Solid State Logic SL 6000 E

On the cover:

The SL 6000 E Series Stereo Video System, recipient of the Videotape Production Association Monitor Award for Engineering, 1984

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The audio production requirements of the entertainment and communication industries are increasingly covergent. Music producers have a growing involvement with the visual arts. Television, film and video producers are more concerned about the audio portion of their programmes than ever before.

Satisfying the demand for higher audio quality and increased creative flexibility is only part of the problem confronting the engineers and managers in charge of equipment planning.

Meeting the technical requirements of both current and emerging video, broadcast and record formats is another problem. No one can afford over-specification. Yet it is equally ill-advised to purchase equipment which will be outgrown by the needs of its users long before it can be economically replaced.

Efficiency is a third problem. All the production power in the world is of no use if it cannot be harnessed easily, yielding superior results within the unyielding time and budget constraints of the producer. An essential part of this equation is reliability. Ease of servicing is vital.

The SL 6000 E Series Stereo Video System from Solid State Logic is a most thoughtful solution to these problems. Its design reflects the experience, innovation and practicality which have made SSL the world's foremost manufacturer of audio mixing systems and studio computers. Its construction reveals an attention to detail and quality which sets the standard for the industry.

But most of all, the SL 6000 E Series has earned its reputation by offering the mixing engineer a virtually limitless range of creative expression, coupled with a control architecture that handles the most complex technical requirements with simple, elegant sophistication.

Solid State Logic

Oxford • England

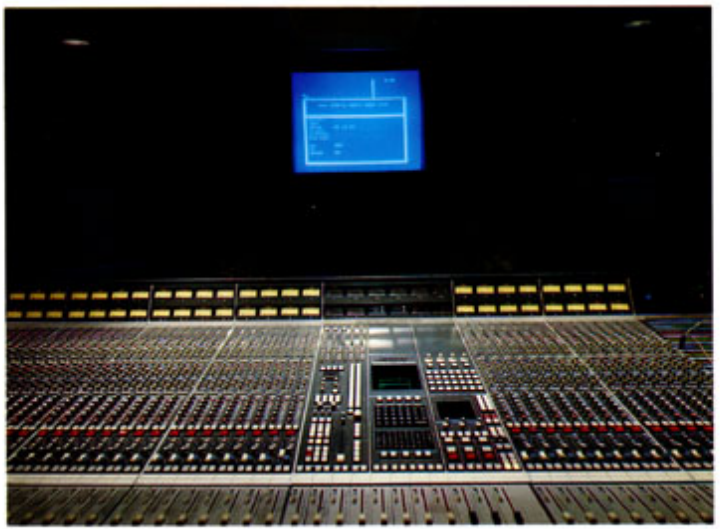
Solid State Logic's SL 6000 E Series is an advanced system for audio production and post-production, designed to serve the most exacting needs of the music, video and teleproduction industries. It is comprised of an audio console mainframe, a studio computer mainframe, and a select family of fully integrated hardware and software modules.

These combine to provide extensive audio processing, routing and mixing capabilities as well as complete machine, synchroniser and events control – all under the command of a single operator, seated at a logical, unified control panel.

The SL 6000 E has three stereo mix buses plus a main stereo programme bus. The console may be operated in standard multitrack, mono or stereo configurations, or to suit a variety of multichannel release formats. The three stereo mix buses may be used to create Music, Dialogue and Effects mixes, or any other useful subdivisions such as Cast, Audience and Orchestra.

These multiple mix buses may also be used to create mix minuses or splits for live broadcast. Each of the buses can be further mixed with any of the others, either at unity gain or variably, enabling the engineer to quickly structure a variety of useful feeds.

The comprehensive nature of the SSL Stereo Video System yields substantial advantages over ordinary audio consoles. In addition to the increased operational efficiency that its design affords, the SL 6000 E Series is the only mixing system with complete interformat capabilities. It supports the diverse requirements of each medium with equal ease, and provides almost instant changeover between formats.



Utopia Studios' Remix Room, London, England

Finally, the three stereo mixes may be combined into stereo and mono master mixes for transmission or video layback. Alternatively, the mixer can create a stereo Programme plus a mono Secondary Audio Programme, or a Triphonic mix consisting of stereo music and effects with mono centre-channel dialogue, in accordance with the new US Multichannel Television Sound standards.

The versatile output distribution of the SL 6000 E is complemented by an extremely flexible routing scheme. Master Status buttons select the basic signal flow for multitrack recording, track building, post-production mixing and live broadcast mixing. Local logic on each input allows instant modification of these statuses to suit individual circumstances.

The SL 6000 E uses an advanced "in-line" architecture. Each Input/Output module contains two signal paths that provide complete channel input, output and multitrack monitoring facilities. During standard multitrack operation, the Channel level is controlled by the large VCA fader, and the Monitor level by the small audio fader.

At all other times, both the large and small faders may control independent signals, thus doubling the number of simultaneous sources available to the mix buses. Further, SSL's unique patchfree audio subgrouping allows any of the first 32 large or small faders to be selected as audio subgroup masters, at the touch of a few buttons.

Any large fader, whether serving as a channel control or an audio subgroup master, may be assigned to one of eight VCA Control Groups. Each of these has its own fader, solo and cut controls, located at the optimum stereo centre listening position. Sets of Control Groups may be assigned to a further Control Group when desired.

Solid State Logic has organised these various features into a cohesive arrangement that frees the engineer from the rigid architecture that is typical of older consoles. Instead, the SL 6000 E Series permits the console setup to be changed at will, so that each project can be handled in the most efficient manner.

In simple circumstances, the engineer need only select the appropriate master status, lift the faders, and start the mix. In more complex cases, SSL's unique ability to totally define the downstream branching of both the audio and control paths allows a single engineer control as many as 132 simultaneous sources and four simultaneous stereo mixes.

The console's freely structured audio submasters and control groups reduce the mechanics of the final mix to the simplest possible level, whilst the security of instant access to each individual source is maintained. Further, as the sources progress downstream towards the mix buses, each successively important level of grouping brings their control closer to the central stereo mixing position.

Finally, this versatility has been extended to include patchfree positioning of the correction and enhancement controls. Seven signal processor routing pushbuttons in each module allow the four band parametric equaliser, pass filters, compressor/limiter and expander/gate to be switched into either the large or small fader signal path in over two dozen combinations.


A
B
C

The extensive signal processing power in each module and the free grouping facilities of the SL 6000 E make it an ideal console for mobile applications, or any other installation where space is at a premium and comprehensive facilities are required.

The multiple stereo mix buses may be used to create a variety of splits in mono and stereo. Multitrack recording and transmission may be performed simultaneously. Alternatively, the multitrack monitor faders may be fed by auxiliary SSL Microphone Preamps, doubling the number of live inputs available with no space penalty.

SSL's unique signal processor routing makes it possible for the operator to respond almost instantly, inserting the necessary correction or enhancement at the desired point of any signal path without resorting to the patchbay.

A system of passive motherboards and modular electronics, floating on SSL's "frame within a frame" chassis, provide reliability and ruggedness to match the roughest roads– or clients!

The Turner Broadcasting System's 44 foot teleproduction mobile employs an SL 6000 E Series console to provide multichannel sound for live sports, news and special events coverage. It accommodates up to 72 simultaneous sources in a four by six foot area.

In addition to signal processing and routing controls, complete tape machine controls are incorporated directly into the console. Multitrack electronics remotes are fitted to each I/O module, visually and logically linked with the monitor controls for their associated tracks. The 4 and 8 track electronics remotes are fitted to the multichannel Mix Matrix panel.

A set of transport remotes is fitted directly below the central command keyboard for the SSL Studio Computer. Operated manually or in conjunction with the computer, these control up to five audio, video or film transports, either individually or in sync.

One of the Studio Computer's principal functions is to improve continuity between the various stages of each production. Extensive tape machine management routines are an important aspect of this function, providing a means of organising the relevant session data and applying it directly to the control of all transports.

The SSL Studio Computer employs a vocabulary of standard studio terminology, which is presented on dedicated command keys, each engraved with a single word. It is operated by entering instructions consisting of one or more command keystrokes. Alpha-numeric keys are also provided, allowing times and descriptions to be included in these command lines. The system's syntax is based on simple English phrases such as "Play Cue 7", and its operation quickly becomes second nature.

The programmes that define the SSL Studio Computer reside on one floppy disk; the second disk is used to build a database containing the myriad details of a particular production. This information, entered as each session progresses, is stored and displayed as a series of lists.

Title Lists show a name for each programme segment, along with its starting and ending tape times. To support interformat and international production, tape locations may be entered as EBU or SMPTE timecodes, or in any motion picture foot/frames standard.

Each Title has its own Cue List, providing permanent memory of up to 100 tape locations within that segment. Cues may be entered off-line or while the tape is rolling. The computer assigns sequential numbers to cues as they are entered, automatically logging and displaying them in chronological tape-time order.

Rather than numbers, Cues may be given descriptive names such as "Verse 1" or "Explosion". Locate commands may then be entered using the first letter(s) of these key words in place of timecode, allowing the creative staff to communicate in musical or dramatic terms rather than numbers, minimising keystrokes at every step.

With an SSL System, important details are easily recorded, automatically organised and instantly available. The computer handles all of the mundane repetitive tasks swiftly and accurately, freeing the engineer to perform more valuable creative work.

The SSL Integral Synchroniser and Master Transport Selector lets the engineer control multiple synchronised machines almost as easily as one. The only additional controls are a row of momentary switches located on the Mix Matrix panel, which allow up to five machines to be selected into the system.

Any of the first three machines may be designated as the Master and operated individually if desired. Any or all of the remaining machines may be added as slaves. The entire system is then operated from the built-in transport remotes and/or the computer keyboard as if it were a single machine.

Each Title has a Sync Preset List which records all of the machine selection details for each project or session, along with any offset values required to synchronise each set of tapes. If the offset values are unknown, the tapes can be rolled to approximate positions, which are "marked" by the computer. The engineer then nudges these marks incrementally until sync is achieved, and the computer calculates and records the precise offset values.

On each subsequent session, the engineer needs only to load the various tapes and select the desired Sync Preset. The computer automatically configures the machines and sets the proper offsets. The various hassles of external synchronisers are eliminated, and the engineer is freed from the tyranny of timecode to deal directly with the relationship between sound and picture.

