



.edge

User Manual

Version: 1.0.13/1

Exported on: 22 February, 2024

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This user manual describes all aspects of the .edge system. It contains information for users, technicians and system integrators.



1 .edge - General Information

Before you start working with .edge, please read the following information.

1.1 .edge - About this Documentation

This documentation represents the latest state of information. Subject to availability, manuals covering former versions are provided via the [Lawo Download-Center](#) (after login).

General Safety & Important Notes

When working with our hardware components, it is important to read and observe all of the instructions provided in the "[General Safety Information for Lawo Equipment](#)" booklet delivered with your devices.

The same symbols are used in the product documentation so please look out for them as follows. The letter in brackets before the signal word denotes the language version: e.g. (E) = English.



(E) WARNING - warnings or mandatory actions.

These instructions **must always be observed** to ensure the personal safety of the user, and to protect your system and the work environment from potential damage.



(E) IMPORTANT NOTE - important information for proper functioning.

Other Informational Icons

When reading about our software or the general operation, you may also see the following icons.



General information and points of clarification. Please take note.



Useful tips and shortcuts. Feel free to follow if you like.



Notes. To avoid getting stuck, make sure you follow.



Important actions. To keep the system operational, you should always follow.

Further Information

Mechanical drawings and data sheets (including weights and dimensions) are available from the [Lawo Download-Center](#) (after login). We also recommend that you carefully observe the release notes for your product/system.

Lawo User Registration

For access to the [Lawo Download-Center](#), and to receive regular product updates, please register at: www.lawo.com/registration.

Contact Details

If you need further assistance, the Lawo Support Department can be contacted by email at support@lawo.com, or by telephone during normal working hours - please visit the [Support](#) area of the Lawo website for the most up-to-date contact details.



1.2 .edge - Important Safety Instructions

When working with our hardware components, please read and observe all of the instructions provided in the "General Safety Information for Lawo Equipment" booklet delivered with your devices.

Click on the link below to read or download the booklet as a pdf.

[Lawo_Safety.pdf](#)

1.3 .edge - Important Cleaning Instructions

Before cleaning your Lawo devices, please read and observe all of the following instructions.

(E) ATTENTION

DO NOT spill liquids into any system components!

DO NOT clean the front panels or operational surfaces with sharp instruments.

(F) ATTENTION

NE PAS renverser de liquides dans les composants du système!

NE PAS nettoyer les panneaux avant ou les surfaces opérationnelles avec des instruments pointus.

(E) IMPORTANT NOTE

General Cleaning / Disinfecting Requirements

Lawo hardware products are made from a variety of different materials, and each material might have specific cleaning requirements. Therefore, a general allowance for the disinfection of product surfaces with disinfectants containing alcohol cannot be given.

Our front panels and operational surfaces are not entirely approved for treatment with chemical cleaning agents and disinfectants. Component surfaces, buttons and electronics can be permanently damaged by treatment with such agents and the lifespan can be dramatically shortened. Please note that some substances can lead to discoloration of surfaces.

Lawo is not responsible for damage caused by the unauthorized use of disinfectants on our products and surfaces. Damages caused by unspecified treatment of modules and components are not covered by regular or extended warranties or SLA regulations.

This is a general instruction and recommendation for cleaning that applies to all Lawo products:

- Before cleaning the device, unplug all external power sources.
- Clean the device with a soft cloth, dipped lightly in warm to hot soapy water.
- Do not use any liquid cleaning agents or spray cleaners that may contain flammable materials.
- Do not get moisture into any openings.
- Do not use aerosol sprays, bleaches, or abrasives.
- Do not spray cleaners directly onto the item.

The above information and our technical application advice are given to the best of our knowledge.



2 .edge - Getting Started

If you are new to .edge, then please read the following topics to get started.

- [.edge - Controls, Connectors and Indicators](#)
- [.edge - Operating Principles](#)
- [.edge - Setup Checklist](#)



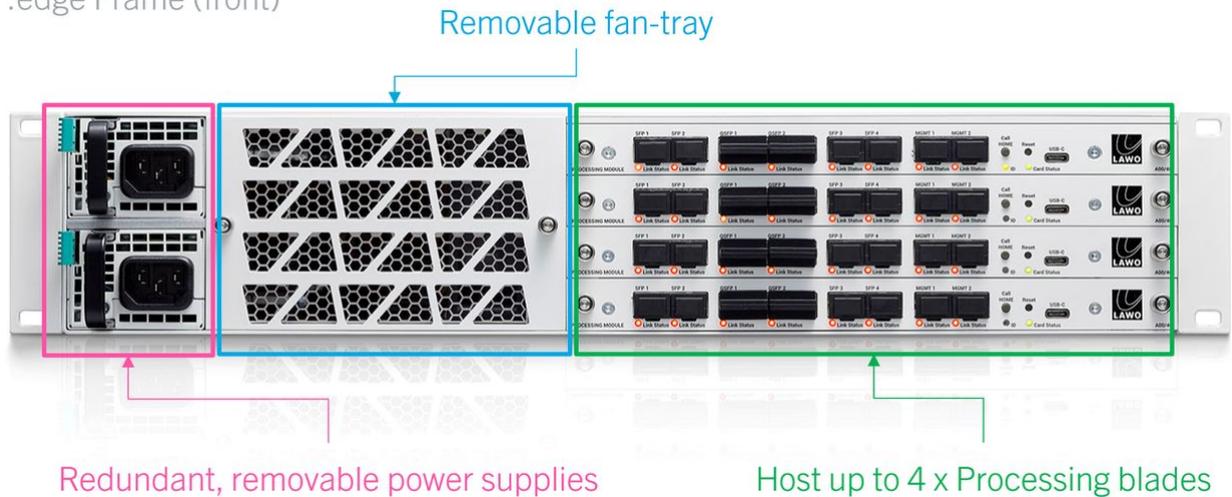
3 .edge - Hardware

This chapter describes the .edge frame and its hardware components.

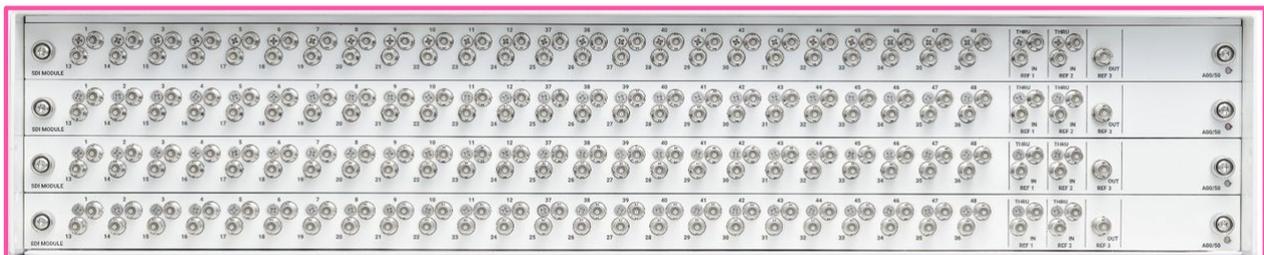
3.1 .edge - Frame

.edge is designed in a modular fashion. Each 19" / 2RU frame can be fitted with up to 4 x processing blades (fitted to the front) and 4 x I/O plates (fitted to the rear).

.edge Frame (front)



.edge Frame (rear)



Host up to 4 x Rear I/O Plates

Key Facts

- Frame size = 19" / 2RU. The frame is designed for indoor use and rack mounting.
- Dual-redundant power supplies are included, either 2 x AC (as standard) or 2 x DC (as an optional extra).
- Temperature-controlled cooling fans are included (as standard).
- Each processing blade and rear I/O plate supports 48 x HD-BNC connectors for SDI interfacing. The number of available SDIs is license-dependent.
- A single frame can be fitted with up to 4 x processing blades + up to 4 x rear I/O plates = 192 x SDI at maximum capacity.
- Each frame must be equipped at least with 1 x processing blade and 1 x rear I/O plate, and the other slots closed with blanking panels.
- Each rear I/O plate provides 5 x HD-BNC connectors for external synchronization.
- Each processing blade can sync to PTP (from the network), one of the two reference inputs (on the rear I/O plate) or internal sync (to free-run).

Components

Each frame has the following user-serviceable components:

- 2 x power supplies: either AC or DC.
- 1 x fan-tray: for temperature-controlled cooling.
- 4 x processing blades: for conversion and processing.
- 4 x rear I/O plates: for SDI and reference signal interfacing.

(E) WARNING

For safety reasons, and to ensure efficient cooling, .edge must not operate without a fully-closed frame. i.e. both PSU slots must be populated and any spare slots (at the front or rear) must be closed with blanking panels.

(F) AVERTISSEMENT

Pour des raisons de sécurité et afin de garantir un refroidissement efficace, .edge ne doit pas être utilisé sans un cadre entièrement fermé, c'est-à-dire que les deux slots d'alimentation doivent être équipés et que tous les slots libres (avant et arrière) doivent être fermés par des plaques de protection.

Blanking Panels

Blanking panels can be ordered using the following part numbers.

Part Number	Description
.edge_frame_blind_plate_front	1 x blanking panel for the front (processing blade) slots.
.edge_frame_blind_plate_rear	1 x blanking panel for the rear (I/O plate) slots.

Ordering Information

.edge can be ordered as a single-frame or multi-frame package using the frame variants or bundles described later. See [.edge - Ordering Information](#).

Further Information

For dimensions, weight, power, etc. see [.edge - Technical Specification](#) and [.edge - Power Supplies](#).

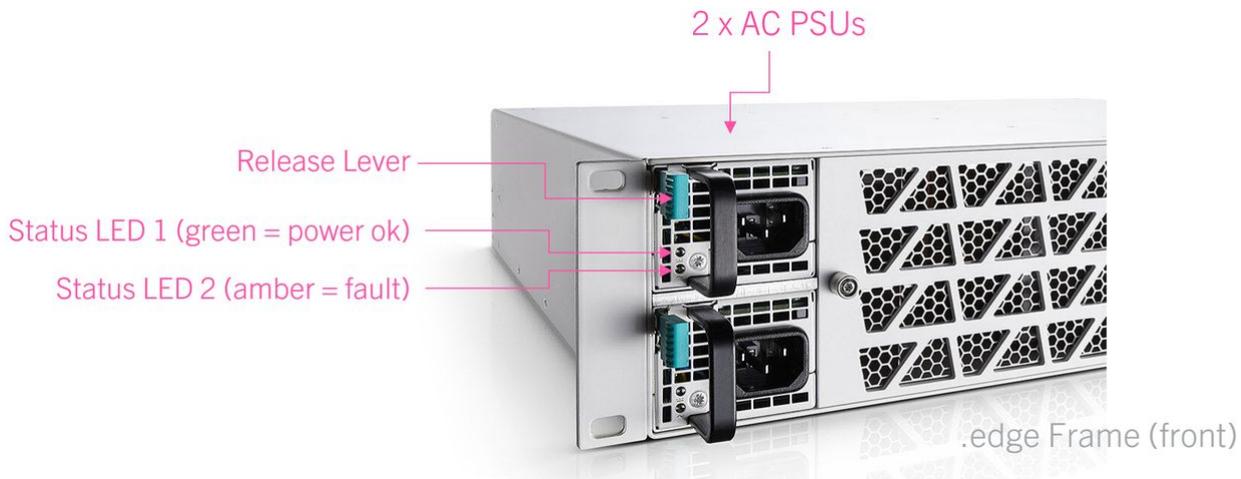
For installation information, see [.edge - Installing the Frame](#).

Additional information such as mechanical drawings and data sheets can be located using the following type numbers:

- A00/10 - for a frame with AC supplies.
- A00/20 - for a frame with DC supplies.

3.2 .edge - Power Supplies

Each .edge frame is powered by two power supplies (fitted to the front). Only one PSU is required for operation; the second provides redundancy.



- ✓ The PSUs are hot-pluggable and so it is possible to replace the redundant unit while the device is powered. See [Replacing a Power Supply Unit](#) for instructions.

Power Supply Options

.edge can be ordered with either AC or DC power supplies. To use the DC power supplies option, there are several conditions that must be observed (described [below](#)).

It is important that the frame is fitted with two identical power supplies: of the same type and from the same manufacturer. This happens automatically when you order a frame variant. However, for spare parts, you must take care that the replacement unit is a match.

Permitted AC Power Supplies:

- 2 x **436-9918-000** (black) or **436-9919-000** (white) - D1U54P-W-1200-12-HC3 series.
- 2 x **436-9914-000** (black) or **436-9916-000** (white) - PFE1100-12-054RA series.

Note that the AC power supplies come in a choice of front grill colors (e.g. **436-9918-000** is black and **436-9919-000** is white). The two colors can be mixed and so it is ok to fit a frame with 1 x **436-9918-000** (black) + 1 x **436-9919-000** (white).

Permitted DC Power Supplies:

- 2 x **436-9920-000** - D1U54-D-1200-12-HC3PC.

Ordering Information

For a new system, the power supplies are included in the frame variant. See [.edge - Ordering Information](#).

To order a spare part, please use the part numbers listed above.

Electrical Specification

For input voltages and power consumption, see [.edge - Technical Specification](#).

IEC Power Cables

If the frame is specified with AC power supplies, then these are delivered with 2 x IEC power cables that are country-specific. The table below describes all permitted options.

Name	Part Number	Description
IEC Lock Schuko	436-7206-000	Power Cord with European connector for e.g. D, AU, F, Benelux.
IEC Lock Open Ends	436-7207-000	Power Cord with open wire ends.
IEC Lock US	436-7208-000	Power Cord with connector for USA.
IEC Lock UK	436-7209-000	Power Cord with connector for United Kingdom.
IEC Lock AUS	436-7218-000	Power Cord with connector for Australia.
IEC Lock JPN	436-7219-000	Power Cord with connector for Japan.

Using the AC Power Supplies

Before connecting power to the frame, please read and observe all of the instructions in the "[General Safety Information for Lawo Equipment](#)" booklet delivered with your devices.

(E) WARNING

The AC input(s) MUST be connected to the mains using the power cable(s) supplied with the system.

Disconnect all power sources to completely disconnect power from the system. e.g. before you open the unit for maintenance and service.

Take care that the protective earth (PE) connection of each PSU is individually connected to the PE connection of the building installation (e.g. wall socket). It is forbidden to use IEC Y-cables, or connect both PSUs to the same multiple-socket outlet. This measure guarantees that there is no shared PE connection (whose failure would lead to a summation of the leakage current from both PSUs to the housing).

(F) AVERTISSEMENT

La ou les entrées CA DOIVENT être connectées au secteur à l'aide du ou des câbles d'alimentation fournis avec le système.

Déconnectez toutes les sources d'alimentation pour couper complètement l'alimentation du système, par exemple avant d'ouvrir l'unité pour la maintenance et l'entretien.

Veillez à ce que la connexion de terre de protection (PE) de chaque PSU soit connectée individuellement à la connexion PE de l'installation du bâtiment (par exemple, une prise murale). Il est interdit d'utiliser des câbles en Y IEC, ou de connecter les deux PSU à la même prise multiple. Cette mesure garantit qu'il n'y a pas de connexion PE partagée (dont la défaillance entraînerait une sommation du courant de fuite des deux PSU vers le boîtier).

Powering On

.edge has no on/off switch and starts automatically when power is applied.

- You will hear the fans speed up when power is first applied. This is normal. The fan speed will settle once the operating temperatures of all processing blades have been determined (by the master blade).

- The processing blades take approximately 40 seconds to boot from power on.
- At the end of the boot-up, each processing blade loads the latest settings (stored at shut-down).

PSU Status LEDs

Each power supply has two status LEDs that can be used to check the health of the PSU:

- LED 1 (power) - lights in green when the power is ok.
- LED 2 (fault) - lights in amber if there is a fault or warning.

The table below describes all possible states.

PSU LED	Condition(s)	Meaning	Recommended Actions
1 - Off 2 - Off	No power.	No AC (or DC) input.	Check the AC mains supply and IEC connection. (For a DC supply, check the disconnect device/power distribution).
1 - Green (blinking) 2 - Off	Standby ON; Main output OFF; AC (or DC) present.	AC (or DC) input detected; PSU is starting.	Wait for PSU to start.
1 - Green (solid) 2 - Off	Standby ON; Main output ON. No errors detected.	PSU is active; no errors.	Normal operation; no action required.
2 - Amber (solid)	Main output overcurrent, undervoltage or overvoltage. Fan fault or overtemperature. Standby overcurrent or undervoltage.	Internal fault.	Check the PSU Health pages (in HOME's Advanced parameters).
2 - Amber (blinking)	Power supply warning event triggered.	Internal warning.	

Installing a Frame with DC Power Supplies

To use the DC power supplies option, there are several conditions that must be observed:

- The use of DC power supplies is only permitted if your system is installed in an area with restricted access (to skilled persons only).
- The device with its PSU and the complete DC mains power distribution system must be placed entirely within a single building.
- The ground (PE) terminal of the .edge frame must be connected to the ground (PE) of the DC mains power distribution system.
- It is mandatory to install some means of cable strain relief for the wires that feed each PSU.
 - For example, by installing a clamp on a 19-inch panel mounted above the .edge frame.
 - Or, if this is not possible, by fixing the wires to the PSU handles using some cable ties (as shown below).
 - The cable strain relief will need to be removed and replaced if you need to exchange a PSU.

Example of Cable Strain Relief (for DC PSUs)



- A 48V DC mains power distribution system feeding the PSU must be classified as a “SELV” (according to 60950) or as “ES1” (according to 62368).
- A 60V DC mains power distribution system feeding the PSU must be classified as a “SELV/TNV-2” (according to 60950) or as “ES2” (according to 62368).
- Please observe the maximum working voltage (described in the table below).

		Maximum Working Voltage
DC PSU Input	Earth	72Vrms
DC PSU Output	Internal circuits of .edge	72Vrms, 93Vpeak

- The branch circuit protection feeding the PSU must be protected by a fuse or circuit breaker rated with 100A maximum. We recommend using an 80 A protection device.
- The breaking capacity must fit the requirements of the DC mains power distribution system.
- The wires that feed the DC PSU must offer a cable cross-section at least of AWG 10 (5,2 mm²). Please check whether a higher cable cross-section is required (based on the local standards and installation situation).
- Use stranded wire with ring or fork terminals.
- Take care that if a strand of a conductor should escape, it does not make contact with any other part of the device.
- A disconnect device must be provided between the DC mains power distribution system and the PSU.
- The disconnect device must be rated for the DC voltage of the DC mains power distribution system and must provide sufficient clearance and creepage distances.
- The DC mains power must be disconnected from the device, using the disconnect device, before the feeding wires are disconnected at the DC PSU.
- The input terminal block has not been evaluated for current interruption purposes.

- If one of the PSU slots is not in use, then make sure that the wires of the DC mains are either isolated (isolated Splicing Connector, isolation tape or tube) or that the disconnect device is secured in the OFF position (lock, marking and cable tie).

 **(E) WARNING**

Disconnecting the feeding wires to the DC PSU while voltage is present can result in a harmful electric arc.

 **(F) AVERTISSEMENT**

Le débranchement des fils d'alimentation du bloc d'alimentation DC pendant la tension est présente peut provoquer un arc électrique dangereux.

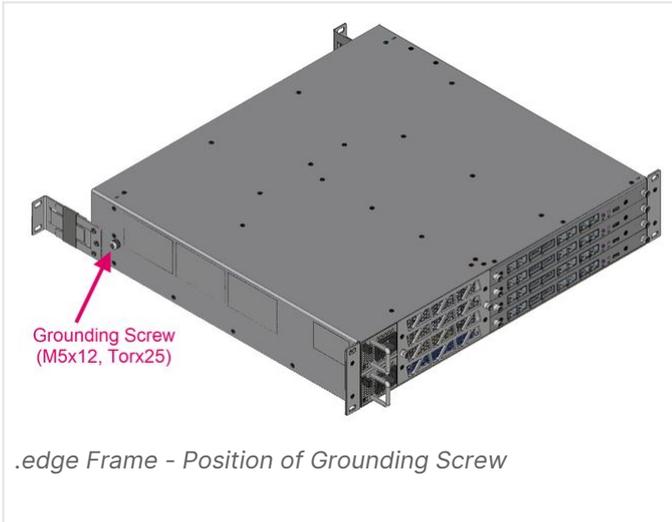
Once the installation is complete, the frame should be powered on (and off) using the disconnect device. The PSU status can be checked using the two LEDs at the front (described [earlier](#)).

3.3 .edge - Grounding

The .edge frame must be grounded for EMC reasons.

Grounding Instructions

A grounding screw is provided on the opposite side of the frame to the ventilation holes. The images below show the location of the grounding screw and the sticker that is attached to the side of the frame.



To ground the frame, please read and observe all of the instructions in the "[General Safety Information for Lawo Equipment](#)" booklet delivered with your devices.

(E) CAUTION

Each frame must be on the same potential as all other system devices.

ALWAYS use a grounded mains connection, to prevent the device from being grounded through Ethernet or other signal connections.

The device must be connected to an additional fixed protective ground if it is conductively connected with more than 20 other devices. i.e. more than 20 copper I/O connections. For more information, please refer to the "General Safety Information for Lawo Equipment" booklet delivered with your devices.

Use the M5x12 screw to fasten the grounding cable to the housing. You should use a Torx T25 driver for this purpose.

3.4 .edge - Fans and Cooling

.edge is cooled by five temperature-controlled fans (fitted behind the front grill). There are three large fans (to cool the processing blades) plus two smaller fans (to cool the rear I/O plates).

- ✓ The fan tray is removable and can be exchanged from the front of the frame. See [Replacing the Fan Tray](#) for instructions.

The fan activity is controlled automatically by the master processing blade. Mid-plane connections between the blades are used to determine the number of blades and their current temperatures. This, in turn, sets the fan speed.

Airflow Requirements

Air is taken in from the front and blown out, across the processing blades, to the right. The image below shows the direction of airflow.



⚠ (E) ATTENTION

- DO NOT obstruct the ventilation holes as to do so will prevent efficient cooling.
- If the maximum operating temperature of +30°C (+86°F) is exceeded, then the power to the processing blades is cut (to prevent damage to the FPGAs due to overheating). In this instance, all operations will stop until the unit has reached a safe temperature.

⚠ (F) ATTENTION

- N'obstruez PAS les trous de ventilation, car cela empêcherait un refroidissement efficace.
- Si la température maximale de fonctionnement de +30°C (+86°F) est dépassée, l'alimentation des lames de traitement est coupée (pour éviter d'endommager les FPGA en raison d'une surchauffe). Dans ce cas, toutes les opérations s'arrêteront jusqu'à ce que l'unité ait atteint une température sûre.

Ordering Information

The fan tray is included in all frame variants. To order a spare part, use the part number: **A00/10-55**.



Further Information

For permitted operating and storage temperatures, see [.edge - Technical Specification](#).

3.5 .edge - Processing Blades

At the front of the frame are the processing blades (up to 4 per frame). Each blade handles the IP connections plus the SDI conversion and signal processing.

- ✔ The processing blades are hot-pluggable and so it is possible to add or replace a blade while the frame is powered. See [Fitting a Processing Blade](#) for instructions.

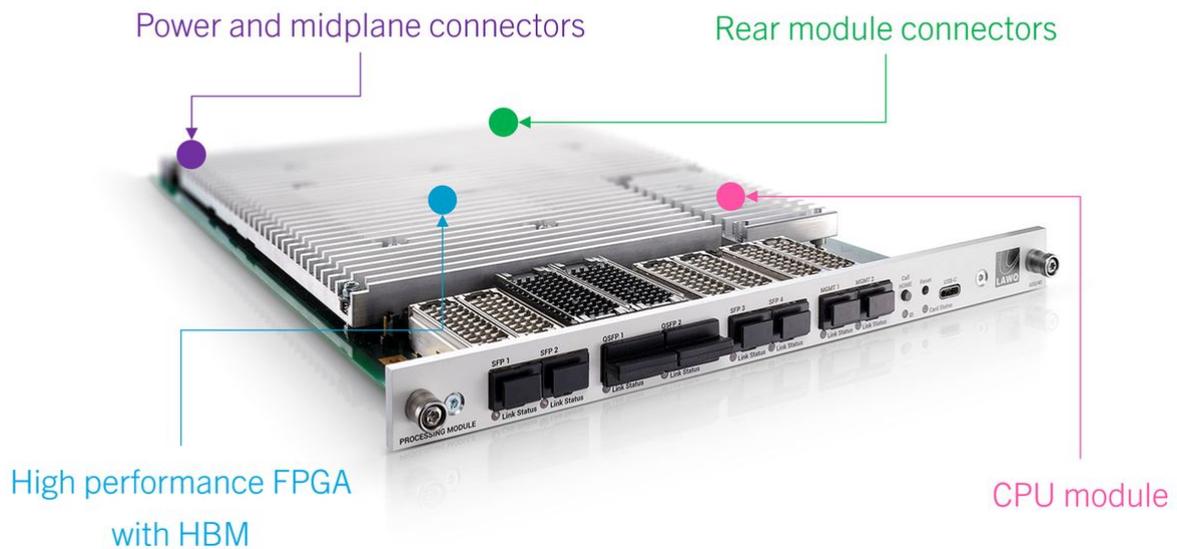
Useful to Know

- Each processing blade is an independent entity and can be addressed separately.
- The processing blades are numbered from 1 to 4, starting at the top of the frame.
- Physically, the highest blade is always the master (e.g. slot 1 in a fully-populated frame).
- The master blade determines the fan activity and error reporting.

Internal Components

Internally, each processing blade is based on the latest generation of high-performance FPGAs, featuring high-bandwidth memory (HBM) for high-density, high-performance 100Gbps operation.

.edge Processing blade



External Connections

Externally, each processing blade is equipped with 8 network interfaces: 6 media + 2 management ports.



Media Ports

The 6 media ports handle the IP streaming. They operate in one of two modes: either 4 x 25GbE (via SFP28) or 2 x 100GbE (via QSFP28).

- 25G comes as standard; 100G requires an optional license.
- 25Gbps is fine for SD and HD; 100Gbps is recommended for 3G and UHD.

For each stream, you can decide whether it will be transmitted or received via the primary or secondary port. To achieve redundant streaming, you must use both interfaces.

Management Ports

The 2 management ports handle the control data. They can be addressed in one of two ways, depending on which is more convenient:

- Out-of-band - control data arrives via the MGMT ports: 2 x 1GbE (via SFP). This scheme requires a dedicated management network. To achieve redundant control, you must use both interfaces.
- In-band - control data arrives via the media ports. This scheme can be used if there is no separate management network.

Optical Transceivers

To use a network port, you must fit a Lawo-certified optical transceiver. The optical transceiver determines the cable type, maximum distance and connector.

For more information about how to connect a processing blade, see edge - Wiring.

Link Status LEDs

Each network port has a **Link Status** LED that can be used to check the Ethernet connection.

Link Status LED	Meaning	Recommended Actions
Green	Link up (ok).	No action required.
Yellow	Link down: optical transceiver detected but no connection.	Check the connection to the network switch.
Off	Link down: optical transceiver missing.	Check the fitting of the optical transceiver.



Other Controls & Indicators

On the right of each processing blade are the following controls and indicators:

- **Call Home** (button) and **ID** (LED) - can be used to identify the hardware in the HOME Web UI.
- **Reset** (recessed button) - can be used to power cycle the processing blade.
- **USB-C** (port) - can be connected to perform diagnostics from a service computer.
- **Card Status** (LED) - shows the health of the processing blade (and chassis on the master blade).

For more information, see [.edge - Controls, Connectors and Indicators](#).

Ordering Information

A processing blade can be ordered using the part numbers **.edge_gateway** (for a complete SDI I/O package) or **A00/40** (for a replacement blade). See [.edge - Ordering Information](#).

Further Information

For information about the supported IP standards, see [.edge - Technical Specification](#).

Additional information such as mechanical drawings and data sheets can be located using the type number: A00/40.

3.6 .edge - Optical Transceivers

To use the network ports on a processing blade, you must fit the correct optical transceivers. These must be Lawo-certified and ordered separately from the blade/frame. You will need:

- 1 x SFP28 - for each 25GbE media port (SFP 1 to 4).
- 1 x QSFP28 - for each 100GbE media port (QSFP1 & QSFP2).
- 1 x SFP - for each 1GbE management port (MGMT 1 & 2).

Note that, while it is possible to fit transceivers to all six media ports, only one operating mode can be active: either **4 x 25G (via SFP28)** or **2 x 100G (via QSFP28)**.

The image below shows the front of a processing blade as it is delivered, with all transceiver cages empty and the dust caps fitted.

.edge - Processing Blade (front view)



Lawo-Certified SFP, SFP28 and QSFP28 Modules

The tables below describe the Lawo-certified optical transceivers.

(E) WARNING

- If a device has SFP slots, the UL approval of the device is valid only if the used SFP modules are UL-certified and comply with the category NWGQ, NWGQ2, AZOT, or AZOT2. The classification of SFPs must be FDA 21 CFR 1010 or CFR 1040 for products with laser class 1 (I) or IEC 60825-2 for products with LED class 1.
- For all other approvals of the device (e.g. CE), the SFP used must have the classification according to IEC 60825-2 for LED class 1 products.

(F) ATTENTION

- Si un appareil possède des emplacements SFP, l'homologation UL de l'appareil n'est valable que si les modules SFP utilisés sont certifiés UL et conformes à la catégorie NWGQ, NWGQ2, AZOT ou AZOT2. La classification des SFP doit être conforme à la norme FDA 21 CFR 1010 ou CFR 1040 pour les produits avec laser de classe 1 (I) ou IEC 60825-2 pour les produits avec LED de classe 1.
- Pour toutes les autres homologations de l'appareil (par exemple CE), le SFP utilisé doit avoir la classification selon IEC 60825-2 pour les produits à LED de classe 1.

Options for SFP 1 to 4 (25GbE media ports)

Please order 1 x SFP28 for each media port you wish to use. e.g. 4 x SFP28 for redundant 25Gbps operation.

If the processing blade is set to operate at 100Gbps, then these ports are inactive (and the cages can be left empty with the dust caps fitted).

Part Number	Description	Notes
.edge_sfp28sr	1 x 25GbE SFP28: short-range (100m) optical transceiver.	Up to 4 per blade.



Part Number	Description	Notes
.edge_sfp28lr	1 x 25GbE SFP28: long-range (10km) optical transceiver.	Up to 4 per blade.

Options for QSFP 1 & 2 (100GbE media ports)

Please order 1 x QSFP28 for each media port you wish to use. e.g. 2 x QSFP28 for redundant 100Gbps operation.

If the processing blade is set to operate at 25Gbps, then these ports are inactive (and the cages can be left empty with the dust caps fitted).

Part Number	Description	Notes
.edge_qsfp28sr	1 x 100GbE QSFP28: short-range (100m) optical transceiver.	Up to 2 per blade.
.edge_qsfp28lr	1 x 100GbE QSFP28: long-range (10km) optical transceiver.	Up to 2 per blade.

Options for MGMT 1 & 2 (1GbE management ports)

Please order 1 x SFP for each management port you wish to use. e.g. 2 x SFP for redundant control.

Note that the management ports can be addressed via the media ports/network once the initial setup is complete. In this instance, the cages can be left empty with the dust caps fitted.

Part Number	Description	Notes
edge_rj45	1 x 1000 BASE-T SFP: Copper, RJ45 short-range (100m) optical transceiver	Up to 2 per blade.
.edge_sfpsr	1 x 1000 BASE-SX SFP: short-range (100m) optical transceiver	Up to 2 per blade.
.edge_sfplr	1 x 1000 BASE-LX SFP: long-range (10km) optical transceiver	Up to 2 per blade.

Further Information

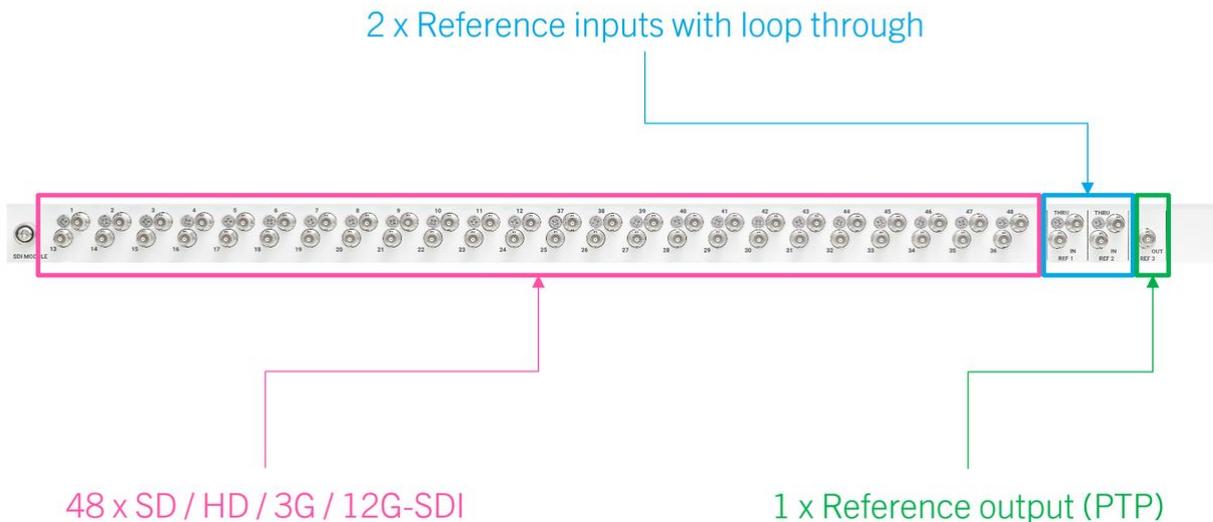
For additional technical information, see [_edge - Technical Specification](#).

3.7 .edge - Rear I/O Plates

At the rear of the frame are the I/O plates (up to 4 per frame). Each plate is equipped with 48 x HD-BNC (for SDI interfacing) + 5 x HD-BNC (for external synchronization).

- ✓ The rear I/O plates are hot-pluggable and so it is possible to add or replace a plate while the frame is powered. See [Fitting a Rear I/O Plate](#) for instructions.

.edge Rear I/O Plate



SDI Interfacing

Each rear I/O plate is equipped with 48 x HD-BNC for SDI interfacing.

Available SDIs

The number of available SDIs is determined by the number of ".edge_sdi" licenses (on the processing blade).

When a processing blade is ordered using the ".edge_gateway" part number, it comes with a rear I/O plate and a single ".edge_sdi_inc" license (to enable 16 SDI interfaces). This can be expanded by adding either one or two ".edge_sdi" licenses (to enable 32 or 48 SDI interfaces). Thus, there are three licensing options for each blade:

- **Base system** (1 x .edge_sdi_inc license is included) = **16 x SDI**.
- **Option 1** (adds 1 x .edge_sdi license) = **32 x SDI**.
- **Option 2** (adds 2 x .edge_sdi licenses) = **48 x SDI**.

Configuration Presets

In each case, the user can choose one of three presets to determine the number of SDI inputs versus outputs. This provides nine possible configurations for each blade/plate:

- **Base system (16 x SDI)**
 - Preset 1 = 8 in + 8 out
 - Preset 2 = 4 in + 12 out
 - Preset 3 = 12 in + 4 out
- **Option 1 (32 x SDI)**
 - Preset 1 = 16 in + 16 out
 - Preset 2 = 8 in + 24 out



- Preset 3 = 24 in + 8 out
- **Option 2 (48 x SDI)**
 - Preset 1 = 24 in + 24 out
 - Preset 2 = 16 in + 32 out
 - Preset 3 = 32 in + 16 out

12G-Capable SDIs

While all connectors provide full support for SD, HD, 3G and 12G signals, the number of simultaneous 12G streams is defined by the bandwidth of the network interfaces. This means that, in the current release, there is a limit on the number of 12G-capable SDI inputs and outputs:

- **Base system:** up to **4 x 12G-SDI**.
- **Option 1 license:** up to **8 x 12G-SDI**.
- **Option 2 license:** up to **12 x 12G-SDI**.

The 12G- capable inputs and outputs are indicated by a solid connector in the connectivity diagrams below. To connect a 12G-SDI signal, there are two possibilities:

- Connect a single-link 12G-SDI signal to a solid connector (1, 5, 9, etc.) and leave the other three connectors in the block unused.
- Or, if using 3G UHD gearboxing, connect the 4 x 3G-SDI signals to a quad-link block: 1-4, 5-8, 9-12, etc. This option requires a ".edge_gbox" license for each quad-link instance.

In both cases, if you wish to add input frame synchronization, you will need to purchase 4 x input frame sync licenses for each 12G instance.

Connectivity

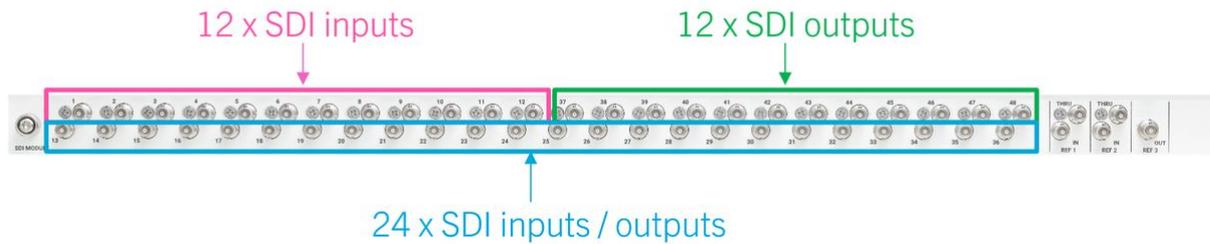
The table below describes the rear I/O plate connectivity for each license option and configuration preset.

SDI Interfacing Bundle	Active Licenses (on Blade)	Available SDIs (on Rear I/O)	SDI in/out option (for Rear I/O)
Base system (comes as standard)	1 x .edge_sdi	16 x SDI	<p>Configuration Preset 1: 8 inputs, 8 outputs*</p> <p>Configuration Preset 2: 4 inputs, 12 outputs*</p> <p>Configuration Preset 3: 12 inputs, 4 outputs*</p>
Option 1 (adds 1 x .edge_sdi license)	2 x .edge_sdi	32 x SDI	<p>Configuration Preset 1: 16 inputs, 16 outputs*</p> <p>Configuration Preset 2: 8 inputs, 24 outputs*</p> <p>Configuration Preset 3: 24 inputs, 8 outputs*</p>
Option 2 (adds 2 x .edge_sdi licenses)	3 x .edge_sdi	48 x SDI	<p>Configuration Preset 1: 24 inputs, 24 outputs*</p> <p>Configuration Preset 2: 16 inputs, 32 outputs*</p> <p>Configuration Preset 3: 32 inputs, 16 outputs*</p>
			*Solid connectors indicate 12G-capable inputs and outputs.

Q: Why do the connector numbers jump from 12 to 37?

A: On each rear I/O plate, the top row of connectors is directional and the bottom row is bi-directional. This means that, for example, the thirteenth connector on the top row can only ever operate as an SDI output.

.edge Rear I/O Plate



The numbering scheme has been chosen so that all of the SDI inputs (1 to x) are followed by all of the SDI outputs (y to 48), regardless of the configuration preset.

For external wiring purposes, it is useful to know that...

- Connectors 1 to 12 are *always* SDI inputs.
- Connectors 37 to 48 are *always* SDI outputs.
- For the remaining connectors (13 to 36), the direction is software-defined (by the configuration preset). The possible options are shown in the table above.

Cabling

Before cabling the connectors, please read the following important safety information.

⚠ (E) WARNING

Section 5.7.7 of IEC 62368 (Ed. 2) specifies that a device must be connected to an additional fixed protective ground if it is conductively connected with more than 20 other devices. e.g. has more than 20 copper I/O connections.

For more information, see [.edge - Grounding](#).

⚠ (F) AVERTISSEMENT

La section 5.7.7 de la norme CEI 62368 (Ed. 2) spécifie qu'un dispositif doit être connecté à une terre de protection fixe supplémentaire s'il est connecté de manière conductrice avec plus de 20 autres dispositifs, par exemple s'il possède plus de 20 connexions E/S en cuivre.

Pour plus d'informations, voir [.edge - Mise à la terre](#).

Reference Inputs and Outputs

For external synchronization, there are 5 x HD-BNC connectors: 2 x REF IN, 2 x REF THRU and 1 x REF OUT.

- The two reference inputs can be used to connect up to two external sync reference signals. In each case, the THRU connector provides a "looped-through" output of the corresponding IN.
- The REF OUT is always active and provides an output of the current reference: External IN 1, External IN 2, PTP or Internal (free-run).

The current reference can be changed using the HOME Web UI. For more information, see [.edge - Synchronization](#).

