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DIGITAL MICROPHONES? IT CAN'T BE DONE...



The TLM103D large diaphragm digital condenser microphone

The new Solution-D family of microphones from Neumann lands squarely in a market sector that never previously existed.

By **ANDY MACKENZIE**

Microphones have always been analogue devices, and the capsules always will be but Neumann have brought the digital conversion process closer to the capsule than ever before. The Neumann company has a long and distinguished history of innovation in the recording field. The organisation lays claim to many substantial developments including the first condenser microphones, stereo microphones, phantom power and a host of others. This latest foray into R&D is intended to address what Neumann's engineers have identified as a significant weakness in current recording technology.

The idea goes something like this – analogue systems need buckets of headroom and every stage of analogue audio processing contributes its own little bit of noise and non-linear distortion. Digital transport and processing introduces neither noise nor distortion. So...if we're going to convert it to digital anyway, we may as well do it as early as possible and eliminate as much of the analogue processing as we can thus reducing the distortion levels and improving the dynamic range.

To achieve this, Neumann have eliminated the analogue processing from the equation. The signal leaves the capsule and is immediately

converted to digital. The electronics in the microphone are all digital and offer some degree of processing before the signal even leaves the mic. When the signal does leave the mic, it is coded according to the AES 42 standard – this is not the same as AES/EBU, it is a specially designed format specifically intended for use with digital microphones.

AES 42 goes both ways. It carries phantom power and control data to the microphone and digital audio away. While the cable uses standard 3 pin XLR connectors, this is no ordinary mic cable. As with all digital systems, AES 42 requires a substantially greater bandwidth than normal audio cable is designed for, so you need to use an appropriate digital cable. Consoles and other devices with AES 42 inputs aren't real common as yet, but I won't be surprised to see option cards for it appearing as the format gains support. Once this happens, the console could control all the user adjustable parameters of the mic: output level, polar pattern, limiter settings, the lot. Cool, huh?

In the meantime, you have a couple of options for getting the signal into your console or recorder. The simplest is to use a connection kit, which is a little device that will supply power to the mic and convert the output to a different format. These are available with either S/PDIF or AES/EBU outputs. The downside of the simple connection kit is that you can't take advantage of the microphone control options. If you



KM184D

use the DMI-2 controller and the RCS software you have access to all the microphone control features and you can plug in two microphones. The output of the DMI-2 is standard AES/EBU.

At this stage the digital range doesn't go as far as the analogue range from Neumann, but there is a pretty good variety in the microphones available. The KM D series is a digital version of the KM18x series and is available with a range of capsule heads for different polar responses. If you're looking for a large diaphragm condenser, you've

got two possibilities. The TLM103D is, as you would expect, a digital version of the TLM103 cardioid condenser, while the D-01 is the flagship multi-pattern model. All the microphones can operate at any of the industry standard sample rates from 44.1 to 192kHz and produce 24-bit resolution, so system compatibility shouldn't be a problem.

WE TESTED IT

CX spent some time playing with the KM184D downstairs in the recording studio, and we were frankly impressed. The mic was set up on a

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SENNHEISER, NEUMANN AND THE SYDNEY OPERA HOUSE

A new 'sound partnership' between Sennheiser, Neumann and the Sydney Opera House was announced on the 18th of April. Described as a 'partnership of excellence', the deal will see the Opera House equipped with a broad selection of microphones from the Neumann and Sennheiser range.

Sennheiser and Neumann have similar arrangements in place with a number of leading opera houses and concert halls in other parts of the world, and the benefits flow both ways. For Sennheiser and Neumann it offers both a visible marketing tool and a valuable way of keeping track of the effectiveness and reliability of their products in demanding real world environments. For the various sound partners, the benefits include ready access to the latest in equipment as well as service and support.

"Sydney Opera House has used Sennheiser and Neumann microphones since opening its doors, and is thrilled that both companies are now official corporate partners. Using their microphones is a unique opportunity for us to be aligned with the best in the industry," said Sydney Opera House Technical Director, David Claringbold, during the official announcement.

Susanne Seidel, President of Global Marketing at Sennheiser, and Wolfgang Fraissinet, Neumann's President of Marketing and Sales, were also enthusiastic about the partnership, saying that Sennheiser and Neumann are "...pleased to have the opportunity to officially provide Sydney Opera House and its artists with our products..." and "...looking forward to working together closely with our new partner..."



Wolfgang Fraissinet, Susanne Seidel and David Claringbold

stand in the studio and we did some listening tests, comparing it to a similar analogue microphone using the onboard preamp in the DM2000. The first very obvious point of difference is the noise floor – the digital mic just didn't seem to have one. Cranking every bit of gain we could get through the console and the monitors didn't show up any discernible noise, despite giving enough gain that I could hear myself tapping my fingers on the console.

At similar gain levels the analogue mic's noise floor was extremely apparent. Given that the gain levels were wildly unrealistic for any practical application, is the difference enough to be significant? I think so, especially when you consider that in most cases you would be using multiple mics, each of which adds to the noise floor.

