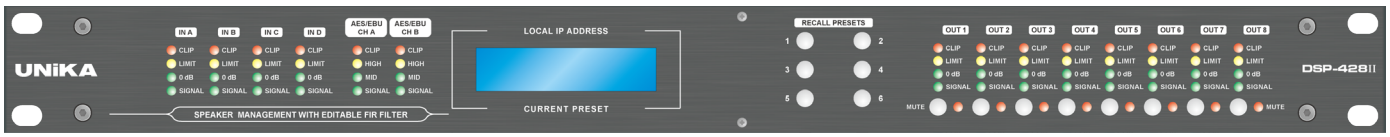
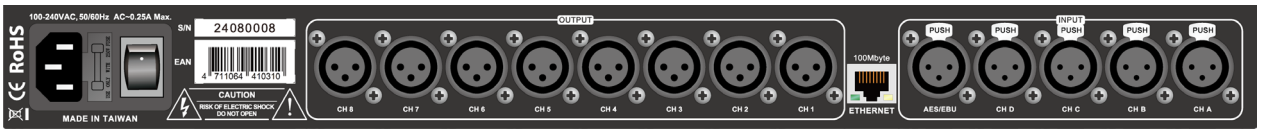
UNiKA

PROFESSIONAL AUDIO

DSP-428II Digital Speaker Management

Instruction Manual





DSP-428II Instruction Manual

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DSP-428II Basic-Quick Start

Introduction

DSP-428II is a four-input + eight-output digital signal processor, suitable for professional audio systems or high-end home audio and home theater speaker systems.

Enlarger. Using the most advanced audio-specific components and high-level algorithms, its unparalleled audio quality and functions meet the highest standards in the industry.

The DSP-428II digital processor adopts the latest generation 3-core processing architecture. Compared with the previous generation, the conversion rate remains at 64bit, but the sampling rate is increased to 96KHz, and it has an 8x384-order FIR filter.

In order to improve the convenience of use, the new panel only retains 6 preset buttons and output channel mute buttons, and the one-page display retains the current IP address and default name.

The dedicated UNiKA DSP CONTROL control and monitoring software supports 32bit/64bit Windows 8 or above operating systems and MAC OSX. It also uses high-efficiency 100MBps Ethernet connection. When connecting and calculating more FIR filters through the dedicated software, you can Reflects higher efficiency and response speed. Users can directly connect the device through a computer via a network cable, or connect to the Internet through a general network switch or router. It is recommended to use a router with built-in DHCP function, which can automatically assign IPs to all devices on the network.

DSP-428II also has a unique feature, that is, its channel delay can be set to 2 seconds, and the interval of each step is as low as 0.01 milliseconds. In addition, when conducting FIR RTA testing, the input source of the test microphone can be a computer built-in microphone, a USB microphone, or the NBB system imported into UNiKA through a Dante Virtual Sound Card as a high-end microphone amplifier to connect to a professional-grade test microphone.

DSP-428II does not have built-in pink noise for use by its built-in RTA. Users can download general-purpose noise software from the Internet. These noise software may include white noise and pink noise.

Network Assignment

When using UNiKA DSP Controller for network control, a large amount of data flow needs to be transmitted between the device and the computer. In order to avoid Data congestion and delay, DSP-428II only provides 100Mbps RJ-45 network port.

The factory IP of the device is 169.254.XXX.XXX. If you use a computer to connect directly or through a network switch, make sure that the computer has never been connected.

Connect to the intranet router. Because the network segment of the intranet router is 192.168.XXX.XXX, the computer’s IP will be assigned to the same network segment.

network segment. At this time, you need to turn on the power of DSP-428II first and then restart the computer. The IP of the computer will automatically change to 169.254.XXX.XXX. most

The best connection method is to connect the DSP-428II and the computer through a wired or wireless router, so that the IPs of both will be automatically assigned.

192.168.XXX.XXX. If you use a switch to connect, you can also connect the LAN port of the router to the LAN port of the router. The login password for general users (USER) is: 1234

The login password for advanced settings for professionals is: 5678X.

DSP-428II Basic-Quick Start

UNiKA DSP Controller Software

If you are an expert sound engineer, you need to download the UNiKA DSP Controller special control software first to perform various functions of DSP-428II.

settings. The software includes Windows 64x/32x and MacOS versions. The Windows version only supports Windows 8/10/11 systems; MacOS supports Ver.10.5 and above systems, MacOS software supports both Inter processor and the latest M1 and M2 processor systems.

The DSP Controller control software includes the complete settings of the processor and the measurement and operation of the FIR filter. This operation requires the assistance of a professional sound engineer. If you are a general user, please ask a professional sound engineer to set and download the presets, and then switch between the 6 preset modes on the panel as needed. If you need to use DSP Controller for remote control or switching default modes, please download the Windows or MacOS version from the following link:

https://www.unikapro.com/support/download/

The login password for general users is: 1234

The login password for general users is: 5678

DSP-428II Basic-Quick Start

Rear panel functions and wiring instructions

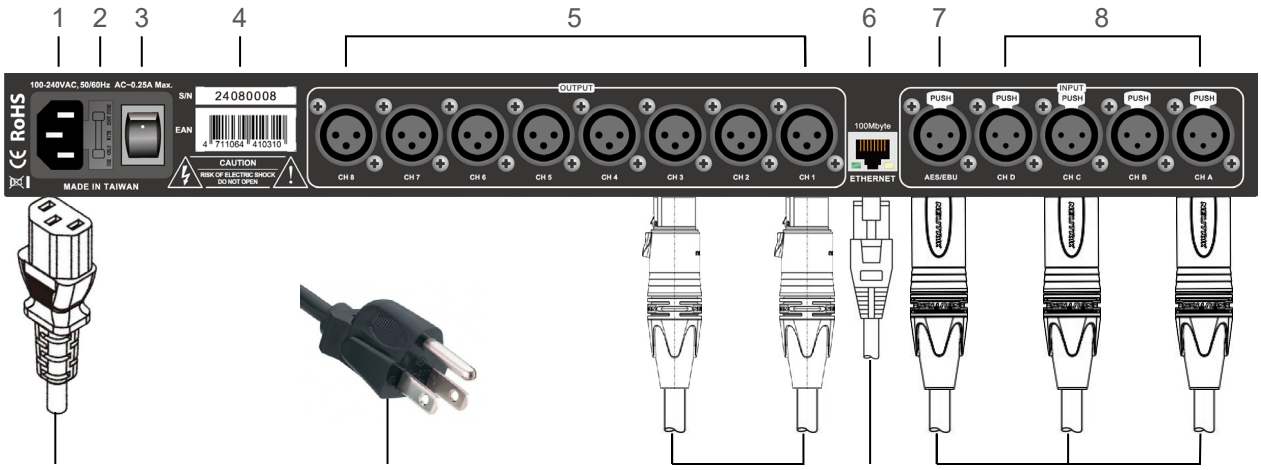
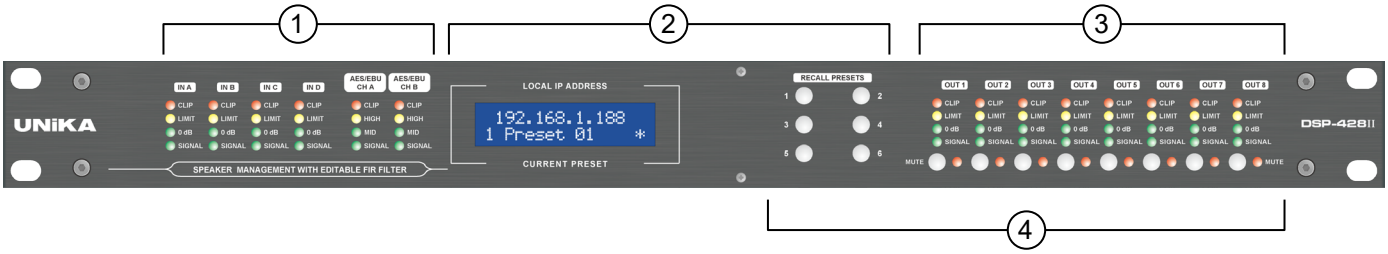


Figure 1 Figure 5 Figure 2 Figure 3 Figure 4

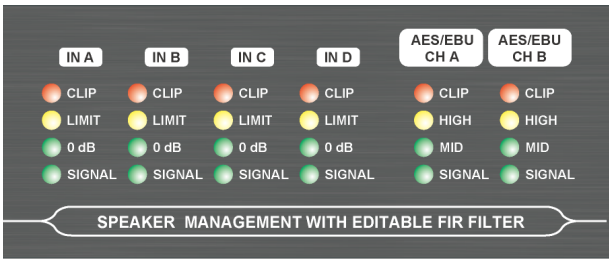
1. AC power input socket: Before use, please insert the IEC AC power cord attached to the machine (Figure 1), and plug the other end into the AC power supply socket.
2. Fuse holder: Built-in 0.5A/250V fuse. During normal use, please do not remove it at will to avoid incorrect power supply.
3. Main power switch: After correctly inserting the AC power supply, press the switch to the upper position to turn on the power of the device; before unplugging the power cord, press the switch to the lower position to turn off the power of the device.
4. Factory label: Paste the factory serial number and EAN international product Bar-code label here. In order to ensure that the equipment can be returned to the factory smoothly for maintenance, please do not tear the label.
5. Signal output : The 8 sets of signal outputs are XLR male sockets. Please insert the female plug of the XLR cable (Figure 2) and connect the other side to an amplifier or active speaker.
6. Network socket (RJ-45/100Mbs): Plug the included or optional Cat-5e network cable into this socket. The other end can be directly connected to a computer, network switch, network router, etc. Up to 255 DSP-428II units can be controlled simultaneously through a network switch or router.
7. AES/EBU input : This XLR female socket can be inserted into the AES/EBU stereo signal, which can be assigned to any input channel 1-4 through the UNiKA DSP Controller software. The connected cable is an XLR male plug (Figure 4), and the conductor can use a general balanced signal cable or an AES/EBU dedicated cable.
8. Signal input : The 4 sets of signal inputs are XLR female sockets. Please insert the male plug of the XLR cable (Figure 8) and connect the other end to a mixer or other peripheral equipment. Such as graphic equalizer.
9. **Warning: To prevent electric shock, please do not remove the upper cover of the equipment by yourself.**
10. **In order to allow the device power supply to be properly grounded to prevent leakage, do not remove the grounding pin of the AC power plug (Figure 5).**

DSP-428II Basic-Quick Start

Front panel operation and status display LCD/LED instructions

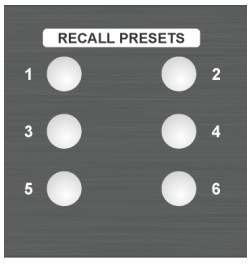


① The input level indicators of the A-D input channels and AES/EBU channels



- The actual level at 0dB position of A-D channel is 1Vrms
- AES/EBU LED level value-HIGH=-1dB/MID=-20dB/SIGNAL=-60dB
- When the LIMITER limiter is activated, the LIMIT light will always be on or flash.
- When the signal is overloaded, the CLIP light will be always on or flashing. Please reduce the audio source signal level.

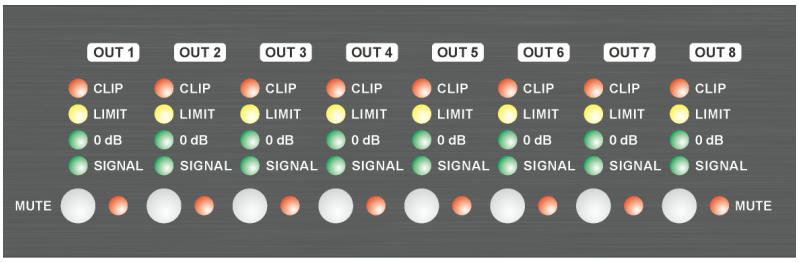
② The display content of the LCD monitor and the call preset button



- The upper row of LCD displays the network IP of the current device
- The lower row of the LCD displays the preset currently used by the device, which corresponds to the 6 preset call buttons on the right.
- When the "*" symbol appears in the lower right corner of the LCD, it means that the device is connecting to the computer through the network for editing.

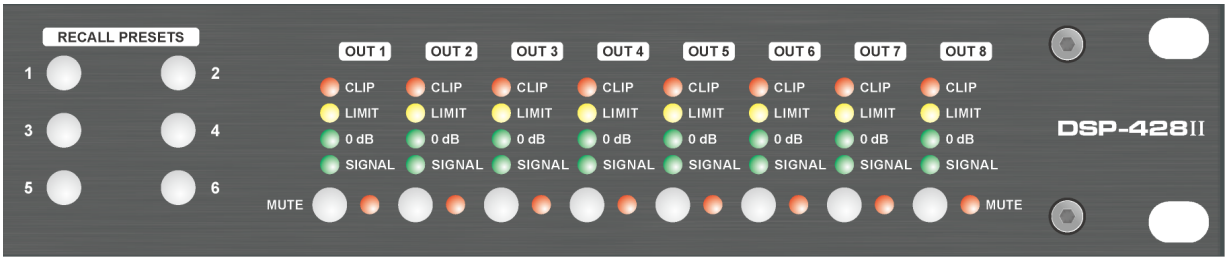
DSP-428II Basic-Quick Start

③ The output level indicator and mute button/indicator of OUT 1-8 channels



- Actual level at L0dB position is 2Vrms
- When the LIMITER limiter is activated, the LIMIT light will always be on or flash.
- When the signal is overloaded, the CLIP light will be always on or flashing. Please reduce the audio source signal level.
- After mute control of any channel 1-8, whether it is manually pressed or through the control software, the red indicator light on the right side will light up.

