



Trinnov MC

MIKE AITON tries some Trinnov, and discovers how inaccurate his studio is acoustically

Trinnov Audio are French audio engineers who have extensively researched spatial audio and delivered world-class engineering papers in the processing of acoustic fields in 3D. They make a range of products from professional cinema processors, high end home theatres and hi-fi, to pro audio loudspeaker/room optimisation systems. The pro audio room/monitoring optimizers come in three distinct flavours.

ST2: a fixed configuration of twin stereo optimized outputs, for either your main and near fields, or as main stereo and twin subwoofers. This is ideal for music studios with existing monitor controllers or consoles with monitor switching.

DMon: available in a small variety of fixed configurations –either a four channel optimized for twin stereo, six-channel (for 5.1), eight-channel (for 7.1 or 5.1 + 2.0) or 12-channel (for immersive formats) The DMon is intended for use where there is a need for a monitor controller (as well as room correction) and will act as slot in replacement for the Avid X-Mon. Eucon compatibility gives it connectivity with the Avid S3 and S6 desks, and DMon has a browser app for its routing and monitor control functionality.

MC: the most highly configurable and can be 4, 8, 12, 16, 24 or even 64 channels of optimized monitoring, with MADI I/O for the most serious Dolby Atmos multi-channel type installations.

I have had a multi channel MC for some weeks for extended listening thanks to Paul Mortimer of Emerging Ltd, the UK Trinnov distributors.

The first step in the installation process is to connect the Trinnov tetrahedral surround microphone to the Trinnov inputs via a loom. Your dealer can set you up, or you can learn to do it yourself. If you change your room, or change your speaker positions, then you need

to re-sweep the room. I connected the 5.0 outputs of my Avid Omni (from my Pro Tools HDX rig) to the Trinnov inputs via an analogue D-sub, and the analogue outputs of the Trinnov to the inputs of the trio of stereo Quad 520 power amps that power my Dynaudio/Harbeth BBC LS 5/12a monitor speakers. If your hardware and monitoring are AES, you can connect digitally. The Trinnov was also connected to my computer via ethernet for VNC screen monitoring and switching. Once connected, the box then identifies the speakers and allows you to make any routing changes within its I/O matrix (such as Dolby order or SMPTE order).

Testing time...

Once the routing is set and identified, the box then issues about a minute or so of test tones, impulses and sweeps. You can choose to either have a mixer monitoring sweet spot, or a variety of sweet spots, such as the producer couch etc. These are all storable as recallable pre-sets. The Trinnov then processes the data and calculates its conclusions. For my 5.0 set up this took about two minutes in total.

The Trinnov sends pulses to identify the direct speaker sound, the first reflections, room decay and analyses the differences. It also measures your RT60 reverb time; mine is 0.16s. It plots your speaker positions on a 360 graph and shows them relative to the ITU recommended positions. It also plots your horizontal positions. All of these can (if you wish) be digitally corrected, even the vertical position! This enables you to hear correct panning as you move mono sources around the sound field, despite any incorrect studio geometry. The Trinnov also corrects for any slight audio level differences (due to the Quad amps in my room).

The Trinnov shows a plot of the level and



/ Trinnov tetrahedral surround microphone

frequency responses of each speaker in your room. It is very interesting to see the room nodes and perturbations. Please note, NO rooms are ever flat, despite what acousticians tell you. NO monitor systems are flat either (even in an anechoic chamber). The bottom of the graph shows how the Trinnov has been able to correct for your frequency/amplitude errors with its DSP cleverness, but that is less than half of the story.

Most importantly, NO monitor and room combinations are phase accurate across the frequency range. The Trinnov phase page shows the phase timing errors in your room relative to frequency. I can't pretend to always understand the pictorial graph, apart from where it goes 180 degrees out of phase (which is a concept I can grasp) — but oh my goodness, you can not only hear it — you can feel it. My room has some phase errors that, despite acoustic treatments on the walls and ceiling, are typical of small mix rooms with multiple computer monitors in front of the speakers. It is also a cruel fact of the laws of physics of smaller rooms that you cannot employ enough bass traps to sort out your LF.

Aural tests: what we heard

To ensure listening validity, I invited supervising sound editor Mike Wabro (*Game Of Thrones*) and re-recording mixer John York (ex-head of sound at [long-running ITV soap] *The Bill*) to audition with me. This is a panel of very experienced post-production ears! We chose a variety of sources; from the best of contemporary music, simple stereo recordings, voices we had recorded, or films we had

personally mixed.

I played the reference recordings without the Trinnov to Mike and John to allow them to get used to my monitoring environment. John has LCR Dynaudio BM15s in his studio, Mike has 5.1 JBL LSR monitors, which are quite different. We then listened to each track with the Trinnov correction.

The difference was night and day. To say there were three jaws hitting the floor is no exaggeration. The timing of bass and kick drums was brought sharply into focus and lost any vagueness and approximation. Gone was any bass bloat and bloom. The imaging dramatically improved, with a very firm focused phantom centre image (when listening to stereo mixes). The tonality of good mixes sounded even better and more equal. Reverbs and delays were sharper and more apparent. The dynamics and timing in general were much tighter. On listening to simple voice and piano recordings, you could hear how the piano was miked and the resulting stereo image shift as notes were played up and down the keyboard. Vocals sounded less like a recording and more like a performance, and we could hear clearly that some of the vocals were edited from different takes.

