MIMO4040CDN

DIGITAL MATRIX

Digital Matrix for conferences with Acoustic Echo Cancellation and Dante®/AES67Interface

USER MANUAL

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1 IMPORTANT REMARK

WARNING: SHOCK HAZARD - DO NOT OPEN

AVIS: RISQUE DE CHOC ÉLECTRIQUE - NE PAS OUVRIR

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING (If applicable): The terminals marked with symbol of " " may be of sufficient magnitude to constitute a risk of electric shock. The external wiring connected to the terminals requires installation by an instructed person or the use of ready-made leads or cords.

WARNING: To prevent fire or shock hazard, do not expose this equipment to rain or moisture.

WARNING: An apparatus with Class I construction shall be connected to a mains socket-outlet with a protective earthing connection.

2 IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions
3. Heed all warnings
4. Follow all instructions
5. Do not use this apparatus near water
6. Clean only with dry cloth
7. Do not block any ventilation openings Install in accordance with the manufacturer's instructions

8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade and the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at the plugs, convenience receptacles, and at the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug the apparatus during lightening sorts or when unused for long periods of time.
13. Refer all servicing to qualified personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. Disconnecting from mains: switching off the POWER switch all the functions and light indicators of the amplifier will be stopped, but fully disconnecting the device from mains is done unplugging the power cord from the mains input socket. For this reason, it always shall remain readily operable.
15. Equipment is connected to a socket-outlet with earthing connection by means of a power cord.
16. The marking information is located at the bottom of the apparatus.
17. The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on apparatus.
18. External wiring shall be connected by a skilled person.
19. This product is for indoor use only.

NOTE: *This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

WARNING: This product must not be discarded, under any circumstance, as unsorted urban waste. Take it to the nearest electrical and electronic waste treatment centre.

CAUTION. Battery included on this product. Pay attention to the following safety statements:

1. Replacing the wrong type of battery will invalidate the safety protection
2. Explosion may be caused by putting the battery into the fire or heating furnace, or disposing of the battery by mechanical extrusion or cutting
3. Placing the battery in an extremely high temperature environment with flammable liquid or gas can cause the battery to explode or leak.
4. The extremely low air pressure of combustible liquid and gas placed on the battery may cause the battery to explode or leak.

NEEC AUDIO BARCELONA, S.L. accepts no liability for any damage that may be caused to people, animal or objects due to failure to comply with the warnings above.

3 IMPORTANT NOTE

Thank you for choosing our MIMO4040CDN digital audio matrix for conference applications, including AEC and Dante®/AES67 interface. It is **VERY IMPORTANT** to carefully read this manual and to fully understand its contents before any connection in order to maximize your use and get the best performance from this equipment.

To ensure optimal operation of this device, we strongly recommend that its maintenance be carried out by our authorized Technical Services.

All ECLER products are covered by warranty, please refer to www.ecler.com or the warranty card included with this product for the period of validity and conditions.

4 INTRODUCTION

MIMO4040CDN is a 40x40 digital audio matrix (40 inputs and 40 outputs) for installation, fully programmable through the EclerNet Manager application **(*)**.

(*) Refer to the EclerNet Manager Application manual for more information at www.ecler.com. The EclerNet Manager application is available for download at www.ecler.com.

It has 8 analog audio inputs and 8 analog audio outputs, 32 digital audio inputs Dante®/AES67 and 32 digital audio outputs Dante®/AES67, converting it into a native 40x40 matrix, with real routing of any input to any output. Also includes up to 8 input channels with echo cancellation, (AEC) designed for audio / video conferencing applications, with the first 2 AEC licenses included free of charge. **(*)**

(*) The echo cancellation function is enabled by software (SF) license validation for a specific hardware (HW) unit. Contact your official Ecler dealer for more details.

MIMO4040CDN is only available with CONFERENCE firmware, and not with firmware for standard applications. For these types of applications, see the capabilities of the MIMO7272DN model.

4.1 Main features

- 8 balanced MIC/LINE analog audio inputs (42VDC phantom power independent per input channel). Euroblock connectors
- 8 balanced analog audio outputs Euroblock connectors
- 2 balanced MONITOR outputs Euroblock connectors rear panel + stereo jack front panel
- 32-channel digital audio inputs Dante®/AES67
- 32-channel digital audio outputs Dante®/AES67
- Allows the use of network redundancy for the transport of audio over IP (2 Ports Dante®/AES67 primary & secondary)
- 8 control ports GPI (General Purpose Input)
- 8 control ports GPO (General Purpose Output)
- Ethernet control port, RJ45 connector (Compatible with EclerNet Manager, UCPs and TP-NET protocol)
- RS-232 control port, DB9 connector (for integration with third-party systems, via TP-NET protocol)
- Programming and remote management via Ethernet via EclerNet Manager application (either point-to-point, with direct CAT5/CAT6 cable, or from an Ethernet network connection)
- Remote control via custom control panels UCP (User Control Panels)
- iOS and Android remote control app available (Ecler UCP V2)
- Remote control from third party external devices. (Crestron, AMX, Extron, Medialon, etc., are registered brands from their respective owners). TP-NET protocol, through Ethernet o RS-232 ports
- Remote control via panels connected to the same Ethernet network (WPNET series)
- Embedded UCP panel server: EclerNet projects executed in the internal matrix engine, acting as UCP server and as *hardware* control included in the project.
- Configuration memory management (presets).
- Events scheduled on a calendar basis
- Broad DSP processing configurable. Examples:
    - Matrix router-mixer, from any input to any output (analog and/or digital Dante®/AES67) with adjustable crosspoint level (independent mixes of different inputs for each output).

- Treatment of channels in mono or stereo mode.
- Level, mute, vumeters and phase adjustment in inputs and outputs.
- Internal signal generator (sinusoidal signal, pink noise, white noise, polarity test).
- Parametric EQ on inputs and outputs.
- Delays on inputs and outputs.
- Noise gate / compressor on input channels.
- Compressor / limiter on outputs.
- Priorities (ducking) between input channels.
- Virtual and physical paging consoles
- Auto-mixer
- Feedback loop canceller (Larsen effect), o Feedback Killer
- Acoustic Echo Cancellation (AEC), enabled by SW license

The programming of the MIMO4040CDN is done using the EclerNet Manager application (*). Refer to the EclerNet Manager Application manual at www.ecler.com for more information.

(*) The EclerNet Manager application is available for download at www.ecler.com.