④ Lock Button



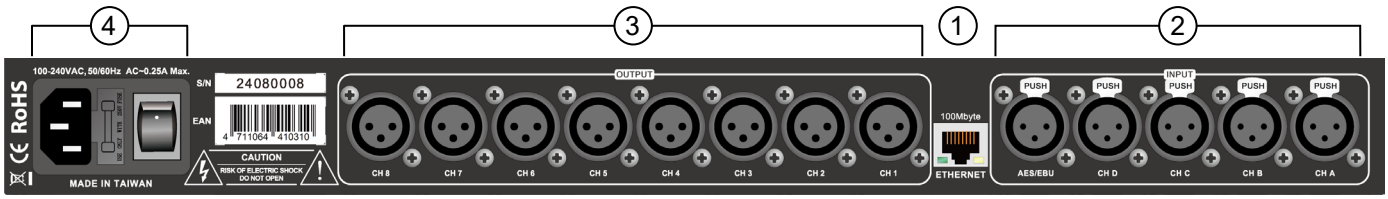
When the PRESET 6 button is pressed for 3 seconds, the MUTE indicators of the OUT 1-8 channels will flash once. From then on, the PRESET 1-6 buttons and the OUT 1-8 MUTE buttons will be locked. This is for use The default mechanism was tampered with during the period. To unlock, just press the PRESET6 button for another 3 seconds. The MUTE indicator light of OUT 1-8 flashes once to unlock.

Note~

This lock button is just to prevent accidentally touching Preset or Mute during use. The lock function needs to be reset again after rebooting.

DSP-428II Preparatory work for DSP CONTROL

Preparatory work

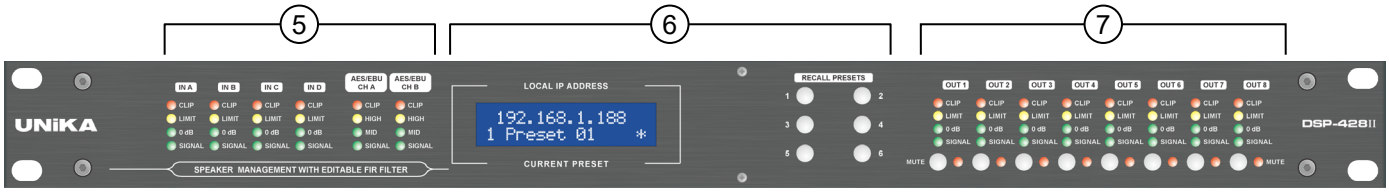


① **Plug the network cable into the ETHERNET socket**
The other end can be directly connected to a computer (PC/MAC) or network switch or router

② **Insert 1-4 of balanced LINE signals (CH A-CH D), or AES/EBU signals at the same time.**

③ **Insert 1-8 of balanced line output signals.(CH 1-CH 8)**

④ **Plug in the power cord and turn on the power switch.**



⑤ **LED light display, IN A- IN D: 0dB=1Vrms (0dBV)**
LED light display, AES/EBU: HIGH=-10dBFS ; MID=- 20dBFS ; SIGNAL=-60dBFS

⑥ **LCD display content, Top row - IP address ; Bottom row - current preset**
* Prompt symbol for editing currently.
RECALL PRESETS, Press the 1-6 buttons to recall the presets stored in the device.

⑦ **LED light display, OUT 1-OUT 8: 0dB=2Vrms(+6dBV)**
MUTE button and light, Press any of mute button to light on the LED then the output channel will be muted.
*During power-on verification, the 8 of MUTE lights will stay on for about 5 seconds and then turn off.

DSP-428II Preparatory work for DSP CONTROL

Download and install DSP CONTROL

Please copy the following URL into the search bar of your browser to download the latest version of DSP CONTROL software.

Please extract and save to your computer,

https://www.unikapro.com/support/download/

After entering the download page, please click on the DSP CONTROL exclusive to DSP-428II under SOFTWARE.

The ones previewed as "WIN64/WIN32" are Windows-specific versions that support the latest Windows-11 system. The file names are as follows,

DSPControl_WIN64bit_3.9.1build140104

DSPControl_WIN32bit_3.9.1build140104

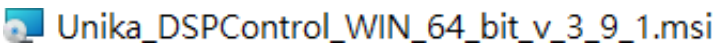
The preview of the MAC version is "MAC", which can support the latest M1/M2/M3 and Intel CPU versions before 2020.

The file name is as follows,

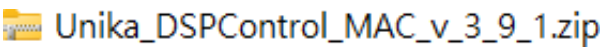
Unika_DSPControl_MAC_v_3_9_1

Install software

After extracting the Windows version software, please click directly in the folder to install the executable file (as shown below) to enter the installation process.



The MAC OSX version can be directly copied to the "Applications" area and installed directly by double-clicking the compressed package as shown below.



Please note: DSP CONTROL does not support Windows-7 or XP systems anymore. Please ensure that your operating system is at least Windows-8 or higher before use.

DSP-428II Preparatory work for DSP CONTROL

Connect DSP-428II into Ethernet

When using UNiKA DSP CONTROL for network control, a large amount of data flow needs to be transmitted between the device and the computer. In order to avoid data congestion and delay

Lately, DSP-428II only provides a 100Mbps RJ-45 network port, replacing the USB port.

The factory IP of the device is 169.254.XXX.XXX. If you use a computer to connect directly or through a network switch, make sure that the computer has never been connected to the intranet router because the network segment of the intranet router is 192.168.XXX.XXX , so the computer's IP will be assigned to the same network segment. At this time, you need to turn on the power of DSP-428II first and then restart the computer. The IP of the computer will automatically change to 169.254.XXX.XXX.

The best connection method is to connect the DSP-428II and the computer through a wired or wireless router, so that the IP of both will be automatically assigned as 192.168.XXX.XXX. If you use a switch to connect, you can also connect the LAN port of the router to the LAN port of the router. The IP addresses of all devices on the switch will be assigned 192.168.XXX.XXX, as shown in Figure-1 192.168.1.188 in Control Center .

***MAC address:** The MAC address is an address used to confirm the location of a network device. In the OSI model, the third network layer is responsible for IP addresses, and the second data link layer is responsible for MAC addresses. The MAC address is used to uniquely identify a network card on the network. If a device has one or more network cards, each network card needs and will have a unique MAC address. The display image of MAC address is shown in Figure-1 "b8:96:74:02:6f:7b" in ControlCenter

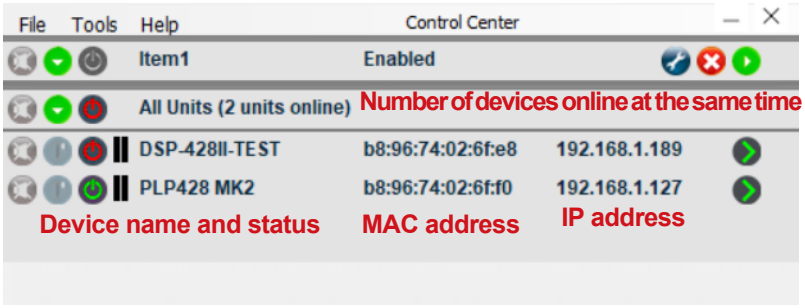


Figure-1

When the device is correctly connected to the computer through the LAN, the first screen when opening the DSP CONTROLLER will display the Control Center and the various basic statuses of the currently online devices are shown in Figure-1.

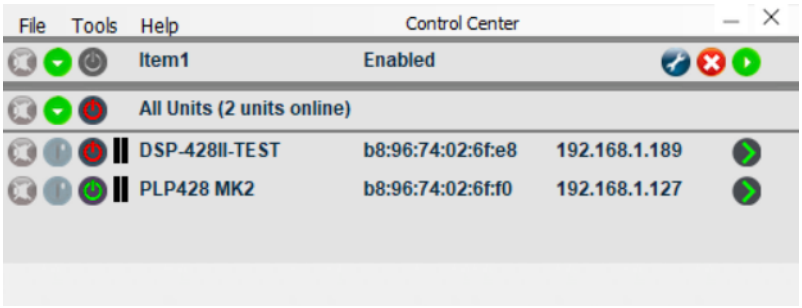


Figure-2

When multiple DSP-428II devices are connected at the same time, the Control Center will display the name, MAC and IP of each device as shown in Figure-2.

Figure-3

The device IP displayed in Control Center will also be displayed on the LCD display of the device as shown in Figure-3

DSP-428II Preparatory work for DSP CONTROL

Revise the name of online devices

Control Center allows users to modify the device name as shown in Figure-4. After modification, it will be displayed in Figure-5. It is convenient for users to use multiple devices at the same time and quickly identify different devices or the location of each device through name, MAC and IP. When connected again after being offline, the new device name will be automatically loaded into the software.

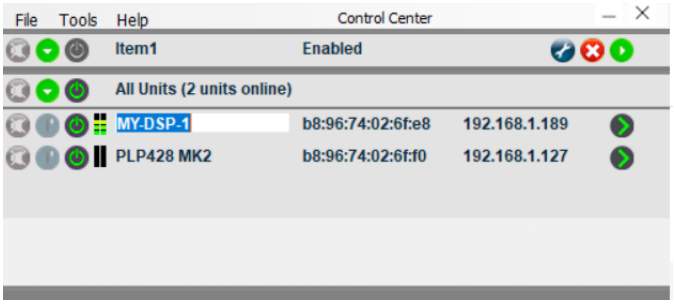


Figure-4

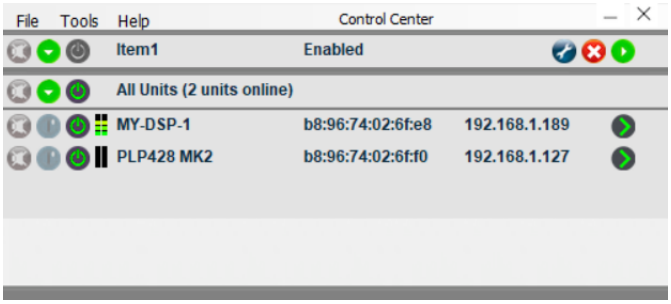


Figure-5

Select system langue

After clicking Tool to expand the drop-down window, hover the mouse on Language to open the subordinate window shown by the right arrow to select different display languages as shown in Figure-6. Currently, only Chinese (Simplified), Deutsch, English,and Nederlands are available. If you select Simplified Chinese, only the top options are listed in Chinese.

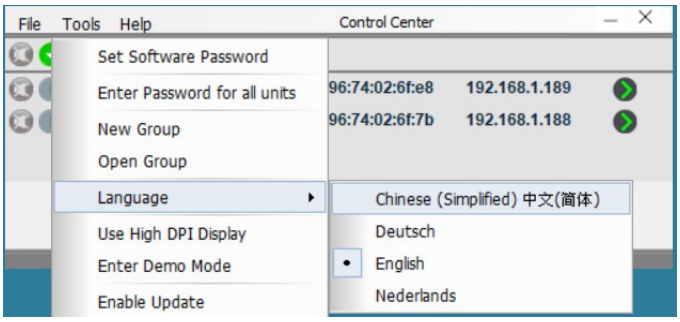


Figure-6

The following content will explain the complete software functions in English interface as shown in Figure-7.

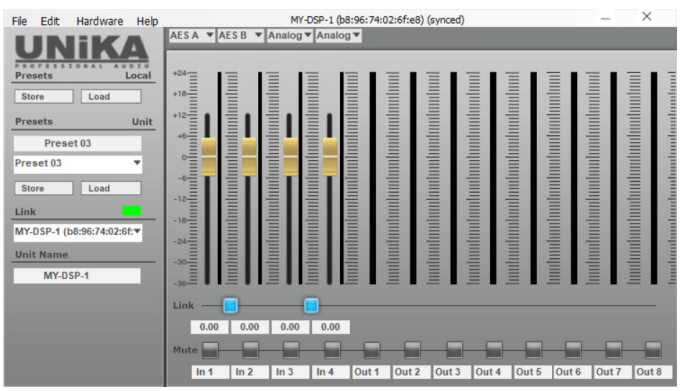


Figure-7

DSP-428II Preparatory work for DSP CONTROL

Advanced editing

Click the green arrow on the right side of the device IP that needs to be edited > as shown in Figure-8, you will enter the basic editing screen of User mode as shown in Figure-9, at this time the green arrow on the right side of the IP will turn to red as shown in Figure-10.