Cart machines, turntables and other ancillary devices may be linked into the system using the SSL Events Controller. An Event is defined as the closure of one or more contacts occurring at a specific frame. The SSL System provides up to 32 contact closures per Event, and as many as 150 Events per Title.

Events buttons are engraved with the device name and function they control. An Events Setup List stores these descriptions, along with any required pre-roll times.

Events may be entered off-line or while the tape is rolling. When an Event button is pressed, its description appears on the Events List along with the current master tape time. This time may be nudged in frame increments, or replaced by entering a new timecode or a Cue Name.

A "Comments" column allows further description of each Event, such as which cart is loaded in the machine being controlled. As Events are added, or when existing event times are modified, the Events List re-sorts itself to show the new chronological tape-time order.

On subsequent passes, the Events Controller triggers each device as the specified master timecode is reached. If a pre-roll time has been entered, the computer will "anticipate" the Event trigger by the designated value.

The SL 6000 E Series Stereo Video System thus brings control of the entire machine complement to the central mixing position, along with an unprecedented degree of useful, rational and efficient computer assistance.

The audio post-production suite at Editel New York provides facilities for the creation of stereo soundtracks for music videos, television commercials and feature length programmes. All of the audio, video and film machines are remotely housed, freeing space for a comfortable and quiet client area.

Completion of the soundtrack is the final creative step in producing a programme. The post-production mixer frequently has to perform this critical work under the considerable pressure of an absolute deadline.

At this point, a perfect blend must be made between sound and picture, an art requiring intense concentration on both elements. There is no place for distractions, and no time for confusing or redundant operations.

The SSL Stereo Video System meets the specification perfectly. It provides the interformat flexibility required to accommodate the full spectrum of today's production needs, without hassle or compromise.

It replaces the chaos of roll-around carts, assorted black boxes and tangles of trailing cables with central controls and a consistent operating system.

And it lets you return the ATR's and VTR's to the machine room where they belong– next to the dubbers, and away from the mixer's ears.

The SSL Dynamic Mixing System integrates all of the previously described machine control functions with the world's most versatile audio mixing software. The result is a system that lets engineers retain their traditional mixing techniques, supplementing these with simple yet powerful routines and "shortcuts" that allow unlimited mix revisions and edits to be performed with complete frame accuracy.

Notably absent from the SL 6000 E Series are the sets of mechanical toggle switches or read, write and update buttons required by older automation systems. Gone too are the complications of manual nulling, and the tracking limitations and drag of non-standard faders.

Each SSL fader panel is fitted with a precision Penny & Giles fader and a single electronic key called the "Status Button", whose functions are defined by the system's software. At each stage of the mix, the computer selects the most appropriate status automatically. The status button is used only to request special functions.

At the start of a new mix, a red led lights up next to the status buttons on each Channel and Group, indicating that the computer will record all fader and cut button manipulations exactly as the engineer performs them.

Mixes may be performed in a single pass, or in smaller segments which can then be joined together. When the mix pass is ended, it can be given a name, which is logged on the Mix List along with the current date and time.

When a mix is played back, green leds indicate that the computer is simultaneously monitoring the playback levels and any new motions that are made. When a fader is moved, the adjustments act as a trim on the previously stored values.

If the engineer would prefer to re-write any faders absolutely, their Status Buttons may be used to select this mode. Other statuses allow all stored fader values to be retained while the engineer re-writes the cuts, or all cuts to be retained whilst re-writing the faders.

Any time the mixer misses a change, the entire system can be rolled back using the command keys or transport controls. When Play motion is resumed, the mix that was in progress is played back in Review mode. The engineer can then perform a "pick-up" and continue mixing. The procedure emulates motion picture re-recording methods, allowing balances to be preset at each scene change and then punched in directly to the mix data.

Mixes may be joined with or inserted into other mixes, using timecode, foot/frames or cue names to specify the edit points. Mixes may also be joined on a track selective basis: for example, dialogue tracks from one mix may be joined with effects tracks from another.

The constituent elements of complex soundtracks may thus be assembled entirely within the automation. The final mix can then be layed back to the video master in a single first-generation pass, directly from the multitrack!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CUE
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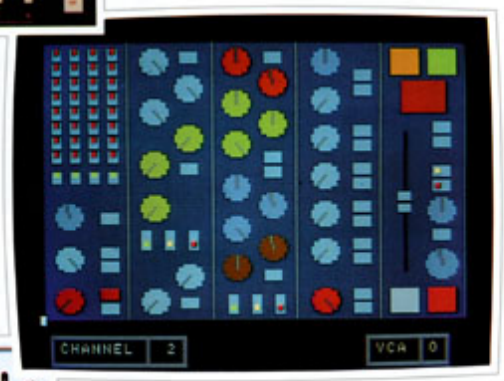
CHANNEL 2
VCA 0


SYNCHRONISER STATUS
RECORD
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PHASE
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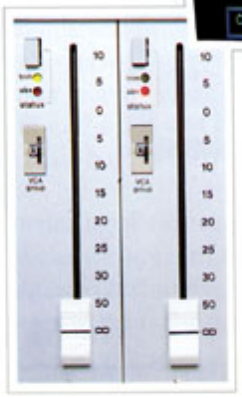
CODE
LOCATE
LOCATE



The SL 611-V Input/Output Module

First and foremost, the SL 6000 E Series is about audio. The design provides short, clean signal paths with superb phase and transisent characteristics, and a dynamic range and bandwidth that comfortably exceed the world's best 16 bit digital recorders and converters.

The SL 611-V is the standard Input/Output module for the SSL Stereo Video System. The front panel is milled from a solid block of aluminium, secured at ten points to the printed circuit mothercard. The active electronics for each module subsection are on daughter cards which plug into gold edge connectors. Switch and led assemblies are mounted on gold-plated zero insertion force pc wafers. The module is firmly seated by means of nylon collars that mate with docking posts adjacent to the gold edge connectors on the console bus cards.

Each SL 611-V module controls two signal paths. The Channel Input card is normally supplied with a transformer-coupled mic input and an electronically balanced line input. A transformerless mic input may be optionally specified, and a dual line input version is also available.

Input selection normally follows the console's master logic. The local "Flip" button sets its module's input selection in opposition to the master logic. The "Subgroup" button overrides the master logic. The Phase Reversal button acts on the selected input. The 20dB pad acts only on the mic preamp; the pre-amp gain knob has a pull up switch to turn off the phantom power from its channel.

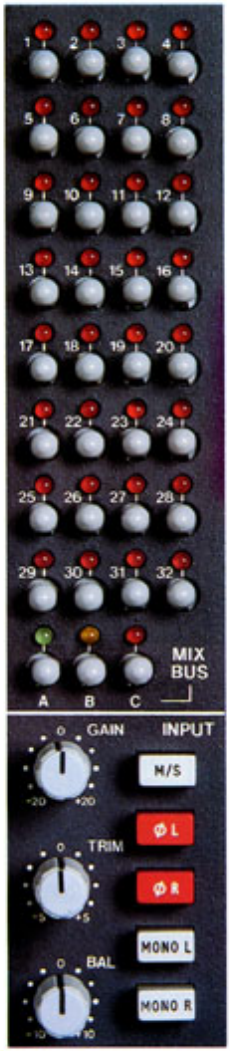
The Dynamics Section provides a full range compressor and a 2:1 expander which can be switched to a 20:1 gate by pressing the button marked "Gate." The "Link" button interconnects the Dynamics level-sensing sidechain with that of the adjacent module to its right, creating a stereo tracking pair. Two five-segment led meters indicate gain reduction activities introduced by the Dynamics section.

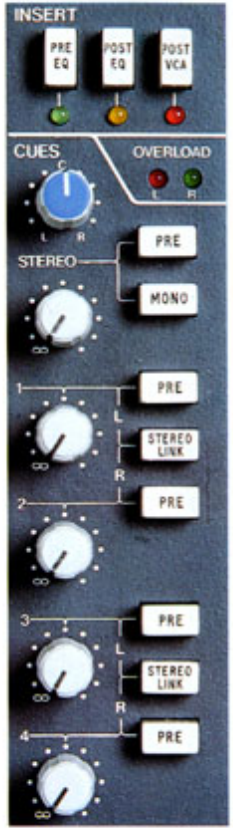
The SL 611-EQ is a reciprocal four band parametric equaliser with switchable shelving/peaking curves in the high and low bands, and continuously variable Q in the two mid bands. The optional SL 611-EQP card uses the same front panel controls but provides a different set of characteristics that emulate earlier valve-type equalisers.

Six Cue/Auxiliary Sends are configured as a stereo pair with panning, and four mono sends. Each has a dual action push-push on/off switch on its gain pot, and may derive its source pre or post either the large or small fader.

The multitrack Safe/Ready and Record switches built into the module also serve to select Tape, Group or both as the source for the monitor fader. Alternatively, the monitor fader source may be derived from the channel Input, the channel Output, or pre the channel fader but post any processors in the channel signal path.

The main signal's stereo panning is selectable between the left and right channels of either the A, B or C stereo buses. The secondary signal's panning between these buses and any odd/even groups is provided at the top of the module.





The SL 611-S Stereo I/O Module

The SL 611-S is an electronically balanced stereo input module which will accept a Left/Right or Sum & Difference stereo line input. A rotary switch provides ±20dB of gain in 5dB steps. The Trim pot provides ±5dB of variable gain, and the Balance pot provides ±10dB of variable left/right gain offset. The Left signals route to odd numbered groups; right signals route to even numbered groups. Left and Right signals each have a phase reversal switch and a mono switch to derive Left, Right or Left plus Right mono signals.

The Dynamics section is a stereo version of that found in the SL 611-V. Side chain control can be derived pre or post equaliser; an external keying signal may be derived from the Insert Return.

The SL 611-S Stereo Equaliser provides continuously variable controls on all three bands, plus switchable shelving or peaking curves on the high and low bands, and switchable "Q" on the mid band. The 12dB per octave high and low pass stereo filters may be switched in at the channel input, or pre channel fader but post signal processors, or into the Dynamics sidechain. Stereo insert points appear at the patchbay, and may be switched pre or post EQ, or post the channel fader.

