visual engineering
LIGHTWARE

User's Manual

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

Universal Multimedia Switcher

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, let the ventilation holes free and never block or bypass the ventilators (if any).

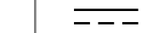
WARNING

To prevent injury, the apparatus is recommended to securely attach to the floor/wall or mount in accordance with the installation instructions. The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus. No naked flame sources, such as lighted 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 which is highly recommended to read and keep in every case!

ATTENTION! Useful information to perform 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 which 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 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	v1.27.0b2
Lightware Device Updater (LDU2) software	v1.2.3b3
Controller firmware	v1.2.0b12
Hardware	1.1

Document revision: **2.5**

Release date: 09-04-2019

Editor: Judit Barsony

About Printing

Lightware Visual Engineering supports green technologies and Eco-friend mentality. Thus, this document is made for digital usage primarily. If you need to print out 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 possible to organize the pages better. After punching the printed pages, they can be placed easily into a ring folder.

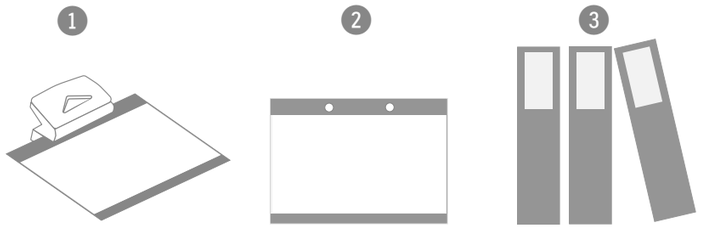


Table of Contents

Table of Contents

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 below listed sections:

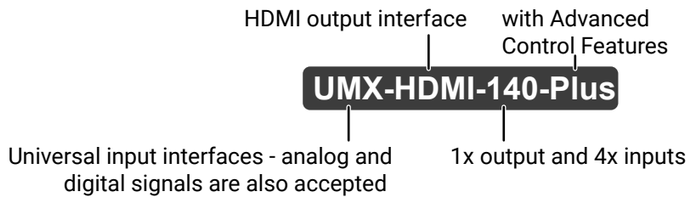
1.1. Description

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.

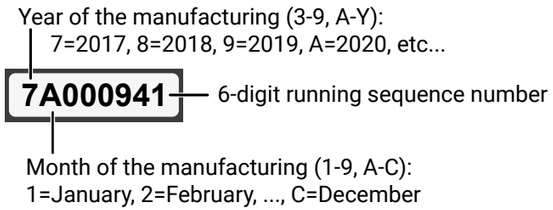
The device can be mounted on a rack shelf or used standalone. UMX-HDMI-140 is compatible with HDMI extenders and matrix switchers.

Model Denomination

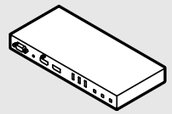


About the Serial Number

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



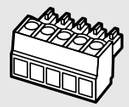
1.2. Box Contents



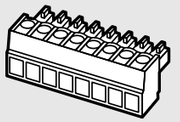
UMX-HDMI-140 switcher

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

1.2.1. 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	-	✔

1.3. 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.

Pixel Accurate Reclocking

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

HDCP-compliant

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

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.

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.

GPIO Control Port

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

Advanced Control Features (UMX-HDMI-140-Plus)

Consumer Electronic 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.

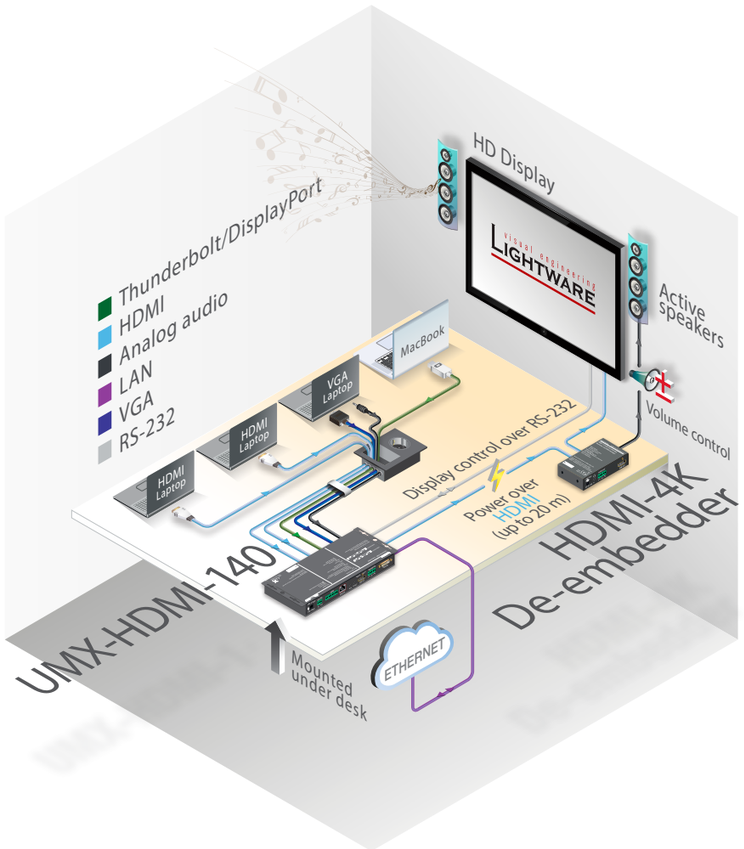
1.4. Typical Applications

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.

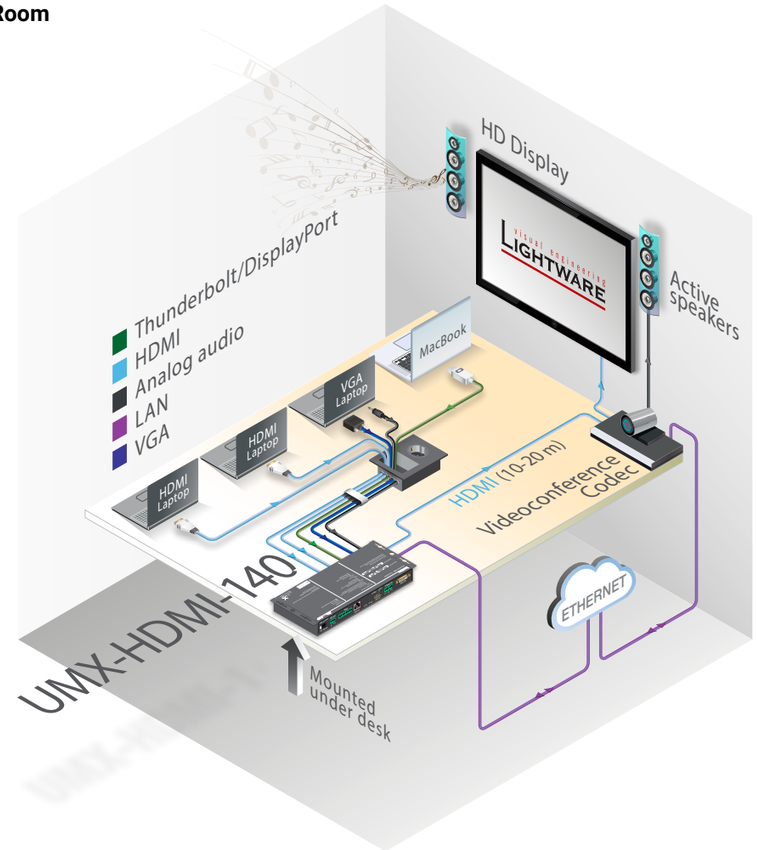
UMX-HDMI-140 transmits HDMI audio/video signal toward the sink devices. The Lightware HDMI-4K De-embedder de-embeds the audio signal and transmits it to the Active speakers. The De-embedder does not need local powering because it can be supplied via the HDMI cable by the source and the cable extensions 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



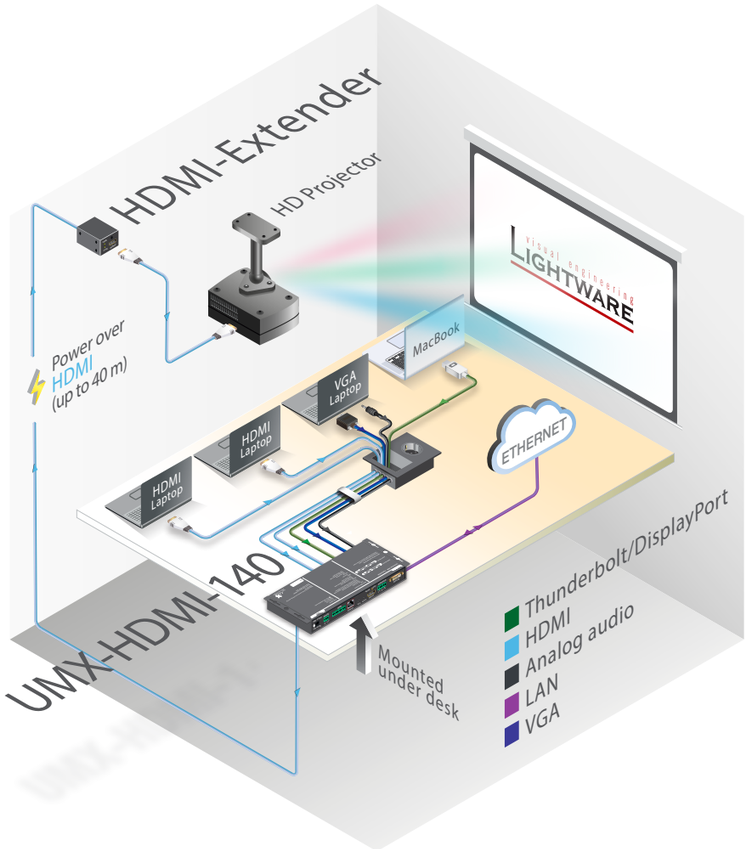
The Concept

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.

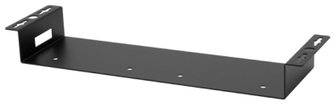
To order Lightware HDMI-Extender device please contact sales@lightware.com.

2 Installation

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

2.1. 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

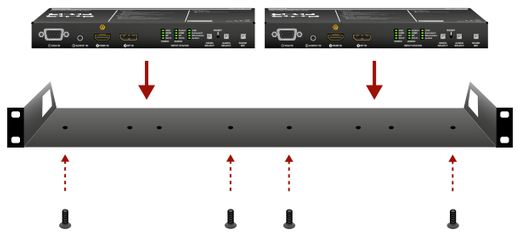
The Under-desk double mounting kit makes easy to mount a single device on any flat surface, e.g. furniture. 1U high rack shelf provides mounting holes for fastening two half-rack or four quarter-rack sized units. Pocket-sized devices can also be fastened on the shelf. To order mounting accessories please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

2.1.1. 1U High Rack Shelf

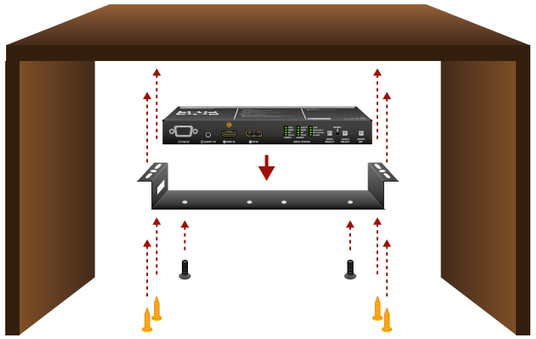
Allows rack mounting for half-rack, quarter-rack and pocket sized units.



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.

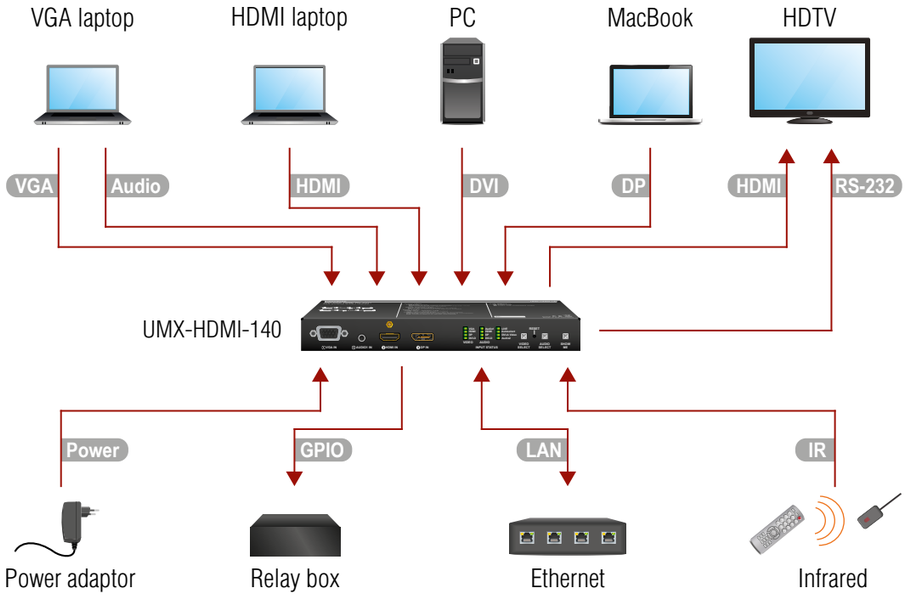
2.1.2. Under-desk Double Mounting Kit

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.

2.2. 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.

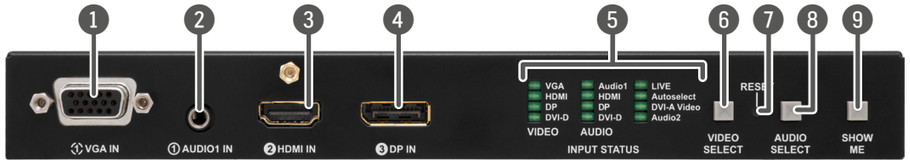
INFO: Powering on the devices is not recommended before the final step.

3

Product Overview

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

3.1. Front View

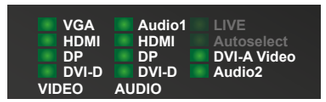


1	**VGA input**	D-SUB connector for analog video signal.
2	**Audio1 input**	3.5 mm Jack connector for asymmetric analog audio input signal.
3	**HDMI input**	HDMI connector for DVI video or HDMI video and audio.
4	**DisplayPort input**	DisplayPort connector for DisplayPort audio/video signal.
5	**Input 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.

Status LEDs

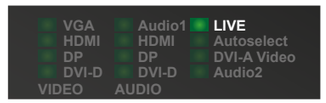
Input Status LEDs



OFF:	Input is not selected.
BLINKING:	Input is selected, and signal is not detected.
ON:	Input is selected and signal is present.

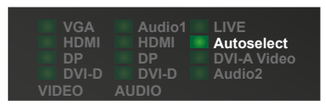
ATTENTION! When Dark mode is enabled, input status LEDs are off, even though the device is fully functional.

LIVE LED



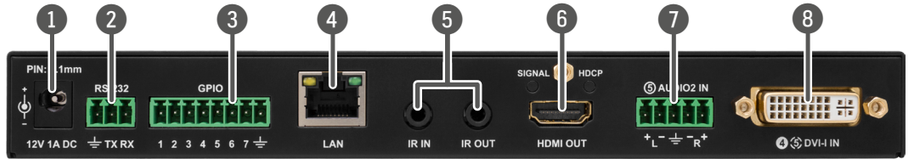
OFF:	Device is not powered.
BLINKING: (slow, 1 sec)	Device is powered and operational.
BLINKING: (fast, 0,5 sec)	Device is in firmware upgrade mode.
ON:	Device is powered but not operational.

AUTOSELECT LED



OFF:	Autoselect function is disabled.
BLINKING:	Autoselect function is enabled, searching for signal (the video input LEDs are also blinking).
ON:	Autoselect function is enabled, the active video signal is found (the selected video input's LED is also ON).

3.2. 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 upgrading 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 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.

HDMI OUTPUT LEDs

SIGNAL LED

OFF: Signal is not present on output.

ON: Signal is present on output.

HDCP LED

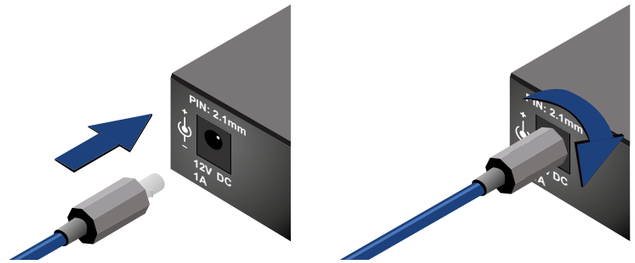
OFF: Output signal is not HDCP-encrypted.

BLINKING: Non-HDCP capable device is connected, encrypted signal is replaced with red screen.

ON: Output signal is HDCP-encrypted.

3.3. Electrical Connections

3.3.1. 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.

3.3.2. 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.

3.3.3. HDMI Connector

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

3.3.4. DisplayPort Connector

UMX-HDMI-140 switcher provides standard 20-pole DisplayPort connector for input. Always use high quality DP cable for connecting DisplayPort devices.

3.3.5. 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.

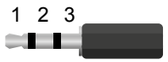
Always use high quality DVI cable for connecting DVI devices.

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)		

3.3.6. 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

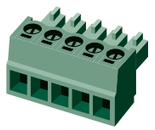
Jack audio plug pin assignments

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

3.3.7. 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 Audio Cable Wiring Guide section.

Pin nr.	Signal
1	Left+
2	Left-
3	Ground
4	Right-
5	Right+



Analog audio connector and plug pin assignments

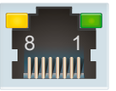
Compatible Plug Type

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.

3.3.8. Ethernet Connector (LAN Port)

The extender provides standard RJ45 connectors for TPS IN and LAN ports. Always use high quality Ethernet cable for connecting transmitters and receivers.

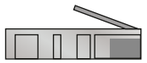


Wiring of TPS and LAN Cables

Lightware recommends the termination of LAN cables on the basis of TIA/EIA T 568 A or TIA/EIA T 568 B standards.

Top

Bottom



Side

Pin	TIA/EIA T568 A	Color and name	TIA/EIA T568 B	Color and name
1		white/green stripe		white/orange stripe
2		green solid		orange solid
3		white/orange stripe		white/green stripe
4		blue solid		blue solid
5		white/blue stripe		white/blue stripe
6		orange solid		green solid
7		white/brown stripe		white/brown stripe
8		brown solid		brown solid

3.3.9. RS-232 Connector

The receiver 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.

3.3.10. IR Connector

IR detector and IR emitter can be connected to the receiver 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:

1 2 3  **Detector – 3-pole-TRS**		1 2-3  **Emitter – 2-pole-TS**	
1 Tip	Signal (active low)	1 Tip	+5V
2 Ring	GND	2 Ring	Signal (active low)
3 Sleeve	+5V	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.

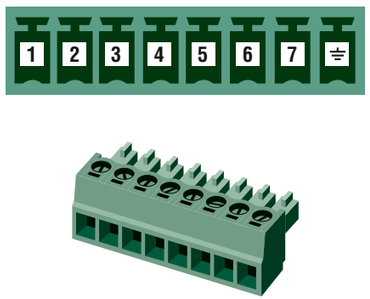
3.3.11. GPIO - General Purpose Input/Output Ports

UMX-HDMI-140 switcher contains 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.	Level and direction
1	Configurable
2	
3	
4	
5	
6	
7	
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.

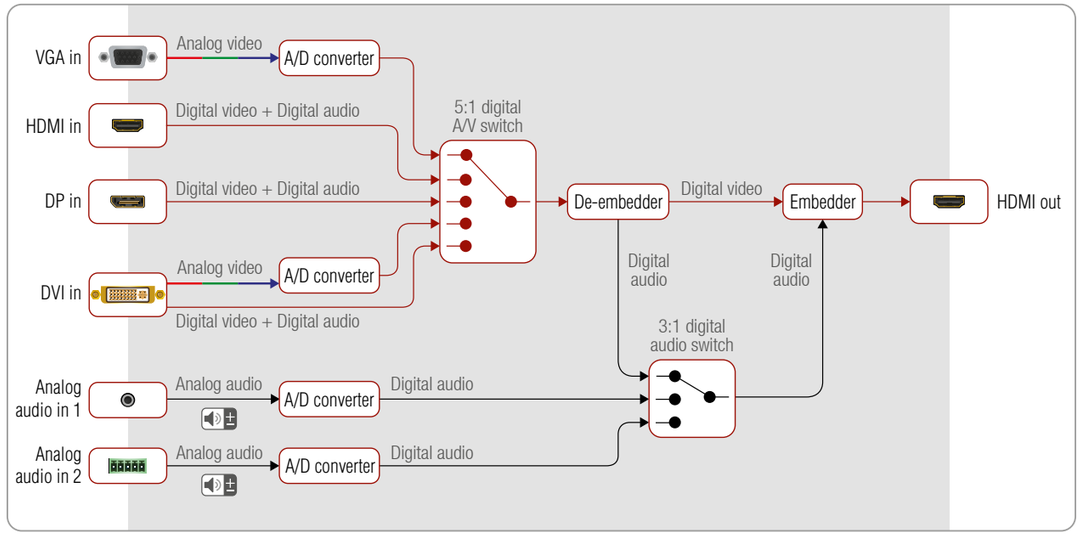
You can find more information about GPIO interface in the GPIO Interface section.

