MaNima Magnus

Highlights

- 8 independent SPI outputs, up to 6 universes or 3072 channels each, 26 universes in total
- Support for over 50 digital LED protocols
- 2 DMX ports, each independently configurable as input or output
- Art-Net input from MADRIX®, ELM and any other Art-Net source
- 6 analog inputs for 0–10 V or 4–20 mA, and 5 digital inputs for PLC interfacing
- SD card storage for scenes and settings, played back by 5 independent players
- Synchronized playback across any number of devices in master-slave mode
- Built-in effects — snake, rainbow and more — assignable per segment
- Ethernet for configuration, monitoring and the UDP API
- Wide input voltage 12–48 V, with polarity and overvoltage protection

Applications

- Architectural facade, hallway and cinema lighting
- Themed and experience lighting in high-end buildings
- Industrial Art-Net playback driven by PLC I/O or UDP control
- Live Art-Net playback from a mapping PC
- Machine and process lighting that must run standalone after commissioning

Description

The MaNima Magnus is a digital LED controller for installations where the lighting has to be driven precisely, from more than one source, and keep running without a PC. It drives eight independent SPI outputs, each carrying up to 6 universes or 3072 channels — 1024 RGB or 768 RGBW pixels per port — with up to 26 universes across the device as a whole, and supports over 50 digital LED protocols.

Where the data comes from is a matter of configuration rather than of wiring. Art-Net, two DMX ports, six analog inputs, five digital inputs, five SD-card players and a synchronized master-slave stream are all available at once, and an input-output matrix decides by priority which one reaches the outputs. An installation can therefore run a stored scene by default and hand control to a console or a PLC the moment one appears.

Recorded scenes live on the SD card and play back without a network, a controller or a PC in the loop. Players start at boot, loop in several ways, and are started, paused and selected by triggers from any input — a DMX channel, a dry contact, a 4–20 mA sensor or the UDP API.

Integration works in both directions. Ethernet carries Art-Net in, the MaNima Configurator and a JSON-RPC UDP API for third-party systems, and the MaNima Cloud for remote monitoring. A MaNima Pollux can be registered as an extension so that measured fixture temperature dims the Magnus, and a MaNima Extensa carries the SPI outputs beyond their 10 m limit to up to 100 m.

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Revision history

Revision	Change	Author	Reviewer	Date
1.0	Initial release	MvdH		
2.0	Update to new lay-out	MvdH	NOo	September 2024
2.1	Better explanation of triggers.	MvdH		June 2025
3.0	Restructured: installation, commissioning, configuration and application procedures moved to the user manual (MA243701). Datasheet reduced to specifications, functional description, pinouts and mechanical data. Corrected throughout to 8 SPI outputs.	NOo	MvdH	August 2026

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Electrical specifications

Absolute maximum ratings are limits, not operating points. Applying values beyond them may cause permanent damage that is not covered by warranty.

Absolute maximum ratings

Table 1 — Absolute maximum ratings

Absolute maximum rating	Min	Max	Unit
Power supply input	9	50	V
Analog 10 V power output current		50	mA
Digital output voltage		5	V
Digital input voltage levels		VCC	
Cable length, digital outputs [1]		10	m
Cable length, power supply		3	m

[1] The digital output cable length can be extended to 100 m with a MaNima Extensa.

General

Table 2 — Electrical ratings

Specification	Min	Max	Unit	Condition
Power supply	12	48	V	
Idle supply input current [1]		75	mA	24 V
		65	mA	48 V
Idle power consumption [1]		1.8	W	24 V
		3.1	W	48 V
Operating temperature	10	50	°C	
Humidity	20	80	%	
IP rating	IP52			
Weight		360	g	

[1] Idle means power is supplied and all eight digital outputs are driven, with no input being driven.

Inputs

Table 3 — Digital and analog input levels

Specification	Min	Max	Unit	Condition
Digital input high level (Vih)	2.0		V	
Digital input low level (Vil)		1.22	V	
Digital input current		1.4	mA	48 V input
Analog input current, 0–10 V mode [1]		0.3	mA	10 V input

[1] The analog inputs have an overcurrent protection that disables 4–20 mA mode on overcurrent.

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Terminals

Table 4 — Screw terminal data

Specification	Min	Max	Unit	Condition
Wire size, solid	0.05	3.31	mm²	
	30	12	AWG	
Wire size, stranded	0.05	3.31	mm²	
	30	12	AWG	
Torque		0.5	Nm	
		4	lb·in	
Wire strip length		6	mm	

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Features

The Magnus is built around one idea: many possible sources of LED data, one set of outputs, and a deterministic rule that decides which source wins. Everything below either feeds that matrix or is driven by it.

