PURITY MEETS PERFORMANCE

Avantgarde Acoustic

Pictured tutorial on

PROGRAMMING EQ FILTERS in the Avantgarde Acoustic XD CONTROL Software

(Room adaption feature of XD-Series semi-active speakers)

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Avantgarde Acoustic Lautsprechersysteme GmbH • Nibelungenstr. 349 • D–64686 Lautertal • Germany
Tel: +49 6254/306–100 • Fax: +49 6254/306–109 •info@avantgarde-acoustic.de • www.avantgarde-acoustic.de

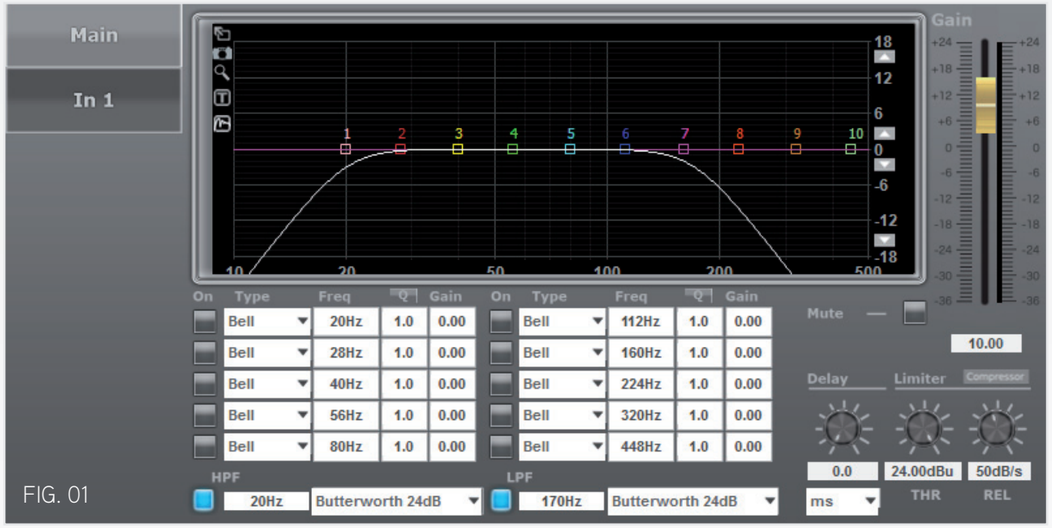

FIG. 01

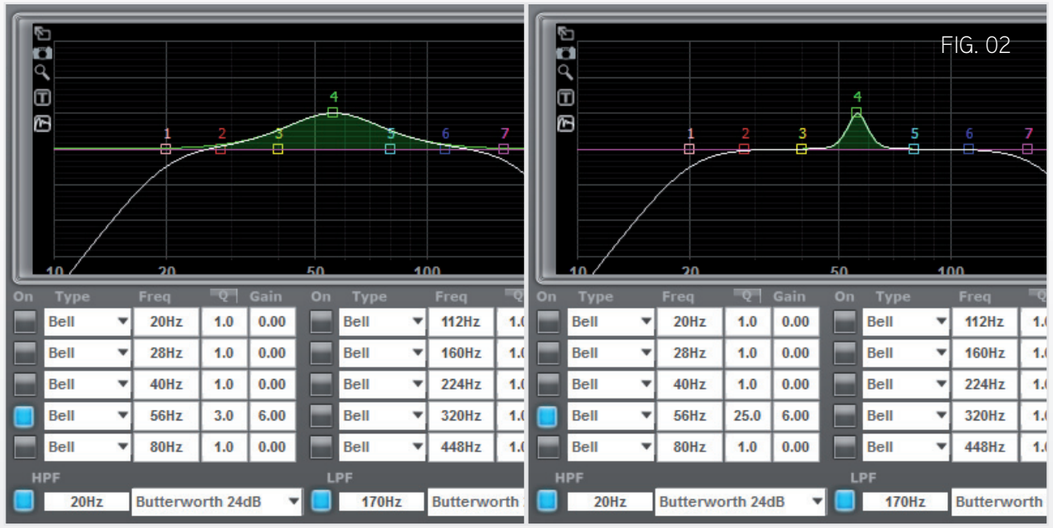

FIG. 02

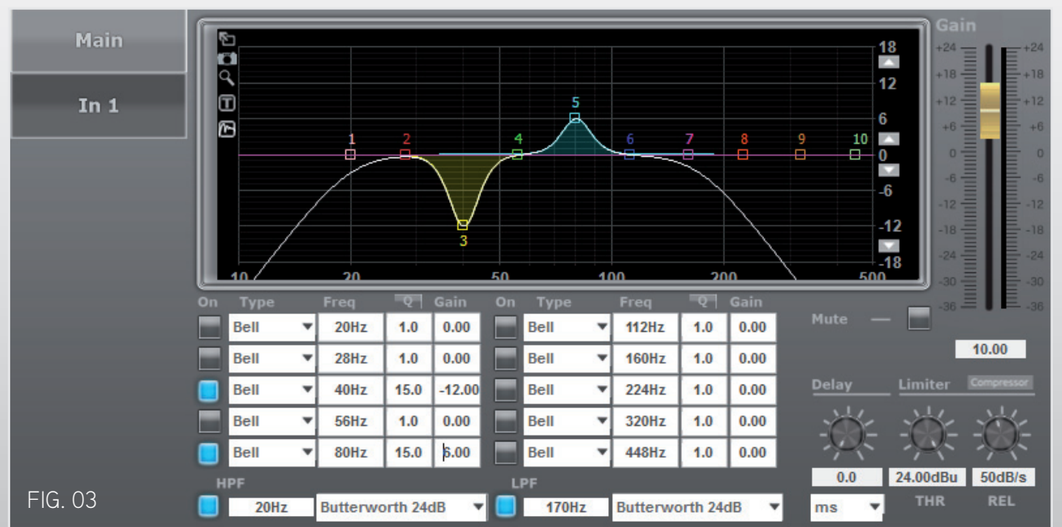

FIG. 03

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The Functionalities Of The Parametric EQ

NOTE: During adjusting the parametric EQ filters, the effect of any adjustment made is directly audible in the sub-woofer/speaker.

There are 10 parametric filters available sorted in 2 blocks of 5, numbered 1-10 from top left to bottom right. Additionally, each filter is represented by an individual "colored box" symbol. The numbering is just used to distinct the filters from each other, not for defining a sequence that needs to be kept. Thus for instance filter #1 may be swept across the spectrum to any frequency point in the grid, even beyond filter #10.

The described adjustments of the 10 EQ filters may be executed by entering figures into the "entering fields" of the respective control feature or by grabbing the small square "colored box" of an EQ filter with the mouse pointer. Holding the left mouse button down will allow to shift the "colored box" across the grid. Holding the right mouse button down will change the Q while moving the mouse horizontally (toward left = lower Q, toward right = higher Q).

NOTE: While working on a filter by computer mouse, the actual values of GAIN, Q and FREQUENCY are also displayed in the grid, aside the "colored box".

The 10 filters offer the following 4 control features (see FIG. 01):