3.4. 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.

3.5. Port Diagram

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



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.

3.6. Audio Interface

3.6.1. 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.

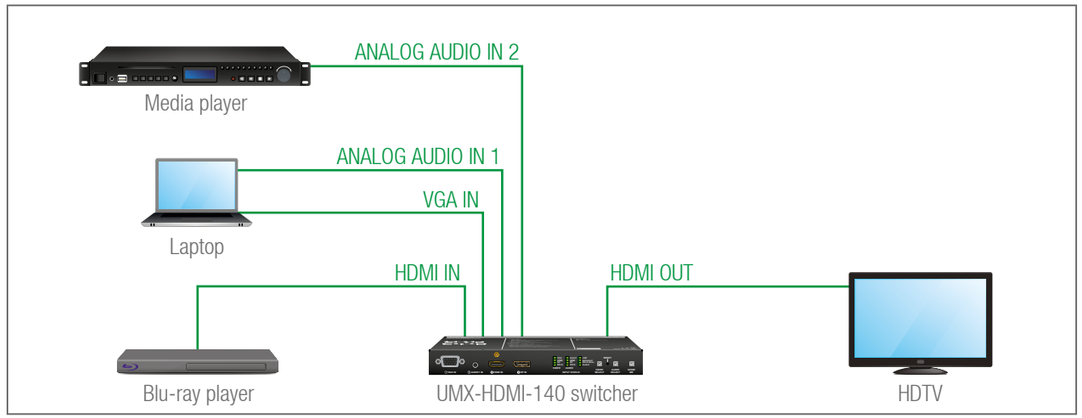
The video and audio inputs can be combined with limitations. Below table contains the allowed connections:

		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.

3.6.2. 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**.

3.7. Video Interface

3.7.1. 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.

3.7.2. Input Source Selection Modes

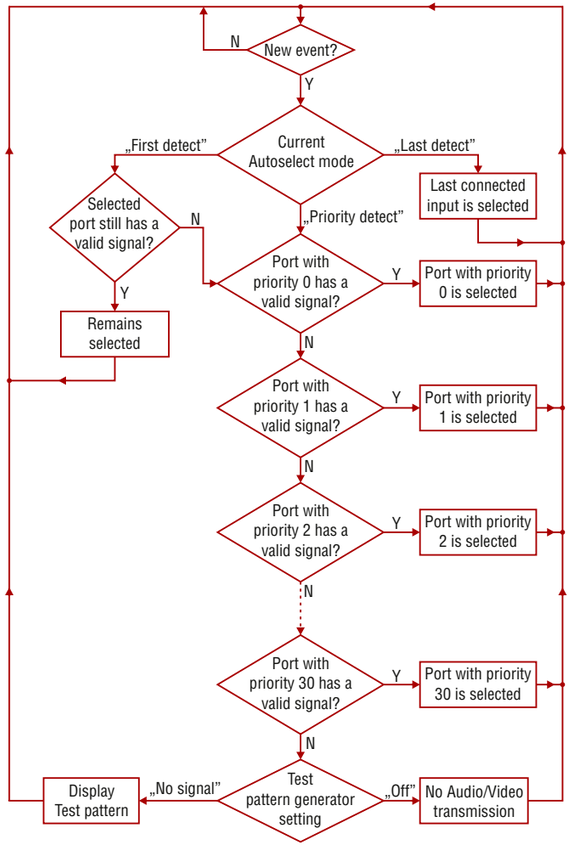
Video input source can be selected the following ways:

- pressing **Video Select** button on the device;
- using Lightware Device Controller (LDC);
- sending LW2 or LW3 protocol commands; or
- using the **Autoselect** function.

The Autoselect Feature

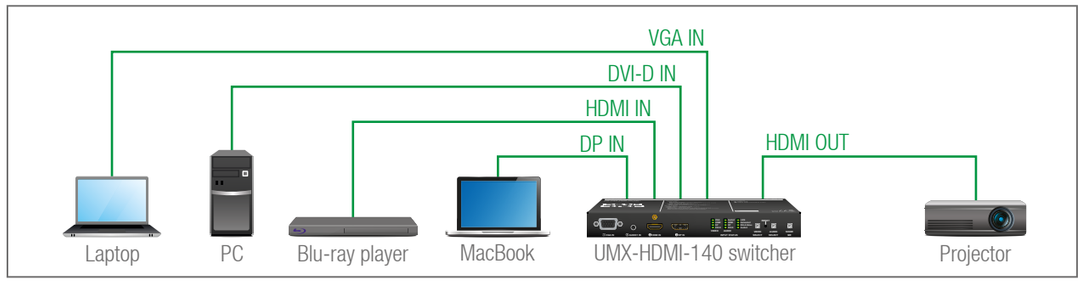
There are three types of Autoselect as follows.

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



Flowchart of Autoselect modes

3.7.3. Automatic Input Selection - Example



The Concept

If there is no other source connected to the switcher, but the Laptop, VGA input will be automatically switched to the HDMI output. If the Laptop and the PC are also connected to the switcher, 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**

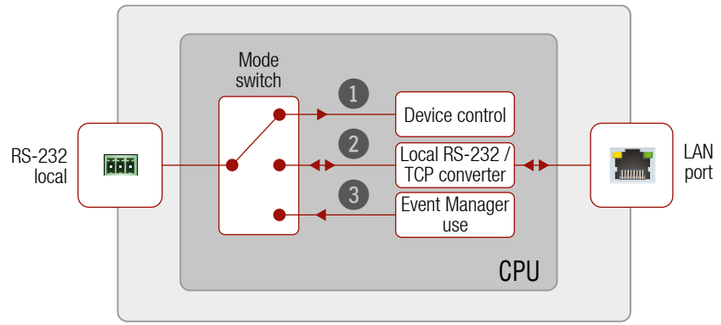
Priorities can be set in Lightware Device Controller software, see related settings in the Video Output section.

3.8. Control Features

3.8.1. 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 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.

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.

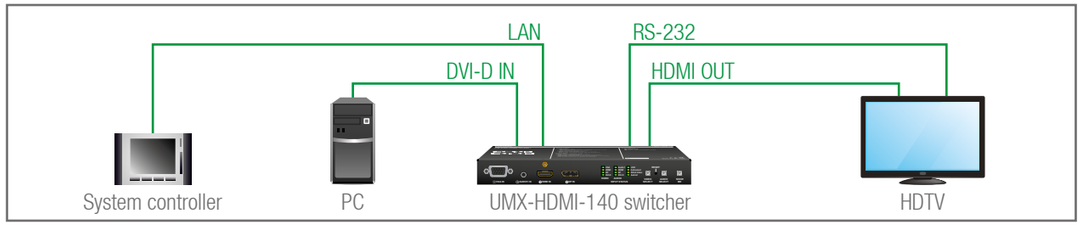
Command Injection Mode

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 separated TCP/IP port number is defined (independent of the basic ones which 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 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.

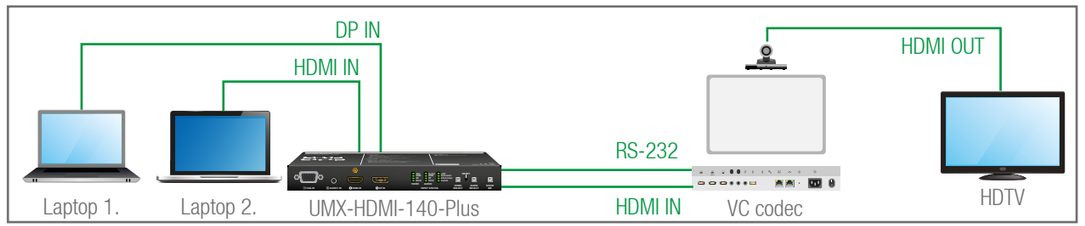
RS-232 Recognizer

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

This tool is able to recognize and store the incoming RS-232 message until the previously defined string (delimiter) is arrived or the timeout elapsed after the last data. The last incoming serial data is stored and it can trigger an action in Event Manager.

RS-232 Recognizer Example

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



When the active signal appears on the output of the UMX-HDMI-140-Plus, it triggers a bi-directional communication with the VC codec via RS-232:

- UMX-HDMI-140-Plus (starts the communication on RS-232): **PING**
- VC codec (requests the login name): **Login name:**
- UMX-HDMI-140-Plus (sends the login name): **Admin**
- VC codec (requests the password): **Password:**
- UMX-HDMI-140-Plus (sends the password): **Admin**

First, configure the recognizer for the serial communication, after that, set the events in the Event Manager.

The RS-232 recognizer settings has to be done with Lightware Device Controller Software (see details in see Message Recognizer section) or with LW3 protocol commands (see more information in RS-232 Recognizer section).

Create the following events in the event manager:

E1. When the signal is present on O1 port of the UMX-HDMI-140-Plus, it sends a message '**PING**' on P1 port of RS-232 to the VC codec. For more details see Message Sending via RS-232 Serial Port 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.

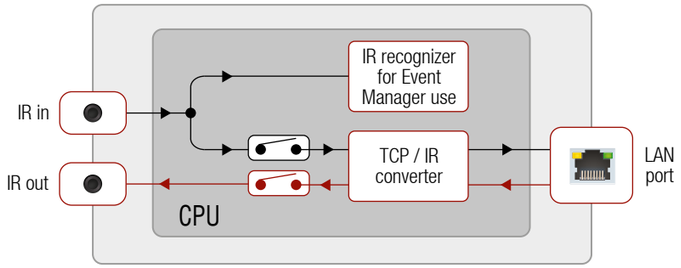
For more information about setting the events, see Event Manager section.

3.8.2. IR Interface

ATTENTION! For the complete usage attach the IR emitter unit to the IR OUT and the 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 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.

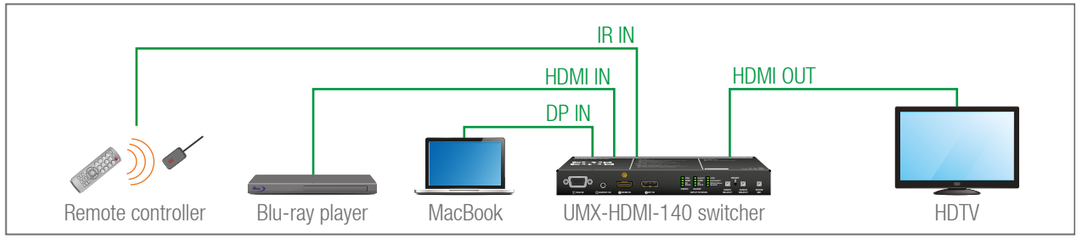


The device has an IR recognizer function. Recognizing IR commands can trigger actions in Event Manager. The second option is the command injection mode (like at serial interface in the previous section) where you can send IR commands over LAN. Command injection mode can be enabled and disabled on the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

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

INFO: The modulation of output IR signal can be turned off or on by LW3 command, see the Enable/Disable 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 A/V sources (a Blu-ray player and a MacBook) and an A/V sink device (an HDTV).

UMX-HDMI-140 switcher's input can be routed by the remote controller 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

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 Sending pronto hex codes (Little-endian format) section)
- With Event Manager (for more details see Sending pronto hex codes (Little-endian format) and Event Manager section)
- 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.

3.8.3. Ethernet Control Interface

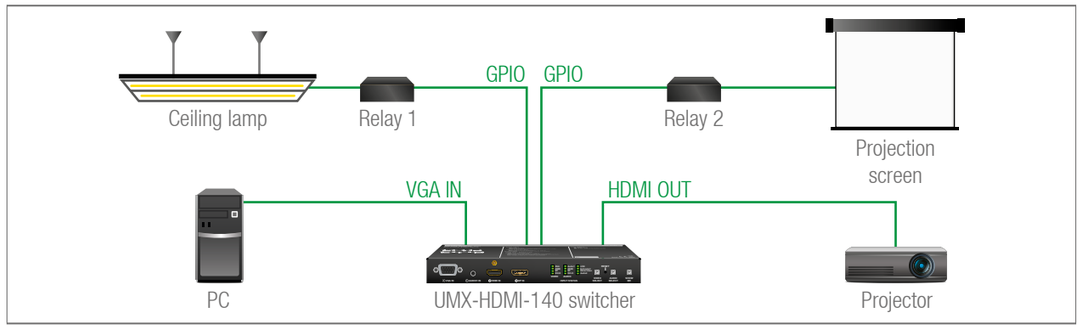
The device can be controlled over front panel Ethernet port (standard RJ45 connector). This interface supports any third-party system controller with both LW2 and LW3 command protocols.

The interface can be used to configure the device with Lightware Device Controller and establish the connection to Lightware Device Updater software and perform firmware upgrade.

3.8.4. GPIO Interface

The GPIO (General Purpose Input/Output) port is a multifunctional 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. Seven pin's direction is configurable independently based on needs of the application.

GPIO Options - Example



The Concept

Ceiling lamp is turned off by Relay 1 and projection screen is rolled down by Relay 2 when signal 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) then set GPIO pins to low level for Relay 1 opening. Also create another event when signal is not present on Input 1 (I1) then set GPIO pins to high level for Relay 1 closing.
- **For Relay 2**: create an event in Event manager when signal is present on Input 1 (I1) then set GPIO pins to high level for Relay 2 closing. Also create another event when signal is not present on Input 1 (I1) then set GPIO pins to low level for Relay 2 opening.

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

ATTENTION! Please always check the electrical parameters of the devices what 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 GPIO port in the GPIO section. See also the details about the Event Manager settings in the Event Manager section.

3.8.5. Consuming Electronic Control (CEC) Interface

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

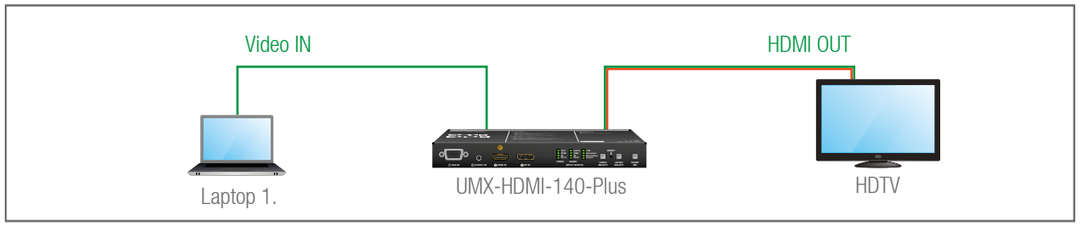
Consumer Electronic Control (CEC) is a bi-directional communication, defined in the HDMI standard. This feature is for remote control of the source and sink devices in the A/V system.

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

CEC has a dedicated pin in the HDMI connector. 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 active signal is detected on DP in, the switcher sends a CEC message automatically to the HDTV to wake up.



Create an event in the event manager:

- Set as a condition, that the signal is present on the output (O1),
- Set as an action then send a CEC command 'Image view on' O1 output port.

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

3.9. Further Built-in Features

3.9.1. 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.

4

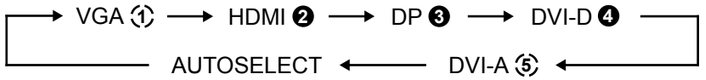
Operation

This chapter is about the powering and operating of the device describing the functions which are available by the front/rear controls:

4.1. Front Panel Operation

4.1.1. Video Select Button

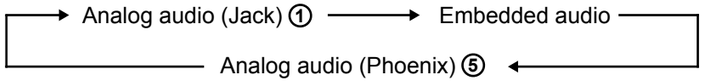
You can select the video input source for the output by pushing the Video Select button. The sequence is the following:



You can find more details about Autoselect feature in the The Autoselect Feature section.

4.1.2. Audio Select Button

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



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.

4.1.3. Port Legend

① Video only ① Audio only ② Video with embedded audio

4.1.4. 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.

4.2. Special Functions

4.2.1. 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.

4.2.2. 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:

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.

4.2.3. Reset to Factory Default Settings

To restore factory default values, do the following steps:

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.

4.2.4. 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.

4.2.5. Reseting the Device

In few cases (after firmware upgrade, 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:

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.

4.2.6. Entering Firmware Upgrade Mode

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

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 upgrade mode the LIVE LED is blinking quickly (less than 500 ms duty cycle). The other LEDs are off.

The procedure of firmware upgrade can be found in the Firmware Upgrade chapter.

4.3. Software Control Modes

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.

5.1. Install and Upgrade

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

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.

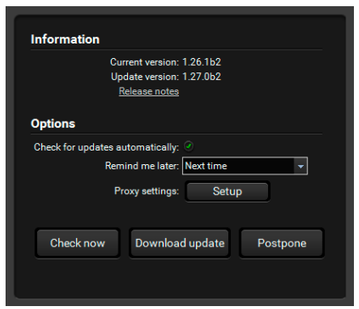
Installation for macOS

Mount the DMG file with 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.

Upgrading 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 the LDC found updates.



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 the **About icon** and the **Update** button.

Step 2. Set the desired update setting in the **Options** section.

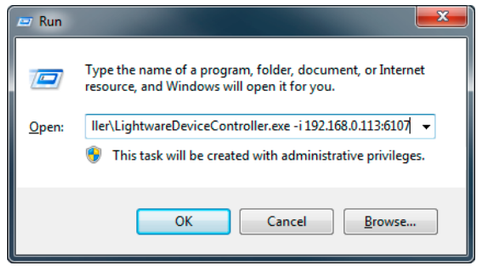
- If you do not want to check for the updates automatically, uncheck **the circle**, which contains the green tick.
- If you want to postpone the update, a reminder can be set with different delays from the **drop down list**.
- If the proxy settings traverse the update process, set the proper values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

Step 3. Click the **Download update** button to start the upgrading.

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

5.2. Running the LDC

The common way to start the software is 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

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

Example: `LightwareDeviceController -i 192.168.0.20:10001`

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.

Connecting to a Device via a Serial Port

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

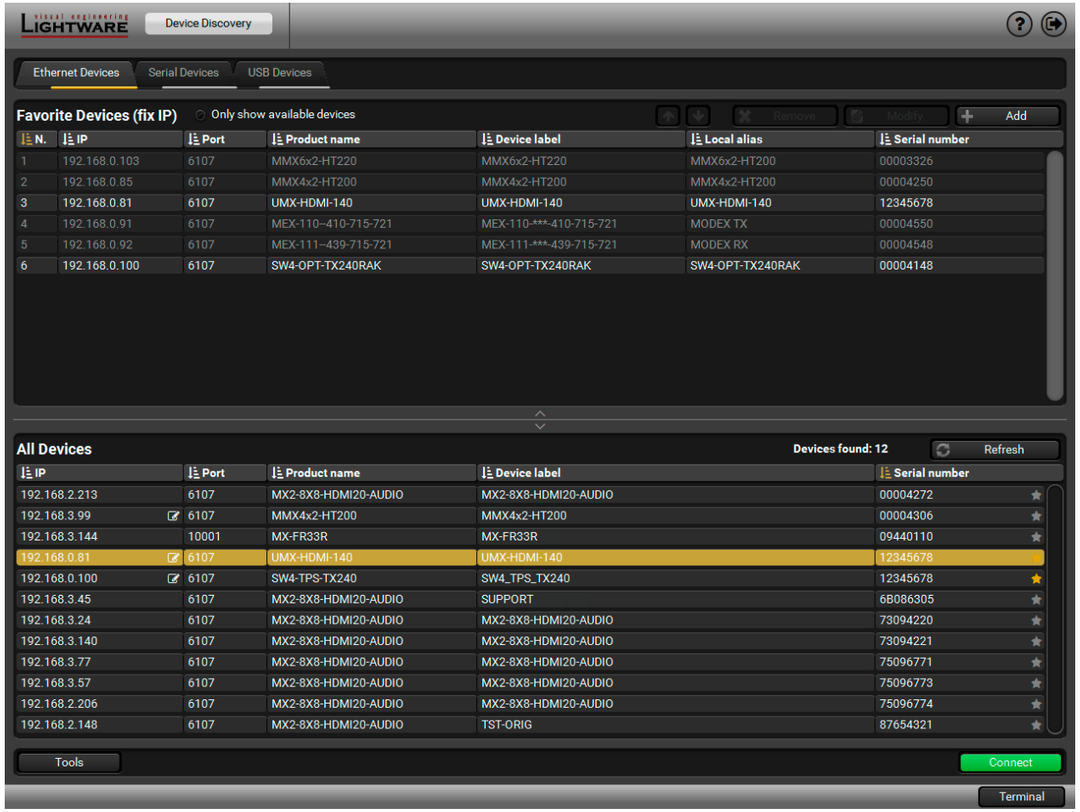
Example: `LightwareDeviceController -c COM1:57600`

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.