5 INSTALLATION

5.1 Location, assembly and ventilation

MIMO4040CDN has been specially designed to be placed in 19" rack structure, occupying one unit.

It is very important that, as a heat generating element, MIMO4040CDN is not completely enclosed or exposed to extreme temperatures. Fresh air should be allowed to pass through the ventilation holes in the chassis, leaving at least one free rack unit between each piece of equipment and those installed above and below it in the rack frame.

If the installation consists of several amplifiers in the same rack or is carried out inside cabinets closed by means of doors, it is highly recommendable to equip them with forced upward ventilation, installing fans at their lower and upper ends. This upward flow of ventilation will favor the dissipation of the heat generated in its interior.

5.2 Mains connection and power on

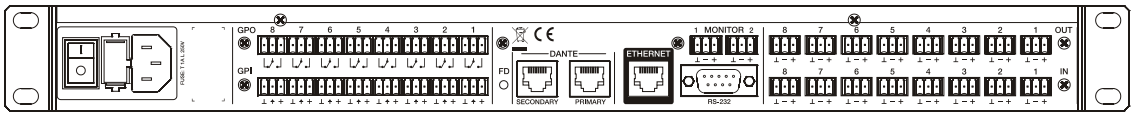
MIMO4040CDN operates on alternating voltages from 90 to 264V and 47 to 63 Hz. This device is equipped with an oversized power supply capable of adapting without any type of adjustment to the mains voltage of any country in the world.

On the rear panel, next to the IEC power connector, there is an on/off switch for the unit. On the front panel there is an LED indicator that illuminates when the unit is in operation.

Do not allow the network cable to run parallel to the shielded cables carrying the audio signal, as this may cause humming.

5.3 Balanced analog audio inputs

MIMO4040CDN has on its rear panel 8 analog signal inputs (IN 1 to 8), balanced and supporting line or microphone levels. The selection of the input signal type and its management is done from the EclerNet Manager application. Refer to the EclerNet Manager Application manual at www.ecler.com for more information.



The signal input connectors are Euroblock type. The assignment of the connection is as follows:

Live or direct signal	>	Terminal +
Cold or inverted signal	>	Terminal -
Ground	>	Terminal ⊥

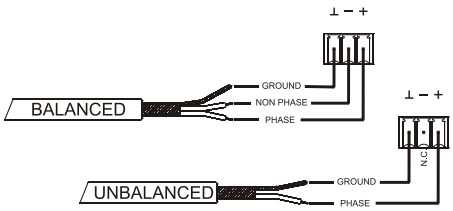
For UNbalanced connections, short-circuit the terminal - to earth.

5.4 Balanced analog audio outputs

The rear panel of the MIMO4040CDN has 8 analog signal outputs (OUT 1 to 8) and 2 additional "MONITOR" monitoring outputs, balanced and with line level.

The signal output connectors are Euroblock type. The assignment of the connection is as follows:

Live or direct signal	>	Terminal +
Cold or inverted signal	>	Terminal -
Ground	>	Terminal ⊥



For UNbalanced connections, leave the terminal - unconnected.

5.5 Digital audio inputs and outputs over IP DANTE®/AES67

(Ports for primary and secondary networks)

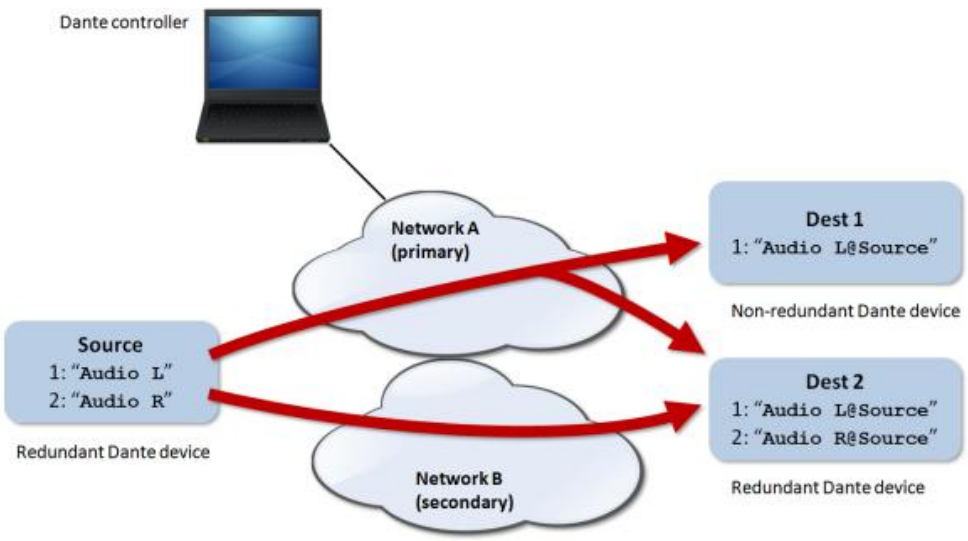
MIMO4040CDN allows the reception of 32 channels of digital audio Dante®/AES67 and the sending of 32 channels of digital audio Dante®/AES67 through an Ethernet network compatible with the transport of digital audio over IP through the Dante®/AES67 protocol.

The routing of the digital audio signals Dante®/AES67 through the Ethernet network, as well as the network configuration of the ports Dante®/AES67 (IP addresses, mask, etc.) of the MIMO4040CDN, is managed by the software application Dante Controller. For more information, please refer to the developer's documentation:

www.audinate.com/products/software/dante-controller?

MIMO4040CDN features two ports with RJ45 interface in its rear panel that allow the sending and reception of digital audio Dante®/AES67, labeled as primary (PRIMARY) and secondary (SECONDARY). MIMO4040CDN can work with these ports in two possible modes:

- **Redundant Mode**: there are two simultaneous network connections (each with its own IP address, both different) so that the information Ethernet packets Dante®/AES67 are transmitted via both connections. Each port (primary and secondary) must be connected to a different physical Ethernet local network, or to a different virtual local network (VLAN), correctly configured and isolated from each other. The digital audio Dante®/AES67 is therefore sent and received using two distinct and independent paths, with no possible communication between the primary and secondary ports. In case one of them fails, MIMO4040CDN will automatically switch to the other, recovering the audio transmission almost instantaneously. Obviously, to achieve total redundancy, all Dante®/AES67 devices that are part of a system of this type must have primary and secondary Dante®/AES67 ports, connected respectively to the same two independent networks as MIMO4040CDN.



