ZETA INSTALLATION MANUAL

Digital Broadcast Production Console

CALREC

Putting Sound in the Picture

calrec.com

Calrec Audio Ltd
Nutclough Mill
Hebden Bridge
West Yorkshire
England UK
HX7 8EZ

Tel +44 (0)1422 842159
Fax +44 (0)1422 845244
Email Enquiries@calrec.com

calrec.com

ZETA
CONTENTS

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 8:30a.m - 5:00p.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 and the Zeta Operator 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 Zeta group.

ZETA
OVERVIEW

CALREC

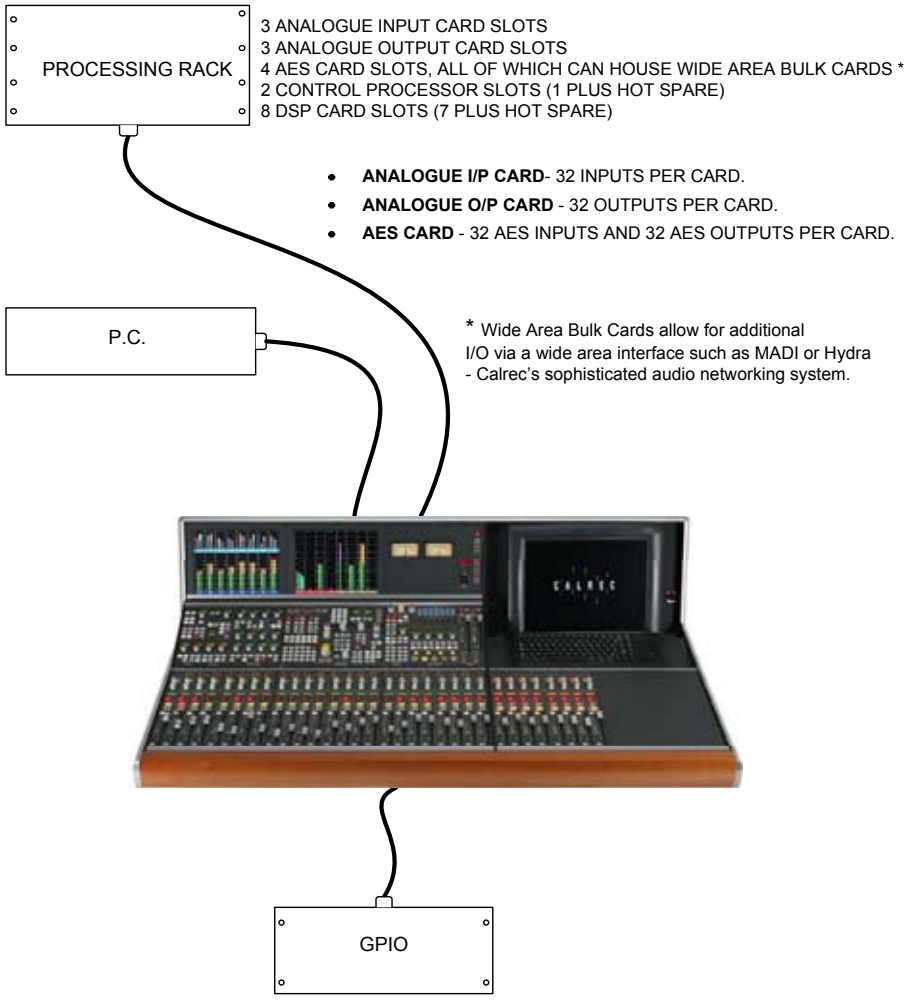
SYSTEM OVERVIEW

- Available in three frame sizes - 24 fader, 40 fader and 56 fader.
- 108 or 112 equivalent channels (up to 42 stereo/mono plus 24 mono channels, or 56 stereo).
- Table-top or floor stand mounting.
- Console operates independently of PC, and PC failure has no effect on audio or control.
- Independent DSP operation ensures audio continuity even during PC or control reset.
- Console and racks boot from power on in less than 20 seconds.
- Full control system reset in less than 15 seconds.
- Last settings fully restored on power-up or reset.
- Automatic change over to hot spares for PSU's, control cards and DSP cards.
- Hot plugging of every card and module.
- Hot plugged cards initialise upon insertion.

Audio Packs

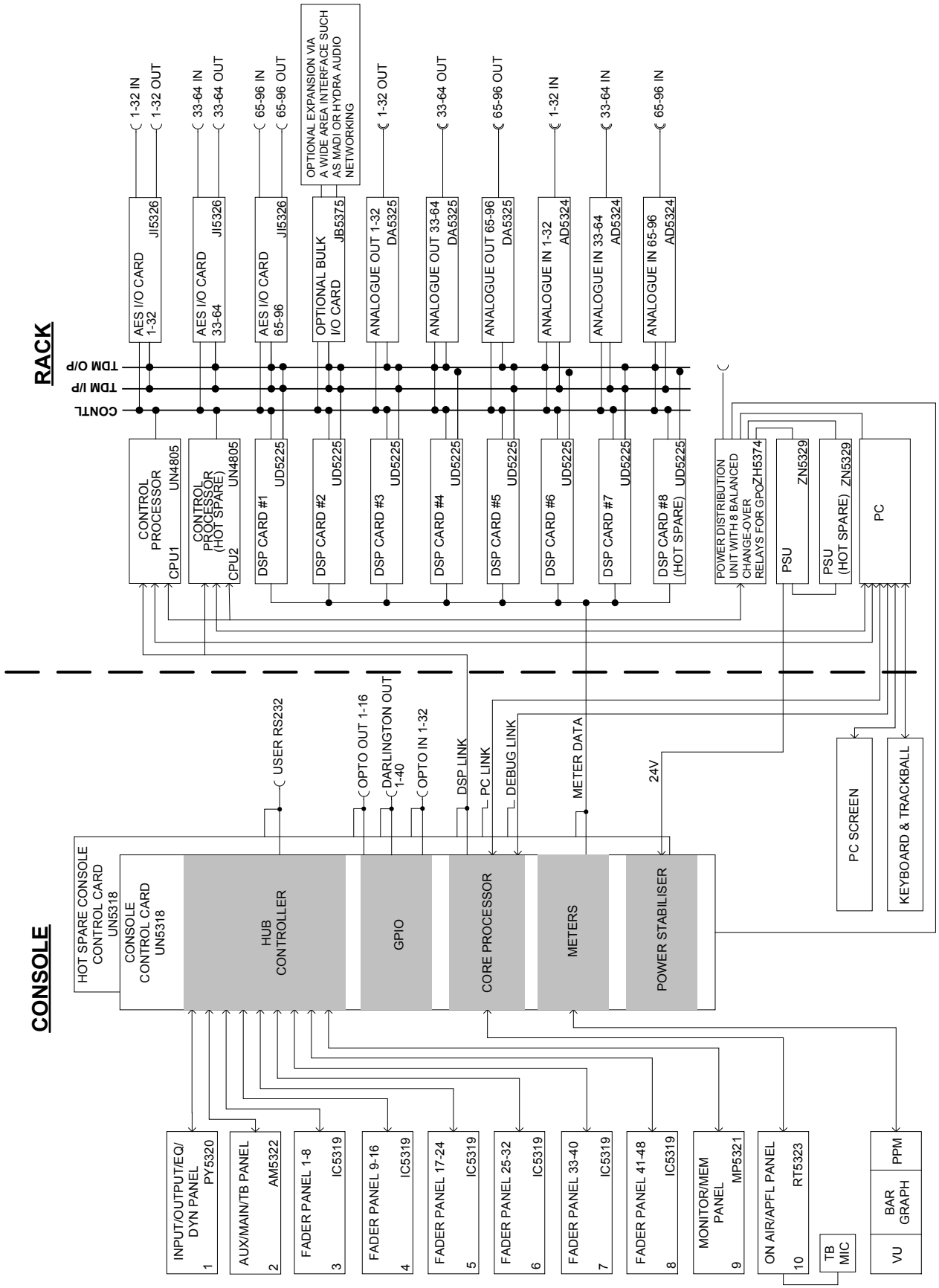
The console is supplied in combinations of four basic processing cores (packs) providing pre-defined numbers of channels I/O and input delay legs. Each of the four core provisions A, B, C and D are available with all stereo channels or a specific mono/stereo configuration as described below. In addition, Pack A is available with 4 or 8 audio groups.

All console output allocations must be derived from these standard port provisions. However, they may be expanded by purchasing additional interface cards.



Audio Pack	A1	A2	A3	A4	B1	B2	C1	C2	D1	D2
Stereo Channels	24	30	20	26	30	36	32	48	42	56
Mono Channels	8	0	8	0	10	0	24	0	24	0
Mono/Stereo Groups	4	4	8	8	8	8	8	8	8	8
Mic/Line Inputs	32	32	32	32	64	64	96	96	96	96
Line Outputs	32	32	32	32	64	64	96	96	96	96
AES Inputs	32	32	32	32	32	32	64	64	96	96
AES Outputs	32	32	32	32	32	32	64	64	96	96
Delay Legs (Mono)	8	8	8	8	15	15	24	24	21	21

TYPICAL SYSTEM DIAGRAM



ENVIRONMENTAL CONSIDERATIONS

Temperature Range
Operating: 0°C to +30°C (32°F to +86°F) in the immediate environment.

Non-operating: -20°C to +60°C (-4°F to +140°F).

Relative humidity
Operating: 25% to 80% non condensing.
Non-operating: 0% to 90% non condensing.

Altitude
Operating: Up to 2,000 metres (6562 feet). (This is the limit to which the safety tests are valid).

Non-operating: Up to 15,000 metres (49213 feet).

Earthing
The control surface and processing rack are provided with chassis earth studs. These must be connected to a common earth buss before any AC power is applied to the system. The system power supplies and PC are earthed via their AC power inlets.

AC (Mains) Power
All power supplies are rack-mounting and are seperate from the units they power, except for the PC which has a built-in power supply.

AC (Mains) Power inlets are IEC type. Each PSU in the Bulk PSU rack has one inlet, each Multi-Rail power supply unit has one inlet, the PC has one inlet, each mains powered MADI unit (if purchased) has one inlet, and there is one inlet on the rear of the control surface, for any AC powered equipment which needs to be housed within it.

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.

Touch Screen
If the console is installed into an outside broadcast vehicle, it is important that the touch screen monitor is secured using suitable fixings during transit to prevent movement, and possible damage. Calrec Audio Ltd is not liable for any damages to the touch screen, the touch screen arm, the console or any other items caused by movement or damage of the monitor and / or monitor arm.

TFT Screens
The TFT meter screens that are fitted in our consoles are industrial units. The display manufacturer states that screen brightness may reduce to 50% of the initial value after the unit has been running at maximum brightness for 50,000 hrs. Our maximum brightness is intentionally reduced so that the useful life of the backlights should be in excess of 100,000 hrs.

We do not believe that there are any burn-in or image-persistence issues with this type of TFT display.

The TFT screens should be cleaned with a micro-fibre cloth, dampened only with clean water. Do not use any corrosive chemicals, solvents or window cleaning solutions.

The TFT screens have no user-serviceable parts. Should you encounter a problem with any of your screens, please contact Calrec.

INPUT/OUTPUT PORT LABELLING

The system allows the user to pre-define labels for all the I/O. The only rules imposed on this 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; mono, stereo or surround.

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, a stereo signal, or parts of a surround 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 which appears 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, Transmission Control Suite, 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.

A set of input/output port labelling sheets are provided for your use at the end of this manual.

Lists

In addition to labelling, each port can be allocated to one of a number of lists using the Options - Port Lists screens. This allows I/O which is wired for similar purposes to be grouped together for selection.

Each list will have been given a six character “list label” and the lists can be sorted into the required order on the Options-Port Lists screens. The lists will appear in the same order on the I/O port selection controls on the control surface. It is possible to determine which lists appear for selection on the I/O Matrix panel. This reduces the number of times the pot needs to be pushed, to go through all the available lists.

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

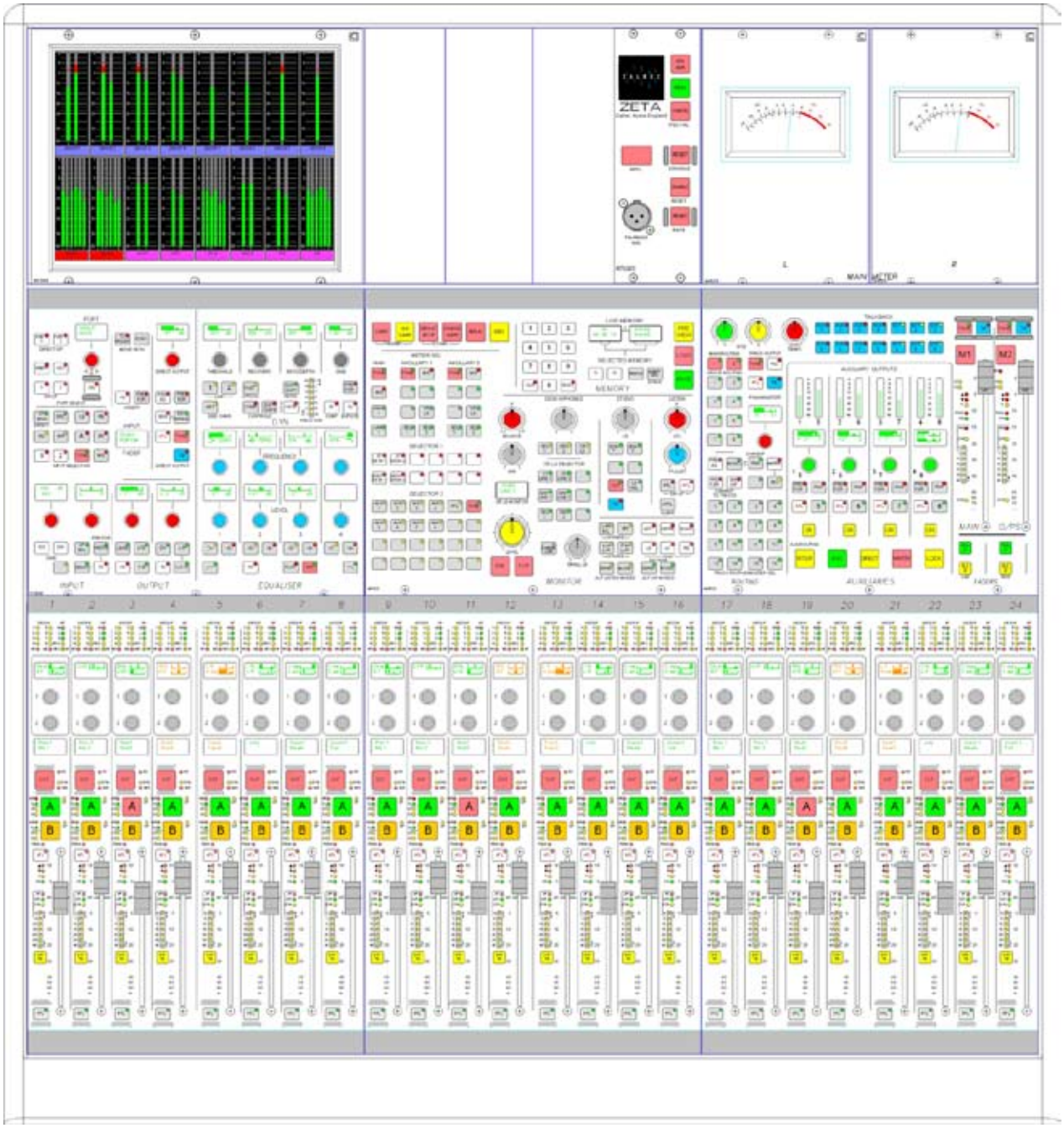
Analog output for 0dBFS Matches input setting into >1kOhms (+24dBu max into 600 Ohms)

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

ZETA
FRAME OPTIONS AND DIMENSIONS

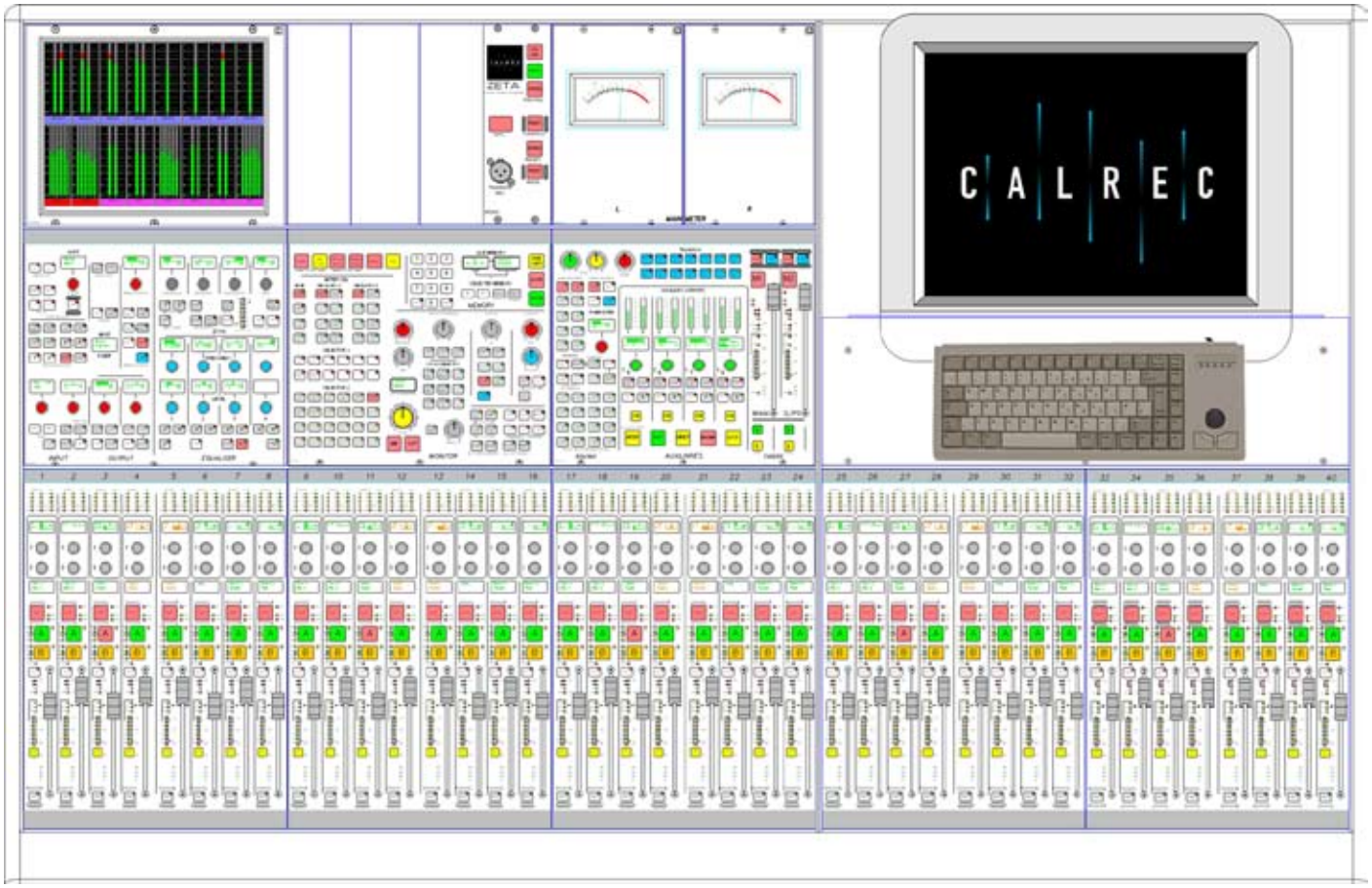
24 FADER FRAME TYPICAL LAYOUT



The smallest frame houses up to 24 faders, which allows up to 48 paths to be controlled within a frame only 784mm (30.9 inches) wide.

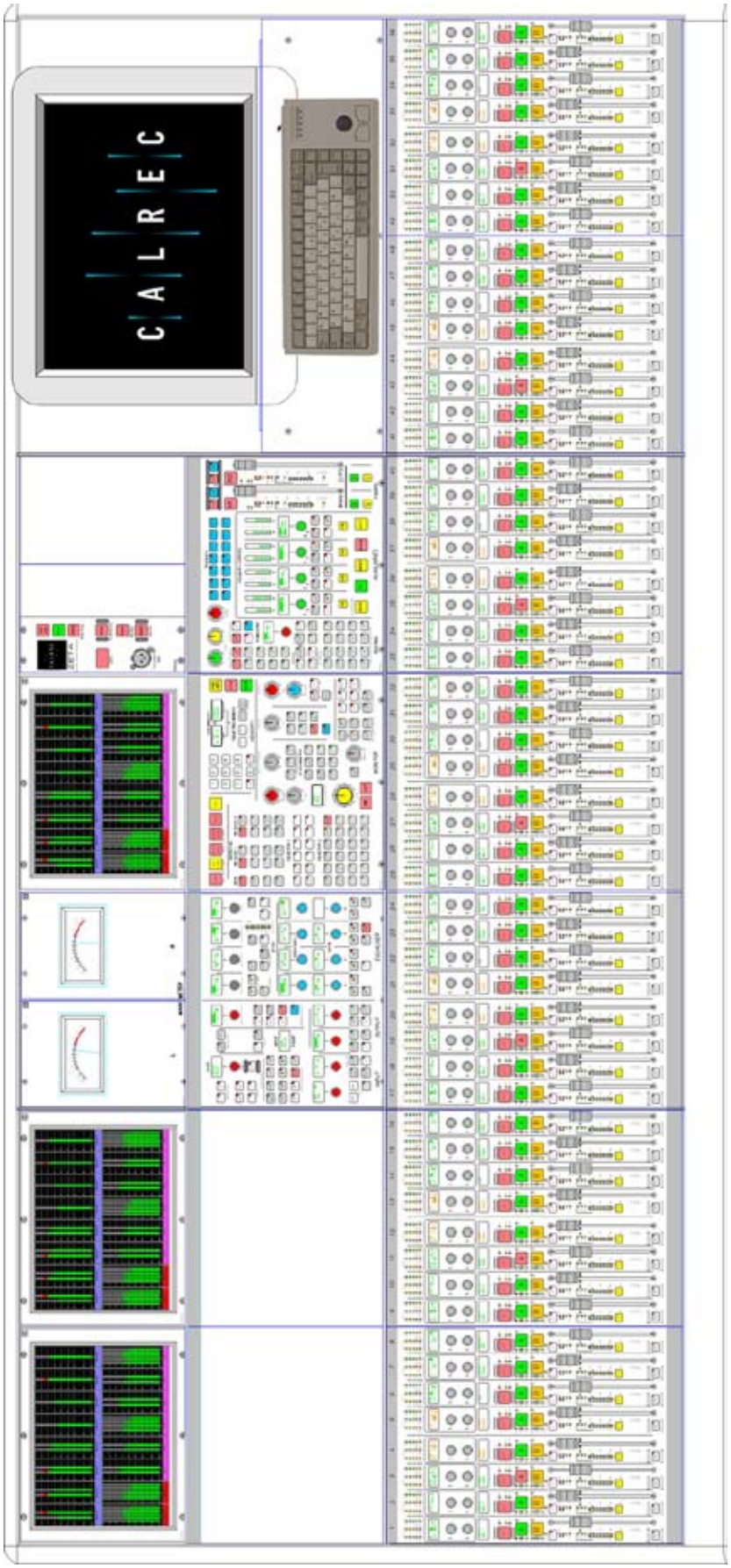
Due to the console's compact size, colour touch screen, keyboard and trackerball are housed separately.

40 FADER FRAME TYPICAL LAYOUT



The medium sized frame houses up to 40 faders, which allows up to 80 paths to be controlled within a frame only 1290mm (50.8 inches) wide.

56 FADER FRAME TYPICAL LAYOUT

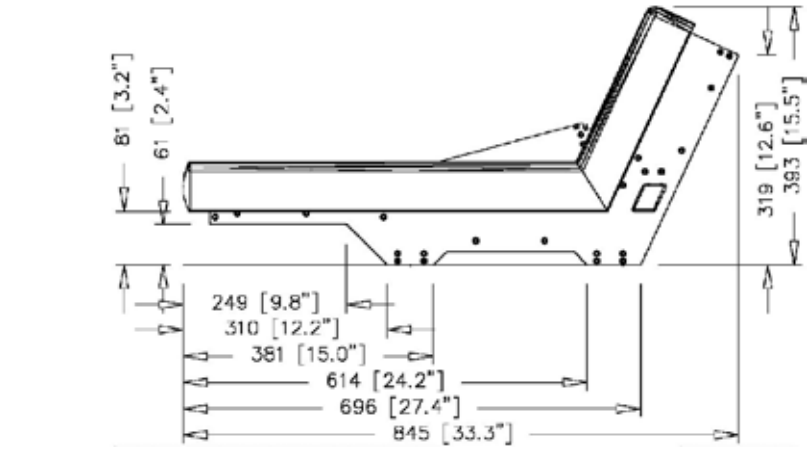


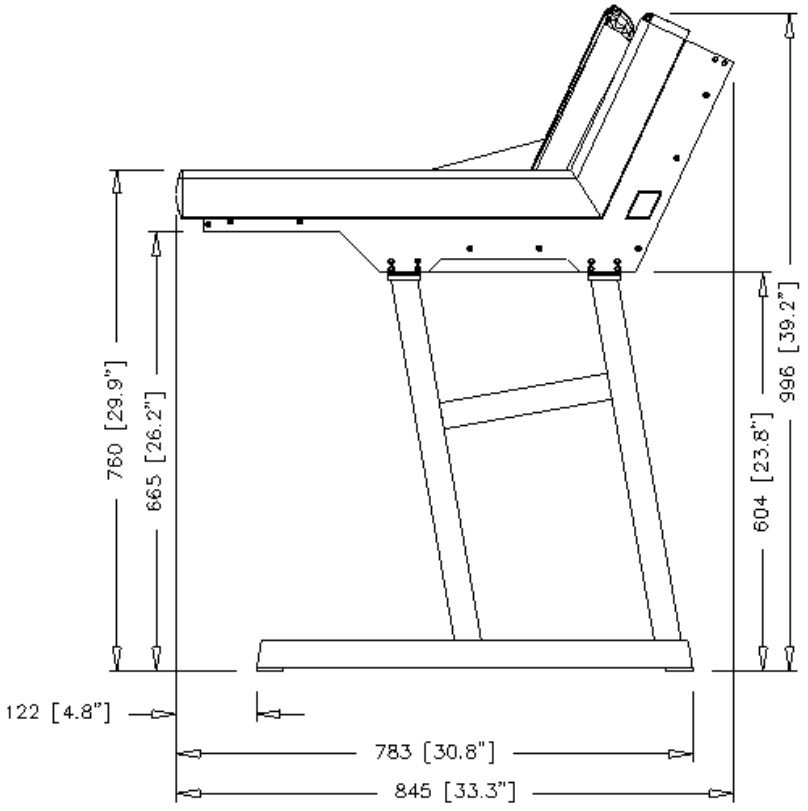
The largest frame houses up to 56 faders (the maximum number possible), which allows up to 112 paths to be controlled within a frame only 1796mm (70.7 inches) wide.

