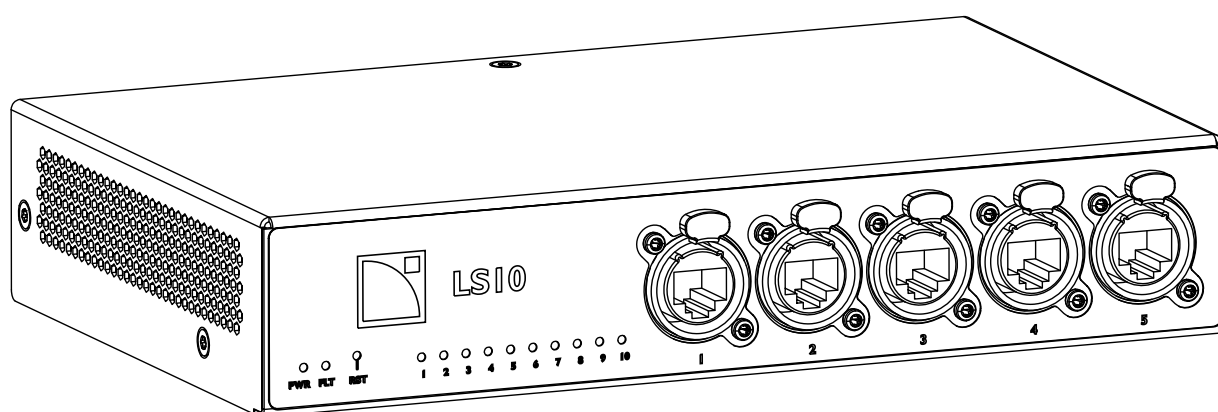


# LS10



owner's manual (EN)



Document reference: LS10 owner's manual (EN) version 1.0

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# Safety

## Important safety instructions

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- 
**Inspect the product before operation.**  
 If any sign of defect or damage is detected, immediately withdraw the product from use for maintenance.
- 
**Perform preventive maintenance at least once a year.**  
 Refer to the preventive maintenance section for a list of actions and their periodicity.  
 Insufficient upkeep of the product can void the warranty.
- 
**Verify the electrical conformity and compatibility of the mains supply.**  
 Only connect the product to an AC power outlet rated 100-240 V, 50-60 Hz.  
 The product draws 10 W (typical).  
 The product draws 20 W (typical) when it powers another LS10.  
**WARNING:** The product is of CLASS 1 construction and shall be connected to a mains socket outlet with a protective connection to earth.
- 
**When the product is used in a three-phase circuit, verify the electrical conformity and compatibility of the three-phase circuit.**  
 Verify that the three phases work, and balance the loads between the three phases.  
 Verify that the neutral and earth work.  
 Never try to emulate a 230 V circuit connecting an apparatus to two live wires of a 120 V three-phase circuit.  
 Never try to emulate a 200 V circuit connecting an apparatus to two live wires of a 100 V three-phase circuit.
- 
**Electrical generator**  
 You must power on the generator before powering on the product.  
 Verify that the product is turned off before powering on the generator.
- 
**Never incorporate equipment or accessories not approved by L-Acoustics.**  
**Read all the related PRODUCT INFORMATION documents shipped with the products before exploiting the system.**
- 
**Intended use**  
 This system is intended for use by trained personnel for professional applications.
- 
**As part of a continuous evolution of techniques and standards, L-Acoustics reserves the right to change the specifications of its products and the content of its documents without prior notice.**  
 Check [www.l-acoustics.com](http://www.l-acoustics.com) on a regular basis to download the latest document and software updates.
- 
**Do not use the product outside its operating temperature range.**  
 The product operates at a room temperature between -5 °C / 23 °F and 50 °C / 122 °F.  
 Do not expose the product to direct sun.
- 
**Only use the product in a conformed electro-magnetic environment.**  
 Conformed environments are: E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors), E4 (controlled EMC environment, ex. TV studio), as per EN55103-2 standards.
- 
**Avoid radio interference.**  
 This product has been tested and complies with the limits indicated in the EMC directive (Electro Magnetic Compatibility). These limits are designed to provide reasonable protection against harmful interference from electrical equipment, but it cannot be guaranteed that interference will never occur.
- 
**Read the maintenance section of this document before servicing the product.**
- 
**Contact L-Acoustics for advanced maintenance.**  
 Any unauthorized maintenance operation will void the product warranty.



## Shipping

Use the original packaging for shipping the product.

## Symbols

---

The following symbols are used in this document:



This symbol indicates a potential risk of harm to an individual or damage to the product.

It can also notify the user about instructions that must be strictly followed to ensure safe installation or operation of the product.



This symbol indicates a potential risk of electrical injury.

It can also notify the user about instructions that must be strictly followed to ensure safe installation or operation of the product.



This symbol notifies the user about instructions that must be strictly followed to ensure proper installation or operation of the product.



This symbol notifies the user about complementary information or optional instructions.



Do not open unless authorized.

This symbol indicates the presence of electrical shock hazards.

It also indicates that no maintenance performed by the end user requires access to internal components.

# Introduction

## How to use this manual

---

The LS10 owner's manual is intended for all actors involved in the system design, implementation, preventive and corrective maintenance of the LS10 product. It must be used as follows:

1. Read the technical description for an overview of all product elements, their features, and their compatibilities.
  - [Technical description](#) (p.10)
2. Before installing the product, perform mandatory inspections and functional checks.
  - [Inspection and preventive maintenance](#) (p.12)
3. To deploy the product, follow the step-by-step installation instructions and refer to the cabling schemes.
  - [Installation](#) (p.14)
  - [Network cabling](#) (p.19)
4. To configure the settings and parameters of the product, follow the step-by-step operation instructions.
  - [Operation](#) (p.24)

**As part of a continuous evolution of techniques and standards, L-Acoustics reserves the right to change the specifications of its products and the content of its documents without prior notice.**

Check [www.l-acoustics.com](http://www.l-acoustics.com) on a regular basis to download the latest document and software updates.

## Contact information

For information on advanced corrective maintenance:

- contact your Certified Provider or your L-Acoustics representative
- for Certified Providers, contact the L-Acoustics customer service: [customer.service@l-acoustics.com](mailto:customer.service@l-acoustics.com)

## LS10 AVB switch

---



LS10 is an Avnu™-certified AVB switch that integrates seamlessly within the L-Acoustics ecosystem to further simplify connectivity, uniting audio and control distribution. LS10 runs out-of-the-box AVB, providing a reliable network solution that does not require IT expertise.

On its own or as an integral part of the LA-RAK II AVB, LS10 distributes audio and control via front and rear etherCON™ connectors and SFP cages, enabling long-distance optical links. Two units mounted side-by-side on the dedicated 1U rack shelf allow to create a seamless redundant network effortlessly. Upgrading LA-RAK II to LA-RAK II AVB is possible.

The rugged LS10 incorporates features designed to overcome the challenges of touring events but also installation applications. The quick, 5-second, startup time allows for rapid recovery in case of power loss. A configurable GPO port enables status monitoring and the auxiliary DC input offers ultimate reliability.

With LS10, lightning-quick setup of a stable distribution of your AVB signal is ensured without the need for extensive IT knowledge or experience.



## System components

**!** This manual is about LS10 only.

### Rigging accessory

LS10-RAKSHELF                      1U Rack shelf for two LS10

### Rack

LA-RAK II AVB                      Touring rack containing three LA12X, LA-POWER II for power distribution, LA-PANEL II for audio and network distribution, and two LS10 for AVB distribution

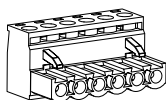
### Software applications

Switch Configuration Tool                      Application for remote monitoring of LS10

## Cables

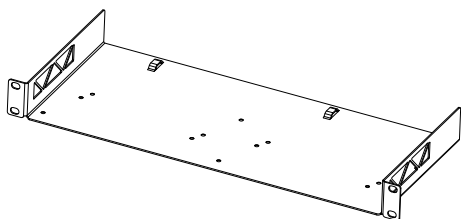
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- 1 × 6-point terminal block connector (Phoenix™ MSTB 2,5/ 6-ST - 1754520)



## Rigging elements

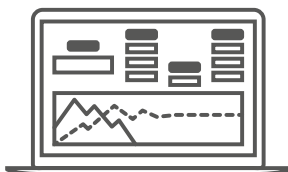
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LS10-RAKSHELF

## Illustrations

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LA Network Manager (which includes Switch Configuration Tool)

# Technical description

## Main features

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### Components

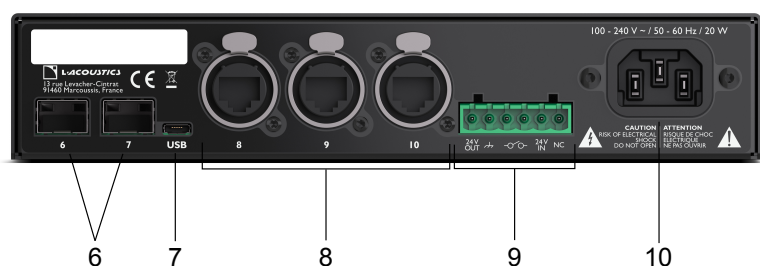
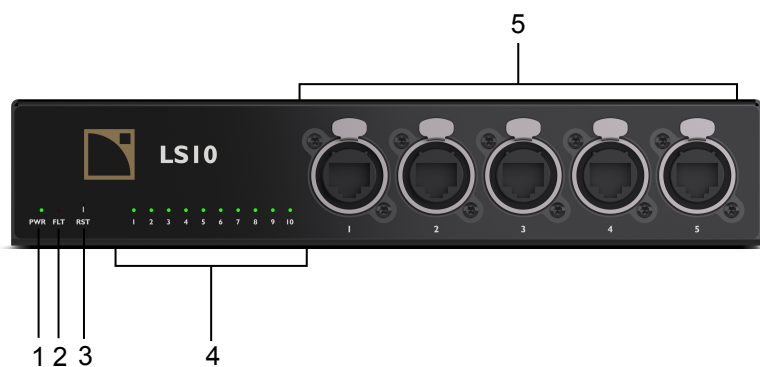
LS10 has 10 Ethernet ports:

- 5 Ethernet etherCON I/Os 1 Gb/s (front side)
- 3 Ethernet etherCON I/Os 1 Gb/s (rear side)
- 2 SFP cages supporting 1 Gb/s interfaces

In addition, the switch features:

- 1 Mains power input, IEC C13 V-Lock compatible socket
- 1 6-point terminal block that gathers:
  - 1 24 V DC IN / 1 24 V DC OUT pin for power supply backup
  - GPO for status control
- 1 USB port for maintenance and switch configuration

## Front and rear panels



- |          |                                |           |   |
|----------|--------------------------------|-----------|---|
| <b>1</b> | 1 power indicator              | <b>6</b>  | 2 SFP cages   |
| <b>2</b> | 1 fault indicator              | <b>7</b>  | 1 female micro type USB port                          |
| <b>3</b> | 1 Reset button                 | <b>8</b>  | 3 Ethernet etherCON I/Os                              |
| <b>4</b> | 10 link status/port indicators | <b>9</b>  | 1 6-point terminal block, step 5 mm                   |
| <b>5</b> | 5 Ethernet etherCON I/Os       | <b>10</b> | 1 Mains power input, IEC C13 V-Lock compatible socket |

## Ethernet ports

LS10 features Ethernet ports that can operate at 10 Mbit/s, 100 Mbit/s or 1 Gb/s, in half-duplex or full duplex mode. The operating mode and speed are automatically negotiated with the connected device. The 8 ports equipped with RJ45 also feature auto MDI/MDIX detection to use straight or crossover cables. LS10 supports the management of up to 150 AVB streams regardless of the number of channels of these streams.

## Power supply

LS10 relies on a universal Switched Mode Power Supply (SMPS) suitable for mains from 100 V AC to 240 V AC ( $\pm 10\%$ ), 50 Hz to 60 Hz.

# Inspection and preventive maintenance

## How to do preventive maintenance

---

Inspect the product periodically as indicated, and after any corrective maintenance operation.

### Structure and cleanness

Before and after each deployment (touring applications), or at least once a month (fixed installations):

- [CHK - External structure](#) (p.12)
- [CHK - External cleanness](#) (p.12)


### Functionalities

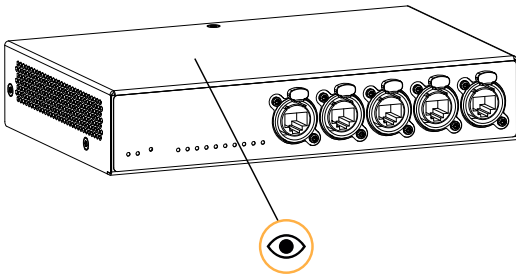
At least once a year:

- [CHK - Network functionalities and firmware](#) (p.13)

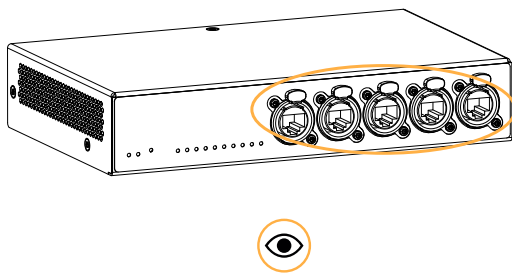
## CHK - External structure

---

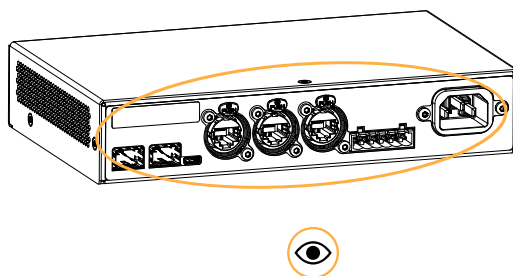
The  icon indicates a visual inspection.



chassis is not damaged



front and rear connectors are not damaged



## CHK - External cleanness

---

Use a dry cloth to remove any dust from the side grills.


## CHK - Network functionalities and firmware

---

### Equipment

- computer with LA Network Manager version 3.1.0 minimum and CAT5e cable

### Procedure

1. Connect LS10 to an Ethernet port of a computer running LA Network Manager.  
Use the CAT5e cable.
2. Open the Switch Configuration Tool application.
  - a) Open LA Network Manager.
  - b) Click  > **Switch Configuration Tool**.
  - c) Scan the network.
3. Check that the switch is detected by the application.  
Refer to [Using Switch Configuration Tool](#) (p.25) for more information.
4. Check that all L-Acoustics switches in the system run the same version of the firmware.
5. If convenient, update LA Network Manager and the firmware to the latest version.

# Installation

## Mounting

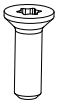
LS10 is one rack unit high (1U) and a half rack unit wide. LS10-RAKSHELF is a rigging accessory that can contain up to two LS10 side by side. LS10-RAKSHELF is mounted to LA-RAK II AVB and can be mounted to LA-RAK II as well as other 19-inch racks.

### Mounting two LS10 on LS10-RAKSHELF

#### Tools

- torque screwdriver
- T10 Torx bit

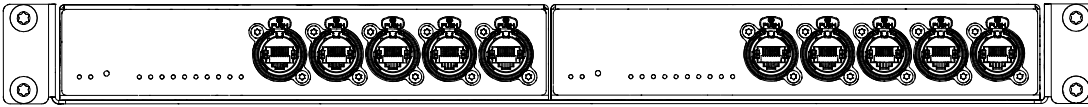
#### Material



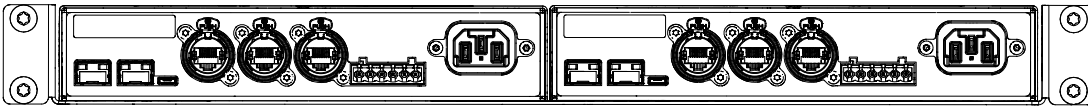
6 × M3×6 Torx screws

There are three different mounting configurations for LS10 on LS10-RAKSHELF:

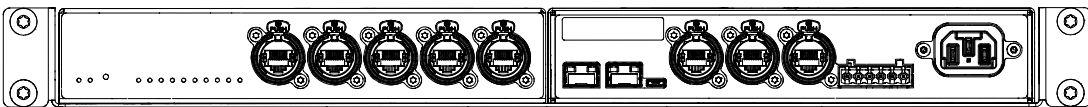
- side by side in front position (default)



- side by side in rear position

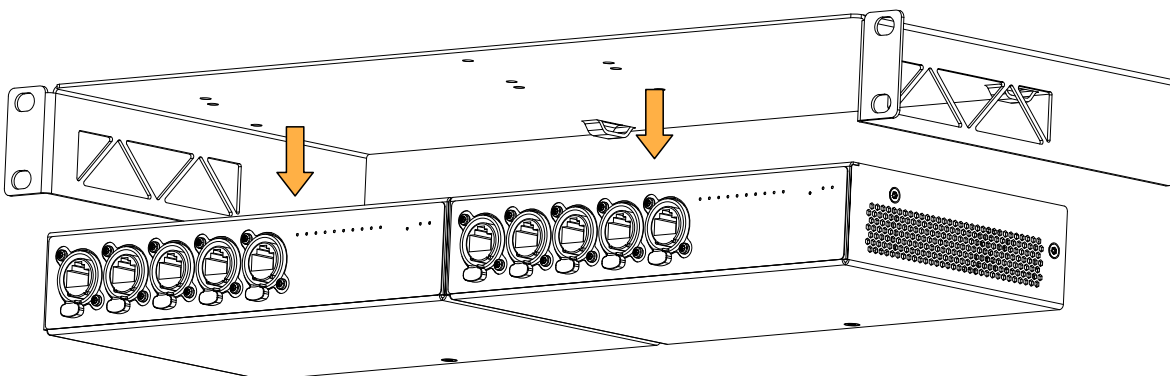


- side by side with one in inverted position

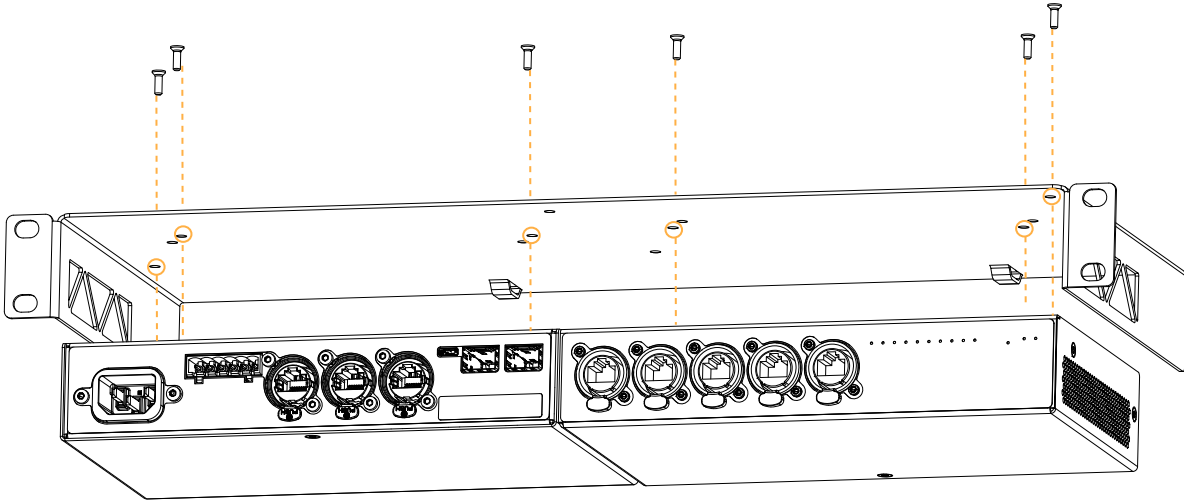


#### Procedure

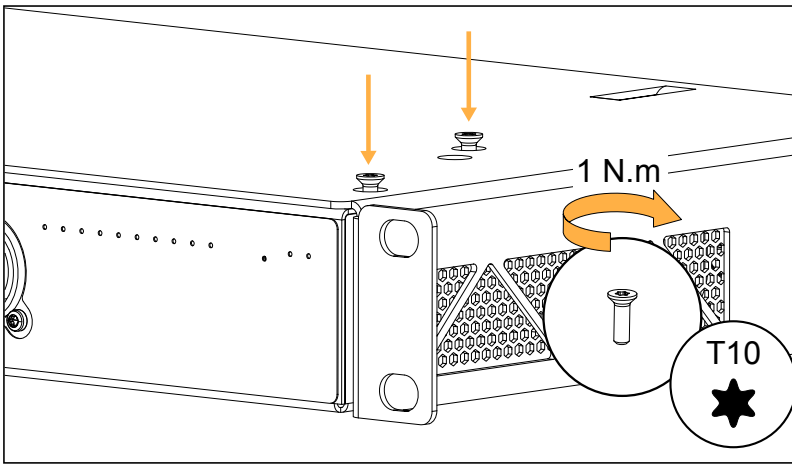
1. Turn upside down one or two LS10 and revert the LS10-RAKSHELF on top.



