SL 9000 J Series
THE ULTIMATE ANALOGUE CONSOLE
Solid State Logic

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## Overview of the Computer

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Introduction

The SL 9000 J is the latest large format mixing console from Solid State Logic. A unique approach to analogue circuit design has resulted in the record and mix paths having a dynamic range that equals or exceeds the published specifications of all commercially available 20/24 bit analogue to digital converters, and a bandwidth that extends nearly two octaves beyond the next generation of 96kHz digital recorders.

The console retains all the signal routing and processing features of SSL’s other music consoles, together with a control surface that will be instantly familiar to any recording engineer used to the E and G Series range. However, alongside the dramatic sonic changes created by the new channel and centre section electronics, a wealth of new features sets the console apart from its predecessors.

The enhanced in-line signal path and expanded console bussing, simplifies the use of different recording media and includes, as standard, support for the new multichannel mixdown formats currently being proposed.

The new 9000 equaliser is essentially two independent equalisers switchable between SSL’s original E Series circuit, complete with the Bell curve option on the shelving bands, or back to the enhanced shelving slopes and constant Q parametric curves of the later G Series circuit.

The channel’s dynamics processor adds a switchable peak sensing side chain to the compressor and a hold control to the gate. Dynamics keying options are expanded by the new insert return to side chain feature, simplifying the use of external side chain signal processing.

The desk has 48 Multitrack busses, 4 Stereo busses, a Main Stereo (optionally LCR) bus and 8 Auxiliary busses, which are divided into 6 Mono FX sends and a Stereo Cue bus. The four Stereo busses can be used as subgroups, multiple stereo cue busses, additional FX sends, and to generate Centre signals and mono or split Surround feeds.

An ingenious FX reassign system allows Auxiliary send controls on individual channels to be floated from the console wide buses and routed to any of the Stereo or Multitrack busses, allowing up to 64 discrete FX send mixes to be generated with the use of the ‘Small Fader’.

The new J Series Computer starts with Ultimation for the channel faders and cuts and continues with full dynamic automation for the following additional functions:

- Small Fader level
- Small Fader Cut
- EQ In/Out
- Insert In/Out
- Individual Aux On/Off switches
The J Series Computer supports an entirely new user interface, vast amounts of processing power, colour graphics, and integral Total Recall including the console centre section. All main operational commands are on dedicated keys or accessed via the simple function grouped screen based menu boxes.

**An Operational Overview of the Console**

The following descriptions are intended for those already familiar with SSL’s SL 4000/6000/8000 range of consoles. For a more detailed description of the console’s features and functions, refer to the relevant sections of the Console Operator’s Manual.

**Master Status Switching**

The console retains the familiar master RECORD, REPLAY and MIX statuses. In RECORD and REPLAY Status, the Large Fader is now in the Monitor path and the Small Fader is in the Channel path to reflect normal studio working practice.

To reverse faders in RECORD or REPLAY status, select SMALL FADER TO MON.

![Console Interface](image)

**Metering**

Depending on the console specification, it may be fitted with standard VU metering or SSL’s back lit LCD bargraphs. These can be switched between VU and digital Peak scales from the console’s centre section. The 0dB point of the Peak scale can be adjusted to read between +16dBu and +24dBu. Factory default is +18dBu (-6dBFS on a Sony multitrack).
**Input/Output Module**

The Input/Output module has a reassuring resemblance to the SL 4000 G Series module, but with numerous key enhancements.

The differences are briefly as follows:

The channel input stage is similar to G Series but the MIC gain is now a continuously variable control (from +15dB to +75dB) with a 20dB pad switch. The Mic input can also be switched to high impedance using the HIGH-Z switch, allowing the Mic input to be used for line level signals or to present a different loading impedance to Dynamic Microphones.

The Multitrack BUS trim control, which on SL 4000/6000/8000 Series consoles is adjacent to the Group/Tape switches near the bottom of the module, is now located near the top of the module, beneath the new direct output assignment.

The SL 9000 J Series Dynamics section is based on the classic G Series circuits, with the addition of a new Peak sensing sidechain option on the Compressor (selected by pulling the RATIO switch up) and a HOLD control for the Gate. The Expander/Gate section defaults to Gate, with Expand selected by pulling the HOLD control. As with G Series, the Dynamics section is switched into the Channel path, pre or post the EQ, by means of the CH IN and CH OUT switches. MON puts the Dynamics section in the Monitor path. The Dynamics sidechain can be keyed from the Monitor path by selecting MON and either CH IN or CH OUT. It can also be keyed from the Insert Return by selecting KEY and IN for the channel insert point.

The Equaliser is a four band parametric, with variable Q on the mid bands and shelving/bell high and low bands. The normal curves of the equaliser are based on the G Series equaliser. The mid bands are constant Q, so the bandwidth increases as the gain is decreased. LF and HF BELL switches are provided as opposed to the LMF and HMF range shift switches found on G Series EQ.

The E switch selects an alternative set of EQ characteristics, based on the classic ‘242’ E Series card. The mid bands have a constant bandwidth, so Q increases as gain is increased; the HF band has a shallower slope than in ‘normal’ mode. The bell curves are identical to the normal ones, i.e. without E selected.

The Equaliser is switched into the Channel path with the IN switch, and the Monitor path with the MON switch. SPLIT places the filters at the channel input, just as in G Series.

The EQ IN switch is automated.
The Auxiliary send section includes one stereo and 6 mono aux send controls. The Aux On/Off function for each send is automated, with push/push switches on each control which toggle between on and off. A yellow LED indicates that the send is on. Auxes can be sourced from either fader. The SF switch next to each send switches the source to the small fader. The PRE switches at the bottom of the section switch the aux source to pre-fader. There is a PRE switch for the Stereo Cue send and one PRE switch for each pair of mono sends.

