AMS NEVE

CAPRICORN

INSTALLATION MANUAL

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HEAD OFFICE
AMS NEVE PLC • BILLINGTON ROAD • BURNLEY
LANCS BB11 5UB • ENGLAND
TELEPHONE: +44 (0) 1282 457011 • FAX: +44 (0) 1282 417282

LONDON OFFICE
TELEPHONE: +44 (0) 20 7916 2828 • FAX: +44 (0) 20 7916 2827

NORTH AMERICAN OFFICES
AMS NEVE INC., NEW YORK
TEL: +1 (212) 965 1400 • FAX: +1 (212) 965 3739
AMS NEVE INC., HOLLYWOOD
TEL: +1 (818) 753 8789 • FAX: +1 (818) 623 4839
RUPERT NEVE CANADA INC., TORONTO
TEL: +1 (416) 365 3363 • FAX: +1 (416) 365 1044
e-mail: enquiry@ams-neve.com
http://www.ams-neve.com

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Introduction

System Hardware

The Capricorn System Hardware consists of the following:

- ❑ Console Control Surface
- ❑ High Resolution VDU
- ❑ DSP Rack
- ❑ Machine Control Rack
- ❑ Monitor Facilities I/O Rack

Plus a number of the following optional racks depending on the system:

- ❑ 20 Bit Analogue I/O Rack
- ❑ 24 Bit Analogue I/O Rack
- ❑ Mic/Line Input Rack (for 20 Bit I/O)
- ❑ Mic/Line Input Rack (for 24 Bit I/O)
- ❑ Digital (AES/EBU) I/O Rack
- ❑ Multichannel AES I/O Unit
- ❑ CXS Monitor Rack

The Capricorn Range of Consoles

A range of consoles is available, based on standard units, to cover the applications of multi–track music recording, multi–track broadcast, video post–production and film dubbing. The control surface contains the following:

Strip Section:	Maximum = 5 (120 faders).
Assignable Facilities Unit Section:	Maximum = 3.
Monitor/Automation Section:	1 per console.
Monitor/Automation Section CRT:	1 per console.

In addition, the following optional sections are available:

Producer's Table Custom Module available in two sizes:

- ❑ AFU width.
- ❑ Channel Strip width.
- ❑ CXS

The console size may be retrospectively expanded on site without the need for extensive rework.

The following table shows the component population for standard console sizes:

Component	System 64	System 112	System 160
Channel Faders	48	48	72
Analogue Mic/Line A/B Inputs	16	32	64
Stereo Digital Line Inputs	8	24	32
Multitrack Returns	48	64	96
Multitrack Send Buses	48	48	48
Stereo Main Outputs	1	2	4
Aux Outputs	8	16	16
Cue Outputs	4	8	16
Mono Insertions Send/Returns – Analogue	8	8	8
Stereo Insertions Send/Returns – Digital	4	16	16
Stereo Monitor Outputs – Analogue	3	3	3
Group Buses	8	16	24
Talkback In/Outs	4	4	4
High Resolution Dot Matrix Meters	55	55	79
Equalisers and Filters	32	96	160
Sideband Filters	32	96	160
Dynamics (Lim/Comp/Gate/Exp)	32	96	160

Pre–Commissioning Instructions

The following procedures and conditions must be carried out before the arrival of the commissioning engineer. Failure to do so will cause delays in commissioning for which a charge may reluctantly have to be made.

One commissioning engineer will be assigned to the console installation. Technical assistance will be required and must be provided by the customer. Assistance must be provided to position the console and racks.

Static Sensitive Devices – Handling Precautions

Introduction

This Specification details the precautions to be used for the Protection of Semi-Conductor Devices.

Static Charge build up in humans, tools, fixtures etc, could appear as a voltage difference applied between the leads of a device, leaving either immediate or latent damage.

Component and Package Identification from AMS Neve plc

Containers and Packages holding Semi-Conductive Devices will be suitably marked. Approved containers consist of:

- ❑ A rigid plastic container lined with conductive foam.
- ❑ A conductive plastic bag of a size adequate to completely contain the item.

Handling of Static Sensitive Devices

General Precautions

- ❑ Personnel handling these devices must not wear outer clothing which will generate a static charge. Cotton or linen is preferred.
  Wool frequently contains man made additives. Nylon or man made fibre outer garments or dust coats must not be worn.
- ❑ Freshly xeroxed/photostat copies can hold a substantial static charge and should be kept well away from static sensitive devices.
- ❑ All bench surfaces where these devices are handled must be conductive and maintained at earth potential.
- ❑ Before removing a device from the protective material personnel must be adequately earthed. The device should not be handled by its leads.

Static Sensitive Devices to be returned to AMS Neve plc

All containers and packages containing semi-conductive devices should be suitably marked with a warning 'STATIC SENSITIVE'.

Approved containers consist of:

- ❑ A rigid plastic container lined with conductive foam.
- ❑ A conductive plastic bag of a size adequate to completely contain the item.

Environmental Conditions

Console Frame and Racks

Before moving the console frame, DSP rack or I/O sub-racks into a hostile environment, they must be well wrapped to protect against damage caused by dust particles, water or other substances.

Modules and printed circuit boards

Never unpack modules in any form of hostile environment. All electronic circuits are vulnerable to Electrostatic Discharge and anti–static precautions should be taken at all times.

General

Equipment must not be subjected to excessive heat, shock or vibration.

Unpacking

Console

The weight and dimensions of console parts must be checked before moving.

The console can be delivered in separate sections for assembly on site. The Strip, AFU and Monitor sections are supported by two cross-member beams, they can be fitted in any order along the beams (this is specified at the time of the sales order).

When handling the console sections please observe the following guidelines:

- ❑ Gloves or suitable protective hand wear must be used when moving the console frame parts.
- ❑ The console must only be lifted by its solid structural members.
- ❑ The console must not be lifted by its finishing trim.
- ❑ The console must be positioned correctly in the room and its feet must be levelled to avoid distortion of the frame.
- ❑ Modules must not be installed before the arrival of the commissioning engineer.
- ❑ The console must not be powered up.

Racks

The Capricorn processing racks are all designed to fit into standard 19 inch rack housing.

- ❑ The weight and size of the racks must be checked before moving.
- ❑ The Racks must not be powered up.
- ❑ The Racks should preferably be left packaged until the arrival of the commissioning engineer, but if unpacked, the racks should be stored in a suitable frame.

Signal Processing Cards and Modules

Modules should preferably be left packaged until the arrival of the commissioning engineer.

If modules are unpacked, anti–static precautions must be taken at all times.

Pre-Wiring

Patch Bay Wiring

If a remote analogue patch is supplied by AMS Neve, it must be mounted in its rack bay. All cables must be laid in their ducts and terminated for Capricorn racks. If the console is to have a customer supplied patch, it must be installed and tested.

Tape Machines

All tape machine audio, transport and tally cables must be laid and correctly terminated.

Equipment Cables

All cables supplied by AMS Neve for connection between the console and remote mounted units must be laid in cable ducts.

Equipment Required at Commissioning

Multitrack Tape Machines

Tape machines and auto–locator must be available at the time of commissioning. If they are not available and a return visit is required, the additional cost will be charged.

Digital tape machines must be capable of synchronising to an AES/EBU wordclock source, a convertor unit may be required to interface to BNC connections.

Power Amplifiers and Audio Loudspeakers

These must be made available for audio testing, but need not be the actual units for the room.

Music Source (CD or Tape Player)

This must be made available for audio testing, with both analogue and digital outputs (AES/EBU). The music source must be capable of being synchronised to the system wordclock.

AES/EBU Wordclock Reference

A suitable wordclock reference must be available. If the DSP rack wordclock source is used, a splitter for the AES/EBU wordclock may be required.

Physical Information

Console Control Surface Dimensions

System Type	Length mm (ins)	Depth mm (ins)	Height mm (ins)	Approximate Weight kg (lbs)
System 64	2300 (90.6)	1100 (43.3)	1100 (43.3)	160 (353)
System 112	2300 (90.6)	1100 (43.3)	1100 (43.3)	160 (353)
System 160	3070 (120.8)	1100 (43.3)	1100 (43.3)	214 (470)

Rack Dimensions

All racks are 19" width.

Rack Type	U	Depth mm (ins)	Height mm (ins)	Approximate Weight kg (lbs)
DSP Rack	42	680 (26.8)	1867 (73.5)	200 (441)
Machine Control Rack	6	260 (10.2)	267 (10.5)	35 (77)
Monitor Facilities I/O Rack	12*	370 (14.6)	534 (21)	40 (88)
20 Bit Analogue I/O Rack	12*	370 (14.6)	534 (21)	40 (88)
24 Bit Analogue I/O Rack	6	482 (19)	267 (10.5)	50 (110)
Mic/Line Input Rack 20 Bit I/O	12*	370 (14.6)	534 (21)	40 (88)
Mic/Line Input Rack 24 Bit I/O	3	546 (21.5)	134 (5.25)	25 (55)
Mic/Line Rack PSU 24 Bit I/O	2	420 (16.5)	89 (3.5)	10 (22)
Digital I/O Rack	9	370 (14.6)	400 (15.75)	40 (88)
Multichannel AES I/O Unit	1	370 (14.6)	45 (1.75)	6.5 (15)
CXS Monitor Rack	4	470 (18)	178 (7)	17 (38)

* The 12U rack units include an integral 2U fan unit fitted above the rack.

All components are of a size suitable for transportation through a standard door (900mm wide x 2100mm high nominal).

The console surface is bolted together and delivered whole. If it requires splitting for installation, this should be stated at the time of order.

Console Control Surface

This contains the operator interface and interactive display facilities associated with the control of audio and the automation of the system. It consists of the following separate section types:

1. Up to 5 Channel strip sections, each containing 24 strips.

2. At least one Assignable Facilities Unit (AFU).

For multi-user operation, up to 3 AFUs may be fitted.

3. One Monitor section for "global" control of functions such as Monitoring, Automation and the Tape Machine. Only one Monitor section can be fitted to the desk.

4. CXS (Optional)

Console dimensions

The length of the console control surface depends on the sections within it, to calculate the overall length of the console the width of the buffers, 160mm, must be added. Section widths are as follows:

Section	Width (mm)
Channel Section	768mm
Assignable Facilities Unit Section	347mm
Monitor/Automation Section	347mm
Producer's Table	768mm
Custom Module	347mm or 768mm
Maximum height of meter upstand	1057mm
Depth front to back	1008mm

Constructional Overview

The console consists of a number of modular sections supported on a tubular metal frame. The modules and tubular leg structure are surrounded by buffering and cladding as appropriate. Provision is made to mount a CRT on the console.

Each module is constructed with aluminium end-cheeks with extruded features spacing the end cheeks apart. The modules are entirely self-contained with dedicated power supplies and interface processor. The modules can be fitted in any order on the metal frame to the specification of the customer if specified in advance.

Control Surface Structure

The structural shell of each module supports three control panel assemblies. The control panel is made up of a sandwich construction consisting of an aluminum front panel, a card carrying the displays and switches and an aluminum under-tray. The sandwich assembly is secured to the module shell via the metal under-tray with fixings hidden beneath the script-rail assembly.

Provision is made for the easy separation of the aluminium front panel and the card to aid servicing. Considerable importance is placed on the accuracy of alignment between switch caps and knobs to front panel features such as legending, apertures and windows. Encoder knobs are push-fit and switch caps are assembled into the front panel with no mechanical connection to the switch actuator mechanism.

The Processor handling the control surface interface and the Ring is located behind the central front panel assembly.

The power supplies are mounted on the hinged tray at the base of the console and are reached by quick release fasteners. Take care to support the tray when releasing the fasteners and **ALWAYS DISCONNECT THE MAINS POWER BEFORE LOWERING THE PANEL.**

The meter modules are accessible from the rear of the desk. The displays operate with high voltages, always disconnect the mains power before removing the module.

CRT for Monitor Section

Provision is made to optionally install the Monitor Section CRT on the console. A rigid platform, secured directly to the frame, is provided on which a fully cased monitor may be placed. It is possible to locate the platform in one of several positions along the console. A tilt and swivel base is provided for the CRT. Cables are not provided for remote mounting of the CRT.

Cooling



Internal cooling of the modules is by convection only, forced air cooling being unnecessary and unacceptable due to noise. Air is drawn up across the PSU heatsinks from the underside of the desk, warm air flowing out through exhaust vents behind the meters at the back of the desk. Cooling air for the cards is drawn in through vents in the underside cover at the front of the modules, flowing up through the control surface sandwich assembly. The vents should not be obstructed or the console could overheat.

Cables

All external cables enter the console through the leg assemblies. Cable-trays are fitted to the lateral cross-members to protect and distribute cables along the console. The cable-trays may be removed easily to permit access to the various connections on the underside of the modules. The rear cable-tray is used for signal and ring cables, connectors being mounted on the baffle-plate between the two rear extrusions. The front cable-tray houses facilities for mains distribution, due attention having been given to safety considerations.

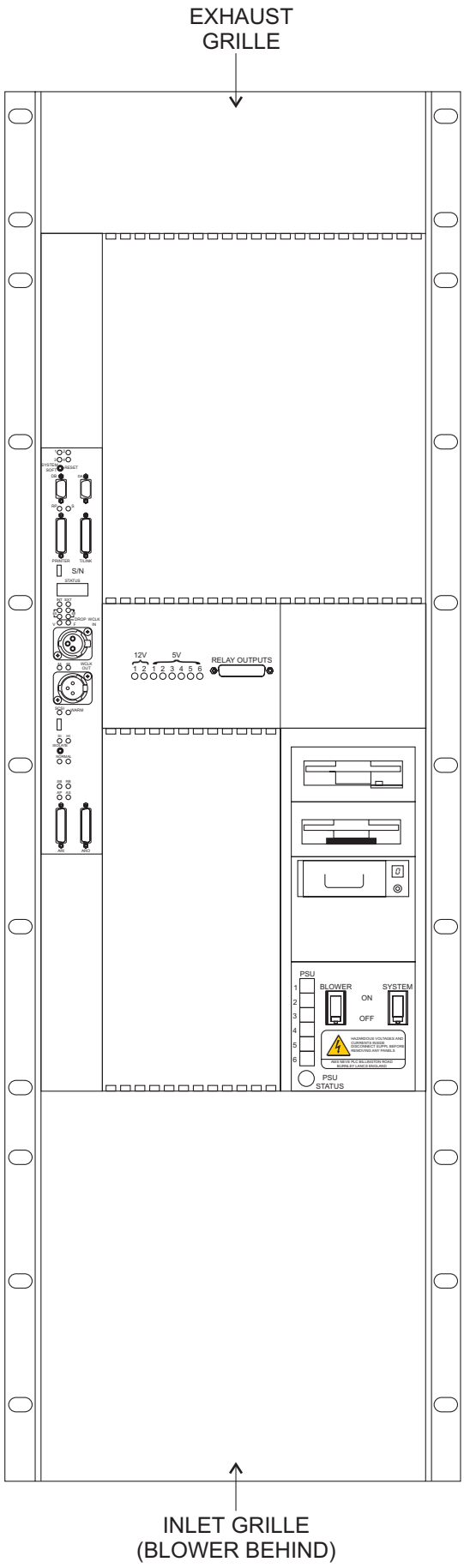
DSP Rack

The same size Digital Signal Processing Rack is used with all systems, the processing architecture being such that any system size can be created by fitting the appropriate number of processing cards. Rear access is required for the mains input.

Together with the processing cards, the DSP rack contains Power Supplies, Removable Hard Disk Drive, 3.5 inch Floppy Disk Drive and Zip Drive, Storage Node, Backplanes and Rack cooling system.

Shown opposite is the DSP sub-rack assembly. There are two shelves of Signal Processing cards which are linked on the left hand side by the Storage Node. A single, mains powered fan mounted at the base of the rack cools the cards and power supplies, the hot air is vented from the top.

A remote RS232 terminal is used for system setup, backing-up and low level debugging. This is connected to the Storage node in the DSP rack.



Cooling



The integral, mains powered fan in the base of the rack cools the printed circuit boards and the power supplies. The hot air is vented from the top of the rack. The ambient temperature of the room in which the rack is sited must not exceed 30 C.

There are two temperature sensors on the processing cards. The first will warn the operator that the internal rack temperature is above normal. The second will automatically shut-down the whole DSP rack if the maximum operating temperature is exceeded.

Cables

All cables are fed down through the base of the rack into ducting or floor cavity.

Machine Control Rack

This provides machine control functions and timecode sourcing. It has ports for machine control through internal relays and for returned machine status via internal opto-couplers. All connections are to the rear panel. A further 70mm, in addition to the rack depth, is required to allow for the mating connectors and cabling. The timecode and machine control signals may be wired by the customer as required.

The Machine Control Rack contains a number of printed circuit boards plugged vertically into a backplane.

Together with the processor card and the timecode reader card, up to 10 Relay cards may be fitted.

All connections are made from the back of the rack.

Cooling



No forced cooling is required. The base and top of the rack must not be blocked, a gap of about 1U is recommended.

I/O Racks

- ❑ Monitor Facilities I/O Rack
- ❑ 20 Bit Analogue I/O Rack
- ❑ 24 Bit Analogue I/O Rack
- ❑ Mic/Line Input Rack (for 20 Bit I/O)
- ❑ Mic/Line Input Rack (for 24 Bit I/O)
- ❑ Mic/Line Rack Power Supply (for 24 Bit I/O)
- ❑ Digital I/O Rack
- ❑ Multichannel AES I/O Unit
- ❑ CXS Monitor Rack

Approximately 70mm must be allowed at the rear of the racks for cabling and connectors.



Cooling

Where required the racks are fitted with an integral fan unit.