2. Place the screws in the appropriate holes.



3. Tighten the screws.



4. Turn back the assembly to nominal position for cabling and mounting.

## Ventilation

LS10 is equipped with one grill on each side to ventilate the system.

### **! Do not block the side ventilation grills.**

Install the switch with the side panels at a minimum distance of 5 cm (1.9 in)\* from any external object or structure.

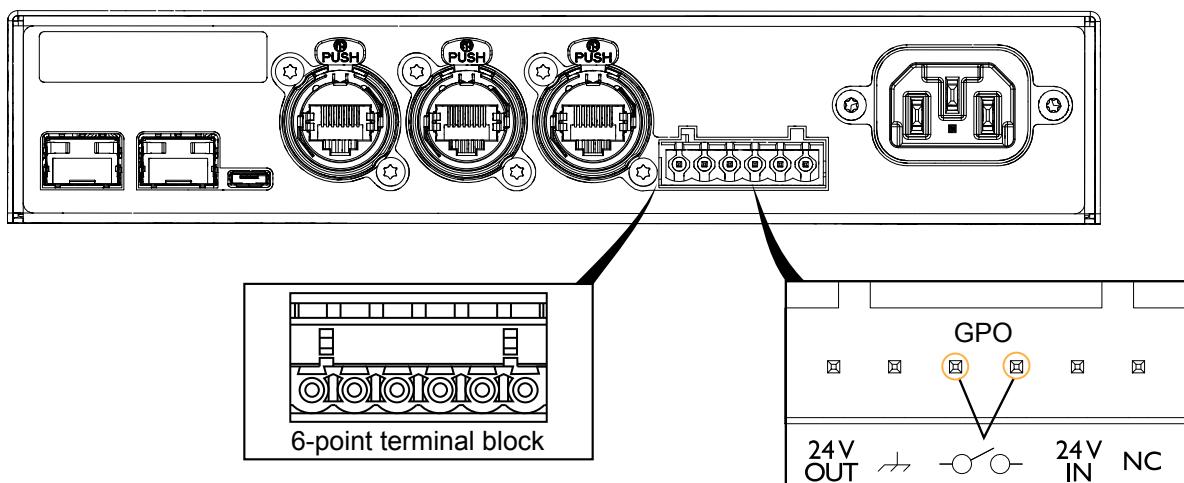
The same distance of 5 cm must be guaranteed on both sides of the rack.

When rack-mounted, make sure airflow is not reduced.

## General Purpose Output (GPO)

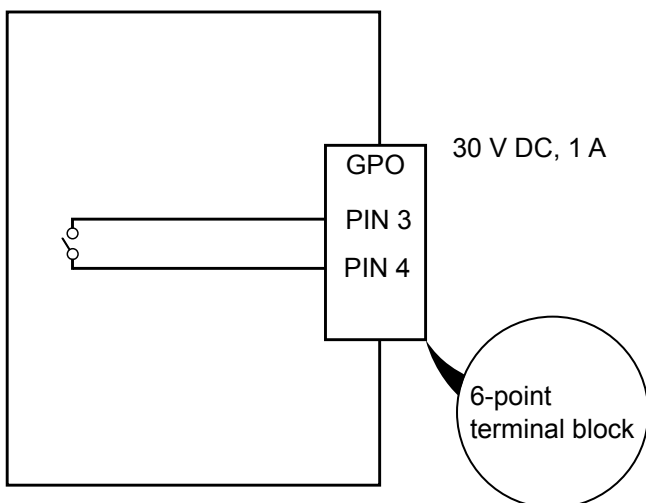
LS10 features a 6-point terminal block on the rear panel that includes a configurable GPO to indicate the presence of a fault on the LS10. It can be connected with a 6-point terminal block.

The pitch of the connector is 5 mm.



GPO is controlled by a Normally Open (NO) relay that can operate in a circuit with up to 30 V DC, 1 A.

### Relay max rating



Relay is open when the unit is unpowered.

GPO can be configured using the L-Acoustics Switch Configuration Tool.

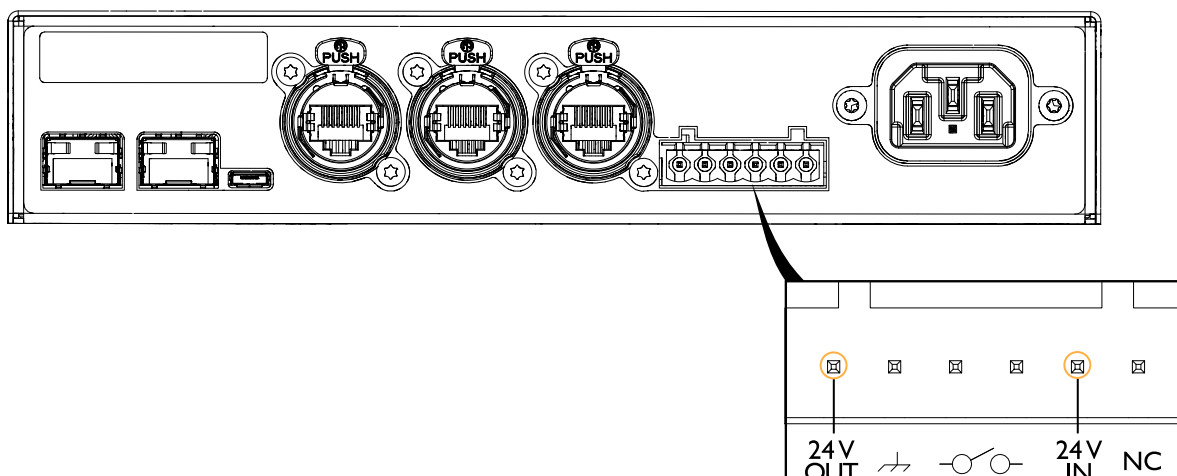
**i** For more information, refer to the [Using Switch Configuration Tool](#) (p.25) section.

\* This distance is respected when mounted in LA-RAK II AVB.



## 24 V DC Input and Output

24 V DC Input and Output pins allow to power another LS10 with a redundant powering.



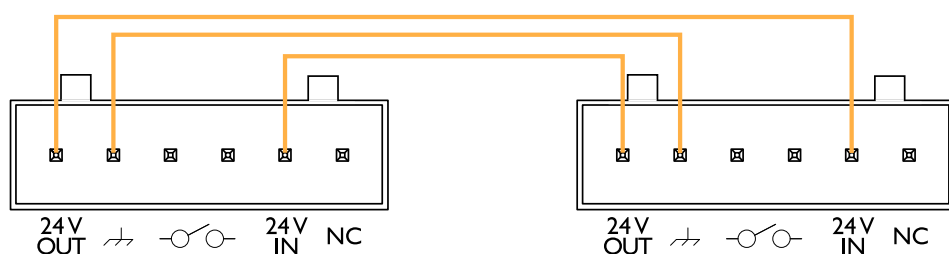
It is also possible to power LS10 with an external power supply.

### Backup power cable

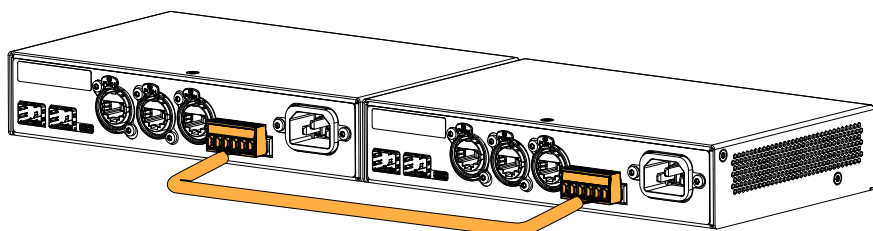
In case of component fault inside one LS10, the other LS10 will automatically provide backup power thanks to this cable. To do so, each LS10 must be connected to independent power sources.

This cable can be made with two Phoenix<sup>™</sup> connectors (reference MSTB 2,5/ 6-ST - 1754520 for example) and a cable with three conductors such as Alpha Wire<sup>™</sup> (reference 1896L SL005). Connectors and cable conductors are connected as follows:

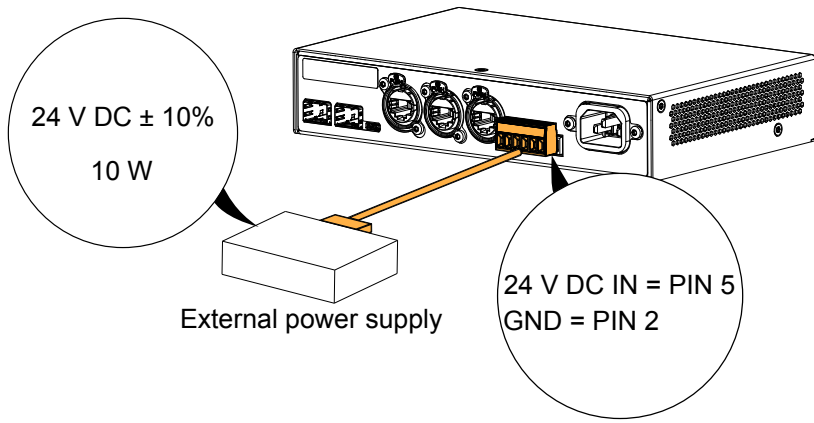
- cable conductor from PIN 1 to PIN 5
- cable conductor from PIN 2 to PIN 2
- cable conductor from PIN 5 to PIN 1



### Backup powering



## External 24 V DC powering



## Network cabling

### Connection panels

LS10 features connectors on its front and rear panels for network connection.



