visual engineering

LIGHTWARE

User's Manual

UMX-HDMI-140
UMX-HDMI-140-Plus

Universal Multimedia Switcher

🏷 v3.5   📅 12-12-2023

Important Safety Instructions

Class II apparatus construction.

The equipment should be operated only from the power source indicated on the product.

To disconnect the equipment safely from power, remove the power cord from the rear of the equipment, or from the power source. The MAINS plug is used as the disconnect device, the disconnect device shall remain readily operable.

There are no user-serviceable parts inside of the unit. Removal of the cover will expose dangerous voltages. To avoid personal injury, do not remove the cover. Do not operate the unit without the cover installed.

The appliance must be safely connected to multimedia systems. Follow instructions described in this manual.

Ventilation

For the correct ventilation and to avoid overheating, ensure enough free space around the appliance. Do not cover the appliance, leave the ventilation holes free and never block or bypass the ventilators (if there are any).

WARNING

To prevent injury, the apparatus is recommended to be securely attached to the floor/wall or mounted in accordance with the installation instructions. The apparatus shall not be exposed to dripping or splashing, and no objects filled with liquids, such as vases, shall be placed on the apparatus. No naked flame sources, such as lit candles, should be placed on the apparatus.

Waste Electrical & Electronic Equipment WEEE

This marking shown on the product or its literature indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources. Household users should contact either the retailer where they purchased this product or their local government office for details of where and how they can take this item for environmentally safe recycling. Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial wastes for disposal.
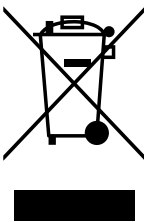
Common Safety Symbols

Symbol	Description
⎓	Direct current
∿	Alternating current
▣	Double insulation
⚡	Caution, possibility of electric shock
⚠	Caution

Symbol Legend

The following symbols and markings are used in the document:

WARNING! Safety-related information that is highly recommended to read and keep in every case!

ATTENTION! Useful information for performing a successful procedure; it is recommended to read.

INFO: A notice, which may contain additional information. Procedure can be successful without reading it.

DEFINITION: The short description of a feature or a function.

TIPS AND TRICKS: Ideas that you may have not known yet, but can be useful.

Navigation Buttons

Go back to the previous page. If you clicked on a link previously, you can go back to the source page by clicking on the button.

Navigate to the Table Contents.

Step back one page.

Step forward to the next page.

Document Information

This User's Manual applies to the following versions of the mentioned software, firmware, and hardware:

Item	Version
Lightware Device Controller (LDC) software	2.7.5b2
Lightware Device Updater (LDU2) software	2.23.0b1
Controller firmware package	1.3.1b2
Hardware	1.1

Document revision: **v3.5**

Release date: **12-12-2023**

Editor: Tamas Forgacs

Hashtag (#) Keywords in the Document

This user's manual contains keywords with hashtags (#) to help you find the relevant information as quick as possible.

The format of the keywords is the following:

#<keyword>

The usage of the keywords: use the **Search** function (Ctrl+F / Cmd+F) of your PDF reader application, type the **#** (hashtag) character and the wished keyword.

The **#new** special keyword indicates a new feature/function that has just appeared in the latest firmware or software version.

Example

#dhcp

This keyword is placed at the DHCP (dynamic IP address) setting in the front panel operation, the Lightware Device Controller (LDC) and the LW3 programmer's reference section.

See the list of all hashtag keywords of the document in the Hashtag Keyword List section, and it is highlighted with claret in the table of contents of the document.

About Printing

Lightware Visual Engineering supports green technologies and eco-friendly mentality. Thus, this document is primarily made for digital use. If you need to print out a few pages for any reason, follow the recommended printing settings:

- Page size: A4
- Output size: Fit to page or Match page size
- Orientation: Landscape

TIPS AND TRICKS: Thanks to the size of the original page, a border around the content (gray on the second picture below) makes it possible to organize the pages better. After punching holes in the printed pages, they can easily be placed into a ring folder.
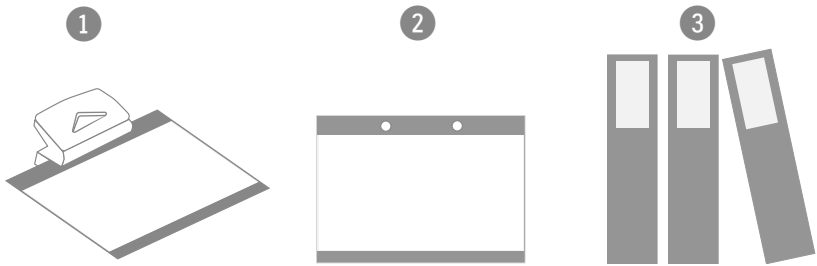
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1

Introduction

Thank you for choosing Lightware's UMX-HDMI-140 series switcher family. In the first chapter we would like to introduce the device, highlighting the most important features in the sections listed below:

- ▶ Description
- ▶ Box Contents
- ▶ Model Comparison
- ▶ Features
- ▶ Typical Applications

1.1. Description
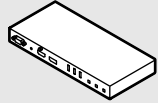
UMX-HDMI-140 switches universal 4K video and audio to a HDMI output port. This device was designed for digital and analog video and audio signals: VGA, DVI, HDMI 1.4 and DP 1.1 with analog stereo audio from local inputs or embedded 7.1 HBR audio. The unit can also handle HDCP encryption. Analog signals (both audio and video) are converted into digital format. Using the factory, custom or transparent EDID emulation the user can fix and lock EDID data on each input connector. Advanced EDID Management forces the required resolution from any video source and fixes the output format conforming the system requirements.

The **Advanced Control** feature pack includes functions which help to integrate the product with 3rd party systems and/or to overcome system automation challenges. In small to mid-size systems, these automation features can help to dismiss an additional control processor box, thus lowering integration time and costs.
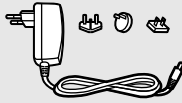
Moreover, the **Advanced Control Pack v3** contains a lot of useful functions that can be added to the UMX-HDMI-140-Plus device.

The device can be mounted on a rack shelf or used standalone. UMX-HDMI-140 is compatible with HDMI extenders and matrix switchers.

Model Denomination

HDMI output interface   with Advanced Control Features

UMX-HDMI-140-Plus

Universal input interfaces - analog and digital signals are also accepted   1x output and 4x inputs

About the Serial Number

Lightware devices contain a label indicating the unique serial number of the product. The structure is the following:

7A000941 — 6-digit running sequence number

Month of the manufacturing:

1: Jan	4: Apr	7: Jul	A: Oct
2: Feb	5: May	8: Aug	B: Nov
3: Mar	6: Jun	9: Sep	C: Dec

Year of the manufacturing: (3-9, A-Y)

7=2017	A=2020	D=2023
8=2018	B=2021	E=2024
9=2019	C=2022	F=2025

1.2. Box Contents

UMX-HDMI-140 series switcher
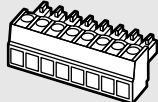
12V DC adaptor with interchangeable plugs

Phoenix® Combicon 3-pole connector

Phoenix® Combicon 5-pole connector

Phoenix® Combicon 8-pole connector

Safety & Warranty Info, Quick Start Guide

1.3. Model Comparison

	UMX-HDMI-140	UMX-HDMI-140-Plus
Video Ports		
VGA input	✓	✓
HDMI input	✓	✓
DisplayPort input	✓	✓
DVI-I input	✓	✓
Analog Stereo Audio Ports		
3.5 mm Jack input	✓	✓
5-pole Phoenix input	✓	✓
Control Ports		
RS-232 (3-pole Phoenix)	✓	✓
IR emitter (3.5 mm Jack)	✓	✓
IR detector (3.5 mm Jack)	✓	✓
GPIO (8-pole Phoenix)	✓	✓
Ethernet (RJ45)	✓	✓
Advanced Control Features		
Nr. of Events in Event Manager	40	100
IR message sending	-	✓
CEC message sending	-	✓
RS-232 message recognizer	-	✓

1.4. Features

3D and 4K Support

High bandwidth allows extension of resolutions up to 4K and even 3D sources and displays are supported.
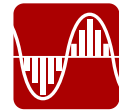
Analog Audio and Video A/D Conversion

Analog audio and video signals are converted to digital before being sent to the output.

Autoselect Function for Video Inputs

The Autoselect feature can sense the port status on the video input ports and select automatically one of them. Priority number can be set for each input port and the feature allows to set various modes for the automatic input selection (First detect, Last detect, Priority mode).

Bi-directional RS-232 Pass-through

AV systems can also contain serial port controllers and controlled devices. Serial port pass-through supports any unit that works with standard RS-232.

Built-in Event Manager

The Event Manager tool takes care of all the necessary control in a smaller configuration by performing predefined actions in response to device status changes. Hence, in a less complex environment, there is no need to invest in additional control solutions, which makes the receiver the best choice for numerous applications.

Dark Mode

Rental application requires this function, which keeps the LEDs unlit to hide the device during the event.

HDCP-compliant

The receiver fulfills the HDCP standard. HDCP capability on the digital video inputs can be disabled when non-protected content is extended.

GPIO Control Port

7 GPIO pins operating at TTL digital signal levels and can be controlled with both LW2 and LW3 commands.

Miniweb

The Miniweb is able to display an adaptive surface with a virtual crosspoint and buttons for Event manager Actions. The miniweb can be displayed in a mobile device, too.

Pixel Accurate Reclocking

Each output has a clean, jitter free signal, eliminating signal instability and distortion caused by long cables or connector reflections.

Advanced Control Features

> **DIFFERENCE:** These features are available only for UMX-HDMI-140-Plus from FW pack v1.2.0b12.

Consumer Electronics Control

Supports transmitting standard CEC commands in order to remote control the source or sink device.

Infra Message Sending

Infrared (IR) is a wireless technology used for device communication over short ranges. Third party control systems may send IR control commands to endpoints turning them on and off or switching their inputs.

RS-232 Recognizer

Support recognizing incoming RS-232 messages to integrate with 3rd party devices like VC codec.

Advanced Control Pack v3

> **DIFFERENCE:** These features are available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

Basic IT-security

These entry-level network security improvements help to prevent unauthorized access to the Lightware device: cleartext login, TCP port blocking and MAC address filtering.

Batch of Commands

A batch of LW3 commands (salvo) can be run by the Lightware device either by a previously stored macro or by sending a file to the device with the desired commands.

Event Manager +

Triggering a condition, defining variables and checking two conditions for an action – these features are available by the improved Event Manager.
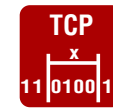
TCP Recognizer

Support recognizing the incoming TCP messages to integrate with 3rd party devices like the video conference codec devices.

1.5. Typical Applications

The typical application of the UMX-HDMI-140 switcher:

- Small meeting rooms
- Huddle rooms
- Home cinema

The following drawings introduce three simple examples how you can apply the device in different environments.

Huddle Room with Speakers
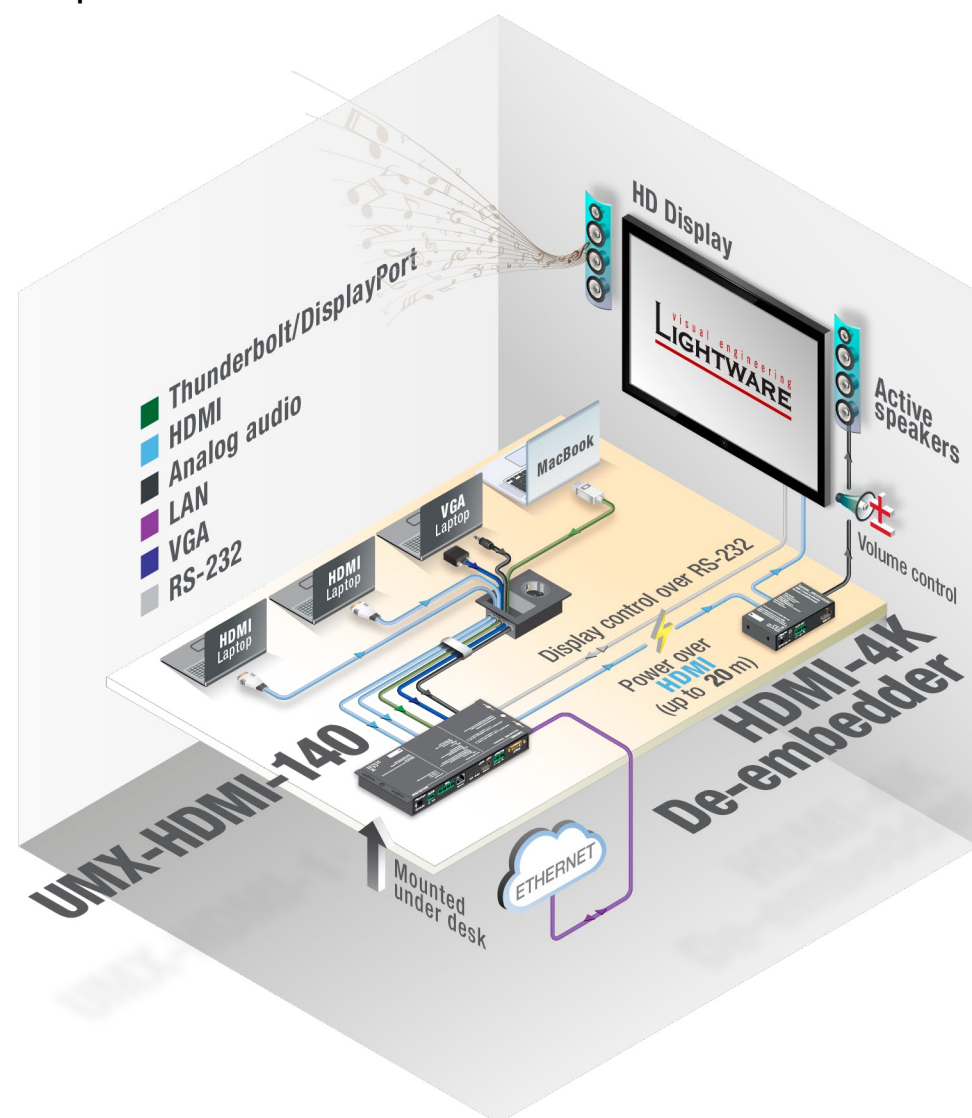
The Concept

The huddle room has an HD Display and dedicated audio sink devices. The UMX-HDMI-140 switcher is assembled under the desk in an Under-desk Double Mounting Kit. The cables for the input sources are guided below the desk's surface to a cable box. The visitors of the huddle room can use their laptops built with VGA, HDMI, DVI, DisplayPort, or Thunderbolt connectors as well. The device also accepts analog audio signals from two different sources. You can see all accepted interfaces of the device in the Electrical Connections section.

UMX-HDMI-140 transmits HDMI audio/video signal toward the sink devices. The Lightware HDMI-4K De-embedder de-embeds the audio signal and transmits it to the Active speakers. The De-embedder does not need local powering because it can be supplied via the HDMI cable by the source and the cable extensions can be up to 20 meters thanks to the built-in Pixel Accurate Reclocking technology of the Lightware devices.

The Switcher and also the De-embedder can be controlled easily via LAN network using our controller software (LDC); see the details in the Software Control - Lightware Device Controller chapter.

The HD Display can be also controlled via the UMX-HDMI-140 by RS-232 interface.

To order Lightware HDMI-4K De-embedder device please contact sales@lightware.com.

Video Conference Room
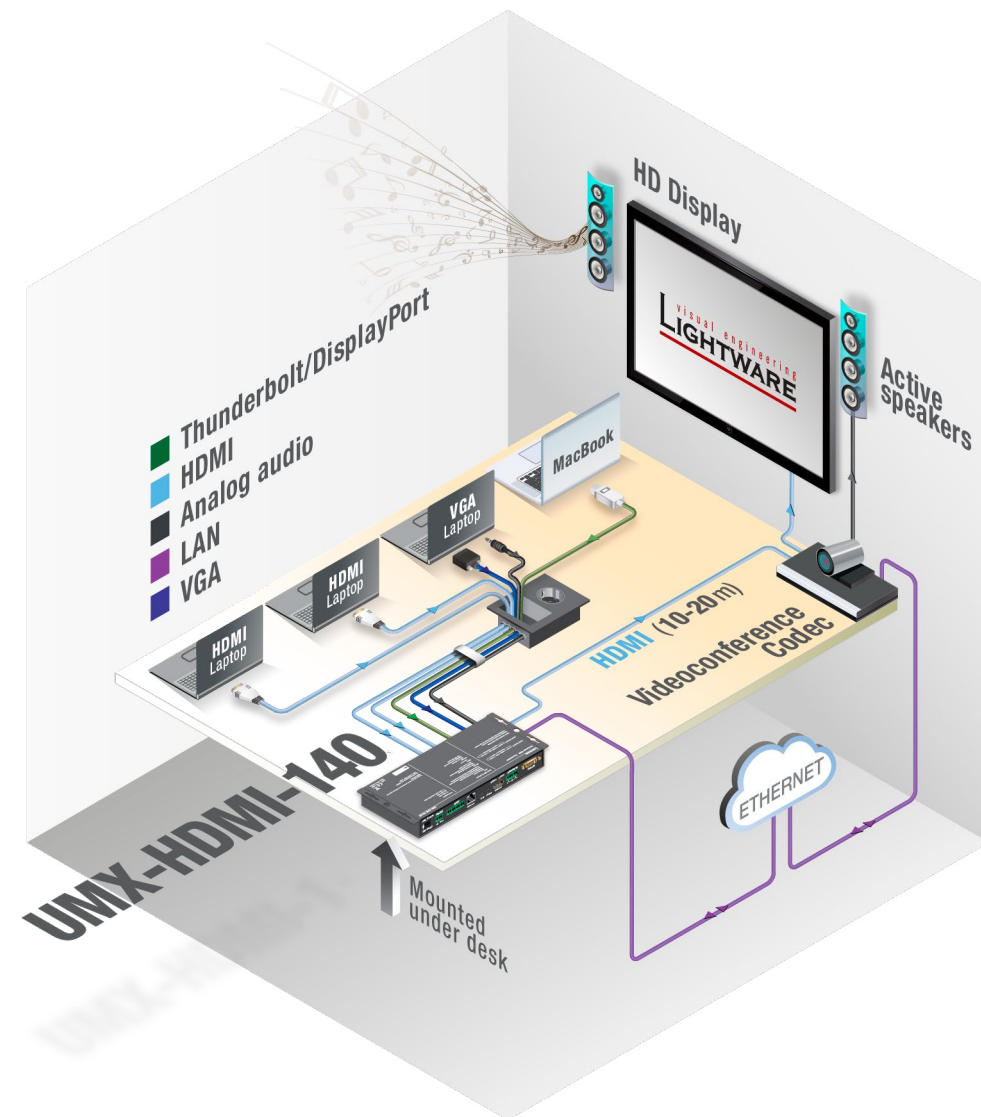
The Concept

The VC (Video Conference) room has an HD Display, Active speakers, and Video conference codec. The UMX-HDMI-140 switcher is assembled under the desk in an Under-desk Double Mounting Kit. The cables for the input sources are guided below the desk's surface to a cable box. The visitors of the huddle room can use their laptops built with VGA, HDMI, DVI, DisplayPort, or Thunderbolt connectors as well. The device also accepts analog audio signals from two different sources. You can see all accepted interfaces of the device in the Electrical Connections section.

The number of the inputs of the Video conference codec is extended by the Switcher as its output is connected to the input of the VC. The Switcher can be controlled easily via LAN network using our controller software (LDC); see the details in the Software Control - Lightware Device Controller chapter.

The HDMI cable between the Switcher and the codec can be up to 20 meters thanks to the built-in Pixel Accurate Reclocking technology of the device.

Collaboration Room with Ceiling Mounted Projector
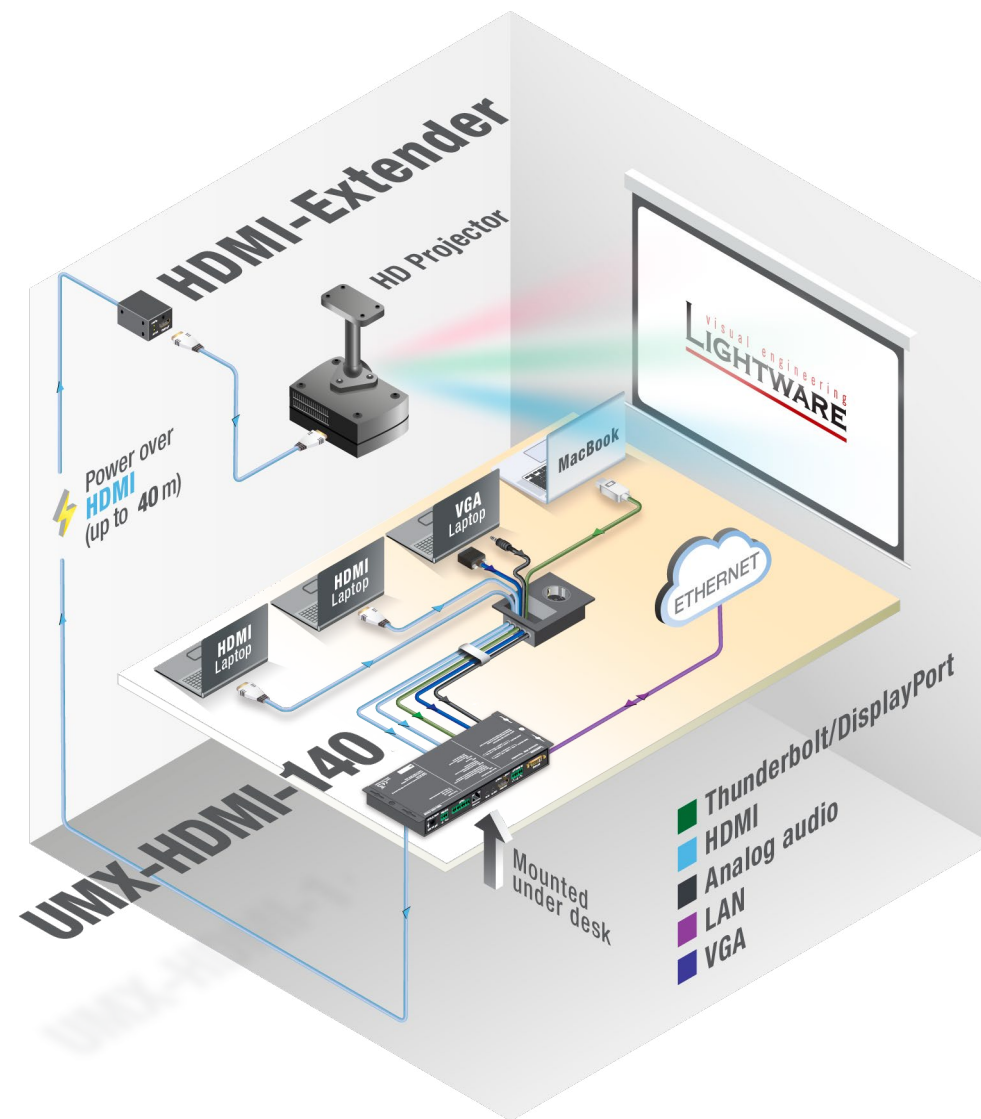
The Concept

The Collaboration Room is built with a ceiling mounted projector and a projection screen. The output of UMX-HDMI-140 is connected to the projector by HDMI cable which can be extended up to 40 meters using a Lightware HDMI-Extender device. The HDMI-Extender does not need local powering because it can be supplied via the HDMI cable.

The Switcher can be controlled easily via LAN network using our controller software (LDC); see the details in the Software Control - Lightware Device Controller chapter.

As an additional feature the Switcher can control the projection screen indirectly. Connect a relay box to the GPIO port of the UMX-HDMI-140 which can roll up and down the projection screen. You can find more information about it in the GPIO Interface section.

To order Lightware HDMI-Extender device please contact sales@lightware.com.

2

Product Overview

The following sections are about the physical structure of the device, input/ output ports and connectors:

2.1. Front View
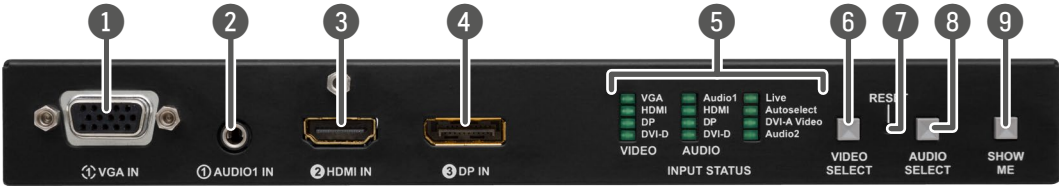
1	**VGA input**	D-SUB connector for analog video signal.
2	**Audio1 input**	3.5 mm Jack connector for asymmetric analog audio input signal.
3	**HDMI input**	HDMI connector for DVI video or HDMI video and audio.
4	**DisplayPort input**	DisplayPort connector for DisplayPort audio/video signal.
5	**Input Status LEDs**	LEDs give feedback about the current status of the unit and input signals. See the details in the next section.
6	**Video Select button**	Button for switching between video sources.
7	**Reset button**	Pushing the button reboots the unit.
8	**Audio Select button**	Button for switching between audio sources.
9	**Show Me button**	Special functions can be reached using this button (bootload mode, DHCP settings, restore factory default settings, condition launching in Event Manager).

INFO: Both UMX-HDMI-140 and UMX-HDMI-140-Plus have the same look and controls on the front panel.

2.2. Rear View
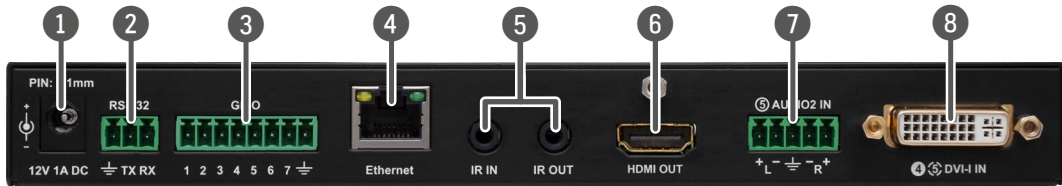
1	**12V DC input connector**	12V DC input for local powering. For more details see the next section.
2	**RS-232 connector**	3-pole Phoenix connector for controlling the device with LDC or third-party control systems, or third-party device control. Pin assignment can be found in the RS-232 Connector section.
3	**GPIO**	8-pole Phoenix connector for configurable general purpose input/output ports. Pin assignment can be found in the GPIO - General Purpose Input/Output Ports section.
4	**Ethernet**	Locking RJ-45 connector for configuring the device using Lightware Device Controller (LDC), or updating it using Lightware Device Updater (LDU). Any third-party control system can use this port to control the device.
5	**IR IN and OUT**	3-pole TRS connector, also known as 3.5 mm (1/8") jack plug for optional IR receiver (IR IN) and transmitter (IR OUT) connection. Pin assignments can be found in the IR Connector section.
6	**HDMI OUT**	HDMI output port for DVI or HDMI signal. Connect an HDMI cable between the switcher and the display device. Applied cable shall not be more, than 30 m (when the signal is 1080p) and maximum cable length varies between 5 meters and 20 meters for 4K signals depending on cable quality and the display's equalization.
7	**Audio2 input**	5-pole Phoenix connector for balanced analog audio input. Pin assignment can be found in the Analog Stereo Audio (AUDIO2 IN) section.
8	**DVI-I input**	DVI-I connector for analog / DVI / HDMI signals.

INFO: Both UMX-HDMI-140 and UMX-HDMI-140-Plus have the same look and controls on the rear panel.

2.3. Status LEDs

Input status LEDs (VIDEO, AUDIO)			
☐		off	The video source is not selected.
▣	green	blinking	The video source is selected but signal is not detected.
▣	green	on	The video source is selected and signal is detected.
LIVE LEDs			
☐		off	The device is not powered.
▣	green	blinking	**Slow** (1 sec): the device is powered and operational. **Fast** (0.5 sec): the device is in firmware update mode.
▣	green	on	The device is powered but not operational.
AUTOSELECT LED			
☐		off	Autoselect function is disabled.
▣	green	blinking	Autoselect function is enabled, searching for signal (the video input LEDs are also blinking).
▣	green	on	Autoselect function is enabled, the active video signal is found (the selected video input's LED is also ON).
SIGNAL LED			
☐		off	Signal is not present on output.
▣	green	on	Signal is present on output.
HDCP LED			
☐		off	Output signal is not HDCP-encrypted.
▣	green	blinking	Non-HDCP capable device is connected, encrypted signal is replaced with red screen.
▣	green	on	Output signal is HDCP-encrypted.

2.4. Front Panel Operation - AV Functions

2.4.1. Video Select Button

You can select the video input source for the output by pushing the Video Select button. The sequence is the following: *#switch #crosspoint*

$$\text{VGA } ① \rightarrow \text{HDMI } ❷ \rightarrow \text{DP } ❸ \rightarrow \text{DVI-D } ❹$$
$$\text{AUTOSELECT} \leftarrow \text{DVI-A } ⑤$$
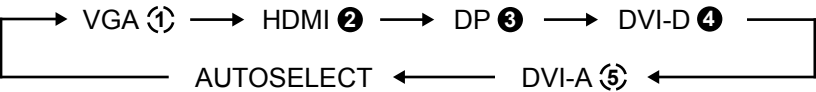
You can find more details about Autoselect feature in the The Autoselect Feature section.

2.4.2. Audio Select Button

You can select the audio input source for the output by pushing the Audio Select button. The sequence is the following:

$$\text{Analog audio (Jack) } ① \rightarrow \text{Embedded audio}$$
$$\text{Analog audio (Phoenix) } ⑤$$
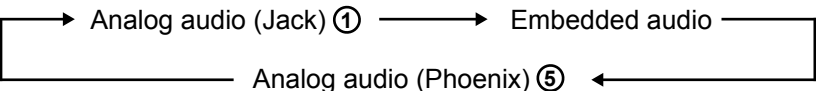
Embedded audio is received on the digital video input port (HDMI / DP / DVI-D) which is currently selected. If analog video input signal (VGA / DVI-A) is selected which cannot contain embedded audio, this source is skipped.

2.4.3. Port Legend

① Video only	① Audio only	❷ Video with embedded audio

2.5. Front Panel Operation - Special Functions

2.5.1. Programmable Show Me Button

Action or an operation can be assigned to the **Show Me** button. "Show Me button pressed" is a condition that can be selected in the Event Manager. See more details in the Event Manager section.

HighlightMe (Default Function)

▎ **DIFFERENCE:** This feature is available only from FW package v1.3.0b5.

This feature is to help finding the desired device in the Device discovery window of Lightware Device Controller software. Press the **Show Me** button for **5 seconds** until the front panel LEDs start to blink slowly, then release the button. In parallel, the device is **highlighted in green for 4 seconds** in the Device discovery window of the LDC, see the Highlighting the Device section.   *#new*

2.5.2. Customize Button Function

The audio and input select function can be disabled by Lightware Device Controller (LDC) software or LW3 protocol command and the buttons can configured for any function in the Event Manager.

2.5.3. Enable DHCP IP Address

The device has a static IP address as a factory default setting. If this setting does not fit to the circumstances during install or usage, DHCP can be enabled from the front panel: *#ipaddress #dhcp #network*

Step 1. Make sure the device is powered on and operational.

Step 2. Press and keep pressed the **Show Me** button for 5 seconds.

Step 3. After 5 seconds front panel LEDs start blinking; release the button and press it 3 times again quickly (within 3 seconds).

Step 4. The LEDs get dark, DHCP gets enabled.

2.5.4. Reset to Factory Default Settings

To restore factory default values, do the following steps: *#factory*

Step 1. Make sure the device is powered on and operational.

Step 2. Press and keep pressed the **Show Me** button for 10 seconds. After 5 seconds front panel LEDs start blinking but keep on pressing the button.

Step 3. After 10 seconds the LEDs start blinking faster; release the button and press it 3 times again quickly (within 3 seconds).

Step 4. The LEDs get dark, the device restores the factory default settings and reboots.

Factory default settings are listed in the Factory Default Settings section.

2.5.5. Control Lock

Press the **Audio Select** and **Show Me** buttons together (within 100 ms) to disable/enable front panel buttons; front panel LEDs blink 3 times when locking/unlocking. If the control lock is enabled and a button is pressed, front panel LEDs blink 3 times. *#controllock #lockbutton #buttonlock*

2.5.6. Reseting the Device

In few cases (after firmware update, etc) you may need to reset the device. Pushing the reset button results the same as you disconnect and reconnect the power adaptor to the switcher. To reseting the device follow the steps: *#reset #reboot#restart*

Step 1. Push the button with a thin object for a second.

Step 2. Wait until the device reboots. You can use the switcher when the LIVE LED is blinking slowly again.

▎ **ATTENTION!** Reseting the device does not reset the settings to factory defaults. To reset factory default settings see the previous section.

2.5.7. Entering Firmware Update Mode

It may happen that the firmware update process is not successful and the device cannot be switched to bootload mode automatically. In this case, switcher device can be forced into firmware update mode as follows: *#bootload*

Step 1. Make sure the switcher is powered off.

Step 2. Press and keep pressed the **Show Me** button.

Step 3. Power on the switcher while the **Show Me** button is being pressed. If the device is switched to firmware update mode the LIVE LED is blinking quickly (less than 500 ms duty cycle). The other LEDs are off.

The procedure of firmware update can be found in the Firmware Update chapter.

3

Installation

The chapter is about the installation of the device and connecting to other appliances, presenting also the mounting options and further assembly steps:

▶ Mounting Options
▶ Electrical Connections
▶ Connecting Steps

3.1. Mounting Options

To mount the switcher Lightware supplies optional accessories for different usage. There are two kinds of mounting kits with similar fixing method. The switcher has two mounting holes with inner thread on the bottom side; see the bottom view in the Mechanical Drawings section. Fasten the device by the screws enclosed to the accessory:

Under-desk double mounting kit
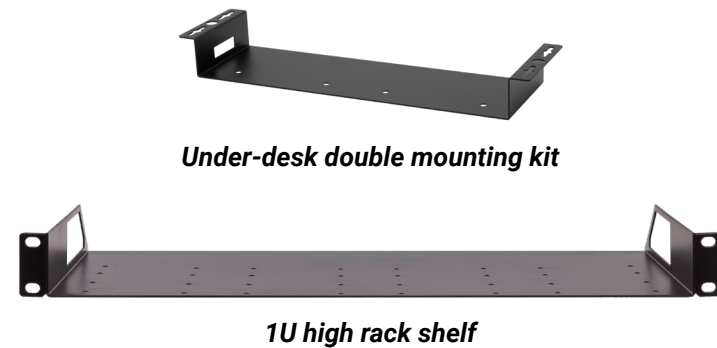
1U high rack shelf

The Under-desk double mounting kit makes easy to mount a single device on any flat surface, e.g. furniture. 1U high rack shelf provides mounting holes for fastening two half-rack or four quarter-rack sized units. Pocket-sized devices can also be fastened on the shelf. To order mounting accessories please contact sales@lightware.com.

▌ **WARNING! Always use the supplied screws. Using different (e.g. longer) ones may cause damage to the device.**

▌ INFO: The switcher is half-rack sized.

3.1.1. 1U High Rack Shelf

Allows rack mounting for half-rack, quarter-rack and pocket sized units.
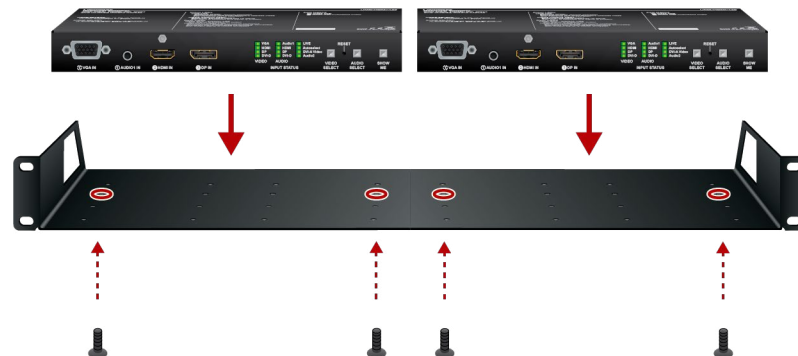
1U high rack shelf provides mounting holes for fastening two half-rack or four quarter-rack sized units. Pocket sized devices can also be fastened on the self.

3.1.2. Under-desk Double Mounting Kit

The UD-kit double makes it easy to mount a single switcher on any flat surface (e.g. furniture).
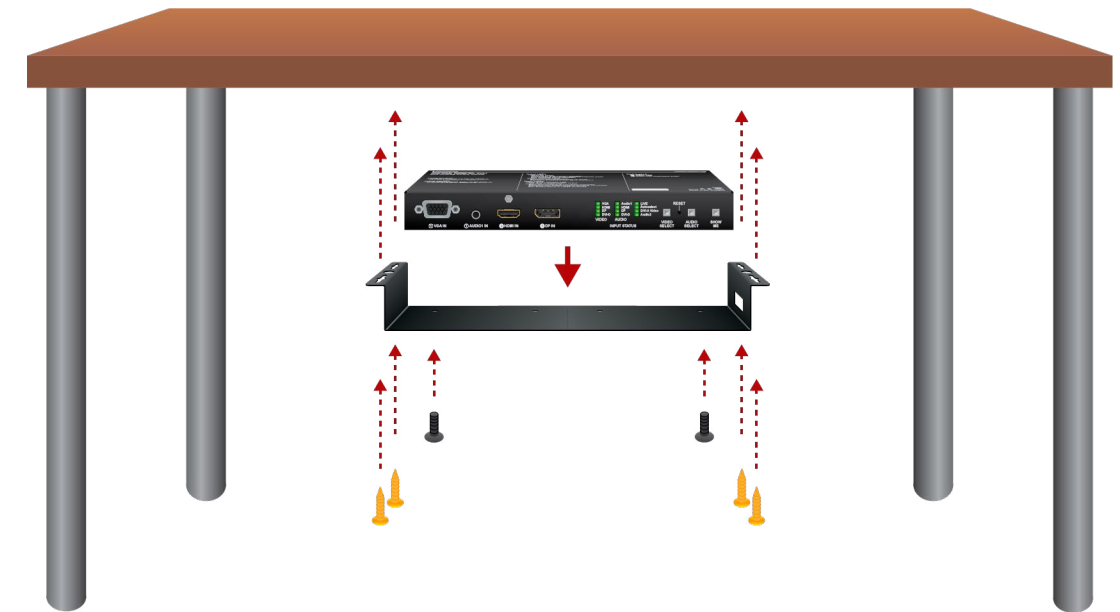
▌ INFO: The chipboard screws are not supplied with the mounting kit.

3.2. Electrical Connections

3.2.1. 12V DC Connection
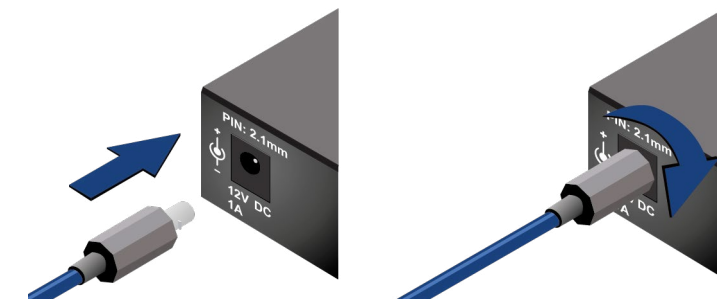
Locking DC connector

Do not forget to turn the plug clockwise direction before disconnecting the power adaptor.

▌ **WARNING! Always use the supplied 12V power adaptor. Warranty void if damage occurs due to use of a different power source.**

3.2.2. VGA Connector

The switcher provides a standard 15-pole D-SUB female connector for connecting VGA devices. Always use high-quality VGA cable for connecting sources and displays; using a VGA cable where all the pins are wired (including the DDC channel's wires) is highly recommended.

3.2.3. DVI-I Connector

UMX-HDMI-140 switcher provides a standard 29-pole DVI-I connector for input where digital and analog pins are connected internally. Hence users can use the connector receiving DVI-A (analog video) and DVI-D signals (digital video and digital audio) as well.

ATTENTION! Only one (DVI-A or DVI-D) mode is available at a same time. You can use the Video Select button to choose the input source.

Always use high quality DVI cable for connecting DVI devices.

The following drawing and table show the pinout of DVI-I connector and the position of analog and digital signal pins.

Pin	Signal	Pin	Signal
1	TMDS Data2-	**16**	Hot Plug Detect
2	TMDS Data2+	**17**	TMDS Data0-
3	TMDS Data2 Shield	**18**	TMDS Data0+
4	not connected	**19**	TMDS Data0 Shield
5	not connected	**20**	not connected
6	DDC Clock	**21**	not connected
7	DDC Data	**22**	TMDS Clock Shield
8	Analog Vertical Sync	**23**	TMDS Clock+
9	TMDS Data1-	**24**	TMDS Clock-
10	TMDS Data1+	**C1**	Analog Red
11	TMDS Data1 Shield	**C2**	Analog Green
12	not connected	**C3**	Analog Blue
13	not connected	**C4**	Analog Horizontal Sync
14	+5V Power	**C5**	GND
15	GND (for +5V)		

3.2.4. HDMI Connector

The extender provides standard 19 pole HDMI connector for output. Always use high quality HDMI cable for connecting sources and displays.

3.2.5. DisplayPort Connector

UMX-HDMI-140 switcher provides standard 20-pole DisplayPort connector for input. Always use high quality DP cable for connecting DisplayPort devices.
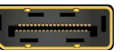
3.2.6. Analog Stereo Audio (AUDIO1 IN)

The connector is used for receiving unbalanced analog audio signal. It is also known as (3.5 mm or approx. 1/8") audio jack, phone jack, phone plug and mini-jack plug.
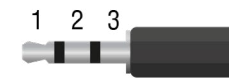
Pin nr.	Signal
1	Left
2	Right
3	Ground

Jack audio plug pin assignments

You can find more information about audio functions in the Audio Interface section.

3.2.7. Analog Stereo Audio (AUDIO2 IN)

5-pole Phoenix connector is used for balanced analog audio input. Unbalanced audio signals can be connected as well. See more details about the balanced and unbalanced input port wiring in the Cable Wiring Guide section.

Pin nr.	Signal
1	Left+
2	Left-
3	Ground
4	Right-
5	Right+
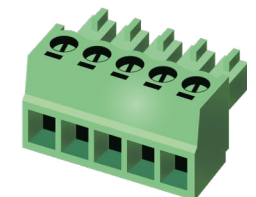
Analog audio connector and plug pin assignments

Compatible Plug Type

Phoenix® Combicon series (3.5mm pitch, 5-pole), type: MC 1.5/5-ST-3.5.

You can find more information about analog audio function in the Audio Interface section.

3.2.8. Ethernet Connector (LAN Port)

The extender provides standard RJ45 connectors for the Ethernet port.

Wiring of CATx Cables

Lightware recommends the termination of LAN cables on the basis of TIA/EIA T 568 A or TIA/EIA T 568 B standards.
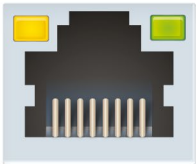
Pin	TIA/EIA T568A	TIA/EIA T568B
1	white/green	white/orange
2	green	orange
3	white/orange	white/green
4	blue	blue
5	white/blue	white/blue
6	orange	green
7	white/brown	white/brown
8	brown	brown
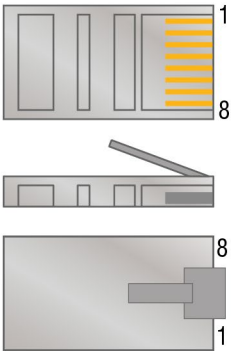
3.2.9. RS-232 Connector

The device contains a 3-pole Phoenix connector which is used for RS-232 serial connection.

Pin nr.	Signal
1	Ground
2	TX data
3	RX data
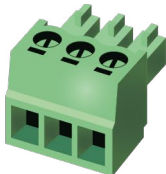
RS-232 connector pin assignments
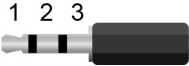
Compatible Plug Type

Phoenix® Combicon series (3.5mm pitch, 3-pole), type: MC 1.5/3-ST-3.5.

You can find more information about RS-232 interface in the Serial Interface section.
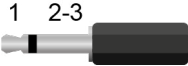
3.2.10. IR Connector

IR detector and IR emitter can be connected to the device with TRS (Tip, Ring, and Sleeve) connectors. They are also known as (3,5 mm or approx. 1/8") audio jack, phone jack, phone plug, and mini-jack plug. The pin assignments are the following for the detector and the emitter:

Detector – 3-pole-TRS

1 Tip	Signal (active low)
2 Ring	GND
3 Sleeve	+5V

Emitter – 2-pole-TS

1 Tip	+5V
2 Ring	Signal (active low)
3 Sleeve	

INFO: Ring pole of the emitter is optional. If your IR emitter has three pole-TRS plug, then the Ring and the Sleeve are the same signal (Output -).

You can find more information about Infrared interface in the IR Interface section.

3.2.11. GPIO - General Purpose Input/Output Ports

UMX-HDMI-140 series switchers contain a 8-pole Phoenix connector with seven GPIO pins, which operates at TTL digital signal levels and can be set to high or low level (Push-Pull). The direction of the pins can be input or output (adjustable). Voltage ranges for GPIO inputs are the following:

	Input voltage [V]	Output voltage [V]	Max. current [mA]
Logical low level	0 - 0.8	0 - 0.5	30
Logical high level	2 - 5	4.5 - 5	18

INFO: The maximum total current for the seven GPIO pins is 180 mA.

Pin nr.	Signal
1	
2	
3	
4	Configurable
5	
6	
7	
8	Ground
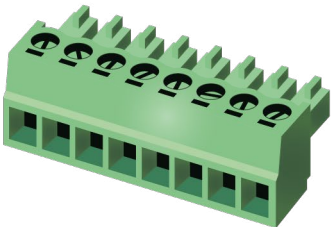
GPIO connector and plug pin assignments

Compatible plug type

Phoenix® Combicon series (3.5mm pitch 8-pole), type: MC 1.5/8-ST-3.5.

You can find more information about GPIO interface in the GPIO Interface section.

3.3. Connecting Steps
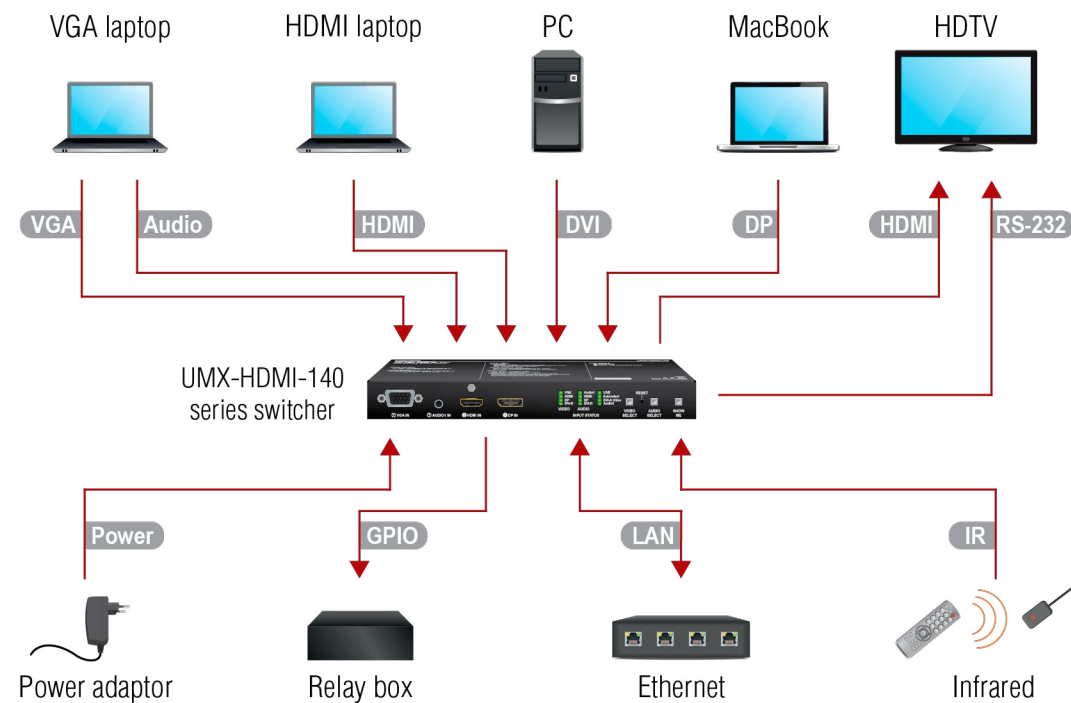
VGA DVI HDMI DP   Connect the switcher and the sources using the inputs and VGA / DVI-I / HDMI / DisplayPort cables.

Audio   Optionally connect an audio device (e.g. the VGA laptop) to the audio input port.

HDMI   Connect the sink (e.g. HDTV) to the HDMI output port by an HDMI cable.

RS-232   Optionally for RS-232 control: connect a controller/controlled device (e.g. HD TV) to the RS-232 port.

IR   Optionally for Infrared control:
 - Connect the IR emitter to the IR OUT port of the device.
 - Connect the IR detector to the IR IN port of the device.

LAN   Optionally connect the switcher to a LAN network in order to control the device.

GPIO   Optionally connect a controller/controlled device (e.g. relay box) to the GPIO port.

Power   Connect the power adaptor to the DC input of the switcher first, then to the AC power socket.

INFO: Powering on the devices is not recommended before the final step.

4

Device Concept

The following chapter describes the features of the device with a few real-life examples. The topics that are described:

- ▸ Universal Switcher Concept
- ▸ Port Diagram
- ▸ Video Interface
- ▸ Audio Interface
- ▸ The Autoselect Feature
- ▸ Serial Interface
- ▸ Ethernet Interface
- ▸ Basic IT Security
- ▸ Batch Commands
- ▸ Bulk Device Management
- ▸ GPIO Interface
- ▸ IR Interface
- ▸ The Event Manager Feature
- ▸ Further Built-in Features
- ▸ Software Control Modes

4.1. Universal Switcher Concept

UMX-HDMI-140 is a universal audio/video switcher with analog/digital conversion and audio embedding functions. The device receives analog (VGA, DVI-A) and digital (DP, HDMI, DVI-D) video signals and transmits HDMI. Analog audio signals can be received via the 3.5" TRS (jack) and the 5-pole Phoenix connectors. The device can be controlled via Ethernet, RS-232 or Infrared and is able to control third-party devices via the RS-232, Ethernet, Infrared interfaces.

INPUT

VGA
HDMI
DP
DVI-D
DVI-A
Analog audio

OUTPUT

HDMI

+ Ethernet
+ RS-232
+ Infrared
+ GPIO

4.2. Port Diagram

The device has four video input ports to receive analog video (VGA, DVI-A) and digital video (HDMI, DP, DVI-D) signals. The analog signals are converted to digital. A 5:1 digital audio/video switch decides which signal is routed toward the HDMI output port. The device also has two analog audio input ports (3.5mm Jack, 5-pole Phoenix). The analog signals are converted to digital ones. The user can choose which audio signal is transmitted on the HDMI output port: one from the analog audio sources or the original embedded audio from the HDMI / DP / DVI-D ports.

▌ INFO: The DVI-D input accepts HDMI signal with embedded audio as well.

Besides, the switcher has four different interfaces to control the unit itself or third-party devices: infrared (input and output), RS-232, Ethernet, and GPIO.

The following figure describes the port diagram of the UMX-HDMI-140 series switcher:
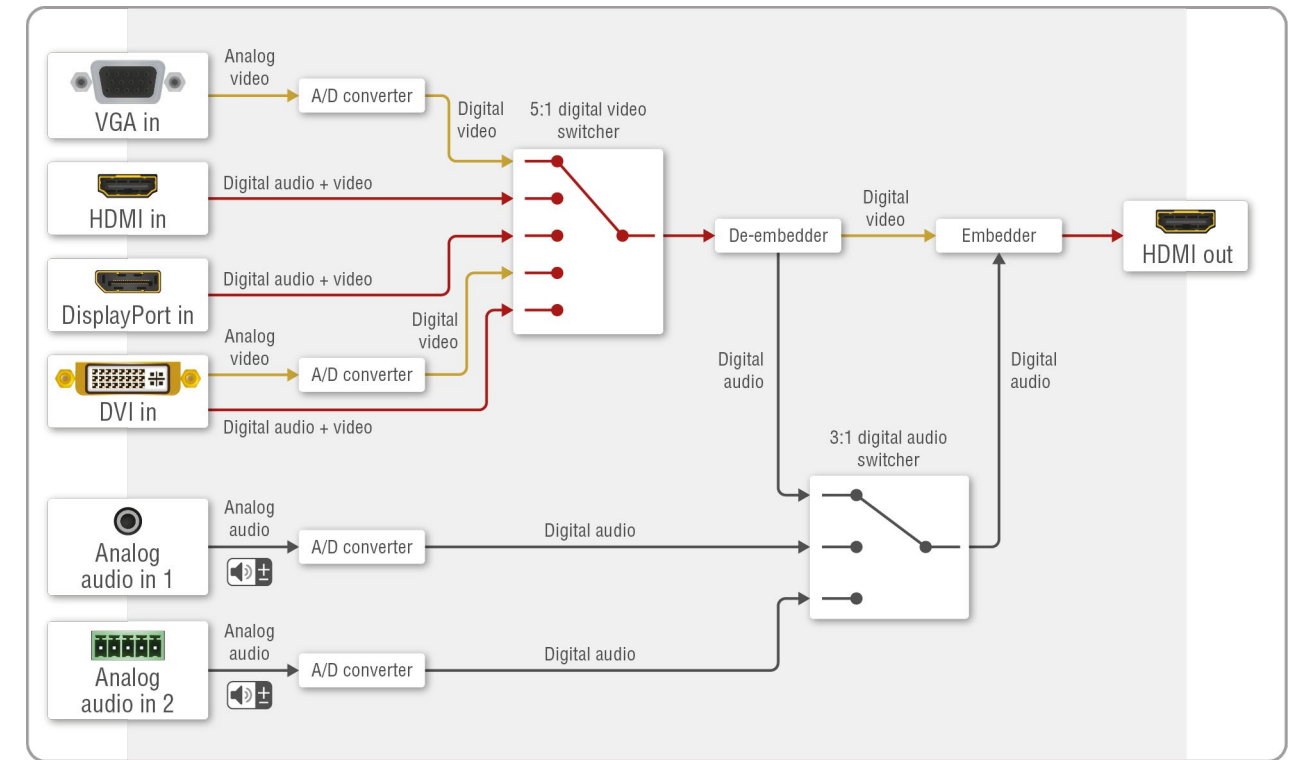
Port diagram

4.3. Video Interface

4.3.1. Video Input Modes

The device can receive digital video signal on the HDMI, DisplayPort, and DVI-D input ports and analog video signal on the VGA and the DVI-A input ports.

▌ INFO: Both the DVI-A and DVI-D signals can be received on the same DVI-I input port.

4.3.2. Input Source Selection Modes

Video input source can be selected in the following ways:
- pressing **Video Select** button on the device;
- using Lightware Device Controller (LDC);
- sending LW2 or LW3 protocol commands; or
- using the **Autoselect** function.

4.4. Audio Interface

4.4.1. Audio Input Modes

The device can receive embedded digital audio signal on the HDMI, DisplayPort, and DVI-D input ports and analog audio signal on the Jack and the Phoenix input ports.

Audio Embedding

The switcher has a built-in audio embedder function which means the audio signal being received on the analog audio input port can be embedded to the HDMI output.

The video and audio inputs can be combined with limitations. Below table contains the allowed connections:

		Audio sources				
		HDMI	DP	DVI-D	Analog audio 1	Analog audio 2
Video sources	HDMI	✔	-	-	✔	✔
	DP	-	✔	-	✔	✔
	DVI-D	-	-	✔	✔	✔
	VGA	-	-	-	✔	✔
	DVI-A	-	-	-	✔	✔

Allowed audio connections

ATTENTION! Audio embedding is available where the pixel clocking of the video signal is up to 225 MHz. If the output video is 4K, the audio embedding function is not available.

4.4.2. Audio Options - Example
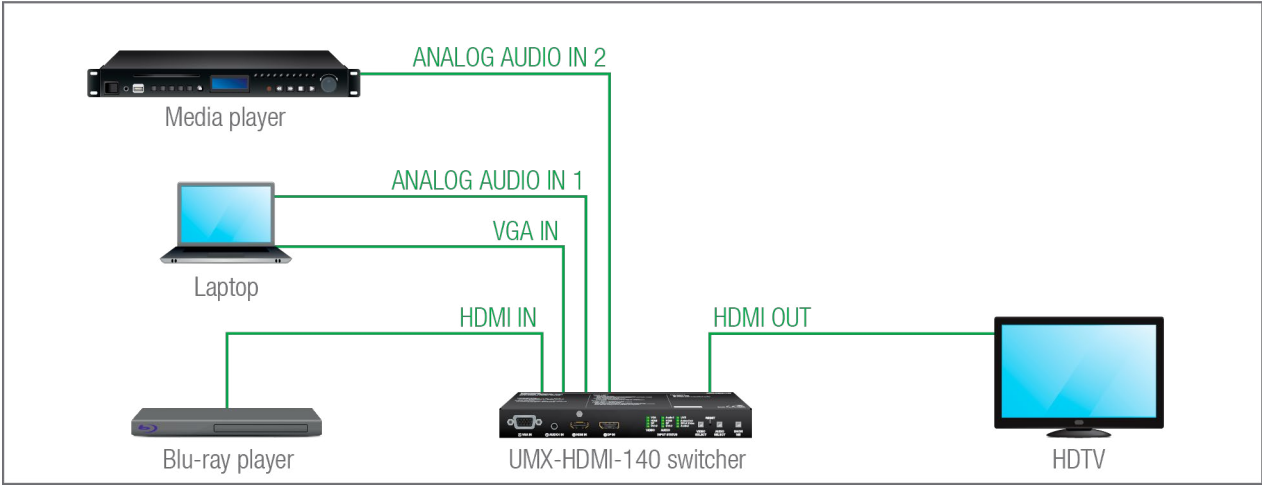
The Concept

Three audio sources are connected to the switcher: a Blu-ray player on the HDMI input (embedded HDMI audio); a Laptop on the analog audio input 1; and a Media player on the analog audio input 2. There are two video sources as well: the Blu-ray player on the HDMI input (digital video with the embedded audio) and the Laptop on the VGA input (analog video).

The following options are available for audio routing / signal selection:
- If the video input source of the **HDTV** is the **Blu-ray player**, you can select from the following audio sources:
  - the original embedded HDMI audio from the **Blu-ray player**;
  - the analog audio input 1 from the **Laptop**;
  - the analog audio input 2 from the **Media player**.
- If the video input source of the **HDTV** is the **Laptop**, you can select from the following audio sources:
  - the analog audio input 1 from the **Laptop**;
  - the analog audio input 2 from the **Media player**.

4.5. The Autoselect Feature

There are three types of Autoselect as follows.

- **First detect mode**: selected input port is kept connected to the output as long as it has an active signal.
- **Priority detect mode**: it is always the highest priority active input that is selected to transmit.
- **Last detect mode**: it is always the last attached input that is selected to transmit.
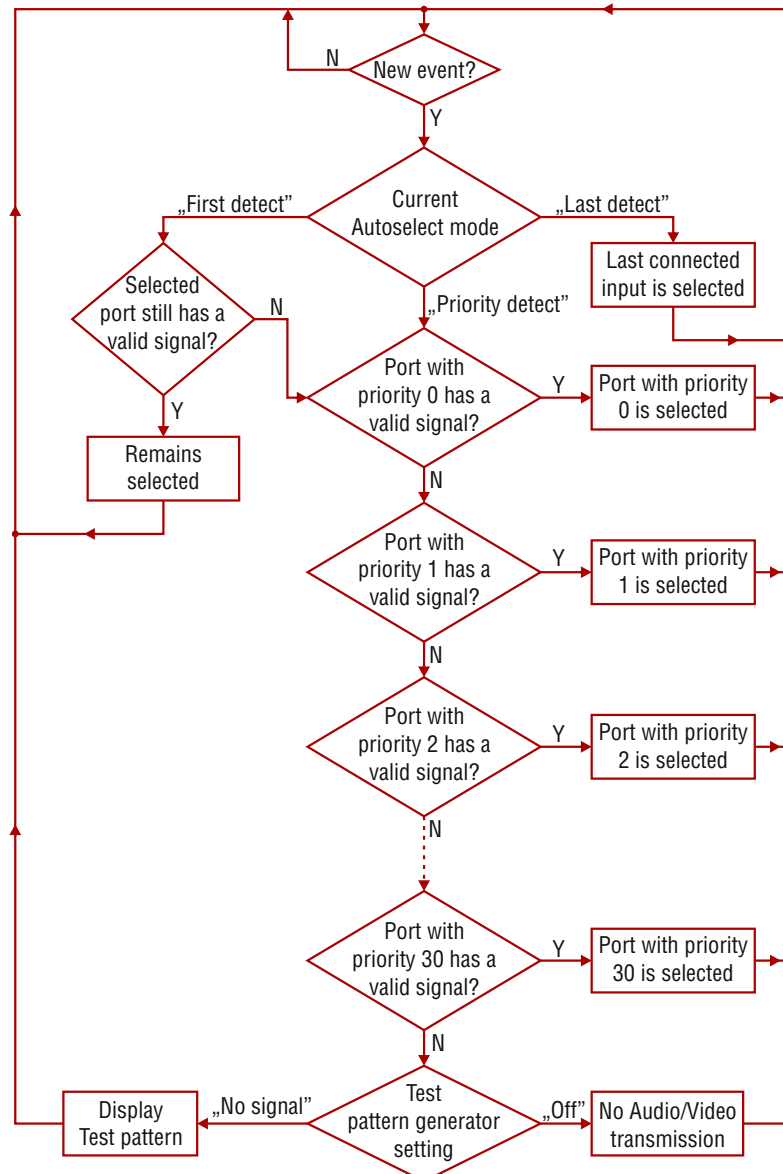
Flowchart of Autoselect modes

4.5.1. Automatic Input Selection - Example
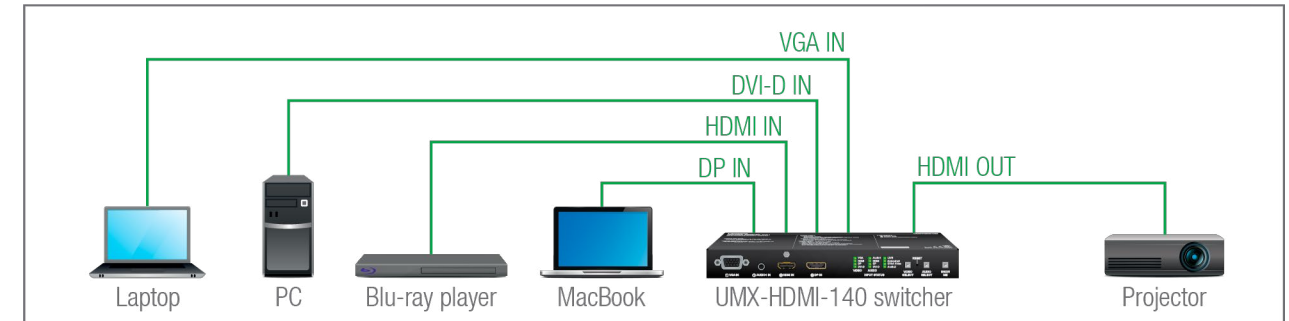
The Concept

If there is no other source connected to the switcher but the Laptop, the VGA input will be automatically switched to the HDMI output. If the Laptop and the PC are also connected to the switcher, the DVI-D input will be switched to the HDMI output. If the Blu-ray player is connected on the HDMI input, and later the MacBook is connected on the DP input of the switcher, it will be switched to the HDMI output – independently of the presence of other video signals.

Settings

- **HDMI output**: Set the Autoselect to **Enabled**. Set Autoselect mode to **Priority detect**. The priorities are the following (the lowest number means the highest priority):

Source device	Input interface	Input port	Priority
MacBook	DP IN	I3	**0**
Blu-ray player	HDMI IN	I2	**1**
PC	DVI-D IN	I4	**2**
Laptop	VGA IN	I1	**3**

Priorities can be set in the Lightware Device Controller software, see the related settings in the Video Output section.

4.6. Serial Interface

4.6.1. Serial Interface

Technical Background

Serial data communication can be established via the local RS-232 port (Phoenix connector). Three different RS-232 modes can be set for the serial port: Control mode, Command Injection mode, or Event Manager mode; see the figure below.
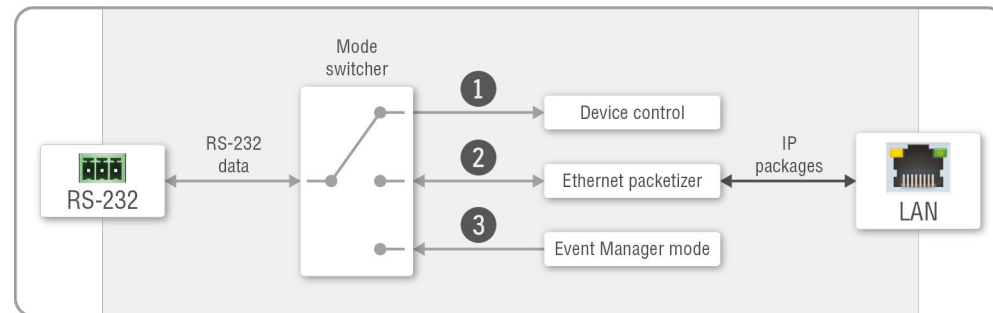
Block diagram of the UMX-HDMI-140 serial interface

The following settings are defined:

1   The serial port is in **Control mode**.

2   The serial port is in **Command Injection mode**.

3   The serial port is in **Event Manager mode**.

▌ INFO: All settings are available in the LDC software, see details in the RS-232 section.

Only one mode can be used at a time: Control mode, Command Injection mode or Event Manager mode.

4.6.2. RS-232 Modes

Control Mode

The incoming data from the given port is processed and interpreted by the CPU. The mode allows to control the receiver directly. LW2 or LW3 protocol commands are accepted – depending on the current port setting.

Command Injection Mode

In this mode, the device works as a TCP/IP <-> RS-232 bidirectional converter. The TCP/IP data is converted to RS-232 data and vice versa. For this operation a separated TCP/IP port number is defined (independent of the basic ones that are used for device control over TCP/IP).

