

# DEQX™



## NEW – HDP-Express™

*DEQX™ HDP-Express™ sets a new price/performance benchmark by allowing you to enjoy the sonic benefits that naturally flow when your speaker's inherent errors are corrected in timing, phase and frequency-response. HDP-Express™ provides the same basic features as DEQX's premium HDP3™ processor preamp, utilizing the same DEQX-Cal™ PC software for measuring and setting up your speakers.*

The improved sense of realism we experience after our speaker's native (anechoic) timing, phase and frequency-response errors are corrected is always surprising. For example our speaker's frequency response is typically only accurate within a 6dB window, or nearly 6dB worse than the signal driving them. DEQX reduced to about a one dB window or error. With regard to musical coherence; timing and phase errors in speakers cause critical mid band frequencies to typically lag behind others in the order of a millisecond. DEQX reduces these typically fivefold.

When the speaker itself is working accurately, HDP-Express™ provides room correction that focuses on bass and the lower midrange without the danger of corrupting its native performance by using room measurement to correct midrange and high frequency phase information.

However, since neither speaker or room correction can actually increase speaker's resolution, reduce breakup and crossover distortion, nor improve dynamics and dispersion, HDP-Express™ provides the option to upgrade your speakers to a new generation of 'active' configuration – where high-order crossover filters can be implemented yet maintaining true linear-phase and individual driver correction!

Speakers become 'active' when individual power amps are provided for each type of driver: bass, midrange and tweeter, whose amplifiers are driven by typically a 3-way active crossover, or 2-way plus subs. The steep linear-phase crossover filters that HDP-Express™ provides properly quarantines frequencies sent to each driver to their 'comfort zone', so they deliver best-case distortion, resolution, and dynamics.

To avoid unnecessary conversions, HDP-Express™ provides preamp features so that when using digital input sources no additional DAC conversions are required that could compromise source signal integrity. Analogue inputs are also provided.

### Timing and frequency-response correction:

A speaker's frequency-response is a measure of its success in reproducing all frequencies at exactly the same relative volume. Very few speakers can achieve this more accurately than within a 6dB window (+/-3dB). DEQX corrects this to within one-decibel window (+/-0.5dB subject to measurement accuracy), where voice and live music are balanced to the extent that they sound more convincingly real, especially through the midrange.

Unfortunately, correcting frequency-response is not enough. Another fundamental parameter of audio is time, where the phase of all frequencies needs to maintain linearity in order to sound natural; hence the need for linear-phase. Just as uncompensated speakers don't deliver amplitude accurately, nor do they deliver all frequencies in phase and on time. The different timing delays that occur for different frequency groups are known as 'group-delay' errors.

HDP-Express™ can correct 'group-delay' errors that all speakers introduce. For example, one band of lower mid frequencies might lag behind higher midrange frequencies by about a millisecond (the time it takes for sound to travel one foot). The magnitude of correction DEQX provides is typically better than five-fold, so a 1-millisecond delay at one frequency group will be reduced to less than 0.2 milliseconds.

In practice, different degrees of correction are required for different frequencies, and improvements are usually most noticeable through the midrange. This detail of correction is possible because DEQX's patented DSP process effectively slows down 'on-time' frequencies so that latecomers can catch up.

### Active linear-phase crossovers:

In the quest for the being-there goal to which DEQX aspires, we can't ignore the fact that very few speakers resolve their output to better than 1% or 2% 'best case' resolution, rising nearly tenfold due to modulation breakup distortion associated with louder dynamics.

This further loss of resolution occurs when drivers to operate outside their typically four-octave wide comfort zone – which especially occurs in passive speaker designs. This not only results in breakup modulation, but also crossover distortion, unnatural dispersion (beaming), lobing and limited volume.

To improve a speaker's resolution, volume, dynamic performance and dispersion, we take a tip from the pro-audio world who have used the 'active' speaker architecture for decades. 'Active' speakers use separate amplifiers for each type of bass, midrange and tweeter driver, avoiding the use of passive crossover filters and their unfortunately consequences.

Actually, DEQX™ introduces a new generation of 'active' speaker, which out performs normal active speaker designs, including normal DSP-based active crossovers. Specifically, DEQX-active provides true linear-phase crossover filters, whereas traditional crossover filters (other than the most shallow 1st order 6dB/octave) are non-linear, and so introduce phase distortion.

The ability to use steep slopes - typically four-times steeper than passive crossovers but maintaining linear-phase - virtually eliminates breakup inter-modulation distortion. The narrow crossover transition virtually eliminates crossover comb-filtering distortion and largely eliminates driver 'beaming', providing more natural horizontal and vertical dispersion.

Most importantly, by quarantining drivers to their comfort zone as never before, DEQX-active allows increased volume levels and effortless dynamics.