5.3. Establishing the Connection

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

Step 2. Run the controller software; device discovery window appears automatically.

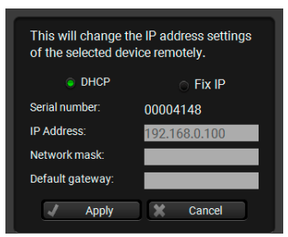


Device discovery window in LDC

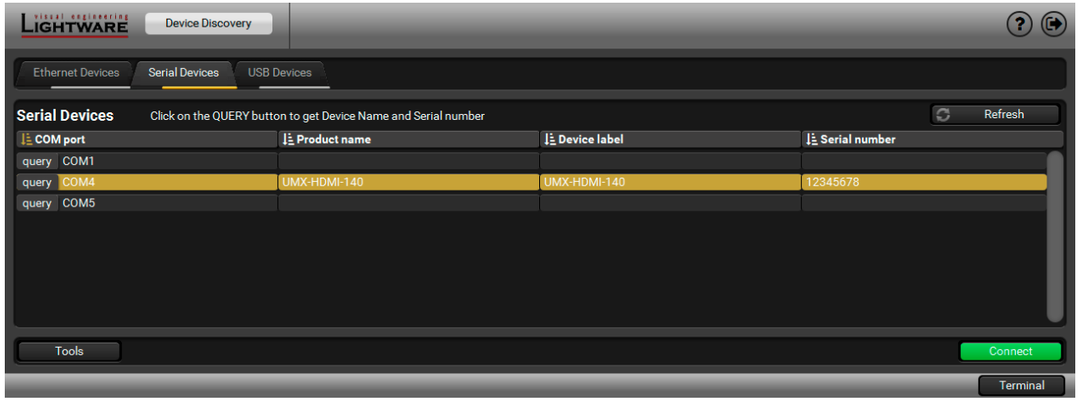
Change IP Address

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

In this window you can see only the new settings.



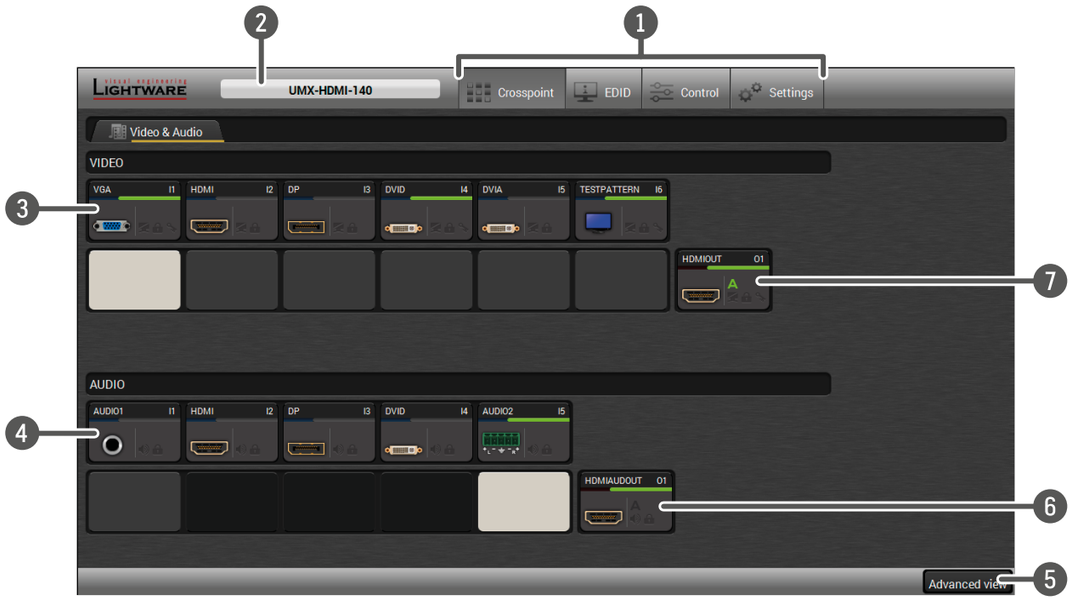
Step 3. Select the unit from the discovered Ethernet devices or under Serial devices; when the device is connected through RS-232 click on the **Query** button next to the desired serial port to display the device's name and serial number. Double click on the switcher or select the device and click on the **Connect** button.



ATTENTION! When the device is connected via the local RS-232 port, make sure that Control mode and LW3 protocol are set on the serial port.

5.4. Crosspoint Menu

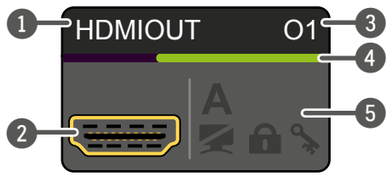
When LDC finds the hardware, it determines the product type, and the LDC starts with the default page, showing the Crosspoint menu.



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.
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 embed 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 icon
3. Port number
4. Signal present indicator
   green: present
   grey: not present
5. State indicators

State Indicators

Following icons display different states of the port/signal:

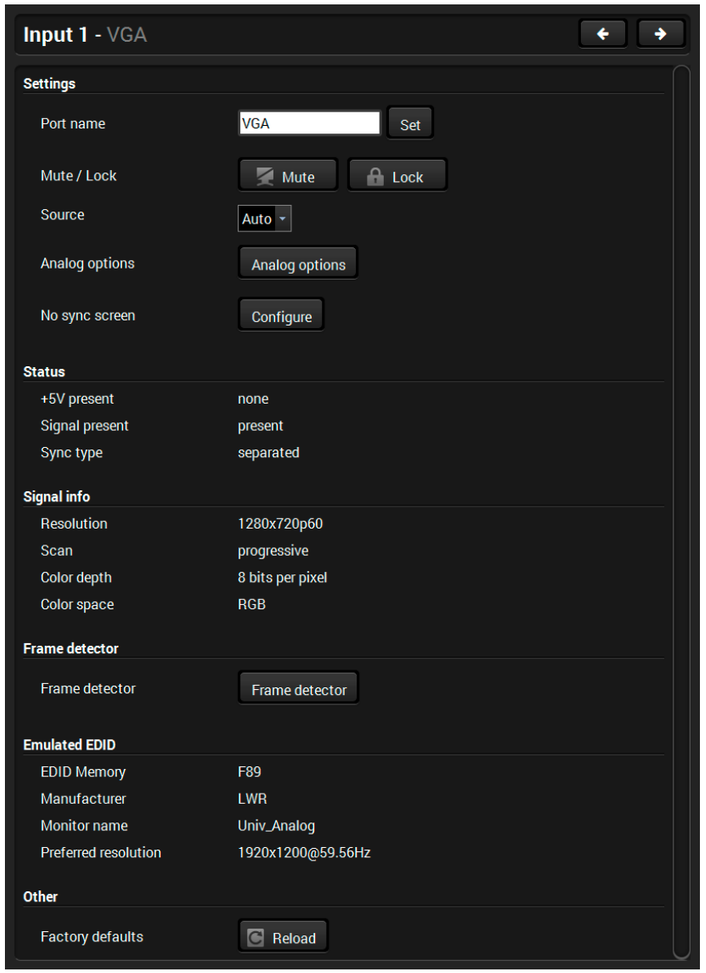
Icon	Icon is grey	Icon is black	Icon is green
	Signal is not encrypted with HDCP	Signal is encrypted with HDCP	-
	Port is unmuted	Port is muted	-
	Port is unlocked	Port is locked	-
	Autoselect is disabled	-	Autoselect is enabled

5.5. 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.

5.5.1. Analog Video Inputs

Port properties windows of VGA and DVI-A input ports provide similar settings and status information:



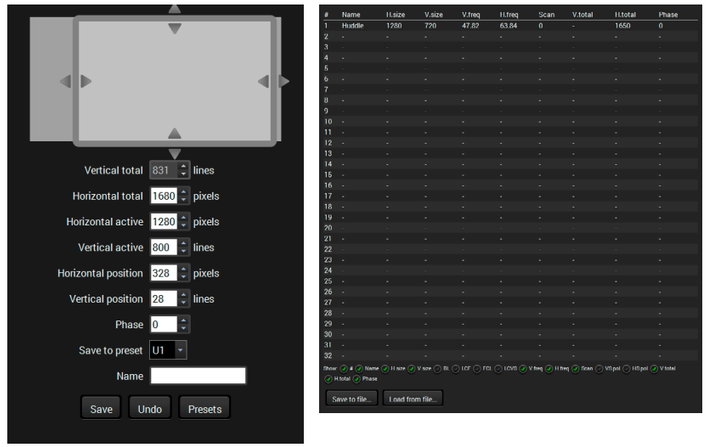
Port properties window of the VGA video input

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;
- Reloading factory default settings for the selected port.

Analog Options

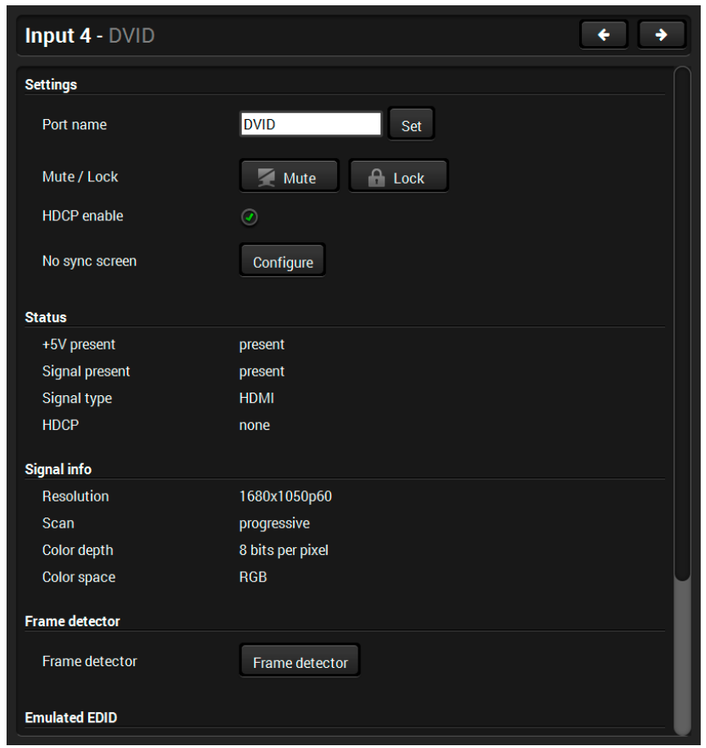
Analog video signals are digitized on the input. The timing parameters can be adjusted here if needed. Timing presets can be saved for each resolution separately. User has 32 user presets to store different timing data.



Analog options and Presets windows in LDC

5.5.2. Digital Video Inputs

Clicking on the HDMI, DisplayPort, or DVI-D input port icon results opening the Port properties window. The most important information and settings are available from the panel.



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;
- Reloading factory default settings for the selected port.

5.5.3. CEC (on HDMI Ports)

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

Layout of CEC panel in Lightware Device Contoller

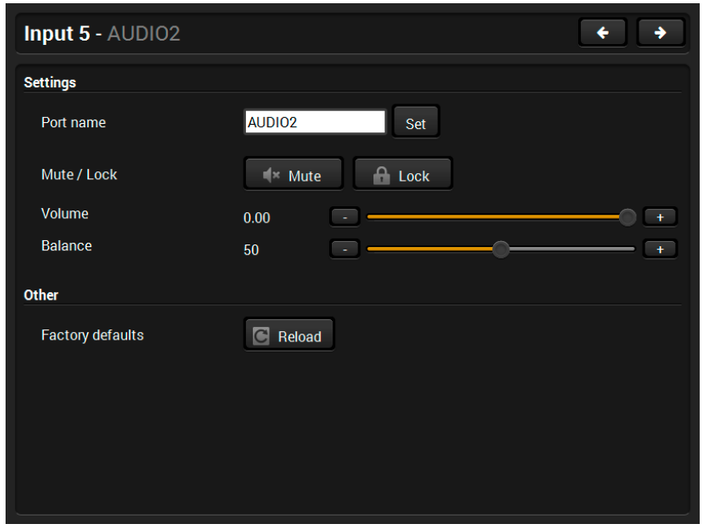
ATTENTION! It can occur that the third-party device can receive, but not execute the command because it is not supported by the product. Check the accepted commands in the documentation of the device.

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 execute sending 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 execute sending 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 (in red) CEC commands 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 refuse 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 the quick and easy management of CEC commands. These buttons are pre-programmed with basic functions and sends commands towards the sink. The communication is displayed in the Received Command box. For the list of the commands see 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.

5.5.4. Analog Audio Inputs

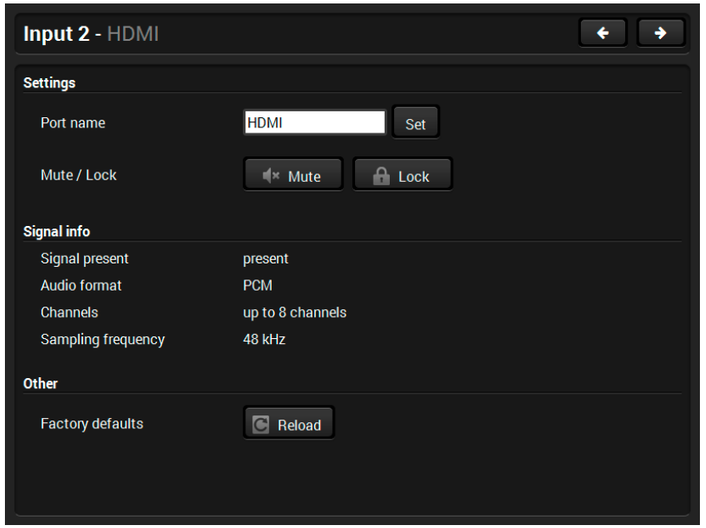


Port properties window of the AUDIO2 (Phoenix) input

Certain parameters of the analog audio input signal can be set as follows:

- 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)
- Reloading factory default settings for the selected port.

5.5.5. Digital Audio Inputs



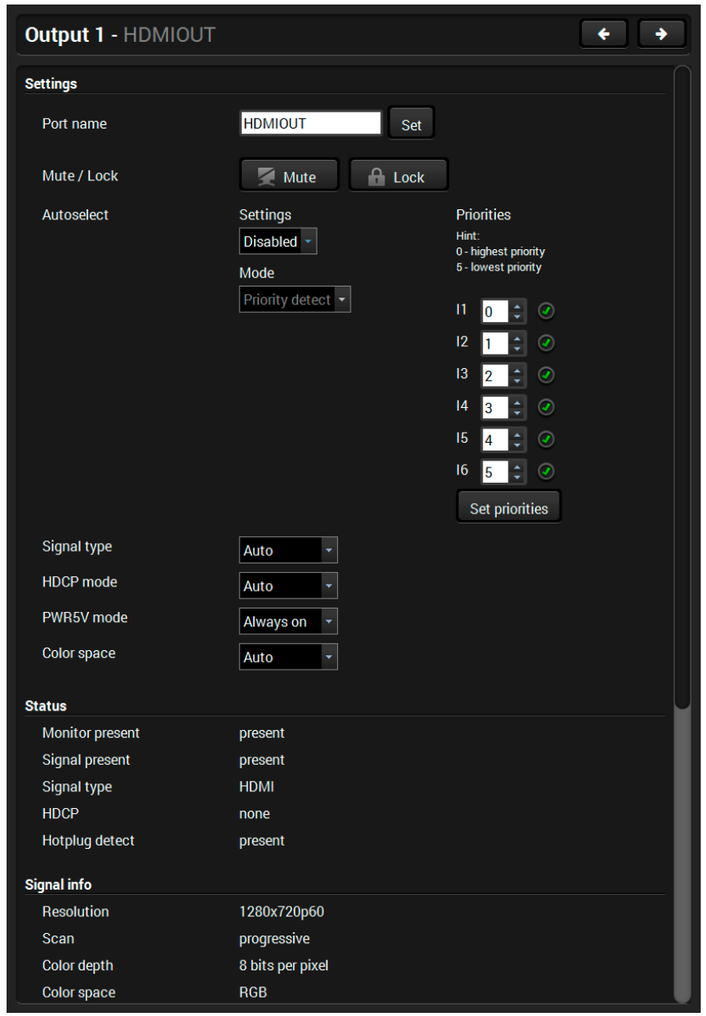
Port properties window of HDMI audio input

Certain parameters of the embedded audio input signal can be set as follows:

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

5.5.6. Video Output

Click on the output port to display its properties. The most important information and settings are available from the panel.



Port properties window of HDMI video output

Available settings:

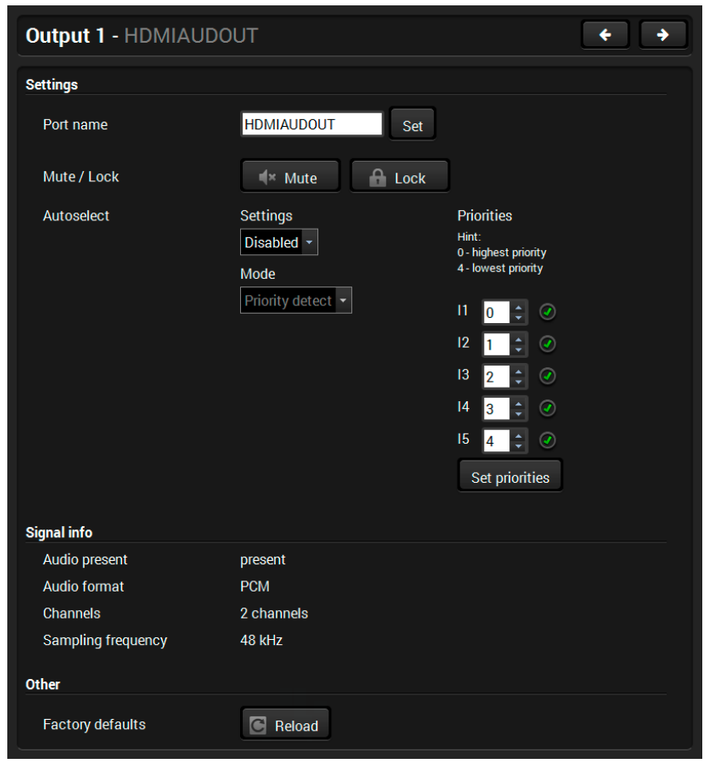
- Mute/unmute the port;
- Lock/unlock the port;
- **Autoselect settings**: enable / disable, mode, and priorities. (See more details about Autoselect feature in the The Autoselect Feature section);
- **Signal type**: Auto / DVI / HDMI 24 bit / HDMI 30 bit / HDMI 36 bit - The outgoing signal format can 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;
- Frame Detector;
- Reloading factory default settings for the selected port.

In UMX-HDMI-140-Plus model:

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

5.5.7. Audio Output

Certain parameters of the digital audio output signal can be set as follows:



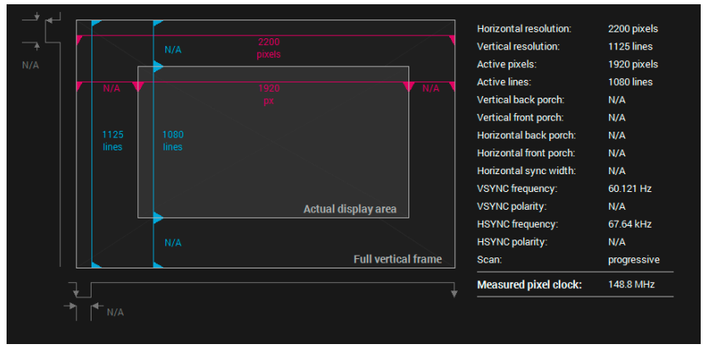
Port properties window of the HDMI audio output

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);
- Reloading factory default settings for the selected port.

5.5.8. 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.



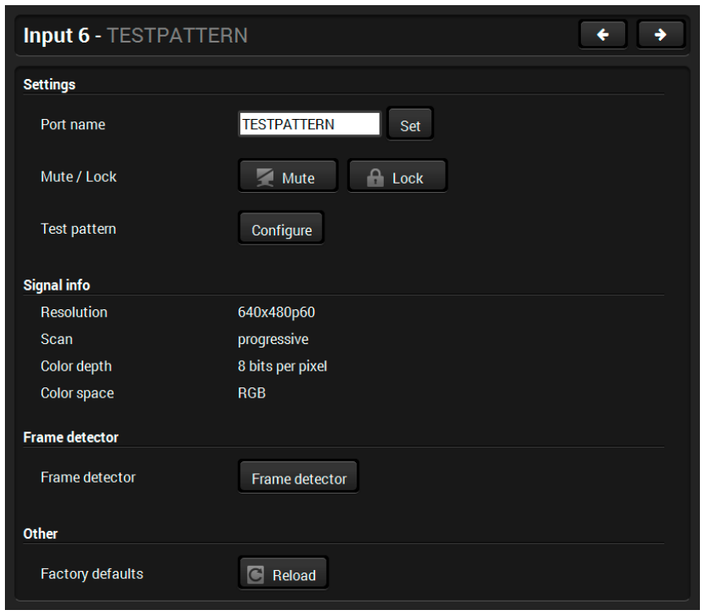
Frame detector window

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 more easy to use. Actual display area shows the active video size (light grey). 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 actually on the signal and not retrieved only from the HDMI info frames.

