X2 OPERATOR MANUAL V1.3

Digital Broadcast Production Console for Radio

CALREC

Putting Sound in the Picture

calrec.com

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Calrec Audio Ltd reserve the right to change specifications without notice. E & O.E.

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IMPORTANT INFORMATION

After Sales Modifications
Please be aware that any modifications other than those made or approved by Calrec Audio Limited or their agents, may invalidate the console's warranty. This includes changes to cabling provided by Calrec and variations to the recommended installation as detailed in Calrec documentation.

Modifications to this equipment by any party other than Calrec Audio Limited may invalidate EMC and safety features designed into this equipment. Calrec Audio Limited can not be liable for any legal proceedings or problems that may arise relating to such modifications.

If in doubt, please contact Calrec Audio Limited for guidance prior to commencing any modification work.

ESD (Static) Handling Procedures
In its completed form, this equipment has been designed to have a high level of immunity to static discharges. However, when handling individual boards and modules, many highly static sensitive parts are exposed. In order to protect these devices from damage and to protect your warranty, please observe static handling procedures, for example, use an appropriately grounded anti-static wrist band. Calrec will supply an electrostatic cord and wrist strap with all of it's digital products.

All modules and cards should be returned to Calrec Audio Limited in anti-static wrapping.
Calrec Audio Limited can supply these items upon request, should you require assistance.

This applies particularly to digital products due to the types of devices and very small geometries used in their fabrication, analog parts can however still be affected.

ROHS Legislation
In order to comply with European RoHS (**R**eduction **o**f **H**azardous **S**ubstances) legislation, from the second week in April 2006 the vast majority of Calrec PCB and cable assemblies will have been produced with lead-free (tin/copper/silver) solder instead of tin/lead solder.

This means that for a period of time after April 2006 delivered consoles will contain a mixture of assemblies produced with different types of solder. This is unavoidable due to the fact that circuit boards are built in batches and allocated to consoles on a 'first in, first out' basis (hence the need to change the process well in advance of the legislation coming into force).

In the unlikely event of a customer having to carry out any re-soldering on such assemblies, it is imperative that the correct type of solder is used; not doing so is likely to have an adverse effect on the long-term reliability of the product. Circuit boards assembled with lead-free solder can be identified (in accordance with IPC/JEDEC standards) by a small oval sticker placed on the top-side of the circuit board near the PCB reference number (8xx-xxx).

The same sticker is used on the connectors of soldered cable assemblies. The absence of a sticker indicates that tin/lead solder has been used. **If in doubt, please check with a Calrec customer support engineer before carrying out any form of re-soldering.**

HEALTH AND SAFETY

Please observe the following:

- This equipment must be EARTHED
- Only suitably trained personnel should service this equipment
- Please read and take note of all warning and informative labels
- Before starting any servicing operation, equipment must be isolated from the AC supply (mains)
- Fuses should only be replaced with ones of the same type and rating as that indicated
- Operate only in a clean, dry and pollutant-free environment
- Do not operate in an explosive atmosphere
- Do not allow any liquid or solid objects to enter the equipment. Should this accidentally occur then immediately switch off the unit and contact your service agent
- Do not allow ventilation slots to be blocked
- Do not leave the equipment powered up with the dust cover fitted
- The rack mounting parts of this equipment must be fitted into an enclosure which complies with local regulations

Cleaning

For cleaning the front panels of the equipment we recommend anti-static screen cleaner sprayed onto a soft cloth to dampen it only.

Explanation of Warning Symbols

The triangular warning symbols below contain a black symbol on a yellow background, surrounded by a black border.

The lightning flash with arrow head symbol within an equilateral triangle is intended to alert the user to the presence of dangerous voltages and energy levels within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock or injury.

The exclamation mark within an equilateral triangle is intended to prompt the user to refer to important operating or maintenance (servicing) instructions in the documentation supplied with the product.

Power Supply Blanking Plates (ZN4849-3 and ZN6020)

If you are in receipt of a ZN4849-3 or ZN6020 power supply unit please do not remove the blanking plates which are fitted to the unused output connectors. The maximum potential between the terminals exceeds 60 volts, the blanking plates are fitted to avoid the risk of electric shock.

TECHNICAL SUPPORT

Should you require any technical assistance with your Calrec product then please contact your local distributor, if outside the U.K. and Ireland. For a list of Worldwide distributors please see the Calrec Web site at www.calrec.com or contact Calrec UK.

For technical assistance within the UK and Ireland, please contact the Customer Support Team at :-

Customer Support
Calrec Audio Ltd
Nutclough Mill
Hebden Bridge
HX7 8EZ
England
UK

Tel: +44 (0) 1422 842159
Fax: +44 (0) 1422 845244
Email: support@calrec.com
Website: www.calrec.com

We can deal with all technical after sales issues, such as :-

- Arrange repairs
- Supply of replacement or loan units while repairs are being carried out
- Service / commissioning site visits
- Operational training courses
- Maintenance training courses
- Supply of replacement components
- Supply of documentation
- Technical advice by telephone

Customer Support Hours
Factory based customer support engineers can be contacted by telephone during normal office hours (Monday - Friday 9:00a.m - 5:30p.m). Outside these hours, a message can be left on the answering machine, all messages are dealt with promptly on the next working day. Alternatively a message can be sent to them by email.

Product Warranty
A full list of our conditions & warranties relating to Goods & Services is contained in the Company's standard Terms and Conditions. A copy of this is available on request.

Repairs
If you need to return goods to Calrec, for whatever reason, please contact the Company beforehand in order that you can receive advice on the best method of returning the goods, and that a repair order reference number can be issued.

Standard of Service
Ensuring high standards is a priority, if you have any comments on the level of service, product quality or documentation offered to you by Calrec, then the Customer Support team would be pleased to receive your comments through any of the normal contact numbers, email or on the User registration form located at the end of this manual. If you have any other issues regarding your Calrec purchase, then please contact us and we will do our best to help. Calrec welcomes all Customer feedback.

Operator and Installation Manual PDFs
This manual can be found in pdf format on your console's CD Handbook.

You can also access this manual on your console's PC from the Start menu, under the Calrec X2 group.

X2
OVERVIEW

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INTRODUCTION

The Calrec X2 is a digital radio console designed for on-air operation. A simple control surface is employed to allow easy use by non-technical presenters while more complex functions are available to technical users.

Robust Design
Being a broadcast desk the X2 has to be more robust and fault tolerant than a music or post production desk. The control system is based on that used on all previous Calrec assignable desks which have proved very reliable over the last 15 years. In the unlikely event of a failure of the control system the programme output will not be effected and a control surface re-boot takes approximately 6 seconds.

A remote rack houses the desk's electronics, including input cards, output cards and processing.

Flexible Control
The X2 control surface is available with 6, 12, 18 or 24 fully assignable faders, so that a custom layout can be created.

The flexibility offered by computer software has been harnessed to provide greater functionality and ease of use.

All settings, for all channels and outputs except the positions of the channel faders, can be stored in the memories and recalled at a later date. This level of assignability makes the X2 ideal for use in situations where the same equipment is used by multiple operators, each of whom may have their own preferred desk layouts and settings.

Multi-Purpose Operation
The X2 has been designed to allow presenter operated programmes to be made easily with all essential controls being present as part of the desk's hardware.

For more complex programmes, perhaps with an engineer or technical operator using the desk, the central screen provides access to the more advanced functions. These include routing, memories (including save and load from disc), fader labelling and processing such as EQ and dynamics. An assign button above each fader calls the screen to that channel allowing instant access to the various settings and options.

It is intended that all set-up procedures and configuration may be carried out and maintained by an engineer or technical operator, as it is not necessary for the presenters themselves to understand the desk's underlying configuration. It is for this reason that the X2 software has two operational modes - "Engineer" mode, in which access to all of the PC interface screens is permitted and "Self-Op" mode, in which access only to the screens enabled by the engineer in "Engineer" mode is permitted. The option for the engineer to disable the unnecessary PC interface screens reduces complexity, and prevents accidental changes being made.

Bi-directional communication to external scheduling/play-out systems is available.

Custom Layouts and Furniture
The X2 control surface hardware consists of drop in panels individually cabled back to the control rack. This permits a wide variety of layouts to suit different operating practices.

Technical furniture can be user supplied hence no woodwork or stand is provided as part of an X2 system. However custom furniture and control panels can be designed on request.

ISO 9001 and RAB Registered
Calrec Audio Ltd has been issued the ISO9001: 2000 standard by the Governing Board of ISOQAR.

The award, for both UKAS and RAB registration, is the most comprehensive of the ISO9000 international standards. Granted in recognition of excellence across design, development, manufacture and after-sales support, the certification follows a rigorous and thorough review of Calrec's internal and external communication and business procedures.

PRINCIPAL FEATURES

FORMAT

- 6, 12, 18 or 24 stereo channels
- 4 stereo auxiliaries with aux master level controls
- 2 stereo mains with limiters and gain reduction metering
- 30 source based mono clean feed outputs with talkback facility from a selectable talkback source
- 1 stereo metering direct input
- 2 main direct inputs each with separate routing and gain controls for the contribution to each main bus
- 48 source based stereo inserts
- 30 source based direct outputs
- 1 Stereo PFL
- 1 Stereo Control Room (Cubicle) LS output
- 1 Stereo Operator's Headphones output
- 1 Stereo Studio LS output
- 4 on-screen PPM meters with peak indication and selectable AB/MS
- Comprehensive GPIO System

CHANNEL FACILITIES

- Input Selection
- Input Trim
- Phase Reverse
- Left to both, Right to both
- 4-band EQ
- 2 Filters
- Compressor/limiter and expander/gate
- Insert (pre/post fader)
- PFL
- Level controls to auxiliary mix busses (pre/post fader)
- Channel Fader
- Pan
- Routing to mains and auxiliaries
- Clean Feed Output Level Control and pre/post selection
- Direct output gain control and pre/post selection
- Auxiliary send (pre/post fader)
- 6 character label
- Assignable WILD button, display and rotary control
- Assign button
- Machine Control buttons and tally LED's

MICROPHONE INPUT FACILITIES

- Input Coarse Gain
- Phantom Power On/Off

SYSTEM

- On board Flash ROM memory system allows 99 full console snaphot or partial memories.
- PC backup allows an unlimited number of memories.
- Independent DSP operation ensures audio continuity even during PC or control reset.
- Console and racks boot from power on in less than 15 seconds.
- Full control system reset in less than 6 seconds.
- Last settings fully restored on power-up or reset.
- All cards and modules are designed to be Hot Plugged.
- All cards and modules are designed to initialise upon insertion.

SYSTEM OVERVIEW

Hardware
The modular control panels and PC screen can be built into almost any style of operator furniture. There are 3 types of panel available:

- Channel Fader Panel (up to 4).
- Optional monitor panel.
- 5-way balanced stereo mixer/reset panel.

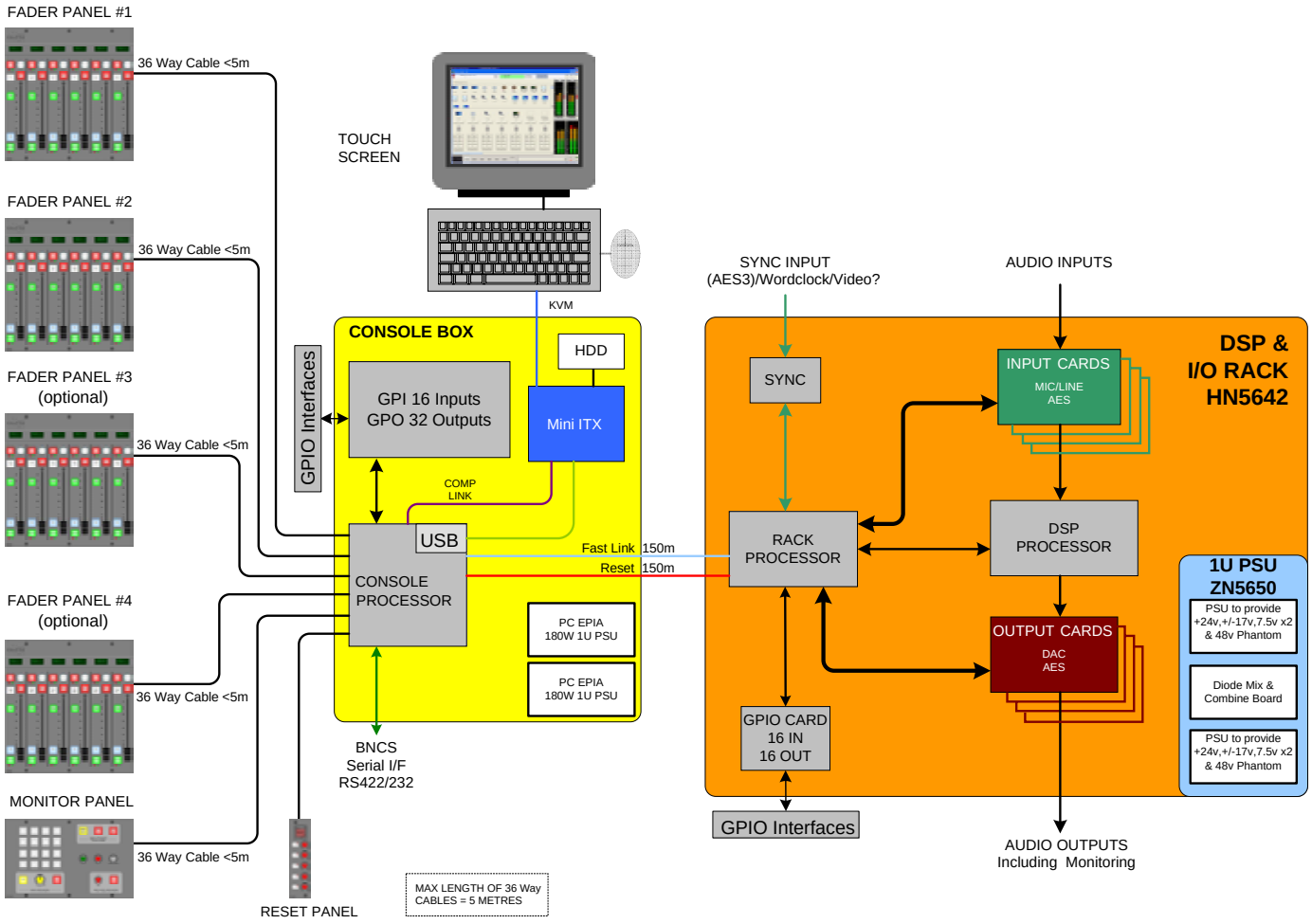
A 2U console processing unit, containing the control processing for the console, and the PC hardware on which the front end application runs.

A 7U DSP & Digital I/O rack, housing DSP, audio I/O, GPIO and control cards

Inputs and Outputs
Audio signals enter and leave the X2 system through the rack-mounted input and output cards. It is possible to request a custom input/output card combination to suit almost any installation. No audio passes through the modular control panels. These control the DSP, input/output cards and monitoring via the digital control system.

The console can be provided with any combination of internal and external sources.

Processing
Audio is processed within the system by the DSP & Digital I/O rack, using Bluefin HDSP.



Front End Operation
Controls such as channel controls, routing, EQ, filter and dynamics settings, mix buss output levels & clean feed selection can be accessed via the front end application. Parameter changes can be made from the control screens, as well as the ability to save & recall console-wide settings.

Power Up
When power is supplied to the X2 system, the console boots up in its most recent configuration, to the point of passing audio and providing control in about 6 seconds.

The front end takes slightly longer to boot up, as the PC hardware first has to load Windows. Once booted, the front end application synchronises itself with the console so that operation from the PC screens may begin. The front end can be restarted at any time without interrupting the audio.

Earthing
The DSP/Digital I/O rack is provided with chassis earth studs. These must be connected to a common earth buss before any AC power is applied to the system. The power supply and console processing unit are earthed via their AC power inlets.

AC (Mains) Power
AC (Mains) Power inlets are IEC type. The Multi-Rail power supply unit has two inlets, and the console processing unit has one inlet.

The whole system must be powered from the same phase of the AC power supply. All modules, cards and cables are designed to permit hot plugging.

SYSTEM REDUNDANCY

Power System Redundancy
The X2 system is supplied with full power supply redundancy. The 2U console processing unit, which powers the user interface panels, the configuration computer and the control interface to the DSP/Audio I/O rack, contains 2 multi-rail power supplies, either of which are independently capable of running the unit, and attached panels.

The DSP/Audio I/O rack is powered by a 1U rack mounted unit, which contains 2 multi-rail power supplies, either of which are independently capable of running the unit.

If the primary supply fails, the secondary supply will automatically take over, with no audio interruption. This takeover will be reported to the front end via AWACS.

During operation, the console settings (apart from channel fader levels) are saved at frequent intervals (approximately every 5 seconds). Therefore, after a power failure, the console will re-boot in its most recently saved configuration, to the point of passing audio and providing control in about 3.5 seconds. The front end will have to re-boot in the same way as for initial power on, as it first has to load Windows. Once booted, the application synchronises itself with the console so that operation from the screens may continue.

Calrec recommend that the system is fed via an on-line UPS (un-interruptable power supply).

Control System Crashes
In the unlikely event of a control system crash, the system will continue to process audio. The control system can then be reset by activating the console reset on the reset panel or console processing unit. When the reset is activated, the system will continue to process audio. This means that in the event that the control system crashes, the system may be reset without interrupting audio.

Front End Crashes
If the front end application crashes, it may be restarted without resetting the console, using the PC reset button on the front of the console processing unit. Once booted, the PC program synchronises itself with the console so that operation from the PC screens may continue.

Card Failures
The system is designed such that, if an audio card is removed, the other audio cards will still work. The facilities lost will only depend on the functions of the removed card. As cards are designed to be hot-pluggable, replaced cards will synchronise upon insertion.

SYSTEM SPECIFICATION

DIGITAL INPUTS	
Word Length	24-Bit
Formats Supported	AES/EBU (AES3) Also suitable for use with SPDIF (IEC958 Type 2) signals
Interface	110 Ohm transformer balanced, 5V Pk-Pk 75 Ohm unbalanced (BNC), 1V Pk-Pk
Sample Rate Conversion	24-Bit switchable on all digital inputs
SRC THD+N	-117dB @ 1kHz, 0.00014%
DIGITAL OUTPUTS	
Word Length	24-Bit
Formats Supported	AES/EBU (AES3)
Interface	Transformer balanced 4V Pk-Pk (nominal) into 110 Ohm load Unbalanced 1V Pk-Pk (nominal) into 75 Ohm load (BNC)
ANALOGUE INPUTS	
Analogue - Digital Conversion	24-Bit
Input Balance/CMR	Electronically Balanced - Better than -70dB (Typically -80dB)
Input Impedance	>1k Ohms for Mic gains (1K2 Nominal) 10k Ohms for Line gains
Sensitivity	+18 / -78dB
Equivalent Input Noise	-125dB (150 Ohm source, 22Hz-22kHz bandwidth)
Distortion	-1dBFS @ 1kHz - Better than 0.003% -20dBFS @ 1kHz - Better than 0.004% -60dBFS @ 1kHz - Better than 0.3%
Frequency Response	20Hz to 20kHz +/- 0.25dB
Crosstalk	20Hz to 20kHz >-86dB
Delay	0.3ms
ANALOGUE OUTPUTS	
Digital - Analogue Conversion	24-Bit
Output Balance	Electronically Balanced, 20Hz to 20kHz, Better than -45dB, typically -55dB
Output Impedance	<40 Ohms
Distortion	-1dBFS @ 1kHz - Better than 0.003% -20dBFS @ 1kHz - Better than 0.006% -60dBFS @ 1kHz - Better than 0.5%
Frequency Response	20Hz to 20kHz +/- 0.25dB
Crosstalk	20Hz to 20kHz >-90dB
Delay	0.22ms
PERFORMANCE	
Digital to Digital (AES/EBU) Distortion	-1dBFS, 20Hz to 10kHz - Better than 0.002%
Digital to Digital (with SRC) Distortion	-1dBFS, 20Hz to 10kHz - Better than 0.002%
Frequency Response (Analogue Input to Output)	20Hz to 20kHz +/- 0.5dB
SYNCHRONISATION	
48kHz synchronisation from	NTSC/PAL Video Internal Crystal Reference TTL Wordclock AES/EBU Digital Input

ENVIRONMENTAL CONSIDERATIONS

	Operating	Non-Operating
Temperature Range	0°C to +30°C (32°F to +86°F)	-20°C to +60°C (-4°F to +140°F)
Relative Humidity	25% to 80% Non-condensing	0% to 90% Non-condensing
Maximum Altitude	2,000 Metres (6500ft)*	15,000 Metres (49,000ft)

Analog input for 0dBFS can be pre-set globally to +28, +24, +22, +20, +18 or +15 dBu

Pre-fader headroom on analog inputs is adjustable globally from +24 to +36dB in 2dB steps

Analog output for 0dBFS Matches input setting into >1kOhms (+24dBu max into 600 Ohms)

The system can be pre-set with up to five external sync sources, plus internal, such that if the 1st source fails, it will automatically switch to the 2nd, and so on.

*This is the limit to which the safety tests are valid

X2
RACK EQUIPMENT

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DSP & DIGITAL I/O RACK

The 7U DSP/Digital I/O rack houses the system's DSP, input, output and control cards. Incorporated into the rack is a built-in low noise fan tray, situated above the processing area. The fan tray incorporates a baffle such that warm air is drawn out of the rack and out through the rear of the fan tray.

- 1 DSP card (UD5763)
- 1 control processor card (UN5764)
- 1 GPIO card (WY5647)
- 1 ADC (analog input) card (AD5766)
- 1 DAC (analog output) card (DA5767)
- Up to 2 AES input/output cards (JI5765)

Mounting

The unit should always be mounted in a horizontal position, located into an equipment bay and secured into the front of the bay by the four fixing holes in each of the two front angles.

Synchronisation

The system can be pre-set with up to five external sync sources, plus internal, such that if the 1st source fails, it will automatically switch to the 2nd, and so on.

It is strongly recommended that all items of digital equipment connected digitally to the console, are synchronised to the same sync signal.

If the console's internal sync is to be the master, other digital equipment should be synchronised to the digital outputs of the console.

External AES Sources

Please note that the facility for locking to external AES sources is restricted to the first six inputs of each AES card in the console. One of the external sources can be Video, (PAL or NTSC). TTL Wordclock is another possible external source.

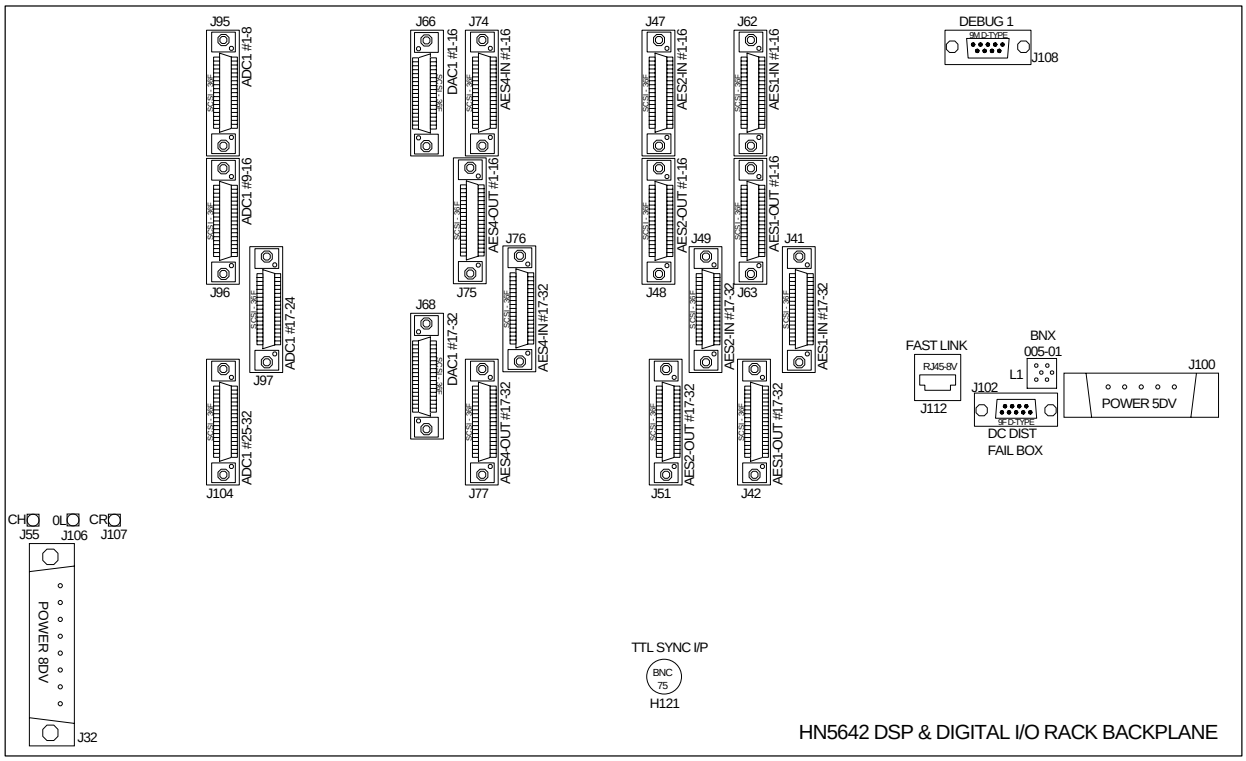
TTL Wordclock Synchronisation

A TTL Word Clock synchronisation input is provided on the rear of the Digital I/O Rack, on a 75Ω BNC connector.

