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 can be used as an aid in the editing of automation data.

Switch Groups

A large number of Switch Groups can be set up to group together the non-latching objects on the console. This facility can be used in and out of automated mix mode. 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.

Software Groups

In addition to the eight Control Group faders in the centre of the console and the Switch Group facility (see above), 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 fader to any other 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. Each slave fader in a group can be one of six types, and groups may contain slaves of mixed types. Cuts can also be incorporated in a Switch Group at the same time as being part of a Software Control Group.

Groups are setup 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 fader status of the Master.
Joining Mixes

This feature allows mix data, for any automated switch or fader and from any Project, to be joined to the current mix. 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 Setups, 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 in.

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 SL9000J Systems.

The console controls are manually reset in conjunction with a graphic display (see upper screen 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 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 (see above).

Total Recall setups are saved on a Project basis, in a similar manner to mixes, via the Project Manager Setup Menu (see Page 4-3). This also provides access to the Total Recall Setup List – see opposite. Setups are also selected for recall from this list.
The System Network

The Machines menu provides 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 DiskTrack, VisionTrack, SesiNet (remote magneto-optical disc drives), KeyPad, SSL programmable PatchBays, etc.

For more details on DiskTrack, see Page 4-25.

VisionTrack is SSL’s proprietary random access video system, which provides an instantly available picture source locked to audio – absolutely no delay waiting for video tapes to spool. Up to 50 or 100 minutes 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.

SSL’s PatchBay is a 24 x 8 automated router unit, which may be controlled directly from the SL 9000 J. Each crosspoint comprises a balanced relay closure to provide a true bi-directional selection. PatchBays can be equally used with analogue audio, AES/EBU digital audio or machine control lines.

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

User-Programmable Keys

Above the timecode display in the console’s centre section is a group of keys designated USER DEFINED FUNCTIONS (see opposite). Certain keys are factory configured with specific tasks – CYCLE ON/OFF, LIST EVENTS etc. The lowest row of 5 keys (MSEL 1-5) provide a dedicated ‘shift’ function to access different ‘layers’ for the 11 keys above, so that each of these keys may have up to six different functions.

As they become more familiar with the SL9000J system, users may wish to 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 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 SL9000J system.
DiskTrack

Unlike any other analogue console, the SL 9000 J Series console is available with an integral hard disk based audio recorder – DiskTrack. Not only can DiskTrack provide up to 128 tracks (48 hours maximum storage time) of disk storage, but also a routing system which provides a centralised resource server of additional hard disk recording/playback and analogue or digital I/O. The console can access up to 95 concurrent record/playback disk tracks at one time.

Disk storage itself is integral to the DiskTrack unit and is provided with a minimum of 24 tracks (9 hours maximum storage time). This can be expanded, 8 tracks at a time, up to the maximum 128 tracks. Recording to disk is user-selectable to 16-bit or 20-bit. 20-bit recordings will reduce the maximum storage time of, for example, a 128 track unit to 38 hours. SCSI-based devices such as Tape Backup units or Magneto Optical drives may also be connected to your DiskTrack (see Backup and Restore, Page 4-29).

Interconnection

Audio connections to/from the SL 9000 J console and DiskTrack are made via SSL 'RIOs' (see opposite). These units come in two forms, a Remote Analogue I/O (providing up to 48 inputs and outputs per unit) and a Remote Digital I/O (up to 96 AES/EBU inputs and outputs – 48 pairs – per unit).

Audio connections ('multitrack' sends and returns) between the console and Analogue RIOs are made in a conventional manner via multi-pin connectors. Connections between the RIO and DiskTrack are made via SSL 'HiWay' links. These carry high-quality multiplexed audio and comprise two coaxial cables for audio sends and returns, and an Ethernet control line.

Digital RIOs can be used to interface DiskTrack directly to a digital multitrack tape machine or, if required, via an AES/MADI converter. This enables pre-recorded material to be transferred from multitrack to DiskTrack or vice versa, if required. Simultaneous backup of recorded material to multitrack is also provided for.
Recording and Playback

Once suitable audio paths between the SL 9000 J console and Disktrack have been set up, recording and playback can take place in a conventional manner. The Record Enable buttons on the console's Input/Output modules can be used to arm tracks for record. A major difference, however, that will be noticed is the instantaneous way in which the system can locate to any part of the recorded audio. This can be achieved by any of the normal methods described earlier in this section.

Since DiskTrack is a non-destructive recorder, up to 50 takes can be recorded to any one track. One second of extra audio is automatically saved at both the start and end of each recording to allow subsequent editing flexibility (see below).

Take Management

DiskTrack records audio as discrete sound files, creating a single ‘Audio File’ file for each individual recording, overdub or drop-in (punch-in). Comprehensive take management facilities are provided to enable any one of these Audio Files to be selected for replay.

As recording proceeds, an internal ‘playlist’ is created which is later used to call up these files, as required, for track playback. This strategy allows all takes and overdubs to be separately logged so that they are easily accessible at any time, and dramatically simplifies backup and restore routines. Each ‘playlist’ is associated with a system Project File.

All drop-ins/outs are crossfaded to avoid clicks. These crossfades are stored on disk at the time of creation, so that it is not necessary to recreate them in realtime whenever the track is played. There is no limit to the number of simultaneous or stacked crossfades that can be stored.

Editing Audio

Once audio has been recorded to DiskTrack it will appear on the J Series Computer’s Overview display (see Page 4-17). Full non-linear editing facilities are provided here for DiskTrack-equipped systems. Audio may be edited, copied and even slipped on single or across multiple channels. Edit groups can be set up to enable the same edits to be performed simultaneously on multiple channels. The audio information can be displayed as a waveform to aid the editing process.
Backup and Restore

At the end of each session, DiskTrack audio and associated project data may be backed up to 8mm Exabyte Tape Drives. If required, audio backups of existing material can take place as new material is being recorded to DiskTrack.

The user can choose to backup the complete contents of all the disk drives or selected Audio Files. A queuing system enables selected files to be backed up in any preferred order, regardless of the order originally specified. A facility is provided, subject to the availability of a postscript printer, to automatically add job-specific details to a pre-designed backup tape case insert.

Audio is restored to DiskTrack's hard disks using similar routines.
SL 9000 J Series

Console Operator’s Manual

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   System Overview

2 Basic Routing and Signal Flow

3 The SL 911 Input/Output Module

4 Signal Processor Routing

5 The Console Centre Section

6 The Patch

7 The SL 959 Eight Channel Monitor System

On the following pages you will find a full alphabetical Index. We have tried to make this Index as comprehensive as possible because we believe that, once you have become accustomed to the basic features of the SL9000J Series Console, you will only need to use this manual as a reference volume.

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Solid State Logic

SL 9000 J Series
Total Studio System

Console Operator's Manual

SECTION 1

Console Overview
Console Overview

The SL 9000J is the latest analogue mixing console from Solid State Logic. It draws on and develops many of the features of SSL’s other music consoles, while retaining a control surface that will be familiar to any recording engineer familiar with SL4000, 6000 or 8000 Series systems.

The desk has an in-line signal path, with master status switching to quickly reconfigure the console for particular tasks, but the signal routing can be overridden locally, providing even more flexibility than other SSL consoles.

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, additional record feeds, to generate Surround or Centre signals, or as additional FX sends.

