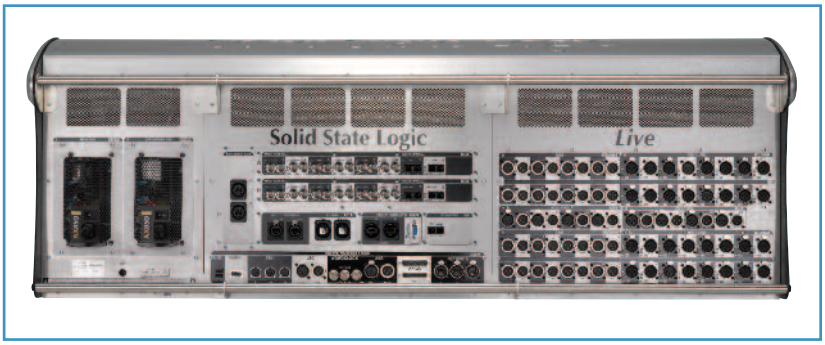


Solid State Logic L350/L550 Live Sound Digital Consoles

By: Mel Lambert

Launched in mid-2013 (and reviewed in the 11-13 issue of *LSA*), the original Live console from Solid State Logic, a company better known for its recording, broadcast, and post-production offerings, soon attracted attention for its sonic fidelity and live-performance features. At that time owned by musician Peter Gabriel and entrepreneur David Engelke, who purchased the company in 2005, SSL invested heavily in the development of a product that Gabriel used on his subsequent world tours, and which went on to claim considerable market share within its first two years of availability. But SSL has not remained inactive. During the past six years, it has continued to offer enhancements and alternate frame sizes, including the Live 100, Live 200, Live 300, and Live 500 consoles. Unveiled earlier this year at the NAMM Show in Anaheim, the L350 and L550 are said to represent a quantum leap in processing power and on-surface control, and have been joined with several key connectivity products that incorporate Audinate Dante audio-over-IP ports; they replace the L300 and L500, respectively.

SSL Live L350 console.



Rear view of the L550.

Each configured as a self-contained control surface with an integral DSP engine that connects via high-speed busses to stage boxes and processor/amplifier racks, the L Series L350 and L550 share a number of key features and differ in I/O capacity and on-surface controls. The L350 provides a total of 216 signal paths—168 of which are full-featured and 48 dry with no processing—plus 36 matrix outputs and 36 VCAs at a 96kHz sample rate (up from 192 paths offered by the L300), while the L550 handles 288 signal paths—250 full-featured and 48 dry—plus 36 matrix outputs and 48 VCAs (compared to 256 paths for the L500). Maximum I/O for the L350 is 600 sources or destinations, while for larger installations the L550 will accommodate a total of 1,136 I/Os. The system will also run at a 48kHz sample rate, if required.

The L350 console features a pair of 12-fader Fader Tiles with two assignable/master faders; the larger L550 boasts three Fader Tiles, to provide additional, simultaneously accessible, on-surface controls. Each Fader Tile displays up to five scrollable layers, each of which features five vertical banks that are accessed via a dedicated call button; usefully, layers and banks are color-coded with user labels to aid identification. Paths can be placed in any order anywhere within this on-surface topology. In essence, the new offerings differ in the number of on-surface control tiles plus

assignable knobs, switches, and faders.

Current customers can field-upgrade L300 and L500 consoles to the newer configurations; the modification comprises a Tempest CPU swap and simple software upgrade. Like previous Live Series consoles, the new offerings feature SSL's SuperAnalogue high-precision microphone pre-amps, together with 24-bit/96kHz A-to-D and D-to-A convertors, plus full 64-bit internal processing that includes custom-developed special effects and audio-analysis tools. Depending on I/O configuration and fixed/touring package, the end-user price for the L350 is close to $132,000; the larger L550 costs in the region of $174,000.