CONSOLE PLAN AND ELEVATION

Frame Size	Length		Depth	
	inches	mm	inches	mm
24 Fader Frame	30.9	784	33.3	845
40 Fader Frame	50.8	1290	33.3	845
56 Fader Frame	70.7	1796	33.3	845

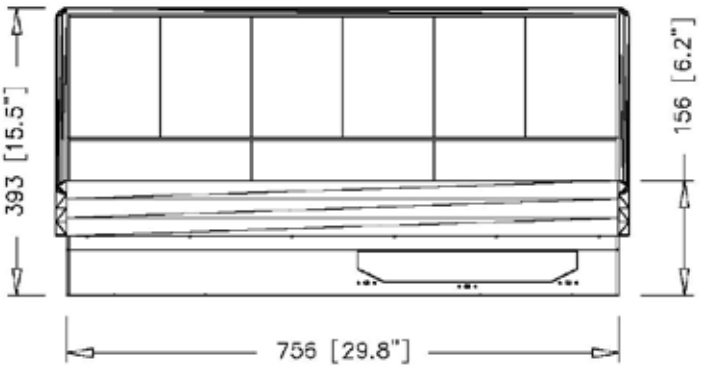
The end profile is the same for all three frame sizes. An optional floor stand is available.



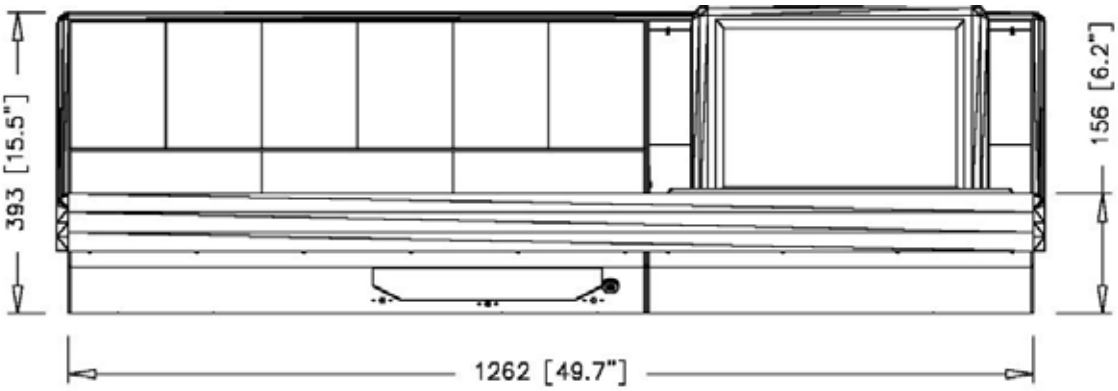


FRONT ELEVATION

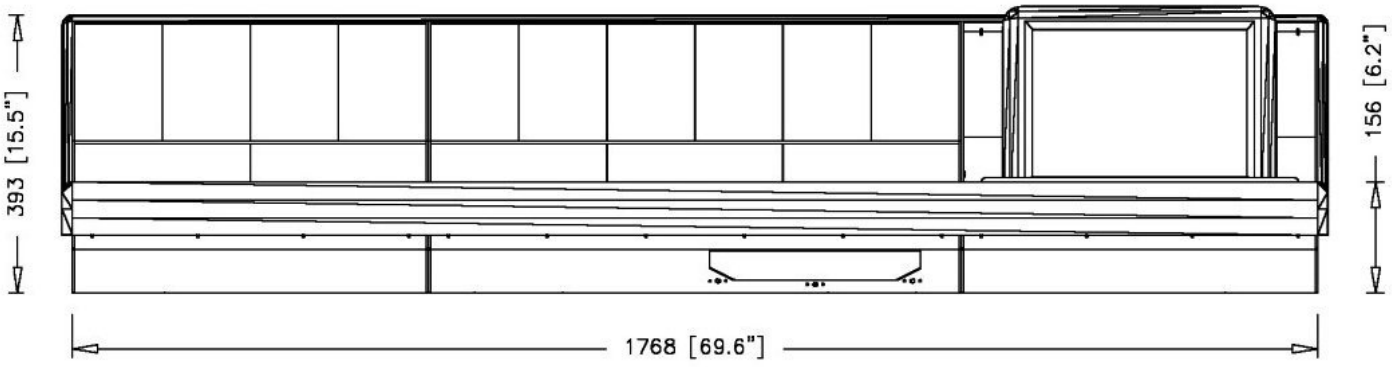
24 FADER



40 FADER



56 FADER



ZETA
EQUIPMENT INSTALLATION INFORMATION

CALREC

calrec.com

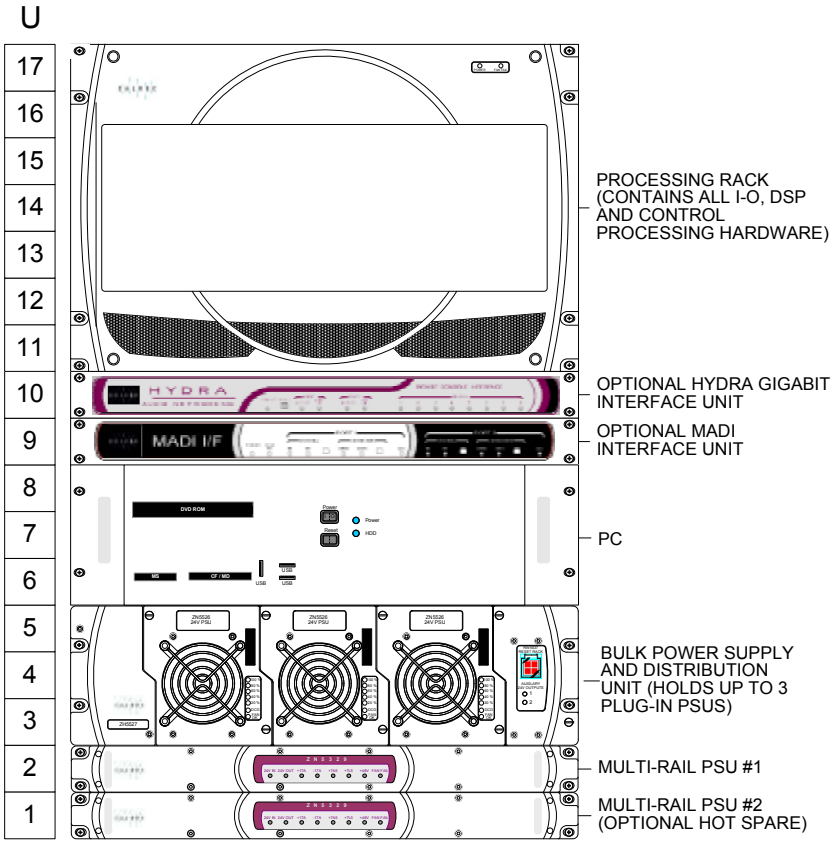
Putting Sound in the Picture

RACK SPECIFICATIONS

It is recommended that all equipment over 8Kg (17.5 lbs) in weight, or over 150mm (6 inches) deep is mounted into equipment bays which offer mechanical supports under each of the units. This will allow units to be supported as they slide forward during removal for maintenance purposes.

Equipment can be mounted in separate enclosures. Please refer to the cable lengths table when planning this.

The Processing rack has a fan tray built into it, which incorporates a baffle such that warm air is sucked up out of the rack and out through the rear of the fan tray. A vent in the front of the fan tray allows ambient air to enter. The baffle deflects this air up into the rack above. The bottom rack should not be positioned above any equipment producing significant heat.



Item	Height	Approx depth (incl. mating cons)		Approx weight		Approx Power Output (W) (full load)	Approx AC Power (VA) (full load)
		inches	mm	lbs	kgs		
Bulk Power Supply and Distribution rack with one PSU	3U	15	380	26	11.8	600	750
Additional Plug-in PSU (Hot Spare)	-	-	-	8.0	3.65	No extra	Less than 5% extra
Processing Rack (Unpopulated)	7U	19.7	500	29.5	13.4	-	-
Processing Rack (Populated)	7U	19.7	500	42.3	19.2	-	-
PC*	3U	23.7	600	27	12.2	-	400
Hydra Gigabit Interface Unit	1U	11.9	300	6	2.7	-	-
MADI Unit	1U	11.9	300	7	3.2	-	-
Multi-Rail PSU *	1U	18.1	460	9.3	4.23	-	-
Additional Multi-Rail PSU Hot spare	1U	18.1	460	9.3	4.23	No extra	Less than 5% extra

* Note: Unit has handles protruding approx 1.3" (32mm) from the surface of the front panel.

Cables From	To	Maximum Length	
		Feet	Metres
Control Surface	PC	492	150
Control Surface	Processing Rack	492	150
Control Surface *	Bulk Power Supply & Distribution Unit	24/32 Faders -492 40 Faders - 459 48 Faders - 394	24/32 Faders - 150 40 Faders - 140 48 Faders - 120
Processing Rack	Bulk Power Supply & Distribution Unit	16.5	5
Processing Rack	PC	98	30
Processing Rack	BNC I/O Interface Panels (Digital)	16.5	5
Processing Rack	XLR I/O Interface Panels (Digital)	9.8	3
Processing Rack**	EDAC I/O Interface Panels (Analogue)	16.5	5
Processing Rack	MADI Unit	16.5	5
Processing Rack	Hydra Gigabit Interface Unit	16.5	5

* For longer distances, the control surface requires a local power supply.

** For longer distances, custom made cables can be provided.

PROCESSING RACK

The 7U Processing 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.

- 8 slots for DSP Cards
- 2 slots for Processor Cards
- 3 slots for ADC (Analog Input) Cards
- 3 slots for DAC (Analog Output) Cards
- 4 slots for AES I/O cards, 3 of which can house Wide Area Bulk Cards

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.

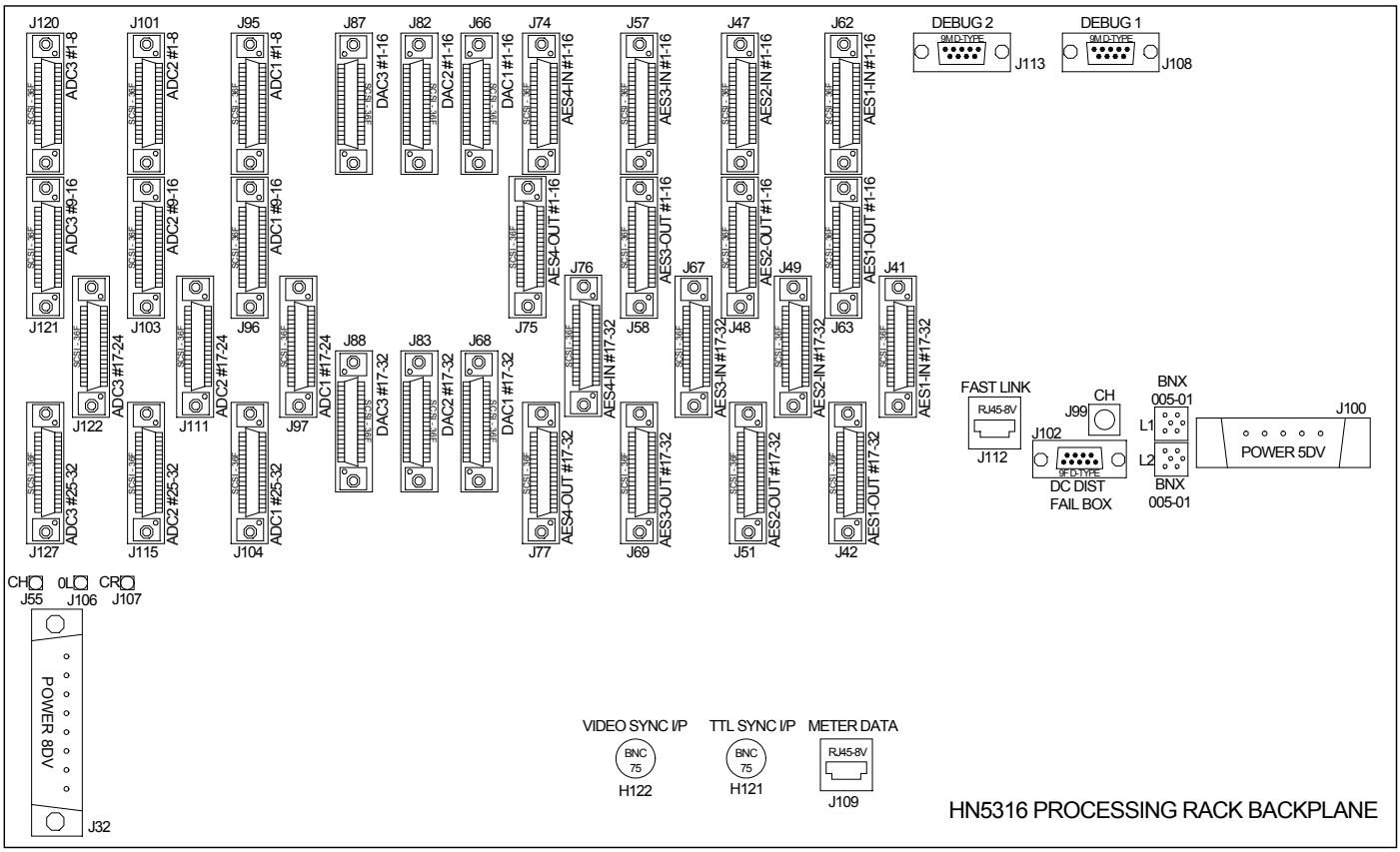
Video and TTL Wordclock Synchronisation

Video (PAL or NTSC) and TTL Word Clock synchronisation inputs are provided on the rear of the Processing rack, on 75Ω BNC connectors.

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).

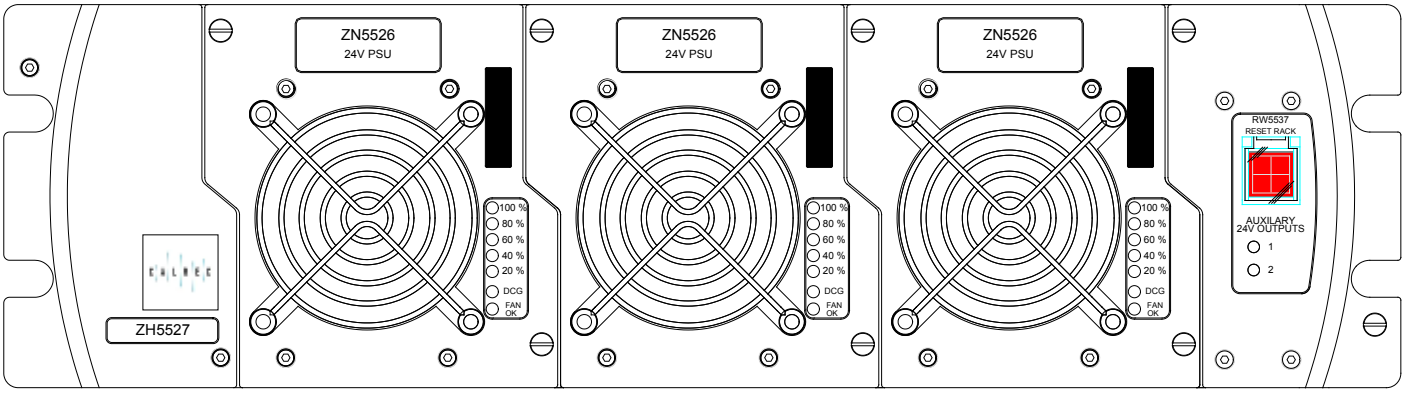
REAR INTERFACE



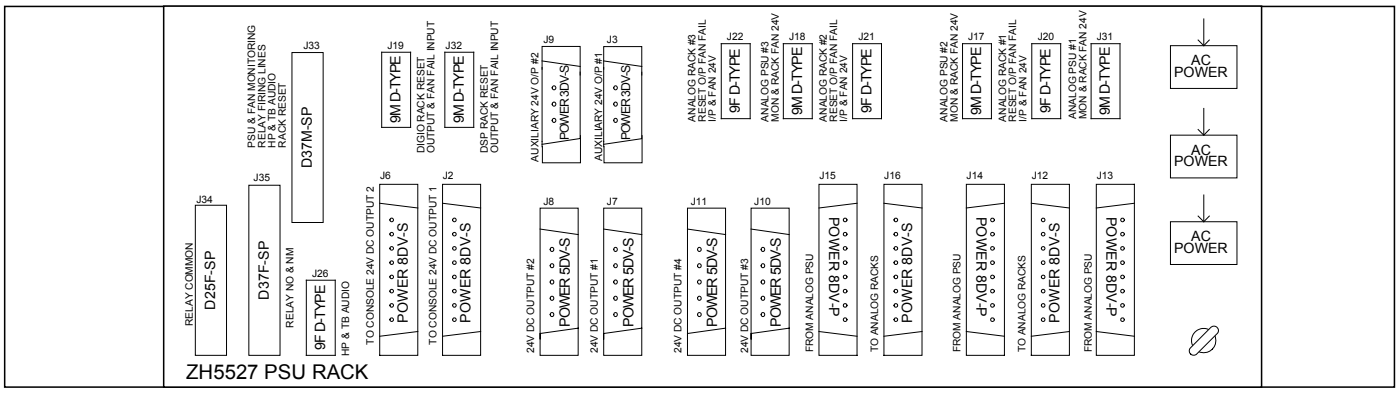
HN5316 PROCESSING RACK BACKPLANE

BULK POWER SUPPLY AND DISTRIBUTION UNIT

FRONT



REAR



This 3U rack is used to provide power to the control surface and digital components in the system. The rack can hold up to 3 identical plug-in power supply units. The number of plug-in PSU's required in the rack is dependant upon the distance between console and rack, and the "hot spare" requirement.

If your system uses the 2U Bulk power supply and seperate distribution system, please refer to Appendix A at the end of this manual.

Plug-in Units

Each unit has separate AC power inputs via IEC 950 filtered inlets at the rear of the rack. The DC outputs are combined on the backplane. The maximum output power from each plug-in unit is 600W.

Hot Swapping

The units can be "hot swapped" providing there is enough output power remaining to drive the load. Each unit has a bargraph to indicate the output power demand.

Auxiliary Power

Two 24V Auxiliary outputs are provided via resetable 10A current trips with LED status indication on the front panel. These could be used for a MADI interface unit or a Hydra networking interface unit for example.

Fan Cooling

The rack is fan cooled with fans mounted in the front of each PSU. The warm air is directed out of the sides of the rack.

Bulk PSU Rack Fan Noise (dB SPL A-Weighted)	
These measurements were taken on axis at 1 metre from the dominant noise source:	
1 x 24V 600W PSU	42dBA
2 x 24V 600W PSU	45dBA
3 x 24V 600W PSU	47dBA
4 x 24V 600W PSU	48dBA
5 x 24V 600W PSU	49dBA
6 x 24V 600W PSU	50dBA

To ensure proper cooling, there must be a minimum clearance of two inches (50mm) from the fans and side air outlets The maximum operating ambient temperature is 35°C.

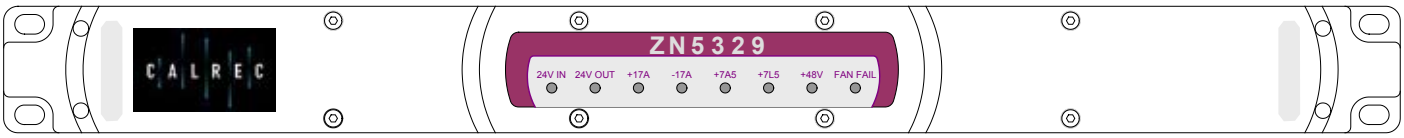
Power Monitoring & Distribution

In addition to supplying the console and digital rack components of the system with power, the Bulk Power Supply and Distribution Unit gathers and distributes the multiple rails (from external power units) required for any analog I/O cards. All the system power rails and fan speed monitoring is gathered here before being sent to the console. Should a fault occur, a warning light will flash on the console and a diagnostic message will appear on the front end AWACS (Automatic Warning And Correction System) screen.

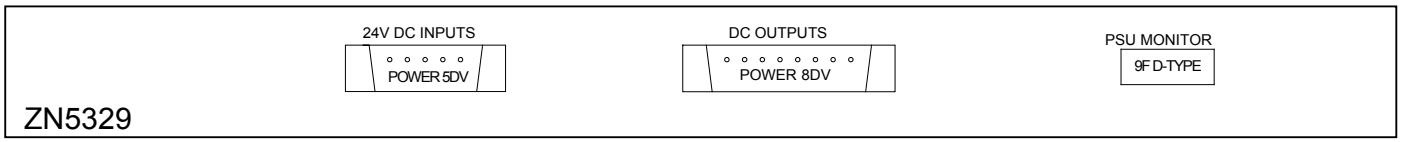
The unit also includes a front-mounted reset button for the Processing rack.

MULTI-RAIL POWER SUPPLY UNIT

FRONT



REAR



A 1U multi-rail power supply unit is used to power the analog components in the system. These supplies can be parallelled together. A typical system would have one of these multi-rail power supply units, plus a second unit acting as a "hot spare" providing redundancy, in case the other units fail.

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. In outside broadcast situations, the unit should ideally be located in an equipment bay which offers mechanical support from underneath.

Fan Cooling

The multi-rail power supply unit is fan cooled but uses a very low noise fan, drawing air from side to side through the PSU instead of in from the front, to minimise noise. 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 PC to warn the operator of a problem.

Power Monitoring & Distribution

These units are monitored via the bulk power supply and distribution unit. Should a fault occur, the hot spare would automatically take over from the primary unit, the PSU Fail Indicator on the Broadcast Facilities panel would begin to flash and a message would be sent to the control surface via AWACS.

PC INFORMATION

Mounting Instructions

The PC should be mounted by means of the side brackets, each of which has two mounting holes. The PC rack should always be mounted in a horizontal position. The sliders should be used when no support is provided under the PC assembly. It should not be supported by front flanges alone. Failure to follow these instructions may invalidate the warranty. The PC is earthed via its AC power inlet.

Remote Access

USB connectors are provided on both the front and rear of the PC 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.

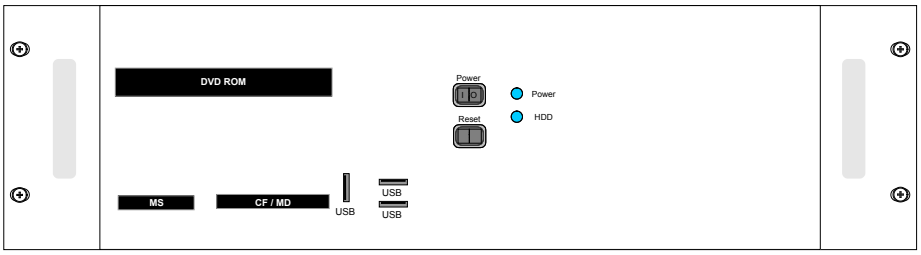
Hydra Network Connection

A Gigabit Ethernet port is provided to enable the PC to be connected to a Calrec Hydra Audio Network, which is an option which can either be purchased with the console or in the future.

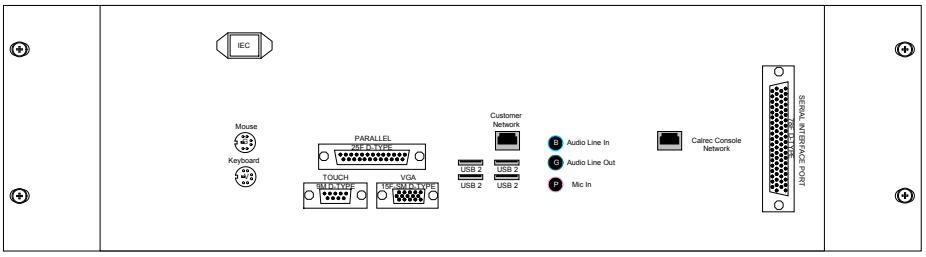
Software Supplied

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, and supplied on a CD-ROM.

FRONT



REAR



3rd Party Software

Calrec recommends that the PC is regarded as an integral control device for the console, and not as a general purpose PC. If 3rd party software is installed on the PC, care must always be taken to ensure that it does not interfere with the normal performance of the PC. The installation of inappropriate software on the 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. set up network, 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. It is recommended that this user is used during configuration of the PC and the setup of Hydra Audio Networking.