An ingenious reassign system allows Auxiliary send controls on individual channels to be disconnected from their own bus and routed to any of the Stereo or Multitrack busses, allowing up to 64 discrete FX send mixes to be generated.

As well as the Large Fader level and Cut, the following console channel functions are automated:

- Small Fader level
- Small Fader Cut
- EQ In/Out
- Insert In/Out
- Individual Aux On/Off switches

These functions are controlled from an entirely new automation computer, providing additional processing power, colour graphics, pop up menus etc. The J Series Computer also provides complete integration with SSL’s digital product range, allowing random access multitrack recorders, digital work stations, random access video recorders and routing switchers to be controlled from the console. Further information on the automation system is contained in the J Series Computer Operator’s Manual.

The following descriptions are intended for those engineers who are already familiar with SSL’s SL4000/6000/8000 range of consoles. Those requiring a more detailed description of of the console’s features and functions should refer to the relevant sections of this manual.
Master Status Switching

The console retains the familiar RECORD, REPLAY and MIX statuses. Note, however, that in RECORD or REPLAY Status, the Large Fader is in the Monitor path and the Small Fader is in the Channel path. This represents a logical change from SL4000/6000/8000 Series consoles where the additional selection of VCA TO MONITORS or FADER REVERSE is required to achieve the same signal flow.

To reverse faders in RECORD or REPLAY status, select SMALL FADER TO MON. Note that there is a great deal of flexibility in sourcing signals to feed to the various busses – either fader can be switched locally to feed any of the busses in any status.

Metering

Depending on the specification of the console you are working on, 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 points of the VU scale can be adjusted to read between 0 and +6dBu. Factory default is +4dBu. The 0dB point of the Peak scale can be adjusted from a terminal to read between +16dBu and +24dBu. Factory default is +18dBu (-6dBFS on a Sony multitrack).
Input/Output Module

The input/output module bears a strong resemblance to the SL4000G module, but with a number of enhancements.

The differences are briefly as follows:

The channel input stage is similar to G Series. The MIC gain is 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.

The Multitrack BUS trim control, which on SL4000/6000/8000 Series consoles is adjacent to the Group/Tape switches near the bottom of the module, is also located in this area.

The SL 9000J Series Dynamics section is based on the classic G Series circuits, with the addition of a Peak detect 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 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 can be switched to the Monitor path using the MON switch. SPLT 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 toggling 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.

A major advance on the SL4000 system is the FX send reassign system – EFX for short. This allows any two mono FX sends, or the stereo cue send, to be disconnected from their respective busses 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 SL4000 system.

The Small Fader section is similar to that on an SL4000. Both the fader and CUT switch are automated. The Small Fader pan is located here and, unlike the SL4000, is always associated with the Small Fader. The pan is permanently in circuit. 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 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 cancelling, FLEET which makes them momentary, and SOLO LINK which links Large and Small Fader Solo cut busses.

The Large Fader is motorised and, like all SSL Ultimation systems, can switch the audio via a VCA to allow Trim updates etc. See the J Series Computer Operator’s Manual for more details.

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 Motion 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 SL9000 J centre section is logically divided into two main areas (see the picture on Page 1-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 the J Series Computer Operator’s Manual for more details.

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 SL4000. 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 SL4000, 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 SL4000.
Four stereo Echo returns, each with level, cut, AFL, pan, and width controls, plus routing to main mix bus and feedback outputs.

Stereo bus master level controls and routing to main mix (LCES) outputs.

Level controls for stereo cue and FX bus outputs.

Source, level, AFL, and cut signals for studio loudspeakers.

Meters: voltage/peak scale selection - C/SELECT

- SELECT toggles sources for the eight centre section bargraphs, between stereo/busses, cue and FX busses, and Mix bus outputs.

- DISPLAY PEAK shows peak level with a 2 second delay.

- NCOLD PEAK indicates peak level until cancelled or CLEAR PEAK is pressed.

Channel meter source selector normally fed by Tape Return or Group Monitor signals, they can alternatively be fed by Channel Input signals (MTERT INPUT), large (EF MIX) or small (6F MIX) fader computer returns.

PFL, stereo AFL, and SOLO IN FRONT mode control of large and small fader and group fader solo switches. A/PFL, TO MINUS routes AFL or PFL signal to near-field monitors while leaving the main monitor signal unaltered.

Console solo switches are normally latching. ALTM makes all switches interchanging, while PLAT makes them momentary. SOLO CLEAR switches all channel and group solos. SOLO LINK links large and small fader solos.

1 CH and 2 CH - select pan mode with LCR pan option fitted; also switch monitoring between 2 and 4-channel stereo modes.

A/B allows selection of two pairs of near-field monitors.

MONO SUR - switches a 4-channel insert into the monitor path to accommodate surround sound encoding units.

MONO allows the monitor path to either left and right (2 CH) or center (4 CH) monitor outputs.

Recessed 14" colour monitor for a clear local view of computer displays.

Computer display buttons:

- Function switches for fader and switch protection modes, plus hardware/software fader and cue group setup.

Individual and master buttons to enable control of one parallel or up to four Sony 9-pin machines, with individual and master record enable buttons.

Automation mode and fader status selection buttons.

Project data Save and Load buttons.

Motion Wheel with Jog, Shuttle and Feedback functions for rapid location of machine transports.

Buttons for generating and naming marks/cues.

Dedicated pen and tablet for access to all on-screen functions.

Twenty user-programmable 'macro' buttons, predefined to provide enhanced computer operation.

Numeric key pad with GOTO transport locate function.

Display cursor buttons. OK and QUIT save or discard information entered or parameter changes.

Master menu select buttons.

Large display of current virtual/tape machine times/cues. May also be selected to show current mark/cue.

5 instant locate buttons simply programmed by holding down a key at the desired locate time.

< > keys may be used to frame jog, locate rapidly from one mark/cue to another, or locate to mix start/end times.

Master transport control keys.
Solid State Logic

SL 9000 J Series
Total Studio System

Console Operator’s Manual

SECTION 2

Basic Routing and Signal Flow
Basic Routing and Signal Flow

In order to understand signal flow through the console, it is probably best to start with the status buttons located on the SL952J Master Panel. These buttons determine basic signal paths in the SL911J I/O module, so they are very important. Exact details of each local control can be found in Sections 3 and 5.

When first setting up the console, you should always check these buttons and select them correctly for the particular mode you wish to work in.

There are four basic desk statuses: RECORD, REPLAY, MIX and RECORD + MIX (overdub). The SMALL FADER TO MONITOR and MASTER INPUT FLIP buttons also affect I/O module signal flow.

Each I/O module has two completely independent audio signal paths, the ‘Channel’ path and the ‘Monitor’ path (typical of an In-Line console). This gives the system flexibility, but may cause some confusion if you don’t understand which areas of each module are dealing with each of these signals.
The Six Key Points in the SL911J

There are six key points in each I/O module which define the two separate audio paths: two inputs to the module, two faders and two outputs from the module. The status buttons determine how these elements are connected together to provide default configurations required for tackling various tasks from track laying through to final mixdown.

The six key elements in the signal paths are:

The Channel Input

The Channel Input section can be found towards the top of the module and has three inputs: MIC, LINE and SUBGROUP. We will deal with the SUBGROUP input later. The FLIP button allows you to flip between MIC and LINE inputs. All inputs can be flipped by using the MASTER INPUT FLIP button located in the SL952J master status button group. The other controls on the input section are fairly obvious but are detailed in Section 3.

