

Applications Note 22-2: Use of the ION2.0 & ION0.2 in a typical Hotel Ballroom/Banqueting Application

1 ION2.0/ION0.2

The Media Technology Systems ION2.0 and ION0.2 are 2 channel wall/floor mount CobraNet™ interfaces powered by PoE (Power over Ethernet). The ION2.0 converts 2 analog Mic/line input channels into 2 Cobranet audio streams. Similarly, the ION0.2 converts 2 CobraNet™ audio streams into 2 analog line level output channels.

The form factor of the ION2.0 and ION0.2 is a 2 gang wall mount Decora® wall plate, see below.

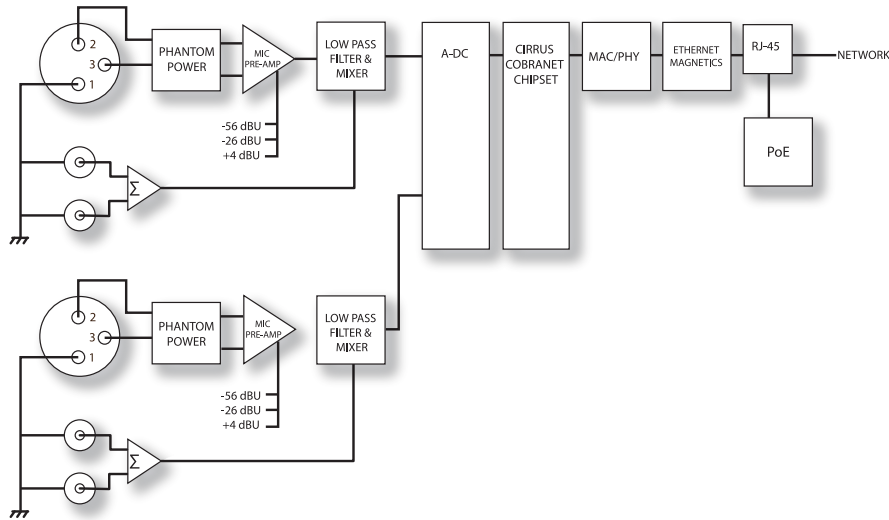


Front Panel above



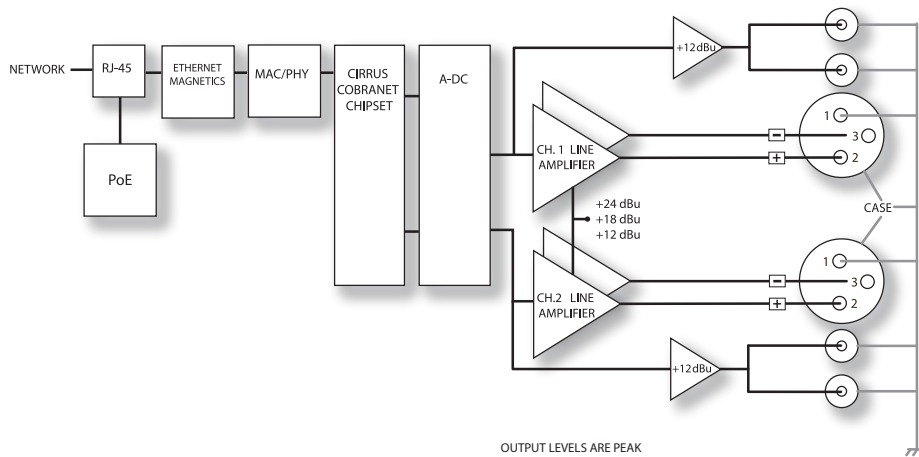
Rear showing network interface and CobraNet™ Chipset.

The signal path of the ION2.0 is given below.



The two RCA's are -8dBu (nominal), summed to mono and mixed in with the balanced XLR-3F. The balanced input has gain of +60dB, +30dB and 0dB, with a nominal input of -56dBu, -26dBu and +4dBu respectively (+22dBu peak). Phantom power is automatically applied to the +60dB and +30dB gain settings.