Event Manager Mode

Third-party devices can be controlled from Event Manager in this mode. ASCII characters and binary data in hexadecimal format can be used in this case.

RS-232 Control – Example
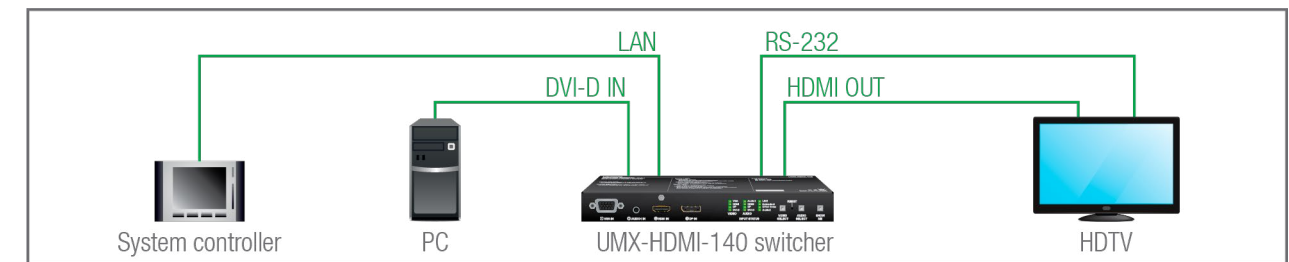
The following ways are available for controlling the devices:

- The **System controller** sends messages over the LAN port of the **Switcher** to the given port number. The Switcher converts the incoming TCP messages to RS-232 commands and transmits them over the local RS-232 port to the **HDTV**. The local RS-232 port has to be set to **Command Injection mode**. In this case the direction of the communication is bi-directional between the Switcher and the System controller, so the answer of the HDTV is received by the System controller.
- The **Switcher** sends a "power on" message to the **HDTV** via the RS-232 port if signal is received on the DVI-D input. In this case the RS-232 port has to be set to **Event Manager mode** and an event has to be created where the condition is "signal is received on I4" and the action is "send a message on RS-232 port". Find a detailed example for the serial message sending in the Event Creating - Example section.

4.6.3. RS-232 Recognizer

> ▌ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.2.0b12.

RS-232 Recognizer Example

Steps and Settings
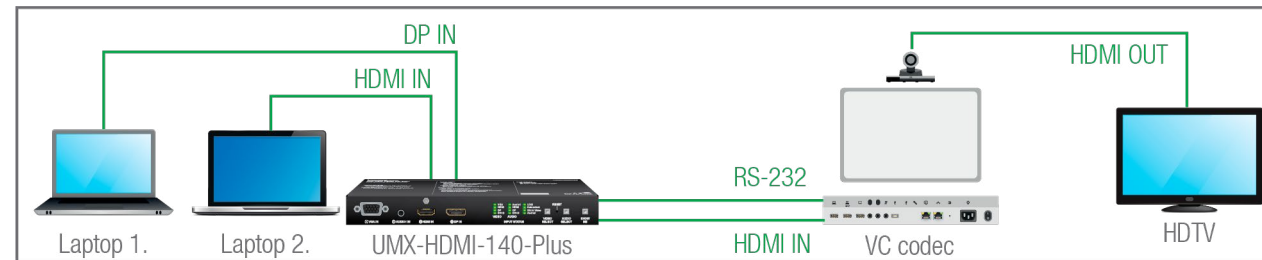
Process	Settings
When signal presents on any HDMI input, the extender sends a message: '**ping**'.	This condition and the action is set in Event manager.
↓	
Video codec sends a message: '**Login name:**'.	The serial communication is scanned continuously by the recognizer in the extender and gets the '**Login name**' string.
↓	
When '**Login name:**' is detected in the string, the extender sends a message: '**Admin**'.	This condition and the action is set in Event manager.
↓	
Video codec sends a message: '**Password:**'.	The serial communication is scanned continuously by the recognizer in the extender and gets the '**Password**' string.
↓	
When '**Password:**' is detected in the string, the extender sends a message: '**Admin**'.	This condition and the action is set in Event manager.
↓	
Login is established, Video codec is ready to use.	

First configure the recognizer for the serial communication, after that, set the events in the Event Manager (for more details see the Event Manager section). The RS-232 recognizer settings need to be done with the Lightware Device Controller Software (see the Message Recognizer section) or with LW3 protocol commands (see the RS-232 Message Recognizer section).

Settings in the Event manager

- ▪ **E1.** When the signal is present on O1 port of the UMX switcher, it sends a message **'PING'** on the P1 port of RS-232 to the VC codec. For more details, see the RS-232 Settings section.
- ▪ **E2**. Set a condition where '**Login name:**' is the recognized RS-232 message. Action is sending serial message ('Admin') on the P1 port to the VC codec.
- ▪ **E3**. Set a condition where '**Password:**' is the recognized RS-232 message. Action is sending serial message ('Admin') on the P1 port to the VC codec.

4.7. Ethernet Interface

The device can be controlled over the Ethernet port. This interface supports both LW2 and LW3 protocols.

4.7.1. Device Control over Ethernet

The interface can be also used to remote control a third-party device and establish the connection to the Lightware Device Updater software and perform firmware update.

Third-party Device Control via Local Ethernet (Example)
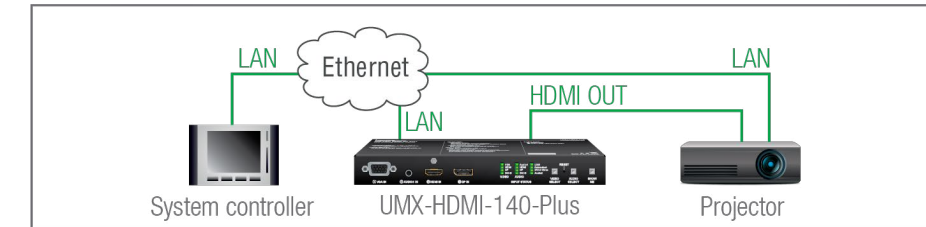
The following ways are available for device control:

- ▪ The **system controller** can communicate with the **switcher** via Ethernet using LW2/LW3 protocol commands.
- ▪ The **system controller** can communicate with the **projector** by its IP:port address.
- ▪ The **switcher** can send commands (e.g. as an action by the Event Manager) to the IP:port address of the **projector** by using LW3 protocol commands. See Event Manager usage in the Event Manager section, and find the related LW3 protocol commands in the Ethernet Message Sending section.

4.7.2. Wake-on-Lan

> ▌ **DIFFERENCE:** This feature is available from FW package v1.3.0b5.

The well-known wake-on-lan feature (sending a magic Packet to the target PC) is available. This can be used to power on a computer automatically: just send a simple LW3 command, see the Powering on a Computer over Ethernet (Wake-on-LAN) section.

> ▌ INFO: Please make sure the feature is enabled in the target PC and it is powered (but switched off).
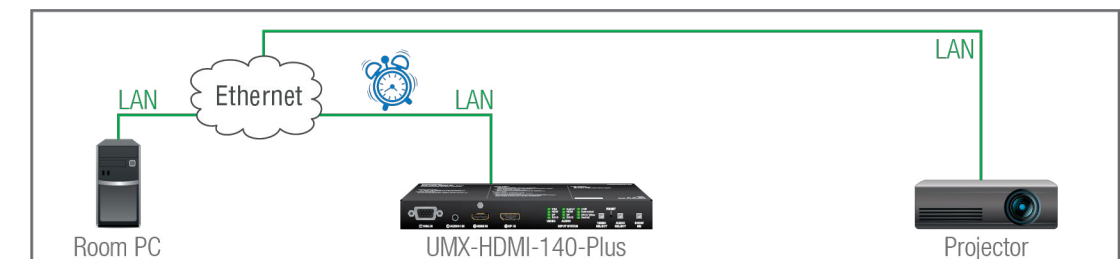
4.7.3. TCP Recognizer

▌ **DIFFERENCE:** This feature is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

The feature is almost the same as in case of the RS-232, but for the network interface: the incoming TCP messages can be processed, which may trigger actions. The combination of the TCP recognizer and the Event Manager gives numerous opportunities for creating automatic room solutions.

TCP Recognizer Example

When the Projector switches off, the button light (1) of the TBP6-EU button panel is turned off automatically.
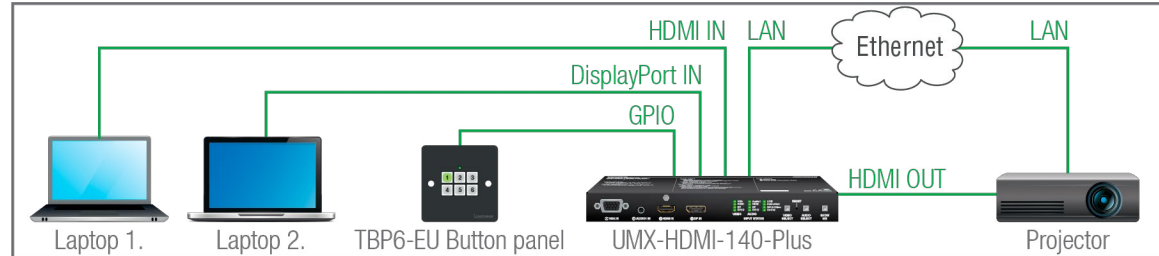
When the power-off process is started in the projector, it will send a message over Ethernet. That message will be recognized by the **Switcher** and will be used as a Condition in Event Manager.

How to setup the switcher?

Step 1. Configure the recognizer for the communication by the LDC, see the TCP Clients (TCP Message Recognizer) section, or by LW3 protocol commands (see the TCP Message Recognizer section). Define the desired device as a TCP client. (The Projector is saved as 'C1' in this example.)

Step 2. Create the following event in the Event manager:
E1. When the `(PWR!001 "On")` message is recognized from the C1 client, the GPIO pin 1 is set to low level.

For more information about setting the events in LDC, see the Event Manager section.

4.8. Basic IT Security

▌ **DIFFERENCE:** This feature is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

These entry-level network security improvements help prevent unauthorized access to the Lightware device: *#new*

- **Cleartext login**
- **IP Port Block**
- **MAC Filtering**

The **Cleartext Login** tool allows setting a password for login, thus the device will not accept any command coming from an interface (RS-232, Ethernet, etc...), only the device type and the serial number can be queried without login. You can set all affected TCP/IP ports individually to enable or disable.

The **IP Port Block** feature is an additional protection for the Cleartext login. There are TCP/IP ports in Lightware devices that are not protected by the login, so you can disable them if necessary. Example: due to the working method of the LW2 communication, the Cleartext login does not provide protection when an LW2 command is sent to the device, that is why the TCP port no.10001 shall be blocked manually.

Another level of security is the **MAC Filtering** tool. You can create an 'allowlist' of network devices based on the MAC address that are allowed:

- Controlling the device (Send option), or
- Querying parameters (Receive option) to/from the Lightware device.

The table below shows the protection levels of these features.

IP Port	Function	MAC Filter	Cleartext Login	IP Port Block
80	HTTP Post&Get	✔	-	✔
81	LW3 control (miniweb)	✔	✔	-
6107	LW3 protocol	✔	✔	-
800x	Command injection (RS-232)	✔	-	✔
900x	Command injection (IR)	✔	-	✔
10001	LW2 protocol	✔	-	✔

▌ **ATTENTION!** Be careful when combining these functions; improper settings may cause malfunction.

Most of these features are available in the LDC, see the Settings Menu section.

4.9. Batch Commands

▌ **DIFFERENCE:** This feature is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

These features can be used to process a group of pre-defined commands. The commands can be stored in the device as macros or you can save the commands in a plain text file and send it to the device by an HTTP message.   *#new*

LW3 over HTTP (Command Salvo)

This feature allows the LW device to be controlled over HTTP. In this case, a batch of commands is sent over HTTP to the Lightware device for processing. Save the LW3 commands into a file, post it to the <IP_address>/protocol.lw3 file and the commands are processed immediately.

Running Macros

In this case, the command sequences (macros) are stored in the device. You can create your custom macros in a file, upload them into the device and run at any time. The number of the macros depends on the device type, at most 50 macros can be saved in a UMX switcher. See more information about the feature in the Macros section.

4.10. Bulk Device Management

It is possible to configure several devices at once with the Bulk Device Management tool. This feature can be accessed by clicking on the **Tools** button in the bottom left corner of the Device Discovery window of the LDC and choosing the Bulk Management option. *#new*

See the Bulk Device Management section for more details.

4.10.1. Network Settings

This function makes it possible to change and adjust the network settings of several devices at once (unique settings for each device), without having to set them at each device one by one. A .csv file can be created containing the list and desired settings of the devices and it can be uploaded into the LDC to be applied to the devices quickly.
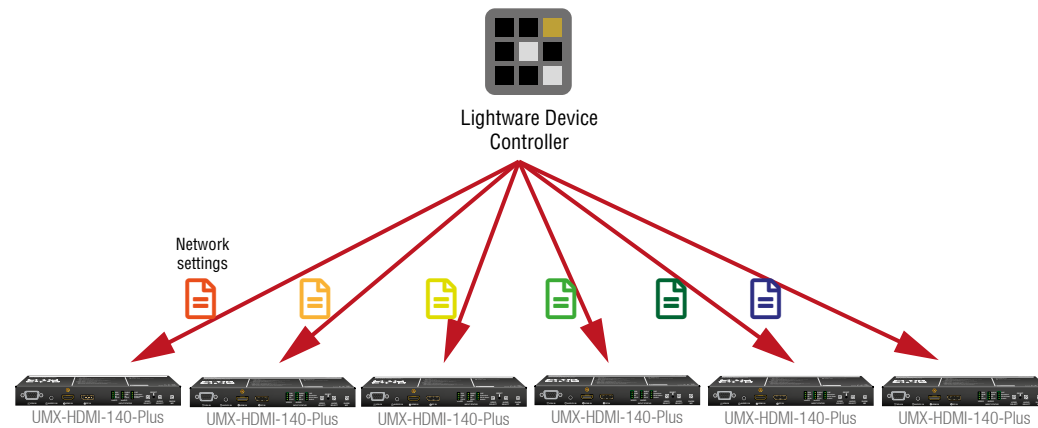
4.11. GPIO Interface

The GPIO (General Purpose Input/Output) port is a multi-functional input/output interface to control the switcher or third-party devices and peripherals. You can establish connection between the controller/ controllable device and the switcher by the 8-pole Phoenix connector. The direction of the seven pins is configurable independently based on needs of the application.

GPIO Options - Example
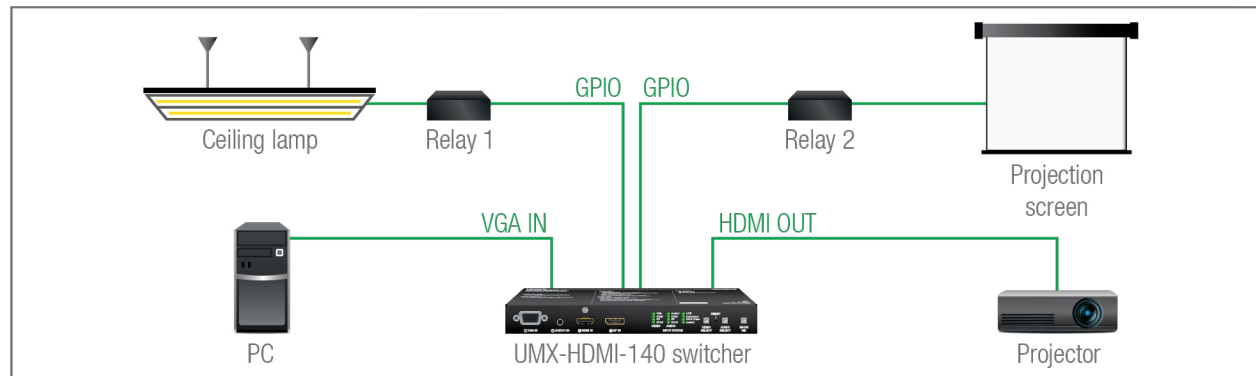
The Concept

The ceiling lamp is turned off by Relay 1 and the projection screen is rolled down by Relay 2 when signal is received from the PC over the VGA input. Both relays are controlled by the GPIO port.

Settings of the Switcher

- **For Relay 1**: create an event in Event manager: when signal is present on Input 1 (I1), set the GPIO pins to low level to open Relay 1. Also create another event: when signal is not present on Input 1 (I1), set the GPIO pins to high level to close Relay 1.
- **For Relay 2**: create an event in Event manager: when signal is present on Input 1 (I1), set the GPIO pins to high level to close Relay 2. Also create another event: when signal is not present on Input 1 (I1), set the GPIO pins to low level to open Relay 2.

When the PC starts to play the video presentation, the signal is received over the VGA input, so the GPIO pins send a signal to Relay 1 to open, which turns off the lights. Furthermore, the GPIO pins also send a signal to Relay 2 to close and the projection screen is rolled down. When the presentation ends, signal ceases on the VGA input, so the GPIO pins send a signal to Relay 1 to close, which turns on the lights and send a signal to Relay 2 to open, so the projection screen returns to its enclosure.

ATTENTION! Please always check the electrical parameters of the devices that you want to control. The maximum current of one GPIO pin is 30 mA, the maximum total current for the seven pins is 180 mA.

See the LDC settings for the GPIO port in the GPIO section. See also the details about the Event Manager settings in the Event Manager section.

4.12. IR Interface

ATTENTION! For the complete usage attach an IR emitter unit to the IR OUT and an IR detector unit to the IR IN connectors. To order IR receiver and transmitter units, please contact sales@lightware.com.

Technical Background

The UMX-HDMI-140 switcher contains a dedicated IR I/O connection and is able to transmit/receive IR signal via the IR emitter and detector units. The signal is in pronto HEX format.
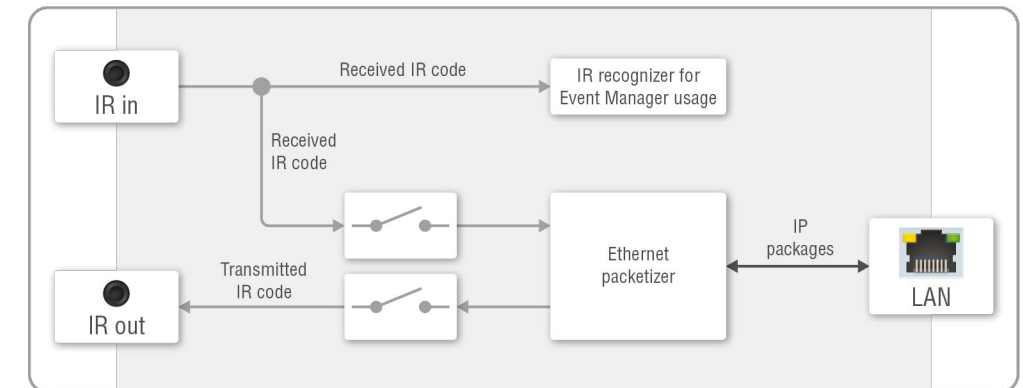
Block diagram of the UMX-HDMI-140 Infrared interface

The device has an IR recognizer function. Recognizing IR commands can trigger actions in Event Manager. The second option is the command injection mode (like at serial interface in the previous section) where you can send IR commands over LAN. Command injection mode can be enabled and disabled on the input/ output ports.

INFO: All settings are available in the LDC software, see the settings in the Infra section.

INFO: The modulation of output IR signal can be turned off or on by an LW3 command, see the Enabling/ Disabling Output Signal Modulation section.

IR Signal Transmission - Example
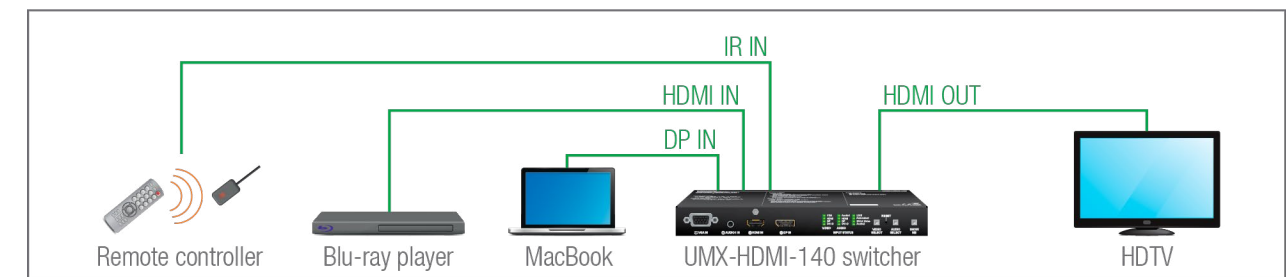
The Concept

An IR detector is attached to the Infrared input port of the switcher and IR signals are sent by the Remote controller. The switcher has two AV sources (a Blu-ray player and a MacBook) and an AV sink device (an HDTV).

UMX-HDMI-140 switcher's input can be routed by the remote controller in the following way:

Step 1. Make the **Switcher** learn the IR codes of the desired remote control buttons, see the Learning IR Code (hash) section.

Step 2. Arrange the events in **Event Manager**; if the set IR code is received from the IR input (condition), then switch the input source between the **Blu-ray player** and the **MacBook** (action) in the **Switcher**. In this case you can control the **HDTV** via the **Switcher** remotely. See the details about the Event Manager settings in the Event Manager section.

Advanced IR functionality

█ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.2.0b12.

UMX-HDMI-140-Plus can send Little-endian pronto hex IR codes on its IR output port.

It is possible in the following ways:

- With Lightware Device Controller software (for more details, see the Sending Pronto Hex Codes in Little-endian Format via IR Port section)
- With Event Manager (for more details, see the Sending Pronto Hex Codes in Little-endian Format via IR Port and Event Manager sections)
- With LW3 protocol command (for more information, see Sending Pronto Hex Codes in Little-endian Format via IR Port)

Sending Bigger-endian pronto hex code is also available, see Sending Pronto Hex Codes in Big-endian Format via IR Port.

4.13. The Event Manager Feature

The Event Manager feature means that the device can sense changes on its ports and is able to react according to the pre-defined settings. Lightware Device Controller contains a user-friendly software tool and allows to create Events by defining a Condition and an Action.
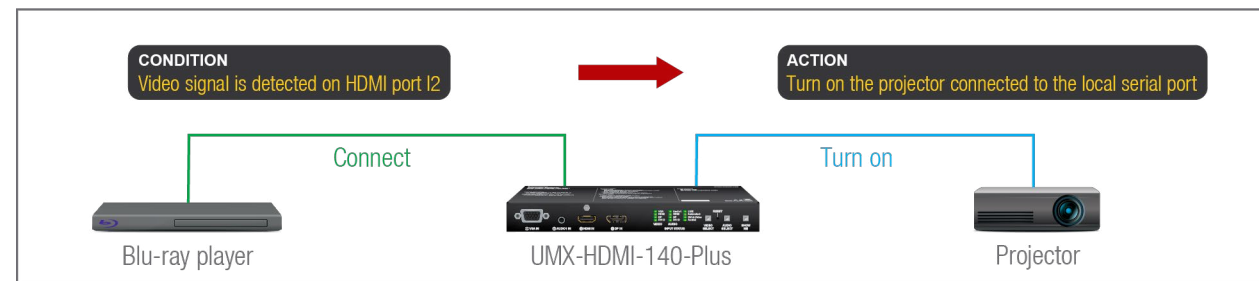
Event Manager example

See more information about the settings in the Event Manager section.

Event Manager +

The AND Operator

█ **DIFFERENCE:** This feature is available from FW package v1.3.0b5.

The practical experience has shown that there is a need to examine more conditions (up to four) as follows: if one of the set conditions becomes true (while the other conditions are fulfilled), then the set Action is launched. For example, in a meeting room we have the following situation:

- Signal is present on an input port,
- A GPIO pin state becomes 'low' (by an external device).

If the two **Conditions** are present at the same time, the **Action** is launched. Just create the two **Conditions** into separate Events, then create a third Event, select the two **Conditions** and define the **Action**.

See the Combine Links section for the settings in LDC.

Event Manager Variables

█ **DIFFERENCE:** This feature is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

A brand new area is opened by implementing the variables. You can create custom variables in number or text format, which can be used in the Event Manager. The variables can have the following properties/methods:

- Numeric (integer) type with min/max value setting, or string-type (determined automatically)
- Increment/step the numeric value,
- Value-dependent case operations,
- Reading and storing the value of an LW3 property into a string or a numeric variable.

The defined variables are stored in a non-volatile memory and the value is kept in case of a reboot. The new opportunities allow creating a monitoring/controlling system without connecting an additional control processor.

See the Variables section for the settings in LDC.   *#new*

Condition Trigger

█ **DIFFERENCE:** This feature is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

This improvement in the Event Manager works as if a condition is detected. When a complex control system is built, a Condition may trigger numerous Actions. A typical example is when a system is powered on and the 'ready-to-use' state has to be loaded. In this case, there could be many actions that are based on the same condition. In order to reduce the number of the commands, you can trigger one 'key' condition, which could start the whole process.

See the Condition Triggering section for the settings in LDC.

4.14. Further Built-in Features

4.14.1. Device Cloning – Configuration Backup and Restore

The device (configuration) cloning of UMX-HDMI-140 switcher is a simple method that eliminates the need to repeatedly configure certain devices to have identical (non-factory) settings. If the devices are installed in the same type of system multiple times, then it is enough to set up only one device to fit the user's needs and then copy those settings to the others, thus saving time and resources. See more information about the settings in the Backup (Configuration Cloning) section.

Configuration cloning can be also done by LDU2 over Command Line for many devices in one step, see the Restore section.

4.14.2. Consumer Electronics Control (CEC) Interface

▌ DIFFERENCE: This feature is available only in UMX-HDMI-140-Plus model from FW package v1.2.0b12.

Consumer Electronics Control (CEC) is a bi-directional communication, defined in the HDMI standard. This feature is for remote control of the source and sink devices in the AV system.

UMX-HDMI-140-Plus model is able to send and receive CEC commands, on the HDMI IN (I2) port towards the source, on the HDMI OUT (O1) port towards the sink.

CEC has a dedicated pin in the HDMI connector. The DVI connector does not contain this pin, so the CEC transmission brakes when HDMI-DVI connector or adapter is in the signal route.

CEC Application Example

When an active signal is detected on the DP in, the switcher automatically sends a CEC message to the HDTV to wake up.

Video IN   HDMI OUT

Laptop 1. UMX-HDMI-140-Plus HDTV
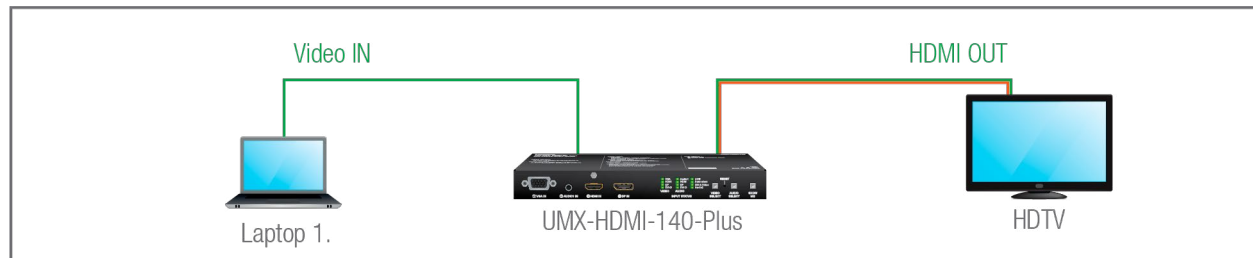
Create an event in the event manager:
- Set as a condition that the signal is present on the input (I1),
- Set as an action to send a CEC command 'Image view on' through the O1 output port.

See the details about the Event Manager settings in the Event Manager section.

4.15. Software Control Modes

The user has more possibilities to control the device besides the front panel buttons. The following list contains the software control modes:

- **Lightware Device Controller (LDC)** - you can connect to the device via our control software using Ethernet or RS-232 interface and control or configure the device as you wish. For the details, see the Software Control - Lightware Device Controller chapter.
- **LW2 protocol commands**: you can configure the device by using the reduced command set of LW2 protocol. For more details, see the LW2 Programmer's Reference chapter.
- **LW3 protocol commands**: you can configure the device by using the full-range command set of LW3 protocol. For more details, see the LW3 Programmers' Reference chapter.

5

Software Control - Lightware Device Controller

The device can be controlled by a computer through the Ethernet and RS-232 port using Lightware Device Controller (LDC). The software can be installed on a Windows PC or macOS. The application and the User's manual can be downloaded from www.lightware.com.

▶ INSTALL AND UPDATE
▶ RUNNING THE LDC
▶ ESTABLISHING THE CONNECTION
▶ BULK DEVICE MANAGEMENT
▶ CROSSPOINT MENU
▶ PORT PROPERTIES WINDOWS
▶ DIAGNOSTIC TOOLS
▶ CEC (ON HDMI PORTS)
▶ EDID MENU
▶ CONTROL MENU
▶ EVENT MANAGER
▶ SETTINGS MENU
▶ THE MINIWEB ROOM CONTROL
▶ BACKUP (CONFIGURATION CLONING)
▶ ADVANCED VIEW WINDOW

5.1. Install and Update

> INFO: After the installation, the Windows and the Mac applications have the same look and functionality. This type of the installer is equal with the Normal install in case of Windows and results in an updateable version with the same attributes.

Minimum System Requirement

RAM: 1 GB

Minimum display resolution: 1600x900

Installation for Windows OS

Run the installer. If the User Account Control drops a pop-up message, click **Yes**.

During the installation you will be prompted to select the type of the installation: **normal** and the **snapshot** install:

Normal install	Snapshot install
Available for Windows and macOS	Available for Windows
The installer can update only this instance	Cannot be updated
Only one updateable instance can exist for all users	More than one different version can be installed for all users

Comparison of installation types

> **ATTENTION!** Using the Normal install as the default choice is highly recommended.

Installation for macOS

Mount the DMG file by double clicking on it, and drag the LDC icon over the Applications icon to copy the program into the Applications folder. If you want to copy the LDC into another location, just drag the icon over the desired folder.

> **ATTENTION!** Please check the firewall settings on the macOS device. LDC needs to be added to the exceptions of the blocked software for the proper operation.

Updating of LDC

Step 1. Run the application.

The **Device Discovery** window appears automatically and the program checks the available updates on Lightware's website and opens the update window if LDC updates are found.

The current and the update version number can be seen at the top of the window and they are shown in this window even with the snapshot install.

The **Update** window can also be opened by clicking on the **About** ⑦ icon and the **Update** button.

Step 2. Set the desired update setting in the **Options** section.
- If you do not want to check for updates automatically, uncheck **the circle** that contains the green tick.
- If you want to postpone the update, a reminder can be set with different delays from the **drop down list**.
- If the proxy settings traverse the update process, set the proper values, then click on the **OK** button.

Step 3. Click on the **Download update** button to start the updating.

The updates can be checked manually by clicking on the **Check now** button.

5.2. Running the LDC

The common way to start the software is to double-click on the LDC icon. But the LDC can be run by command line parameters as follows:

Connecting to a Device with Static IP Address

The LDC is connected to a device with the indicated static IP address directly; the Device Discovery window is not displayed. When the port number is not set, the default port is used: 10001 (LW2 protocol). For LW3, devices use the **6107** port number.

Format: `LightwareDeviceController -i <IP_address>:<port>`

Example: `LightwareDeviceController -i 192.168.0.20:6107`

Connecting to a Device via a Serial Port

Format: `LightwareDeviceController -c <COM_port>:<Baud>`

Example: `LightwareDeviceController -c COM1:57600`

The LDC is connected to a device with the indicated COM port directly; the Device Discovery window is not displayed. If no Baud rate is set, the application will detect it automatically.

Adjusting the Zoom

The window can be zoomed to a specific value to fit to the resolution of the desktop (higher/lower). '1' is the default value (100%).

Format: `LightwareDeviceController -z <magnifying_value>`

Example: `LightwareDeviceController -z 1.2`

> **ATTENTION!** The last set value is stored and applied when LDC is started without a parameter.
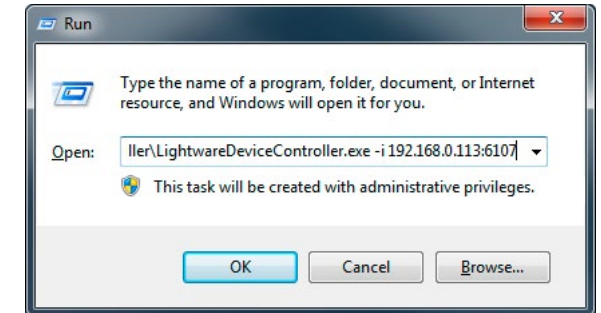
5.3. Establishing the Connection

Connecting Steps

Step 1. Connect the device to a computer via USB, RS-232 or Ethernet.

Step 2. Run the controller software; the device discovery window appears automatically. There are three tabs for the different type of interfaces; Ethernet and Serial are available for UMX switchers.

Step 3. Select the desired unit and click on the green **Connect** button (or just double-click on the device).
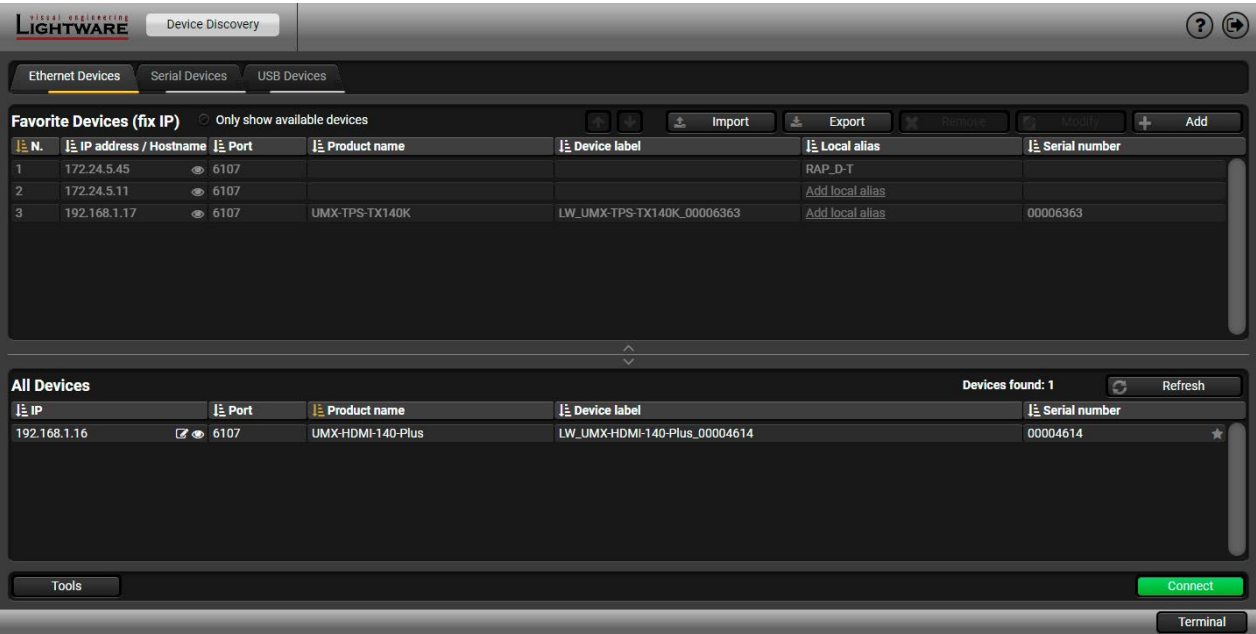
Device discovery window in LDC

5.3.1. Ethernet Tab

The Ethernet tab consists of two lists. **All devices** list contains all Lightware devices that are available in the connected network (in the 255.255.0.0 subnet). However, there is no need to browse all available devices, as you can expand the list of **Favorite devices with** any Lightware device that is connected via Ethernet in any of the following ways:

- Mark the desired device with the ★ symbol in the **All Devices** list,
- Press the **Add** button and add the device in the appearing window, or
- **Import** the list of favorite devices that was **exported** previously.

Add New Favorite Device

Press the **Add** button; in the appearing window you can enter the **IP address**. The **hostname** of the desired device can be used instead, if it is supported. That allows setting a unique name to identify the device in a network. If the host name is saved in this window and the IP address is changing, the device will still be available and connectible.

> **ATTENTION!** The host name connection-feature does not work when the target device is accessed over VPN.

See more information about the host name property in the Setting the Host Name section.
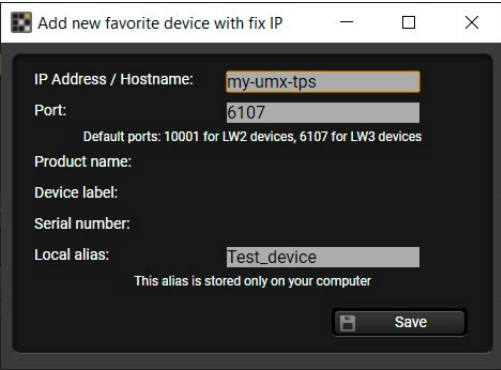
Import/Export the List of Favorite Devices

The list of favorite devices can be exported/imported by the dedicated buttons (saved as *.JSON file). The list can be imported later (in another computer, too), but please note that the current list will be overwritten by the imported list.

Changing the IP Address ✎

To modify the IP address settings quickly, it is not necessary to enter the device's settings/network menu, you can set them by clicking on the pencil icon beside the IP address.

You can see the new settings only in this window. The device needs a few seconds to apply the new settings.
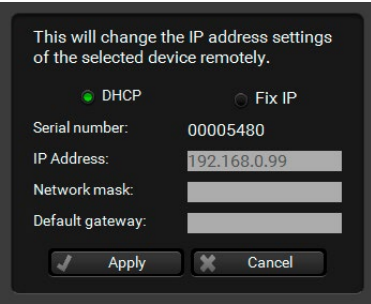
Identifying the Device 👁
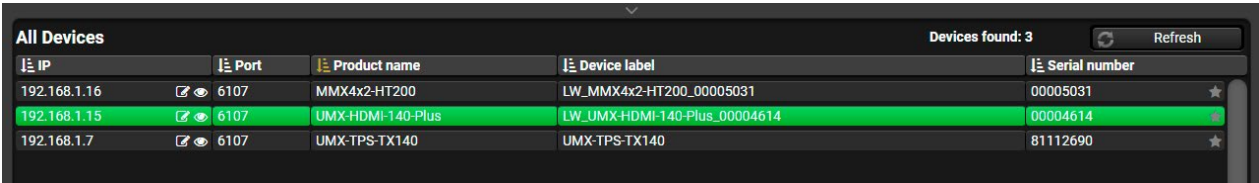
Clicking on the icon results in the blinking of the status LEDs for 10 seconds. The feature helps find the device itself physically.

Highlighting the Device

▌ **DIFFERENCE:** This feature is available only from FW package v1.3.0b5.

The opposite feature is also available to help find the desired device. Press the **Show Me** button for **5 seconds** until the front panel LEDs start to blink slowly. In parallel, the device is **highlighted in green for 4 seconds** in the Device discovery window of the LDC.   *#highlightme*
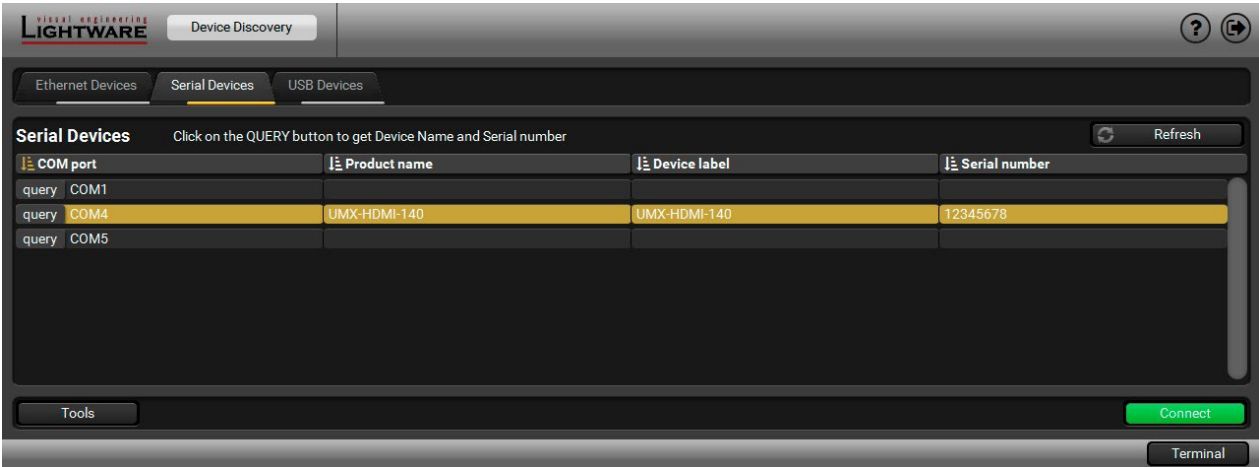
▌ INFO: "Highlight Me" is the default function of the **Show Me** button. If you assign a different function to the button, the feature above will not be available.

5.3.2. Serial Tab

If the device is connected via the RS-232 port click on the **Query** button next to the desired serial port to display the device's name and serial number. Double-click on the device or select it and click on the green **Connect** button.

▌ **ATTENTION!** Before the device is connected via the local RS-232 port, make sure that **Control mode** and **LW3 protocol** are set on the serial port. Furthermore, the RS-232 port must be free and other serial connection must not be established to the device over that port.

5.3.3. Further Tools

The **Tools** menu contains the following options:

- ▪ **Log Viewer:** The tool can be used for reviewing log files that have been saved previously.
- ▪ **Create EDID:** This tool opens the Easy EDID Creator wizard, which can be used for creating unique EDIDs in a few simple steps. Functionality is the same as the Easy EDID Creator.
- ▪ **Demo Mode:** This is a virtual MX-FR17 matrix router with full functionality built into the LDC. Functions and options are the same as that of a real MX-FR17 device.
- ▪ **Bulk Management**: This tool allows changing the network settings of several devices at once. See the details in the next section.

The **Terminal** window is also available by pressing its button on the bottom.

5.4. Bulk Device Management

It is possible to configure several devices at once with the Bulk Device Management tool. This feature can be accessed by clicking on the Tools button in the bottom left corner of the Device Discovery window and choosing the Bulk Management option. *#new*

Tools
Log Viewer
Create EDID
Demo mode
Bulk Management
Tools

DIFFERENCE: This function is available from the firmware version v2.6.0b6 of the LDC and v1.3.1b2 of the UMX-HDMI-140-Plus devices.

ATTENTION! Bulk Device Management is only available for UMX-HDMI-140-Plus devices.
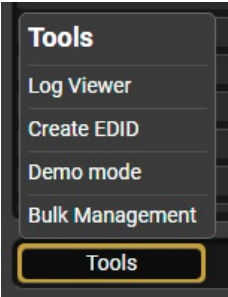
5.4.1. Network Settings

It is possible to set the network settings of several devices at once by using a .csv file that contains the list of the devices that we need to configure, then uploading it into the LDC.

Please note that if the data in the file is missing or incorrect, then the discovery of the affected device will fail and an '**Invalid data**' message will be displayed in the State column. In case of an IP or MAC address conflict, the message is '**Duplicated**'.

Changing the network settings can be done in a few easy steps:

Step 1. First alter the settings you need to change in the .csv file that contains the devices. You can use a template file accessible via the **Export template** button and saving the file to your computer, then filling it out with the parameters of the devices. The file contains the MAC address, Partnumber, DHCP status, IP address, Netmask, Gateway, Hostname and Device label of each device.

Step 2. Upload the .csv file into the LDC by pressing the **Choose network file** button and browsing the file in the pop-up window. This will result in a list of the devices appearing on the screen.

Step 3. Finally, press the **Apply settings** button to execute the changes. This might take up to a minute to finish.

Message	DHCP enabled	DHCP disabled	Device discovered
✅ **All Done**	Successful procedure		✔
❌ **Partly Done**	Failure setting the Host name and/or the Device label		✖
Unavailable device	Host name **and** Device label missing	IP address, Network, **and/or** Gateway missing	✖
Failed	Host name **and** Device label incorrect	IP address, Network **and** Gateway incorrect	✔
IP mismatch	-	Host name **and** Device label incorrect	✖

ATTENTION! The '**Failed**' and '**IP mismatch**' status indicators are not common, they appear when the multicast and/or the port used for LMDMP connection is disabled, or if the firmware version of the device is below the recommended (see the pop-up window when opening the Bulk Management or the beginning of this chapter).

5.5. Crosspoint Menu

When LDC finds the hardware, it determines the product type, and the LDC starts with the default page, showing the Crosspoint menu. *#crosspoint #switch*
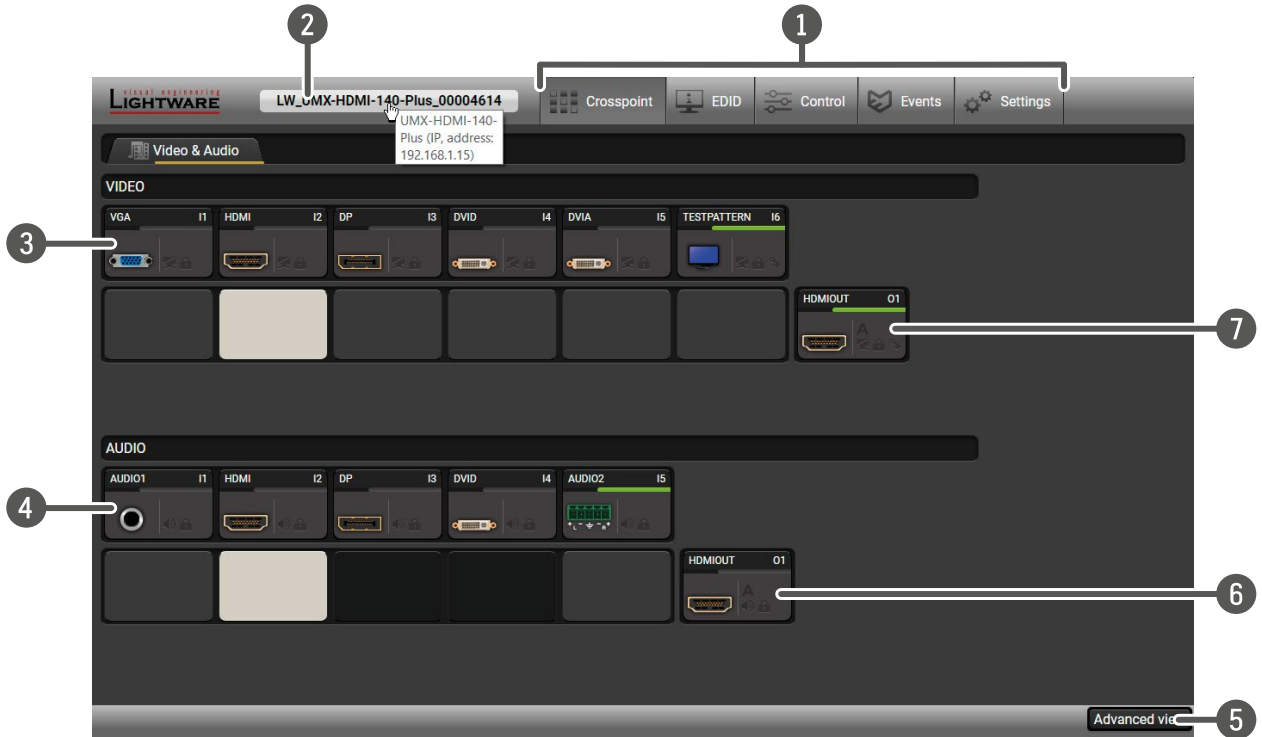
①	**Main menu**	The available menu items are displayed. The active one is showed with dark grey background color.
②	**Information ribbon**	The label shows the device label, which can be edited in the Settings menu - Status tab. Device discovery window can be displayed by clicking on this ribbon. Hover the mouse cursor over the information ribbon; the product name and the IP address will appear as a tooltip text.
③	**Video input ports**	Each tile represents a video input port. The tile below the port shows the current crosspoint setting; if the port is switched to the output, the color of the tile is white, otherwise grey.
④	**Audio input ports**	Each tile represents an audio input port. The tile below the port shows current crosspoint setting; if the port is switched to the output, the color of the tile is white, otherwise grey. Dark grey means the audio port is not allowed to be embedded in the current video input port.
⑤	**Advanced view**	Displaying Advanced View Window, showing the Terminal window and the LW3 protocol tree.
⑥	**Audio output**	The audio output of the HDMI out port. Clicking on the tile opens the Port Properties Windows.
⑦	**Video output**	The video output of the HDMI out port. Clicking on the tile opens the Port Properties Windows.

Port Tiles

The colors of the port tiles and the displayed icons represent different states and information:

1. Port name
2. Port symbol
3. Port number
4. Signal present indicator
   - **green:** present
   - **grey:** not present
5. State indicators
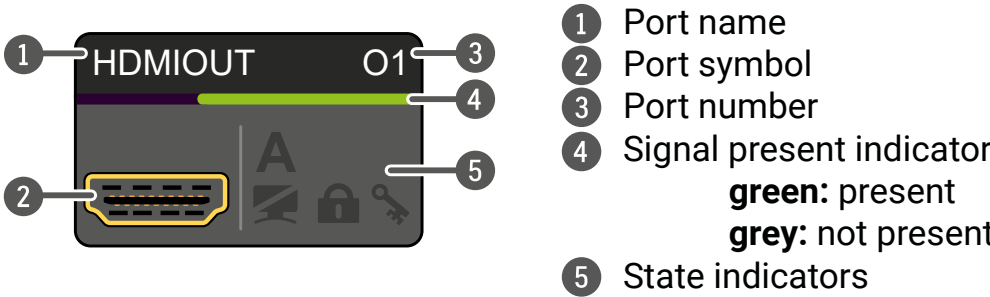
State Indicators

The following icons display different states of the port/signal:

Icon	Icon is grey	Icon is black	Icon is green
🔑	Signal is not encrypted with HDCP	Signal is encrypted with HDCP	-
📺	Port is unmuted	Port is muted	-
🔒	Port is unlocked	Port is locked	-
A	Autoselect is disabled	-	Autoselect is enabled

5.6. Port Properties Windows

Clicking on the port tile opens the Port properties window. This section shows the available settings and status information by port types.

5.6.1. Analog Video Inputs

Port properties windows of VGA and DVI-A input ports provide similar settings and status information: *#vga #analogvideo #mute #unmute #lock #unlock #portstatus*
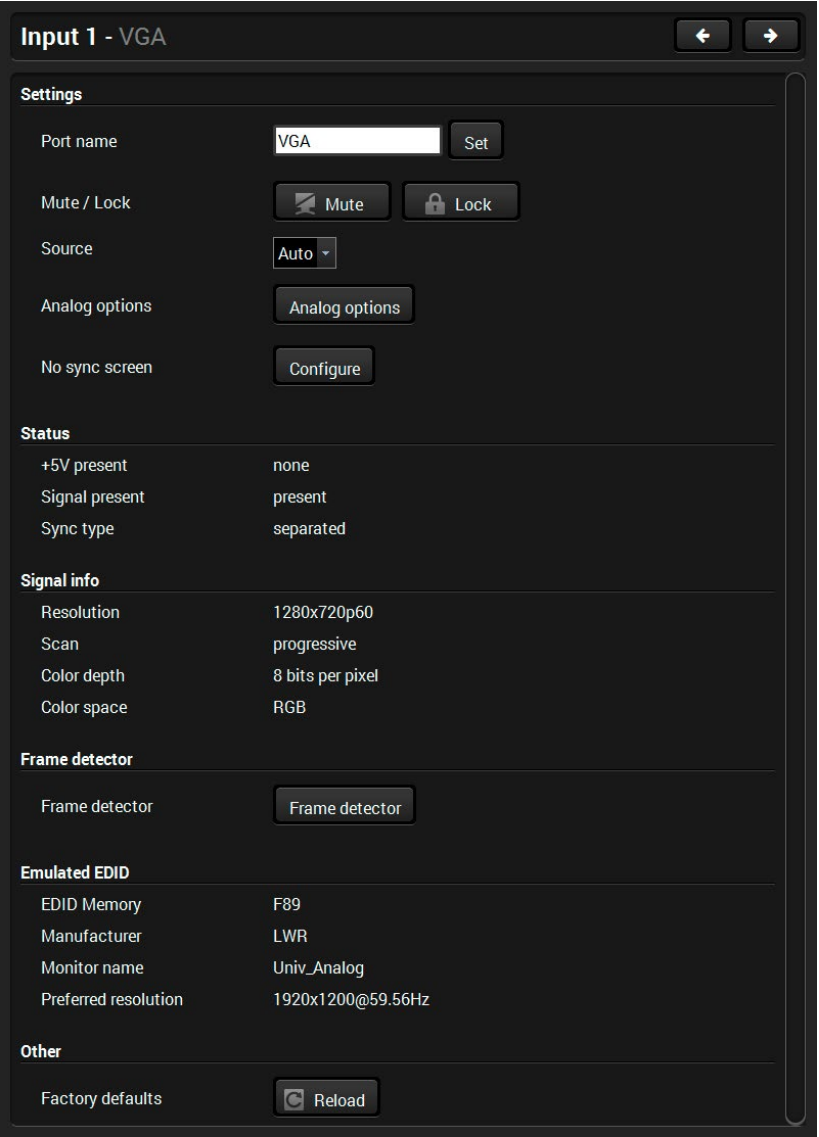
Port properties window of the VGA video input

Available settings:

- ▪ Mute/unmute the port;
- ▪ Lock/unlock the port;
- ▪ Source: Auto / RGB / YUV;
- ▪ Analog options, see the details below;
- ▪ No sync screen: configuration settings of the test pattern; see details in the Test Pattern section;
- ▪ Frame Detector;
- ▪ Reload factory default settings for the selected port.

Analog Options

Analog video signals are digitized on the input. The timing parameters can be adjusted here if needed. Timing presets can be saved for each resolution separately. The user has 32 user presets to store different timing data.
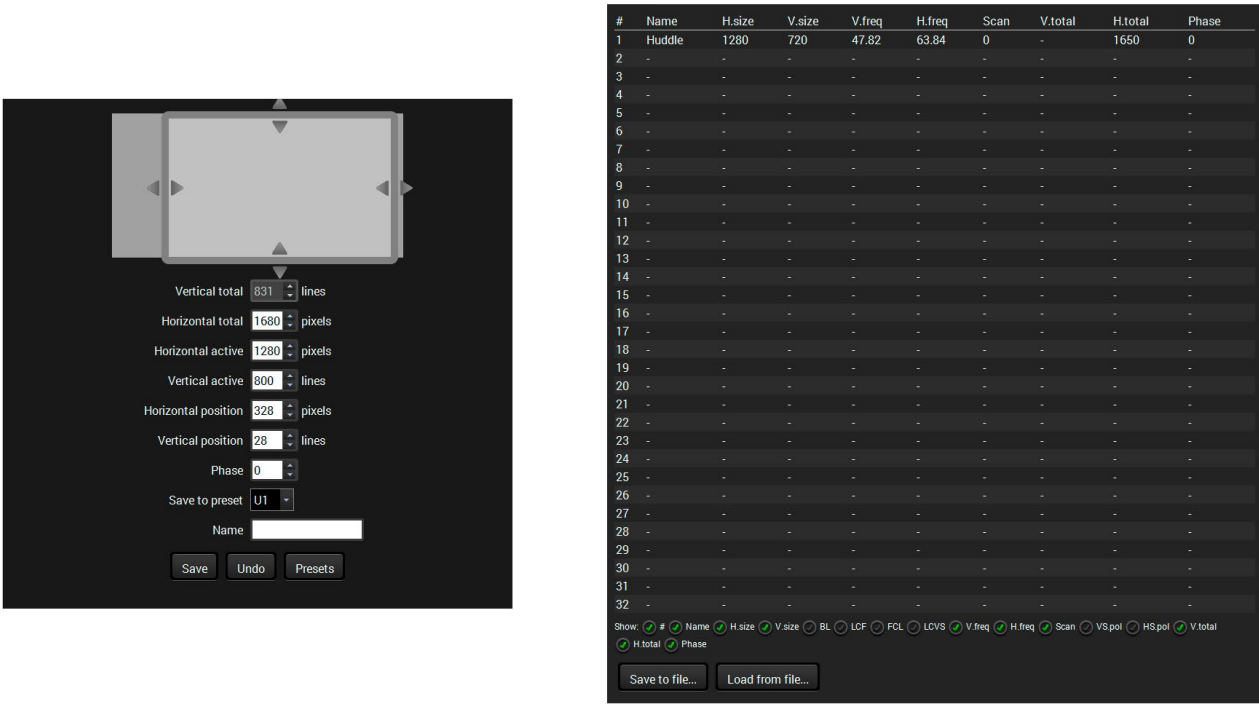
Analog options and Presets windows in LDC

5.6.2. Digital Video Inputs

Clicking on the HDMI, DisplayPort, or DVI-D input port icon opens the Port properties window. The most important information and settings are available from the panel. *#mute #unmute #lock #unlock #portstatus*

Port properties window of the DVI-D video input

Available settings:

- ▪ Mute/unmute the port;
- ▪ Lock/unlock the port;
- ▪ HDCP setting (enable / disable);
- ▪ No sync screen: configuration settings of the test pattern; see details in the Test Pattern section.
- ▪ Frame Detector;
- ▪ Reload factory default settings for the selected port.

5.6.3. Analog Audio Inputs

Port properties window of the AUDIO2 (Phoenix) input

Certain parameters of the analog audio input signal can be set as follows: *#analogaudio #volume #balance #mute #unmute #lock #unlock #portstatus*

- Mute/unmute the port;
- Lock/unlock the port;
- Volume: from 0 dB to -52 dB (step 0.25 dB), from -54 dB to -66 dB (step 2 dB); -69 dB; -72 dB; -78 dB (default is 0 dB)
- Balance: from 0 to 100, step 1 (default is 50 = center)
- Reload factory default settings for the selected port.

5.6.4. Digital Audio Inputs
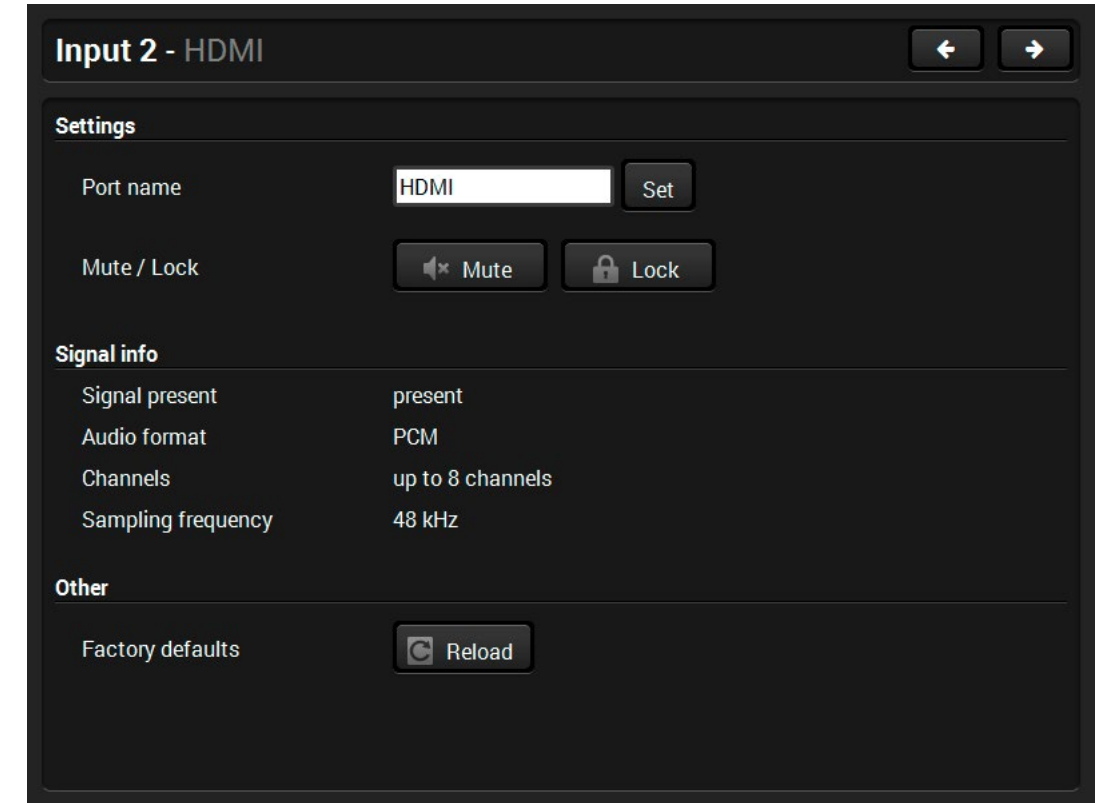
Port properties window of the HDMI audio input

Certain parameters of the embedded audio input signal can be set as follows: *#mute #unmute #lock #unlock #portstatus*

- Mute/unmute the port;
- Lock/unlock the port;
- Reload factory default settings for the selected port.

5.6.5. Video Output

Click on the output port to display its properties. The most important information and settings are available from the panel. #mute #unmute #lock #unlock #autoselect #colorspace #power5v #hdcp #signaltype #portstatus
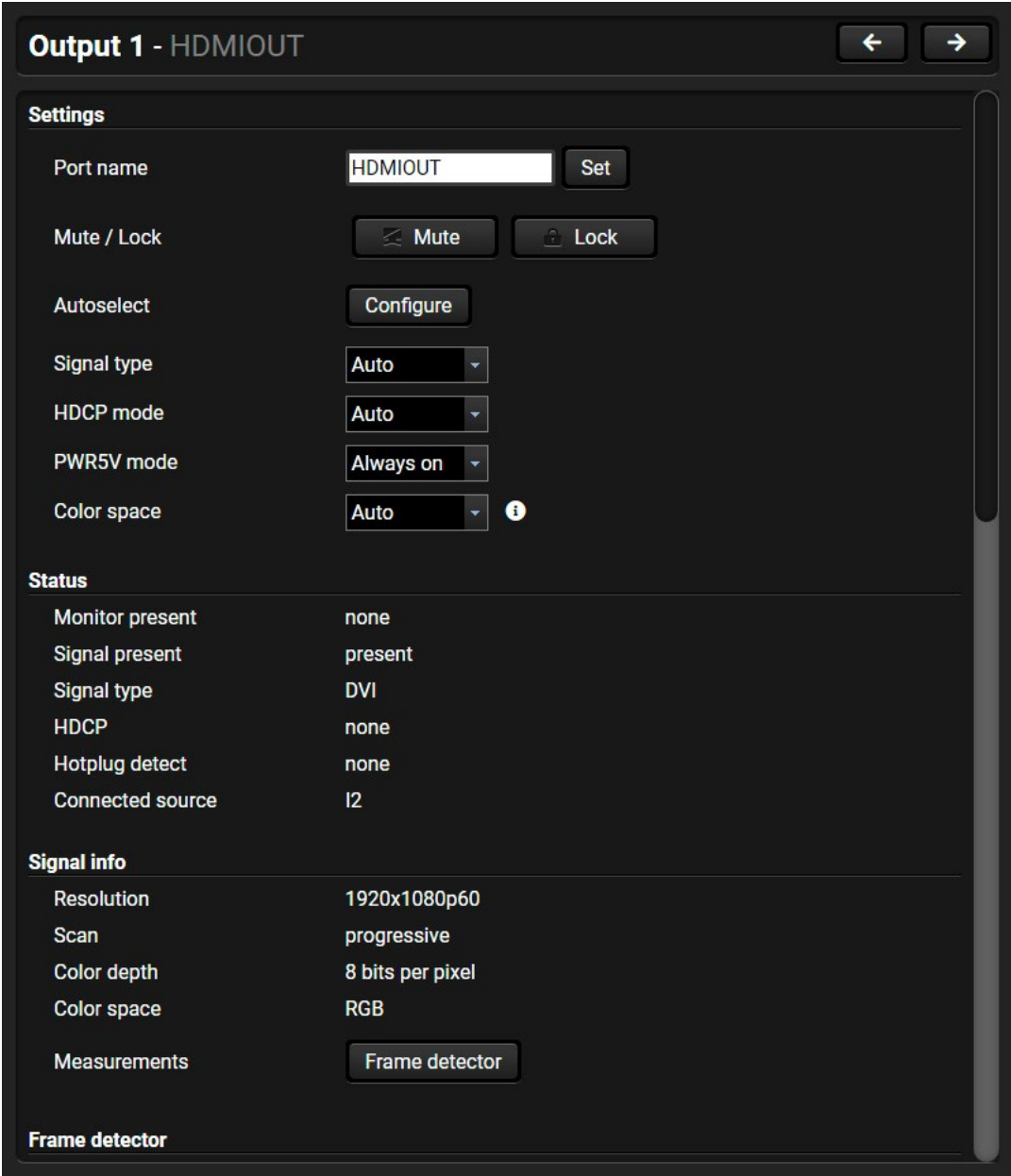
Port properties window of the HDMI video output

Available settings:

- ▪ Mute/unmute the port;
- ▪ Lock/unlock the port;
- ▪ **Autoselect settings**: enable / disable, mode, and priorities. (See more details about Autoselect feature in the The Autoselect Feature section);
- ▪ **Signal type**: Auto / DVI / HDMI 24 bit / HDMI 30 bit / HDMI 36 bit - The outgoing signal format can be selected by a drop-down menu;
- ▪ **HDCP mode**: Auto / Always - The switcher forces the source sent the signal without encryption if the content allows when Auto mode is selected;
- ▪ **Power 5V mode**: Auto / Always on / Always off - The setting lets the source and the sink devices be connected – independently from the transmitted signal;
- ▪ **Color space**: Auto / RGB / YCbCr 4:4:4 / YCbCr 4:2:2 - The outgoing signal color space can be selected by a drop-down menu;
- ▪ **Connected source** #new
- ▪ Frame Detector;
- ▪ Reloading factory default settings for the selected port.

Only in case of UMX-HDMI-140-Plus model:

- ▪ **CEC:** See more details about the CEC feature in CEC (on HDMI Ports) section.