The Small Fader and Pan

The Small Fader is linked to the computer automation system. Its associated pan control is mounted above and to the right of the fader. This will normally pan between Left/Right or Odd/Even busses unless the optional LCR panning system is fitted, in which case a separate Centre bus is also available.
The Routing Matrix

The Routing Matrix provides access to 48 Multitrack busses and four Stereo Subgroup busses. Bus selection is simple in operation, with two buttons determining the Multitrack bus selection for tracks 1-24 or 25-48.

Sources for the Multitrack and Stereo Subgroup busses are determined by the buttons beneath each section. Default selection of Large or Small Fader sources for the Multitrack busses is made by the master Status buttons on the SL952J but this can be overridden locally as required (see later).

Source selections for the Stereo Subgroup busses are independent of the master console status and may be chosen according to the job in hand. See Page 2- 25 for a description of the EFX re-assign system.

The Monitor Input Section

The Monitor Input buttons enable two sources to be selected for the monitor path. GROUP selects that module's Group Output, which also feeds the multitrack. TAPE selects the track output of the multitrack machine. It is possible to select both of these buttons together to get a mix of the two signals. You will find a more detailed account of this in Section 3.
The Large Fader and Pan

The Large Fader is linked to the computer automation system. Large Faders may be assigned for control by one of the eight group faders in the centre of the console.

An associated pan control is provided directly above the fader at the foot of the I/O module. This will normally pan between Left/Right or Odd/Even busses unless the optional LCR panning system is fitted, in which case a separate Centre bus is also available.

The Output to Mix Bus Controls

Two buttons, LF MIX (above the large Fader pan) and SF MIX (below the Small Fader pan) determine which fader will feed the console’s main Mix bus.

Normally these are selected to a default condition by the master status buttons on the SL952J but may be overridden locally when the situation dictates.

Also in this area are the PRE and POST LF buttons. These are mainly used in mixdown (as we shall see later) to source pre- and post-Large Fader channel signals when the Monitor path and Routing Matrix provide a method of setting up additional Aux/FX sends.

In order to explain the console routing system, we will go through the master statuses in the most logical progression, from basic track laying to final mixing. The status buttons are designed to differentiate between the various phases of the recording process.
Record Status

Recording basic tracks onto a blank multitrack tape is the starting point! In the record mode, with the RECORD status button selected, the various elements in the module signal paths are connected as shown below.

![Diagram showing input selection, processing, fader, and output assignment](image)

<table>
<thead>
<tr>
<th>INPUT SELECTION</th>
<th>PROCESSING</th>
<th>FADER</th>
<th>OUTPUT ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANNEL</td>
<td>EQ Filters Dynamics</td>
<td>Small Fader</td>
<td>To Bus Trims and Tracks</td>
</tr>
<tr>
<td>GROUP</td>
<td>EQ Filters Dynamics</td>
<td>Large Fader</td>
<td>To Main Mix Busses</td>
</tr>
<tr>
<td>TAPE</td>
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</table>

This will be the preferred recording mode for most engineers. If you have previously been using an SL4000 system, note that RECORD status on the SL9000 is equivalent to RECORD + VCA to MONITORS (FAADER REVERSE on Ultimation and G+ consoles) status.

The Large Faders are much more useful if used as monitor faders during recording, as they can, if required, be automated for end-of-the-day monitor mixes.

The upper section of the diagram shows the 'Channel' signal path whilst the lower part shows the 'Monitor' signal path. The Channel signal path is that path which originates from the Channel Input section of the I/O module. The Monitor signal is derived from the Monitor Input section.
The drawing opposite shows RECORD status routing in more detail and will give you a good idea of where the various controls appear in the signal path.

Before we go any further, it would be worth explaining some of the elements in the drawings opposite and on the following pages. This will enable you to more easily understand the default signal paths and the variations available.

- Default/Main Signal Path in I/O Module
- Alternative/Additional Signal Paths
  - Selected Function (shaded)
  - Deselected Function (unshaded)
  - Changeover switch (electronic)
  - Half-normalled jack sockets

Note that most of the drawings are ‘single-line’ diagrams. This means that even stereo signal paths have been shown, for simplicity, as single lines. Just remember that the outputs of a pan control are always stereo, as are the Subgroup busses, main Mix bus and the Monitoring system.

Record Signal Flow Diagram

This diagram is fundamental to understanding the console signal flow, so it is worth while spending some time to look at it in detail. In this status, a Mic input is the standard selection and this signal will be fed, via the Mic gain control, to Channel path input. The FLIP button allows the Line input to be selected if you are sourcing from line level feeds rather than from microphones. The SUB GP (Subgroup) button overrides Mic and Line selections.

Normally the Subgroup button will be up and the Mic signal will pass to the phase reverse circuit (not shown). If SUB GP is pressed, the Channel signal path will derive its input from that module’s multitrack bus (Group) mix amp. This allows signals from other modules to be subgrouped through the channel, which is a very powerful feature while mixing. In the tracking mode this could be used to provide overall Dynamics or EQ to a group of signals prior to sending them to the multitrack. For more on this function, see Page 2-21 and Section 3.
Following the input stage, the signal passes via the EQ and Dynamics sections (if selected) to the Small Fader. The Channel signal can also be fed via the insert points to an external device (not shown on the diagram) which can be switched pre or post the EQ.

After passing through the Small Fader and associated pan, the signal is sent to the Multitrack Routing Matrix, via the default selection of the associated SF (Small Fader) routing source button. When recording to a stereo pair of tracks, the Small Fader pan can be used to pan source signals between odd and even multitrack busses.

From the Routing Matrix the Channel signal passes on to the multitrack busses, to be picked up by the bus mix amp associated with that multitrack bus/Group. The Bus Trim may be on another module if the channel has been routed to a bus other than its own (which is usually the case). The signal then passes (via the FAADER switch) on to the Group Output patch point on Row G, where it is normalised to the Multitrack Send and Group Monitor Input on Row H. The Multitrack Return appears on Row J and is normalised to the Tape Monitor Input (Row K).

Both these Tape and Group Monitor signals feed a switching matrix which is controlled by the GROUP and TAPE buttons (see Section 3 for more details). Note that selection of MASTER READY GROUP on the SL952J selects all Monitor path inputs to GROUP automatically. This can be a useful starting point if you are recording to a large number of tracks simultaneously.

If required, the monitor signal can now be processed with the EQ and Dynamics sections (which can be switched into the Monitor or Channel signal paths, see Section 4). The signal passes on via the Large Fader and out of the module onto the Mix bus.

The Mix bus is fed into summing amps in the centre section and then passes via the Main Fader out to the monitor amps and ATRs.

Remember that, in RECORD status, the Large Faders relate to the monitoring of multitrack sends and returns, and the Small Faders relate to whatever source is being fed into that channel. Quite often these two signals may be completely different. For example, Track 7 may be fed from a mic plugged into Channel 1. The Small Fader on Channel 1 will control the level of that mic to the multitrack machine, the Large Fader on Channel 7 will control the level of Track 7 sends and returns as heard on the monitors.