Monitor Facilities I/O Rack

The Monitor Facilities I/O rack contains a Monitor card, Matrix cards, High Resolution A/D cards, High Resolution D/A cards, Talkback cards, Multiplex and Interface cards. External analogue connections are via multiway Varicon connectors at the rear of the rack. The user may then terminate to an analogue patch bay as required.

20 Bit Analogue I/O Rack

The Analogue I/O rack contains converter cards and a control card. Each converter card provides 4 converters, either A/D or D/A. A rack can accommodate up to 8 A/D converter cards and 8 D/A converter cards. External analogue connections are via multiway Varicons at the rear of the rack. The user may then terminate to an analogue patch bay as required.

24 Bit Analogue I/O Rack

This Analogue I/O rack houses up to 12 (24 bit) ADCs and 12 (24 bit) DACs providing up to 48 inputs and 48 outputs.

Mic/Line Input Rack (for 20 Bit I/O)

The Analogue Mic/Line Input rack contains Mic/Line cards, High Resolution A/D Converter cards and a Multiplex and Interface card. Each Mic/Line and converter card provides 4 channels. Each rack can accommodate 16 channels. An optional talkback card provides 16 bit A/D-D/A converters.

Analogue terminations to the rack are via multiway 'Varicon' connectors. The user may then terminate to an analogue patch or studio input box as required.

Mic/Line Input Rack (for 24 Bit I/O)

Each Mic/Line rack, designed for use with the 24 bit Analogue I/O rack, provides up to 8 dual (mic/line) inputs.

Mic/Line Rack Power Supply (for 24 Bit I/O)

This rack is capable of powering up to 4 Mic/Line racks.

Digital I/O Rack

The Digital I/O rack contains AES/EBU Transmit/Receive cards and Sub Rack Controller. External digital connections are via 50 way D-Type Connectors at the rear of the rack. The user may then terminate to an AES/EBU digital patch as required.

Multichannel AES I/O Unit

The Multichannel AES/EBU Digital I/O unit provides 24 mono AES/EBU inputs (with SRC), and 24 mono AES/EBU outputs. Optionally up to 2 expansion cards can be fitted providing an additional 16 mono AES/EBU inputs (with SRC) per card.

CXS Monitor Rack

The CXS Monitor rack houses the Academy filtering card, processor card, summing amplifier card, and relay cards required for CXS routing and monitoring.

Electrical Information

Power Consumption

Console Control Surface/Rack Type	Estimated Typical Power Consumption (kVA)
Console Control Surface (System 64)	1.2 (2.5)
Console Control Surface (System 112)	1.2 (2.5)
Console Control Surface (System 160)	1.7 (3.3)
Digital Processing Rack (System 112)	1.8
Digital Processing Rack (fully fitted)	3.5
Machine Control Rack	0.2
Monitor Facilities I/O Rack	0.3
20 Bit Analogue I/O Rack	0.3
24 Bit Analogue I/O Rack	0.2
Mic/Line Input Rack (for 20 Bit I/O)	0.3
Mic/Line Rack PSU (for 24 Bit I/O)	0.2
Digital I/O Rack	0.3
Multichannel AES I/O Unit	0.04
CXS Monitor Rack	0.08

Figures in brackets give the absolute maximum power requirement.

Power Requirements

The system requires single phase AC power at a nominal 110V or 240V. Separate mains connections are required for the Console and racks.

	Extreme	Nominal
Supply Voltage	90V - 132V AC **or**	100V - 120V AC **or**
	180V - 264V AC	200V - 250V AC
Supply Frequency	47Hz to 63Hz	

Voltage Selection

The console will normally be supplied already set to the correct voltage and there will be indication of the setting. Do not change the voltage selection, the installation engineer will change it if necessary.

Technical Earth

On all Capricorn racks the chassis is attached to Mains earth for safety. A separate technical earth connection is not required for the digital racks in the system. The Analogue I/O racks however have two earth studs, for technical earth and mains safety earth. This rack is supplied to the customer with the technical earth stud attached to the mains safety earth stud.

It is the responsibility of the customer to comply with local safety regulations, but it is normal practice to remove the earth link to the technical earth and connect the studio earth to the technical earth stud.



The very low hum and noise achieved in all AMS Neve sound mixing equipment can be marred by the use of a poor earthing system. A good earthing system (technical earth) is generally available in professional recording studios and broadcast installations. The earthing wire provided at the AC power input should not be relied upon for the best results.

Earthing at more than one point on the console, or on ancillary equipment connected to the console circuits should be avoided as circulating currents will produce a 'hum loop' giving unacceptably high hum content in the output signal from the console.

Particular care should be taken when remote ancillary equipment such as microphones, turntables or tape machines are used. If a good technical earth is available at the ancillary equipment, this may be used, provided that the earth return via the screens of the audio cable is disconnected at one end.

When a technical earth is not available at a location where ancillary equipment is used, the screens of the audio cables cannot be relied upon to ensure connection to the technical earth on the Capricorn Racks. This is particularly true where tape or gram machines are used. The currents induced by the motors of the tape machine must not be allowed to find earth at the sub-racks via the audio cable screens. Instead, a heavy cable connected directly to the machine should be run to the console and connected to the technical earth connection. The earthing between the ancillary equipment and the I/O racks should remain connected at all times.

Independent earthing to the mains earth wire should not be used as a technical earth.

Mains Connections

Console Mains Cables

Two unterminated 3-core mains cables are supplied with the console. They are connected to terminal blocks within the console frame and routed through the frame and down the foot into ducting or the floor cavity. The cables are intended to be hard-wired into the customers installation, and no connectors are supplied, about 20 metres of cable are provided.

DSP Rack Mains Connection

Mains power connection is made from the rear of the rack. A minimum clearance of 300mm is required for access. The mating connector is supplied suitable for the local operating voltage.

If the customer wishes to fit his own cable the recommended cable sizes are:

Wiring Practice	Voltage Range	Conductor Size	
		mm	AWG
Multicore cable in ducting	120 and below	16	5
	200 and above	6	9
Single core cables unconfined	120 and below	10	7
	200 and above	4	11

✍ *The customer is responsible for ensuring that the cable meets local wiring regulations.*

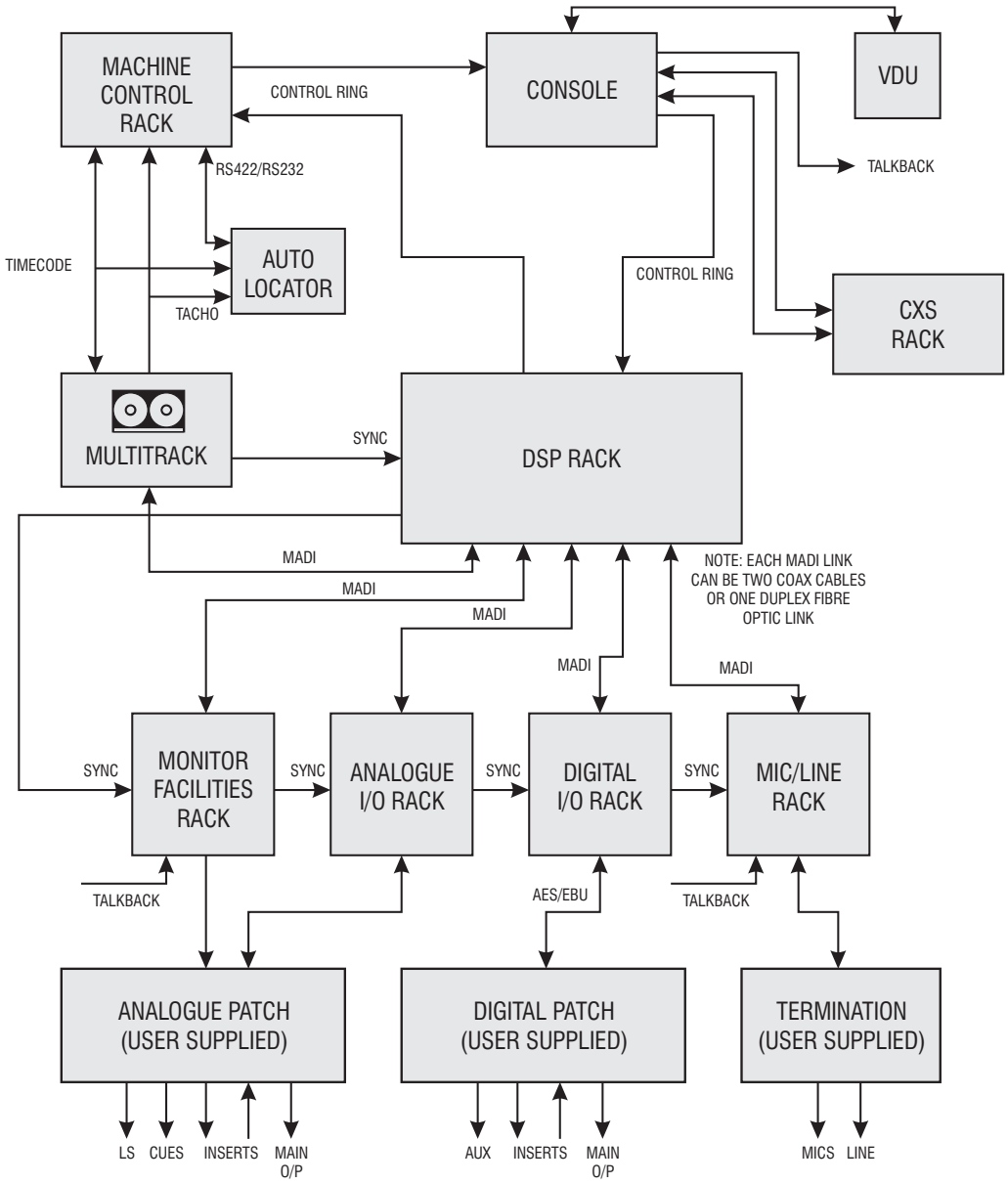
I/O Rack Mains Connection

All remote racks are supplied with separate 3-pin IEC mains connectors. A cordset with 5 metres of cable is provided with each rack.

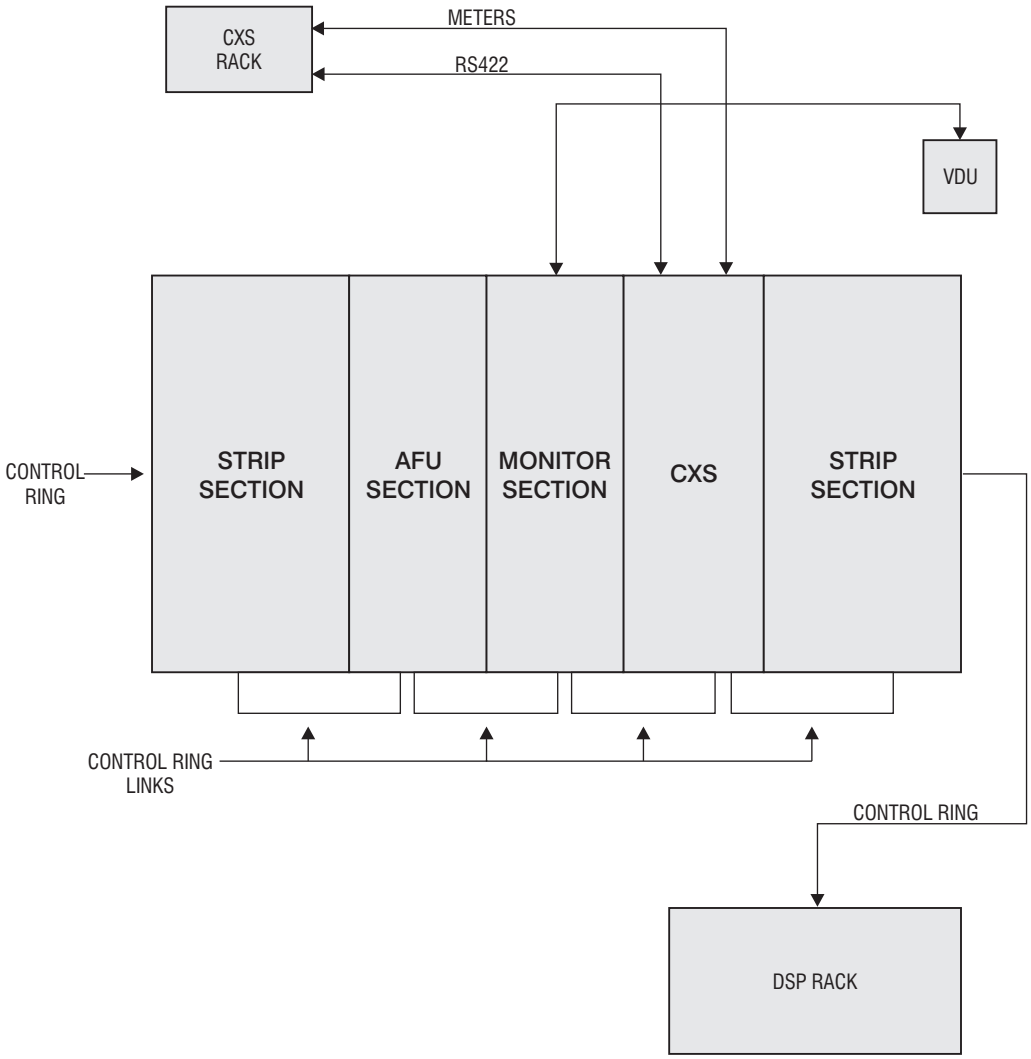
System Interconnections

The Capricorn system interconnections are described in this section. For detail pin numbering of signal connections to and from the racks see Connector Details section.

Below shows the interconnections for a typical system.



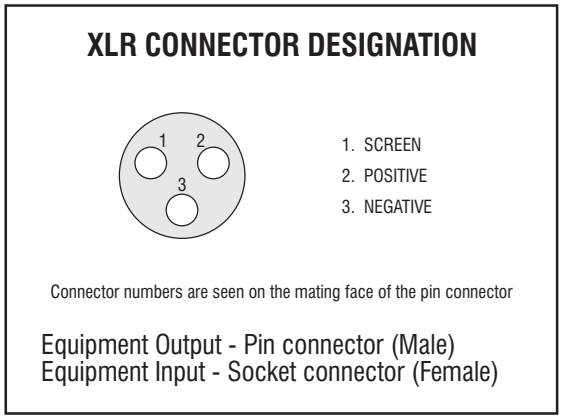
CXS Connections



Wordclock Synchronisation

System wordclock synchronisation is important and must be performed correctly for satisfactory results. The DSP and analogue/digital I/O racks have AES/EBU external reference XLR inputs, allowing the units to be locked to an externally generated AES/EBU reference. These racks also have a buffered AES/EBU reference XLR output port, allowing the units to be daisy-chained .

All wordclock connections within the Capricorn system use the standard AES/EBU protocol with XLR connectors. The AES/EBU interface uses RS422 signals which requires two-core twisted, screened cable. The maximum recommended length for these cables is 100 metres. The pin designation is shown below.



Using the setup menu on the VDU the operator can select the source of the wordclock reference to be one of the following:

Internal at 44.1kHz
Internal at 48kHz
External

If an internal source is selected the DSP rack provides the AES/EBU output reference signal via the male XLR on the Storage Node front panel.

If an external wordclock source is used the system will detect and operate at 48kHz or 44.1kHz. The external source should be directly connected to the DSP rack via the AES/EBU XLR connector on the Storage Node. The I/O racks should then receive their wordclock reference from the output AES/EBU XLR connector on the Storage Node.

It is recommended by the AES that point to point connections be employed, thereby avoiding multiple receivers on one transmitter to minimize reflections and potential problems. In larger installations it may be necessary for the wordclock to be buffered with a distribution amplifier and routed to the I/O racks and other external equipment in parallel rather than “daisy-chained”.

The interconnection diagram shows a typical installation where the wordclock source is generated from the Multitrack tape machine and drives the DSP rack directly. The DSP rack wordclock output is then used to drive the I/O racks which are connected in a “daisy–chain” fashion. Irrespective of the overall system master source it is recommended that the DSP rack always generates the clock for the remote I/O racks.

Control Ring Connections

The Console communicates with the DSP rack over a special control ring. All major processing cards are connected together via the ring, including the Channel Strip, AFU and Monitor sections of the console. The same ring protocol is used to communicate between the console and the Machine Control rack. Two cables are required, one out-going, one in-coming.

The clock rate is 5MHz, and care must be taken to ensure that the screen of the connectors makes good contact with the chassis through the use of the retaining screws provided, in order to minimise EMC problems.

The ring communication protocol uses 5 volt RS422 balanced signals.

Console - DSP Ring

There are two control ring cables connected to the DSP rack, which may be up to 30 metres in length. The cables are round shielded with multiple twisted pairs and are terminated in 25 way 'D' type connectors. Each section has two connectors to allow daisy-chaining to and from adjacent sections and/or the DSP rack.

The Ring cable is routed though the foot of the console to each console section in turn. The cable is run in a duct at the back of the desk below the meter panel.

The control ring is connected to the DSP rack directly onto the right hand most cards on the lower and upper shelves (I/O and FILT cards respectively).

Console - Machine Control Rack

The Machine Control rack is controlled over the Ring. The rack is connected in series with the ring between the Console and the DSP rack. The cables are round shielded with multiple twisted pairs and are terminated in 25 way 'D' type connectors.

Two connectors are provided at the back of the rack.

MADI Connections

MADI (Multi-channel Audio Digital Interface) is used for interconnection between all the I/O racks and the DSP rack. MADI would normally be used to connect the multitrack tape machines to the system.

The MADI interface can be implemented on a Coax link or a fibre optic link (FDDI). The Coax link requires two standard video 75 ohm coax cables, while the fibre optic version uses one duplex FDDI fibre MIC (Media Interface Connector) connection. The type of interface is specified by the user.