Operating System	Windows XP
CPU	Intel Celeron Processor (2GHz+)
RAM	256 MB DDR RAM
HDD	40GB
CD ROM	52x
Network Ports	2 x 10/100
Card Slots	Compact Flash/Microdrive, SmartMedia, Memory Stick, Secure Digital/Multimedia Card
USB 2 Ports	4 (Rear of Unit), 1 (Front of Unit)
IEEE1394 Port	1 (Front of Unit)
Additional Hardware	8 Port Serial Card

FILE BACKUP

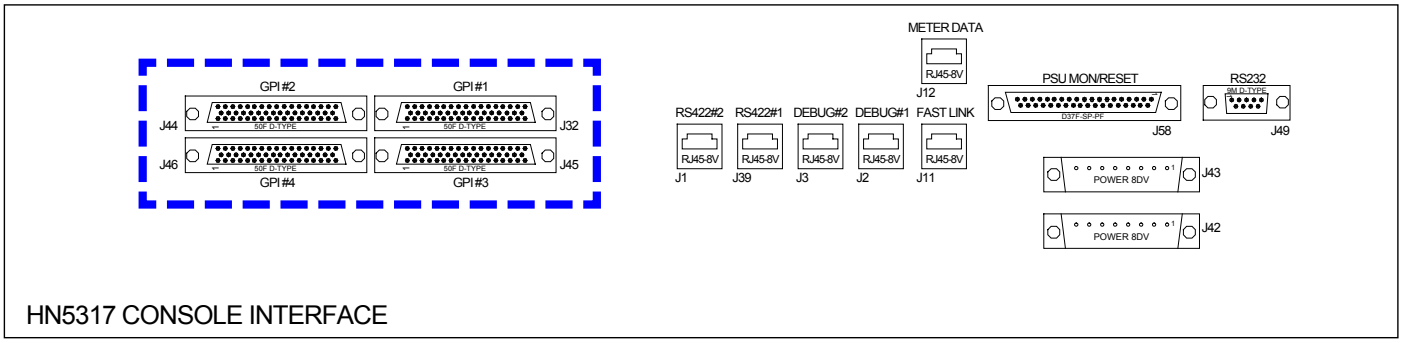
A number of flash card slots are provided on the front of the PC for file backup. In addition, backup could also be to a LAN or to a USB device which can be plugged into the front or rear of the PC.
The following files are not installed from the CD-ROM as they are specific to each individual console. As such, a backup copy should be kept of these files in-case of PC or hard-drive failure:

The system will automatically back up these files to a user-specified drive, if it is set to do so. This is done using the Set-up Application.

FILENAME	DESCRIPTION
C:\Zeta\Cust1\Config.ini	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:\Zeta\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:\Zeta\Cust1\Options\Options.bin (Or C:\Zeta100\Cust1\Options.bin in earlier software versions)	This file is updated and a new backup should be made when changes to any of the sub-pages of the options screen are made and saved.
C:\Zeta\Cust1\memories	This is the default location for the user memories. However, operators can choose to save them to any location they desire. 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:\Zeta\Cust1\Meter	This is the default location for the user-definable meter configurations. You should keep a backup copy of the files in this folder.
C:\Zeta\Cust1\Network	If your console uses Hydra Audio Networking, you should also keep a backup copy of the files in this folder. These are the configuration settings for the network units.
C:\Zeta\Cust1\Lists	This is the default location for the user-definable port list configurations. You should keep a backup copy of the files in this folder.
For customers using Compaq PC's only: C:\Zeta100\Cust1\A100fe1.ini C:\Zeta100\Alphaprg\Alphaprg.ini	These files are installed from the CD-ROM in a default format. The settings in these files can vary in different Compaq PCs. The backup of these files should be updated after a software upgrade. If a new hard-drive is fitted to the original Compaq PC, these files should be used to over-write the versions installed by the CD-ROM.

GPIO CONNECTIONS

Connections to the general purpose inputs and outputs are provided on 50 way female D-Type connectors on the rear of the console. 32 opto inputs, 16 opto outputs and 40 Darlington outputs are available.



HN5317 CONSOLE INTERFACE

GPI #1

Pins	Circuit
1 . 18	5L
34 . 2	Opto 1 IN
19 . 35	Opto 2 IN
3. 20	Opto 3 IN
36 . 4	Opto 4 IN
21 . 37	Opto 5 IN
5 . 22	Opto 6 IN
38 . 6	Opto 7 IN
23 . 39	Opto 8 IN
7 . 24	0L
40 . 8	5L
25 . 41	Opto 1 OUT
9 . 26	Opto 2 OUT
42 . 10	Opto 3 OUT
27 . 43	Opto 4 OUT
11 . 28	0L
44 . 12	5L
29 . 45	D OUT 1/2
13 . 30	D OUT 3/4
46 . 14	D OUT 5/6
31 . 47	D OUT 7/8
15 . 32	D OUT 9/10
48 . 16	NC
33 . 49	0L
17 . 50	CHASSIS

GPI #2

Pins	Circuit
1 . 18	5L
34 . 2	Opto 9 IN
19 . 35	Opto 10 IN
3. 20	Opto 11 IN
36 . 4	Opto 12 IN
21 . 37	Opto 13 IN
5 . 22	Opto 14 IN
38 . 6	Opto 15 IN
23 . 39	Opto 16 IN
7 . 24	0L
40 . 8	5L
25 . 41	Opto 5 OUT
9 . 26	Opto 6 OUT
42 . 10	Opto 7 OUT
27 . 43	Opto 8 OUT
11 . 28	0L
44 . 12	5L
29 . 45	D OUT 11/12
13 . 30	D OUT 13/14
46 . 14	D OUT 15/16
31 . 47	D OUT 17/18
15 . 32	D OUT 19/20
48 . 16	NC
33 . 49	0L
17 . 50	CHASSIS

GPI #3

Pins	Circuit
1 . 18	5L
34 . 2	Opto 17 IN
19 . 35	Opto 18 IN
3. 20	Opto 19 IN
36 . 4	Opto 20 IN
21 . 37	Opto 21 IN
5 . 22	Opto 22 IN
38 . 6	Opto 23 IN
23 . 39	Opto 24 IN
7 . 24	0L
40 . 8	5L
25 . 41	Opto 9 OUT
9 . 26	Opto 10 OUT
42 . 10	Opto 11 OUT
27 . 43	Opto 12 OUT
11 . 28	0L
44 . 12	5L
29 . 45	D OUT 21/22
13 . 30	D OUT 23/24
46 . 14	D OUT 25/26
31 . 47	D OUT 27/28
15 . 32	D OUT 29/30
48 . 16	NC
33 . 49	0L
17 . 50	CHASSIS

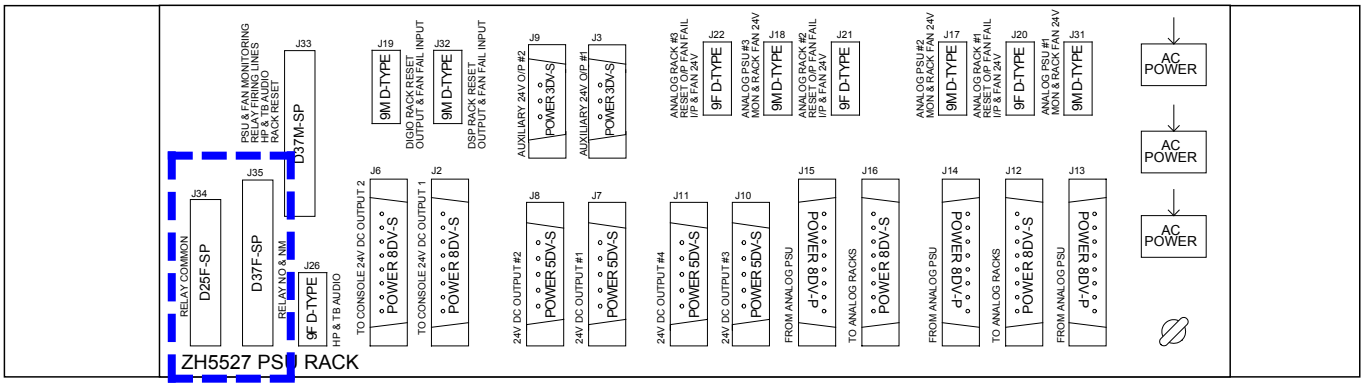
GPI #4

Pins	Circuit
1 . 18	5L
34 . 2	Opto 25 IN
19 . 35	Opto 26 IN
3. 20	Opto 27 IN
36 . 4	Opto 28 IN
21 . 37	Opto 29 IN
5 . 22	Opto 30 IN
38 . 6	Opto 31 IN
23 . 39	Opto 32 IN
7 . 24	0L
40 . 8	5L
25 . 41	Opto 13 OUT
9 . 26	Opto 14 OUT
42 . 10	Opto 15 OUT
27 . 43	Opto 16 OUT
11 . 28	0L
44 . 12	5L
29 . 45	D OUT 31/32
13 . 30	D OUT 33/34
46 . 14	D OUT 35/36
31 . 47	D OUT 37/38
15 . 32	D OUT 39/40
48 . 16	NC
33 . 49	0L
17 . 50	CHASSIS

Opto Specification - 5-24V
Darlington Specification - 30V, 5mA

GPIO CONNECTIONS

8 change over relays are also available on the rear of the Bulk Power Supply and Distribution Unit.



RELAY INPUTS (CONNECTOR J35)

Pins	Circuit
1 . 20	Normally Made a/b Relay 1
2 . 21	Normally Open a/b Relay 1
3 . 22	Normally Made a/b Relay 2
4 . 23	Normally Open a/b Relay 2
5 . 24	Normally Made a/b Relay 3
6 . 25	Normally Open a/b Relay 3
7 . 26	Normally Made a/b Relay 4
8 . 27	Normally Open a/b Relay 4
9 . 28	Normally Made a/b Relay 5
10 . 29	Normally Open a/b Relay 5
11 . 30	Normally Made a/b Relay 6
12 . 31	Normally Open a/b Relay 6
13 . 32	Normally Made a/b Relay 7
14 . 33	Normally Open a/b Relay 7
15 . 34	Normally Made a/b Relay 8
16 . 35	Normally Open a/b Relay 8
17 . 36	Chassis
18 . 37	Chassis
19	Chassis

Relay Specification - 50V, 1A (switched power not exceeding 30W)

RELAY OUTPUTS (CONNECTOR J34)

Pins	Circuit
1 . 14	Common a/b Relay 1
2 . 15	Common a/b Relay 2
3 . 16	Common a/b Relay 3
4 . 17	Common a/b Relay 4
5 . 18	Common a/b Relay 5
6 . 19	Common a/b Relay 6
7 . 20	Common a/b Relay 7
8 . 21	Common a/b Relay 8
9 . 22	Chassis
10 . 23	Chassis
11 . 24	Chassis
12 . 25	Chassis
13	Chassis

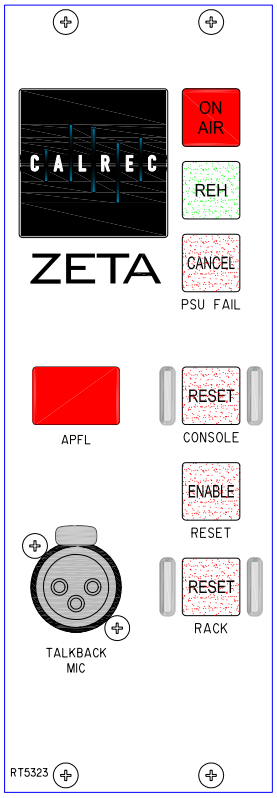
TALKBACK MIC & HEADPHONE SIGNAL FORMAT AND CONNECTIONS

The talkback and headphone signals are carried between the console backplane and the power monitoring and distribution unit using a multi-core cable with a 37-way D-type connector at each end.

- The headphone signal is AES only
- The talkback microphone signal can be AES or analog

Talkback Mic Connections

The talkback microphone connects to the console via the XLR connector on the reset panel.



The reset panel contains the following talkback microphone circuitry:

- Talkback microphone pre-amplifier
- Internal preset resistor to adjust the gain from 18dB to 48dB
- Internal switch to enable the 16V phantom power to the talkback microphone (SW9)
- Talkback microphone ADC
- Internal switch to set the talkback output signal format to AES or analog (SW5)

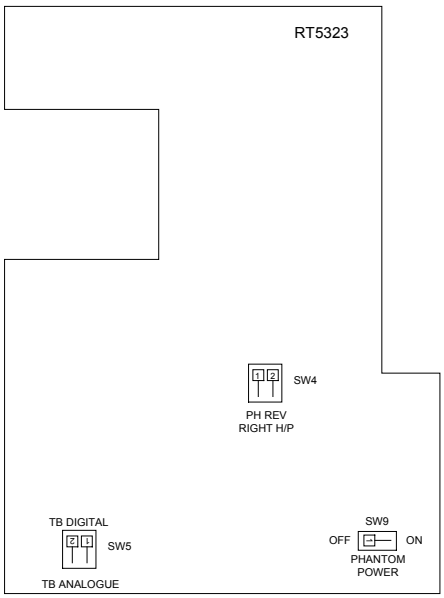
Headphone Connections

On consoles with a screen section the headphone jack is located in the well next to the screen. On single section consoles the headphone jack is located on the interface plate next to the console backplane. The headphone output is driven by circuitry on the reset panel. The reset panel contains the following headphone circuitry:

- Headphone DAC
- Headphone amplifier
- An internal DIL switch to reverse the phase of the right leg of headphone audio (SW4)

Installations that do not use an external talkback system can obtain the headphone signal from an AES output via an XLR, BNC or EDAC digital interface panel. The talkback signal will feed an analog or AES input via the appropriate XLR, BNC or EDAC interface panel depending on the format selected using the DIL switch inside the reset panel (SW5).

DIL SWITCHES



TALKBACK MIC & HEADPHONE SIGNAL FORMAT AND CONNECTIONS

Connecting External Equipment
If the talkback output is required to feed an external talkback system, the desk talkback output will feed the external talkback system via a cable from the power monitoring and distribution unit, or via an extra cable wired into the 37-way D-type on the console backplane, depending on which is nearer.

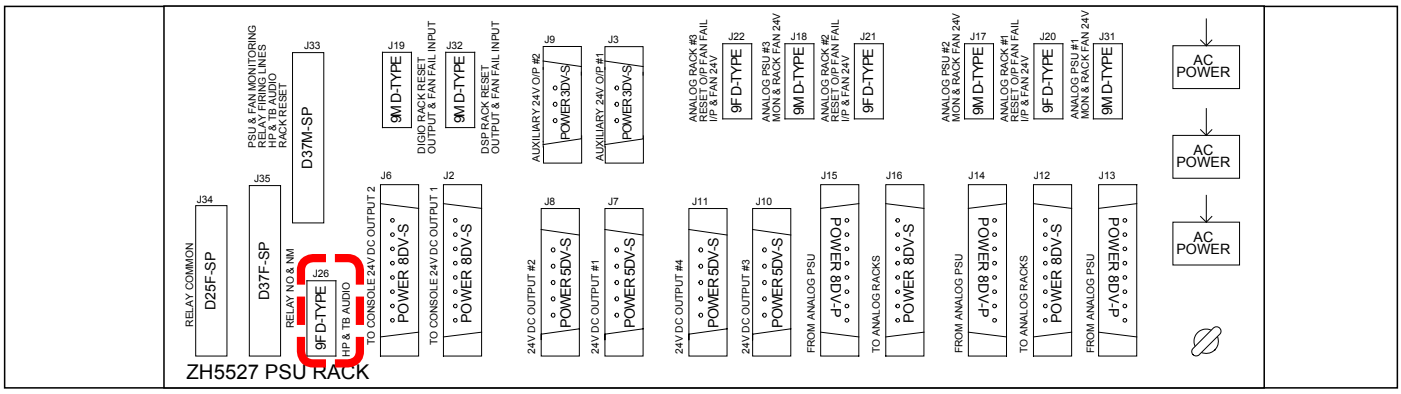
If the headphone feed is to come from external equipment, the connection will either be via a cable to the D-type connector J26 on the power monitoring and distribution unit, or via an extra cable wired into the 37-way D-type connector J58 on the rear of the console depending on which is nearer. Please note that this can be an AES signal only.

Connector J26 Pin Out Information
On the rear of the PSU monitoring and distribution unit, connector J26:-

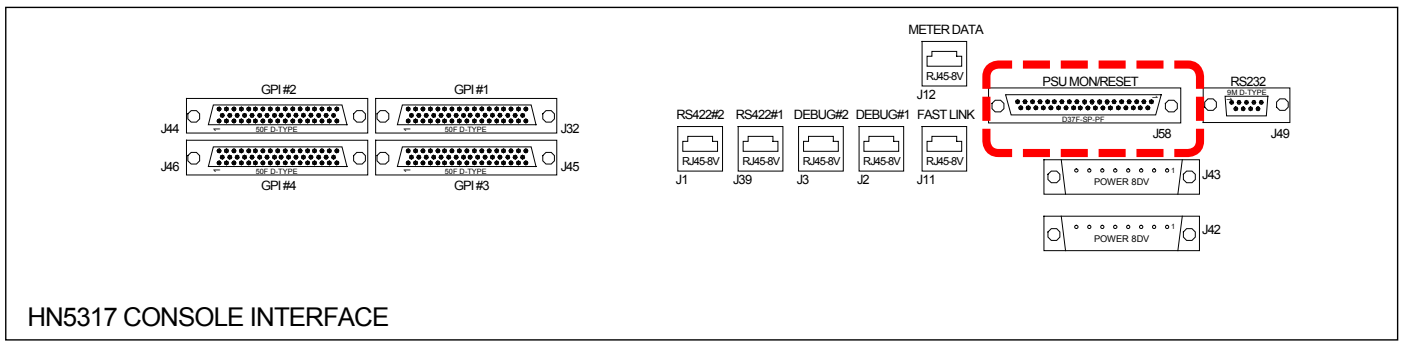
Pins 1 and 2 - From control surface TB mic (AES or analog)

Pins 4 and 5 - To control surface headphone jack (AES only).

POWER SUPPLY, MONITORING AND DISTRIBUTION UNIT (REAR)



CONSOLE INTERFACE (REAR OF CONSOLE)



SERIAL INTERFACE

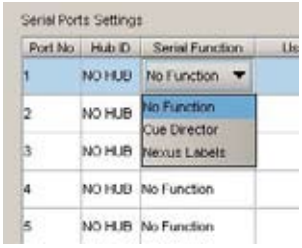
The system currently supports the following serial interfaces:

- Cue Director
- Nexus Router
- TSI Image Video 1000

Serial port setup and label associations are made using the Options-Serial I/F screens.

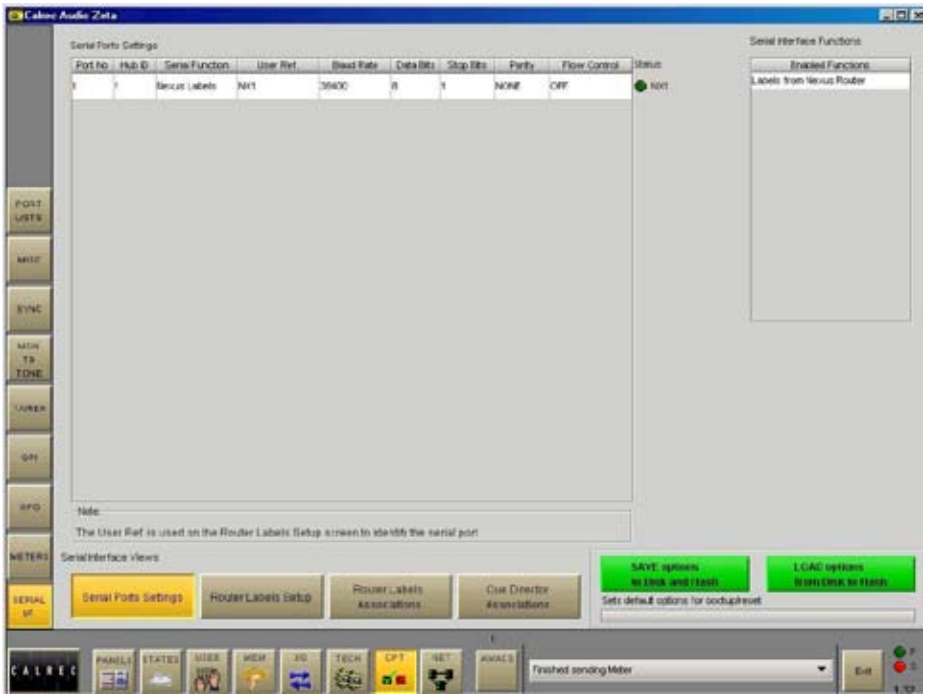
Serial Port Settings Screen
The console has a serial interface port for allowing equipment to be connected to the system.

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.



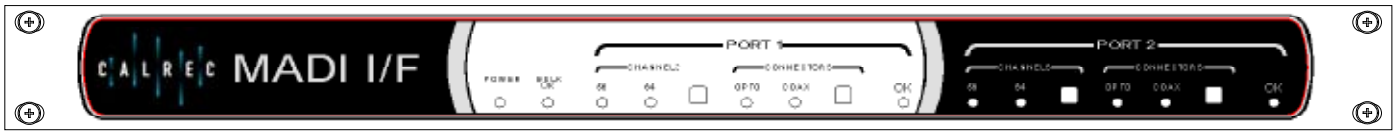
The function can be given a name by typing up to six characters in the USER REF column.

For each function there is an indicator which flashes when a valid message is received from the user serial port.

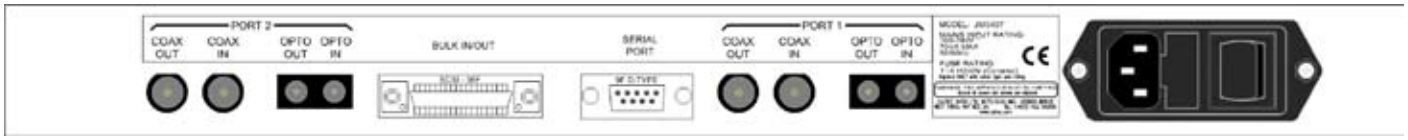


MADI

FRONT



REAR



The 1U rack mounted MADI unit contains two independent AES10 MADI compatible interfaces, and is available as an option. The two ports are interfaced to the console via a Wide Area Bulk (WAB) card, which occupies one of the AES card slots in the Processing rack.

Each MADI interface can operate in either 56 or 64 channel mode and can transmit over a coaxial (copper) AND optical (fiber) medium and receive over a coaxial OR optical medium. A switch allows receiver selection.

There is no sample rate conversion available on MADI inputs or outputs therefore, all the equipment connected via MADI must be synchronised to the same source as the console.

MADI Unit	Power	Fiber		Copper	
		Connection	Max Cable Length	Connection	Max Cable Length
JM5407	DC (24V)	ST - Multi-mode	2km	BNC (75Ohm)	50m
JM5418	AC (100-240V)	ST - Multi-mode	2km	BNC (75Ohm)	50m
JM5450	DC (24V)	SC - Multi-mode	2km	BNC (75Ohm)	50m
JM5451	AC (100-240V)	SC - Multi-mode	2km	BNC (75Ohm)	50m

ZETA
HYDRA AUDIO NETWORKING

CALREC

calrec.com

Putting Sound in the Picture

HYDRA TECHNOLOGY

Gigabit Ethernet is founded on key principles of preceding Ethernet technologies and provides a data rate of 1000 Mbps over copper or optical fiber.

Audio and control data is transferred using the Ethernet frame format over switched media in a network constructed from standardised structured cabling.

Hydra I/O boxes providing fixed or configurable I/O may be connected onto the network, providing remotely located sources and destinations that can be used by any or all mixing consoles.

The Hydra Audio Network fabric is constructed using low-cost off-the-shelf hardware. The network topology is similar to that of an office LAN, being created out of a central Gigabit switch with connections to each mixing console and Hydra I/O box, in a star formation. Connections may be made with Category 5e UTP, up to 90 metres, or with optical fiber, up to 10 kilometres.

Hardware

There are many commercially available Gigabit switches, repeaters and media converters that can be used to build the network, however some proprietary hardware is required to interface the consoles and Hydra I/O boxes to the network.

The diagram below shows a console and racks connected to a network via a Wide Area Bulk Card and Hydra Gigabit interface unit. 3 Hydra I/O boxes and 2 modular Hydra I/O boxes are also shown, each with up to 96 inputs/outputs available to any console on the network.

