changes will exist while the connected KAB amplifier has power and it turned on. However, these changes will be lost when power to the KAB amplifier is lost.

- To prevent this, the current program must be saved to "non volatile" memory, which means memory that holds data even when power is lost. To do this, you must press the "save" button in the top right corner whenever you are ready. This will make sure your program remains after a power cycle. The software will also prompt you to save when you exit the program.

- The top bar of the KABX software, when connected to a compatible amplifier, will display "KABX" or " * KABX" in green. This means that the amplifier is connected, but also shows save status.

  - When "KABX" is shown, that means that current DSP preset is saved to non-volatile memory of the KAB and will be retained even after a power cycle.

  - When "* KABX" with an asterisk shows, this means that your DSP preset is NOT saved to non-volatile memory. This means that even though you can hear the changes you've made, you will lose these changes if power to the KAB is lost. To prevent this lost, press save in the top right corner.
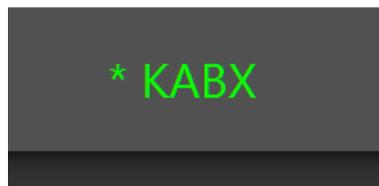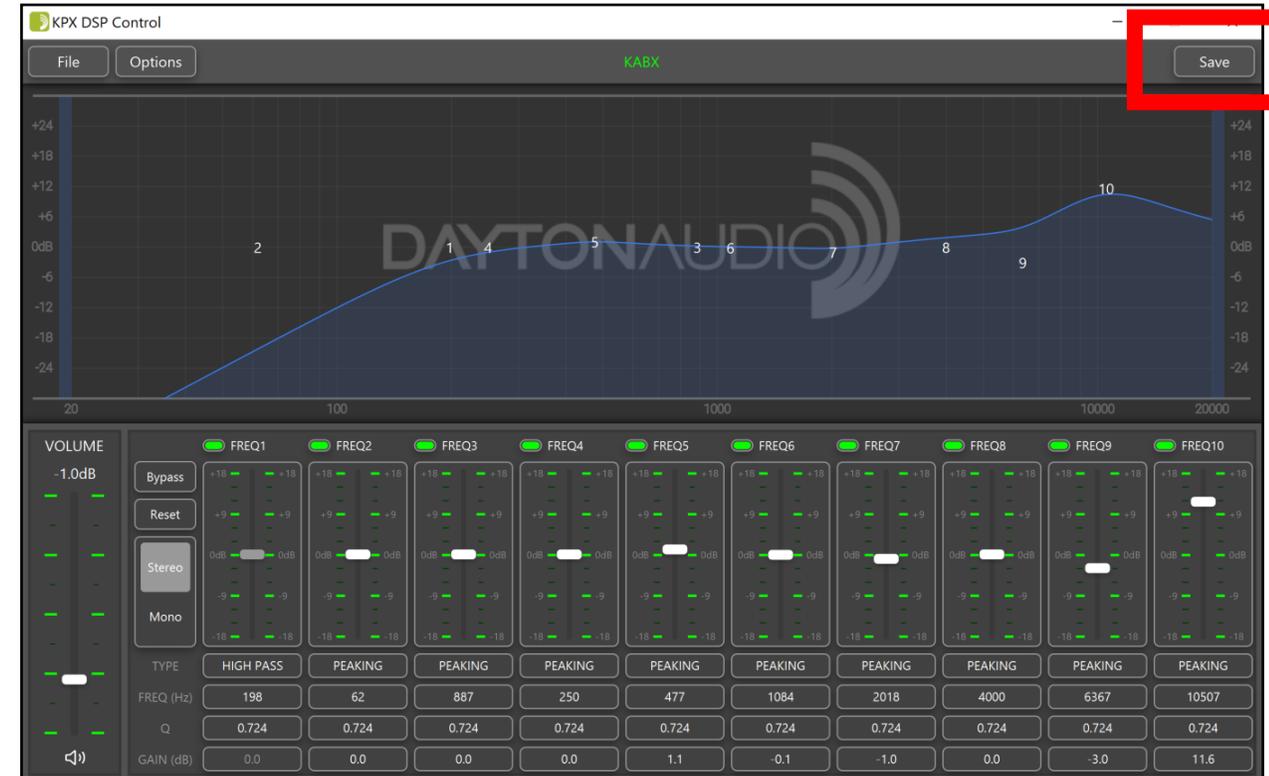
EQ Controls

- Stereo vs. Mono
  - Compatible KAB amplifiers at the time of release have 2 audio output types. The first is the stereo powered output via J2, and the second is a mono, line level output via J12. These outputs can have completely independent EQ.

