

CALREC: BRINGING GOLF UP TO PAR

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Introduction

Back in the 1980's we were confident of several indefensible truths:

1. Robots were going to take over the world, just as soon as they became self-aware, which was any day.
2. Back to the Future was an accurate representation of what life would be like in the next century, and we were all looking forward to it.
3. With the advent of Teletext, we had all sports information at our fingertips. We had reached the pinnacle of our ability to get information.

With the obvious exception of number one, these things never came to pass and probably never will. In fact, our ability to consume information keeps growing, and our insatiable consumption of sports is a good example of this. At NAB 2015 the direction of Calrec's announcements were all geared around ease of communication – between sources, between manufacturers, between protocols and yes, between the people who actually use Calrec products. And all this is great news for sports.

Sports coverage has undergone the biggest transformation of all. Sport drives significant developments in broadcast technology, and this constant shifting not only affects how sport is broadcast, but more fundamentally how we consume it. Second screen technologies have their own dedicated content and big names are looking at how object based audio can give viewers even more control over their viewing experience.

As consumers and as an industry our expectations have never been higher. We have multiple pitch-side mics, Skycam, 3D cameras, underwater cameras, on the fly screen graphics, enhanced behind-the-scenes coverage, Drones, and Go-Pros everywhere. At the Olympics we want to choose which sport to watch through interactive controls. If we are watching the Masters in Augusta we don't just want the first six and the last three holes – we want them all in HD, On Demand, and on the device of our choosing.

In fact, the Masters is a fabulous example - golf is big business and coverage has blossomed. This year CBS Sports and the Masters Tournament unveiled Masters Live, broadcasting live coverage on CBSSports.com with five full channels of golf for the 2015 Tournament. This equates to more than 125 hours of live video, plus in-progress highlights, in addition to live coverage through traditional broadcast methods, to all continents.

And golf coverage is expensive. It involves complex and expensive runs of copper and fibre over long distances with mic/line inputs in multiple locations – another consequence of increased coverage is a parallel increase in cabling, and this is one of the issues where Calrec has listened to its customers to find a solution. Put simply, we were asked how to cut costs, reduce weight and simplify the installation for Outside Broadcast (OB) customers.

The Fieldbox

Ten years ago, miking up a golf course would have used lots of analogue connections. Miles of heavy copper would connect to a number of mics on the greens, the tees and to commentary areas. This model worked, but has become impractical for modern broadcast environments where every hole, every tee, fairway mics and even more commentary positions for international providers or second language mixes and roaming presenters all need to be miked.

Over the last ten years, the use of networking technology offered partial solutions. Modern networks use portable field-based I/O units to simplify this cabling (Figure 1), but these boxes often require AC power and can be difficult to integrate and still require significant albeit shorter copper cable runs. Some of our customers have cut these costs by interfacing Calrec systems with third party I/O options, but this sacrifices the advantages offered by audio networks like Calrec's Hydra2 that offer significant control functions such as mic gain and phantom power control, signal management, signal ownership, label-sharing and automatic network patching direct from the console. In large, ad hoc audio networks, these management tools are essential.

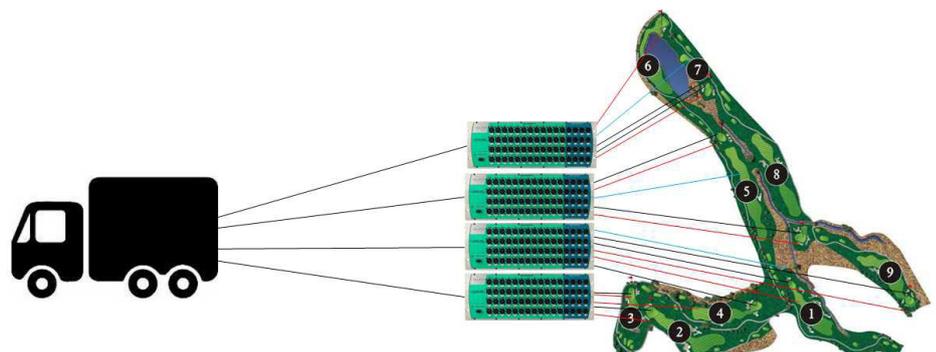
Calrec's Fieldbox, launched at NAB 2015, fills this need for more cost-effective I/O in field applications while retaining all the benefits of Hydra2.

When sources are spread over a large area, they can be placed as close to their sources as possible, resulting in significant savings on rigging time and overall cabling cost as well as reducing cable storage and transport.

