MaNima Magnus

User Manual

Installation, commissioning, configuration and maintenance

Read this manual in full before you install the controller.

Document	Detail
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Revision	2.0
Date	August 2026
Product	MaNima Magnus digital LED controller
Datasheet	DS243701 — MaNima Magnus — Revision 3.0

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1 Revision history

Revision	Change	Author	Reviewer	Date
1.0	Initial release. First user manual for the Magnus; replaces the unnumbered Manual V3.8 and takes over the installation, commissioning, configuration and application content removed from DS243701 revision 3.0.	NOo	MvdH	August 2026
2.0	Content revision for the Magnus REV2 hardware.	NOo	MvdH	August 2026

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2 About this manual

This chapter states who the manual is written for, which hardware and software versions it describes, and where to find the documents it refers to. Read it before you rely on any figure in the chapters that follow.

2.1 Who this manual is for

This manual is written for the people who put a Magnus into service and keep it running: the installer who mounts and wires the controller, the commissioning engineer who configures it, and the service technician who maintains it later. It assumes working knowledge of low-voltage DC wiring, of Ethernet networking, and of the lighting control protocol in use on the installation — Art-Net, DMX512 or a stored scene played back from the SD card.

It does not assume any previous experience with MaNima products. Where a procedure depends on knowledge of another MaNima device, that device is named and its own documentation is referenced.

2.2 Scope

This manual covers the MaNima Magnus REV2, the revision with eight SPI outputs. The revision is identified by counting the SPI ports: a REV2 unit carries ports 1 to 4 on the bottom face and ports 5 to 8 on the top face. Earlier units with six SPI outputs are not covered here.

Two version numbers matter, they look alike, and they are regularly confused with each other. Quote both when you contact support.

Table 1 — Versions covered by this manual

Item	Version	Where to find it
Magnus firmware	V 3.4.0	MaNima Configurator, Update screen, under Current firmware version
MaNima Configurator	2.6	MaNima Configurator, About screen

A Magnus running different firmware may present screens that differ from the ones shown here. Where behaviour depends on the firmware version, the manual says so.

Specification values are held in the datasheet, not here. This manual repeats only the handful of figures a person needs while their hands are on the hardware — supply range, terminal data, cable lengths — and every repeated figure carries a line marking where it came from, in the form Reproduced from DS243701. If such a figure changes, it must be corrected in both documents.

2.3 Conventions

Numbered lists are procedures. Carry out the steps in the order given, and read the notice above a procedure before you start the first step — a notice guards the steps that follow it. Every procedure closes with a Result line stating what you now have and what is still outstanding.

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Names of screens, buttons and fields in the MaNima Configurator are written exactly as the software spells them, including where that spelling is inconsistent with the rest of this manual.

The three levels of safety notice used throughout are defined in chapter 3.

2.4 Related documents

Table 2 — Related documents

Document	Where
DS243701 — MaNima Magnus datasheet	Specifications, functional description, pinouts and mechanical data
MaNima downloads	www.manima-technologies.com — Downloads
Firmware downloads	www.manima-technologies.com/support/update/
Video tutorials	See chapter 18

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3 Safety

This chapter defines the safety notices used throughout the manual and lists the requirements that apply to the Magnus as a whole. It contains no installation instructions; those begin in chapter 6.

3.1 Notice hierarchy

This manual uses three levels of notice. Each level is a single-cell box with a coloured bar on the left.

Table 3 — Notice hierarchy

Level	Meaning
WARNING	Could cause death or serious injury.
CAUTION	Could cause minor or moderate injury.
NOTICE	No personal injury; equipment damage, data loss or a voided warranty.

3.2 General requirements

> **WARNING — LIVE DC TERMINALS**
> The supply terminals and the wiring connected to them carry up to 48 V DC whenever the upstream supply is energised. The Magnus has no switch: it is live from the moment the supply is on.
> **De-energise the upstream supply and confirm it is dead before you touch any terminal.**

The following requirements apply to the product as a whole.

- Read this manual in full before you install the Magnus.
- Hand these instructions to the technicians and end users responsible for installing and operating the product.
- Installation may be carried out by certified personnel only.
- Do not open, modify or repair the product. Any modification or repair by anyone other than MaNima Technologies B.V. voids the warranty and the built-in protection.
- Do not put a damaged unit into service. Take the product out of service if it is visibly damaged, does not work correctly, or behaves in any way that is out of the ordinary for an electrical device.
- Wire the product only as described in this manual.
- Verify that the supply is free of short circuits before you energise it.
- Supply the product from a single source only. Do not connect more than one power source to the Magnus.
- Keep the supply within 12–48 V DC while the product is powered. A higher voltage may damage it.
- Observe the IP rating. The Magnus is rated IP52 and must be protected against wet environments; moisture will damage it.
- Keep the product within its operating temperature and humidity range.
- To switch the Magnus off, disconnect it from the supply.

Reproduced from DS243701.

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4 Product overview

This chapter describes what the Magnus does and names its connections, so that the installation chapters can refer to them without further explanation. No hardware needs to be powered or mounted to read it.

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 and supports over 50 digital LED protocols. 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; an input-output matrix decides by priority which of them reaches the outputs.

4.1 Key features

- 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 any 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
- Ethernet for configuration, monitoring and the UDP API
- Wide input voltage 12–48 V, with polarity and overvoltage protection

Reproduced from DS243701. For the full specifications, see the Electrical specifications chapter of DS243701.

4.2 Protection

The supply input is protected against reverse polarity and against overvoltage, so a miswired or briefly out-of-range supply will not immediately destroy the device. This protection is not a substitute for wiring the supply correctly: keep the input within the rated 12 to 48 V, and observe the absolute maximum ratings in DS243701, since values beyond them can cause permanent damage that the warranty does not cover.

The analog inputs carry their own overcurrent protection. If an input wired for 4 to 20 mA mode draws too much current, that mode is disabled to protect the input. Check the wiring and the source before re-enabling it.

The device draws little power when idle, meaning powered with all eight digital outputs driven but no input active: about 75 mA and 1.8 W at 24 V, falling to about 65 mA and 3.1 W at 48 V. Size the supply for the connected LED load on top of this, not for the idle figure alone.

Reproduced from DS243701. Idle figures and protection limits are reproduced from DS243701; if either document changes, correct both.

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4.3 Connector overview

All connections are on the two long faces of the enclosure. The top face carries the supply and the 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.

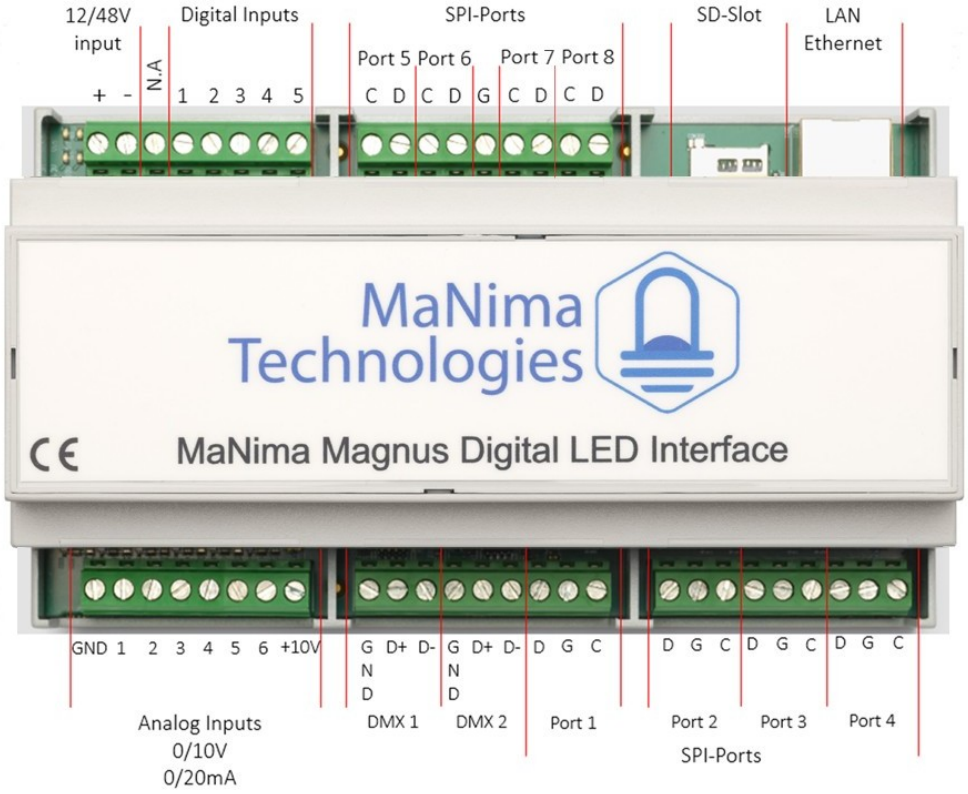

Figure 1 — Connector and pin layout, top and bottom face.

Full pinouts are reproduced in chapter 16.

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5 Unpacking and scope of delivery

This chapter tells you what is in the box and what to check before you mount anything. Carry it out before the mechanical installation.

5.1 Scope of delivery

The Magnus ships with very little, because it needs very little. The terminals are screw terminals fitted to the product, so no mating connectors have to be bought or assembled: strip the conductor and screw it down.

Table 4 — Scope of delivery

Item	Quantity	Remark
MaNima Magnus	1	In its DIN-rail enclosure, screw terminals fitted
Industrial SD card	1	Fitted in the SD card slot; see the notice below

Nothing else is supplied. Cables, the DIN rail or mounting screws, and any sensors or fixtures are not part of the delivery.

> **NOTICE — THE SD CARD HOLDS THE CONFIGURATION, NOT JUST THE SCENES**
> The SD card carries the recorded scenes and the device configuration — the LED output configuration and the settings. Removing it while the Magnus is powered, or replacing it with a blank card, leaves the controller without its configuration.
> **Leave the supplied card in place. Power the Magnus down before you remove or replace it, and copy the card first if you are replacing it.**

5.2 Checks on arrival

1. Check the packaging for transport damage before you open it.
2. Take the Magnus out of its packaging and inspect the enclosure, the terminal blocks and the Ethernet port for damage.
3. Confirm that the SD card is present in the slot on the top face.
4. Count the SPI ports. A Magnus covered by this manual has eight: ports 1 to 4 on the bottom face and ports 5 to 8 on the top face.
5. Report any damage or shortage to MaNima Technologies before you install the product.

Result: the delivery is confirmed complete and undamaged, and the controller is ready to be mounted. Do not wire or power it yet.

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6 Mechanical installation

This chapter mounts the Magnus. The enclosure and mounting are the same as the MaNima Pollux Industrial; the values below are reproduced from that product and from DS243701. Do not wire or power the controller until it is mounted (see chapter 7).

6.1 Enclosure

Table 5 — Enclosure properties

Property	Value
Type	DIN-rail enclosure, meets DIN 43880
Mounting	Clips onto a 35 mm DIN rail, or screwed to a flat surface
Material	Light-grey UL94-V0 flame-retardant polycarbonate
Width	3 units, 159.2 mm
Protection rating	IP52
Weight	360 g

Reproduced from DS243701 and from the MaNima Pollux Industrial, which shares this enclosure.

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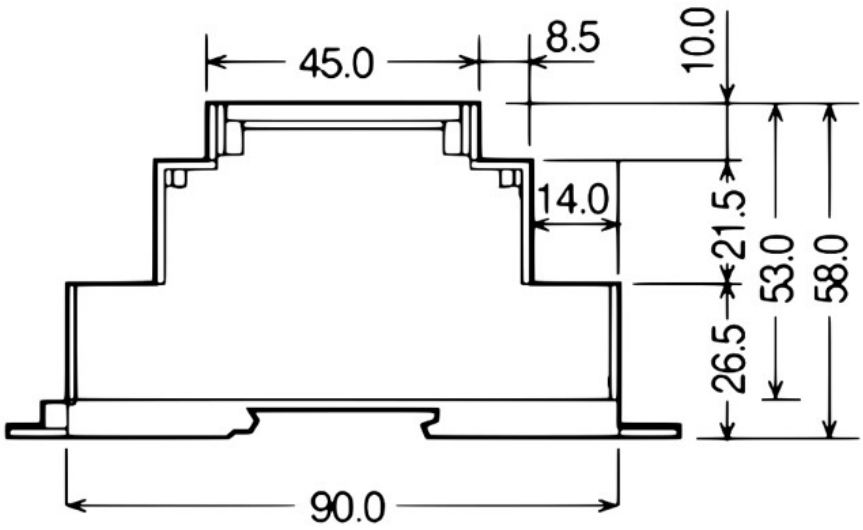

Figure 2 — Enclosure dimensions in mm, side view.

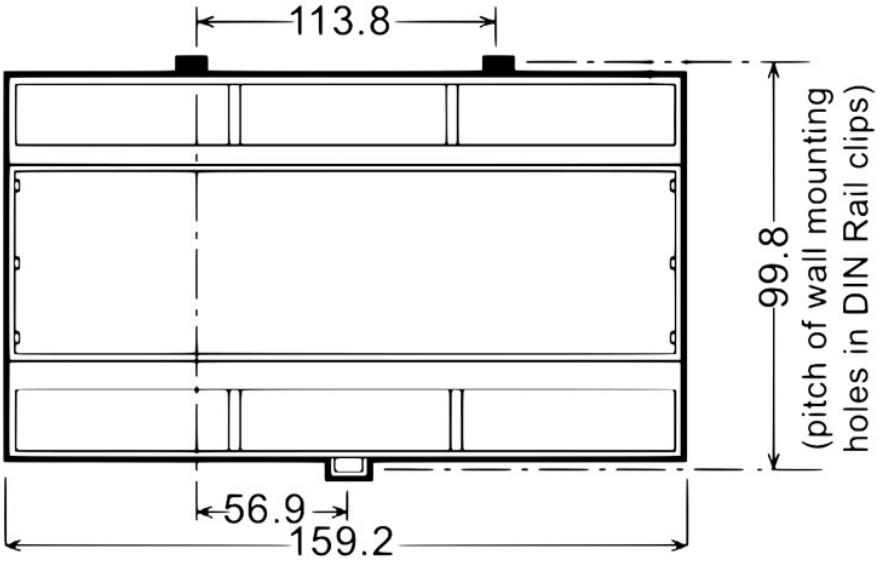

Figure 3 — Enclosure dimensions in mm, seen from the connector face. 99.8 mm is the pitch of the wall-mounting holes in the DIN-rail clips.

6.2 Mounting

1. Choose a position where both long faces of the enclosure stay accessible, because the connections are on the top and bottom faces.
2. For DIN-rail mounting, hook the enclosure onto the top edge of the 35 mm rail and press the bottom home until the clip latches.
3. For flat-surface mounting, screw the enclosure to the surface through its mounting points.
4. Confirm the enclosure is held firmly and does not move on the rail.

Result: the Magnus is mounted and its connection faces are accessible, ready for wiring.

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6.3 Clearances and thermal requirements

The Magnus is convection-cooled through its enclosure. Mount it upright on a horizontal rail and leave room above and below for air to move past the connection faces. Keep it within the operating temperature range given in DS243701, and do not mount it directly against a heat source such as a power supply running at full load.

Enclosure and thermal behaviour reproduced from the MaNima Pollux Industrial.

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7 Electrical installation

This chapter wires the Magnus. The Magnus must be mounted (chapter 6) and unpowered throughout. The terminals are the same screw terminals as the MaNima Pollux Industrial, so the terminal data below applies to both products.

> **WARNING — WIRE THE CONTROLLER ONLY WHEN IT IS UNPOWERED**
> The DC supply terminals are live when the Magnus is powered. Wiring a live controller risks a short circuit across the supply and damage to the device.
> **Switch off and isolate the supply before you touch any terminal.**

7.1 Terminal data

All connections use screw terminals fitted to the product. Strip the conductor to the length below and screw it down; no mating connector has to be bought or assembled.

Table 6 — Screw terminal data

Property	Value
Wire size, solid	0.05 to 3.31 mm2 (30 to 12 AWG)
Wire size, stranded	0.05 to 3.31 mm2 (30 to 12 AWG)
Tightening torque	0.5 Nm
Strip length	6 mm

Terminal data reproduced from DS243701. The MaNima Pollux Industrial uses the same screw terminals.

7.2 Connection layout

The connections are split across the two long faces. Wire each group at the terminal shown for it; the full pinouts are in chapter 16.

Table 7 — Connection groups by face

Face	Connections
Top	DC supply, digital inputs, SPI ports 5 to 8, SD card slot, Ethernet
Bottom	Analog inputs, both DMX ports, SPI ports 1 to 4

7.3 Wiring procedure

1. Confirm the supply is switched off and isolated.
2. Wire the DC supply to the supply terminals on the top face, observing polarity. The Magnus accepts 12 to 48 V and is protected against reverse polarity and overvoltage.
3. Wire the SPI outputs in use, ports 1 to 4 on the bottom face and ports 5 to 8 on the top face, following the pinout in chapter 16.
4. Wire the DMX ports, analog inputs and digital inputs that the installation uses, again following chapter 16.
5. Connect Ethernet on the top face for configuration and monitoring.
6. Check each conductor is stripped to 6 mm, seated fully, and tightened to 0.5 Nm.

