



Conservatory of Recording Arts and Sciences

G Series Master Studio System

Solid State Logic

G Series Console Operator's Manual

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Introduction

In 1978 Solid State Logic designed the first A Series Console and Studio Computer. The idea behind the project was to build a system for the company's studio which was buried deep in the Oxfordshire countryside, in a small village called Stonesfield. The studio was called Acorn. It was small and as there was only one room it became known as Huge One.

Not satisfied with the first console, SSL went on to build yet another system, the B Series. It too was innovative and somebody suggested that it should be shown at the Paris AES show in 1978. Following the show, orders were received from several studios world-wide and SSL became the world's greatest console manufacturing company and not the world's greatest studio. In total, nine B Series consoles were made, featuring a VCA based automation system, Dynamics sections on every channel and many other features that are now accepted as industry standards.

The B Series console achieved cult status amongst those brave engineers who managed to understand the philosophy behind the system. Many of the initial users sent back suggestions about improving the console and the computer. So, in 1980, a third design went into production and was named the SL 4000 E Series Master Studio System. The new system was a giant leap forward, solving many of the operational limitations of the B Series. It was an instant success. As well as sonic improvements there were several changes to the routing system, enabling the small faders to be used as additional inputs to the main mix busses and as extra auxiliary sends via the routing matrix. This doubled the number of inputs that could be mixed down to the main outputs as well as solving the problem of not having enough aux sends. Changes in the signal processor routing also gave the system much more flexibility.

Another major addition to the range came in 1981 when Total Recall™ was first introduced. For the first time, engineers could store and recall all the console module settings, from the very first mic EQ at the start of a tracking session to the final take of the mix.

The E Series was designed as a system. Not only a mixing console, but also a central control station for signal processing, machine control, fader automation and Total Recall™.

Over 500 installations later, the system underwent its fourth major change with the introduction of the SL 4000 G Series Console and Computer at the 1987 New York AES show. Most of the audio circuitry has been redesigned to improve sonic performance, reducing cross-talk, distortion and noise. The tracking path now features new EQ, Mic and Line amps, Group amps and Monitoring sections.

There are a few other differences between E Series and G Series Consoles, such as the addition of patchable Stereo VCA Faders, a split Cue system, Channel in to Meters and individual Solo Isolate functions, but for the most part the systems are operationally the same.

The philosophy behind these changes stems from the fact that more and more engineers are using the system for entire projects. There was a need for greater computer data storage and sonic and operational changes to improve tracking performance. The 20MByte Data Cartridge used with the G Series Computer and Total Recall™ allows engineers to store every desk setting, from the start of a session all the way through to the final mix. It is now common for engineers to automate the monitor mix and each mix can be stored and improved upon as the tracking process

progresses, without having to sort through dozens of floppy discs. At any time, each monitor mix can be accessed and parts of it used during final mix if required. To compliment the new computer facilities, the audio signal paths through the console have been scrutinized and redesigned to meet the ever more exacting audio integrity that today's engineers demand. These changes encourage the desk to be split during the tracking process, with a full monitor section to the left of the centre section and source channels to the right.

About This Manual

This manual is divided into eleven sections. Sections 2 to 6 act as reference sections, giving exact descriptions of each control, the meters and the patch. The key to understanding the power behind the G Series system is to master the routing and signal flow. Sections 7, 8 and 9 cover this in great detail. Some people may wish to start with the applications guide (Section 10) and then consult the reference sections as they read. How you use this manual is up to you; if you get stuck, just skip to a new section as information about a particular desk function may be found in several different sections. It will help if you refer to the foldout drawing of the modules and centre section (included at the back of this book) while you read the manual.

The manual has been written so that you may learn to operate the console without actually having one in front of you. However, there is no substitute for putting up a mic and going through the process of laying tracks and then remixing, as you refer to the book. It would also be helpful, when learning the system, to sit in on a session with an engineer who knows the console.

If you are new to the system it is suggested that you read the manual from cover to cover a couple of times and then try out a session. Once you become more familiar with the controls you will begin to understand the flexibility of the system, and also why the routing needs to be so complex. This system was designed for professionals who spend ten or more hours a day, seven days a week using the desk. They want to push the console to its limits, hence the limits are far beyond those of lesser systems and it may take you several weeks to completely explore all the possibilities that a SSL system has to offer.

Once you have mastered the art of tracking and mixing, without getting lost in the routing, it is strongly suggested that you go through the manual one more time. It is very easy to settle into one particular way of working, to the exclusion of others, and you may discover some operational possibilities that you previously overlooked. For instance, many engineers don't realize that whilst tracking, the main VCA fader may be bypassed on the patch. This frees the quad compressor for use in stereo subgroups or as a master compressor on the drum overheads, for example.

Differences between the SL 4000 G and the SL 6000 G

It is probably worth describing the differences between SL 4000 G and SL 6000 G Series consoles, as they are basically very similar and it will be possible to apply 92% of this manual to the SL 6000 G (or for that matter, the SL 6000E).

The main difference between the two systems lies in the output bus structure:

The SL 4000 G Series console has four output busses designated Left Front, Right Front, Left Back and Right Back. Each Input/Output module routes directly to the main outputs via the master fader on the SL 651G Master Facilities module.

The SL 6000 G(E) Series console has three stereo output busses designated A, B and C which can be combined to feed a main stereo Programme output. There are therefore four stereo outputs from the console - the clean stereo feeds from the A, B, and C busses and the stereo Programme output. The SL 688V Mix Matrix panel fits in an additional centre section and deals with the matrixing and control of these busses. The main Programme output feeds through the SL 651V Master Facilities Module in exactly the same way as the Quad bus feeds through the SL 651G on a SL 4000 G Series console, with identical control of such functions as the main fader, master compressor and echo returns.

Where this manual refers to the "Quad Bus", just substitute "A, B or C Bus" if you have an SL 6000 G(E) Series system. The stereo Programme output on the SL 6000 is the equivalent of the Quad output on a SL 4000 system. Apart from the main output routing, all other functions and controls are identical. The patch layout and metering, however, reflect the different output configurations.

The G Series Studio Computer system and its operation are identical for each system, so transfer from one type of system to the other is effortless and makes logical sense. Ultimation™, SSL's unique dual path moving fader automation system, may be optionally fitted to both G and E Series SL 4000/6000 consoles.

If you are working on an SL 6000 E System frequently, you may be interested in obtaining a copy of the operational manual with deals specifically with this console. Contact your nearest SSL office to purchase a copy.

Finally, if you have any comments on this book please contact us. We will be updating the contents from time to time and would appreciate your input.

Definition of Terms

Although most of the terminology in this manual should be familiar to you, there are a few things that we should cover now to avoid confusion.

BUS - A common term used to describe a mixing bus bar. It refers to a signal path within the console, prior to mix amps and output level controls. As an example, the main Quad outputs will often be referred to as the Quad busses when, for instance, talking about SL 611G I/O module signals routed to the SL 651G Master Facilities module. Signals are sent from the I/O modules, at low level, and mixed together on bus bars running the length of the console. The SL 651G picks up these signals, amplifies them and feeds them to the console outputs at line level (nominally +4dBm). So "output" refers to a line level signal leaving the console via the patchbay whereas "bus" refers to an internal route for signals at low level.