Input-output matrix

The Magnus accepts many inputs but drives one source to the outputs at a time — unless segments are used, which subdivide the outputs. Which source is active is decided by priority: the highest-priority source that is currently enabled takes the outputs. A source is enabled when it is configured and receiving data, so a console that stops sending hands the outputs back to whatever sits below it.

Table 5 — Input sources, in order of priority

Input source	Priority	Description
Blackout	Lowest	Outputs nothing, turning off all LEDs.
Analog source		The analog inputs, when configured as an input source.
Art-Net source		Always enabled in the background; takes the outputs when Art-Net data arrives.
DMX port 1 source		DMX port 1, when that port is configured as an input source.
DMX port 2 source		DMX port 2, when that port is configured as an input source.
Segment source		Enabled automatically when segments are enabled.
Player 1–5 source		A player becomes an enabled source while it is playing a scene.
Sync player source		Used in master-slave operation; enabled when slave data is received.
Identify source	Highest	Enabled while identifying or testing an output. Overrules everything else and outputs an R-G-B-RGB cycle.

LED chip support

The Magnus supports an extensive list of digital LED chips, published and kept current on the MaNima website. If a chip is not on the list, contact MaNima — protocols are added on request.

LED type support: https://www.manima-technologies.com/magnus-led-type-support/

Colour order and colour limits

Each SPI port carries its own colour order, so fixtures with different driver ICs run side by side on one controller. Three-component and four-component orders are both supported.

Alongside the order, every port has a limit per colour component, from 0 to 255. The limit rescales the component rather than clipping it: the full 0 to 255 range the port receives is mapped onto 0 to the limit, so the proportions within a fade are kept and the component runs over a smaller range. Because it is set per port and per component, a fixture that runs brighter than the ones around it, or a run of fixtures whose white point does not match, is corrected at the controller rather than in every scene.

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DMX ports

Two DMX ports are configured independently. Either can carry a universe out, receive a universe as a trigger source, or act as the LED data source itself — which makes the Magnus a DMX-to-SPI converter, or a DMX-to-Art-Net converter when the received universe is forwarded.

Table 6 — DMX port modes

DMX mode	Direction	Function
Master	Output	Outputs the configured universe as DMX master.
Slave	Input	Receives a DMX universe; triggers can be configured on it.
Input source	Input	Receives DMX data and drives the LED outputs with it.
Disabled	—	The port is switched off.

SD card and players

The SD card supplied with the Magnus holds settings and recordings. Settings are *.cfg files — JSON, so they can be read, edited and backed up on a PC. Recordings are *.rec files, which can be copied and backed up but not edited. A replacement card must carry a valid FAT32 filesystem.

Five players play those recordings back. Filenames are pre-loaded, and start, stop and pause come from triggers or from the MaNima Configurator. A player can be set to start at boot and to repeat a set number of times, so an installation returns to its scene after a power cut with nothing else in the loop.

Table 7 — Loop methods

Loop method	Function
Default	Jump back to the start after the last frame.
Autoloop	Scan the file for a frame matching the start frame and jump to that one.
Bounce	Reverse the direction of playback at the last frame.
Fader	Fade out, then jump back to the start.
Fade and bounce	Fade out, then reverse the direction of playback.

Triggers

A trigger is an event from outside the Magnus that makes it do something. Triggers come from the analog inputs, the digital inputs, a DMX port configured as slave, or the UDP API.

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Table 8 — Triggers

Trigger	Behaviour
Player x start / pause / stop	One control value drives all three: below one third of the maximum the player stops, above two thirds it starts, and in between it pauses.
Player x start	Starts the player when the value passes half of the maximum.
Player x stop	Stops the player when the value passes half of the maximum.
Player x speed	Sets the playback speed.
Player x select scene	Selects a scene from the SD card by value. On a 0–255 input a value below 10 stops the player; otherwise the file whose name reads X_Y.REC is selected, where the value falls between X and Y. 10_20.REC plays for values from 10 to 20.
Global dimming	Dims the whole system, slaves included. Set it on the device that starts the synchronized playback.
Safety dimming	Force-dims the whole system from a temperature measured by a MaNima Pollux, and reaches devices configured as slaves as well.

Segments

Segments divide the outputs into smaller independent stretches. A segment is defined by a start LED, a length and an output port, and each one displays its own effect — so one port can run a static colour over part of its length and an Art-Net universe over the rest.

Table 9 — Segment effects

Effect	Function	Configurable
Colour	A static colour.	RGBW value
Rainbow	A rainbow across the segment.	Length and speed
Snake	A running snake.	Head and tail length, the gap between snakes, speed, direction and RGB colour
Art-Net	Art-Net input on that stretch.	Universe and start channel

Some effects generate triggers of their own — the snake exposes its colour and its speed — so those parameters can in turn be driven from any of the trigger sources. Further effects are added on request.