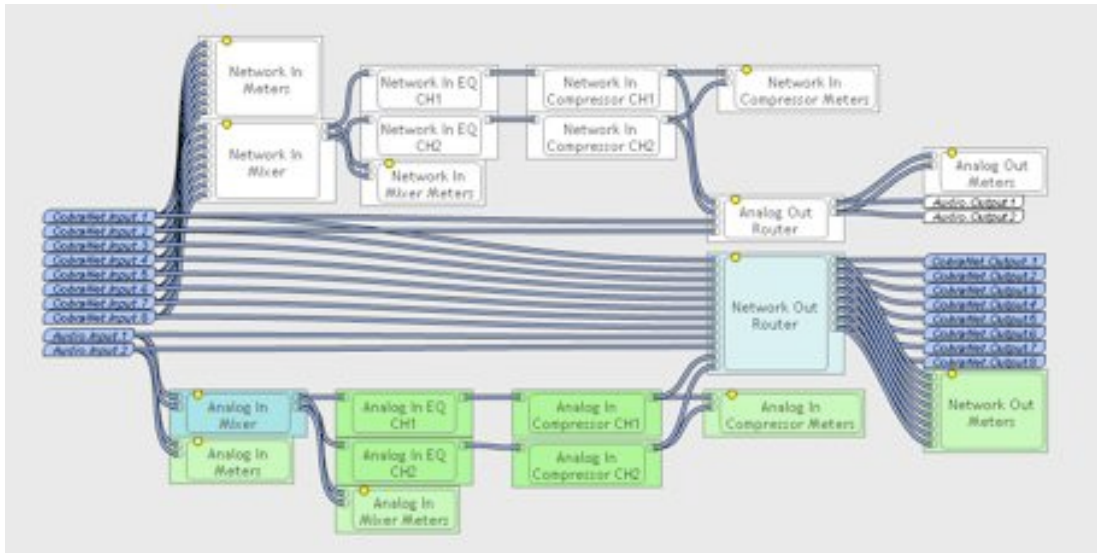
The signal path of the ION0.2 is given below.



For the ION0.2, the two RCA's are a mono feed (-8dBu nominal) derived from the XLR-M balanced output. The balanced output has -8dBu, -2dBu and +4dBu nominal outputs (+22dBu peak).

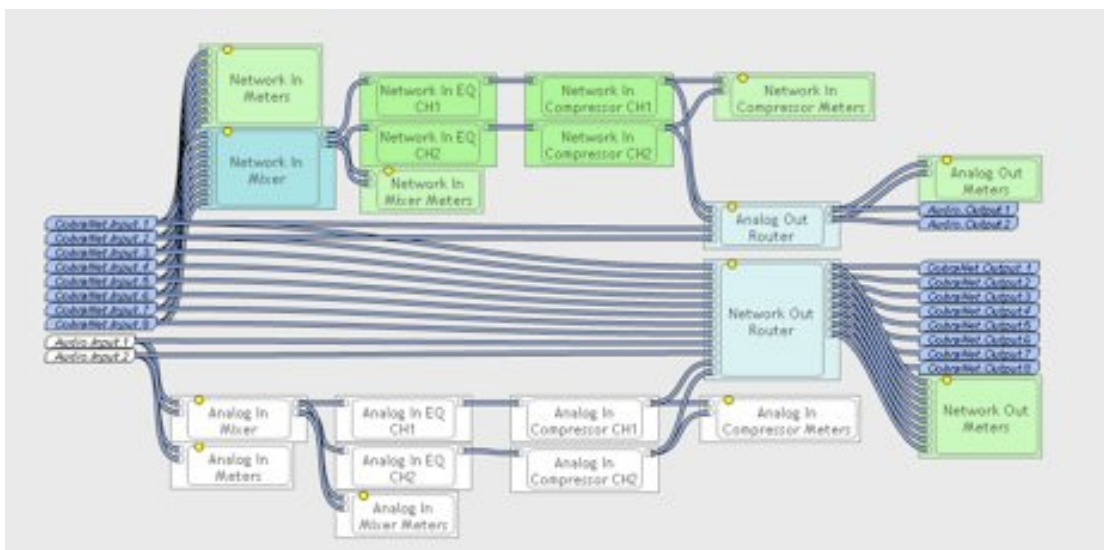
In addition, the ION2.0 and ION0.2 both have 'on board' DSP for audio signal processing. The intention is to take some of the processing load off the 3rd party Control Room DSP, by pre-conditioning the Microphone input signal before streaming to the network and providing simple loudspeaker management processing.

