DiGiCo SD12 Digital Mixing Console

By: Mel Lambert

It is a fact of life that product development is an ongoing saga. New processing technologies enable manufacturers to offer more mixing power in a smaller footprint, while feedback from the marketplace drives new innovations. The UK-based company DiGiCo has been offering digital mixing solutions for 15 years, bringing to market new or refined solutions in a timely fashion. The SD12 console, which was formally unveiled at the 2017 NAMM Show in Anaheim, represents a good example of progressive development within the firm's extensive SD-Series in response to evolving user demands.

Tagged as "the culmination of everything that DiGiCo has learned over the last decade and a half, and encapsulating the best features of both the SD- and S-Series," the new compact console utilizes the company's latest generation of Super FPGA technology and is targeted at installations that require a compact control surface with expandable I/O capabilities, including sports arenas, houses of worship, performance centers, Broadway-type theatres, and touring rigs. The system accommodates 72 input channels, 36 aux/group busses, a 12-by-8 matrix, and a flexible LR/LCR assignment buss—each of which feature full signal processing—together with freely assignable elements: 12 stereo FX modules, 16 graphic equalizers, 119 dynamic equalizers, 119 multiband compressors, and 119 DiGiTue digital tube mic pre-amps. Also available are 12 VCA control groups.

As I discovered, DiGiCo offered a powerful processing platform from the very first SD-Series console, based on field-programmable gate array/FPGA-based DSP and 40-bit floating-point math. During subsequent iterations of the evolving series, its designers implemented additional DSP functions as the marketplace's needs evolved and live sound engineers began seeking new features and functions. Readily acknowledging that the initial SD8 model might have been overbuilt with more data processing than would be needed by that first generation of users, there is no denying that the design philosophy has paid off with subsequent offerings in the genre, including application-specific variants available at a variety of price points. Since the SD12 console runs under DiGiCo's Stealth Core2 software, which added powerful GUI functions with touch capabilities on display screens, mixing/setup sessions are fully compatible with other SD-Series systems.

Dual 15" digital touch screens—previously only seen on the company's SD7 and SD5 offerings—provide a full 24 channels in a single view; dual-operator mode also is available, plus the ability for the right-hand screen to serve as Session Master. Connectivity to a variety of analog and digital I/O formats is enabled using a series of optional DMI cards, to ensure plug-and-play work flows with current touring, corporate, installation, house-of-worship, theatre, and related applications.

Signal-processing DSP is fully assignable, with channel resources split between input or output channels in virtually any configuration; DiGiCo's default template is 48 input channels (formats being defined within each channel, not within the session structure), with six mono and six stereo aux busses, six mono and six stereo group busses, 12 matrix inputs and eight matrix outputs, plus 12 control groups. While changing routing assignments, you have the option of clearing any non-default routing or processing—EQ, dynamics, etc.—from the channels in a session, which is particularly useful when modifying

or updating an existing session to develop a new one. A handy Auto-Route function automatically routes consecutive inputs for physical inputs and consecutive outputs for busses; the latter might be aux, group, and matrix channels auto-directed to physical outputs.

Dynamics and EQ controls are aligned next to both the left- and right-hand display screens, so that, when a parameter is selected, they are located directly adjacent to their graphical representation. The familiar DiGiCo Hidden Til Lit (HTL) technology instantly brings two banks of 24 encoders to the surface, each with a color control ring and an SD7-style channel strip with HTL encoders. A new dynamics metering function is also provided on the channel strip, together with new high-intensity meters beside each on-surface fader.

A very useful Master Section, located below the right-hand section of the control surface, features two assignable faders—complete with corresponding channel displays and metering—that can be assigned to control any input or output channel strips, or solo master. An array of five RGB scribble strips also can be assigned as macro controls on all five banks—providing a total of 25—with a snapshot panel that lets the user quickly access and control the list of available system snapshot lists, in addition to activating the next or previous setting values in a pre-programmed list for scene transitions and the like.

Eight local mic/line inputs, eight local line outputs, and eight AES/EBU in/out for local digital sources are located on the SD12's rear panel, in addition to a pair of multichannel MADI (AES10) ports plus a handy UB MADI connection for making board recordings at a sample rate of either 96kHz or 48kHz—24 track at the former and 48 tracks at the latter.