- Bypass
  - This button will turn off all bands of EQ, but will not reset values. Perfect for testing EQ presets against the original sound.

- Reset
 - This button will reset all EQ values to default.
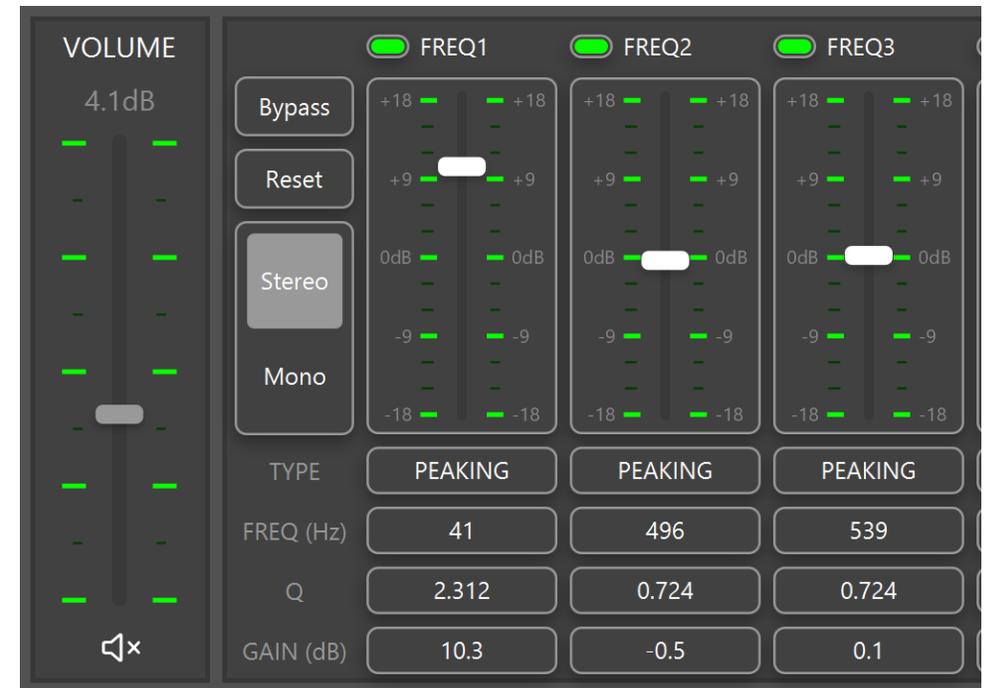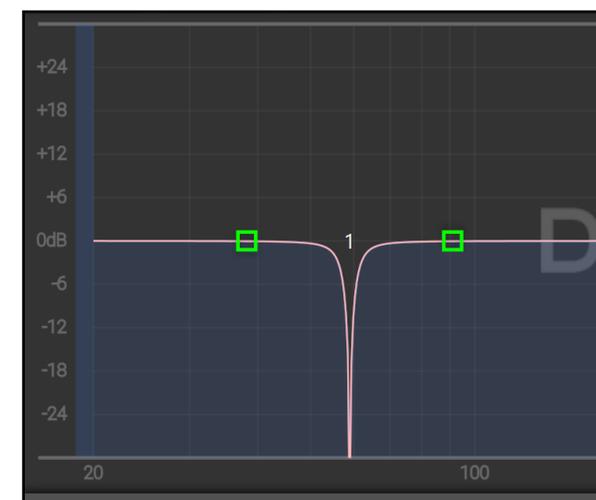
EQ Filter Types

