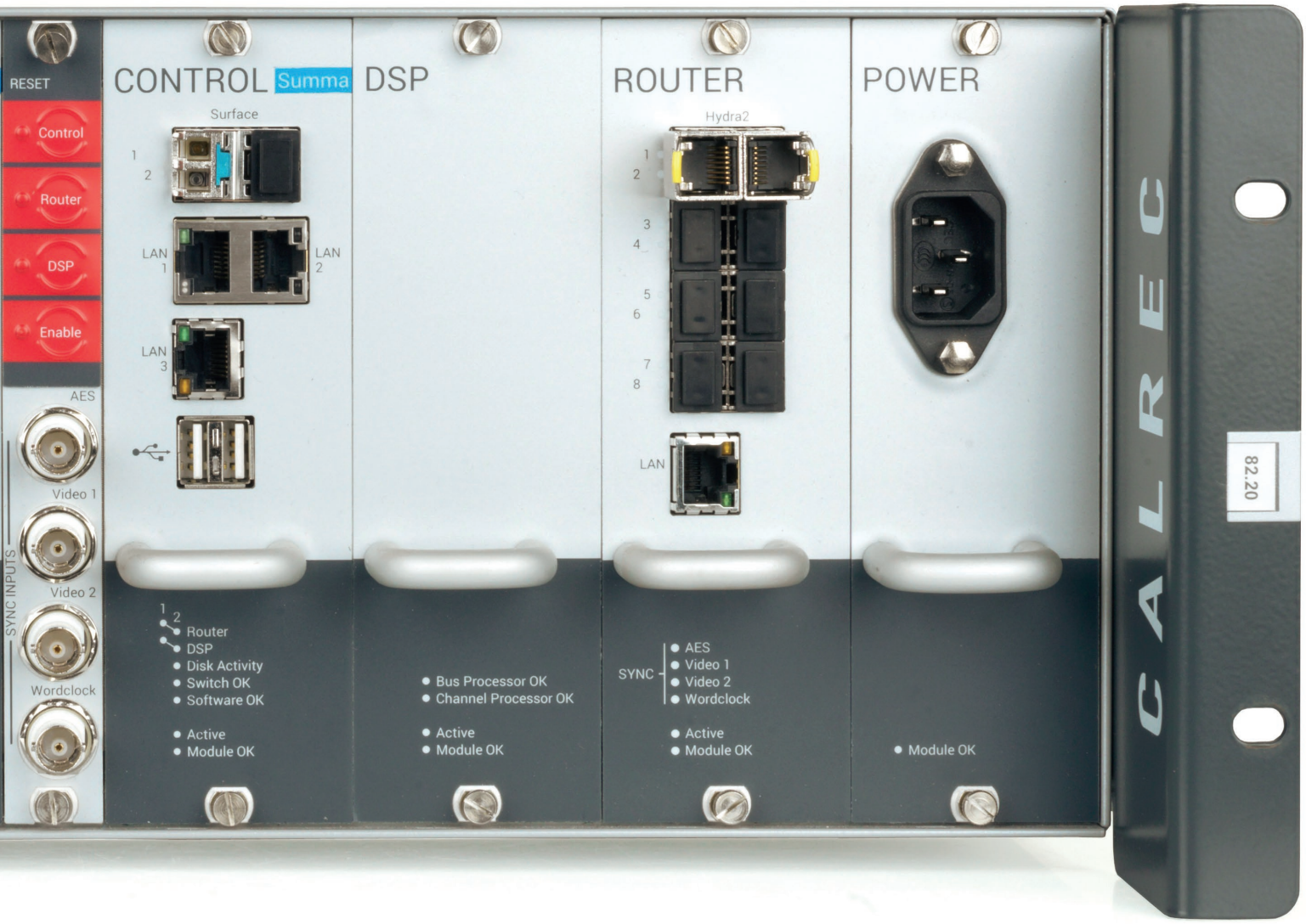
Hydra2 I/O Product Guide

Your Route to Success

CALREC



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INTRODUCTION

Calrec Audio supplies audio broadcast mixing consoles which are relied on by the world's most successful broadcasters. Formed as a microphone manufacturer in 1964, Calrec celebrated 50 years as audio specialists in 2014. The company's reputation for build quality, reliability and audio performance has made it an industry benchmark across the world.

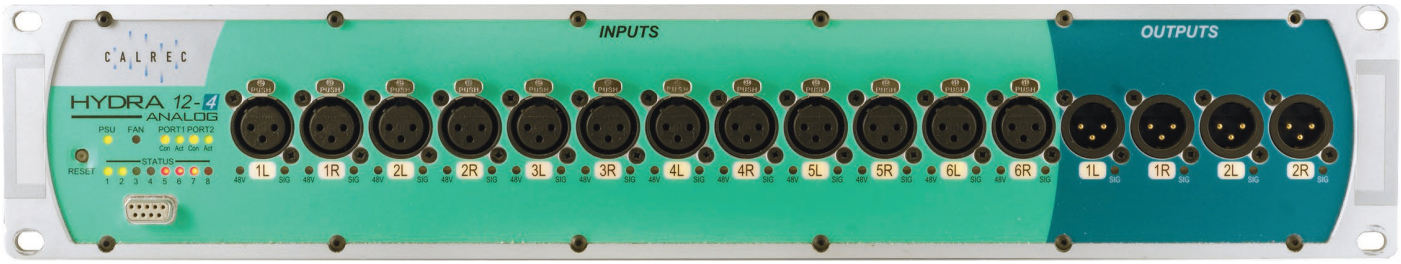
Today, broadcasters demand even more versatility and integration from their audio equipment, and in this technologically-progressive era TV companies want to ensure that their systems can produce programmes efficiently and to required specifications. For their audio systems to achieve this, greater consideration has to be given to their networks as a whole, and how efficiently they can be controlled. Calrec has designed its range of consoles to meet these demands.

Consistently pushing technology barriers, the Apollo platform introduced Bluefin2, the next generation of award-winning Bluefin technology. It provides over 1000 channel processing paths on just one DSP card. For surround sound mixing it is the industry's most advanced and economical solution. In the Apollo, Artemis and Summa consoles, and the Hydra2 network, Calrec provides intelligent solutions for easily sharing network I/O resources and control data.

This Product Guide provides detailed descriptions for Calrec's full range of fixed format and modular Hydra2 units and both 8U and 4U console core options.

For putting sound in the picture, broadcasters trust in Calrec.

I/O OPTIONS – FIXED FORMAT



AD5782

ANALOGUE MIC/LINE 12 IN/4 OUT – XLR

UNIT SPECIFICATIONS

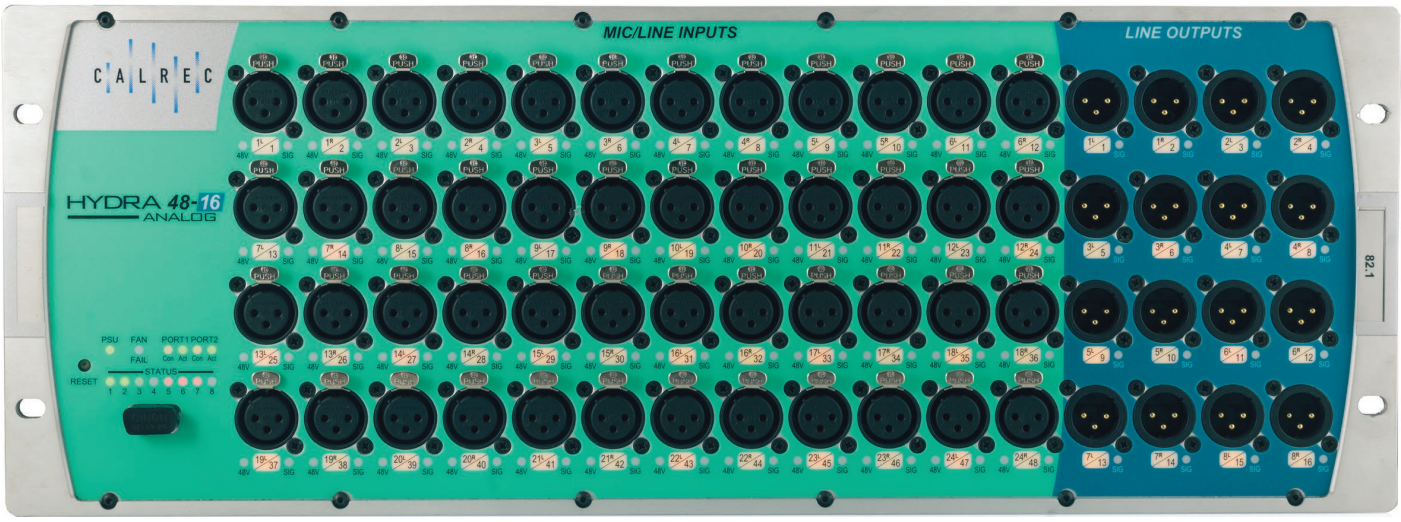
Format	Analogue
Inputs	12 Mic / Line Level, Electronically Balanced
Outputs	4 Line Level, Electronically Balanced (20 Hz–20 kHz Better than -35 dB, typically -45 dB
Audio Connectors	XLR (Inputs – Female, Outputs – Male)
Input Gain Range	-18 dB to +78 dB, remotely controlled per port
Phantom Power	48 V, remotely controlled per port
Input Impedance	2 kΩ @ Mic Level / 10 kΩ @ Line Level (auto-switching)
Output Impedance	<40 Ω
Sensitivity	-18 / -78 dB Mic / Line inputs
Equivalent Input Noise	-127 dB (150 Ω source)
Distortion (input)	-1 dBFS @ 1 kHz – Better than 0.003% -20 dBFS @ 1 kHz – Better than 0.006% -60 dBFS – Better than 0.3%
Frequency Response (input)	20 Hz–20 kHz +/- 0.5 dB on Mic/Line inputs
Frequency Response (output)	20 Hz–20 kHz +/- 0.25 dB
Input CMR (Common Mode Rejection)	>75 dB (Typical 85 dB) on Mic/Line inputs
ADC / DAC	24 bit
GPIO Compatible	Yes (SW5739)
Height	2U
Width	19” rackmount (483 mm)
Depth	9” (230 mm)
Depth inc. rear mating connectors	12” (300 mm)
Approximate Weight	11.5 lbs (5.2 kg)
Input Power	100-240 V AC, 0.45-0.25 A RMS, 50/60 Hz
Acoustic Noise	26 dB-SPL A-Weighted, 1 m from source

AD5781

ANALOGUE MIC/LINE 24 IN/8 OUT – XLR

UNIT SPECIFICATIONS

Format	Analogue
Inputs	24 Mic / Line Level, Electronically Balanced
Outputs	8 Line Level, Electronically Balanced (20 Hz–20 kHz Better than -35 dB, typically -45 dB
Audio Connectors	XLR (Inputs – Female, Outputs – Male)
Input Gain Range	-18 dB to +78 dB, remotely controlled per port
Phantom Power	48 V, remotely controlled per port
Input Impedance	2 kΩ @ Mic Level / 10 kΩ @ Line Level (auto-switching)
Output Impedance	<40 Ω
Sensitivity	-18 / -78 dB Mic / Line inputs
Equivalent Input Noise	-127 dB (150 Ω source)
Distortion (input)	-1 dBFS @ 1 kHz – Better than 0.003% -20 dBFS @ 1 kHz – Better than 0.006% -60 dBFS – Better than 0.3%
Frequency Response (input)	20 Hz–20 kHz +/- 0.5 dB on Mic/Line inputs
Frequency Response (output)	20 Hz–20 kHz +/- 0.25 dB
Input CMR (Common Mode Rejection)	>75 dB (Typical 85 dB) on Mic/Line inputs
ADC / DAC	24 bit
GPIO Compatible	Yes (SW5739)
Height	2U
Width	19” rackmount (483 mm)
Depth	9” (230 mm)
Depth inc. rear mating connectors	12” (300 mm)
Approximate Weight	12.5 lbs (5.7 kg)
Input Power	100-240 V AC, 0.6-0.31 A RMS, 50/60 Hz
Acoustic Noise	26 dB-SPL A-Weighted, 1 m from source

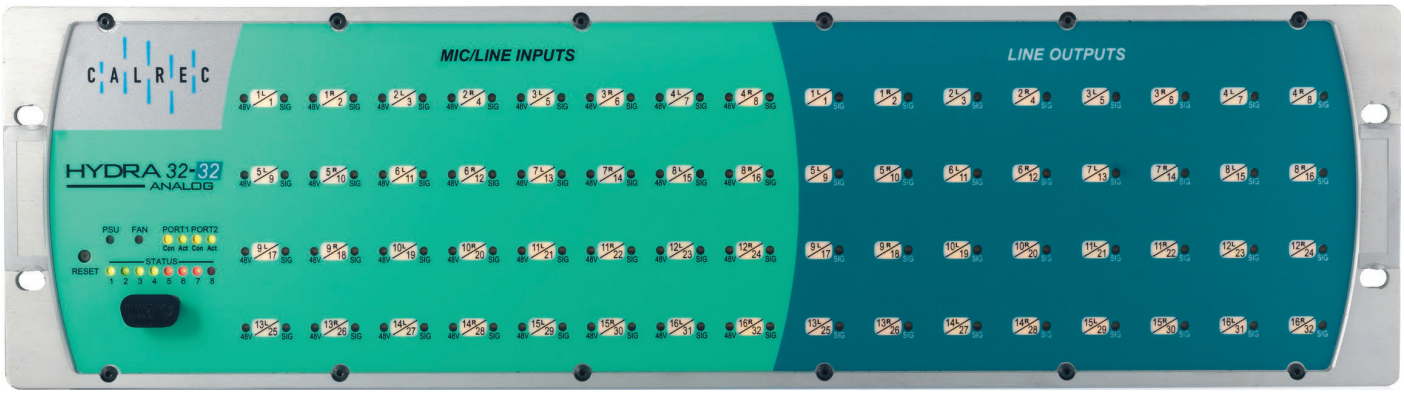


AD5780

ANALOGUE MIC/LINE 48 IN/16 OUT – XLR

UNIT SPECIFICATIONS

Format	Analogue
Inputs	48 Mic / Line Level, Electronically Balanced
Outputs	16 Line Level, Electronically Balanced (20 Hz–20 kHz Better than -35 dB, typically -45 dB
Audio Connectors	XLR (Inputs – Female, Outputs – Male)
Input Gain Range	-18 dB to +78 dB, remotely controlled per port
Phantom Power	48 V, remotely controlled per port
Input Impedance	2 kΩ @ Mic Level / 10 kΩ @ Line Level (auto-switching)
Output Impedance	<40 Ω
Sensitivity	-18 / -78 dB Mic / Line inputs
Equivalent Input Noise	-127 dB (150 Ω source)
Distortion (input)	-1 dBFS @ 1 kHz – Better than 0.003% -20 dBFS @ 1 kHz – Better than 0.006% -60 dBFS – Better than 0.3%
Frequency Response (input)	20 Hz–20 kHz +/- 0.5 dB on Mic/Line inputs
Frequency Response (output)	20 Hz–20 kHz +/- 0.25 dB
Input CMR (Common Mode Rejection)	>75 dB (Typical 85 dB) on Mic/Line inputs
ADC / DAC	24 bit
GPIO Compatible	Yes (SW5739)
Height	4U
Width	19" rackmount (483 mm)
Depth	9" (230 mm)
Depth inc. rear mating connectors	12" (300 mm)
Approximate Weight	16.1 lbs (7.3 kg)
Input Power	100-240 V AC, 1.05–0.51 A RMS, 50/60 Hz
Acoustic Noise	27 dB-SPL A-Weighted, 1 m from source



AE5743, AE5991, AE5992

ANALOGUE MIC/LINE 32 IN/32 OUT – EDAC

Standard connector layout (AE5743), Alpha cabling compatible (AE5991) and 12 interfaces per connector (AE5992)

UNIT SPECIFICATIONS

Format	Analogue
Inputs	32 Mic / Line Level, Electronically Balanced
Outputs	32 Line Level, Electronically Balanced (20 Hz–20 kHz Better than -35 dB, typically -45 dB
Audio Connectors	EDAC
Input Gain Range	-18 dB to +78 dB, remotely controlled per port
Phantom Power	48 V, remotely controlled per port
Input Impedance	2 kΩ @ Mic Level / 10 kΩ @ Line Level (auto-switching)
Output Impedance	<40 Ω
Sensitivity	-18 / -78 dB Mic / Line inputs
Equivalent Input Noise	-127 dB (150 Ω source)
Distortion (input)	-1 dBFS @ 1 kHz – Better than 0.003% -20 dBFS @ 1 kHz – Better than 0.006% -60 dBFS – Better than 0.3%
Frequency Response (input)	20 Hz–20 kHz +/- 0.5 dB on Mic/Line inputs
Frequency Response (output)	20 Hz–20 kHz +/- 0.25 dB
Input CMR (Common Mode Rejection)	>75 dB (Typical 85 dB) on Mic/Line inputs
ADC / DAC	24 bit
GPIO Compatible	Yes (SW5739)
Height	3U
Width	19" rackmount (483 mm)
Depth	9" (230 mm)
Depth inc. rear mating connectors	12" (300 mm)
Approximate Weight	11.5 lbs (5.2 kg)
Input Power	100-240 V AC, 1.05-0.51 A RMS, 50/60 Hz
Acoustic Noise	27 dB-SPL A-Weighted, 1 m from source

AD6300 EXTERNAL I/O RACK FOR BRIO AND SUMMA

BR-IO is a 4U Hydra2 based external I/O Rack allowing for cost effective expansion of I/O for use with Brio and Summa consoles.