Sends switched to pre-monitor fader automatically receive SSL’s SuperCue mix determined by the Group and Tape monitor switches, and the master transport status.

A major advance on the SL 4000 aux system is the new FX send reassign system – EFX for short. This allows any two mono FX sends, or the stereo cue send, to be floated from their respective buses and used as sources for the channel’s Group Output, the channel’s Stereo Bus routing and/or the channel’s Multitrack routing.

Aux sends are assigned to the EFX system using the EFX switches by each one. FX1, 3 and 5 can be assigned to EFX ODD. FX 2, 4 and 6 can be assigned to EFX EVEN. Selecting EFX on the Stereo Cue send feeds Stereo Cue L to EFX ODD and Stereo Cue R to EFX EVEN. Note that only one odd and one even numbered FX send or Stereo Cue can be assigned. Red (EFX ODD) or green (EFX EVEN) LEDs indicate that a send is assigned to the EFX system.

GROUP, TAPE and the Record Enable switches function identically to the SL 4000 system.

The Small Fader section is similar to that on an SL 4000 but both the fader and CUT switch are automated. The Small Fader pan is located here and, unlike the SL 4000, is always associated with the Small Fader. The pan may be switched in or out of circuit by means of a push/push switch. The Small Fader can be assigned to the Main Stereo mix bus using the SF MIX switch.

In MIX or RECORD/REPLAY + SMALL FADER TO MON(itor) status, the Small Fader is normally sourced from the Monitor input. In RECORD or REPLAY status the Small Fader is normally sourced from the channel input. This selection can be overridden by the PRE LF/PST LF fader switches. The PRE LF switch will pick up the channel signal immediately post input selection, or the channel signal post signal processing. Which signal is chosen is set by an internal link option. PST LF selects the post Large Fader signal.

The Small Fader has its own automation status switch and LEDs.
Below the Small Fader is the Large Fader pan control. This is always associated with the Large Fader, and is always in circuit.

The Large Fader CUT switch is automated. This and all the other automated switch objects in the channel make use of the Match and Play switches fitted above the Large Fader CUT and SOLO. See the computer overview later in this document, or the J Series Computer Operator’s Manual, for more details.

As with the Small Fader Solo switch, the Large Fader SOLO switch can act as a destructive solo, a post pan listen (AFL), a pre-fade listen (PFL) or as a Solo In Front function. This last mode provides a mix of the AFL signal and dimmed Main Mix to the monitors. The different solo functions are selected with the solo mode switches in the console’s centre section. These switches also include a SOLO CLEAR switch, ALT which makes all solo switches intercancelling, FLEET which makes them momentary, and SOLO LINK which links Large and Small Fader Solo cut busses.

The Large Fader is motorised, and can switch the audio via a VCA to allow Trim update monitoring and other features unique to SSL’s Ultimation System.

The Large Fader can be assigned to one of the 8 master control faders in the centre section, by using the group select switch at the bottom of the fader. Selecting HARD GROUP SETUP on the Computer Control panel enables the select switches. A short press of the individual select switches increments the group number in that fader’s 7-segment display; a slightly longer press decrements.
There are four possible outputs from the channel strip:

- The Main Mix stereo bus
- The four Stereo Subgroup busses (A, B, C and D)
- The 48 Multitrack busses
- The channel’s Group Output

Either or both faders can feed the Main Mix bus via the LF MIX and SF MIX switches at the foot of the channel strip; the other three outputs each have a source selector.

The Multitrack and Stereo Subgroup busses can be fed by Large or Small Fader (post-pan control) signals, or by one or both of the EFX ODD/EVEN signals. If one EFX switch is selected, then the corresponding routing output will be fed in mono by the selected source. Selecting both switches together will feed EFX ODD to left (odd) and EFX EVEN to right (even) bus. This enables any two Aux Send controls to be re-routed to the Multitrack or Stereo busses, allowing large numbers of separate mixes to be generated without using the Small Fader.

The 48-track routing is accessed via 1-24/25-48 bank select switches and signals are normally sourced from the Small Fader unless RECORD/REPLAY + SMALL FADER TO MON(itor) are selected.

The Stereo Subgroup bus routing has no source until one is selected.

The Group Output is normally fed by the multitrack bus Mix Amp, but this can be replaced with a post-fader channel signal by pressing FADER, or by the EFX ODD or EFX EVEN signals.
Centre Section

The SL 9000 J centre section is logically divided into two main areas (see the picture on Page ii). On the left, two panels provide master controls for the console’s audio functions – console status switching, main outputs and monitoring, subgroup and auxiliary masters, meter switching, talkback, FX and cue send masters, echo returns, oscillator etc. Below these panels, eight master control faders are provided.

The right hand side of the centre section is taken up by a large colour video monitor and a panel housing controls associated with the J Series Computer. A jog wheel, a standard set of transport controls, five instant locate buttons and a large timecode display are provided for machine control. A pen and tablet interface for the computer is provided in the fader area.

See over the page for a basic description of the centre section audio controls.
Master Audio Facilities

The SL 9000 J master audio facilities are built to a completely new design, offering high performance, low noise, high bandwidth and low distortion. The controls provide all of the functionality of a G Series centre section, plus master facilities for the additional Auxiliary and Stereo Subgroup busses. The foldback and external source selection systems are substantially refined and extended. Additional switching for the new Solo modes is provided.

