

Solid State Logic

G Series Systems

Operator's Shortform Guide

82S6MGS010A

READ ME FIRST!

This document is designed as a (nearly!) pocket-sized guide for users who are new to G Series Systems. It will also be useful for those who have had some experience of G or E Series consoles, but need to remind themselves of certain functions. Further copies may be downloaded from our web site.

This guide is split into two sections — Section 1 covers the console, Section 2 is on the computer. Please note that an annotated front panel drawing and console block schematic are provided at the end of this document. If you are reading a hard copy of this guide, and either of these items is missing, please contact your local SSL representative to obtain a new copy.

If you would like to comment on the usefulness of this guide, or make suggestions for further topic inclusions (or removals), please email productinfo@solid-state-logic.com

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SL 4000 G+ Console

Introduction

The SL 4000 G+ is the latest version of Solid State Logic's original analogue mixing console, the SL 4000 E. Much copied since its inception, the world famous SL 4000 range remains the industry standard.

The SL 4000 G+ is a totally integrated single operator studio system, employing an advanced in-line format with extensive signal processing and routing facilities. Operational refinements include remote track arming, and a computer built on proprietary technology, providing tape transport control, together with comprehensive session management and sophisticated mix automation.

A G+ system consists of two independent units: the SL4000 G+ console, and a 19" 'rack' containing the G Series Computer and dual floppy disk drive unit, together with the console and computer power supplies. This section of the guide covers the console. Section 2 covers computer operation.

The G+ Console — an Overview

At first sight, the G+ console may appear to be overwhelmingly complicated, due in part to the exceptionally flexible nature of its audio architecture. However, the opposite will soon found to be true as, in fact, the console is a highly intuitive, ergonomic and versatile tool.

The G+ console has four main mix output busses, most commonly designated Left Front, Right Front, Left Back, and Right Back. This bus structure may be modified to provide Left, Centre, Right and Surround outputs (referred to as the 'Film Panning' option) for surround mixing applications. In non-surround mixing applications, the four output busses may be configured to deliver two entirely different mixes.

Monitor feeds are provided for one set of Main control room loudspeakers and two pairs of Mini 'speakers, directly supplied from the main bus output distribution. A dedicated Studio Loudspeaker feed is also provided.

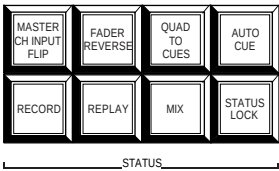
The console I/O modules are fitted as standard with moving-coil VU meters which may be selected to display the tape return, corresponding group/bus output, channel input signals, or fader/VCA levels. Main output metering can be selected from Desk Output, or External Source (or to simply Follow Monitor). The centre section is normally fitted with VU meters for the four main output busses, summed mono and phase, plus mechanical peak metering for left and right outputs. Furthermore, an audio phase-scope is also provided, connected in parallel with the left and right meters. VU metering is also supplied for each Cue/Auxiliary bus.

To determine the location of front panel functions described on the following pages, please refer to the foldout drawing at the back of this guide.

Signal Flow

Being an in-line console, two distinctly independent signal paths exist within each G+ Input/Output module — the Channel path and the tape Monitor path. Each path has a separate input source, and an output with dedicated pan-pot, fed via the small or large fader.

The Channel path source is either a Mic or Line (or Sub Group) input, which normally feeds the multitrack Routing Matrix at the top of the channel strip. The Monitor path source can be the Group (bus feed to the multitrack) or Tape (the multitrack tape return) signal, fed to the main mix busses via the front and surround pan-pots.

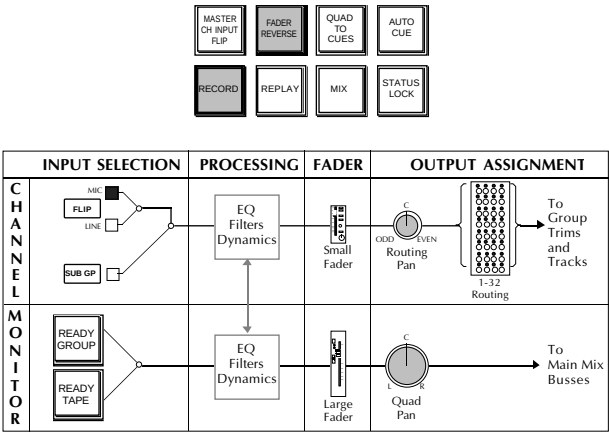


The G+ console uses master status switching to enable basic console signal paths to be instantly configured for the task in hand. There are four primary master statuses: **RECORD**, **REPLAY**, **MIX**, and **RECORD + MIX** (Overdub). These can be combined with two secondary modes **FADER REVERSE** and **MASTER CH(ANNEL) INPUT FLIP**.

RECORD

Sets the channel inputs to Mic (red LEDs). The large fader is in the Channel path and the small fader in the Monitor path. However, in order to provide a ‘clean’ VCA-free path to tape, it is usual for the small faders to be in the Channel path whilst recording. This also means that the large faders are in the Monitor path, and the operator can therefore take advantage of the VCA groups while creating a monitor mix. The faders are swapped between paths by selecting **FADER REVERSE**.

The basic signal routing diagram for **RECORD** plus **FADER REVERSE** is shown below:



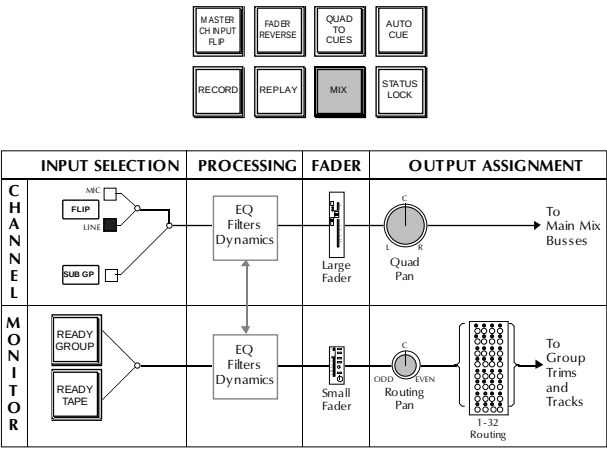
REPLAY

Switching to **REPLAY** provides rapid playback of a track. The signal path is the same as **RECORD**, except that any channel **READY GROUP** selections are defeated, so that the Monitor mix is coming from tape. Also, if connected, a remote relay can switch an analogue multitrack machine from the sync head to the repro head. The studio loudspeakers will be enabled (they are disabled in **RECORD**), to allow the mix to be played to the studio floor.

MIX

Sets the Channel inputs to Line (green LEDs) which feed the large faders. The line inputs are connected in parallel to the tape returns (if you look at the patch, the Tape Monitor inputs and the Line inputs are usually both coloured green). The small faders are in the Monitor path, which, if **READY GROUP** is not pressed, is also fed from the tape returns. This means that the multitrack routing can now be used for additional effects sends.

The basic signal routing diagram for **MIX** status is shown below:



RECORD + MIX (press both buttons simultaneously)

This is identical to **MIX** status, until either the **READY TAPE** or **READY GROUP** button is pressed on a channel, then that channel will automatically switch to **RECORD** status. This allows fast overdubs with minimal disturbance to any other routing.

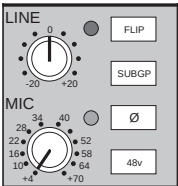
For a detailed view of signal flow though the entire console, a SL 4000 G+ Console Block Schematic is provided at the end of this document.

Input/Output Module

Channel Input Section

This section provides a transformerless microphone amplifier, featuring low noise and high CMRR, with stepped, variable range of 70dB down to line level, a gain control, and **48V** phantom power supply switch.

An electronically balanced line amplifier with trim pot, providing high input overload margin and balanced input impedances to both differential and common-mode inputs. The Phase Reverse switch (**Ø**) operates on both inputs.



Channel input is globally defined by the selected Master Status, however, **FLIP** toggles input selection locally between Mic and Line, with **MASTER CHANNEL INPUT FLIP** in the centre section reversing channel input selections across the desk. Selection of **SUBGP** replaces the current channel input with that module's group mix amp output, enabling the creation of audio subgroups, with the Group Trim acting as a master level control.

The **CHANNEL IN TO METERS** button, in the centre section, facilitates viewing of the Channel Input levels, overriding the bus/tape default.

See Appendix B for the Channel Input Amplifier specification.

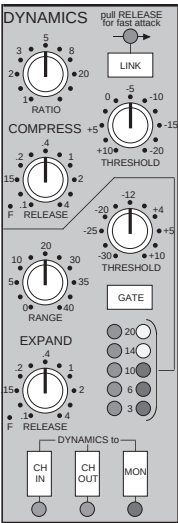
Dynamics Section

This comprises a soft-knee Compressor/Limiter and Expander/Gate, which are selectable to the Channel or Monitor signal path. For the Channel path, the Dynamics can be switched pre (**CH IN**) or post (**CH OUT**) Equaliser. **MON** applies the dynamics section to the Monitor path (post EQ if also selected).

Although the same gain change element is utilised for both Compressor/Limiter and Expander/Gate, two dedicated LED displays are provided to indicate the activity in each device. Automatic gain make-up, evaluated from the Ratio and Threshold settings, is applied by the compressor to maintain a steady output level. The default compressor attack time is programme sensitive, responding to the audio material's waveform.

The Gate default setting is actually that of an Expander, behaving in this application as a gentle gate. Variable hysteresis is incorporated into the Threshold circuitry, allowing the signal to decay below the opening level.

The dynamics Key Input/Sidechain can be sourced from the modules' Monitor path (select **CH IN** or **CH OUT** and **MON** simultaneously), or post filter signals. Dynamics sections may be ganged using the **LINK** keys; whilst each channel indicates its individual input activity, whichever channel whose processing is working hardest will the dominant signal, driving all linked circuits.



See Appendix B for Dynamics specifications.

Equaliser Section

High Pass (18dB per octave) and Low Pass (12dB per octave) Filters are provided at the top of this section. The Filters may be switched into the Dynamics section side chain to afford simple de-essing etc., by the selection of **FLT DYN SC** (at the foot of the section).

The equaliser is a four band device, switchable to either signal path with the **CH** and **MON** buttons respectively. Normally the Filters are switched into the same path with these buttons, pre equaliser unless **SPLIT** is selected. **SPLIT** switches the Filters to the Channel path pre input select and phase reverse switch.

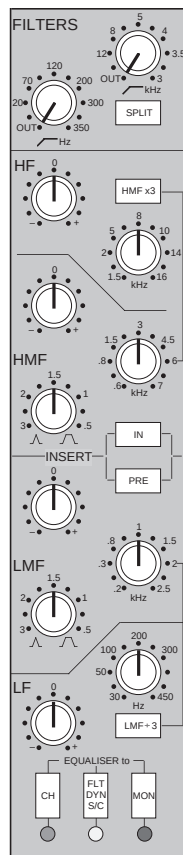
Two different EQ cards are available. The standard G-Series parametric EQ comprises variable bandwidth mid-range curves with adjustable Q (the bandwidth decreases as the gain is increased), and shelving high and low bands, with LMF and HMF range shift switches. See Appendix B for detailed EQ parameters.

The **IN** and **PRE** buttons control the Channel path Insert point. The insert is switchable pre or pre equaliser with the **PRE** button. Selection of **IN** switches the Insert Return back into the Channel signal path. Note that the Insert Send always carries the Channel signal and may be used as an additional pre fader output if required.

Many signal processing routing arrangements are possible, using the Dynamics, EQ, Filters, Insert and Dynamics Sidechain shared between the Channel and Monitor paths. See diagrams in Appendix A for details.

Overload Indicator

The overload detection circuit monitors the Channel signal path at three different points: Channel input, pre channel fader and pre channel fader. The overload LED (fitted between the EQ and Cues sections) will indicate when the signal at any of these points is within 4dB of clipping.



Cue and Aux Sends

One stereo and four mono auxiliary sends are provided. These may be individually sourced pre or post the small or large fader, according to selection of the appropriate buttons.

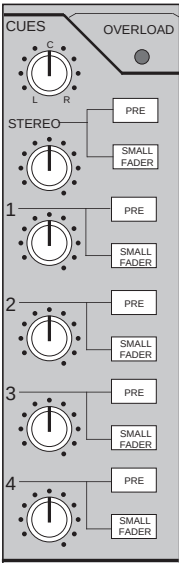
The controls fulfil a dual purpose, firstly as Cue sends (Stereo, plus 1 and 2), capable of receiving talkback injection, stereo echo return signals, and any external source added from the centre section, for Headphone (Cans) and Studio Loudspeaker (SLS) feeds. Alternatively, sends 1 to 4 may be used as echo sends or clean feeds to FX devices.

Each auxiliary bus has a master level control in the centre section, with a push-push On/Off switch, and dedicated high and low pass filters. The bus outputs can be viewed on dedicated meters, usually found above the patchbay.

Selecting **MIX TO CUES** (to the left of the Master Fader) replaces any existing cue feeds with the consoles main output, providing a quick and simple way of supplying the mix to headphones.

SuperCue

In Record Ready mode (see Monitor Input section below), hitting **PRE** on any cue/auxiliary send assigned to the Monitor path (usually the large fader by default) actuates the SuperCue system. This feeds the headphones an alternative arrangement of inputs to those being monitored in the control room. See the G Series Console Operator’s Manual for details.