Ordering Information

A rear I/O plate can be ordered using the part numbers **.edge_gateway** (for a complete SDI I/O package) or **A00/50-11** (for a replacement I/O plate). See [.edge - Ordering Information](#).



Specifications

For information about the SDI and reference standards, supported formats, return loss and cable lengths, see [.edge - Technical Specification](#).

3.8 .edge - Ordering Information

The table below lists the part numbers for .edge. You will need these to specify a new system, expand an existing system (via hardware or software) or order replacement parts.

When specifying a new system, please follow these steps:

1. Choose a **frame variant** - to order a frame with either AC or DC power supplies and a rack-mounting kit.
2. Add up to 4 x **.edge_gateway** - to populate the frame. Each .edge_gateway includes 1 x processing blade + 1 x rear I/O plate + 1 x .edge_sdi_inc software license (for 16 x SDI I/Os).
3. Add the required **software licenses** - to unlock more resources (on each processing blade).
4. Don't forget to add **optical transceivers** - to use the network ports (on each blade).

Alternatively, you can choose one of the hardware and software **bundles** to order a complete multi-frame package.

To expand a partially-fitted frame, use **.edge_gateway** (to include the processing blade, rear I/O plate and 1 x SDI license).

To order a replacement part, see **spare parts**.

.edge	Part Number	Description	Notes
Frame Variants	.edge_frame+ac+rails1	.edge frame fitted with 2 x AC power supplies + 1 x fan tray. Includes 1 x rack-mounting kit with 800-900mm rails.	.edge gateway(s) must be ordered separately. Each kit includes 1 x Torx10 driver + 1 x HD-BNC removal tool.
	.edge_frame+ac+rails2	.edge frame fitted with 2 x AC power supplies + 1 x fan tray. Includes 1 x rack-mounting kit with 600mm rails.	
	.edge_frame+dc+rails1	.edge frame fitted with 2 x AC power supplies + 1 x fan tray. Includes 1 x rack-mounting kit with 800-900mm rails.	
	.edge_frame+dc+rails2	.edge frame fitted with 2 x AC power supplies + 1 x fan tray. Includes 1 x rack-mounting kit with 600mm rails.	
Frame Components	.edge_gateway	1 x .edge processing blade + 1 x rear I/O plate + 1 x .edge_sdi_inc license (for 16 x SDI).	Up to 4 per frame. Excludes the optical transceivers.
Software Licenses	.edge_sdi_inc	Enables 16 x SDI interfaces.	Included with .edge_gateway.
	.edge_sdi	Enables an additional 16 x SDI interfaces.	Up to 2 per blade.
	.edge_fsync	Enables input frame synchronization for a single SDI input.	Up to 48 per blade.



.edge	Part Number	Description	Notes
	.edge_gbox	Enables 3G UHD gearboxing for a quad-link 3G-SDI signal (input or output).	Up to 12 per blade.
	.edge_100g	Enables the 2 x 100GbE option for the media network interfaces.	1 per blade.
	.edge_gw_all	This license bundle enables the full feature set of a processing blade. Includes: 2 x .edge_sdi, 48 x .edge_fsync, 12 x .edge_gbox, 1 x .edge_100g.	1 per blade.
All software licenses are perpetual and locked to an individual processing blade. For more information, see .edge - Licensed Feature Sets .			
Optical Transceivers	.edge_sfp28sr	1 x 25GbE SFP28: short-range (100m) optical transceiver.	Up to 4 per blade, fitted to SFP ports.
	.edge_sfp28lr	1 x 25GbE SFP28: long-range (10km) optical transceiver.	
	.edge_qsfp28sr	1 x 100GbE QSFP28: short-range (100m) optical transceiver.	Up to 2 per blade, fitted to QSFP ports.
	.edge_qsfp28lr	1 x 100GbE QSFP28: long-range (10km) optical transceiver.	
	edge_rj45	1 x 1000 BASE-T SFP: Copper, RJ45 short-range (100m) optical transceiver	Up to 2 per blade, fitted to MGMT ports.
	.edge_sfpsr	1 x 1000 BASE-SX SFP: short-range (100m) optical transceiver	
	.edge_sfp1r	1 x 1000 BASE-LX SFP: long-range (10km) optical transceiver	
Active Optical Cables	.edge_sfp28-qsfp28_aoc5m	4 x 25GbE SFP28 to 1 x 100GbE QSFP28 active optical cable (5m).	
	.edge_qsfp28_aoc5m	1 x 100GbE QSFP28 active optical cable (5m).	
Bundles	.edge_96x96	.edge Bundle 96x96* Includes: 4 x .edge_gateway + 8 x .edge_sdi + 1 x .edge_frame (ac or dc) + 1 x HOME cluster license + 3 x Dell R340 servers.	Excludes the optical transceivers.



.edge	Part Number	Description	Notes
	.edge_144x144	.edge Bundle 144x144* Includes: 6 x .edge_gateway + 12 x .edge_sdi + 2 x .edge_frames (ac or dc) + 1 x HOME cluster license + 3 x Dell R340 servers.	
	.edge_288x288	.edge Bundle 288x288* Includes: 12 x .edge_gateway + 24 x .edge_sdi + 3 x .edge_frames (ac or dc) + 1 x HOME cluster license + 3 x Dell R340 servers.	
	.edge_576x576	.edge Bundle 576x576* Includes: 24 x .edge_gateway + 48 x .edge_sdi + 6 x .edge_frames (ac or dc) + 1 x HOME cluster license + 3 x Dell R340 servers.	
	.edge_1152x1152	.edge Bundle 1152x1152* Includes: 48 x .edge_gateway + 96 x .edge_sdi + 12 x .edge_frames (ac or dc) + 1 x HOME cluster license + 3 x Dell R340 servers.	
*The number of crosspoints is specified for SD and HD operation (at 25G). Each bundle is a complete multi-frame system, with a HOME server cluster. The HOME cluster license supports up to 50 devices.			
Spare Parts	A00/10-54	1 x .edge frame (fitted with removable fan tray + blanking panels).	Spare part only. New systems must be ordered using the frame variants listed above (to ensure they include PSUs and a rack-mounting kit).
	A00/40	1 x .edge processing blade (hardware only; no software licenses).	Spare part only. To expand a partially-fitted frame, use .edge_gateway.
	A00/50-11	1 x .edge rear I/O plate.	
	PSU sparepart Murata	1 x .edge AC power supply.	A frame must be fitted with two identical power supplies (as described earlier).
	PSU sparepart 48V DC	1 x .edge DC power supply.	
	A00/10-55	1 x .edge fan tray.	Spare part only.
Accessories	.edge_frame_blind_plate_front	1 x blanking panel for the front (processing blade) slots.	



.edge	Part Number	Description	Notes
	.edge_frame_blind_plate_rear	1 x blanking panel for the rear (I/O plate) slots.	
	.edge_frame+rails2	1 x .edge frame rack-mounting kit with 600mm rails.	
	.edge_frame+rails1	1 x .edge frame rack-mounting kit with 800-900mm rails.	
	.edge_frame+hdbnc1	1 x HD-BNC removal tool 1 (TG)	
	.edge_frame+hdbnc2	1 x HD-BNC removal tool 2 (AMP).	
	500-1070-000	1 x Lawo Torx10 driver.	
	microSD8G	1 x .edge SD Card (micro SD-Card, 8GB).	
IEC power cables	Various	A list of permitted IEC power cables can be found in .edge - Power Supplies .	

4 .edge - Licensed Feature Sets

The functionality of each processing blade is unlocked by a series of software licenses.

Firstly, the number of ".edge_SDI" licenses determines the number of active SDIs (on the rear I/O plate). Secondly, the advanced feature licenses can be used to unlock the Input Frame Synchronization, Video Gearboxing and 100Gbps operation (including 3G and UHD format support).

i All software licenses are perpetual and locked to an individual processing blade.

The available licenses are determined by a licensing file that must be uploaded to the processing blade. Once this is in place, the user can choose which licenses are active, or how they are assigned, using the HOME Web UI.

For more information on the activation procedure, see [License Activation](#). Here we describe how the licensing model works for each option.

4.1 Software License Options

In the current release, there are four features of .edge that require a valid license (or licenses):

- Additional SDI Interfacing
- Input Frame Synchronization
- Video Gearboxing
- 100Gbps operation + 3G and UHD format support

SDI Interfacing

The **.edge_sdi** software license enables 16 x SDI interfaces on the rear I/O plate.

Each **.edge_gateway** processing blade comes with a single **.edge_sdi_inc** license (for 16 x SDIs). The number of SDIs can be expanded by adding one or two **.edge_sdi** licenses (for 32 or 48 x SDIs).

Licensing Requirements:

- 1 x **.edge_sdi_inc** license is included (per blade).
- Up to 2 x **.edge_sdi** licenses can be added (per blade).

Input Frame Synchronization

The **.edge_fsyc** software license enables input frame synchronization for a single SDI input. It allows the user to adjust the timing of an SDI input as follows:

- Video: 1 frame adjustable delay in line OR pixel granularity + one subsequent frame sync (= maximum delay of 2 frames).
- Audio: up to 250 seconds applied to all channels of the SDI audio essence.

Licensing Requirements:

- For SD and HD, you will need 1 x **.edge_fsyc** license for each SDI input.
- For UHD (single-link 12G-SDI or quad-link 3G-SDI), you will need 4 x **.edge_fsyc** licenses for each 12G instance.
- Up to 48 x **.edge_fsyc** licenses are possible (per blade).

Video Gearboxing

The **.edge_gbox** software license enables 3G UHD gearboxing for a quad-link 3G-SDI signal (input or output). It allows you to connect 4 x 3G-SDI inputs or outputs to transport a 12G signal (also known as quad-link 3G-SDI).

Licensing Requirements:



- Requires 1 x .edge_gbox license for each input or output instance.
- The 4 x 3G-SDI signals must connect to one of the 12G-capable rear I/O blocks: 1-4, 5-8, 9-12, etc.
- Up to 12 x .edge_gbox licenses are possible (per blade).

Additional Notes:

- The .edge_gbox license supports SDQS (Square Division Quad Split), 2SI, and 4 x super slow motion. Includes VPID insertion on the output interface (2-sample interleave, SMPTE ST352 payload identification).
- The .edge_gbox license also includes the UHD Link Rotate feature: Automatic reshuffling of a four-wire 3G-SDI link whose cables were connected in the wrong order (based on 2-sample interleave signal identifiers).
- This license is not required for a single-link 12G signal.

100G Operation

The **.edge_100g** software license enables the 2 x 100GbE option for the media network interfaces. It allows the processing blade to operate at 100Gbps and enables support of 3G and 12G format signals.

Licensing Requirements:

- Requires 1 x .edge_100g license (per blade).

4.2 Software License Bundle

The **.edge_gw_all** license bundle can be purchased to enable the full feature set of a processing blade. The package includes:

- 2 x .edge_sdi licenses: to enable all 48 SDI interfaces (on the rear I/O plate)
- 48 x .edge_fsync licenses: to enable input frame synchronization on every SDI input.
- 12 x .edge_gbox licenses: to enable video gearboxing for every possible quad-link 3G-SDI input/output.
- 1 x .edge_100g license: to enable the 2 x 100GbE option for the media network interfaces as well as 3G and UHD format support.

4.3 Ordering Information

The software licenses can be ordered either individually or as part of a bundle. See [.edge - Ordering Information](#).



5 .edge - Installation

This chapter describes how to install the .edge hardware.

5.1 .edge - Installation Instructions

We recommend that you read all of this chapter in full before starting the installation. Any product-specific tools, such as Torx drivers, can be found in the Lawo tool case delivered with your system.

Mechanical drawings and data sheets (including weights and dimensions) are available from the [Lawo Download-Center](#) (after login).



(E) WARNING

Please read and observe ALL of the [Lawo - Important Safety Instructions](#) BEFORE installing or servicing any component.



(F) AVERTISSEMENT

Veuillez lire et respecter TOUTES [les consignes de sécurité importantes](#) AVANT d'installer ou d'entretenir un composant.

Once you are ready to begin, it is recommended to complete the tasks in the following order.

- [Unpack](#)
- [Fit the Processing Blades and Rear I/O Plates](#)
- [Install the Frame](#)
- [Fit the Optical Transceivers](#)
- [Cable the system](#)
- [Check the synchronization](#)

The rest of this chapter describes each task in more detail.

If you need further assistance, the Lawo Support Department can be contacted by email at support@lawo.com, or by telephone during normal working hours - please visit the [Support](#) area of the Lawo website for the most up-to-date contact details.



5.2 .edge - Unpacking

Each .edge frame is delivered in its own box with all included accessories. If additional processing blades and rear I/O plates have been ordered, then these are packaged separately, along with the optical transceivers.

The license codes for all software licenses can be found on the [delivery note \(included with the shipment\)](#).

A list of serial numbers for the hardware components is also included. Please keep this list for your records.

Please check the contents of the shipping boxes, and in the event of any transport damage, contact your local Lawo representative or email support@lawo.com.

Packing List

The contents of the shipment will vary depending on the component(s) ordered. Here we describe each of the main frame variants and .edge_gateway. For more information about how to specify a system, see [.edge - Ordering Information](#).

Included

Packing list for **.edge_frame+ac+rails1** and **.edge_frame+ac+rails2**:

- 1 x .edge frame fitted with 2 x AC power supplies + 1 x fan tray.
- 1 x rack-mounting kit (either 600mm or 800-900mm) - to mount the frame into the equipment rack.
- 2 x IEC power cables (country-specific) - to connect mains to the AC power supplies.
- 4 x front slot blanking panels - to close the slots at the front of the frame.
- 4 x rear slot blanking panels - to close the slots at the rear of the frame.
- 1 x Lawo toolkit - including a Torx10 driver and HD-BNC removal tool, for performing installation and service procedures.

Packing list for **.edge_frame+dc+rails1** and **.edge_frame+dc+rails2**:

- As above, but the frame is fitted with 2 x DC power supplies (instead of 2 x AC power supplies).
- The IEC power cables are not included.

Packing list for **.edge_gateway**:

- 1 x .edge processing blade - to connect the blade to the network (and perform all SDI conversion and signal processing).
- 1 x .edge rear I/O plate - to connect the blade to the external SDI and sync reference devices.
- 1 x .edge_sdi_inc software license - to activate 16 x SDI I/Os.

As a first step, the processing blades and rear I/O plates should be fitted into the frame. See [Fitting a Processing Blade](#) and [Fitting a Rear I/O Plate](#) for instructions.

Not Included

The following items are not included and must be provided by the customer or installer:

- Ethernet cable(s), optical and/or copper - to connect the media and management ports to the network switch.
- Micro HD-BNC cable(s) - to connect the SDI and Reference ports to the external devices.

5.3 .edge - Installing the Frame

.edge is designed for indoor use in a dust-free environment. The frame should be mounted, horizontally, in a 19-inch equipment rack (as described below).

Before mounting the frame, it is important to understand how the device is cooled to ensure that the final installation meets the airflow requirements.

For dimensions, weight and power, see [.edge - Technical Specification](#).

If the frame is fitted with DC power supplies, then you must observe all of the DC power supply conditions (described [earlier](#)).

Airflow Requirements

.edge is cooled by five temperature-controlled fans (fitted behind the front grill).

Air is taken in from the front and blown out, across the processing blades, to the right. The image below shows the direction of airflow.



(E) ATTENTION

- DO NOT obstruct the ventilation holes as to do so will prevent efficient cooling.
- If the maximum operating temperature of +30°C (+86°F) is exceeded, then the power to the processing blades is cut (to prevent damage to the FPGAs due to overheating). In this instance, all operations will stop until the unit has reached a safe temperature.

(F) ATTENTION

- N'obstruez PAS les trous de ventilation, car cela empêcherait un refroidissement efficace.
- Si la température maximale de fonctionnement de +30°C (+86°F) est dépassée, l'alimentation des lames de traitement est coupée (pour éviter d'endommager les FPGA en raison d'une surchauffe). Dans ce cas, toutes les opérations s'arrêteront jusqu'à ce que l'unité ait atteint une température sûre.

Rack Requirements

To support the weight of the device, the frame must be attached to the equipment rack at both the front and rear. This is achieved as follows.

- The front of the frame attaches to the front of the rack using the mounting screws provided.
- At the rear, the frame must be fitted with a rack-mounting kit (as described below).

Connectors are located at the front and rear of the unit. Therefore, when using 19-inch racks with doors please leave enough room for the cables (and airflow).

Due to the position of the ventilation holes, it is ok to install other rack-mounted units either directly above or below the .edge frame.

Installing the Processing Blades and I/O Plates

As standard, the frame is delivered with blanking panels to close the front and rear slots. Therefore, before mounting the frame, you must fit the processing blades and rear I/O plates.

How to do this is described later. See [Fitting a Processing Blade](#) and [Fitting a Rear I/O Plate](#).

Mounting Instructions

To mount the frame, please read the following important safety information and then follow the step-by-step instructions.

(E) WARNING

Please read and observe ALL of the [Important Safety Instructions](#) BEFORE installing the frame.

(F) AVERTISSEMENT

Veillez lire et respecter TOUTES [les consignes de sécurité importantes](#) AVANT d'installer le cadre.

(E) CAUTION

- The frame must be installed using one of the rear rack-mounting kits provided (to support the weight of the device).
- DO NOT install the frame into a rack with slide rails (as to do so will block the hot air outlet and prevent efficient cooling).
- Leave enough space at the front of the frame (for the connectors, cables and cold air intake).
- Leave enough space at the rear of the frame (for the connectors and cables).
- Leave enough space at the right side of the frame (for the hot air outlet).
- DO NOT block the front or side ventilation holes.

(F) ATTENTION

- Le châssis doit être installé à l'aide de l'un des kits de montage en rack arrière fournis (pour supporter le poids de l'appareil).
- NE PAS installer le châssis dans un rack avec des glissières (car cela bloquerait la sortie d'air chaud et empêcherait un refroidissement efficace).
- Laissez suffisamment d'espace à l'avant du cadre (pour les connecteurs, les câbles et la prise d'air froid).
- Laissez suffisamment d'espace à l'arrière du cadre (pour les connecteurs et les câbles).
- Laissez suffisamment d'espace sur le côté droit du cadre (pour la sortie d'air chaud).
- N'obstruez PAS les orifices de ventilation frontaux ou latéraux.

1. Start by fitting the rack-mounting kit to the rear of the .edge frame.

There are two kits available to support different rack depths. The kit supplied with your frame is specified at the time of order (as part of the frame variant). If you need to order a different kit, then please use the Accessory part numbers listed in [.edge - Ordering Information](#).

The mechanical drawings below show the parts supplied for each option.

Rack-mounting Kit	Mechanical Drawings
.edge frame rack-mounting kit (600mm)	A00_10_57_00_Rack mounting rear kit 600mm.pdf
.edge frame rack-mounting kit (800-900mm)	A00_10_58_00_Rack mounting rear kit 800-900mm.pdf

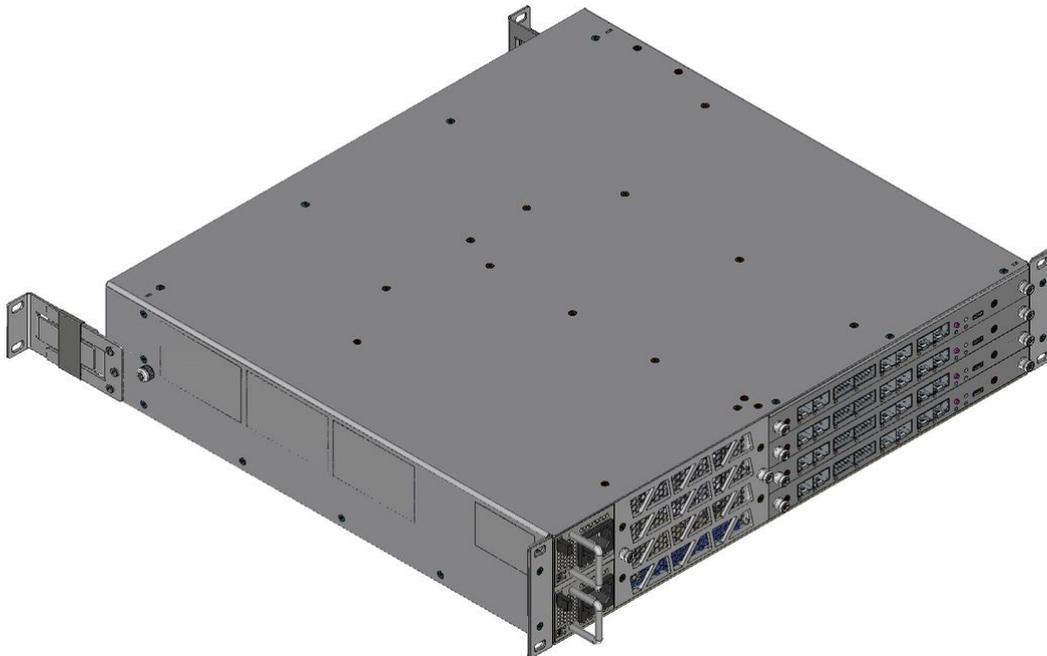
Each kit contains:

- 2 x rack-mounting brackets/rails with ears - to span the gap between the rack and frame.
- 6 x screws (M3x4) - to secure the brackets to the frame.

Using the screws provided, fix the brackets to the rear of the frame. There are six screws in total: three for each bracket.

The image below shows the final assembly when using the shorter (600mm) rack-mounting rails.

.edge Frame (fitted with rear rack-mounting kit)



2. Fix the front of the frame to the rack using the mounting screws provided.

There are four holes/screws in total: two for each side of the unit.

3. Fix the rear rack-mounting brackets to the rack using the mounting screws provided.

There are four holes/screws in total: two for each bracket.

The image below shows how one side of the rear installation should look when using the longer (800-900mm) rack-mounting rails.

Rack-mounting of .edge Frame (view from rear)



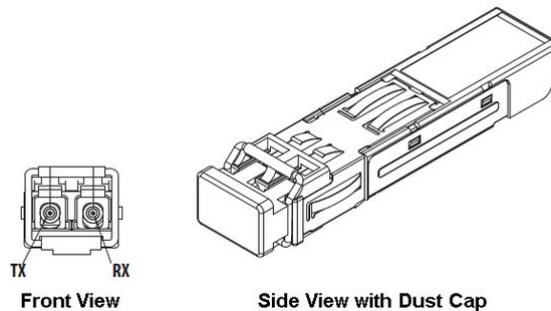
5.4 .edge - Fitting the Optical Transceivers

In order to connect a processing blade to the network, it must be fitted with the correct optical transceivers. These must be Lawo-certified (as described [earlier](#)).

Overview

The optical transceivers are hot-pluggable, so they can be fitted or exchanged while the device is powered.

When fitting modules of different types (e.g. SFP, SFP28 & QSFP28), take care not to mix up the modules. The image below shows an example of an optical transceiver.



SFP Installation

Before fitting or removing a transceiver, please read and observe the following important safety information.

(E) CAUTION

This equipment may use Class 1 Laser products. It emits invisible laser radiation that may lead to eye injury.

- Never look directly into optical components or optical fibre cables.
- Keep optical components closed by protection plugs when unused.
- For your safety connect all fibre cables first before turning on the equipment.

(F) ATTENTION

Cet équipement peut utiliser des produits laser de classe 1. Il émet un rayonnement laser invisible qui peut entraîner des lésions oculaires.

- Ne regardez jamais directement dans les composants optiques ou les câbles à fibres optiques.
- Gardez les composants optiques fermés par des bouchons de protection lorsqu'ils ne sont pas utilisés.
- Pour votre sécurité, connectez d'abord tous les câbles à fibres optiques avant d'allumer l'équipement.

(E) IMPORTANT NOTE

- Before removal, please unlock the transceiver to avoid mechanical damage to the slots.
- If a transceiver is removed, please refit the device's dust cap to protect the internal components.
- When fitting an optical transceiver, you must use the correct fiber type for your remote device. Using the wrong fiber type, or exceeding the maximum optical input power, can result in a malfunction of, or damage to, the device.

Instructions (for insertion)

SFP modules must only be inserted when there is no cable connected.

1. Disconnect the cable from the SFP module or remove its dust cap (as applicable).

We recommend that you label the cable before it is disconnected (for easy reconnection to the correct port at a later time).

Please watch out for locks on the cable connector, and unlock these to release the cable. In some cases, this must be done while pulling the cable out of the SFP.

You must take care to prevent electrostatic discharge to the SFP module. This can be done by grounding yourself and taking ESD measures. Do not touch the contacts of the SFP.

When disconnecting the cable from an optical transceiver, take care to cover the unplugged optical cable with a dust cap.

2. Remove the dust cap from the SFP cage on the device.

Any spare dust caps should be stored carefully so that they can be replaced if a module is removed.

3. Before inserting the SFP, flip the extraction lever (at the front) up to its rest position.
4. Slide the SFP gently into the slot.

Please note: if the SFP is upside down, then it will not glide in easily.

The SFP module must slide in smoothly without force. When done correctly, the contacts of the SFP glide into the contacts of the device. At this moment, press firmly until the module locks into position (you will hear a click).

5. Check that the SFP is locked by pulling on it without lifting the extraction lever.
 - If the module cannot be removed, it is installed correctly.
 - If the module can be removed, then check its orientation: perhaps the SFP is inserted upside down.
 - Repeat step 4 until the module is securely latched into the SFP cage.
6. After inserting an optical transceiver, take care to immediately connect the optical cable or fit a dust cap.

When connecting a cable, make sure that the cable connector locks into position correctly (you will hear a click).

Instructions (for removal)

SFP modules must only be removed when there is no cable connected.

1. Disconnect the cable from the SFP module.

We recommend that you label the cable before it is disconnected (for easy reconnection to the correct port at a later time).

As before, watch out for locks on the cable connector, and unlock these to release the cable. In some cases, this must be done while pulling the cable out of the SFP.

You must take care to prevent electrostatic discharge to the SFP module. This can be done by grounding yourself and taking ESD measures. Do not touch the contacts of the SFP.

When disconnecting the cable from an optical transceiver, take care to cover the unplugged optical cable with a dust cap.

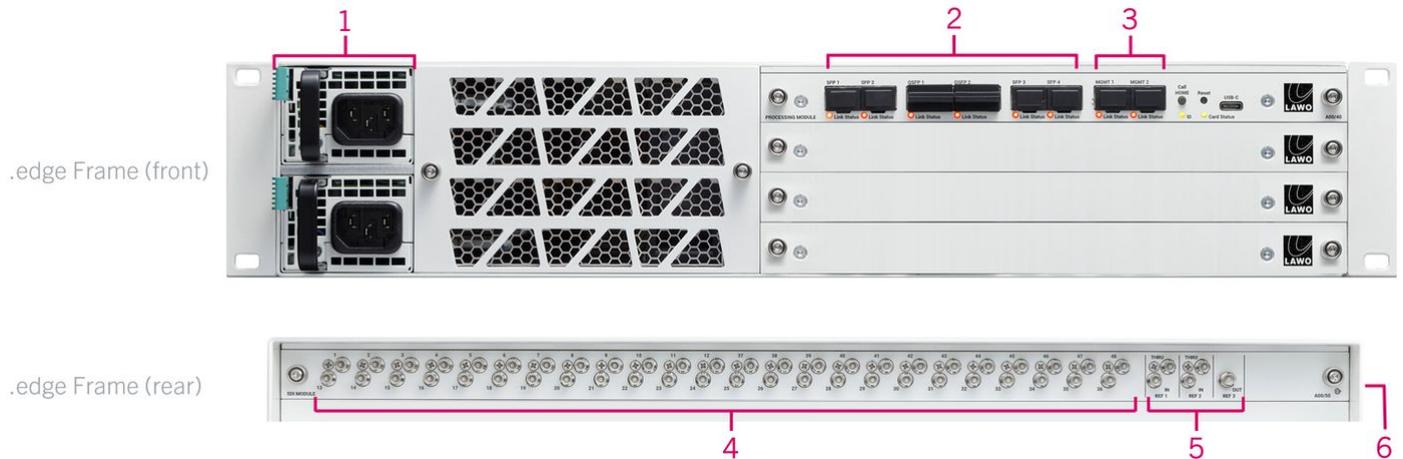
2. Before removing the SFP, flip the extraction lever (at the front) down. Then use the lever to pull out the SFP.
3. Pull firmly until the contacts of the SFP glide out of the contacts of the device.

From this point onwards, the SFP must slide out smoothly without force.

4. After removing the SFP module, take care to refit a dust cap immediately to the device's SFP cage (to protect the internal components) and to the SFP module (if the transceiver is optical).

5.5 .edge - Wiring

Once the frame is populated and mounted, you are ready to cable the device. This topic describes all possible connections to the .edge frame. To configure the system, only power (1) and control (3) are required.



1. AC Power (2 x IEC)

See [.edge - Power Supplies](#).

2. Media Network Ports: either 4 x 25GbE (via SFP28) or 2 x 100GbE (via QSFP28)

The first six network interfaces connect the processing blade's IP streams to the media network.

While it is possible to connect all six ports, only one set of ports is active: either SFP 1 to 4 or QSFP 1 & 2.

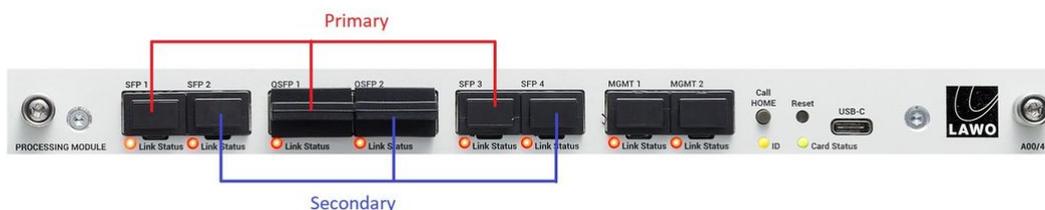
- **SFP 1 to 4** – active in 25G mode: 4 x 25GbE (via SFP28).
- **QSFP 1 & 2** – active in 100G mode: 2 x 100GbE (via QSFP28).

By default, every processing blade is set to operate at 25G. If a valid 100G license is available, then a blade can be set to operate at either 25G or 100G.

For each stream, you can decide whether it will be transmitted or received via the primary or secondary port. To achieve redundant streaming, you must use both interfaces.

To use the network ports, you must fit the correct optical transceivers. These must be Lawo-certified (as described [earlier](#)). The optical transceiver determines the cable type, maximum distance and connector.

The image below shows the location of the primary and secondary interfaces.



3. Management Network Ports: 2 x 1GbE (via SFP)

The two MGMT ports are used for administration and control.

At least one port must be connected initially to configure the blade's network settings. The ports can then be used to connect the processing blade to a dedicated management network (if you are using out-of-band control):

- **MGMT 1 & 2** – always active: 2 x 1GbE (via SFP).



To achieve redundant control, you must use both interfaces.

If you are using in-band control, then the management ports are addressed via the media ports/network (and the physical MGMT ports can be left unconnected).

To use the network ports, you must fit the correct optical transceivers. These must be Lawo-certified (as described [earlier](#)). The optical transceiver determines the cable type, maximum distance and connector.

4. SDI Interfaces (48 x HD-BNC)

See [.edge - Rear I/O Plates](#).

5. Reference Interfaces (5 x HD-BNC)

For external synchronization, there are 5 x HD-BNC connectors: 2 x REF IN, 2 x REF THRU and 1 x REF OUT.

- The two reference inputs can be used to connect up to two external sync reference signals. In each case, the THRU connector provides a "looped-through" output of the corresponding IN.
- The REF OUT is always active and provides an output of the current reference: External IN 1, External IN 2, PTP or Internal (free-run).

The current reference can be changed using the HOME Web UI. For more information, see [.edge - Synchronization](#).

6. Grounding Screw (M5x12)

A grounding screw is provided on the right side of the frame (when viewed from the rear). See [.edge - Grounding](#) for more information about the safety requirements.

5.6 .edge - Synchronization

Each processing blade can sync to an external reference signal, PTP arriving from the media network or its own internal sync generator.

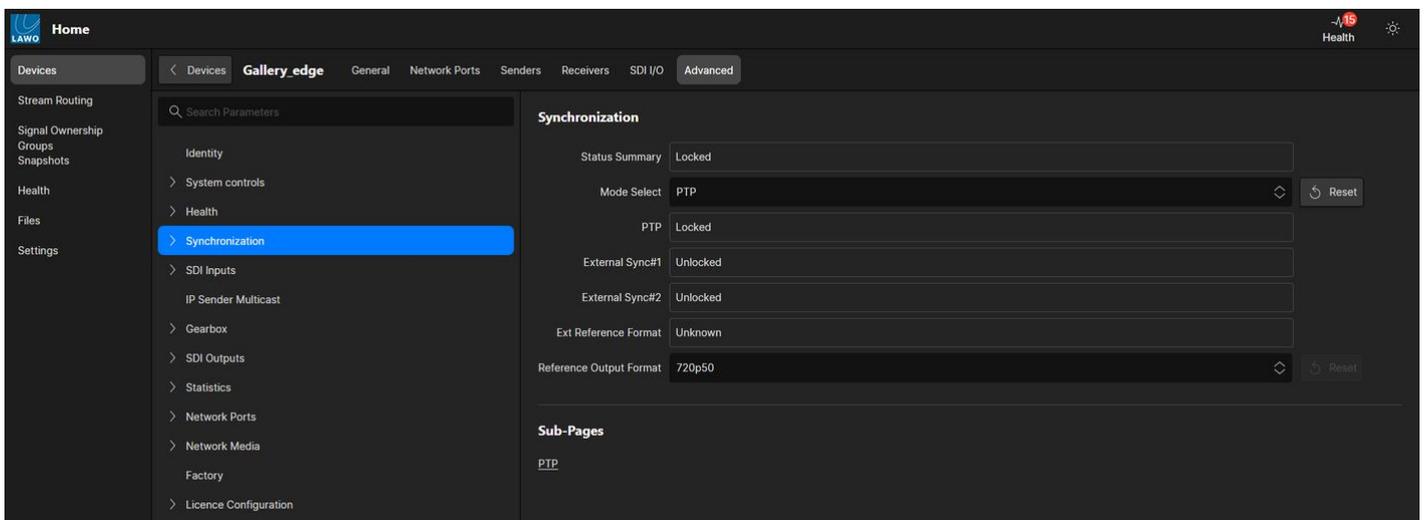
Usually, PTP (Precision Time Protocol) is the preferred option. If PTP is not available, then you can connect up to two external reference signals (to the IN connectors on the rear I/O plate) and daisy-chain these to other devices (using the THRU connectors). If there is no PTP or external reference, then the processing blade can sync to its internal sync generator. In this mode, all streams are free-running.

In each case, the sync reference must be set manually (as described below).

Configuration via HOME

The sync reference for a processing blade is defined using the **Synchronization** options (in HOME's Advanced parameters). From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)). Then select the **Advanced** tab and **Synchronization**.

Synchronization (main page)



From the main page, the **Mode Select** field sets the system reference. The **Status Summary** shows **Locked** when a valid reference is selected.

If **Mode Select** is set to PTP, then the [PTP sub-pages](#) become relevant.

Changing the Sync Reference

Click on the **Mode Select** field to set the system reference. There are four possible options:

- **External Ref 1** – connected to REF 1 IN on the rear I/O plate.
- **External Ref 2** – connected to REF 2 IN on the rear I/O plate.
- **PTP** – from the media network.
- **Free Run** – the internal sync generator.

The **PTP**, **External Sync#1** and **External Sync#2** fields show the Locked/Unlocked status of each option.

If the system reference is set to one of the external inputs, then the **Ext Reference Format** field shows the format of the incoming signal.

Setting the Sync Output Format

The **Reference Output Format** field defines the video format used for the sync output (connected to REF OUT on the rear I/O plate).

Using PTP

For correct synchronization via PTP, the media network requires a PTP master clock source. This can be achieved by using a streaming node or installing a separate grandmaster device. A PTP master should be capable of taking an incoming sync signal and generating PTP clock. You can read more about the PTP implementation in the [Lawo IP Networking Guide](#). For now, it is useful to know that:

- At any moment in time, there can be only one PTP master operating on the network.
- If a device is set to master-slave mode, then the current mode is determined by the PTP priorities set within the device itself and all other streaming nodes.
- Each .edge processing blade is a master-capable device that can operate in one of two PTP modes: slave only or master-slave.

The PTP mode, and other parameters, for the processing blade are adjusted from the [Synchronization → PTP](#) sub-pages (in HOME's Advanced parameters).

If a valid PTP clock signal is detected, then the **PTP** field will show **Locked**.

Using an External Reference

If PTP is not available or you wish to connect a backup sync pulse generator, then you can connect up to two external reference signals.

The reference signal(s) must conform to one of the following standards: SMPTE ST170, SMPTE ST318 or ITU 624-4 blackburst.

To make the connections, use the 2 x REF IN connectors on the rear I/O plate. In each case, the REF THRU connector provides a "looped-through" output of the corresponding IN. This allows you to daisy-chain the incoming signal to other blades/devices.

If a valid reference signal is detected, then the **External Sync#1** or **#2** field will show **Locked**.

Please note:

- For correct synchronization without PTP, the same reference signal must be distributed to all streaming nodes. If multiple sync sources are used, then they must be referenced to a single common basis (e.g. GPS).
- All nodes must support syntonised streaming. This is true for all Lawo media network interfaces, but must be checked for third-party devices.

Using the Sync Output

The REF OUT connector on the rear I/O plate provides an output of the processing blade's reference: PTP, IN 1, IN 2 or Internal (free-running).

By setting the reference to PTP, the processing blade can receive PTP from the media network and provide tri-level sync to other non-PTP devices.

.edge - PTP Configuration

The PTP parameters for a processing blade can be adjusted from the **Synchronization** → **PTP** sub-pages (in HOME's [Advanced](#) parameters). These options become relevant if the **Mode Select** option on the **Synchronization** page is set to PTP (as described [earlier](#)).

There is one main page with global parameters plus several sub-pages that address the ports.

The first option to check is **Slave Only** as this defines the PTP mode.

- If **Slave Only** is enabled, then the processing blade is forced to operate as a PTP slave at all times. In this mode, the blade looks for an incoming PTP signal from the media network (e.g. from an external grandmaster).
- If **Slave Only** is disabled, then the processing blade will operate as either a master or slave, depending on the PTP priorities set within the device itself and the other streaming nodes.

In each case, you can choose which port(s) are listening for, or transmitting, PTP using the [Enable Port PTP](#) options. To configure redundancy, you must enable at least two ports.

The other parameters define the PTP priorities of the blade. How they should be configured depends on the network architecture and PTP profile in use. More information can be found in the [Lawo IP Networking Guide](#).

i In order for PTP to work correctly, and to avoid configuration mistakes, we strongly recommend using the same values for all PTP-capable devices, masters and slaves.

Global Parameters

Synchronization → PTP

The screenshot shows the PTP configuration page in the LAWO edge user interface. The page is titled "Synchronization → PTP" and displays various parameters for PTP configuration. The "Slave Only" option is enabled. The "Clock Status" is "Locked" and "PTP Process Status" is "Active". The "Port Enables" are set to "[QSFP1]". The "Domain" is 127, "DSCP Event" is 56, and "DSCP General" is 0. The "Priority 1" and "Priority 2" are both set to 128. The "TimeToLive (UDP)" is 5. The "Two Step Mode" is enabled. The "Clock ID" is 00-0b-72-ff-fe-09-e0-6c, "Clock Accuracy" is 254, "Clock Class" is 255, "Clock Traceable" is "Untraceable", and "Clock Offset" is "-". The "Reset" button is visible next to several parameters.

Clock Status

Shows the status of the PTP clock source (arriving from the network).



PTP Process Status

Shows the status of the internal PTP processes within the blade.

Port Enables

Shows which port(s) are listening for, or transmitting, PTP. You can add or remove port(s) using the [Enable Port PTP](#) options.

Domain

Defines the domain number. The recommended value for this field will vary depending on the PTP profile in use. **Please refer to the [Lawo IP Networking Guide](#).**

DSCP

Defines the DSCP (differentiated services code point) or quality class. The default value for PTP is 56.

Priority 1 and Priority 2

These options set the PTP priorities of the processing blade as follows.

PTP uses a master-slave approach in which all master-capable devices elect the best master, called the grandmaster, according to a common algorithm known as the Best Master Clock Algorithm (BMCA). The algorithm compares the following parameters in turn:

- **Priority 1** - the lower the number, the higher the priority of the device.
- **Clock Class**
- **Priority 2** - as for **Priority 1**.
- **MAC Address**

For example, if there is no **Priority 1** available, then all devices on the network look at the **Clock Class**, then **Priority 2** and finally the **MAC Address**.