THE PATCH - A jack in the SSL patchbay is designated by a letter for each row and a number counted from the far left of that row. e.g. Channel Mic Input 7 is designated as B7 etc. Section 6 includes patch drawings for reference.

SL 611G - This is the Input/Output Module.

SL 611S - The Stereo Module.

SL 651G - The Master Facilities Module. Located to the right of the centre section. (In E Series consoles this is usually located to the left of the centre section.)

The SL 611G Input/Output Module

When operating the I/O module, it is important to remember that it has two independent main signal paths. Each path has its own input and output section and a fader to control the level. One path, normally controlled by the LARGE VCA FADER, is designated the CHANNEL and the second signal path, normally controlled by the SMALL FADER, is designated the MONITOR.

The two input sections are:

The CHANNEL INPUT Section and the MONITOR INPUT Section.

The two faders are:

The LARGE VCA FADER and the SMALL FADER.

The two outputs are:

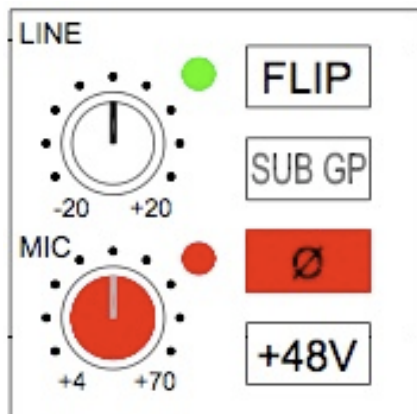
The QUAD BUS PANS at the bottom of the module and the MULTITRACK GROUP ROUTING MATRIX at the top of the module.

EQ, Filters, Dynamics and Aux send controls are available on each module and these may be switched into either signal path, even at different points.

Life would be simple (and the console totally inflexible) if there were fixed signal paths through the console. As it is, there are many permutations of routing which give SSL consoles the flexibility that has now become accepted as an essential part of audio mixing. It is these permutations that allow the engineer to configure the desk to conform to any task that is presented during a session.

The following section looks at each control individually, with brief summaries of the routing possibilities. Section 7 of this manual takes a more detailed look at signal flow and routing with flow diagrams.

Channel Input Section



The channel input section may receive any one of three inputs:

LINE - Selects a Line Input from Jack Row D via the Line Trim pot (-20db to +20dB). A green led indicates Line Input selection.

MIC - Selects a Microphone Input from Jack Row B via the red Mic Trim pot (+4dB to +70db).

The new G Series transformerless mic preamps have an improved gain performance over the E Series versions and as a consequence do not require a 20dB pad switch. The preamp will cope with a much wider dynamic range due to a brilliant bit of design work on our part! The gain control is stepped in 6dB increments. 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 Group mix amp. The Subgroup button is associated with a patch-free audio subgrouping facility. By selecting SUB GP on Modules 1-32, the fader previously being fed from the Channel Input Section will now pick up its input from the multitrack bus of the same number. In this way the channel becomes a subgroup. Sources from any of the other modules in the desk may be sent to that fader via the ROUTING MATRICES. The 'subgroup' module's GROUP TRIM control can be used as a level control for this input. Both leds off show this selection.

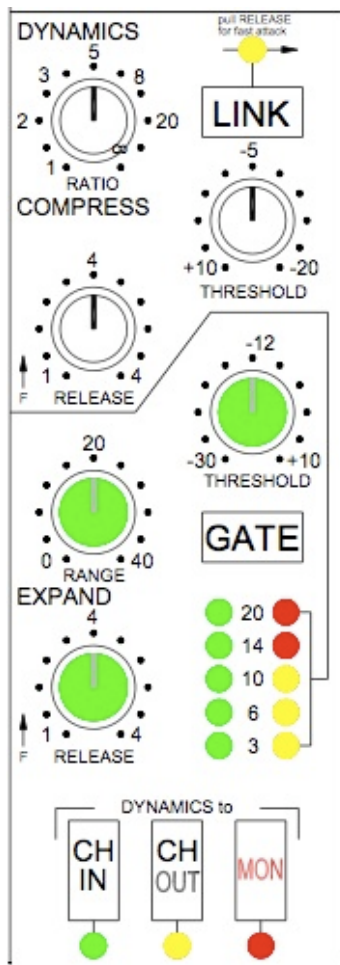
FLIP - This reverses the MIC/LINE selection on individual channels.

Ø (PHASE) - This reverses the phase of any channel input selected.

+48v - When selected, this provides phantom power to the associated microphone. Powering up a mic will cause a small thump to be heard, so it is preferable to cut a channel when switching the phantom power on.

MIC or LINE inputs are automatically selected by the STATUS switches on the SL651G Master module. In RECORD or REPLAY status, all inputs switch to MIC input, whereas in the MIX Status all inputs switch to LINE input. The FLIP button reverses the normal MIC/LINE selection for individual channels. The MASTER CH INPUT FLIP button on the SL 651G panel reverses the input selection on all channels.

Dynamics Section



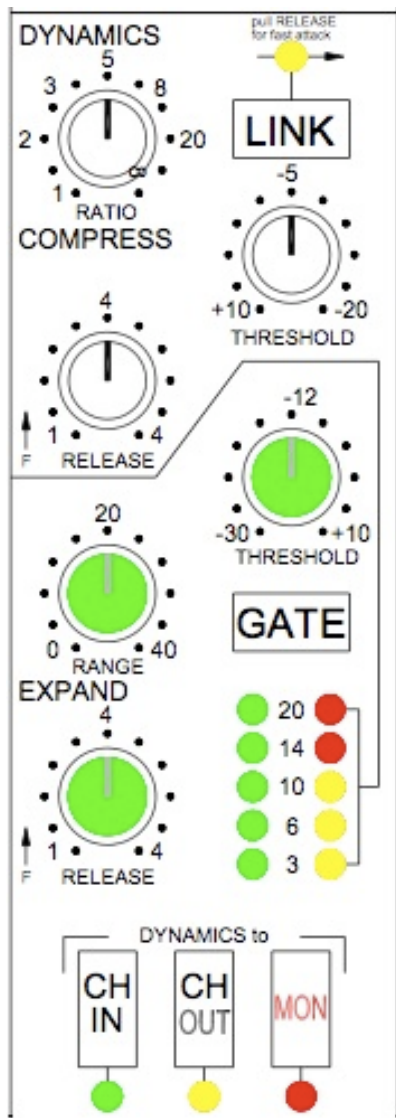
The Dynamics section comprises a compressor/limiter and an expander/ gate using the same gain change element. Both sections work independently but can be operational at the same time, thus providing sophisticated dynamics control of either the Channel or Monitor signal.

The Dynamics section has three routing buttons associated with it. Section 8 covers the Dynamics routing in more detail, but briefly these buttons function as follows:

CH IN - Switches the Dynamics into the Channel audio path PRE EQ

CH OUT - Switches the Dynamics into the Channel audio path POST EQ

MON - Switches the Dynamics into the Monitor audio path (Post-EQ if the EQ has also been selected to the Monitor audio path).



If both the CH IN (or CH OUT) and the MON button are selected, the Dynamics section is switched into the Channel and the side chain can be accessed from the Monitor signal path (after the READY GROUP and READY TAPE selection buttons). See Section 8 for more details.

Compressor/Limiter

RATIO - When turned to 1:1 the section is inactive. Turning the control clockwise increases the compression ratio to give a true peak limiter in the fully clockwise position.