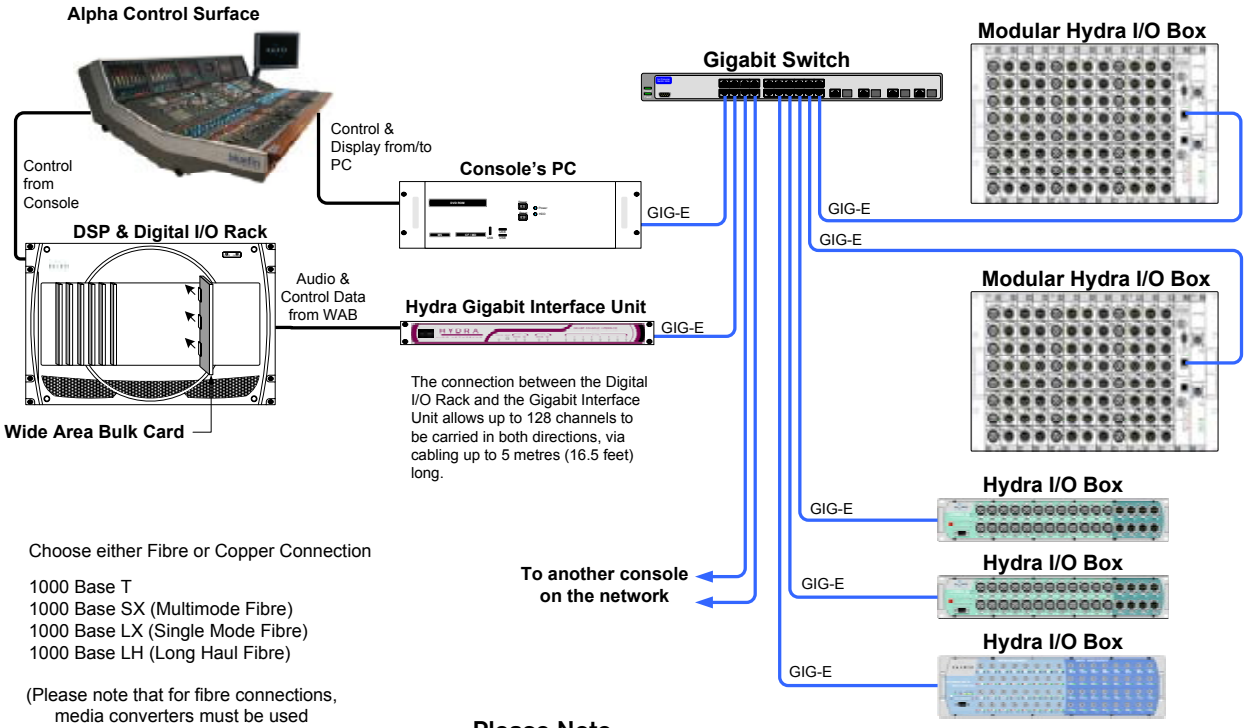
Network Editor

For a network to be truly useful, it must be easy to use and maintain. The system's control software constantly monitors the network, performing essential administration functions, leaving the user free to creatively exploit network resources as easily as if they were locally connected.

The console's Network Editor consists of a set of screens for :

- Configuration of modular Hydra I/O boxes
- Offline editing of Hydra I/O and Audio Network
- Status representation of all devices on the network
- Utility for forcing ownership to be dropped

The Network Editor can be run independently of the Front End (console application), allowing the modular Hydra I/O boxes and audio network to be configured offline. During this time, any operations which require a console are disabled.



The connection between the Digital I/O Rack and the Gigabit Interface Unit allows up to 128 channels to be carried in both directions, via cabling up to 5 metres (16.5 feet) long.

Choose either Fibre or Copper Connection

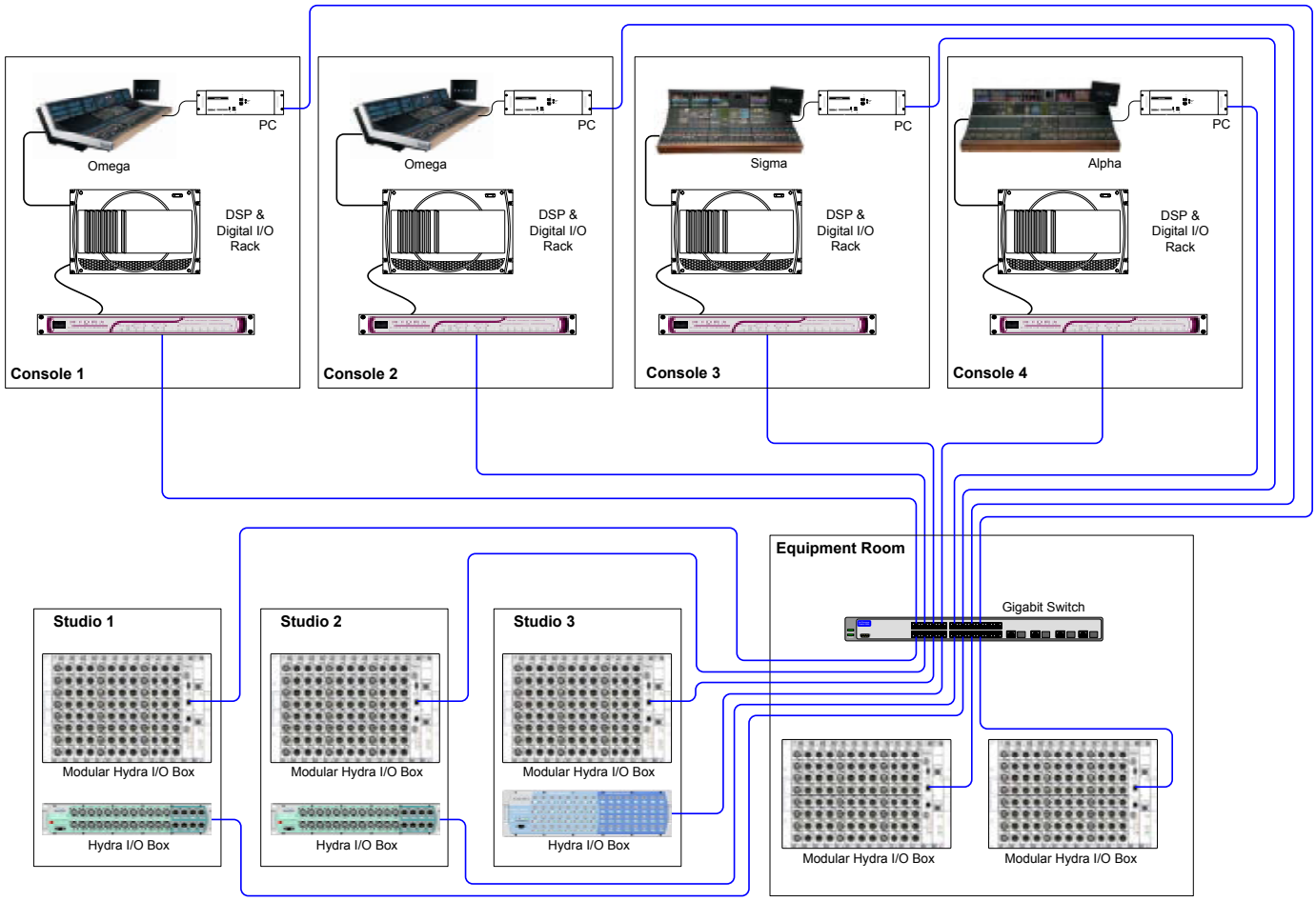
1000 Base T
1000 Base SX (Multimode Fibre)
1000 Base LX (Single Mode Fibre)
1000 Base LH (Long Haul Fibre)

(Please note that for fibre connections, media converters must be used between the Gigabit switch and the Modular Hydra I/O Boxes)

Please Note

Connections to the modular Hydra I/O box are via RJ45 connectors on the front of the unit's processor module. As this is a copper interface, when using fiber cabling, it is necessary for media converters to be used between the Gigabit switch and the modular Hydra I/O boxes.

TYPICAL HYDRA NETWORK EXAMPLE



The above diagram shows 4 control rooms, each with a Calrec digital console. The Gigabit interface unit for each console transmits and receives audio data to and from the Hydra I/O boxes, via a Gigabit switch located in the Equipment Room.

The console racks and Gigabit interface unit could also be in the Equipment Room if this was more suitable.

Synchronisation

Consoles sharing sources must be synchronised (e.g. to station sync or video). The Hydra I/O boxes synchronise to the console Gigabit interface with the lowest IP address on the network.

Private Network

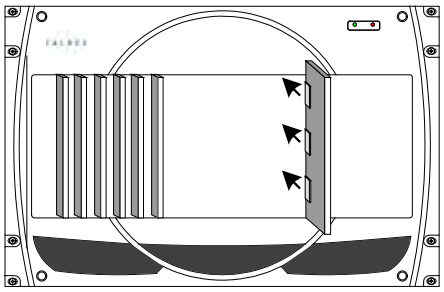
In order to guarantee fully deterministic performance, it is necessary to apply the restriction that the network must be kept private. This means that it must not be made to carry any data other than that generated by the audio network.

Local I/O

Local I/O in the console's own racks can be used for connections to routers, monitoring, talkback, inserts, etc. It is not networked to the other consoles.

CONSOLE HARDWARE

Wide Area Bulk Card
A Wide Area Bulk (WAB) card is inserted into the console's Processing rack.



The function of the WAB is to transfer digital audio samples and control data between the console and the Gigabit interface unit.

Alpha and Sigma systems can have up to 8 WAB interfaces; Omega and Zeta systems can have up to 3.

128 inputs and outputs are carried between each WAB card and the Gigabit interface unit via 36 way SCSI-style cabling up to 5 metres (16.5 feet) long.

During set up, the user can decide how many of the system's WAB interfaces will be available for redundancy. The bandwidth chosen for redundancy will be reserved for use by the redundancy system, and will not be used during normal operation.

Control data is sent and received as UDP (User Data Protocol) messages, and consists of proprietary commands for audio routing, parametric control and network management.

Console PC
The console's PC is connected to the network via the Gigabit switch, such that the user can monitor the devices on the network.

If the console's PC is not connected to the network via the Gigabit switch, some limitations apply - the front end screens will not show port status or device heartbeats, and the user will be unable to edit the device names.

The console PC can also send and receive UDP (User Data Protocol) messages to and from the network.

Gigabit Interface Unit
The Gigabit interface unit provides the console with a full duplex connection from the WAB interface to the network via a commercially available Gigabit switch.

Connection to the network is via a Gigabit port on the rear of the unit. The second Gigabit port on the unit is not used. The unit runs at Gigabit speed all the time, and may not be connected to switch ports that run at lower speeds.

The unit is powered from the console's bulk power supply system, via a 24V DC input. A second connection is provided for redundancy. The console's bulk power supply can also be supplied with redundancy, further protecting the Hydra system from failure.

An RS232 port is provided, such that system diagnostics can be performed by a Calrec-approved engineer. Connection to the port is via a 9-PIN D-Sub connector.

MAC Addresses
Any device on an Ethernet network requires a Media Access Control (MAC) address. The MAC address is a number that uniquely identifies a device.

Each Ethernet frame has a source and destination MAC address, length identifier and CRC. A device on the network can identify frames that are sent to it by checking the destination MAC address against its own MAC address. There is a special address known as the broadcast address in which all devices on the network will receive the frame.

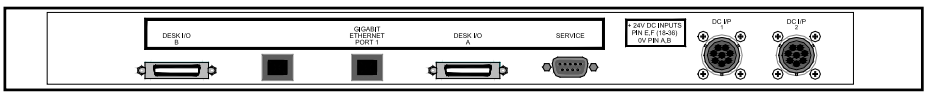
IP Addresses
Calrec will supply each device in your system (including the console) with its own unique IP address, which the system uses to identify each network connection. Where a device has two ports, each will have a unique IP address. The 4th byte is unique to the device.

The Hydra I/O boxes synchronise to console with the lowest IP address on the network.

For mobile installations, the 3rd byte of the IP address will be unique to that installation, such that it is possible for different installations to connect their networks together.

FRONT

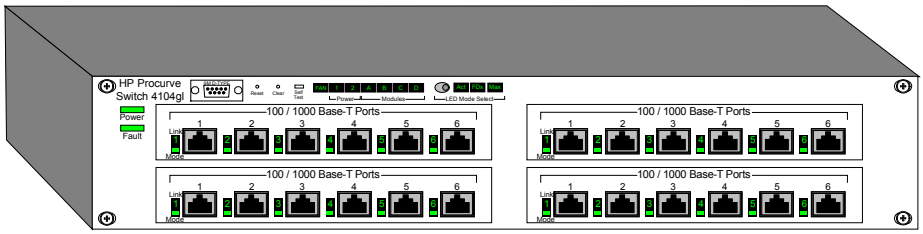
REAR



Dimensions	1U X 482mm (19 inch)
Depth (not including mating connectors)	195mm (7.7 inches) behind the front panel
Depth (including mating connectors)	265mm (10.4 inches) behind the front panel
Weight	2.6 Kg (5.5125 lb)

GIGABIT SWITCH

A commercially available Gigabit switch is used to connect consoles and Hydra I/O boxes together, forming a Hydra audio network.



The switch serves to route traffic directly from source to destination. It learns which devices are connected to it, and routes data to the correct destination port. It is capable of continuously receiving data at one port and routing it to another at the maximum data rate, irrespective of what traffic other ports are handling.

Switches are available in 1U or 3U versions, and can have a combination of copper and fiber ports.

HP® ProCurve Switches

To ensure reliability in a live on-air broadcast environment, Calrec has chosen to standardise on one make of commercially available Gigabit switch. We recommend HP ProCurve switches because of their reputation for reliability, their high throughput (packets per second), their lifetime warranty, the availability of PSU redundancy, their hot-changeable modules and connections, their flexibility in offering a variety of fiber connections; and their management capabilities.

Our intensive test procedures are carried out on a Hydra network comprised of HP ProCurve switches and our own hardware. This repeated testing and the thousands of hours of use in the field, mean that we can be confident that we are providing a robust system using this type of Gigabit switch.

Although other makes of Gigabit switch are designed to the same Ethernet standards as HP ProCurve switches, there may be slight differences in how they work internally, which has led to incompatibilities with our system.

It is for this reason that Calrec do not warrant our products for any Hydra network problem unless the HP ProCurve switches we recommend are used.

If other makes of switch are used and problems do occur, Calrec shall not be liable for the costs of any support, engineering or design work undertaken as a result of that equipment installation.

The switches we recommend are as follows:

- HP Procurve 4104gl Switch: Modular - this switch can be fitted with up to 4 plug-in modules providing a combination of copper or fiber ports. This is a 3U mains powered switch.
- HP ProCurve Switch 2824 (J4903A): 20 copper ports and 4 copper or fiber ports. This is a 1U mains powered switch.
- HP ProCurve Switch 2848 (J4904A): 44 copper ports and 4 copper or fiber ports. This is a 1U mains powered switch.
- HP ProCurve 2800 Redundant External PSU (J8168A): This is a 1U mains powered PSU to provide redundant power for the switches. One redundant PSU can supply redundancy for any one of up to 6 switches. If any one switch has a PSU failure, the redundant supply will take over. Due to cable length restrictions, the redundant PSU must be located in close proximity to the switches it is connected to.

HP GBIC Connectors

Please ensure that your switch uses genuine HP GBIC connectors.

Starting with software version G.07.65, the Series 4100gl switches detect and disable non-genuine ProCurve transceivers and mini-GBICs discovered in switch ports. When a non-genuine device is discovered, the switch disables the port and generates an error message in the Event Log.

HP ProCurve Switch Warranty Support

Please ensure that you register your switch for support in the country that it is to be used.

Redundant Power

The Gigabit switch can be provided with an HP ProCurve redundant power supply.

Booting

Although the console and racks boot from power on in less than 20 seconds, the switch may take longer. Therefore, networked I/O may take longer to become available on power up, or after a switch reset. It is recommended that the switch is powered using an un-interruptible power supply.

HYDRA I/O BOXES

These robust, self-contained boxes can provide audio input and output facilities for use in areas such as:

- Equipment Room Rack
- Studio Wall Box
- Studio Gantry / Lighting Grid
- Control Room Rack
- Outside Broadcast Truck
- Outside Broadcast Flight Case

Variants

Units are available in the following variants:

- 12 mic/line inputs and 4 line outputs (XLR)
- 24 mic/line inputs and 8 line outputs (XLR)
- 48 mic/line inputs and 16 line outputs (XLR)
- 32 AES inputs and 32 AES outputs (BNC)

The units connect to the network via an ethernet port on the rear of the unit. Each unit has two identical ports to provide network redundancy. Media dependant variants for 1000BASE-T (for distances up to 90m), 1000BASE-SX (for distances up to 550m) and 1000BASE-LX (for distances up to 10km) are available.

All external connections to the units are hot pluggable. If more than one media type is detected, the system will prefer fiber as its primary connection.

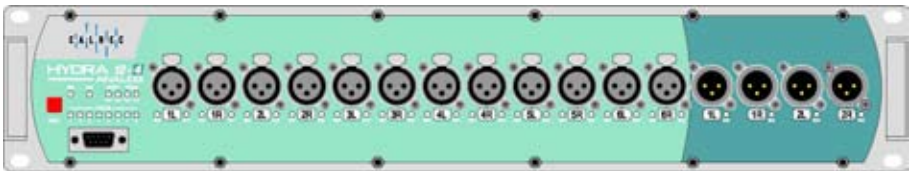
Power and Redundancy

The units are mains powered, and internally, have two power supply units, providing PSU redundancy.

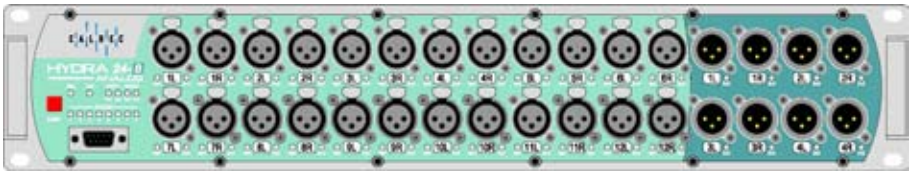
Optionally, a second IEC can be fitted to allow a unit to be powered from two separate mains supplies. The twin IEC approach supports mains supply redundancy, as well as internal power supply component redundancy.

The units incorporate a cooling fan module. Each PSU module and the fan module within the unit are monitored to ensure proper performance. PSU OK and FAN FAIL indication is provided on the front of the unit. PSU failures are reported to the operator by the console software.

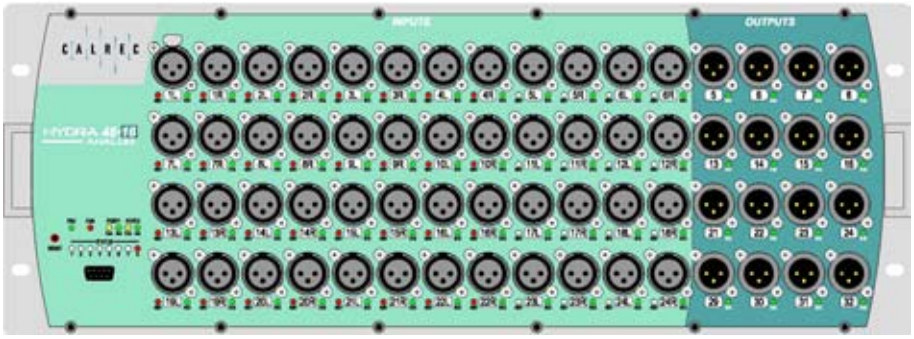
12 MIC/LINE IN & 4 LINE OUT (AD5608)



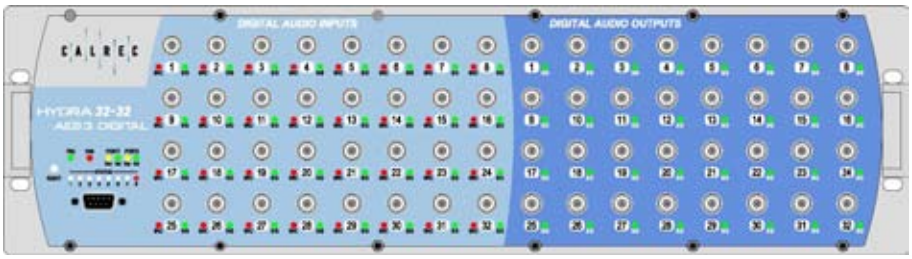
24 MIC/LINE IN & 8 LINE OUT (AD5603)



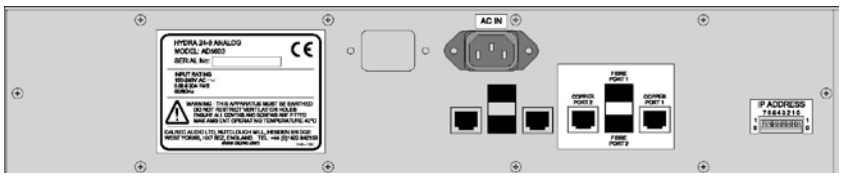
48 MIC/LINE IN & 16 LINE OUT (AD5608)



32 AES IN & 32 AES OUT (JB)



REAR CONNECTORS (SAME FOR ALL UNITS)



Unit	Height	Width		Approx depth (incl. mating cons)		Approx weight		Input Power Rating
		inches	mm	inches	mm	lbs	kgs	
AD5603 24 mic/line in & 8 line out - XLR	2U	19	483	12	300	12.5	5.7	100-240V AC ~ 0.58-0.30A RMS 50/60Hz
AD5608 12 mic/line in & 4 line out - XLR	2U	19	483	12	300	11.5	5.2	100-240V AC ~ 0.42-0.23A RMS 50/60Hz
AD5600 48 mic/line in & 16 line out - XLR	4U	19	483	12	300	16.1	7.3	100-240V AC ~ 1.0-0.48A RMS 50/60Hz
JB5607 32 AES in & 32 AES out - BNC	3U	19	483	12	300	12	5.8	100-240V AC ~ 0.38-0.20A RMS 50/60Hz

HYDRA I/O BOXES

Status LEDs
The following indicative LEDs are visible from the front panel:

PSU OK (green)
Fan Fail (red)
Port 1 connected (yellow)
Port 1 active (green)
Port 2 connected (yellow)
Port 2 active (green)
Status (x8 red)

In addition, each input connector has its own tricolour LED to indicate signal presence. The incoming signal will cause the LED to light green when the signal is between -60dBFS and -38dBFS, amber when between -38dBFS and -2dBFS, and red when the signal clips at -2dBFS or above.

Each output connector has a green LED to indicate that there is a route established to it from a console on the network.

Synchronisation
Units are frequency synchronised using synchronisation packets received from the Hydra network.

Diagnostics
The units support remote FPGA firmware and software updates across the network via the Ethernet ports. In addition, an RS232 port is provided, such that system diagnostics can be performed by a Calrec approved engineer. Connection to the port is via a front-mounted 9 pin D-Sub connector.

IP Addresses
Calrec will supply each device in your system with its own unique IP address, which the system uses to identify each network connection. On the front of each Hydra I/O box, there is a label showing the IP address. The secondary port will use the address of the primary port + 100 decimal. For example:

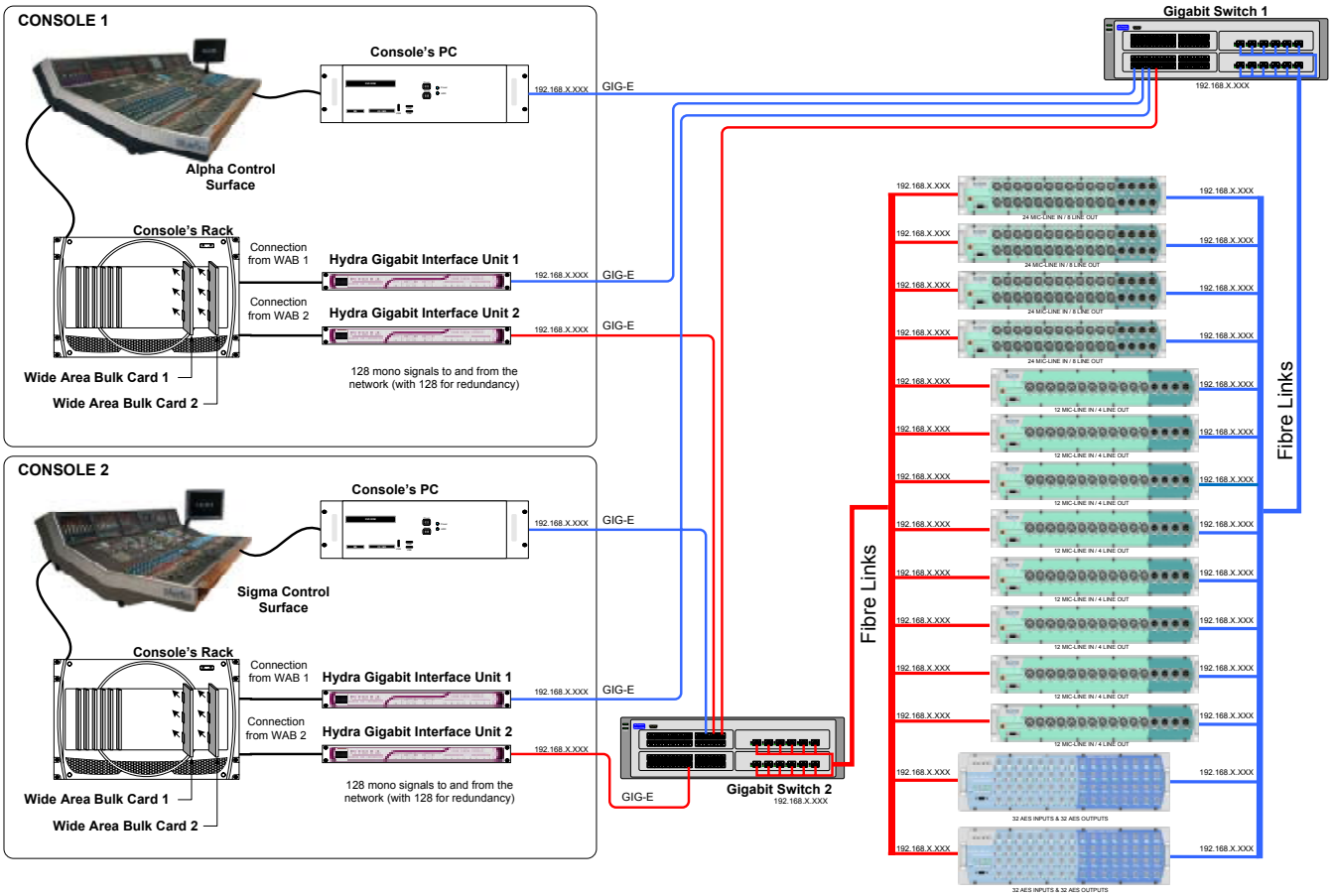
Primary Port	192.168.0.050
Secondary Port	192.168.0.150

In an installation, the first 3 bytes (shown in red) are fixed. The 4th byte or least significant byte is the part of the address which is unique to that port on the device.

