SADiE Series 5

It's a been a fair time coming but SADiE's next generation platform reinforces its core markets and raises the performance bar simultaneously. ROB JAMES offers some context and explains why it's time for a revisit.

SADIE IS REMARKABLE in several ways. For one thing, it has survived when so many others have fallen by the wayside. It is hard enough to make a living anywhere in pro-audio manufacturing, but building audio workstations is particularly tough. The early days are comparatively easy, come up with a good idea, get some finance, hire some bright electronics, IT and manufacturing people and get something on the market that works. Then the fun starts. To survive you need to support early adopters, understand their needs (not what they say they want), and keep selling product to finance the R&D. You also have to sell at a price people are prepared to pay. With the entry-level turnkey system at a mere UK£4000 (+ VAT) and a top of the range dual-processor based DSD mastering machine at around UK £10,500 (+ VAT) these are not expensive tools by any professional measure. SADiE's first products appeared in 1992, and it has proved it can go the distance.

Whatever the application, there are really three sub-species in the workstation world. As in nature, there is a pecking order. The so-called 'dedicated' hardware types believe (with some justification) that they are at the top of the food chain. In these examples, even where there are elements of a PC involved there is little evidence of this from the user's perspective. Next in the hierarchy come the hybrids where the user-interface is a PC, (and often dedicated control surfaces in addition) but all the audio functions are handled by proprietary hardware. Hybrids are typified by an ability to continue playing audio or writing a CD-R even when the host PC has terminally crashed. The last sub-species uses proprietary I-O hardware but uses the PC architecture to handle control and audio with or without additional DSP. It is only comparatively recently that the last option has been sufficiently robust to warrant a 'professional' label.

Previous SADiE systems could be clearly identified as members of the second group. With Series 5 this is no longer quite so straightforward and this is the most significant change from previous SADiEs. In the past, SADiE cards had their own dedicated SCSI interface that handled all the audio storage and CD-R drives, Exabyte tape drives for CD mastering, and so on. The audio remained in the SADiE environment with the PC working, in effect, as a control terminal. This brought considerable advantages in terms of reliability and relative immunity to the vagaries of the PC environment. However, there were also downsides. A CD-R connected to the SADiE card could not be used by the PC. Audio could not be played from the PC's drives and networking required an expensive proprietary solution, SADiEnet, and all plug-ins had to be written specifically to run on SADiE.

For the Series 5 all this has changed. PC's are generally more reliable and Windows 2000 and XP are far more robust than earlier iterations. The audio I-O and dedicated DSP are still on proprietary cards but the PC's storage hardware and conventional networking are now fully exploited to open up the SADiE environment. Consequently, the current generation of IDE hard disks and CD writers can be used instead of higher priced SCSI devices.

If the application demands it, a standard Adaptec SCSI card can be fitted. For example in a DSD machine where the data rates are high and an AIT tape drive is used for mastering. SADiE still has its own method of directly addressing the disk hardware so legacy disks that cannot be 'seen' by Windows can still be used.

Another consequence of this change of approach is that is has become possible to integrate standard Direct X plug-ins directly in the SADiE mixer as well as the proprietary ones. VST plug-ins can be used via a 'wrapper' utility. A further consequence of this is that CPU horsepower becomes an issue. If you want or need to run a lot of DSP hungry Direct X plug-ins you would be well advised to take the (optional) higher powered PC with dual processors. In this configuration one CPU is effectively dedicated to running plug-ins.

Alternatively, I confidently expect third party DSP cards such as the Mackie UAD-1 and TC Powercore to work quite happily with SADiE 5. Of course, exclusive plug-ins continue to be available. Several of these have been updated, but the real killer is the new CEDAR Retouch. Recording wreckers like coughs, phone rings and chairs falling over are no longer safe now this scalpel is available. I can envisage Series 5 workstations being ordered for this alone (see page 38).

Other useful innovations include single-wire AES-EBU connections for sampling rates up to 96kHz (192kHz requires two-wire). SADiE has added the source and destination editing paradigm, much admired by Sonic Solutions users, along with three and four point editing. The last of these is pretty much the same model used in on-line VT editing. A moment's thought will show that there are four relevant points in a conventional edit. The in and out points of the source material and the in and out points where the material is to be placed in the edit decision list or playlist. A bit more thought should reveal it is generally only necessary to define any three of these points. Defining the fourth can be used to change the length of the material in the destination. There are more sophisticated variations possible, long supported in SADiE, where a sync point or 'hit point' is also defined, but the three or four-point model is generally quite sufficient for most applications.

Series 5 hardware replaces all the previous offerings – Radia, 24.96 and Artemis. The Portia video card is no longer supported since it is ISA and the current motherboards are PCI only. A new Portia may appear or SADiE may elect to support a third party solution.

Since I last looked at a SADiE (Version 3 software) there have been many worthwhile improvements. At long last it has a fixed cursor, scrolling tracks mode and reverse play. Many simple editing tasks can be performed directly in the Playlist Window, which is generally quicker than opening the trim window. More

recently the Navigator (overview) window, improved crossfade control and better waveform display have all been introduced.

SADiE has always been a strong advocate of open file interchange. So it should not come as a surprise that AES31 is included as standard with Version 5. DDP images can now be written to disk, just as well given the difficulty of obtaining Exabyte drives and cartridges.

Alternative desktops can now be set for differing screen resolutions and operating methods. Both the Playlist and Mixer windows now look a great deal smarter. I particularly liked the clear mixer in 'house colour' shades of blue. Traditionalists have not been forgotten so there is an option to use the 'classic' interface.

