Glensound

MR-AUDIO

Glensound MR-Audio
A Dedicated System For Audio In Meeting Rooms

The MR Audio system contains all the components to provide a high performance meeting room audio system. From dedicated microphones and speaker front ends, through to local interface units, then structered network audio distribution with power, then remote control. A full redundancy system of processing cores and power supplies, provide a solution for a system where permanent operation is paramount.

Key Points

- **Digital meeting room audio system**
- **AES3 digital audio connections 128 inputs x 128 outputs on 64 AES3 circuits**
- **Central audio mixing router (core) manages audio to up to 64 interface units (edge)**
- **Operates on a structured wiring network and is power safe**
- **Small Edge connectors interfaces microphones, loudspeakers, analogue audio lines and control surfaces**
- **Core and Edge interfaces connect via structured wiring and standard patch cables with up to 100M cable range.**
- **Power to Edge interfaces via 'power over Ethernet' across the AES3 circuits**
- **Full redundant system - redundant PSUs, redundant DSP cores, redundant interfaces**
- **Radio frequency interference free**
- **High quality Audio Technica mics feature Unigaurd RF shield**
- **Intelligent management system can detect main speaker and ignore coughs, paper rustles, etc**
- **Very high audio quality**
- **Manages distribution of audio for broadcast, legal logging, local PA, recording etc.**
- **Frequency shifter uses software hilbert transformers to remove feedback whilst maintaining a better frequency response with lower distortion**

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Introduction

MR-Audio is the next generation of Glensound meeting room audio systems designed specifically for providing high quality audio circuits for broadcast, recording & sound reinforcement in committee rooms, debating chambers and board rooms.

It is the 4th generation of Glensound meeting room equipment, the original 1st generation equipment is now over 25 years old but it is still in daily use in the world's most prestigious environments. The design builds on the previous systems performance to embrace the challenges of modern working such as its immunity to mobile phone RF interference and the modern design also adds functionality such as the software control panel.

At the heart of the system is a very sophisticated set of fully redundant audio processors that provide 100% reliability for those crucial meetings. These processors feature the unique Glensound auto detect algorithm, which enables the system to automatically select mics to be turned on/ off when a committee member is talking. This latest version of the algorithm is so advanced that it won't get distracted by the rustling of a set of papers or a glass being put down near a microphone and it can determine which of a number of delegates is genuinely talking from a group in close proximity to each other.

Glensound's 50 years of experience in designing audio broadcast equipment for broadcast, recording and sound reinforcement, has resulted in an audio integrity and quality within the audio circuits emanating from the MR-Audio system, are all of an exceptional standard.

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The MR Meeting Room Audio system is a highly capable and configurable system for making sure everyone in a meeting, however large, can hear each other as if they are sitting next to them. Discrete microphones capture audio without having to be up close to attendents allowing a more natural speaking position. Details follow, but key feature highlights are mentioned below.

Highlights

- **Radio Frequency Interference Free**
  Isolation from RF interference was a key consideration in the system design. The mic amps are within the board room EDGE connection units to minimise the mic cable length thus, reducing the likelihood of RF interference.

  The system is also isolated against cell phone interference. As participants at a meeting are all likely to have cell phones in close proximity, isolating their RF was a key design criteria.

  Audio is transported around the system using digital AES3, and not RF susceptible analogue audio. AES3 is very good at rejecting external RF interference.

- **Dynamic Digital Features**
  All mic amps feature Glensound designed compressor limiter systems. In a meeting environment, clarity of audio is paramount. The Glensound Referee compressor/limiter systems maintains consistent audio and prevents any peaks from excited individuals from distorting or clipping the signal.

  The digital control systems allow for a customer preferred EQ and dynamics setting to be configured.

- **Installer & Maintenance Friendly - Structured Wiring Network Installation**
  The audio and power of the MR-AUDIO system is passed across structured wiring networks. This makes the system installation very straightforward and uses industry standard and cost effective CAT 5/6 cabling

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- **Installer & Maintenance Friendly - PoE**
  The remote EDGE units receive their power from the CAT 5/6 cabling using PoE. This means there is no need for separate power supplies, making the locating of the EDGE units simpler as they only need the data connections.

  Our PoE system is network safe, so if any cabling is plugged incorrectly there will be no power passed and no damage caused to any equipment.