Frequency Variation

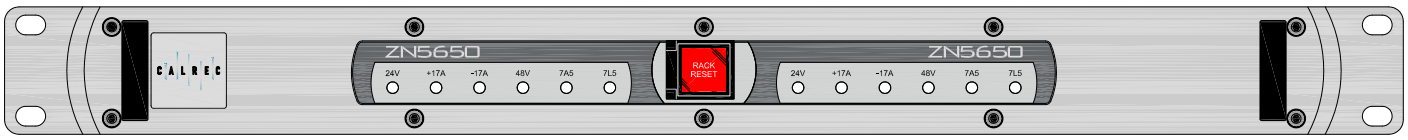
When using a digital input or wordclock as a source, the system will tolerate a variation of up to +/- 100 Hz in the frequency of the source. The console may also be synchronised from its internal crystal oscillator (48 kHz).

REAR INTERFACE

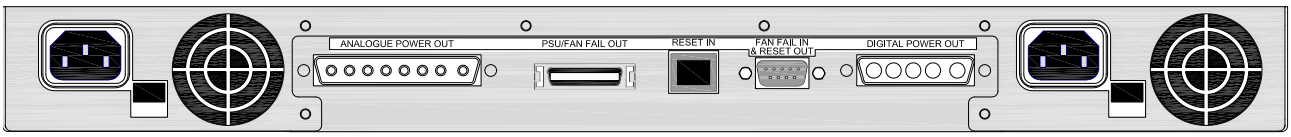


POWER SUPPLY UNIT

FRONT



REAR



A 1U multi-rail power supply unit is used to power the DSP/Digital I/O Rack. This unit houses two multi-rail power supply units - one powering the rack, plus a second unit acting as a "hot spare" providing redundancy, in case the first unit fails.

Each PSU within the unit has an IEC inlet.

Power Output Connections

An 8 way connector for Analog power connects to the rear of the DSP/Digital I/O rack, providing power to its analog components.

A 5 way connector for 24V power connects to the rear of the DSP/Digital I/O rack, providing power to its digital components.

Mounting

This unit should be secured into the front of the bay by the two standard fixing holes in each of the two 1RU front angles. The unit should always be mounted in a horizontal position.

PSU Fail Indication

Should any of the fans slow down or stop, or any voltage rail fall outside specified limits, a PSU Fail signal will be sent to the console and front end via relays, to warn the operator of a problem.

A 9 way D-type connector receives the fan status of the DSP/Digital I/O rack. A 36 way SCSI style connector provides the link back to the DSP/Digital I/O rack for the fan fail signal to be sent to the console's front end via AWACS.

Rack Reset

Pressing the RACK RESET button resets the DSP/Digital I/O rack only, the control surface is unaffected.

Please Note: Resetting the racks will result in a brief audio interruption.

Fan Cooling

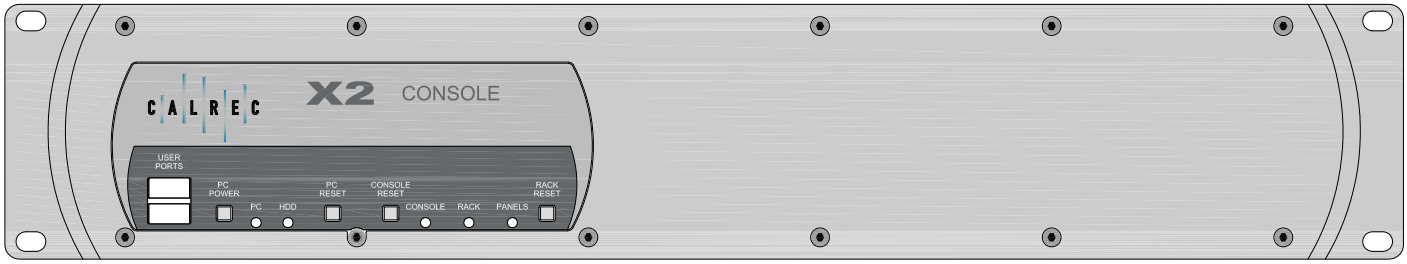
The multi-rail power supply unit is fan cooled using low noise fans.

Acoustic Noise Level

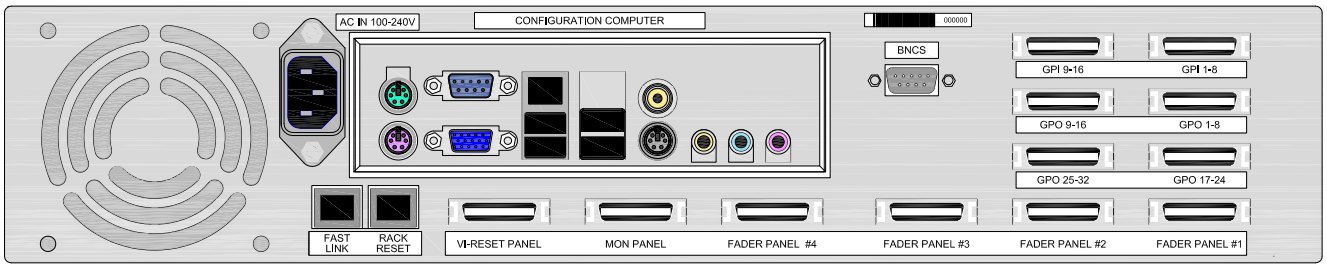
The acoustic noise of the unit is 42dBA. This measurement was taken at 1 metre from the dominant noise source.

CONSOLE PROCESSING UNIT

FRONT



REAR



This unit houses the console's control processing system, GPIO hardware and the PC hardware on which the front end application runs.

Mounting

This unit should be secured into the front of the bay by the two standard fixing holes in each of the two 1RU front angles. The unit should always be mounted in a horizontal position.

User Interface Panels

Connections for up to 6 user interface panels, are located on the rear of this unit. There can be up to 4 fader panels, a monitoring panel, and a Reset/VI mixer panel.

KVM Connections

Connections for the touch screen, keyboard and mouse are found on the rear of this unit

GPIO Connections

This unit interfaces up to 32 general purpose outputs and 16 general purpose inputs via 36 way SCSI-style connectors. These inputs and outputs can be used to perform various operations. In engineer mode, GPIO functions are set on the Tech - GPIO - screens.

Fast Link

The unit interfaces to the DSP/Digital I/O rack is via a fast link connection.

Console Reset

A recessed switch allows the console to be reset. This button resets the control system only. Independent DSP operation ensures audio continuity during console reset. The most recent console settings will be fully restored in less than 15 seconds.

Rack Reset

A recessed switch allows the DSP/Digital I/O rack to be reset. Pressing this button resets the DSP/Digital I/O rack only, the control surface is unaffected.
Please Note: Resetting the racks will result in a brief audio interruption.

PC Reset

A recessed switch allows the PC inside the unit to be reset. As the console operates independently of the PC, rebooting or failure of the PC will affect neither the audio nor the operation of the console.

BNCS

A serial port provides connection to a BNCS system. This allows the console to use labels from an external router. In engineer mode, the serial interface and router label associations are set up using the Tech - Misc - Serial I/F screens.

Acoustic Noise Level

The acoustic noise of the unit is 24dBA. This measurement was taken at 1 metre from the dominant noise source.

Remote Access

USB connectors are provided on both the front and rear of the unit for the option to add an external modem of your choice.

If a modem is added, and a suitable telephone line installed, the console can

be remotely accessed by Calrec Support Engineers to aid software upgrades and diagnostic work. This can greatly enhance the level of service and support we can provide.

A dial-up facility must first be activated at the PC before this is possible, to ensure that connections are not made at inappropriate times or without the user's knowledge and consent.

Local Network

A network port is provided to enable the user to connect to their own LAN. Calrec will not be responsible for the configuration of this port or for any performance issues arising from its use.

Software Supplied

An OEM PC Operating System license is supplied with each console, and the operating system software is pre-installed. The console software is also pre-installed.

3rd Party Software

Calrec recommends that the unit is regarded as an integral control device for the console, and not as a general purpose PC. The installation of inappropriate software on the unit's PC may invalidate the console warranty.

Usernames and Passwords

The PC will initially be set up with two sets of usernames and passwords:

Username: CalrecAudio
Password: (none)

This user can install and run programs, but cannot change PC hardware settings (i.e. install drivers. It is recommended that this user is used during normal operation.

Username: CalrecAudioAdmin
Password: calrec

This user has full rights to the PC and can install and change PC hardware settings.

File Backup

The files in the table below are specific to each individual console. As such, a backup copy should be kept of these files in-case of PC or hard-drive failure.

Backup could be to a LAN or to a USB device which can be plugged into the front or rear of the unit.

Operating System	Windows XP
CPU	EPIA EN15000G (C7 1.5 GHz+)
RAM	1GB DDR2-533
HDD	40GB WD400UE
Network Ports	1 x 10/100/1000 Fast Ethernet
Card Slots	1 x PCI Slot
USB 2 Ports	4 (Rear of Unit), 2 (Front of Unit)

FILENAME	DESCRIPTION
C:\X2\Cust1\Config.bin	This file should only be altered by an approved Calrec engineer using a specifically designed application. The file can be copied but any unauthorised changes made will render it inoperable, including changing the date stamp of the file (such as saving even if not edited). If the file needs to be e-mailed to Calrec for any reason it should always be zipped to protect the file time/date stamp. A new backup copy of this file should be made after a console upgrade.
C:\X2\Cust1\Setup.ini	This file is updated when changes to console settings are made and saved using the set-up application. It should not be altered by any means other than by using the set-up application. A new backup copy of this file should be made after such changes are made or after a software upgrade.
C:\X2\Cust1\Options\Options.bin	This file is updated and a new backup should be made when changes to any of the sub-pages of the TECH screen are made and the options are saved.
C:\X2\Cust1\memories	This is the default location for the user memories. The maintenance department should keep a backup of the important default memories, whilst operators should be encouraged to keep their own backups of their own memories and to update them whenever they make important changes to them. After a software upgrade the main set of memories will be upgraded and checked by the engineer carrying out the upgrade. A new backup should then be made of these memories.
C:\X2\Cust1\cfg	This is the default location for the user-definable port list configurations. It is important to keep a backup copy of the files in this folder.

X2
CONNECTIONS

CALREC

Putting Sound in the Picture

GPIO CONNECTIONS

X2 provides 48 relay-isolated general purpose outputs and 32 opto-isolated general purpose inputs. Connections are split between the Console Processor and the Rack.

Console Processor GPIO

The Console Processor provides access to 16 GPIs and 24 GPOs. The connectors are found to the right of the rear of the unit as shown on the following page.

Rack GPIO

The rack provides access to the remaining 8 GPIs (the other 8 GPIs are reserved for use by the power fail detect circuitry) and 16 GPOs. The GPIOs are accessed via the AES in/out connectors of the slot occupied by the GPIO card. On the diagram on the following page this is AES slot 4.

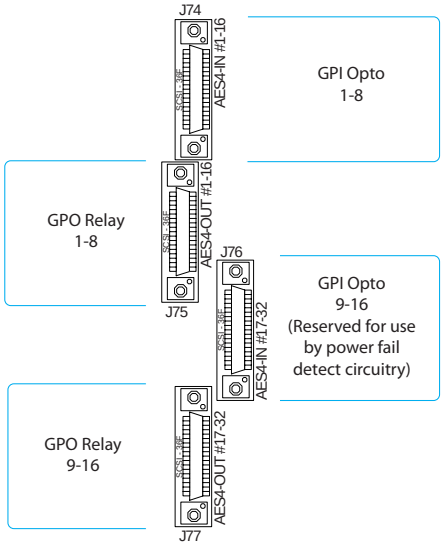
The following diagram illustrates the function of each connector when used for GPIO purposes.

Pinouts

All GPI connections have the same pinout information. Likewise, all GPO connectors share the same pinout information. The pinout tables shown here use the numbers 1-8 for relay and opto connections. These numbers refer to the first to eight relay or opto connection on that socket rather than the first 8 relays or optos in the X2 system. For the GPO 17-24 socket, number 1 in the diagrams below would refer to GPO 17. Number 8 would refer to GPO 24.

All GPIO connections are made via 36 pin MDR (SCSI-Style) connectors.

RACK - GPIO CONNECTOR FUNCTION



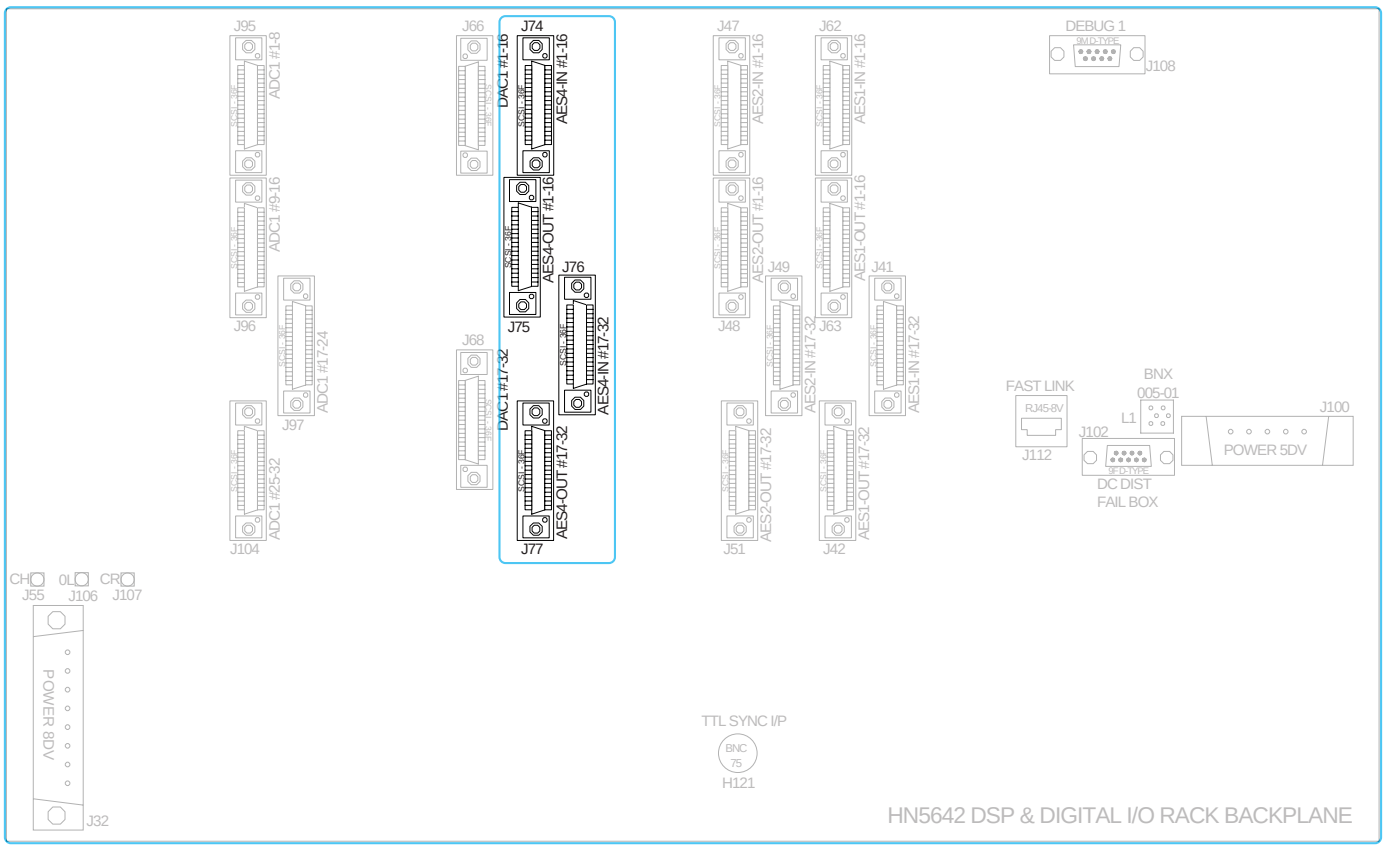
GPI PINOUT INFORMATION

Pin	Function
1,19	Chassis
2,20	Opto 1+, Opto 1-
3,21	Fused 5L, 0L
4, 22	Opto 2+, Opto 2-
5, 23	Fused 5L, 0L
6, 24	Opto 3+, Opto 3-
7, 25	Fused 5L, 0L
8, 26	Opto 4+, Opto 4-
9, 27	Fused 5L, 0L
10, 28	Opto 5+, Opto 5-
11, 29	Fused 5L, 0L
12, 30	Opto 6+, Opto 6-
13, 31	Fused 5L, 0L
14, 32	Opto 7+, Opto 7-
15, 33	Fused 5L, 0L
16, 34	Opto 8+, Opto 8-
17, 35	Fused 5L, 0L
18, 36	Chassis

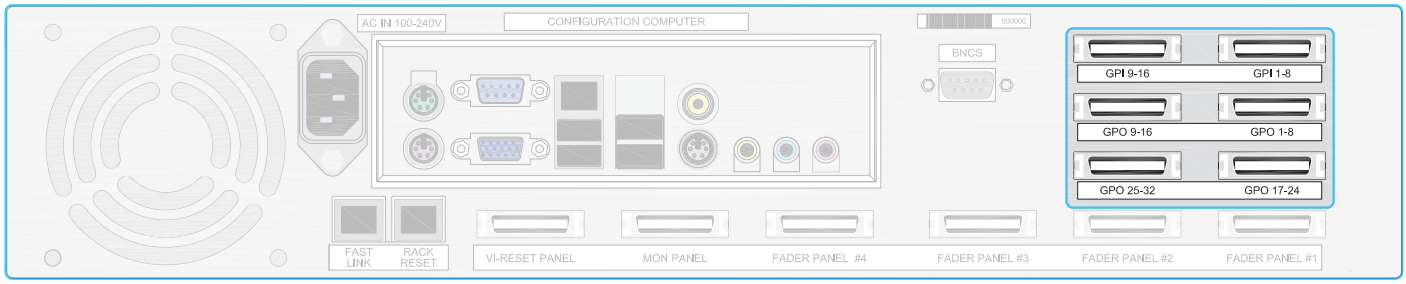
GPO PINOUT INFORMATION

Pin	Function
1,19	Chassis
2,20	Relay 1 no, Relay 1 com
3,21	Relay 1 nc, Relay 1 com
4, 22	Relay 2 no, Relay 2 com
5, 23	Relay 2 nc, Relay 2 com
6, 24	Relay 3 no, Relay 3 com
7, 25	Relay 3 nc, Relay 3 com
8, 26	Relay 4 no, Relay 4 com
9, 27	Relay 4 nc, Relay 4 com
10, 28	Relay 5 no, Relay 5 com
11, 29	Relay 5 nc, Relay 5 com
12, 30	Relay 6 no, Relay 6 com
13, 31	Relay 6 nc, Relay 6 com
14, 32	Relay 7 no, Relay 7 com
15, 33	Relay 7 nc, Relay 7 com
16, 34	Relay 8 no, Relay 8 com
17, 35	Relay 8 nc, Relay 8 com
18, 36	Chassis

RACK - GPIO CONNECTIONS



CONSOLE PROCESSOR - GPIO CONNECTIONS



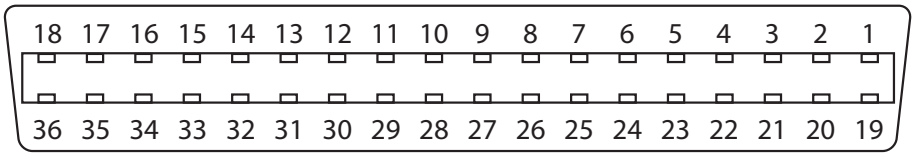
SPECIFICATION FOR MDR CABLES

Although frequently referred to as 'SCSI style' cables, it is important to be aware the correct term for these plugs is an 'MDR' connector.

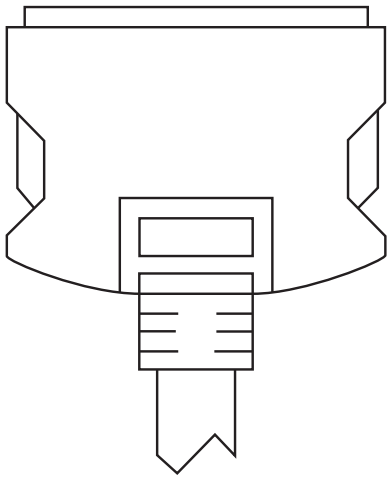
Pairs of pins are wired as shown in the following table:

Cable pairs wired as:
1 . 19
2 . 20
3 . 21
4 . 22
5 . 23
6 . 24
7 . 25
8 . 26
9 . 27
10 . 28
11 . 29
12 . 30
13 . 31
14 . 32
15 . 33
16 . 34
17 . 35
18 . 36

MDR PIN NUMBERS (WIRING SIDE OF CONNECTING CABLE)



TYPICAL MDR CONNECTOR CASING



Stock codes

Calrec stock codes for MDR cables are as follows:

- **1M** - 312-079
- **3M** - 312-078
- **5M** - 312-077

BNC AND XLR INTERFACE PANELS

Audio inputs and outputs may be connected directly to the console using 36 way MDR (SCSI-style) connectors. Optionally, break out connector panels and cabling can be provided.

Ideally, BNC interface panels should be fitted within 3 m (9.8 ft) of the backplane they connect to. XLR interface panels should be fitted within 2 m (6.5 ft) of the backplane they connect to.

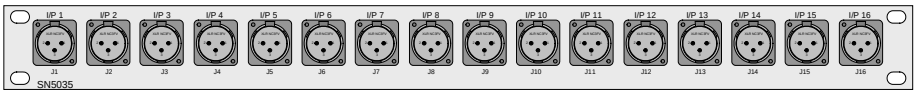
Digital panels

For digital inputs and outputs, interface panels can be either XLR (16 male or female on a 1U panel) or BNC (32 on a 1U panel) as shown in the diagrams to the right.

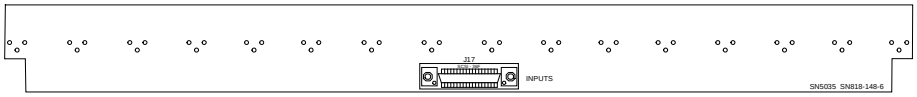
Analog panels

The analog XLR I/O panels are similar to the AES panels, however the analog XLR input panel is not connected via a rear mounted MDR connector. Instead the XLR sockets are hand-wired to MDR connectors for connection to the console backplane.

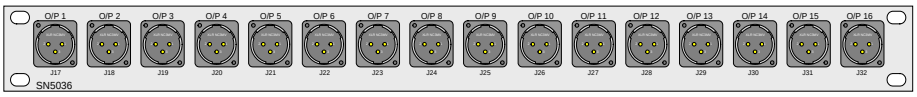
AES XLR INPUT PANEL (FRONT)



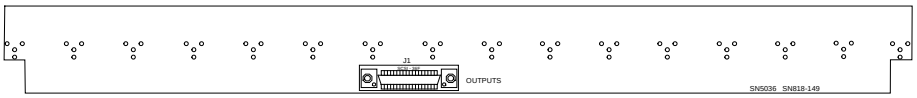
AES XLR INPUT PANEL (REAR)



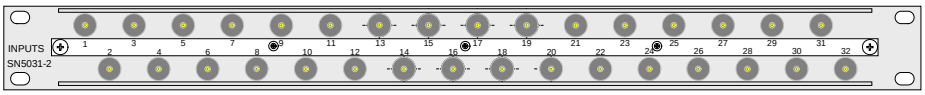
AES XLR OUTPUT PANEL (FRONT)



AES XLR OUTPUT PANEL (REAR)

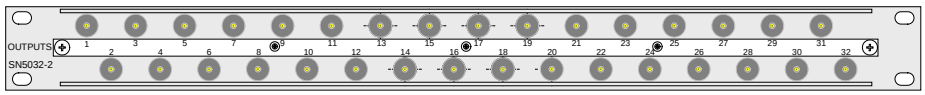


AES BNC INPUT PANEL (FRONT)



AES BNC INPUT PANEL (REAR)

AES BNC OUTPUT PANEL (FRONT)



AES BNC OUTPUT PANEL (REAR)

EDAC/ELCO INTERFACE PANELS

8 or 12 way EDAC/ELCO connector 2U panels are available to interface analog I/O in one of the styles shown in the table.

The choice of style depends on the installation with the major influence normally being the number of circuits in the installation cabling. Style 2 lends itself to easy installation with 12 pair cable, though the vast majority of users opt for style 1 as this works well with commonly available 8 circuit cables.

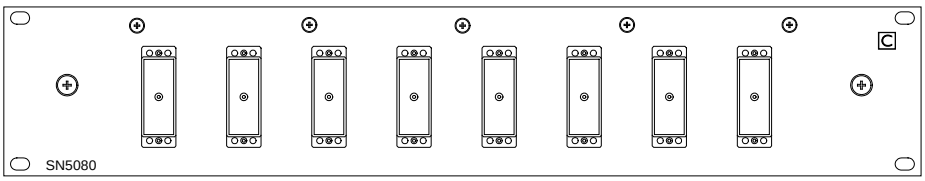
The different styles are achieved using interface cards which attach to the rear of the 2U panels to provide different combinations of MDR (SCSI-style) connectors per EDAC/ELCO.

In many cases, customer cabling with EDAC/ELCO connectors for the console on one end may have the opposite end broken out to IDC (punch-block) connectors. This can make for easy routing of circuits to the required destinations.

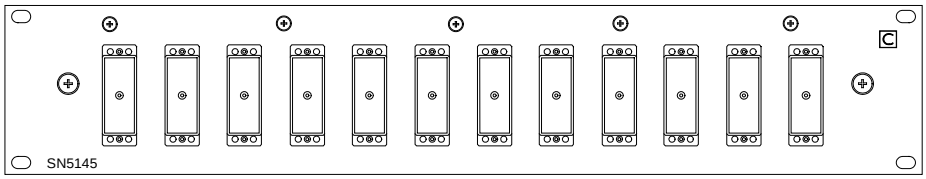
The panel mounted connectors are 38 pin, males - EDAC/ELCO 38MP. Cables connecting to these panels need 38 pin, female cable connectors (38FC). Refer to the photograph to be sure your EDAC/ELCO supplier interprets male and female in the right way. As with all the installation connectors, unless specially ordered as optional extras, mating EDAC/ELCO connectors for customer cabling are not supplied by Calrec.

