DYNACORD MXE564 MXE DSP Matrix Mix Engine Installation Guide

Contents

DYNACORD

DYNACORD MXE564 MXE DSP Matrix Mix Engine

Safety

Safety messages explained

Four types of signs can be used in this manual. The type is closely related to the effect that may be caused if it is not observed. These signs – from least severe effect to most severe effect – are:

Notice!

Containing additional information. Usually, not observing a ‘notice’ does not result in damage to the equipment or personal injuries.

 **Caution!**
The equipment or the property can be damaged, or persons can be lightly injured if the alert is not observed.

 **Warning!**
The equipment or the property can be seriously damaged, or persons can be severely injured if the alert is not observed.

 **Danger!**
Not observing the alert can lead to severe injuries or death.

Important safety instructions

 **CAUTION**
RISK OF ELECTRIC SHOCK DO NOT OPEN

 **WARNING:** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

 **CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING OF THE CENTRE PIN OF THIS PLUG MUST BE MAINTAINED.

 **Danger!**
The lightning symbol inside a triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.

 **Warning!**
The exclamation mark inside a triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

1. Read these instructions.
2. Keep these safety notes in a safe place.
3. Heed all warnings.
4. Follow all instructions.

5. Do not use this apparatus near water.
6. Clean only with a 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. This PROTECTION CLASS I device must only be connected to a mains socket with a safety ground connection. 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 or 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 plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified or approved by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time. However, this does not apply if the device is to be used as part of an evacuation system.
13. Refer all servicing to qualified service 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. Do not place any sources of open flame, such as lit candles, on top of the device.

 **Warning!**

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

 **Warning!**

Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.

 **Warning!**

To completely disconnect this apparatus from the ac mains, disconnect the power supply cord plug from the ac receptacle.

 **Warning!**

The mains plug of the power supply cord shall remain readily accessible.

 **Danger!**

To prevent electric shock do not remove top cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

Important service information

 **Caution!**

This service information is for use by qualified service personnel only. To avoid the risk of electric shock, do not perform any maintenance work that is not described in the operating instructions unless you are qualified to do so. Have all service work and repairs performed by a trained customer service technician.

1. Repair work on the device must comply with the safety standards specified in EN 60065 (VDE 0860) and IEC 62368.
2. A mains isolating transformer must be used during any work for which the opened device is connected to and operated with mains voltage.
3. The device must be free of any voltage before performing any alterations with upgrade sets, switching the mains voltage, or performing any other modifications.
4. The minimum distance between voltage-carrying parts and metal parts that can be touched (such as the metal housing) or between mains poles is 3 mm, and must be observed at all times.
5. The minimum distance between voltage-carrying parts and circuit parts that are not connected to the mains (secondary) is 6 mm, and must be observed at all times.
6. Special components that are marked with the safety symbol in the circuit diagram (note) must only be replaced with original parts.
7. Unauthorized changes to the circuitry are prohibited.
8. The protective measures issued by the relevant trade organizations and applicable at the place of repair must be observed. This includes the properties and configuration of the workplace.
9. Observe the guidelines with respect to handling MOS components.

 **Danger!**

SAFETY COMPONENT (MUST BE REPLACED BY THE ORIGINAL PART)

 **Warning!**

This equipment contains a non-rechargeable lithium battery, which contains perchlorate. The non-rechargeable lithium battery may explode if it is exposed to fire or extreme heat. Do not short circuit the battery. Do not attempt to recharge the non-rechargeable lithium battery. The battery may only be replaced by qualified service personnel. There is a risk of explosion if the battery is replaced by an incorrect type. For battery disposal use the return and collection systems put in place in the country concerned.

IT security disclaimer

In order to offer maximum compatibility with all networked audio devices and to allow for fast and easy setup and maintenance, our OMNEO-enabled products:

- do not verify the authenticity of any Dante or OCA controllers (or any other node) on the network

This means that these devices do not take any special precautions against malicious or accidental attacks via their network interfaces. Such attacks happen every day on the public internet. It is strongly recommended to set up the system in a safe, isolated network, meaning a network where all hardware components are known and physically

owned and none of them is connected to the public internet.