Provision has been made for an analogue multitrack tape machine output to automatically switch to Sync whenever the RECORD status button is selected. This may, or may not, be wired in your studio.
From the diagram opposite you will see that, if required, the Large or Small Fader Pan outputs can be assigned to any one or more of the Stereo Subgroups. If you need to create audio subgroups of source signals, in order to apply overall signal processing, this can be very easily set up by using the Stereo Subgroups and outboard signal processors, or spare I/O modules (see Page 2-25). For convenient level control, Monitor (Large in RECORD status) Faders can be assigned to the eight group control faders in the centre of the desk.

Track Bouncing

If you have previously been using an SL4000 desk, you will probably be familiar with the FLOAT function. Amongst other uses, this provided a simple method of setting up for track bouncing. The same effect can be just as easily obtained on the SL9000 but requires the selection/deselection of two switches.

As an example, say that we want to bounce Tracks 1, 2, 3 and 4 down to a stereo pair on Tracks 7 and 8, and we are still in RECORD status. First assign the Large Faders on Channels 1, 2, 3 and 4 to the Routing Matrix by selecting the associated LF button. Note that this toggles with the SF button. While in this area, select routing buttons 7 and 8 on each of these modules, having first ensured that the 1-24 routing bank switch is also selected.

Now move to the foot of the module and deselect the LF MIX button to prevent 'double monitoring' during the bounce. Select GROUP on Channels 7&8 and set the Large Fader pans on these channels to left and right. Set the Large Faders on 7 and 8 to unity gain.

Run the tape and balance the mix of tracks 1-4 on the Large (Monitor) Faders of those channels. If not already set, the Large Fader pans can be used to create the required stereo image.

For more experienced SSL users, this may at first seem over-complicated. However, unlike the SL4000 Series, the Small Fader remains available while track bouncing, and panning across the multitrack busses follows the Large Fader pan control. Think, moreover, of the potential available when you can freely assign Small or Large Fader outputs to the Routing or main Mix busses in any console status.
Record + Small Fader To Monitor

RECORD + SMALL FADER TO MON(ITOR) status provides an alternative record mode to basic RECORD status. Selection of SMALL FADER TO MON simply swaps the faders in the Channel and Monitor paths, and can be used in conjunction with both RECORD and REPLAY status.

<table>
<thead>
<tr>
<th>INPUT SELECTION</th>
<th>PROCESSING</th>
<th>FAADER</th>
<th>OUTPUT ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHANNEL</strong></td>
<td>EQ Filters Dynamics</td>
<td>Large Fader</td>
<td>To Bus Trims and Tracks</td>
</tr>
<tr>
<td><strong>MONITOR</strong></td>
<td>EQ Filters Dynamics</td>
<td>Small Fader</td>
<td>To Main Mix Busses</td>
</tr>
</tbody>
</table>

In this status, the Mic input is fed via the Large Fader and Pan to the Multitrack Routing Matrix (the ‘Channel’ signal path) and then to the multitrack itself via the module’s Group mix amp and Trim control associated with that track of the machine (i.e. Track 7 is fed from Module 7’s Group Output).

The Small Faders monitor the multitrack sends (GROUP) and returns (TAPE) and feed these signals to the main Mix outputs and monitoring of the desk, via the module’s Small Fader pan (the ‘Monitor’ signal path), the Mix busses and the SL952J. Again, Track 7 will be monitored on Module 7’s Small Fader.

This way of working is particularly suited where you need to handle a large number of sources simultaneously and want to have fader control of these as close to you as possible.

Some consoles may have local SMALL FADER TO MON buttons, allowing, for example, Channels 25-48 only to be switched to this mode. The Large Faders on these channels can then be used as input faders while the Large Faders on Channels 1-24 act as monitor faders. Note that SMALL FADER TO MON has no effect in MIX status.
Master Input Flip

This button works in any desk status and simply flips all channel inputs between Mic and Line inputs. Each channel can be flipped on an individual basis but it is simpler to hit MASTER INPUT FLIP to select the majority type of input. You would use this button if, for example, you are working in the RECORD status and wish to use Line inputs for synthesisers or samplers, rather than the Mic inputs.

Replay Status

This mode is used when working in RECORD, or RECORD + SMALL FADER TO MON status. The current console status is put on 'standby' and the tape returns are automatically routed to the Monitor faders. This allows a quick replay of the tape without disrupting the console setup. If the Sync/Replay option is wired, then an analogue multitrack machine will be switched to normal Replay.

This status is useful during track laying. For example, when operating in RECORD status, the time will come when a quick monitor mix is required. This can be accomplished in RECORD status by deselecting any GROUP buttons, switching the multitrack machine to Replay manually, and mixing down the monitor inputs via the main output busses onto a stereo ATR. REPLAY status does all this with one button. Any GROUP selections are temporarily disabled and the monitor inputs pick up multitrack returns from the Replay head.

Reselecting RECORD status will reinstate all the previous GROUP and TAPE button selections, and an analogue multitrack will switch back to Sync, ready for more recording.

REPLAY status is also useful for playback over the Studio Loudspeakers, as RECORD status prevents the SLS outputs from receiving signal.
Mix Status

<table>
<thead>
<tr>
<th>INPUT SELECTION</th>
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<th>FADER</th>
<th>OUTPUT ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANNEL MONITOR</td>
<td>EQ Filters Dynamics</td>
<td>Large Fader</td>
<td>To Main Mix Busses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large Fader Pan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stereo Subgroups</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To Bus Trims and Tracks</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-46 Routing</td>
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</tr>
</tbody>
</table>

Line inputs are selected on the channels, sent via the Large Faders and Large Fader Pans to the main Mix bus and then, via the Master Fader on the SL 952, out to the mastering machine. The multitrack machine is usually nornalled to the Line inputs, so this single status button will instantly set you up for a mixdown.

As described on the following pages, the Small Faders can be used for a variety of different purposes in MIX status. You will see from the drawings above and opposite that the default Monitor path in MIX status feeds the Tape Monitor Inputs via the Small Fader and Pan to the Multitrack Routing Matrix.
The Small Faders

Learning how to use the Small Faders in various console statuses is the key to getting the most out of the SL9000 system.

Small Faders as Additional Inputs to the Mix

By patching a line source into a Tape Monitor input jack on the patch, and with both GROUP and TAPE buttons deselected (ie. the Tape input default), this external signal will feed the Small Fader (see opposite). More information on GROUP and TAPE switching can be found in Section 3.

By selecting the SF MIX button (found on the upper right of the Small Fader), the Small Fader pan output will be added to the main mix. This instantly gives you double the number of inputs to the mix. For example, a 64 channel console can provide 128 inputs to the main outputs. As shown opposite, these Small Fader inputs provide an ideal way of returning multiple FX device outputs to the mix.

The Small Faders are automated on the SL9000, so level changes and cuts can be written to the mix data. Remember, however, that there is only one Dynamics and one EQ section per channel, so it is not possible to fully signal process every input. However, this facility allows smaller consoles to deal with the mega-mixdown situations which are becoming more and more frequent.

Note that the selection of SF MIX does not automatically deselect the Small Fader to Multitrack Routing Matrix switch (SF in the multitrack routing select buttons). This will not normally be a problem unless any routing buttons in the matrix are selected to undesired destinations.
Small Faders as Additional Auxiliary Sends

In spite of being provided with six mono and one stereo Auxiliary/FX sends, there may be occasions, particularly in complex mixdown situations, where you need to be able to access large numbers of different FX devices. The SL9000 has an innovative auxiliary send reassign system which can provide up to 56 extra aux send busses. See Page 2-25 for more details.