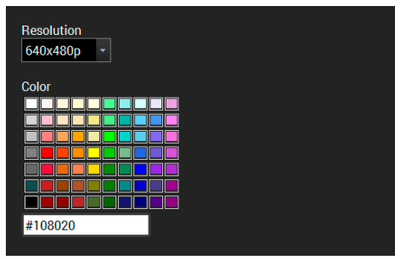
5.5.9. Test Pattern

The port generates an image which 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.



Port properties window of the Test pattern input

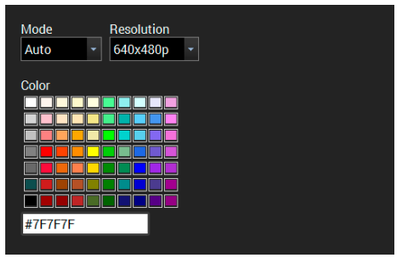
Test Pattern Configuration on Testpattern Port (I6)



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.

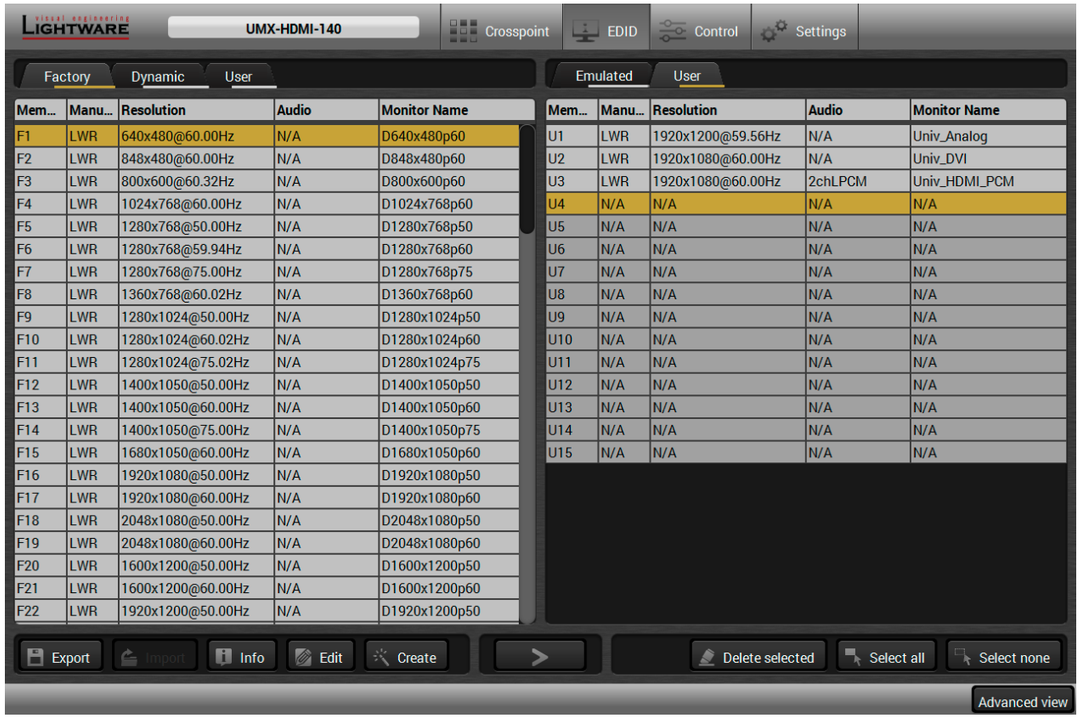
Always off: No signal is sent when there is no incoming signal.

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.

5.6. EDID Menu

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



Mem...	Manu...	Resolution	Audio	Monitor Name
F1	LWR	640x480@60.00Hz	N/A	D640x480p60
F2	LWR	848x480@60.00Hz	N/A	D848x480p60
F3	LWR	800x600@60.32Hz	N/A	D800x600p60
F4	LWR	1024x768@60.00Hz	N/A	D1024x768p60
F5	LWR	1280x768@50.00Hz	N/A	D1280x768p50
F6	LWR	1280x768@59.94Hz	N/A	D1280x768p60
F7	LWR	1280x768@75.00Hz	N/A	D1280x768p75
F8	LWR	1360x768@60.02Hz	N/A	D1360x768p60
F9	LWR	1280x1024@50.00Hz	N/A	D1280x1024p50
F10	LWR	1280x1024@60.02Hz	N/A	D1280x1024p60
F11	LWR	1280x1024@75.02Hz	N/A	D1280x1024p75
F12	LWR	1400x1050@50.00Hz	N/A	D1400x1050p50
F13	LWR	1400x1050@60.00Hz	N/A	D1400x1050p60
F14	LWR	1400x1050@75.00Hz	N/A	D1400x1050p75
F15	LWR	1680x1050@60.00Hz	N/A	D1680x1050p60
F16	LWR	1920x1080@50.00Hz	N/A	D1920x1080p50
F17	LWR	1920x1080@60.00Hz	N/A	D1920x1080p60
F18	LWR	2048x1080@50.00Hz	N/A	D2048x1080p50
F19	LWR	2048x1080@60.00Hz	N/A	D2048x1080p60
F20	LWR	1600x1200@50.00Hz	N/A	D1600x1200p50
F21	LWR	1600x1200@60.00Hz	N/A	D1600x1200p60
F22	LWR	1920x1200@50.00Hz	N/A	D1920x1200p50

Mem...	Manu...	Resolution	Audio	Monitor Name
U1	LWR	1920x1200@59.56Hz	N/A	Univ_Analog
U2	LWR	1920x1080@60.00Hz	N/A	Univ_DVI
U3	LWR	1920x1080@60.00Hz	2chLPCM	Univ_HDMI_PCM
U4	N/A	N/A	N/A	N/A
U5	N/A	N/A	N/A	N/A
U6	N/A	N/A	N/A	N/A
U7	N/A	N/A	N/A	N/A
U8	N/A	N/A	N/A	N/A
U9	N/A	N/A	N/A	N/A
U10	N/A	N/A	N/A	N/A
U11	N/A	N/A	N/A	N/A
U12	N/A	N/A	N/A	N/A
U13	N/A	N/A	N/A	N/A
U14	N/A	N/A	N/A	N/A
U15	N/A	N/A	N/A	N/A

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		

5.6.1. 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 with a yellow cursor.

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:

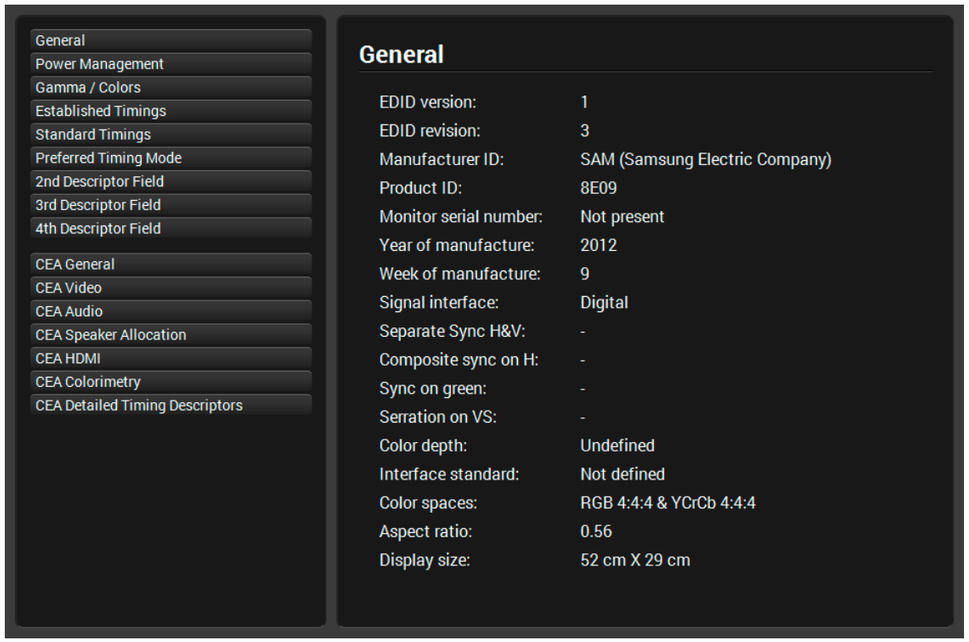
Step 1. Press **User** button on the top of the Destination panel.

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).

5.6.2. EDID Summary Window

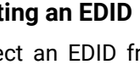
Select an EDID from Source panel and press **Info** button to display EDID summary.

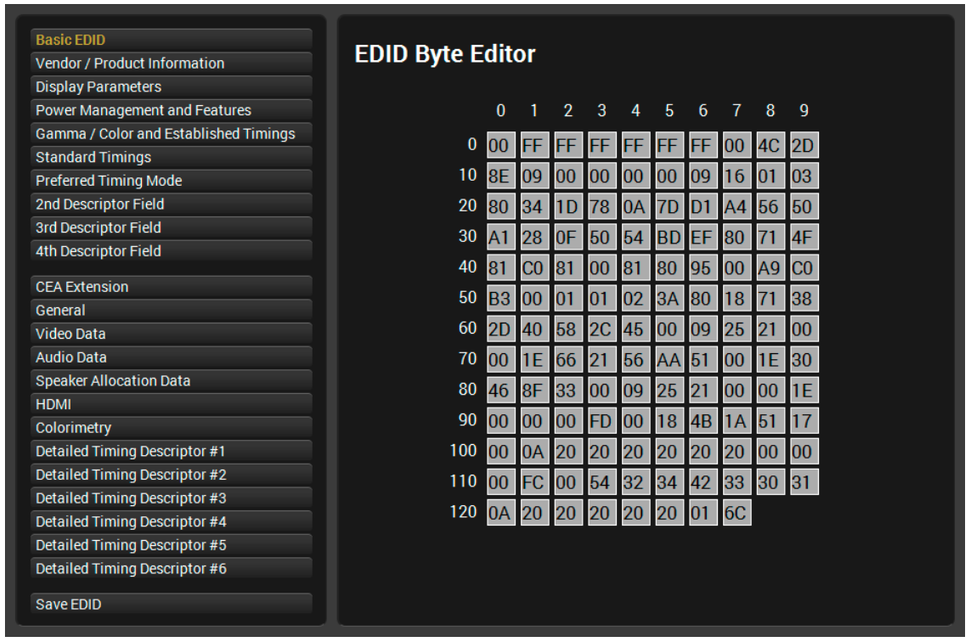


EDID Summary Window

5.6.3. 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, which 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 EDID Editor user's manual.

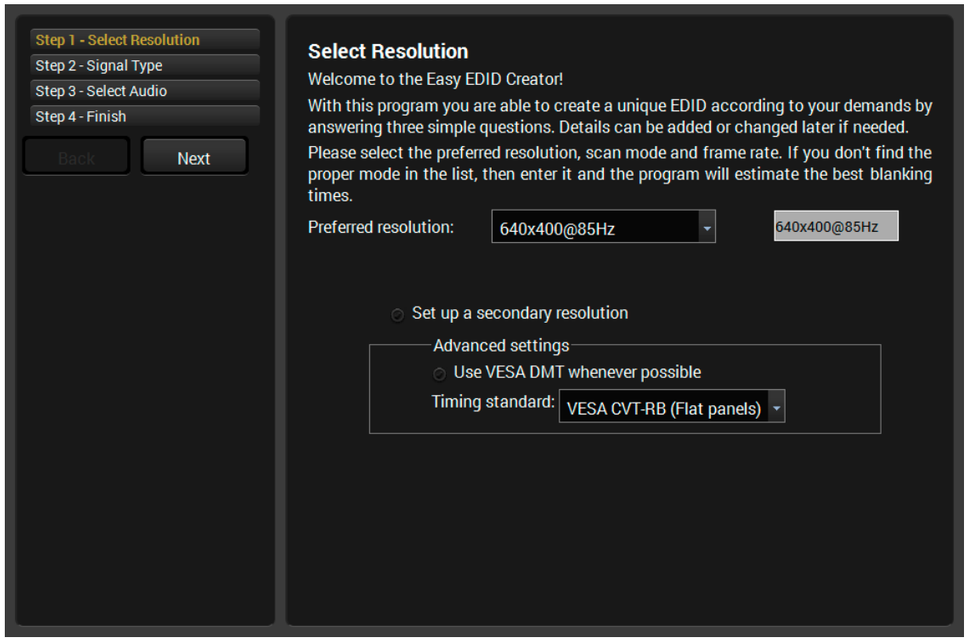




EDID Editor Window

5.6.4. Creating an EDID - Easy EDID Creator

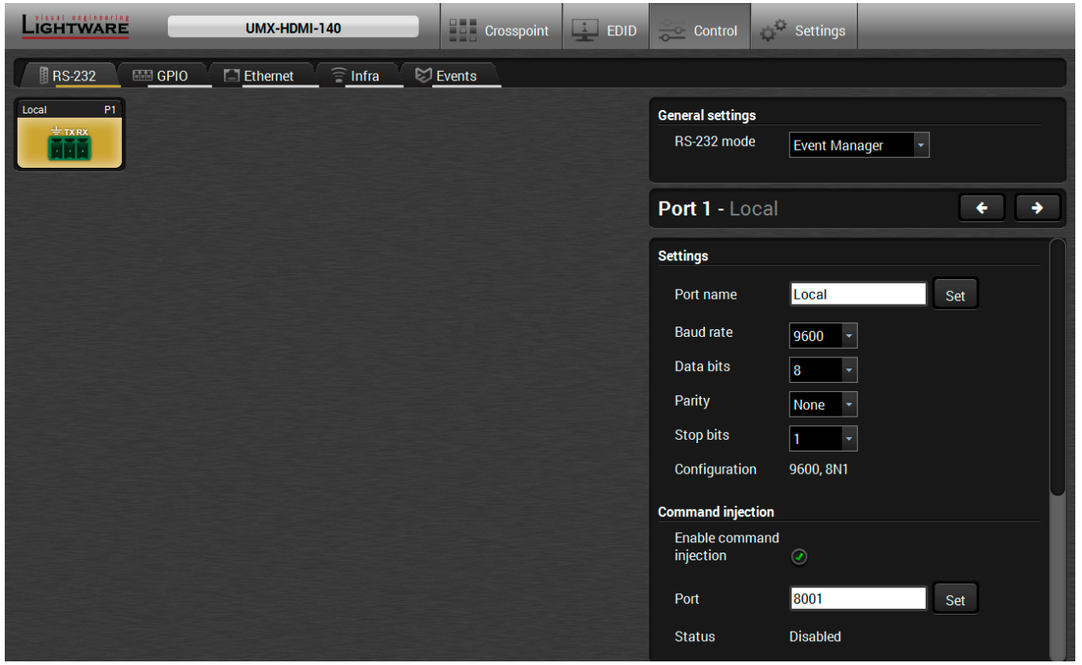
Since above mentioned Advanced EDID Editor needs more complex knowledge about EDID, Lightware introduced a wizard-like interface for fast and easy EDID creation. With Easy EDID Creator it is possible to create custom EDIDs in four simple steps. By clicking on the **Create** button below Source panel,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



EDID Creator Window

5.7. Control Menu

5.7.1. RS-232



RS-232 tab in Control menu

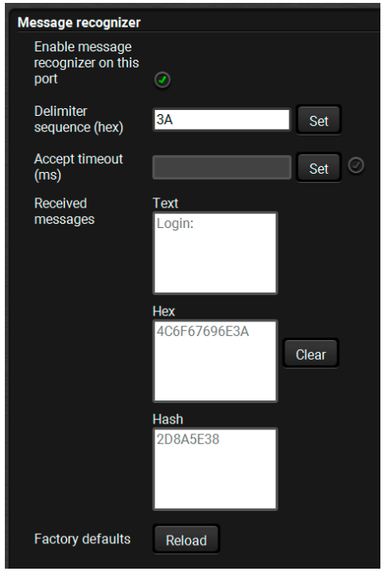
The following settings and functions are available on the local RS-232 port:

- Operation mode: Control, Command Injection, or Event Manager (for more details about serial interface modes see the Serial Interface section);
- 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).

5.7.2. Message Recognizer

INFO: 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 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 is elapsed 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.

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 login 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. These stored content can be set as a condition in the event manager.

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

Step 3. Set the Active timeout 100. This property is responsible for erasing the temporary storage (ActiveRx, ActiveRxHex, ActiveHash) after the elapsing time. In the below example, it can be seen how does 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 is elapsed, so the values of the Active- prefixed properties are deleted.

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

◂ VC codec: **Password:**

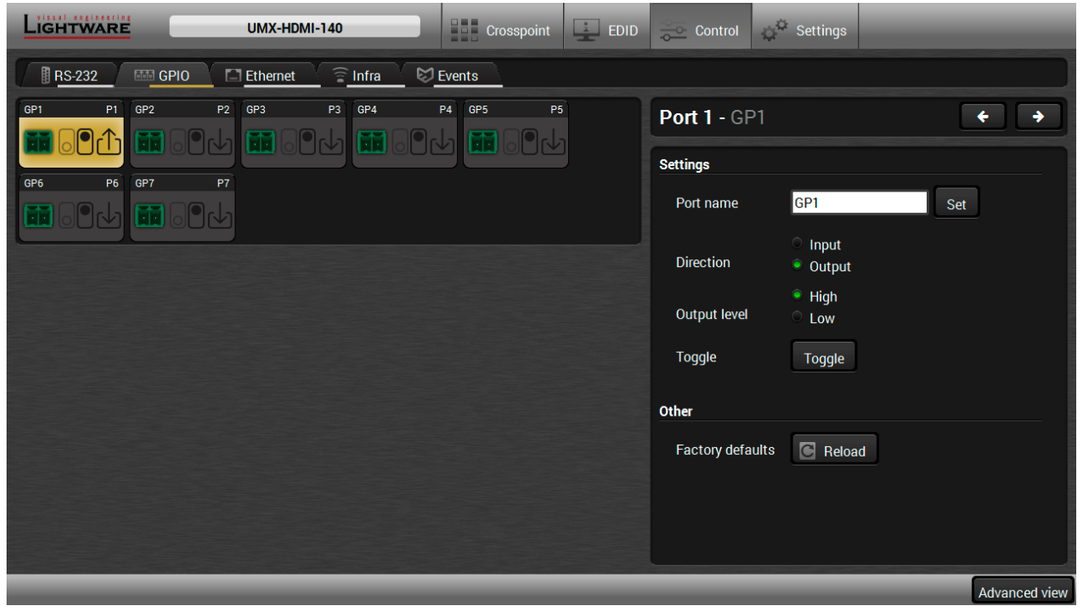
Rx	RxHex	Hash	ActiveRx	ActiveRxHex	ActiveHash
Password:	50617373776F72643A	79059B26	Password:	50617373776F72643A	79059B26

▸ UMX-HDMI-140-Plus: **Admin**

Active timeout is elapsed, so the values of the Active- prefixed properties are deleted.

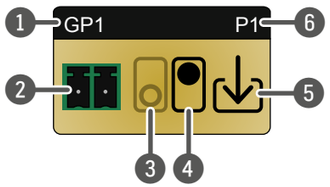
Rx	RxHex	Hash	ActiveRx	ActiveRxHex	ActiveHash
Password:	50617373776F72643A	79059B26			

5.7.3. GPIO



GPIO tab in Control menu

The GPIO port has 7 pins, which 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:



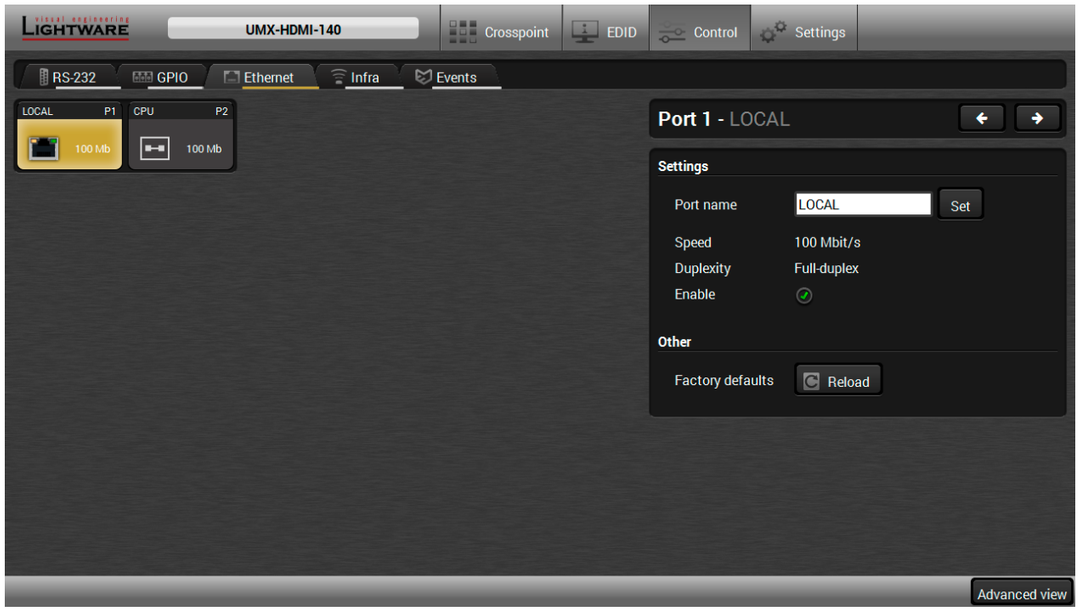
1. GPIO pin name
2. GPIO port icon
3. Low level indicator
4. High level indicator *
5. Pin direction:
   Input: down arrow
   Output: up arrow
6. GPIO port number

* Highlighted with black means the current setting.