THRESHOLD - Whenever a signal exceeds the level set by this control, the Dynamics section will compress that signal at the ratio set by the RATIO control. This control also provides automatic gain make-up, i.e. as you lower the threshold and introduce more compression, the output level is increased. This effectively maintains a steady output level regardless of the amount of compression

RELEASE TIME - Sets the time constant (speed), variable from 0.1 - 4 seconds, at which the compressor returns to normal gain settings once the signal has passed its maximum. This control also incorporates a switch which, when pulled up, provides a fast attack time (3ms for 20dB gain-reduction). When down, the attack time is programme controlled (3ms-30ms) - in other words, a steep wavefront is met with a correspondingly fast attack; attack time decreases to meet gentler level changes. Note that with a signal that contains transient peaks, such as a piano, a fast attack may result in an unpleasant effect as the compressor will duck the level as it senses the peaks and not the main

body of the input signal. The release time setting is independent of the attack time switch setting.

The yellow and red leds, on the right of the two displays, indicate the amount of gain reduction (compression).

Expander/Gate

This section can act as a 2:1 Expander or as a ∞ :1 Gate when the GATE button is selected.

RANGE - Determines the depth of Gating or Expansion. When turned fully anticlockwise (Range = 0) this section is inactive and when turned fully clockwise a Range of 50dB can be obtained.

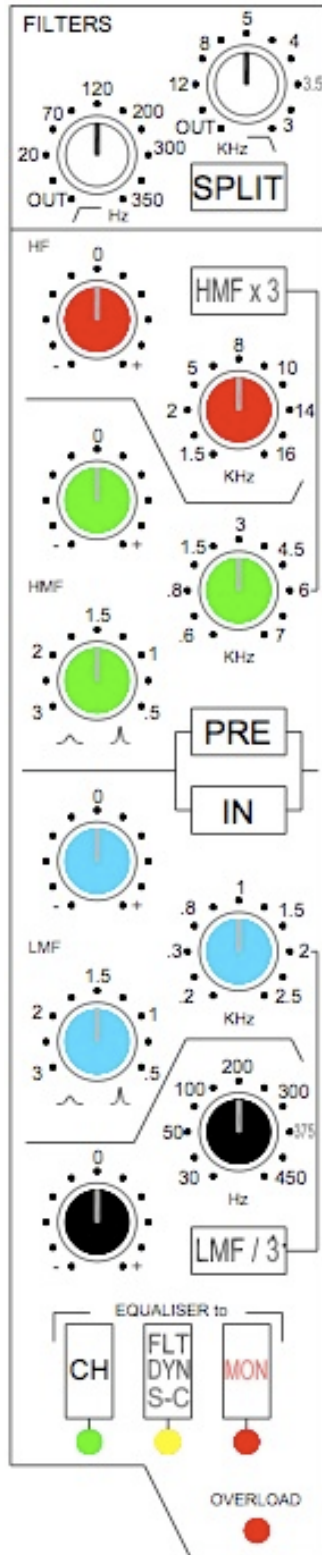
THRESHOLD - Variable hysteresis is incorporated in the Threshold circuitry. For any given 'open' setting, the Exp/Gate will have a lower 'close' threshold. The hysteresis value is increased as the Threshold is lowered. This is very useful in music recording as it allows instruments to decay below the open threshold before Gating or Expansion takes place.

RELEASE TIME-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 μ s per 40db). When down, a controlled linear attack time of 1.5ms per 40dB 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.

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

The **LINK** button at the top of the section links the sidechain signal of that unit to the sidechain of the next Dynamics section along to the right. Note that when the Dynamics section is not in circuit, its sidechain 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 8 describes the routing combinations in more detail but briefly these buttons function as described below.

CH - Switches the section into Channel audio path. The Filters POST the Equaliser.

FLT DYN SC - The Filters are switched into the sidechain of the Dynamics section. The Equaliser can be switched into the Channel or Monitor path independently.

MON - The section is switched into the Monitor audio path. The Filters are POST the Equaliser. The section is PRE the Dynamics section if this has also been selected to the Monitor audio path.

SPLIT - 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.

Note that FLT DYN SC overrides the SPLIT function.

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

Parametric Equaliser

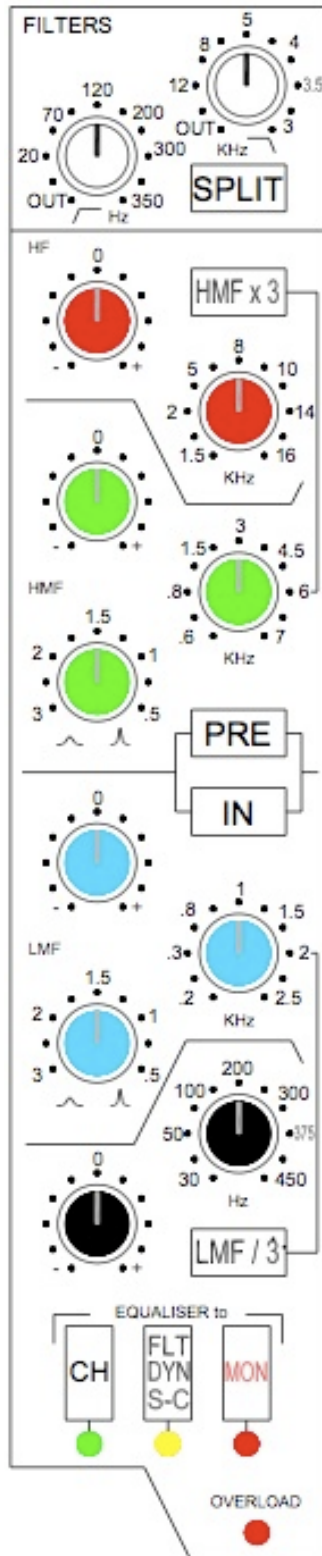
HF Section:

Comprises a 12dB per octave shelf filter with variable cutoff frequency and a boost/cut control.

HMF Section:

Continuously variable Q (filter width), gain and centre frequency controls.

x3 - This button is unique to the G Series EQ. G Series consoles have a BELL or peak button in this position which switches the HF section between shelf and peak filters). It operates on the HMF centre frequency control by multiplying the frequency range by a factor of 3. This allows the HMF section to be used in the HF region. For example, if the HMF centre frequency is 3KHz, the x3 button will move the centre frequency to 9KHz.. Working the HMF (with the x3 button in operation) and the HF sections together can yield some spectacular results unobtainable from the E Series EQ.



LMF Section:

Continuously variable Q (filter width), gain and centre frequency controls.

÷3 - This button is unique to the G Series EQ (E Series consoles have a BELL or peak button in this position which switches the LF section between shelf and peak filters).

It operates on the LMF section centre frequency control by dividing the frequency range by a factor of 3. This allows the LMF section to be used in the LF region. For example, if the LMF centre frequency is 1.5KHz, the ÷3 button will move the centre frequency down to 500Hz. A calculator is essential for working in this mode.

Using the LMF (with the ÷3 button in operation) and the LF sections together will allow you far more control of the bass frequencies. For example, the LMF controls could be set to remove unwanted resonance whilst the LF controls are set to give a warmer overall sound by boosting the lower end.

