



Genesis of a Console Digidesign's VENUE

By Jerry Cobb

Digidesign's new VENUE desk appears, at first look, to be an innovative, state-of-the-art live sound production environment offering the quality and functionality of a high-end live sound mixing system at a price point that's the buzz of the industry. VENUE configurations start from around \$45,000. Purpose-built from the ground up, only time and real world use will prove if VENUE delivers the studio-grade sound quality, maximum reliability and unprecedented flexibility it promises. However, a closer look reveals that it's far more than just another digital console; it heralds several new concepts in interoperability, potentially changing the way that music is delivered to the consumer.

VENUE consists of the D-Show mixing console, FOH mix engine, a Stage Rack I/O unit with recallable, remote-controlled preamps and a multi-channel digital snake. The system is fully scalable, allowing up to 96 mic inputs to be mixed to 27 busses. The mix engine provides support for Pro Tools plug-ins, features built-in EQ and dynamics processing on every input channel and includes 24 assignable graphic EQs. Most importantly, VENUE offers an integrated Pro Tools recording and playback option. We asked Digidesign's David Gibbons, the principal "father" of VENUE, to fill readers in on some of the thinking that went into realizing this project.

Whose idea was this?

David Gibbons: The idea for VENUE originally arose in the late 1990s between Dave Lebolt, then V.P. of product strategy, now general manager, and the Digidesign executive team. Considering Digidesign's success in the recording industry, it seemed like a natural evolution to look for new markets for our digital processing and control surface design expertise. The field closest to recording that needs products with these capabilities is live sound, and many people at the company had some experience with the sound reinforcement business, including Dave Lebolt, who made his living as a professional touring musician for many years with acts like David Bowie and Billy Joel.

In 2000, Digidesign hired me to start the project, and I worked on it as a product manager until I handed the reins over to Sheldon Radford, who joined us in May 2004. Sheldon is now our live sound products manager.

Where does VENUE fit in the market, and who do you expect will buy it?

VENUE is for live sound production applications including touring, corporate sound, fixed installations like theatre and Houses of Worship, and anywhere else that a traditional SR console would be used: cruise ships, some broadcast applications, conference halls, etc. It will be used from the mid- right up to the high-end in these applications. Purchasers will include touring sound companies, AV and events companies, venue management companies, performing artists and independent sound engineers.

Compare VENUE to other desks of similar configuration, and describe the process of getting to VENUE's feature set/price point.

I'll answer this question in a higher-level "market differentiation" way. The world of digital signal processing has evolved in both the studio and in sound reinforcement worlds to the point where traditional "channel-strip" features are taken for granted, and you can't launch a product without fourband parametric EQs, dynamics, etc. Digital consoles in SR are relatively new, and the pre-VENUE product offerings have (perhaps rightly) concentrated on getting the fundamentals into a package that can travel well. But if every live console has a compressor and gate on every channel, how can you choose between them? While VENUE provides these fundamentals, it does so in a way that is highly focused on sound quality. From the design of the pre-amp and converter section, to the careful modeling of analog sounding EQs and dynamics, to the 48-bit clean mix-bus

architecture to ensure highheadroom, nothing in VENUE that can affect the sound quality was left to chance. Our hopes for the product are that in the future, when choosing between what will inevitably be a wide range of digital consoles, users will pick VENUE because it is the best-sounding and most intuitive to operate. “Digital done right” (and with a wide variety of digital “flavors”) has the potential to outstrip the sonic appeal even of analog consoles; I believe that our continued refinement of the platform will eventually lead audio professionals to support that point of view.

At the beginning of the project, however, it was clear to us that we would have to do much more than raise the bar for sound quality to earn a place in the live sound world. I drafted some outline plans and hit the road, talking to as many people as possible working in touring, theatre, corporate and worship applications, including sound company staff, independents and part-time users. The discussions included folks at the top of the live-mixing game and journeymen working every day in clubs and sheds, as well as people who used to mix for a living but now run the bigger live sound production businesses. It also included senior folks who had previously worked at other console development companies. This process continued throughout the development cycle (almost four years). To keep the details of the product from our competitors, we carefully emphasized with each contributor the importance of confidentiality. They agreed, and we had tremendously productive interactions — at least that’s how I thought of it! — and developed relationships that often spanned the years from the start of the project to the launch. It quickly became apparent that people saw Digidesign’s value in providing integration of recording and playback (via Pro Tools), signal processing (via plug-ins) and external show control systems (via snapshots and MIDI integration). We’ve heard this message loud and clear, and looking to the long-term, we intend to extend this integration we already provide by including networking and video integration.

Pro Tools is known to crash in the recording world. Crashing would be catastrophic in the live mixing world. How has VENUE’s design addressed this problem?

While it’s true that Pro Tools has had some periods of “shakiness” in the past, most current users find it more than reliable enough for live-tracking in the studio, for recording live performances, and for broadcast recording applications — that is part of the reason why it has replaced tape.