CALREC'S FIELDBOX



FIGURE 1



Reducing the distance that analogue mic level signals are carried also reduces the noise and interference picked up, improving audio performance by the longer run connections being moved from analog copper cabling to fibre. (Figure 2).

The Fieldbox functions just like any other Hydra2 I/O, providing remote control over input settings, and utilises Hydra2's sophisticated sharing, protection and access management system, along with active status monitoring, and a backup Hydra2 network connection. The locational flexibility goes even further as the units can be powered by

an industry standard battery pack or AC feed. Batteries would likely be used as the primary power source at some locations on the field and provide backup functionality at other locations where AC power is readily available. There is no drain on the battery and switch-over from AC to DC is seamless. Like all Hydra2 units System Status warnings are issued across the network and front panel LED indication is provided if the battery level is low.

Adding lots of Fieldboxes is a solution to running miles of heavy copper cable but all those Fieldboxes still need to connect

to the truck. All we have done so far is move from lots of copper to lots of fibre, and this is one time when there is too much fibre in our diet!

H2Hubs

To add further distribution flexibility to a Hydra2 network, Calrec launched the H2Hub alongside the Fieldbox, which uses the same compact form factor to provide aggregation points for the Fieldboxes or other Hydra2 I/O units. A single connection from the router can then be switched via a H2Hub to multiple I/O units.

CALREC'S H2HUB

FIGURE 2

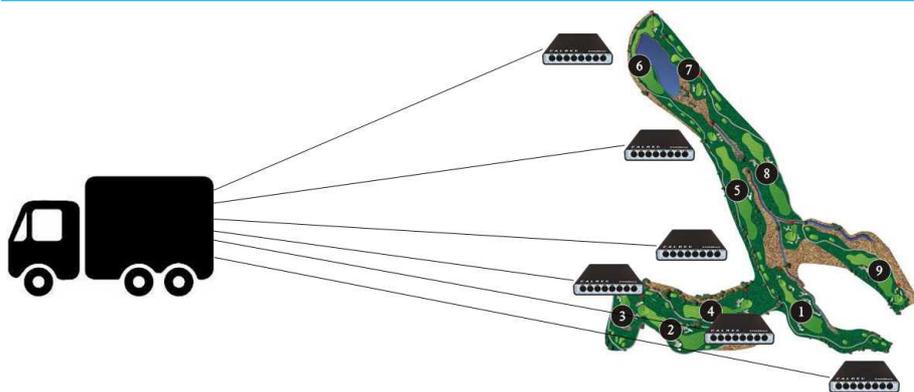
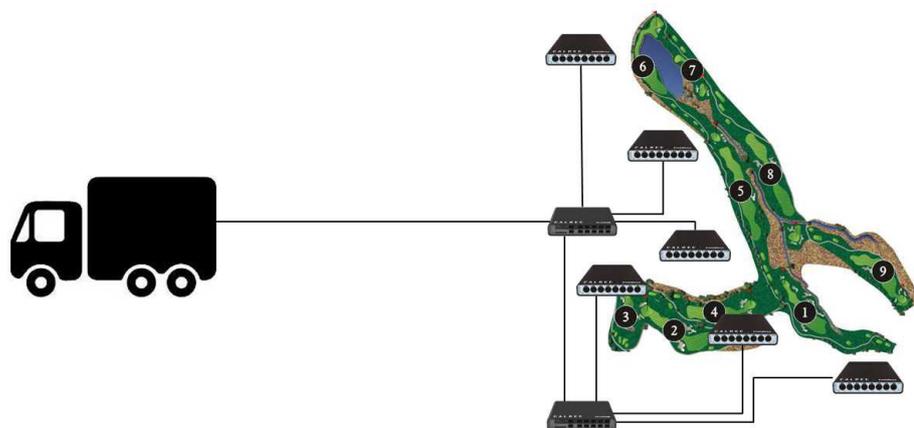


FIGURE 3



Of particular use is that another H2Hub can be daisy-chained to the first if further I/O distribution is required. The H2Hub's connection and distribution options make them ideal for forming ad hoc networks, especially when combined with the Fieldboxes and other Calrec I/O infrastructure (Figure 3)

In April 2014 Calrec committed itself to an agnostic future. While we felt that MAD1 continued to serve the industry extremely well, we predicted that we would see AoIP interconnections providing more flexible and elegant replacements. The appeal of audio networking is vast: it saves money, increases efficiency, provides additional security and redundancy, and encourages remote working.