The main console output is 4-channel with a 4-channel fader and compressor. The output is provided with a pre-fade insert point. The compressor is identical to the design used in the G Series range. Selecting KEY bypasses the pre-fade insert point and allows the insert return to be used as a key input. The Master Fader has its own status button and LEDs. The OFFSET control allows the Master Fader level to be adjusted while still leaving the Master Fader at the top of its travel.

The Left and Right Main outputs are fed from console-wide busses. If the LCR Film Pan option is fitted, then the Centre bus can also be fed directly from the channels. The four Stereo Subgroup busses can also be re-routed back to the Left/Right, Centre and Surround outputs, allowing four-channel mixes to be built up even if the console does not have the LCR panning option fitted. The Centre and Surround outputs are fed by a mono sum of the selected Stereo Subgroup bus.

The main monitor output is 4-channel with a switchable insert point, pre the monitor level control, for Dolby Surround encoders/decoders. Two pairs of near-field monitor outputs are also available, and can be selected using the MINI A and MINI B buttons.

The monitors are normally fed by the desk main output, but this can be replaced by either one of two External Source selector banks by selecting EXT 1 or EXT 2. The External Source selectors have independent sources, unlike the SL 4000. The buttons are normally intercancelling, but selecting SUM allows several sources to be monitored together. LINK connects both source selectors together, for comprehensive multiple-source selection.

The Auxiliary bus outputs are provided with level control only.

The Studio monitor system has been substantially extended. Three stereo Foldback and one stereo Studio Loudspeaker outputs are provided. Each is provided with level control and can be fed by any one or a mix of External Source Selector 1, External Source Selector 2, or an external signal fed via the patchbay. For the Foldback outputs this is normally the Stereo Cue output, but this may vary from desk to desk. For the Studio Loudspeakers, the third source is always the stereo main Mix output.

The four stereo Echo Returns are similar to those fitted on the SL 4000, with the addition of discrete routing switches to the main outputs. Note that the STUDIO level control feeds signal back to the Foldback outputs – not the Auxiliary busses.

Oscillator and Talkback level controls are similar to those found on the SL 4000.
An Operational Overview of the Computer

User Interface
Replacing the command line structure of the earlier E and G Series Studio Computers, is a new graphically-based interface with logical sets of defined function boxes, grouped in a series of master menus. Each box either directly actions the function, selects a display option, or calls up additional related function boxes which are ordered horizontally along the bottom of the screen. A ‘pop-up’ containing status functions, numeric readouts or value lists is overlaid by specific function keys whenever data or numeric entry is required.

The five master menus as well as the majority of functions boxes used during a session are normally selected from dedicated switches, all with illuminated tallies. Four cursor keys together with a numeric keypad are used for data and value entry, and large OK and QUIT keys to action or remove a pop-up. A small QWERTY keyboard, located in a sliding tray underneath the front buffer, is used for entering names. The Return key duplicates the action of the OK key.

All other function boxes are selected by using the pen and tablet interface located in the front buffer. Although this may be new to some users, the pen offers many advantages over the more traditional mouse or trackerball alternatives. The absolute relationship between the pen’s position and the position of the screen cross-hair cursor makes it extremely simple and fast to position the cursor accurately anywhere on the screen.

Stabbing (pressing down) with the pen in a box on the screen selects the function or new menu page. Names and numbers/timecodes may also be entered with the pen via on-screen keypads which duplicate the actions of hardware keyboard and numeric keypad. A Keyword list displayed in the keyboard pop-up contains frequently used names and phrase to eliminate unnecessary typing.

There are five master menus – FILE/SETUP, MIX-DESK, RECALL, MACHINES and MISC. The majority of functions required during a typical session are found in the MIX-DESK display (see opposite). The lower section of the screen is taken up by menu and function boxes – the five main menu selections plus two columns of master function boxes for this page. The long bar above the menu boxes is used to display status messages and prompts (hopefully helpful !) from the computer.

On the right of the screen is the main status display area with timecode and status readouts for the master tape machine and ‘Desk’ (system) position, as well as boxes for cycle start and end times. Below the master timecode are the mix pass times together with the current Reference Mix name and Mix Pass list.

The remaining area is used for various information display screens. These include Track Lists and Cue lists as well as fader and automation overview displays. These are all selected via dedicated keys or from the first column of on screen function boxes.
Data Storage

The computer stores all data on an internal hard disk, known as the System Disk. File handling is new compared to the previous E and G series approach, but the basic concepts of Cue Lists, Track Lists, Total Recall Setups and Mix Data are still retained. Data can be copied to other storage mediums such as 600MB Magneto-Optical or High Density, 1.44MB, 3.5” Floppy disks for transfer between different studios.

Information stored on G Series 3.5” disks (or optionally from Bernoulli Data Cartridges) can be imported onto the System Disk, and mix data created with G Series automation can be converted to play back on a J Series system (but not the other way around).

In the J Series Computer, session data is saved on the System Disk in directories known as ‘Projects’. Studios will have a ‘Default’ Project from which they can simply build subsequent ‘Working’ Projects to hold all the data for a particular session.

The Default Project contains all the basic setup information required to use the system. This may include, for example, basic console/computer setups, tape machine control parameters, user-defined function keys (Macros), etc. (see opposite).

At the start of a new session, the engineer selects the New Project function. This creates a copy of the Default Project which is named to suit the job ahead. All subsequent session data is then stored in this new ‘Working’ Project. For music recording, a different Working Project is normally created for each song.

Alternatively, if you are continuing a previous session, the appropriate Project can be loaded at the start of the session.