The coax MADI links are limited to 50 metres and the FDDI fibre to 2km.

Using Fibre Optic cables



The light level of the fibre optic links could be hazardous when directly viewed. The interface uses Infra-Red wavelength light and is not visible.

DO NOT LOOK INTO THE END OF THE FIBRE.

The standard fibre optic cable supplied by AMS Neve is OFN rated and is suitable for use in equipment rooms. The cable will withstand a tensile load of 1250N and is crush resistant to 700N/cm. The standard cable must not be installed with a bend radius of less than 10cm.

DSP Rack

There are 4 bi-directional MADI interfaces provided on each I/O card. These are connected into the front panels of the I/O cards but like all other cables are fed through the floor of the unit.

I/O Racks

MADI connections are made on the front panel of these racks. Coax or fibre links must be specified by the customer at time of ordering.

Digital AES/EBU Connections

Connections to external digital equipment are made via AES/EBU through the Digital I/O rack. When fully fitted the rack provides for up to 48 stereo AES/EBU input ports and 48 stereo output ports, data is passed to/from the DSP rack over two MADI links.

All connections utilise both left and right legs for stereo operation. For mono inputs signal either leg can be selected, for mono outputs the signal is provided on the left leg only. Connection is via rear mounted 50 way D-type connectors which can be wired out by the customer to remote patch connectors etc. as required. The inter-connection should be via screened, twisted-pair cable.

The interface protocol meets the AES3-1992 standard with balanced signals. Input signals must be synchronised to the system wordclock of either 48kHz or 44.1kHz.

System wordclocks of 47.952kHz and 48kHz OR 44.056kHz and 44.1kHz are available to special order.

Each 50 way connector has 8 AES/EBU input and 8 AES/EBU output connections.

To fully utilise the Digital I/O rack two MADI links are required, for this reason the rack has two wordclock connectors at the rear.

Timecode

The Machine Control rack requires, in parallel with the auto-locator, master timecode (from the multitrack) and tacho/biphase (also from the multitrack).

Timecode can be provided either as SMPTE linear timecode (LTC), via an XLR, or as a VITC input via BNC

SMPTE timecode and tacho/biphase should use twisted screened cable, and it is recommended that the tacho/biphase link does not exceed 10 metres since it can carry high frequency signals.

Tacho input from the machine providing timecode, via the XLR connector, is necessary for correct operation of the autolocator and the automation system.

Both LTC and Tacho must be connected to the autolocator in addition to the Studio Control rack interface.

The VITC input is unterminated so that the signal can be connected to the studio clock with a "T" piece. If the rack is connected to the end of the distributed VITC clock a "T" piece with a terminator attached is required.

Machine Control Connections

The tape machines are controlled through an external auto-locator, such as a Synchronet ES2. The auto-locator is controlled over an RS232 or RS422 port via a 9 pin 'D' type connector fitted to the back panel of the Machine Control Rack.

Relay cards are fitted to the Machine Control rack to control individual tracks and monitor the record tallies. Each relay board can control 24 relay outputs and has 24 opto-isolated inputs. The connections are made at the back of the rack. The relay cards may be used for:

- ❑ External Event switching.
- ❑ Red/Green Light switching.
- ❑ Record Enable switching (up to 3 machines each with 48 tracks).
- ❑ Record Ready Tally return inputs (up to 3 machines each with 48 tracks).
- ❑ Tape transport controls (up to 5 ancillary machines).
- ❑ Tape mode control (up to 3 multitrack machines).

The main transport control keys are wired out to the back of the console via relays. This allows the operator to hard-wire the time critical functions directly to the tape machine. For each relay there are three connections: Common, Normally Closed and Normally Open.

CRT Interface

Provision is made to connect a CRT directly to the Monitor section of the control surface. The CRT is connected via a standard VGA panel-mounted 15-way video connector mounted in the cable tray behind the Monitor section. An IEC mains power outlet is provided in the undertray for the CRT.

If the customer wants to use his own CRT it should meet the following specification:

- ❑ Resolution better than 800 x 600.
- ❑ Analogue RGB input (0.7V p-p).
- ❑ Separate TTL sync input.
- ❑ Positive horizontal and vertical sync polarity.
- ❑ 35kHz line frequency.
- ❑ 45MHz bandwidth.

✍ *Long video cables will reduce the quality of the picture.*

Talkback

Capricorn supports up to ten talkback stations. Four talkback cards are needed to support ten stations:

- ❑ Two cards in the Monitor Facilities I/O rack support the first 8 talkback stations; i.e. 1–4 and 5–8 respectively.
- ❑ One card in the first Mic/Line Input rack supports talkback station 9.
- ❑ One card in the second Mic/Line Input rack supports talkback station 10.

A microphone is fitted in the Monitor section of the console for talkback. The signal is buffered to line level and connected to an XLR connector at the rear of the desk. A cable is required to connect this output to a talkback input in the Monitor Facilities I/O rack. Talkback station 1 is fixed as the console, and is called "Engineer". The second talkback station is called "Producer".

Interconnections between Capricorn racks and talkback stations 2–10 are via Varicon connectors. Together with the audio signals, the Varicon connectors also carry code data to indicate talkback destinations. For each talkback channel there is a 4–bit key input which is used for connection to remote talkback selection switches. There is also one output signal that is set high when the channel is engaged and pulses high/low in snoop mode. All levels are 5V CMOS logic.

A talkback station consists of a microphone, a microphone to line level amplifier, a line level to loudspeaker amplifier, a loudspeaker, and some key coding electronics. Four TTL level inputs (0V to 5V into a CMOS buffer) carry a key press code in BCD – 0000 and 1111 mean no key is pressed, 0001 means key 1 is pressed, 1100 means key 12 is pressed. Key codes should ideally be debounced.

Each station can have up to twelve talkback keys, and each key is freely assignable to talkback to one or more talkback stations, or to one or more of six talkback groups. A talkback group allows you to send talkback to track sends, main outputs, cues, headphones, and the studio loudspeakers. Slate tone can be sent to track sends. The six talkback groups are shared between the ten talkback stations. A "Red Light" switch on the console prevents accidental routing of talkback to main outputs and to track sends.

AMS Neve does not supply talkback stations but they are commercially available from firms such as BCD Audio who can supply complete 12 key talkback stations. Post Office type 1000 lever switches, commonly used on telephone switchboards, have also been successfully used to code key presses.

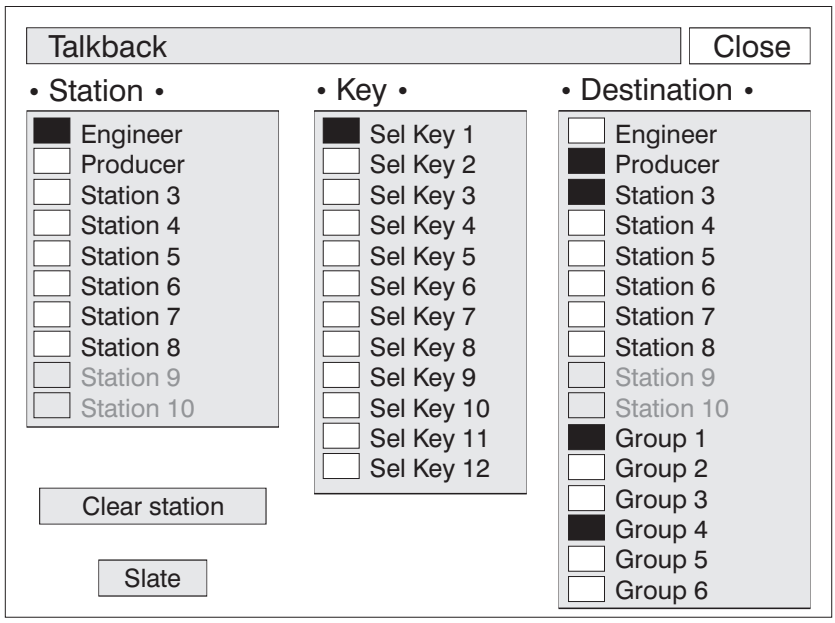
A 5 Volt power feed is not available from the talkback cards, this will have to be provided separately. The key code inputs do not have pull up resistors.

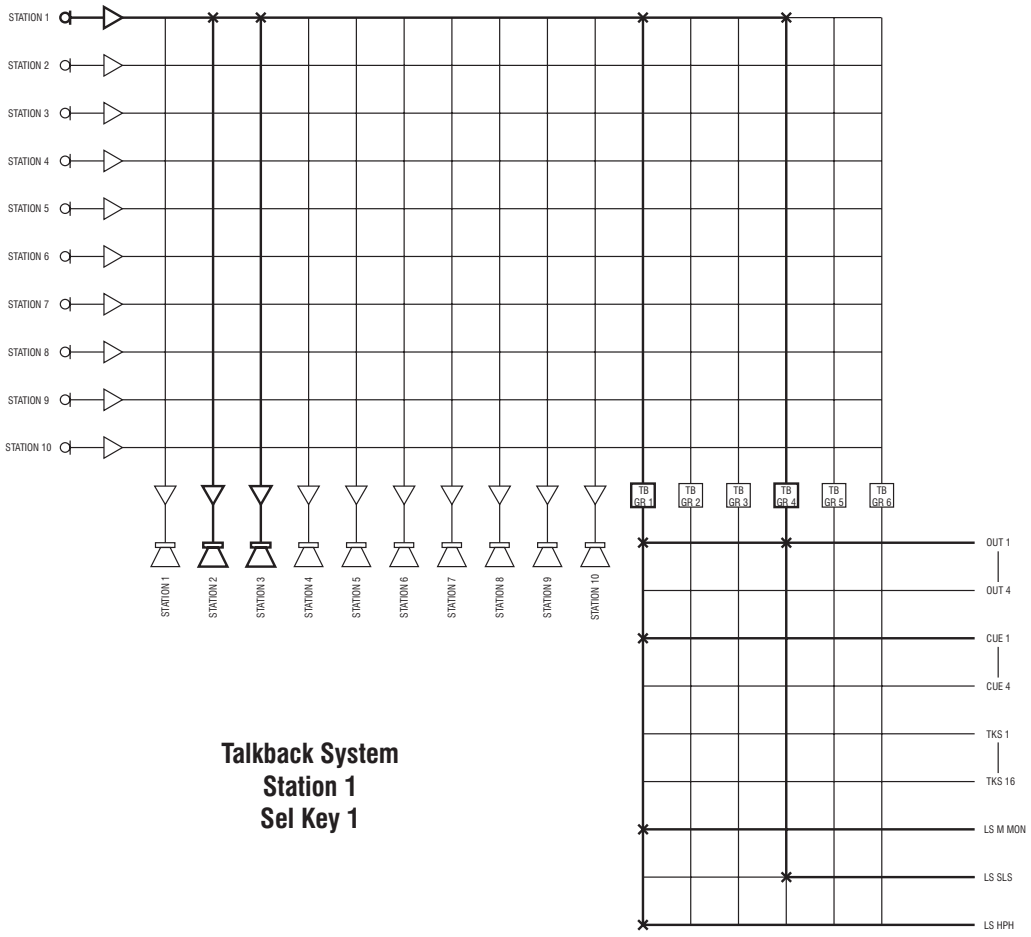
The first talkback station connections are used by the console for the console microphone and a feed to the PFL loudspeakers. No key codes are fed to the first talkback station - the talkback keys on the console graphics panel are handled separately.

It is possible to display short debug messages on the graphics soft panel (near the trackerball) to display key press codes. This can help in tracking down problems with key coding on remote talkback stations.

The CON card implementation of the talkback cross point matrix uses spare capacity on Group and Input paths. This is why there is a minimum of eight groups, so that talkback stations 1 and 2 (Engineer and Producer), and the six talkback groups, are always available.

Allocation of talkback paths is somewhat complex, and is not simply number of group paths plus number of input paths. The Talkback screen displays the number of talkback stations that can be supported by the cross point matrix in the CON cards, it does NOT show the number of talkback cards plugged into the I/O racks.





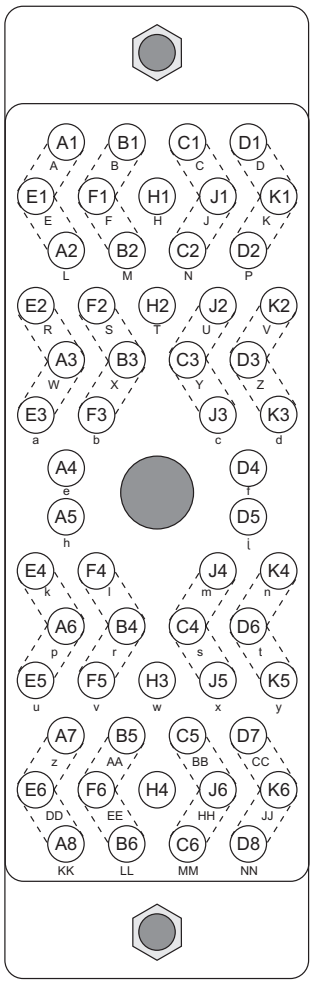
Talkback System
Station 1
Sel Key 1

Connector Details

✍ *Three different pin-out arrangements for the Varicon 56-way connector are used on Capricorn. These are shown below.*

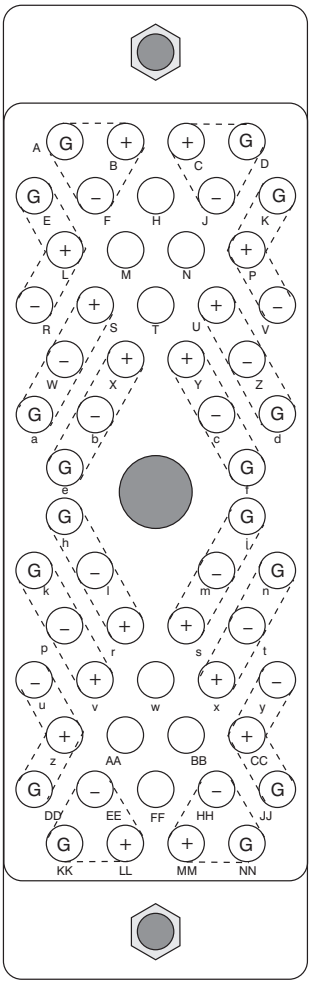
The relevant connector pin-out is shown at the start of each section.

MATING CONNECTOR



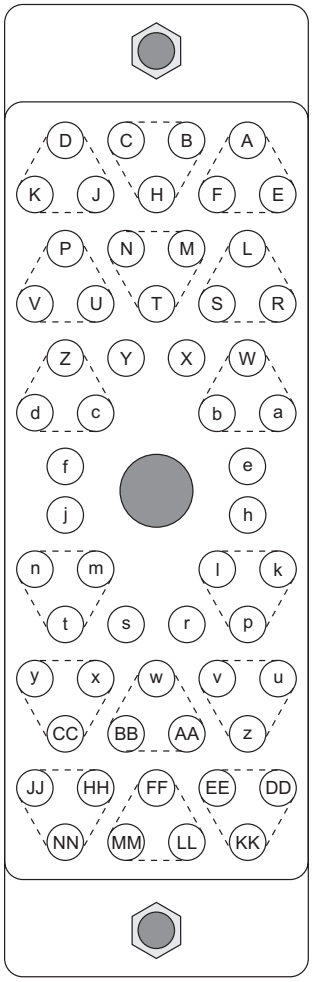
Exposed pins
View on wiring side

MATING CONNECTOR



Exposed pins
View on wiring side

MATING CONNECTOR



Enclosed pins
View on wiring side

Console Connections

Channel Strip Section

Control Ring Input Connector.

Connector type fitted to console: 25 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Control Ring Output Connector.

Connector type fitted to console: 25 way female D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Diagnostics Serial Port Connector (RS232).

Connector type fitted to console: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

AFU Section

Control Ring Input Connector.

Connector type fitted to console: 25 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Control Ring Output Connector.

Connector type fitted to console: 25 way female D–Type.

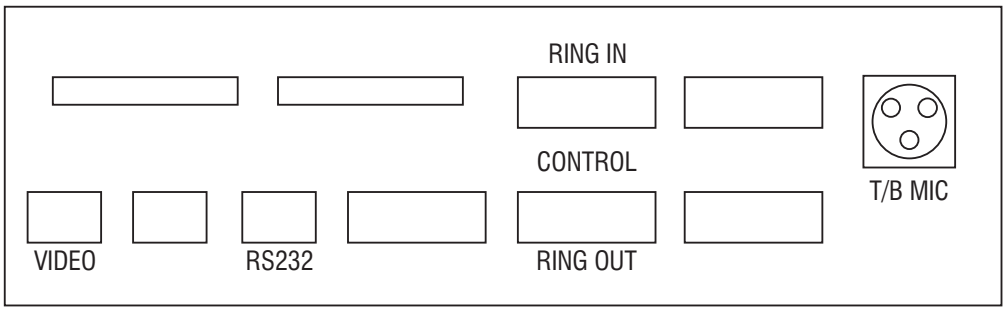
PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Diagnostics Serial Port Connector (RS232).

Connector type fitted to console: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

Monitor Section



Control Ring Input Connector.

Connector type fitted to console: 25 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Control Ring Output Connector.

Connector type fitted to console: 25 way female D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Diagnostics Serial Port Connector (RS232).

Connector type fitted to console: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

Talkback Connector.

Connector type fitted to console: 3 way male XLR.

