



# Wheatstone WheatNet-IP BLADE-3

## OVERVIEW/PRODUCT PLANNING GUIDE

## BLADE-3s Are Different

BLADE-3s are what some people might call misfits. They almost fit that class of IP audio products called nodes because these are the access units and elements that make up the WheatNet-IP Intelligent Network. But there's a whole lot more going on inside a BLADE than mere I/O...Like a powerful CPU complete with operating system.

You told us that you wanted to stop chasing after logic, too, so we did it. No more chasing down a particular microphone setting when you call up the morning show's host mic from Studio A, or Studio B for that matter. In the BLADE world, the settings for devices and particular feeds follow audio like a puppy on a leash.



There's no PC running the show here. When we sat down to build a modern IP audio network, we wanted something that could think for itself so you wouldn't have to give system reliability and redundancy a second thought.

We also had in mind really, really smart I/O units that included logic control and onboard utility functions, like audio processing and utility mixing. Imagine that: routable channel mix-downs and microphone groupings, plus spot processing where you need it, for those loud callers, finicky codecs, and hushed satellite feeds.

And because broadcasters can be an impatient lot, we went with the fastest networking throughput we could get our hands on: Gigabit Ethernet. Every BLADE has a Gigabit Ethernet port, and this is why our WheatNet-IP Intelligent Network has been able to outrun audio where other IP audio systems haven't — and why our friends have been able to take advantage of readily-available, affordable network switches. (We can't remember the last time we even saw a 100BaseT switch for sale, can you?)

BLADEs are know-it-alls. Each individual BLADE I/O access unit has the tools to be a radio studio all on its own, yet it also holds the brain trust of the entire network operation for exceptional redundancy and scalability. They're smart and they're independent. But don't worry. BLADE I/O units are also very civilized, and even hold elections to determine which

We have BLADEs for just about every purpose that can be networked together with our control surfaces to make one smart, WheatNet-IP audio network. Our new third-generation BLADE-3s, now available in a smart new enclosure with some cool new features, come in a combination of analog and digital I/O models, and are available for MADI audio and for



one in the network has the longest uptime record, for example, in order to assume the role as master over the rest. You won't have to bother with seating assignments, either. All BLADEs know what they're supposed to do – and what all their other BLADE friends are supposed to do.

microphone inputs. All you have to do is plug them into an Ethernet switch, add the control surfaces you want, and WheatNet-IP does the rest.

# MEET BLADE-3

Everything you need to put music on the air... all the way from audio input to your transmitter, in a single box.

When we invented modern radio audio networking, we vowed to build the first truly intelligent IP audio system. One where every interface held the DNA of the entire system for recovery. A system with true Gigabit connectivity. One that required only a single CAT-6 cable to interface any network piece – to carry audio AND control information. A system that could actually be up 24/7/365 and handle everything you need, yet so simple to interface as to be virtually foolproof. Well, here ya go...

## Gigabit Connectivity

All BLADE-3s use Gigabit Ethernet. This makes all the difference in network capacity, near-zero latency, throughput, reliability – in short, everything.

## Virtually All Audio Formats

BLADEs are built to handle native analog, microphone, AES/EBU, SPDIF, AOIP, MAD1, SDI and AES 67. Once any type of audio is ingested into the WheatNet-IP network, any type of audio input can be converted to any other type of output. Example: analog to digital, AES to IP, MAD1 to AES 67, mics to AOIP, etc.

## Two 8x2 Utility Mixers

Each BLADE has two 8x2 utility mixers that can be configured in many different formats. Two 8x2, four 4x1, etc. These internal mixers are full featured and include panning, channel ON/OFF, fader levels, and access to any source signal in the system. They also include a full ACI (Automation Control Interface) allowing remote control, ducking, auto fade, channel on/off, levels, source assign, etc.

## Audio & Control Routing Matrix

You can take any audio input and route it to any output or all outputs. You can take any GPI and send to multiple GIO's or you can marry GPIO's to an audio source and have it follow that source through the system. All through one RJ45 connector for each device.

## Dual OLED Displays\*

Each BLADE has two small full color displays for monitoring and control of most functions right from the front panel. Setup, monitoring, network information, alarm status, enabling and operating utility mixes, setting input and output gain, enabling audio processing – and whatever else we can think of in the years to come.

## Silence Detection

In case of an operator error, this can be programmed as a “source” or “input” for the failover. If an operator misses a cue or leaves a fader down when the system senses silence it can take the automation system directly to air or use the integral clip player to play music and ads until the operator catches up. Every single audio output channel can be programmed with a silence detection and automatic switch-over function.

## Source & Destination Control

Each BLADE has the ability to route any source to the destinations on that BLADE.

## Built-in Audio Clip Player\*

There is an optional built-in audio clip player that can be used to put emergency audio on the air. The files are managed in Navigator where you can add files, organize the playlist, and fire playback with a logic port. Silence or LIO can trigger this playback or it can be manually controlled from Navigator.

## Front Panel Logic Indicators\*

Status indicator for active logic and the direction (in or out) of the BLADE.

## 12 Universal GPI/O Ports

Each BLADE is equipped with RJ45 connectors to provide 12 Universal Logic Ports which can be individually designated during set up as inputs or outputs. These ports are used to interface the various external switches, indicators, and control functions you need.

## 128 Software Logic Ports\*

Used to interface with software switches, indicators, and control functions throughout the system.

## LIO/SLIO Logging\*

This logging app tracks LIO/SLIO activity throughout the system and shows the user when any input comes into the system and when it is sent, via multicast, across the network and to the output. A comprehensive Sort Section and Activity Visualizer let the user see a detailed view of what happened in the system.

## Stereo Audio Processor\*

Each BLADE-3 has a stereo multiband processor with the following: 4-band parametric equalizer, 3-way crossovers, 3 compressors, 3 limiters, and a final lookahead limiter. This is a “routable processor,” meaning it is not limited to the local I/O on the BLADE – it can be considered a network resource.

## AES67\*

Ability to support AES67 compliant devices. Allows WheatNet-IP system to synchronize to IEEE1588 from a PTP grandmaster clock and ingest /stream AES67 compliant packets.

## Associated Connections\*

This is a great feature in BLADEs for callers, codecs, networks, remote broadcast & live talk shows that require a mix-minus. You can create a predetermined back haul, IFB feed or mix-minus for each device based on its location in the system or on a fader. If you have a shared resource connected to your system, such as a codec, the software will “automagically” give the proper return feed to the codec based on its destination. When a base connection is made, up to ten additional connections can be made. This significantly helps streamline studio routing, phone and codec selection.

## Aliases\*

Allows the same source to be identified by different names. A signal can now be given an alias(es) which can be a more friendly name that operators understand. Multiple aliases can be used so different operators can share logic functions, source feeds, routing, etc.

## 44.1, 48K, External Sync or AES 67 Operation\*

This is the overall clocking for your digital system. The system clock rate can be either 44.1K, 48K, External Reference or AES 67.

## Clock/Sync Indicators\*

The 1588 Clock Loss Indicator notifies the user when the AES67 clock source has been lost.

The AES Sync Loss Indicator notifies the user when an AES input has lost its clock source. Also generates Alarms for any AES3 input that becomes disconnected.

## Onboard Intelligent OS

Each BLADE has its own intelligence/operating system that allows it to be a powerful standalone router, be part of a larger system, or control the entire routing system. WheatNet-IP is an embedded system that does not require outside intervention or control from 3rd party software running on PC's. The configuration of the entire network is stored in each BLADE.

## 44.1K or 48K Sampling Rates

System operates at 44.1K or 48K while converting incoming signals up or down as needed.



### Auto Mono Summing

Any stereo signal sent to a mono output is automatically summed. If you route a stereo source or stereo mix to a mono destination such as hybrid or codec, the system will automatically “sum” the left and right channels together.

### Signal Splitting

The BLADE can take any Stereo AES / EBU or Analog input or output and split it into two mono channels.

### Gain Control on Every Input & Output

Gain control on every input and output. This allows the user to calibrate the input level for each source or destination.

### Balance Control

There is a balance control on every stereo input and output.

### Flexible Signal Configuration

Signal can be defined as up to 16 mono, 8 stereo or any combination of mono and stereo totaling 16 channels.

### Studio Bypass

With the push of a button or a command from the automation system, this output can feed the transmitter, freeing the on-air studio up for production or voice tracking.

### Front Panel Input and Output Metering

There is metering for every input and output on the system – 12-segment, multi-color LEDs that can be used for metering inputs and outputs as 8 pairs or 16 mono signals.

### Front Panel Headphone Jack and Source Selection

This is a self-powered headphone jack with volume control. It allows you to select and monitor any source or mix on that BLADE or in the entire system.

### Salvos/Macros

There are an unlimited number of salvos and macros, used when more than one route needs to take place. These are preprogrammed events or a series of switched events that can happen within a BLADE or throughout an entire WheatNet-IP network.

### Automation Control Interface (ACI)

This is a “tool box” in every BLADE that allows full control functions such as routing, ducking, panning, full logic control, mixing and silence detection. Each BLADE supports up to 20 ACI connections which can be used with devices like Talent Stations, GP panels, Sideboards, etc. It also allows control of our partners’/third party equipment.

### Screen Builder\*

While not built into a BLADE, the screen builder app offers the scripting capability of a GP16, the control of GlassE, monitoring and metering of the IP Meters app, and ACI protocol. This will allow a user to build a custom screen to fit many needs in specific applications. Will work with any version BLADE.

### SNMP

Wheatstone’s enhanced Simple Network Management Protocol (SNMP) management systems use SNMP to monitor network attached devices such as BLADEs for conditions that may require action by the end user. This tool gives you centralized monitoring over large distributed systems. You can configure alarms and set thresholds to get notified if and when a problem occurs. The instant alarms and notifications help you take quick corrective actions through e-mail, SMS, and executing custom scripts.

### Connection Choices

Has both DB25 to make transitional wiring easy for existing BRIDGE TDM customers and RJ45 – Studio Hub compatible RJ connectors for input and output.

### Info Screen

Each signal has a new info screen allowing the user to add text to signals such as wire numbers, termination locations, etc.

### LIO Test

LIO Outputs can be tested from the front panel of each BLADE.

### Backup

Due to its distributed intelligence, the system has automatic backup capability.

### Alarm Notification

Using Alarm doc or LED status, BLADEs can report on a wide variety of error and alarms.

### NTP

System can lock to a NTP server on the network for time of day synchronization.

### Front Panel Locking

All BLADEs’ front panels can be locked for security

### Version Checker

Built in version checker to aid in update process.

### Crosspoint Save

Can save a current copy of all crosspoints in the system. This is done in Navigator.

### Debugging

A comprehensive logging application is included for every BLADE to aid in system debugging.

### No Cooling Fans

They don’t need them!

## Specific Functions for Specific BLADES

### Mic Pre

Using the 88m you have 8 Mic preamps

### Mic Processor

using the M4 you have 4 Mic preamps, but also 4 M1 mic processors.

### Eight Audio processors

The Aura8-IP has 8 stereo processors that allow user to process any audio in the WNIP system and route that processed audio to any output.

### High density ingest

Using a MADI BLADE user can connect to a variety of 3rd party devices and ingest up to 64 channels of audio over a single coaxial cable.

### External Clock reference

88d, 88ad, Aura8-IP BLADEs can accept an AES reference into port 8 to use a master clock reference for the system.

# I/O BLADE-3s

IP-88A Analog, IP-88D Digital, IP-88AD Analog/Digital and IP-88M Microphone

I/O BLADEs are far more than mere access units connecting studios, elements and Wheatstone control surfaces in the WheatNet-IP Intelligent Network. Yes, I/O BLADEs convert audio and logic inputs to data streams on the network and convert outgoing data streams to hardware outputs. But these 1RU I/O units – which come in analog, digital and analog/digital I/O units - also have intelligence inside. Each I/O BLADE comes with a CPU and operating system so you can do amazing things with your audio network, starting with routable mixing, logic-follow-audio and a whole lot more.



## IP88A Analog I/O BLADE-3

The IP88A is an analog input/output BLADE. It handles input and output, each with 8 stereo channels, 16 mono channels, or any combination totaling 16 discrete channels.



## IP88D Digital I/O BLADE-3

The IP88D is an AES digital input/output BLADE. It handles input and output, each with 8 stereo channels, 16 mono channels, or any combination totaling 16 discrete channels.



## IP88AD Analog/Digital I/O BLADE-3

The IP88AD is a combined analog and AES digital input/output BLADE. It handles input and output, each with 8 stereo channels, 16 mono channels, or any combination totaling 16 discrete channels. Half of these are analog, the other half AES digital.



## IP88M Microphone I/O BLADE-3

The IP88M is an analog input/output BLADE with microphone-level inputs. It has eight built-in microphone preamplifiers complete with pad, phase switch, and phantom power. It provides eight analog line-level outputs.