5.6.6. Audio Output

Certain parameters of the digital audio output signal can be set as follows: *#portstatus #mute #unmute #lock #unlock #autoselect*
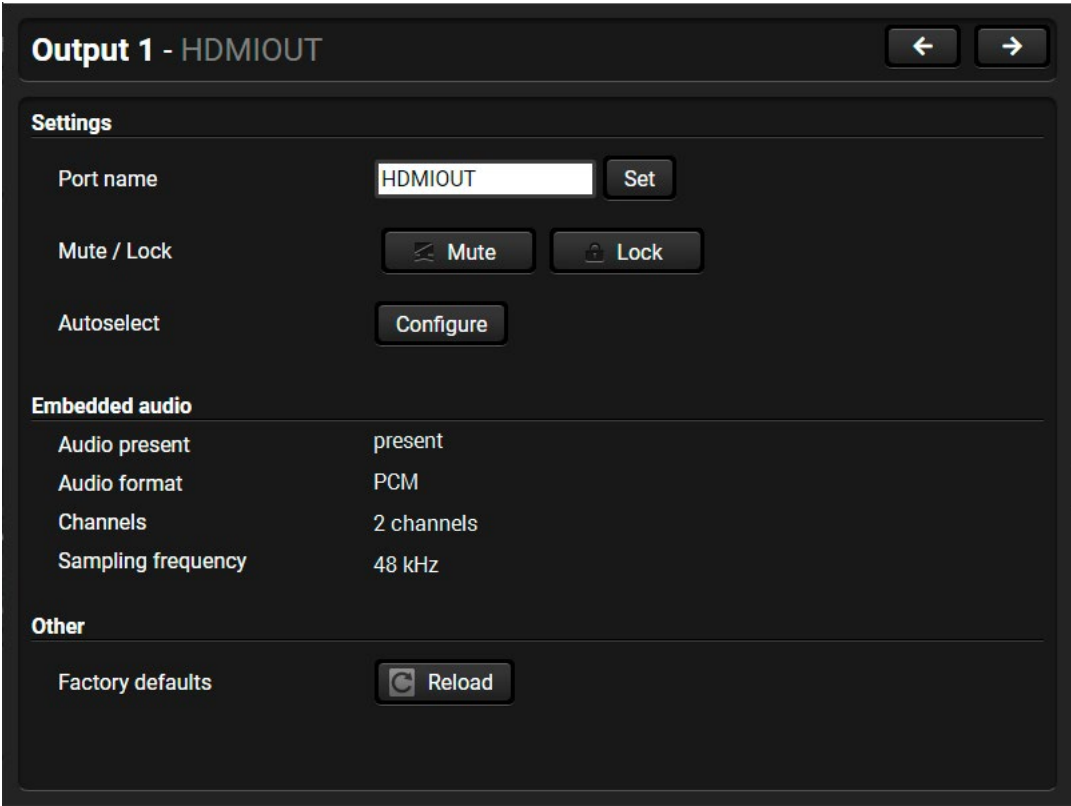
Port properties window of the HDMI audio output

Available settings:

- Mute/unmute the port;
- Lock/unlock the port;
- **Autoselect settings**: enable / disable, mode, and priorities. (See more details about Autoselect feature in the The Autoselect Feature section);
- Reload factory default settings for the selected port.

5.7. Diagnostic Tools

5.7.1. Frame Detector

The ports can show detailed information about the signal like full size and active video resolution. This feature is a good troubleshooter if compatibility problems occur during system installation. To access this function, open the port properties window and click on **Frame detector** button. *#diagnostic framedetector*
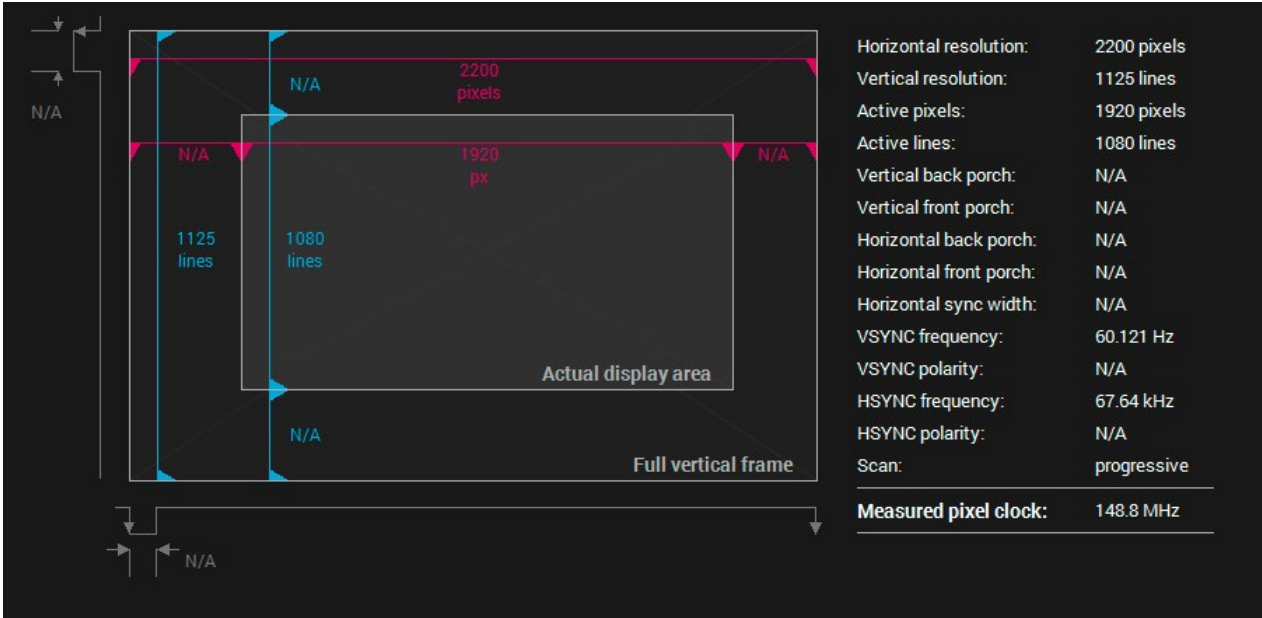
Frame detector window

Lightware's Frame Detector function works like a signal analyzer and makes possible to determine the exact video format that is present on the port, thus helps to identify many problems. E.g. actual timing parameters may differ from the expected and this may cause some displays to drop the picture.

Frame Detector measures detailed timings on the video signals just like a built-in oscilloscope, but it is much easier to use. The actual display area shows the active video size (light grey). The dark grey area of the full frame is the blanking interval, which can contain the info frames and embedded audio data for HDMI signals. Shown values are measured directly on the signal and not retrieved only from the HDMI info frames.

5.7.2. Test Pattern

The port generates an image that can be displayed when there is no incoming signal on the port. Each port can have individual settings, which can be set by clicking on the **Configure** button. *#testpattern #nosyncscreen*

Port properties window of the Test pattern input

Test Pattern Configuration on Testpattern Port (I6)

Resolution:	Set the desired image resolution from the drop-down menu.	
Color:	Click on the desired color or use the sliders and press the **Set color** button to store.	

Test Pattern Configuration on Video Input Ports

Mode:	**Auto:**	No sync screen signal is sent when there is no incoming signal.
	Always on:	No sync screen signal is sent always, independently from the incoming signal.
	Always off:	No signal is sent when there is no incoming signal.
Resolution:	Set the desired image resolution from the drop-down menu.	
Color:	Click on the desired color or use the sliders and press the **Set color** button to store.	

5.8. CEC (on HDMI Ports)

▌ **DIFFERENCE:** This feature is available only in **UMX-HDMI-140-Plus** model.

UMX-HDMI-140-Plus model is able to send and receive Consumer Electronics Control (CEC) commands. This feature is for remote control of the source or sink device. CEC is a bi-directional communication via an HDMI cable, in this case between the output port of the switcher and the sink. *#cec*
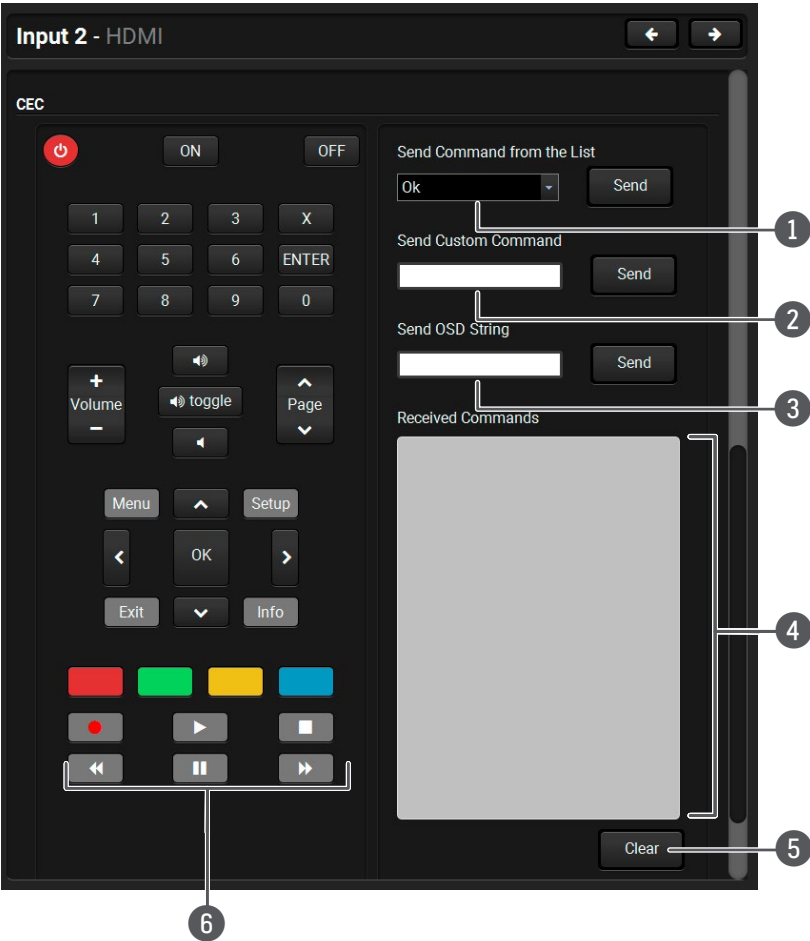
Layout of CEC panel in Lightware Device Contoller

▌ **ATTENTION!** It can occur that the third-party device can receive, but not execute the command because it is not supported by the product. Check the accepted commands in the documentation of the device.

▌ INFO: The first 2x2 bytes of the CEC commands contains identification data of the source and destination address. When the port is input, it is always 04 (from TV to Playback device 1.); when the port is output, it is always 40 (from Playback device 1. to TV).

① **Drop-down command list** — This list contains the basic CEC commands, most of them are displayed on the graphical interface, too (on the left side). Click on the **Send** button to send the command.

② **Custom command textbox** — The text field is for sending hexadecimal commands to the source. The maximum length of the message could be 30 characters (15 bytes). Click on the **Send** button to send the command.

③ **OSD string textbox** — A max. 14-character-long text can be shown on the sink device. The send OSD (On-screen display) command textbox is the input field of the string. Alphanumeric characters, glyphs and space are accepted. Click on the **Send** button to execute the command.

④ **Received Command box** — Displays all the sent CEC commands (in red) and the received answers (in blue) with a timestamp.
Legend of the received message:
< [10:33:17] ACK
Answer for the acknowledged command.
< [10:35:01] NACK
Answer for the not acknowledged command.
< [10:33:17] IN PROGRESS
The command is in progress at the moment.
< [10:33:17] FAILED
Answer for other failure.
< [10:35:40] feature_abort_<*>
This is the most common answer from the third-party devices when the command is delivered, but the execution is refused. The cause of the refusal stands after 'feature_abort' expression.

⑤ **Clear button** — Click on the **Clear** button to erase the content of the terminal window.

⑥ **CEC command button panel** — This panel provides quick and easy management of CEC commands. These buttons are pre-programmed with basic functions and send commands towards the sink. The communication is displayed in the Received Command box. For the list of the commands, see the Sending CEC Commands section. Both the layout and functionality are similar to the design of a remote control.

▌ **ATTENTION!** Make sure that the controlled unit is CEC-capable and this function is enabled.

5.9. EDID Menu

Advanced EDID Management can be accessed by selecting the EDID menu. There are two panels: the left one contains the Source EDIDs, the right one contains the Destination places where the EDIDs can be emulated or copied. *#edid*
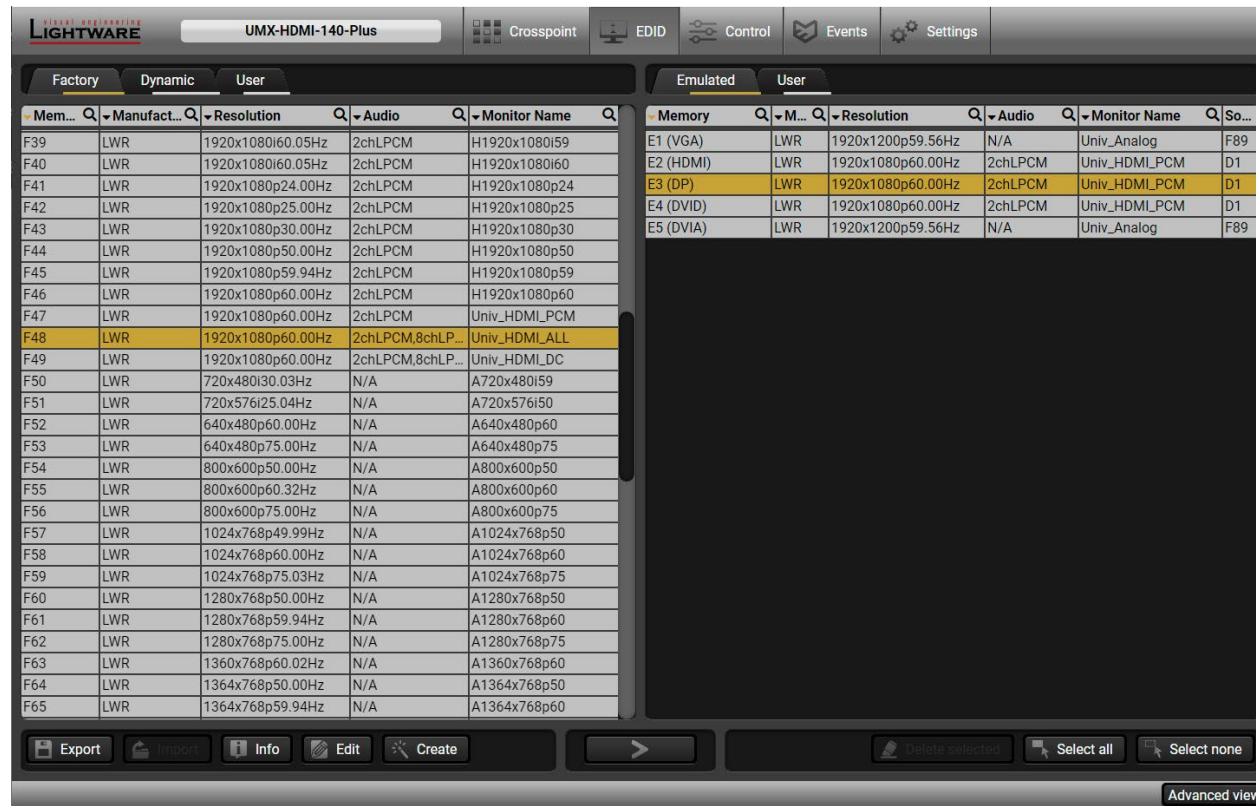
EDID Menu

Control Buttons

Export	Exporting an EDID (save to a file)	>	Transfer button: executing EDID emulation or copying
Import	Importing an EDID (load from a file)	Delete selected	Deleting EDID (from User memory)
Info	Display EDID Summary window	Select all	Selecting all memory places in the right panel
Edit	Opening Advanced EDID Editor with the selected EDID	Select none	Selecting none of the memory places in the right panel
Create	Opening Easy EDID Creator		

5.9.1. EDID Operations

Changing Emulated EDID

Step 1. Choose the desired **EDID list** on the source panel and select an **EDID**.

Step 2. Press the **Emulated** button on the top of the Destination panel.

Step 3. Select the desired **port** on the right panel (one or more ports can be selected); the EDID(s) will be highlighted in yellow.

Step 4. Press the **Transfer** button to change the emulated EDID.

Learning an EDID

The process is the same as changing the emulated EDID; the only difference is the Destination panel: press the **User** button. Thus, one or more EDIDs can be copied into the user memory either from the factory memory or from a connected sink (Dynamic).

Exporting an EDID

> **ATTENTION!** This function is working on Windows and macOS operating systems and under Firefox or Chrome web browsers only.

Source EDID can be downloaded as a file (*.bin, *.dat or *.edid) to the computer.

Step 1. Select the desired **EDID** from the Source panel (line will be highlighted with yellow).

Step 2. Press the **Export** button to open the dialog box and save the file to the computer.

Importing an EDID

Previously saved EDID (*.bin, *.dat or *.edid file) can be uploaded to the user memory:

Step 1. Press the **User** button on the top of the Source panel and select a **memory** slot.

Step 2. Press the **Import** button below the Source panel.

Step 3. Browse the file in the opening window then press the **Open** button. Browsed EDID is imported into the selected User memory.

> **ATTENTION!** The imported EDID overwrites the selected memory place even if it is not empty.

Deleting EDID(s)

The EDID(s) from User memory can be deleted as follows:

Step 1. Press **User** button on the top of the Destination panel.

Step 2. Select the desired **memory** slot(s); one or more can be selected ("Select All" and "Select None" buttons can be used). The EDID(s) will be highlighted with yellow.

Step 3. Press the **Delete selected** button to delete the EDID(s).

5.9.2. EDID Summary Window

Select an EDID from Source panel and press **Info** button to display EDID summary.

 Info

EDID Summary Window

5.9.3. Editing an EDID

Select an EDID from Source panel and press Edit button to display Advanced EDID Editor window. The editor can read and write all descriptors that are defined in the standards, including the additional CEA extensions. Any EDID from the device's memory or a saved EDID file can be loaded into the editor. The software resolves the raw EDID and displays it as readable information to the user. All descriptors can be edited, and saved in an EDID file, or uploaded to the User memory. For more details about EDID Editor, please visit our website (www.lightware.com) and download the EDID Editor Application Notes.

 Edit

EDID Editor Window

5.9.4. Creating an EDID - Easy EDID Creator

Since the Advanced EDID Editor mentioned above needs more complex knowledge about EDID, Lightware introduced a wizard-like interface for fast and easy EDID creation. With Easy EDID Creator it is possible to create custom EDIDs in four simple steps. By clicking on the **Create** button below Source panel, **Easy EDID Creator** is opened in a new window. For more details about EDID Editor, please visit our website (www.lightware.com) and download the EDID Editor Application Notes.
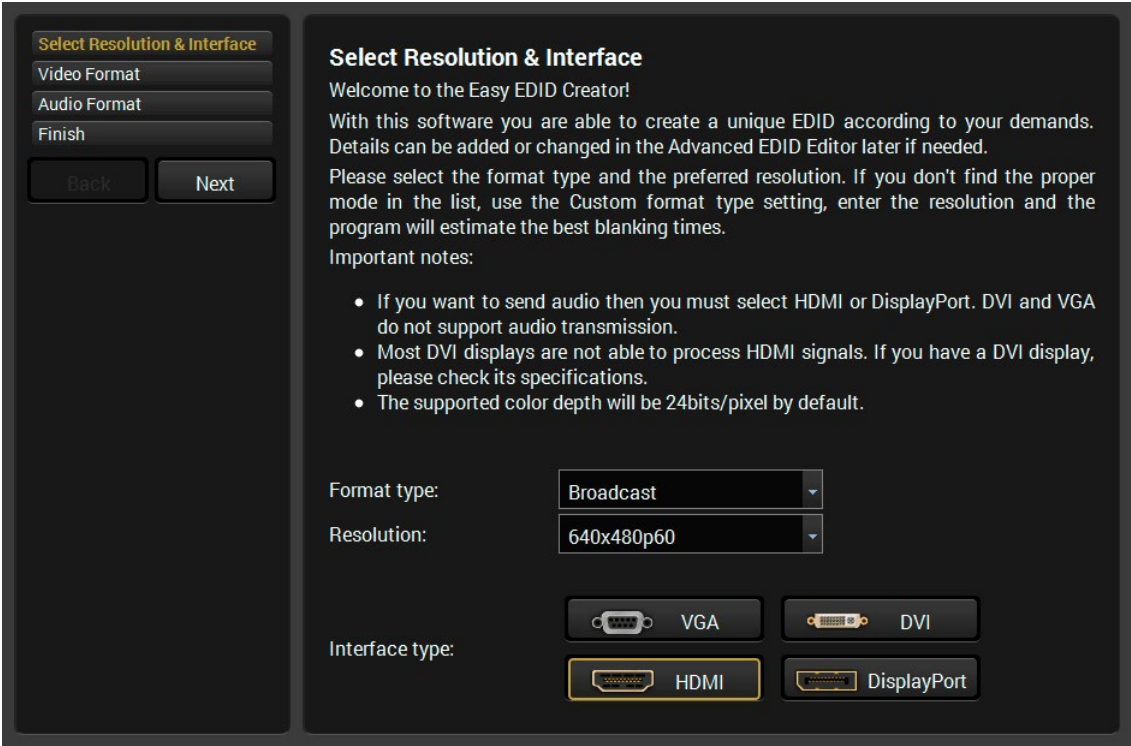
EDID Creator Window

5.10. Control Menu

5.10.1. RS-232
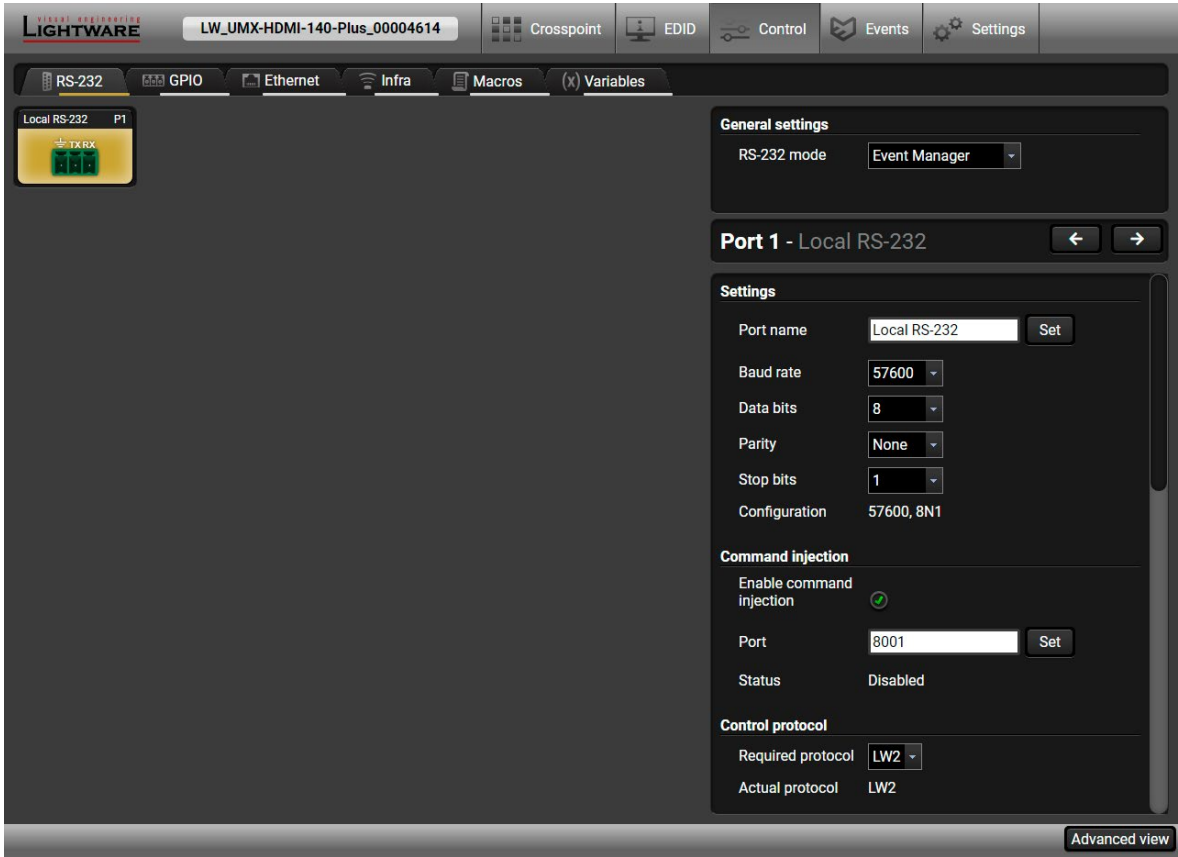
RS-232 tab in the Control menu

The following settings and functions are available on the local RS-232 port: *#serial #rs232 #rs-232 #protocol*

- ▪ Operation mode: Control, Command Injection, or Event Manager (for more details about serial interface modes see the Serial Interface section); *#commandinjection*
- ▪ Baud rate: 4800, 7200, 9600, 14400, 19200, 38400, 57600, 115200;
- ▪ Data bits: 8 or 9;
- ▪ Parity: None, Odd, or Even;
- ▪ Stop bits: 1, 1.5, or 2;
- ▪ Command injection: enable or disable;
- ▪ Command injection port number;
- ▪ Control protocol: LW2 or LW3;
- ▪ Message Recognizer
- ▪ Message sending via serial port;
- ▪ Reloading factory defaults (see factory default settings in the Factory Default Settings section).

5.10.2. Message Recognizer

DIFFERENCE: This feature is available only in UMX-HDMI-140-Plus model.

UMX-HDMI-140-Plus model can analyze and store the received serial data. For more information, see the RS-232 Recognizer section.

Put a tick to **Enable message recognizer on this port** to switch the recognizer on.

Delimiter sequence text box is for set the delimiter string in hex format. When this string is detected in the incoming serial data, the device saves the RS-232 message data from the first bit, until the delimiter (or the data between the two delimiters).

INFO: 0D0A is the factory default value, this is the hexadecimal code of Carriage Return and Line Feed. LW3 protocol commands ended with this formula, so the default value support the recognition of the LW3 commands and the stored changes automatically.

If the **Timeout** is enabled and set, the received data is saved when the timeout has passed after the last received message.

In **Received messages** box shows the last received and stored message in Text (RECOGNIZER.Rx), Hex (RECOGNIZER.RxHex), and Hash (RECOGNIZER.Hash) format. The Hex and Hash contains the delimiter.

Press the **Clear** button to erase this storage. *#rs232recognizer #rs-232recognizer #recognizer #message*

Clicking on **Reload** restores the Factory Default Settings of the recognizer.

INFO: Message recognizer operates independently of the RS-232 mode.

Configuration Example for the Message Recognizer

The detailed description below shows how to configure the message recognizer in RS-232 Recognizer Example.

When the UMX-HDMI-140-Plus has an active video signal, the switcher logs into the VC codec automatically.

The signal presence triggers a bi-directional communication with the VC codec via RS-232:

Step 1. Turn on the recognizer: Enable it on the P1 serial port.

Step 2. Set the delimiter (in hex format). In this case, the delimiter character is '**:**', which is '**3a**' in hex format. When the delimiter string is detected in the incoming serial data, the serial message is stored in string (in Rx and ActiveRx property), hex (in RxHex and ActiveHex property) and hash (in Hash and ActiveHash property) format. This stored content can be set as a condition in the event manager.

Delimiter (hex format: 3A)

… Password : Login name : …

Stored string

INFO: The stored content is the incoming data which arrives **before** the delimiter or **between** the two delimiters.

Step 3. Set the Active timeout to 100. This property is responsible for erasing the temporary storage (ActiveRx, ActiveRxHex, ActiveHash) after the elapsing time. In the example below, it can be seen how the recognizer properties change during the communication:

▸ UMX-HDMI-140-Plus: **PING**

Rx	RxHex	Hash	ActiveRx	ActiveRxHex	ActiveHash

◂ VC codec: **Login:**

Rx	RxHex	Hash	ActiveRx	ActiveRxHex	ActiveHash
Login:	4C6F67696E3A	2D8A5E38	Login:	4C6F67696E3A	2D8A5E38

▸ UMX-HDMI-140-Plus: **Admin**

Active timeout has passed, so the values of the Active- prefixed properties are deleted.

Rx	RxHex	Hash	ActiveRx	ActiveRxHex	ActiveHash
Login:	4C6F67696E3A	2D8A5E38			

◂ VC codec: **Password:**

Rx	RxHex	Hash	ActiveRx	ActiveRxHex	ActiveHash
Password:	50617373776F72643A	79059B26	Password:	50617373776F72643A	79059B26

▸ UMX-HDMI-140-Plus: **Admin**

Active timeout has passed, so the values of the Active- prefixed properties are deleted.

Rx	RxHex	Hash	ActiveRx	ActiveRxHex	ActiveHash
Password:	50617373776F72643A	79059B26			

5.10.3. GPIO

GPIO tab in the Control menu

The GPIO port has 7 pins that operate at TTL digital signal levels and can be controlled by LDC or protocol commands. Select a GPIO pin and under the Port settings section; the settings (pin direction and input level) are displayed on the port tiles as well: *#gpio*

1	GPIO pin name	**5**	Pin direction:
2	GPIO port icon		**Input:** down arrow
3	Low level indicator		**Output:** up arrow
4	High level indicator *	**6**	GPIO port number
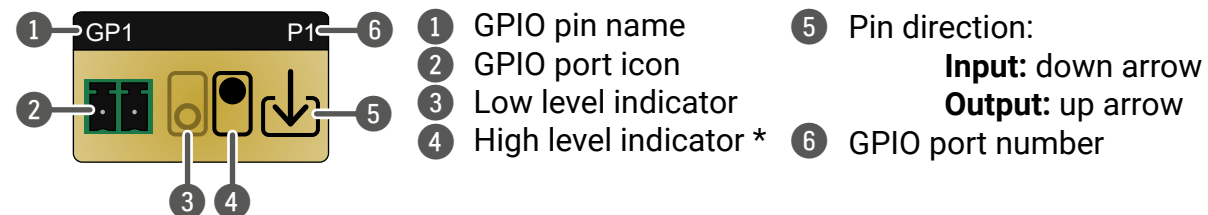
* Black highlight means the current setting.

> INFO: Output level can be set only if the pin direction is set to Output. In case of input direction the output level setting and the Toggle button is not available.

For more details about the GPIO interface, see the GPIO Interface section.

5.10.4. Ethernet
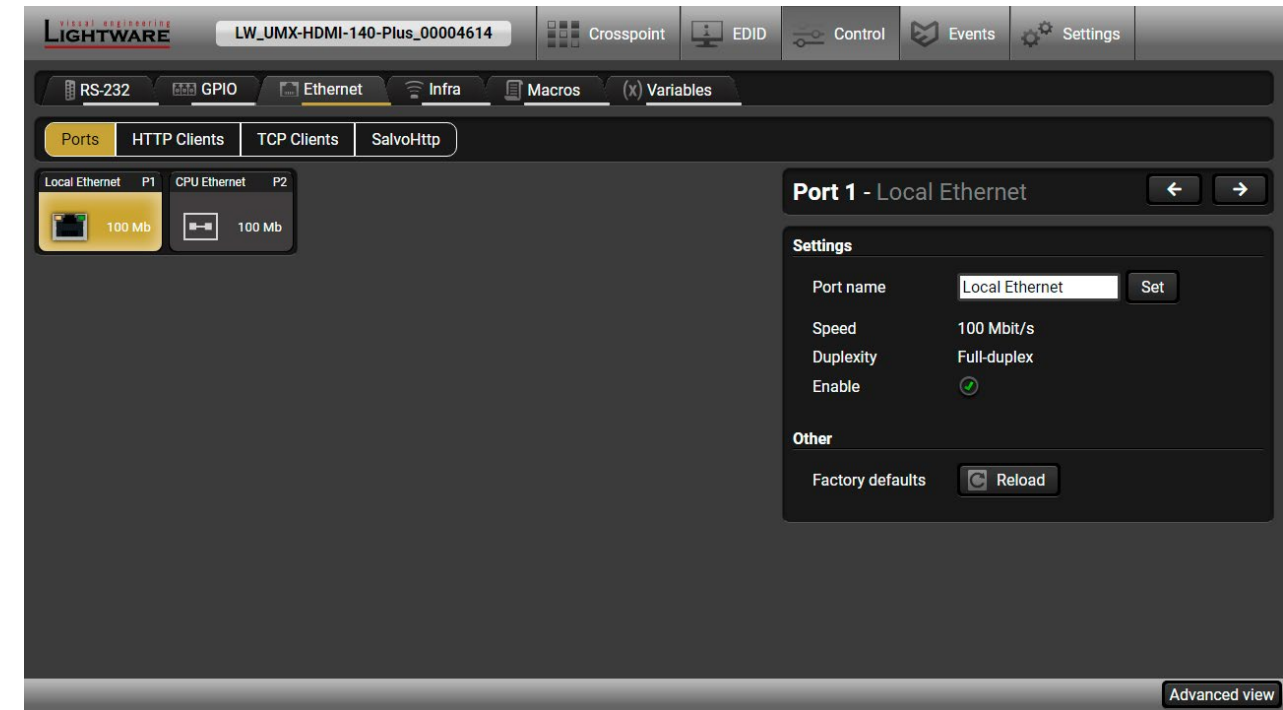
Ethernet tab in the Control menu

Two ports are displayed in the Ethernet settings: Local and CPU. You can check the status of the Ethernet line by each port: the speed and the duplexity of the connection. *#ethernet*

The following settings are available for the local port:
- Enable / disable the port*;
- Reloading factory defaults.

* CPU Ethernet port cannot be disabled

> **ATTENTION!** If the Ethernet port is set to disabled, this may break the connection with the device.

> INFO: CPU Ethernet port cannot be disabled.

HTTP Clients (HTTP Post and Put Message Sending)

▌ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

▌ **ATTENTION!** This feature means posting or putting **HTTP** messages from the Lightware device to another device. Encrypted transmission (**HTTPS**) is not supported.

The HTTP Clients tab allows sending HTTP post and put messages to the desired server IP:port no. Control commands can be sent to the target device, but it is not suitable for processing the response (e.g. querying a parameter/status) since the response is just an acknowledge (ACK).　*#http*

The feature is available also by LW3 commands, see the HTTP Messaging section.
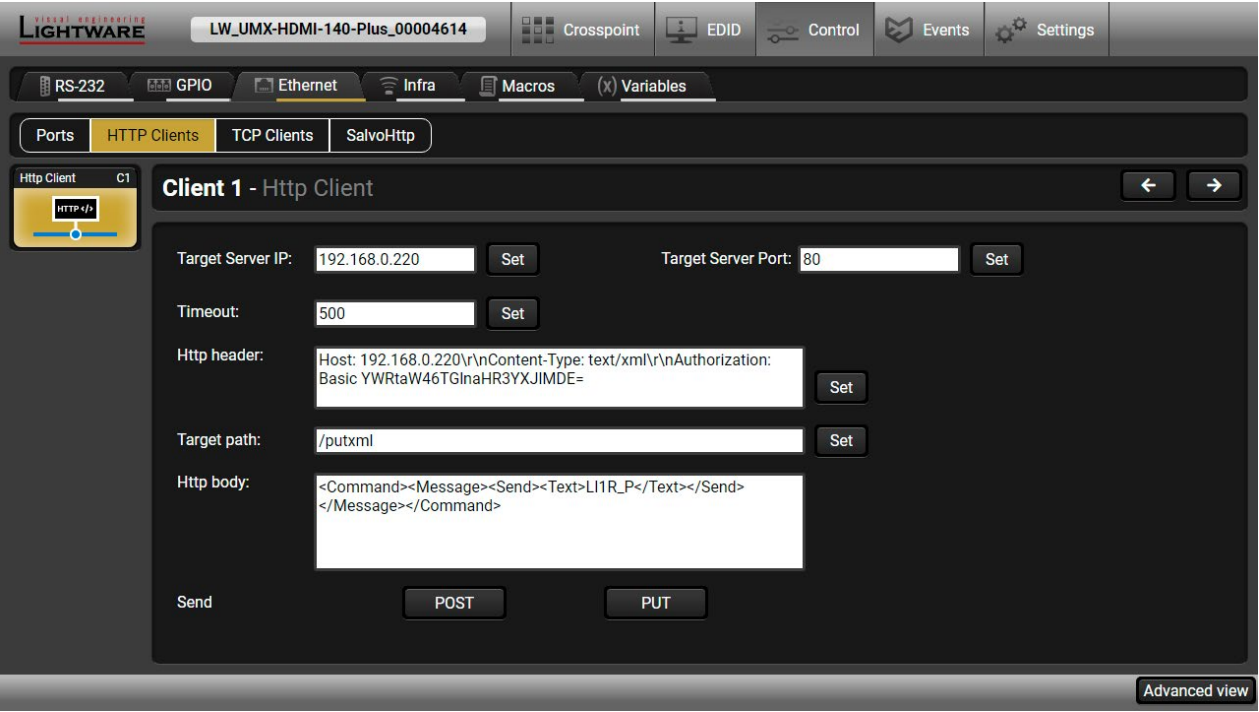
HTTP Clients tab in the Control/Ethernet menu

When you press the enter in the **Http header** or **Http body** text box, the \r\n is added automatically.

#new

TCP Clients (TCP Message Recognizer)

▌ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

This tab is for the preparation and monitoring interface for the TCP recognizer, which may trigger Event Manager Actions. A simple example can be seen in the TCP Message Recognizer section.
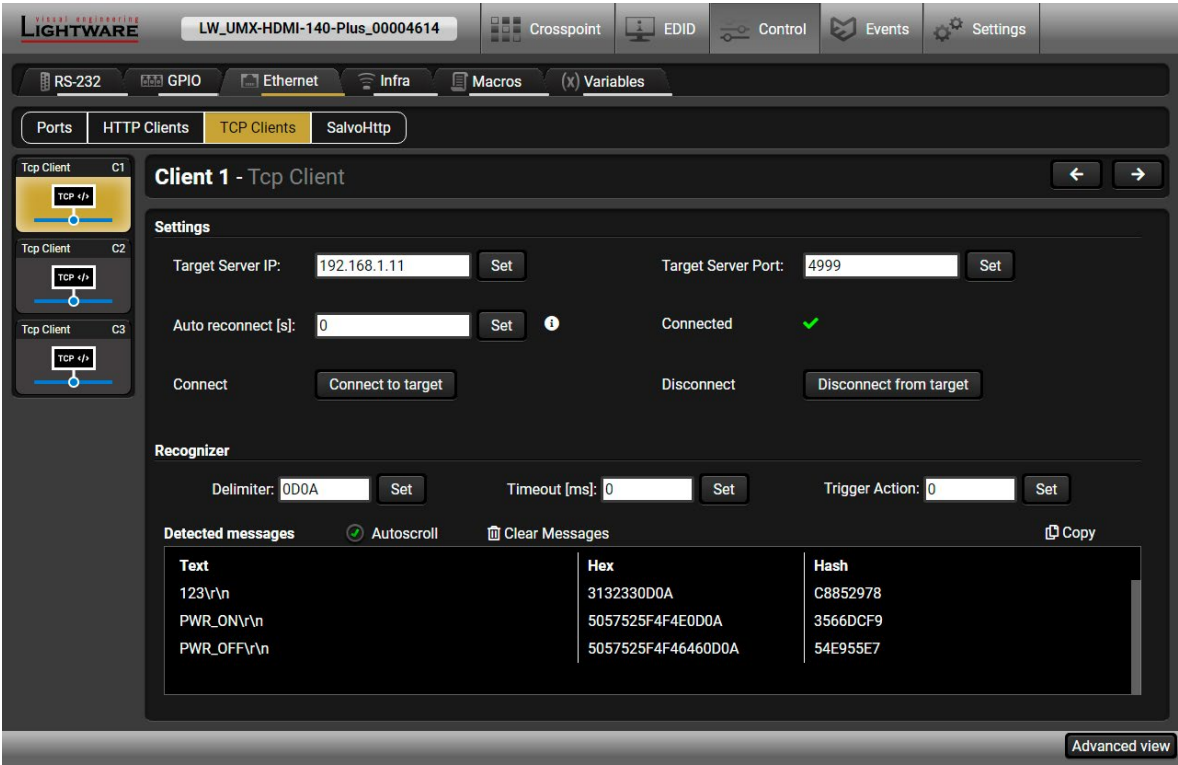
TCP Clients tab in the Control/Ethernet menu

The target device has to be set as a TCP client (three clients can be set):

Step 1. Type and set the **Target IP address**.

Step 2. Type and set the **TCP port number**.

Step 3. Make sure the same **TCP port is opened** and Enabled in the target device.

Step 4. Press the **Connect to target** button.

Step 5. Make the target device send a message and check it in the Detected messages list.

▪ **Auto reconnect:** Numeric value; sets the time (seconds) between the automatic reconnections.
▪ **Delimiter:** When the delimiter hex string is detected in the incoming data, the message is saved from the first bit until the delimiter (or the data between the two delimiters).
▪ **Timeout:** If there is no response within the set time interval (milliseconds), the data that is received from the last delimiter will be accepted.
▪ **Trigger Action:** If data is received that is closed with the recognized delimiter, an Action can be run. Type the number of the Event (without letter 'E').　*#tcprecognizer #message　　#new*

SalvoHttp Status Page (Receiving HTTP Message)

> **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

> **ATTENTION!** This feature means sending **HTTP** messages from an external device to the Lightware device. Encrypted transmission (**HTTPS**) is not supported.

In this case, a batch of commands can be sent over HTTP to the Lightware device for processing. Post the commands to the <IP_address>/protocol.lw3 address and the commands are processed immediately and sequentially. *#http* *#new*

Control commands can be sent to the Lightware device, but it is not suitable for querying a parameter/status, since the LW3 responses are not sent back to the sender.

> **ATTENTION!** If the Cleartext Login (Login Settings) is enabled in the device, the login has to be the first command. No commands will be processed without a successful login. See the syntax in the Cleartext Login Protection section.
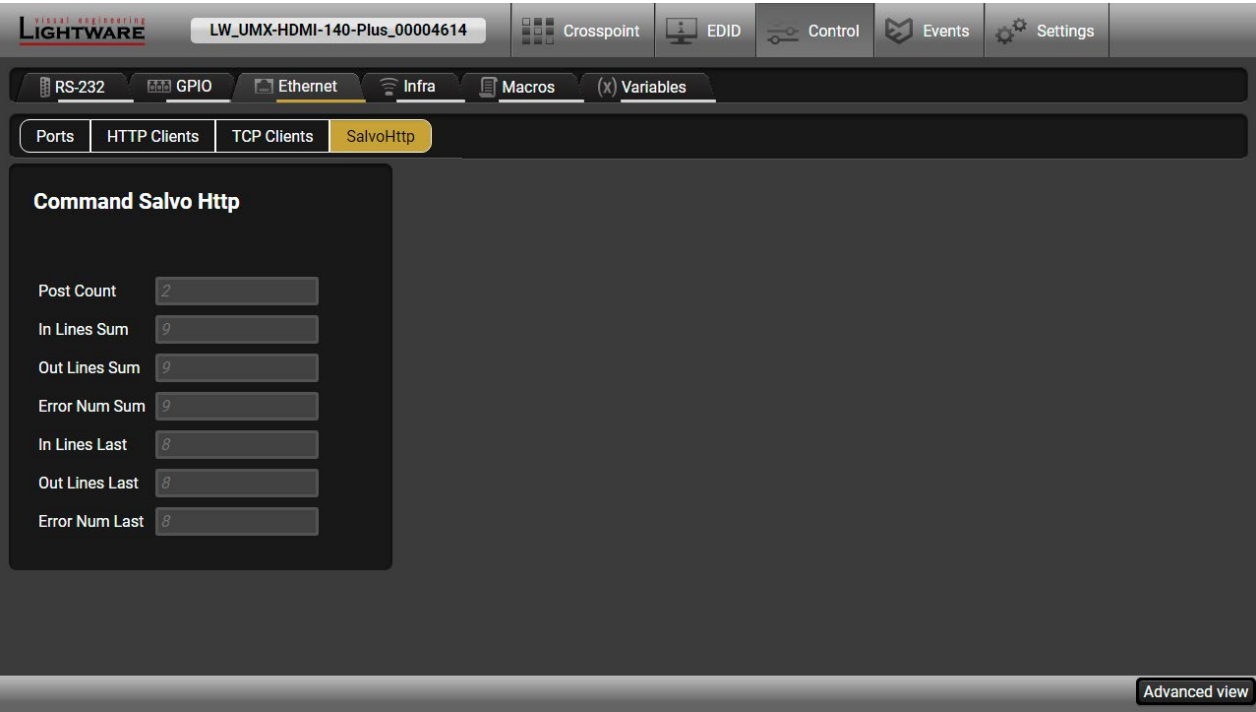
SalvoHttp tab in the Control/Ethernet menu

5.10.5. Infra

ATTENTION! The device has no built-in Infrared receiver and transmitter. For the complete usage, attach an IR emitter unit to the IR OUT and an IR detector unit to the IR IN connectors.

Infra-Red (IR) receiver and transmitter options can be found on this tab. There are three submenus available under it: **IR codes**, **Ports**, and **Clear all IR codes**. *#infra #infrared #ir*

IR Codes

User can set the name of the IR code, the fingerprint (hash), and the repeat timeout in ms, and actions can also be ordered to each IR code.
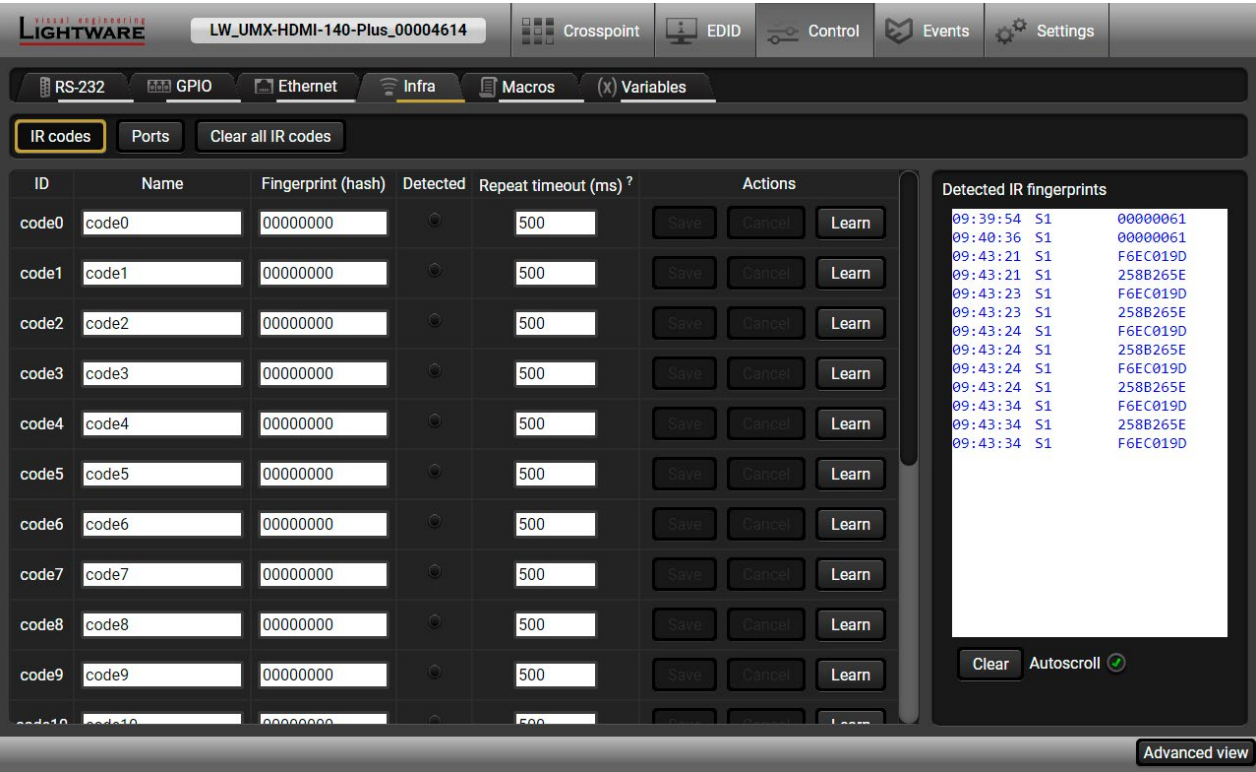
IR codes window in the Control menu

Description	Function
ID	Code number.
Name	You can give an unique name for the desired code.
Fingerprint (hash)	Fingerprint code in pronto hexa format.
Detected	Indicator gives feedback about whether the given IR code is detected currently.
Repeat timeout (ms)	You can set a timeout to avoid the involuntary code recurrence.
Actions	Action buttons for the desired IR code: **Save**: saving the fingerprint. **Cancel**: cancelling the fingerprint. **Learn**: learning the detected IR code.
Detected IR fingerprints	You can check the detected IR codes in this panel. Pushing the **Clear** button deletes all current fingerprints and you can switch the automatic scrolling on or off with the **Autoscroll** option.

20 fingerprints can be stored in the device at the same time. Each of them can be ordered to an action in the Event Manager.

Learning IR Code (hash)

Step 1. Connect the IR detector unit to the IR IN port of the switcher.

Step 2. Click on the **Learn** button on the **Infra** tab in the LDC.

Step 3. Turn the remote controller to the IR detector. A pop-up window appears in LDC - press your remote button to learn.

Step 4. Once the code is received, a new window pops up in LDC - learning completed. Click **OK** to continue.

Step 5. Optionally, type a unique name for the code in the **Name** text box. The default name is code#, e.g. code0.

INFO: UMX-HDMI-140 model can handle the IR codes in hash format.

Ports Tab in UMX-HDMI-140-Plus
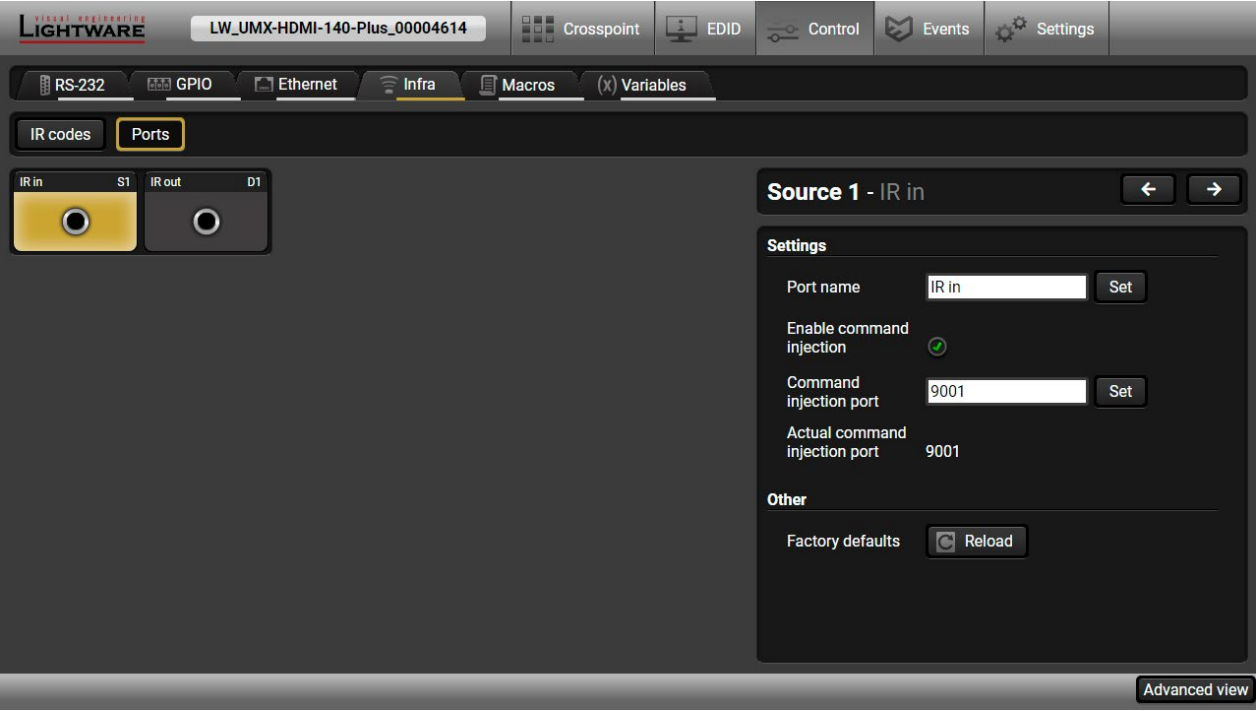
Infra tab - Ports Window - UMX-HDMI-140-Plus

The user can set the name and command injection port to each source and destination. For more details about IR interface, see the IR Interface section.

The following settings are also available:

▪ Port name;
▪ Enable / disable the port;
▪ Port number;
▪ Enable / disable command injection;
▪ Message sending function (little-endian pronto hex code). For more details, see the Sending pronto hex codes (Little-endian format) section;
▪ Reload Factory Default Settings.

Sending pronto hex codes (Little-endian format)

Copy the raw, little endian-format IR code into the **Send Pronto Hex** entry field and click on the **Send** button.

The maximum length of the code can be 765 characters (765 bytes). For more details about the accepted IR code formats, see the Infrared Message Sending section.

This entry field does not store the code. The code can be saved into the action in the event manager with the following parameters: **Category:** Infra; **Expression:** Send pronto hex; **Port:** D1; **Pronto hex:** <custom_code>

In the Event Manager, the maximum length of the code can be 184 characters (184 bytes).

▎ INFO: Sending bigger endian-format code is available with LW3 protocol command, see the Sending Pronto Hex Codes in Big-endian Format via IR Port section.

Ports Tab in UMX-HDMI-140

User can set the name and command injection port to each source and destination. For more details about IR interface, see the IR Interface section.
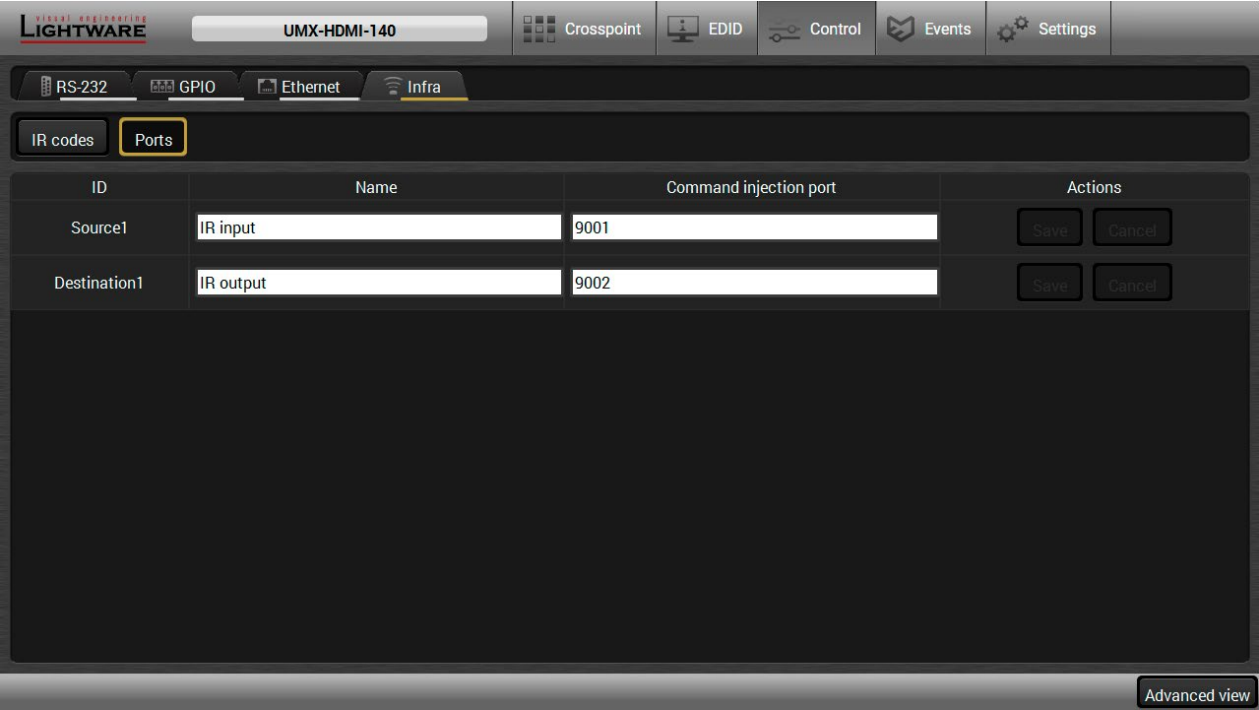
Infra tab - Ports Window - UMX-HDMI-140

Clear all IR codes

Clicking on the button deletes all stored IR fingerprints.

5.10.6. Macros

DIFFERENCE: This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

DEFINITION: Macro is a batch of pre-defined commands stored in the device. *#macro #new*

You can create your custom macros in a file, upload them to the device and run at any time. The number of the macros depends on the device type, UMX-HDMI-140-Plus switchers can handle up to 50 macros.

Important Notes about Macros

- The macros are stored in the internal device presets.
- The commands of a macro are executed sequentially (even if an error happens at a command).
- Macros allow long commands that are suitable for e.g. infra code sending.
- Macros cannot be edited in the device.
- Macros are not saved when backup is created. See the Saving the Macros section.

Macro File Structure

<table>
<tr><th>Format:</th><th>Example:</th></tr>
<tr><td>

```
;<preset_name>
;Begin <macro1_name>
<LW3_commands>
;End <macro1_name>
;Begin <macro2_name>
<LW3_commands>
;End <macro2_name>
```

</td><td>

```
;myDeviceMacros
;Begin myMacro1
CALL /MEDIA/VIDEO/XP:unmuteSource(I3)
CALL /MEDIA/VIDEO/XP:switch(I3:O1;I3:O2)
;End myMacro1
;Begin myMacro2
CALL /MEDIA/VIDEO/XP:unmuteSource(I4)
CALL /MEDIA/VIDEO/XP:switch(I4:O1;I4:O2)
;End myMacro2
```

</td></tr>
</table>

`<preset_name>`: it will be displayed in the Settings/Backup submenu (device configurations list).

`<macro_name>`: each Macro must have a unique name.

`<LW3_commands>`: LW3 SET and CALL commands. Syntax is not checked, error is not reported.

ATTENTION! If you use the same name for a new macro, the existing one will be deleted.

Open a simple text editor and save the file with 'LW3' extension.

Uploading New Macros into the Internal Device Configuration Preset

The uploading steps are the following:

Step 1. Create the **file** with macros according to the macro file structure and save it.

Step 2. Navigate to the **Settings/Backup** submenu.

Step 3. Select the device configuration **preset** at the bottom of the page.

Step 4. Press the **Upload** button, browse the LW3 file and press **Open**.

ATTENTION! The preset and the macros of the selected slot will be erased. If there is a macro with the same name already in the device, it will be removed and the new one will be available.
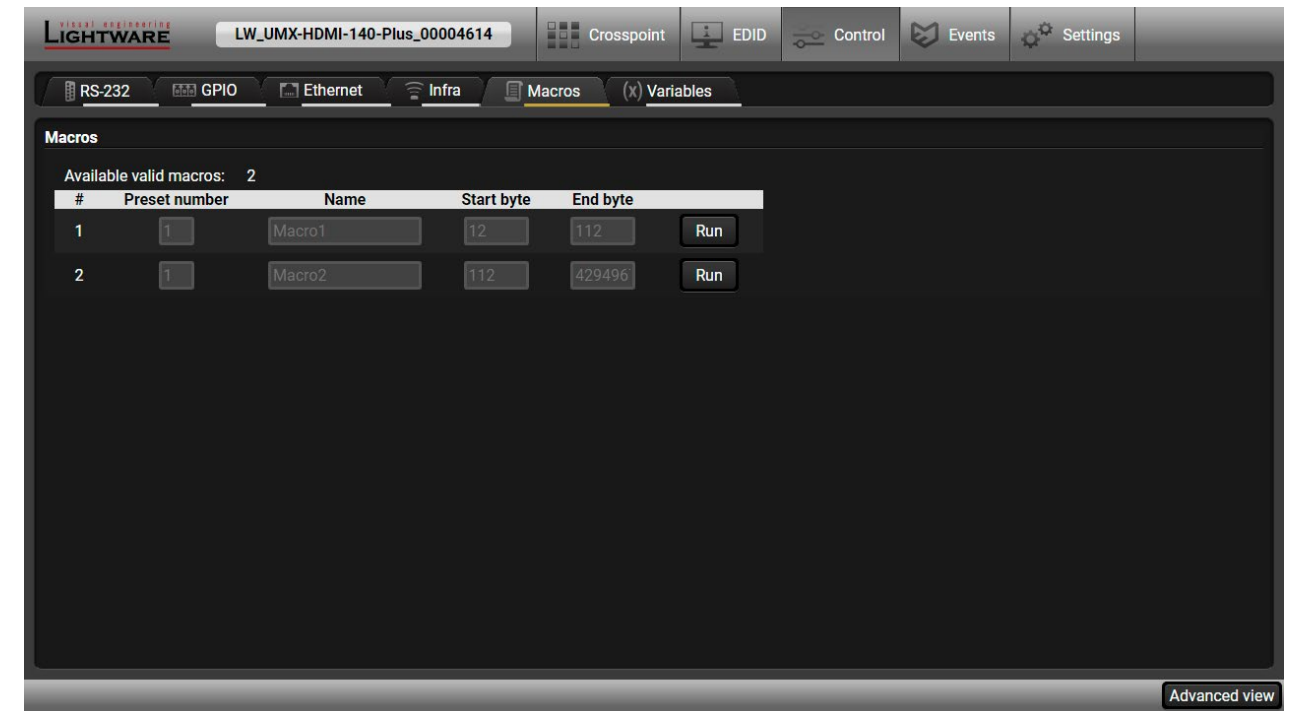
Discovered Macros in the device shown under Control/Macros submenu

Adding Macros by Preserving the Current Preset and Macros

If you follow the steps below, the existing macros of the selected preset will be preserved. But if there is a macro with the same name already in the device, it will be removed and the new will be available.

Step 1. Navigate to the **Settings/Backup** submenu.

Step 2. Select the device configuration **preset** at the bottom of the page.

Step 3. Press the **Download** button and click **Save** in the pop-up window.

Step 4. Open the **file** with a simple text editor and add the desired macros to the bottom of the commands between the `;Begin <macro_name>` and `;End <macro_name>` labels.

Step 5. Save the file and navigate to the **Settings/Backup** submenu.

Step 6. Select the device configuration **preset.**

Step 7. Press the **Upload** button, browse the LW3 file and press **Open**.

Saving the Macros

When you make a backup of the device, the macros are not saved in that file. Sometimes it is necessary to save the macros into a file, and for example apply them in another (same type of) device. Follow these steps:

Step 1. Navigate to the **Settings/Backup** submenu.

Step 2. Select the device configuration **preset** at the bottom of the page.

Step 3. Press the **Download** button and click on **Save** in the pop-up window.

5.10.7. Variables

▌ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

You can create custom variables in number or text format, which can be used in the Event Manager. The variables can have the following properties/methods: *#variables*   *#new*

- Numeric (integer) type with min/max value setting, or string-type (determined automatically)
- Increment/step the numeric value,
- Value-dependent case operations,
- Reading and storing the values of LW3 properties into string or numeric variables.
- The max length of a string variable can be 15 characters. Numeric variable is defined between -2147483648 and 2147483647.

The defined variables are stored in a non-volatile memory and the value is kept in case of a reboot.
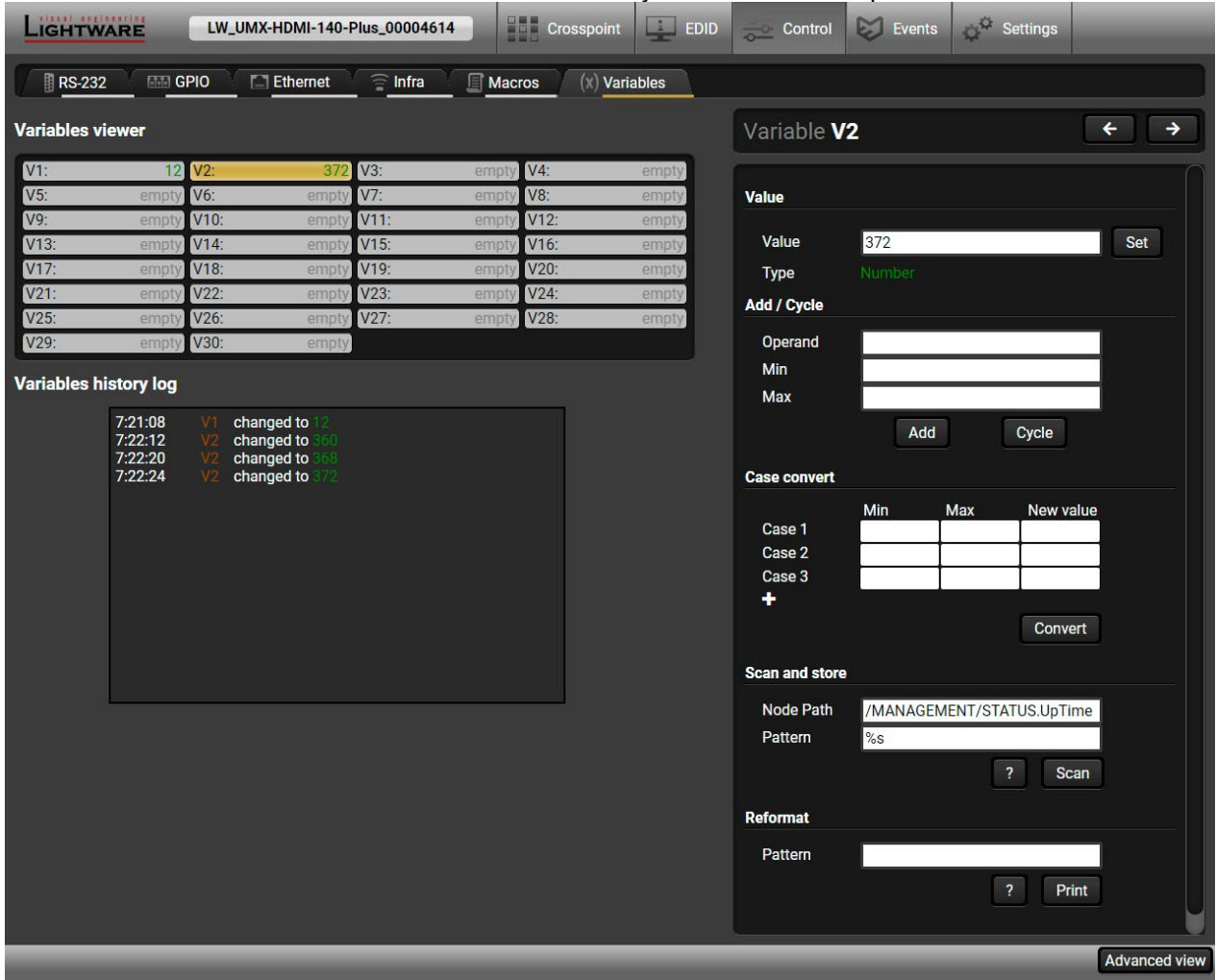
Variables tab in the Control menu

Value Section

You can set the value of the variable by the field. The type of the variable is determined automatically based on its value (numeric/string).