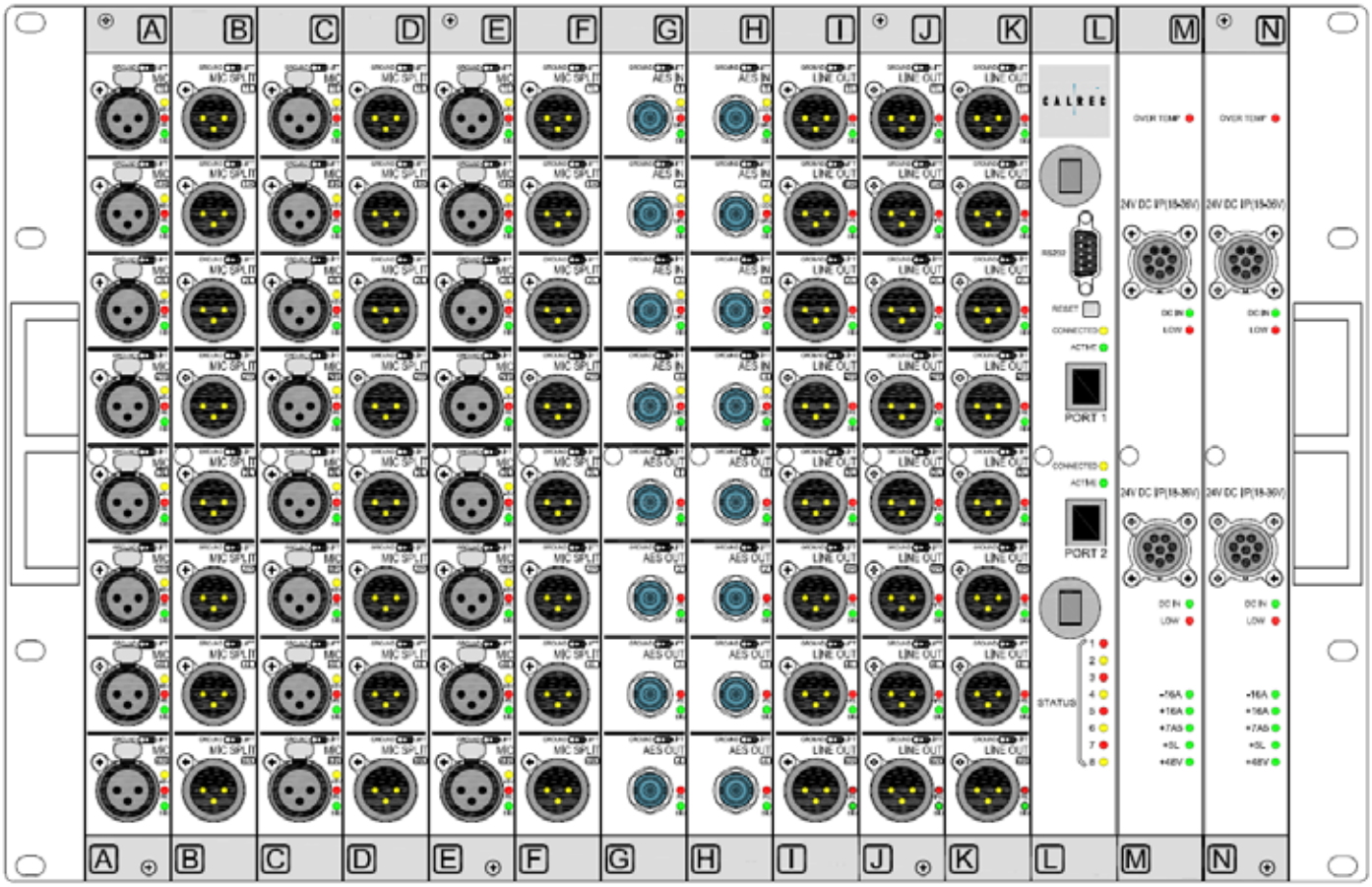
For mobile installations, the 3rd byte of the IP address will be unique to that installation, such that it is possible for different installations to connect their networks together.

If a Hydra I/O box needs to be swapped out, the replacement unit must be programmed with the correct IP address. The 8-way switch on the rear of the unit allows the least significant byte of the IP address of the primary port to be set in binary.

Surround Signals
It is not recommended that ports on a modular Hydra I/O box should be combined with ports on a fixed Hydra I/O box to create a 5.1 surround signal.



MODULAR HYDRA I/O BOX



Modular Hydra I/O boxes allow a user-configurable set of analog and digital I/O to be connected via the networking system to one or more Calrec digital consoles.

Modular Structure

There are 14 modular slots across the width of the unit, labelled A to N. Input, output, processor and DC PSU modules fit into these slots, in accordance with the requirements of the installation. Input and output modules receive and transmit analog or digital audio signals, to the Gigabit interface processor via a 32 bit TDM bus. The module options are listed in the table below. Each modular unit is 1.2 inches (30.48 mm) wide.

Module Number	Description	Connector Type
AD5090	4 stereo or 8 mono mic/line inputs	XLR
LN5230	8 split outputs for adjacent left mic/line input module	XLR
JB5340	4 AES inputs and 4 AES outputs	BNC
JX5341	4 AES inputs and 4 AES outputs	XLR
DA5091	4 stereo or 8 mono outputs	XLR
UC5339	Processor with copper interface	RJ45
ZN5231	DC Power Supply	8 PIN PLUG

All 14 slots may be used by any of the modules in any combination. However, it is advised that the three slots at the right hand side of the unit are best occupied by a processor control unit and provision for two DC PSU modules, the second of which would be the optional hot-spare, providing power redundancy incase the first unit, or the connection to it should develop a fault.

If no spare DC PSU is present, either a blank panel must be fitted or the processor unit could move into slot M allowing a twelfth input or output module to be fitted into slot L.

Ground Lift Switches

Input and output modules are available with or without ground lift switches. On modules with switches fitted, the ground is lifted if the switch is toggled to the right.

Module Extraction

In some applications, it is envisaged that modules within the modular Hydra I/O box could be changed according to the requirements of its use. To aid this operation, a module extraction hole is located on the module front panels. The module slides in and out the unit on two runners at the top and bottom of the rack. The rear interface connector on the module then locates into the appropriate connector on the backplane. To aid accurate plugging-up, some guide strips are located between the three interface connectors on the backplane.

External Connections

All external connections are located on the front face of the Hydra I/O box. Space must be allowed in excess of the box dimensions to feed cables to the front interface from any rear access routes.

Mounting

The modular Hydra I/O box is mounted in place using 4 fixing screws on each side angle bracket.

MODULAR HYDRA I/O BOX

Fan Operation

To dissipate the heat, 3 low-noise fans are located in the rear of the modular Hydra I/O box. They are controlled from the DC power supply unit. The unit's rear panel has venting holes which must not be obstructed in any way.

Earthing

The box is fitted with an external earth stud on the rear, for connection to an external earthing system. No AC mains power is contained within the rack. All power connections should be unplugged prior to removing the earth connection.

Rack-Mounted AC PSU

A 2U rack-mounted power supply unit is available to provide the DC power for the modular Hydra I/O box. This holds up to four identical AC plug-in PSU modules. One module will provide power for a fully populated modular Hydra I/O box, with a second providing redundancy. Two other modules could be fitted to power a second unit.

The rack has separate AC power inputs and DC outputs for each of the four PSU's. Any one PSU can be removed from the rack without disturbing the operation of the others in the rack.

Diode feeding allows supplies of the same type to be parallelled together.

Mounting Instructions

The power supply rack should be mounted in a horizontal position by means of the side brackets, each of which has two mounting holes. The rear mounting brackets fix to the rear of the equipment bay and should be used when no support is provided under the rack assembly. Extensions of the rack sides slot into these rear supports, allowing the rack to be removed without removing the support. The rack should not be supported by front flanges alone.

Cooling

The rack is fan cooled with fans mounted in the front of each plug-in PSU. The warm air is directed out of the rear of the rack. To ensure proper cooling, there must be a minimum clearance of two inches (50mm) from the fans and rear air outlets, and also any walls or other surfaces.

Input Power Connections

3-wire safety AC outlet sockets should be located near the power system (number as required). Each line cord will provide AC power to one of the power supply modules.

The AC line cord is the mains disconnect for each module. The AC line cords should have an IEC320 connector to plug into the rear of the power system chassis.

Each line cord MUST be suitably rated and FUSED (or have an equivalently rated circuit breaker). The maximum inrush current is 30 Amps. Fuses should be at least 250V AC, T6.3A HRC rated to avoid nuisance "blows". Breakers should be at least 6A , Type C.

Safety grounding is provided via ground connections in the line cord entry receptacles.

If in doubt, please consult Calrec's customer support team.

FAN OPERATION

Internal Ambient Temperature	Fan Speed	DC PSU
<50°C (122°F)	OFF	OK
50°C to 55°C (122°F to 131°F)	SLOW	OK
55°C to 60°C (131°F to 140°F)	FAST	OK
60°C to 70°C (140°F to 158°F)	FAST	OVER TEMP
>70°C (158°F)	FAST	DISABLED

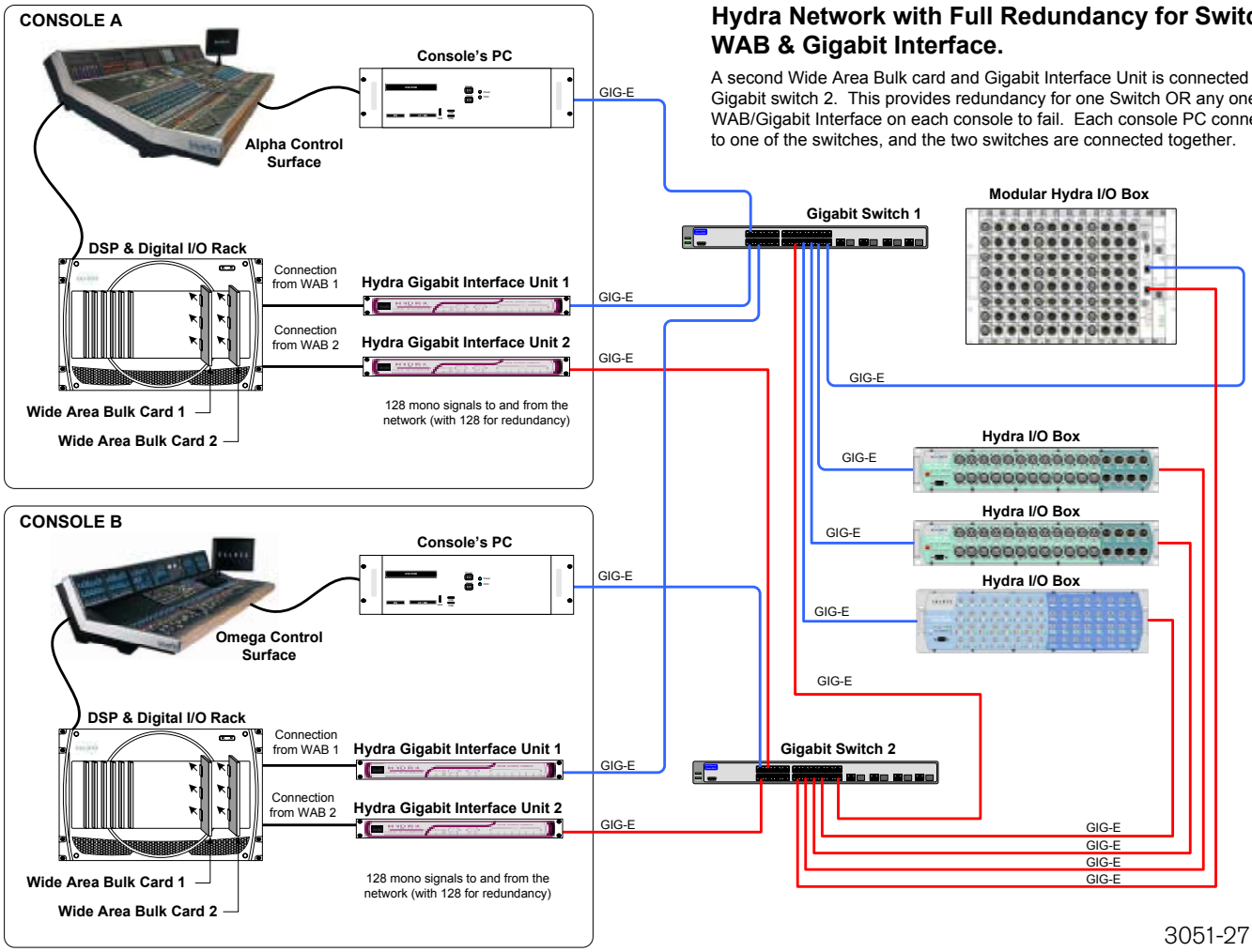
DIMENSIONS & WEIGHTS

Unit	Height	Width		Approx depth (incl. mating cons)		Approx weight	
		inches	mm	inches	mm	lbs	kgs
Modular Hydra I/O Box (Fully Populated)	7U	19	483	12	300	35.2	16
Optional Rack Mounted PSU (with 2 plug-in units)	2U	19	483	12	300	15.6	7.1
Optional Rack Mounted PSU (with 4 plug-in units)	2U	19	483	12	300	25.3	11.5

RACK-MOUNTED AC PSU

Bulk PSU Rack Fan Noise (dB SPL A-Weighted)	
These measurements were taken on axis at 1 metre from the dominant noise source:	
1 x 24V 200W PSU	24dBA
2 x 24V 200W PSU	27dBA
3 x 24V 200W PSU	29dBA
4 x 24V 200W PSU	30dBA

NETWORK REDUNDANCY



Hydra Network with Full Redundancy for Switch, WAB & Gigabit Interface.

A second Wide Area Bulk card and Gigabit Interface Unit is connected to Gigabit switch 2. This provides redundancy for one Switch OR any one WAB/Gigabit Interface on each console to fail. Each console PC connects to one of the switches, and the two switches are connected together.

3051-27

The system can offer redundancy, such that it is protected in case of failure of any connector, cable, or even a Gigabit switch.

Redundant Hardware

Alpha and Sigma systems can have up to 8 Gigabit interface units; Omega and Zeta systems can have up to 3. During set up, the user selects how many Gigabit interfaces are available for redundancy. The redundant bandwidth is reserved for use by the redundancy system and is not used during normal operation.

A second Gigabit switch provides redundancy, such that if the first switch fails, the audio can still be routed to and from the network. Each console PC connects to one of the switches, and the two switches are connected together.

The control system tests end to end connectivity, detecting what can be "seen" from each console and works out how to reach each Hydra I/O box. In the event of the system detecting any failures, the signals affected by the failure are automatically re-routed using the redundant hardware. This will happen quickly but there will be a brief audio interruption, typically 3-4 seconds.

Each Hydra I/O box has a second port with a different IP address, allowing a second connection to the network to be made. Two consoles on the same network may use different ports on the same Hydra I/O box. They can each still have a redundant path to the other port.

Automatic Fault Detection

Once powered, the Hydra I/O boxes broadcast "heartbeats" to advertise their presence. When a Gigabit interface unit detects the presence of a Hydra I/O box, it begins to "echo" each of the Hydra I/O box's two ports. In this way, it can be determined which Hydra I/O box ports can be "seen" from the Gigabit interface unit.

When two device echo responses have been missed, the network connection to that port is assumed to have failed. A message report to the console will inform the user that a Gigabit port on a Hydra I/O box is no longer available.

At the console, echo messages are periodically sent to each of the Gigabit interface units in its configuration. If a Gigabit interface unit does not respond, that path to the network is assumed to have failed.

Automatic Re-routing

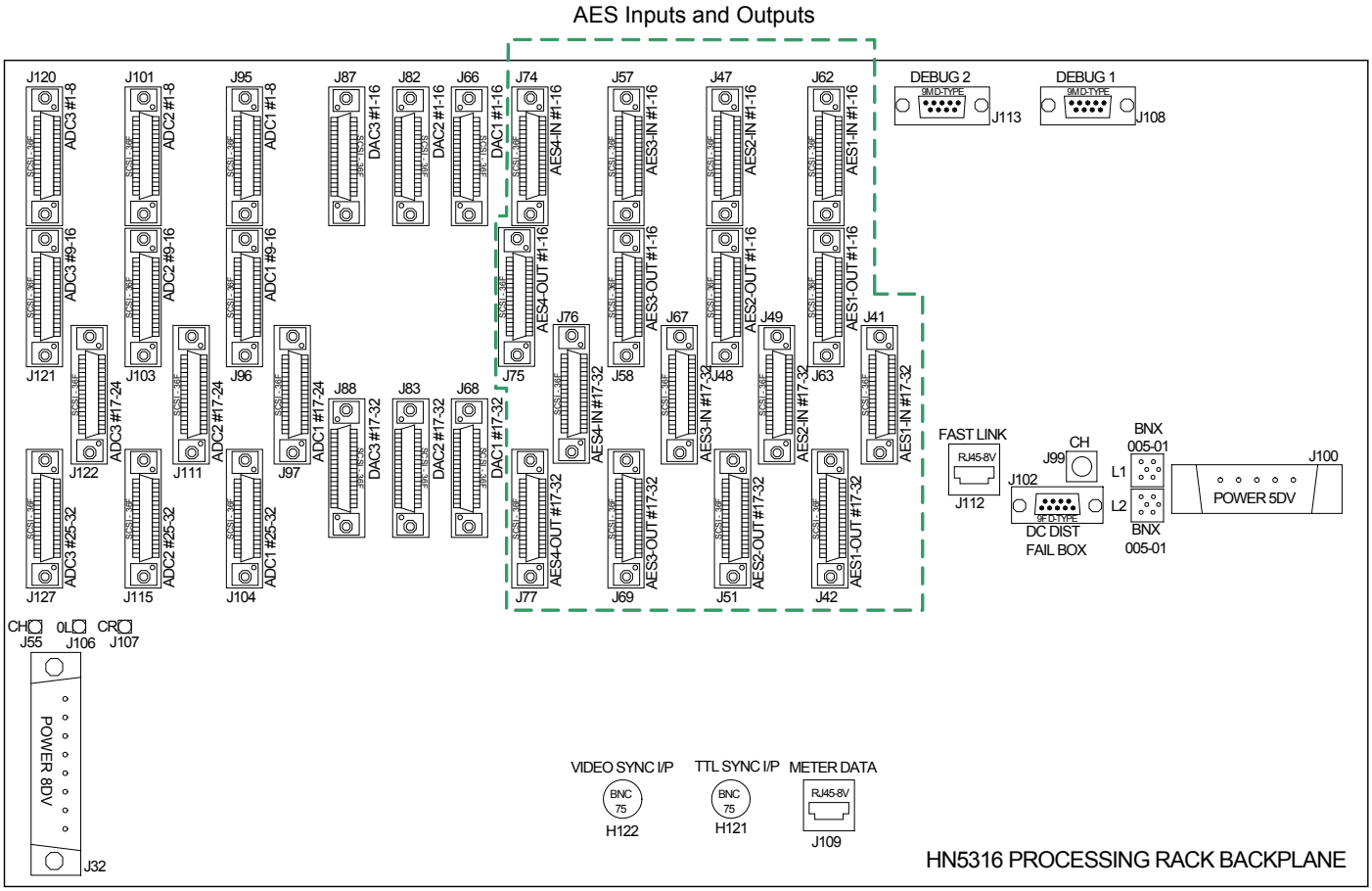
If a fault occurs where there is an alternative redundant path, then take over will happen. Each console manages the re-routing of its own audio. Only those audio paths affected by a failure will be re-routed.

ZETA
AUDIO INPUT AND OUTPUT INTERFACES

CALREC

Putting Sound in the Picture

AES INPUT AND OUTPUT CONNECTIONS



All of the system's AES inputs and outputs are provided on 36 way female SCSI-style connectors on the rear of the Processing rack.

AES Inputs and Outputs

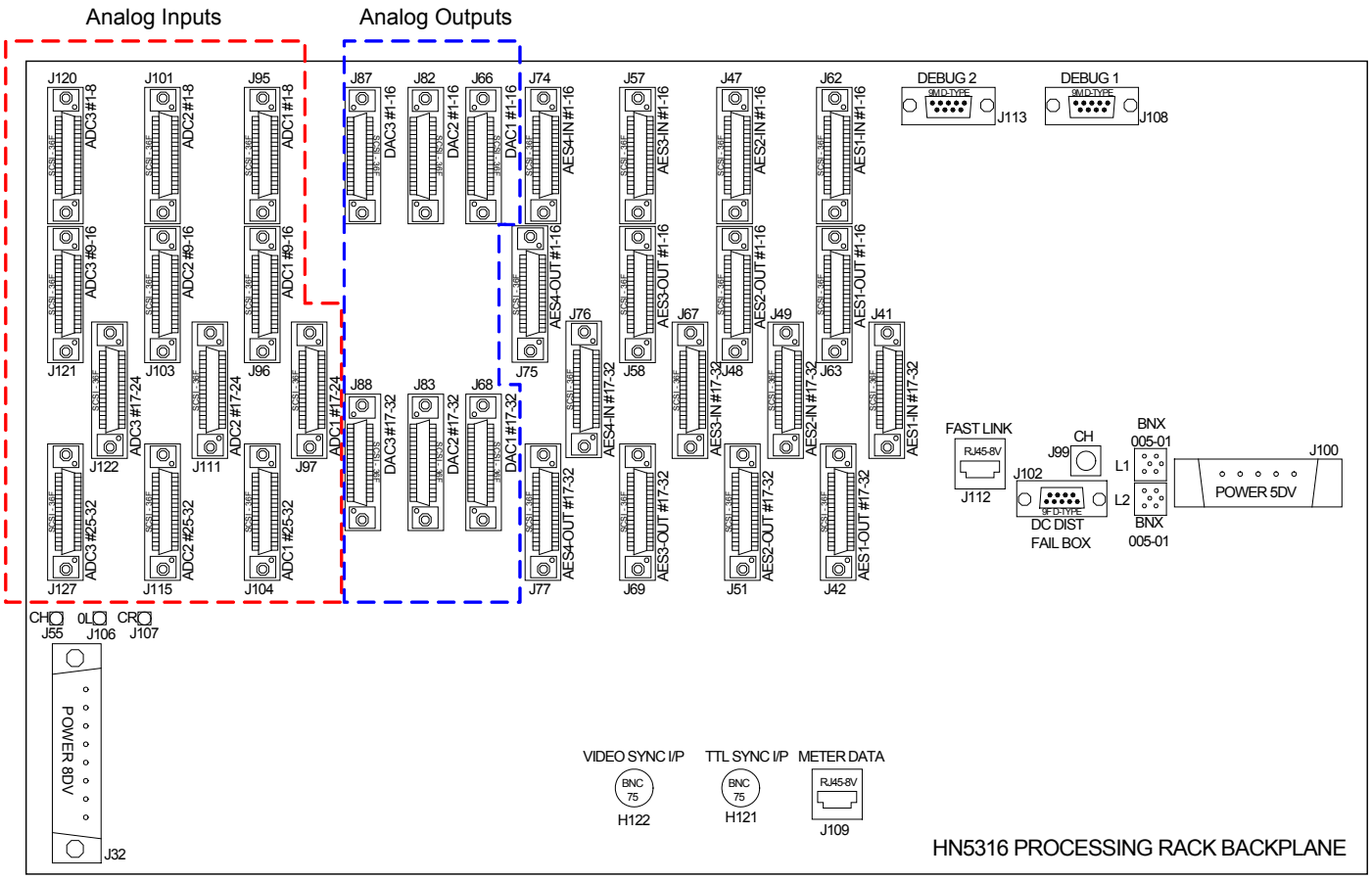
The Processing rack can house up to 4 AES I/O cards, each of which provides 32 AES inputs and 32 AES outputs. The cards are inserted into the slots within the rack, these are numbered 1-4.
Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected. Each of the connectors provides 16 AES pairs.

AES SLOT	AES INPUTS 1-16 CONNECTOR	AES INPUTS 17-32 CONNECTOR	AES OUTPUTS 1-16 CONNECTOR	AES OUTPUTS 17-32 CONNECTOR
1	J62	J41	J63	J42
2	J47	J49	J48	J51
3	J57	J67	J58	J69
4	J74	J76	J75	J77

Wide Area Interfaces

Of the 4 slots available, up to 3 can be occupied by wide area bulk I/O (WAB) cards, which are used to interface to MADI units or a Hydra audio networking system. If a slot is occupied by a bulk I/O or a WAB I/O card, then the AES I/O connectors on the rear of the Processing rack belonging to that slot are used to connect to the equipment being interfaced.

ANALOG INPUT AND OUTPUT CONNECTIONS



All of the system's analog inputs and outputs are provided on 36 way female SCSI-style connectors on the rear of the Processing rack.

Analog Inputs (ADC Cards)

The Processing rack can house up to 3 mic/line input (ADC) cards, each of which provides 16 stereo inputs. The cards are inserted into the slots within the rack, these are numbered 1-3. Each slot has 4 dedicated input connectors on the rear of the rack, to which the system's analog inputs are connected. Each of the input connectors provides connections for 4 stereo inputs.

Analog Outputs (DAC Cards)

In addition, the Processing rack can house up to 3 line output (DAC) cards, each of which provides 16 stereo outputs. The cards are inserted into the slots within the rack, these are numbered 1-3. Each slot has 2 dedicated output connectors on the rear of the rack, which provide connections for the system's analog outputs. Each of the output connectors provides connections for 8 stereo outputs.