The stereo cue send normally feeds a stereo signal to its master. The "Mono" button sums the left and right channels and allows the resulting mono signal to be panned. Cue/Aux sends 1-2 and 3-4 normally feed mono signals to their masters, but may be configured as stereo pairs by pressing their "Stereo Link" buttons.

Each send may be switched pre or post fader, and is fitted with a push-push on/off switch. Pre-fader sends are normally cut when the channel is cut. Optionally, links on the motherboard may be set to cut pre-fader sends when their channel or assigned Control Group fader is closed.

The meter above each stereo module may be switched to read either the left or right signal, or the higher of the two.

Two momentary illuminated switches (controlling relay contacts and reading opto-isolated tally returns) provide control of external devices such as cart machines. These functions may be assigned to operate as the fader is opened and closed, and/or interfaced with the SSL Events Controller.

The Image Width pot varies the stereo image from standard through mono to stereo reverse. The Image Pan pot positions the image thus set across the stereo panorama. On a mono image it provides normal panning; as the image widens, the pan pot's effect diminishes such that it has no effect on a full stereo image. The "Extra Wide" control switches in a width enhancement circuit which expands the image outside of the normal stereo picture. A filter may be inserted to prevent this from operating on signals below 250Hz.

The Solo and Cut buttons operate as in the SL 611-V module. A separate PFL button provides a L + R pre fade listen feed to the monitors. Solo Isolate disconnects the module from the Channel Solo bus.

The SL 688-V Mix Matrix controls the feeds from the A, B and C stereo mix buses to the programme outputs, the control room monitors, and the 4 and 8 track machines.

The left side of the panel houses identical sets of local controls for each of the three stereo groups and their associated tape tracks. The right side houses a series of master controls which govern the programme, monitor and meter sources. Machine selection and status controls and indicators for the associated multitrack ATRs are located at the top of the panel.

All three stereo groups can be routed to the programme bus by selecting the "A + B + C" button in the "Programme From" column at the lower right of the panel. The adjacent button in the "Monitor From" column feeds the programme to the monitor bus.

Individual stereo groups may be routed to (or removed from) the programme bus by operating the local controls labelled "A To Programme", "B To Programme" and "C To Programme". Two matrix buttons above each of these Programme Assigns allow their stereo group to be assigned to either or both of the other stereo groups. Combinations such as "B To A" plus "A To B" which would create a loop are electronically disallowed.

Each of the mix sections has an AFL button which sends a stereo signal to the monitor bus, and a Monitor Cut button which cuts its section's feed to the monitor bus. Neither function interrupts the programme feed.

Each set of stereo mix bus amplifiers has a Group Level pot. Following this pot, each group is normalled to two tracks of an 8 track ATR. Stereo Group A feeds tracks 1 and 2, Group B feeds 3 and 4, and Group C feeds 5 and 6.

The left and right channels of these ATR sends are also summed and fed via Mono Trims to tracks 1, 2 and 3 respectively of a 4 track ATR. Each trim has a range of −12dB to unity gain, with a centre detent at −6dB. Thus an equal in-phase signal sent to two tracks of the 8 track ATR will be sent in mono to the 4 track ATR at the same level.

Each of the A, B and C local control sets has a "Monitor Tape" button, which replaces the Group send to the monitor bus with its corresponding Tape return. When "Monitor From 8 Track" is selected, the Monitor Tape source is the corresponding stereo pair from the 8 track. When "Monitor From 4 Track" is selected, the source is the corresponding mono Tape return from the 4 track. Ganged trim controls provide ±10dB of gain control for each set of Monitor Tape Returns.

Beneath each Monitor Tape button is a Record button, which controls either the corresponding pairs on the 8 track or the single channels on the 4 track, depending on the Record Enable selection at the top right of the panel. Sync/Repro switches are also fitted for each machine.

The stereo mix meters may be switched to read the Group Sends or Tape Returns from either the 4 or 8 track, or they may be left to follow the "Monitor From" selection.

For standard stereo operation, the "Programme From A+B+C" and "Monitor From Programme" masters are selected along with the "A To Programme" local button. For multichannel formats such as stereo music, effects and dialogue, the "B To Programme" and "C To Programme" buttons are also selected. The composite stereo mix is then heard on the monitors, and the individual mixes are routed to the 8 track ATR in stereo and the 4 track ATR in mono.

Operation of the "Monitor From (8 Track or 4 Track)" buttons, the "Monitor Tape" buttons and the AFL and Monitor Cut buttons allow the engineer to listen to any combinations of Group and Tape sources without interrupting the feed to the programme bus.

Stereo or mono playback from the 4 or 8 track machine is accomplished by selecting the desired "Programme From" button. These present the selected Tape returns directly to the programme bus at unity gain. The "Faders to Monitors" button inserts the faders beneath the A, B and C sections (and their AFL switches) into the path after the "Monitor Tape" switches, providing remix level control if desired.

The "Faders to Groups" button places the faders and AFL switches after the stereo mix bus amps, which provides a final stage of submaster level control when the A, B and C mix buses are used to provide splits in live broadcasting.

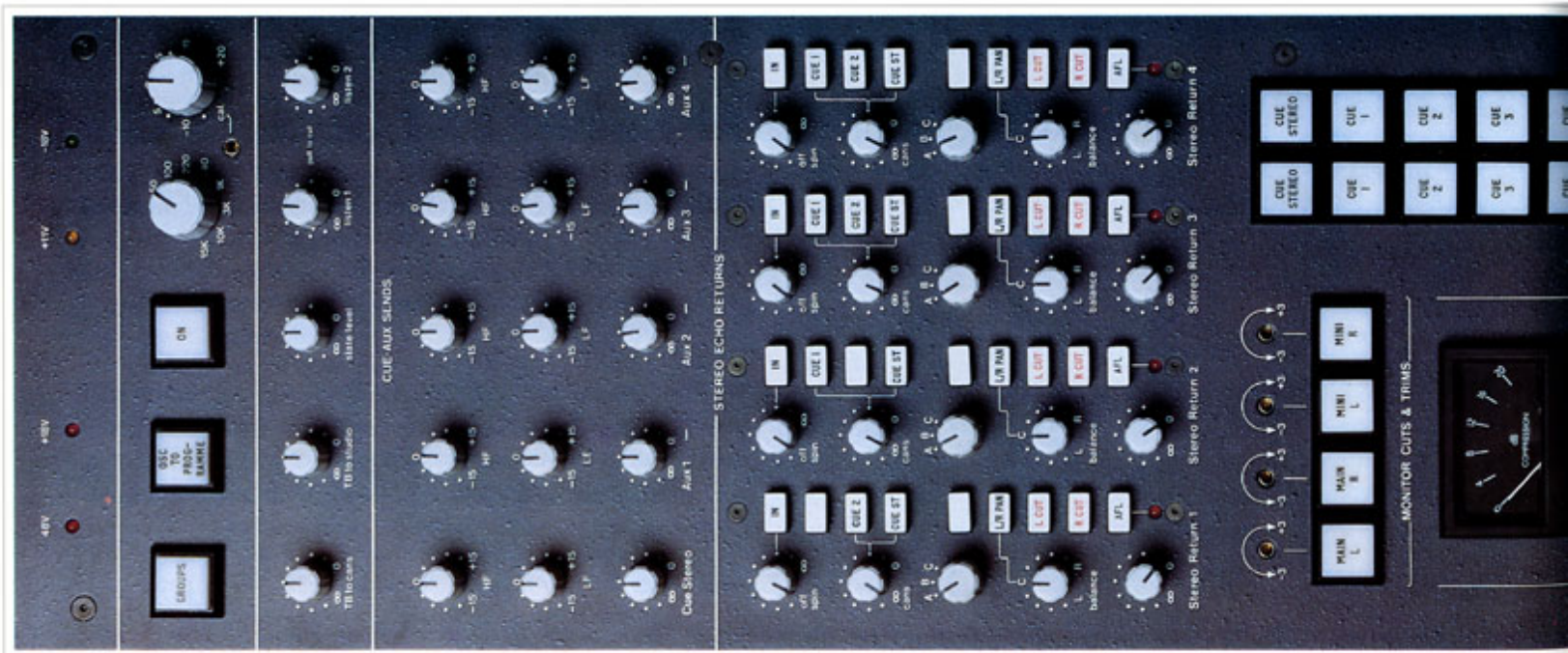
Finally, the Programme bus may be fed from both A + B + C and either the 4 or 8 Track, allowing the SL 688-V panel to serve an output mixer for up to 6 pairs of stereo sources.

The SL 651-V Master Electronics Module houses the master logic controls, monitoring and metering controls, send and echo return masters, communications facilities, power supply rail indicators and a test oscillator.

Each of the send masters has a send level control plus shelving equalisation at 100Hz and 10KHz. The monitor echo return masters are stereo but may be switched to mono and panned, with access to any of the mix buses. Echo returns may also feed the stereo cues and cue/aux buses 1 and 2. A "Spin" pot provides controlled feedback to the originating send for creating "endless loop" echo.

Thirteen sources may be selected to either the control room or studio loudspeakers and/or headphones. Level pots are provided for all three destinations. An additional mini-loudspeaker pot is provided to control the volume of small reference monitors. The "Alt" button switches the control room feed to an alternative set of monitors.

The Status buttons control the console's master logic. Once set, these controls may be protected by the "Status Lock" button, which also disables the oscillator and any talkback feeds which would disrupt the main programme. "Mix to Cues" feeds the main programme to all cue buses.

