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Co-founder Xavier Marchal testing a TS40 sample with the Ares 12



(Top): Every aspect of the assembly had to be rethought to deal with the huge force

Powersoft's new M-Force

Combining forces

Since Powersoft's M-Force technology was debuted in 2013, AudioFocus has become one of the first to bring a product to market with the TS40. **Simon Luckhurst** finds out more

THE BRAINCHILD OF CO-FOUNDER AND R&D DIRECTOR,

Xavier Marchal, Belgian speaker manufacturer AudioFocus is one of the newer generation of pro audio companies to take the market by storm. Its rapid success is seemingly down to the quality of relationships maintained with partners on both sides of the business, as well as a genuine desire to look in new directions. So it surely wasn't long after Powersoft debuted its M-Force moving magnet linear motor technology that cogs began spinning in Belgium.

'We started cooperating with Powersoft when they launched their first modules and we decided to create our own cabinets with built-in amplifiers with DSP,' recalls Mr Marchal. 'What started as us working together on small projects led to us testing some amplifiers and new products. At the moment we are very close to them; it's really a long-term partnership. We've given them a lot of feedback and they're very open to discussing many things; technical things.'

The conventional moving coil technology offers a well-travelled path to success. Everyone's doing it – and has been happily for the last century. Whereas a completely new technology is a step into the unknown; it takes courage to break from the norm. But with the combined engineering experience of the two companies, it was a no-brainer for Mr Marchal. 'It's very new technology and a lot of people are very excited – for me it is kind of a revolution,' he explains. 'At AudioFocus we also want to invent things. We try to do our best to be different from our competitors.'

'We believe that M-Force is a revolutionary technology for subwoofers,' says Claudio Lastrucci, Powersoft co-founder, R&D director and the visionary behind M-Force. 'It will be like Class-D – everybody will eventually use it.'

Tellingly, he is quick to add that this does not mean Powersoft will be entering the subwoofer business in its own right. 'Our



AudioFocus' Alexandre Kostenko demonstrates the true scale of the TS40

strategy, our interest is to provide the technology, not the final product,' he clarifies. 'M-Force is one example of how things can be done differently because of the exploitation of switch-mode technology, but it is only one example. There are things going on inside of Powersoft that will move us further towards merging technologies and mixing things together'.

However, Mr Marchal is keen to stress it's not just the latest trend. For the low frequency systems it's intended, the M-Force motor offers some distinct technical advantages. 'We know that switch mode amplification has some features that haven't been fully exploited until today,' explains Powersoft's Massimo Minardi, M-Force product manager. 'One is the possibility to drive a very inductive load. The second is the ability to recycle into the power supply the back electromotive force generated. The movement of the coil drives this back force and it can be recycled with great efficiency with a Class-D amp. For a

traditional amp, this ends up as heat to dissipate and not energy to recycle.

'We also took some features from our other technologies,' he continues, 'such as zero latency DSP and the differential pressure control technology. This gives us the possibility to measure the difference between the inside of the cabinet and outside, and then feed this information to the DSP in order to adapt the functioning of the transducer to correspond to the input of the amplifier.'

All this in practice means that you can 'save space, you can save weight and you can also save in the power supply because you don't need so much signal for the amplifiers,' adds Mr Minardi. 'This means more space in the truck for the same SPL. This is why this is so interesting.'

Around the time of the M-Force launch, AudioFocus was seeking a companion subwoofer for its Ares 12 line array and was drawn to the novel approach. 'We had the possibility to go and follow all the other manufacturers but we wanted to launch a brand new product with a new technology. The idea was also to have a kind of "green subwoofer". The energy that we use is so low that it's really efficient. This was the route we wanted to take. You can have very compact enclosures and systems with a very low end, low distortion and high pressure level.'

But the resulting product, the TS40, is not just a mere subwoofer. At a massive 40 inches, the infra-sub is capable of reaching from 20Hz-80Hz with a huge SPL of 153dB. 'We can compare one TS40 to three or four double 18-inch subwoofers,' smiles the R&D director. 'There is an excellent dimension to performance ratio as a result of the moving magnet.' Quite the statement, I'm sure you'll agree!