- The KABX DSP software offers 4 filter types for each EQ band.
- Peaking
  - The default and most common type of EQ filter. It has adjustable center frequency, Q (bandwidth) and gain value.
  - Useful for creating bass boosts, treble boosts and so much more.
  - There is an inverse relationship between the Q value and the bandwidth of the filter, which means as you increase the Q value, the bandwidth reduces, and as you decrease the Q value, the bandwidth increases
- Notch
  - Notch filters will remove a very narrow bandwidth of frequency content. Useful for removing the sound caused by an unwanted resonance.
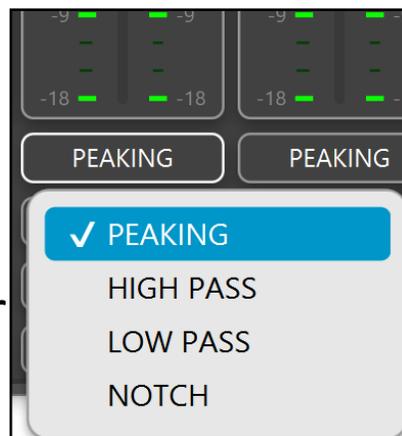
Peaking
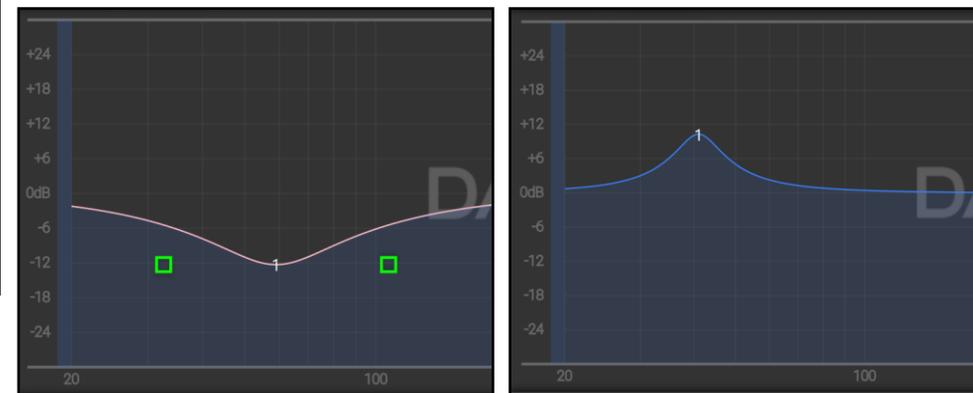
Notch

EQ Filter Types

- High Pass
  - High pass filters cut out frequencies lower than the targeted frequency. The high frequencies "pass" through the filter unaffected. Used in crossover circuits to prevent tweeters from playing low frequencies, or for protecting ported systems or small drivers from playing bass notes lower than they are capable.

- Low Pass
  - Low Pass Filters cut out frequencies higher than the targeted frequency. The low frequencies "pass" through the filter unaffected. Generally used in crossover circuits to prevent woofers from playing high frequencies.
  - This type of filter is essential for a subwoofer or bass shaker

- The Q value of a HP or LP filter will determine the alignment of the filter. This will be described on the next page.

High Pass
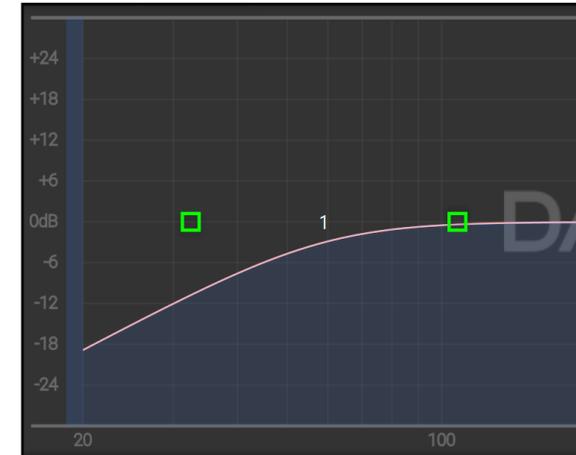
Low Pass

High and Low Pass Filters – Slopes and Q

- Slopes
  - The slope of the HP or LP filters offered in the KABX Software is 12 dB per octave, which can easily be seen in the software's graph.
  - Higher order (steeper) slopes can be achieved by using multiple filter bands set to HP or LP filters.

