

# ALLEN & HEATH

# GLSERIES



## GL2800

## USER GUIDE

Publication AP6095

## **Limited One Year Warranty**

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This product is warranted to be free from defects in materials or workmanship for a period of one year from the date of purchase by the original owner.

To ensure a high level of performance and reliability for which this equipment has been designed and manufactured, read this User Guide before operating. In the event of a failure, notify and return the defective unit to Allen & Heath Limited or its authorised agent as soon as possible for repair under warranty subject to the following conditions

### **Conditions Of Warranty**

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1. The equipment has been installed and operated in accordance with the instructions in this User Guide
2. The equipment has not been subject to misuse either intended or accidental, neglect, or alteration other than as described in the User Guide or Service Manual, or approved by Allen & Heath.
3. Any necessary adjustment, alteration or repair has been carried out by Allen & Heath or its authorised agent.
4. This warranty does not cover fader wear and tear.
5. The defective unit is to be returned carriage prepaid to Allen & Heath or its authorised agent with proof of purchase.
6. Units returned should be packed to avoid transit damage.

In certain territories the terms may vary. Check with your Allen & Heath agent for any additional warranty which may apply.



This product complies with the European Electromagnetic Compatibility directives 89/336/EEC & 92/31/EEC and the European Low Voltage Directives 73/23/EEC & 93/68/EEC.

This product has been tested to EN55103 Parts 1 & 2 1996 for use in Environments E1, E2, E3, and E4 to demonstrate compliance with the protection requirements in the European EMC directive 89/336/EEC. During some tests the specified performance figures of the product were affected. This is considered permissible and the product has been passed as acceptable for its intended use. Allen & Heath has a strict policy of ensuring all products are tested to the latest safety and EMC standards. Customers requiring more information about EMC and safety issues can contact Allen & Heath.

**NOTE:** Any changes or modifications to the console not approved by Allen & Heath could void the compliance of the console and therefore the user's authority to operate it.

GL2800 User Guide AP6095 Issue 3

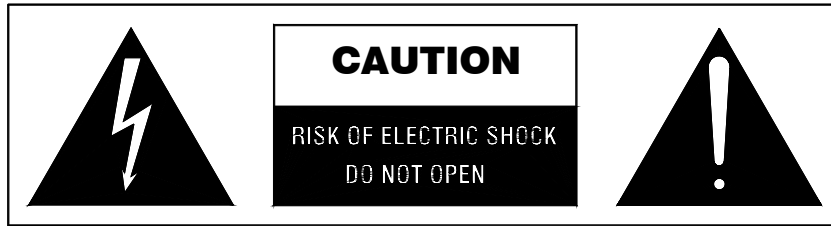
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<http://www.allen-heath.com>

## Important Safety Instructions

**WARNINGS - Read the following before proceeding :**



**ATTENTION: RISQUE DE CHOC ELECTRIQUE – NE PAS OUVRIR**

**Read instructions:** Read and retain these safety and operating instructions for future reference. Adhere to all warnings printed here and on the console. Follow the operating instructions printed in this User Guide.

**Do not remove cover:** Operate the console and power units with their covers correctly fitted. Disconnect mains power by unplugging the power cord if the cover needs to be removed for setting internal options. Refer this work to competent technical personnel only.

**Power sources:** Connect the console to a mains power outlet only of the type described in this User Guide and marked on the rear panel. Use the power cord with sealed mains plug appropriate for your local mains supply as provided with the console. If the provided plug does not fit into your outlet consult your service agent for assistance.

**Power cord routing:** Route the power cord so that it is not likely to be walked on, stretched or pinched by items placed upon or against it.

**Grounding:** Do not defeat the grounding and polarisation means of the power cord plug. Do not remove or tamper with the ground connection in the power cord.



**WARNING: This equipment must be earthed.**

**Water and moisture:** To reduce the risk of fire or electric shock do not expose the console or its power units to rain or moisture or use in damp or wet conditions. Do not place containers of liquids on surfaces where liquid may spill into any openings.

**Ventilation:** Do not obstruct the power supply heatsinks and ventilation slots or position the console where the air flow required for ventilation is impeded. If the console is to be operated in a flight case, plinth or other furniture ensure that it is constructed to allow adequate ventilation.

**Heat and vibration:** Do not locate the console in a place subject to excessive heat or direct sunlight as this could be a fire hazard. Locate the console away from any equipment which produces heat or causes excessive vibration.

**Servicing:** Switch off the equipment and unplug the power cord immediately if it is exposed to moisture, spilled liquid, objects fallen into the openings, the power cord or plug become damaged, during lightning storms, or if smoke, odour or noise is noticed. Refer servicing to qualified technical personnel only.

**Installation:** Install the console in accordance with the instructions printed in this User Guide. Do not connect the output of power amplifiers directly to the console. Use audio connectors and plugs only for their intended purpose.

## General Precautions

**Damage** To prevent damage to the controls and cosmetics avoid placing heavy objects on the control surface, scratching the surface with sharp objects, or rough handling and vibration.

**Environment** Protect from excessive dirt, dust, heat and vibration when operating and storing. Avoid tobacco ash, smoke, drinks spillage, and exposure to rain and moisture. If the console or its power unit becomes wet, switch off and remove mains power immediately. Allow to dry out thoroughly before using again.

**Cleaning** Avoid the use of chemicals, abrasives or solvents. The control panel is best cleaned with a soft brush and dry lint-free cloth. The faders, switches and potentiometers are lubricated for life. The use of electrical lubricants on these parts is not recommended. The fader and potentiometer knobs may be removed for cleaning with a warm soapy solution. Rinse and allow to dry fully before refitting them.

**Lifting** To avoid injury to yourself or damage to the equipment take care when lifting, moving or carrying the console.

**Transporting** The console may be transported as a free-standing unit or mounted in a purpose built flight case. We recommend that the console is surrounded by shock absorbent foam to protect it from damage during transit. Always use adequate packing if you need to ship the unit. Protect the controls to avoid damage when moving the console.

**Hearing** To avoid damage to your hearing do not operate any sound system at excessively high volume. This also applies to any close-to-ear monitoring such as headphones and IEM transducers. Continued exposure to high volume sound can cause frequency selective or wide range hearing loss.



### Important Mains plug wiring instructions.

The console is supplied with a moulded mains plug fitted to the AC mains power lead. Follow the instructions below if the mains plug has to be replaced. The wires in the mains lead are coloured in accordance with the following code:

TERMINAL		WIRE COLOUR	
		European	USA/Canada
L	LIVE	BROWN	BLACK
N	NEUTRAL	BLUE	WHITE
E	EARTH GND	GREEN & YELLOW	GREEN

The wire which is coloured Green and Yellow must be connected to the terminal in the plug which is marked with the letter E or with the Earth symbol. **This appliance must be earthed.**

The wire which is coloured Blue must be connected to the terminal in the plug which is marked with the letter N.

The wire which is coloured Brown must be connected to the terminal in the plug which is marked with the letter L.

Ensure that these colour codes are followed carefully in the event of the plug being changed.

# Introduction

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Welcome to the Allen & Heath **GL2800**, the latest generation of the popular GL series of dual function live sound mixing consoles. We have tried to keep this user guide brief and to the point. Please read it fully before starting. Included is information on installing, connecting and operating the console, panel drawings, system block diagram and technical specification. For further information on the basic principles of audio system engineering, please refer to one of the specialist publications and resources available from bookshops, audio equipment dealers and the Internet.

Whilst we believe the information in this guide to be reliable we do not assume responsibility for inaccuracies. We also reserve the right to make changes in the interest of further product development.

We are able to offer further product support through our world-wide network of approved dealers and service agents. You can also access our Web site on the Internet for information on our full product range, resource downloads, our company pedigree, contact details, assistance with your technical queries, or simply to chat about audio. To help us provide the most efficient service please keep a record of your console serial number, and date and place of purchase to be quoted in any communication regarding this product.

<http://www.allen-heath.com>

<http://www.glseries.com>

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**ST1-2** **ST3-4** **MTX1** **MTX2** **MTX3** **MTX4**

Channels ST1-2, ST3-4, and MTX1-4 each feature a +48V phantom power switch, a polarity switch, a line input gain knob, an HPF filter, and four frequency response knobs (HF, LM, LM, LF) with level indicators. Each channel also includes an EQ IN switch and five auxiliary input knobs with post/pre EQ and mute options.

**DUAL STEREO RETURN**

Channels ST1-2 and ST3-4 include dual stereo return controls with stereo gain knobs, a direct to LR switch, and auxiliary input knobs (AUX 1-5) with mute and pfl buttons.

**EXT IN** **GRP 1-8** **MTX 1-4**

The main mixer section features 8 groups (GRP 1-8) and 4 matrix outputs (MTX 1-4). Each group has an external input, a gain knob, and a level knob. Matrix outputs have level knobs and mute buttons.

**TALKBACK MIC** **TALKBACK** **OSC/NOISE** **POWER** **MONITOR**

The monitoring and output section includes a talkback mic, a talkback level knob, an osc/noise knob, a power switch, and various monitor output buttons (L, R, M, L-R, MTX1-4, AUX 1-10, ZTRK).

**AUX 1-10** **MUTE GROUPS**

AUX 1-10 and MUTE GROUPS section includes 10 auxiliary input knobs with AFL/REV options and 4 mute group buttons (MUTE 001-004).

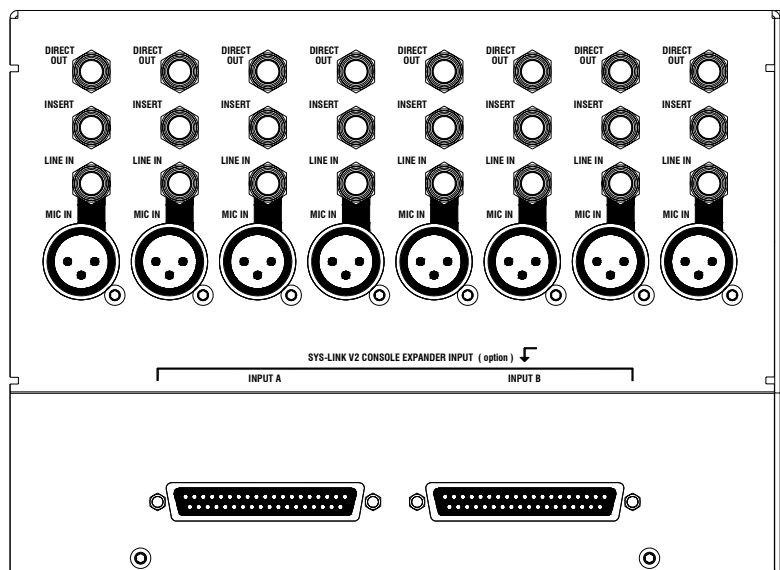
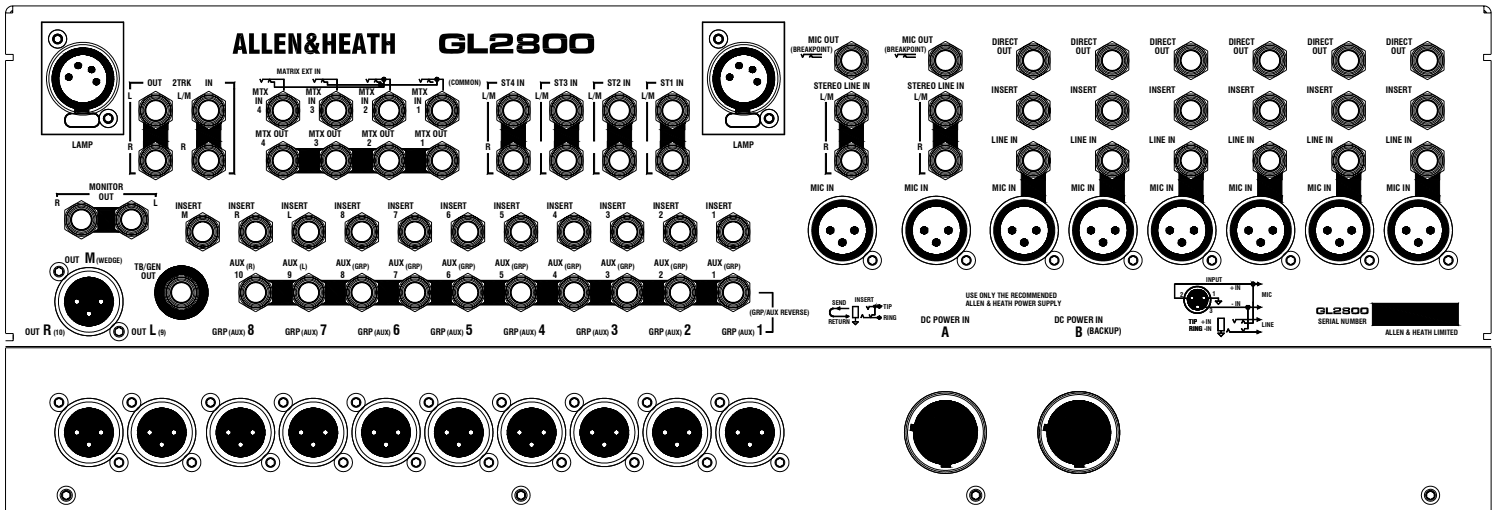
**GRP 1-8** **L R M**

Main mixer faders and level meters section includes 8 group faders (GRP 1-8), 3 matrix faders (L, R, M), and level meters for each.



The Range:

<b>GL2800-24</b>	22 mono mic/line, 2 mic/ stereo line, 2 dual stereo returns
<b>GL2800-32</b>	30 mono mic/line, 2 mic/ stereo line, 2 dual stereo returns
<b>GL2800-40</b>	38 mono mic/line, 2 mic/ stereo line, 2 dual stereo returns
<b>GL2800-48</b>	46 mono mic/line, 2 mic/ stereo line, 2 dual stereo returns
<b>GL2800-56</b>	54 mono mic/line, 2 mic/ stereo line, 2 dual stereo returns
<b>RPS1 1</b>	Power Supply
<b>GL2800-SLV2</b>	Sys-Link V2 console in/out expander option kit



## Introducing the Allen & Heath **GL2800**

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The **GL2800** is an 8-bus dual function analogue mixing console designed for professional audio applications. Whether mixing FOH, monitors or both, recording live or in the studio, installed in a busy venue, out on the road touring, or earning its keep in rental stock, the **GL2800** provides the perfect solution. Engineered to the same exacting standards as our top of the range consoles it ensures the highest reliability and finest sonic performance. We have taken the outstanding success of our industry leading GL consoles and provided yet more innovative capability and enhanced performance for modern mixing.

- 24, 32, 40, 48, 56 channel frames
- L, R and M mix buses
- 8 audio groups with pan and routing to LR and M
- 10 Auxes including a dedicated stereo send
- 12x4 matrix with full stereo capability
- 2 Stereo channels each with mic and stereo line inputs
- 2 extra dual stereos provide 4 summed or independent stereo returns
- Proper dual functionality for FOH/monitor mixing
- M can be used for centre, mono sum or sub, or for engineers monitor wedge
- Recording capable with channel direct outputs
- Matrix external inputs with level trim and common input capability
- Stereo channel mic can cross patch into matrix for ambience
- Dual stereo return line inputs can be independently routed to LR
- Responsive 4 band, 2 sweep EQ
- 100Hz channel high pass filters
- Individual phantom power and polarity switching
- Wide angle 4 led channel meters
- Per channel pre/post fader aux switching for unlimited flexibility
- Recessed pre/post-EQ aux switching per channel, no internal access needed
- Internal pluggable jumpers for pre/post-EQ aux and direct out
- Mutes and meters on all fader masters
- Assignable talkback to all outputs
- 1kHz oscillator / pink noise generator with external output
- 2 Track monitoring and replay to LR
- 3 Headphones sockets including 3.5mm for IEM
- Dedicated stereo monitor meters
- Electronically balanced XLR outputs with +26dBu drive capability
- Preamp 74dB gain range and +34 maximum input capability
- Ultra low noise mix head amp design
- Uses external linear power supply
- Built-in combiner for redundant power supply
- Metal jacks, gold plated XLRs, sealed pots and switches
- Individual circuit card assembly with nitted pots
- Solid copper bus grounding
- Sys-Link V2 console linking option
- 4-pin XLR lamp sockets



Here are just a few key points we considered when specifying the **GL2800**:

**Affordability** We understand your need to work within a realistic budget and know you want to get the very best return for your investment. We know too that even the lowest budget shows put the same tough demands on the operator who wants the reassurance of continued reliability and intuitive control, the satisfaction of achieving that special sound, and the functionality to deal with the trickiest situations. We have avoided the temptation of designing in costly plastic trims and needless external add-ons for styling only. Instead we have invested every penny of our budget into parts that make a real difference in improving performance, durability and flexibility of use, whether the comfortable soft feel armrest, the practically shaped space saving steel chassis, the wide viewing angle meter design, the exceptional feature set, or the 'under the bonnet' engineering such as the solid copper grounding strip, individual cards, circuit enhancements and more. The result is a no-nonsense, durable mixing tool right for its application... a sensible investment.