DAC SLOT	LINE OUTPUTS 1-16 CONNECTOR	LINE OUTPUTS 17-32 CONNECTOR
1	J66	J68
2	J82	J83
3	J87	J88

ADC SLOT	MIC/LINE INPUTS 1-8 CONNECTOR	MIC/LINE INPUTS 9-16 CONNECTOR	MIC/LINE INPUTS 17-24 CONNECTOR	MIC/LINE INPUTS 25-32 CONNECTOR
1	J95	J96	J97	J104
2	J101	J103	J111	J115
3	J120	J121	J122	J127

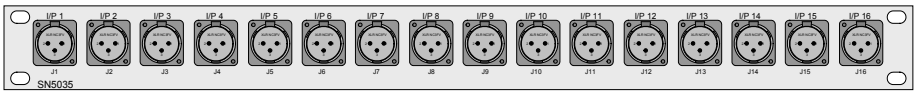
BNC AND XLR INTERFACE CONNECTOR PANELS

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

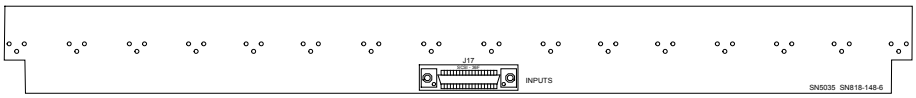
Ideally, BNC interface panels should be fitted within 3m (9.8ft) of the backplane they connect to. XLR interface panels should be fitted within 2m (6.5ft) of the backplane they connect to.

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).

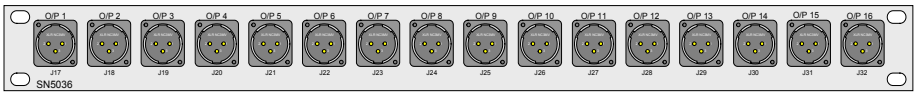
XLR INPUT PANEL (FRONT)



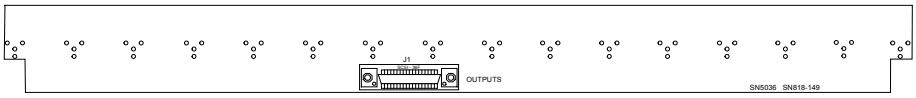
XLR INPUT PANEL (REAR)



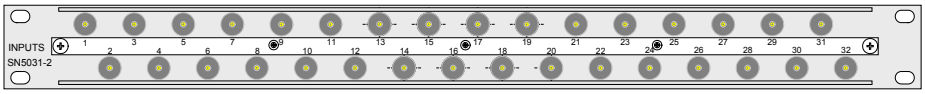
XLR OUTPUT PANEL (FRONT)



XLR OUTPUT PANEL (REAR)

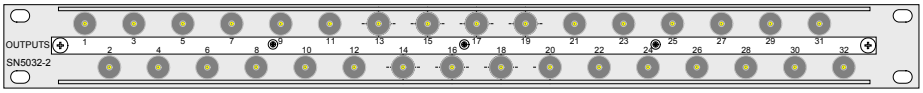


BNC INPUT PANEL (FRONT)



BNC INPUT PANEL (REAR)

BNC OUTPUT PANEL (FRONT)



BNC OUTPUT PANEL (REAR)

EDAC INTERFACE CONNECTOR PANELS

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

Interface	Style 1	Style 2
Mic/Line or Line Inputs	4 pairs per EDAC	6 pairs per EDAC
Line Only Inputs	8 pairs per EDAC	6 pairs per EDAC
Line Outputs	8 pairs per EDAC	6 pairs per EDAC

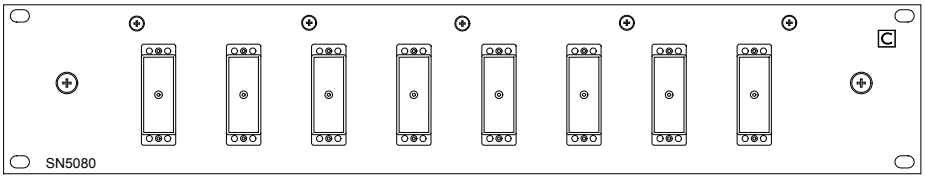
The choice of style will depend on the installation requirements. Limiting factors to be considered are:

- The number of connections available in the external cabling
- Restricted amount of interface space available within 3m(9.8ft) of the backplane.

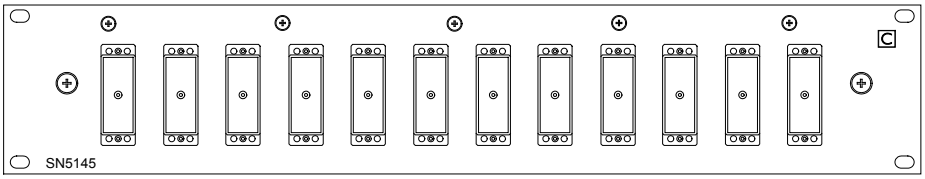
The different styles are achieved using interface cards which attach to the rear of the 2U panels to provide different combinations of SCSI-style connectors per EDAC (Except in the case of mic/line inputs where a custom cable is provided).

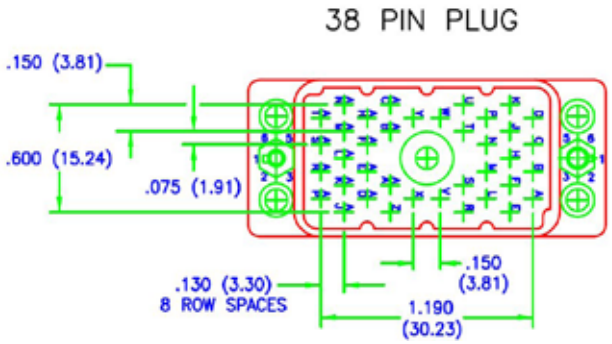
The connectors on these panels are 38 pin, male panel-mounted EDAC connectors (38MP-plug). Therefore, cables interfacing to these panels need 38 pin, female cabling connectors (38FC-receptacle).

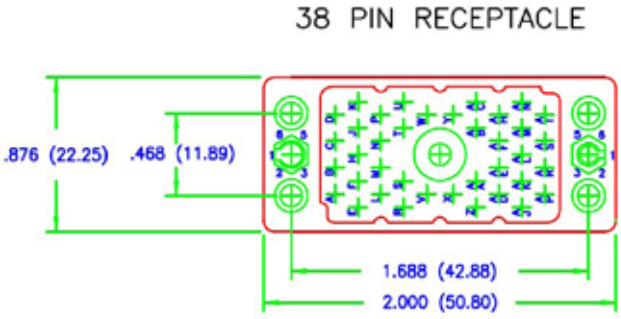
8X38W EDAC PANEL



12X38W EDAC PANEL







Component	Carec Reference	EDAC Reference
Varicon 38 Way Free Socket	400-040	516-038-000-401
Varicon 38 Way Metal Hood	400-037	516-230-538
Varicon 56 Way Free Socket	400-008	516-056-000-401
Varicon 56 Way Metal Hood	400-038	516-230-556
Solder Type Varicon Pins	400-025	516-290-500
Varicon Pin Extraction Tool	-	516-280-200
Crimp Type Varicon Pins	400-024	516-290-590
(XLR) Neutrik NC-3-FC	410-007	-

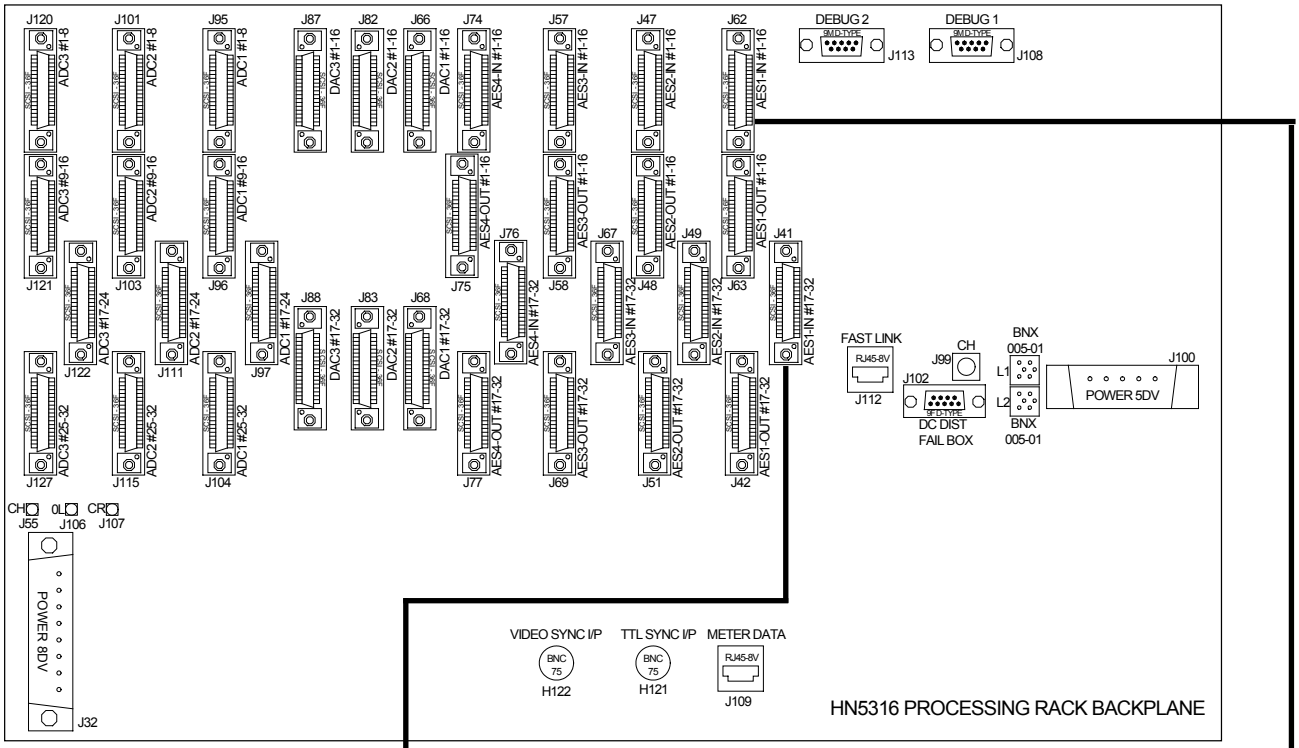
AES INPUTS – BNC INTERFACE

Each AES I/O card in the Processing rack provides 32 AES inputs and 32 AES outputs. Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected.

The diagram below shows how the AES input connectors are connected to 32 way BNC interface panels via SCSI-style cabling. For clarity, input connections from just 1 AES card (occupying AES slot 1) to an interface panel are shown here.

Each BNC interface panel can interface 32 AES inputs. Therefore if all AES inputs are used, 4 BNC interface panels would be needed.

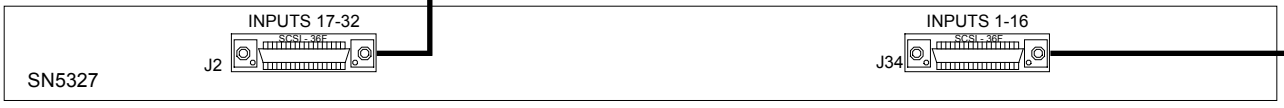
The BNC interface panels must be located within 3m (9.8ft) of the Processing rack.



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

BNC INPUT I/F PANEL (REAR)



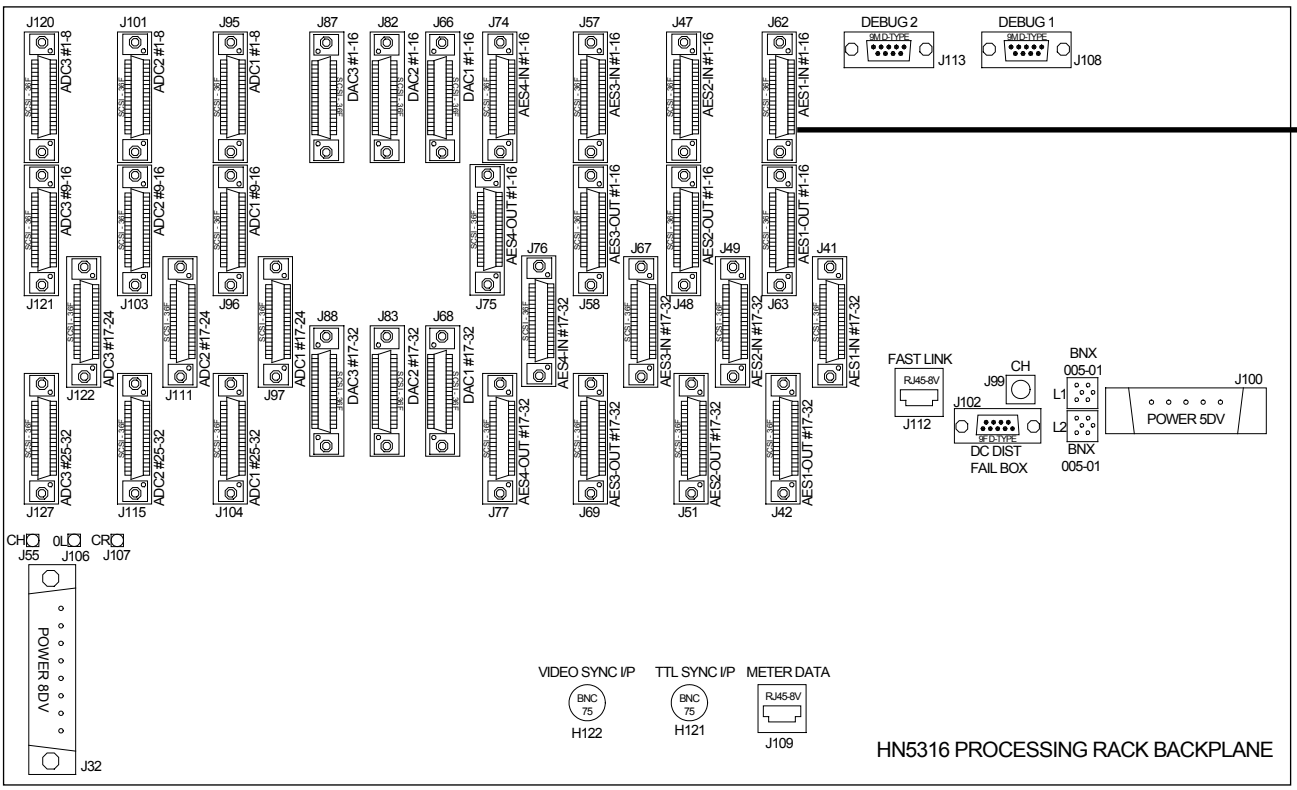
AES INPUTS – XLR INTERFACE

Each AES I/O card in the Processing rack provides 32 AES inputs and 32 AES outputs. Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected.

The diagram below shows how the AES input connectors are connected to 16 way XLR interface panels via SCSI-style cabling. For clarity, connections from the first 16 AES inputs on AES card 1 to an XLR interface panel are shown here.

Each XLR interface panel can interface 16 AES inputs. Therefore if all AES inputs are used, 8 XLR interface panels would be needed.

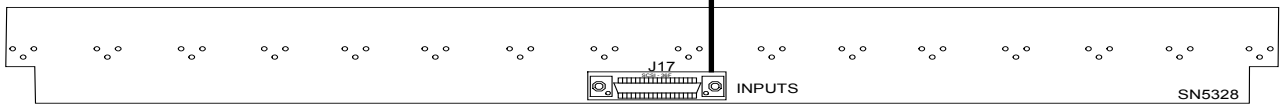
The XLR interface panels must be located within 3m (9.8ft) of the rack.



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

On 3 pin XLR:
Pin 1 is Chassis Connections
Pin 2 is HOT (PHASE)
Pin 3 is COLD (ANTI-PHASE)

XLR INPUT I/F PANEL (REAR)



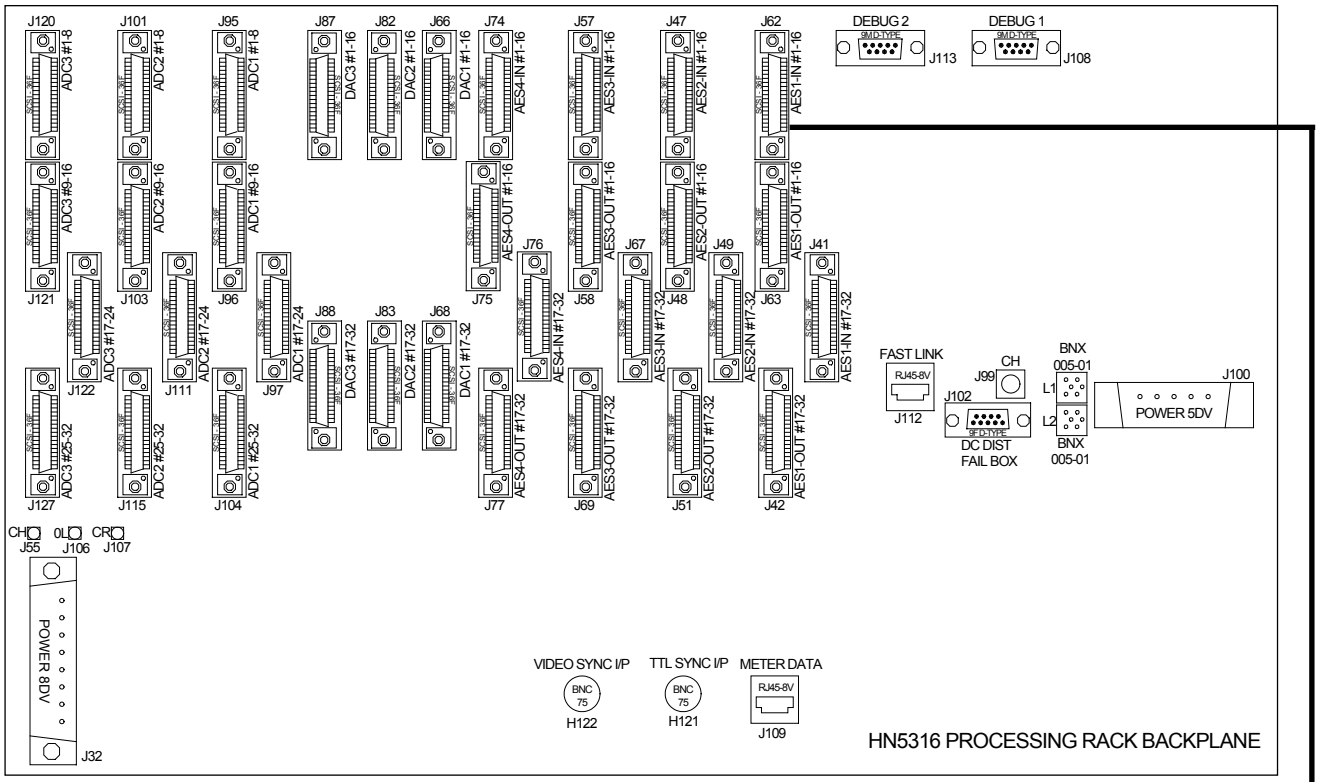
AES INPUTS – EDAC INTERFACE

Each AES I/O card in the Processing rack provides 32 AES inputs and 32 AES outputs. Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected.

The diagram below shows how AES inputs are connected to an 8 way EDAC interface panel via SCSI-style cabling. For clarity, connections from the first 16 AES inputs on AES card 1 to an EDAC connector on the interface panel are shown here.

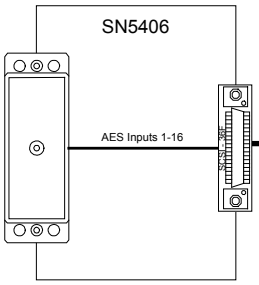
Each connector on the panel can interface 16 AES inputs. Therefore if all AES inputs are used, all 8 connectors on the panel would be needed.

The EDAC Interface panels must be located within 3m (9.8ft) of the rack.



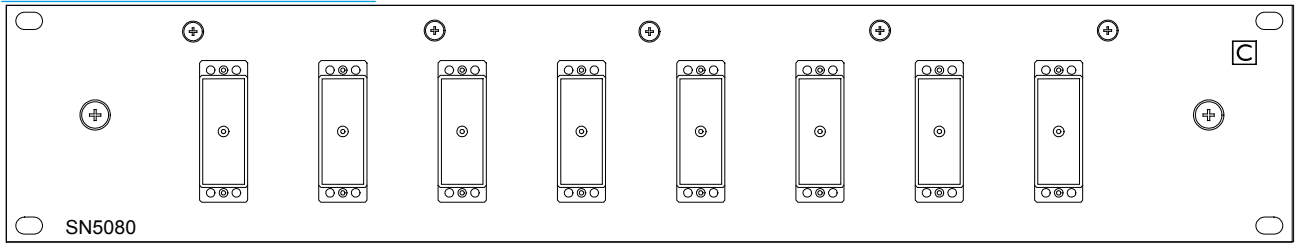
Via SN5406 SCSI to 38W EDAC converter card - Rear of Interface Panel

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

8 WAY EDAC INTERFACE PANEL



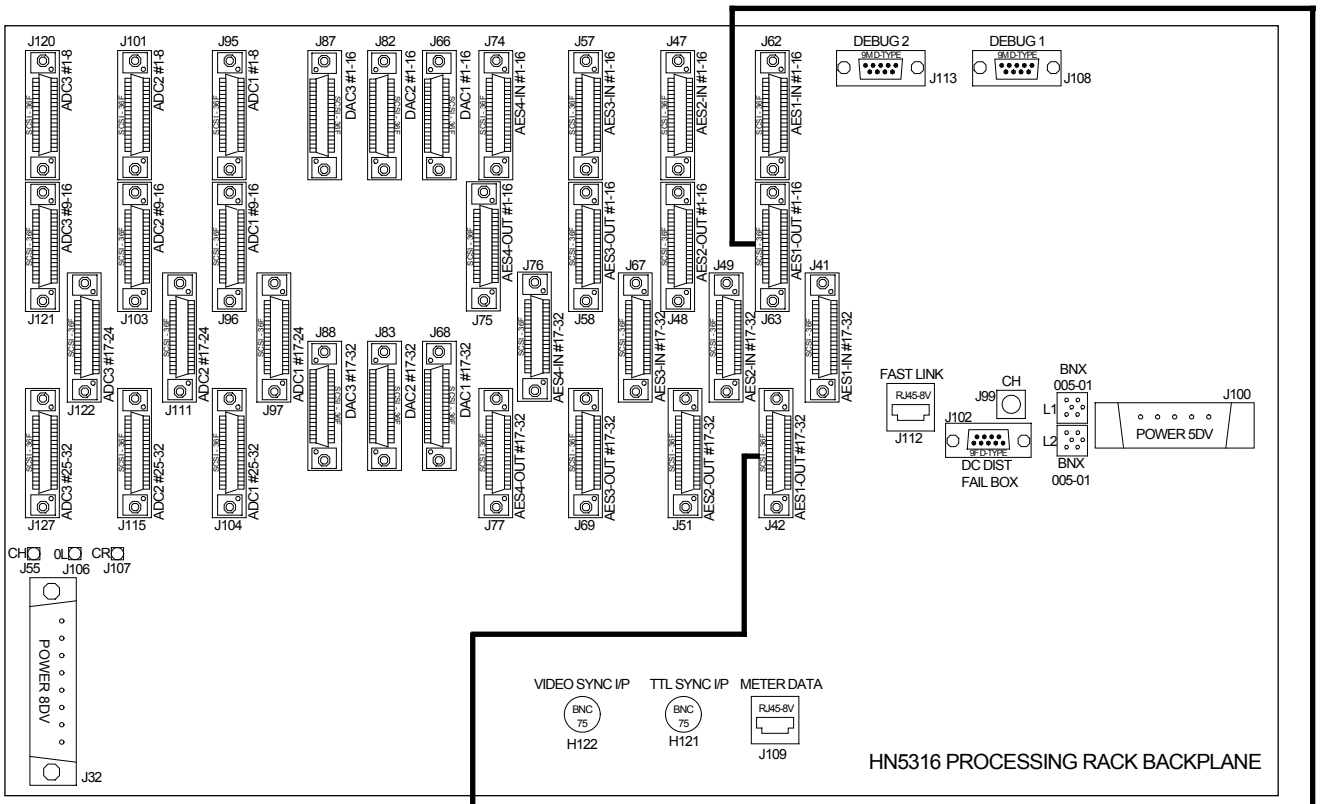
AES OUTPUTS – BNC INTERFACE

Each AES I/O card in the Processing rack provides 32 AES inputs and 32 AES outputs. Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected.

The diagram below shows how the AES output connectors are connected to BNC interface panels via SCSI-style cabling. For clarity, connections from the outputs on just 1 AES card to an interface panel is shown here.

Each panel can interface 32 AES outputs. Therefore if all AES outputs are used, 4 panels would be needed.

The BNC interface panels must be located within 3m (9.8ft) of the Processing rack.