It is intended to be placed in control/ equipment rooms, trucks, studios, and even outdoor use providing the user provides appropriate protection against the elements (flight-cases / covers / general protection).

This rack has the same complement of internal analogue and digital I/O that can be found in a Brio 36 system.

External I/O Rack Audio Interfaces
The image below shows the BR-IO rack and the Audio interfaces available to the user from this I/O Rack are:-

24 x Analogue Mic/Line I/Ps,
16 x Analogue Line O/Ps,
8 x Digital AES I/Ps, with SRC,
8 x Digital AES O/Ps.

The Audio Specifications for the Analogue and Digital inputs and outputs are the same as those built-in to the Brio 36.

Port Patching Identification
The BR-IO has it's own ICON which appears in the I/O Boxes patching pages.

The analogue inputs and outputs are prefixed by the Letter 'A' in the port patching pages and the digital inputs and outputs are prefixed by the letter 'B' for patching purposes.

For example, where the box ID is set to 434 then Analogue Mic/Line Input 3 would be identified as 434A-03. See below for a I/O Box / Port Patching example.

Hydra2 interfacing
The interface controller on the right hand side of the front panel of the unit connects the I/O to the optional Hydra2 module in a Brio 36 system either directly or via a H2Hub.

Alternatively it can be connected to a Summa Core for use with Summa.

Two Hydra2 'Light' based interface ports are provided on the BR-IO rack for redundancy:-

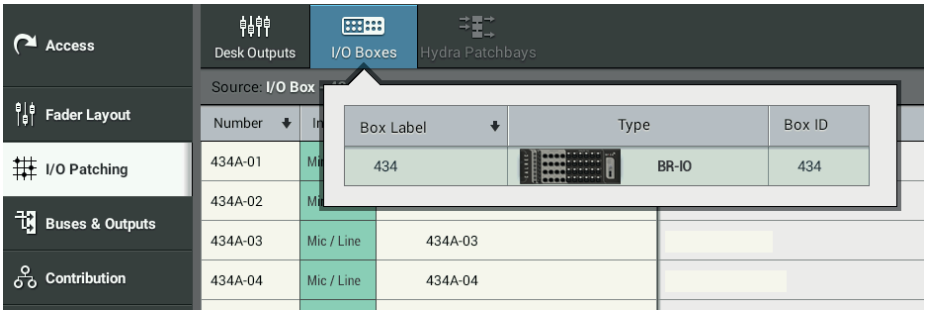
Port 1 connects to the Primary H2 connection on a Brio 36 or Summa

Port 2 connects to the Secondary Hydra 2 connection on the same Brio 36 or Summa

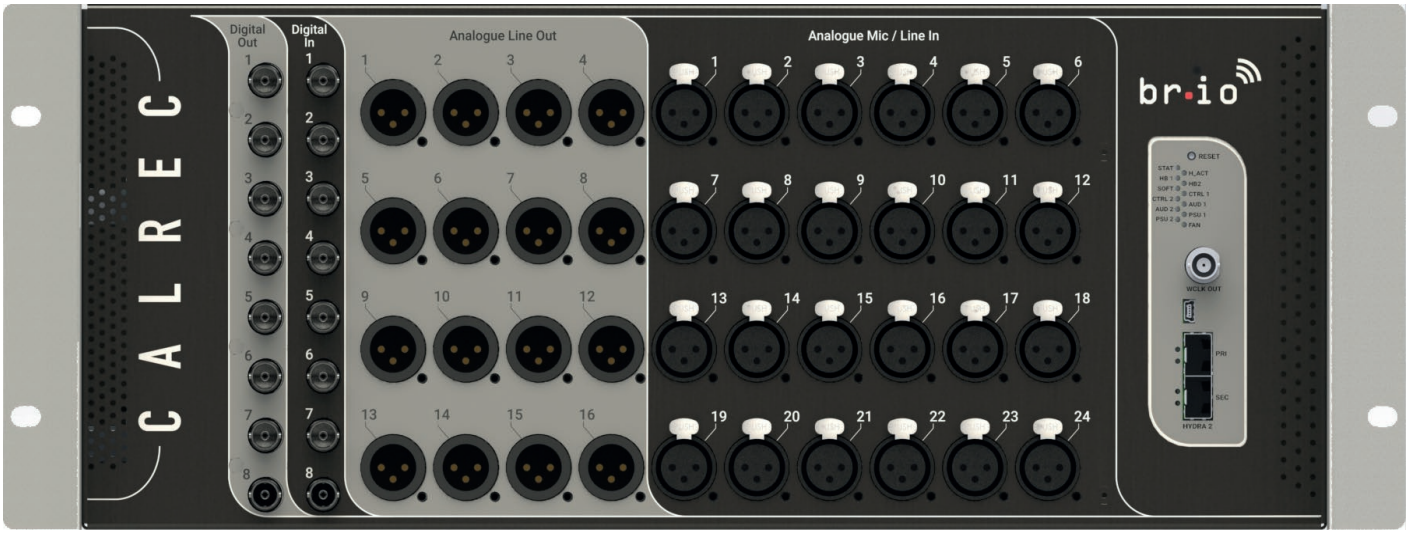
Multiple BR-IO units may be added via a H2 Hub along with other I/O boxes from the Hydra2 range.

Hydra2 based network components interface via pluggable SFP modules, the correct type of SFP should be ordered to match the installation requirements.

BR-IO PORT PATCHING EXAMPLE



AD6300 - BR-IO EXTERNAL I/O RACK.



FIELDBOX - FRONT VIEW

AD6217-2

FIELDBOX 8 IN (XLR)/ 8 OUT ANALOGUE (D-TYPE) "TASCAM" STANDARD

The Fieldbox provides 8 balanced analogue mic/line level inputs, and 8 balanced analogue line level outputs, in a compact, cost-effective package.

Enclosure

The Fieldbox is 220mm wide x 384mm deep x 40mm (<1U) high. Threaded fixing holes in the base allow the unit to be secured in place if required.

Cooling

This is a fanless design that is cooled through natural convection and radiation. If not being used in a cooled environment, please allow for 45mm (1.75') clearance on the top and sides from other heat generating equipment.

Power

The Fieldbox contains a single AC mains PSU that can be fed 100-240V AC via a rear mounted IEC connector. The IEC connector has a retaining clip that can hold some types of IEC cables in place. The cable supplied with the unit has a built in latching mechanism and does not need to be clipped in place.

A 10-30V DC input allows an optional external PSU to be connected to provide power redundancy if required.

Battery powered operation

The DC input is also suitable for use with batteries. Batteries can be used as a backup to the internal AC supply, or as the primary power source. There is no drain on the battery whilst the unit is fed with AC, yet switch-over from AC to DC is seamless.

System Status warnings are issued across the network and front panel LED indication is provided if the battery level is low.

A wide range of suitable batteries are commonly available from broadcast suppliers. Costs vary significantly based on run time and other factors. Calrec recommends the use of Anton Bauer G150 batteries in conjunction with their QR-UNIV XLR mount to provide a runtime in excess of 12 hours. 'Hot-swap' battery mounts are also available to fit 2 batteries that can be individually swapped out without interrupting operation.

The DC input is protected by ISO 7637-2 circuitry against surges, reverse polarity and other external power faults.

Hydra2 network connection

A pair of rear mounted SFP slots provide primary and secondary connections for a Hydra2 network. Various fibre and copper SFP modules can be supplied.

Note that SFP design varies depending on manufacturer, please ensure that SFPs are correctly latched in place after fitting them. In the event that a connection is not automatically established after hot-plugging an SFP, please reset the unit the SFP is plugged in to.

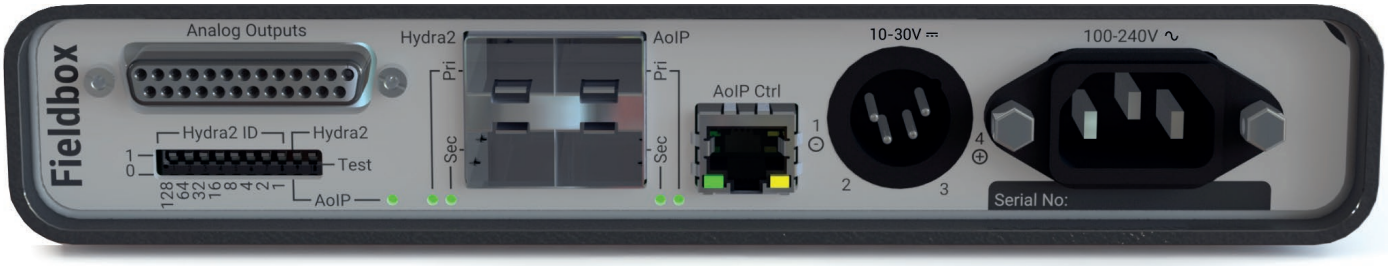
Like all other Hydra2 I/O, the Fieldbox must be given an ID, unique amongst all the I/O on the network, before being connected. The ID is a value from 1 to 255, set as a binary representation using DIP switches accessible from the rear.

For further guidance, please refer to the I/O Box Identification section, under Fixed Format I/O in the Hydra2 Installation manual.

Another DIP switch accessible from the rear sets whether the unit is to network via Hydra2 or AoIP. Please ensure this switch is set to the Hydra2 position for normal operation.

AoIP

A card slot within the unit will allow for future upgrades to AoIP networking. More information on AoIP connectivity will be provided when module options are available.



FIELDBOX - REAR VIEW

STATUS LEDS

Power AC	Lights solid green when internal PSU is active.
Power DC	Light solid green when DC input valid. Flashes when outside of range.
OK	Flashes green heartbeat when connected and running. Fast flashing indicates boot/establishing comms.
+48V	One per input, lights solid red when phantom power switched on
AoIP (Rear)	Lights green if set to connect to a non Hydra2 network
Pri / Sec SFP (Rear)	Indicates network activity

DC INPUT CONNECTOR - 4 PIN XLR

Pin 1	- V DC
Pin 4	+ V DC (10-30V)

- Unit connector is male, the connecting cable requires female termination.

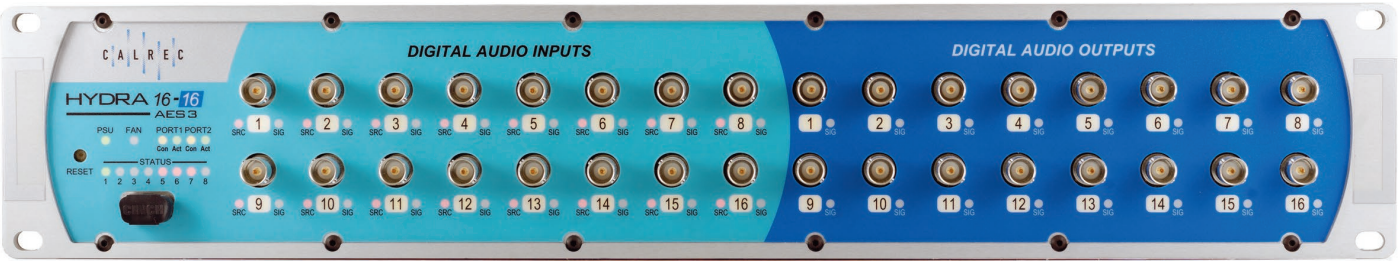
OUTPUT AUDIO CONNECTOR - 25 PIN D-TYPE, AES59 / 'TASCAM' STANDARD

Signal	Pins (+ , - , Gnd)
O/P 1	24, 12, 25
O/P 2	10, 23, 11
O/P 3	21, 9, 22
O/P 4	7, 20, 8
O/P 5	18, 6, 19
O/P 6	4, 17, 5
O/P 7	15, 3, 16
O/P 8	1, 14, 2

- Unit connector is female, the connecting cable requires male termination.

SPECIFICATION

Format	Analogue, electronically balanced
I/O	8 x Mic/line inputs + 8 x line level outputs.
Input Gain	-18 to +78dB, remotely controlled
Phantom Power	+48V remotely switchable
Input Impedance	5k
Equiv I/P noise	-126dBu
Input distortion	-1dBFS @ 1kHz - <0.004% -20dBFS @1kHz - <0.006% -60dBFS @1kHz - <0.6%
Input CMR	>80dB @1kHz
ADC/DAC	24 bit
Output balance	> 45 dB
Output impedance	<40 Ohms
GPIO	None
Height	< 1U - 40mm (1.6')
Width	220mm (8.7')
Depth	384mm (15.2')
Weight	2.5kg (5.5lbs)
AC input power	100-240V AC, 0.34-0.16A RMS, 50/60Hz, Supply current - 0.16A @ 240V, 0.30A @ 115V, 0.34A @ 100V
DC input power	10 - 30V DC, 20VA max. Supply current - 1.67A @ 12V, 0.83A @ 24V
Power dissipation (heat)	20W when fed DC 24W when fed 115-240V AC, 24.5W @ 100V AC
Operating ambient air temperature	0-40 C

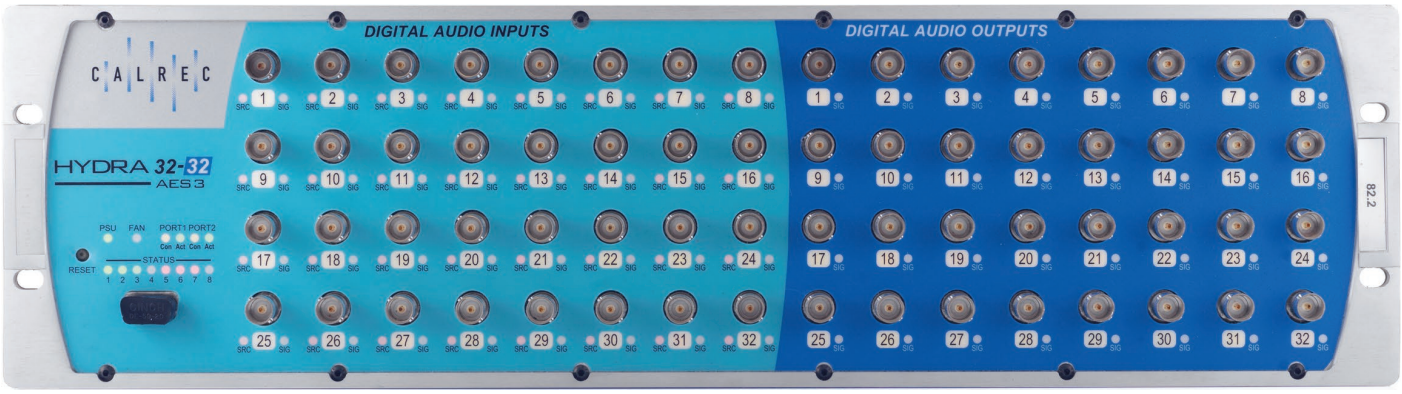


JB5606

DIGITAL AES3 16 IN/16 OUT – BNC

UNIT SPECIFICATIONS

Format	Digital AES3 unbalanced
Inputs	16
Outputs	16
Audio Connectors	BNC
Impedance	75 Ω
Input Signal Range	0.3–1.2 V Pk–Pk
Output Signal	1 V Pk–Pk (nominal)
Signal to Noise Ratio (SNR)	22 Hz to 20 kHz – Better than -120 dB
Digital to Digital (AES3) Distortion	-1 dBFS, 20 Hz to 10 kHz – Better than 0.0001%
Digital to Digital (AES3 with SRC) Distortion	-1 dBFS, 20 Hz to 10 kHz – Better than 0.0002%
Fader Off Isolation	22 Hz to 22 kHz – Better than -132 dB
Sample rate conversion (SRC)	24-Bit switchable on all AES inputs
SRC THD+N	-117 dB @ 1 kHz, 0.00014%
GPIO compatible	Yes (SW5739)
Height	2 U
Width	19” rackmount (483 mm)
Depth	9” (230 mm)
Depth inc rear mating connectors	12” (300 mm)
Approx Weight	8.6 lbs (3.9 kg)
Input Power	100–240 V AC, 0.24–0.13 A RMS, 50/60 Hz
Acoustic Noise	26 dB-SPL A-Weighted, 1 m from source