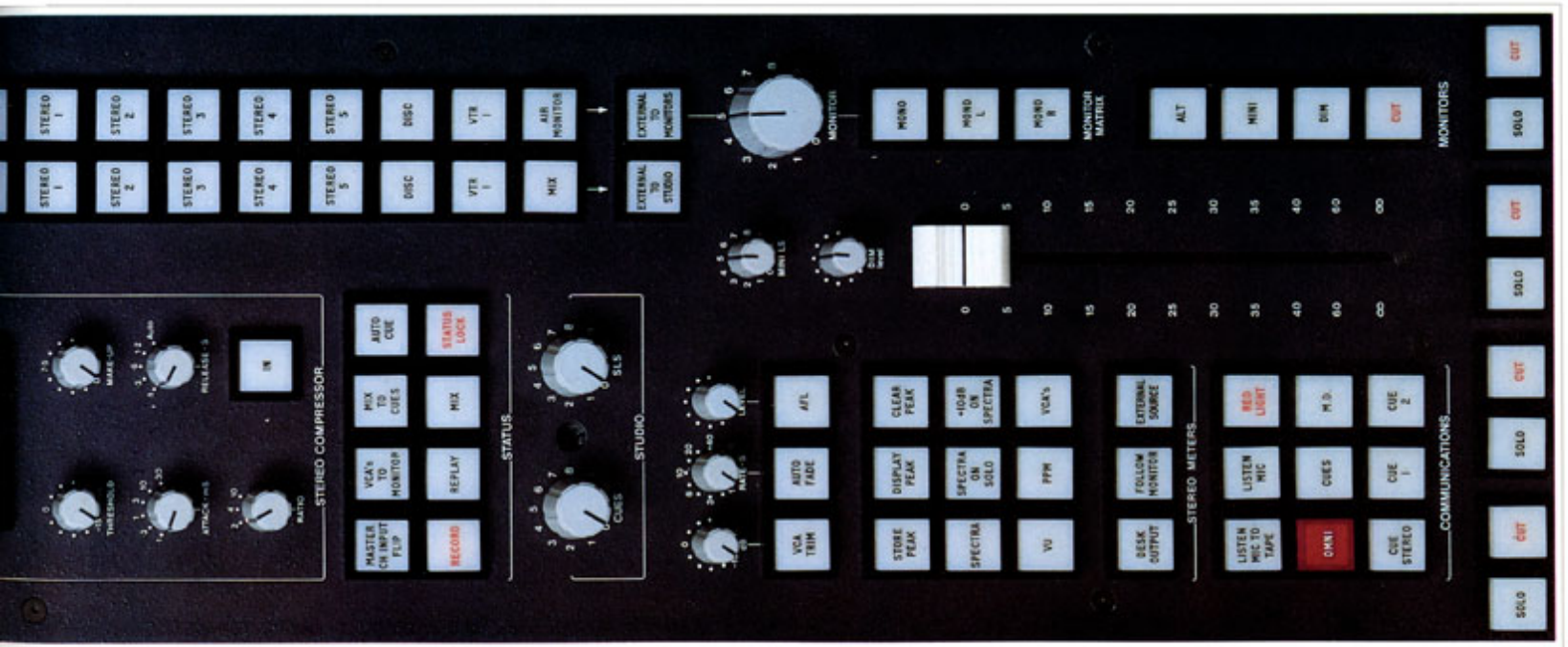


A stereo compressor may be switched across the main programme output. This acts directly on the stereo VCAs controlled by the programme master fader. The "Auto Fade" button initiates a master fade out or fade in, the rate being set from 0.5 to 60 seconds.

The "VCA Trim" button switches in a trim pot providing ±15dB gain on all channel and group VCA's, unless their local thumbwheel switches are set to Isolate. The AFL button switches all channel and monitor solos from "Solo In Place" to "After Fade Listen." The pot above this switch controls the AFL level to the control room monitors.

On consoles fitted with SSL's Plasma Display, controls are provided to switch between VU and PPM scales, VCA levels, and stereo third-octave spectrum analysis of the main programme or any soloed signals. Accumulated peak levels may also be stored and displayed. On consoles fitted with mechanical VU or PPMs, a button is provided to switch between display of audio or VCA levels, and the remaining 8 buttons are available for user options.

Comprehensive talkback and reverse talkback controls and the Solo and Cut buttons for VCA Control Groups 1-4 complete the facilities of the SL 651-V.

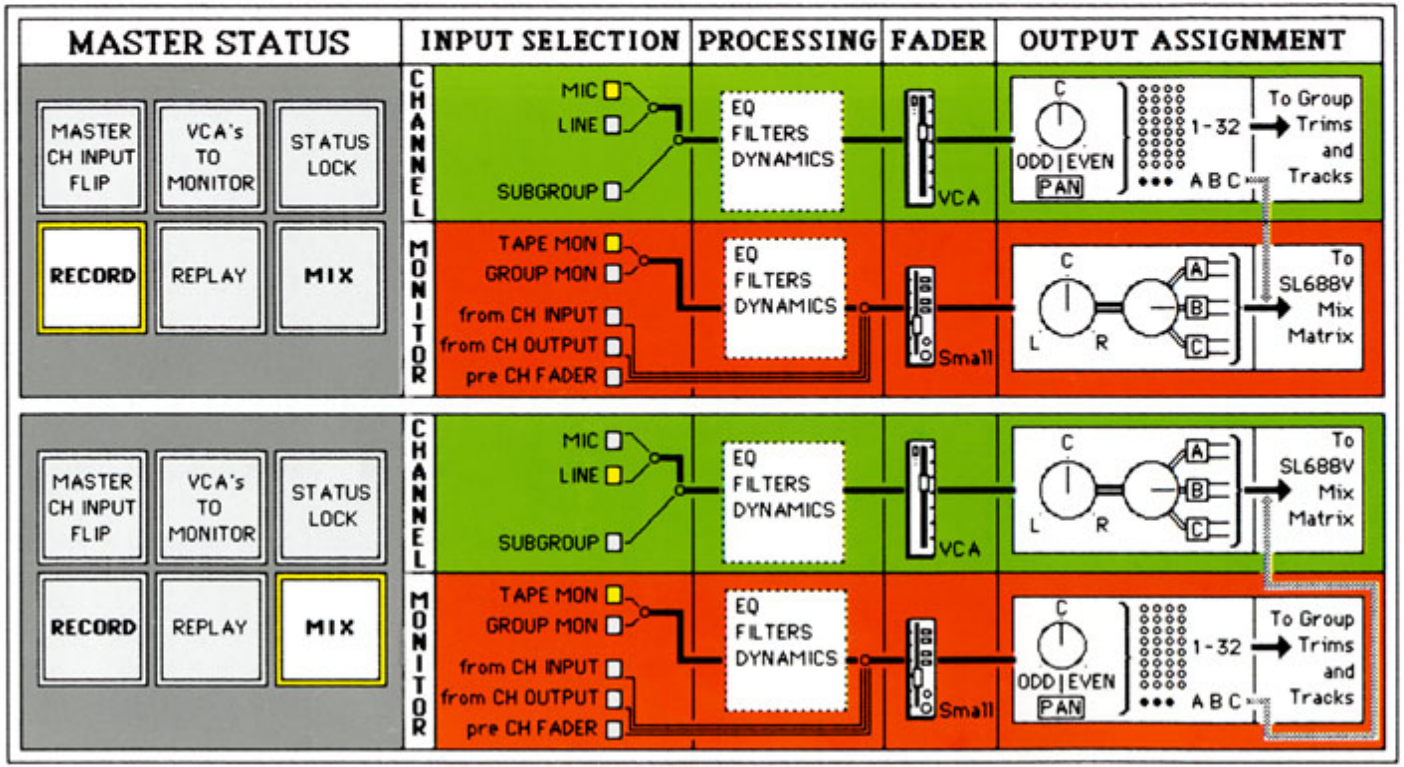


The Master Status buttons on the SL 651-V determine the basic signal flow through the SL 611-V Input/Output modules. Each module has two paths: the "Channel" path is shown here in green, and the "Monitor" path in red.

Each of these paths has several possible sources. The source selected by the master logic is indicated in yellow. Any of the other sources may be selected by operating local controls, which override the master selection.

In RECORD status, the mic input is sent via the channel fader to the multitrack routing matrix, and the Tape return (or Group send) is sent via the small fader to the stereo mix bus assign. The multitrack ATR is set to Sync.

In MIX status, the line input is sent via the channel fader to the stereo mix bus assign, and any desired source is sent via the small fader to the routing matrix. The multitrack ATR is set to Repro.

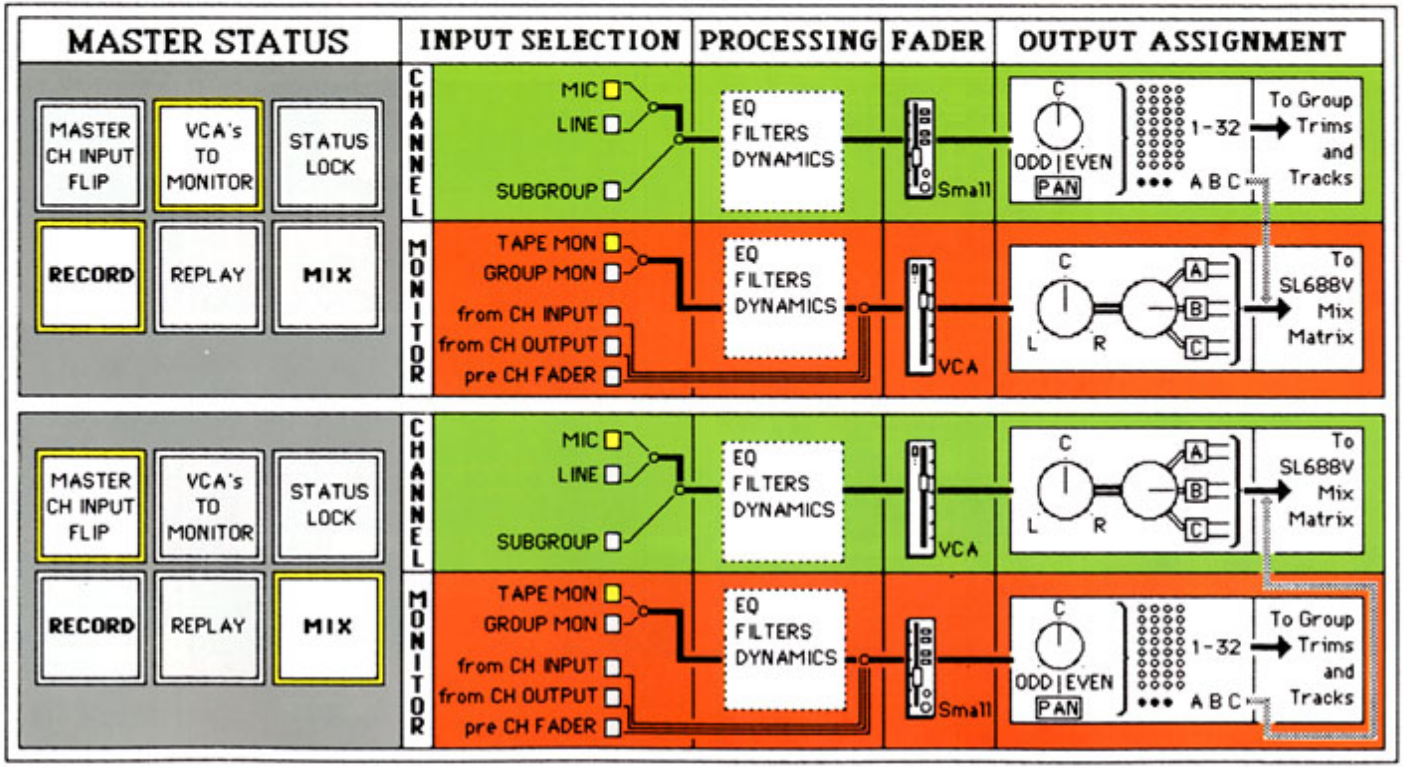


In RECORD + VCA TO MONITOR status, the console and multitrack remain in Record status, but the small fader is placed in the channel signal path, and the large (VCA) fader is placed in the monitor signal path.