The block diagram below shows the internal routing common to both the ION2.0 and ION0.2, with the ION2.0 section highlighted in color.



The DSP provides simple Input/Output routing, with 2 DSP side chains available for the analog inputs on each ION2.0. The side chains connect to the analog inputs via a simple 2x2 input mixer. Each side chain contains a 5 band parametric equalizer, high pass, low pass and low shelf filters (to compensate for proximity effect on microphones) and finally a compressor.

The ION0.2 uses the remainder of the DSP schematic. The block diagram below shows the internal routing common to both the ION2.0 and ION0.2, this time with the ION0.2 section highlighted in color.



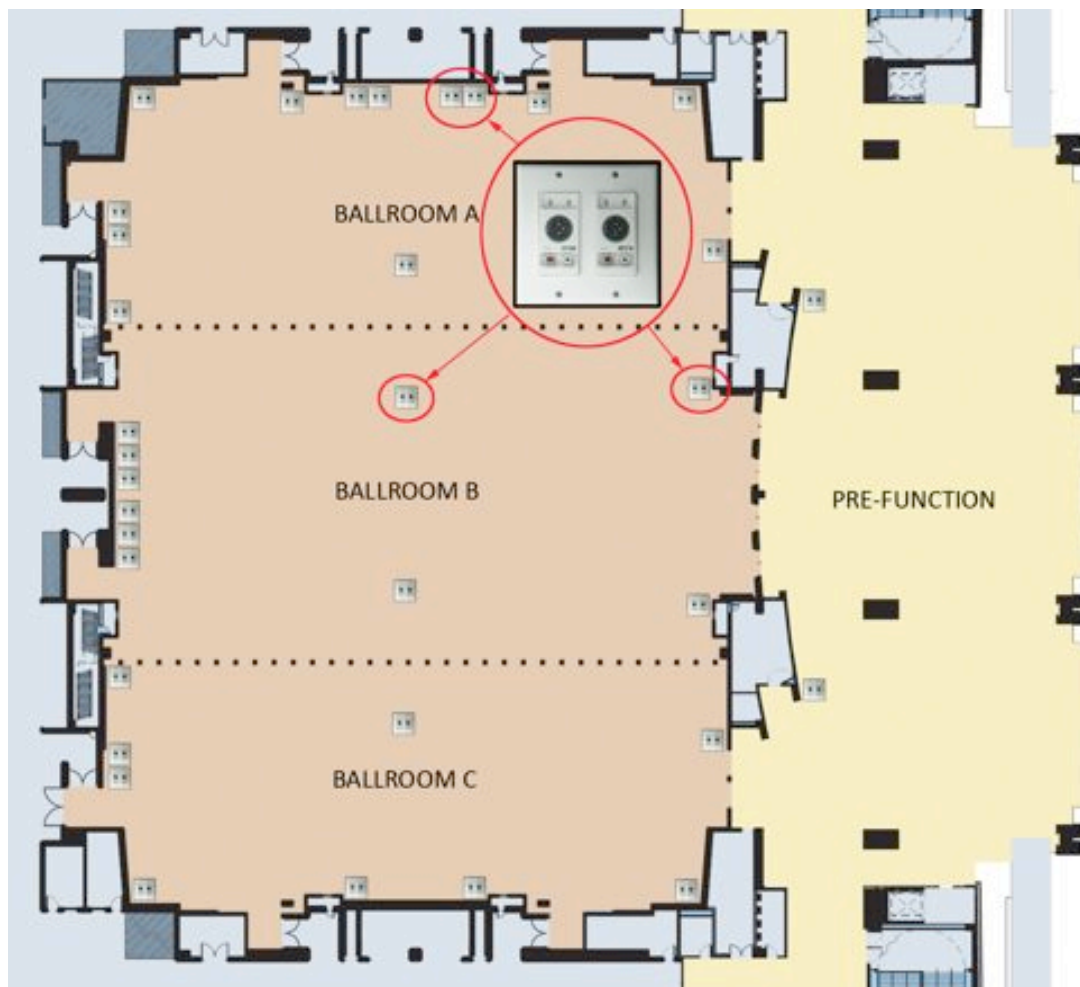
Eight incoming CobraNet™ channels can be mixed down to 2 channels, which can be routed through a simple DSP processing side chain, providing an 8 band parametric EQ, HighPass, LowPass and Compressor devices.