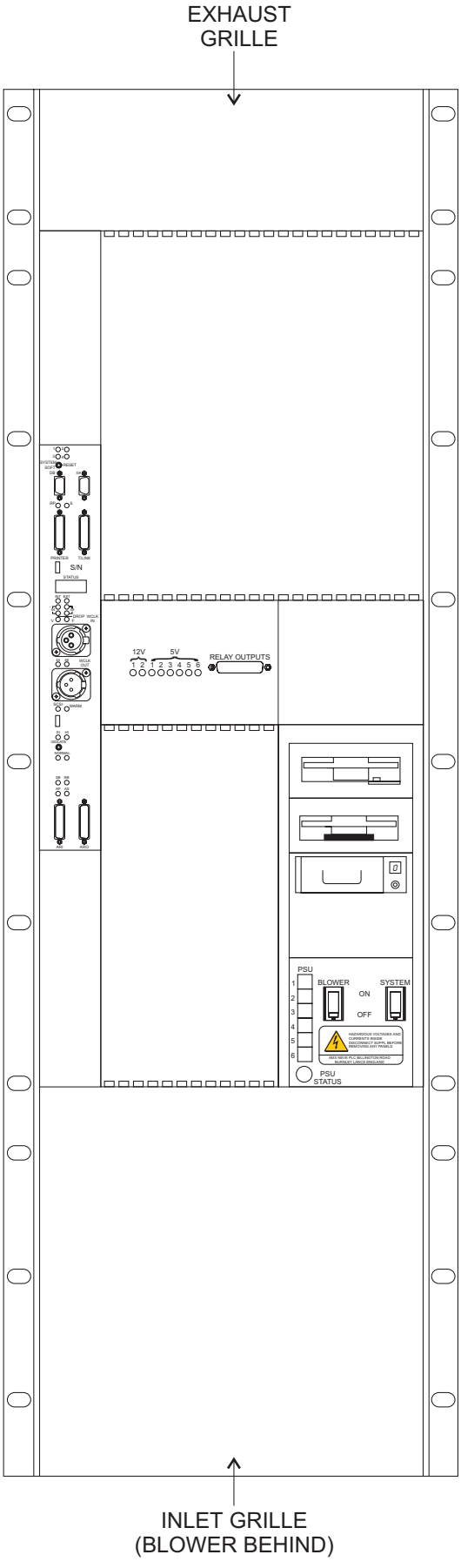
PIN	SIGNAL	PIN	SIGNAL
1	no connection	3	Screen
2	Signal		

Video Out – Analogue S–VGA.

Connector type fitted to console: 15 way female D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RED VIDEO	9	no connection
2	GREEN VIDEO	10	0v
3	BLUE VIDEO	11	0v
4	0v	12	no connection
5	0v	13	HORIZ SYNC
6	0v	14	VERT SYNC
7	0v	15	no connection
8	0v		

DSP Rack


EXHAUST
GRILLE
S/N
12V
5V
RELAY OUTPUTS
PSU
BLOWER
SYSTEM
ON
OFF
PSU
STATUS
INLET GRILLE
(BLOWER BEHIND)

Storage Node

Diagnostics Serial Port Connector.

Connector type fitted to rack: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

Filter Card

Ring Input Connector.

Connector type fitted to card: 25 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Diagnostics Serial Port Connector.

Connector type fitted to card: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

Contribution Card

Diagnostics Serial Port Connector.

Connector type fitted to card: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

I/O Card

Ring Output Connector.

Connector type fitted to card: 25 way female D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	RCLK	14	$\overline{\text{RCLK}}$
2	RSYNC	15	$\overline{\text{RSYNC}}$
3	RDATA 0	16	$\overline{\text{RDATA 0}}$
4	RDATA 1	17	$\overline{\text{RDATA 1}}$
5	RDATA 2	18	$\overline{\text{RDATA 2}}$
6	RDATA 3	19	$\overline{\text{RDATA 3}}$
7	RDATA 4	20	$\overline{\text{RDATA 4}}$
8	RDATA 5	21	$\overline{\text{RDATA 5}}$
9	RDATA 6	22	$\overline{\text{RDATA 6}}$
10	RDATA 7	23	$\overline{\text{RDATA 7}}$
11	RPAR	24	$\overline{\text{RPAR}}$
12	RRES	25	$\overline{\text{RRES}}$
13	0v		

Diagnostics Serial Port Connector.

Connector type fitted to card: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

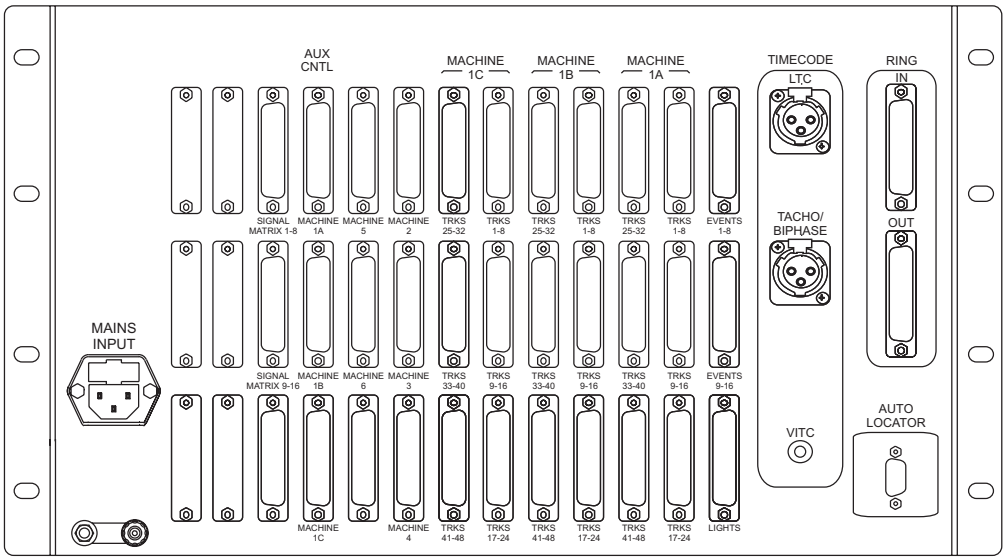
DRC Card

Diagnostics Serial Port Connector.

Connector type fitted to card: 9 way male D–Type.

PIN	SIGNAL	PIN	SIGNAL
1	no connection	6	no connection
2	SERIAL DATA IN	7	no connection
3	SERIAL DATA OUT	8	no connection
4	no connection	9	no connection
5	0v		

Machine Control Rack Connections



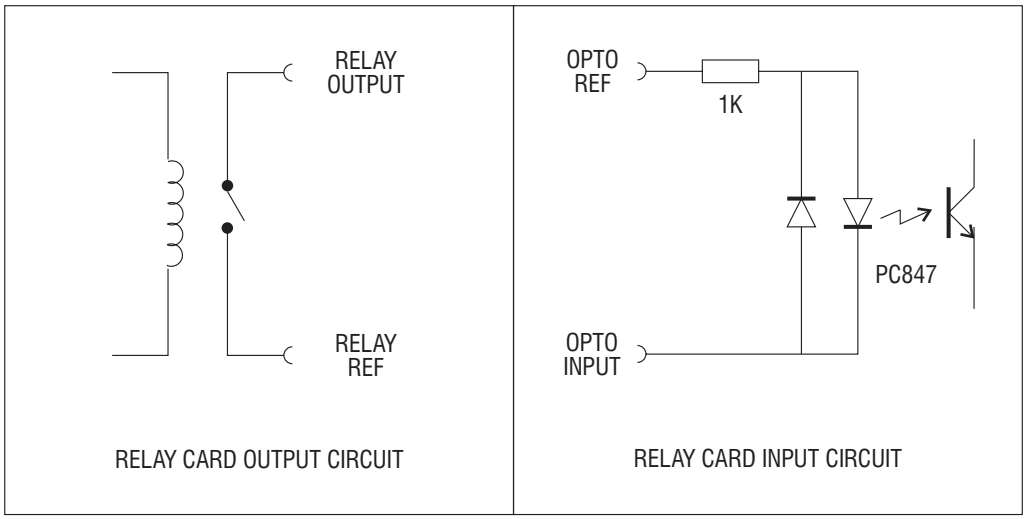
Relay Card Connectors

Connector type fitted to rack: 25 way female D–Type.

Mating Connector Required: 25 way male D–Type

The drawing above shows the connectors on the Machine Control Rack back panel. The full pin-out and function for these connectors is given on the following pages.

Each relay card has 8 relay outputs and 8 opto inputs, the circuits for these connections are shown below.



Machine Control Rack Relay/Tally Connections

Events Connectors

EVENTS 1-8	
PIN	**SIGNAL**
1	Event 1 Relay
14	Event 2 Relay
2	Event 3 Relay
15	Event 4 Relay
3	Event 5 Relay
16	Event 6 Relay
4	Event 7 Relay
17	Event 8 Relay
5	Event 1 Tally Opto
18	Event 2 Tally Opto
6	Event 3 Tally Opto
19	Event 4 Tally Opto
7	Event 5 Tally Opto
20	Event 6 Tally Opto
8	Event 7 Tally Opto
21	Event 8 Tally Opto
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

EVENTS 9-16	
PIN	**SIGNAL**
1	Event 9 Relay
14	Event 10 Relay
2	Event 11 Relay
15	Event 12 Relay
3	Event 13 Relay
16	Event 14 Relay
4	Event 15 Relay
17	Event 16 Relay
5	Event 1 Tally Opto
18	Event 1 Tally Opto
6	Event 1 Tally Opto
19	Event 1 Tally Opto
7	Event 1 Tally Opto
20	Event 1 Tally Opto
8	Event 1 Tally Opto
21	Event 1 Tally Opto
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

LIGHTS	
PIN	**SIGNAL**
1	Red Light Relay
14	Green Light Relay
2	Cue Light Relay
15	Master Record Relay
3	Event 21 Relay
16	Event 22 Relay
4	Event 23 Relay
17	Event 24 Relay
5	Red Light Tally Opto
18	Green Light Tally Opto
6	Cue Light Tally Opto
19	Master Record Tally Opto
7	Event 21 Tally Opto
20	Event 22 Tally Opto
8	Event 23 Tally Opto
21	Event 24 Tally Opto
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Machine 1A Connectors

TRKS 1-8	
PIN	**SIGNAL**
1	Rec Enable 1
14	Rec Enable 2
2	Rec Enable 3
15	Rec Enable 4
3	Rec Enable 5
16	Rec Enable 6
4	Rec Enable 7
17	Rec Enable 8
5	Rec Ready 1 Input
18	Rec Ready 2 Input
6	Rec Ready 3 Input
19	Rec Ready 4 Input
7	Rec Ready 5 Input
20	Rec Ready 6 Input
8	Rec Ready 7 Input
21	Rec Ready 8 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 9-16	
PIN	**SIGNAL**
1	Rec Enable 9
14	Rec Enable 10
2	Rec Enable 11
15	Rec Enable 12
3	Rec Enable 13
16	Rec Enable 14
4	Rec Enable 15
17	Rec Enable 16
5	Rec Ready 9 Input
18	Rec Ready 10 Input
6	Rec Ready 11 Input
19	Rec Ready 12 Input
7	Rec Ready 13 Input
20	Rec Ready 14 Input
8	Rec Ready 15 Input
21	Rec Ready 16 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 17-24	
PIN	**SIGNAL**
1	Rec Enable 17
14	Rec Enable 18
2	Rec Enable 19
15	Rec Enable 20
3	Rec Enable 21
16	Rec Enable 22
4	Rec Enable 23
17	Rec Enable 24
5	Rec Ready 17 Input
18	Rec Ready 18 Input
6	Rec Ready 19 Input
19	Rec Ready 20 Input
7	Rec Ready 21 Input
20	Rec Ready 22 Input
8	Rec Ready 23 Input
21	Rec Ready 24 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Machine 1A Connectors

TRKS 25-32	
PIN	**SIGNAL**
1	Rec Enable 25
14	Rec Enable 26
2	Rec Enable 27
15	Rec Enable 28
3	Rec Enable 29
16	Rec Enable 30
4	Rec Enable 31
17	Rec Enable 32
5	Rec Ready 25 Input
18	Rec Ready 26 Input
6	Rec Ready 27 Input
19	Rec Ready 28 Input
7	Rec Ready 29 Input
20	Rec Ready 30 Input
8	Rec Ready 31 Input
21	Rec Ready 32 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 33-40	
PIN	**SIGNAL**
1	Rec Enable 33
14	Rec Enable 34
2	Rec Enable 35
15	Rec Enable 36
3	Rec Enable 37
16	Rec Enable 38
4	Rec Enable 39
17	Rec Enable 40
5	Rec Ready 33 Input
18	Rec Ready 34 Input
6	Rec Ready 35 Input
19	Rec Ready 36 Input
7	Rec Ready 37 Input
20	Rec Ready 38 Input
8	Rec Ready 39 Input
21	Rec Ready 40 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 41-48	
PIN	**SIGNAL**
1	Rec Enable 41
14	Rec Enable 42
2	Rec Enable 43
15	Rec Enable 44
3	Rec Enable 45
16	Rec Enable 46
4	Rec Enable 47
17	Rec Enable 48
5	Rec Ready 41 Input
18	Rec Ready 42 Input
6	Rec Ready 43 Input
19	Rec Ready 44 Input
7	Rec Ready 45 Input
20	Rec Ready 46 Input
8	Rec Ready 47 Input
21	Rec Ready 48 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Machine 1B Connectors

TRKS 1-8	
PIN	**SIGNAL**
1	Rec Enable 1
14	Rec Enable 2
2	Rec Enable 3
15	Rec Enable 4
3	Rec Enable 5
16	Rec Enable 6
4	Rec Enable 7
17	Rec Enable 8
5	Rec Ready 1 Input
18	Rec Ready 2 Input
6	Rec Ready 3 Input
19	Rec Ready 4 Input
7	Rec Ready 5 Input
20	Rec Ready 6 Input
8	Rec Ready 7 Input
21	Rec Ready 8 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 9-16	
PIN	**SIGNAL**
1	Rec Enable 9
14	Rec Enable 10
2	Rec Enable 11
15	Rec Enable 12
3	Rec Enable 13
16	Rec Enable 14
4	Rec Enable 15
17	Rec Enable 16
5	Rec Ready 9 Input
18	Rec Ready 10 Input
6	Rec Ready 11 Input
19	Rec Ready 12 Input
7	Rec Ready 13 Input
20	Rec Ready 14 Input
8	Rec Ready 15 Input
21	Rec Ready 16 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 17-24	
PIN	**SIGNAL**
1	Rec Enable 17
14	Rec Enable 18
2	Rec Enable 19
15	Rec Enable 20
3	Rec Enable 21
16	Rec Enable 22
4	Rec Enable 23
17	Rec Enable 24
5	Rec Ready 17 Input
18	Rec Ready 18 Input
6	Rec Ready 19 Input
19	Rec Ready 20 Input
7	Rec Ready 21 Input
20	Rec Ready 22 Input
8	Rec Ready 23 Input
21	Rec Ready 24 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Machine 1B Connectors

TRKS 25-32	
PIN	**SIGNAL**
1	Rec Enable 25
14	Rec Enable 26
2	Rec Enable 27
15	Rec Enable 28
3	Rec Enable 29
16	Rec Enable 30
4	Rec Enable 31
17	Rec Enable 32
5	Rec Ready 25 Input
18	Rec Ready 26 Input
6	Rec Ready 27 Input
19	Rec Ready 28 Input
7	Rec Ready 29 Input
20	Rec Ready 30 Input
8	Rec Ready 31 Input
21	Rec Ready 32 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 33-40	
PIN	**SIGNAL**
1	Rec Enable 33
14	Rec Enable 34
2	Rec Enable 35
15	Rec Enable 36
3	Rec Enable 37
16	Rec Enable 38
4	Rec Enable 39
17	Rec Enable 40
5	Rec Ready 33 Input
18	Rec Ready 34 Input
6	Rec Ready 35 Input
19	Rec Ready 36 Input
7	Rec Ready 37 Input
20	Rec Ready 38 Input
8	Rec Ready 39 Input
21	Rec Ready 40 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 41-48	
PIN	**SIGNAL**
1	Rec Enable 41
14	Rec Enable 42
2	Rec Enable 43
15	Rec Enable 44
3	Rec Enable 45
16	Rec Enable 46
4	Rec Enable 47
17	Rec Enable 48
5	Rec Ready 41 Input
18	Rec Ready 42 Input
6	Rec Ready 43 Input
19	Rec Ready 44 Input
7	Rec Ready 45 Input
20	Rec Ready 46 Input
8	Rec Ready 47 Input
21	Rec Ready 48 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Machine 1C Connectors

TRKS 1-8	
PIN	**SIGNAL**
1	Rec Enable 1
14	Rec Enable 2
2	Rec Enable 3
15	Rec Enable 4
3	Rec Enable 5
16	Rec Enable 6
4	Rec Enable 7
17	Rec Enable 8
5	Rec Ready 1 Input
18	Rec Ready 2 Input
6	Rec Ready 3 Input
19	Rec Ready 4 Input
7	Rec Ready 5 Input
20	Rec Ready 6 Input
8	Rec Ready 7 Input
21	Rec Ready 8 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 9-16	
PIN	**SIGNAL**
1	Rec Enable 9
14	Rec Enable 10
2	Rec Enable 11
15	Rec Enable 12
3	Rec Enable 13
16	Rec Enable 14
4	Rec Enable 15
17	Rec Enable 16
5	Rec Ready 9 Input
18	Rec Ready 10 Input
6	Rec Ready 11 Input
19	Rec Ready 12 Input
7	Rec Ready 13 Input
20	Rec Ready 14 Input
8	Rec Ready 15 Input
21	Rec Ready 16 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 17-24	
PIN	**SIGNAL**
1	Rec Enable 17
14	Rec Enable 18
2	Rec Enable 19
15	Rec Enable 20
3	Rec Enable 21
16	Rec Enable 22
4	Rec Enable 23
17	Rec Enable 24
5	Rec Ready 17 Input
18	Rec Ready 18 Input
6	Rec Ready 19 Input
19	Rec Ready 20 Input
7	Rec Ready 21 Input
20	Rec Ready 22 Input
8	Rec Ready 23 Input
21	Rec Ready 24 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Machine 1C Connectors