All automation data, Track Lists, Events (Cue) Lists, etc., are held in memory until deliberately saved to the Working Project directory on the System Disk. Each time any element of a Project is saved, it generates a new version of that element and does not overwrite the version previously saved to disk. Different versions of Project elements are therefore available for loading at any time. The Project Hold function allows these versions to be easily identified within a Project. Text pages are provided to save notes on outboard settings and other relevant information.

Projects may be backed up onto Magneto-Optical or 3.5” floppy disks, and transferred to other studios as required. Both types of drive are provided as standard in SL 9000 J systems.
Transport Control

Augmenting the five conventional master transport keys located in the console centre section, are a variety of new approaches to machine control.

TC 1-5 buttons located directly above the transport controls are five one-shot locate stores. These can be programmed to locate to a specific timecode point or, as relative locates, to move backwards or forwards incrementally by a programmed number of seconds and frames.

A dedicated GOTO button, with a repeat function, locates to specific events in the Cue List or to timecode points using the console’s numeric keypad.

Alternatively, stabbing with the pen on an event in the Cue List (see next page) or Overview display (see Page 33) will instantly locate the system to that point.

Cycle in/out points are set up by entering timecodes into the boxes in the status area, or capturing the current time with dedicated CYCLE START and CYCLE END buttons. The system will then cycle when the dedicated CYCLE button is selected.

The Jog Wheel provides a ‘coarse’ jog, ‘fine’ jog, or varispeed (up to 4 times play speed, or down to $\frac{1}{8}$ play speed) function. The varispeed function is only currently supported by SSL’s video hard disk recorder option.

Timecode Displays

The timecode readout on the MIX-DESK display (see opposite) always shows the current system timecode. The alpha-numeric LED display on the console may be used for the same purpose or, alternatively, can be set to display machine position (for parallel interface [DCTM] controlled machines only), Events/Cues or the date/time of day. Timecode displays, including the large on-screen display, may be switched to a Bar/Beat count based on a pre-programmed tempo map – either by direct entry or via importing MIDI sequencer files.
Cue Lists

With J Series, the Cue List forms part of what is known as the ‘Events’ List (see opposite). The Events List contains Mark information – a series of timecode-referenced points, which enable different parts of the recording to be easily identified, and can be used as conventional locate points. Additionally, the Events list can also show the start and end of audio clips. This information can be generated by the console’s unique Capture Clips facility (see Page 35) which uses the console channels’ noise gates to generate a graphic representation of audio on the computer’s Overview display.

The Events List can be called up at any time via the front panel EVENTS button.

Cue Lists are simply created by use of the MARK button. This can be done ‘on-the-fly’ as the tape is running or with the system parked at the correct timecode position. Once marked, cues can be named by selecting the NAME MARK key and entering a name on the QWERTY keyboard.

The system can locate to any entry in the Events List, by simply stabbing the pen on that entry. Alternatively the name of a cue can be typed in and, when Enter is pressed, the system will locate to the correct position. Note that the computer only requires a sufficient number of characters to identify that specific cue point. If a cue is numbered, the appropriate number can be entered via the numeric keypad on the console’s front panel followed by OK. Subsequently pressing the OK key again repeats the last locate-to-cue command.

For convenience, a smaller version of the Events List appears below the Overview display (see Page 33). A mini Events List is also called up each time the timecode calculator is accessed to enter a locate target.
The Mix System

The J Series mix automation system is based on features that will be familiar to all users of SSL’s E and G Series software. However, the enhanced capabilities of the J Series Computer, together with the additional channel strip automation, means that there are some new concepts to grasp in order to take full advantage of what the system can offer to the experienced music mixer. These include new status routines for switches, new automation modes, as well as the graphical display and editing of mix data.

The Large Faders and Group Faders feature SSL’s patented Ultimation system which combines the physical feedback of moving faders, with the update flexibility of VCA based systems. Normally, the fader motors are turned on and channel audio passes through the fader until a specific type of update dictates that audio must be routed through the paralleled VCA for the engineer to monitor the fader move being written. Using the channel fader to apply continuous trims to previous levels, autotakeover back to the original mix data, and updating individual faders within a master group, are just some of the operations that Ultimation achieves in a moving fader environment without having to resort to linking to additional faders or using nudge keys for level trims.

The global MOTORS OFF switch disables the motors entirely for engineers who are more comfortable with a non-moving fader system. However to retain the J Series’ sonic advantages, audio only passes via the channel VCAs whenever a fader is grouped, or the automation is turned on.

Automation of the Small Faders is provided by separate VCAs. As in Motors Off, Small Fader audio will only pass via the VCA when the automation system is active. Even then, this can be overridden by a specific fader status – Protect Manual, to allow the audio to pass directly via the fader track.

The Large Fader Cuts, along with all the other automated objects (switches), are now treated quite separately to the faders, and are completely independent of channel fader status. Automated objects assume one of two statuses – Record or Play, i.e. write or read. G Series users need not worry about complex cut editing statuses; all you’ll ever need to edit mix data for cuts (and all the other automated switches) can be handled effortlessly with the two new status switches – Match and Play, located on each module. The new graphic mix data editing facilities also mean that nudging cuts no longer resembles an operation more suited to an on-line video edit suite circa late 80’s.
As in G Series, there are two possible update statuses for faders – Absolute and Trim. When the system is playing back previously written data, the faders are in what is termed Replay status. A Manual status is available at the start of a new mix for faders that are not required to write any mix data, and the Preview function allows Absolute and Trim updates to be auditioned without affecting existing automation data. FADER STATUS LOCK and COPY keys provide easy handling of mixed Trim and Absolute update configurations. All global fader status functions are selected from dedicated keys, including Autotakeover, Snap and the new timed Glide feature.
Some Fundamentals.....