In MIX + MASTER CHANNEL INPUT FLIP, the console remains in Mix status, but the line inputs to the channel signal path are replaced with microphone inputs. This is the basic live broadcast mode.

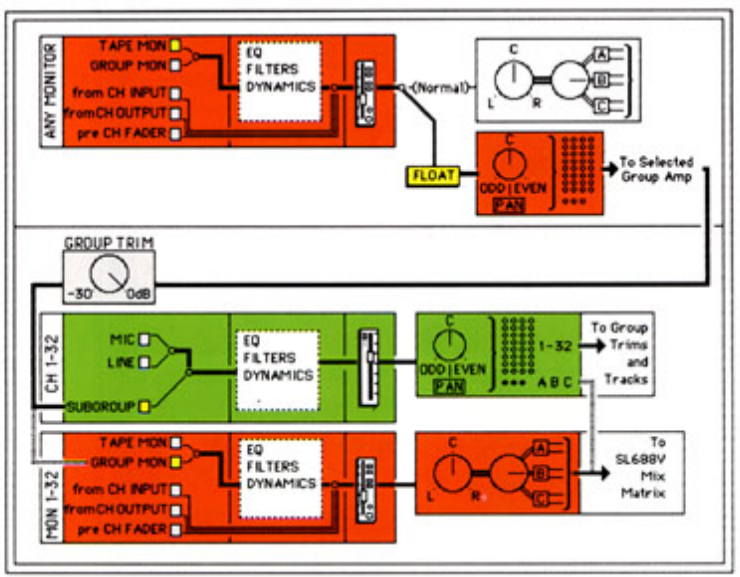
In RECORD + MIX (not shown), the console remains in Mix status, but when a "Ready" button is selected on any module, that module assumes Record status. This mode is ideal for last minute overdubs.

In REPLAY status (not shown), the current console status is put on "standby," and the Tape returns are routed to the monitor faders. This allows a quick replay of the tape without disrupting the console setup.



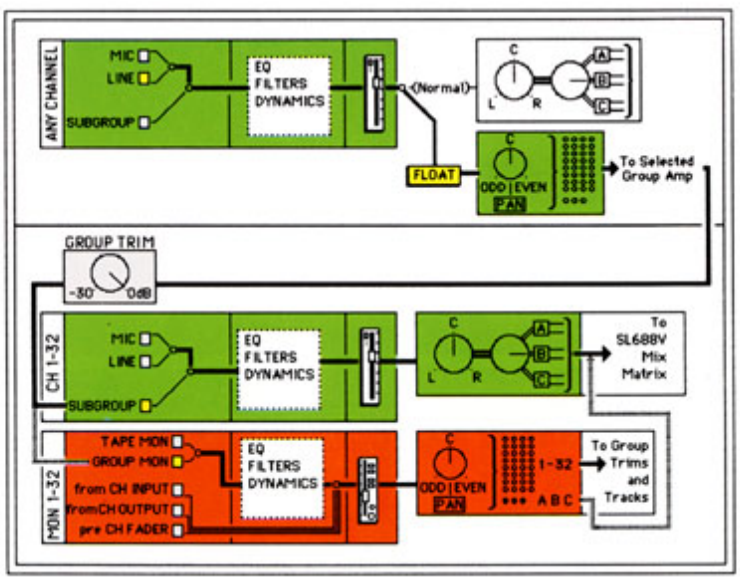
When the console is in RECORD status, the monitor fader normally feeds the stereo mix bus assign. The FLOAT button breaks this feed, disables the channel fader, and sends the monitor fader to the routing matrix.

This mode, known as "Float in Record," allows track bouncing to be performed quickly and easily, directly from the monitor mix. The track or tracks on which the bounce is being recorded may be monitored by pressing their associated "Ready Group" buttons.



When the console is in MIX status, the channel fader normally feeds the stereo mix bus assign. The FLOAT button breaks this feed, disables the monitor fader, and sends the channel fader to the routing matrix.

This mode, known as "Float in Mix," allows patchfree creation of audio subgroups. The bus or buses to which the channels have been routed are returned to the mix by pressing the Subgroup buttons on their associated I/O modules, which then serve as audio submasters.

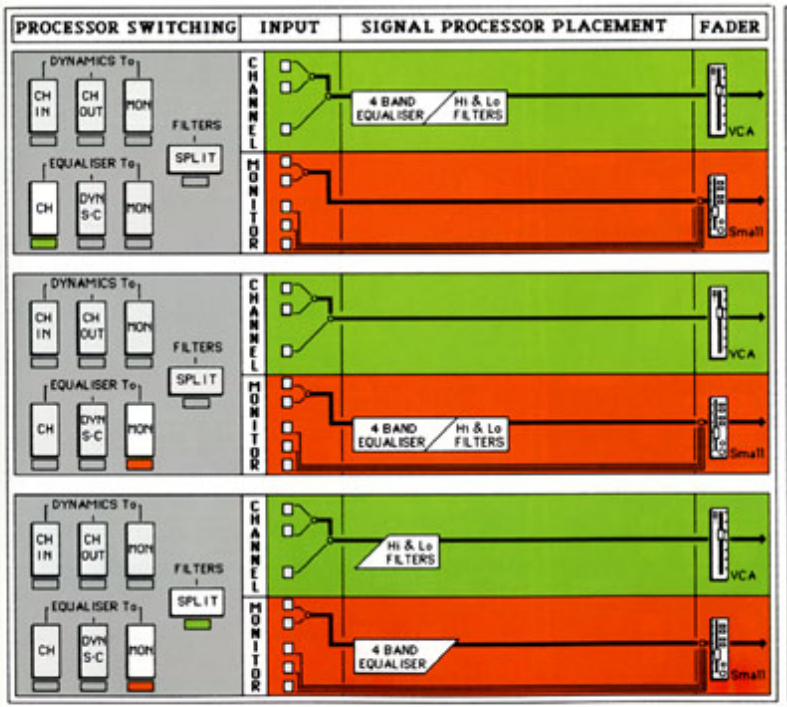


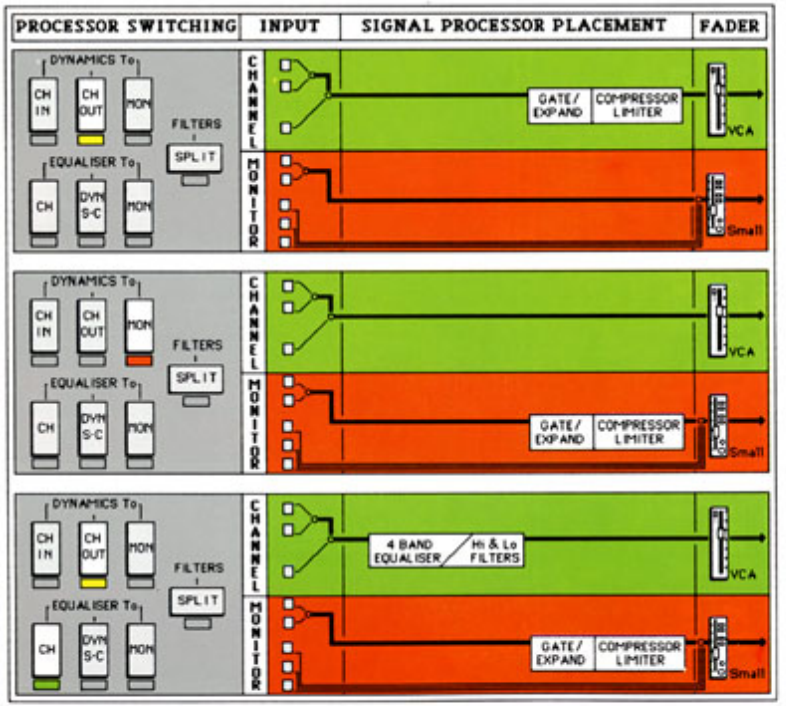
Each SL 611-V Input/Output module has seven signal processor routing buttons, which position the Dynamics, Equaliser and Filter sections in the signal paths. The first two examples below show that the Equaliser and Filters are normally treated as a single unit, which may be switched into either the channel or monitor path.

The SPLIT button splits the filters from the equaliser, placing them directly after the Mic/Line switch. The equaliser may then be separately routed elsewhere.

The Dynamics section can also be switched to either the channel or monitor path. As shown below and on the next page, the equaliser may be placed in the channel and Dynamics in the monitor; or the equaliser may be placed pre or post Dynamics in the channel; or the filters may be placed pre-Dynamics while the equaliser is post-Dynamics.

Using the SPLIT button, it is also possible to place the filters in the channel path while the Equaliser and Dynamics sections are in the monitor path.