Also unveiled alongside the two new L Series consoles were a new interconnection unit, a smaller-format stage box, and upgraded software. The new, ruggedized X-Light Bridge is said to represent SSL's next generation of AoIP infrastructure for live productions, and comprises a 256-channel Dante interface that connects between suitably equipped L Series control surfaces and stage boxes via a single pair of fiber optic connectors to provide what SSL describes as a touring-grade, high-bandwidth topology. X-Light ports can be factory-supplied or retrofitted to any L100, L200, L350, or L550 console, as well as current L300 and L500 console owners who upgrade to the new models. The new Network I/O SB 16.12 stage box is a smaller-format version of SSL's SB Series stage boxes that features 16 SuperAnalogue mic/line inputs, gain-compensated digital split outputs, eight line-level analog outputs, four AES/EBU-format inputs with sample-rate conversion and four AES/EBU outputs. The new Live V4.8 software, which runs on all L Series consoles, introduces 16 and 24 wide instances of SSL's AutoMix plug-in for the built-in effects rack, and also adds attack and release parameters that are said to offer finer control of key dynamics effects.

The new software release also enables L Series surfaces to control other network-connected consoles. Up to two remote surfaces or PCs, including SOLSA connections, can be connected to a main L350 or L550 surface, while a single remote surface can be connected to a main L100 or L200 surface. (SOLSA is the "SSL On/Off Line Setup Application.") Both consoles can be augmented with either USB Remote Fader Tile or connected remotely from another console from a laptop or PC running the firm's SOLSA remote-control software, or from a tablet running SSL's TaCo control app to provide an expandable work surface. Applications include setting key system parameters while moving though a live-performance environment or relocating the key front-of-house functions within the seating area without displacing revenue-producing customers.

In addition, V4.8 is said to offer faster channel view screen response, expanded remote-control options and improvements to the automix special-effect engine, plus other features. (While such display-screen rewrite and update speeds are rather subjective, SSL reports that, under V4.8, console-function responses have increased by close to 80% for channel view and detail view, while automation filters are said to be just over 90% faster.) In addition, path link can now be activated with or without

	L100	L200	L350	L550
Paths	96 (all full)	144 (all full)	216 (168 full, 48 dry)	288 (240 full, 48 dry)
Fader Tiles	One (12 +2 faders)	Three (36 +2 faders)	Two (24 +2 faders)	Three (36 +2 faders)
Matrix	4 x 32 inputs / 12 outputs	4 x 32 inputs / 24 outputs	4 x 32 inputs / 36 outputs	4 x 32 inputs / 36 outputs
VCA's	12	24	36	48
FX Slots	24	48	48	96
FX types	45+	45+	45+	45+
Sample rate	96 kHz or 48kHz	96 kHz or 48kHz	96 kHz or 48kHz	96 kHz or 48kHz
Local analogue I/O	12 mic/line, 2 TB, 3.5mm input, 12 line out , 2x headphone	12 mic/line, 2 TB, 3.5mm input, 12 line out , 2x headphone	16 mic/line, 16 line out	32 mic/line, 32 line out
Local AES/EBU I/O	4 pairs (with SRC)	4 pairs (with SRC)	4 pairs (with SRC)	Up to 8 pairs (with SRC)
MADI ports (coax/optical)	4 (2 redundant pairs)	8 (4 redundant pairs)	8 (4 redundant pairs)	16 (8 redundant pairs)
MADI FX loop	Optical in/out x 1	Optical in/out x 1	Optical in/out x 1	Optical in/out x 1
Blacklight II	Optional redundant pair	Optional redundant pair	Optional redundant pair	Optional redundant pair
X-Light	Optional redundant pair	Optional redundant pair	Optional redundant pair	Optional redundant pair
Local Dante	Optional 32x32 redundant pair	Optional 32x32 redundant pair	Optional 32x32 redundant pair	Optional 32x32 redundant pair
Maximum I/O	up to 472 in /out	up to 600 in /out	up to 600 in /out	up to 1136 in /out
Channel Control Tile	Not Available	Not Available	Option	Standard
Main touch-screen	17" 600 Nits	17" 600 Nits	19" 600 Nits	19" 1,500 Nits
Power Supply	One (redundant option)	Two redundant as standard	Two redundant as standard	Two redundant as standard
Width	691mm (27.2")	1370mm (54")	923mm (36.3")	1,191mm (46.9")
Weight	52Kg (115lbs)	85Kg (187lbs)	81Kg (179lbs)	85Kg (187lbs)