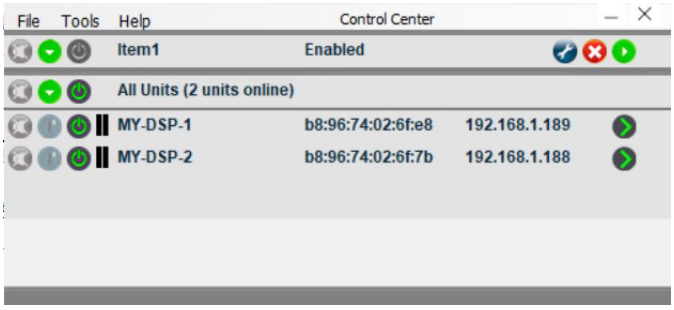


Figure-8

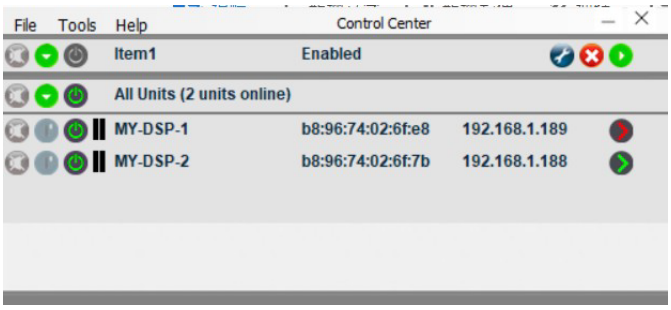


Figure-9

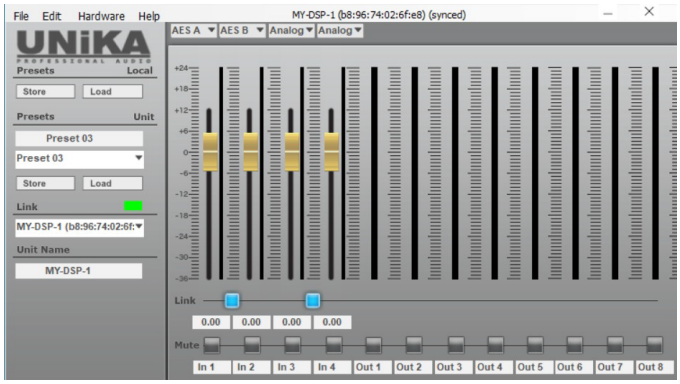


Figure-10

Then click the window option: Hardware>Password as shown in the Figgure -11, then enter the administrator password: 5678 as shown in the Figuire -12, and then click "OK" .

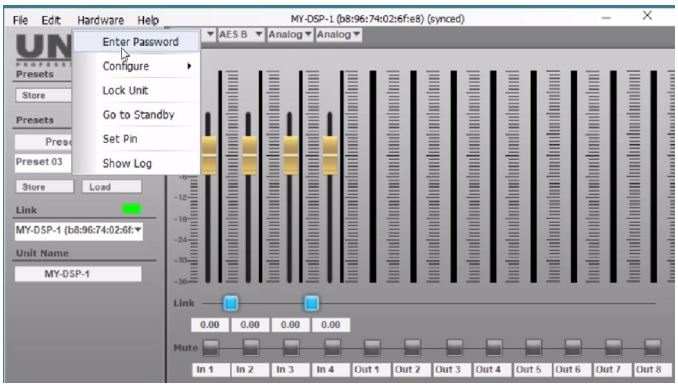


Figure-11

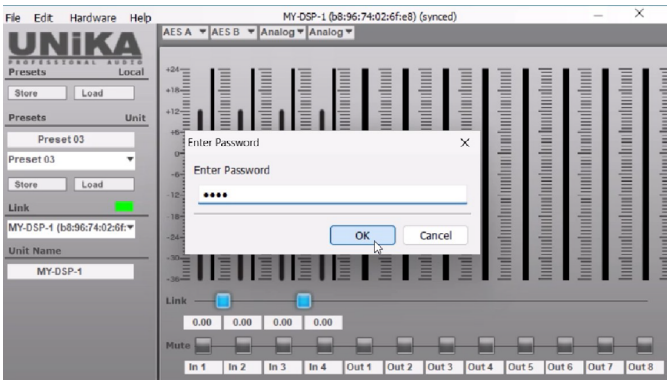
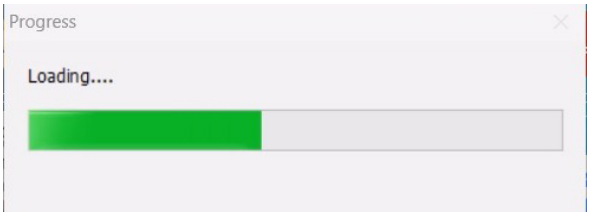


Figure-12

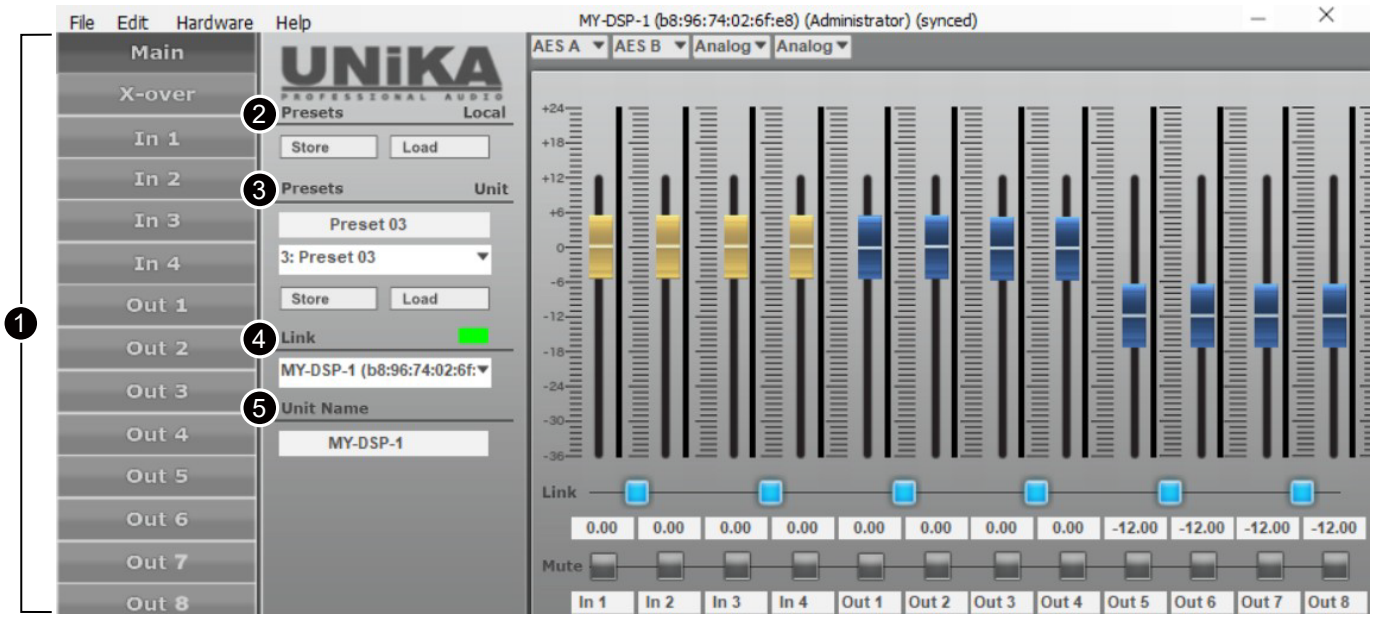


At this time, the Loading window will pop up to start the software. And the synchronization process between devices.

DSP-428II Preparatory work for DSP CONTROL

When the following screen appears, complete advanced editing can begin.

Main Page



The content displayed in 1-5 on the screen is explained as follows:

❶ **Click on any item to enter each page for editing. For example, if you click In 1, you will enter the paging of input channel 1, and the paging will be displayed on the right.**

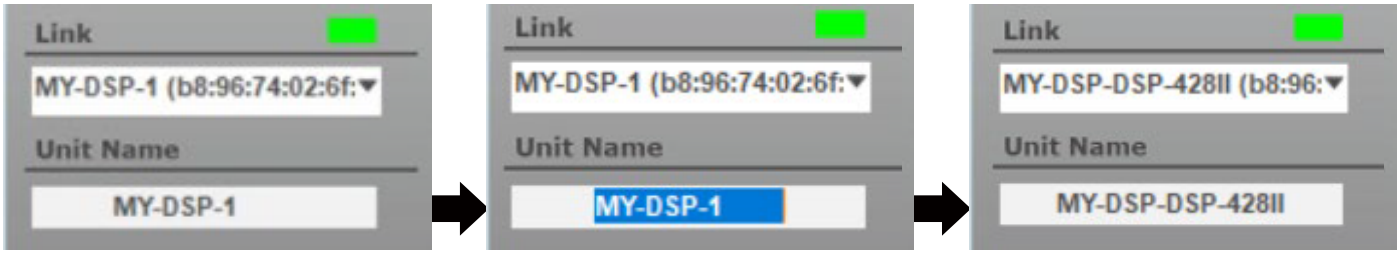
❷ **Presets_Local:** Here you can press Store to save the currently edited content to the computer. The suffix of the document is ".preset"; you can also press Load to download the preset content from the computer. Save the ".preset" document to the software for further editing.

❸ **Presets_Unit:** Here you can press Load to import the currently used state from the device, with a total of 1-6 presets available; you can also save the edited state of the software to the device. The 1-6preset is prepared, the name can be modified at will, and up to 16 English letters, symbols and numbers can be entered in the name.

❹ **Link_green square:** Link will display the name and MAC address of the device currently connected to the network and being edited. The green square indicates a successful network connection.

❺ **Unit Name:** Displays the name of the device currently connected for editing. This name can be modified in the first step of opening the software. It can also be modified and saved here. The name on the software's connection status page will also change accordingly after modification.

* Just press the text and it will turn blue and you can rename it.
You can enter up to 16 English letters, symbols and numbers for the name.



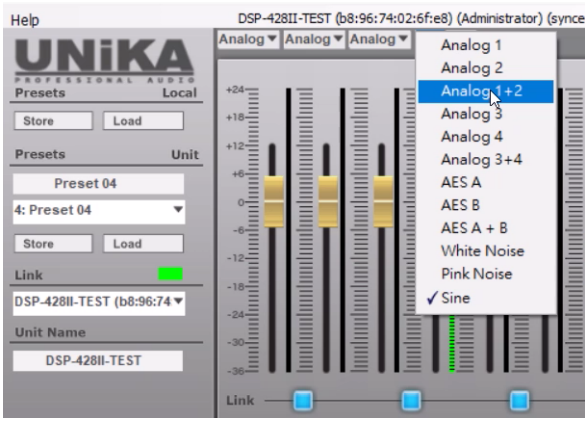
DSP-428II Preparatory work for DSP CONTROL

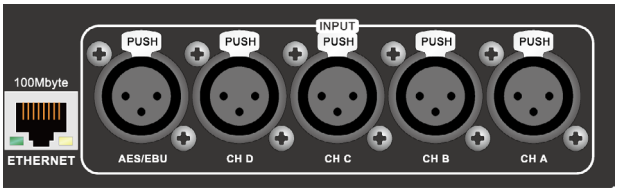
Things to note when saving the preset to the device,

1. The end user can only operate the 6 presets belonging to buttons 1-6 on the device panel.
2. The device software can save 1-100 presets to the device. After saving, Presets_Local can be displayed simultaneously on the device LCD display: Here you can press Store to save the current preset.
   The edited content is saved to the computer, and the file suffix is ".preset"; you can also press Load to download the pre-saved ".preset" file from the computer to the software for further editing.
3. Presets_Unit: Here you can press Load to import the currently used status from the device. A total of 1-6 presets are available; you can also save the edited status of the software to 1-6 presets of the device. The name can be modified arbitrarily, and the name can be up to Enter 16 English letters, symbols and numbers.
4. Link_green square: Link will display the name and MAC address of the device currently connected to and edited through the network. The green square indicates a successful network connection.
5. Unit Name: Displays the name of the device currently connected for editing. In addition to modifying the name in the first step of opening the software, it can also be modified and saved here. After modification, the name on the connection status page of the software will also change accordingly.

Select input signal source,

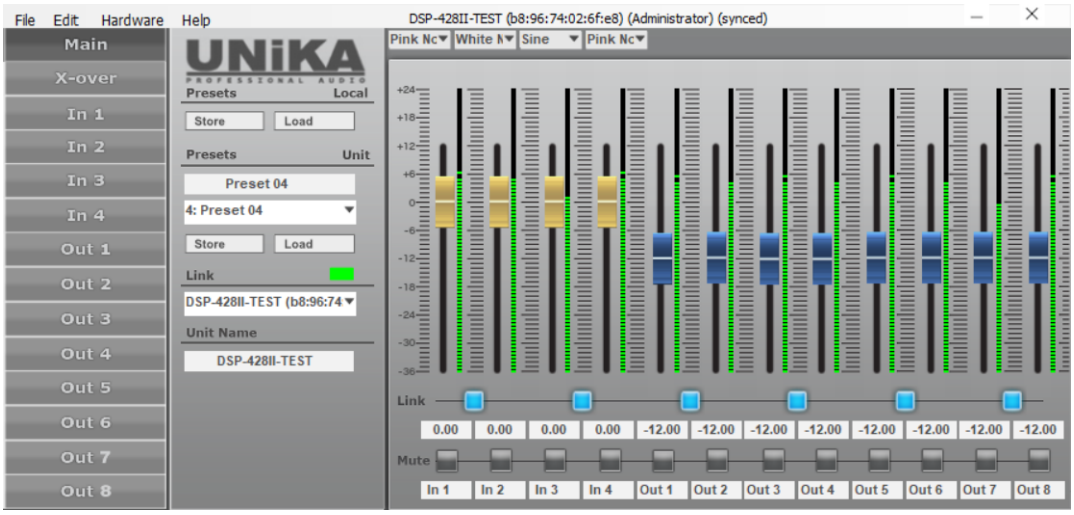
There are 4 drop-down windows for selectable input methods above the volume fader of the input signal, which correspond to the Analog analog input CH A/CH B/CH C/CH D and AES/EBU digital input as shown on the right, each input channel All have 9 different input methods to choose from, including any Analog or Analog combination, AES/EBU single side channel or A stereo channel.





Anglog 1-4 = CH A - CH D

In addition, when using the built-in RTA to test FIR, each input channel can select Pink Noise, White Noise or Sine (1KHz) sine wave signal generated by the program.