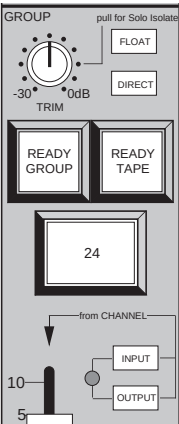
Group Output Section

This comprises the Group mix amp, with its attenuating **TRIM** pot, plus the crucial **FLOAT** and **DIRECT** buttons (see Routing Matrix section, Page 1-9). The behaviour of this section is highly dependent on the console’s Master Status. The Group Trim pot has an integral pull-push Solo Isolate switch.

Monitor Input Section

This section provides selection of inputs to the module’s Monitor path, together with small fader input selection.

READY GROUP derives its input from the corresponding Group amp output, allowing the signal being sent to tape (Multitrack Send) to be monitored (and metered), whilst permitting the big red record switch to be enabled. **READY TAPE**, monitors the multitrack returns until the machine is in record. Selecting **READY GROUP** and **READY TAPE** together enables simultaneous monitoring of tape send and return signals, allowing a previously recorded take and the new performance to be monitored prior to a drop-in.



Small Fader

Depending on the console's Master Status, the small fader can control signals in the Monitor path (Record Status) or the Channel path (Record *and* Fader Reverse). During mixdown, the small fader may serve as an additional line input for any signal patched into the Tape Monitor Input.

The 'from CHANNEL' **INPUT** and **OUTPUT** buttons change the small fader source to channel signals as follows:

- INPUT** Pre signal processing but after Filters if **SPLIT**
- OUTPUT** Post large fader
- INPUT + OUTPUT** Pre signal processing, pre large fader

In Mix Status, signals picked up in this way may be used as extra Echo (FX) Sends via the Routing Matrix.

The small fader **SOLO** button normally provides a destructive solo or AFL (After-Fader Listen) function. The choice is made on a console-wide basis in the centre section. The function of the **CUT** button should be self explanatory. Pre Monitor fader auxiliary sends will not be cut by this function unless optionally set to do so by an internal switch.

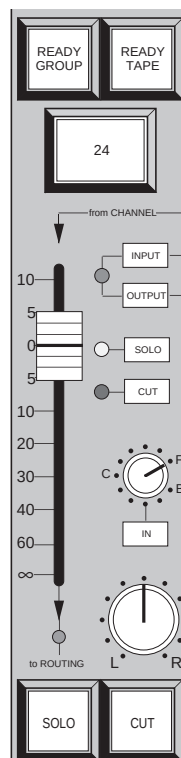
The green 'to ROUTING' LED below the fader confirms which fader is feeding the multitrack routing busses. When lit, the small fader feeds these busses; when not lit, the large fader is feeding the busses.

The Large Fader

The fader below each I/O module normally controls the module's VCA. If the console is fitted with SSL's Ultimatum™ automation system (see Section 2), this fader will be motorised.

The large fader **SOLO** is switchable to provide a destructive solo or AFL function as described previously for the small fader. Backstop PFL may be provided as an option.

The Status button and LEDs are associated with the G Series Computer and its automated mix system (see Section 2).

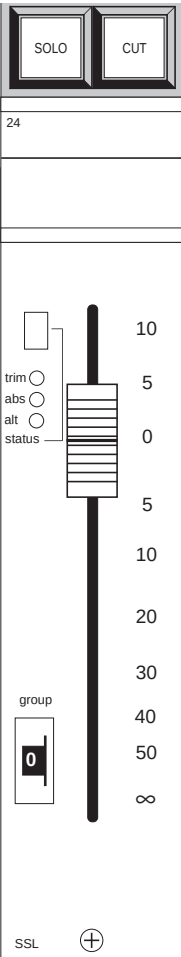


VCA Control Groups

In addition to the console's comprehensive patch-free audio subgroup facilities (see the G Series Console Operator's Manual for details) eight VCA control group faders are provided in the centre section. Assignment of large faders to these control groups is achieved by means of the thumbwheel switch beside each fader. The control groups themselves are also fitted with thumbwheel selectors, to enable (sensible) group to group assignments.

As well as groups 1-8, each thumbwheel has **0** (zero) and **I** (Independent) positions. On non-Ultimation consoles, when selected to 0, fader levels may be varied by $\pm 15\text{dB}$ using the **VCA TRIM** control in the centre section, enabling the overall level of a mix to be quickly adjusted. Set to **I**, faders become independent of this control and any other group selection, preventing faders being cut by the control group **SOLO** buttons.

SOLO buttons on the control group faders work in a similar way to those on the channels, by muting all other non-soloed control groups, and therefore the channels assigned to them. Note that control group **SOLO** buttons cannot provide an AFL function, except on G+ Special Edition consoles that feature the 'True Group Solo' modification.



Routing Matrix

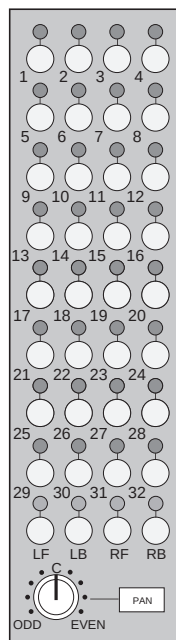
The Routing Matrix provides access to 32 multitrack busses and group outputs. In broadcast applications these busses may be used as mix-minus (clean feed) sends. Otherwise the matrix may be used to structure any combination of up to 32 audio subgroups, effects or cue sends, entirely patchfree.

Either one of the signal paths (Channel or Monitor) can contribute to the matrix at any time, via the associated small pan control located at its base. The path *not* feeding the matrix can generally be assumed to be routed to the main mix busses (again, always via the large pan control); the green 'to ROUTING' LED below the small fader confirms the current situation.

FLOAT (next to the Group Trim pot) removes the current fader output from the mix bus, and re-routes it to feed the Routing Matrix. This facilitates track bouncing or the setting up of audio subgroups.

DIRECT (just below the **FLOAT** button) provides a means of routing the post Channel fader signal on that module directly to the corresponding multitrack group output, thereby bypassing the Routing Matrix, the group mix bus and mix amp. This button also allows channels above 32 to access their own group outputs, enabling these to be used as inputs to a second multitrack, for example. See also Extended Multitrack routing on Page 1-15.

Any signal assigned to the Routing Matrix may also access the main mix busses via four buttons at the foot of the matrix.



Stereo I/O Modules

Consoles may be fitted with optional Stereo I/O modules, for use with stereo FX returns or other stereo source material. Such modules have a single, stereo signal path from line input to output via the routing matrix; the layout of the matrix is similar to that of the mono modules. Left channel signals will normally feed left/odd busses; right channel signals feed right/even busses. Comprehensive stereo image control is provided for the channel output. In addition to Solo and AFL, PFL and a dedicated Solo Isolate function are provided. See the G Series Console Operator's Manual for further information.

The Centre Section

The SL 4000 G+ centre section contains many master facilities, including the console's master status selection, main bus output, monitoring and metering controls, cue/aux send and echo return masters, talkback facilities, a test oscillator and power rail indicators (for the layout of centre section controls, see the foldout drawing at the end of this guide).

Main Outputs

Channels assigned to the console's main mix busses (LF, RF, LB, RB) feed mix amps in the centre section. Main output control is via the Master Fader (with accompanying AutoFade function) in conjunction with the Quad Compressor (see right). This famous soft-knee compressor has achieved unparalleled popularity in the world's top recording studios. With a little overpatching, the compressor may be made available for use during tracking — access is via the Pre and Post VCA Insert Sends and Returns provided on the patchbay.

The compressor is also available from SSL in a 1U rack-mounting Logic FX package.

The main bus outputs, plus derived stereo and mono outputs, are normalled via the patchbay and distributed to machine inputs via the console's connector panel.



Metering

Metering facilities will vary according to specification. As standard, the console is equipped with moving-coil VU meters for each I/O module, and eight mechanical VU meters (alternatively PPMs, with a choice of scales) above the centre section, dedicated to LF, RF, LB, RB, Left, Right, Mono and Phase for the main busses. A stereo audio phasescope, metering the main Left and Right outputs, is also provided as standard. Meters for the Auxiliary Sends and Studio Loudspeaker outputs are fitted above the patchbay.

According to selections made on the 'QUAD METERS' buttons, the meters can be selected to meter the **DESK OUTPUT**, the **EXTERNAL SOURCE** matrix or whichever is being monitored — **FOLLOW MONITOR**.

Optionally, mechanical PPM or 250-segment Plasma Bargraph meters may have been provided for the channels and/or main outputs. Bargraph meters are switchable between VU and PPM scale characteristics and also provide a 3rd octave, 15 band, stereo, spectrum analysis display. A group of nine buttons controls these functions from the centre section.

Monitoring

Comprehensive monitoring facilities are provided to the lower right of the centre section. For stereo applications, the control room loudspeakers normally monitor the LF and RF output busses in **STEREO** mode. Alternatively all four busses may be monitored on a pair of loudspeakers by selecting **STEREO** and **QUAD** simultaneously. On consoles configured for surround mixing, the **QUAD** button is redesignated **LCRS**. In either configuration, **MONO** provides a mixed feed of all four busses.

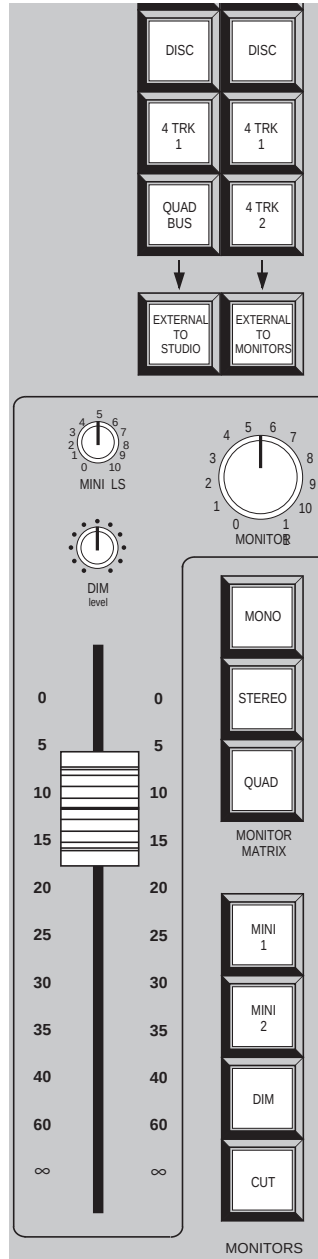
If **EXTERNAL TO MONITORS** is selected, any source in the matrix above (**CUE STEREO** to **4 TRK 2**) may be monitored. The patchbay provides inputs for up to five stereo and three 4-channel sources.

The monitor output may be dimmed, when the **DIM** button is pressed, by a level set on the associated **DIM** level control. Final monitor output level is set on the large rotary **MONITOR** switch, unless **MINI 1** or **MINI 2** have been selected, in which case level is set on the rotary **MINI LS** control. Monitor outputs may be cut with the appropriate 'MONITOR CUTS' button above the Quad Compressor.

Studio Loudspeakers

The vertical row of buttons to the left of the **EXTERNAL TO MONITOR** source selector presents a number of sources (notably including **QUAD BUS**), that may be fed to a pair of studio loudspeakers on selection of **EXTERNAL TO STUDIO**. Level to the speakers is controlled by the **SLS** pot to the left. This output may have talkback injected (see above). SLS output meters are provided above the patchbay.

Note that, to prevent howlround, selection of **EXTERNAL TO STUDIO** is prohibited in Record Status and Status Lock (see Page 1-13), though this can be overridden by an internal link.



Solo/AFL

The **SOLO** buttons on each channel normally provide a destructive solo-in-place function. Selecting the **AFL** button in the centre section forces the **SOLO** buttons to provide an After Fader Listen function. AFL signals replace the default feed to the monitors at a level set by the pot above the AFL button. AFL is automatically selected when Status Lock is enabled (see Page 1-13).

Large and small fader solo cut busses can be linked to act simultaneously by selecting **SOLO LINK** (fitted to the upper right of the computer keyboard panel). This is useful when sources to the mix are feeding the inputs to both Channel and Monitor signal paths.

Cue/Auxiliary Sends and Echo Returns

The G+ auxiliary sends system provides one stereo and four mono busses fed from controls on the I/O modules. Master level controls for these busses (each with a push/push On/Off switch) plus LF and HF equalisation, are provided near the top of the centre section.

The sends may be used as clean feeds, FX device feeds, or as headphone outputs. Clean feeds and feeds to FX devices should be patched from the 'ECHO SEND' or 'LOCAL AUX SEND' (see below) outputs on the patchbay, or connected via the console connector panel. Six meters are fitted above the patchbay to display the output levels.

The system provides three stereo outputs (Cue Sends) for use as headphone feeds. Cue Sends L and R are fed from the stereo auxiliary bus. Cue Sends 1L and 1R, and 2L and 2R are derived from the mono auxiliary busses 1 and 2. Insert points are provided on the patchbay. Any source selected on the External to Studio selectors may be fed in stereo to the headphones, simply by turning up the **CUES** pot next to the **SLS** pot. If **QUAD TO CUES** (to the left of the Master Fader) is selected, any existing cue feeds are replaced with the console's main output. This provides a quick and simple way of feeding the main mix to headphones.

Two sets of master send controls are provided; normally all sends pass via a single set of controls at the top of the main centre section module. **SPLIT** buttons on the **LOCAL AUX SENDS** (fitted to the left of that panel) enable sends from modules to the left of the centre section to be isolated from those to the right; these feed a set of dedicated outputs on the patchbay.