Note: in this mode, if (by mistake) the primary and secondary ports connect to the same Ethernet network, Dante Controller will no longer have access to the network configuration control and routing Dante®/AES67 of the MIMO4040CDN ports. This control is recovered when one of them is disconnected from the same network as the other.

Note: Dante®/AES67 redundancy requires that the primary and secondary ports of all Dante®/AES67 devices connect using the same network connection speed. For example, if the primary port connects to a network with a 1 Gbps link, the secondary port must also connect at 1 Gbps.

- **Switched mode:** in this mode only a single network connection is actually enabled (and therefore only one IP address exists), with the primary and secondary ports behaving as ports of a network switch integrated within MIMO4040CDN, to which devices forming part of the system's Dante®/AES67 network, or Ethernet switches forming part of that network's infrastructure, can be directly connected.

Note: in this mode both ports **primary and secondary, should never be connected simultaneously to network switches**, as this would create a loop that would cause network conflicts and disruption of the digital audio Dante®/AES67traffic.

5.6 Programming and control Ethernet port

The RJ45 connector labeled ETHERNET allows the connection of the equipment to an Ethernet local network (LAN), being compatible with the following purposes:

- Management from the EclerNet Manager application, by direct connection (CAT5 cable or higher) of a computer with a MIMO4040CDN unit or using an Ethernet network as a link between both. Refer to the EclerNet Manager Application manual at www.ecler.com for more information.
- Connection to third party control equipment. (Crestron, AMX, Extron, Medialon, etc. are registered brands from their respective owners). Protocol used: Ecler TP-NET. Refer to the TP-NET protocol manual for more information.
- UCP: EclerNet project remote control service using customisable graphical control panels. MIMO4040CDN can act as a server for these panels, included in an EclerNet project, and also be remotely controlled by UCP panel client devices (WPNETTOUCH, Android® or iOS® mobile devices, Windows® devices, etc.).

5.6.1 Factory Preset Network settings

The factory default network settings for EclerNet Manager compatible devices are as follows:

- IP: 192.168.0.100
- Mask: 255.255.255.0
- Gate: 192.168.0.1
- UDP Port: 2210

5.7 Control remote RS-232 port

The RS-232 port with DB9 connector built into the rear panel allows an external device to communicate with a MIMO4040CDN unit via serial connection. This connection will use the syntax of the TP-NET protocol so that the external device can obtain the value of some of the parameters of the MIMO4040CDN unit (by means of "GET" commands) and/or modify these values ("SET" commands). Refer to the TP-NET protocol manual for more information.

The serial connection must comply with the following characteristics:

- Baud rate: 115200 (fixed, no auto negotiation)
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

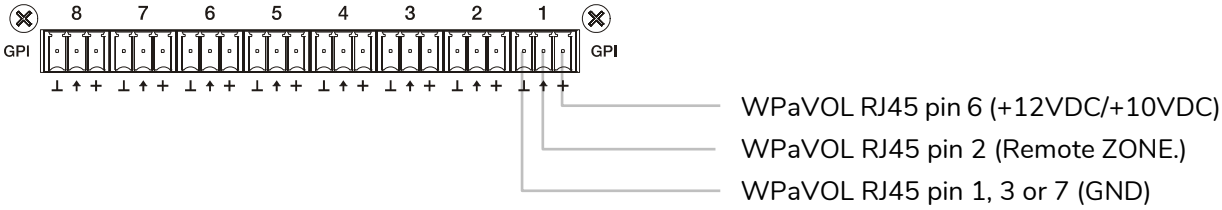
5.8 Remote control GPI ports

The MIMO4040CDN rear panel has 8 GPI inputs for direct voltage control, 0 to 10 VDC. Each of these inputs can be connected to an external physical device (a potentiometer, a contact closure, a variable 0-10V DC voltage, etc.) and associated with a MIMO4040CDN function, for example:

- Remote control of a input channel volume, output or matrix crossover using a physical potentiometer or a remote control WPa series from Ecler
- Activation / deactivation of a MUTE or SOLO by means of a push-button or contact closure
- Retrieval of a *preset* by means of a pushbutton or contact closure

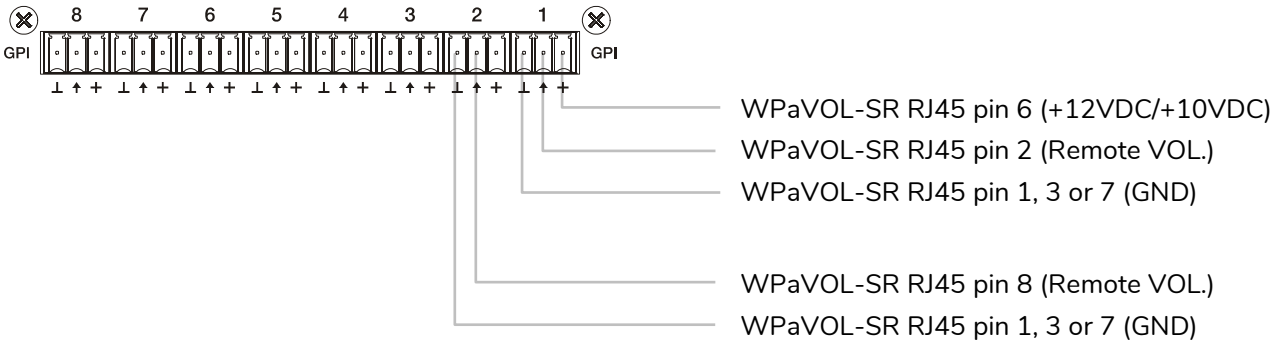
The GPI connectors are Euroblock type. The assignment of the connection is as follows

Positive, + 12 VDC	>	Terminal +
Variable voltage, 0-12 VDC	>	Terminal ↑
Ground	>	Terminal ⊥



Jumpers position: ALOG / LIN → **LIN position**
+12 / +10 → **+12 position**

WPaVOL connection to MIMO serial GPI ports



Jumpers position: ALOG / LIN → **LIN position**
+12 / +10 → **+12 position**

WPaVOL-SR connection to MIMO serial GPI ports

The connection cables can be up to 500 meters approximately, using a minimum cross-section of 0,5 mm^2.

Consult your ECLER distributor or at www.ecler.com about the serial remote-control wall panels WPa series and other accessories available for connection to REMOTE / VCA ports.