BLADE I/O access units make up the audio routing backbone of the WheatNet-IP Intelligent Network and use RJ45 StudioHub+ compatible connectors for input and output, and also have DB25 connectivity for transitioning from BRIDGE TDM networks.

But there's more inside their sleek, all-metal housing than mere I/O. The I/O BLADE has its own CPU and operating system; no additional PC required. It can operate alone or as part of a network, and can be located anywhere in the studio (no noisy fans inside). Each BLADE has a 1000-base-T (Gigabit) network interface. This single network connection is used to send and receive audio, logic, and communications from the I/O BLADE to the rest of the WheatNet-IP network. Gigabit Ethernet provides very low latency while allowing the use of readily-available switches and infrastructure for connectivity. Connect automation and production PC's, codecs, audio processors, controllers, and other devices directly to the network without installing specialized sound cards, A/D-D/A converters, audio wiring, or control connections. The I/O BLADE communicates at the speed of Gigabit Ethernet connectivity for optimum network QoS and reliability, and includes logic control, onboard utility functions and the dedicated controller that is at the core of its intelligence. Each individual I/O BLADE can hold the brain trust of the entire system's operation for exceptional network redundancy and scalability.

- CPU with OS and standalone operation
- 24-bit A/D and D/A converters
- 1RU, no fans
- AES67 compatible
- One Gigabit Ethernet port
- Two stereo 8x2 utility mixers
- Stereo multiband processor
- Embedded audio playback (optional)
- Silence sensing can be applied to any outputs
- 16 analog input channels
- 16 analog output channels
- RJ45 connectors for audio (8 in, 8 out)
- Four D-Sub connectors for audio (2 in, 2 out)
- 12 universal logic ports (GPIO) on 2 RJ45 connectors
- 128 software logic ports
- Front panel headphone jack
- Two full color OLED displays on front

## STAGEBOX 1

High Density I/O



The 4RU StageBox One extends console I/O, providing 32 mic/line inputs, 16 analog line outputs, and 8 AES3 inputs and 8 AES3 outputs as well as 12 logic ports and dual Ethernet ports. Its heavy duty construction makes it adept for on-the-go applications, such as remote sporting events. StageBox One works with all WheatNet-IP audio networked consoles.

# MIX ENGINE BLADE-3

IP-88E



Every nerve center needs a brain. For many Wheatstone control surfaces, the IP88E Mix Engine BLADE-3 is it. This is the unit that handles the audio mixing for most E-Series control surfaces and the Wheatstone Glass-E Virtual Console.

Unique to Wheatstone's console engine approach is its true IP connectivity. The control surface networks directly into the network switch itself, giving it access to mix engine functions as well as direct access to automation systems, network applications and other control surfaces that make true system interoperability possible. Other IP audio systems tie the control surface and the console engine together using CAN bus, thereby filtering all outside communications through the console engine first and isolating the control surface from other elements and functions in the network.

The IP88E BLADE-3 houses all the DSP processing power for an individual control surface and distributes the four stereo PGM busses, four stereo AUX sends, per-channel mix-minus feeds, monitor outputs, and other bus signals to the network. Once on the network, bus signals are available as sources and destinations anywhere. This creates an extremely flexible system in which program outputs from one surface can be sources on any other surface; for example, a news mixer's program bus can be brought up as a source on the air studio surface. While the IP88E doesn't house audio I/O, it does include 12 universal logic (GPIO) ports for interfacing various external switches, indicators and devices for control purposes.

The IP88E is AES67 compatible for use with other AES67-compatible devices and signals in the WheatNet-IP Intelligent Network.

- True IP connectivity: Includes DSP processing
- 12 universal logic ports (GPIO) on 2 RJ45 connectors
- AES67 compatible
- Front panel headphone jack
- OLED front panel display with graphical menu
- One Gigabit Ethernet port



# CONSOLE AUDIO BLADE-3

IP-88CB



Console Audio BLADE-3s provide audio I/O and DSP mix engine functions for WheatNet-IP control surfaces through the network switch. Unique to Wheatstone's console engine approach is its true IP connectivity. The control surface connects directly into the network switch itself, giving it access to mix engine functions as well as direct access to automation systems, network applications and other control surfaces that make true system interoperability possible.

The IP88CB Console Audio BLADE-3 comes standard with L-8, L-12, E-1, IP-12 and IP-16 control surfaces. A single Console Audio BLADE-3 is all that is needed for most studio operations, but busy studios often require additional I/O BLADEs or an upgrade to Wheatstone's newer 2RU model with double the I/O.

At double the I/O, the new 2RU Console Audio BLADE-3 comes with 8 AES inputs, 8 stereo analog inputs, 8 AES outputs, and 8 stereo analog outputs on StudioHub+ RJ45s, plus 4 mic level inputs with gain trim and switchable phantom power on XLRs. 1RU Console Audio BLADE-3s are also available for the same control surfaces, and come with standard I/O (4 AES inputs, 4 stereo analog inputs, 4 AES outputs, 4 stereo analog outputs, and 2 mic level inputs).

Both the 2RU and 1RU Console Audio BLADE3 provide control room and studio stereo analog outputs on XLRs as well as cue and headphone outputs on both RJ45 and 1/4" TRS and 12 GPI logic ports on RJ45.

Paired with Wheatstone's L-8, L-12, E-1, IP-12 or IP-16 control surface consoles, the IP88CB provides an economical standalone/networkable solution.

With XLRs for mic inputs and monitor outputs, 1/4" TRS for sends to headphone and cue amps, and StudioHub+ compliant RJ45's for all the general purpose analog and digital I/O, the Console Audio BLADE-3 is essentially a plug-and-play console system in a box. Just plug the Console Audio BLADE-3 and the related WheatNet-IP control surface into an Ethernet switch and you're ready to go.

All Console Audio BLADEs are AES67 compatible for use with other AES67-compatible devices and signals in the WheatNet-IP Intelligent Network.

There are three types of IP-88 Console Audio BLADEs:

CB:	Used with IP-12 and IP-16 consoles
CBE:	Used with E-1; includes DSP processing
CBL:	Used with L-8 and L-12 consoles

- True IP connectivity
- 24-bit A/D and D/A convertors
- 12 Universal Logic ports (GPIO) on 2 RJ45 connectors
- Integrated I/O Mix Engine BLADE
- AES67 Compatibility
- Cue and headphone outputs on RJ45 and 1/4" jack
- Control room and studio monitor outputs on XLRs
- OLED front panel displays with graphical menu
- Gigabit Ethernet port

#### I/O STANDARD 1RU ENCLOSURE:

- 2 Mic Preamps w/ XLR inputs, phantom power and gain trim
- 4 Stereo (8 Mono) Analog Line inputs on RJ45
- 4 AES inputs on RJ45
- 4 Stereo (8 Mono) Analog Line Outs on RJ45
- 4 AES Outputs on RJ45

#### I/O CB32 2RU ENCLOSURE:

- 4 Mic preamps w/ XLR inputs, phantom power and gain trim
- 8 Stereo (16 Mono) analog line inputs on RJ45
- 8 AES inputs on RJ45
- 8 Stereo (16 Mono) analog line outs on RJ45
- 8 AES outputs on RJ45

\* NOTE: Control Room, Studio, Cue and Headphone outputs are part of the total of AES and stereo analog outputs. These may be reassigned for use as other outputs as desired.



# SPECIALTY BLADE-3s

BLADES that are made to address specific applications



## MADI BLADE-3

The MADI BLADE-3 is a high-density multichannel I/O BLADE for converting a 64-channel MADI input to data streams on the WheatNet-IP Intelligent Network, and converting network data stream to 64-channel MADI outputs.

With this, you can now ingest into WheatNet-IP audio from any system that utilizes MADI. You don't need a full blown control surface to use the MADI BLADE-3, either. With WheatNet-IP NAVIGATOR, you can control routing all of your MADI gear in ways that can breathe new life into your existing infrastructure. Or, use our SideBoard control surface to take advantage of the MADI BLADE-3's built-in utility mixers.

As a bridge to the WheatNet-IP audio network, this 1RU box interfaces to intercom systems, TDM routers, ProTools systems and DAWs that are MADI-capable. It provides 64 bidirectional channels (AES 10) between the WheatNet-IP audio network and a TDM or intercom system over one coaxial cable.

The MADI BLADE-3 uses BNC connectors for coaxial MADI inputs and outputs (1 each), and an SFP (small form-factor pluggable) transceiver slot for fiber connectivity. It has a 1000-base-T (Gigabit) network interface for optimum network QoS and reliability, and includes logic control, onboard utility functions and the dedicated controller that is at the core of its intelligence.

Like all BLADE-3s, the MADI BLADE-3 has its own CPU and operating system, is AES67 compatible, and has two built-in 8x2 stereo mixers. It comes with 12 universal logic (GPIO) ports for interfacing various external switches, indicators and devices for control purposes – as well as 128 software logic ports for routing and controlling devices anywhere on the network.

- 64-channel bidirectional MADI interface
- BNC connectors for coaxial MADI inputs and outputs (1 each)
- One SFP transceiver slot for fiber connectivity
- CPU with OS
- 24-bit A/D and D/A converters
- 1RU, no fans
- AES67 compatible
- One Gigabit Ethernet port
- Two stereo 8x2 utility mixers
- Silence sensing can be applied to any output
- 12 universal logic ports (GPIO) on 2 RJ45 connectors
- 128 software logic ports
- Two full color OLED displays on front
- Front panel headphone jack



## LIO-48 LOGIC BLADE

The LIO-48 is a high-density logic BLADE that can be added to any WheatNet-IP audio network to give you more of what you need in a modern studio: control. The LIO-48 Logic BLADE provides 48 universal logic I/O ports, each individually configurable, for machine control of devices and elements in the network.

LIO-48 logic ports can output to closures for machine control of on-air lights, mic tallies, transmitter remote control and the like. The LIO-48 also can receive machine closures from external devices like satellite receivers, remote mic panels or the automation system for triggering channels ON/OFF.

The LIO-4's logic I/O meter provides drill-down information for each of the 48 ports.

- 48 universal logic ports, individually configurable
- Front panel LED status indicators
- Ethernet port



## HD-SDI BLADE-3

The HD-SDI BLADE-3 is a specialty BLADE for extracting encapsulated audio from a serial digital interface (SDI). With the HD-SDI BLADE-3, you can ingest audio into the WheatNet-IP Intelligent Network from video production automation systems, routers, and other professional video equipment that use HD-SDI.

Our new specialty HD-SDI BLADE-3 for the WheatNet-IP Intelligent Network de-embeds multiple audio channels from HD-SDI streams so you can mix, process or simply route audio to your console for final broadcast. This 1RU is capable of de-embedding up to four HD-SDI streams, and up to 8 AES/EBU pairs (16 audio channels) per stream.

The HD-SDI BLADE-3 has four BNC connectors for coaxial input, and includes logic control, onboard utility functions and the dedicated controller that is at the core of its intelligence. Like other BLADEs, the HD-SDI BLADE-3 has its own CPU and operating system and provides a 1000BaseT (Gigabit) network interface for optimum network QoS and reliability. The HD-SDI BLADE-3 is AES67 compatible for interoperability with other AES67 compatible systems and devices, and has two built-in 8x2 stereo mixers. It comes with 12 universal logic (GPIO) ports for interfacing various external switches, indicators and devices for control purposes – as well as 128 software logic ports for routing and controlling devices anywhere on the network.

- De-embeds audio from four HD-SDI streams
- De-embeds 8 AES/EBU pairs (16 audio channels) per stream
- 4 BNC connectors for coaxial input and 4 BNC loop connectors
- CPU with OS
- 1RU, no fans
- AES67 compatible
- One Gigabit Ethernet port
- Two stereo 8x2 utility mixers
- 12 universal logic ports (GPIO) on 2 RJ45 connectors
- 128 software logic ports
- Front panel headphone jack

# SPECIALTY NETWORK INTERFACE

## Network EDGE



With the growing use of IP wireless radios and other commercial connectivity options for STLs, the new Network EDGE introduced by Wheatstone at NAB offers a broadcast-quality interface into these inexpensive transport methods.