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

BNC OUTPUT I/F PANEL (REAR)

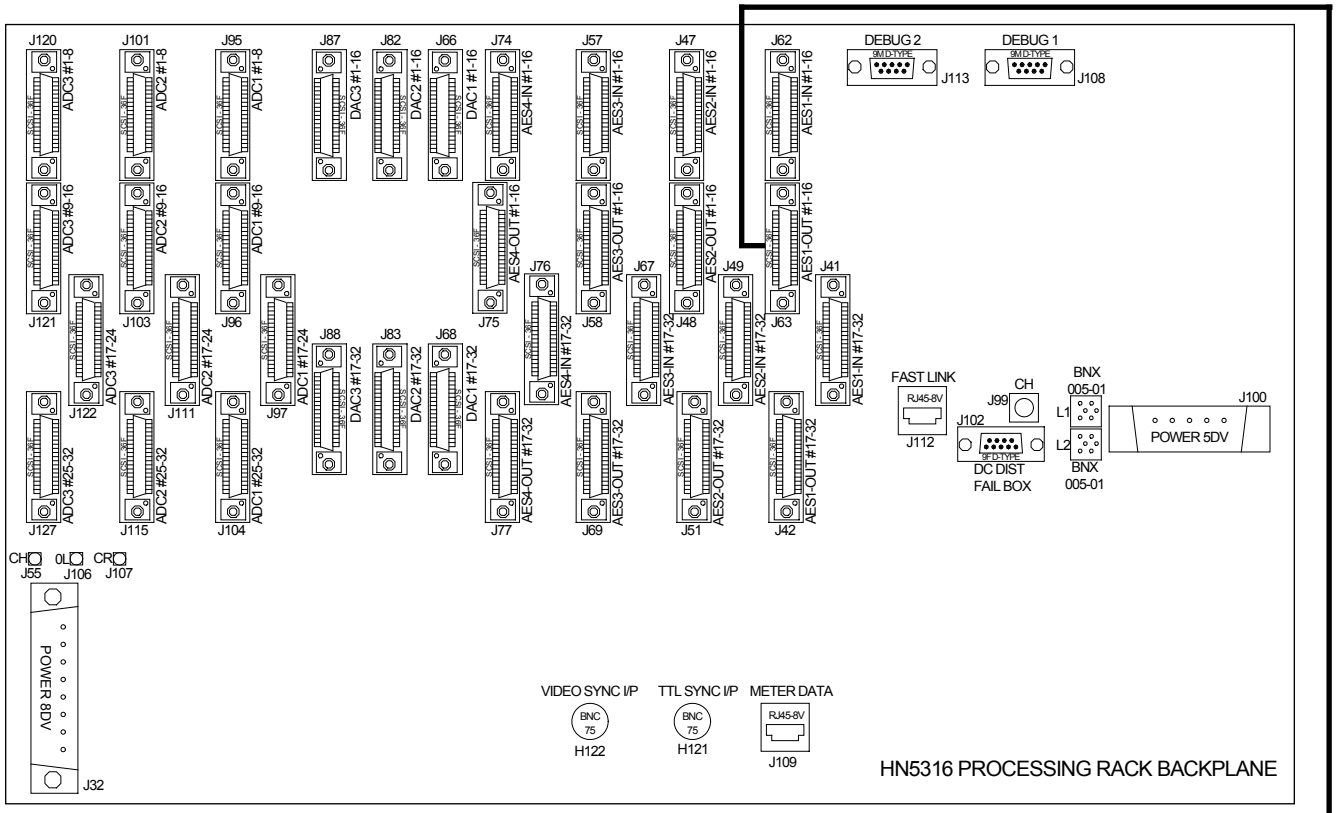
AES OUTPUTS – XLR INTERFACE

Each AES I/O card in the Processing rack provides 32 AES inputs and 32 AES outputs. Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected.

The diagram below shows how the AES output connectors are connected to XLR interface panels via SCSI-style cabling. For clarity, just the connections from the first 16 outputs on AES card 1 to an interface panel are shown here.

Each XLR interface panel can interface 16 AES outputs. Therefore if all AES outputs are used, 8 XLR interface panels would be needed.

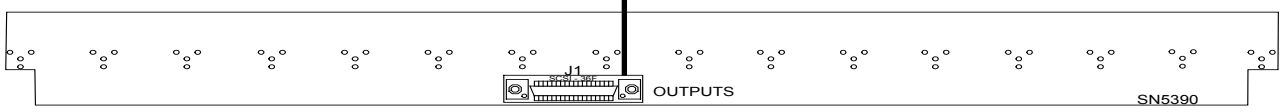
The XLR Interface panels must be located within 3m (9.8ft) of the rack.



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

On 3 pin XLR:
Pin 1 is Chassis Connections
Pin 2 is HOT (PHASE)
Pin 3 is COLD (ANTI-PHASE)

XLR OUTPUT I/F PANEL (REAR)



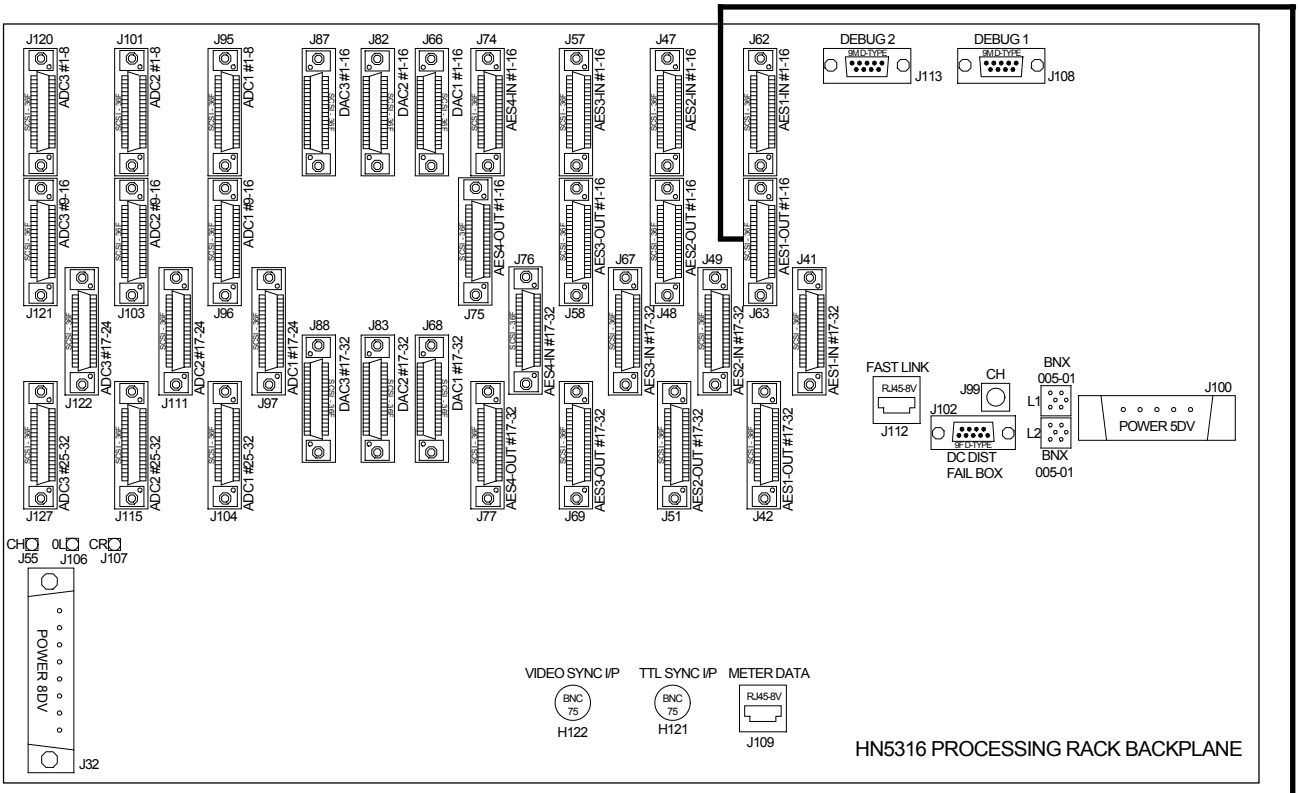
AES OUTPUTS – EDAC INTERFACE

Each AES I/O card in the Processing rack provides 32 AES inputs and 32 AES outputs. Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected.

The diagram below shows how the AES output connectors are connected to XLR interface panels via SCSI-style cabling. For clarity, just the connections from the first 16 outputs on AES card 1 to an EDAC connector on the interface panel are shown here.

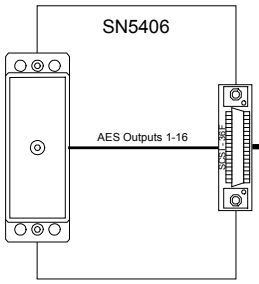
Each EDAC connector on the panel can interface 16 AES outputs. Therefore if all AES outputs are used, all 8 connectors on the panel would be needed.

The EDAC interface panels must be located within 3m (9.8ft) of the rack.



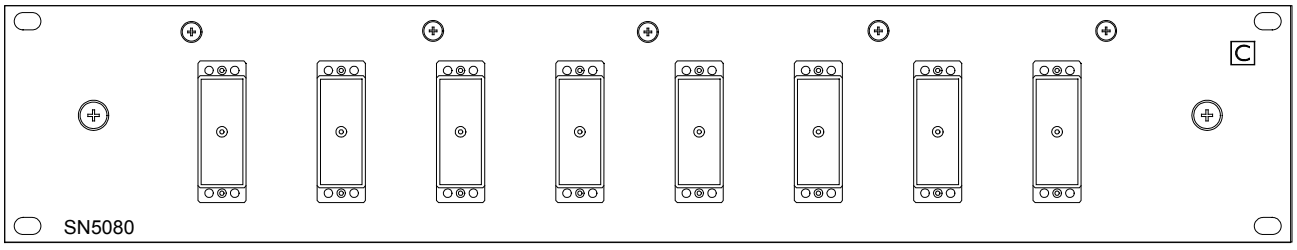
Via SN5406 SCSI to 38W EDAC converter card - Rear of Interface Panel

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

8 WAY EDAC INTERFACE PANEL



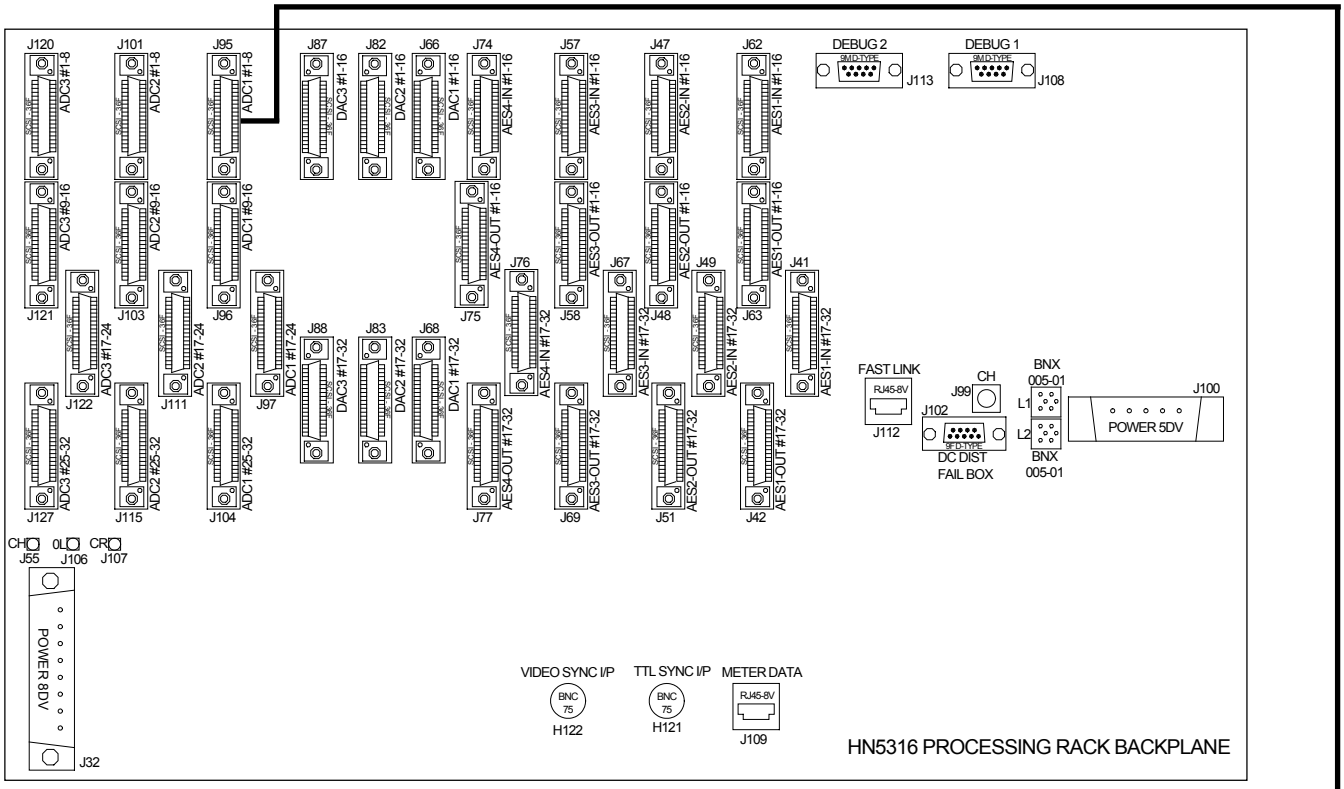
ANALOG MIC/LINE INPUTS - STYLE 1

Up to 3 analog input (ADC) cards can be fitted into the Processing rack, each providing 16 stereo inputs. The cards are inserted into the slots within the rack, and each slot has 4 dedicated input connectors on the rear of the rack, to which the system's analog inputs are connected.

Each of the input connectors provides connections for 4 stereo inputs. The diagram below shows how 8 or 12 way EDAC Input Interface panels can be connected to the ADC connectors on the rear of the rack via Calrec custom cabling to achieve Style 1 (4 pairs per EDAC).

4 Cables are required for each ADC card fitted - 4 stereo inputs on each cable (Just one shown here).

Ideally the EDAC interface panels should be located within 3m (9.8ft) of the rack.



Wired into EDAC - 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

Stereo Inputs 1-4

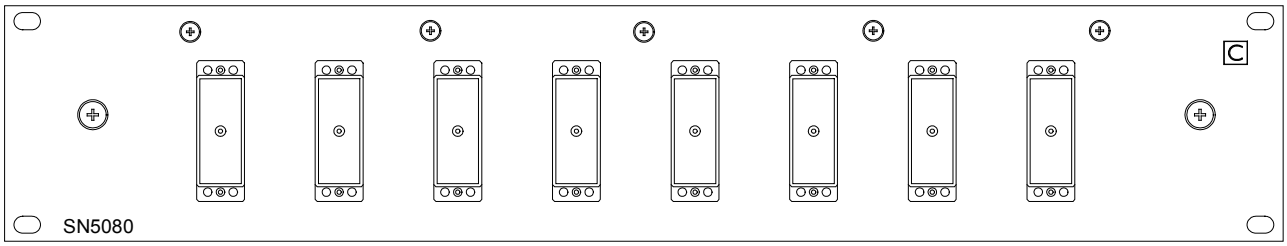
(CABLE 2 IS NOT SHOWN)

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

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

8 WAY EDAC INTERFACE PANEL



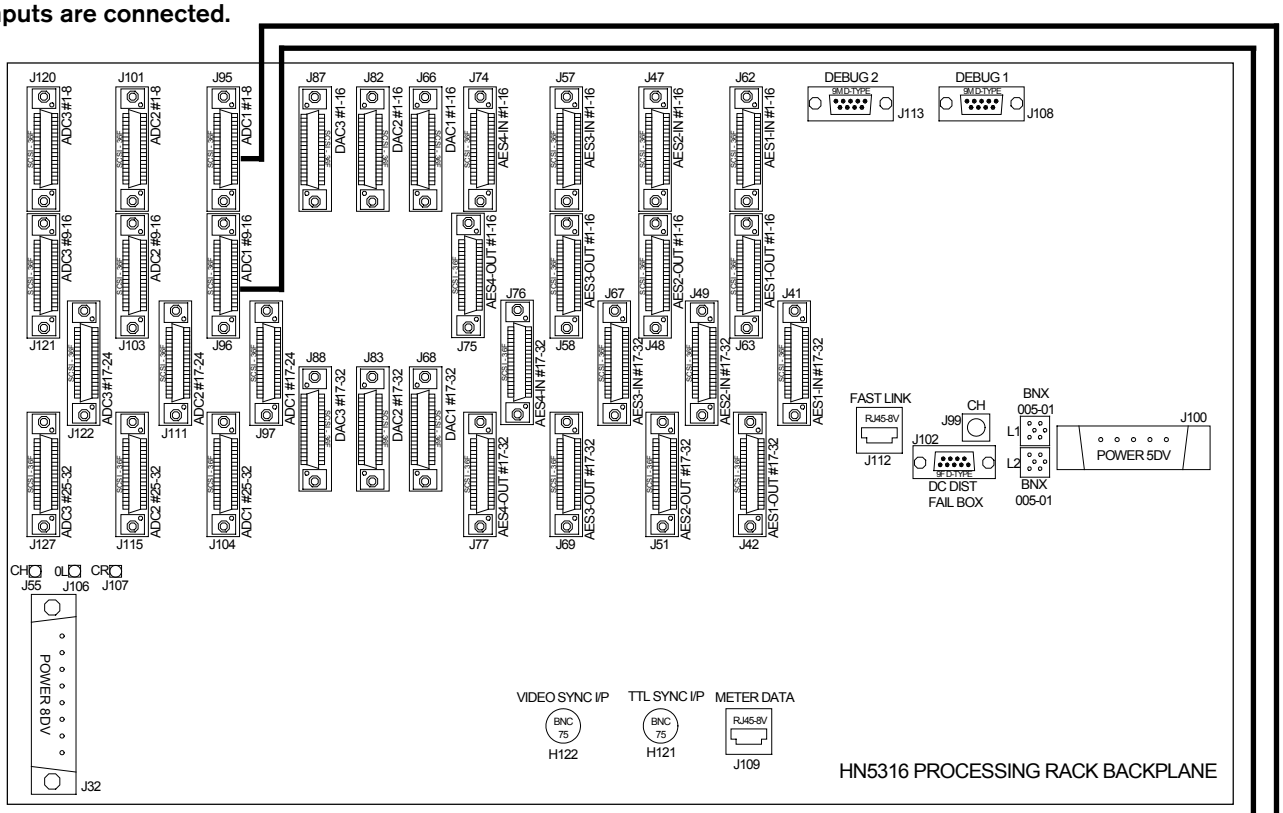
ANALOG MIC/LINE INPUTS – STYLE 2

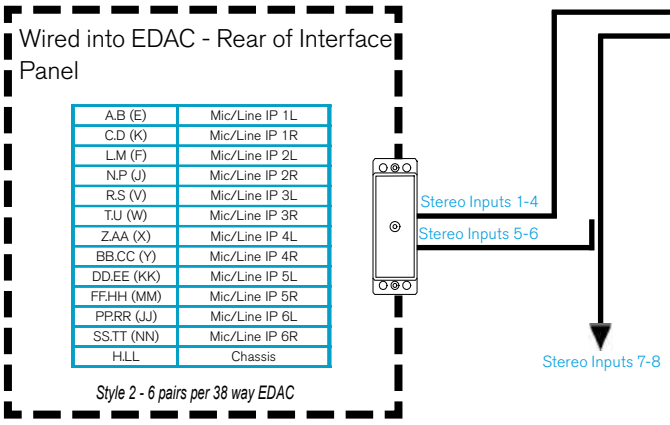
Up to 3 analog input (ADC) cards can be fitted into the Processing rack, each providing 16 stereo inputs. The cards are inserted into the slots within the rack, and each slot has 4 dedicated input connectors on the rear of the rack, to which the system's analog inputs are connected.

Each of the input connectors provides connections for 4 stereo inputs. The diagram below shows how 8 or 12 way EDAC Input Interface panels are connected to the ADC connectors on the rear of the rack via Calrec custom cabling to achieve Style 2 (6 pairs per EDAC).

4 Cables are required for each ADC card fitted. Cable 2 wires into the first EDAC to provide circuits 5 and 6.

Ideally the EDAC interface panels should be located within 3m (9.8ft) of the rack.



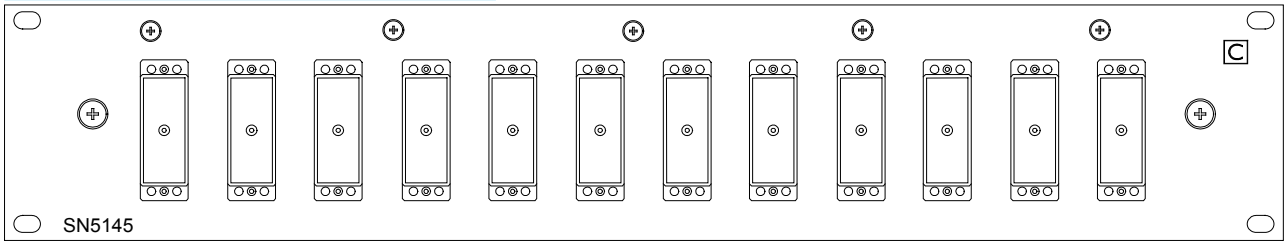


Cable 1 Stereo Inputs 1-4	
SCSI Pins	Circuit
1 . 19	Chassis
2 . 20	1L
3 . 21	Chassis
4 . 22	1R
5 . 23	Chassis
6 . 24	2L
7 . 25	Chassis
8 . 26	2R
9 . 27	Chassis
10 . 28	Chassis
11 . 29	3L
12 . 30	Chassis
13 . 31	3R
14 . 32	Chassis
15 . 33	4L
16 . 34	Chassis
17 . 35	4R
18 . 36	Chassis

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

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

12 WAY EDAC INTERFACE PANEL



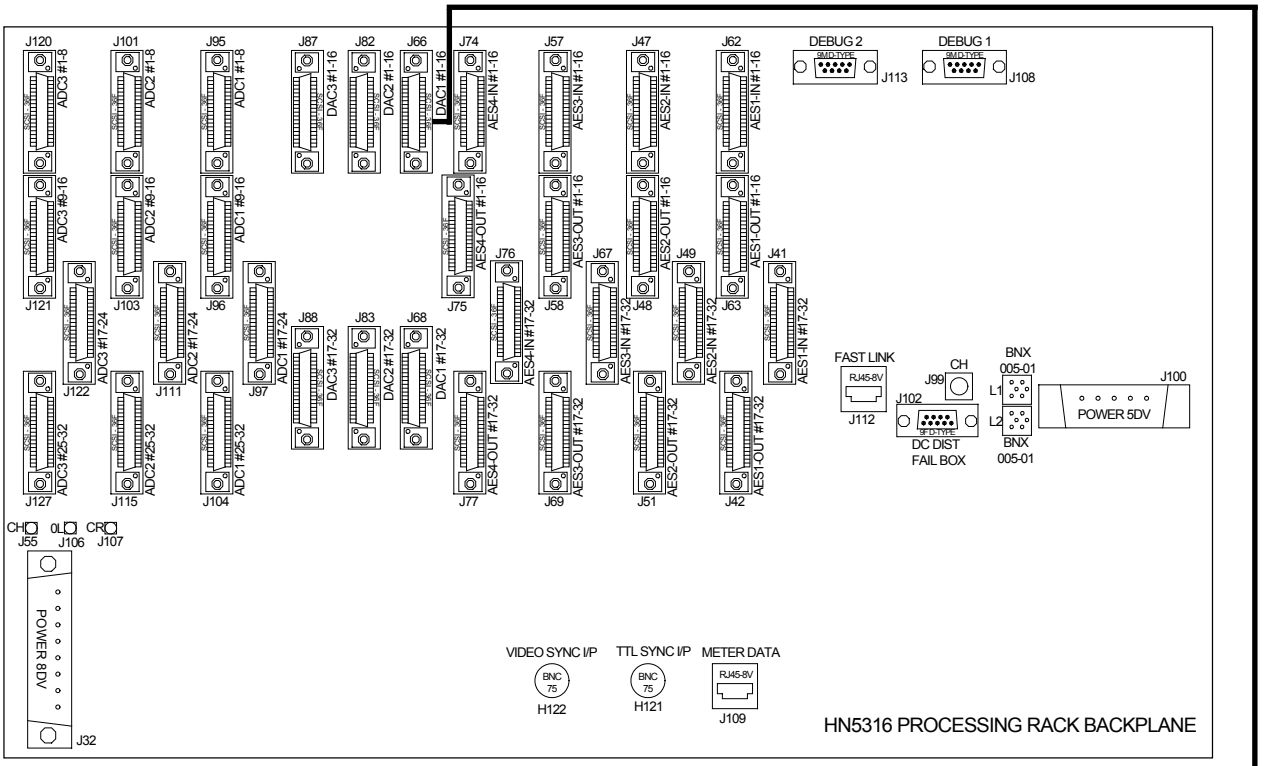
ANALOG LINE OUTPUTS – STYLE 1

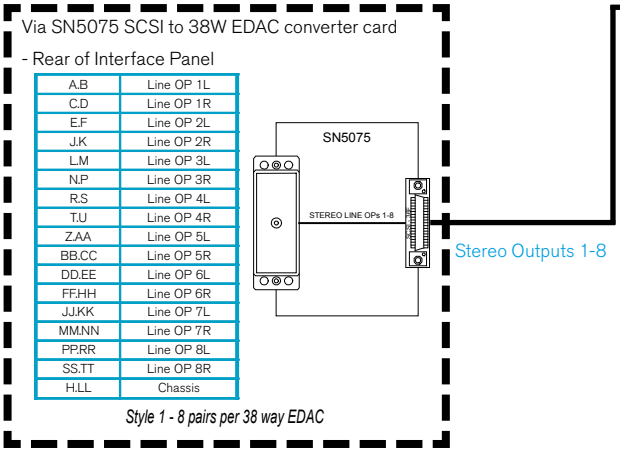
Each analog output (DAC) card in the Processing rack, provides 16 stereo outputs. The cards are inserted into the slots within the rack, these are numbered 1-3. Each slot has 2 dedicated output connectors on the rear of the rack, which provide connections for the system's analog outputs.

Each of the output connectors provides connections for 8 stereo outputs. The diagram below shows how 8 way EDAC interface panels are connected to the DAC connectors on the rear of the rack via SCSI style cabling to achieve Style 1 (8 pairs per EDAC connector).