The HMF and LMF bands of the Equaliser have continuously variable bandwidth (Q). This measurement of the shape of the EQ curve is calculated as the ratio of Gain/Bandwidth.

Note that the frequency bands overlap considerably, allowing greater flexibility of control. By using the x3 and $\div 3$ buttons, the HMF and LMF sections can work with, or against, the HF and LF sections respectively.

LF Section:

Comprises a 12dB perOctave shelf filter with variable cutoff frequency and boost/cut control.

Now a little history lesson. SSL uses the colour of the LF knob caps to indicate which EQ type is fitted. The following colour code applies:

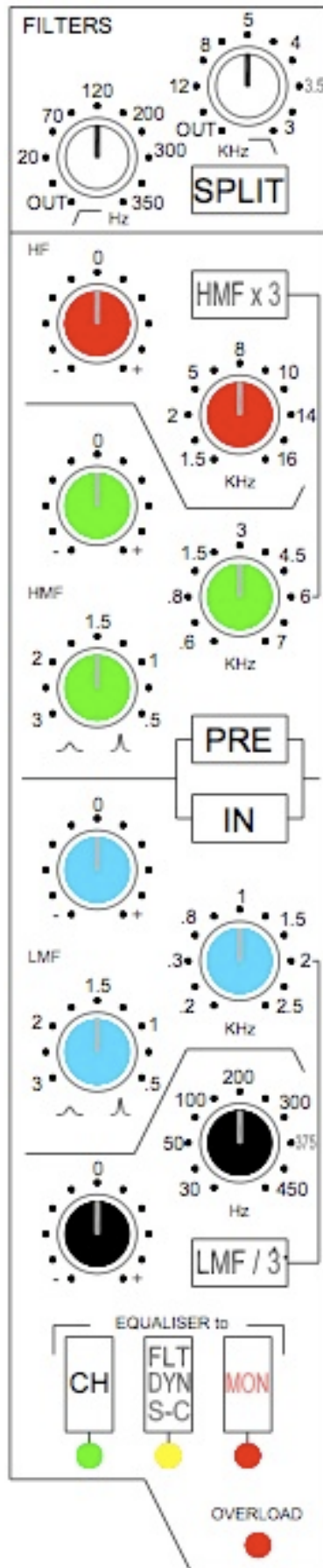
BROWN - The original SSL EQ fitted to all consoles prior to Summer 1985. Despite rumours to the contrary, these equalisers only came in one version. There were various small modifications done to early versions but basically they should all now be the same (provided the studio carried out all suggested SSL modifications).

ORANGE - The infamous EQP equaliser. This was a variation on the 'Brown' EQ with controls simulating the curves of valve type equalisers. Very few were sold.

BLACK - The latest version of the standard SSL E Series EQ. It came about from discussions with many engineers and proved to be very successful. This EQ is still fitted to SL 6000 E series systems as it was found to be excellent for post production applications.

BLACK - The new G Series EQ. Designed with tracking and mixing in mind, with changes to the sound quality and the addition of the x3 and $\div 3$ buttons.

G Series EQ may be retrofitted to E Series consoles and can be recognised by the x3 and $\div 3$ buttons. A few early retrofit kits were supplied with yellow LF knob caps, just to confuse you further!



Filters

The Filters can be completely bypassed when the controls are turned fully anticlockwise to the detented OUT position. On older consoles, all the EQ routing buttons must be switched out to accomplish this.

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 and gives an indication when it is within 4dB of clipping. The monitor points are: post-channel fader, post-insert point and channel front end pre any signal processing.

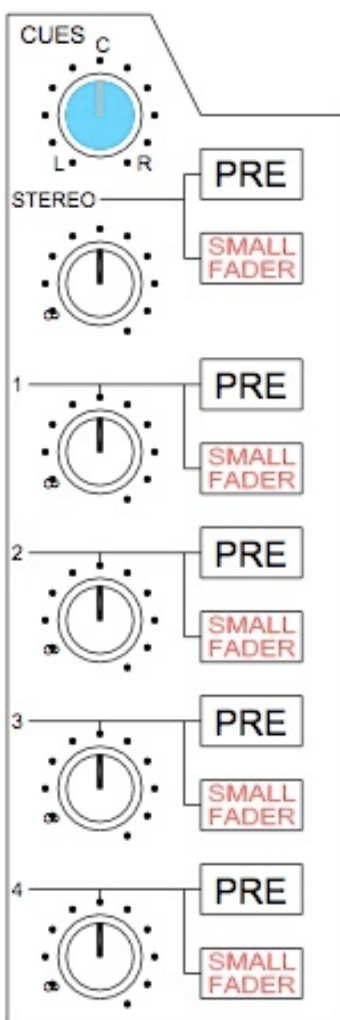
Insert Point

The insert point is switchable PRE or (normally) post the EQ 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. Note that the level at the insert send is 0dB, relative to a nominal operating level of +4dB.

There are two different insert point options set by links on the I/O module mothercard.

When the insert point links have been set to CHANNEL, the insert point will always be in the channel no matter where the EQ is. When the links are set to FOLLOW EQ, the insert point can only be switched in when the EQ is switched into an audio path. In this case the insert point moves with the EQ, so if the EQ is in the Monitor audio path then the insert point will also be in the Monitor path.

Cue and Aux Sends



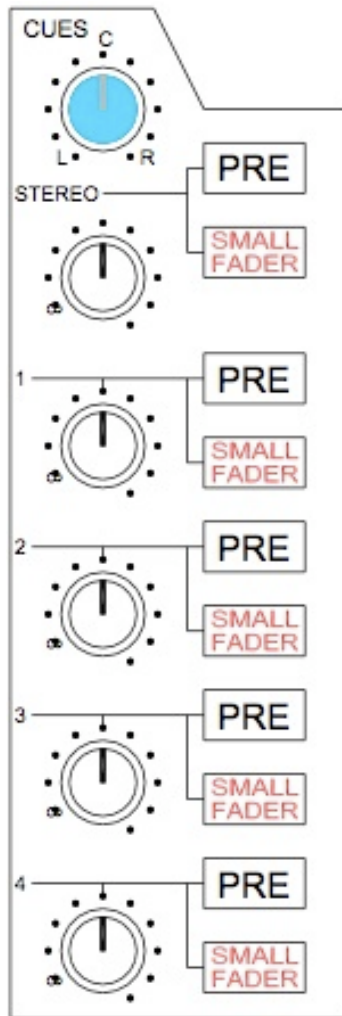
This section comprises one stereo and four mono sends. Either audio path, controlled by the Large or Small Fader within each module, may be routed to any of the send busses, in any pre or post-fader permutation.

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. When the knob is down it is on.

The stereo send also has a pan control. The source select buttons for each send are:

PRE - When pushed down the send is derived pre-fader and when up, post-fader.

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.



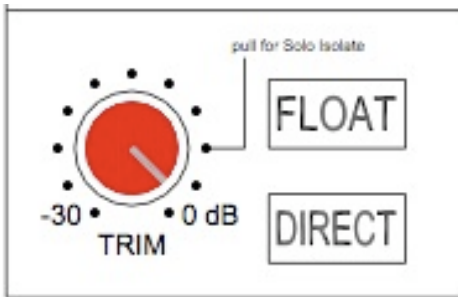
During the recording process, the stereo and the first two mono busses may be used as headphone feeds. All the Aux send bus outputs are found on the jackfield (Jacks N1-6) and can be used as feeds to effects units. The stereo and the first two mono sends are also routed back into the centre section (Jacks P5-8) where talkback, reverb returns and additional external stereo feeds can be added via the CUES pot on the SL 651G. Refer to the signal flow diagram on Page 9-5.