- **Fully Redundant System**
  The MR AUDIO system operates on two independent circuits, a main and a reserve. This gives full redundancy with twin power supplies, twin central cores, and twin I/O circuits on the EDGE cards. When there is a high profile meeting room environment where operation of the audio system is paramount, MR-AUDIO offers the maximum redundancy for peace of mind.

- **Intelligent System For Audio Clarity**
  Software DSP control allows for automatic and manual operation modes.

- **Feedback Prevention**
  To work alongside the intelligent dimming system, there is a dedicated, digital frequency shifter. This uses software 'hilbert' transformers and the frequency shift produced removes any feedback. This system allows better frequency response with lower distortion

- **Audio Distribution**
  A further function of the MR-Audio system is to distribute the audio. A main 'programme' mix is generated and individual mic outputs are available for distribution to broadcasters, for official logging, for local Pas or for recording.

- **Audio Clarity**
  Carefully selected Audio Technica microphones, high quality microphone amplifiers, RF rejection systems, AES3 audio distribution throughout, digital control of mic levels, dynamic proccing, compressor/limiter systems, and anti feedback algorithms, all contribute to produce the highest audio quality possible.

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MR-CORE001
The MR Audio Core Processor

The MR Audio Core Processor takes care of all audio processing, system control and distribution of power to the MR-Edge Processors

Key Points

- **Digital Mixing Router 128 x 128 Individual Channels**
  64 AES3 inputs and 64 AES3 outputs provides a large capacity to tailor the audio routing as required for the project, whilst remaining flexible to be amended at any time in the future. The digital audio is 24 bit linear PCM at 48kHz.

- **Fully Redundant operation**
  Full redundancy is available with intelligent redundant power supplies and a second processor core, to act as a full main and reserve system.

- **Directly Powers Up To 64 Local Interface Units**
  The MR-Core001 provides power to the MR-EDGE002 interface units via the AES3 connections. This gives the benefit of not requiring local power to the MR-EDGE002 and increases the flexibility of where these units can be located. The connections do not provide power until a compatible unit is discovered, making the power connections fully network safe in case of any mistaken connections.

- **Ethernet Control Port**
  The CORE is controlled through it's Ethernet control port. An Ethernet EDGE processor such as the MR-EDGE007 acts as a bridge via USB to a software control panel running on a PC. IP addresses are allocated to EDGE processors automatically by the CORE.

- **Connections**
  Digitial audio I/O is available on 32 RJ45 sockets each having 2 x AES3 inputs and 2 x AES3 outputs. A single S/PDIF port is also available for input that includes a sample rate converter. A connection to the MR-PSU provides power and a data path for the management of the redundant power supply system.

- **Word Clock Sync**
  The MR-CORE001 has an internal clock. However to sync with local digital devices there is a word clock input.

- **USB Upgrades & Configuration**

MR-PSU002
The MR Audio Intelligent Power Center

The MR-PSU002 is more than just the power supply. It is an intelligent power management controller

Key Points

- **Twin Power Supplies**
  There are two mains power supplies, one for the main and one for reserve, each with a full set of independent controls. Each has a separare IEC power input

- **Intelligent Selection Of Power Supply**
  The monitoring of the main and reserve power system is under microprocessor control. Both supplies are constantly monitored and an immediate switch is made should the main supply fail.

- **Remote Control Of Power**
  A rear panel DC loop acts as a system on/off, in addition to the front panel power switches

- **Display Shows State Of Relevant Core**
  Each display shows the switch state of the MR-CORE002 that it is connected to.

- **Independent Mains Distribution**
  A separate IEC mains input is distributed to 6 x IEC power outputs

- **Patch Blocks**
  Patch blocks are provided as a convenient way to route Ethernet circuits and MR-CORE001 AES3 circuits to the MR-EDGE003 and MR-EDGE005 units.

MR-EDGE003
The MR Audio Mic & Speaker Connection Interface

The MR-EDGE003 is the discrete bi-directional interface for local connection of microphones and speakers.

Key Points

- **Digital Audio Converter**
  Four channels of digital audio are output as analogue audio for driving local loudspeakers. Four channels of analogue audio input are converted to AES for transmission across to the GS-CORE001.

- **Simple Connection To The MR-CORE001**
  Connections back to the MR-CORE001 are via CAT5/6 cables onto a structured network. There are two connections, one for the main link and one for the reserve link. As well as the bi-directional audio these connections also provide power.