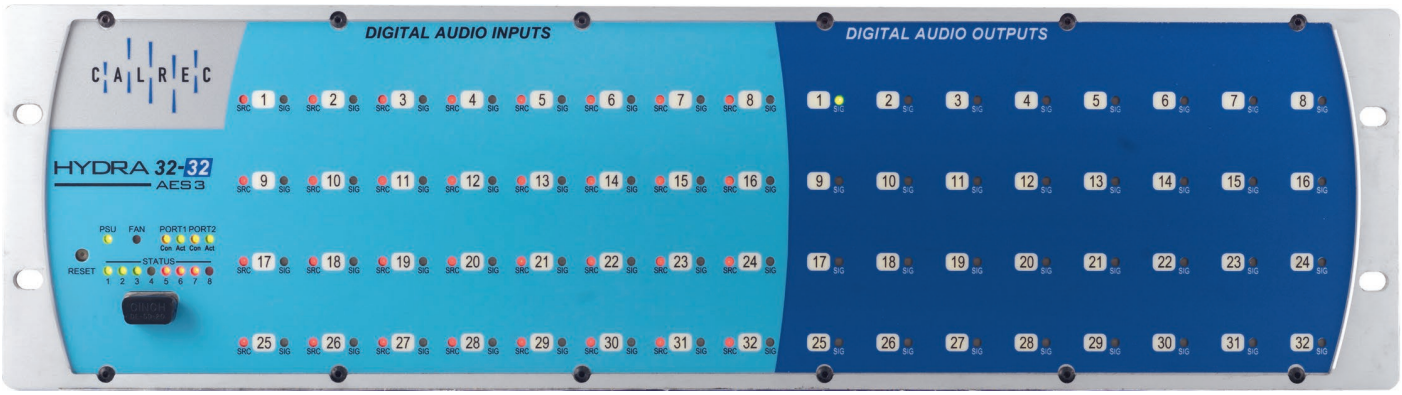


JB5783

DIGITAL AES3 32 IN/32 OUT – BNC

UNIT SPECIFICATIONS

Format	Digital AES3 unbalanced
Inputs	32
Outputs	32
Audio Connectors	BNC
Impedance	75 Ω
Input Signal Range	0.3–1.2 V Pk–Pk
Output Signal	1 V Pk–Pk (nominal)
Signal to Noise Ratio (SNR)	22 Hz to 20 kHz – Better than -120 dB
Digital to Digital (AES3) Distortion	-1 dBFS, 20 Hz to 10 kHz – Better than 0.0001%
Digital to Digital (AES3 with SRC) Distortion	-1 dBFS, 20 Hz to 10 kHz – Better than 0.0002%
Fader Off Isolation	22 Hz to 22 kHz – Better than -132 dB
Sample rate conversion (SRC)	24-Bit switchable on all AES inputs
SRC THD+N	-117 dB @ 1 kHz, 0.00014%
GPIO compatible	Yes (SW5739)
Height	3 U
Width	19” rackmount (483 mm)
Depth	9” (230 mm)
Depth inc rear mating connectors	12” (300 mm)
Approx Weight	14.3 lbs (6.5 kg)
Input Power	100–240 V AC, 0.38–0.20 A RMS, 50/60 Hz
Acoustic Noise	26 dB-SPL A-Weighted, 1 m from source

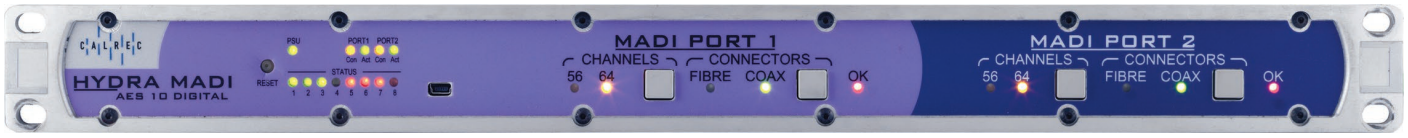


JB5962

DIGITAL AES3 REAR MOUNT 32 IN/32 OUT - BNC

UNIT SPECIFICATIONS

Format	Digital AES3 unbalanced
Inputs	32
Outputs	32
Audio Connectors	BNC
Impedance	75 Ω
Input Signal Range	0.3–1.2 V Pk–Pk
Output Signal	1 V Pk–Pk (nominal)
Signal to Noise Ratio (SNR)	22 Hz to 20 kHz – Better than -120 dB
Digital to Digital (AES3) Distortion	-1 dBFS, 20 Hz to 10 kHz – Better than 0.0001%
Digital to Digital (AES3 with SRC) Distortion	-1 dBFS, 20 Hz to 10 kHz – Better than 0.0002%
Fader Off Isolation	22 Hz to 22 kHz – Better than -132 dB
Sample rate conversion (SRC)	24-Bit switchable on all AES inputs
SRC THD+N	-117 dB @ 1 kHz, 0.00014%
GPIO compatible	No
Height	3 U
Width	19” rackmount (483 mm)
Depth	9” (230 mm)
Depth inc rear mating connectors	12” (300 mm)
Approx Weight	14.3 lbs (6.5 kg)
Input Power	100–240 V AC, 0.38–0.20 A RMS, 50/60 Hz
Acoustic Noise	26 dB-SPL A-Weighted, 1 m from source



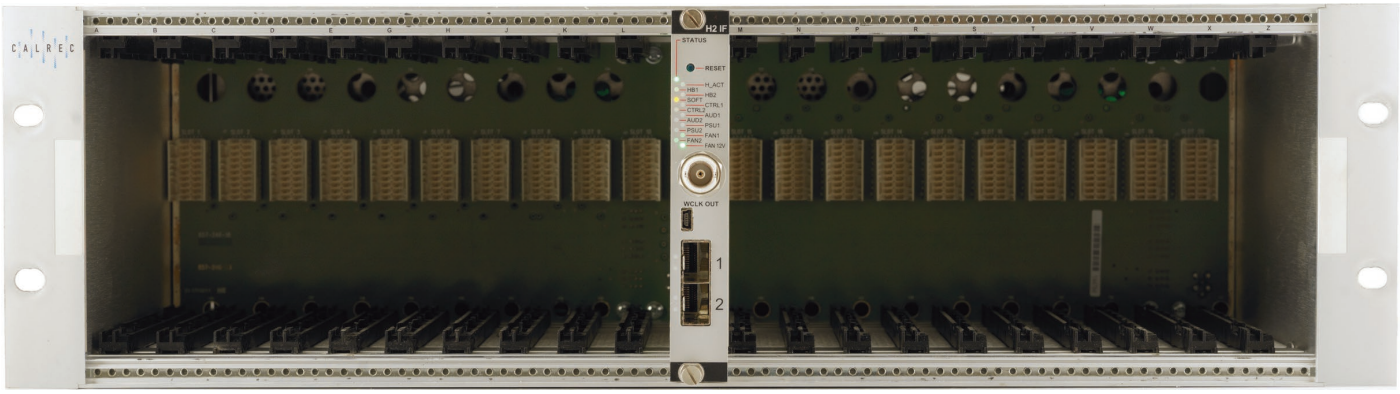
JM5736, JM5831, JM5890

DUAL MADI

UNIT SPECIFICATIONS

Format	MADI (AES10)
Inputs	2 x MADI (2 x 64 / 56 channels)
Outputs	2 x MADI (2 x 64 / 56 channels)
Audio Connectors	BNC and: JM5736 – Multimode SC Fibre JM5831 – Singlemode SC Fibre JM5890 – Multimode ST Fibre
GPIO compatible	No
Height	1 U
Width	19” rackmount (483 mm)
Depth	9” (230 mm)
Depth inc. rear mating connectors	12” (300 mm)
Approximate Weight	7.5 lbs (3.4 kg)
Input Power	100–240 V AC, 0.20–0.12 A RMS, 50/60 Hz
Acoustic Noise	N/A – No fans fitted in this unit

I/O OPTIONS – MODULAR



Modular I/O boxes are 3U rack-mount enclosures with 20 I/O card slots that can be populated with a mixed range of I/O cards, allowing for a custom selection of I/O quantities and formats.

Modular I/O boxes connect to a Hydra2 network in the same way as Fixed Format I/O. Multiple modular I/O boxes can coexist on a Hydra2 network alongside fixed format I/O if required in order to make up the total quantity of I/O in the format and location it is needed.

Power

Each modular I/O box is fitted with 2 x rear mounted AC PSUs, each with their own AC IEC input operating from 100–240V AC 50/60 Hz. Either PSU can power the whole box, two are fitted in order to provide redundancy. Where possible, each PSU should be fed from a separate AC source in order to provide redundancy against both PSU failure, and external AC mains loss. Input power (maximum) 100–240 VAC, 1.52–0.68A RMS, 50/60 Hz.

Earthing

Chassis earth studs are fitted to each PSU cover. These should be connected to ground using earth cable of at least 6mm^2 cross-section (10 AWG).

Airflow and mounting

The unit is a 19" rack-mount enclosure designed for mounting into standard equipment bays. Rear/side supports should be considered in order to avoid excessive stress on the front racking angles, particularly if fitted into a mobile installation.

A recessed air-intake grill runs across the bottom of the box. The box can be mounted directly under, or on top of another unit or surface—the recessed design of the intake allows sufficient air to be drawn in from the sides (see diagram) to cool the box. Both side facing inlets should be left unobstructed.

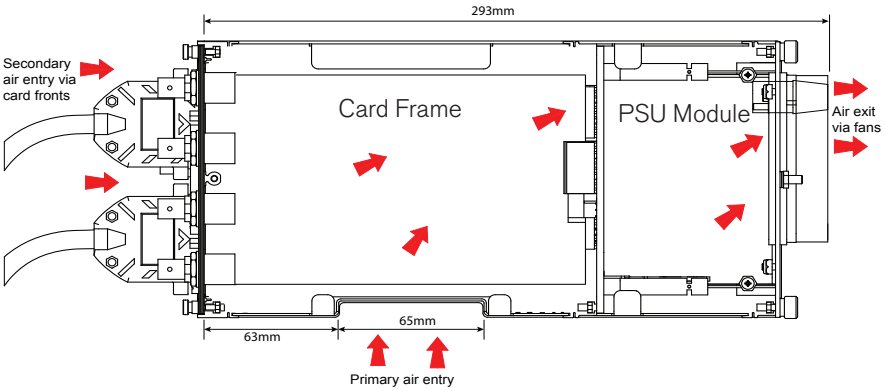
Low noise fans fitted to the PSU modules pull air through the box, venting to the rear. To minimize fan noise and longevity, modular I/O fan speed is varies depending on the temperature within the box.

Hydra2 interface card

The central card slot of a modular I/O box is reserved for a Hydra2 interface card. This card connects the I/O to a Hydra2 network. Unlike fixed format I/O, the Hydra2 interface connectors are on the front of the modular I/O box.

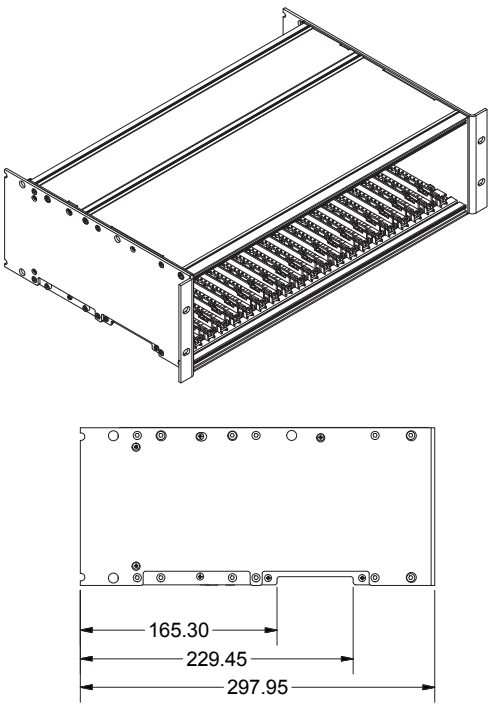
Two Hydra2 interface ports are provided for redundancy—port 1 connects to a primary Calrec router, port 2 to the secondary router in the same core. The Hydra2 interface is via pluggable SFP modules, the correct type of SFP should be ordered to match the installation requirements—Cat5e copper, singlemode, or mulitmode fibre. Please refer to the section on SFPs in the Installation manuals for more detail.

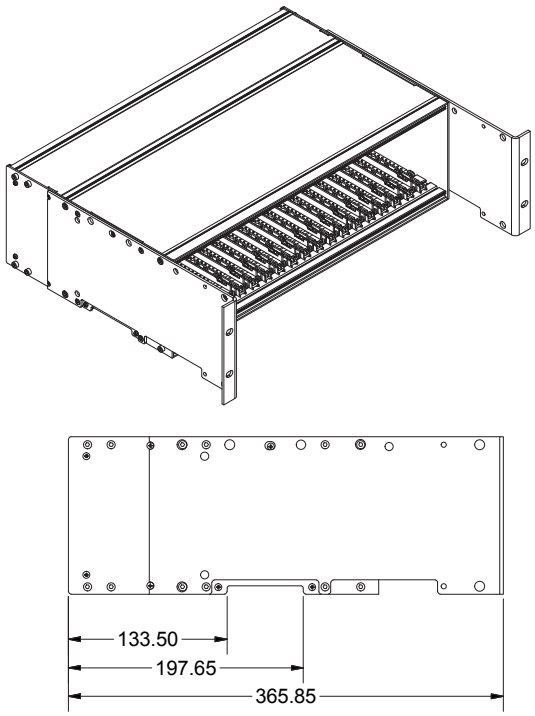
The table on the following page provides an overview of the modular I/O cards which are currently available. More detailed information is provided in the following sections.



Card Type	Code	Connector Type	Inputs	Outputs
8 Analogue Line Inputs	AD5838	D-Type	8	0
8 Analogue Mic/Line Inputs	AD6057	D-Type	8	0
4 Mic/Line Inputs	AD5840	XLR	4	0
4 Transformer Mic/Line Inputs	AD6365	XLR	4	0
2 Mic/Line Inputs + Splits	AL5870	XLR	2	2
Waves Soundgrid	BI6218	RJ45	64	64
Dante with Network Redundancy	BI6192	RJ45	64	64
8 Analogue Line Outputs	DA5839	D-Type	0	8
4 Analogue Line Outputs	DA5867	XLR	0	4
4 Digital AES Inputs Unbalanced	JB5860	BNC	4	0
4 Digital AES Inputs Balanced	JX5869	XLR	4	0
8 Inputs, 8 Outputs Digital AES	JD5842	D-Type	8	8
4 Digital AES Outputs Unbalanced	JB5837	BNC	0	4
4 Digital AES Outputs Balanced	JX5868	XLR	0	4
MADI AES 10	JM6199	BNC+SFP	64/56	64
2 x SDI Embedder	VI5872	BNC	2	2
2 x SDI De-Embedder	VO5841	BNC	2	2
GPIO 8 Inputs, 8 Full Changeover Outputs	WY5858	D-Type	8	8
GPIO 8 Inputs, 16 Outputs	WY5859	D-Type	8	16
Blanking Plate	NN5866	N/A	N/A	N/A

Modular I/O boxes can be recessed if required:





AD5838

8 X ANALOGUE LINE LEVEL INPUTS (D-TYPE)

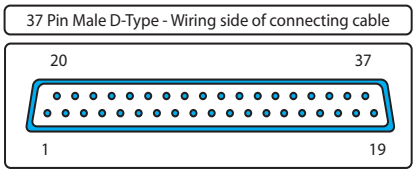
The AD5838 provides 8 balanced line level analogue inputs to the Hydra2 network in a 1 slot-wide module. The audio interface is via a 37 pin female D-Type connector.

Front panel LEDs indicate audio signal presence for each input, lighting green for signals above -60dBFS.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW

WIRING INFORMATION



Function		Pin
In 1	+	21
	-	3
	Ground	2
In 2	+	23
	-	5
	Ground	4
In 3	+	25
	-	7
	Ground	6
In 4	+	27
	-	9
	Ground	8
In 5	+	29
	-	11
	Ground	10
In 6	+	31
	-	13
	Ground	12
In 7	+	33
	-	15
	Ground	14
In 8	+	35
	-	17
	Ground	16
Ground		18, 20, 36

- Card connector is female, requiring male terminated interface cabling.