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

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

5.7.4. Ethernet



Ethernet tab in Control menu

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

The following settings are available for the local port:

- Enable / disable the port;
- Reloading factory defaults.

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

INFO: CPU Ethernet port cannot be disabled.

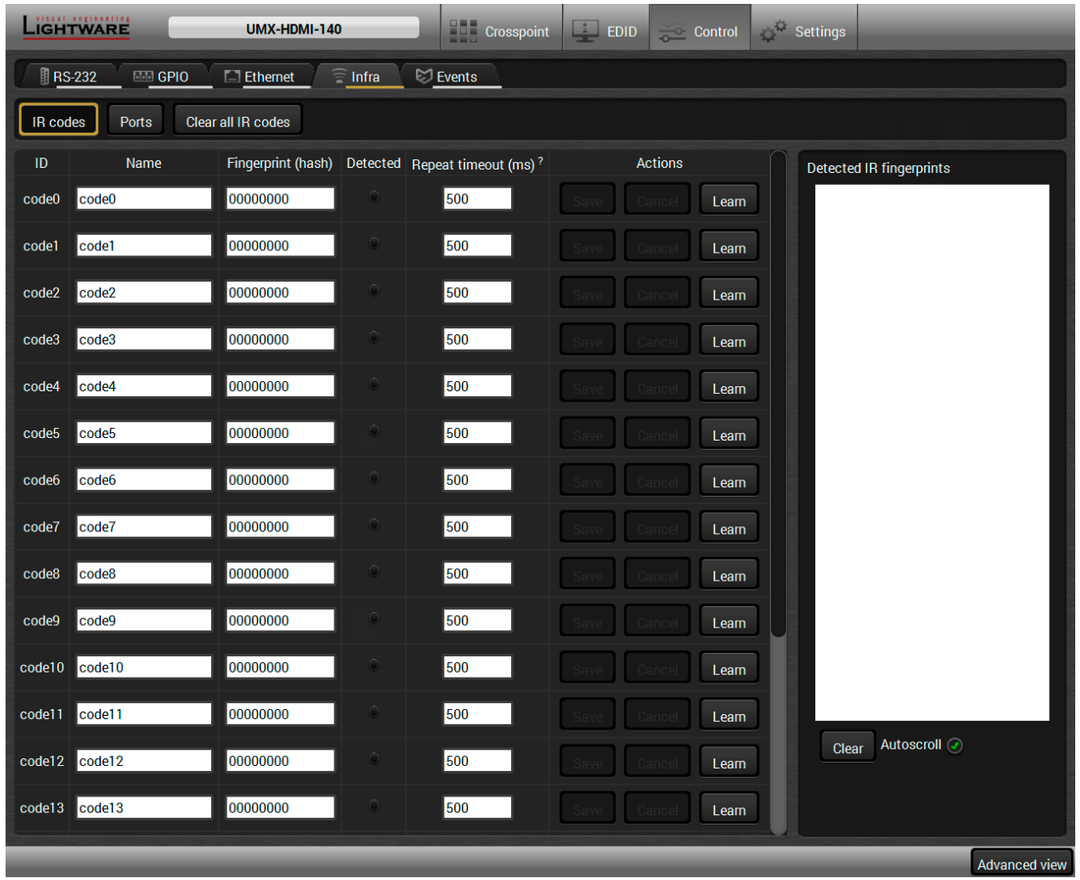
5.7.5. Infra

> **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 are available under it: **IR codes**, **Ports**, and **Clear all IR codes**.

IR Codes

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



IR codes window in 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 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**: canceling the fingerprint. **Learn**: learning the detected IR code.
Detected IR fingerprints	You can check the detected IR codes in this panel. Pushing **Clear** button deleting all current fingerprints and switch on or off the automatic scrolling with the **Autoscroll** pipe.

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

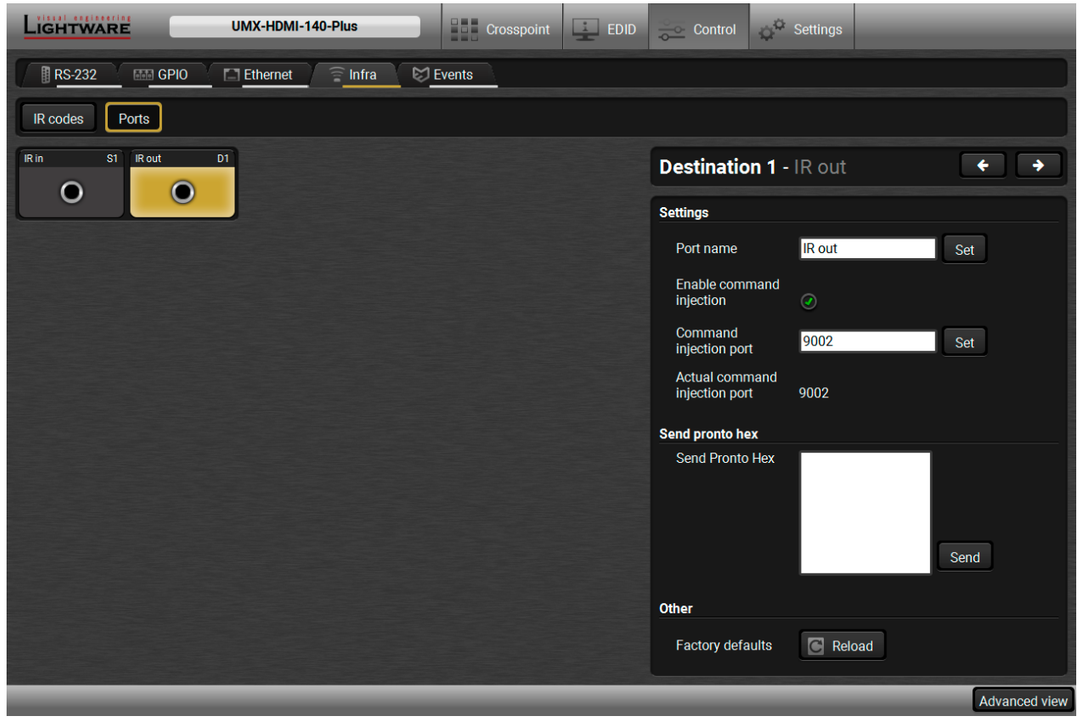
Step 3. Turn the remote controller to the IR detector. A pop-up window appears in LDC - press your remote button to learn.

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



The user can set the name and command injection port to each sources and destinations. 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 prontohex 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 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 Sending Pronto Hex Codes in Little-endian Format via IR Port section.

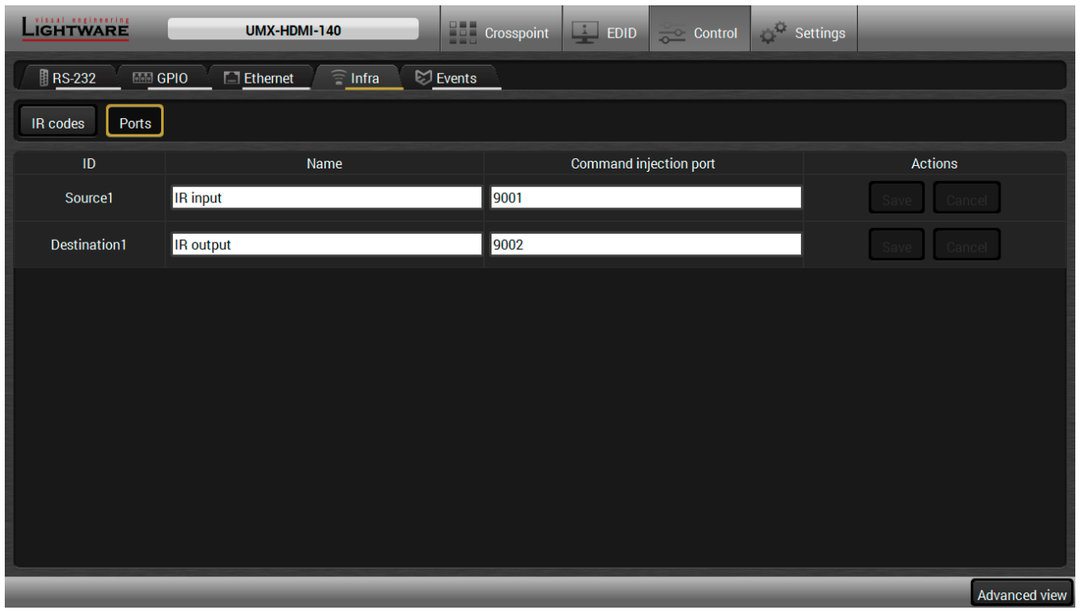
This entry field does not store the code. The code can be saved into the action in the event manager with the following parameters: **Category:** Infra; **Expression:** Send pronto hex**; Port:** D1; **Pronto hex:** <custom_code>

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 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 sources and destinations. For more details about IR interface see the IR Interface section.



Infra tab - Ports Window

Clear all IR codes

Clicking on the button results deleting all stored IR fingerprints.

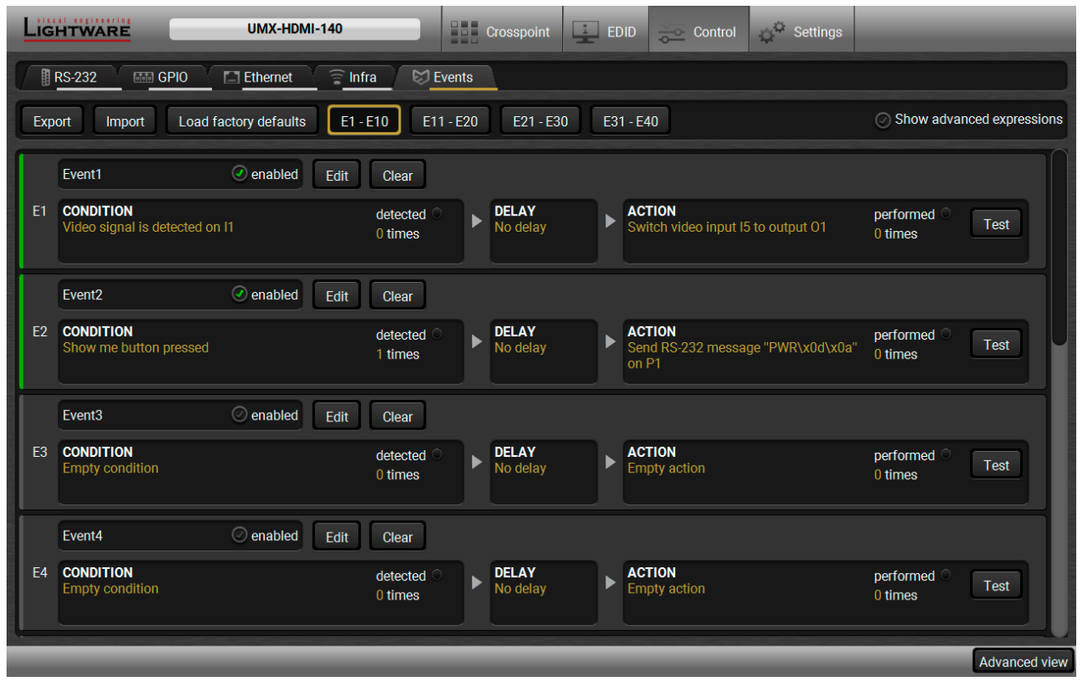
5.8. Event Manager

The feature means that the device can sense changes on its ports and 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 present or HDCP active) are necessary to display but it is not easy when the device is hard to access (e.g. built under the desk).

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 Control/Events tab, or by LW3 protocol commands. Configurable events number depends on the device what you are using actually.

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 implemented. The Event editor can be opened by pressing the **Edit** button at each Event.

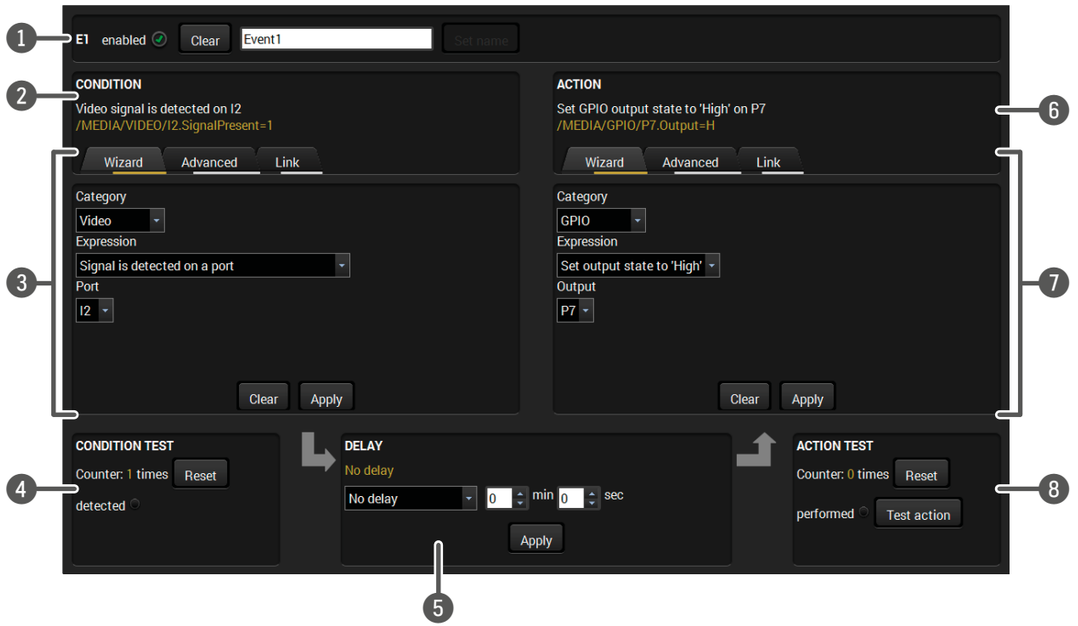
There is a **grey bar** on the left of the Event panel in each line. If a condition and an action are set and the Event is enabled, the bar is displayed **in green**.



Control menu, Event Manager tab

5.8.1. The Event Editor

Press the **Edit** button in the desired Event line to open the Event editor window.

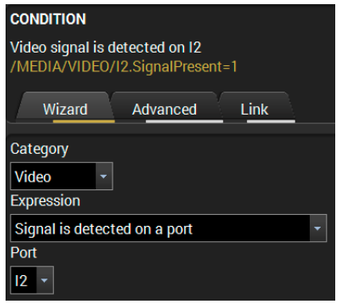


1	**Event header**	The name of the Event is displayed. Type the desired name and press the Set name button. The Event can be cleared by the Clear button. Use the tick mark to enable/disable the Event.
2	**Condition header**	If the condition is set, the description (white colored text) and the exact LW3 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 to set the condition. The parameters and settings are displayed below the buttons.
4	**Condition test**	The set condition can be tested to see the working method in the 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 to set 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 the practice.

5.8.2. 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.

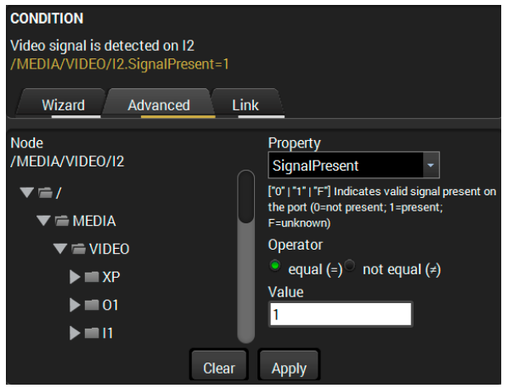
Step 2. The wizard mode is displayed as default. Select the desired **Category** first (e.g. Audio or Video).

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

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

Advanced Mode

The goal of this mode is the same as 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.

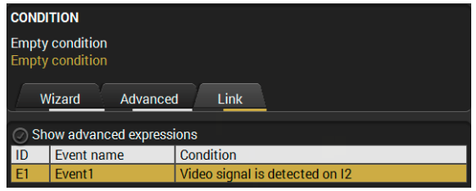
Step 2. The wizard mode is the default, press the **Advanced** button. The LW3 protocol tree is displayed showing the list of the properties in the drop-down menu. Navigate to the desired node.

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

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

The Link Tool

The new interface allows creating more actions to the same condition. In that case, a condition can trigger more 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 as default, press the **Link** button.

Step 3. All the saved Events are analyzed and the **conditions** are listed (it takes some seconds to finish). The **Show advanced expressions** option allows showing the exact path and set the value of the given property.

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

5.8.3. Special Tools and Accessories

The Name of the Event

The name of a port can be changed by typing the new name and clicking 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 setting 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 if the set condition is detected and how many times. The **Counter** can be reset by the button in Event editor. If the Condition is true, the **detected** mark turns green for two seconds and the **Counter** is increased.

Testing the Action

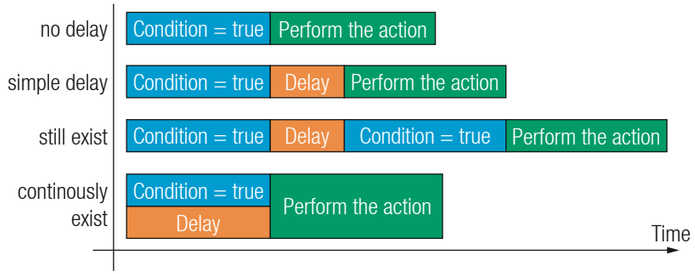
The method is the same as testing the Condition, but in this case, the Action can be triggered manually by pressing the **Test** button.

> 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 below settings:

- **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 exists**: when the Condition is detected, the Action is launched after the set time interval only if the Condition still exists.
- **Continuously exists**: 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: **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 Link tool is used.

5.8.4. 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.

5.8.5. 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.

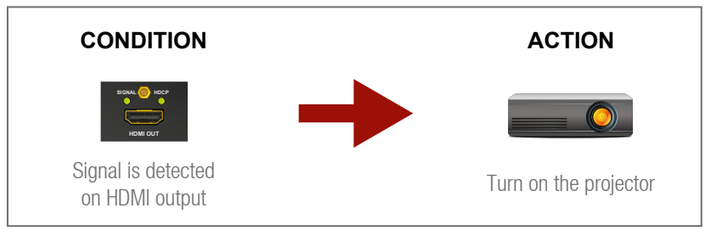
5.8.6. Event Creating - Example

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

The Concept

The UMX-HDMI-140 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.

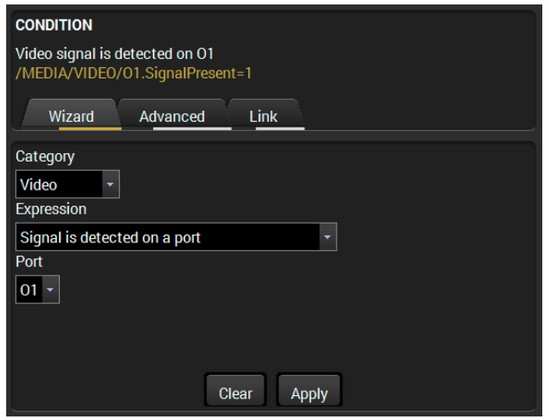
The task is to turn on the projector when signal is detected on the HDMI output port.



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 set exactly the same which 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: Event Manager. See the relevant LDC settings in the RS-232 section.

Setting the Event



You can create the Event in the Wizard in few simple steps:

Step 1. Set the condition.

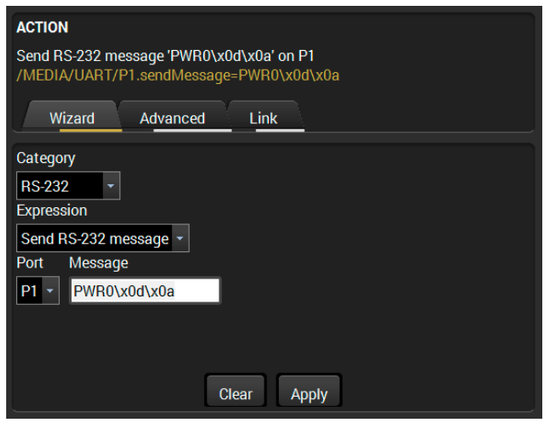
Select the required parameters to set the condition:

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

Click on the **Apply** button to complete the procedure. When it is done, 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>

For this instance 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:

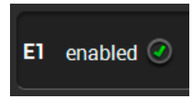
<command$_1$><\x0d\x0a><command$_2$><\x0d\x0a>...
...<command$_n$><\x0d\x0a>

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.