- **Mic Inputs**
  The four mic inputs are on mini 3 pin XLR plugs. These connect directly to Audio Technica U853R/U857R microphones. These microphones have been selected specifically due to their high performance and effectiveness at rejecting RF due to their Unigaurd RF shield technology

- **Speaker Outputs**
  The four speaker outputs are on 4 pin mini XLR plugs to avoid cross connection with the mic inputs. Each loudspeaker amp is 1 watt RMS and has short circuit and thermal protection.

- **USB**
  For firmware updates and configuration

EDGE Options

MR-EDGE006
Dual AES To Analogue Connection Interface

Th MR-EDGE006 converts CORE AES3 to line level balanced analogue audio. This unit has two AES3 circuits.

MR-EDGE007
Ethernet Control + Single AES to Analogue Connection Interface

Th MR-EDGE007 converts CORE AES3 to line level balanced analogue audio. This unit has one AES3 circuit and one Ethernet circuit. Connecting a PC to the two USB ports provides a safe seamless interface between the software control panel and the CORE via Ethernet.

MR-EDGE005
The MR Audio Line Level Connection Interface

The MR-EDGE005 provides the main inputs and outputs for connecting the MR AUDIO system to the outside world.

Key Points

- **Contains Up To 4 Edge Interface Cards**
  These are multiples of the cards as used in the MR-EDGE007 but with line level I/O only, giving 8 audio circuits to and from the CORE. Four analogue inputs can be mixed in the EDGE DSP on each single AES3 CORE circuit. Audio from each single AES3 CORE circuit can be mixed to the 4 analogue outputs. This gives the MR-EDGE005 up to 16 inputs and 16 outputs via the rear panel RJ45 connectors.

- **Audio**
  Audio connections are via eight Rj45 sockets with two inputs and outputs on each jack. Maximum level is +18dBu on both the inputs and outputs. The Edge Controller card that is designated as the master has control of the audio outputs. The audio inputs are distributed to both Edge Controller cards.

- **Each Of The 4 EDGE Controller Cards:**
  - Supports Ethernet plus a single AES transmit/receive circuit.
  - Connection by Rj45 sockets that complies with Ethernet 100base tx
  - Two pairs that are not used for Ethernet carry the AES3 circuits
  - Power is supplied through the AES3 connection using power over ethernet for safe working in structured environments

- **Connection**
  The MR-EDGE005 connects to the MR-CORE001 via the patch blocks in the power supply (MR-PSU002) or via the GS-SWITCH008 Ethernet switch. When using the connection through the power supply, the power on/off state can also be controlled.

- **Local Power Supply**
  The front panel USB connections are local 5V power inputs, supplying power to the individual EDGE card. Type A USB connectors on the front and rear panels provide limited power for external devices. These are intended for Glensound approved equipment, not charging a mobile phone!

MR-SWITCH008
## The MR Audio Ethernet Switch & Patch Link

The MR-SWITCH008 is a dual redundant switch of the MR-AUDIO system.

Key Points

- **Ethernet Switches**
  The MR-Switch008 contains two Ethernet switches, one for main and one for reserve. Each Ethernet switch has a separate power supply and separate mains IEC input.