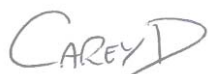
**Reliability** Without doubt, the most important quality for any equipment intended for the professional application. The **GL2800** uses the well proven and long term serviceable Allen & Heath method of individual channel card construction with every potentiometer nutted to the front panel, a solid steel chassis with rigid beam front extrusion, 100mm smooth travel faders with protective dust covers, metal bodied jacks and gold-plated Neutrik XLRs, and sealed Alps pots and switches to ensure you can mix with confidence show after show. The external linear power supply has plenty of overhead. You can even plug in a second supply as a backup for added security.

**Performance** The **GL2800** benefits from our latest circuit developments which have improved the sound and responsiveness of the mic preamp and EQ, and achieved astonishingly low residual noise from the mix head amp and output stages, crucial when mixing into modern high powered speaker systems. The new mic preamp maintains ultra low distortion and can accept as much as +34dBu to deal with the hottest signal you are ever likely to plug in. The XLR outputs provide proper differential drive up to a massive +26dBu to work with the longest and most hostile cable environments. Extensive listening evaluation together with solid engineering practice have ensured the console achieves accurate sound reproduction under all conditions.

**Capability** We know a thing or two about 'Dual Functionality' having pioneered this innovative feature back in the early 90's. The **GL2800** takes this an important stage further with its new multiple stereo mix capability. Tamperproof recessed switches configure the console safely for optimum FOH or stage monitor operation, or for mixing monitors from FOH. In FOH mode you get 3 main mix buses L, R and M. You can use M to feed the C in an LCR system, to create a mono fill by summing L and R, or even drive a sub-bass speaker system. In MONITOR mode the 'M' fader becomes the engineer's monitor wedge control, you get all 10 aux masters available on faders with mutes, inserts, meters and electronically balanced XLR drive, and you still get the 8 subgroups to LRM, and the groups/LRM feeding the matrix for yet more mixes. The fully featured 12x4 matrix is a valuable addition. For example, in FOH mode you can create independent fill speaker and acoustics compensated recording feeds, even capturing the atmosphere by cross patching the stereo channel mic preamps into the matrix to add individual or common mono or stereo ambience signals. In MONITOR mode the matrix gives you more monitor outputs easily created from the groups and LR with added 'more me' and ambience for the in-ear application. This compact console can feed up to 14 independent mixes, for example 8 wedges and 3 true stereo IEM. We have also considered the RECORDING application with direct outputs on all mono channels, 8 groups, matrix and not least the studio quality analogue mic preamps and EQ. Whatever your application you get full control with nothing wasted.

**Attention to detail** In true Allen & Heath form, every detail has been meticulously thought through. Take for example, the compact, no frills chassis that gives you a seat saving, flight case convenient footprint, the provision of individual channel rather than restrictive global pre/post aux switching, comprehensive talkback, the built-in tone/pink noise generator for system checking, full channel and main output metering, the multi-functional stereo channel and return strips, Sys-Link V2 console expansion... and much more. We hope you enjoy being as creative using the **GL2800** as our team enjoyed creating it.

Carey Davies, Head of Design, and sound guy too...



## Installing the Console

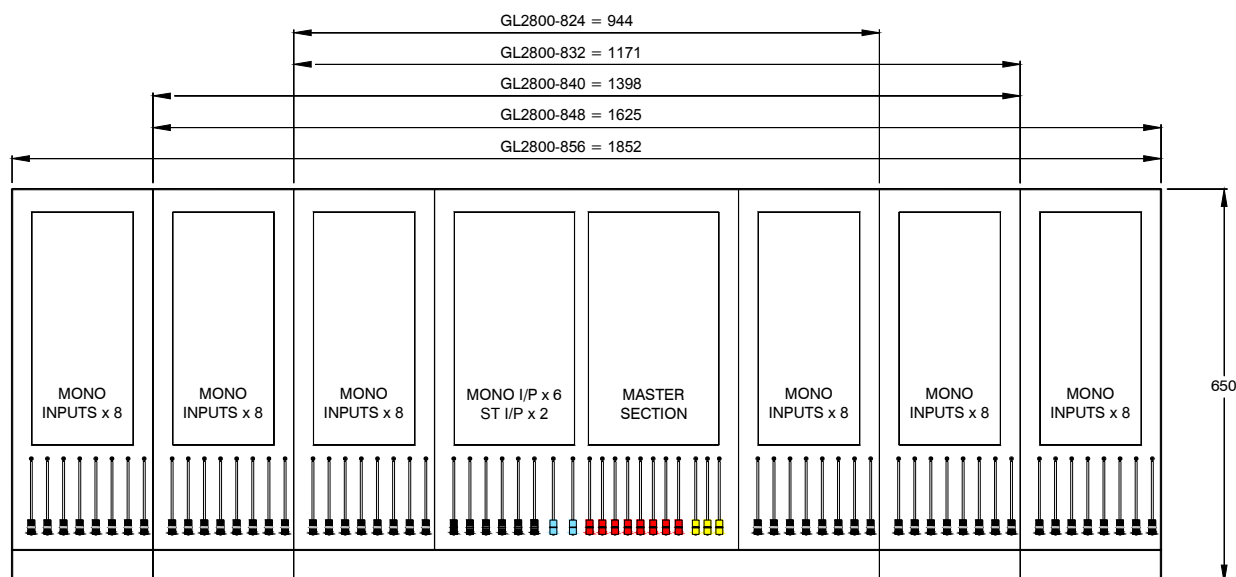
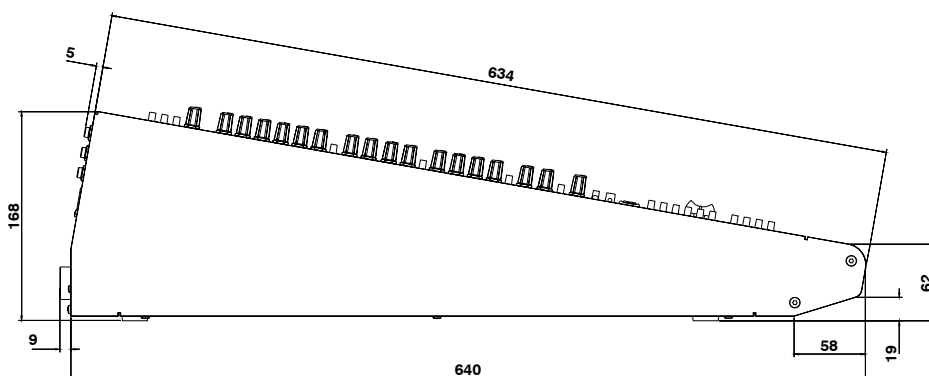
The **GL2800** has a space saving, compact chassis design. This is convenient both in saving seats for the paying audience in a busy venue, and in reducing the size, complexity and weight of flight casing for on-the-road use. The control surface has a 10 degree slope for optimum visibility during operation. The rear connector panel has a split angle design for ease of plugging and unplugging the connectors.

**Free Standing** The console has rubber feet fitted for free standing operation on a flat surface. Make sure the surface is well supported, stable and big enough for the console to sit securely on all its feet. Allow enough space behind the console for access to its connectors.

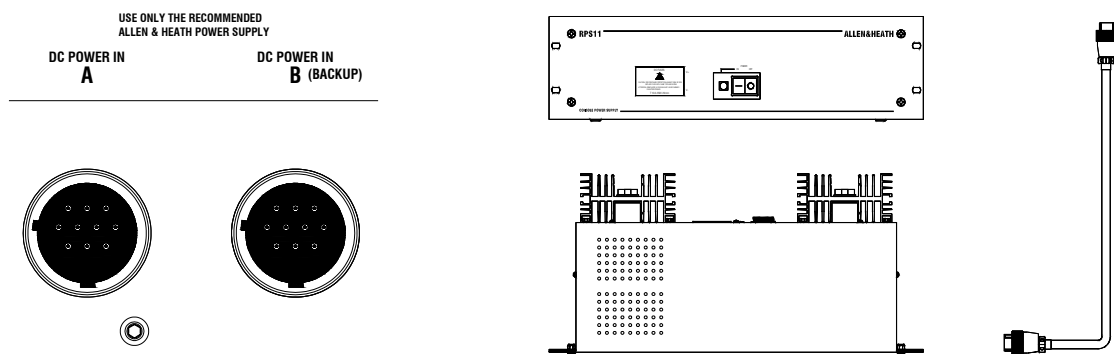
**Flight Casing** The console is shaped for easy flight casing. Make sure it is supported on all sides using suitably thick, shock absorbent foam intended for this purpose. Ensure no part of the case or its lid touches the controls or connectors. If you include a rear 'doghouse' to house the connections make sure the cables can be supported in a way that prevents putting stress on the console connectors. To prevent transit damage through inadequate protection, we recommend you have the flight case supplied or approved by a professional, specialist equipment case manufacturer.



**Do not obstruct the heatsinks or ventilation openings on the power unit. Ensure adequate air flow around its surfaces. To avoid audible hum, buzz or other performance degradation, do not place equipment that radiates strong electromagnetic fields such as the power unit, other mains power supplies, amplifiers and computers next to or directly underneath the console.**



# Connecting Power



Read and understand the **Important Safety Instructions** printed at the start of this guide, and the warnings printed on the rear of the console. Check that your local mains supply voltage is the same as that marked on the rear of the **RPS11** power unit. Check that the correct mains lead with moulded plug has been supplied. Make sure that the IEC mains plug is pressed fully into the panel socket on the **RPS11** before switching on.

## Grounding

The connection to ground in an audio system is important for two reasons:



1. **SAFETY** - To protect the operator from high voltage electric shock, and
2. **AUDIO PERFORMANCE** - To minimise the effect of ground (earth) loops which result in audible hum and buzz, and to shield the audio signals from interference.

For safety it is important that all equipment grounds are connected to mains ground so that exposed metal parts are prevented from carrying high voltage which can injure or even kill the operator. Do not disconnect the ground connection in the mains lead. It is recommended that the system engineer check the continuity of the safety ground from all points in the system including microphone bodies, turntable chassis, equipment cases, rack metalwork and so on.

## Connecting the power supply

Connect the DC power lead between the socket labelled “DC OUT” on the **RPS11** and the socket labelled “DC POWER IN A” on the **GL2800**.

## Switching the console on and off

It is good practice to turn power amplifiers off before switching the console and any other connected equipment on or off. This prevents any unexpected clicks or thumps when the equipment is powered up.



**Turn amplifiers and powered speakers on last and off first.**

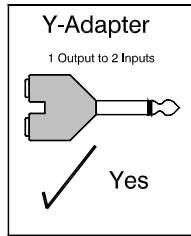
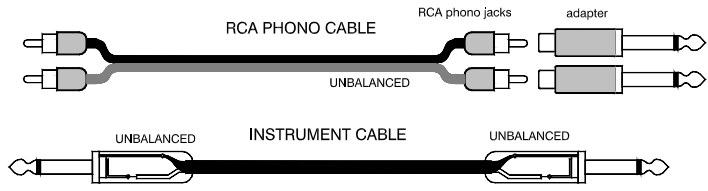
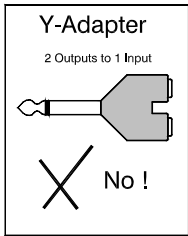
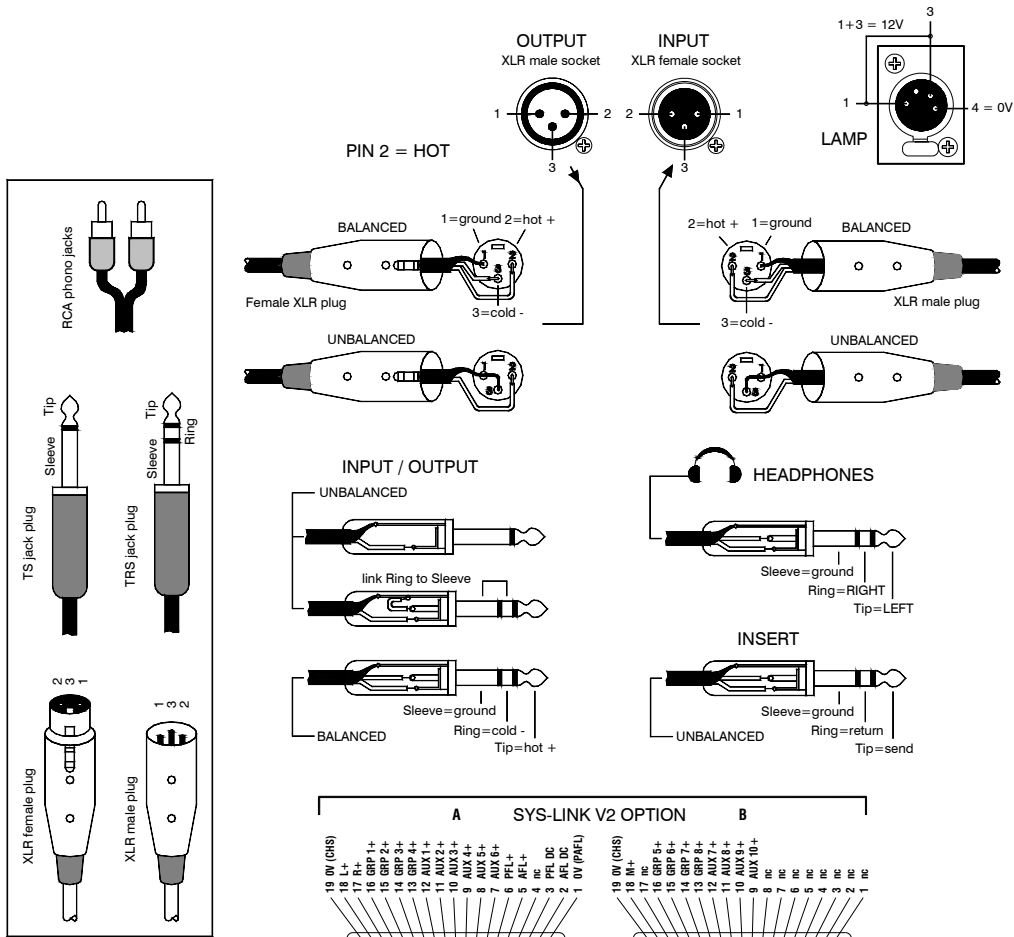
Turn the console on and off using the power switch on the front of the **RPS11** (there is no separate ON/OFF switch on the console itself). The blue power indicator LED on the console front panel will illuminate to show that the console is switched on.

## Connecting a backup supply

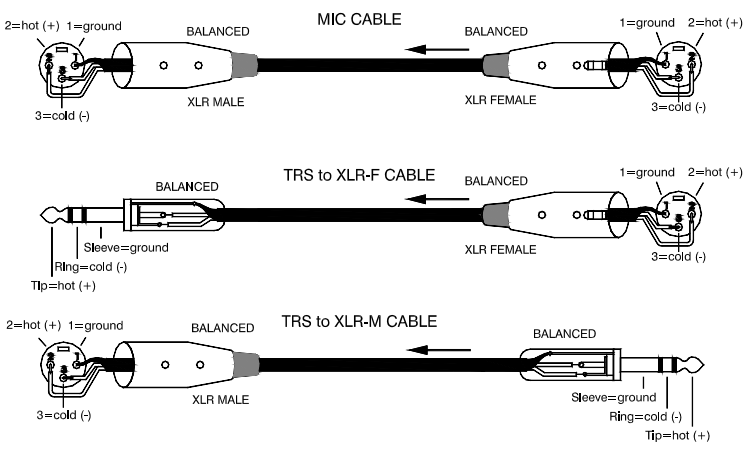
A second power socket, labelled “DC POWER IN B (BACKUP)” is included for plugging in an optional backup power supply. This provides the reassurance of power supply dual redundancy, a feature usually found only on expensive top end consoles. The console uses diode combining technology so that both supplies can be powered at the same time. One will automatically take over should the other be switched off or stop working. The recommended backup supply for the **GL2800** is a second **RPS11**.