This is a highly configurable series of workstations. A wide range of hardware options can be specified for specific applications. However, the number of hardware options pales into insignificance compared to the software configuration. SADiE has managed the extremely difficult trick of designing a user interface that can be set up to suit the most casual user in radio without overwhelming them. At the other extreme, extremely complex tasks can be undertaken. Thanks to the management control functions, several users can safely use the same machine without endangering each other's projects.

After years of concentrating on the functionality, I see signs that people are finally starting to pay due attention to sound quality. The sound of a SADiE workstation is almost beyond question. The number of units in use in mastering houses tells a story. Of course, many mastering engineers use external convertors. Some of these cost considerably more than an entire SADiE workstation. That said, SADiE's own convertors have always passed muster and the ones used in these latest models continue in the same vein.

SADiE has earned the respect of some of the most demanding users in the business by concentrating on its core markets, broadcasting and mastering. The secrets of its success are not that hard to understand. Instead of trying to be all things to all men, i.e. joining the 'features' arms race, SADiE has dealt with hundreds, if not thousands of the devils that lie in the detail of broadcast, mastering and other production processes.

Any one of these seemingly insignificant items can be a showstopper, yet makes poor reading in advertising copy. Another significant factor is security of investment. A headline price will often appear to offer good value. However, if you have to invest the same amount or more every couple of years to get continued support, then the cost over the lifetime of a system can be many times the original entrance fee. Since SADiE began, all software updates have been free of charge and the hardware has had a longer currency than most. In fact, this is the first major change for around five years. The introduction of DSD mastering capabilities is a natural progression, given SADiE's considerable presence in CD mastering. Of course, these machines can also master for conventional PCM CDs and, with the addition of the Meridian lossless packing plug-in, for DVD-Audio, so regardless of who wins the format war, they have the bases covered. SADiE is confidently branding the DSD-8 as 'The Ultimate Mastering Workstation'.

The new, blue, image is fresh and clean and should serve them well in making the hardware more attractive and giving the on-screen interface a face-lift. The hardware controllers are functionally identical to their predecessors but have also been given the new look.

With a long pedigree and sensible pricing the Series 5 range of machines is an attractive proposition. This is especially true now at the beginning of a new series of hardware. On previous form, early adopters will have five years of free updates to look forward to. This should ensure SADiE Series 5 remains high on the list of possible purchases for anyone considering the purchase of a serious, professional, audio workstation. ■

The range

The Series 5 Turnkey systems are custom rackmounting PCs, 4U high for the PCM systems and 5U high for the DSD variants. These also have a headphone output and volume control on the front panel.

PCM 4
Four 24-bit, 96kHz analogue I-Os. Two AES-EBU I-Os, inputs and outputs, single-wire 96kHz. Breakout is on cables.

PCM 8
Eight 24-bit, 96kHz analogue I-Os. Four AES-EBU I-Os, single-wire 96kHz, dual-wire 192kHz. Breakout box included. Cards may be chained together for multiple I-O systems.

DSD 2
Two 24-bit, 96kHz analogue outputs. One AES-EBU I-O, single-wire 96kHz, dual-wire 192kHz. One SDIF2 I-O, one SDIF3 I-O. Breakout on the back panel.

DSD 8
Eight analogue I-Os. Supporting both DSD and 24-bit, 192kHz. Eight main audio channels of digital I-O supporting AES-EBU (single-wire 96kHz, dual-wire 192kHz), SDIF2, SDIF3, optional Sony MAC-DSD multichannel digital interface. Eight channels of digital aux sends and returns (supporting multiple formats as above). One Sony DSD processing module included (Mix and EQ). Breakout on the back panel.

PROS Highly professional approach; a tool for specific applications rather than trying to be all things to all men; sensibly priced.

CONS Screens can get a bit busy; otherwise not much.

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DSD

Originally designed as an archiving format, Direct Stream Digital employs high data rates to improve on 'conventional' PCM methods. One-bit conversion and a sampling rate of 64fS (i.e. 2.8224MHz) results in a pulse chain that even looks like the analogue signal. At the simplest, D to A conversion can be just an analogue low-pass filter. A printout of the DSD pulse train as vertical bars, placed alongside a conventional sine wave makes this obvious.

The overall data rate is around four times that of 44.1kHz PCM. The one-bit sampling process introduces a lot of self-noise and 5th order noise shaping is used to shift this out of audible range. Analogue filtering is minimised and no decimation is needed in the digital to analogue conversion. SACD is capable of delivering 120dB dynamic range with a 100kHz frequency response.

Super Audio CD is a Sony/Philips format for delivering DSD to consumers. Lossless packing is used to reduce the amount of data. The SACD specification is known as Scarlet Book.

Simple recording and playback is not too much of a problem. The fun starts when you want to mix, EQ or change the dynamics of DSD signals. Here, there are two alternative approaches in current use. SADiE perform all editing, equalisation, and other processing at the same 64fs sample rate, but the processing expands the bit depth up to 8 bits (DSD-wide). At the end of the processing chain, the bit depth is reduced back to a 1-bit wide signal through a delta-sigma modulator (still at 64fS). There is no sample rate conversion involved. Processing in this way requires the use of some innovative techniques. SADiE uses Sony D-MAP (DSD Modular Audio Processing) plug-ins to apply EQ and dynamics. D-MAP is not simply a software plug-in but involves special hardware on SODIMM cards.

The alternative approach is to convert the DSD bitstream to high (8fS) PCM audio, n bits wide, to do all the processing in this format using conventional algorithms, and then to convert back to a DSD bitstream at the end. SADiE feels avoiding any unnecessary sample rate conversion is preferable.

The jury is still out on whether one method produces better results than the other.