ON: This button turns the particular EQ filter ON (blue) or OFF (grey). If you program a filter and then want to omit the change (e.g. for reassuring yourself on its effect), you can just turn off that EQ band until needed again, instead of having to zero out the settings.

NOTE: The white line represents the actually executed EQ curve! While the colored lines show the individual filter's curve. By switching filters ON or OFF, you can watch how the white line either retraces the colored lines or snaps back toward the zero dB line.

TYPE: The drop down list offers multiple shapes of the EQ curve. The shape commonly used, and thus solely in consideration here, is BELL shaped, meaning the filter affects a range of frequencies around a center frequency.

FREQUENCY: The value in this field determines around which center frequency the EQ is influencing a certain range. The width of that range is then adjusted by the Q Factor (see paragraph below). FREQUENCY is the horizontal axis on the grid, covering a displayed range of 10 to 500 Hz (adjustments possible between 20-500 Hz).

Q FACTOR: The value for Q determines how wide or narrow the EQ band is. A setting of 0.2 (min.) will affect almost the entire spectrum (depending on GAIN) while a setting of 25 (max.) will only affect a very small frequency band.

FIG. 02 shows the difference in affected bandwith between a low Q of 3, and a high Q of 25, both at 56 Hz.

GAIN: Once a filter's FREQUENCY and Q are decided, you can adjust its GAIN control. Filters have no effect without some gain reduction or addition, no matter what you do with the other controls! GAIN determines how many dBs are added or subtracted at a certain frequency. GAIN is the vertical axis on the EQ grid, and the taller it is, the more of that frequency is being added or subtracted.

FIG. 03 shows a subtractive EQ filter at 40 Hz, and an additive EQ filter at 80 Hz, both at an average Q Factor.

NOTE: Be cautious with additive EQ! Depending on the incoming signal level, adding more than some 6-8 dB may cause saturation in the DSP's internal digital processing, thus potentially causing distortion.

