It’s been a while since we were able to disassociate the computational power beneath the hood and the bells and whistles of the consoles we use. As a consequence digital desks fall into a number of different camps loosely organised according to their primary processing method. DSP via SHARC processing was the great gift that Analog Devices gave to audio complete with easy-to-get-started kits. Others chose the FPGA route which is flexible, reconfigurable and powerful but requires a manufacturer to build expertise in developing skillsets and the longer you get to do it for the better at it you get. The third route is one that has been among us increasingly and involves harnessing the power of computer CPUs. This is an approach that we’ve seen taking hold within DAWs although until relatively recently its use in mixing consoles has been less prominent. While CPUs can make a DAW fly if implemented correctly and sensibly, a desk — with all its real-time controls on the surface, all the time and channel counts at the limits of engineer imaginations (until you throw in lots of 5.1) — needs a fair whack of processing headroom and reserve to avoid embarrassment. But CPU power has matured and is now with us for good. Not only has it proven itself with continued hikes in power while remaining refreshingly competitive in terms of price, one also detects a drop-off in interest in DSP on account of the chip manufacturers focussing their efforts in other directions. If you look at the activity in handheld devices in the consumer market you’ll see that miniaturisation is where it’s at. CPUs have also miniaturised and increased in power at constant rates. It’s why Studer’s new Infinity Core — the back end that is driven by the new Vista X controller — has CPU at its heart.

The arguments for CPU are compelling particularly for someone who has, over the years, seen every incarnation of the innovative Vista desk. Studer Vistas have been SHARC-based and the manufacturer achieved three generations of SHARC Core the last of which was, interestingly enough, introduced with the Vista 1 — a console in a box. To go back to the origin, in the late 90s there was the Performa Core that transitioned in around 2005 to the S-Core, which shrunk the cards from 6U to 3U and put 12 chips on each card that were also faster for what amounted to a five-times increase in power. The original Performa ran around 150 mono equivalent channels and used 20 boards each with six chips. The S-Core did around 350 mono equivalent channels on a 9-card core. Vista 1 is obviously smaller in scale as a desk but achieves around 125 mono equivalent channels from eight chips on a single board. If you draw a line through the points on the graph, this SHARC-based progress equates to a 22-fold increase in grunt over the last 15 years. Perfectly respectable you’d think until you spot that CPU has shown a 4000-fold increase in processing power in the same time frame. That kind of tells you where Studer sees the DSP train a-going.

Of course, switching from SHARC to CPU is a big decision and requires a lot of work to port across. What the SHARC does well is provide developers with lots of tools to make stuff that is custom to a manufacturer — it’s why it is so common in desks. Studer is good at embellishing its feature set in this way, with things like Vistamix automated mixing among a lot of other stuff. You can even open up the system for the end-user so they can compile their own configuration, which Studer also does. The decision to introduce the next generation of Core as CPU-based is a massive one but Studer is keen to take advantage of the huge momentum and investment in CPU technology. And let’s not forget that the reason Studer has had only three generations of SHARC core so far is because each involved a huge investment on the upgrade. If you can harness CPU for DSP then the power upgrades will be coming along continually — well, at least that’s the idea. You’re using standard technology and in theory every couple of years you can get a new server board, put in some faster chips and enjoy the power hike. That’s not going to mean a doubling of channel counts every two years but it will mean a palpable improvement, should you choose to do upgrades that often (unlikely).

Studer has found ways to overcome a fundamental problem of CPUs being undeterministic. A point to note is that clock speeds of processors have largely maxed out of late so performance is improved by using lots of cores...
and that suits the parallel processing requirements of Studer — something SHARCs are good at.

Studer has worked out ways of isolating cores within a CPU, making them deterministic and having one core taking care of the housekeeping. The Intel E5 has ten cores, they isolate nine of those, hyperthread them so they run two threads on each physical core — for 18 virtual cores — and can run around 25 channels per core. So on a single chip they can achieve around 400 mono channels enabling Studer to create its Core 400 (one chip for 400 channels, which is some 10% bigger than Studer can hit with its biggest SHARC core) or you can employ two chips to make a Core 800. Apparently they’ve had 100 surround channels running, which amounts to 600 mono equivalent channels, without issues.

The approach to redundancy is different because your dealing with CPU technology with a motherboard and power supplies and with a single chip running those 400 channels there’s little point in adding another backup chip on the same board, so to serve redundancy they just employ two complete duplicated cores. The switching is handled at the new D23 interface box. The introduction of Studer’s high capacity A-Link interfacing was made precisely to deal with the large numbers of channels involved.

The system employs FPGAs for the busing and mixing on the Core Link PCIe card (with 12 A-Link interfaces on it) which goes back to the CPUs for faders, gains, EQs, dynamics, etc.

It’s worth reminding that A-Link is directly compatible with Riedel’s MediorNet and offers the ability to go straight out of the Cores to the I-O frames and straight out of the Core to a routing system. There is massive potential and application here; it’s how Studer sits on networking and large distributed setups.

If you’re an existing Vista owner, what’s the implication of all this for you?

You can upgrade a Vista 5 and 9 to an Infinity Core and reuse some of your existing I-O but you can’t upgrade a Vista 6 or 7 to this. Prices will depend on configuration but upgrading a Core on a Vista 9 would incur ‘several tens of thousands’ rather than having to buy the whole shooting match all over again.

The standard offering for the new system is a dual Core 400, which will cost about 10% more than you’d pay for the best SHARC Core. Bargain.

The new Vista X surface has enjoyed some cosmetic tweaks and changes but nothing so dramatic that you wouldn’t recognise it immediately as the latest iteration of the clever Vistonics surface. You can add different coloured sides and trim, they’ve changed the meter cards and meter bridge, and employed a smart laser printing process direct to the aluminium faceplate surface that is incredibly hard wearing. There’s a better stab at doing a more obvious ‘strip’ up the desk but really the changes are minor. It’s all about the Core, which is the truly innovative bit. Frankly I’m more than a little surprised at how low-key and almost apologetic the roll-out of Infinity has been when it is by far the most exciting and ground-breaking product from Studer since the introduction of the Vista as a console range. Studer really has a good story to tell here and should start shouting it before it’s thunder is stolen.

By definition, CPU technology is very scalable. There’s the obvious rolling forward regular jump in performance (Intel has apparently announced a chip with 74 cores) but you can also use previous generation processing more cheaply or cheaper smaller CPUs for less demanding applications. Without doubt, the technology behind Infinity will emerge elsewhere in the Harman console group in different guises. This is significant for all the brands. It’s massive for the industry.

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**PROS**

- Massive hike in processing potential and power; retains all the worksurface functionality; the most significant development from Studer since the introduction of the Vista.

**CONS**

- Upgrade paths could be complicated; the most innocuous looking core I have seen – scary.

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