A pair of DMI card slots also is provided on the rear panel, including an optional Audinate Dante module that can be plugged straight into the back of the console, alleviating the need to purchase an Orange Box, for example. The DMI-Dante card pro-

Front and back views of SD-Rack, with cards.

vides 64 inputs and 64 outputs at 48kHz and 32 I/Os at 96kHz, and features primary and secondary (backup) Gigabit Ethernet ports for connection to a Dante-compatible network, control and configuration of which is handled externally via suitable software. An optional DMI-Waves module can also be fitted to take full advantage of the SoundGrid platform; it features 64 inputs and 64 outputs at both 48kHz and 96kHz. Finally, a DMI-Hydra card with 112 I/Os (sample rate converted to 48kHz) enables direct connection to a Hydra network that is being controlled from software and control panels developed by Calrec, which, with Allen & Heath, is a sister company to DiGiCo. (Audiotonix, the pro-audio group encompassing these three component brands, was acquired in February by Europe-based Astorg.)

The SD12 also offers a suite of remote-control options, including the iPad SD remote app; off-line software enables session preparation and on-line remote command via OSC and Ross audio protocols. A 16-pin GPI/O provides for audio-follows-video and show control, while serial/MIDI I/O is available for MMC/MTC, MIDI remote, and QLab, as well as second-console mirroring and redundancy. And, as with all SD Series products, an optional Optocore network upgrade, via two loop topologies, enables connection to a pair of I/O racks that can be shared between up to five consoles.

System components: control surface with DSP engine plus outboard I/O boxes

The SD12 comprises a familiar work surface, containing the audio engine and a range of onboard input and output interfaces that connect via optical fiber and/or MADI links; also provided are two DiGiCo-format DMI slots that accommodate optional I/O cards, plus a USB-format MADI port. The latter provides up to 48 I/O channels when the SD12 is run at a sample rate of 48kHz, and 24 at 96kHz; the port is clocked at 48kHz, regardless of the user-selected master sample rate. The console surface and input/output racks both feature dual redundant power supplies.

By default, the left-hand controller section handles a total of 12 fully assignable faders and on-screen channel-strip controls, while the right-hand master section handles system setups, I/O assignments, and other administrative functions, with 12 assignable channel faders plus a pair of extra faders that are fully mappable, but which default to the Master Buss and Solo 1. As might be expected, the SD's buss architecture is completely dynamic, supporting mono, stereo, and LCR configurations, enabling console setups that can accommodate both front-of-house and stage monitoring with shared stage racks and gain tracking. Remote control of the in-use SD12 console also is possible from another SD-Series surface and also from a laptop via a network connection; the SD12 DSP engine contains two IP-addressable devices—the console-control PC and the host interface controller.

The Master Screen features a row of gray buttons across the top that access a range of configuration displays, by either opening a further drop-down sub-menu with pop-ups, or a function pop-up display; usefully, the buttons light to indicate that sub-menus or a pop-up are active. Normally, buttons within the pop-ups are lit gray when their function is inactive, switching to a color when activated. In addition, pressing on a text box opens a numeric or QWERTY keypad that can be operated

directly on the screen or via the console's external keyboard. Navigation is straightforward, with target functions never more than one, two, or three button clicks away.

All user functions are accessed via the touch-screen displays, using a finger or the keyboard and mouse or via physical encoders comprising switches and faders. Uniquely, a single encoder labeled "touch-turn" on the right-hand panel will access any rotary controls within the Master Screen—you simply touch the on-surface control to be assigned and a colored ring appears to indicate it is now following the universal touch-turn encoder; the same color appears at the base of the encoder to confirm what it is controlling.

Each bank on the SD12 contains 12 controller channels, with all channels currently assigned to the surface being defined using the appropriate layer buttons, labeled one through four. A master screen assign button located above the layer and bank controls can also be used to switch the right-hand section to display the Master Screen or parameters for the current assigned channels to the targeted layer and bank of 12 channel strips. Which specific channels are assigned to each bank can be selected on a fader banks display; as is to be expected, input channels are assigned by default to Layer 1 on the left and then right sections of the console, running left to right, output channels to Layer 2, and control groups to Layer 3—assignments that can be customized and then saved in a session file. (Usefully, holding down any bank or layer button for a couple of seconds switches both work surface sections to the same bank level or layer.)