Add / Cycle Section

This section can be used for numeric types.

- **Operand**: the increment, the number that will be added to the current value (negative value is accepted).
- **Min (optional)**: the lowest allowed value
- **Max (optional)**: the highest allowed value
- **Add** button: the operand will be added to the current value. If the result would be higher than the max setting, the max will be valid; if the result would be lower than the min setting, the min will be valid
- **Cycle** button: the operand will be added to the current value. If the result would be beyond the limit (min/max), the value will be stepped to the other end of the interval.

Examples

The following shows the difference between the **Add** and the **Cycle** options. The input values are the same in both cases:

- **Min**: 1
- **Max**: 5
- **Operand**: 1
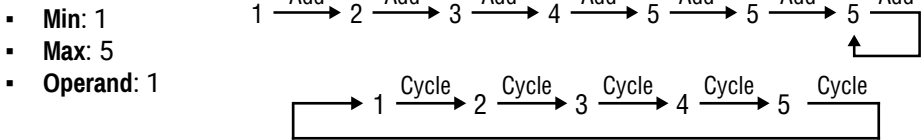
In **Add** case: when the value hits the limit (max), the operand will not increase the value any more.

In **Cycle** case: when the value hits the limit (max), the value will be stepped to the other end of the interval.

Similar case happens vice versa, when the operand is a negative number and the value hits the min value.

▌ TIPS AND TRICKS: Set min=1, max=2, operand=1 and use the **cycle** method. Thus, the value of the variable can be toggled, which can be linked to a property with two states (e.g. low/high level) in the Event manager.

Case Convert

This tool can be used to change the value of a variable if it fits in any of the defined intervals. The check and the change will be performed only if you press the **Convert** button. A typical example is when two different ranges of values have to meet:

Incoming values: between 0 and 255 (e.g. the slider of a controller can have these values).

Outgoing values: between 0 and 100 (e.g. the controlled device accepts these values).

Defined cases:

	Min	Max	New value			Min	Max	New value
Case 1	1	25	10	Case 6	126	150	60
Case 2	26	50	20	Case 7	151	175	70
Case 3	51	75	30	Case 8	176	200	80
Case 4	76	100	40	Case 9	201	225	90
Case 5	101	125	50	Case 10	226	255	100

Scan and Store

This tool can be used to get the value (or a part) of an LW3 property. The defined path will be checked according to the pattern and the result will be saved into the variable (number or string type). Press the **?** button to open the pattern options:

Pattern	Pattern description
%s	String of characters stopping at the first whitespace character
%<number>s	The next <number> of characters (string) stopping at the first whitespace
%c	One character
%<number>c	The next <number> of characters
%[<characters>]	Defined character set, specified between brackets
%[^<characters>]	Negated character set, which will be skipped, specified between brackets
%*	Ignored part
<custom_text>	User-defined text

Examples

Node Path [1]	Property Value	Pattern [1]	Scanned result
/MANAGEMENT/STATUS.CpuTemperature	32 C; 0;75; 0;79;21;34;	%s	32
/MANAGEMENT/STATUS.CpuFirmware	1.3.0b0 r1	%12s	1.3.0b0
/MEDIA/VIDEO/I6.Resolution	640x480p60	%3c	640
/MEDIA/UART/P1.Rs232Configuration	57600, 8N1	%*[^,], %s	8N1
/MEDIA/AUDIO/XP.SourcePortStatus	T000A;T000A;T0008;T000A;T000C	%*6c%5c	T000A
/MEDIA/VIDEO/I6.Resolution	640x480p60	%[^b]%*	640
/MANAGEMENT/NETWORK.HostName	lightware-00005031	lightware-	00005031

[1] defined by the user

Reformat

The value of the variable can be changed by adding text as prefix and/or postfix. Type **%s** to indicate where to insert the original value.

Example

- **Original value**: 3
- **Pattern**: input%s
- **Modified value**: input3

5.11. Event Manager

The feature means that the device can sense changes on its ports and is able to react according to the pre-defined settings. The development idea of the Event manager is based on users' feedbacks. In many cases internal events (such as signal being present or HDCP being active) are necessary for displaying, but it is not easy when the device is hard to access (e.g. built under the desk). For more details and examples about the Event Manager, please visit our website (https://lightware.com/support/guides-and-white-papers) and download **Event Manager user's guide** in the Downloads section. *#eventmanager*

The Event manager can be configured to perform an action if a condition has been detected. E.g. the desired setup is that after a certain type of signal has been detected on I1 port, the port has to be switched to O1. The settings can be done via the LDC in the main menu or by LW3 protocol commands. The number of configurable events depends on the device that you are actually using.

Numerous new ideas and requests have been received in connection with the features and settings of the Event manager since the first release. Therefore, the user interface has been re-designed and many new functions have been implemented. The Event editor can be opened by pressing the **Edit** button at each Event.

There is a **grey bar** on the left of the Event panel in each line. If a condition and an action are set and the Event is enabled, the bar is displayed **in green**.
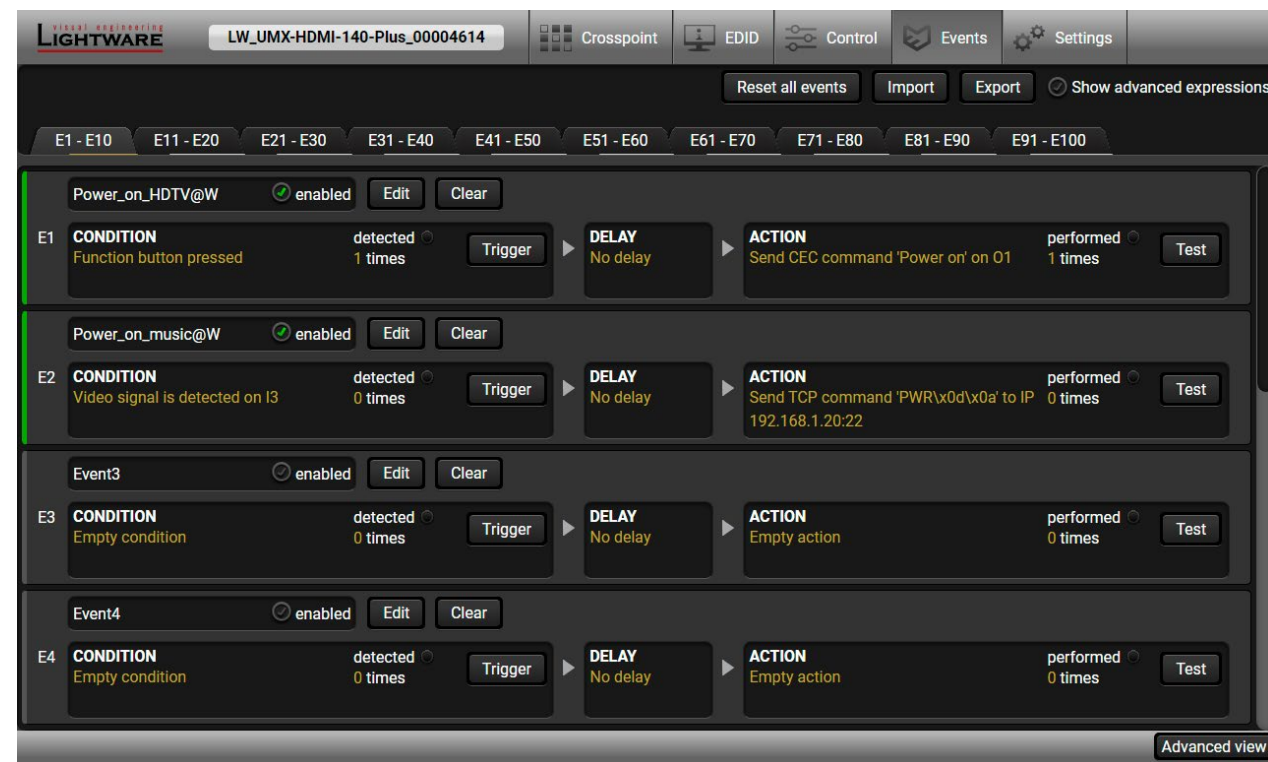
Control menu, Event Manager tab

5.11.1. The Event Editor

Press the **Edit** button in the desired Event line to open the Event editor window.
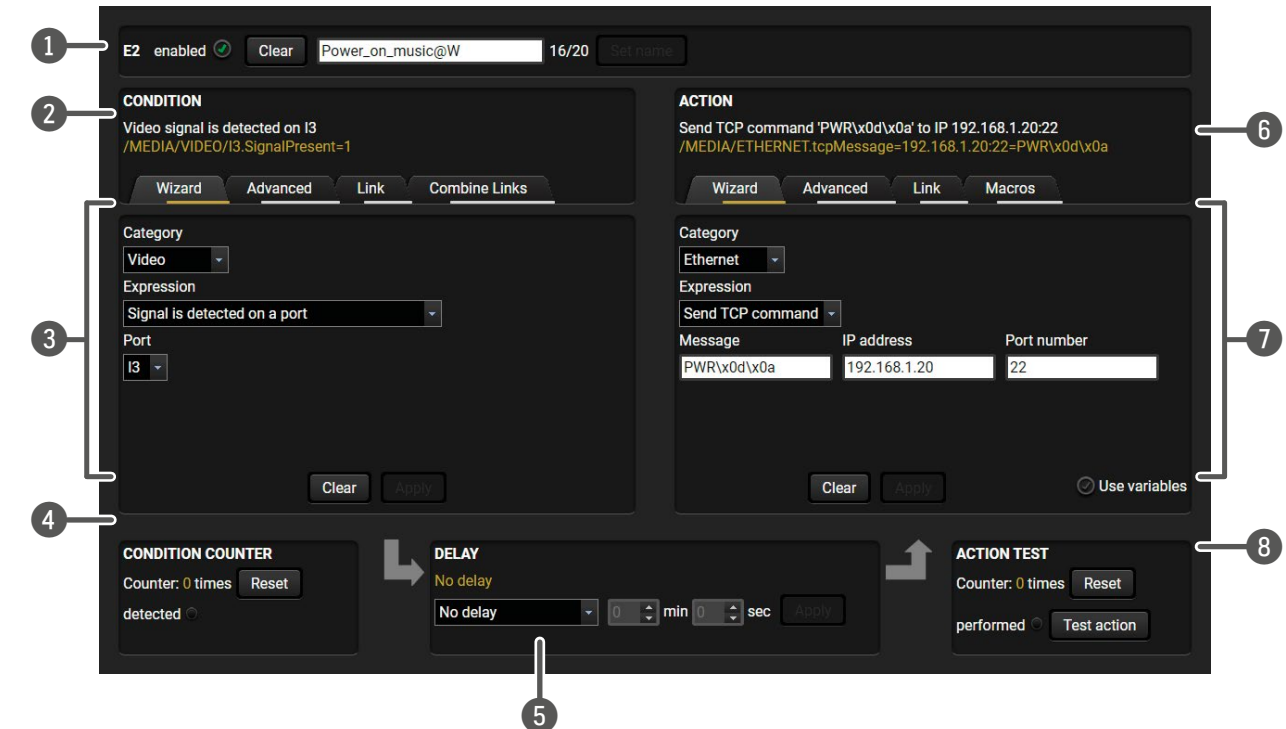
①	**Event header**	The name of the Event is displayed. Type the desired name and press the **Set name** button. The Event can be cleared by the **Clear** button. Add/remove the tick mark to enable/disable the Event.
②	**Condition header**	If the condition is set, the description (white colored text) and the exact LW3 protocol expression (yellow colored text) can be seen. If the advanced mode was used, the description is "Custom condition".
③	**Condition panel**	The Wizard, the Advanced or the Link tool is available for setting the condition. The parameters and settings are displayed below the buttons.
④	**Condition counter**	The set condition can be tested to see the working method in practice.
⑤	**Delay settings**	The action can be scheduled to follow the condition after the set time value.
⑥	**Action header**	If the action is set, the description (white colored text) and the exact LW3 protocol expression (yellow colored text) can be seen. If the advanced mode was used, the description is "Custom action".
⑦	**Action panel**	The Wizard, the Advanced or the Link tool is available for setting the action. The parameters and settings are displayed below the buttons.
⑧	**Action test**	The set action can be tested to see the working method in practice.

5.11.2. Create or Modify an Event

Wizard Mode

The wizard mode lists the most common conditions and actions, so the user does not have to look for LW3 nodes and properties.

Step 1. Click on the **Edit** button of the desired Event; the **Event editor** is displayed.

Step 2. The wizard mode is displayed by default. Select the desired **Category** first (e.g. Audio or Video).

Step 3. Select the desired **Expression** from the drop-down menu. If any other parameter is necessary to be set, it is going to be displayed.

Step 4. Press the **Apply** button to store the settings of the Condition.

> INFO: This mode is also available for setting the **Action**.

Advanced Mode

The goal of this mode is the same as that of the wizard: set the properties and methods for conditions and actions. The difference is the number of the available and usable properties and methods of the LW3 protocol. Advanced mode allows almost all of it.

Step 1. Click on the **Edit** button of the desired Event; the **Event editor** is displayed.

Step 2. The wizard mode is the default, press the **Advanced** button. The LW3 protocol tree is displayed, showing the list of the properties in the drop-down menu. Navigate to the desired node.

Step 3. Select the desired **Property** from the menu. The **manual** of the property is displayed below to help select the necessary property and set the value.

Step 4. Set the desired **value** and **operator**, then press the **Apply** button to store settings.

> INFO: This mode is also available for setting the **Action**.

The Link Tool

The new interface allows creating more actions for the same condition. In that case, a condition can trigger several actions. To set such an Event, the Link tool has been introduced.

Step 1. Click on the **Edit** button of the desired Event; the **Event editor** is displayed.

Step 2. The wizard mode is displayed by default, press the **Link** button.

Step 3. All the saved Events are analyzed and the **conditions** are listed (it takes a few seconds to finish). The **Show advanced expressions** option shows the exact path and sets the value of the given property.

Step 4. Select the desired **Condition** and press the **Apply** button to store the settings.

> INFO: This mode is also available for setting the **Action**.

Combine Links

> **DIFFERENCE:** This feature is available from FW package v1.3.0b5.

The first generation of the Event Manager is able to sense a change (one condition), but in some cases that is not enough. The practical experience has shown that there is a need to examine more conditions as follows: if one of the set conditions becomes true (while the other conditions are fulfilled), then the set Action is launched. The **Combine Links** tool allows the setting of these Conditions. Follow the steps below:

Step 1. Create individual **Conditions** in separate Events.

Step 2. Create a new Event and navigate to the **Combine Links** tab in the Editor.

Step 3. Select up to four **Conditions** in the **left** panel.

Step 4. Set the desired **Action** (and do not forget to **enable** the Events).

> INFO: This mode is available for setting the **Condition only**.　*#new*

Linking a Macro (Action)

> **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

Macros stored in the device can be run as Actions. Thus, a lot of commands can be run by using only one Event. The commands will be processed one-by-one after each other. *#macro*

Step 1. Click on the **Edit** button of the desired Event; the **Event editor** is displayed.

Step 2. The wizard mode is the default, press the **Macros** button in the **Action** panel.

Step 3. Select the desired **Macro** from the list, then press the **Apply** button to store settings.

If the **Use variables** option is enabled, you can link a variable via the **$** character. If you do so (e.g. $1), the device will handle it as the V1 variable. You can send the value of the variable e.g. as a TCP message.

See more information about the Macro settings in the Macros section. *#new*
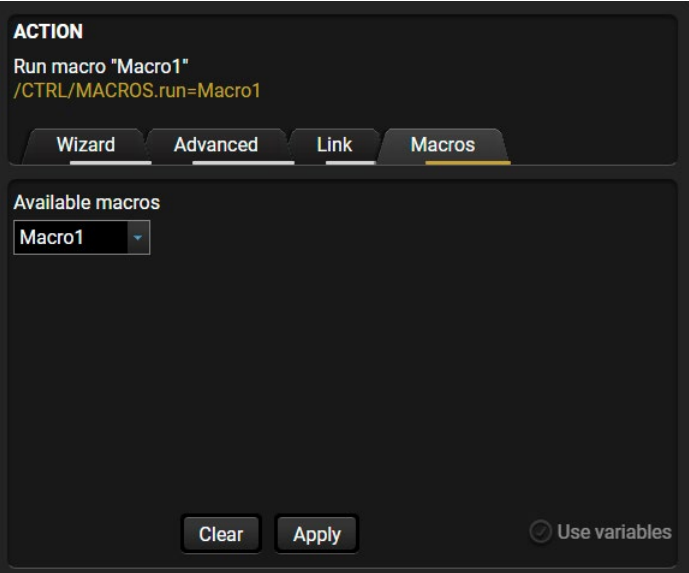
5.11.3. Special Tools and Accessories

The Name of the Event

The name of a port can be changed by typing the new name and clicking on the **Set** button. The following characters are allowed when naming:

Letters (A-Z) and (a-z), numbers (0-9), special characters: hyphen (-), underscore (_), and space ( ).

Enable or Disable an Event

The set Event can be enabled or disabled in the Event list, or directly in the Event editor window by adding or removing the **tick mark** beside the name.

Testing the Condition

When the desired Condition is arranged, the setting can be tested. The Event list and the Event editor contains a small panel that shows whether the set condition is detected and how many times. The **Counter** can be reset by the button in the Event editor. If the Condition is true, the **detected** mark turns green for two seconds and the **Counter** is increased.

Testing the Action

The method is the same as when testing the Condition, but in this case, the Action can be triggered manually by pressing the **Test** button.

> TIPS AND TRICKS: The Test button is also placed on the Action panel in the Event list. Thus, you can check the Actions without opening the Event editor.

Delay the Action

In most cases the Action is performed immediately after the Condition is detected. But sometimes a delay is necessary between the Condition and the Action. Therefore, the new Event manager contains the Delay panel, which allows that feature with the settings below:
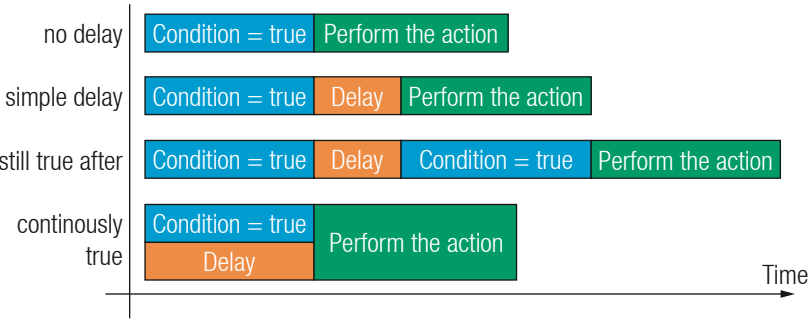
- **No delay**: when the Condition is detected, the Action is launched.
- **Simple delay**: when the Condition is detected, the Action is launched after the set time interval.
- **Still true after**: when the Condition is detected, the Action is launched after the set time interval only if the Condition still exists.
- **Continuously true**: when the Condition is detected, the Action is launched after the set time interval only if the Condition has been existing continuously.

> TIPS AND TRICKS: The **Show advanced expressions** option is a useful tool when you look for the path or value of a property, but just the expression is displayed. The option is available in the Event list window or when the Link tool is used.

Variables

> **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

The variables and the tools (shown in the Control/Variables tab) can be used in the Event Manager.

Condition Wizard   *#variables*   *#new*

The desired variable can be checked if its value is changed to a specific value.

Action Wizard

The value of a variable can be set/changed by the same methods as in the Control/Variables tab:

- Setting the exact value
- Increasing the value with/without limits
- Converting the value (e.g. interval change)
- Scanning, storing or reformatting a property/parameter

If the **Use variables** option is enabled, you can link a variable via the **$** character. If you do so (e.g. $1), the device will handle it as the V1 variable. You can send the value of the variable e.g. as a TCP message.

Condition Triggering

> **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

This improvement works as if a condition is detected. When a complex control system is built, a Condition may trigger numerous Actions. A typical example is when a system is powered on and the 'ready-to-use' state has to be loaded. In this case, there could be many actions that are based on the same condition. In order to reduce the number of the commands, you can trigger one 'key' condition, which could start the whole process.
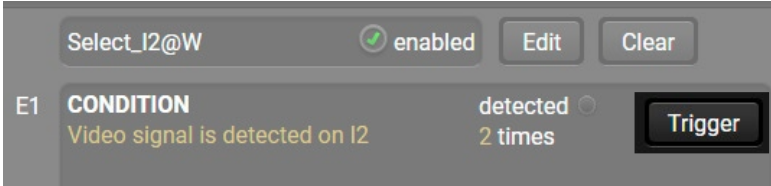
5.11.4. Clear One or More Event(s)

Clear an Event

Press the **Clear** button in the Event list or in the header section in the Event editor.

Clear all Events

When all the Events must be cleared, press the **Load factory defaults** button above the Event list. You will be prompted to confirm the process.

5.11.5. Export and Import Events

The feature allows saving all the Events. The backup file can be uploaded to another UMX-HDMI-140 switcher.

Export all the Events

Step 1. Press the **Export** button above the Event list.

Step 2. The Save as dialog box will appear. Set the desired folder and file name, then press the **Save** button.

The generated file is a simple text file, which contains LW3 protocol commands. The file can be viewed by a simple text editor, e.g. Notepad.

> **ATTENTION!** Editing the file is recommended only for expert users.

Import all the Events

Step 1. Press the **Import** button above the Event list.

Step 2. The Open dialog box will appear. Select the desired folder and file, then press the **Open** button.

5.11.6. Event Creating - Example

The following example shows you on a real-life situation how to set up an Event.
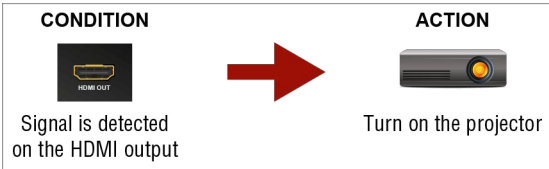
The Concept

The UMX-HDMI-140-Plus switcher is connected to a projector by the HDMI output port. The switcher is also connected to the projector by the RS-232 port, and can send commands via the serial line. The task is to turn on the projector when signal is detected on the HDMI output port.

RS-232 Settings

Make sure that the serial line is established between the switcher and the projector. Check that the RS-232 settings of the switcher is exactly the same as required for the projector: baud rate, data bits, parity, stop bits. The switcher needs to be set to: Control protocol: LW3; and RS-232 mode: Pass-through. See the relevant LDC settings in the RS-232 section.

Setting the Event

Step 1. Set the condition.

Select the required parameters to set the condition:

- **Category**: Video;
- **Expression**: Signal is detected on a port;
- **Port**: O1.

Click on the **Apply** button to complete the procedure, then the condition appears on the upper side in textual and LW3 command format as well.
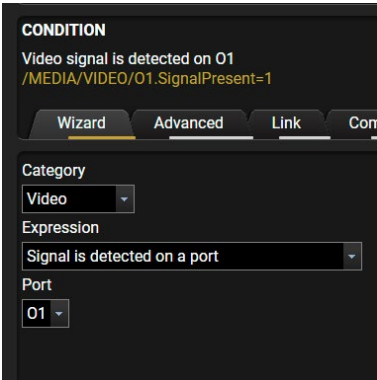
Step 2. Set the action.

If the condition is fulfilled, the following action needs to be launched: the receiver sends a command to the projector over the serial line:

- **Power on** - the required command, which is accepted by the projector: PWR0<CR><LF>

E.g. the command has to be closed with the <CR><LF> characters so they need to be escaped. You can use the following format for escaping:

$$<command_1><\backslash x0d\backslash x0a><command_2><\backslash x0d\backslash x0a>...$$
$$...<command_n><\backslash x0d\backslash x0a>$$

In the current case the command is: PWR0\x0d\x0a

Select the required parameters to set the action:

- **Category**: RS-232;
- **Expression**: Send RS-232 message;
- **Port**: P1;
- **Message**: PWR0\x0d\x0a
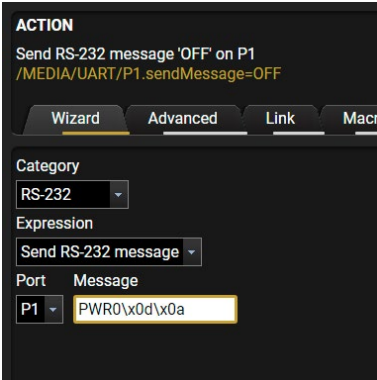
Step 3. Enable the Event.

Add a tick next to **E1 enabled** in the upper left corner to set the Event as active.

> INFO: If you do not find the required category/expression/etc that you need, choose the Advanced mode in the Wizard, where the entire LW3 structure tree is available. For example, instead of signal detection you can set a specified resolution or color range too as a condition.
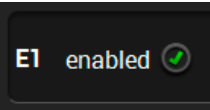
5.12. Settings Menu

5.12.1. Status
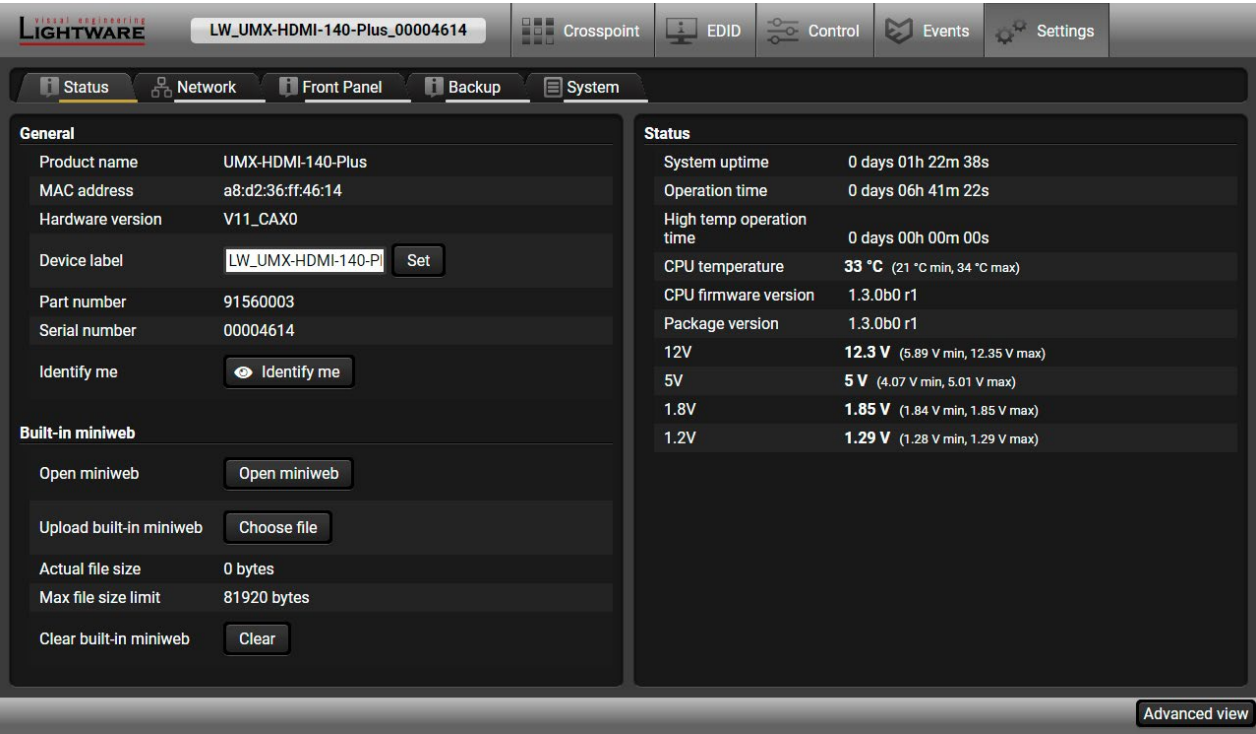
Status tab in the Settings menu

The most important hardware and software related information can be found on this tab: hardware and firmware version, serial numbers, temperatures, operation time, and voltage information. Device label can be changed to a unique description via the **Set** button. *#label #devicelabel #status #firmwareversion #producttype #serialnumber #miniweb #builtinweb #web*

> INFO: The **Device label** is a user-editable name displayed next to the main menu. The **Product name** is a read-only property.

Please note that the **Miniweb**-related descriptions can be found in The Miniweb Room Control section.

Identify Me Feature

Clicking on the **Identify me** button results in the blinking of the status LEDs (in green) for 10 seconds. The feature helps identifying the device itself in the rack shelf. *#identifyme*

5.12.2. Network
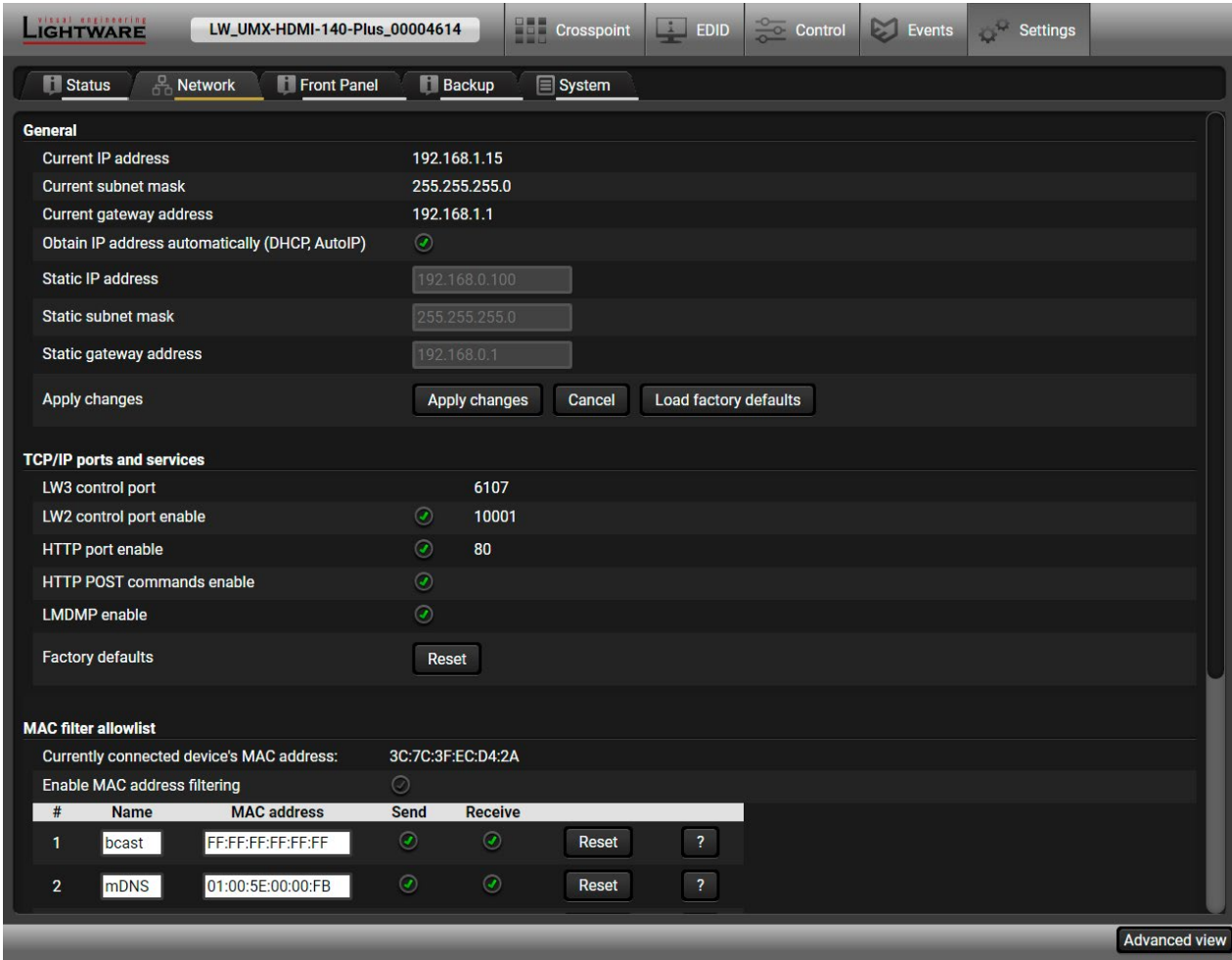
Network tab in the Settings menu

General

IP address and DHCP settings can be set on this tab. Always press the **Apply settings** button to save changes. Factory default settings can be recalled with a dedicated button.

TCP/IP Ports and Services

> DIFFERENCE: This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

The IP Port Block feature is an additional protection for the Cleartext login, see the Cleartext Login (Login Settings) section. There are TCP/IP ports in Lightware devices that are not protected by the login, so you can disable them if necessary. For example, due to the working method of the LW2 communication, the Cleartext login does not provide protection when an LW2 command is sent to the device, that is why the TCP port no.10001 shall be blocked manually. *#dhcp #ipaddress #network #portblock #new*

MAC Filter Allowlist

▌ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

Another level of the security is the MAC Filtering tool. You can create a list of network devices based on the MAC address that are allowed: *#macfilter*   *#new*

- ▪ Controlling the device (Send option), or
- ▪ Querying parameters (Receive option) to/from the Lightware device.

Do not forget to press the **Apply changes** button to store the new settings.

▌ **ATTENTION!** The first three lines are factory default values and they are necessary for the proper working.

▌ **ATTENTION!** If the device is installed in a network where it gets IP address from a DHCP server and you plan to use the MAC filtering, make sure the MAC address of the DHCP server is added to the white list. Otherwise, the device will not get an IP address and will be unreachable.

5.12.3. Front Panel
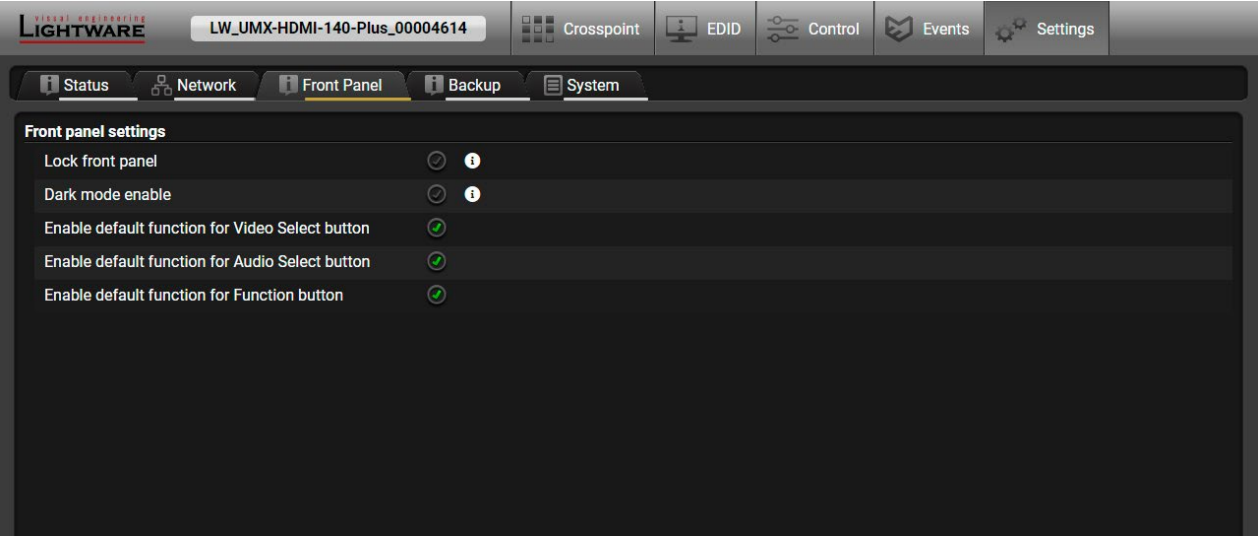
Front panel tab in the Settings menu

Front panel operation LEDs and buttons can be configured in this tab.

- ▪ You can disable the functionality of the front panel buttons by marking the **Lock front panel** option. This is the same method of the control lock that is done by the front panel buttons. See the details in the Control Lock section. *#controllock #buttonlock #lockbutton*
- ▪ **Dark mode** enable/disable: video and audio LEDs on the front panel are turned off 60 seconds after enabling the dark mode. *#darkmode*
- ▪ **Enable default function for Video Select / Audio Select / Function (Show me) button**: when this property is disabled, it means that pushing the button will not perform the original function. This makes the button free for programming custom functions by the Event Manager. This setting is also available via LW3 protocol, for more details, see the Disabling the Default Function of the Front Panel Buttons section.

5.12.4. Backup

Details about this function can be found in the Backup (Configuration Cloning) section.

5.12.5. System
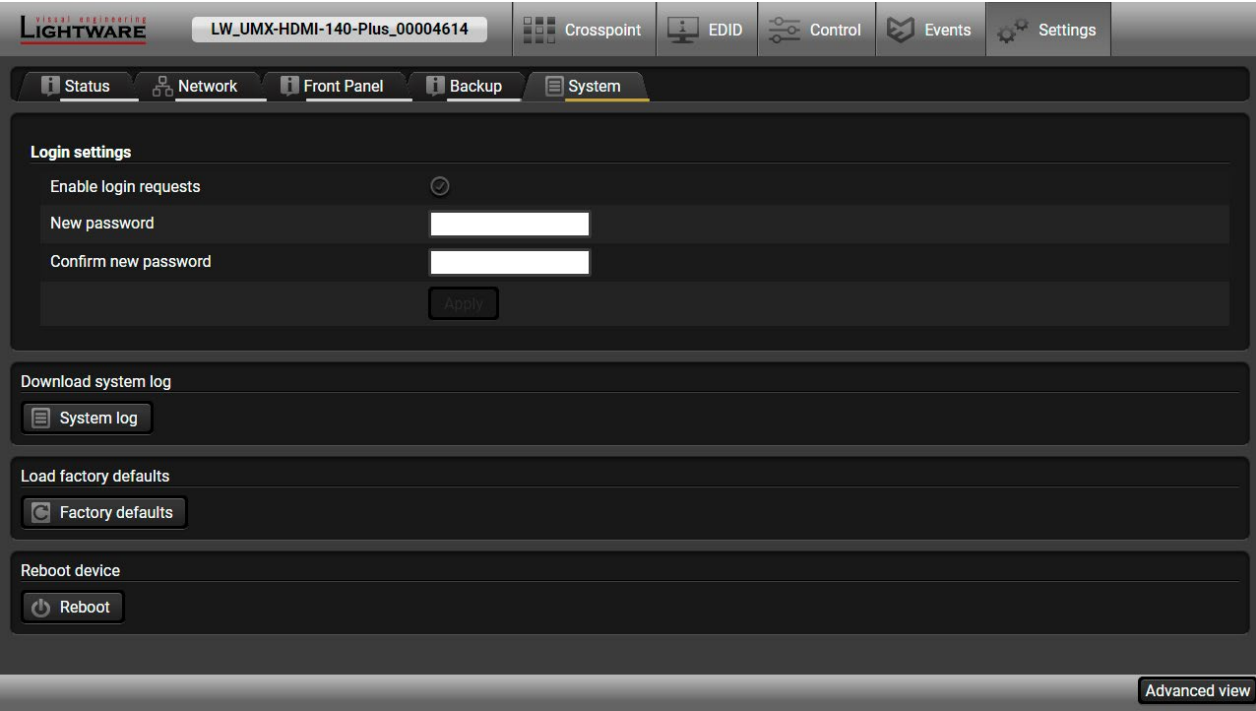
System tab in Settings menu

Cleartext Login (Login Settings)

▌ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

This cleartext login tool allows setting a password for login, and thus the device will not accept any command coming from a control interface (RS-232, Ethernet, etc...) without login. The device will be visible in the Device Discovery window (as the device type and the serial number can be queried without login) but connection can be established only after successful login. The login is valid until a TCP socket break in case of Ethernet connection. *#login*   *#new*

▌ **ATTENTION!** If the login is enabled, the password will be asked when opening The Miniweb Room Control.

▌ INFO: The login password is erased and the login is disabled when restoring the factory default values.

Further functions

- ▪ **Download system log** - saving the file of the device.
- ▪ **Load factory defaults** - recalling factory defaults settings and values. All factory default settings are listed in the Factory Default Settings section.
- ▪ **Reboot** - rebooting the system.   *#factory*   *#log*   *#systemlog*   *#reboot #restart*

5.13. The Miniweb Room Control

DEFINITION: The miniweb is a dedicated location in the memory where an HTML file can be uploaded to. If the `http://<IP_address>/index.html` page or the `http://<host_name>/index.html` is opened in a web browser, the file is displayed.

ATTENTION! The Miniweb Room Control is available from FW package v1.1.1b8. The default control page can be installed in the device during the first firmware update process by the user if the necessary parameter is enabled. See the Step 3. Check the update parameters. section.

The default control page allows the following:

- **Source selection:** This block can be used to select an input or enable/disable the Autoselect remotely e.g. from a mobile device.
- **Action triggers:** The action trigger buttons can be used to perform a configured Event Action without waiting for the condition to occur. This can be done remotely from a mobile device, too.
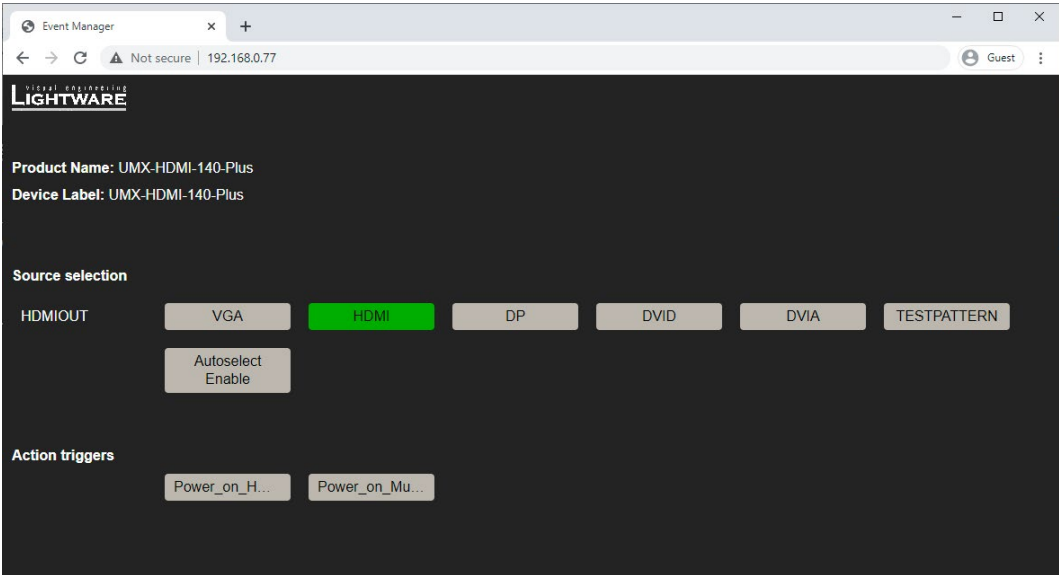
The Control Page Displayed in a Desktop Browser (with Action Trigger Buttons)

#miniweb #builtinweb #web

5.13.1. Opening the Miniweb

The Miniweb Room Control is available by:

- Opening a **web browser** and typing the **http://<IP_address>.index.html** or the **http://<IP_address>** in the address line, or
- Launching the **LDC**, connecting to the device, navigating to **Settings/Status** and pressing the **Open miniweb** button.
- The host name can be used instead of the IP address; see the Setting the Host Name section.
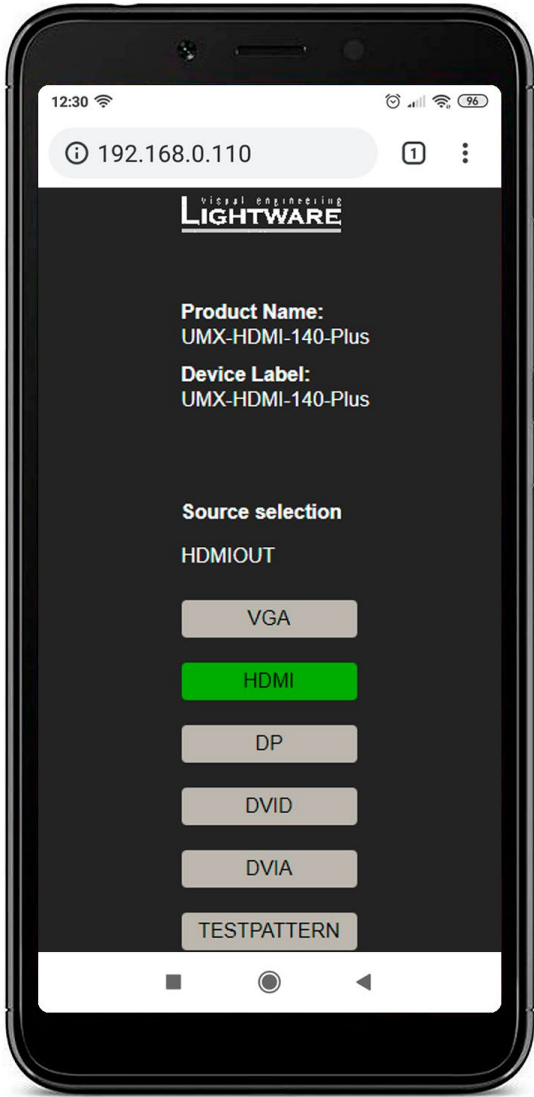
The Control Page Displayed in a Smartphone Browser

The Default Status Page

If there is no control page uploaded, the default status page will be displayed (which is also available by opening the **<IP_address>/status.html** address).
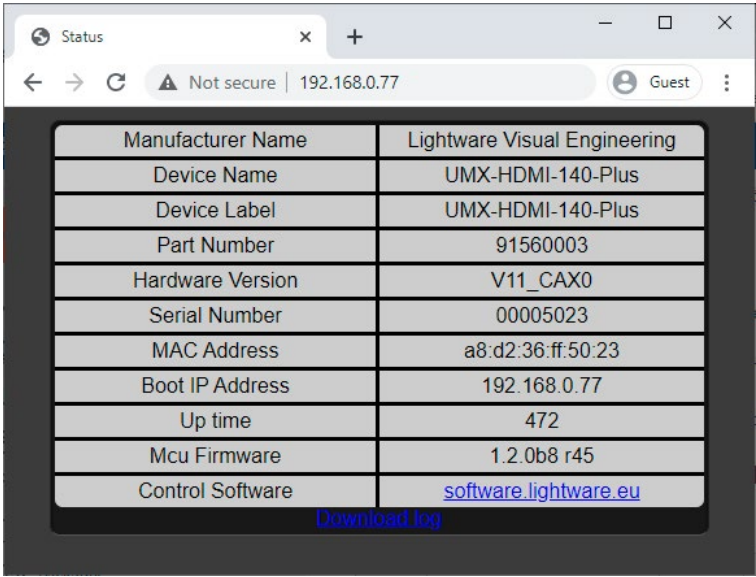
The Factory Default Status Page (status.html)

5.13.2. Miniweb Customization

The buttons of the **Action triggers** section are linked to Actions of certain Events in the Event Manager. These buttons are displayed **only** for specific events:

- Any Event which does **not** have the **@W** suffix in its name will **not** be displayed as a trigger button.
- The displayed trigger buttons will get a **text label** with the **event name** except the suffix.

To add the desired Action as a button, **append the name** of the desired Event with the **@W** characters - see below (type uppercase for 'W', as it is case-sensitive):
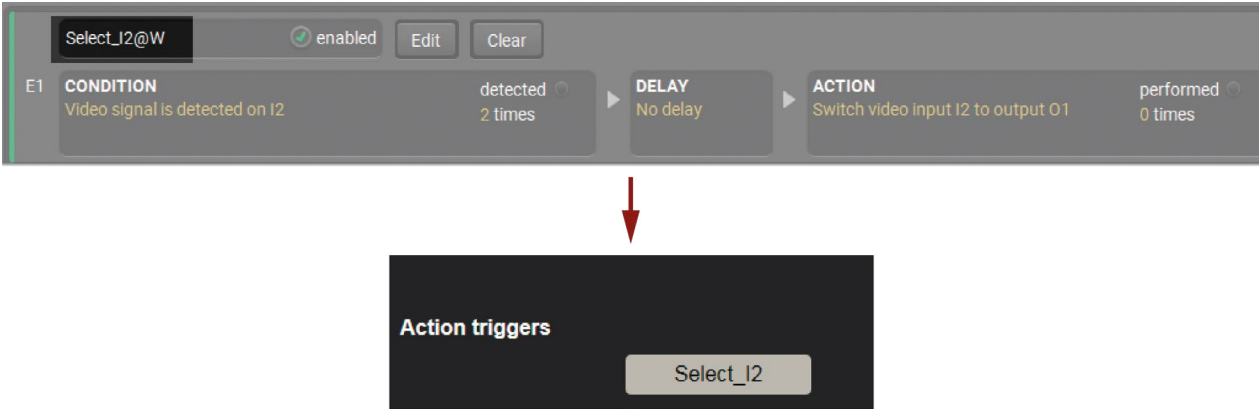
Customized HTML

The default control page can be replaced in the LDC; navigate to the **Settings/Status** page. Custom HTML file can be uploaded by pressing the **Choose file** button. Pay attention to the size of the HTML file. Only one file is allowed, and the maximum file size is 10 KB.

Press the **Reset** button to remove the control page. The default control page can be restored during a firmware update process, see the Step 3. Check the update parameters. section.
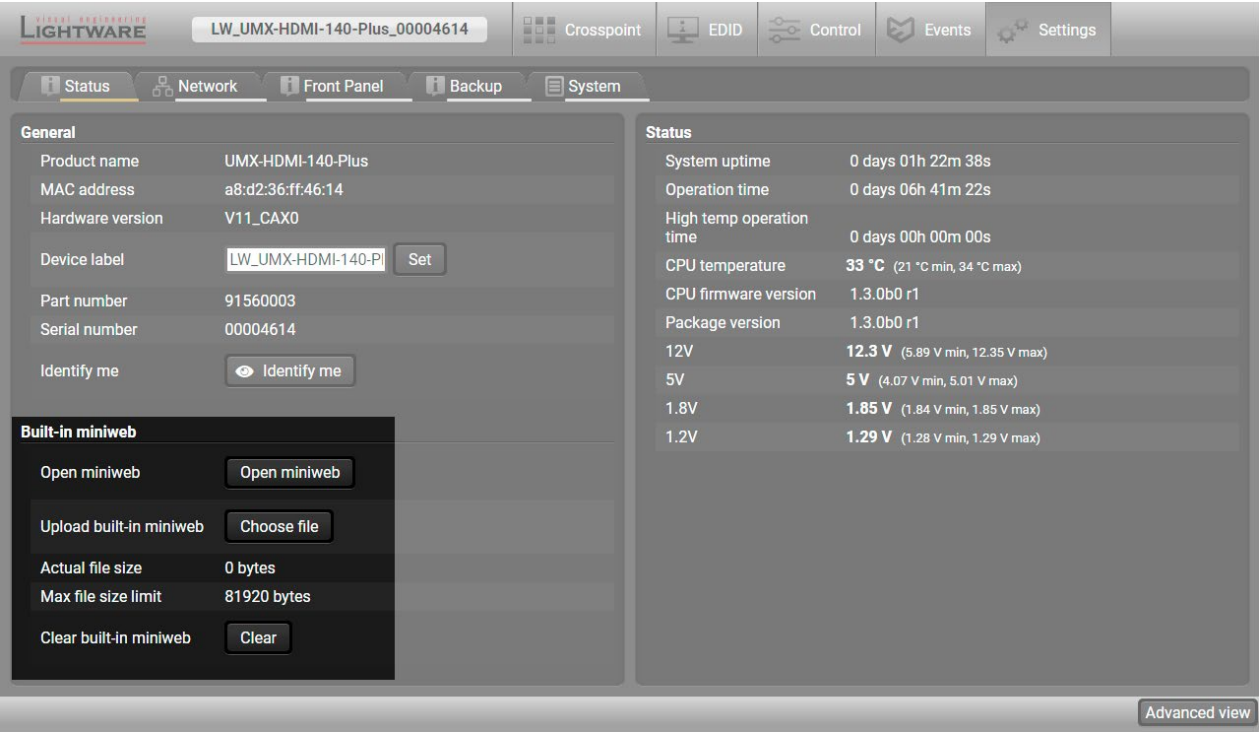
The Miniweb Room Control (Built-in miniweb) Section in LDC

5.14. Backup (Configuration Cloning)

Configuration cloning of Lightware LW3 devices is a simple method that eliminates the need to repeatedly configure certain devices to have identical (non-factory) settings. If the devices are installed in the same type of system multiple times, then it is enough to set up only one device to fit the user's needs, and then copy those settings to the others, thus saving time and resources. *#backup #configurationcloning*

> **ATTENTION!** Macros cannot be saved into the backup file. If you have macros stored in a Configuration slot, download it separately and upload it in the target device.
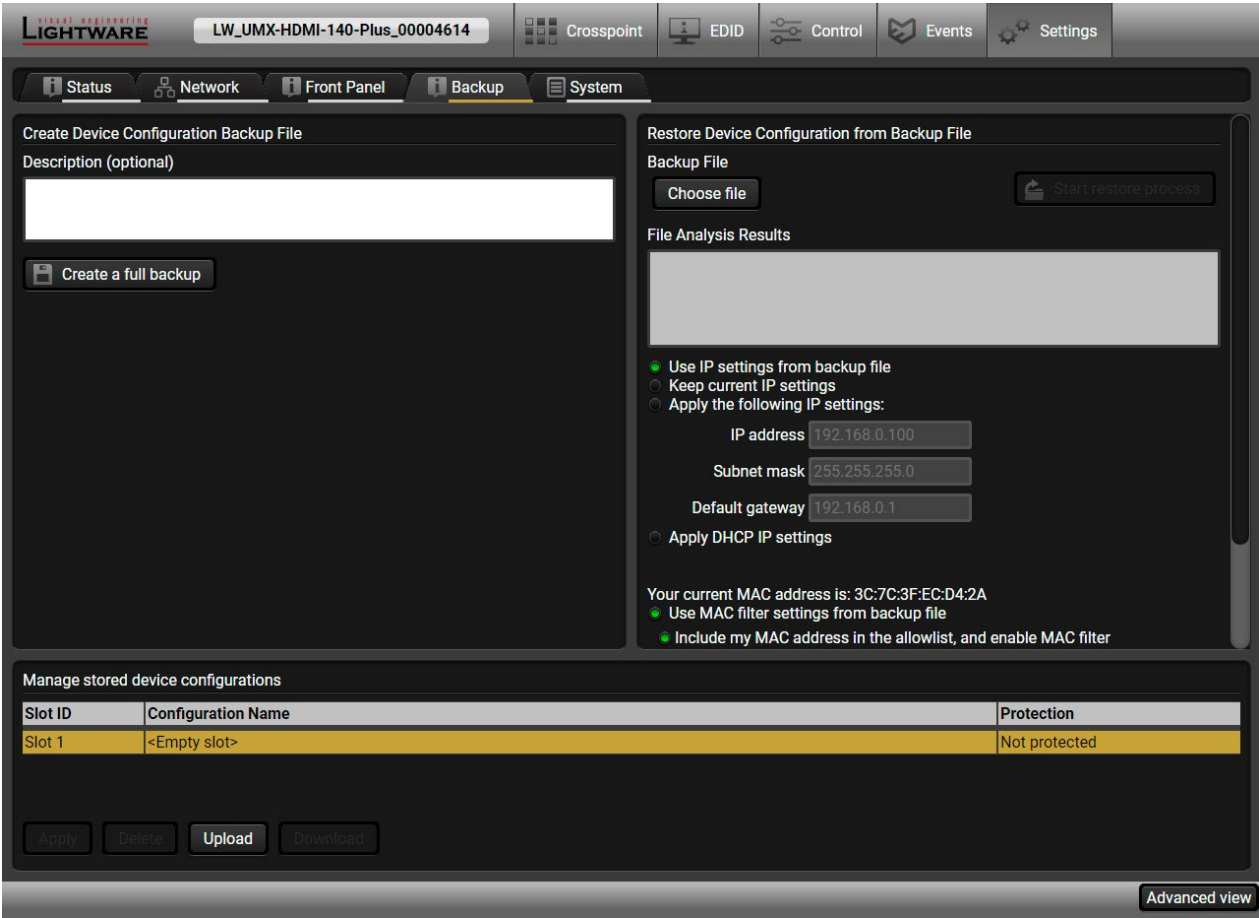
Backup tab in Settings menu

5.14.1. Steps in a Nutshell

Installing multiple devices with the same customized configuration settings can be done in a few easy steps:

Step 1. Configure one device with all your desired settings using the LDC software.

Step 2. Backup the full configuration file to your computer.

Step 3. If needed, make some modifications to the configuration file using a text editor (e.g. Notepad). E.g. modifying the static IP address is necessary when DHCP is not used.

Step 4. Connect to the other device that has to be configured and upload (restore) your configuration file.

Step 5. Done! You can have as many totally identical, customized devices as you like.

> **ATTENTION!** Macros cannot be saved into the backup file. If you have macros stored in a Configuration slot, download it separately and upload it in the target device.

5.14.2. Save the Settings of a Device (Backup)

Step 1. Apply the desired settings in the switcher (port parameters, crosspoint, etc.)

Step 2. Select the **Settings / Backup** tab from the menu.

Step 3. Write a short **description** in the text box on the left (optional).

Step 4. Press the **Create a full backup** button. You will be prompted to save the file to the computer. The default file name is the following:

```
BACKUP_<DEVICE TYPE>_SN<SERIAL NUMBER>.LW3
```

Step 5. Set the desired **file name**, select the folder and **save** the file.

> TIPS AND TRICKS: Using the exact product type in the filename is recommended, since it makes the file usage more comfortable.

About the Backup File

The backup file is a simple text file, which contains LW3 protocol commands. The first line is the description and the further lines are the commands that will be executed during the restore process. The file can be viewed (and/or edited) by a simple text editor, e.g. Notepad.

See the entire list of saved data in the Content of Backup File section.

> **ATTENTION!** Editing the command lines is only recommended for expert users.

5.14.3. Upload the Settings to a Device (Restore)

> **WARNING! Please note that the settings will be permanently overwritten with the restored parameters in the device. Withdrawal is not possible.**

> **ATTENTION!** The cloning can be successful if the backup file is downloaded from the same type of source device as the destination device.

The Restoring Process

Step 1. Select the **Settings / Backup** tab from the menu.

Step 2. Click on the **Choose file** button on the right panel and **browse** the desired file.

Step 3. The file is checked and the result will be displayed in the textbox below. If the file is correct, the settings can be restored.

Step 4. Choose the **IP settings** that you want to use after backup. You can apply settings from the backup file, keep actual settings, set it manually in a dialog box or apply DHCP.

Step 5. Select the desired **MAC filter settings** to be applied in the device. See more information about this feature in the MAC Filter Allowlist section.

Step 6. Press the **Start restore process** button and click on the **Yes** button when asked.

Step 7. Reboot the device to apply the network settings after finishing.

5.14.4. Create and Restore Backups from the Device Memory

The device can store configurations in its own memory, an internal slot is available for this purpose.

Manage stored device configurations		
Slot ID	**Configuration Name**	**Protection**
Slot 1	<Empty slot>	Not protected

Apply　Delete　**Upload**　Download
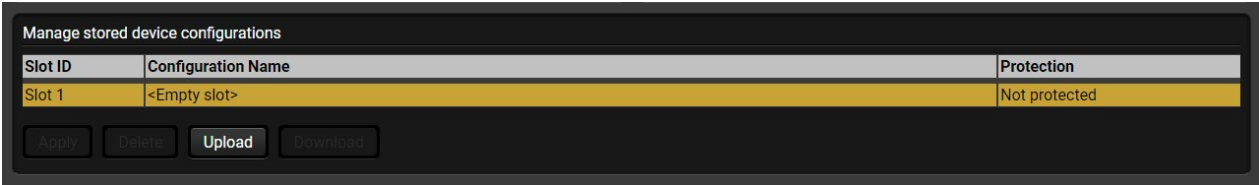
You can save the configuration to the internal slot:

- **without protection:** it can be easily applied/deleted, or
- **with protection:** it can be protected by a password to apply or delete the configuration.

Apply	Loading the selected configuration
Delete	Deleting the selected configuration
Save	Saving the current configuration to the selected slot without protection
Upload	Loading a configuration from a file to the selected slot
Save as protected	Saving the current configuration to the selected slot with a password
Download	Saving the selected configuration as a file

The preset can be used for the macros as well, please see the Macros section.

> **WARNING! Loading factory default settings will erase the internal preset in the device memory!**

5.15. Advanced View Window
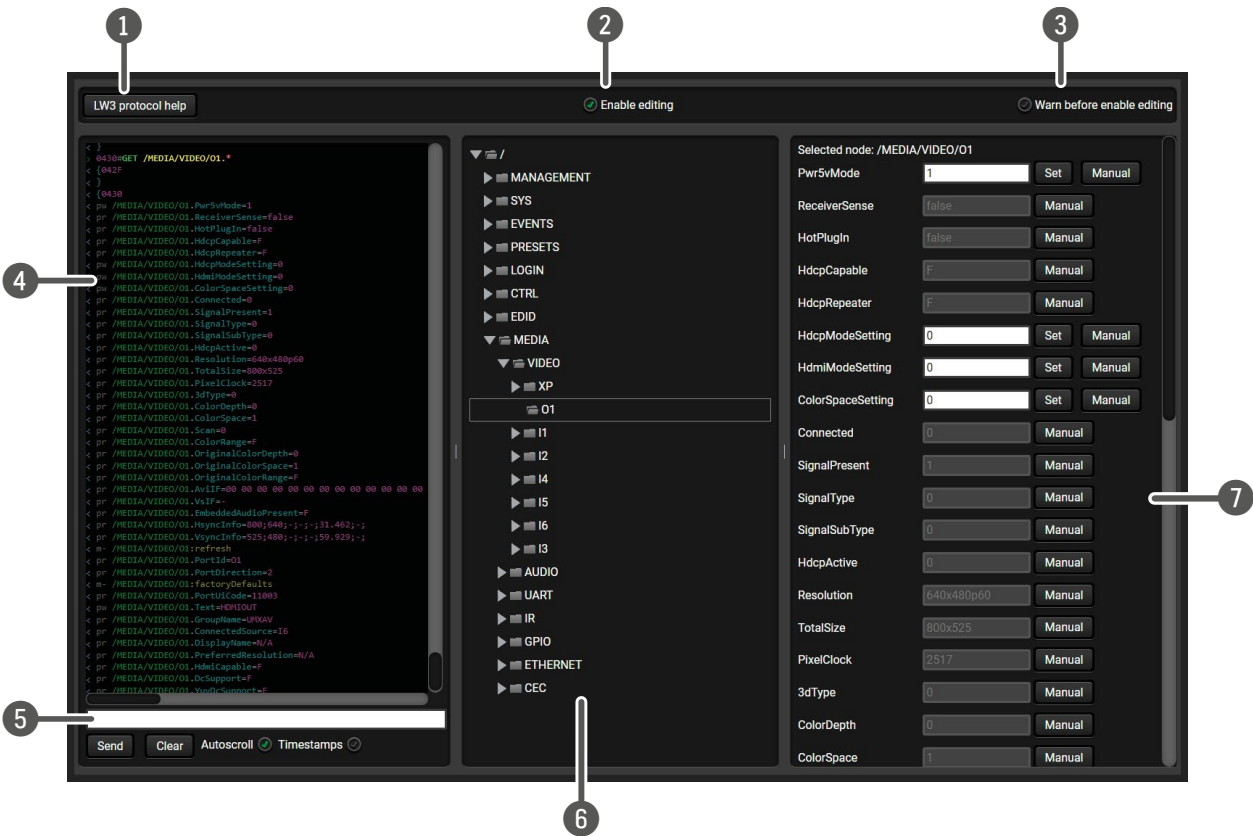
#terminal #advancedview

① LW3 protocol help   Pushing the button results in a help window opening, which describes the most important information about LW3 protocol commands in HTML format.

② Edit mode   The default appearance is the read-only mode. If you want to modify the values or parameters, add a tick to the option. You will be prompted to confirm your selection.

③ Warning mode   If this circle is checked in, a warning window pops up when you enable Edit mode.

④ Terminal window   Commands and responses with time and date are listed in this window. Sent command starts with '>' character, received response starts with '<' character. The color of each item depends on the type of the command and response. The content of the window can be emptied by the **Clear** button. If the **Autoscroll** option is ticked, the list is scrolled automatically when a new line is added.

⑤ Command line   Type the desired command and execute it by the **Send** button. Clear all current commands and responses in the Terminal window by the **Clear** button. The commands typed in this line are not escaped automatically.

⑥ Protocol tree   LW3 protocol tree; select an item to see its content.

⑦ Node list   Correspondent parameters and nodes are shown that are connected to the selected item in the protocol tree. The commands typed in these fields are escaped automatically.

Manual button: Manual (short description) of the node can be called and displayed in the terminal window.

Set button: Saves the value/parameter typed in the textbox.

Call button: Calls the method, e.g. reloads factory default settings.

6

LW2 Programmer's Reference

The device can be controlled through a reduced command set of LW2 protocol commands to ensure the compatibility with other Lightware products. The supported LW2 commands are described in this chapter.

6.1. Protocol Description

The protocol description hereinafter stands for Lightware protocol. The commands listed below can be sent to the device in RAW format via the TCP/IP port no. 10001.

The device accepts commands surrounded by curly brackets - { } - and responds data surrounded by round brackets - ( ) - only if a command was successfully executed. All input commands are converted to uppercase, but respond commands can contain upper and lower case letters as well.