**Only use the recommended Allen & Heath power supply unit.** Do not attempt to modify any other power unit to work with the console. Do not attempt to modify or extend the DC power cable that comes with the supply.



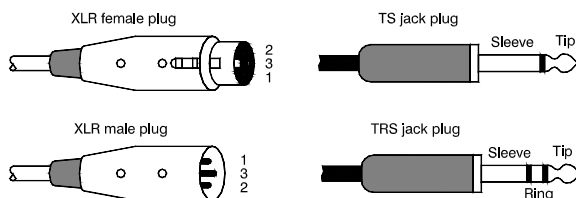
**TO INPUT**



**FROM OUTPUT**

## Audio Connections

The **GL2800** uses professional grade 3 pin XLR and 1/4" TRS (3 pole) jack sockets. To ensure best performance, we recommend that you use high quality audio cables and connectors, and take time to check for reliable and accurate cable assembly. It is well known that most audio system problems are due to faulty or sub standard interconnecting leads. The following plugs may be used to connect audio to the console:



Avoid reversing + and - on balanced connections as this will result in reversed polarity (out of phase) signals which may cause signal cancellation effects.

Where long cables runs are required, balanced interconnections should be used. However, line level interconnections between more affordable 2-wire (signal, ground) unbalanced equipment and the console are unlikely to cause problems if the cables are kept shorter than 10 metres or so. Refer to the wiring diagrams on the opposite page.

### Dealing with Ground Loops, Buzz and Interference

For optimum performance all audio signals should be referenced to a solid, noise-free ground (earth) point, frequently referred to as the 'star point' or 'clean earth'.

A ground loop is created when potential differences exist between grounds at different points in the system, and the signal has more than one path to ground. In most cases ground loops do not result in audible problems. Should you experience hum or buzz caused by a ground loop, check first that each piece of equipment has its own separate path to ground. If so, operate ground lift switches on connected equipment in accordance with the instruction manuals. Alternatively disconnect the cable screen at the destination end only. This breaks the offending loop while keeping the signal shielding down the length of cable.



**WARNING** For operator safety, do not remove the ground (earth) connection in the power lead of the console power supply unit or connected equipment.

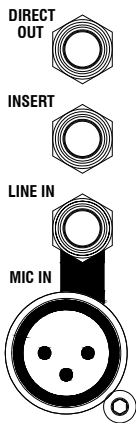
To avoid interference pickup keep audio cables away from mains power units and cables, lighting cables, thyristor dimmer units, computer equipment and mobile phones. Where this cannot be avoided, cross the cables at right angles to minimise interference

### A note about balanced connections

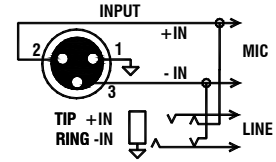
A differentially balanced connection has two signal wires, signal + (hot) and signal - (cold) and a shield. The signal source generates positive going polarity down the + wire and negative polarity down the - wire. The destination input stage accepts the + signal on its non-inverting (+) input pin, but it inverts the - signal, adding it to the + signal. The result is that the wanted signal is boosted. Now examine what happens when unwanted interference (hum and noise) is induced into the cable. The noise is induced equally and with the same polarity into both wires. At the destination input the - wire signal gets inverted and added to the + signal. Because the polarity is the same on both input wires the noise cancels itself out at this input. For this interference rejection to work it is important that the source, the cable and the destination input are all balanced. Balancing provides greatest advantage with low level signals such as those produced by microphones.

An impedance balanced output provides similar interference rejection, but not as much maximum drive capability as the differentially balanced output, typically +20dBu versus +26dBu. It does not generate a negative polarity signal at its - output. Instead, the - wire has no signal but is held at the same impedance as the + wire. This means that both wires pick up the noise equally resulting in the advantage of noise cancellation as described above when connected to a balanced input stage.

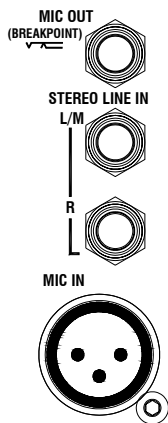
# The Console Connectors



**MONO CHANNEL MIC / LINE IN** The LINE (PAD) switch selects either the MIC XLR or the LINE TRS jack as the input source. The XLR is normalled through the TRS jack so that it can be used for microphone or line level signals when nothing is plugged into the jack socket. This gives the channel preamp a massive headroom with +34dBu maximum input capability using XLR or jack. Both inputs are balanced but can be wired to work with unbalanced signals when required. The MIC XLR can be switched to provide +48V DC via 6k8 ohm resistors to pins 2 and 3 for microphones such as condensers which require phantom powering.



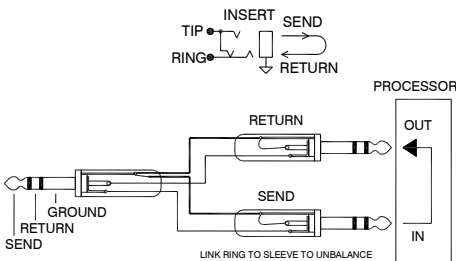
**WARNING:** Do not connect unbalanced sources or cables to the XLR input when 48V phantom power is selected. To avoid loud clicks always turn the channel off by pressing MUTE when switching +48V on or off, and when plugging or unplugging cables.



**STEREO CHANNEL MIC IN** Each stereo channel features a mono microphone XLR input and an independent stereo line input. The balanced MIC input accepts a maximum +14dBu and can be switched to provide 48V phantom power.

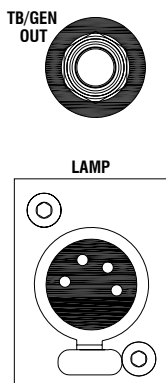
**STEREO CHANNEL MIC OUT** The output of the mic preamp is available on the MIC OUT (BREAKPOINT) TRS jack socket. This is impedance balanced and operates at a nominal 0dBu line level. **Plugging into this socket breaks the signal into the associated stereo channel.** This means that the mic preamp can be used independently of the channel, for example to create an ambience mic feed for recording, or as a preamp for an RTA measurement system.

**STEREO CHANNEL LINE IN** These inputs are balanced on TRS jacks. The L input is normalled through the R socket to accept mono signals on a single jack.



**INSERT** A single 3-pole TRS jack carries the unbalanced insert signal for each mono channel and main mix output. Tip = send, Ring = return, Sleeve = common ground. The channel inserts are post-HPF, pre-EQ and operate at 0dBu. The group (aux) and LRM mix inserts are pre-fader and operate at -2dBu. Use these to patch in line level signal processing equipment such as compressors, outboard EQ, delay units and so on. The wiring of a suitable cable is shown in the diagram.

**DIRECT OUTPUT** Each mono channel direct output is available on an impedance balanced TRS jack providing a line level signal operating at 0dBu. The source is set using an internal option jumper for each channel. The factory default setting is pre-fade (following the pre/post-EQ setting). This may be changed to post-fade if preferred.



**TB/GEN OUTPUT** Use this to provide an external talkback feed, or to access the console 1kHz oscillator / pink noise generator. You can patch this into other inputs or equipment as a test signal.

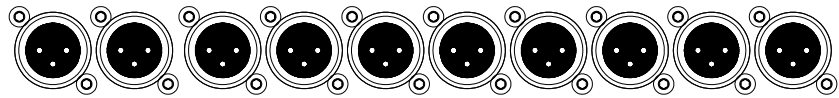
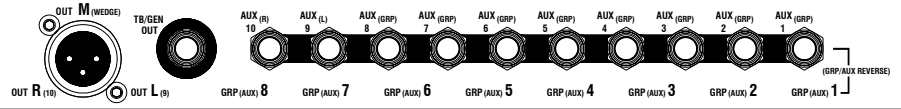
**LAMP** The console has two 4pin XLR sockets to plug in standard 12V gooseneck lamps to illuminate the operating surface when working in a dark environment. Only use lamps intended for this purpose. We recommend the Allen & Heath LEDlamp with cool white LED illumination and a built in dimmer.



## Operating Modes

In FOH mode, LR and M feed the main PA. Groups outputs 1-8 may be used for multitrack recording, zone feeds and so on, or simply left unconnected where they are used as 'subgroups' to LRM for level masters and/or inserted processing.

In monitor mode Groups 1-8 and LR XLRs and inserts become the 10 aux mix masters. Stereo Aux 9-10 is available on the LR XLRs. M becomes the engineer's listen wedge AFL/PFL feed. This configures the console with 10 main stage monitors and an engineer's output. The groups and LRM mix are still available via the matrix to provide yet more monitor feeds from the 4 matrix outputs.

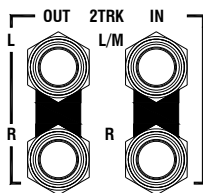
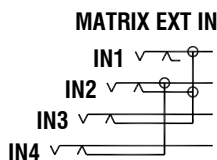
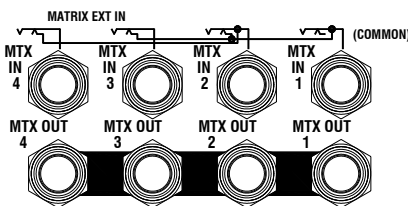


**GROUP, L, R, M OUT** The main console mix outputs are on electronically balanced XLR. These produce the professional standard +4dBu when the meters read '0', and provide up to a maximum +26dBu. The L, R and M outputs typically feed the house PA system in live sound mixing, or 2-track and mono recorders in studio mixing. In monitor mode, these outputs reverse with the Aux TRS jack connections.

**AUX OUT 1-10** Each aux send is available on an impedance balanced TRS jack operating at -2dBu line level. An internal option is available to fit a balanced line driver IC to provide an electronically balanced output operating at +4dBu. Note that it is not usual to require this option as the impedance balanced standard drive provides sufficient interference rejection when feeding balanced equipment inputs. The aux sends are typically used to feed monitors, effects devices such as reverb and delay, and for special mix requirements. In monitor mode, these outputs reverse with the group and LR XLR connections.

**MATRIX OUT 1-4** Each matrix output is available on an impedance balanced TRS jack operating at -2dBu line level. An internal option is available to fit a balanced line driver IC to provide an electronically balanced output operating at +4dBu. The matrix outputs are typically used for stereo or mono recording or broadcast feeds, delay and fill speakers, zone feeds, additional monitors such as IEM, hearing assist loops and so on.

**MATRIX EXT IN 1-4** Each matrix has an unbalanced 0dBu line level TRS jack input. An external signal such as ambience mix, additional or sub mixer, remote source, reference tone and so on may be mixed in to each matrix. The inputs are normalled as shown in the diagram here. This means that you can plug in just one jack (EXT1) as a common source to all matrix, two jacks (EXT1,2) as a common stereo source to matrix pairs, or four independent sources. This is ideal for adding mono or stereo ambience to recordings or in-ear monitors fed from the matrix.



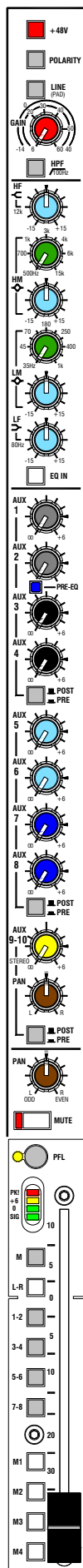
**2-TRACK IN and OUT** Unbalanced TRS jack outputs and TRS inputs connect to popular recording and playback devices such as CD, MiniDisc, computers and tape machines. Nominal line level is -2dBu. The 2-track SEND always follows the post-fade LR mix regardless of mode switch configuration. The 2-track RETURN can be used for monitoring a mono or stereo recording, or as a simple input for playback of walk-in and background music. The L input normals through the R socket for plugging in a mono source on a single jack.

**MONITOR OUT** These impedance balanced line level TRS jack outputs follow the post-level monitor signal. Separate sockets are provided for the L and R signals. Use these to feed local speaker or other monitor systems.

**SYS-LINK V2 OPTION** Blank plates are fitted here as standard. The GL2800 Sys-Link V2 (version 2) input/output option kit is available from Allen & Heath. Refer to OPTIONS later in this guide.



# The MONO Input Channel



**+48V** Switches +48VDC to the channel input XLR for powering microphones or DI boxes that need phantom power. The power is current limited through 6k8 ohm resistors to pins 2 and 3.

**WARNING:** Do not connect unbalanced sources or cables to inputs with phantom power selected. To avoid loud clicks always mute the channel before switching +48V on or off and when plugging or unplugging microphones.

**POLARITY** Reverses the polarity (+ and - connections) of the input source. Useful when using the 'above/below' mic technique, for example when miking a snare drum with two microphones, or for correcting mic placement and cable wiring errors.

**LINE (PAD)** Press this switch to select the channel TRS jack LINE input. Release the switch to select the XLR MIC input. The XLR normals through the TRS socket. With nothing plugged into the line input the switch therefore becomes a PAD for the mic XLR. It attenuates the input signal by 20dB for connection to high level microphone or line sources. This gives the mic preamp a 74dB range and headroom of +34dB to deal with the hottest signals.

**GAIN** Adjusts the input sensitivity to match the connected source to the internal 0dBu operating level of the channel. Provides a variable 54dB range from +6 to +60dB gain (mic), or -14 to +40dB (line, padded mic). The gain should be set so that the channel meters average '0' with loudest moments lighting '+6'. Reduce gain if the red peak indicator lights.

**Important note on setting channel levels:** Use PFL to set the GAIN controls for correct signal level through each channel. The main LR meters provide a high resolution display of the channel signal level. Use the faders to balance each signal in the mix. To ensure optimum gain structure we do not recommend the practice of setting the faders to '0' and mixing using the GAIN controls.

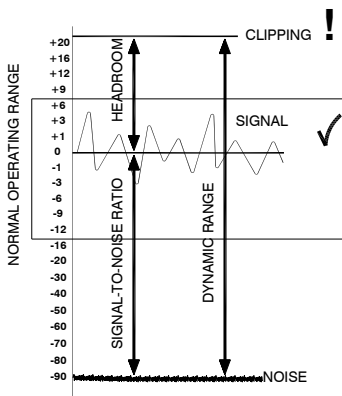
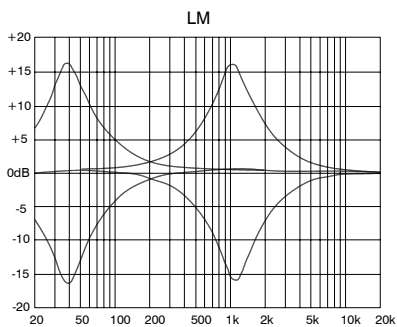
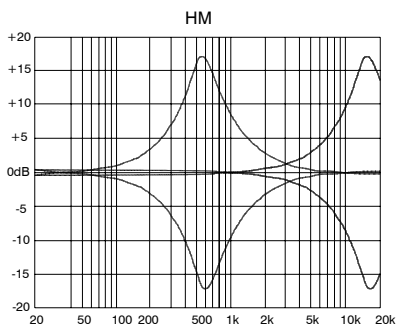
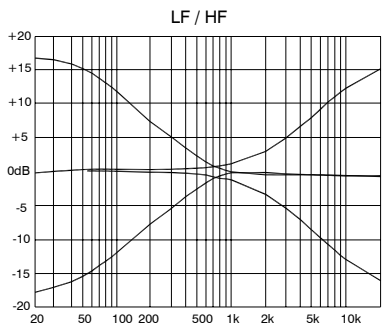
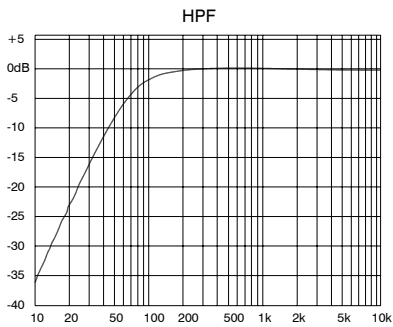
**HPF** Switches in the channel high pass filter. This attenuates frequencies below 100Hz by 12dB per octave. The filter is pre-insert, pre-EQ. Select the HPF to reduce low frequency noise such as microphone popping, stage noise and tape transport rumble.