DSP-428II Using FIR and RTA

Introduction

The ALLCONTROL Software provides FIR calculation functions for hardware that supports FIR filters, and an RTA (Real Time Analyzer) option that can be used in combination with the FIR filter, but is independent from the hardware. This document describes the use of both options.

It is assumed that you know what a FIR filter is, what the difference between IIR and FIR filters is and that you understand the concepts of truncating, convolution, group delay and related topics, as well as transfer function, power compression, directivity etc.

Using the RTA function

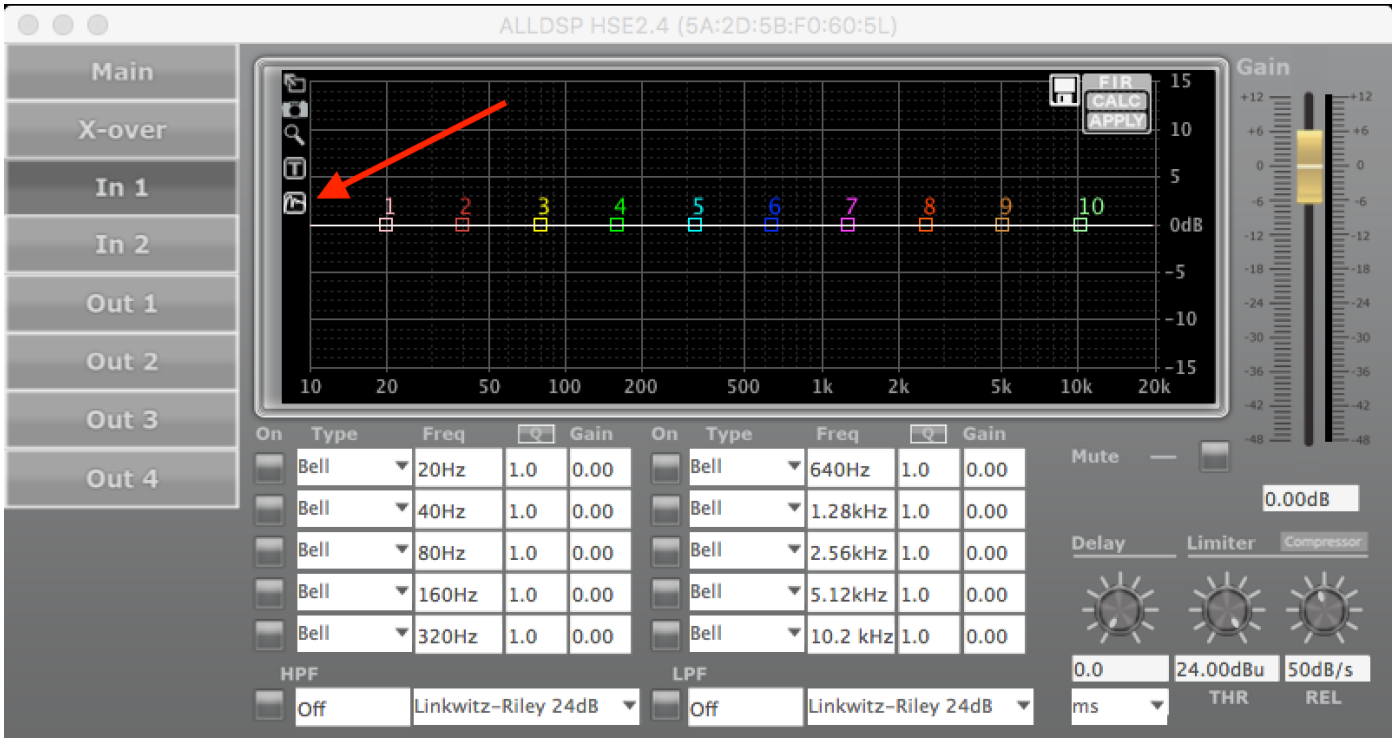
The RTA enables you to visualize the spectrum of the audio signal. By using this to measure the output of the loudspeaker to replay white noise or pink noise or 1KHz sine wave, you can find the transfer curve of the loudspeaker. Although other applications exist, we will focus on this application.

To measure a transfer curve, select a signal from input channel's signal selection to play white noise or pink noise and assign those channel into your specific output channel by AllControl software and adjust the volume to a reasonable level.There is no need for high SPL measurements unless you want to test power compression.

Now go into the channel you want to adjust. For a 2-way system this may be the HF or LF channel, or it may be the input channel to adjust the overall transfer function. If you plan to use the RTA measurement to control a FIR filter, choose a channel that supports FIR.

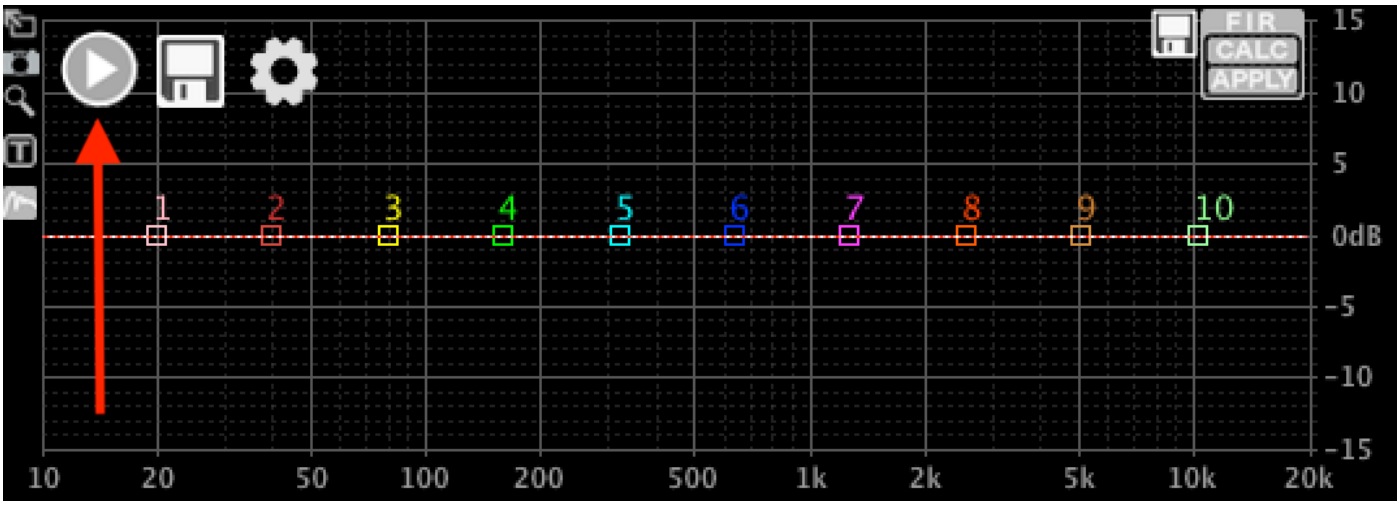
STARTING A MEASUREMENT

First you need to enable the RTA function. To do so, click the RTA icon in the graphical window.

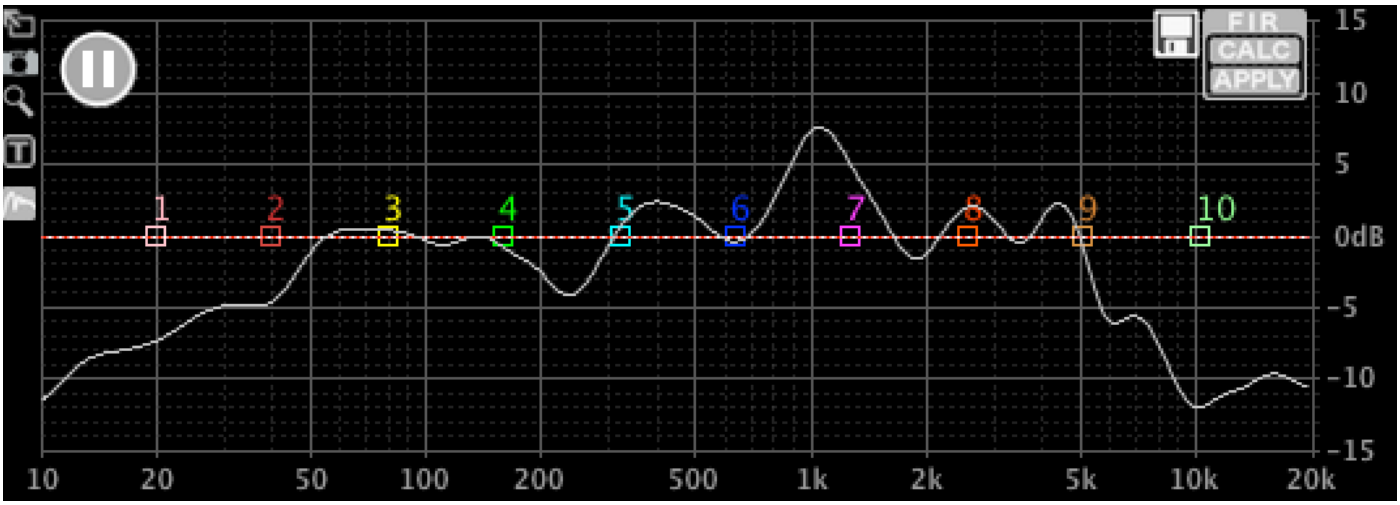


DSP-428II Using FIR and RTA

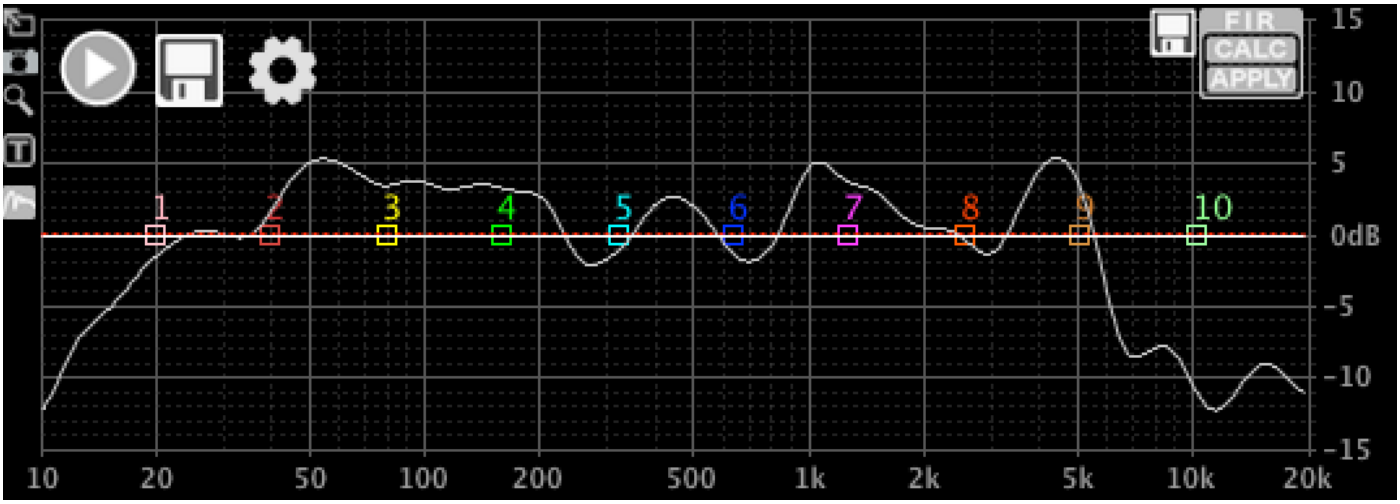
The RTA function will be enabled. To start the measurement, click Play:



This will start the RTA with the default settings. A measured response will be shown:



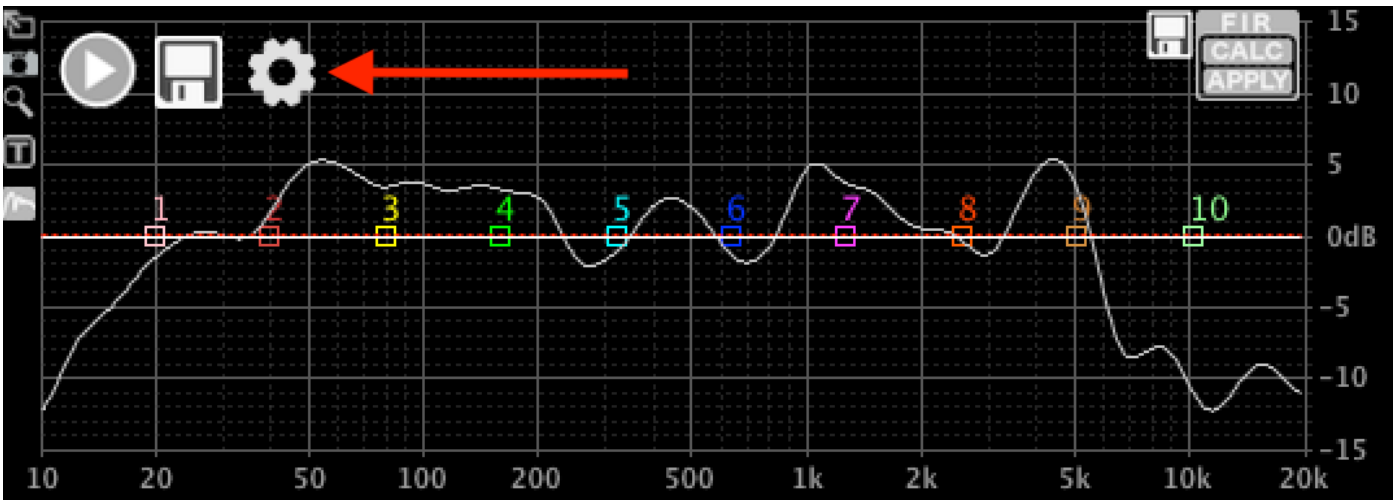
Click Pause to stop measuring:



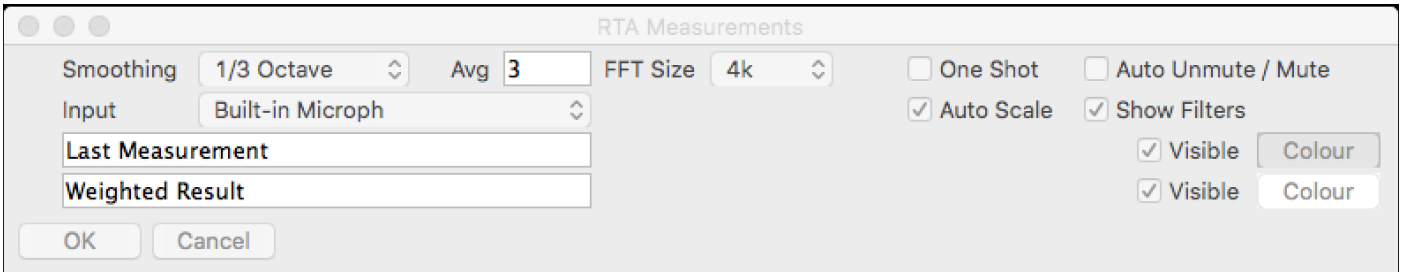
DSP-428II Using FIR and RTA

MEASUREMENT OPTIONS

Now that you have made a first measurement, let's have a look at the measurement options.
Click the Settings button:



A window will open with the measurement options:



- Smoothing: Choose the frequency smoothing. For manual measurements and settings, 1/6th or 1/3 Octave is recommended. For automatic FIR adjustment, this may lead to unexpected results due to room interference; in this case, a setting of 1/2 to 1 Oct is recommended.
- Avg: Choose the number of measurements that are averaged. The averaging function is a moving average over Avg samples. For fast indications, 1 to 5 is OK; for accurate measurements, you may want to increase this value to 10 or more.
- FFT size: The size (length) of the sampled data. With a size of 4k, lower frequencyes are not accurately measured, but the measurement is fast. Larger size leads to more accuracy in the low region, but longer measurement times. To see the accuracy, try setting the smoothing to "Off"; then you will see the actual data points.
- One Shot: When selected, one reading consisting of "Avg" measurements will be taken. When deselected, the measurement is continuous.
- Auto Mute / Unmute: When selected, the software will automatically mute the hardware at the end of each measurement, and unmute it before the next measurement. Use this in combination with the One Shot setting to go easy on your neighbours.
- Input: Select the source fo the measurement. A proper measurement microphone is recommended; the measurement is only as good as the microphone.

- Auto Scale: Manual scale is not supported yet. Please leave this check box selected.
- Show Filters: When deselected, the filter (PEQ, HPF, LPF, FIR) response curves will not be drawn.

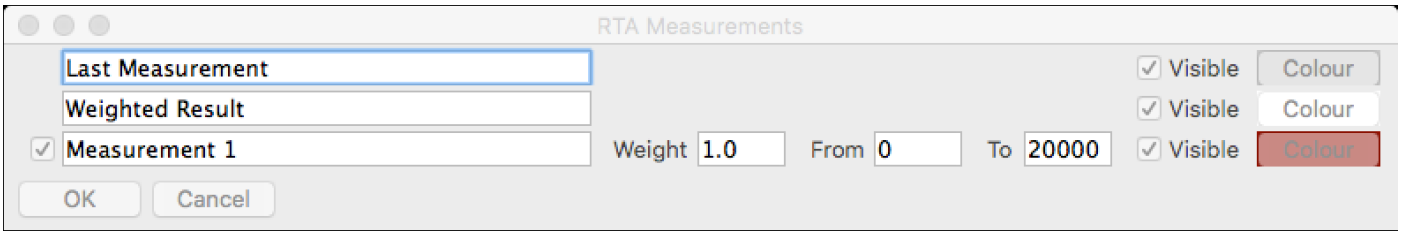
Below the options, a list of saved measurements appears. When no measurements have been saved yet, only the default curves are listed:

- Last Measurement: This is the as-yet-not-saved measurement. Select if it is visible or not by clicking “Visible”; select the colour by clicking “Colour”.
- Weighted Result: When saving multiple measurements, these can be combined into one Weighted Result. Select visibility and colour here.

Feel free to play around; it will not explode.

SAVING AND COMBINING MULTIPLE MEASUREMENTS

After making a measurement, look at the curve and see if it is plausible. Measurements can be distorted by nearby objects (walls, floor, people, bookshelves). Try measurements in different places to see what happens. When you are satisfied with a measurement, click the Save button.



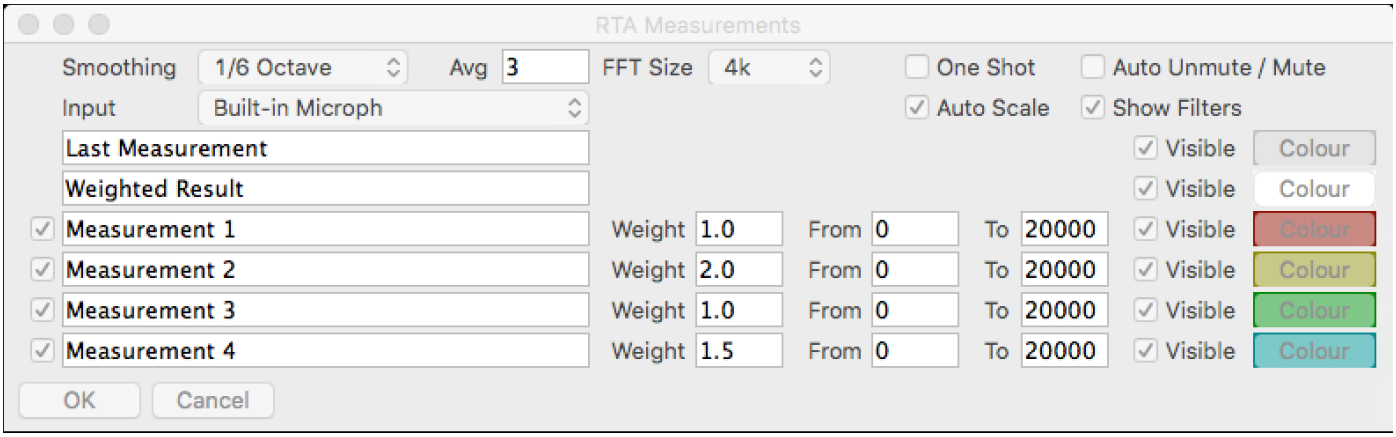
One more line is added to the measurements. You can set some options:

- Enabled: When deselected, this measurement will not be visible and will not be taken into account for the weighted result.
- Name: You can set the name for each measurement.
- Weight: The weight of each measurement determines the relative importance of each measurement when calculating the weighted result. For instance: When you have one measurement with weight 2 and another with weight 1, the first measurement will be twice as influential in the result. Choose any number other than zero.
- From: The bottom end of the frequency range where this measurement is used. More on this on the next page.
- To: The top end of the frequency range where this measurement is used. More on this on the next page.
- Visible: When deselected, the measurement will not be visible, but will still be taken into account for the weighted result.
- Colour: Select the colour of the displayed curve plot.

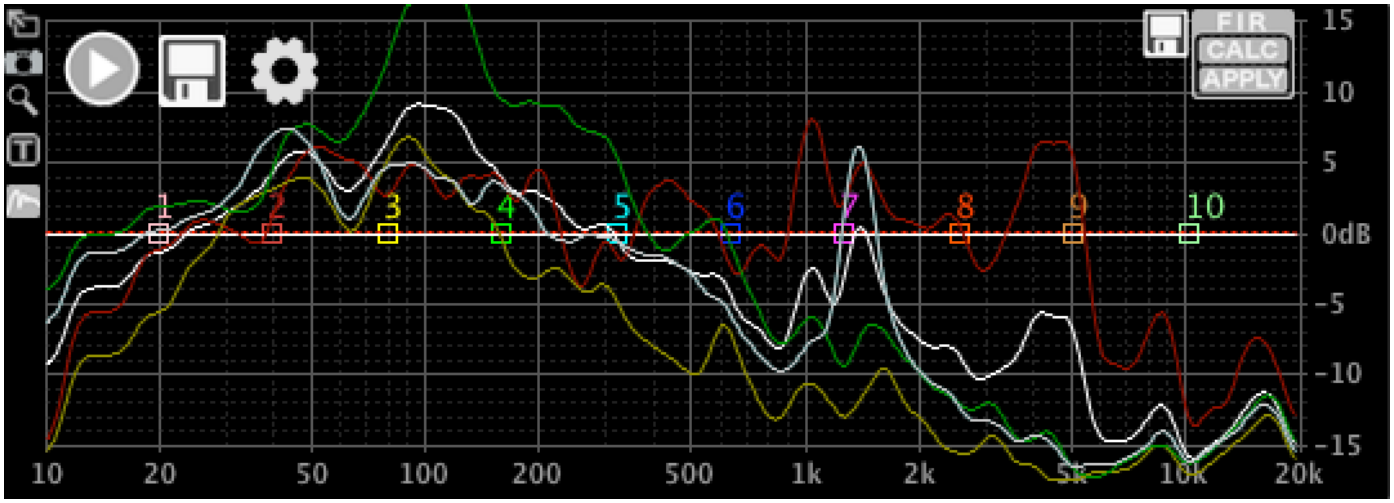
Normally, one would make several measurements, e.g. for different listening positions to take the room into account, or from different angles w.r.t. the loudspeaker to take the directivity of the loudspeaker into account. I will not go into the details of why and how to measure for optimal results; that is not the scope of this document, and there is plenty of information on that in the Internet.

DSP-428II Using FIR and RTA

After saving several measurements, the Settings window looks like this:

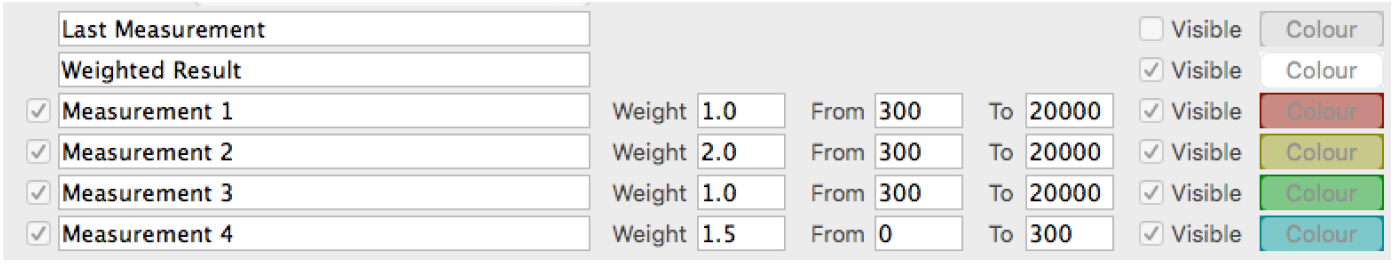


And the graphical window like this:



Now you can combine these measurements into one averaged result. In the image above, measurements 2 and 4 have a greater weight than the other two; these would be e.g. on-axis results, or my favourite listening position.