EDAC/ELCO connectors can be 'keyed' with the two locating pins, one of which is larger than the other. Each pin can also be fitted with the slot at one of six different angles which can make for a vast range of unique pairings of connector halves. This can be a major inconvenience during installation testing and for maintenance.

8X38W EDAC/ELCO PANEL



12X38W EDAC/ELCO PANEL



Interface	Back-plane cable	Style 1	Style 2
Mic/line inputs	hand wired	8 mono circuits	12 mono circuits
Line only inputs	moulded plugs	16 mono circuits	12 mono circuits
Line outputs	moulded plugs	16 mono circuits	12 mono circuits

Component	Calrec part	EDAC/ELCO part
38 way socket	400-040	516-038-000-401
38 way metal hood	400-037	516-230-538
Crimp pin	400-024	516-290-590
Solder pin	400-025	516-290-500
Pin extractor tool	-	516-280-200

For this reason Calrec assembles all EDAC/ELCOs in the same way with the large pin at the top which is the same end of the connector as pin A. The keying pins are all aligned vertically with the slots/keys pointing outwards.

EDAC/ELCO and other styles of connector panel link to the console I/O back plane via Calrec supplied cables, normally of 1, 3 or 5 metres but this length can affect pricing. Most of these cables have balanced audio pairs with an overall screen and moulded MDR connectors.

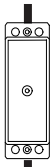
Mic/line inputs use a hand wired cable assembly of twin and screen cables. The extra screen connections is the reason for fewer audio circuits with style 1.

ANALOG INPUTS

Wired into EDAC/ELCO - Rear of Interface Panel

A.E (B)	Mic/Line IP 1L (screen)
D.K (C)	Mic/Line IP 1R (screen)
L.R (M)	Mic/Line IP 2L (screen)
P.U (N)	Mic/Line IP 2R (screen)
Z.DD (AA)	Mic/Line IP 3L (screen)
CC.HH (BB)	Mic/Line IP 3R (screen)
JJ.PP (KK)	Mic/Line IP 4L (screen)
NN.TT (MM)	Mic/Line IP 4R (screen)
F.J.S.T.H.LL EE.FF.RR.SS	Chassis

Style 1 - 4 pairs per 38 way EDAC/ELCO



Stereo Inputs 1-4

On EDAC/ELCOs, pin 1 (A) is HOT (phase), pin 2 (E) is COLD (anti-phase) and pin 3 (B) is chassis connections.

Cable 1 Stereo Inputs 1-4	
SCSI Pins	Circuit
1 . 19	Chassis
2 . 20	1L
3 . 21	Chassis
4 . 22	1R
5 . 23	Chassis
6 . 24	2L
7 . 25	Chassis
8 . 26	2R
9 . 27	Chassis
10 . 28	Chassis
11 . 29	3L
12 . 30	Chassis
13 . 31	3R
14 . 32	Chassis
15 . 33	4L
16 . 34	Chassis
17 . 35	4R
18 . 36	Chassis

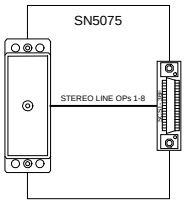
Cable 2 Stereo Inputs 5-8	
SCSI Pins	Circuit
1 . 19	Chassis
2 . 20	5L
3 . 21	Chassis
4 . 22	5R
5 . 23	Chassis
6 . 24	6L
7 . 25	Chassis
8 . 26	6R
9 . 27	Chassis
10 . 28	Chassis
11 . 29	7L
12 . 30	Chassis
13 . 31	7R
14 . 32	Chassis
15 . 33	8L
16 . 34	Chassis
17 . 35	8R
18 . 36	Chassis

(CABLE 2 IS NOT SHOWN)

ANALOG OUTPUTS

Via SN5075 SCSI to 38W EDAC/ELCO converter card - Rear of Interface Panel

A.B	Line OP 1L
C.D	Line OP 1R
E.F	Line OP 2L
J.K	Line OP 2R
L.M	Line OP 3L
N.P	Line OP 3R
R.S	Line OP 4L
T.U	Line OP 4R
Z.AA	Line OP 5L
BB.CC	Line OP 5R
DD.EE	Line OP 6L
FF.HH	Line OP 6R
JJ.KK	Line OP 7L
MM.NN	Line OP 7R
PP.RR	Line OP 8L
SS.TT	Line OP 8R
H.LL	Chassis



Stereo Outputs 1-8

Style 1 - 8 pairs per 38 way EDAC/ELCO

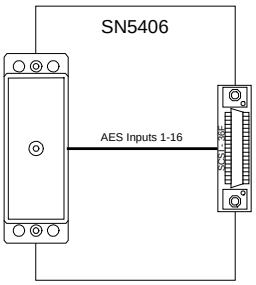
On EDAC/ELCOs, the first pin is HOT (phase), the second pin is COLD (anti-phase) and H.LL are chassis connections.

Cable 1 - Stereo Outputs 1-8	
SCSI Pins	Circuit
1 . 19	Chassis
2 . 20	1L
3 . 21	1R
4 . 22	2L
5 . 23	2R
6 . 24	3L
7 . 25	3R
8 . 26	4L
9 . 27	4R
10 . 28	5L
11 . 29	5R
12 . 30	6L
13 . 31	6R
14 . 32	7L
15 . 33	7R
16 . 34	8L
17 . 35	8R
18 . 36	Chassis

AES INPUTS

Via SN5406 SCSI to 38W EDAC/ELCO converter card - Rear of Interface Panel

A.B	Line IP 1L
C.D	Line IP 1R
E.F	Line IP 2L
J.K	Line IP 2R
L.M	Line IP 3L
N.P	Line IP 3R
R.S	Line IP 4L
T.U	Line IP 4R
Z.AA	Line IP 5L
BB.CC	Line IP 5R
DD.EE	Line IP 6L
FF.HH	Line IP 6R
JJ.KK	Line IP 7L
MM.NN	Line IP 7R
PP.RR	Line IP 8L
SS.TT	Line IP 8R
H.LL	Chassis

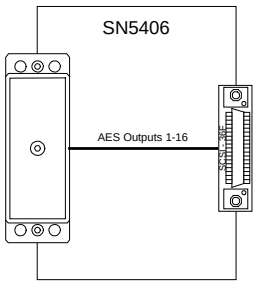


Cable 1 AES Inputs 1-16	
SCSI Pins	Circuit
1 . 19	Chassis
2 . 20	1
3 . 21	2
4 . 22	3
5 . 23	4
6 . 24	5
7 . 25	6
8 . 26	7
9 . 27	8
10 . 28	9
11 . 29	10
12 . 30	11
13 . 31	12
14 . 32	13
15 . 33	14
16 . 34	15
17 . 35	16
18 . 36	Chassis

AES OUTPUTS

Via SN5406 SCSI to 38W EDAC/ELCO converter card - Rear of Interface Panel

A.B	AES 1
C.D	AES 2
E.F	AES 3
J.K	AES 4
L.M	AES 5
N.P	AES 6
R.S	AES 7
T.U	AES 8
Z.AA	AES 9
BB.CC	AES 10
DD.EE	AES 11
FF.HH	AES 12
JJ.KK	AES 13
MM.NN	AES 14
PP.RR	AES 15
SS.TT	AES 16
H.LL	Chassis



Cable 1 AES Outputs 1-16	
SCSI Pins	Circuit
1 . 19	Chassis
2 . 20	1
3 . 21	2
4 . 22	3
5 . 23	4
6 . 24	5
7 . 25	6
8 . 26	7
9 . 27	8
10 . 28	9
11 . 29	10
12 . 30	11
13 . 31	12
14 . 32	13
15 . 33	14
16 . 34	15
17 . 35	16
18 . 36	Chassis

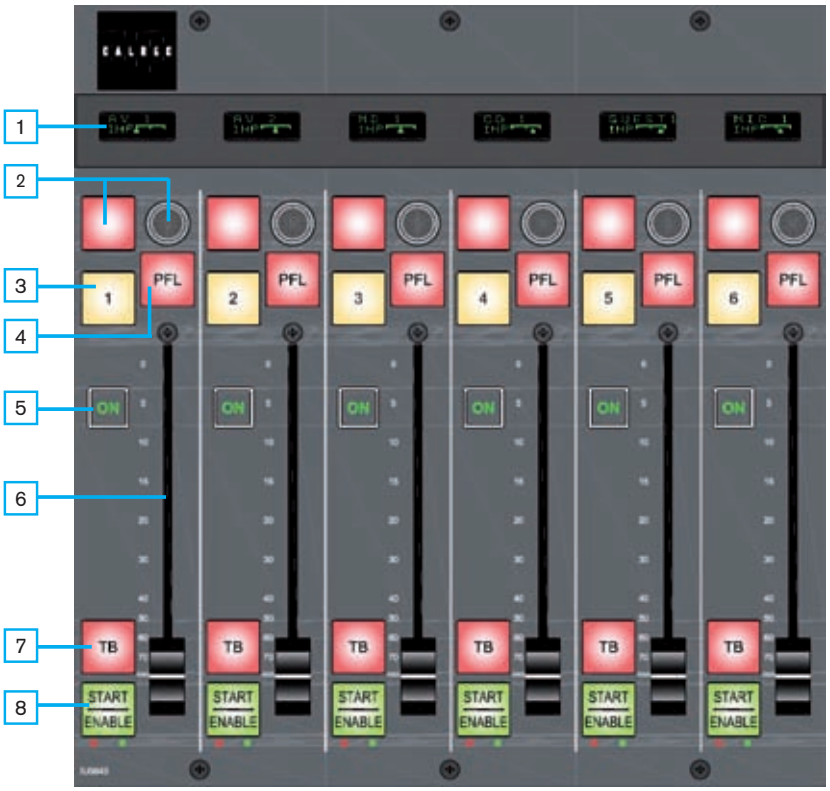
X2
PANELS

CALREC

Putting Sound in the Picture

FADER PANEL

The console is can have up to 4 fader control panels, giving a maximum of 24 channel faders. Each fader panel provides a simple but powerful set of controls for six channels.



(1) Display

Each fader has an LCD display for up to two lines of six characters. The displays are used to indicate fader labels, wild control functions and wild control parameter values. Each source can be set up individually to display in either amber or green. This can be useful to provide an "at a glance" indication of source labels on the fader panels.

The display shows the source label on the top row. If any wild functions are enabled, the bottom row of the display will show a representation of the wild function, and a short scale of its value.

When the wild control is adjusted, the top row of the display will show the value of the wild function.

(2) Wild Controls

The assignable wild button and rotary control can be used to control a number of parameters, including Input Trim and Pan. For each function, the rotary control and wild button perform different functions (see Wild Controls section). Pressing the rotary control skips through the available functions. These controls may be set up on each channel independently. They may be programmed to provide access to the same controls, separate controls on each channel, or automatically change their function, depending on what control is selected on the Tech - Wilds screen.

(3) Assign Button

The numbered Assign button selects the channel for viewing and control. The channel's fader number and label will be shown under "Current Fader Assignment" on the screen. The audio parameters for the channel are displayed on and controlled by the control screens

(4) PFL

Pre Fade Listen button. The setup application allows the PFL switches on the fader modules to be set to operate momentarily, to latch, or auto. A tick box allows the setting of PFL to cancel when a fader is opened.

(5) Channel ON indicator

The fader's position controls the channel ON indicator. When the fader is down, the indicator is off and the channel cut. The channel ON indicator is illuminated when the fader is up.

(6) Channel Fader

The channel fader operates the channel level.

(7) Talkback

If a cleanfeed output is associated with the source on the currently assigned channel, the TB button switches talkback to it.

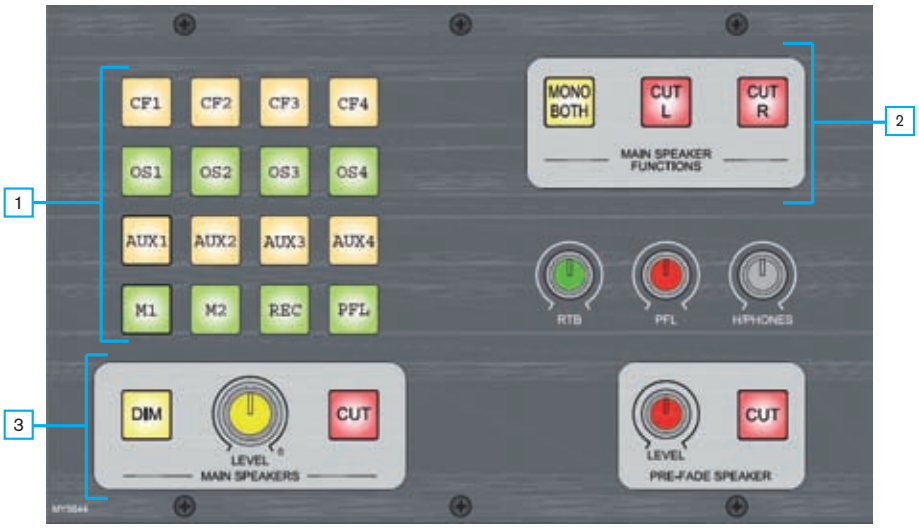
(8) Machine Controls

Machine control relays can be set up on the Tech - GPIO TX REH - GPO screen so that the transition of the fader from "closed" to "open" operates a machine start, which can be used to trigger other equipment. The Start button enables the machine control, and must be pressed first to "arm" the fader.

General purpose inputs can be set on the Tech - GPIO TX REH - GPI screen to operate machine start or machine stop tally LEDs for any source. When fired, the GPI will light the green machine start LED or the red machine stop LED under the fader start button.

MONITOR PANEL

The monitor panel connects to the 2U console processing unit via a 36 way SCSI-style connector.



(1) 16 Way Monitor Selector
The 16 buttons on the monitor panel act as a cancelling set, and allow up to 16 sources to be switched to the Control Room (cubicle) loudspeakers and operator's headphones. Each selector input may be driven by mains 1-2, record, auxiliary 1-4, external input, PFL, Tone, any direct output or any clean feed.

In engineer mode, sources are allocated to the buttons on this panel using the Tech - Monitor Panel screen.

(2) Main Loudspeaker Functions
The main loudspeaker output can have mono applied to both legs using MONO BOTH.

The left and right legs can be cut independently using CUT L and CUT R.

(3) Main Speaker Level & CUT/DIM
The level of the main speakers can be adjusted using the rotary control. The main speakers can be CUT and have a preset DIM level applied.

DIM level can be adjusted on the Tech - Monitor Meter - Monitor Settings screen.

The CUT and DIM controls can be operated remotely in order to work with third party talkback systems, station intercoms etc. This is set via general purpose inputs on the Tech - GPIO TX REH - GPI screen under misc functions.

The main loudspeakers can be set to DIM when talkback to clean feed is active. This is set via condition switching on the Tech - GPIO TX REH - TX REH screen.

The main speakers can also be cut using a source location group. If any source belonging to the source location group is live and faded up, then the mute will be activated.

The setup application allows the user to specify a source location group to drive the mute.

Sources are allocated to source location groups on the Tech - Lists screen.

PFL
When PFL, on a channel fader, is activated, the PFL signal will replace the selector output on the headphones and loudspeakers.

A rotary control and CUT switch are provided to control the PFL speaker.

Operator Headphones
The level of the operator's headphones can be adjusted using the rotary control.

The setup application allows the operator's headphones to be given a mono, stereo or OFF setting for PFL, and can choose to include RTB Override and LS Sel stereo input.

The operator's headphones can be set to operate in split ear mode using the setup application, where the user to choose what is fed to each ear. For example, PFL could be set to feed one ear (one leg only), and RTB to feed the other.

Reverse Talkback
RTB is normally set to replace both the selector output and the PFL signal on the headphones and loudspeakers. This can be altered in the setup application. A rotary control is provided to adjust its level.

RESET PANEL

Console Reset
A protected switch allows the console to be reset. Pressing the RESET button resets the Control System only. Independent DSP operation ensures audio continuity during console reset. The most recent console settings will be fully restored in less than 15 seconds.

Power Supply Monitoring
The reset button on this panel will flash if any one PSU fails (the hot spare PSU would prevent the desk from being affected).

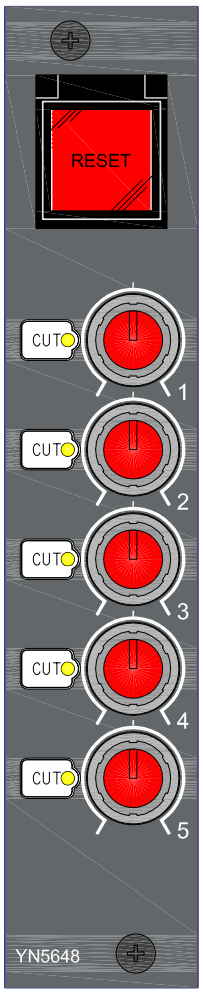
This button can be set to flash whenever an AWACS error or warning message is reported. This is done using a general purpose output, set up on the Tech - GPIO - GPO screen.

VI Mixer
This panel acts as a 5 into 1 stereo line mixer which is used to combine up to 4 stereo sources together with the output from the console.

This can be used to mix audible cues to assist visually impaired operators. The cues are provided using a system called JAWS, which generates spoken messages in response to control inputs.

Each stereo input is balanced, with a nominal gain range of +10dB to -30dB.

Each stereo input can be cut individually, using the cut buttons.



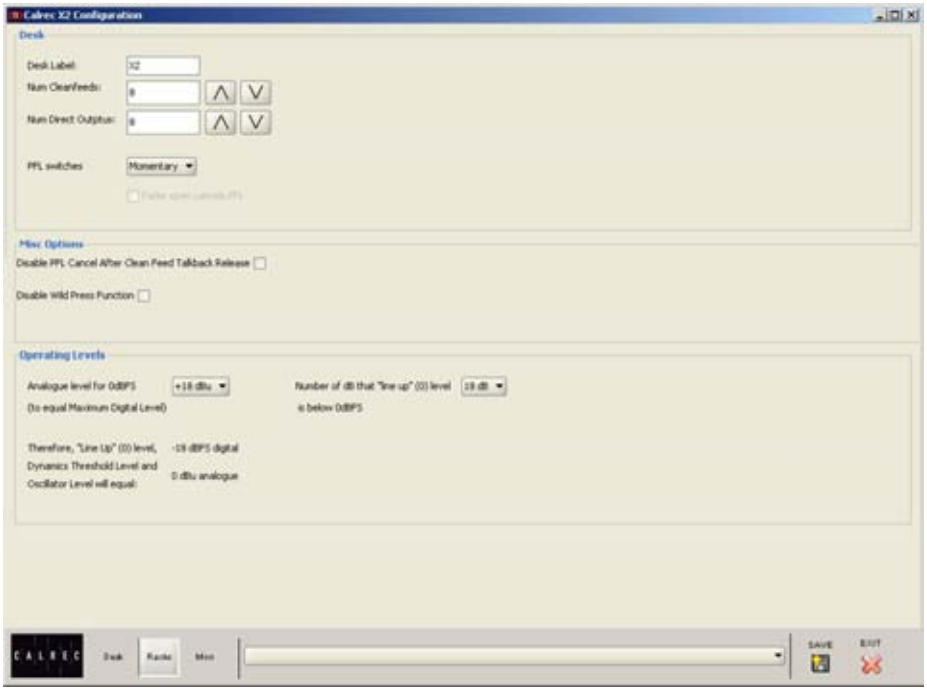
X2
SCREEN INTERFACE

CALREC

Putting Sound in the Picture

SETUP APPLICATION

The setup application allows the console to be set up.



Desk
A label for the console can be entered.

The number of clean feed and direct outputs can be set here. There can be a maximum of 30 of each in the system.

The PFL switches on the fader modules can be set to operate momentarily, to latch, or auto.

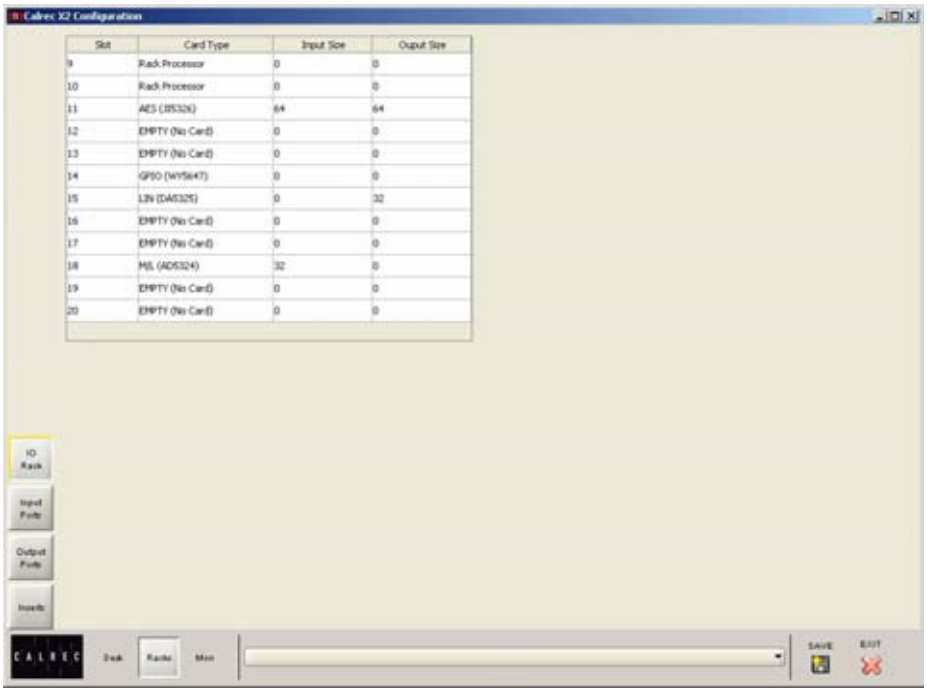
A tick box allows the setting of PFL to cancel when a fader is opened.

When talking back to a clean feed and releasing the talkback button the PFL of the clean feed is cancelled. An option is provided to remove this behaviour and keep the PFL activated when talkback is released.

The 'press' function of the wild knob that cycles through the available controls can be disabled.

The analog level that 0dBFS equates to can be set between +15dBu and +28dBu.

Line up (0) level can be set to a number of dB below 0dBFS.



Racks - I/O Rack
Shows the card configuration.

This screen, and the output ports screen allow the user to pre-define labels, descriptions and graphical icons for all the input and output ports.

The rules imposed on labelling are:

- The I/O must be labelled in pairs.
- The label must be no more than six characters.
- No two inputs can have the same label, but an input can have the same label as an output.

I/O is labelled in pairs to make it easier to use with any type of signal. In addition to this, digital I/O is wired in pairs and it makes sense to deal with all the I/O in the same way.

The input port label is used as the default name for the channel input and will be shown on the display above the fader.

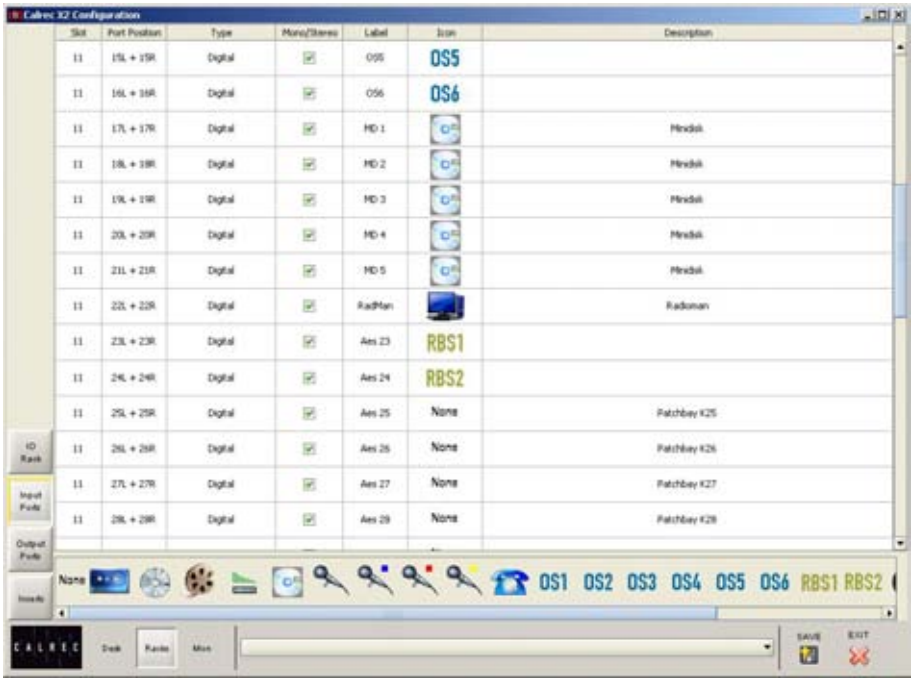
The system automatically adds a left (L) and right (R) suffix to the label to distinguish the two halves of the pair, or an L R suffix when the pair is used together.

The pairs can be used either for two mono signals or a stereo signal.

One exception to these rules is allowed:

When I/O is dedicated to mono signals only, (e.g phone lines, mono reverbs, mono distribution feeds) it can be marked as being mono in which case the two halves of the pair have separate labels and the L & R suffixes are not applied.

Note that I/O marked in this way cannot be connected in pairs to stereo paths from the control surface.



A stereo channel input can only be connected to the L - R of a pair of ports, or to one mono port in which case the mono signal will be fed to both L & R of the channel.

A stereo channel direct output can only be connected to the L - R of a pair of ports.

A mono channel input or direct output can be connected to any of: The L or R of a pair of ports, or any mono port.