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Result: the Magnus is fully wired but still unpowered. Proceed to commissioning (chapter 9) to power it up for the first time.

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8 I/O and signal connections

This chapter covers the interfaces one by one: what each one carries, how it is configured in outline, and what it can be made to do. The Magnus must be mounted and unpowered before you wire any of them. The screens named here are described in full in chapter 10.

8.1 SPI outputs

The eight SPI outputs are the connections to the LED fixtures. Each port carries a clock line, a data line and a ground, and each is configured independently: the LED protocol and the range of universes assigned to it are set per port on the Led output screen. Over 50 digital LED protocols are supported, and different ports may run different protocols at the same time.

Each port accepts up to 6 universes, which is 3072 channels, or 1024 RGB pixels or 768 RGBW pixels. The device total is 26 universes, so the eight ports cannot all be filled to their individual maximum at once; distribute the universes over the ports to suit the installation.

> **NOTICE — KEEP THE GROUND CLOSE TO THE SIGNAL LINES**
> The ground conductor belonging to an SPI port carries the return path for the clock and data lines. Routing it separately, or borrowing a ground from elsewhere in the installation, degrades the signal and produces flicker or dropouts that are hard to trace afterwards.
> **Run the ground of each port in the same cable as its clock and data lines.**

The SPI outputs drive up to 10 m of cable. Longer runs need a MaNima Extensa, which extends the reach to 100 m.

Table 8 — Universe capacity

Item	Figure
Universes per port	6 maximum
Channels per port	3072
Pixels per port	1024 RGB or 768 RGBW
Universes per device	26 in total

Reproduced from DS243701. The frame rate the installation can sustain depends on how many universes are assigned; see chapter 13 if the output stutters.

8.2 DMX ports

The Magnus has two DMX ports. Each is configured independently, and each can be an input or an output depending on the mode chosen for it on the DMX screen.

Table 9 — DMX port modes

Mode	Behaviour
Disabled	The port is not used.
Master	The port sends DMX. A universe number is assigned to it, and dimming can be enabled so that the master dimming level is applied to what it sends.
Slave	The port receives DMX and acts on it. Individual channels are assigned to functions, so that an external DMX console drives the Magnus.
Inputsource	The port receives DMX as a source of pixel data, which the input-output matrix can route to the outputs.

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Slave and Inputsource are both inputs, and the difference between them matters. Inputsource brings in pixel data to be shown on the fixtures. Slave brings in control: the incoming channels are assigned to functions, and they steer the Magnus rather than feeding it images.

A slave channel can carry four kinds of control. It can set colour, by assigning Stripcontrol to a channel as described below. It can drive the players: separate functions start, stop and pause a player, select the scene it plays, and set its playback speed, so an external console can run the show. It can dim the whole system, through Global dimming, or invoke Safety dimming. Each function occupies one channel and takes its value from that channel, so a console mixing colour, player control and dimming simply spends one channel on each. The complete list of functions, with what each one does, is given in section 16.2.

8.2.1 Controlling the installation colour from DMX

Where an external console has to set the colour of the whole installation directly, the function to assign is Stripcontrol. It exists as four separate functions, one per colour component: Stripcontrol: R, Stripcontrol: G, Stripcontrol: B and Stripcontrol: W. Each is assigned to one channel, and the value on that channel becomes the level of that colour component across the whole device.

Assign one channel per colour component the installation uses. A single-colour or white installation needs one channel; a two-component installation, such as a tunable colour-temperature strip, needs two; an RGB installation three; and an RGBW installation four. Channels beyond those can be assigned to any other function in the same list.

Table 10 — Channels needed for Stripcontrol

Components	Channels	Functions assigned
One	1	Stripcontrol: R
Two	2	Stripcontrol: R, G
Three	3	Stripcontrol: R, G, B
Four	4	Stripcontrol: R, G, B, W

Stripcontrol acts on the device as a whole, not on one port or one segment. To drive parts of the installation separately from DMX, use a DMX port in Inputsource mode, or assign the LinkedDMX effect to individual segments as described in section 10.4.3.

The same function list applies to the analog inputs, the digital inputs and the inputs of a registered extension, not only to DMX slave channels.

8.3 Analog inputs

The six analog inputs read an external signal and turn it into a function. Each channel is set individually to 0–10 V or to 4–20 mA, so inputs of both kinds can be mixed on one device. Pin 8 of the analog connector supplies +10 V for sensors that need it.

The inputs as a group are either Disabled or set to Functions. In Functions mode, a channel number is paired with a function from the list in section 16.2. A typical use is four channels carrying Stripcontrol R, G, B and W from a 0–10 V colour controller, with a fifth channel starting a stored scene.

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8.4 Digital inputs

The five digital inputs are switching inputs, intended for interfacing with a PLC or with dry contacts. They are either Disabled or Enabled as a group. When enabled, each channel is paired with a function from the list in section 16.2, in the same way as the analog inputs.

Because a digital input has only two states, it suits the functions that are themselves switching actions — starting or stopping a player, or stopping everything and starting one player — rather than the functions that take a level, such as Stripcontrol or dimming.

8.5 Ethernet

The Ethernet port carries everything that is not lighting cable: the connection to the MaNima Configurator, Art-Net from any Art-Net source, the UDP API, synchronized playback between devices, and the link to a registered extension.

Put the Magnus on the same network as the computer running the Configurator. The network settings are configured on the Network screen; see section 10.3.

8.6 Temperature monitoring with a MaNima Pollux

The Magnus does not measure temperature itself. Where the installation has to dim back when the fixtures get hot, the measurement is made by a MaNima Pollux and the Magnus is registered to it as an extension. The NTC sensors are wired to the Pollux, not to the Magnus.

The Magnus applies one dimming value to the whole device. Where a Pollux carries several NTC sensors — eight, for example — the average of those sensors is the temperature that determines the safety dimming value.

Two dimming functions exist and they are not interchangeable:

Table 11 — Safety dimming and global dimming compared

Function	Purpose	Source
Safety dimming	Protects the installation by forcing the output down as measured temperature rises. This is the function to use for temperature monitoring.	A MaNima Pollux registered as an extension
Global dimming	Master dimming of the whole system, as an operator control rather than a protection.	A DMX channel or a 0–10 V analog input

Global dimming can technically be driven from an NTC input, but it is not intended for thermal protection and must not be used for it.

8.6.1 Extension modes

A registered extension runs in one of two modes.

Table 12 — Extension modes

Mode	Behaviour
MONITOR	The Magnus reads the measured data from the Pollux. This is the mode required for safety dimming.
FULL	As MONITOR, and the Pollux also receives data from the Magnus, so that the Magnus drives it as well as reads from it.

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For temperature monitoring alone, MONITOR is sufficient. Choose FULL only where the Pollux also has to be driven by the Magnus.

The registration procedure is given in section 10.10.

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9 Commissioning

This chapter takes the Magnus from wired-but-off to configured-and-running. The mechanical and electrical installation must be complete before you start.

9.1 Before you switch on

Work through this list with the supply still isolated. Every item is something that is awkward to correct once the fixtures are live.

> **WARNING — FIXTURES LIGHT UP WITHOUT WARNING**
> From this point the outputs can drive the fixtures at full output, and a fixture that emits UV is a hazard to eyes and skin at any distance where it is in view. The Magnus can also start a player automatically at boot, so the installation may come up lit before anyone touches a control.
> **Clear the area and confirm that no person is in the line of sight of any fixture before you switch on.**

1. Verify that every terminal screw is tightened to 0.5 Nm and that each conductor is stripped to 6 mm and held by the clamp, not by its insulation.
2. Verify that the supply is within 12 to 48 V DC, wired with the correct polarity, and free of short circuits.
3. Verify that the supply is sized for the connected LED load on top of the idle consumption of the controller. See section 4.2.
4. Verify that every SPI output in use is wired to the pinout in section 16.1, with data and ground from the same port.
5. Verify that each analog input is wired for the mode it will be set to, and that its source stays within 0 to 10 V or 4 to 20 mA accordingly.
6. Verify that the DMX ports and the digital inputs are wired to the pinout in section 15.1.
7. Verify that the Ethernet cable is connected and that the computer running the Configurator is on the same network.
8. Verify that the SD card is in its slot on the top face. Without it the controller has no configuration and no scenes.
9. Verify that the controller is mounted on a horizontal rail with room above and below it, and not directly against a heat source. See section 6.3.

Result: the installation is wired, checked and safe to energise. Nothing has been powered yet.

9.2 First power-up

This procedure powers the controller and takes it as far as a verified, recorded configuration. Follow it in order; each step assumes the one before it succeeded.

1. Switch on the supply and confirm that all four power LEDs next to the supply terminals are green.

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2. Confirm that the heartbeat LED blinks and that the error LED is off. See section 9.3.1.
3. Start the MaNima Configurator and connect to the controller from the Scanner screen, as described in section 10.1.2.
4. Confirm that the product and the firmware version are what you expect. See section 2.2.
5. Set the network settings the installation needs, on the Network screen. See section 10.3.
6. Assign the universes and the LED protocol to each port in use on the Led output screen, and the colour order on the Colors screen. See sections 10.4.1 and 10.5.
7. Use the identify function on the Scanner screen to confirm which fixture each port drives, and record the result.
8. Divide the ports into segments and assign effects where the installation needs them. See sections 10.4.2 and 10.4.3.
9. Configure the inputs, the DMX ports and the scenes the installation uses. See sections 10.5 to 10.7.
10. Where a MaNima Pollux provides temperature monitoring, register it as an extension in MONITOR mode and assign its measurement to safety dimming. See sections 8.6 and 10.9.
11. Run the installation at full output and confirm that the output is stable and that the error LED stays off. An error LED that comes on under load points at the frame rate or the amount of data on a port; see chapter 13.
12. Take a backup of the configuration and store it with the project documentation. See section 11.5.1.

Result: the installation is powered, configured and verified under load, and a backup of the configuration exists outside the controller. Record the port-to-fixture map, the universe assignment and the protocol per port before you hand it over — they are what the next person needs in order to change anything safely.

9.3 Restart, factory reset and indications

The Magnus has two distinct reset actions, and the difference between them matters. A restart changes nothing; a factory reset discards the configuration. Both can be triggered from the MaNima Configurator and from the reset button inside the enclosure.

Table 13 — Restart and factory reset compared

Action	What it does	What is kept
Restart	Restarts the controller.	Everything. Nothing is lost.
Factory reset	Returns the controller to its factory state, including the network settings, the LED output configuration and the settings.	The recorded scenes on the SD card are kept.

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NOTICE — A FACTORY RESET DISCARDS THE CONFIGURATION, BUT KEEPS THE SCENES

A factory reset clears the complete configuration — the LED output configuration, the settings and the network settings. The recorded scenes on the SD card are always kept. This is true whether the reset is triggered from the Configurator or with the hardware reset button.

Copy the SD card before you carry out a factory reset, and be ready to reconfigure the controller afterwards.

Use the buttons in the Configurator where you can — see chapter 10. Use the reset button inside the enclosure only when the Configurator cannot reach the device.

Table 14 — Reset button

Action	Button
Restart	Press once, shorter than 1 second.
Factory reset	Hold for 20 seconds, until all LEDs to the right of the reset button turn on.

After a factory reset the network settings return to their defaults.

Table 15 — Network defaults after a factory reset

Setting	Default
IP address	192.168.0.185
DHCP	Off

Two points in earlier documentation are incorrect and do not apply. A factory reset does not clear the recorded scenes and does not require the SD card to be reformatted to FAT32 afterwards; the scenes are kept and the card is left as it is. A factory reset also does not change the MAC address, which is fixed in hardware and never changes; it is the IP address that returns to its default.

9.3.1 Indication LEDs

A row of indication LEDs on the board reports the state of the controller. Count from the left of the row; the first LED is the error LED and the fourth is the heartbeat LED. A separate group of four LEDs sits next to the supply terminals and reports the supply only.

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Table 16 — Indication LEDs

LED	State	Meaning	Action
Error (1st of the row)	Off	Normal operation.	None.
Error (1st of the row)	Red, or flashing red	The frame rate is too high, or more data is being sent than the controller can process.	Reduce the number of universes on the port, or lower the frame rate in the playback software. See chapter 13.
Heartbeat (4th of the row)	Blinking slowly, like a heartbeat	The controller is running normally.	None.
Heartbeat (4th of the row)	Not blinking	The controller is not running normally.	Carry out a factory reset. Read this section first — the configuration is cleared.
Power (four, next to the supply terminals)	All four green	The controller is powered.	None.
Power (four, next to the supply terminals)	One or more not green	The supply is absent, out of range, or wired incorrectly.	Check the supply voltage and the polarity at the input terminals. See chapter 7.

The heartbeat LED is the quickest check of whether the controller itself is alive. If it blinks but nothing is output, the fault is in the configuration or in the data path, not in the controller.

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10 Configuration and operation

This chapter configures the Magnus with the MaNima Configurator, screen by screen, in the order the screens appear in the sidebar. The controller must be powered and reachable on the network before you start.

10.1 The MaNima Configurator

The MaNima Configurator is the program used to configure the Magnus. It runs on a computer connected to the same network as the controller. Most options are unavailable without a connection to a device, so connect the Magnus first and then start the Configurator.

The sidebar on the left lists the screens: Scanner, Network, Led output, Inputs, DMX, Scenes, Group, Extensions, Update, Settings and About. The bar across the top of every screen names the device you are editing, so that you can see at a glance which controller your changes are going to.

10.1.1 Installing the Configurator

The Configurator is distributed from the MaNima download page. Install it on the computer you will use for commissioning, before you go to site. The program needs Java on that computer; the current version is sufficient, no particular version is required.

Downloads: www.manima-technologies.com/support/downloads/

Java: www.java.com/en/

1. Install the current version of Java on the computer, if it is not there already.
2. Download the MaNima Configurator installer, manimaConfigurator_latest, from the MaNima download page.
3. Run the installer. On Select Additional Tasks, leave Create a desktop shortcut ticked and click Next.
4. On Ready to Install, click Install and wait for the installation to finish.
5. On the final screen, leave Launch MaNima Configurator ticked and click Finish.
6. Open the About screen and confirm the version. This manual describes version 2.6.

Result: the Configurator is installed and its version is known. No device is connected yet.

10.1.2 Connecting to a device for the first time

The Configurator finds devices on the local network. The computer therefore has to be on the same network as the Magnus, and in the same subnet.

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NOTICE — A NEW OR FACTORY-RESET CONTROLLER HAS A FIXED ADDRESS

Out of the box, and after every factory reset, the Magnus has DHCP switched off and the fixed address 192.168.0.185. A computer on a different subnet, or one that expects a DHCP server on the link, will not see it.

Give the computer a fixed address in 192.168.0.x for the first connection, then set the address the installation needs on the Network screen.

1. Connect the Magnus and the computer to the same network, or connect them directly with an Ethernet cable.
2. Power the Magnus and wait until the heartbeat LED blinks.
3. Start the Configurator and open the Scanner screen. The controller appears in the list with its name, address, MAC address, product and firmware version.
4. Select the controller. The bar across the top of the screen now names the device you are editing.
5. Set the address the installation needs on the Network screen, as described in section 10.3.

Result: the Configurator is connected to one specific controller and every following screen acts on that controller.

If the controller does not appear in the Scanner, check the subnet first, then the cabling and the heartbeat LED. See chapter 13.

10.2 Scanner

The Scanner screen finds the MaNima devices on the network and is where you choose which one to edit. Each row shows the device name, its IP address, its MAC address, the product, and the firmware it is running. A device with registered extensions can be expanded to show them beneath it, with the mode each extension runs in.

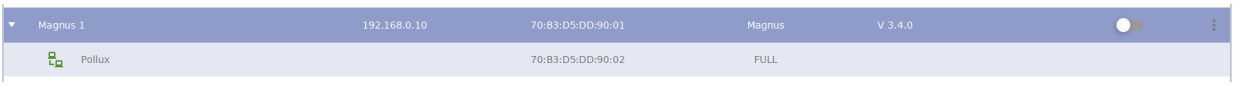

Figure 4 — Scanner, one device expanded to show a registered extension.

The toggle at the end of the row identifies the device physically, which is the quickest way to tell two identical controllers apart in a rack. The menu at the far right connects and disconnects extensions.

10.3 Network

The Network screen sets how the Magnus obtains its address.

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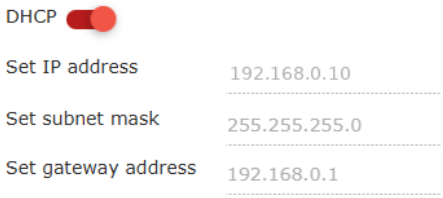

Figure 5 — Network screen with DHCP enabled.

Table 17 — Network screen

Control	Function
DHCP	When on, the device takes its address from the network. When off, the three fields below are used.
Set IP address	The fixed address of the device.
Set subnet mask	The subnet mask of the network.
Set gateway address	The gateway of the network.