Compared to G Series, the J Series Computer has a vastly improved approach to handling mix data. Every time you roll back after update moves have been made, the system will store a new ‘Mix Pass’ in RAM (memory). Each new pass will update the previous pass, unless you elect to update a different pass by using the Revert function.

The Mix Pass list is located to the right the main MIX-DESK display (see opposite). Five mix passes can held in RAM; beyond this figure, the system operates on a first-in-first-out basis (FIFO – named after a famous French poodle) unless you elect to Keep a mix. This locks the mix in the pass list, reducing the FIFO buffer to the last four passes. The box at the top of the list (with a ✳ at the left hand end) is known as the Reference Mix box. This is used to display the name of the last mix saved to disk or loaded from disk. Apart from providing a local reference of the last saved mix name, this mix is key to ‘Insert Mixing Off’ operation (see next page).

A new mix pass is only created if you have updated the mix information. This means that just rolling back, and listening to a mix a number of times, does not create a new mix pass. Passes are automatically named with an incrementing number and time-stamped. Select the Name function to enter a meaningful name.

Discard enables the last pass to be thrown away, if selected before the system is rolled back.

The mix system is simply enabled by pressing the large AUTO ON button in the console centre section. The starting status in a new mix for Large and Small Faders is Absolute. When replaying previous mixes, the faders will start in Replay status. As mixing proceeds, the update fader status may be selected to Absolute, Trim or Replay on all or selected channels as required.

In Trim status, the fader effectively becomes a gain control for any previously made moves. For example, if fader rides on a vocal are correct but they all need to be 2dB louder, the fader can be simply switched to Trim and moved 2dB higher.

When using Trim, the fader moves are stored as a separate ‘stream’ of data independent of the original Absolute mix data. If you roll back and make further trimming moves, you are punching into the Trim data stream and thus will still be trimming the original Absolute pass, not adding to previously trimmed levels. At all times, the combined result of the two data streams is what is controlling the channel VCA (the benefits of Ultimation !). This was always the case in G Series, but J Series has the additional feature of being able to graphically see the two sets of fader data on the Overview display (see Page 33).
Saving Mixes

Up to five mix passes are held in the Mix List memory. Saving mixes to disk can be carried out at any time via the Project Manager display (see opposite). Normally, the necessary items will be pre-selected on this display and the mix is saved by pressing the SAVE PROJECT button on the front panel. The Auto function simplifies the process by ensuring all elements that have changed since the last save are automatically saved with the SAVE PROJECT button.

When mixes are saved to hard disk, you are given the option to re-name them, otherwise they will take the names given to them in the Mix Pass list. A list of saved mixes is available via the Project Manager display (see lower screen opposite). Previously saved mixes can be loaded directly from this list for further updates. The last saved mix will automatically be shown in the Reference Mix box in the status area of the screen.

Insert Mixing

J Series provides two fundamentally different approaches for mix updates – ‘Insert Mixing On’ or ‘Insert Mixing Off’. Selection is made with the INSERT MIXING ON button on the front panel. These two master modes exist to satisfy the operational methods associated with the historically ‘traditional’ approaches developed for moving fader and VCA automation systems. With a moving fader system, the default update status would be Absolute, so that it is always the last pass that is being updated; specifically when returning from Absolute to Replay, it is the moves from the last pass that are heard. With a VCA system, as the fader cannot represent the actual mix level, Trim is the normal update status, and all moves are added to those existing in the mix being updated. On returning from Trim to Replay, it is the moves from the original mix that are heard, not those of the last trim pass.

‘Insert Mixing On’ is the moving fader mode, and returning a fader to write will erase previous moves when in Absolute status, or create new trim data alongside the current absolute data if a Trim update is selected. Dropping back to Replay will return to the absolute moves of the last pass, or any subsequent trim data present in the last mix pass. As with G Series, the first mix pass (in Absolute) always uses Insert Mixing On.

‘Insert Mixing Off’ is the VCA mode found in SSL E and G Series software (prior to the introduction of the Insert Mixing option in G3). Dropping into write will erase the existing moves when in Absolute status, or create new trim data alongside the Reference Mix absolute data if Trim status is selected. Dropping back to Replay, regardless of the update status, will return to playback of the Reference Mix data.

A key difference between the two modes is that ‘Insert Mixing Off’ effectively provides an ‘undo’ function for both Absolute updates and Trim updates. If an update sounds wrong on playback it can be removed by dropping in and out of Trim or Absolute just prior to the offending move. The original moves from the Reference Mix are then restored.
The Reference Mix is the last mix pass loaded from, or saved to, disk, and is displayed in the top box of the Mix Pass list (see above). The current mix pass can also become the Reference Mix by pressing the MAKE REFERENCE MIX button on the front panel. This combines the current absolute and trim data to make a new absolute pass, which in turn becomes the new Reference Mix. This is equivalent to ‘ENDING’ a mix in G Series.

Automation Modes

Another new concept to grapple with in J Series are the Automation Modes. Simply put, they determine what is saved as mix data on faders and switches that are in an active update state (ie. with either a Trim or Absolute LED on, or the object ‘REC’ LED on) at the rollback point, ie. the point where the current mix pass is ended by rewinding the tape machine. Channels in Replay are not affected by automation modes, thus changing modes does not affect existing automation data, only how new data will be added. Modes can be changed at any time prior to a rollback, but the mode selected at the rollback point is the one that will be used.

