Detailed Instructions for Advanced DSP Functions

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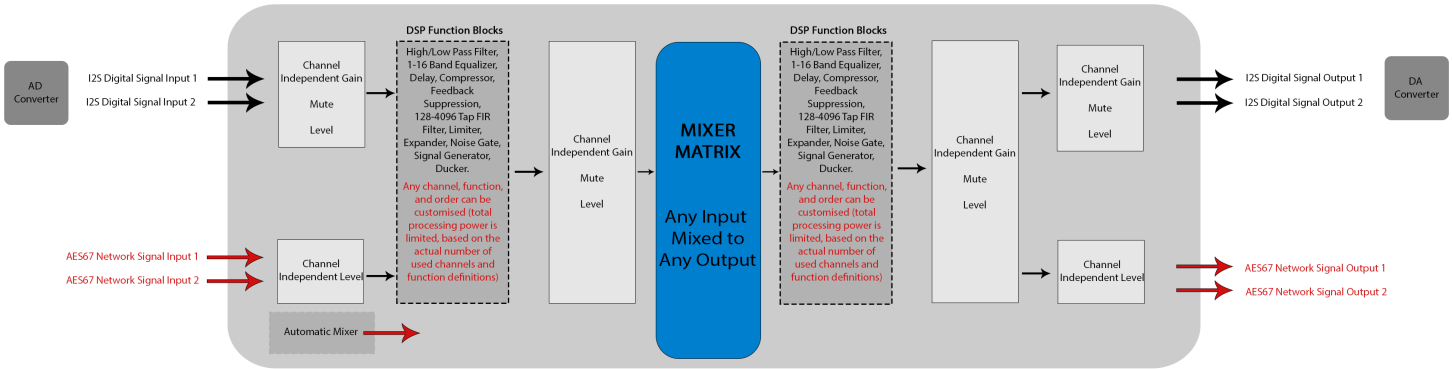
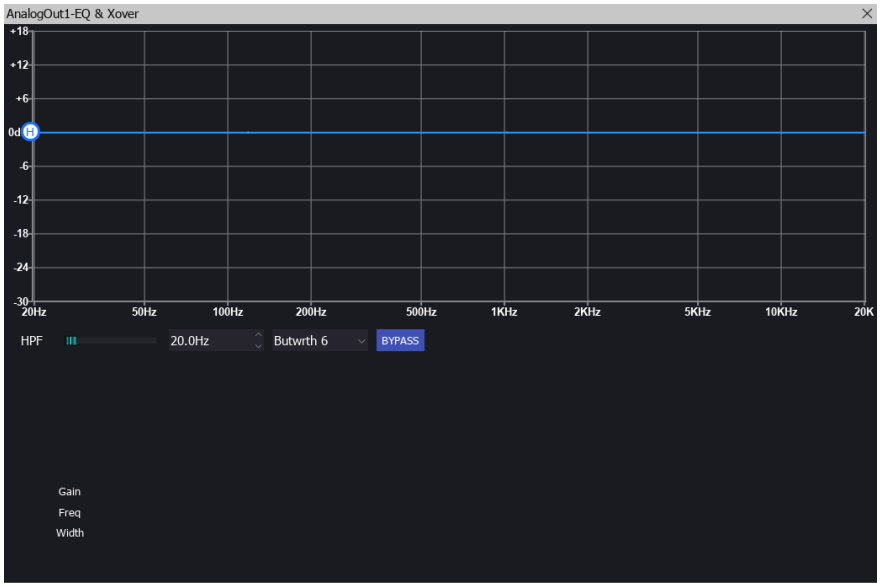
1. Signal Flow Chart of DSP Module Equipped Devices:



2. Custom Function Blocks in the Signal Chain:

These are the modules you can add to any “+” marked places of the signal chain from the Editor menu:

2.1 High Pass Filter

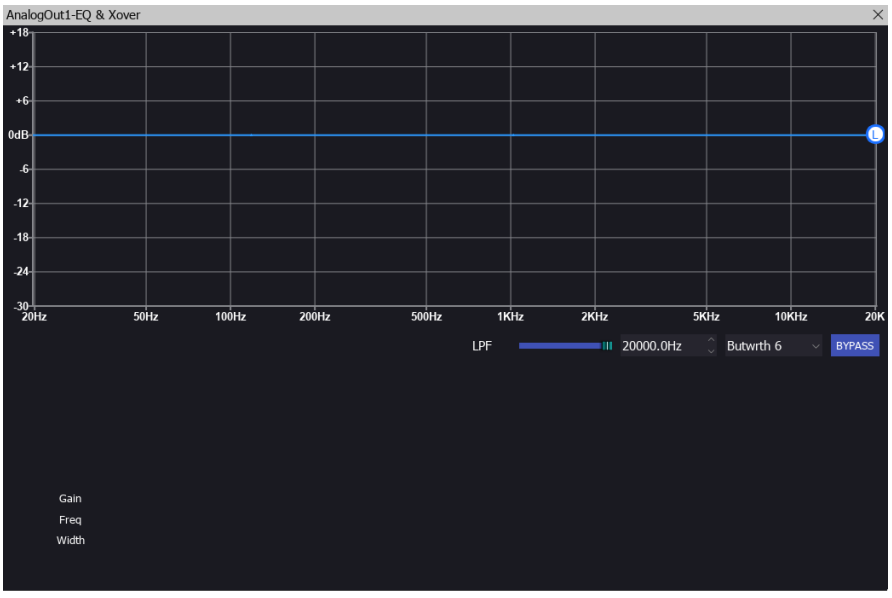


BYPASS: Toggle Bypass / Enable of the function.

HPF: You can adjust the cutting frequency of the high pass filter with the **slider** between 20-19900Hz or typing the value manually between 19.7-20200Hz up to one decimal accuracy.
You can also drag the Ⓗ to adjust the frequency.

Butwrth 6: Here you can select the characteristics of the cutting frequency.
The types of filters are the following:
Butterworth (Butwrth): 6/12/24/36/48 dB/oct
Bessel: 12/24/36/48 dB/oct
Linkwitz-Riley (Lnk-Ril): 12/24/36/48 dB/oct

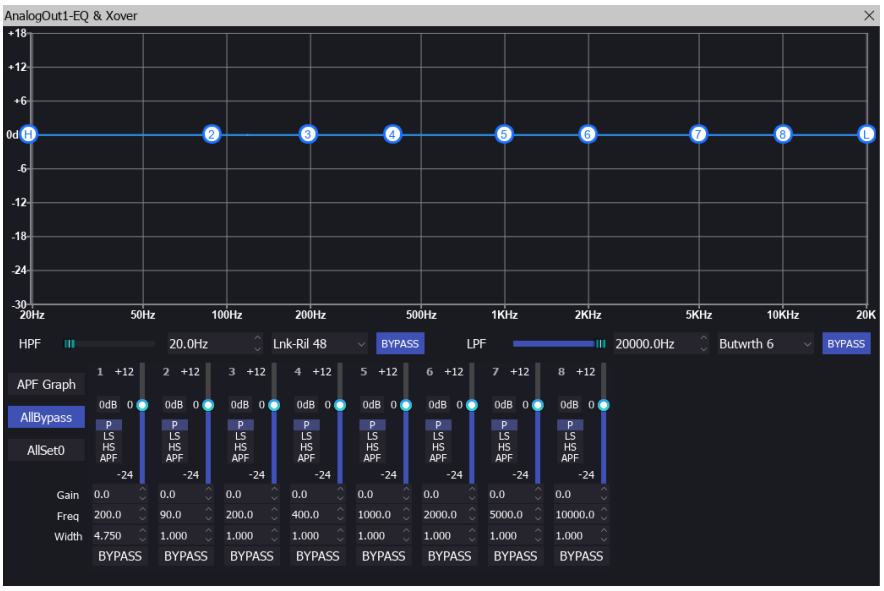
2.2 Low Pass Filter



Every parameter is modifiable in the same manner as the High Pass Filter.

Note that if both High and Low Pass Filter is present on a channel, they share the same view, along with the Equalizer. Also you can’t add more than one LPF, HPF, or EQ to each channel.