NOTICE — CHANGING THE ADDRESS ENDS THE CURRENT CONNECTION

The Configurator reaches the device over the network. Changing the address, the subnet or the DHCP setting takes effect on the device, after which the Configurator is no longer talking to it at the old address.

Note the new address before you apply the change, and rediscover the device on the Scanner screen afterwards.

After a factory reset the device returns to its default address; see section 9.3.

10.4 Led output

The Led output screen has two tabs. Universe mapping assigns universes and a protocol to each port; Segments divides a port into parts that can be driven separately.

10.4.1 Universe mapping

Each port has its own column. The universes assigned to the port are listed in the box, the range beneath it sets which universes those are, and the dropdown at the bottom sets the LED protocol for that port. The colour order is set on the Colors screen, described in section 10.5.

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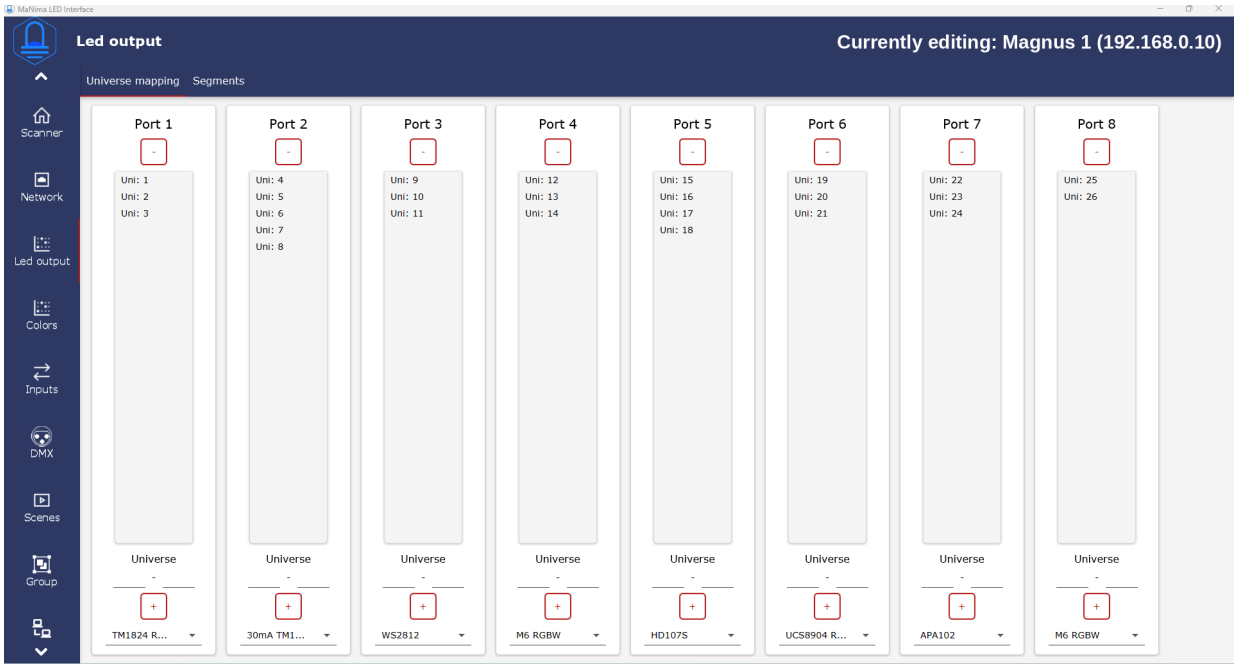

Figure 6 — Universe mapping, eight ports with different protocols.

Table 18 — Universe mapping controls

Control	Function
Plus and minus	Adds a universe to the port, or removes the selected one.
Universe range	The first and last universe assigned to this port.
Protocol	The LED protocol the fixtures on this port use.
Colour order	The order the colour components are sent in, such as R-G-B or R-G-B-W.

Ports may run different protocols at the same time, as the figure shows. Assign no more universes than the port needs: the device total of 26 is shared across all eight ports.

10.4.2 Segments

A segment is a part of a port that is driven by its own effect, independently of the rest. Segments are listed one per row, and each row carries the port it belongs to, where on that port it starts, how long it is, and the effect running on it.

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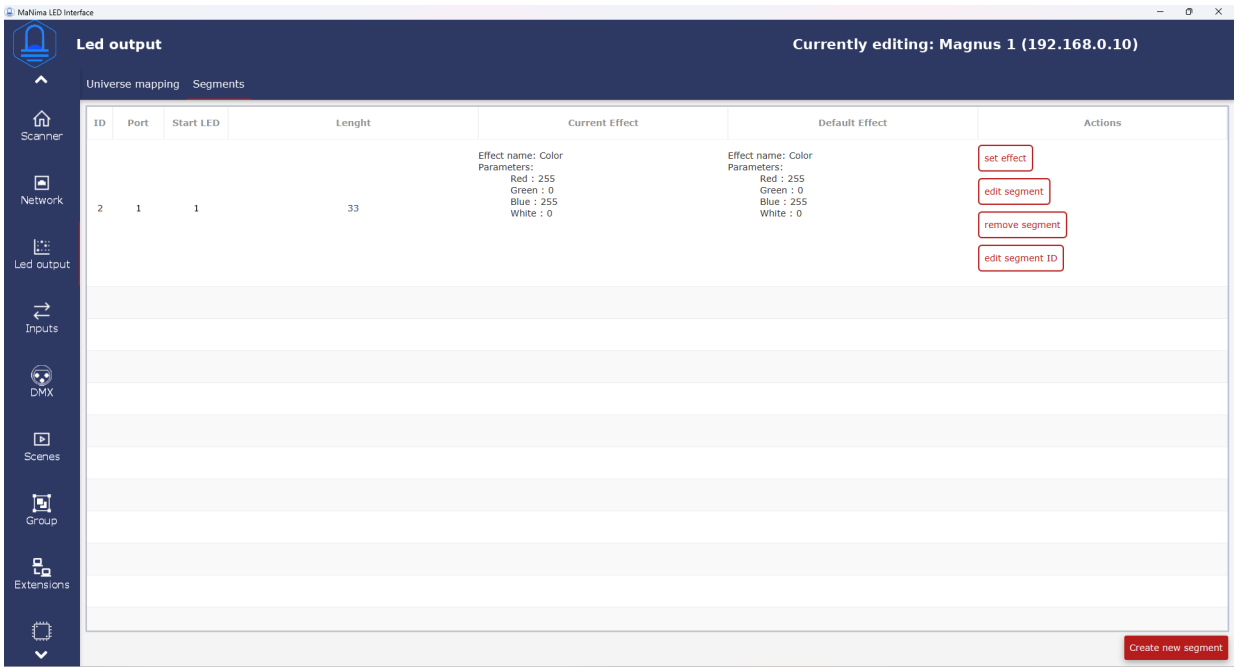

Figure 7 — Segments tab, one segment of 33 LEDs on port 1.

Table 19 — Segments table

Column	Meaning
ID	The identifier of the segment. Change it with edit segment ID.
Port	The SPI port the segment is on.
Start LED	The first LED of the segment, counted from the start of the port.
Lenght	The number of LEDs in the segment. The software spells this field as shown.
Current Effect	The effect running on the segment now, with its parameters.
Default Effect	The effect the segment falls back to.
Actions	Set effect, edit segment, remove segment and edit segment ID.

Create a segment with the button at the bottom right, then use set effect to give it something to show.

10.4.3 Segment effects

Choosing set effect opens a short wizard: first the effect, then its parameters.

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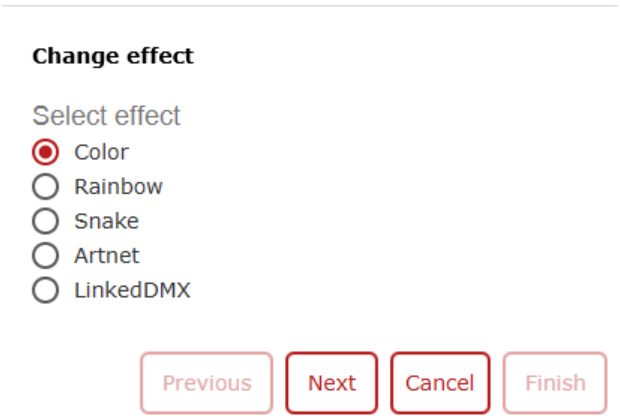

Figure 8 — Selecting a segment effect.

Table 20 — Segment effects

Effect	What it does
Color	Holds the segment at one fixed colour.
Rainbow	Runs a rainbow along the segment.
Snake	Runs a moving band of colour along the segment, with a fade-out tail.
Artnet	Drives the segment from incoming Art-Net data.
LinkedDMX	Drives the segment from channels on a DMX port.

Color takes one value per colour component, each 0 to 255.

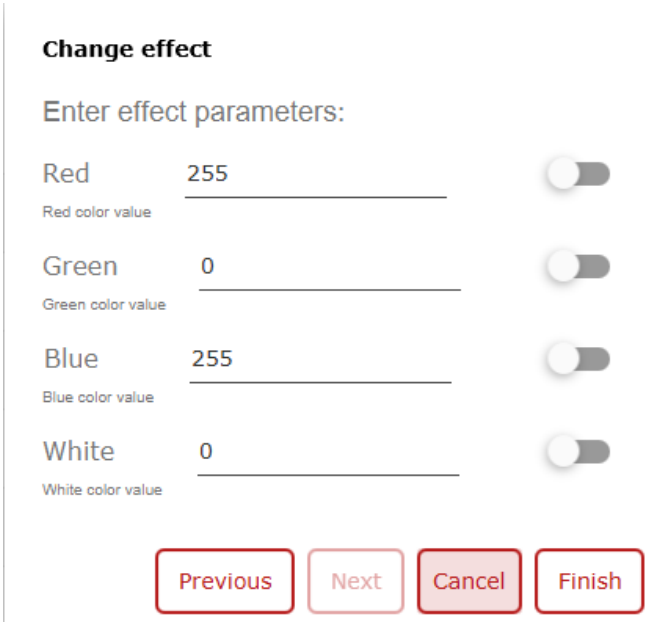

Figure 9 — Color effect parameters.

Rainbow takes a width in LEDs and a speed.

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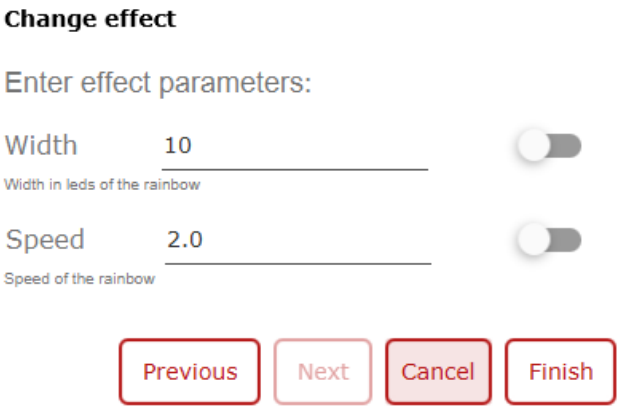

Figure 10 — Rainbow effect parameters.

Snake takes the shape of the moving band as well as its colour.

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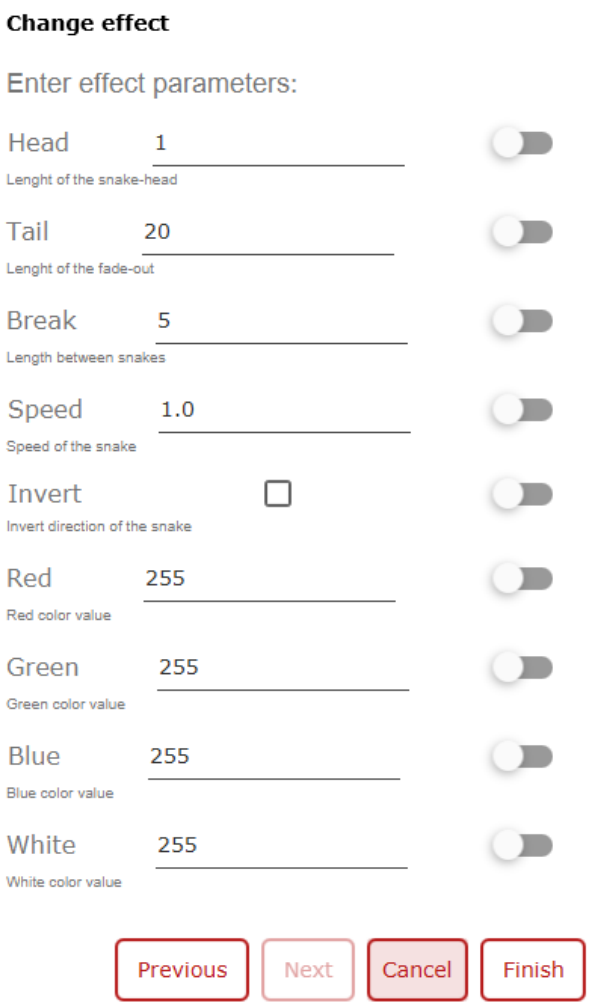

Figure 11 — Snake effect parameters.

Table 21 — Snake parameters

Parameter	Meaning
Head	Length of the snake head.
Tail	Length of the fade-out behind the head.
Break	Length between snakes.
Speed	Speed of the snake.
Invert	Reverses the direction of travel.
Red, Green, Blue, White	Colour of the snake, each 0 to 255.

LinkedDMX ties the segment to channels on a DMX port. It is the way to drive part of the installation from a console while the rest runs on something else, and it is distinct from Stripcontrol described in section 8.2.1, which acts on the whole device.

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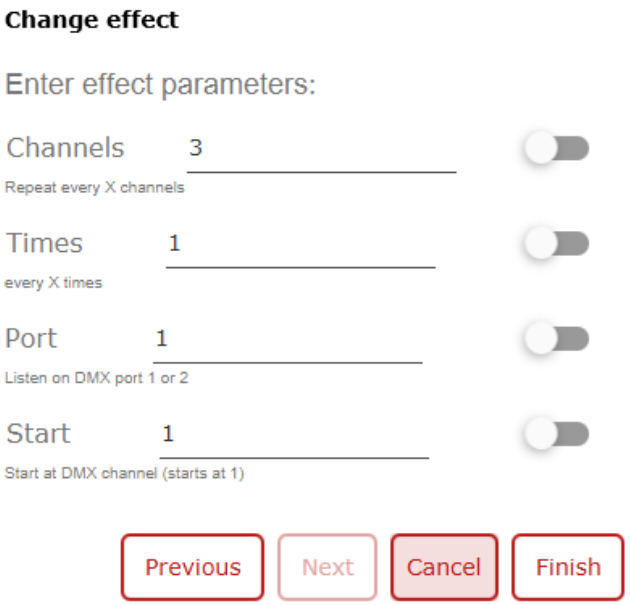

Figure 12 — LinkedDMX effect parameters.

Table 22 — LinkedDMX parameters

Parameter	Meaning
Channels	Repeat every X channels.
Times	Repeat every X times.
Port	The DMX port to listen on, 1 or 2.
Start	The DMX channel to start at. Channels start at 1.

10.5 Colors

The Colors screen sets how each port drives the components of its fixture. It holds one block per SPI port, and each block carries two settings: the colour order the port sends its data in, and a limit per colour component.

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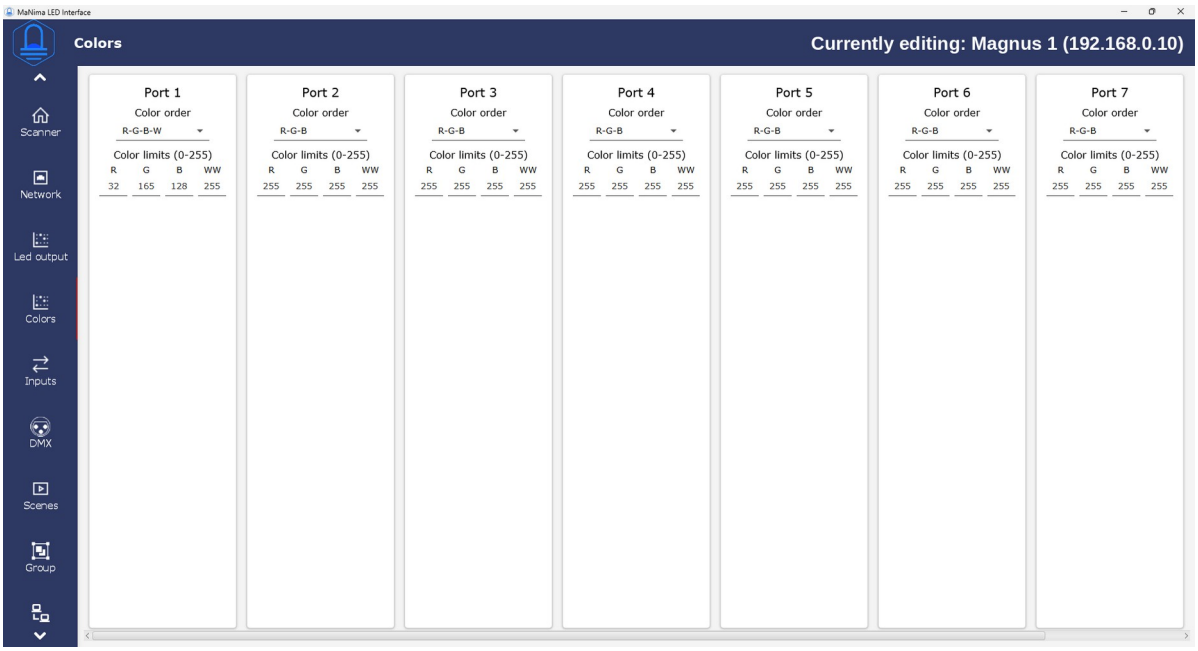

Figure 13 — The Colors screen, with one block per SPI port.