The J Series mix system provides seven different types of Automation Mode – Overwrite, Rollback, Rollback/Join, Clip Fill, Clip End, Cycle Fill, Cycle End and Static.

The system default mode is Rollback/Join, which is equivalent to how E and G Series software functions. Any fader or switch in an active update state at the rollback point will return to write when the system next plays through the rollback point. The Overview display shows rollback points as Red or Green (Absolute and Trim) bars in each channel, which provides a pictorial aid to understanding the process. At any time prior to the rollback point, the JOIN key will drop all controls active at the rollback point back into update. This allows a group of mutes, or a fader balance, to be written from an earlier point in the track, and is a commonly used feature in E and G series. J Series adds to this feature by only returning the active channels to write, as opposed to all channels. (The E/G Revise function is achieved via the J Series TRIM RENULL key).

With Overwrite selected, when the system is rewound, the new pass contains the dynamic moves for faders and switch objects, up to the point of rollback. For all faders or switches actively in write at the rollback point, the last fader level or switch state will be in written to 23:59:59:24(:29), effectively overwriting any previous mix data from the rollback point onwards. This mode is useful for switches which are essentially state based as opposed to the dynamic fader automation. There is no need to continually write switch automation because if a switch is subsequently operated, it automatically returns to write. This means that a REC indication on a channel will always mean new data is being written in the current pass as opposed to from a previous pass, which could easily be the case with Rollback/Join mode. Overwrite may also be familiar to engineers with experience of other moving fader systems.
In Rollback mode, the new pass contains new mix data generated up to the point at which the system is rewound. After the rollback back point, on all channels in update, the mix data will be that of the previous pass. Rollback mode effectively performs an automatic ‘Insert Join Mix’ on active faders and switches at the rollback point. Again this mode is primarily included for dedicated moving fader users.

Static mode is unusual in that, as soon as the system is rolled back, the new pass will contain the levels and switch settings for all channels faders and switches in update at the rollback point. written from the start of the mix pass to 23:59:59:24(:29). Static is effectively a constantly updating snapshot, based on the new settings of channels in write at the rollback point. It has many uses, for example whilst writing cuts, if the faders are in Static, a snapshot of the current levels is automatically saved with each mix pass. Alternatively use Static with Aux and EQ switches, to save their current status as part of the automation data, prior to selecting Overwrite for adding dynamic switch automation.

Clip Fill and Clip End are designed for use with ‘captured clips’ (see Page 35). With Clip Fill, switches and faders can be freely adjusted without being written to the mix. When the system is rewound, the settings at that point will be written for the entire length of the chosen audio clip. With Clip End, dynamic moves can be written to the mix and, at the point of rollback, the last settings will be written to the end of the chosen audio clip. These modes are effectively a subset of the Static and Overwrite modes, delineated by the Clip boundaries.
Cycle Fill and Cycle End operate on a similar principle to Clip Fill and Clip End but within the duration of the current cycle window.

Automation Modes are selectable from a pop-up (see previous page) for the Large, Small, Group, and Master faders and the Large, Small, Group Cuts, Groups Solos and Aux switches (including EQ and Insert), by using the cursor keys or the pen and tablet.

Additional Mix Options and Statuses

These can all be selected by pressing the appropriate console button or by stabbing with the pen in the relevant on-screen box (see opposite).

Status Lock – This locks a fader’s status into its current active update status cycle i.e. putting a fader in to write will do so in the stored status, regardless of current global selection of Absolute/Trim etc. Storable statuses include Trim, Absolute, Snap, AutoGlide, Autotakeover, Preview and Immediate Pickup (see below).

Fader Status Copy – Stores the current selection of fader statuses for recall at a later time. Note that this can only be done by pressing and holding the FADER STATUS COPY button until it flashes (not available on-screen). Stored statuses are recalled by a quick press of the button.

Renull – This provides the option to force a level jump at the point that a fader is switched from Replay to Trim, or not, according to the effect required. When selected, the fader position will be ‘renulled’ on entering Trim from Replay, thereby avoiding any level change. With Renull active, the JOIN key effectively becomes the E/G Series REVISE key.

Snap – When a Large Fader is in Replay, and with the fader motors on, as soon as the fader is touched it will switch to the selected write mode. With Snap selected, a fader will stay in the write mode as long as you are still touching the fader. Once you let go, the fader will return to playing back the reference or previous pass mix data.

Autoglide – Enables a timed return to the reference mix level on any fader in Absolute or Trim, by a subsequent operation of the status switch. The ‘glide’ time can be set from 1 frame up to 10 seconds. If Snap is enabled, releasing the fader automatically initiates a ‘glide’ to the previous pass level.

Autotakeover – This uses the fader status LEDs to indicate the direction in which an active update fader must be moved in order to return it to the null (reference) position. When this null point is crossed, the fader automatically drops back into Replay. This feature will be well known to G Series users, and provides an alternative to Autoglide when a manually controlled return to Replay is required.

Autofade – This function can be used regardless of whether the automation system is turned on or not, and provides a timed, automatic, fadeout for the Master Fader. The fade duration can be set between 1 and 60 seconds.

Preview – Used in conjunction with either Absolute or Trim status and enables fader levels (only) to be rehearsed and monitored without affecting the underlying mix data. The previewed levels can be compared with the original mix by toggling the FSM key. JOIN will return all Previewed channels to the active update status.
Immediate Pickup – This is useful for Large Faders when the fader motors are turned off, and simulates the touch sensitivity function of moving faders. With the Large Fader motors on, Immediate Pickup can still be used to drop Small Faders into write.