- The Q value of the HP or LP filter will determine the alignment of the filter.
  - Q = 1.0 – Chebychev
  - Q = 0.707 – Butterworth (Maximally flat)
  - Q = 0.58 – Bessel
 - Q = 0.49 Linkwitz-Riley
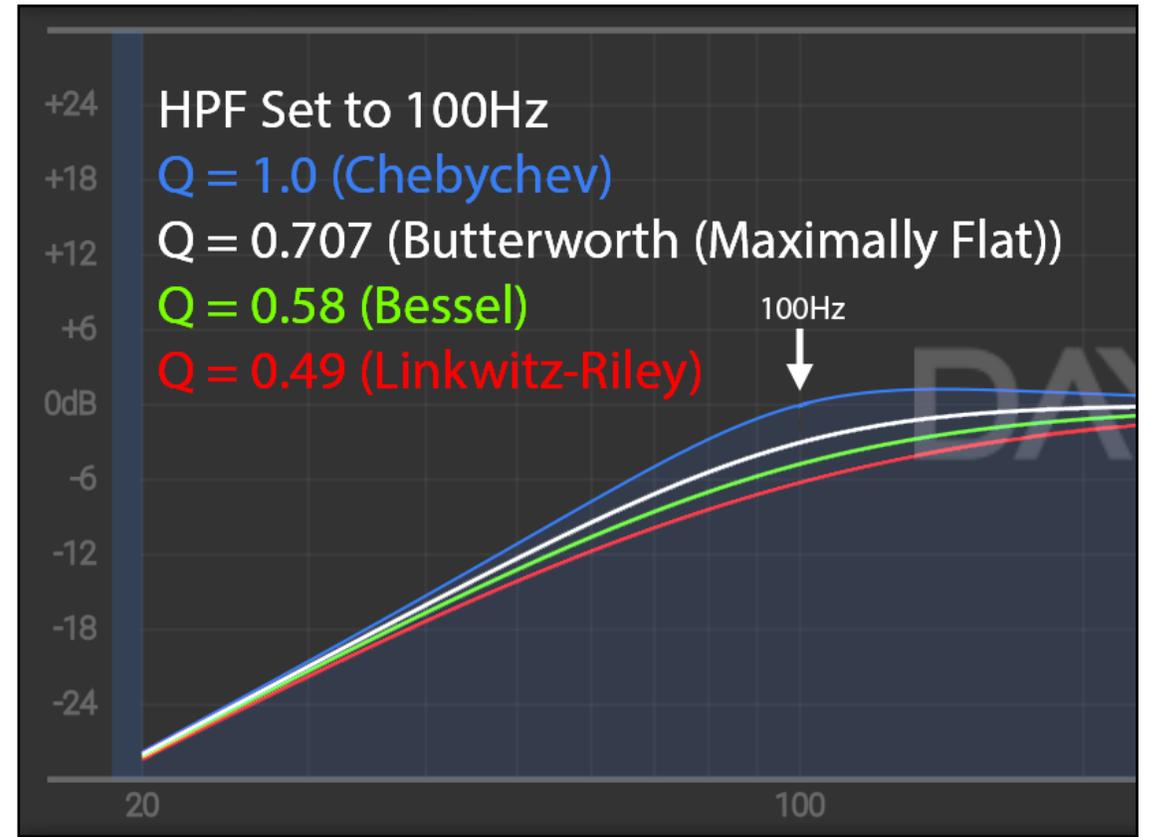
Compressor / Limiter

- A configurable compressor is accessible by pressing options -> dynamic range compressor.