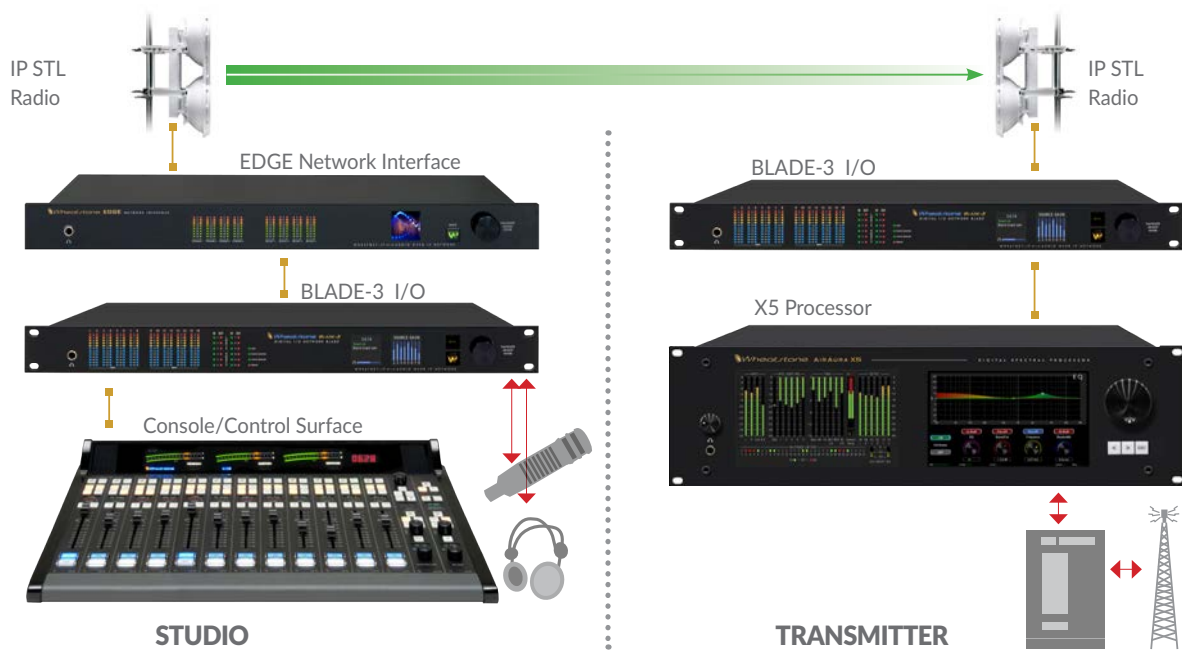
Network EDGE is designed specifically as a translator between high-quality, low-latency studio networks such as WheatNet-IP and low-bandwidth STL connectivity options such as IP wireless radios.

IP wireless radios in the unlicensed 5 or 24 GHz range are priced from a few hundred to several thousand dollars.

Typically located at the studio, the Network EDGE interfaces directly to an IP wireless radio or commercial leased line for point-to-point connectivity between locations. Network EDGE can be used with any of the major IP radio brands currently on the market. When used within the WheatNet-IP system, with a Network EDGE at one end and a BLADE at the other, this opens up a world of possibilities based on BLADE I/O functionality such as silence detection, clip player, logic for automation, et al.

The Network EDGE includes local I/O (two AES and two stereo analog) and 12 programmable logic ports.

- IP Wireless STL (half-duplex) compatible
- 2 programmable logic ports (GPIO)
- 4 audio inputs: 2 AES/2 analog
- Compatible with WheatNet-IP BLADEs for control functions
- Front panel headphone jack
- 1RU, no fans
- Ethernet port



## HIGH-SPEED BIDIRECTIONAL IP DATA THROUGHPUT

When you put up an IP link from the studio to the transmitter, your transmitter site immediately becomes part of your Ethernet network. Audio from a WheatNet-IP audio network I/O BLADE or EDGE unit connects directly into the IP wireless radio through RJ-45 connectors, and because it's all IP, that means you can carry audio, video, voice-over-IP, and data of all kinds. Back and forth. Both ways. If you have video surveillance at your tower site, you can carry that data back. If you have a Burk or other transmitter remote control system, you can carry that data back. And, if your transmitter is remotely located with spotty or no cellphone coverage, you can put VoIP out there and carry that back and forth over wireless IP. Your remote tower site is now part of your network, even though it's miles down the road.

Wireless IP systems can go some distance, too. The longest shot on wireless IP microwave is 55 miles, though most average in the 20 to 25 mile range. The make or break rule is, as always, line of sight.

As for throughput, IP microwave has plenty of that, too. For example, a WheatNet-IP audio IP-88D BLADE into an IP wireless radio can run 8 stereo channels across a wireless IP link and still have enough bandwidth left over for all those things we just talked about: video surveillance, VoIP, remote control and other periphery functions.

# M4IP-USB BLADE-3

Four Channel Mic Processing BLADE



This single rack unit BLADE-3 gives you four mic processors that are accessible from anywhere in your WheatNet-IP network. The M4IP-USB offers four completely independent channels of DSP-based high quality voice processing as well as four independent USB ports.

The M4IP-USB Microphone Processor BLADE combines four high-quality microphone preamps, four channels of Vorsis Embedded microphone processing, four independent USB ports, and a WheatNet-IP BLADE interface, allowing you to place four microphone inputs anywhere in your WheatNet-IP Intelligent Network (although it also works just fine as a standalone processor). The preamps and processors are accessed and controlled from any point on the network via its Windows-based GUI.

The M4IP-USB is a great way to maximize your investment in on-air talent by combining four mic processors into a single rack space, accessible from anywhere.

The M4IP-USB microphone processor is equipped with four matched Super-Quiet (SQ) microphone preamplifiers featuring an extremely low noise floor, very wide dynamic range, faithfully accurate transient response, and ruler flat frequency response. Operating in harmony with high quality 24-bit A/D converters and a 96kHz base sample rate, the M4IP-USB adds absolutely no undesired coloration to the signal and faithfully preserves the sound of any microphone and talent combination. It also features a four-section equalizer with high and low shelving EQ and two bands of fully parametric EQ, high and low pass filters, and de-esser and expander functions.

The signal path of the M4IP-USB includes four completely independent channels of Wheatstone's smooth-sounding Vorsis dynamics processing. Adjustable from anywhere on your network, the M4IP-USB offers the security of password protected TCP/IP-based remote control and no front panel controls.

## Wheatstone-designed Equalization

Based on great-sounding designs built for Wheatstone's other high performance professional audio applications, the M4IP-USB's equalization section operates predictably and adds no noise, ringing, phasiness or other undesirable coloration to the sound.

## Wheatstone-designed Dynamics Processing tools

A high performance and fully adjustable downward expander, de-esser, and smooth sounding broadband compressor and selectable low distortion final look-ahead limiter round out the M4IP-USB to create powerful and authoritative presence to production or on-air microphones.

## Processing Presets

A variety of ready-to-use factory processing presets are provided, carefully tailored for different processing goals and formats. You can select a factory preset, confident that it will sound great just as it is. Or use a factory preset as a starting point and create a custom sound for each announcer, then save the new settings as a personalized user preset. In a facility with multiple microphone processors, presets saved in one unit can be easily copied to the others.

## WheatNet-IP Native

The M4IP-USB is a WheatNet-IP BLADE which gives it a great deal of additional functionality. All Wheatstone's BLADEs are single rack-space interfaces that talk directly to WheatNet-IP control surfaces, other BLADEs and compatible third-party equipment. They contain features such as router control, logic control, gain control, two 8-channel utility mixers, silence detection and switching (among other things).

## Wheatstone Talent Control Interface and GUI

Voice talent can activate his or her own personal sound at the press of a button using the Talent Control Interface, a special GUI designed for preset recall only. The Wheatstone Talent Control Interface software can reside on an air studio/control room PC and gives talent the ability to recall presets from any Wheatstone microphone processor without allowing processing adjustments.

All parameters of the M4IP-USB are controlled using the included Windows-based GUI (see page 10).



- Four extremely high performance microphone preamplifiers with 48V phantom power
- Four completely independent processing channels
- Four independent USB ports
- Four stereo analog line level outputs
- Four stereo AES outputs
- All digital, field proven Wheatstone-designed advanced processing algorithms
- Phase Scrambler to correct asymmetrical voice waveforms
- High- and low-pass filters
- Fully adjustable downward expander
- Precision de-esser sibilance controller
- Four-bands of EQ: low-frequency shelving, two-band parametric, high-frequency shelving

- Broadband compressor
- Final precision peak limiter – can be defeated if desired for lower latency
- TCP/IP-based remote control from anywhere via M4IP-USB Remote Control Software
- Talent Control Interface software for preset recall without processor control
- Front panel metering of input and output levels

- WheatNet-IP BLADE-3 features include:
- 12 Universal Logic ports (GPIO)
  - Front panel headphone jack
  - Front panel LED bargraph metering
  - Built-in routing control
  - Two built-in 8-channel utility mixers
  - Gigabit Ethernet
  - Silence sensing can be applied to any output
  - Built-in Audio Clip Player
  - Front Panel Logic Indicators
  - LIO/SLIO Logging
  - Aliases
  - Associated Connections
  - Dual OLED Displays
  - Clock/Sync Indicators and more

# AURA8-IP BLADE-3

Eight-Channel Vorsis Audio Processing BLADE



Rack up eight audio processors in one networkable unit. Convenient, cost-effective, and more than able enough, the Aura8-IP audio processing BLADE-3 has I/O onboard and eight fully independent Vorsis multiband stereo audio processors. This 1RU BLADE-3 offers processing control and network connectivity through the WheatNet-IP Intelligent Network and full AGC, compression and limiting functions for HD, streaming or podcasting separate channels of programming in one unit.

The Aura8-IP BLADE-3 audio processor brings two of Wheatstone's core technologies together: Vorsis ultra-high resolution audio processing and the WheatNet-IP Intelligent Network. Merging these technologies in a single product provides a convenient and cost effective way to access audio processing wherever you need it on your WheatNet-IP network. The Aura8-IP occupies a single rack space, but packs in an impressive eight fully independent Vorsis® multi-band stereo audio processors.

Each processing chain consists of a 4-band parametric equalizer followed by a crossover and three bands of compression. The compressors each feed their own limiters, whose outputs are then fed to a broadband lookahead limiter for tight peak control. The Aura8-IP has its own local I/O, with four stereo pairs of AES digital audio and four stereo pairs of analog line level audio in and out, and can function as a standalone processing engine. Because it's a BLADE-3, it can also instantly configure itself as part of a new or existing WheatNet-IP Intelligent Network, making its processing power available throughout that network.

Like all BLADE-3 access units, the Aura8-IP BLADE-3 is AES67 compatible.

The Aura8-IP is configured and controlled over Ethernet using a laptop or desktop computer. Included with the unit is Wheatstone's acclaimed "Guru" GUI software, which allows easy setup of the processing using familiar, straightforward controls. Also available is a more sophisticated control interface called "GUI Pro," which provides access to every individual processing parameter for expert-level adjustments.

- Highest performance 24-bit A/D and D/A converters
- 8 complete Vorsis multiband processors, each with:
  - 4-band parametric equalizer
  - 3-way crossover
  - 3 compressors
  - 3 limiters
  - Final lookahead limiter
- Two 8-channel utility mixers
- 4 AES digital inputs on RJ45 and "D" connectors
- 4 stereo analog inputs on RJ45 and "D" connectors
- 4 AES digital outputs on RJ45 and "D" connectors
- 4 stereo analog outputs on RJ45 and "D" connectors
- Built-in router control
- AES67 compatible
- Full color OLED front panel displays
- Front panel headphone jack
- Front Panel Metering
- Rugged Power Supply
- Can be used standalone or as part of a WheatNet-IP Intelligent Network
- Silence sensing can be applied to any outputs
- One Gigabit Ethernet port



What can you do with the Aura8-IP? Virtually anything you want! These are just a few of the ways you might use Aura8-IP. As a standalone processor, you get eight stereo channels of jaw-dropping Vovsis ultra high resolution processing power for under \$500 per channel. That alone is worth the price of admission. But when you take advantage of Aura8-IP being a BLADE with its built-in utility mixers, full logic, SNMP messaging and silence detection, and use all that with its eight channels of processing, its power is really unleashed. How many ways can YOU think of to use the Aura8-IP?

**Low Latency Talent Headphone Processing**

Often, the key to talent turning in their best performances is what they hear in their headphones. Give them a sound that drives them to brilliance with Aura8-IP.



**Remote Feed Conditioning**

The great and hard thing about radio is that you can tie the world together on your broadcast. That means you can have audio flying in from all over. Aura8-IP is exactly what you need for all of it, at a price that will make you very happy!



**Talkshow Call-Ins**

Processing can make a huge difference in the on-air quality of call-ins on your talk shows. Aura8-IP is up to the task.



**Mic Processing**

Every microphone does a better job when it's processed not only for the voice that's speaking into it, but for the path it's taking on the way to someone's ears. Aura8-IP does a superb job processing microphone audio.



**Satellite Uplink Peak and Spectral Control**

The key here is keeping signals under control. Aura8-IP is perfect for the job, keeping an eye (or ear) on the peaks as well as ensuring the spectral range stays consistent.



**IFB Conditioning**

Clear communications between director, engineering and talent is key to presenting successful sports and multiple-report shows. Aura8-IP is perfect for cleaning up IFB.



**STL Pre-Processing and Protection-Processing**

There are a lot of dedicated STL systems out there. Or, if you have a WheatNet-IP, it's the perfect solution. No matter HOW you handle STL, let Aura8-IP handle processing to ensure the audio is optimized for it.



**Multiple HD Feeds**

HD Radio gives you the option of broadcasting multiple audio streams of varying quality. Make the most of each by giving them processing that will make them stand out.