**EQ** A responsive 4-band semi parametric EQ (equaliser) provides independent control of four frequency bands. Use EQ IN to compare the sound with the equaliser switched in or out of circuit.

HF and LF are shelving filters which affect high frequencies above 12kHz, and low frequencies below 80Hz respectively. HM and LM are bell shaped peak/dip filters which affect frequencies around a centre point which can be swept from 500Hz to 15kHz, and 35Hz to 1kHz respectively. These have a width (Q) of 1.8 which provides effective control for both creative and corrective equalisation. The EQ curves shown opposite display the signal level response at maximum boost and cut as the frequency varies from low (20Hz) to high (20kHz).

All bands can be boosted or cut by up to 15dB and have a centre detent 0dB position. The overlapping frequency ranges let you deal with challenging source problems easily using combinations of bands.

Check that you are using the best microphone type and placement before using the EQ. Start with the EQ set flat and apply only as much boost or cut as is really needed. When dealing with problem frequencies cut rather than boost where possible.



**AUX SENDS** These rotary controls adjust how much channel signal is mixed to each of the aux outputs. They adjust from fully off to +6dB boost. Unity gain 0dB is marked at 3 o'clock position.

**AUX SENDS 1-8** Mono aux sends with independent control.

**AUX SENDS 9-10** A dedicated stereo aux send with level and pan controls. Set pre-fade to create stereo monitor mixes such as IEM. Set post-fade to create stereo recording feeds or to balance between two effects devices such as reverb.

**PRE** Press to select the channel pre-fader source, release for post-fader. Auxes 1 to 4, 5 to 8 and stereo aux 9-10 are grouped for pre/post switching. Pre-fade aux sends are not affected by the channel fader movements. These are typically used to feed stage monitors. Post-fade aux sends follow the channel faders and are typically used to send a proportion of the channel signal to an effects device such as reverb or delay. Note that post-fade sends may be preferred when the console is configured in monitor mode so that the faders become channel 'masters' affecting all monitor mixes.

**PRE-EQ** Changes the pre-fade aux source from post-EQ (switch up) to pre-insert, pre-EQ (switch pressed) so that inserted compressors and the EQ do not affect the sends when mixing monitors from FOH. This affects all auxes set pre-fader for the channel. The switch is recessed to prevent accidental operation once set. Use a pointed object to change the setting.

**PAN** Positions the channel signal between L/R in the stereo mix, and odd/even if routed to the groups. The centre position (mono image) is detented for quick resetting.

**MUTE** When pressed, the channel signal is turned off. This affects the feed to the LRM mix, pre and post-fade aux sends and direct output, but does not affect the insert send. The red indicator lights when the channel is muted. Always mute the channel when switching phantom power or plugging the cables and sources.

**PFL** Press PFL to listen to the pre-fade channel signal in the headphones and local monitor without affecting the main outputs. The console PFL/AFL active red indicator lights and the monitor LR meters display the channel signal. Selecting more than one PFL at the same time mixes those signals together in the monitor.

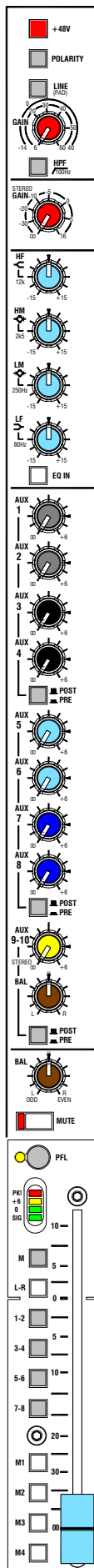
**METER** A 4 LED channel meter displays the pre-fader signal level. 'SIG' lights when a signal level of -12dBu is detected. '0' lights when the nominal 0dBu level is reached, and '+6' at +6dBu. 'PK' lights when the channel pre-fade signal is within 5dB of clipping. This gives you enough warning to reduce GAIN before you hear signal distortion.

**ROUTING** Press to route to the required combination of L-R, M and the 8 groups. Use PAN to position the signal between L/R or the odd/even group pairs. To route to a single group set PAN fully to one side. Check that you have set these switches correctly before you start mixing.

**FADER** A 100mm smooth travel fader with protective dust cover controls the channel level feeding the main mix, groups and post-fade aux sends. It also affects the direct output if this has been set to post-fade using the internal option jumpers. The fader provides +10dB maximum boost above its normal unity gain 0dB position.

**MUTE GROUPS** Press these switches to add the channel to Mute Groups 1 to 4 as required. Pressing the master mute switch mutes all channels assigned to that group.

# The STEREO Input Channel



Each **GL2800** stereo channel features a mono microphone preamp as well as a stereo line input. These sources can be mixed together into the channel or split using the mic breakpoint, so providing a unique flexibility. For example, you could patch the mic stage as an independent preamp for an ambience microphone feeding a recording, or for a system calibration microphone, while the stereo line input returns an external effects processor to the mix. Two stereo channels could be linked so that the mic preamps cross patch to provide one stereo mic and one stereo line channel.

**MIC INPUT** Similar to the mono channel microphone preamplifier. A rear panel MIC OUT breakpoint socket is provided so that the mic stage can be used independently. Plugging a jack into the MIC OUT socket breaks its signal path to the stereo channel.

**⚠ WARNING:** Do not connect unbalanced sources or cables to inputs with phantom power selected. To avoid loud clicks always mute the channel before switching +48V on or off and when plugging or unplugging microphones.

**STEREO LINE INPUT** A level control adjusts from fully off to +16dB gain. The L input signal is normalled through the R input socket so that a mono source may be plugged in to feed both left and right sides of the stereo channel.

**EQ** Similar to the mono channel, but the two peak/dip mid bands are fixed at 250Hz and 2.5kHz centre frequencies.

**AUX SENDS** These work as described for the mono channel, but the L and R sides of the stereo signal sum together to feed Auxes 1 to 8 in mono. Aux 9-10 is fed with the stereo signal. The auxes can be switched pre or post-fader but are always sourced post-EQ.

**BAL** Balances the level of the L signal against the R signal to compensate for differences in the source, or to position the signal within the stereo image.

**MUTE** When pressed, all the channel pre and post-fade signals are turned off except the MIC OUT and any stereo routed direct to LR.

**PFL** Press PFL to display the summed L+R pre-fade channel signal on the monitor meters and listen to it in the headphones and local monitor without affecting the main outputs.

**METER** As the mono channel, but the left and right signals are summed to display in mono.

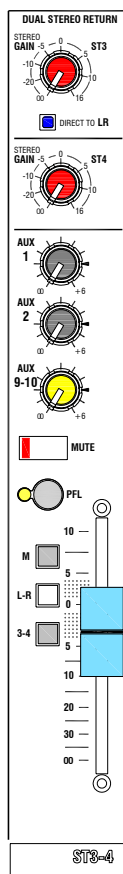
**ROUTING** As the mono channel, but routes the left signal to L and odd groups, right signal to R and even groups, and sums L and R to feed the M mix in mono.

**FADER** The stereo fader provides +10dB maximum boost above its normal unity gain 0dB position

**MUTE GROUPS** Assign the stereo channel to any combination of the 4 mute groups by pressing these switches.

## The STEREO Return Channel

Two additional dual stereo return channels are provided. Each has two stereo line inputs which can be mixed together or used separately. ST1 and ST3 can be routed directly to LR instead of the return channels. This gives you the flexibility of mixing in four more stereo sources in a small panel space.



**ST1 INPUT** A level control adjusts from fully off to +16dB gain. The L input signal is normalised through the R input socket so that a mono source may be plugged in to feed both left and right sides of the stereo channel. A recessed switch can be set to route the source directly to the L-R mix instead of the return channel. Use a pointed object to change the switch setting.

**ST2 INPUT** A level control adjusts from fully off to +16dB gain. The L input signal is normalised through the R input socket so that a mono source may be plugged in to feed both left and right sides of the stereo channel.

**AUX SENDS** Use these controls to feed the return signal to a combination of the auxes. The stereo signal is summed to feed Aux 1 and Aux 2 in mono. The signal feeds aux 9-10 in stereo. Internal jumper options are provided to set the auxes pre or post-fader. Default setting is post-fade so that the fader provides master control for all the sends.

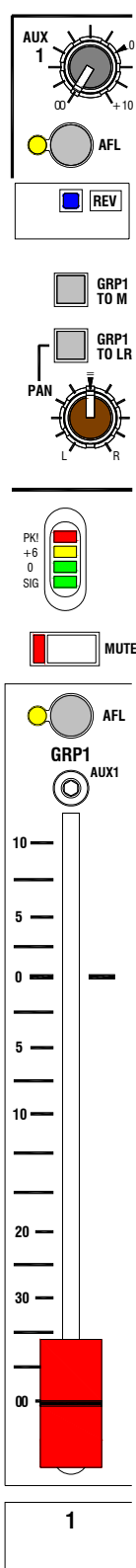
**MUTE** When pressed, all the channel pre and post-fade signals are turned off except ST1 or ST3 if routed direct to LR.

**PFL** Press PFL to display the summed L+R pre-fade channel signal on the monitor meters and listen to it in the headphones and local monitor without affecting the main outputs.

**ROUTING** Routes the left signal to L and odd group 1 or 3, and the right signal to R and even group 2 or 4, and sums L and R to feed the M mix in mono. Return channel ST1-2 can be routed to Groups 1-2, and ST3-4 can be routed to Groups 3-4.

**FADER** A 60mm stereo fader provides +10dB maximum boost above its normal unity gain 0dB position.

Applications for the stereo channels and returns are described later in this user guide.



**AUX 1-8 MASTERS** Each aux mix has a master level control that adjusts the output level to match external equipment, or trims the monitor, effect or other send without affecting the mix balance. Up to +10dB boost is available above the normal 0dB position. Note that this becomes the group master in monitor mode.

**AUX AFL** Press AFL to listen to the post-level aux mix in the headphones and local monitor without affecting the main outputs. The console monitor meters are interrupted with the aux (group) signal. The yellow indicator lights to show that AFL has been selected on the master. Use AFL to check the signal being sent to the monitors, effects or other destination. AFL is pre-mute so that you can check the signal before sending it to its destination.

**REV mode switch** These switches reverse the function of the group and aux masters, the heart of the dual functionality pioneered by Allen & Heath. They are recessed to prevent accidental operation. Use a pen or pointed object to set their position. In the up position (flush with the panel), the group is controlled by the fader and the aux by the rotary master. This is typical for FOH mode where the faders are used for subgroups feeding the main stereo mix. When pressed, the aux uses the fader as the master and the group is moved to the rotary control. The aux mix is now presented to rear Group XLR complete with insert. The group mix appears at the Aux TRS jack. This is used for monitor mode where the auxes are the main mix feeding the stage monitors. You can select any combination for the FOH and monitor mode, for example, just four giving you 4 fader subgroups for level control, 4 groups on rotaries for inserting effects, 4 monitor sends on faders, 4 effects sends on rotaries and main mix.

**Note:** The groups always feed the matrix and the subgroup controls regardless of mode. This means the group mix can still perform a useful function when the console is configured in monitor mode.

**GRP to LR/M** Press to route the post-fade group signal to L-R and/or M. These provide sub grouping to the main mix for grouped level control and inserted processing.

**PAN** Positions the group signal between L and R in the stereo mix when the GRP TO LR switch is pressed. Using pan you can create mono or stereo groups positioned as you require in the main mix. For stereo grouping, set the odd group pan fully to the left, and the even group pan fully to the right. Note that the group mix always feeds these subgroup controls regardless of FOH or monitor mode selected.

**METER** A 4 LED bar meter displays the post-fade group signal (FOH mode), or aux signal (monitor mode, REV pressed).

**MUTE** When pressed the group (aux) signal is turned off. This affects the feed to the output XLR, LR, M and matrix. The red indicator lights when the channel is muted. Mute does not affect the AFL monitoring.

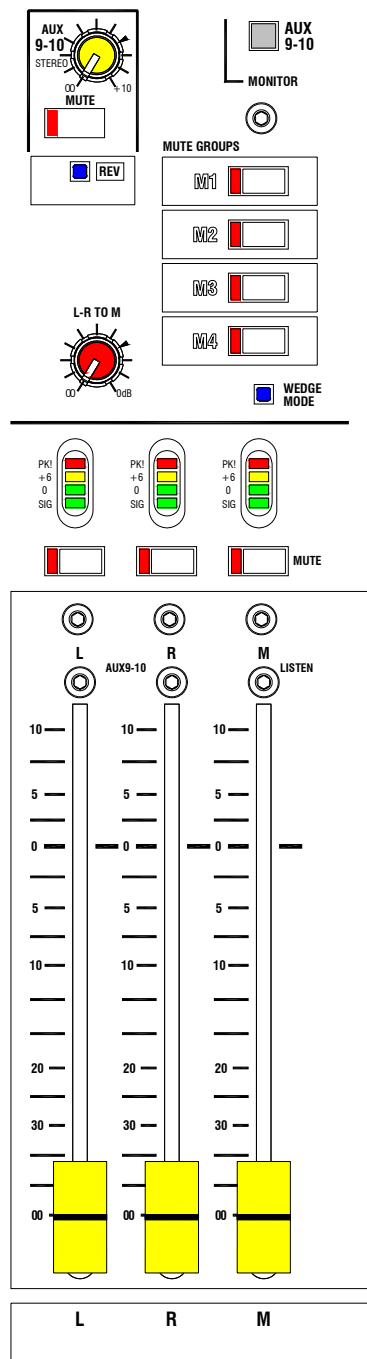
**GROUP AFL** Press AFL to listen to the post-fade, pre-mute group mix in the headphones and local monitor without affecting the main outputs. Note that this becomes the aux mix in monitor mode. The console monitor meters are interrupted with the group (aux) signal.

**GROUP FADER** A 100mm smooth travel fader controls the group mix output level. Note that it becomes the aux mix master in monitor mode (REV pressed). The fader provides +10dB maximum boost above its normal unity gain 0dB position.



# The MUTE, AUX 9-10 and L-R-M Masters

**MUTE MASTERS 1-4** Press to mute all the input channels assigned to the mute group. Any combination of masters may be active at any time. The red LED indicates that the master is active.



**AUX 9-10 MASTER** Controls the master level of stereo Aux 9-10. Up to +10dB boost is available above the normal 0dB position. Note that this becomes the LR master in monitor mode.

**REV mode switch** Reverses Aux 9-10 rotary master with the L-R faders, inserts and XLR outputs. Recessed to prevent accidental operation. Use a pen or pointed object to set the position. In monitor mode (switch pressed) the stereo aux is controlled by the main faders, for example to provide a stereo in-ear monitor mix.

**Note:** LR always feeds the matrix and LR to M controls regardless of mode. This means the LR mix can still perform a useful function when the console is configured in monitor mode. The Aux mix is always monitored by selecting the nearby monitor select AUX 9-10 switch.

**AUX MUTE** When pressed the stereo aux (LR) signal is turned off. The red indicator lights when the channel is muted.

**LR to M** Dials the sum of L and R into the M mix to create a mono output from the stereo mix. You can use this to create a starting point for a fill or centre mix, and then add selected channels using their M routing switches. This control always routes the LR signal to M regardless of mode.

**METERS** 4 LED bar meters display the post-fade LRM master signals (FOH mode), or aux 9-10 and engineer's wedge signal (monitor mode, REV pressed)

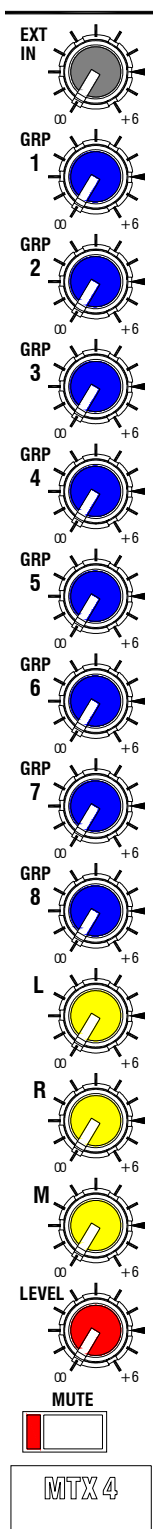
**LR MASTERS** Separate 100mm faders control the main mix L and R output levels. They provide +10dB maximum boost. Each master includes a 4 LED bar meter and a MUTE switch so that L and R can be separately muted. This is also useful in monitor mode where these masters carry the Aux 9-10 signals.