SPECIFICATION

Format	Analogue
Type	Balanced Line Level
Inputs	8
Outputs	N/A
Input Impedance	10 kΩ
ADC	24 bit

AD6057

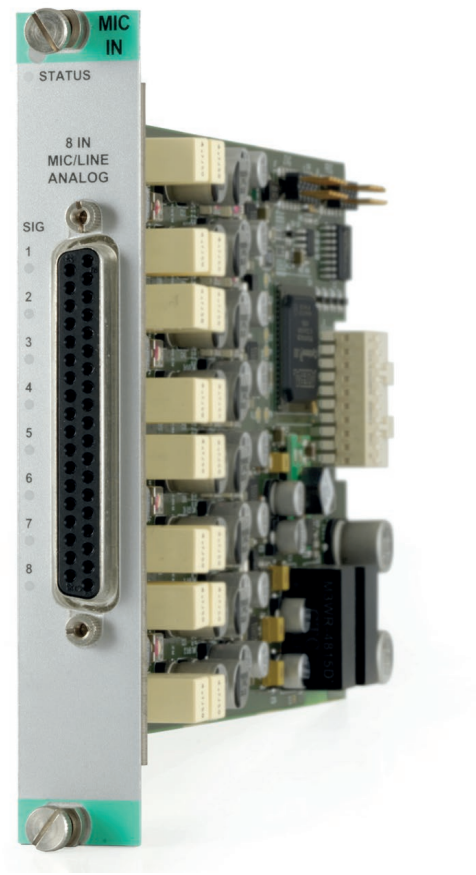
8 X ANALOGUE MIC/LINE LEVEL INPUTS (D-TYPE)

The AD6057 provides 8 balanced mic / line level analogue inputs to the Hydra2 network in a 1 slot-wide module. The audio interface is via a 37 pin female D-Type connector.

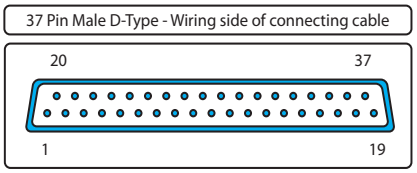
Front panel LEDs indicate audio signal presence for each input, lighting green for signals above -60dBFS.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



WIRING INFORMATION



Function		Pin
In 1	+	21
	-	3
	Ground	2
In 2	+	23
	-	5
	Ground	4
In 3	+	25
	-	7
	Ground	6
In 4	+	27
	-	9
	Ground	8
In 5	+	29
	-	11
	Ground	10
In 6	+	31
	-	13
	Ground	12
In 7	+	33
	-	15
	Ground	14
In 8	+	35
	-	17
	Ground	16
Ground		18, 20, 36

- Card connector is female, requiring male terminated interface cabling.

SPECIFICATION

Format	Analogue
Type	Balanced Mic/Line Level
Inputs	8
Outputs	N/A
Input Gain Range	-18dB to +78dB, remotely controlled per input
Phantom Power	48V remotely switchable per input
Input Impedance	5 kΩ
ADC	24 bit

AD5840

4 X MIC/LINE IN (XLR)

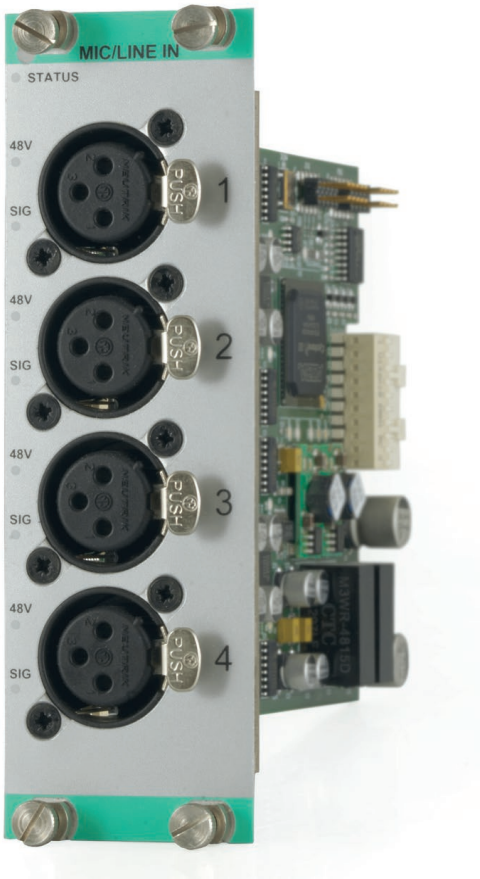
The AD5840 provides 4 balanced mic / line level analogue inputs to the Hydra2 network in a 2 slot-wide module. The audio interface is via 4 female XLR connectors.

Front panel LEDs indicate audio signal presence for each input, lighting green for signals above -60dBFS.

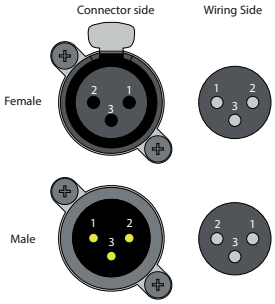
Each input also has front panel LED indicators which light red when 48 V phantom power is on.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



WIRING INFORMATION



Function	Pin
Positive	2
Negative	3
Ground	1

- Card connectors are female, requiring male terminated interface cabling.

SPECIFICATION

Format	Analogue
Type	Balanced Mic/Line Level
Inputs	4
Outputs	0
Input Gain Range	-18 dB to +78 dB, remotely controlled per input
Phantom Power	48 V remotely switchable per input
Input Impedance	2 kΩ @ Mic Level / 10 kΩ @ Line level (auto-switching)
ADC	24 bit

AL5870

2 X MIC/LINE IN WITH SPLITS (XLR)

The AL5870 provides 2 balanced mic / line level analogue inputs to the Hydra2 network along with a pre-gain analogue 'split' output for each input in a 2 slot-wide module. The 2 Input connectors are female XLR, the 2 'split' outputs are male XLR.

The pre gain analogue split outputs are active, irrespective of the Hydra2 interface card status, as long as the I/O box is powered.

Front panel LEDs indicate audio signal presence for each input and split output, lighting green for signals above -60dBFS.

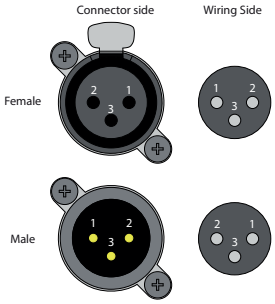
Each input also has front panel LED indicators which light red when 48V phantom power is on.

This module supports phantom power detection, allowing for power to the mic input to be controlled by the device being fed from the split output. This feature is enabled per input / split using PCB mounted DIP switches fitted to the card. When active, if +24V DC or greater is detected on a split output (i.e. phantom power is being fed by the device connected to the split), the card will automatically switch its own phantom power to the corresponding mic input. If phantom power has been switched in this way, the 48 V LED indicator will briefly blink off approximately every two seconds.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW

WIRING INFORMATION



Function	Pin
Positive	2
Negative	3
Ground	1

- Card input connectors are female, requiring male terminated interface cabling.
- Card Split output connectors are male, requiring female terminated interface cabling.

SPECIFICATION

Format	Analogue
Type	Balanced Mic/Line Level
Inputs	2
Outputs	2 (Pre-gain input splits)
Input Gain Range	-18 dB to +78 dB, remotely controlled per input
Phantom Power	48 V remotely switchable per input
Input Impedance	2 kΩ @ Mic Level / 10 kΩ @ Line level (auto-switching)
ADC	24 bit

AD6365

4 X TRANSFORMER ISOLATED MIC/LINE IN (XLR)

The AD6365 provides 4 transformer isolated balanced mic / line level analogue inputs to the Hydra2 network in a 2 slot-wide module. The audio interface is via 4 female XLR connectors.

Transformer based I/O has the benefits of being isolated, and therefore protecting hardware from damage due to adverse currents, reducing susceptibility to noise from poor earthing, and their ability to be fed directly with either a balanced or an unbalanced signal.

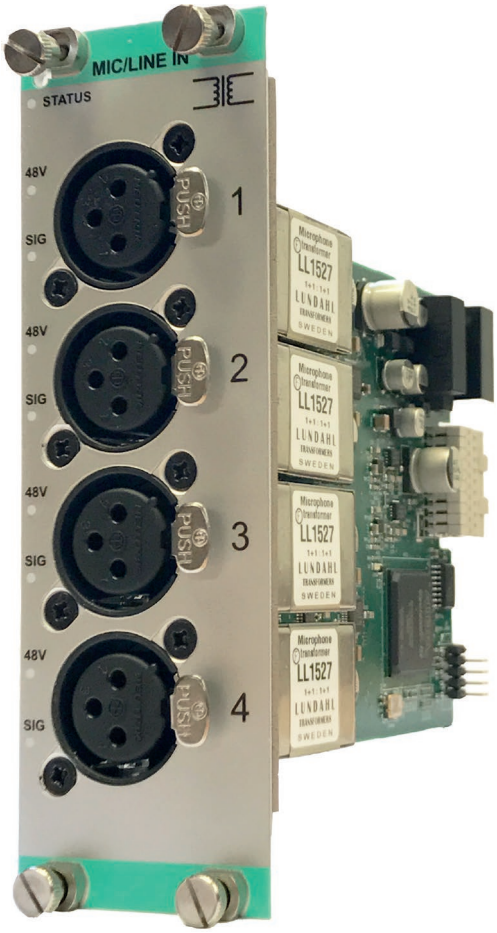
Transformer based circuits provide high performance, with many audiophiles and music production users preferring the "warm" sound brought by transformers.

Front panel LEDs indicate audio signal presence for each input, lighting green for signals above -60dBFS.

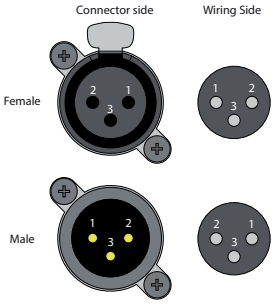
Each input also has front panel LED indicators which light red when 48 V phantom power is on.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



WIRING INFORMATION



Function	Pin
Positive	2
Negative	3
Ground	1

- Card connectors are female, requiring male terminated interface cabling.

SPECIFICATION

Format	Analogue
Type	Transformer Balanced Mic/Line Level
Inputs	4
Outputs	0
Input Gain Range	-18 dB to +78 dB, remotely controlled per input
Phantom Power	48 V remotely switchable per input
Input Impedance	1.6 kΩ @ Mic Level / >6.2 kΩ @ Line level (auto-switching)
ADC	24 bit

BI6218

WAVES SOUNDGRID (RJ45)

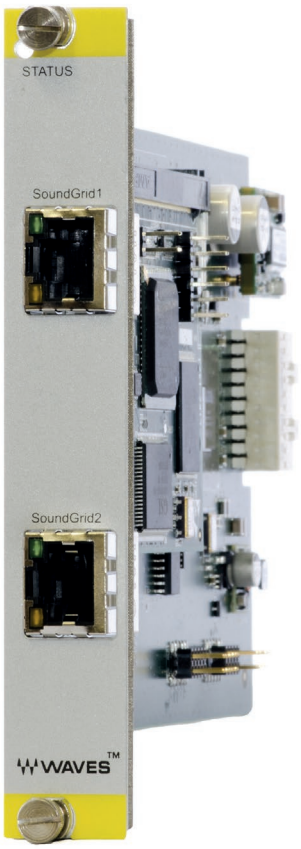
The BI6218 provides 64 outputs from the Hydra 2 network to the SoundGrid network, and 64 inputs to Hydra 2 from SoundGrid at 48 kHz via a single Ethernet cable. .

SoundGrid is an Audio-over-Ethernet networking and processing technology developed by Waves. SoundGrid provides extremely low-latency, high-channel-count audio processing using standard Intel CPUs and 1 Gbps Ethernet networks for studio, live sound, and other real-time professional audio applications.

Real-time audio processing is performed on standard Intel-based plug-in servers, running a Waves-customised real-time version of Linux.

For more information please go to:-
http://www.waves.com/soundgrid-systems

FRONT PANEL VIEW



SPECIFICATION

Format	Digital
Type	SoundGrid
Connector	RJ45
Inputs	64
Outputs	64

BI6192

DANTE WITH NETWORK REDUNDANCY (RJ45)

The BI6192 provides an interface for routing audio in and out of a Hydra2 network into a Dante network. The interface is via RJ45 connectors housed within a 1-slot wide module.

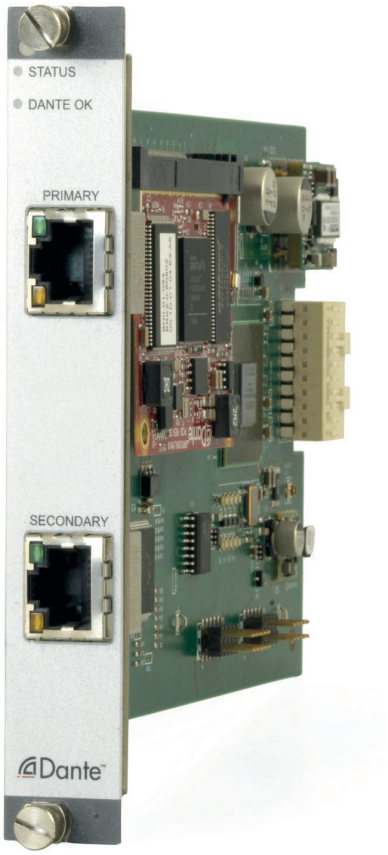
Dante is a self-configuring, plug and play, digital audio networking technology developed by Audinate. Dante uses standard internet protocols. The Calrec Dante modular I/O card operates over Gigabit (Giga/E) Ethernet.

The BI6192 provides 64 input channels and 64 output channels (for a Dante network operating at 48 kHz or 44.1 kHz) or 32 input channels and 32 output channels (for a Dante network operating at 96 kHz) sample-rate converted down to 48kHz with the SRC's permanently enabled on all channels.

Two RJ45 ports (primary and secondary) are provided to give full redundancy on the Dante portion of the network.

For more information please see Audinate's Dante documentation here www.audinate.com/resources/technical-documentation.

FRONT PANEL VIEW



SPECIFICATION

Format	Digital
Type	Dante
Connector	RJ45
Inputs	64 (at 48 kHz or 44.1 kHz), 32 (at 96 kHz)
Outputs	64 (at 48 kHz or 44.1 kHz), 32 (at 96 kHz)

DA5839

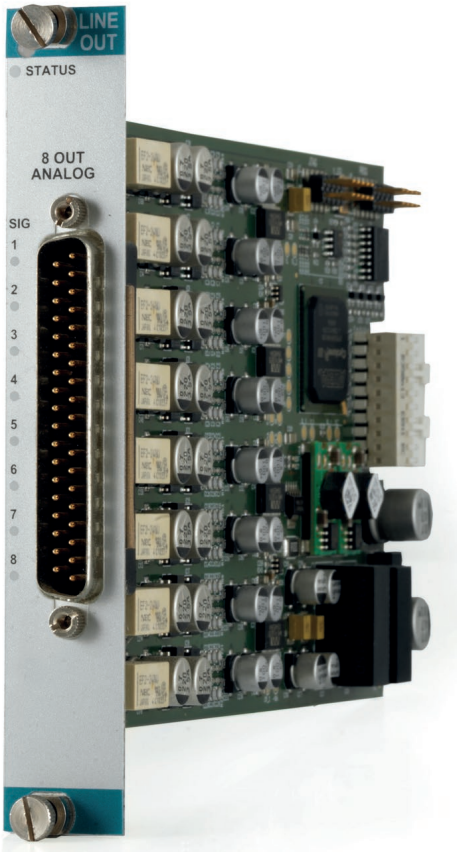
8 X ANALOGUE LINE OUT (D-TYPE)

The DA5839 provides 8 balanced analogue line level outputs from the Hydra2 network in a 1 slot-wide module. The audio interface is via a 37 pin male D-Type connector.

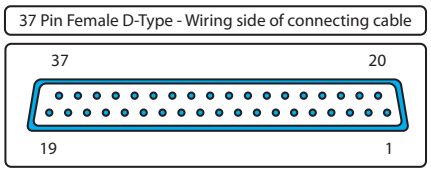
Front panel LEDs indicate audio signal presence for each output, lighting green for signals above -60dBFS.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



WIRING INFORMATION



Function		Pin
Out 1	+	21
	-	3
	Ground	2
Out 2	+	23
	-	5
	Ground	4
Out 3	+	25
	-	7
	Ground	6
Out 4	+	27
	-	9
	Ground	8
Out 5	+	29
	-	11
	Ground	10
Out 6	+	31
	-	13
	Ground	12
Out 7	+	33
	-	15
	Ground	14
Out 8	+	35
	-	17
	Ground	16
Ground		18, 20, 36

- Card connector is male, requiring female terminated interface cabling.

