The Product Book
Let's get talking

CALREC

Introduction

Calrec is a leading designer and supplier of audio broadcast mixing equipment, relied on by the world's most successful broadcasters.

Formed as a microphone manufacturer in 1964, Calrec's reputation for build quality, reliability and audio performance has made it an industry benchmark across the world.

Now, broadcasters demand even more versatility and integration from their audio equipment. In this highly progressive era, TV companies want to ensure that their systems can produce programmes increasingly efficiently and to exacting specifications.

For their audio systems to achieve this, greater consideration has to be given to networks as a whole, and how efficiently they can be controlled.

Calrec understands modern broadcast facilities, and works alongside broadcasters to keep ahead of the changing needs of the broadcast environment.

Calrec is at the heart of changing broadcast requirements with its range of broadcast mixing consoles, remote production and audio networking solutions, its understanding of AoIP and IP infrastructures, and its work with third-party integration.

All Calrec products are designed, manufactured and tested at Calrec's Nutclough Mill headquarters in Hebden Bridge, West Yorkshire, England.

From customer research through to R&D, production and test departments, every element of product development is in-house. This ensures the integrity of the entire process and guarantees a quality standard unsurpassed in the broadcast console marketplace.

Calrec is a broadcast specialist and over the last 50 years, has earned a reputation for innovation with a history of technological world firsts:

1977: Calrec supplies the world's first stereo broadcast console.

1978: Calrec launches the Soundfield microphone, the world's first single-point source microphone capable of recording sound in three-dimensions for surround-compatible playback.

1981: Calrec supplies the world's first digitally controlled assignable mixing console.

2007: Calrec launches Bluefin, an FPGA-based high-density DSP card, which permits real-time 5.1 surround mixing and processing. Bluefin, available as an upgrade to existing Calrec desks, improved efficiency by a phenomenal 5000%. This technology was another world first for Calrec.

2009: Calrec unveils Bluefin2, a significant step up from Calrec's pioneering work with FPGAs for real-time audio DSP processing. Bluefin2 increases DSP capacity to an unsurpassed 1020 channel processing paths.

2009: Calrec launches Hydra2, allowing the construction of complex routing networks with control software which organises all routing.

2018: The Type R and ImPulse cores introduce new IP-based processing and routing with native AES67 and SMPTE 2110 connectivity. Based on Blu3fin, ImPulse provides built-in 3D immersive path widths and downmixing.

Modern broadcast infrastructures need to be adaptable. We all need to talk to each other across multiple languages, and we need to support all kinds of changing workflows.

It's an exciting time to be in broadcast audio, and Calrec is right in the middle of it.

Calrec is part of the Audiotonix family alongside DiGiCo, SSL, Allen & Heath and Klang Technologies.

Argo

Designed to adapt to changing production needs, Argo is a new approach to audio mixing with a flexible control philosophy that breaks the traditional geographic tie lines between processing and control.

Flexible

Fully modular and with interchangeable hardware panels, Argo is built around Calrec's time-served Assist UI. This means that whether you are on physical panels or a remote GUI, the user interface is both familiar and easy to drive.

Argo's panel system encourages broadcasters to adapt surface hardware to meet their unique requirements, with two mid-level rows of interchangeable panels on the larger Argo Q model, and one mid-level row on the compact Argo S model. Calrec has also introduced a comprehensive system of user templates to instantly change the hardware user interface to meet changing requirements or user preferences.

Powerful IP Core

Built around an expanded version of Calrec's ImPulse IP core means the location of the control surface is not tied to the processing core. It can power up to four independent mix environments, including headless mixers accessed via public internet, with each mixer able to access more than 2,350 processing paths on a single console; this provides enough power to deal with the biggest immersive and NGA mixing demands.

User Friendly

Argo's control surface uses optically bonded touchscreens to provide unrivalled visual feedback and speed of access.

Soft panels provide a richer user experience and hardware panels allow users to build definable functions and apply these as templates - this helps operators move around the surface faster and makes it more intuitive.

Argo's panels are also interchangeable and can be placed wherever they are needed. This makes it easy to grow and adapt the console to individual requirements and it means the desk can easily be split for sub mixing or mixing in other locations.

Maximum Uptime

Argo builds on Calrec's broadcast- specific and industry-leading surface redundancy. All control elements can be duplicated so an operator can use any panel to access inputs and controls, while fader scrolling functionality adds more protection.

Combined with standard redundant hardware, Argo provides SMTPE's hitless packet merging alongside a second layer of hardware redundancy to guarantee broadcast uptime.

I/O on the Fly

Argo includes optional AoIP IO modules which can be fitted directly into the control surface, with a variety of I/O options. These can be fitted into every section of the console to give the operator a variety of input options, make cabling more efficient and save space in external racking.

NGA Ready

With NGA content on the increase and broadcasters adding value to productions with increasingly complex NGA output formats, Argo provides tools to make everything simpler to organize and manage.

Flexible immersive spill helps maintain total control over a variety of multi-channel formats but with no need for dedicated surface real estate.

Multi-channel sources can be controlled on a single fader but spilled out onto more faders for fine control; Argo allows spill faders to be placed anywhere on the control surface, on any layer and in any position to free up space and make the workspace more adaptable to individual needs.

Total DSP paths	2384
Input channels	2048
Mains	16
Groups	48
Tracks	96
Auxes	48
Max Faders	240
Track sends per ch/gp path	4
Direct/Mix-minus Output leg pool	1024
Direct/Mix-minus Output per ch/gp path	4
Mix-minus busses	1
Insert leg pool	1024
Inserts per ch/gp/mn path	2
Inserts per aux/track path	2
Input delay leg pool	256
Output delay leg pool	256
Path delay	All legs of all path types
Delay time	Up to 5.4 secs on each Input, Path and Output delay block
EQ	6 band parametric on every channel goup, main, aux and track 6 and 12db per octave slope options on any band operating with shelf response 6, 12 and 18db per octave slope options on bands 1and 2 when set to HF/LF filter response
Dynamics	2 x compressor/limiter + 1 x expander/gate/ducker on every channel, group and main 2 x compressor/limiter on every aux and track
Sidechain EQ	2 x bands SCEQ on every channel's dyn1 (1 x comp/lim + exp/gate/ducker) 1 x band SCEQ on every group and main dyn (1 x comp/lim + exp/gate/ducker)
Key Input (sidechain source selection)	Compressor 1 + expander/gate/ducker on channels/groups/mains can be keyed from audio on any mono path. U paths can be used as keys at any given time
Automixer	8 x Automixers available to control any mono or stereo channel or group path
Monitoring	2 x control room LS (with AFL), 3 x PFL and AFL busses, 4 x MiscMonitor outputs and 4 x meter slector outputs, 15 inputs

Apollo

Surface

- 100mm faders with mechanical PFL overpress
- 12 A/B Layers, providing 24 possible assignments for each fader
- Colour-changing rotary knobs to indicate function
- Touch screens controlling I/O, monitoring and routing