Mono ports should therefore be considered as unusual. If there is any doubt as to the use of ports, they should be treated as a pair.

Suitable Labels

Generally, I/O ports should be labelled with the name of the source at the other end of the cable, which is connected to the port.

Ideally, the port will be connected directly to a device (Mic splitter box, Video Tape Recorder, Echo unit, outside source, etc).

Alternatively, some I/O may be wired to a patch. This will be done, for example, to allow for hired devices to be connected and may also be done to aid maintenance and operator familiarity with analog consoles.

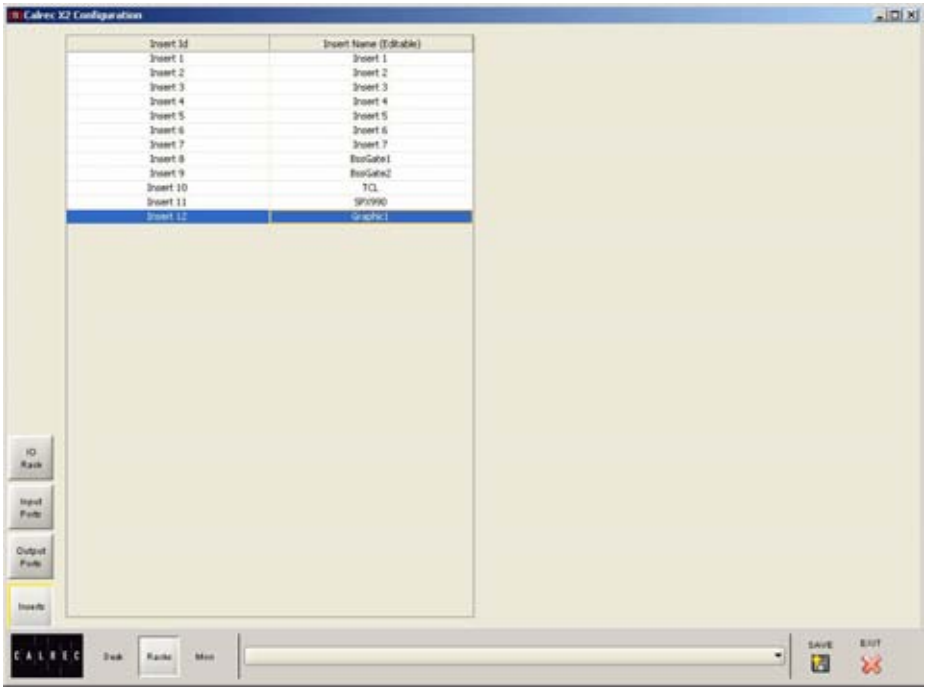
When planning the use and labelling of I/O, you should also bear in mind that the console includes an internal electronic input patch and output patch. These allow ports to be used for different purposes on different shows and also, the patch connections are stored with the snap-shot memories.

Port Lists

In addition to labelling, each port can be allocated to one of a number of lists in the main application, using the Tech - Lists screen.

Racks - Inserts

The available inserts can be given a user label here. Double-click on the insert name to type over it.



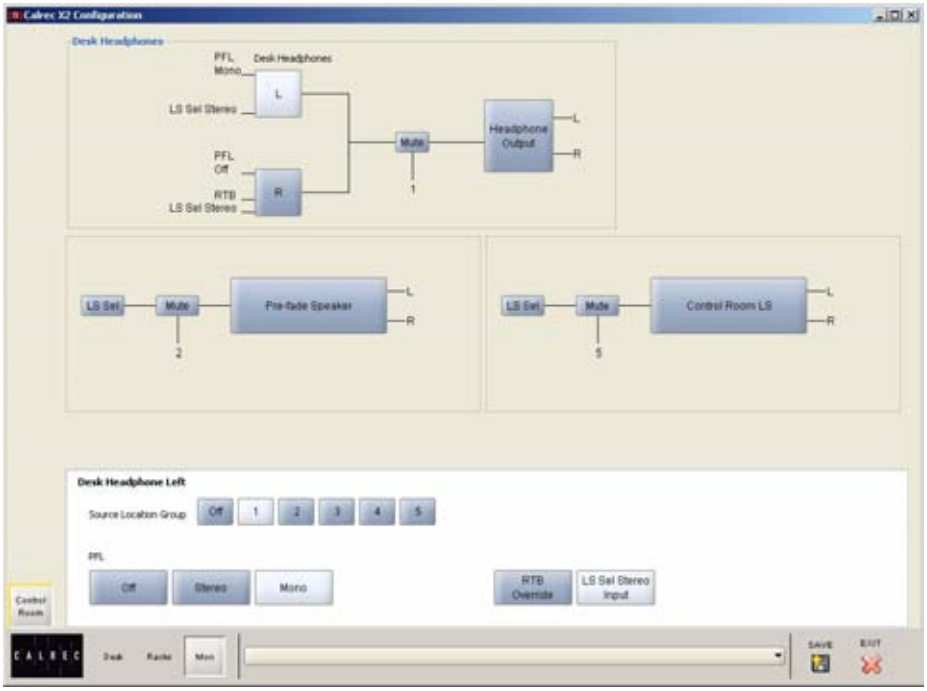
Mon

Allows settings for the system's monitoring to be set. Using the selection buttons, each mute can be set to be driven by a source location group, allowing any source belonging to the source location group which is live and faded up, to activate the mute. This is enabled using condition switching on the Tech - GPIO - TX REH screen.

Sources are allocated to source location groups on the Tech - Lists screen.

The operator's headphones can be given a mono, stereo or OFF setting for PFL, and can choose to include RTB Override and LS Sel stereo input.

The user can choose what to feed to each ear of the operator's headphones. They can be set to operate in split ear mode - for example, PFL could be set to feed one ear (one leg only), and RTB to feed the other.



FRONT END USER INTERFACE

Touch Screen
A range of SVGA screens such as TFT displays can be used with or without an integrated touch-screen controller. The X2 program runs in a fixed size window designed to fit an SVGA display and has a fixed resolution of 1024 x 768.

User Interface
A logical user interface provides easy and quick access to the functions and information on the touch screen. Failure of the console's PC has no effect on the operation of the control surface or the audio.

The Front End screens are divided into groups which are accessed using the buttons along the bottom of the display. Within each group there are a number of screens accessed by buttons up the left side of the display. On some screens, there are additional buttons to access sub-sets of the screen's function.

Along the top of each screen, the currently assigned fader and currently loaded memory are shown.

A status display at the bottom of the screen reports message information to the operator.

Meters
4 user-definable meters are shown on the right of the screen. In Engineer mode, the user can choose what to display on each meter, and change the colour of the bars using the Tech - Monitor Meter - Metering screen. Arrows at the top corner of the screen are used to toggle the meter view.

The LR button on each meter toggles the meter between A/B and M/S.

Operational Modes
The X2 has been designed to allow presenter-operated programmes to be broadcast easily, with all essential controls being present as part of the console's hardware. It is intended that all set-up procedures and configuration may be carried out and maintained by an engineer or technical operator. It is not necessary for the presenters themselves to understand the desk's underlying configuration, and it is for this reason that the X2 software has two operational modes, selected on the Tech - Op Mode screen.

ENGINEERING mode allows unrestricted access to all features of the system. This permits an authorised engineer to prepare the console for use by a non-technical operator.

OPERATOR mode allows access to only those controls enabled by the engineer. The option for the engineer to disable the unnecessary controls reduces complexity, and prevents accidental changes being made. Disabled controls will disappear from the control area, but the settings on them will still be active.

Currently Assigned Fader
The front end screens will adjust settings for the currently assigned fader. The currently assigned fader is chosen using the fader assign button.

Each screen has a "Change Fader" button, which, allows the user to change the currently assigned fader from the screen. When selected, a box appears from which the required fader can be selected.

Help
The user can access help information about a function, using the question mark icon on each screen. Simply select the question mark icon, then point to a function on the screen.

SCREEN LAYOUT

A logical user interface provides easy and quick access to the functions and information on the touch screen. Failure of the screen's computer has no effect on the operation of the control surface or the audio.

The Front End screens are divided into groups which are accessed using the buttons along the bottom of the display. Within each group there are a number of screens accessed by buttons up the left side of the display. On some screens, there are additional buttons to access sub-sets of the screen's function.

The Assign screen allows sources to be allocated to the console's faders.

Screens for saving and loading up to 99 console memories, and restoring additional memories from backup.

Operational screens for setting channel functions, eq and filter settings, dynamics, clean feed, direct output and insert assignment.

Control of the main direct inputs and dynamics, control of auxiliary outputs.

The Tech button allows entry to and control of password-protected operational modes for "Operators" and "Engineers". Engineers can access further screens under this button.

In Engineer mode, the Tech screens are used to pre-set the system to the studio's required settings. Includes set up and display of all I/O connections and port lists, set up of meters, monitor panel buttons, serial interface and label associations, GPIO and condition switching.

Console Options

Some of the Tech screens allow setting of console options. Options settings are not stored in the individual console memories but are saved and loaded separately using the buttons on each Options screen. This allows changes to be made without invalidating any saved memories. Changes to options take effect as soon as they are made, however if they are not saved, the next time the desk boots up the options will revert to their previous settings. Upon loading the options settings from the file on the hard disk, any changes made will be over-written unless they have been saved. This allows changes to be tried without losing the original settings and the original settings can be restored without having to re-boot the system.

The "EXIT" button at the bottom corner of the screen will exit the application. Next to this button is an indicator which shows the status of the control processor. During normal operation, this indicator will be green. When busy, the processor's indicator will be yellow, during which time, no changes can be made to the control screens (Although changes to the control panels can be made, and will take immediate effect).

ERROR MESSAGES (AWACS)

If a problem does develop, messages are delivered on the Automatic Warning and Correction System (AWACS) screen.

The AWACS button at the bottom of the screen will flash to alert the user that a message has been reported. Selection of this button will open the AWACS page, where messages can be viewed.

Selecting a message will reveal a more detailed description. Message history is saved to the PC's hard disk for future analysis.

Three types of messages are reported:

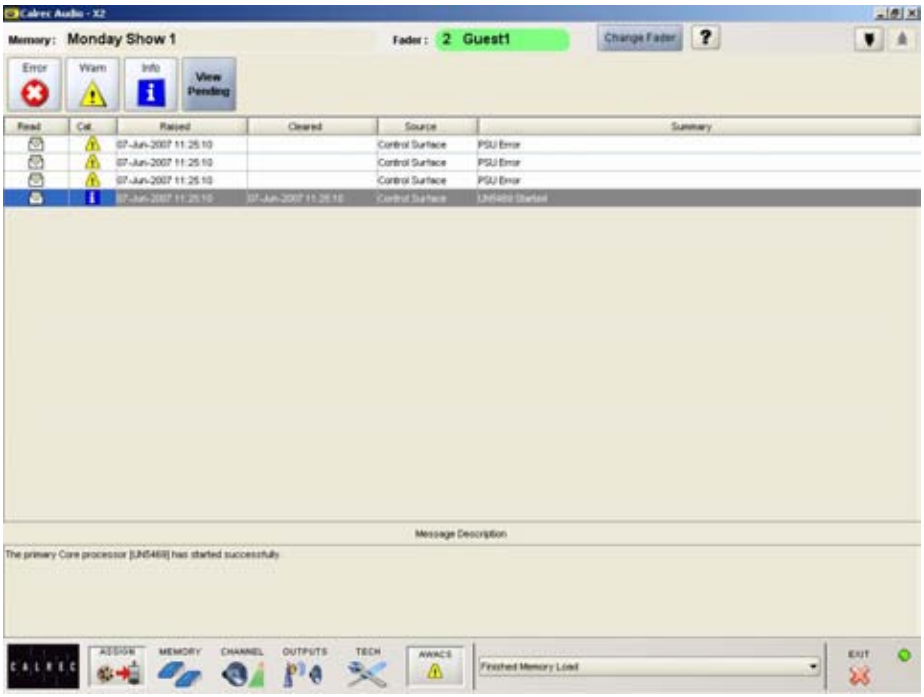
Information messages, eg "Control Surface UN4806 processor started successfully"

Warning messages, where the system back-up has taken over

Error messages, where the system cannot recover by itself (perhaps because the back-up is already in use)

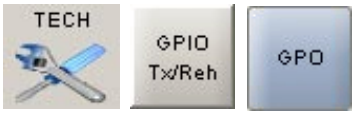
As the system has many back-up features, it is possible to continue operating after errors are reported. If uncleared errors are still present, an icon will flash in the AWACS button. Selecting this button at any time will switch back to the AWACS screen.

Information messages can be cleared by selecting them and then leaving the AWACS screen. Warning and Fatal Error



messages can only be cleared by clearing the error and restoring the system to its normal operational state.

In engineer mode, it is possible to set the PSU Fail Indicator button on the reset panel, to flash when an error message is reported. This is set up on the Tech - GPIO screen.



ASSIGNING SOURCES

This screen allows sources to be assigned to the console's channel faders. The icons and source labels shown here are defined during the set up of the console.

12 faders are shown across the width of the screen. If your console has more than 12 faders, the screen is navigated using the scrollbar along the bottom of the screen. All the available input sources are shown at the top of the screen.

Assigning Sources To Faders

To assign a source to a channel fader, simply 'drag and drop' the icon, from the list of available input sources, to the space above the fader symbol. Once a source is assigned to a fader, it will be removed from the pool of available sources.

Once a channel fader has a source assigned, its source label will appear in the LCD display above the fader on the channel faders module.

A source can be de-assigned by dragging its source icon back to the available sources list.

To change a source, either drag and drop a new icon onto the fader (the original source will return to the list of available sources), or drag and drop an icon from another fader (the sources will swap over).

Channel settings are stored with sources. This means that when a source icon is dragged onto a fader, the input trim, dynamics, EQ, filter, pan, aux send and stereo function settings stored for the source are copied onto the channel controlled by that fader. Similarly, when the source icon is dragged off the fader, these settings are copied from the channel back to the source. Hence, a source will retain its settings when it is moved around on the control surface.

Selecting the fader symbols from the screen changes the currently assigned fader. A line beneath the fader's routing buttons indicates the currently assigned fader.

A red box around a screen fader indicates that the fader is open.

When live input protection is enabled on the Tech - Op Mode screen (in engineer mode), a source cannot be removed from or assigned to a fader when it is open. This prevents sources from accidental movement during use.

Machine Start/Stop

If a fader has machine controls associated with it, this will be indicated by a white ARM icon above the fader symbol. This icon will turn green if the source's fader start enable is active. The icon turns amber when the fader is opened.

In engineer mode, machine controls are set up using the Tech - GPIO TX REH - GPO screen.

CUT GPI

If a source has a cut GPI input associated with it, this will be indicated by a red CUT icon above the fader symbol when the cut is active.

In engineer mode, cut GPIs are set up using the Tech - GPIO TX REH - GPI screen.

Routing

Channels can be routed to Main 1, Main 2, mix-minus, record or auxiliaries 1-4 using the selection buttons below the faders. The routes selected are shown in bright colours.

If you left click (or touch) on the routing display, a small window appears which allows selection of destinations for the channel.

Alternatively, if you right click on one of the routing selection buttons, the route will be made directly.

DIRECT OUTPUTS

The system can have up to 30 direct outputs. Any input source can be designated as a direct output source.

To assign an input source to a direct output, simply drag its icon from the available source area to the required direct output fader.

The On/Off buttons activate the direct output.

Using the screen faders, gain can be adjusted between Off (-60dB) and 10dB for the contribution to the direct output

Pre/Post Fader
Both clean feed and direct output share the same pre/post channel fader setting. This is set on the Channel - Chans screen.

Direct Output Port Patching
In engineer mode, direct outputs are patched to output ports using the Tech - I/O Patching - Direct Outputs screen.

Screen Visibility
In engineer mode, a user can hide this screen, so that it will not be visible in operator mode. To hide a screen, select the Hidden button. To un-hide a screen, select the Visible button.

CHANNEL CONTROL

This screen allows settings to be applied to the channel on the currently assigned fader.

The currently assigned fader is chosen either by selecting its fader assign button on the fader panel, or by selecting Change Fader from the screen (A box will appear from which the required fader can be selected). If there is no source on the fader selected, then the controls on this screen will be disabled.

This screen is always visible to the operator, although some of the controls here may be restricted using the Tech - Wilds screen. Restrictions can only be set up in engineer mode.

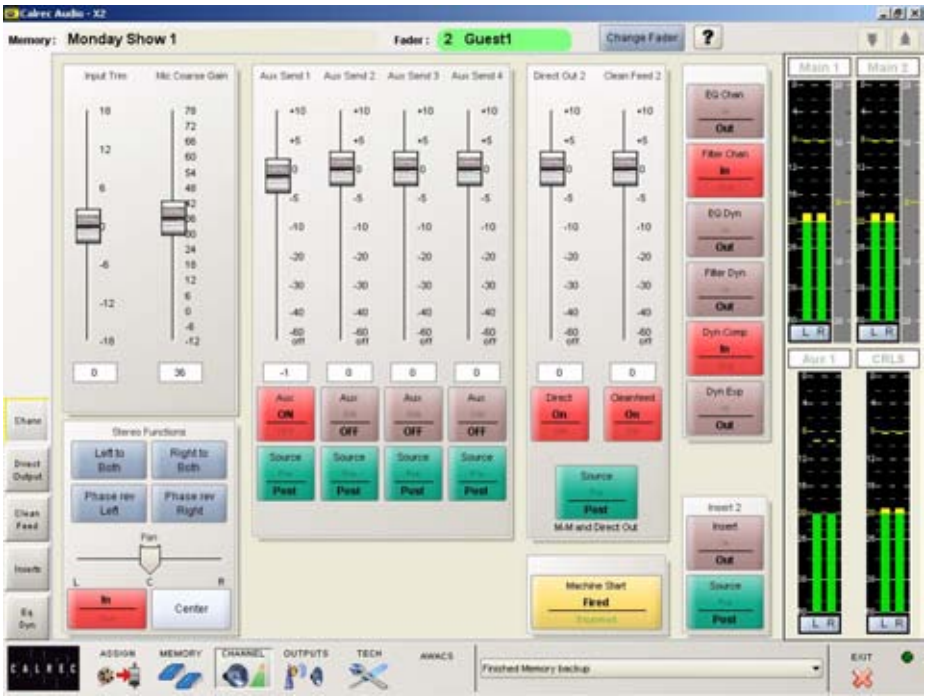
Input Trim
Input Trim is adjustable between -18dB and +18dB

Mic Coarse Gain
A coarse gain control for microphones is provided on this screen. Mic coarse gain is adjustable between -12 and +78dB

Stereo Functions
Left To Both and Right To Both feed the left or right legs of the incoming signal to both the left and right legs of the stereo channel. Selecting both of these will feed L+R to both, which with a gain reduction of -3dB produces a mono signal.

Phase Reverse Left and Phase Reverse Right will reverse the phase of the left or right legs of the incoming signal.

Channel Pan
The channel can be panned from left through centre, to right. The pan control



can be switched In/Out using the button. A button sets the pan to centre.

Auxiliary Send Control
There are 4 stereo auxiliaries. The On/Off controls on this screen switch the currently assigned channel to that auxiliary mix. A screen fader allows level adjustment between Off (-60dB) and +10dB.

Buttons allow each auxiliary output to be pre or post the channel fader. The auxilliary outputs are controlled using the Outputs - Aux Master screen.

Direct Output
If the source on the currently assigned channel has been designated as a direct output source on the Channel - Direct Output screen, controls on this screen allow its direct output to be switched On/Off, and to adjust its level. A button allows pre/post fader selection - this setting is shared by the channels's clean feed output (if assigned).

Direct outputs can also be switched On/Off and adjusted on the Channel - Direct Output screen.

In engineer mode, ports for direct outputs are patched using the Tech - I/O Patching screen.

Clean Feed
If a clean feed output has been set up for the source allocated to the currently assigned fader on the Channel - Clean Feed screen, controls here allow it to be switched On/Off. Clean feed output level is adjustable between Off (-60dB) and +10dB using the screen fader.

The clean feed output is fed with all channels routed to the mix minus bus, minus this channel.

The clean feed shares the same pre/post fader setting as the channel's direct output.

Clean feed outputs can also be switched On/Off and adjusted on the Channel - Clean Feed screen.

In engineer mode, ports for clean feed outputs are patched using the Tech - I/O Patching screen.

EQ, Filter & Dynamics
EQ, filter and dynamics can be switched In/Out of the channel using the controls on this screen. Also, EQ and filters can be switched in and out of the dynamics here.

Settings for EQ and dynamics are adjusted on the Channel - EQ Dyn screens.

Insert
If an insert has been assigned to the source on the currently assigned channel on the Channel - Insert screen, controls on this screen allow the insert to be switched In/Out, and for pre/post selection to be made.

In engineer mode, ports for insert sends and returns can be patched using the Tech - I/O Patching screens.

Machine Start Indicator
If machine controls have been allocated to the the currently assigned fader, a machine start indicator is provided on this screen to show the status of the machine start. Please note that this is for indication only, and does not control the machine start.

In engineer mode, machine controls are set up using the Tech - GPIO TX REH - GPO screen.

CLEAN FEEDS

This screen is used to control up to 30 mono clean feed outputs. Each clean feed is fed with all channels routed to the mix minus bus, minus the source it is feeding.

To allocate a clean feed output to a source, simply drag its icon from the available source area to the required clean feed output fader.

The screen is navigated using the scrollbar along the bottom of the screen.

The ON/OFF button activates and deactivates the clean feed output.

Gain can be adjusted between Off (-60dB) and +10dB.

Controls to adjust the clean feed for the currently assigned channel are also available on the Channel - Chans screen.

Pre/Post Fader
Both clean feed and direct output share the same pre/post channel fader setting. This is set on the Channel - Chans screen.

Clean Feed Output Port Patching
In engineer mode, ports for clean feed outputs are patched using the Tech - I/O Patch screen.

Talkback To Clean Feed
In engineer mode, inputs for Talkback and Reverse Talkback are patched using the Tech - Monitor Meter - Talkback Mon IP screen.

Screen Visibility
In engineer mode, a user can hide this screen, so that it will not be visible in

operator mode. To hide a screen, select the Hidden button. To un-hide a screen, select the Visible button.

INSERTS

The system can have up to 48 inserts. Each insert can be allocated for use to one source using this screen.

If an insert is assigned to the source on the currently assigned channel, controls on the Channel - Chans screen allow it to be switched In/Out, and allow pre/post fader send selection.

Insert Send/Return Patching
In engineer mode, ports for the insert sends and returns are patched using the Tech - I/O Patch screens.

All input patching is saved and loaded in the User Memories, this includes insert return patching.

All output patching is retained in the console's "hidden" memory which is not affected by loading user memories, this includes Insert Send patching.

When a user memory is loaded, the insert send patches saved in that memory will be restored, but the return patches will not.

Screen Visibility
In engineer mode, a user can hide this screen, so that it will not be visible in operator mode. To hide a screen, select the Hidden button. To un-hide a screen, select the Visible button.

EQ & FILTERS

This screen controls EQ and Filters on the currently assigned channel. The user can view and manipulate the EQ and filter response curves, using the touch screen.

The required band is selected from the left side of the screen. When selected, that band's response curve is shown in the Editable Response window, with the adjustable area highlighted in blue.

Frequencies are adjusted using the touch screen, by selecting the crosshair and moving it around within the editable area. As it moves, the frequency and level values of the selected path will change.

Nudge buttons to the right of the editable response window can also be used to make adjustments.

EQ and Filters are switched in and out of the signal path using the IN buttons. EQ and Filters can also be switched In/Out on the Channel - Chans screen.

The overall response window shows the overall response curve for the selected path. The curve itself is only visible if EQ is switched into the path.

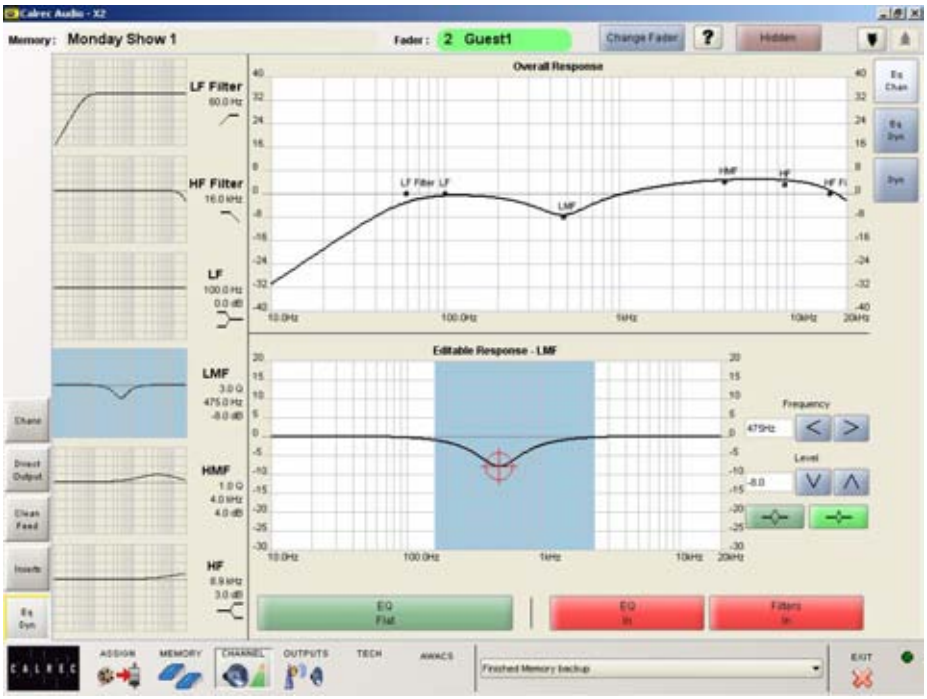
Filters

LF 12dB/octave plus notch, 20Hz to 330Hz

HF 12dB/octave plus notch, 3.3kHz to 20kHz

Equaliser

LF 30Hz to 470Hz, shelf or bell (Q of 1)



LMF 160Hz to 2.4kHz, Q of 1 or 3

HMF 500Hz to 7.5kHz, Q of 1 or 3

HF 1kHz to 16kHz, shelf or bell (Q of 1)

EQ level controls are adjustable by ±15dB. Excessive control ranges are deliberately avoided to simplify operation.