Legend for Control Commands

Format	Explanation
<in>	Input number in 1 or 2 digit ASCII format (01, 5, 07, 16, etc.)
<out>	Output number in 1 or 2 digit ASCII format
<in/out>	input or output port number in 1 or 2 digit ASCII format *
<in2>	Input number in 2 digit ASCII format (01, 02, 10, 12 etc.)
<out2>	Output number in 2 digit ASCII format (01, 02, 10, 12 etc.)
<in2/out2>	input or output number in 2 digit ASCII format*
<loc>	Location number in 1, 2 or 3 digit ASCII format
<id>	id number in 1 or 2 digit ASCII format
<id2>	id number in 2 digit ASCII format
CrLf	Carriage return, Line feed (0x0D, 0x0A)
·	Space character (0x20)
→	Each command issued by the controller
←	Each response received from the router

* The command has the same arguments on the input ports and the output port, as well.

6.2. Instructions for the Terminal Application Usage

Terminal Application

The LW2 protocol commands can be applied to the device using a terminal application. You need to install one of them on your control device, for example **Putty** or **CLI**.

Establishing Connection

Follow the steps for establishing connection to the device:

Step 1. Connect the device to a LAN over Ethernet (see the details in the Connecting Steps section).

Step 2. Open the terminal application (e.g. Putty).

Step 3. Add the **IP address** of the device (default: 192.168.0.100) and the **port number (10001)**.

Step 4. Select the **Raw** connection type, and open the connection.

Once the terminal window is opened, you can enter the LW2 protocol commands, which are listed in the following sections.
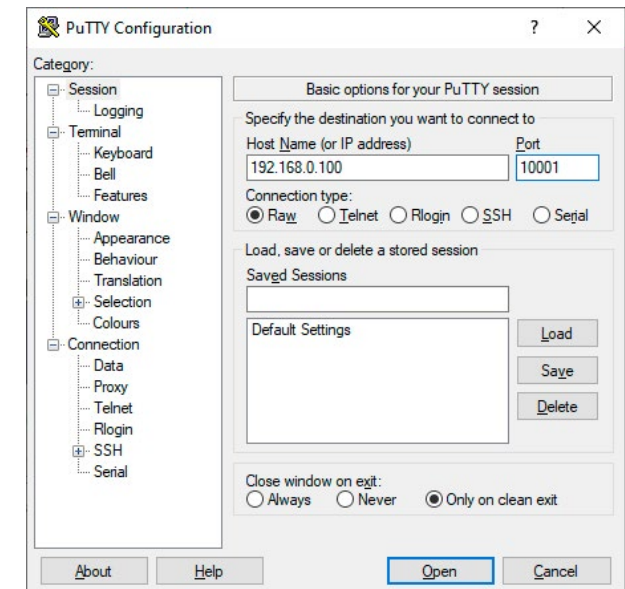
```
(LCMD# I: Device name)
(LCMD# P_?: Current protocol)
(LCMD# F: Firmware version)
(LCMD# S: Serial number)
(LCMD# IS: Query installed cards)
(LCMD# FC: Fetch cards)
(LCMD# ST: Query state)
(LCMD# FACTORY: Factory reset)
(LCMD# LABEL: Device label)
(LCMD# [inputNum]@[outputNum] <A|V>: Switch)
(LCMD# [inputNum]@O <A|V>: Switch to all)
(LCMD# #[outputNum] <A|V>: Mute)
(LCMD# +[outputNum] <A|V>: Unmute)
(LCMD# #>[outputNum] <A|V>: Lock)
(LCMD# +<[outputNum] <A|V>: Unlock)
(LCMD# VC <A|V>: Crosspoint status)
(LCMD# GETSIZE <A|V>: Crosspoint size)
(LCMD# GPIO[num]=I|O;[L|H|T]|?)
(LCMD END)
{i}
(I:UMX-HDMI-140-Plus)
{vc}
(ALL 06)
```

LW2 protocol command communication in a terminal window

6.3. General LW2 Commands

6.3.1. List of All Available LW2 Commands

Command and Response

→ {lcmd}
← (LCMD# LCMD: List all commands)CrLf
← <LW2_commands>CrLf
← (LCMD END)CrLf

Example

→ {lcmd}
← (LCMD# LCMD: List all commands)
← (LCMD# PING: Always response PONG)
← (LCMD# CT: Compile time)
← ...
← (LCMD END)

6.3.2. Querying theProduct Type

The device responds its name. *#producttype*

Command and Response

→ {i}
← (I:<product_type>)CrLf

Example

→ {i}
← (I:UMX-HDMI-140)

6.3.3. Querying the Control Protocol

The device can be controlled with different control protocols. This command queries the active protocol of the currently used control interface. *#protocol*

Command and Response

→ {p_?}
← (CURRENT·PROTOCOL·=·#<protocol>)CrLf

Example

→ {p_?}
← (CURRENT PROTOCOL = #1)

Explanation

The device communicates with LW2 protocol.

6.3.4. Querying the Firmware Version

Command and Response *#firmwareversion*

→ {f}
← (FW:<firmware_version>)CrLf

Example

→ {f}
← (FW:1.2.0b8 r45)

6.3.5. Connection Test

Simple test to see if the connection is established successfully.

Command and Response

→ {ping}
← (PONG!)CrLf

Example

→ {ping}
← (PONG!)

6.3.6. Querying the Serial Number

The device responds its 8-digit serial number. *#serialnumber*

Command and Response

→ {s}
← (SN:<serial_number>)CrLf

Example

→ {s}
← (SN:A2000274)

6.3.7. Compile Time

Returns the date when the CPU firmware was compiled.

Command and Response

→ {ct}
← (COMPILED:·<date>·<time>)CrLf

Example

→ {ct}
← (Compiled: Oct 29 2020 17:16:28)

6.3.8. Querying the Device Label

Command and Response *#label #devicelabel*

→ {label}
← (LABEL=<device_label>)CrLf

Example

→ {label}
← (LABEL=UMX-HDMI-140_ConferenceRoom)

6.3.9. Viewing the Installed Board

Shows the hardware name and revision of the installed cards.

Command and Response

→ {is}
← (SL#·0·<mb_desc>)CrLf
← (SL·END)CrLf

Example

→ {is}
← (SL# 0 UMX-HDMI-140-Plus)
← (SL END)

6.3.10. Viewing Firmware for All Controllers

Shows the firmware versions of all installed controllers. *#firmwareversion*

Command and Response

→ {fc}
← (CF·<device>·<firmware_version>)CrLf
← (CF·END)CrLf

Example

→ {fc}
← (CF UMX-HDMI-140 1.2.0b8 r45)
← (CF END)

6.3.11. Restarting of the Device

The device can be restarted without unplugging power. *#restart #reboot #reset*

Command and Response

→ {rst}
←

Example

→ {rst}
←

6.3.12. Querying the Health Status

Internal voltages and measured temperature values are shown. *#status*

Command and Response

→ {st}
← (ST·<health_status>)CrLf

Example

→ {st}
← (ST CPU 12.01V 4.98V 1.83V 1.27V 37.76C 37.83C)

6.3.13. Recalling Factory Default Settings

All settings and parameters are reset to factory default, see the table in the Factory Default Settings section. *#factory*

Command and Response

→ {factory=all}
← (FACTOR Y ALL...)CrLf

Example

→ {factory=all}
← (FACTORY ALL...)

6.4. Crosspoint and Port Settings

Port Numbering

Port type	Port	LW2 port number	Applicable media layers		
			Audio	Video	Audio + Video
Input	VGA in	01	-	V	-
	HDMI in	02	A	V	AV
	DP in	03	A	V	AV
	DVI-D in	04	A	V	AV
	DVI-A in	05	-	V	-
	Analog audio in 1	01	A	-	-
	Analog audio in 2	05	A	-	-
Output	HDMI out	01	A	V	AV

6.4.1. Switching an Input to the Output

Command and Response *#switch #crosspoint*

→ {<in>@<out>•<layer>}

← (O<out2>•I<in2>•<layer>)CrLf

Parameters

Identifier	Parameter description	Parameter values
<layer>	Signal type of the layer	**A:** audio layer **V:** video layer **AV:** audio & video layer
<out>	Output port	O1
<in>	Input port	I1-I4 **0:** Using the '0' (zero) value, the input will be disconnected and no signal will appear on the output

Example

→ {2@1 AV}

← (O01 I02 AV)

Explanation

The audio and video signals of the HDMI in (02) are selected to the HDMI out (01) port.

> **ATTENTION!** The response of this command does not show whether the output is muted. To check the mute status, a separate query has to be used, like {VC}.

> **ATTENTION!** Analog video inputs do not contain embedded audio. If you use the AV option in case of VGA input (01), the audio will be switched to the analog audio input 1 (01), and in case of DVI-A input (05), the audio will be switched to the analog audio input 2 (05).

6.4.2. Muting an Output

Command and Response *#mute*

→ {#<out>•<layer>}

← (1MT<out>•<layer>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	A	Audio layer
		V	Video layer
		AV	Audio and video layers together

Example

→ {#1 A}

← (1MT01 A)

Explanation

The audio signal of the HDMI out (01) is muted.

> **ATTENTION!** Muting does not change the state of the crosspoint but disables the output itself. This way the last connection can be easily restored with an unmute command. Switching a muted output does not unmute the output.

6.4.3. Unmuting an Output

Command and Response *#unmute*

→ {+<out>•<layer>}

← (0MT<out>•<layer>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	A	Audio layer
		V	Video layer
		AV	Audio and video layers together

Example

→ {+1}

← (0MT01)

Explanation

The audio and video signals of the HDMI out (01) are unmuted.

> INFO: Unmuting an output makes the previous connection active, as the crosspoint state has not been changed by the muting command, only the output was disabled.

6.4.4. Locking an Output

Locks an output port. The state of the output cannot be changed until unlocking.

Command and Response *#lock*

→ {#><out>·<layer>}

← (1LO<out>·<layer>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	A	Audio layer
		V	Video layer
		AV	Audio and video layers together

Example

→ {#>1 V}

← (1LO01 V)

Explanation

The video signal of the HDMI out (01) is locked.

6.4.5. Unlocking an Output

Command and Response *#unlock*

→ {+<<out>·<layer>}

← (0LO<out>·<layer>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	A	Audio layer
		V	Video layer
		AV	Audio and video layers together

Example

→ {+<1}

← (0LO01)

Explanation

The audio and video signals of the HDMI out 1 (01) are unlocked.

> INFO: The device issues the response above regardless of the previous state of the output (whether it was locked or unlocked).

6.4.6. Viewing Connection State on the Output

Command and Response *#portstatus*

→ {VC·<layer>}

← (ALL<layer>·<state_letter><in>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	A	Audio layer
		V	Video layer
		AV	Audio and video layers together
<state_letter>	The mute and lock state of the output port.	L	The output port is locked.
		M	The output port is muted.
		U	The output port is locked and muted.

Example

→ {vc av}

← (ALLV 03)

← (ALLA 05)

Explanation

DP in video input port (03) is connected to the video output port and Analog audio in 2 (05) port is connected to the audio output port.

6.4.7. Viewing Crosspoint Size

Shows the physical crosspoint size.

Command and Response

➞ {GETSIZE·<layer>}

⬅ (SIZE=<size>·<layer>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<size>	The size of the crosspoint	<in>**x**<out>	The number input ports and the number of output ports, separated with an "x".
<layer>	The layer of the HDMI signal	A	Audio layer
		V	Video layer
		AV	Audio and video layers together

Example

➞ {getsize av}

⬅ (SIZE=6x1 V)

⬅ (SIZE=5x1 A)

Explanation

The device reports that it has a video crosspoint with 6 inputs (Test pattern is the 6th input) and 1 output, and an audio crosspoint with 5 inputs and 1 output.

6.4.8. Querying the Autoselect Mode

The autoselect mode of the audio or video outputs can be changed.

Command and Response *#autoselect*

➞ {AS_<layer><out>=?}

⬅ (AS_<layer><out>=<state>;<mode>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	A	Audio layer
		V	Video layer
<state>	Autoselect state	E	Autoselect mode is enabled.
		D	Autoselect mode is disabled.
<mode>	Autoselect mode	F	First detect mode
		L	Last detect mode
		P	Priority detect mode

Example

➞ {as_v1=?}

⬅ (AS_V1=D;P)

Explanation

The Autoselect function is disabled on the video signal of the HDMI out (1) port.

6.4.9. Changing the Autoselect Mode

The autoselect mode of the audio or video outputs can be changed.

Command and Response

➞ {AS_<layer><out>=<state>;<mode>}

⬅ (AS_<layer><out>=<state>;<mode>)CrLf

Parameters

See at the previous section.

Example

➞ {as_a1=E;F}

⬅ (AS_A1=E;F)

Explanation

The Autoselect function is enabled in first detect mode on the audio signal of the HDMI out (1) port.

6.4.10. Querying the Autoselect Input Priority

The settings of audio or video autoselect input priority can be queried as follows.

Command and Response

➝ {PRIO_<layer><out>=?}

⬅ (PRIO_<layer><out>=<in1_prio>;<in2_prio>;...;<inX_prio>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	**A**	Audio layer
		V	Video layer
<in_prio>	Priority number of the input ports.	**0; 1; 2; ... 5**	Priority numbers from 0 to 5, the highest priority is 0, the lowest is 5.

Example

➝ {prio_v1=?}

⬅ (PRIO_V1=0;1;2;3;4)

Explanation

The video signal of the VGA port has the highest priority, the DVI-A has the lowest priority.

6.4.11. Changing the Autoselect Input Priority

The settings of audio or video autoselect input priority can be changed as follows.

Command and Response

➝ {PRIO_<layer><out>=<in1_prio>;<in2_prio>}

⬅ (PRIO_<layer><out>=<in1_prio>;<in2_prio>;...;<inX_prio>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<layer>	The layer of the HDMI signal	**A**	Audio layer
		V	Video layer
<in_prio>	Priority number of the input ports.	**0; 1; 2; ... 5**	Priority numbers from 0 to 5, the highest priority is 0, the lowest is 5.

Example

➝ {prio_a1=1;0;2;3;4;5}

⬅ (PRIO_A1=1;0;2;3;4;5)

ATTENTION! Always set the priority for all the ports when changing, otherwise the change will not be executed and the response will be the current setting (like querying the priority setting).

6.5. Network Configuration

6.5.1. Querying the IP Status

The network configuration of the device can be queried as follows. *#network #ipaddress #dhcp*

Command and Response

➝ {IP_STAT=?}

⬅ (IP_STAT=<mode>;<ip_address>;<subnet_mask>;<gateway_addr>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<mode>	Static IP address setting or DHCP (dynamic IP address)	**0**	Static IP address
		1	DHCP
<ip_address>	Current IP address of the device		IP address (four decimal octets separated by dots).
<subnet_mask>	Current subnet mask of the device		Subnet mask (four decimal octets separated by dots).
<gateway_address>	Current gateway address of the device		Gateway address (four decimal octets separated by dots).

Example

➝ {ip_stat=?}

⬅ (IP_STAT=0;192.168.0.75;255.255.255.0;192.168.0.1)

Explanation

The device has a static (fix) IP address: 192.168.0.75; the subnet mask is 255.255.255.0, the gateway address is 192.168.0.1.

6.5.2. Querying the IP Address

IP address can be queried as follows.

Command and Response

→ {IP_ADDRESS=?}
← (IP_ADDRESS=<mode>;<ip_address>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<mode>	Static IP address setting or DHCP (dynamic IP address)	**0**	Static IP address
		1	DHCP
<ip_address>	Current IP address of the device		IP address (four decimal octets separated by dots).

Example

→ {ip_address=?}
← (IP_ADDRESS=1;192.168.2.118)

Explanation

The device has a DHCP (dynamic) IP address: 192.168.2.118.

6.5.3. Setting the IP Address

IP address can be set as follows.

Command and Response

→ {IP_ADDRESS=<mode>;<ip_address>}
← (IP_ADDRESS=<mode>;<ip_address>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<mode>	Static IP address setting or DHCP (dynamic IP address)	**0**	Static IP address
		1	DHCP
<ip_address>	IP address of the device		IP address (four decimal octets separated by dots).

Example

→ {ip_address=1;}
← (IP_ADDRESS=1;192.168.2.118)

Explanation

The device is set to DHCP (dynamic) IP address and got 192.168.2.118.

6.5.4. Querying the Subnet Mask

The subnet mask can be queried as follows.

Command and Response

→ {IP_NETMASK=?}
← (IP_NETMASK=<subnet_mask>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<subnet_mask>	Current subnet mask of the device		Subnet mask (four decimal octets separated by dots).

Example

→ {ip_netmask=?}
← (IP_NETMASK=255.255.255.0)

6.5.5. Setting the Subnet Mask

The subnet mask can be set as follows.

Command and Response

→ {IP_NETMASK=<subnet_mask>}
← (IP_NETMASK=<subnet_mask>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<subnet_mask>	Subnet mask of the device		Subnet mask (four decimal octets separated by dots).

Example

→ {ip_netmask=255.255.0.0}
← (IP_NETMASK=255.255.0.0)

6.5.6. Querying the Gateway Address

Gateway address can be queried as follows.

Command and Response

➞ {IP_GATEWAY=?}
⬅ (IP_GATEWAY=<gateway_address>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<gateway_address>	Current gateway address of the device		Gateway address (four decimal octets separated by dots).

Example

➞ {ip_gateway=?}
⬅ (IP_GATEWAY=192.168.0.1)

6.5.7. Setting the Gateway Mask

Gateway address can be set as follows.

Command and Response

➞ {IP_GATEWAY=<gateway_address>}
⬅ (IP_GATEWAY=<gateway_address>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<gateway_address>	Current gateway address of the device		Gateway address (four decimal octets separated by dots).

Example

➞ {ip_gateway=192.168.0.1}
⬅ (IP_GATEWAY=192.168.0.1)

6.5.8. Enabling/Disabling the Ethernet Port

Command and Response

➞ {ETH_ENABLE=<switch>}
⬅ (ETH_ENABLE=<switch>)CrLf

Parameters

If the <switch> parameter is **0**, the port is **disabled**. If its value is **1**, the port is **enabled**.

Example

➞ {ETH_ENABLE=1}
⬅ (ETH_ENABLE=1)

6.5.9. Applying Network Settings

Applying the network settings and restarting the network interface.

▌ **ATTENTION!** The command is always required as the last step for applying the modified network settings.

Command and Response

➞ {IP_APPLY}
⬅ (IP_APPLY)CrLf

Example

➞ {ip_apply}
⬅ (IP_APPLY)

6.6. RS-232 Settings

6.6.1. Setting the RS-232 Mode

RS-232 mode can be set as follows. See more details about RS-232 modes in the Serial Interface section.
#rs232 #rs-232 #serial #commandinjection

Command and Response

➞ {RS232=<mode>}
⬅ (RS232=<mode>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<mode>	RS-232 operation mode	CONTROL	Control mode
		CI	Command injection mode
		PASS	Event Manager (Pass-through) mode

Example

➞ {rs232=control}
⬅ (RS232=CONTROL)

▌ INFO: The current RS-232 mode can be queried by the {RS232=?} command.

6.6.2. RS-232 Parameters Settings

The parameters of local RS-232 port can be set as follows.

Command and Response

→ {RS232_LOCAL_FORMAT=<BaudRate>;<DataBit>;<Parity>;<StopBit>}

← (RS232_LOCAL_FORMAT=<BaudRate>;<DataBit>;<Parity>;<StopBit>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<BaudRate>	Baud rate	X	No change
		4800	4800
		7200	7200
		9600	9600
		14400	14400
		19200	19200
		38400	38400
		57600	57600
		115200	115200
<DataBit>	Data bit	X	No change
		8	8
		9	9
<Parity>	Parity	X	No change
		N	None
		E	Even
		O	Odd
<StopBit>	Stop Bit	X	No change
		1	1
		1,5	1,5
		2	2

Example

→ {rs232_local_format=9600;8;O;X}

← (RS232_LOCAL_FORMAT=9600;8;O;X)

Explanation

RS-232 port is set as the following: the baud rate to 9600, data bit to 8, parity to odd, and stop bit is not changed, remained 1.

▌ INFO: The actual RS-232 parameters can be queried by the {RS232_LOCAL_FORMAT=?} command.

6.6.3. Setting the RS-232 Control Protocol Port

The control protocol of local RS-232 port can be set as follows.

Command and Response *#protocol*

→ {RS232_LOCAL_PROT=<protocol>}

← (RS232_LOCAL_PROT=<protocol>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<protocol>	RS-232 control protocol	LW2	LW2 control protocol
		LW3	LW3 control protocol

Example

→ {rs232_local_prot=lw2}

← (RS232_LOCAL_PROT=LW2)

▌ INFO: The actual RS-232 parameters can be queried by the {RS232_LOCAL_PROT=?} command.

6.7. GPIO Configuration

6.7.1. Querying the Level and Direction of Each Pin

Level and direction of the GPIO pins can be queried as follows. See more details about the GPIO connector in the GPIO - General Purpose Input/Output Ports section and about the interface in the GPIO Interface section.

Command and Response *#gpio*

→ {GPIO<pin_number>=?}

← (GPIO<pin_number>=<direction>;<level>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<pin_number>	GPIO pin number	**0 ...8**	GPIO pin number 1 to 8
<direction>	Direction of the communication	**I**	Input
		O	Output
<level>	Level of the pin	**L**	Low
		H	High

Example

→ {gpio1=?}

← (GPIO1=O;L)

Explanation

GPIO pin 1 is an output with low level.

6.7.2. Setting the Level and Direction of Each Pin

GPIO pins can be configured as follows. See more details about the GPIO connector in the GPIO - General Purpose Input/Output Ports section and about the interface in the GPIO Interface section.

Command and Response

→ {GPIO<pin_number>=<direction>;<level>}

← (GPIO<pin_number>=<direction>;<level>)CrLf

Parameters

Parameter	Parameter description	Value	Parameter value
<pin_number>	GPIO pin number	**0 ...8**	GPIO pin number 1 to 8
<direction>	Direction of the communication	**I**	Input
		O	Output
<level>	Level of the pin	**L**	Low
		H	High
		T	Toggle

Example

→ {gpio1=i;h}

← (GPIO1=I;H)

Explanation

GPIO pin 1 is set to input with high level.

6.8. LW2 Commands – Quick Summary

General LW2 Commands

List of All Available LW2 Commands
➝ {lcmd}

Querying theProduct Type
➝ {i}

Querying the Control Protocol
➝ {p_?}

Querying the Firmware Version
➝ {f}

Connection Test
➝ {ping}

Querying the Serial Number
➝ {s}

Compile Time
➝ {ct}

Querying the Device Label
➝ {label}

Viewing the Installed Board
➝ {is}

Viewing Firmware for All Controllers
➝ {fc}

Restarting of the Device
➝ {rst}

Querying the Health Status
➝ {st}

Recalling Factory Default Settings
➝ {factory=all}

Crosspoint and Port Settings

Switching an Input to the Output
➝ {<in>@<out>•<layer>}

Muting an Output
➝ {#<out>·<layer>}

Unmuting an Output
➝ {+<out>·<layer>}

Locking an Output
➝ {#><out>·<layer>}

Unlocking an Output
➝ {+<<out>·<layer>}

Viewing Connection State on the Output
➝ {VC·<layer>}

Viewing Crosspoint Size
➝ {GETSIZE·<layer>}

Querying the Autoselect Mode
➝ {AS_<layer><out>=?}

Changing the Autoselect Mode
➝ {AS_<layer><out>=<state>;<mode>}

Querying the Autoselect Input Priority
➝ {PRIO_<layer><out>=?}

Changing the Autoselect Input Priority
➝ {PRIO_<layer><out>=<in1_prio>;<in2_prio>}

Network Configuration

RS-232 Settings

GPIO Configuration

7

LW3 Programmers' Reference

The device can be controlled through Lightware 3 (LW3) protocol commands to ensure compatibility with other Lightware products. The supported LW3 commands are described in this chapter.

7.1. Overview

The Lightware Protocol #3 (LW3) is implemented in almost all new Lightware devices (matrix switchers, signal extenders and distribution amplifiers) since 2012. The protocol is ASCII-based and all commands are terminated with a carriage return (Cr, '\r') and line feed (Lf, '\n') pair. It is organized as a tree structure that provides outstanding flexibility and user-friendly handling with 'nodes', 'properties' and 'methods'. The **Advanced View** of the Lightware Device Controller software is the perfect tool for browsing and learning how the LW3 protocol can be used in practice.

7.2. Instructions for the Terminal Application Usage

Terminal Application

The LW3 protocol commands can be applied to the receiver using a terminal application. You need to install one of them on your control device, for example **Putty** or **CLI**.

Establishing Connection

Follow the steps for establishing connection to the receiver:

Step 1. Connect the receiver to a LAN over Ethernet (see the details in the Connecting Steps section).

Step 2. Open the terminal application (e.g. Putty).

Step 3. Add the **IP address** of the device (default: 192.168.0.100) and the **port number (6107)**.

Step 4. Select the **Raw** connection type, and open the connection.
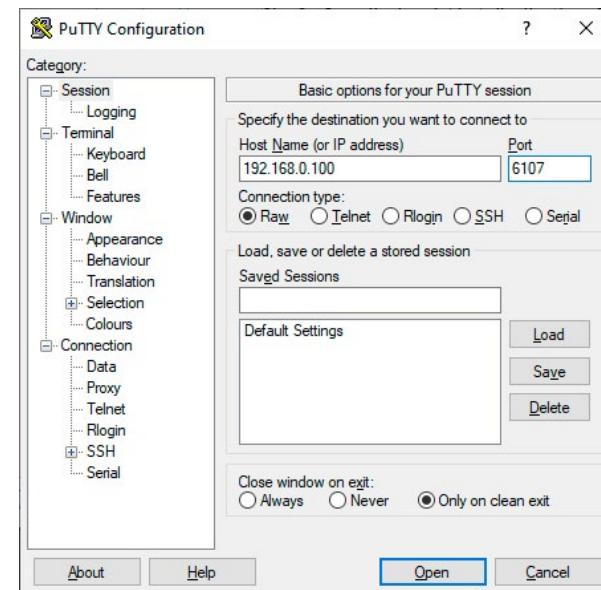
Once the terminal window is opened, you can enter the LW3 protocol commands, which are listed in the following sections.
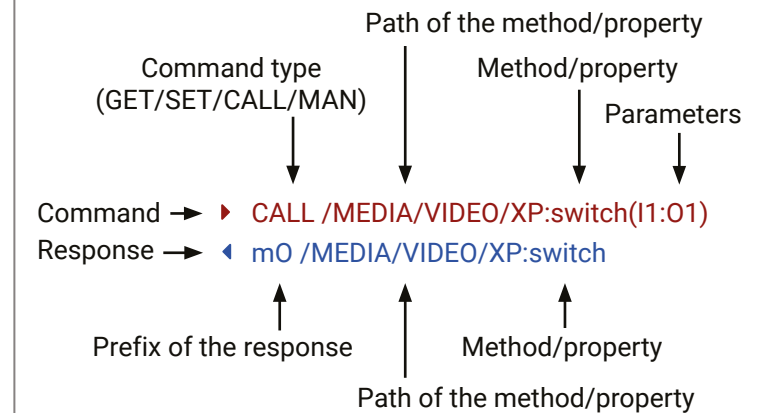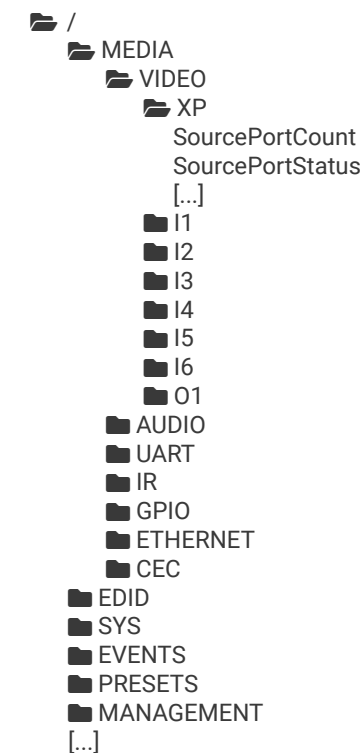

LW3 protocol command communication in a terminal window

7.3. Protocol Rules

7.3.1. LW3 Tree Structure and Command Structure (examples)

7.3.2. General Rules

- All names and parameters are **case-sensitive**.
- The nodes are separated by a slash ('/') character.
- The node name can contain the elements of the **English alphabet and numbers**.
- The command lines have to be closed by **Carriage return and Line Feed** (CrLf).
- Use the **TCP port no. 6107** when using LW3 protocol over Ethernet.
- The length of a line (command/response, command type / prefix, path, method/property and parameters together) can be **max. 800 bytes**.
- When a command is issued by the device, the received response cannot be processed by the CPU.
- The node paths describe the exact location of the node, listing each parent node up to the root.

7.3.3. Command Types

GET command

The **GET** command can be used to get the child nodes, properties and methods of a specific node. It can also be used to get the value of a property. Use the dot character (.) when addressing a property:

▶ GET /.SerialNumber
◀ pr /.SerialNumber=87654321

GETALL command

The **GETALL** command can be used to get all child nodes, properties and methods of a node with one command.

▶ GETALL /MEDIA/UART
◀ ns /MEDIA/UART/RECOGNIZER
◀ ns /MEDIA/UART/P1
◀ pr /MEDIA/UART.PortCount=1
◀ pr /MEDIA/UART.PortUi=P1:12209
◀ pr /MEDIA/UART.P1=Local RS-232

SET command

The **SET** command can be used to modify the value of a property. Use the dot character (.) when addressing the property:

▶ SET /MEDIA/VIDEO/I1.ColorSpaceMode=0
◀ pw /MEDIA/VIDEO/I1.ColorSpaceMode=0

CALL command

A method can be invoked by the **CALL** command. Use the colon character (:) when addressing the method:

▶ CALL /MEDIA/VIDEO/XP:switch(I1:O1)
◀ mO /MEDIA/VIDEO/XP:switch

MAN command

The manual is a human readable text that describes the syntax and provides a hint on how to use the primitives. For every node, property and method in the tree there is a manual, type the MAN command to get the manual:

▶ MAN /MEDIA/VIDEO/O1.Pwr5vMode
◀ pm /MEDIA/VIDEO/O1.Pwr5vMode ["0" | "1" | "2"] 0 - Auto, 1 - Always On, 2 - Always Off

7.3.4. Prefix Summary

▌ DEFINITION: The prefix is a 2-character long code that describes the type of the response.

The following prefixes are defined in the LW3 protocol:

Prefix	Description	Prefix	Description
n-	a node	pm	a manual for the property
nE	an error for a node	m-	a method
nm	a manual for a node	mO	a response after a successful method execution
pr	a read-only property	mF	a response after a failed method execution
pw	read-write property	mE	an error for a method
pE	an error for the property	mm	a manual for a method

7.3.5. Error Messages

There are several error messages defined in the LW3 protocol, all of them have a unique error number.

▶ CALL /MEDIA/VIDEO/XP:switch(IA:O1)
◀ mE /MEDIA/VIDEO/XP:switch %E004:Invalid value

7.3.6. Escaping

▌ DEFINITION: An escape sequence is a sequence of characters that does not represent itself when used inside a character or string literal, but is translated into another character or a sequence of characters.

Property values and method parameters can contain characters that are used as control characters in the protocol. They must be escaped. The escape character is the backslash ('\') and escaping means injecting a backslash before the character that should be escaped (like in C language).

Control characters are the following: \ { } # % ( ) \r \n \t

The **original** message: CALL /MEDIA/UART/P1:sendMessage(Set(01))

The **escaped** message: CALL /MEDIA/UART/P1:sendMessage(Set\(01\))

7.3.7. Signature

▌ DEFINITION: The signature is a four-digit-long hexadecimal value that can be optionally placed before every command to keep a command and the corresponding responses together as a group.

Each line is terminated with carriage return (Cr, '\r') and line feed (Lf, '\n') characters. In several cases the number of the lines in the response cannot be determined in advance, e.g. the client intends to receive the whole response and also wants to be sure that the received lines belong together and to the same command. In these cases, a special feature, the 'signature' can be used. The response to that particular command will also be preceded by the signature, and the corresponding lines will be between brackets:

▶ 1700#GET /EDID.*
◀ {1700
◀ pr /EDID.EdidStatus=F89:E1;D1:E2;D1:E3;D1:E4;F89:E5
◀ m- /EDID:copy
◀ m- /EDID:delete
◀ m- /EDID:reset
◀ m- /EDID:switch
◀ m- /EDID:switchAll
◀ }

▌ INFO: The lines of the signature are also Cr and Lf terminated.

7.3.8. Subscription

▌ DEFINITION: Subscription to a node means that the user will get a notification if a property of the node changes.

A user can subscribe to any node. These notifications are asynchronous messages and are useful to keep the client application up to date, without having to periodically poll the node to detect a changed property. When the user does not want to be informed about the changes anymore, he can simply unsubscribe from the node.

▌ ATTENTION! The subscriptions are handled separately for connections. Hence, if the connection is terminated, all registered subscriptions are deleted. After reopening a connection all subscribe commands have to be sent in order to get the notifications of the changes on that connection.

Subscribing to a Node

▶ OPEN /MEDIA/VIDEO
◀ o- /MEDIA/VIDEO

Getting the Active Subscriptions

▶ OPEN
◀ o- /MEDIA/VIDEO

◀ o- /EDID
◀ o- /DISCOVERY

Subscribing to Multiple Nodes

▶ OPEN /MEDIA/VIDEO/*
◀ o- /MEDIA/VIDEO/*

Unsubscribing from a Node

▶ CLOSE /MEDIA/VIDEO
◀ c- /MEDIA/VIDEO

Unsubscribing from Multiple Nodes

▶ CLOSE /MEDIA/VIDEO/*
◀ c- /MEDIA/VIDEO/*

7.3.9. Notifications about the Changes of the Properties

When the value of a property is changed and the user is subscribed to the node that the property belongs to, an asynchronous notification is generated. This notification is called the 'change message'. The format of such a message is very similar to the response for the **GET** command:

◀ CHG /EDID.EdidStatus=F48:E1

A Short Example of How to Use the Subscription

There are two independent users controlling the device through two independent connections (**Connection #1** and **Connection #2**). The events in the rows occur after each other.

▶ OPEN /MEDIA/AUDIO/O3
◀ o- /MEDIA/AUDIO/O3
▶ GET /MEDIA/AUDIO/O3.VolumePercent   connection #1
◀ pw /MEDIA/AUDIO/O3.VolumePercent=100.00

▶ GET /MEDIA/AUDIO/O3.VolumePercent
◀ pw /MEDIA/AUDIO/O3.VolumePercent=100.00   connection #2
▶ SET /MEDIA/AUDIO/O3.VolumePercent=50.00
◀ pw /MEDIA/AUDIO/O3.VolumePercent=50.00

◀ CHG /MEDIA/AUDIO/O3.VolumePercent=50.00   connection #1

Explanation: The first user (**Connection #1**) set a subscription to a node. Later the other user (**Connection #2**) made a change, and thanks to the subscription, the first user got a notification about the change.

7.3.10. Legend for the Control Commands

Format	Description
<in>	Input port number
<out>	Output port number
<port>	Input or output port number
<loc>	Location number
<parameter>	Specific property, which is defined and described in the command
<u>expression</u>	Batched parameters: the underline means that more expressions or parameters can be placed by using a semicolon, e.g. I2;I4;I5 or F27:E1;F47:E2
▶	Sent command
◀	Received response
·	Space character

7.4. System Commands

7.4.1. Querying the Product Name

The name of the product is a read-only parameter and cannot be modified.

Command and Response *#producttype*

▸ GET·/.ProductName
◂ pr·/.ProductName=<product_name>

Example

▸ GET /.ProductName
◂ pr /.ProductName=UMX-HDMI-140

7.4.2. Setting the Device Label

ATTENTION! The device label can be changed to a custom text in the Status tab of the LDC software. This writable parameter is not the same as the ProductName parameter.

The default format of the device label is: LW_<product_name>_<serial_no>

Command and Response *#label #devicelabel*

▸ SET·/MANAGEMENT/UID/DeviceLabel=<custom_name>
◂ pw·/MANAGEMENT/UID/DeviceLabel=<custom_name>

The Device Label can be 39 characters long and ASCII characters are allowed. Longer names are truncated.

Example

▸ SET /MANAGEMENT/UID.DeviceLabel=UMX-HDMI_Huddle_room
◂ pw /MANAGEMENT/UID.DeviceLabel=UMX-HDMI_Huddle_room

7.4.3. Querying the Serial Number

Command and Response *#serialnumber*

▸ GET·/.SerialNumber
◂ pr·/.SerialNumber=<serial_numberr>

Example

▸ GET /.SerialNumber
◂ pr /.SerialNumber=87654321

7.4.4. Querying the Firmware Version

Command and Response *#firmwareversion*

▸ GET·/SYS/MB.FirmwareVersion
◂ pr·/SYS/MB.FirmwareVersion=<firmware_version>

Example

▸ GET /SYS/MB.FirmwareVersion
◂ pr /SYS/MB.FirmwareVersion=1.2.0b8 r45

7.4.5. Querying the Package Version

DIFFERENCE: This command is available from FW package v1.3.0b5.

This command shows the installed **firmware package** version.

Command and Response

▸ GET·/MANAGEMENT/UID.PackageVersion
◂ pr·/MANAGEMENT/UID.PackageVersion=<package_version>

Example

▸ GET /MANAGEMENT/UID.PackageVersion
◂ pr /MANAGEMENT/UID.PackageVersion=1.2.0b14

7.4.6. Resetting the Device

The switcher can be restarted – the current connections (LAN, RS-232) will be terminated.

Command and Response *#reset #reboot #restart*

▸ CALL·/SYS:reset()
◂ mO·/SYS:reset=

Example

▸ CALL /SYS:reset()
◂ mO /SYS:reset=

7.4.7. Restoring the Factory Default Settings

Command and Response *#factory*

▸ CALL·/SYS:factoryDefaults()
◂ mO·/SYS:factoryDefaults=

Example

▸ CALL /SYS:factoryDefaults()
◂ mO /SYS:factoryDefaults=

The device is restarted, current connections are terminated, and the default settings are restored. See the complete list in the Factory Default Settings section.

7.4.8. Locking the Front Panel Buttons

Command and Response *#controllock #buttonlock #lockbutton*

▶ SET·/MANAGEMENT/UI.ControlLock=<lock_status>
◀ pw·/MANAGEMENT/UI.ControlLock=<lock_status>

Parameters

Parameter	Parameter description	Value	Explanation
<lock_status>	Locking status	0	None - All functions of the front panel buttons are enabled.
		1	Locked - The front panel buttons are locked and they can be unlocked by pressing the **Audio select** and the **Show Me** buttons together, or with an LW3 protocol command.
		2	Force locked - Locking and unlocking of the front panel buttons is possible only via protocol command.

Example

▶ SET /MANAGEMENT/UI.ControlLock=1
◀ pw /MANAGEMENT/UI.ControlLock=1

7.4.9. Disabling the Default Function of the Front Panel Buttons

This setting makes it possible to set an event with the Event Manager where the Condition is pressing a button, and the original function of the chosen button will not be executed.

Command and Response

▶ SET·/MANAGEMENT/UI/BUTTONS/<button_id>.DefaultFunctionEnable=<button_status>
◀ pw·/MANAGEMENT/UI/BUTTONS/<button_id>.DefaultFunctionEnable=<button_status>

Parameters

Parameter	Parameter description	Value	Explanation
<button_id>	Locking status	B1	Video Select button
		B2	Audio Select button
		B3	Show Me button
<button_status>		true	Enabled
		false	Disabled

Example

▶ SET /MANAGEMENT/UI/BUTTONS/B1.DefaultFunctionEnable=false
◀ pw /MANAGEMENT/UI/BUTTONS/B1.DefaultFunctionEnable=false

7.4.10. Identifying the Device

Calling the method results in the status LEDs blinking for 10 seconds. The feature helps to identify the device itself in the rack shelf.

Command and Response *#identifyme*

▶ CALL·/MANAGEMENT/UI:identifyMe()
◀ mO·/MANAGEMENT/UI:identifyMe=

Example

▶ CALL /MANAGEMENT/UI:identifyMe()
◀ mO /MANAGEMENT/UI:identifyMe

7.4.11. Dark Mode

This command turns the video and audio LEDs off on the front panel.

Command and Response *#darkmode*

▶ SET·/MANAGEMENT/UI/DARKMODE.DarkModeEnable=<darkmode_status>
◀ pw·/MANAGEMENT/UI/DARKMODE.DarkModeEnable=<darkmode_status>

Parameters

Parameter	Parameter description	Value	Explanation
<darkmode_status>	Status of the dark mode	true	Dark mode is enabled.
		false	Dark mode is disabled.

Example

▶ SET /MANAGEMENT/UI/DARKMODE.DarkModeEnable=true
◀ pw /MANAGEMENT/UI/DARKMODE.DarkModeEnable=true

7.4.12. Dark Mode Delay

The LEDs on the front panel turn off after some delay time, which can be set in seconds.

Command and Response

▶ SET·/MANAGEMENT/UI/DARKMODE.DarkModeDelay=<delay_time>
◀ pw·/MANAGEMENT/UI/DARKMODE.DarkModeDelay =<delay_time>

Parameters

<delay_time>   Delay time in seconds.

Example

▶ SET /MANAGEMENT/UI/DARKMODE.DarkModeDelay=10
◀ pw /MANAGEMENT/UI/DARKMODE.DarkModeDelay=10

7.4.13. Running a Macro

▊ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model fromFW package v1.3.0b5.

▊ DEFINITION: Macro is a batch of pre-defined commands stored in the device. *#macro #new*

You can create your custom macros in a file, upload to the device and run at any time. The uploading can be done over LDC, see the Uploading New Macros into the Internal Device Configuration Preset section. The following LW3 command is suitable only for running a macro.

Command and Response

▸ CALL·/CTRL/MACROS:run(<macro_name>)
◂ mO·/CTRL/MACROS:run

Example

▸ CALL /CTRL/MACROS:run(Macro1)
◂ mO /CTRL/MACROS:run

7.5. Cleartext Login Protection

▊ **DIFFERENCE:** This feature is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

This cleartext login tool allows setting a password for login, and thus any change in the device can only be performed after a successful login – coming from any control interface (RS-232, Ethernet, etc…). The login is valid until a TCP socket break in case of Ethernet connection. *#login   #new*

▊ **ATTENTION!** If the login is enabled, the miniweb is not available.

▊ INFO: The login password is erased and the login is disabled when restoring the factory default values.

The following can be queried without login:

- ProductName
- PartNumber
- SerialNumber
- FirmwareVersion
- PackageVersion
- MacAddress

7.5.1. Setting the Login Password

Command and Response

▸ CALL·/LOGIN:setPassword(<password>)
◂ mO·/LOGIN:setPassword

Example

▸ CALL /LOGIN:setPassword(pr0t3ctED)
◂ mO /LOGIN:setPassword

7.5.2. Logging into the Device

Command and Response

▸ CALL·/LOGIN:login(<password>)
◂ mO·/LOGIN:login

Example

▸ CALL /LOGIN:login(pr0t3ctED)
◂ mO /LOGIN:login

After a successful login, the **LoggedIn** property becomes **true** and the LW3 tree is available.

7.5.3. Logging out of the Device

Command and Response

▸ CALL·/LOGIN:logout(<password>)
◂ mO·/LOGIN:logout

Example

▸ CALL /LOGIN:logout(pr0t3ctED)
◂ mO /LOGIN:logout

After a successful logout, the **LoggedIn** property becomes **false** and the LW3 tree is protected.

7.5.4. Enabling/Disabling the Cleartext Login Function

▊ **ATTENTION!** This property can be changed only if the **LoggedIn** property is **true**.

Command and Response

▸ SET·/LOGIN:LoginEnable=<login_state>
◂ pw·/LOGIN.LoginEnable=<login_state>

Parameters

If the <login_state> parameter is **true** (or **1**), the Cleartext login function is **enabled**, if the parameter is **false** (or **0**), the function is **disabled**. Please note that the function can be enabled without setting a password by the **setPassword** method.

Example

▸ SET /LOGIN.LoginEnable=true
◂ pw /LOGIN.LoginEnable=true

7.6. Video Port Settings

▌ INFO: Video port numbering can be found in the Input/Output Port Numbering section.

7.6.1. Querying the Status of Source Ports

Command and Response *#portstatus*

▸ GET·/MEDIA/VIDEO/XP.SourcePortStatus

◂ pr·/MEDIA/VIDEO/XP.SourcePortStatus=<in1_state>;<in2_state>;<...>; <inX_state>

The response contains 5 ASCII characters for each port. The first character indicates the mute/lock state, the next four characters represent a 2-byte HEX code that shows the current state of the input ports.

Example

▸ GET /MEDIA/VIDEO/XP.SourcePortStatus

◂ pr /MEDIA/VIDEO/XP.SourcePortStatus=T002E;M00AA;T00AA;T00EF;T000A;T002E

Parameters

Letter (Character 1)		
	Mute state	**Lock state**
T	Unmuted	Unlocked
L	Unmuted	Locked
M	Muted	Unlocked
U	Muted	Locked

M 0 0 A A

- Letter → Mute / Lock status
- Byte 1 → Reserved character, always 0.
- Byte 1 → Reserved character, always 0.
- Byte 2 → Embedded audio / HDCP status
- Byte 2 → Signal present / Connection status

	Byte 1				Byte 2			
	Character 2		Character 3		Character 4		Character 5	
	BIT 7-6	BIT 5-4	BIT 3-2	BIT 1-0	BIT 7-6	BIT 5-4	BIT 3-2	BIT 1-0
	Reserved	Reserved	Reserved	Reserved	Embedded audio status	HDCP status	Signal present status	Connection status
0 0					Unknown			
0 1					Reserved			
1 0	Reserved	Reserved	Reserved	Reserved	No embedded audio	Not encrypted	No signal	Not connected
1 1					Embedded audio presents	Encrypted	Signal presents	Connected

Example and Explanation (for input 4, T00EF):

T	0		0		E		F	
Unlocked, Unmuted	0 0	0 0	0 0	0 0	1 1	1 0	1 1	1 1
	Reserved	Reserved	Reserved	Reserved	Embedded audio presents	Not encrypted	Signal presents	Connected

The Most Common Received Port Status Responses

T00AA	T	0		0		A		A	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	1 0	1 0	1 0	1 0
		Reserved	Reserved	Reserved	Reserved	No embedded audio	Not encrypted	No signal	Not connected

T00AB	T	0		0		A		B	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	1 0	1 0	1 0	1 1
		Reserved	Reserved	Reserved	Reserved	No embedded audio	Not encrypted	No signal	Connected

T00AF	T	0		0		A		F	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	1 0	1 0	1 1	1 1
		Reserved	Reserved	Reserved	Reserved	No embedded audio	Not encrypted	Signal presents	Connected

T00EF	T	0		0		E		F	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	1 1	1 0	1 1	1 1
		Reserved	Reserved	Reserved	Reserved	Embedded audio presents	Not encrypted	Signal presents	Connected

T00BF	T	0		0		B		F	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	1 0	1 1	1 1	1 1
		Reserved	Reserved	Reserved	Reserved	No embedded audio	Encrypted	Signal presents	Connected

T00FF	T	0		0		F		F	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	1 1	1 1	1 1	1 1
		Reserved	Reserved	Reserved	Reserved	Embedded audio presents	Encrypted	Signal presents	Connected

Only for analog video ports: Character 5 is E (11 10), which means signal is present, but the cable is not connected. The explanation is that analog video ports have no hotplug signal that indicates the connection status.

T002E	T	0		0		2		E	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	0 0	1 0	1 1	1 0
		Reserved	Reserved	Reserved	Reserved	Unknown	Not encrypted	Signal presents	Not connected

7.6.2. Querying the Status of Destination Port

Command and Response *#portstatus*

▶ GET·/MEDIA/VIDEO/XP.DestinationPortStatus

◀ pr·/MEDIA/VIDEO/XP.DestinationPortStatus=<out1_state>;<out2_state>;<…>;<out#_state>

The response contains 5 ASCII characters for each port. The first character indicates the mute/lock state, the next 2-byte long HEX code shows the current state of the output port.

Example

▶ GET /MEDIA/VIDEO/XP.DestinationPortStatus

◀ pr /MEDIA/VIDEO/XP.DestinationPortStatus=M00BF

Parameters: See the previous section.

M	0		0		B		F	
Unlocked, Muted	0 0	0 0	0 0	0 0	1 0	1 1	1 1	1 1
	Reserved	Reserved	Reserved	Reserved	No embedded audio	Encrypted	Signal presents	Connected

7.6.3. Querying the Video Crosspoint Setting

Command and Response

▶ GET·/MEDIA/VIDEO/XP.DestinationConnectionList

◀ pr·/MEDIA/VIDEO/XP.DestinationConnectionList=<in>

Example

▶ GET /MEDIA/VIDEO/XP.DestinationConnectionList

◀ pr /MEDIA/VIDEO/XP.DestinationConnectionList=I1

Explanation: I1 input port is connected to the output port.

7.6.4. Switching Video Input

Command and Response *#switch #crosspoint*

▶ CALL·/MEDIA/VIDEO/XP:switch(<in>:<out>)

◀ mO·/MEDIA/VIDEO/XP:switch

Example

▶ CALL /MEDIA/VIDEO/XP:switch(I2:O1)

◀ mO /MEDIA/VIDEO/XP:switch

I2 port is connected to O1 port.

7.6.5. Querying the Video Autoselect Settings

Command and Response *#autoselect*

▶ GET·/MEDIA/VIDEO/XP.DestinationPortAutoselect

◀ pr·/MEDIA/VIDEO/XP.DestinationPortAutoselect=<out1_set>;<out2_set>;<…>;<out#_set>

The response shows the settings of each output one by one.

Parameters

Parameter	Parameter description	Value	Explanation
<out_set>	Two-letter code of the Autoselect settings 1st letter	E	Autoselect is **enabled.**
		D	Autoselect is **disabled.**
	Two-letter code of the Autoselect settings 2nd letter	F	**First** detect mode: the first active video input is selected.
		P	**Priority** detect: always the highest priority active video input will be selected.
		L	**Last** detect: always the last attached input is switched to the output automatically.

Example

▶ GET /MEDIA/VIDEO/XP.DestinationPortAutoselect

◀ pr /MEDIA/VIDEO/XP.DestinationPortAutoselect=EL

EL: the Autoselect is Enabled on output, selected mode is Last detect.

INFO: For more information about the Autoselect feature, see the The Autoselect Feature section.

7.6.6. Changing the Autoselect Mode

Command and Response

▶ CALL·/MEDIA/VIDEO/XP:setDestinationPortAutoselect(<out>:<out_set>)

◀ mO·/MEDIA/VIDEO/XP:setDestinationPortAutoselect

Parameters: see the previous section.

Example1:

▶ CALL /MEDIA/VIDEO/XP:setDestinationPortAutoselect(O1:EP)

◀ mO /MEDIA/VIDEO/XP:setDestinationPortAutoselect

The setting is changed to **EPM**: Autoselect is enabled (E); the mode is set to **priority detect** (P).

Example2:

▶ CALL /MEDIA/VIDEO/XP:setDestinationPortAutoselect(O1:D)

◀ mO /MEDIA/VIDEO/XP:setDestinationPortAutoselect

The setting is changed to "DPM": Autoselect is disabled (D). The other settings remain unchanged.

7.6.7. Querying the Input Port Priority

Command and Response

▸ GET·/MEDIA/VIDEO/XP.PortPriorityList
◂ pr·/MEDIA/VIDEO/XP.PortPrioirtyList=<u><out1_list>;<out2_list>;<...>;<out#_list></u>

The response shows the priority of each output one after another. The priority number can range from 0 to 31; 0 is the highest and 30 is the lowest priority. 31 means that the port will be skipped in the priority list.

Parameters

<out#_list>   The input port priority order of the given output port: <in1>,<in2>,…,<in>

Example

▸ GET /MEDIA/VIDEO/XP.PortPriorityList
◂ pr /MEDIA/VIDEO/XP.PortPriorityList=0,1,2,3,4,5

Explanation

	Output 1					
Video input port	in1	in2	in3	in4	in5	in6
Priority	0	1	2	3	4	5

Highest priority is assigned to I1 port.

ATTENTION! The same priority number can be set to different input ports. When the priority numbers match, the input port with the lowest port number will have the highest priority.

7.6.8. Changing the Input Port Priority

Command and Response

▸ CALL·/MEDIA/VIDEO/XP:setAutoselectionPriority(<u><in>(<out>):<prio></u>);(<u><in>(<out>):<prio></u>)
◂ mO·/MEDIA/VIDEO/XP:setAutoselectionPrioirty

Parameters

Parameter	Parameter description
<prio>	Priority number from 0 to 31, equal numbers are allowed (31 means that the port will be skipped in the priority list).

An input port priority can be set on an output port. Many settings can be executed by separating them with a semicolon (no space), see the example below.

Example

▸ CALL /MEDIA/VIDEO/XP:setAutoselectionPriority(I1\(O1\):4;I2\(O1\):4)
◂ mO /MEDIA/VIDEO/XP:setAutoselectionPriority

The priority number of input 1 and Input 2 has been set to 4 on output 1. The example shows that certain control characters have been escaped: the backslash "\" character is inserted before the "(" and ")" characters. See more information about the escaping in the Escaping section.

7.6.9. Muting an Input Port

Command and Response *#mute*

▸ CALL·/MEDIA/VIDEO/XP:muteSource(<u><in></u>)
◂ mO·/MEDIA/VIDEO/XP:muteSource

Example

▸ CALL /MEDIA/VIDEO/XP:muteSource(I1)
◂ mO /MEDIA/VIDEO/XP:muteSource

7.6.10. Unmuting an Input Port

Command and Response *#unmute*

▸ CALL·/MEDIA/VIDEO/XP:unmuteSource(<u><in></u>)
◂ mO·/MEDIA/VIDEO/XP:unmuteSource

Example

▸ CALL /MEDIA/VIDEO/XP:unmuteSource(I1)
◂ mO /MEDIA/VIDEO/XP:unmuteSource

7.6.11. Querying the Connected Input Port Number

DIFFERENCE: This command is available only in UMX-HDMI-140-Plus model from FW package v1.x.x

The response of this command shows the input port that is connected to the queried output port.

Command and Response *#crosspoint   #new*

▸ GET·/MEDIA/VIDEO/<out>.ConnectedSource
◂ pr·/MEDIA/VIDEO/<out>.ConnectedSource=<in>

Example

▸ GET /MEDIA/VIDEO/O1.ConnectedSource
◂ pr /MEDIA/VIDEO/O1.ConnectedSource=I1

7.6.12. Locking an Input Port

Command and Response *#lock*

▶ CALL·/MEDIA/VIDEO/XP:lockSource(<u><in></u>)
◀ mO·/MEDIA/VIDEO/XP:lockSource

Example

▶ CALL /MEDIA/VIDEO/XP:lockSource(I1)
◀ mO /MEDIA/VIDEO/XP:lockSource

7.6.13. Unlocking an Input Port

Command and Response *#unlock*

▶ CALL·/MEDIA/VIDEO/XP:unlockSource(<u><in></u>)
◀ mO·/MEDIA/VIDEO/XP:unlockSource

Example

▶ CALL /MEDIA/VIDEO/XP:unlockSource(I1)
◀ mO /MEDIA/VIDEO/XP:unlockSource

7.6.14. Muting an Output

Command and Response *#mute*

▶ CALL·/MEDIA/VIDEO/XP:muteDestination(<out>)
◀ mO·/MEDIA/VIDEO/XP:muteDestination

Example

▶ CALL /MEDIA/VIDEO/XP:muteDestination(O1)
◀ mO /MEDIA/VIDEO/XP:muteDestination

7.6.15. Unmuting an Output

Command and Response *#unmute*

▶ CALL·/MEDIA/VIDEO/XP:unmuteDestination(<out>)
◀ mO·/MEDIA/VIDEO/XP:unmuteDestination

Example

▶ CALL /MEDIA/VIDEO/XP:unmuteDestination(O1)
◀ mO /MEDIA/VIDEO/XP:unmuteDestination

7.6.16. Locking an Output

Command and Response *#lock*

▶ CALL·/MEDIA/VIDEO/XP:lockDestination(<out>)
◀ mO·/MEDIA/VIDEO/XP:lockDestination

Example

▶ CALL /MEDIA/VIDEO/XP:lockDestination(O1)
◀ mO /MEDIA/VIDEO/XP:lockDestination

7.6.17. Unlocking an Output

Command and Response *#unlock*

▶ CALL·/MEDIA/VIDEO/XP:unlockDestination(<out>)
◀ mO·/MEDIA/VIDEO/XP:unlockDestination

Example

▶ CALL /MEDIA/VIDEO/XP:unlockDestination(O1)
◀ mO /MEDIA/VIDEO/XP:unlockDestination

7.6.18. HDCP Setting (Input Port)

HDCP capability can be enabled/disabled on the input ports, and thus non-encrypted content can be seen on a non-HDCP compliant display. See more information in the HDCP Management section.

Command and Response *#hdcp*

▶ SET·/MEDIA/VIDEO/<in>.HdcpEnable=<hdcp_status>
◀ pw·/MEDIA/VIDEO/<in>.HdcpEnable=<hdcp_status>

Parameters

Parameter	Parameter description	Value	Parameter value
<logical_value>	HDCP enable/disable setting	**true**	HDCP encryption is enabled.
		false	HDCP encryption is disabled.

Example

▶ SET /MEDIA/VIDEO/I2.HdcpEnable=true
◀ pw /MEDIA/VIDEO/I2.HdcpEnable=true

INFO: HDCP can be set for digital video inputs (I2, I3, I4) only. The function is unavailable on the analog inputs (I1, I5).

7.6.19. HDCP Setting (Output Port)

HDCP capability can be set to Auto/Always on the output ports, and thus non-encrypted content can be transmitted to a non-HDCP compliant display. See more information in the HDCP Management section.

Command and Response *#hdcp*

▸ SET·/MEDIA/VIDEO/<out>.HdcpModeSetting=<hdcp_mode>

◂ pw·/MEDIA/VIDEO/<out>.HdcpModeSetting=<hdcp_mode>

Parameters

Parameter	Parameter description	Value	Parameter value
<HDCP_mode>	HDCP mode	0	Auto
		1	Always

Example

▸ SET /MEDIA/VIDEO/O1.HdcpModeSetting=0

◂ pw /MEDIA/VIDEO/O1.HdcpModeSetting=0

7.6.20. Test Pattern Mode

The output port can send a special image towards the sink device for testing purposes. The setting is available on the input ports with the parameters listed below.

Command and Response *#testpattern #nosyncscreen*

▸ SET·/MEDIA/VIDEO/<in>.FreeRunMode=<tpg_mode>

◂ pw·/MEDIA/VIDEO/<in>.FreeRunMode=<tpg_mode>

Parameters

Parameter	Parameter description	Value	Parameter value
<mode>	Test pattern generator mode	0	**Always off**: the test pattern is not displayed on the output.
		1	**Always on**: the test pattern is displayed on the output.
		2	**Auto**: the test pattern is displayed if there is no signal on the input port.

Example

▸ SET /MEDIA/VIDEO/I1.FreeRunMode=2

◂ pw /MEDIA/VIDEO/I1.FreeRunMode=2

7.6.21. Test Pattern Resolution

Command and Response

▸ SET·/MEDIA/VIDEO/<in>.FreeRunResolution=<tpg_resolution>

◂ pw·/MEDIA/VIDEO/<in>.FreeRunResolution=<tpg_resolution>

Parameters

Parameter	Parameter description	Value	Parameter value
<tpg_resolution>	Resolution of the test pattern generator	0	640x480p60
		1	720x480i60
		2	720x480p60
		3	720x576i50
		4	720x576p50
		5	800x600p60
		6	1024x768p60
		7	1280x720p60
		8	1280x1024p60
		9	1280x1080i60
		10	1920x1080p60
		11	1920x1200p60

Example

▸ SET /MEDIA/VIDEO/I2.FreeRunResolution=10

◂ pw /MEDIA/VIDEO/I2.FreeRunResolution=10

7.6.22. Test Pattern Color

Command and Response

▸ SET·/MEDIA/VIDEO/<in>.FreeRunColor=<RGB_code>

◂ pw·/MEDIA/VIDEO/<in>.FreeRunColor=<RGB_code>

Parameters

<RGB_code>   RGB color in RR;GG;BB format (separated by semicolons).

Example

▸ SET /MEDIA/VIDEO/I1.FreeRunColor=10;80;20

◂ pw /MEDIA/VIDEO/I1.FreeRunColor=10;80;20

The test pattern color on the VGA input (I1) is set to green.

7.6.23. HDMI Mode Settings (Output Port)

Command and Response *#signaltype*

▸ SET·/MEDIA/VIDEO/<out>.HdmiModeSetting=<mode>

◂ pw·/MEDIA/VIDEO/<out>.HdmiModeSetting=<mode>

Parameters

Parameter	Parameter description	Value	Parameter value
<mode>	HDMI mode	0	Auto
		1	DVI
		2	HDMI 24bit
		3	HDMI 30bit
		4	HDMI 36bit

Example

▸ SET /MEDIA/VIDEO/O1.HdmiModeSetting=2

◂ pw /MEDIA/VIDEO/O1.HdmiModeSetting=2

7.6.24. Color Space Setting (Output Port)

Command and Response *#colorspace*

▸ SET·/MEDIA/VIDEO/<out>.ColorSpaceSetting=<colorspace>

◂ pw·/MEDIA/VIDEO/<out>.ColorSpaceSetting=<colorspace>

Parameters

Parameter	Parameter description	Value	Parameter value
<colorspace>	Color space setting of the output	0	Auto
		1	RGB
		2	YCbCr 4:4:4
		3	YCbCr 4:2:2

Example

▸ SET /MEDIA/VIDEO/O1.ColorSpaceSetting=2

◂ pw /MEDIA/VIDEO/O1.ColorSpaceSetting=2

7.7. Audio Port Settings

▌ INFO: Audio port numbering can be found in the Input/Output Port Numbering section.

7.7.1. Querying the Status of Source Port

Command and Response *#portstatus*

▸ GET·/MEDIA/AUDIO/XP.SourcePortStatus

◂ pr·/MEDIA/AUDIO/XP.SourcePortStatus=<in1_status>;<in2_status>;...;<inX_status>

The response contains 5 ASCII characters for each port. The first character indicates the mute/lock state, the next four characters represent a 2-byte HEX code that shows the current state of the input ports.

▸ GET /MEDIA/AUDIO/XP.SourcePortStatus

◂ pr /MEDIA/AUDIO/XP.SourcePortStatus=T000F;M000B;T000A;T000A;T000A

Legend:

Letter (Character 1)		
	Mute state	**Lock state**
T	Unmuted	Unlocked
L	Unmuted	Locked
M	Muted	Unlocked
U	Muted	Locked

T 0 0 0 F

Letter — Mute / Lock status
Byte 1 — Reserved character, always 0.
— Reserved character, always 0.
Byte 2 — Reserved character, always 0.
— Signal present / Connection status

	Byte 1				Byte 2			
	Character 2		Character 3		Character 4		Character 5	
	BIT 7-6	BIT 5-4	BIT 3-2	BIT 1-0	BIT 7-6	BIT 5-4	BIT 3-2	BIT 1-0
	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Signal present status	Connection status
0 0								Unknown
0 1								Reserved
1 0	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	No signal	Not connected
1 1							Signal presents	Connected

Example and Explanation (for input 2, M000B):

M	**0**		**0**		**0**		**B**	
Unlocked, Muted	0 0	0 0	0 0	0 0	0 0	0 0	1 0	1 1
	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	No signal	Connected

The Most Common Received Port Status Responses

T000A	**T**	**0**		**0**		**0**		**A**	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	0 0	0 0	1 0	1 0
		Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	No signal	Not connected

T000B	**T**	**0**		**0**		**0**		**B**	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	0 0	0 0	1 0	1 1
		Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	No signal	Connected

T000F	**T**	**0**		**0**		**0**		**F**	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	0 0	0 0	1 1	1 1
		Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Signal presents	Connected

Only for Phoenix audio port: Character 5 is C (11 00), which means signal is present, but the cable connection status is unknown. The explanation is that the Phoenix connector has no pin that can indicate the connection status, so this is always unknown.

T000C	**T**	**0**		**0**		**0**		**C**	
	Unlocked, Unmuted	0 0	0 0	0 0	0 0	0 0	0 0	1 1	0 0
		Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Signal presents	Unknown

7.7.2. Querying the Status of Destination Port

Command and Response *#portstatus*

▶ GET·/MEDIA/AUDIO/XP.DestinationPortStatus

◀ pr·/MEDIA/AUDIO/XP.DestinationPortStatus=<out_status>

The response contains 5 ASCII characters for each port. The first character indicates the mute/lock state, the next 2-byte long HEX code shows the current state of the output port.

▶ GET /MEDIA/AUDIO/XP.DestinationPortStatus

◀ pr /MEDIA/AUDIO/XP.DestinationPortStatus=M000F

Legend

See the previous section.

Example and Explanation (M000F)

M	0		0		0		F	
Unlocked, Muted	0 0	0 0	0 0	0 0	0 0	0 0	1 1	1 1
	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Signal presents	Connected

7.7.3. Querying the Audio Crosspoint Setting

Command and Response

▶ GET·/MEDIA/AUDIO/XP.DestinationConnectionList

◀ pr·/MEDIA/AUDIO/XP.DestinationConnectionList=<in>

Example

▶ GET /MEDIA/AUDIO/XP.DestinationConnectionList

◀ pr /MEDIA/AUDIO/XP.DestinationConnectionList=I5

Explanation: I5 input port is connected to the output port.

7.7.4. Switching Audio Input

Command and Response *#switch #crosspoint*

▶ CALL·/MEDIA/AUDIO/XP:switch(<in>:<out>)

◀ mO·/MEDIA/AUDIO/XP:switch

Example

▶ CALL /MEDIA/AUDIO/XP:switch(I2:O1)

◀ mO /MEDIA/AUDIO/XP:switch

I2 port is connected to O1 port.

7.7.5. Querying the Audio Autoselect Settings

Command and Response *#autoselect*

▶ GET·/MEDIA/AUDIO/XP.DestinationPortAutoselect

◀ pr·/MEDIA/AUDIO/XP.DestinationPortAutoselect=<out_set>

The response shows the settings of each output one by one.

Parameters

Parameter	Parameter description	Value	Explanation
<out_set>	Two-letter code of the Autoselect settings; 1st letter	E	Autoselect is **enabled.**
		D	Autoselect is **disabled.**
	Two-letter code of the Autoselect settings; 2nd letter	F	**First** detect mode: the first active audio input is selected.
		P	**Priority** detect: it is always the highest priority active video input that will be selected.
		L	**Last** detect: it is always the last attached input that is automatically switched to the output.
		S	**Static:** the audio input follows the selected video if the video signal contains embedded audio.