2.3 Parametric Equalizer

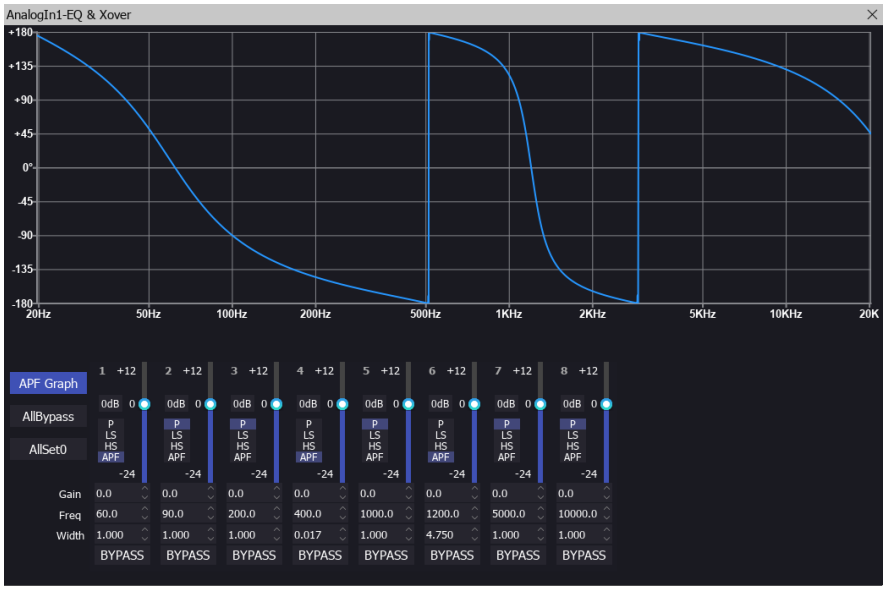


You can enable or disable the EQ with the **“AllBypass”** button. While the EQ is enabled, using a band’s **“BYPASS”** button, you can toggle them on or off. This can be useful for an instant, audible, live feedback, of the changes you make.

EQ Types: Parametric (P), Low Shelf (LS) and High Shelf (HS)

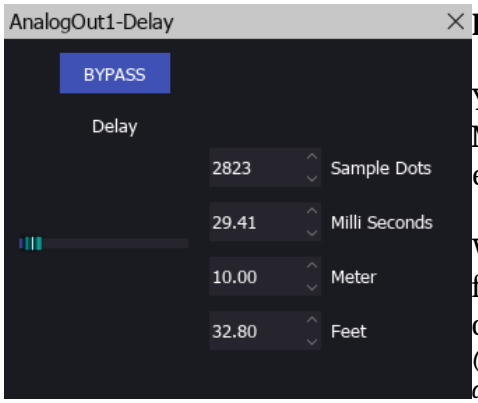
Gain: Set the gain of the corresponding channel between -24 and +12 dB
Freq: Set the desired frequency in Hz. (Same range as HPF/LPF: 19.7-20200Hz)
Width: Set the desired bandwidth for the band. This value can range from 0.017 to 4.75.

To use a band as an All Pass Filter, select the **“APF”** from the EQ types, then toggle the **“APF Graph”** view:



Here, only the **“Width”** and **“Freq”** parameters are useable, to shift the phase of desired frequencies, as the APF Graph shows, between -180 and +180 degrees.

2.4 Delay

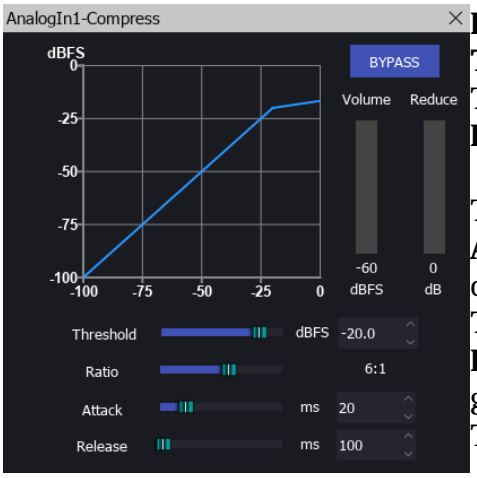


BYPASS: Toggle Bypass / Enable of the function.

You can set the delay parameter by any given data: Sample Dots, Milliseconds, Meter or Feet. The function will automatically calculate every other parameter.

When selecting a Delay function, you can select the maximum value from 0.1s, 0.5s, 1s or 2s. Note that the sum of all channel's total delay cannot exceed 2 seconds.
(for example you can set 4 channels with 0.5s max delay each, but cannot set 3x 0.5s and add 1x 1s)