- |          |   |          |  |
|----------|---|----------|--|
| <b>1</b> | 5 1 Gb/s Ethernet etherCON I/Os (front) | <b>4</b> | 3 1 Gb/s Ethernet etherCON I/Os (rear) |
| <b>2</b> | 2 SFP cages                             |          |  |
| <b>3</b> | 1 USB port                              |          |  |

### SFP cages

The SFP cages are compatible with RJ45 or optical modules. They can operate at up to 1 Gb/s. The SFP cages allow to extend the maximum link distance when using optical modules.

LS10 can work with OM3 fiber optic cables with 1000BASE-SX SFP modules (LC connector, 850 nm). The maximum link length is 550 m. The fiber bending radius (maximum bending capacity) depends on the cable manufacturer recommendation. In any case the fiber bending radius must not be less than 15 times the cable's outside diameter.

L-Acoustics has tested the following the SFP modules:

- Avago AFBR-5710PZ
- FS SFP1G-SX-85
- Finisar FTLF8519P3BNL

### USB

The female micro type USB port is used for maintenance operations and for switch configuration. Refer to [Using Switch Configuration Tool](#) (p.25) for more information.

### Ethernet connectors

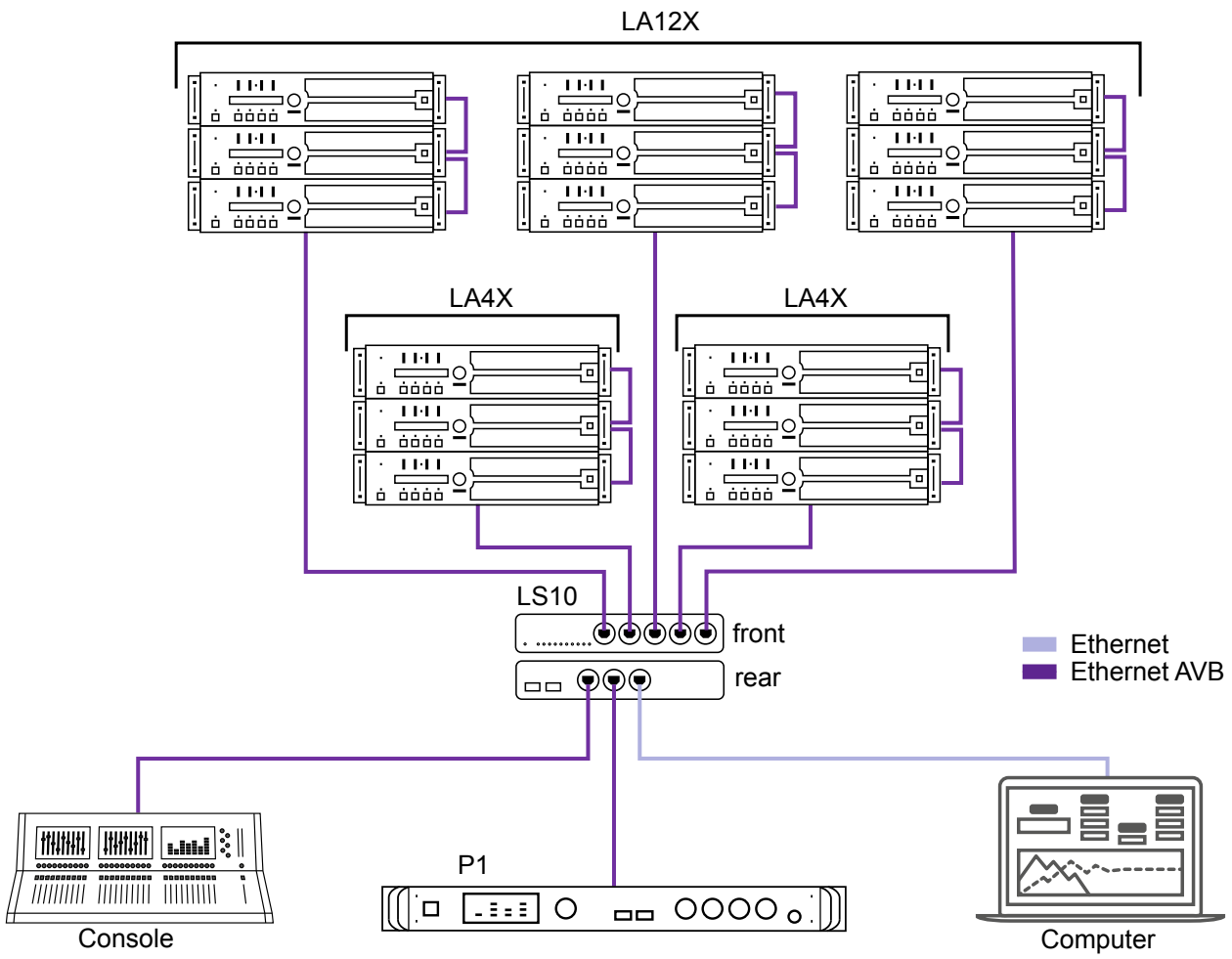
The Ethernet etherCON I/Os allow to create a local area network (LAN) using Ethernet or Ethernet AVB devices such as P1, LA4X or LA12X.

Multiple network topologies such as star and hybrid are configurable for L-NET or AVB networks. The computer and the switches are connected to each other using industry standard cables fitted with optical modules or RJ45 connectors.

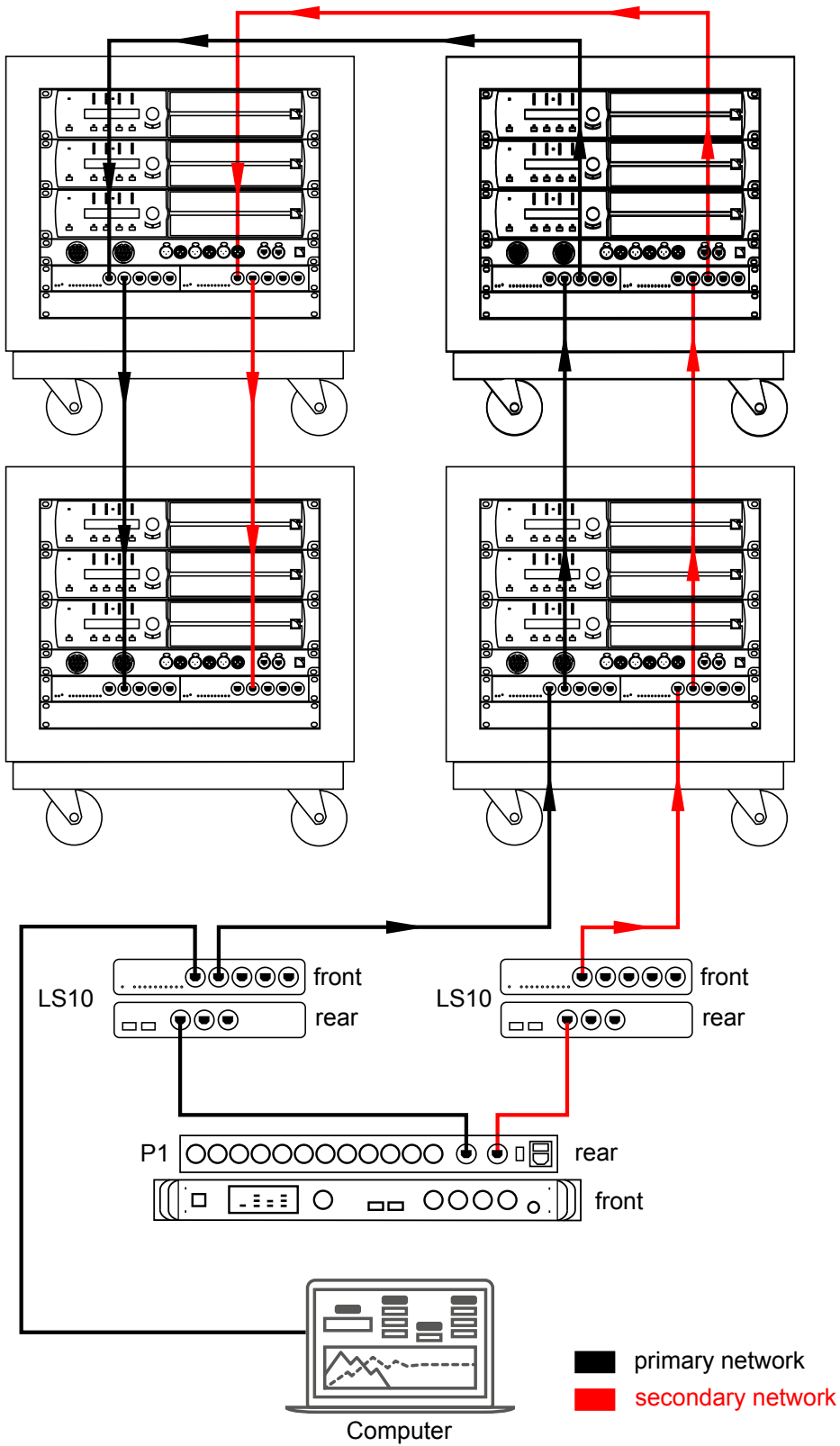
Refer to the **LA Network Manager Help** for more information on how to create an L-NET or AVB network in star or hybrid topologies.