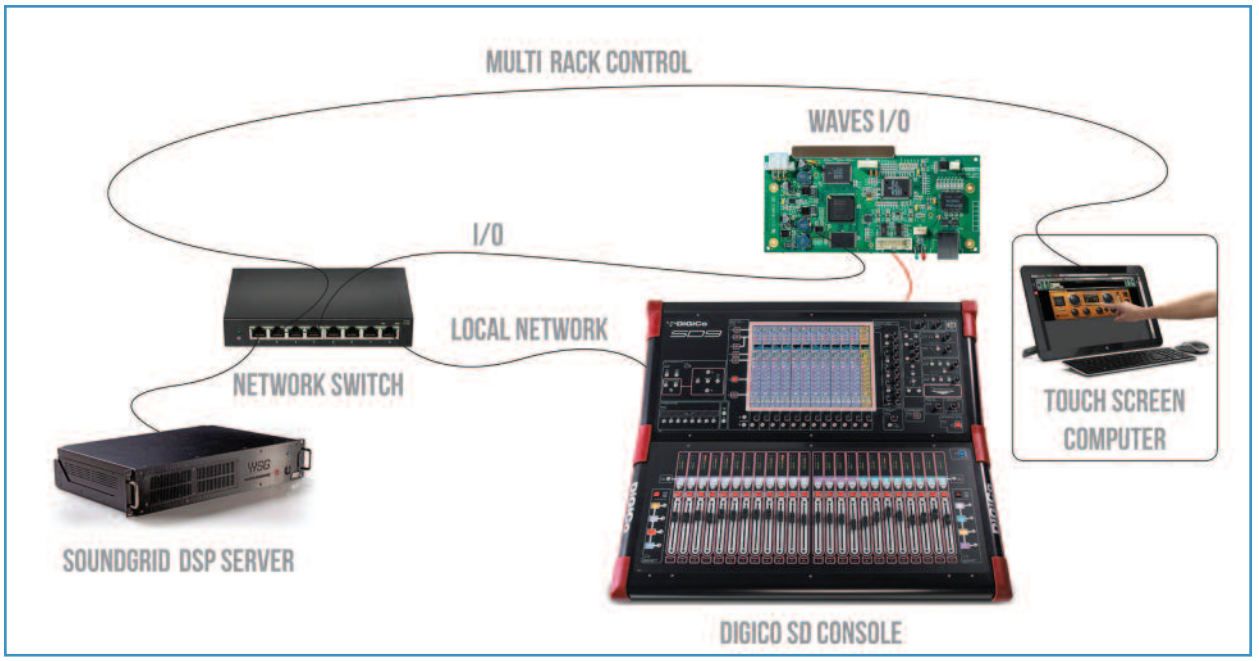
Any channel on the channel strip panel displayed in gold indicates the currently assigned signal path, with work surface controls available for detailed configuration. A channel can be assigned by touch anywhere in the screen display (except for the Aux Send area), or by using the channel left and right buttons to scroll through the channels being displayed on the target panel. Once assigned to the screen, all channel controls not displayed can be accessed quickly via secondary pop-ups, such as input and output routing and signal-processing parameters. Two rows of 12 encoders and buttons immediately below the touch screen map to labeled controller settings. Quick Select buttons, to the left of the screen, assign a selected function to the top row of controls, enabling six aux sends, for example, to be displayed in the channel strip panel at any one time; the remaining aux sends are accessible via a scroll function.

The controls to the right of the channel strip panel allow processing parameters to be adjusted, including output routing, with stereo aux pan and pre/post switching, channel mute and LR or LCR panning; secondary functions are indicated by a green display appearing on the screen, as well as by a button circled with a green ring. The master faders default to a master buss, which is the lowest stereo group output, and the other to Solo Buss 1; they can be re-assigned as necessary to control any input channel or output buss.

Comprehensive I/O connections

The SD12 surface's rear panel offers eight analog and eight AES/EBU digital format connections for local I/O, while remote racks accommodate up to 56 MADI-format inputs and outputs in different formats, connecting via 100m coaxial cables or optical fiber. These racks feature two pairs of MADI connectors—labelled main and aux—that in normal operation connected to the surface's MADI 1 Out and MADI 1 In ports. While running at a sample rate of 48kHz, the other MADI port can be connected to a MADI recorder, for example, or a second DiGiCo rack or console. Extra MADI connections can be added via DMI card options.

Preconfigured session templates are available for the first project run-through, or the user can recall existing configuration sessions, including how the SD12's audio channels are divided between channel types, and their channel-format definitions. A total of 72 input channels are available, routing to 36 busses, plus a master that can be stereo or LCR. Channel resources can be split into input or output channels in virtually any configuration, with a default of 48 input channels that can be increased to 72; six mono aux busses; six stereo aux busses; six mono group busses; six stereo group busses; 12 matrix inputs; eight matrix outputs; and 12 control groups. All busses feature a Merge Input that streamlines cascading with other consoles. An audio I/O window lets users configure the physical I/O connected to the



SD Series Waves setup.

SD12, including configuring and naming the ports on optional DMI-format cards installed in external racks, and the setting of levels pads and phantom power.