SPECIFICATION

Format	Analogue
Type	Balanced Line Level
Inputs	N/A
Outputs	8
Output Impedance	<40 Ω
DAC	24 bit

DA5867

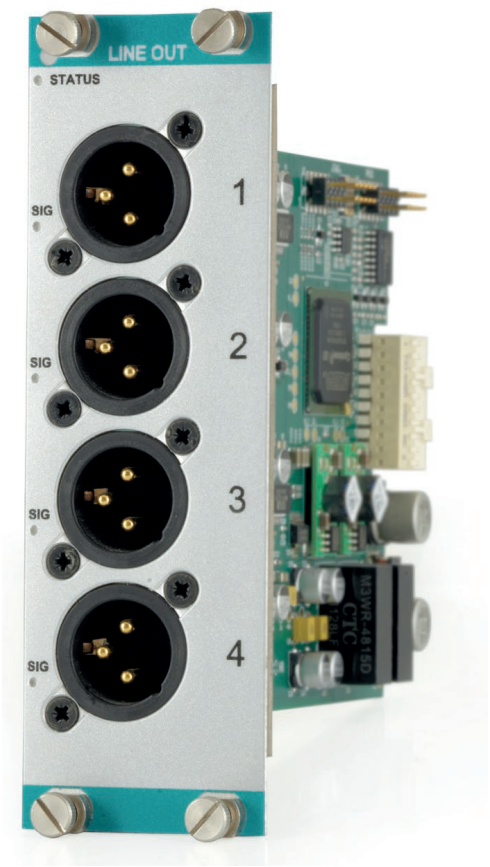
4 X LINE OUT (XLR)

The DA5867 provides 4 balanced analogue line level outputs from the Hydra2 network in a 2 slot-wide module. The audio interface is via the 4 male XLR connectors.

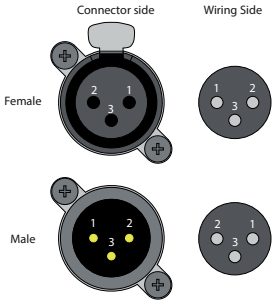
Front panel LEDs indicate audio signal presence for each output, lighting green for signals above -60 dBFS.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



WIRING INFORMATION



Function	Pin
Positive	2
Negative	3
Ground	1

- Card connector is male, requiring female terminated interface cabling.

SPECIFICATION

Format	Analogue
Type	Balanced Line Level
Inputs	0
Outputs	4
Output Impedance	<40 Ω
DAC	24 bit

JB5860

4 X DIGITAL AES INPUT (BNC)

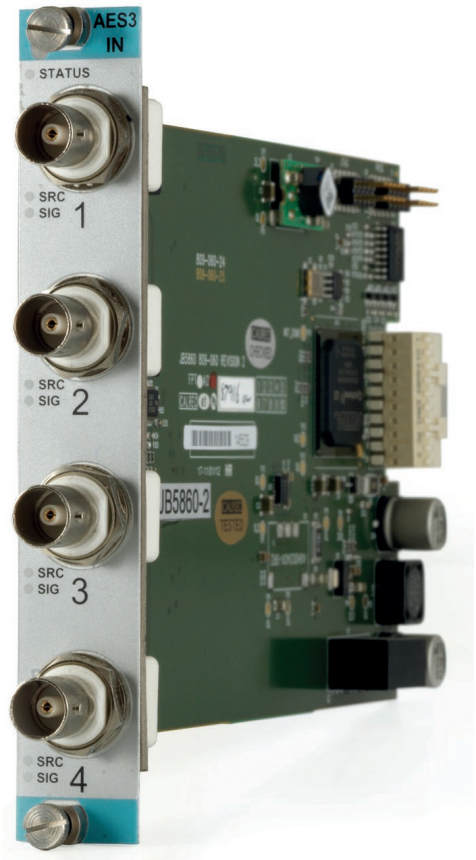
The JB5860 provides 4 unbalanced digital AES3 inputs to the Hydra2 network in a 1 slot-wide module. The audio interface is via the 4 BNC connectors.

Front panel LEDs indicate AES signal presence for each input, lighting green when receiving a valid AES carrier signal (irrespective of audio content).

Each input also has an 'SRC' LED indicator which lights yellow when the sample rate convertor is active.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



SPECIFICATION

Format	Digital
Type	AES3 (75 Ω unbalanced)
Input Range	0.3V-1.2V Pk-Pk
Audio Connector	BNC
Inputs	4
SRC	24 bit, remotely switchable per input.

JX5869

4 X DIGITAL AES INPUT (XLR)

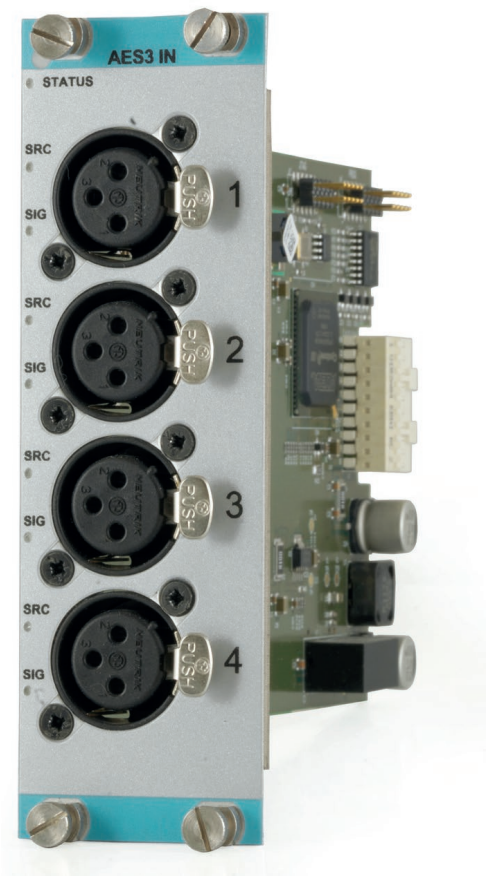
The JB5896 provides 4 balanced digital AES3 inputs to the Hydra2 network in a 2 slot-wide module. The audio interface is via the 4 female XLR connectors.

Front panel LEDs indicate AES signal presence for each output, lighting green when receiving a valid AES carrier signal (irrespective of audio content).

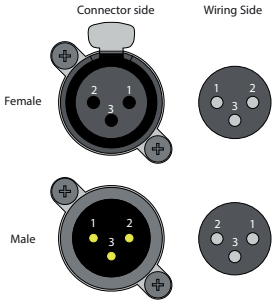
Each input also has an 'SRC' LED indicator which lights yellow when the sample rate convertor is active.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



WIRING INFORMATION



Function	Pin
Positive	2
Negative	3
Ground	1

- Card connector is female, requiring male terminated interface cabling.

SPECIFICATION

Format	Digital
Type	AES3 (110 Ω balanced)
Input Range	0.2 V - 7.0 V Pk-Pk
Audio Connector	Female XLR
Inputs	4
SRC	24 bit, remotely switchable per input.

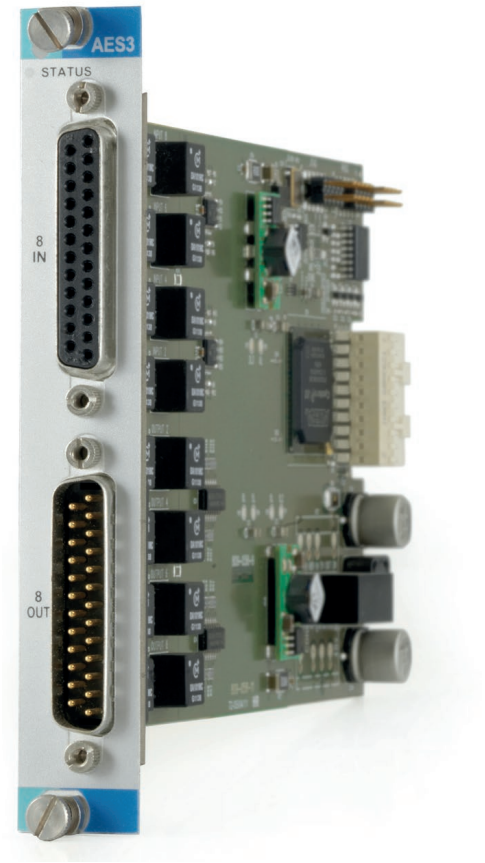
JD5842

8 IN, 8 OUT DIGITAL AES (D-TYPE)

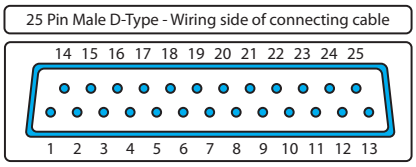
The JD5842 balanced digital AES3 card provides 8 inputs and 8 outputs to / from the Hydra2 network in a 1 slot-wide module. Audio interfacing is via the 2, 25 pin D-Type connectors, female for inputs, male for outputs.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



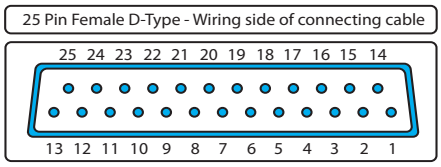
INPUT WIRING INFORMATION



Function		Pin
Input 1	+	14
	-	2
	Ground	1
Input 2	+	3
	-	16
	Ground	15
Input 3	+	17
	-	5
	Ground	4
Input 4	+	6
	-	19
	Ground	18
Input 5	+	20
	-	8
	Ground	7
Input 6	+	9
	-	22
	Ground	21
Input 7	+	23
	-	11
	Ground	10
Input 8	+	12
	-	25
	Ground	24
Ground		13

- Input connector is female, requiring male terminated interface cabling.

OUTPUT WIRING INFORMATION



Function		Pin
Out 1	+	14
	-	2
	Ground	1
Out 2	+	3
	-	16
	Ground	15
Out 3	+	17
	-	5
	Ground	4
Out 4	+	6
	-	19
	Ground	18
Out 5	+	20
	-	8
	Ground	7
Out 6	+	9
	-	22
	Ground	21
Out 7	+	23
	-	11
	Ground	10
Out 8	+	12
	-	25
	Ground	24
Ground		13

- Output connector is male, requiring female terminated interface cabling.

SPECIFICATION

Format	Digital
Type	AES3 (110 Ω balanced)
Input Range	0.2 V - 7.0 V Pk-Pk
Output Voltage	3.5 V nominal into 110 Ω
Audio Connectors	Inputs - 25 pin female D-Type Outputs - 25 pin Male D-Type
Inputs	8
Outputs	8
SRC	24 bit, remotely switchable per input.

JB5837

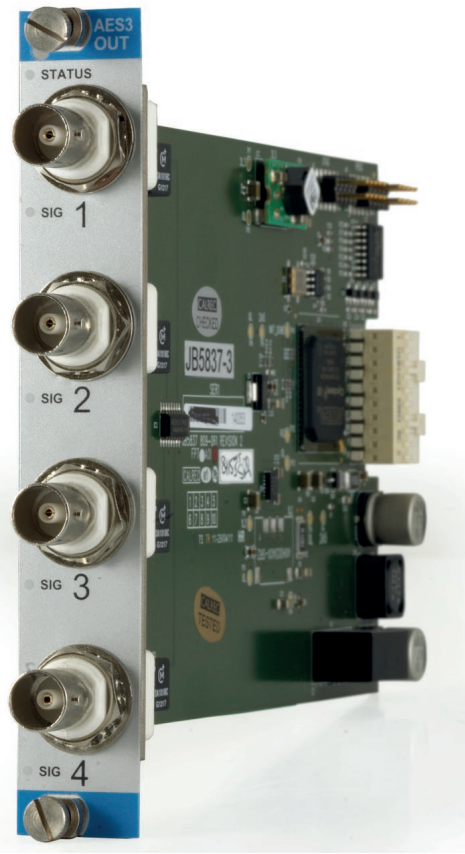
4 X DIGITAL AES OUTPUT (BNC)

The JB5837 provides 4 unbalanced digital AES3 outputs from the Hydra2 network in a 1 slot-wide module. The audio interface is via the 4 BNC connectors.

Front panel LEDs indicate audio presence for each output, lighting green when outputting signal over -60 dBFS.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW



SPECIFICATION

Format	Digital
Type	AES3 (75 Ω unbalanced)
Output	1 V Pk-Pk nominal into 75 Ω
Audio Connector	BNC
Outputs	4

JX5868

4 X DIGITAL AES OUTPUT (XLR)

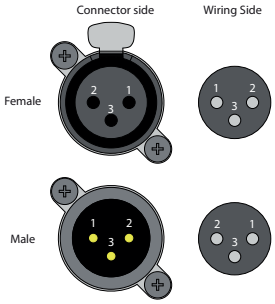
The JX5868 provides 4 balanced digital AES3 outputs from the Hydra2 network in a 1 slot-wide module. The audio interface is via the 4 XLR connectors.

Front panel LEDs indicate audio presence for each output, lighting green when outputting signal over -60 dBFS.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

FRONT PANEL VIEW

WIRING INFORMATION



Function	Pin
Positive	2
Negative	3
Ground	1

- Card connector is male, requiring female terminated interface cabling.

SPECIFICATION

Format	Digital
Type	AES3 (110 Ω unbalanced)
Output	3.5 V Pk-Pk nominal into 110 Ω
Audio Connector	XLR
Outputs	4

JM6199

1 X MADI IN/OUT-AES10 (BNC / SFP)

The JM6199 provides 1 x MADI input stream plus 1 x MADI output stream with independently switchable sample rate converters for both input and output.

The front panel LED provides indication for receiving a valid MADI input and for sample rate converters being active.

Input sources are selectable between BNC copper and SFP. Both BNC and SFP outputs are fed simultaneously with the same signal.

A range of SFPs are available, see Connection Information from page 30 for more details.

FRONT PANEL VIEW

SPECIFICATION

Format	Digital
Type	MADI (AES 10)
Input	1 x 64/56 channel input stream (at 48KHz)
Output	1 x 64 channel output stream (at 48KHz)
Audio Connector	BNC+SFP

VI5872

2 X SDI EMBEDDER (BNC)

The VI5872 provides 2 SDI outputs, into which audio can be embedded from the Hydra2 network. This is a 1 slot-wide module with SDI interfacing via BNC connectors.

Any console, H2O user or 3rd party SW-P-08 controller on the Hydra2 network can select audio to be embedded into the SDI outputs. Each SDI output can carry up to 16 channels of embedded audio.

Each SDI output is paired with an SDI input. A valid SDI signal must be fed into an input connector in order for the corresponding output to function. The output can only pass video content from its corresponding input—video content cannot be re-routed by the Hydra2 system. Any audio in the incoming SDI signal is stripped and discarded—all audio in the output stream is routed from the Hydra2 network. Audio channels within the output stream will be silent unless Hydra2 patches are made to them. If any of the audio content from the SDI input needs to be maintained, the signal should first pass through a de-embedder card (VO5841 / VO5873).

3rd party EMBER controllers, such as L-S-B's VSM and Colledia's BNCS have the ability to insert SMPTE2020 metadata into each SDI output stream's VANC space.

Front panel LEDs for each input will light up green to indicate a valid SDI signal is being received.

The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

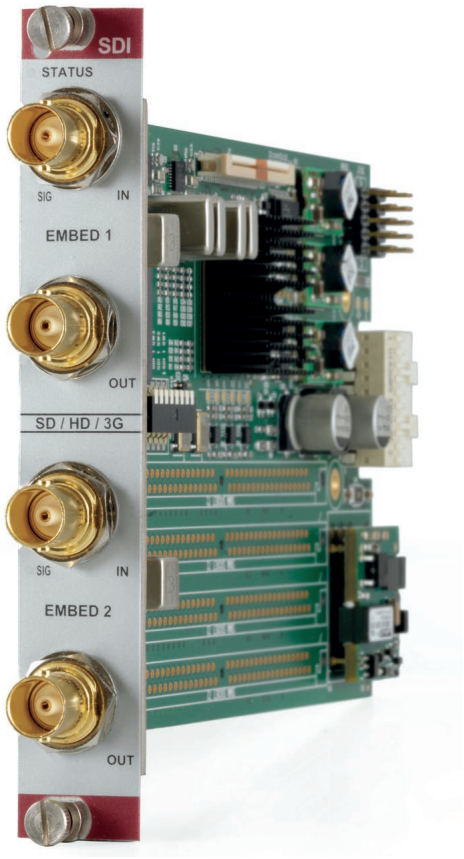
Maximum channel count

As Hydra2 links are limited to 512 channels of audio in each direction, each I/O box can be populated with cards that provide a maximum of 512 input channels, and 512 output channels.

This limitation becomes a factor when a large number of SDI cards are fitted in the same modular I/O box. Channels are counted across the card slots from left to right. If, for example, SDI embedder (audio output) cards are fitted in the first 16 card slots, the output channel count will be at its maximum (16 channels of audio per SDI output x 2 SDI outputs per card x 16 cards = 512 channels) - Any output cards fitted in the remaining 4 slots will not pass audio or GPIO signals, irrespective of whether audio is being routed to any or all of the SDI outputs. The remaining card slots could however be fitted with input cards as inputs and outputs have separate channel count quotas.

Note, the channel count totals mono audio channels, therefore, each SDI stream has a channel count of 16 and each digital AES port has a channel count of 2.