**M MASTER** A 100mm fader adjusts the level of the M mix. The master is fully featured and includes a 4 LED bar meter and a MUTE switch.

**WEDGE mode switch** This switch is recessed to protect it from accidental operation during the show. Use a pointed object to set its position.

**FOH mode** – In the up position (flush with the panel), the fader is the master for the main M mix, typically used to feed a mono fill or C (centre) mix.

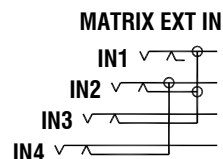
**Monitor mode** - Press to create an engineer's monitor listen wedge feed from the AFL/PFL mix. It is common to use a wedge speaker of the same type used on stage to listen to and check the various monitor mixes being sent to the performers. Together with the group/aux REV function, the **GL2800** can be configured as a compact yet fully featured monitor console.



The matrix adds to the powerful multi-tasking capability of the **GL2800**. It provides a set of 4 additional console outputs. It is a 'mixer within a mixer' creating its output from any combination of the groups, main LR mix and external inputs. It can be used to provide duplicate main outputs or to create new mixes from these outputs. The matrix controls are positioned conveniently away from the live performance controls to avoid accidental operation.

Use the matrix to create special mixes for delay fill and zone speakers, recording and broadcast feeds, IEM (in-ear monitors), hearing assist loops and so on. Mono and stereo feeds can be created. For example, mix L and R to create a mono sum output to feed an additional zone, or use two matrix outputs with L fed to one, R to the other to create an independent stereo main output. Mix in an external source such as an ambience microphone preamp to add atmosphere and audience reaction to a recording or monitor. Compensate for an acoustically loud backline by boosting selected groups in a live recording. For more information, refer to 'Operating Tips' later in this guide.

**EXT IN** Mixes in an external nominal 0dBu line level source. The rotary provides +6dB boost. Note that EXT IN jack sockets are normalised (linked) in a way that lets you plug in a mono or stereo common source to feed all the matrices, or an independent source to each. Plug into EXT1 only to feed one source to all four matrix EXT IN controls. Plug L into EXT1 and R into EXT2 only to feed a stereo source to matrix 1-2 and 3-4.



Some examples include adding ambience sources to recordings and in-ear monitoring, adding a direct output or an aux mix to quickly create a monitor from the main mix plus selected channel/s, and linking in another console to feed the same PA in a festival or other dual console situation.

**GRP 1-8** Mixes in the post-fader, post-mute group mix. The rotary provides +6dB boost.

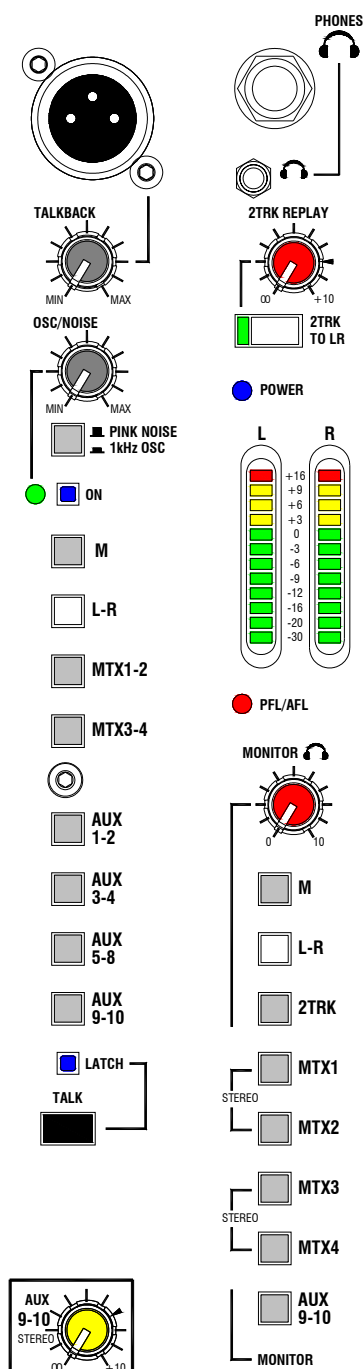
**L,R,M** Mixes in the post-fader, post-mute main LR mix. The rotary provides +6dB boost. Turn up both L and R to create a mono sum from the stereo LR mix. Turn up L in one matrix, R in another to create a stereo output from two matrices.

**LEVEL** The master level control (fader) for the matrix. Provides +6dB boost above the normal '0' setting.

**MUTE** When pressed the matrix output is turned off. The red indicator lights when the matrix is muted. Mute does not affect the matrix AFL monitoring.

Note that the matrix mix can be checked using the meters and headphones by selecting the related monitor select switches. These provide both mono and stereo monitoring of the matrix.

## 2-TRACK REPLAY and CONSOLE MONITOR



**2TRK REPLAY** A stereo source such as a recording playback or walk-in CD can be routed directly to the main LR mix. Adjust its level from fully off to +10dB gain using the rotary control. You can check the source on the meters and in the headphones before bringing it into the mix by selecting the 2TRK monitor switch.

**Console Monitor** Comprehensive engineer's headphones and local monitoring is provided. Select the source from the monitor select switch bank. Pressing PFL or AFL elsewhere on the console automatically overrides the current monitor source with the signal from the channel or master selection. The red PFL/AFL active indicator illuminates and the console meters display the active signal.

The console monitor meters provide 12 LED indicators to accurately display the signal level of the selected monitor source. Reduce the gain or level if the red '+16' peak indicator lights. For optimum performance the signals should be adjusted to read an average '0' with loudest peaks reaching around '+6'.

Use the MONITOR level control to adjust the level in the headphones and local speaker monitor. We recommend you use closed ear headphones in the range 30 to 600 ohms designed for live sound monitoring. 100 ohm headphones are a popular choice.

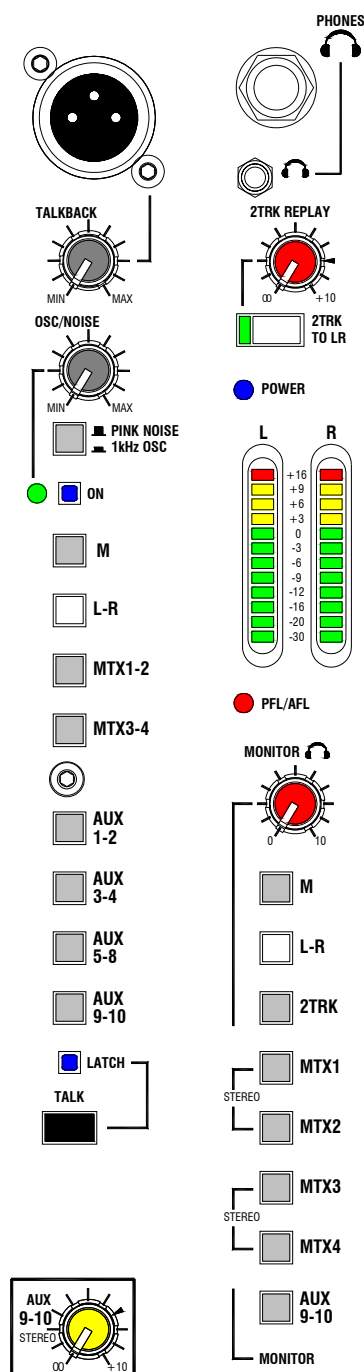
Three headphones sockets are provided for convenience. One 1/4" standard TRS is at the front under the armrest, a second at the top near the talkback mic. A small 3.5mm socket is also provided for plugging in headphones or earpieces fitted with a mini jack. It is useful to monitor an in-ear mix using the same type of earpiece as used by the performers.

**WARNING:** To avoid damage to your hearing do not operate any close-to-ear monitoring such as headphones for long periods at high volume. Continued exposure to high volume sound can cause frequency selective or wide range hearing loss.

**Stereo Monitoring** The GL2800 has been designed to offer maximum capability for working with multiple stereo mixes such as IEM and recording feeds. It is important to be able to hear exactly what you are sending from the console. Press AUX 9-10 to check the stereo aux mix. Press one switch to check a matrix in mono, two to check a related pair in stereo. For example, press MTX1 to listen to a mono fill mix, or press MTX1 and MTX2 together to listen to a stereo recording mix.

**Monitor Selection** With all select switches in the up position, no source is monitored unless PFL or AFL is activated. Press a switch to select the required monitor source. Press two together to select stereo as described above. Switches nearer the faders take priority. For example, press L-R to listen to the main mix. Then press 2TRK to override the L-R source until it is released.

# TALKBACK and SIGNAL GENERATOR



**TALKBACK** Individually assignable talkback is available to all the main outputs. Plug in a suitable cable or gooseneck microphone. A good quality dynamic or condenser vocal microphone is recommended. Note that +48V phantom power is available at the XLR as standard. If you prefer, this can be disabled by repositioning an internal jumper link.

**WARNING:** Do not connect unbalanced sources or cables to inputs with phantom power selected. To avoid loud clicks do not press the TALK switch when plugging or unplugging the talkback microphone.

**TALKBACK enable** First select the source you wish to talk to. You can select the auxes in logical groups, useful for communicating with the performers on stage. The matrix can be enabled in pairs, ideal for working with stereo in-ear monitors or communicating with an outside broadcast facility. You can also talk to LR and M, typically used for announcements to the audience. Once selected, press and hold TALK to route the mic to the required destination. Adjust the talkback level using the TRIM control below the TB mic XLR. Pressing TALK automatically dims the level of the signal generator if it is turned on.

**TALK latch mode** Press this switch to permanently activate the TALK switch. This is useful when using a handheld microphone with built-in switch for talkback. It means you do not need to press the TALK switch to talk to your enabled destinations. Simply use the switch on the microphone. The latch switch is recessed to prevent accidental operation. Use a pointed object to change its setting.

**SIGNAL GENERATOR / PINK NOISE** Press to select either pink noise (up position) or a 1kHz sine wave tone as the test source. Start with the trim control turned fully down. The generator ON switch is recessed to prevent accidental operation. Press this with a pen or pointed object. The green indicator lights to warn that the generator is enabled.

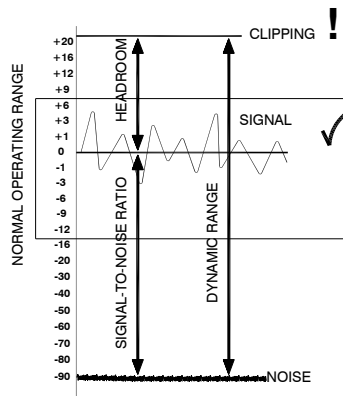
The generator signal is routed to any source selected on the switch bank above the TALK switch. Use the signal to test the loudspeaker system and line up connected equipment. Pink noise is useful for quickly testing the full range frequency operation and phasing/polarity of loudspeakers. The 1kHz tone is better suited to lining up equipment with its steady reading on the meters.

**WARNING:** We recommend you turn off the signal generator once you have finished using it to test and line up your system. This will prevent accidental operation during the show.

# GL2800 Applications and Operating Tips



The following is a collection of brief descriptions, application notes, hints and tips to help the operator understand some of the technical terms referred to, and to get the most out of the uniquely capable **GL2800** live sound mixing console. They are written as a concise reference to spark your imagination to creatively and effectively deal with the many challenges now faced in modern day mixing.



**Gain Structure** The term used to describe the gain (level) matching of the signal through the audio system chain. Each item in the equipment chain has its own optimum ('nominal') operating level determined by its electrical circuits. If you overload it with a signal that is too high then its output tries to produce more voltage than its power rails can provide resulting in harsh sounding distortion as the audio signal is 'clipped'. If you work with a signal that is too low then you are likely to hear the residual hiss of the circuits as the 'noise floor' is amplified along with the signal. The optimum operating level is the point at which the signal is high enough above the noise floor so that the hiss is not heard (good 'signal-to-noise' ratio, the SNR), yet provides enough space ('headroom') before clipping to allow for the louder, dynamic musical moments without distortion. 'Dynamic range' specifies the maximum range between noise floor and clipping. It is the sum of the SNR and headroom. The larger the figure the better... less noise, more headroom, more forgiving to wide ranging signals.

A microphone produces a very tiny signal, for example -50dBu (a few millivolts). This should be amplified by the channel preamp to the optimum operating level of the console circuits, around 0dBu (0.775V), well clear of the noise floor (typically less than -90dBu), and with good headroom (typically clipping at greater than +20dBu). With a channel routed at unity gain from preamp input to main output, the **GL2800** boasts a massive 116dB dynamic range. The signal can pass through many stages which affect its level within the console; the channel, its EQ, fader, pan, a group mix and its fader, on to the main LR mix with its master fader, through the matrix, and of course any inserted equipment. The output XLR provides the professional standard +4dBu (1.23V) nominal level to the next stage in the audio chain, typically a speaker processor such as limiter or crossover, or straight to the amplifier. The amp boosts this signal to tens of volts to move the speaker cones so producing the audible sound.

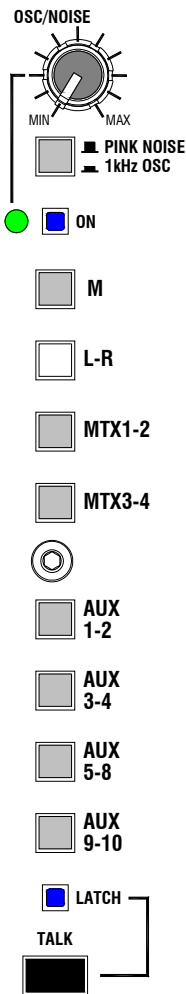
☺ A search on the Internet can reveal a host of additional information on setting correct gain structure and many other audio topics and educational resources.

To get the best performance from your system, it is important that you set up the gain structure correctly within the console and also within and between the connected equipment. Ideally, each circuit should be set to clip at the same time if the signal became too hot, in other words each would have similar headroom relative to its nominal operating level. The resulting dynamic range is the difference between the highest noise floor and the lowest headroom through the system. The performance is only as good as the weakest link.

The **GL2800** provides comprehensive metering to check every point within the console signal path. Use the channel meters and PFL/AFL system to set the gains and mix levels to average around '0' meter reading with usual peaks around '+6'. Reduce the gain if the red '+16' or 'PK' indicator lights.

Use the equipment meters to set each item within the system path to operate at its nominal level. We advise that the speaker processor or amplifier trims are set so that the console outputs can drive up to their nominal '0' level. It is a common mistake to set amplifier trims to maximum sensitivity when this results in the console master faders being operated at very low positions, with low meter readings, and reduced dynamic range and therefore audible residual system hiss.

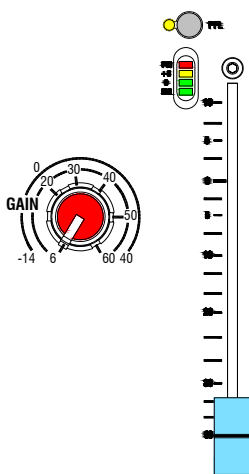
**Using the Oscillator / Noise Generator** The **GL2800** includes a useful signal generator able to produce a pure 1kHz sine wave tone, or a pink noise test source. This is invaluable in testing the system components and setting up correct gain structure. The generator can be routed independently to the various console outputs.



Use the **1kHz tone** to line up the connected equipment. For example, a recorder, video camera or broadcast feed from the matrix. Route the tone to the matrix. Set the matrix LEVEL control to its 3 o'clock '0' position. Press the matrix AFL and adjust the oscillator level until the console monitor meters read '0'. Next, adjust the recorder input trim so that its meters also read '0'. The recorder is now correctly aligned to the operating level of the console. Similarly, you could match the console LR output to a DSP speaker processor by sending the tone to LR, setting the faders for output meters reading '0', and then trimming the processor input for '0' on its meters. To prevent a loud tone through the speakers it is best to do this with the amplifiers turned off.

Use the **Pink Noise generator** to check the signal routing and loudspeaker response. 'Pink noise' is a random signal that contains all audio frequencies and is therefore a very good test source. Unlike 'white noise' which has equal energy per Hz and sounds like system or inter-band tuner hiss, pink noise has equal energy per octave, a response that matches the logarithmic way our ears perceive sound. You can hear all the frequencies clearly from deep bass, through mid to treble. This means you can route the noise to a speaker system and quickly hear if one of the sub, mid or HF drivers is faulty. With the noise sent to several speakers at the same time you can listen for comb filtering effects, and the severe phasing effect which indicates that one of the speakers may have its wires reversed. Pink noise is also used with an RTA (real time analyser) when measuring room frequency response. Testing a system with pink noise through the speakers is often referred to as 'pinking the room'.

