EAW NTL720 BLAM
Small but perfectly formed.

Text: Mark Davie

Recently, AudioTechnology had the opportunity to see and hear the latest (and smallest) line array from EAW, the NTL720. We were also afforded the chance to chat with the head engineers responsible for development of the system: Nathan Butler, Senior Design Engineer, and Jamie Anderson, Product Manager for EAW. It was time to flip the bonnet and see what made this baby (array) tick.

BLAM, BLAM, BADA BANG
The NTL720 module – referred to in development as the Baby Line Array Module (BLAM) – exhibits a selected ‘best of’ feature set derived from the gene pool of EAW’s line array ancestry. Intended for shorter throw applications, the system is particularly suited to theatres, houses of worship and small venues.

AudioTechnology: So Jamie, can you tell us what you decided to design when you sat down and contemplated this system?

Jamie Anderson: We wanted to give the user the benefits of the steerable KF900 system without the complexity. So you've got the 900 system in there, you've got the phase-aligned driver approach developed in the KF730, you've got the off-axis response of the AX series and the Gunness Focusing processing – you're looking at a next-generation system.

Nathan Butler: It's really a combination of half a dozen technologies.

COMPRESS THE SIZE, NOT THE DRIVER
The NTL720 is a three-way design powered by three 500W Class-D Bang & Olufsen amplifier modules, the same modules used in the NT series. One is the power supply and low frequency amplifier, with two hanger modules running the highs and mids. The unit has two low-frequency side-firing six-inch woofers and two identical drivers for the midrange, extending part way down into the low end. There’s no compression driver in the design, instead 6 x one-inch dome tweeters are stacked in two columns of three at the throat of the horn.

AT: Are the tweeters effectively the same soft domes as you might find in a typical nearfield?

NB: Yes. We wanted a 12-degree vertical wavefront coming out of this box, and if we’d gone with a typical output for this size box – maybe a one-inch exit compression driver – in order to get the horn walls we would have had to double the depth of the cabinet we’ve got now. So going with the stacked set of drivers gives us the vertical pattern control that we’re looking for without having to use a deeper horn – it also gives us the output we’re looking for. And also, a dome is much better sounding than a compression driver. The roll-off of a dome tweeter will generally be up above 20kHz, whereas a compression driver begins to roll-off at 15 – 18k, depending on how good the driver is. Ironically, we’ve actually found ways to correct the sound of a compression driver to get it sounding as good as a dome, but by going with a dome, obviously we have the benefit of not having to use that digital correction.

AT: Is this configuration as robust as a compression driver?

NB: We’ve had very good success using dome tweeters, and we’ve had DSA (Digitally Steerable Array) out for about five or six years now, and I don’t think there’s ever been an issue of a dome tweeter failing in that product. If you use them in high enough quantity – and here we have six – it’s really nothing to be concerned about.

JA: I think it’s when you ask for the output of a compression driver from a single dome tweeter... that’s when the dome is toast.

DON’T HONK THAT HORN
Achieving horizontal dispersion characteristics of 110-degrees from the NTL720 module while still retaining a shallow box depth of under 40cm is achieved thanks to a combination of the stacked dome tweeters and a full-sized mid/high horn that fills the entire face of the enclosure. Apparently, making your entire speaker into one big horn actually helps prevent that dreaded honk.

NB: By mounting the mids in the horn, we obviously need an aperture for the mid-frequency energy to come through. We can’t have it blocked off. So one thing that you can do is take that large aperture and squeeze it down to a slot, something that we did in the KF761 and 730. But what we’ve done here is kept the same overall open area for the mid-frequency driver, but we’ve distributed that openness along the high frequency horn wall. If you were to draw a vertical line at any point along this wall, the high frequency wavefront is only seeing a 20% void in the horn, and this void is distributed across different locations (see the image above). So we’ve randomised and minimised where any little voids are going to occur in our time response and therefore affect our magnitude response, and then we’ve further corrected that with the Gunness Focusing techniques.

BRAINS BEHIND THE FRONTAL LOBE
At first glance, a cross section of the NTL720 module looks like someone has succeeded in not much other than plugging a lot of round pegs in square holes – with two of the four drivers facing out the sides of the box! The idea is taken from the pattern control of the KF730 line array and...
Butler explains it succinctly:

**NB:** If you take a look at the polar pattern of two side-firing woofers, at high frequencies it would be a figure-8 pattern extending out the side of the box, but as you go down into the low frequencies the figure-8 reverses itself, so we actually end up with a forward-firing lobe in the frequency range that those drivers are reproducing – purely due to their spacing. Admittedly, we also now end up with a bit of a lobe firing backwards as well, but because the mid-frequency drivers – which are firing forward – are also reproducing those lower octaves, we actually end up with a figure-8 pattern that has a much larger lobe forwards than it does backwards.

**DON'T CROSS ME**

For years, house engineers have put padlocks on the cupboard housing the system crossover, for fear of a ‘greenhorn’ tampering with their settings and leaving them out of sorts for the next gig. EAW has taken this ‘hands-off!’ approach with their built-in crossovers in the NTL series; no point in letting a user unwittingly screw-up years of developing near-perfect phase alignment!

**NB:** One of the things we’ve devised with our powered and UX products is the concept of a grey box: where the user has control over input EQ, input delay, input gain, we even give them control to adjust limiter settings and the high frequency boost for listening distance. But what we’ve taken away control of is the crossover and EQ that makes the box behave the way we want it to.

**AT:** So it’s like preventing the driver of a car from fiddling with the carburettor?

**ND:** Exactly.

**JA:** If you were to just sit there and move the low point on the crossover, you’re going to start interfering with the coverage pattern – especially in systems that rely on the direct interaction of drivers for polar and coverage patterns.

**NB:** And the time response – which we’ve spent so long trying to perfect.

**AT:** What other things were there that you didn’t want to give people control over?

**JA:** Focussing and time-based filtering is another example of where you really need high-resolution measurement tools to see what’s going on. There are systems in the market that call on you to blindly throw a microphone up, take an impulse response measurement, put it in an FIR filter and clean it all up. But the problem – and the real key to this type of technology – is not necessarily in the filtering technique, it’s identifying the anomalies that you can go after and should go after.

**NB:** And also identifying the ones that you can’t and shouldn’t…

**JA:** Tread lightly – don’t go just dropping in filters because there’s a problem – you may be robbing Peter to pay Paul.

**NB:** Everything is interdependent – if you start messing with your crossover point, it’s going to give you a different phase response. But if you keep the time correction filter the same, you’re not getting that flat phase or that impulse that you’re looking for.

**JA:** If you do something in the frequency domain, it has impact in the time domain.

Listening to the array with a variety of program material, most users would be happy to leave the timing up to the EAW experts, especially when it results in the kind of consistent pattern coverage and frequency response exhibited on the day. The system doesn’t come with companion subs, and pushing the low end of this three-way system will expose this limitation somewhat. If you want the system to ‘rock’, you’ll need to add subs.

The NTL720 is a sweet-sounding system provided it’s used in the manner for which it was designed: in applications of short-throw venues with light program, or as supporting fill systems. In that role it sounds quite superb.