After the addition of any talkback, stereo reverb from the stereo reverb returns, and a stereo external source, the Cue outputs appear on the patch (Jacks N9- 14). These outputs are then normalised to the headphone power amps (Jacks P9-14).

CUE 1L and 1R are derived from Aux 1. CUE 2L and 2R are derived from Aux 2. CUE 1 and CUE 2 will be mono unless a stereo external source or stereo reverb has been added, whereas CUE STEREO is a true stereo send derived from the stereo Aux bus.

G Series consoles are fitted with a LOCAL (Split) AUX SENDS panel in the centre section. Exact details of the split system can be found in Section 9. Briefly, sends on modules to the right of the centre section always route through the main Aux and Cue system as described above. Modules to the left of the centre section feed out of the console through the controls on the LOCAL AUX SENDS panel which is to the left of the SL651G. The SPLIT buttons on the panel allow the left hand feeds to be mixed in with the six main sends or 'split' off on their own.

Group Output Section



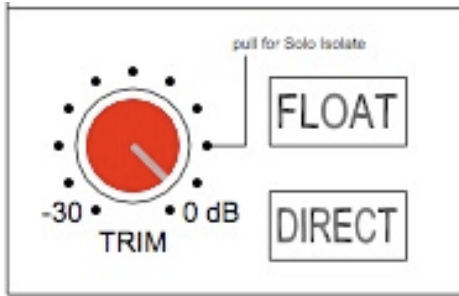
This section comprises a Group mixing amplifier with gain control and the FLOAT and DIRECT routing buttons.

The mix amp takes its input from the associated multitrack mix bus (e.g. all signals routed to multitrack Group 7 will be controlled by the group section on Module 7). The output of the Group appears on patch row G where the signal is normalised down to the Multitrack Send (i.e. to the record inputs of the multitrack) and to the Group Monitor Input via the READY GROUP button, located at the top of the Small Fader section.

The **GROUP TRIM** control attenuates the combined level of signals routed to the group. Normally these controls are left fully up and have detents in this position. Their main use is for attenuating a Group Output when, for example, several channels have been assigned to a group and a relative balance has been set on the faders. If the overall signal level is too high then the Group Trim control can be adjusted to send an optimum level to the multitrack.

When a Group is not being used as a multitrack send it may be routed to the corresponding CHANNEL INPUT SECTION, by pressing SUB GP on that module. The channel will now act as an audio subgroup and the Group Trim control as the channel input gain control.

FLOAT - The STATUS logic switching on the SL 651G Master module normally determines, across the console, the output destination of the two faders on each module. The FLOAT button reroutes whichever of the two faders is currently assigned to the main Quad Bus Pans, up to the Routing Matrix, in order to facilitate track bouncing and audio subgrouping arrangements. Note that the other fader's routing destination is then disabled, although it may still feed post-fader Aux sends. This is *not* a fader flip button.



DIRECT - This button provides a means of routing the post-channel fader signal on that module directly to the corresponding multitrack Group Output, bypassing the Routing Matrix, Group mix bus, Group mix amp and Group Trim control. This improves noise figures but disables all other channels

routed to that Group Output, as the Group mix amp is disconnected from the Group Output (see Section 7). The Group mix amp will, however, still feed the SUB GP button on the Channel Input Section.

The DIRECT button also allows channels above 32 to access their own Group Output (e.g. Group 33 can only be accessed from Channel 33 with the DIRECT button selected). The Group Outputs from 33 onwards can therefore be used as additional sends to a second multitrack during live recording or as direct channel outputs. Remember also that the Insert Send jack always (unless the console has the Follow EQ insert option - see Page 2-11) carries the Channel signal so this may also be used as a direct output in the last resort.

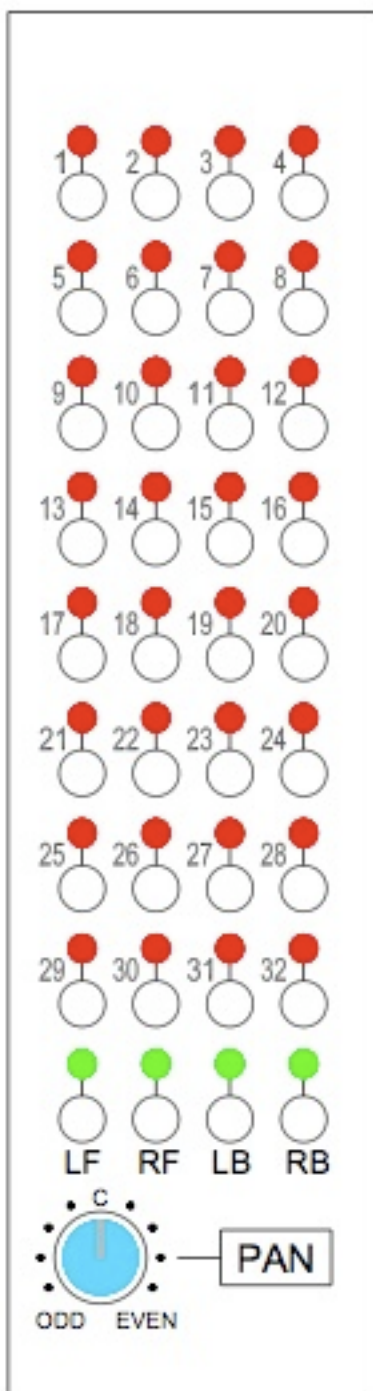
Solo Isolate

The Group Trim control is fitted with a pull-up switch (not fitted to E Series consoles) which, when up, isolates the corresponding VCA fader from the VCA Solo Cut Bus. This facility is very useful for preventing echo returns from being muted when a source is soloed, thus allowing the sources to be heard with their effect returns.

If any channels are being used as audio subgroups, these should also be Solo Isolated to prevent the subgroup output being cut when a channel within that group is soloed. G Series I/O modules are fixed with a switch on the Logic card which can activate Solo Isolate automatically when the SUB GP button is selected.

The VCA Solo button on any channel that is Solo Isolated will operate as an AFL (After Fader Listen) button when pressed.

Routing Matrix



The console has as many Group Outputs as there are I/O modules. The Routing Matrix allows any module to route to the first 32 of these output Groups, as well as the main Quad bus.

The matrix may be fed from either fader path depending on the console STATUS selection and the individual module FLOAT buttons.

There are four main uses for this matrix:

1. In RECORD or REPLAY status the Channel signal can be fed to any multitrack group for track laying, usually from the LARGE FADER or, if VCAs TO MONITOR is selected, from the SMALL FADER.

2. In MIX status either the SMALL FADER signals (or the LARGE FADER when the **LOAT** button is selected) can be fed to the Routing Matrix for audio subgrouping on any of the first 32 channels. Having been routed to the selected group(s), these signals can be picked up on the corresponding LARGE FADER by pressing the **SUB GP** button, or on the SMALL FADER by selecting the **READY GROUP** button.

3. In MIX mode the SMALL FADER can be used as an additional send via a Group. Using the INPUT and OUTPUT buttons next to the SMALL FADER, the Channel signal, pre-signal processing or pre/post-VCA fader can be routed to a multitrack group and then patched, from Row G, to an effects unit input.