Note that only the **Priority 1** and **Priority 2** values can be adjusted for .edge. The **Clock Class** cannot be adjusted but may be used by a third-party grandmaster if one is installed. The **MAC Address** (for the transmitting port) can be viewed in HOME's [Network Ports](#) tab.

In order to sync properly, the **Priority** values must be configured according to the system design. In particular, a **Slave Only** device will not sync properly unless its priority is lower than that of the desired grandmaster.

Slave Only

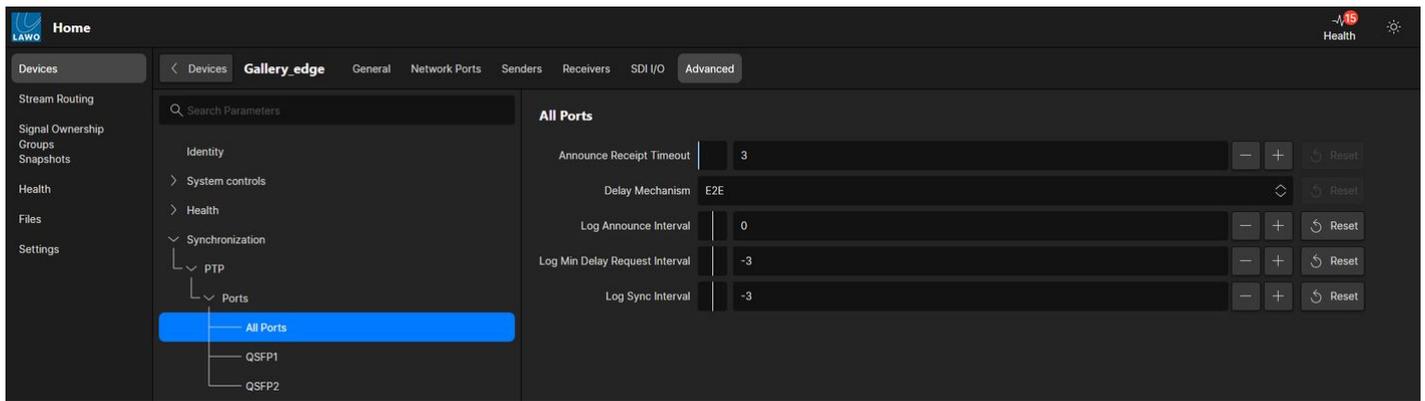
This option defines the PTP mode: ON = Slave Only; OFF = master-slave.

TimeToLive

Defines the PTP Time To Live (TTL). The value determines how many "hops" the PTP clock streams may navigate. Each time a stream traverses a network switch, the TTL is reduced by one.

All Port Parameters

Synchronization → PTP → All Ports

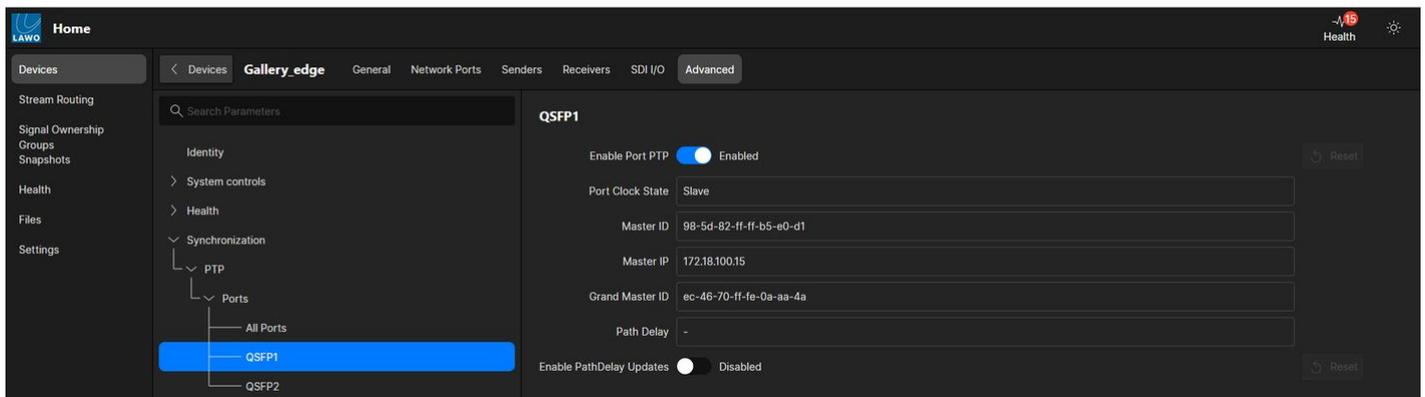


The **All Ports** sub-page includes more global parameters that affect all media network ports: **Announce Receipt Timeout**, **Delay Mechanism**, **Log Announce Interval**, **Log Min Delay Request Interval**, **Log Sync Interval**.

The recommended values will vary depending on the PTP profile in use. Please refer to the [Lawo IP Networking Guide](#).

Individual Port Parameters

Synchronization → PTP → Ports → QSFP



Enable Port PTP

The **Enable Port PTP** options can be used to define which ports are listening for PTP from the media network (or transmitting PTP if the blade is running as master).

The available ports depend on the operating mode of the system: either 4 x 25GbE (SFP 1 to 4) or 2 x 100GbE (QSFP 1 & 2). In each case, select a port (on the left) and then set the option using the on/off slider.

Path Delay

For diagnostic purposes, you can turn on the **Enable PathDelay Updates** option to monitor the **Path Delay**. This is the delay caused by the time taken for packets to travel between the PTP master and slave device.

Other Fields

The other fields are for informational purposes.



6 .edge - System Setup

This chapter describes how to set up the system once all of the hardware components are installed.

- [.edge - Setup Checklist](#)
- [.edge - NATS Server IP or Hostname](#)
- [.edge - Network Settings](#)
- [.edge - Device Information](#)
- [.edge - License Activation](#)
- [.edge - 25G vs 100G Operation](#)
- [.edge - SDI Configuration](#)
- [.edge - Multicast IP Addresses](#)



6.1 .edge - Setup Checklist

This topic describes the recommended workflow to configure a processing blade from scratch.

Prerequisites

It is expected that customers will have a HOME cluster and so, once the HOME server(s) are configured, .edge devices are automatically detected by HOME.

If you are connecting a new blade to an existing network, then it is important to check the NATS Server IP/Hostname parameter. See [.edge - NATS Server IP or Hostname](#).

Instructions

1. Connect the processing blade to the HOME server network using its MGMT 1 port.

By default, MGMT 1 is configured for DHCP. This means that, once a blade is connected to the HOME network using MGMT 1, its control IP address is assigned automatically (by HOME's DHCP server).

Once a connection is established, the network settings can be edited to put the blade into an existing network or change to in-band control. See [.edge - Network Settings](#)

2. Check that the processing blade appears in HOME's "Devices" list.

The "Devices" list shows all devices known to HOME. If this is a first-time connection, then you will need to Approve the device before you can continue. It is also a good idea to edit the device's label and add a location so that it is easy to identify.

See [.edge - Operating Principles](#).

3. Activate the software license(s) for the processing blade.

See [.edge - License Activation](#).

4. Edit the operating mode (to activate the required media ports).

See [.edge - 25G vs 100G Operation](#).

5. Edit the SDI I/O configuration (to define the number of SDI in/out).

See [.edge - SDI Configuration](#).

6. Define the multicast IP address range for the IP senders.

See [.edge - Multicast IP Addresses](#).

Next Steps

Once you have completed the steps above, the system is ready for operation.

If you haven't done so already, connect and check your sync reference. See [.edge - Synchronization](#).

Then set up some streams to and from another device and connect the corresponding SDI connectors. By turning on the video test pattern and/or audio test tone, you can check the streaming connection(s) and audio channel handling. See [.edge - Stream Routing](#) and [.edge - IP Senders and Receivers](#).

6.2 .edge - NATS Server IP or Hostname

This topic describes how to check and edit the NATS Server IP / Hostname.

Overview

The **NATS Server IP/Hostname** parameter is the DNS lookup that .edge uses to communicate with HOME.

By default, it is set to **nats.home** so that all blades come ready to connect to a HOME cluster with a default configuration. (i.e. one that uses the built-in DNS server).

If you wish to use your own DNS server, then you will need to add a **.home** entry to the existing DNS server. (This can be done by creating a domain called .home with an A-RECORD for nats that is resolved to the IP address of the HOME server.)

Alternatively, the **NATS Server IP/Hostname** parameter can be modified to match the existing DNS Server (although this would need to be modified in the HOME configuration also).

The **NATS Server IP/Hostname** parameter can be edited from the **System Controls** page (in HOME's Advanced parameters). It can also be modified via Ember+ if required.

We recommend a power cycle of the blade if the **NATS Server IP/Hostname** is modified.

Configuration via HOME

From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).

Select the **Advanced** tab and **System Controls**. Scroll down to check the **NATS Server IP/Hostname** parameter.

System Controls

The screenshot shows the HOME interface for a device named .edge_Slot2. The 'Advanced' tab is selected, and the 'System controls' section is highlighted in the left sidebar. The main content area displays various system parameters:

- Card Fault(s): None
- Card Warnings(s): None
- Force Immediate Restart: Trigger Event
- Find Me: Disabled
- Uptime (D:HH:MM:SS): 0:00:58:09
- IGMP V3 SSM: Disabled
- IGMP Use UDP Dest Port: Disabled
- Rest API Enable: Enabled
- Rest API Port: 8080
- NATS Server IP/Hostname: nats.home
- Set NATS IP/Hostname -- CAUTION!: Trigger Event

Below the main controls, there is a 'Sub-Pages' section with a link for 'Hardware Revision Info'.

To modify the current value:

1. Enter the new IP address or hostname you wish to use (for the DNS lookup).
2. Click on **Trigger Event** to push the contents of the **NATS Server IP/Hostname** field to the network.
3. Reboot the processing blade.

6.3 .edge - Network Settings

This topic describes how to configure the network settings for a processing blade.

Active Network Ports

Each blade is equipped with 8 network interfaces: 6 media + 2 management ports.

- The two management ports are always active: MGMT 1 & MGMT 2.
- The active media ports are defined by the operating mode: either SFP 1 to 4 for 25G (the default) or QSFP 1 & 2 for 100G (requires optional license).

Default Network Settings

By default, MGMT 1 and all media ports are configured for DHCP. MGMT 2 is assigned a static IP.

Port Label	Default IP Address		Default Subnet Mask	Default Gateway
MGMT 1	DHCP	-	255.255.255.0	0.0.0.0
MGMT 2	Static	192.168.101.240/24	255.255.255.0	0.0.0.0
SFP 1 to 4	DHCP	-	255.255.255.0	0.0.0.0
QSFP 1 & 2	DHCP	-	255.255.255.0	0.0.0.0

Resetting the Network Settings

The **Call Home** button (on the front of the processing blade) can be used to reset the two MGMT ports to their default network settings. To perform the reset, press and hold **Call Home** for more than 10 seconds. The **Call Home** reset does not affect the media ports.

If you wish to reset the network settings for all ports, management and media, then this can be achieved using the Factory -> Reset Network Settings option (in HOME's Advanced parameters).

Control Network Scheme

For the initial setup, it is recommended to connect the blade to the HOME network using MGMT 1 (as this will allow a control IP address to be assigned by HOME's DHCP server).

Alternatively, the MGMT 2 port can be used if you need to reach the processing blade via a known static IP. In this instance, it is important to check that there are no duplicate IP addresses on the network (e.g. from another MGMT 2 port with the same default IP).

Once a connection is established, .edge supports two possible control schemes:

- **Out-of-band** - control data arrives via the MGMT ports: 2 x 1GbE (via SFP). This scheme requires a dedicated management network. To achieve redundant control, you must use both interfaces.
- **In-band** - control data arrives via the media ports. This scheme can be used if there is no separate management network.

Media Network IPs

By default, the active media ports are configured for DHCP. This means that, once the port is connected to the media network, it is assigned a source IP address by HOME's DHCP server. If you wish to use static source IP addresses, then these must be manually configured.



Note that the active ports are defined by the operating mode (either 4 x 25GbE or 2 x 100GbE).

Configuration via HOME

In HOME, there are two ways to edit the network settings for a processing blade: via the **Network Ports** tab or **Advanced** parameters. Here we describe the **Network Ports** tab, as this is the best/simplest method for most applications.

From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described earlier). The **Network Ports** tab lists all of the active network ports.

Device → Network Ports

Label	Description	Internal Name	Media Interface	MAC Address	IP Address	IP Assignment	Subnet Mask
MGMT1	Management Port 1	mgmt0	-	00:e0:4b:79:90:f8	172.18.110.24	DHCP	-
MGMT2	Management Port 2	mgmt1	-	00:e0:4b:79:90:f9	172.18.110.29	DHCP	-
QSFP1	Stream 0 Red Media Port	ra0	strm0	00:0b:72:09:e0:6c	172.18.100.199	Static	255.255.255.0
QSFP2	Stream 0 Blue Media Port	ra1	strm0	00:0b:72:09:e0:6d	172.18.102.199	Static	255.255.255.0

From here you can quickly check the status of all network ports or edit the IP settings of a port (as shown below).

The table shows information about each network port including the link state, label, description, internal name, media interface, MAC address, IP address, IP assignment and subnet. Scroll to the right to view more information such as the link speed, switch name, etc.

In edit mode, you can change the **IP Address Assignment**, **IP Address** (for Static assignments), **Network Mask**, **Gateway** and **Primary/Secondary Name Servers**. If you need access to more technical parameters, then these can be reached from the Network Ports branch of the Advanced parameters.

Editing the IP Settings of a Network Port

The screenshot displays the 'Network Ports' configuration page for a device named 'Gallery_edge'. A table lists several ports, with 'QSF1' (Stream 0 Red Media Port) selected. A configuration dialog box is open for this port, showing the following settings:

Field	Value
IP Address Assignment	Static
IP Address	172.18.100.199
Network Mask	255.255.255.0
Gateway	172.18.100.1
Primary Name Server	10.1.215.66
Secondary Name Server	

Red callout boxes with numbers 1-4 indicate the following steps:

- 1: Selecting the 'QSF1' port in the table.
- 2: Clicking the 'Edit Port' button.
- 3: The IP Address field in the configuration dialog.
- 4: Clicking the 'Apply' button in the dialog.

6.4 .edge - Device Information

This topic describes how to check the software version, serial number and other information. It also describes how to edit the device label and location used in the "Devices" list (described [earlier](#)).

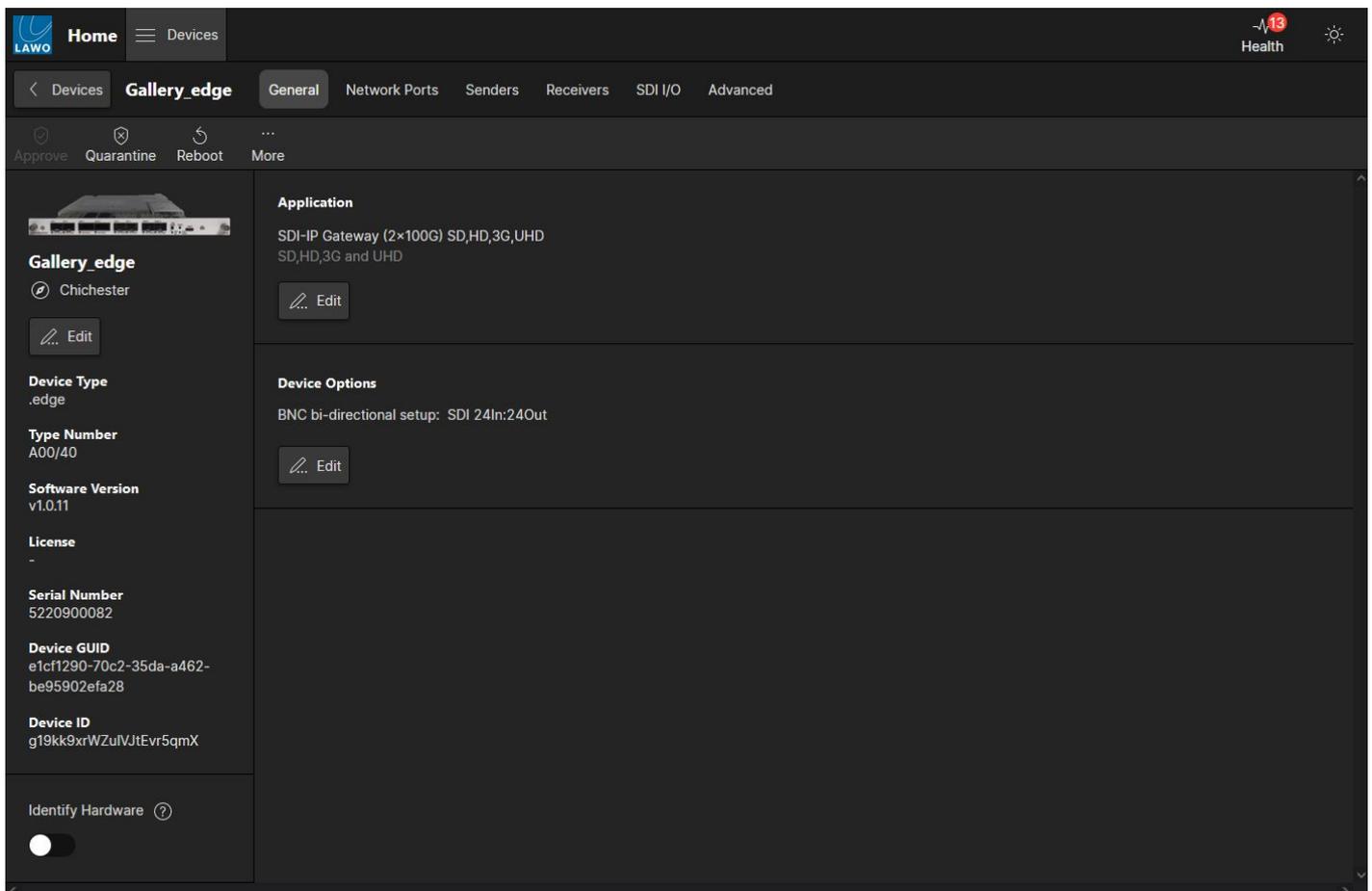
Overview

In HOME, the **Device** → **General** tab can be used to check and edit the device's general settings.

1. Click on the device label (from the main "Devices" list) to open the "Device Details" (as described [earlier](#)).
2. The page opens with the **General** tab selected.

The **General** tab is divided into two sections with general information about the processing blade (on the left) and other settings (on the right).

Device → General



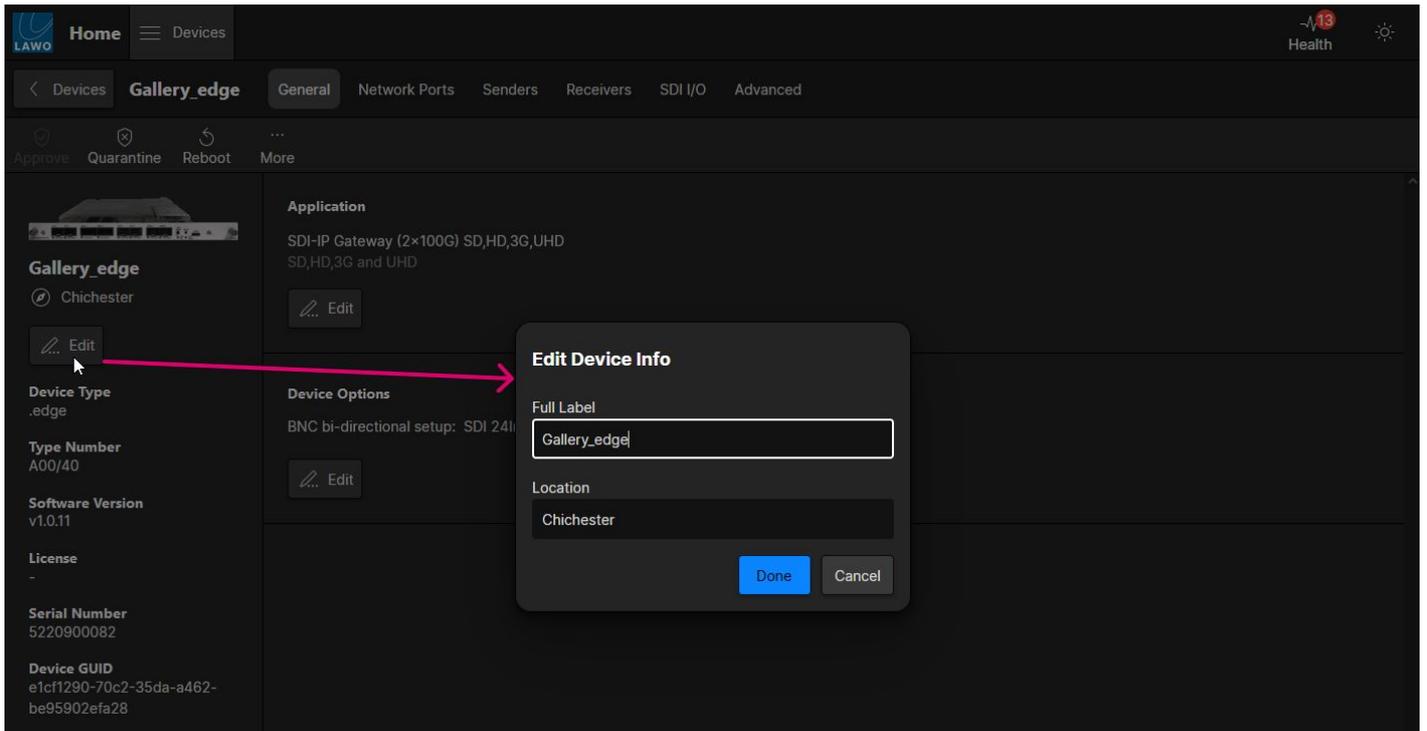
Informational Fields

The fields on the left provide general information about the processing blade such as its label, location, device type, type number, software version, serial number, etc. Of particular note are the **Software Version** and **Serial Number** (which is important for licensing).

Editing the Label & Location

Click on the **Edit** button below the current label to open the "Edit Device Info" dialog box.

Editing the Label & Location



Label

The **Label** identifies the processing blade to the network. It appears in HOME and is forwarded to other devices on the network (where applicable).

i A label must be entered. This field cannot be left blank. The label can be changed, at any time, without affecting the configuration.

Location

The **Location** field is used everywhere in HOME and can be used to filter or sort a list by location. For example, to view only the streaming connections to or from a particular device (in the Stream Routing).

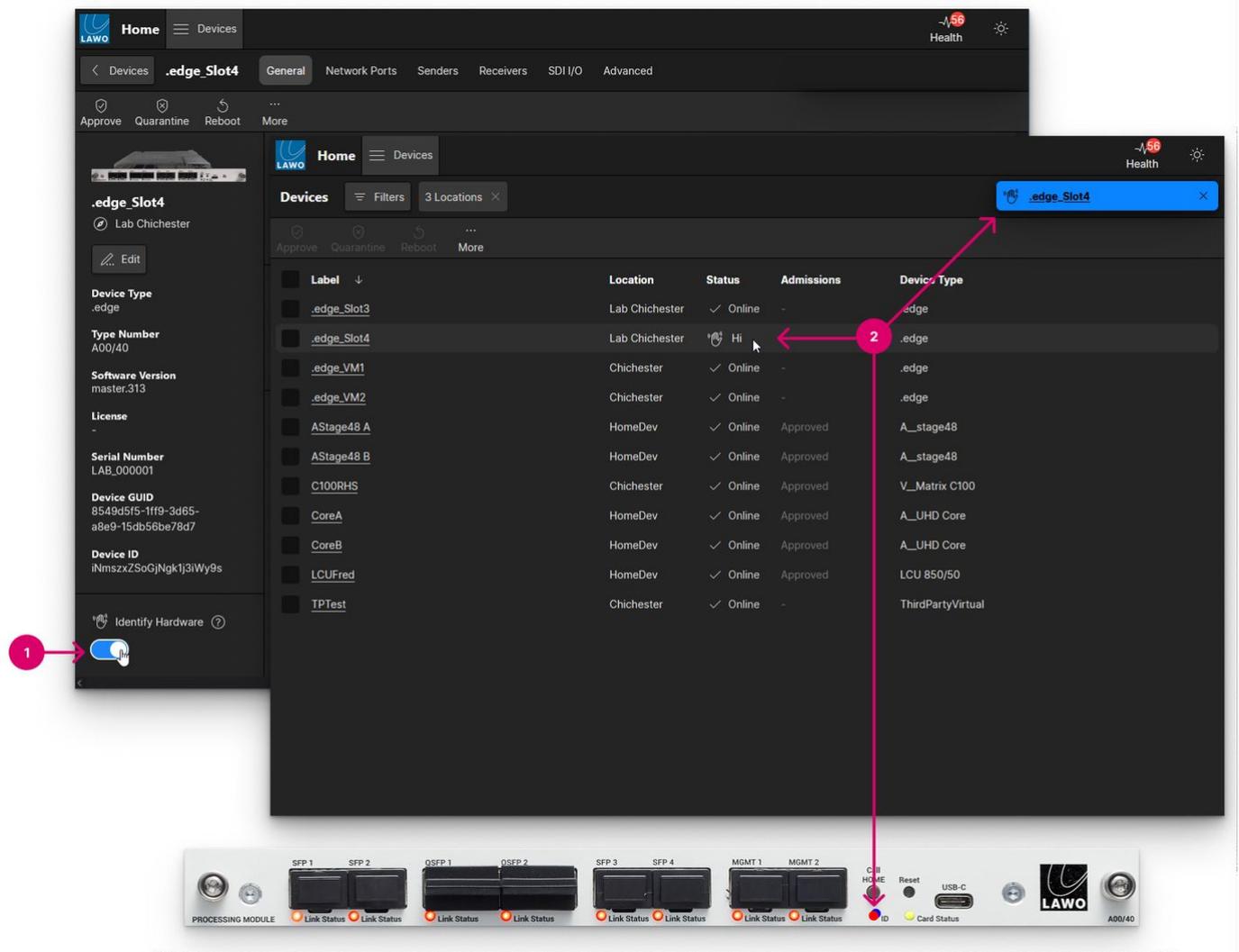
Entering a location is optional.

Identifying a Processing Blade

The **Identify Hardware** button can be used to identify the hardware in the equipment rack. It works in conjunction with the **ID (LED)** on the blade's front panel.

To identify a processing blade, either press and hold **Call Home** (on the unit) for at least 2 seconds or select **Identify Hardware** (in HOME's Device → **General** tab).

Identifying the Hardware



A "Says Hi" message appears in the "Devices" list and in the status area (beside the "Health" icon). On the processing blade, the ID (LED) repeatedly changes color from red to blue.

To cancel the "Identify Hardware" mode, either deselect **Identify Hardware** (on the GUI) or press and hold the **Call Home** button again (on the unit).

Other Parameters

Operating Mode

The **Application** area can be used to change the operating mode.

SDI I/O Configuration

The **Device Options** area can be used to change the SDI I/O configuration.

6.5 .edge - License Activation

This topic describes how to activate the licensed feature(s). For information about the license options and how to order, please see [.edge - Licensed Feature Sets](#).

Overview

The available licenses are determined by a licensing file that is stored on the HOME server(s). There is one licensing file per blade; each file can support multiple licenses. The licensing file must be loaded from HOME to the processing blade. The user can then choose which licenses are active, or how they are assigned using the **License Configuration** page (in HOME's Advanced parameters).

If you do not have access to HOME, then the licensing file can be loaded to a blade using Ember+.

Please note:

- All software licenses are perpetual and locked to an individual processing blade (using the Serial Number provided by the customer).
- Licenses cannot be transferred between blades.
- If a blade fails and you need to fit a replacement, then this will require a separate licensing file (that uses the Serial Number of the replacement blade).

How to obtain a license?

.edge ships with a voucher.

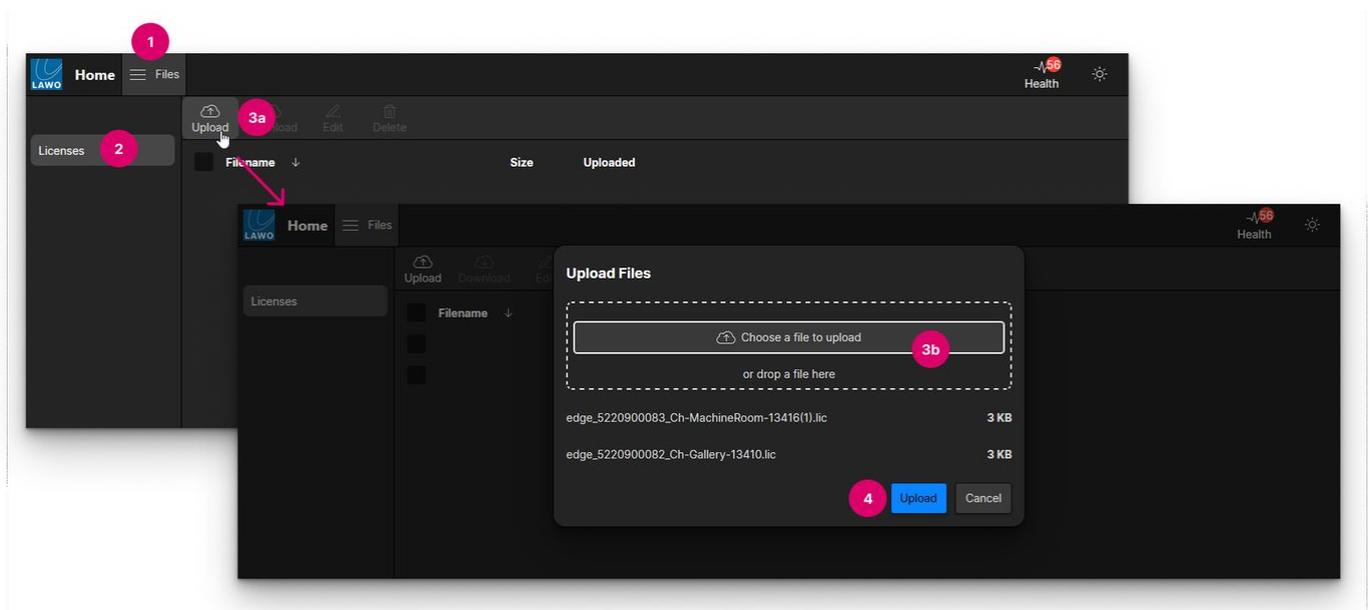
The customer must advise Lawo about which license entitlements should be allocated to each processing blade by supplying the correct Serial Number(s). The Serial Number for a processing blade can be found in HOME's [General](#) tab or on the [Identity](#) page (in the Advanced parameters).

To obtain a new license, please contact edgelicensing@lawo.com

Step One - Uploading the Licensing File

Once you have received the licensing files for your system, the first step is to upload them to the HOME server(s). This can be done using HOME's **Files** page as follows.

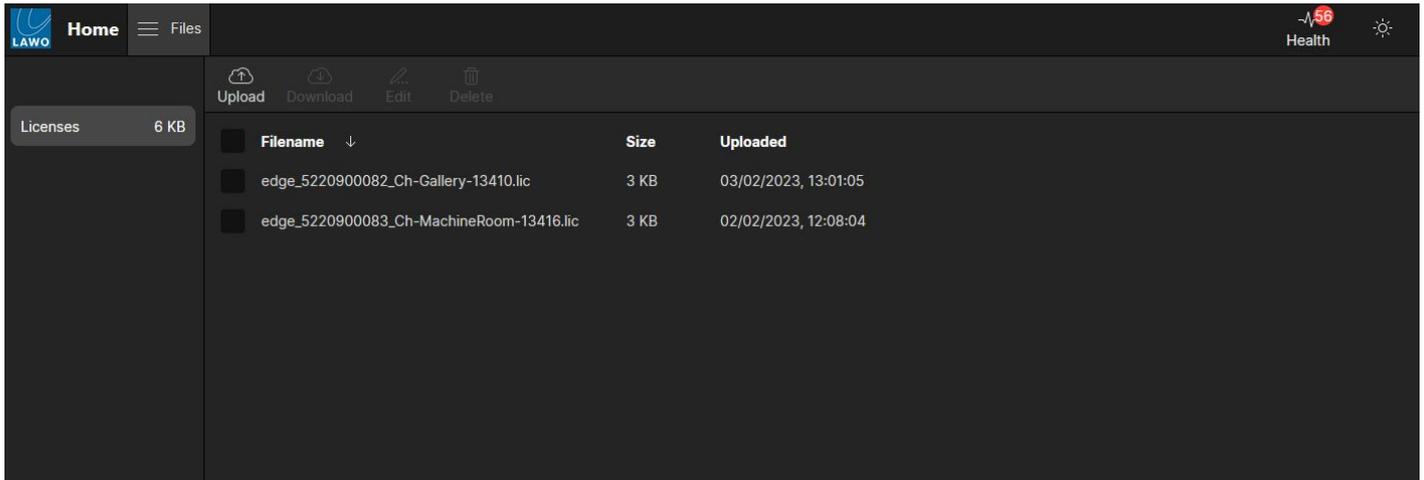
Uploading the Licensing File(s)





1. Open the **Files** page (in HOME Web UI).
2. Select the **Licenses** sub-folder to view the current license files (.lic). If this is a new installation, then the list will be empty.
3. Select the **Upload** button and then follow the on-screen instructions.
 - You can either choose a file to upload (using File Explorer) or drag and drop the licensing file into the dotted outline area.
 - You can choose multiple files if you wish. For example, to upload all of the licensing files required for all processing blades on the network.
4. Once a valid file is selected, click on the **Upload** button to start the transfer.
5. Following a successful upload, the file is added to the **Licenses** list.

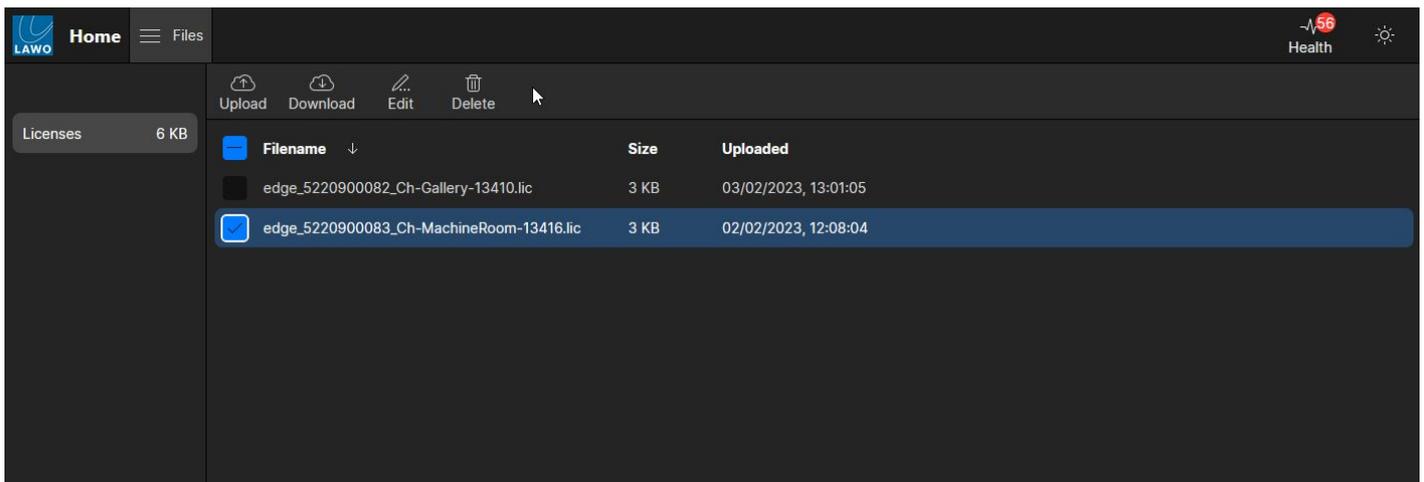
How the Licenses folder will look (after a successful upload)



Each .lic file is specific to an individual processing blade and so you may wish to use some of the following tools (to help manage the list).

Click here to learn more about the file management tools.

Selected File options (in HOME)



The following tools can be used once you have selected a file (or files):

- **Download** - downloads the selected file(s) to your computer. You can use this option to store a local backup of the licensing file(s).
- **Edit** - opens a pop-up where you can edit the selected filename. This can be useful if there are lots of processing blades on the network and, hence, lots of licensing files to manage.

- **Delete** - opens a pop-up where you can delete the selected file(s) from the HOME system. This can be useful to remove obsolete files (e.g. for a processing blade that has been replaced).

Step Two - Fetching the Licenses

Once the licensing files are uploaded to HOME, the next step is to load the licenses to each processing blade.

1. Open the [Advanced](#) parameters (using the HOME Web UI).
2. From the parameter tree (on the left), select **License Configuration**.
3. To the right of the **Fetch License** field, click on **Trigger Event** - the processing blade fetches the license(s) from the licensing file.
4. The processing blade goes offline, temporarily, in order to reboot and load the new license(s).
5. Following a successful operation, the **Status** field updates.

Step Three - Activating the Licensed Feature(s)

The final step is to choose which licenses are active, or how they are assigned using the **License Configuration** page (in HOME's [Advanced](#) parameters).

License Configuration (main page)

The screenshot shows the 'License Configuration' page in the HOME web UI. The page is divided into several sections:

- Fetch License:** Trigger Event
- Status:** Remote License
- 100G License:** Available
- Operating Mode 100G vs 25G:** 100G 2xQSFP (with a Reset button)
- SDI Block[16] Available:** +32 SDI
- Additional SDI:** +32 (48 in total) (with a Reset button)
- SDI I/O configuration:** SDI 24In:24Out (with a Reset button)
- TAKE Configuration Changes:** Trigger Event

Below the main configuration area, there are sub-pages for:

- Gearbox License Assignment
- Input Synchronization Assignment

From the main page, you can configure the operating mode and SDI interfacing. There are then two sub-pages where you can assign the licenses for 3G UHD Gearboxing and Input Frame Synchronization.

In each case, you must edit the parameter field(s) and then push the changes to the processing blade as follows:

- To the right of the **TAKE Configuration Changes** field, click on **Trigger Event**.
- The processing blade goes offline, temporarily, in order to reboot and load the new configuration.

Operating Mode 100G vs 25G

This parameter sets the [operating mode](#) of the processing blade. There is one informational field (**100G License**) and one adjustable parameter (**Operating Mode 100G vs 25G**).

- If a **100G License** is **Available**, then the **Operating Mode** can be set to either **25G 4xSFP** or **100G 2xQSFP**.
- If a **100G License** is **Unavailable**, then only one mode is possible: **25G 4xSFP**.

Any change to the operating mode must be pushed to the processing blade as follows: click on **TAKE Configuration Changes** -> **Trigger Event**.

i After a change of operating mode, a processing blade reboots to load the new configuration. Note that this can take up to 6 minutes (as the change of mode forces a change of FPGA).

Once the processing blade comes back online, the new operating mode can be easily checked from HOME's General tab.

SDI Interfacing

The following parameters define the SDI I/O configuration of the processing blade. There is one informational field (**SDI Block Available**) and two adjustable parameters (**Additional SDI** and **SDI I/O configuration**).

- **SDI Block Available** - shows the number of additional SDIs, based on the number of available ".edge_sdi" licenses.
- **Additional SDI** - can be used to activate the additional SDIs (if more than one license is available).
- **SDI I/O configuration** - defines the number of SDI inputs versus outputs.

Note that if you change the **Additional SDI** value, then this must be pushed to the processing blade before you can select a valid **SDI I/O configuration**. So, to change the number of SDIs, the complete workflow is as follows:

1. Edit the **Additional SDI** parameter.
2. Push the change to the processing blade: click on **TAKE Configuration Changes -> Trigger Event**.
3. After the reboot, edit the **SDI I/O configuration** parameter.
4. Push the change to the processing blade: click on **TAKE Configuration Changes -> Trigger Event**.

Once the processing blade comes back online, the new I/O configuration can be easily checked from the HOME's SDI I/O tab.

3G UHD Gearboxing

From the **Gearbox License Assignment** sub-page, you can assign the video gearboxing licenses to the SDI I/Os.

License Configuration → Gearbox License Assignment

Firstly, there are two informational fields that show the license usage:

- **Number Available Gearbox** - shows the number of available ".edge_gbox" licenses.
- **Number Unassigned** - shows the number of unassigned licenses.

Secondly, there is a license active/disabled slider for each block of SDI I/Os:

- **Gearbox Input 1** - assigns a gearboxing license to SDI inputs 1-4.
- **Gearbox Input 2** - assigns a gearboxing license to SDI inputs 5-8.
- etc.