Four Stereo Echo Returns, fitted below the auxiliary send master controls, may be used to return FX device outputs or any other stereo or mono source to the main mix busses via dedicated pan and level controls. Each return is fitted with **AFL** and **CUT** buttons, and routing switches to enable the return source to be fed back onto the Cue/Aux busses.

Talkback

A group of nine 'COMMUNICATIONS' buttons are provided at the foot of the module. Along with the microphone fitted between the **CUES** and **SLS** pots, and the level controls at the top of the centre section, these provide talkback to the three Cue outputs, individually or simultaneously. **OMNI** talks to all Cues, the studio loudspeakers, and supplies a slate talkback (with 30Hz tone) to the multitrack groups and main desk outputs.

An externally connected listen mic (return talkback) may be fed to the Mini loudspeakers and/or the multitrack groups and main desk outputs. The two Listen Mic inputs are fitted with a single built-in compressor; a post-compressor output, that can provide an interesting effect when recording guitars, for example, is supplied on the patchbay.

If the **AUTOCUE** function is selected, the normally momentary **CUES** talkback button will latch on. The button remains latched until any machine interfaced to the master tape remote buttons in the centre section goes into Play (optionally, Record). The button then relatches as soon as the machine enters Stop, Fast Forward or Rewind, thus enabling immediate communication with the headphones. If used without due caution, this may lead to severe embarrassment!

A **RED LIGHT** button provides a isolated contact closure for interface to an external relay; the circuit can be optionally driven from tape machine play or record tallies.

Status Lock

STATUS LOCK is an extremely useful facility situated in the group of Master Status buttons. On selection, it inhibits the following functions, which could be dangerous if activated during recording, or in a broadcast on-air situation:

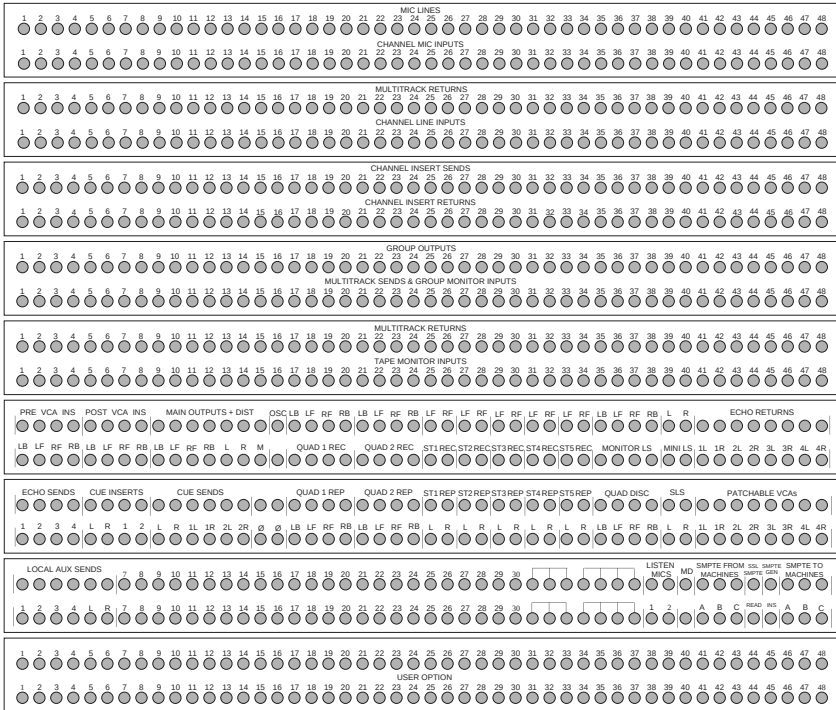
- Status buttons - Record, Replay, Mix, Fader Reverse, and Master Channel Input Flip
- Oscillator On
- Omni Talkback
- Listen Mic to Tape
- AutoCue
- Solo in Place (AFL automatically selected)
- Studio Loudspeaker Outputs

Optionally, the Red Light may be switched on in Status Lock.

Oscillator

The **GROUPS** button feeds tone, via the slate bus, to the 32 multitrack Group Outputs. **QUAD BUS** feeds tone to the main mix bus outputs. The **cal.** position on the level control may be preset to local requirements. House tone, or an external signal generator, may be injected onto the slate bus via the patchbay. The oscillator feed to bus outputs is inhibited in Status Lock (see above).

Power rail indicators are fitted above the oscillator. If any of these is not lit, seek technical help!



typical patchbay layout is shown above. Each pair of rows usually provides output jacks in the upper row, normally to inputs in the lower row. The rows that contain Mic Lines and Channel Mic Inputs are fully-normalled; all other rows will be half-normalled, unless specified otherwise. Note that the row designations, B, C, etc. shown on the drawing are for reference only, and do not appear on the patchbay itself.

Options

Custom Switch Functions

According to customer requirements, a number of standard SSL options may be implemented on the centre section master module, or to the right of the keyboard panel, as indicated by suitably engraved button caps. Common options include Solo Isolate and/or Fader Reverse Inhibit on specific bays, or even the right hand side of the console, enabling split-console style operation.

Patchable Stereo VCAs

Four automated faders to control stereo VCAs may be installed under the centre section master module. Accessed via the patchbay, these can be used to control and automate echo returns, auxiliary sends or even a pair of main bus outputs. Each fader has a **CUT** and **AFL** function.

Extended Multitrack Routing

Consoles fitted with 48 or more I/O modules are supplied as standard with 'Group Cross Normalising'. This enables Groups 1-24 to feed Group Outputs 1-24 and 25-48 simultaneously, and thus provides full access to a 48-track machine from the Routing Matrix.

For additional flexibility, consoles may be fitted with Group Cross Linking; this also provides access to 48 tracks but in a different manner: multitrack busses 1-24 feed the group mix amps (and trims) in modules 1 and 25, (49, 65,...) 2 and 26 (50, 66, ...) etc, thereby providing most of the benefits of conventional 48 track routing.

User-selectable Options (via internal switches and links), include:

Record tally — selectable to operate on track record *or* track readied.

Track record — selectable to operate in record status only.

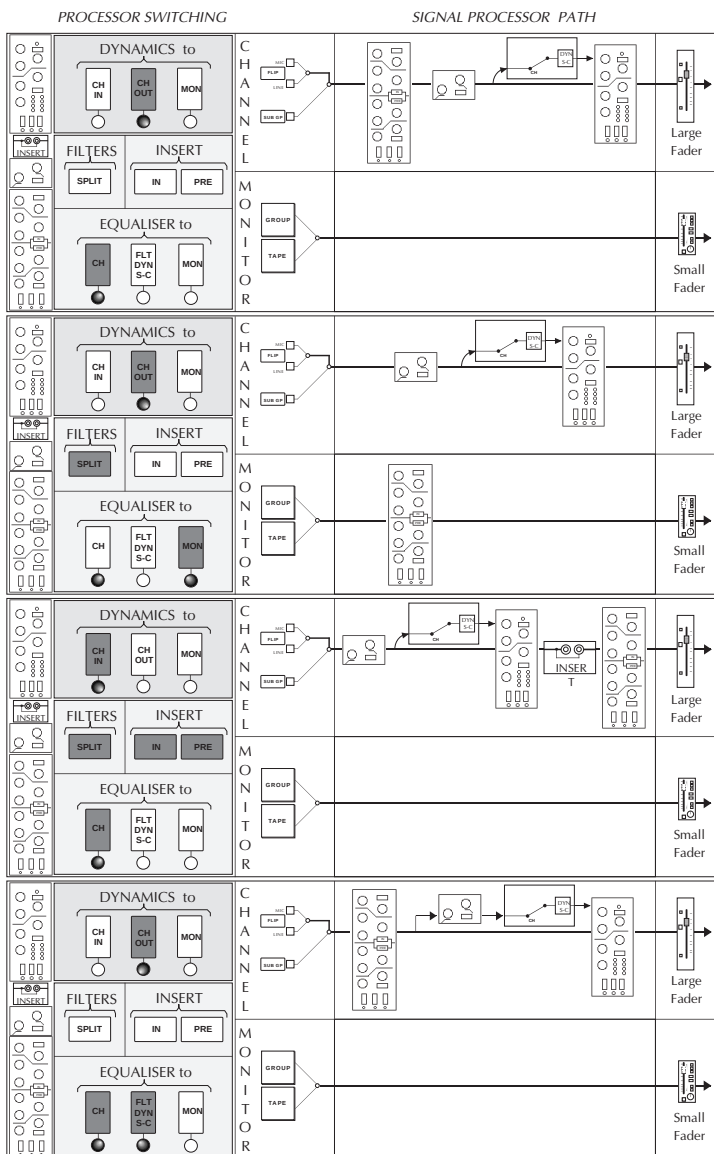
Group and Tape monitor inputs — in 'SuperCue' mode can be set to give unity gain or a 3dB drop (default) on each input whilst summed.

Channel Insert — can be set to follow EQ.

Channel VCA solo isolate — may not be enabled when **SUBGP** is selected.

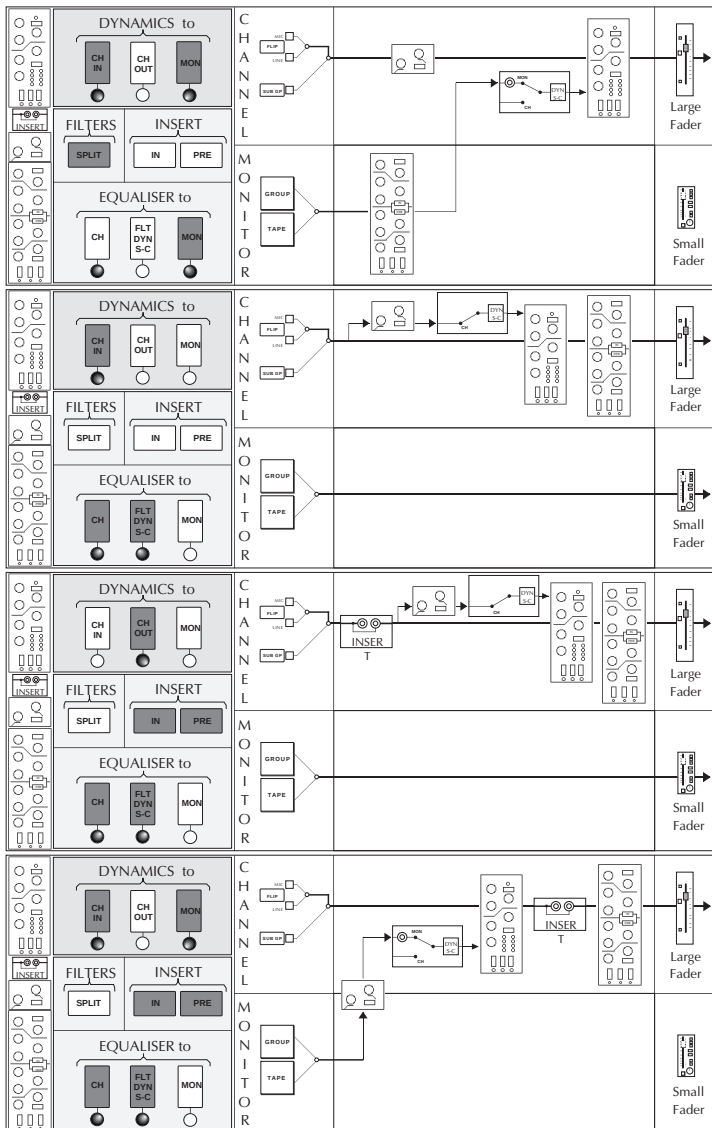
Appendix A — Signal Processor Routing

Here are just a few of the many routing possibilities that are available for signal processing on the G+ Input/Output module:



PROCESSOR SWITCHING

SIGNAL PROCESSOR PATH



Appendix B — 611G I/O Module Specifications

Microphone Amplifier (82E291)

Gain:	Variable from +4dB to +70dB in 6dB steps
Input Impedance:	1.54k Ω
Headroom:	> +24dBu @ +4dB gain, at onset of clipping > +27dB @ all other gain settings
Frequency Response:	+0.0dB/-0.4dB from 20Hz to 20kHz
Equivalent Input Noise:	< -95dBu @ minimum gain < -127dBu @ maximum gain

Line Amplifier (82E291)

Gain:	-20dB to +20dB continuously variable with detent at unity gain
Input Impedance:	> 30k Ω Balanced > 20k Ω Unbalanced
Headroom:	> +26.5dB at onset of clipping
Frequency Response:	+0.0dB/-0.3dB from 20 Hz to 20 kHz
Equivalent Input Noise:	< -95dBu

Dynamics Section

Compressor/Limiter

Ratio/Slope:	Variable from 1 to infinity (limit)
Threshold:	Variable from +10dB to -20dB
Attack Time:	Normally auto-sensing, switchable to 1ms
Release:	Variable from 0.1 to 4 seconds

Expander/Gate

Range:	Variable from 0 to 40dB
Threshold:	Variable from -30dB to +10dB
Attack time:	Normally auto-sensing, switchable to 1ms
Release:	Variable from 0.1 to 4 seconds

G-Series Four Band Equaliser (82E292)

Two bands shelving with slope enhancement to increase selectivity; two bands wide ranging parametric with action over a frequency band that varies with gain (variable 'Q' with gain). High and low pass filters also provided with filter out switching.