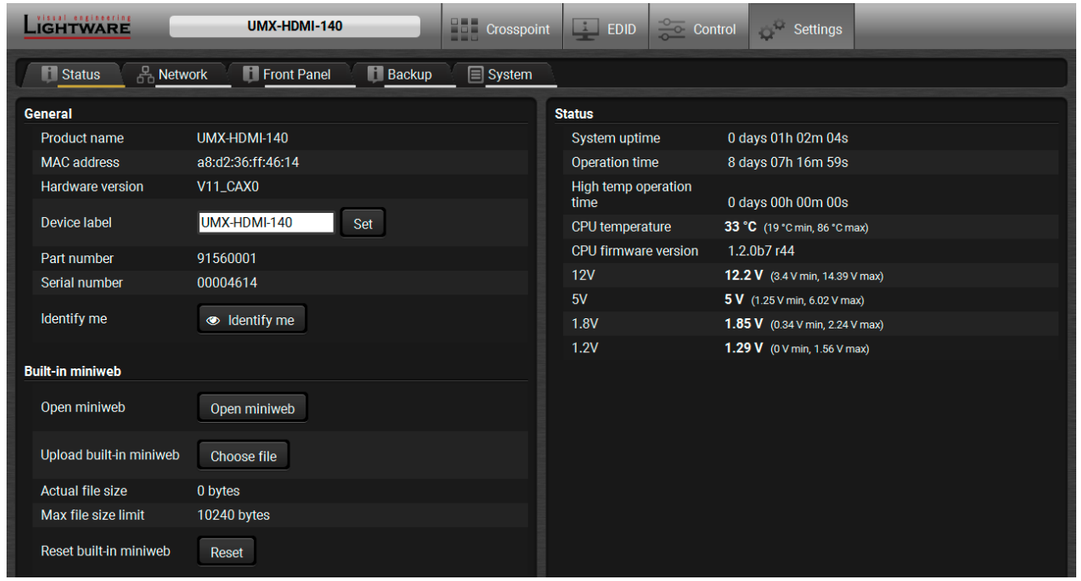


Select the **E1 enabled** pipe in upper left corner to set the Event as launched.

INFO: If you do not find the required category/expression/etc what 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 either as a condition.

5.9. Settings Menu

5.9.1. Status



Status tab in 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 unique description by the **Set** button.

5.9.2. Built-in Miniweb

The built-in website makes possible to connect to the device, and query status information with a web browser.

System requirements for operating systems: Microsoft Windows XP, Windows Vista, Windows 7, Windows 10, macOS, Linux.

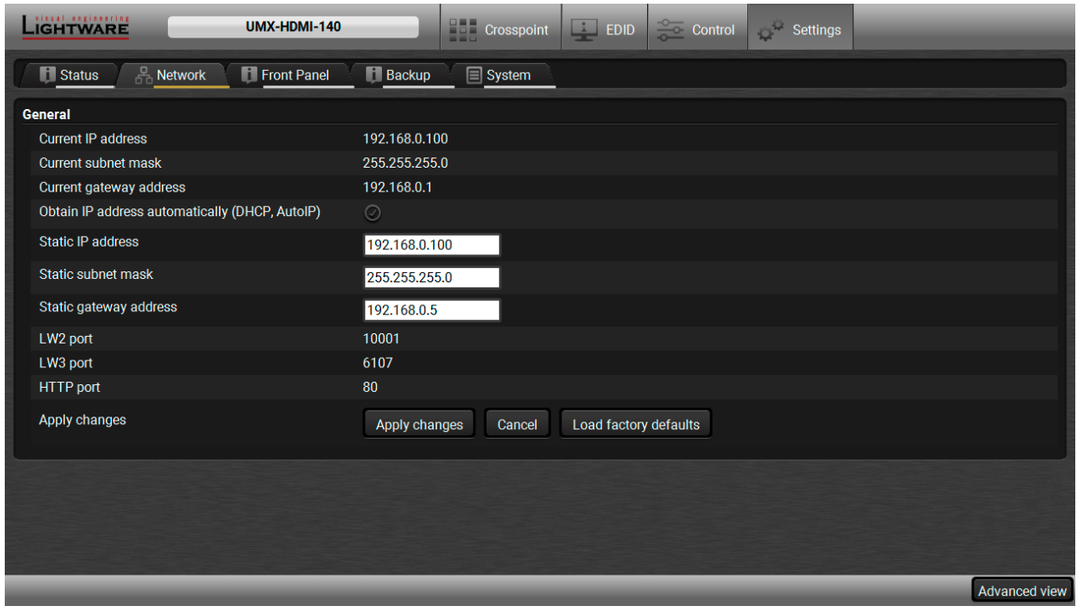
Compatible web browsers: Mozilla Firefox, Google Chrome, Apple Safari.

> **ATTENTION!** Please be sure that the computer is in the same network as the UMX-HDMI-140. If the computer has multiple Ethernet connections (for example Wi-Fi and LAN connections are used simultaneously) you will have to know the IP address for the one, that is used for controlling the switcher.

The built-in website can be easily reached by clicking the **Open the miniweb** button (or write the IP address of the device in the search bar of the web browser).

The .html file of the built-in web can be changed by clicking on **Choose file** button. Clicking on the **Reset** button restores the default .html file.

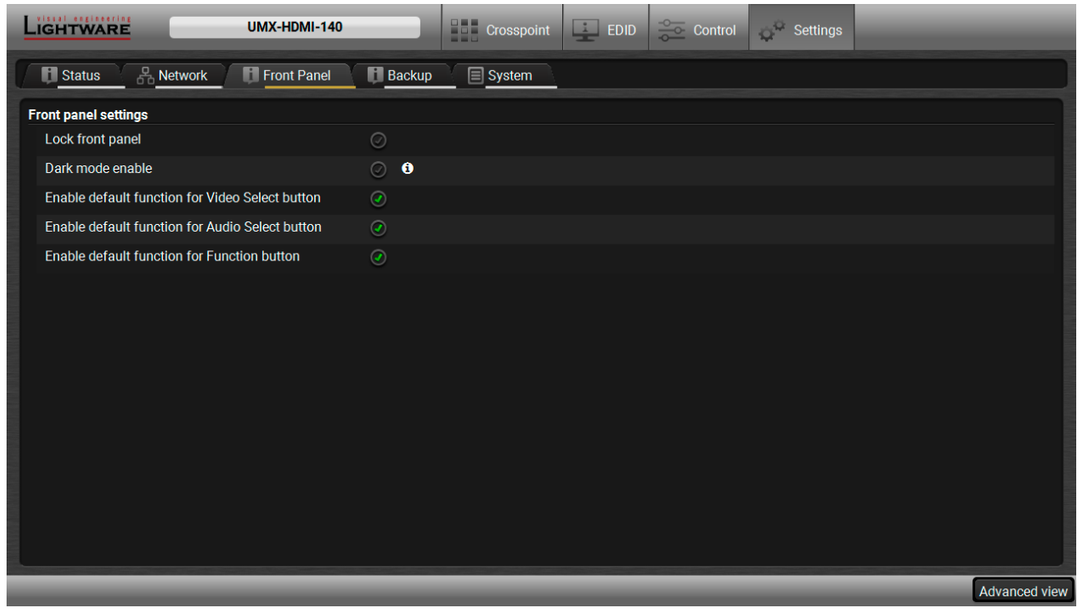
5.9.3. Network



Network tab in Settings menu

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

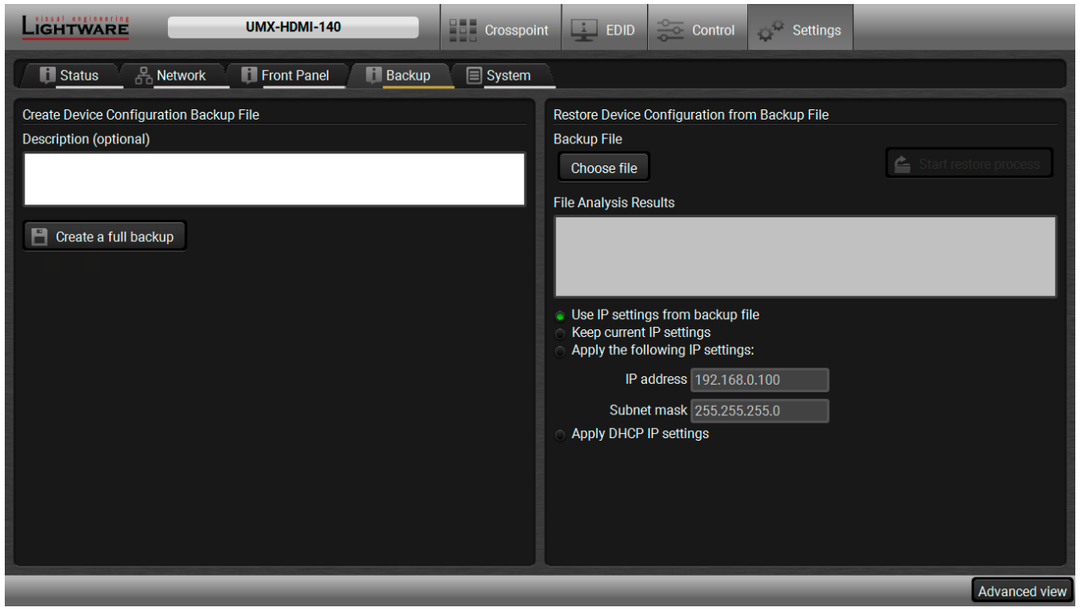
5.9.4. Front Panel



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

- You can disable the functionality of the front panel buttons with marking the **Lock front panel** option. This is same method of the control lock made by the front panel buttons. See the details in the Control Lock section.
- Dark mode enable/disable: video and audio LEDs on the front panel are turned off 60 seconds after enabling the dark mode.
- 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 function by the Event Manager. This setting is also available via LW3 protocol, for more details see Disable the Default Function of the Front Panel Buttons section.

5.9.5. Backup (Configuration Cloning)



Backup tab

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.

5.9.6. 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 which 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.

5.9.7. 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 which 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.

5.9.8. Upload the Settings to a Device (Restore)

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

> **ATTENTION!** The cloning is successful when 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** to the desired file.

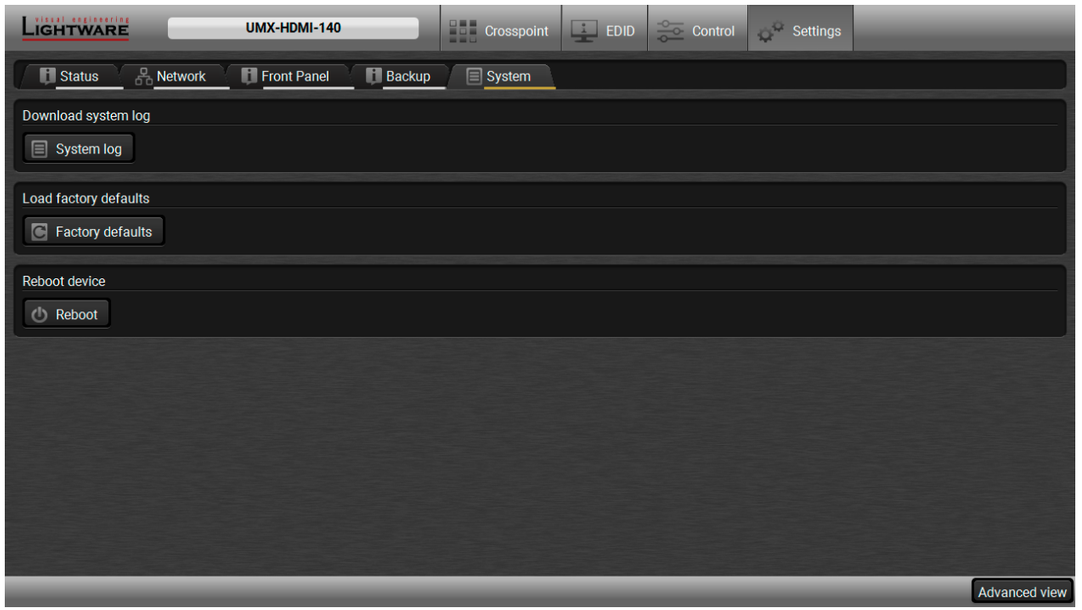
Step 3. The file is verified and the result will be displayed in the textbox below. If the file is correct, then the settings can be restored.

Step 4. Choose **IP settings** what 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. Press the **Start restore process** button and click on the **Yes** button when asked.

Step 6. Reboot the device to apply the network settings after finishing.

5.9.9. System

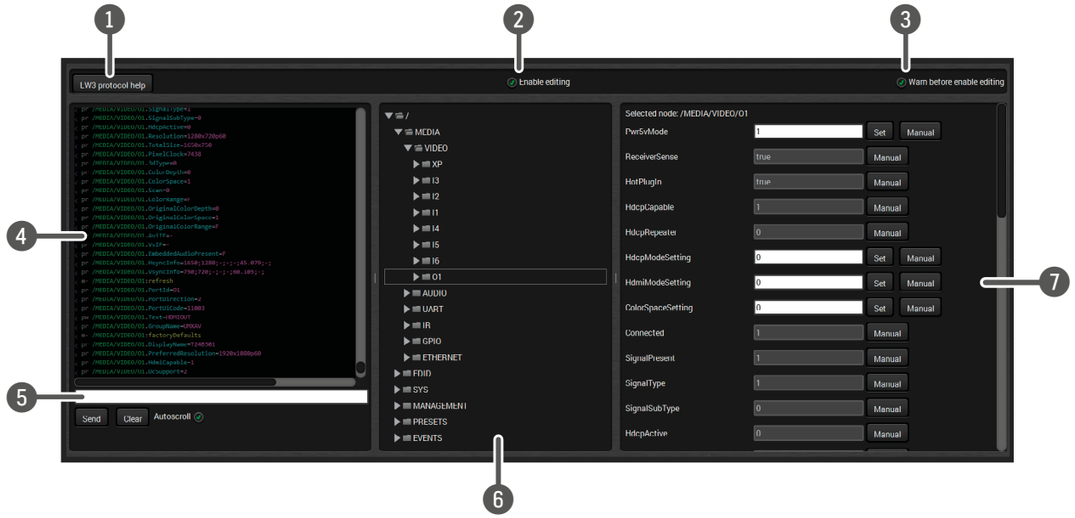


System tab in Settings menu

Three functions are available under System tab:

- **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.

5.10. Advanced View Window



1	**LW3 protocol help**	Pushing the button results 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, tick the option. You will be prompted to confirm your selection.
3	**Warning mode**	If this pipe 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.
6	**Protocol tree**	LW3 protocol tree; select an item to see its content.
7	**Node list**	Correspondent parameters and nodes are shown which are connected to the selected item in the protocol tree. **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. LW2 Protocol Description

The device accepts commands surrounded by curly brackets - { } - and responds data surrounded by round brackets - ( ) - only if a command was successfully executed.

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
<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.)
<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

6.2. General LW2 Commands

6.2.1. View Product Type

Description: The device responds its name.

Format	Example
Command {i} Response (I:<PRODUCT_TYPE>)CrLf	→ {i} ← (I:UMX-HDMI-140)

Explanation: The connected device is a UMX-HDMI-140.

Legend: <PRODUCT_TYPE> shows type.

6.2.2. Query Control Protocol

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

Format	Example
Command {P_?} Response (CURRENT●PROTOCOL●=●#<protocol>) CrLf	→ {P_?} ← (CURRENT PROTOCOL = #1)

Explanation: The device communicates with LW2 protocol.

6.2.3. View Firmware Version of the CPU

Description: View the CPU firmware revision.

Format	Example
Command {f} Response (FW:<FW_VER><s>)CrLf	⟶ {f} ⟵ (FW:1.0.0b4 r5)

Legend: <FW_VER> is the firmware version. It is followed by <s> string which may indicate special versions.

6.2.4. Connection Test

Description: Simple test to see if the connection is established successfully.

Format	Example
Command {PING} Response (PONG!)CrLf	⟶ {ping} ⟵ (PONG!)

6.2.5. View Serial Number

Description: The device responds its 8-digit serial number.

Format	Example
Command {s} Response (SN:<SERIAL_N>)CrLf	⟶ {s} ⟵ (SN:5A003192)

6.2.6. Compile Time

Description: Returns the date, when the microcontroller firmware was compiled.

Format	Example
Command {CT} Response (Complied: <DATE&TIME>)CrLf	⟶ {ct} ⟵ (Compiled: Feb 28 2017 14:02:43)

6.2.7. View Installed Board

Description: Shows the hardware name and revision of the installed card.

Format	Example
Command {is} Response (SL#●0●<MB_DESC>)CrLf (SL●END)CrLf	⟶ {is} ⟵ (SL# 0 UMX-HDMI-140 V10_BAA0) ⟵ (SL END)

Explanation: The device reports its motherboard (slot 0).

6.2.8. View Firmware for All Controllers

Description: Shows the firmware versions of all installed controllers.

Format	Example
Command {FC} Response (CF●<DESC>)CrLf (CF●<DESC>)CrLf … (CF END)CrLf	⟶ {fc} ⟵ (CF UMX-HDMI-140 1.0.0b4 r5) ⟵ (SL END)

Explanation: The device has one control panel.

6.2.9. Restart the Device

Description: The device can be restarted without unplugging power.

Format	Example
Command {RST} Response	⟶ {rst}

Explanation: The device reboots; no response is sent in this case.

6.2.10. Query Health Status

Description: Internal voltages and measured temperature values are shown.

Format	Example
Command {ST} Response (ST●<DESC>)CrLf	⟶ {st} ⟵ (ST CPU 12.05V 4.99V 1.85V 1.28V 35.75C 35.69C)

6.2.11. Restore Factory Default Settings

Description: Settings can be reset to factory default values as follows:

Format	Example
Command {FACTORY=ALL} Response (FACTORY ALL…)CrLf	⟶ {factory=all} ⟵ (FACTORY ALL…)

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

6.3. A/V Port Settings

6.3.1. Switch an Input to the Output

Following commands with <A/V/AV> option can take effect in multiple layers, according to their parameters. Depending on 'A' or 'V' it can change only the Audio or only the Video layer; or 'AV' changes both.

> INFO: <A/V/AV> option usually can be skipped for legacy purposes. In this case, the devices change all (Video & Audio) layers but using status commands it displays information about only the Video layer. Please use AV option, when available.

Description: Switch input <in> to output <out>.

Format	Example
Command {<in>@<out>●<layer>} Response (O<out²>●I<in²>●<layer>)CrLf	→ {2@1 AV} ← (O01 I02 AV)

Explanation: I2 audio and I2 video input ports are switched to O1 output port.

Legend:

<layer>	Layer
A	Audio layer
V	Video layer
AV (or nothing)	Audio & Video layer

<out>: O1 output port.

<in>: I1...I5 input ports.

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

> **ATTENTION!** Analog video inputs does not contain embedded audio. If you use the AV option in case of VGA input (I1) the audio will be switched to the analog audio input 1 (I1) and in case of DVI-A input (I5) the audio will be switched to the analog audio input 2 (I5).

6.3.2. Mute Output

Description: Mute output <out>. The output signal is turned off.

Format	Example
Command {#<out>●<layer>} Response (1MT<out²>●<layer>)CrLf	→ {#01 A} ← (1MT01 A)

Explanation: O1 audio port is muted.

> **ATTENTION!** Muting does not change the crosspoint's state 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.

6.3.3. Unmute Output

Description: Unmute output <out>.

Format	Example
Command {+<out>●<layer>} Response (0MT<out²>●<layer>)CrLf	→ {+01 V} ← (0MT01 V)

Explanation: O1 video port is 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.

6.3.4. Lock Output

Description: Lock an output port. Output's state cannot be changed until unlocking.

Format	Example
Command {#><out>●<layer>} Response (1LO<out²>●<layer>)CrLf	→ {#>01 A} ← (1LO01 A)

Explanation: O1 audio output port is locked.

6.3.5. Unlock Output

Description: Unlock an output port. The connection on output can be changed.

Format	Example
Command {+<<out>●<layer>} Response (0LO<out²>●<layer>)CrLf	→ {+<01 V} ← (0LO01 V)

Explanation: O1 video output port is unlocked.

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

6.3.6. View Connection State on the Output

Description: Viewing the crosspoint state of the device; showing the input port numbers connected to the outputs.

