dspNexus DSP Audio Processor

Something actually new in the Audio World?

Traditional component stereo systems have built around a handful of basic building blocks for a long time. Chances are your first good stereo system consisted of speakers, a preamplifier, a power amplifier, and a variety of sources like turntables, tuners, and tape machines. As time marched on, you probably added a CD player and later a computer for streaming content from the web or managing a large collection of local digital content.

Most of your content is now digital and it doesn't degrade with time, but you probably aren't doing very much to take advantage of the digital audio revolution that is available now that DSP processing and data converter technology have gotten really good. After all, most of the industry's best designers live exclusively in the analog world -- it's not their skill set.

So periodically, you upgrade a piece of your sound system. You buy a better amplifier, new loudspeakers, maybe add some diffusers in your room and chances are it gets a little better. And meanwhile, one of the weakest parts of your system remains completely untouched - the loudspeakers passive crossover!

Introducing dspNexus™, the world's first state-of-the-art DSP Audio Processor, Crossover, and Control Center family.

Connect to the music you want...

The dspNexus is the control center of your system. It connects to the sources you care about.

- Balanced Analog Stereo Input
- USB Audio Class 2
- S/PDIF
- Bluetooth Audio (aptX-HD)

- Ethernet
- WiFi

Digital sources come in all sorts of sample rates and levels. The dspNexus automatically up-samples to either 192k or 384k, performs jitter attenuation, and remembers the volume settings for each source independently.

DSP Processing on Steroids....

Imagine you were buying a car and the only engine option was "Ferrari", the dspNexus is powered by an Analog Devices SHARC DSP, the gold standard of audio DSPs. The DSP is the brain of the system. It performs these functions:

- Time Alignment in 5uS increments
- Sample Rate Conversation and Jitter Attenuation
- Room Correction and Bass Management
- Active Crossovers

At some point, it needs to return to analog....

All the clever DSP processing, attention to detail, and convenience is irrelevant if we don't get the DACs right. So we don't compromise. The dspNexus uses state of the art "Velvet Sound" DACs from AKM. If we thought there were better DACs, we would use them instead. We surround these devices with Class A anti-imaging filters and 3dB stepped attenuators. Regardless, of how you use a dspNexus, you will have at the very least, a no-compromise playback DAC.

Oh and there's other stuff....

Did we forget to mention, that each dspNexus has an integrated Raspberry Pi4? We chose the RPi4 because there are a lot of applications that run on it and more every day. You might use it as a music server, a music server-bridge, a speaker measurement or room correction system or something we haven't thought of yet. As applications become available, we will do our best to support them.

Do you want to listen with headphones? The dspNexus has a headphone amplifier. The headphone settings are independent of the loudspeaker settings so that level and filtering are appropriate for each situation.

Want to make measurements? There is a 48V phantom-powered microphone input and a measurement ADC built into the dspNexus. Each measurement is also referenced to any one of the DACs so that you can make calculated time delays from each driver.

If you have a bank of external amplifiers, you can place them all on standby or mute when the system is not playing music.

What about a new improved dspNexus?....

Well, we did claim that we use the best ADCs and DACs, "Ferrari" like DSP, etc. Someday, this won't be true. We all know we can only use the best available at a point in time.

So here is the good news: The ADC, DACs, and DSP are all implemented with plug-in modules! If we have a newer, shinier option, you will probably be able to upgrade your dspNexus. Software upgrades to the DSP, display, and RPi4 are all done without opening the box.

What dspNexus is best for me?

dspNexus 2/8

The dspNexus 2/8 is a stereo input, eight output version. It's the inspiration for the dspNexus family.

This is the version you want to create a fully active DSP crossover implementation. This is not without implications. It means that you are tailoring a loudspeaker design that will not be using passive crossovers and will instead rely on a bank of power amplifiers driving each driver of your loudspeaker individually.

Customers for this version will almost always be one of the following:

- OEM/ODM loudspeaker manufacturers using the dspNexus 2/8 with a crossover tailored to their specific loudspeakers.
- Serious DIYers who make their own loudspeakers
- A HiFi enthusiast who wants to have the potential to achieve an active crossover in the future.

The design of the crossover does not take special programming skills, We supply the dspNexus 2/8 with a licensed version of DSP Concepts' Audio Weaver. This is a graphical design tool that lets you create production quality crossovers tailored to the specific requirements of your target loudspeaker system. We provide training to use this tool effectively or in some cases, can connect you with a crossover specialist to help you.

The dspNexus 2/8 is the path to convert a very good loudspeaker system to a much better loudspeaker system regardless of the initial cost.

dspNexus 2/2

The dspNexus 2/2 is a stereo input, stereo output version. This is the version you want to use to have a state-of-art DAC for your existing full-range system. The DSP can also be used for room correction. The room correction software runs on the RPI4.

dspNexus 2/4

The dspNexus 2/4 is a stereo input, four output version.

This is the version you want to use to add subwoofers to your existing full-range system. You might be an end-user or an OEM in this case. If you are adding subwoofers that are placed arbitrarily in your listening space, you will need to do the following for best results:

- You will want to adjust the relative delay from the full-range system to the subwoofers for proper alignment. With the dspNexus, delays are settable in 5uS increments to over 20ms.
- You will want to adjust the relative level between the full-range speakers and subwoofer. This is a function of both distance and individual sensitivity.
- You will want to low pass the subwoofer and high pass the full-range loudspeaker in most cases.