Mid Bands

Freq Ranges	HMF: 610Hz to 6.2kHz or 1.8kHz to 18kHz switchable with HMF x3 button LMF: 200Hz to 2.1kHz or 50Hz to 500Hz switchable with LMF x3 button
Gain range	> ± 20 dB
'Q'	0.5 to 3 (may also vary with gain)

Shelving Bands

Freq Range	HF: 2kHz to 16kHz LF: 30Hz to 450Hz
Gain Range	± 17 dB
Headroom	> +26.0 dBu at onset of clipping
Noise	< -86dBu

'Classic' E-Series Four Band Equaliser (82E242)

Two bands switchable bell/shelving; two bands parametric with action over a constant frequency band at all gains (constant 'Q' with gain). High and low pass filtering with 'filter out' switch.

Mid Bands

Freq Ranges	HMF: 600Hz to 7kHz LMF: 200Hz to 2.5kHz
Gain Range	Q @ 3: ± 18 dB Q @ 0.5: ± 15 dB
'Q'	0.5 to 3

High and Low Bands

Freq Range	HF: 1.5kHz to 16kHz LF: 30Hz to 450Hz
Gain Range	Bell: ± 18 dB Shelving: ± 16.5 dB
Headroom	> +26.0 dBu at onset of clipping
Noise	< -82dBu

Filters (82E292 and 82E242)

Freq Ranges	High Pass: 15Hz to 350Hz (-3dB point)
	Low Pass: 3kHz to 20kHz (-3dB point)
Slopes	High Pass: 18dB/Octave
	Low Pass: 12dB/Octave

More detailed information may be found in the G+ Console Performance Specification.
Contact your local SSL representative to obtain a copy.

G Series Computer

Introduction

The G Series computer is a logical and relatively simple command-based processor that allows the operator to work with minimum distraction. It is internationally popular, and as such, a grasp of the fundamental processes should open many studio doors for the competent operator.

In this guide, the dedicated command keys such as **LIST**, **GOTO**, **PLAY** etc. are shown in bold uppercase letters (on-screen messages and console buttons are similarly indicated). QWERTY keyboard entered commands such as LABEL, BEGIN etc. are in plain uppercase. User entries like timecodes, Cue names, Mix names etc. are shown in parenthesis (name). Spaces are indicated by an underscore _. the **EXECUTE** key is indicated as [EX]. For example:

GOTO CUE (name) [EX]

The four basic functions of a G Series Computer system are:

- Project data management ('housekeeping'): Information relating to each session, such as Track Lists, Cues, Total Recall Setups, Mixes, Notes, etc., can be created, displayed and stored.
- External machine transport control: Employing data from the session lists: locating, cueing, cycling, and the rehearsal and execution of programmed drop-ins (minimising destructive errors).
- Total Recall (TR) — if fitted: The position of every knob and switch on each I/O module is stored, together with fader positions and VCA group assignments. These settings can later be recalled to reset any TR-equipped G/E Series console, anywhere in the world.
- Automated mixing: Extensive dynamic fader and mute automation facilitates the production, editing and manipulation of large and complex mixes, on and off-line. Mixes can be joined, and data copied between channels, from point to point in time, if required.

Ultimation

G Series automation can be supplemented by the Ultimation moving fader system which, by incorporating a dual signal path circuit, combines the positional feedback of moving faders with the trim control of VCAs, all within the familiar framework of G Series software. The fader motors may be turned on or off according to taste; with motors on, the audio path is through the faders themselves, bypassing the VCAs.

G Series Command Reference

A list of all the most commonly used computer commands is provided at the end of this section. The list is based on the G Series Computer Reference Card, a handy pocket-sized guide that may also be downloaded from our web site.

Timecode

To synchronise automation data with the audio source, timecode (LTC) must be fed to the computer's timecode reader from the master audio machine. Two timecode formats, SMPTE (30fps or 29.97 drop frame) and EBU (25 fps), can be read from a striped track on traditional multitrack tape machines, or taken from the built-in timecode track/output on digital devices; the reader may also handle 24fps (FILM) timecode. The reader input is designated **READ** on the SSL patchbay.

Using the 'Setup' menu, the computer must be set to receive the required standard. Type:

SETUP [EX]

Y [EX]

S [EX] (this opens the 'Session' menu page)

Set **Timecode frames per second** to **24, 25 or 30**. Use **30** for 29.97 non drop frame; if the timecode is 29.97 drop frame select **30** and set **Using drop frame?** to **YES**.

Press **END** repeatedly to exit the menus.

The computer reads timecode whenever the transport is in forward motion at play speed, and displays the value on a location counter; when shuttling at high speed, the computer automatically interrogates the machine's tach pulses. On returning to standard forward motion, the computer checks the timecode and updates it's clock to compensate for any slippage, if necessary.

Times are entered in the following format: Hours:Minutes:Seconds.Frames (eg. 12:34:56.12).

Abbreviated entries, made by omitting leading zeros and colons, are recognised by the system. For example:

- .18** for 18 frames only
- 34.** for 0 minutes 34 seconds 0 frames
- 4:** for 4 minutes 0 seconds 0 frames
- 4::** for 4 hours 0 minutes 0 seconds 0 frames

An example of a short locate command would be **GOTO 4:34 [EX]**

When valid timecode is being received by the system, its position will be shown in the top right of the screen. Beneath it should be a solid indication showing **EBU, SMPTE, DF TC** or **FILM**.. Any errors are shown by the following indications:

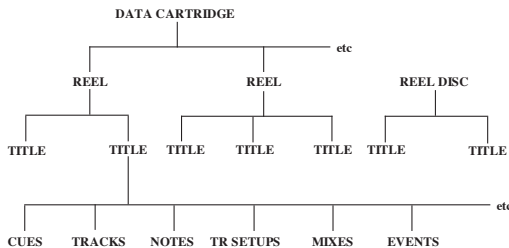
Flashing SMPTE, EBU, DF TC or FILM :	System is incorrectly set for this type of timecode
Flashing smpte, ebu, df tc or film :	System must be reset to this type of timecode in the Setup menu
SMPTE?, EBU?, DF TC? or FILM? :	Incorrect speed/ Tach rate. Wrong master machine in Setup menu
SMPTE*, EBU*, DF TC* or FILM* :	No tach

Striping a Tape

The G Series Computer has an integral timecode generator. However, where audio material on one machine is to be synchronised with another, a video machine for example, all elements of the system must be locked to the same sync source, and any recorded timecode must be provided by a LTC generator locked to the same sync source.

In isolated circumstances, eg. where a multitrack tape is to stay within the facility, the SSL generator can be activated by typing STRIPE [EX] and following the on-screen prompts. The timecode generated is dependent upon the frame rate set in the 'Session' menu (see opposite). The generator output is available on the patchbay under SMPTE GEN.

Data Storage



The G Series Computer uses a dual 3.5" floppy disk drive unit, located in the processor rack, designed to use HD (High Density, 1.44MB) disks. The system software is stored on the 'Program Disk', which is loaded into the left-hand **P** drive. Session information is stored on the 'Reel Disk' in the right-hand **R** drive. A single floppy disk represents a 'Reel' (traditionally of tape), as against the earlier Bernoulli data cartridges which could be subdivided into a number of different Reels.

Floppy disks must be formatted prior to use:

Place a disk into the Reel (**R**) drive, type FORMAT [EX], and follow the on-screen instructions. Press **M** for Mini Floppy, followed by **R** for the Reel Disk. After the warnings and prompts, formatting will begin; this takes about one minute. When completed, type LABEL [EX] to initialise the disk. This will produce a blank 'List' page, ready for use (see over the page).

List
■

59:28.22

Solid State Logic
7:42 pm 24 OCT 2002

reel: BETTY SWANK
drive B

4046 sector
created 24 OCT 2002

artist: BETTY SWANK
client: T & A RECORDS
producer: JUSTIN CASE
engineer: MARK TIME
assistant: ERIC RACE

eq: AES
nr: SR
speed: 30 sample rate:

The information on this page (which may be called up at any time by entering **LIST [EX]**), is for operator reference only, *except* the tape speed and sample rate. The tape speed must be set correctly to allow the computer to correctly calculate tach pulses when a tape is spooling; for example, to set the tape speed for 30ips type SP_30 [EX].

To change any other information on this page, type the first two letters of the required field (except **artist** which must be ART_), add a space and then the desired text. For example: to enter the **artist** as 'BETTY SWANK', type ART_BETTY SWANK [EX]

To enter the **client** as 'T & A RECORDS', type CL_T & A RECORDS [EX]. Should you wish to preserve the names for all future Reel Disks as a default, type ALTER [EX]. To create **TITLES** see below under Project Management.

Computer Control

The computer is controlled from a panel located in the centre of the console (see drawing provided at the end of this guide). At the bottom right of this panel are five computer status buttons: **MIX ON-OFF**, **FADER STATUS**, **LARGE-SMALL**, **TAPE ENABLE**, and **RECORD ENABLE**. To the left of these are the master transport remotes, for manual control of the multitrack. The **TAPE ENABLE** button enables the computer to control an external (tape) machine.

Communication with the computer is generally made via the lower dedicated command keyboard (**LIST**, **GOTO**, **PLAY** etc.). These commands *cannot* be duplicated on the QWERTY keyboard. Command keys are used to form simple English phrases in a basic command-line instruction. The G Series Computer allows abbreviations, thereby eliminating numerous keystrokes, and interprets keys according to the context in which they are used. Furthermore, the system prompts the engineer through the less common procedures and, should a mistake be made, the computer will respond with the message **I don't understand**, (adding the assistant's name from List page).

The upper alphanumeric keyboard is provided for the entry of specific words, especially names not found on the dedicated keyboard. The function keys located above are commonly used to store frequently entered, or long command lines. The dedicated numeric keypad is for the entry of timecodes and numbered locate points.

All command entries must be concluded by pressing the **EXECUTE** key; this informs the computer that the command line has been completed, and the command should now be performed. To escape from any command, or abort any command proceeding and delete the last command given, press the **CANCEL** key (note that **CANCEL** does not need to be followed by **EXECUTE**, and is not detected when using the **REPEAT** key).

Project Management

There are a number of different lists in which details about the session are stored; the primary one of these is the **LIST [EX]** page which stores basic project information, including the tape speed and timecode offset settings (see opposite). All information relating to cues, mixes and setups (Total Recall) is stored under named 'Titles'. A Title usually represents a song, or section of a recording, within a project.

The Title List is called up by entering **LIST TITLE [EX]**. It shows the names of all the titles (songs or sections), complete with start (**From**) and end (**To**) times. This data is built up and stored on the Reel disk over the course of initial tracking sessions.

Creating a New Title

Cue the machine to the beginning of the song or take (having previously devised a source of timecode). Enter **NAME TITLE** (song title) **FROM HERE [EX]**, and the **TITLE** page will be automatically displayed. Play or spool the machine, and at the end of the song or take, enter **TITLE TO HERE [EX]**, causing the end (**To**) time to appear in the list. You can change the **To** and **From** times later by entering **TITLE FROM** (or **TO**) (time) [EX].

Your new **TITLE** will be displayed with **From** and **To** times (as shown right).

List title
■

0:49.06

client: T & A RECORDS reel: BETTYSWANK		
title	from	to
■ GROOVE THAT TUBE FAST MUZAK	0:49.06 7:02.05	6:12.05 11:21.17

Current Item

Notice that the new Title has a square cursor next to it. This means it is the *current item*. Whenever an item in a list is stored, named or specified (as the subject of a command, except **COPY**) it becomes the current item, until any other item from the same list is chosen. IF you enter a command line without a given name, the computer will automatically choose the current item. For example, if the command **PLAY TITLE [EX]** is entered, the computer will locate and play the Title with the cursor next to it. The same principle extends to all other lists within that Title, such the Cue List, the Mix List, etc.

To select a different Title, Cue, Mix, etc. and make it current, issue a command including its name, eg. **GOTO TITLE (name) [EX]**. To save time, and when working with any list, you can enter just the initial letter of a name. In the example above, there are two Titles: 'Groove That Tube' and 'Fast Muzak'. To select the latter Title, **GOTO TITLE F [EX]** would be sufficient. Should you have two or more list items beginning with the same letter, add sequential letters to the command until the computer can differentiate.

Basic Autolocator Functions

Ensure **TAPE ENABLE** is pressed for all control via computer locate functions.

GOTO will locate to a specified timecode value or **TITLE**, **CUE** etc and stop, eg. **GOTO CUE INTRO [EX]**

PLAY will locate to the specified item and play, eg. **PLAY MIX 1 [EX]**

HERE [EX] creates a volatile location point in memory. You can return to the mark using either **GOTO [EX]** or **PLAY [EX]**

To hear a track several times over, enter **CYCLE TITLE [EX]**; the multitrack will roll to the beginning of the Title, play it, and rewind, repeating the procedure until instructed to do otherwise.

More elaborate commands can be composed, always in common-sense English, such as: **CYCLE TITLE FROM HERE [EX]** which plays from the current location to the end of the Title, then rewinds to the current location and repeats the sequence until told to stop.

Cues

A Cue List enables the division of Titles into subsections (verses, choruses, etc) and the identification of locations such as instrumental breaks.

To list the Cues (if any have been created): **LIST CUE [EX]**

Cue points can be generated in two ways: enter **NAME CUE (name) [EX]**, or, to save keystrokes, the **NAME** key need not be used — **CUE (name) [EX]** will do the same. If you use just **CUE [EX]**, the Cues will be created with a computer generated **1*, 2*, 3*** etc., name. The timecode reference of a Cue will be the instant the **[EX]** key is pressed. Using the **REPEAT** key enables Cues to be rapidly produced on-the-fly.