- Color order — the order in which the components are sent to the strip. Set it to match the driver IC in the fixture. The full list is in section 16.4.
- Color limits (0-255) — the top of the range this port drives each component over. 255 leaves the component at its full range.

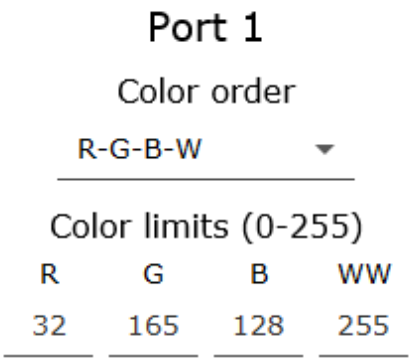

Figure 14 — One port block: the colour order and the four colour limits.

A limit rescales the component rather than cutting it off. The port maps the whole 0 to 255 range it receives onto 0 to the limit, so with R set to 32 a scene asking for full red gives 32 and a scene asking for half red gives 16. The proportions within a fade are kept, and the component simply runs over a smaller range.

Use this to hold back a fixture that runs brighter than the ones around it, or to pull a colour cast out of a run of fixtures whose white point does not match. Because the scaling is per component and per port, it corrects the fixture at the controller instead of in every scene.

The fourth column is labelled WW on every port, whichever colour order is set. On a three-component fixture that column has nothing to act on.

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NOTICE — A COLOUR LIMIT IS NOT A DIMMER
The limit rescales one component of one port and stays in force under every scene. It does not appear in the scene or on the dimming controls, so a fixture scaled back here looks like a fixture that is failing.
Record the limits you set, and use scenes or dimming to set levels.

10.6 Inputs

The Inputs screen carries the analog inputs on the left and the digital inputs on the right. Both are disabled until you set their Mode. What the inputs do physically is described in sections 8.3 and 8.4.

10.6.1 Analog inputs

Set Mode to Functions to enable the group. Each of the six channels is then set individually to 0–10 V or 4–20 mA, and the Functions list at the bottom pairs a channel number with a function.

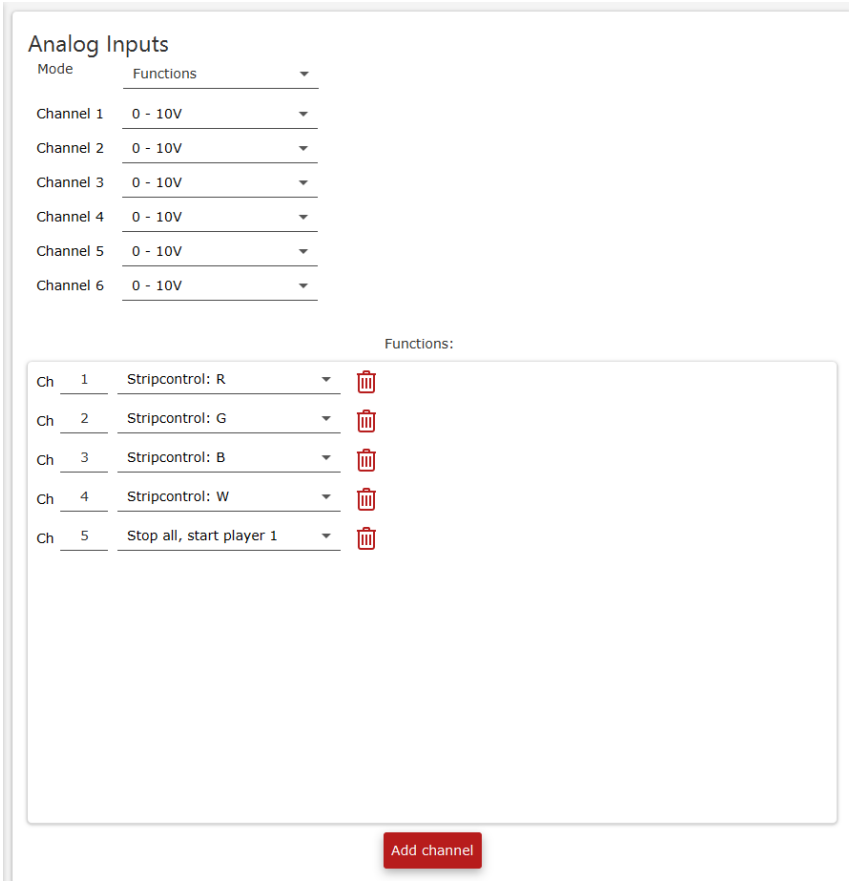

Figure 15 — Analog inputs with four channels on Stripcontrol and a fifth starting a player.

1. Set Mode to Functions.
2. Set each channel that is in use to 0–10 V or 4–20 mA to match the sensor or controller wired to it.
3. Click Add channel.
4. Enter the channel number in the Ch field and choose the function from the dropdown. The full list is in section 16.2.

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5. Repeat for every input in use.

Result: the analog inputs act on the functions you assigned. Test each one by driving the input and watching the installation respond.

10.6.2 Digital inputs

The digital inputs work the same way, with Mode set to Enabled rather than Functions, and without a signal type to choose.

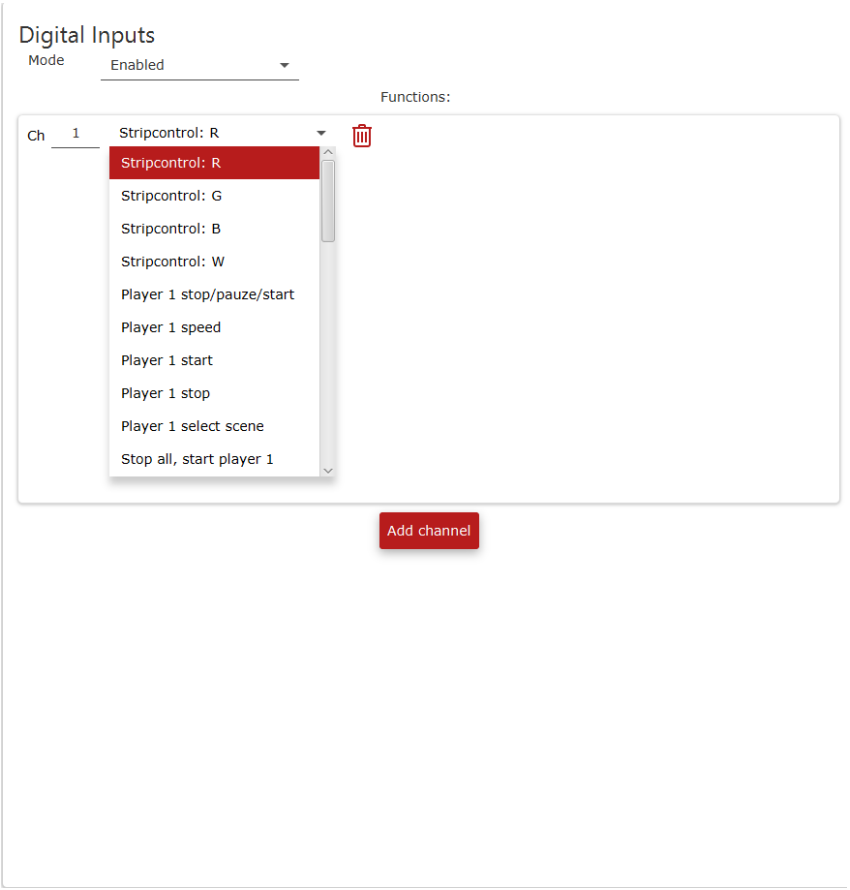

Figure 16 — Digital inputs enabled, choosing a function for channel 1.

The function list is the same as for the analog inputs. Because a digital input only switches, prefer the functions that are themselves actions over the ones that take a level.

10.7 DMX

The DMX screen configures both ports. Each has its own card and its own Mode; the modes are described in section 8.2.

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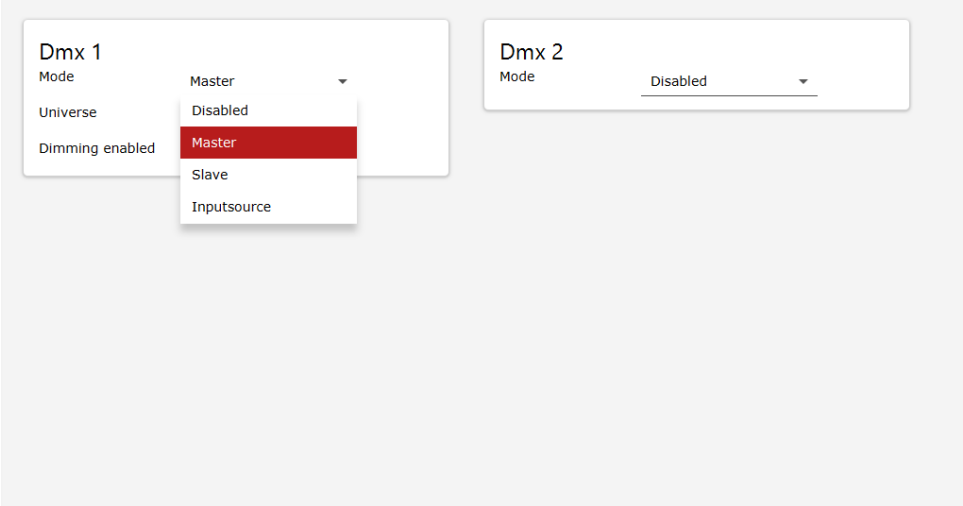

Figure 17 — Choosing the mode for a DMX port.

Master adds a Universe field and a Dimming enabled toggle. Slave adds a list of channels, each paired with a function in the same way as the analog and digital inputs.

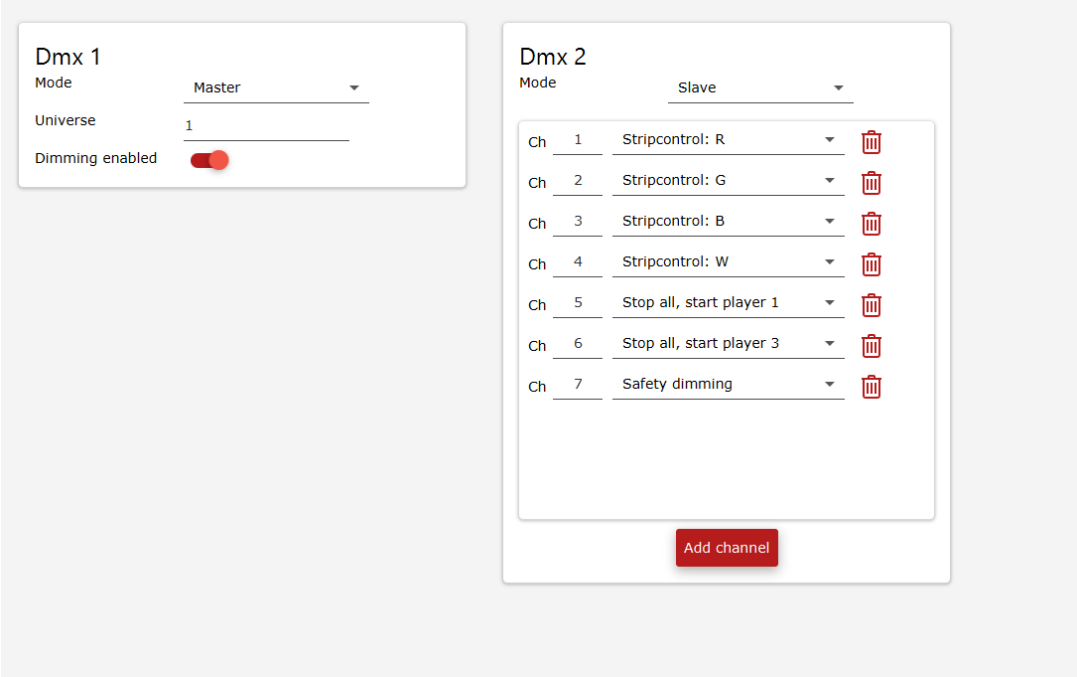

Figure 18 — DMX 1 as master, DMX 2 as slave with seven channels assigned.

The example shows the common case: four channels carrying Stripcontrol R, G, B and W so that the console sets the colour of the installation, two channels starting stored scenes, and one channel on safety dimming.

1. Set Mode for the port you are configuring.
2. For Master, enter the universe number and set Dimming enabled as required.
3. For Slave, click Add channel, enter the DMX channel number and choose its function.
4. Repeat for every channel the console will use.

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Result: the port carries DMX in the direction you set. For a slave port, confirm each channel by moving the corresponding fader on the console.

10.8 Scenes

A scene is a recording stored on the SD card. Five players play scenes back independently, and each player is configured on its own tab.

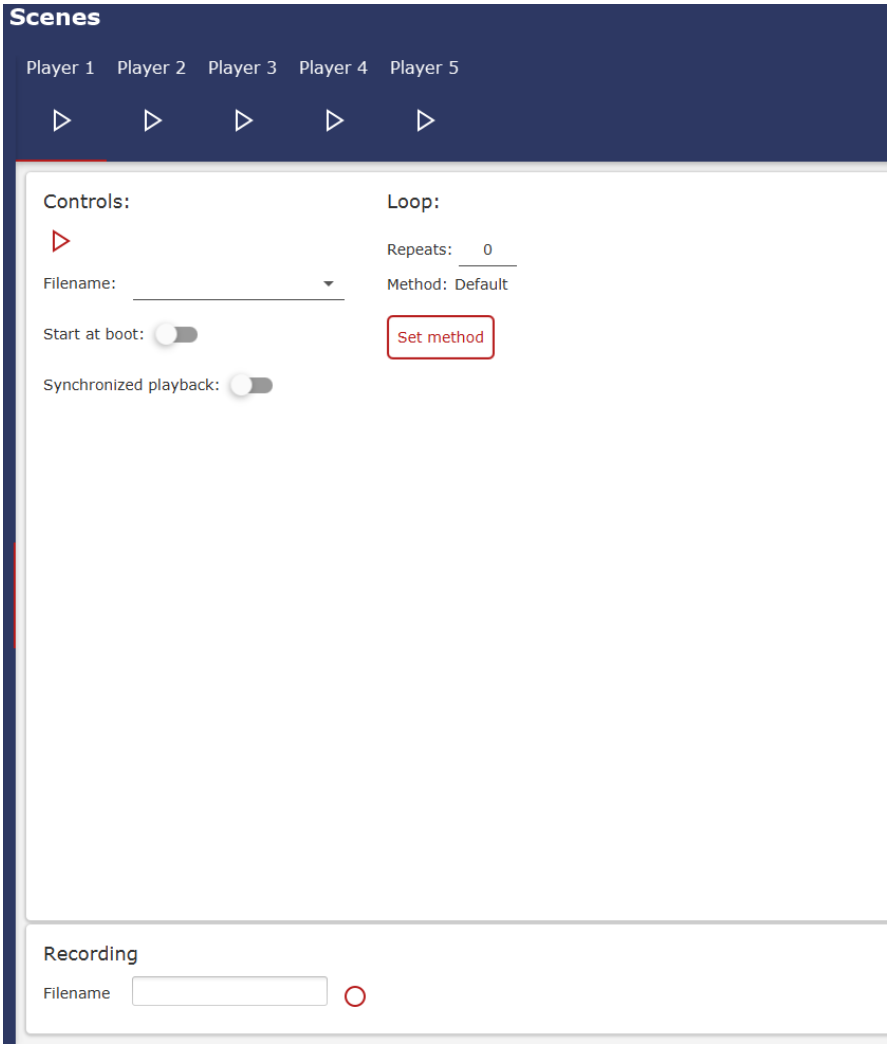

Figure 19 — Scenes screen, player 1 selected.

Table 23 — Scenes screen

Control	Function
Player tabs	Select the player to configure. The play button under each tab starts that player.
Filename	The scene this player plays.
Start at boot	Starts this player automatically when the Magnus powers up.
Synchronized playback	Plays this scene in step with the other devices in the group. See section 10.9.
Repeats	How many times the scene plays. 0 loops indefinitely.
Method	The loop method. Set it with Set method.
Recording	Records what is currently being sent to the outputs into a new scene under the filename given.