Most of all it promotes freedom of choice - if everything works with everything, broadcasters can choose equipment based on its suitability for their requirement.

There are a number of protocols vying for attention, with AES67 aiming to occupy the common ground as an industry standard. But committing to a single format at this time is a real risk for many of Calrec's customers. There is no doubt in our minds that AoIP is the future, but just like our 1980's view of robots taking over the world, do we need to view AoIP with similar caution?

Robots didn't take over the world because they weren't developed that way or given the control to do so. AoIP is similar in that respect: control is paramount. Otherwise, we are just replacing MADI with an AoIP link. The win, as we see it, is being able to live in an AoIP environment while maintaining the control and functionality that our clients are used to and need.

Current IP solutions do not lend themselves well to dynamic, rapid configuration. A stream is not necessarily well suited to route signals from one place to another. Streams need to be large in order to be efficient, but small in order to be flexible. It is theoretically possible to plan a set of stream configurations that will strike the right balance for connections that remain static, but it is a hugely complex and impractical undertaking to reconfigure IP streams/ manage stream widths in order to meet signal routing demands which can change dramatically in the middle of a large sporting event such as Golf. In short, push-button routing and salvos do not currently fit easily with AoIP or AVB.

Broadcast console manufacturers have products to do these jobs, operating via audio networking protocols designed to allow control rooms and studios to connect and share resources seamlessly, and making it easy for any given programme to be made in a different studio or control room without any manual re-patching of signals. This gives clients a lot of flexibility in their management of studio resources. The same applies to the creation of large OB events, like golf or one-off entertainment spectaculars.

Calrec's Hydra2 protocol is very adept at this – it carries thousands of low-latency audio channels and control information that allows port parameters to be controlled. Hydra2 also monitors the network, and offers other safeguards such as the protection of routes to prevent accidental interruption or over-patching of critical signals, and integration with other broadcast control systems. These transports are characterised by low-latency, totally deterministic performance, redundancy, and instantaneous on demand routing (via push button or salvo) that is easily controlled from the mixing console surface.

Calrec has pledged to be agnostic and to work with ALL these AoIP standards,

in order to bridge the gap between the convenience of IP streams, and the safeguards and controls of Hydra2 in these demanding environments. It's what the market demands - some clients will like the standardization of AES67, but others might use Dante as it currently has a wider portfolio of products and manufacturers.

Inside the Fieldbox

For all these reasons it is vital that AoIP options were integrated at the heart of the Fieldbox design. Inside the case is the functionality to insert an optional AoIP sub-card (such as the Dante Brooklyn card) which will allow Calrec customers to upgrade to a variety of AoIP formats in the future, and still have access to all the protections built into the Calrec Hydra2 protocol.

Connectivity with DiGiCo

Calrec introduced further integration with third party equipment at NAB to give OB customers even more network control. The first technology release developed in conjunction with DiGiCo since the formation of Audiotonix pro audio group in August 2014, NAB saw the introduction of the Hydra2 card on DiGiCo's new Orange Box.

DIGICO'S ORANGE BOX



Calrec and DiGiCo share many of the same customers in that DiGiCo consoles are regularly used as feeder consoles to Calrec consoles in the main OBs at large sporting and entertainment events. DiGiCo's new 2U Orange Box is a simple-to-use audio format converter with multiple options, allowing you to use DiGiCo Multichannel Interface (DMI) cards to create audio paths over a variety of interfaces.

There are ten current interfaces available (Hydra2, Dante, Optocore, Aviom, ADC, AES, BNC, CAT5, DAC and SoundGrid), but for Calrec's customers it enables a DiGiCo console to sit on a Hydra2 network. The development offers our broadcast customers the ability to have enhanced control that isn't possible with traditional MADI systems, and to save time and money by streamlining their workflows.

In this instance, the Calrec card sits on DiGiCo's Hydra2 DMI card in the Orange Box and redundantly connects into a Hydra2 router via fibre or copper like any other Hydra2 I/O connection. A MADI DMI card also sits in the Orange Box, which in turn connects to any DiGiCo console.

The dual MADI connection allows 112 channels of audio to pass from the Hydra2 network, but provides more than just a transport system, it also gives operators added control.

The big win for our clients, is that this link provides the ability to share labelling and control input gain along with I/O switching for phantom power.

Calrec is already talking to other manufacturers about future development that will allow them to integrate their equipment onto the Hydra2 network. That development continues Calrec's agnostic interoperability drive of the past few years and offers a unique integration opportunity to third-party manufacturers of complementary products.

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Putting Sound in the Picture