Make Ref. Mix – With the J Series mix system, data is written in two automation streams – one for ‘absolute’ mix data and one for ‘trimmed’ mix data. Make Ref.(erence) Mix creates a new Reference Mix by merging the current pass trim data with the absolute data, thus allowing further trims to be applied to previously trimmed moves. When a mix is saved to disk, a new Reference Mix is automatically created.

The merging of Absolute and Trim data is graphically demonstrated in the Overview display (see Page 33).

Level Match – Using the fader status LEDs as null indicators, Level Match allows a fader to be matched to the written mix information (ie. the current null point), in order to avoid a level jump when switching from Replay to Absolute prior to a re-write. The fader status button is used to enable Level Match on individual channels. This option can be used with Large Faders when the motors are turned off, and with the Small Faders at any time.
Fader and Switch Protection

As well as the various automation modes available for both faders and automated switches, two ‘protection’ modes are available to prevent existing mix data being overwritten by accidental moves. Protect Manual enables changes to be heard on the monitors but new mix data is not written for that control. Protect Replay mode makes an automated control entirely ‘safe’. If the control is moved, no change will be heard on monitor, nor will the existing mix data be affected.

Match and Play

Match and Play is a powerful feature that allows the mix data written for automated switches to be edited, by effectively dropping in and out of write on the existing mix information. Individual Match (M) and Play (P) buttons for each channel are located above the Large Fader SOLO and CUT buttons. When enabled, Match (M) allows a switch to be returned to writing new data without changing its current state (normally operating a switch changes its state!). This makes extending an existing mute, or erasing the start of a mute, extremely simple. Selecting the Play (P) button followed by the required switch, returns that switch to replaying previous automation data. The red ‘REC’ LED lights whenever object data on that channel is being written to the automation system. Separate Match and Play buttons are also fitted above the Group Faders in the centre of the console. These enable the mix data for Group Solos and Cuts to be edited.

Software Groups

In addition to the eight Control Group faders in the centre of the console and the Switch Group facility (see next page), the J Series Computer provides 32 Software Groups. These can be used in or out of an automated mix. Software Control Groups allow the free grouping of any channel fader to any other channel fader (large or small) on the console. It is not possible to have master or slave faders of one group as part of another group; it is possible for a Hard Group slave to be a Soft Group master.

Groups are set up via the Soft Group Setup Menu (see opposite). The following types of group are available:

- Slave Fader and Cut – The Slave follows the Master level and Cut selection
- Slave Fader Only – The Slave follows the Master level only
- Slave Cut Only – The Slave follows the Master Cut only
- Slave Cut Inverted – The Slave Cut is inverted with respect to the Master Cut
- Slave Status Only – The Slave follows the automation status of the Master
- One of ‘n’ Uncut – Uncut any Cut in the group and other Cuts cut!

Cuts can also be incorporated in a Switch Group at the same time as being part of a Software Group.
Switch Groups

A large number of Switch Groups can be set up to group together the automated objects on the console; this feature can be used with the automation on or off. The non-latching objects are FX1-6 On/Off, Cue Stereo On/Off, Insert In/Out, EQ In/Out, Large and Small Fader Cuts, Group Fader Cuts and Solos.

Two types of group are provided – Master/Slave or All Master. A Master/Slave group has a single designated master object; with an All Master group, any object in the group will control all other objects in that group. An All Masters group is particularly useful where you wish to toggle through a selection of different FX sends during a mix.

Intercancelling switch groups can be created by first setting up the on/off relationship between the switches and then selecting all the relevant objects to a group.

Joining Mixes

This feature allows mix data, for any automated switch or fader and from any mix saved in the Project, to be joined to the current mix (see opposite). The Join to Mix menu offers three types of join – Butt, Insert or Timeshift. A Butt join requires a single timecode entry of the join point. Insert requires the entry of insert from and to times. A Timeshift join is used where you wish to take a section of automation data from a mix and insert it at a different start point in the current mix.

Copying and Swapping Mix Data

Mix data can also be freely copied or swapped from one channel to another. In addition, various other types of channel information, such as Fader/Switch Groups and Total Recall Setup data, can also be copied/swapped. This facility is particularly relevant if the studio you are working in now has a different size of console, or the console has a different layout, to the one you started out on.

Trimming Mix Levels Off-line

The Off-line Trim function (see opposite) enables all or individual fader levels, including those in Software or Hardware Groups, to be trimmed up or down by a selectable value in dBs (±10 dB to two decimal places). The off-line process, which creates a new Mix Pass, may be applied to the whole mix or a selected part of the mix.
Snapshots

In addition to all the dynamic automation options, the J Series Computer also offers a console-wide ‘snapshot’ facility for all automated objects. Up to 62 of these snapshots can be taken whether the dynamic automation system is enabled or not.

The computer automatically stores a ‘Pre Enable’ snapshot each time the mix system is enabled. This can be used at any time during the mix to return to the initial fader and switch settings and to restore your settings after turning on the automation system without realising that a mix was already loaded.

The handy ‘Undo’ snapshot contains the console settings prior to the Snapshot you did not mean to recall!

Snapshots are extremely useful as short term memories that can be used many times when mixing. They can even be fired off at specific timecode points by entering a macro in the Events List.

The Overview Display

The Overview display (see opposite) provides a unique graphical representation of mix and cue data. The main part of the display consists of 24 vertical windows representing Channels 1-24. The display can be scrolled to reveal the remaining console Channels, the Groups and the Master fader. The channel windows are used to display marks (cues), automation data, and a representation audio generated with the Capture Clips function (see next page).