5.9 Remote control GPO ports

MIMO4040CDN has on its rear panel 8 relay outputs NO / NC (normally open / normally closed). Each of these outputs can have its status change associated with a trip by means of a specific function programmed through EclerNet Manager, such as a calendar event or the pressing of a key available on a UCP control panel. In this way, it is possible to interact with external equipment, such as motors for projection screens or movable partition walls, lights, sirens, GPI inputs from other equipment, etc.

6 OBSERVATIONS

6.1 Ground loops

It must be ensured at all times that the signal sources that reach the matrix, as well as all the devices that are connected to its output, do not have the grounds interconnected, that is to say that the gounds never reach them by two or more different paths, since, in this way, buzzes could be produced that would even interfere with the quality of the sound reproduction.

The shields of the cables, if they are connected to a chassis, must never be connected to each other. This way we avoid the formation of ground loops.

6.2 Background noise

MIMO4040CDN has been designed to obtain the lowest possible background noise. Regardless of the electronic design, the background noise will depend directly on the correct use and installation of the unit.

It is not the same, for example, to have the GAIN control of a channel at 2 and the VOL of the output to which it is routed at maximum (case 1), to have a correct gain setting on the input signal and the VOL level of the output channels to which it is routed at an intermediate position (case 2). In the first case, the signal that reaches the mix amplifier, which intrinsically has its own background noise level, is weak, so the signal-to-noise

ratio is low (low signal). When the output amplifier raises indistinctly the whole set we will have a very high background noise level at the output.

In the second case, when the input gain is correctly adjusted, the signal received by the matrix is large and therefore with a large signal / noise ratio as well, so when this signal reaches the output channels and is amplified, it will have a better ratio than in the previous case.

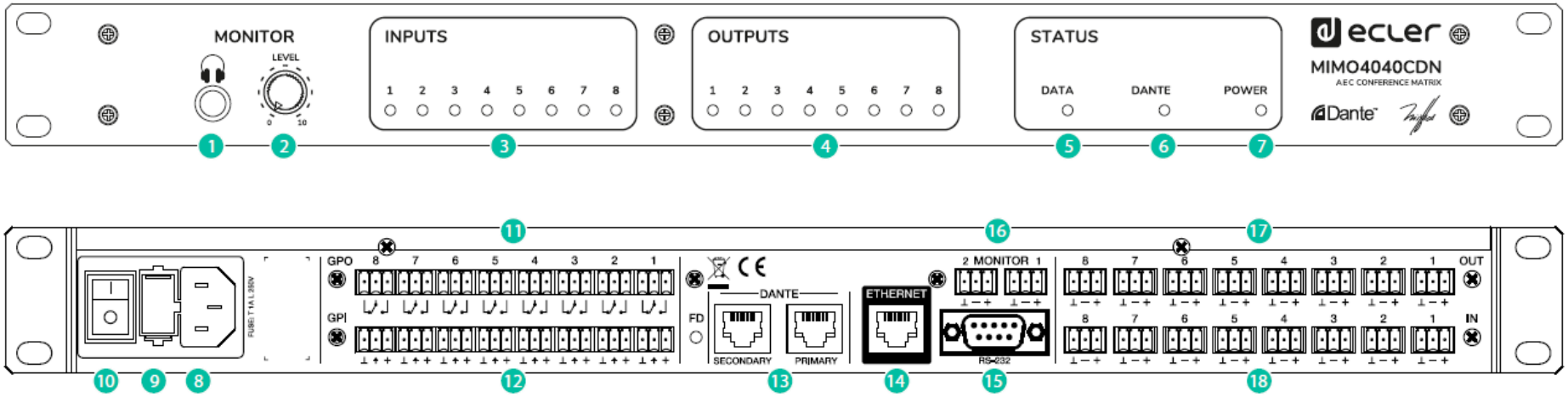
7 PACKAGE CONTENTS

- MIMO4040CDN
- AC power cables
- Euroblock aerial connectors for analog inputs and outputs and GPIO ports
- Quick User Guide and Warranty Card