DEQX combines its steep crossovers with its proprietary timing and frequency-response correction for each driver, while maintaining linear-phase for both the crossover filters as well as the correction filters. The result is unprecedented accuracy in timing and frequency-response, a dramatic reduction of breakup and crossover distortion, louder distortion-free dynamics, and improved natural dispersion.

### Room correction with a difference:

Since HDP-Express™ provides true anechoic speaker correction first and foremost, room correction becomes less invasive and easier to implement. Usually, DSP-based room correction measures a mix of your speaker's direct output along with the effects of the room. These measurements are taken in the listening area, at considerable distance from the speakers, so they have no detailed knowledge of the speaker's true anechoic (without room) behavior.

By contrast, DEQX measures the room after the speaker is already reproducing the signal it's fed as accurately as possible. Now, room correction can focus mainly at bass frequencies without compromising timing and frequency response over the critical midrange and highs.

### Mastering style media correction:

Some recordings simply need tonal adjustment. For this reason, traditional "tone" controls can be justified despite their wide-ranging effects over many octaves. Now, HDP-Express™ puts mastering engineer style tonal adjustment on the remote control. It provides a bass-shelf, a fully parametric mid-band - adjustable across ten octaves, and a high-shelf. Importantly, the three centre-frequencies are adjustable across octaves and semitones, while Q is adjustable from one semitone wide to four-octaves wide. Some recordings are worth spending a minute or two getting exactly right, after which your settings can be saved to one of 99 memories for later recall.

**Pre-amp functions:**

Remote-control selected stereo inputs are: S/PDIF (RCA), AES3 (XLR), Single-Ended Analogue (RCA), and Balanced Analogue (XLR). Four remote-control selected "profiles" provide instant selection of different combinations of crossovers, correction filters, room EQ and preference EQ – all per your choices. Three channels of single-ended stereo line outputs are standard issue, providing Bass (or sub/s), Mid (or full-range) and High signals for the amplifiers. Optional balanced output modules are available using either HD™ Active or Jensen transformer technologies.

**Processing features:**

HDP-Express™ sports dual 32-bit floating-point SHARC DSPs running firmware with patented digital processing technology which provides -140dB THD digital transparency and blazing low-latency, real-time performance. This reliable platform is complimented with high resolution ADC and DAC technology because, unlike others, HDP-Express™ implements a pure 24bit/96kHz digital processing path.

**Surround sound:**

Surround recordings and movie soundtracks take on a new character using the DEQX-active implementation that HDP-Express™ provides. The new HD-Audio media provided on Blu-ray is only as good as your loudspeakers. Using a single HDP-Express to introduce DEQX-active to just the front left and right speakers makes the centre speaker optional. This is because DEQX-active provides extraordinary 3D imaging due to the uniform dispersion, low distortion and phase accuracy from each of the main front speakers, so 'phantom' center imaging can be astounding. For the more adventuresome, of course multiple processors can be used to achieve the ultimate HT experience... contact us anytime for further details and options.

The HDP-Express's remote control provides the following functionality:  
 Tone control: Bass, Mid and Hi include frequency and bandwidth adjustment  
 Store and Recall: 99 tone control settings for media and preference EQ  
 Profile: select from 4 different correction, crossover and room EQ set-ups

HDP-Express's standard hardware and active crossover features include:  
 Audiophile grade electronics and switch mode power supply  
 Audiophile Analogue to Digital conversion at 24/96 resolution  
 Three audiophile DACs .  
 Crossovers offering Liner-phase with correction, Butterworth and Linkwitz Riley  
 Crossover slopes from 6dB/octave to 300dB/octave depending on filter type  
 USB interface to PC running DEQX-cal software, room Phantom powered balanced input for DEQX-calibrated measurement microphones  
 Stereo AES3 (XLR) and S/PDIF (co-ax RCA) digital inputs  
 Stereo balanced (XLR) and unbalanced (RCA) analogue inputs  
 Six unbalanced outputs for L/R bass, midrange or full-range, and tweeters.

HDP-Express options:  
 Balanced analogue output module – 6 x XLR or Balanced analogue output module – transformer 6 x XLR.  
 Standard Cal kit with Behringer microphone and DEQX-cal software  
 Reference Cal kit with calibrated Earthworks mic, DEQX-cal software\* \*recommended for high-end anechoic speaker measurement

Features	HDP3™	HDP-Express™
Remote controls: Standby, Profile-select, volume	Yes	Yes
Front panel controls: Standby, Profile-select, volume	Yes	No
Digital volume control	Yes	Yes
Analogue volume control (post DAC)	Yes	No
Mains (manually switched) analogue power supply	Yes	No
Mains (auto switching) switch-mode power supply	No	Yes
Front panel 12mm brushed aluminium black OR silver	Yes	No
Front panel 6mm black anodized	No	Yes
Balanced analogue output option (6 x XLR)	Yes	Yes
Digital output option	Yes	No
DEQX-Cal Software & Firmware	Yes	Yes