Cues can be renamed thus: **CUE (name) NAME (new name) [EX]**

Useful Tip: If you name the Cues **VERSE 1**, **VERSE 2** etc, then the computer will need **V_1**, **V_2** etc. to differentiate between them, as in **PLAY CUE V_1 [EX]**. But, if you name them **1 VERSE**, **2 VERSE** etc. then the computer only needs to differentiate between the numbers, as in **PLAY CUE 1 [EX]**.

A Cue can be shifted in time: **CUE (name) TO (time) [EX]**. A block of Cues can be shifted in time: **REVISE CUE FROM (time 1) TO (time 2) TO (time 3) [EX]**. This can be useful if you are recording another version of a track but using the same Cues, or the original timecode reference has changed.

All Cues can be shifted in time: **REVISE CUE FROM CUE (1st Cue) TO CUE (last Cue) TO TIME [EX]**. You might use this if you have placed all your Cues at the exact event points, and now want to create a certain amount of global 'preroll'.

Track Lists

Each Title can have its own Track List, which can be written, added to or changed at any time.

Create a Track List by entering **NAME TRACK [EX]**, and use the arrow keys to navigate the cursor around the list. With the cursor on an appropriate line, enter the track name using the QWERTY keyboard. To transfer the information to the Reel Disk for permanent storage, you must press the **END** key, as track names are only held in RAM until you do so.

LIST CUE [EX] displays the Cue List, and **LIST TRACK [EX]** the Track List etc; alternatively, from the **TITLE** List, use the arrow keys to cycle through the lists associated with the current Title.

Notes Pages

Four Notes Pages are available for each Title. Enter: **TITLE LIST [EX]** and enter whatever text you wish. Press **END** to store the Notes on the Reel Disk.

Bar/Beat Locating

To set the option for a bars and beats timecode display, type:

SETUP [EX]

Y [EX] for the Setup menu

S [EX] for the Session Page

Scroll to **Display Time** and type **BARS**.

Press **END** to exit from the menus.

The Bar/Beat count will be displayed in the top right of all screens, in the Large Time display (selected by the **LARGE/SMALL** button), and in Cue Lists. All other times such as Title From and To times, and Mix times will be shown as timecode values until a tempo map is programmed. Times may be still be entered in timecode format when the Bar/Beat option is selected. The time display may be toggled between Bars/Beats and timecode by entering **BB[EX]**. Note that there will be no Bar/Beat count until a Tempo Map has been set up.

To program the Tempo Map enter **TITLE LIST [EX]** to access the Notes Page, followed by **SETUP** to generate a display similar to this:

Each line, with contiguous **From** and **To** times, represents a section of the Title where a differing time signature or tempo exists. Up to 16 sections may be entered.

Set the **From** time using the normal timecode format or **TITLE, HERE, CUE X** etc. Press **[EX]** or the right arrow key to enter the **To** time in the same way. Once entered, this value will also appear in the **From** column for the next section.

When finished entering map
Press END

		1:05.03	
From	To	Tempo	Time Sig
1:05.03	4:22.15	120.5	4/4
4:22.15	????		
????	????		
????	????		
????	????		
????	????		
????	????		
????	????		
????	????		
????	????		
????	????		

Tempo rates can be entered either directly or by using the 'tap' function: first enter a tempo of 0 (zero), followed by [EX]. Now tap the required tempo, in time to the track, on any computer key with the exception of [EX], and the tempo will be displayed on the screen. Once satisfied that the displayed figure is the correct tempo, press the [EX] key. This exits the tap entry mode and enters the tempo value into the field. The permissible tempo range is 40-400 BPM, and can include up to one decimal place. The **Time Signature** is entered as, for example, 3 [EX] 4 [EX], or 7 [EX] 8 [EX], to result in the display of 3/4 or 7/8.

By pressing the **TRACK** key, the **Time Sig** column will flip to show the Bar value of any **To** times entered. The time display at top right of all screens may be toggled between the Bar/Beats count and timecode by entering BB [EX]. If the external machine is not moving, the position display will not change until the timecode value changes or you select another screen display. Similarly, the Cue List will need to be redrawn by pressing the **LARGE/SMALL** button twice and all Cue points will then be shown with Bar/Beat values. Any times may now be entered in Bars format by typing the bar value followed by the # key [EX]. Since the # key on the G Series QWERTY keyboards is SHIFT-3, it may be useful to program one of the function keys with # [EX], although values may still be entered in timecode format when the Bar/Beat option is selected.

Programmed Drop-Ins

The G Series Computer can control record enabling of an external machine as well as the transport functions. This allows the computer to be used to rehearse and perform drop-ins (punch-ins). The relevant button is **RECORD ENABLE** (next to **TAPE ENABLE**).

Drop-in programming is as simple as dropping in manually. With a fully interfaced machine, track arm the designated track(s) for Record, using the channel Record button(s) (via **READY GROUP** or **READY TAPE** — see the G Series Console Guide).

Make sure that the **RECORD ENABLE** button is *off*. Roll the tape, press **DROP-IN** [EX] at the drop-in point. At the drop-out point, press [EX] again. The screen will display the drop-in and drop-out times, and the accuracy can be checked by entering **PLAY DROP-IN** [EX]. Any adjustments to the timings can be made (see below), and once satisfied select the **RECORD ENABLE** button. Now when the drop-in is played, the system will actually perform the operation, switching the chosen tracks in and out of record at the programmed times.

Some other useful drop-in commands:

DROP-IN FROM (timecode, cue) **TO** (timecode, cue) [EX] sets the drop-in and drop-out times.

DROP-IN + (or -) (time) [EX] nudges the drop-in time.

DROP-IN END + (or -) (time) [EX] nudges the drop-out time.

DROP-IN FROM (time) [EX] defines the start and clears the drop-out time for indefinite recording.

Drop-ins can be used as locate targets in **PLAY FROM**, **CYCLE** and **GOTO** commands, in the same way as Cues.

Copying Information

Stored data can be freely copied from the current area to a different one on the same Reel, or onto another Reel Disk altogether, *or* to alternative media such as 8" floppy disc or Data Cartridge.

A copy command line always starts with **COPY**, usually followed by specification of the source data, then **TO**, ending with specification of the destination. Or, if the current Reel and/or Title are the destination for the data, the specification of the source data is followed by **FROM**, followed by the current location of the same data. Alternatively, to copy information to the current Reel or Title, enter **COPY** followed by the source Reel name, Title name and information identity. This type of command enables Lists (complete), Titles, Notes, Mixes etc., to be copied. See the G Series Computer Reference Card for examples.

Mixing

The G Series Computer provides automation of the following controls: Large Faders, Large Fader Cuts, Group Faders and Cuts, Master Fader, and Patchable VCAs (if fitted).

Before you start mixing, it is important that you understand some fundamental principles. The most important of these is that the faders and cuts are, in Absolute write status, united. In other words, when you drop a fader into write in Absolute by pressing its status button, you are also dropping its associated cut into write. Various statuses to aid the mixing process are provided, and some of these separate the faders and cuts. Experienced operators use the G Series Computer in different ways, according to their personal preferences. However, if this is your first experience of G Series automation, we recommend as a general rule that you write the cuts first, *before* any fader moves. Once you are satisfied with the cuts, you can use Play Cuts Only status and write the fader moves, knowing that your cuts are saved and protected.

A button in the centre section of the console — **SOLO CUTS TO COMPUTER** (G+ consoles only), forces the mix system to see the channel cuts generated by soloing a channel, which would otherwise not be written to the mix. On E/G Series consoles, the group solos are 'automated' in that the cuts they generate to each other are read by the computer; to facilitate this, **IP** (Immediate Pickup — see Page 2-13) must be enabled for the relevant group faders.

Mix information is stored in conjunction with SMPTE/EBU timecode data from the master audio machine (there is no independent timing track within the computer). Each fader move or cut is written, together with the time stamp, initially to RAM. At the operator's discretion the mix data is then saved onto the Reel Disk for permanent storage. There is no limit to the number of mixes stored for any single Title except the allocated disk space.

If there is insufficient space on the disk, the message **Reel full, Unsaved mix in memory** will appear. The mix is held in RAM until another Reel Disk is loaded. If necessary, a new disk can be formatted, labelled and a Title created to store the mix in — the mix will stay safely in RAM until **END [EX]** is entered.

The **MIX ON-OFF** button on the computer keyboard panel instructs the computer to enter automated mixing mode; the single button on each fader (together with two associated LED indicators) defines the fader and cut statuses; the **FADER STATUS (FADER STATUS MASTER** on E Series consoles) button, aka **FSM**, switches all faders statuses globally, sets the master fader status and the Fader Status Lock facility.

Mix Statuses

There are three principal mix statuses: **Absolute** (UA), **Trim** and **Replay**. In **Absolute**, fader levels and cuts are written *exactly* as made by the operator. In **Trim**, the existing (Absolute) levels may be adjusted by the value of the trim fader movement. The true fader position is no longer relevant (except in terms of the gain or trim values, determined by the logarithmic scale). See below for more details.

Replay is simply used to play back Absolute and/or Trim mix data.

Two more advanced statuses — **Revise Cuts** (RC) and **Play Cuts Only** — can be used to modify mix data for faders and the cuts independently.

New Mix

The mix system employs two fundamental processes: **New Mix** where a completely original mix is created, and **Update Mix** where a revised mix version is generated by making adjustments to an existing mix.

You will, of course, have set up a basic ‘monitor’ balance before you begin to dynamically automate the mix. As mentioned above, it is a good idea to write the cuts before you begin refining the fader balance. Ensure that you have a Title in which to save your mix; an accurate Cues List is also useful, as cues can be used in mix locate commands.

Two methods may be used to create a New Mix:

Press the **MIX ON/OFF** key (puts **MIX ENABLED** in the top right hand corner of the screen), followed by a locate command, such as **GO TO TITLE [EX]**, which will instruct the system to locate to the beginning of the Title, and set up for a New Mix.

Alternatively, with the track at an appropriate spot, type **SETUP MIX [EX]**, which will activate the mix system (**MIX ENABLED**) and set up for a new mix from the current location.

*** new mix **		0:49.06
You may adjust status now. Press EXECUTE to continue	AT	READY
	PV	MIX ENABLED
client: T & A RECORDS		
reel: BETTYSWANK		
title	from	to
■ GROOVE THAT TUBE	0:49.06	6:12.05
FAST MUZAK	7:02.05	11:21.17

In both cases, the monitor will display the message: **You may adjust status now. Press EXECUTE to continue** (see left).

All faders will be automatically set to Absolute status as indicated by the red **abs** LEDs. Only two statuses — Absolute and Manual — are accessible during a New Mix, because there is no previously stored data to Trim. By pressing the fader status button once, individual channels may be switched to Manual status, enabling movements to be monitored, but *not* written as mix data. The **FSM** key cycles *all* channels through the two statuses prior to mixing.

Press [EX] (not the **PLAY** button, as the computer is now controlling the external machine) and start mixing. The message **MIX ENABLED** becomes **MIX RUNNING**, and the fader levels will be displayed as bargraphs on the screen. These levels may also be shown on the console meters by selecting the **FADERS TO METERS** function in the console centre section.

The transport keys and autolocation functions can be used at any time during mixing, whilst the audio source is under computer control. Fast-forwarding will write the current fader levels and cut states up to the point where the machine is stopped. Rewinding and entering Play puts the system into **MIX REVIEW**, with the faders and cuts in Replay status (both LEDs out), until you reach the point at which you rolled back, where the faders and cuts automatically drop back into Absolute, and you can continue to build the mix.

Whilst in Mix Review you can drop individual faders (or groups of faders) in and out of Absolute, continually rewinding and making corrections, leaving later moves intact (this is known as Insert Mixing — see Page 2-14). At the point from which changes are needed, press the fader status button, and press again to drop out to Replay the previously written moves. The **JOIN** key can be used to drop in on all channels simultaneously (see also Page 2-14); winding back will drop all channels out of Absolute.

You can leave a mix without saving at any time by pressing **CANCEL** twice.

Saving Mixes

Using the methods described above, a mix can be built up section by section, channel by channel, working purely in RAM until the end of the Title. It is therefore possible to create a complete mix from scratch without reference to previously stored mixes. But, whilst being possible it is not necessarily advisable, because of the risk of losing a mix due to, for example, a power cut or something similar.

A permanent save to disk serves two purposes — preventing the loss of work, and creating a reference for subsequent updates.

To save the mix press the **END** key. The machine will stop, and the prompt **Name of mix?** appear on the screen. Enter (name) **[EX]**. Choose a suitable name like **CUTS ONLY** or **ROUGH MIX** etc. If you do not enter a name the computer will automatically name the mix ***1**, ***2** etc.

The mix will be stored under its Title on the Reel Disk, and the Mix List is displayed, showing the name, together with the start and end times (see right).

0:10.09

3988 sectors left:
2% of reel used.

MIX ENABLED

title: GROOVE THAT TUBE		
mix	from	to
■ CUTS	0:49.06	1:32.03

Updating CUTS

You may adjust status now. Press EXECUTE to continue

UA
RC
AT ☒
PV
IP

0:47.06

READY

MIX ENABLED

title: GROOVE THAT TUBE		
mix	from	to
☒ CUTS	0:49.06	1:32.03

Update Mixes

Once a Mix List exists, any of the saved mixes can be specified, and edited on-line as an Update Mix. Update Mixes are created by placing a copy of the stored mix in RAM, to become the reference mix to be modified. In this way, saved mixes are always securely retained, unless deliberately deleted.

Entering a locate command that refers to a named mix, such as **GOTO MIX (name) [EX]** (unless the required mix is the current item, in which case the name can be omitted), sets up for an Update Mix. The screen will look similar to that shown left.