FRONT PANEL VIEW



SPECIFICATION

Format	SDI
Type	SD / HD / 3G
SDI Connector	BNC
Outputs	2 x SDI (16 audio channels each)
Inputs	2 x SDI in (audio discarded)

VO5841

2 X SDI DE-EMBEDDER (BNC)

The VO5841 provides 2 SDI inputs, the audio from which can be de-embedded and distributed across the Hydra2 network. This is a 1 slot-wide module with SDI interfacing via BNC connectors.

All 16 channels of audio can be de-embedded from SD, HD or 3G SDI signals.

For each SDI input, there is an SDI 'thru' connector which passes on the incoming SDI signal, unchanged, with its original audio channels included.

Front panel LEDs for each input light up green to indicate a valid SDI signal is being received.

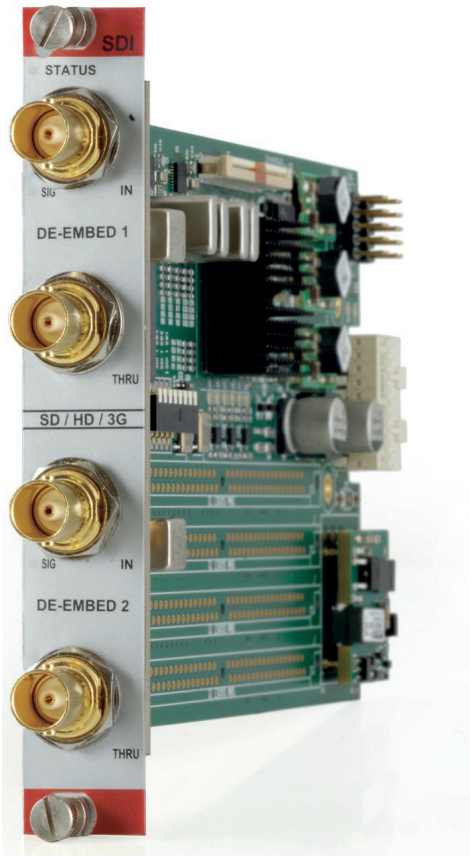
The standard modular I/O status LED flashes green once the card has booted and lights solid green once a connection between the card and the Hydra2 interface has been established.

Maximum channel count
As Hydra2 links are limited to 512 channels of audio in each direction, each I/O box can be populated with cards that provide a maximum of 512 input channels, and 512 output channels. When counting inputs and outputs GPIO ports must also be included.

This limitation becomes a factor when a large number of SDI cards are fitted in the same modular I/O box. Channels are counted across the card slots from left to right. If, for example, SDI de-embedder (audio input) cards are fitted in the first 16 card slots, the input channel count will be at its maximum (16 channels of audio per SDI output x 2 SDI outputs per card x 16 cards = 512 channels).

Any input cards fitted in the remaining 4 slots will not pass audio or GPIO signals, irrespective of whether audio is being used from any or all of the SDI inputs. The remaining card slots could however be fitted with output cards as inputs and outputs have separate channel count quota's. Note, the channel count totals mono audio channels and therefore each SDI stream has a channel count of 16 and each digital AES port has a channel count of 2.

FRONT PANEL VIEW



SPECIFICATION

Format	SDI
Type	SD / HD / 3G
SDI Connector	BNC
Inputs	2 x SDI (16 audio channel in each)
Outputs	2 (SDI 'Thru')

WY5858

GPIO, 8 IN / 8 FULL CHANGEOVER OUT (D-TYPE)

GPIO cards can be fitted to provide General Purpose interfacing for logic control such as remote / fader starts for playback devices, triggering autofades on a control surface, and much more.

Access to each general purpose input and output can be given to any console on the Hydra2 network.

The function of each general purpose input and output is configurable and assignable from any Apollo/Artemis/ Summa console which has been granted access.

This is a one slot wide module. Inputs and outputs are all on 1 x female 50 pin D-type connector.

LEDs

The Status LED strobes to indicate that the local software is running. The LED illuminates solidly when connection is established to the Hydra2 Interface Module in the same modular I/O chassis.

GP Inputs

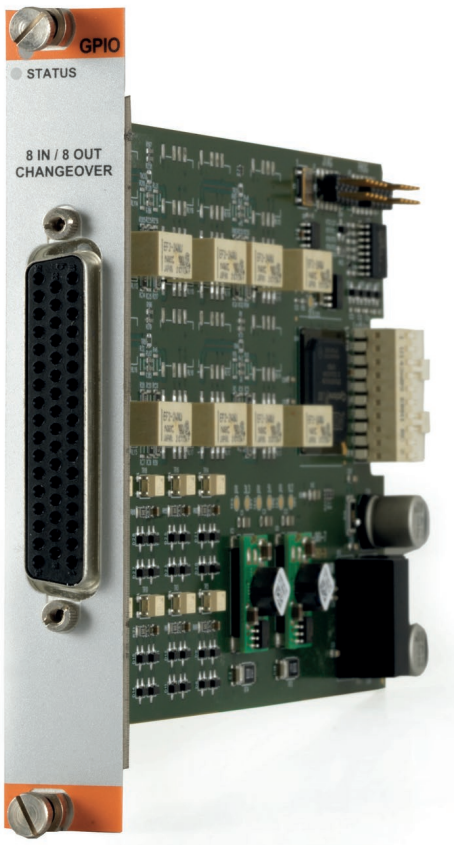
8 opto-isolated inputs allow for remote control of console functions. Applying between 3 and 50 Volts, AC or DC across the + & - pins of the opto will trigger them.

If using a dry closure to trigger a GP input, note that the incoming closure should be wired to one side of an opto input only. The other side of the opto should be pulled up by linking it to the 5V pin on the connector. The other side of the closure should be wired to the 0V pin. An example of wiring a closure to GP input #1 is shown above right.

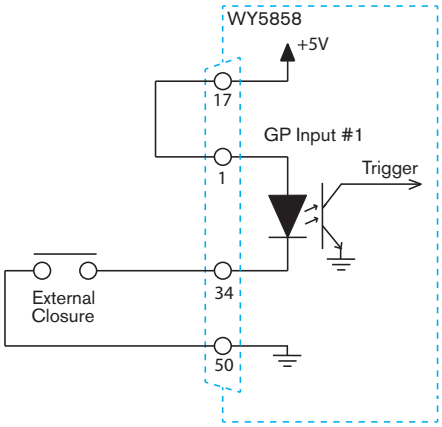
GP Outputs

The WY5858 version provides 8 changeover relays with access to both the normally open, and normally closed contacts for each. A closure pair is achieved by wiring one leg to either NO or NC and the other leg to a common pin for that specific relay. If external equipment requires a ground for activation, rather than a closure, the common pin for that relay should be connected to a ground from the external equipment.

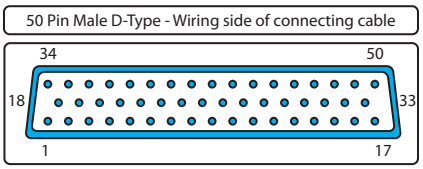
FRONT PANEL VIEW



INPUT WIRING EXAMPLE GP INPUT #1



GP INPUT PINS



Function		Pin
GPI 1	+	1
	-	34
GPI 2	+	18
	-	2
GPI 3	+	35
	-	19
GPI 4	+	3
	-	36
GPI 5	+	20
	-	4
GPI 6	+	37
	-	21
GPI 7	+	5
	-	38
GPI 8	+	22
	-	6
Supply	+5 V	17
Supply	0 V	50

GP OUTPUT PINS

Function		Pin
GPO 1	NO	39
	NC	7
	Common	23, 40
GPO 2	NO	24
	NC	41
	Common	8, 25
GPO 3	NO	9
	NC	26
	Common	42, 10
GPO 4	NO	43
	NC	11
	Common	27, 44
GPO 5	NO	28
	NC	45
	Common	12, 29
GPO 6	NO	13
	NC	30
	Common	46, 14
GPO 7	NO	47
	NC	15
	Common	31, 48
GPO 8	NO	32
	NC	49
	Common	16, 33

WY5859

GPIO, 8 IN / 16 OUT (D-TYPE)

GPIO cards can be fitted to provide General Purpose interfacing for logic control such as remote / fader starts for playback devices, triggering autofades on a control surface, and much more.

This is a one slot wide module. Inputs and outputs are all on 1 x female 50 pin D-type connector.

Access to each general purpose input and output can be given to any console on the Hydra2 network.

The function of each general purpose input and output is configurable and assignable via Apollo/Artemis/Summa console's which have been granted access.

LEDs

The Status LED strobes to indicate that the local software is running. The LED illuminates solidly when connection is established to the Hydra2 Interface Module in the same modular I/O chassis.

GP Inputs

8 opto-isolated inputs allow for remote control of console functions. Applying between 3 and 50 Volts, AC or DC across the + & - pins of the opto will trigger them.

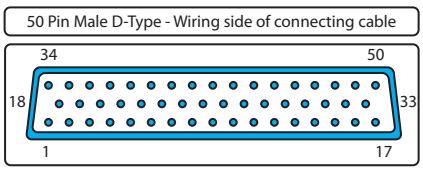
If using a dry closure to trigger a GP input, note that the incoming closure should be wired to one side of an opto input only. The other side of the opto should be pulled up by linking it to the 5V pin on the connector. The other side of the closure should be wired to the 0V pin. An example of wiring a closure to GP input #1 is shown on the previous page.

GP Outputs

The WY5859 version provides 16 normally open contact closure pairs. If external equipment requires a ground for activation, rather than a closure, one side of the relay should be connected to a ground from the external equipment and the other side of the relay used as the trigger.

FRONT PANEL VIEW

GP INPUT PINS



Function		Pin
GPI 1	+	1
	-	34
GPI 2	+	18
	-	2
GPI 3	+	35
	-	19
GPI 4	+	3
	-	36
GPI 5	+	20
	-	4
GPI 6	+	37
	-	21
GPI 7	+	5
	-	38
GPI 8	+	22
	-	6
Supply	+5 V	17
Supply	0 V	50

GP OUTPUT PINS

Function		Pin
GPO 1	NO +	39
	NO -	23
GPO 2	NO +	7
	NO -	40
GPO 3	NO +	24
	NO -	8
GPO 4	NO +	41
	NO -	25
GPO 5	NO +	9
	NO -	42
GPO 6	NO +	26
	NO -	10
GPO 7	NO +	43
	NO -	27
GPO 8	NO +	11
	NO -	44
GPO 9	NO +	28
	NO -	12
GPO 10	NO +	45
	NO -	29
GPO 11	NO +	13
	NO -	46
GPO 12	NO +	30
	NO -	14
GPO 13	NO +	47
	NO -	31
GPO 14	NO +	15
	NO -	48
GPO 15	NO +	32
	NO -	16
GPO 16	NO +	49
	NO -	33

DIGICO ORANGE BOX – HYDRA 2 INTERFACE

ORANGE BOX - FRONT VIEW

The Orange Box provides audio format conversion between any two of the ten available interfaces using DMI (DiGiCo Multichannel Interface) modules

The DMI-HYDRA 2 module interface for the Orange Box is shown right. It currently provides up to 56 Inputs and 56 Outputs when format converted to MADI using the DMI-MADI-B / DMI-MADI-C modules.

The DMI-MADI module is connected to the DiGiCo console allowing I/O to be passed between Calrec and DiGiCo domains along with exchange of labels in either direction.

The DMI bus interface carries up to 128 channels of audio in both directions and allows modules to be plugged in with power applied.

DMI-HYDRA2 MODULE - FRONT PANEL

Module Enclosure

The DMI-HYDRA 2 Module fits into one of the module slots in the Orange Box.

Hydra2 network connection

A pair of front mounted SFP slots provide primary and secondary connections for a Hydra2 redundant network. Various fibre and copper SFP modules can be supplied for medium to long distances over Singlemode or Multimode fibre or CAT5e over Copper up to 90m.

Both Primary and Secondary interfaces show connectivity and active data status using LED indication on the front of the modules.

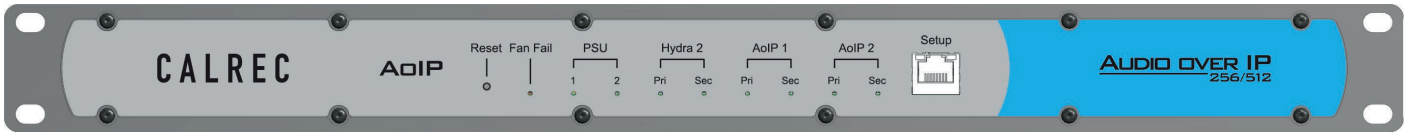
Fitting Modules

Currently the DMI-HYDRA 2 Module has to be fitted in the right hand slot (DMI 2) of the Orange Box for sync purposes and as a consequence the DMI-MADI Module is fitted in the left hand slot (DMI 1) of the Orange Box. When fitting the H2 Module static protection wristbands should be worn to prevent ESD failures.

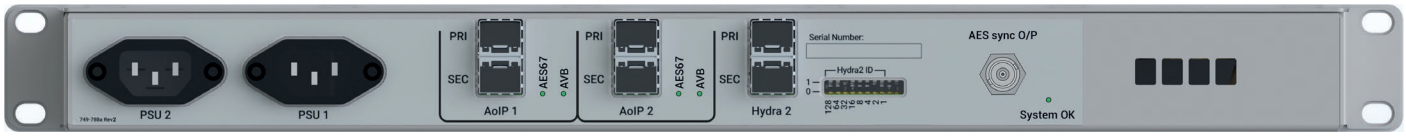
- Note that this requires V3.2 software or later to work correctly.

EG6266-2 AOIP INTERFACE

AOIP INTERFACE- FRONT VIEW



AOIP INTERFACE- REAR VIEW



The Calrec Audio over IP unit provides a Hydra2 AoIP interface carrying up to 512 x 512 channels using AES67/ Ravenna and or AVB modules.

The unit can accommodate two modules AoIP 1 & AoIP 2 and may be fitted with one or two 256 x 256 channel AES67/ Ravenna or AVB modules, or one of each type as required.

In addition to the standard Hydra2 redundancy each module also has both a primary and secondary 1GB IP connection, supporting hitless switching for redundancy.

IP Stream management is achieved through a WEB UI.

Enclosure

The AoIP interface unit is 440mm wide x 225mm deep x 44mm (<1U) high.

Cooling

The unit has a single ultra low noise fan. Air is drawn in from the right and extracted from the rear, please allow at least 25mm (1') clearance at the right and rear of the unit for operation up to 40 deg C (104 deg F) ambient temperature.

Power

The AoIP unit contains dual AC mains PSUs for redundancy that can be fed 100-240V AC via rear mounted IEC connectors. The IEC connectors have a retaining clip that can hold some types of IEC cables in place. The cable supplied with the unit should be clipped in place.

Hydra2 network connections

A pair of rear mounted SFP slots provide primary and secondary connections back to routers in a Hydra2 network.

Primary and Secondary SFP slots are also provided for the 2 x AoIP ports and indicators are provided on the rear to show which modules have been fitted to the unit.

The AoIP unit must be given an ID which is unique on the network, before being connected. The ID is a value from 1 to 256, set as a binary representation using DIP switches accessible from the rear.

The AES sync O/P on the rear of the unit provides a PTP clock reference derived from the Internet stream. *Note: this sync O/P is not yet enabled as of 01/09/16.*

STATUS LEDS

AES67/AVB	Lights to show modules are installed.
System OK	Flashes heartbeat every second when connected and running. Fast flashing indicates no comms with Hydra 2.
Fan Fail	Lights Red to show fan not spinning.
PSU 1 & 2	Light solid green when PSU working.
Hydra2 Pri & Sec	Light solid green when valid connections made to Hydra2 SFP ports.
AoIP 1 & 2 Pri & Sec	Lights solid green when valid connections made to AoIP1 & 2 SFP ports.

The System OK LED strobes every second to indicate that the system is actively talking to the AoIP modules and the Hydra 2 interface. or every 100ms if the Hydra 2 interface is not active.

Config Port

A Cat 5e connector on the front of the unit is used for Setup via a WEB UI.

