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4EVAC MAZE AUDIO OVER IP DATASHEET

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SUMMARY

This document is the datasheet for the 4Evac Maze audio over IP system, content in the document comprises the maze system components available and its general uses, explanation on the network architecture and the wide capability of the Maze Network, it also describes the integration possibility with 4Evac Impact and compact systems.

REVISION AND APPROVAL

Rev.	Date	Nature of Changes	Approved By
00	29-09-2022	Preliminary version	
01	20-10-2022	Ethernet characteristics / Network Requirements	



4EVAC MAZE AUDIO OVER IP



With MAZE, 4Evac has set a new audio streaming technology which offers lossless audio connected over IP and using state-of-the-art technologies where up to 250 audio channels distributed within the maze network, the system can be used for multistream background music distribution with uncompressed audio quality.

4Evac Voice Alarm devices equipped with MAZE interface feature a dual-port 100Base-T Ethernet interface and can be configured to access any channel in the MAZE network, making the platform fully equipped for large Voice Alarm applications, where multi-channel simultaneous background audio broadcast for Public Address is required.

System Overview

MAZE is comprised of the following products *i-Controller*, *i-DCA* & *i-Matrix* devices.

MAZE devices are equipped with dual port Ethernet switch built-in as a standard, 4Evac devices can be connected directly to each other, without additional switch or router in between. Configurable via 4Evac Manager application, MAZE manager, MAZE network offers two-way audio routing between components of 4Evac Voice Alarm System, each having continuous access over the LAN to multiple digital audio channels.

Features

- 250 Audio channels in the MAZE Network
- Max 3000 devices in the network
- 10/100 Mbps Ethernet all devices in the same LAN
- Volume and delay control per audio channel
- Flexibility in Talk and Listening Mode, audio can be received or transmitted in any of the amplifiers or controllers in the MAZE network
- Excellent sound quality with lowest possible latency
- 4Evac MAZE manager for System Design and Control
- Loudspeaker line surveillance for A/B Zone wiring
- In accordance with EN54-16 full monitored supervision from paging microphone capsule, amplifier monitoring to the end of loudspeaker line
- High flexibility in audio routing across all 250 channels in the MAZE network.

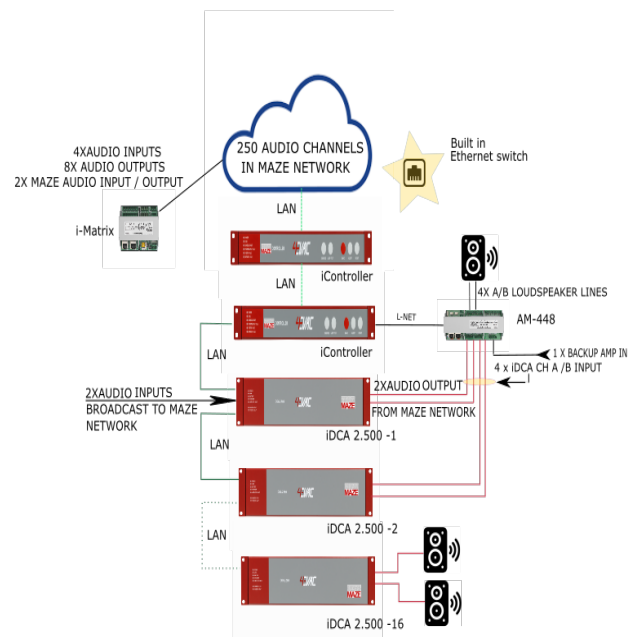
Audio Over IP Technology

- Low latency
- Lossless audio
- 250 Audio streams
- Multi-stream
- Inbuild Ethernet switch
- Secure IP-infrastructure
- Redundancy G-net
- Scalable & Flexible

Maze devices

- *i-Controller*
- *i-DCA 2.500*
- *i-Matrix 6/10*
- AM448*
- *i-CMT**

AM448 is over the Local network
i-CMT available from 2023



i-Controller

i-Controller is the brain of the maze engine modules which is equipped with enabled Ethernet ports and MAZE engine installed. *i-Controller* has therefore direct access to 250 audio channels transmitted within the MAZE network.

i-Controller can either transmit 2 BGM channels over IP to the MAZE Network or it can send the standard analog BGM inputs to the global network. Standard analog BGM inputs can be used as priority BGM channel over other channels. Signal from local analog BGM inputs that is broadcasted by *i-Controller* to the LAN, can be received by other MAZE modules like the *i-DCA* and the *i-Matrix*.