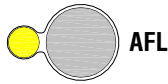
The **GL2800** signal generator is an invaluable tool for calibrating and testing the system during setup. To prevent any unexpected mishaps during the sound check or show, remember to disable it by releasing the recessed ON switch once you have finished the testing. We also advise that you always start the calibration with the OSC/NOISE trim turned fully off so that you can bring it up gradually without the risk of overloading the destination.



**Mixing with faders or gain controls?** There is a technique used by some operators where they set all the faders to '0' position and balance the mix using the channel gain controls. We do not advise this method as the signal to noise ratio and control resolution can be severely degraded. In addition, it is impossible to mix monitors from FOH in this way as changes to the gain settings affect the monitors too.

The correct method is to use **GAIN** to match the source to the operating level of the channel for optimum dynamic range, and then use the **FADERS** to balance each source into the mix. With correct system gain structure, prime sources such as vocals would have their faders operated around '0' while sources low in the mix such as backing vocals and acoustically loud brass and drums would display their true contribution with their lower fader positions. This is a much more visual and accurate way of mixing.





Note: The stereo Aux 9-10 and matrix 1-4 outputs can be monitored using the monitor select switch bank. This provides true stereo monitoring of these mixes. PFL/AFL automatically overrides any source selected on this switchbank.

**Using PFL / AFL** Allen & Heath are renowned for bringing you the most comprehensive engineer's monitoring system in consoles at this price point. We recognise the importance of correct gain structure and signal handling. The **GL2800** includes LED meters for every input channel and main output, as well as a pair of high resolution meters dedicated to monitor duty only. In monitor mode the M fader and associated controls become a full featured PFL/AFL monitor feed for the engineer's listen wedge.

The input channels provide **PFL** (pre-fade listen) so that each source can be checked using the meters and headphones before you bring the fader up. You can even use PFL while the channel is muted to prevent the signal reaching the house and monitor speakers until you have checked it and are ready.

All the main and aux outputs provide **AFL** (after-fade listen) so that you can check the exact level leaving the console. Once again, the AFL switch gets its source before the output mute switch so that you can check the signal before you send it to its destination. This can be very important when you are feeding remote destinations such as broadcast and recording.

## dB Tech talk...

For an audio circuit stage:  
 $P_i$  = Input signal power  
 $P_o$  = Output signal power

The Decibel is defined as:

$$dB = 10 \log (P_o / P_i)$$

$$= 10 \log (V_o^2/R_o / V_i^2/R_i)$$

If input and output impedances  $R_i$  and  $R_o$  are the same, then:  
 $dB = 20 \log (V_o / V_i)$

**dBm** is defined as 1mW into 600 ohms = 0.775V

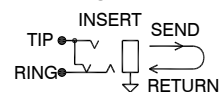
**dBu** = 0.775V ignoring the 600 ohms as we assume high input and low output impedance and therefore maximum voltage transfer between stages, appropriate for modern audio.

**The Decibel** the 'Bell' is the unit of sound level. Decibel is 1/10 Bell, a more conveniently sized unit.  $dB = 20 \log (V_o / V_i)$  where  $V_i$  and  $V_o$  are two signal voltages, in and out (ignoring the impedances). The dB is used to express the relationship between two levels, chosen because of the logarithmic way our ears respond to sound. The 'dB' relates one level to another. For example, a preamp with a gain of 40dB (100x) would produce an output of +10dBu for an input of -30dBu. Several audio standards exist to relate a signal level to a known reference. Audio engineers need to deal with a variety of equipment standards, for example, a -10dBV CD player plugged into a console with +4dBu outputs connected to a 0dBu input DSP speaker manager, or an operator using an SPL (sound pressure level) meter to measure sound intensity.

- dBu** Relative to 0.775Vrms – professional standard  
 $0dBu = 0.775V$      $+4dBu = 1.228V$
- dBV** Relative to 1Vrms - consumer audio standard  
 $0dBV = 1V$          $-10dBV = 316mV = -8dBu$
- dB-A** Sound pressure with a filter contour to approximate the response of the human ear. Three curves A, B, C exist for different loudness.
- dBfs** Relative to signal maximum before clip (full scale)

☺ If you suspect the insert socket to be faulty or intermittent through excessive wear or contamination, test for this by plugging in a jack with its tip shorted to its ring contact. This bypasses the contact in the socket. Clean using suitable electrical contact cleaner.

**Using Inserts** The **GL2800** channel inserts operate at 0dBu, the output inserts operate at -2dBu. In practice this makes little difference as long as the inserted equipment is intended for line level operation (-6 to +4dBu). Simply set the gain through the device to unity (0dB) with the bypass switch pressed (if available). With the effect switched in, use the console channel gain control to make any further adjustments needed. This keeps the gain structure correct through the channel signal path.



With nothing plugged into the insert, the channel signal is routed through a switching ('normalling') contact in the socket. As soon as a jack is plugged into the socket the contact is opened and the signal path broken so that the external device can be patched in series with the signal.

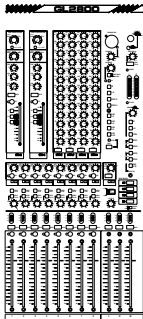


## POLARITY

**Polarity** Refers to the positive (+) and negative (-) wires of a loudspeaker or balanced audio connection. The console input channels include POLARITY switches which reverse the + and - input connections. Some applications include correcting for reverse wired cables, correcting for microphone placement problems, mixing two mics on a snare drum, one above the other below where the diaphragms move in opposite directions, and helping to reduce comb filtering effects as radio miked actors perform close to each other. Polarity is sometimes labelled 'phase' on mixing consoles. Technically, 'phase' is not the correct term as it implies a 180 degree time shift. Polarity simply reverses the wires. It does not affect time. Before starting your mixing, check that all the channel polarity switches are correctly set, normally up (+).



**Mixing the PA in mono or stereo?** Because a console provides an L and R output does not mean you have to mix in stereo. It is often convenient to have separate fader control, processor inserts, and outputs to drive two mono speaker stacks in an FOH system. How much stereo you introduce into your mix depends on where you position the pan controls. In most situations the size of the room and position of the speakers makes stereo mixing an advantage only for a small section of the audience, usually those around the sound operator! Those listening near the speakers are likely to lose information from the opposite stack. For this reason it is best to mix most sources in mono (pan centred). However, it can enhance the image by mixing some 'ambient' sounds in stereo, for example reverb returns, keyboards and special effects. Where the speakers are widely placed, you can reduce the stereo image by reducing the amount of panning to each side. Whatever image you create it is important that you listen to the results and consider the listeners at all positions in the room.



**Zero the console** Before starting the sound check it is good practice to 'zero' the console by setting all its controls to a sensible starting condition. Check that the mode switches are correctly set for your application. Set all GAIN, EQ and PAN controls mid, FADER, AUX and MATRIX controls off, TALKBACK and OSC/NOISE levels off, and all switches up. Make sure the osc/noise generator is turned off. Cue Sheets are provided at the rear of this user guide for you to copy and log your control settings. This can also be downloaded from our web site.

Think before you hit the switch!



**Turning the system on and off** It is good practice to:

- Turn the amplifiers on last and off first.
- Mute channels before plugging cables, unplugging instruments and switching phantom power.
- Let equipment which has been stored in a damp or cold place acclimatise in the venue first before powering it up.
- Power up the system in plenty of time before you start the sound check or show.



**Sound levels** The ear is a delicate instrument. Do not subject yourself or any listener to long periods of loud sound, particularly with extreme equalisation. This may result in frequency selective or full range hearing loss. Adhere to the sound level regulations which may apply to the venue... and common sense!

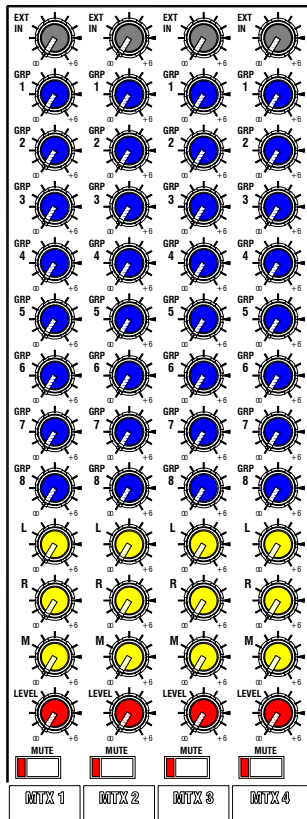


**Dual Functionality** Now an industry standard, Allen & Heath pioneered this feature with the introduction of the first GL consoles in the '90s. In the past it was necessary to stock two different types of live sound console, one for mixing FOH (front-of-house), the other designed for mixing on-stage monitors. With the introduction of a few clever 'mode' switches we changed all that. Now, the same console can be quickly configured to carry out either task properly and without compromise.

The **GL2800** takes dual functionality a thoughtful stage further with the advent of new engineering practices such as multi-media and IEM (in-ear monitor) mixing, and computer based live multi-track recording. The key principles of dual functionality are:

- FOH / Monitor**
  - The same console can be quickly configured by the operator for proper FOH or stage monitor mixing, or as a combination of both for mixing monitors from FOH. In either mode, no part of the console is redundant. Every control and socket can be used for an associated function.
- Protected**
  - To prevent accidental operation during the show, the configuration mode switches are safely recessed under the panel.
- Aux Reverse**
  - In FOH mode the groups and LR are the main outputs while in Monitor mode the aux mixes become the main outputs.
- Master Control**
  - The REV switch swaps the group or L, R master controls with the related aux master so that you have full fader control of the appropriate main output complete with mute, AFL and LED bar meter.
- XLR + Inserts**
  - In Monitor mode the aux outputs are routed to the console main XLR sockets for electronically balanced drive, with inserts for patching in processors such as graphic EQ, limiters and delays.
- Pre/Post**
  - Channel pre/post switches and link options are important. In Monitor mode it must be possible to switch all auxes post for channel fader mastering. For Monitors from FOH, the pre-insert, pre-EQ or post-EQ option is needed. Note that per channel pre switching is best as you may occasionally need to mix in some post sources such as radio mics and sound effects.
- Sub Grouping**
  - In Monitor mode the groups continue to feed the sub grouping to LR so that you can still work with grouped level control to the main mix.
- Matrix Feed**
  - In Monitor mode the groups and LR continue to feed the matrix so that you can create independent mixes in addition to the auxes for special feeds, recording, and further mono or stereo in-ear monitors.
- Listen Wedge**
  - In Monitor mode the M output becomes the engineer's 'listen wedge' feed providing the PFL/AFL mix. It gives the engineer identical fader control and XLR drive for all wedges including their own.
- Talkback**
  - In both modes assignable talkback is provided.
  - The matrix has a useful application in both modes. External ambience sources can be mixed in to the matrix to create live recording and in-ear monitor mixes. A mono aux can be converted to stereo IEM.

FOH	Monitor	Recording
LR + M mixes	14 Monitors	Stereo / Mono
Subs on M mix	8 Aux (wedge)	2-Track
LR to M for mono	2 Aux (stereo IEM)	8 Groups
8 Sub Groups	4 Matrix (2 stereo IEM)	4 Matrix
10 Auxes	Engineer's Wedge	Direct Outputs
4 Matrix	Ambience, Talkback	Ambience



**Applications for the Matrix** The matrix is a ‘mixer within a mixer’, a versatile toolbox of outputs you can use to satisfy a host of applications. Each of the 4 outputs is mixed from any combination of the groups, L, R, M and an external input as dialled up on the 12 source rotaries (hence a ‘12x4’ matrix). Its master level can be adjusted independently. Using combinations of the outputs you can create mono, stereo or multiple output mixes. Some applications include:

**Mono Recording** If you are working with a stereo PA you can combine L and R into a matrix output to produce a mono mix feeding a recorder, video camera and so on. Raise the L and R rotaries to the 2 o’clock position to sum them together. You can use the built-in 1kHz tone generator to feed a line-up tone to the connected recorder.

**Stereo Recording** Raise L to the unity 3 o’clock position in one matrix, R in another to create a stereo pair that follows the LR mix. You can adjust the balance to compensate for the acoustic sound in the room using the groups, and even add audience ambience (described later).

**Remote Broadcast** Create a mono or stereo feed as described above. Use the tone generator to send a ‘slate’ signal to the destination for line-up.

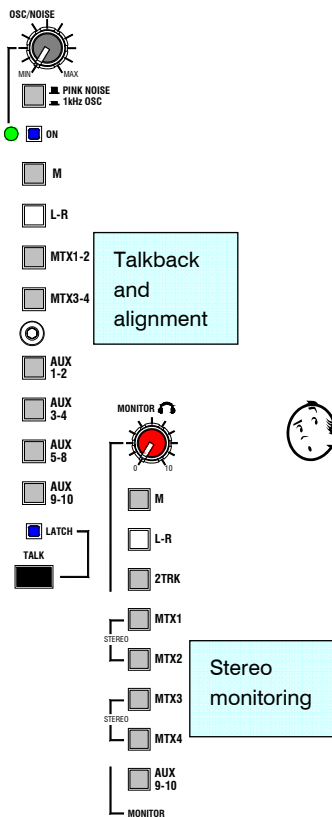
**Zone Feeds** Send independent relay feeds to additional locations such as the foyer, dressing rooms, cry room, balcony and so on. You can use the groups to adjust the balance to suit the destination, for example to boost the orchestra against the vocals. Feed the output through an EQ to tune the speaker for the local acoustics.

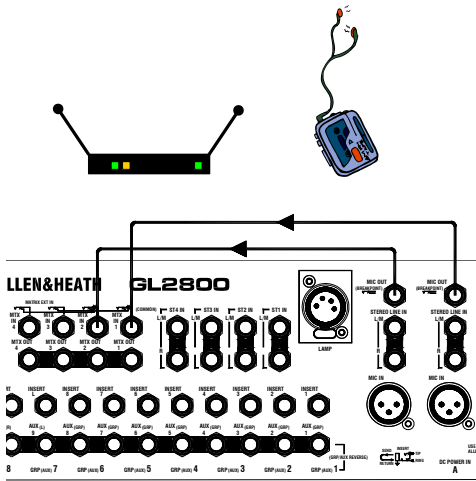
**Delay Fill Speakers** Use the matrix to feed additional fill speakers for distributing the sound more evenly around a large venue, for example centre fill, stage front fills, under balcony or rear fills, or ‘mix island’ delay tower at a festival. To aid intelligibility for the nearby listeners without moving their focus from the stage, the send should be delayed using an in-line delay processor. As a rule of thumb, delay 1mS per foot difference between the listener and the fill and the listener and the main speakers. Now add a few milliseconds ‘Haas effect’ delay so the listener hears the main speakers slightly before the fill. Keep the fill level about 10dB or so below the main PA sound at that location. It may help intelligibility to boost the vocals above the instruments in the fills, and to use an EQ to cut the extreme LF and HF frequencies.

**Hearing Assist** It is a growing requirement that venues provide a hard-of-hearing inductive loop, IR or wireless broadcast for the hearing impaired audience. The matrix is ideal for this application as you can combine a stereo LR mix into mono, add groups to help vocal intelligibility, patch in an external ambience source, and add processing such as EQ and limiters which may be needed.

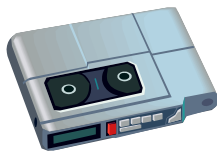
**Additional Monitor Mixes** You can use the matrix to create some additional monitor mixes when you run out of auxes, this time made up from a mix of the groups, LR and external input. The LR could be used to create a general overall balance, and then the groups added according to musician preference. Groups could be routed from ‘me only’ channels associated with each musician, or traditionally grouped sources. The musician could get a balance from, say, the overall stereo mix, drums, brass, keyboards, ‘me only’ and ambience, a very quick way of mixing. You could also use the EXT IN to add ambience pickup, very useful if you are creating in-ear (IEM) mixes. Use two matrices to create stereo monitor feeds.

**Combining Two Consoles into a Single PA** In a festival situation you may have a support band wishing to patch in their own console. One way to do this is to feed the PA from a pair of matrices, and then use EXT Inputs to combine the external console with the main LR mix.