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10.8.1 Loop methods

The loop method decides what happens when a scene reaches its end. Choose it with Set method.

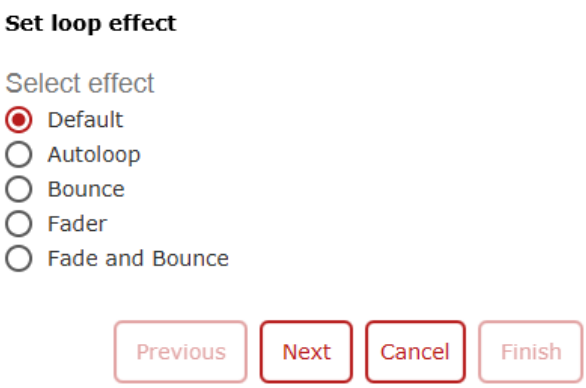

Figure 20 — Selecting a loop method.

Table 24 — Loop methods

Method	What it does	Parameters
Default	No effect. The scene plays from start to end and round again.	None
Autoloop	Finds a point where the scene can loop without a visible jump.	Duration, Equality
Bounce	Plays the scene forwards, then backwards, then forwards again.	None
Fader	Fades between the end and the start of the scene.	Duration, Fadein, Fadeout, Crossfade
Fade and Bounce	Bounces, with the fade applied at the turning points.	Duration, Fadein, Fadeout, Crossfade

Autoloop searches the recording for a frame close enough to the starting frame to be used as a loop point.

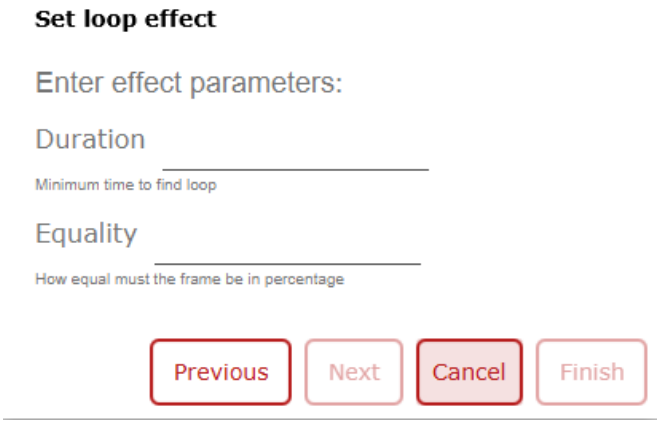

Figure 21 — Autoloop parameters.

Table 25 — Autoloop parameters

Parameter	Meaning
Duration	Minimum time to find a loop.
Equality	How equal the frames must be, as a percentage.

Fader and Fade and Bounce take the same four parameters.

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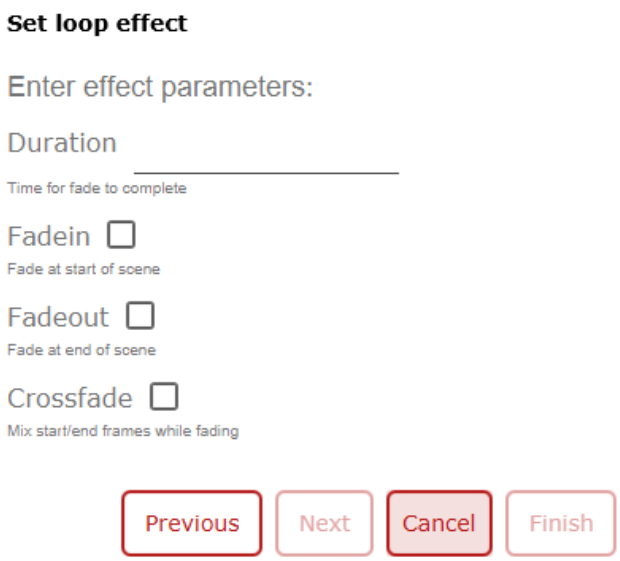

Figure 22 — Fader parameters.

Table 26 — Fader parameters

Parameter	Meaning
Duration	Time for the fade to complete.
Fadein	Fade at the start of the scene.
Fadeout	Fade at the end of the scene.
Crossfade	Mixes the start and end frames while fading.

10.9 Group

A group makes several interfaces work together, which is what synchronized recording and synchronized playback rely on. Every device that has to stay in step is given the same group number.

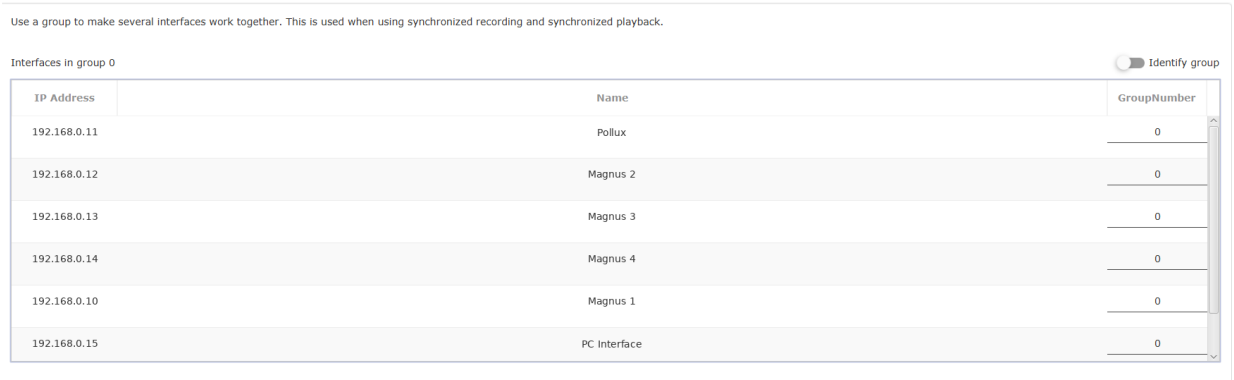

Figure 23 — Group screen listing the interfaces on the network.

The Identify group toggle makes every device in the group identify itself, which confirms the membership of the group physically before you rely on it.

10.10 Extensions

The Extensions screen registers another MaNima device to this Magnus. Registration is by MAC address, so a registered extension survives a change of IP address. For temperature monitoring with a Pollux, see section 8.6.

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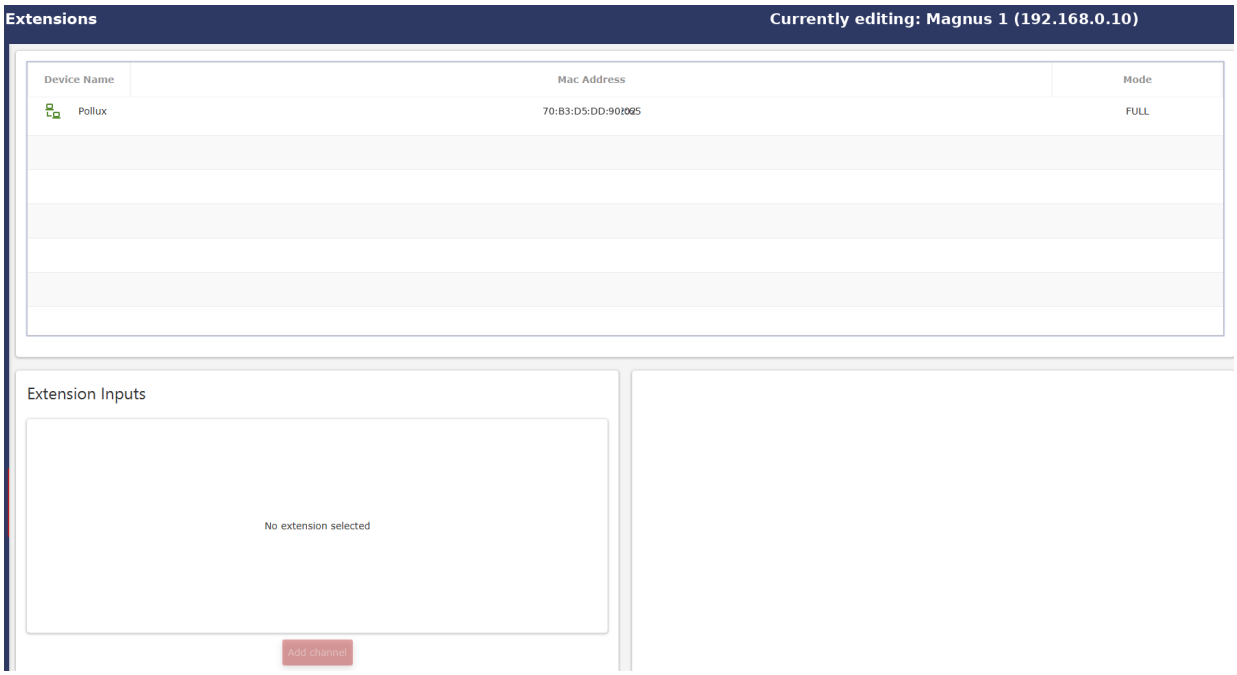

Figure 24 — Extensions screen with a Pollux registered in FULL mode.

The table lists the registered extensions with their MAC address and mode. The Extension Inputs panel below assigns the inputs of the selected extension to functions on this Magnus.

10.10.1 Registering an extension

1. Confirm that the device to be registered is powered and on the same network.
2. Open the Scanner screen, find this Magnus, and choose Connect Extension from the menu at the end of its row.
3. Select the device to register. It is listed by MAC address and name.
4. Choose the extension mode, FULL or MONITOR. See section 8.6.1.
5. Finish the wizard and open the Extensions screen to confirm the device is listed.

Result: the extension is registered and its inputs are available in the Extension Inputs panel. The registration survives a change of the extension IP address.

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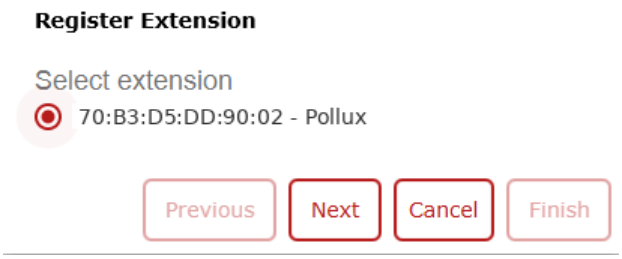

Figure 25 — Selecting the device to register.

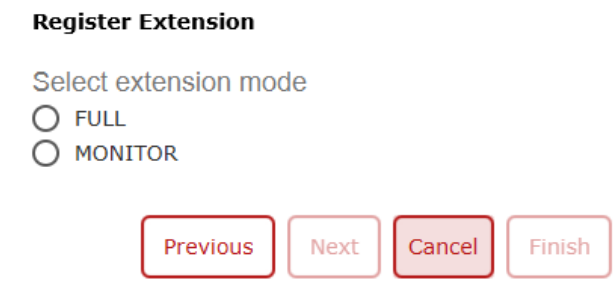

Figure 26 — Choosing the extension mode.

10.10.2 Extension inputs

The inputs of a registered extension are assigned to functions on this Magnus, from the same list used by the analog and digital inputs. This is how the temperature measured by a Pollux reaches the safety dimming of the Magnus.

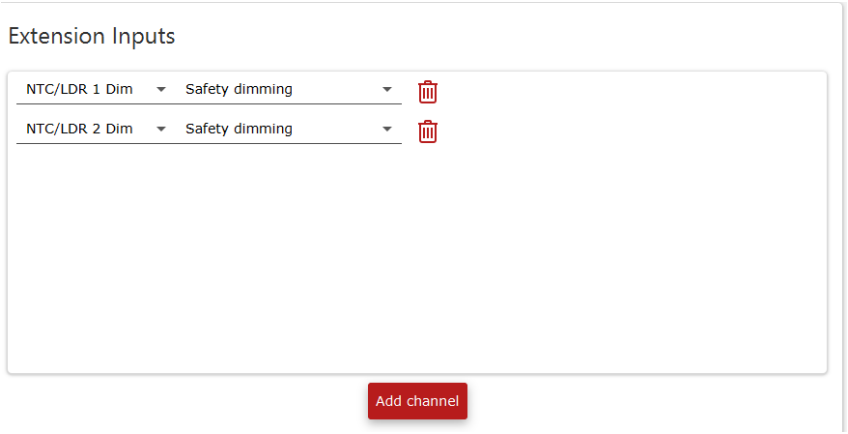

Figure 27 — Two NTC inputs on the extension assigned to safety dimming.

1. Select the extension in the table at the top of the screen.
2. Click Add channel in the Extension Inputs panel.
3. Choose the input of the extension in the left dropdown, such as NTC/LDR 1 Dim.
4. Choose the function in the right dropdown. For temperature protection, choose Safety dimming.
5. Repeat for every sensor input in use.

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Result: the Magnus dims the installation back as the temperature measured by the Pollux rises. Where several NTC inputs are assigned, the average determines the dimming value.

10.11 Update

The Update screen reports the firmware currently running on the device and installs new firmware over Ethernet. Firmware is downloaded from the MaNima website first and then selected as a file; the Configurator does not fetch it for you.

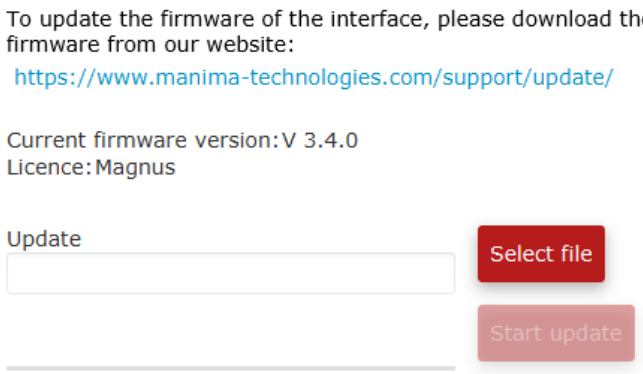

Figure 28 — Update screen showing firmware and licence.

Table 27 — Update screen

Field	Meaning
Current firmware version	The firmware running on the connected device. Quote this to support.
Licence	The licence the firmware on this device belongs to. Where custom firmware has been built for a specific customer, the device checks that the firmware offered matches its licence before it accepts the update. A standard unit shows Magnus.
Select file	Selects the downloaded firmware file.
Start update	Transfers the file and installs it.

NOTICE — AN INTERRUPTED UPDATE DOES NO HARM

The firmware is transferred in full before it is installed. An update that is interrupted or fails therefore leaves the device on its existing firmware rather than in a half-written state.

If an update does not complete, repeat the procedure.

1. Download the firmware for the Magnus from www.manima-technologies.com/support/update/.
2. Open the Update screen and read Current firmware version, so that you can confirm afterwards that the update took effect.
3. Click Select file and select the downloaded firmware file.

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4. Click Start update and wait for the transfer and installation to finish.
5. Confirm that Current firmware version now shows the new version.

Result: the Magnus runs the new firmware and its configuration is unchanged. Reconnect the Configurator if the device restarted.

10.12 Settings

The Settings screen carries the device name, the master dimming level, and the restart and factory reset buttons.

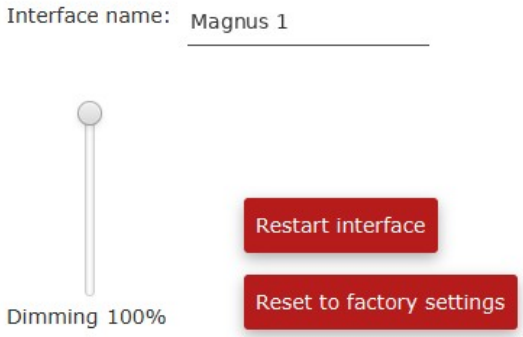

Figure 29 — Settings screen.

Table 28 — Settings screen

Control	Function
Interface name	The name under which this device appears in the Scanner and in the title bar. Give each device a name that identifies it in the installation.
Dimming	Master dimming level for the whole device, 0 to 100%.
Restart interface	Restarts the controller. Nothing is lost.
Reset to factory settings	Clears the configuration. See section 9.3 before you use it.

10.13 About

The About screen shows the version of the MaNima Configurator itself. This is not the firmware version of the device; see section 2.2.