Processing

- 1292 DSP processing paths
- 1020 Input channels
- Up to 16 x stereo or 5.1 surround main outputs*
- Up to 48 x mono, stereo or 5.1 surround audio groups*
- 96 x multi-track Buses for IFB or recording
- 4 x track sends per path
- 48 x auxiliary Buses
- Up to 4 x Direct Outputs/Mix Minus sends per path
- Direct outputs can be pre-EQ, pre-fader or post-fader
- 3 x independent user sections with independent monitoring
- All channels and groups have 6-band parametric EQ
- All channels, groups and mains have full dynamics
- Side Chain EQ/Filters
- 256 x Inserts
- Up to 2.73s delay per Output from a pool of 256 channels
- Up to 2.73s delay per Input from a pool of 256 channels
- All paths have 2.73s delay in addition to in and out delay
- 12 fader layers, each with its own A and B paths
- 8 x AutoMixers, each controlling an unlimited number of paths
- Advanced AutoFader (AFV) functionality on all faders

Networking

- Integral 8192² router
- 16/32 Router ports
- All I/O provided over Hydra2 network via a comprehensive range of Hydra2 I/O boxes
- Cat5e or fibre connectivity

Resilience

- Highly resilient – all modules are hot-pluggable with automatic redundant PSU, DSP, Control processor, Router module, I/O Expansion module
- Independent DSP operation ensures audio continuity in the event of a PC or control reset
- Low power consumption and heat generation

* from a Mains/Group pool of 128 resources

Apollo+

Apollo+ is built on the hardware architecture of the Apollo surface, and combines it with the power and flexibility of Calrec's ImPulse IP processing core, the third generation of Calrec's award winning Bluefin DSP.

Apollo+ offers a new range of IP based consoles from Calrec which provides powerful control, DSP and audio routing with comprehensive redundancy.

Apollo+ has the option of five different DSP pack sizes and enables broadcasters to hang four independent mixing environments onto a single core.

It has native AES67 and SMPTE 2110 connectivity and is compatible with existing Apollo control surfaces providing a simple upgrade path for existing Calrec customers.

Apollo+ also provides 3D immersive paths up to 7.1.4 wide and panning for next generation audio applications. Height and 3D pan controls are provided, with flexible panning and downmixing built in.

The full feature set for all Calrec consoles, including Apollo+, are at the back of this Product Guide.

Processing

- Contains next generation "Bluefin3" DSP
- Up to 1458 DSP processing paths
- Up to 1122 input channels
- Main and Group busses expanded to 192
- Supports 3D Immersive path widths for next generation audio
- Input Channels, Groups and Main paths support mono, Stereo, 5.1, 5.1.2, 5.1.4, 7.1, 7.1.2, 7.1.4 width
- Immersive paths have an additional "height" legs to produce a 3D soundfield
- Height and 3D pan controls are provided with flexible panning and downmixing built in
- Monitoring and metering provided immersive content

160 fader Apollo, MLB Networks, USA

Covering live Major League Baseball and National Hockey League, MLB Network use two Apollo consoles linked to a router core to create a powerful and flexible network.

"The interface between the operator and the console/network is logical, which allows mixers to adapt to changes that happen with our live, sports-highlight programming."

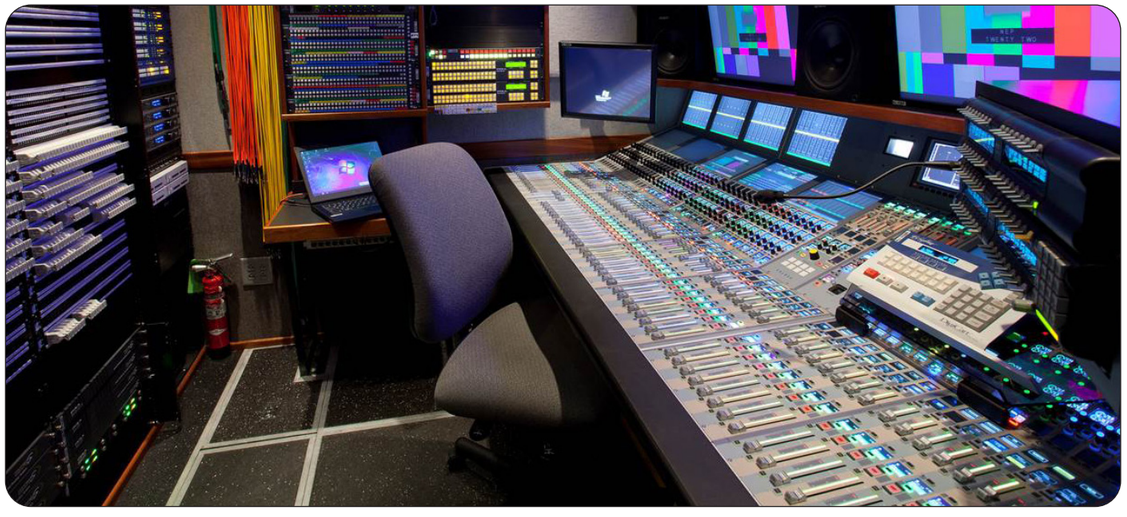
Mark Haden, Vice President of Engineering and IT, MLB Network

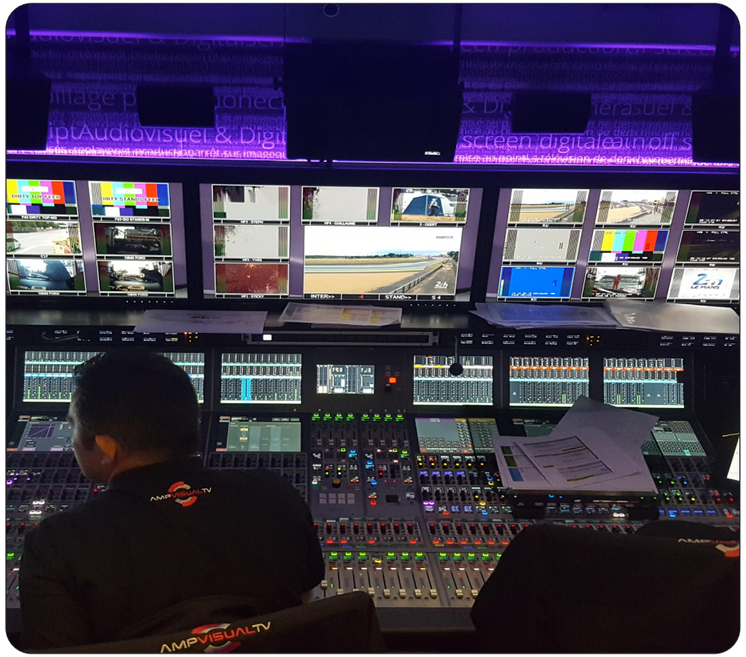
128 fader Apollo, SS22, NEP, USA

NEP Supershooters' SS22 high-definition mobile production truck is designed for quick set-ups and increased efficiencies. NEP is a trusted and valued Calrec customer with multiple Calrec consoles.

"We had a very significant requirement from ESPN for a very large audio console with extra faders for their NBA coverage. We have been very focused and deliberate about our audio requirements."