opening the on-screen pop-out, an enhancement that is said to provide better access to on-screen controls while that function is enabled.

Also announced earlier this year by SSL were software updates to the various Dante-capable stage boxes, including remote reset of network settings, viewing of network I/O names of connected boxes, viewing of network pre-amp ownership (useful if front-of-house and stage-monitor mixers are sharing a remote-located pre-amplifier, but only one "owns" the gain/trim settings), improved reporting of Dante I/O conflicts, plus remote refreshment of network-connected devices.

Enhanced user flexibility — modular I/O connectivity options

In an era where touring sound-system operators seldom know what they might encounter—even when the venue rider is well-defined—and permanent systems might need to accommodate complex events on a day-to-day basis, a console's I/O and infrastructure connectivity are key parameters. In this respect, the new generation of L Series consoles gives every appearance of being configured to handle contemporary productions. In addition to high-capacity MADI, Blacklight II, and multichannel Dante-based ports, SSL' proprietary X-Light fiber-optic scheme offers a high channel count, ultra-low latency, and a 256-by-256-channel capacity. High-precision 24/96-bit audio plus multiplexed control data passes seamlessly between SSL consoles and onstage Dante-capable I/Os via a single fiber cable, with a redundant fiber link for automatic backup. Industry-proven Dante connections are quick to deploy and set up—automatic discovery streamlines crosspoint assignments between console and remote stage boxes plus peripherals—while still maintaining many of the benefits of a scalable and flexible AoIP network capable of supporting sufficient stage inputs for mid- to large-scale tours. (Previous Dante schemes were limited to 64 channels at a 48kHz sample rate.) The L350 and L550 consoles can be specified with both X-Light and SSL Blacklight II connections.

The new 1U X-Light Bridge features a redundant pair of X-Light front-panel connections via Neutrik opticalCON Quad format ports, while two redundant pairs of Neutrik etherCON-format Dante connections on the console's rear panel handle audio and control distribution. In this way, up to eight SB 32.24 stage boxes can be connected via a pair of conventional gigabit network switches to a single X-Light Bridge to provide 96kHz redundantly, with remote gain control of each input. All of this extra connectivity is available without changes to a current live-performance workflow, since the X-Light Bridge adds a simple-to-implement I/O boost, with routing within the console interface that's exactly the same as via an existing local Dante Expander Module. For even greater flexibility, X-Light channel capacity can also be configured as Virtual Tie Lines to provide routing within a Dante Controller, or as Dual Domain Routes for direct routing and control from individual console channels.

The new SB 16.12 stage box also features dual Dante network interfaces, providing a redundant pair of ruggedized etherCON ports for the main I/O together with a redundant pair of small form-factor pluggable (SFP) ports for the compensated split outputs. (Usefully, for added networking flexibility, these SFP ports can be configured by the user with a choice of RJ45, multi-mode fiber, or single-mode fiber connections.) The two networks can also be linked to allow quick user access to all I/O connections and multichannel ports on a single (redundant) network or split to provide network segregation for the split outputs—maybe to simultaneously feed signal sources to a companion remote broadcast truck. Put succinctly, the SB 16.12 offers enhanced flexibility connectivity options when deploying multiple I/O ports within a distributed system.