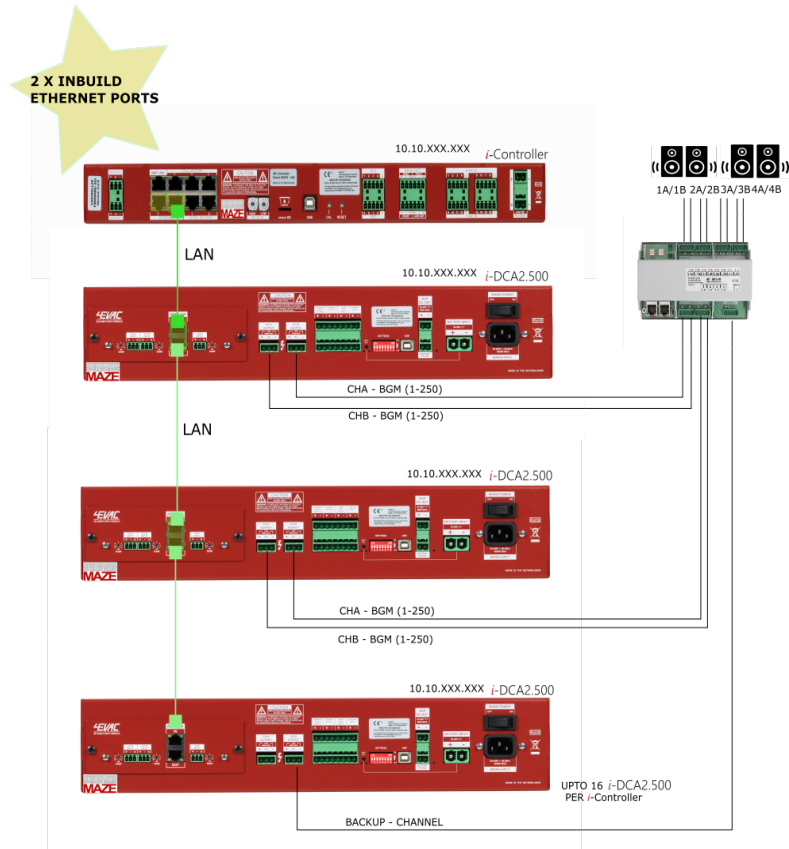
Each of the *i-Controller* is configurable by the maze manager where static IP can be assigned as well as to create a maze setting for Evac manager which helps to simplify the configuration by providing an optimal solution for the users.

i-Controllers have similar functional options like impact controller with L-net and G-net Interfaces, GPO, Evac-in. Unlike Impact the *i-Controllers* in combination with *i-DCA2.500* uses AM448. A DIN-rail mounted surveillance box with 4 amplifier inputs and one backup amplifier input which is routed to 4 A/B loudspeaker outputs. The AM448 modules are connected with *i-Controllers* over L-net. *i-Controllers* can also be integrated with normal DCA 2.500 amplifiers subjected to limited audio channel access over Global network.

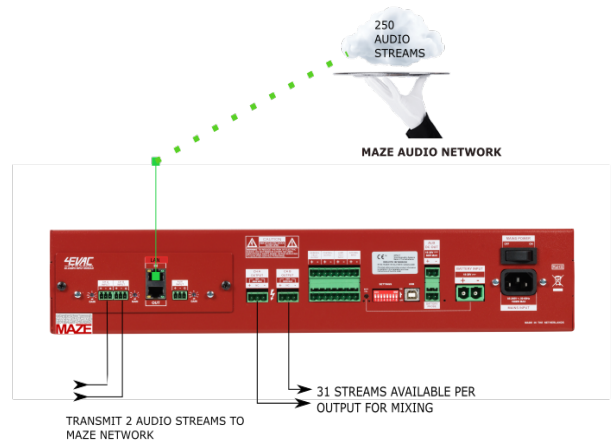
i-DCA 2.500

i-DCA2.500 is the MAZE version of DCA 2.500 , the *i-DCA2.500* has dual-port Ethernet interface with built-in 100 Mbps switch and MAZE engine, which opens access to 250 BGM audio channels available in the MAZE network.