George Hoover, CTO NEP Broadcasting





56 fader Apollo, AMP, France

France's AMP Visual TV installed Apollo and Artemis consoles into its Millennium Signature 12 (MS12) remote production unit.

Boasting the world's largest surface area at 76-sq-m, MS12 hosts a 56f Apollo, a 24f Artemis Light, and a 16f Artemis sidecar that can be used to extend the other two.

"We wanted to be able to maximize the equipment for any size of international production. The flexibility and modularity of the Calrec desks made them a perfect fit for this vision. The consoles offer full redundancy to give us peace of mind for major events, and their plug-and-play operation simplifies productions and gives us even more versatility. "Calrec is renowned for technology excellence in OBs. We know we've made a great choice."

Emmanuel Le Marquand , AMP Visual TV Audio Operations Manager

80 fader Apollo, TV Tokyo, Japan

Replacing an analogue console, TV Tokyo's Tennozu studio was upgraded with an Apollo as part of a major update to the broadcaster's flagship studio and was the second Apollo in TV Tokyo's inventory.

"TV Tokyo's challenge was to source a desk that could match their old console in sound quality. The Apollo more than exceeds TV Tokyo's expectations for pristine sound, and its impressive feature set is also a huge improvement."

Yosuke Maruyama of Hibino Corporation

Artemis

	Artemis Shine	Artemis Ray	Artemis Beam	Artemis Light
- DSP Processing Paths	904	680	564	384
- Input Channels	680	456	340	240
- Main Outputs	Up to 16 from pool of 128	Up to 16 from pool of 128	Up to 16 from pool of 128	Up to 16 from pool of 72
- Groups	Up to 48 from pool of 128	Up to 48 from pool of 128	Up to 48 from pool of 128	Up to 48 from pool of 72
- Track Buses	Up to 64	Up to 64	Up to 64	Up to 48
- Aux Buses	Up to 32	Up to 32	Up to 32	Up to 24
- AFL Systems	3	3	3	3
- PFL Systems	3	3	3	3
- Inserts	Pool of 256	Pool of 256	Pool of 256	Pool of 128
- Chan/Grp Direct/ Mix Minus Outputs	Up to 4 per path from pool of 512	Up to 4 per path from pool of 512	Up to 4 per path from pool of 512	Up to 4 per path from pool of 256
- Input Delay	256 legs of 2.73s	128 legs of 2.73s	128 legs of 2.73s	128 legs of 2.73s
- Output Delay	256 legs of 2.73s	128 legs of 2.73s	128 legs of 2.73s	128 legs of 2.73s
- Bus Path Delay	2.73s per path	2.73s per path	2.73s per path	2.73s per path
- Track Sends/Chan or Grp	4	4	4	4
- EQ 1-4	4 band Para	4 band Para	4 band Para	4 band Para
- EQ 5-6	2 band Para	2 band Para	2 band Para	2 band Para
- Sidechain EQ	2 band Para	2 band Para	2 band Para	2 band Para
- Dynamics 1	Comp/Lim and Exp/Gate	Comp/Lim and Exp/Gate	Comp/Lim and Exp/Gate	Comp/Lim and Exp/Gate
- Dynamics 2	Comp/Lim	Comp/Lim	Comp/Lim	Comp/Lim
- Max Faders	72	72	64	56
- Layers	12 Dual Layers	12 Dual Layers	12 Dual Layers	12 Dual Layers
- AutoMixers, each controlling an unlimited number of paths	8	8	8	8
Router Ports	16/32	16/32	16/32	8
Networking	Integral 8192² router	Integral 8192² router	Integral 8192² router	Integral 4096² router
	All I/O provided over Hydra2 network via a range of Hydra2 I/O boxes. Cat5e or fibre connectivity			
Surface	100mm faders with mechanical PFL overpress 12 A/B Layers, providing 24 possible assignments for each fader Colour-changing rotary knobs to indicate function Touch screens controlling I/O, monitoring and routing			

Artemis+

Artemis+ is built on the hardware architecture of the Aremis surface, and combines it with the power and flexibility of Calrec's ImPulse IP processing core, the third generation of Calrec's award winning Bluefin DSP.

Artemis+ offers a new range of IP based consoles from Calrec which provides powerful control, DSP and audio routing with comprehensive redundancy.

Artemis+ has the option of five different DSP pack sizes and enables broadcasters to hang four independent mixing environments onto a single core.

It has native AES67 and SMPTE 2110 connectivity and is compatible with existing Artemis control surfaces providing a simple upgrade path for existing Calrec customers.

Artemis+ also provides 3D immersive paths up to 7.1.4 wide and panning for next generation audio applications. Height and 3D pan controls are provided, with flexible panning and downmixing built in.

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- Up to 1122 input channels
- Main and Group busses expanded to 192
- Supports 3D Immersive path widths for next generation audio
- Input Channels, Groups and Main paths support mono, Stereo, 5.1, 5.1.2, 5.1.4, 7.1, 7.1.2, 7.1.4 width
- Immersive paths have an additional "height" legs to produce a 3D soundfield
- Height and 3D pan controls are provided with flexible panning and downmixing built in
- Monitoring and metering provided immersive content

32 fader Artemis, Al Jazeera Balkans, Bosnia

As part of an expansion and upgrade project, Bosnia's Al Jazeera Balkans installed a Calrec router core, two Artemis audio consoles, and a Summa console.

"We chose Calrec because they offer very powerful, rock-solid consoles built with broadcasters in mind. That's why Calrec is at the heart of our audio infrastructure."

Mirad Isakovic, Manager of the Broadcast Technology Department, Al Jazeera Balkans

32 fader Artemis, Hedgehog, Lebanon

Hedgehog installed a 32-fader Artemis Light console into Lebanon's first HD OB truck. It can handle up to 14 HD cameras and houses a full production setup to meet the demand for HD television production.

"Not only do we have Lebanon's first HD OB truck, but it is also the first OB truck in Lebanon to have this degree of audio power. Calrec was an obvious choice because it has a long, successful history in OB trucks."

George Moufarrej, Hedgehog CEO and managing director

56 fader Artemis, Full Sail University, USA

Full Sail University expanded its world-class performance venue, Full Sail Live, with Calrec's Artemis and Brio36 consoles. The consoles are available to both students and external clients.

"By choosing Calrec's Artemis and Brio36 consoles for the venue, we now have the ability to grow the system and scale it towards the events in that space. Calrec is providing us with a lot more room to grow in terms of the number of busses, channels and networks."

Scott Dansby, Director, Industry Relations, Full Sail University

48 fader Artemis, Tilt, Spain

Madrid-based Tilt, a bespoke audio and video broadcast service provider, installed an Artemis Light console following considerable business growth with customers across sports, music, commercials and documentaries.

"We have a modest budget, so price point measured against performance was very important to us. We also didn't want to have to worry about channel count and to know that we always have all the capacity that we need; we have more than satisfied that requirement with this Calrec install."