The available licenses can be assigned to any combination of input and output instances. After each change, the **Number Unassigned** field updates accordingly.

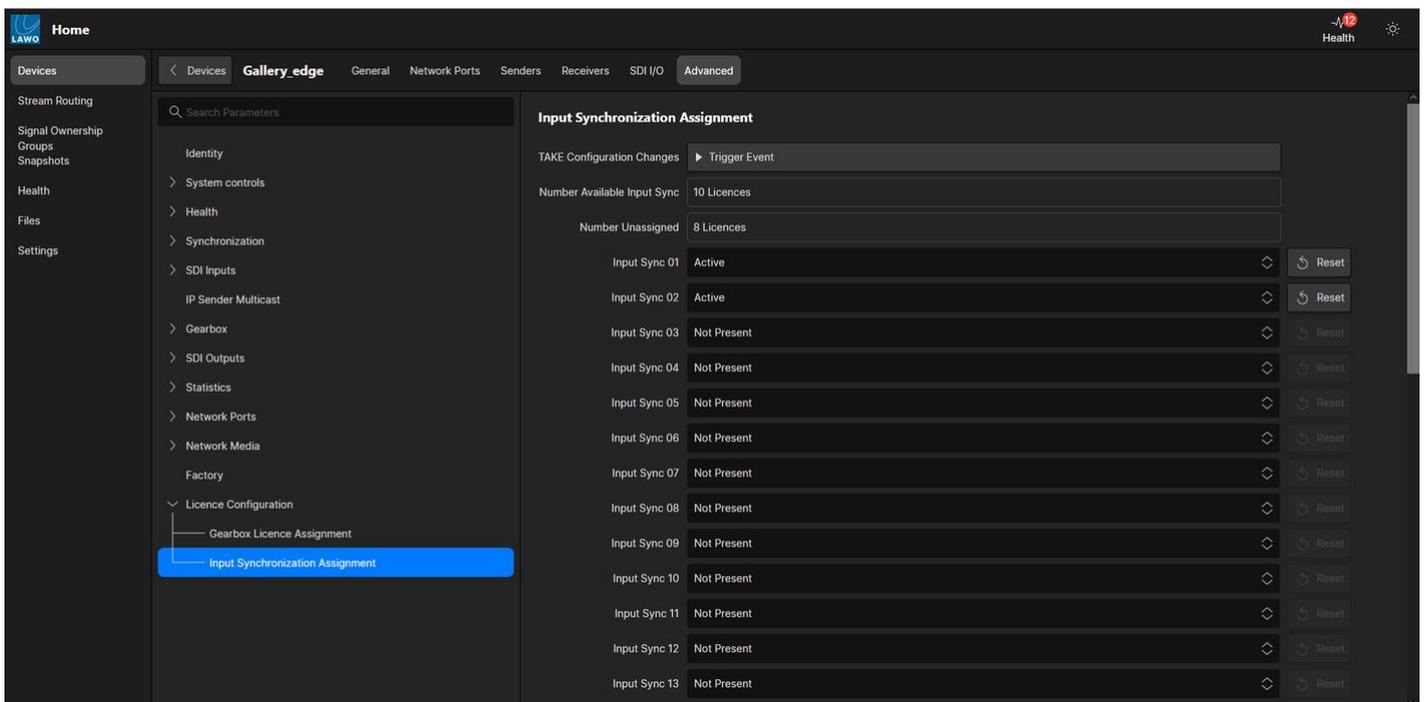
Once you finished editing the license assignments, any changes must be pushed to the processing blade as follows: click on **TAKE Configuration Changes -> Trigger Event**.

Once the processing blade comes back online, the new license assignments can be easily checked from the [Gearbox](#) page (in HOME's Advanced parameters).

Input Frame Synchronization

From the **Input Synchronization Assignment** sub-page, you can assign the input frame sync licenses to the SDI inputs.

License Configuration → Input Synchronization Assignment



Firstly, there are two informational fields that show the license usage:

- **Number Available Input Sync** - shows the number of available ".edge_fsync" licenses.
- **Number Unassigned** - shows the number of unassigned licenses.

Secondly, for each SDI input, you can choose one of three options:

- **Not Present** = no license assigned.
- **Active** = license assigned to an individual SDI input.
- **12G/UHD Active** = 4 x licenses assigned to a block of SDI inputs: 1-4, 5-8, etc.

The **12G/UHD Active** option should be used for either **single-link 12G-SDI** or **quad-link 3G-SDI** signals. After each change, the **Number Unassigned** field updates accordingly. Note that each **12G/UHD Active** instance uses four licenses.

Once you finished editing the license assignments, any changes must be pushed to the processing blade as follows: click on **TAKE Configuration Changes -> Trigger Event**.



Once the processing blade comes back online, the new license assignments can be easily checked from HOME's [SDI I/O](#) tab.

6.6 .edge - 25G vs 100G Operation

This topic describes how to change the operating mode of a processing blade.

Overview

Each processing blade can run in one of two operating modes: either 25G or 100G. The mode determines which media ports are active: either 4 x 25GbE (via SFP28) or 2 x 100GbE (via QSFP28).

- 25G comes as standard; 100G requires an optional license.
- 25Gbps supports SD and HD format; 100Gbps is required for 3G and UHD.

By default, every processing blade is set to operate at 25G. If a valid 100G license is available, then a blade can be set to operate at either 25G or 100G.

i After a change of operating mode, a processing blade reboots to load the new configuration. Note that this can take up to 6 minutes (as the change of mode forces a change of FPGA).

Licensing Information

The **.edge_100g** software license enables the 2 x 100GbE option for the media network interfaces. It allows the processing blade to operate at 100Gbps and enables support of 3G and 12G format signals.

Licensing Requirements:

- Requires 1 x .edge_100g license (per blade).

License Activation

All of the licensed features are managed using the License Configuration parameters (in HOME's Advanced parameters). Please follow the steps to upload and fetch the license(s).

Changing the Operating Mode

If a 100G license is available, then the operating mode can be changed from either the **General** or **Advanced** tab. The simplest method is to use the **General** tab (as shown below).

Changing the Operating Mode

The screenshot shows the LAWO interface for a 'Gallery_edge' device. The 'Application' section is active, displaying two options: 'SDI-IP Gateway (4x25G) SD HD' (unselected) and 'SDI-IP Gateway (2x100G) SD,HD,3G,UHD' (selected). A modal dialog titled 'Application' is open, showing the selected option and a warning: 'Changing the Application of a device may change that device's configuration. Be sure to check the configuration of a device after changing its Application. Devices will restart when their Applications are changed, which may be disruptive to live productions.' Below the warning is a text input field containing 'confirm' and two buttons: 'Apply' and 'Cancel'. A pink arrow points to the 'Edit' button in the background.

1. From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).
2. Click on the **Edit** button (under 'Application').
3. Choose either **SDI-IP Gateway (25G)** or **SDI-IP Gateway (100G)**. Note that if a 100G license is not available, then only one option is possible: **25G**.
4. For security, you must enter the confirmation text and then click **Apply**.
5. The processing blade goes offline, in order to reboot and load the new configuration. Note that this can take up to 6 minutes for the first reboot after a change of mode.
6. After the reboot, you can use the 'Application' area to check the new operating mode.
7. The next steps are to configure the media ports (described later).



6.7 .edge - SDI Configuration

This topic describes how to change the SDI I/O configuration of a processing blade.

Overview

There are two variables that determine the SDI configuration of a processing blade and rear I/O plate: the number of **active** SDI licenses and the SDI I/O configuration preset.

By default, every processing blade includes a single license (16 x SDI) and is set to configuration preset 1 (8 inputs, 8 outputs). If additional ".edge_sdi" licenses are available, then the total number of SDI interfaces can be increased.

Licensing Information

The **.edge_sdi** software license enables 16 x SDI interfaces on the rear I/O plate.

Each .edge_gateway processing blade comes with a single .edge_sdi_inc license (for 16 x SDIs). The number of SDIs can be expanded by adding one or two .edge_sdi licenses (for 32 or 48 x SDIs).

Licensing Requirements:

- 1 x .edge_sdi_inc license is included (per blade).
- Up to 2 x .edge_sdi licenses can be added (per blade).

License Activation

All of the licensed features are managed using the [License Configuration](#) options (in HOME's Advanced parameters). Please follow the steps to upload and fetch the license(s).

Unlocking the Additional SDIs

If additional SDI licenses are available, then use the **Additional SDI** parameter (in the [License Configuration](#) page) to increase the total number of I/O.

Changing the SDI I/O Configuration Preset

Once the **Additional SDI** parameter is defined, the I/O configuration preset can be changed from either the **General** or **Advanced** tab. How to use the **General** tab is shown below.

Changing the SDI I/O Configuration Preset

The screenshot shows the LAWO interface for a device named 'Gallery_edge'. The 'Device Options' section is active, and a dialog box titled 'Device Options' is open. The dialog box displays the 'BNC bi-directional setup' options, with 'SDI 24In:24Out' selected. Below the options, there is a confirmation prompt: 'To confirm you want to do this, enter **confirm** in the text field below.' A text input field contains the word 'confirm'. At the bottom of the dialog box, there are 'Apply' and 'Cancel' buttons. A pink arrow points from the 'Edit' button in the 'Device Options' section of the device details to the 'confirm' text field in the dialog box.

1. From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).
2. Click on the **Edit** button (under 'Device Options').
3. Choose one of the three options from the drop-down menu.
4. For security, you must enter the confirmation text and then click **Apply**.
5. The processing blade goes offline, temporarily, in order to reboot and load the new configuration.
6. After the reboot, the new I/O configuration can be easily checked from the [SDI I/O](#) tab.

6.8 .edge - Multicast IP Addresses

This topic describes how to define the multicast addresses for the IP senders.

Overview

In order to publish streams to the network, each IP sender must be assigned a unique multicast IP address. As there are many streams to configure, the system provides two ways of automating the process plus a third option to configure the addresses manually.

- **Option 1 - SRC IP-Based.** The multicast addresses are allocated automatically based on the source IPs of the media ports.
- **Option 2 - Custom.** The user must define a start address for each essence: Video, Audio and Meta. The rest of the multicast addresses are then allocated automatically (using the same rules as option 1).
- **Option 3 - Manual.** The user must define each multicast address manually.

The first option is the simplest as it offers complete automation. The second two options can be used if you need more manual control (e.g. to fit an existing multicast scheme). The tables below describe the formula used for options 1 and 2.

Source IP-Based Assign Mode

In this mode, the multicast IP addresses are generated automatically using the following formula:

	1st Octet	2nd Octet	3rd Octet	4th Octet
Media Port Source IP	aaa	bbb	ccc	ddd
Multicast IP Address	239	ccc	ddd	xxx
	Always 239 (this is fixed)	Matches 3rd octet of the source IP	Matches the 4th octet of the source IP	Generated automatically as follows: <ul style="list-style-type: none"> • 1 to 32 - assigned to video streams: 1 = video from SDI 1; 2 = video from SDI 2; etc. • 33 to 128 - assigned to audio streams: 33 = audio block 1 from SDI 1; 34 = audio block 2 from SDI 1; etc. • 161 to 184 - assigned to meta steams: 161 = metadata from SDI 1; 162 = metadata from SDI 2; etc.

Custom Assign Mode

In this mode, the multicast IP addresses are generated according to the Start IP values (entered in HOME).

	1st Octet	2nd Octet	3rd Octet	4th Octet
Multicast IP Address	aaa	bbb	ccc	xxx
	custom-defined	custom-defined	custom-defined	Generated automatically by counting upwards from the IP Start value entered for each essence: Video, Audio and Meta. An IP Start value should be entered for both the primary and secondary networks. In the example below, the Audio Stream IP Start value = 40. This means that 40 is used for audio block 1 from SDI 1; 41 = audio block 2 from SDI 1; etc.

Configuration via HOME

For options 1 and 2, the mode of assignment (and starting IP values) are defined using the **IP Sender Multicast** options (in HOME's Advanced parameters). Option 3 is handled in a different way (via the individual IP Senders for each SDI Input).

From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).

For options 1 and 2, select the **Advanced** tab and **IP Sender Multicast**.

IP Sender Multicast

The screenshot displays the 'IP Sender Multicast' configuration page. The 'Assign Mode' is set to 'SrcIpBased'. Below this, there are several rows of configuration for different stream types and network configurations. Each row includes a label (e.g., 'Video Stream 0 IP Start (Primary)'), a numerical value or range, and a 'Reset' button.

Stream Type / Network	Value / Range	Action
Assign all multicast (Use Custom Ranges)	Trigger Event	Reset
Assign all multicast (Src IP based)	Trigger Event	Reset
Video Stream 0 IP Start (Primary)	239.10.1.1	Reset
Video Stream 0 IP Start (Secondary)	239.10.2.1	Reset
Video Stream 0 IP Range (Primary)	239.100.199.1--239.100.199.24	Reset
Video Stream 0 IP Range (Secondary)	239.102.199.1--239.102.199.24	Reset
Audio Stream 0 IP Start (Primary)	239.10.1.40	Reset
Audio Stream 0 IP Start (Secondary)	239.10.2.40	Reset
Audio Stream 0 IP Range (Primary)	239.100.199.33--239.100.199.128	Reset
Audio Stream 0 IP Range (Secondary)	239.102.199.33--239.102.199.128	Reset
Meta Stream 0 IP Start (Primary)	239.10.1.180	Reset
Meta Stream 0 IP Start (Secondary)	239.10.2.180	Reset
Meta Stream 0 IP Range (Primary)	239.100.199.161--239.100.199.184	Reset
Meta Stream 0 IP Range (Secondary)	239.102.199.161--239.102.199.184	Reset
UDP Port Video	5004	Reset

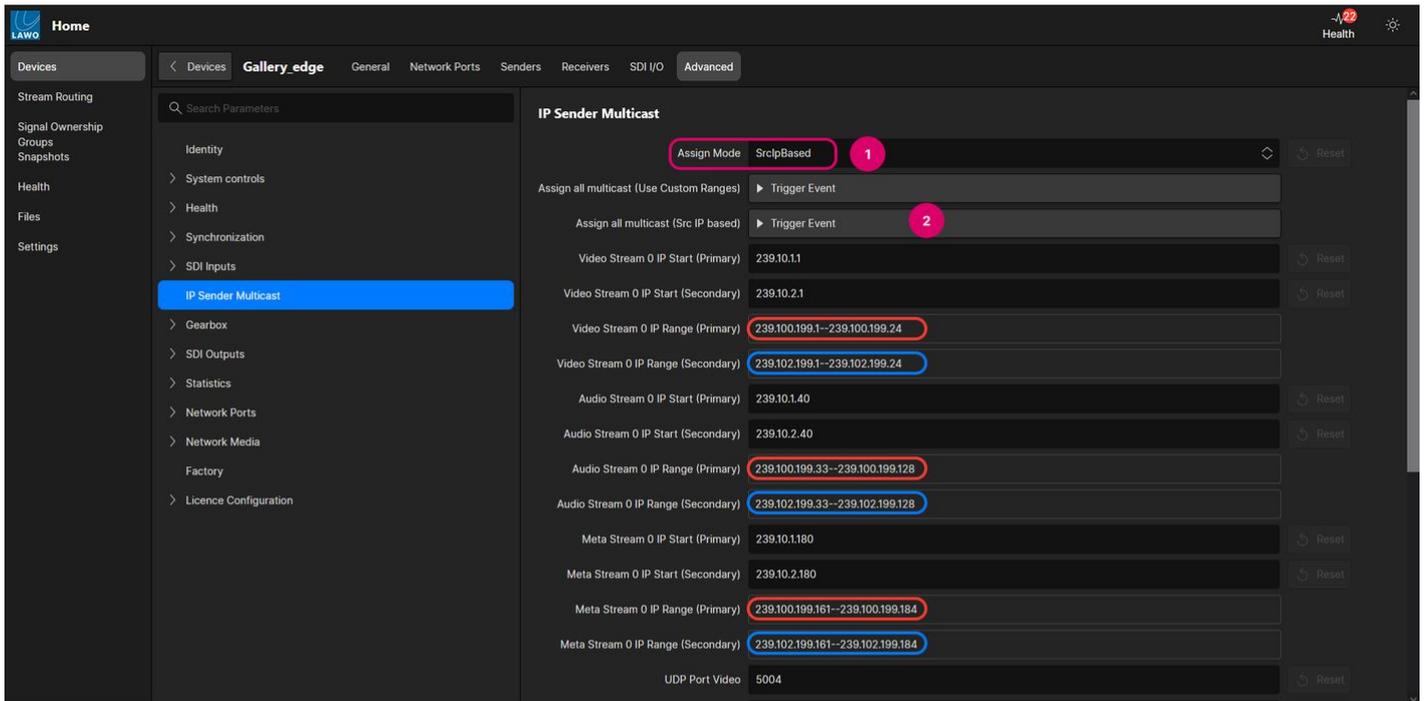
The **Assign Mode** field sets the method of assignment: either **SrcIpBased** (Source IP Based) or **Custom**.

Option 1: Using Source IP-Based Assign Mode

If the **Assign Mode** is set to **SrcIpBased**, then the **Video/Audio/Meta Stream 0 IP Range (Primary)** and **(Secondary)** fields show the automatically-generated IP ranges. These are based on the media port source IPs (as described above).

To push all of the multicast addresses to the IP senders, click on **Trigger Event** beside the **Assign all multicast (Src IP based)** field. Addresses outlined in red are pushed to the primary network and those in blue are pushed to the secondary network. If you need to check the source IPs, then this can be done from the Network Ports tab. The screenshots below show the steps.

HOME Advanced tab



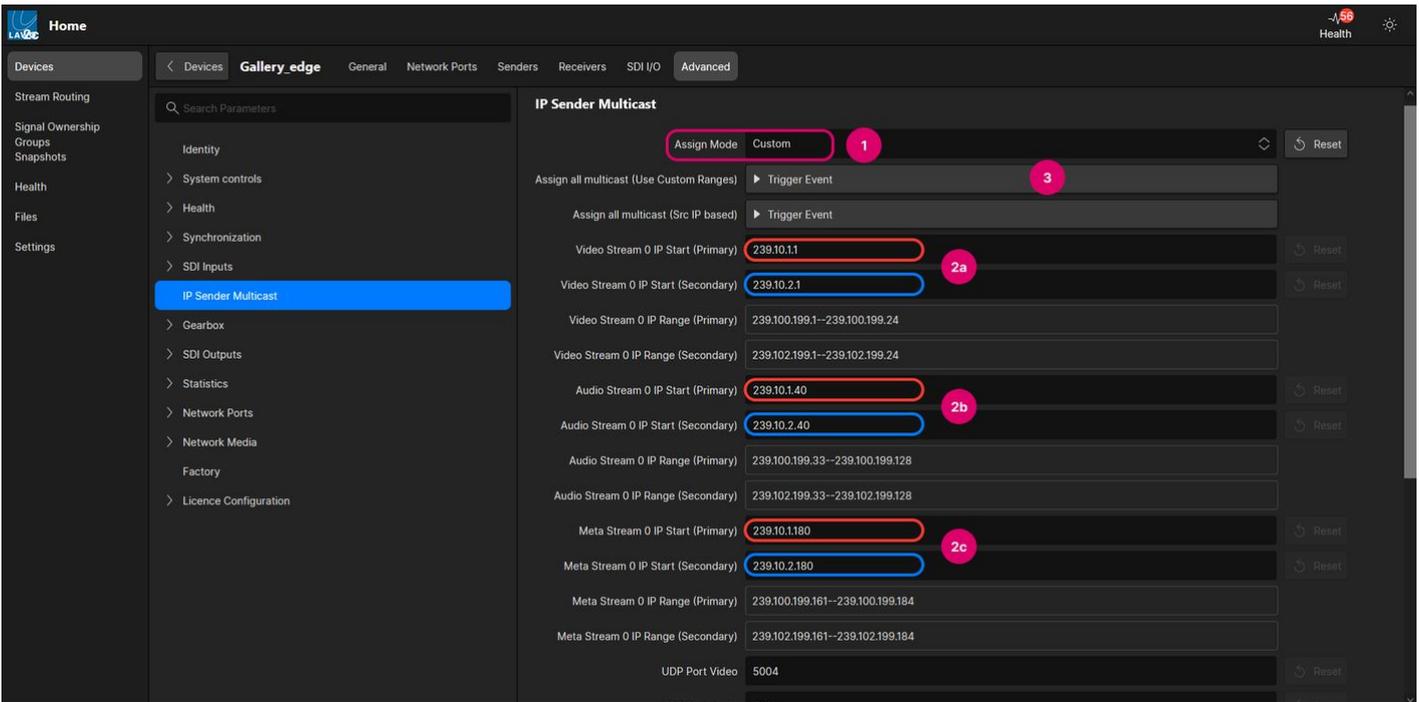
HOME Network Ports tab

Label	Description	Internal Name	Media Interface	MAC Address	IP Address	IP Assignment	Subnet Mask	Default Gateway	Primary Name Server
MGMT1	Management Port 1	mgmt0	-	00:e0:4b:79:90:f8	172.18.110.24	DHCP	-	-	-
MGMT2	Management Port 2	mgmt1	-	00:e0:4b:79:90:f9	172.18.110.29	DHCP	-	-	-
QSPF1	Stream 0 Red Media Port	ra0	strm0	00:0b:72:09:e0:6c	172.18.100.199	Static	255.255.255.0	172.18.100.1	101.215.66
QSPF2	Stream 0 Blue Media Port	ra1	strm0	00:0b:72:09:e0:6d	172.18.102.199	Static	255.255.255.0	172.18.102.1	101.215.66

Option 2: Using Custom Assign Mode

If the **Assign Mode** is set to **Custom**, then you must manually define the **IP Start** values for each stream essence. In this instance:

1. Set the **Assign Mode** to **Custom**.
2. Enter an **IP Start** value for the **Video** streams, **Audio** streams and **Meta** streams. In each case, you must enter values for both the primary (red) and secondary (blue) networks.
3. Click on **Trigger Event** beside the **Assign all multicast (Use Custom Ranges)** field to push all of the addresses to the IP senders. The screenshots below show the steps.

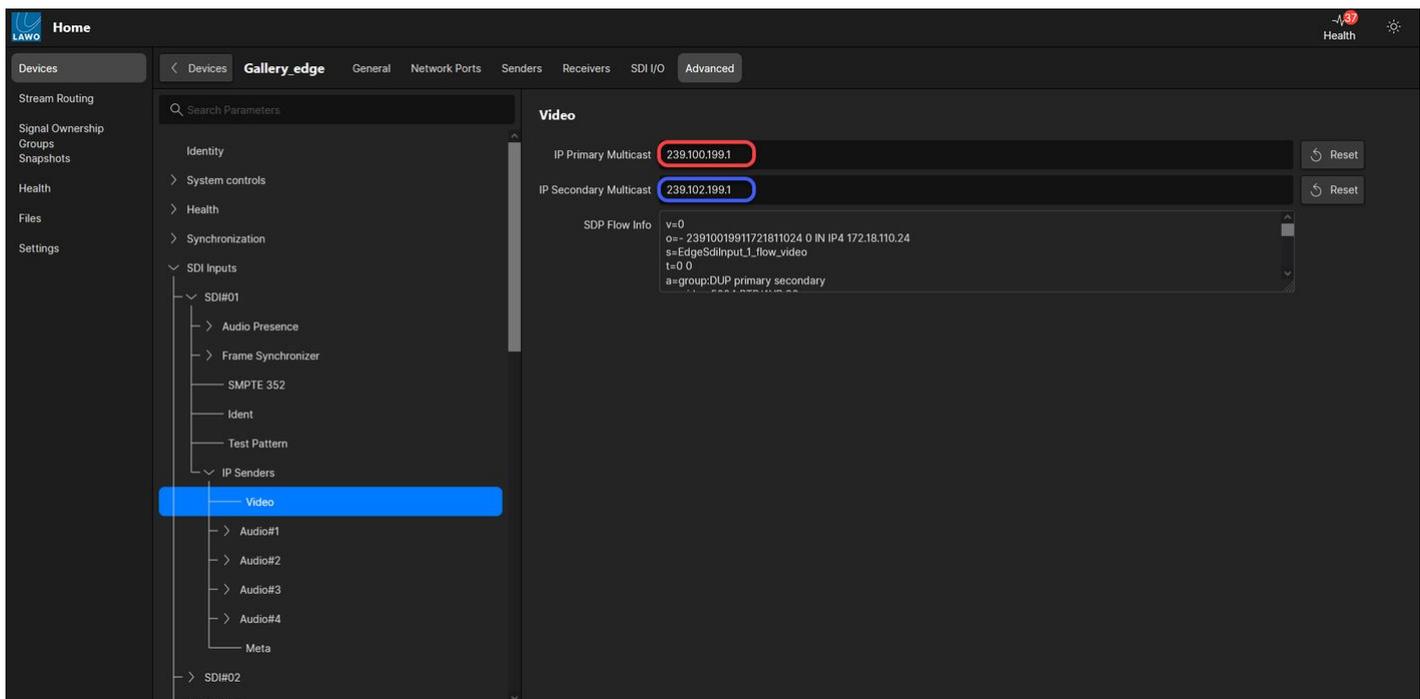


Option 3: Using Manual Assign

If you wish to define each multicast IP address manually, then this must be done by opening the individual IP Senders for each SDI input.

1. Open the **SDI Inputs** branch of the **Advanced** parameters.
2. Open **SDI#01**, **IP Senders** and **Video**.
3. Type in the multicast addresses into the **IP Primary Multicast** and **IP Secondary Multicast** fields.
4. Repeat for each essence: 1 x Video, 4 x Audio and 1 x Meta
5. Then repeat for the next SDI input (up to 32 depending on the [SDI Configuration](#)).

SDI Inputs → SDI#01 → IP Senders → Video



Changing the UDP Port, RTP and TTL Values

If you scroll further down the **IP Sender Multicast** page, then there are three sets of additional fields. These can be used to change the **UDP Port** number (for the Video, Audio or Meta streams), the **RTP** payload value (for the Video, Audio or Meta streams) or the **TTL** (TimeToLive) value for all streams.

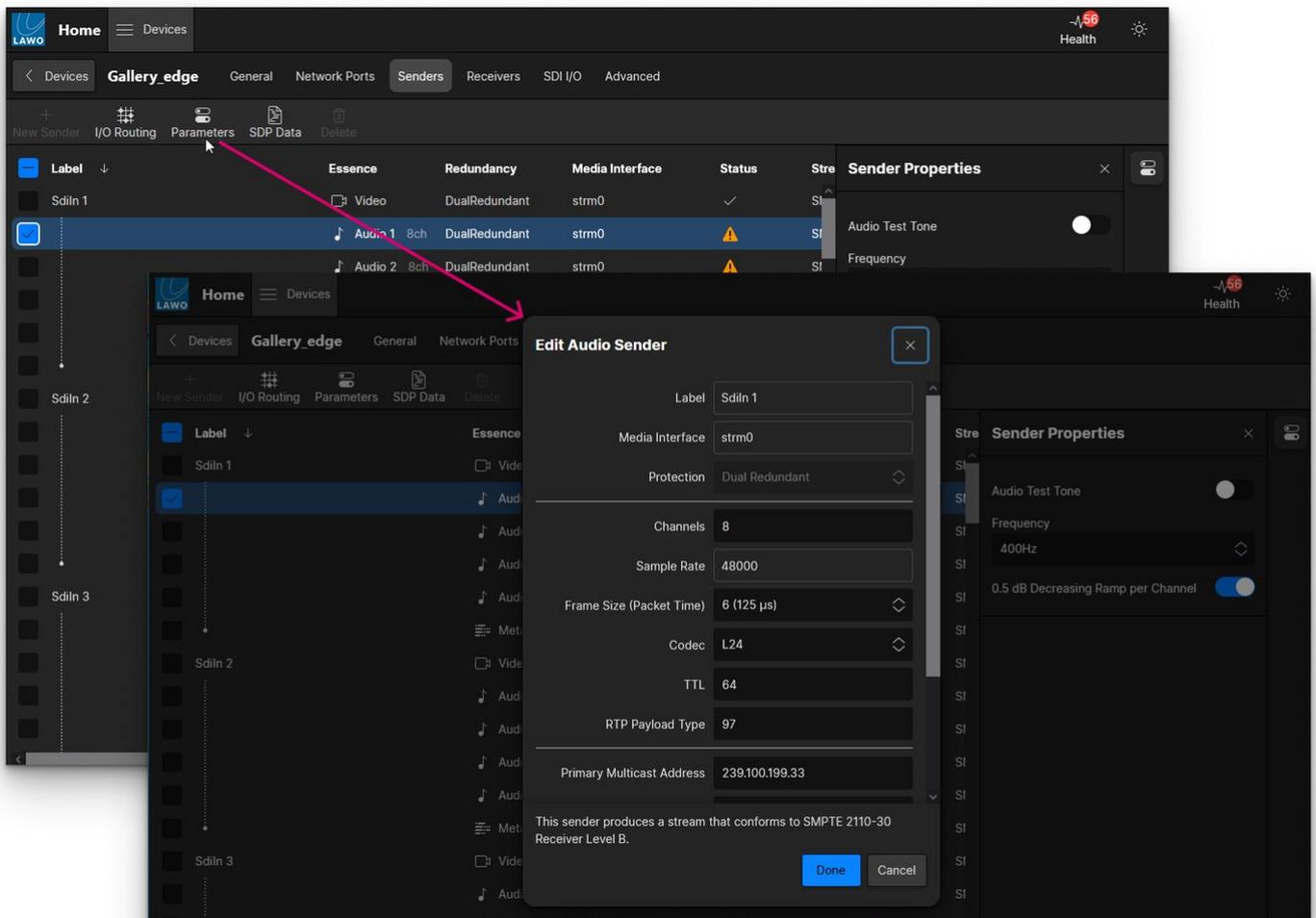
In each case, enter the required value(s) into each field, and then use the corresponding **Trigger Event** button to push the values to the IP senders.

Checking the IP Senders

All of the settings above can be checked from the **Senders** tab as follows.

1. From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).
2. Then select the **Senders** tab to view all of the IP senders.
3. Select a sender (e.g. **SdiIn1 Audio 1**).
4. Click on **Parameters** to open the "Edit Audio Sender" dialog box.
5. From here you can check all of the sender parameters, including the **Primary** and **Secondary Multicast Address** plus the **Destination UDP Port**, **TTL** and **RTP Payload Type**.

Checking the Multicast Address of an IP Sender





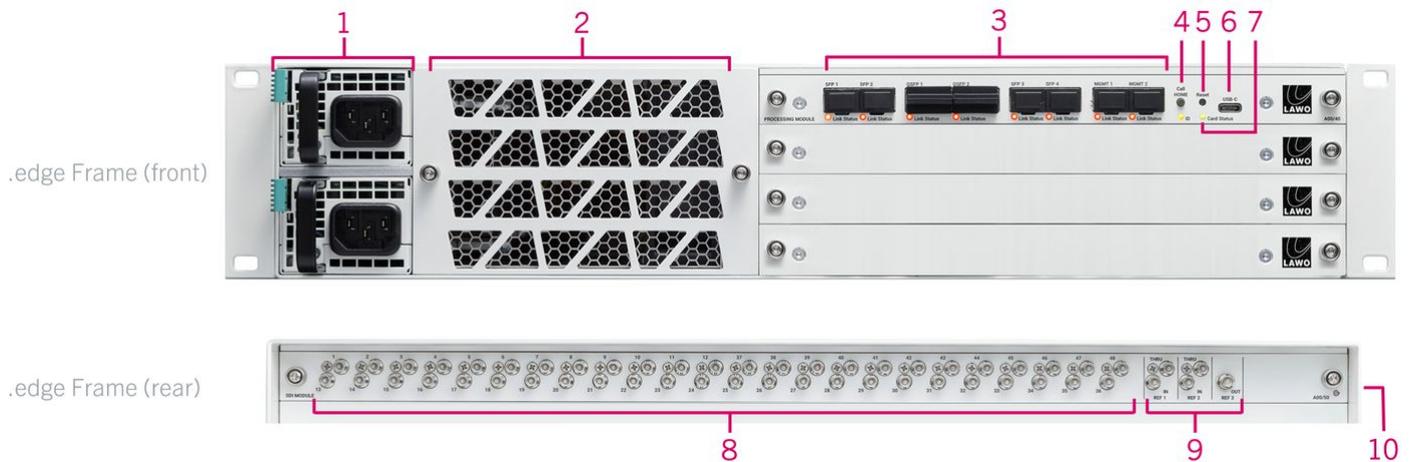
7 .edge - Operation

This chapter describes how to operate the system once the initial setup is complete.

- [.edge - Controls, Connectors and Indicators](#)
- [.edge - Operating Principles](#)
- [.edge - IP Senders and Receivers](#)
- [.edge - SDI Inputs and Outputs](#)
- [.edge - Stream Routing](#)
- [.edge - Audio Handling](#)
- [.edge - Frame Synchronization](#)
- [.edge - Video Gearboxing](#)
- [.edge - Video and Audio Delay](#)
- [.edge - Test Signals](#)

7.1 .edge - Controls, Connectors and Indicators

All controls, connectors and indicators are located on the front and rear panel, with the exception of the grounding screw (10).



1. Power Supplies x 2

.edge has no on/off switch and starts automatically when power is applied.

- You will hear the fans speed up when power is first applied. This is normal. The fan speed will settle once the operating temperatures of all processing blades have been determined (by the master blade).
- The processing blades take approximately 40 seconds to boot from power on.
- At the end of the boot-up, each processing blade loads the latest settings (stored at shut-down).

Each power supply has two status LEDs that can be used to check the health of the PSU:

- LED 1 (power) - lights in green when the power is ok.
- LED 2 (fault) - lights in amber if there is a fault or warning.

The table below describes all possible states.

PSU LED	Condition(s)	Meaning	Recommended Actions
1 - Off 2 - Off	No power.	No AC (or DC) input.	Check the AC mains supply and IEC connection. (For a DC supply, check the disconnect device/power distribution).
1 - Green (blinking) 2 - Off	Standby ON; Main output OFF; AC (or DC) present.	AC (or DC) input detected; PSU is starting.	Wait for PSU to start.
1 - Green (solid) 2 - Off	Standby ON; Main output ON. No errors detected.	PSU is active; no errors.	Normal operation; no action required.
2 - Amber (solid)	Main output overcurrent, undervoltage or overvoltage. Fan fault or overtemperature. Standby overcurrent or undervoltage.	Internal fault.	Check the PSU Health pages (in HOME's Advanced parameters).

PSU LED	Condition(s)	Meaning	Recommended Actions
2 - Amber (blinking)	Power supply warning event triggered.	Internal warning.	

2. Front Grill / Fans

.edge is cooled by five temperature-controlled fans (fitted behind the front grill).

- Air is taken in from the front and blown out, across the processing blades, to the right side.
- The fan activity is controlled automatically by the master processing blade.

The health of the fans can be interrogated using the [Health](#) pages (in HOME's Advanced parameters).

3. Network Interfaces

Each processing blade is equipped with 8 network interfaces: 6 media + 2 management ports.

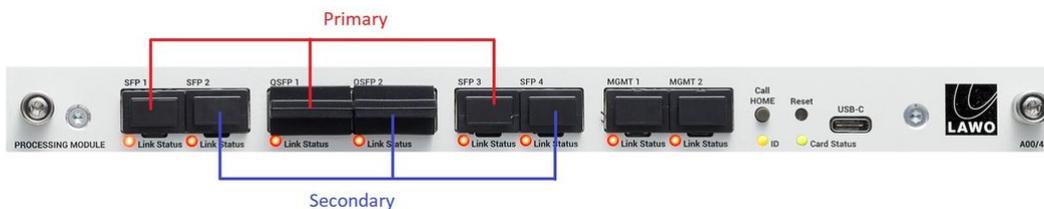
- The media ports connect the IP streams to the media network(s). The active ports depend on the [operating mode](#): either 4 x 25GbE (via SFP28) or 2 x 100GbE (via QSFP28).
- The MGMT ports connect the processing blade to the management network(s): 2 x 1GbE (via SFP).

Each network port has a **Link Status** LED that can be used to check the Ethernet connection.

Link Status LED	Meaning	Recommended Actions
Green	Link up (ok).	No action required.
Yellow	Link down: optical transceiver detected but no connection.	Check the connection to the network switch.
Off	Link down: optical transceiver missing.	Check the fitting of the optical transceiver.

The link status and IP settings can also be interrogated using HOME's [Network Ports](#) tab.

The image below shows the location of the primary and secondary interfaces.



4. Call Home & ID

The **Call Home** (button) and **ID** (LED) can be used to identify the hardware in the HOME Web UI. This can be extremely useful when you are configuring more than one blade.

The **ID** LED has three possible states:

- Green (fully lit) = Identify Hardware inactive (normal state).
- Red to Blue, alternating = Identify Hardware active.
- Off = processing blade is off (no power).



To identify a processing blade, either press and hold **Call Home** (on the unit) for at least 2 seconds or select **Identify Hardware** (in HOME's [General](#) tab).

When **Call Home** or **Identify Hardware** is active, a "Says Hi" message appears in the HOME Web UI (as shown [here](#)).

To cancel the "Identify Hardware" mode, either deselect **Identify Hardware** (on the GUI) or press and hold the **Call Home** button again (on the unit).

The **Call Home** button can also be used to reset the network settings for the MGMT ports. This is described later in [.edge - Network Settings](#).

5. Reset

The **Reset** button can be used to reset the power of the processing blade. The button is recessed to prevent accidental operation. After the reboot, the blade loads the latest configuration.

You can also reboot a processing blade remotely using the **Reboot** option (from HOME's "[Devices](#)" list).

i A processing blade can be reset to its factory default settings using the [Factory](#) page (in HOME's Advanced parameters).

6. USB-C

The **USB-C** (port) is provided for diagnostics. In the event of a problem, you may be asked to connect this port to a service computer by a Lawo support engineer. The connection should be made using a standard USB Type-C cable.

7. Card Status

The **Card Status** LED shows the health of the processing blade (and chassis*). The LED has three possible states: green, amber or red.

Card Status LED	Meaning	Recommended Actions
Green, intermittent	Ok	No action required.
Amber, intermittent	Warning	Check the Card Warning(s) on the System controls page (in HOME's Advanced parameters).
Red, blinking	Fault	Check the Card Fault(s) on the System controls page (in HOME's Advanced parameters).

*On the master processing blade (fitted to the highest physical slot), the **Card Status** LED shows the health of both the card (blade) and chassis (frame). Typically, the chassis faults are either power or fan-related. e.g. If there is a power fault in the frame, then the top **Card Status** LED lights in red while all other **Card Status** LEDs are green.

8. SDI Interfaces

Each rear I/O plate is equipped with 48 x HD-BNC for SDI interfacing.

The number of available SDIs is determined by the number of [".edge_sdi" licenses](#) on the processing blade. In addition, the number of SDI inputs versus outputs can be changed using the [Device Options](#) (in HOME's General tab).



9. Reference Signal Interfaces

Each rear I/O plate is equipped with 5 x HD-BNC for external reference signals: 2 x REF IN, 2 x REF THRU and 1 x REF OUT. The sync reference can be checked or changed using the [Synchronization](#) parameters (in HOME's Advanced parameters).

10. Grounding Screw

A grounding screw is provided on the right side of the frame (when viewed from the rear). See [.edge - Grounding](#) for more information about the safety requirements.



7.2 .edge - Operating Principles

Before configuring .edge, it is useful to understand how each processing blade is controlled and where its settings are stored.

Remote Control Options

All of the parameters for a processing blade are controlled, via the network, in one of three ways: using HOME, Ember+ or REST API.

As .edge supports native control via Lawo's HOME, this section assumes that you are using HOME as the control interface. If you do not have access to HOME, then please see [Control via Ember+](#) and [Control via REST API](#).

Prerequisites

It is expected that customers will have a HOME cluster and so, once the HOME server(s) are configured, .edge devices are automatically detected by HOME.

You can learn how to configure the processing blade's network interfaces [later](#). For now, it is useful to know that, by default, the MGMT 1 port is configured for DHCP. This means that, once a blade is connected to the HOME network using MGMT 1, its control IP address is assigned automatically (by HOME's DHCP server).

To control a processing blade using HOME, you will need a computer that is installed with a suitable web browser application (to open the HOME Web UI).

The computer must be connected to the same network and subnet as the .edge processing blades and the HOME server(s).

For more information about the computer and browser requirements, please see [HOME - First Steps](#) (in the HOME - User Manual).