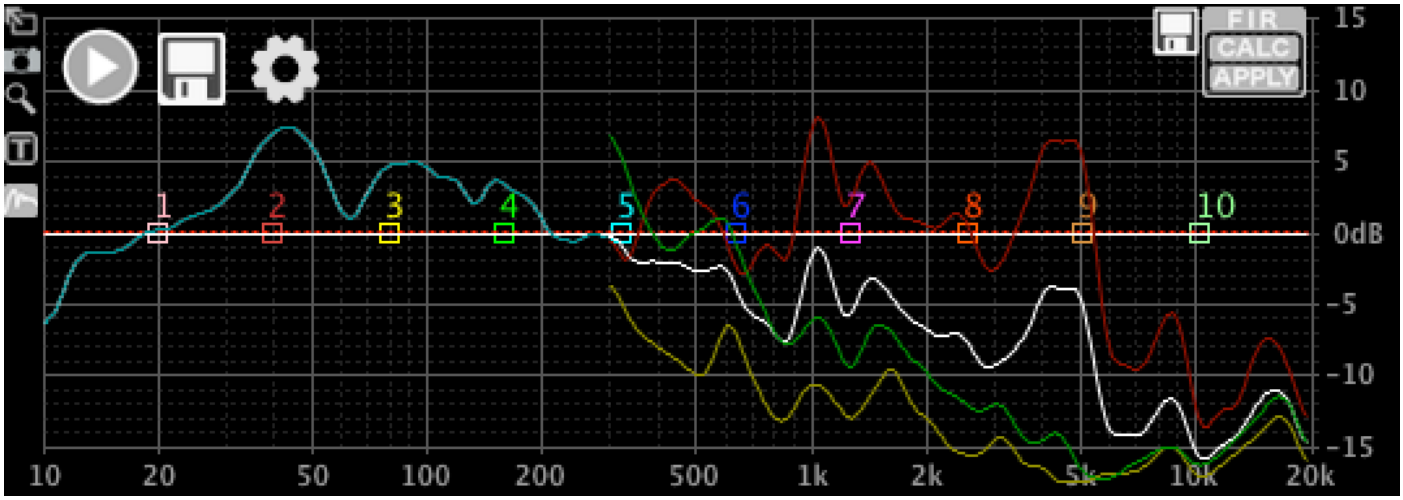
Now let's assume that measurement 4 (the blue one, also the last one, so shown light grey here) was done close to the woofer, and I think this data is very useful for the low end up to 300Hz, but irrelevant for the rest of the frequency spectrum; and the other measurements are relevant for 300Hz and higher. I can se the "From" and "To" fields like this:



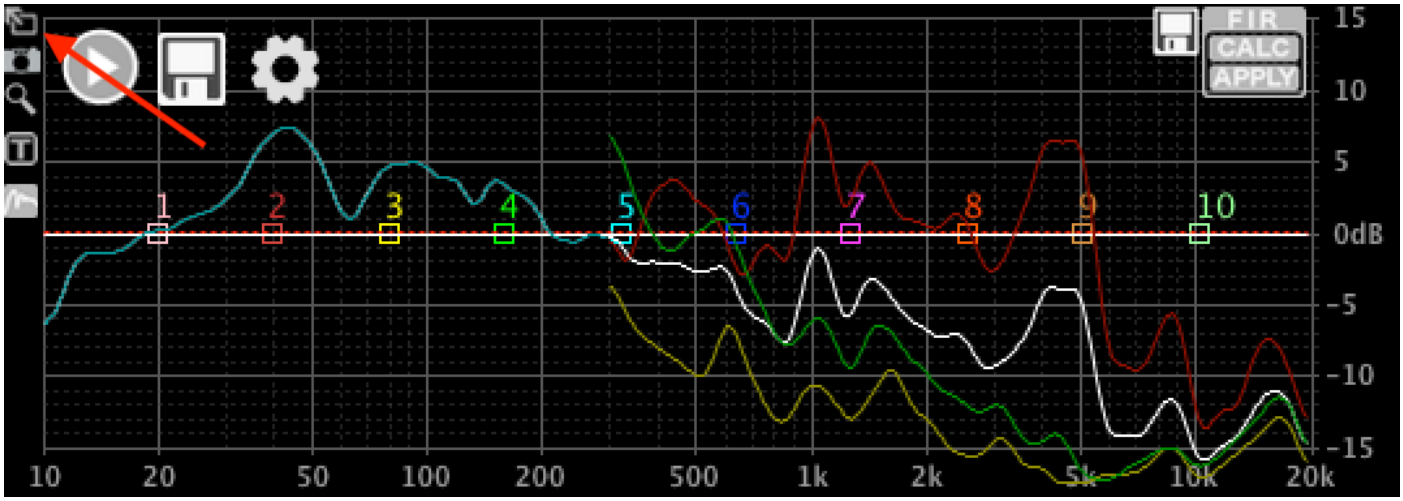
I also set the Last Measurement to invisible so as not to be in the way, since I am done measuring for now.

DSP-428II Using FIR and RTA

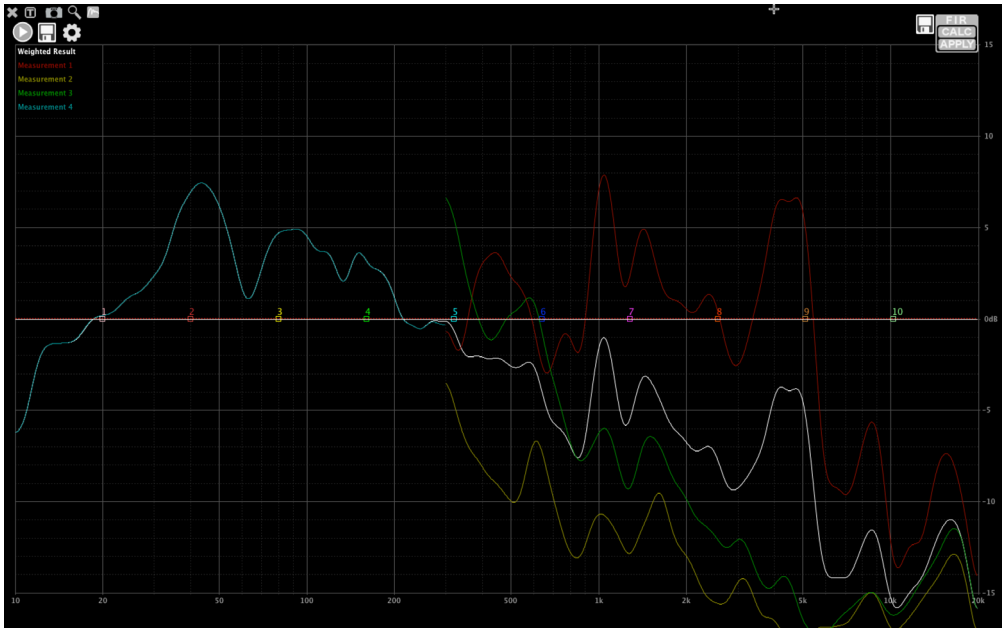
The graphical window will look like this:



For more detail, I will go to Full Screen Mode. Click the Full Screen button:

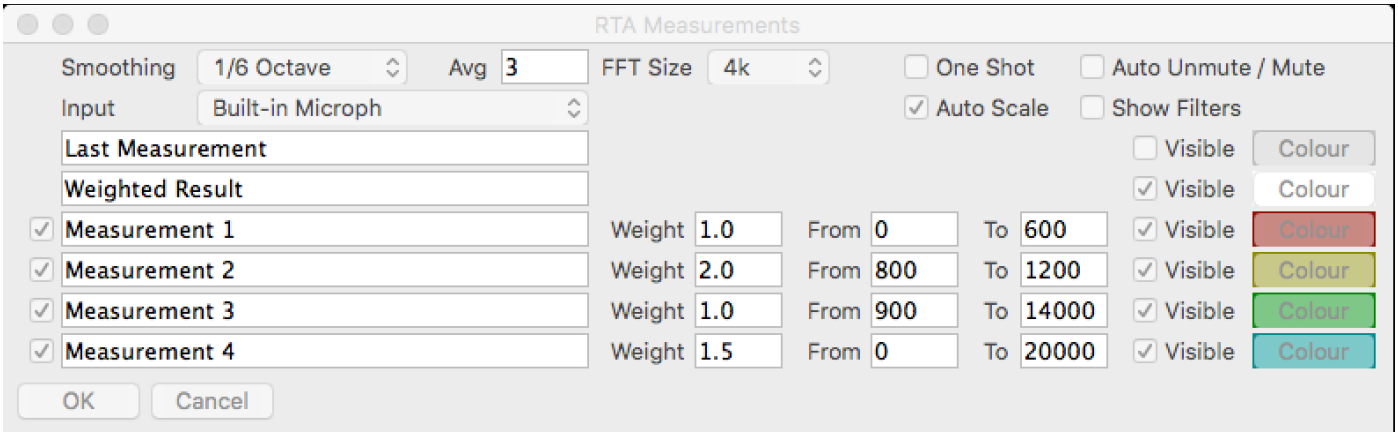


The graphical window will fill the size of the unit panel. Click the same button again to use the whole display area for maximum detail.

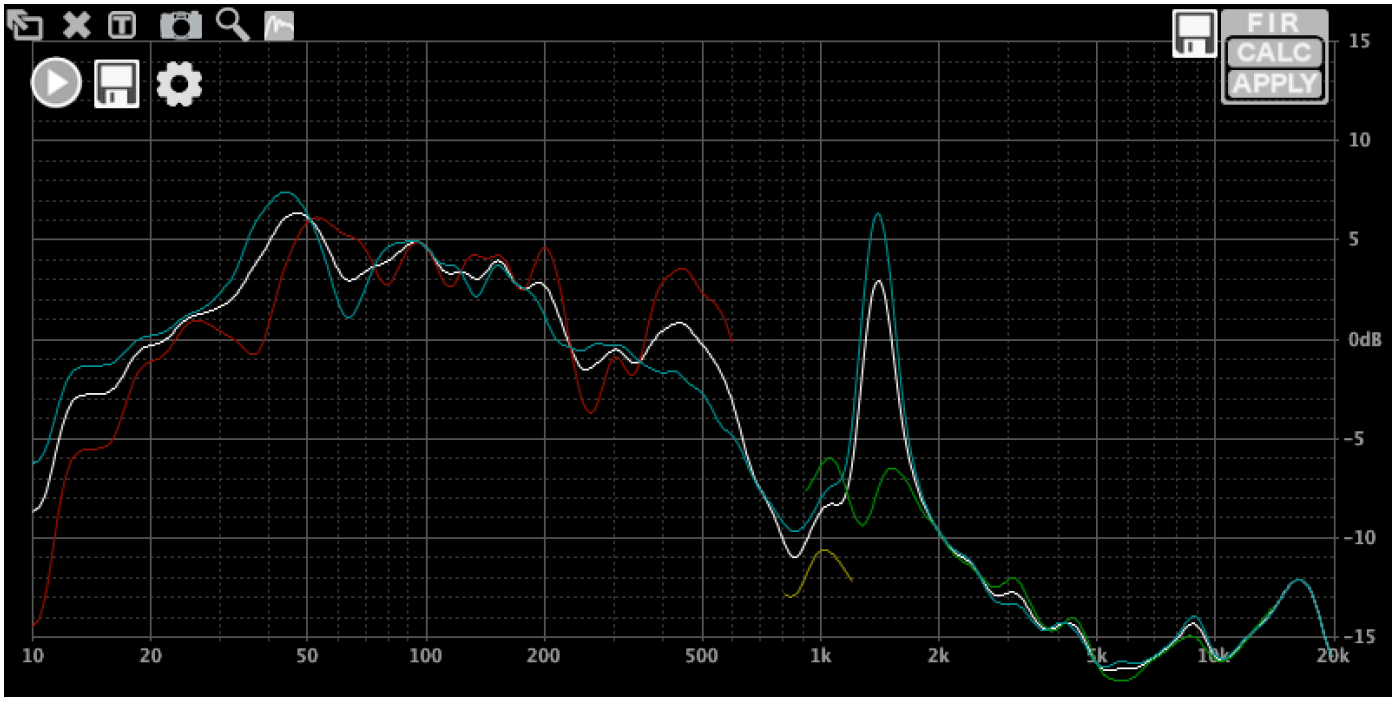


DSP-428II Using FIR and RTA

You can play around with different frequency and weight settings to reach the desired weighted result.
One more example: Settings:



And the result:



DSP-428II Using FIR and RTA

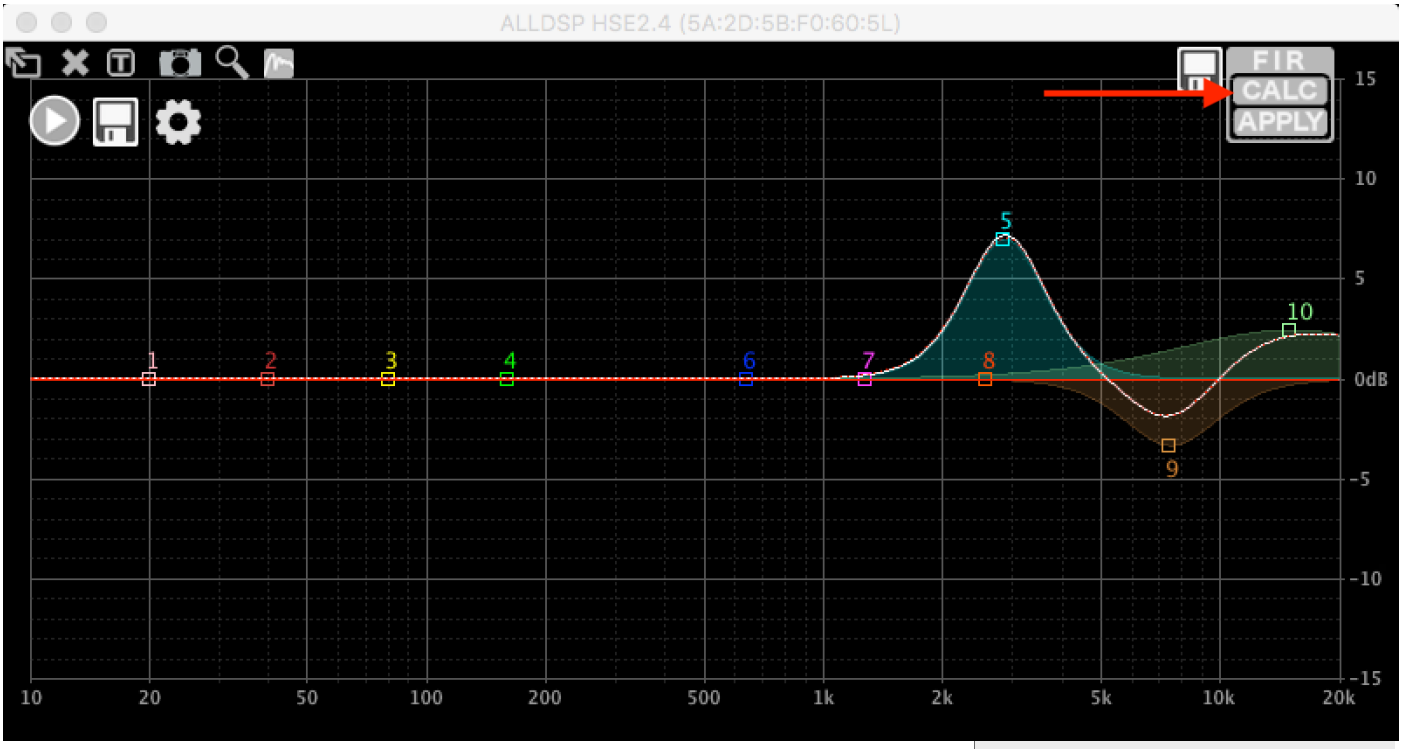
Using FIR filters

There are 3 ways to define a FIR filter in ALLCONTROL: Load from a file, create by using PEQs and crossovers to draw a target response, and by inverting the RTA measurement.