## Cabling examples

### Example of non-redundant network with hybrid topology



### Example of redundancy topology



## Connecting to AC mains

### Electrical specifications

#### AC mains specifications



#### Verify the electrical conformity and compatibility of the mains supply.

Only connect the product to an AC power outlet rated 100-240 V, 50-60 Hz.

The product draws 10 W (typical).

The product draws 20 W (typical) when it powers another LS10.

WARNING: The product is of CLASS 1 construction and shall be connected to a mains socket outlet with a protective connection to earth.

#### Three-phase circuit



#### When the product is used in a three-phase circuit, verify the electrical conformity and compatibility of the three-phase circuit.

Verify that the three phases work, and balance the loads between the three phases.

Verify that the neutral and earth work.

Never try to emulate a 230 V circuit connecting an apparatus to two live wires of a 120 V three-phase circuit.

Never try to emulate a 200 V circuit connecting an apparatus to two live wires of a 100 V three-phase circuit.

### Power cord

The removable IEC cord is fitted with a female IEC C13 connector with V-Lock at one end and a country-specific plug at the other end.

| type | plug                | cable ratings | live  | neutral | ground       |
|------|---------------------|---------------|-------|---------|--------------|
| CE   | CEE 7/7, earthed    | 10 A / 250 V  | brown | blue    | green/yellow |
| CN   | GB 2099, earthed    | 10 A / 250 V  |       |         |              |
| JP   | JIS C 8303, earthed | 7 A / 125 V   |       |         |              |
| US   | NEMA 5-15, earthed  | 10 A / 125 V  | black | white   | green        |



Strictly apply the specific safety regulations of the country of use.

Do not defeat the ground connection of the supplied power cord using an adaptor or any other methods.

A suitable plug must be wired to the INT power cord.

If the power plug does not match the local power outlet, have a qualified electrician wire a suitable plug.

Verify that the plug conforms to the specific voltage and current rating given in section [Electrical specifications](#) (p.22).

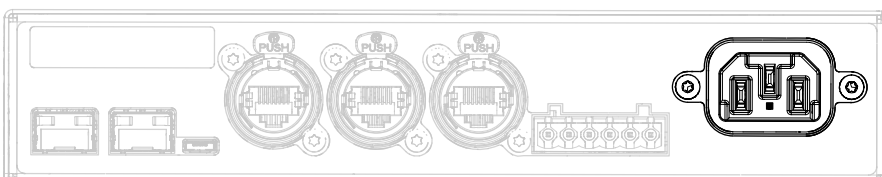
### Plugging to AC mains

#### Procedure

1. Connect the power cord female IEC C13 connector to the switch male IEC C14 socket.



**Check that the cable is properly locked.**



2. Connect the power cord country-specific plug to the mains socket.

## **Power consumption**

LS10 power requirement is 10 W. For an LS10 that powers another LS10 via 24 V DC, it is 20 W.

## **Powering on/off**

---

LS10 features one power LED indicator. To power LS10 on, connect the IEC cable. LS10 is detected and operational in less than 5 seconds.

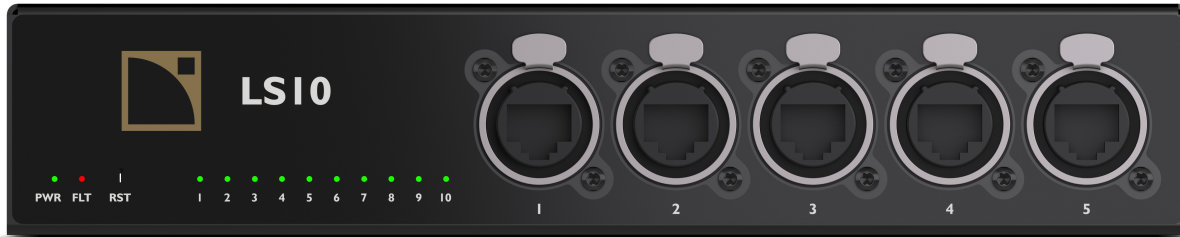
To power the switch off, unplug the power cord from the mains socket.

## Operation

### LS10 LED colors

---

LS10 is equipped with 12 LED indicators:



- 10 Link/Act indicators
- 1 Fault indicator
- 1 Power indicator

### Colors and meaning

|                     |       |                      |
|---------------------|-------|----------------------|
| Power               | green | powered              |
|                     | off   | unpowered            |
| Fault               | red   | fault detected       |
|                     | off   | nothing to report    |
| Link/act indicators | green | link established     |
|                     | blink | link active          |
|                     | off   | link not established |

### Reset button

---

It is possible to reset LS10 to factory default settings using the Reset button.

Press the **RST** button and hold it for seven seconds to set back the switch to factory default settings.

It sets back:

- the default IP address to 192.168.1.200
- the default subnet mask to 255.255.255.0
- the default options of the switch

It is also possible to reset LS10 with the Switch Configuration Tool. Refer to [Using Switch Configuration Tool \(p.25\)](#).



## Using Switch Configuration Tool

---

### Introduction

LS10 can be remotely configured using the **Switch Configuration Tool** application. The application is available from the main menu of LA Network Manager version 3.1.0 minimum.

The Switch Configuration Tool allows to configure the connected LS10 with the following parameters:

- display and change the IP address
- update the firmware to the latest version
- check the status of the switch and the ports
- customize the switch options (RSTP, gPTP, Error Auto Recovery)
- define the fault conditions to include in the GPO (General Purpose Output Logic)
- retrieve the embedded log files when required
- reset to factory default settings if necessary

## Assigning individual IP addresses to the LS10 of a network

### Setting the IP over the network

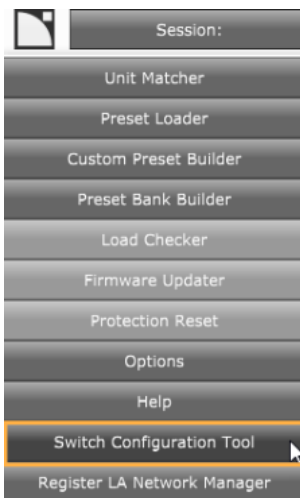
LS10 are typically controlled over Ethernet. Follow this procedure to define the IP addresses of all LS10 on the same subnet.

If the IP addresses of the switches need to be set on a different subnet, refer to [Setting the IP via USB](#) (p.28).

#### Procedure

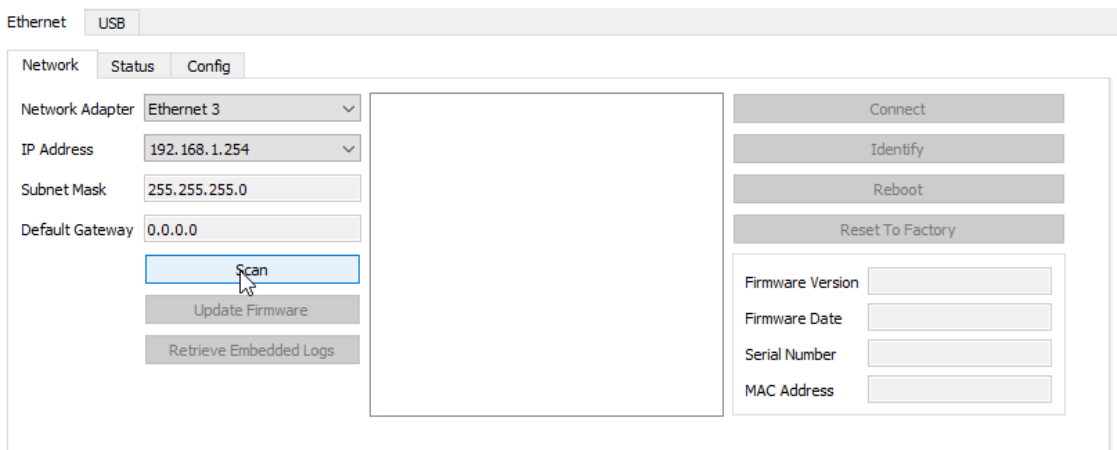
1. Set the Network Interface Card (NIC) of the computer hosting LA Network Manager to 192.168.1.254 / 255.255.255.0.
2. Connect one LS10 at a time to this NIC with an Ethernet cable.
3. Open the application with LA Network Manager.

Click  > **Switch Configuration Tool**.



The application opens on the **Ethernet** tab.

4. Select the NIC.
5. Click **Scan**.



The default IP address of LS10 is 192.168.1.200. If the switch is not detected, then press the **RST** button of the switch for seven seconds to reset the IP address, and scan again.

**6.** Select the detected switch and click **Connect**.

The screenshot shows the 'Network' configuration page with the 'USB' interface selected. The 'Network Adapter' is set to 'Ethernet 3' and the IP address is '192.168.1.200'. The 'Connect' button is highlighted with a mouse cursor. Other buttons include 'Identify', 'Reboot', and 'Reset To Factory'. A sidebar on the right displays device information: Firmware Version (2.10.0.18-dev3), Firmware Date (16/07/2019), Serial Number (1670000006), and MAC Address (00:1B:92:01:B9:EB).

**7.** Go to the **Config** tab.

**8.** Set a unique IP address on the same range, for instance 192.168.1.201.

Click **Apply**.

The screenshot shows the 'Config' tab of the network configuration interface. The 'IP Settings' section is active, with the 'Address' field set to '192.168.1.201'. The 'Apply' button is highlighted with a mouse cursor. Other sections include 'GPIO Configuration' (Pin Function: NONE, Fault Reporting: Link Fault, Mains Loss, 24V Input Loss, 24V Output Error), 'Link Fault Port' (Pin state: OPEN, Alive Period: 60 sec), and 'Neighbor PropDelay Threshold' (Port 1-10, Enable: checked, Value: 800 nsec).

**9.** On the **Network** tab, click **Disconnect**.

**10.** Repeat the above procedure until all LS10 are configured.

### What to do next

After all LS10 are set to a unique IP address, it becomes possible to interconnect them and modify their settings or proceed to their firmware update from the Switch Configuration Tool.