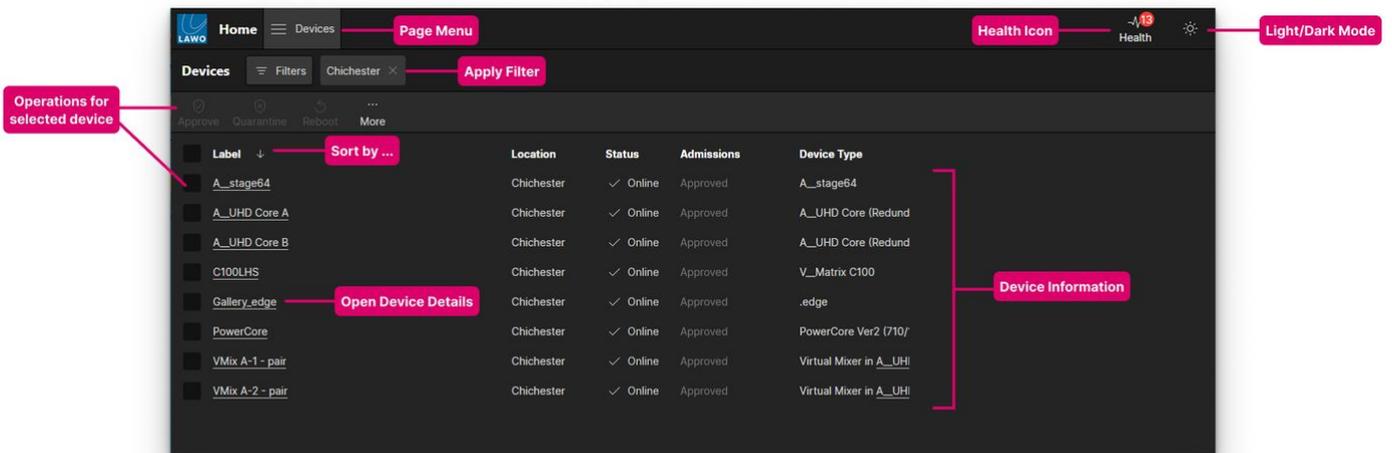
Opening a Connection to HOME

Start by configuring the network settings for your computer's Network Interface Card (NIC):

- The **IP address** must be unique, and set within the same range as that of the HOME servers management NIC(s).
- The **subnet masks** should be identical.
- A **default gateway** is required if data packets are to be redirected (e.g. via a network switch with Layer 3 routing capability). If redirection is not required, then the default gateway can be left blank.

Then open a connection to HOME as follows.

1. Open your web browser application and type in either `http://IP address:5000/` or the domain name of the HOME server, followed by port `:5000`. Press Enter.
2. At the "Sign in" screen, enter the following credentials: **Username** = admin; **Password** = password.
3. Following a successful sign-in, the HOME "Devices" page appears (listing all the devices known to HOME).



- ✓ The HOME Web UI can operate in either light or dark mode: click on the "brightness" icon (top right) to toggle the view.

The **Filters** button can be used to filter the contents of the list. For example, to view only the devices in a particular location.

For more information about these, and other features of HOME, please see [HOME - Operating Principles](#) (in the HOME - User Manual).

Identifying the .edge Devices

Each .edge processing blade appears as a separate device. So, if you connect all 4 processing blades (from a single frame), then HOME displays these as 4 separate entries.

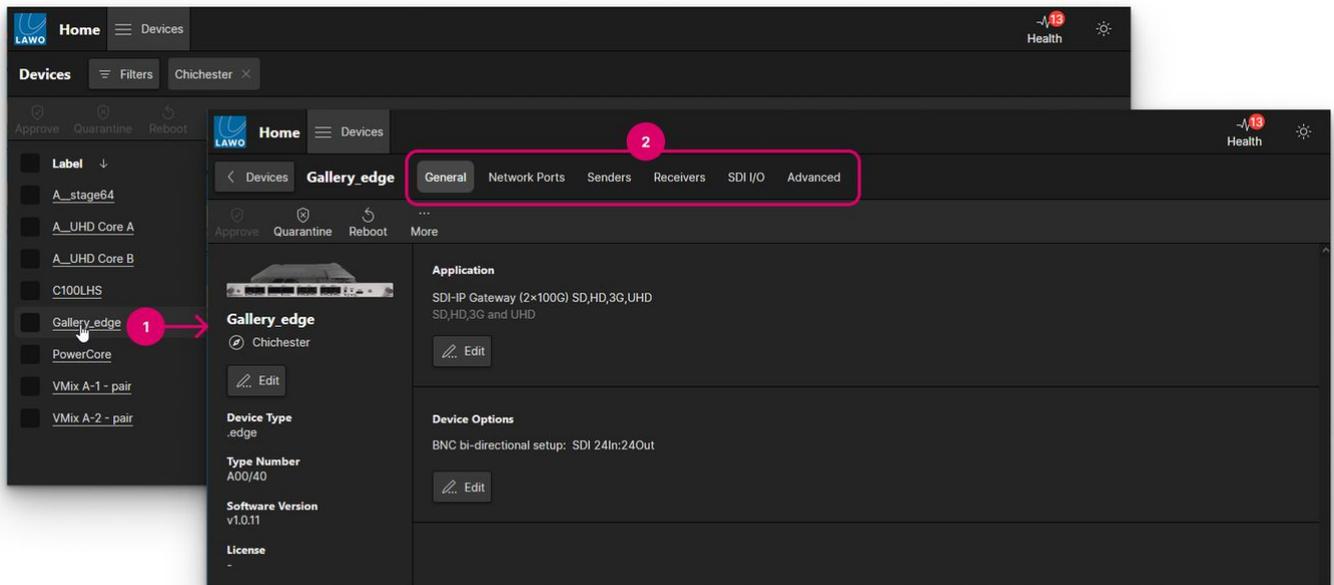
By default, the blades are assigned a default label: **.edge_Slot1** to **.edge_Slot 4**, where slot 1 is the master processing blade (fitted to the highest physical slot in the frame).

- If a processing blade does not appear, or shows as **Offline**, then check that it is powered and connected to the HOME server network.
- If a processing blade is showing as **Quarantined**, then it must be approved before you can continue. To learn more, please see [HOME - Approve or Quarantine a Device](#) (in the HOME - User Manual).
- If you need help identifying each processing blade, then you can use the "[Identify Hardware](#)" function.
- The label and location of each processing blade can be edited using the "[Edit Device Info](#)" function.

Adjusting Settings

All of the settings for a processing blade can be viewed and edited from the "Device Details" page. This is opened and closed as follows.

1. Click on the device label (from the main "Devices" list) - the "Device Details" page opens with the **General** tab selected.
2. Use the menu tabs to access the other subpages: **Network Ports**, **Senders**, **Receivers**, etc.
3. To return to the main "Devices" list, click on the **< Devices** button (to the left of the device label).



The six menu tabs provide access to the settings.

The **General** tab is divided into two sections with general information about the processing blade (on the left) and other settings (on the right). Here you will find information such as the **Software Version** and **Serial Number** (important for licensing), plus the "Identify Hardware" function (if you need to locate a blade in the equipment rack). The three **Edit** buttons allow you to edit the Device Info (label and location), the Application (operating mode), or the Device Options (SDI I/O configuration).

The **Network Ports** tab lists all of the processing blade's active network ports. From here you can check the status of a port or edit its network settings.

The **Senders** and **Receivers** tabs list the processing blade's senders and receivers. The senders and receivers are pre-defined, where each one handles the three essence types of an SDI I/O: 1 x Video, 4 x Audio, 1 Meta(data). The total number is determined by the SDI I/O configuration. For example, 24 senders + 24 receivers for a fully-licensed processing blade. From this tab, it is possible to adjust the I/O Routing (for the audio streams), edit the streaming parameters or access the SDP data. In addition, the "Show Sidebar" button (on the right) reveals the available properties for the selected sender or receiver. For example, for an audio essence, you can adjust the delay or turn on the test tone.

The **SDI I/O** tab can be switched between **SDI Inputs** and **SDI Outputs**. It provides a quick overview of the connections including signal present (for Video and Audio), and which options are enabled (Frame Sync, Ident, Test Pattern, Gearboxing). The "Show Sidebar" button (on the right) reveals the available properties for the selected input or output. For example, for an SDI input, you can turn on the ident and test pattern, or adjust the gearboxing and input frame sync (if the relevant licenses are active).

The **Advanced** tab provides access to ALL of the available parameters for a processing blade. It is designed for technical users who need access to more advanced settings and informational fields.

Connecting and Disconnecting Streams

The "Stream Routing" page is used to manage all the network's streaming connections. From here you can connect a sender to a receiver, or interrogate the existing connections. The operation is identical for all devices on the HOME network, and so the same steps apply to all devices known to HOME and not just .edge. The screenshot below shows an example.

The screenshot shows the Stream Routing configuration interface. It features two main panels: 'Sources' on the left and 'Destinations' on the right. The 'Sources' panel lists various input devices and their essences, with a 'Source Used Count' column. The 'Destinations' panel lists output devices and their essences. A central area shows connections between sources and destinations. Callouts highlight specific UI elements: 'Operations for selected source' points to the source list, 'Apply Filters' points to the filter buttons, 'Operations for selected destination' points to the destination list, 'Device Label/Sender Label' points to the source name, 'Source Used Count' points to the count column, and 'Device Label/Receiver Label' points to the destination name.

Source	Essence	→	Connected Source	Essence	Destination
> .edge100G/SdiIn 1	🎵		AStage48 A/GPI-1	🎵	Astage48 B/GPO-1
> .edge100G/SdiIn 2	🎵		AStage48 A/GPI-2	🎵	Astage48 B/GPO-2
> .edge100G/SdiIn 3	🎵		AStage48 A/GPI-3	🎵	Astage48 B/GPO-3
> .edge100G/SdiIn 4	🎵		AStage48 A/GPI-4	🎵	Astage48 B/GPO-4
AStage48 A/GPI-1	🎵	1	AStage48 A/GPI-5	🎵	Astage48 B/GPO-5
AStage48 A/GPI-2	🎵	1	AStage48 A/GPI-6	🎵	Astage48 B/GPO-6
AStage48 A/GPI-3	🎵	1	AStage48 A/GPI-7	🎵	Astage48 B/GPO-7
AStage48 A/GPI-4	🎵	1	AStage48 A/GPI-8	🎵	Astage48 B/GPO-8
AStage48 A/GPI-5	🎵	1	UHD-Core-A - VMix two -pair/TX-1	🎵 8ch	Astage48 B/Rx-1
AStage48 A/GPI-6	🎵	1	AStage48 A/Tx-8Chan-2	🎵 8ch	Astage48 B/Rx-2
AStage48 A/GPI-7	🎵	1		🎵 8ch	Astage48 B/Rx-3
AStage48 A/GPI-8	🎵	1		🎵 8ch	Astage48 B/Rx-4
AStage48 A/Main	🎵 8ch			🎵	AStage48 SIM-1/RX-1
AStage48 A/Tx-8Chan-1	🎵 8ch			🎵	AStage48 SIM-1/RX-2
AStage48 A/Tx-8Chan-2	🎵 8ch	1		🎵	AStage48 SIM-1/RX-3

Saving Settings

The current configuration of all devices on the HOME network is stored automatically whenever a change is made. The data is stored on the HOME server. If the server restarts, then the configuration is re-instated at the end of the reboot.

If a networked device restarts, or is disconnected, then any streaming connections to and from the device are lost. However, the connections are still prepared. This means that as soon as the device comes back online, its streaming connections are re-established.

If you wish to make a backup of a particular point in the setup, then you can save the complete configuration in a snapshot. For more information on how to do this, please see [HOME - The Snapshots Page](#) (in the HOME - User Manual).

i In the current release, it is not possible to save (or load) the settings of an individual processing blade.



7.3 .edge - IP Senders and Receivers

This topic describes how to check and configure the IP senders and receivers.

Overview

Each processing blade supports a number of IP senders (and receivers) that stream content to (and from) the media network. The senders and receivers are pre-defined, where each one handles the three essence types of an SDI I/O: 1 x Video, 4 x Audio, 1 Meta(data).

The total number of senders and receivers is determined by the SDI I/O configuration. For example, 24 senders + 24 receivers for a fully-licensed processing blade.

Note that, for each converted signal, there are two sets of parameters: the sender/receiver parameters (on the IP side) and the input/output parameters (on the SDI side). Here we deal with the former. For more information on the latter, see [.edge - SDI Inputs and Outputs](#).

IP Senders and Receivers

The **Senders** and **Receivers** tabs list all of the pre-defined senders and receivers. From here, it is possible to adjust the I/O Routing (for the audio streams), edit the streaming parameters or access the SDP data. In addition, the "Show Sidebar" button (on the right) reveals the available properties for the selected sender or receiver. For example, for an audio essence, you can adjust the delay or turn on the test tone.

From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)). Then select either **Senders** or **Receivers**.

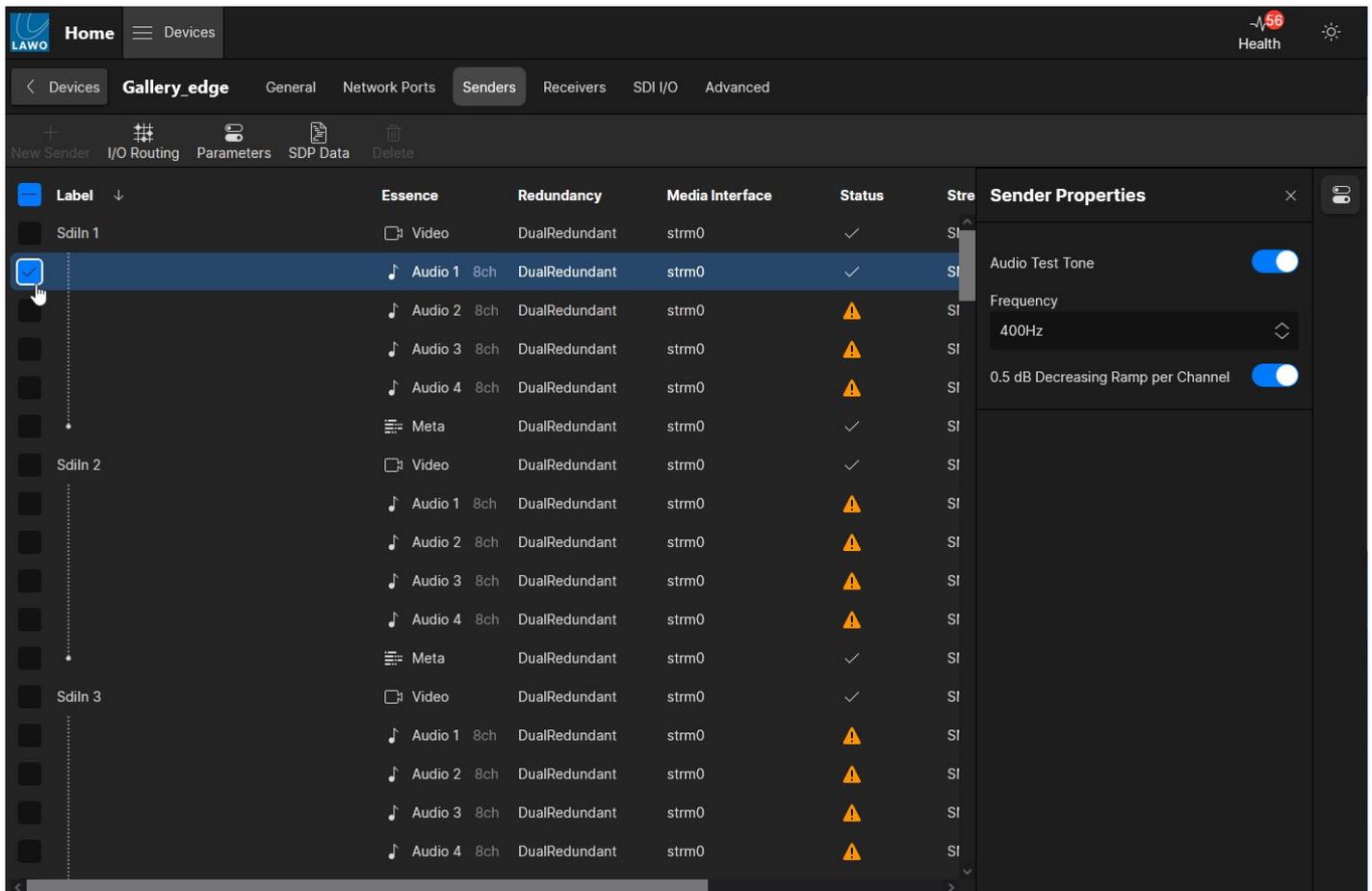
IP Senders

The **Senders** tab lists all of the streams transmitted from the processing blade to the network. The screenshots below show the two possible views: with the Properties sidebar turned off and on.

.edge - IP Senders (overview)

Label	Essence	Redundancy	Media Interface	Status	Stream Information
SdiIn 1	Video	DualRedundant	strm0	✓	SMPTE2110_20: 1080p50
	Audio 1 8ch	DualRedundant	strm0	✓	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 2 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 3 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 4 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Meta	DualRedundant	strm0	✓	SMPTE2110_40
SdiIn 2	Video	DualRedundant	strm0	✓	SMPTE2110_20: 1080p50
	Audio 1 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 2 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 3 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 4 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Meta	DualRedundant	strm0	✓	SMPTE2110_40
SdiIn 3	Video	DualRedundant	strm0	✓	SMPTE2110_20: 1080p50
	Audio 1 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 2 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 3 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Audio 4 8ch	DualRedundant	strm0	⚠	SMPTE2110_30: 48 kHz, L24, 125 µs
	Meta	DualRedundant	strm0	✓	SMPTE2110_40

IP Senders (audio sender properties)



Sender Information

The following information is displayed for each stream:

- **Label** - identifies the stream to other network users. For .edge it is pre-defined and cannot be edited.
- **Essence** - describes the type of content carried by the stream: Video, Audio or Metadata. For audio streams, you will also see the number of channels (e.g. 8ch).
- **Redundancy** - shows the redundancy status of the stream. A DualRedundant stream is SMPTE ST2022-7 compatible.
- **Media Interface** - shows the name of the network interface(s) sending the stream.
- **Status** - indicates the status of the stream. Hover over the icon to reveal more information.
- **Stream Information** - shows a summary of the stream parameters. e.g. for a video stream: the IP standard and video format; for an audio stream: the IP standard, sample rate, codec type and packet time.

Video Sender Properties

For video streams, all of the adjustable parameters are on the SDI side, and so there are no properties for a video sender.

Audio Sender Properties

For an audio sender, the following properties can be adjusted:

- **Audio Test Tone** - on/off
- **Frequency** - selectable from the drop-down menu.
- **0.5 dB Decreasing Ramp per Channel** - on/off. Turn this option on to vary the audio level of the test tone.

The audio test tone can be used to line-check the audio path from the sender (once a connection is made via the [Stream Routing](#) page).

Other Operations

If you select a sender, then a number of other functions become available:

- **I/O Routing** (for audio senders only) - assigns the SDI audio inputs to the IP sender channels. Otherwise known as audio shuffling.
- **Parameters** - check or edit the stream parameters.
- **SDP Data** - view or copy/paste the stream's SDP.

IP Receivers

The **Receivers** tab works in a similar manner, but this tab lists all of the available receivers. Each one can be used to receive a stream from the network either by making a connection in the [Stream Routing](#) page or by editing the receiver's SDP data.

.edge - IP Receivers (overview)

Label	Essence	Redundancy	Media Interface	Status	Connected Source	Stream Information
SdiOut 25	Video	DualRedundant	strm0	✓	Gallery_edge/SdiIn 12	SMPTE2110_20: 1080p5
	Audio 1	DualRedundant	strm0	!	Gallery_edge/SdiIn 12	SMPTE2110_30: 48 kHz,
	Audio 2	DualRedundant	strm0	!	Gallery_edge/SdiIn 12	SMPTE2110_30: 48 kHz,
	Audio 3	DualRedundant	strm0	!	Gallery_edge/SdiIn 12	SMPTE2110_30: 48 kHz,
	Audio 4	DualRedundant	strm0	!	Gallery_edge/SdiIn 12	SMPTE2110_30: 48 kHz,
	Meta	DualRedundant	strm0	✓	Gallery_edge/SdiIn 12	SMPTE2110_40
SdiOut 26	Video	DualRedundant	strm0	✓	Gallery_edge/SdiIn 10	SMPTE2110_20: 1080p5
	Audio 1	DualRedundant	strm0	!	Gallery_edge/SdiIn 10	SMPTE2110_30: 48 kHz,
	Audio 2	DualRedundant	strm0	!	Gallery_edge/SdiIn 10	SMPTE2110_30: 48 kHz,
	Audio 3	DualRedundant	strm0	!	Gallery_edge/SdiIn 10	SMPTE2110_30: 48 kHz,
	Audio 4	DualRedundant	strm0	!	Gallery_edge/SdiIn 10	SMPTE2110_30: 48 kHz,
	Meta	DualRedundant	strm0	✓	Gallery_edge/SdiIn 10	SMPTE2110_40
SdiOut 27	Video	DualRedundant	strm0			-
	Audio 1 64ch	DualRedundant	strm0			-
	Audio 2 64ch	DualRedundant	strm0			-
	Audio 3 64ch	DualRedundant	strm0			-
	Audio 4 64ch	DualRedundant	strm0			-

IP Receivers (video receiver properties)

The screenshot displays the 'Receivers' section of the LAWO edge interface. A table lists various receivers, including SdiOut 25, 26, and 27. Each receiver is associated with an essence (Video or Audio), a redundancy type (DualRedundant), and a media interface (strm0). The status of each receiver is indicated by a checkmark or a red exclamation mark. A 'Receiver Properties' panel is open for 'SdiOut 25', showing a 'Switching Behaviour' dropdown menu set to 'Make Before Break (MBB)'.

Label	Essence	Redundancy	Media Interface	Status	Con
<input checked="" type="checkbox"/> SdiOut 25	Video	DualRedundant	strm0	✓	G
<input type="checkbox"/>	Audio 1	DualRedundant	strm0	!	G
<input type="checkbox"/>	Audio 2	DualRedundant	strm0	!	G
<input type="checkbox"/>	Audio 3	DualRedundant	strm0	!	G
<input type="checkbox"/>	Audio 4	DualRedundant	strm0	!	G
<input type="checkbox"/>	Meta	DualRedundant	strm0	✓	G
SdiOut 26	Video	DualRedundant	strm0	✓	G
<input type="checkbox"/>	Audio 1	DualRedundant	strm0	!	G
<input type="checkbox"/>	Audio 2	DualRedundant	strm0	!	G
<input type="checkbox"/>	Audio 3	DualRedundant	strm0	!	G
<input type="checkbox"/>	Audio 4	DualRedundant	strm0	!	G
<input type="checkbox"/>	Meta	DualRedundant	strm0	✓	G
SdiOut 27	Video	DualRedundant	strm0		
<input type="checkbox"/>	Audio 1 64ch	DualRedundant	strm0		
<input type="checkbox"/>	Audio 2 64ch	DualRedundant	strm0		
<input type="checkbox"/>	Audio 3 64ch	DualRedundant	strm0		
<input type="checkbox"/>	Audio 4 64ch	DualRedundant	strm0		

IP Receivers (audio receiver properties)

The screenshot shows the 'Receivers' tab in the LAWO edge interface. A table lists various receivers, and a 'Receiver Properties' panel is open for the selected 'SdiOut 25' receiver.

Label	Essence	Redundancy	Media Interface	Status	Connected Source
SdiOut 25	Video	DualRedundant	strm0	✓	G
	Audio 1	DualRedundant	strm0	!	G
	Audio 2	DualRedundant	strm0	!	G
	Audio 3	DualRedundant	strm0	!	G
	Audio 4	DualRedundant	strm0	!	G
	Meta	DualRedundant	strm0	✓	G
SdiOut 26	Video	DualRedundant	strm0	✓	G
	Audio 1	DualRedundant	strm0	!	G
	Audio 2	DualRedundant	strm0	!	G
	Audio 3	DualRedundant	strm0	!	G
	Audio 4	DualRedundant	strm0	!	G
	Meta	DualRedundant	strm0	✓	G
SdiOut 27	Video	DualRedundant	strm0	✓	G
	Audio 1 64ch	DualRedundant	strm0	!	G
	Audio 2 64ch	DualRedundant	strm0	!	G
	Audio 3 64ch	DualRedundant	strm0	!	G
	Audio 4 64ch	DualRedundant	strm0	!	G

The 'Receiver Properties' panel for 'SdiOut 25' shows the following settings:

- Switching Behaviour: Make Before Break (MBB)
- Audio Delay: (On)
- Audio Delay (ms): 0.000
- Audio Delay (samples): 0
- Audio Test Tone: (On)

Receiver Information

The following information is displayed for each receiver. This is similar to the information for senders but adds the **Connected Source** column (to show the connected stream).

- **Label** - identifies the receiver within the network. For .edge it is pre-defined and cannot be edited.
- **Essence** - describes the type of content that can be received: Video, Audio or Metadata. For audio streams, you will see the number of channels (once a connection is made).
- **Redundancy** - shows the redundancy status of the receiver. A DualRedundant receiver can be connected to either a redundant or non-redundant stream.
- **Media Interface** - shows the name of the network interface(s) used by the receiver.
- **Status** - indicates the status of the receiver. Hover over the icon to reveal more information.
- **Connected Source** - shows the name of the connected stream (once a connection is made).
- **Stream Information** - shows a summary of the connected stream parameters. e.g. for a video stream: the IP standard and video format; for an audio stream: the IP standard, sample rate, codec type and packet time.

Video Receiver Properties

For a video receiver, there is a choice of two switching modes: either **Make Before Break (MBB)** or **Break Before Make (BBM)**.

Audio Receiver Properties

For an audio receiver, the following properties can be adjusted:

- **Switching Behaviour** - either **Make Before Break (MBB)** or **Break Before Make (BBM)** as above. To achieve clean switching for audio streams, **MBB** is recommended.
- **Audio Delay** - on/off and delay time adjustment (in ms or samples).



- **Audio Test Tone** - on/off.

Other Operations

If you select a receiver, then a number of other functions become available:

- **I/O Routing** (for audio receivers only) - assigns the IP receiver channels to the SDI audio outputs. Otherwise known as audio shuffling.
- **Parameters** - check or edit the receiver parameters.
- **SDP Data** - view or copy/paste the receiver's SDP.

7.4 .edge - SDI Inputs and Outputs

This topic describes how to check and configure the SDI inputs and outputs.

Overview

The **SDI I/O** tab can be switched between **SDI Inputs** and **SDI Outputs**. It provides a quick overview of the connections including signal present (for Video and Audio), and which options are enabled (Frame Sync, Ident, Test Pattern, Gearboxing). The "Show Sidebar" button (on the right) reveals the available properties for the selected input or output. For example, for an SDI input, you can turn on the ident and test pattern, or adjust the gearboxing and input frame sync (if the relevant licenses are active).

From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)). Select the **SDI I/O** tab and then either **SDI Inputs** or **SDI Outputs**.

SDI Inputs

SDI Inputs (input properties)

Physical Input	Video	Audio	Frame Sync	Ident	Test Pattern	3G to 12G Gear
SDI Input 1	720p50	●●●●●●●●	Off	Off	Off	Off
SDI Input 2	1080p50	●●●●●●●●	Off	⚠️ IN#2	⚠️ Moving	Off
SDI Input 3	Unknown	-	-	Off	Off	Off
SDI Input 4	1080p50	●●●●●●●●	-	⚠️ IN#4	⚠️ Moving	Off
SDI Input 5	Unknown	-	-	Off	Off	Off
SDI Input 6	Unknown	-	-	Off	Off	Off
SDI Input 7	Unknown	-	-	Off	Off	Off
SDI Input 8	Unknown	-	-	Off	Off	Off
SDI Input 9	2160p50	●●●●●●●●	-	Off	Off	Off
SDI Input 13	Unknown	-	-	Off	Off	Off
SDI Input 14	Unknown	-	-	Off	Off	Off
SDI Input 15	Unknown	-	-	Off	Off	Off
SDI Input 16	Unknown	-	-	Off	Off	Off
SDI Input 17	Unknown	-	-	Off	Off	Off
SDI Input 18	Unknown	-	-	Off	Off	Off
SDI Input 19	Unknown	-	-	Off	Off	Off

SDI Input Information

The following information is displayed for each input:

- **Physical Input** - identifies the SDI connection.
- **Video** - if signal is present, then you will see a green LED and the detected format.
- **Audio** - if signal is present, then you will see a green LED for each audio channel.
- **Frame Sync** - shows **On** if the input frame synchronizer is enabled.
- **Ident** - if the video ident is turned on, then you will see a warning triangle and the ident text.



- **Test Pattern** - if the video test pattern is turned on, then you will see a warning triangle and the test pattern mode,
- **3G to 12G Gearbox** - shows **On** if video gearboxing is enabled.

SDI Input Properties

The following properties can be adjusted by selecting an SDI input and revealing the Properties sidebar.

- **SDI Inputs Preset** - defines the mode of the SDI input blocks: 1-4, 5-8, 9-12, etc. Choose **Auto** to set the mode automatically (according to the incoming SDI signal). The other options can be used to force the mode as follows:
 - **SD/HD/3G** - the inputs will operate as four independent SDIs.
 - **UHD Single Link** - the four inputs are configured to accept a single-link 12G signal. The signal must be connected to the first connector of the SDI block: SDI 1, 5, 9, etc.
 - **UHD Quad Link** - the four inputs are configured to accept a quad-link 12G signal. In this mode, the **Gearbox** option is turned on. Note that this option is hidden if there is no gearbox license.
- **SDI Input Mode** - shows the mode of the SDI input.
- **Gearbox** - turns the video gearbox on or off. Note that the option is hidden if there is no gearbox license. There are three possible modes: Auto, On and Off. If you choose **Auto**, then the gearbox can be enabled automatically by the **SDI Inputs Preset**. Alternatively, you can choose to force the option on or off.
 - When the gearbox is active, the **Link Rotate** option can be enabled to “fix” any errors in the input cabling.
- **IP Sender Mode** - shows the mode of the IP sender.
- **Frame Synchronizer** - turns the input frame synchronizer on or off. When the option is turned on, the Pixel and Line Offsets are applied.
- **Ident** - turns the video ident on or off. When the option is turned on, the Ident text appears on the SDI input. Click inside the text field to edit the Ident text.
- **Video Test Pattern** - turns the video test pattern on or off. You can choose the test pattern mode (for the color bars): either **Moving** or **Static**. In addition, you can choose a **Format** using drop-down menu.

- ✓ By selecting all SDI inputs, you can quickly change the status of an option globally. e.g. to turn on the video test pattern and idents for all inputs.

SDI Outputs

SDI Outputs (output properties)

Physical Input	Video	Audio	Frame Sync	Ident	Test Pattern	Audio Tone Test Pattern
<input type="checkbox"/> SDI Output 25	1080p50	●●●●●●●●●●	On	Off	Off	Off
<input type="checkbox"/> SDI Output 26	1080p50	●●●●●●●●●●	On	Off	Off	Off
<input checked="" type="checkbox"/> SDI Output 27	1080i50	-	On	⚠ OUT#27	⚠ Static	⚠ On
<input type="checkbox"/> SDI Output 28	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 29	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 30	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 31	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 32	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 33	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 34	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 35	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 36	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 37	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 38	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 39	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 40	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 41	Unknown	-	On	Off	Off	Off

SDI Output Information

The following information is displayed for each SDI output. This is similar to the information for inputs but adds the **Audio Tone Test Pattern** column (to show the status of the audio test tone).

- **Physical Output** - identifies the [SDI connection](#).
- **Video** - if signal is present, then you will see a green LED and the detected format.
- **Audio** - if signal is present, then you will see a green LED for each audio channel.
- **Frame Sync** - shows **On** if the [output frame synchronizer](#) is enabled.
- **Ident** - if the [video ident](#) is turned on, then you will see a warning triangle and the ident text.
- **Test Pattern** - if the [video test pattern](#) is turned on, then you will see a warning triangle and the test pattern mode.
- **Audio Tone Test Pattern** - if the [audio test tone](#) is turned on, then you will see a warning triangle in this column.
- **3G to 12G Gearbox** - shows **On** if [video gearboxing](#) is enabled.

SDI Output Properties

The following properties can be adjusted by selecting an SDI output and revealing the Properties sidebar. The operations are similar to the inputs side except for a few additions: the **Audio Test Tone**, **SMPT352** options and **Number of Audio Groups**.

- **SDI Outputs Preset** - defines the mode of the SDI output blocks: 25-28, 29-32, 33-36, etc. Choose **Auto** to set the mode automatically (according to the incoming IP signal). The other options can be used to force the mode as follows:
 - **SD/HD/3G** - the outputs will operate as four independent SDIs.
 - **UHD Single Link** - the four outputs are configured to output a single-link 12G signal. The signal must be connected to the first connector of the SDI block: SDI 25, 29, 33, etc.
 - **UHD Quad Link** - the four outputs are configured to output a quad-link 12G signal. In this mode, the **Gearbox** option is turned on. Note that this option is hidden if there is no gearbox license.
- **IP Receiver Mode** - shows the mode of the IP receiver.

- **Gearbox** - turns the video gearbox on or off. Note that option is hidden if there is no gearbox license. There are three possible modes: Auto, On and Off. If you choose **Auto**, then the gearbox can be enabled automatically by the **SDI Outputs Preset**. Alternatively, you can choose to force the option on or off.
 - When the Gearbox is active, the **Link Rotate** option can be enabled to “fix” any errors in the input cabling.
- **Insert 2SI** -
- **SDI Output Mode** - shows the mode of the SDI output.
- **Format** -
- **Pixel Offset** and **Line Offset** - adjusts the pixel and line offsets for the output frame synchronizer. Note that the output frame synchronizers are always enabled.
- **Delay** - adjusts the video delay (up to 6 frames OR fields depending on the video standard).
- **Ident** - turns the video ident on or off. When the option is turned on, the Ident text appears on the SDI output. Click inside the text field to edit the Ident text.
- **Video Test Pattern** - turns the video test pattern on or off. You can choose the test pattern mode (for the color bars): either **Moving** or **Static**. In addition, you can choose a **Format** using drop-down menu.
- **Audio Test Tone** - turns the audio test tone on or off. The **Frequency** can be selected from the drop-down menu. Turn on the **0.5 dB Decreasing Ramp per Channel** option to vary the audio level of the test tone.
- **SMPTE352 Transfer Characteristics Overwrite** -
- **SMPTE352 Transfer Colometry Overwrite** -
- **Number of Audio Groups** -

✓ By selecting all SDI outputs, you can quickly change the status of an option globally. e.g. to turn on the audio test tone for all audio outputs.

7.5 .edge - Stream Routing

This topic describes how to connect the IP streams.

Overview

The "Stream Routing" page manages the streaming connections. From here you can connect a sender to a receiver, or interrogate the existing connections.

The operation of this page is identical for all devices on the HOME network, and so the same steps apply to all devices known to HOME.

For .edge, the main points are:

- The senders and receivers are pre-defined, where each one handles the three essence types of an SDI I/O: 1 x Video, 4 x Audio, 1 Meta(data).
- The essences can be routed as a group (Video, Audio & Meta) or individually (by unfolding the group).

For step-by-step instructions on how to use this page, please see [HOME - The Stream Routing Page](#) (in the HOME User Manual). The screenshots below show some examples for .edge.

Stream Routing Examples

.edge Stream Routing - as a group

The screenshot displays the 'Stream Routing' interface for a device named 'Gallery_edge'. The interface is split into two main panels: 'Sources' on the left and 'Destinations' on the right. In the 'Sources' panel, a list of sources is shown, with 'Gallery_edge/SdiIn 10' selected and highlighted in blue. A blue arrow points from this source to the 'Connect' button in the top right of the 'Sources' panel. In the 'Destinations' panel, a list of destinations is shown, with 'Gallery_edge/SdiOut 26' selected and highlighted in blue. A blue arrow points from the 'Connect' button to this destination. The 'Destinations' panel also shows a table of connected sources and their essences.

Connected Source	Essence	Destination
EdgeSdiInput_3_flow_video		C100LHS/Rx-3
EdgeSdiInput_4_flow_video		C100LHS/Rx-4
AUDIO_TX_1	+1	C100LHS/Rx-5
AUDIO_TX_2	+1	C100LHS/Rx-6
AUDIO_TX_3	+1	C100LHS/Rx-7
AUDIO_TX_4	+1	C100LHS/Rx-8
AUDIO_TX_5	+1	C100LHS/Rx-9
		C100LHS/Rx-10
Gallery_edge/SdiIn 12		Gallery_edge/SdiOut 25
Gallery_edge/SdiIn 10		Gallery_edge/SdiOut 26
		Gallery_edge/SdiOut 27
		Gallery_edge/SdiOut 28
		Gallery_edge/SdiOut 29
		Gallery_edge/SdiOut 30
		Gallery_edge/SdiOut 31
		Gallery_edge/SdiOut 32
		Gallery_edge/SdiOut 33
		Gallery_edge/SdiOut 34

.edge Stream Routing - of individual essence



Home Stream Routing Health

Sources Gallery_edge

I/O Routing Show Destinations Disconnect Connect

Source	Essence	→
> Gallery_edge/SdiIn 1		
> Gallery_edge/SdiIn 2		2
> Gallery_edge/SdiIn 3		
> Gallery_edge/SdiIn 4		
> Gallery_edge/SdiIn 5		
> Gallery_edge/SdiIn 6		
> Gallery_edge/SdiIn 7		
> Gallery_edge/SdiIn 8		
> Gallery_edge/SdiIn 9		
∨ Gallery_edge/SdiIn 10		1
	8ch	1
	8ch	1
	8ch	1
	8ch	1
	8ch	1
		1
> Gallery_edge/SdiIn 11		
> Gallery_edge/SdiIn 12		1
> Gallery_edge/SdiIn 12		

Destinations Filters

I/O Routing Lock Disconnect

Connected Source	Essence	Destination
EdgeSdiInput_3_flow_video		C100LHS/Rx-3
EdgeSdiInput_4_flow_video		C100LHS/Rx-4
AUDIO_TX_1	+1	C100LHS/Rx-5
AUDIO_TX_2	+1	C100LHS/Rx-6
AUDIO_TX_3	+1	C100LHS/Rx-7
AUDIO_TX_4	+1	C100LHS/Rx-8
AUDIO_TX_5	+1	C100LHS/Rx-9
		C100LHS/Rx-10
Gallery_edge/SdiIn 12		Gallery_edge/SdiOut 25
Gallery_edge/SdiIn 10		Gallery_edge/SdiOut 26
Gallery_edge/SdiIn 10	64ch	
Gallery_edge/SdiIn 10	64ch	
Gallery_edge/SdiIn 10	0ch	
Gallery_edge/SdiIn 10	0ch	
Gallery_edge/SdiIn 10		
		Gallery_edge/SdiOut 27
		Gallery_edge/SdiOut 28
		Gallery_edge/SdiOut 29

7.6 .edge - Audio Handling

This topic describes what happens to the different essences during the SDI to IP conversion process. In particular, it is important to understand how the audio channels are handled, as .edge supports audio shuffling and test-tone insertion (on both the input and output sides). These parameters can be adjusted whenever you configure an IP sender or SDI output.

Overview

Options for IP Senders

- Audio (de-embedding) – independent mono audio channel mapping per IP sender, selectable number of channels (up to 16 or 32 depending on the SDI signal type)
- Test tone generator insertion – 400Hz to 1kHz frequency control with decreasing ramp (0.5dB per channel)

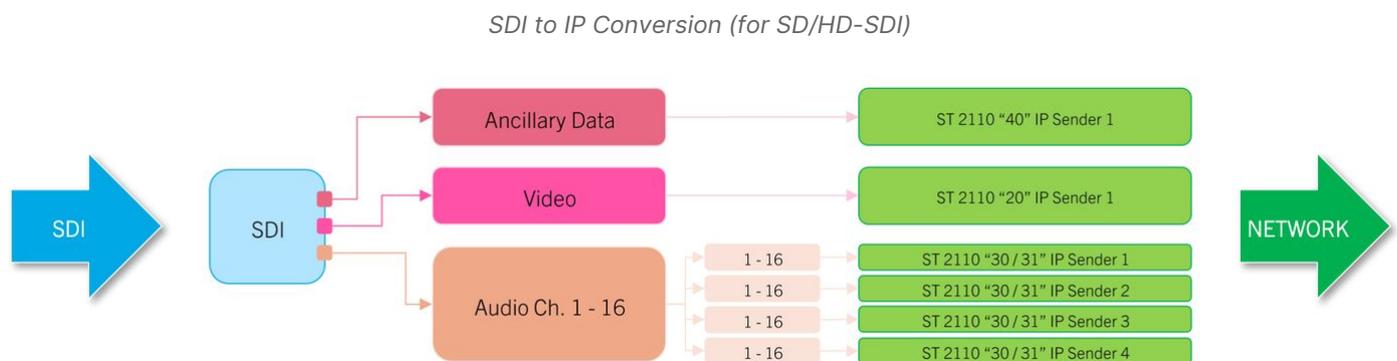
Options for SDI Outputs

- Audio (embedding) – independent mono audio channel mapping per SDI output, selectable number of channels (up to 64)
- Test tone generator insertion – 400Hz to 1kHz frequency control with decreasing ramp (0.5dB per channel)

The examples that follow describe how this works for different SDI signal types.