Voice evacuation systems disclaimer

While capable of being used for announcements, MXE series products have not been certified as components of voice evacuation systems according to EN54-16. Voice evacuation systems for life safety applications must not be designed and built using MXE DSP Matrix Mix Engines.

High frequency interference – FCC/EN55032

IMPORTANT: Do not modify this unit! Changes or modifications not expressly approved by the manufacturer could void the user's authority, granted by the FCC, to operate the equipment.

Notice!
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV/communications equipment technician.

FCC suppliers Declaration of Conformity Product(s):

Material	Commercial code	Material description
F.01U.424.586	MXE5-64	DSP matrix mix engine 76×72 channels

Compliance statement

FCC
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Responsible party
Bosch Security Systems, LLC
130 Perinton Parkway
14450 Fairport, NY, USA
www.boschsecurity.us

RoHS statement
The MXE DSP Matrix Mix Engine Series is in compliance with European Directive 2011/65/EU – Restriction of Hazardous Substances (RoHS3).
The MXE DSP Matrix Mix Engine Series is in compliance with “China RoHS” directives. The following chart is provided for product use in China and its territories:

Notices

Old electrical and electronic appliances
Electrical or electronic devices that are no longer serviceable must be collected separately and sent for environmentally compatible recycling (in accordance with the European Waste Electrical and Electronic Equipment Directive).
To dispose of old electrical or electronic devices, you should use the return and collection systems put in place in the country concerned.

Network cabling
The OMNEO network comprises audio transport using the Dante protocol as well as OCA control commands. In order to guarantee the product performance according to specifications, network cabling has to be shielded, fulfilling the requirements of CAT 5e as a minimum.
For integration in networks, the network switches require a dedicated configuration. Further details will be explained in the documentation of the related network control software.

Copyright and disclaimer

The overview for global service and spare parts is available on **www.dynacord.com**

About this manual

Manual purpose and intended audience
The purpose of this manual is to provide information required for installing, configuring, operating, and maintaining the MXE DSP Matrix Mix Engine Series.
Read through this manual to familiarize yourself with the safety information, features, and applications before you use these products.
This manual is intended for installers, operators, and users of MXE series products.

Digital document
This manual is available as a digital document in the Adobe Portable Document Format (PDF).
You can find information about Dynacord products on the product related information at **www.dynacord.com**.

Unpacking and inspection
Carefully open the packaging and take out the device. Inspect the enclosure for damages that might have happened during transportation. Each product is examined and tested in detail before leaving the manufacturing site to make sure it arrives in perfect condition at your place. Please inform the transport company immediately if the device shows any damage. Being the addressee, you are the only person who can claim damages in transit. Keep the cardboard box and all packaging materials for inspection by the transport company.
Keeping the cardboard box including all packing materials is also recommended, even if the device shows no external damage.

 **Caution!**
Do not ship products in anything other than its original packaging.

When shipping the products, make sure to always use its original box and packaging materials. Packing the products like it was packed by the manufacturer guarantees optimum protection from transport damage.

Scope and delivery

Quantity	Component
1	MXE5-64 DSP Matrix Mix Engine
10	6-pin Euroblock-type connector, inputs/outputs
1	15-pin Euroblock-type connector, control port/GPIO
2	Mains input AC power cables, US- and EU-types
1	Installation manual
1	Safety instruction booklet

Keep the original invoice that states the purchase/delivery date in a safe place.

System overview

Application
The MXE DSP Matrix Mix Engine series are designed to control, mix, and route audio signals through professional audio systems in fix installed and live audio applications, for example stadiums, arenas, houses of worship, concert halls, theaters, and other applications that require high-performance multichannel audio system controllers with sophisticated signal processing and networking.