Each *i-DCA2.500* can broadcast two digital audio streams to the MAZE network from its local BGM analog inputs. At the same time it can also receive 2 streams from the MAZE network. Multiple *i-DCA2.500* units can be daisy-chained with the *i-Controller* inside the rack, without extra switches or routers. Maximum of 16 *i-DCA2.500* units can be connected with a single *i-Controller*. The 100 Volt line output from the *i-DCA2.500* is linked with AM448 which allows the flexibility of using the *i-DCA2.500* for life safety applications combined with the multimedia application. The *i-DCA2.500* powered with AM448 can do line surveillance and added amplifier backup function which is shared by all 4 primary amplifier inputs.



i-DCA2.500 can be also used as a standalone system, 250 MAZE channels can be streamed across multiple *i-DCA2.500* units and can be transmitted to amplifier channels in any combination as required, control to the channels is done with the help of Mixing table available in the MAZE manager.



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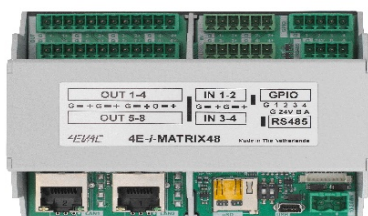
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The mixing table allows user to have stable control on the Input/Output settings by routing the audio signals as required to the output channels or mix them with the local channels as well as available MAZE channels.

Apart from this each *i*-DCA2.500 have the ability to mix 32 audio channels per device, this can be done with the combination of *i*-Matrix which is a 4 input 8 output module. The *i*-Matrix is also a maze powered module and has the ability to stream 2 audio channels in and out from the MAZE network.

i-Matrix

With the MAZE network users have the ability to stream multiple digital audio channels over IP. With the help of *i*-Matrix users now have the flexibility to expand the MAZE audio streams, total of 6 IN X 10 OUT audio channels. The *i*-Matrix is a cost effective solution when the users needs extra inputs to the MAZE network without the need of extra output power that an additional *i*-DCA2.500 would offer.



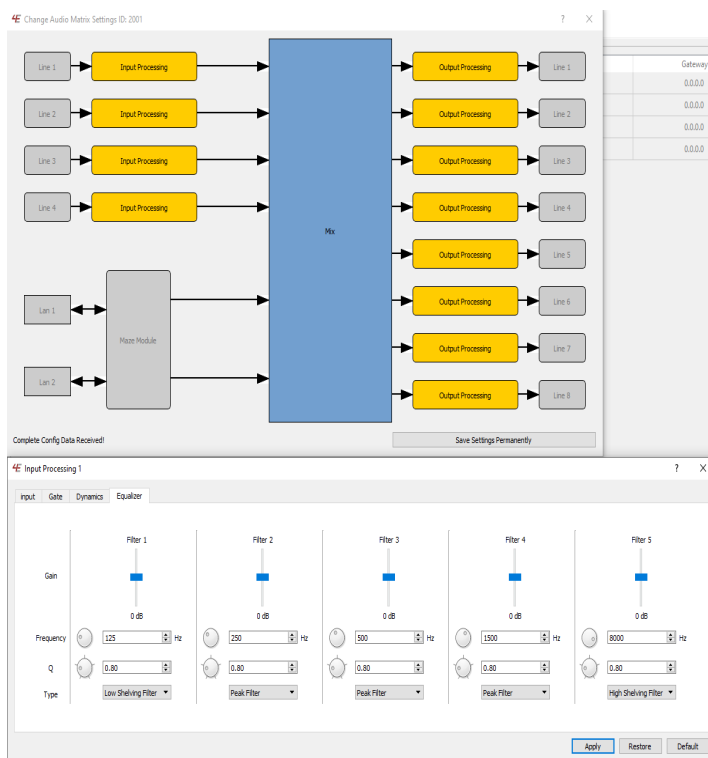
i-matrix is a 4 x 8 balanced audio matrix with DSP, *i*-matrix has direct access to the MAZE network 2 In /2 out audio streams to and from MAZE devices.

	Output 1	Output 2	Output 3	Output 4	Output 5	Output 6	Output 7	Output 8	Maze Output 1	Maze Output 2
Line Input 1	-64 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	0 dB	-64 dB
Line Input 2	-64 dB	-64 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	0 dB
Line Input 3	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB
Line Input 4	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB
Maze Channel 1	-64 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-64 dB	-63 dB
Maze Channel 2	-64 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB	-63 dB

With the help of the mixing table, line inputs can be routed to the desired outputs as required. The module has a build-in SD card, 4 x GPI, USB port, RS485 and 100 Mbps dual ethernet port. The *i*-Matrix is configurable with the help of MAZE manager.

i-Matrix also has the ability to handle up to 32 audio channels from the MAZE network and mix them together.

Input and outputs from the *i*-matrix can be processed easily with the help of MAZE manager GUI. Here the user has the ability to adjust gain, control gate, apply filters and perform dynamic operations on the input as well as the output side.