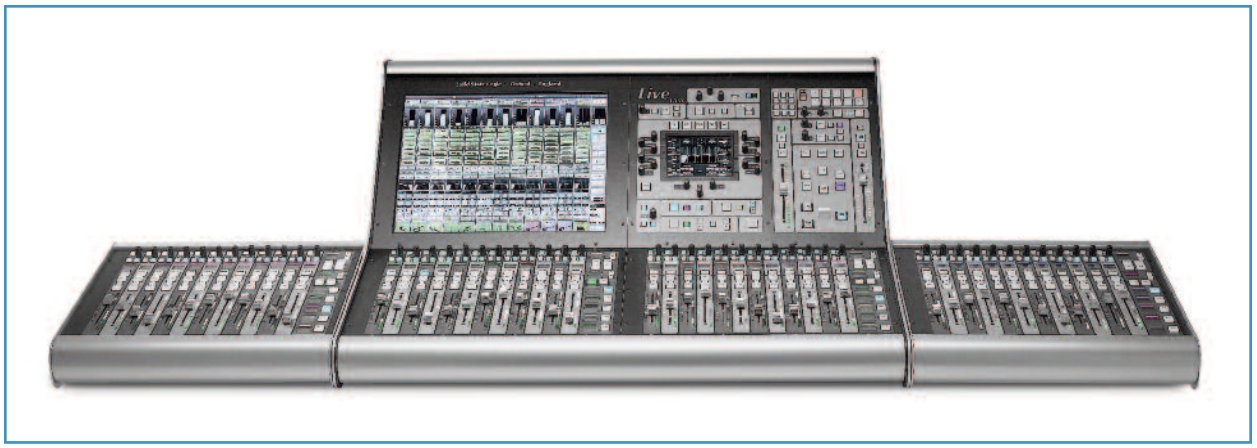
On-surface control tiles— a familiar user paradigm

While SSL may have updated the controller and GUI software to provide enhanced display speed and system refresh—early L Series users never reported sluggish performance, however—the firm's engineering team has left the user interface pretty much as it was at product launch. All of which means that users who have become familiar with the simple assignability and layer/bank switching of the first L Series offerings will find it remarkably easy to master the new L350 and L550 models. Both consoles use the same remote I/O, identical audio conversion and internal DSP engine technology. While the combination and layout of Fader Tiles, Master Tiles, and Channel Control Tiles vary from model to model, all on-surface controls and feature sets are identical. Differences between the four models focus on physical size, layout, available channel paths, and local I/O, as shown in the chart on page 64.

Developed specifically to meet the demands of live production, Live consoles use the proven Tempest platform for all high-speed DSP and routing, while a user-configurable software shell handles all the multidimensional GUI and controller settings. I understand that, to offer enhanced processing speeds, all legacy code running within the fourth-generation Tempest engine has been rewritten in the latest software languages; it also features SSL's patented Optimal Core Processing to deliver "highly efficient and reliable performance with minimal latency."

Integrated user interface for fast system interrogation and control

All primary system setup and interrogation is handled by a single high-resolution multi-touch screen that also creates surface layouts using the Layer Manager, Automation Interface, effects rack, and two different views of a current mixing project: The channel view and console overview. As I



L350 with remote tiles.

discovered, channel view provides overviews with pop-ups that show specific channel information corresponding to target faders in the Fader Tile and provide touch access to all signal-path functions. High-visibility displays ensure rapid identification of each function, while level meters can be expanded to offer large-scale views. Usefully, double-tapping an individual channel opens up a more detailed GUI that also offers multi-gesture control for a menu of operations, including routing assignments, VCA setups, aux assignments, Stem Groups, EQ, dynamics, all-pass filter, and output panning. All changes in the order of signal-path processing and bus architecture can be changed on the fly using simple drag-and-drop actions.