Analog inputs

Six analog inputs are configured independently as 0–10 V or 4–20 mA, and each is set to one of two modes. In Functions mode the input drives triggers. In LED data mode a universe is simulated from the values of the analog ports, at a configurable universe and start channel — so a sensor reading maps straight onto pixels. A +10 V output on the same connector supplies the sensors.

Digital inputs

Five digital inputs are individually enabled or disabled and drive triggers. They accept up to the supply voltage and connect directly to PLC outputs, dry contacts and the digital outputs of other equipment.

Master-slave and groups

Where an installation needs more than eight outputs, several Magnus devices run in master-slave mode on one local network. There is no practical limit to the number of slaves. Any device can be the master, and it can be chosen after

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configuring and recording: the master is simply the device that receives the start-playback command, and it need not be the device that recorded the scene.

Groups keep separate master-slave sets apart on a shared network. A device only listens to synchronized playback commands from devices in its own group.

Custom UDP API

A UDP API built on JSON-RPC exposes the Magnus to third-party systems: output mapping and segments, the players and the recorder, and more. The API document is available on request.

Custom touchscreen control — HMI

MaNima supplies a touchscreen HMI that talks to the Magnus and can carry your own logo. By default it offers a global dimming slider, a playback speed slider and a scene selector, with a settings menu reached by tapping the logo rapidly — deliberately little else, so it can be handed to an end user. The logo is set through the MaNima Cloud, or over Ethernet from a laptop where there is no internet connection.

MaNima Cloud

The Magnus registers itself with the MaNima Cloud as soon as it has an internet connection, for remote monitoring and control of an installation that has already been handed over.

Pinout

All connections are on the two long faces of the enclosure. The top face carries the supply and digital inputs, SPI ports 5 to 8, the SD card slot and the Ethernet port. The bottom face carries the analog inputs, both DMX ports and SPI ports 1 to 4.

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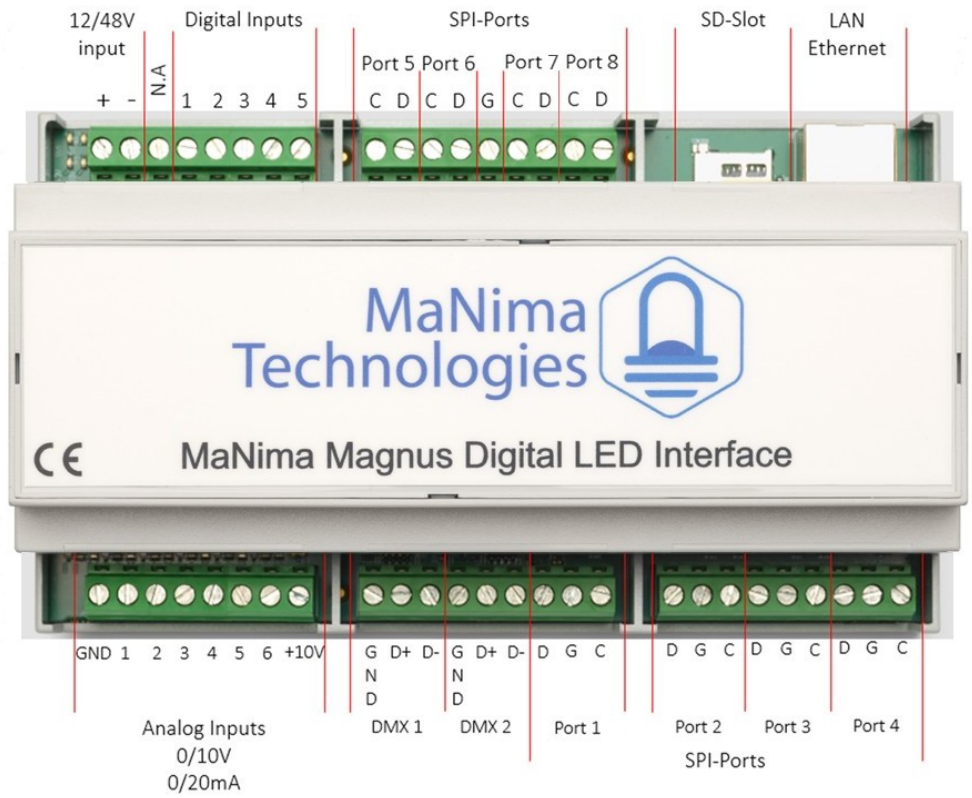

Figure 1 — Connector and pin layout, top and bottom face.