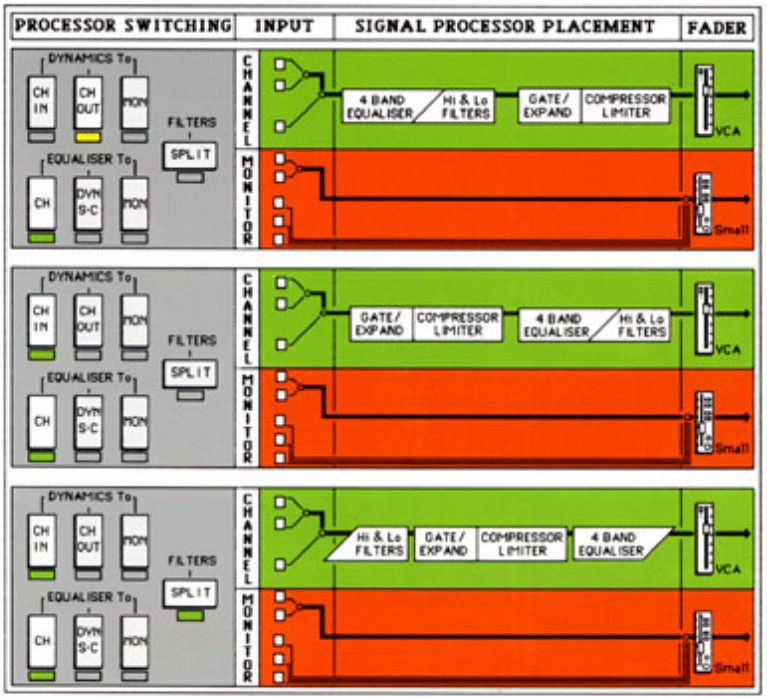


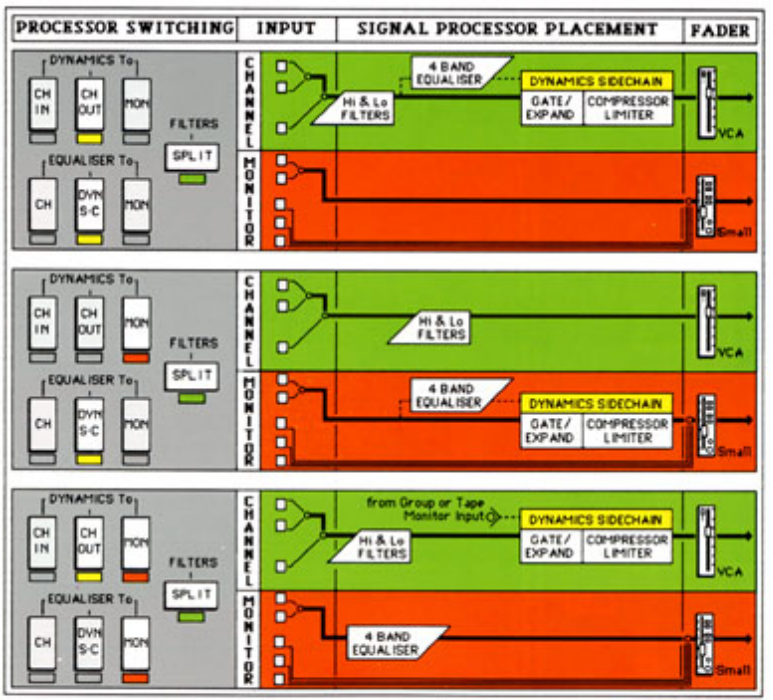
Access is also provided to the level sensing sidechain of the Dynamics section. The equaliser may be placed in the sidechain of the Dynamics section in either the channel or monitor path, with or without the filters. Frequency dependent effects such as stressing and de-essing are thus easily achieved.

Selecting Dynamics to Monitor and Dynamics to either Channel Input or Channel Output allows an external keying signal to control the sidechain.

The variations illustrated here represent about half of the possible combinations. It is worth noting that the signal processor routing selects the minimum internal signal path for the requested function at all times. The extra gain stages, patchpoints, connectors and power supplies required by external devices are also eliminated.

Of course, Insert sends and returns are provided for each channel, allowing any special effects devices to be switched in, pre or post EQ, directly from the module.





The outputs of the SL 611-V and SL 611-S modules are assigned to the A, B and C stereo mix buses as desired. The master controls for these mix buses are located in the SL 688-V Mix Matrix panel at the console centre.

Each stereo mix bus amp has a ganged Group level control. After this control, the stereo signals are sent to their designated pairs on the 8 track ATR. Each stereo pair is also summed and sent via a mono Trim control to its designated channel on the 4 track ATR.

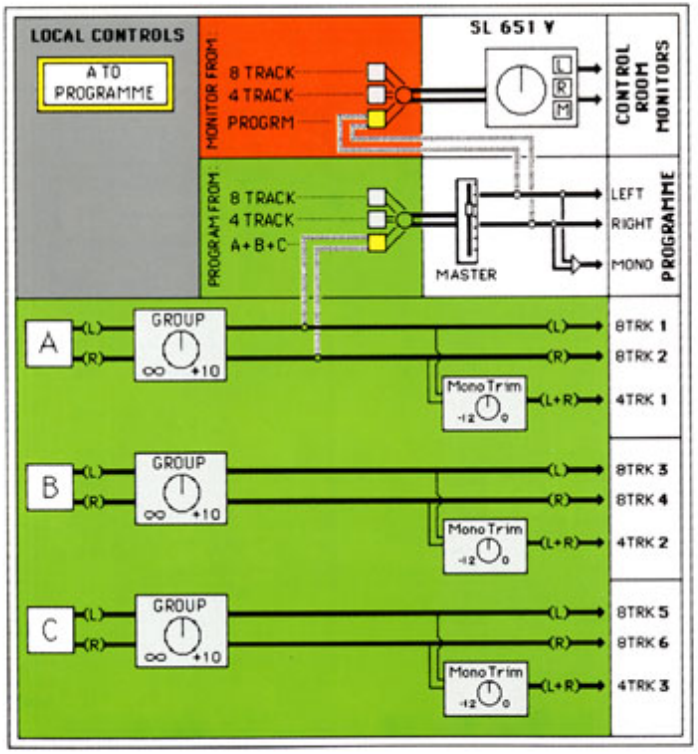
Two sets of controls determine the master sources for the Programme bus and the control room Monitor bus. Three sets of Local Controls modify the master selections.

The Programme may be derived from the A, B and C stereo Groups; or from the 8 or 4 track Tape send & returns; or from a combination of the A, B and C Groups plus either the 8 or 4 track sends & returns. The control room Monitor is derived from either the Programme bus or the 8 or 4 track Tape sends & returns.

The control functions are designed to allow the mixer to change from standard mono and stereo operation to a variety of multichannel modes at the press of a few buttons. The Mix Matrix controls also switch the relevant ATR electronics, further simplifying format changeover. For on the air security, all SL 688-V assignment functions are locked by operation of the console master Status Lock button on the SL 651-V Master Electronics module.

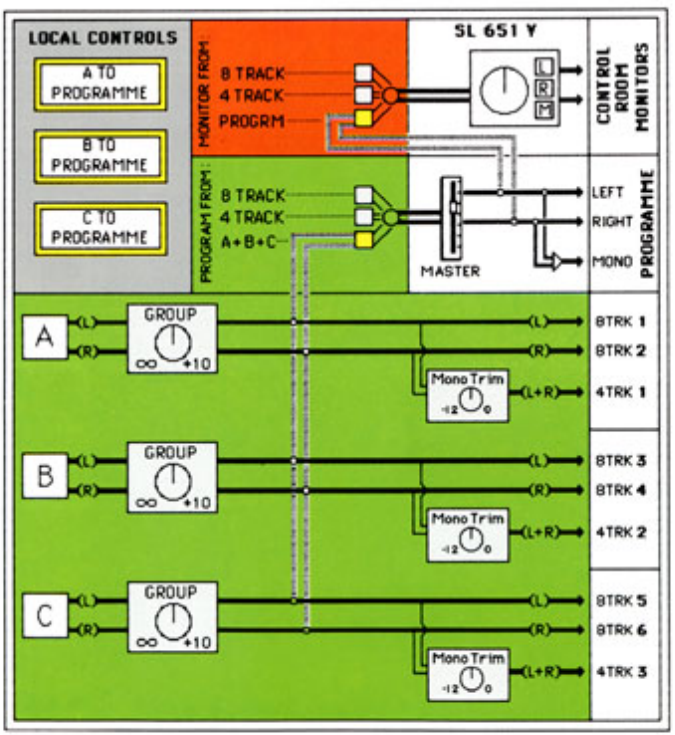
In standard operation, all modules are assigned to Stereo Bus A. The "Programme From A + B + C" master button and the "A To Programme" local button switch the Stereo Group A output to the Programme buses, which are controlled by the master fader on the SL 651-V.

The "Monitor From Programme" master button picks up the programme signal post-fader, and feeds it to the control room monitor controls on the SL 651-V.



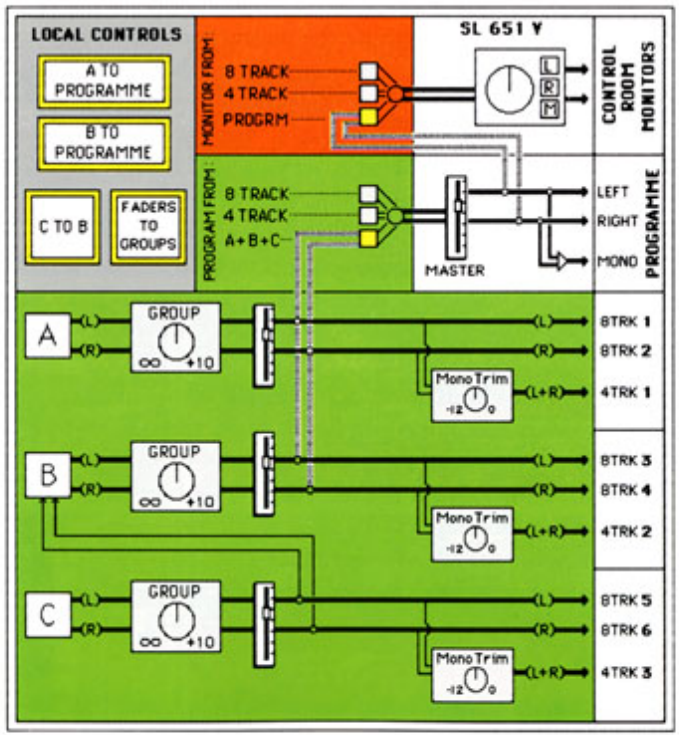
For multichannel operation, modules may be assigned to any combination of Stereo Buses A, B and C. The Programme and Monitor masters are set as before, and the "B to Programme" and "C To Programme" buttons are also selected.