**Sweetening Incoming Commercials and Newsroom Feeds**

Keeping your revenue sources sounding compelling can really help with audience perception and acceptance. Aura8-IP is a cost-effective solution for ensuring your entire audio stream sounds SWEET!



**Codec Pre-Processing**

Audio from codecs is subject to environmental conditions - at the source and through the connection. Processing with Aura8-IP can clean it up nicely.



**Web Streams**

Whether you are streaming now or getting ready to, there's no better investment you can make in your station than to ensure those streams sound great. That's exactly what Aura8-IP does.



**Automation Streams**



Wheatstone enjoys technology partnerships with the leaders in broadcast today. Use the AGC in Aura8-IP to keep your automation streams clean and under control.

# SCREEN BUILDER 2.0

Control Your Entire WheatNet-IP Network. Create Custom Screen Builder Apps.

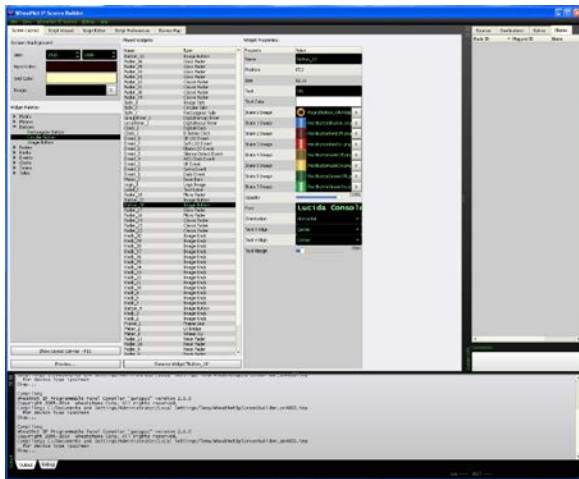


Admit it. You've always wanted complete control of everything and everyone. You've always wanted to be able to know what's happening at all times in all places in your world. Well, here you go. Welcome to ScreenBuilder (should we have called it World Builder?)

Build your own on-screen virtual control interface for just about any purpose. Our new Screen Builder app has faders, meters, labels, buttons, clocks, timers and other widgets that you can arrange on a PC screen to create your own custom control panels and touchscreens with quick-access buttons, faders and meters for level adjusting and monitoring, and more.

Add your own graphics and logos, even images. Custom panels made with Screen Builder have access to our complete AoIP network, the WheatNet-IP Intelligent Network and all of the BLADEs, control surfaces, processors, and partner devices on it so you are only limited by your imagination. Once created, your custom panels and touchscreen interfaces can be password protected to prevent unauthorized manipulation of the special graphics and functions you've designed.

- Widgets include Faders, Knobs, Buttons, Graphics Tools, Clocks, Timers, Meters, and programmable events
- Easy to use layout environment
- Drag, drop and assign values to each widget
- Completely scriptable
- Control all aspects of your WheatNet-IP environment including all third party gear that's interfaced
- Password protection
- Use your own graphics
- Access from anywhere



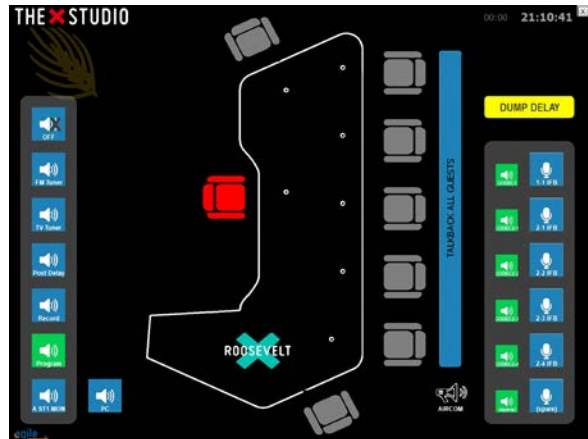
Screen Builder Environment Window



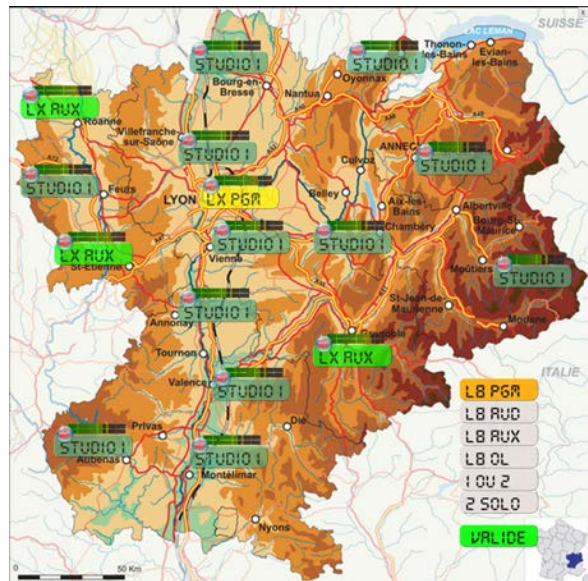
Screen Builder Script Wizard



ScreenBuilder 2.0 screen featuring RSS feeds



Custom Project from Agile Broadcast, Australia, created with Screen Builder



Two Custom Projects from Save Diffusion, France, created with Screen Builder

# IP-METERS GUI

AoIP Software BLADE



Get a quick read of any audio source, destination or stream in your WheatNet-IP Intelligent Network. Our new IP Meters GUI app displays a “wall of meters” on your computer screen for ongoing monitoring of audio peak levels and average levels at selected points throughout the entire network. Included is a separate FFT meter for spectral readings plus visual alerts should a channel go dark.

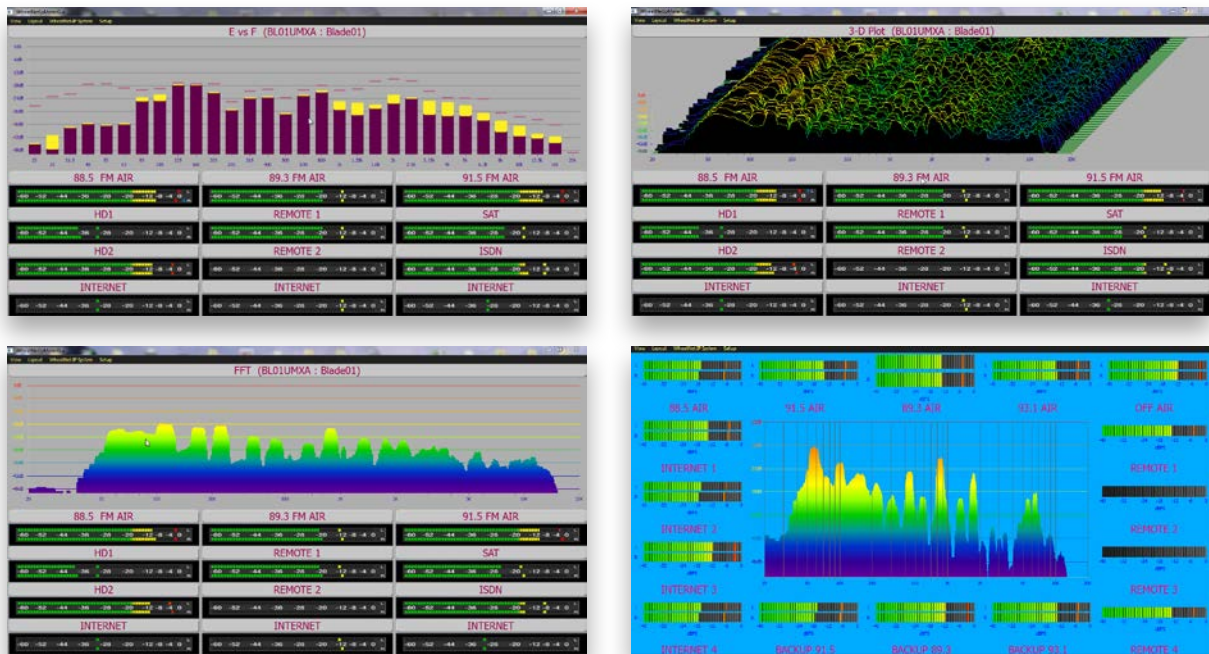
In today’s connected world of AoIP, it’s nice to know what’s going on with your audio. Not just the audio at local sources and destinations, either, but all audio at every point in your network. You could haul out all that expensive test gear for a look, but who has time for that? It’s much easier to drop in an app like our new IP Meters GUI for the WheatNet-IP network, which gives you ongoing metering of audio levels, signal density, FFT readings – the works.

Fully customizable, the IP-MTR64 Meters GUI lets you display an almost limitless array of metering and analysis on the monitor of any computer connected to the WheatNet-IP Intelligent Network. Plus, meters have silence detection, so you can see at a glance if an audio stream has gone down, and where.

Each meter – or cell – in your IP “wall of meters” can be set up as a horizontal, vertical or eyebrow bargraph meter. You can set up two or 20 or 60 or more cells in one “wall.” You determine where and what to meter: console inputs, mic outputs, the

satellite receiver, studios, web streams, you name it. In addition, a separate analysis window allows you to view one audio stream in a variety of informative ways, including FFT, 3-D plot, oscilloscope, energy vs. frequency, spectral dynamic range, and more.

Meters are arranged in a grid layout with the individual cells placed where you want. You can also choose the size and location of the analysis window. Style of metering can be curved, horizontal or vertical bargraph (you determine the number of bars) for mono or stereo, and for reading peak levels, average levels and peak over average levels. Set up one or two bright VU or PPM meters for instant loudness verification of on-air studios from across the room, for example, and add five or 10 or 30 side meters for checking levels of players and mics feeding those studios. Size, background color and text labeling for each cell is fully customizable by you. One meter at a time can be zoomed to a full-screen view for detailed observation. Multiple layouts, complete with source selection, metering choices, colors, labels, and analysis settings, can be saved and recalled for use in various situations.



Easily customize the look and functionality of IP-Meters to your specific applications

- Multiple bargraph meters in one computer display for checking levels of any source, destination or audio path in a WheatNet-IP network
- Separate analysis window for detailed signal evaluation using FFT, 3-D plot, oscilloscope, energy vs. frequency, spectral dynamic range, and other tools
- Real-time metering of audio peak levels, average levels and peak over average levels; stereo or mono
- Two to more than 60 meter cells in a single display screen
- Style of metering can be curved “eyebrow,” horizontal or vertical bargraph (you determine the number of bars)
- Silence detection/failover at a glance for alerting you if an audio stream has failed
- Customizable as an overall grid layout of meters with color options and font selections for metering in a way that makes sense to you

# WHEATNET-PC

AoIP Software BLADE



The WheatNet-IP Driver is software which allows bi-directional streaming of PC audio to and from a WheatNet-IP network via an Ethernet port on the computer.

Install WheatNet-PC on automation PCs to allow them to play audio to the entire WheatNet-IP network without using a sound card, and control console functions such as channel on/off without the need for separate control wiring. There is a huge savings in hardware cost because there's no need for an expensive sound card or the associated wiring time and complexity.

There are many more uses for WheatNet-PC: Install it on news reporters' computers to allow them to record and edit any audio in the system. Install it on program directors' and managers' computers to allow them to listen to system sources directly on their computers, limiting their selection lists to only those sources you authorize.

- Available in single (stereo) channel, four stereo pair, and eight stereo pair versions.
- ASIO-compliant version now available.
- Versions included on the CD for Windows XP and Windows 7.

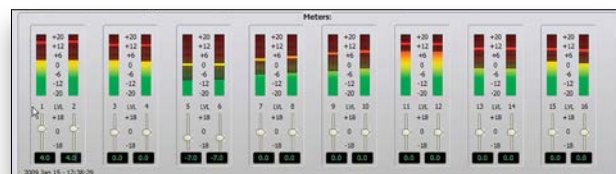
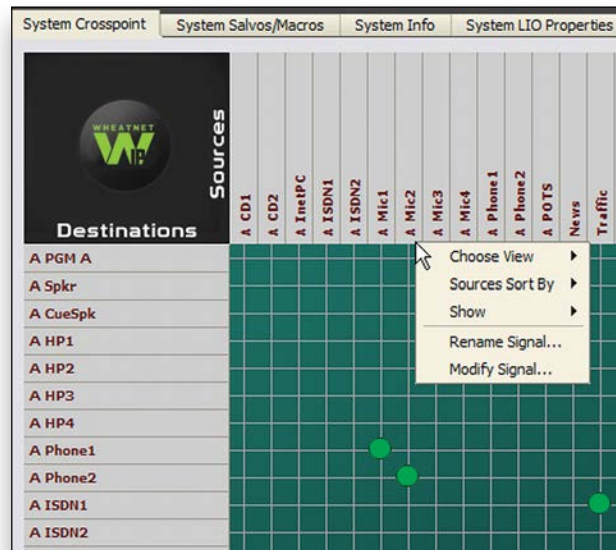
# NAVIGATOR

Administration and Control Software

WheatNet-IP NAVIGATOR is administration software that is installed on a PC running Windows®. It can be accessed directly on the WheatNet-IP network or remotely over VNC.