EQ Flat

EQ FLAT will clear any EQ settings to flat. A confirmation box must be accepted before this action is carried out, this prevents against accidental flattening of settings.

Side Chain EQ

A similar screen exists to adjust the EQ in the dynamics.

Screen Visibility

In engineer mode, a user can hide this screen, so that it will not be visible in operator mode. To hide a screen, select the Hidden button. To un-hide a screen, select the Visible button.

DYNAMICS

This screen controls the compressor/ limiter and expander/gate on the currently assigned channel.

The dynamics are adjusted using the touch screen, by selecting the crosshair and moving it around within the editable area. As it moves, the values of the selected path will change.

Nudge buttons to the right of the editable response window can also be used to make adjustments.

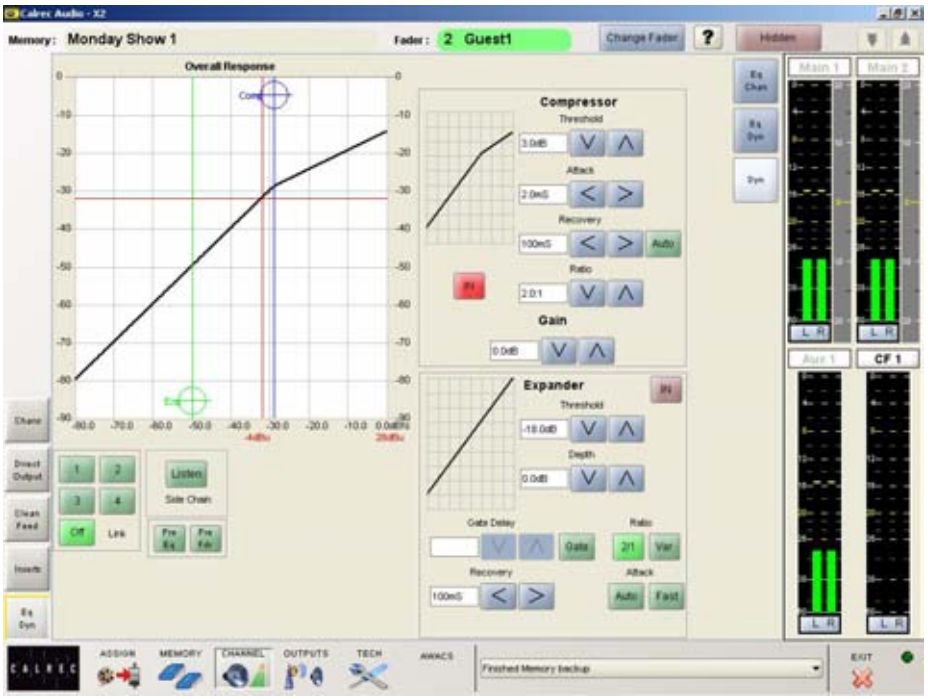
The compressor and expander/gate are switched in and out of the signal path using the IN buttons. Dynamics can also be switched In/Out using buttons on the Channel - Chans screen.

The overall response window shows the overall response curve for the selected path. The curve itself is only visible if dynamics are switched into the path.

Compressor
Threshold +20dB to -20dB
Recovery 75ms to 4 sec + AUTO
Ratio 1 to 50
Attack 50µs to 30ms
Sidechain Listen

Side Chain Listen
The sidechain listen facility allows the user to listen to the signal driving the compressor sidechain. This allows the effect of the EQ settings in the dynamic's side chain to be heard on the PFL bus.

Make up gain is adjustable from 0dB to +20dB.



Expander
Threshold +10dB to -40dB
Recovery 75ms to 4 sec
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)
Ratio 2/1 and VAR (variable - according to level)

Gate
Threshold 0dB to -40dB
Recovery 75ms to 4 sec + AUTO
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)
Gate delay 0 to 1 sec in addition to 6dB hysteresis

Dynamics Linking
It is possible to have the dynamics of many channels linked by assigning them to one of four available link busses. This is useful for when the same dynamics settings need to be applied to more than one channel. Link buttons 1, 2, 3 and 4 assign the channel to the link busses. An OFF button removes the channel from a link bus.

Pre EQ or Pre Fader
Buttons allow the dynamics to be applied pre EQ or pre fader.

Screen Visibility
In engineer mode, a user can hide this screen, so that it will not be visible in operator mode. To hide a screen, select the Hidden button. To un-hide a screen, select the Visible button.

AUX MASTER

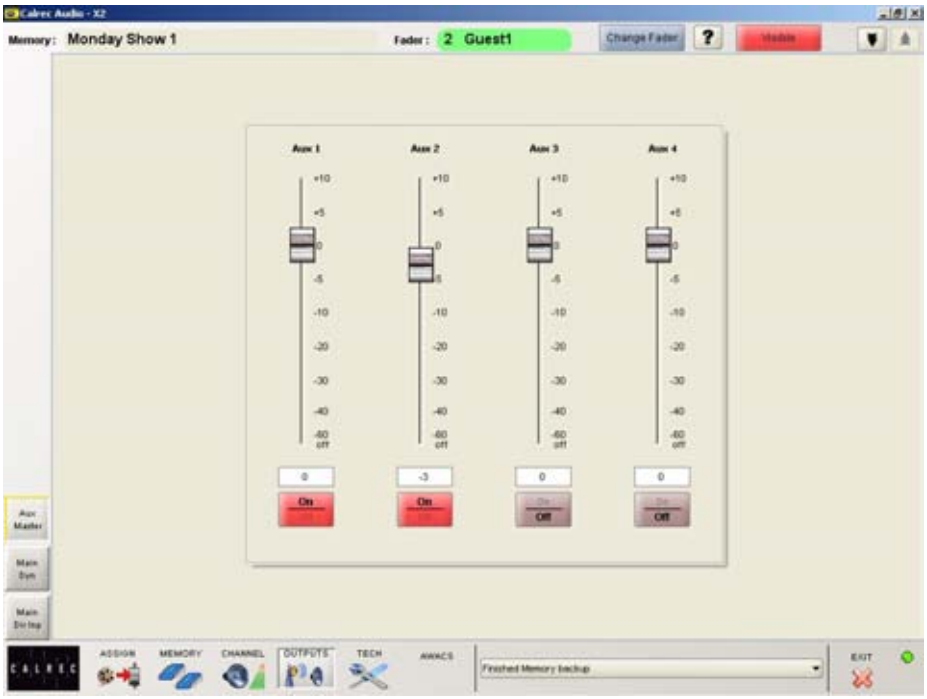
The master send levels and On/Off switching for the 4 stereo auxiliary outputs are available on this screen.

Each stereo auxiliary output's level can be adjusted between Off (-60dB) and +10dB using the screen faders.

Channels are routed to Auxilliaries in the area below the relevant fader icon on the Assign screen.

Aux send controls are available on the Channel - Chans screen.

Screen Visibility
In engineer mode, a user can hide this screen, so that it will not be visible in operator mode. To hide a screen, select the Hidden button. To un-hide a screen, select the Visible button.



MAIN DYNAMICS

This screen controls the compressor/ limiter and expander/gate on main outputs 1, 2 and record

The dynamics are adjusted using the touch screen, by selecting the crosshair and moving it around within the editable area. As it moves, the values of the selected path will change.

Nudge buttons to the right of the editable response window can also be used to make adjustments.

The compressor and expander/gate are switched in and out of the signal path using the IN buttons. Dynamics can also be switched In/Out using buttons on the Channel - Chans screen.

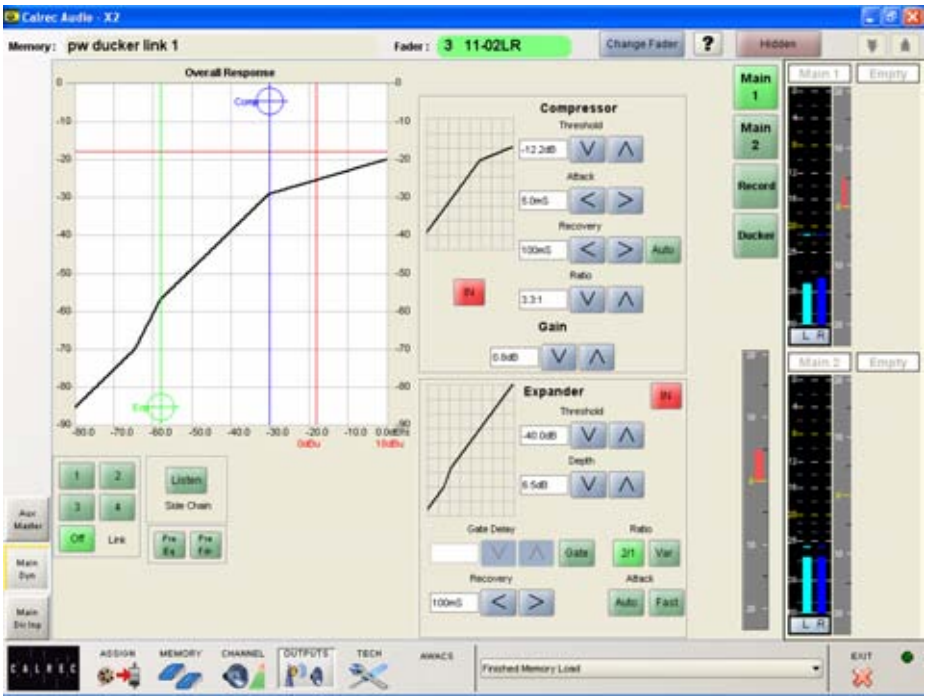
The overall response window shows the overall response curve for the selected path. The curve itself is only visible if dynamics are switched into the path.

Compressor
Threshold +20dB to -20dB
Recovery 75ms to 4 sec + AUTO
Ratio 1 to 50
Attack 50µs to 30ms
Sidechain Listen

The sidechain listen facility allows the user to listen to the signal driving the compressor sidechain. This allows the effect of sidechain EQ to be "previewed".

Make up gain is adjustable from 0dB to +20dB.

Expander
Threshold +10dB to -40dB



Recovery 75ms to 4 sec
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)
Ratio 2/1 and VAR (variable - according to level)

Gate
Threshold 0dB to -40dB
Recovery 75ms to 4 sec + AUTO
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)
Gate delay 0 to 1 sec in addition to 6dB hysteresis

Dynamics Linking
It is possible to have the dynamics of many channels linked by assigning them to one of four available link busses. This is useful for when the same dynamics settings need to be applied to more than one channel. Link buttons 1, 2, 3 and 4 assign the channel to the link busses. An OFF button removes the channel from a link bus.

Pre EQ or Pre Fader
Buttons allow the dynamics to be applied pre EQ or pre fader.

Screen Visibility
In engineer mode, a user can hide this screen, so that it will not be visible in operator mode. To hide a screen, select the Hidden button. To un-hide a screen, select the Visible button.

DUCKER

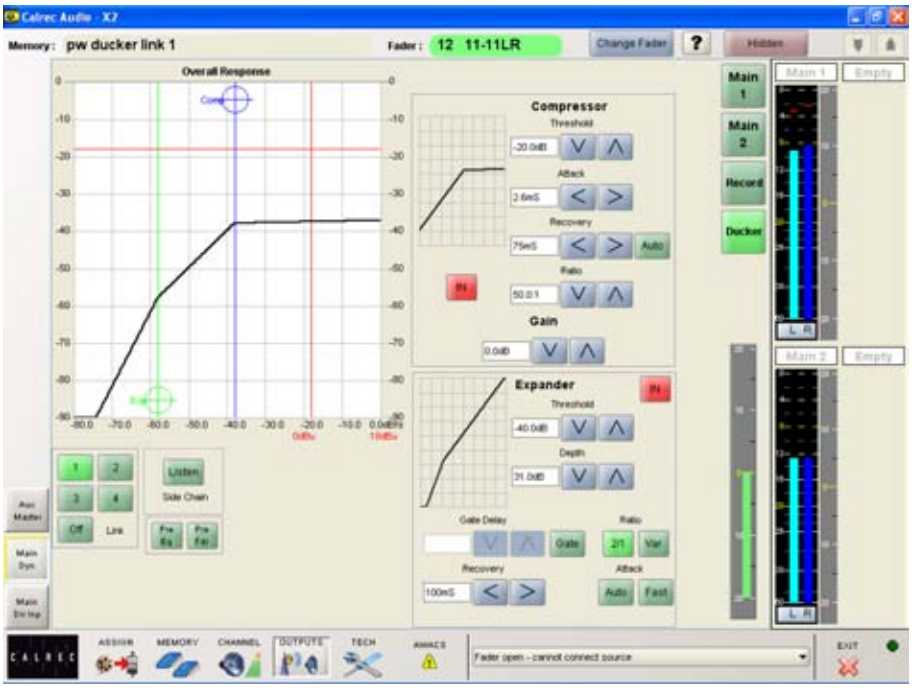
The ducker applies dynamics to certain signals when a designated control signal is present. For example the level of background music can be reduced when a presenter speaks.

To set up the ducker, press the 'Ducker' button below the designated controller channel in the 'Assign' screen. A pop-up window will appear to allow easier access to the controls. This channel is now the controller of the ducker.

In the 'Outputs', 'Main Dyn' screen select the 'Ducker' page. Set the dynamics to provide the amount of reduction/ expansion required and make sure they are set 'in'. Set the ducker to a dynamics link, for example 1.

In the dynamics screen of a channel that is to be affected by the ducker, ensure that it uses the same dynamics link bus as the ducker and that the compressor (and/ or expander) is switched in as required.

Now when the control signal crosses the threshold of the compressor or expander set up in the ducker dynamics page, any other signals with the same dynamics link are affected. The control signal remains unaffected.



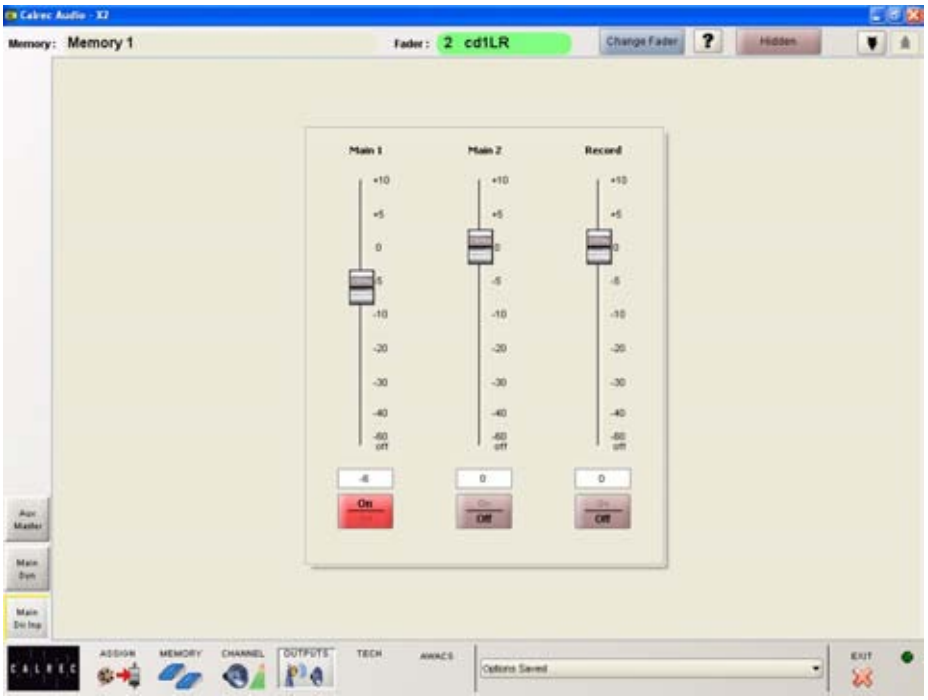
MAIN DIRECT INPUTS

The direct input levels and On/Off switching for main 1, main 2 and record are controlled using this screen.

Each direct input's level can be adjusted between Off (-60dB) and +10dB using the screen faders.

Buttons allow the direct input to be switched On/Off.

In engineer mode, input ports for main 1, main 2 and record direct inputs can be set up using the Tech - I/O Patch - Direct Inputs screen.

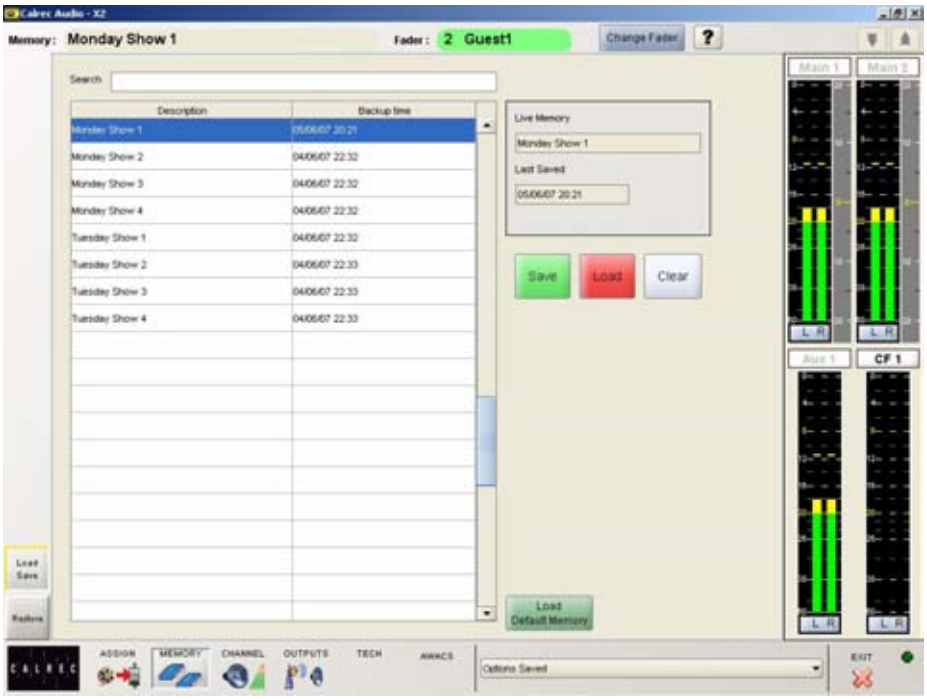


Screen Visibility
In engineer mode, a user can hide this screen, so that it will not be visible in operator mode.

USER MEMORIES

The memory system allows the user to save different console arrangements. This can be useful when many different operators use the same console, or when the console is used to broadcast many different weekly productions. The Memory - Load Save screen is used to load and save memories,

Up to 99 memories can be available for use at any time. In addition, the console will back up an unlimited number of memories, which are easily recalled using the Mem-Restore screen. Memories can also be stored to removable media if desired.



Memory List

All the available memories (Up to 99) are listed on the memories screen. Memories will be shown as empty if they have not yet been used.

Creating A New Memory

To create a new memory, select an empty memory from the list. When SAVE is selected, the console's current settings are saved, and the new memory can be given a description. The memory will be automatically backed up to the console's hard drive.

Loading Memories

To load a memory, select it from the list and select Load.

When a stored memory is loaded, the system checks that the current desk configuration matches that of the stored memory. If there are discrepancies, a warning message is reported.

Saving and Recalling I/O Patches

All input patching is saved and loaded with the user memories.

All output patching is retained in the console's "hidden" memory which is not affected by loading user memories.

Searching For Memories

Typing the name of a memory into the search box above the memory list allows the user to locate previously saved memories in the list.

Clear Memory

To clear a memory, select it from the list and select "Clear Memory". This removes the memory from the console memory list. A confirmation box must be accepted before the clear is executed to prevent memories from being accidentally cleared.

A cleared memory can still be restored from the console back up, using the Mem - Restore screen.

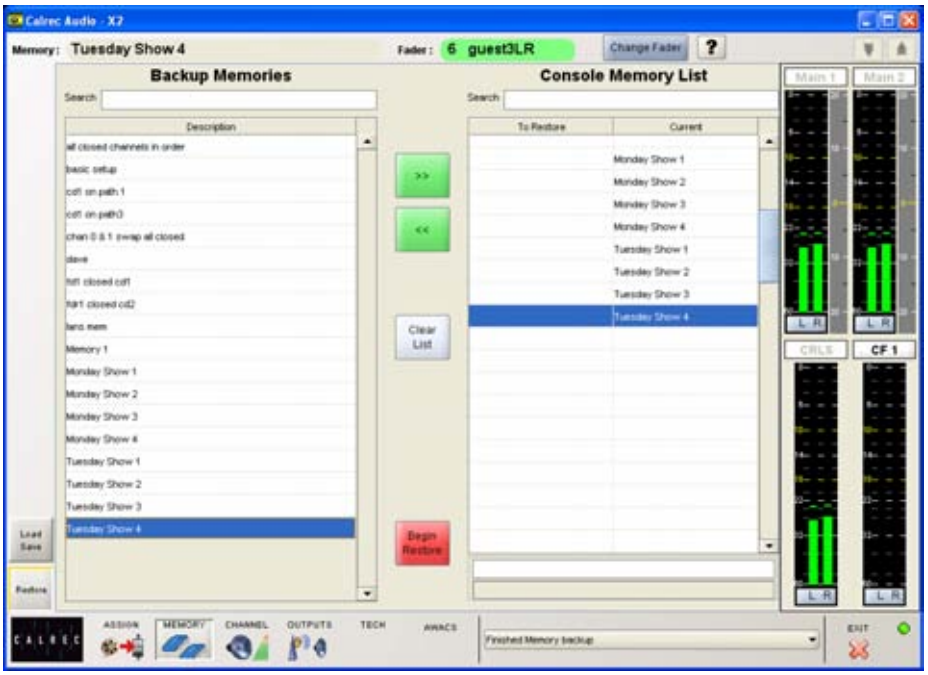
Default Memory

Recalls the default configuration for the console, replacing all settings.

The default memory will usually be created upon installation of the console, and is saved in engineer mode using the button on the Tech-Op Mode screen. This is a default memory, which could contain the fixed port set-ups which match the studio wiring, and any other settings which hardly ever change. It could have all channel settings OFF or flat, with no routes made, and would be available as a start up memory, from which more specific memories could be created.

MEMORY BACKUP AND RESTORE

In addition to the 99 memories which can be held in the Flash ROM for different console arrangements, the PC back-up can allow an unlimited number of memories, which are easily recalled using this screen.



The “Backup Memories” list shows all the memories which are backed up onto the console’s hard drive.

All the memories which the console is currently using are listed in the “Console Memory List” on the right of the screen.

The arrow buttons allow memories to be moved between the backup memories list and a “To Restore” list. When the user has moved all the required memories from the “Backup Memories” list to the restore list, the “Begin Restore” button will execute the memory restore, transferring any memories moved to the “To Restore” list to the console memory list.

Single memories or groups of memories can be moved to the “To Restore” list by selecting and dragging them across.

The clear list button will clear the “To Restore” list.

If a memory is cleared from the console memory list using the Mem - Load Save screen, it is still possible to restore it from the PC backup here.

X2
TECH SCREENS

CALREC

Putting Sound in the Picture

BUSS OUTPUT PATCHING

The Tech - I/O Patch - Buss Output screen allows patching of console output signals to output ports for mains 1 and 2, record, auxiliary, mix minus, monitor, talkback, PFL and oscillator outputs. This screen is only visible in engineer mode.

Output Port Lists

All of the available ports can be grouped into suitable lists using the Tech - Lists screen. These lists can then be displayed on the right of this screen, ready to have signals patched to them from the left. Different lists are accessed using the selection buttons.

Viewing Options

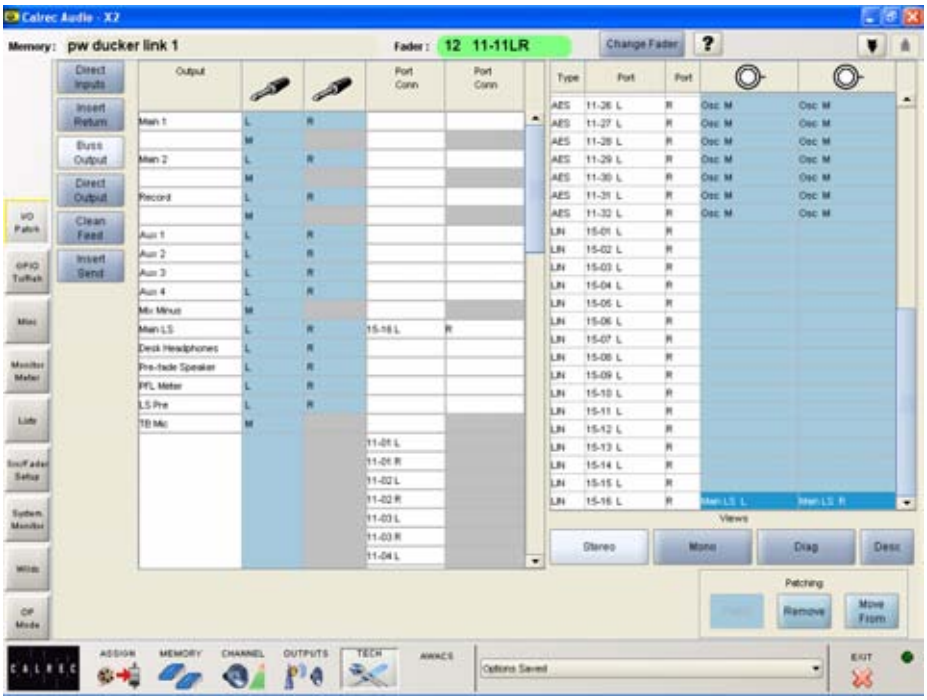
The ports can be viewed as pairs (for patching from stereo or surround paths), individual (for patching from mono paths), or individual with the actual rack number, card slot and output shown (for diagnostic purposes).