The Group level controls may be used to adjust the balance between each section; when these are set at their centre detents, the A, B and C mixes are summed at unity gain.



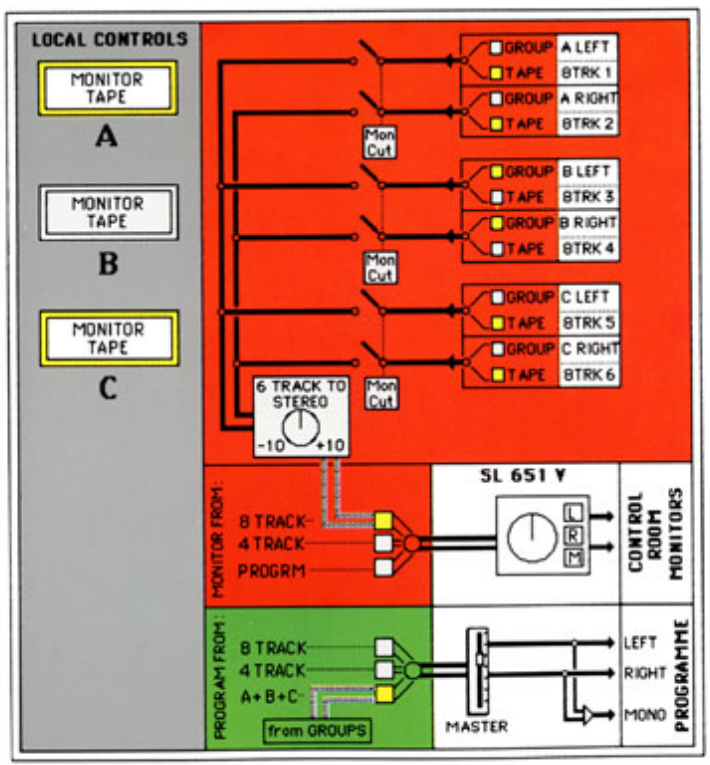
If desired, the stereo faders located beneath each local section in the SL 688-V panel may be switched into the Group signal path. This is useful when the A, B and C groups are being used to create mix minuses and splits.

In this example, four stereo feeds are available at the output distribution row. Stereo C and A are available as separate mixes, Stereo B is available as a composite of B and C, and the Programme Mix is a composite of all three.



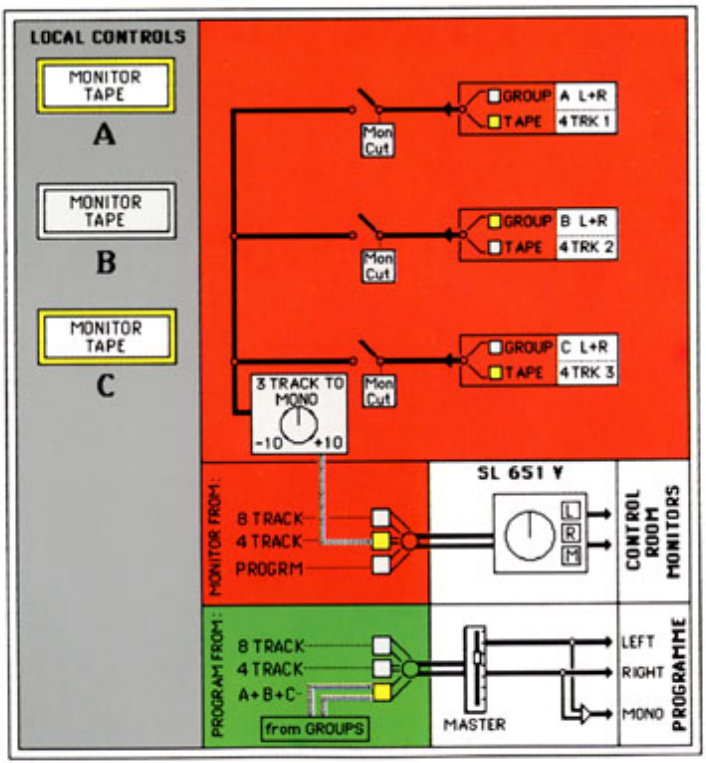
The engineer can monitor either the 8 track or the 4 track ATR without disturbing the Programme feed. When "Monitor From 8 Track" is selected, the local "Monitor Tape"buttons switch between the Group sends to the 8 track and their corresponding pairs of Tape returns.

In the example shown below, the control room monitors are presented with the Tape returns from tracks 1/2 and 5/6, and the Group sends to tracks 3/4.



When "Monitor From 4 Track" is selected, the "Monitor Tape" buttons switch between Group sends to the 4 track, and their corresponding Tape returns. In the example below, the monitors are presented with the Tape returns from Tracks 1 and 3, and the Group send to track 2.

Facilities in the SL 651-V enable the monitors to be fed stereo, mono left, mono right, or mono Left + Right. Note also that a mono Programme feed is always available.



An on-board monochrome video display which always monitors the main computer output is mounted directly above the Command Keyboard. Provision is made to interface two external RGB monitors or video projectors with the system.

The five keys along the top of the on-board display control the SSL Video Switcher and Distribution Unit. The first key toggles between the main computer's display and the Total Recall computer's RGB display. The remaining four buttons switch NTSC, PAL or SECAM sources to the external displays.

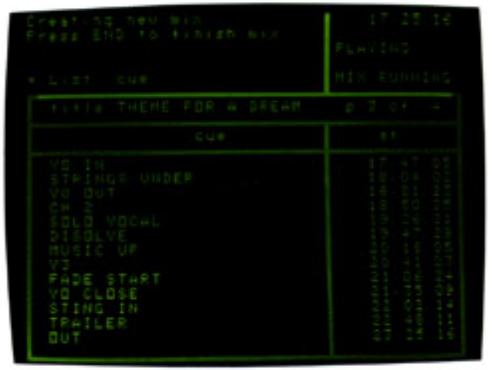
The typical SSL Studio Computer display is divided into three areas. The upper lefthand box is the "Command Field." This field shows each command line as it is entered, and then indicates the computer's response to that command.

The upper righthand box is the "Status Field." The current tapetime appears in this field, along with a "valid timecode" indicator and various system messages about mixing and locating status.

The remainder of the screen is the "List Field." This is where the session data requested by the engineer is displayed. The various displays are called by command lines such as [LIST] [TITLE] or [LIST] [CUE]. In systems equipped with printers, hardcopy of these lists may be requested by commands such as [PRINT] [TITLE].

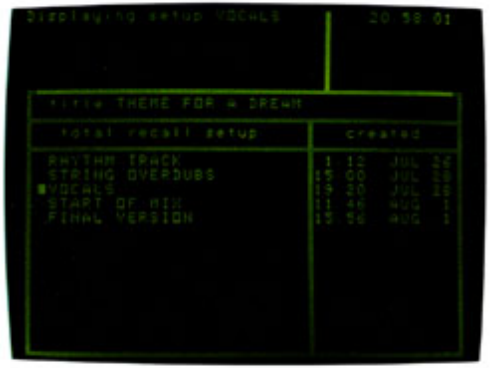
The data pertaining to each project is stored on a floppy disk called the "Reel Disk". The basic division of information on each Reel Disk is called a "Title".

The Title List shows a name for each segment along with the starting and ending tape times. When a Title is created, the system automatically provides a Time and Date stamp. The left and right cursor controls are used to toggle between the alternative Title Lists.



Additional lists within each Title keep track of the session details. The basic information about tape locations is stored on the Cue List.

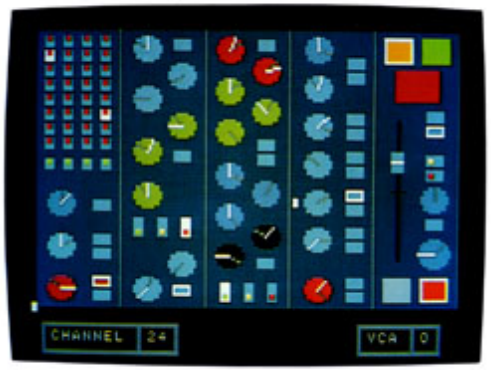
The Cue List shows a name, number or abbreviation for each desired point, along with its exact tape time. Cues may be entered at any time, and sort automatically in tape-time order. Locations may be entered or displayed in any timecode or foot/frames standard.



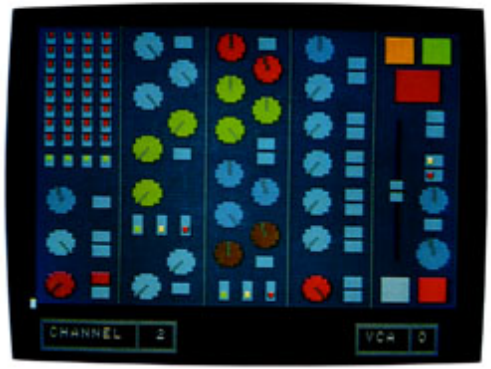
Complete details of all I/O module settings are stored by entering a command such as NAME SETUP Vocals. As each setup is named, it appears on the Total Recall setup list along with the time and date of its creation.

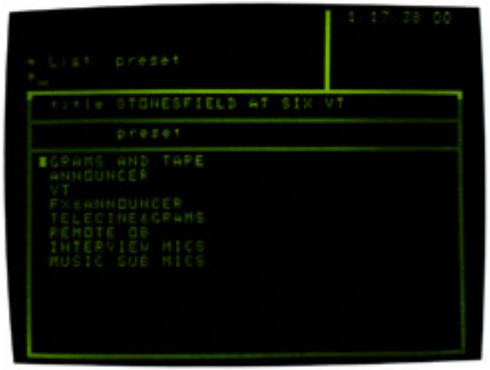
To recall a setup, the command PLAY SETUP is entered. The computer accesses the proper file, and presents an RGB colour graphics display such as that shown at the top right of this page.