Features

MXE5-64

- Open architecture DSP matrix for high-performance audio applications
- 12 mic/line inputs, 8 line outputs, 8 configurable GPIOs
- 64 x 64 Dante channels
- TaskEngine for sophisticated system control and integration
- Integrated into SONICUE Sound System Software

Installation

Main power connection
The MXE series products receive their power supply via the IEC MAINS inlet connector that will accept voltages from 100 to 240 volts AC, 50-60 Hz. Only use the included AC cable or AC cables approved for your country of use. During installation, always separate the device from the mains. Connect the device only to a mains network once the device is ready for operation.

MountingThe
MXE series has been designed for installation in a conventional 19-inch rack or case. Attach the device with its frontal rack mount ears using four 20mm screws and washers.

Ventilation
Attention should be given to provide sufficient ventilation. MXE products will often be installed in cases or racks with other equipment, such as amplifiers, Consideration should be given to the accumulated heat from those devices within the rack space. An air duct of at least 50 mm between the rear panel of the MXE products and the inner wall of the cabinet/rack case is recommended. Make sure that the duct reaches up to the cabinets or the rack case's top ventilation louvers. Since temperatures inside many cabinet/rack case can easily rise up to 40 °C during operation, it is mandatory to bear in mind the maximum allowable ambient temperature for all other appliances installed in the same cabinet/rack case.

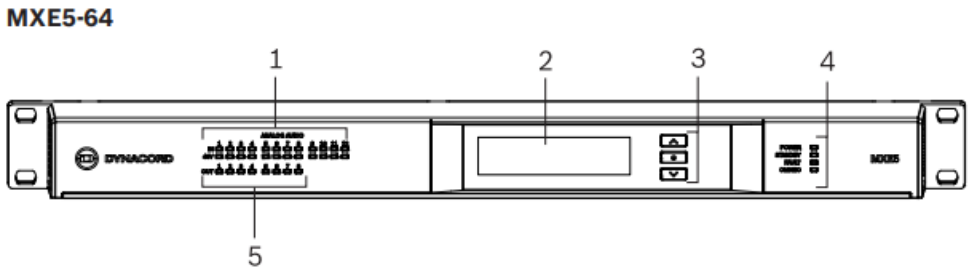
Caution!
Blocking/closing the devices ventilation louvers is not permissible. Keep ventilation louvers free from dust to ensure unhindered airflow.
Without sufficient cooling/ventilation, the device may enter protect mode.

Notice!
Do not use these devices in direct sunlight or near heat sources, like heater blowers, stoves, or any other heat radiating devices.

Notice!
Do not use these devices in an environment where temperatures are below -5 °C (+23 °F) or exceed +45 °C (+113 °F).

Controls, indicators, and connections

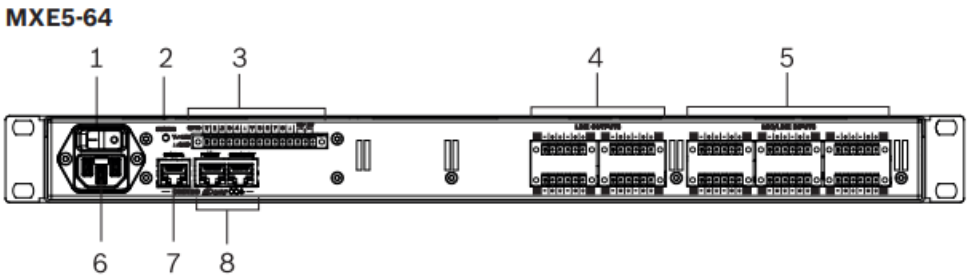
Front panel
MXE5-64



1. Audio inputs 1-12 metering (green = signal present, red = clip) and phantom power (+48 V) indication
2. OLED display
3. Navigation buttons: up, enter, and down for menu navigation and parameter editing
4. MXE status information: POWER, STANDBY, FAULT, OMNEO present
5. Audio outputs 1-8 metering (green = signal present, red = clip/limit)