Format	Example
Command {VC●<layer>} Response (ALL<layer>●<O01>●<O02>)CrLf	→ {VC AV} ← (ALLV 02) ← (ALLA 05)

Legend: O01 shows the corresponding output's connection state.

<layer>	Layer
A	Audio layer
V	Video layer
AV *	Audio & Video layer

* AV is not used in the response. When AV is typed in the commands, the response will result two lines, one for the Video and one for the Audio port states.

State letters:

Letter	State	Example
L	Output is locked	L01
M	Output is muted	M01
U	Output is locked and muted	U01

Explanation: I2 video input port is connected to the video output port and I5 audio input port is connected to the audio output port.

6.3.7. View Crosspoint Size

Description: Shows the physical crosspoint size.

Format	Example
Command {getsize●<layer>} Response (SIZE=<size>●<layer>)CrLf	→ {GETSIZE AV} ← (SIZE=6x1 V) ← (SIZE=5x1 A)

Legend:

<size>: <number of inputs>x<number of outputs>
<layer>: See details in the previous section.

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.

6.3.8. Change Video Autoselect Mode

Description: The autoselect mode of the video outputs can be changed.

Format	Example
Command {AS_V<out>=<state>;<mode>} Response (AS_V<out>=<state>;<mode>)CrLf	→ {as_v1=E;P} ← (AS_V1=E;P)

Legend: The output numbers are listed in Input/Output Port Numbering section.

Letter	<state>
F	First detect mode
P	Priority detect mode
L	Last detect mode

Letter	<mode>
E	Autoselect mode is enabled
D	Autoselect mode is disabled

Explanation: The Autoselect mode of video output1 (and output 2) is enabled and set to Priority mode.

INFO: The Autoselect mode can be queried by typing the "as_v<out>=?" command.

6.3.9. Change Audio Autoselect Mode

Description: The autoselect mode of the audio outputs can be changed.

Format	Example
Command {AS_A<out>=<state>;<mode>} Response (AS_A<out>=<state>;<mode>)CrLf	→ {as_a1=E;P} ← (AS_A1=E;P)

Legend: The output numbers are listed in Input/Output Port Numbering section.

Letter	<state>
F	First detect mode
P	Priority detect mode
L	Last detect mode

Letter	<mode>
E	Autoselect mode is enabled
D	Autoselect mode is disabled

Explanation: The Autoselect mode of audio output1 (and output 2) is enabled and set to Priority mode.

INFO: The Autoselect mode can be queried by typing the "as_v<out>=?" command.

6.3.10. Change the Video Input Priorities

Description: The settings of video input priority can be changed as follows.

Format	Example
Command {PRIO_V<out>=<in^1_prio>; <in^2_prio>;...;<in^n_prio>} Response (PRIO_V<out>=<in^1_prio>; <in^2_prio>;...;<in^n_prio>)CrLf	→ {prio_v1=1;0;2;3;4;5} ← (PRIO_V1=1;0;2;3;4;5)

Legend:

<out>:	The output port number: V1/V2.
<in1_prio>...<inn_prio>:	Priority number of the input ports. See more details about port numbering in the Input/Output Port Numbering section.

Explanation: Input 2 has the highest priority (0), Input 1 has the second highest (1). Input 6 has the lowest priority (5).

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

INFO: In this case, the outputs are linked; the change will affect both local and fiber optical output ports.

INFO: The video priorities can be queried by typing the “prio_v<out>=?” command.

6.3.11. Change Audio Input Priority

Description: The settings of video input priority can be changed as follows.

Format	Example
Command {PRIO_A<out>=<in^1_prio>; <in^2_prio>;...;<in^n_prio>} Response (PRIO_A<out>=<in^1_prio>; <in^2_prio>;...;<in^n_prio>)CrLf	→ {prio_a1=1;0;2;3;4} ← (PRIO_A1=1;0;2;3;4)

Legend:

<out>:	The output port number: A1/A2.
<in1_prio>...<inn_prio>:	Priority number of the input ports. See more details about port numbering in the Input/Output Port Numbering section.

Explanation: Input 2 has the highest priority (0), Input 1 has the second highest (1). Input 5 has the lowest priority (4).

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

INFO: In this case, the outputs are linked; the change will affect both local and fiber optical output ports.

INFO: The audio priorities can be queried by typing the “prio_a<out>=?” command.

6.4. Network Configuration

6.4.1. Query the Current IP Status

Description: IP address settings can be queried as follows.

Format	Example
Command {IP_STAT=?} Response (IP_STAT=<type>; <ip_address>;<subnet_mask>;<gateway_addr>)CrLf	→ {ip_stat=?} ← (IP_STAT=0;192.168.0.100;255.255.255.0; 192.168.0.1)

Legend:

<type>:	0 = static IP; 1 = DHCP.
<ip_addr>:	IP address (four decimal octets separated by dots).
<subnet_mask>:	Subnet mask (four decimal octets separated by dots).
<gateway_addr>:	Gateway address (four decimal octets separated by dots).

Explanation: The device has a static (fix) IP address: 192.168.0.100; the subnet mask is 255.255.255.0, the gateway address is 192.168.0.1.

6.4.2. Set the IP Address

Description: IP address can be set as follows.

Format	Example
Command {IP_ADDRESS=<type>;<ip_address>} Response (IP_ADDRESS=<type>;<ip_address>)CrLf	→ {ip_address=0;192.168.0.110} ← (IP_ADDRESS=0;192.168.0.110;)

Legend: <type>: 0 = static IP; 1 = DHCP

INFO: The IP address can be queried by typing the “ip_address=?” command. The response contains the fix IP address that is stored in the device even if DHCP is enabled; in this case, this IP address is not valid.

6.4.3. Set the Subnet Mask

Description: Subnet mask can be set as follows.

Format	Example
Command {IP_NETMASK=<subnet_mask>} Response (IP_NETMASK=<subnet_mask>)CrLf	→ {ip_netmask=255.255.255.0} ← (IP_NETMASK=255.255.255.0)

Legend: <subnet_mask>: Four decimal octets separated by dots.

INFO: The subnet mask can be queried by typing the “ip_address=?” command. The response contains the fix IP subnet mask that is stored in the device even if DHCP is enabled; in this case, this IP subnet mask is not valid.

6.4.4. Set the Gateway Address

Description: Gateway address can be set as follows.

Format	Example
Command {IP_GATEWAY=<gateway_addr>} Response (IP_GATEWAY=<gateway_addr>)CrLf	⟶ {ip_gateway=192.168.0.50} ⟵ (IP_GATEWAY=192.168.0.50)

Legend: <gateway_addr>: Four decimal octets separated by dots.

> INFO: The gateway address can be queried by typing the "ip_gateway=?" command. The response contains the static IP gateway address that is stored in the device even if DHCP is enabled. In that case, the latest valid gateway address (for static IP) is stored.

6.4.5. Apply Network Settings

Description: Apply the network settings and restart the network interface.

Format	Example
Command {ip_apply} Response (IP_APPLY)CrLf	⟶ {ip_apply} ⟵ (IP_APPLY)

6.5. GPIO Configuration

6.5.1. Set Level and Direction for Each Pins

Description: GPIO pins can be configured as follows. See more details about GPIO connector in the section and about the interface in the section.

Format	Example
Command {GPIO<pin_nr>=<dir>;<level>} Response (GPIO<pin_nr>=<dir>;<level>)CrLf	⟶ {gpio1=O;H} ⟵ (GPIO1=O;H)

Legend:
<pin_nr>: GPIO pin number 1...8
<dir>: The direction of the communication, it can be input or output.
<level>: The level of the pin, it can be low or high.

Parameter <dir>	Description
I	Input
O	Output

Parameter <level>	Description
L	Low
H	High
T	Toggle

Explanation: GPIO pin 1 is set to output with high level.

> INFO: The current GPIO pin configuration can be queried by typing the {GPIO<pin_nr>=?} command.

6.6. LW2 Commands – Quick Summary

General LW2 Commands

Operation	See in chapter	Command
View Product Type	6.2.1	{I}
Query Control Protocol	6.2.2	{P_?}
View Firmware Version of the CPU	6.2.3	{F}
Connection Test	6.2.4	{PING}
View Serial Number	6.2.5	{S}
Compile Time	6.2.6	{CT}
View Installed Board	6.2.7	{IS}
View Firmware for All Controllers	6.2.8	{FC}
Restart the Device	6.2.9	{RST}
Query Health Status	6.2.10	{ST}
Restore Factory Default Settings	6.2.11	{FACTORY=ALL}

A/V Port Settings

Operation	See in chapter	Command
Switch an Input to the Output	6.3.1	{<in>@<out>●<layer>}
Mute Output	6.3.2	{#<out>●<layer>}
Unmute Output	6.3.3	{+<out>●<layer>}
Lock Output	6.3.4	{#><out>●<layer>}
Unlock Output	6.3.5	{+<out>●<layer>}
View Connection State on the Output	6.3.6	{VC●<layer>}
View Crosspoint Size	6.3.7	{GETSIZE●<layer>}
Change Video Autoselect Mode	6.3.8	{AS_V<out>=<state>;<mode>;<no_signal>}
Change Audio Autoselect Mode	6.3.9	{AS_A<out>=<state>;<mode>;<no_signal>}
Change the Video Input Priorities	6.3.10	{PRIO_V<out>=<in_1_prio>;...;<in_n_prio>}
Change Audio Input Priority	6.3.11	{PRIO_A<out>=<in_1_prio>;...;<in_n_prio>}

Network Configuration

Operation	See in chapter	Command
Query the Current IP Status	6.4.1	{IP_STAT=?}
Set the IP Address	6.4.2	{IP_ADDRESS=<type>;IP_ADDRESS}
Set the Subnet Mask	6.4.3	{IP_NETMASK=<subnet_mask>}
Set the Gateway Address	6.4.4	{IP_GATEWAY=<gateway_address>}
Apply Network Settings	6.4.5	{IP_APPLY}

GPIO Configuration

Operation	See in chapter	Command
Set Level and Direction for Each Pins	6.5.1	{GPIO<pin_nr>=<dir>;<level>}

7

LW3 Programmers' Reference

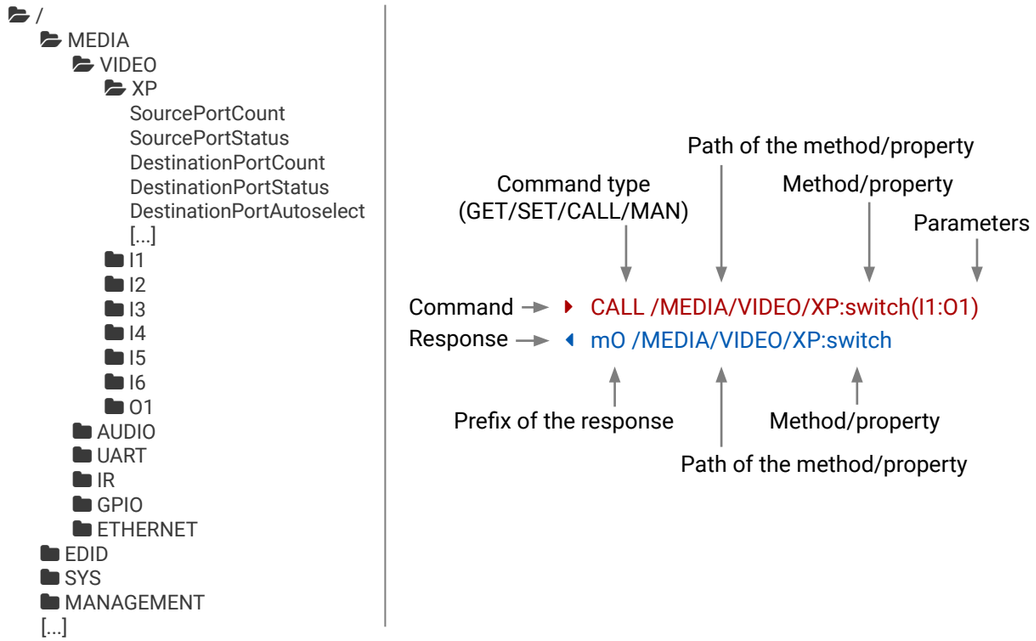
The device can be controlled through Lightware 3 (LW3) protocol commands to ensure the compatibility with other Lightware products. The supported LW3 commands are described in this chapter.

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. Protocol Rules

7.2.1. LW3 Tree Structure and Command Structure (examples)



7.2.2. 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.
- Use the **TCP port no. 6107** when using LW3 protocol over Ethernet.
- 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.

7.2.3. 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/P1
- ns /MEDIA/UART/P2
- pr /MEDIA/UART.PortCount=2
- pr /MEDIA/UART.PortUi=P1:12209;P2:12224
- pr /MEDIA/UART.P1=Local RS-232
- pr /MEDIA/UART.P2=TPS out 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 for 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

7.2.4. 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 success 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

7.2.5. 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

7.2.6. 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 which 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\(01\))**

7.2.7. 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 a 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 for 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.

7.2.8. 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.

Subscribe to a Node

- OPEN /MEDIA/VIDEO
- o- /MEDIA/VIDEO

Get the Active Subscriptions

- OPEN
- o- /MEDIA/VIDEO
- o- /EDID
- o- /DISCOVERY

Subscribe to Multiple Nodes

- OPEN /MEDIA/VIDEO/*
- o- /MEDIA/VIDEO/*

Unsubscribe from a Node

- CLOSE /MEDIA/VIDEO
- c- /MEDIA/VIDEO

Unsubscribe from Multiple Nodes

- CLOSE /MEDIA/VIDEO/*
- c- /MEDIA/VIDEO/*

7.2.9. Notifications about the Changes of the Properties

When the value of a property is changed and the user is subscribed to the node, which the property belongs to, an asynchronous notification is generated. This is notification is called as 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/VIDEO/QUALITY
- o- /MEDIA/VIDEO/QUALITY
- GET /MEDIA/VIDEO/Quality.QualityMode
- pm /MEDIA/VIDEO/QUALITY.QualityMode=graphic

Connection #1

- GET /MEDIA/VIDEO/Quality.QualityMode
- pm /MEDIA/VIDEO/QUALITY.QualityMode=graphic
- SET /MEDIA/VIDEO/Quality.QualityMode=video
- pw /MEDIA/VIDEO/QUALITY.QualityMode=video

Connection #2

- CHG /MEDIA/VIDEO/QUALITY.QualityMode=video → **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 for the subscription, the first user got a notification about the change.

7.2.10. 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>	Variable, which is defined and described in the command
<expression>	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

7.3. System Commands

7.3.1. Query the Product Name

The name of the product is a read-only parameter and cannot be modified.

Command and Response

- GET·/.ProductName
- pr·/.ProductName=<product_name>

Example

- GET /.ProductName
- pr /.ProductName=UMX-HDMI-140

7.3.2. Set 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.

Command and Response

- SET·/MANAGEMENT/UID/DeviceLabel=<custom_name>
- pw·/MANAGEMENT/UID/DeviceLabel=<custom_name>

The Device Label can be 39 character length 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

7.3.3. Query the Serial Number

Command and Response

- GET·/.SerialNumber
- pr·/.SerialNumber=<serial_nr>

Example

- GET /.SerialNumber
- pr /.SerialNumber=87654321

7.3.4. Query the Firmware Version

Command and Response

- GET·/SYS/MB.FirmwareVersion
- pr·/SYS/MB.FirmwareVersion=<firmware_version>

Example

- GET /SYS/MB.FirmwareVersion
- pr /SYS/MB.FirmwareVersion=1.1.1b5 r35

7.3.5. Resetting the Device

The transmitter can be restarted – the current connections (LAN, RS-232) will be terminated.

Command and Response

- CALL·/SYS:reset()
- mO·/SYS:reset=

Example

- CALL /SYS:reset()
- mO /SYS:reset=

7.3.6. Restore the Factory Default Settings

Command and Response

- 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.

7.3.7. Lock the Front Panel Buttons

Command and Response

- SET /MANAGEMENT/UI.ControlLock=<lock_status>
- pw /MANAGEMENT/UI.ControlLock=<lock_status>

Parameters

<lock_status> **0:** None - All functions of the front panel button are enabled.

1: Locked - The front panel buttons are locked and they can be unlock by pressing **Audio select** and **Show me** buttons or with LW3 protocol command.

2: Force locked - Locking and unlocking of the front panel buttons are possible only via protocol command.

Example

- SET /MANAGEMENT/UI.ControlLock=1
- pw /MANAGEMENT/UI.ControlLock=1

7.3.8. Disable the Default Function of the Front Panel Buttons

This setting makes possible to set an event with 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/<btn_id>.DefaultFunctionEnable=<btn_status>
- pw /MANAGEMENT/UI/BUTTONS/<btn_id>.DefaultFunctionEnable=<btn_status>

Parameters

Indentifier	Parameter description	Parameter value
<btn_id>	Button identifier number	**B1**: Video select **B2**: Audio select **B3**: Show me button
<btn_staus>	Status of the default function	**true**: Enable **false**: Disable

Example

- SET /MANAGEMENT/UI/BUTTONS/B1.DefaultFunctionEnable=false
- pw /MANAGEMENT/UI/BUTTONS/B1.DefaultFunctionEnable=false

7.3.9. Dark Mode

This command turns the Video and Audio LEDs off the on the front panel.

Command and Response

- SET /MANAGEMENT/UI/DARKMODE.DarkModeEnable=<darkmode_status>
- pw /MANAGEMENT/UI/DARKMODE.DarkModeEnable=<darkmode_status>

Parameters

<darkmode_status> **true:** Dark mode is enabled.

false: Dark mode is disabled.

Example

- SET /MANAGEMENT/UI/DARKMODE.DarkModeEnable=true
- pw /MANAGEMENT/UI/DARKMODE.DarkModeEnable=true

7.3.10. 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> **0:** Delay time in seconds.

Example

- SET /MANAGEMENT/UI/DARKMODE.DarkModeDelay=10
- pw /MANAGEMENT/UI/DARKMODE.DarkModeDelay=10

7.4. Video Port Settings

INFO: Video port numbering can be found in the Input/Output Port Numbering section.

7.4.1. Query the Status of Source Ports

Command and Response

- GET·/MEDIA/VIDEO/XP.SourcePortStatus
- pr·/MEDIA/VIDEO/XP.SourcePortStatus=<in1_state>;<in2_state>;<…>; <in#_state>

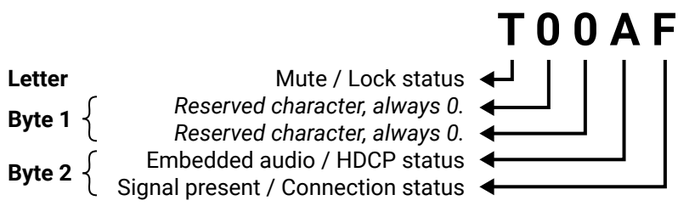
The response contains 5 ASCII characters for each port. The first character indicates the mute/lock state, the next four characters represent a 2-byte HEX code showing the current state of the input ports.

Example

- GET /MEDIA/VIDEO/XP.SourcePortStatus
- pr /MEDIA/VIDEO/XP.SourcePortStatus=T002E;T00AF;T00AA;T00EF; T000A;T002E

Parameters: :

Letter (Character 1)		
	Mute state	Lock state
T	Unmuted	Unlocked
L	Unmuted	Locked
M	Muted	Unlocked
U	Muted	Locked



	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	Reserved	Reserved	Reserved	Reserved	Unknown			
0 1					Reserved			
1 0					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 analog video ports have no hotplug signal which 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

7.4.2. Query the Status of Destination Port

Command and Response

- 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 showing the current state of the output port.

Example

- GET /MEDIA/VIDEO/XP.DestinationPortStatus
- pr /MEDIA/VIDEO/XP.DestinationPortStatus=M00BF

Parameters: See at 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

7.4.3. Query 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.

7.4.4. Switching Video Input

Command and Response

- 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.

7.4.5. Query the Video Autoselect Settings

Command and Response

- 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

<out#_set> Two-letter code of the Autoselect settings:

Letter		Explanation
1st letter	E:	Autoselect is **enabled**
	D:	Autoselect is **disabled**
2nd letter	F:	**First** detect mode: the first active video input is selected.
	P:	**Priority** detect mode: always the highest priority active video input will be selected.
	L:	**Last** detect mode: 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.

7.4.6. Change the Autoselect Mode

Command and Response

- CALL·/MEDIA/VIDEO/XP:setDestinationPortAutoselect(<out>:<out_set>)
- mO·/MEDIA/VIDEO/XP.setDestinationPortAutoselect

Parameters: see 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.

7.4.7. Query the Input Port Priority

Command and Response

- GET·/MEDIA/VIDEO/XP.PortPriorityList
- pr·/MEDIA/VIDEO/XP.PortPrioirtyList=<out1_list>;<out2_list>;<...>;<out#_list>

The response shows the priority of each output one after another. The priority number can be from 0 to 31; 0 is the highest- and 30 is the lowest priority. 31 means that the port will be skipped from 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.