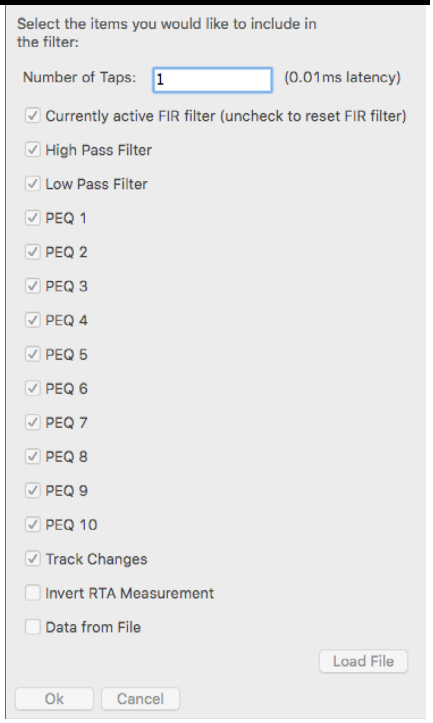
When a unit is connected, the filter that is loaded will be shown on the display as a white line. In this example, no FIR filter has been loaded yet. Let's change that, shall we?

CREATING A FILTER FROM PARAMETRIC EQUALISERS

First, set some PEQs to create a target response, then click "CALC" in the FIR corner:



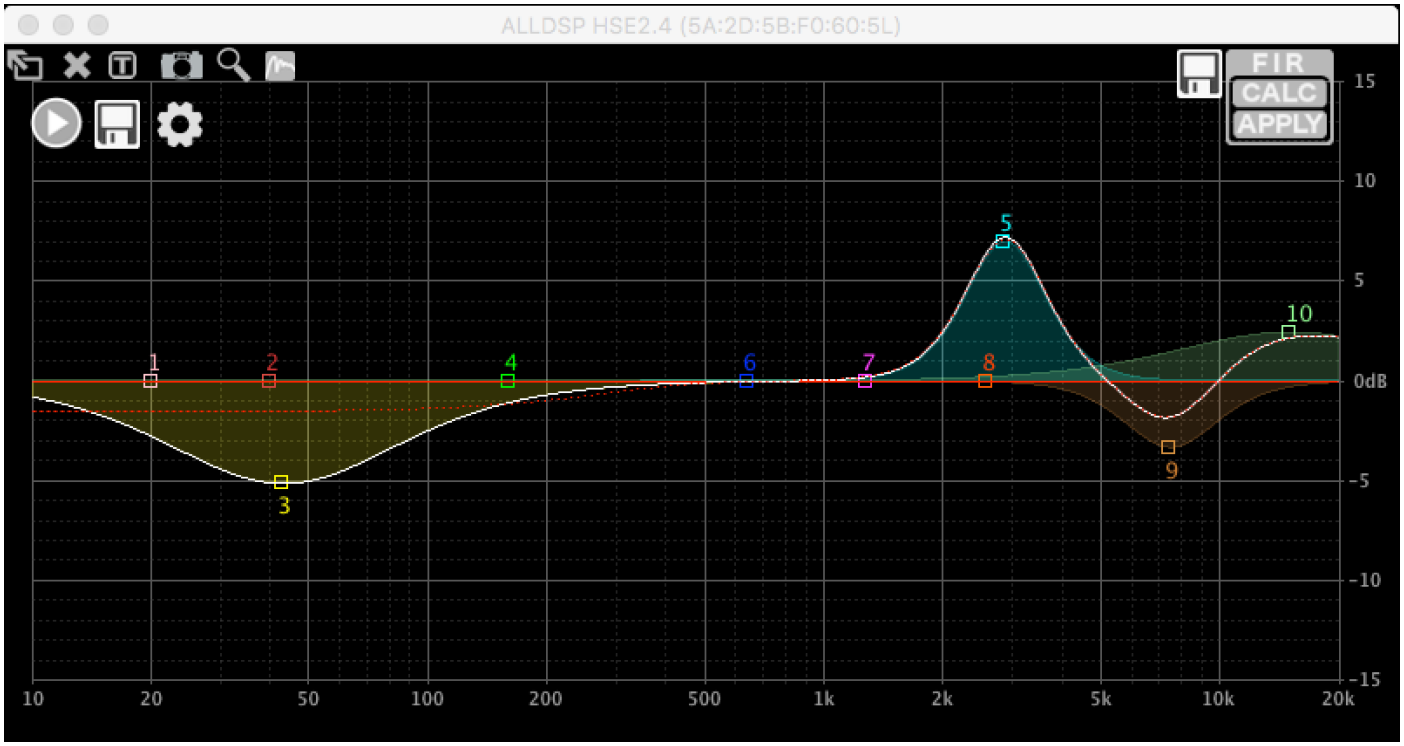
A pop-up window will appear with some options:



- Number of taps: You can select how many taps of the FIR filter are used. More taps means more accuracy in the low end, but also means that the filter will cause more latency. The filters we generate are all linear phase with a symmetrical impulse response, and the latency is therefore equal to half of the filter length.
- Currently active filter: You can add to the filter that is currently active in the hardware, or you can start from scratch by deselecting this option.
- HPF, LPF and PEQs: You can choose which filter will be converted to FIR and which will be ignored. It is common practice to use IIR for low frequencies and FIR for higher frequencies to keep the latency down to a minimum.
- Track changes: The FIR calculation will be updated automatically as you change PEQs.
- Invert RTA measurement: We will come to that later.
- Data from File: We will come to that later.

DSP-428II Using FIR and RTA

Select 256 taps (the maximum number for the hardware that is used for this example), deselect “Currently Active FIR filter” and click OK. In the graphical screen you will see a dotted red line indicating the calculated FIR response. As you can see in the screenshot above, it is perfect as far as the display resolution allows us to see. The red dotted line is the calculated response from the FIR coefficients; so any deviations will be visible here. This becomes clear when we try to use this FIR filter to change the low frequency response:

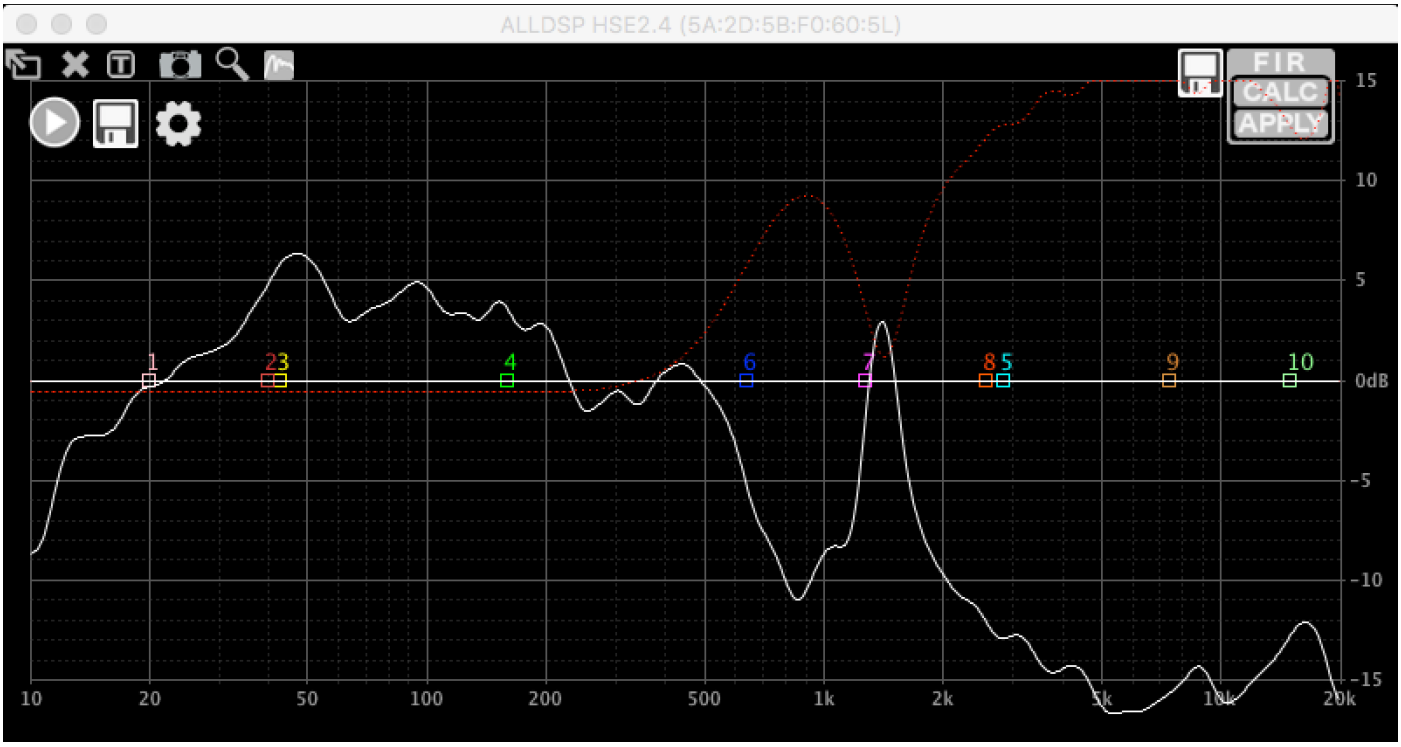


As you can see, the deviation below 200Hz is quite serious. In other words: A 256 tap FIR filter is useless in this frequency region. Which is to be expected, it is caused by the “finite” in the name FIR. You can use the red dotted line to see the result of the approximation.

DSP-428II Using FIR and RTA

INVERTING THE RTA MEASUREMENT

We can also create a filter by inverting the RTA measurement. Using the measurement we did in the previous chapter, the result looks like this:

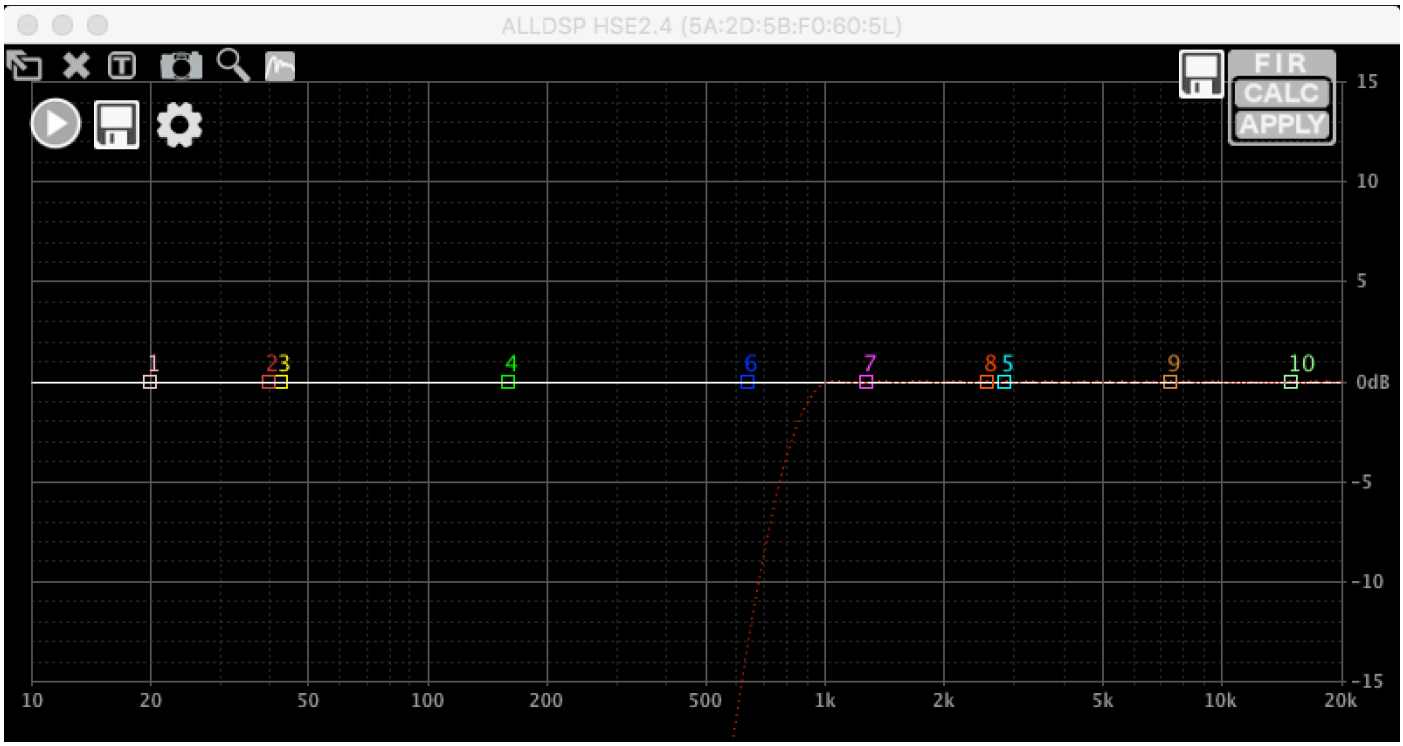


As you can see, it only works above appr. 300Hz. Below that, the response is automatically reduced, taking the amount of taps into account. The red dotted line again shows the expected response.