The next section will show the benefits of using the ION2.0 and ION0.2 in a typical ballroom application.

2 Ballroom Application

A typical system design for a flexible meeting space (Hotel Ballrooms, Meeting rooms, Convention Centers, Houses of Worship, Lecture Theaters, etc), will have a large number of Wall/Floor connection points intended for general purpose Microphone or Line level inputs. In most cases, these are analog wall panels with analog cabling connecting the wall plate (via Patch Bays) to a set of A/D and/or Cobranet Network interfaces located in the main control rooms or subsidiary rack rooms.

A typical ballroom floor plan is shown below.



The layout is conventional, with 2 gang wall plates scattered around the walls and floor, each providing a pair of microphone points. The wall plates are densely clustered at the 4 possible stage positions (Ballrooms A, B, C and Full ballroom) and lightly scattered around the walls of the Ballroom & Pre-Function space for question/answer (Q&A) microphones.

Normally, there would be 50-100 of the microphone points in a Ballroom (depending on size and planned use), of which (typically) 2-8 would be in use for a partitioned section and 16-32 for a full ballroom.

The selection of the required microphone points (ie choosing the required 32 from 100) is usually done at the patch bays in the control room. This can be a tedious process requiring constant reference to printed drawings.

This solution has the following disadvantages...

- One Microphone cable only carries one channel
- Good quality microphone cable is costly.
- Good quality control room patch bays are costly
- Patch bays multiply the connectivity by two, ie every mic point in the room now requires an input and an output to the patch bay.
- Patch bay contacts are vulnerable to corrosion and pitting (DC phantom power)
- Termination and testing requires both skilled labor and considerable man-hours to comply with system needs in terms of testing (continuity, short to ground and polarity) and manual documentation.

The ION2.0 and ION0.2 provide a more practical and cost effective solution. In place of simple analog wall plates containing a pair of XLR connectors, the ION2.0/0.2 converts the signal from the XLR connectors directly into a Cobranet audio stream **at the wall**. The advantages to this approach are considerable...