- Compressors can also be used as limiters by setting the ratio very high (the maximum is 1000)
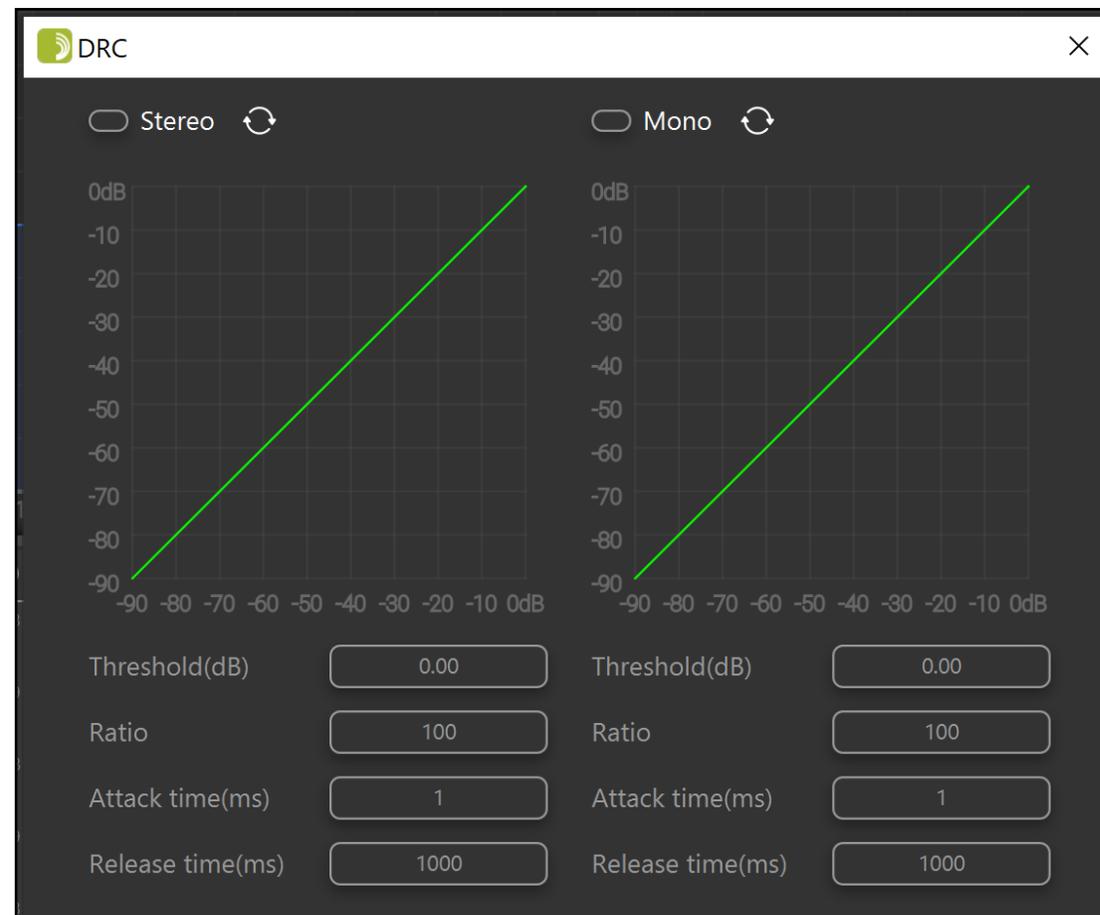
Effects Menu

- The effects menu can be found by pressing options -> effects on the main screen.

- The oval buttons can be pressed to enable/disable each effect.
  - Green means enabled, grey means disabled

- Enter parameters by typing into the boxes.