While much of the basic configuration of WheatNet-IP can be done easily from a BLADE's front panel, WheatNet-IP NAVIGATOR offers a more convenient way to do comprehensive system configuration, to enter source and destination names, perform other system setup functions, program salvos and macros, and control audio paths (cross-points). You can also control and monitor real-time levels.

When connected, WheatNet-IP NAVIGATOR continuously queries the network so that it's always showing the current configuration and status. You can even run up to four copies of WheatNet-IP NAVIGATOR at the same time to monitor and control the system from multiple locations simultaneously.



# SCHEDULER

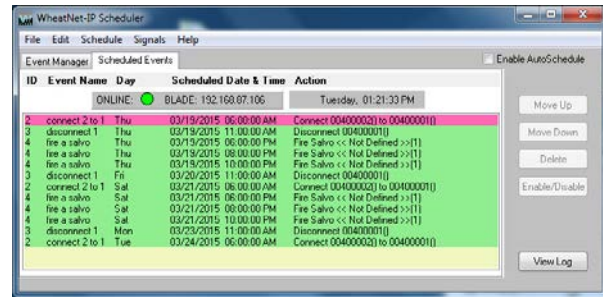
## Schedule Events on the Network

SCHEDULER tells your WheatNet-IP system when to switch between live and automated programming, turn on/off microphones and perform other events at predetermined times.

The WheatNet-IP SCHEDULER program triggers events at predetermined times by connecting or disconnecting signal routing. It fires off commands to send a satellite feed direct to air or to turn on mic feeds for the morning show at regularly scheduled times, for example.

SCHEDULER is a PC program that works in conjunction with BLADE logic ports, which can output to closures for machine control, on-air lights, mic tallies, and transmitter remote control. Each I/O BLADE can store hundreds of customized salvos, or sequence of commands for connecting/disconnecting signal routing, which can be scheduled as events by SCHEDULER. Users can group any audio source, logic and destination together that can be triggered by event or time.

SCHEDULER also can trigger events based on satellite closures, and works with any of the major automation systems through Wheatstone's Automation Control Interface (ACI). SCHEDULER makes/breaks single crosspoints or multiple crosspoints in the network, and triggers GPI closures or programmed salvos by the hour, day or week. All scheduled events are kept in a log activity file for reference.



- Windows ® compatible
- Hourly, daily, weekly, monthly scheduling
- Triggers salvo events
- Triggers events for third-party systems/devices
- Activity log
- ACI compatible



# PC-XY CONTROLLER SOFTWARE

## Manage your network

This XY controller is installed on standard PCs connected to the WheatNet-IP network. Provides source/destination control and can also access and take system salvos. Can be installed on multiple PCs with a site license.

PC-XY is an easy-to-use PC application that facilitates audio and logic cross-point control of a WheatNet-IP audio network. The software connects to any host BLADE in the system via the PC's Ethernet connection and provides customizable routing of audio or logic. Source and Destination windows display user-defined signal lists that give the broadcast engineer tight control over access to system resources. Eight fully-programmable "hot" buttons can act as source selectors for rack room or desktop speakers, control room-to-air chain selectors, recorder source selectors – the possibilities are endless!

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# WHEATNET-IP

## Why WheatNet-IP Intelligent Network Is SO Much Better

With the modern, intelligent WheatNet-IP audio networking, you can:

### **Make wholesale studio changes...**

...or switch studios from any seat, reconfigure control surfaces for multiple purposes, and even change audio processing settings automatically when, say, a certain mic turns on. It's all in the WheatNet®.

### **Bring on the devices.**

WheatNet-IP gets along with everyone, including MADI gear like ProTools and TDM systems, and interfaces to more than 40 third-party brands and/or products for end-to-end, seamless operation from the microphone to the stick. In addition, new third-generation WheatNet-IP access units are AES67 compatible, which means you can integrate your audio network with other AES67 compatible devices and systems.

### **Integrate audio routing and automation.**

Imagine interfacing your audio network to your automation system with no sound cards, external logic connections or added routers. Or, better yet, imagine fully integrated audio automation and routing so an announcer seated at the playout system can set a fader for a console located anywhere in the facility. That's WheatNet-IP.

### **Access any audio, anywhere.**

WheatNet-IP handles native analog, microphone, AES/EBU, SPDIF, AoIP, MADI, SDI and even AES67, which is now included in our third-generation access units. Ingest any audio format into the WheatNet-IP, and convert to any audio output – analog to digital, AES to IP, microphone to AoIP or MADI to AES67.

### **Control and route audio all on the same cable.**

No more having to chase down or create new logic commands for sources every time you change control surfaces or studios. Logic follows audio. Audio and control for that audio travel down the same cable, so you can pick up feeds and the logic for those feeds anywhere along the network. Route any audio input to any or all outputs in the network.

### **Relax, you have switch-over silence detection.**

Let's say an operator misses a cue or leaves a fader down. No problem. When WheatNet-IP senses silence, it can take the automation system directly to air until the operator catches up. Every single audio output channel can be programmed with silence detection and automatic switch-over function.

### **Simplify things.**

No need to assign IP addresses or allocate bandwidth or pay someone else big money to do it. Just plug it into your managed gigabit Ethernet switch and let WheatNet-IP do the rest. Add codecs, processors and controllers or change I/Os in a snap. You spend less time configuring the system, and more time on what's important: creating awesome sound.

### **Call the shots.**

You call the shots, not some PC. WheatNet-IP distributes the workload to all access points in the system for better overall network stability. Each WheatNet-IP BLADE access unit has its own embedded processor with operating system that allows it be a powerful standalone router or part of a larger system. WheatNet-IP is an embedded system that does not require outside intervention or control from 3rd party software running on PCs. The configuration of the entire network is stored in each BLADE.

### **Self-pruning multicast trees.**

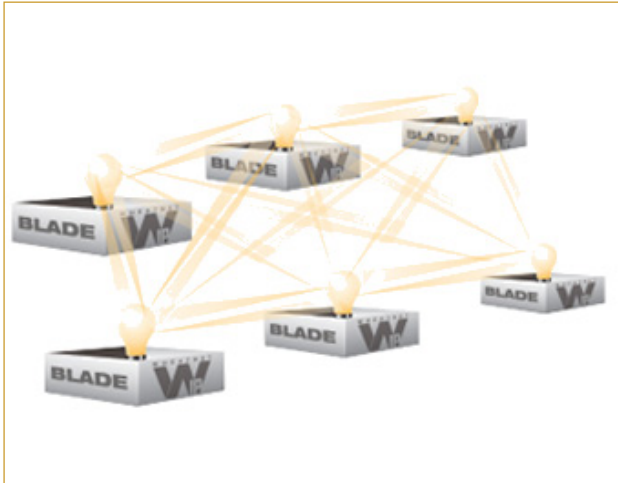
A lot of older IP audio networks don't manage the multicast streams, which could require you having to periodically manage this yourself or getting a bigger, more expensive switch to handle the mounting volume of streams. Not WheatNet-IP, which continually prunes unused source groupings from the network so that you never run out of switch or time having to delete unused channel assignments that are no longer in use.

### **Avoid costly system failures.**

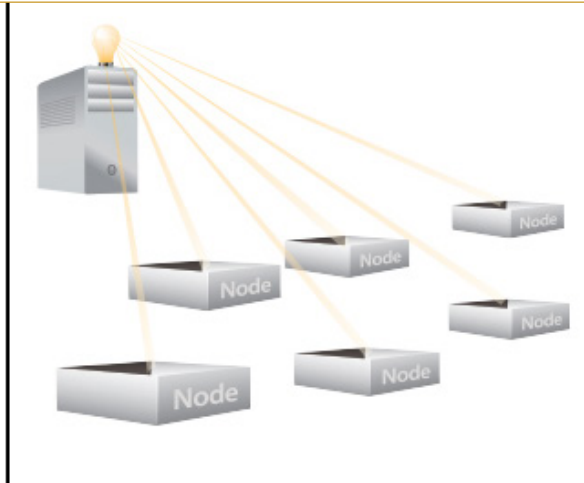
A distributed and intelligent network means no more centralized points of failure to go wrong, plus more points of recovery. Every WheatNet-IP BLADE access unit is self-aware, and can reconfigure itself in an emergency. In fact, each BLADE in the network can recover settings for your entire studio operation!



**MODERN**  
(WHEATSTONE)



**NOT SO MODERN**  
(NOT SO WHEATSTONE)



**Stay ahead of the curve with Gigabit Ethernet architecture.**

You might not be in a hurry now with 100mbps throughput, but we promise you'll want the system that has 1 gigabit/second Ethernet throughput once you get your audio network up and running. All WheatNet-IP BLADEs use gigabit Ethernet. This makes all the difference in network throughput, near-zero delay, reliability – and a whole lot more.

**Get more on the network for less cost.**

Some IP audio nodes are mere input/output devices. Each WheatNet-IP BLADE I/O access unit, by comparison, comes standard with routable utility mixers for mixing, summing and controlling audio in lieu of costly DAs, plus newer BLADE-3s include a multi-band stereo processor for “spot” processing satellite feeds, headphone audio, web streams or any audio feed routed throughout the network. Also included in our new BLADE-3 access units is embedded audio playback that can be used to put emergency audio on the air, and much, much more. With all that functionality built in, WheatNet-IP can save you substantially in hardware costs alone.

**Eliminate audio latency problems.**

Finally, an audio IP system that can keep up with audio, which means your automation system won't ever drop a satellite feed or skip a commercial because of delay again. Gigabit Ethernet is why.

**Get way more for less.**

We're talking full-featured routable mixers, stereo processor, and automation control in each BLADE-3 I/O unit, so operators can pan audio, turn channels ON/OFF, set fader levels, and do audio fades, ducking, source assignments – and lots more. The possibilities are mind-boggling.

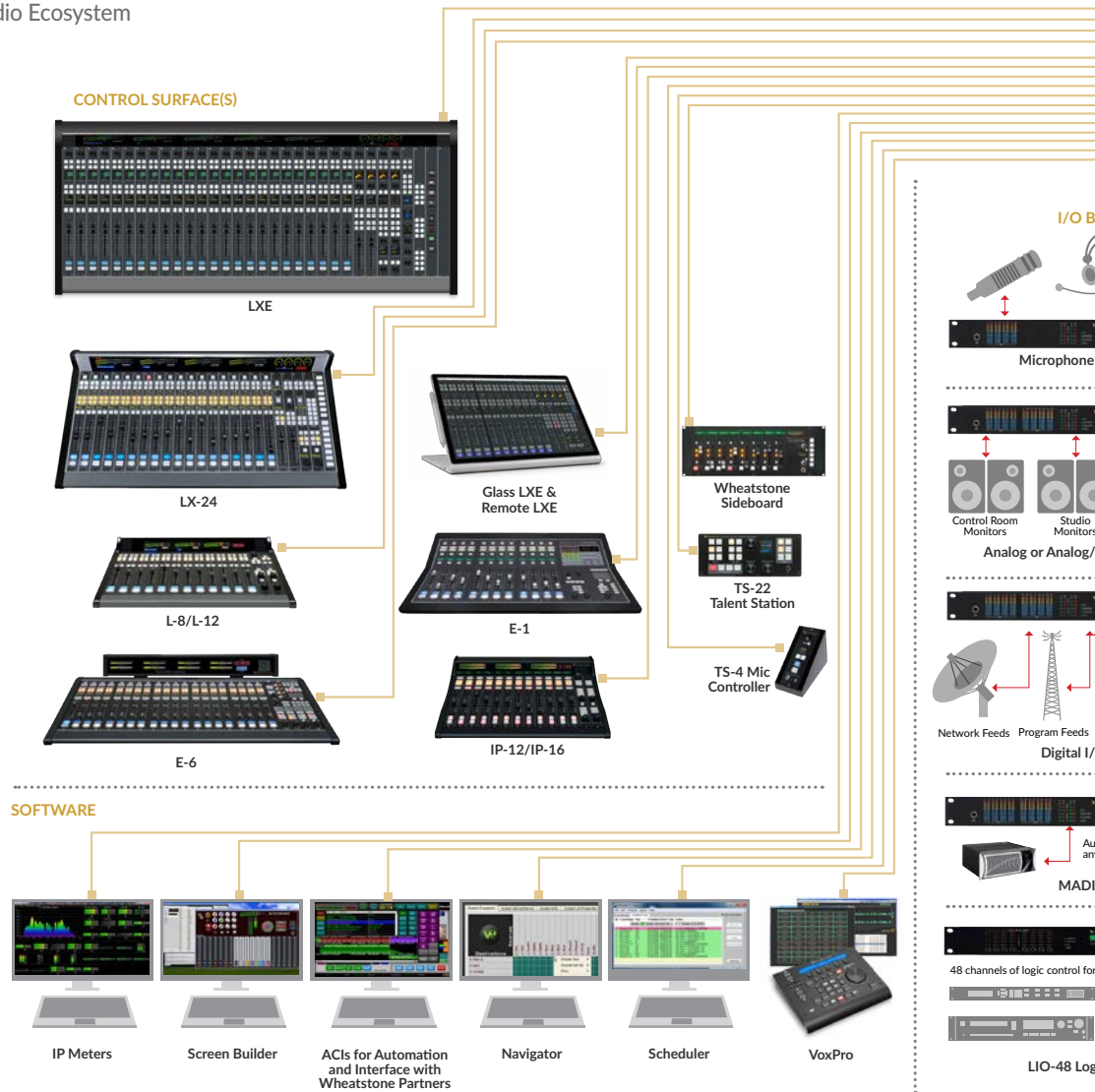
**Expand your network at any time, for less.**

With control and intelligence built into every WheatNet-IP BLADE I/O access unit, you already have most of the networkability you need to grow with the times.