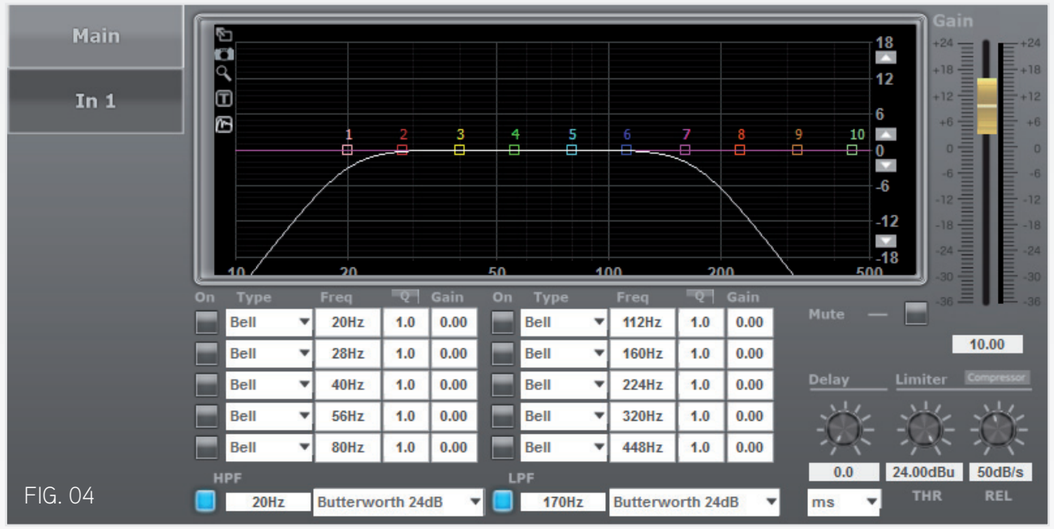

FIG. 04

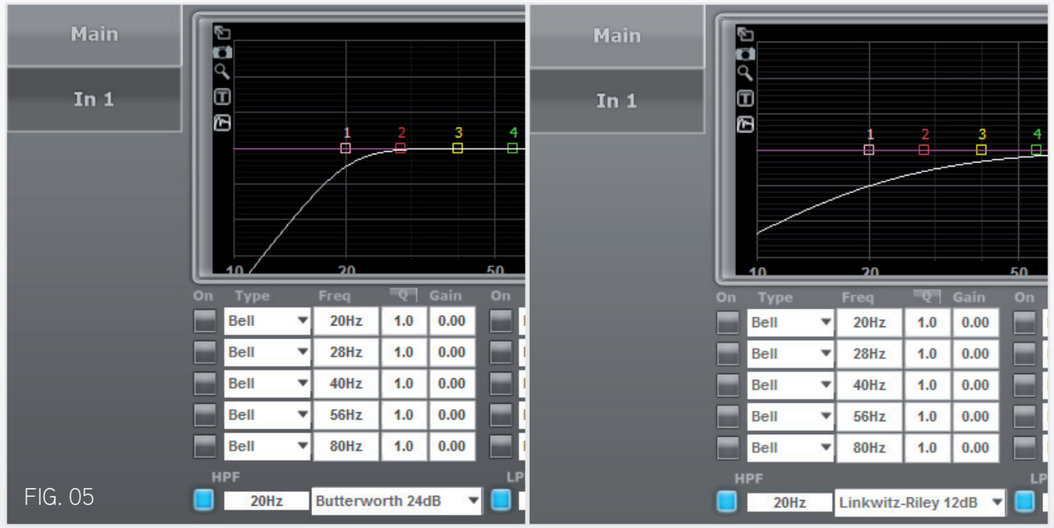

FIG. 05

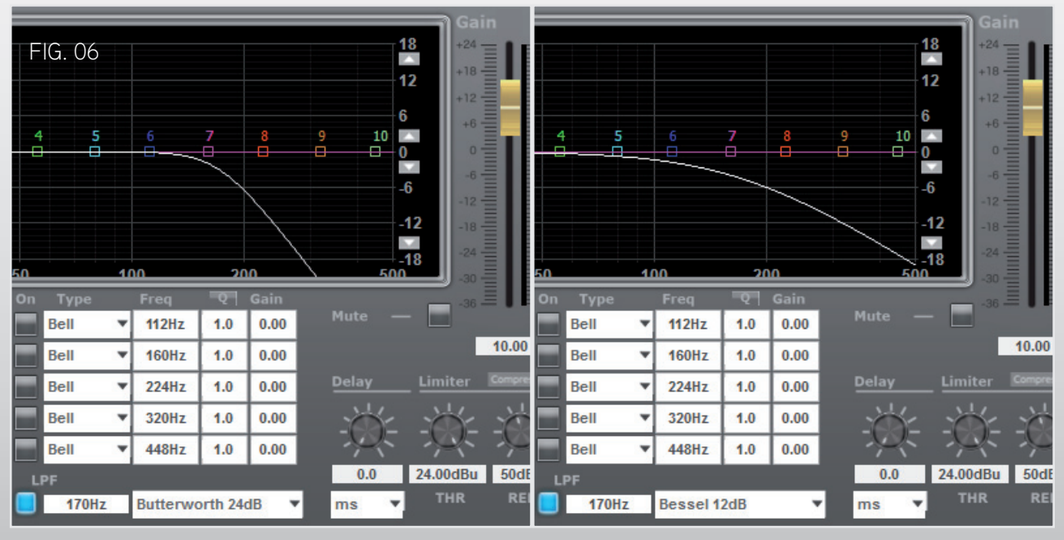

FIG. 06

HIGH PASS FILTER - HPF: This filter offers 2 parameters: The entering field for the cut off frequency, and a drop down list to select the slope & filter characteristics. This is used to create a roll-off toward subsonic frequencies, preventing e.g. acoustical feedback (subsonic rumble) with turntable playback. The initial factory setting is Butterworth 24dB @ 20 Hz, see FIG. 04.

Frequency values below 20 Hz will not be accepted and result in a 20 Hz setting automatically.

NOTE: This filter may be switched ON (blue) and OFF (grey) the same way the 10 EQ filters are switchable. ONLY CONSIDER SWITCHING IT OFF when digital playback sources (CD, streaming...) are used! With any analog sources, heavy subsonic feedback may occur, significantly limiting the subwoofer's SPL capacity!

Higher frequency values may be used to create subsonic filtering for very sensitive analog equipment. For example some turntables may need a filtering that cuts at 40 Hz (or even higher), in order to prevent subsonic rumble.

Lower slope values (6, 12, 18 dB) create a less effective filtering, the resulting sound may sometimes be a matter of personal preference. Deciding for different characteristics (Bessel, Linkwitz-Riley) may also be a personal choice.

NOTE: Be cautious with using only 6 or 12 dB slope values for this filter! As the filtering is less effective then, subsonic feedback may occur with analog sources, significantly limiting the subwoofer's SPL capacity!

