Applications Guide

The SL 4000 G Series Console is an extremely versatile piece of equipment which can be configured to operate in a number of different audio environments. Because of the inherent flexibility of the console we have included this applications guide to demonstrate various ways to approach real sessions.

For each type of audio recording we look at typical situations that you may be expected to have to cope with and then examine how the console may best be operated to achieve the required result.

You may only be interested in one particular area of audio. However, you will find it very useful to check through all the sections in order to see how the system can be configured to operate in different environments. It is also true to say that each area of recording has some relevance to another.

There are many ways to tackle each situation and we only cover some of the various ways of working. These examples should not therefore be looked upon as the way you must do it, but rather as some of the ways which can be used to achieve the required end result.

Zero the Console

Before you start it is probably best to zero the console.

I/O and Stereo Modules:

- All switches should be off (up), including Cue send level pots. Small Faders down.

- Set the following pots to their detent position:
  Line input gain, HF, HMF, LMF, LF gain controls, Group Trim.

- The following pots should be set to the indicated value:
  Dynamics Ratio to 1, Expand/Gate Range control to 0, Filters out, Cue send level pots to infinity (this is, in fact, pretty close to off).
VCA thumbwheels to 0.

On the SL 651G:

- Main fader up, Aux Send levels off (pretty close to infinity), Echo Return levels off, Quad Compressor out, Select Status button required, all other status buttons off, CUES and STUDIO levels down, EXTERNAL TO STUDIO and EXTERNAL TO MONITORS off. All other functions should be off and those that can't be switched off don't matter!

Music Recording

Let's assume that we are recording a band to 24 track. Let's also assume that the band consists of a drummer, a bass player, a keyboard player, a sax player and a lead singer with dark hair.

The recording will go through three stages:

Basic track laying, overdubbing and finally an automated mix.

If you don't need to edit the multitrack, start by laying timecode on Track 24. This is useful if you are using the SSL Studio Computer as cue points can be entered as soon as the basic track has been recorded. From this point on, the computer can be used for autolocation, drop-ins, automated monitor mixes, Total Recall™ of console setups, track lists, notes pages etc.
Basic Track laying

Let's start with the bass and drums. Assume that the console has been zeroed. The console needs to be in Record status so hit the RECORD status button on the SL 651G. All channels switch to Mic input and feed via the Large Faders to the multitrack Routing Matrix. The multitrack will also switch to the Sync head.

Plug up the mics (with the faders down!) to Channels 1-24 (twenty-two for the drums, bass DI into Channel 23 and a bass cabinet mic into 24). With luck, and the faders and mic gain controls in useful positions, you should see and hear nothing. This is because the channels are not routed anywhere. So route each channel to a multitrack Group(s). If you need to pan between Groups (e.g. the seven toms to Groups 4 and 5, which will act as a stereo pair) select the two Groups and switch in the multitrack routing pan control to pan the channel send between the selected Groups. Check the flow diagram on Page 7-7 to see the signal path in more detail.

The Routing Matrix can be bypassed if the channel is carrying the same signal as the the track. So if we have the bass drum mic coming into Channel 1 and we want to record it on Track 1 only, it can be sent directly by pressing the DIRECT button. Because the Routing Matrix and Group mix amplifier are bypassed, the noise figures will be improved. Note that when the DIRECT button is pressed no other channel may route to that Group.

You still have dead meters and monitors? The monitor faders are probably looking at the multitrack outputs (READY TAPE is selected or both READY GROUP and READY TAPE buttons are off) so select READY GROUP for
each track that you wish to record to. This selection will also allow you to set that track to Record Ready with the module RECORD buttons. Now the Group Outputs will be feeding the monitor faders and meters, so you should be able to set up a quick monitor mix on the Small Faders, the pan controls at the bottom of the modules allowing you to set the stereo position of each Group Monitor signal. If the tape machine is in Auto-input, you will hear the same signal by selecting READY TAPE, as the machine will be returning the Group signal to the desk.

The GROUP TRIM controls on each module can be used to attenuate the level feeding the Group Outputs and these should normally be left fully up. If the level is too high, first check that the channel fader is set around the nominal '0' level. Then adjust the input Line or Mic trim pot. The Group Trims should be used for adjusting the level of Groups that are fed from several channels (i.e. the tom tracks, 4 and 5, are fed from seven tom mics). If the Group level is too high, it is easier to adjust the Group Trims than to take down the level of all the tom mics and maybe upset the overall balance.

If things are still dead, check the module meter. OK - so it is getting to the machine. Check that the READY GROUP button is selected and the monitor fader is up. OK - so it is going to the Quad bus. Now check on the SL 651G that all controls are zeroed (see above). The main fader should be up, EXT TO MONITORS off etc. Now check that the monitor amps are on, take out you earplugs and panic.

Still nothing? Try the main MONITOR level pot!

The Large Faders will control the level to tape and the Small Faders will control the monitor mix level. You are actually monitoring via the main Quad output. Most engineers prefer to feed the multitrack via the Small Faders, using the Large Faders for the monitor mix. This can be achieved by pressing the VCAs TO MONITOR button on the SL 651G. In RECORD status this simply flips the two faders. From now on we
will assume that you have **VCAs TO MONITOR** selected. See the signal flow diagrams on Pages 7-8 and 7-9.

G Series consoles are fitted with a **VCA TO MON INHIBIT** button. This prevents the fader flip on Module 25 and upwards, with the result that the multitrack can be monitored on Large Faders 1-24 and the mics can be plugged up to Channel 25 and upwards, to feed the multitrack via those Large Faders. This simply separates the Channels (on the right) from the Monitors (on the left), for those who prefer to split the desk in this way.

For most people, the distinction doesn't matter and each I/O module may handle a Mic or Line input feeding a multitrack Group as well as carrying a monitor fader fed from a multitrack Group.