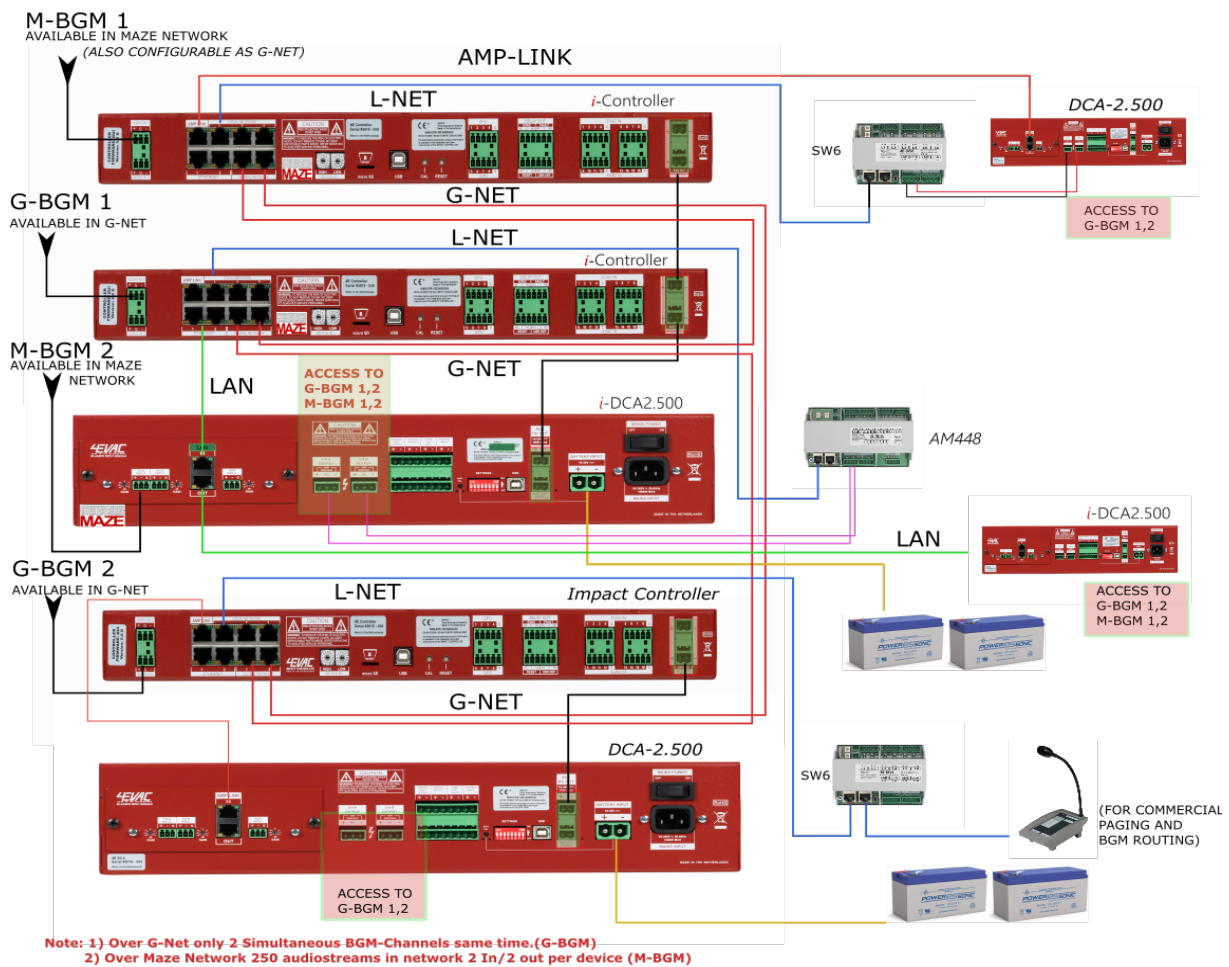


With the help of output processing user can perform dynamics, output volume control and create delays per output channels. *i*-matrix can be used in combination with *i*-DCA2.500 or with any third-party amplifiers or mixers.

Flexible – Integrated with Impact / Compact

4Evac systems are primarily designed for Voice Alarm, therefore Audio over IP feature provided by MAZE can be installed as an optional facility, additional to the core functionality of Voice Alarm compliant with EN54 group of safety standards. Architecture and processing embedded in 4Evac products will always grant highest priority to the mandatory Voice Alarm functions. Apart from the features of Audio streaming, *i*-Controllers can be networked with Impact and Compact systems over the Global Network.