In surround, the imaging was even more startling, and some mistakes in mixing and some poor choices began to be audible, especially with dialogue relative to atmosphere balances, and dialogue EQ. The Trinnov made a source panned around the room completely pinpoint accurate AND consistent like I have never heard before.

Disbelief — surely this is wrong?

Changes in phase correction often made atmosphere tracks sound very different in tonality AND image, sometimes alarmingly so. The sound was so different. We wanted to disbelieve it, as a principle, so we set up a couple of tests.

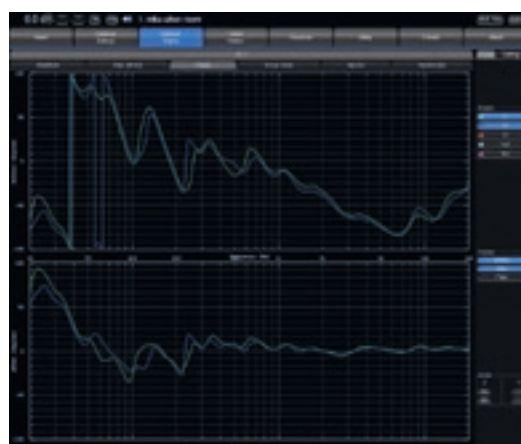
We downloaded a demo of Sonarworks Reference 4 software. I borrowed a calibrated Sonarworks test microphone from remix producer Max Sanna, and we tested my studio. Even a cursory glance at the resultant frequency response curves showed a remarkable similarity between the Sonarworks and Trinnov.

Accepting the freq/level curves by measurement was one thing, but what did our ears tell us? We then put up a signal generator in Pro Tools and swept it down the frequency range. When we got to around 600Hz there was a huge drop in level, due to an anti-node. Switching in the Trinnov and the volume jumped back up again to what we were expecting, and further sweeping around this area yielded a flat response with no level jumps. We did this test at several frequencies with the same result.

Because the Trinnov is able to correct phase as well as frequency and amplitude, we put a mono chat track from *The Bill* to a stereo output. Without phase correction the track sounded vague as if it had some element of width. With the phase correction it sounded locked firmly to a phantom centre. The phase



/ Dynaudio monitors frequency response before & after



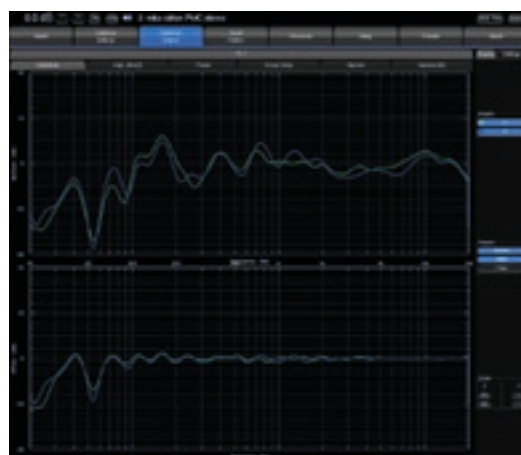
/ Dynaudio monitors phase response before & after

graph showed my L-R speakers are 180° out of phase at 6kHz!

We then tried the converse, where we made one leg of the mono track 180° out of phase and listened without phase correction. It sounded slightly out of phase. When we added the Trinnov phase correction the audio snapped straight to the back of our heads in typical out of phase fashion.

The Truth, The Whole Truth And Nothing But The Truth

Now we were all believing the science and starting to trust the Trinnov correction.



/ Trinnov Amplitude PMC Two Two Six monitors

Suspension of disbelief had occurred. We were starting to accept that the Trinnov was speaking a new truth, one of accuracy. The phantom centre image created by the Trinnov on stereo speakers was virtually the same as a real centre speaker. We are very used to listening with phase issues on stereo speakers.

The next day, John contacted Emerging Ltd and arranged for a demo of a Trinnov at his studio. He phoned me up afterwards to tell me of his shock at the similarity of the results. When listening in someone else's studio it is very easy to remain slightly dispassionate, as it is not your room and not your monitoring. When you hear your own monitoring and studio faults so aptly demonstrated and corrected, it is quite profound. I drove to John's studio and we auditioned the same material (especially my feature film mix in 5.1). It all sounded the same as at my studio. We tried some of the same tests with phase and frequency and got the same results.

The end of this journey...

To quote John York, "You start the demo by listening to some of your lovingly crafted mix work. Sometimes you don't like the changes the Trinnov makes and want to discount it. Then you start listening to some of your favourite iconic, well-mastered music, and the Trinnov makes a great improvement in clarity, tonality, and stereo imagery ... and then there is that moment, when you realise the only thing that you don't like through the Trinnov is your own work mastered in your own studio! Why? Because it is revealing EXACTLY what you have produced because of your room's acoustic issues."

We can all hear peaks to some degree in monitoring, but we are far less good at hearing subtractive dips from the anti-nodes. You do not miss what you never knew was there. The biggest lie that we all kid ourselves with is that "we know our room and we can compensate for its inadequacies" — often we do not even know the half of it!

There has now been a paradigm shift in professional audio, and I think it is time that we say that it is no longer acceptable to make your mixing decisions in audio ignorance and denial. Rooms need correcting and we need to get over this fast, as an industry, to continue being professional and relevant. ①

resolution/VERDICT

PROS A Trinnov should be the norm and not the exception and is arguably now probably THE new modern-day pro studio essential.

CONS John has ordered a DMon 6 unit for 5.1; Mike Wabro and I are currently shaking our audio piggy banks...

www.trinnov.com