# WHEATNET-IP

An Overview of the AoIP Audio Ecosystem

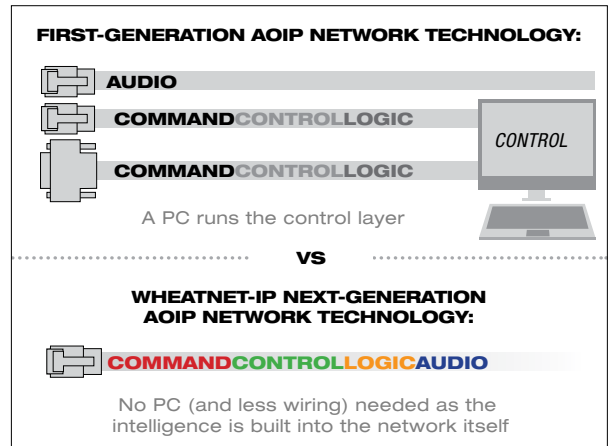
WheatNet-IP: Building the Co



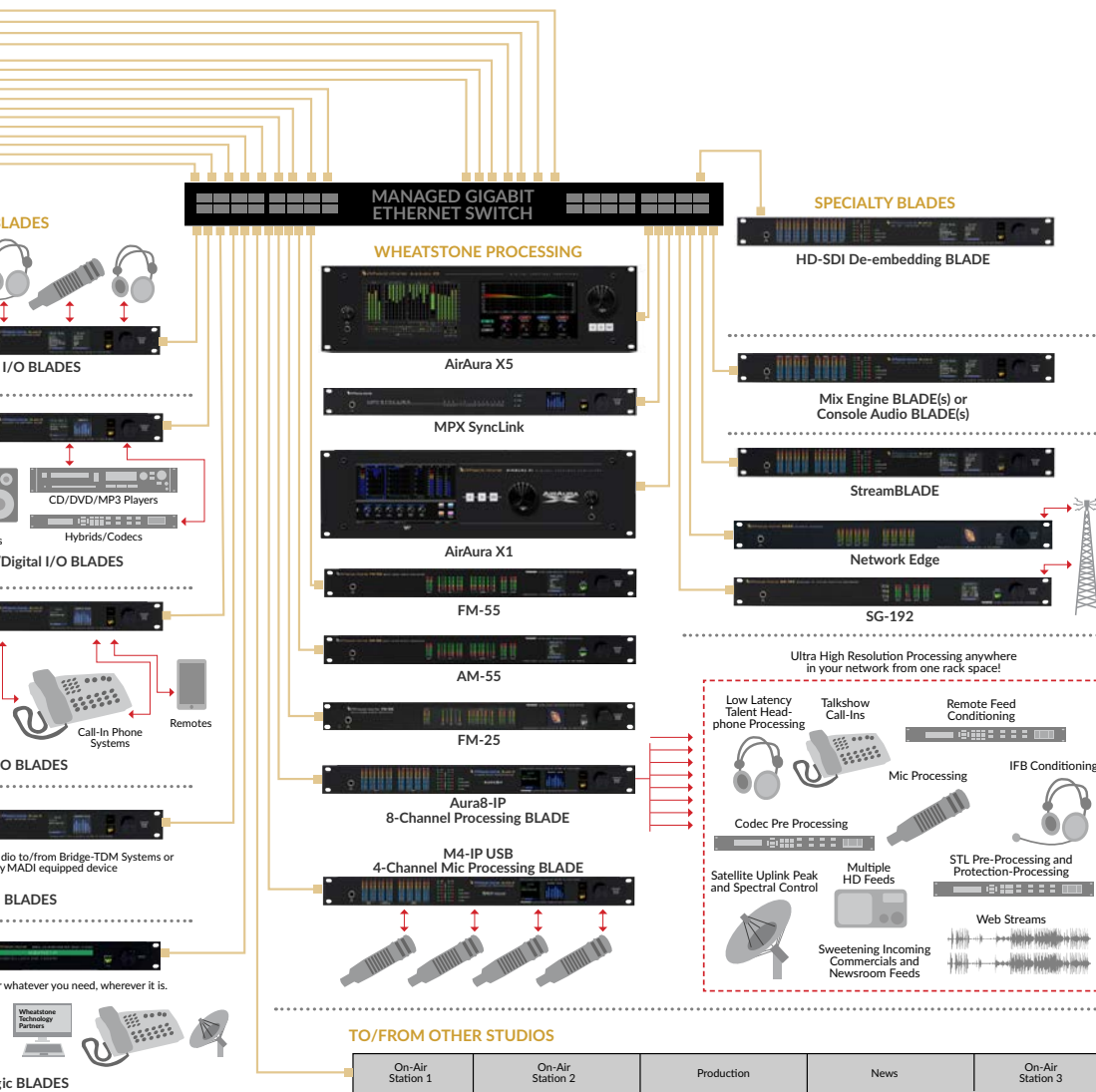
## Why the Integrated Control Layer is Important

Broadcasters who connect their studios with an AoIP network can make their facilities more efficient and flexible. But to take full advantage of the capabilities of these networks, a second control layer is needed. Up until now, AoIP technology has been deployed in two steps: first the transport layer, which carries the IP audio is built, and then a second, optional control layer, usually running on networked PCs, is added on top. But the next generation of AoIP networks combine the two from the start.

The system becomes one integrated audio ecosystem. Users interact with it as an entity and have greater control and capability because each component of the system is always linked in and available from anywhere on the network. Just as a large computer network benefits from centralized administration and control, so does an AoIP network. Any node, control surface, or application



Complete IP Audio Network Ecosystem



that is not directly controlled becomes time consuming and difficult to deal with, just as orphaned printers, drives, or modems do in a computer network. Devices isolated from networked control ultimately limit flexibility, reliability, and creativity.

When all of the devices in the system are true IP devices, installation and maintenance are simplified. Every device uses a common Ethernet cable and plugs into an Ethernet switch. No special serial cables and distribution systems or logic adapter cards and breakout boxes are needed. Changing logic functionality means clicking on a computer screen, even from a remote location, rather than punching down wires or sending configuration files as is needed in older systems.

Because each member of the system is able to see and interact with all of the other members, complex features and dynamic, conditional functionality can be user programmed; things like wholesale station reformatting, studio switching, or changing audio processing when a certain mic turns on can be easily achieved, all over the single CAT6 cable that is already in place for the audio connection.

Just as audio processing has evolved beyond a simple equalizer or compressor, today's most advanced AoIP systems have progressed beyond simply sending audio over a network. They can provide unparalleled control for unleashing the creativity, responsiveness and flexibility needed to succeed in the most competitive of environments.



# I/O, BLADE-3 IS AMAZING

BLADE I/O access units make up the audio routing backbone of the WheatNet-IP Intelligent Network and use RJ45 StudioHub-compatible connectors for input and output, and also have DB25 connectivity for transitioning from BRIDGE TDM networks.

But there's more inside their sleek, all-metal housing than mere I/O. The I/O BLADE has its own CPU and operating system; no additional PC required. It can operate alone or as part of a network, and can be located anywhere in the studio (no noisy fans inside). Each BLADE has a 1000-base-T (Gigabit) network interface. This single network connection is used to send and receive audio, logic, and communications from the I/O BLADE to the rest of the WheatNet-IP network. Gigabit Ethernet provides very low latency while allowing the use of readily-available switches and infrastructure for connectivity. Connect automation and production PC's, codecs, audio processors, controllers, and other devices directly to the network without installing specialized sound cards, A/D-D/A converters, audio wiring, or control connections. The I/O BLADE communicates at the speed of Gigabit Ethernet connectivity for optimum network QoS and reliability, and includes logic control, onboard utility functions and the dedicated controller that is at the core of its intelligence. Each individual I/O BLADE can hold the brain trust of the entire system's operation for exceptional network redundancy and scalability.

## Logic follows audio like a puppy on a leash

I/O BLADEs come with universal logic (GPIO) for interfacing various external switches, indicators and devices for control purposes – as well as software logic ports for routing and controlling devices anywhere on the network. Send any GPI to multiple GIOs or marry GPIOs to an audio source and have them follow that source through the system -- all through one RJ connector. Audio and the logic controls for that audio are all on the same CAT6 cable, to be used anywhere in the network. When routing the audio of a CD player to a console fader, for example, the START button logic is routed right along with it. These logical associations reside within the I/O BLADE itself, and do not require a PC or other controller to work.



## Mixers and Audio Processing Included

I/O BLADEs include two built-in 8x2 stereo mixers. In addition, newer third-generation BLADE-3 I/O units include a stereo multiband processor with 4-band parametric equalizer, 3-way crossovers, 3 compressors, 3 limiters, and a final, look-ahead limiter. By routing mixing and audio processing, these functions are no longer limited to a location in the studio and instead are resources available anywhere in the network.



The I/O BLADE's internal mixers are full-featured, stereo mixers implemented within its internal hardware. The inputs and output busses of these mixers are available as resources on the network, accessible anywhere and don't use up any of the inputs or outputs of the BLADE itself. From simple features like summing, splitting, and level adjustment all the way to creating custom mixes and intercom systems under automatic control and performing fades and segues, the potential uses for these mixers are nearly endless. The I/O BLADE includes the Wheatstone ACI (Automation Control Interface) "tool box" for third party control of its functions, such as routing ducking, panning, logic control, mixing and silence detection. Each I/O BLADE supports up to 20 ACI connections that can be used with devices like Talent Stations, GP panels and SideBoard surfaces as well as to integrate with automation systems and other Wheatstone partners for control purposes.



## Silence detection, emergency audio

Each I/O BLADE comes with a headphone jack with volume control and source selection for local monitoring of any sources or mixes anywhere in the network. Each of its output channels can be programmed for silence detection and for automatic switchover and switchover to/from a standby device – or to the unit's onboard audio player – in an emergency. In addition, new I/O BLADE-3s come with embedded audio storage and playback for emergency or utility applications, or any other application requiring an hour or more of 24-bit, uncompressed audio. Silence alarms or LIO/SLIO can trigger playback or this can be manually controlled from the NAVIGATOR configuration and crosspoint software.



**Interoperable and flexible**

I/O BLADEs operate at 44.1k or 48k sampling rates while converting incoming signals up or down as needed. Newer third-generation I/O BLADE-3s provide selectable system clocking at 44.1kHz or 48kHz, External Reference or AES67.

I/O BLADE-3s support AES67 compliant devices using an IEEE1588 PTP grandmaster clock for synchronizing to and ingesting /streaming AES67 compliant packets. A 1588 Clock Loss Indicator is included for notifying operators when the AES67 clock source has been lost; an alarm is also generated when an AES input has lost its clock source or becomes disconnected.

All BLADEs can take any analog and/or digital input or output and split it into two mono channels. Any stereo signal sent to a mono output is automatically summed. When routing a stereo source or stereo mix to a mono destination such as a hybrid or codec, for example, the unit will automatically “sum” the left and right channels together. It has gain control on every input and output, and balance control on every stereo input or output.

**Easy to configure and maintain, with failsafe**

Activating the I/O BLADE is as easy as plugging it in. No need to assign it an IP address or prioritize packets. Once plugged in, it will instantly recognize that it's been connected to a functioning network and configure itself into that network with almost no human intervention at all! All of its resources are instantly available so it can be pushing out or bringing in audio in little more than a minute after it is first plugged in.

New I/O BLADE-3s come with dual OLED displays for monitoring and control of most functions right from the front panel, including audio routing setup, monitoring, network information, alarm status, enabling and operating utility mixes, setting input and output gain, and connecting audio processing. Settings can also be done remotely using a PC.