Jaume Bordoy, Manager at Tilt

Summa

Surface

- 100mm faders with PFL overpress
- Six surface layers
- Built-in Talkback Microphone
- Stereo Headphone Output

Processing

- 300 DSP Processing Paths
- 180 Input Channels
- 4 x Main Outputs (mono, stereo or 5.1)
- 8 x Audio Sub-Groups (mono, stereo or 5.1)
- 32 x Track Outputs (mono or stereo)
- 16 x Auxiliary Outputs (mono or stereo)
- 1 x Direct Output per Channel* (Pre EQ, Pre Fader or Post Fader)
- 1 x Mix Minus Output per Channel* (can be fed from Auto Minus, Auxes, Tracks or Off Air Conference Bus)
- 1 x Auto Minus Bus
- 1 x Off Air Conference Bus
- 1 x Insert on every Channel, Group, Main and Console Monitor Output
- 152 x External Monitor and Meter Inputs
- 4 x AutoMixers, each controlling an unlimited number of paths
- Unlimited VCA groups
- 6-band parametric EQ on every Channel, Group, Main
- Dynamics processing on every Channel, Main, Group, Aux and Track (2 x Compressor/Limiter, Expander, Gate, Side Chain EQ/Filters)
- 2.73s of delay within every Channel, Group, Main, Aux and Track
- An additional pool of 128 blocks of assignable Input Delay (2.73s each)
- An additional pool of 128 blocks of assignable Output Delay (2.73s each)
- 5.1 Console Monitor Output (with dedicated small LS and PFL/RTB outputs)
- 3 x 5.1 Studio Monitor Outputs
- Advanced AutoFader (AFV) functionality on all faders

Networking

- Integral 4096^2 router
- 8 redundant router connections for networking consoles and connecting I/O boxes
- All I/O provided over Hydra2 network via a wide range of I/O formats
- Cat5e or fibre connectivity

Resilience

- Highly resilient. PSU, DSP, Control Processor and Router Modules are hot-swappable and have automatic redundancy
- Independent DSP operation ensures audio continuity in the event of a surface reset
- Low power consumption and heat generation

* from a pool of 188 mono resources shared between direct outputs and mix minus outputs.

24f + 8f Summa, University of Missouri, USA

Calrec's Summa drives professional broadcast-quality sound for the University of Missouri Athletics department (Mizzou Athletics).

"The improved audio quality definitely makes our live broadcasts stand out. But the Summa also plays a big role in helping us prepare our students for the workplace."

Stan Silvey, Assistant Athletic Director, Broadcast Operations, Mizzou Athletics

24f +8f Summa, Kuwait TV, Kuwait

Kuwait Television (KTV), part of the Kuwaiti Ministry of Information, installed a Summa into an OB van to give KTV the flexibility to cover a wider variety of programming.

"The Summa enables us to take our audio coverage to new heights, and its advanced audio capabilities mean less reliance on third-party companies and on other departments."

Waleed Hamadah, TV Broadcast Engineer, TV Engineering Division, Ministry of Information

24f+8f Summa, LeSports, Hong Kong

LeSports in Hong Kong installed 3 x Summa consoles for its OTT sports video platform. LeSports Hong Kong chose the Summas for their wealth of features and extreme ease of operation.

"At LeSports Hong Kong, we are constantly striving to improve our programming and expand our multiformat content. Summa is an important step in achieving these goals, because they make even the most demanding audio playout tasks very straightforward."

Mr. P.K. Lee, LeSports Hong Kong

24f+8f Summa, HD Protek, Turkey

Turkish OB company HD Protek installed a Summa as part of an upgrade to its HDP 04 outside broadcast unit. The installation marked the first Summa in the Turkish OB market.

"Knowing that the console will work without question is a big comfort to us. Summa adds a powerful new audio-mixing option to our fleet, so we can handle more complex shows more easily."

Yucel Ozacar, general manager of HD Protek

24f+8f Summa, Jimmy Swaggart SonLife Broadcasting USA

Reverend Jimmy Swaggart's SonLife Broadcasting Network (SBN) now relies on Summa and Brio consoles for all its live broadcasts.

"SBN produces approximately six hours of live studio production daily. We needed consoles that were reliable and broadcast-ready at all times."

Dave Cooper, Drector at SonLife Broadcasting Network

24f+8f Summa, AV Compañia de Producciones, Spain

Summa is turbo-charging audio coverage aboard UM 21, a 4K OB vehicle designed by Spanish production company VAV Compañia de Producciones.

"We faced some significant challenges designing UM 21 — not only in meeting Dorna Sports' specific requirements but also the technical complexities of covering a racing circuit like the FIM CEV. We knew the Summa desk would be up to the task, and it has not disappointed."

Israel Perez, chief technology officer of VAV

Brio36

brio·36 duet

Comes with internal Hydra2 connectivity, comprehensive built-in IO and 96 input channels as standard

brio·36 medley

Comes with internal Hydra2 connectivity, comprehensive built-in IO and 96 input channels as standard, plus a Dante 64 card or MADI I/O module and an external Br.IO box with an additional 24 mic/line inputs, 16 analogue outputs & 8 AES I/O

Surface

- 12 or 36 x dual layer faders - 100mm, motorised, with PFL overpress
- Compact footprint:
  - Brio 36 only 892mm wide x 892mm deep x 270mm high
  - Brio 12 only 484mm wide x 892mm deep x 270mm high
- 1 x user assignable rotary control per strip
- 2 x user assignable buttons per strip

DSP

- Freely configurable on the fly, operates at 44.1, 48, 88.2 and 96kHz:
- Up to 96 legs assignable as mono, stereo, or 5.1 Input Channels*
- 36 legs assignable as mono, stereo or 5.1 mains or groups
- 24 legs assignable as mono or stereo auxes
- Up to 96 legs assignable as Insert sends and returns*
- Up to 96 legs assignable as Direct, or Mix-Minus Outputs*
- Automatic Mix-Minus
- Off-Air Conference for Mix-Minus

Dynamics

Every Input Channel and Group path:
- Expander/Gate/Ducker, with key input and sidechain EQ
- Compressor with key input and sidechain EQ
- Multiband Compressor

Every Aux:
- Expander/Gate
- Compressor

Every Main:
- Single Band Compressor
- Multiband Compressor

2 x Automixers available to all mono Input Channels and Groups

EQ

6 band EQ available on every Input Channel, Group, Aux and Main path:
- 4 band full PEQ
- 2 band LF/HF filters, 12 or 24dB/octave

Delay

- Delay available on every path
- Up to 64 legs assignable as output delay
- Up to 64 legs assignable as input delay

Monitoring/Metering

- 3 x Monitor outputs
- Surround capable metering within each strip
- Configurable meter screen output (DVI)
- Loudness meters

Multiple Sample Rates

- Functions at 48, 96, 44.1 or 88.2kHz
- All DSP facilities are available at all sample rates

Remote/Automated Control

- Remote/Automated Control
- 8 x GPI + 8 x GPO built in**
- AutoFaders for Audio Follows Video style control
- CSCP mixer control protocol interfaces with a variety of video switchers and production automation systems
- SW-P-08 'Pro-Bel' router control protocol
- EMBER

I/O

- 24 x Mic/Line inputs**
- 16 x Analogue outputs**
- 8 x AES3 digital inputs**
- 8 x AES3 digital outputs**
- 3 x Expansion slots to increase standard built in I/O, or to provide interface to other formats, including SDI, MADI, Dante etc.
- Optional Hydra 2 Module allows for further I/O to be connected, and to network audio with other consoles

*Up to 64 legs on Brio 12
** Brio 36 only

Brio 36, Video Europe, UK

Video Europe chose Brio for OB5, an eight-camera HD OB truck. OB5 has a smaller footprint for productions such as film premieres, as well as Championship football and Welsh Premier League rugby matches.