The pictures of FIG. 05 show the HPF curves of Butterworth 24dB versus a Linkwitz-Riley 12dB, both @ 20 Hz.

LOW PASS FILTER - LPF: This filter offers 2 parameters: The entering field for the cut off frequency, and a drop down list to select the slope & filter characteristics. This is used to create a roll-off toward midrange frequencies, coupling the subwoofer smoothly to the midrange horn's playback range. The factory recommended setting is Butterworth 24dB (factory set frequency depends on speaker model), see FIG. 04.

NOTE: MAKE SURE this filter is ON (blue) at all time! When OFF (grey), the subwoofer will play into the midrange frequency band, thus considerably muddling the overall sound!

Lower frequency values may be entered to create a more "analytical" midrange character, practical values are in the range down to 50 Hz below the factory set frequency.

Higher frequency values may be entered to create a more "meaty" midrange character, practical values are in the range up to 50 Hz above the factory set frequency.

Lower slope values (6, 12, 18 dB) create a less effective filtering, the resulting sound may sometimes be a matter of personal preference. Deciding for different characteristics (Bessel, Linkwitz-Riley) may also be a personal choice.

The pictures of FIG. 06 show the LPF curves of Butterworth 24dB versus a Bessel 12dB, both @ 170 Hz.

NOTE: The settings of DELAY, LIMITER and COMPRESSOR (sub-menu) are factory set to optimized audiophile performance values. DO NOT readjust these without profound knowledge of their effects on performance! PLEASE consult Avantgarde Acoustic before deciding whether readjusting these might be of any benefit!