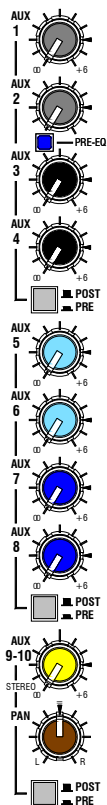




**Create IEM Mixes with Ambience** In Monitor mode the matrix continues to be fed with the 8 groups, L, R and M mixes. You can use these to create additional, independent monitor mixes. Together with the auxes these give you as many as 14 mixes. Create mono or stereo in-ear monitor feeds using single or paired matrices, for example MTX1-2 and 3-4. You could use LR to start with a basic stereo mix, then add up to eight instrument or ‘more me’ groups. Add ambience using a pair of jack leads to patch the stereo channel MICs into matrix EXT IN 1 and 2. With nothing plugged into EXT IN 3 and 4 the two mic signals are automatically linked across making the same stereo ambience available to both IEM mixes. Alternatively you could use an outboard reverb effects processor fed from a post-fade aux send to create the ambience. Use the channel faders and pan to create the basic stereo mix. Remember to set the other monitor aux sends to pre-fade.



**Using the Matrix to create a Recording** The band may be acoustically loud in the room, and you need only mix vocals and some of the instruments into the PA to get good clarity and overall balance for the listeners. If you recorded the console main output you would be disappointed when you got home and listened to the result. For example, there may be strong voices, acoustic guitar and flute, but the drums, bass and electric guitar may be low. This is because you did not need much of these backline instruments in the PA mix. However, if you use the matrix to feed the recording you could start with the main LR (PA) mix, then turn up the drum and guitar groups to compensate for the lack of these in the house system. You could also add in ambience as described above to give the recording more life by including audience reaction and natural reverberation.



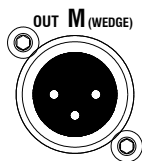
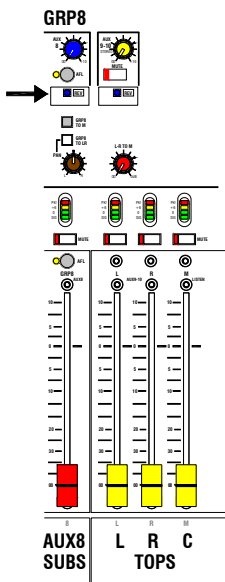
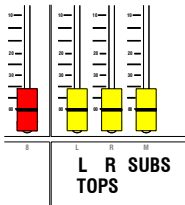
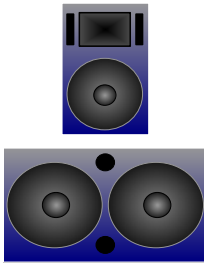
**Recording with the GL2800** The console is equally at home recording live or in the project studio. The studio grade preamps produce an accurate and noise-free recording. Create a stereo recording from the main LR output, or from a pair of matrices as described above if recording and mixing live at the same time. To record to multitrack use whichever combination of groups, matrix, auxes and channel direct outputs is most convenient. The direct outputs are set pre-fade as factory default. This setting means that the recording is not affected by your live fader and EQ changes. Note that you can swap internal jumpers to change this to post-fade if you prefer. Set the channel pre-EQ switches as required. Remember to use some ambience microphones to record the audience and venue atmosphere too.

**Pre/post Fade Aux Settings** The aux sends are switched pre or post fader using three PRE switches on every channel. One switch affects auxes 1-4, another auxes 5-8, and one for stereo aux 9-10. It is usual to set auxes pre-fade if you are mixing monitors from FOH. Set post-fade for auxes used as effects sends, zone feeds, aux-fed subs and so on. If you are using the console to mix monitors only then the auxes are typically set post-fade so that the channel fader becomes the source master to all monitors. In this case start with all channel faders set to ‘0’.

There are times when you may want some monitor sends set post-fade while most are set pre-fade, for example mixing monitors with radio mics and cued sound effects. Here, it may be better for the radio mics to follow your fader movements so avoiding off-stage chat or noise in the monitors. **For this reason we believe it is important that channel rather than global mix pre/post switching is provided.**







**Mix and Aux-Fed Subs** Driving the PA system sub bass speakers with their own mix has two main advantages. First, the mix is much cleaner because only sources that generate the low frequencies, for example kick drum, bass guitar, keyboards and sound effects are sent to the subs. Low frequency bleed from these sources into open microphones such as vocals and snare is eliminated from the PA much more effectively than using just the channel filters. Second, the sub bass amplifier is only working with the sources needed. It is not wasting power reproducing unnecessary pickup.

The subs can be separately driven in several ways. A common method is to use the **independent M mix**. Route all sources to L-R. Route the sources you want in the subs to both L-R and M. Feed the LR to a stereo crossover to drive the top speakers, and M to a mono crossover to drive the sub speakers. Refer to the speaker manufacturer for recommended crossover frequency, usually within the range 80Hz to 120Hz. The PA overall level is adjusted by moving the L, R and M (sub) master faders together.

Another method that has become popular is to use an Aux mix to drive the subs. This is referred to as 'aux-fed subs'. Align the system so that the normal unity gain position of the channel fader and aux send result in the correct speaker balance. For sources you wish to send to the sub, turn up the channel aux send to its unity 3 o'clock position. Avoid the temptation to ride the aux send to create more or less sub as this may upset the natural speaker balance or cause problems for listeners in different parts of the room.



One problem with using the aux in this way is that it becomes difficult to balance the top and sub speakers if you need to adjust the overall volume of the PA. Typically the LR (tops) use fader masters, and the aux is on a rotary master. The **GL2800** overcomes this with the monitor mode 'REV' switch that swaps the rotary aux master with the related fader group master. This switch is recessed for protection against accidental operation. This puts the aux (sub) master on to a fader next to the PA tops master faders. The result is you get all master faders aligned for simultaneous control, individual mutes and meters, and three properly balanced XLR outputs. We recommend that you use Aux 8 for the sub feed. This gives you 4 master faders next to each other, for example, Subs, L, R and C.

**Other M Output Applications** Apart from the main PA C mix or sub-bass speaker mix, other examples include L+R sum mono fill, additional mono zone feed, mono recording, mono PA with LR providing two more subgroups to M, engineers PAFL wedge feed... and more.

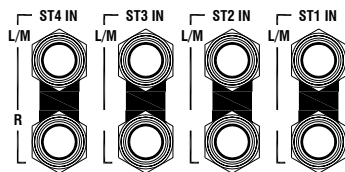
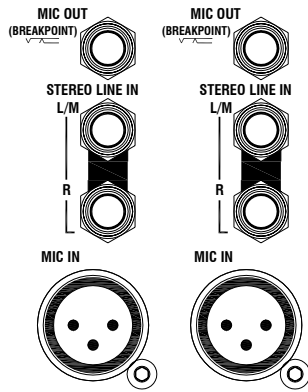
### Using the channel Direct Outputs

**Recording** - Default factory setting is pre-fade so that your live fader mixing does not affect the recording. Use the channel recessed PRE-EQ switches to select either post-EQ or pre-insert, pre-EQ for your recording. Post-EQ lets you use the EQ for source correction affecting the recording too. Select pre-EQ if you do not want your compressor and EQ to affect the recording.

**Monitor mixing** - You could also patch DIR OUT into a matrix EXT IN to add a 'more me' channel into a monitor send created from the groups and LR. If preferred you can reconfigure the direct outputs to post-fade by setting internal jumpers.

**Single effects** - Use post for feeding an effects processor with one source only, for example a dedicated reverb on lead vocals or snare.





**Using the Stereo Channels** The two full feature stereo channels and the two dual stereo returns present a unique flexibility. The channels each include a patchable mic input and a stereo line input. The returns each include two stereo inputs which can be mixed together or used separately.

The mic preamp has a TRS jack MIC OUT breakpoint so that its output can be used independently. Plugging into this socket breaks the signal path feeding the channel and routes it to the jack instead. ST1 and ST3 stereo inputs can be routed either into the return channels or directly to the LR mix. This is configured using recessed mode switches which protect from accidental operation during a show.

The **GL2800** provides 6 stereo inputs in a compact format. Together with the 2 mics the stereos provide for a host of space saving applications:

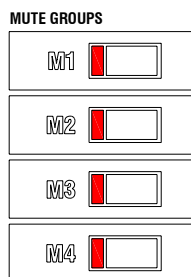
**Standard Mono Microphone Channels** Mono mic input through the stereo channel with 4band EQ, auxes and full routing.

**True Stereo Microphone Channel** For example, use short jack leads to patch both MIC OUT breakpoints into the stereo line input of one channel. Set the stereo line level control on this channel to its '0dB' position. Adjust the gain and balance between the left and right microphones using the two mic GAIN controls. The other channel can be used as a stereo effects return, sound effects or other line source.

**Mixing Two Microphones through One Channel** Patch one MIC OUT into the other channel stereo L/M input. On that channel turn up the mic gain control to add its own mic, and the stereo line level control to add the patched mic.

**Patchable Microphone Preamplifier** Plug into the MIC OUT breakpoint to disconnect the mic preamp from the channel and patch it elsewhere to be used independently. For example, plug in a room microphone and patch MIC OUT to a matrix EXT IN to add ambience to a recording or monitor feed, or use it as a preamplifier for a reference microphone with an RTA or other analysis equipment. You could even use it to provide a better mic source to a video camera or other recorder.

**Dual Stereo Line Inputs** A trademark of Allen & Heath consoles is the ability to combine more than one source into a stereo channel, each with its own level control. This can save channel space when working with two similar sources routed to the same destination, for example, two stereo reverb returns, two backing track or sound effects players, or to alternate between walk-in music and recorded announcement players. The two stereo return channels provide this facility.



**Using the Mute Groups** The 4 mute groups let you simultaneously mute combinations of input channels with a single key press. For example, use a group to mute all the drum channels, or all stage mics in a musical production. You could also assign a group to mute all channels during the intermission. You could even use the groups to recall the correct channel settings for different bands or scenes during a theatre show.

**Finally... A Note about Combining Signals** You can use a 'Y' splitter cable or adapter to feed one output to two destinations, but never try to combine two outputs to one destination. This may damage or degrade the performance of the equipment driver stage.



# Specifications

## Performance

Maximum input level	Mic	+34dBu (inc pad)
	CH Line	+34dBu
	Other Line	+20dBu
Maximum output level	XLR	+26dBu
	Jack	+20dBu
Internal headroom	Channels	+20dB
	Mix	+22dB
Meters	3 colour, quasi peak response	
Sensitivity	0VU = +4dBu at XLR output	
Master meters	12 segment	-30 to +16dB
Channel meters	4 segment	-12,0,+6+16dB (5dB before clip)
Frequency response	20Hz to 50kHz	+/-0.5dB
Mic CMRR at 1kHz	> 80dB typical	
THD+n at +14dBu 1kHz	Mic to mix out	< 0.003%
Crosstalk at 1kHz	Fader shutoff	>90dB
	Mute shutoff	>88dB
	Inter channel	>90dB
Noise, rms 22Hz to 22kHz	Mic EIN	-128dB
	Residual output noise	< -96dBu (-100dB S/N)
	LR mix noise 24 routed	< -86dBu (-90dB S/N)
	Group mix noise 16 routed	< -86dBu (-90dB S/N)
	Aux mix noise 16 routed	< -92dBu (-90dB S/N)
	Mix noise 24 line 0dB gain	< -86dB S/N
Channel HPF	12dB/octave below 100Hz	
Mono EQ	HF	Shelving +/-15dB, 12kHz
	HM	Peak/dip +/-15dB, 500Hz to 15kHz, Q=1.8
	LM	Peak/dip +/-15dB, 35Hz to 1kHz, Q=1.8
	LF	Shelving +/-15dB, 80Hz
Stereo EQ	HF	Shelving +/-15dB, 12kHz
	HM	Peak/dip +/-15dB, 2.5kHz, Q=1.8
	LM	Peak/dip +/-15dB, 250Hz, Q=1.8
	LF	Shelving +/-15dB, 80Hz
Power supply	External RPS11	IEC input
	External Input for optional RPS11 backup supply	

## Mechanical

	24	32	40	48	56
Width	944mm (37.2")	1171mm (46.1")	1398mm (55")	1625mm(64")	1852mm(73")
Depth	650mm (25.6")				
Height	170mm (6.7")				
Weight	29kg(63.8lbs)	35kg(77lbs)	41kg(90.2lbs)	47kg(103.4lbs)	53kg(116.6lbs)

## Connections

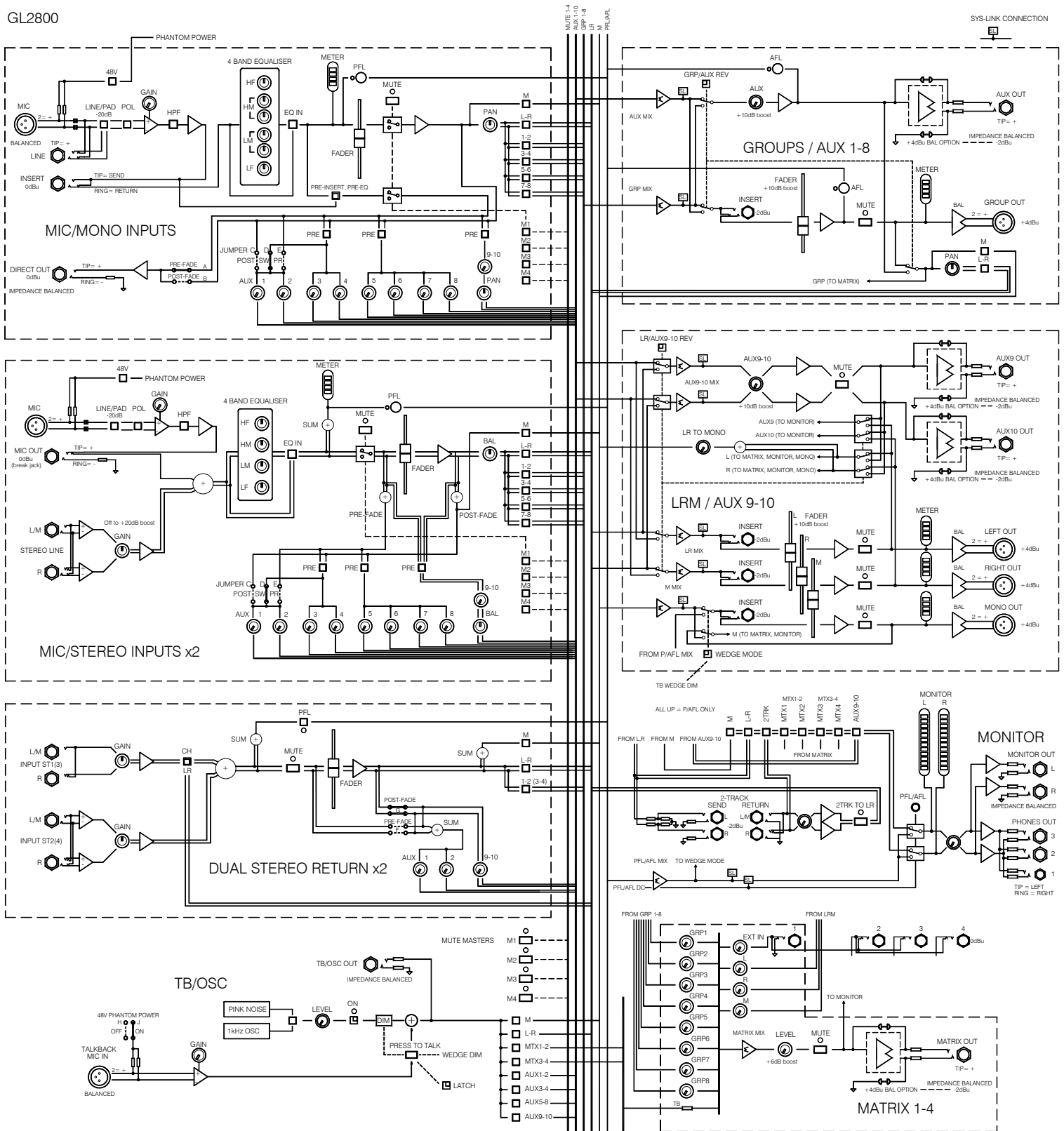
Mono channel	XLR balanced pin 2 hot	Sensitivity -60 to +14dBu
	TRS balanced, tip hot	Sensitivity -40 to +14dBu
	Total gain range	74dB
	Pad out (MIC)	2k ohm
	Pad in (MIC or LINE)	>10k ohm, -20dB attenuation
	Max input level	+34dBu
	XLR phantom power	+48V, on/off
Stereo channel	Mic in	Same as mono channel
	Stereo in	TRS balanced >10k ohm, -16 to +20dBu
Stereo return	ST1/3	TRS unbal >10k ohm, -16 to +20dBu
	ST2/4	TRS balanced >10k ohm, -16 to +20dBu
Talkback mic	XLR balanced pin 2 hot	Sensitivity -50 to -10dBu
	Phantom power	Internal jumper +48V (fitted)
2-track return	TRS unbalanced	>4k ohm, -2dBu
2-track send	TRS impedance balanced	<75 ohm, -2dBu
Inserts	Channel	TRS, tip send, ring return, 0dBu
	Output	TRS, tip send, ring return, -2dBu
L, R, M outputs	XLR balanced pin 2 hot	<75 ohm, +4dBu, +26dBu max
Group (aux) out	XLR balanced pin 2 hot	<75 ohm, +4dBu, +26dBu max
Aux 1-10 output	TRS impedance balanced	<75 ohm, -2dBu, +20dBu max
	Electronic balance option	<75 ohm, +4dBu, +26dBu max
Direct out	TRS impedance balanced	<75 ohm, 0dBu, +20dBu max
Matrix out	TRS impedance balanced	<75 ohm, -2dBu, +20dBu max
	Electronic balance option	<75 ohm, +4dBu, +26dBu max
Headphones	TRS, tip L, ring R, 30 to 600 ohm headphones recommended	
Monitor out	TRS impedance balanced	<75 ohm, -2dBu, +20dBu max
Talkback/osc out	TRS impedance balanced	<75 ohm, +20dBu max
Lamp	4-pin XLR	max 12V 5W lamp