TRKS 25-32	
PIN	**SIGNAL**
1	Rec Enable 25
14	Rec Enable 26
2	Rec Enable 27
15	Rec Enable 28
3	Rec Enable 29
16	Rec Enable 30
4	Rec Enable 31
17	Rec Enable 32
5	Rec Ready 25 Input
18	Rec Ready 26 Input
6	Rec Ready 27 Input
19	Rec Ready 28 Input
7	Rec Ready 29 Input
20	Rec Ready 30 Input
8	Rec Ready 31 Input
21	Rec Ready 32 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 33-40	
PIN	**SIGNAL**
1	Rec Enable 33
14	Rec Enable 34
2	Rec Enable 35
15	Rec Enable 36
3	Rec Enable 37
16	Rec Enable 38
4	Rec Enable 39
17	Rec Enable 40
5	Rec Ready 33 Input
18	Rec Ready 34 Input
6	Rec Ready 35 Input
19	Rec Ready 36 Input
7	Rec Ready 37 Input
20	Rec Ready 38 Input
8	Rec Ready 39 Input
21	Rec Ready 40 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

TRKS 41-48	
PIN	**SIGNAL**
1	Rec Enable 41
14	Rec Enable 42
2	Rec Enable 43
15	Rec Enable 44
3	Rec Enable 45
16	Rec Enable 46
4	Rec Enable 47
17	Rec Enable 48
5	Rec Ready 41 Input
18	Rec Ready 42 Input
6	Rec Ready 43 Input
19	Rec Ready 44 Input
7	Rec Ready 45 Input
20	Rec Ready 46 Input
8	Rec Ready 47 Input
21	Rec Ready 48 Input
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Tape Transport Control Connectors

MACHINE 2	
PIN	**SIGNAL**
1	PLAY
14	STOP
2	WIND
15	REWIND
3	RECORD
16	SET ZERO
4	LOCATE
17	Extra
5	PLAY Tally
18	STOP Tally
6	WIND Tally
19	REWIND Tally
7	RECORD Tally
20	Extra 1 Tally
8	Extra 2 Tally
21	Extra 3 Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

MACHINE 3	
PIN	**SIGNAL**
1	PLAY
14	STOP
2	WIND
15	REWIND
3	RECORD
16	SET ZERO
4	LOCATE
17	Extra
5	PLAY Tally
18	STOP Tally
6	WIND Tally
19	REWIND Tally
7	RECORD Tally
20	Extra 1 Tally
8	Extra 2 Tally
21	Extra 3 Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

MACHINE 4	
PIN	**SIGNAL**
1	PLAY
14	STOP
2	WIND
15	REWIND
3	RECORD
16	SET ZERO
4	LOCATE
17	Extra
5	PLAY Tally
18	STOP Tally
6	WIND Tally
19	REWIND Tally
7	RECORD Tally
20	Extra 1 Tally
8	Extra 2 Tally
21	Extra 3 Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Tape Transport Control Connectors

MACHINE 5	
PIN	**SIGNAL**
1	PLAY
14	STOP
2	WIND
15	REWIND
3	RECORD
16	SET ZERO
4	LOCATE
17	Extra
5	PLAY Tally
18	STOP Tally
6	WIND Tally
19	REWIND Tally
7	RECORD Tally
20	Extra 1 Tally
8	Extra 2 Tally
21	Extra 3 Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

MACHINE 6	
PIN	**SIGNAL**
1	PLAY
14	STOP
2	WIND
15	REWIND
3	RECORD
16	SET ZERO
4	LOCATE
17	Extra
5	PLAY Tally
18	STOP Tally
6	WIND Tally
19	REWIND Tally
7	RECORD Tally
20	Extra 1 Tally
8	Extra 2 Tally
21	Extra 3 Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Unallocated Block	
PIN	**SIGNAL**
1	Talkback 1 Relay
14	Talkback 2 Relay
2	Talkback 3 Relay
15	Talkback 4 Relay
3	Talkback 5 Relay
16	Automation in REC Relay
4	Red Light Relay
17	Green Light Relay
5	CUT Opto
18	DIM Opto
6	Master Record (Off-On) All match (On-Off) Opto
19	Unassigned
7	Unassigned
20	Unassigned
8	Red Light Opto
21	Green Light Opto
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Aux Control Connectors

MACHINE 1A	
PIN	**SIGNAL**
1	MC A Track A Ready
14	MC A Track B Ready
2	MC A Track C Ready
15	MC A Track D Ready
3	MC A Input Ready
16	MC A Repro Relay
4	MC A Sync Relay
17	MC A Rehearse Relay
5	MC A Track A Tally
18	MC A Track B Tally
6	MC A Track C Tally
19	MC A Track D Tally
7	MC A Input Tally
20	MC A Repro Tally
8	MC A Sync Tally
21	MC A Rehearse Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

MACHINE 1B	
PIN	**SIGNAL**
1	MC B Track A Ready
14	MC B Track B Ready
2	MC B Track C Ready
15	MC B Track D Ready
3	MC B Input Ready
16	MC B Repro Relay
4	MC B Sync Relay
17	MC B Rehearse Relay
5	MC B Track A Tally
18	MC B Track B Tally
6	MC B Track C Tally
19	MC B Track D Tally
7	MC B Input Tally
20	MC B Repro Tally
8	MC B Sync Tally
21	MC B Rehearse Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

MACHINE 1C	
PIN	**SIGNAL**
1	MC C Track A Ready
14	MC C Track B Ready
2	MC C Track C Ready
15	MC C Track D Ready
3	MC C Input Ready
16	MC C Repro Relay
4	MC C Sync Relay
17	MC C Rehearse Relay
5	MC C Track A Tally
18	MC C Track B Tally
6	MC C Track C Tally
19	MC C Track D Tally
7	MC C Input Tally
20	MC C Repro Tally
8	MC C Sync Tally
21	MC C Rehearse Tally
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Signal Matrix Connectors

Signal Matrix 1-8	
PIN	**SIGNAL**
1	Unassigned Relay 1
14	Unassigned Relay 2
2	Unassigned Relay 3
15	Unassigned Relay 4
3	Unassigned Relay 5
16	Unassigned Relay 6
4	Unassigned Relay 7
17	Unassigned Relay 8
5	Unassigned Opto 1
18	Unassigned Opto 2
6	Unassigned Opto 3
19	Unassigned Opto 4
7	Unassigned Opto 5
20	Unassigned Opto 6
8	Unassigned Opto 7
21	Unassigned Opto 8
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Signal Matrix 9-16	
PIN	**SIGNAL**
1	Unassigned Relay 9
14	Unassigned Relay 10
2	Unassigned Relay 11
15	Unassigned Relay 12
3	Unassigned Relay 13
16	Unassigned Relay 14
4	Unassigned Relay 15
17	Unassigned Relay 16
5	Unassigned Opto 9
18	Unassigned Opto 10
6	Unassigned Opto 11
19	Unassigned Opto 12
7	Unassigned Opto 13
20	Unassigned Opto 14
8	Unassigned Opto 15
21	Unassigned Opto 16
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Unallocated Block	
PIN	**SIGNAL**
1	Unassigned Relay 17
14	Unassigned Relay 18
2	Unassigned Relay 19
15	Unassigned Relay 20
3	Unassigned Relay 21
16	Unassigned Relay 22
4	Unassigned Relay 23
17	Unassigned Relay 24
5	Unassigned Opto 17
18	Unassigned Opto 18
6	Unassigned Opto 19
19	Unassigned Opto 20
7	Unassigned Opto 21
20	Unassigned Opto 22
8	Unassigned Opto 23
21	Unassigned Opto 24
9	Opto Reference
22	0v
10	Relay Reference
23	Spare
11	5v
24	no connection
12	no connection
25	no connection
13	no connection

Auto–locator Control Connector

Connector type fitted to rack: 9 way female D–Type.

Mating Connector Required:

RS–232 mode, jumper P3 to P4		
PIN	**SIGNAL**	**DESCRIPTION**
1		no connection
2	RxDB	receive data
3	TxDB	data terminal
4	DTR	signal ground
5	GND	signal ground
6	DSR	data set ready
7	RTS	request to send
8	CTS	clear to send
9		no connection

RS–422 mode, jumper P3 to P5		
PIN	**SIGNAL**	**DESCRIPTION**
1		no connection
2	TX A	transmit data positive
3	RX B	receive data negative
4	GND	signal ground
5		no connection
6	GND	signal ground
7	TX B	transmit data negative
8	RX A	receive data positive
9		no connection

The Autolocator can be controlled via RS232 or RS422, the selection is made by fitting a jumper on the studio control processor card.

LTC Timecode Connector

Connector type fitted to rack: 3 pin XLR socket.

Mating Connector Required:

PIN	SIGNAL	DESCRIPTION
1	GND	signal ground
2	LTC+	timecode positive/hot
3	LTC–	timecode negative/cold

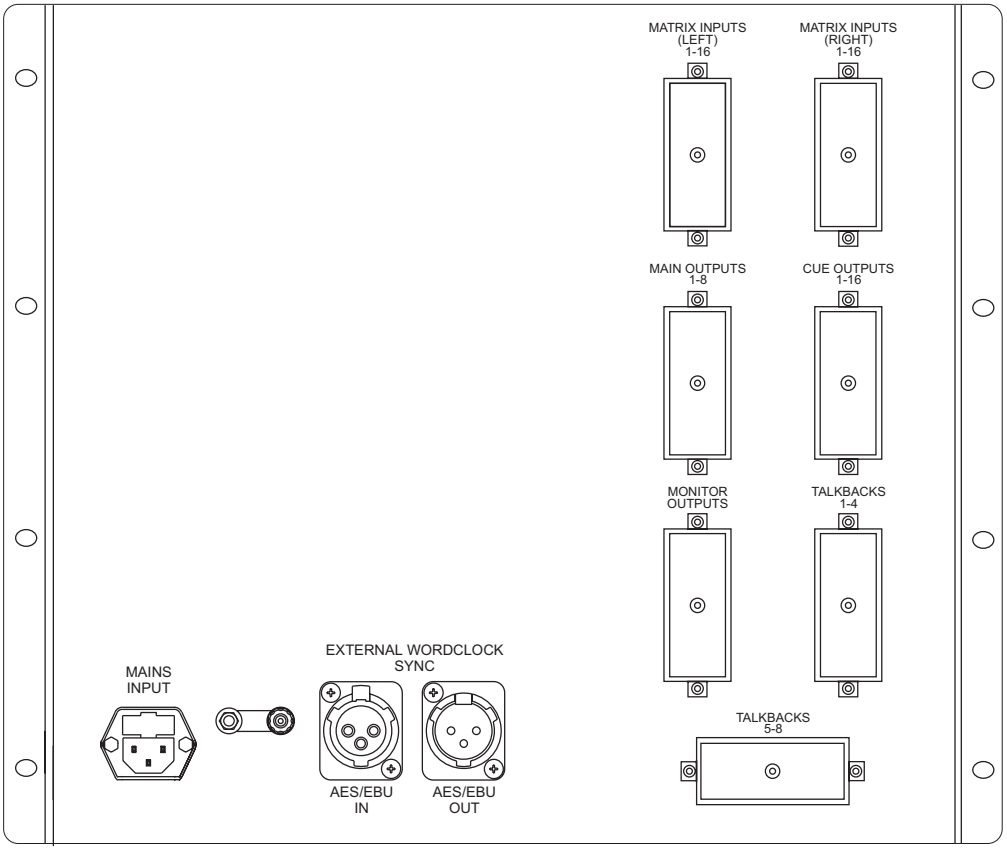
Biphase/Tacho Connector

(Connector type fitted to rack: 3 pin XLR socket)

Mating Connector Required:

PIN	SIGNAL	DESCRIPTION
1	GND	signal ground
2	TACH/A	tacho or A signal
3	DIRN/B	direction or B signal

Monitor Facilities I/O Rack



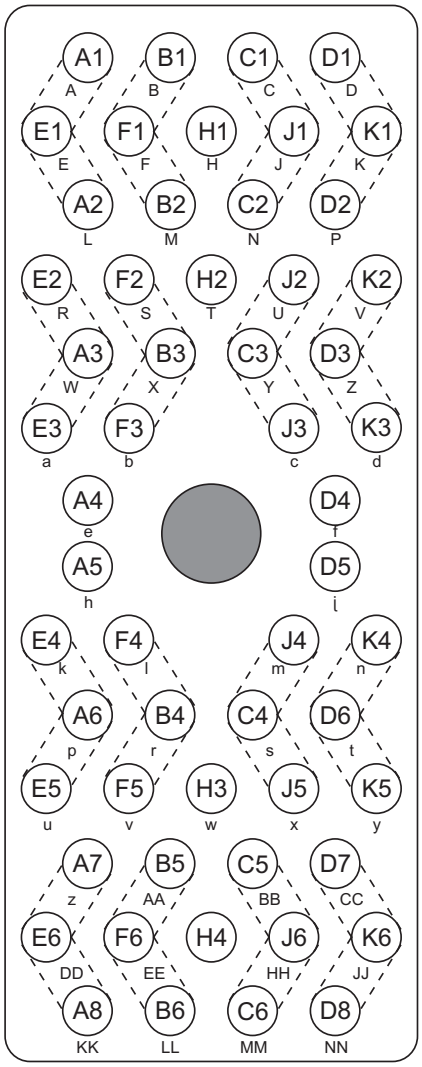
This rack provides the analogue line level outputs for Main Outputs, Cues/Auxes, Monitoring, Talkback and the monitoring External Input Matrix.

The way in which the Main Output and Cue connections (or ports) are allocated to the system is set up by the user using software routing. For this reason the allocation is arbitrary and the ports can be used for any function and in any order. The connectors are labelled as Outputs and Cues for convenience but utilise system output ports 1 to 24.

All connections are via rear mounted 56 way Varicon connectors which can be wired out by the customer to remote patch connectors etc. as required.

Monitor Facilities I/O Rack - 56 Way Varicon Connectors

Note: Pin out as shown below



Mating Connector
View on wiring side

Matrix Inputs Left

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			MATRIX IN L
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Matrix Input 1 L
2	B1	F1	B2	Matrix Input 2 L
3	C1	J1	C2	Matrix Input 3 L
4	D1	K1	D2	Matrix Input 4 L
5	E3	A3	E2	Matrix Input 5 L
6	F3	B3	F2	Matrix Input 6 L
7	J3	C3	J2	Matrix Input 7 L
8	K3	D3	K2	Matrix Input 8 L
9	E4	A6	E5	Matrix Input 9 L
10	F4	B4	F5	Matrix Input 10 L
11	J4	C4	J5	Matrix Input 11 L
12	K4	D6	K5	Matrix Input 12 L
13	A8	E6	A7	Matrix Input 13 L
14	B6	F6	B5	Matrix Input 14 L
15	C6	J6	C5	Matrix Input 15 L
16	D8	K6	D7	Matrix Input 16 L

Matrix Inputs Right

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			MATRIX IN R
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Matrix Input 1 R
2	B1	F1	B2	Matrix Input 2 R
3	C1	J1	C2	Matrix Input 3 R
4	D1	K1	D2	Matrix Input 4 R
5	E3	A3	E2	Matrix Input 5 R
6	F3	B3	F2	Matrix Input 6 R
7	J3	C3	J2	Matrix Input 7 R
8	K3	D3	K2	Matrix Input 8 R
9	E4	A6	E5	Matrix Input 9 R
10	F4	B4	F5	Matrix Input 10 R
11	J4	C4	J5	Matrix Input 11 R
12	K4	D6	K5	Matrix Input 12 R
13	A8	E6	A7	Matrix Input 13 R
14	B6	F6	B5	Matrix Input 14 R
15	C6	J6	C5	Matrix Input 15 R
16	D8	K6	D7	Matrix Input 16 R

Main Outputs

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			MAIN	
Signal #	**Hi**	**Lo**	**Scn**	**Port ***	**Signal Name**
1	A1	E1	A2	1	Main Output 1 L
2	B1	F1	B2	2	Main Output 1 R
3	C1	J1	C2	3	Main Output 2 L
4	D1	K1	D2	4	Main Output 2 R
5	E3	A3	E2	5	Main Output 3 L
6	F3	B3	F2	6	Main Output 3 R
7	J3	C3	J2	7	Main Output 4 L
8	K3	D3	K2	8	Main Output 4 R
9	E4	A6	E5		
10	F4	B4	F5		
11	J4	C4	J5		
12	K4	D6	K5		
13	A8	E6	A7		
14	B6	F6	B5		
15	C6	J6	C5		
16	D8	K6	D7		

* The connection usage is arbitrary, and using software port routing these connections can be used for Aux or Cue Outputs.

Cue Outputs

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			CUE	
Signal #	**Hi**	**Lo**	**Scn**	**Port ***	**Signal Name**
1	A1	E1	A2	9	Cue Output 1
2	B1	F1	B2	10	Cue Output 2
3	C1	J1	C2	11	Cue Output 3
4	D1	K1	D2	12	Cue Output 4
5	E3	A3	E2	13	Cue Output 5
6	F3	B3	F2	14	Cue Output 6
7	J3	C3	J2	15	Cue Output 7
8	K3	D3	K2	16	Cue Output 8
9	E4	A6	E5	17	Cue Output 9
10	F4	B4	F5	18	Cue Output 10
11	J4	C4	J5	19	Cue Output 11
12	K4	D6	K5	20	Cue Output 12
13	A8	E6	A7	21	Cue Output 13
14	B6	F6	B5	22	Cue Output 14
15	C6	J6	C5	23	Cue Output 15
16	D8	K6	D7	24	Cue Output 16

* The connection usage is arbitrary, and using software port routing these connections can be used for Aux or Main Outputs.