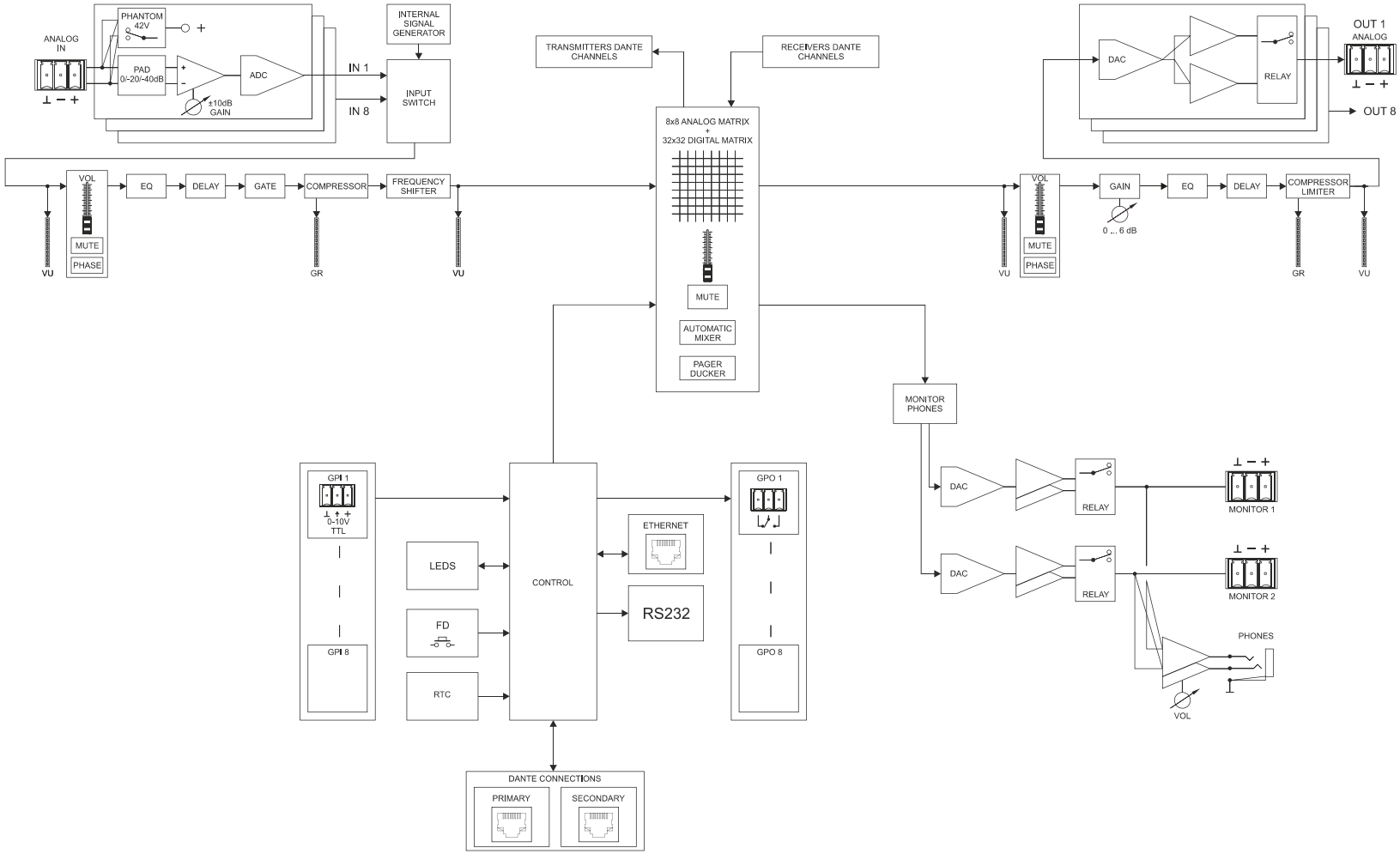
8 FUNCTION LIST

1. Stereo jack headphone connection
2. Headphone volume control, VOL
3. Analog Input Signal LEDs, INPUTS
4. Analog output signal LEDs, OUTPUTS
5. Data traffic indicator light, DATA
6. Digital audio traffic light DANTE
7. Start-up indicator light, POWER
8. IEC type connector for external AC power cable
9. Fuse holder
10. Unit Power On Switch
11. Euroblock DC voltage control terminals, GPI
12. Euroblock relay output terminals, GPO
13. Ports DANTE primary and secondary, RJ-45 connector
14. Ethernet control port, RJ-45 connector
15. DB9 connector for remote control via TP-NET protocol, RS-232
16. Euroblock terminals analog audio output, MONITOR
17. Euroblock terminals analog audio output, OUT
18. Euroblock terminals analog audio input, IN

9 FUNCTION DIAGRAM



10 BLOCKS DIAGRAM



11 TECHNICAL FEATURES

MIMO4040CDN

DSP	
CPU	Quad core 64bits 1GHz
Sampling rate	48 kHz
Latency analog IN to analog OUT	<4.3 ms.
Converters	
Resolution	24 bit
Dynamic range	AD:110dB, DA: 115dB
Analogue	
8 Input / Output	Terminal block (Symmetrical)
2 monitor output	Terminal block (Symmetrical)
Headphones connector	Jack ¼
Analogue input headroom	+27dBV = +30dBu
Max. output level	+18dBV = +21dBu
Input sensitivity @0dBV out	from -50dBV to +10dBV in 0.5dB steps
Input impedance	Balanced, >4kΩ
Phantom power	+42VDC, 5mA max. software switched
Headphones	>200mW/200Ω
Frequency response (-3dB)	5Hz to 24kHz
Flatness	better than ±0.1dB
THD+Noise @ 1kHz, 0dBV input (line)	<0.004%
THD+Noise @ 1kHz, -40dBV input (mic.)	<0.008%
Output Noise floor FFT (20Hz - 20kHz)	better than 115dB
Interchannel crosstalk (20Hz - 20kHz)	better than 90dB (100dB typ.)
Channel Leakage (20Hz - 20kHz)	better than 100dB (115dB typ.)
CMRR 20Hz- 20kHz	65dB typ.
Dante®/AES67 Audio interface	
DANTE®/AES67 Network Tx / Rx channels	32 / 32 (Brooklyn) (32/32 flows)
Latency	1 / 2 / 5 ms (selectable)
Connector	1xRJ45 primary, 1xRJ45 secondary
Cable length between devices	100m CAT5e/CAT6
Processing	
Input level (x40)	Range: from Off to 0 dB Mute: Yes Signal Polarity reverse: Yes Metering: VU+clip pre & post fader
Output level (x40)	Range: from Off to 0 dB

	Mute: Yes
	Solo: Yes
	Signal Polarity reverse: Yes
	Metering: VU+clip pre & post fader
Output gain (x40)	Range: from 0 to +6 dB
Input delay (x40)	from 0 to 1000 ms. Units: sec/ms/m/cm.
Output delay (x40)	from 0 to 1000 ms. Units: sec/ms/m/cm.
Parametric EQ types (4max/input - 8max/output)	Bypass / On-Off all channels
	Param Eq. Freq: 20Hz-20kHz;
	Gain: -60/+12 dB
	Q: 0.3 to 200
	Low & High Shelf 6/12 dB/oct
	Low & High Pass 6/12 dB/oct
	All Pass 1/2 order
High & Low pass output X-over filters (x40)	Bypass On-Off
	Butterworth in 6/12/18/24 dB/oct
	Bessel in 12/18/24 dB/oct
	Linkwitz-Riley in 12/24 dB/oct
Input noise gate (x40)	Bypass On-Off
	Threshold: from –80 dBV to +18 dBV
	Depth: 0 dB to 80 dB
	Attack time: from 0,1 ms. to 500 ms.
	Hold time: from 10 ms. to 3000 ms.
	Release time: from 10 ms. to 1000 ms.
Input compressor / limiter (x40)	Bypass On-Off
	Threshold: from –36 dBV to +18 dBV
	Knee: hard / soft
	Ratio: inf:1 (limiter)
	Attack time: from 0,1 ms. to 500 ms.
	Release time: from 10 ms. to 1000 ms.
	Make up gain: from 0 to +10 dB
Input Frequency Shifter (x40)	Per input. ON / OFF function
(Feedback Loop Reducer)	
Output Limiter (x40)	Bypass On-Off
	Threshold: from –36 dBV to +18 dBV
	Attack time: from 0,1 ms. to 500 ms.
	Release time: from 10 ms. to 1000 ms.
Built in Signal Generator	Sine: from 20 Hz to 20 kHz
	Polarity: from 20 Hz to 20 kHz
	White noise
	Pink noise
Stereo Linking	Adjacent input / output channels
	Linked processing