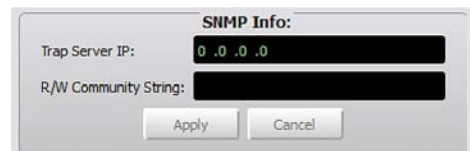
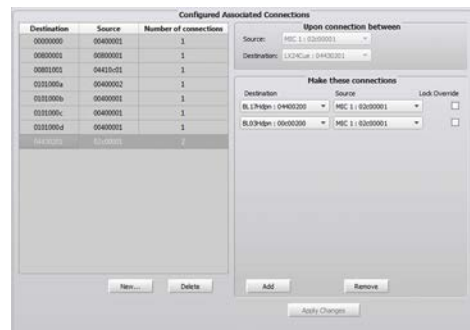
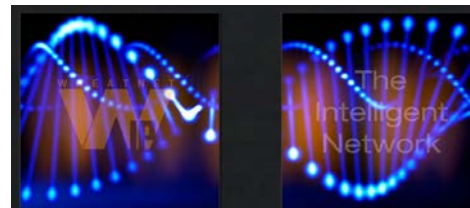
Ongoing changes and updates are just as easy. Change a signal name on the fly and it is instantly updated in every device on the network; no reboots or configuration file gymnastics required.

The I/O BLADE-3s' new Aliases feature allows the same source to be identified by different names. A signal can be given an alias that's more familiar to a particular operator, and multiple aliases can be used so different operators can share logic functions, source feeds and routing while using signal names they recognize.

Another new I/O BLADE-3 feature, Associated Connections, is useful for callers, codecs, networks, remote broadcasts and live talk shows that require a mix-minus. With this, operators can create a predetermined back haul, IFB feed or mix-minus to each device based on its location in the system and the fader to which it is connected. For a shared resource connected to your system, such as a codec, the software will 'automagically' give the proper return feed to the codec based on its source connection. When a base connection is made, up to ten additional connections can automatically follow. This significantly helps streamline studio routing, phone and codec work flow.

The I/O BLADE comes with maintenance and diagnostic tools, including built in SNMP capability for network management, statistics, and alerts. Newer BLADE-3s also include a new logging app that can be used for tracking LIO/SLIO activity throughout the system. This app shows time-stamped location activity messages in high resolution for when inputs come into and leave the system, and provides sophisticated filtering functions for revealing relevant information that otherwise might be buried in the clutter of system data.

Any I/O BLADE can restore the settings for the entire network and allow remaining segments of the network to continue to operate in the event of a facility-wide disaster. Only the section of the network that has been brought down by a power failure, for example, is affected. When power is restored, affected BLADEs will seamlessly rejoin the network, all without any user interaction.



# BETTER WAYS TO DO AUDIO

BLADEs can do things that mere I/O nodes can't because of their embedded CPU and OS that make routable utilities such as audio mixing and processing possible. But what does that mean to you? For starters, it means faster, better and easier ways of doing audio. Here are some practical ways you can put BLADEs to use in your broadcast facility.



## Audio Routing and Control

Route any audio input to any output or all outputs. Send one GPI to multiple GPOs or marry GPIOs to an

audio source and have them follow that source through the system. All BLADEs in the network live on a simple crosspoint matrix.

## Auto Mono Summing

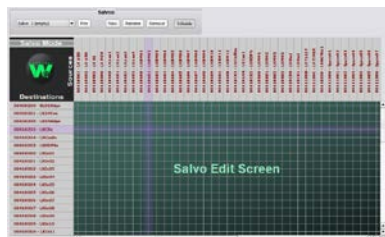
BLADEs have the onboard processing and intelligence to auto sum and level match a stereo output that is routed to a mono output or destination. If, for example, you want to feed a stereo console bus down a hybrid or codec, the audio will be available in both mono and stereo on the receiving end. If you route a mono source such as field recording device or remote interview through the router it will put that mono source on both channels.



Left: The above shows a mono source being routed to both stereo and mono destinations in a BLADE.

(Two dots indicate a stereo or dual channel connection. A single dot indicates it's a mono to mono connection.)

Right: The above shows a stereo source being routed to mono destinations.



Line	Nominal level	Nominal level, Vrms	Peak Amplitude, Vpp	Peak-to-Peak Amplitude, Vpp
Professional audio	+4 dBu	1.228	1.736	3.472
Consumer audio	-10 dBV	0.316	0.447	0.894

## Input Gain Control

Calibrate levels for each source or destination using bargraph metering. Shown, audio levels for the individual channels color coded over a 40dB range, with the highest level being "+20" VU, corresponding to +24dBu, 0dBFS, and the onset of clipping. These meters show the actual input signal level as modified by the input gain setting. The bouncing bar at the top shows the peak audio level while the solid column shows the short-term average audio level using VU time constants. Adjusting source levels ensures that they have enough volume to keep noise levels low in comparison, but not so high that they overload the equipment and cause distortion.

## Output Gain Control

Destination gain adjustments are useful for output signals known to be too low or too hot, such as those feeding headphones or amplified speakers with no gain control of their own, to bring them to the correct listening level. As shown, the audio gain of individual output channels can be adjusted over a range of +/-18dB in .1dB steps. The nominal setting is 0, corresponding to an output level of +4dBu analog, or -20dBFS digital, providing for 20dB of headroom.

## Unlimited Salvos or Macros

Each I/O BLADE can store hundreds of customized salvos, which can be useful for assigning feeds to codecs or hybrids and switching between studios. Group any audio source, logic and destination together that can be triggered by event or time.



## Mixers for Mic Groupings, Talkback

Each I/O BLADE contains two stereo 8x2 internal mixers that become a source or input to the system. This can be useful for grouping several mics to a single output. You can use the output of each mixer as a talkback source.

## Mixers for Panning Mic and Caller Feeds

The BLADE's two stereo 8x2 internal mixers are independent of each other, so they can feed audio to each other or another BLADE. The output of mixer #1 can be brought up on a fader in mixer #2, for example. With balance control on each fader, this can be useful for recording a telephone mix with the "callers" on the left channel and the "announcers" on the right channel. The output of the mixer feeds the recording device.

## Automation Mix-Down

The BLADE's stereo 8X2 internal mixers can be used to mix down multiple channels to a single output. Shown is a BLADE utility mixer being used to mix down multiple RCS automation channels to a stereo output, which can then be programmed as the automatic failover source in an emergency. This is also useful as a way to bypass the studio, so that with the push of a button or a command from the automation system, this output can feed the transmitter and free up the on-air studio for production or voice tracking, for example.

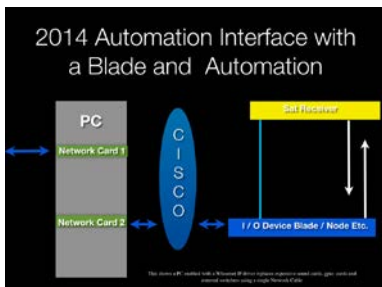


**Logic on RJ45 Connectors**

Each I/O BLADE is equipped with 12 logic ports on RJ45 connectors, which can be individually designated during set up as inputs or outputs for interfacing to various external switches and indicators. Logic ports can output to closures for machine control, on-air lights, mic tallies, transmitter remote control and the like. They can also receive closures from external devices like satellite closures, remote mic panels or triggers from your automation system for channel ON/OFF.

**Selectable Master Clock**

Automation PCs and other digital devices that require a specific sample rate are no problem. New I/O BLADE-3s provide system clock rates selectable at 44.1kHz or 48kHz, External Reference or AES67. While all AES inputs in I/O BLADE-3s are equipped with sample rate converters, the master clock sets the sample rate of all of the system's AES digital outputs.



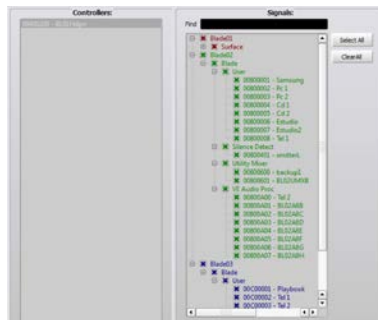
**Automation Interface. One Cable**

One cable is all it takes to integrate your automation system with a network of BLADEs. WheatNet-IP audio drivers replace expensive sound cards, GPIO cards and external switches.



**Monitor Devices with SNMP (Simple Network Management Protocol)**

BLADEs include SNMP agent software for centralized monitoring of all BLADEs in a large distributed network. You can configure alarms and set thresholds in order to be notified should a problem occur and therefore respond with quick corrective actions through e-mail, SMS, traps and executing custom scripts. SNMP is part of the Internet protocol suite defined by the Internet Engineering Task Force (IETF). Network management systems use SNMP to monitor network-attached devices such as BLADEs for conditions that may require action by the end user.



**Quick Source and Destination Changes**

Each BLADE can act as an X-Y controller sending any system source or input to any of its outputs. This comes in handy when changing feeds to monitors, codecs, hybrids or recording devices.



**Silence Detection and Failover**

Every single audio output channel can be programmed with silence detection and automatic switchover function. Showing on the left is the console PGM channel being routed to the station transmitter during normal operation. On the right shows a failover state after silence was detected.



**Rountable Audio Processing**

New I/O BLADE-3s include a multiband processor useful for processing incoming audio from callers, remotes, codecs, satellite feeds and microphones. You can also use it to process output audio for headphones, web streams, pre-processors, IFB, or for level protection for STL applications. This is a routable processor that includes 4-band parametric equalizer, 3-way crossover, 3 compressors, 3 limiters, and final look-ahead limiter.

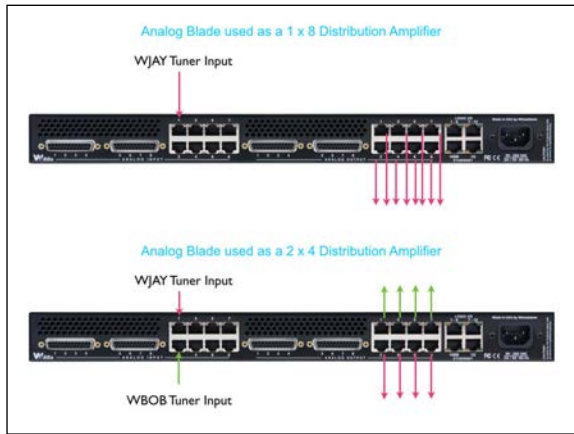


**Share Resources, Connections**

Create a predetermined back haul, IFB feed or mix-minus for each device based on its location in the network or on a fader. For shared resources like a codec, new I/O BLADE-3 software will 'automagically' give the proper return feed to the codec based on its destination. So, if you pull up the codec in Studio One, the mix-minus from Studio One will automatically and magically be routed to the return feed. Later, when you call up the same codec on the console in Studio Two, the Studio Two mix-minus will be routed to that Codec. This is useful for call-ins and live talk shows that require a separate mix-minus.

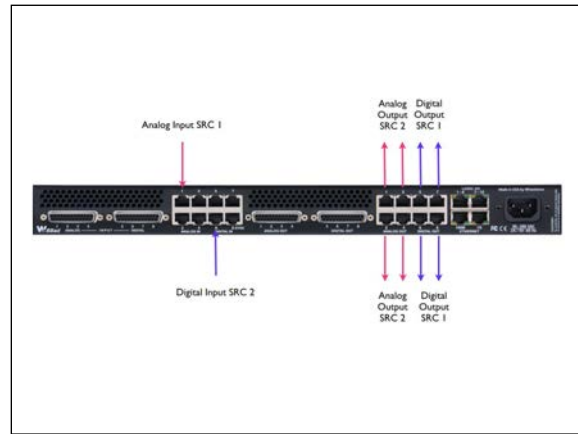
# APPLICATIONS & CONFIGURATIONS

Here are just a few unique uses, configurations and applications for our BLADE access units that our customers have told us about. If you have a unique BLADE application, we'd like to hear from you. Drop us an email at [wehearyou@wheatstone.com](mailto:wehearyou@wheatstone.com).