Example

▶ GET /MEDIA/AUDIO/XP.DestinationPortAutoselect

◀ pr /MEDIA/AUDIO/XP.DestinationPortAutoselect=EL

Explanation

EL: the Autoselect is **E**nabled on O1, selected mode is **L**ast detect.

▌ INFO: For more information, see The Autoselect Feature section.

7.7.6. Changing the Autoselect Mode

Command and Response

▶ CALL·/MEDIA/AUDIO/XP:setDestinationPortAutoselect(<out>:<out_set>)

◀ mO·/MEDIA/AUDIO/XP:setDestinationPortAutoselect

Legend

See the previous section.

Example

▶ CALL /MEDIA/AUDIO/XP:setDestinationPortAutoselect(O1:EF)

◀ mO /MEDIA/AUDIO/XP:setDestinationPortAutoselect

7.7.7. Querying the Input Port Priority

Command and Response

▶ GET·/MEDIA/AUDIO/XP.PortPriorityList

◀ pr·/MEDIA/AUDIO/XP.PortPrioirtyList=<in1_prio>

Legend

<out_prio>:   The input port priority order of the given output port: I1 to I5.

Example

▶ GET /MEDIA/AUDIO/XP.PortPriorityList

◀ pr /MEDIA/AUDIO/XP.PortPriorityList=0,1,2,3,4

Explanation

Input 1 has the highest priority and Input 5 has the lowest priority on O1 output port.

> **ATTENTION!** The same priority number can be set to different input ports. When the priority numbers match, the input port with the lowest port number will have the highest priority.

7.7.8. Changing the Input Port Priority

Command and Response

▶ CALL·/MEDIA/AUDIO/XP:setAutoselectionPriority(<in>(<out>):<prio>)

◀ mO·/MEDIA/AUDIO/XP:setAutoselectionPrioirty

Legend

Parameter	Parameter description
<prio>	Priority number from 0 to 31, equal numbers are allowed (31 means that the port will be skipped in the priority list).

An input port priority can be set on an output port. Many settings can be executed by separating them with a semicolon (no space), see the example below.

Example

▶ CALL /MEDIA/AUDIO/XP:setAutoselectionPriority (I1(O1):1;I2(O1):0;I3(O1):2 I4(O1):3;I5(O1):4)

◀ mO /MEDIA/AUDIO/XP:setAutoselectionPriority

Explanation

The priority order of the inputs for O1 is: I2, I1, I3, I4, I5.

7.7.9. Muting an Audio Input

Command and Response *#mute*

▶ CALL·/MEDIA/AUDIO/XP:muteSource(<in>)

◀ mO·/MEDIA/AUDIO/XP:muteSource

Example

▶ CALL /MEDIA/AUDIO/XP:muteSource(I1)

◀ mO /MEDIA/AUDIO/XP:muteSource

7.7.10. Unmuting an Audio Input

Command and Response *#unmute*

▶ CALL·/MEDIA/AUDIO/XP:unmuteSource(<in>)

◀ mO·/MEDIA/AUDIO/XP:unmuteSource

Example

▶ CALL /MEDIA/AUDIO/XP:unmuteSource(I1)

◀ mO /MEDIA/AUDIO/XP:unmuteSource

7.7.11. Locking an Audio Input

Command and Response *#lock*

▶ CALL·/MEDIA/AUDIO/XP:lockSource(<in>)

◀ mO·/MEDIA/AUDIO/XP:lockSource

Example

▶ CALL /MEDIA/AUDIO/XP:muteSource(I1)

◀ mO /MEDIA/AUDIO/XP:muteSource

7.7.12. Unlocking an Audio Input

Command and Response *#unlock*

▶ CALL·/MEDIA/AUDIO/XP:unlockSource(<in>)

◀ mO·/MEDIA/AUDIO/XP:unlockSource

Example

▶ CALL /MEDIA/AUDIO/XP:unmuteSource(I1)

◀ mO /MEDIA/AUDIO/XP:unmuteSource

7.7.13. Muting an Audio Output

Command and Response *#mute*

▸ CALL·/MEDIA/AUDIO/XP:muteDestination(<out>)

◂ mO·/MEDIA/AUDIO/XP:muteDestination

Example

▸ CALL /MEDIA/AUDIO/XP:muteDestination(O1)

◂ mO /MEDIA/AUDIO/XP:muteDestination

7.7.14. Unmuting an Audio Output

Command and Response *#unmute*

▸ CALL·/MEDIA/AUDIO/XP:unmuteDestination(<out>)

◂ mO·/MEDIA/AUDIO/XP:unmuteDestination

Example

▸ CALL /MEDIA/AUDIO/XP:unmuteDestination(O1)

◂ mO /MEDIA/AUDIO/XP:unmuteDestination

7.7.15. Locking an Audio Output

Command and Response *#lock*

▸ CALL·/MEDIA/AUDIO/XP:lockDestination(<out>)

◂ mO·/MEDIA/AUDIO/XP:lockDestination

Example

▸ CALL /MEDIA/AUDIO/XP:muteDestination(O1)

◂ mO /MEDIA/AUDIO/XP:muteDestination

7.7.16. Unlocking an Audio Output

Command and Response *#unlock*

▸ CALL·/MEDIA/AUDIO/XP:unlockDestination(<out>)

◂ mO·/MEDIA/AUDIO/XP:unlockDestination

Example

▸ CALL /MEDIA/AUDIO/XP:unmuteDestination(O1)

◂ mO /MEDIA/AUDIO/XP:unmuteDestination

7.7.17. Analog Audio Input Volume

Command and Response

▸ SET·/MEDIA/AUDIO/<in>.Volume=<level>

◂ pw·/MEDIA/AUDIO/<in>.Volume=<level>

Parameters

Parameter	Parameter description
<level>	Sets the output volume (attenuation) between -95.625 dB and 0 dB in step of -0.375 dB. The value is rounded up if necessary, to match with the step value.

Example

▸ SET /MEDIA/AUDIO/I1.Volume=-15

◂ pw /MEDIA/AUDIO/I1.Volume=-15.000

#analogaudio #volume #balance

7.7.18. Analog Audio Input Balance

Command and Response

▸ SET·/MEDIA/AUDIO/<in>.Balance=<level>

◂ pw·/MEDIA/AUDIO/<in>.Balance=<level>

Parameters

Parameter	Parameter description
<level>	Sets the balance; 0 means left balance, 100 means right balance, step is 1. Center is 50 (default).

Example

▸ SET /MEDIA/AUDIO/I5.Balance=75

◂ pw /MEDIA/AUDIO/I5.Balance=75

The balance level of the right audio sink is set to 75%, the left one is set to 25%.

7.8. Event Manager Basics

The graphical interface of the Event Manager can be found in the LDC, which allows creating any kind of Events. In certain cases, the Events have to be arranged or modified by LW3 commands from another device. These commands are detailed in the coming sections.

7.8.1. How to arrange an Event?

The following are necessary to have a successful event:
- Defining the **Condition**
- Defining the **Action**
- Setting the **Delay** (optional)
- **Name** the Event and set to **Enabled.** (Setting the Event to **Enabled** as the last step is recommended.)

Command and Response

- ▶ SET·/EVENTS/E\<loc\>.Condition=\<expression\>
- ◀ pw·/EVENTS/E\<loc\>.Condition=\<expression\>

Parameters

The structure of the \<expression\> is: \<node_path\>.\<property\>=\<value\>.

Example 1 – property changes to a set value

- ▶ SET /EVENTS/E1.Condition=/MEDIA/VIDEO/I1.SignalPresent=1
- ◀ pw /EVENTS/E1.Condition=/MEDIA/VIDEO/I1.SignalPresent=1

The Condition is fulfilled if the **SignalPresent** property changes to '1'.

Example 2 – property changes anything but the set value

In some cases, the opposite is necessary: when the property does **not** equal with the value. If you need so, the **ConditionInverted** property must be set to **true**:

- ▶ SET /EVENTS/E2.Condition=/MEDIA/VIDEO/O1.ConnectedSource=I1
- ◀ pw /EVENTS/E2.Condition=/MEDIA/VIDEO/O1.ConnectedSource=I1
- ▶ SET /EVENTS/E2.ConditionInverted=true
- ◀ pw /EVENTS/E2.ConditionInverted=true

The Condition is fulfilled if the **ConnectedSource** property does not equal with 'I1' (in other words: if other input port is connected to O1 than I1).

Example 3 – property changes to anything

█ **DIFFERENCE:** This feature is available from FW package v1.3.0b5.

When it is not the property value that matters, but the change of the property value, the change can be set as a condition. In this case, put a **?** character to the end of the desired property:

- ▶ SET /EVENTS/E3.Condition=/MEDIA/VIDEO/O1.ConnectedSource?
- ◀ pw /EVENTS/E3.Condition=/MEDIA/VIDEO/O1.ConnectedSource?

If the **ConnectedSource** property changes (due to a crosspoint-switch), the set Condition is fulfilled.

7.8.2. Setting a Condition by Linking Another Condition

Command and Response

- ▶ SET·/EVENTS/E\<loc\>.Condition=\<event_nr\>
- ◀ pw·/EVENTS/E\<loc\>.Condition=\<event_nr\>

Parameters

The \<event_nr\> means the number (location) of the linked event without letter 'E'.

Example

- ▶ SET /EVENTS/E2.Condition=1
- ◀ pw /EVENTS/E2.Condition=1

The Condition of the E2 Event is set to be the same as the one set at E1 Event.

7.8.3. Setting a Condition by Linking More Conditions

█ **DIFFERENCE:** This command is available from FW package v1.3.0b5..

The first generation of the Event Manager is able to sense a change (one condition), but in some cases that is not enough. The practical experience has shown there is a need to examine more conditions (up to four) as follows: if one of the set conditions becomes true (while the other conditions are fulfilled), then the set Action is launched.

Command and Response

- ▶ SET·/EVENTS/E\<loc\>.Condition=\<event_nr\>&\<event_nr\>&\<event_nr\>&\<event_nr\>
- ◀ pw·/EVENTS/E\<loc\>.Condition=\<event_nr\>&\<event_nr\>&\<event_nr\>&\<event_nr\>

Parameters

The \<event_nr\> parameters mean the numbers (locations) of the linked Events without letter 'E'. Up to four event numbers can be set.

Example

- ▶ SET /EVENTS/E4.Condition=1&2&3
- ◀ pw /EVENTS/E4.Condition=1&2&3

If two Conditions exist and the third is detected (changes to true), the Condition of E4 will be fulfilled and the Action of E4 will be launched.

█ TIPS AND TRICKS: You do not have to define Actions for E1, E2 and E3 Events, and you can leave those **Disabled**.

7.8.4. Setting an Action by Specifying a Direct Path

Command and Response

▶ SET·/EVENTS/E<loc>.Action=<expression>

◀ pw·/EVENTS/E<loc>.Action=<expression>

Parameters

The structure of the <expression> is: <node_path>.<property_or_method>=<value>. Properties and methods are handled in the same way: dot (.) stands after the path in both cases, colon (:) is not used. Do not use brackets for methods. The <value> parameter is optional in case of certain methods.

Example

▶ SET /EVENTS/E1.Action=/MEDIA/VIDEO/XP.switch=I4:O1

◀ pw /EVENTS/E1.Action=/MEDIA/VIDEO/XP.switch=I4:O1

7.8.5. Setting an Action by Linking Another Action

Command and Response

▶ SET·/EVENTS/E<loc>.Action=<event_nr>

◀ pw·/EVENTS/E<loc>.Action=<event_nr>

Parameters

The <event_nr> means the number (location) of the linked event without letter 'E'.

Example

▶ SET /EVENTS/E2.Action=1

◀ pw /EVENTS/E2.Action=1

The Action of the E2 Event is set to be the same as the one set at E1 Event.

7.8.6. Setting an Action by Linking a Macro

▌ **DIFFERENCE:** This command is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

Command and Response

▶ SET·/EVENTS/E<loc>.Action=<macro_name>

◀ pw·/EVENTS/E<loc>.Action=<macro_name>

Parameters

The <macro_name> means the name of the macro that can be seen in LDC (see the Macros section) or can be queried by the `GET /CTRL/MACROS.<id>` command.

Example

▶ SET /EVENTS/E1.Action=Macro1

◀ pw /EVENTS/E2.Action=Macro1

7.9. Event Manager Tool Kit

7.9.1. Setting the Delay

In most cases, the Action is performed immediately after the Condition is detected. But sometimes a delay is necessary between the Condition and the Action, and thus the following delay options are defined:
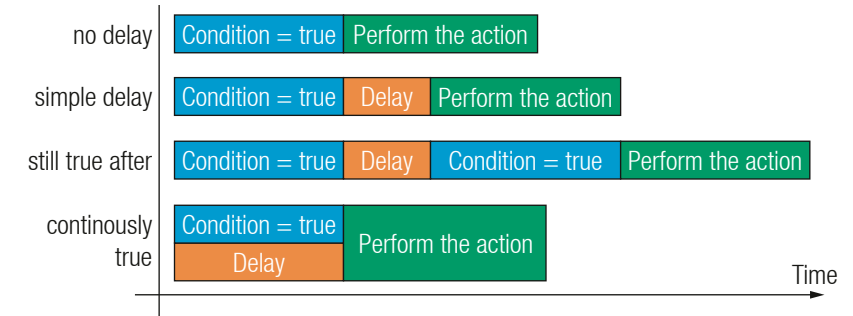
Command and Response (summary)

▶ SET·/EVENTS/E<loc>.ConditionTimeout=<time>

◀ pw·/EVENTS/E<loc>.ConditionTimeout=<time>

▶ SET·/EVENTS/E<loc>.ConditionEndCheck=<true/false>

◀ pw·/EVENTS/E<loc>.ConditionEndCheck=<true/false>

▶ SET·/EVENTS/E<loc>.ConditionTimeoutContinuous=<true/false>

◀ pw·/EVENTS/E<loc>.ConditionTimeoutContinuous=<true/false>

Parameters

The <time> parameter means seconds. Set the following properties for the desired delay type:

Delay type	Properties to set	Value	Result
no delay	/EVENTS/E<loc>.ConditionTimeout	**0**	The Action will be launched after the Condition is detected.
simple delay	/EVENTS/E<loc>.ConditionTimeout	<time>	If the Condition is detected, the action will be launched after the set time.
still true after	/EVENTS/E<loc>.ConditionTimeout	<time>	The Condition is fulfilled only if is detected after the set time **again**.
	/EVENTS/E<loc>.ConditionEndCheck	**true**	
continuously true	/EVENTS/E<loc>.ConditionTimeout	<time>	The Condition is fulfilled only if it is existing **continuously** during the set time.
	/EVENTS/E<loc>.ConditionEndCheck	**true**	
	/EVENTS/E<loc>.ConditionTimeoutContinuous	**true**	

Example 1 (simple delay)

▶ SET /EVENTS/E1.ConditionTimeout=10

◀ pw /EVENTS/E1.ConditionTimeout=10

If the Condition is detected (the **ConditionDetect** property becomes **true**), the **ConditionTimeoutPending** property becomes **true**. 10 seconds later the **ConditionTimeoutPending** property becomes **false** and the set Action is launched.

Example 2 ('still true after' delay type)

▶ SET /EVENTS/E1.ConditionTimeout=10

◀ pw /EVENTS/E1.ConditionTimeout=10

▶ SET /EVENTS/E1.ConditionTimeoutPending=true

◀ pw /EVENTS/E1.ConditionTimeoutPending=true

If the Condition is detected (the **ConditionDetect** property becomes **true**) the **ConditionTimeoutPending** property becomes **true**. 10 seconds later the Condition is checked again (the **ConditionTimeoutPending** property becomes **false**). If the Condition can be detected again (the **ConditionDetect** property becomes **true** again), the Condition is fulfilled and the set Action is launched.

Example 3 ('continuously true' delay type)

▶ SET /EVENTS/E1.ConditionTimeout=10

◀ pw /EVENTS/E1.ConditionTimeout=10

▶ SET /EVENTS/E1.ConditionTimeoutContinuous=true

◀ pw /EVENTS/E1.ConditionTimeoutContinuous=true

If the Condition is detected (the **ConditionDetect** property becomes **true**), the **ConditionTimeoutPending** property becomes **true**. If the Condition can be detected in the following 10 seconds continuously (the **ConditionDetect** property stays **true**), the Condition is fulfilled, the **ConditionTimeoutPending** property becomes **false**, and the set Action is launched.

7.9.2. Setting the Name of the Event

Command and Response

▶ SET·/EVENTS/E<loc>.Name=<string>

◀ pw·/EVENTS/E<loc>.Name=<string>

Parameters

The <string> may contain letters (A-Z) and (a-z), numbers (0-9), special characters: hyphen (-), underscore (_), and space ( ) up to 20 characters. A longer string results in an error, unaccepted characters are skipped.

Example

▶ SET /EVENTS/E1.Name=Projector_ON

◀ pw /EVENTS/E1.Name=Projector_ON

7.9.3. Enabling/Disabling the Event

Command and Response

▶ SET·/EVENTS/E<loc>.Enabled=<true/false>

◀ pw·/EVENTS/E<loc>.Enabled=<true/false>

Parameters

When the property value is **true** (or **1**), the Action will be launched if the Condition is detected. If the property is **false** (or **0**), the Action will not run, however, the Condition counter will be increased when detected.

Example

▶ SET /EVENTS/E1.Enabled=true

◀ pw /EVENTS/E1.Enabled=true

7.9.4. Triggering a Condition

▌ **DIFFERENCE:** This command is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

This feature works like a condition is fulfilled. When a complex control system is built, a Condition may trigger numerous Actions. A typical example is when a system is powered on and the 'ready-to-use' state has to be loaded. In this case, there could be many actions that are based on the same condition. In order to reduce the number of the commands, you can trigger one 'key' condition, which starts the whole process.

Command and Response *#new*

▶ CALL·/EVENTS/E<loc>:triggerCondition(1)

◀ mO·/EVENTS/E<loc>:triggerCondition

Example

▶ CALL /EVENTS/E1:triggerCondition(1)

◀ mO /EVENTS/E1:triggerCondition

The Condition of Event1 is fulfilled, the set Action will be launched (after the delay if set).

7.9.5. Querying the Condition Counter

This property shows how many times the Condition has been detected and triggered altogether. The counter is reset at boot.

Command and Response

▶ GET·/EVENTS/E<loc>.ConditionCount

◀ pw·/EVENTS/E<loc>.ConditionCount=<num_value>

Example

▶ GET /EVENTS/E1.ConditionCount

◀ pw /EVENTS/E1>.ConditionCount=5

7.9.6. Querying the Condition Trigger Counter

▌ DIFFERENCE: This command is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

This property shows how many times the Condition has been triggered, but does not contain the number of real detections. The counter is reset at boot.

Command and Response

▶ GET·/EVENTS/E<loc>.ExternalConditionTriggerCount
◀ pw·/EVENTS/E<loc>.ExternalConditionTriggerCount=<num_value>

Example

▶ GET /EVENTS/E1.ExternalConditionTriggerCount
◀ pw /EVENTS/E1.ExternalConditionTriggerCount=2

7.9.7. Testing an Action

This tool is for launching the Action without detecting or triggering the Condition.

Command and Response

▶ CALL·/EVENTS/E<loc>:ActionTest(1)
◀ mO·/EVENTS/E<loc>:ActionTest

Example

▶ CALL /EVENTS/E1:ActionTest(1)
◀ mO /EVENTS/E1:ActionTest

7.10. Variable-Management

▌ DIFFERENCE: This feature and the commands are available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5. *#new*

Custom variables (30 pcs.) can be defined in number or text format, which are available also in the Event Manager. The maximum length of a variable can be 15 characters and they are stored in a non-volatile memory, and thus the value is kept in case of a reboot. The type of the variable (text or string) is determined automatically based on the value. If an operation cannot be performed (e.g. adding number value to a string-type variable), an error will be the response. *#variables*

7.10.1. Value Assignment

Command and Response

▶ SET·/CTRL/VARS/V<loc>.Value=<value>
◀ pw·/CTRL/VARS/V<loc>.Value=<value>

Parameters

Parameter	Parameter description	Value	Value description
<loc>	The location of the variable	**1-30**	
<value>	The value of the variable	**Custom**	Length can be max 15 characters. Numeric variable is defined between -2147483648 and 2147483647.

Example

▶ SET /CTRL/VARS/V1.Value=120
◀ pw /CTRL/VARS/V1.Value=120

7.10.2. Addition and Subtraction (Add Method)

The value of a numeric variable can be increased by adding a positive value, or it can be decreased by adding a negative value. Minimum and maximum values can be defined as limits.

Command and Response

▶ CALL·/CTRL/VARS/V<loc>:add(<operand>;<min>;<max>)
◀ mO·/CTRL/VARS/V<loc>:add

Parameters

Parameter	Parameter description	Value	Value description
<loc>	The location of the variable	**1-30**	
<operand>	The value that is added to the variable	**Integer**	Negative value is also accepted
<min>	The lowest allowed value (optional)	**Integer**	Negative value is also accepted
<max>	The highest allowed value (optional)	**Integer**	Negative value is also accepted

If the value of the variable is higher or equals with <max>, the new value will be <max>. Likewise, in case of <min> setting: if the value of the variable is lower or equals with <min>, the new value will be <min>.

Examples

Change messages (CHG) can be seen after each response for better understanding, which are not part of the command, but they can be set as described in the Subscription section.

Example 1 – addition

▸ GET /CTRL/VARS/V1.Value
◂ pw /CTRL/VARS/V1.Value=6
▸ CALL /CTRL/VARS/V1:add(1)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=7
▸ CALL /CTRL/VARS/V1:add(1)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=8
▸ CALL /CTRL/VARS/V1:add(2)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=10

Example 2 – subtraction

▸ GET /CTRL/VARS/V1.Value
◂ pw /CTRL/VARS/V1.Value=10
▸ CALL /CTRL/VARS/V1:add(-2)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=8
▸ CALL /CTRL/VARS/V1:add(-2)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=6
▸ CALL /CTRL/VARS/V1:add(-10)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=-4

Example 3 – addition with 'max' value

▸ GET /CTRL/VARS/V1.Value
◂ pw /CTRL/VARS/V1.Value=16
▸ CALL /CTRL/VARS/V1:add(2;10;20)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=18
▸ CALL /CTRL/VARS/V1:add(2;10;20)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=20
▸ CALL /CTRL/VARS/V1:add(2;10;20)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=20

Example 4 – subtraction with 'min' value

▸ GET /CTRL/VARS/V1.Value
◂ pw /CTRL/VARS/V1.Value=14
▸ CALL /CTRL/VARS/V1:add(-2;10;20)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=12
▸ CALL /CTRL/VARS/V1:add(-2;10;20)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=10
▸ CALL /CTRL/VARS/V1:add(-2;10;20)
◂ mO /CTRL/VARS/V1:add
◂ CHG /CTRL/VARS/V1.Value=10

7.10.3. Addition and Subtraction (Cycle Method)

The value of a numeric variable can be increased by adding a positive value, or it can be decreased by adding a negative value. Minimum and maximum values can be defined as limits. This method has a feature that if the value hits the limit (min/max), the value will be stepped to the other end of the interval.

Command and Response

▸ CALL·/CTRL/VARS/V<loc>:cycle(<operand>;<min>;<max>)
◂ mO·/CTRL/VARS/V<loc>:cycle

Parameters

Parameter	Parameter description	Value	Value description
<loc>	The location of the variable	1-30	
<operand>	The value that is added to the variable	Integer	Negative value is also accepted
<min>	The lowest allowed value (optional)	Integer	Negative value is also accepted
<max>	The highest allowed value (optional)	Integer	Negative value is also accepted

If the calculated value is beyond the limit (min/max), the value will be stepped to the other end of the interval.

Examples

Change messages (CHG) can be seen after each response for better understanding, which are not part of the command, but they can be set as described in the Subscription section.

Example 1 – addition

▸ GET /CTRL/VARS/V1.Value
◂ pw /CTRL/VARS/V1.Value=18
▸ CALL /CTRL/VARS/V1:cycle(1;10;20)
◂ mO /CTRL/VARS/V1:cycle
◂ CHG /CTRL/VARS/V1.Value=19
▸ CALL /CTRL/VARS/V1:cycle(1;10;20)
◂ mO /CTRL/VARS/V1:cycle
◂ CHG /CTRL/VARS/V1.Value=20
▸ CALL /CTRL/VARS/V1:cycle(1;10;20)
◂ mO /CTRL/VARS/V1:cycle
◂ CHG /CTRL/VARS/V1.Value=10
▸ CALL /CTRL/VARS/V1:cycle(1;10;20)
◂ mO /CTRL/VARS/V1:cycle
◂ CHG /CTRL/VARS/V1.Value=11

Example 2 – subtraction

▸ GET /CTRL/VARS/V1.Value
◂ pw /CTRL/VARS/V1.Value=13
▸ CALL /CTRL/VARS/V1:cycle(-2;10;20)
◂ mO /CTRL/VARS/V1:cycle
◂ CHG /CTRL/VARS/V1.Value=11
▸ CALL /CTRL/VARS/V1:cycle(-2;10;20)
◂ mO /CTRL/VARS/V1:cycle
◂ CHG /CTRL/VARS/V1.Value=20
▸ CALL /CTRL/VARS/V1:cycle(-2;10;20)
◂ mO /CTRL/VARS/V1:cycle
◂ CHG /CTRL/VARS/V1.Value=18

7.10.4. Value Change with Intervals (Case)

This command can be used to change the value of a variable if it fits in any of the defined intervals.

Command and Response

▶ CALL·/CTRL/VARS/V<loc>:case(<min> <max> <val>;)

◀ mO·/CTRL/VARS/V<loc>:case

Parameters

Parameter	Parameter description	Value
<loc>	The location of the variable	1-30
<min>	The lowest value of the interval	Integer
<max>	The highest value of the interval	Integer
<val>	The new value that will be valid if the current value is in the interval	Integer

The parameters are divided by a space character, and the interval groups are divided by a semicolon. Up to 16 cases can be defined.

Examples

▶ CALL /CTRL/VARS/V1:case(10 20 15)

◀ mO /CTRL/VARS/V1:case

A typical example is when two different ranges of values have to meet:

Incoming values: between 0 and 255 (e.g. the slider of a controller can have these values).

Outgoing values: between 0 and 100 (e.g. the controlled device accepts these values).

Defined cases:

	Min	Max	New value
Case 1	1	25	10
Case 2	26	50	20
Case 3	51	75	30
Case 4	76	100	40
Case 5	101	125	50
Case 6	126	150	60
Case 7	151	175	70
Case 8	176	200	80
Case 9	201	225	90
Case 10	226	255	100

The command looks like:

▶ CALL /CTRL/VARS/V1:case(1 25 10;26 50 20;51 75 30;76 100 40;101 125 50;126 150 60;151 175 70; 176 200 80; 201 225 90; 226 255 100)

◀ mO /CTRL/VARS/V1:case

7.10.5. Scanning and Storing

This command can be used to get the value (or a part of the value) of an LW3 property. The defined path will be scanned according to the pattern and the result will be the value of the variable (number or string type).

Command and Response

▶ CALL·/CTRL/VARS/V<loc>:scanf(<path>.<property>;<pattern>)

◀ mO·/CTRL/VARS/V<loc>:scanf

Parameters

Parameter	Parameter description	Value
<loc>	The location of the variable	1-30
<path>.<property>	The LW3 property with node	
<pattern>	The pattern that scans the property for the desired result	see below

Pattern options

Pattern	Pattern description
%s	String of characters stopping at the first whitespace character
%<number>s	The next <number> of characters (string) stopping at the first whitespace
%c	One character
%<number>c	The next <number> of characters
%[<characters>]	Defined character set, specified between brackets
%[^<characters>]	Negated character set, which will be skipped, specified between brackets
%*	Ignored part
<custom_text>	User-defined text

The patterns can be combined to get the desired result as shown in the examples.

▌ **ATTENTION!** Do not forget to escape the % character as shown in the example below.

Examples

▶ CALL /CTRL/VARS/V1:scanf(/MEDIA/AUDIO/XP.SourcePortStatus;\%5c)

◀ mO /CTRL/VARS/V1:scanf

▶ GET /CTRL/VARS/V1.Value

◀ pw /CTRL/VARS/V1.Value=T00AA

A simple pattern has been applied: we need the first five characters from the property value.

Further Examples

<path>.<property>	Property Value	<pattern>	Scanned result
/MANAGEMENT/STATUS.CpuTemperature	42 C; 0;75; 0;7	%s	42
/MANAGEMENT/STATUS.CpuFirmware	1.3.0b3 r32	%12s	1.3.0b3
/MEDIA/VIDEO/XP.DestinationPortStatus	T00AA;T00AF	%6c	T00AA
/MEDIA/UART/P1.Rs232Configuration	57600, 8N1	%*[^,], %s	8N1
/MEDIA/AUDIO/XP.SourcePortStatus	T000A;T000B;T000F	%*6c%5c	T000B
/MANAGEMENT/NETWORK.HostName	lightware-00005031	lightware-%[0-9]	00005031

7.10.6. Reformatting a Value

The value of the variable can be changed by adding text as prefix and/or postfix.

▌ **ATTENTION!** Think about the length of the value: 15 characters are allowed, the others are truncated.

Command and Response

▸ CALL·/CTRL/VARS/V<loc>:printf(<prefix>%s<postfix>)

◂ mO·/CTRL/VARS/V<loc>:printf

Parameters

Parameter	Parameter description	Value	Value description
<loc>	The location of the variable	1-30	
<prefix>	The text before the original value of the property (optional)	Custom	ASCII characters
%s	The original value of the variable		
<postfix>	The text following the original value of the property (optional)	Custom	ASCII characters

Example

▸ GET /CTRL/VARS/V1.Value

▸ pw /CTRL/VARS/V1.Value=01

▸ CALL /CTRL/VARS/V1:printf(PWR%s)

◂ mO /CTRL/VARS/V1:printf

▸ GET /CTRL/VARS/V1.Value

◂ pw /CTRL/VARS/V1.Value=PWR01

The 'PWR' string has been inserted before the original value.

7.11. Ethernet Port Configuration

7.11.1. Setting the DHCP State

▌ **ATTENTION!** When you change a network property, the new value is stored, but the **applySettings** method must always be called to apply the new settings. When two or more network parameters are changed, the **applySettings** method is enough to be called once as a final step.

Command and Response   *#dhcp*   *#network*   *#ipaddress*

▸ SET·/MANAGEMENT/NETWORK.DhcpEnabled=<dhcp_status>

◂ pw·/MANAGEMENT/NETWORK.DhcpEnabled=<dhcp_status>

Parameters

If the <dhcp_status> parameter is **true**, the current IP address setting is DHCP, if the parameter is **false**, the current IP address is static.

Example

▸ SET /MANAGEMENT/NETWORK.DhcpEnabled=true

◂ pw /MANAGEMENT/NETWORK.DhcpEnabled=true

▸ CALL /MANAGEMENT/NETWORK:applySettings(1)

◂ mO /MANAGEMENT/NETWORK:applySettings

▌ INFO: The **applySettings** method will save and apply the new value and will reboot the device.

▌ INFO: The current setting can be queried by the GET command.

7.11.2. Changing the IP Address (Static)

Command and Response

▸ SET·/MANAGEMENT/NETWORK.StaticIpAddress=<IP_address>

◂ pw·/MANAGEMENT/NETWORK.StaticIpAddress=<IP_address>

Example

▸ SET /MANAGEMENT/NETWORK.StaticIpAddress=192.168.0.85

◂ pw /MANAGEMENT/NETWORK.StaticIpAddress=192.168.0.85

▸ CALL /MANAGEMENT/NETWORK:applySettings(1)

◂ mO /MANAGEMENT/NETWORK:applySettings

▌ INFO: The **applySettings** method will save and apply the new value and will reboot the device.

▌ INFO: The current setting can be queried by the GET command.

7.11.3. Changing the Subnet Mask (Static)

Command and Response *#ipaddress*

▸ SET·/MANAGEMENT/NETWORK.StaticNetworkMask=<netmask>
◂ pw·/MANAGEMENT/NETWORK.StaticNetworkMask=<netmask>

Example

▸ SET /MANAGEMENT/NETWORK.StaticNetworkMask=255.255.255.0
◂ pw /MANAGEMENT/NETWORK.StaticNetworkMask=255.255.255.0
▹ CALL /MANAGEMENT/NETWORK:applySettings(1)
◂ mO /MANAGEMENT/NETWORK:applySettings

▮ INFO: The **applySettings** method will save and apply the new value and will reboot the device.

▮ INFO: The current setting can be queried by using the GET command.

7.11.4. Changing the Gateway Address (Static)

Command and Response

▸ SET·/MANAGEMENT/NETWORK.StaticGatewayAddress=<gw_address>
◂ pw·/MANAGEMENT/NETWORK.StaticGatewayAddress=<gw_address>

Example

▹ SET /MANAGEMENT/NETWORK.StaticGatewayAddress=192.168.0.5
◂ pw /MANAGEMENT/NETWORK.StaticGatewayAddress=192.168.0.5
▹ CALL /MANAGEMENT/NETWORK:applySettings(1)
◂ mO /MANAGEMENT/NETWORK:applySettings

▮ INFO: The **applySettings** method will save and apply the new value and will reboot the extender.

▮ INFO: The current setting can be queried by using the GET command.

7.11.5. Applying Network Settings

Command and Response

▸ CALL·/MANAGEMENT/NETWORK:ApplySettings(1)
◂ m0·/MANAGEMENT/NETWORK:ApplySettings

Example

▹ CALL /MANAGEMENT/NETWORK:ApplySettings(1)
◂ m0 /MANAGEMENT/NETWORK:ApplySettings

All network settings that have been changed will be applied and network interface will restart.

7.12. Ethernet Tool Kit

7.12.1. Device Filter Based on MAC Address

▮ **DIFFERENCE:** This command is available only in UMX-HDMI-140-Plus model from FW package v1.3.0b5.

You can create a list of network devices that are allowed to control the device or to query parameters from the Lightware device based on the MAC address. *#macfilter* *#new*

▮ **ATTENTION!** If the device is installed in a network where it gets IP address from a DHCP server and you plan to use the MAC filtering, make sure the MAC address of the DHCP server is added to the white list. Otherwise, the device will not get IP address and will be unreachable.

Command and Response

▸ SET·/MANAGEMENT/MACFILTER.MACaddress<loc>=<MAC_address>;<receive>;<send>;<name>
◂ pw·/MANAGEMENT/MACFILTER.MACaddress<loc>=<MAC_address>;<receive>;<send>;<name>

The filter is disabled by default. Set the **FilterEnable** property to **true** as shown in the example.

Parameters

Parameter	Parameter description	Values	Value description
<loc>	Location of the address	**1-8**	The default values of **1, 2** and **3** ensure that address resolution and device discovery continue to work after enabling the MAC filter
<MAC_address>	The MAC address of the device	Unique value	Hex format, divided by a colon
<receive>	Enable/disable the parameter querying option	**false** (or **0**)	The device is **not allowed** to query parameters from the LW device
		true (or **1**)	The device is **allowed** to query parameters from the LW device
<send>	Enable/disable the parameter setting option	**false** (or **0**)	The device is **not allowed** to change parameters in the LW device
		true (or **1**)	The device is **allowed** to change parameters in the LW device
<name>	Unique name for better identification (optional)	Any string	Up to 5 ASCII characters (longer names are truncated)

Example

▹ SET /MANAGEMENT/MACFILTER/MACaddress4=(04:D4:C4:4D:01:43;1;1;Tech)
◂ pw /MANAGEMENT/MACFILTER/MACaddress4=(04:D4:C4:4D:01:43;1;1;Tech)
▹ SET /MANAGEMENT/MACFILTER.FilterEnable=true
◂ pw /MANAGEMENT/MACFILTER.FilterEnable=true

New MAC address is saved into the 4th property with name 'Tech', which may query/set parameters from/in the Lightware device. The **FilterEnable** property is set to **true**, and thus the filter is enabled.

7.12.2. LW2 Control Port Blocking

▌ **DIFFERENCE:** This command is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

This command is for blocking the LW2 control port; it is an additional protection for the Cleartext login function.

Command and Response *#portblock*

▸ SET·/MANAGEMENT/SERVICEFILTER.Lw2Enabled=<port_mode>
◂ pw·/MANAGEMENT/SERVICEFILTER.Lw2Enabled=<port_mode>

Example

▸ SET /MANAGEMENT/SERVICEFILTER.Lw2Enabled=false
◂ pw /MANAGEMENT/SERVICEFILTER.Lw2Enabled=false

7.12.3. HTTP Port Blocking

▌ **DIFFERENCE:** This command is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

This command is for blocking the HTTP port (80); it is an additional protection for the Cleartext login function.

Command and Response

▸ SET·/MANAGEMENT/SERVICEFILTER.HttpEnabled=<port_mode>
◂ pw·/MANAGEMENT/SERVICEFILTER.HttpEnabled=<port_mode>

Example

▸ SET /MANAGEMENT/SERVICEFILTER.HttpEnabled=true
◂ pw /MANAGEMENT/SERVICEFILTER.HttpEnabled=true

7.12.4. HTTP Post Receiving Blocking

▌ **DIFFERENCE:** This command is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

This command is for blocking HTTP posts; it is an additional protection for the Cleartext login function.

Command and Response

▸ SET·/MANAGEMENT/SERVICEFILTER.HttpEnabled=<port_mode>
◂ pw·/MANAGEMENT/SERVICEFILTER.HttpEnabled=<port_mode>

Example

▸ SET /MANAGEMENT/SERVICEFILTER.HttpEnabled=true
◂ pw /MANAGEMENT/SERVICEFILTER.HttpEnabled=true

7.12.5. Powering on a Computer over Ethernet (Wake-on-LAN)

▌ **DIFFERENCE:** This command is available only from FW package v1.3.0b5.

The well-known wake-on-lan feature (sending magic Packet to the target PC) is available by the following command:

Command and Response

▸ CALL·/MEDIA/ETHERNET:wakeOnLan(MAC_address)
◂ mO·/MEDIA/ETHERNET:wakeOnLan

Example

▸ CALL /MEDIA/ETHERNET:wakeOnLan(AA:BB:CC:22:14:FF)
◂ mO /MEDIA/ETHERNET:wakeOnLan

Please make sure the feature is enabled in the target PC and it is powered (but switched off).

7.12.6. Setting the Host Name

▌ **DIFFERENCE:** This command is available only from FW package v1.3.0b5.

The host name is a property that can be used instead of the IP address when connecting to the device. It is also suitable for finding the device in the Device Discovery window of the LDC, see more details in the Add New Favorite Device section. Furthermore, it can be used to open The Miniweb Room Control. If the IP address of the device is changing, the host name can be used as a fixed property.

Command and Response

▸ SET·/MANAGEMENT/NETWORK.HostName=<unique_name>
◂ pw·/MANAGEMENT/NETWORK.HostName=<unique_name>

Parameters

The <unique_name> can be 1-64 characters long and the following are allowed for naming: the elements of the English alphabet and numbers. Hyphen (-) and dot (.) are also accepted, except as last character.

Example

▸ SET /MANAGEMENT/NETWORK.HostName=room-switcher
◂ pw /MANAGEMENT/NETWORK.HostName=room-switcher

7.13. Ethernet Message Sending

The device can be used for sending a message to a certain IP:port address. The three different commands allow controlling the connected (third-party) devices.

7.13.1. Sending a TCP Message (ASCII-format)

The command is for sending a command message in ASCII-format. This method allows escaping the control characters. For more information, see the Escaping section.

Command and Response

▶ CALL·/MEDIA/ETHERNET:tcpMessage(<IP_address>:<port_no>=<message>)

◀ mO·/MEDIA/ETHERNET:tcpMessage

Example

▶ CALL /MEDIA/ETHERNET:tcpMessage(192.168.0.103:6107=C00)

◀ mO /MEDIA/ETHERNET:tcpMessage

The 'C00' message is sent to the indicated IP:port address.

Example with HEX codes

▶ CALL /MEDIA/ETHERNET:tcpMessage(192.168.0.20:5555=C00\x0a\x0d)

◀ mO /MEDIA/ETHERNET:tcpMessage

The 'C00' message with CrLf (Carriage return and Line feed) is sent to the indicated IP:port address. The \x sequence indicates the HEXA code; see more information in the Escaping section.

7.13.2. Sending a TCP Text (ASCII-format)

The command is for sending a text message in ASCII-format. This method **does not allow** escaping or inserting control characters.

Command and Response

▶ CALL·/MEDIA/ETHERNET:tcpText(<IP_address>:<port_no>=<text>)

◀ mO·/MEDIA/ETHERNET:tcpText

Example

▶ CALL /MEDIA/ETHERNET:tcpText(192.168.0.103:6107=pwr_on)

◀ mO /MEDIA/ETHERNET:tcpText

The 'pwr_on' text is sent to the indicated IP:port address.

7.13.3. Sending a TCP Binary Message (HEX-format)

The command is for sending a binary message in Hexadecimal format. This method **does not require** escaping the control and non-printable characters.

Command and Response

▶ CALL·/MEDIA/ETHERNET.tcpBinary(<IP_address>:<port_no>=<HEX_message>)

◀ mO·/MEDIA/ETHERNET:tcpBinary

Example

▶ CALL /MEDIA/ETHERNET:tcpBinary(192.168.0.103:6107=0100000061620000cdcc2c40)

◀ mO /MEDIA/ETHERNET:tcpBinary

The '0100000061620000cdcc2c40' message is sent to the indicated IP:port address.

█ INFO: There is no need to insert a space or other separator character between the binary messages.

7.13.4. Sending a UDP Message (ASCII-format)

The command is for sending a UDP message in ASCII-format. This method allows escaping the control characters. For more information, see the Escaping section.

Command and Response

▶ CALL·/MEDIA/ETHERNET:udpMessage(<IP_address>:<port_no>=<message>)

◀ mO·/MEDIA/ETHERNET:udpMessage

Example

▶ CALL /MEDIA/ETHERNET:udpMessage(192.168.0.103:6107=C00)

◀ mO /MEDIA/ETHERNET:udpMessage

The 'C00' message is sent to the indicated IP:port address.

Example with HEX codes

▶ CALL /MEDIA/ETHERNET:udpMessage(192.168.0.20:9988=C00\x0a\x0d)

◀ mO /MEDIA/ETHERNET:udpMessage

The 'C00' message with CrLf (Carriage return and Line feed) is sent to the indicated IP:port address. The \x sequence indicates the HEXA code; see more information in the Escaping section.

7.13.5. Sending a UDP Text (ASCII-format)

The command is for sending a text message in ASCII-format via UDP-protocol. This method **does not allow** escaping or inserting control characters.

Command and Response

▸ CALL·/MEDIA/ETHERNET:udpText(<IP_address>:<port_no>=<text>)

◂ mO·/MEDIA/ETHERNET:udpText

Example

▸ CALL /MEDIA/ETHERNET:udpText(192.168.0.20:9988=open)

◂ mO /MEDIA/ETHERNET:udpText

The 'open' text is sent to the indicated IP:port address.

7.13.6. Sending a UDP Binary Message (HEX-format)

The command is for sending a binary message in Hexadecimal format. This method **does not require** escaping the control and non-printable characters.

Command and Response

▸ CALL·/MEDIA/ETHERNET:udpBinary(<IP_address>:<port_no>=<HEX_message>)

◂ mO·/MEDIA/ETHERNET:udpBinary

Example

▸ CALL /MEDIA/ETHERNET:udpBinary(192.168.0.20:9988=433030)

◂ mO /MEDIA/ETHERNET:udpBinary

The '433030' message is sent to the indicated IP:port address.

▌ INFO: There is no need to insert a space or other separator character between the binary messages.

7.14. HTTP Messaging

▌ **DIFFERENCE:** The features and commands below are available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

Http **post** and **put** messages can be sent from the Lightware device for more integration with third-party devices.   *#http*   *#new*

▌ **ATTENTION!** This feature means posting or putting **HTTP** messages from the Lightware device to another device. Encrypted transmission (**HTTPS**) is not supported.

7.14.1. Setting the Target IP Address

Command and Response

▸ SET·/CTRL/HTTP/C1.ServerIP=<IP_address>

◂ pw·/CTRL/HTTP/C1.ServerIP=<IP_address>

Example

▸ SET /CTRL/HTTP/C1.ServerIP=192.168.0.220

◂ pw /CTRL/HTTP/C1.ServerIP=192.168.0.220

7.14.2. Setting the TCP Port

Command and Response

▸ SET·/CTRL/HTTP/C1.ServerPort=<port_no>

◂ pw·/CTRL/HTTP/C1.ServerPort=<port_no>

Example

▸ SET /CTRL/HTTP/C1.ServerPort=80

◂ pw /CTRL/HTTP/C1.ServerIP=80

7.14.3. Setting the Target Path

This property sets the path in the target device where the post/put message will be sent.

Command and Response

▸ SET·/CTRL/HTTP/C1.File=<path>

◂ pw·/CTRL/HTTP/C1.File=<path>

Example

▸ SET /CTRL/HTTP/C1.File=/putxml

◂ pw /CTRL/HTTP/C1.File=/putxml

7.14.4. Setting the Message Header

Command and Response

▶ SET·/CTRL/HTTP/C1.Header=<header_text>

◀ pw·/CTRL/HTTP/C1.Header=<header_text>

Example

▶ SET /CTRL/HTTP/C1.Header=Host: 192.168.0.220\r\nContent-Type: text/xml\r\nAuthorization: Basic YWRtaW46TGlnaHR3YXJlMDE=

◀ pw /CTRL/HTTP/C1.Header=Host: 192.168.0.220\r\nContent-Type: text/xml\r\nAuthorization: Basic YWRtaW46TGlnaHR3YXJlMDE=

7.14.5. Sending a Post Message

Command and Response

▶ CALL·/CTRL/HTTP/C1:post(<body_text>)

◀ mO·/CTRL/HTTP/C1:post

Example

▶ CALL /CTRL/HTTP/C1:post(<Command><Message><Send><Text>LI1R_P</Text></Send></Message></Command>)

◀ mO /CTRL/HTTP/C1:post

7.14.6. Sending a Put Message

Command and Response

▶ CALL·/CTRL/HTTP/C1:put(<body_text>)

◀ mO·/CTRL/HTTP/C1:put

Example

▶ CALL /CTRL/HTTP/C1:put(<Command><Message><Send><Text>LI1R_P</Text></Send></Message></Command>)

◀ mO /CTRL/HTTP/C1:put

7.15. TCP Message Recognizer

> **DIFFERENCE:** The features and commands below are available only for UMX-HDMI-140-Plus from FW package v1.3.0b5..

This tool can be used to recognize messages coming from a TCP server. You can link an immediate event Action that is run when a message is recognized, but you can also use it in Event manager.
#tcprecognizer   *#message*   *#new*

Preparation

Step 1. Set a TCP client in the Lightware device (three TCP clients can be run at the same time), set the properties of the target TCP server.

Step 2. Set the **DelimiterHex** and the **TimeOut** settings for the proper message processing

Step 3. Make sure the TCP/IP port is opened in the target device (think about Firewall settings in the network).

Step 4. Connect to the TCP server.

Working Method

A message got recognized from the incoming data, if one of the following occurs:

▪ The set **DelimiterHex** is detected in the message, or

▪ The set **TimeOut** has passed since receiving the last data bit.
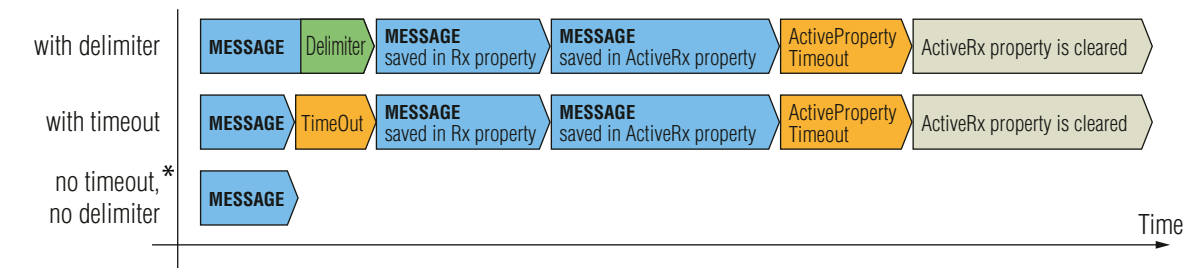
* In that case, the not-recognized data is kept in the memory (up to 128 bytes). If the **DelimiterHex** is detected later, or the **TimeOut** parameter is set in the meanwhile, the data appears in the **Rx**, **RxHex**, **Hash** and **ActiveRx**, **ActiveRxHex, ActiveRxHash** properties.

7.15.1. Setting the IP Address of the TCP Server

Command and Response

▶ SET·/CTRL/TCP/C<loc>.ServerIP=<IP_address>

◀ pw·/CTRL/TCP/C<loc>.ServerIP=<IP_address>

Parameters

The <loc> parameter can be 1, 2 or 3, as at most three TCP connections can be established at the same time.

Example

▶ SET /CTRL/TCP/C1.ServerIP=192.168.1.14

◀ pw /CTRL/TCP/C1.ServerIP=192.168.1.14

7.15.2. Setting the TCP/IP Port Number of the TCP Server

Command and Response

▸ SET·/CTRL/TCP/C<loc>.ServerPort=<port_no>

◂ pw·/CTRL/TCP/C<loc>.ServerPort=<port_no>

Example

▸ SET /CTRL/TCP/C1.ServerPort=4999

◂ pw /CTRL/TCP/C1.ServerPort=4999

7.15.3. Connecting to a TCP Server

Command and Response

▸ CALL·/CTRL/TCP/C<loc>:connect()

◂ mO·/CTRL/TCP/C<loc>:connect

Example

▸ CALL /CTRL/TCP/C1:connect()

◂ mO /CTRL/TCP/C1:connect

7.15.4. Disconnecting from a TCP Server

Command and Response

▸ CALL·/CTRL/TCP/C<loc>:disconnect()

◂ mO·/CTRL/TCP/C<loc>:disconnect

Example

▸ CALL /CTRL/TCP/C1:disconnect()

◂ mO /CTRL/TCP/C1:disconnect

7.15.5. Setting the Delimiter Hex

This property stores the delimiter that is between the messages (e.g. Cr, Lf, Space). The value has to be in hex format (e.g.0D, 0A, 20).

Command and Response

▸ SET·/CTRL/TCP/C<loc>.DelimiterHex=<delimiter>

◂ pw·/CTRL/TCP/C<loc>.DelimiterHex=<delimiter>

Parameters

The <delimiter> parameter can be max. 8 characters long (16 hex digits) in hex format.

Example

▸ SET /CTRL/TCP/C1.DelimiterHex=00

◂ pw /CTRL/TCP/C1.DelimiterHex=00
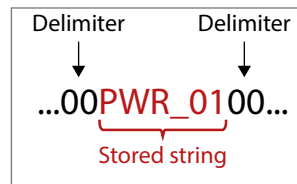
7.15.6. Setting the Timeout

When the set time has passed after the last received message and delimiter was not detected, the device saves the data into the **Rx, RxHex, Hash** properties. The timeout setting is useful if there is no special or easily defined delimiter in the incoming data, but there is a time gap between the messages.

Command and Response

▸ SET·/CTRL/TCP/C<loc>.TimeOut=<timeout>

◂ pw·/CTRL/TCP/C<loc>.TimeOut=<timeout>

Parameters

The <timeout> parameter sets the time value in milliseconds: **0** means the timeout is disabled, the min. value is 10.

Example

▸ SET /CTRL/TCP/C1.TimeOut=20

◂ pw /CTRL/TCP/C1.TimeOut=20

7.15.7. Querying the Last Recognized Message (String)

The recognized message is stored as a string in the property seen below until the next recognized message, or until the **clear()** method is called.

> TIPS AND TRICKS: When this property is set as a condition in the Event Manager, and the same strings follow each other, the action **will execute once**. (A Condition can be detected in Event Manager if a change happens. But if the same string is saved into the property after each other, it will not cause a change.)

Command and Response

▸ GET·/CTRL/TCP/C<loc>.Rx

◂ pr·/CTRL/TCP/C<loc>.Rx=<recognized_string>

Parameters

The <recognized_string> parameter can be max. 128 bytes long.

Example

▸ GET /CTRL/TCP/C1.Rx

◂ pr /CTRL/TCP/C1.Rx=PWR_off

Delimiter　　Delimiter

...00PWR_0100...

Stored string

7.15.8. Querying the Last Recognized Message (Hex)

The recognized message is stored as a hex message in the property seen below until the next recognized message, or until the **clear()** method is called.

Command and Response

▸ GET·/CTRL/TCP/C<loc>.RxHex

◂ pr·/CTRL/TCP/C<loc>.RxHex=<recognized_hex_data>

Example

▸ GET /CTRL/TCP/C1.RxHex

◂ pr /CTRL/TCP/C1.RxHex=5057525F6F6666

7.15.9. Clearing the Last Recognized Stored Message

This method clears the stored recognized messages from **Rx**, **RxHex** and **Hash** properties.

Command and Response

▸ CALL·/CTRL/TCP/C<loc>:clear()

◂ mO·/CTRL/TCP/C<loc>:clear

Example

▸ CALL /CTRL/TCP/C1:clear()

◂ mO /CTRL/TCP/C1:clear

7.15.10. Querying the Last Recognized Active Message (String)

The recognized data is stored in string in the **temporary** property seen below. When the time set in the **ActiveTimeout** property has passed, the property is cleared.

TIPS AND TRICKS: When this property is set as a condition in the Event Manager, and the same strings follow each other, the action **will execute on every occasion.** (A Condition can be detected in Event Manager if a change happens. In this case, the string is stored in the property and after the **ActiveTimeout,** it will be cleared. If the same string is saved into the (empty) property, it will cause a change.)

Command and Response

▸ GET·/CTRL/TCP/C<loc>.ActiveRx

◂ pr·/CTRL/TCP/C<loc>.ActiveRx=<recognized_string>

Parameters

The <recognized_string> parameter is a max. 12-byte-long recognized data string.

Example

▸ GET /CTRL/TCP/C1.ActiveRx

◂ pr /CTRL/TCP/C1.ActiveRx=AudOut+

INFO: Please note that the property only contains the string until the **ActivePropertyTimeout** has passed.

7.15.11. Querying the Last Recognized Active Message (Hex)

Command and Response

▸ GET·/CTRL/TCP/C<loc>.ActiveRxHex

◂ pr·/CTRL/TCP/C<loc>.ActiveRxHex=<recognized_hex>

Parameters

The <recognized_hex> parameter is the recognized data in hex format.

Example

▸ GET /CTRL/TCP/C1.ActiveRxHex

◂ pr /CTRL/TCP/C1.ActiveRxHex=4175644F75742B00

INFO: Please note that the property only contains the data until the **ActivePropertyTimeout** has passed.

7.15.12. Setting the Active Timeout

This property is responsible for clearing the **ActiveRx**, **ActiveRxHex**, **ActiveHash** properties after the elapsed time. Default value is 50ms.

Command and Response

▸ SET·/CTRL/TCP/C<loc>.ActivePropertyTimeout=<a_timeout>

◂ pw·/CTRL/TCP/C<loc>.ActivePropertyTimeout=<a_timeout>

Parameters

The <a_timeout> parameter is the active timeout value (ms) between 0 and 255.

Example

▸ SET /CTRL/TCP/C1.ActivePropertyTimeout=255

◂ pw /CTRL/TCP/C1.ActivePropertyTimeout=255

7.15.13. Running an Immediate Event Action

When a message is recognized (DelimiterHex is detected in the message, or TimeOut has passed since receiving the last data bit) a specific Action of an Event can be run by the following command.

Command and Response

▸ SET·/CTRL/TCP/C<loc>.ActionTrigger=<event_nr>

◂ pw·/CTRL/TCP/C<loc>.ActionTrigger=<event_nr>

Parameters

The <event_nr> means the number (location) of the linked Event Action without letter 'E'. (There is no need to define a Condition in the linked Event.)

Example

▸ SET /CTRL/TCP/C1.ActionTrigger=5

◂ pw /CTRL/TCP/C1.ActionTrigger=5

7.16. RS-232 Port Configuration

7.16.1. Setting the Protocol

Command and Response *#serial #rs232 #rs-232 #protocol*

▶ SET·/MEDIA/UART/P1.ControlProtocol=<protocol>

◀ pw·/MEDIA/UART/P1.ControlProtocol=<protocol>

Parameters

Parameter	Parameter description	Value	Parameter value
<protocol>	Control protocol that is applied on the selected port	0	LW2 protocol
		1	LW3 protocol

Example

▶ SET /MEDIA/UART/P1.ControlProtocol=1

◀ pw /MEDIA/UART/P1.ControlProtocol=1

7.16.2. Setting the RS-232 Operation Mode

Command and Response

▶ SET·/MEDIA/UART/P1.Rs232Mode=<mode>

◀ pw·/MEDIA/UART/P1.Rs232Mode=<mode>

Parameters

Identifier	Parameter description	Value	Parameter value
<mode>	Stopbits value	0	Event Manager mode
		1	Control mode
		2	Command injection mode

Example

▶ SET /MEDIA/UART/P1.Rs232Mode=1

◀ pw /MEDIA/UART/P1.Rs232Mode=1

7.16.3. Setting the BAUD Rate

Command and Response

▶ SET·/MEDIA/UART/P1.Baudrate=<baud_rate>

◀ pw·/MEDIA/UART/P1.Baudrate=<baud_rate>

Parameters

Parameter	Parameter description	Value	Parameter value
<baudrate>	BAUD rate value	0	4800
		1	7200
		2	9600
		3	14400
		4	19200
		5	38400
		6	57600
		7	115200

Example

▶ SET /MEDIA/UART/P1.Baudrate=2

◀ pw /MEDIA/UART/P1.Baudrate=2

7.16.4. Setting the Databits

Command and Response

▶ SET·/MEDIA/UART/P1.DataBits=<databits>

◀ pw·/MEDIA/UART/P1.DataBits=<databits>

Parameters

Parameter	Parameter description	Value	Parameter value
<databits>	Databits value	8	8
		9	9

Example

▶ SET /MEDIA/UART/P1.DataBits=8

◀ pw /MEDIA/UART/P1.DataBits=8

7.16.5. Setting the Stopbits

Command and Response

▶ SET·/MEDIA/UART/P1.StopBits=<stopbits>

◀ pw·/MEDIA/UART/P1.StopBits=<stopbits>

Parameters

Parameter	Parameter description	Value	Parameter value
<stopbits>	Stopbits value	**0**	1
		1	1,5
		2	2

Example

▶ SET /MEDIA/UART/P1.StopBits=0

◀ pw /MEDIA/UART/P1.StopBits=0

7.16.6. Setting the Parity

Command and Response

▶ SET·/MEDIA/UART/P1.Parity=<parity>

◀ pw·/MEDIA/UART/P1.Parity=<parity>

Parameters

Parameter	Parameter description	Value	Parameter value
<parity>	Parity setting	**0**	None
		1	Odd
		2	Even

Example

▶ SET /MEDIA/UART/P1.Parity=0

◀ pw /MEDIA/UART/P1.Parity=0

7.16.7. Setting the Command Injection Mode

Command and Response *#commandinjection*

▶ SET·/MEDIA/UART/P1.CommandInjectionEnable=<logical_value>

◀ pw·/MEDIA/UART/P1.CommandInjectionEnable=<logical_value>

Parameters

Parameter	Parameter description	Value	Parameter value
<logical_value>	Command injection mode status	**true**	Command injection mode is enabled.
		false	Command injection mode is disabled.

Example

▶ SET /MEDIA/UART/P1.CommandInjectionEnable=true

◀ pw /MEDIA/UART/P1.CommandInjectionEnable=true

INFO: The Command injection status is stored in another read-only property: /MEDIA/UART/P1.CommandInjectionStatus.

7.17. RS-232 Message Sending

7.17.1. Sending a Message (ASCII-format) via RS-232

The command is for sending a command message in ASCII-format. This method **allows** escaping the control characters. For more information, see the Escaping section.

Command and Response *#message*

▸ CALL·/MEDIA/UART/P1:sendMessage(<message>)
◂ mO·/MEDIA/UART/P1:sendMessage

Example

▸ CALL /MEDIA/UART/P1:sendMessage(PWR0)
◂ mO /MEDIA/UART/P1:sendMessage

The 'PWR0' message is sent out via the P1 serial port.

7.17.2. Sending a Text (ASCII-format) via RS-232

The command is for sending a command message in ASCII-format. This method **does not require** escaping the control and non-printable characters.

Command and Response

▸ CALL·/MEDIA/UART/P1:sendText(<message>)
◂ mO·/MEDIA/UART/P1:sendText

Example

▸ CALL /MEDIA/UART/P1:sendText(open)
◂ mO /MEDIA/UART/P1:sendText

The 'open' text is sent out via the P1 serial port.

7.17.3. Sending a Binary Message (HEX-format) via RS-232

The command is for sending a binary message in Hexadecimal format. This method **does not require** escaping the control and non-printable characters.

Command and Response

▸ CALL·/MEDIA/UART/P1:sendBinaryMessage(<message>)
◂ mO·/MEDIA/UART/P1:sendBinaryMessage

Example

▸ CALL /MEDIA/UART/P1:sendBinaryMessage(433030)
◂ mO /MEDIA/UART/P1:sendBinaryMessage

The '433030' message is sent out via the P1 serial port.

7.17.4. Using Hexadecimal Codes

Hexadecimal codes can be inserted in the ASCII message when using:

sendMessage command: `CALL /MEDIA/UART/P1:sendMessage(C00\x0D)`

tcpMessage command: `CALL /MEDIA/ETHERNET:tcpMessage(C00\x0D)`

udpMessage command: `CALL /MEDIA/ETHERNET:udpMessage(C00\x0D)`

- **C00**: the message.
- **\x**: indicates that the following is a hexadecimal code.
- **0D**: the hexadecimal code (Carriage Return)

7.18. RS-232 Message Recognizer

▌ DIFFERENCE: This feature is available only for UMX-HDMI-140-Plus from FW pack v1.2.0b12.

This tool can be used to recognize messages coming from the RS-232 port. The message can be used as a Condition in Event manager and an Action can be defined for it.

Working Method

A message got recognized from the incoming data, if one of the following occurs:

- ▪ The set **DelimiterHex** is detected in the message, or
- ▪ The set **TimeOut** has passed since receiving the last data bit.
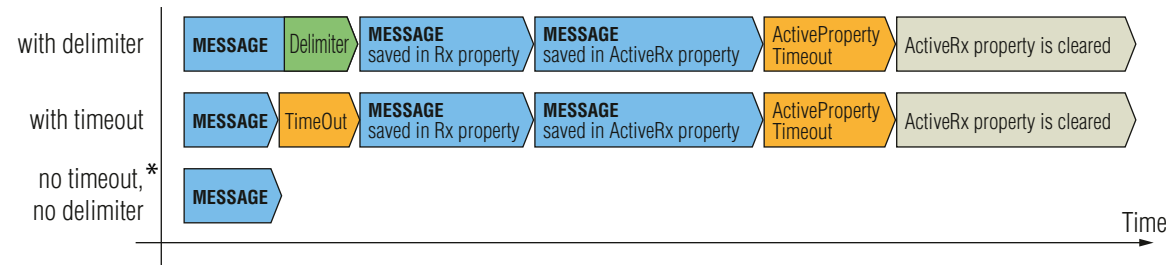
* In that case, the not-recognized data is kept in the memory (up to 128 bytes). If the **DelimiterHex** is detected later, or the **TimeOut** parameter is set in the meanwhile, the data appears in the **Rx**, **RxHex**, **Hash** and **ActiveRx**, **ActiveRxHex**, **ActiveRxHash** properties.

7.18.1. Enabling/Disabling the Recognizer

Command and Response

- ▶ SET·/MEDIA/UART/<serial_port>.RecognizerEnable=<recognizer_enable>
- ◀ pw·/MEDIA/UART/<serial_port>.RecognizerEnable=<recognizer_enable>

Parameters

Parameter	Parameter description	Values	Value description
<serial_port>	Serial port number	**P1, P2**	
<recognizer_enable>	Recognizer mode	**true**	Recognizer is enabled
		false	Recognizer is disabled

Example

- ▶ SET /MEDIA/UART/P1.RecognizerEnable=true
- ◀ pw /MEDIA/UART/P1.RecognizerEnable=true

#recognizer   #rs232recognizer   #rs-232recognizer

7.18.2. Setting the Delimiter Hex

This property stores the delimiter that is between the messages (e.g. Cr, Lf, Space). The value has to be in hex format (e.g.0D, 0A, 20).
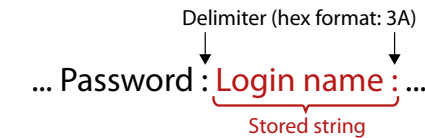
Command and Response

- ▶ SET·/MEDIA/UART/RECOGNIZER.DelimiterHex=<delimiter>
- ◀ pw·/MEDIA/UART/RECOGNIZER.DelimiterHex=<delimiter>

Parameters

The <delimiter> parameter can be max. 8 characters long (or 16 hex digits) in **hex** format.

Example

- ▶ SET /MEDIA/UART/RECOGNIZER.DelimiterHex=3a
- ◀ pw /MEDIA/UART/RECOGNIZER.DelimiterHex=3a

7.18.3. Setting the Timeout

When the set time has passed after the last received message and delimiter was not detected, the device saves the data into the **Rx, RxHex, Hash** properties. The timeout setting is useful if there is no special or easily defined delimiter in the incoming data, but there is a time gap between the messages.

Command and Response

- ▶ SET·/MEDIA/UART/RECOGNIZER.TimeOut=<timeout>
- ◀ pw·/MEDIA/UART/RECOGNIZER.TimeOut=<timeout>

Parameters

The <timeout> parameter sets the timeout value in milliseconds: **0** means the timeout is disabled, the min. value is 10.

Example

- ▶ SET /MEDIA/UART/RECOGNIZER.TimeOut=20
- ◀ pw /MEDIA/UART/RECOGNIZER.TimeOut=20

7.18.4. Querying the Last Recognized Message (String)

The recognized message is stored as a string in the property seen below until the next recognized message, or until the **RECOGNIZER.clear()** method is called.

> TIPS AND TRICKS: When this property is set as a condition in the Event Manager and the same strings follow each other, the action **will execute once**. (A Condition can be detected in Event Manager if a change happens. But if the same string is saved into the property after each other, it will not cause a change.)