Mix Matrix	Matrix routing linked Size: 40x40 Analogue in/out ports: 8x8 Dante®/AES67 network in/out ports: 32x32 Vol: Input, Output, Crosspoint Mute: Set/Clear individual, row, column, all Input /output Mono/stereo selector Meter: Input /output VU and clip
Ducker (x25)	Input: IN1 to IN40 Priorities: 25 (1 max, 25 min) Depth: 0 dB to 80 dB Attack time: from 5 ms. to 2000 ms. Release / Hold time: from 50 ms. to 3000 ms.
AEC audio input channels	Up to 8, subject to software licensing
Mechanical	
Dimensions (WxHxD)	482.6 x 44 x 253 mm / 19 x 1.73 x 9.96 in.
Weight	3,25kg / 7.17 lb.
Power supply	
Mains	90-264VCA 47-63Hz
Power consumption	30VA
Miscellaneous	
Management Connectivity	Ethernet Base-Tx 10 /100Mb, 1GB Auto X-Over CAT5e or better
GPI	8, from 0 to 12VDC or TTL level
GPO	8, 3 poles isolated relay; 1A, 48VDC max.
Aux. Power Supply for Remotes & GPI	+12VDC, 1.2A max. (short circuit protected)
Time and date retention (battery)	> 3 months
Programming and control application	
EclerNet Manager	From v6.00

TP-NET PROTOCOL

SOFTWARE

Third-Party NET

USER MANUAL

12 TP-NET PROTOCOL INTRODUCTION

The TP-NET protocol lets a client device (control device) get and/or set the values of several parameters of the **EclerNet compatible devices** (MIMO and MIMO SG series digital matrices, DUO-NET PLAYER, NXA digital audio manager series, NZA amplifier series, NPA amplifier series, etc.), like volumes, mutes, alarms, etc. It's **as well available for** eMIMO1616 digital matrix, HUB series digital zoner, MIMO7272DN and **MIMO4040CDN digital matrix**.

The communication with these digital audio devices can be established using Ethernet and the UDP/IP transport protocol, always by means of the **5800** UDP port.

A second option for this communication is using the RS-232 interface that some of these compatible devices do also have (MIMO series, DUO-NET PLAYER, NXA series, etc.). In this case, the serial connection must fulfil the following specifications:

- Baud rate: **57600** (fixed, no autonegotiation) for all the devices, except for DUO-NET PLAYER, eMIMO1616, HUB series and MIMO4040CDN, which use **115200** baud rate)
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

In case the Ecler device has an Euroblock connector for the RS-232 interface, the serial cable wiring, from the device's connector to a standard DB9 serial interface connector, must be the following:

WIRING RS232 – DB9	
RS232	**DB9**
Tx	Pin 2 (RxD)
Rx	Pin 3 (TxD)
Gnd	Pin 5 (Signal Gnd)

The protocol is simple and direct, making it easy to read, write and modify the generated code. It is based on messages with no begin and end delimiter: each message is self-delimited by the UDP packet size, which is defined with a maximum of **80 characters**. All the messages must be written in capital letters.

To let some control systems (like CRESTRON®, EXTRON®, AMX®, RTI®, VITY®, MEDIALON®, etc.) process the messages more easily, the EclerNet device adds the character **LF** (0x0A) to the end of each message. This way the client can buffer the

messages to process them, if it's required. The EclerNet device can also handle several messages received in a single message packet by using the **LF** delimiter.

The available messages are built with one or more fields separated with blank spaces (= blank space):

<TYPE> [PARAM1] [PARAM2] [PARAM3] [PARAM4][LF]

The first field (**TYPE**) defines the **message type** and then, the required parameters for it (each kind of message requires a given number of parameters). The field **TYPE** can have these values:

- **SYSTEM**
- **GET**
- **SET**
- **INC**
- **DEC**
- **SUBSCRIBE**
- **UNSUBSCRIBE**
- **DATA**
- **ERROR**

At the end of this document, you'll find all the available messages and their parameters for each model of the EclerNet compatible devices.

The **SYSTEM, GET, SET, INC, DEC, SUBSCRIBE** & **UNSUBSCRIBE** messages can be sent from the client to the EclerNet device. The **DATA** & **ERROR** messages can be sent from the device to the client. The only exception is the **SYSTEM PING** message, that is a **SYSTEM** type message that is sent from the EclerNet device when the initial message from the client to the device was **SYSTEM CONNECT PINGPONG.**

The communication (using UDP or RS-232) starts when a client sends the message **SYSTEM CONNECT** to the EclerNet device. As far as the UDP communication requires no connection (unlike the TCP), the EclerNet device stores this client's IP address, and then uses it as the destination IP address for the messages that it generates (**DATA** & **ERROR**). After receiving the **SYSTEM CONNECT** message, the device dumps its entire configuration using several consecutive **DATA** messages.

Note: if the configuration data dump process (usually a huge list of parameters & values) wants to be avoided after a **SYSTEM CONNECT** message, a **SYSTEM CONNECT ONCE** message can be used instead.

The communication can be terminated by two methods:

- **Manually:** when the client sends the **SYSTEM DISCONNECT** message**,** cancelling all the subscriptions and stopping the **DATA** & **ERROR** messages
- **Automatically:** in case the initial message was **SYSTEM CONNECT PINGPONG** and the client didn't get any **SYSTEM PONG** message in a period longer than 10 seconds (presuming a communication breakdown)

The **SET** messages don't have an automatic acknowledgement with a **DATA** message sent from the EclerNet device after it has processed the **SET** command. The client must update the values itself and must send the needed **GET** message if it requires confirmation from the device.

NOTES:

- The numerical values are always integer numbers without **+**, **–**, comma or dot symbols.
- **[PINGPONG]** is an optional parameter used to configure the device-client communication with a periodical check, to see whether the client or the device have terminated it. When configured this way, the device sends a **SYSTEM PING** once per second, and the client must answer with a **SYSTEM PONG** message. If anyone doesn't get these messages along a 10 seconds period, the communication will be considered terminated.
- **[ONCE]** is an optional parameter used to start the device-client communication without a full data dump process (usually a huge list of parameters & values).
- **<Input Channel>** & **<Output Channel>** are numerical values that identify an input or output channel of the EclerNet device. It can be within a [1…40] range for MIMO4040CDN
- **<Preset Number>** is a numerical value that identifies one available Preset stored in the EclerNet device's memory.
- **<Level>**, **<Pre Vumeter Level>** y **<Post Vumeter Level>** are numerical values in the [0..100] range that define values in a scale equivalent to [-inf..0] dB
- **<GPI>** & **<GPO>** are numerical values. For the MIMO4040CDN GPI and GPO values can be within [1..8].
- **<GPI Value>** is a numerical value within the [0..100] range that indicates the value of an analogue GPI input. For a digital input only 0 or 100 are the possible values.
- **<GPO Value>** is a numerical value within the [0..1] range: it can only be 0 or 1 (opened or closed GPO).
- **<Rate>** is a numerical value within the [1..10] range that sets the VU-meter refresh rate, or the number of times the vumeters' values are sent per second (by default = 3) .