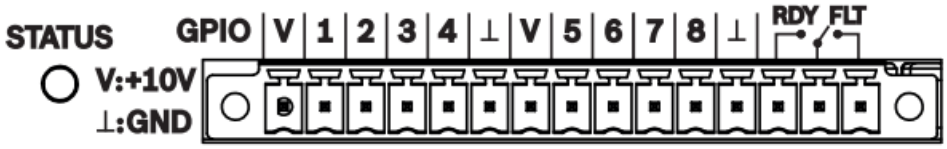
Rear panel

MXE5-64



1. Power switch
2. Status LED
3. Control ports (GPIO)
4. Line outputs 1-8
5. Mic/line inputs 1-12
6. Mains power connector
7. OMNEO/OCA control port (no multicast audio)
8. OMNEO/Dante/OCA primary and secondary ports

Control port



The control port features eight GPIOs (general purpose inputs & outputs), ready/fault contacts, and ground/+10 V reference pins. It is equipped with a 15-pin Euroblock-type connector. The eight GPIOs are configurable for either control inputs or control outputs. Control inputs can be defined by the user to change device and system parameters, for example, channel mute, preset selection, and others. Control outputs can be used to send parameter and status indication to external devices. The other ports are potential free relay toggle contacts for READY or FAULT indication.

Audio connections

All audio connectors are Euroblock-type. The pinouts are labeled on the rear of the device. It is highly recommended to use a balanced cabling configuration whenever possible. Using unbalanced cabling can result in poor audio quality.

Input connections

MXE5-64 has 12 Mic/Line input connections.

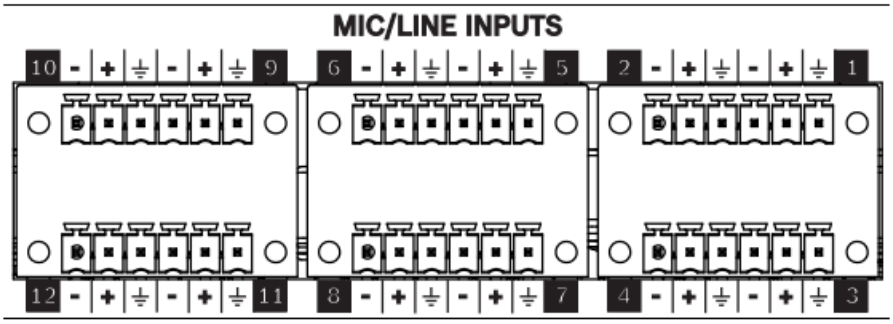


Figure 5.1: Analog input connections

Output connections
MXE5-64 has eight line output connections.

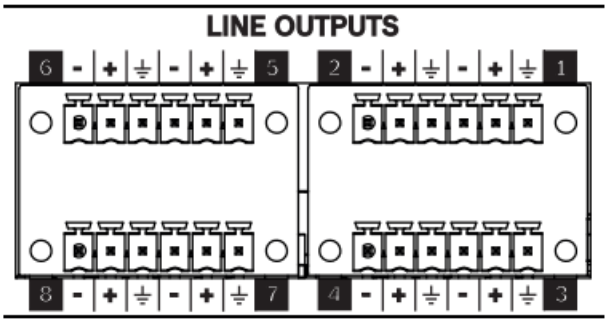


Figure 5.2: Analog output connections

Dante/OCA and OMNEO connections
The MXE5-64 has three RJ45 network ports for receiving and transmitting control data, as well as audio via an OMNEO or Dante network. The primary and secondary ports provide Dante and OCA networking for glitch free, transparent, and RSTP configurations. The control port provides a direct network connection for control data – no multicast audio.

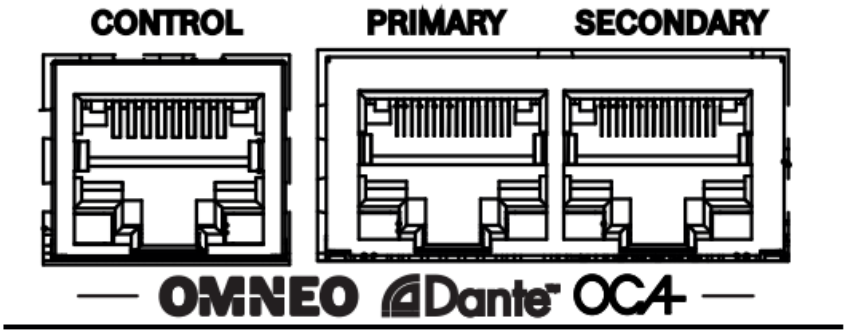


Figure 5.3: MXE5-64 network ports

In SONICUE the primary/secondary ports can be configured for three different modes:

- Glitch-free: The two ports are used for parallel, fully redundant audio transmission via two independent networks (primary, secondary)
- Transparent: The two ports can be used for daisy-chaining of up to 20 devices without additional external switches.
- RSTP: The two ports can be used for daisy-chaining of up to 20 devices in a loop. A single network failure (e.g. broken cable) is corrected automatically by the Rapid Spanning Tree Protocol.

For more details please refer to the SONICUE help documentation.

Menu navigation

Display

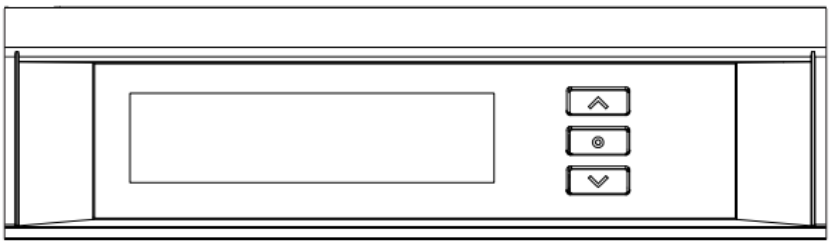


Figure 6.1: OLED display

The MXE series uses an OLED display to show information such as status, temperatures, IP address, and other useful information. The navigation is provided by three buttons: up, down, and enter.

Front panel control

The OLED display and the three navigation buttons allow basic operation of the MXE series on the front panel, as well as the monitoring of important parameters.
The main screen shows important device information (e.g. device ID, device name, IP address, status), the active preset with number and name, and the panel locked/unlocked state. It also provides a menu icon for navigating to the menu list with additional functions and parameters.

Via the menu list you have access to the following features:

- Find function activation
- Power/Standby switching
- Network settings
- Display settings
- Front panel lock/unlock
- Preset selection
- Device status
- Device restart
- Device reset to factory settings

Remote control via software
MXE DSP Matrix Mix Engines can be completely remote-controlled and supervised via SONICUE remote control software. For further instructions, refer to the SONICUE dynamic help and tutorials available in the download section of www.dynacord.com.

Technical data

MXE5-64

Description and features	
MXE5-64 DSP Matrix Mix Engine	Audio system manager with integrated matrix mixing, s ignal processing, network routing, system control and s upervision. Free DSP configuration with up to 3840 x-points and 256 signal paths. TaskEngine for sophisticated system control and integration.
Audio	12 analog inputs, 8 analog outputs 64 Dante network i nputs and outputs 64 flows
Safety and redundancy	Internal supervision, system monitoring, watchdog, faul t output Redundant audio networking supported
Configuration and control software	SONICUE Sound System Software (>=1.4) for design, configuration, control and supervision. Creation of customized control panels and system auto mation with MXE's TaskEngine

Audio	
Frequency response	
ref. 1 kHz, analog in to analog out, 48 kHz	20 Hz to 20 kHz (±0.5 dB)
ref. 1 kHz, analog in to analog out, 96 kHz	20 Hz to 40 kHz (±0.5 dB)
Signal-to-noise ratio	
A-weighted, analog input	> 118 dB
A-weighted, analog output	> 118 dB
A-weighted, analog input to analog output	> 115 dB
EIN Equivalent Input Noise	
20 Hz to 20 kHz, A-weighted	< -128 dB
THD+N	
1 dB below max., @ 1 kHz	< 0.002 %
Crosstalk	

Audio	
1 dB below max., @ 1 kHz	< -105 dB
Common mode rejection	
@ 1 kHz, nominal Level	> 70 dB
Phantom power	
Voltage @ Current	+48 V/10 mA, switchable per analog input
Input gain	
Analog inputs	0 dB to +60 dB