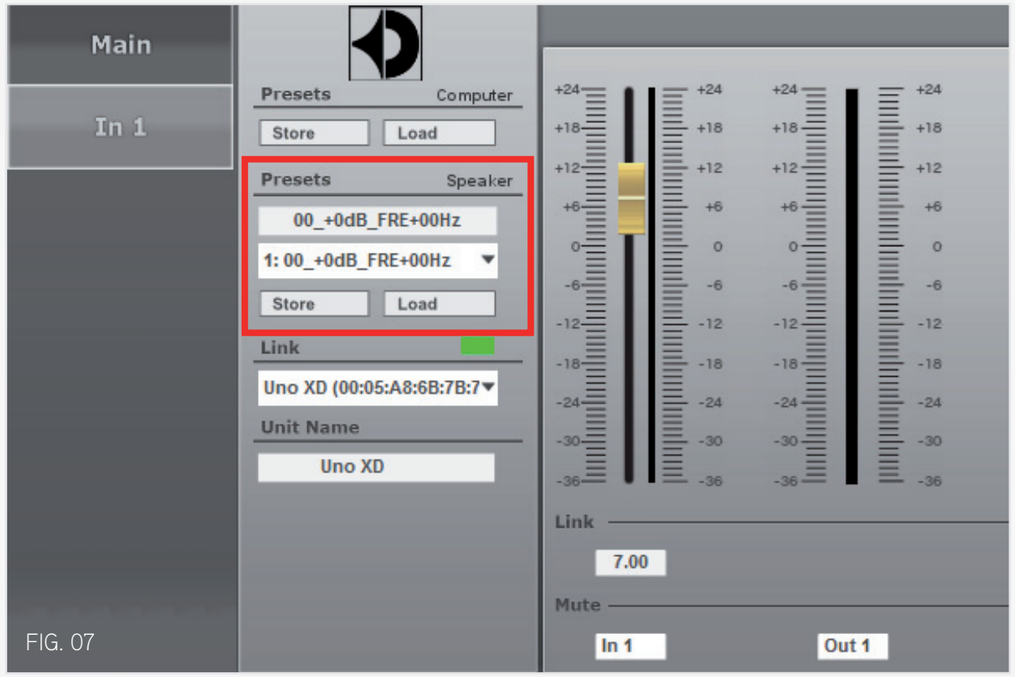

FIG. 07

Finding Room Acoustic Problem Frequencies

A typical acoustic problem is a boomy room, with certain notes in the music causing a boost effect that blurs the bass sound. To create a compensation in such cases, choose a filter (you may take filter #1), enter an average Q value (15 is a practical value) and decrease the GAIN as low as it goes (-12 dB).

Now play some music (at a regular listening volume) that exposes the problem, and perform a slow but steady manual "sweep" along the spectrum by "grabbing" the respective filter's "colored box". Once you approach the boomy frequency, the problem will audibly diminish. By further fine adjusting the FREQUENCY, Q-factor and GAIN values, you may still be able to improve the compensation's effectiveness.

A similar procedure is executed for rooms that "swallow" certain bass frequencies by using positive GAIN values, in this case +6 dB is recommended, while performing the manual "sweeping". Note: using higher GAIN values (e.g. +12 dB) may result in overdrive/saturation distortion, depending on the listening volume chosen after creating the compensation! So should GAIN values higher than +6dB be desirable, increase the GAIN values incrementally (in 1 dB steps) and cross-check for distortion with higher volume settings of your hifi amplifier.

IMPORTANT: With positive GAIN-values of EQ-filters it is a given that this increase will reduce the headroom (until max. SPL level is reached) of the subwoofer by approx. the same amount (depending on how wide-banded the increased range is)! At higher listening volumes, this can cause distortion or may introduce other audible artifacts (e.g. hissing noise etc.).

EXTRA TIP: Should one EQ filter with -12 dB not suffice for suppressing a "boomy" resonance, a second EQ filter may be programmed to exactly the same FREQUENCY and Q values, giving it a GAIN between -1 dB and -12 dB. This additional "piggyback" filter suppresses the respective frequency band by further 1-12 dB.

Group Adjustments

To facilitate the adjustments for a pair of speakers (in case of BASSHORNS: 2, 4 or 6 modules), the speakers may be connected to the computer at the same time (by Ethernet and/or USB) and put into a group. The grouping procedure is described in the XD CONTROL manual PDF, downloadable from www.avantgarde-acoustic.de, section DOWNLOADS.

Saving Created Filters Onto The Speaker

In the red marked section (named "Preset/Speaker" or "Preset/Unit") see FIG. 07 (showing the XD CONTROL software's MAIN window), the so found filter settings may be stored as follows:

- enter a distinct name (of choice, 16 digits max.) in the top white field (after erasing whatever stands in this field)
- open the drop down list below that field and choose the next free (EMPTY) preset position between 21 and 80 (filter 1-20 are factory-set and protetced)
- click to STORE

If the filters have been created while the speakers were grouped, this saving procedure only needs to be executed on one speaker, the other(s) of the group will copy the same saving procedure automatically.