Monitor Outputs

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			MONITOR
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Monitor Output 1 L
2	B1	F1	B2	Monitor Output 1 R
3	C1	J1	C2	Monitor Output 2 L
4	D1	K1	D2	Monitor Output 2 R
5	E3	A3	E2	Monitor Output 3 L
6	F3	B3	F2	Monitor Output 3 R
7	J3	C3	J2	SLS Output L
8	K3	D3	K2	SLS Output R
9	E4	A6	E5	Headphone Output L
10	F4	B4	F5	Headphone Output R
11	J4	C4	J5	
12	K4	D6	K5	Spare Output
13	A8	E6	A7	PFL Output
14	B6	F6	B5	
15	C6	J6	C5	
16	D8	K6	D7	

Talkback 1–4

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			TALKBACK 1–4
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Talkback Input 1
2	B1	F1	B2	Talkback Input 2
3	C1	J1	C2	Talkback Input 3
4	D1	K1	D2	Talkback Input 4
5	E3	A3	E2	Talkback Output 1
6	F3	B3	F2	Talkback Output 2
7	J3	C3	J2	Talkback Output 3
8	K3	D3	K2	Talkback Output 4

Signals 9 to 16 are used for talkback signalling:

E4	1bit0	A6	1bit2	E5	1bit1
F4	1bit3	B4	gnd	F5	engage (o/p)
J4	2bit0	C4	2bit2	J5	2bit1
K4	2bit3	D6	gnd	K5	engage (o/p)
A8	3bit0	E6	3bit2	A7	3bit1
B6	3bit3	F6	gnd	B5	engage (o/p)
C6	4bit0	J6	4bit2	C5	4bit1
D8	4bit3	K6	gnd	D7	engage (o/p)

Talkback 5–8

Connector type fitted to rack: 56 way Varicon socket

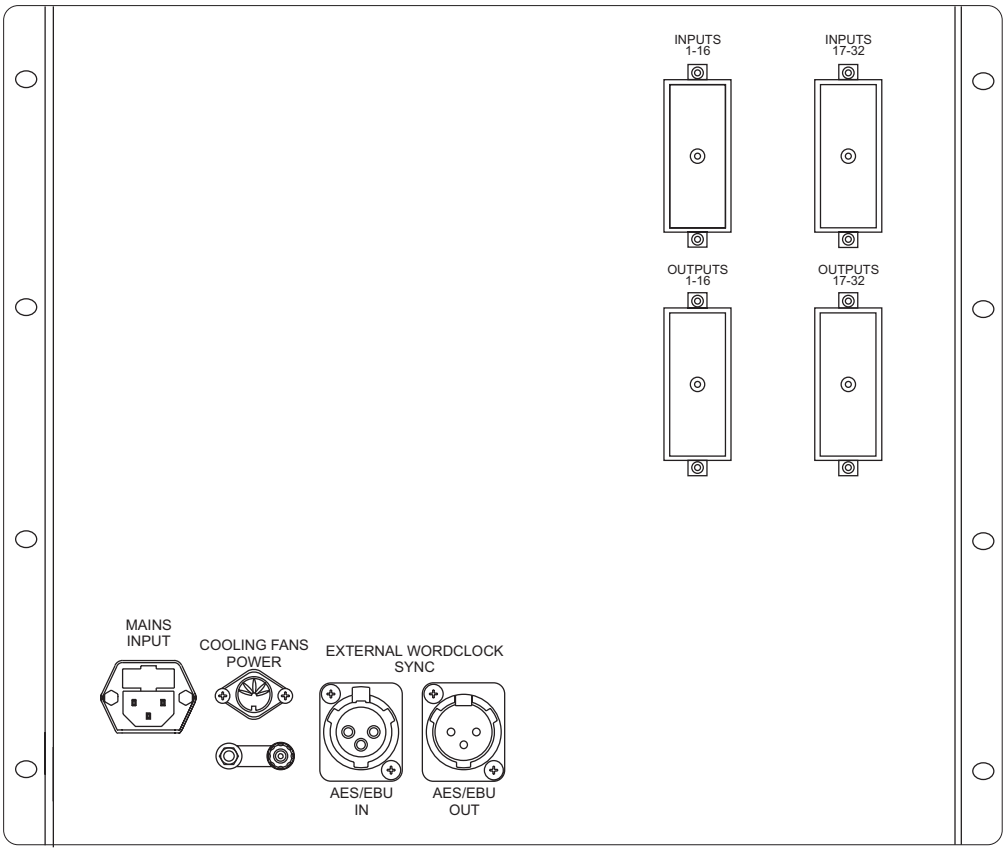
Mating Connector Required: 56 way Varicon plug

	Pin Number			TALKBACK 5–8
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Talkback Input 5
2	B1	F1	B2	Talkback Input 6
3	C1	J1	C2	Talkback Input 7
4	D1	K1	D2	Talkback Input 8
5	E3	A3	E2	Talkback Output 5
6	F3	B3	F2	Talkback Output 6
7	J3	C3	J2	Talkback Output 7
8	K3	D3	K2	Talkback Output 8

Signals 9 to 16 are used for talkback signalling:

E4	5bit0	A6	5bit2	E5	5bit1
F4	5bit3	B4	gnd	F5	engage (o/p)
J4	6bit0	C4	6bit2	J5	6bit1
K4	6bit3	D6	gnd	K5	engage (o/p)
A8	7bit0	E6	7bit2	A7	7bit1
B6	7bit3	F6	gnd	B5	engage (o/p)
C6	8bit0	J6	8bit2	C5	8bit1
D8	8bit3	K6	gnd	D7	engage (o/p)

20 Bit Analogue I/O Rack



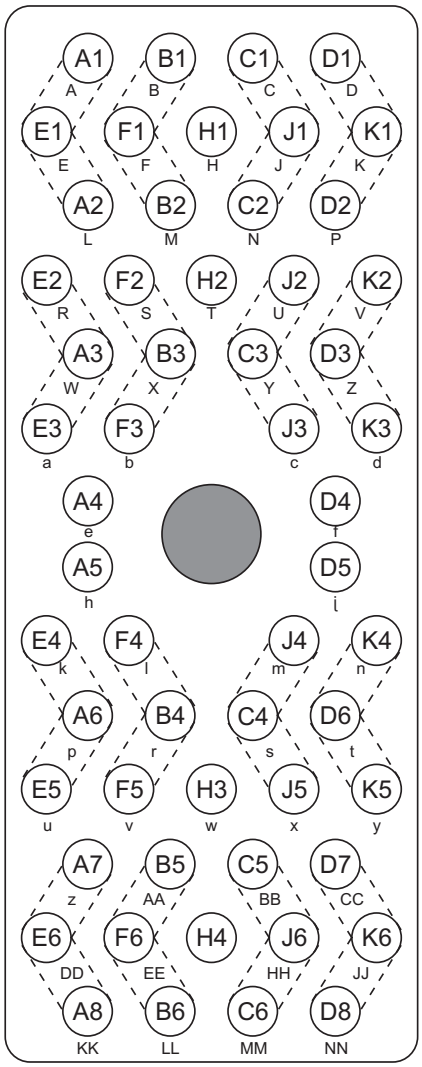
The Analogue I/O rack provides line level inputs and outputs for the system which can be used for Insertion points and Aux, Cues and Outputs. Fully fitted, the rack will support 32 inputs and outputs.

The rack communicates with the DSP rack over a MADI link.

The way in which the connections (or ports) are allocated to the system is set up by the user, with software routing. For this reason the allocation is arbitrary, and the ports can be used for different functions and in any order. The system will automatically allocate output ports 25 onwards and Input ports 1 onwards to the Analogue I/O rack(s).

Analogue I/O Rack - 56 Way Varicon Connectors

Note: Pin out as shown below



Mating Connector
View on wiring side

Inputs 1-16

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			INPUT
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Analogue Input 1
2	B1	F1	B2	Analogue Input 2
3	C1	J1	C2	Analogue Input 3
4	D1	K1	D2	Analogue Input 4
5	E3	A3	E2	Analogue Input 5
6	F3	B3	F2	Analogue Input 6
7	J3	C3	J2	Analogue Input 7
8	K3	D3	K2	Analogue Input 8
9	E4	A6	E5	Analogue Input 9
10	F4	B4	F5	Analogue Input 10
11	J4	C4	J5	Analogue Input 11
12	K4	D6	K5	Analogue Input 12
13	A8	E6	A7	Analogue Input 13
14	B6	F6	B5	Analogue Input 14
15	C6	J6	C5	Analogue Input 15
16	D8	K6	D7	Analogue Input 16

Inputs 17-32

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			INPUT
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
17	A1	E1	A2	Analogue Input 17
18	B1	F1	B2	Analogue Input 18
19	C1	J1	C2	Analogue Input 19
20	D1	K1	D2	Analogue Input 20
21	E3	A3	E2	Analogue Input 21
22	F3	B3	F2	Analogue Input 22
23	J3	C3	J2	Analogue Input 23
24	K3	D3	K2	Analogue Input 24
25	E4	A6	E5	Analogue Input 25
26	F4	B4	F5	Analogue Input 26
27	J4	C4	J5	Analogue Input 27
28	K4	D6	K5	Analogue Input 28
29	A8	E6	A7	Analogue Input 29
30	B6	F6	B5	Analogue Input 30
31	C6	J6	C5	Analogue Input 31
32	D8	K6	D7	Analogue Input 32

Outputs 1-16

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			OUTPUTS
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Analogue Output 1
2	B1	F1	B2	Analogue Output 2
3	C1	J1	C2	Analogue Output 3
4	D1	K1	D2	Analogue Output 4
5	E3	A3	E2	Analogue Output 5
6	F3	B3	F2	Analogue Output 6
7	J3	C3	J2	Analogue Output 7
8	K3	D3	K2	Analogue Output 8
9	E4	A6	E5	Analogue Output 9
10	F4	B4	F5	Analogue Output 10
11	J4	C4	J5	Analogue Output 11
12	K4	D6	K5	Analogue Output 12
13	A8	E6	A7	Analogue Output 13
14	B6	F6	B5	Analogue Output 14
15	C6	J6	C5	Analogue Output 15
16	D8	K6	D7	Analogue Output 16

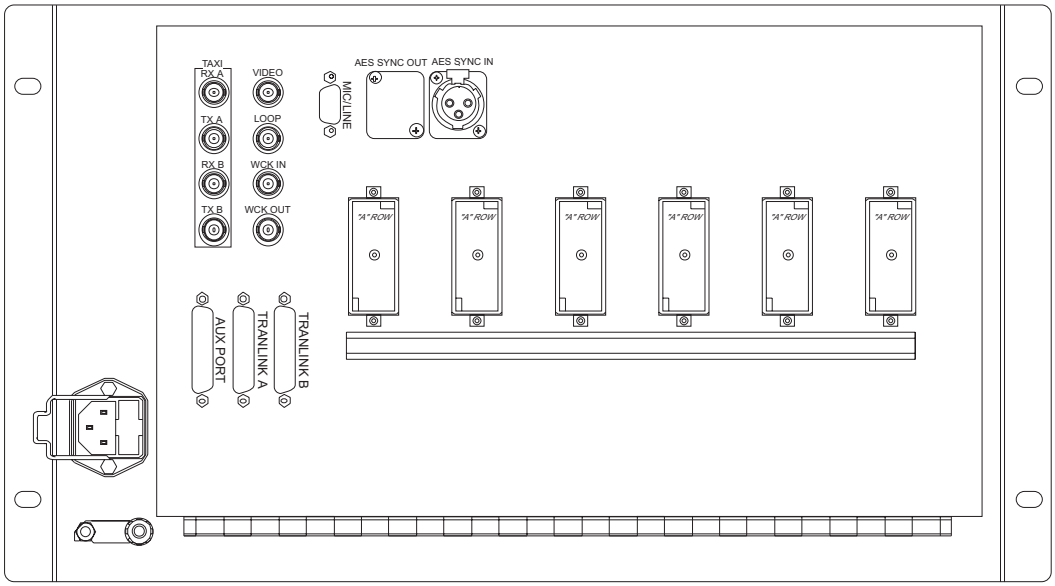
Outputs 17-32

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			OUTPUTS
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
17	A1	E1	A2	Analogue Output 17
18	B1	F1	B2	Analogue Output 18
19	C1	J1	C2	Analogue Output 19
20	D1	K1	D2	Analogue Output 20
21	E3	A3	E2	Analogue Output 21
22	F3	B3	F2	Analogue Output 22
23	J3	C3	J2	Analogue Output 23
24	K3	D3	K2	Analogue Output 24
25	E4	A6	E5	Analogue Output 25
26	F4	B4	F5	Analogue Output 26
27	J4	C4	J5	Analogue Output 27
28	K4	D6	K5	Analogue Output 28
29	A8	E6	A7	Analogue Output 29
30	B6	F6	B5	Analogue Output 30
31	C6	J6	C5	Analogue Output 31
32	D8	K6	D7	Analogue Output 32

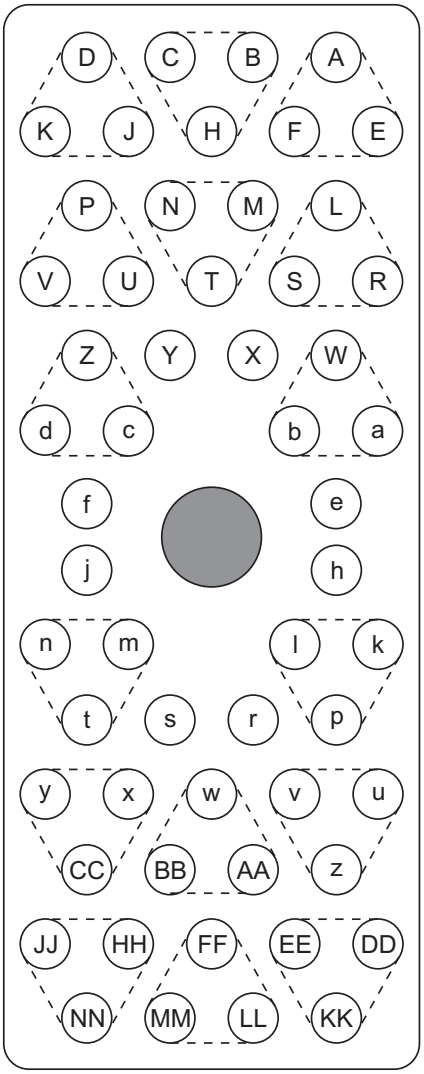
24 Bit Analogue I/O Rack



24 Bit Analogue I/O Rack - 56 Way Varicon Connectors

(Elco,Varelco, etc. Shells are all coded the same i.e.1:1)

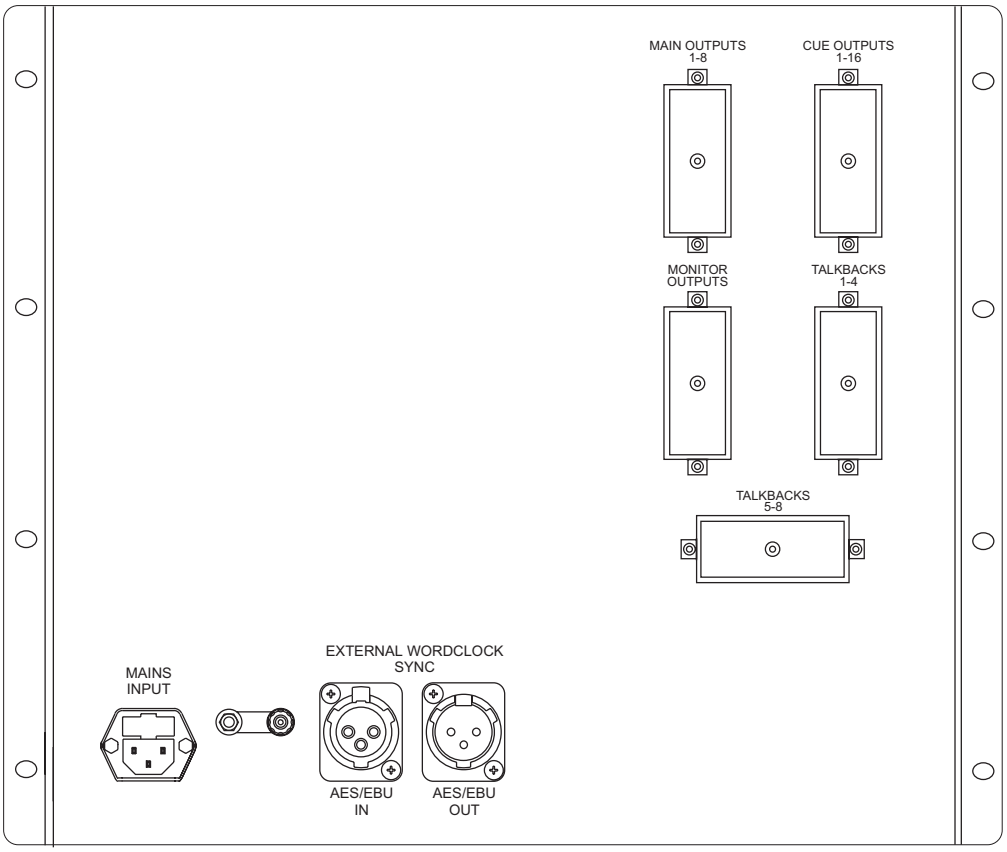
Note: Pin out as shown below



Mating Connector
View on wiring side

56 Way Varicon Connections

Mic/Line Rack (for 20 Bit I/O)



Each Mic/Line rack houses 16 A/D converters for microphone and line level inputs. The input to each A/D convertor may be selected from 4 sources: Mic A, Mic B, Line A and Line B.