Command and Response

▶ GET·/MEDIA/UART/RECOGNIZER.Rx
◀ pr·/MEDIA/UART/RECOGNIZER.Rx=<recognized_string>

Parameters

The <recognized_string> parameter can be a max. 12-byte-long recognized data string.

Example

▶ GET /MEDIA/UART/RECOGNIZER.Rx
◀ pr /MEDIA/UART/RECOGNIZER.Rx=Login:

7.18.5. Querying the Last Recognized Message(Hex)

Command and Response

▶ GET·/MEDIA/UART/RECOGNIZER.RxHex
◀ pr·/MEDIA/UART/RECOGNIZER.RxHex=<recognized_hex>

Parameters

The <recognized_hex> parameter is the recognized data in hex format.

Example

▶ GET /MEDIA/UART/RECOGNIZER.RxHex
◀ pr /MEDIA/UART/RECOGNIZER.RxHex=FF1F4C6F67696E3A

7.18.6. Clearing the Last Recognized Stored Message

This method deletes all the stored received serial messages.

Command and Response

▶ CALL·/MEDIA/UART/RECOGNIZER:clear()
◀ mO·/MEDIA/UART/RECOGNIZER:clear

Example

▶ CALL /MEDIA/UART/RECOGNIZER:clear()
◀ mO /MEDIA/UART/RECOGNIZER:clear

7.18.7. Querying the Last Recognized Active Message (String)

The recognized data is stored in string in the **temporary** property seen below. When the time set in the **ActiveTimeout** property has passed, the property is cleared.

> TIPS AND TRICKS: When this property is set as a condition in the Event Manager, and the same strings follow each other, the action **will execute on every occasion.** (A Condition can be detected in Event Manager if a change happens. In this case, the string is stored in the property and after the **ActiveTimeout,** it will be cleared. If the same string is saved into the (empty) property, it will cause a change.)

Command and Response

▶ GET·/MEDIA/UART/RECOGNIZER.ActiveRx
◀ pr·/MEDIA/UART/RECOGNIZER.ActiveRx=<recognized_string>

Parameters

The <recognized_string> parameter is a max. 12-byte-long recognized data string.

Example

▶ GET /MEDIA/UART/RECOGNIZER.ActiveRx
◀ pr /MEDIA/UART/RECOGNIZER.ActiveRx=Login:

7.18.8. Querying the Last Recognized Active Message (Hex)

Command and Response

▶ GET·/MEDIA/UART/RECOGNIZER.ActiveRxHex
◀ pr·/MEDIA/UART/RECOGNIZER.ActiveRxHex=<recognized_hex>

Parameters

The <recognized_hex> parameter is the recognized data in hex format.

Example

▶ GET /MEDIA/UART/RECOGNIZER.ActiveRxHex
◀ pr /MEDIA/UART/RECOGNIZER.ActiveRxHex= 4C6F67696E3A

7.18.9. Setting the Active Timeout

This property is responsible for clearing the **ActiveRx**, **ActiveRxHex**, **ActiveHash** properties after the elapsed time. Default value is 50ms.

Command and Response

▶ SET·/MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=<a_timeout>

◀ pw·/MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=<a_timeout>

Parameters

The <a_timeout> parameter is the active timeout value (ms) between 0 and 255.

Example

▶ SET /MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=255

◀ pw /MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=255

7.18.10. Running an Immediate Event Action

DIFFERENCE: This command is available from firmware v1.6.0.

When a message is recognized (DelimiterHex is detected in the message, or TimeOut has passed since receiving the last data bit), a specific Action of an Event can be run by the following command.

Command and Response

▶ SET·/CTRL/TCP/C<loc>.ActionTrigger=<event_nr>

◀ pw·/CTRL/TCP/C<loc>.ActionTrigger=<event_nr>

Parameters

The <event_nr> means the number (location) of the linked Event Action without letter 'E'. (There is no need to define a Condition in the linked Event.)

Example

▶ SET /CTRL/TCP/C1.ActivePropertyTimeout=255

◀ pw /CTRL/TCP/C1.ActivePropertyTimeout=255

7.19. Sending CEC Commands

DIFFERENCE: This feature is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

INFO: According to the standard, the CEC feature works only at HDMI ports.

The device is able to send and receive Consumer Electronics Control (CEC) commands. This feature is for remote controlling the source or sink device. CEC is a bi-directional communication via HDMI cable.

INFO: The hidden first 2 bytes of the CEC command are static, they refer to the logical address of the sender and the addressee. When the port is an input, it is always 04 (from TV to Playback device 1.); when the port is an output, it is always 40 (from Playback device 1. to TV). Broadcast addressing is also possible (in this case it is 0F or 4F). *#cec*

7.19.1. Press&Release Commands

DIFFERENCE: This command is available only for UMX-HDMI-140-Plus from FW package v1.3.0b5.

The CEC commands below are called 'push-button commands' like a button in a remote controller, e.g. volume up/down. When the CEC command is sent, the 'release' command is also sent in the background. Certain devices require this feature for the proper working, but this is only necessary for push-button commands.

Command and Response

▶ CALL·/MEDIA/CEC/<port>:sendClick(<command>)

◀ mO·/MEDIA/CEC/<port>:sendClick

Parameters

The <port> parameter means the video input or output port. The following is accepted as <command>:

ok	number_2	input_select	rewind	select_media_4
back	number_3	display_info	fast_forward	select_media_5
up	number_4	power_legacy	eject	power_toggle
down	number_5	page_up	skip_forward	power_on
left	number_6	page_down	skip_backward	power_off
right	number_7	volume_up	3d_mode	stop_function
root_menu	number_8	volume_down	stop_record	f1
setup_menu	number_9	mute_toggle	pause_record	f2
contents_menu	dot	mute	play_forward	f3
favorite_menu	enter	unmute	play_reverse	f4
media_top_menu	clear	play	select_next_media	
media_context_menu	channel_up	stop	select_media_1	
number_0	channel_down	pause	select_media_2	
number_1	sound_select	record	select_media_3	

Example

▶ CALL /MEDIA/CEC/I2:sendClick(play)

◀ mO /MEDIA/CEC/I2:sendClick

7.19.2. Further Commands

Command and Response

▶ CALL·/MEDIA/CEC/<port>:send(<command>)

◀ mO·/MEDIA/CEC/<port>:send

Parameters

The <port> parameter means the video input (I1-I4) or video output (O1-O2) port. The following are accepted as <command>:

image_view_on	standby	text_view_on	active_source
get_cec_version	set_osd	clear_osd	give_power_status

The **set_osd** command requires to also send another command, see the following section.

Example

▶ CALL /MEDIA/CEC/I2:send(standby)

◀ mO /MEDIA/CEC/I2:send

7.19.3. Sending an OSD String

The OSD string sending consists of two steps. First set the **OsdString** property with the desired text, then call the **send** method.

Command and Response

▶ SET·/MEDIA/CEC/<port>.OsdString=<text>

◀ pw·/MEDIA/CEC/<port>.OsdString=<text>

▶ CALL·/MEDIA/CEC/<port>:send(set_osd)

◀ mO·/MEDIA/CEC/I2:send

Parameters

Parameter	Parameter description	Values	Value description
<port>	Video input or video output port	I1-I4	Video inputs
		O1	Video output
<text>	The desired OSD string		Letters (A-Z) and (a-z), hyphen (-), underscore (_), numbers (0-9), and dot (.). Max length: 14 characters.

Example

▶ SET /MEDIA/CEC/I2.OsdString=Lightware

◀ pw /MEDIA/CEC/I2.OsdString=Lightware

▶ CALL /MEDIA/CEC/I2:send(set_osd)

◀ mO /MEDIA/CEC/I2:send

7.19.4. Sending CEC Commands in Hex Format

▶ CALL·/MEDIA/CEC/<port>:sendHex(<hex_code>)

◀ mO·/MEDIA/CEC/<port>:sendHex

Parameters

Parameter	Parameter description	Values	Value description
<port>	Video input or video output port	I1-I4	Video inputs
		O1	Video output
<hex_code>	The desired CEC command		Max. 30 characters (15 bytes) in hexadecimal format.

Example

▶ CALL /MEDIA/CEC/I2:sendHex(8700E091)

◀ mO /MEDIA/CEC/I2:sendHex

7.19.5. Querying the Last Received CEC Message

▶ GET /MEDIA/CEC/<port>.LastReceivedMessage

◀ pr /MEDIA/CEC/<port>.LastReceivedMessage=<CEC_message>

Parameters

Parameter	Parameter description	Values	Value description
<port>	Video port	I1-I4 or O1	
<CEC_message>	The last incoming CEC message from the connected device.		

Example

▶ GET /MEDIA/CEC/I2.LastReceivedMessage

◀ pr /MEDIA/CEC/I2.LastReceivedMessage=give_power_status

TIPS AND TRICKS: This property can be a condition in the Event manager. When the connected device sends status information via CEC, it could be a trigger for an action.

7.20. Infrared Port Configuration

█ INFO: Infrared input and output port numbering can be found in the Input/Output Port Numbering section.

7.20.1. Enabling/Disabling Command Injection Mode

Command and Response *#infra #infrared #ir*

▶ SET·/MEDIA/IR/<ir_port>.CommandInjectionEnable=<ci_status>
◀ pw·/MEDIA/IR/<ir_port>.CommandInjectionEnable=<ci_status>

Parameters

If the <logical_value> is **true** (or 1), the command injection is enabled. If it is **false** (or 0), the command injection is disabled.

Example

▶ SET /MEDIA/IR/S1.CommandInjectionEnable=true
◀ pw /MEDIA/IR/S1.CommandInjectionEnable=true

7.20.2. Changing Command Injection Port Number

Command and Response

▶ SET·/MEDIA/IR/<in|out>.CommandInjectionPort=<port_no>
◀ pw·/MEDIA/IR/<in|out>.CommandInjectionPort=<port_no>

Example

▶ SET /MEDIA/IR/S1.CommandInjectionPort=9001
◀ pw /MEDIA/IR/S1.CommandInjectionPort=9001

7.20.3. Enabling/Disabling Output Signal Modulation

Command and Response

▶ SET·/MEDIA/IR/D1.EnableModulation=<modulation>
◀ pw·/MEDIA/IR/D1.EnableModulation=<modulation>

Parameters

If the <modulation> parameter is **true** (or 1), the signal modulation is enabled. If it is **false** (or 0), the modulation is disabled.

Example

▶ SET /MEDIA/IR/D1.EnableModulation=false
◀ pw /MEDIA/IR/D1.EnableModulation=false

Signal modulation is turned off on IR output (D1).

█ INFO: The default setting value is **true** (enabled).

7.21. Infrared Message Sending

█ **DIFFERENCE:** This feature is available only in **UMX-HDMI-140-Plus** model.

7.21.1. Sending Pronto Hex Codes in Little-endian Format via IR Port

Command and Response *#infra #infrared #ir*

▶ CALL·/MEDIA/IR/<out>:sendProntoHex(<hex_code>)
◀ mO·/MEDIA/IR/<out>:sendProntoHex

Parameters

Parameter	Parameter description	Parameter values
<out>	Output port of the Infrared interface	Local Infra output: **D1**
<hex_code>	Pronto hex format code	Accepts a maximum 765-character-long code in hexadecimal format (0-9; A-F; a-f) without space character in little-endian system.

█ INFO: This command can send exactly one pronto hex message. The header of the IR code contains the length of the whole code in hexa format. If the code is deficient or duplicated, it causes syntax error.

For more details about the pronto hex codes, see the IR Interface section.

Example

▶ CALL /MEDIA/IR/D1:sendProntoHex(00006D0025000300A900A80015 003F0015003F0015003F00150 0150015001500150015001500150015001500150015003F0015003F0015003F001500150015001500150 0150015001500150015003F0015003F001503F00150015001500150015001500150015001500150015 0015001500150015001500150015003F0015003F0015003F0015003F0015003F0015000207A900A80 01500150015006E0E)
◀ mO /MEDIA/IR/D1:sendProntoHex

█ TIPS AND TRICKS: Download a code that belongs to your controlled device from a web database from the Internet.

7.21.2. Sending Pronto Hex Codes in Big-endian Format via IR Port

Command and Response *#infra #infrared #ir*

▶ CALL·/MEDIA/IR/\<out>:sendProntoHexBigEndian(\<hex_code>)

◀ mO·/MEDIA/IR/\<out>:sendProntoHexBigEndian

Parameters

Parameter	Parameter description	Parameter values
\<out>	Output port of the Infrared interface	Local Infra output: **D1**
\<hex_code>	Pronto hex format code	Accepts a maximum 765-character-long code in hexadecimal format (0-9; A-F; a-f) without space character in big-endian system.

> INFO: This command can send exactly one pronto hex message. The header of the IR code contains the length of the whole code in hexa format. If the code is deficient or duplicated, it causes syntax error.

For more details about the pronto hex codes, see the IR Interface section.

Example

▶ CALL /MEDIA/IR/D1:sendProntoHexBigEndian(0000006d0025000300a900a80015 003f0015003f0015 003f00150015001500150015001500150015001500150015003f0015003f0015003f001500150015001 5001500150015001500150015001500150015003f0015003f0015003f001500150015001500150015001500150 0150015001500150015001500150015003f0015003f0015003f0015003f0015003f0015070200a9 00a80015001500150e6e)

◀ mO /MEDIA/IR/D1:sendProntoHexBigEndian

> TIPS AND TRICKS: Learning raw IR code with a terminal program:

Step 1. Connect to the UMX-HDMI-140-Plus device with a terminal program (see the details in the Instructions for the Terminal Application Usage section).

Step 2. Push the desired button of the remote control to scan the raw IR code.

Step 3. Remove all non-hexadecimal characters (e.g. spaces, h characters etc.) from the code.

The pronto hex code that is learned by a Lightware device is in big-endian format.

7.22. GPIO Port Configuration

> INFO: Use the GET command to query a parameter.

7.22.1. Setting the Direction of a GPIO Pin

Command and Response

▶ SET·/MEDIA/GPIO/\<port>.Direction(\<dir>)

◀ pw·/MEDIA/GPIO/\<port>.Direction(\<dir>)

Parameters

Identifier	Parameter description	Parameter values
\<dir>	The direction of the GPIO pin.	**I**: input, **O**: output

Example

▶ SET /MEDIA/GPIO/P1.Direction=I

◀ pw /MEDIA/GPIO/P1.Direction=I

7.22.2. Setting the Output Level of a GPIO Pin

Command and Response

▶ SET·/MEDIA/GPIO/\<port>.Output(\<value>)

◀ pw·/MEDIA/GPIO/\<port>.Output(\<value>)

Parameters

Identifier	Parameter description	Parameter values
\<value>	The output value of the GPIO pin.	**H**: high level, **L**: low level

Example

▶ SET /MEDIA/GPIO/P1.Direction=I

◀ pw /MEDIA/GPIO/P1.Direction=I

7.22.3. Toggling the Level of a GPIO Pin

The output level can be changed from high to low and from low to high by the command below.

Command and Response

▶ CALL·/MEDIA/GPIO/\<port>:toggle()

◀ mO·/MEDIA/GPIO/\<port>:toggle

Example

▶ CALL /MEDIA/GPIO/P1:toggle()

◀ mO /MEDIA/GPIO/P1:toggle

7.23. EDID Management

Parameters

Parameter	Description
<emulated>	The emulated EDID memory of the desired input port. Example: E1.
<dynamic>	Dynamic EDID memory index. Example: D1
<user>	User EDID memory index. Example: U1
<factory>	Factory EDID memory index. Example: F1

See the list of all factory EDID tracks in the Factory EDID List section.

7.23.1. Querying the Emulated EDIDs

Command and Response *#edid*

▶ GET·/EDID.EdidStatus

◀ pr·/EDID.EdidStatus=<dynamic|user|factory>:<emulated>;...;<dynamic|user|factory>:<emulated>

Example

▶ GET /EDID.EdidStatus

◀ pr /EDID.EdidStatus=D1:E1;F47:E2

Emulated EDID memory for input port is listed with the EDID number that is currently emulated on the input.

7.23.2. Querying the Validity of a Dynamic EDID

Command and Response

▶ GET·/EDID/D/<dynamic>.Validity

◀ pr·/EDID/D/<dynamic>.Validity=<logical_value>

Parameters

The <logical_value> can be **true** or **false**.

Example

▶ GET /EDID/D/D1.Validity

◀ pr /EDID/D/D1.Validity=true

7.23.3. Querying the Preferred Resolution of an User EDID

Command and Response

▶ GET·/EDID/U/<user>.PreferredResolution

◀ pr·/EDID/U/<user>.PreferredResolution=<resolution>

Example

▶ GET /EDID/U/U2.PreferredResolution

◀ pr /EDID/U/U2.PreferredResolution=1920x1080p60.00Hz

7.23.4. Emulating an EDID to an Input Port

Command and Response

▶ CALL·/EDID:switch(<dynamic|user|factory>:<emulated>)

◀ mO·/EDID:switch

Example

▶ CALL /EDID:switch(F49:E1;F27:E2)

◀ mO /EDID:switch

7.23.5. Emulating an EDID to All Input Ports

Command and Response

▶ CALL·/EDID:switchAll(<dynamic|user|factory>)

◀ mO·/EDID:switchAll

Example

▶ CALL /EDID:switchAll(F47)

◀ mO /EDID:switchAll

7.23.6. Copying an EDID to User Memory

Command and Response

▶ CALL·/EDID:copy(<dynamic|emulated|factory|user>:<user>)

◀ mO·/EDID:copy

Example

▶ CALL /EDID:copy(D1:U1)

◀ mO /EDID:copy

The EDID of the last connected sink of D1 (Output 1) has been copied to U1.

7.23.7. Deleting an EDID from User Memory

Command and Response

▶ CALL·/EDID:delete(<u><user></u>)
◀ mO·/EDID:delete

Example

▶ CALL /EDID:delete(U1;U2;U6)
◀ mO /EDID:delete

7.23.8. Resetting the Emulated EDIDs

Command and Response

▶ CALL·/EDID:reset()
◀ mO·/EDID:reset

Example

▶ CALL /EDID:reset()
◀ mO /EDID:reset

Calling this method switches all emulated EDIDs to a factory default one. See the table in the Factory Default Settings section.

7.24. LW3 Commands - Quick Summary

System Commands

Querying the Product Name
▸ GET·/.ProductName

Setting the Device Label
▸ SET·/MANAGEMENT/UID/DeviceLabel=<custom_name>

Querying the Serial Number
▸ GET·/.SerialNumber

Querying the Firmware Version
▸ GET·/SYS/MB.FirmwareVersion

Querying the Package Version
▸ GET·/MANAGEMENT/UID.PackageVersion

Resetting the Device
▸ CALL·/SYS:reset()

Restoring the Factory Default Settings
▸ CALL·/SYS:factoryDefaults()

Locking the Front Panel Buttons
▸ SET·/MANAGEMENT/UI.ControlLock=<lock_status>

Disabling the Default Function of the Front Panel Buttons
▸ SET·/MANAGEMENT/UI/BUTTONS/<button_id>.DefaultFunctionEnable=<button_status>

Identifying the Device
▸ CALL·/MANAGEMENT/UI:identifyMe()

Dark Mode
▸ SET·/MANAGEMENT/UI/DARKMODE.DarkModeEnable=<darkmode_status>

Dark Mode Delay
▸ SET·/MANAGEMENT/UI/DARKMODE.DarkModeDelay=<delay_time>

Running a Macro
▸ CALL·/CTRL/MACROS:run(<macro_name>)

Cleartext Login Protection

Setting the Login Password
▸ CALL·/LOGIN:setPassword(<password>)

Logging into the Device
▸ CALL·/LOGIN:login(<password>)

Logging out of the Device
▸ CALL·/LOGIN:logout(<password>)

Enabling/Disabling the Cleartext Login Function
▸ SET·/LOGIN:LoginEnable=<login_state>

Video Port Settings

Querying the Status of Source Ports
▸ GET·/MEDIA/VIDEO/XP.SourcePortStatus

Querying the Status of Destination Port
▸ GET·/MEDIA/VIDEO/XP.DestinationPortStatus

Querying the Video Crosspoint Setting
▸ GET·/MEDIA/VIDEO/XP.DestinationConnectionList

Switching Video Input
▸ CALL·/MEDIA/VIDEO/XP:switch(<in>:<out>)

Querying the Video Autoselect Settings
▸ GET·/MEDIA/VIDEO/XP.DestinationPortAutoselect

Changing the Autoselect Mode
▸ CALL·/MEDIA/VIDEO/XP:setDestinationPortAutoselect(<out>:<out_set>)

Querying the Input Port Priority
▸ GET·/MEDIA/VIDEO/XP.PortPriorityList

Changing the Input Port Priority
▸ CALL·/MEDIA/VIDEO/XP:setAutoselectionPriority(<in>(<out>):<prio>);(<in>(<out>):<prio>)

Muting an Input Port
▸ CALL·/MEDIA/VIDEO/XP:muteSource(<in>)

Unmuting an Input Port
▸ CALL·/MEDIA/VIDEO/XP:unmuteSource(<in>)

Querying the Connected Input Port Number
▸ GET·/MEDIA/VIDEO/<out>.ConnectedSource

Locking an Input Port
▸ CALL·/MEDIA/VIDEO/XP:lockSource(<in>)

Unlocking an Input Port

▸ CALL·/MEDIA/VIDEO/XP:unlockSource(<in>)

Muting an Output

▸ CALL·/MEDIA/VIDEO/XP:muteDestination(<out>)

Unmuting an Output

▸ CALL·/MEDIA/VIDEO/XP:unmuteDestination(<out>)

Locking an Output

▸ CALL·/MEDIA/VIDEO/XP:lockDestination(<out>)

Unlocking an Output

▸ CALL·/MEDIA/VIDEO/XP:unlockDestination(<out>)

HDCP Setting (Input Port)

▸ SET·/MEDIA/VIDEO/<in>.HdcpEnable=<hdcp_status>

HDCP Setting (Output Port)

▸ SET·/MEDIA/VIDEO/<out>.HdcpModeSetting=<hdcp_mode>

Test Pattern Mode

▸ SET·/MEDIA/VIDEO/<in>.FreeRunMode=<tpg_mode>

Test Pattern Resolution

▸ SET·/MEDIA/VIDEO/<in>.FreeRunResolution=<tpg_resolution>

Test Pattern Color

▸ SET·/MEDIA/VIDEO/<in>.FreeRunColor=<RGB_code>

HDMI Mode Settings (Output Port)

▸ SET·/MEDIA/VIDEO/<out>.HdmiModeSetting=<mode>

Color Space Setting (Output Port)

▸ SET·/MEDIA/VIDEO/<out>.ColorSpaceSetting=<colorspace>

Audio Port Settings

Querying the Status of Source Port

▸ GET·/MEDIA/AUDIO/XP.SourcePortStatus

Querying the Status of Destination Port

▸ GET·/MEDIA/AUDIO/XP.DestinationPortStatus

Querying the Audio Crosspoint Setting

▸ GET·/MEDIA/AUDIO/XP.DestinationConnectionList

Switching Audio Input

▸ CALL·/MEDIA/AUDIO/XP:switch(<in>:<out>)

Querying the Audio Autoselect Settings

▸ GET·/MEDIA/AUDIO/XP.DestinationPortAutoselect

Changing the Autoselect Mode

▸ CALL·/MEDIA/AUDIO/XP:setDestinationPortAutoselect(<out>:<out_set>)

Querying the Input Port Priority

▸ GET·/MEDIA/AUDIO/XP.PortPriorityList

Changing the Input Port Priority

▸ CALL·/MEDIA/AUDIO/XP:setAutoselectionPriority(<in>(<out>):<prio>)

Muting an Audio Input

▸ CALL·/MEDIA/AUDIO/XP:muteSource(<in>)

Unmuting an Audio Input

▸ CALL·/MEDIA/AUDIO/XP:unmuteSource(<in>)

Locking an Audio Input

▸ CALL·/MEDIA/AUDIO/XP:lockSource(<in>)

Unlocking an Audio Input

▸ CALL·/MEDIA/AUDIO/XP:unlockSource(<in>)

Muting an Audio Output

▸ CALL·/MEDIA/AUDIO/XP:muteDestination(<out>)

Unmuting an Audio Output

▸ CALL·/MEDIA/AUDIO/XP:unmuteDestination(<out>)

Locking an Audio Output

▸ CALL·/MEDIA/AUDIO/XP:lockDestination(<out>)

Unlocking an Audio Output

▸ CALL·/MEDIA/AUDIO/XP:unlockDestination(<out>)

Analog Audio Input Volume

▸ SET·/MEDIA/AUDIO/<in>.Volume=<level>

Analog Audio Input Balance

▸ SET·/MEDIA/AUDIO/<in>.Balance=<level>

Event Manager Basics

How to arrange an Event?

▸ SET·/EVENTS/E\<loc\>.Condition=\<expression\>

Setting a Condition by Linking Another Condition

▸ SET·/EVENTS/E\<loc\>.Condition=\<event_nr\>

Setting a Condition by Linking More Conditions

▸ SET·/EVENTS/E\<loc\>.Condition=\<event_nr\>&\<event_nr\>&\<event_nr\>&\<event_nr\>

Setting an Action by Specifying a Direct Path

▸ SET·/EVENTS/E\<loc\>.Action=\<expression\>

Setting an Action by Linking Another Action

▸ SET·/EVENTS/E\<loc\>.Action=\<event_nr\>

Setting an Action by Linking a Macro

▸ SET·/EVENTS/E\<loc\>.Action=\<macro_name\>

Event Manager Tool Kit

Setting the Delay

▸ SET·/EVENTS/E\<loc\>.ConditionTimeout=\<time\>

▸ SET·/EVENTS/E\<loc\>.ConditionEndCheck=\<true/false\>

▸ SET·/EVENTS/E\<loc\>.ConditionTimeoutContinuous=\<true/false\>

Setting the Name of the Event

▸ SET·/EVENTS/E\<loc\>.Name=\<string\>

Enabling/Disabling the Event

▸ SET·/EVENTS/E\<loc\>.Enabled=\<true/false\>

Triggering a Condition

▸ CALL·/EVENTS/E\<loc\>:triggerCondition(1)

Querying the Condition Counter

▸ GET·/EVENTS/E\<loc\>.ConditionCount

Querying the Condition Trigger Counter

▸ GET·/EVENTS/E\<loc\>.ExternalConditionTriggerCount

Testing an Action

▸ CALL·/EVENTS/E\<loc\>:ActionTest(1)

Variable-Management

Value Assignment

▸ SET·/CTRL/VARS/V\<loc\>.Value=\<value\>

Addition and Subtraction (Add Method)

▸ CALL·/CTRL/VARS/V\<loc\>:add(\<operand\>;\<min\>;\<max\>)

Addition and Subtraction (Cycle Method)

▸ CALL·/CTRL/VARS/V\<loc\>:cycle(\<operand\>;\<min\>;\<max\>)

Value Change with Intervals (Case)

▸ CALL·/CTRL/VARS/V\<loc\>:case(\<min\> \<max\> \<val\>;)

Scanning and Storing

▸ CALL·/CTRL/VARS/V\<loc\>:scanf(\<path\>.\<property\>;\<pattern\>)

Reformatting a Value

▸ CALL·/CTRL/VARS/V\<loc\>:printf(\<prefix\>%s\<postfix\>)

Ethernet Port Configuration

Setting the DHCP State

▸ SET·/MANAGEMENT/NETWORK.DhcpEnabled=\<dhcp_status\>

Changing the IP Address (Static)

▸ SET·/MANAGEMENT/NETWORK.StaticIpAddress=\<IP_address\>

Changing the Subnet Mask (Static)

▸ SET·/MANAGEMENT/NETWORK.StaticNetworkMask=\<netmask\>

Changing the Gateway Address (Static)

▸ SET·/MANAGEMENT/NETWORK.StaticGatewayAddress=\<gw_address\>

Applying Network Settings

▸ CALL·/MANAGEMENT/NETWORK:ApplySettings(1)

Ethernet Tool Kit

Device Filter Based on MAC Address

▸ SET·/MANAGEMENT/MACFILTER.MACaddress\<loc\>=\<MAC_address\>;\<receive\>;\<send\>;\<name\>

LW2 Control Port Blocking

▸ SET·/MANAGEMENT/SERVICEFILTER.Lw2Enabled=\<port_mode\>

HTTP Port Blocking

▸ SET·/MANAGEMENT/SERVICEFILTER.HttpEnabled=\<port_mode\>

RS-232 Port Configuration

Setting the Protocol

▶ SET·/MEDIA/UART/P1.ControlProtocol=<protocol>

Setting the RS-232 Operation Mode

▶ SET·/MEDIA/UART/P1.Rs232Mode=<mode>

Setting the BAUD Rate

▶ SET·/MEDIA/UART/P1.Baudrate=<baud_rate>

Setting the Databits

▶ SET·/MEDIA/UART/P1.DataBits=<databits>

Setting the Stopbits

▶ SET·/MEDIA/UART/P1.StopBits=<stopbits>

Setting the Parity

▶ SET·/MEDIA/UART/P1.Parity=<parity>

Setting the Command Injection Mode

▶ SET·/MEDIA/UART/P1.CommandInjectionEnable=<logical_value>

RS-232 Message Sending

Sending a Message (ASCII-format) via RS-232

▶ CALL·/MEDIA/UART/P1:sendMessage(<message>)

Sending a Text (ASCII-format) via RS-232

▶ CALL·/MEDIA/UART/P1:sendText(<message>)

Sending a Binary Message (HEX-format) via RS-232

▶ CALL·/MEDIA/UART/P1:sendBinaryMessage(<message>)

Using Hexadecimal Codes

RS-232 Message Recognizer

Enabling/Disabling the Recognizer

▶ SET·/MEDIA/UART/<serial_port>.RecognizerEnable=<recognizer_enable>

Setting the Delimiter Hex

▶ SET·/MEDIA/UART/RECOGNIZER.DelimiterHex=<delimiter>

Setting the Timeout

▶ SET·/MEDIA/UART/RECOGNIZER.TimeOut=<timeout>

Querying the Last Recognized Message (String)

▶ GET·/MEDIA/UART/RECOGNIZER.Rx

Querying the Last Recognized Message(Hex)

▶ GET·/MEDIA/UART/RECOGNIZER.RxHex

Clearing the Last Recognized Stored Message

▶ CALL·/MEDIA/UART/RECOGNIZER:clear()

Querying the Last Recognized Active Message (String)

▶ GET·/MEDIA/UART/RECOGNIZER.ActiveRx

Querying the Last Recognized Active Message (Hex)

▶ GET·/MEDIA/UART/RECOGNIZER.ActiveRxHex

Setting the Active Timeout

▶ SET·/MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=<a_timeout>

Running an Immediate Event Action

▶ SET·/CTRL/TCP/C<loc>.ActionTrigger=<event_nr>

Sending CEC Commands

Press&Release Commands

▶ CALL·/MEDIA/CEC/<port>:sendClick(<command>)

Further Commands

▶ CALL·/MEDIA/CEC/<port>:send(<command>)

Sending an OSD String

▶ SET·/MEDIA/CEC/<port>.OsdString=<text>

▶ CALL·/MEDIA/CEC/<port>:send(set_osd)

Sending CEC Commands in Hex Format

▶ CALL·/MEDIA/CEC/<port>:sendHex(<hex_code>)

Querying the Last Received CEC Message

▶ GET /MEDIA/CEC/<port>.LastReceivedMessage

Infrared Port Configuration

Enabling/Disabling Command Injection Mode

▶ SET·/MEDIA/IR/<ir_port>.CommandInjectionEnable=<ci_status>

Changing Command Injection Port Number

▶ SET·/MEDIA/IR/<in|out>.CommandInjectionPort=<port_no>

Enabling/Disabling Output Signal Modulation

▶ SET·/MEDIA/IR/D1.EnableModulation=<modulation>

Infrared Message Sending

Sending Pronto Hex Codes in Little-endian Format via IR Port

▶ CALL·/MEDIA/IR/<out>:sendProntoHex(<hex_code>)

Sending Pronto Hex Codes in Big-endian Format via IR Port

▶ CALL·/MEDIA/IR/<out>:sendProntoHexBigEndian(<hex_code>)

GPIO Port Configuration

Setting the Direction of a GPIO Pin

▶ SET·/MEDIA/GPIO/<port>.Direction(<dir>)

Setting the Output Level of a GPIO Pin

▶ SET·/MEDIA/GPIO/<port>.Output(<value>)

Toggling the Level of a GPIO Pin

▶ CALL·/MEDIA/GPIO/<port>:toggle()

EDID Management

Querying the Emulated EDIDs

▶ GET·/EDID.EdidStatus

Querying the Validity of a Dynamic EDID

▶ GET·/EDID/D/<dynamic>.Validity

Querying the Preferred Resolution of an User EDID

▶ GET·/EDID/U/<user>.PreferredResolution

Emulating an EDID to an Input Port

▶ CALL·/EDID:switch(<dynamic|user|factory>:<emulated>)

Emulating an EDID to All Input Ports

▶ CALL·/EDID:switchAll(<dynamic|user|factory>)

Copying an EDID to User Memory

▶ CALL·/EDID:copy(<dynamic|emulated|factory|user>:<user>)

Deleting an EDID from User Memory

▶ CALL·/EDID:delete(<user>)

Resetting the Emulated EDIDs

▶ CALL·/EDID:reset()

8

Firmware Update

This chapter is meant to help customers perform firmware updates on our products by giving a few tips on how to start and by explaining the features of the Lightware Device Updater v2 (LDU2) software. The latest software and firmware pack can be downloaded from www.lightware.com.

- ▶ INTRODUCTION
- ▶ PREPARATION
- ▶ RUNNING THE SOFTWARE
- ▶ UPDATING VIA GUI
- ▶ COMMAND LINE INTERFACE (CLI)
- ▶ CLI COMMANDS
- ▶ IF THE UPDATE IS NOT SUCCESSFUL

ATTENTION! While the firmware is being updated, the normal operation mode is suspended, as the device is switched to bootload mode. The firmware update process has an effect on the configuration and the settings of the device.

8.1. Introduction

Lightware Device Updater v2 (LDU2) software is the second generation of the LFP-based (Lightware Firmware Package) firmware update process.

DIFFERENCE: This software can be used for uploading the packages with LFP2 extension only. LDU2 is not suitable for using LFP files, please use the LDU software for that firmware update.

LDU   LDU2

8.2. Preparation

Most Lightware devices can be controlled over several interfaces (e.g. Ethernet, USB, RS-232). But the firmware can be updated usually over one dedicated interface, which is the Ethernet in most cases.

If you want to update the firmware of one or more devices, you need the following:
▪ **LFP2 file**,
▪ **LDU2 software** installed on your PC or Mac.

Both can be downloaded from www.lightware.com/downloads.

Optionally, you can download the **release notes** file in HTML format.

8.2.1. About the Firmware Package (LFP2 File)

All the necessary tools and binary files are packed into the LFP2 package file. You only need this file to update your device.
▪ This allows the use of the same LFP2 package for different devices.
▪ The package contains all the necessary components, binary, and other files.
▪ The release notes is included in the LFP2 file, which is displayed in the window where you select the firmware package file in LDU2.

8.2.2. LDU2 Installation

ATTENTION! Minimum system requirement: 2 GB RAM.

INFO: The Windows and the Mac applications have the same look and functionality.

Download the software from www.lightware.com/downloads.

Installation Modes

Normal install	Snapshot install
Available for Windows, macOS and Linux	Available for Windows only
The installer can update only this instance	Cannot be updated
One updateable instance may exist for all users	Many different versions can be installed for all users

ATTENTION! Using the default Normal install is highly recommended.

INFO: If you have a previously installed version, you will be prompted to remove the old version before installing the new one.

Installation in case of Windows OS

Run the installer. If the User Account Control displays a pop-up message, click **Yes**.

Using the **Normal install** (default setting) is highly recommended.

Installation in case of macOS

Mount the DMG file by double clicking on it, and drag the LDU2 icon over the Applications icon to copy the program into the Applications folder. If you want to copy LDU2 into another location, just drag the icon over the desired folder.

INFO: This type of installer is equal to the **Normal install** of Windows.

ATTENTION! Please check the firewall settings on the macOS device. LDU2 needs to be added to the exeptions of the blocked softwares for proper operation.

Installation in case of Linux

Step 1. Download the **archive file** (tar.gz) from www.lightware.com and unpack it to a temp folder.

Step 2. Run the **install_ldu2.sh** file in the temp folder. The script will install LDU2 into the following folder: HOME/.local/share/lightware/ldu2.

Step 3. Above folder will contain this file: **LightwareDeviceUpdaterV2.sh** that can be used to start LDU2.

8.3. Running the Software

> **DIFFERENCE:** Added support for firmware update from a host PC which is in another subnet as the device. The feature is available only **from firmware package v1.6.4b2**.

You have two options:

- **Starting the LDU2** by double-clicking on the shortcut/program file, or
- Double-clicking on an **LFP2 file**.

8.3.1. LDU2 Interfaces

The software can be used over:

- The Graphical User Interface (GUI), or by
- The Command Line Interface (CLI).

LDU2 Auto-Update

At startup, the software checks if a newer version is available on the web.
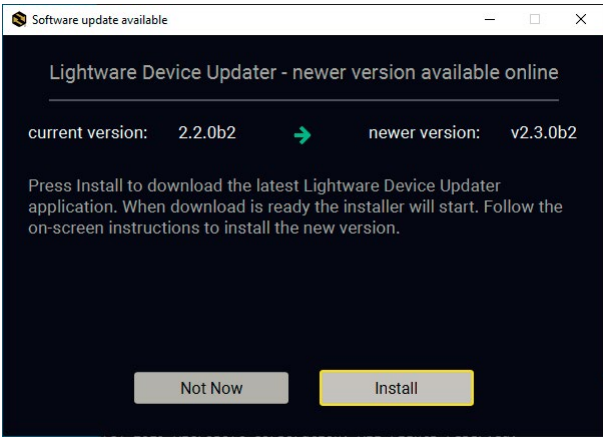
Main Screen

When the software is started by the shortcut, the device discovery screen appears. Press the **Search for devices** button to start finding the Lightware devices:
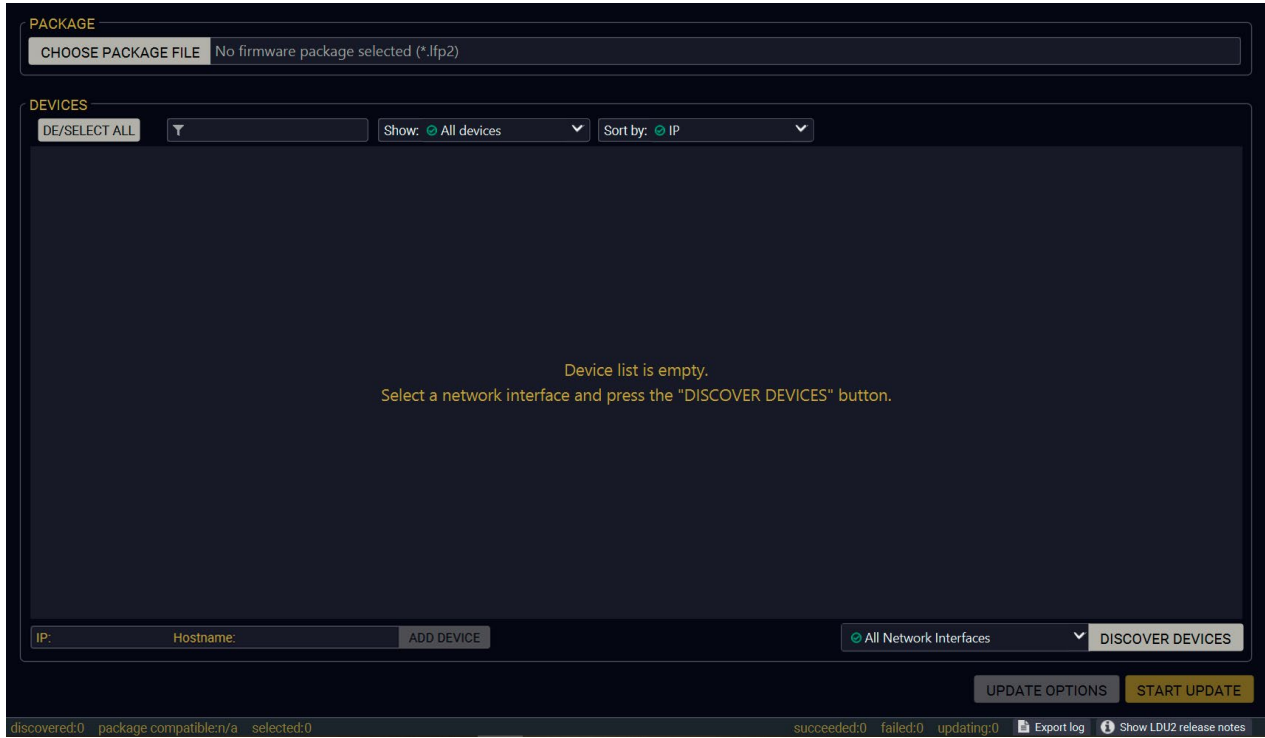
Devices may also be added manually by typing the IP address in the box near the bottom of the screen. From LDU2 version v2.16.1, manual addition of devices can also be done using the hostname.

> **ATTENTION!** If the device cannot be added by the hostname, please use the IP address.

If you start the software by double-clicking on the LFP2 file, the firmware will be loaded. Press the **Discover devices** button; all the devices will be listed that are compatible with the selected firmware pack.

> INFO: If you press the **Choose package file** button, the release notes of the LFP2 file will be displayed in the right panel; see the Step 1. Select the Firmware Package. section.

Device List

When the discovery is completed, the devices available on the network are listed in the application.
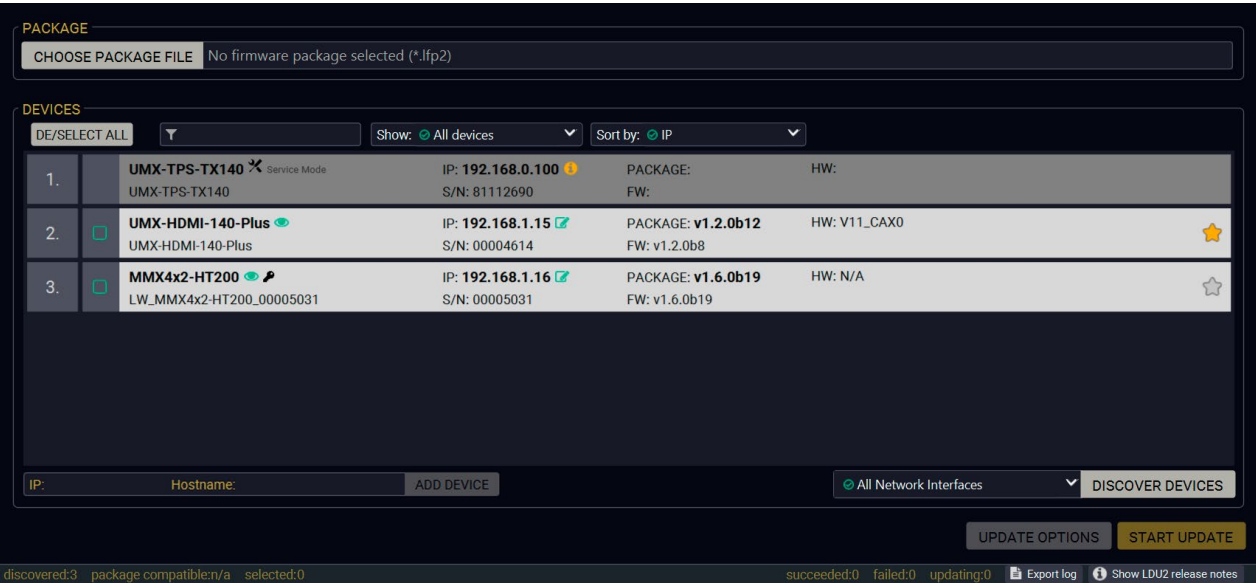
If the desired device is not discovered, you can add it by typing the IP address in the dedicated field and pressing the **Add device** button.

Legend of the Icons

✏️	**IP address editor**	The IP address of the device can be changed in the pop-up window.
👁️	**Identify me**	Clicking on the icon results in the front panel LEDs blinking for 10 seconds, which helps to identify the device physically.
⭐	**Favorite device**	The device has been marked, thus the IP address is stored. When a device is connected with that IP address, the star will be highlighted in that line.
ⓘ	**Further information available**	Device is unreachable. Change the IP address by pressing the **IP address editor** icon or use the front panel buttons (if available).
🔑	**Cleartext login enabled**	The password-protection is enabled. You have to enter the password to perform the firmware update in the **Parameters** window or in the appearing window in the beginning of the update.
🛠️	**Service mode**	The device is in bootload mode. Backup and restore cannot be performed in this case.

8.3.2. The Updating Steps

> **ATTENTION!** While the firmware is being updated, the normal operation mode is suspended, as the device is switched to bootload mode. Signal processing is not performed. Do not interrupt the firmware update. If any problem occurs, reboot the unit and restart the process.

Keeping the Configuration Settings

By default, device configuration settings are restored when firmware update is finished. If factory reset has been chosen in the parameters window, all device settings will be erased. In the case of factory reset, you can save the settings of the device in the Lightware Device Controller software and restore it later.

The following flow chart demonstrates how this function works in the background.

Step 1. Create a backup

The current configuration of the device is being saved into a configuration backup file on your computer.

Step 2. Start the Update

The device reboots and starts in bootload mode (firmware update mode).

Step 3. Update

The CPU firmware is changed to the new one.

Step 4. Factory reset

All configuration settings are restored to the factory default values.

Step 5. Conversion / Restore

The firmware package checks the backup data before the restoration procedure, and if it is necessary, a conversion is applied to avoid incompatibility problems between the firmware versions. All configuration settings are restored to the device after the conversion.

If the factory default option is selected in the Parameters window, the conversion / restoration procedure will not be performed!

Step 6. Finish

Once the firmware update procedure is finished, the device reboots and is ready for use.

8.4. Updating Via GUI

To update the desired device(s) via the Graphical User Interface, follow these steps.

Step 1. Select the Firmware Package.

Click on the **Choose Package File** button and navigate to the location where the LFP2 file was saved. When you click on the name of the package, the preview of the release notes are displayed in the right panel.

CHOOSE PACKAGE FILE
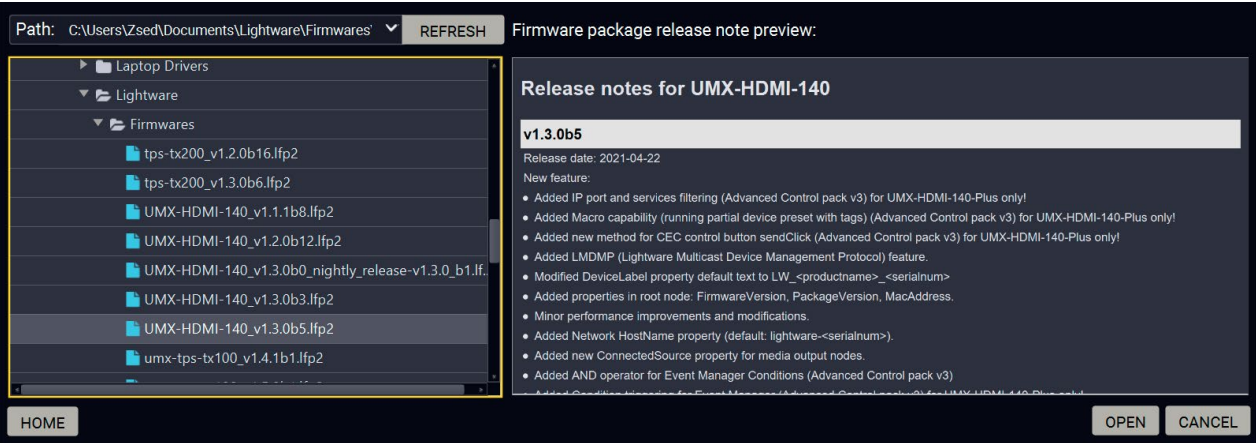
After the package file is loaded, the list is filtered to show only the compatible devices. The current firmware version of the device is highlighted in orange if it is different from the version of the package loaded.
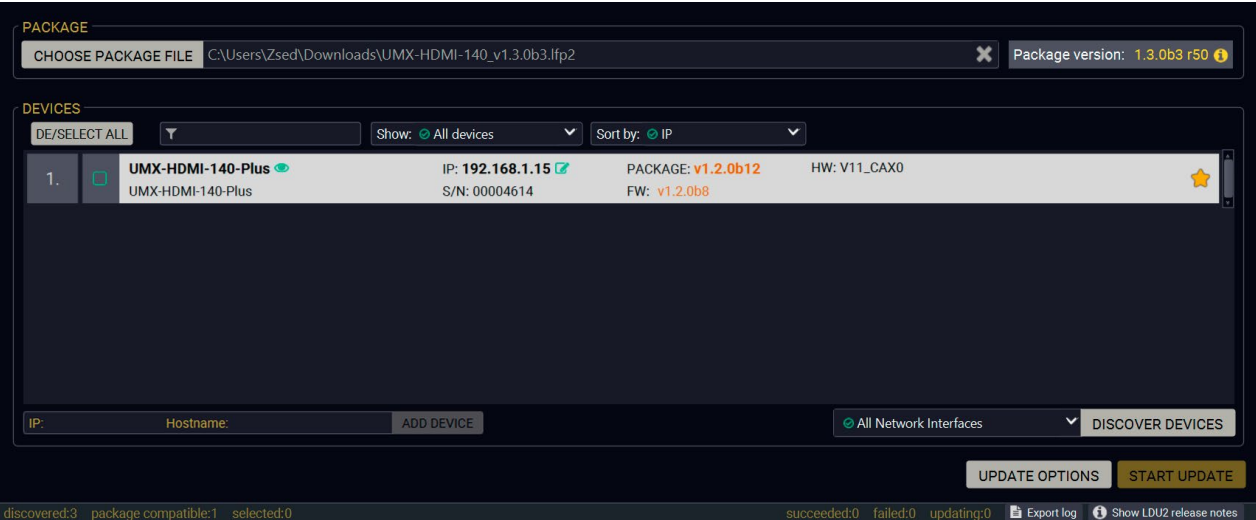
INFO: If you start the update by double-clicking on the LFP file, the screen above will be loaded right away.

The Meaning of the Symbols

	Show details	The log about the updating process of the device can be displayed in a new window.
	Service mode	The device is in bootload mode. Backup and restore cannot be performed in this case.

Step 2. Select the desired devices for updating.

Select the devices for updating; the selected line will be highlighted in green.

If you are not sure which device to select, press the **Identify me** 👁 button. It makes the front panel LEDs blink for 10 seconds. The feature helps to find the device physically.
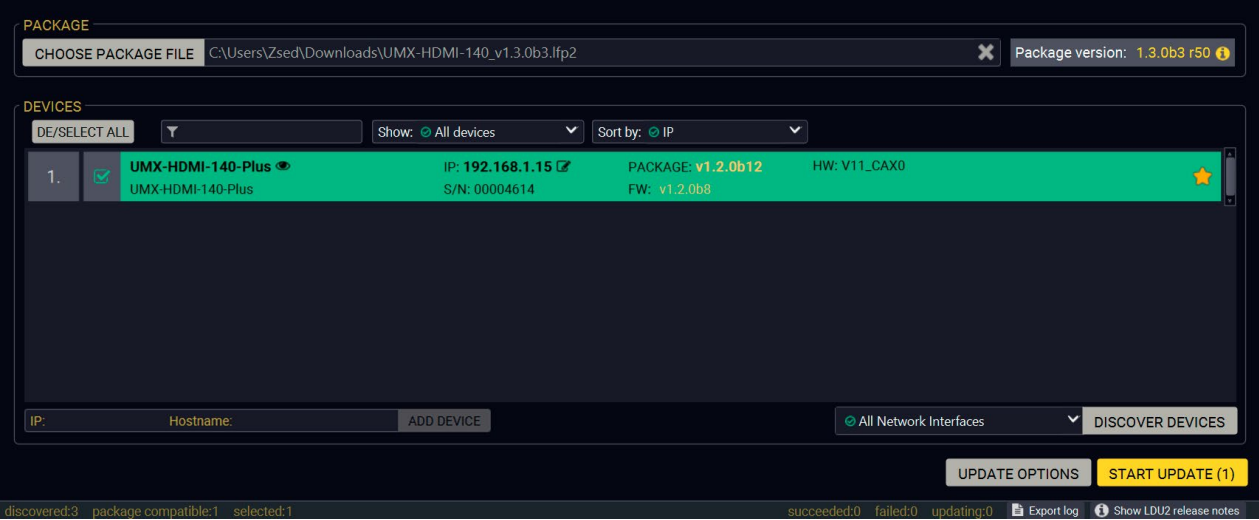
Step 3. Check the update parameters.

DIFFERENCE: The appearing settings are device-dependent and can be different from device to device.

Clicking on the **Update Options** button, special settings will be available, such as:

UPDATE OPTIONS

- ▪ Creating a backup about the configuration,
- ▪ Restoring the configuration or reloading the factory default settings after the firmware update,
- ▪ Uploading the default Miniweb (if available)   *#builtinweb*   *#miniweb*   *#web*   *#new*
- ▪ Entering the password for the Cleartext login.

INFO: The password entered will be used for all the selected devices where the Cleartext login is enabled. If the password is incorrect, a window will appear for each device during the update to request the correct one.

Please arrange the settings carefully.

Step 4. Start the update and wait until it is finished.

Click on the **Start Update** button to start the procedure. The status is shown in percent in the right side of the device line and the overall process in the bottom progress bar.

START UPDATE

If the Cleartext login is enabled and you did not enter the password in the **Parameters** window (or it is incorrect), a window will appear for each device to request the password.

> INFO: The device might reboot during the firmware update procedure.
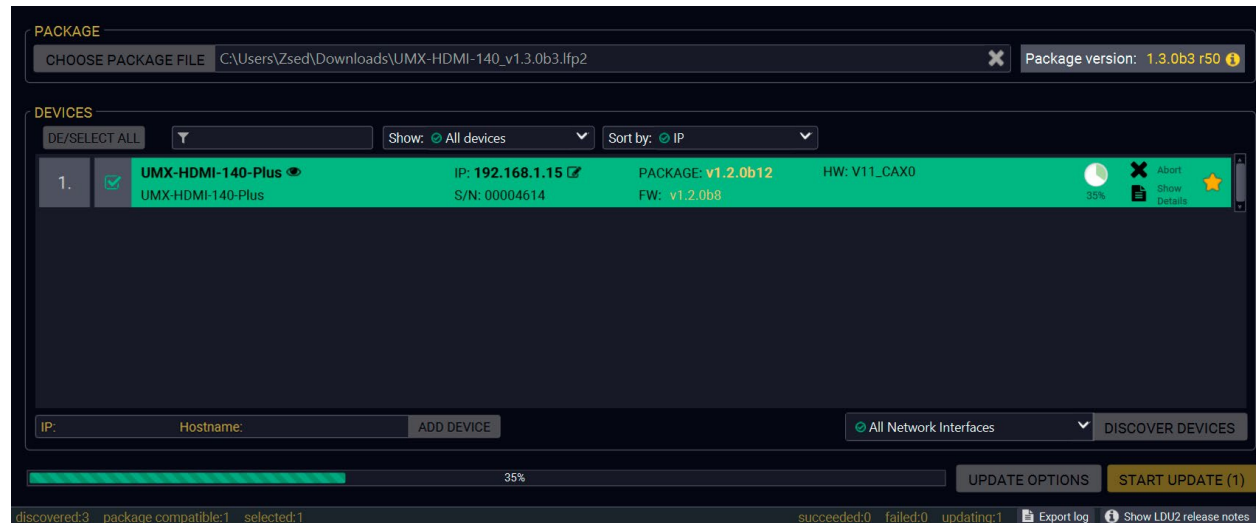
The log about the updating process can be displayed in a new window by pressing the 📄 button. When the progress bar reaches 100% (**Done** is displayed at all devices), the update of all devices is finished successfully and a message appears; you can close the software.
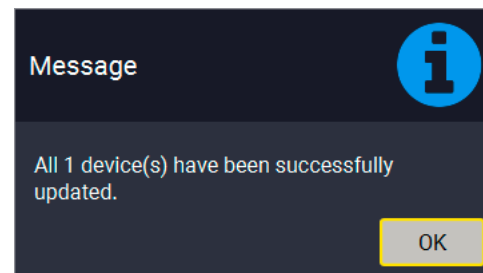
Step 5. Wait until the unit reboots with the new firmware.

Once the firmware update procedure is completed, the device is rebooted with the new firmware. Shutting down and restarting the device is recommended.

8.5. Command Line Interface (CLI)

> **DIFFERENCE:** The Command Line Interface is available from LDU2 v2.9.0b9.

The CLI of the LDU2 software is a simple tool for creating scriptable device updates without the need for human interactions. It allows batch updating with the same features that are available in the case of GUI usage.

8.5.1. How to Run

Running under Windows® OS

The installer of LDU2 puts the following file into the installation folder:

`LightwareDeviceUpdaterV2_CLI.cmd`

CLI is available via this file, the exe is not suitable for that purpose. Open a command line window to execute or test the features directly.

Step 1. Open an Explorer window where the cmd file is located, the default is:
`c:\Program Files (x86)\Lightware\Lightware Device Updater V2\LightwareDeviceUpdaterV2_CLI.cmd.`

Step 2. Click on the address line (highlighed in blue in the picture), type `cmd.exe` and press enter. The command interpreter window of Windows is opened at the path of the LDU2 install folder.
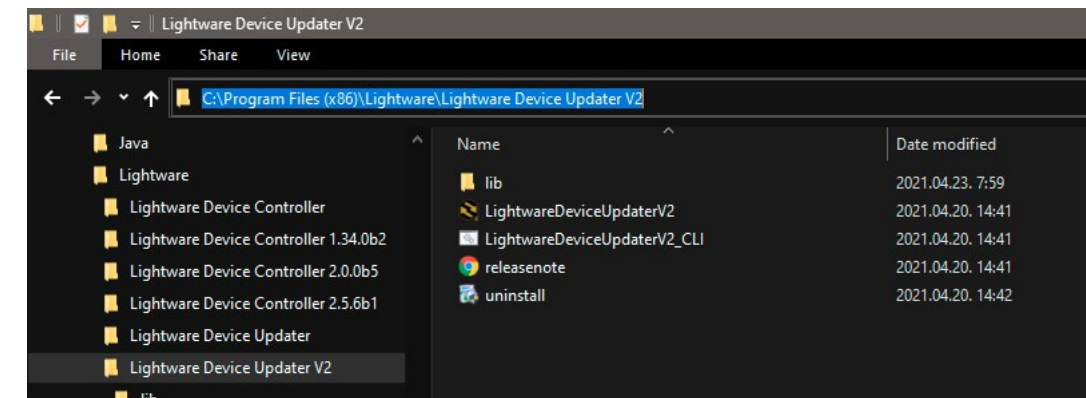
Step 3. Now you can use the `LightwareDeviceUpdaterV2_CLI.cmd` file with the commands and options that are described in the coming sections:

Running under Linux

The Command Line Interface under Linux Operating Systems can be run by the following:

`LightwareDeviceUpdaterV2.sh.`

Running an update:

```
bash LightwareDeviceUpdaterV2.sh update --ip 172.24.5.27 --package ~/Downloads/tps-
tx200_1.3.1b3.lfp2
```

The commands and options are the same under Windows® and Linux, too. The following sections contain examples with **LightwareDeviceUpdaterV2_CLI.cmd**.

8.5.2. How to Use

Command Structure

The commands can be run over CLI in the following way:

`LightwareDeviceUpdaterV2_CLI.cmd [command] [options]`

`[Command]`: a certain command described in the coming sections; only one command can be run at a time

`[Options]:` mandatory and/or optional parameters of the command, if any. Optional parameters have a default value, which can be found at each affected command. You only have to define the parameter if you want to apply a different value. The **order of the options** is arbitrary.

Important Notes

- CLI is **case-sensitive** (including commands, options and other parameters).
- There is **no limit** regarding the number of the devices to update. At most 20 devices are updated simoultaneously, when one of them is finished, the following (21st) will be started automatically.
- If an update is failed, the IP address of the affected device(s) are listed at the end.

8.6. CLI Commands

> INFO: The commands and options described in the following sections are the same under Windows® and Linux, too. The examples contain **LightwareDeviceUpdaterV2_CLI.cmd**.

About the Examples

- Sent command is in blue, response is in grey.
- If the response in practice is **longer than listed** in the example, this symbol can be seen: [...].

8.6.1. Help

The defined commands and options can be listed by the **help** command.

Command

`LightwareDeviceUpdaterV2_CLI.cmd help`

Example

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd help

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar help
Command line usage:
    Win: LightwareDeviceUpdaterV2_CLI.cmd [command] [options]
    Linux: LightwareDeviceUpdaterV2.sh [command] [options]

    Commands:
        * help
        * version
        * update
        * deviceInfo
        * restore
        * packageOptions
[...]
```

8.6.2. LDU2 Version

The response shows the version of the LDU2 and the version of the Script API (the Application Programming Interface that is used by the LDU2 and the script).

Command

`LightwareDeviceUpdaterV2_CLI.cmd version`

Example

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd version

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar version
LDU2 version: 2.9.0b9
Script API version: 1.3.9
```

8.6.3. Check For New LDU2 Version

The following command can be used to check if an update of LDU2 is available. This is just a request, since the CLI is not suitable for handling the complete installation of the software.

Command

`LightwareDeviceUpdaterV2_CLI.cmd checkForUpdates`

Example 1

```
c:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd checkForUpdates

c:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar checkForUpdates
Current LDU2 version: 2.9.1b1
LDU2 is up-to-date
```

Example 2

```
c:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd checkForUpdates

c:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar checkForUpdates
Current LDU2 version: 2.9.1b1
New version is available online: v2.9.2b2
Download URL: http://update.lightware.hu/ldu2/lwr/v2.9.2b2/install_LDU2_v2.9.2b2.exe
```

8.6.4. Device Info

The most important information about the selected device is displayed; see the example for more details.

Command

```
LightwareDeviceUpdaterV2_CLI.cmd deviceInfo [options]
```

Options

Option	Description	Required?
-i or --ip	List of IP addresses of devices to be updated	one of them is mandatory
-n or --hostName	List of host names of devices to be updated	
-v or --packageVersion	Shows installed package version only	optional

Example 1

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd deviceInfo --ip
192.168.1.7

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar deviceInfo --ip
192.168.1.7
Product name:    UMX-HDMI-140-Plus
IP address:      192.168.1.7
Serial number:   00004614
MAC address:     a8:d2:36:ff:46:14
Part number:     91560003
Device label:    UMX-HDMI-140-Plus
Package version: v1.3.0b5
CPU FW version:  v1.3.0b5
HW version:      V11_CAX0
Operation mode:  Application mode
```

Example 2

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd deviceInfo --ip
192.168.1.7 --packageVersion

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar deviceInfo --ip
192.168.1.7 --packageVersion
v1.3.0b5
```

8.6.5. Update

This command can be used to update the firmware of the devices.

Command

```
LightwareDeviceUpdaterV2_CLI.cmd update [options]
```

Options

Option	Description	Required?
-p or --package	The path of the firmware package file	yes
-i or --ip	List of IP addresses of devices to be updated	one of them is mandatory
-n or --hostName	List of host names of devices to be updated	
-b or --backupFolder	Folder to create device configuration backup at. Default: USER_HOME/.ldu2/backup	optional
-f or --factoryDefault	Apply factory reset during device update. Default: false	optional
-r or --reportProgress	Report update progress in percentage form. Default: false	optional
Package-specific options	Certain LFP2 packages have features that can be applied at this command; see the Package Options section.	optional

> **ATTENTION!** The configuration is restored automatically if the factory default option is not applied in the **update** command.In that case, there is no need to run the **restore** command after the update.

Example

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd update --ip
192.168.1.7 --package C:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2 --reportProgress

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar update --ip
192.168.1.7 --package C:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2 --reportProgress
[2021-04-26 14:30:52.908] [ INFO] [         main] - Device IPs: [192.168.1.7]
[2021-04-26 14:30:55.870] [ INFO] [         main] - All the selected devices are accessible over the network.
[2021-04-26 14:30:56.102] [ INFO] [         main] - All the selected devices are compatible with the specified
package.
[2021-04-26 14:30:56.556] [ INFO] [    192.168.1.7] - Package version: 1.3.0b5
[2021-04-26 14:30:56.649] [ INFO] [    192.168.1.7] - Login functionality is currently not enabled.
[2021-04-26 14:30:56.683] [ INFO] [    192.168.1.7] - Creating backup of device settings...
[2021-04-26 14:31:00.343] [ INFO] [    192.168.1.7] - HTTP and HTTP post have got enabled on port 80
[2021-04-26 14:31:00.500] [ INFO] [    192.168.1.7] - No miniweb file is found on the device.
[2021-04-26 14:31:01.108] [ INFO] [ProgressReporter] - Progress: 5%
[2021-04-26 14:31:03.121] [ INFO] [    192.168.1.7] - HTTP and HTTP post have got enabled on port 80
[2021-04-26 14:31:03.128] [ INFO] [    192.168.1.7] - Switching device into bootload mode...
[...]
```

The lines containing "ProgressReporter" can be enabled optionally. If it is enabled, the current state is displayed every 5 seconds.

8.6.6. Restore

Restores device configuration from a backup file.

> TIPS AND TRICKS: This command can be used for uploading a configuration to numerous devices (aka Configuration cloning by CLI).

Command

```
LightwareDeviceUpdaterV2_CLI.cmd restore [options]
```

Options

Option	Description	Required?
-i or --ip	List of IP addresses of devices to be updated	one of them is mandatory
-n or --hostName	List of host names of devices to be updated	
-b or --backupFile	The path of the configuration backup file	yes
-k or --keepOriginalIp	Do not override the network settings of the device with the ones in the backup file. It comes in handy when multiple devices' configuration is being restored from a single backup file. Default: false	optional

> **ATTENTION!** The configuration is restored automatically if the factory default option is not applied in the **update** command. In that case, there is no need to run the **restore** command after the update.

Example

```
c:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd restore --ip
192.168.1.7 --backupFile C:\mybackup.lw3 --keepOriginalIp

c:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar restore --ip
192.168.1.7 --backupFile C:\mybackup.lw3 --keepOriginalIp
[2021-04-28 07:51:23.206] [ INFO] [            main] - Executing configuration restore...
[2021-04-28 07:51:23.219] [ INFO] [            main] - Device IPs: [192.168.1.7]
```

> INFO: The firmware package checks the backup data before the restore procedure, and if it is necessary, a conversion is applied to avoid incompatibility problems between the firmware versions. In that case, two backup files are created: the original and a new one with "_converted" suffix. Using the last one for restoring is recommended.

8.6.7. Package Options

Shows package-specific update options.

Command

```
LightwareDeviceUpdaterV2_CLI.cmd packageOptions [options]
```

Options

Option	Description	Required?
-p or --package	The path of the firmware package file	yes

Example

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd packageOptions
--package c:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar packageOptions
--package c:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2
Backup and restore options:

        factoryDefault:  if set to true device will reset to factory default settings after the upgrade process is
finished, default: false
        restoreFromBackup:      if true, no device configuration is restored from the backup created at the
begininning of upgrade process (default: true)
        skipPresetsAtRestore:    If true. Device presets will be skipped at restore. (default: false)
        backupFolder:    folder to create configuration backup into

Advanced backup and restore options:

        forceNoBackup:   if true, no backup file will be created (default: false)
        uploadDefaultMiniWeb: If true, the default built-in miniweb will be uploaded to the device. (default:
false)

Login options:

        clearTextLoginPw:       The login password used when updating devices. (It's cleartext password!)
```

> INFO: There is a known bug in UMX-HDMI-140_v1.3.0b5.lfp2 package file: the double dashes of the options are not displayed in the description, however, the example above shows it correctly. The double dash is a must when applying a special parameter during the update.