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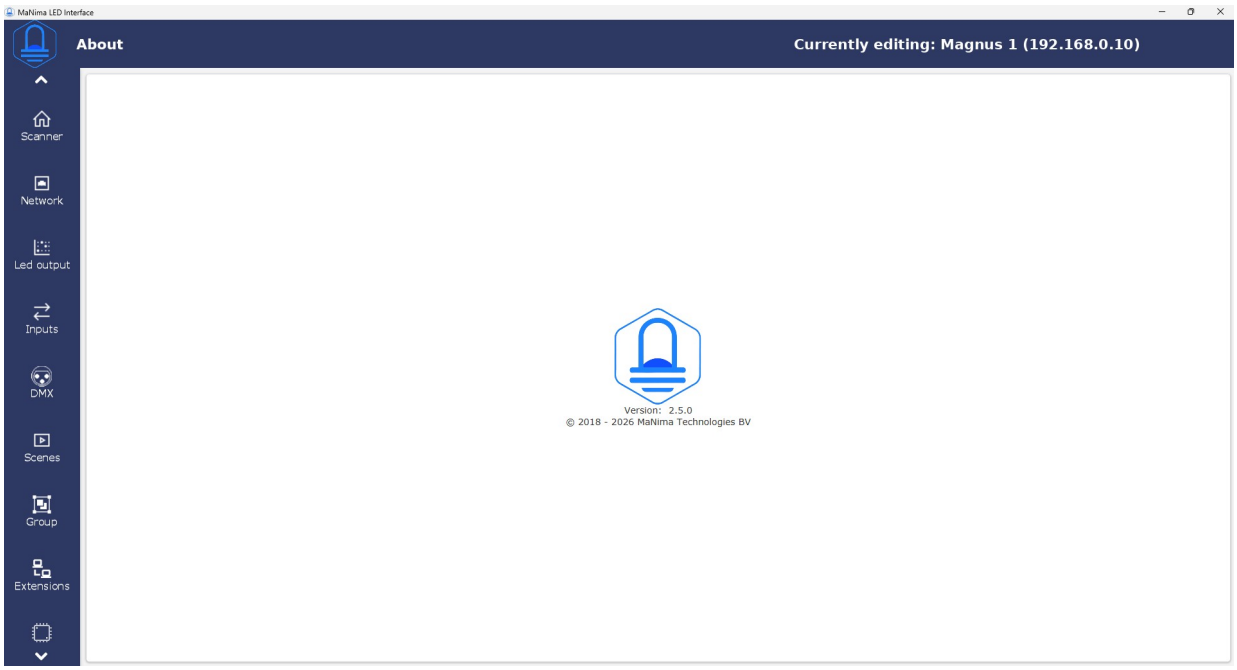

Figure 30 — About screen showing the Configurator version.

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11 Cloud and remote service

This chapter operates and monitors a Magnus from the MaNima Cloud, over the internet and without the Configurator. The controller must be installed, configured and connected to a network with internet access before the cloud is of any use.

The cloud reaches the same controller the Configurator reaches, but from the other side. Use it to see whether a device is online, to start and stop playback, to change the output settings of a port, and to take a copy of the configuration off the device and put one back. Commissioning a controller is still Configurator work.

> **CAUTION — THE CLOUD DRIVES THE INSTALLATION, NOT A PREVIEW OF IT**
> Every control on the cloud page acts on the live controller as soon as you use it. Playback, dimming and output settings change on the fixtures immediately, and there is no confirmation step.
> **Confirm which device you have open before you change anything, and treat the page as if you were standing in front of the installation.**

11.1 The dashboard

The dashboard is the overview page for one controller. It reports the state of the device and carries the controls needed during operation.

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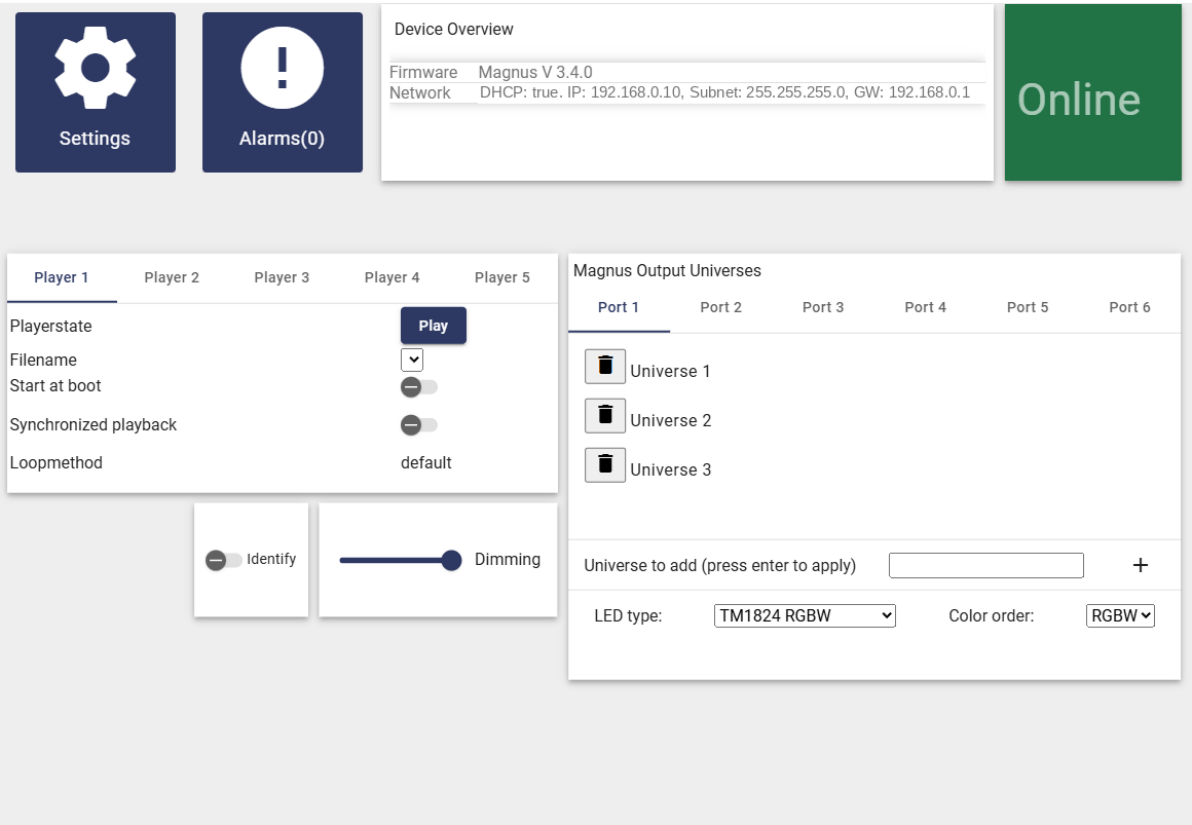

Figure 31 — Cloud dashboard: device overview and status, the players, and the output universes of a port.

Table 29 — Dashboard panels

Panel	What it shows or does
Settings	Opens the settings page described in section 11.2.
Alarms	The number of active alarms for this device.
Device Overview	The firmware running on the controller, and its network configuration: whether DHCP is on, the address, the subnet mask and the gateway.
Status tile	Online in green when the cloud is in contact with the controller. Any other state means the page is showing the last known values, not the present ones.
Players	One tab per player, with the controls described in section 11.3.
Identify	Makes the controller identify itself physically, the same function as in the Configurator.
Dimming	The master dimming level for the whole device.
Magnus Output Universes	One tab per SPI port, with the universes assigned to it, the LED protocol and the colour order. See section 11.4.

NOTICE — A STALE PAGE LOOKS LIKE A WORKING PAGE

The dashboard keeps the values it last received. If the controller drops off the network, the panels stay filled in and only the status tile changes.

Check the status tile before you trust anything else on the page.

11.2 Settings

The settings page gathers everything that changes the device rather than the playback: the device name, the output configuration of each port, the DMX ports, and the file and reboot actions.

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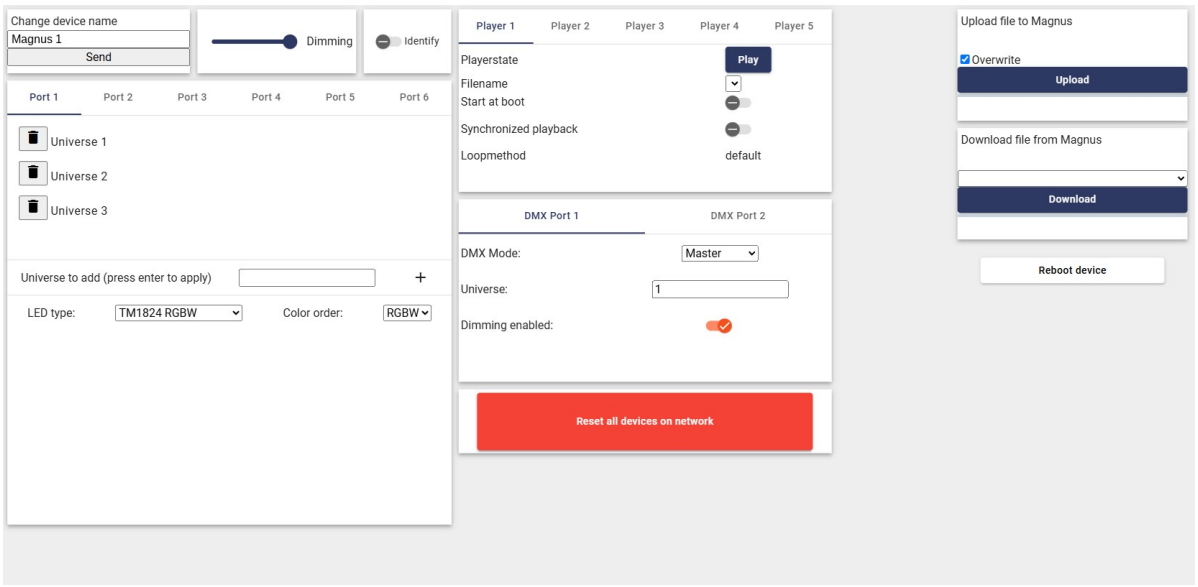

Figure 32 — Settings page, with DMX port 1 configured as master.

Table 30 — Settings page controls

Control	Function
Change device name, Send	Renames the device. The name only takes effect when you press Send.
Dimming	Master dimming level for the whole device, as on the dashboard.
Identify	Makes the controller identify itself physically.
Port tabs	Universes, LED type and colour order per SPI port. See section 11.4.
Player tabs	The five players. See section 11.3.
DMX Port 1, DMX Port 2	The mode of each DMX port, its universe, and whether dimming applies to it. The modes are the same as in the Configurator; see section 10.7.
Upload file to Magnus, Download file from Magnus	Configuration backup and restore. See section 11.5.
Reboot device	Restarts the controller. Nothing is lost.
Reset all devices on network	Resets every MaNima device the controller can see. See the warning below.

WARNING — RESET ALL DEVICES ON NETWORK ACTS ON THE WHOLE INSTALLATION

This button does not act on the device you have open. It resets every MaNima device on the same network, and each of them loses its configuration in the way described in section 9.3. In a live installation that means every controller stops driving its fixtures at the same moment.

Do not use this button as a way of restarting one device — use Reboot device for that. Only use it when you intend to return the whole installation to its factory state, and only with the installation out of service.

11.3 Players

The five players are the same players the Configurator drives, with the controls that matter during operation.

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Table 31 — Player controls

Control	Function
Playerstate	Play starts the selected file; the button reads Stop while the player runs.
Filename	The recorded scene the player plays.
Start at boot	Starts this player automatically when the controller powers up.
Synchronized playback	Keeps this player in step with the other controllers playing the same scene.
Loopmethod	The loop method the scene runs with. The methods are described in section 10.8.1.

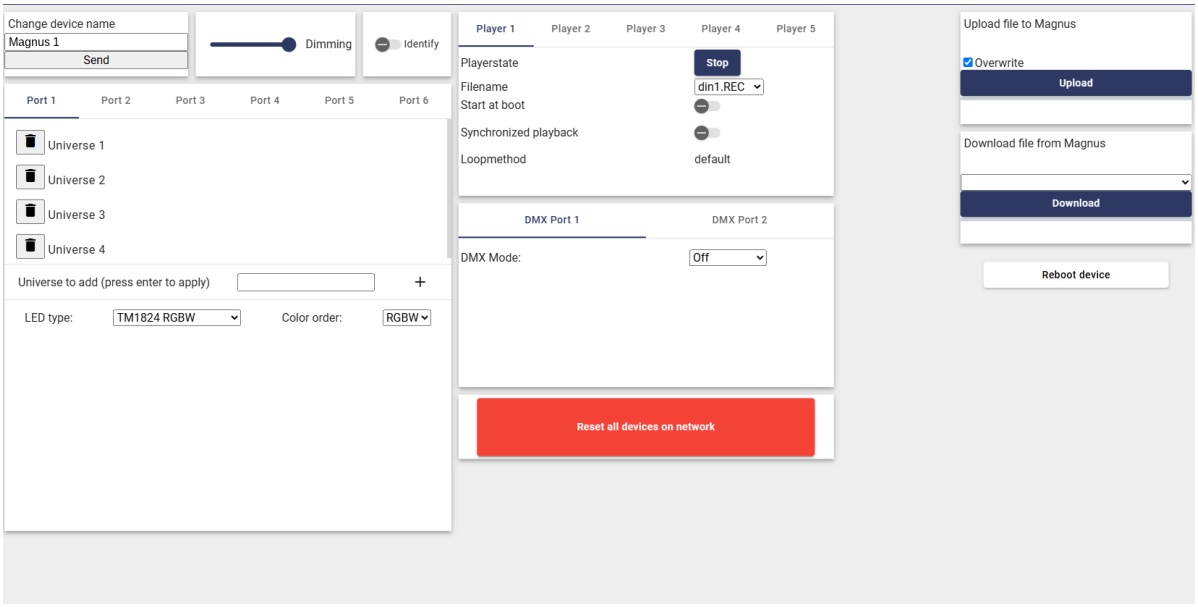

Figure 33 — A player running: the button reads Stop and the file being played is named.

11.4 Output universes per port

Each SPI port has its own tab, Port 1 through Port 8. The strip shows a few tabs at a time; use the arrows at either end to reach the rest. The tab lists the universes assigned to the port, each with a bin icon that removes it, and a field that adds one. Beneath the list sit the LED protocol, the colour order and the colour limits for that port.

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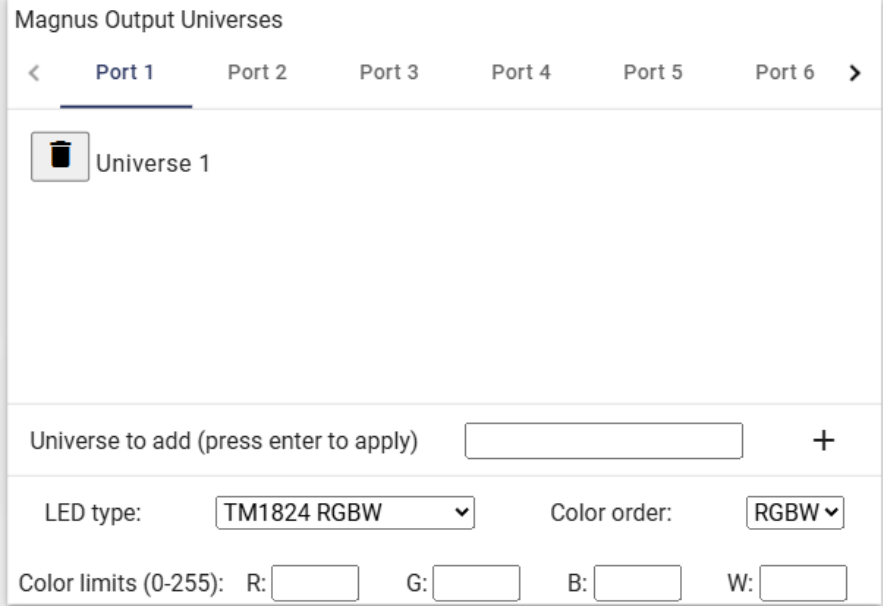

Figure 34 — The output universes of one port, with the LED type, colour order and colour limits below the list.

The cloud gathers on one panel what the Configurator splits over two screens: the protocol is on Led output there, described in section 10.4.1, and the colour order and the limits are on Colors, described in section 10.5. Either way they are the same settings on the same device.

1. Open the tab of the port you want to change.
2. Type the universe number in Universe to add and press Enter, or use the plus button.
3. Remove any universe you do not want with the bin icon next to it.
4. Set LED type and Color order to match the fixtures on the port.
5. Where the port has to be held back, set the colour limits. They rescale the component as described in section 10.5.

Result: the port carries the universes you assigned and drives the fixtures with the protocol, colour order and limits you set. The device total of 26 universes is shared across all ports.

The fourth colour limit is labelled W in the cloud and WW in the Configurator. It is the same setting on the same component.

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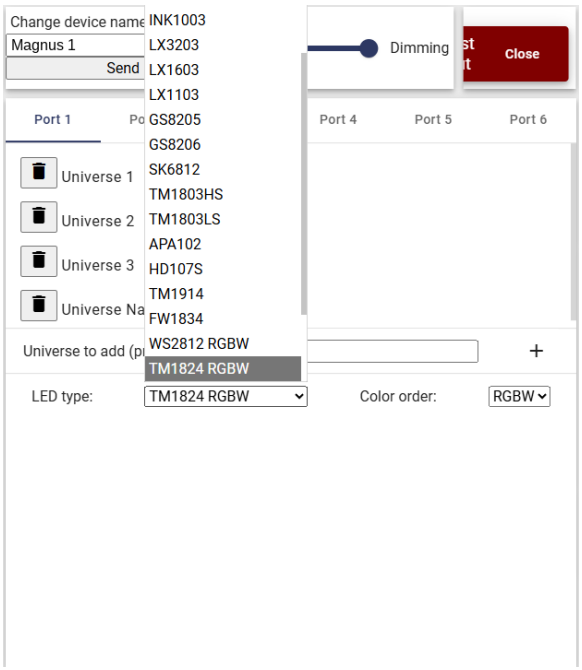

Figure 35 — LED type dropdown.