We need reverb on the monitors, so patch Aux Send 3 to the reverb input and the reverb returns to Tape Monitor Inputs 25 and 26. Aux Send 4 can be used for a second device, the returns being patched into Tape Monitor Inputs 26 and 27. You will hear these inputs, if the monitor is selected for them (i.e. **READY GROUP** and **TAPE** both off or **READY TAPE** only selected) via the Large Fader.

"What about reverb on the toms tracks?" you shout. Well, in that case plug the reverb returns into Channel Line Inputs 25 and 26 and **FLIP** the inputs to Line. Route the reverb return to the appropriate multitrack Group (in this case Groups 4 and 5) via the Small Fader (remember we have **VCAs TO MONITOR** pressed) and you should have the desired effect.

Maybe you need to gate the reverb, triggered (keyed) by the toms. This is an interesting effect and neatly demonstrates the inter-module routing that makes the console so versatile. You have already routed the toms to Groups 4 and 5. Also route them to Groups 25 and 26. Gate the reverb return channels by switching the Dynamics on Channel 25 and 26 to **CH IN** or **CH OUT**. To externally trigger the gate, simply push the **MON** button as well as the **CH** button. The gates will be triggered from the monitor input to that module (i.e. Group 25 and 26) if you now select the **READY GROUP** button.
Set the Gate (or Expander) controls so that the reverb signal is gated at the correct threshold level from the Group Monitor signal. If required, the Group Trims on 25 and 26 will attenuate the level of signal feeding the Dynamics' sidechain. This may sound confusing. If so, read it again.

If it still sounds confusing, try once more or give up.

What about triggered reverb on the monitors only? In this case, plug the reverb returns into the Channel Line Input, route to the LF and RF busses at the top of the module (remember that the channel inputs feed the multitrack groups at the top of the module and that there is also access here to the main Quad output busses). As before, you can switch the Dynamics to CH IN or CH OUT with the MON button pressed and having selected READY GROUP, the gate will be triggered from multitrack Groups 25 and 26 which have the toms signals on them (see Page 8-13). Again this is easy to do but hard to grasp for the first time. Maybe you didn't want gated reverb after all?

What about EQ? Well, now is the time to switch it in with the CH button where needed. The same applies to the Dynamics section. If you want the Dynamics pre-EQ then select the CH IN button. For Dynamics post-EQ, select the CH OUT button. There are many more combinations of EQ and Dynamics routing - see Section 8.

Remember that the EQ and Dynamics sections can be used on both the Monitor and Channel signals. This allows you to try something out on the monitors before you decide to switch the effect into the channel and commit it to tape. However, you can only toggle EQ and Dynamics between Channel and Monitor on the same module, if the Channel is feeding the same numbered track. It is quite likely that the Channel signal will be monitored on a different module, in which case you will need to transfer the EQ and Dynamics settings to the Channel module after your experimentation.

The insert point can be switched pre or post-EQ and has an IN switch which is useful if you need to switch effects in and out while recording. The insert points can be configured in two ways (Page 2-10). If your inserts are permanently in the channel, effect units can still be inserted in the monitor chain before the Tape Monitor Input jacks (Row K).
You should have a good monitor mix by now and this can be sent to the studio headphones by simply pressing the **QUAD TO CUES** button on the SL 651G. Set the correct level on the **CUES** level pot, just below the Status buttons. This allows the musicians to hear what they are doing while you get a foldback mix together with the cue send controls on each module.

Select the **EXTERNAL TO MONITORS** button and the **CUE STEREO** button on the External Selector bank above. You are now monitoring the stereo cue output to the headphone amps (interrupted at this moment in time by **QUAD TO CUES** which is feeding the headphone amps with a straight Large Fader monitor mix). Set the Cue Stereo Master send level to about 2 o'clock, and get a stereo cue mix together on the module cue send controls.

You should be picking up a pre-fader send from the monitor (Large) fader for each multitrack Group you are monitoring. Switch the send on by pressing the level control down. When you are as happy as you ever will be, simply deselect the **QUAD TO CUES** button. The headphones will now be fed from the stereo cue mix.

Deselect the **EXTERNAL TO MONITORS** button on the SL 651G otherwise you will forever be monitoring the Cue Stereo mix!

You can talk to the musicians by pressing the **CUES** button in the communications section of the SL 651G or talk to the Cue sends individually on the buttons below. If you select **AUTOCUE**, the **CUES** button will latch on, allowing you to talk to the cues whilst the tape machine is not playing. Very useful for instant hands-off communication but avoid comments like "That was the worst bass playing I've heard"
in my entire life", as you may be unaware that people are listening!

If you want to listen to someone in the studio, simply press the LISTEN MIC button. Again this is to be found in the communications group of buttons at the bottom of the SL 651G. There should be two mics hanging in the studio, connected to two mic amps whose gains are controlled by the LISTEN 1 and LISTEN 2 controls at the top of the SL 651G. The mics can be cut off by pulling up the appropriate level control. You will find that these two mics come up on the jackfield (R38 and 39) and other mics can be substituted here in S38 and 39 if you wish. Some studios have tied the LISTEN MIC button to the AUTOCUE facility so that the button latches on if selected when the tape machine is not playing, thus allowing continuous two way talkback automatically. Be a little careful here that you get the levels correct, to prevent feedback.

When you are happy with the rehearsals, prime each track by pressing the module RECORD buttons and get something down onto tape. When you have done a take you wish to hear, simply rewind the tape and play it back. But you will hear nothing on the monitors as long as the READY GROUP buttons are pressed, as you will be monitoring the Group Outputs and not the returns from the multitrack. You could go along all the modules and deselect READY GROUP but there is a much simpler method.