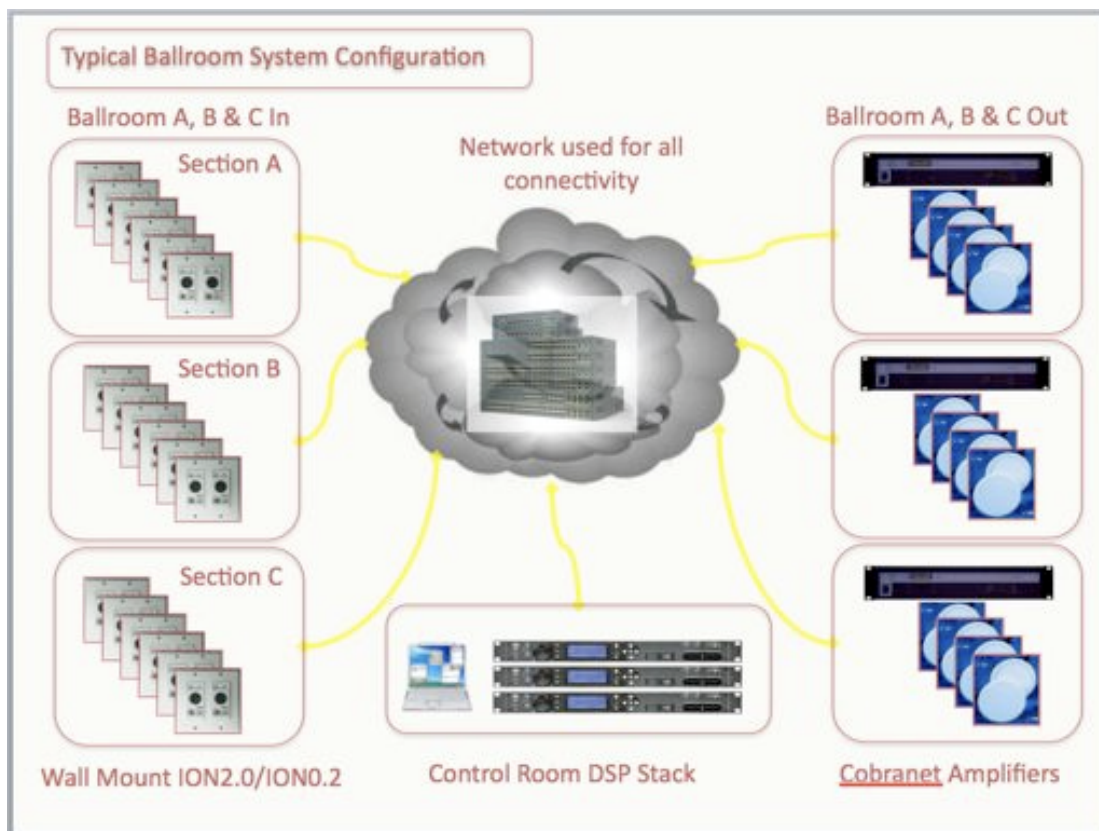
- Replaces costly microphone cables with low cost UTP.
- One UTP carries 2 audio channels, further reducing costs
- Significant cost savings when the audio network is a simple VLAN on the data network. The cost of the additional UTP points for audio is small and the customer is leveraging additional value out of their network investment.
- Simple and rapid termination via a crimp UTP compared to soldered analog audio connectors.
- Widely available training and skills for structured cable installation and termination
- Semi-automated test process with documentation. The test tools for network cables can check 20 cables in the time taken to test one mic cable from wall to patch bay.
- PoE compliant, so no additional power supply is needed
- Pro-Audio compliant, ie meets audio performance and signal interfacing needs for both consumer and professional audio applications.
- Early conversion to digital eliminates the buzz/hum problems
- Early conversion to Ethernet eliminates the need for ¼" jack patch bays (any ION2.0/0.2 can be routed to any destination via network addressing) and the associated reliability issues of patching phantom power signals (contacts need regular cleaning). NOTE: the network addressing solution is the equivalent of a combination of a ¼" patch bay and a costly electronic switcher.
- The network addressing solution also allows complex patching and room combining to be achieved in seconds, via presets/snapshots. For example, the client can quickly change the configuration of a banquet room from a daytime corporate function to an evening event. In addition, room combining becomes a simple button press.

- Early conversion to Ethernet increases system reliability, as the system is not dependent on a single point of failure in the control room
- Embedded SNMP (Simple network management protocol) allows control and fault monitoring integration with most Building Management Systems (BMS).

The next section will show how the ION2.0 and ION0.2 integrate with 3rd party Control room DSP solutions.

3 Typical System Configuration

The block diagram below shows a simple network configuration, where the ION2.0 inputs and ION0.2 outputs are all connected to the Ethernet LAN.