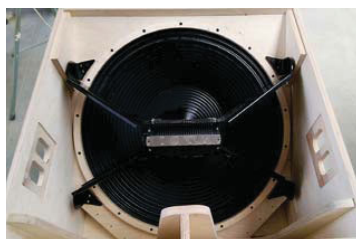
But there's more to a loudspeaker than decibels. An infra-sub is a relatively niche product, so maximising flexibility is also key to success. This has been another focus for AudioFocus. 'You

can use it in many situations because we have different presets in the DSP. You can use it as a true subwoofer or between a subwoofer and bass and also as part of the bass. It can be indoor or outdoor for big festivals and gigs – it doesn't matter, it's very versatile. You can also use it with any kind of top unit and as long as you make a good join between both, it's good for all applications.'

The M-Force motor is ideally suited to diaphragms of about 30 inches. There are other manufacturers currently exploring the solution, but none pushing the size of the diaphragm to quite such extremes. As the diameter increases further, so do the challenges with properly



Four Ares 12s sit atop the finished TS40 as the teams assess their hard work



The first TS40 sample design

matching the crossover point with the tops, and this is where AudioFocus has had another breakthrough. 'Xavier already had something in mind about the 40 inches but I was a little bit concerned,' remembers Mr Minardi. 'Using such a huge diaphragm, a huge moving mass, is not easy because the frequency response can't reach high enough. Xavier was really good at finding a solution with acoustical load to reach this goal.'

'After introducing us to M-Force we made a couple of prototypes and then Massimo visited us at our offices to help us take measurements, perform listening tests and just make sure that our design matched well. It matched perfectly! The biggest challenges after that really lay in the assembly of the cabinet,' the co-founder furthers. 'We had to reconsider the production process. The force is so huge we had to redesign and rethink everything to do with the assembly. Everything has to be screwed together and we required a very specific spider basket. It has to be completely different from what we would usually consider and we had to design all of



Starting to take shape



Ready for action

this. I think the process as a whole probably took us about a year in between other projects.'

Preview versions of the TS40 travelled recently to Frankfurt for Pro Light & Sound 2016, as well as Palm Expo in India, with last minute tweaks still being made. 'We've had the final design only in the last two weeks,

it's still a baby for us,' chimes in Alexandre Kostenko, AudioFocus sales director. In a couple of weeks time AudioFocus engineers will be heading to the Baltic States Music Festival in Estonia with four TS40s for beta testing. 'We have a plan to go out there to perform some tests and at times even go directly on the stage to have an idea of how the materials are performing and how we can fine-tune the economic parts,' adds the sales director. 'It's always very interesting to go on stage.'

Since unveiling the TS40, AudioFocus has been blessed with a hugely positive reaction. 'We've already seen huge interest, from Latin America to the East, to Africa, it's really worldwide. We realised this when I uploaded a video to Facebook. It was just a 30s video of the magnet and cone moving for the TS40 and we had about 30,000 views within hours, and more than 300 shares,' muses Mr Kostenko. 'Most of our partners, including those in Asia and the Middle East, have already heard the TS40 sample design and the feedback is always more of the same: "Your sub is just blowing us away!". It's very powerful, goes low with lots of punch, and you can really feel it in all the parts of your body. You can see why we were all very excited.'

The product of what has really been combination of efforts stretching back well over half a decade has finally reached fruition. Both companies will be hoping it impresses just as much in person as it does on paper.

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THE TERMINATOR INFRA SUB



TS40 INFRA SUB



TS-40 infra subwoofer is based on the latest knowledge of energy transducers from Powersoft coupled with the AUDIOFOCUS unique design of cabinets. The ultimate mix of these two technologies is a low deep end result with low distortion at high spi levels.

This can be managed by AF MANAGER software to match perfectly the coupled top units and the audience. TS-40 has uncommon weight/dimensions/performance ratios which is important in terms of transport costs and truck fill-in efficiency. TS-40 can be compared to three pieces of double 18" of the market in terms of audio performance, while it is only 35% of the size.