Patching

To make an assignment, select an output signal from the list on the left, and an output port from the list on the right, and select Patch.

Output signals can be patched to any number of output ports by repeating this procedure. (If paths are set to be mono, only the left output will have a signal on it).

Patches can be removed from selected output ports using the REMOVE button.



Connections can be moved between output ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Multiple Patching

It is possible to patch output signals to many output ports in one operation:

- From the list on the left, select the output signals by using the mouse to drag (click and hold) down the column.
- Select the port in the list on the right where you want the patching to begin.
- Select Patch.

CLEAN FEED OUTPUT PATCHING

The Tech - I/O Patch - Clean Feed screen allows patching of clean feed outputs to output ports. This screen is only visible in engineer mode.

Clean feed outputs are controlled using the Channel - Clean Feed screen, where sources are allocated, and gain and On/Off are applied.

Controls for the currently assigned channel's clean feed are also available on the Channel - Chans screen.

Output Port Lists

All of the available ports can be grouped into suitable lists using the Tech - Lists screen. These lists can then be displayed on the right of this screen, ready to have signals patched to them from the left. Different lists are accessed using the selection buttons.

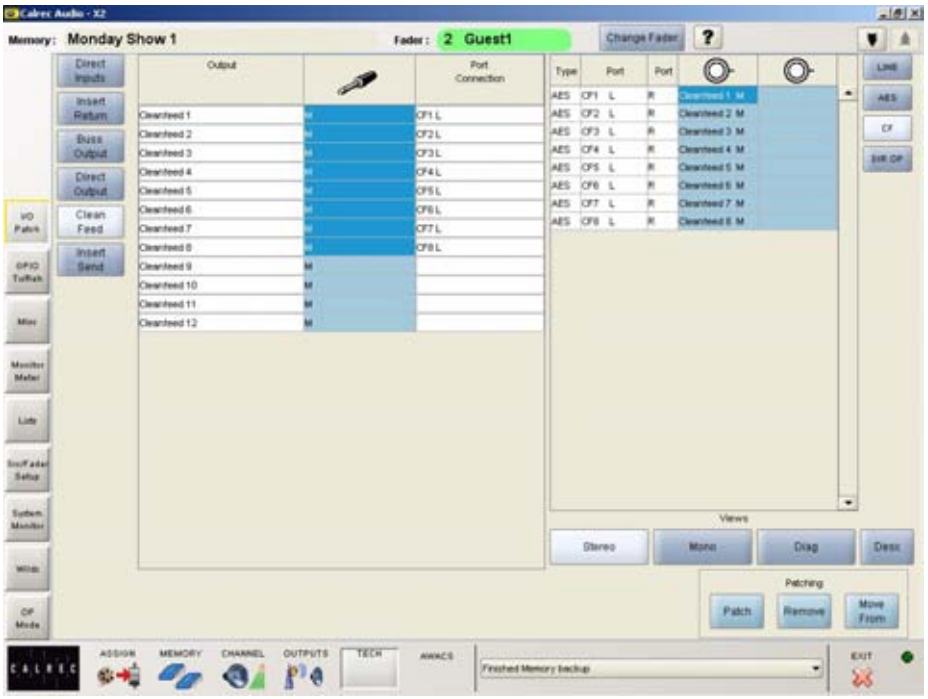
Viewing Options

The ports can be viewed as pairs (for patching from stereo or surround paths), individual (for patching from mono paths), or individual with the actual rack number, card slot and output shown (for diagnostic purposes).

Patching

To make an assignment, select a clean feed from the list on the left, and an output port from the list on the right, and select Patch.

(If paths are set to be mono, only the left output will have a signal on it).



Patches can be removed from selected output ports using the REMOVE button.

Connections can be moved between output ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Multiple Patching

It is possible to patch output signals to many output ports in one operation:

- From the list on the left, select the output signals by using the mouse to drag (click and hold) down the column.
- Select the port in the list on the right where you want the patching to begin.
- Select Patch.

DIRECT OUTPUT PATCHING

The Tech - I/O Patch - Direct Output screen allows patching of direct output signals to output ports. This screen is only visible in engineer mode.

The direct outputs can then be controlled using the Channel - Direct Output screen, where sources are allocated, and gain and On/Off are applied.

Controls for the currently assigned channel's direct output are also available on the Channel - Chans screen.

Output Port Lists

All of the available ports can be grouped into suitable lists using the Tech - Lists screen. These lists can then be displayed on the right of this screen, ready to have signals patched to them from the left. Different lists are accessed using the selection buttons.

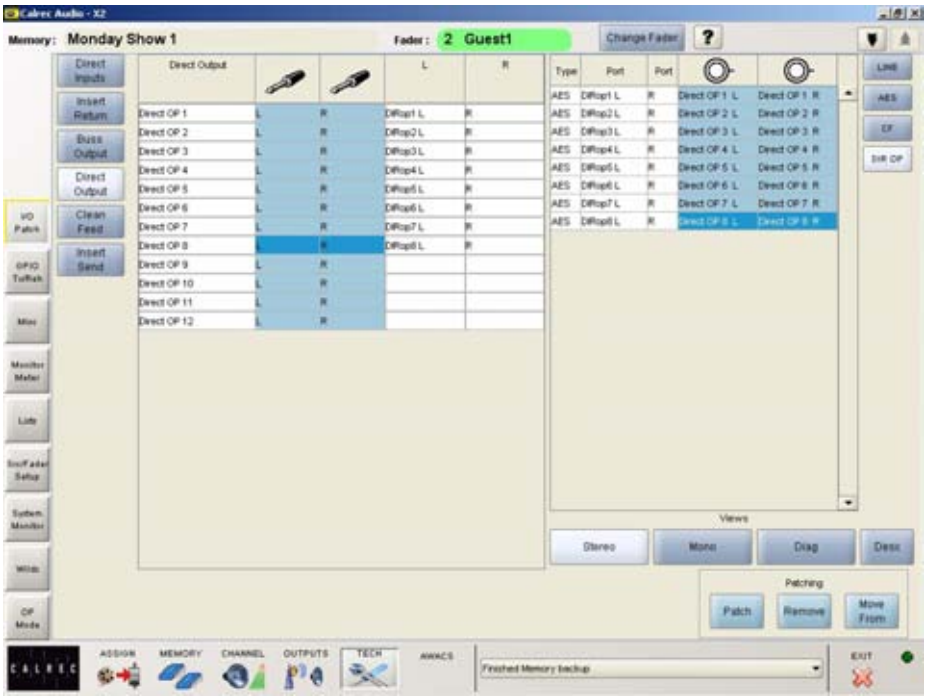
Viewing Options

The ports can be viewed as pairs (for patching from stereo or surround paths), individual (for patching from mono paths), or individual with the actual rack number, card slot and output shown (for diagnostic purposes).

Patching

To make an assignment, select a direct output signal, and an output port, and select Patch.

Output signals can be patched to any number of output ports by repeating this procedure.



Patches can be removed from selected output ports using the REMOVE button.

Connections can be moved between output ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Multiple Patching

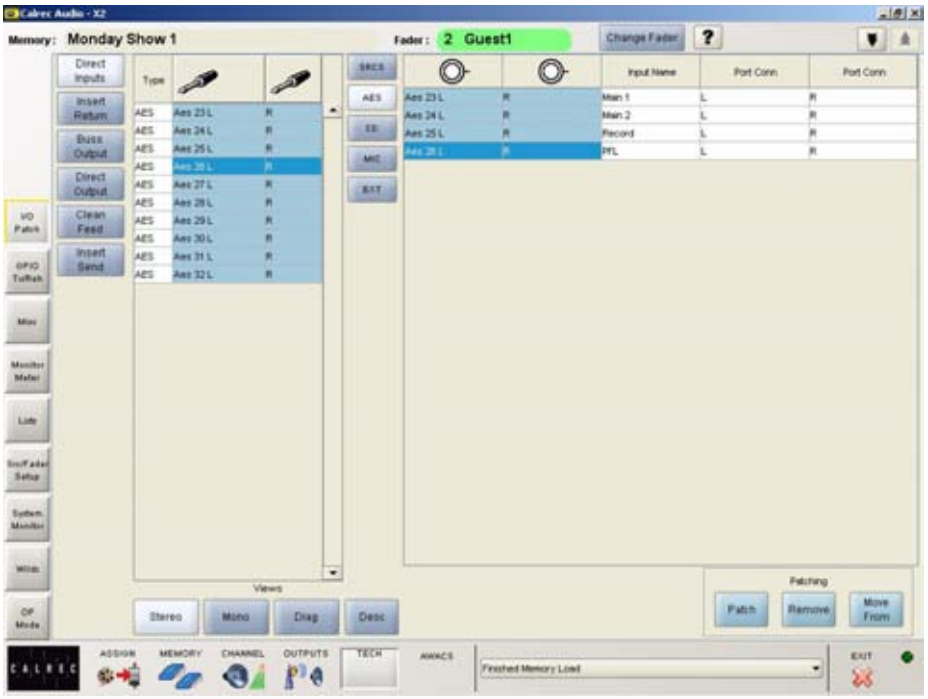
It is possible to patch direct outputs to many output ports in one operation:

- From the list on the left, select the direct outputs by using the mouse to drag (click and hold) down the column.
- Select the port in the list on the right where you want the patching to begin.
- Select Patch.

DIRECT INPUT PATCHING

The Tech - I/O Patch - Direct Input screen allows patching of input ports to main, record and PFL direct inputs. This screen is only visible in engineer mode.

Main direct inputs are controlled using the Outputs - Main Dir IP screen



Input Port Lists

All of the available ports can be grouped into suitable lists using the Tech - Lists screen. These lists can then be displayed on the left of this screen, ready to be patched to inputs on the right. Different lists are accessed using the selection buttons.

Viewing Options

The ports can be viewed as pairs (for patching from stereo or surround paths), individual (for patching from mono paths), or individual with the actual rack number, card slot and output shown (for diagnostic purposes).

Patching

To make an assignment, select an input port, and a direct input, and select Patch.

(If paths are set to be mono, only the left output will have a signal on it).

Patches can be removed from selected output ports using the REMOVE button.

Connections can be moved between output ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Multiple Patching

It is possible to patch input ports to many direct inputs in one operation:

- From the list on the left, select the input ports by using the mouse to drag (click and hold) down the column.
- Select the direct input in the list on the right where you want the patching to begin.
- Select Patch.

INSERT SEND PATCHING

The Tech - I/O Patch - Insert Send screen allows patching of insert send signals to output ports. This screen is only visible in engineer mode.

Return ports for each insert are patched using the Tech - I/O Patch - Insert Return screen.

Once an insert has send and return ports patched, it can then be allocated for use to one source using the Channel - Insert screen.

If an insert is assigned to the source on the currently assigned channel, controls on the Channel - Chans screen allow it to be switched In/Out, and select a pre-post fader setting.

Output Port Lists

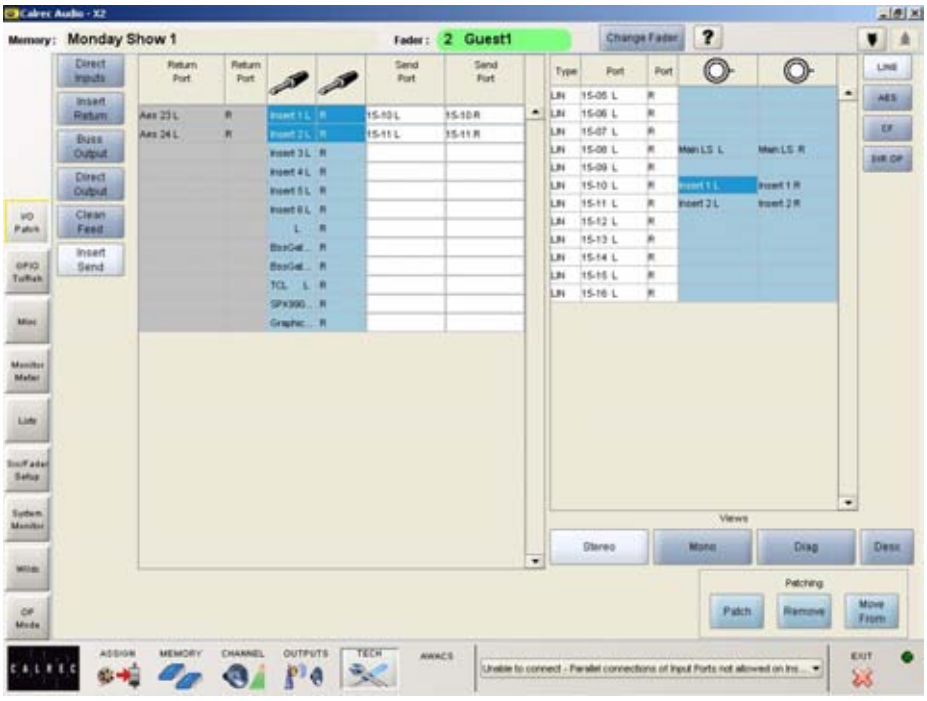
All of the available ports can be grouped into suitable lists using the Tech - Lists screen. These lists can then be displayed on the right of this screen, ready to have signals patched to them from the left. Different lists are accessed using the selection buttons.

Viewing Options

The ports can be viewed as pairs (for patching from stereo or surround paths), individual (for patching from mono paths), or individual with the actual rack number, card slot and output shown (for diagnostic purposes).

Patching

To make an assignment, select an insert send and an output port, and select Patch.



Output signals can be patched to any number of output ports by repeating this procedure.

Patches can be removed from selected output ports using the REMOVE button.

Connections can be moved between output ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Multiple Patching

It is possible to patch insert sends to many outputs in one operation:

- From the list on the left, select the insert sends by using the mouse to drag (click and hold) down the column.
- Select the port in the list on the right where you want the patching to begin.
- Select Patch.

Saving and Recalling Insert Patches

All input patching is saved and loaded with the user memories, this includes insert return patching.

All output patching is retained in the console's "hidden" memory which is not affected by loading user memories, this includes Insert Send patching.

When a user memory is loaded, the insert send patches saved in that memory will be restored, but the return patches will not.

INSERT RETURN PATCHING

The Tech - I/O Patch - Insert Return screen allows patching of input ports to insert return signals. This screen is only visible in engineer mode.

Send ports for each insert are patched using the Tech - I/O Patch - Insert Send screen.

Once an insert has send and return ports patched, it can then be allocated for use to one source using the Channel - Insert screen.

If an insert is assigned to the source on the currently assigned channel, controls on the Channel - Chans screen allow it to be switched In/Out, and select a pre-post fader setting.

Input Port Lists

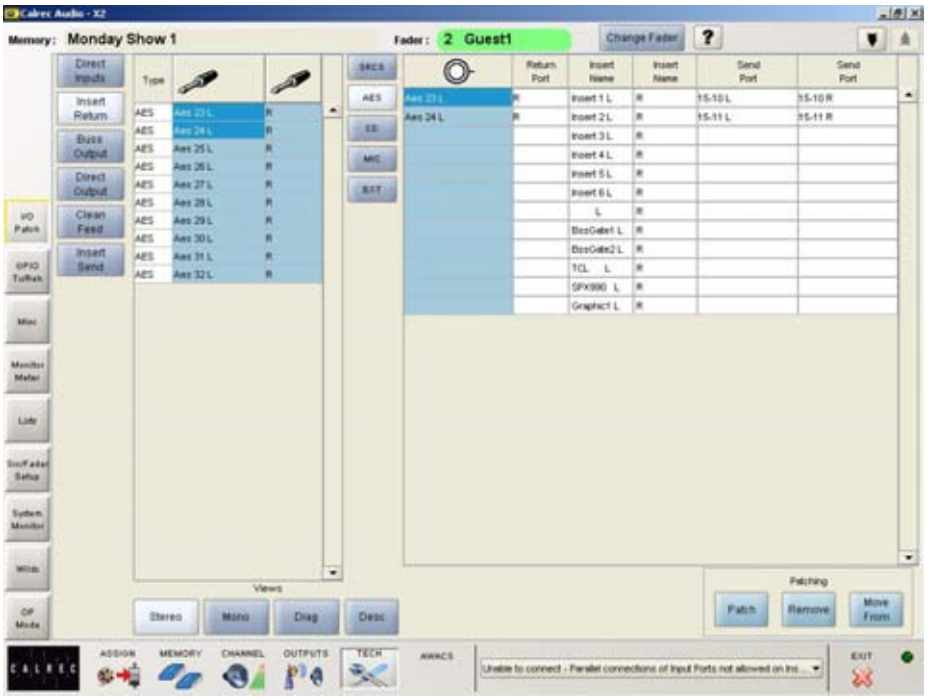
All of the available ports can be grouped into suitable lists using the Tech - Lists screen. These lists can then be displayed on the left of this screen, ready to be patched to insert returns on the right. Different lists are accessed using the selection buttons.

Viewing Options

The ports can be viewed as pairs (for patching from stereo or surround paths), individual (for patching from mono paths), or individual with the actual rack number, card slot and output shown (for diagnostic purposes).

Patching

To make an assignment, select an input port, and an insert return, and select Patch.



(If paths are set to be mono, only the left output will have a signal on it).

Patches can be removed from selected output ports using the REMOVE button. Connections can be moved between ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Multiple Patching

It is possible to patch input ports to many insert returns in one operation:

- From the list on the left, select the input ports by using the mouse to drag (click and hold) down the column.
- Select the insert return in the list on the right where you want the patching to begin.
- Select Patch.

Saving and Recalling Insert Patches

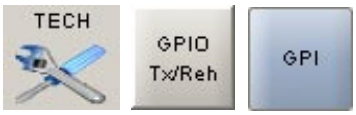
All input patching is saved and loaded with the user memories, this includes insert return patching.

All output patching is retained in the console's "hidden" memory which is not affected by loading user memories, this includes Insert Send patching.

When a user memory is loaded, the insert send patches saved in that memory will be restored, but the return patches will not.

GPIO – GPI

The Tech - GPIO TX/REH - GPI screen allows the system's 32 opto-isolated general purpose inputs to be set up. This screen is only visible in engineer mode.



Different views allow different operations to be assigned.

Misc Functions

Each general purpose input be assigned to operate up to 10 console functions. These include the console's transmit, rehearse or neither state, allowing condition switching options to be set on the Tech - GPIO TX REH - TX REH screen.

Remote Cut

Each general purpose input can be set to cut up to 10 input sources.

Machine Start/Stop Tally LEDs

General purpose inputs can be set to operate machine start or machine stop tally LEDs for any source. When fired, the GPI will light the green machine start LED or the red machine stop LED under the START button on the source's fader.

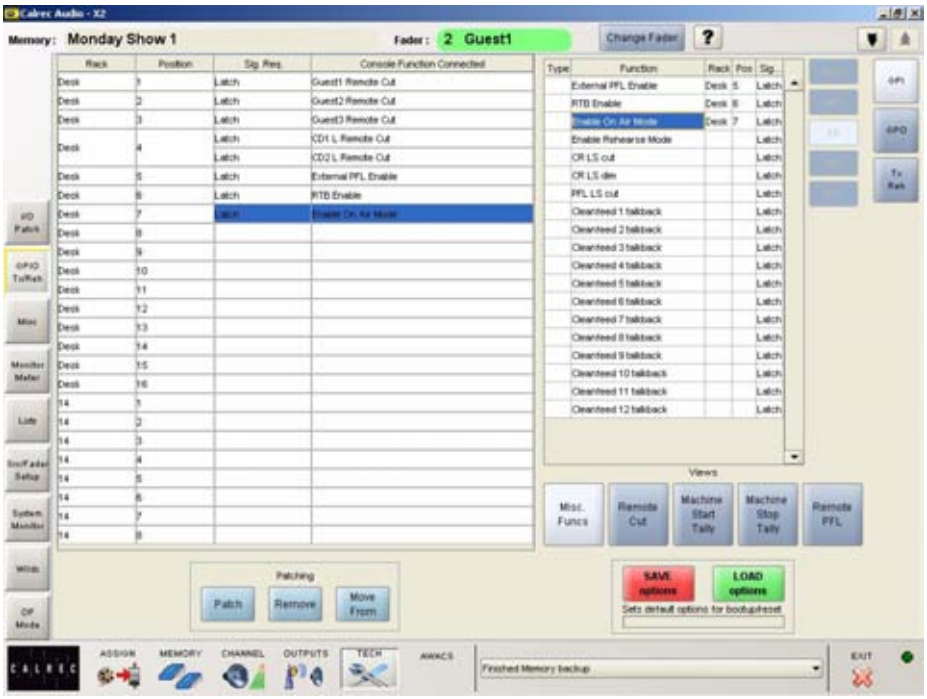
Remote PFL

General purpose inputs can be set to operate PFL for any source. When fired the PFL will activate as normal, and the PFL button on the fader will light.

Patching

To make an assignment, select a general purpose input, and a function, and select Patch.

Patches can be removed from selected output ports using the REMOVE button.



Connections can be moved between output ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Save and Load Options

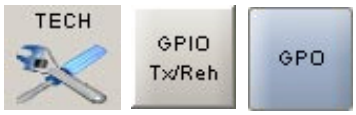
Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

GPIO - GPO

The GPO screen allows the system's 48 relay-isolated general purpose outputs to be set up. This screen is only visible in engineer mode.



Different views allow them to be assigned to different operations.

Misc Functions

The general purpose outputs can be set to operate when various console functions occur. Console functions can be assigned to more than one output.

Source Open

General purpose outputs can be set to operate when a source is allocated to a fader, and that fader is opened.

Cut Active

General purpose outputs can be set to operate when a source is cut.

Source Live

General purpose outputs can be set to operate when a source is live.

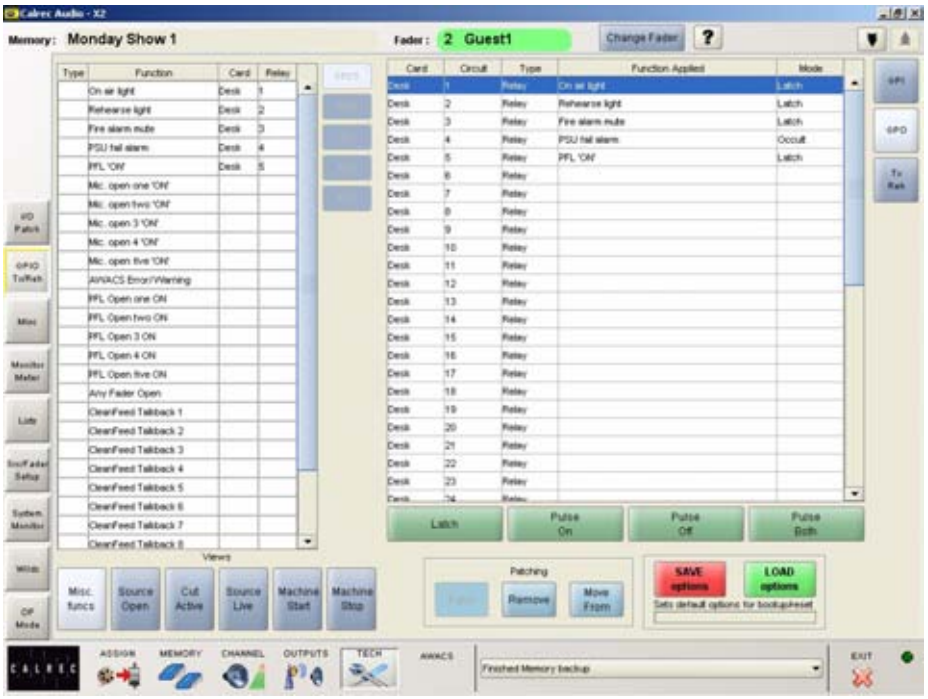
Machine Start/Stop

General purpose outputs can be set to operate when the fader is armed (by enabling the start button), and the fader is opened

Latch or Pulse

The relay can be set to latch or pulse for 100 ms, when the console function is activated. When setting the relay to pulse, there are three different options.

- Pulse On sets the relay to pulse when the function is activated.
- Pulse Off sets the relay to pulse when the function is deactivated.



- Pulse Both sets the relay is set to pulse once when the function is activated, and again when the function is deactivated.

Patching

To make an assignment, select a function, and a general purpose output, and select Patch.

Patches can be removed from selected output ports using the REMOVE button.

Connections can be moved between output ports when selected using the MOVE FROM button. The PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

Save and Load Options

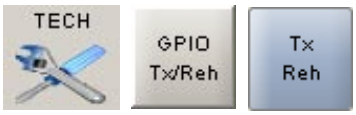
Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

GPIO – TX/REH

This screen provides a mechanism for the system's condition switching to be set up. This screen is only visible in engineer mode.



There are three modes which the system can be in: Transmit (TX or On Air), Rehearse, or Neither. These are controlled from opto-isolated general purpose inputs set up on the Tech - GPIO TX REH - GPI screen under misc functions.