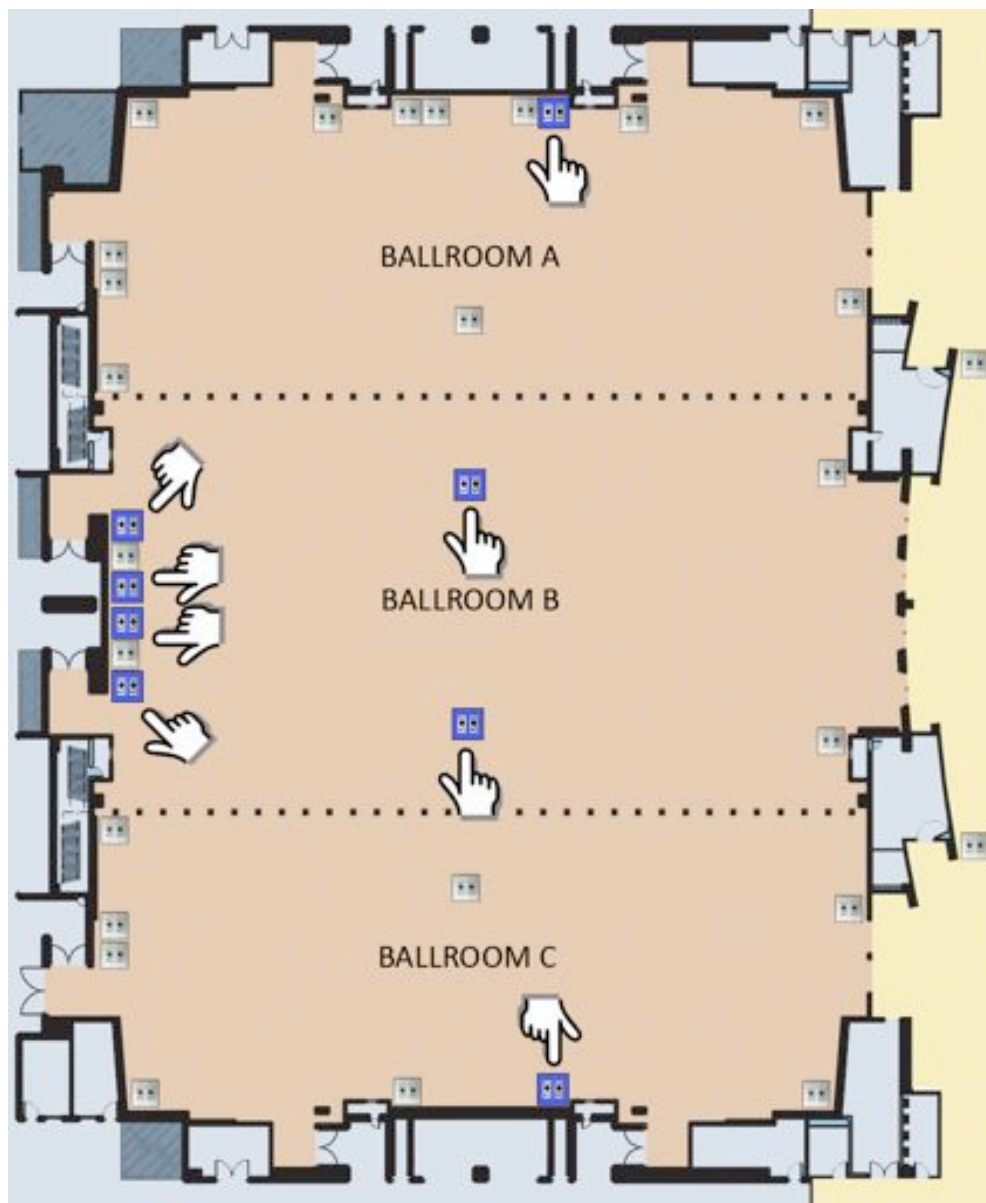


The Control room DSP processor(s) connects to the Ethernet addresses of the ION interfaces needed for a particular event, mixes and processes the audio streams from those interfaces and then in turn transmits the processed signals over the network to racks of Cobranet amplifiers that may be remotely located closer to the loudspeaker circuits.