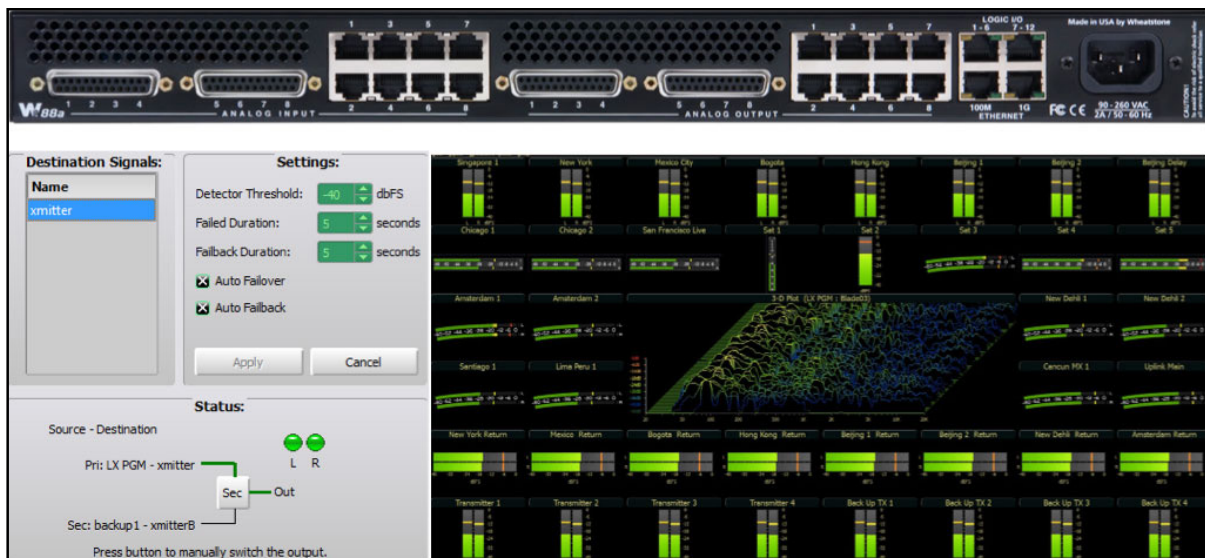
Analog BLADE as a 1x8 distribution amplifier

Analog BLADE as a 2x4 distribution amplifier



BLADE as an A/D and D/A converter

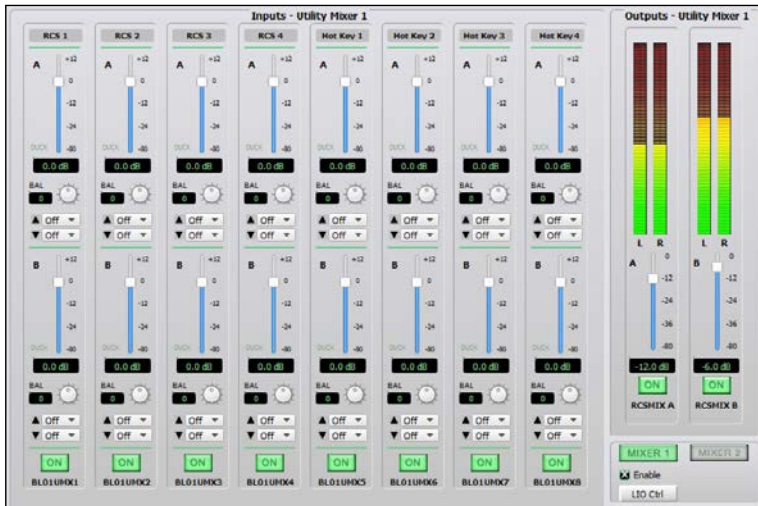
With a single IP88AD I/O BLADE, you can easily convert from analog to digital audio.



BLADE plus meter app = failover monitoring

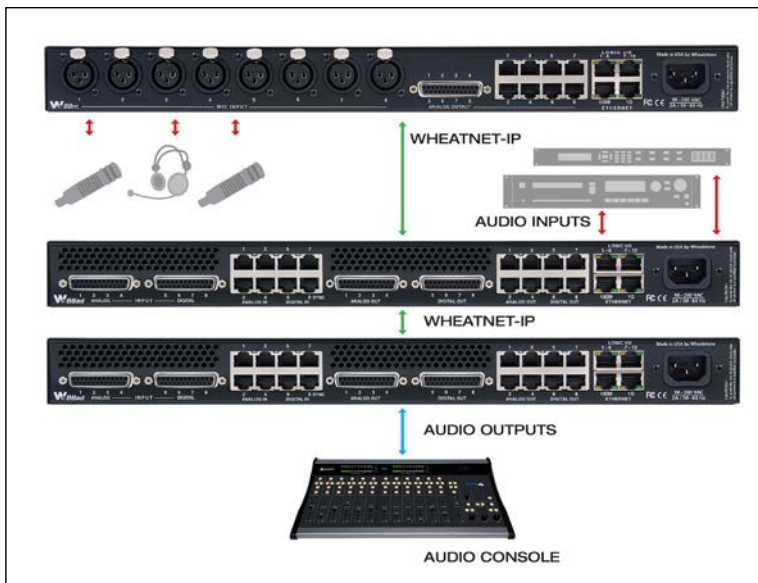
You can wire your sources to the inputs of the BLADE 3 and then using the WheatNet-IP's meter app, build a meter screen to monitor all of the sources and destinations in the system. If silence is detected, the BLADE will failover and the particular meter will change color to give you a visual notification. Each time a failover is detected on an output, a logic signal is generated that can be routed to any logic port in the system.





**BLADE as a mixer**

With two built-in 8x2 stereo utility mixers, the BLADE has more flexibility than some hardware solutions.



**BLADE 3 as an audio snake**

Use BLADEs to transport audio between the on-air or production studio and a performance studio using CAT6, wireless link or optical fiber. Carry the mic and direct feeds from the stage area to the network. Do separate mixes using the BLADE's 8x2 stereo mixers, or capture multitrack recordings that could be saved for future mixing projects (such as the CD or DVD release). All this can be done without the need for a conventional audio snake with transformer splits for the various feeds.



**BLADE as part of an IP STL**

Continue IP audio from the studio to the transmitter with BLADEs on both ends of an IP wireless audio STL. Newtwork EDGE facilitates connection to IP radios which connect to the switch on each end, which are connected to the BLADE for managing audio and any devices hanging off the network. If the IP radio should lose connection, the new BLADE-3 will not only detect silence, it can trigger the startup of playback audio stored on the BLADE-3 itself.

# SYSTEM PREPARATION

## Working with Wheatstone

While it's incredibly easy to install, interface and operate, proper planning can make all the difference with your WheatNet-IP system.

Before we even begin to think about the gear you are going to need, we think about where it's going and consider the most efficient way to meet your needs.

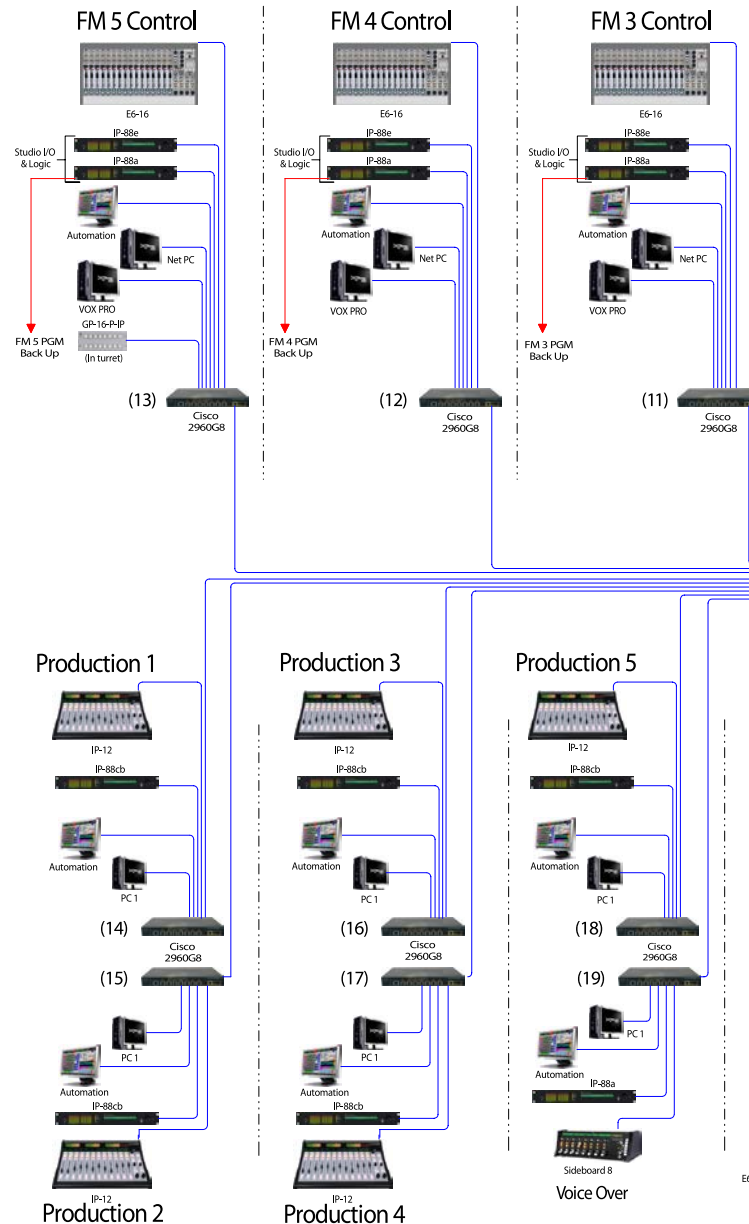
Wheatstone professionals work with you to ensure your system is perfect for your application and facility. Working very closely with you, we plan the entire system to determine the right gear for each room/need.

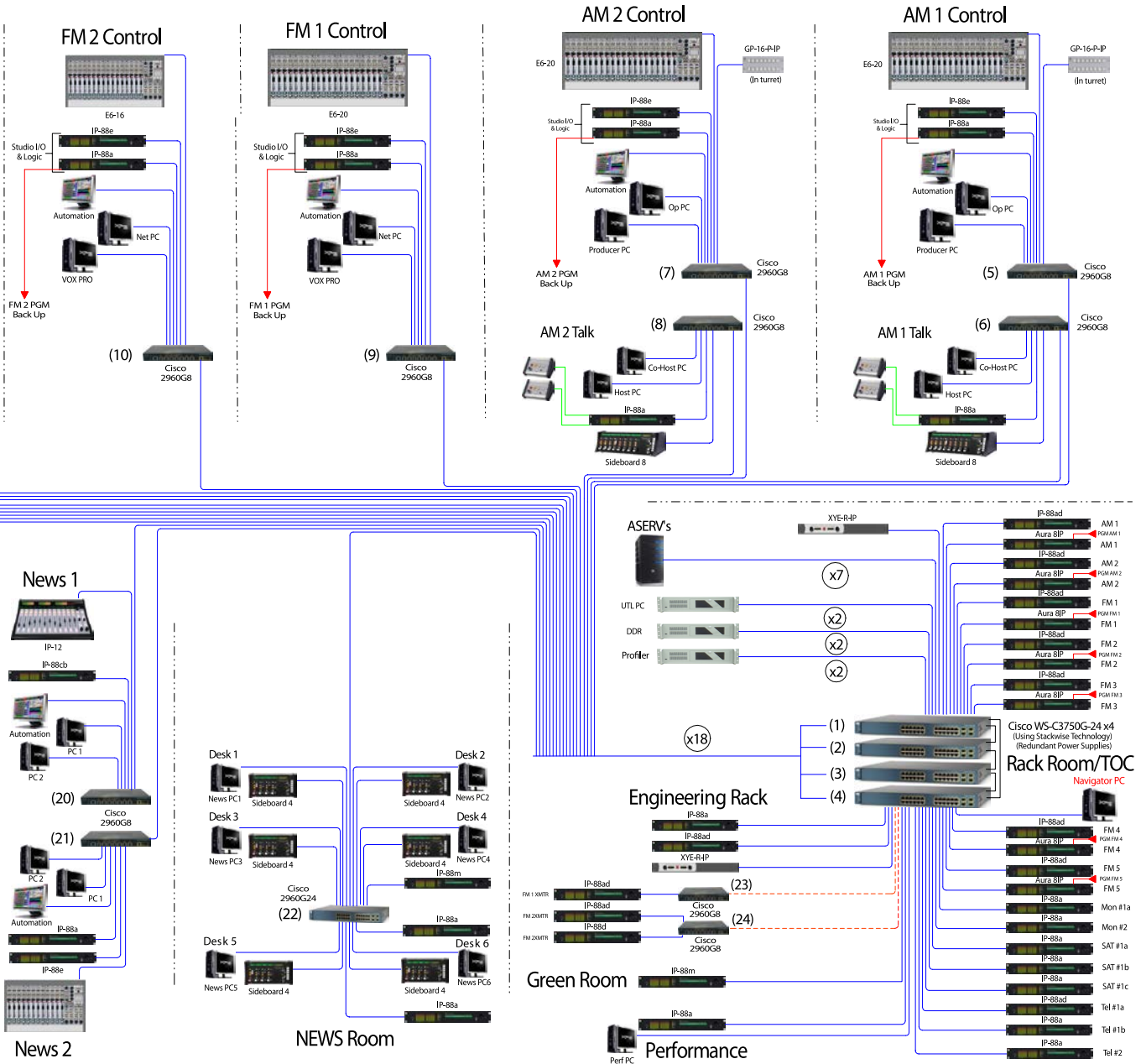
What you see to the right is a final plan for a customer in Portland, Oregon. Installation went exactly as pictured. Before the system ever got to Portland, it was completely set up in New Bern and fully tested for functionality.

Recently, during a test setup in New Bern, we decided to see how long it would take to completely reboot all the BLADES in the system at once. Over 60 BLADES, many control surfaces and a ton of peripherals were involved. The time from live to down to live? Just under 1 minute and 13 seconds! No kidding. You can see that video and many other informational videos about WheatNet-IP here:

<https://wheatstone.com/wheatnet-ip-videos>

Of course we show this same level of commitment to every customer regardless of the size of their network. We look forward to working with you!





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