Simply press the REPLY status button on the SL 651G and all the READY GROUP buttons will be electronically defeated (those that were selected will go to half brightness showing that Replay has been actuated). The multitrack will automatically switch over to the Replay head. You can now hear the playback through the monitor faders with the same balance as you had when monitoring the take. As the Quad bus is always used for the monitor mix, you can record this rough mix straight to all the stereo machines normalled to the main desk output.
Since **REPLAY** status deselects **RECORD** status, the SLS feeds will be enabled and you can now select **EXTERNAL TO STUDIO** and **QUAD BUS** on the External Selectors of the SL 651G (see Page 4-10). This allows the Quad bus mix to be sent to the Studio Loudspeakers via the SLS level control so that the musicians can hear the playback.

To prepare for another take, just return to **RECORD** status and like magic all the **READY GROUP** buttons will go to full brightness.

If you need to bounce a couple of tracks, the **FLOAT** button can save a lot of time. Say we wish to bounce the drum tracks across to Tracks 21 and 22. (Having recorded eight tracks of drums, we find that we will need more tracks than we have free space). This is simple. The monitor mix of drums coming from the eight Large Faders can be re-routed to the multitrack by hitting the **FLOAT** button on each of these eight modules and selecting Groups 21 and 22 at the top of each module. Select **READY GROUP** on Modules 21 and 22 and monitor the bounce on those two modules' Large Faders. It's as simple as that.

The above description only covers use of the standard I/O modules. If you wish to use any Stereo Modules that the desk may be fitted with, simply plug the source into the Line Inputs and route the signal to the required destination via the Routing Matrix at the top of the module. The operation of stereo channels is much simpler than the standard I/O modules, due to the fact that there is only one stereo signal path through the module. With external SSL Mic Preamplifiers, the stereo modules may be used with stereo mics. You could also patch out of a pair of Channel Insert Sends and use those I/O module Mic preamps.
If you are using M/S (Sum and Difference) techniques, simply select the M/S button. The left hand input should be fed with the M signal and the right hand input with the S signal.

Stereo Modules can also be used for stereo audio subgroups, with EQ and Dynamics, which can then feed the multitrack. Take the example of the tom tracks. Instead of routing these to Groups 4 and 5 they could be routed to a pair of unused Groups, say 31 and 32. The Group Outputs (G31 and 32) can now be patched across to the Stereo Module inputs and the resultant stereo signal routed via Groups 4 and 5 to the multitrack.

**Split Console Recording**

Basic track laying, as described above, uses the console as a true in-line system. However, there is an alternative way to record basic tracks. The console is 'split' so that all sources are plugged up to the right hand side of the centre section and the left hand side is used for the monitor mix. The main advantage of this way of working is that the EQ and Dynamics sections do not have to be shared between source and monitor, as is the case with in-line working.

The desk can still be worked in **RECORD + VCAs TO MONITOR** status. Mics and line sources are patched to the right hand side inputs and and sent to the Routing Matrices via the Small Faders. Any EQ or Dynamics treatment required is switched into the channel, where appropriate.

The left hand side of the console is used for the monitor mix. The inputs are still selected using the **READY GROUP** and **READY TAPE** buttons feeding the Quad bus via the Large Faders. All the EQ and Dynamics sections are available for the monitor mix as none of these are being used for the source signals.

The Local Aux system is useful in this mode. Aux 3 and 4 can be split using the buttons on the LOCAL AUX SENDS panel. The source signals on the right hand side of the desk can feed the main Echo Send patch outputs, for adding reverb onto tracks with the sources. Aux 3 and 4 can be used separately by the monitor section for sending to two different devices, which can be returned into the monitor section to add effects to the monitor mix.
Overdubbing

The second step in the recording process is overdubbing. The console allows you to do this in two ways.

1. Stay in **RECORD** status and record in exactly the same way as above, the only difference being that you deselect all the **READY GROUP** buttons on the tracks that you have just recorded and select **READY GROUP** and/or **READY TAPE** for the tracks that you are about to record onto.

2. Press the **RECORD** and **MIX** status buttons on the SL 651G simultaneously. This is logically called Record and Mix status! The tape machine will switch to Sync. This status allows you to build up a mix on all channels except those associated with tracks that you are recording to. The advantage of this way of working is that as the overdubbing proceeds, you get closer to the final mix and the desk can be set up in exactly the same way as you would for the mix, while still adding tracks. Again, the split way of working is very useful here, as the left hand side of the console can be set up as a full mix section and the right hand side used for sources feeding the Routing Matrices.

However, if you have many source channels (e.g. twenty-eight synthesiser outputs), depending on the size of the console, you may need to work in **RECORD** or **RECORD + VCAs TO MONITOR** status if there are not enough Large Faders to work in the split mode.

For the purpose of our example we will look at the recording we have made so far: Drums on Tracks 1-8, Bass to Tracks 9 and 10.
Select RECORD + MIX status. Let's assume that we now wish to overdub synthesisers.

All inputs will switch to Line and as the multitrack is normalled to the Line Inputs, the first ten channels will receive the Drums and Bass that we recorded previously.

The inputs feed the Large Faders and then the main Quad bus via the Left/Right and Front/Back pan at the bottom of the module. A mix can be made using EQ and Dynamics in each channel as required.

We now want to lay the first synth overdub onto Track 11. Several tracks will be needed, fed by different synthesisers, sometimes on their own but sometimes simultaneously with others (the wonders of MIDI!).

The most sensible way to do this is to leave Channels 11-24 clear for overdubbing. Set up the keyboards to feed Channels 25-32 (we only have four stereo keyboards I'm afraid). Patch reverb and effects into Channels from 33 upwards or into the Tape Monitor Inputs (Small Faders) on channels not being used for overdubbing (i.e. not Channel 11) and route these to the multitrack or the main Quad output bus via the Routing Matrix at the top of the module.