Mix Options in an Update Mix

Before starting an Update Mix, you can select from a complete range of statuses. The five choices can be used either singly or combined. To select them, either type the first letter or positional number (as shown below). It is not necessary to press [EX]. Your selection will be indicated on-screen by a square cursor, next to the abbreviation of that status, in the 'Mix Options' box.

Update Absolute (UA: U or 1) — Unavailable in a New Mix. Faders drop into Absolute instead of Trim when selected. See notes on Trim below.

Play Cuts Only (UA + RC: U & R or 1 & 2) — Unavailable in a New Mix. The faders will be in Absolute, with cuts in either Trim or Replay (dependent on whether **Edit Cuts in Play Cuts Only** is set to **Yes** or **No** on the Mix Page of the Engineers Setup Menu); fader levels may be changed while the cuts play out unaffected.

Revise Cuts (RC: R or 2) — Unavailable in a New Mix. A two stage process, designed to edit cuts in a more sophisticated fashion than is possible in Trim. The fader remains in Trim, while the fader status button toggles the cut between Absolute and Replay — **WRITE CUTS** and **READ CUTS**. Fader LEDs will indicate either mode, (see the Fader Status LED table at the end of this guide).

Autotakeover (AT: A or 3) — Can be used in a New or Update Mix, with Trim or Absolute. Normally, when a fader is dropped out of write, the level will jump back to the previous written replay level. With AT selected, when a fader is dropped out, one of the LEDs will flash to show the direction in which to move the fader to match the replay level. When it matches this level, the fader will automatically drop out of write and back into Replay. In this way level jumps can be avoided as the operator decides the fade rate between one level and another.

Preview (PV: P or 4) — Can be used in a New or Update Mix. Preview can be used to rehearse moves, and then selectively write them to the mix. With PV selected, pressing a fader status button will drop the fader into a preview mode of the current active write status, as indicated by the flashing LED(s). Any new moves may now be monitored, while the written mix level remains unaffected. Additionally, the audition and currently written levels may be compared by toggling the **FSM** key (displayed on-screen by **PREVIEW ON / PREVIEW OFF**). When the desired level is found, the fader status button or **JOIN** key can be pressed, and any faders in preview mode will drop into write.

Immediate Pickup (IP: 1 or 5) — Can be used in a New or Update Mix. When selected, as soon as a fader or cut is moved/pressed, the channel will drop into write as determined by current selections in the Mix Options box. With **PV** and **IP** selected, moving a fader or switching a cut will put them into Preview mode to audition new levels, until the status button is pressed to drop them into write. Note that, on consoles fitted with **Ultimation™**, IP only has an application in **MOTORS OFF**.

Level Match

When using the rollback features described above, it may be necessary to physically match a fader level or cut state, *before* dropping into write, in order to prevent any undesired level jumps. (On consoles fitted with **Ultimation™** — see below — the fader motors automatically set faders to the correct replay level.)

Pressing the **MIX** key selects 'Level Match' mode, and a **LEVEL MATCH** legend appears on-screen. The faders are now disconnected from the mix system and their LEDs illuminate to indicate the match state (it is probably best, but not essential, to stop the machine at this stage, as you may well be attempting to chase a moving audio target). Both LEDs on solid indicate that the fader and cut are matched; a flashing green LED means move the fader up, a flashing red LED indicates that you should move it down; both LEDs flashing indicate the cut button is inverted. Having set the faders/cuts as required, press the **MIX** key again to disable Level Match. Drop the faders that need to be rewritten into Absolute by pressing their fader status buttons.

Using **Ultimation™**

On consoles fitted with **Ultimation**, the fader motors can be toggled on/off by typing **MO [EX]**. When they are on, **MTR** will show in the top right of the screen. In Motors On mode, audio passes through the fader itself, bypassing the VCA, and giving a 'cleaner' signal path. In Motors Off the signal passes through the VCA, as in a normal VCA-equipped console.

If the first mix pass is experimental, (to find rough levels, to be written from the start) after rolling back to the top, **Ultimation** faders will reset themselves to their original positions on moving forward again. To avoid this, turn the fader motors off before rewinding.

In a new mix, in Motors On and Mix Review, to drop a fader into write, simply touch the fader knob; it will automatically switch from Replay to Absolute.

Dropping out may be achieved in one of two ways, dependent on whether 'Snap' mode is currently selected. Snap mode is toggled by typing **SO [EX]**; appropriate legends appear top right of the screen.

SNAP ON — The yellow **Alt** LED lights when the fader is touched; the fader will drop out to Replay as soon as you remove your finger from the fader.

SNAP OFF — The **Alt** LED remains off while the fader is held, indicating that the fader will continue writing until the fader status button is pressed to drop it back into Replay.

Note that the system defaults to **SNAP OFF** on boot up. If Snap On is currently selected, but an extended move is necessary, pressing the fader status button will keep the fader in Absolute until the button is pressed again.

The Trim Concept

A fader in Trim status *always modifies the existing data* (ie. the reference mix) by any amount within the range of the channel VCA. For example, at Cue A the fader is trimmed up by 5dB, down again by 3dB at Cue B, and switched back to Replay at Cue C; all the previous moves will be retained and played back, but 5dB higher from Cue A, and just 2dB higher from Cue B to Cue C. If you rewind, and drop the channel back into Trim at Cue B until Cue C, the previous Trim will be overwritten, and therefore lost — it is *not* possible to Trim a Trim.

With both VCA and Ultimotion systems, when faders are in Trim, audio passes through the channel VCA. The fader remains free of motor control, allowing delicate moves to be made without concern for accommodating the ballistics of a moving fader, or chasing a moving target. Additional cuts may be made in Trim, and existing ones overwritten. For more extensive editing, you should use Revise Cuts. Faders selected to Trim at the head of a mix are disconnected, allowing them to be renulled to a convenient position.

All the previously discussed tools are available for use with Trim, including Immediate Pickup direct from Replay.

The Join/Revise Concept

REVISE and **JOIN** switch faders in Mix Review from Replay back to their write status. These functions only differ when faders are in Trim (including faders in Revise Cuts).

REVISE — any difference between the fader position and current mix levels will be ignored. When Trim faders are revised from Replay into write there are no level jumps, as the fader null is recalculated at this point. Thus, Trim faders may be moved freely to any convenient position whilst in Replay.

JOIN — returns all faders to write as before, but *with* a level change, the degree of which is determined by any fader movement made in Mix Review, relative to the last level written before rollback.

Individual channels in Mix Review may be dropped from Replay back into Trim by pressing their faders status buttons; generally this effects a **REVISE** dependant on a user option (**Selected trim faders will Join in Mix Review - Yes/No**, found in the Mix Page of the Engineers Setup Menu).

Outside rollback (ie. in Mix Running), individual faders switched from Replay to Trim will Revise.

Insert Mixing

New mix moves are written into a separate one-shot buffer memory location, overwriting previous moves, while the reference mix is stored in RAM. You can therefore choose whether to return to the previous pass level (the buffer), or the reference mix when switching from a write status back to Replay. The choice, known as 'Insert Mixing On/Off', can be selected on the Mix page of the Setup Menu, via the option **Insert Mixing Yes/No**.

New Mixes are always Insert Mixes as there is no reference mix to switch to. With the option set to **Yes**, the system returns to playing the last pass much like drop-ins on a multitrack. With the option set to **No**, the system always returns to the reference mix being updated, losing any subsequent moves made in the previous pass.

Additional Mix Options

Status Retention

Pressing the **COPY** button at the head of a mix stores all the channels' statuses, allowing the rapid build-up of different statuses while progressing through subsequent Update Mixes. Also, in an Update Mix, channels can be locked in the status they are in at the point of rollback, by pressing the **COPY** key.

Timed Joins/Revisions

Global drop-in times to return to switch from Replay in Mix Review can be pre-programmed, eg. **AT (TIME) JOIN [EX]**.

Safe Set

At any point in a mix, selected faders may be made 'Safe' by either typing **SA** at the beginning of a mix, or **SAFE [EX]** during the mix, and pressing the required fader status buttons.

The first press (red LED) switches the channel to 'Safe Manual' — any changes to faders or cuts affect only the monitoring, leaving the current mix information intact. The fader is effectively disconnected from the mix system, so any automation data will not play back.

The second press switches to 'Safe Replay' (green LED) — any moves made will neither be heard nor will they affect the mix data. However, the mix data *will* play back as usual. This is useful for printing a final mix when you want to avoid accidental adjustments. If you touch an Ultimotion fader that is in Safe Replay, and the fader motors are on, then that fader will drop into Safe Manual.

Track Copy/Swap Mode

Written mix information can be copied or swapped between channels, *only* at the start of an Update Mix. At the start of a mix (**MIX READY**) press the **TRACK** key, and toggle between **TRACK COPY** and **TRACK SWAP** using the **FSM** key. In either case, press the fader status button of the channel to be copied/swapped **from**, and then, following the screen prompt, press the status button of the channel to be copied/swapped **to**. **DELETE** will clear the selection to allow you to start again. Once the copy/swap has taken place, the information is held in RAM; to save it to the mix, press the **END** key.

Status Help

A useful feature when learning the system, 'Status Help' can be called up at any point during the mixing process. Enable Help at the head of a mix by pressing the **H** key; in a mix type **HELP [EX]**. The fader LEDs will be switched off. Now, if you select a channel by pressing its fader status button, its current status will be shown on the screen. Disable Help by repeating the command, and the display will track the selected fader's status on-screen as it is switched. Clear that fader's Help display by re-enabling Status Help, and deselecting the channel.

Software Control Groups

Up to fifteen software control groups can be set up with *any* fader slaved to any other fader, with any number of faders in each group; it is not possible for a fader to belong to more than one group. Each slave fader can be one of five types, which determines its reaction in response to changes on the master; mixed types can exist within a single group. The slave types are: Slave Fader and Cut, Slave Fader Only, Slave Cut Only, Slave Cut Inverted, and Slave Status Only.

Software Groups act only on the mix playback. Using the Group Merge command will write grouping data into the mix, directly onto the slave faders (allowing this data to be edited), and the group is dissolved.

To set up a software group press **PRESET** and follow the on-screen instructions.

Off-line Mix Facilities

Off-line Mix Trim

The levels of mix moves on selected faders can be adjusted by a specified value, over a defined section. The command uses the **REVISE** key. Eg. **REVISE MIX (name) +5 [EX]** will trim the whole mix up by +5dB. **REVISE MIX (name) +1 FROM (time 1) TO (time 2) [EX]** will trim the mix by +1db between the two times. The mix outside these times will not be affected.

Off-line Mix Join

Stored mixes can be combined in a number of ways, by section and/or selected channels, to form a composite mix. Enter the required command and follow the on-screen prompts; the options allow cuts to be separated from the faders. Some examples:

Butt Join: **JOIN (mix B) TO (mix A) AT (time)**

Insert Join: **JOIN (mix B) TO (mix A) FROM (time) TO (time)**

Time Shift Join: **JOIN (mix A) FROM (time) TO (time) TO (Mix A) FROM (time)**

Total Recall (TR)

Total Recall scans and records the positions of all the I/O modules' front panel controls, faders and thumbwheels as a single snapshot called a 'Setup', stored under the current Title. Recalling a Setup provides a graphic representation of the selected channel on an external RGB monitor.

To create a Setup, enter **NAME SETUP** (name) [EX]. Press the fader status buttons on any channels set to I - 'Independent', that are to be included, and hit [EX] again. The Setup is now saved and will appear in the **LIST SETUP** [EX] list.

To recall a Setup, type **PLAY SETUP** (Name) [EX]. The RGB display is divided into four sections, with the channel number and group assignment displayed at the bottom of the screen. Press any channel's fader status buttons to display that channel on the RGB monitor.

For rotary controls, the RGB display shows the stored settings in black and highlights any misaligned controls in white. Resetting a control until the two lines match makes the highlight disappear. Switches are highlighted white when incorrectly set, press them to match their stored positions; those incorporated within rotary controls are highlighted to the side of the control graphic (except the large fader Solo Isolate switches, incorporated in the Group Trim control, which are indicated on the large fader Solo button). The small fader's stored position is shown by a black horizontal line.

The on-board monochrome monitor displays the TR instructions page. The console's fader LEDs will be in Level Match, indicating the fader positions stored in the Setup. Pressing the T key, causes the red status LEDs to light on any channels or groups with incorrectly set thumbwheels; once checked, **END** will return the system to Level Match.

AutoScan can be used to rapidly scan some or all the channel settings. Press the A key and follow the instructions on-screen. Once a channel's settings have been restored, the computer will automatically display the next unmatched channel

The **LARGE/SMALL** key enables specific areas of the module to be displayed in an enlarged form, and will automatically track to that section of the module when a control is operated.

Useful Tip: TR Setups can use a lot of disk space. Instead of taking a fresh Setup each time, you can simply update an existing Setup by using **REVISE SETUP** (name) [EX]. The computer will then store only the differences between the named Setup and the current console settings.