Package option example can be seen in the following section.

8.6.8. Complex Examples

Example 1

The following options applied:

- ▪ Firmware is updated
- ▪ Factory default settings are restored

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd update --ip
192.168.1.7 --factoryDefault --package c:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar update --ip
192.168.1.7 --factoryDefault --package c:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2
[2021-04-29 21:44:59.927] [ INFO] [           main] - Device IPs: [192.168.1.7]
[2021-04-29 21:45:03.502] [ INFO] [           main] - All the selected devices are accessible over the network.
[2021-04-29 21:45:03.751] [ INFO] [           main] - All the selected devices are compatible with the specified
package.
[2021-04-29 21:45:04.239] [ INFO] [     192.168.1.7] - Package version: 1.3.0b5
[2021-04-29 21:45:04.321] [ INFO] [     192.168.1.7] - Login functionality is currently not enabled.
[2021-04-29 21:45:04.377] [ INFO] [     192.168.1.7] - Creating backup of device settings...
[2021-04-29 21:45:07.821] [ INFO] [     192.168.1.7] - HTTP and HTTP post have got enabled on port 80
[2021-04-29 21:45:08.046] [ INFO] [     192.168.1.7] - No miniweb file is found on the device.
[2021-04-29 21:45:10.432] [ INFO] [     192.168.1.7] - HTTP and HTTP post have got enabled on port 80
[2021-04-29 21:45:10.439] [ INFO] [     192.168.1.7] - Switching device into bootload mode...
[2021-04-29 21:45:30.929] [ INFO] [     192.168.1.7] - Gathering UID information from device...
[2021-04-29 21:45:31.306] [ INFO] [     192.168.1.7] - UID info - Device IP: 192.168.1.7 Product name: UMX-
HDMI-140-Plus Product part number: 91560003 Serial number: 00004614 Hardware version: V11_CAX0 MAC address:
A8:D2:36:FF:46:14
[2021-04-29 21:45:31.659] [ INFO] [     192.168.1.7] - Package version on device: 1.3.0b5 r52
[2021-04-29 21:45:31.725] [ INFO] [     192.168.1.7] - Updating UMX-HDMI-140 application fw (F4)...
[2021-04-29 21:45:32.052] [ INFO] [     192.168.1.7] -  [umx-hdmi-140_F4.bin]'s current version on device: 1.3.0b5
r51
[2021-04-29 21:45:32.053] [ INFO] [     192.168.1.7] -  [umx-hdmi-140_F4.bin]'s version in the package: 1.3.0b5 r51
[2021-04-29 21:45:56.185] [ INFO] [     192.168.1.7] -  [umx-hdmi-140_F4.bin]'s firmware version updated in FVS
EEPROM.
[2021-04-29 21:45:56.187] [ INFO] [     192.168.1.7] - Updating PS171 FW...
[2021-04-29 21:45:56.513] [ INFO] [     192.168.1.7] -  [tps_family_ps171.bin]'s current version on device: 1.0.6b0
r0
[2021-04-29 21:45:56.515] [ INFO] [     192.168.1.7] -  [tps_family_ps171.bin]'s version in the package: 1.0.6b0
r522
[2021-04-29 21:46:12.504] [ INFO] [     192.168.1.7] -  [tps_family_ps171.bin]'s firmware version updated in FVS
EEPROM.
[2021-04-29 21:46:18.627] [ INFO] [     192.168.1.7] - Setting system information...
[2021-04-29 21:46:47.906] [ INFO] [     192.168.1.7] - Starting application...
[2021-04-29 21:48:32.311] [ INFO] [     192.168.1.7] - Done

All 1 update(s) finished successfully.
```

Example 2

The following options applied:

- ▪ Cleartext login password is applied
- ▪ Custom backup folder is set
- ▪ Current configuration is saved
- ▪ Firmware is updated and saved configuration is restored

```
C:\Program Files (x86)\Lightware\Lightware Device Updater V2>LightwareDeviceUpdaterV2_CLI.cmd update --ip
192.168.1.7 --package c:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2 --backupFolder c:\My_backup --clearTextLoginPw
qwer1234

C:\Program Files (x86)\Lightware\Lightware Device Updater V2>lib\jre\bin\java.exe -jar lib\ldu2.jar update --ip
192.168.1.7 --package c:\Firmwares\UMX-HDMI-140_v1.3.0b5.lfp2 --backupFolder c:\My_backup --clearTextLoginPw
qwer1234
[2021-04-29 20:55:19.646] [ INFO] [           main] - Device IPs: [192.168.1.7]
[2021-04-29 20:55:22.648] [ WARN] [ pool-2-thread-1] - NetworkMask property is not available. Cannot determine
whether the device is on the same network or not.
[2021-04-29 20:55:22.726] [ WARN] [ pool-2-thread-1] - Bonjour device builder error messages: [object Array]
[2021-04-29 20:55:22.763] [ INFO] [           main] - All the selected devices are accessible over the network.
[2021-04-29 20:55:22.996] [ INFO] [           main] - All the selected devices are compatible with the specified
package.
[2021-04-29 20:55:23.466] [ INFO] [     192.168.1.7] - Package version: 1.3.0b5
[2021-04-29 20:55:23.621] [ INFO] [     192.168.1.7] - Logged in successfully.
[2021-04-29 20:55:23.654] [ INFO] [     192.168.1.7] - Creating backup of device settings...
[2021-04-29 20:55:27.219] [ INFO] [     192.168.1.7] - HTTP and HTTP post have got enabled on port 80
[2021-04-29 20:55:27.454] [ INFO] [     192.168.1.7] - No miniweb file is found on the device.
[2021-04-29 20:55:29.870] [ INFO] [     192.168.1.7] - HTTP and HTTP post have got enabled on port 80
[2021-04-29 20:55:29.876] [ INFO] [     192.168.1.7] - Switching device into bootload mode...
[2021-04-29 20:55:50.178] [ INFO] [     192.168.1.7] - Gathering UID information from device...
[2021-04-29 20:55:50.581] [ INFO] [     192.168.1.7] - UID info - Device IP: 192.168.1.7 Product name: UMX-
HDMI-140-Plus Product part number: 91560003 Serial number: 00004614 Hardware version: V11_CAX0 MAC address:
A8:D2:36:FF:46:14
[2021-04-29 20:55:50.931] [ INFO] [     192.168.1.7] - Package version on device: 1.3.0b5 r52
[2021-04-29 20:55:51.330] [ INFO] [     192.168.1.7] - Updating UMX-HDMI-140 application fw (F4)...
[2021-04-29 20:55:51.654] [ INFO] [     192.168.1.7] -  [umx-hdmi-140_F4.bin]'s current version on device: 1.3.0b5
r51
[2021-04-29 20:55:51.656] [ INFO] [     192.168.1.7] -  [umx-hdmi-140_F4.bin]'s version in the package: 1.3.0b5 r51
[2021-04-29 20:56:16.250] [ INFO] [     192.168.1.7] -  [umx-hdmi-140_F4.bin]'s firmware version updated in FVS
EEPROM.
[2021-04-29 20:56:16.252] [ INFO] [     192.168.1.7] - Updating PS171 FW...
[2021-04-29 20:56:16.577] [ INFO] [     192.168.1.7] -  [tps_family_ps171.bin]'s current version on device: 1.0.6b0
r0
[2021-04-29 20:56:16.577] [ INFO] [     192.168.1.7] -  [tps_family_ps171.bin]'s version in the package: 1.0.6b0
r522
[2021-04-29 20:56:32.605] [ INFO] [     192.168.1.7] -  [tps_family_ps171.bin]'s firmware version updated in FVS
EEPROM.
[2021-04-29 20:56:38.728] [ INFO] [     192.168.1.7] - Setting system information...
[2021-04-29 20:56:44.838] [ INFO] [     192.168.1.7] - Starting application...
[2021-04-29 20:58:31.501] [ INFO] [     192.168.1.7] - Restoring device settings from the following backup file:
c:\My_backup\backup_91560003_00004614_2021-04-29_20-55-24_converted.lw3 ...
[2021-04-29 20:58:39.950] [ INFO] [     192.168.1.7] - Device settings have been restored
[2021-04-29 20:58:39.983] [ INFO] [     192.168.1.7] - Resetting device...
[2021-04-29 20:58:44.821] [ INFO] [     192.168.1.7] - Done

All 1 update(s) finished successfully.
```

8.6.9. Exit Codes

There is a return value in all cases when a command run is finished. Currently, three codes are defined:

Code	Displayed text	Description
0	N/A	The update performed successfully
1	Update error (ErrorCode:1)	The error happened during the update
2	CLI error (ErrorCode:2	The error happened before starting the update

The error line contains further information about the error.

Querying the Exit Code under Windows®

```
c:\Program Files (x86)\Lightware\Lightware Device Updater V2\echo %errorlevel%
0
```

Querying the Exit Code under Linux

```
echo $?
0
```

If this value is queried after the update and it is 0, the update was performed successfully.

8.7. If the Update is not successful

- Restart the process and try the update again.
- If the device cannot be switched to bootload (firmware update) mode, you can do that manually as written in the User's manual of the device. Please note that backup and restore cannot be performed in this case.
- If the backup cannot be created for some reason, you will get a message to continue the process without backup or stop the update. A root cause can be that the desired device is already in bootload (firmware update) mode, and thus the normal operation mode is suspended and backup cannot be made.
- If an update is not successful, the **Export log** button becomes red. If you press the button, you can download the log file as a ZIP package, which can be sent to Lightware Support if needed. The log files contain useful information about the circumstances to help find the root cause.   *#bootload*

9

Troubleshooting

Usually, if the system seems not to transport the signal as expected, the best strategy for troubleshooting is to check signal integrity through the whole signal chain starting from source side and moving forward to switcher end.

Link to connections/cabling section.

Link to front panel operation section.

Link to LDC software section.

LW2 Link to LW2 protocol commands section.

LW3 Link to LW3 protocol commands section.

The following sections are available in the chapter:

▶ Use Case Studies
▶ How to Speed Up the Troubleshooting Process

9.1. Use Case Studies

At first, check front panel LEDs and take the necessary steps according to their states. For more information about status LEDs, refer to the Front View and the Rear View sections.

Symptom	Root cause	Action	Refer to
		Video signal	
No picture on the video output	Device or devices are not powered properly	Check the switcher and the other devices if they are properly powered; try to unplug and reconnect them.	📱 3.2.1
	Cable connection problem	Cables must fit very well, check all the connectors.	📱 3.2
	The output is muted	Check the mute state of output ports.	📺 5.6.5 LW2 6.4.6 LW3 7.6.2
	Display is not able to receive the video format	Check the emulated EDID; select another (e.g. emulate the display's EDID on the input port).	📺 5.9 LW3 7.23
	HDCP is disabled	Enable HDCP on the input and output port.	📺 5.6.2 📺 5.6.5 LW3 7.6.18 LW3 7.6.19
Not the desired picture displayed on the video output	Video output is set to test pattern (no sync screen) statically	Check test pattern settings in the properties of the input ports.	📺 5.6 LW3 7.6.20
	Video source is set to Testpattern input (I6)	Check the crosspoint settings	📺 5.5 LW2 6.4.6 LW3 7.6.2
	Video output is set to test pattern (no sync screen) as there is no picture on video source	Check video settings of the source.	

Symptom	Root cause	Action	Refer to
		Audio signal	
No audio is present on output	Source audio volume is low or muted	Check the audio settings of the source.	
	Analog audio input is muted	Check the analog audio input port properties	📺 5.6.3 LW2 6.4.6 LW3 7.7.17
	Output port is muted	Check the output port properties.	📺 5.6.6 LW2 6.4.6 LW3 7.7.2
HDMI output signal contains no audio	HDMI mode was set to DVI	Check the properties of the output port and set to HDMI or Auto.	📺 5.6.5 LW3 7.6.23
	DVI EDID is emulated	Check the EDID and select an HDMI EDID to emulate.	📺 5.9 LW3 7.23
		CEC	
CEC communication does not work	Cable quality problem	Check the pinout of the HDMI cable. CEC line could be missing in the low quality HDMI cables.	📱 3.2
	CEC is not enabled in the third-party device	Check the documentation of the device and enable the CEC feature.	
		RS-232 signal	
Connected serial device does not respond	Cable connection problem	Check the connectors if they fit well; check the wiring of the plugs.	📱 3.2.9
	RS-232 settings are different	Check the port settings of the switcher and the connected serial device(s).	📺 5.10.1 LW3 7.16
	RS-232 mode is not right	Check the RS-232 mode settings (control, command injection, or Event Manager mode)	📺 5.10.1 LW3 7.16.2

Symptom	Root cause	Action	Refer to
Network			
No LAN connection can be established	Incorrect IP address is set (fix IP)	Use dynamic IP address by enabling DHCP option.	📟 2.5.6 ▦ 5.12.2 LW3 7.11.2
		Restore the factory default settings (with fix IP).	📟 2.5.4 ▦ 5.12.4 LW2 6.3.13
	IP address conflict	Check the IP address of the other devices, too.	
GPIO			
Connected device does not respond	Cable connection problem	Check the connectors if they fit well; check the wiring of the plugs.	🔌 3.2.11
Output level cannot be changed	The direction of the selected pin is set to input	Check and modify the direction setting of the desired pin	▦ 5.10.3 LW2 6.7.2 LW3 7.22.1
Miscellaneous			
Front panel buttons are out of operation	Buttons are set as locked in LDC	Unlock the buttons	▦ 5.12.1
	Original function of the buttons is disabled	Enable the function	▦ 5.12.1 LW3 7.4.9
Error messages received continuously	Different protocol is set	Check the port protocol settings (LW2 / LW3) and use the proper protocol commands.	▦ 5.10.1 LW3 7.16.1

9.2. How to Speed Up the Troubleshooting Process

Lightware's technical support team is always working hard to provide the fastest support possible. Our team's response time is one of the best in the industry, and in the toughest of cases we can directly consult with the hardware or software engineer who designed the product to get the information from the most reliable source.

However, the troubleshooting process can be even faster... with your help.

There are certain pieces of information that push us in the right direction to find the root cause of the problem. If we receive most of this information in the first e-mail, or it is gathered at the time when you call us, then there is a pretty high chance that we will be able to respond with the final solution right away.

This information is the following:

- Schematic (a pdf version is preferred, but a hand drawing is sufficient).
- Serial number(s) of the device(s) (it is either printed somewhere on the box or you can query it in the Device Controller software or on the built-in website).
- Firmware versions of the devices (please note that there may be multiple CPUs or controllers in the device and we need to know all of their firmware versions, a screenshot is the best option).
- Cable lengths and types (in our experience, it's usually the cable).
- Patch panels, gender changers or anything else in the signal path that can affect the transmission.
- Signal type (resolution, refresh rate, color space, deep color).
- Emulated EDID(s) (please save them as a file and send it to us).
- Actions to take in order to re-create the problem (if we cannot reproduce the problem, it is hard for us to find the cause).
- Photo or video about the problem ('image noise' can mean many different things, it's better if we see it too).
- Error logs from the Device Controller software.
- In the case of an Event Manager issue, the event file and/or backup file from the Device Controller software.

The more of the information above you can give us, the better. Please send this information to the Lightware Support Team (support@lightware.com) to speed up the troubleshooting process.
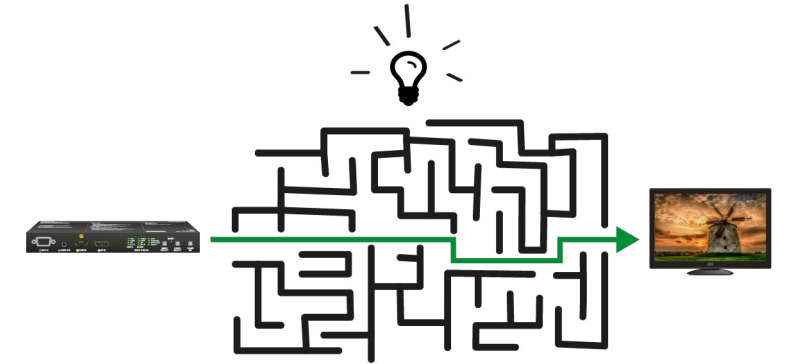
10

Technologies

The following sections contain descriptions and useful technical information on how the devices work in the background. The content is based on experiences and cases we met in the practice. These sections help to understand features and technical standards like the following:

▶ EDID Management
▶ HDCP Management
▶ Pixel Accurate Reclocking

10.1. EDID Management

10.1.1. Understanding the EDID

The Extended Display Identification Data (EDID) is the passport of display devices (monitors, TV sets, projectors). It contains information about the capabilities of the display, such as supported resolutions, refresh rates (these are called Detailed Timings), the type and manufacturer of the display device, etc.

After connecting a source to a display (DVI, HDMI, DP), the source reads out the EDID to determine the resolution and refresh rate of the image to be transmitted.
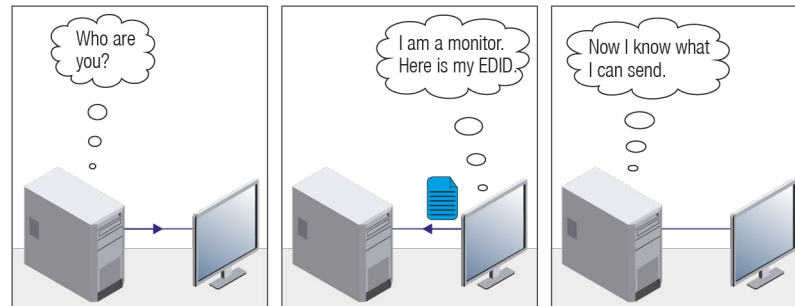
EDID Communication

Most DVI computer displays have a 128-byte-long EDID structure. However, Digital Televisions and HDMI capable displays may have another 128 bytes, which is called E-EDID and defined by CEA (Consumer Electronics Association). This extension contains information about additional Detailed Timings, audio capabilities, speaker allocation and HDMI capabilities. It is important to know that all HDMI capable devices must have CEA extension, but not all devices with CEA extension are HDMI capable.

Common Problems Related to EDID

Problem: "My system consists of the following: a computer, a Lightware device, a WUXGA (1920x1200) LCD monitor, and an SXGA (1280x1024) projector. I would like to see the same image on the monitor and the projector. What EDID should I choose on the Lightware device?"

Solution: If you want to see the image on both displays, you need to select the resolution of the smaller display (in this case SXGA), otherwise the smaller display may not show the higher resolution image.

Problem: "I have changed to a different EDID on an input port of the Lightware device to have a different resolution but nothing happens."

Solution: Some graphics cards and video sources read out the EDID only after power-up, and later they do not sense that the EDID has been changed. You need to restart your source to make it read out the EDID again.

10.1.2. Advanced EDID Management

Each DVI sink (e.g. monitors, projectors, plasma displays, etc...) must support the EDID data structure. Source BIOS and operating systems are likely to query the sink using DDC2B protocol to determine what pixel formats and interface are supported. DVI standard uses EDID data structure to identify the monitor type and capabilities. Most DVI sources (VGA cards, set top boxes, etc.) will output DVI signal after accepting the connected sink's EDID information. In the case of EDID readout failure or missing EDID, the source will not send DVI video signal.

Lightware devices provide the Advanced EDID Management function that helps system integration. The built-in EDID Router can store and emulate factory pre-programmed- and User programmable EDIDs. The EDID of the attached monitors or projectors for each output are stored in a non-volatile memory. This way, the EDID of a monitor is available when the monitor is unplugged or switched off.

Any EDID can be emulated on any input. An emulated EDID can be copied from the EDID router's memory (static EDID emulation), or from the last attached monitor's memory (dynamic EDID emulation). For example, the Lightware device can be set up to emulate a sink device, which is connected to one of the outputs. In this case, the EDID automatically changes if the monitor is replaced with another display device (as long as it has a valid EDID).

EDID is independently programmable for all inputs without affecting each other. All inputs have their own EDID circuit.

INFO: The user is not required to disconnect the video cable to change an EDID as opposed to other manufacturer's products. EDID can be changed even if a source is connected to the input and powered ON.

INFO: When EDID has been changed, the router toggles the HOTPLUG signal for 2 seconds. Some sources do not sense this signal. In such cases, the source device must be restarted or powered OFF and ON again.

10.2. HDCP Management

Lightware Visual Engineering is a legal HDCP adopter. Several functions have been developed that help solve HDCP related problems. Complex AV systems often have both HDCP and non-HDCP components. The matrix allows transmitting both HDCP encrypted and unencrypted signals. The devices will be still HDCP compliant, as they will never output an encrypted signal to a non-HDCP compliant display device. If an encrypted signal is switched to a non-compliant output, a red screen alert or muted screen will appear.

10.2.1. Protected and Unprotected Content

Many video sources send HDCP protected signal if they detect that the sink is HDCP capable – even if the content is not copyrighted. This can cause trouble if an HDCP capable device is connected between the source and the display. In this case, the content cannot be viewed on non-HDCP capable displays and interfaces like event controllers. Rental and staging technicians often complain about certain laptops, which are always sending HDCP encrypted signals if the receiver device (display, matrix router, etc.) reports HDCP compliancy. However, HDCP encryption is not required all the time (e.g. computer desktop image), certain laptops still do that.

To avoid unnecessary HDCP encryption, Lightware introduced the HDCP enabling/disabling function: the HDCP capability can be disabled in the Lightware device. If HDCP is disabled, the connected source will detect that the sink is not HDCP capable, and turn off authentication.

10.2.2. Disable Unnecessary Encryption

HDCP Compliant Sink

All the devices are HDCP-compliant, no manual setting is required, both protected and unprotected contents are transmitted and displayed on the sink.

Protected content → Encrypted signal → Standalone device or Extender units → Encrypted signal → HDCP-compliant sink

Not HDCP-compliant Sink 1.

Not-HDCP compliant sink is connected to the matrix. Some sources (e.g. computers) always send HDCP encrypted signals if the receiver device reports HDCP compliancy, however, HDCP encryption is not required all the time (e.g. computer desktop image). If HDCP is enabled in the matrix, the image will not be displayed on the sink.

Unprotected content → Non-encrypted signal → Standalone device or Extender units → Non-encrypted signal → Non-HDCP compliant sink

Setting the HDCP parameter to Auto on the output port and disable HDCP on the input port, the transmitted signal will not be encrypted if the content is not protected. Thus, non-HDCP compliant sinks will display non-encrypted signal.

Not HDCP-compliant Sink 2.

The layout is the same as in the previous case: non-HDCP compliant display device is connected to the matrix but the source would send protected content with encryption. If HDCP is enabled on the input port of the matrix, the source will send encrypted signal.

Protected content → Encrypted signal → Standalone device or Extender units → Non-HDCP compliant sink

The sink is not HDCP compliant, and thus it will not display the video signal (but blank/red/muted/etc. screen). If HDCP is disabled on the input port of the matrix, the source will not send the signal. The solution is to replace the display device with an HDCP-capable one.

10.3. Pixel Accurate Reclocking

Signal reclocking is an essential procedure in digital signal transmission. After passing the reclocking circuit, the signal becomes stable, jitter-free, and can be transmitted over more equipment like processors, or event controllers. Without reclocking, sparkles, noise, and jaggies appear on the image.

Lightware's sophisticated Pixel Accurate Reclocking technology fixes more problems than general TMDS reclocking. It removes not only intra-pair skew, but inter-pair skew as well. The Pixel Accurate Reclocking circuit eliminates the following errors:

Intra-pair skew

Skew between the + and - wires within a differential wire pair (e.g. Data2- and Data2+). It's caused by different wire lengths or slightly different wire construction (impedance mismatch) in the DVI cable. It results in jitter.

Intra-pair skew
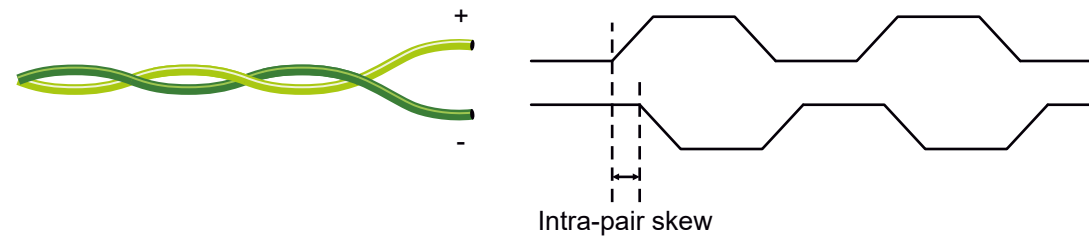
Inter-pair skew

Skew between two differential wire pairs in a cable. It is caused by different wire pair lengths or different number of twists in the DVI cable. Too much inter-pair skew results in color shift in the picture or sync loss.

Inter-pair skew
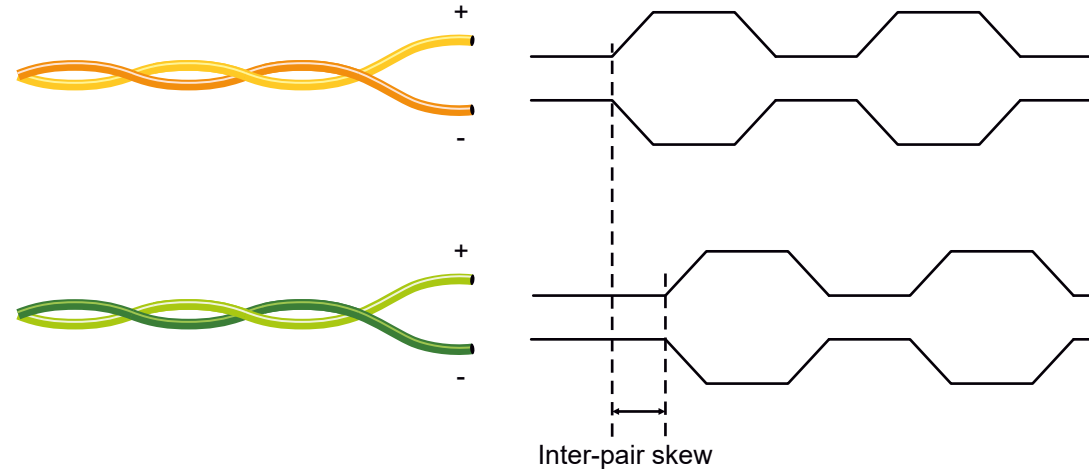
Jitter

Signal instability in the time domain. The time difference between two signal transitions should be a fixed value, but noise and other effects cause variations.
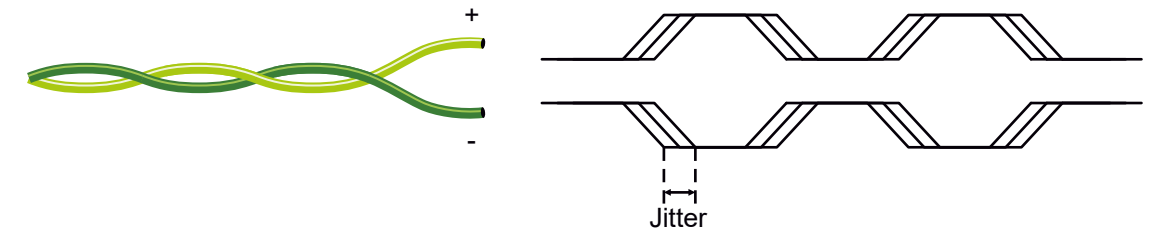
Jitter

Noise

Electromagnetic interference between other electronic devices such as mobile phones, motors, etc. and the DVI cable are coupled onto the signal. Too much noise results in increased jitter.

Noise
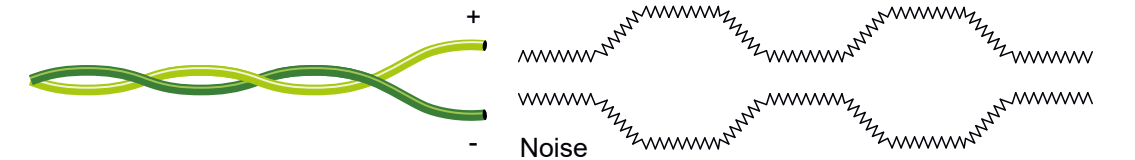
11

Appendix

Tables, drawings, guides, hashtag keyword list and technical details as follows:

11.1. Specification

General

Compliance	CE, UKCA
EMC (emission)	EN 55032:2015+A1:2020
EMC (immunity)	EN 55035:2017+A11:2020
RoHS	EN 63000:2018
Electrical safety (device)	EN 62368-1:2020
Warranty	3 years
Cooling	Passive
Operating temperature	0 to +50˚C (+32 to +122˚F)
Storage temperature	-40° to +85˚C (-40° to +185˚F)
Operating humidity	10% to 90%, non-condensing

Power

Power supply option	External power adaptor
Power adaptor	In 100-240 V AC 50/60 Hz, Out 12V DC, 2 A
Power connector	Locking DC connector (2.1 mm pin)
Power consumption	8 W (maximum)
Heat dissipation	27.3 BTU/h (max)

Enclosure

Rack mountable	Yes
Material	1 mm steel
Dimensions in mm	221W x 100.4D x 26H
Dimensions in inch	8.7 W x 3.95 D x 1.02 H
Weight	607 g (1.34 lbs)

Video Ports

VGA Input

Connector type	DE-15F (15-pole D-sub Female)
Supported video signal	Analog RGB and YPbPr video
Color depth	Up to 24 bits, 8 bit/color
Max. data rate	Up to 170 MHz video and graphics digitizer
Max. resolution	Up to 1600x1200@60 Hz

HDMI Input

HDMI port connector type	19-pole HDMI Type A receptacle
Standard	DVI 1.0, HDMI 1.4
Color depth	Deep color support up to 36 bits, 12 bit/color
Color space	RGB, YCbCr 4:4:4, YcbCr 4:2:2
Supported resolutions at 8 bits/color *	up to 4096x2048@30Hz (4:4:4) or 4096x2048@60Hz (4:2:0); up to 3840x2160@30Hz (4:4:4) or 3840x2160@60Hz (4:2:0); 1920x1080@60Hz (4:4:4) up to 12 bits/color
Audio formats	8 channel PCM, Dolby TrueHD; DTS-HD Master Audio 7.1
Reclocking	Pixel Accurate Reclocking
3D support	Yes
Video delay	0 frame
HDCP compliance	HDCP 1.1

* All standard VESA, CEA and other custom resolutions up to 300MHz (HDMI1.4) are supported.

DisplayPort Input

DisplayPort connector type	20-pole DisplayPort receptacle
AV standard	DP 1.1
Color depth	Deep color support up to 36 bits, 12 bit/color
Color space	RGB, YcbCr 4:4:4, YCbCr 4:2:2
Supported resolutions at 8 bits/color *	up to 4096x2048@30Hz (4:4:4) or 4096x2048@60Hz (4:2:0); up to 3840x2160@30Hz (4:4:4) or 3840x2160@60Hz (4:2:0); 1920x1080@60Hz (4:4:4) up to 12 bits/color
Video delay	0 frame
3D support	Yes
HDCP compliance	HDCP 1.3

* All standard VESA, CEA and other custom resolutions up to 300MHz (DP1.1) are supported.

DVI-I Input with DVI-D support

Connector type	29-pole, DVI-I
AV standard	DVI 1.0, HDMI 1.4
Color depth	Deep color support up to 36 bits, 12 bit/color
Color space	RGB, YCbCr 4:4:4, YcbCr 4:2:2

Supported resolutions at 8 bits/color *	up to 4096x2048@30Hz (4:4:4) or 4096x2048@60Hz (4:2:0); up to 3840x2160@30Hz (4:4:4) or 3840x2160@60Hz (4:2:0); 1920x1080@60Hz (4:4:4) up to 12 bits/color
Audio formats	8 channel PCM, Dolby TrueHD; DTS-HD Master Audio 7.1
Reclocking	Pixel Accurate Reclocking
Video delay	0 frame
3D support	Yes
HDCP compliance	HDCP 1.1

* All standard VESA, CEA and other custom resolutions up to 300MHz (HDMI1.4) are supported.

DVI-I Input with DVI-A support

Connector type	29-pole, DVI-I
AV standard	DVI 1.0
Supported video signal	Analog RGB and YPbPr video
Color depth	Up to 24 bits, 8 bit/color
Max. data rate	Up to 170 MHz video and graphics digitizer
Max. resolution	Up to 1600x1200@60 Hz, 24 bits

HDMI Output

HDMI port connector type	19-pole HDMI Type A receptacle
Standard	DVI 1.0, HDMI 1.4
Color depth	Deep color support up to 36 bits, 12 bit/color
Color space	RGB, YCbCr 4:4:4, YcbCr 4:2:2
Video delay	0 frame
Supported resolutions at 8 bits/color *	up to 4096x2048@30Hz (4:4:4) or 4096x2048@60Hz (4:2:0); up to 3840x2160@30Hz (4:4:4) or 3840x2160@60Hz (4:2:0); 1920x1080@60Hz (4:4:4) up to 12 bits/color
Audio formats	8 channel PCM, Dolby TrueHD; DTS-HD Master Audio 7.1
Reclocking	Pixel Accurate Reclocking
3D support	Yes
HDCP compliant	Yes, 1.1

* All standard VESA and CEA resolutions up to 300MHz (HDMI1.4) and other custom resolutions up to 300Mhz are supported.

Audio Ports

Embedded Audio Signal

Supported on	DisplayPort, DVI-D, HDMI ports
Supported audio formats	Up to 8 channel PCM; Dolby TrueHD; DTS HD Master Audio 7.1 formats

Analog Audio Input (Jack)

Connector type	3.5mm TRS (approx. 1/8" jack)
Audio formats	2-channel PCM
Sampling frequency	48 kHz
Volume	-95.62 – 0 dB
Balance	0 - 100 (50 = center)
Maximum input level	+0 dBu, 0.77 Vrms, 2.19 Vpp

Analog Audio Input (Phoenix)

Connector type	5-pole Phoenix connector
Signal transmission	Balanced and unbalanced audio
Audio formats	2-channel PCM
Sampling frequency	48 kHz
Volume	-95.62 – 0 dB
Balance	0 - 100 (50 = center)
Maximum input level	+4 dBu, 1.23 Vrms, 3.47 Vpp

Control Ports

RS-232

Connector type	3-pole Phoenix connector
Available Baud rates	between 4800 and 115200 baud
Available Data bits	8 or 9
Available Parity	None / Odd / Even
Available Stop bits	1 / 1.5 / 2

Infrared

Number of IR ports	2 (1x RX, 1x TX)
Input connector type	3.5 mm TRS (approx. 1/8" jack)
Output connector type	3.5 mm TS (approx. 1/8" jack)
Input carrier frequency	38 kHz
Output signal	modulated (38kHz) / not modulated (baseband)

Ethernet

Connector type	Locking RJ45 female
Ethernet data rate	10/100Base-T, full duplex with autodetect
Power over Ethernet (PoE)	Not supported

GPIO

Connector type	8-pole Phoenix connector
Number of configurable pins	7
Port direction	Input or output
Input voltage: Low level / Max. current	0 - 0,8 V
Input voltage: High level / Max. current	2 - 5 V
Output voltage: Low level	0 - 0,5 V
Output voltage: High level	4.5 - 5 V
Max. current: Low level	30mA
Max. current: High level	18mA
Total available current	180 mA

INFO: Specifications are subject to change without notice.

11.2. Content of Backup File

The backup file contains numerous settings and parameters saved from the device. When the file is uploaded to a device, the following will be overwritten:

Analog video input ports (VGA, DVI-A)
Horizontal position, Vertical position, Active horizontal size, Active vertical size, Total horizontal size, Pixel phase
Test pattern mode, Test pattern resolution, Test pattern color
Digital video input ports (HDMI, DP, DVI-D)
Video port name, Audio port name, HDCP setting
Test pattern mode, Test pattern resolution, Test pattern color
HDMI output port
Port name, HDCP mode, HDMI mode, Power +5V mode, Color space setting
Analog audio input ports
Port name, Volume, Balance
Crosspoint settings
Video crosspoint settings, audio crosspoint settings
Autoselect (enable/disable, delay settings, priority list)
Mute/lock state of video ports, Mute/lock state of audio ports
Serial port
RS-232 mode, Control protocol, Baud rate, Data bits, Stop bits, Parity
Port name and Command Injection (CI) port number
IR port
Port status (enable / disable), Code length, Repetition code, Modulation state
Input port name, Output port name
CI status (enable / disable), CI port number
Network settings
DHCP status (enable / disable), Static IP address, Network mask, Gateway address
Further settings
Device label
User presets (1-32), User EDID data (U1-U15), Event manager: settings of all Events
GPIO port configuration (pin 1-7)

11.3. Input/Output Port Numbering

The following table contains the input and output ports with their ID numbers that shall be used in protocol commands.

Audio/Video Ports

Port name	Video port number		Audio port number		Emulated EDID memory
	LW2	LW3	LW2	LW3	
Analog audio in 1	-	-	01	I1	-
VGA in	01	I1	-	-	E1
HDMI in	02	I2	02	I2	E2
DP in	03	I3	03	I3	E3
DVI-D in	04	I4	04	I4	E4
DVI-A in	05	I5	-	-	E5
Analog audio in 2	-	-	05	I5	-
HDMI out	01	O1	01	O1	-

Infrared Ports

Port name	Port nr. (LW3)
IR input	S1
IR output	D1

11.4. Mechanical Drawings

The following drawings present the physical dimensions of the device. Dimensions are in mm.

Bottom View

178.5   20

M3 thread   M3 thread

84

Front View

221

26

Top View

LIGHTWARE   UMX-HDMI-140

Universal Switcher
with VGA, HDMI, DP, DVI-I
and Analog Audio inputs

VIDEO SELECT:
→ VGA → HDMI → DP → DVI-D ⌐
└─ Autoselect ← DVI-A ←

AUDIO SELECT:
→ Audio1 → HDMI emb. → DP emb. ⌐
└─ Audio2 ← DVI-D emb. ←

Front LEDs
LIVE LED
OFF: No power
Blinking (1 sec): Normal operation
Fast blinking (0.5 sec): Firmware upgrade mode
ON: Powered but no operation
INPUT STATUS LEDs
OFF: Input is not selected
Blinking: Selected input has no signal
ON: Input is selected and signal is present
Rear LEDs
HDMI OUT - SIGNAL LED
ON: Signal is present on output
HDMI OUT - HDCP LED
OFF: Output signal is not HDCP encrypted
Blinking: Non HDCP capable device is connected,
encrypted signal cannot be transmitted
ON: Output signal is HDCP enrcyped

Port legend
Video only
Audio only
Video with embedded audio

Sn: RoHS
Made in EU, Hungary

100.4

Rear View

PIN: 2.1mm   RS-232   GPIO   SIGNAL HDCP   ⑤ AUDIO2 IN

12V 1A DC TX RX   1 2 3 4 5 6 7   LAN   IR IN   IR OUT   HDMI OUT   L R   ④ DVI-I IN

Side View

11.5. Cable Wiring Guide

Inputs and outputs of audio devices are symmetric or asymmetric. The main advantage of the symmetric lines is the better protection against the noise, therefore they are widely used in the professional audio industry. Symmetric audio is most often referred to as balanced audio, as opposed to asymmetric, which is referred to as unbalanced audio. Ligthware products are usually built with 5-pole Phoenix connectors, so we would like to help users assemble their own audio cables. See the most common cases below.

ATTENTION! Symmetric and asymmetric lines can be linked with passive accessories (e.g. special cables), but in this case half of the line level is lost.

ATTENTION! There are numerous types of regularly used connector and cable types to connect audio devices. Please always make sure that a connector or cable fits your system before use.

ATTENTION! Never join the phase-inverted (negative, cold or -) poles (either right or left) to the ground or to each other on the output side, as this can damage the unit.

INFO: Use a galvanic isolation in case of a ground loop.

11.5.1. Serial Ports

The device is built with a 3-pole Phoenix connector. See the examples below of connecting to a DCE (Data Circuit-terminating Equipment) or a DTE (Data Terminal Equipment) type device:

Lightware device and a DCE D-SUB 9 and Phoenix	Lightware device and a DTE D-SUB 9 and Phoenix
TX RX	TX RX
2: TX data 3: RX data 5: Ground	2: RX data 3: TX data 5: Ground
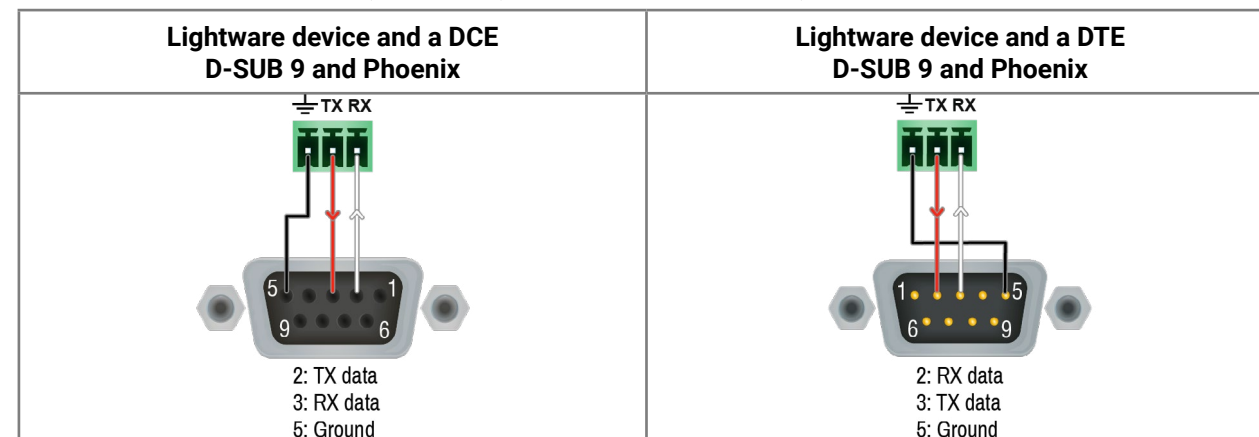
11.5.2. Audio Ports

The Pinout of the 5-pole Phoenix Connector

Pin nr.	Signal
1	Left+
2	Left-
3	Ground
4	Right-
5	Right+
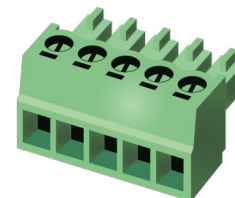
Compatible Plug Type: Phoenix® Combicon series (3.5mm pitch, 5-pole), type: MC 1.5/5-ST-3.5.

From Unbalanced Output to Balanced Input

2 x 6.3 (1/4") TS - Phoenix
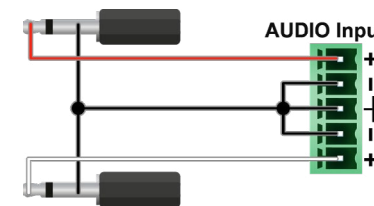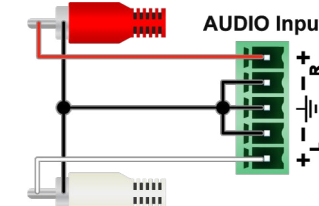
2 x RCA - Phoenix

3.5 (1/8") TRS - Phoenix
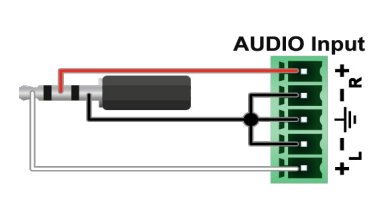
From Balanced Output to Unbalanced Input

Phoenix - 2 x 6.3 (1/4") TS
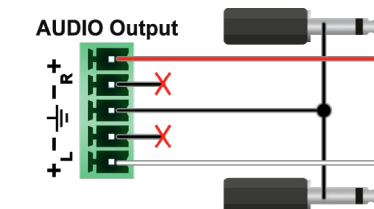
Phoenix - 2 x RCA
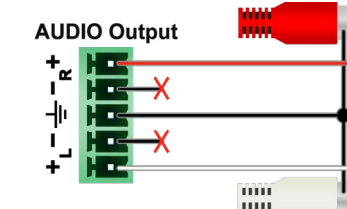
Phoenix - 3.5 (1/8") TRS
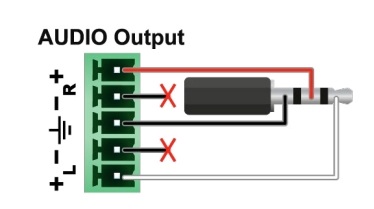
From Balanced Output to Balanced Input

Phoenix - 2 x 6.3 (1/4") TRS
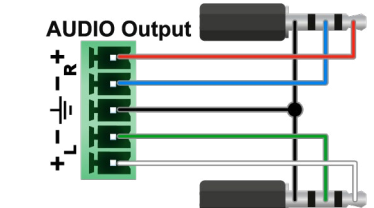
Phoenix - 2 x XLR
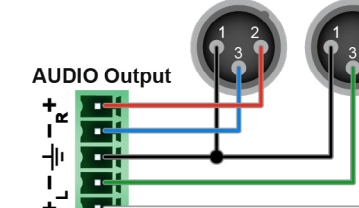
2 x 6.3 TRS (1/4") - Phoenix
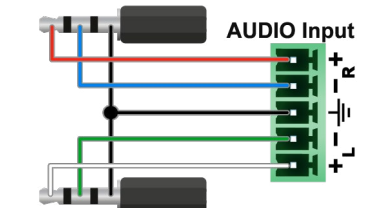
2 x XLR - Phoenix
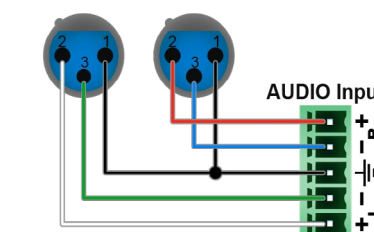
Phoenix - Phoenix
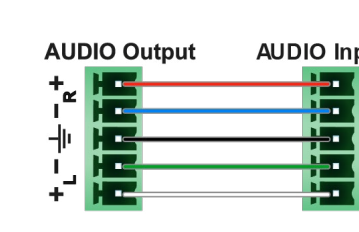
11.6. Factory Default Settings

Parameter	Setting/Value
Crosspoint settings	
Video	I6 (Testpattern)
Audio	I1 (Analog audio in 1)
Video port settings	
HDCP	Enabled
Autoselect	Enabled, Last detected
Emulated EDID on analog video inputs	Factory #89: Universal Analog EDID
Emulated EDID on digital video inputs	Dynamic #1: Copy EDID from connected sink device.
Test pattern mode	Auto
Test pattern resolution	640x480p
Test pattern color (RGB code)	#7F7F7F (grey)
Test pattern resolution on Testpattern input (I6)	640x480p
Test pattern color (RGB code) on Testpattern input (I6)	#108020 (green)
Output HDMI mode	Auto
Output HDCP mode	Auto
Power 5V mode	Always on
Color space	Auto
Analog audio port settings (I1 and I5)	
Volume	0.00 dB (100%)
Balance	50 (center)
Network settings	
IP address	192.168.0.100
Subnet mask	255.255.255.0
Static gateway	192.168.0.1
DHCP	Disabled
LW2 port number	10001
LW3 port number	6107
HTTP port number	80
RS-232 settings	
Control protocol	LW2
Baud rate	57600

Parameter	Setting/Value
Databits	8
Parity	No
Stopbits	1
Operation mode	Event Manager / Control / Command Injection
Recognizer delimiter*	0D0A
Recognizer Timeout*	0 (disabled)
Recognizer Active property timeout*	50
Command injection port nr.	8001
IR port settings	
Command injection status	Enabled
Command injection input port nr.	9001
Command injection output port nr.	9002
GPIO port settings	
Output level	High
Direction	Input

* Only in UMX-HDMI-140-Plus model.

11.8. Factory EDID List

Mem	Resolution	Type	EDID features
F1	640 x 480p @ 60.00 Hz	D	
F2	848 x 480p @ 60.00 Hz	D	
F3	800 x 600p @ 60.32 Hz	D	
F4	1024 x 768p @ 60.00 Hz	D	
F5	1280 x 768p @ 50.00 Hz	D	
F6	1280 x 768p @ 59.94 Hz	D	
F7	1280 x 768p @ 75.00 Hz	D	
F8	1360 x 768p @ 60.02 Hz	D	
F9	1280 x 1024p @ 50.00 Hz	D	
F10	1280 x 1024p @ 60.02 Hz	D	
F11	1280 x 1024p @ 75.02 Hz	D	
F12	1400 x 1050p @ 50.00 Hz	D	
F13	1400 x 1050p @ 60.00 Hz	D	
F14	1400 x 1050p @ 75.00 Hz	D	
F15	1680 x 1050p @ 60.00 Hz	D	
F16	1920 x 1080p @ 50.00 Hz	D	
F17	1920 x 1080p @ 60.00 Hz	D	
F18	2048 x 1080p @ 50.00 Hz	D	
F19	2048 x 1080p @ 60.00 Hz	D	
F20	1600 x 1200p @ 50.00 Hz	D	
F21	1600 x 1200p @ 60.00 Hz	D	
F22	1920 x 1200p @ 50.00 Hz	D	
F23	1920 x 1200p @ 59.56 Hz	D	
F24	2048 x 1200p @ 59.96 Hz	D	
F29	1920 x 1080p @ 60.00 Hz	U	
F30	1440 x 480i @ 60.05 Hz	H	2chLPCM
F31	1440 x 576i @ 50.08 Hz	H	2chLPCM
F32	640 x 480p @ 59.95 Hz	H	2chLPCM
F33	720 x 480p @ 59.94 Hz	H	2chLPCM
F34	720 x 576p @ 50.00 Hz	H	2chLPCM

Mem	Resolution	Type	EDID features
F35	1280 x 720p @ 50.00 Hz	H	2chLPCM
F36	1280 x 720p @ 60.00 Hz	H	2chLPCM
F37	1920 x 1080i @ 50.04 Hz	H	2chLPCM
F38	1920 x 1080i @ 50.00 Hz	H	2chLPCM
F39	1920 x 1080i @ 60.05 Hz	H	2chLPCM
F40	1920 x 1080i @ 60.05 Hz	H	2chLPCM
F41	1920 x 1080p @ 24.00 Hz	H	2chLPCM
F42	1920 x 1080p @ 25.00 Hz	H	2chLPCM
F43	1920 x 1080p @ 30.00 Hz	H	2chLPCM
F44	1920 x 1080p @ 50.00 Hz	H	2chLPCM
F45	1920 x 1080p @ 59.94 Hz	H	2chLPCM
F46	1920 x 1080p @ 60.00 Hz	H	2chLPCM
F47	1920 x 1080p @ 60.00 Hz	U	2chLPCM
F48	1920 x 1080p @ 60.00 Hz	U	2chLPCM, 8chLPCM, DD, DTS, AAC, DD+, DTS-HD, MLP, DST, WMAP
F49	1920 x 1080p @ 60.00 Hz	U	2chLPCM, 8chLPCM, DD, DTS, AAC, DD+, DTS-HD, MLP, DST, WMAP
F50	720 x 480i @ 30.03 Hz	A	
F51	720 x 576i @ 25.04 Hz	A	
F52	640 x 480p @ 60.00 Hz	A	
F53	640 x 480p @ 75.00 Hz	A	
F54	800 x 600p @ 50.00 Hz	A	
F55	800 x 600p @ 60.32 Hz	A	
F56	800 x 600p @ 75.00 Hz	A	
F57	1024 x 768p @ 49.99 Hz	A	
F58	1024 x 768p @ 60.00 Hz	A	
F59	1024 x 768p @ 75.03 Hz	A	
F60	1280 x 768p @ 50.00 Hz	A	
F61	1280 x 768p @ 59.94 Hz	A	

Mem	Resolution	Type	EDID features
F62	1280 x 768p @ 75.00 Hz	A	
F63	1360 x 768p @ 60.02 Hz	A	
F64	1364 x 768p @ 50.00 Hz	A	
F65	1364 x 768p @ 59.94 Hz	A	
F66	1364 x 768p @ 74.99 Hz	A	
F67	1280 x 1024p @ 50.00 Hz	A	
F68	1280 x 1024p @ 60.02 Hz	A	
F69	1366 x 1024p @ 60.00 Hz	A	
F70	1400 x 1050p @ 50.00 Hz	A	
F71	1400 x 1050p @ 60.00 Hz	A	
F72	1400 x 1050p @ 75.00 Hz	A	
F73	1920 x 540i @ 50.00 Hz	A	
F74	1920 x 540i @ 60.00 Hz	A	
F75	1920 x 1080p @ 50.00 Hz	A	
F76	1920 x 1080p @ 60.00 Hz	A	
F77	1600 x 1200p @ 50.00 Hz	A	
F78	1600 x 1200p @ 60.00 Hz	A	
F79	1920 x 1200p @ 59.56 Hz	A	
F80	1920 x 1200p @ 50.00 Hz	A	
F89	1920 x 1200p @ 59.56 Hz	U	
F90	1920 x 2160p @ 59.99 Hz	D	
F91	1024 x 2400p @ 60.01 Hz	D	
F94	2048 x 1536p @ 60.00 Hz	D	
F96	2560 x 1600p @ 59.86 Hz	D	
F97	3840 x 2400p @ 24.00 Hz	D	
F98	1280 x 720p @ 60.00 Hz	H	2chLPCM
F99	1920 x 1080p @ 60.00 Hz	H	2chLPCM
F100	1024 x 768p @ 60.00 Hz	H	2chLPCM
F101	1280 x 1024p @ 50.00 Hz	H	2chLPCM
F102	1280 x 1024p @ 60.02 Hz	H	2chLPCM

Mem	Resolution	Type	EDID features
F103	1280 x 1024p @ 75.02 Hz	H	2chLPCM
F104	1600 x 1200p @ 50.00 Hz	H	2chLPCM
F105	1600 x 1200p @ 60.00 Hz	H	2chLPCM
F106	1920 x 1200p @ 59.56 Hz	H	2chLPCM
F107	2560 x 1440p @ 59.95 Hz	H	2chLPCM
F108	2560 x 1600p @ 59.86 Hz	H	2chLPCM
F109	3840 x 2400p @ 24.00 Hz	H	2chLPCM
F110	3840 x 2160p @ 24.00 Hz	H	2chLPCM
F111	3840 x 2160p @ 25.00 Hz	H	2chLPCM
F112	3840 x 2160p @ 30.00 Hz	H	2chLPCM
F118	3840 x 2160p @ 30.00 Hz	U	2chLPCM
F119	3840 x 2160p @ 30.00 Hz	U	2chLPCM, 8chLPCM, DD, DTS, AAC, DD+, DTS-HD, MLP, DST, WMAP
F120	3840 x 2160p @ 60.00 Hz	H	2chLPCM

Legend

D: DVI EDID

H: HDMI EDID

A: Analog EDID

U: Universal EDID, supporting many standard resolutions:

- **F29**: Universal EDID for DVI signals (no audio support).
- **F47**: HDMI EDID supporting PCM audio.
- **F48**: HDMI EDID supporting all type of audio.
- **F49**: HDMI EDID supporting all type of audio and deep color.
- **F89**: Universal EDID for analog signals (no audio support).
- **F118**: HDMI EDID supporting PCM audio and 4K@30 Hz signals.
- **F119**: HDMI EDID supporting all type of audio and 4K@30 Hz signals.

INFO: Please note that minor changes in the factory EDID list may be applied in further firmware versions.

11.9. Applied Ports (Network Settings)

The following ports are necessary to pass via a network switch/firewall for a proper working between the device and the softwares:

Purpose/function	Affected software	Protocol	Port nr.
Firmware update TFTP	LDU2	UDP	69
		UDP	49990
		UDP	49995
Device Discovery	LDC	UDP	224.0.0.251:5353
Remote IP	LDC	UDP	230.76.87.82:37421
Find me (LMDMP)	-	UDP	230.76.87.82:37422
LW2 protocol	-	TCP	10001
LW3 protocol	-	TCP	6107
HTTP port	-	TCP	80
RS-232 command injection	-	TCP	8001
IR command injection	-	TCP	9001, 9002

11.10. Release Notes of the Firmware Packages

v1.3.0b5

Release date: 2021-04-22

New feature:

- Added IP port and services filtering (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added Macro capability (running partial device preset with tags) (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added new method for CEC control button sendClick (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added LMDMP (Lightware Multicast Device Management Protocol) feature.
- Modified DeviceLabel property default text to LW_<productname>_<serialnum>
- Added properties in root node: FirmwareVersion, PackageVersion, MacAddress.
- Minor performance improvements and modifications.
- Added Network HostName property (default: lightware-<serialnum>).
- Added new ConnectedSource property for media output nodes.
- Added AND operator for Event Manager Conditions (Advanced Control pack v3)
- Added Condition triggering for Event Manager (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added Condition detect on property change to anything in Event Manager (Advanced Control pack v3)
- Added Variable handling for Event Manager (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added Permanent TCP clients with configurable target IP address, and Message recognizer for TCP clients (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added LW3 command-salvo over Http POST (protocol.lw3) (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added Http message sending with sendHttpPost and sendHttpPut (target server IP, target filepath, header, body) (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added method to send Wake On LAN packet (Advanced Control pack v3)
- Added cleartext login function (disabled by default) (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added MAC filtering (Advanced Control pack v3) for UMX-HDMI-140-Plus only!
- Added property to indicate FeaturePackVersion (Advanced Control pack v3)

Bugfix:

- Fixed issue with tick counter when the device is continuously operating for a very long time.
- Improved network compatibility with 10.x.x.x IP address range.

v1.2.0b12

Release date: 2019-04-05

New feature:

- Sending IR codes (SendProntoHex e.g. send max. 200 Byte IR code with Event Actions) for UMX-HDMI-140-Plus only!
- CEC - sendCEC command (e.g. turn on the TV with Event Actions) for UMX-HDMI-140-Plus only!

- RS232 Minimal Recognizer for Cisco compatibility (Cisco Login) for UMX-HDMI-140-Plus only!

Bugfix:

- Condition link was broken is fixed.
- Notification message fixed - Use LDU2 v1.2.3 for the upgrade!

v1.1.1b8

Release date: 2019-01-14

New feature:

- Factory default values changed (Autoselect: enabled; Autoselect mode: Last detect)
- 40 events can be saved in Event Manager
- Added 'User replaceable miniweb slot' to support built-in control webpage
- Firmware platform library updated
- Added 'Dark mode' function to turn off front panel LEDs
- Compatible for LDU2 only!
- Improved GPIO detection
- Modified DP input driver to fix HDCP issue with MacBooks
- Added 'Disable default button function' option to support button customization in Event Manager
- Modified RS-232 modes to support SendMessage in Control mode
- Added 'Forced button lock' function to lock buttons via protocol command

Bugfix:

- Message sending via an RS-232 Port is available in all RS-232 modes (Control mode/ Command injection mode / Event manager mode).
- Fixed DP input cable adaptor detection.

Known issue:

- GPIO input polling time is slow, in spite of the correct operation, it may seem that the connected buttons are not sensed

v1.0.5b4

Release date: 2018-06-25

New feature:

- Factory default values changed (Autoselect: enabled; Autoselect mode: Last detect)
- 40 events can be saved in Event Manager

Bugfix:

- Message sending via an RS-232 Port is available in all RS-232 modes (Control mode/ Command injection mode / Event manager mode).

Known issue:

- GPIO input polling time is slow, in spite of the correct operation, it may seem that the connected buttons are not sensed

11.11. Hashtag Keyword List

This user's manual contains keywords with hashtags (#) to help you to find the relevant information as quick as possible.

The format of the keywords is the following:

#<keyword>

The usage of the keywords: use the **Search** function (Ctrl+F / Cmd+F) of your PDF reader application, type the **#** (hashtag) character and the wished keyword.

The **#new** special keyword indicates a new feature/function that has just appeared in the latest firmware or software version.

Example

#dhcp

This keyword is placed at the DHCP (dynamic IP address) setting in the front panel operation, the Lightware Device Controller (LDC) and the LW3 programmer's reference section.

The following list contains all hashtag keywords placed in the document with a short description belonging to them. The list is in **alphabetical order** by the hashtag keywords.

Hashtag Keyword ↓	Description
#advancedview	Advanced view / Terminal window
#analogaudio	Analog audio related settings
#analogvideo	Analog video related settings
#autoselect	Autoselect feature settings
#backup	Configuration cloning (backup)
#balance	Balance (for analog audio) setting
#bootload	Bootload mode setting
#builtinweb	Built-in miniweb
#buttonlock	Front panel button lock setting
#cec	CEC related settings
#colorspace	Color space converter related settings
#commandinjection	RS-232 command injection settings
#configurationcloning	Configuration cloning (backup)
#controllock	Control lock setting
#crosspoint	Crosspoint switch setting
#darkmode	Dark mode setting
#devicelabel	Device label

Hashtag Keyword ↓	Description
#dhcp	Dynamic IP address (DHCP) setting
#diagnostic	Failure diagnostic related tool/information
#edid	EDID related settings
#ethernet	Ethernet related settings
#eventmanager	Event manager
#factory	Factory default settings
#firmwareversion	Firmware version query
#framedetector	Frame detector in LDC
#gpio	GPIO related settings
#hdcp	HDCP-encryption related setting
#highlightme	Find the device in LDC Device discovery
#http	Http post and put messaging, salvo commands
#identifyme	Identify me (identify the device) feature
#infra	Infrared port related settings
#infrared	Infrared port related settings
#ipaddress	IP address related settings
#ir	Infrared port related settings
#label	Device label
#lock	Port lock setting
#lockbutton	Front panel button lock setting
#log	System log
#login	Cleartext login feature
#macfilter	MAC filtering (IT security)
#message	Message sending via communication ports
#miniweb	Built-in miniweb
#mute	Port mute setting
#macro	Macro-handling
#network	Network (IP address) related settings
#nosyncscreen	Test pattern (no sync screen) settings
#portblock	IP port blocking (IT security)
#portstatus	Source/destination port status query

Hashtag Keyword ↓⅗	Description
#power5v	Power 5V mode setting
#producttype	Product type query
#protocol	RS-232 protocol setting
#reboot	Restarting the device
#recognizer	RS-232 recognizer related settings
#reset	Restarting the device
#restart	Restarting the device
#rs232	RS-232 related settings
#rs-232	RS-232 related settings
#rs232recognizer	RS-232 recognizer related settings
#rs-232recognizer	RS-232 recognizer related settings
#serial	RS-232 related settings
#serialnumber	Serial number query
#signaltype	HDMI/DVI signal type setting
#status	Status query
#switch	Crosspoint switch setting
#systemlog	System log
#tcprecognizer	TCP message recognizer-related settings
#terminal	Advanced view / Terminal window
#testpattern	Test pattern (no sync screen) settings
#unlock	Port unlock setting
#unmute	Port unmute setting
#variables	Variable-management
#vga	VGA video related settings
#volume	Volume (for analog audio) setting
#web	Built-in miniweb

11.12. Further Information

Limited Warranty Statement

1. Lightware Visual Engineering PLC (Lightware) warrants to all trade and end user customers that any Lightware product purchased will be free from manufacturing defects in both material and workmanship for three (3) years from purchase unless stated otherwise below. The warranty period will begin on the latest possible date where proof of purchase/delivery can be provided by the customer. In the event that no proof can be provided (empty 'Date of purchase' field or a copy of invoice), the warranty period will begin from the point of delivery from Lightware.

1.1. 25G and MODEX product series will be subject to a seven (7) year warranty period under the same terms as outlined in this document.

1.2. If during the first three (3) months of purchase, the customer is unhappy with any aspect of a Lightware product, Lightware will accept a return for full credit.

1.3. Any product that fails in the first six (6) months of the warranty period will automatically be eligible for replacement and advanced replacement where available. Any replacements provided will be warranted for the remainder of the original unit's warranty period.

1.4. Product failures from six (6) months to the end of the warranty period will either be repaired or replaced at the discretion of Lightware. If Lightware chooses to replace the product, then the replacement will be warranted for the remainder of the original unit's warranty period.

2. The above-stated warranty and procedures will not apply to any product that has been:

2.1. Modified, repaired or altered by anyone other than a certified Lightware engineer unless expressly agreed beforehand.

2.2. Used in any application other than that for which it was intended.

2.3. Subjected to any mechanical or electrical abuse or accidental damage.

2.4. Any costs incurred for repair/replacement of goods that fall into the above categories (2.1., 2.2., 2.3.) will be borne by the customer at a pre-agreed figure.

3. All products to be returned to Lightware require a return material authorization number (RMA) prior to shipment, and this number must be clearly marked on the box. If an RMA number is not obtained or is not clearly marked on the box, Lightware will refuse the shipment.

3.1. The customer will be responsible for in-bound and Lightware will be responsible for out-bound shipping costs.

3.2. Newly repaired or replaced products will be warranted to the end of the originally purchased product's warranty period.

Document Revision History

Rev.	Release date	Changes	Editor
1.0	13-03-2017	Initial version	Tamas Forgacs
. . .			
3.4	12-05-2023	IR Message Sending examples updated	Nikolett Keindl
3.5	12-12-2023	Specifications updated	Tamas Forgacs

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