In addition, as those who have previously used an SL4000 will know, Small Faders and the Multitrack Routing Matrix can also be used to derive additional effects sends from each channel.

The channel signal can be picked up and fed to the Small Fader by selection of either the PRE LF or P(0)ST LF buttons (see opposite) which are located to the right of the Small Fader. In MIX status, the Small Fader pan feeds the Routing Matrix by default. Select an appropriate multitrack bus on the Routing Matrix which in turn will take the feed to the associated Group Output. Patching from there to the effects device input completes the chain. The level of this send can, of course, be automated.

Note that selection of PRE LF normally feeds a post-processing, pre-fader signal to the Small Fader; an internal link may be optionally set to derive this signal pre-processing.

When setting up for a mix, it's useful to patch from Group Outputs into the inputs of all the studio effects devices (apart from the primary reverb and delays, which are usually fed from the dedicated sends). For example, you might patch delay lines to Groups 1, 2, 3, 4, extra reverb to 5, 6, 7 etc.

Any channel can then access the input of the reverb connected to Group 7 via either the FX Reassign System (see Page 2-25) or by selecting the PST LF button (for a post-fader feed) and selecting 7 on the Routing Matrix. The send level will be controlled by the (automated) Small Fader. Where several channels are being fed to the same reverb, the overall send level can be controlled by the Bus Trim control on Module 7.
Subgrouping

When dealing with several channels of similar sources in a mix, eg. background vocals, it may be desirable to apply overall compression or other signal processing to a group of channels rather than to each individual source.

For level control alone, Large Faders can be subgrouped to one of the eight group control faders in the centre of the console. However, in order to apply overall signal processing to a group of sources, an audio subgroup must be set up. This can be achieved by routing signals to one of the Stereo Subgroups and inserting outboard processing at the Stereo Bus Output patch point (see opposite), before returning the subgroup back into the main mix (see also Page 2-27).

Alternatively spare I/O modules can be used to setup audio subgroups. This can be easily achieved without the use of patch cords, and in either stereo or mono. Say, for example, we have six backing vocal tracks returning on channels 43 to 48. Channels 25 and 26 are currently spare. By selecting the Large Fader to Multitrack Routing button (LF), the channel signal may be assigned to the Routing Matrix (see opposite). Select routing buttons 25 and 26 to feed a mix of these channels to Group Outputs 25 and 26.

If the SUB GP buttons on Channels 25 and 26 are now selected, the pre Group Output, post Bus Trim signals will be fed to the inputs of Channels 25 and 26. Pan the Large Faders on 25 and 26 left and right. The position of the source tracks in the stereo group can be set on the Large Fader pans of Channels 43 to 48. Overall processing can now be applied using the EQ and Dynamics sections of Channels 25 and 26.

If, instead of hitting the SUB GP buttons on channels 25 and 26, we select the GROUP buttons, the Small Faders will receive the grouped backing mix, as GROUP simply switches that module's Group Output to its Monitor fader. These two Small Faders can now contribute to the mix by pressing SF MIX.

By using Small Faders to act as audio subgroup masters, the Large Faders can still be used as normal, fed from the Channel path. Remember that, as with the use of Small Faders providing extra inputs to the mix described on Page 2-19, there will be a limit to the distribution of signal processing between the Small and Large Fader signal paths.

In fact it is possible to set up other variations on the above theme, i.e Small Fader to Large Fader and Small Fader to Small Fader subgroups. By the way, although we are describing all this in the MIX mode, the basic principles are exactly the same in the other desk statuses.

You can only route to the first 48 Groups via the Routing Matrix, but any channel above Channel 48 can be a subgroup master by patching from any of Group Outputs 1-48 into the Line Inputs (or Tape Monitor Inputs) of channels from 48 onwards.
Record + Mix Status (Overdub Mode)

This mode was designed for use in overdubbing but many engineers will use this status when laying basic tracks. Select this combined status by pressing the RECORD and MIX status buttons simultaneously.

The desk is basically in MIX status but an individual module may be put into the RECORD status, in order to record onto that track, if either the TAPE or the GROUP button is selected. The advantage of this mode is that the majority of modules will be in MIX status and you can mix with the Large Faders as if you were doing a final mix. In other words, the modules are not split into source signal paths and monitor signal paths unless you are recording from that module. You can work towards the final mix as you are tracking, using the mix capabilities to their full extent but with the ability to record onto the necessary tracks.

It is quite usual for the desk to be split for this way of working. The first 24 or 48 modules are dedicated to the multitrack, and modules upwards from 25 or 49 act as source channels, although this is not essential.

By way of an example, suppose you were overdubbing a vocal to several tracks at the very end of the recording process. You have four tracks free, 35 to 38. Select RECORD + MIX status and mix the rest of the tracks normally, as you would in basic MIX mode.

Plug the vocal mic into Channel 49, FLIP the input to Mic, and select LF to the Routing Matrix. Now deselect LF MIX on 49 to avoid feeding the mic direct to the Mix bus. By selecting routing button 35, the Large Fader on Channel 49 will feed the mic to Track 35.

Now select GROUP (and/or) TAPE on Module 35 to monitor the multitrack signal. This will put Module 35 into RECORD mode with the Large Fader monitoring the signal to the Mix bus. (the converse will be true with SMALL FADER TO MON also selected.)

Proceed with the overdub as if you were in basic RECORD status.

When you have completed the overdub, just deselect GROUP (and/or TAPE) on 35 and select GROUP (and/or TAPE) on 36 to continue recording onto Track 36. You will also need to select 36 on Module 49's Routing Matrix, unless all the overdub tracks have been preselected.

Just to add to the possibilities, you could carry out the same recording process in a slightly different way. Simply plug the mic to Channel 35 hit GROUP (and/or TAPE) to put 35 into RECORD mode. The Small Fader will feed the mic signal to the Routing Matrix, so select 35 and monitor the multitrack signal on the Large Fader using the GROUP and TAPE buttons.
The Fader Button

This leads us neatly into use of the FADER button. In the last example on the previous page, the Routing Matrix can be bypassed altogether by simply hitting FADER. This will send Channel 35’s source mic, post-Small Fader, direct to Group 35 without going via the Routing Matrix. The benefit of this is that there will be fewer stages in the signal path. The disadvantage with this method of overdubbing is that you have to re-plug the mic each time you wish to move to another track.

Note that the FADER button on channels above Channel 48 can be used to feed post channel fader signals to the same numbered Group Outputs. These Group Outputs cannot, of course, be accessed via the Routing Matrix in the normal way. For more on the FADER button, see Section 3.

By the way, for analogue machines, the multitrack may be switched to the Replay head in MIX mode, if this facility has been wired; whenever the RECORD status button is selected, as in MIX + RECORD, the multitrack will be switched to the Sync head.

All this shows that there are many ways to carry out a particular task. If you are new to the system it may cause some confusion, but the whole philosophy behind the console is to provide alternatives and to allow an engineer, who knows the system well, some choice. A fixed routing path would be simpler to learn but would soon limit the engineer’s ability to work quickly and get the best out of the equipment and the performer.