<i>Buttons Selected</i>	<i>Source of Small Fader Input</i>
INPUT	Pre-Signal Processing but after Filters if SPLIT.
INPUT & OUTPUT	Post-Signal Processing but Pre-VCA Fader.
OUTPUT	Post-VCA Fader.

Note that these buttons are also active in RECORD and REPLAY status.

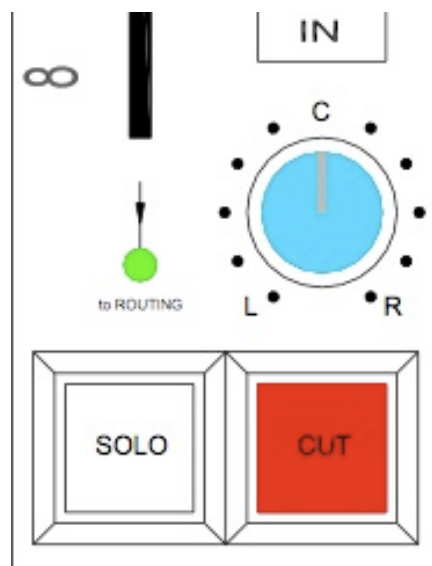
4. In MIX mode as a way of accessing the main quad outputs from the SMALL FADERS. Additional Line Inputs (or Mic Inputs, with the optional SSL Dual Mic preamps) can be patched into the Tape Monitor Inputs (Row K) and sent via the SMALL FADER to the Quad bus select buttons on the Routing Matrix, so allowing twice as many inputs to the Quad bus as there are modules.

The Routing Matrix allows a signal to be routed to any number of destinations simultaneously. Stereo panning between Groups can be achieved by selecting two Groups, switching in the **PAN** control and panning between Odd and Even groups selected (the odd Group is the left of the pair and the even Group is the right). If the signal is routed to the Quad busses, the pan can be used between the LF aid RF or the LB and RB busses.

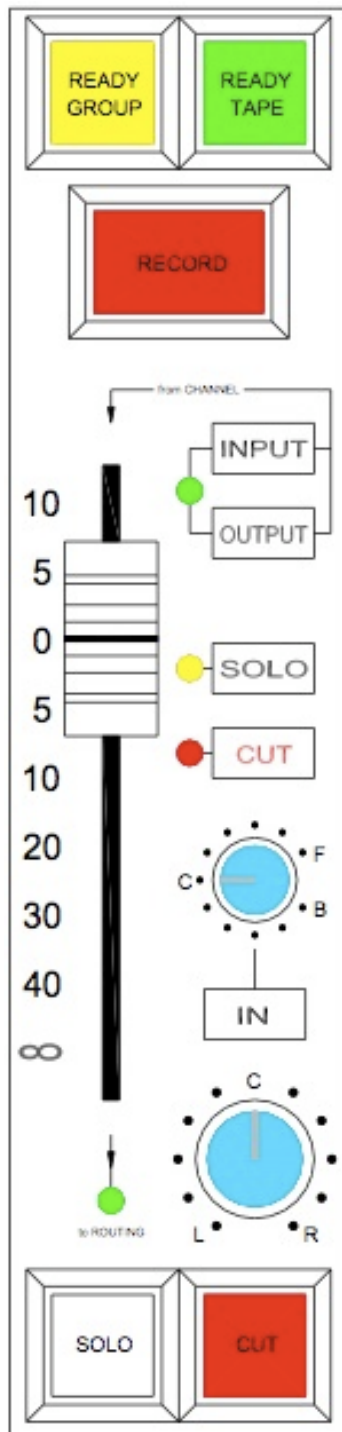
The Routing Matrix and Status Logic Switching

<i>Status</i>	<i>Routing Matrix fed from</i>
RECORD/REPLAY	Channel Input via LARGE FADER
RECORD/REPLAY + VCA TO MON	Channel Input via SMALL FADER
RECORD/REPLAY + module FLOAT	Monitor Input via SMALL FADER
RECORD/REPLAY + VCA TO MON + module FLOAT	Monitor Input via LARGE FADER
MIX	Monitor Input via SMALL FADER
MIX + module FLOAT	Channel Input via LARGE FADER

Note that the easiest way to tell which fader is feeding the Routing Matrix, is to look at the green led below the SMALL FADER. When it is lit, the SMALL FADER feeds the matrix and when off, the LARGE FADER is feeding the matrix.



Monitor Input and Small Fader Section



Monitor Input Section

The source selected by the MONITOR INPUT SECTION is governed by the state of the **READY GROUP** and **READY TAPE** buttons and the **INPUT** and **OUTPUT** buttons.

Note that the INPUT and OUTPUT buttons override READY TAPE and READY GROUP, but we will assume that they have not been pressed at the moment.

The READY GROUP and READY 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 **RECORD** button to function as a Track Ready button.

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

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 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 set. 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!

Small Fader Source and Destination

The console STATUS and FLOAT buttons determine if the Small Fader is placed in the Monitor or Channel signal path. (See Section 7 for more details.)

The led situated below the Small Fader is a good indication of the fader's destination and will help you to quickly confirm which signal path it is controlling.

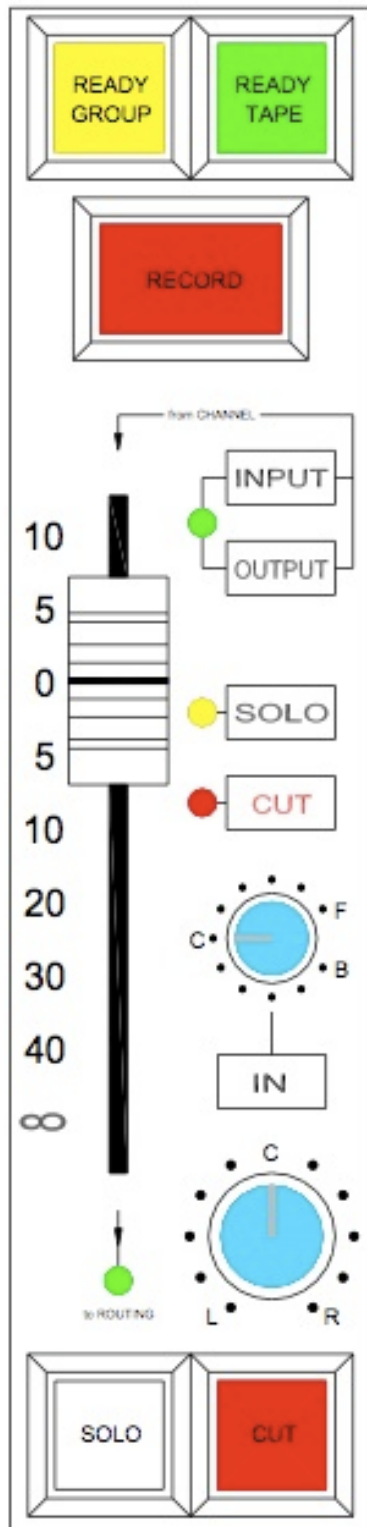
For your reference the sources and destinations of the Small Fader signal are shown below:

<i>Status Buttons Selected</i>	<i>Small Fader Input</i>	<i>Small Fader Output</i>
MIX	Monitor Input	Routing Matrix
RECORD	Monitor Input	Quad Bus
RECORD + VCA TO MON	Channel Input	Routing Matrix

If the channel FLOAT button is also pressed:

<i>Status Buttons Selected</i>	<i>Small Fader Input</i>	<i>Small Fader Output</i>
MIX + FLOAT	Monitor Input	Disconnected*
RECORD + FLOAT	Monitor Input	Routing Matrix (For Track Bouncing)
RECORD + VCA TO MON + FLOAT	Channel Input	Disconnected*

* Post-Small Fader Aux sends will still be fed.