## Setting the IP via USB

If the IP addresses of the switches need to be set on a different subnet, then proceed as follows.

### Basic use only

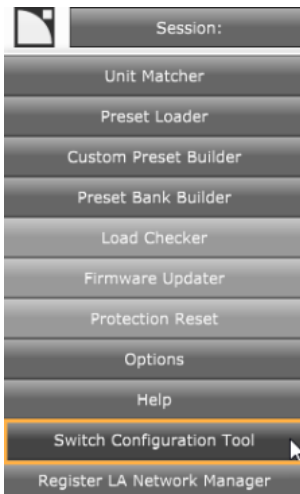
The **USB** tab is used to display and change the IP settings of LS10.

Connect the switch with an Ethernet cable and use the **Ethernet** tab for a complete configuration.

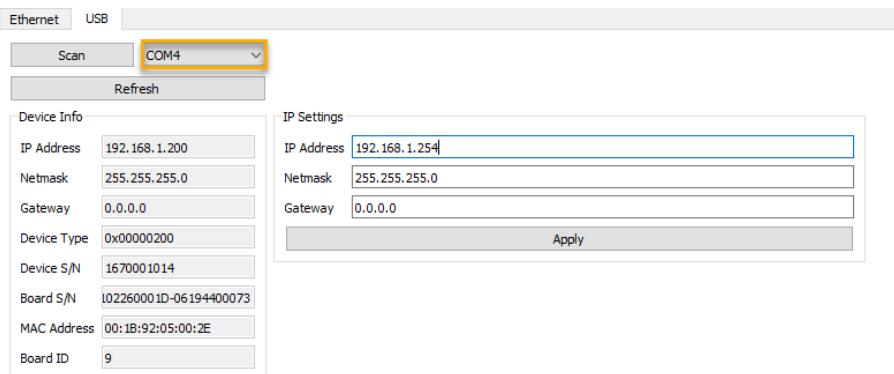
### Procedure

1. Identify the IP address and the subnet mask of the network card of the computer on which LA Network Manager will be run.
2. Open the application with LA Network Manager.

Click  > **Switch Configuration Tool**



3. Go to the **USB** tab.
4. Click **Scan** to retrieve the list of serial ports on the computer. Expand the list to visualize the ports detected.



5. Connect LS10 to the computer with a USB cable.
6. Click **Scan**, and select the COM port that appeared in the list.

7. Click **Refresh** to retrieve the LS10 information.

The screenshot shows a network configuration window with two tabs: 'Ethernet' and 'USB'. Under the 'Ethernet' tab, there is a 'Scan' button and a dropdown menu set to 'COM4'. Below this is a 'Refresh' button, which is highlighted with an orange border. To the right of the 'Refresh' button is a 'Device Info' section with the following fields:

|             |                        |
|-------------|------------------------|
| IP Address  | 192.168.1.200          |
| Netmask     | 255.255.255.0          |
| Gateway     | 0.0.0.0                |
| Device Type | 0x00000200             |
| Device S/N  | 1670001014             |
| Board S/N   | 102260001D-06194400073 |
| MAC Address | 00:1B:92:05:00:2E      |
| Board ID    | 9                      |

To the right of the 'Device Info' section is an 'IP Settings' section with the following fields:

|            |               |
|------------|---------------|
| IP Address | 192.168.1.254 |
| Netmask    | 255.255.255.0 |
| Gateway    | 0.0.0.0       |

Below the 'IP Settings' section is an 'Apply' button.

8. Enter the same **Netmask** as that of the network card that will be used to connect to the LS10.

The screenshot shows the same network configuration window as in step 7. The 'Refresh' button is no longer highlighted. In the 'IP Settings' section, the 'Netmask' field is highlighted with an orange border. The 'Netmask' field contains the value '255.255.255.0'. The 'IP Address' field contains '192.168.1.254' and the 'Gateway' field contains '0.0.0.0'. The 'Apply' button is visible below the 'IP Settings' section.

9. Assign a unique IP address to each LS10 on the corresponding subnet.

The screenshot shows the same network configuration window as in step 8. The 'Netmask' field is no longer highlighted. In the 'IP Settings' section, the 'IP Address' field is highlighted with an orange border. The 'IP Address' field contains the value '192.168.1.254'. The 'Netmask' field contains '255.255.255.0' and the 'Gateway' field contains '0.0.0.0'. The 'Apply' button is visible below the 'IP Settings' section.

10. Click **Apply**.

### What to do next

After all LS10 are set to a unique IP address, it becomes possible to interconnect them and modify their settings or proceed to their firmware update via Ethernet from the Switch Configuration Tool.

## Updating the LS10 firmware

The Switch Configuration Tool is the only way to update the firmware of LS10.

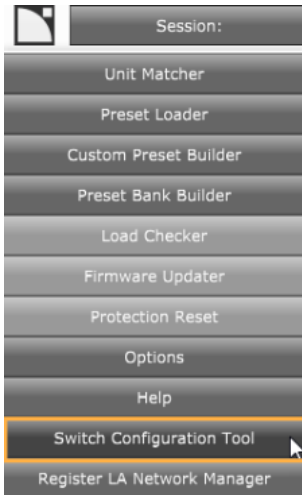


The Units that are connected to the switch are unavailable during the firmware update.

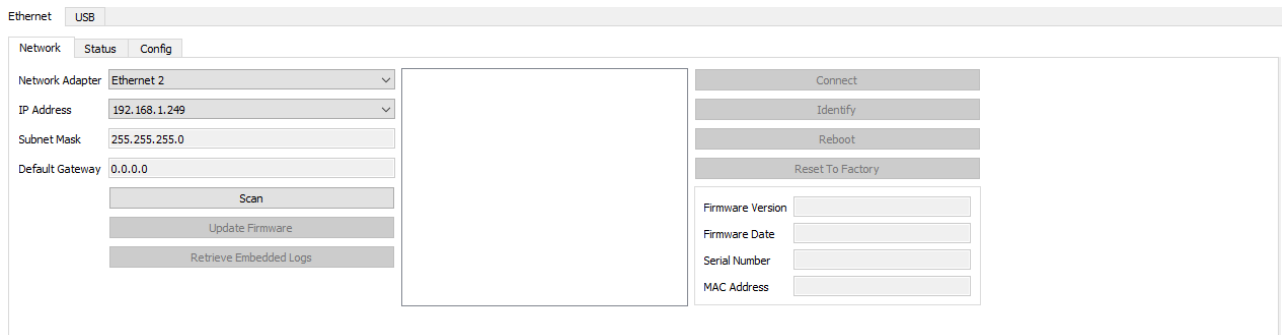
### Procedure

1. Set the NIC of the computer hosting LA Network Manager to 192.168.1.254 / 255.255.255.0.
2. Connect one LS10 at a time to the computer with an Ethernet cable.
3. Open the application with LA Network Manager.

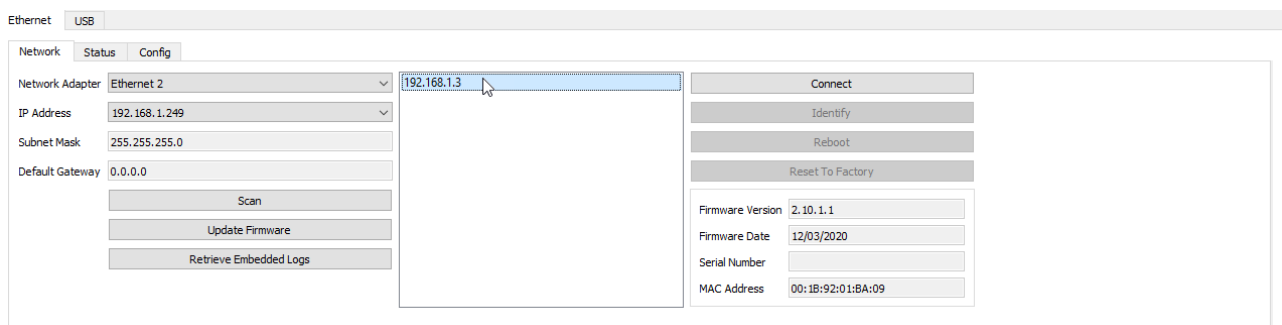
Click  > **Switch Configuration Tool**.



The application opens on the **Ethernet** tab.