The keyboards will now be feeding the main output busses via the Large Faders. This is useless, as they need to go to the multitrack. So FLOAT Channels 25-32 off the main busses and send them to Track 11 via the Routing Matrix. But wait, there is an easier method!

When in RECORD and MIX, all modules behave as in MIX status unless either a READY GROUP or READY TAPE button is pressed. In this case, that module reverts to the RECORD mode (i.e. Channel Input to Routing Matrix via Large Fader and Monitor Input to main output busses via the Small Fader). So to overdub onto Track 11, just select READY GROUP on Module 11. The Large Faders on Modules 25-32 will set the levels feeding the multitrack and the Small Fader on Module 11 will allow this feed to be monitored, together with Channels 1-10. As before, if the VCAs TO MONITOR status button is pressed, any module in the RECORD mode will now feed its source to the Routing Matrix via the Small Fader.
Again the module **RECORD** button can prime or drop in Track 11 and the synth can be recorded. The musician will always hear Module 11's Group Output, but if you need to drop in on a mistake, you will want to hear the signal off tape. This is where the SSL Supercue system comes to the rescue. By selecting **READY TAPE** and **READY GROUP**, the (Large) monitor fader will be fed with a 1:1 mix of the Group Output and the tape return.

Both you and the musician (assuming he is listening to the Cue system on headphones) can now hear this 1:1 mix. The keyboard player can always hear himself and will also hear the Sync output of Track 11 whenever the tape is playing. (See the table on Page 2-23 for the different monitoring combinations of **READY GROUP** and **READY TAPE** buttons) As soon as the track drops into record he hears only the Group Output.

The other, more usual, monitoring combination can be achieved by selecting **READY TAPE** only. In this case the engineer can hear the tape signal and will be able to monitor the drop-in exactly. The musician still receives a 1:1 mix so his monitoring is identical to the **READY TAPE** and **READY GROUP** situation above.

With Track 11 completed, deselect the **READY TAPE** and/or **READY GROUP** buttons. Module 11 now behaves in the same way as the other modules and Track 11 can be added to the mix via the Large Fader. If you need to add more synth tracks, simply deselect Group 11 on Channels 25-32 and select another track.

Repeat the process for several months.

This is a good time to take a break.
Although the process is fairly easy once you get the hang of it, it may be extremely confusing first time round.

If you only have a single mic source to overdub onto one track, plug this into the Mic Input of the module corresponding to the track you are recording onto. Let's assume you need to add a guide vocal onto Track 15. Plug the mic into Channel 15 and hit READY GROUP and/or READY TAPE on Module 15. Select the DIRECT button and the mic will be fed directly to Group 15. Monitor as before on the Large Fader.

To track bounce in this mode (the same example with the drums) FLOAT Modules 1-8 off the main mix busses and select Groups 21 and 22 on the Routing Matrices. As before, select READY GROUP on Modules 21 and 22 and monitor the bounce as a normal overdub.

**G Series Automation and Total Recall™**

Now that the G Series computer is fitted with 20MByte Data Cartridges, it makes much more sense to use Total Recall during this stage of the recording process.

All the fader levels, EQ and Dynamics settings for the source channels can be stored on one disc and recalled at a later date. This is especially useful if you need to re-record a track or section of a track, because Total Recall allows you to exactly match the new source with the settings used during the original recording. Before, this process used piles of discs and was a pain. Providing that you sensibly name the TR setups, any setting can be accessed within seconds.

The 'split' method of working the console also helps this recall process as all channels on the left hand side of the console will be saved as monitors and those on the right will be the sources.
With the additional storage capacity of G Series, it is now possible to store and replay automated monitor mixes for each song, without having to dig through stacks of discs.

The possibilities are endless.

Phew!

Now back to the Console Operator's Manual.

Mixing

If you haven't already recorded timecode on the multitrack (you obviously didn't use a SSL for overdubbing) and you intend to use the Studio Computer, this is the time to panic if you don't have any spare tracks. Check the Computer Operator's Manual for details of the automated mixing system.

Back to the console. Select MIX status and zero the desk.

All channel inputs are switched to Line and feed via the Large Faders to the main Quad outputs. The Small Faders feed the Routing Matrix and the machine is switched to Replay.

The multitrack will of course come up on Channels 1-24 (or more with a 52 track machine) and you should patch reverb and other effects returns to the spare channels. If you think that you will require audio subgroups, leave a couple of channels free between Channels 1-32 as these can all be accessed by any other faders and used as subgroups, as we will see later.

G Series consoles are all fitted with a facility called CHANNEL INTO METERS. Normally, with this button off, the meters above each I/O module look at the Monitor Input (either the Group or Tape signal depending on the READY GROUP and READY TAPE selections).
This is fine while recording but during mixdown it is useful to see the channel input on these meters. As the tape returns are normalised to both Line Inputs and the Tape Monitor Inputs, confusion can arise if the meters are looking at the Monitor inputs, especially if the Channel Line Inputs have been crosspatched with another source. When CHANNEL IN TO METERS is deselected, the meters will look at the outputs of the multitrack machine (provided READY GROUP or VCAs to meters have not been selected). When CHANNEL IN TO METERS is selected, the meters will look at whatever source (Mic or Line) has been patched into the channel input.

While on this subject, there is one variation of this facility that can be useful during the recording process if the console is being operated in a 'split' mode (i.e. monitor mix on the left and sources on the right of the centre section). If the Channel In to Meters function has been split into two or more sections, there will be a button labelled CHANNEL IN TO METERS RHS. This allows the meters on the left hand side of the console to meter the multitrack via the Monitor Inputs and meters on the right hand side to meter the sources (Mics or Lines) via the Channel Inputs.