## GL2800 Series Part Numbers

22 mic/line, 2 mic/stereo, 8 group console	GL2800-24/v
30 mic/line, 2 mic/stereo, 8 group console	GL2800-32/v
38 mic/line, 2 mic/stereo, 8 group console	GL2800-40/v
46 mic/line, 2 mic/stereo, 8 group console	GL2800-48/v
54 mic/line, 2 mic/stereo, 8 group console	GL2800-56/v
Sys-Link V2 input/output option kit	GL2800-SLV2
SSM2142P balanced output driver option IC	AE0302
DRV134 balanced output driver option IC (alternative to above)	AE5725
Allen & Heath RPS11 power supply	RPS11/v
Allen & Heath 18" gooseneck LED lamp – right angled	LEDLAMP-X

# System Block Diagram

GL2800



# User Options

The **GL2800** has a versatile architecture which should satisfy most applications you may encounter without modification. However, the following internal options provide alternative settings for those applications that may demand them. Access is required to the internal assemblies. For user convenience, pluggable jumper links are used in most places.

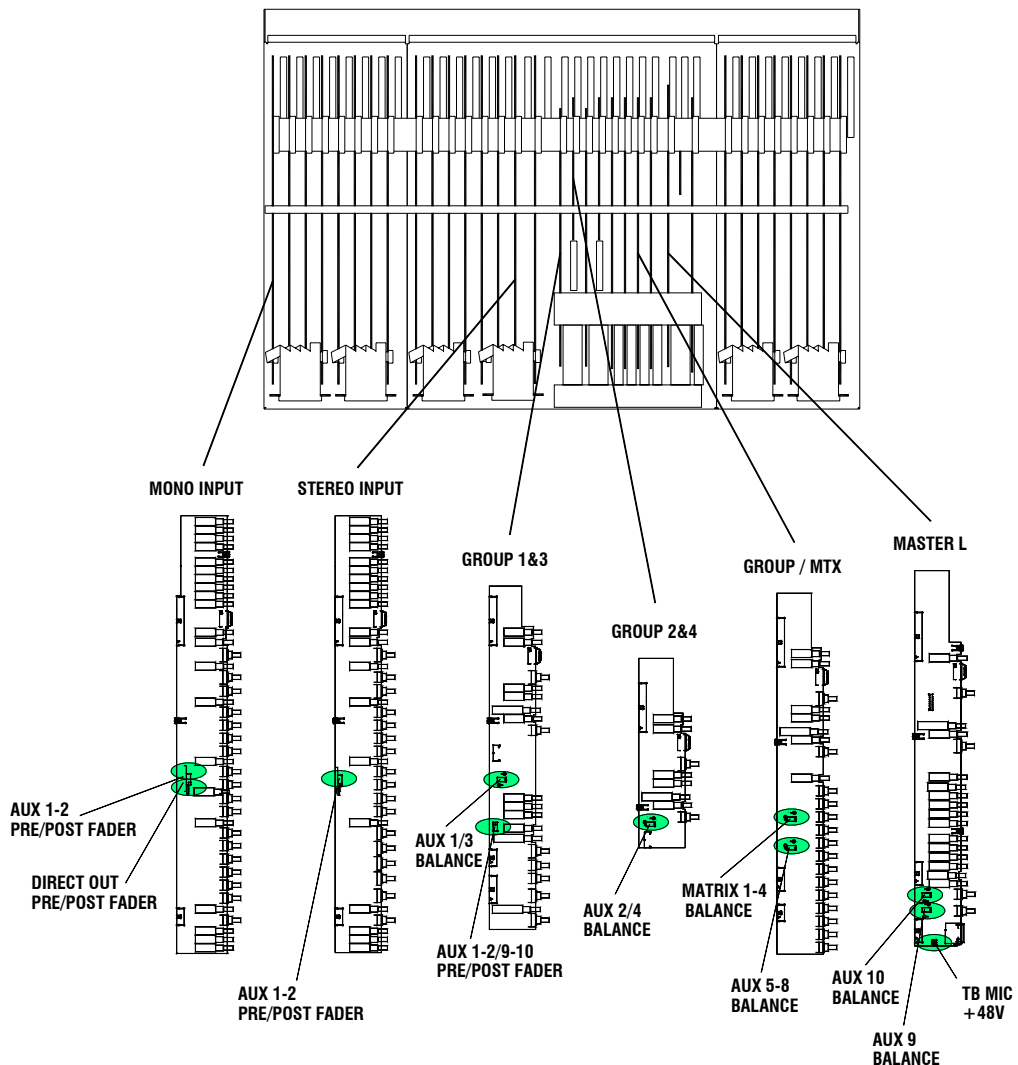
**⚠ Do not adjust the user options while power is applied to the console. Do not remove or tamper with the internal power unit, its cover or wiring.**

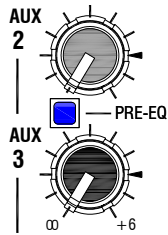
**Remove the base** Switch off power and unplug the power unit and all the cables. Invert the console on a flat, clean, well lit surface. Use Torx (star head) screwdrivers to remove the screws holding the base to the chassis. Use a T15 driver to remove the set of 6Bx5/16 screws holding the base to the rear and underside of the chassis. Carefully lift off the base.

**Configure the internal options** Fit any options required referring to the instructions provided. Set the option jumpers to the required positions. Make sure they are pressed fully home. Check that all channels are correctly set and all options fitted according to their instructions. Make sure that no debris or parts are left loose inside the console.

**Refit the base** Carefully reposition the base. Refit the fixing screws.

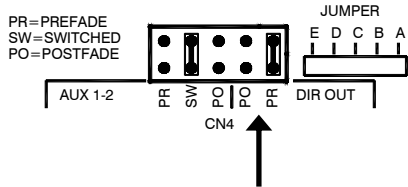
**IMPORTANT: Check carefully that all channel jumpers are correctly set as required.** Errors on one or more channels now may cause user problems later. We recommend that you write the repositioned jumper settings on a label and adhere this to the rear panel. This would provide a helpful reference to other users of the console.





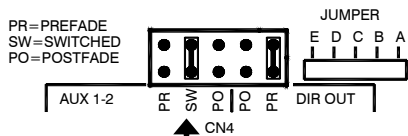
**Aux pre/post EQ** For convenience, this option is a recessed front panel switch per channel. No internal access is required. The up position is post-EQ, pressed is pre-insert and pre-EQ. Note that this setting affects all pre-fade sends from the channel, including auxes and direct output.

**MONO CHANNEL**



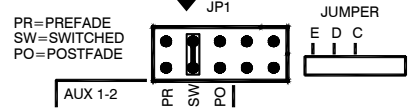
**Direct output source** Factory default is pre-fader. This is common for live recording to multitrack. The live mix fader movements do not affect the recording. Move the jumper from PR to PO to change to post-fade. Post-fade is appropriate when using the output as a direct channel effects send.

**MONO CHANNEL**

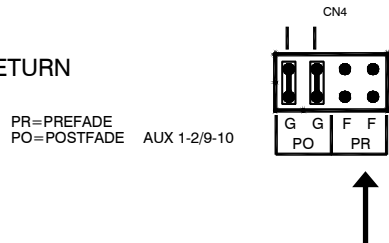


**Channel Aux pre/post settings** Factory default is Aux 1-4 = switched, Aux 5-8 = switched, Aux 9-10 = switched pre/post fader. You can change the setting of Aux 1-2 from switched to permanently pre-fade or post-fade if preferred. Make sure you set all mono and stereo channels the same. To avoid possible future confusion when the console is used by other operators, we recommend you only change these settings if absolutely necessary.

**STEREO CHANNEL**

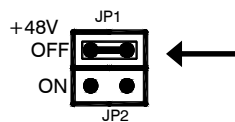


**STEREO RETURN**



**Return Aux pre/post settings** The stereo returns feed Auxes 1, 2 and 9-10. Factory default is the post-fader so that the fader becomes a master for all feeds from the return. This may be changed to pre-fade if you prefer. Move the two jumpers from G to F.

**L MASTER**

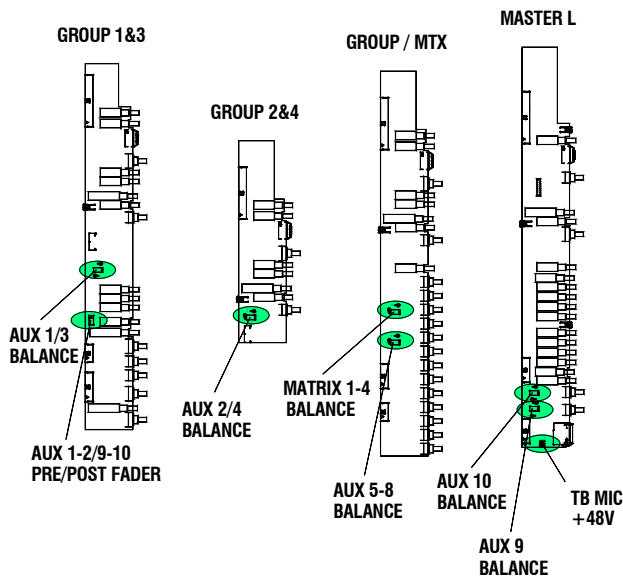


**Talkback mic +48V** Factory default is +48V phantom power turned on for the front panel talkback mic XLR input. The option jumper is behind the TB mic XLR on the L Master board. If you prefer, phantom power can be disabled by repositioning the jumper to the OFF position.

Note that phantom power should not harm non-powered dynamic microphones as long as balanced connections are used.

**⚠ WARNING:** Do not connect unbalanced sources or cables to inputs with phantom power selected. To avoid loud clicks do not press the TALK switch when plugging or unplugging the talkback microphone.



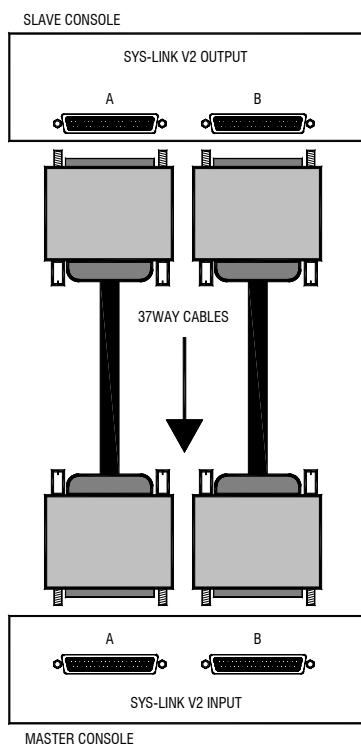


**Output balance options** The aux and matrix outputs are impedance balanced as standard operating at nominal -2dBu and with +20dBu maximum drive. They provide similar interference rejection to electronically balanced outputs when connected to balanced equipment inputs. An electronically balanced option is available if you require nominal +4dBu and higher output drive up to +26dBu over very long cable runs. However, it is not usually necessary to fit this option as the impedance balanced drive satisfies most applications. Check that you really need the option before fitting it.

There are two balanced driver ICs which may be used. Either is suitable. These are available from Allen & Heath or good electronic component suppliers. The Allen & Heath part number is shown below:

SSM2142P	A&H Part AE0302
DRV134	A&H Part AE5725

For each aux master, snip the legs of the two zero ohm resistor links next to the IC socket. This removes them from the circuit. Now simply plug the option IC into the socket. Observe the correct IC pin1 orientation and make sure its legs are correctly aligned with the socket. Test the output once the work is complete. You should measure the same level but opposite polarity signal between + (hot) and ground, and - (cold) and ground.



**Sys-Link V2 input/output option** A blank plate is fitted in both positions as standard. This may be replaced with optional cards which provide the console inputs, outputs and PFL system on pairs of 37way D connectors for linking to other Allen & Heath consoles already fitted with Sys-Link V2. The GL2800 can become an input channel expander (slave) or have its number of input channels expanded (master) when linked to other consoles.

Two 37way cables are required to link the GL2800 with another console.

The 37way shielded multi-core cable carries the balanced, line level mix signals and PFL/AFL system to or from the other console.

**IMPORTANT:** Note that you need 37 to 25way adapter cables if you are connecting Sys-Link V2 (Version 2) to the older Sys-Link V1 (Version 1) standard.

For full details please refer to the Sys-Link option Applications Note AP6284 and Fitting Instructions AP6159.

Copy and use this page to record your console settings.

**GL2800**

The diagram illustrates the control panel of the GL2800 console, organized into several functional sections:

- STEREO RETURN:** Includes ST1, ST2, ST3, and ST4, each with a STEREO GAIN knob and a DIRECT TO LR checkbox.
- AUXILIAR CHANNELS:** Features AUX 1, 2, and 9-10 with gain knobs and MUTE buttons. Below are PFL and M meters, and L-R level meters.
- GROUPS (GRP):** A 4x4 grid of 16 GRP channels (GRP 1-16). Each channel includes an EXT IN knob, a GRP gain knob, and a MUTE button. Below the grid are MUTE GROUPS (MG1-MG4) and various routing checkboxes (e.g., GRP1 TO M, GRP1 TO LR).
- MIXING:** Includes four MIX channels (MIX 1-4) with level meters and MUTE buttons. Below are checkboxes for PAN, TO M, TO LR, and TO M.
- MONITORING:** Features a PHONES jack, a 2TRK REPLAY knob, and a 2TRK TO LR checkbox. Below are MONITOR meters (M, L-R, 2TRK) and checkboxes for MTX1-2, MTX3-4, AUX 1-2, AUX 3-4, AUX 5-6, AUX 9-10, and MUTE GROUPS.
- LEVEL METERING:** A series of 16 FPK (Full Power) meters, each with a 0 to 10 dB scale and a MUTE button.
- STEREO MONITORING:** Includes L, R, and M (LISTEN) meters with 0 to 10 dB scales.

Copy and use this page to record your console settings.



<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN	<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN	<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN	<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN	<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN	<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN	<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN	<input type="checkbox"/> +48V <input type="checkbox"/> POLARITY <input type="checkbox"/> LINE GAIN <input type="checkbox"/> HPF HF LM LF <input type="checkbox"/> EQ IN
AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE	AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE	AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE	AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE	AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE	AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE	AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE	AUX 1 AUX 2 AUX 3 AUX 4 AUX 5 AUX 6 AUX 7 AUX 8 AUX 9-10 PAN MUTE
PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4	PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4	PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4	PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4	PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4	PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4	PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4	PFL PK1 PK2 L-R 1-2 3-4 5-6 7-8 M1 M2 M3 M4