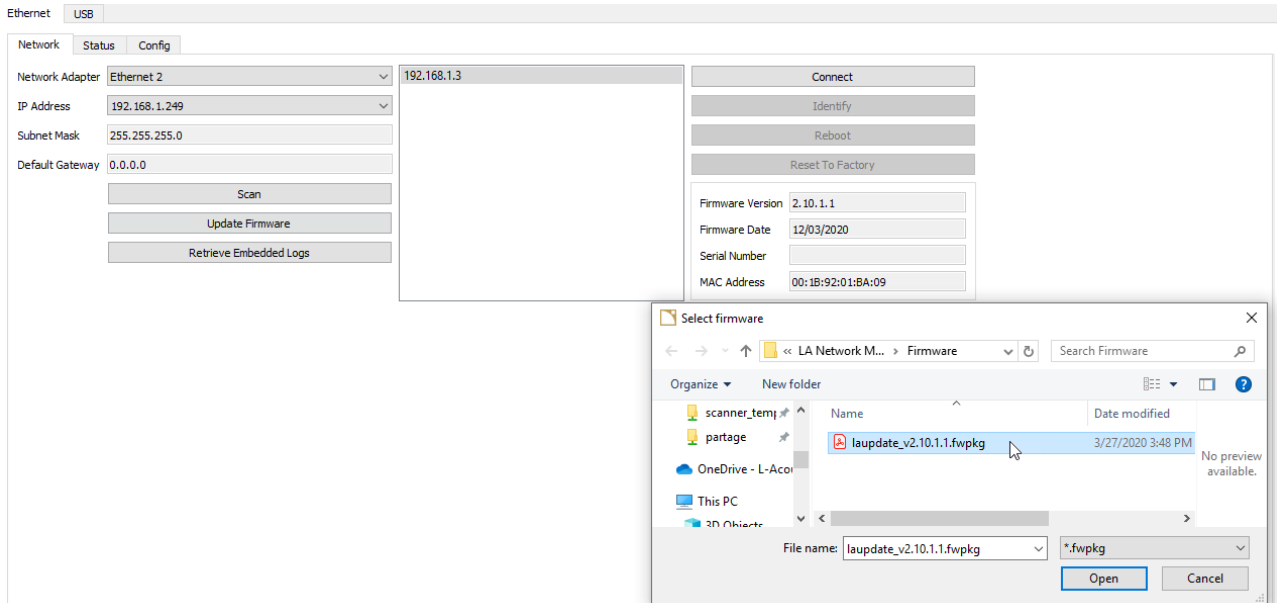


4. Select a network adapter.
5. Click **Scan**.
6. Select the switch.



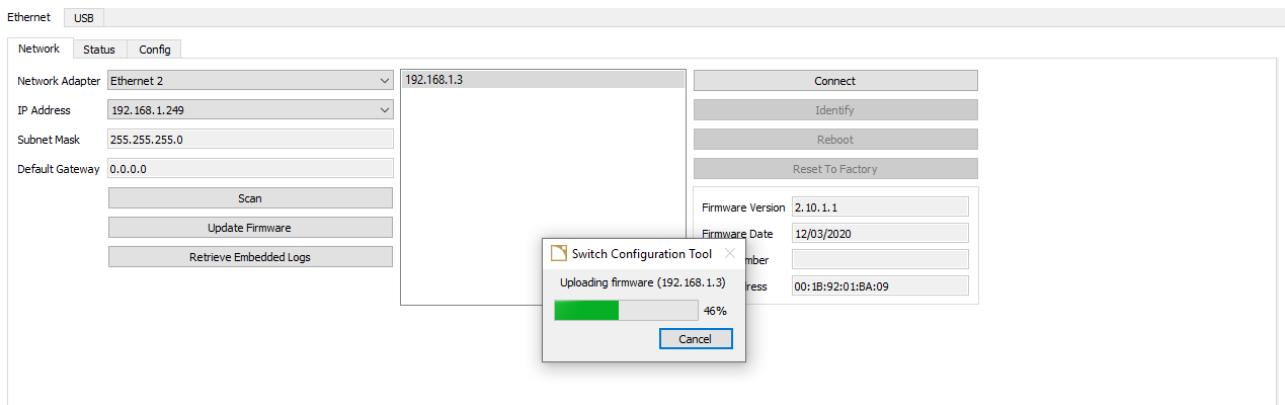
## 7. Click **Update firmware**.

The file explorer displays the latest firmware package.



## 8. Click the package and click **Open**.

The update takes a few seconds to load.



The LS10 will automatically reboot and install the new firmware.

## What to do next

Wait for 20 seconds, then click **Scan** again to detect LS10. Select the switch to read its firmware version on the right and verify that the installation succeeded.

## Ethernet

The **Ethernet** tab features three sub-tabs of configuration:

- **Network**
- **Status**
- **Config**

### Network



**Network** tab allows to identify one or several LS10 and to apply the following functions:

1. **Scan**: scans the network to detect devices using a broadcast detection mechanism.



#### Risk of detection failure

Before scanning, it is essential that:

- the subnet mask of the network card used and the subnet mask set on the LS10 match.
- the network card and the LS10 pertain to the same subnet.

2. **Update firmware**: allows to update the firmware of one more LS10 that have been detected, after selecting them in the central frame.
3. **Retrieve Embedded Logs**: retrieves the logs of one more LS10 that have been detected, after selecting them in the central frame.
4. **Connect/Disconnect**: allows to connect to one device at a time to monitor its status and define particular settings in the **Config** tab.
5. **Identify**: identifies the connected device. The green LEDs of the ports blink.
6. **Reboot**: reboots the connected device.
7. **Reset To Factory**: resets the connected device to factory default settings.



## Status

**Status** gives information about the device. It is possible to see the ports that are connected and to control the registered data such as the serial number, the firmware version. This tab is not editable.

The only command available to the user is the **Reset** button in the **Switch Status** on the top right, which performs the same command as the **RST** (reset) button on the LS10 front panel.

The screenshot shows the 'Status' tab with the following sections:

- Device Information:** Product Name (LS10), Firmware Version (2.10.0.18), Firmware Date (17/07/2019), Serial Number (1670000020), MAC Address (00:1B:92:01:89:F5).
- Device Status / GPIO Status:** Reset Button State (FALSE), Output Pin State (OPEN).
- Power Supply Status:** Mains (unchecked), 24V IN (unchecked), 24V OUT (checked), INTERNAL (checked).
- Switch Status:** gPTP GM ID (0xF5B901FEFF921B00), AVB Stream Count (0/150), VLAN Count (0/150), Fault (FALSE), and a Reset button.
- Port Status Table:** A table with 10 columns (ports 1-10) and 14 rows of status indicators.

|                  | 1          | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|------------------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| State            | UP         | DOWN     | DOWN     | DOWN     | DOWN     | DOWN     | DOWN     | DOWN     | DOWN     | DOWN     |
| Link Duplex Mode | FULL       | HALF     | HALF     | HALF     | HALF     | HALF     | HALF     | HALF     | HALF     | HALF     |
| Link Speed       | 1000M      | 10M      | 10M      | 10M      | 10M      | 10M      | 10M      | 10M      | 10M      | 10M      |
| Error Count      | 0          | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        |
| RSTP State       | FORWARDING | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED |
| RSTP Role        | DESIGNATED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED |
| RSTP tcdet       | FALSE      | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    |
| gPTP Capable     | FALSE      | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    |
| Class A Capable  | FALSE      | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    |
| Class B Capable  | FALSE      | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    | FALSE    |
| Total AVB bw.    | 750        | 7.5      | 7.5      | 7.5      | 7.5      | 7.5      | 7.5      | 7.5      | 7.5      | 7.5      |
| Rev'd AVB bw.    | 0          | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

## Config

The **Config** tab allows to configure the device. It is possible to configure the IP address, the switch options (RSTP and gPTP), and the GPO options.

### IP settings

It is possible to change the IP settings (address, netmask, gateway).

The screenshot shows the 'Config' tab with the following IP Settings section:

- Address:** 192.168.1.200
- Netmask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Apply** button

After changing the IP address, the LS10 will be disconnected. Go to the **Network** tab to retrieve the switch.

## Switch Options

The **Switch Options** allows to activate the **RSTP** (Rapid Spanning Tree Protocol) features.

It is also possible to set the set the gPTP user-defined priorities (for influencing the gPTP grandmaster selection).

The **Error Auto Recovery** is generally used in redundant network topologies. In case of optical link disconnection, the **FLT** (Fault) LED may blink. In this case, it is necessary to reset internal components in order to recover from the optical port incident. The **Error Auto Recovery** enables the automatic reset of LS10 in case of optical link disconnection. It takes a few ms to apply.

- !** **Brief stream interruption**
- All the ports reset at the same time and this triggers a brief stream interruption even for streams forwarded by copper ports.

In normal network topologies, it is instead recommended to manually reset the switch from the **Status** tab when necessary.

The **Error Auto Recovery** is available from firmware 2.10.1.1. In former firmware versions, this feature is grayed out.

Switch Options

RSTP  Off  On

gPTP Priority 1

gPTP Priority 2

Error Auto Recovery  Off  On

## GPIO Configuration

The **GPIO Configuration** features different options to monitor and configure the LS10 GPO pins.

Use the **Pin Function** setting to configure the function for the pins (NONE, STATE, FAULT, ALIVE):

- NONE: pin is always OPEN.
- STATE: manually define the pin state (use the **Pin state** setting).
- FAULT: select which faults should be reported by the pins (using **Fault Reporting** and **Link Fault Port** settings, multiple selection is possible). The pins are in OPEN state when the faults occur.
- ALIVE: periodic toggle between OPEN and CLOSED state (use the **Alive Period** setting).

GPIO Configuration

Pin Function

Fault Reporting  Link Fault  
 Mains Loss  
 24V Input Loss  
 24V Output Error

Link Fault Port

1 2 3 4 5 6 7 8 9 10

Pin state

Alive Period (sec)

## Neighbor PropDelay Threshold

The **Neighbor PropDelay Threshold** configures the gPTP parameters for maximum allowed propagation delay on connected links. When the ports are equipped with RJ45, the default value is 800 nsec. If the SFP with RJ45 is not configured this way, then check the corresponding port and enter the standard 800 ns value. When the ports are equipped with optical modules, the option is disabled. If they are not automatically disabled, uncheck the ports connected with optical modules. The port numbers on this window correspond to the port numbers on the front and rear labels of LS10.

| Port | Enable                              | Value (nsec) |        |
|------|-------------------------------------|--------------|--------|
| 1    | <input checked="" type="checkbox"/> | 800          | Modify |
| 2    | <input checked="" type="checkbox"/> | 800          | Modify |
| 3    | <input checked="" type="checkbox"/> | 800          | Modify |
| 4    | <input checked="" type="checkbox"/> | 800          | Modify |
| 5    | <input checked="" type="checkbox"/> | 800          | Modify |
| 6    | <input type="checkbox"/>            |              | Modify |
| 7    | <input type="checkbox"/>            |              | Modify |
| 8    | <input checked="" type="checkbox"/> | 800          | Modify |
| 9    | <input checked="" type="checkbox"/> | 800          | Modify |
| 10   | <input checked="" type="checkbox"/> | 800          | Modify |

## USB

When it is not possible to connect the device with Ethernet connectors, it is possible to at least identify the device connected to the USB port.

It is also possible to set the IP address with the **USB** tab. Refer to [Setting the IP via USB](#) (p.28) for more information.

Ethernet **USB**

Scan COM1

Refresh

| Device Info | IP Settings             |
|-------------|-------------------------|
| IP Address  | IP Address 192.168.1.24 |
| Netmask     | Netmask 255.255.255.0   |
| Gateway     | Gateway 0.0.0.0         |
| Device Type | Apply                   |
| Device S/N  |                         |
| Board S/N   |                         |
| MAC Address |                         |
| Board ID    |                         |

# Specifications

## LS10 specifications

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All values given in this section are typical values.