Front Panel Reset & Status LEDs

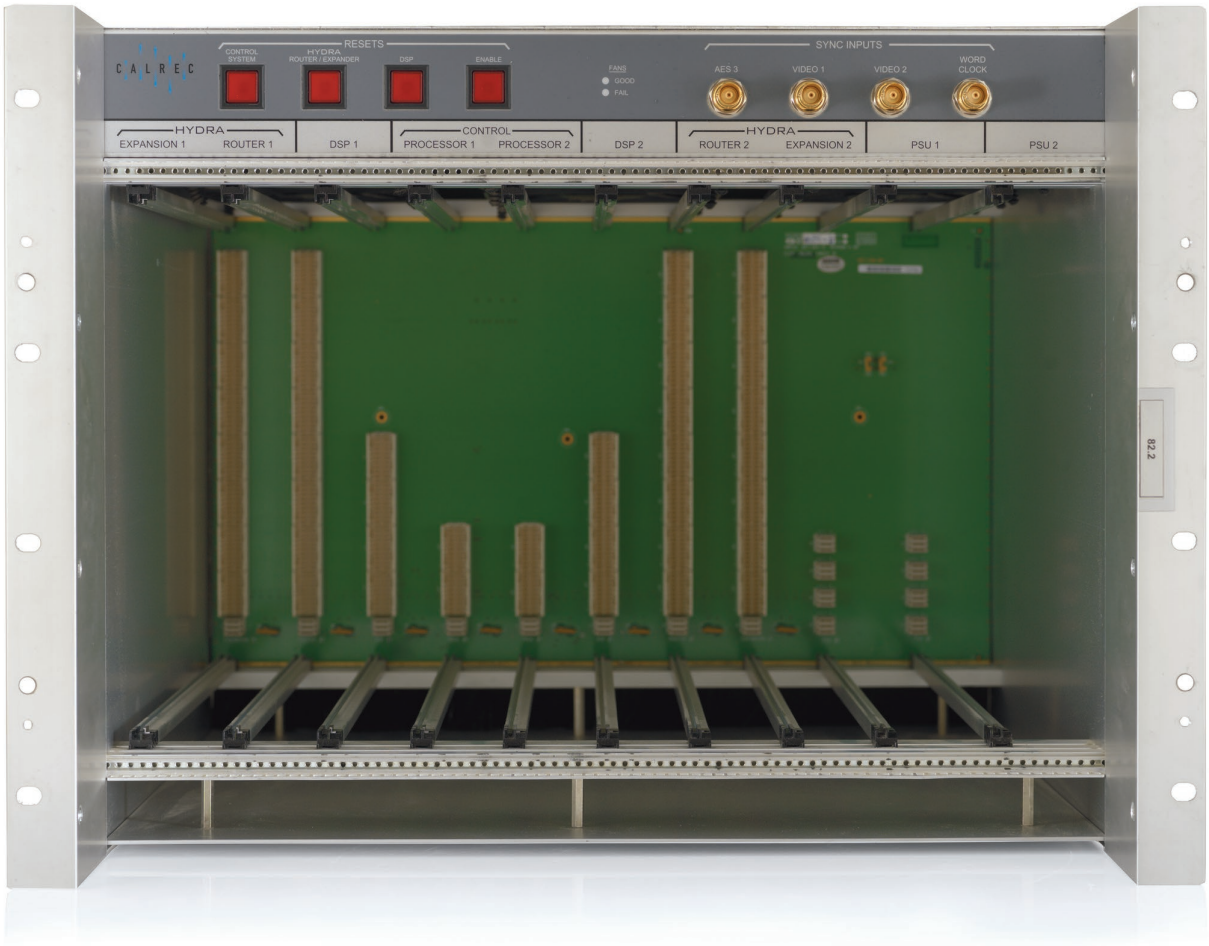
A recessed Reset button allows the user to reset the system. A Red Fan Fail LED illuminates if the fan stops spinning. Next to this are the 2 PSU LEDs which illuminate green to show they are ON.

The Hydra2, AoIP 1 & AoIP 2 primary and secondary interface LEDs illuminate to show they are connected.

SPECIFICATION

Height	< 1U - 44mm (1.73')
Width	19" Rackmount (483mm)
Depth	225mm (8.9') inc BNC
Weight	3.13kg (6.9lbs)
AC input power	100-240V AC, 50/60Hz, 0.35-0.18A RMS, Supply current - 0.18A @ 240V, 0.30A @ 115V, 0.35A @ 100V
Power Dissipation (Heat)	26.0W @ 100-240V AC
Operating ambient air temperature	0-40 C

PROCESSING CORE – APOLLO, ARTEMIS SHINE & BEAM



ED5708

8U CORE ENCLOSURE

The Apollo, Artemis (Shine and Beam) and Router Core processing core is an 8U 19" rack mount enclosure designed for installation in standard 19" equipment bays. The core is cooled by fan assisted convection. Air is drawn in from the front into the cable-tray and up through the base of the card frame. Fans mounted in the top of the core pull air through the card frame which then exits through vents across the top of the rear of the core. A fully populated core has been measured to produce <40dB acoustic noise. All connections, including power, are made to the front of the core which is recessed from the racking angles to allow cable clearance within the bay.

Accessory	Stock Code
Perle Iolan SCS8 (serial to TCP/IP remote control data conversion)	491-189
Serial to RJ45	312-269
Blanking plate	650-167
KVM (when in use as Router Core)	491-211
1U PC (when in use as Router Core)	491-212

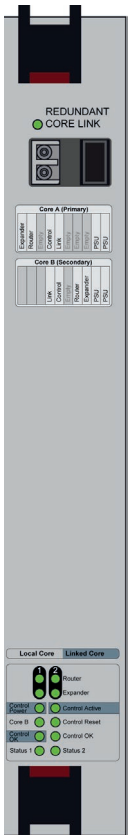
UN5713

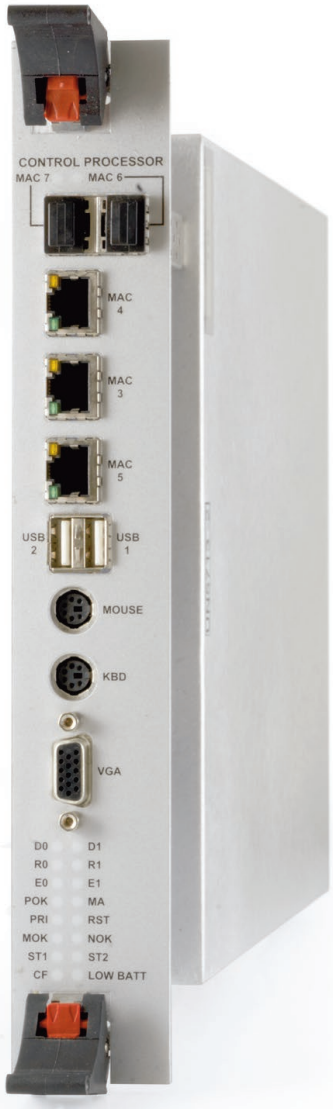
CONTROL PROCESSOR CARD

Slots 4 and 5 are for control processor modules, slot 4 for the primary / normally active card, slot 5 for the secondary / hot-spare. The active Master Controller is the central processor in the system, handling all control parameters and directing data between control surface, DSP and router. At the top of the module are two SFP slots that can be fitted with copper or fibre SFPs for interfacing with the control surface. As well as the standard status indicators, front panel LEDs are also provided to show the status of other cards in the core.

If Dual Router Core redundancy is chosen as an option, to split redundancy across two physical locations, redundant core link cards (UN6149) are required in both primary and secondary cores to provide a backup data link between the two cores.

UN6149 REDUNDANT CORE LINK CARD





UD5709/UD5927/UD5928

DSP CARD

The primary, normally active DSP card fits in slot 3, the secondary, hot-spare in slot 6. DSP cards are not required in Router Cores. This audio processing module has no front panel connectors. All audio and data is passed to / from the Master Controller and router cards via the core backplane.

UD5709 – Apollo

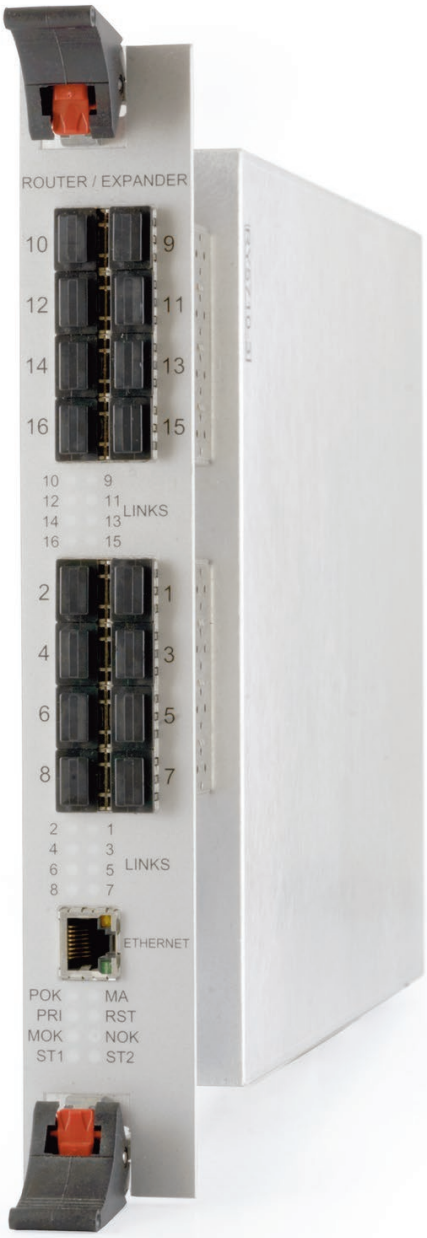
UD5927 – Artemis Shine

UD5928 – Artemis Beam

RY5710

ROUTER CARD

The primary router card fits in slot 2, the secondary in slot 7. As an option, slots 1 and 8 can be fitted with additional router expander modules of the same type to double the number of Hydra2 connections in the core. The Apollo and Artemis (Shine and Beam) router card has 16 SFP ports that can be fitted with copper or fibre SFPs to allow connection of Hydra2 I/O boxes and connections to other consoles' and Router Cores' routers. A single RJ45 port labeled 'Ethernet' allows for the connection of 3rd party equipment supporting the SW-P-08 or Ember protocols for remote control. As well as standard status LEDs there are front panel LED indicators to show activity on each port.



ZN5714

PSU Card
Card slots 9 and 10 are for PSU modules. Both slots share the power load for the whole core. One PSU module is sufficient to power the whole core, two are fitted to provide redundancy. Each card has an IEC AC mains input connector, requiring 100–240V AC.

PROCESSING CORE – ARTEMIS LIGHT, SUMMA

ED6207

4U CORE ENCLOSURE

The Artemis Light and Summa processing core is a 4U 19" rack mount unit designed for installation into standard 19" equipment bays. The core is cooled by fan assisted convection. Air is drawn in through inlets on the front panels of the cards fitted in the core. Air exits via 9 fans mounted to the rear of the core, across the top. The speed of each fan is monitored and error reports are generated for any failures. Air inlets and fans should be left clear and unobstructed to ensure air can flow through the card frame. No clearance is required above or below the core for cooling. All connections, including power. are made to the front of the core which is recessed from the racking angles to allow cable clearance within the bay

JN6209

RESET AND SYNC INTERFACE CARD

This module fits in the central, 5th card slot of the Artemis Light / Summa processing core. Three buttons can individually reset the control, router and DSP cards within the core. The bottom button, 'enable', must be pressed at the same time as any of the resets as a safety precaution. Front panel LED indication shows the status of the fans within the core. 4 x BNC connectors provide sync inputs, allowing for redundancy and a range of formats. Two inputs are for SD / HD video sync signals, one for AES DARS and one for TTL Wordclock.

Accessory	Stock Code
Perle Iolan SCS8 (serial to TCP/IP remote control data conversion)	491-189
Serial to RJ45	312-269

UN6210

CONTROL PROCESSOR CARD

Card slots 4 and 6, immediately adjacent on either side of the reset and sync card, are for Control Processor cards. Slot 4 is for the primary, normally active card and slot 6 is for the secondary, hot-spare card. As well as the standard status LEDs, LEDs are provided to show activity on the RJ45 and SFP ports. LEDs are also provided to show the heartbeat status of other cards within the core.

Three ethernet ports are provided for interfacing with external control systems. Two surface connections are available for connecting a the control surface, an extension or sidecar if required (Artemis only) and a maintenance PC.

Redundancy is optional when a Summa with 128 channels is chosen. Secondary cards are replaced with blanking plates in non-redundant systems.

UD6180

DSP CARD

The primary, normally active DSP card fits in slot 3, to the immediate left of the primary Control Processor. The secondary, hot-spare DSP card fits in slot 7, to the immediate right of the secondary Control Processor. This audio signal processing card has no front panel connections. All audio and data is passed to / from the Control Processor and Router cards via the core backplane.

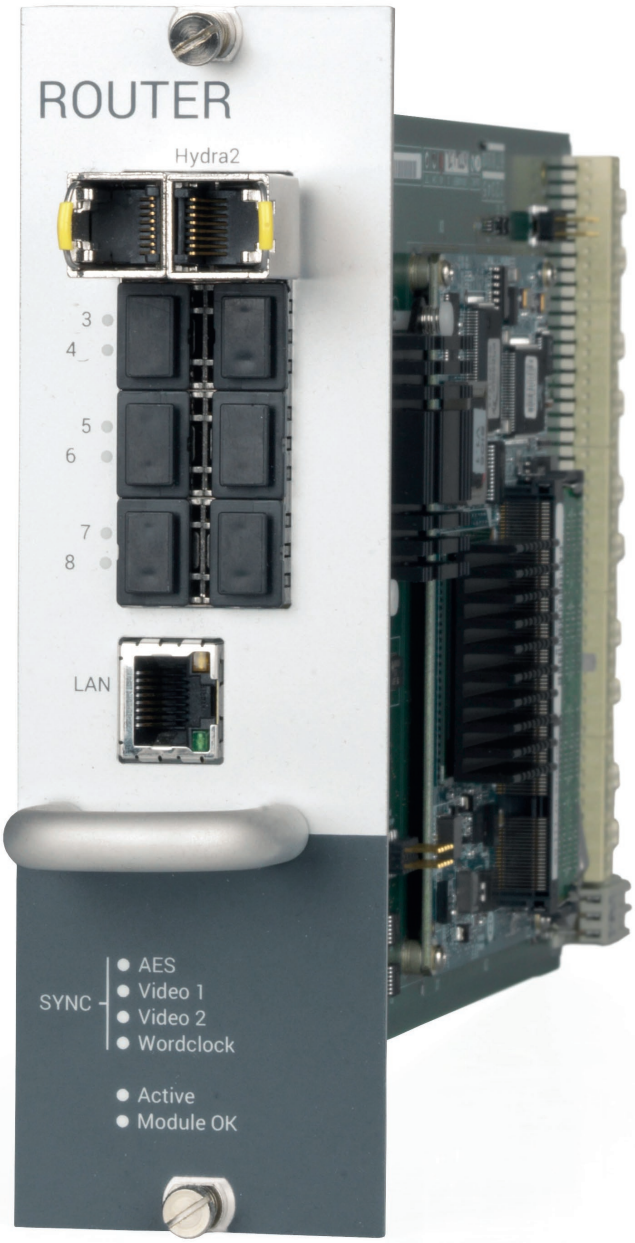
Redundancy is optional when a Summa with 128 channels is chosen. Secondary cards are replaced with blanking plates in non-redundant systems.

RY6181

ROUTER CARD

Card slot 2 is for the primary router module, slot 8 is for the secondary router module. The Artemis Light / Summa router card has 8 SFP ports that can be fitted with copper or fibre SFPs to allow connection of Hydra2 I/O boxes and connections to other consoles or Router Cores. A single RJ45 port labeled Ethernet allows for 3rd party equipment supporting the SW-P-08 or Ember protocols to interface for remote control. As well as the standard status LEDs there are front panel indicators to show the active sync source and for activity on the RJ45 and SFP ports.

Redundancy is optional when a Summa with 128 channels is chosen. Secondary cards are replaced with blanking plates in non-redundant systems.



ZN6177

PSU CARD

Card slots 1 and 8 are for PSU modules. Both slots share the power load for the whole core. One card is sufficient to power a fully populated core, two are fitted to provide redundancy. Each card has an IEC AC mains input connector, requiring 100–240 V AC. LEDs provide front panel indication for incoming mains voltage (POK), 5 V and 12 V DC output voltages and an over temperature warning. Failures are also reported by the console's system status monitoring system.

Redundancy is optional when a Summa with 128 channels is chosen. Secondary cards are replaced with blanking plates in non-redundant systems.

HYDRA2-HUB

RY6211-2

FIGURE 1. H2HUB - FRONT VIEW

The H2Hub provides a network distribution node that can be used to connect from a router up to 4 external connections which may be I/O boxes or other Hubs to form a local array of I/O connectivity, in a compact, cost-effective package.

Enclosure

The H2Hub is 220mm wide x 284mm deep x 40mm (<1U) high. Threaded fixing holes in the base allow the unit to be secured in place if required.

Cooling

The unit has a single ultra low noise fan. Air is drawn in from the front and extracted from the rear, please allow at least 25mm (1') clearance at the front and rear of the unit for operation up to 40 deg C (104 deg F) ambient temperature.