Digital signal processing	
Sampling rate	48 kHz/96 kHz, OMNEO/Dante synchronized
CPU	2x SHARC ADSP-21469@450 MHz
Processing power	900 MIPS, 5.4 GFLOPS
Delay	348 seconds
Signal delay/Latency	
Analog In to Analog Out, 48 kHz/96 kHz	< 0.45 ms/< 0.22 ms
Signal processing	32/40 bit, floating point
Filter	PEQ, Lopass, Hipass, Loshelv, Hishelv, X- Over, FIR
Dynamics	Ducker, Compressor, Noisegate, AGC, ANC
Limiter	Peak (PA) limiter, RMS/TEMP limiter
Pilot tone	Generator, Detector with Notch
Generators	Sine, Pink noise, White noise
Mixer/Router	Router, Matrix mixer, auto mixer
Misc	VU Meter, Level, Polarity, Mute, Delay
Special algorithms	FIR-Speaker processing
Memory	
DSP presets	60

Connectivity	
Analog audio input/output	
Type	12 mic/line level inputs, 8 line level outputs, electronically symmetric

Connectivity	
Connectors	10x 6-pole Euroblock connectors, 2 channels each
Nominal input/output level	+6 dBu/1.55 V
Maximum input/output level	+22 dBu/9.7 V
Reference level equal to digital input	+22 dBu for 0 dBFS
Input impedance, active balanced	2.2 kΩ
Output impedance, active balanced	47 Ω
Min. load impedance	600 Ω
Network	
Type	3x RJ45
Standards	1000base-T/100base-TX, integrated switch
Network audio inputs	64 channels, 48 kHz/96 kHz, Dante format, 64 flows
Network audio outputs	64 channels, 48 kHz/96 kHz, Dante format, 64 flows
GPIO control port	
Type	15-pole Euroblock connector
Ports and operating modes	8x GPIO, switchable Analog In/Digital In/ Digital Out
Analog input range	0 V to +11 V, 110 kΩ input resistance
Digital inputs	ON: < 1.5 V OFF: > 2.0 V, internal pull-up (10 kΩ)
Digital outputs	ON: Output switched to GND, max. 200 mA OFF: Ope n Collector (110 kΩ to GND)
Reference voltage output	+10 V, max. 200 mA, supervised, short circuit protecte d
READY/FAULT contact	Galvanic isolated relay, max. 30 VDC/500 mA
Mains input	1x IEC appliance inlet

User interface	
Display	Black/white OLED 256 x 64 pixel
Front panel indicators	12 x Input LEDs (Signal/Clip) 12 x Phantom Power LEDs (+48 V) 8 x Output LEDs (Signal/Clip) 4 x status LEDs (POWER, STANDBY, FAULT, OMNEO)

User interface	
Front panel operating elements	3 push buttons (UP, ENTER, DOWN)
Rear panel indicators	1 x status LED (STATUS)
Rear panel operating elements	Mains switch
Display	Black/white OLED 256 x 64 pixel

General specifications	
Power requirements	100 V to 240 V, 50 Hz to 60 Hz AC
Power consumption	
Operating mode	50 W typical, 55 W max
Protections	High temperature, Mains over-/undervoltage protection
Cooling	Front-to-rear, temperature controlled fan
Ambient temperature limits	-5 °C to +45 °C (+23 °F to +113 °F)
Operating altitude	2000 m
IEC protection class	Class I (grounded)
Electromagnetic environment	E1, E2, E3
Color	Black
Dimensions (W x H x D)	483 x 43.5 x 471 mm (19″, 1 RU)
Weight	6.0 kg (13.2 lb)
Shipping weight	8.1 kg (17.9 lb)