LED Reference Table for Fader Statuses

New Mix

No LED	Manual/Replay
Red LED, solid	Absolute
Red LED, slow flashing	Preview Absolute

Update Mix

No LED	Replay/Safe
Red LED, solid	Absolute
Green LED, solid	Trim
Red LED solid + green LED flashing	Play Cuts Only
Green LED + red LED, solid	Revise Cuts Write
Green LED solid + red LED flashing	Revise Cuts Read
Red LED, slow flashing	Preview Absolute
Green LED, slow flashing	Preview Trim
Red LED slow flashing	
+ green LED flashing	Preview Play Cuts Only
Green LED slow flashing	
+ red LED, solid	Preview Revise Cuts
Red LED, fast flashing	Direction indicators
Green LED, fast flashing	for Autotakeover

Ultimation Only

Yellow LED	Snap On mode
All LEDs lit	Fader stall

G Series Command Reference

DATA CARTRIDGE AND DISK DRIVES

BEGIN EX	Re-loads program
FORMAT EX	Formats new Data Cartridge (DC) (5 mins) or 3.5" Reel Disk (1 min). A must!
LABEL EX	Sets choice of REEL size if using DC or 'labels' Reel Disk as required. Essential!
ALTER EX	Stores current List page info for further transfer to REELS and Reel Disks
LOAD EX	Loads the default floppy
FLOPPY EX	Makes 8" disk current Reel Disk
MINI EX	Makes 3.5" disk current Reel Disk
DI EX	Displays remaining current Reel space

GENERAL

SIGN_.....EX.....	Changes Program start sign on message
HERE EX	Makes a NOW cue point for use in locate command lines.
? HERE EX	Displays current timecode value
FLOPPY CL EX	Sets Time and Date clock
TI EX	Displays clock
DELETE (whatever) EX	Whatever must be specified. The item name of the TITLE, MIX etc may be abbreviated as usual
SETUP EX	Accesses Setup Menu (customising pages)

Time as referred to here by	a) Last time specified
TIME can be:	b) Timecodes hh:mm:ss.ff or hh:mm:ssff
	c) Feet' Frames
	d) TITLE, MIX, CUE, HERE, DROP-IN

(t) indicates a specific value of time i.e. . 6(6 frames), 3. (3 secs) etc.

TIMECODE

Flashing SMPTE, EBU, DF TC or FILM	System is set (incorrectly) for this type of timecode. Solid display when set correctly
Flashing smpte, ebu, df tc or film	System needs to be reset to this type of timecode in Setup Menu
SMPTE?, EBU?, DF TC? or FILM?	Wrong Speed/Tach rate. Wrong Master machine selected in Setup Menu
SMPTE*, EBU*, DF TC* or FILM*	No Tach
????	Synchroniser gone away
LARGE/SMALL key	Toggles large display of current timecode or Sync page with current page display
SMPTE, EBU or STRIPE EX	To generate timecode. Set type in Setup Menu
OFF_TIME EX	Sets up REEL/Reel Disk offset
OFF:	Cancels REEL/Reel Disk offset
SP_30 (or 15) EX	Changes Speed on List page. (MUST be correct for current Master machine)

BAR/BEATS

TITLE LIST EX SETUP	Displays Tempo Map
nnn.n EX	With cursor in Tempo column, defines tempo in the range 40-400 BPM
0 EX	Enables entry of Tempo by tapping any key (not EX). Hit EX to enter value
3 EX 4 EX, 7 EX 8 EX etc.	Enters time signature
TRACK key	Displays Bar value of 'To' times
GOTO nn# EX	Locates to Bar nn
BB EX	Toggles display of Bar/Beats and Timecode
DELETE key	Hit twice to delete entire Tempo Map

TAPE CONTROL

GOTO (TIME) EX or	If TIME is not entered, the last specified target is assumed
PLAY (TIME) (TO TIME) EX ..	
HERE EX	Sets a NOW target for GOTO EX, PLAY EX etc. or Mix data changes
PLAY FROM TIME (TO	
TIME) EX	Plays for ever if TO time is not specified
CYCLE ((FROM TIME)	Cycles from last locate target if FROM
TO TIME) EX	TIME is not specified
PLAY CYCLE EX	Reinstates an interrupted cycle
CYCLE EX	Cycles to NOW from the last specified locate target
+/- (t) EX	Overrides Setup Menu default time value of +/- keys
+/- EX	Locates and plays
+/- GOTO EX	Locates and parks
+/- CYCLE EX	Locates and cycles
Q EX	Toggles the option to locate the machine to target without preroll

REELS

NB. The REEL key replaces the SEQUENCE key used on E Series keyboards

NAME REEL Name EX	Creates and names REEL on the current DC.
NAME REEL (A) or (B) Name EX ..	Creates a REEL on a specific drive
REEL Name EX	Makes that REEL current
REEL (A) or (B) Name EX	Makes that REEL and that DC current
REEL (A) or (B) Name	Lists TITLES on REEL 'Name' and makes
TITLE EX	first TITLE on list current
REEL X TITLE A EX	Makes Title A on REEL X current
DELETE REEL Name EX	Deletes the named REEL. Fairly lethal!
REEL X NAME Y EX	Renames REEL X

NB. When defining DC with (A) or (B) the brackets must be entered in command line.

LISTS

(LIST) REEL EX	Displays REEL List
(LIST) REEL (A) or (B) EX	Lists REELS on DC in A or B drive
LIST EX	Displays Information page of current REEL or Reel Disk
(LIST) TITLE, TRACK	
or MIX etc EX	Gives a list of the specified item
TITLE LIST EX	Accesses Notes Pages for reading or writing
NAME TRACK (n) EX	Enables TRACK List entries
Left/Right cursor keys	Scan through CUES, MIX, SYNC PRESET, TR SETUP, TRACK, NOTES pages
Up/Down cursor keys	Give alternative information associated with TITLE, MIX and TR SETUP lists
NAME TITLE (FROM TIME)	
(TO TIME) EX	Enters new TITLE
NAME TITLE (Name)	Enters new TITLE starting at current time
TO TIME EX	and ending at TIME
TITLE (Name) FROM TIME EX	Changes TITLE start time (and re-
sorts list)	
TITLE (Name) TO TIME EX ..	Changes TITLE end time
As above	
TITLE END TIME EX	Clears TITLE end time
TITLE (Name) NAME	Renames title. Same syntax used for
(New Name) EX	cues, mixes etc.

LISTS (cont)

CUE EX	Defines CUE point at current time, computer numbered
CUE Name AT TIME EX	Defines a named CUE point at TIME
CUE (Name) TO TIME EX	Changes time of CUE point (and re-sorts list)
CUE (Name) +/- (t) EX	Nudges cue time by one frame if it is not specified
REVISE CUE FROM CUE X TO CUE Y TO TIME EX	Re-sorts Cue List so that CUE X is now at TIME and subsequent Cues on the list up to Y are time shifted accordingly
DELETE ALL CUE, MIX SETUP etc EX	Deletes all items on the specific list
DELETE CUE 1 CUE 2 CUE 3 etc EX	For selective multiple deletions
DELETE TITLE LIST EX	Deletes all Notes in current TITLE

DROP-INS

NB. On SL 4000/6000/8000 Series systems, Drop-ins will be REHEARSED on monitor if desk TRACK READY is set but RECORD ENABLE is NOT set. To Drop-in for real, set RECORD ENABLE.

DROP-IN EX	Plays and sets Drop-in for indefinite recording
DROP-IN EX.....EX	Sets Drop-in and out times on the fly
DROP-IN FROM TIME TO TIME EX	Sets Drop-in and out times
DROP-IN END EX	Clears Drop-out time
DROP-IN AT TIME EX	Resets Drop-in time but not Drop-out time
DROP-IN TO TIME EX	As above
DROP-IN (END) +/- (t) EX	Changes Drop-in or out times by one frame or specified time (t)
LIST DROP-IN EX	Displays Drop-in and out times
GOTO DROP-IN EX	Guess what!
PLAY DROP-IN FROM TIME EX	Plays Drop-in from TIME
CYCLE DROP-IN (FROM TIME) EX	For multiple Drop-in rehearsals
AT TIME DROP-IN EX	Locates and drops in at TIME for indefinite recording
AT DROP-IN EX	As PLAY DROP-IN but clears Drop-out time
+/- (t) DROP-IN EX	Locates and drops in at time set by +/- keys
PLAY FROM DROP-IN EX	Locates but does not perform the Drop-in

TOTAL RECALL

NAME SETUP (Name) EX (EX)	Stores complete scan of desk
REVISE SETUP (Name) EX (EX)	Changes existing Setup to current settings
PLAY SETUP (Name) EX	Runs Total Recall and displays Setup
LIST SETUP EX	Lists Total Recall Setups!
LARGE/SMALL Key	Zooms in on section of display

PRINTER

PRINT	Prints screendumps if this feature enabled in Setup Menu
<i>Otherwise:</i>	
PRINT TITLE EX	Prints every List in the current TITLE
PRINT MIX, CUE, SETUP etc EX	Prints that list from current TITLE
PRINT TITLE LIST EX	Prints Notes Pages from current TITLE

COPYING INFORMATION

WARNING

G Series and Ultimatum mixes are not backwards compatible with E Series software.

Stored information can be copied from the current area to another area or copied from another area to the current area or between two other areas as required e.g:

NB. Omit (A) or (B) from command lines if copying within the same DC

COPY ALL EX	Copies Program Disk or any floppy to floppy
COPY REEL EX	Specifically copies Reel Disk to another floppy
COPY CUSTOM EX	Copies custom Setup parameters to new Program Disk
BACKUP EX	Makes copy of DC in drive A to DC in drive B
COPY FLOPPY TO REEL	Copies 8" Reel Disk to a REEL (A/B) Name EX
COPY REEL (A) Name TO FLOPPY EX	Copies REEL to 8" Reel Disk if there's room!
COPY REEL (A) Name TO REEL (B) Name EX	Copies REEL and renames it
COPY TITLE Name TO REEL (A/B) Name EX ...	Copies TITLE to another REEL
COPY TITLE Name TO MINI EX	Copies TITLE on current REEL to 3.5" Reel Disk
COPY TITLE 1 FROM REEL (A/B) X EX	Copies TITLE 1 from REEL X to current REEL
COPY MIX 1 FROM TITLE X EX	Copies Mix 1 to current TITLE
COPY REEL X TITLE 1 MIX 3 EX	Copies Mix from another REEL to current TITLE

Total Recall SETUPS are copied in the same way as Mixes. Substitute SETUP for MIX.

COPY CUE FROM (REEL Name) TITLE 1 EX	Replaces CUE list in current TITLE with TITLE 1 CUE list
COPY CUE TO TITLE 1 EX ...	Current CUE list overwrites CUE list in TITLE 1

BEWARE

Copying a Cue list to a Title will overwrite any existing Cue list for that Title. If the destination Title specified does not exist, you have the option to create it.

Track lists are copied in the same way as Cue lists - substitute TRACK for CUE. (This facility replaces NAME TRACK FROM TITLE). Substitute SYNC PRESET for CUE to copy Sync Presets. Substitute LIST for CUE to copy Notes Pages and Bar/Beat Tempo Map.

MIXING

Although SSL offer both VCA-based G Series and G Series with Ultimotion moving faders, almost all of the mix commands are common to both systems. Any differences mostly apply to default fader status and status indication. Please note that this card does not cover the G Series moving fader system fitted to SL5000M consoles.

All G Series mix systems operate in two basic modes - **New Mixes** where an original mix is created from scratch and **Update Mixes** where a mix, previously created and stored on disk, is edited.

NEW MIXES

SETUP MIX EX Enables mix system, and starts mix here
MIX ON/OFF key Followed by any locate command, enables mix from locate target

Mix Options

1. UA UPDATE ABSOLUTE*
2. RC REVISE CUTS
3. AT AUTOTAKEOVER
4. PV PREVIEW
5. IP IMMEDIATE PICKUP

UA + RC = PLAY CUTS ONLY

The above may be selected or de-selected at the start of, or during a mix, by typing *either* the associated number (1, 2, etc.) *or* the first letter (U, A, etc.) of the required control name. Selected controls are indicated by a blot on the screen display. Any selected controls may be cleared down (to Setup Menu standard) at any time by typing 0 (zero). *Note that controls 1 and 2 are not available in a New Mix and are therefore not displayed.*

FADER STATUS

Changes to fader status at the head of, or during a mix may be made individually using fader status buttons. Across the board changes at the head of a mix are made using the Fader Status Master key (FSM).

ABSOLUTE	Red LED
PREVIEW ABSOLUTE	Flashing red LED
MANUAL (See SAFE MODE)	No LEDs
REPLAY	No LEDs
TRIM	Green LED
PREVIEW TRIM	Flashing Green LED
TRIM (Fader) READ CUTS	Green + flashing Red LED
TRIM (Fader) WRITE CUTS	Green + Red LED
ABS (Fader) READ CUTS (UA + RC)	Red + flashing Green LED

NB. On Ultimotion systems only, the yellow **alt** LED indicates SNAP ON mode; all LEDs flashing indicate a fader stall.

Fader Status Cycles in a New Mix

CONTROL	READY	MIX RUNNING	MIX REVIEW
None	ABS MANUAL	ABS	REPLAY ABS
PV	ABS P/VIEW ABS ABS	ABS P/VIEW ABS* ABS	REPLAY P/VIEW ABS* ABS
PV+AT	ABS P/VIEW ABS ABS	ABS P/VIEW ABS* ABS	REPLAY P/VIEW ABS* ABS AUTOTAKEOVER

Autotakeover allows faders to be switched to REPLAY automatically when the fader crosses the previous pass level of the mix being edited.

* Toggle between PREVIEW ON (current fader levels) and PREVIEW OFF (written levels) using the FADER STATUS MASTER (FSM) key.

On non-moving fader systems, with IP selected, faders and cuts switch from REPLAY to ABS, or PREVIEW ABS, on touch in MIX REVIEW.