- Reset to defaults by pressing the reset button
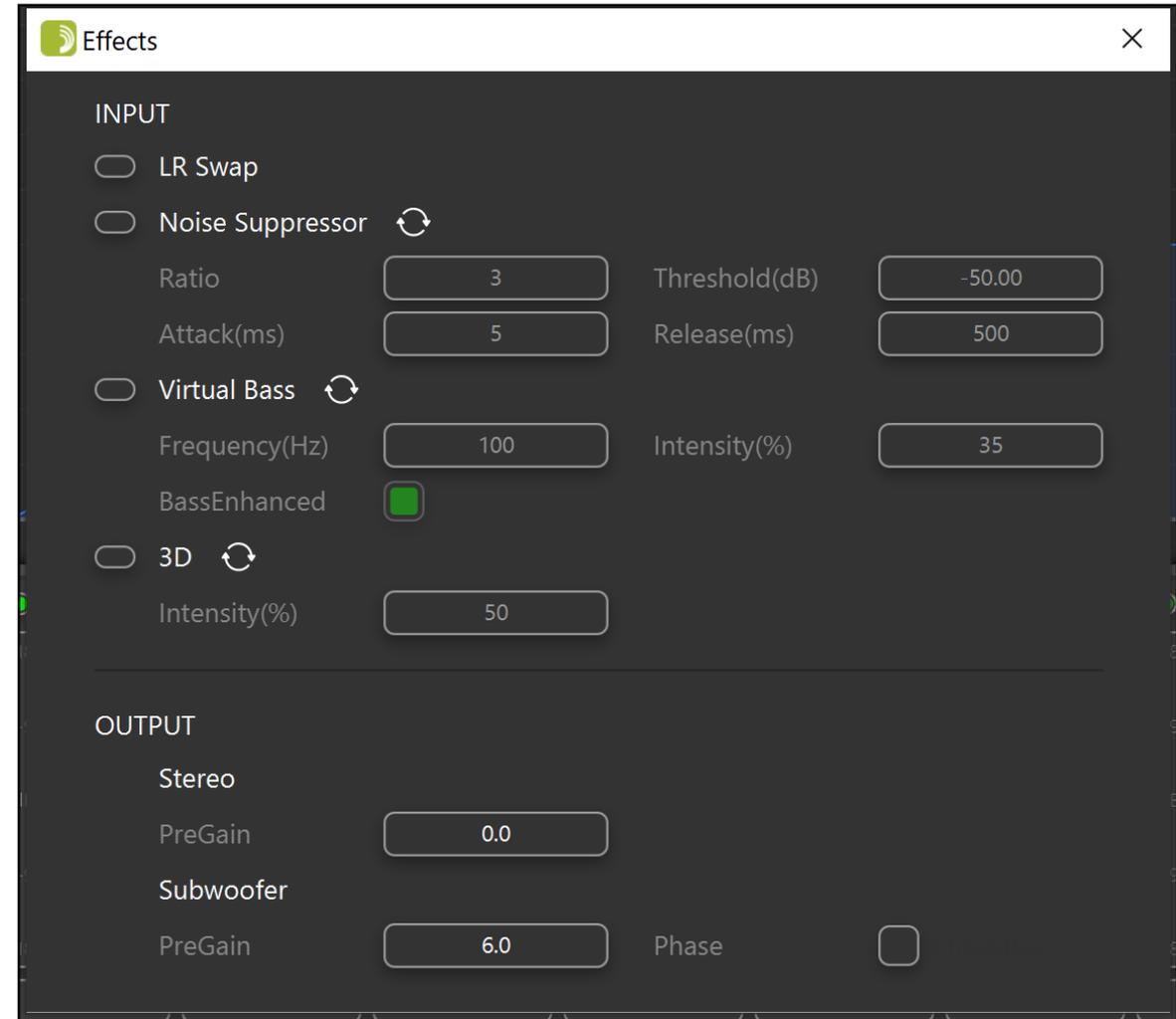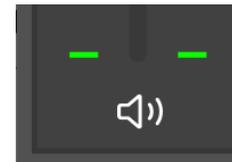
Import and Export Preset Files

- Your current DSP configuration can easily

be saved to your computer by using the export button, and then reloaded by importing.