As you spend more and more time on the console, the many possibilities will start to become obvious and will allow you to work faster and with more options than any other system available.
FX Reassign System

An innovative feature of the SL9000 is its FX Send reassign system – EFX for short, which provides an extended auxiliary send capability of up to 56 extra busses without using the Small Fader as a level control.

The Auxiliary Sends section of each I/O module includes one stereo and 6 mono aux send controls. Auxes can be sourced from pre or post the Large or Small Fader. For more details on this, see Section 3.

The reassign system allows any two mono FX sends, or the stereo cue send, to be disconnected from their respective busses and used as sources for the channel’s Multitrack Routing Matrix, Stereo Subgroup bus routing and/or the channel’s Group Output.

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 simultaneously. Lower numbered sends take priority over higher numbered ones, and Cue Stereo takes the highest priority. Red (EFX ODD) or green (EFX EVEN) LEDs indicate that a send is assigned to the EFX system.

The Multitrack Routing 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 buses, allowing large numbers of independent headphone or effects send mixes to be generated.

Connect FX device inputs to the appropriate Group Output jacks if sends are reassigned to the Multitrack Routing. In the case of Stereo Subgroups, connect devices to the appropriate Stereo Bus Output jacks.

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. Note that although Group Outputs above Channel 48 cannot be accessed via the Multitrack Routing Matrix, they can be accessed from the same numbered channel by selection of EFX ODD and EFX EVEN (or for a post channel fader signal, by FADER).
Output Routing – Standard Systems
Output Routing – Standard Systems

So far in this section we have only talked about the console's main outputs and monitoring in general terms. Now we should look at this in a little more detail. For full information on all the console's centre section controls, see Section 5. If your console is fitted with the LCR pan option, please read this page and the additional information over the page.

Stereo post-Large and Small Fader signals can be freely assigned to the Multitrack busses, the Stereo Subgroup busses and the main Mix busses. As standard, the console is fitted with LCR Mix busses (see opposite), but the Centre bus cannot be accessed directly from channels unless the LCR pan option is fitted (see over the page).

Stereo Subgroups

Signals assigned to the Subgroup busses, if being used for stereo stem mixes, can simply exit the console either via the connector panel or by patching out of the Stereo Bus output sockets on the patch. Your installation may have a multitrack layback machine normalled to these outputs.

In addition, Subgroup signals can be reassigned back, post insert point, onto the main Mix busses by selection of the TO L/R, TO CEN(TRE) or TO SURROUND. Note that the latter two functions feed a mono sum of Left and Right Subgroup bus signals to the respective main Mix busses, and that the Surround mix bus is internal to the centre section.

Using the functions described above, with two of the Subgroup busses dedicated to Centre and Surround mix paths, LCRS film or video mixes can be simply generated even if the console is not fitted with the LCR pan option.

The Stereo Subgroup bus outputs can be monitored on External Source Selector 1. See Section 5 for more details.

Main Outputs

Signals on the main LCRS busses pass via a pre-fader insert point before reaching the console's master (4-channel), VCA automated, fader. At this point the centre section's 4-channel Compressor (not shown in the diagram) can be switched in to control main output levels. This compressor is the classic SSL 'Quad' compressor, which will be well known to experienced SL4000 users.

The desk's main outputs are normalled to a series of Distribution jacks which, in turn, may be normalled to three 4-track and nine stereo machines.
Monitoring

Feeds to the desk’s monitoring facilities are picked up post the Main Fader and Compressor. This point also feeds the main output meters when selected to DESK OUTPUT.

Following the injection of AFL, PFL and Solo-In-Front signals, the monitor feeds can also be interrupted by source selections from the two External Source Selectors (more on this in Section 5). MONO sums all four monitor busses and feeds the result equally to Left and Right monitor outputs or to the Centre output, subject to the selection of the 2 CH or 4 CH switches. Selecting 2 CH also mutes the Centre and Surround monitor outputs.

A switchable Monitor Insert point is provided for the connection of Dolby Surround Encoders/Decoders.

Level controls are provided for both the Main and two pairs of Mini (near-field) loudspeakers. Inputs from two ‘Listen Mic’ circuits are fed to the Mini ‘A’ LS outputs. AFL, PFL and Solo-In-Front are also fed to the Mini ‘A’ LS outputs if A/PFL TO MINIS is selected. Note that this selection leaves the desk output on the Main monitors and the AFL/PFL level control is inactive.

Output Routing with LCR Pan Option

When the LCR pan option is fitted, the Centre Mix bus can be fed directly from the channels (see opposite). Selection of 2 CH or 4 CH in the centre section determines whether both Small and Large Fader pans will pan between Left and Right with a ‘phantom’ centre or from Left, through Centre, to Right. When selected to 4-Channel mode, the pans will still pan between odd/left and even/right Multitrack or Stereo Subgroup busses.

Apart from this simple but extremely useful and convenient function, the desk’s main output and monitoring signal paths and facilities are as described above for standard systems.
The SL911 Input/Output Module

The I/O module has two independent signal paths. Each path has its own input and fader. The module automatically powers up in a standard output routing configuration determined by the master desk status. The output routing, however, can be over-ridden locally at any time, to provide extra flexibility of operation.

The two inputs are the CHANNEL INPUT and the MONITOR input.

The two faders are the LARGE FADER and the SMALL FADER (LF and SF for short). Each fader has an associated pan control.

The path fed by the Channel Mic/Line Input stage is designated the ‘CHANNEL’ path. The path fed by the Tape/Group Monitor Input is designated the ‘MONITOR’ path.

The module’s outputs are the main Stereo/LCR bus, the 48-track Routing Matrix at the top of the module, the four Stereo Subgroup busses A, B, C and D (immediately below the Multitrack Routing Matrix) and the channel Group Output.

Either or both faders can feed the main Stereo bus (‘Mix’).

Either fader can feed the Multitrack Routing Matrix and Stereo Subgroup busses or the Group Output.

On channels 1-48, the Group Output can also be fed by the multitrack mix bus corresponding to that channel.

The Multitrack and Stereo Subgroup busses can also be fed by any of the Auxiliary send controls, allowing additional effects sends or cue mixes to be generated.

EQ, Filters, Dynamics and Aux send controls can be switched into either signal path.

Obviously there are many possible permutations of signal routing, allowing an enormous number of creative possibilities. This section looks at each control on the SL911 module individually, with a brief summary of the routing possibilities. Section 2 describes these in more detail.
Channel Input Section

The channel input can receive any one of three inputs:

**LINE** – Selects a Line level input from patch row D via the LINE trim pot (+20dB to -20dB). The pot is indented at unity gain. A green LED indicates Line Input selection.

**MIC** – selects a Microphone input from Patch row B via the MIC trim control. This is continuously variable from +15dB to +75dB of gain, with a 20dB pad switch shifting the gain range to -5dB to +55dB. A red LED indicates Mic Input selection.

**SUB GP** – When this button is pressed, the above selections are overridden and the input of the channel is taken from that module’s multitrack bus mix amp. This allows modules 1-48 to be used to as audio subgroups.

**FLIP** – This reverses the mic/line selection on individual channels.

Ø (Phase) – This reverses the phase of the selected channel input.

**48V** – When selected provides phantom power to the associated microphone.

**HIGH-Z** – Increase the input impedance of the microphone input from 1.2KΩ to 8KΩ. This allows the connection of line level outputs to the mic input if required, and provides an alternative input impedance for some dynamic microphones.