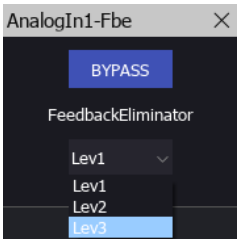
2.5 Compressor



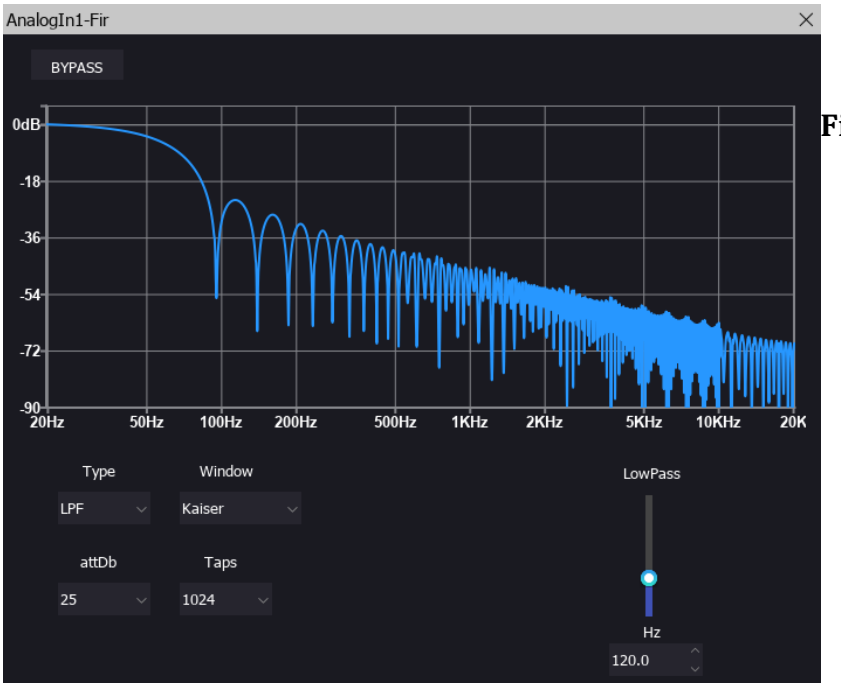
BYPASS: Toggle Bypass / Enable of the function.
Threshold: Set where should the compression take effect.
The value can range between -100 and 0 dBFS
Ratio: Set the compression ratio (slope of the knee).

The value can range between 1.2:1 and 128:1 ratio.
Attack: Set the time, how soon should the compression take effect once the signal is above the given threshold.
The value can range between 1 and 100ms.
Release: Set, how much time has to pass after the signal is below the given threshold, for the compression to return to normal.
The value can range between 100 and 6000ms.

2.6 Feedback Eliminator



BYPASS: Toggle Bypass / Enable of the function.
You can choose between 3 levels. The higher you choose, the more it impacts the signal.



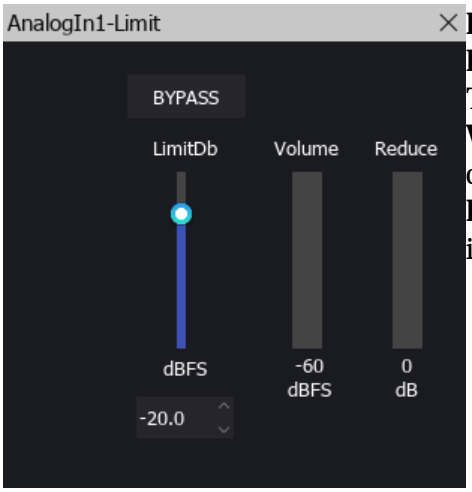
2.7 Finite Impulse Response (FIR) Filter

BYPASS: Toggle Bypass / Enable of the function.
Type: You can select between a Low Pass Filter (**LPF**), High Pass Filter (**HPF**), **Band** and **Custom**
Window: If you didn't select a Custom IR, you can select a window for the custom pass FIR filter.
The options are: **Rectangle**, **Hanning**, **Hamming**, **Blackman** and **Kaiser**.
Taps: Even though you selected a maximum number of taps when choosing the FIR from the list, here you can still change the resolution of the taps, up to the max value.

IMPORTANT NOTE: Higher number of taps can be tolling on the CPU. Always make sure to monitor the CPU usage when you add a high resolution FIR filter! (for 4 channels we recommend 512 taps each)

attDb: This function is exclusive to the **Kaiser** window, as only that has means to modify the attenuation. The values range from 21 to 120 dB.
Slider(s): If the selected type is not Custom, the respective low and/or high frequencies can be set with the sliders, or by typing the values manually.
The values can range: HPF: 20-19999.9Hz | LPF: 20.1-20000Hz | Band: Both HPF and LPF

2.8 Limiter

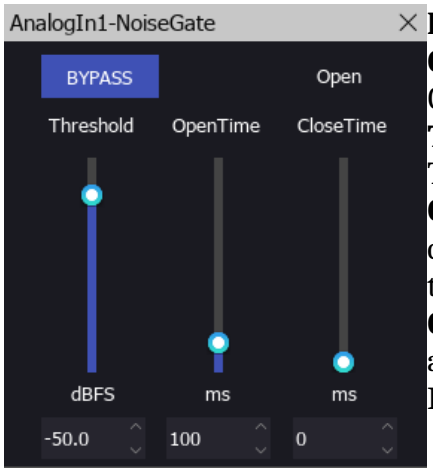


BYPASS: Toggle Bypass / Enable of the function.
LimitDb: Set the ceiling for the limiter to take effect from.
The values range from 0 to -100dB.
Volume: Here you can see the current signal volume on the selected channel (in dBFS).
Reduce: This shows how much volume is being cut from the signal that is exceeding the given limit (in dB).