SD and HD (SDI)

For SD and HD signals sent to an SDI input, .edge accepts the usual 16 audio channels. These can be routed to four IP senders, in any combination.

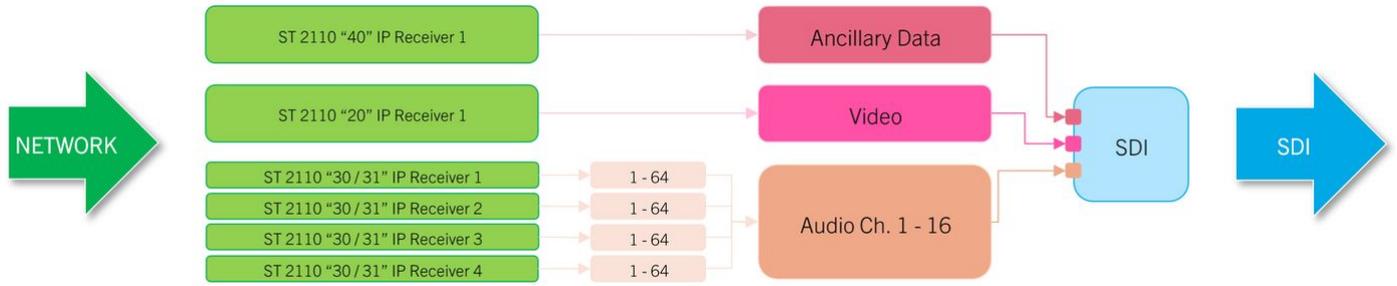


When receiving audio from the network, each IP receiver accepts up to 64 audio channels. These can include other audio signals available on the IP network as well as the ones received by the SDI input.

For the final audio packaging, any of the 64 channels sent to the four IP receivers can be shuffled into the final 16 audio channels sent to the SDI output.

Thus, it is possible to replace some or all of the original audio channels with those from a different source (e.g. audio mixing console).

IP to SDI Conversion (for SD/HD-SDI)



3G 1080p (3G-SDI)

For 3G input scenarios (at 1080p), the conversion works similarly, except that each IP sender accepts up to 32 audio channels.

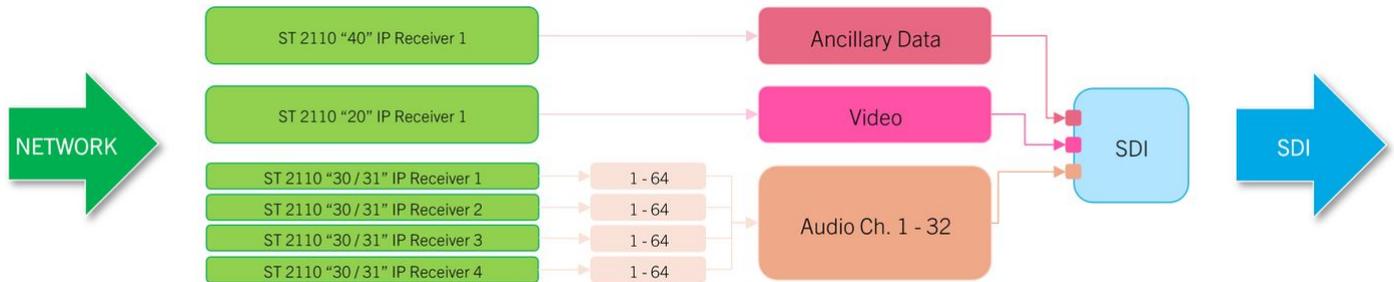
SDI to IP Conversion (for 3G-SDI)



On the receiving side, each IP receiver can handle 64 audio channels (as before).

For the final audio packaging, any of the 64 channels sent to the four IP receivers can be shuffled into the final 32 audio channels sent to the SDI output.

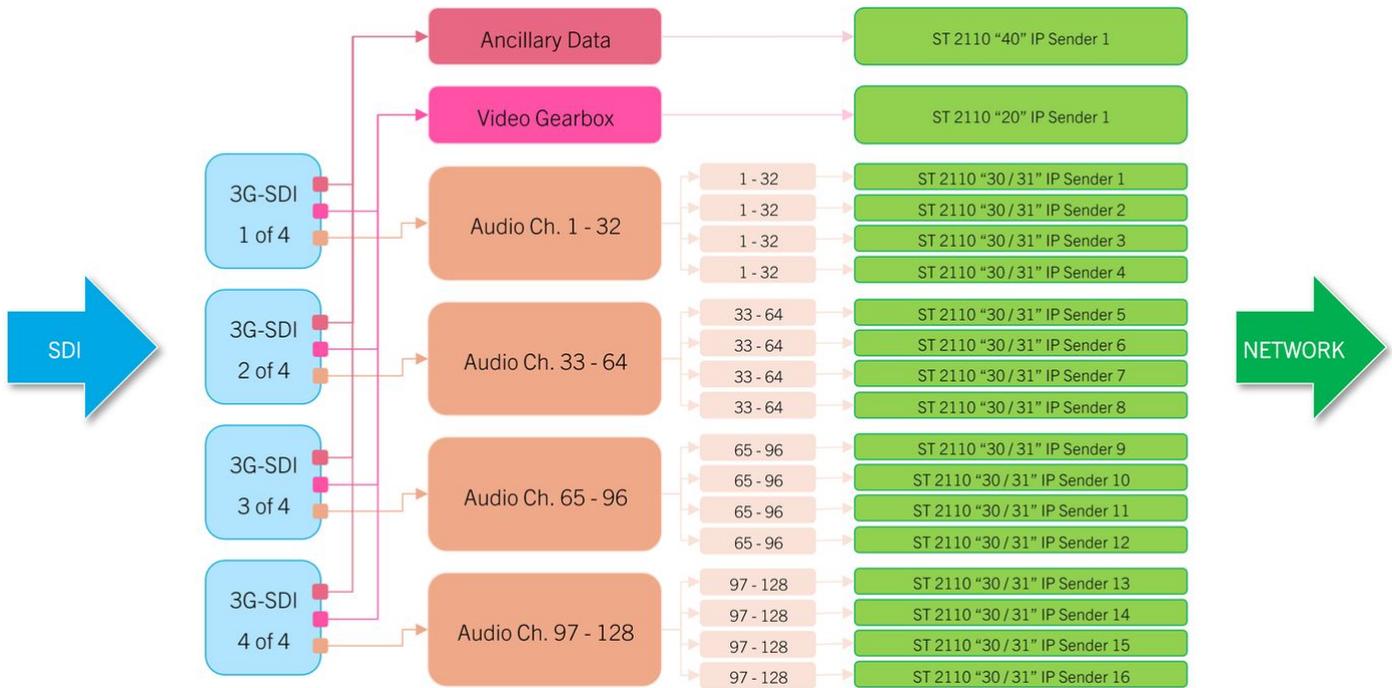
IP to SDI Conversion (for 3G-SDI)



UHD 2160p (4 x 3G-SDI)

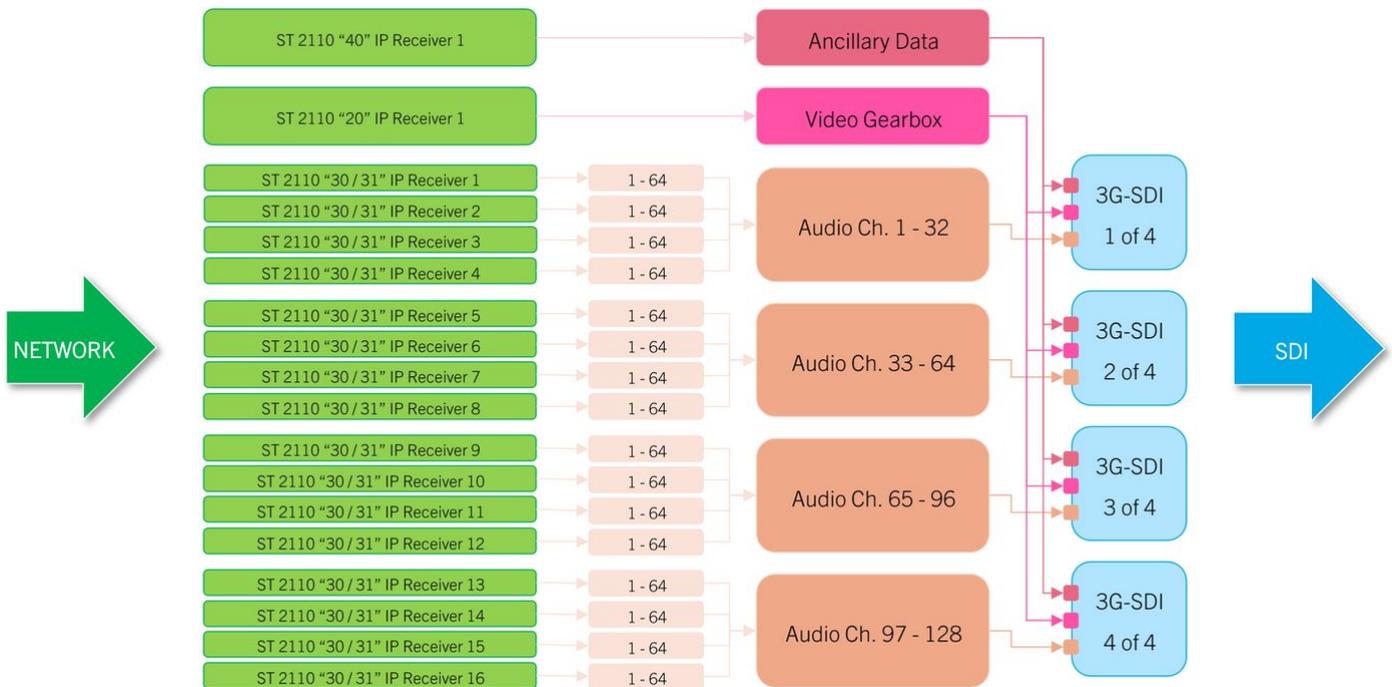
In quad-link 3G-SDI configurations (2160p, UHD), 128 audio channels (4 x 32 ch.) are supported and can be assigned to four IP senders per leg.

SDI to IP Conversion (for 4 x 3G-SDI)



On the output side, 4 x 4 audio receivers each support 64 audio channels and can output 32 of them. Thus, .edge supports a combined 128 audio channels (4 x 32 ch.), as defined for the 12G/Quad-Link standard.

IP to SDI Conversion (for 4 x 3G-SDI)



UHD 2160p (1 x 12G-SDI)

Single-link 12G-SDI works in the same way as quad-link 3G-SDI, the only exception being that there is no need to gearbox the video.

Configuration via HOME

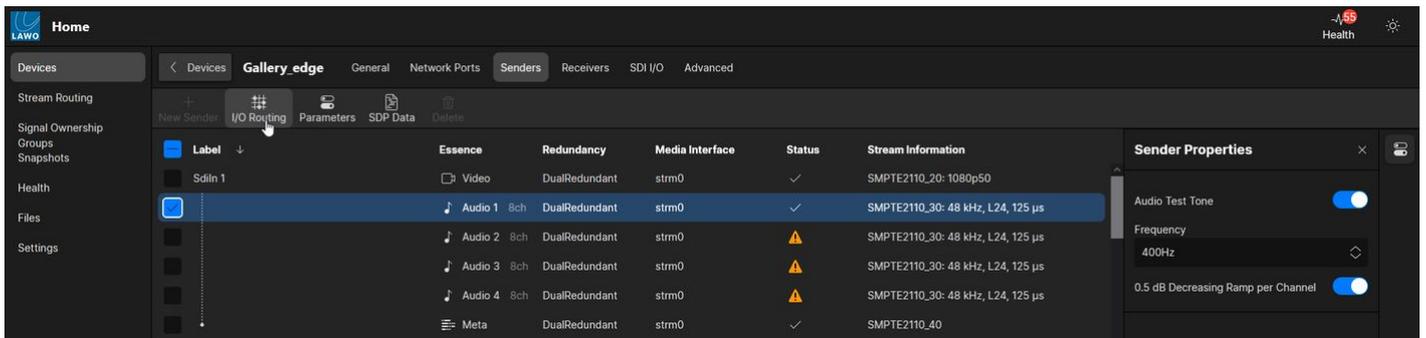
To configure the audio de-embedding (and embedding) you will need to open the **I/O Routing** page for either the senders (or receivers). This is done as follows.

1. From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).
2. Select the **Senders** tab (to configure the de-embedding) or the **Receivers** tab (to configure the embedding).
3. Select the audio sender (or receiver) you wish to adjust and select the **I/O Routing** button.

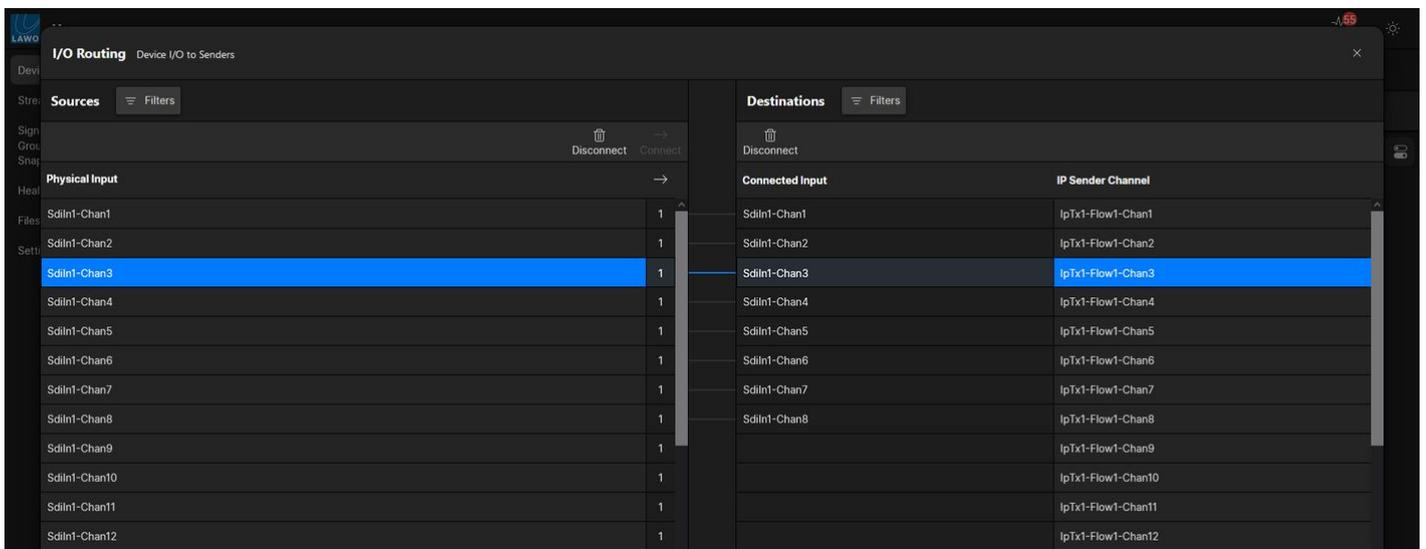
The **I/O Routing** page is used to connect the IP channels of the senders and receivers to the audio channels of the SDI inputs and outputs. The operation is very similar to the "Signal List" display on Lawo's mc² consoles.

To make a connection, select a source (on the left) and a destination (on the right); then click **Connect**. The screenshots below show an example.

Open I/O Routing for Audio Sender



Default I/O Routing is 1:1



I/O Routing Adjusted (to swap channels 2 and 3)

The screenshot displays the 'I/O Routing' configuration window, titled 'Device I/O to Senders'. It is divided into two main sections: 'Sources' and 'Destinations', each with a 'Filters' button.

Sources Section:

- Section: **Physical Input**
- Item: **Sdlin1-Chan2** (highlighted in blue)
- Value: 1

Destinations Section:

- Section: **Connected Input**
- Item: **IpTx1-Flow1-Chan3** (highlighted in blue)
- Value: 1

A blue dashed arrow indicates the connection from 'Sdlin1-Chan2' in the Sources list to 'IpTx1-Flow1-Chan3' in the Destinations list. A 'Connect' button with a right-pointing arrow is visible at the top of the Sources list, and a 'Disconnect' button with a left-pointing arrow is visible at the top of the Destinations list.

Source	Value	Destination	Value
Sdlin1-Chan1	1	IpTx1-Flow1-Chan1	1
Sdlin1-Chan2	1	IpTx1-Flow1-Chan2	1
Sdlin1-Chan3	1	IpTx1-Flow1-Chan3	1
Sdlin1-Chan4	1	IpTx1-Flow1-Chan4	1
Sdlin1-Chan5	1	IpTx1-Flow1-Chan5	1
Sdlin1-Chan6	1	IpTx1-Flow1-Chan6	1
Sdlin1-Chan7	1	IpTx1-Flow1-Chan7	1
Sdlin1-Chan8	1	IpTx1-Flow1-Chan8	1
Sdlin1-Chan9	1	IpTx1-Flow1-Chan9	1
Sdlin1-Chan10	1	IpTx1-Flow1-Chan10	1
Sdlin1-Chan11	1	IpTx1-Flow1-Chan11	1
Sdlin1-Chan12	1	IpTx1-Flow1-Chan12	1

7.7 .edge - Frame Synchronization

This topic describes the frame sync options for SDI inputs and outputs.

Frame synchronization comes as standard on all SDI outputs. For SDI inputs, it is a licensed option.

SDI Outputs

Video

Parameters can be found in the [Advanced tab](#) at "Advanced → SDI Outputs → SDI#n → All Frame Synchronizer".

For each SDI Output, controls are provided to allow the user to adjust Horizontal and Vertical Offset per video standard. Changes made in the "All Frame Synchronizer" menu will affect the current video standard of the selected port.

- Delay Frames Fields - offers up to 6 frames or fields of delay with respect to Reference Timing.
- Pixel / Horizontal Offset - allows the user to adjust the horizontal position of the picture with respect to Reference Timing.
- Line / Vertical Offset - allows the user to adjust the vertical position of the picture with respect to Reference Timing.

The pixel and line offsets both adjust the output with respect to Reference, and therefore will also affect the delay.

Setting a vertical offset of 1 would mean the SDI Outputs would start 1 line earlier than with a setting of zero, the delay will have decreased by one line. However, as the vertical timing is adjusted there will be points at which the delay of the picture content increases or decreases by a frame. The timing of the start of the SDI frame will vary directly with the horizontal and vertical offsets but the delay of the content is also determined by the arrival time of the IP flow as well as the offsets.

Audio

Parameters can be found in the [Advanced tab](#) at "Advanced → SDI Outputs → SDI#n → IP Receiver → Audio#n".

Allows the user to adjust Audio timing by up to +/- 250 mS.

The amount of delay can be entered in terms of either Time (mS) or Samples.

SDI Inputs

Video

Parameters can be found in the [Advanced tab](#) at "Advanced → SDI Inputs → SDI#n → All Frame Synchronizer".

For each SDI Input, controls are provided to allow the user to adjust Horizontal and Vertical Offset per video standard. Changes made in the "All Frame Synchronizer" menu will affect the current video standard of the selected port.

- Sync Enable - switches the Frame Synchronizer function On or Off, when a Frame Synchronizer license has been assigned.
- Pixel / Horizontal Offset - allows the user to adjust the horizontal position of the picture with respect to Reference Timing
- Line / Vertical Offset - allows the user to adjust the vertical position of the picture with respect to Reference Timing

Configuration via HOME

In HOME, there are two ways to edit the frame sync parameters: via the **SDI I/O** tab or **Advanced** parameters. Here we describe the **SDI I/O** tab, as this is the best/simplest method for most applications.

The screenshot below shows the frame synchronizer 'Properties' for an SDI input.

Physical Input	Video	Audio	Frame Sync	Ident	Test Pattern	3G to 12G Gear
<input checked="" type="checkbox"/> SDI Input 1	1080p50	*****	On	⚠ IN#1	⚠ Moving	Off
<input type="checkbox"/> SDI Input 2	1080p50	*****	Off	⚠ IN#2	⚠ Moving	Off
<input type="checkbox"/> SDI Input 3	1080p50	*****	-	⚠ IN#3	⚠ Moving	Off
<input type="checkbox"/> SDI Input 4	1080p50	*****	-	⚠ IN#4	⚠ Moving	Off
<input type="checkbox"/> SDI Input 5	1080p50	*****	-	⚠ IN#5	⚠ Moving	Off
<input type="checkbox"/> SDI Input 6	1080p50	*****	-	⚠ IN#6	⚠ Moving	Off
<input type="checkbox"/> SDI Input 7	1080p50	*****	-	⚠ IN#7	⚠ Moving	Off
<input type="checkbox"/> SDI Input 8	1080p50	*****	-	⚠ IN#8	⚠ Moving	Off
<input type="checkbox"/> SDI Input 9	1080p50	*****	-	⚠ IN#9	⚠ Moving	Off
<input type="checkbox"/> SDI Input 10	1080p50	*****	-	⚠ IN#10	⚠ Moving	Off
<input type="checkbox"/> SDI Input 11	1080p50	*****	-	⚠ IN#11	⚠ Moving	Off
<input type="checkbox"/> SDI Input 12	1080p50	*****	-	⚠ IN#12	⚠ Moving	Off
<input type="checkbox"/> SDI Input 13	1080p50	*****	-	⚠ IN#13	⚠ Moving	Off
<input type="checkbox"/> SDI Input 14	1080p50	*****	-	⚠ IN#14	⚠ Moving	Off
<input type="checkbox"/> SDI Input 15	1080p50	*****	-	⚠ IN#15	⚠ Moving	Off
<input type="checkbox"/> SDI Input 16	1080p50	*****	-	⚠ IN#16	⚠ Moving	Off
<input type="checkbox"/> SDI Input 17	1080p50	*****	-	⚠ IN#17	⚠ Moving	Off

Properties

SDI Inputs 1 - 4

Preset: Auto

SDI Input Mode: SD/HD/3G

Gearbox: Auto

IP Sender Mode: SD/HD/3G

Frame Synchronizer:

Format: 1080p50

Pixel Offset: 4

Line Offset: 2

Ident:

1. From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).
2. Select the **SDI I/O** tab and then either **SDI Inputs** or **SDI Outputs**.
3. Select the SDI input (or output) you wish to adjust and reveal the '**Properties**' sidebar to access the SDI input parameters.
4. For an SDI input, turn on the **Frame Synchronizer** slider. Then use the + and - buttons to adjust the **Pixel** and **Line Offsets**.
5. For an SDI output, the frame synchronizer is always enabled and so there is no on/off option. Simply use the **Pixel** and **Line Offset** fields to adjust the values.

Troubleshooting

If you cannot see the input frame synchronizer option, then this is because there is no license assigned to the selected SDI input. Please see [.edge - License Activation](#) to activate the required license.

7.8 .edge - Video Gearboxing

This topic describes the video gearboxing option for SDI inputs and outputs.

Overview

Video gearboxing is a licensed option that enables 3G UHD gearboxing for a quad-link 3G-SDI signal (input or output).

It allows you to connect 4 x 3G-SDI inputs or outputs to transport a 12G signal (also known as quad-link 3G-SDI). The 4 x 3G-SDI signals must connect to one of the 12G-capable rear I/O blocks: 1-4, 5-8, 9-12, etc.

The license also supports the following features:

- SDQS (Square Division Quad Split), 2SI, and 4 x super slow motion. Includes VPID insertion on the output interface (2-sample interleave, SMPTE ST352 payload identification).
- Link Rotate - allows automatic reshuffling of a four-wire 3G-SDI link whose cables were connected in the wrong order (based on 2-sample interleave signal identifiers).

Configuration via HOME

In HOME, there are two ways to edit the gearbox parameters: via the **SDI I/O** tab or **Advanced** parameters. Here we describe the **SDI I/O** tab, as this is the best/simplest method for most applications.

Video Gearboxing (on) for SDI Input

Physical Input	Video	Audio	Frame Sync	Ident	Test Pattern	3G to 12G Gear
<input checked="" type="checkbox"/> SDI Input 1	1080p50	●●●●●●●●●●●●●●●●	Off	⚠️ IN#1	⚠️ Moving	On
<input type="checkbox"/> SDI Input 5	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#5	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 6	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#6	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 7	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#7	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 8	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#8	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 9	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#9	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 10	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#10	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 11	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#11	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 12	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#12	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 13	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#13	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 14	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#14	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 15	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#15	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 16	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#16	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 17	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#17	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 18	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#18	⚠️ Moving	Off
<input type="checkbox"/> SDI Input 19	1080p50	●●●●●●●●●●●●●●●●	-	⚠️ IN#19	⚠️ Moving	Off

Properties

SDI Inputs 1 - 4

Preset: Auto

SDI Input Mode: UHD Single Link

Gearbox: On

Link Rotate:

SDI 1 → 1

SDI 2 → 2

SDI 3 → 3

SDI 4 → 4

IP Sender Mode: UHD

Frame Synchronizer:

Format: 1080p50

Pixel Offset:

1. From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).
2. Select the **SDI I/O** tab and then either **SDI Inputs** or **SDI Outputs**.
3. Select the SDI input (or output) you wish to adjust and reveal the Properties sidebar to access the SDI input parameters.



4. Use the **Gearbox** menu to turn the option on. Note that the option is hidden if there is no gearbox license. There are three possible modes: Auto, On and Off.
 - a. If you choose **Auto**, then the gearbox can be enabled automatically by the **SDI Inputs Preset**. Alternatively, you can choose to force the option on or off.
 - b. When the Gearbox is active, the **Link Rotate** option can be enabled to “fix” any errors in the input cabling.

Troubleshooting

If you cannot see the Gearbox menu, then this is because there is no license assigned to the selected SDI input or output instance. Please see [.edge - License Activation](#) to activate the required license.

Advanced Operation

The same features can be accessed from the [Gearbox](#) branch of the Advanced parameters.

7.9 .edge - Video and Audio Delay

This topic describes the video and audio delay.

Overview

As standard, .edge provides video and audio for every output:

- For video, you can add up to 6 frames OR fields depending on the video standard.
- For audio, you can add up to 250 ms before shuffling and embedding.

Note that the video delay is added to the SDI output, while the audio delay is added to the IP receiver.

Configuration via HOME: Video Delay

In HOME, there are two ways to access the video delay parameters: via the **SDI I/O** tab or **Advanced** parameters.

Video Delay for SDI Output

Physical Input	Video	Audio	Frame Sync	Ident	Test Pattern	Audio Tone Te Pattern
SDI Output 25	1080p50	●●●●●●	On	Off	Off	Off
SDI Output 26	1080p50	●●●●●●	On	Off	Off	Off
<input checked="" type="checkbox"/> SDI Output 27	1080i50	-	On	⚠️ OUT#27	⚠️ Static	⚠️ On
SDI Output 28	Unknown	-	On	Off	Off	Off
SDI Output 29	Unknown	-	On	Off	Off	Off
SDI Output 30	Unknown	-	On	Off	Off	Off
SDI Output 31	Unknown	-	On	Off	Off	Off
SDI Output 32	Unknown	-	On	Off	Off	Off
SDI Output 33	Unknown	-	On	Off	Off	Off
SDI Output 34	Unknown	-	On	Off	Off	Off
SDI Output 35	Unknown	-	On	Off	Off	Off
SDI Output 36	Unknown	-	On	Off	Off	Off
SDI Output 37	Unknown	-	On	Off	Off	Off
SDI Output 38	Unknown	-	On	Off	Off	Off
SDI Output 39	Unknown	-	On	Off	Off	Off
SDI Output 40	Unknown	-	On	Off	Off	Off
SDI Output 41	Unknown	-	On	Off	Off	Off

Properties

SDI Outputs 25 - 28

Preset: Auto

IP Receiver Mode: SD/HD/3G

SDI Output Mode: SD/HD/3G

Format: 1080i50

Pixel Offset: 0

Line Offset: 0

Delay (Frames/Fields): 1 Frame/Field

Ident:

Ident Text: OUT#27

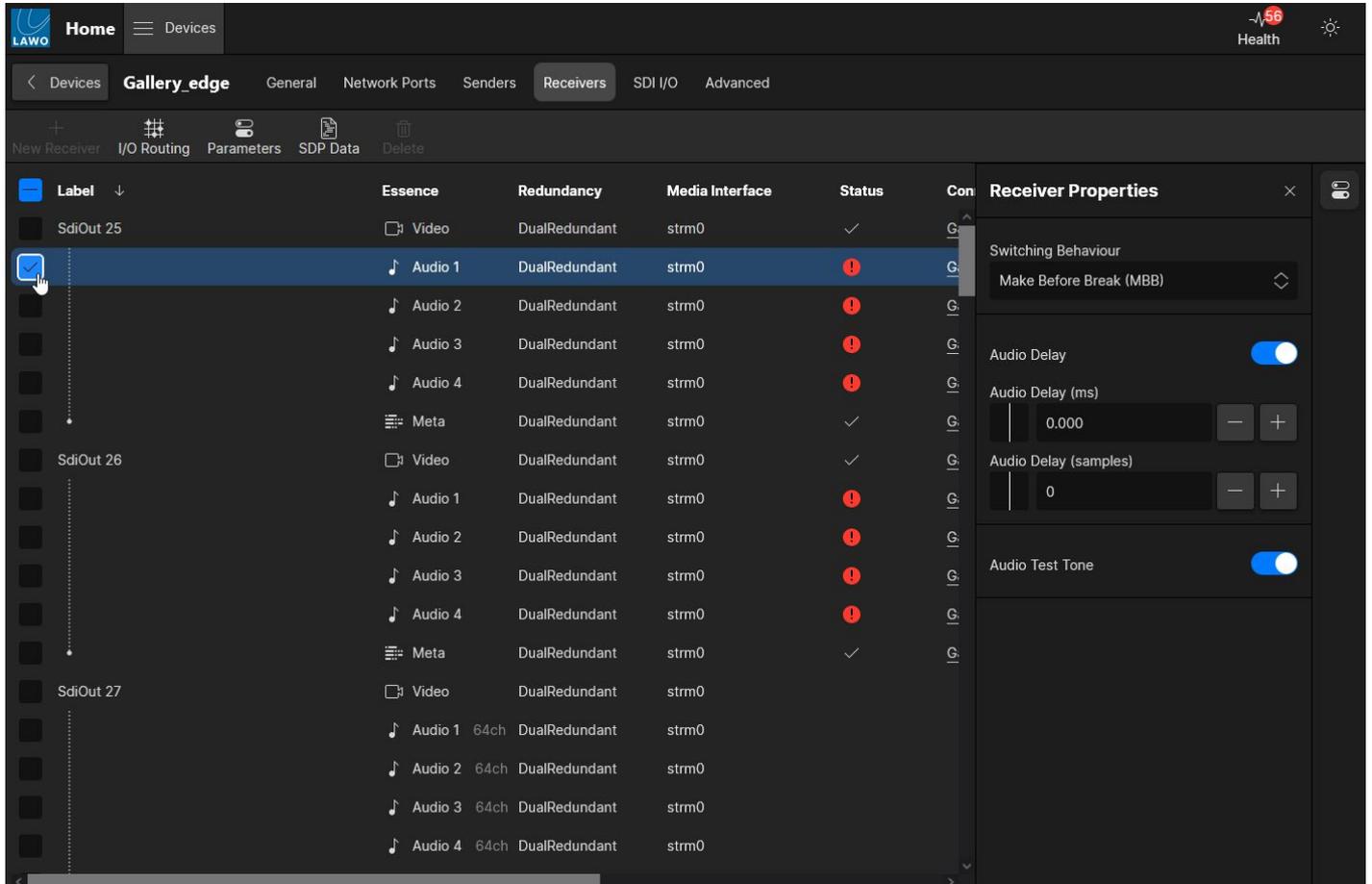
1. From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)).
2. Select the **SDI I/O** tab and then **SDI Outputs**.
3. Select the SDI output you wish to adjust and reveal the Properties sidebar to access the parameters.
4. Use the **Delay** field to adjust the number of frames or fields (depending on the video standard).

The same features can be accessed via the [SDI Outputs](#) branch of the Advanced parameters: choose an SDI output and then **All Frame Synchronizer**.

Configuration via HOME: Audio Delay

The audio delay is added to the IP receiver, so switch to the **Receivers** tab to access the option. In this instance, the delay can be adjusted in either ms or samples.

Audio Delay for IP Receiver



The same features can be accessed via the SDI Outputs branch of the Advanced parameters: choose an SDI output and then **IP Receiver** and **Audio**.



7.10 .edge - Test Signals

This topic describes the video test pattern, video ident and audio test tone options.

Video Test Pattern and Ident

For every SDI input and output, you can turn on a video test pattern and/or text ident.

Video Test Pattern

The test pattern uses standard color bars and can run in one of two modes: either **moving** or **static**.

For a **moving** test pattern, the direction is as follows:

- Right to Left Color Bars - for SDI Inputs
- Left to Right Color Bars - for SDI Outputs

Thus, the direction can be used to determine where the test pattern is enabled: on the input or output.

Video Ident

When enabled the video ident text is displayed on the selected input or output. The text can be edited

Audio Test Tone

For the audio side, you can turn on test tone for an SDI output or IP sender.

In each case, the following properties can be adjusted:

- **Audio Test Tone** - on/off
- **Frequency** - selectable from the drop-down menu.
- **0.5 dB Decreasing Ramp per Channel** - on/off. Turn this option on to vary the audio level of the test tone.

Configuration via HOME

The video test pattern and ident are adjusted for the selected SDI input or output (via the [SDI I/O](#) tab).

Video Test Pattern and Ident (for SDI input)

Physical Input	Video	Audio	Frame Sync	Ident	Test Pattern	3G to 12G Gear
SDI Input 1	720p50	●●●●●●●●●●	Off	Off	Off	Off
SDI Input 2	1080p50	●●●●●●●●●●	Off	⚠ IN#2	⚠ Moving	Off
SDI Input 3	Unknown	-	-	Off	Off	Off
<input checked="" type="checkbox"/> SDI Input 4	1080p50	●●●●●●●●●●	-	⚠ IN#4	⚠ Moving	Off
SDI Input 5	Unknown	-	-	Off	Off	Off
SDI Input 6	Unknown	-	-	Off	Off	Off
SDI Input 7	Unknown	-	-	Off	Off	Off
SDI Input 8	Unknown	-	-	Off	Off	Off
SDI Input 9	2160p50	●●●●●●●●●●	-	Off	Off	Off
SDI Input 10	Unknown	-	-	Off	Off	Off
SDI Input 11	Unknown	-	-	Off	Off	Off
SDI Input 12	Unknown	-	-	Off	Off	Off
SDI Input 13	Unknown	-	-	Off	Off	Off
SDI Input 14	Unknown	-	-	Off	Off	Off
SDI Input 15	Unknown	-	-	Off	Off	Off
SDI Input 16	Unknown	-	-	Off	Off	Off
SDI Input 17	Unknown	-	-	Off	Off	Off
SDI Input 18	Unknown	-	-	Off	Off	Off
SDI Input 19	Unknown	-	-	Off	Off	Off

SDI Inputs 1 - 4

Preset: Auto

SDI Input Mode: SD/HD/3G

Gearbox: Auto

IP Sender Mode: SD/HD/3G

Format: 1080p50

Ident:

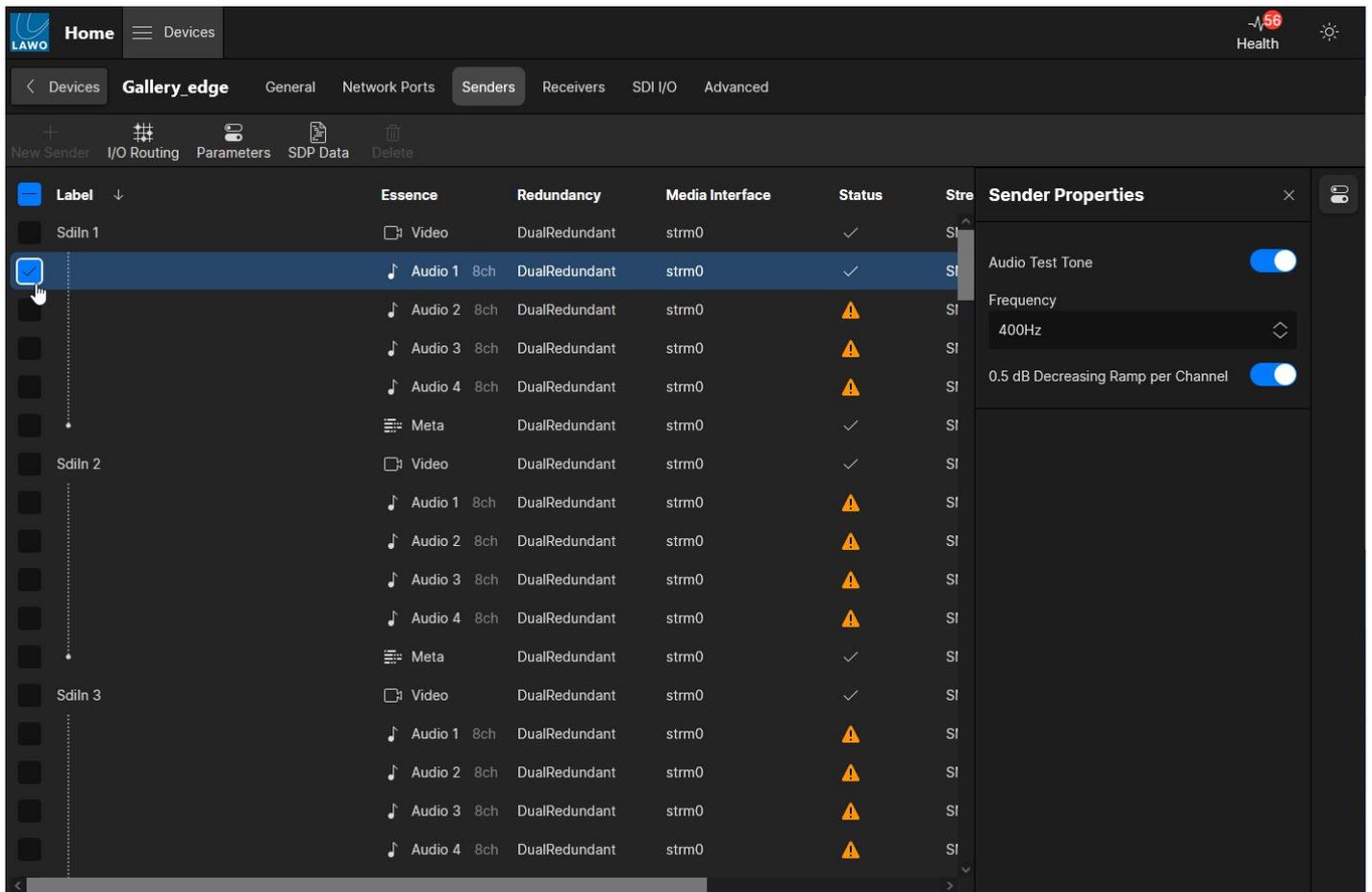
Ident Text: IN#4 Reset

Video Test Pattern:

Moving

The test tone for an audio input is adjusted from the [Senders](#) tab.

Audio Test Tone (for audio sender)



The test tone for an audio output is adjusted from the Senders tab for the selected SDI output,
Audio Test Tone (for audio output)



Home ☰ Devices Health 55

Devices **Gallery_edge** General Network Ports Senders Receivers **SDI I/O** Advanced

SDI Inputs **SDI Outputs**

Physical Input	Video	Audio	Frame Sync	Ident	Test Pattern	Audio Tone Test Pattern
<input type="checkbox"/> SDI Output 25	1080p50		On	Off	Off	Off
<input checked="" type="checkbox"/> SDI Output 26	1080p50		On	Off	Off	Off
<input type="checkbox"/> SDI Output 27	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 28	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 29	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 30	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 31	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 32	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 33	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 34	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 35	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 36	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 37	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 38	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 39	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 40	Unknown	-	On	Off	Off	Off
<input type="checkbox"/> SDI Output 41	Unknown	-	On	Off	Off	Off

Video Test Pattern

Static

Format

Audio Test Tone

Frequency

0.5 dB Decreasing Ramp per Channel

SMPTE352 Transfer Characteristics Overwrite

SMPTE352 Colorimetry Overwrite

Number of Audio Groups Groups

4 Groups = 16 Channels



8 .edge - Advanced Parameters

This chapter describes all of the advanced parameters available for a processing blade.