**MIC** or **LINE** inputs are automatically selected by the STATUS switches on the SL952 Master Facilities Module. In RECORD or REPLAY status, all inputs switch to **MIC**. In MIX, all inputs switch to **LINE**. The **FLIP** button reverses the input selection on individual channels. The **MASTER INPUT FLIP** button on the SL952 panel reverses the input selection on all channels.
Dynamics Section

The Dynamics section comprises a compressor/limiter and an expander/gate, which use the same gain change element. Both sections work independently, but can be operational at the same time, providing sophisticated control of either the Channel or Monitor signal.

The Dynamics section has three routing buttons associated with it. Section 4 deals with Dynamics routing in more detail, but briefly these button function as follows:

MON – switches the Dynamics section into the Monitor path (Pre EQ if the EQ has also been selected to the Monitor path).

CH IN – Switches the Dynamics section into the Channel audio path PRE EQ.

CH OUT – switches the Dynamics section into the Channel audio path POST EQ.

If both the CH IN (or CH OUT) and the MON buttons are selected, then the Dynamics section is switched to the Channel path but the Dynamics’ side chain is fed from the Monitor path, post TAPE/GROUP selection. See Section 4 for more details. This allows the Dynamics to be keyed via either a multitrack bus or the patch bay.

The Channel Insert Return can also be used as a key input via the Insert KEY switch. See more on this under Insert Point on Page 3-8.

Compressor/Limiter

RATIO – When turned to 1:1 the Compressor/Limiter section is inactive. Turning the control clockwise increases the compression ratio to give a true limiter at the fully clockwise position. The compressor normally has an ‘over-easy’ characteristic. Pulling the RATIO switch up changes this to peak sensing, and replaces the ‘over easy’ characteristic with a hard knee, providing an alternative for some instruments. The FK LED lights to indicate that this option has been selected.
THRESHOLD – Whenever a signal exceeds the level set by this control, the compressor will start to act at the ratio set by the RATIO control. This control also provides automatic make-up gain, so as you lower the threshold and introduce more compression, the output level is increased, maintaining a steady output level regardless of the amount of compression.

RELEASE – Sets the time constant (speed) with which the compressor returns to normal gain settings once the signal has passed its maximum. The control also incorporates a pull switch which, when selected, provides a fast attack time (3mS for 20dB gain reduction). When down the attack time is program dependent (3mS - 30mS).

The yellow and red LEDs, on the right of the LED display area, indicate the amount of gain reduction (compression).

Expander/Gate

This section can act as a ∞:1 Gate or as a 2:1 Expander when the HOLD pot is pulled upwards. A red LED indicates that Expand mode has been selected.

RANGE – Determines the depth of Gating or Expansion. When turned fully anti-clockwise (Range = 0), this section is inactive. When turned fully clockwise, a Range of 40dB can be obtained.

THRESHOLD – Variable hysteresis is incorporated in the Threshold circuitry. For any given ‘open’ setting, the Expander/Gate will have a lower ‘close’ threshold. The hysteresis value is increased as the Threshold is lowered. This is very useful in music recording as it allows instruments to decay below the open threshold before Gating or Expansion takes place.
**RELEASE** – This determines the time constant (speed), variable from 0.1 - 4 seconds, at which the Gate/Expander reduces the signal level once it has passed below the threshold. This control also incorporates a switch which, when pulled up, provides a fast attack time (100 µs per 40 dB). When down, a controlled linear attack time of 1.5 ms per 40 dB is selected. The attack time is the time taken for the Expander/Gate to ‘recover’ once the signal is above the threshold. When gating signals with a steep rising edge, such as drums, a slow attack may effectively mask the initial THWACK, so you should be aware of this when selecting the appropriate attack time.

**HOLD** – Determines the time after the signal has decayed below the threshold before the gate closes. Variable from 0 to 4 seconds. A pull switch on this control switches the section from gate to expand operation.

The green LEDs indicate Expander/Gate activity (the amount of gain reduction).

The **LINK** button at the top of the section links the side chain signal of that unit to the side chain of the next Dynamics section along to the right. When two Dynamics sections are linked, the control voltages of each section sum together, so that whichever section has the most gain reduction will control the other section.

Note that it is not possible to link two gates so that the signal on one opens the other. If you need to achieve this effect, take a keying signal from one section to trigger the other. The easiest way to do this is by patching from the Insert Send of the ‘source’ channel into the Insert Return of the ‘destination’ channel, and selecting KEY (see Page 3-8) on this channel.

Note that when the Dynamics section is not in circuit, its side chain input is also bypassed.
Filters and Parametric Equaliser Section

This section comprises a four band parametric Equaliser plus High and Low pass Filters. The EQ and Filters can be routed separately to different audio paths within the module.

Routing Buttons

There are four routing buttons associated with this section of the module. Section 4 describes the routing combinations in more detail but, briefly, these buttons function as described below.

EQ IN – Switches the section into circuit. If no other switches are pressed, the Equaliser is in the Channel path and the Filters are post the Equaliser. This switch is automated – see the J Series Computer Operator’s Manual for more details.

DYN SC – The Filters are switched into the side chain of the Dynamics section. The Equaliser can be switched into the Channel or Monitor path independently. Note that DYN SC overrides the SPLT function (see below).

MON – The section is switched into the Monitor audio path. The Filters are post the Equaliser. Note that EQ IN must also be selected for the section to be active. The section is post the Dynamics section if this has also been selected to the Monitor audio path.

SPLT – Can be operated in combination with the above selections and splits off the Filters to put them in circuit immediately after the Channel Input section.

This allows the Filters to be used in channels feeding the multitrack while in RECORD status, with the Equaliser being used on the monitors only. This is also useful in the MIX mode, when additional inputs are being brought into the mix via the Small Faders. The Filters can be used on the signal passing through the channel via the Large Fader, and the Equaliser used on the signal being fed via the Monitor Input and the Small Fader.

As with the Dynamics section, the Equaliser is completely bypassed when none of its routing buttons are pressed.
Parametric Equaliser

The equaliser can be switched between two different sets of curves, one based on the G Series equaliser and one based on the latest version of the classic E Series EQ.

HF Section:

Comprises a shelving filter with variable cutoff frequency and a boost/cut control. This is switchable to a shallower curve by selecting the ‘E’ switch. Selecting BELL in either mode switches the filter to a peaking curve.

HMF Section:

Continuously variable Q (filter width), gain (±20dB) and centre frequency controls (600Hz-7kHz).

LMF Section:

Continuously variable Q (filter width), gain (±20dB) and centre frequency (200Hz to 2.5kHz) controls.

In normal operation, the HMF and LMF bands of the equaliser have continuously variable bandwidth (Q). This is calculated as the ratio of gain/bandwidth so that as the gain is decreased the bandwidth increases. When the equaliser is switched to ‘E’ operation, the bandwidth remains constant at all gains, so at lower gains the EQ curves are narrower for a given Q setting.

LF Section:

Comprises a shelving filter with variable cutoff frequency and boost/cut control. This is switchable to a shallower curve by selecting the ‘E’ switch. Selecting BELL in either mode switches the filter to a peaking curve.
Filters

The Filters can be completely bypassed when the controls are turned fully anti-clockwise to the detented OUT position.