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 Monitor fader or a Channel fader (as in RECORD + VCAs TO MONITOR status).

Normally the **SOLO** buttons activate an 'in place' (destructive) Solo function. This is useful when using the Small Faders as Monitor fader in the RECORD status. However, if the Small Faders are being used as Channel faders in RECORD + VCAs TO MONITOR status, the SOLO buttons can be switched to an AFL (After Fader Listen) function by selecting **AFL** (or **STATUS LOCK**) on the SL 651G (Section 4).

The **CUT** button always cuts (mutes) the Small Fader. However, depending on the console Status and DIL switch settings on the module Logic Card, it may or may not cut the Pre-Fader Cue/Aux sends. This is explained in more detail on Page 2-25.

Quad Pans

These controls allow signals to be panned across the Quad output busses. If the FRONT/BACK pan is not switched in, the LEFT/RIGHT pan feeds the front two busses only, for normal stereo work. The Front/Back pan can be used to split the mix into two separate stereo outputs.

Ready Group/Tape Selections and the Supercue System

The READY GROUP and READY TAPE buttons are used to select monitor sources for the Monitor fader and to determine the Pre-Fader Cue feeds. As already described, these buttons also enable the module track RECORD facility. The table below lists the different combinations of buttons and the resultant signals that are fed to the Monitor fader and the Cue sends:

<i>Ready Button Selected</i>	<i>Monitor Fader Source</i>	<i>Pre-Fader Cue Feeds</i>	<i>Track Record Facility</i>
None	TAPE	TAPE	NO
TAPE	TAPE	GROUP + TAPE	YES
GROUP	GROUP	GROUP	YES
GROUP + TAPE	GROUP + TAPE	GROUP + TAPE	YES

As can be seen above, both Group Output and Tape Return can be monitored together, when both READY GROUP and READY TAPE buttons are selected. This is presented as a 1:1 mix. Note also that when the READY TAPE button is selected on its own, the Cue sends still receive a combination of Group and Tape, allowing the engineer to hear the drop-in while the artiste can hear both himself (or herself) as well as a feed from the Sync head of the ATR.

The table above applies while the multitrack is not running in record. When the machine is in record, the console senses the machine record line and then adjusts the monitor sources accordingly (see opposite). This facility of automatic source selection is called the SSL Supercue System.

Let's first look at the Monitor fader source before the during the drop-in. The following table shows the sources that will be selected:

<i>Ready Button Selected</i>	<i>Monitor Fader Source Pre-Drop-in</i>	<i>Monitor Fader Source During Drop-in</i>
TAPE	TAPE	GROUP †
GROUP	GROUP	GROUP
GROUP + TAPE	GROUP + TAPE	GROUP *

* The asterix indicates that the Supercue system has switched from GROUP +TAPE to the GROUP signal only. When cues and Monitors are fed with a GROUP+TAPE signal, the two signals can be optionally reduced by 3dB to avoid coherent summing. This is achieved by links in the I/O modules (G Series only). In this case, when Supercue switches to GROUP only, the level of the Group signal is restored. Check with your studio which option is present. This option is not usually set in video post-production applications.

† Indicates that this condition will give TAPE if a DIL switch on the I/O Logic card is set to ON. This may have ramifications in the following text.

In the Control Room

When laying fresh tracks it is possible to monitor either the READY GROUP or READY TAPE signal. READY GROUP allows you to meter signals going to the multitrack.

Remember that when READY TAPE only is selected, you will only hear a signal if the multitrack is playing: or if the multitrack automatically switches to Input when stopped. When the machine is in Record the monitoring automatically switches to GROUP. The metering however will continue to meter TAPE, which may in turn be effectively GROUP if the machine switches to Input when in record. READY TAPE will allow you to hear a "clean edit" when dropping in (i.e. the Sync output of the multitrack prior to the drop-in point and then the Group Output after the drop-in point, switched when the track drops into record).

When overdubbing, selecting READY TAPE and READY GROUP together will allow you to hear the artiste playing along with the previously recorded track prior to the drop-in, and then the Group signal on its own during the drop-in.

It may seem like things are getting a little too complicated here. Don't you think it would be better if we all agreed to record bands direct to 2 Track?

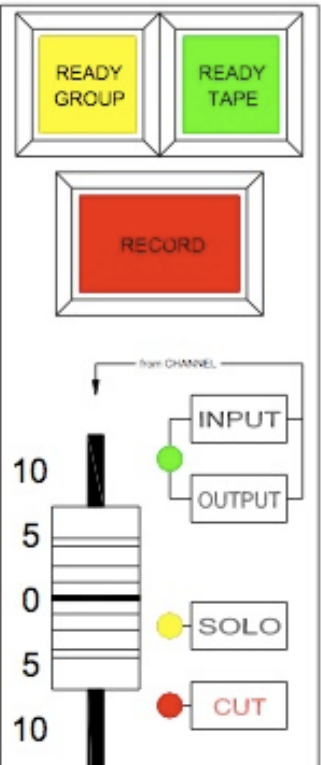


In the Headphones

Let's assume that both READY TAPE and READY GROUP are selected. This means that the mic is always present in the headphones and allows the artiste to play or sing along with the previous take and in many cases pick up any complex nuances that were in the original performance. The artiste will hear himself (or herself) as well as the machine Sync output up to the drop-in point.

After the drop-in point, the TAPE signal is switched off and the GROUP signal, the mic or other source, is raised in level by 3db (if the 3dB option has been set internally).

Small Faders as Extra Auxiliary Sends



The INPUT and OUTPUT buttons, next to the SMALL FADER, provide a means of feeding the Channel signal into the Monitor path in place of the READY GROUP, READY TAPE selections.

These two buttons override any READY GROUP or READY TAPE selection.

This is very useful in the MIX mode for deriving additional auxiliary sends or clean feeds (see Section 10). These can then be fed to the Routing Matrix and out to effects devices or cue lines e.g. Groups 25-32 can be used as clean feeds of a live mix, the Small Faders being used to send the Channel signal to as many of these clean feeds as required.

<i>Buttons Selected</i>	<i>Source of Small Fader Input</i>
INPUT	Pre-Signal Processing but after the Filters if SPLIT
INPUT & OUTPUT	Post-Signal Processing but Pre-VCA Fader
OUTPUT	Post-VCA Fader

Monitor Cut and Solo

When laying tracks it is often preferable to be able to CUT and SOLO the Monitor feeds without cutting the Pre-Fader Cue sends to the studio headphones. There is a DIL switch on the Logic card which determines if the Monitor Pre-Fader Cue sends are cut by the Monitor Cut or not.

In RECORD and REPLAY status, Monitor Cuts do not cut the Pre-Fader Cue sends if this option has been selected.