- [.edge - Advanced Parameter Control from HOME](#)
- [.edge - Advanced -> Identity](#)
- [.edge - Advanced -> System controls](#)
- [.edge - Advanced -> Health](#)
- [.edge - Advanced -> Synchronization](#)
- [.edge - Advanced -> SDI Inputs](#)
- [.edge - Advanced -> IP Sender Multicast](#)
- [.edge - Advanced -> Gearbox](#)
- [.edge - Advanced -> SDI Outputs](#)
- [.edge - Advanced -> Statistics](#)
- [.edge - Advanced -> Network Ports](#)
- [.edge - Advanced -> Network Media](#)
- [.edge - Advanced -> Factory](#)
- [.edge - Advanced -> License Configuration](#)
- [.edge - Control via Ember+](#)
- [.edge - Control via REST API](#)

8.1 .edge - Advanced Parameter Control from HOME

All of the available parameters for a processing blade can be accessed from the **Device** → **Advanced** tab (in HOME).

This tab is designed for technical users who need access to more advanced settings and informational fields. The same parameters can be accessed via Ember+ or REST API.

Advanced Parameter Tree

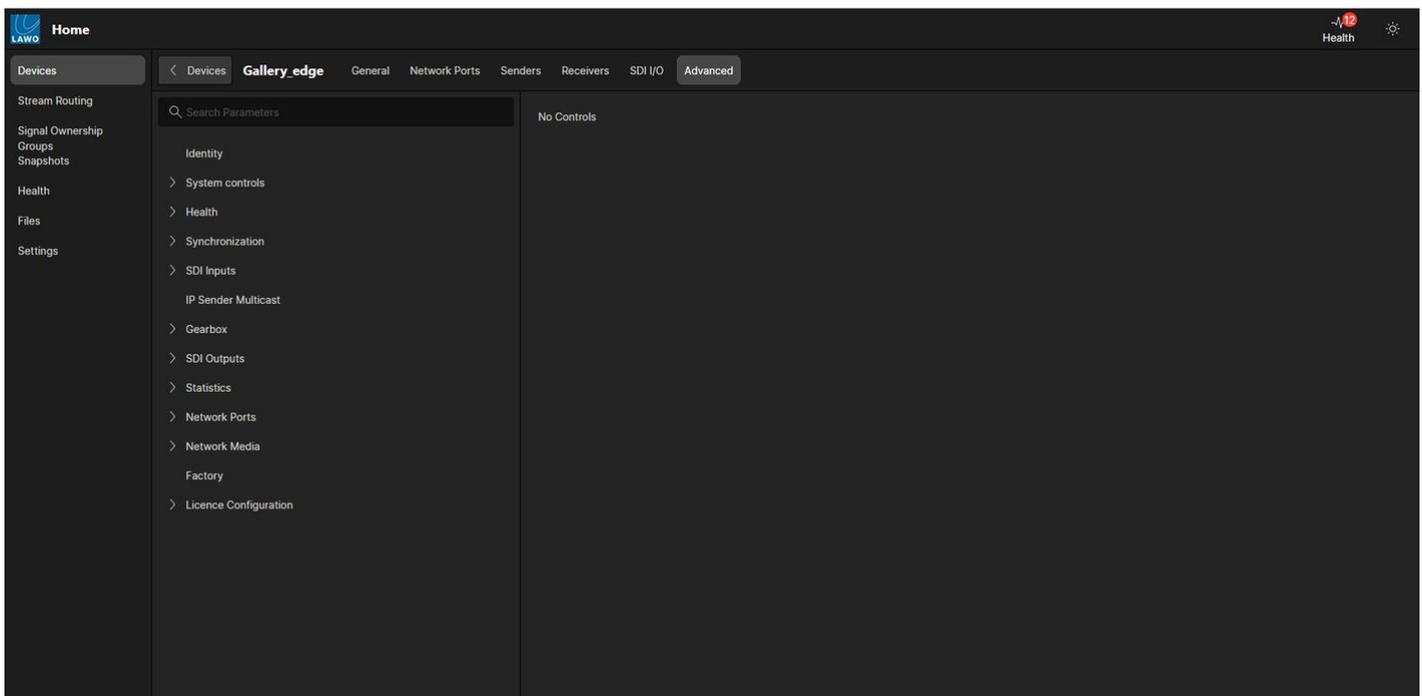
The following topics describe each branch of the parameter tree.

- [.edge - Advanced -> Identity](#)
- [.edge - Advanced -> System controls](#)
- [.edge - Advanced -> Health](#)
- [.edge - Advanced -> Synchronization](#)
- [.edge - Advanced -> SDI Inputs](#)
- [.edge - Advanced -> IP Sender Multicast](#)
- [.edge - Advanced -> Gearbox](#)
- [.edge - Advanced -> SDI Outputs](#)
- [.edge - Advanced -> Statistics](#)
- [.edge - Advanced -> Network Ports](#)
- [.edge - Advanced -> Network Media](#)
- [.edge - Advanced -> Factory](#)
- [.edge - Advanced -> License Configuration](#)

Opening the Advanced Tab (in HOME)

From the main "Devices" list, click on the processing blade label (to open the "Device Details" as described [earlier](#)). Then from the menu tabs, select **Advanced**.

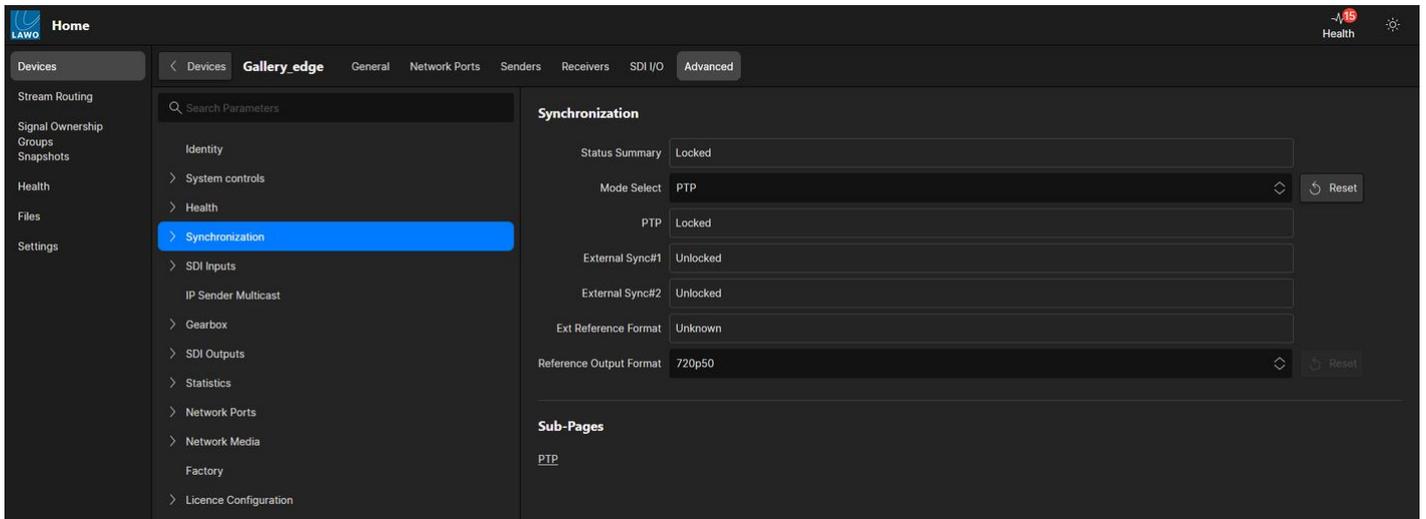
If this is the first time you have opened the **Advanced** tab in the current browser session, then there is nothing selected in the navigation tree.



Viewing & Adjusting Parameters

The **Advanced** tab is divided into two sections: the navigation tree (on the left) and the parameter area (on the right).

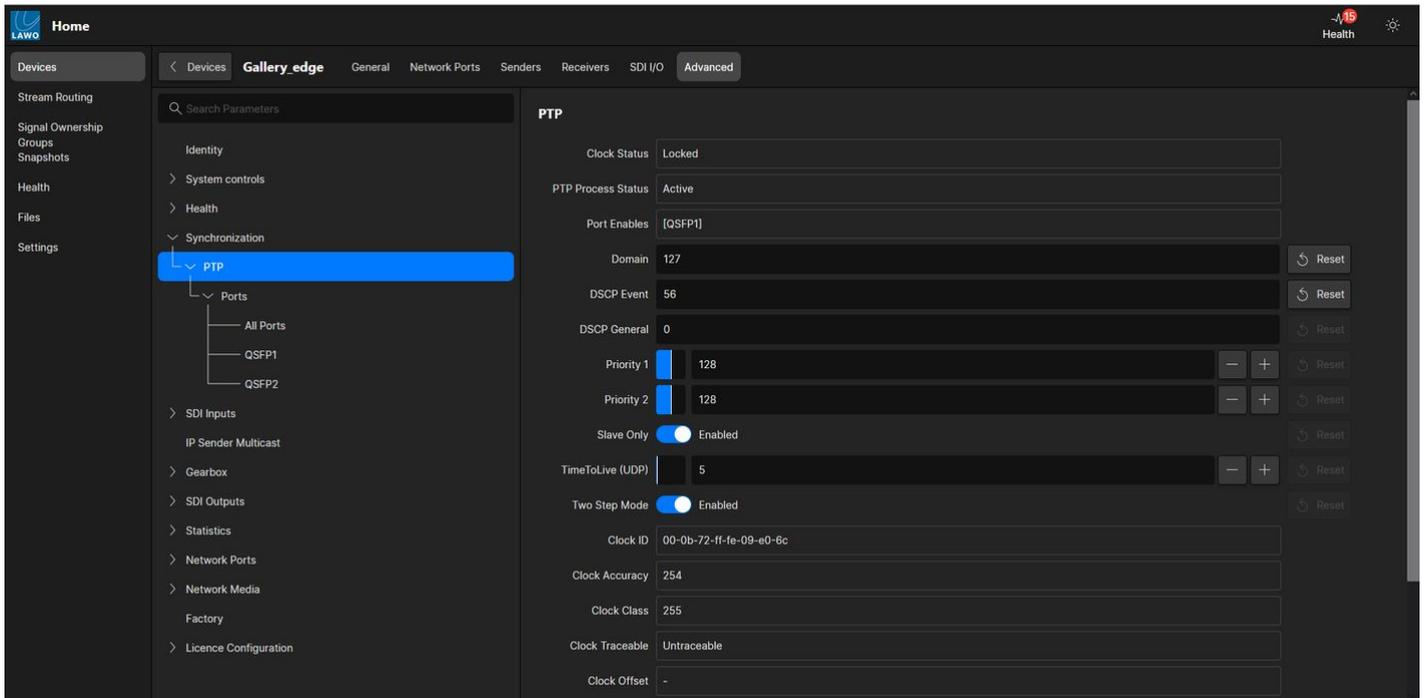
- Select an entry in the tree to display its available parameters - for example, the **Synchronization** main page.



If there are sub-pages available, then these can be accessed in one of two ways:

- Click on the arrows in the navigation tree to show or hide the next level.
- Or, scroll down to the bottom of the parameter area to view the **Sub-Pages** (as a list).

The example below shows how to navigate to the "Synchronization → PTP" page.



- ✔ You can search for a parameter by typing into the "Search Parameters" field (at the top of the tree). All possible matches are displayed in the navigation area. Make a selection to open the parameter's page.
Click on the **X** (on the right of the "Search Parameters" field) to clear the search and revert to the unfiltered tree.

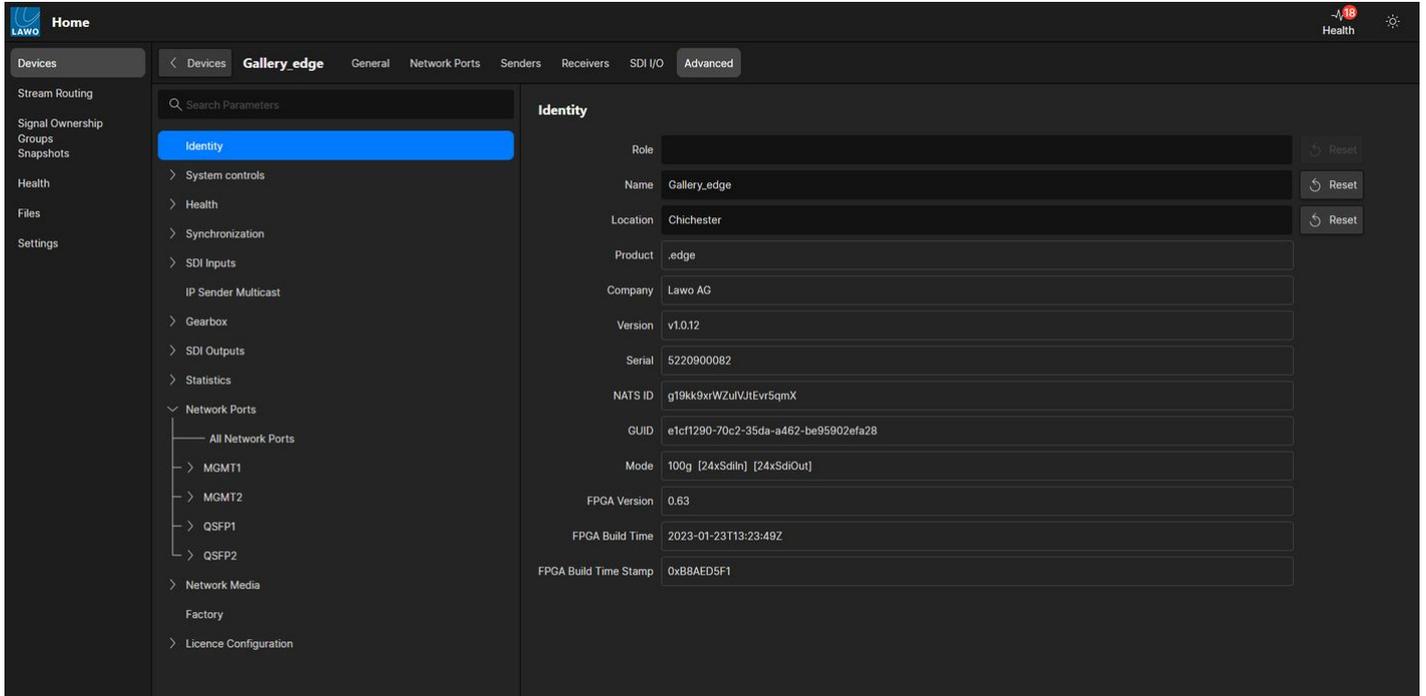
If a field can be edited, then it has a different background color or on/off slider. If there is no difference in background color, then the field provides information only.

8.2 .edge - Advanced -> Identity

The **Identity** parameters provide information about the processing blade.

Operation (using HOME)

All parameters are displayed on a single page.



The first three fields can be edited and define the **Role**, **Name** and **Location** of the processing blade. The remaining fields are for information only.

Available Parameters

The table below describes all available parameters.

Advanced (tree path)	Parameter	Possible Values	Description
Identity	Role	Text entry	-
	Name	Text entry	Identifies the processing blade to the network.
	Location	Text entry	Can be used to filter or search for the processing blade in HOME.
	Product	Read-only	-
	Company	Read-only	-
	Version	Read-only	Describes the software version.

Advanced (tree path)	Parameter	Possible Values	Description
	Serial	Read-only	Describes the serial number (important for licensing).
	NATS ID	Read-only	-
	GUID	Read-only	-
	Mode	Read-only	-
	FPGA Version	Read-only	Describes the build version of the FPGA.
	FPGA Build Time	Read-only	Shows the decoded FPGA Build Time Stamp.
	FPGA Build Time Stamp	Read-only	Describes the FPGA Build Time Stamp as a hexadecimal code/number.

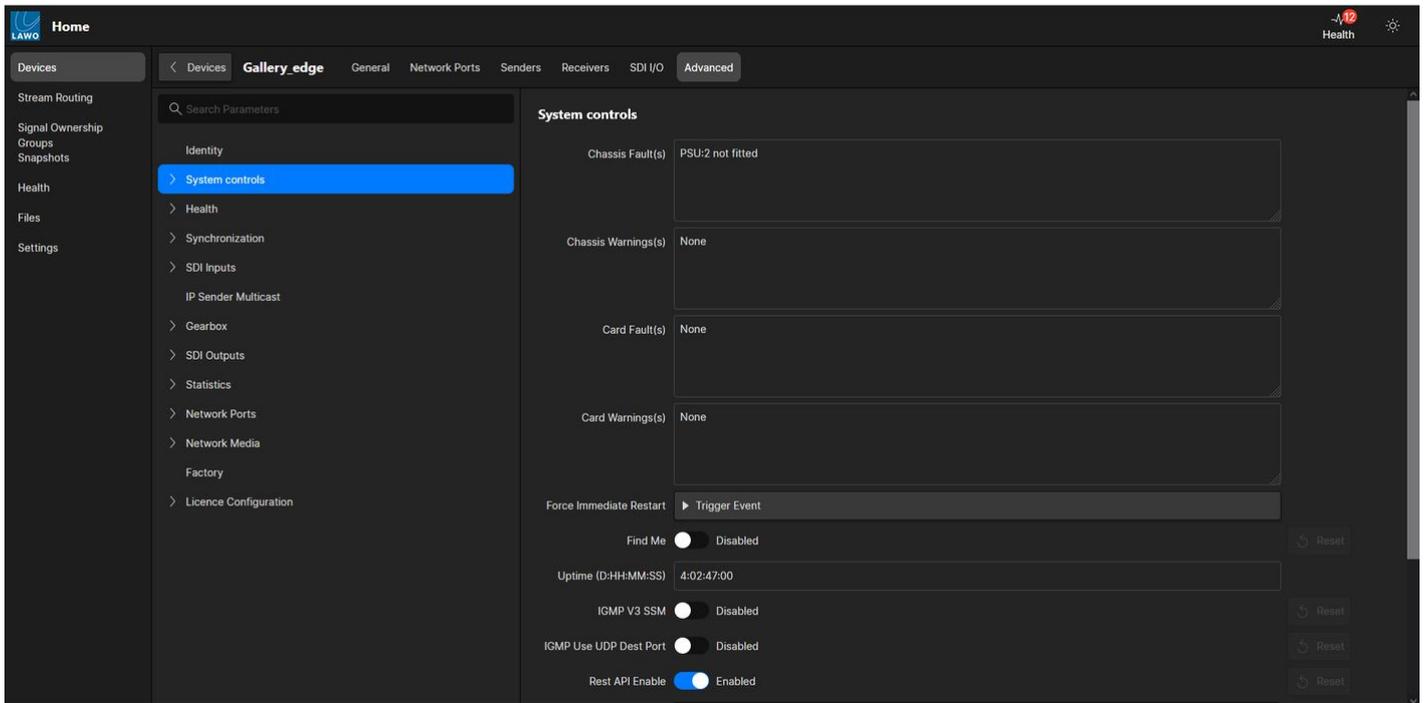
8.3 .edge - Advanced -> System controls

The **System controls** provide diagnostic tools and global options.

Operation (using HOME)

Most of the fields are displayed on the main page. The **Hardware Revision Info** sub-page displays additional information about the internal components.

System Controls



Available Parameters

The table below describes all available parameters.

Advanced (tree path)	Parameter	Possible Values	Further Information
System controls	Chassis Fault(s)	Read-only	The first four fields show information about any chassis and card faults/warnings These feed into the Card Status LED on the front of the blade.
	Chassis Warning(s)	Read-only	
	Card Fault(s)	Read-only	
	Card Warning(s)	Read-only	
	Force Immediate Restart	-	Use Trigger Event to force a restart. This is the same as using the Reboot option (from the " Devices " list) or the recessed Reset button (on the front of the blade).
	Find Me	Enabled/Disabled	Turns on the " Identify Hardware " function.



Advanced (tree path)	Parameter	Possible Values	Further Information
	Uptime	Read-only	Displays the running time of the processing blade (since the last restart/reboot).
	IGMP V3 SSM	Enabled/Disabled	
	IGMP Use UDP Dest Port	Enabled/Disabled	
	Rest API Enable	Enabled/Disabled	
	Rest API Port	Numerical entry	
	NATS Server IP/Hostname	Text entry	Can be used to edit the NATS server IP or hostname (as described earlier).
	Set NATS IP/Hostname	-	Use Trigger Event to push the contents of the NATS Server IP/Hostname field to the network.

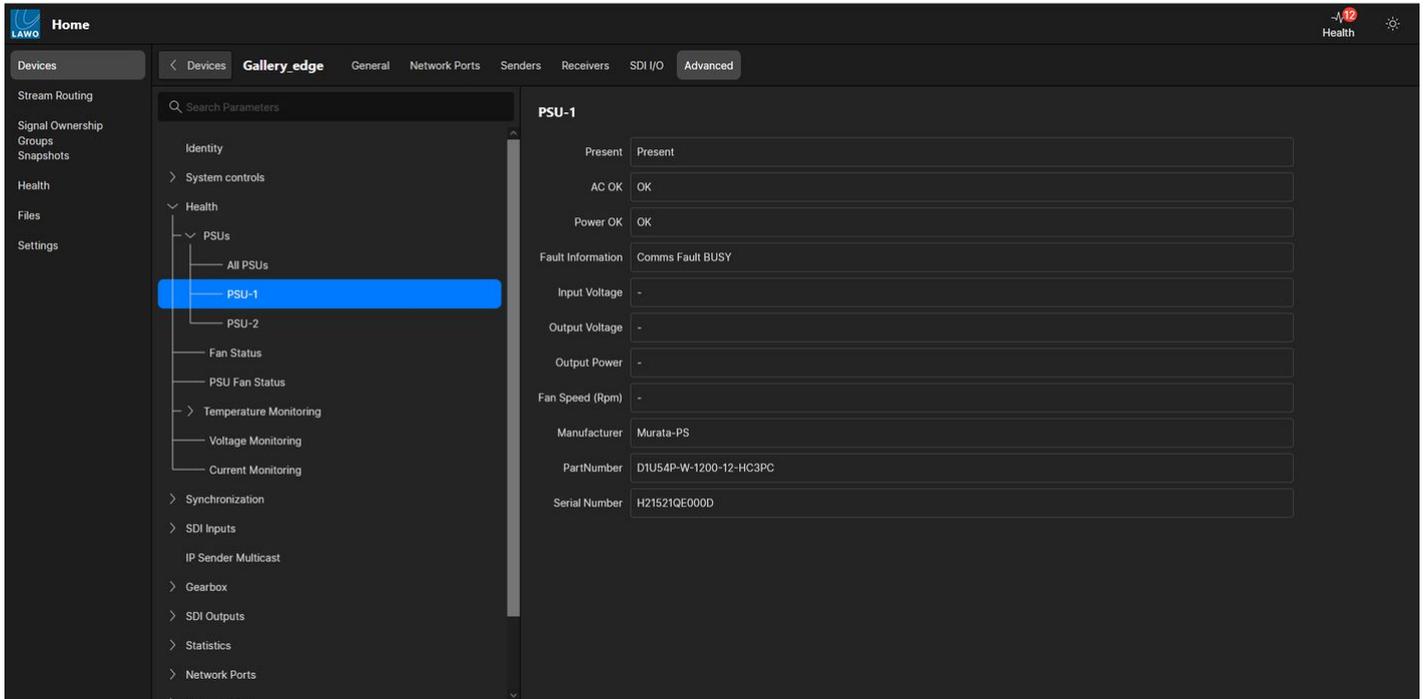
8.4 .edge - Advanced -> Health

The **Health** pages provide status monitoring for the PSUs, fans, temperature, voltage and current.

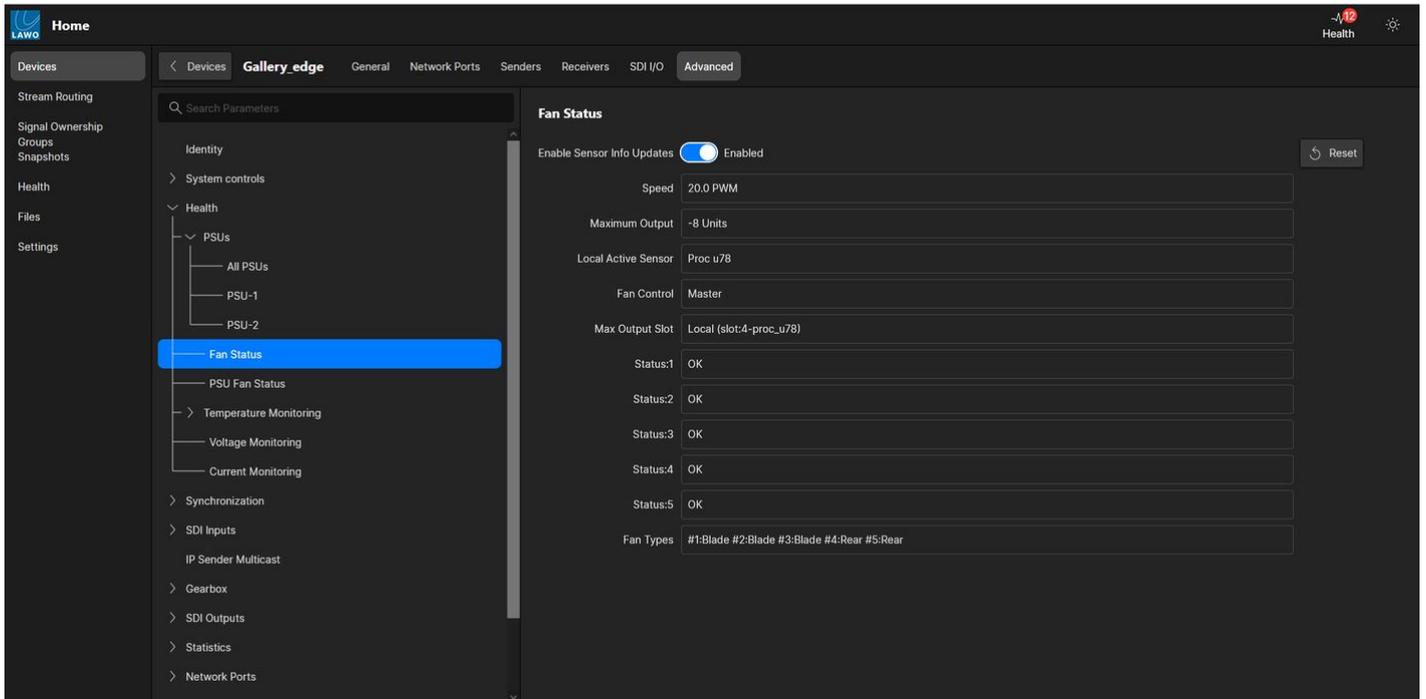
Operation (using HOME)

There is a separate sub-page for each component. The screenshots below show the Health pages for a PSU and the fans.

Health → PSUs → PSU 1



Health → Fan Status



Other pages of note are the **Temperature Monitoring** for the internal components. Here you can see what the current temperature of a component is (e.g. for the FPGA on the processing blade).



- The **Proc FPGA** page shows the **Set Point** and the **Current Temp Value**, providing that the **Enable Temperature Updates** option is enabled (under **All Temperature Monitoring**).
- If the **Current Temp Value** exceed the **Set Point**, then the fan speed will increase, and vice versa. Thus, all of the temperature control takes place automatically.e

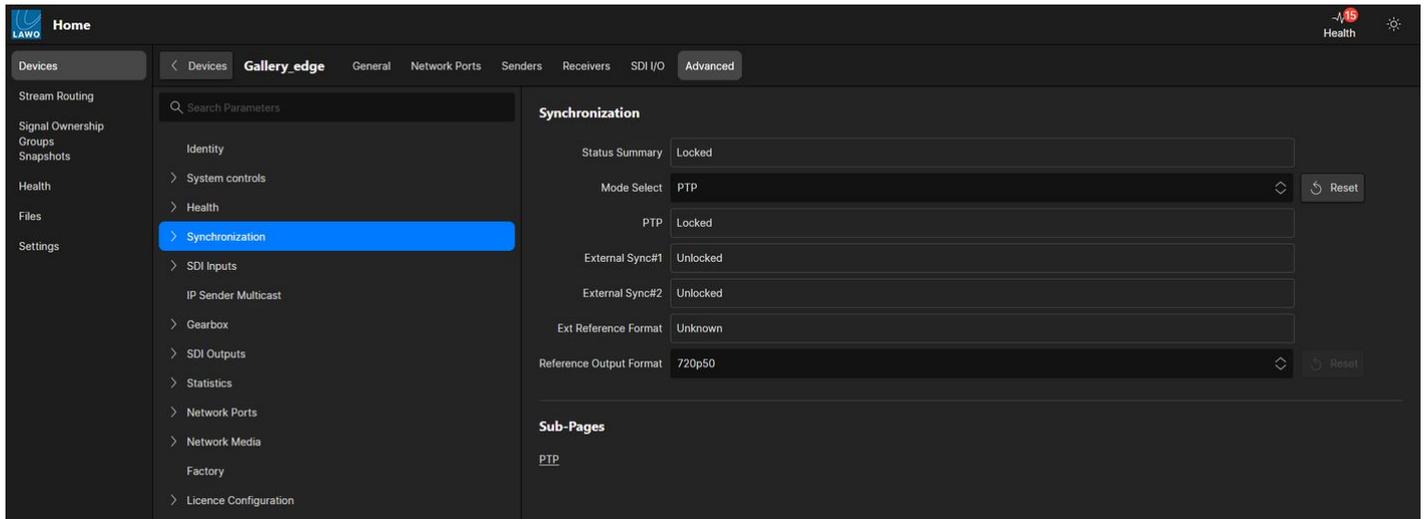
8.5 .edge - Advanced -> Synchronization

The **Synchronization** parameters define the sync reference options for the processing blade. Please see [.edge - Synchronization](#) for more information.

Operation (using HOME)

Most of the important fields are displayed on the main page. The **PTP** sub-pages become relevant if the **Mode Select** option is set to PTP.

Synchronization (main page)



Available Parameters

The table below describes all available parameters.

Advanced (tree path)	Parameter	Possible Values	Further Information
Synchronization	Status Summary	Read-only	Shows Locked when the processing blade is locked. i.e. the Mode Select field (e.g. PTP) is receiving a valid sync signal.
	Mode Select	<ul style="list-style-type: none"> External Ref#1 External Ref#2 PTP FreeRun 	Defines the sync reference for the processing blade (as described earlier).
	PTP	Read-only	Shows Locked if the blade is receiving a valid PTP signal from the network.
	External Sync#1	Read-only	Shows Locked if there is a valid sync signal connected to the REF 1 IN (on the rear I/O plate).
	External Sync#2	Read-only	Shows Locked if there is a valid sync signal connected to the REF 2 IN (on the rear I/O plate).



Advanced (tree path)	Parameter	Possible Values	Further Information
	Ext Reference Format	Read-only	If the Mode Select field is set to one of the external inputs, then this field shows the format of the incoming signal.
	Reference Output Format	Various	Defines the video format used for the sync output (connected to REF OUT on the rear I/O plate).
Synchronization → PTP	See .edge - PTP Configuration .		

8.6 .edge - Advanced -> SDI Inputs

The **SDI Inputs** pages provide access to all of the SDI input parameters.

Operation (using HOME)

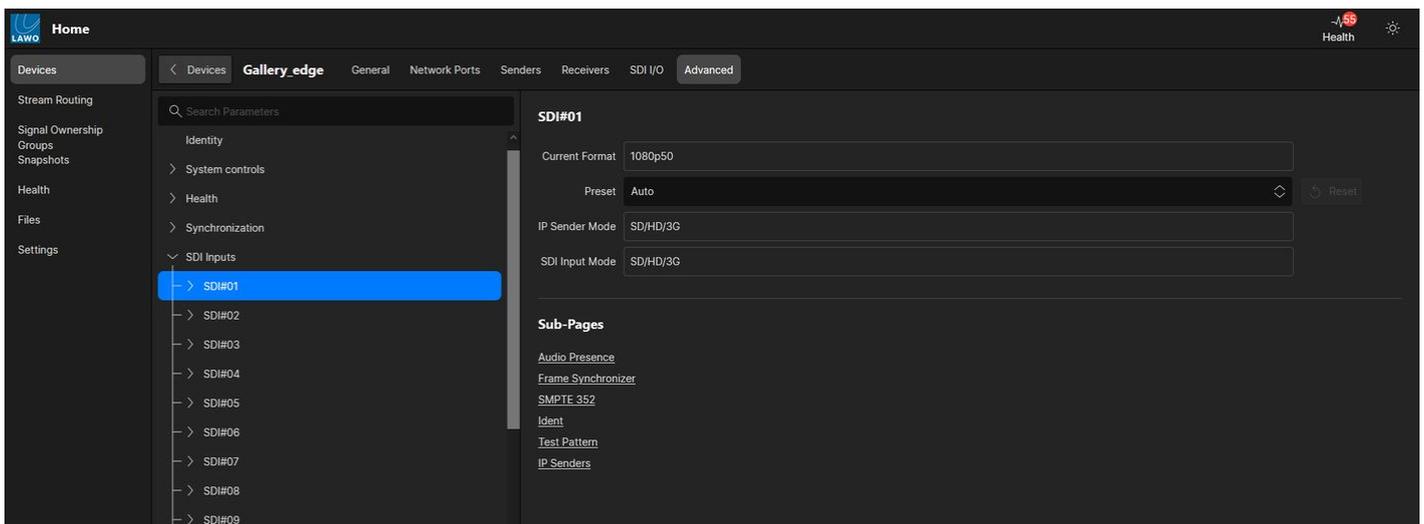
There is a separate sub-page for each SDI input and, within that, a sub-page for each feature. Most of these have been described elsewhere in this manual, so please follow the links below for more information:

- Audio Presence - shows whether audio is present for each individual channel. A better overview can be obtained from the **Audio** signal present LEDs on the [SDI I/O](#) tab.
- Frame Synchronizer - see [.edge - Frame Synchronization](#).
- SMPTE 352
- Ident - see [.edge - Test Signals](#).
- Test Pattern - see [.edge - Test Signals](#).
- IP Sender - see [.edge - IP Senders and Receivers](#).

Note that the number of SDI inputs is affected by the [SDI configuration](#). In our example, there are 24 SDI Ins.

The screenshots below show the main page for an SDI Input and a sub-page for its input frame synchronizer. The latter allows you to adjust the Pixel and Line Offsets to each individual video format.

SDI Inputs → SDI#01



SDI Inputs → SDI#01 → Frame Synchronizer → 720p50



The screenshot shows the 'edge' control interface. At the top, there is a 'Home' button and a 'Health' indicator. Below this is a navigation bar with tabs for 'Devices', 'Gallery edge', 'General', 'Network Ports', 'Senders', 'Receivers', 'SDI I/O', and 'Advanced'. The 'Advanced' tab is selected. On the left, a sidebar lists various settings categories: Stream Routing, Signal Ownership, Groups, Snapshots, Health, Files, and Settings. The 'Settings' category is expanded to show 'SDI Inputs'. Under 'SDI Inputs', there is a sub-section for 'SDI#01' which includes 'Audio Presence' and 'Frame Synchronizer'. The 'Frame Synchronizer' is further expanded to show a list of frame rates: 525i29, 625i25, 720p25, 720p29, 720p30, 720p50 (highlighted in blue), 720p59, and 720p60. The main content area displays the configuration for the selected '720p50' frame rate. It shows two offset fields: 'Pixel/Horizontal Offset' and 'Line/Vertical Offset', both set to '0'. Each field has minus and plus buttons for adjustment and a 'Reset' button.

8.7 .edge - Advanced -> IP Sender Multicast

The **IP Sender Multicast** page can be used to automatically define the multicast IP addresses for the IP senders. Please see [.edge - Multicast IP Addresses](#) for more information.

Operation (using HOME)

All parameters are displayed on a single page.

IP Sender Multicast

The screenshot displays the 'IP Sender Multicast' configuration page within the LAWO HOME interface. The page is organized into several sections:

- Assign Mode:** Set to 'SrcIpBased'.
- Assign all multicast (Use Custom Ranges):** Set to 'Trigger Event'.
- Assign all multicast (Src IP based):** Set to 'Trigger Event'.
- Video Stream 0 IP Start (Primary):** 239.10.1.1
- Video Stream 0 IP Start (Secondary):** 239.10.2.1
- Video Stream 0 IP Range (Primary):** 239.100.199.1–239.100.199.24
- Video Stream 0 IP Range (Secondary):** 239.102.199.1–239.102.199.24
- Audio Stream 0 IP Start (Primary):** 239.10.1.40
- Audio Stream 0 IP Start (Secondary):** 239.10.2.40
- Audio Stream 0 IP Range (Primary):** 239.100.199.33–239.100.199.128
- Audio Stream 0 IP Range (Secondary):** 239.102.199.33–239.102.199.128
- Meta Stream 0 IP Start (Primary):** 239.10.1.180
- Meta Stream 0 IP Start (Secondary):** 239.10.2.180
- Meta Stream 0 IP Range (Primary):** 239.100.199.161–239.100.199.184
- Meta Stream 0 IP Range (Secondary):** 239.102.199.161–239.102.199.184
- UDP Port Video:** 5004

Each row includes a 'Reset' button on the right side.

How to use this page is described earlier, see [.edge - Multicast IP Addresses](#).



8.8 .edge - Advanced -> Gearbox

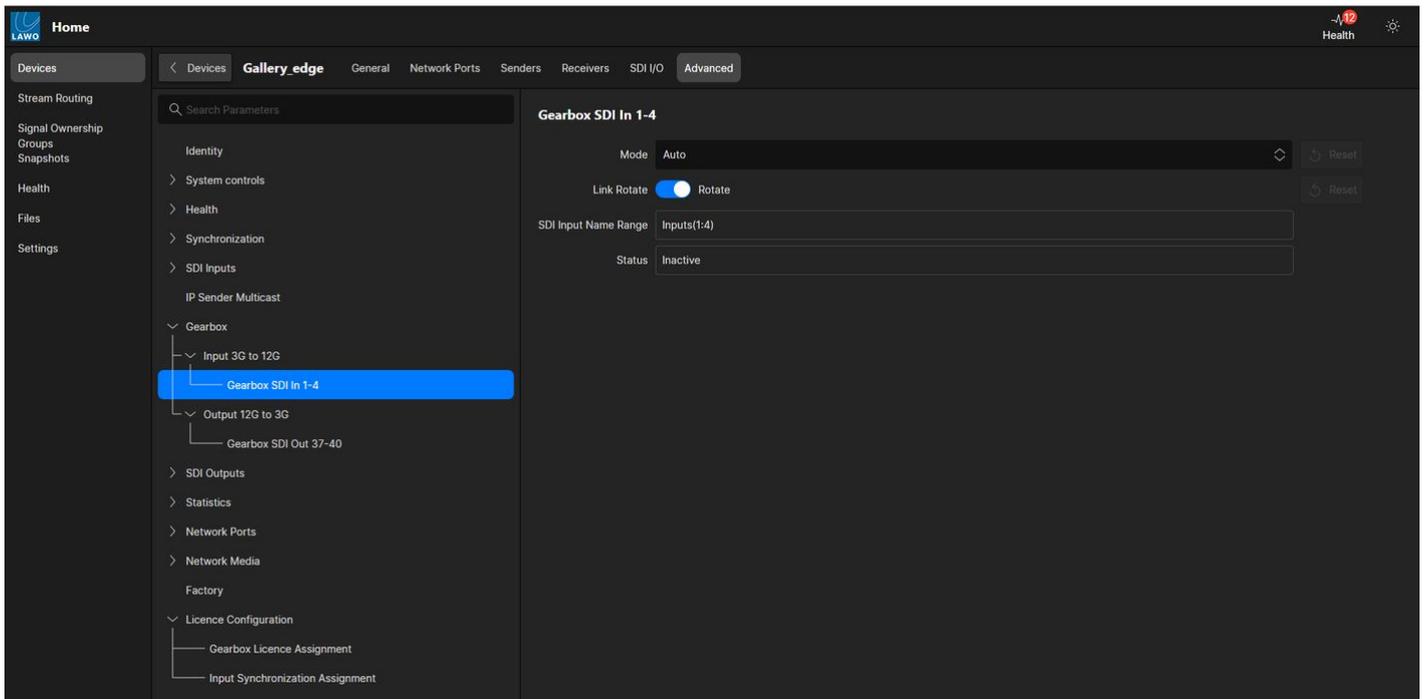
The **Gearbox** parameters define the video gearboxing for the processing blade. Note that this feature is hidden if there are no valid gearbox licenses.