Ultimotion Systems Only

The yellow **alt** LED indicates SNAP ON mode when lit. In SNAP ON, touch the fader to write, take finger off to return to Replay; individual faders may be switched to SNAP OFF by pressing their fader status buttons. In SNAP OFF, touch fader to write, use fader status button to return to Replay. All LEDs flashing indicate fader stall.

SO EX Toggles SNAP ON/OFF
MO EX Toggles MOTORS ON/OFF
. (period key) Displays current state of MOTORS ON/OFF

UPDATE MIXES

SETUP MIX HERE EX Sets up for Update of current mix here
SETUP MIX Name EX Sets up for Update of mix 'Name'
GOTO MIX (Name) EX Locates and parks at start of Update mix
PLAY MIX (Name) EX Locates and starts Update mix
PLAY FROM MIX (Name) EX Locates to start of selected mix, plays past end of selected mix

GOTO/PLAY/CYCLE MIX (Name)FROM TIME (TO TIME) EX Creates an mix with updated section but at least as long as the mix being updated

Fader Status Cycles in an Update Mix

Default starting status in an Update Mix can be set in the Mix Options Page of the Setup Menu. The following table assumes Replay has been selected.

CONTROL	READY	MIX RUNNING	MIX REVIEW
None	REPLAY TRIM ABS	REPLAY TRIM REPLAY	REPLAY TRIM REPLAY

MIXING (cont)

Other Status Controls

UA, RC or UA + RC will allow faders to be switched to ABS, READ/WRITE CUTS or ABS FADER READ CUTS from any previous status, at any point before or during the mix, by using the status buttons or the Fader Status Master key at the head of the mix only.

IP sets faders and cuts to the appropriate status e.g. ABS, WRITE CUTS etc. immediately on moving the fader in MIX REVIEW. With Ultimotion, channels only switch when the state of a cut is changed.

PV allows faders to be selected to a PREVIEW of the update status selected. PREVIEW ON/OFF can be toggled during the mix, with the FSM key and can also be used in MIX REVIEW to selectively JOIN faders to the mix - see JOIN and REVISE.

AT allows faders to be switched to REPLAY automatically when the fader crosses the reference level of the mix being updated. Autotakeover is not available with RC (REVISE CUTS mode) as this mode is specifically designed to toggle READ/WRITE CUTS status.

MIX COMMANDS (all systems)

END	Stops mix and asks for name
CANCEL (twice)	Cancels current mix
LARGE/SMALL key	Toggles bargraphs with current page display if bargraphs are enabled
FSM key	Toggles 'Status Locked' mode, except when faders are in a Preview status or the FSM key is assigned to the Master Fader
MIX	Selects LEVEL MATCH. (Choose faders with buttons or all with FSM if Local Fader Level Match = YES in Setup Menu)
JOIN or REVISE	Enables MIX RUNNING from MIX REVIEW on all channels. With PV selected, only channels in Preview status
AT TIME JOIN (REVISE) EX	Specifies end of rollback
AT TIME EX	Switches faders to preview levels at TIME
-(t) JOIN/REVISE EX	Rolls back by value of - key plus run-up time and JOINS/REVISES at target time determined by the - key
HERE EX	Sets/Updates current JOIN/REVISE point
	enabling AT EX or AT JOIN EX commands. Also Sets/Updates current locate target
COPY (Head of Mix only)	Stores current fader status for starting further Update mixes until Mix System is disabled with MIX ON/OFF key
FROM EX	Logs current fader statuses
TO EX	Restores statuses logged with FROM EX
BA EX	Toggles bargraph display on or off
* key	Switches through name of mix, sectors used, FSM assignment, Master Fader status, Insert Mixing on/off and Mix Options Box selection
PRESET	Accesses/clears Software Group Setup menu
? MIX or ? END MIX EX	Displays mix start or end time with frames
? END MIX- MIX EX	Displays length of mix
MF EX	Makes FSM the Master Fader status selector
HELP EX	Enables STATUS HELP
SAFE EX	Enables SAFE SET
TRACK (in mix READY only)	Enables TRACK COPY/SWAP mode. Use FSM to choose COPY or SWAP
SL (in mix READY only)	Toggles 'Status Locked' mode. Do not hit EX after SL unless you want to start the mix!

MIX COMMANDS (continued)

MIX	Selects LEVEL MATCH. (Choose faders with buttons or all with FSM if Local Fader Level Match = YES in Setup Menu)
JOIN or REVISE	Enables MIX RUNNING from MIX REVIEW on all channels. With PV selected, only channels in Preview status
AT TIME JOIN (REVISE) EX	Specifies end of rollback
AT TIME EX	Switches faders to preview levels at TIME
-(t) JOIN/REVISE EX	Rolls back by value of - key plus run-up time and JOINS/REVISES at target time determined by the - key
HERE EX	Sets/Updates current JOIN/REVISE point
	enabling AT EX or AT JOIN EX commands. Also Sets/Updates current locate target
COPY (Head of Mix only)	Stores current fader status for starting further Update mixes until Mix System is disabled with MIX ON/OFF key
FROM EX	Logs current fader statuses
TO EX	Restores statuses logged with FROM EX
BA EX	Toggles bargraph display on or off
* key	Switches through name of mix, sectors used, FSM assignment, Master Fader status, Insert Mixing on/off and Mix Options Box selection
PRESET	Accesses/clears Software Group Setup menu
? MIX or ? END MIX EX	Displays mix start or end time with frames
? END MIX- MIX EX	Displays length of mix
MF EX	Makes FSM the Master Fader status selector
HELP EX	Enables STATUS HELP
SAFE EX	Enables SAFE SET
TRACK (in mix READY only)	Enables TRACK COPY/SWAP mode. Use FSM to choose COPY or SWAP
SL (in mix READY only)	Toggles 'Status Locked' mode. Do not hit EX after SL unless you want to start the mix!

SOFTWARE CONTROL GROUPS

Up to 15 separate software groups, with any number of faders in each group, may be set up at any time - out of a mix or during mixing i.e. Mix Ready, Running or Review. Select the Group Setup Menu with the PRESET key. Up/Down cursor keys select slave type, Left/Right keys select group number. Select faders with fader status buttons - Master first (red LED) followed by slaves (green LED). RUB key clears current group. To exit menu press PRESET again. Group information is 'monitor only' until merged with mix data by using the COPY key when group menu is on the screen and the group to be merged is current. Once merged, groups are dissolved.

MIXING (cont)

OFF-LINE CREATION AND JOINING OF MIXES

REVISE MIX Name $\pm n.n$ (FROM TIME TO TIME) EX	Initiates a trim of $\pm n.n$ dB for the specified time.
REVISE MIX Name TO G EX	Copies G Series or Ultimatum mix for use with earlier G 2.12 software. E Series and G2.12 mixes are automatically converted for use with Ultimatum and current G Series
REVISE MIX Name FROM TIME TO TIME EX	Creates a shortened mix from mix 'Name'
REVISE MIX Name FROM TIME TO TIME TO TIME EX	Creates a new mix from (a section of) Mix 'Name' and time shifts it to start at the second TO time
JOIN (MIX) B TO (MIX) A AT TIME EX	Off-line Butt join resulting in Mix A followed by Mix B
JOIN (MIX) B TO (MIX) A FROM TIME TO TIME EX	Off-line Insert join resulting in Mix A followed by Mix B followed by Mix A
JOIN (MIX) A FROM TIME TO TIME TO (MIX) A FROM TIME EX ..	Time shifts portion of Mix A and inserts it back into Mix A
JOIN (MIX) A FROM TIME TO (MIX) B FROM TIME TO TIME EX	As above with different mixes

OFF-LINE CUTS

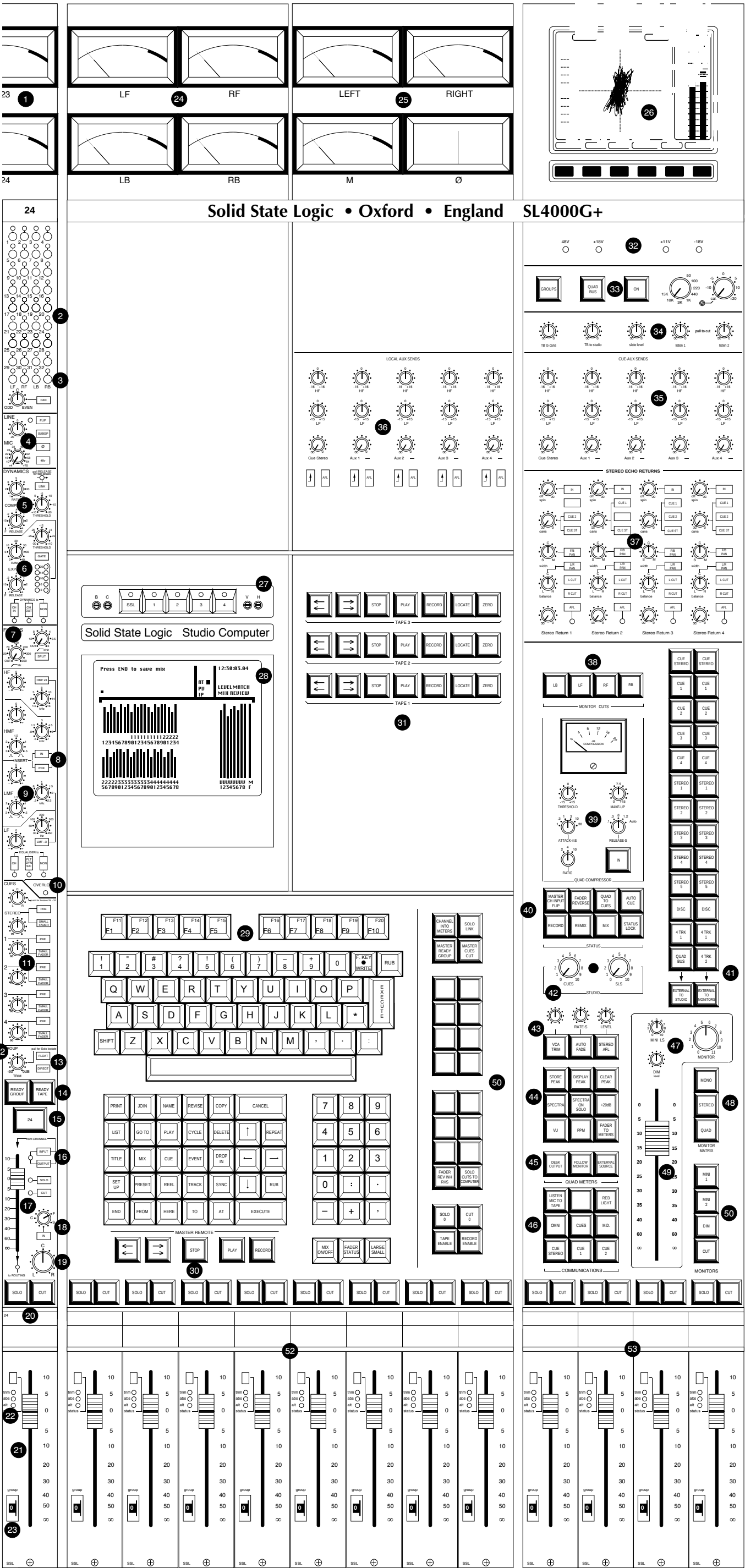
SETUP PRESET MIX (AT TIME) EX	Enables off-line Cut creation without running tape machine
--	--

To display and edit cut data for individual faders enter **LIST Fnn EX** for Channel Fader nn. Use Vn for Groups, Sn for Patchable VCAs and M1 for the Master fader. Move cursor to time column to enter EDIT MODE. Then:

GOTO, PLAY, CYCLE keys	Locate to and play events
REVISE key	Toggles cut/uncut state
JOIN key	Inserts new cut event on the line above
DELETE key	Deletes current cut event (for ever!)
COPY key	Enables the same event to be modified on multiple channels
END key	With cursor in the Cue column, saves edited cuts as a Mix to disk

Solid State Logic

- Channel meters (VU standard, PPM optional)
- Routing to multitrack busses
- Routing to quad mix busses
- Channel input controls
- Compressor/Limiter
- Expander/Gate
- Hi/Low-Pass Filters
- Channel Insert select
- Equaliser
- Overload indicator
- Cue/Aux controls
- Group/Bus level trim
- Channel/monitor path output select
- Monitor path input select
- Track record arm button
- Small fader input select
- Small fader
- Front/Surround pan
- Left/Right pan
- Large fader Solo and Cut
- Large fader (Ultimation™ version shown)
- Automation status select and indicators
- Group assignment thumbwheel



- Main bus output meters (VUs standard, PPM optional)
- Left, Right, Mono and phase correlation meters
- Optional phascope
- Optional Video Switcher
- On-board computer monitor
- Computer keyboard
- Master transport buttons
- Optional tape remotes
- Power rail indicators
- Oscillator
- Talkback level controls
- Cue/Aux master controls
- Local Aux Send controls
- Stereo Echo Returns
- Monitor cuts
- Main output compressor
- Master console status selection
- External source selectors
- Studio LS output level controls
- VCA level, AFL level, Autofade rate
- Optional bargraph meter mode selector
- Main output meter selector
- Talkback buttons
- Monitor level controls
- Monitor mode selector
- Master fader
- Monitor selector
- Additional master functions
- 8 Group faders
- 4 Patchable VCA faders

SL4000G+ SERIES CONSOLE
BLOCK SCHEMATIC

Drw. No. T4000G.41

Rev: 1.1

Date: 25 May 1994

Design: SSL Japan

Drawn: AH/DG

Ref: SL4KG+.MD

Solid State Logic

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