The great thing about SSL consoles is that you can use any of the Small Faders as additional inputs to the main mix busses. A 56 channel console actually has 112 fader inputs available for mixing (see Page 7-17).

Any signals that you wish to automate should be in the Channel path, as the Small Faders are not hooked up to the automation system. However, all is not lost, as the Small Faders can be subgrouped to the Large Faders which, of course, are linked to the automation system. You can also patch additional inputs via the patchable Stereo VCA faders and then into Small Fader inputs. These patchable VCAs are also useful for automating stereo echo returns.

A common problem can be a 48 track mix using a 40 channel desk. In this case, buy a bigger console! No, we must be serious. Plan the inputs carefully. If there are groups of tracks that can be grouped and then automated, these are best patched to the Small Faders and subgrouped to one or more channel inputs.
Let's assume that we are remixing a 48 track and that there are eight vocals which will form a stereo backing (see Page 7-18). They can be patched to Small Faders 1-8 via the Tape Monitor Inputs, Row K.

Route the Small Faders to Groups 25 and 26 at the top of each module and switch in the routing pan. Select SUB GP on Channels 25 and 26 and these channels will now pick up the vocals. You now have overall EQ and Dynamics capability as well as automation. The alternative method is to patch from Group Outputs 25 and 26 (G25 & 26) into a Stereo Module if you are fortunate enough to have some of these fitted.

You can also use the Small Faders as additional effects sends. If you need to do this, avoid using these faders as extra inputs on the modules where you need additional sends.

For the main vocal on Channel 18 you may need an additional delay as well as the usual effects hooked up to the stereo and four mono Aux Sends. In this case the Small Fader will be needed as an extra send from this channel, so don't plug one of those backing vocal tracks into this Tape Monitor Input.

The INPUT and OUTPUT buttons next to the Small Fader can pick up the signal from the channel (see Pages 2-25 & 7-21). Let's assume we need a pre-fade send after the EQ. Select both INPUT and OUTPUT buttons. Select Group 32 on the Routing Matrix and patch Group Output 32 (G32) into the delay unit. The Small Fader will now act as your send level control.

What about subgroups? Well, there are five different ways of doing this covered in a special section so there is little point repeating all that. We will however explain which subgrouping methods you can use for specific examples in a typical mix.
VCA Subgroups

If you simply need level control of a group of signals, then use the VCA Group Faders situated in the centre of the console. In our mix we can select the two Bass faders (Ch 9 and 10) to VCA Group 1, using the thumb-wheel switches on these faders.

Large Faders to Large Faders

The eight Drum tracks need to be combined into a stereo group that we wish to EQ and compress, so FLOAT these channels (1-8) off the Quad bus and route them to Groups 29 and 30. Select SUB GP on Channels 29 and 30, which will now act as audio subgroups.

Large Faders to Small Faders

The above has taken up two additional Large Faders. OK, so the Drums may need to be faded out by the computer. But if they don’t and you still need an audio subgroup, we can route all the Drum channels to a pair of Small Faders instead. As before, FLOAT Channels 1-8 and route them to Groups 29 and 30, but this time select READY GROUP on Modules 29 and 30. The inputs to Small Faders 29 and 30 are now fed with the Group monitor and if they are routed to the Quad bus at the top of the module, we have the two Small Faders controlling the overall Drum levels. EQ or Dynamics can be switched in with the MON button. The patchable VCAs can be used here between the Group Outputs and the Group Monitor Inputs, to automate this stereo subgroup with one fader and you avoid wasting two complete channels.
Small Faders to Large Faders

This is covered on Page 10-17, in the example of the vocal backing subgroup using a pair of Large Faders.

Small Faders to Small Faders

Assume that the eight vocal backing tracks, that are patched into Small Faders 1-8, need audio subgrouping for overall EQ and Dynamics. However, we do not need automation as the tracks are clean and they sing most of the way through the number. So we don't need to use a Large Fader for the subgroup. In this case the tracks are sent to Groups 29 and 30 from the Small Faders on Modules 1-8 as before. However, this time we can hit the READY GROUP buttons on 29 and 30 and pick these signals up on the Small Faders, routing them to the busses via the Quad routing buttons at the top of the module. Don't forget the patchable VCA option here as well. Simple and very versatile!

Finally, before you commit the mix to tape, try the compressor on the main Quad output.
Remote (Mobile) Recording

There are now several SSL consoles in mobile environments and although the operation is usually one of track laying, there are occasions, usually in Television work, when it is essential to provide a stereo mix in addition to a multitrack back-up tape.

There are two basic ways to tackle the problem:

1) Work in the same way as a recording studio would. In other words put the desk into RECORD status and route all Channel Mic/Line Inputs via the Large Faders to the multitrack Groups. The stereo mix can be derived from the twenty-two Groups (assuming use of a 24 track with timecode) via the Small Faders and the main Quad output busses. Selecting VCAs TO MONITOR will flip all the faders so that the inputs are routed to the multitrack via the Small Faders and the show is mixed down on the Large Faders.

2) Set the desk in the MIX mode and audio subgroup from Large Faders to Large Fader those signals that need to be grouped for the multitrack. Then use the Small Faders as sends on all the channels that need to be routed to the multitrack. Take the pre-Large Fader signal from the channel, by selecting both INPUT and OUTPUT buttons next to the Small Fader, and assign the fader to the appropriate multitrack Group.

Let's look at the advantages and disadvantages of each approach.
Method 1

The desk is in RECORD and VCAs TO MONITOR mode. The inputs to the console come up on Small Faders and are routed to multitrack Groups. The Large Faders mix the Group Outputs to the main Quad output by selecting READY GROUP on each of the first twenty-two modules.

You achieve two things. First of all you know that what is going to the multitrack is OK because you are deriving your stereo mix from the multitrack feeds 'on-the-night'. Your mix will be much simpler as you are only working from twenty-two faders plus effects returns. You will also have a very clear idea of any problems that you may encounter when you eventually come to the remix, as you will have already done the mix once on the night.