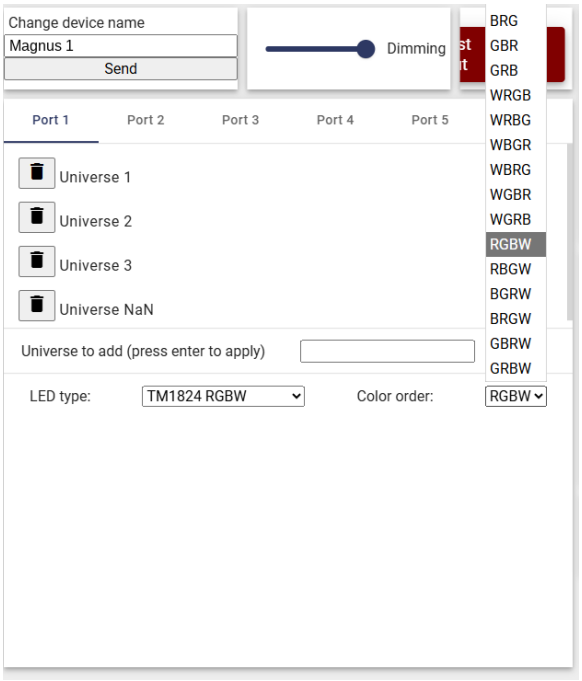

Figure 36 — Colour order dropdown.

The protocols and colour orders offered are the same as in the Configurator; the full lists are in section 16.4.

NOTICE — AN EMPTY UNIVERSE FIELD PRODUCES UNIVERSE NAN

Applying the field while it is empty, or while it holds something that is not a number, adds an entry that reads Universe NaN to the list. It is not a valid universe and the port will not output the data you expect.

Remove any Universe NaN entry with its bin icon and add the universe again with a number in the field.

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11.5 Configuration backup and restore

The cloud is the way a copy of the configuration is taken off a controller and put back on one. The configuration lives in three files, and each is downloaded and uploaded separately.

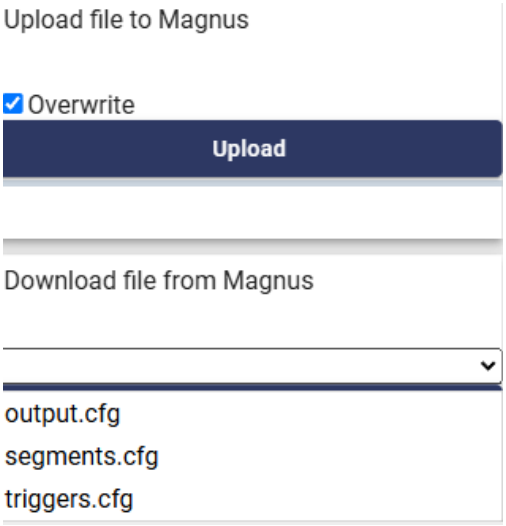

Figure 37 — Upload and download block, with the three configuration files listed.

Table 32 — Configuration files

File	Contents
output.cfg	The LED output configuration: the universes, the protocol and the colour order per port.
segments.cfg	The segments and the effects assigned to them.
triggers.cfg	The trigger configuration of the inputs.

The recorded scenes are not part of these files. They live on the SD card and are copied by copying the card. See section 12.4.

11.5.1 Downloading the configuration

1. Open Download file from Magnus.
2. Choose the file you want: output.cfg, segments.cfg or triggers.cfg.
3. Press Download and store the file with the project documentation.
4. Repeat for the other two files.

Result: the complete configuration of this controller is held outside the installation. Take the backup again after every change you want to be able to fall back to.

11.5.2 Uploading a configuration

> **CAUTION — AN UPLOAD CHANGES THE RUNNING CONFIGURATION**
> Uploading a configuration file replaces what the controller is using now. With Overwrite ticked, the file already on the controller is replaced without a confirmation, and the previous configuration is gone.
> **Take a download of the current configuration first, and upload with the installation out of service.**

1. Download the current configuration first, as described in section 11.5.1.

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2. Open Upload file to Magnus and select the file to upload.
3. Tick Overwrite if the file is to replace one already on the controller.
4. Press Upload.
5. Reboot the device and confirm that the output is what you expect.

Result: the controller runs the uploaded configuration. Check the ports, the segments and the triggers against the installation before you hand it back over.

Restoring a configuration onto a replacement controller is the fastest way back into service after a hardware swap: mount and wire the new unit, set its address, upload the three files, and copy the SD card across for the scenes.

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12 Maintenance

This chapter keeps an installed Magnus in the condition it was commissioned in. The controller has no wearing parts and nothing inside it that may be serviced, so maintenance is a matter of inspection, cleaning, and confirming that the terminals are still tight.

> **WARNING — DE-ENERGISE BEFORE ANY WORK ON THE TERMINALS**
> The supply terminals and the wiring connected to them carry up to 48 V DC while the upstream supply is on. Re-torquing or rewiring a live terminal risks a short circuit across the supply.
> **Switch off and secure the upstream supply, and confirm that all four power LEDs are off, before you touch a terminal.**

12.1 Inspection intervals

The intervals below are a starting point for a controller in a normal indoor installation. Shorten them where the environment is dusty, damp, or subject to vibration, and align them with the maintenance schedule of the rest of the installation.

Table 33 — Inspection schedule

Interval	Check
Every 6 months	Indication LEDs: all four power LEDs green, heartbeat blinking, error LED off. Can be done without opening anything and without taking the installation out of service.
Every 12 months	Visual inspection of the enclosure, the DIN rail mounting and the cable entries. Look for discolouration at the terminals, loose or strained cables, and dust build-up.
Every 12 months	Ambient conditions still within 10 to 50 °C and 20 to 80 % relative humidity, non-condensing, and the clearances of chapter 6 still free.
Every 24 months, and after any thermal event	Re-torque the screw terminals as described in section 12.3.
After every configuration change	Take a fresh configuration backup. See section 12.4.

Reproduced from DS243701. Ambient limits are datasheet values; the intervals are a recommendation.

12.2 Cleaning

The enclosure is rated IP52, which keeps dust out of the housing but does not make it sealed. Dust on and around the enclosure reduces the convection the controller relies on, so cleaning is a thermal measure rather than a cosmetic one.

1. Switch off and secure the upstream supply.
2. Remove dust from the enclosure and from the space around it with a dry brush or dry compressed air at low pressure.
3. Wipe the enclosure with a dry or barely damp lint-free cloth.
4. Check that the clearances above and below the controller are clear of anything that has been stored there since the last visit.

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Result: the controller is clean and the convection path is free. Do not restore the supply until any moisture has evaporated.

> **NOTICE — NO SOLVENTS, NO WET CLEANING**
> The enclosure is a polycarbonate housing with unsealed cable entries. Solvents attack the housing and its markings, and liquid entering an entry reaches the electronics.
> **Clean dry. Never spray or hose the enclosure, and never use solvents or aggressive cleaning agents.**

12.3 Re-torquing the terminals

Screw terminals relax over time, and a loose terminal heats up under load. Re-torque them at the interval in section 12.1 and after any event that heated the installation.

1. Switch off and secure the upstream supply, and confirm that the power LEDs are off.
2. Check each conductor for discolouration or a burnt smell before you touch it. Replace any conductor that shows either.
3. Re-torque every screw terminal to 0.5 Nm (4 lb·in) with a torque screwdriver.
4. Confirm that each conductor is stripped 6 mm and fully in the clamp, with no strands outside it.

Result: every terminal is at its specified torque. Restore the supply and verify the installation as described in section 12.5.

Reproduced from DS243701. Torque and strip length are datasheet values. Do not exceed the torque — an over-tightened terminal damages the conductor.

12.4 Configuration backup

A controller carries two separate things worth keeping: the configuration and the recorded scenes. They are backed up in different ways.

Table 34 — What to back up

Item	Where it lives	How to copy it
Configuration	In the controller: output.cfg, segments.cfg, triggers.cfg.	Download the three files from the cloud. See section 11.5.
Recorded scenes	On the SD card.	Copy the card with the controller switched off.

> **NOTICE — NEVER REMOVE THE SD CARD WHILE THE CONTROLLER IS POWERED**
> The SD card holds the configuration and the recorded scenes and is read while the controller runs. Removing it under power can corrupt the card.
> **Switch off the controller before you remove or insert the card.**

Take a backup after commissioning and after every change you would not want to redo from memory. A current backup turns a controller replacement into a wiring job.

12.5 Verification after service

Run this check after any maintenance visit, before you hand the installation back.

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1. Restore the upstream supply and confirm that all four power LEDs are green.
2. Confirm that the heartbeat LED blinks and the error LED is off.
3. Connect with the Configurator or open the cloud page and confirm that the device is reachable and reports the expected firmware version.
4. Confirm that every port outputs to its fixtures, and that the segments and effects are as they were.
5. Confirm that the configured players start as expected, including any player set to start at boot.
6. Record the visit, and take a fresh configuration backup if anything was changed.

Result: the installation is back in the state it was commissioned in, and the record shows what was checked.

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13 Troubleshooting

> **WARNING — LIVE DC TERMINALS**
> Fault finding tempts you to probe a running installation. The supply terminals and the wiring connected to them carry up to 48 V DC while the upstream supply is on.
> **De-energise the upstream supply before you touch any terminal.**

Find the symptom in the table, work through the actions in order, and stop when the symptom clears.

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Table 35 — Troubleshooting

Symptom	Likely cause	Action
The error LED is red or flashing red	The frame rate is too high, or more data is being sent than the controller can handle.	Reduce the number of universes assigned to the port, or lower the frame rate in the playback software.
Output stutters or drops frames with all universes assigned	The port is carrying its maximum number of universes at a frame rate the installation cannot sustain.	Lower the FPS in the playback software, or distribute the universes over more ports.
The heartbeat LED does not blink	The controller is not running normally.	Carry out a factory reset. See section 9.3 first — the configuration is cleared.
Fixtures do not dim back as they heat up	The temperature is driving global dimming instead of safety dimming.	Assign the Pollux temperature to safety dimming. Global dimming is a master control, not a thermal protection. See section 8.6.
A registered extension is no longer reachable	The extension is registered by MAC address; the device itself is off or off the network.	Check that the extension is powered and on the same network. A changed IP address is not the cause.
The controller does not appear in the Scanner	The computer is in a different subnet. A new or factory-reset controller sits on 192.168.0.185 with DHCP off.	Give the computer a fixed address in 192.168.0.x and scan again. See section 10.1.2.
The controller does not appear in the Scanner	Two devices share the same IP address.	Give every device a unique address on the Network screen.
One or more power LEDs are not green	The supply is absent, out of range, or wired with reversed polarity.	Check for 12 to 48 V DC at the supply terminals and confirm the polarity. See chapter 7.
The heartbeat blinks but a port outputs nothing	No universe is assigned to that port, or the wrong LED protocol is set.	Check the universe assignment and the protocol for that port. See section 10.4.1.
A port lights, but in the wrong colours	The colour order does not match the driver IC in the strip.	Set the colour order for that port on the Colors screen; see section 10.5. The lists are in section 16.4.
A universe in the list reads Universe NaN	The universe field was applied while empty or holding something that is not a number.	Remove the entry and add the universe again with a number in the field.
The cloud page shows values that do not match the installation	The controller is not in contact with the cloud, so the page is showing the last values it received.	Check the status tile. See section 11.1.
A restored configuration does not reproduce the installation	Only part of the configuration was uploaded. The three files are separate.	Upload output.cfg, segments.cfg and triggers.cfg. See section 11.5.2.
A replacement controller runs but plays no scenes	The scenes live on the SD card and are not part of the configuration files.	Fit the SD card from the original controller, with the power off. See section 12.4.
A player does not start after a power cycle	Start at boot is off for that player.	Switch on Start at boot for the player. See sections 10.7 and 11.3.

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14 Decommissioning and disposal

This chapter takes a Magnus out of an installation, either to replace it or to retire it. Work through it in order: what comes off the device is worth more than the device itself.

14.1 Before you remove anything

A controller that is about to be removed still holds the configuration of the installation. Recover it while the device is still running.

1. Download output.cfg, segments.cfg and triggers.cfg from the cloud, as described in section 11.5.1.
2. Note the network settings, the device name, and which extensions are registered to it.
3. Photograph the wiring, or check it against the installation drawings, before anything is disconnected.

Result: the configuration and the wiring are documented. A replacement controller can now be brought into service without reconstructing the commissioning.

14.2 Safe removal

> **WARNING — LIVE DC TERMINALS**
> The supply terminals and the wiring connected to them carry up to 48 V DC while the upstream supply is on. So do the LED outputs while the controller drives them.
> **Switch off and secure the upstream supply, and confirm that all four power LEDs are off, before you disconnect anything.**

1. Stop all players and take the installation out of service.
2. Switch off and secure the upstream supply. Confirm that the power LEDs are off.
3. Disconnect the signal and network connections first, then the LED outputs, and the supply last.
4. Label every conductor as you remove it, against the wiring record from section 14.1.
5. Switch the controller off, then remove the SD card and keep it with the project documentation.
6. Release the controller from the DIN rail and remove it.

Result: the controller is out of the installation and every conductor is labelled. The SD card, with the recorded scenes on it, is out of the device and accounted for.

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NOTICE — THE SD CARD LEAVES THE SITE WITH YOU, NOT WITH THE HARDWARE

The card carries the configuration and the recorded scenes of the installation. A card left in a controller that is scrapped or sent on takes that content with it.

Remove the card before the controller leaves your hands, and either keep it with the project documentation or destroy it.

14.3 Disposal and WEEE

The Magnus is electrical and electronic equipment and falls under the WEEE directive. It must not go into household or general waste.

Table 36 — Disposal

Part	Route
Controller	Separate collection for waste electrical and electronic equipment, through your national WEEE scheme or your supplier's take-back arrangement.
SD card	Keep it, or destroy it. It carries the configuration and the recorded scenes of the installation.
Cabling removed with the controller	Cable and metal recycling, separately from the electronics.
Packaging	Cardboard and plastics recycling, separated by material.

National rules differ. Where local regulation is stricter than the routes above, follow the local rule. If no route is available to you, contact MaNima Technologies using the details in section 18.1.

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15 Use cases

The three arrangements below show how the SPI outputs of the Magnus reach fixtures that sit further away than a direct run allows. Each uses a MaNima Extensa to carry the data over RJ45, and differs in what sits at the far end. The settings named are the ones that make the arrangement work; the screens themselves are described in chapter 10.

The port numbers on the terminal blocks in these figures are the ports of the Extensa, not the SPI ports of the Magnus.

15.1 Three datalines over RJ45 with a MaNima Recepta

Three fixtures, each with a Recepta built into it, are driven from one Extensa. Three SPI outputs of the Magnus feed the data ports of the Extensa, and each fixture is reached over an RJ45 cable of up to 100 m. The Recepta takes its power from that same cable, so no supply is needed at the fixture.