The ION2.0 and ION0.2 will work with any 3rd party Manufacturer's Cobranet enabled DSP product, such as EVI's Netmax™, BSS' Soundweb™, Peavey's Mediamatrix™, Biamp Audia™, Symetrix Symnet™, etc.

Each ION2.0/0.2 has an IP address and a Cobranet Bundle address, so configuration and patching is extremely simple. The image below could be a

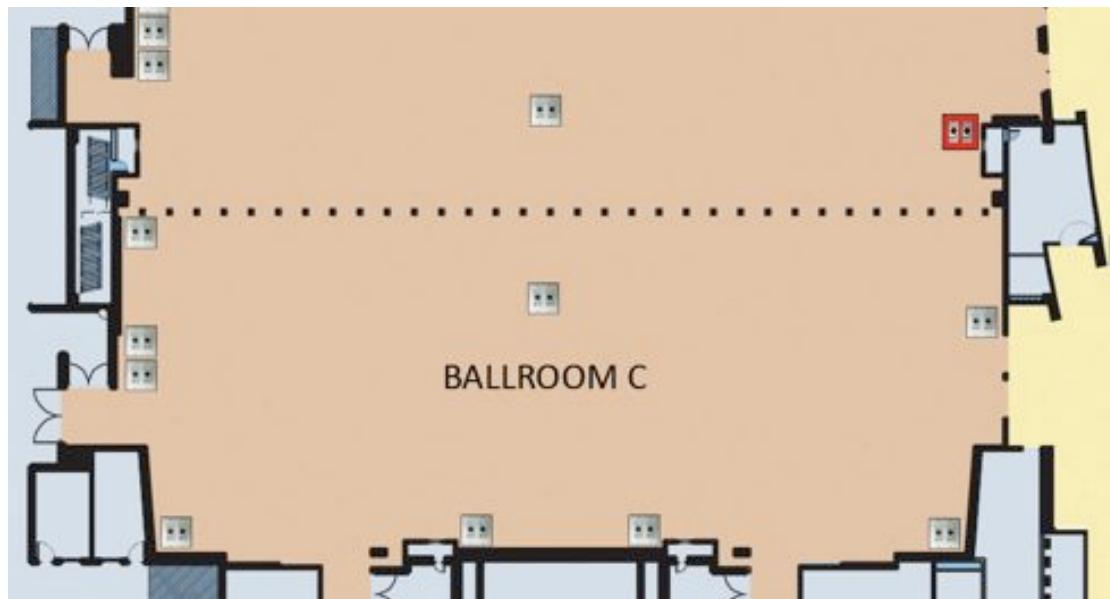
touch panel screen, where the operator presses the image of each ION wall interface needed for the event. As a wall plate is selected, it will show a highlighted color (blue in the example below).



The above could be a typical Corporate function with a head table on a low central stage needing 4-6 boundary microphones, plus a podium with a gooseneck microphone. The audience might have 4-6 Q&A microphones on stands.

Configuration with the ION2.0/ION0.2 only takes seconds, as all the complex manual patch bays have been eliminated in favor of network address patching.

The system can also monitor the health of each ION interface and alert the control room operator of a problem. In the image below, one of the rear wall interfaces is shown flashing red, which will allow a technician to repair the fault before the event, or to patch in another interface during the event.



4 Costs

An ION2.0 or ION0.2 costs around $\frac{1}{4}$ of a typical 8 channel rack mount Cobranet interface. So in terms of interface hardware costs, there is little penalty for choosing a wall mounted ION2.0.

In summary, the benefits are...

- *Cost savings on cable/parts infrastucture*
- *Cost savings on skilled manpower*
- *Significant reduction in critical path. The project can be delivered earlier, benefiting both the Customer and the Systems Integrator (who can now more projects in less time with the same manpower resources).*
- *Future proofed.*