In some cases (especially in broadcasting), the on-the-night mix may be acceptable for use at a later date and may simply need small corrections at various points. With Total Recall, the desk in the remix room (hopefully a SSL!) can be set up in exactly the same way as on the night of the show, to remix the unacceptable sections for editing back into the on-the-night mix.

The disadvantage of this way of working is that you will only be able to have as many sources as channels on the console. The Small Faders or (if VCAs TO MONITOR is pressed) the Large Faders, will be used for the stereo mix and therefore cannot be used as additional inputs.

To avoid this problem on larger shows, it is wise to use external submixers for additional inputs. Say you have a 48 channel console and you need sixty inputs to the desk. This would be simple if there was no multitrack, as the additional twelve inputs could be brought in on the Small Faders and routed to the output busses. However, in this method of working you need to route these to multitrack Groups and then mix these Groups to the main outputs. So you will have to use external submixers.

SSL manufactures a stereo rack mounting submixer for this very application. In our example above, we could plug up ten audience mics plus eight mics on the brass section of the band to the submixer, routing these to Output Groups 1 and 2 respectively (the SSL submixer
has four stereo output groups available). This would leave six modules on the desk free. The outputs from the submixer could then be patched into four of these free channels (or two Stereo Modules) and the problem is now solved.

It should be remembered that any changes in level on the channel faders routed to the Groups, will affect levels recorded on the multitrack. For example, if the engineer decides that the internal mix of the brass is wrong and alters it, these changes will affect the multitrack feeds, making the remix at a later date slightly more difficult as the balance of the brass tracks will alter during the programme.

This method of operation is adopted by most remote recording trucks using SSL consoles.

Method 2

This method is favoured by some broadcasters, as feeds to the multitrack are completely independent of the main mix. In Method 1 sends to the multitrack form the basis of the stereo mix. This method effectively sets up two separate mixes. The first is the 'on-the-night' mix and the second is the mix of sends to the multitrack.

The sources are subgrouped as required for the mix and then the Small Faders are used as sends to the multitrack groups. If the subgrouping has been sensibly organised, there should be no more than twenty-two channels, including subgroup control channels, for the main mix.

With no audio subgroups and forty-eight channels routed directly to the Quad bus, there is the problem of how to condense these down to twenty-two multitrack Groups. All the module INPUT and OUTPUT buttons next to the Small Faders must be pressed and the Small Faders will now feed the channels' pre-Large Fader signals to the multitrack. The grouping of signals to the multitrack will have to be setup on the Small Faders.
For example, a band with twenty mics needs to go to six tracks of the multitrack. All the brass channels can be routed to, say, Groups 16 and 17, the balance of the Group being determined by the Small Fader levels and so on. Monitoring of these outputs has to be carried out externally from the desk as all the Small Faders are being used as sends from the channels.

The one and only advantage of this system is that the multitrack sends are completely independent of the main mix; whatever happens on the night, the multitrack levels will be intact. This may be an advantage in the case of another remote truck wanting many feeds from your desk for its own use. If they are not happy with the grouped sends that you want to supply, this could be the solution. In this situation, the direct output facility on the console is useful. Pressing DIRECT on every module not being used as a subgroup will provide another truck with a feed from every channel and do away with the need for mic splitters.

The disadvantages are as follows. The remix from multitrack will be completely different from the mix on the night. The engineer at the desk has no idea of what is going on with the multitrack sends, apart from an indication on the meters, and cannot control them adequately unless he has some means of monitoring them.
Audio Post-Production

Introduction

Solid State Logic now manufactures two different types of Post-Production Console:

1) The SL 6000 G Series Stereo Video System is a derivation of the SL 4000 Series and as such will be familiar in operation to anyone who has worked on an SL 4000 Series Console (see Page 1-4 for a detailed account of the differences). It is basically an SL 4000 Series Console with the addition of three dedicated stereo subgroups for splitting the mix into Music, Dialogue and Effects outputs, whilst at the same time providing a composite mix for layback to a VTR or ATR.

2) The SL 5000 M Series Audio Production System was introduced in 1986 as a system designed for Broadcasting, Film Studios and Video Post-Production houses that wanted dedicated custom consoles for specialist applications. Each SL 5000 console utilizes the same basic architecture but with unique channel and output configurations which exactly match the requirement of the studio. For example, a Film dubbing console may require mix busses in several sets of up to eight outputs, while a Post Production house might need four sets of stereo audio subgroups and a main stereo programme output.

One of the main considerations when dealing with Audio post-production is the requirement to split the mix into stereo or mono components, usually Music, Dialogue, Effects and sometimes Audience reaction. It is this one requirement, together with the monitoring and machine control for these mix minus feeds that is characteristic of post-production work.

As a result of this requirement, the SL 4000 G console will never be quite as suited to this type of work as the SL 6000 or SL 5000 Systems.
However, the SL 4000 G Series is a very flexible system and it is possible to configure the routing to accommodate some of these requirements. If all that is required is a stereo (or indeed a 4 track) mix to picture, then the SL 4000 G Series will provide better facilities than practically any other system in the world. Laying tracks and mixing can be accomplished in an similar manner to that described in the Music Recording section of this applications guide. If there is a requirement for mix minus feeds, then some I/O or Stereo Modules will have to be configured as mono or stereo subgroups. If only a mono final mix is required, the four main Quad busses can quite easily provide the Music, Dialogue and Effects split.

In this section, various methods and helpful hints for console operation in the post-production environment will be looked at. As you will see, the SL 4000 G Series console and associated options offer an incredible amount of flexibility and power (even fun) in solving the many problems facing the audio post-production engineer.