Console overview provides an overview of the console's show file on a touch screen that let the user quickly identify and access a channel or bus for updating and adjustment, following a single button press that bring the signal path onto the Focus Fader and Channel Tile. A dedicated automation interface also can be vectored onto the main screen or—equally as useful—an external video monitor or touch screen. Coupled with high-visibility metering and red overload indicators for every I/O, maintaining an overview is easy and intuitive.

User-definable color coding is useful for enhanced visual memory during a complex mix session—and also for maybe differentiating between different acts and/or scenes—while within fader strips a single LED strip identifies and organizes the type of signal path (maybe VCA, aux send, etc.) or an instrument group (drums, vocals, etc.) assigned to that channel fader. Controls intended for parameter editing—these might include aux Send levels, EQ and effect parameters, etc.—on screen and in the quick controls also use user-definable color coding. What's selected in the touch screens and the various sets of edit control hardware can be set to always follow one other.

Being an open-architecture system, any channel, Stem Group, VCA, aux, master, and other key sources can be placed anywhere on the available Fader Tiles using L Series' familiar Layer Manager interface with drag-and-drop commands. These functions, together with flexible banking layering, enable front-of-house and monitor engineers to develop their favorite layout with fully assignable controls that are only—at most—two button pushes away. Bright, high-precision touch screens streamline on-surface navigation. In addition, a Wi-Fi- or hardwire network-capable tablet adds touch-screen control for all channel processing functions, while SSL's TaCo tablet control of effects rack settings. And if you need to view and control more functions simultaneously, extra arm-mounted screens can be connected to external Windows-capable PCs or touch displays.

SSL's SOLSA is a stand-alone version of the SSL Live console software that provides full real-time remote control—useful for a second engineer or assistant to create a remote mix or as a submix position at the front of house—in addition to offline setup and modification of live show files between dates, including console architecture plus Fader Tile layer and banks setups. SOLSA also allows stage-box labeling and I/O routing, along with scene creation and automation editing, including effects settings, channel processing, bus routing, and full VCA assignment. (To expand hands-on control at a remote mix position, up to two Remote Tiles can also be connected directly to the SOLSA-capable PC.)

Bringing a signal path to the surface using the live channel architecture and making setup and in-performance adjustments are extremely simple. Having made EQ, dynamics, effects, panning, and level adjustments during rehearsals or a previous event, layers can be developed that bring key channels—lead vocals, for example, or sectional stems—to easily accessible fader positions that can also be held on-surface during bank and layer switching. Accessing key controls while mixing is just a matter of one, at most two, button pushes to put the target function in front of the operator, with full GUI feedback. Each channel can be set

Front view of L550.

up with its own, dedicated processing power, or left dry to consume less processing power (such as subgroup stems, for example). Full-processing channels feature hi- and lo-pass filters, four-band parametric EQ, compressor (including a new tube "warmth" effect), expander/gate, delay, a unique all-pass filter for control of phase versus frequency, and panning to stereo, LCR, 4.0- or 5.1-channel assignments, with user-configurable fold-down options.

Internal effects can be accessed via insert points within channels plus Stem, aux, and master busses, as well as from the master I/O cross-router. Seven categories of mono, stereo, and multi-channel effects are available, with ultra-low latency necessary for live use, including reverbs, delays, modulation effects and EQ. Since the effects rack boast its own dedicated DSP core, up to 96 effects can be used in an L550 and up to 48 in an L350 console. EQ effects include G-Flex EQ in multi-filter versions, plus a 10-or six-band parametric with user-selectable characteristics per band; a smooth contour program-shaping EQ offers a familiar graphic EQ interface. Dynamics effects include SSL's stereo bus compressor and Listen Mic Compressor, together with de-esser, dynamic EQ, gate, multiband compressor, and transient shaper. Reverb effects comprise gated, early reflection, ambient, cathedral, stadium, recording room, tight ER and plate ambience, plus a vocal processor and a "D Gen" processor, while modulation effects includes band split flanger, classic flanger, envelope flanger, classic phaser, chorus, and guitar chorus. A powerful Dialogue Automix system enables the operator to set a relative mix of 12, 16, or 24 microphones and then make automatic crossfades between them, according to incoming signal levels.