The EQ section comprises four user-configurable parametric filters with dynamic control on all elements, two EQ algorithms (Precision and Classic), plus a pair of swept 24dB/octave high- and low-pass filters. A pair of user-set dynamics modules can function as a simple compressor, a three-way multiband compressor or a de-esser; a second module can also function as a gate, ducker, or compressor with an external sidechain. A handy Graph button allows user-configurable parameters to be adjusted by screen touch in graphical format, with dedicated threshold plus gain controls and I/O switches on the right-hand side of that section's work surface. Assignable encoders and switches beneath the pair of screens serve as any of the main dynamics controls. The crossover frequency between bands is adjustable between 20Hz and 20kHz; each band can be auditioned individually via a solo function.

Any number of input and output channels can be assigned to one or more of 12 Control Groups, with changes to the control group fader, mute, solo, or controls affecting all channels connected to that target group. Usefully, when a channel becomes a member of a Control Group, its own controls can still be adjusted independently of the other members. In addition, multichannel inputs are controlled by routing each component through a mono channel and then linking those channels via a multi-channel in LCR, LCRS, 5.1, or multi-input format. (The latter combines up to 11 components.)

Two solo busses are provided, each of which can be used independently or together, a useful function when the SD12 is being used to control on-stage monitors, with the first solo buss for IEMs and the second for wedges. Both solo busses feature a mono/stereo switch, inserts (with both internal and external routing), direct-out routing (maybe for feeding a separate wedge), AFL/PFL modes plus delay, and level trim.

Connected DiGiRacks and SD-Racks link via optional Optocore connections and, as with other SD-Series consoles, can operate with one of two firmware versions: V220 for DiGiRacks and MINI-Racks; and V221 for SD-Racks, SD-MINI-Racks, NANO-Racks, and D-Racks. (DiGiCo points out that any type of rack can be used with an SD-Series console interconnected via coaxial BNC MADI, irrespective of the Optocore version being used.) An Automatic Conforming function checks the type of racks that have been connected and their I/O capability, either globally, rack-by-rack, or card-by-card.

While the SD12 console will operate at a sample rate of either 48kHz or 96kHz, and by default is set to clock internally, if Optocore I/Os are being used, the entire system will use that device with the lowest Optocore ID as its sync source. It is also possible to clock the system externally at 96kHz using a word clock, AES/EBU-format source, MADI/AES10, Optocore, and relevant DMI cards; here, one Optocore-capable device is set to clock to the external source

and all other Optocore devices are set to sync to that source.

Given that, within a multi-console array, one or more I/O resources can be shared between more than one DiGiCo console, operators can set up the system with only one surface controlling key settings, with others automatically compensating for gain, phantom-power, and pad changes within a target rack. For these eventualities, with Optocore the SD12 offers three distinct modes of operation: Isolate, in which the SD12 does not communicate with the rack; Receive Only, with the SD12 receiving a rack's current settings but unable to control them; and Full Control. Such modes can be set on a per-rack basis or globally for all shared racks. A total of 56 console-to-console sends are available with text messaging via the fiber connection, which is useful for sharing rack output cards between consoles.

All system configurations can be saved to the console's internal memory or removable flash drive under an appropriate filename. A Save Session button records an existing session in the same location and under the same file name as it was previously saved or loaded from, and hence serves as a "quick save" option to update existing sessions. (A proprietary utility can be used to convert sessions from other SD-Series consoles to run on the SD12 system).

In a nutshell

All in all, the SD12 is a very useful adjunct to the current, well-received SD-Series from DiGiCo, with a compact control surface and a pair of color-coded, easy-to-follow display screens. In fact, any user currently familiar with the SD-Series operating paradigm will be up and running on this new console in a remarkably short amount of time.

Even a novice user will be able to find his or her way around the key mixing setup and operating functions within the time it takes to press a handful of buttons and interrogate key screens. As I found during an extended session on the new console offering, the friendly and inviting user interface is well-thought-out and springs from the minds of clever software and hardware designers that have obviously spent a lot of time ensuring that operator functions are where you would expect to find them, and not buried deep in submenus. Targeted functions pop onto the GUI when and where you expect them, and then disappear from view to unclutter the user layout. It's a truly rewarding experience.

Stop Press: At the recent ProLight + Sound Show in Frankfurt, DiGiCo and Waves unveiled a new way to integrate SD-Series consoles with a Waves Multirack system running on an external PC to provide live sound mixers with access to favorite equalizer and dynamics plug-ins, plus reverbs and delays. Such integration will continue to use the low-latency Waves I/O interface built into SD consoles for audio routing, and will also include existing session, snapshot, and plug-in control. The companies also report that further control implementation is being planned, to provide enhanced user experiences, including new operator tools and advanced networking.

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