The sound of the mic was crisp and accurate without any obvious colouration. As a cardioid capsule it shows some proximity effect, but this is not excessive or obtrusive. I can see this mic working in a wide range of applications and its strengths would show particularly well when used with quiet sources where noise often becomes an issue.

I can also see it filling a role in live environments like choir and lectern miking where the small size and low reflectivity finish would make it visually unobtrusive at the same time as the zero noise factor helped in traditionally high-gain applications.

HOW MUCH DOES IT COST?

Well, more than the analogue versions, but perhaps not as much as you might think...

The basic starter kits, consisting of a KM184D microphone and a conversion kit is a reasonably inexpensive option at \$2099 suggested retail, but at the big end of town the D-01 with a DMI-2 controller is a shade over nine thousand. But to be fair, high end studio microphones have never been cheap and neither have the other components in the signal path. When you consider that the D-01 is a top of the line multi-pattern Neumann condenser with complete remote control and very, very impressive performance specs, it starts to look pretty reasonable. Add to that the fact that it eliminates the need for an analogue mic pre and you can see a serious market.

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Robert Sloss (Syntec), Susanne Seidel and Wolfgang Fraissinet

While they were in Sydney for the launch of the sound partnership with the Opera House, I had the opportunity to chat with Susanne Seidel and Wolfgang Fraissinet. These two hold senior positions in two of the world's best known microphone companies, so I was interested to get their views on their products, their customers and a bunch of other issues...

On the links between Sennheiser and Neumann...

Neumann is part of the Sennheiser group of companies, but they operate almost completely autonomously. R&D, which is critical to both companies, is undertaken separately and products are manufactured mostly in different factories. The product components which share manufacturing facilities are things like CNC machined casings which don't care where they're made.

On their products...

Sennheiser and Neumann serve slightly different markets – Neumann has historically been known for high quality studio condensers while Sennheiser's dynamic microphones have been widely known and used both in studios and in live environments. A conscious decision has been taken to stick with these markets and not cannibalise one another. Quality control is seen as fundamentally important to both companies and Wolfgang points out the 64 individual QC tests carried out by hand on each and every U87 to leave the factory.

On their relationship with their customers...

"We feel that we give our customers excellent ongoing support, which means they continue to have confidence in us. Our customers also are the main driver for our R&D. If our customers tell us they need it, we will try to make it." Susanne goes on to say that a significant part of their customer support network is the local distributor, Syntec International, who have a longstanding relationship with the Sennheiser group.

On the future of microphones...

We may see Sennheiser producing a limited range of digital mics using technology similar to that used in the Neumann Solution-D series, and there's no telling what other manufacturers are planning, but we're likely to remain in an analogue microphone world for the immediate future. Neumann are confident enough in the future of analogue microphones to be developing their own analogue mic pre, scheduled for release at AES in October. Wolfgang promises it will be "...ideal for all Neumann microphones..." and will have a number of unspecified "unique features". We'll just have to wait and see...

Even so, the market for the D-01 is probably reasonably limited – whether it's good value or not, there are only so many people with that kind of cash to throw at a microphone. I would suggest, however, that the cheaper kits are going to present a very attractive proposition to small studio operators otherwise faced with the purchase of a mic, pre and A-D converter.

WIRING

For those seeking to introduce digital mics to their existing studio, there may be a few teething troubles – since many studios are wired only for analogue mic signals, arrangements would need to be made for AES cables from the live room to the control room. For the purposes of our testing we ran the cables through the open doors of the airlock, but this is not a real solution. A similar issue can be raised about console inputs. Most digital consoles offer AES/EBU inputs as an option, but most have only one or two (if any) as standard. Both these issues can be rectified with a little bit of effort and some dollars and won't present an impediment to someone serious about going digital.

There is also an obvious niche for these mics in a live environment. Since the majority of digital production consoles now use remote I/O racks with interchangeable cards, optioning in some AES/EBU inputs is not difficult, and users won't need to upgrade their multicore to manage the digital format – just make sure the AES mic leads are clearly identified so you don't confuse them with the standard ones. The things would probably still work up to a point, but I can't imagine you'd get ideal performance from either analogue or digital.

The only other negative that I can see people identifying in this system is the absence of a preamp. While there are lots of people who swear that mic pres should be completely neutral and uncoloured, there are also lots of people who like to combine particular mics with particular preamps specifically because of the colouration they offer. If this is you, you may be happier staying in the analogue domain, at least for a little while. But for all those who want to hear the sound straight off the mic capsule, this is for you.



Digital vs analogue AB test

- **SEX APPEAL:** 8 The sleek finish will appeal to just about everyone
- **QUIETNESS:** 10+ This sets a new benchmark for what quietness actually means
- **SOUND:** 9 Very clean, neutral sound. I can see the KM184D being a busy all-rounder in most studios as well as live environments
- **CONSTRUCTION:** 9 Neumann's build quality has always been excellent, and this is no different
- **FEATURES:** 8 The RCS software offers a whole lot of user control, but some folks will wish for analogue preamp emulation
- **VALUE:** 8 Costs more than an equivalent analogue mic, but not necessarily more than an analogue mic/pre combo
- **PRACTICALITY:** 7 Not really a 'drop in' replacement for analogue mics – some adjustments will need to be made to link these into an existing system.



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