Room Setup

One of the many challenging aspects facing audio post-production work is the incredibly large amount of different types of source material. In a well equipped audio post room you will find a multitude of machines to play back this source material. These include video machines, mag decks (to play and record audio on film stock coated with magnetic oxide), cart machines, compact disc players, disc turntables, 1/4 and 1/2 inch mono/stereo/centre-track timecode/pilot tone machines, to name but a few. All of these plus a record machine. This has generally been left to 24 track analogue and more recently, digital machines (although any multitrack from 4 to 32 tracks may be used).

OK, now that we have a machine room the size of a Zeppelin hanger, a bunch of cables running in the general direction of the console and a client overloaded with bags of tapes with questionable markings, "What's next?" you ask.
Beginning the 'Typical' Session

The first and highly recommended task is to record continuous timecode onto the multitrack (hereafter assumed to be a 24 track). It should be recorded for at least the length of the programme to be mixed. This gives a solid reference to start building elements onto, and reduces the chance of messy sync problems that can bite you later.

**Caution:**

If video is to be used at any stage in the project, a video-referenced timecode generator should be used. Unfortunately, the built-in SSL timecode generator is not able to be referenced. It can of course be used for mixing and synchronising on audio only sessions.

Track Laying

Most audio post-production jobs involve the proper placement in time and recording of a single (or very few) track(s) at a time, such as a single dialogue track or sound effect (SFX). At this stage, the proper laying out of audio elements on the multitrack is time well spent and later rewarded. Here are a few points to consider:

- Keep similar types of audio elements on the same track.
- Maintain a reasonable space in time between audio elements on the same track.
- Record multiple tracks of any element that may need more than one setting of EQ or other processing.
- Work to a standard track format that will be the same between different jobs.

A convenient console master status for tracking, oddly enough, is MIX. This sets up all modules in mix mode with Line Inputs from the 24 track feeding the Large Faders. To use this mode, make sure your multitrack is locally switched to monitor off the Sync head.
Ideally all the source machine outputs should be normalised to Channel Line Inputs above 24, thus allowing playback/monitoring of the 24 track on the first twenty-four Large Faders. In this way, a mix can be gradually built up, one fader at a time, as sources are recorded. This mix can even be automated as you record, leaving you with only a few adjustments to be made to the final mix in one pass!

In MIX status, source channels normally route to the 24 track via the Small Faders. Alternatively, the FLOAT button may be selected to allow Large Faders to feed the Routing Matrix on source channels.

Source channels (above Channel 24) may be have been specified with Dual Line Inputs instead of Mic/Line Inputs. This allows two separate line level sources to be selected at the channel input, with just a press of the FLIP button.

As stated above, many different sources are used to build a 'typical' audio post-production mix. What has not been mentioned is the varying quality of these sources. To make all the sources manageable in a mix, a common practice is (unlike music recording) to clean up tracks while recording. A great feature on the SSL is the ability to Gate/Expand/Compress on each module, as well as EQ with Filters and the four band parametric Equaliser.

While laying a pre-recorded dialogue track to the 24 track, it is possible to use the GATE function of the Dynamics section to clean up tape hiss or extraneous noises. At the same time, compression and minor EQ may be added to start shaping up the tracks before the final mix.

While recording dialogue tracks, either live from a booth or from a pre-recorded tape, you have the ability to feed that source to all multitrack inputs and the Quad bus at the same time, via the FLOAT button and the Routing Matrix. This makes it a breeze to select any track to Ready from the console, with the module RECORD button, and record just to that track. Then you can quickly move onto the next track to record, without reassigning any routing or changing levels. This also allows you to record several tracks of the same source on the multitrack, all at the same time, which is useful when dealing with a pre-recorded dialogue track that needs many separate EQ settings during mixdown.
Automation during Track Laying

Use of the SSL G Series Studio Computer during tracking can be as basic as autolocating the multitrack tape to various points in the recording. The computer also permits frame accurate drop-in and drop-out points. This can make cramming-in that last sound effect on the only available track, less of a hit and miss adventure.

After a few tracks have been recorded on the multitrack, automated mixing can start. As each new track is added, and while using the Large Faders for monitoring, you can build up the mix.

Other SSL automation features such as the Events Controller, the Master Transport Selector and the Integral Synchroniser System are all useful in the process of building up tracks on the 24 track. For operational details, refer to the G Series Computer Operator's Manual.

Mixing

Setting up

The console master status should be MIX.

If there is a need to split the mix into several mix minus feeds then it will be necessary to configure the console to include three (or four) stereo or mono subgroups. If mono only is required, the LF, RF, LB and RB Quad busses can be used. Alternatively, in a typical situation, where stereo Music, mono Dialogue and stereo Effects outputs are required, three subgroups will be needed. If the console is fitted with Stereo Modules then these may be the best modules to use. Each of the multitrack return channels should be FLOATed off the Quad bus and sent via the Routing Matrix to five Groups (Group 28 for Dialogue, 29 & 30 for Music and 31 & 32 for Effects). The Subgroup buttons on these I/O modules should be selected so that these channels are now the masters for the mix minus feeds. It is then possible to take the Group Outputs and feed them to their ATR destinations.
If the console is put into MIX + RECORD+VCAs TO MONITOR status, the READY GROUP and READY TAPE buttons can be used to allow the Group Outputs and their Tape Returns to be monitored via the Large Faders (on Modules 28-32) and the Quad bus. In this case the module Subgroup buttons are not used.

In this mode of working, all the channel inputs will be floated up to the Routing Matrix so the Small Faders will be disconnected and will be unable to control additional inputs to the mix.

At this point, initial EQ, Dynamics, outboard effects and level adjustments should be made to individual channels. Unfortunately a large part of audio post-production work involves fixing problems as opposed to enhancing good quality audio.