"We were absolutely bowled over by Brio. Compact, yet very robust and intuitive, it fits perfectly into a medium-sized truck like OB5, where space is at a premium, but at the same time it delivers all of the functionality we need to handle very complex programs."

Pete Leutner , Video Europe Sound Supervisor

Brio 36, WhitebaitMedia, New Zealand

WhitebaitMedia, the producers of New Zealand's longest running kids show, "What Now," chose the Calrec Brio36 as its new mobile broadcast console.

"The Calrec Brio was the logical choice, because it was the only one to offer the power and flexibility of a larger broadcast console, but at the budget and size of the smaller consoles."

Tim Murdoch, WhitebaitMedia's Technical Manager

Brio 36, Proshow Broadcast, Canada

Proshow Broadcast upgraded its Prodigy HD truck with Brio to bring new levels of broadcast-grade functionality to Prodigy's coverage for major sports broadcast clients including the Pac-12 Network.

"The term 'revolutionary' might be overused in our industry, but the Brio is revolutionary in many ways. There really is nothing else like it for the price point — a truly compact console that doesn't make any compromises on broadcast feature set."

Tim Lewis, president, Proshow Broadcast

Brio 36, Full Sail University, USA

A pair of Brio consoles at Full Sail University provide hands-on training in audio mixing for students in the Film bachelor's degree program, as well as being utilized in the university's on-campus performance venue.

"The Brio's deliver the core functionality that students need at a price point that made sense for us. Since these systems are used throughout the industry, we knew we'd be giving our students experience on a board they'll be using in the future and throughout their careers."

Scott Dansby, Director, Industry Relations at Full Sail University

Brio 36, Bleacher Report, USA

Popular online sports publisher Bleacher Report installed two Brio consoles for programming ranging from pro and college football, soccer, and basketball to fantasy football and panel shows.

"The Brios are our first Calrec desks, and they're a great addition to our team. Brio can accommodate any skill level, which makes it really ideal for our crew. The layout is easy to grasp at first glance and displays the data in a very intuitive and natural manner."

Mark Steinmetz, studio operator/audio engineer, Bleacher Report.

Brio 36, Rush Media, USA

Brio was the console of choice for Rush Media's recently completed six strong new OB fleet. Primarily used for sports broadcast, the mobile unit provider was looking for a high-quality audio console with a small footprint.

"The Brio is the perfect fit to bring all of the equipment elements together, in a limited space, with no other console at this price point coming close. Our job became a lot easier once we made the switch to Calrec, with both integration and implementation. With various engineers using the console from show to show, ease of use is really important. The Brio, as with all Calrec consoles, is built for broadcast; the user is up and running a few minutes after sitting down."

Rusty Cummins, Senior Engineer, Rush Media

Type R

Type R is a modular, expandable, IP-based mixing system for TV and radio which utilises standard networking technology and combines it with soft panels that can be tailored to operator needs.

Simple customisation across networks, open control protocols and surface personalisation means Type R can be used with or without a physical surface. Up to three independant mixing environments can be operated remotely from just one core. Control and setup can be via Calrec's browser-based Assist application and it is fully compatible with automated systems.

Surface and Hardware

- Full size 100mm faders
- External Talkback microphone
- 2 x stereo headphone outputs (1/4"TRS jack) I/O boxes
- Integral 512^2 router
- AoIP connectivity, including redundant connectivity for all I/O boxes
- Up to 256 audio channels per AoIP port

Processing

- Multiple sample rates; operates at 44.1 and 48kHz. All DSP facilities available at all sample rates.
- Between 20 and 120 input channels per console
- Up to 3 x (mono / stereo / 5.1) main outputs
- Up to 8 x (mono / stereo / 5.1) a groups
- Up to 16 (mono or stereo) aux outputs
- Dedicated suite of Dynamics and EQ on all channels and groups
- 11 x mono mix minus buses
- 1 x off-air stereo conference bus
- 48 x external monitor/meter inputs
- Unlimited VCA groups

I/O

- 4 x AES inputs, 4 x AES outputs, 8 x analogue mic/line, 8 x analogue line level output, 12 x GPI, 12 x GPO ports and 2 x stereo headphone outputs, with optional redundant AoIP boards
- 1U Combo I/O unit provides 4 x AES inputs, 4 x AES outputs, 8 x analogue mic/line input, 8 x analogue line level output, 6 x GPI, 6 x GPO ports and 2 x stereo headphone outputs, with optional redundant AoIP boards
- 1U Analogue I/O unit provides 16 x channels of analogue mic/line input, 16 x channels of analogue line level output, 6 x GPI and 6 x GPO ports
- 1U Digital AES I/O unit provides 8 x AES inputs, 8 x AES outputs, 6 x GPI and 6 x GPO ports

The touch-screen soft panels are designed around simple and colourful control elements and can be customised as multi-function panels from show-to-show. The Talent Panel (below) can be easily added and an IP endpoint.

Type R, RTM, Malaysia

Radio Television Malaysia installed six Type R consoles as part of a move to implement a new IP audio network infrastructure at Perlis FM. The facility is now the reference for all future upgrades to RTM's other regional stations.

The complete radio system included a full IP network and visual radio technology to support video streaming to social media and other online platforms.

The IP native Type R consoles are located in Perlis FM's Main Conty, Standby Conty, Edit (1 & 2), Ingest, News Depot Studios and Master Control Room respectively.

Type R, Boîte à Outils Broadcast, France

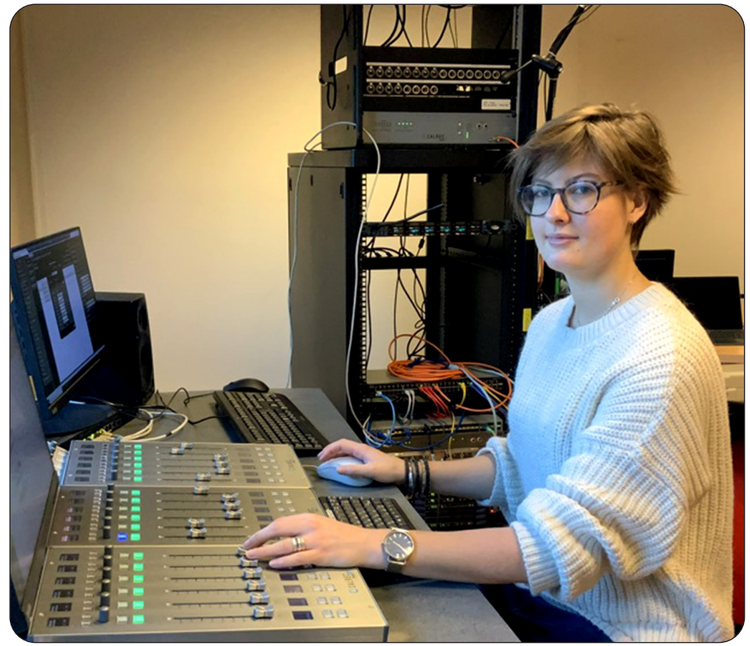
Calrec's Type R console was used as a remote console over ST2110 and installed at home by the sound engineer. Remote control was achieved using Calrec's virtual mixing UI Calrec Assist via Google Chrome, giving access to console features such as aux sends, Automix and monitor feeds.