Switches are shown as rectangles corresponding to the actual buttons or indicators on the I/O module. Any switch shown at double-brightness is not set as it was when the Total Recall Setup was stored. Pots are shown as horizontal lines, keyed to the colours of their knobs. The peg beneath each line shows the stored position, and the peg above the line shows the current position.



The channel display above indicates numerous controls which do not match the requested setup. The Display below shows all channel controls perfectly matched. The channel to be displayed is selected by pressing the Status button on its fader panel.





The SSL Real Time System "Preset List" displays all of the Presets which have been stored for a given Title. Each Preset is a record of all channel and group fader and values.

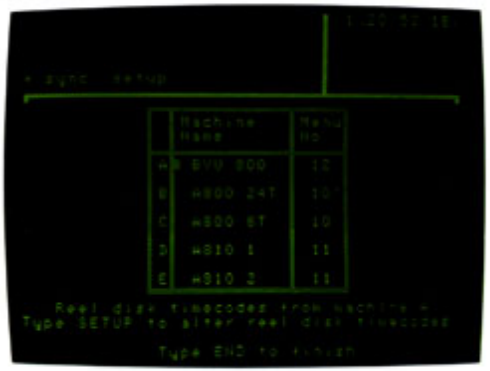
Presets may be edited into a Sequence List, which displays them in running order. For live broadcast, the engineer can switch or crossfade between Presets manually. When a master timecode is available, the switching and crossfade times may be entered off-line, and the Sequence may be played automatically.

The SSL Events Controller activates external devices at specific times. The Events Setup List stores the name and preroll time for each device under the unit's control.

The Events List shows the Event number, the devices which are part of each Event, and the frame at which the Event is to occur. When a preroll time has been entered on the Events Setup List, the device will "anticipate" the Event time accordingly. A column is also provided on the Events List to indicate the nature of each Event.

The SSL Programme Disk has a Tape machine Menu containing detailed profiles of up to 16 audio, video and film transports. Each user may customise these profiles to match their own machine complement.

The engineer may select the master machine with the cursor controls. The complete hierarchy of masters and slaves in a multi-machine system can be setup by entering the desired menu numbers into the Sync Setup List. This allows almost instant changeover between the various machine setups required for different projects.



The command "List Sync" displays the names, positions and offsets for all tape machines selected into the system, and the master timecode. The cursor keys call alternate versions of this list, showing the "Mark" position of each tape and a "Time to Sync" countdown for all machines.

Complete details of the machine hierarchy and tape offsets may be stored on the Sync Preset list at any time. Sync Presets may be given any name that is useful to the engineer. When commanded to "Play" a Sync Preset, the entire system sets itself to the requested configuration.

The engineer can refer to any desired list while the SSL Studio Computer is performing other tasks. The Track List above is being displayed during a dynamic mix. System activity is confirmed in the Status Field, and prompts for the engineer appear in the Command Field.

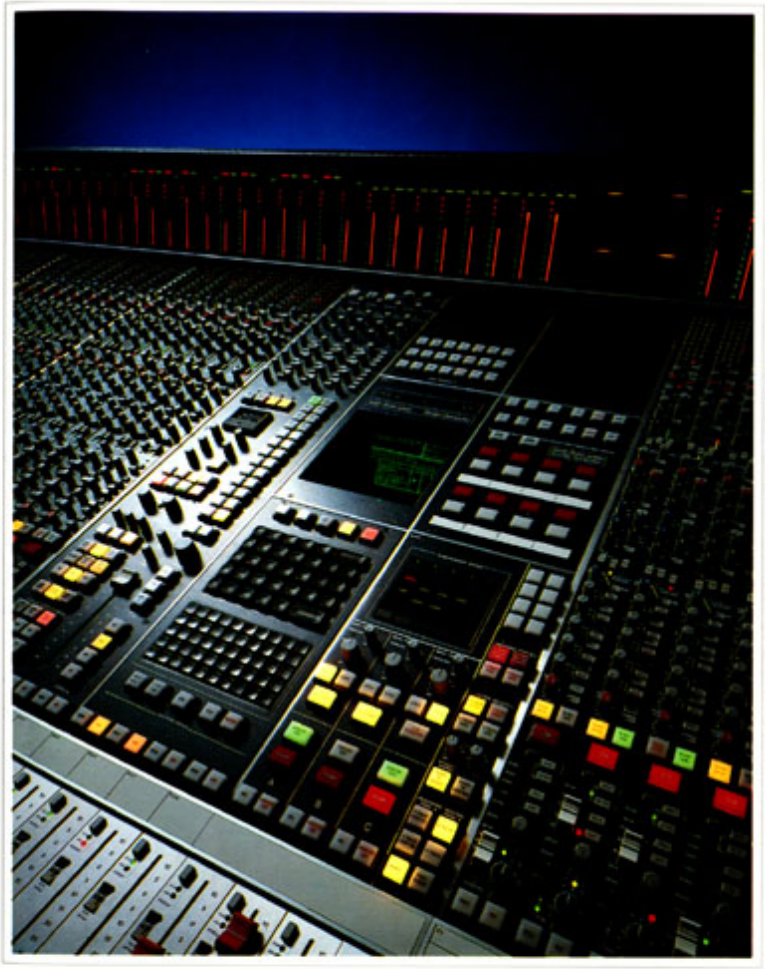
The Mix List below shows complete passes and mix segments that have already been stored. The cursor indicates the mix that is currently being played. Frame accuracy is maintained throughout unlimited mix revisions, joins and inserts.

SSL issues regular software revisions to all clients, incorporating our own advances and with suggestions from engineers working with audio in all its aspects, around the world. This policy maintains absolute state of the art compatibility between all SSL-equipped facilities.

The screens shown in this section only suggest the depth of the system. Many other levels, normally invisible to the operator, are readily available to guide the maintenance staff through the setup and diagnostic procedures.

The SL 6000 E Series – System Synopsis

- Complete interformat flexibility for Stereo, Triphonic, Stereo plus SAP, and Mono television audio, with simultaneous broadcast and multitrack capability.
- Mainframes available in versions accepting up to 32; 40, 48, 56 and 64 mono and stereo I/O modules.
- All versions have 32 Output Groups, 3 Stereo Mix Groups with mono feeds and trims, Stereo and Mono Programme Outputs.
- Stereo Compressor on Main Programme Outputs.
- All inputs and outputs are electronically balanced. Trasnsformer-coupled mic preamps are available.
- Patchfree audio subgrouping plus 8 VCA Control Groups with dedicated faders, soloes and cuts located at the central stereo mixing position.
- 6 Cue/Auxiliary Sends with HF and LF Equalisation.
- 26 Illuminated External Source Selectors for Control Room and Studio Monitors.
- Six Master Statuses for rapid setup; fully distributed logic for maximum reliability; local overrides of all logic functions for complete flexibility.
- SSL's exclusive Total Recall™ stores complete details of all stereo and mono I/O module settings; control accuracy is within a quarter of a dB.
- Each mono module has 4 band parametric EQ and pass filters; compressor/limiter and expander/gate with gain reduction meters; built-in multitrack electronics remotes; patchfree processor routing.
- Mic preamps have individual 48v on/off switches; 50dB gain range plus 20dB pad. Mono line inputs have ±20dB trim with a centre detent at unity. Phase reversal operates on both mic and line.
- Each stereo module has 3 band parametric EQ and high and low pass filters; compressor/limiter and expander/gate with gain reduction meters; image width, pan and width enhancement circuitry with a low frequency bypass.
- Stereo line inputs have ±20dB gain in 5dB steps and ±5dB continuously variable trim with centre detent; ±10dB left/right gain offset; left and right phase reversal and mono switches; built-in remote machine starts and stops, optional fader start.
- Metering may be specified as VU or PPM, scaled to any international broadcast standard. Optional SSL Plasma Display shows VU, PPM or VCA levels; stereo 1/3 octave spectrum analysis; peak hold and display.
- Renowned SSL audio performance: short, clean signal paths provide dynamic range and bandwidth that comfortably exceed the best 16 bit digital converters.



- All SL 6000 E Series audio consoles are prepared for complete interface with the SSL Studio Computer.
- Computer provides complete machine management and synchronisation for up to five audio, video and film transports. System is compatible with EBU, SMPTE, VITC, Bi-Phase and Tach. RS 232 and RS 422 Communications Ports are provided.
- Dual floppy disk system is referenced to timecode, requiring no data tracks. Maintains frame accuracy throughout unlimited mix revisions and edits.
- Total Recall Setups and Sync Presets restore complete console and multi-machine settings at any time.
- Events Controller provides up to 150 Events per Title, with as many as 32 contact closures per Event!
- SSL Programmable Equaliser and panning unit provides continuously variable controls that track with timecode. Ideal for dialogue matching and effects equalisation and positioning.
- SSL Real Time System brings computer support to live broadcast mixing, using sequences of preset channel and group faders and cuts, operated from a single switch and crossfader.
- SSL hardware and software components are field retrofittable, allowing the system to grow as your needs and budget dictate.

Each Solid State Logic Stereo Video System is built to the client's specification. A wide variety of electronics, software and mainframe options are available, as are custom panels, special patchbays, producer's tables and wing cabinets. We require about three months from the date of order to complete your system. For complete ordering information, weights and dimensions, installation details and other particulars, please ask your Solid State Logic sales engineer for a copy of the Client Specification Manual, SSL Publication Number 82S6S-SSL.

Research and development is a continual process, and all Solid State Logic products are designed to incorporate every possible advance through field retrofit. This policy is supported by SSL's worldwide installation and field service team, who are on 24 hour call 365 days of the year.

SSL issues regular software updates on floppy disks to maintain state-of-the-art compatibility between all SSL Systems. User's data disks may be freely transferred between more than 200 SSL-equipped facilities – the largest and most advanced computerised audio production and post-production network in the world. SSL publishes an International Client Directory four times annually. If you would like a current copy, please request SSL Publication Number 82S6C-SSL.

Solid State Logic SL 6000 E Series Stereo Video Systems, SL 4000 E Series Master Studio Systems and SL 5000 M Series Audio Production Systems are demonstrated at most major international audio and broadcast exhibitions throughout the year. We are also happy to arrange private demonstrations at your convenience.

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