In MIX status, Pre-Small Fader Cue/Aux sends will also not be cut by the Small Fader Cut button if this option has been selected.

Large (VCA) Fader

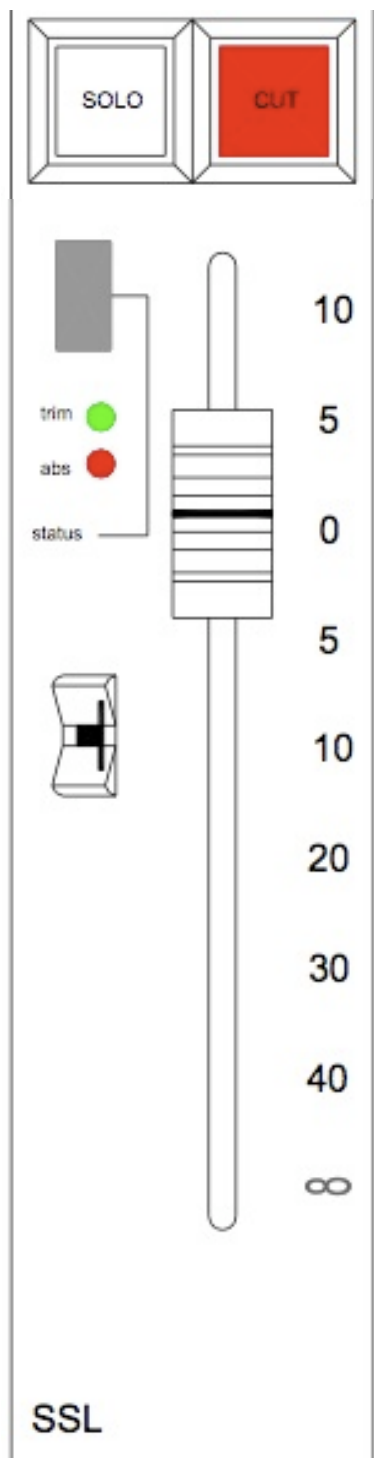
The LARGE FADER is usually fed from the CHANNEL INPUT SECTION. However, there are exceptions as this table shows:

<i>Status Selected</i>	<i>Large Fader Input</i>	<i>Large Fader Output</i>
MIX	Channel Input	Quad Bus
RECORD	Channel Input	Routing Matrix
RECORD + VCA TO MON	Monitor Input	Quad Bus

If the FLOAT button is also pressed:

<i>Status Buttons Selected</i>	<i>Large Fader Input</i>	<i>Large Fader Output</i>
MIX + FLOAT	Channel Input	Routing Matrix
RECORD + FLOAT	Channel Input	Disconnected *
RECORD + VCA TO MON + FLOAT	Monitor Input	Routing Matrix

* Post-Large Fader Aux sends are still fed.

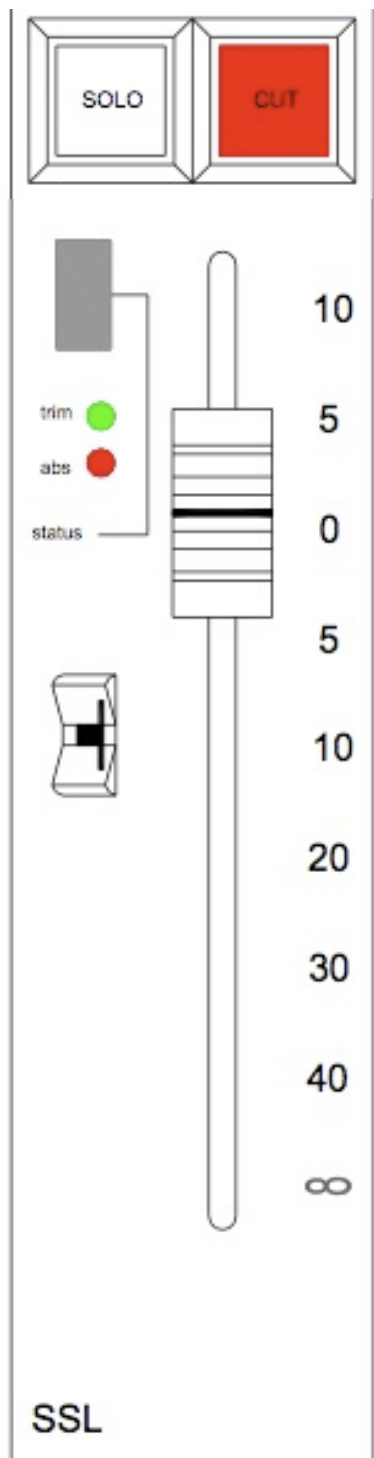


The large illuminated SOLO and CUT buttons are always associated with the Large Fader.

SOLO - This button does not affect the I/O module at all. However, it cuts all other modules which are not soloed, allowing selected channels to be monitored in stereo on their own. This is known as a "destructive solo" and should not be used on Channel signals while recording. If **AFL** is selected on the SL 651G, none of the channels will be cut when Solo buttons are pressed, but the selected channel can be heard in mono on the main monitors. Links within each module select PFL (Pre Fader Listen) instead of AFL if preferred.

If the module's GROUP TRIM control is pulled up, then that channel will be isolated from the VCA Solo Cut Bus and so will be unaffected if another module is soloed (G Series Only).

CUT - When the VCA Fader is used in the Channel signal path the CUT (or Mute) button actually cuts the channel in two places - at the input and at the fader (VCA). This differs slightly from a cut generated when a SOLO button is pressed on another channel. In this case, the channels are only cut at their inputs. This allows the soloed channel to be heard but doesn't send a cut signal to the VCA and hence the automation computer. Therefore, channel solos during an automated mix are not recorded as part of the mix data.



STATUS - This switch beside the Large Fader is related to the automation system, as are the **trim** and **abs** leds.

VCA Fader Subgrouping

The VCA thumbwheel switch is the means by which the module VCA, being controlled by the LARGE FADER, can be assigned to one of the eight VCA GROUP FADERS located in the console centre section.

The VCA Group Faders can also be assigned to other VCA Group Faders, so many combinations of VCA subgrouping can be achieved.

If a VCA Subgroup has been selected then the module VCA will be controlled by the Large Fader *and* the VCA Group Fader. When set at 0 the VCA Group Fader has no effect on the channel VCA, allowing 10dB of headroom above this position. If **I** is selected on the thumbwheel switch, the Large Fader VCA is 'Independent' of the VCA Group Faders, including their Solo Cut Bus, and the VCA Group 0 Trim control, located on the SL 651G.

The Independent thumbwheel setting has a variety of uses. For instance, it may be that VCA fader levels across the console are basically set but one or more channels need to be slightly higher than their fader allows. In this case, set them to Independent and reduce the level of the other faders with the VCA Trim control. Or, when a VCA subgroup is soloed, all other subgroups will normally be cut (including VCA Group 0), along with the channels assigned to them. This may not be desirable where effects devices fed from the soloed subgroup are returned through channels. If the effects return faders are set to Independent, they will not be cut. In addition this will prevent the return levels being affected if the VCA trim control is being used as above.

Both the Large Faders and the VCA Subgroup Faders are connected to the SSL Primary Studio Computer. Optionally, the console may be fitted with Ultimotion, SSL's unique dual-path moving fader automation system. See the Computer Operator's Manual for further details.

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