- These functions can be used to easily

program multiple KAB amplifiers the same way, for A/B testing

DSP configurations, or for sharing your configuration with others!
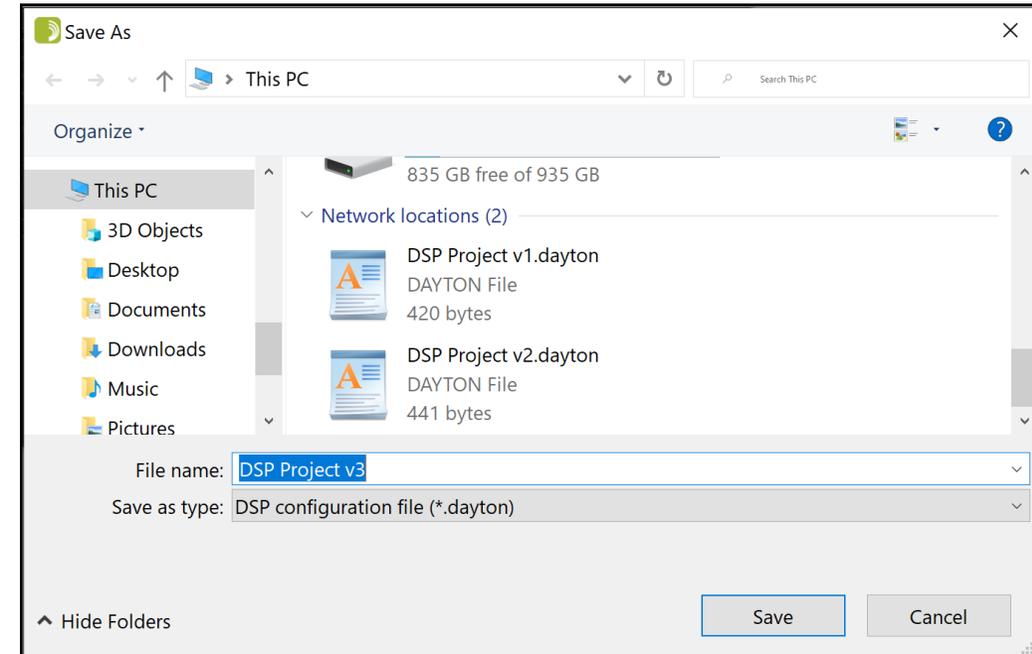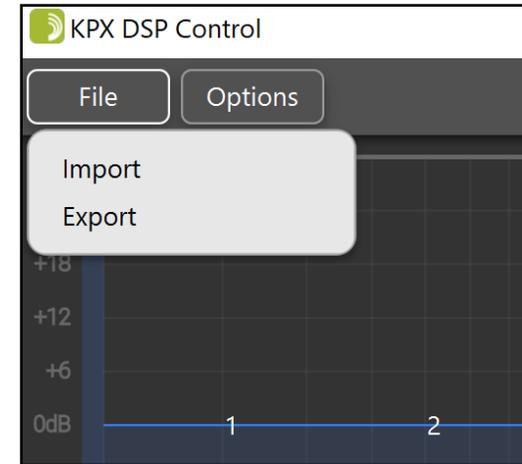
Notes and Troubleshooting

- I am getting no output from my amplifier after connecting to the software.
    - Make sure that your volume is not muted by looking at the bottom left corner of your screen in the volume box, and try turning up the volume of the slider. Click the icons below to change the mute status.
    - Check your input volume levels and also your volume level in the KPX Software
    - Check all connections are secure and your input source is working correctly

- If crackling or other unwelcome sounds are heard while changing DSP settings, such as sliding around a band of EQ, this is normal and due to the rapid changing of EQ parameters in real time. This noises will not occur after the change has been made.
    - Preventing this would prevent the changes from happening in real time / saves significant cost on DSP hardware to keep amplifier costs low. These noises do not affect the overall performance of the DSP processing at all.

- If the software will not connect-
    - Make sure your amplifier is powered
    - Your KPX programmer is set to "KABX" mode
    - You are connecting to a KABX compatible amplifier (do not use a KABD amplifier)
    - Your USB cable is working properly, free from damage and fully connected.
        - Try flipping the USB C side of your cable upside down and plugging it back in
    - Your 4-pin cable is free from damage and fully connected
    - Try running the software in administrator mode
    - Try reinstalling the software

- My DSP settings are lost when my amplifier turns off and back on again.
    - You must press the save button. See the "Saving to Non-Volatile Memory" section of this guide

UNMUTED

MUTED