2.9 Expander

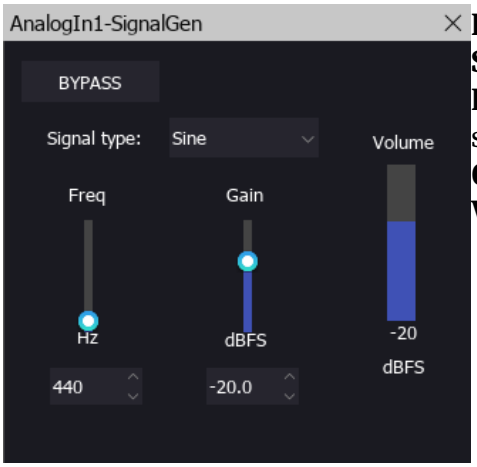
BYPASS: Toggle Bypass / Enable of the function.
Threshold: Set the value from which below the Expander should further lower the volume of the received signal.
The value can range between -100 and 0 dBFS
Ratio: Set how much the signal is reduced for every dB it is below the threshold.
The value can range between 1.2:1 and 128:1 ratio.
Attack: Set the time how quickly the gain reduction is applied after the signal drops below the threshold.
The value can range between 1 and 100ms.
Release: Set the time how long it takes for the signal's gain to return to normal after it goes back above the threshold.
The value can range between 100 and 6000ms.

2.10 Noise Gate



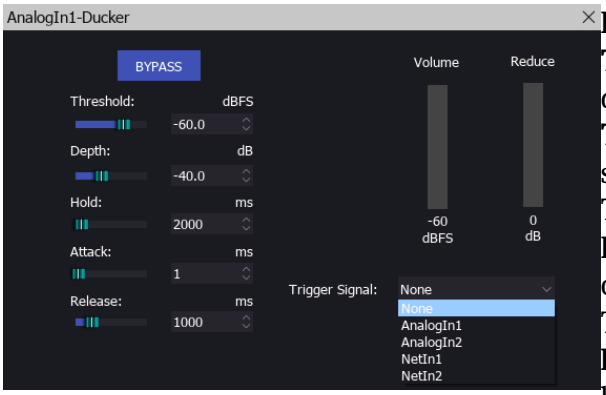
BYPASS: Toggle Bypass / Enable of the function.
Open/Close: On the top right, you can see the current state of the Noise Gate.
Threshold: Set the value from which below, the signal is muted.
The value can range between -42 and -100dBFS.
OpenTime (aka Attack): Set the time it takes for the gate to go from completely closed to fully open after the input signal exceeds the given threshold.
CloseTime (aka Release): Set the duration the gate remains fully open after the signal falls below the threshold.
Both Open and CloseTime values can range between 0 and 1000ms.

2.11 Signal Generator



BYPASS: Toggle Bypass / Enable of the function.
Signal Type: Choose from 3 options: **Sine**, **White Noise** or **Pink Noise**
Freq: Only with **Sine**, you can manually change the frequency of the sine wave from 20 to 20000 Hz.
Gain: Set the volume of the selected signal type, between 0 and -60dB.
Volume: Monitor the current volume of the signal.

2.12 Ducker



BYPASS: Toggle Bypass / Enable of the function.
Trigger Signal: Choose the input signal, which will determine the attenuation of the Ducker.
Threshold: Set the value the selected trigger signal source should reach, to activate the volume reduction.
The value can range between -80 and -50 dBFS.
Depth: Set the value where the volume should be reduced to, once the trigger signal source reaches the given threshold.
The value can range between -60 and 0 dB.
Hold: Set how long the signal remains at its attenuated level before the release.
The value can range between 1 and 50000ms.
Attack: Set how quickly should the ducker lower the signal volume once the trigger meets the treshold.
The value can range between 1 and 1000ms.
Release: Set the time it takes for the signal to return to its original level after the **Hold** time has passed.
The value can range between 1 and 5000ms.