Power

The H2Hub contains a single AC mains PSU that can be fed 100-240V AC via a rear mounted IEC connector. The IEC connector has a retaining clip that can hold some types of IEC cables in place. The cable supplied with the unit has a built in latching mechanism and does not need to be clipped in place.

A 10-30V DC input allows an optional external PSU to be connected to provide redundancy if required.

Battery powered operation

The DC input is also suitable for use with batteries. Batteries can be used as a backup to the internal AC supply, or as the primary power source. There is no drain on the battery whilst the unit is fed with AC, yet switch-over from AC to DC is seamless.

A wide range of suitable batteries are commonly available from broadcast suppliers. Costs vary significantly based on run time and other factors. Calrec recommends the use of Anton Bauer G150 batteries in conjunction with their QR-UNIV XLR mount to provide a runtime in excess of 12 hours. 'Hot-swap' battery mounts are also available to fit 2 batteries that can be individually swapped out without interrupting operation.

The DC input is protected by ISO 7637-2 circuitry against surges, reverse polarity and other external power faults.

Hydra2 network connections

A pair of front mounted SFP slots provide primary and secondary connections back to routers in a Hydra2 network. Various fibre and copper SFP modules can be supplied.

Primary and Secondary SFP slots are also provided for up to 4 downstream ports which can either be connected to Calrec I/O Units or other H2Hubs.

The H2Hub must be given an ID which is unique on the network, before being connected. The ID is a value from 1 to 64, set as a binary representation using DIP switches accessible from the rear. Note that Hub ID's are different to I/O Box HID's so no conflict occurs if an I/O Box and a Hub have the same ID.

Two other switches are also provided on the rear of the unit the first is the Split / Contained switch. The unit is normally used in Contained mode where both Primary and Secondary connections are made to the same hub. In this mode the Upper row of SFP's are used for Primary connections and the lower row used for Secondary connections.

In certain situations extra redundancy may be provided by switching this to 'Split' the Hub. In this mode each Hub only manages either the Primary or Secondary connection which is determined by the Pri /Sec switch adjacent. Another hub is then required to be in 'Split' mode with the same ID to manage the other paired connection for mission critical I/O redundancy. Note that in 'Spilt' Mode ,

FIGURE 2. H2 HUB - REAR VIEW

only the Upper row of SFP's are used for both Primary and Secondary connections.

The Front Panel LEDs indicate the mode of operation and which SFP's are active.

Config Port
A Cat 5e connector on the rear of the unit is used for factory setup and diagnostics.

STATUS LEDS

Power AC	Lights solid green when internal PSU is active.
Power DC	Light solid green when DC input valid. Flashes when outside of range.
OK	Flashes green heartbeat when connected and running. Fast flashing indicates boot/establishing comms.
Pri Sec RTR	Light solid green when valid connections have been made to the Routers SFP ports.
Pri Sec 1-4	Light solid green when valid connections have been made to the 1 thru 4 I/O SFP ports.
Sec (Split)	Lights Yellow if Hub set to Sec in Split Mode

SPECIFICATION

Height	< 1U - 40mm (1.6')
Width	220mm (8.7')
Depth	284mm (11.2')
Weight	2.0kg (4.4lbs)
AC input power	100-240V AC, 0.30-0.13A RMS, 50/60Hz, Supply current - 0.13A @ 240V, 0.26A @ 115V, 0.30A @ 100V
DC input power	10 - 30V DC, 15VA max. Supply current - 1.25A @ 12V, 0.62A @ 24V
Power dissipation (heat)	15W when fed DC 19.5W when fed 100-240V AC
Operating ambient air temperature	0-40 C

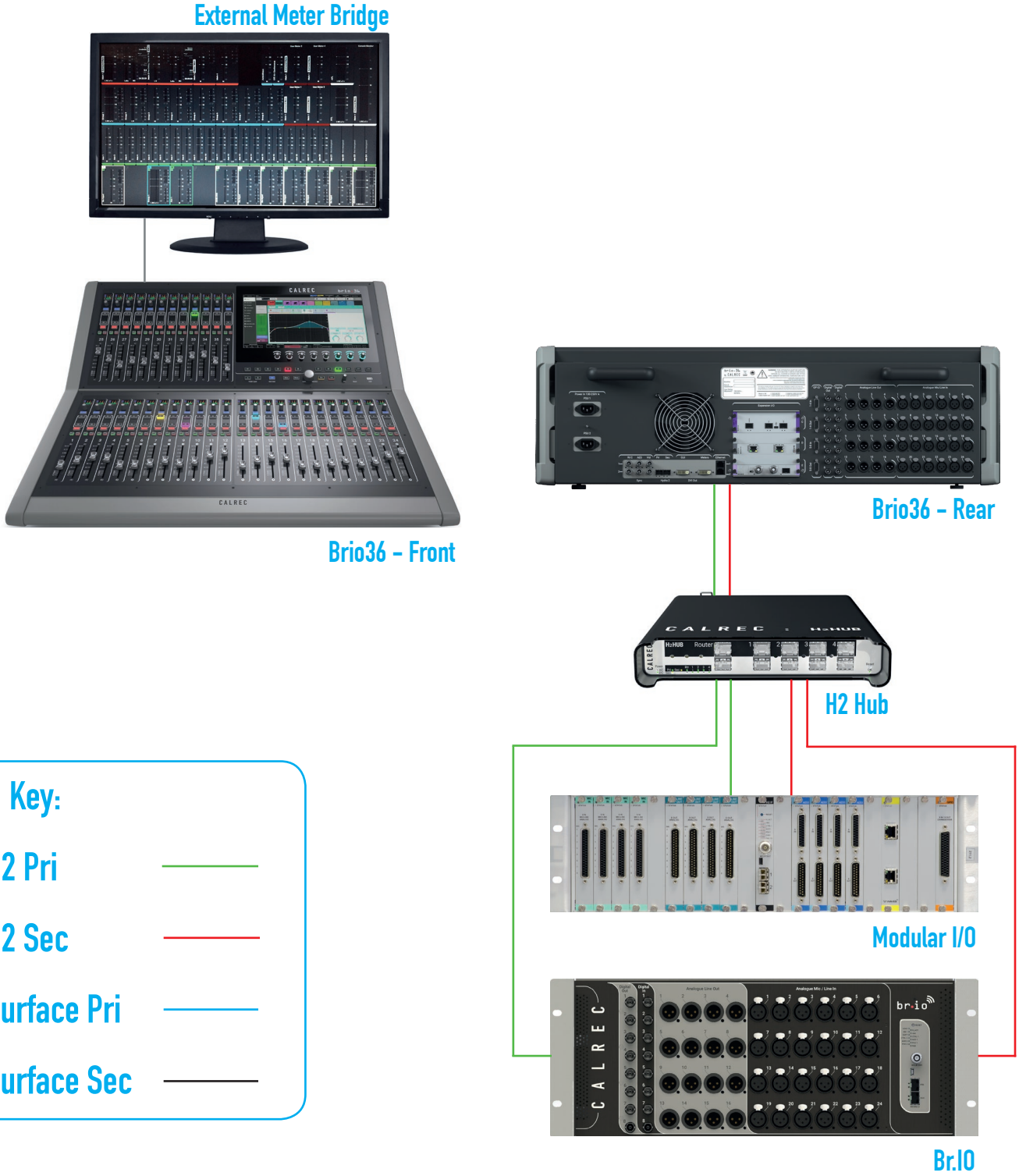
DC INPUT CONNECTOR - 4 PIN XLR

Pin 1	- V DC
Pin 4	+ V DC (10-30V)

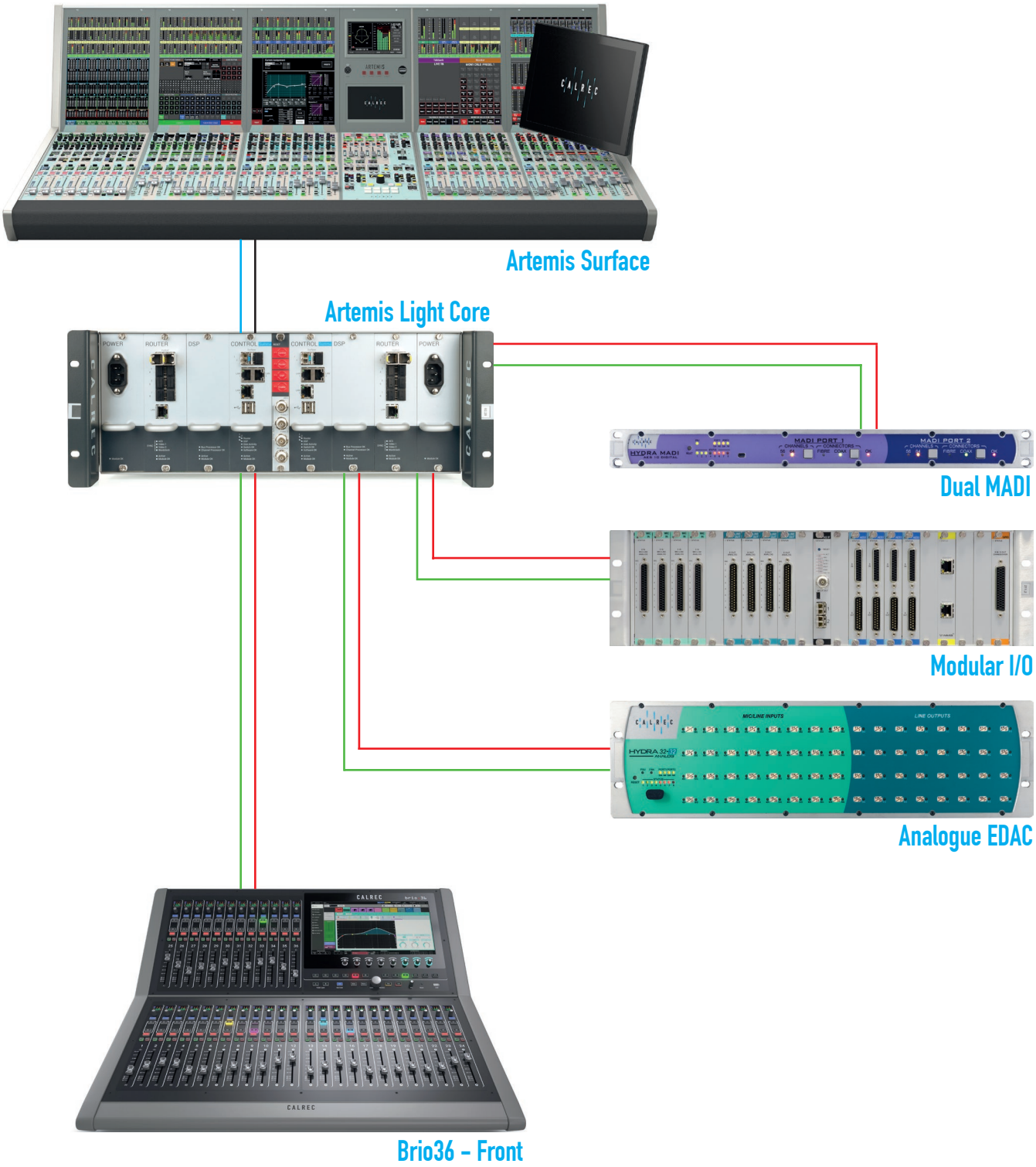
- Unit connector is male, requiring a female termination on the connecting cable

HYDRA2 – EXAMPLE NETWORKS

Single Brio36 with external I/O



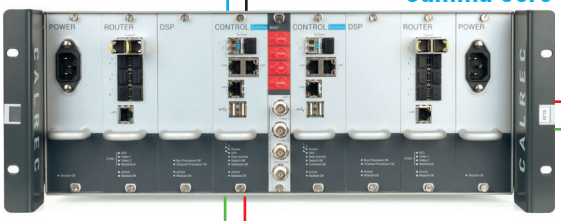
Small Network – Artemis Console Master with Brio Slave



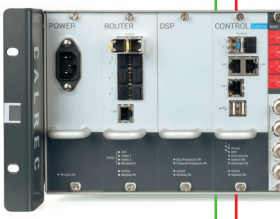
Large Network with Router Core

Summa Surface

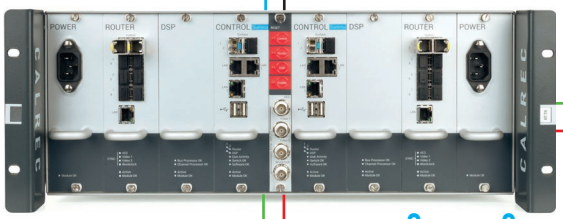
Summa Core



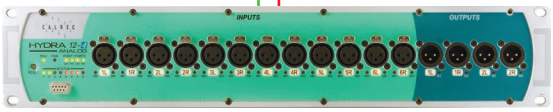
Modular I/O



Summa Surface



Summa Core



Analogue – XLR

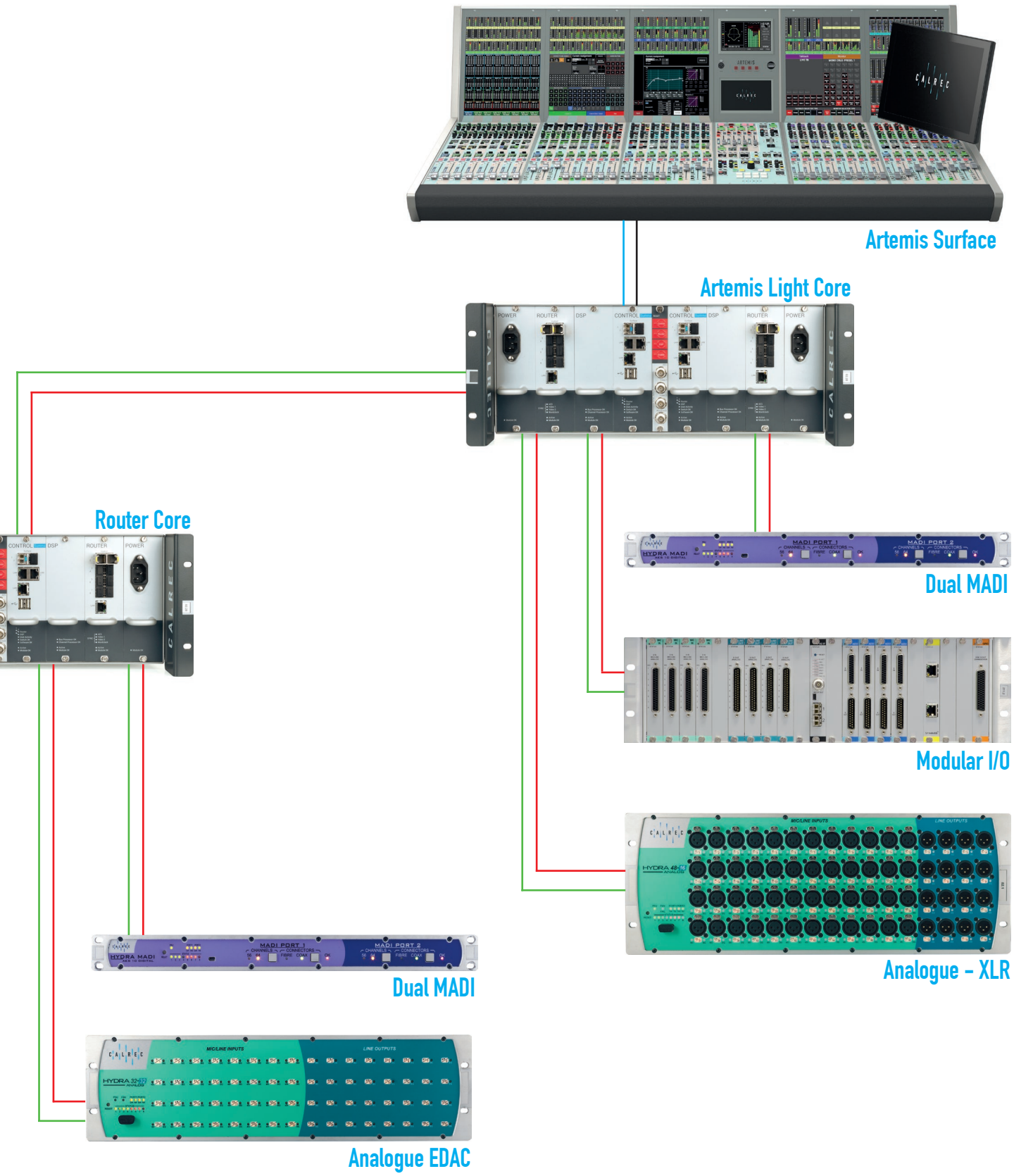
Key:

H2 Pri

H2 Sec

Surface Pri

Surface Sec


Artemis Surface
Artemis Light Core
Router Core
Dual MADI
Modular I/O
Analogue - XLR
Dual MADI
Analogue EDAC

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