- **“<Device Name>”** is the device name inside double quotation marks, to allow for names with blank spaces.
- **<Error ID>** is a numerical value for an error code.
- **“<Error Description>”** is a text chain inside double quotation marks, containing an error description.
- **<Virtual Control>** is a numerical value that identifies a Virtual Control in a MIMO4040CDN model, it can be within a [1..80] range.

13 MIMO4040CDN DIGITAL MATRIX

IMPORTANT NOTE: The communication must be started with the client sending **the first message** **SYSTEM CONNECT** or **SYSTEM CONNECT ONCE** to the EclerNet device. Otherwise, the commands from the client to the EclerNet device will be ignored. See TP-NET PROTOCOL INTRODUCTION chapter for additional information.

TYPE	PARAM1	PARAM2	PARAM3	PARAM4	DESCRIPTION
SYSTEM	CONNECT	[MASTER]	[PINGPONG]	[ONCE]	• MASTER: this parameter, applied in SYSTEM CONNECT, is used to disconnect all clients currently connected to the device, releasing all open and not correctly closed connections, opening a new connection. In this way we guarantee that the client that has set the MASTER option is the only one connected by TP-NET to the device. • PINGPONG: this parameter can be used with the MASTER parameter, the difference is that this parameter performs a periodic check to see if the communication is still open (PING PONG) or if after 10 seconds with no response, the communication has ended (PING). • ONCE: this parameter is used to prevent the device status dump.
	DISCONNECT				Cancel subscriptions and terminates communication
	SUBSCRIPTION_RATE	<Rate>			Alive message from device
	PING				Alive message from device
	PONG				Alive ACK message from client

	PING INTERVAL	<1-1000>			Ping Interval, in seconds
GET	ALL				Dumps current device status (with DATA messages)
	PRESET				Gets the current PRESET
	ILEVEL	<Input Channel>			Gets the current LEVEL of an Input Channel
	OLEVEL	<Output Channel>			Gets the current LEVEL of an Output Channel
	XLEVEL	<Input Channel>	<Output Channel>		Gets the current LEVEL of a Matrix point
	IMUTE	<Input Channel>			Gets the current MUTE status of an Input Channel
	XMUTE	<Input Channel>	<Output Channel>		Gets the current MUTE status of a Matrix Point
	IVU	<Input Channel>			Gets the VU-meter value of an Input Channel
	OVU	<Output Channel>			Gets the VU-meter value of an Output Channel
	GPI	<Input>			Gets the current value of a General Purpose Input
	GPO	<Output>			Gets the current value of a General Purpose Output
	INFO_NAME				Gets the Device Name
	INFO_MODEL				Gets the Device Model
	INFO_VERSION				Gets the Firmware Version
	INFO_MAC				Gets the Device MAC address
	VIRTUAL_CONTROL	<Virtual Control>			Gets the Virtual Control value

TYPE	PARAM1	PARAM2	PARAM3	PARAM4	DESCRIPTION
SET	PRESET	<Preset Number>			Sets the current PRESET
	ILEVEL	<Input Channel>	<Level>		Sets the current LEVEL of an Input Channel
	OLEVEL	<Output Channel>	<Level>		Sets the current LEVEL of an Output Channel
	XLEVEL	<Input Channel>	<Output Channel>	<Level>	Sets the current LEVEL for a Matrix point
	IMUTE	<Input Channel>	YES/NO		Sets the current MUTE status of an Input Channel
	XMUTE	<Input Channel>	<Output Channel>	YES/NO	Sets the current MUTE status for a Matrix Point
	GPO	<Output>	<GPO Value>		Sets the current value for a General Purpose Output
	VIRTUAL_CONTROL	<Virtual Control>	<Value>		Sets the Virtual Control value (Value can range from 1 to 100)
INC	ILEVEL	<Input Channel >	<Value>		Increases the current LEVEL of an Input Channel by Value (Value can range from ±1 to ±100)
	OLEVEL	<Output Channel>	<Value>		Increases the current LEVEL of an Output Channel by Value (Value can range from ±1 to ±100)
	XLEVEL	<Input Channel>	<Output Channel>	<Value>	Increases the current LEVEL of a Matrix point by Value (Value can range from ±1 to ±100)
DEC	ILEVEL	<Input Channel >	<Value>		Decreases the current LEVEL of an Input Channel by Value (Value can range from ±1 to ±100)
	OLEVEL	<Output Channel>	<Value>		Decreases the current LEVEL of an Output Channel by Value (Value can range from ±1 to ±100)
	XLEVEL	<Input Channel>	<Output Channel>	<Value>	Decreases the current LEVEL of a Matrix point by Value (Value can range from ±1 to ±100)
SUBSCRIBE	ALL				Subscribes to all VU-meters
	IVU	<Input Channel>			Subscribes to an Input Channel VU-meter

	OVU	<Output Channel>			Subscribes to an Output Channel VU-meter
UNSUBSCRIBE	ALL				Unsubscribe to all VU-meters
	IVU	<Input Channel>			Unsubscribe to an Input Channel VU-meter
	OVU	<Output Channel>			Unsubscribe to an Output Channel VU-meter

Note: INC and DEC commands are replied with a DATA command from the device with the resulting LEVEL value, after it has been increased or decreased. When the INC or DEC command tries to adjust a LEVEL value beyond its minimum or maximum limits, no reply (DATA command) will be produced.