"Calrec's Type R is a modular mixer with ST2110 compatibility. All of the faders or screen are connected via IP to the core and stageboxes are connected to the core with a ST2110 feed.

"This mixer fitted perfectly with this use case because it's made for IP. Having the ability to network multiple IP devices for each console is very useful.

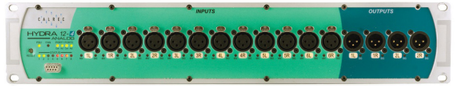
"Consoles are managed via a web Interface, and in the case of a network problem at the Sound Engineer's home, we can take control from the control room using the web GUI or a physical fader panel."

Marine Martignac, Freelance Audio Technician



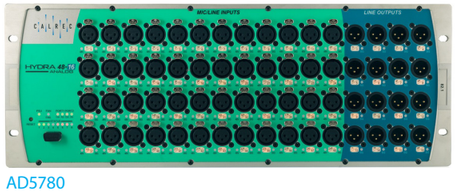
I/O

Fixed Format I/O

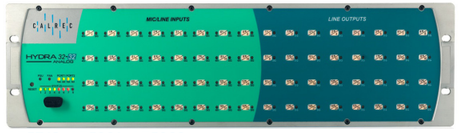


AD5782
Analogue Mic/Line 12 In/4 Out - XLR (Hydra2 and IP)

AD5781
Analogue Mic/Line 24 In/8 Out - XLR (Hydra2 and IP)

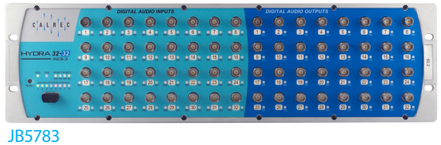


AD5780
Analogue Mic/Line 48 In/16 Out - XLR (Hydra2 and IP)

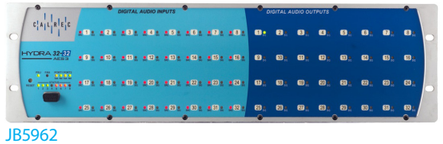


AE5743, AE5991, AE5992
Analogue Mic/Line 32 In/32 Out- EDAC (Hydra2 and IP)

JB5606
Digital AES3 16 In/16 Out – BNC (Hydra2 and IP)



JB5783
Digital AES3 32 In/32 Out - BNC (Hydra2 and IP)



JB5962
Digital AES3 Rear Mount 32 In/32 Out - BNC (Hydra2 and IP)

JD6503
Type R IP AES I/O Interface box

AD6502
Type R IP Analogue IO Interface box

AD6501
Type R IP Combo IO Interface box

Digital I/O

JX5869
4 x Digital AES Input (XLR)

JB5860
4 x Digital AES Input (BNC)

JX5868
4 x Digital AES Output (XLR)

JB5837
4 x Digital AES Output (BNC)

JD5842
8 In, 8 Out Digital AES (D-Type)

JM6199
1 x Madi In/Out - AES10 (BNC/SFP)

SDI, GPIO, AoIP

VI5872
2 x SDI Embedder (BNC)

VO5841
2 x SDI De-Embedder (BNC)

WY5858
GPIO, 8 In/8 Full Changeover Out (D-Type)

WY5859
GPIO, 8 In/16 Out (D-Type)

BI6192
Dante with Network Redundancy (RJ45)

BI6218
Waves Soundgrid (RJ45)

Analogue I/O

AD5840
4 x Mic/Line In (XLR)

AL5870
2 x Mic/Line In with Splits (XLR)

AD6057
8 x Analogue Mic/Line Level Inputs (D-Type)

AD5838
8 x Analogue Line Level Inputs (D-Type)

DA5839
8 x Analogue Line Out (D-Type)

DA5867
4 x Line Out (XLR)

AD6365
4 x Transformer Mic/Line In (XLR)

EE5833
Modular 3u I/O box enclosures with 20 x I/O card slots (Hydra2 and IP)

Br.IO*

- 24 x Mic/Line inputs
- 16 x Analogue outputs
- 8 x AES3 digital inputs
- 8 x AES3 digital outputs

Fieldbox and H2Hub

- 8 x Mic/Line inputs
- 8 x Line outputs
- Compact 220mm x 384mm, 1u high
- AC and DC input power

- Portable hub or switch point for a Hydra2 network
- Connect up to 4 external connections, which may be I/O boxes or other Hubs
- Potential to daisy-chain up to 3 x H2Hubs
- Primary and Secondary SFP slots for redundancy

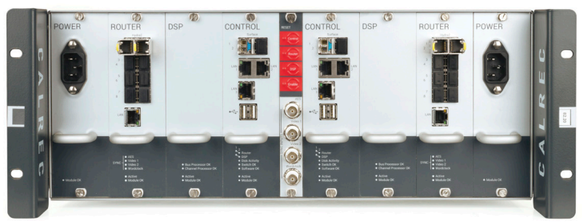
VP2 headless console

Calrec's VP2 virtualised mixing system has no physical control surface and uses Calrec's Assist software for setup and control.

This enables a station to reap many of the benefits of using a Calrec console, but without a physical control surface.

VP2's 4U core comes in 3 DSP sizes; 128, 180 and 240 input channels.

Assist can be accessed via a web-browser, giving instant control to both the engineering level and the production area.



An expanded feature set provides a comprehensive interface; CSCP allows VP2 to be controlled by an automation system and a low cost, third party fader pack.

Operators can control functions using the automation system/fader pack, and an engineer can fine tune the setup or recall setups as needed.

* only available for Brio and Summa consoles

RP1 – Remote Production

RP1 is a broadcast mixing system in a 2U rackmount box, containing Calrec's award-winning Bluefin2 processing.

It provides local DSP to enable the generation of monitor mixes and IFBs with no latency and gives an operator in a remote studio direct control over channel functions such as mic gains, aux send/monitor mix levels and fader levels.

It also provides a mechanism to embed audio into existing backhaul technologies, such as SDI or SMPTE 2022.

With all DSP processing for monitor mixes taken care of on-site, the studio transmission console is able to concentrate purely on the main programme mix.

RP1 can embed all the transmission audio into existing video transport mechanisms, ensuring no synchronisation issues. Its modular I/O backbone accepts any of Calrec's I/O cards.

This versatility means RP1 can connect via a range of transports. The studio console mixing the transmission is able to assign these signals where required on the desk, so workflows are exactly the same as any other broadcast.