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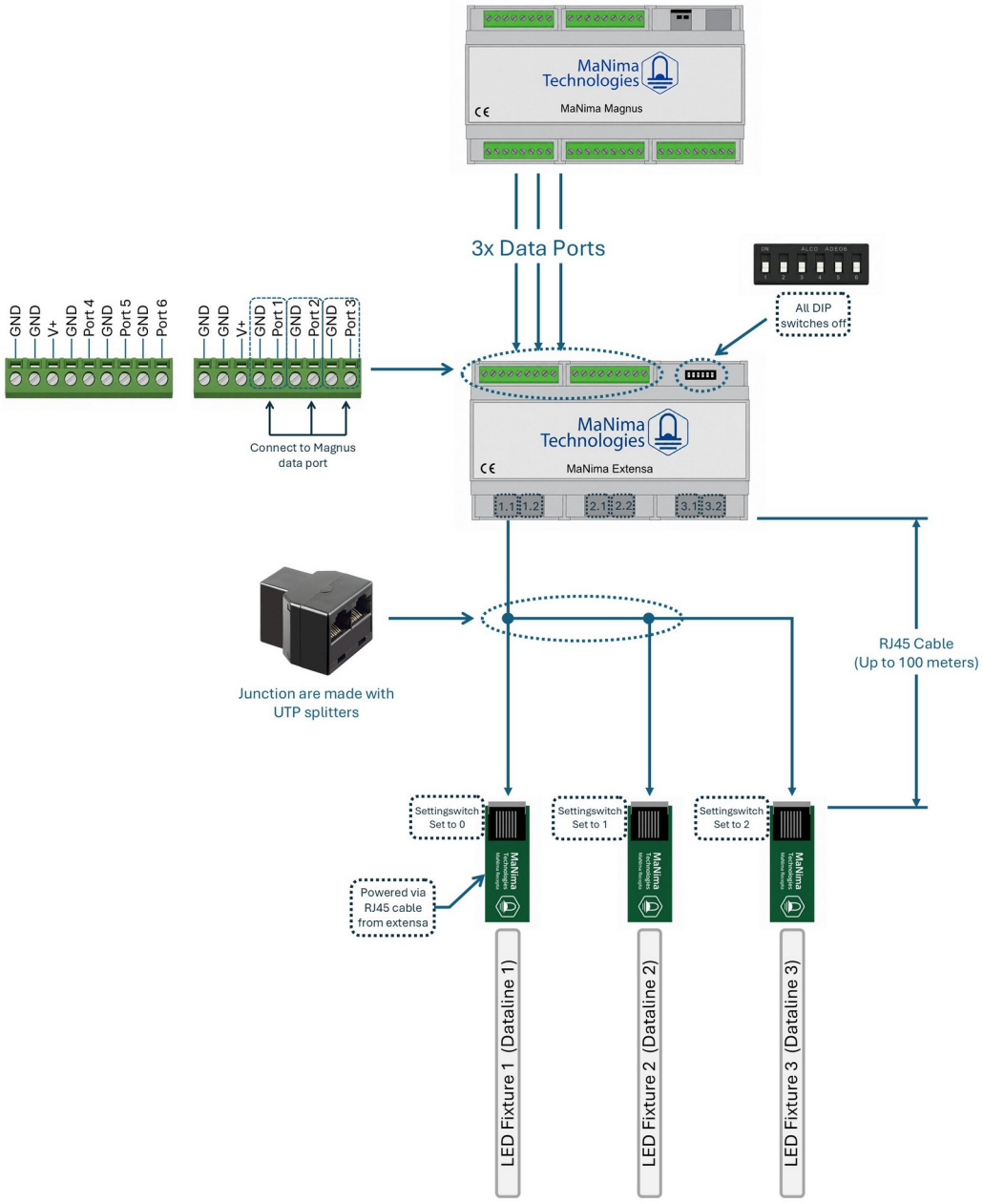

Figure 38 — Three datalines from one Extensa, each ending in a fixture with a Recepta.

Leave every DIP switch on the Extensa off. Give each Recepta its own setting-switch position — 0, 1 and 2 in the figure — so that each one picks up its own dataline. Where a cable has to branch, the junctions are made with UTP splitters.

15.2 Six datalines over RJ45 with a MaNima Tricepta

Where more datalines are needed than a single run carries, a Tricepta at the far end splits one RJ45 link into three fixture connections. Six SPI outputs of the Magnus feed the Extensa, and two Tricepta modules, each in its own junction box, drive three fixtures apiece.

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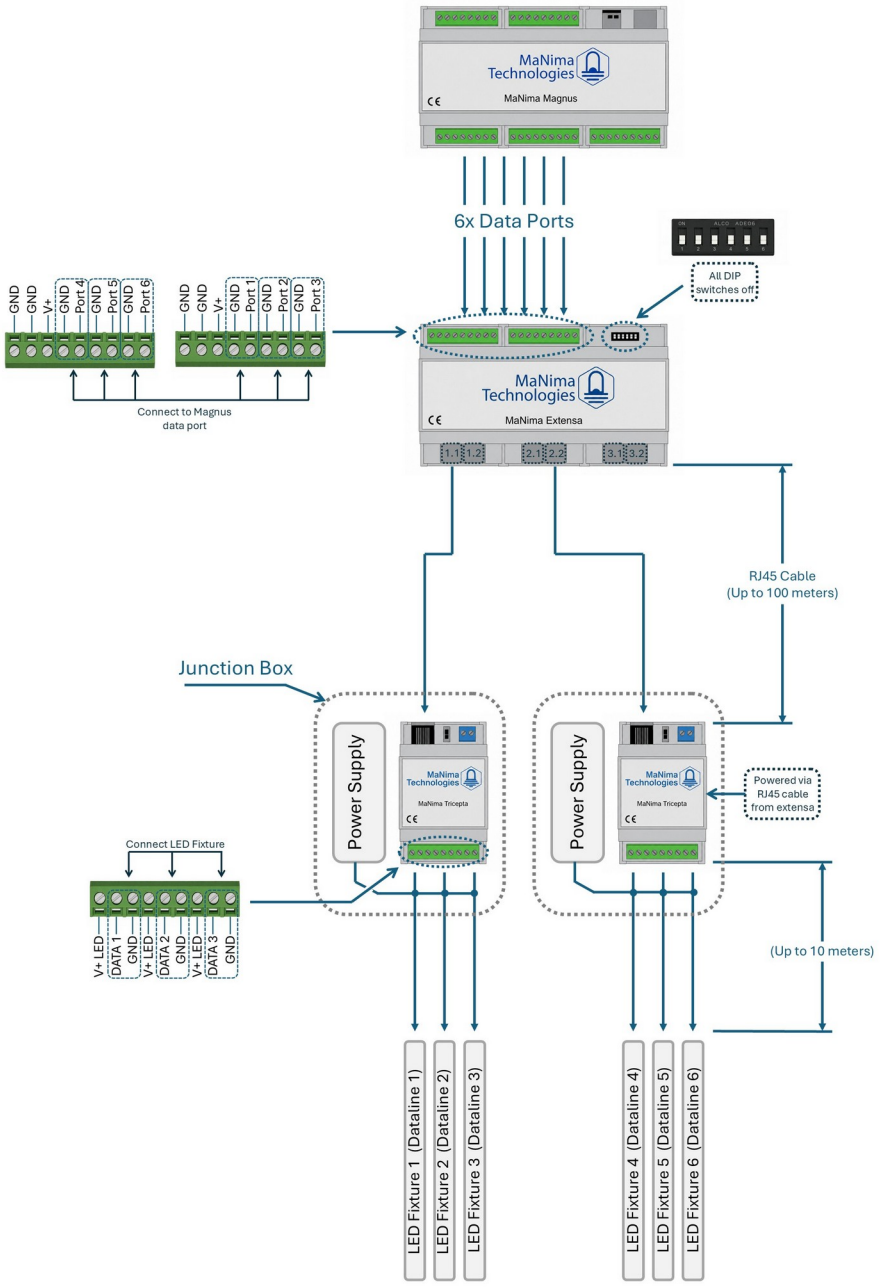

Figure 39 — Six datalines, split by two Tricepta modules in junction boxes.

Leave every DIP switch on the Extensa off. Each Tricepta is powered over the RJ45 cable from the Extensa, but the fixtures themselves are fed from a power supply in the junction box: the terminal block carries V+ LED, DATA and GND per fixture. Keep the run from the Tricepta to a fixture within 10 m.

15.3 Datalines and NTC monitoring over one link

The same link can carry a temperature measurement back. Two SPI outputs of the Magnus and one NTC input of a MaNima Pollux Industrial feed the Extensa, and a Tricepta at the far end drives two fixtures while returning the NTC signal from one of them. This is the arrangement to use where the fixtures are too far away to wire an NTC separately.

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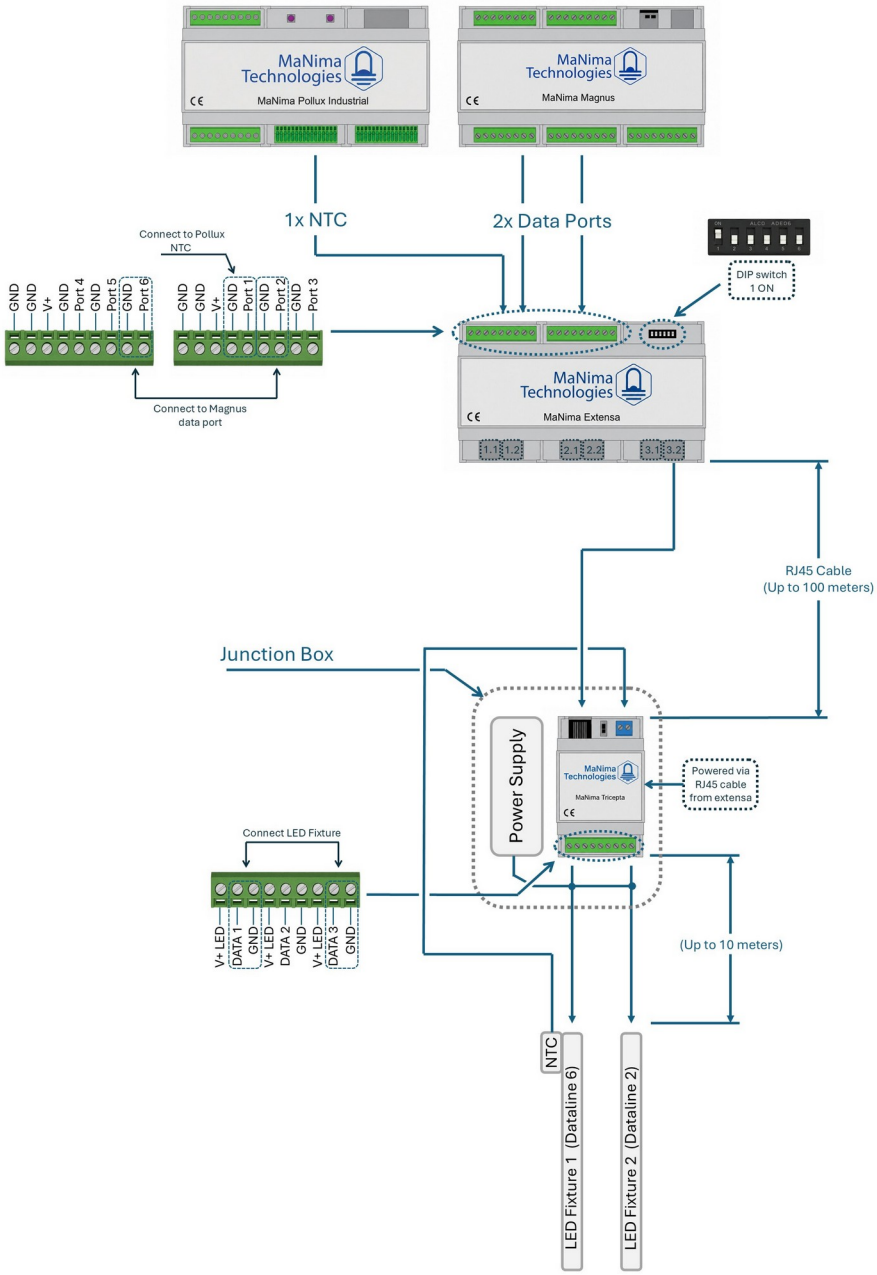

Figure 40 — Two datalines and one NTC over a single RJ45 link.

Set DIP switch 1 on the Extensa to ON; this is what makes the port carry the NTC signal instead of a third dataline. Wire the NTC port of the Extensa to the Pollux, not to the Magnus — the Magnus does not measure temperature itself, as described in section 8.6.

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16 Technical reference

This chapter gathers the tables you need with the product in front of you.

16.1 Connector pinouts

All connections are on the two long faces of the enclosure.

16.1.1 Top face

Table 37 — 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 38 — 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

16.1.2 Bottom face

Table 39 — 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

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Table 40 — 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 41 — 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

Reproduced from DS243701.

16.2 Trigger functions

The functions below can be assigned to an analog input, a digital input, a DMX slave channel or an input of a registered extension. The list is the same in all four places and is given here once.

Where a function takes a level rather than performing an action, it suits an input that carries a level: an analog input, or a DMX channel. A digital input switches only, so it suits the functions that are actions.

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Table 42 — Trigger functions

Function	Meaning
Stripcontrol: R	Red level of the whole installation.
Stripcontrol: G	Green level of the whole installation.
Stripcontrol: B	Blue level of the whole installation.
Stripcontrol: W	White level of the whole installation.
Player 1 stop/pauze/start	Cycles player 1 through stop, pause and start. The software spells this as shown.
Player 1 speed	Playback speed of player 1.
Player 1 start	Starts player 1.
Player 1 stop	Stops player 1.
Player 1 select scene	Selects the scene player 1 plays.
Stop all, start player 1	Stops every player, then starts player 1.
Player 2 stop/pauze/start	Cycles player 2 through stop, pause and start. The software spells this as shown.
Player 2 speed	Playback speed of player 2.
Player 2 start	Starts player 2.
Player 2 stop	Stops player 2.
Player 2 select scene	Selects the scene player 2 plays.
Stop all, start player 2	Stops every player, then starts player 2.
Player 3 stop/pauze/start	Cycles player 3 through stop, pause and start. The software spells this as shown.
Player 3 speed	Playback speed of player 3.
Player 3 start	Starts player 3.
Player 3 stop	Stops player 3.
Player 3 select scene	Selects the scene player 3 plays.
Stop all, start player 3	Stops every player, then starts player 3.
Player 4 stop/pauze/start	Cycles player 4 through stop, pause and start. The software spells this as shown.
Player 4 speed	Playback speed of player 4.
Player 4 start	Starts player 4.
Player 4 stop	Stops player 4.
Player 4 select scene	Selects the scene player 4 plays.
Stop all, start player 4	Stops every player, then starts player 4.
Player 5 stop/pauze/start	Cycles player 5 through stop, pause and start. The software spells this as shown.
Player 5 speed	Playback speed of player 5.
Player 5 start	Starts player 5.
Player 5 stop	Stops player 5.
Player 5 select scene	Selects the scene player 5 plays.
Stop all, start player 5	Stops every player, then starts player 5.
Global dimming	Master dimming level of the whole system.
Safety dimming	Forced dimming based on measured temperature.

Stripcontrol is described in section 8.2.1. Safety dimming and global dimming are compared in section 8.6.

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16.3 Key values reproduced from the datasheet

Table 43 — Key values

Value	Figure
Supply voltage	12–48 V DC
Operating temperature	10–50 °C
Humidity	20–80 %
IP rating	IP52
Weight	360 g
Wire size, solid or stranded	0.05–3.31 mm² (30–12 AWG)
Terminal torque	0.5 Nm (4 lb·in)
Wire strip length	6 mm
Cable length, SPI outputs	10 m, extendable to 100 m with a MaNima Extensa
Cable length, power supply	3 m

Reproduced from DS243701. If any of these change, correct both documents.

16.4 LED protocols and colour orders

The lists below are the choices offered by the LED type and Color order dropdowns. They are the same in the Configurator and in the cloud, and they are set per port. The protocol must match the driver IC in the strip and the colour order must match the order that IC expects, or the fixtures light in the wrong colours.

Table 44 — LED protocols

Protocols
INK1003, LX3203, LX1603, LX1103, GS8205, GS8206, SK6812, TM1803HS, TM1803LS, APA102, HD107S, TM1914, FW1834, WS2812 RGBW, TM1824 RGBW

The list follows the firmware and may grow with a firmware update. Where a strip uses a protocol that is not listed, contact MaNima before you order it.

Table 45 — Colour orders

Components	Orders
Three	BRG, GBR, GRB
Four	WRGB, WRBG, WBGR, WBRG, WGBR, WGRB, RGBW, RBGW, BGRW, BRGW, GBRW, GRBW

A three-component strip takes a three-letter order and a four-component strip a four-letter one. If the colours come out swapped but the brightness is right, the order is wrong rather than the protocol.

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17 Glossary

Table 46 — Glossary

Term	Meaning
Art-Net	A protocol for carrying DMX512 data over Ethernet.
Channel	One controllable value. A universe holds 512 channels.
Configurator	The MaNima Configurator, the software used to configure the device. Abbreviated MC in earlier documentation.
DMX512	The standard serial protocol for lighting control.
Extension	Another MaNima device registered to this one, by MAC address.
FULL	Extension mode in which the extension is both read and driven.
Global dimming	Master dimming of the whole system, driven by DMX or a 0–10 V input.
MONITOR	Extension mode in which the extension is read only.
NTC	A temperature sensor whose resistance falls as temperature rises.
Player	One of five independent playback engines for stored scenes.
Safety dimming	Forced dimming of the whole system based on temperature measured by a Pollux.
Scene	A recording stored on the SD card and played back by a player.
Segment	A subdivision of an output, driven by its own source.
SPI	The serial interface used to drive digital LED strips.
Universe	512 DMX channels.

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18 Support and tutorials

MaNima publishes video tutorials covering the tasks in this manual. They complement the procedures here rather than replacing them.

Table 47 — Video tutorials

Tutorial	Subject
1	Connecting the interface
2	Mapping and recording digital LEDs
3	Synchronized recording and playing
4	DMX functions
5	Digital triggers
6	Analog triggers
7	Loop functions
8	Updating with Ethernet
9	Using segments
10	Connecting the MaNima Pollux
11	Configuring NTC inputs
12	Current and failure handlers
13	Inputs and outputs
14	Installing the MaNima HMI touchscreen

The tutorials are published on the MaNima Technologies YouTube channel.

18.1 Contact

Table 48 — Contact

Contact	Detail
Company	MaNima Technologies B.V.
Address	Hastelweg 260 B, 5652 CN Eindhoven, Netherlands
Email	info@manima-technologies.com
Web	www.manima-technologies.com
Telephone	+31 40 202 49 04
Chamber of Commerce	71614605

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19 Disclaimer

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