DSP-428II Using FIR and RTA

LOADING A FILTER FROM A FILE

Click CALC, then “Load File”. Select your file. If the number of taps in the file fit in the FIR filter, it will be loaded automatically. If the number of taps exceeds the available filter size, the filter will be truncated. ALLCONTROL supports 24 and 32 bit fixed point files, and floating point files. Any lines that do not contain a number (such as comments) will be ignored. You can generate FIR files with many 3rd party programs, or even online. Here is a 1k HPF, generated with ScopeFIR:

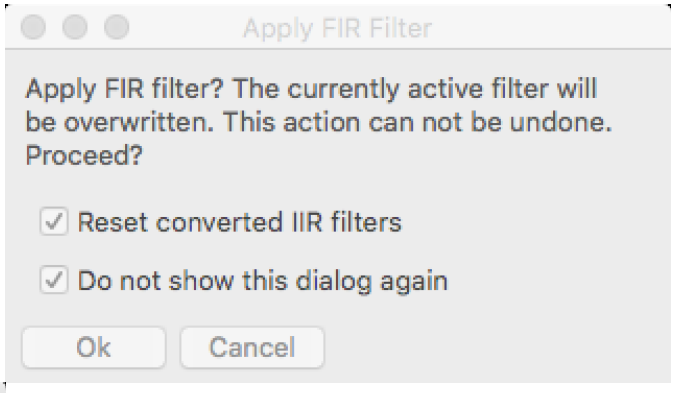


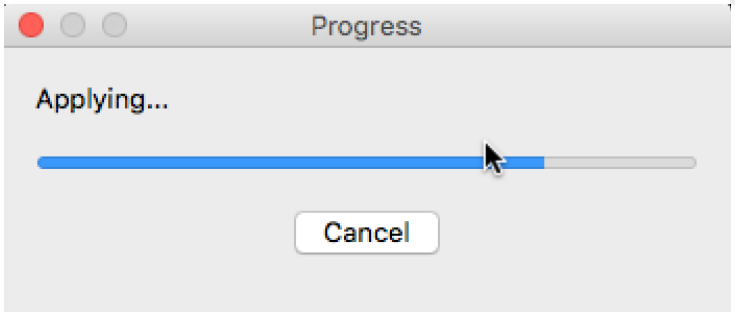
Again, the dotted red line indicates the calculated frequency response.

SENDING A FILTER TO THE HARDWARE

When you are satisfied with the response indicated by the red dotted line, click APPLY to send the filter to the hardware. A window will appear with two options:

- Reset converted IIR filters: When selected, the software will automatically disable the IIR filters that were converted to FIR.
- Do not show this dialog again: Speaks for itself, doesn’t it?

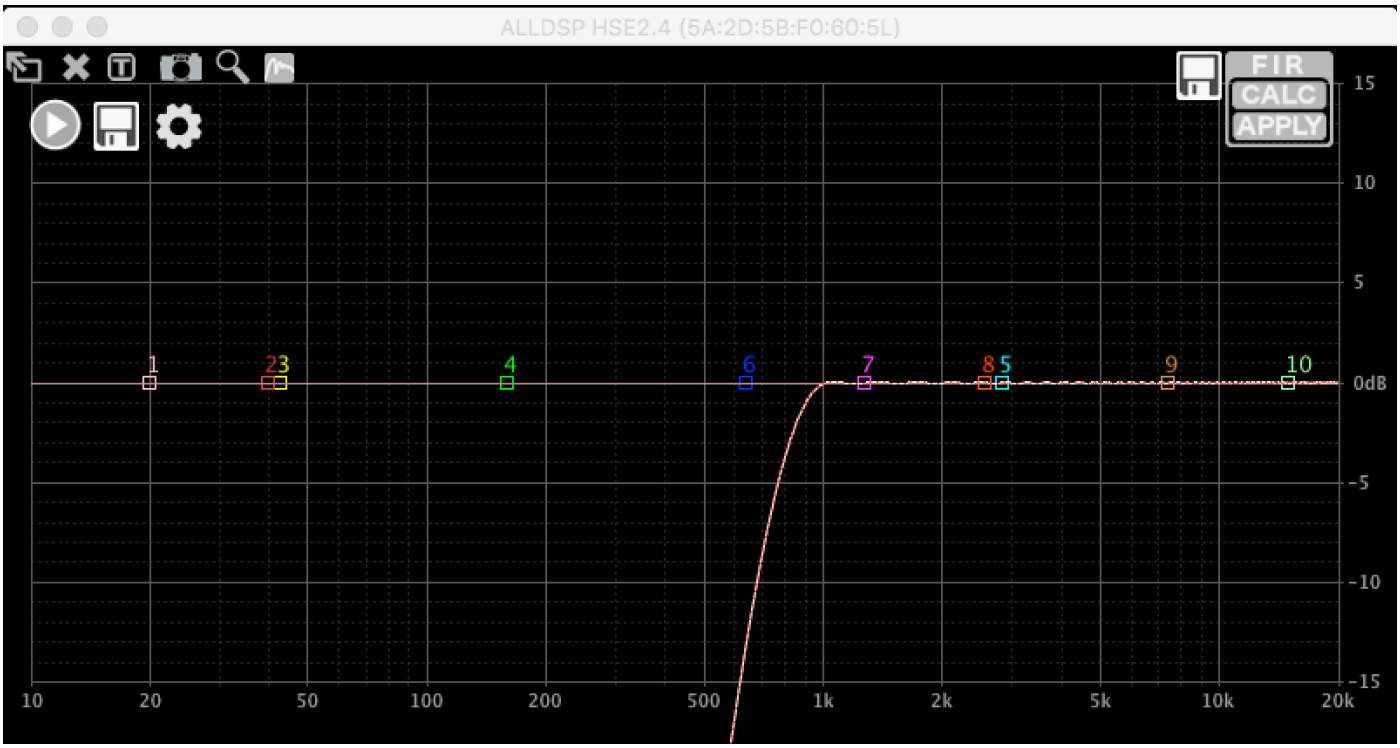




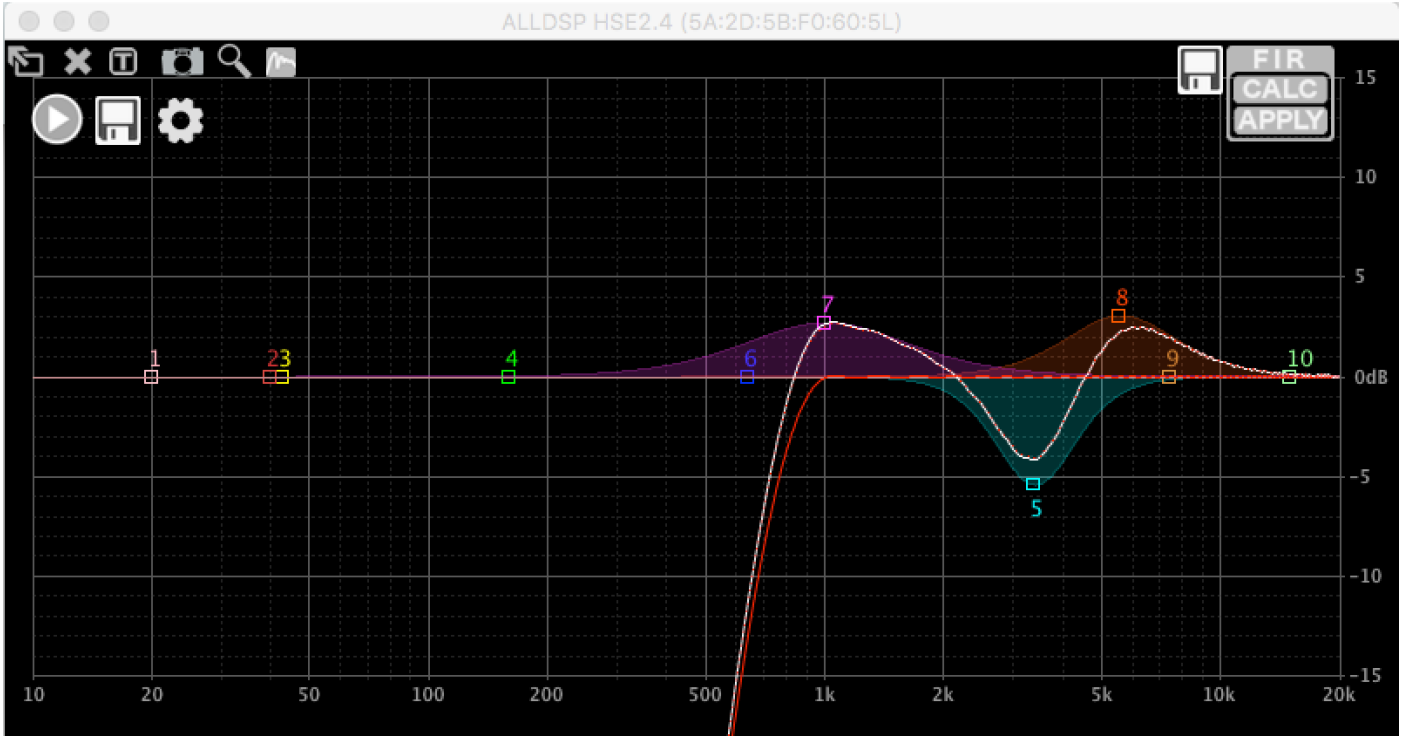
The communication can take some time to complete, depending on filter size and connection speed.

DSP-428II Using FIR and RTA

If no other filters are active, the response will be shown as a white line:



When you add PEQs now, you will see the white line will follow the PEQs, as well as the red dotted line; the red dotted line is the newly calculated FIR filter, following the changes you are doing with PEQs, and the white line is the overall frequency response. If some PEQs are not taken into account in the FIR calculation, the white line will include them (because that is the overall frequency response) but the red dotted line will not. There will also be a solid red line, which is the response of the FIR filter that is currently loaded in the hardware:



SAVING FILES

Click the disk icon next to the FIR block to save a filter as a text file. The filter that is loaded in the hardware will be saved to disk, and can be loaded into other channels or saved for later use. Here is the FIR file of this example (omitting most coefficients):

FIR filter generated by ALLDSP ALLCONTROL software. Sample rate: 48828Hz, 255taps

-0.00251117721317	0.000422636978525	3.95923853105e-05
0.000136785209243	0.000440970994737	-4.697032275e-05
0.000140666030413	0.000454998575363	-0.000135075300995
0.000148858875106	0.000464653596498	-0.000237385742477
0.000161494128481	0.000468616374055	-0.000340500846664
0.000177634880029	0.000467024743774	-0.000444556586651
0.000197263434621	0.000458568334793	-0.000553787686189
0.000219509005649	0.000443564728109	-0.000663964078139
0.00024409592163	0.00042071472873	-0.000775675289694
0.000270059332377	0.00039056222904	-0.000885844231064
0.000297261402149	0.000351847149596	-0.000994163565801
0.00032448116705	0.000305717811131	-0.00109791569463
0.000351532362565	0.000250644981978	-0.00119658745881
0.000377209857282	0.000188274309127	
0.000401332974621	0.000117114745135	

Conclusion

We believe that these functions provide you with powerful tools to use FIR filters and RTA measurements conveniently. Development is ongoing (as always), so functionality will be added in the future.

The examples in this document were made with software version 3.8.23 build 117010. Earlier software versions will have more limited functionality. Please always upgrade to the latest version as found on https://www.alldsp.com/software.html

DSP-428II Technical Specifications

Inputs	
Analog Inputs (electronically balanced)	4
Dynamic Range	typ. 125dB(A)
Max. Input Level	+24dBu
Input Impedance (balanced)	21kΩ
Input Impedance (single ended)	10.5kΩ
Digital Inputs	1x AES/EBU
0dB at the LED level indicator	1Vrms
Outputs	
Analog Outputs	8
Dynamic Range	typ. 120dB(A)
Maximum Output Level	+12dBu
Noise floor at lowest signal level setting	< -104dBu(A)
Source Impedance	235Ω
0dB at the LED level indicator	2Vrms
System	
Input-to-output latency	350μs
Gain	0 +/-0.5dB
Dynamic Range (unity gain)	> 116dB(A)
T.H.D. (@0dBV, 1KHz, unity gain, DSP only)	<0.005%
Frequency response	10-40KHz +/-0.5dB
DSP	
Number of processors	3
Sample rate	96KHz
FIR	8 x 384 taps
Presets	100
Delay	2000ms (in) 50ms (out)
PEQ (each input and output)	10 bands
Grouping EQ (each input)	5 bands
Crossover (each input, LPF and HPF)	24 dB/Oct
Crossover (each output, LPF and HPF)	48 dB/Oct
Filtered Compressors (each input and output)	4 bands
Limiter (switchable true RMS / Zero Attack, each in and out)	1 bands
Power Supply	
Universal Power Supply	100-240 VAC, 50/60Hz
Power Consumption	20W max.
Fuse	0.5A/250V
Others	
Dimension (W x H x D) ex. Rack Ears	445 x 44.5 x 145 mm
Nett Weight	2.0kg
Shipping Dimension (W x H x D)	553 x 70 x 243 mm
Shipping weight	2.65kg
Content of Master Carton	6 pieces

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