Operation (using HOME)

The page is divided into sub-pages for each input and output instance. Note that the instances are determined by the gearbox license assignments. So, if you cannot see a Gearbox option for the required input or output, you will need to modify the license assignments. Please see [.edge - License Activation](#) for more information.

The screenshot below shows an example of an SDI Input instance. The available parameters are identical to those on the SDI I/O tab. See [.edge - Video Gearboxing](#) for more information.

Gearbox → Input 3G to 12G → Gearbox SDI In 1-4



8.9 .edge - Advanced -> SDI Outputs

The **SDI Outputs** pages provide access to all of the SDI output parameters.

Operation (using HOME)

There is a separate sub-page for each SDI output and, within that, a sub-page for each feature. Most of these have been described elsewhere in this manual, so please follow the links below for more information:

- Audio Embedders -
- Frame Synchronizer - see [.edge - Frame Synchronization](#).
- Test Pattern - see [.edge - Test Signals](#).
- Ident - see [.edge - Test Signals](#).
- Audio Tone Generator - see [.edge - Test Signals](#).
- IP Receiver - see [.edge - IP Senders and Receivers](#).

Note that the number of SDI outputs is affected by the [SDI configuration](#). In our example, there are 24 SDI Outs.

The screenshots below show the main page for an SDI Output and a sub-page for its video test pattern. The parameters here are identical to those in the **SDI I/O** tab.

SDI Outputs → SDI Out#25

The screenshot displays the .edge web interface for configuring SDI output #25. The top navigation bar includes 'Home', 'Gallery edge', and tabs for 'General', 'Network Ports', 'Senders', 'Receivers', 'SDI I/O', and 'Advanced'. The left sidebar shows a tree view under 'SDI Outputs' with 'SDI#25' highlighted. The main panel shows the following configuration:

Current Format	1080p50	
Preset	Auto	Reset
IP Receiver Mode	SD/HD/3G	
SDI Output Mode	SD/HD/3G	
SMPTE352 Transfer Characteristic Overwrite	OFF	Reset
SMPTE352 Colorimetry Overwrite	OFF	Reset

Below the configuration is a 'Sub-Pages' section with links to: [Audio Embedders](#), [Frame Synchronizer](#), [Test Pattern](#), [Ident](#), [Audio Tone Generator](#), and [IP Receiver](#).

SDI Outputs → SDI Out#25 → Test Pattern



The screenshot shows the edge control interface with the following components:

- Header:** Home, Health, and a settings icon.
- Navigation:** Devices, Gallery_edge, General, Network Ports, Senders, Receivers, SDI I/O, and Advanced.
- Left Sidebar:** Stream Routing, Signal Ownership, Groups, Snapshots, Health, Files, and Settings.
- Search:** Search Parameters.
- Tree View:** Identity, System controls, Health, Synchronization, SDI Inputs, IP Sender Multicast, Gearbox, SDI Outputs (SDI#25, SDI#26, SDI#27). Under SDI#25, there are Audio Embedders, Frame Synchronizer, Test Pattern (highlighted), Ident, Audio Tone Generator, and IP Receiver.
- Test Pattern Configuration:**
 - Test Pattern Type: Static (Reset)
 - Test Pattern Select: Bars (Reset)
 - Test Pattern Enable: OFF (Reset)
 - Test Pattern Format: 1080I50 (Reset)

8.10 .edge - Advanced -> Statistics

The **Statistics** pages can be useful for diagnosing streaming errors.

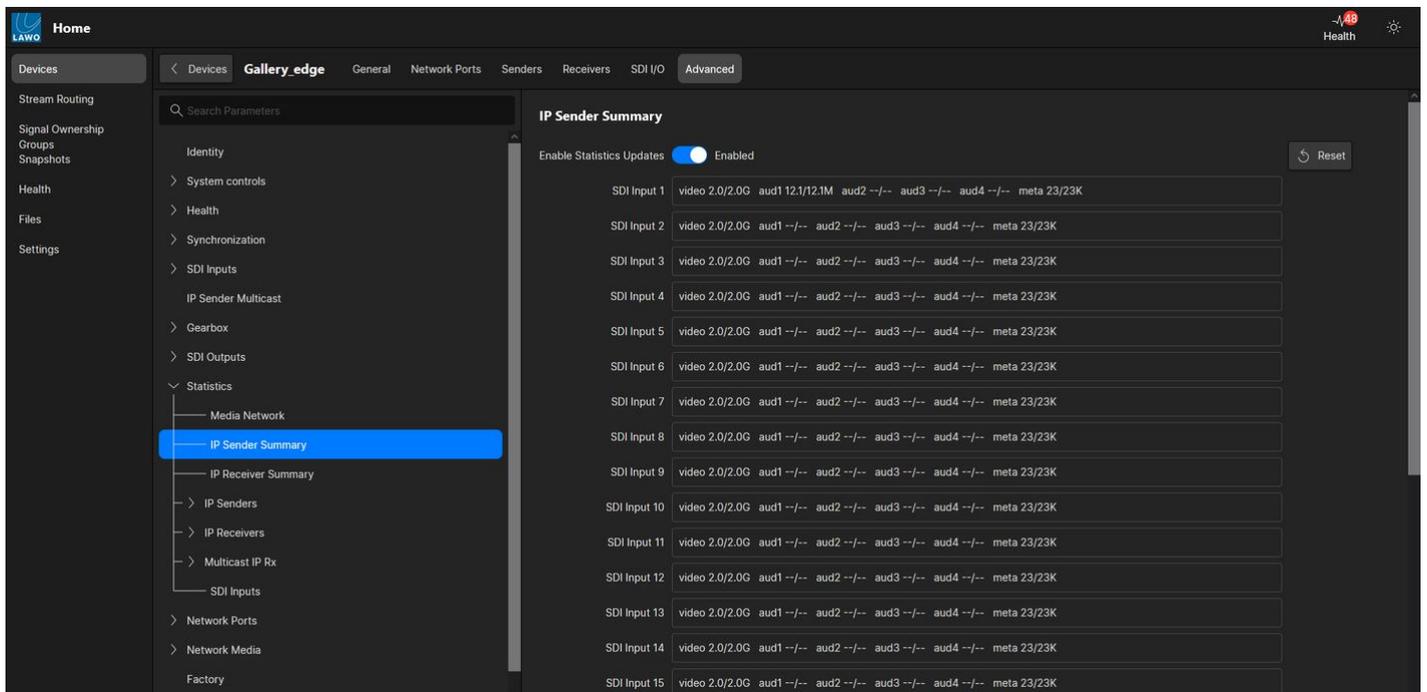
Operation (using HOME)

There are seven sub-pages that provide diagnostic tools:

- Media Network - for the media network ports.
- IP Sender Summary - describes the IP flows for all senders in a single string (per SDI).
- IP Receiver Summary - describe the IP flows for all receivers in a single string (per SDI).
- IP Senders - individual statistics per IP sender: video, audio and meta.
- IP Receivers - individual statistics per IP receiver: video, audio and meta.
- Multicast IP Rx - statistics for the multicast IPs.
- SDI Inputs - shows an error count (per SDI).

The screenshot below shows the IP Sender Summary.

Statistics → IP Sender Summary



To use this page, turn on the **Enable Statistics Updates** slider. There is one string for each SDI input. The contents of each string can be interpreted as follows:

“- -” === “0”

“ur” === unrouted (for IP receivers)

Units, all video rate is is Gbps(G) Audio Mbps(M) Metadata Kbps(K)

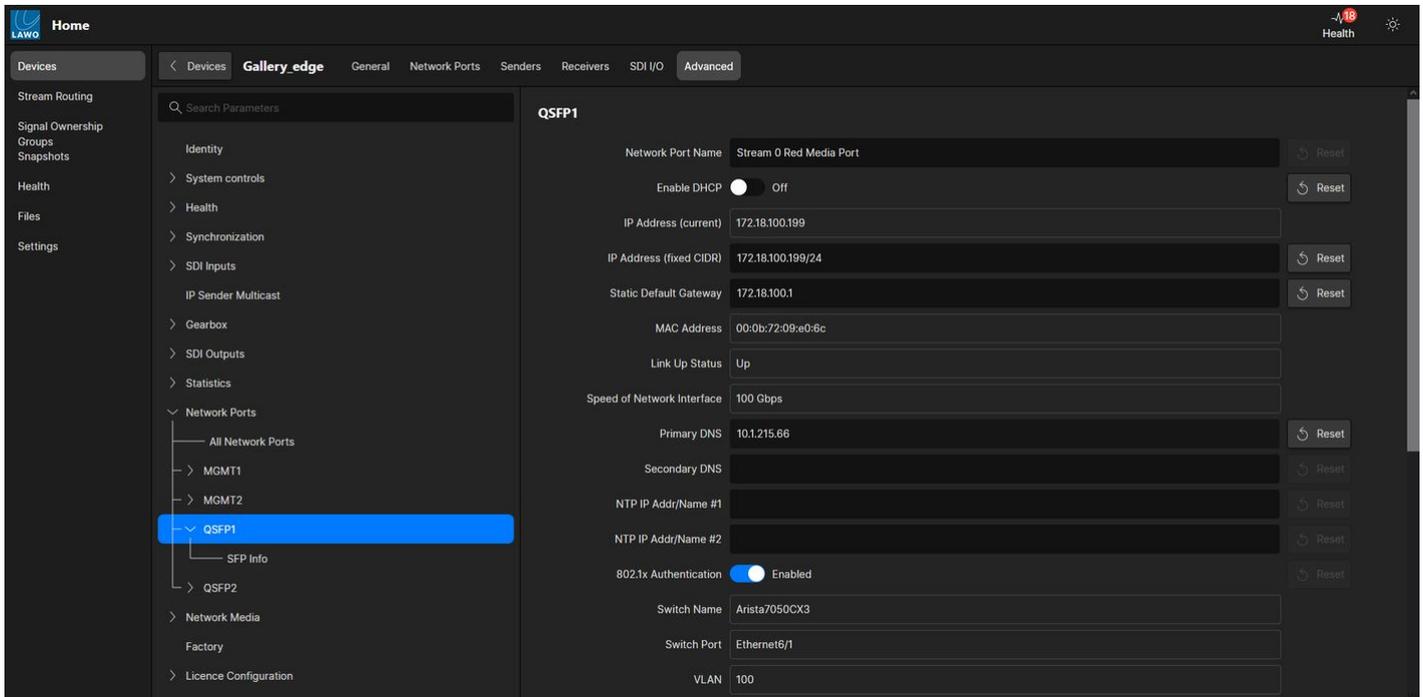
Turn off the slider or click on **Reset** to reset the strings.

8.11 .edge - Advanced -> Network Ports

The **Network Ports** branch can be used to check or edit the IP settings of a network port.

Operation (using HOME)

Open the **Network Ports** branch and select a port (e.g. **QSFP 1**). There is one sub-page for each active port.



The page lists all available parameters for the network port. This includes everything displayed in the **Network Ports** tab, plus many more fields that may be useful to a network administrator.

Of particular note are:

- **PING test** - click on **Trigger Event** to run a PING test to the HOME server. The results are displayed in the **PING Output** field.
- **SFP Info** - select this sub-page and click on **Trigger Event** to display information about the optical transceiver.

Network Port Parameters

The table below describes all available parameters.

Parameter Tree Path	Parameter	Possible Values	Further Information
Network Ports	-	-	-
Network Ports → All Network Ports	Current Date/Time	Read-only	-
	Refresh Date/Time	-	Use Trigger Event to refresh the Current Date/Time value.
Network Ports → <Individual Network Port>	Network Port Name	Read-only	-



Parameter Tree Path	Parameter	Possible Values	Further Information
	Enable DHCP	Active / Off	Choose Off to configure a static IP.
	IP Address (current)	Read-only	
	IP Address (fixed CIDR)	Enter IP	Used if Enable DHCP is set to Off .
	Static Default Gateway	Enter IP	
	MAC Address	Read-only	
	Link Up Status	Up / Down	
	Speed of Network Interface	Read-only	

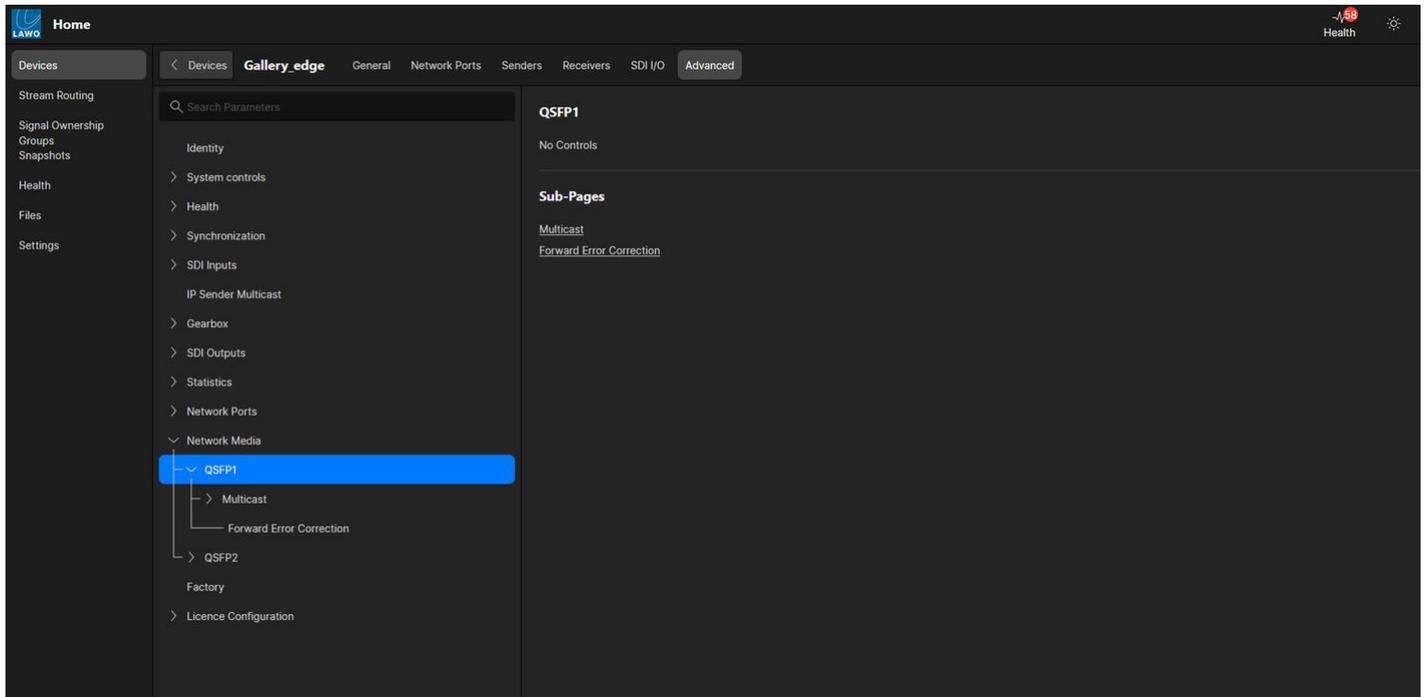
8.12 .edge - Advanced -> Network Media

The **Network Media** pages can be used to check the multicast IPs of the media ports.

Operation (using HOME)

Open the **Network Media** branch and select a port (e.g. **QSFP 1**). There is one sub-page for each active port.

Network Media → <Port>



The **Multicast** sub-pages can be used to check the multicast IPs of the media port.

The **Forward Error Correction** sub-page includes some tools to monitor the error correction.

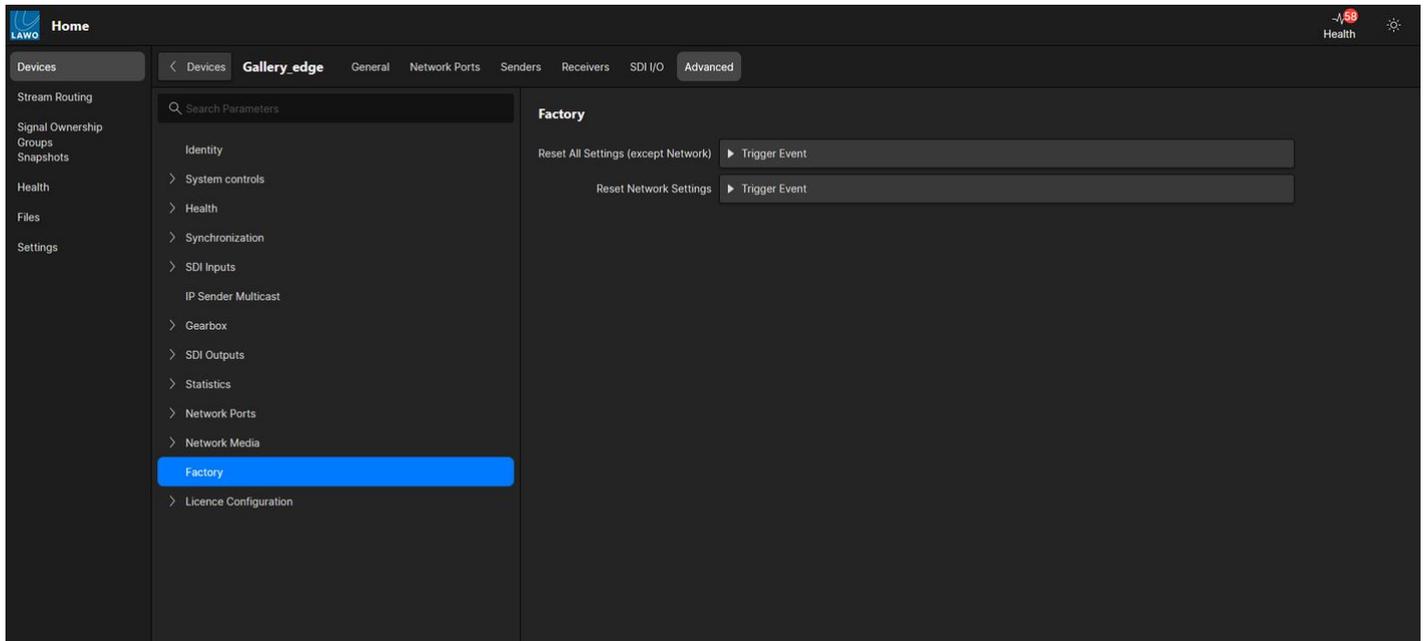
8.13 .edge - Advanced -> Factory

The **Factory** parameters can be used to reset the settings of a processing blade.

Operation (using HOME)

All parameters are displayed on a single page.

Factory



There are two parameters available:

- Reset All Settings (except Network) - this field resets all parameters except for the network settings defined in the **Network Ports** tab.
- Reset Network Settings - this field resets just the network settings.

In each case, click on **Trigger Event** to action the function.

For more information, see [.edge - Network Settings](#).



8.14 .edge - Advanced -> License Configuration

The **License Configuration** page manages all of the software licenses. Please see [.edge - License Activation](#) for more information.

Operation (using HOME)

From the main page, you can configure the operating mode and SDI interfacing. There are then two sub-pages where you can assign the licenses for 3G UHD Gearboxing and Input Frame Synchronization.

License Configuration (main page)

The screenshot shows the 'License Configuration' page within the 'Advanced' settings of the '.edge Slot 2' interface. The page is divided into several sections:

- Fetch Licence:** Trigger Event
- Status:** Remote Licence
- 100G Licence:** Available
- Operating Mode 100G vs 25G:** 100G 2xQSFP (with a 'Reset' button)
- SDI Block[16] Available:** +32 SDI
- Additional SDI:** +32 (48 in total) (with a 'Reset' button)
- SDI I/O configuration:** SDI 24In:24Out (with a 'Reset' button)
- TAKE Configuration Changes:** Trigger Event

Below the main configuration fields, there is a 'Sub-Pages' section with two links:

- [Gearbox Licence Assignment](#)
- [Input Synchronization Assignment](#)

The left sidebar shows a navigation menu with 'Licence Configuration' highlighted in blue. The top navigation bar includes 'Home', 'Devices', and various tabs for configuration, with 'Advanced' currently selected.



8.15 .edge - Control via Ember+

This topic describes how to control a processing blade via Ember+.

Overview

Ember+ is a non-proprietary TCP/IP control protocol that allows devices to be remotely controlled via the network. It is supported by a wide range of products and manufacturers. More details about the Ember+ protocol can be found at <https://github.com/Lawo/ember-plus/wiki>.

To access .edge parameters via Ember+, you will need:

- A computer that is connected to the same network as the .edge processing blades and HOME server(s).
- A suitable Ember+ Viewer application.

Ember+ Tree

The Ember+ tree is the same as the Advanced parameter tree in HOME. Thus, you can use the [Advanced](#) parameter topics as a guide.



8.16 .edge - Control via REST API

This topic describes how to control a processing blade via REST API.

Overview

REST API is a scripting protocol that allows devices to be remotely controlled via the network.

Scripting

A script can address the same parameters as in the Advanced parameter tree in HOME. Thus, you can use the [Advanced](#) parameter topics as a guide.



9 .edge - Service Procedures

This chapter describes the service procedures available for the .edge hardware.

- [.edge - Using the Service Procedures](#)
- [.edge - Replacing a Power Supply Unit](#)
- [.edge - Replacing the Fan Tray](#)
- [.edge - Replacing a Processing Blade](#)
- [.edge - Replacing a Rear I/O Plate](#)

9.1 .edge - Using the Service Procedures

This topic describes how to use the service procedures.

We recommend that you read each topic in full before starting a procedure. Any product-specific tools, such as Torx drivers, can be found in the Lawo tool case delivered with your system.

(E) WARNING

Please read and observe ALL of the [Lawo - Important Safety Instructions](#) BEFORE installing or servicing any component.

(F) AVERTISSEMENT

Veillez lire et respecter TOUTES [les consignes de sécurité importantes](#) AVANT d'installer ou d'entretenir un composant.

Mechanical drawings and data sheets (including weights and dimensions) are available from the [Lawo Download-Center](#) (after login).

The following procedures are covered in this chapter.

- [Replacing a Power Supply Unit](#)
- [Replacing the Fan Tray](#)
- [Replacing a Processing Blade](#)
- [Replacing a Rear I/O Plate](#)

If you need further assistance, the Lawo Support Department can be contacted by email at support@lawo.com, or by telephone during normal working hours - please visit the [Support](#) area of the Lawo website for the most up-to-date contact details.

9.2 .edge - Replacing a Power Supply Unit

The following procedure can be used to exchange an AC power supply unit.

The same procedure can be used to exchange a DC power supply unit, except that you must remove and replace the cable strain relief and observe all of the DC power supply conditions (described [earlier](#)).

Overview

Each .edge frame is powered by two power supplies (fitted to the front). Only one PSU is required for operation; the second provides redundancy.

The power supplies are hot-pluggable and so it is possible to replace the redundant unit while the frame is powered.



What you will need

- No tools are required - as the PSU is unlocked using the release lever.
- 1 x .edge AC power supply - identical to the other PSU in the frame*.

*It is important that the frame is fitted with two identical power supplies: of the same type and from the same manufacturer. The permitted options are explained in [.edge - Power Supplies](#).

Instructions

Please read the following important safety information and then follow the step-by-step instructions.

(E) WARNING

Please read and observe ALL of the [Lawo - Important Safety Instructions](#) BEFORE installing or servicing any component.

(F) AVERTISSEMENT

Veillez lire et respecter TOUTES [les consignes de sécurité importantes](#) AVANT d'installer ou d'entretenir un composant.

(E) CAUTION

For safety reasons and to ensure efficient cooling, both PSU slots must be fitted with a module. The frame must not be operated with an empty slot. If a PSU is faulty, then leave it in the frame (but disconnected) until you are ready to fit the replacement unit.

(F) ATTENTION

Pour des raisons de sécurité et pour assurer un refroidissement efficace, les deux emplacements PSU doivent être équipés d'un module. Le châssis ne doit pas être utilisé avec un emplacement vide. Si un PSU est défectueux, laissez-le dans le châssis (mais déconnecté) jusqu'à ce que vous soyez prêt à installer l'unité de remplacement.

1. Disconnect the mains power to the supply.

- For AC power supplies, disconnect and remove the IEC mains cable.
- For DC power supplies, turn off the DC mains power using the disconnect device. Then remove the feeding wires including the cable strain relief. See [Using the DC Power Supplies](#).

2. Remove the existing power supply.

- Press the green release lever (towards the handle) and pull out the unit from the front of the frame.

3. Check that the replacement unit is of a permitted type.

4. Fit the new power supply.

- Take the power supply unit out of its packaging and slide it carefully into the guide rails (at the front of the frame).
- Secure by pushing in tightly (until the release level clicks into place).

4. Reconnect the power source and test the operation of the PSUs.

- For AC power supplies, reconnect the IEC mains cable.
- For DC power supplies, replace the DC feeding wires and cable strain relief. Then turn on the DC mains power.

9.3 .edge - Replacing the Fan Tray

The following procedure can be used to exchange the fan tray.

Overview

.edge is cooled by five temperature-controlled fans (fitted behind the front grill). There are three large fans (to cool the processing blades) plus two smaller fans (to cool the rear I/O plates).

If a fan is faulty, you can replace the complete fan tray from the front of the frame. Note that, at this time, it is not possible for the customer to order or replace an individual fan.



What you will need

- 1 x Torx10 driver - included in the Lawo toolkit supplied with the system.
- 1 x .edge fan tray - ordered using the part number: **A00/10-55**.

Instructions

Please read the following important safety information and then follow the step-by-step instructions.

(E) WARNING

Please read and observe ALL of the [Lawo - Important Safety Instructions](#) BEFORE installing or servicing any component.

(F) AVERTISSEMENT

Veuillez lire et respecter TOUTES [les consignes de sécurité importantes](#) AVANT d'installer ou d'entretenir un composant.

(E) CAUTION

For safety reasons and to ensure efficient cooling, the frame must not be operated with an empty slot. If only one fan is faulty, then leave the fan tray in the frame until you are ready to fit the replacement unit.

(F) ATTENTION

Pour des raisons de sécurité et pour assurer un refroidissement efficace, le cadre ne doit pas être utilisé avec un emplacement vide. Si un ventilateur est défectueux, laissez le plateau du ventilateur dans le cadre jusqu'à ce que vous soyez prêt à installer l'unité de remplacement.

1. Disconnect both of the IEC cables to turn off the power to the frame.

2. Remove the existing fan tray.

- Using a Torx10 driver, remove the two securing screws at each side of the front grill. The screws should be loosened alternately so that the fan tray slides smoothly out of the frame. If you loosen one screw completely, then this may cause damage to the fan tray or frame.
- Carefully, pull out the fan tray from the front of the frame.

3. Fit the new fan tray.

- Take the unit out of its packaging and slide it carefully into the guide rails (at the front of the frame).
- Secure by tightening the 2 x Torx10 screws. The screws should be tightened alternately so that the fan tray fits smoothly into the frame. If you tighten one screw completely, then you may cause damage to the fan tray or frame.

4. Reconnect the IEC power cables and test the operation of the fan unit.

9.4 .edge - Replacing a Processing Blade

The following procedure can be used to fit or exchange a processing blade.

Overview

Each .edge frame can be fitted with up to 4 x processing blades (fitted to the front).

The processing blades are hot-pluggable and so it is possible to add or replace a blade while the frame is powered.

.edge Frame (front)



What you will need

- 1 x Torx10 driver - included in the Lawo toolkit supplied with the system.
- 1 x .edge processing blade - ordered using the part numbers **.edge_gateway** (for a complete SDI I/O package) or **A00/40** (for a replacement blade).
- 1 x .edge front slot blanking panel - if you wish to operate the frame without a processing blade. This can be ordered using the part number: **.edge_frame_blind_plate_front**.

Instructions

Please read the following important safety information and then follow the step-by-step instructions.

(E) WARNING

Please read and observe ALL of the [Lawo - Important Safety Instructions](#) BEFORE installing or servicing any component.

(F) AVERTISSEMENT

Veillez lire et respecter TOUTES [les consignes de sécurité importantes](#) AVANT d'installer ou d'entretenir un composant.

(E) CAUTION

If a frame is not fully populated, then any spare slots must be closed with blanking panels. For safety reasons and to ensure efficient cooling, the frame must not be operated with an empty slot.

(F) ATTENTION

Si un cadre n'est pas entièrement rempli, les emplacements libres doivent être fermés par des panneaux d'obturation. Pour des raisons de sécurité et pour assurer un refroidissement efficace, le cadre ne doit pas être utilisé avec un emplacement vide.

1. Remove the existing processing blade (or blanking panel).

- Disconnect and remove all of the network cables.
- Using a Torx10 driver, remove the two securing screws at each side of the blade (or blanking panel). The screws should be loosened alternately so that the blade slides smoothly out of the frame. If you loosen one screw completely, then this may cause damage to the blade or frame.
- Carefully, pull out the processing blade (or blanking panel) from the front of the frame.
- Store any blanking panels safely (as they may be required in the future to close the frame).

2. Fit the new processing blade (or blanking panel).

- Take the processing blade out of its packaging and slide it carefully into the guide rails (at the front of the frame).
- Secure by tightening the 2 x Torx10 screws. The screws should be tightened alternately so that the blade fits smoothly into the frame. If you tighten one screw completely, then you may cause damage to the blade or frame.
- A blanking panel can be fitted in a similar manner. Each panel includes a metal divider (behind the fascia) that is important for the airflow.

3. Fit the optical transceivers to the network interface cages.

See [.edge - Fitting the Optical Transceivers](#).

4. Reconnect the network cables and test the operation of the processing blade.

9.5 .edge - Replacing a Rear I/O Plate

The following procedure can be used to fit or exchange a rear I/O plate.

Overview

Each .edge frame can be fitted with up to 4 x I/O plates (fitted to the rear).

The rear I/O plates are hot-pluggable and so it is possible to add or replace a plate while the frame is powered.



What you will need

- 1 x Torx10 driver - included in the Lawo toolkit supplied with the system.
- 1 x HD-BNC removal tool - included in the Lawo toolkit.
- 1 x .edge rear I/O plate - ordered using the part numbers **.edge_gateway** (for a complete SDI I/O package) or **A00/50** (for a replacement I/O plate).
- 1 x .edge rear slot blanking panel - if you wish to operate the frame without an I/O plate. This can be ordered using the part number: **.edge_frame_blind_plate_rear**.

Instructions

Please read the following important safety information and then follow the step-by-step instructions.

(E) WARNING

Please read and observe ALL of the [Lawo - Important Safety Instructions](#) BEFORE installing or servicing any component.

(F) AVERTISSEMENT

Veuillez lire et respecter TOUTES [les consignes de sécurité importantes](#) AVANT d'installer ou d'entretenir un composant.

(E) CAUTION

If a frame is not fully populated, then any spare slots must be closed with blanking panels. For safety reasons and to ensure efficient cooling, the frame must not be operated with an empty slot.

(F) ATTENTION

Si un cadre n'est pas entièrement rempli, les emplacements libres doivent être fermés par des panneaux d'obturation. Pour des raisons de sécurité et pour assurer un refroidissement efficace, le cadre ne doit pas être utilisé avec un emplacement vide.

1. Remove the existing I/O plate (or blanking panel).

- Disconnect and remove all of the SDI and Reference cables. It is recommended to use the HD-BNC removal tool (included in the Lawo toolkit).
- Using a Torx10 driver, remove the two securing screws at each side of the plate (or blanking panel). The screws should be loosened alternately so that the I/O plate slides smoothly out of the frame. If you loosen one screw completely, then this may cause damage to the plate or frame.
- Carefully, remove the I/O plate (or blanking panel) from the rear of the frame.
- Store any blanking panels safely (as they may be required in the future to close the frame).

2. Fit the new I/O plate (or blanking panel).

- Take the I/O plate out of its packaging and slide it carefully into the guide rails (at the rear of the frame).
- Secure by tightening the 2 x Torx10 screws. The screws should be tightened alternately so that the I/O plate fits smoothly into the frame. If you tighten one screw completely, then you may cause damage to the plate or frame.
- A blanking panel can be fitted in a similar manner. Each panel includes a metal divider (behind the fascia) that is important for the airflow.

3. Reconnect the SDI and Reference port cables and test the operation of the I/O.



10 .edge - Data and Specifications

This chapter contains data to work with such as specifications and release information.

- [.edge - Type Numbers](#)
- [.edge - Technical Specification](#)
- [.edge - Release Information](#)



10.1 .edge - Type Numbers

Additional information such as mechanical drawings and data sheets can be located using the following type numbers:

- A00/10 - .edge frame with AC supplies.
- A00/20 - .edge frame with DC supplies.
- A00/40 - .edge processing blade.
- A00/50 - .edge rear I/O plate.

Note that, for ordering purposes, you should use the part numbers listed earlier (and not type numbers listed above).

10.2 .edge - Technical Specification

This topic provides technical data for .edge.

- [.edge Frame](#)
 - [Dimensions](#)
 - [Weight](#)
 - [Power: 2 x AC Power Supplies](#)
 - [Power: 2 x DC Power Supplies](#)
 - [Environmental Specifications](#)
- [.edge Processing Blade](#)
 - [Interfaces](#)
 - [Standards](#)
 - [Reference Standards](#)
 - [Basic Processing](#)
 - [Advanced Processing \(via optional licenses\)](#)
 - [Management and Monitoring](#)
- [.edge Rear I/O Plate](#)
 - [SDI Connectors](#)
 - [SDI Standards](#)
 - [Supported Formats](#)
 - [Return Loss](#)
 - [Cable Length](#)
 - [Reference Connectors](#)

.edge Frame

Dimensions

- Height x Width x Depth: 88,1 mm (2RU) x 483 mm (19") x 412 mm
- Depth measured without excess length screws/handles.

Weight

- Frame with fan tray fitted: 5.8kg (12.8lb)
- Per PSU: 1.1kg (2.4lb)
- Per processing blade: 1.2kg (2.7lb)
- Per rear I/O plate: 1.1kg (2.4lb)

Power: 2 x AC Power Supplies

- Connectors: 2 x IEC redundant
- Input Voltage: nominal 2x 100-120V AC / 2x 200-240V AC, +/- 10%, 50/60Hz
- Hot-swappable
- Indicators: 2 x status LEDs per PSU (power and fault)
- Max consumption: < 700W

Power: 2 x DC Power Supplies

- Connectors: see [.edge - Power Supplies](#).
- Input Voltage: nominal 2x -48V to -60V DC
- Hot-swappable
- Indicators: 2 x status LEDs per PSU (power and fault)
- Max consumption: < 700W



Environmental Specifications

- Operating temperature: 0°C to +30°C (+32°F to + 86°F)
 - Storage temperature: -20°C to +70°C (-4°F to +158°F)
 - Relative humidity: < 90% non-condensing
 - Ventilation/Airflow: front to right cooling in frame
 - Electromagnetic environment: IEC 55032, IEC 55035, IEC 61000-3-2, IEC 61000-3-3
 - Maximum altitude 2000m
-

.edge Processing Blade

Interfaces

- 2x SFP (1GbE) cages: copper (RJ45), short- (SR) and longreach (LR) optical transceiver modules supported.
- 4x SFP28 (25GbE) cages: active optical cable (AOC), short-(SR) and long-reach (LR) optical transceiver modules supported.
- 2x QSFP28 (100GbE) cages: active optical cable (AOC), short-(SR) and long-reach (LR) optical transceiver modules supported.
- 1x USB Type-C port: maintenance console port.

Standards

SMPTE 2110 Professional Media Over Managed IP Networks:

- ST2110-10: System Timing and Definitions.
- ST2110-20: Uncompressed Active Video.
- ST2110-21: Traffic Shaping and Delivery Timing for Video.
- ST2110-30: PCM Digital Audio (Levels A, B and C).
- ST2110-31: AES3 Transparent Transport (Levels A, B and C).
- ST2110-40: SMPTE ST291-1 Ancillary Data.

SMPTE ST2022-7: Seamless Protection Switching of RTP datagrams (Class A and B).

Reference Standards

IEEE1588 (PTP version 2).

Basic Processing

- SDI handling: 16x SDI, available in 3x in/out configurations.
- SD/HD media port operation: 2x SFP28 (25GbE) in non-SPS discrete mode, 4x SFP28 (25GbE) in SPS redundancy mode.
- Video and audio delay (per output): 6 frames OR fields based on the video standard / 250 ms before shuffling and embedding.
- Audio shuffling: for inputs and outputs.
- Video test pattern and audio test tone insertion.

Advanced Processing (via optional licenses)

- SDI handling: up to 48x SDI, available in 3x in/out configurations.
- 3G/12G media port operation: 1x QSFP28 (100GbE) in non-SPS discrete mode, 2x QSFP28 (100GbE) in SPS redundancy mode.
- Input frame synchronization: 1 frame adjustable video delay (either line OR pixel granularity) + one subsequent frame sync / up to 250s audio delay (per channel).



- 3G UHD Gearboxing: combines 4 x 3G-SDI inputs or outputs to transport a 12G signal.

For more information about the software licenses, see [.edge - Licensed Feature Sets](#).

Management and Monitoring

- OUT-OF-BAND CONTROL via 2x SFP (1GbE) interfaces.
- IN-BAND CONTROL via 4x SFP28 (25GbE) or 2x QSFP28 (100GbE) interfaces.
- API PROTOCOLS: HOME, Ember+ and RESTful.
- FUNCTION BUTTONS: 1x Call HOME button and 1x Card RESET button.
- INDICATORS: 1x Card Status LED, 1x Location (ID) LED, 8x Network Status LEDs (one per network interface).

.edge Rear I/O Plate

SDI Connectors

- 48 x micro HD-BNC connectors: 12 inputs (fixed), 12 outputs (fixed). 24 bi-directional (software-defined).

SDI Standards

- SD: SMPTE ST259M-C (270Mb/s)
- HD: SMPTE ST292 (1.485, 1.485/1.001 Gb/s)
- 3G: SMPTE ST424 (2.970, 2.970/1.001 Gb/s)
- 12G: SMPTE ST2082-1:2015

Supported Formats

- SD: 525i59.94 (NTSC) and 625i50 (PAL)
- HD: 720p25, 720p29.97, 720p30, 720p50, 720p59.94, 720p60, 1080i23.98 (PsF), 1080i24 (PsF), 1080i50, 1080i59.94, 1080i60, 1080p23.98, 1080p24, 1080p25, 1080p29.97 and 1080p30
- 3G: 1080p50, 1080p59.94 and 1080p60
- 12G: 2160p50, 2160p59.94 and 2160p60

Return Loss

- SD: >15dB, HD: >15dB
- 3G: >15dB (5 MHz~1.485 GHz), >10dB (1.485 GHz~2.97 GHz)

Cable Length

- SD: 400m at 270 Mb/s (using Belden 1694A)
- HD: 165m at 1.485 Gb/s (using Belden 1694A)
- 3G: 120m at 2.970 Gb/s (using Belden 1694A)
- 12G: 60m at 11.88 Gb/s (using Belden 4794A)

Reference Connectors

- 5 x micro HD-BNC connectors: 2 x inputs with 2 x loop-through, 1 x output
- Reference standards: SMPTE ST170, SMPTE ST318, ITU 624-4 blackburst



10.3 .edge - Release Information

The table below shows information about the current software release for the .edge processing blades.

If more than one blade is installed, then it is recommended to run all processing blades on the same and latest release version.

Current Release

.edge Release	Compatible with...	Notes
<p>Version 1.0.13 01.02.2023</p> <p>RELEASED</p> <ul style="list-style-type: none"> • Software Version: 1.0.13 • FPGA Version: 0.65 • FPGA Build Time (for 25G operation): 2023-01-30T13:01:09Z • FPGA Build Time (for 100G operation): 2023-01-31T18:37:48Z <p>Click here to read or download the release notes as a PDF. ADD LINK.</p>	<p>.edge integrates natively with HOME.</p> <p>.edge supports the following interface solutions:</p> <ul style="list-style-type: none"> • Alliance for IP Media Solutions (AIMS) • RAVENNA • Ember+ • REST API 	

Q: How do I check the software versions running on my system?

A: The software version of each processing blade can be checked from the "[Identify](#)" page in HOME's Advanced parameters.

In addition to the main software **Version**, it is important to note the **FPGA Version** and **FPGA Build Time**.

Q: How do I update a processing blade to the current release?

A: The installer for each release is available from the [Lawo Download-Center](#) (after login). Once you have downloaded the correct file, you can use the "nodesys installer" tool to perform the update (via the control network).

For full instructions, see [Updating a Processing Blade](#).

Previous Releases

There are no previous releases to document.