The powerful parametric EQ and Filters, with careful adjustment, can take care of the worst audio offenders, such as timecode leakage, hum, and other garbage.

One method for finding a problem frequency:

With the EQ selected to CH, zero all the controls. Choose the most likely frequency band and turn the Q control to the sharpest curve. The x3 and the +3 buttons allow the HMF and LMF bands to be swept over the entire frequency range. Turn the level control of that frequency band up as far as you dare and sweep the frequency control until you make the offender scream out the most. It is then a simple matter to reverse the level boost and dip out the problem while adjusting the Q for the necessary width.

If your console is fitted with Plasma Bargraph metering, the Spectral display can be of great help in locating problem audio frequencies. It also lets you see the effect of any EQ you are putting in.

The Dynamics section on each module can be used to keep track noise down with the Gate function. This can make the mix easier by not having to remember cuts.
The Mix

Many post-production jobs can be mixed without the aid of automation. This is made easier by the wide variety of grouping combinations offered on the console. For instance, the eight dedicated VCA subgroups can control any or all of the Large Faders from the centre section. Usually they are placed in the best stereo monitoring position in the control room. The VCA subgroups may be further grouped to themselves to allow even greater control.

The READY GROUP and READY TAPE buttons on the 'subgroup' I/O modules allow the more traditional film-style 'pick-up and record' mixing method through the use of the module RECORD Buttons. This allows punching in selectively on Music, Dialogue and SFX tracks while perfecting your mix.

Automation

The SSL G Series Mix System is so friendly that you'll find it can be used on even the simplest jobs. This makes going back to revise those mixes easy, without having to resort to separate Music, Dialogue and SFX tracks and their associated generation loss.

The amazing power and flexibility of the Mix System is fully described in the G Series Computer Operator's Manual.

Here are a few automation features to look at:

A mix can easily be built up a fader at a time. This lets you concentrate fully on, for instance, a dialogue track that was recorded very unevenly. Instead of compressing the —— out of it, a more natural sound can be gained from riding little nuances with the fader. Once those moves are stored, it is a simple matter to do overall level trims on subsequent passes.

Cuts (mutes) and Faders can be written separately to save either the good cuts or good fader levels from a previous mix.
A common problem in post-production is the need to uncut a track at exactly the right moment. An interesting feat if there is nothing on uncut tracks or the picture to cue from. A neat trick is to use the Small Fader to feed the Routing Matrix to monitor the track, while the Large Fader is cut. Now it is easy to uncut at the right moment and have the automation play back the cut/uncut on the next pass.

The rollback and JOIN function can be used to accomplish frame accurate cuts or level changes, such as on a video scene change.

An infinite amount of mix versions can be stored and recalled at a later date, e.g. Producer's version, Client's version, Client's mother's version, the Right version. Different versions can even be compared on-line.

A fully automated mix can be transferred directly from the multitrack to the finished product, such as a 1" video tape, without intervening steps or generation loss. A second automated pass can be made for separate M/D/E tracks via the Quad bus.

The REVISE MIX feature can move mix data in time to a different point on the 24 track. This can make mixing different versions a matter of a few faders, instead of starting from scratch.

The best way to learn anything is to do it. Take the time to read the Computer Operator's Manual, hopefully sitting in front of the console, and then start mixing!
Film Mixing and Scoring

It is much more common these days for recording studios to be working with Film Soundtracks and even Film Mixing. Providing that the output requirements are for four busses or less, the SL 4000 G Series console is capable of mixing to Film.

The most common requirement is for a 3 or 4 Track mix configured as LEFT-CENTRE-RIGHT and sometimes a mono SURROUND. As the SL 4000 G Series Console has Quad output capabilities this should not present a problem.

In this case the outputs from the SSL should be configured as follows:

<table>
<thead>
<tr>
<th>Output</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEFT FRONT</td>
<td>Left</td>
</tr>
<tr>
<td>RIGHT FRONT</td>
<td>Right</td>
</tr>
<tr>
<td>LEFT BACK</td>
<td>Centre</td>
</tr>
<tr>
<td>RIGHT BACK</td>
<td>Surround</td>
</tr>
</tbody>
</table>
It is possible with a standard SL 4000 System to hard pan, using the Quad pan controls at the bottom of each module, to these four outputs. The monitor speakers in the room need setting up so that the Left Back output feeds a Centre speaker and the Right Back output feeds to a set of mono Surround speakers.

SSL can now provide a special modification which allows the console to instantly configure the panning to provide true L-C-R-S panning. A single button, located on the SL 651G in place of the QUAD monitor button, switches the pan laws of all I/O modules between standard Stereo panning and Film panning. In this case the main Quad Left/Right pan control now pans the signal between the L-C-R outputs of the console. The Front/Back pan control will allow the signal to be panned between the front (L-C-R) and the mono surround. When this modification is fitted it is not possible to route to a stereo pair of rear busses in the 'non-Film Pan' mode, due to the Left Back bus being dedicated as a Centre Output.

When working in this way, it is usual to monitor via a Dolby DS4 or DS4-2-4 module.
The usual way to patch this is to feed the DS4 inputs from the Quad Bus Outputs (Jacks L9-12). The DS4 provides a stereo encoded signal (this is recorded if you are doing the final mix to picture) which can be fed back into an External Stereo Selector (e.g. ST1 REP, Jacks P25-26) for metering. The decoded 4 track output from the DS4 should be fed back into the QUAD 1 input of the external monitoring selector so that the effect of the encoding/decoding can be monitored simply by selecting QUAD 1 and EXTERNAL TO MONITORS.

For film scores it is usual to record the discrete four channel output of the console whilst monitoring the 4 Track output of the DS4. When doing a final mix to picture it is usual to record the stereo encoded output of the DS4 while monitoring the 4 Track decoded DS4 output.