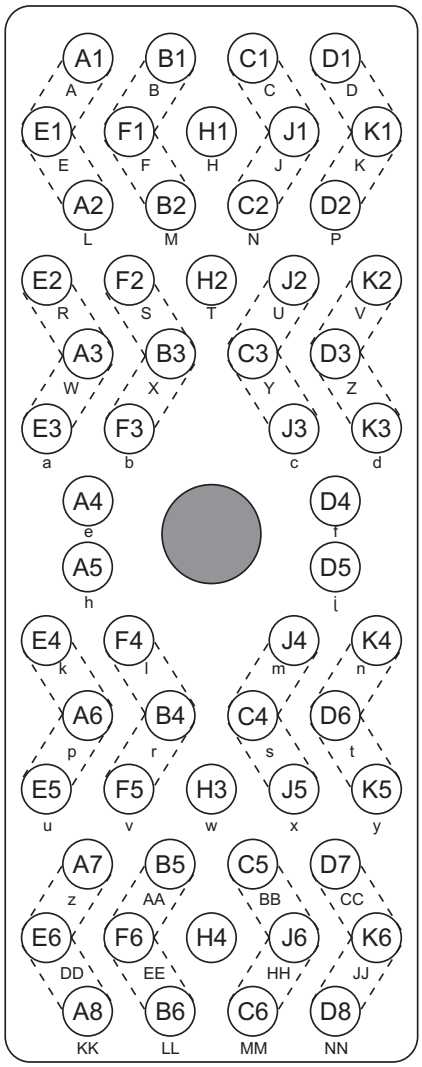
The rack can be fitted with a Talkback card providing a talkback input and output channel, connection for this is made via Varicon 5.

Data is passed to the DSP Rack over a MADI bi-directional link.

All MIC/LINE inputs are connected via rear-mounted 56 way Varicon connectors which can be wired out by the customer to remote patch connectors etc. as required.

Mic/Line Rack - 56 Way Varicon Connectors

Note: Pin out as shown below



Mating Connector
View on wiring side

Mic A Inputs

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			MIC A IN
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Mic A Input 1
2	B1	F1	B2	Mic A Input 2
3	C1	J1	C2	Mic A Input 3
4	D1	K1	D2	Mic A Input 4
5	E3	A3	E2	Mic A Input 5
6	F3	B3	F2	Mic A Input 6
7	J3	C3	J2	Mic A Input 7
8	K3	D3	K2	Mic A Input 8
9	E4	A6	E5	Mic A Input 9
10	F4	B4	F5	Mic A Input 10
11	J4	C4	J5	Mic A Input 11
12	K4	D6	K5	Mic A Input 12
13	A8	E6	A7	Mic A Input 13
14	B6	F6	B5	Mic A Input 14
15	C6	J6	C5	Mic A Input 15
16	D8	K6	D7	Mic A Input 16

Mic B Inputs

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			MIC B IN
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Mic B Input 1
2	B1	F1	B2	Mic B Input 2
3	C1	J1	C2	Mic B Input 3
4	D1	K1	D2	Mic B Input 4
5	E3	A3	E2	Mic B Input 5
6	F3	B3	F2	Mic B Input 6
7	J3	C3	J2	Mic B Input 7
8	K3	D3	K2	Mic B Input 8
9	E4	A6	E5	Mic B Input 9
10	F4	B4	F5	Mic B Input 10
11	J4	C4	J5	Mic B Input 11
12	K4	D6	K5	Mic B Input 12
13	A8	E6	A7	Mic B Input 13
14	B6	F6	B5	Mic B Input 14
15	C6	J6	C5	Mic B Input 15
16	D8	K6	D7	Mic B Input 16

Line A Inputs

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			LINE A IN
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Line A Input 1
2	B1	F1	B2	Line A Input 2
3	C1	J1	C2	Line A Input 3
4	D1	K1	D2	Line A Input 4
5	E3	A3	E2	Line A Input 5
6	F3	B3	F2	Line A Input 6
7	J3	C3	J2	Line A Input 7
8	K3	D3	K2	Line A Input 8
9	E4	A6	E5	Line A Input 9
10	F4	B4	F5	Line A Input 10
11	J4	C4	J5	Line A Input 11
12	K4	D6	K5	Line A Input 12
13	A8	E6	A7	Line A Input 13
14	B6	F6	B5	Line A Input 14
15	C6	J6	C5	Line A Input 15
16	D8	K6	D7	Line A Input 16

Line B Inputs

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug

	Pin Number			LINE B IN
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Line B Input 1
2	B1	F1	B2	Line B Input 2
3	C1	J1	C2	Line B Input 3
4	D1	K1	D2	Line B Input 4
5	E3	A3	E2	Line B Input 5
6	F3	B3	F2	Line B Input 6
7	J3	C3	J2	Line B Input 7
8	K3	D3	K2	Line B Input 8
9	E4	A6	E5	Line B Input 9
10	F4	B4	F5	Line B Input 10
11	J4	C4	J5	Line B Input 11
12	K4	D6	K5	Line B Input 12
13	A8	E6	A7	Line B Input 13
14	B6	F6	B5	Line B Input 14
15	C6	J6	C5	Line B Input 15
16	D8	K6	D7	Line B Input 16

Talkback

Connector type fitted to rack: 56 way Varicon socket

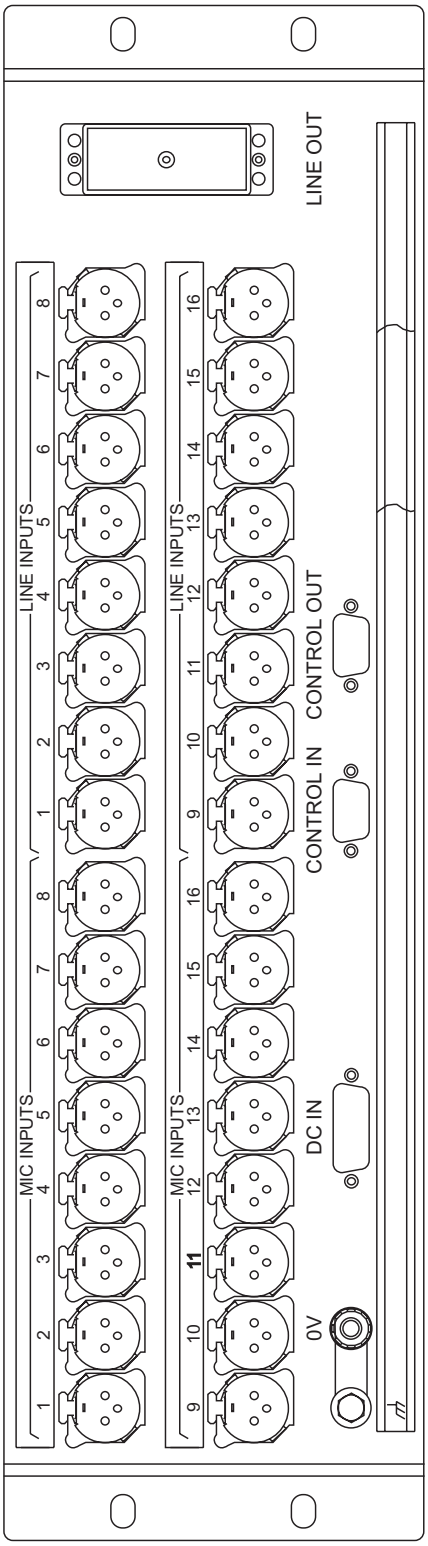
Mating Connector Required: 56 way Varicon plug

	Pin Number			TALKBACK 1
Signal #	**Hi**	**Lo**	**Scn**	**Signal Name**
1	A1	E1	A2	Talkback Input 1
5	E3	A3	E2	Talkback Output 1

Signals 9 and 10 are used for talkback signalling:

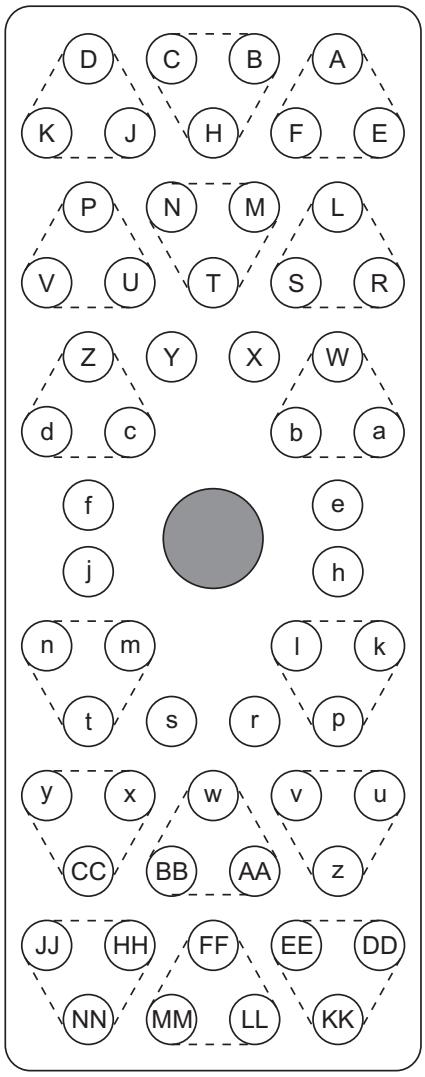
E4	1bit0	A6	1bit2	E5	1bit1
F4	1bit3	B4	gnd	F5	engage (o/p)

Mic/Line Rack (for 24 Bit I/O)



Mic/Line Rack (for 24 Bit I/O) - 56 Way Varicon Connectors

Note: Pin out as shown below



Mating Connector
View on wiring side

Mic/Line Connections

The outputs of the Mic/Line unit are line level, unbalanced (balanced impedance).

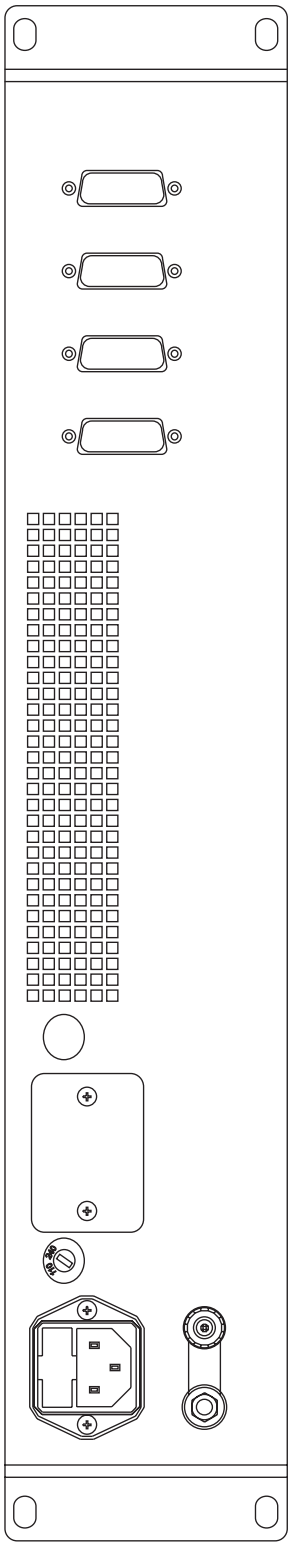
Each Mic/Line unit can accommodate up to 8 dual mono cards which should be connected to the first 16 ADC inputs: LIN 1 (AB) to LIN 8 (AB).

All XLRs are 3 pin female.

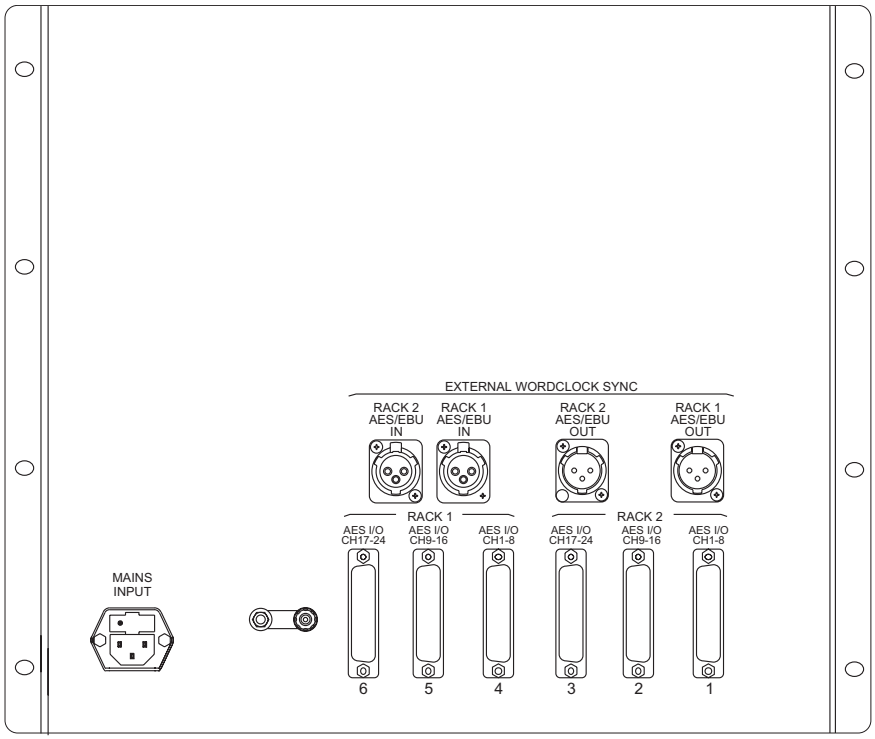
The line output connector is a 56 pin Varicon (Elco, Varelco, etc) male coded 1:1 with pin- outs identical to the IOS rack varicon connectors.

Mic/Line Rack Power Supply

Connections



Digital I/O Rack



There are six 50 way female D–type connectors on the rear of the rack for the AES/EBU input and output connections. Each connector provides connections for 8 stereo inputs and 8 stereo outputs, as shown in the tables overleaf.

Connector 1	Inputs and Outputs 1-16 (AES/EBU channels 1-8)
Connector 2	Inputs and Outputs 17-32 (AES/EBU channels 9-16)
Connector 3	Inputs and Outputs 33-48 (AES/EBU channels 17-24)
Connector 4	Inputs and Outputs 1-16 (AES/EBU channels 1-8)
Connector 5	Inputs and Outputs 17-32 (AES/EBU channels 9-16)
Connector 6	Inputs and Outputs 33-48 (AES/EBU channels 17-24)

The rack is divided into two partitions, one for AES/EBU channels 1-24, the other for channels 25-48. Each partition requires its own MADI interface and wordclock input.

Connectors 1, 2 & 3

Mating Connector Required: 50 way male D-type

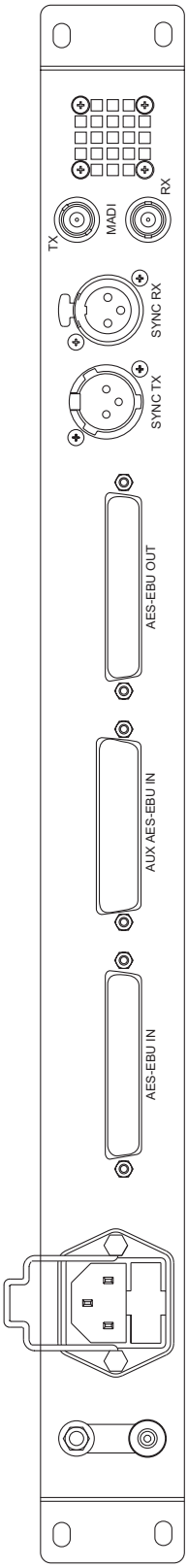
CONNECTOR 1	CONNECTOR 2	CONNECTOR 3	PLUS	MINUS	GND
Input 1/2	Input 17/18	Input 33/34	1	34	35
Input 3/4	Input 19/20	Input 35/36	18	2	19
Input 5/6	Input 21/22	Input 37/38	3	36	37
Input 7/8	Input 23/24	Input 39/40	20	4	21
Input 9/10	Input 25/26	Input 41/42	5	38	39
Input 11/12	Input 27/28	Input 43/44	22	6	23
Input 13/14	Input 29/30	Input 45/46	7	40	41
Input 15/16	Input 31/32	Input 47/48	24	8	25
Output 1/2	Output 17/18	Output 33/34	9	42	43
Output 3/4	Output 19/20	Output 35/36	26	10	27
Output 5/6	Output 21/22	Output 37/38	11	44	45
Output 7/8	Output 23/24	Output 39/40	28	12	29
Output 9/10	Output 25/26	Output 41/42	13	46	47
Output 11/12	Output 27/28	Output 43/44	30	14	31
Output 13/14	Output 29/30	Output 45/46	15	48	49
Output 15/16	Output 31/32	Output 47/48	32	16	33

Connectors 4, 5 & 6

Mating Connector Required: 50 way male D-type

CONNECTOR 4	CONNECTOR 5	CONNECTOR 6	PLUS	MINUS	GND
Input 1/2	Input 17/18	Input 33/34	1	34	35
Input 3/4	Input 19/20	Input 35/36	18	2	19
Input 5/6	Input 21/22	Input 37/38	3	36	37
Input 7/8	Input 23/24	Input 39/40	20	4	21
Input 9/10	Input 25/26	Input 41/42	5	38	39
Input 11/12	Input 27/28	Input 43/44	22	6	23
Input 13/14	Input 29/30	Input 45/46	7	40	41
Input 15/16	Input 31/32	Input 47/48	24	8	25
Output 1/2	Output 17/18	Output 33/34	9	42	43
Output 3/4	Output 19/20	Output 35/36	26	10	27
Output 5/6	Output 21/22	Output 37/38	11	44	45
Output 7/8	Output 23/24	Output 39/40	28	12	29
Output 9/10	Output 25/26	Output 41/42	13	46	47
Output 11/12	Output 27/28	Output 43/44	30	14	31
Output 13/14	Output 29/30	Output 45/46	15	48	49
Output 15/16	Output 31/32	Output 47/48	32	16	33