- 3 x expansion slots to increase standard built in I/O, or to provide interface to other formats, including SDI, MADI, Dante etc.
- Hydra2 Module allows for further I/O to be connected, and to network audio with other consoles
- 8 x GPI + 8 x GPO built in

RP1 Case Study with the BBC

BBC Sport has been embracing remote production for many years, having used it in Vancouver 2010 Winter Olympics and again in Sochi 2014.

In 2018 Calrec's RP1 solution was successfully deployed with the BBC at both the Olympics in Pyeongchang and the Commonwealth Games in the Gold Coast, Australia.

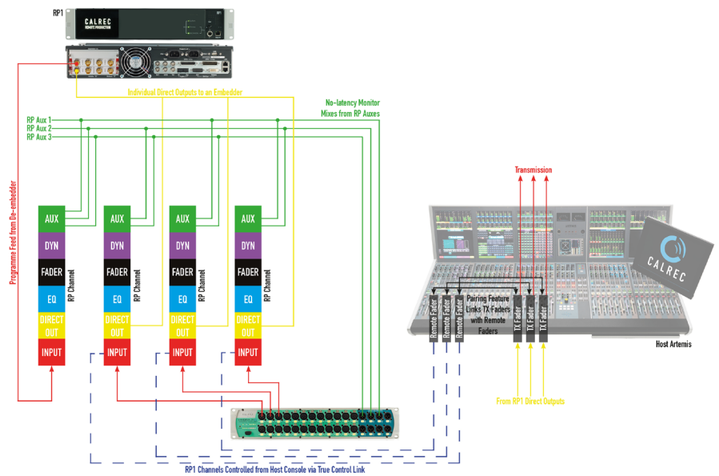
"Latency is absolutely key to any live sports production – the main consideration being the talent hearing what they need to hear to do their job properly," explains BBC Lead Sound Supervisor Dave Lee. "They need to hear a combination of things: mainly instructional talkback information from the production team plus the programme into which they are contributing.

"They must be able to talk to one another – presenter to commentator to reporter and so on. This involves a lot of bi-directional audio traffic."

Working collaborative with Calrec resulted in RP1, which sits at the remote venue. The latency challenge is solved by providing local DSP channels for mixing the venue audio locally, along with switched talkbacks and mix-minus-all-venues added to each contributor's mix.

"We can now treat audio content generated in the UK, which is behind-time, separately from the instantaneous audio content generated locally. Anything that's available on the event side of the latency, the talent only hears through the RP1 remote mixer; it doesn't pass to the UK and back."

Visit calrec.com for the full version of this article.



ImPulse core

ImPulse is a powerful audio processing and routing engine with AES67 and SMPTE 2110 connectivity and is compatible with existing Apollo and Artemis control surfaces to provide a simple upgrade path for existing Calrec customers.

ImPulse has a robust and scalable DSP platform to give Calrec customers a defined upgrade path as they transfer to IP workflows.

Using the next generation of Calrec's award-winning Bluefin DSP technology – Bluefin3 – ImPulse has the most powerful DSP engine on the planet and can be switched between five different user-upgradable DSP packs.

ImPulse allows up to four DSP mix engines and control systems to run independently on a single core at the same time.

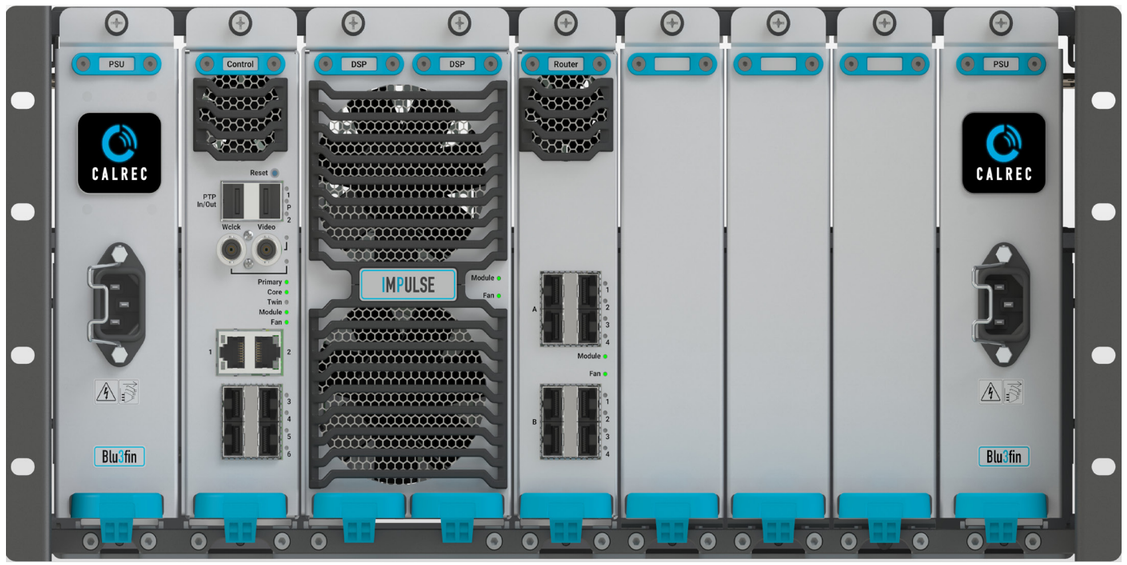
- Additional Main and Group capacity allows immersive content to be produced
- Integrates with Calrec Assist web-UI
- Supports 3rd party remote controllers such as video switchers and production automations systems
- SW-P-08 remote control over router cross-point switching with no reduction in surround buses
- Supports "Headless" operation – no surface required

ImPulse also provides 3D immersive path widths and panning for next generation audio applications. Height and 3D pan controls are provided, with built-in panning and downmixing.

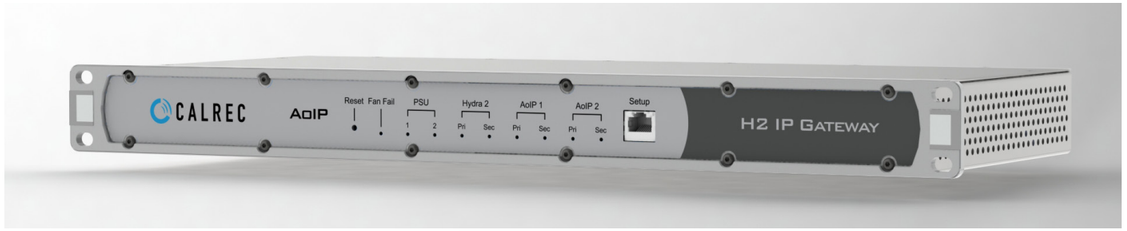
- Contains next generation Bluefin3 DSP
- Supports 3D Immersive path widths for next generation audio
- Immersive paths have an additional height legs to produce a 3D soundfield
- Input Channels, Groups and Mains support mono, Stereo, 5.1, 5.1.2, 5.1.4, 7.1, 7.1.2, 7.1.4 widths
- Monitoring and metering provided for immersive content

Designed for native IP integration, ImPulse meets your needs now and in the future.