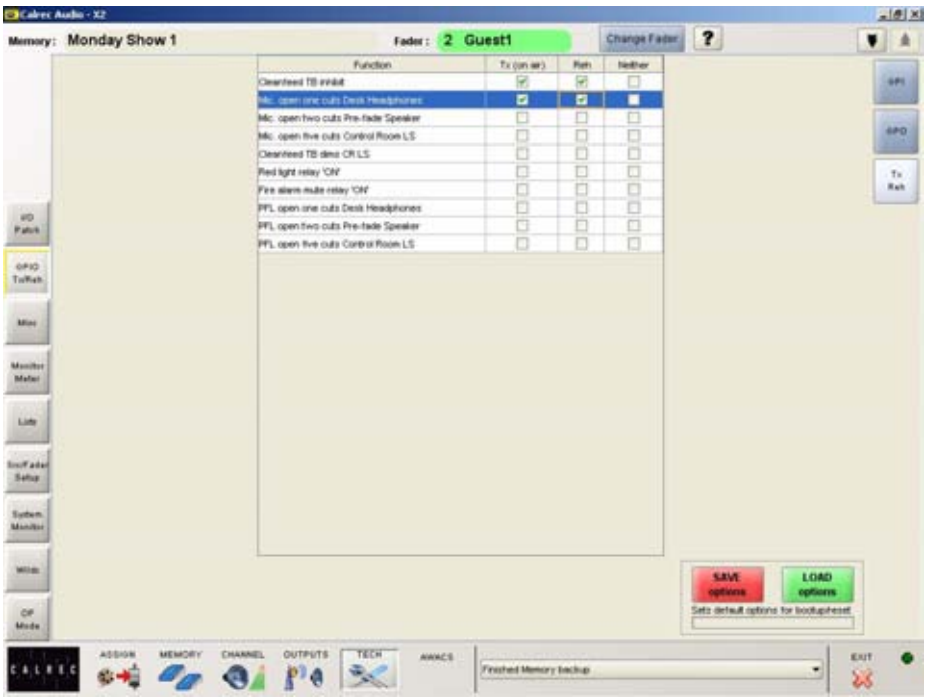
Each function can be set to be active, or not, in any of the three states.

Save and Load Options

Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.



MISC – SYNCHRONISATION

The Misc - Sync screen allows the system's synchronisation sources to be set. This screen is only visible in engineer mode.

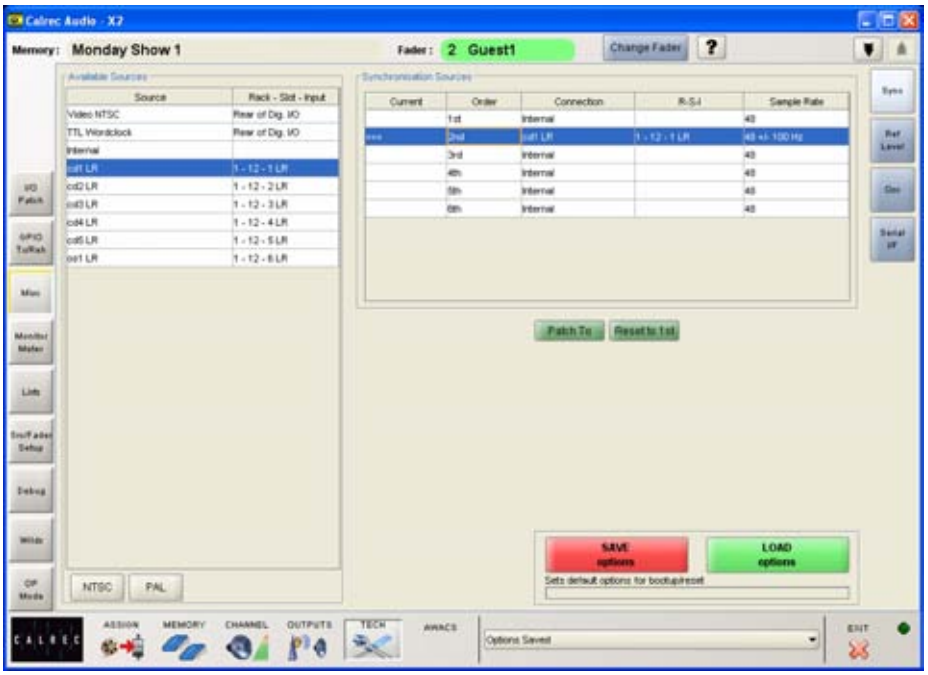
The system can be pre-set with up to five external sync sources, plus internal, such that if the 1st source fails, it will automatically switch to the 2nd, and so on. One of the external sources can be Video, (PAL or NTSC). TTL wordclock is another possible external source.

AES inputs on the console can also be used as an external source. Please note that the facility for locking to external AES sources is restricted to the first six inputs of each AES card in the console. When using a digital input or wordclock as a source, the system will tolerate a variation of up to +/- 100 Hz in the frequency of the source.

Assigning Synchronisation Sources
Synchronisation sources are assigned by selecting an available source from the list on the left side of the screen, then selecting one of the five places in the priority list on the right side of the screen, and selecting Patch To.

Reset to 1st
If the first source has failed, and the system is running on any of the selections 2 to 6, when the first source becomes available again, the system can be RESET TO 1ST during any convenient off-air period.

Save and Load Options
Settings on this screen are not stored in the individual console memories but are



saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

MISC – REFERENCE LEVEL

The Misc-Ref Level Screen allows the following console functions to be set.This screen is only visible in engineer mode.

Mic Input Headroom

This area allows the channel mic input headroom to be set. This is the headroom available above the input gain setting, up to the channel fader.

For example, if the input gain is set to 40 dB and the mic input headroom is 36 dB, then the channel will handle up to -4 dB up to the fader which can be backed off to avoid clipping of the programme output. Obviously, any pre-fader insert or pre-fader feeds to auxes, tracks, or direct outputs will not handle this level and so these should not be used where this headroom is needed.

Headroom can be adjusted between 20dB and 36dB. Please be aware that selecting a high headroom value will compromise the noise specification slightly but this should not be noticeable in practice.

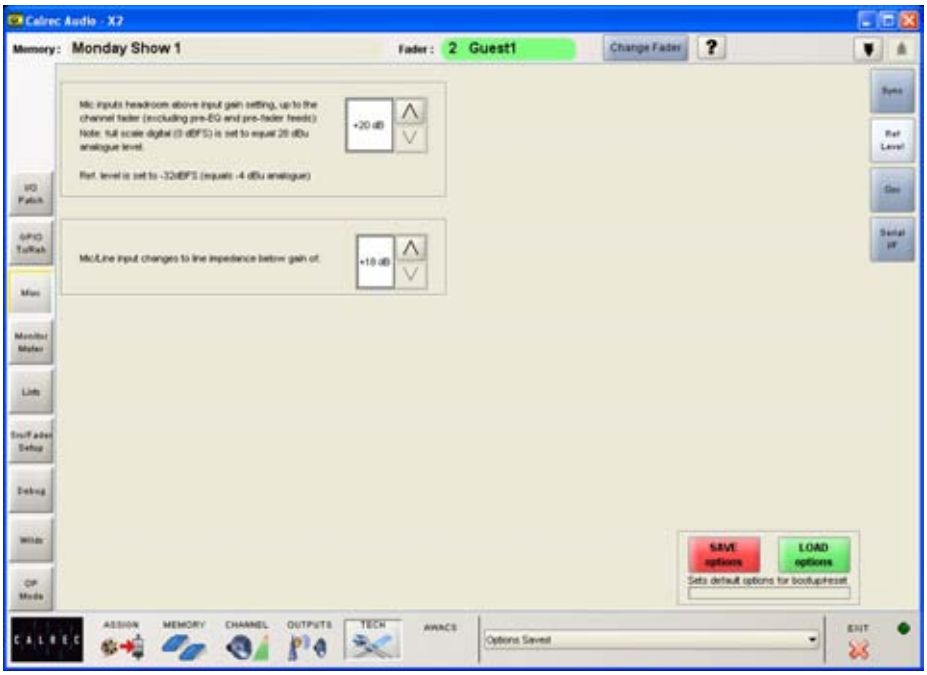
Mic/Line Input Impedance

The point at which the mic/line input impedance changes can be adjusted between 18dB and 24dB.

Save and Load Options

Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up

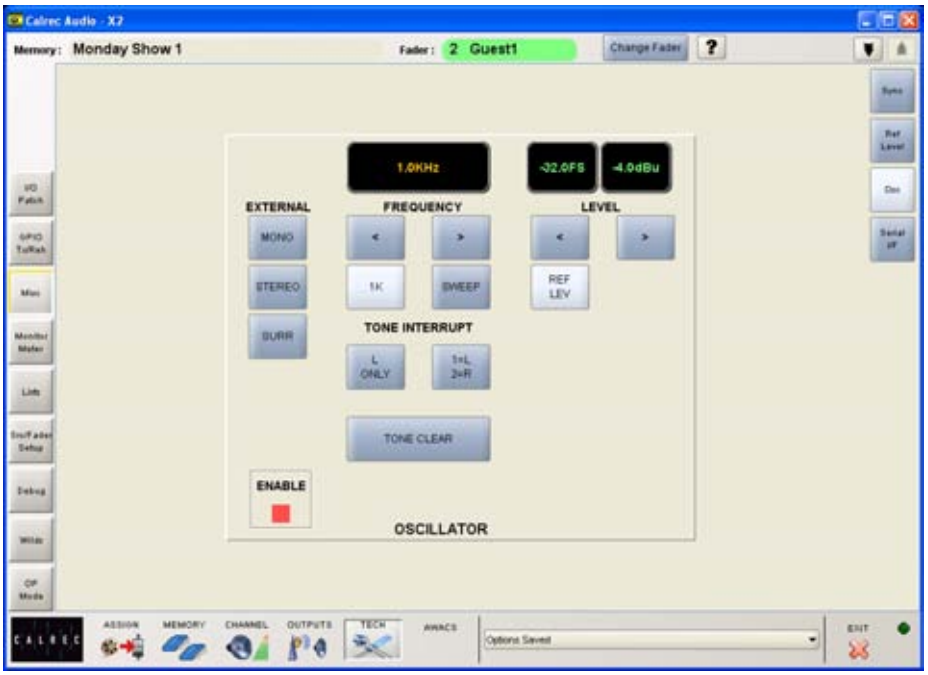


the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

MISC - OSCILLATOR

This screen provides controls for the oscillator, which is used to generate test tones for alignment and testing. This screen is only visible in engineer mode.



Frequency

The frequency of the tone can be adjusted from 20Hz to 20KHz in incremental steps using the nudge buttons, or set to 1KHz using the 1K button. Alternatively, the sweep button will set the oscillator to sweep through all frequencies.

Level

The level of the test tone can be adjusted from -60dBFS to 0dBFS using the nudge buttons, or set to the reference level using the REF LEV button.

Tone Interrupt

The Tone Interrupt buttons are useful for testing stereo monitoring and metering. It allows the tone to be interrupted on the left side only, or on the left and right sides in an alternating pattern.

Clearing Oscillator Routes

TONE CLEAR clears all oscillator routes made, providing an easy way of removing test tones from signal paths.

External Input

The External buttons replace the tone with an external source of your choice. This allows for external oscillators to be used if preferred. The ports for this are set up on the Tech - Monitor Meter - Talkback Monitor Inputs screen.

Enable Indicator

The Enable indicator shows that the oscillator controls are enabled.

MISC – SERIAL INTERFACE

The console has a serial interface port on the rear of the console processing unit to allow the console to be connected to a BNCS (Broadcast network Control System). The Misc - Serial I/F screens provide controls to set up the console's serial port and any router label associations. This screen is only visible in engineer mode.

Serial Port Settings Screen

The Serial Port Settings screen is used to tell the system what information it should receive from the serial interface port, by allocating a function to it from a drop down box in the Serial Function column.

Only the serial functions which are enabled for the console will be available for selection.

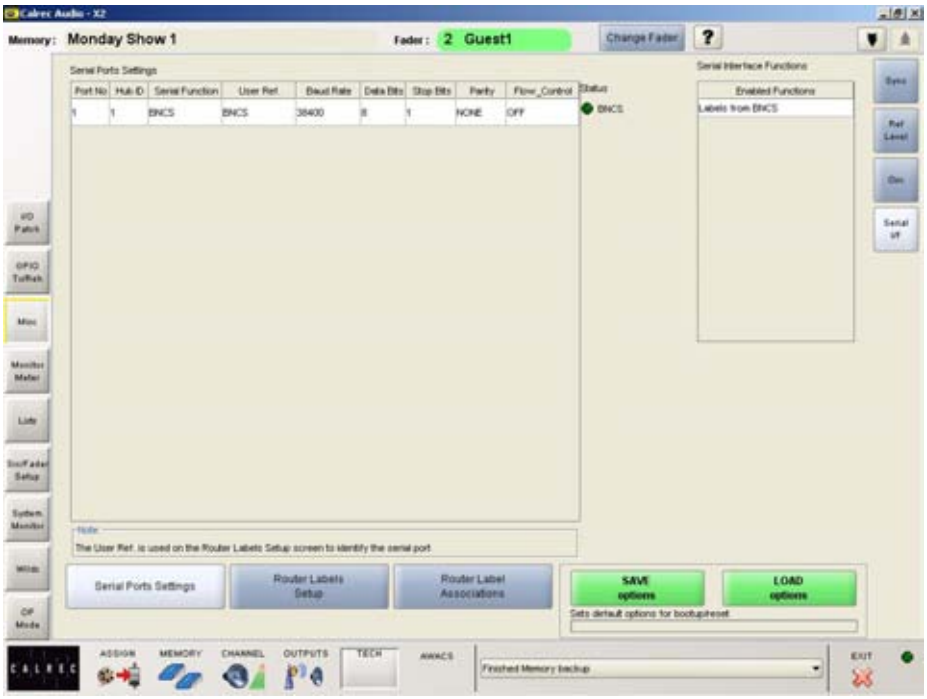
The function can be given a name by typing up to six characters in the USER REF column.

The status indicator flashes when a valid message is received from the serial port.

Save and Load Options

Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up

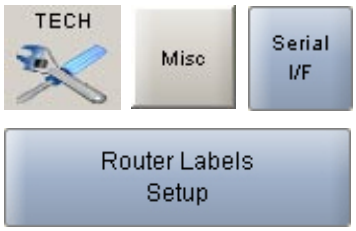


the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

ROUTER LABELS SETUP

Some Routers incorporate a label interface which is used for the transmission of source (input) and destination (output) descriptions between itself and other equipment.

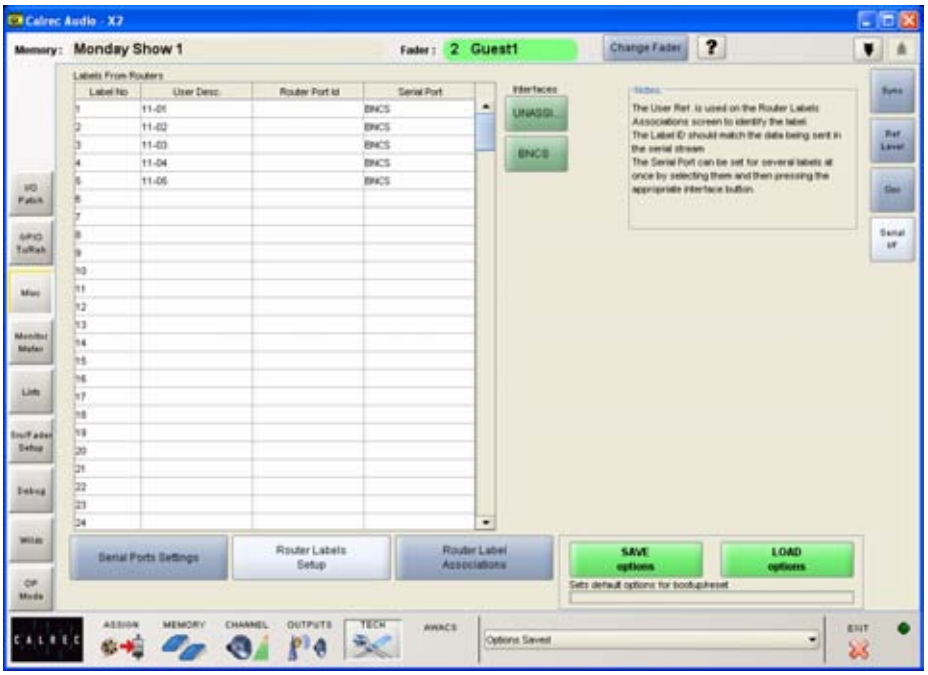


When an audio signal from a Router is connected to the console, its associated label is transmitted to the console via the serial interface. The console can use these labels as input names, and they can then be displayed and used on the control surface and front end application.

The console can support up to 256 Router labels. The Tech - Misc - Serial I/F - Router Labels Setup screen allows the link between messages from the router to be associated with one of the console's 256 labels.

The serial port function previously set up on the Serial Port Settings screen will now have a selection button on this screen. To associate labels to the interface, select the label, or region of labels, and select the serial port function button. The serial port column tells the user which serial port function the label is linked to. The UNASSIGN button when selected will remove any assignment from the selected label(s).

A Router uses a reference code to define each of its output ports The user must enter these reference codes into the Label ID column for each label.



The User Reference column allows the user to give the label a friendly name of up to six characters.

Save and Load Options

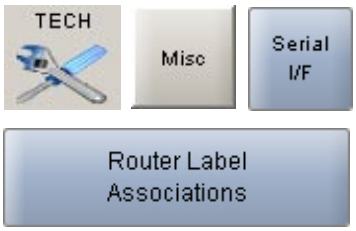
Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

MISC – SERIAL INTERFACE

The Tech - Misc - Serial I/F - Router Labels Associations screen allows each of the defined labels to be associated with one of the console's input ports.

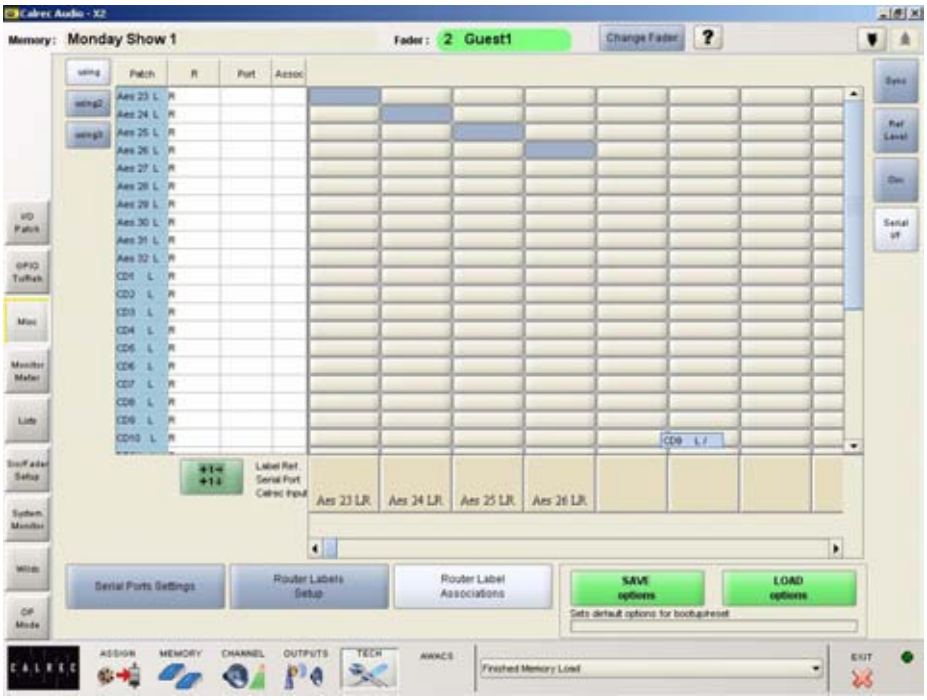


The input ports are shown down the left hand side of the screen, and the Router labels are shown along the bottom of the screen. This forms a grid, and associations are made by selecting the intersecting cell between input port and router label. Each leg of the input ports is always presented as if it were a mono port.

When an association is made, the cell will turn yellow. Associations can be unmade by selecting the cell again, whereby its colour will change back to grey. The +1 button is used to automatically move diagonally down the grid to the next association cell and toggle its condition. The action occurs out of sight even if you go beyond the viewed section of the screen.

Once an input port is associated with a Router label, the labels will be visible on the fader label column on the I/O - Input screen on whichever channel the port is patched. If a new fader label is entered on the I/O - Input screen, it overrides the router label. The router label will also be displayed on the channel display on the fader module.

If the Router fails to communicate for longer than ten seconds then the Router



label text is cleared and the fader labels revert back to displaying the input port label.

Save and Load Options

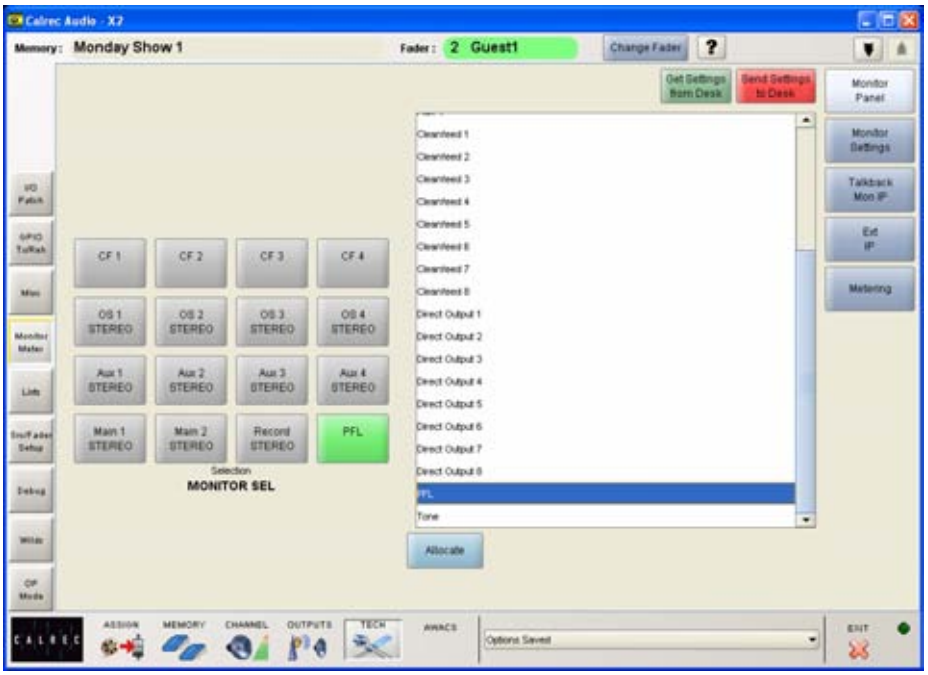
Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

MONITOR PANEL SETUP

This screen allows all the available monitor sources to be allocated to the 16 selection buttons on the monitor panel. This screen is only visible in engineer mode.



The left side of the screen shows a representation of the monitor selection buttons. The right side of the screen lists all the available monitor sources. Monitor sources are allocated to the 16 selection buttons as follows:

- Select the button to which you want to assign a source (screen button will flash)
- Select a monitor source from the list
- Select “Allocate”

For external sources, a pop up window allows the user to enter a suitable label for the button, and define the source as mono, stereo or surround.

Send Settings To Desk

Changes to the monitor configuration on this screen will not take effect on the monitor panel until “Send Settings To Desk” is selected. If changes are made on the screen, but are not sent to the desk, this button will be red.

Get Settings From Desk

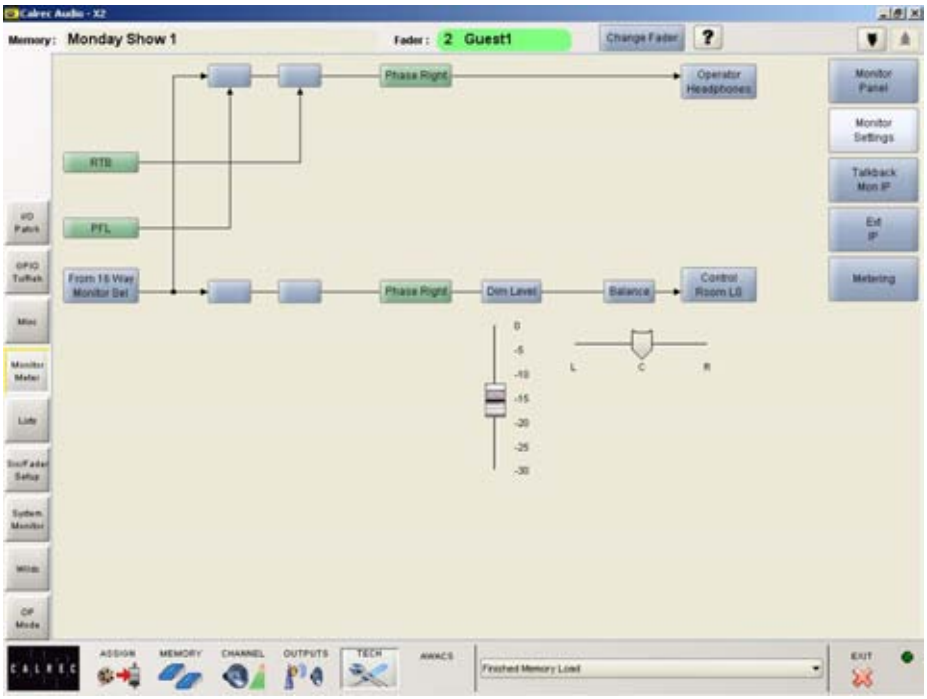
The “Get Settings From Desk” button retrieves the setting that the panel is currently using and displays it on the screen.

Storing settings

The settings on this screen are saved in, and loaded from, the default memory only.

MONITOR SETTINGS

This screen allows some monitor settings to be adjusted. This screen is only visible in engineer mode.



PFL & RTB

PFL and RTB can be set to feed the operator's headphones or the control room loudspeakers. Selecting the PFL or RTB buttons on the screen will toggle between them.

Phase Right

The phase of the right leg of the signal can be inverted here.

Dim Level

The control room loudspeaker's Dim Level can be adjusted using the screen fader.