But you’re right: There is an even higher threshold of “mission criticality” in live mixing than in the studio. We took this very seriously, and in addition to making the touring chassis of VENUE highly reliable (to reduce mechanically-caused failures) we added lots of other technological foundations to make it “ready for primetime.” These include:

- Dual-redundant power supply options, allowing any supply to fail with an autoswitchover to the backup supply (and with a heads-up warning).
- A dual digital snake option, providing glitchless switchover in the event that one of the co-axial snake cables running between the stage and FOH should fail, or become disconnected.
- A fault-tolerant control surface interconnection system, which allows banks of faders to be taken on- or off-line “live,” without interruption to the audio. This is based on the highly resilient CAN system that is common in automotive control applications.
- A host computer, which can be completely reset during the mix. Since most of the complexity is in the host computer (which draws the graphics on screen, and implements higher-level functionality like snapshots), we did an enormous amount of engineering to allow the user to reset the motherboard and re-boot the entire system, in the middle of a performance if necessary. Throughout the re-boot cycle, all fader and mute functions are available (including banking, VCAs, stereo faders) with no interruptions or unwanted changes to the mix settings, including plug-in processing. I believe this is unique in the realm of live digital consoles.

Of course, we also engineered the VENUE control software from the ground-up. VENUE is not Pro Tools, even though it does run Pro Tools plug-ins, and can connect to Pro Tools for the purposes of recording. The VENUE software architecture ensures a modern, robust code base that contains minimal bugs, and handles any anomalies it does encounter with the maximum of grace!

Using software plug-ins live also raises the problem of latency. How has VENUE’s design addressed this issue?

Latency is important in live applications, but doesn’t always arise in the places we fear. VENUE has a through-latency of less than 2.8ms. The majority of typical EQ or dynamics plug-ins add only two to five samples of additional latency (around another 0.1ms). The types of plug-ins that add more latency tend

to be time-based effects such as reverbs, delays and choruses, where the latency is lost in the much greater delay you actually want to get from the plug-in's effect or sound. There are a couple of exceptions such as mastering limiters, pitch-processors, feed-forward dynamics — and it remains to be seen if people will want to use these for live sound. My guess is that they will experiment, and need to be educated about how to deal with the results. VENUE provides input delays on every channel and on most outputs, to make this easy.

It's also worth noting that an external digital effect unit introduces much more latency than a plug-in — especially when used with an analog console — due to its analog/digital conversion stages. If you combine this advantage with the headroom advantage of a 48-bit internal processor like VENUE's built-in graphic EQs, there are more than enough reasons to want to keep things inside the board.

The other area where latency is important is when sending a signal to several different busses, particularly where those busses re-combine with each other (as happens when groups are submixed to mains, or in an output matrix). VENUE predicts and automatically deals with most of the common latency problems encountered in these scenarios, so the user doesn't have anything extra to think about compared with doing those things on an analog console.

Is VENUE a revolutionary product — a point of no return in the march toward an all-digital world — or simply a new line of control surfaces from Digi?

VENUE's D-Show console is purpose-designed for live mixing, not simply a Pro Tools peripheral — in fact, it isn't based on Pro Tools at all. (The D-Control worksurface is its sibling within the ICON system.)

As I noted earlier, future digital consoles are unlikely to be measured by the presence of things that once "differentiated" analog consoles: sweepable parametrics, channel-strip dynamics, the presence of VCAs, sophisticated solo overrides, etc. The new killer-app features of the future will include:

- A wide range of signal processing options. People want the maximum flexibility, and ideally want to be able to choose the "sound character" of their console on a per-gig basis. Plug-ins make this possible.
- Networkability: not just delivering audio, but also the ability to integrate control of the other equipment used by live pros to pull off productions.
- Media integration: more and more productions involve the need to record and/or play back audio material. This allows live performances to be re-distributed in other media channels (Web, streaming media, live CDs sold during or after the show, DVDs, etc.). I think Digidesign has a role to play in democratizing this so that a great-sounding live recording can be made for a fraction of the current cost. Of course, video, lighting, set automation and special effects (like pyro, lasers, etc.) are all significant other media components, and because we are part of the Avid group of companies, we are well-positioned to enhance the integration with these parts too.

"I was really excited to see Digidesign enter this area of sound reinforcement. I think they can bring a pretty big palette of resources to the table in regard to R&D. I was very flattered when Dave Lebolt and David Gibbons approached me about getting involved on the ground floor of the project. My gut instinct was telling me they were going to come at this from a slightly skewed angle compared to the other digital console manufacturers, and that was very enticing indeed. The thing to understand here is that this is not a live sound version of Pro Tools. This is an architecture designed completely from the ground up to stand on its own, but using a lot of the familiar look and feel of a ProTools environment. Now, I do think that Digi is still kind of "testing the waters," if you will, with this first entry, but if the water turns out to be fine, look out. Digidesign will get behind this market full force and you will see some profound changes in the look and feel of sound reinforcement control surfaces in the not-too-distant future." — Robert Scovill