- All audio I/O is AES67 and SMPTE ST-2110 compliant
- ST2022-7 redundant connetions per card
- Built-in support for NMOS discovery and connection management
- Support for mDNS/Ravenna discovery
- Up to 4 router cards
- Max router capacity of 10,240 x 10,240
- Router cards can operate in 1 or 10Gbps mode
- Each AoIP stream can pass between 1 to 80 audio channels
- High bandwidth utilisation
- Full hardware redundancy
- Redundant pairs of cores can be physically remote from each other
- Surface connectivity is via IP, so surfaces can be physically remote, connected over COTS networks



IP Gateway



The broadcast industry is going through huge infrastructure changes, and much of the discussion is around the move from proprietary infrastructures, like Calrec's Hydra2, to IP networks.

There are pros and cons with either option – but broadcasters don't need to choose between the two. In fact, there are countless other options.

Broadcasters need not choose one or the other.

Calrec is helping many broadcasters leverage their existing equipment to benefit from the efficiencies of an IP domain. Most broadcasters are still using proprietary systems where they have made major investments, but that doesn't mean they can't benefit from the efficiencies of IP at the same time.

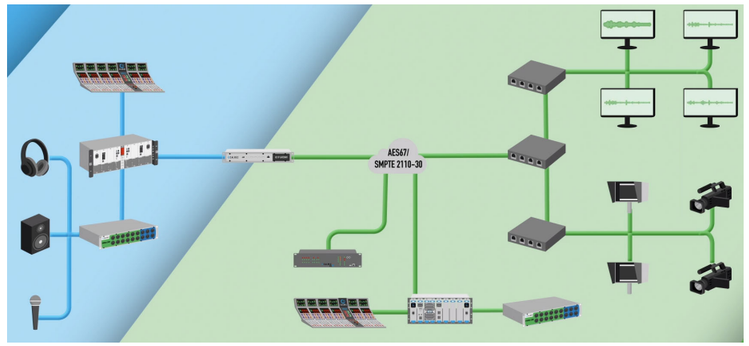
Calrec's H2-IP Gateway provides an interface between a Hydra2 network and an AoIP network. This allows Calrec equipment to sit on an IP network, or Calrec equipment to sit on a proprietary Hydra2 network. Or any combination of the two.

It awards an extra control level that allows audio labels to be passed in both directions between the two networks along with control data.

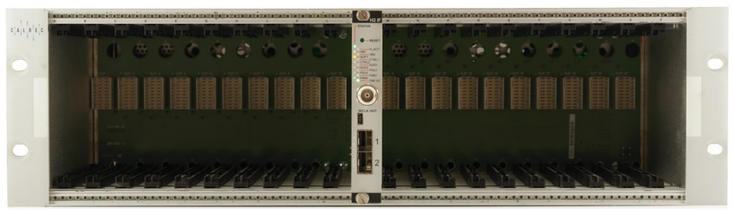
This gives Hydra2 users the ability to control the gain of Calrec IP mic inputs, and IP users can control gain of Hydra2 mic inputs.

It is SMPTE 2110/AES67-compatible and expands Calrec's range of AoIP solutions.

The 1U gateway can pass either 256 or 512 channels of audio in each direction and multiple gateways can be used to increase capacity or to connect with multiple networks.



AoIP Modular I/O Controller Card



Calrec's AoIP Modular I/O Controller card can operate in either Hydra2 or AoIP mode.

The mode is selected via a simple switch on the card making it dual purpose, allowing for it to be used on either network. Not only does this make a tailorable AoIP I/O solution for the ImPulse core, it also fits into existing Modular I/O frames so units can be upgraded in the field.

The card provides two redundant pairs of 1G SFPs to allow 512 audio channels to pass without over-using bandwidth in AoIP mode.

The AoIP Modular I/O Controller card is SMPTE 2110/AES67-compatible and expands Calrec's range of AoIP solutions for new and for existing customers.

Hydra2 consoles

	Apollo	Artemis Shine	Artemis Ray	Artemis Beam	Artemis Light	Summa	Brio36	Brio12
DSP Processing Paths	1292	904	680	564	384	300	156	124**
Input Channels	1020	680	456	340	240	180	96	64**
Max Physical Faders	320	72	72	64	56	44	36	12
Max Main Output Buses	16					4		
Max Group Buses	48					8		
Track/IFB Output Buses	96	64			48	32	N/A	
Track/IFB Sends per Path	4					1	N/A	
Aux Output Buses	48	32			24	16	24	
Mix-Minus Outputs and DIrect Outputs	512				256	188	64	48
Insert Send and Returns	256				128	252	132	100
EQ	6 band EQ on every processing path						6 band EQ on every processing path plus 2 filters	
Dynamics	2 x compressor/limiters and 1 x expander/gate per path						2 x compressor/limiters and 1 x expander/gate/ducker per path*	
Input Delay	256 of up to 2.73s						96 of up to 5.4s	64 of up to 5.4s
Path Delay	1020 of up to 2.73s	680 of up to 2.73s	456 of up to 2.73s	340 of up to 2.73s	240 of up to 2.73s	180 of up to 2.73s	96 of up to 5.4s	64 of up to 5.4s
Output Delay	256 of up to 2.73s			128 of up to 2.73s			96 of up to 5.4s	64 of up to 5.4s

Maximum sizes quoted
* No compressor/limiter 2 on auxes, no expander/gate/ducker on main 2
** Max available with DSP upgrade to 64 channels. Standard Brio12 has 48 Input Channels and 108 DSP Processing Paths

ImPulse consoles

	Argo only			Argo, Apollo+ and Artemis+				
DSP Processing Paths	2384	2128	1872	1458	1056	800	672	528
Input Channels	2048	1792	1536	1122	768	512	384	256
Max Physical Faders	240			320 (Apollo+) / 72 (Artemis+)				
Max Main Output Buses	Up to 16 from Main/Group pool of 192 mono legs							Up to 16 from Main/Group pool of 96 mono legs
Max Group Buses	Up to 48 from Main/Group pool of 192 mono legs							Up to 16 from Main/Group pool of 96 mono legs
Track/IFB Output Buses	Up to 96 from a pool of 96 mono legs			Up to 64 from a pool of 64mono legs				Up to 48from a pool of 48 mono legs
Track/IFB Sends per Path	4							
Aux Output Buses	Up to 48 from pool of 48 mono legs			Up to 32 from pool of 32 mono legs				
Mix-Minus Outputs and DIrect Outputs	Up to 4 outputs from pool of 512 mono legs							Up to 4 outputs from pool of 256 mono legs
Insert Send and Returns	Pool of 256 mono legs							Pool of 128 mono legs
EQ	6 band parametric EQ/filters on every channel, track, aux, group and main							
Dynamics	2 x compressors/limiters + 1 x expander/gate/ducker + 2 x full bands of sidechain EQ per channel, track, aux, group and main***							
Input Delay	Up to 2.73s per input from pool of 256 mono legs							Up to 2.73s per input from pool of 128 mono legs
Path Delay	Up to 2.73s per path							
Output Delay	Up to 2.73s per output from pool of 256 mono legs							Up to 2.73s per output from pool of 128 mono legs

Maximum sizes quoted
*** No Ducker on Mains

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