Balance

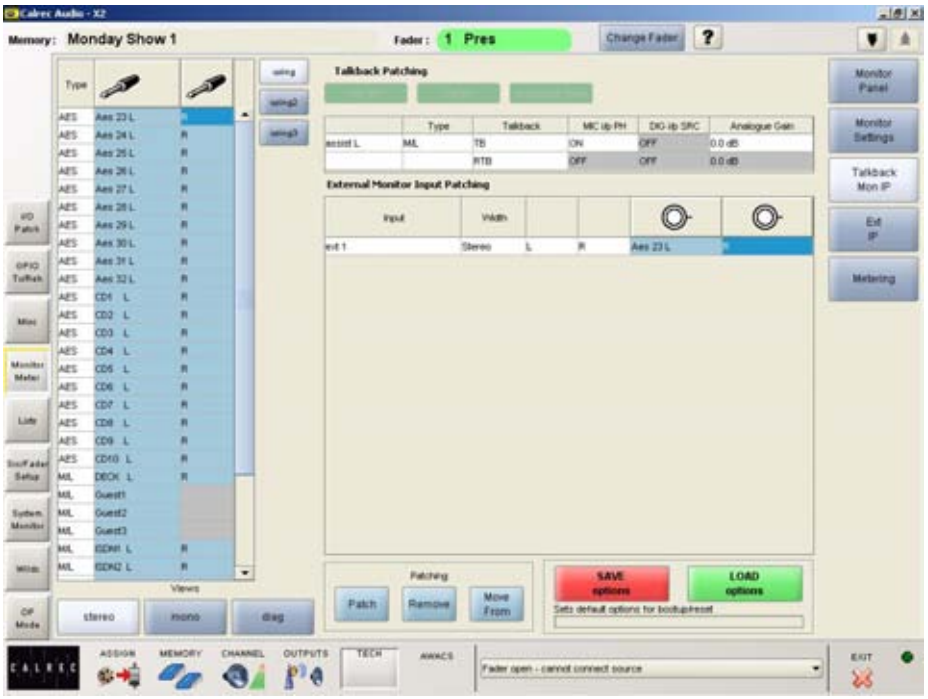
A balance control for the control room loudspeakers is provided.

Storing settings

The settings on this screen are saved in, and loaded from, the default memory only.

TALKBACK MONITOR INPUTS

The input sources for Talkback, Reverse Talkback and the external monitor input are patched on this screen. This screen is only visible in engineer mode.



Source Lists

Talkback input ports can be any kind of port, selected from the list on the left of the screen. Different lists are accessed using the selection buttons.

The sources can be viewed as pairs (for patching to stereo or surround paths), individual (for patching to mono paths), or individual with the actual rack number, card slot and input shown (for diagnostic purposes).

Patching

The Talkback inputs are listed in the main section of the screen. Assignment is made by selecting a source and an input, and selecting Patch.

Parameters

The parameter buttons provide controls for analog gain control (coarse), Phantom Power (mic/line) and SRC switching for the input (AES). When selecting analog gain, a box will appear where the gain can be selected. Selecting Mic i/p PH will turn phantom power on for mic/line inputs. Dig I/P SRC will switch SRC on for AES inputs.

External Monitor Input

Ports for the external monitor input can also be patched on this screen.

Save and Load Options

Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

Storing settings

The settings on this screen are saved in, and loaded from, the default memory only.

EXTERNAL METER INPUTS

The input sources for external meters can be patched on this screen. There can be up to 16 mono or stereo external meter inputs. This screen is only visible in engineer mode.

Sources are selected from the available lists on the left of the screen. Different lists are accessed using the selection buttons. The sources can be viewed as pairs (for patching to stereo or surround paths), individual (for patching to mono paths), or individual with the actual rack number, card slot and input shown (for diagnostic purposes).

Assignment is made by selecting an input source and a meter, and selecting Patch.

Save and Load Options

Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

METERING

This screen allows the user to change settings for the 4 screen based meters. This screen is only visible in engineer mode.

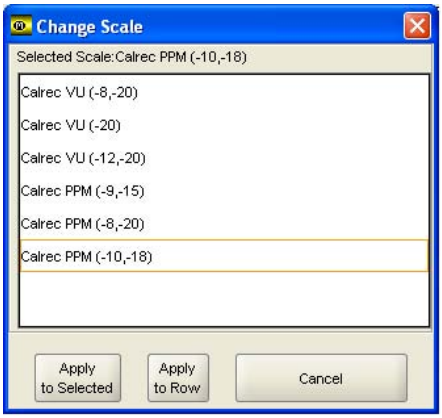
Change Meter

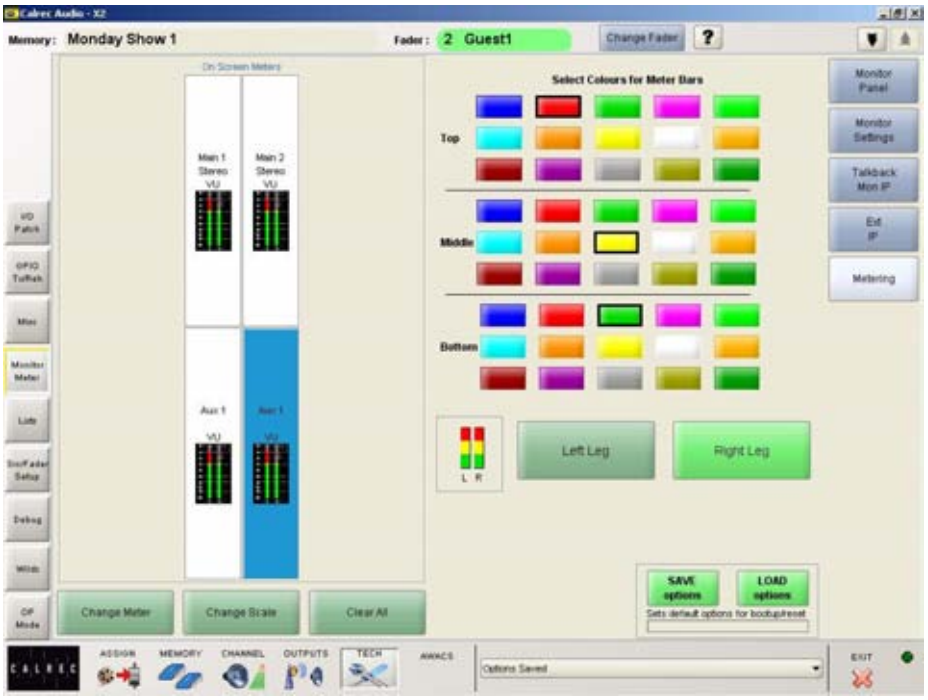
Select a meter position (its background will turn blue) and select CHANGE METER.

A dialogue box will appear which allows the meter source to be chosen. Select the required source from mains 1-2, Record, aux 1-4, Select, PFL, CRLS, Mix Minus or External 1-16. Each meter can be stereo, m/s or stereo phase (except mix minus, which is mono only).

Change Scale

Each meter can be PPM or VU.





The scale type can be selected individually for each meter. Scales available to the user can be restricted in the Set-up Application.

Clear All

"Clear All" resets all the meter positions, clearing all settings on all meters in the upstand. A confirmation box must be accepted before this action is carried out, this is to prevent against accidental changes.

Bar colours

The user can select the colours for the top/middle/bottom colours for each leg of the signal can be selected independently. Select the meter position, then select the colours from the palette. The selected colours for each signal are shown at the bottom of the screen and are used for all 4 meters.

Save and Load Options

Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

PORT LISTS

All of the available input and output ports can be grouped into lists using the Tech Lists screens. These lists are then selectable on the patching screens. This screen is only visible in engineer mode.

The buttons at the bottom right corner of the screen switch between input port lists and output port lists. There can be up to 5 lists for inputs and 5 lists for outputs.

Allocating Ports To Lists

To create a new list, select the required port from the Port Name column (multiple ports can be selected by dragging down the column) and select “Create New List”. A window will appear for the user to enter a name for the list.

“Move to List” will move any selected ports to existing lists. A window will appear for the user to choose which list to move the port to.

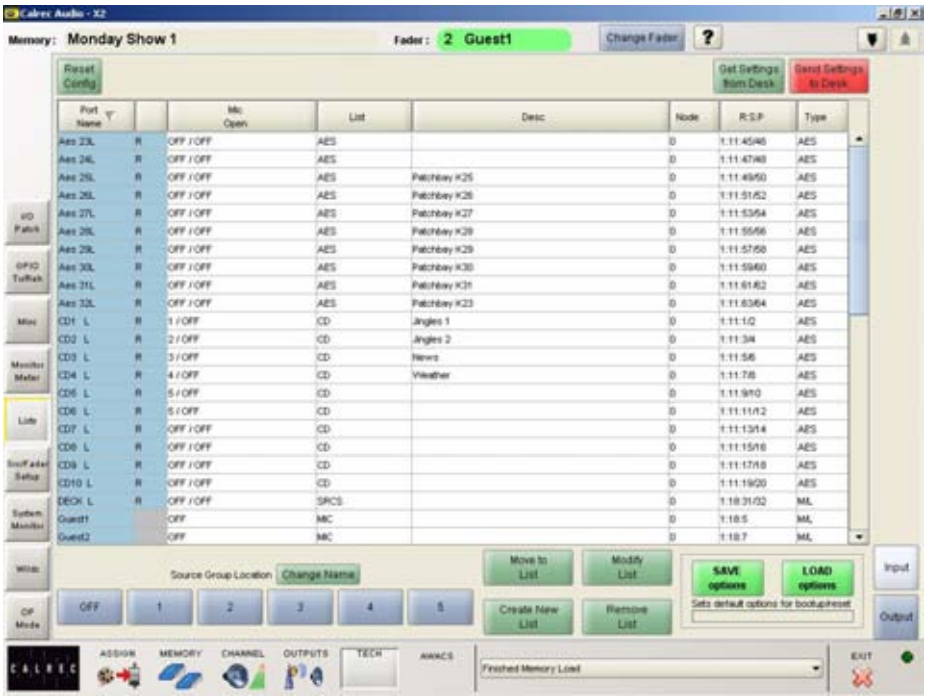
“Remove List” allows the user to delete lists from the configuration

“Modify List” allows the user to change the name of a list.

Port Description

Each port can be given a long description by typing directly into the description column. This description could describe the port’s use, or it could be some information on where to find the connection within the installation, for example, its location on a patchfield.

These descriptions appear on the I/O patching screens under the “DESC” button.



Source Location Groups

Each input port can be assigned to a source location group, such that it will operate the mic open circuit when that source is faded up and routed to the programme output.

First select the input from the list and then select the required source location group button. Each source location group can be given a user friendly name, by selecting “Change Name”

The source location group number will appear in the “Mic Open” column (There will be two digits if both legs of a pair of inputs are assigned to a source location group). The source will operate the group to which the left of the pair is assigned.

In the setup application, a source location group can be set to automatically cut the control room loudspeaker output., by allocating it to the mute function. The function is then enabled via condition switching on the Tech - GPIO - TX/REH screen.

Source location groups can also be set to fire a relay. These are set on the and Tech - GPIO - GPO screens.

Save and Load Options

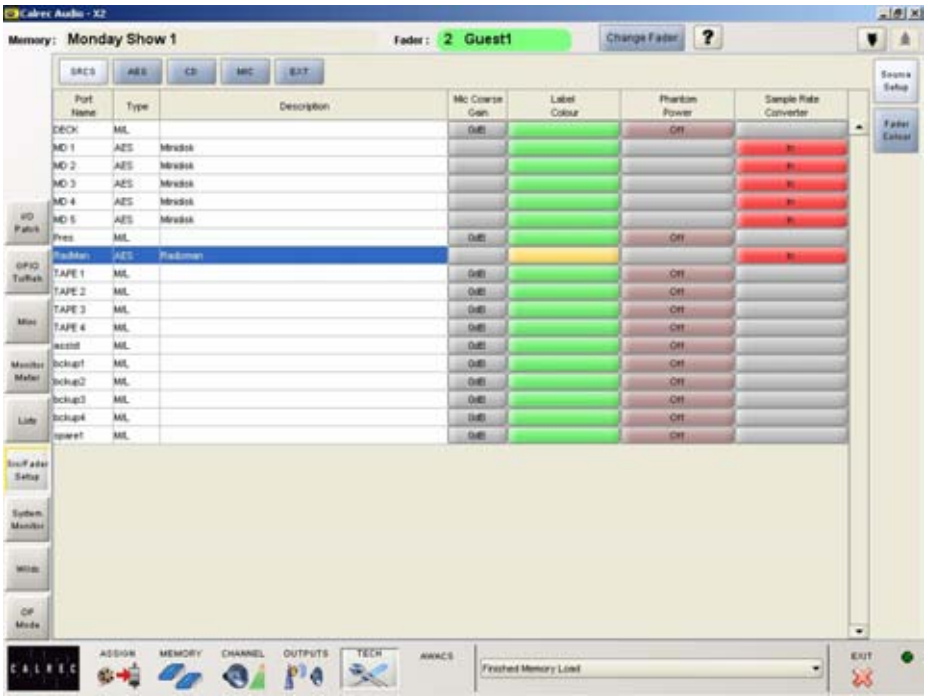
Settings on this screen are not stored in the individual console memories but are saved and loaded separately using the Save and Load options buttons.

Changes to options take effect as soon as they are made, but, if they are not saved, the next time the desk boots up the options will revert to their previous settings.

When changes are made to this screen, the Save button will change colour, and if the user leaves the screen without saving the options, the system will ask whether to save the changes.

SOURCE SETUP

This screen allows the user to set the following functions for each input source. This screen is only visible in engineer mode.



Mic Coarse Gain

A pop up box allows the mic coarse gain for the input to be set between -12dB and +78dB. When a mic input is assigned to a fader mic coarse gain control is also provided on the Channel - Chans screen

Label Colour

The colour of the display label on the source's fader can be set to green or amber here.

Phantom Power

Selecting a cell in this column will switch phantom power On/Off for mic/line inputs.

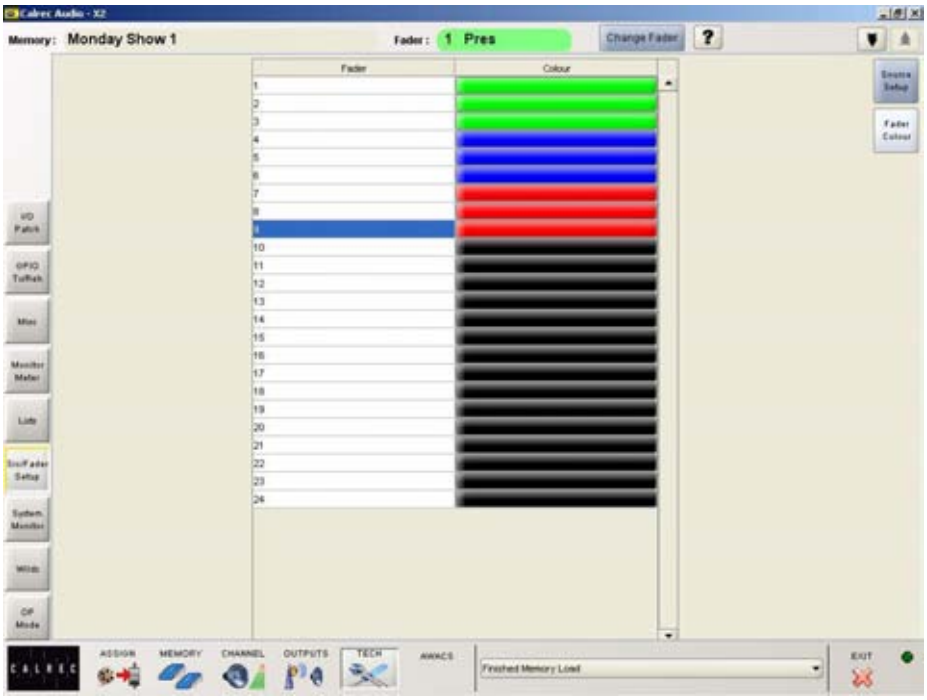
Sample Rate Converter

Selecting a cell in this column will switch sample rate conversion In/Out for AES inputs.

FADER COLOUR

This screen allows the user to change the colour of each screen fader. This makes them easier to distinguish. This screen is only visible in engineer mode.

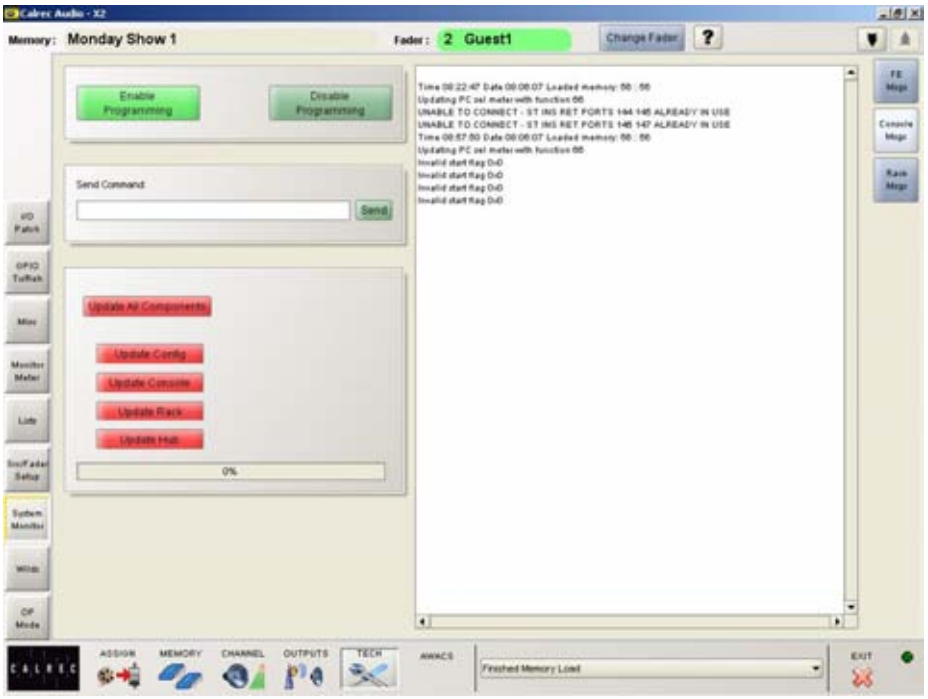
Selecting the cell in the colour column allows the colour to be chosen from a new window. A choice of four colours is available.



SYSTEM MONITOR

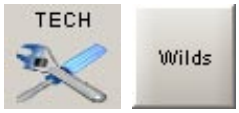
This screen logs system messages, allows debugging and system updates to be carried out. They allow a Calrec support engineer to update and troubleshoot your system. This screen is only visible in engineer mode.

When Enable Programming is selected, the system will ask again for the engineer's password.



WILDS

This screen allows the user to allocate functions to the faders' wild controls, and for studio engineer to restrict access to certain screens when in Operator mode.



Allocating Wild Controls

The Assign buttons in the list of functions will set the currently assigned fader's wild control to that function.

Apply to All Faders will apply the current wild control to all the console's faders.

Auto-Wild

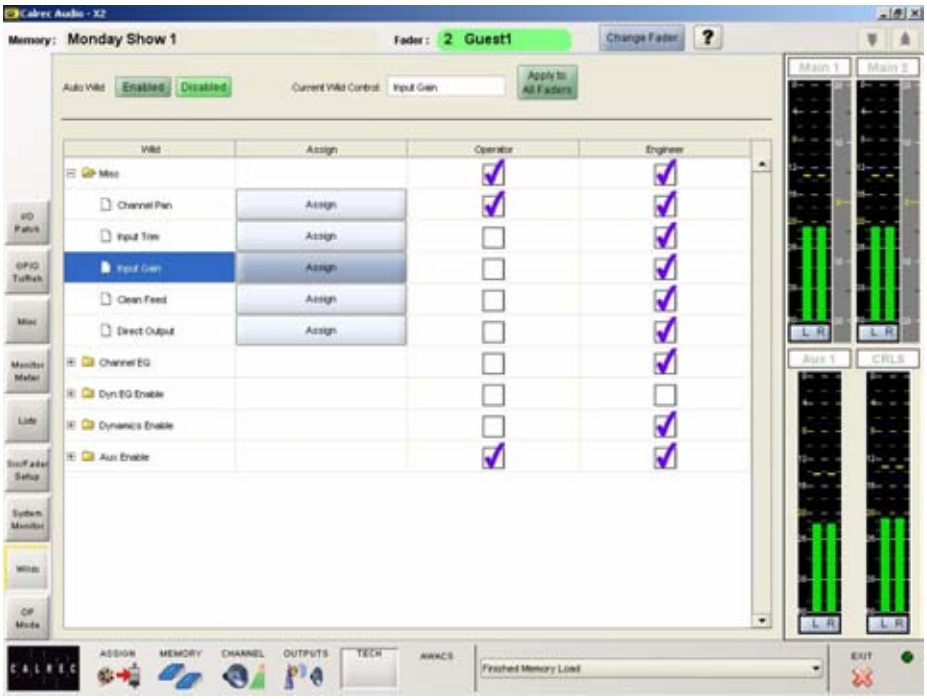
Auto-wild mode for the currently assigned channel can be enabled or disabled using the buttons on this screen. In auto-wild mode, any screen control which is operated will be copied to the wild control on the currently selected channel (provided that the control is among those available for wild assignment). It can then be adjusted from the currently assigned fader's wild control in addition to the screen control.

Screen Function Restrictions

In engineer mode, the user can restrict access to certain screen functions, so that the screen is still visible to the operator, but some of its functions will not be available.

To allow or restrict screen functions, place or remove the ticks to and from the relevant column on the screen. If a function has been restricted, it will not be available as a wild control.

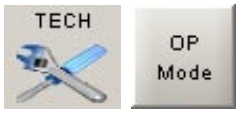
Screen restrictions are saved with the user memory.



Function	Wild Control Operation	
	Rotary Control	Wild Button
Pan/Balance	Pan/Balance	In/Out
Input Trim	Input Trim	-
EQ LF Level	LF Level	In/Out
EQ LMF Level	LMF Level	In/Out
EQ LMF Frequency	LMF Frequency	In/Out
EQ HMF Level	HMF Level	In/Out
EQ HMF Frequency	HMF Frequency	In/Out
EQ HF Level	HF Level	In/Out
Dynamics Threshold	Threshold Level	In/Out
Dynamics Make Up Gain	Make Up Gain	-
Direct Output Level	Direct Output Level	On/Off
Clean Feed Output Level	Clean Feed Output Level	On/Off
Aux 1-4 Send Level	Aux 1-4 Send Level	On(Post)/On (Pre)/Off (steps through)

OPERATIONAL MODES

The console can be in one of two operational modes, “Operator”, or “Engineer”. Operation of certain screen functions is only available in “Engineer” mode, which is password protected to add an extra layer of security. The Tech - OP Mode screen is used to log in and out of different modes.



Operator Mode

In operator mode, the only Tech screens which are visible are Tech - Op Mode and Tech - Wilds. This prevents accidental changes to the set up being made.

Engineer Mode

It is intended that all set-up procedures and configuration may be carried out and maintained by an engineer or technical operator. Engineer mode allows unrestricted access to all features of the system, permitting an authorised engineer to prepare the console for use.

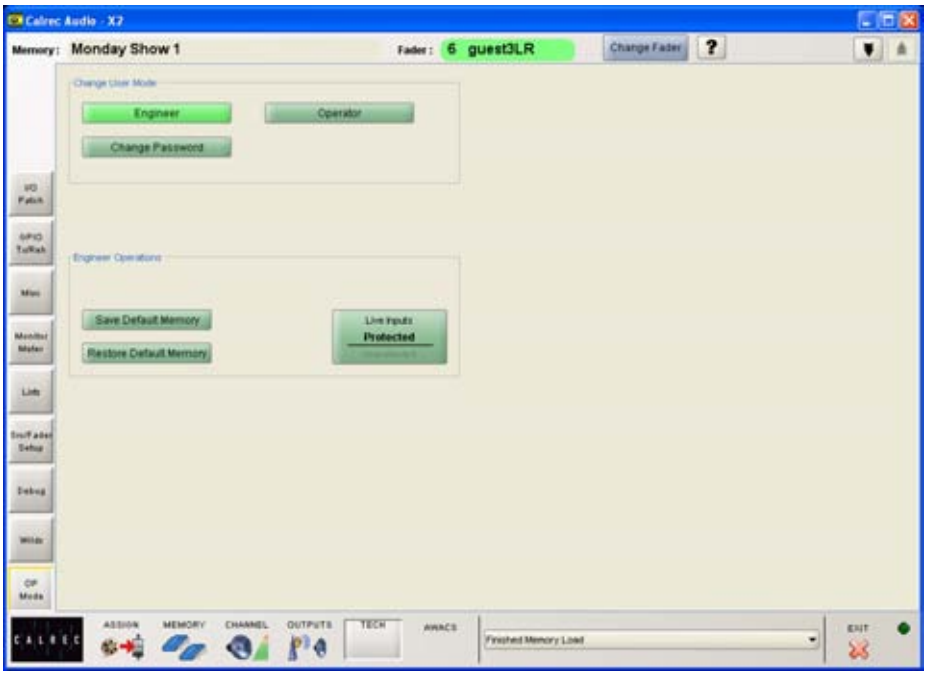
Restricting Screens and Screen Functions

In addition, an engineer can hide further screens, using the buttons on each screen.

An engineer can restrict access to certain screen functions, using the Tech - Wilds screen, so that the screen is still visible to the operator, but some of its functions will not be available.

When the system is in Engineer mode, the TECH icon at the bottom of the screen will flash.

The first time engineer mode is selected, the user will be asked to set up a password. This password will then be required each time engineer mode is entered.



Default Memory

In engineer mode, a user can save and load a console default memory, using the save and load buttons on this screen. It is recommended that a default memory is created upon installation of the console. This default memory could contain the input port set-ups which match the studio wiring, and settings for GPIO, and running levels. It could have all channel settings off or flat, with no routes made, and could be available as a start up memory, from which more specific memories could be created.

Protect Live Inputs

When live input protection is enabled, sources cannot be removed from or moved between faders when the fader is open.

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