Top face

Table 10 — 12/48 V input and digital inputs

Pin	Signal
1	VDD (+)
2	GND
3	N.A.
4	Digital input 1
5	Digital input 2
6	Digital input 3
7	Digital input 4
8	Digital input 5

Table 11 — SPI ports 5 to 8

Pin	Signal
1	Clock port 5
2	Data port 5
3	Clock port 6
4	Data port 6
5	GND — keep close to the data and clock lines
6	Clock port 7
7	Data port 7
8	Clock port 8
9	Data port 8

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Bottom face

Table 12 — Analog inputs

Pin	Signal
1	Analog GND
2	Analog input 1
3	Analog input 2
4	Analog input 3
5	Analog input 4
6	Analog input 5
7	Analog input 6
8	+10 V output, to supply sensors

Table 13 — DMX ports and SPI port 1

Pin	Signal
1	DMX 1 GND
2	DMX 1 D+
3	DMX 1 D−
4	DMX 2 GND
5	DMX 2 D+
6	DMX 2 D−
7	Data port 1
8	GND port 1
9	Clock port 1

Table 14 — SPI ports 2 to 4

Pin	Signal
1	Data port 2
2	GND port 2
3	Clock port 2
4	Data port 3
5	GND port 3
6	Clock port 3
7	Data port 4
8	GND port 4
9	Clock port 4

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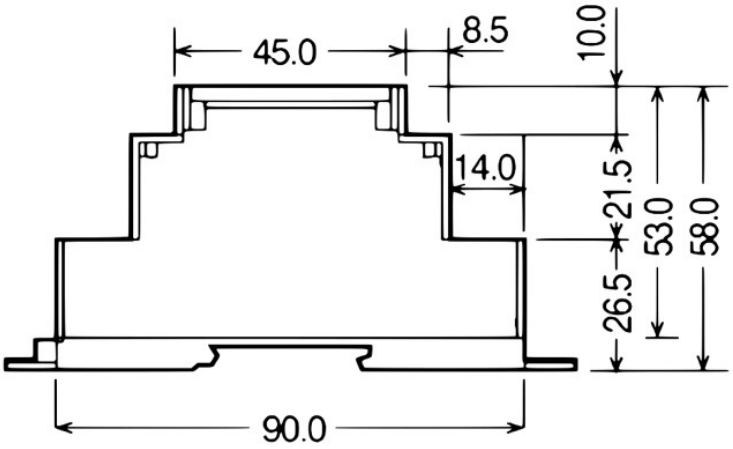
Mechanical specifications

The Magnus is fitted inside a DIN-rail enclosure.

Dimensions are found in the image on the right. The width of the enclosure is found below.

- Design meets the requirements of DIN 43880
- Fits a 35 mm DIN rail, or screwed to a flat surface
- Durable light-grey UL94-V0 flame-retardant PC material
- 90 mm long and 58 mm high
- Weight 360 g, rated IP52



Magnus

The enclosure of the Magnus is 3 units wide, or 159.2 mm.

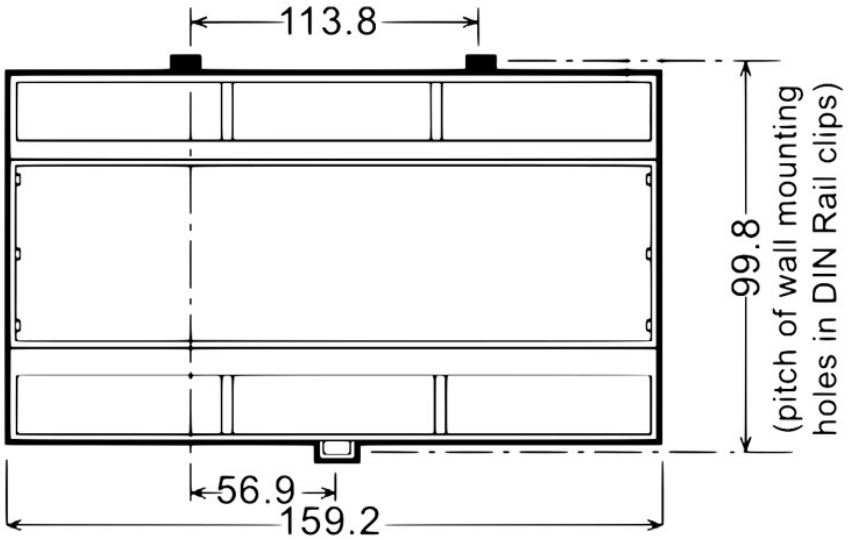


Figure 2 — Enclosure dimensions in mm; 99.8 mm is the pitch of the wall-mounting holes in the DIN-rail clips.

Ordering information

Table 15 — Ordering information

Order number	Type	Remark
MAGNUS	MaNima Magnus	In DIN-rail enclosure, SD card included
MAGHMI	HMI touchscreen	Default, with the MaNima logo
MAGHMICL	HMI touchscreen	With a custom logo in the software

All products are carefully handled and packaged using ESD-safe methods. Installation, commissioning, configuration and application procedures are described in the user manual, MA243701.

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