TYPE	PARAM1	PARAM2	PARAM3	PARAM4	DESCRIPTION
DATA	PRESET	<Preset Number>			Shows the current PRESET
	ILEVEL	<Input Channel>	<Level>		Shows the current LEVEL of an Input Channel
	OLEVEL	<Output Channel>	<Level>		Shows the current LEVEL of an Output Channel
	XLEVEL	<Input Channel>	<Output Channel>	<Level>	Shows the current LEVEL for a Matrix point
	IMUTE	<Input Channel>	YES/NO		Shows the current MUTE status of an Input Channel
	XMUTE	<Input Channel>	<Output Channel>	YES/NO	Shows the current MUTE status for a Matrix Point
	VIRTUAL_CONTROL	<Virtual Control>	<Value>		Shows the Virtual Control value (Value can range from 1 to 100)
	IVU	<Input Channel>	<Pre Vumeter Level>	<Post Vumeter Level>	Shows the VU-meter value of an Input Channel
	OVU	<Output Channel>	<Pre Vumeter Level>	<Post Vumeter Level>	Shows the VU-meter value of an Output Channel
	GPI	<Input>	<GPI Value>		Shows the current value of a General Purpose Input
	GPO	<Output>	<GPO Value)		Shows the current value of a General Purpose Output.
	INFO_NAME	“<Device Name>”			Shows the Device Name
	INFO_MODEL	<Device Model>			Shows the Device Model
	INFO_VERSION	<Firmware Version>			Shows the Firmware Version
	INFO_MAC	<Device MAC address>			Shows the Device MAC address
	INFO_IPLIST				Shows the list of clients connected to the Device. The message will contain a list including **ClientNumber ClientIP Client Port** (separated by blank characters)

13.1 MIMO4040CDN: AEC MANAGEMENT

TYPE	PARAM1	PARAM2	PARAM3	PARAM4	DESCRIPTION
GET	AEC_MIC_LEVEL	<Room>	<Mic>		Gets the current LEVEL of a local mic from a given AEC room
	AEC_MIC_MUTE	<Room>	<Mic>	YES/NO	Gets the current MUTE status of a local mic from a given AEC room
	AEC_MIC_VU	<Room>	<Mic>		Gets the VU-meter value of a of a local mic from a given AEC room. It returns the Pre Fader and Post Fader values
	AEC_SPK_LEVEL	<Room>	<Speaker>		Gets the current LEVEL of a local loudspeaker from a given AEC room
	AEC_SPK_MUTE	<Room>	<Speaker>	YES/NO	Gets the current MUTE status of a local loudspeaker from a given AEC room
	AEC_SPK_VU	<Room>	<Speaker>		Gets the VU-meter value of a local loudspeaker from a given AEC room. It returns the Pre Fader and Post Fader values
SET	AEC_MIC_LEVEL	<Room>	<Mic>	<Value>	Sets the current LEVEL of a local mic from a given AEC room
	AEC_MIC_MUTE	<Room>	<Mic>	YES/NO	Sets the current MUTE status of a local mic from a given AEC room
	AEC_SPK_LEVEL	<Room>	<Speaker>	<Value>	Sets the current LEVEL of a local loudspeaker from a given AEC room
	AEC_SPK_MUTE	<Room>	<Speaker>	YES/NO	Sets the current MUTE status of a local loudspeaker from a given AEC room
	AEC_RESET	<Room>			Reset the AEC algorithm (default parameters) from a given AEC room

INC	AEC_MIC_LEVEL	<Room>	<Mic>	<Value>	Increases the current LEVEL of a local mic from a given AEC room (Value can range from ±1 to ±100)
	AEC_SPK_LEVEL	<Room>	<Speaker>	<Value>	Increases the current LEVEL of a local loudspeaker from a given AEC room (Value can range from ±1 to ±100)
DEC	AEC_MIC_LEVEL	<Room>	<Mic>	<Value>	Decreases the current LEVEL of a local mic from a given AEC room (Value can range from ±1 to ±100)
	AEC_SPK_LEVEL	<Room>	<Speaker>	<Value>	Decreases the current LEVEL of a local loudspeaker from a given AEC room (Value can range from ±1 to ±100)
SUBSCRIBE	AEC_MIC_VU	<Room>	<Mic>		Subscribe to all VU-meters of a local mic from a given AEC room
	AEC_SPK_VU	<Room>	<Speaker>		Subscribe to all VU-meters of a local loudspeaker from a given AEC room
UNSUBSCRIBE	AEC_MIC_VU	<Room>	<Mic>		Unsubscribe to all VU-meters of a local mic from a given AEC room
	AEC_SPK_VU	<Room>	<Speaker>		Unsubscribe to all VU-meters of a local loudspeaker from a given AEC room

14 ERROR CODES FOR ECLERNET DEVICES

14.1 COMMON ERROR CODES (to all EclerNet - TP-NET compatible devices)

ERROR ID	DESCRIPTION
0	TPNET_ERROR_NONE = 0,
1	TPNET_ERROR_INVALID_FIELD_TYPE,
2	TPNET_ERROR_INVALID_FIELD_PARAM1,
3	TPNET_ERROR_INVALID_FIELD_PARAM2,
4	TPNET_ERROR_INVALID_FIELD_PARAM3,
5	TPNET_ERROR_INVALID_FIELD_PARAM4,

14.2 MIMO4040CDN SPECIFIC ERROR CODES

ERROR ID	DESCRIPTION
6	UDP_ERROR_TIMEOUT_PONG,
7	UDP_ERROR_CONNECT_WHILE_CONNECTED,
8	UDP_ERROR_DISCONNECT_WHILE_UNCONNECTED,
9	UDP_ERROR_INVALID_CLIENT_IP,
10	UDP_ERROR_MESSAGE_TOO_LONG,
11	UDP_ERROR_UNSUPPORTED_MESSAGE,
12	UDP_ERROR_UNSUPPORTED_PRESET_NUMBER,
13	UDP_ERROR_UNSUPPORTED_INPUT_CHANNEL_NUMBER,
14	UDP_ERROR_UNSUPPORTED_OUTPUT_CHANNEL_NUMBER,
15	UDP_ERROR_UNSUPPORTED_GPI_NUMBER,
16	UDP_ERROR_UNSUPPORTED_GPO_NUMBER,
17	UDP_ERROR_INVALID_LEVEL_VALUE,
18	UDP_ERROR_INVALID_RATE_VALUE,
19	UDP_ERROR_GPO_VALUE,

All product characteristics are subject to variation due to production tolerances. **NEEC AUDIO BARCELONA S.L.** reserves the right to make changes or improvements in the design or manufacturing that may affect these product specifications.

For technical queries contact your supplier, distributor or complete the contact form on our website, in Support / Technical requests.

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