While the L Series' list of useful functions is virtually endless, there is a quartet of possibly unique capabilities worthy of mention. An array of 12 quick controls located along the upper edge of each Fader Tile can be assigned console-wide to the same parameter for all channels—for example, input section or aux sends—either using the tile controls or from the touch screen in channel view. Alternatively, these same controls on the Fader Tile below the touch screen can be set to Follow Detail mode as individual parameter controls; quick control rotary functions also can be flipped onto the channel faders. And to provide the fastest way of accessing key parameters on any selected channel, a focus channel places a full single fader strip into an optimal position on the console, while SSL's Super-Q lets the user "spill out" the contributing sources or destinations for a target fader/path across the remainder of the control surface; hitting the VCA's Q button displays all affected channels. Usefully, Super-Q also shows send levels to/from mixes, providing instant mix control either from a channel- or mix-centric viewpoint. (Contributions can be displayed on the rotary encoders at the top of each fader strip, or automatically "flipped" onto the channel faders.) Although Stem Groups are featured on recording/post consoles, for live performance this hybrid mix bus takes key functions of a sub group, an input, an aux, and a matrix to offer additional routing options in mono or multi-channel formats, in either full-featured or dry versions

The combination of Fader Tile, Master Tile, and Channel Control Tile packs a lot of functionality within a simple-to-implement topology. L Series users can lay out channel/path types across the console to match their target workflow,

using independent tiles arrayed as 25 banks of 12 touch-sensitive, motorized faders per tile; LCD displays on access keys provide rapid layer and bank access with solo, mute, query, and select buttons. The Master Tile concentrates automation and mute-group controls, and provides a Master Fader that can be assigned and locked to any target signal path, with a Focus Fader that can either follow the selected path or again be locked to a specified path, plus a set of assignable user keys. The Channel Control Tile provides an expanded set of hardware and touch-screen controls for the targeted channel, based on a 7.5" high-resolution display surrounded by 15 rotary controls, including dedicated button panels for EQ, dynamics, panning, and insert effects. Two talkback channels are provided, each of which can feed aux busses and/or direct outs, while the default solo source can be accessed from any point, including matrix outputs, or from six external solo inputs. A new, very handy Broadcast Solo mode offers Solo Dim for each Solo Channel and an Auto Dim feature. Built-in audio tools include a tone/noise generator, SPL Meter, Phase Scope, and a built-in stereo FFT analyzer.

Finally, console automation is controlled via a full hardware or software interface that can be implemented from the main touchscreen, Channel Control Tile screen, or an optional external monitor. Virtually unlimited automation scenes are available, with filters that enable selection of stored or recalled settings on a global or per-scene basis, while scene groups enable absolute or relative editing of all selected scenes; scenes can also be activated manually or from external triggers.

In a nutshell: a powerful mixing platform available in multiple serving suggestions

As will be readily appreciated, the L Series L350 and L550 comprise a pair of live-mixing consoles that pack a great deal of updated processing power in a package that offers a choice of 24 or 36 on-surface channel faders, with a centralized command and setup touch screen. Also added are new connectivity options that enable large-capacity I/O topologies to be established quickly using easy-to-rig fiber-optic and CAT-5 cabling to Dante-capable stage boxes and peripherals.

The original L Series console from 2013 has been under continuous development since that time, with revised and re-optimized DSP processing from its proprietary Tempest Core, and high-resolution setup and GUI screens with faster responses and activation parameters. In back of all this dazzling signal processing remains SSL's 40-year dedication to high-precision audio performance. The 24-bit/96 kHz A-to-D and output convertors are some of the best I have ever heard and ensure that live and pre-recorded signal sources reach the audience with pristine quality. What more could we ask for? Once heard, an L Series console sets a difficult-to-beat benchmark.

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