Multichannel AES I/O Unit



AES-EBU IN

Location: Rear of Multichannel AES I/O Unit

Mating connector required: 37-way D type male

Pin No.	Signal type	Channel
37	Hot	AES 1AB In
36	Cold	
18	Screen	
17	Hot	AES 2AB In
16	Cold	
35	Screen	
34	Hot	AES 3AB In
33	Cold	
15	Screen	
14	Hot	AES 4AB In
13	Cold	
32	Screen	
31	Hot	AES 5AB In
30	Cold	
12	Screen	
11	Hot	AES 6AB In
10	Cold	
29	Screen	
28	Hot	AES 7AB In
27	Cold	
9	Screen	
8	Hot	AES 8AB In
7	Cold	
26	Screen	
25	Hot	AES 9AB In
24	Cold	
6	Screen	
5	Hot	AES 10AB In
4	Cold	
23	Screen	
22	Hot	AES 11AB In
21	Cold	
3	Screen	
2	Hot	AES 12AB In
1	Cold	
20	Screen	

AES-EBU OUT

Location: Rear of Multichannel AES I/O Unit

Mating connector required: 37-way D type male

Pin No.	Signal type	Channel
37	Hot	AES 1AB Out
36	Cold	
18	Screen	
17	Hot	AES 2AB Out
16	Cold	
35	Screen	
34	Hot	AES 3AB Out
33	Cold	
15	Screen	
14	Hot	AES 4AB Out
13	Cold	
32	Screen	
31	Hot	AES 5AB Out
30	Cold	
12	Screen	
11	Hot	AES 6AB Out
10	Cold	
29	Screen	
28	Hot	AES 7AB Out
27	Cold	
9	Screen	
8	Hot	AES 8AB Out
7	Cold	
26	Screen	
25	Hot	AES 9AB Out
24	Cold	
6	Screen	
5	Hot	AES 10AB Out
4	Cold	
23	Screen	
22	Hot	AES 11AB Out
21	Cold	
3	Screen	
2	Hot	AES 12AB Out
1	Cold	
20	Screen	

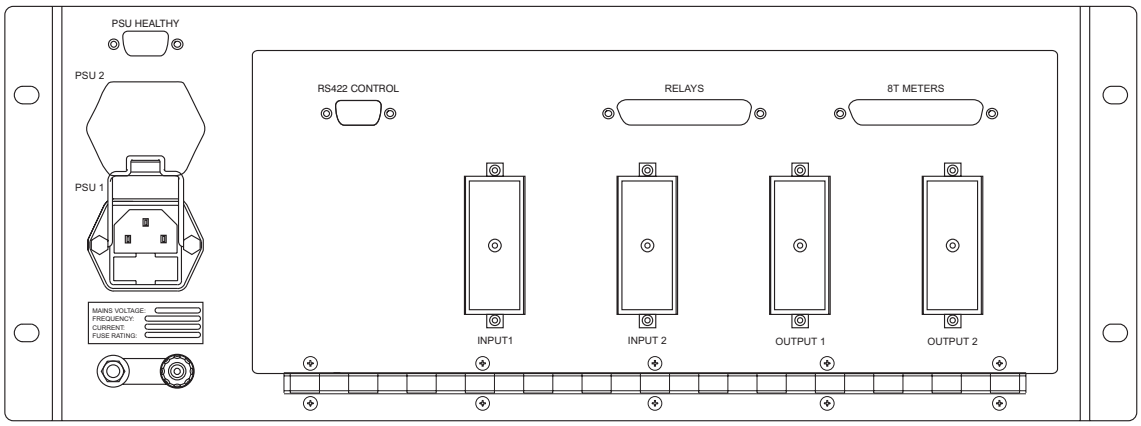
AUX AES-EBU IN - Optional Expansion 1 or 2 Cards

Location: Rear of Multichannel AES I/O Unit

Mating connector required: 50-way D type male

Pin No.	Signal type	Channel	
		1 Exp. Card	2 Exp. Cards
33	Hot	AES 1AB In	AES 1AB In
49	Cold		
16	Screen		
15	Hot	AES 2AB In	AES 2AB In
32	Cold		
48	Screen		
31	Hot	AES 3AB In	AES 3AB In
47	Cold		
14	Screen		
13	Hot	AES 4AB In	AES 4AB In
30	Cold		
46	Screen		
29	Hot	AES 5AB In	AES 5AB In
45	Cold		
12	Screen		
11	Hot	AES 6AB In	AES 6AB In
28	Cold		
44	Screen		
27	Hot	AES 7AB In	AES 7AB In
43	Cold		
10	Screen		
9	Hot	AES 8AB In	AES 8AB In
26	Cold		
42	Screen		
25	Hot		AES 9AB In
41	Cold		
8	Screen		
7	Hot		AES 10AB In
24	Cold		
40	Screen		
23	Hot		AES 11AB In
39	Cold		
6	Screen		
5	Hot		AES 12AB In
22	Cold		
38	Screen		
21	Hot		AES 13AB In
37	Cold		
4	Screen		
3	Hot		AES 14AB In
20	Cold		
36	Screen		
19	Hot		AES 15AB In
35	Cold		
2	Screen		
1	Hot		AES 16AB IN
18	Cold		
34	Screen		

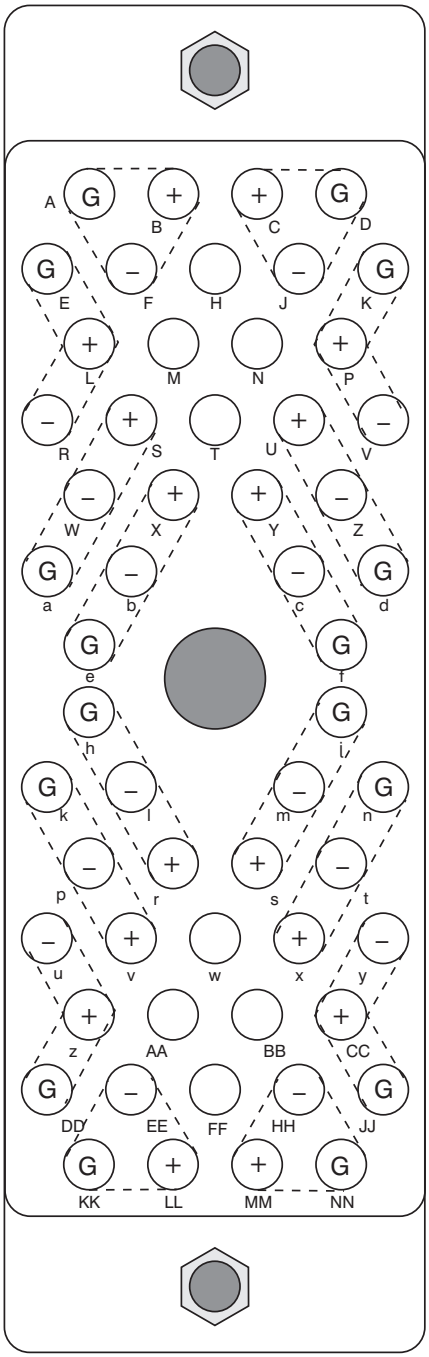
CXS Monitor Rack



✍ *The 56 way Varicon connectors on the rear panel are mounted upside down, this must be taken into consideration when fitting the covers to the mating varicon connectors if the cables are to be fed from below.*

CXS Monitor Rack - 56 Way Varicon Connector

Note: Pin out as shown below



Mating Connector (View on wiring side)

Input 1

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug (male)

Signal	Signal Name	Pin Number		
		Hi	Lo	Scn
1	MON IP L	C	J	D
2	MON IP C	P	V	K
3	MON IP R	U	Z	d
4	MON IP LS	Y	c	f
5	MON IP RS	s	m	j
6	MON IP SW	x	t	n
7	MON IP LE	CC	y	JJ
8	MON IP RE	MM	HH	NN
9	PATCH IP L	B	F	A
10	PATCH IP C	L	R	E
11	PATCH IP R	S	W	a
12	PATCH IP LS	X	b	e
13	PATCH IP RS	r	l	h
14	PATCH IP SW	v	p	k
15	PATCH IP LE	z	u	DD
16	PATCH IP RE	LL	EE	KK

Input 2

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug (male)

Signal	Signal Name	Pin Number		
		Hi	Lo	Scn
1	2T L	C	J	D
2	2T R	P	V	K
3	LT	U	Z	d
4	RT	Y	c	f
5	SP1 L	s	m	j
6	SP1 R	x	t	n
7	SP2 L	CC	y	JJ
8	SP2 R	MM	HH	NN
9	CAP LS1 L	B	F	A
10	CAP LS1 R	L	R	E
11	CAP LS2 L	S	W	a
12	CAP LS2 R	X	b	e
13	CAP LS3 L	r	l	h
14	CAP LS3 R	v	p	k
15	DIALOG L	z	u	DD
16	DIALOG R	LL	EE	KK

Output 1

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug (male)

Signal	Signal Name	Pin Number		
		Hi	Lo	Scn
1	MINI SPKR OP L	C	J	D
2	MINI SPKR OP R	P	V	K
3	PRE-ACAD SEND	U	Z	d
4	ACAD FILTER SEND	Y	c	f
5		s	m	j
6		x	t	n
7		CC	y	JJ
8		MM	HH	NN
9	ACAD RETURN	B	F	A
10		L	R	E
11		S	W	a
12		X	b	e
13		r	l	h
14		v	p	k
15		z	u	DD
16		LL	EE	KK

Output 2

Connector type fitted to rack: 56 way Varicon socket

Mating Connector Required: 56 way Varicon plug (male)

Signal	Signal Name	Pin Number		
		Hi	Lo	Scn
1	LARGE SPKR OP L	C	J	D
2	LARGE SPKR OP C	P	V	K
3	LARGE SPKR OP R	U	Z	d
4	LARGE SPKR OP LS	Y	c	f
5	LARGE SPKR OP RS	s	m	j
6	LARGE SPKR OP SW	x	t	n
7	LARGE SPKR OP LE	CC	y	JJ
8	LARGE SPKR OP RE	MM	HH	NN
9	SMALL SPKR OP L	B	F	A
10	SMALL SPKR OP C	L	R	E
11	SMALL SPKR OP R	S	W	a
12	SMALL SPKR OP LS	X	b	e
13	SMALL SPKR OP RS	r	l	h
14	SMALL SPKR OP SW	v	p	k
15	SMALL SPKR OP LE	z	u	DD
16	SMALL SPKR OP RE	LL	EE	KK

RS422 CONTROL

Connector type fitted to rack: 9 way female D-Type

Signal Name	Pin Number
no connection	1
TX-HI	2
no connection	3
RX-HI	4
no connection	5
no connection	6
TX-LO	7
no connection	8
RX-LO	9

RELAYS

Connector type fitted to rack: 37 way female D-Type

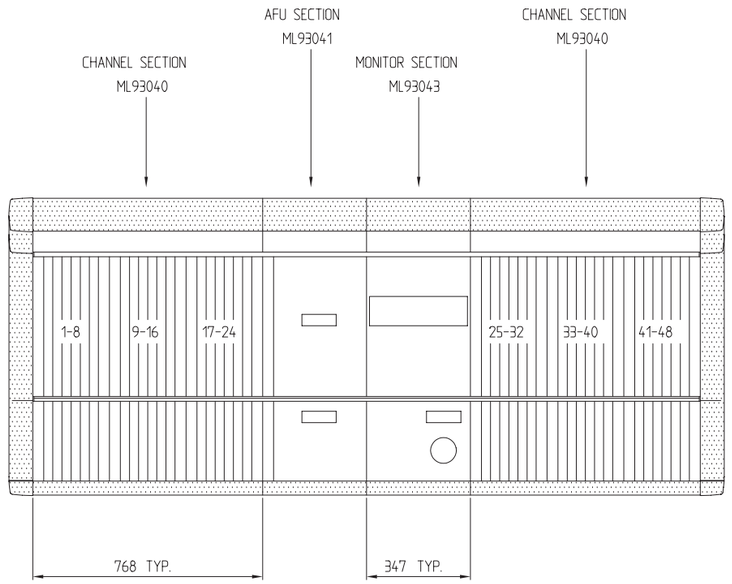
Signal Name	Pin Number	
	Hi	Lo
Relay 1 normally closed contacts	1	20
Relay 1 Wiper contacts	2	21
Relay 1 normally closed contacts	3	22
0 volts Audio	4	
Relay 2 normally closed contacts	23	5
Relay 2 Wiper contacts	24	6
Relay 2 normally closed contacts	25	7
0 volts Audio	26	
Relay 3 normally closed contacts	8	27
Relay 3 Wiper contacts	9	28
Relay 3 normally closed contacts	10	29
0 volts Audio	11	
Relay 4 normally closed contacts	30	12
Relay 4 Wiper contacts	31	13
Relay 4 normally closed contacts	32	14
0 volts Audio	33	
Relay 5 normally closed contacts	15	34
Relay 5 Wiper contacts	16	35
Relay 5 normally closed contacts	17	36

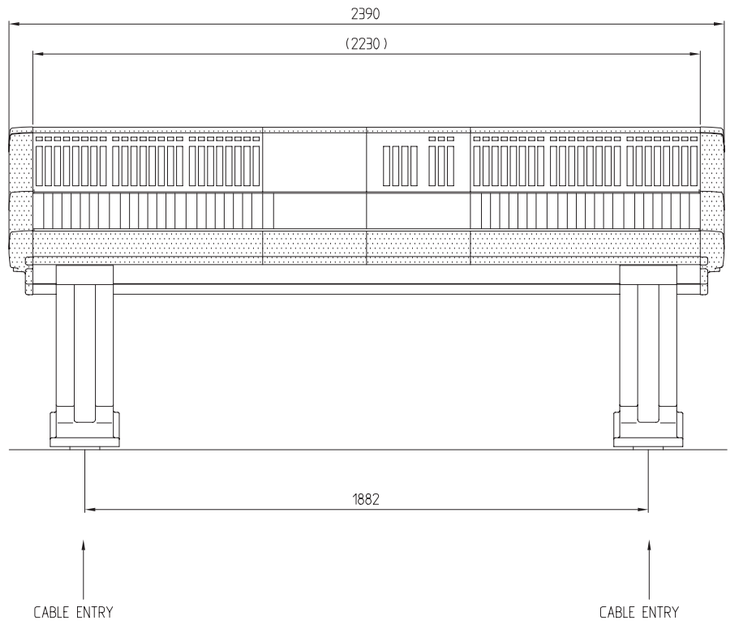
8T METERS

Connector type fitted to rack: 37 way female D-Type

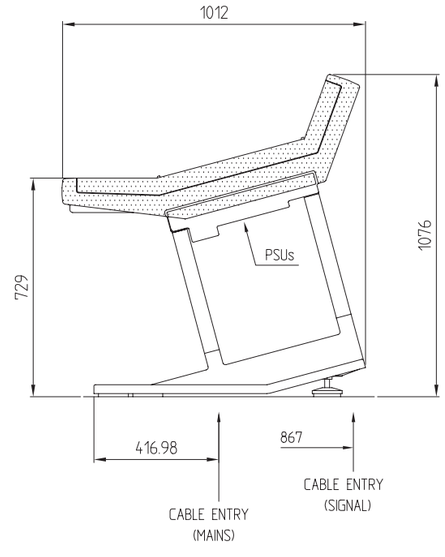
Signal Name	Pin Number	
	Hi	Lo
Vu meter "L"	**1**	**20**
0 volts Audio	2	
Vu meter "C"	**21**	**3**
0 volts Audio	22	
Vu meter "R"	**4**	**23**
0 volts Audio	5	
Vu meter "LS"	**24**	**6**
0 volts Audio	25	7
0 volts Audio	26	8
0 volts Audio	27	9
0 volts Audio	28	10
0 volts Audio	29	11
0 volts Audio	30	
Vu meter "RS"	**12**	**31**
0 volts Audio	13	
Vu meter "SW"	**32**	**14**
0 volts Audio	33	
Vu meter "LE"	**15**	**34**
0 volts Audio	16	
Vu meter "RE"	**35**	**17**
0 volts Audio	36	

DRAWING No.
ML25049





NOTES
1. Console Finish:
   Top Rail, Buffer & End-Cladding:
   Textured Dark Admiralty Grey self-skinning foam
   Under- and Rear Cladding Panels:
   Textured Dark Admiralty Grey
   Under-frame and Leg assemblies:
   Textured Black



ISS.1 - ISS.2
DIM 729 WAS 710, DIM 1076 WAS 1057
DIM 1012 WAS 1008 (REF DAR33358)

2	1	P	ISSUE
14.5.96	08/03/93	10/09/91	DATE
M37000/GL			CHANGE NOTE No.
			CHECKED

FIRST USED ON	DAS	MATL.	TOL.UNLESS OTHERWISE STATED
DRN.	TJB	FINISH	LINEAR ± / ANGULAR / HOLES +0.13 −0
TRACED			3rd ANGLE PRJ. / DIMS.IN MM / SCALE 1:10
CHECKED		TITLE DAS 112/48 CONSOLE (48 CHANNEL)	DRG.No. ML25049 Sht.

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