- **Four Patch Blocks**
  Four Patch Blocks provide a convenient way to route Ethernet circuits and Core AES3 circuits to MR-EDGE units that require both types of communication. Ports 1 & 5 of the patches five port modular jack are connected to the Ethernet switch. Ports 2 & 4 connect to MR-EDGE units. Port three connects to a port on the MR-CORE001 unit. The Ethernet circuits, isolated by transformers, bridge between ports 1 & 2 and ports 5 & 4 respectively. Ethernet requires only two of the four pairs in the port leaving the remaining two available for the AES3 circuits. The two AES3 circuits from the Core are split and bridged to ports 2 & 4 respectively.
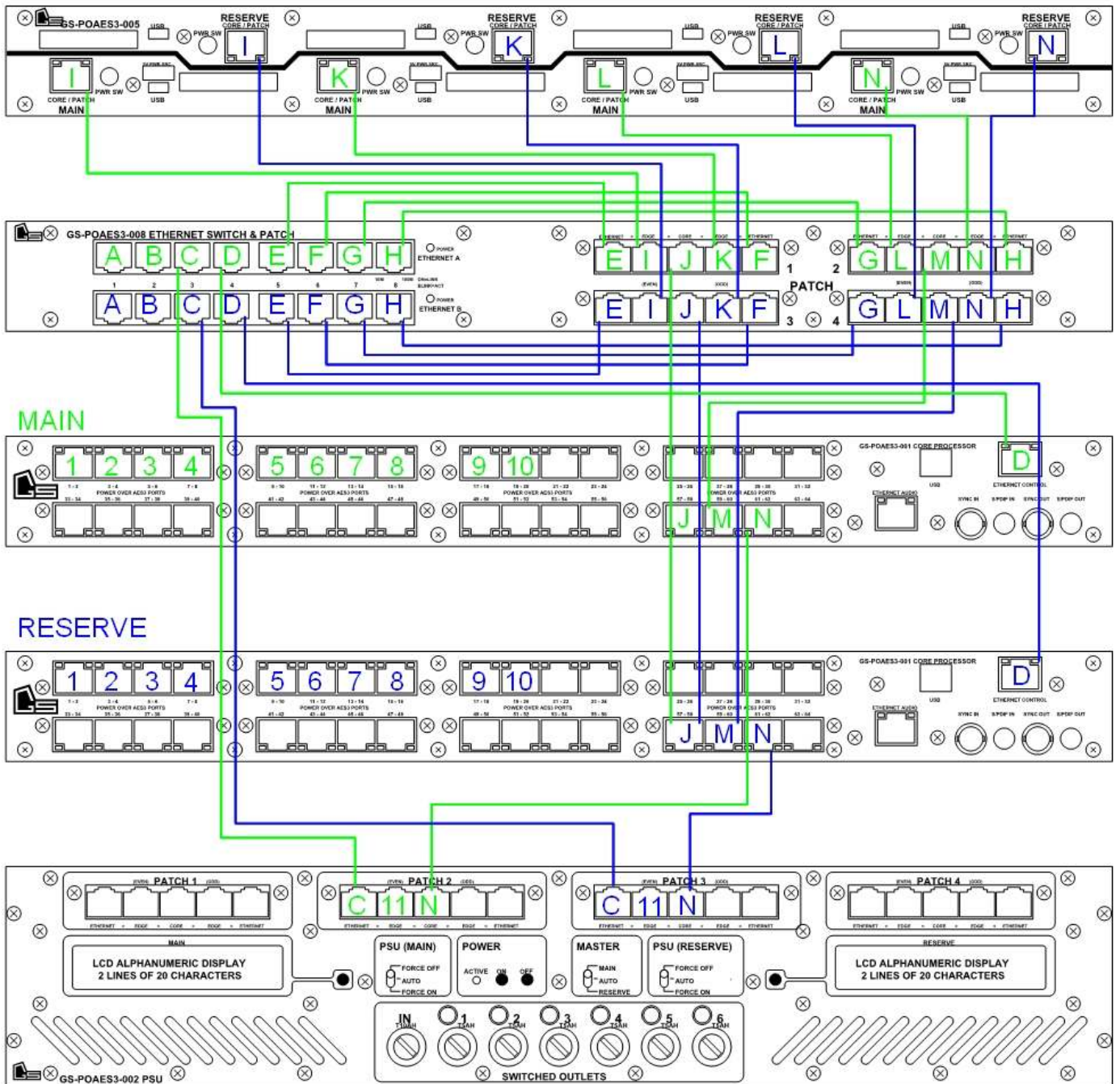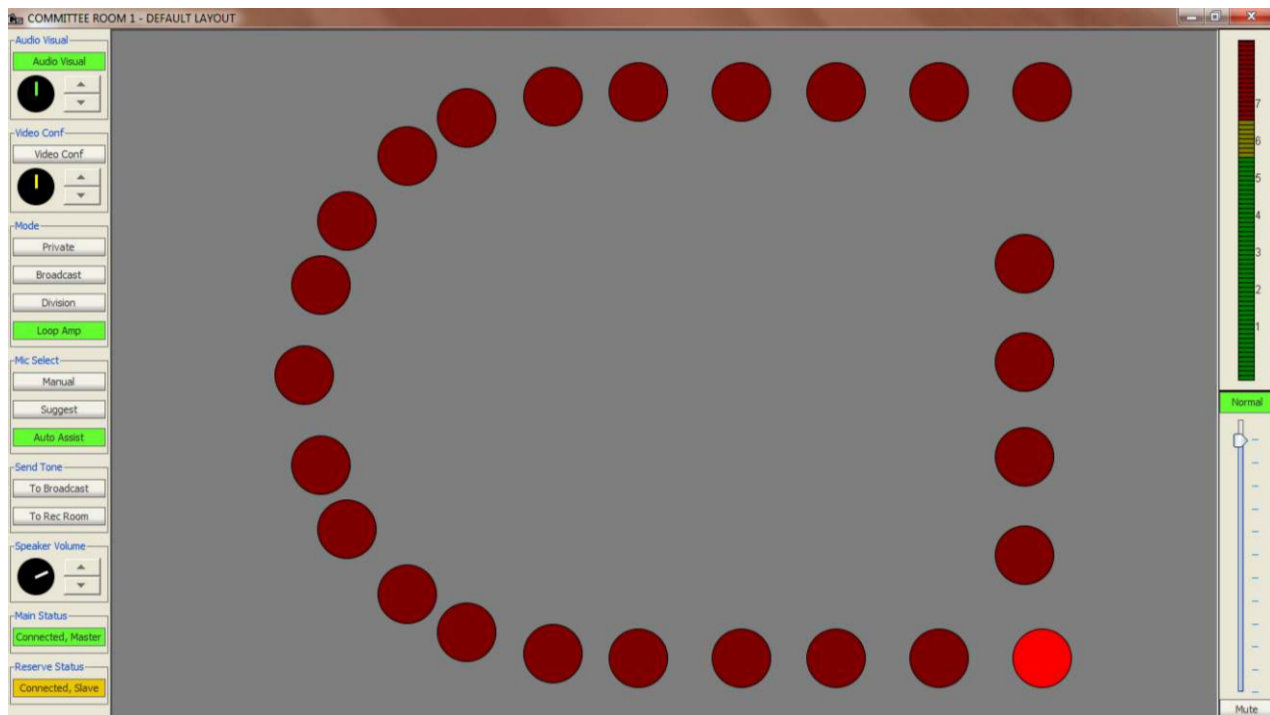
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System Configuration Example
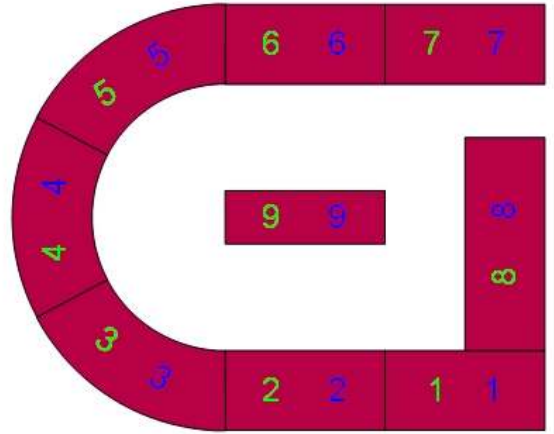
Desk Layout Example
Main is in green   Reserve is in blue
Numbers indicate MR-EDGE003 Units

MR-REM009
The MR Audio Control Software

The MR-REM009 is the remote software of the MR-Audio system and allows automatic and manual control of the system.

Key Points

- **DSP Management System**
    The software control of the MR-AUDIO system has been developed exclusively to manage the unique audio environment of a meeting room. There could be 128 microphone sources and 128 speaker positions around the room. The software can automatically evaluate the main speaker then cut their speaker and dim the speakers at either side, increasing intelligibility and reducing any possibility of feedback. The system is also intelligent enough to identify coughs, paper rustles, and other audio that could give a high input level on the system. It ignores this audio and maintains the audio focus on the key speaker.

- **Automatic, Manual Or Suggest Modes**
    The system can also work in manual mode. When in manual mode, the user manual selects the main microphone source. When in suggest mode, the user is advised on the key speakers for switching, using the same algorithm of the automatic system, but the user will still make the ultimate switching decision. In full automatic mode, the system algorithm will monitor all audio sources and make informed switching decisions automatically.

- **Direct PC Connection To The System**
    The MR-REM009 runs as a Java application and connects via USB on the EDGE units.