### General

|                      |  |
|----------------------|--|
| Mains rating         | 100 V AC - 240 V AC ( $\pm 10\%$ ), 50 Hz - 60 Hz  |
| Power consumption    | 10 W - 20 W max when powering another LS10   |
| Backup power circuit | 24 V DC back-up input<br>24 V DC output for powering another LS10  |
| Startup time         | Ready to forward AVB streams in 5 seconds  |
| Plug-and-play        | open standard (no license required), AVB-enabled without configuration, no manual configuration required |

### Storage and operating conditions

|                       |                                 |
|-----------------------|---------------------------------|
| Storage temperature   | -5 °C / 23 °F to 70 °C / 158 °F |
| Operating temperature | -5 °C / 23 °F to 50 °C / 122 °F |
| Maximum altitude      | 2000 m                          |
| Climate               | moderate, tropical              |

### Interface

|            |   |
|------------|---|
| Indicators | 1 LED for power status, 1 LED for fault status<br>10 LEDs for link/act status |
| Button     | reset to factory settings   |

### Ethernet port features

|                |  |
|----------------|--|
| Management     | gPTP grandmaster capable, priority selection<br>RSTP: enable/disable |
| Port sensing   | Auto negotiation   |
| Auto crossover | MDI / MDIX (allows to use straight or cross cables)                  |
| Auto sensing   | Full or Half Duplex (Gigabit is always Full Duplex Mode)             |
| AVB ports      | 10 ports at 10/100/1000 Mb/s   |

### Connectors

|                          |   |
|--------------------------|---|
| Network                  | 8 × Ethernet etherCON I/O (5 on front, 3 on rear)<br>2 × SFP cages  |
| Mains input              | IEC C13 V-Lock compatible socket  |
| Terminal block connector | 5 mm 6-point terminal block connector for GPO and DC powering with: <ul style="list-style-type: none"> <li>• 1 × 24 V DC power output (max 10 W) to power another LS10</li> <li>• 1 × 24 V DC backup power input (max 10 W)</li> <li>• 1 × GPO for fault indication (Relay, max 30 V DC / 1 A)</li> </ul> |
| USB                      | female micro USB type   |

**AVB**

|                       |  |
|-----------------------|--|
| Featured AVB entities | Avnu™-certified AVB Bridge   |
| Standards             | Ethernet AVB:<br>IEEE 802.1BA-2011 standard augmented by Avnu ProAV 1.1 requirements |
| Supported streams     | Number: 150<br>Class: A and B  |

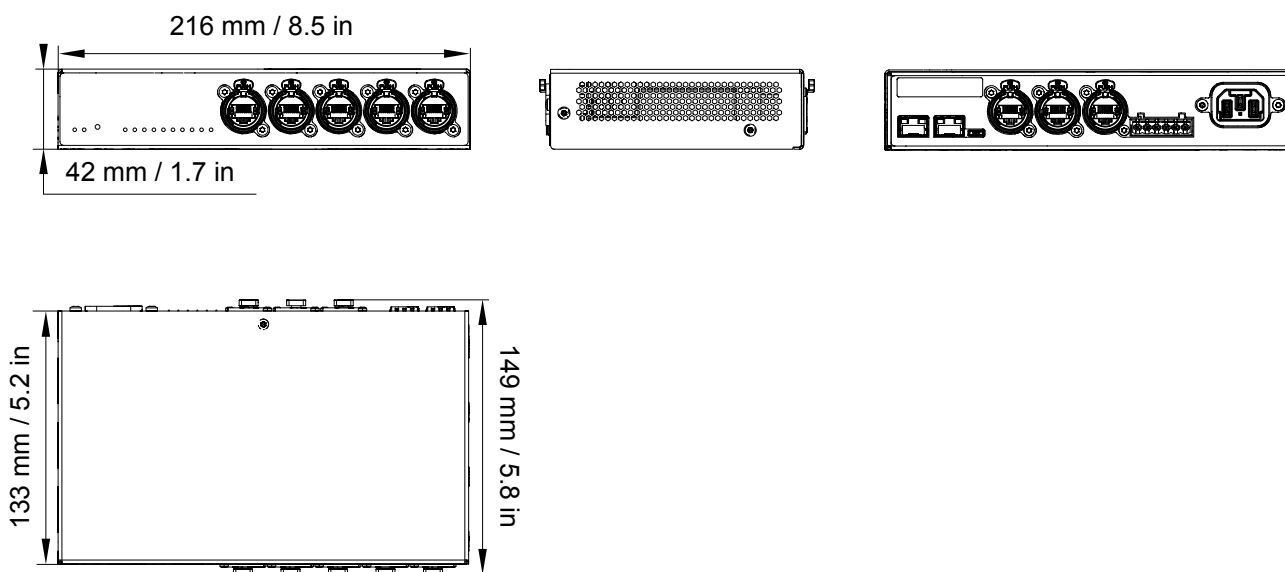
**Management**

|                 |                  |
|-----------------|------------------|
| IP              | static           |
| Firmware update | through Ethernet |

**Physical data**

|                   |                             |
|-------------------|-----------------------------|
| Height x Width    | 1.7 in x 8.5 in (1U x 1/2U) |
| Weight            | 1 kg / 2.2 lb               |
| Finish            | black                       |
| Protection rating | IP3x                        |

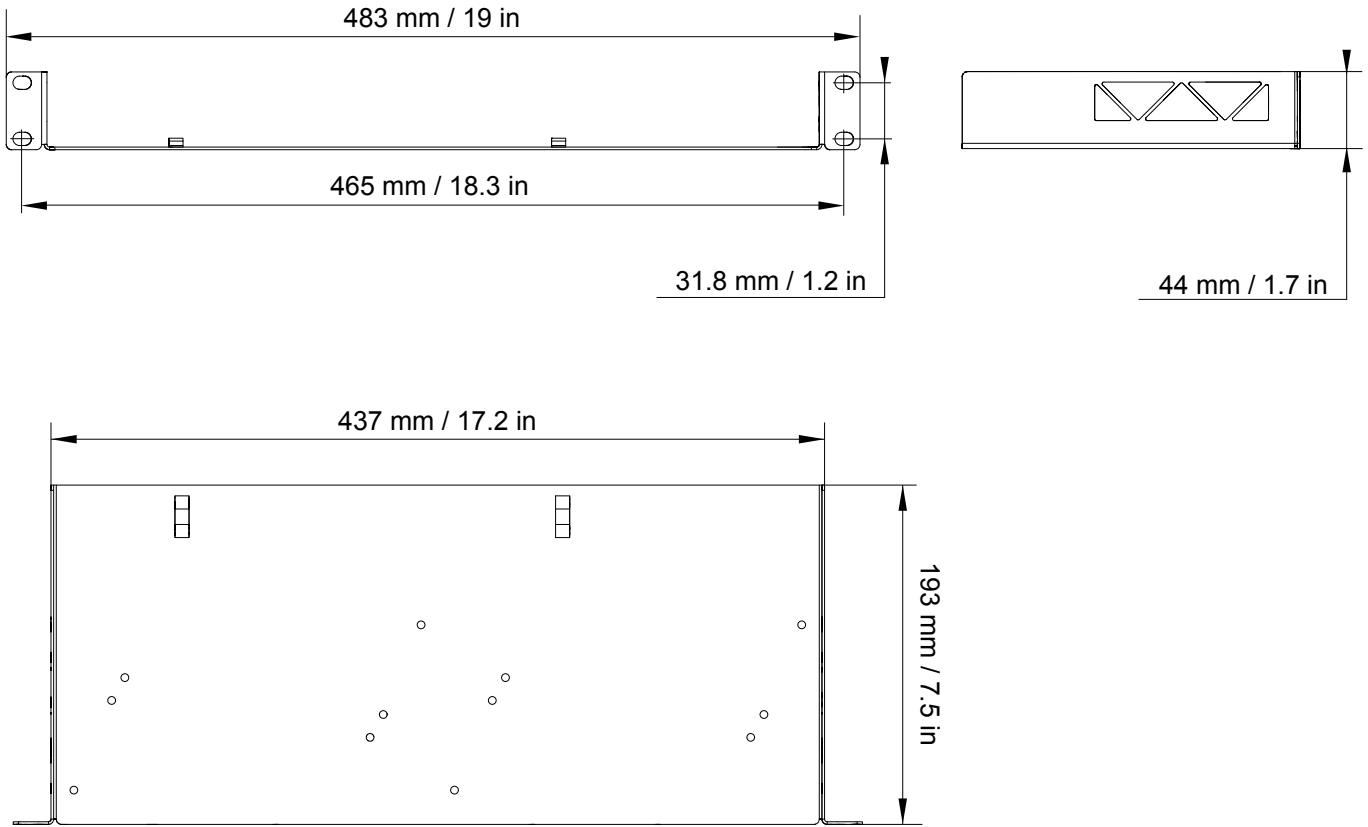
**LS10 dimensions**



## LS10-RAKSHELF specifications

|                     |  |
|---------------------|--|
| <b>Description</b>  | 1U Rack shelf for two LS10<br>6 × M3×6 Torx screws |
| <b>Weight (net)</b> | 1.1 kg / 2.4 lb                                    |
| <b>Material</b>     | electrogalvanized steel                            |

### LS10-RAKSHELF dimensions



# Appendix

## Glossary

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|             |  |
|-------------|--|
| <b>CE</b>   | Europe   |
| <b>CHK</b>  | check procedure  |
| <b>CN</b>   | China  |
| <b>D/R</b>  | disassembly/reassembly procedure   |
| <b>JP</b>   | Japan  |
| <b>KR</b>   | repair kit   |
| <b>SMPS</b> | Switched Mode Power Supply (power supply inside of the amplified controller) |
| <b>US</b>   | United States  |

## Approvals

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LS10 is compliant with the following:



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