A broken red line across the display represents the current Desk (‘playhead’) position. The system can be located to any timecode point within the Overview window by simply stabbing with the pen at the required position, or by dragging the red line to a new locate point. Marks (cues), created with the MARK button, are represented by horizontal black lines across all the channel windows and can be located to in a similar manner. A Zoom In facility provides a more detailed view.

One of the most useful functions of the Overview display is to show the mix data levels for faders and automated objects in coloured overlay traces. Excursions to the right indicate an increase in fader level or, in the case of switches, the ‘on’ condition.

Once automation data has been written for faders and objects, that data may be edited on an additional large-scale display of a single channel. This is particularly useful for fine tuning cut data and for master fades at the start of a track.

The Overview display also includes a smaller, scrollable, version of the Events List.
Capture Clips

Capture Clips is an innovative new feature which allows the J Series Computer to capture audio ‘clip’ information from console channels, via the opening and closing of gates in the channels’ Dynamics sections. Once captured, an on-screen representation of the audio is drawn in the Overview display windows, and there is no need to keep the gates in circuit. The ‘clips’ provide a useful reference for automation data traces and as an aid in setting up locates. They also provide a powerful tool when editing automation data on the display shown opposite.

Total Recall

Total Recall records the position of all the switches and rotary controls in the console’s channel modules and, additionally, the positions of controls in the centre section. Once stored, these ‘setups’ can be recalled, enabling the console to be reset to within 0.25dB tolerance. Total Recall operates independently of the audio processing, ensuring that there is no degradation in the console’s sonic performance. Note that Total Recall is standard on all SL9000 J Systems.

The console controls are manually reset in conjunction with a graphic display (see opposite) which compares the stored positions of controls with their current positions. To reduce the reset time, an Autoscan function can be used to rapidly locate only those controls that are incorrectly set.

Total Recall can be equally used where you want to return to a specific setup stored earlier in the session or if you are moving your project to another studio. In the latter case, it makes no difference if the facility you are moving to has a larger or smaller console, or even a different layout – Total Recall information can be freely copied from one channel to another via the Channel Data Copy and Swap facility.

Total Recall setups are saved on a Project basis, in a similar manner to mixes, via the Project Manager display. A dedicated SAVE TR button is provided on the front panel to facilitate this.
The System Network

The MACHINES menu covers connection and control of any SSL Digital product via an ethernet network. The Network display (see opposite) lists all devices currently connected to the system and is used to set up control relationships between the SL 9000 J and these devices. These may include VisionTrack, ScsiNet (remote magneto-optical disc drives) and KeyPads.

VisionTrack is SSL’s proprietary random access video system, which provides an instantly available picture source locked to audio – with absolutely no delay waiting for video tapes to spool. Up to 2 hours of video storage are available, according to system specification.

The SSL KeyPad is a small unit which connects to the SL 9000 J console via a single cable. Twenty keys on the KeyPad can be used to mimic buttons on the console’s front panel and, once programmed, provide full remote operation, with tallies back to the console buttons, and vice versa. Up to five KeyPads may be optionally connected to a single system.

If you are interested in any of the above options, please contact your local SSL office or distributor for further details.

Machine Control

In addition to conventional single machine control mode, the J Series system is capable of controlling up to four machines as slaves, via direct serial control ports. The slaves can be offset to the nominated master and can be selected on/off-line, and record enabled, from dedicated front panel buttons.

Machine setups are carried out on a Serial Machine Control display (see opposite). The J Series Computer supports the following direct parallel and serial protocols:

DCTM – A parallel interface which is the equivalent of SSL’s ‘S29’ interface as used on SL 4000/6000/8000 systems. The computer slaves to incoming timecode. This is is used for single machine control.

VPR3 – Used to control Timeline Lynx Modules in single machine emulation configuration, not in a multi unit chained system.

Sony 9-Pin – Provides direct machine control of VTRs, some ATRs, as well as compatible MDMs and R-DAT machines. Indirect control of ATRs, VTRs and film transports may also be effected via motionworker and CB Electronics units. Your local SSL office or distributor can provide additional information.

motionworker – The J Series Computer can communicate directly with motionworker, providing sophisticated control of up to five tape transports. Machines can be put on and taken off line from either the motionworker status panel or the computer screen. Offsets can be adjusted dynamically and saved to disk as part of a Project.
**Sony Slave** – Enables the J Series Computer to slave to an external device using the standard Sony 9-pin protocol.

A number of setup options are available according to which protocol is selected. The settings of these options are saved as part of a Project.

The lower half of the Serial Machine Control display is used to locate individual machines to timecode mark/sync points in multiple-machine setups. Provision is made (on this display and in the form of dedicated hardware buttons) to bring on-line, and to record arm, individual machines.

Both Linear and MIDI timecode can be generated locked to system position for slaving external sequencers and timecode-chasing hard disk recorders.

Bars and Beats can be displayed as an alternative to timecode. The tempo map used to generate the Bar/Beats count can be entered from the screen, or from type 0 or 1 generic MIDI Files from a Macintosh or PC based sequencer package.

**User-Programmable Keys**

Above the timecode display, in the console’s centre section, is a group of keys designated USER DEFINED FUNCTIONS (see opposite). All of these are pre-programmed by SSL with useful functions.

Users may add to any macro (a string of user-programmable commands) already assigned to these keys, or even change their functions. Macros can be defined using a comprehensive number of functions contained in the computer’s Macro Function List. Macros may also be entered in the Events List to be actioned at a specific timecode value.

Macros are saved on a per-Project basis and may therefore be transferred, along with other Project data, to another SL 9000 J system.