Dimensions

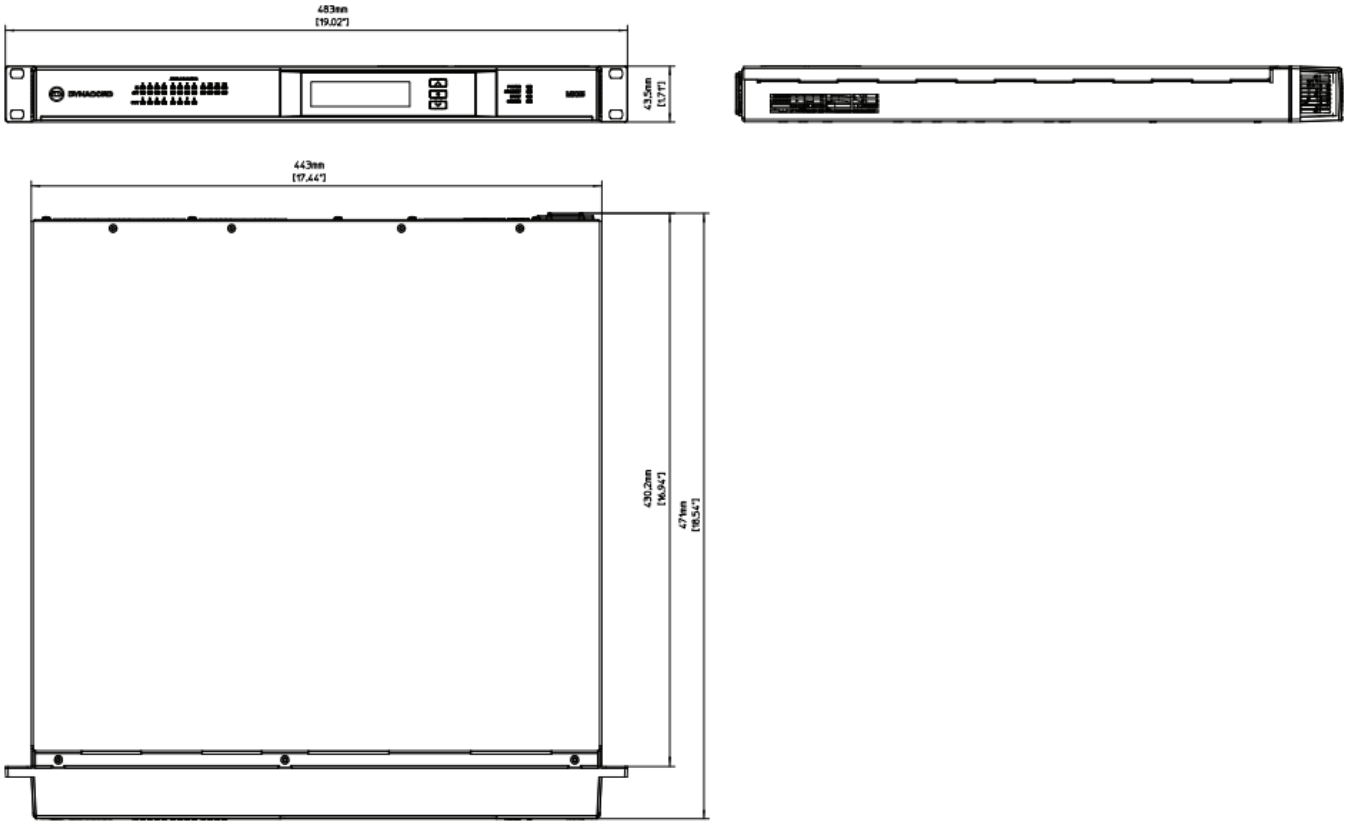
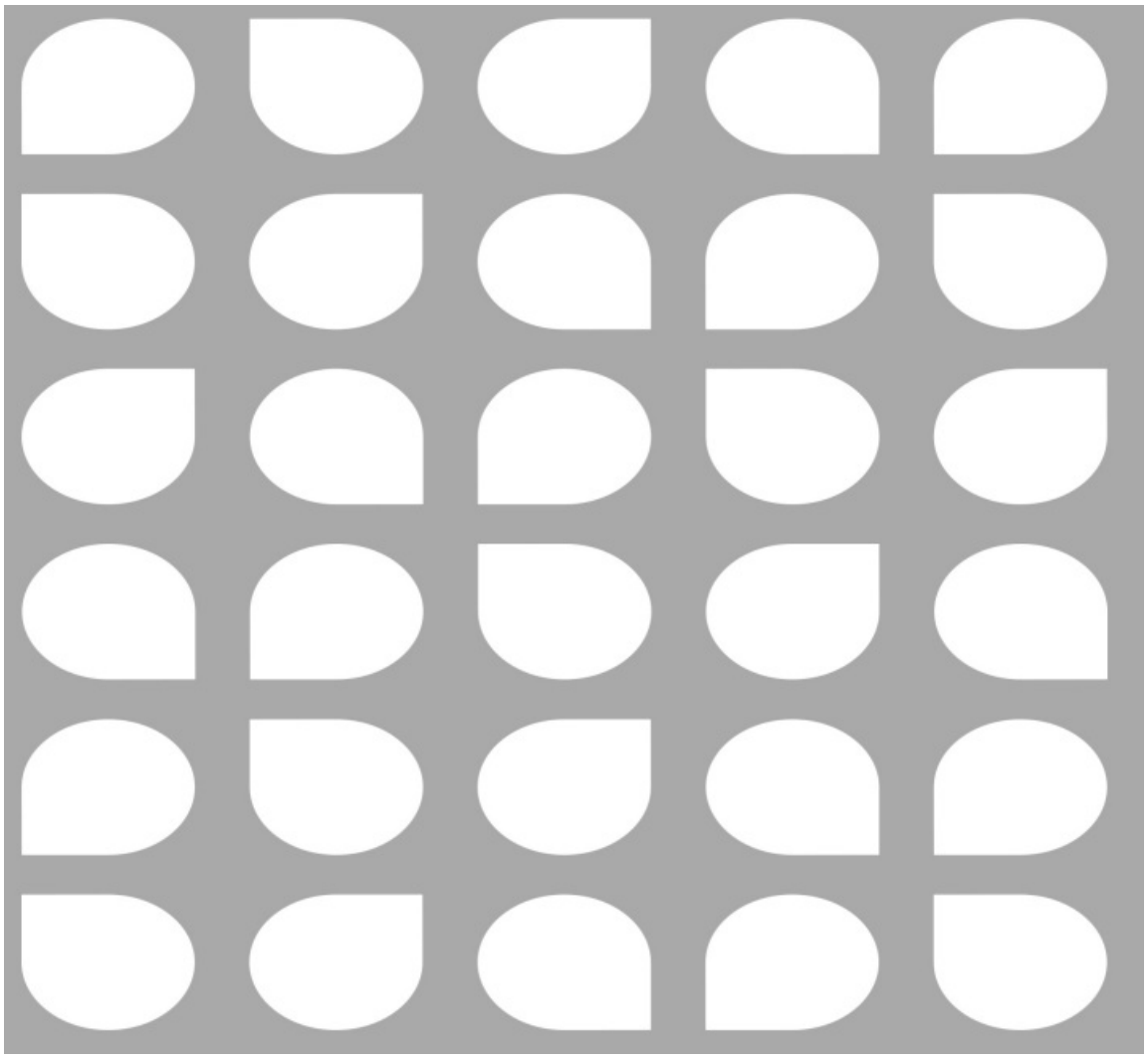


Figure 7.1: Dimensions: MXE5



130 Perinton Parkway
Fairport, NY 14450

USA
www.boschsecurity.com

EU importer:
Bosch Sicherheitssysteme GmbH Robert-Bosch-Platz 1
70839 Gerlingen

Germany

202409111124

Documents / Resources

	DYNACORD MXE564 MXE DSP Matrix Mix Engine [pdf] Installation Guide MXE564 MXE DSP Matrix Mix Engine, MXE564, MXE DSP Matrix Mix Engine, Matrix Mix Engine, Mix Engine

References

- Home | Bosch Security and Safety Systems I North America
- Pro Audio | Dynacord
- User Manual