This flexibility allows user to select an optimal solution of Evac / Paging / Background music together, especially suitable in Mega projects like Malls, Airports or a connected residential and commercial complex. Maze network integration with the Impact controller also allows audio streams from the Impact to be available in the MAZE network. Integration with CMT allows Mazes modules to achieve commercial paging to the needed zones. *i*-CMT* is an upcoming 4Evac product where users can perform general purpose paging over the LAN an IP microphone station with MAZE engine. *i*-CMT* has a 2-port Ethernet switch (easy daisy-chaining) and can be powered from local switch via PoE. Each *i*-CMT* can broadcast two audio streams: one from the local gooseneck microphone and another from local AUX 3.5mm input jack. *(*i*-CMT will be available at 2023) Configuration of the MAZE network works according to principle of creating virtual wire connections and is done directly from 4EVAC Manager powered with MAZE manager application. Users are able to Export maze settings easily to the 4Evac Manager and thus create a optimize method of configuring the system. User can define not only channel routing, but also audio processing parameters, like volume and delay for each transmitted channel.



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AM448

4Evac AM448 is a DIN-rail mounted surveillance box with 4 amplifier inputs and 4 A/B loudspeaker outputs, dedicated for *i*-Controller and *i*-DCA2. AM448 is also the backup amplifier manager, and therefore features additional backup amplifier input, which is shared by all 4 primary amplifier inputs.



Each amplifier channel is split internally into 2 loudspeaker circuits: A and B.

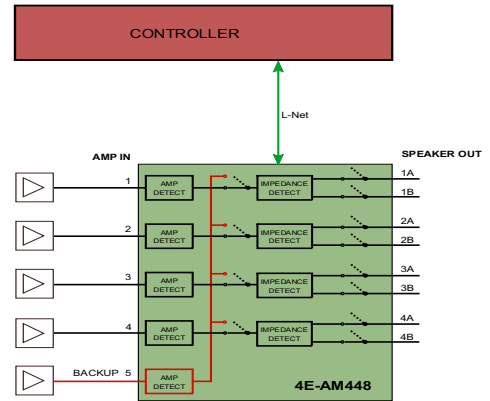
- AMP 1 -> LINE 1A + LINE 1B
- AMP 2 -> LINE 2A + LINE 2B
- AMP 3-> LINE 3A + LINE 3B
- AMP 4 -> LINE 4A + LINE 4B

Each of 8 loudspeaker output circuits is monitored individually.

AM448 provides four A/B output lines = 8 individually monitored 100V loudspeaker circuits (2 circuits per amplifier). The monitoring is based on the measurement of 20kHz pilot signal, feeding the line from the amplifier input.


The *i*-DCA2.500 does not include any form of line surveillance; therefore, it is necessary to use the AM448 in order to comply with EN54 standard in terms of amplifier surveillance and loudspeaker line surveillance.

AM448 has four 100V primary audio inputs and one backup amplifier input, which connect directly to amplifier outputs. AM448 takes care of automatic amplifier switchover in case of any primary amplifier's failure.



Technical specification

Max. number of Maze devices	3000
Max. Maze audio channels	250
Mix	up to max. 32 channels per device
Local analog in/out	2 input + 2 output per device
Total number of <i>i</i> -DCA per controller	16
Maximum total output power	16000 W
Total number of zones per controller	32
Total number of circuits per controller	32 A/B speaker lines
Total number of zones in network	255
Sampling frequency	48 kHz
Bit resolution	16 bit / sample
Built-in processing ¹	
Volume control	-60 ... +6 dB
Dynamics	gate with adjustable threshold -60 ... 0 dB
EQ	5-point parametric EQ with pre-defined IIR filters
Delay ²	max. 30 seconds per channel
Network requirements	10/100Mbps Ethernet all devices in the same LAN
Line Surveillance	AM448 module 4 IN / 4 OUT (A/B)
Voice messages	Maximum 16 Audio files, 5 minute each
	Micro SD card with content monitoring
Logic Inputs	16 x monitored logic inputs
Logic Outputs	8 x Logic Outputs
Connections	2 X Build in Ethernet ports daisy chain
	3 x Local Net Ports daisy chain
	2 X Global Net Ports redundant
Cabling Ethernet ports	Cat 6 or higher for Ethernet ports
Cabling other ports (G-NET/L-NET)	X-over SFTP CAT6 (or higher)
	/ Multimode optical fibre

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