The High pass filter has a slope of 18dB per Octave and the Low pass filter has a slope of 12dB per octave.

Overload Indicator

The overload circuit monitors the signal in the Channel path at three different points. The level at which it lights can be adjusted from the centre section between +18dBu and +24dBu in 1dB steps. (See the SL9000J Service Manual for more details.) The monitor points are: post-channel fader, post-insert point and channel input pre any signal processing.

Insert Point

The insert point is switchable PRE or (normally) post the EQ and before the fader. The Insert Send jack (Row E) always carries the channel signal and is normalled down to the Insert Return jack (Row F). The IN button switches the return back into the signal path, hence switching in any device patched to the insert jacks.

The insert IN button is automated. See the J Series Computer Operator’s manual for more details.

The Insert Return can also be used as a key input to the dynamics. Selecting KEY re-routes the insert return to feed the dynamics side chain. See also Dynamics Section, Page 3-3.
Auxiliary Sends

This section comprises one stereo and six mono sends. Either audio path, controlled by the Large or Small Fader within each module, may be routed to any of the send busses, in any pre or post-fader permutation.

Each send has a level control with a built-in push-on/push-off switch so that levels may be preset and easily switched in and out. These switches are automated and the On/Off switching is electronically latched. A yellow LED indicates that the send is ON. The stereo send also has a pan control.

The source select buttons for each send are:

**SF (SMALL FADER)** – When pushed down the send is derived from the Small Fader signal path and when up, the send is from the Large Fader signal path.

**PRE** – At the bottom of this section, four switches allow the aux sends to be switched in pairs to be pre-fader. When pushed down, the sends are derived pre-fader and when up, post-fader.

**EFX** – Each aux send control can be disconnected from its own bus and re-routed to any one of the four A, B, C, D stereo busses, the multitrack busses or the channel direct output via one of two 'EFX' busses which are internal to the module. Pressing the EFX button on even numbered aux sends (2, 4 and 6) routes that send onto the EFX EVEN bus. A green LED lights to show that the switch is active. Pressing the EFX button on odd numbered aux sends (1, 3 and 5) routes that send onto the EFX ODD bus. A red LED lights to show that the switch is active. Pressing EFX on the stereo send routes Stereo Cue left to EFX ODD and Stereo Cue right to EFX EVEN. Only one aux send control can be assigned to an EFX bus at any one time, ie. a maximum of one odd and one even numbered aux, or the stereo aux. Lower numbered sends take priority over higher numbered ones. Cue Stereo takes priority over all mono auxes.

This feature allows a large number of independent headphone or effects send mixes to be generated, without using the Small Fader.

All the Aux send bus outputs appear on the jack field, and can be used as feeds to effects units. See Section 5 for details of the Foldback and Studio Loudspeaker systems.
Monitor Input and Small Fader Section

Monitor Input Section

The source selected by the MONITOR INPUT SECTION is governed by the state of the GROUP and TAPE buttons, and the PRE LF (Large Fader) and P(O)ST buttons.

Note that the PRE LF and P(O)ST buttons override TAPE and GROUP, but for the time being we will assume that they have not been selected.

The GROUP and TAPE buttons serve two functions:

1. To select which input will be presented to the Monitor fader – the GROUP signal feeding the multitrack and/or the TAPE return from the multitrack machine.

2. To allow the large red RECORD button to function as a Track Ready button.

Each RECORD button is connected to the corresponding multitrack Track Ready remote, and is only ready (allowed) to prime a track for record if either GROUP or TAPE is selected. This acts as a safety feature to prevent accidental record arming.

The RECORD button is engraved with the module and track number to clearly indicate which tracks are being primed for record. If the module RECORD button is on, then that track on the multitrack will drop into record if the transport RECORD button, in the centre section of the console or on the machine itself, is pressed. Some machines allow the module RECORD button to drop the machine directly into record whilst the machine is running with its transport Record active. Other machines need a fresh transport record command before a primed track will go into record. You should check the logic of this before dropping in for real!
Machines that accept Sony 9-pin serial track ready commands can be controlled directly from the channel RECORD buttons via the J Series Computer. The computer can also light the RECORD button lamps to provide a direct tally from the machine's serial port. See the J Series Computer Operator's Manual for details of how to map channel record buttons to the appropriate serial machine control port. Links in the module need to be set to enable this option.

The RECORD button can also be used to ready tracks for record on SSL's DiskTrack hard disk multitrack recorder (if fitted). See the J Series Computer Operator's Manual for more details.

Small Fader

The 65mm 'Small Fader' can be in either the Channel or the Monitor path, depending on the master desk status. In either case it can be automated if required, in which case audio is switched to a VCA. It has its own automation Status (ST) switch and LEDs.

The Small Fader can also be used to provide an automated pan control between Large and Small Fader signal paths. This mode is selected from the J Series Computer by selecting '4 Channel Pan' in the Desk Setup menu. This allows any or all channels to be switched to this mode. In 4-Channel Pan mode the Large Fader controls the overall level of both signal paths while the Small Fader controls their relative levels.

4-Channel Pan mode can be used:

1. To generate mono or stereo surround mixes by routing the Small Fader to one of the Stereo Subgroup busses. The Small Fader will then provide panning from front to surround outputs while the Small Fader pan will pan across the stereo surround outputs.

2. To give automated left/right panning across the main Mix bus. If both faders are routed to the main stereo Mix bus and one is panned left and the other right, then the Small Fader will pan from left to right.

Note that, in 4-Channel Pan mode, the Small Fader cut switch is inactive and the Large Fader cut switch or a Large Fader solo will cut both faders.
Small Fader Pan Control

The Small Fader pan control is always in circuit. When the Small Fader is routed to the Multitrack or Stereo Subgroup busses it pans between odd and even (or left and right) busses. When routed to the main Mix bus it pans between left and right unless the LCR pan option is fitted, in which case it will follow the 2 CH/4 CH selection on the SL952 panel in the centre section, switching between left/right and LCR panning. In LCR mode the Small Fader will still pan between odd/left and even/right Multitrack or Stereo Subgroup busses.

Small Fader Cut and Solo

These SOLO and CUT buttons are always associated with the Small Fader, regardless of whether the Small Fader is a Channel fader or a Monitor fader (as in RECORD + SMALL FADER TO MONITOR status).

Normally the SOLO buttons activate an 'in place' (destructive) Solo function. This is useful when using the Small Faders as Monitor faders in RECORD + SMALL FADER TO MON status. However, if the Small Faders are being used as Channel faders in RECORD status, the SOLO buttons can be switched to an AFL (After Fader Listen) function by selecting AFL (or STATUS LOCK) on the SL952 (See Section 5). The AFL signal follows left/right and LCR channel pan selection (see above), providing a true AFL-in-place function. The SOLO buttons can also be used to provide a PFL (Pre Fade Listen) function by selecting PFL on the SL952 panel in the centre section.

If SOLO IN FRONT is selected on the SL952, a mix of the AFL signal and the main Mix signal will be heard on the main monitors. A rotary control adjusts the balance between AFL and MIX.

The CUT button always cuts (mutes) the Small Fader. However, depending on the console Status and DIL switch and link settings in the module, it may or may not cut the Pre-Fader Cue/Aux sends. This is explained in more detail on Page 3-16.