2 Cables are required for each DAC card fitted - 8 stereo outputs on each cable.

Ideally the EDAC interface panels should be located within 3m (9.8ft) of the rack.

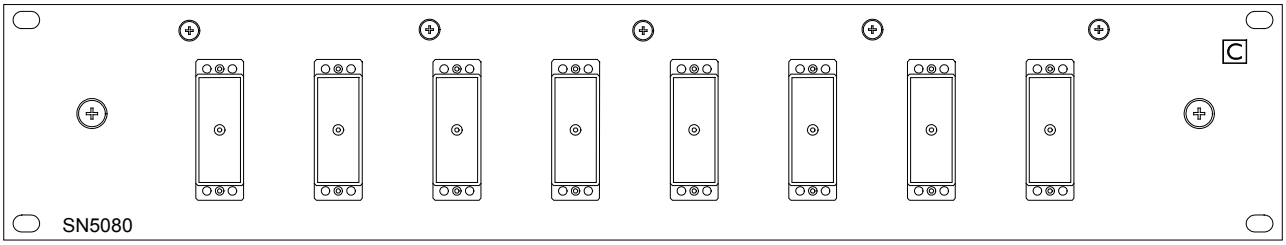




On EDACs, the first pin is HOT (phase), the second pin is COLD (anti-phase) and H.LL are chassis connections.

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

8 WAY EDAC INTERFACE PANEL



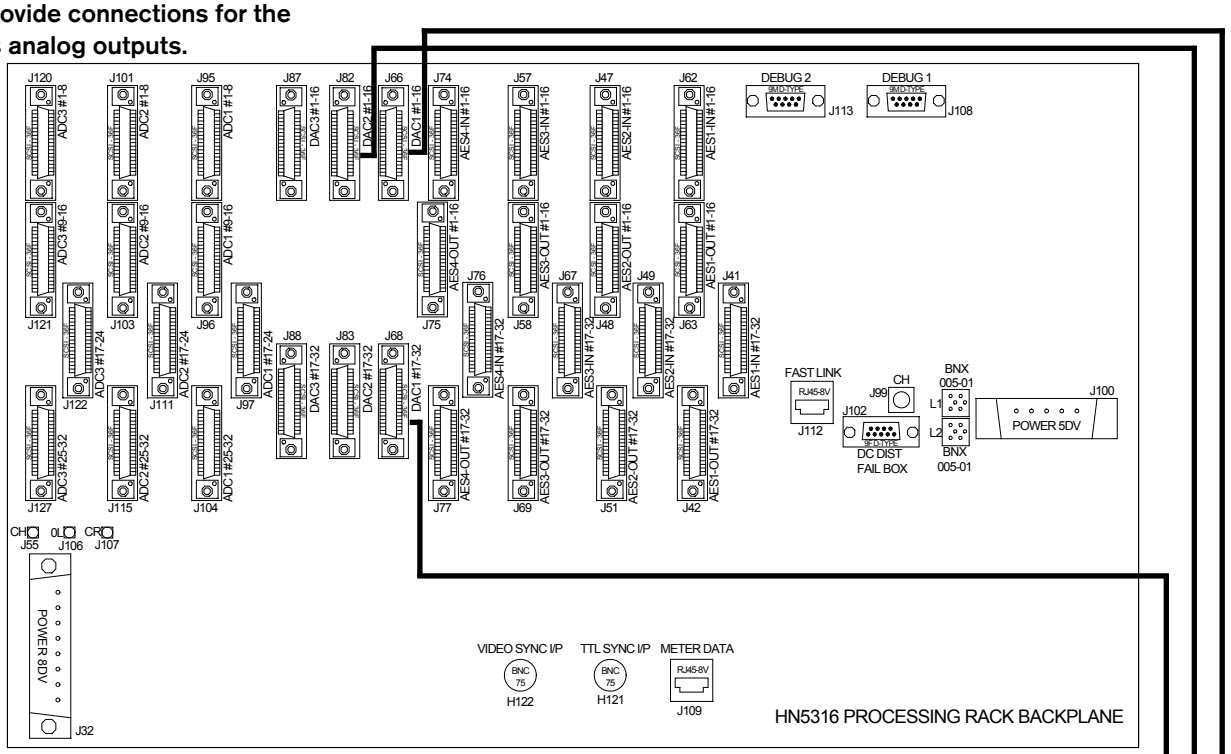
ANALOG LINE OUTPUTS – STYLE 2

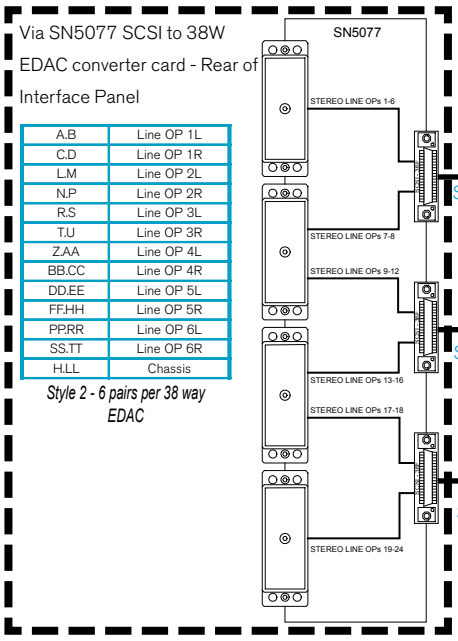
Up to 3 analog output (DAC) cards can be fitted into the Processing rack, each providing 16 stereo outputs. The cards are inserted into the slots within the rack, these are numbered 1-3. Each slot has 2 dedicated output connectors on the rear of the rack, which provide connections for the system's analog outputs.

Each of the output connectors provides connections for 8 stereo outputs. The diagram below shows how 8 way EDAC interface panels are connected to the DAC connectors on the rear of the rack via SCSI style cabling to achieve Style 2 (6 pairs per EDAC connector).

2 Cables for each DAC card fitted - 8 stereo outputs on each cable.

Ideally the EDAC interface panels should be located within 3m (9.8ft) of the rack.





A.B	Line OP 1L
C.D	Line OP 1R
L.M	Line OP 2L
N.P	Line OP 2R
R.S	Line OP 3L
T.U	Line OP 3R
Z.AA	Line OP 4L
BB.CC	Line OP 4R
DD.EE	Line OP 5L
FF.HH	Line OP 5R
PP.RR	Line OP 6L
SS.TT	Line OP 6R
H.LL	Chassis

Style 2 - 6 pairs per 38 way EDAC

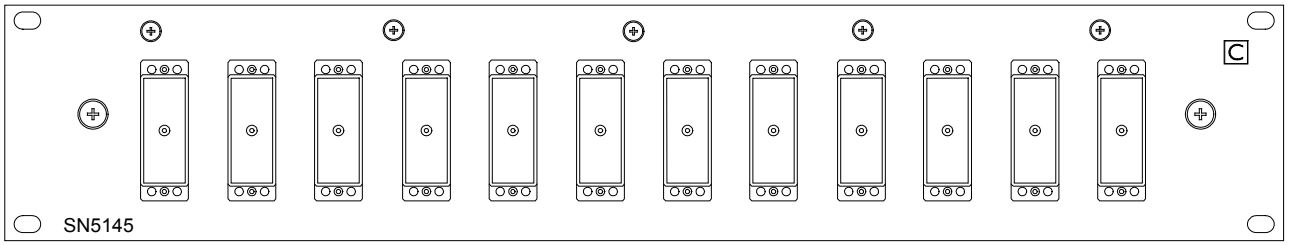
Cable 1 - Stereo Outputs 1-8	
SCSI Pins	Circuit
1 . 19	Chassis
2 . 20	1L
3 . 21	1R
4 . 22	2L
5 . 23	2R
6 . 24	3L
7 . 25	3R
8 . 26	4L
9 . 27	4R
10 . 28	5L
11 . 29	5R
12 . 30	6L
13 . 31	6R
14 . 32	7L
15 . 33	7R
16 . 34	8L
17 . 35	8R
18 . 36	Chassis

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

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

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

12 WAY EDAC INTERFACE PANEL



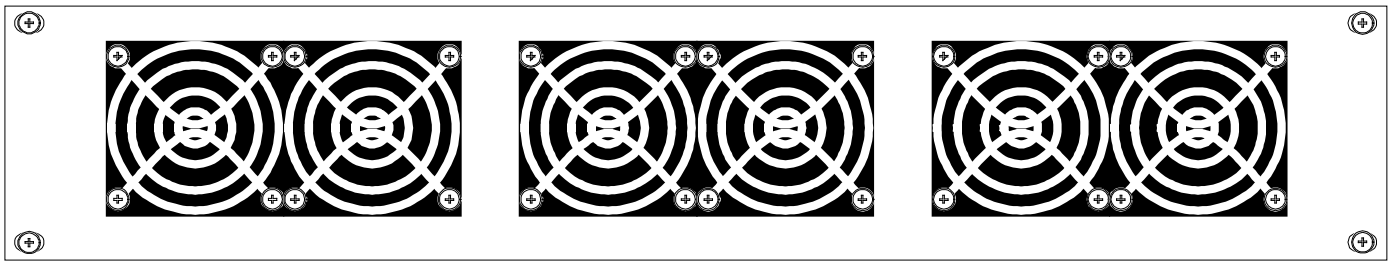
ZETA

APPENDIX A – UNIPOWER BULK POWER SUPPLIES AND SEPERATE DISTRIBUTION

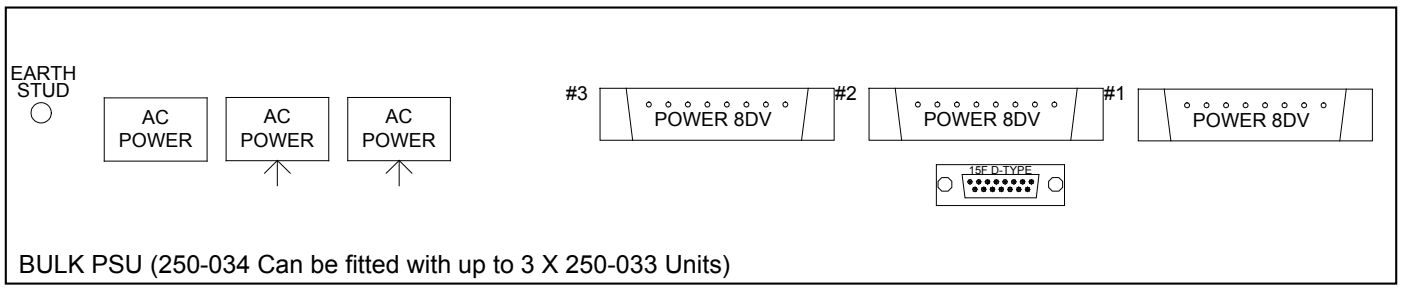
UNIPOWER BULK PSU

This information is for consoles using the Unipower bulk power supplies and seperate distribution unit. If your console uses the combined bulk power supply and distribution unit, please refer to the information in the main part of this manual.

FRONT



REAR



BULK PSU (250-034 Can be fitted with up to 3 X 250-033 Units)

The Bulk PSU rack is a 2U rack which can hold up to three identical 24V 1kW plug-in power supplies. The rack has separate AC power inputs and DC outputs for each of the three plug-in power supplies on the rear of the unit. Any of the plug-in power supplies can be removed from the rack without disturbing the operation of the others. Diode feeding allows supplies to be parallelled together.

The control surface and DSP/Digital I/O rack are powered as one unit from one of these 2U racks. The number of plug-in power supplies required is dependent upon the size of the system, the distance between console and rack, and the hot spare requirement (to provide redundancy).

Fan Cooling

Each of the plug-in power modules has its own cooling fan. The warm air is directed out of the rear of the rack. To ensure proper cooling, the power system requires a minimum clearance of 50mm (2 inches) from the fans and rear air outlets, and also any walls or other surfaces.

Mounting

The unit should be mounted by means of the side brackets, each of which has two mounting holes. It should always be mounted in a horizontal position. The rear mounting brackets should be used when no support is provided under the rack assembly, the rack should not be supported by front flanges alone. The rear mounting brackets fix to the rear of the studio equipment bay. Extensions of the rack sides slot into these rear supports, allowing the Bulk PSU rack to be removed without removing the support.

Input Power Connections

3-wire safety AC outlet sockets should be located near the power system (number as required). Each line cord will provide AC power to one of the power supply modules. The AC line cord is the mains disconnect for each module. The AC line cords should have an IEC320 connector to plug into the rear of the power system chassis. Each line cord MUST be suitably rated and FUSED (or have an equivalently rated circuit breaker). For 230V mains, the rating is10A for the line cords and breakers. For 115V mains, the rating is 15A, (line cords are known as SVT or SJT type).

Do not remove the ground conductor. The ground conductor is connected to safety ground to minimize electrical shock hazard and ensure low EMI (electromagnetic interference). The grounding lug, located on the rear panel, is a bonding for connection of the chassis to other system chassis assemblies. Safety grounding is provided via ground connections in the line cord entry receptacles.

System Fan Noise (dB SPL A-Weighted)

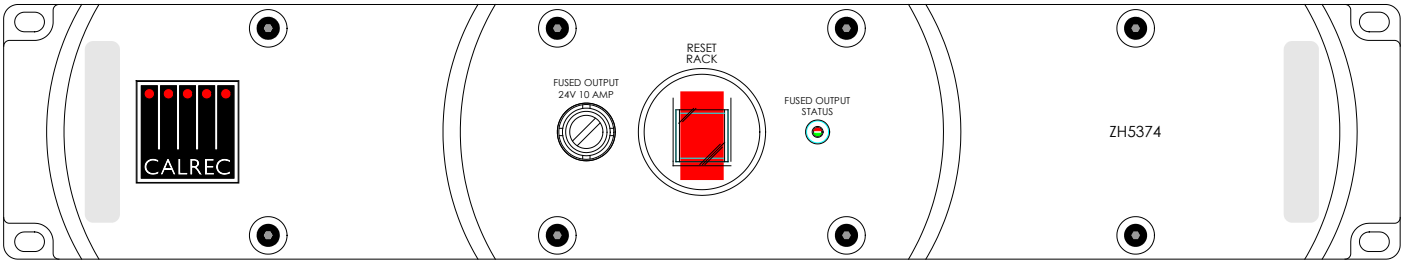
These measurements were taken on axis at 1 metre from the dominant noise source:

Bulk PSU Rack	
1 x 24V 1kW PSU	49dBA
2 x 24V 1kW PSU	52dBA
3 x 24V 1kW PSU	54dBA

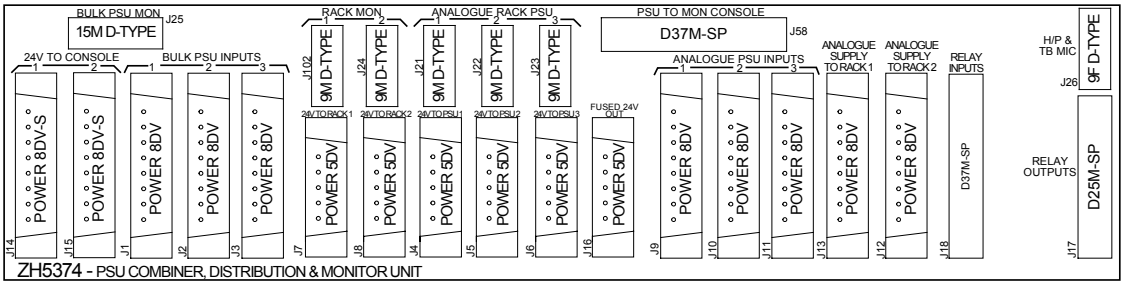
PSU MONITORING AND DISTRIBUTION UNIT

This information is for consoles using the Unipower bulk power supplies and seperate distribution unit. If your console uses the combined bulk power supply and distribution unit, please refer to the information in the main part of this manual.

FRONT



REAR



The Power Monitoring and Distribution rack performs many functions. It monitors the power supplies for failures, and ensures "hot" changeover to the spare (if fitted) should a fault develop.

In addition to connections for power combining and distribution, the module includes:

- A front-mounted rack reset button.
- 8 x changeover relays intended for switching balanced talkback audio.
- 2 x RS422 to RS232 converters to interface the rack control processors to the PC.
- Opto-isolated fan fail and PSU fail inputs.

Rack Reset

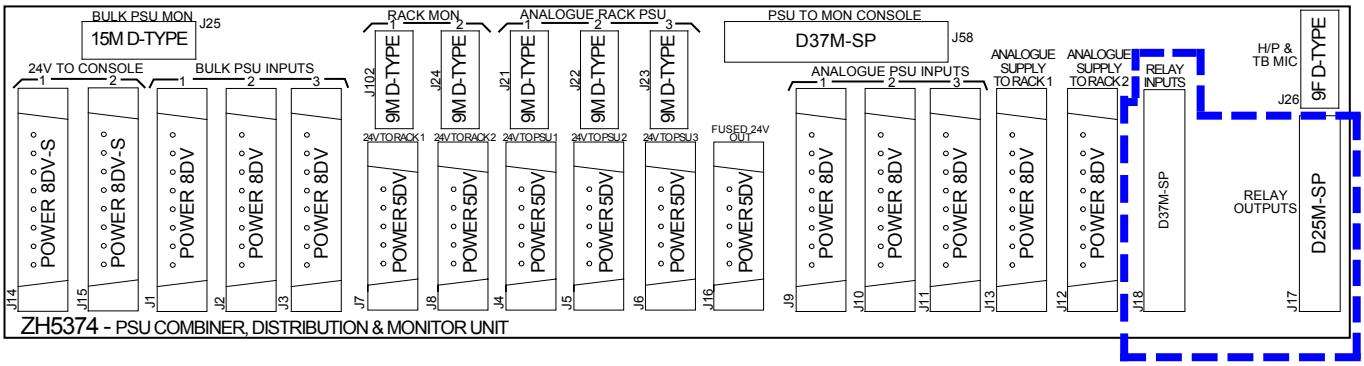
The Reset button reboots the racks only, the control surface is unaffected.
PLEASE NOTE: Resetting the racks will result in a brief audio interruption.

This unit should be secured into the front of the bay by the two standard fixing holes in each of the two 2RU front angles. The unit/s should always be mounted in a horizontal position. It is recommended that the rack is not supported by the front flanges alone.

PSU MONITORING AND DISTRIBUTION UNIT

This information is for consoles using the Unipower bulk power supplies and seperate distribution unit. If your console uses the combined bulk power supply and distribution unit, please refer to the information in the main part of this manual.

8 change over relays are also available on the rear of the Power Monitoring and Distribution Unit.



RELAY INPUTS (CONNECTOR J18)

Pins	Circuit
1 . 20	Normally Made a/b Relay 1
2 . 21	Normally Open a/b Relay 1
3 . 22	Normally Made a/b Relay 2
4 . 23	Normally Open a/b Relay 2
5 . 24	Normally Made a/b Relay 3
6 . 25	Normally Open a/b Relay 3
7 . 26	Normally Made a/b Relay 4
8 . 27	Normally Open a/b Relay 4
9 . 28	Normally Made a/b Relay 5
10 . 29	Normally Open a/b Relay 5
11 . 30	Normally Made a/b Relay 6
12 . 31	Normally Open a/b Relay 6
13 . 32	Normally Made a/b Relay 7
14 . 33	Normally Open a/b Relay 7
15 . 34	Normally Made a/b Relay 8
16 . 35	Normally Open a/b Relay 8
17 . 36	Chassis
18 . 37	Chassis
19	Chassis

Relay Specification - 50V, 1A (switched power not exceeding 30W)

RELAY OUTPUTS (CONNECTOR J17)

Pins	Circuit
1 . 14	Common a/b Relay 1
2 . 15	Common a/b Relay 2
3 . 16	Common a/b Relay 3
4 . 17	Common a/b Relay 4
5 . 18	Common a/b Relay 5
6 . 19	Common a/b Relay 6
7 . 20	Common a/b Relay 7
8 . 21	Common a/b Relay 8
9 . 22	Chassis
10 . 23	Chassis
11 . 24	Chassis
12 . 25	Chassis
13	Chassis

PSU MONITORING AND DISTRIBUTION UNIT

This information is for consoles using the Unipower bulk power supplies and seperate distribution unit. If your console uses the combined bulk power supply and distribution unit, please refer to the information in the main part of this manual.

Connecting External Equipment

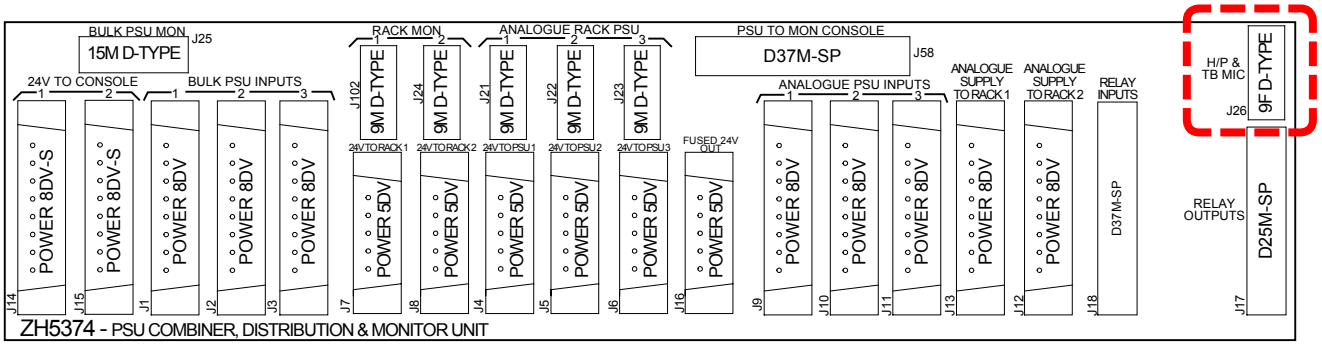
If the talkback output is required to feed an external talkback system, the desk talkback output will feed the external talkback system via a cable from the power monitoring and distribution unit, or via an extra cable wired into the 37-way D-type on the console backplane, depending on which is nearer.

If the headphone feed is to come from external equipment, the connection will either be via a cable to the D-type connector J26 on the power monitoring and distribution unit, or via an extra cable wired into the 37-way D-type connector J58 on the rear of the console depending on which is nearer. Please note that this can be an AES signal only.

Connector J26 Pin Out Information
On the rear of the PSU monitoring and distribution unit, connector J26:-

Pins 1 and 2 - From control surface TB mic (AES or analog)

Pins 4 and 5 - To control surface headphone jack (AES only).



ZETA
INPUT AND OUTPUT LABELLING SHEETS

CALREC

Putting Sound in the Picture

AES INPUTS

AES Card 1 - Inputs 1-32

Connector No	Input	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J62	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J41	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

AES Card 2 - Inputs 1-32

Connector No	Input	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J47	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J49	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

AES INPUTS

AES Card 3 - Inputs 1-32

Connector No	Input	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J57	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J67	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

AES Card 4 - Inputs 1-32

Connector No	Input	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J74	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J76	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

AES OUTPUTS

AES Card 1 - Outputs 1-32

Connector No	Output	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J63	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J42	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

AES Card 2 - Outputs 1-32

Connector No	Output	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J48	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J51	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

AES OUTPUTS

AES Card 3 - Outputs 1-32

Connector No	Output	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J58	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J69	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

AES Card 4 - Outputs 1-32

Connector No	Output	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J75	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J77	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

MIC/LINE INPUTS

ADC Card 1 - Inputs 1-32

Connector No	Input	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J95	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
J96	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J97	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
J104	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

ADC Card 2 - Inputs 1-32

Connector No	Input	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J101	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
J103	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J111	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
J115	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

MIC/LINE INPUTS

ADC Card 3 - Inputs 1-32

Connector No	Input	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J120	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
J121	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J122	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
J127	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

LINE OUTPUTS

DAC Card 1 - Outputs 1-32

Connector No	Output	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J66	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J68	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

DAC Card 2 - Outputs 1-32

Connector No	Output	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J82	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J83	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

LINE OUTPUTS

DAC Card 3 - Outputs 1-32

Connector No	Output	Label for LR pair (or 1st of 2 mono) 6 characters							Circuit Description	2nd Label (only if pair dedicated to 2 mono signals)
J87	1L + 1R							L R		
	2L + 2R							L R		
	3L + 3R							L R		
	4L + 4R							L R		
	5L + 5R							L R		
	6L + 6R							L R		
	7L + 7R							L R		
	8L + 8R							L R		
J88	9L + 9R							L R		
	10L + 10R							L R		
	11L + 11R							L R		
	12L + 12R							L R		
	13L + 13R							L R		
	14L + 14R							L R		
	15L + 15R							L R		
	16L + 16R							L R		

NOTES

Calrec Audio Ltd
Nutclough Mill
Hebden Bridge
West Yorkshire
England UK
HX7 8EZ

Tel +44 (0)1422 842159
Fax +44 (0)1422 845244
Email Enquiries@calrec.com

calrec.com

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

The established policy of Calrec Audio Ltd. is to seek improvements to the design, specifications and manufacture of all products. It is not always possible to provide notice outside the company of the alterations that take place continually.

Despite considerable effort to produce up to date information, no literature published by the company nor any other material that may be provided should be regarded as an infallible guide to the specifications available nor does it constitute an offer for sale of any particular product.

No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and scanning, for any purpose, without the prior written consent of Calrec Audio Ltd.

Whilst the Company ensures that all details in this document are correct at the time of publication, we reserve the right to alter specifications and equipment without notice. Any changes we make will be reflected in subsequent issues of this document. The latest version will be available upon request.

This publication is for International usage.

All trade marks acknowledged.

(926-082 Iss.10)