7.4.8. Change the Input Port Priority

Command and Response

- CALL·/MEDIA/VIDEO/XP:setAutoselectionPriority(<in>(<out>):<prio>);(<in>(<out>):<prio>)
- mO·/MEDIA/VIDEO/XP:setAutoselectionPrioirty

Parameters

<prio> Priority number from 0 to 31, equal numbers are allowed (31 means that the port will be skipped from the priority list).

An input port priority can be set on an output port. Many settings can be executed by separating 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.

7.4.9. Mute an Input Port

Command and Response

- CALL·/MEDIA/VIDEO/XP:muteSource(<in>)
- mO·/MEDIA/VIDEO/XP:muteSource

Example

- CALL /MEDIA/VIDEO/XP:muteSource(I1)
- mO /MEDIA/VIDEO/XP:muteSource

7.4.10. Unmute an Input Port

Command and Response

- CALL·/MEDIA/VIDEO/XP:unmuteSource(<in>)
- mO·/MEDIA/VIDEO/XP:unmuteSource

Example

- CALL /MEDIA/VIDEO/XP:unmuteSource(I1)
- mO /MEDIA/VIDEO/XP:unmuteSource

7.4.11. Lock an Input Port

Command and Response

- CALL·/MEDIA/VIDEO/XP:lockSource(<in>)
- mO·/MEDIA/VIDEO/XP:lockSource

Example

- CALL /MEDIA/VIDEO/XP:lockSource(I1)
- mO /MEDIA/VIDEO/XP:lockSource

7.4.12. Unlock an Input Port

Command and Response

- CALL·/MEDIA/VIDEO/XP:unlockSource(<in>)
- mO·/MEDIA/VIDEO/XP:unlockSource

Example

- CALL /MEDIA/VIDEO/XP:unlockSource(I1)
- mO /MEDIA/VIDEO/XP:unlockSource

7.4.13. Mute Output

Command and Response

- CALL·/MEDIA/VIDEO/XP:muteDestination(<out>)
- mO·/MEDIA/VIDEO/XP:muteDestination

Example

- CALL /MEDIA/VIDEO/XP:muteDestination(O1)
- mO /MEDIA/VIDEO/XP:muteDestination

7.4.14. Unmute Output

Command and Response

- CALL·/MEDIA/VIDEO/XP:unmuteDestination(<out>)
- mO·/MEDIA/VIDEO/XP:unmuteDestination

Example

- CALL /MEDIA/VIDEO/XP:unmuteDestination(O1)
- mO /MEDIA/VIDEO/XP:unmuteDestination

7.4.15. Lock Output

Command and Response

- CALL·/MEDIA/VIDEO/XP:lockDestination(<out>)
- mO·/MEDIA/VIDEO/XP:lockDestination

Example

- CALL /MEDIA/VIDEO/XP:lockDestination(O1)
- mO /MEDIA/VIDEO/XP:lockDestination

7.4.16. Unlock Output

Command and Response

- CALL·/MEDIA/VIDEO/XP:unlockDestination(<out>)
- mO·/MEDIA/VIDEO/XP:unlockDestination

Example

- CALL /MEDIA/VIDEO/XP:unlockDestination(O1)
- mO /MEDIA/VIDEO/XP:unlockDestination

7.4.17. HDCP Setting (Input Port)

HDCP capability can be enabled/disabled on the input ports, thus, non-encrypted content can be seen on a non-HDCP compliant display. See more information in the HDCP Management section.

Command and Response

- SET·/MEDIA/VIDEO/<in>.HdcpEnable=<hdcp_status>
- pw·/MEDIA/VIDEO/<in>.HdcpEnable=<hdcp_status>

Parameters

<hdcp_status> **true**: HDCP enabled
false: HDCP 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)

7.4.18. Test Pattern Generator

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 below-listed parameters.

Test Pattern Generator Mode

Command and Response

- SET·/MEDIA/VIDEO/<in>.FreeRunMode=<tpg_mode>
- pw·/MEDIA/VIDEO/<in>.FreeRunMode=<tpg_mode>

Parameters

Identifier	Parameter description	Parameter values
<tpg_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

Test Pattern Resolution

Command and Response

- SET·/MEDIA/VIDEO/<in>.FreeRunResolution=<tpg_resolution>
- pw·/MEDIA/VIDEO/<in>.FreeRunResolution=<tpg_resolution>

Parameters

Identifier	Parameter description	Parameter values
<tpg_resolution>	Resolution	**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

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 is on VGA input (I1) is set to green.

7.4.19. HDCP Setting (Output Port)

HDCP capability can be set to Auto/Always on the output ports, thus, non-encrypted content can be transmitted to a non-HDCP compliant display. See more information in the HDCP Management section.

Command and Response

- SET·/MEDIA/VIDEO/<out>.HdcpModeSetting=<hdcp_mode>
- pw·/MEDIA/VIDEO/<out>.HdcpModeSetting=<hdcp_mode>

Parameters

<hdcp_mode> **0**: Auto
1: Always

Example

- SET /MEDIA/VIDEO/O1.HdcpModeSetting=0
- pw /MEDIA/VIDEO/O1.HdcpModeSetting=0

7.4.20. HDMI Mode Settings (Output Port)

Command and Response

- SET·/MEDIA/VIDEO/<out>.HdmiModeSetting=<hdmi_mode>
- pw·/MEDIA/VIDEO/<out>.HdmiModeSetting=<hdmi_mode>

Parameters

<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

7.4.21. Color Space Setting (Output Port)

Command and Response

- SET·/MEDIA/VIDEO/<out>.ColorSpaceSetting=<colorspace>
- pw·/MEDIA/VIDEO/<out>.ColorSpaceSetting=<colorspace>

Parameters

<colorspace> **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

7.5. Audio Port Settings

INFO: Audio port numbering can be found in the Input/Output Port Numbering section.

7.5.1. Query the Status of Source Port

Command and Response

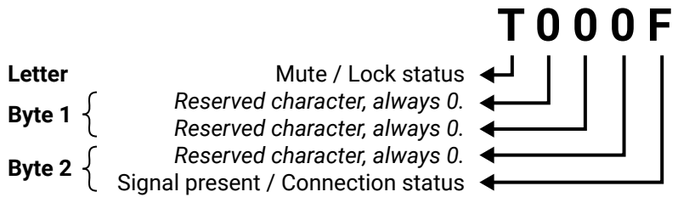
- GET·/MEDIA/AUDIO/XP.SourcePortStatus
- pr·/MEDIA/AUDIO/XP.SourcePortStatus=[<in1>;<in2>;...;<in#>]

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 showing 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



	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	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Unknown	
0 1							Reserved	
1 0							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 Phoenix connector has no pin which 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

7.5.2. Query the Status of Destination Port

Command and Response

- GET·/MEDIA/AUDIO/XP.DestinationPortStatus
- pr·/MEDIA/AUDIO/XP.DestinationPortStatus=[<O_n>]

The response contains 5 ASCII characters for each port. The first character indicates the mute/lock state, the next 2-byte long HEX code showing the current state of the output port.

- GET /MEDIA/AUDIO/XP.DestinationPortStatus
- pr /MEDIA/AUDIO/XP.DestinationPortStatus=M000F

Legend: See at 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

7.5.3. Mute Audio Input

Command and Response

- CALL·/MEDIA/AUDIO/XP:muteSource(<in>)
- mO·/MEDIA/AUDIO/XP:muteSource

Example

- CALL /MEDIA/AUDIO/XP:muteSource(I1)
- mO /MEDIA/AUDIO/XP:muteSource

7.5.4. Unmute Audio Input

Command and Response

- CALL·/MEDIA/AUDIO/XP:unmuteSource(<in>)
- mO·/MEDIA/AUDIO/XP:unmuteSource

Example

- CALL /MEDIA/AUDIO/XP:unmuteSource(I1)
- mO /MEDIA/AUDIO/XP:unmuteSource

7.5.5. Mute Audio Output

Command and Response

- CALL·/MEDIA/AUDIO/XP:muteDestination(<in>)
- mO·/MEDIA/AUDIO/XP:muteDestination

Example

- CALL /MEDIA/AUDIO/XP:muteDestination(O1)
- mO /MEDIA/AUDIO/XP:muteDestination

7.5.6. Unmute Audio Output

Command and Response

- CALL·/MEDIA/AUDIO/XP:unmuteDestination(<out>)
- mO·/MEDIA/AUDIO/XP:unmuteDestination

Example

- CALL /MEDIA/AUDIO/XP:unmuteDestination(O1)
- mO /MEDIA/AUDIO/XP:unmuteDestination

7.5.7. Analog Audio Input Level Settings

Volume

Command and Response

- SET·/MEDIA/AUDIO/<in>.Volume=<level>
- pw·/MEDIA/AUDIO/<in>.Volume=<level>

Parameters

<level> Sets the input 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

Balance

Command and Response

- SET·/MEDIA/AUDIO/<in>.Balance=<level>
- pw·/MEDIA/AUDIO/<in>.Balance=<level>

Parameters

<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%.

7.6. Network Configuration

7.6.1. Query the DHCP State

Command and Response

- GET·/MANAGEMENT/NETWORK.DhcpEnabled
- pw·/MANAGEMENT/NETWORK.DhcpEnabled=<DHCP_state>

Parameters

<DHCP_state> **true**: DHCP is enabled
false: DHCP is disabled

Example

- GET /MANAGEMENT/NETWORK.DhcpEnabled
- pw /MANAGEMENT/NETWORK.DhcpEnabled=true

7.6.2. Change the DHCP State

Command and Response

- SET·/MANAGEMENT/NETWORK.DhcpEnabled=<DHCP_state>
- pw·/MANAGEMENT/NETWORK.DhcpEnabled=<DHCP_state>

Parameters

<DHCP_state> **true**: DHCP is enabled
false: DHCP is disabled

Example

- SET /MANAGEMENT/NETWORK.DhcpEnabled=false
- pw /MANAGEMENT/NETWORK.DhcpEnabled=false

7.6.3. Query the IP Address

Command and Response

- GET·/MANAGEMENT/NETWORK.IpAddress
- pr·/MANAGEMENT/NETWORK.IpAddress=<IP_address>

Example

- GET /MANAGEMENT/NETWORK.IpAddress
- pr /MANAGEMENT/NETWORK.IpAddress=192.168.0.100

7.6.4. Change 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

7.6.5. Query the Subnet Mask

Command and Response

- GET·/MANAGEMENT/NETWORK.NetworkMask
- pr·/MANAGEMENT/NETWORK.NetworkMask=<netmask>

Example

- GET /MANAGEMENT/NETWORK.NetworkMask
- pr /MANAGEMENT/NETWORK.NetworkMask=255.255.255.0

7.6.6. Change the Subnet Mask (Static)

Command and Response

- 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

7.6.7. Query the Gateway Address

Command and Response

- GET·/MANAGEMENT/NETWORK.GatewayAddress
- pr·/MANAGEMENT/NETWORK.GatewayAddress=<gw_address>

Example

- GET /MANAGEMENT/NETWORK.GatewayAddress
- pr /MANAGEMENT/NETWORK.GatewayAddress=192.168.0.1

7.6.8. Change 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

7.7. RS-232 Port Configuration

7.7.1. Protocol Setting

Command and Response

- SET·/MEDIA/UART/P1.ControlProtocol=<cont_protocol>
- pw·/MEDIA/UART/P1.ControlProtocol=<cont_protocol>

Parameters

Identifier	Parameter description	Parameter values
<cont_protocol>	Selected protocol	**0**: LW2 **1**: LW3

Example

- SET /MEDIA/UART/P1.ControlProtocol=1
- pw /MEDIA/UART/P1.ControlProtocol=1

7.7.2. BAUD Rate Setting

Command and Response

- SET·/MEDIA/UART/P1.Baudrate=<baud_rate>
- pw·/MEDIA/UART/P1.Baudrate=<baud_rate>

Parameters

<baud_rate> **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

7.7.3. Databit Setting

Command and Response

- SET·/MEDIA/UART/P1.DataBits=<databit>
- pw·/MEDIA/UART/P1.DataBits=<databit>

Parameters

<databit> **8** or **9**

Example

- SET /MEDIA/UART/P1.DataBits=8
- pw /MEDIA/UART/P1.DataBits=8

7.7.4. Stopbits Setting

Command and Response

- SET·/MEDIA/UART/P1.StopBits=<stopbit>
- pw·/MEDIA/UART/P1.StopBits=<stopbit>

Parameters

<stopbit> **0**: 1
1: 1,5
2: 2

Example

- SET /MEDIA/UART/P1.StopBits=0
- pw /MEDIA/UART/P1.StopBits=0

7.7.5. Parity Setting

Command and Response

- SET·/MEDIA/UART/P1.Parity=<parity>
- pw·/MEDIA/UART/P1.Parity=<parity>

Parameters

<parity> **0:** no parity
1: odd
2: even

Example

- SET /MEDIA/UART/P1.Parity=0
- pw /MEDIA/UART/P1.Parity=0

7.7.6. RS-232 Operation Mode

Command and Response

- SET·/MEDIA/UART/P1.Rs232Mode=<rs232_mode>
- pw·/MEDIA/UART/P1.Rs232Mode=<rs232_mode>

Parameters

<rs232_mode> **0:** Pass (Event Manager)
1: Control
2: Command injection

Example

- SET /MEDIA/UART/P1.Rs232Mode=1
- pw /MEDIA/UART/P1.Rs232Mode=1

> INFO: See more information about RS-232 modes in the Serial Interface section.

7.7.7. Command Injection Mode

Command and Response

- SET·/MEDIA/UART/P1.CommandInjectionEnable=<CI_enable>
- pw·/MEDIA/UART/P1.CommandInjectionEnable=<CI_enable>

Parameters

<CI_enable> **true:** Command injection enabled
false: Command injection disabled

Example

- SET /MEDIA/UART/P1.CommandInjectionEnable=true
- pw /MEDIA/UART/P1.CommandInjectionEnable=true

> **ATTENTION!** The Command injection status is stored in another read-only property: /MEDIA/UART/P1.CommandInjectionStatus.

7.8. RS-232 Recognizer

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

This tool is able to recognize the incoming RS-232 message. It stores the incoming serial data from the first bit, until the previously defined string (delimiter) or the elapsing timeout after the last bit. The last incoming serial string is saved in different formats (string, hex, and hash).

7.8.1. Enable the Recognizer

- SET·/MEDIA/UART/P1.RecognizerEnable=<recognizer_enable>
- pw·/MEDIA/UART/P1.RecognizerEnable=<recognizer_enable>

Parameters

<recognizer_enable> **true:** recognizer is enabled
false: recognizer is disabled

Example

- SET /MEDIA/UART/P1.RecognizerEnable=true
- pw /MEDIA/UART/P1.RecognizerEnable=true

7.8.2. Set the Delimiter Hex

When the delimiter hex 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 delimiter).

- SET·/MEDIA/UART/RECOGNIZER.DelimiterHex=<delimiter>
- pw·/MEDIA/UART/RECOGNIZER.DelimiterHex=<delimiter>

Parameters

<delimiter> It can be max. 8-character long (or 16 hex digit) in **hex** format.

Example

- SET /MEDIA/UART/RECOGNIZER.DelimiterHex=3a
- pw /MEDIA/UART/RECOGNIZER.DelimiterHex=3a

7.8.3. Set the Timeout

When the set time is elapsed after the last received message, the device saves the data. It can be applied, when there is no special or easily defined delimiter string in the incoming serial data, but there is a time gap between the messages.

- SET·/MEDIA/UART/RECOGNIZER.TimeOut=<timeout>
- pw·/MEDIA/UART/RECOGNIZER.TimeOut=<timeout>

Parameters

<timeout> Timeout value in ms.;
0: disable the timeout;
min. value: 10.

Example

- SET /MEDIA/UART/RECOGNIZER.TimeOut=20
- pw /MEDIA/UART/RECOGNIZER.TimeOut=20

7.8.4. Query the Last Recognized Serial Message (Rx, RxHex, Hash)

The recognized data is stored in string, hex and hash formats. They are stored until the next incoming message or until the RECOGNIZER:clear() method is called.

> TIPS AND TRICKS: When one of these properties are set as a condition in the Event Manager, and the same strings follow each other, the action **will execute once**.

Recognized data in string format

- GET·/MEDIA/UART/RECOGNIZER.Rx
- pr·/MEDIA/UART/RECOGNIZER.Rx=<recognized _string>

Parameters

<recognized _string> Max. 12 byte-long recognized data string.

Example

- GET /MEDIA/UART/RECOGNIZER.Rx
- pr /MEDIA/UART/RECOGNIZER.Rx=Login:

Recognized data in hex format

- GET·/MEDIA/UART/RECOGNIZER.RxHex
- pr·/MEDIA/UART/RECOGNIZER.RxHex=<recognized _hex>

Parameters

<recognized _hex> Recognized data in hex format.

Example

- GET /MEDIA/UART/RECOGNIZER.RxHex
- pr /MEDIA/UART/RECOGNIZER.RxHex=FF1F4C6F67696E3A

Recognized data hash

- GET·/MEDIA/UART/RECOGNIZER.Hash
- pr·/MEDIA/UART/RECOGNIZER.Hash=<recognized _hash>

Parameters

<recognized _hash> Fingerprint code, Max. 32 bit-long recognized data hash.

Example

- GET /MEDIA/UART/RECOGNIZER.Hash
- pr /MEDIA/UART/RECOGNIZER.Hash=997A659E

7.8.5. Clear the Stored Last Recognized Serial Message

This method deletes all the stored received serial messages.

- CALL·/MEDIA/UART/RECOGNIZER:clear()
- mO·/MEDIA/UART/RECOGNIZER:clear

Example

- CALL /MEDIA/UART/RECOGNIZER:clear()
- mO /MEDIA/UART/RECOGNIZER:clear

7.8.6. Query the Last Recognized Serial Message (ActiveRx, ActiveRxHex, ActiveHash)

The recognized data is stored in string, hex and hash format in a **temporary** storage. They are erased when the Active Timeout elapsed.

> TIPS AND TRICKS: When these properties are set as a condition in the Event Manager, and the same strings follow each other, the action **will execute every occasion** if the active timeout set properly.

Recognized data in string format

- GET·/MEDIA/UART/RECOGNIZER.ActiveRx
- pr·/MEDIA/UART/RECOGNIZER.ActiveRx=<recognized _string>

Parameters

<recognized _string> Max. 12 byte-long recognized data string.

Example

- GET /MEDIA/UART/RECOGNIZER.ActiveRx
- pr /MEDIA/UART/RECOGNIZER.Rx=Login:

Recognized data in hex format

- GET·/MEDIA/UART/RECOGNIZER.ActiveRxHex
- pr·/MEDIA/UART/RECOGNIZER.ActiveRxHex=<recognized _hex>

Parameters

<recognized _hex> Recognized data in hex format.

Example

- GET /MEDIA/UART/RECOGNIZER.ActiveRxHex
- pr /MEDIA/UART/RECOGNIZER.ActiveRxHex= 4C6F67696E3A

Recognized data hash

- GET·/MEDIA/UART/RECOGNIZER.ActiveHash
- pr·/MEDIA/UART/RECOGNIZER.ActiveHash=<recognized _hash>

Parameters

<recognized _hash> Fingerprint code, Max. 32 bit-long recognized data hash.

Example

- GET /MEDIA/UART/RECOGNIZER.ActiveHash
- pr /MEDIA/UART/RECOGNIZER.ActiveHash= 2D8A5E38

7.8.7. Set the Active Timeout

This property is responsible for erasing the temporary storage (ActiveRx, ActiveRxHex, ActiveHash) after the elapsing time. Default value is 50ms.

- SET·/MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=<a_timeout>
- pw·/MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=<a_timeout>

Parameters

<a_timeout> active timeout value (ms) between 0 and 255.

Example

- SET /MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=255
- pw /MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=255

7.9. Infrared Port Configuration

INFO: Infrared input and output port numbering can be found in the Input/Output Port Numbering section.

7.9.1. Enable Command Injection Mode

Command and Response

- SET·/MEDIA/IR/<ir_port>.CommandInjectionEnable=<ci_status>
- pw·/MEDIA/IR/<ir_port>.CommandInjectionEnable=<ci_status>

Parameters

Identifier	Parameter description	Parameter values
<ir_port>	IR port number	**S1** **D1**
<ci_status>	IR port status	**true**: Enable **false**: Disable

Example

- SET /MEDIA/IR/S1.CommandInjectionEnable=true
- pw /MEDIA/IR/S1.CommandInjectionEnable=true

7.9.2. Enable/Disable Output Signal Modulation

Command and Response

- SET·/MEDIA/IR/D1.EnableModulation=<modulation>
- pw·/MEDIA/IR/D1.EnableModulation=<modulation>

Parameters

<modulation> **true**: IR modulation is enabled.
false: IR 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).

7.10. Sending Message via the Communication Ports

7.10.1. Sending Message via TCP Port

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.

7.10.1.1. 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 Using Hexadecimal Codes section.

7.10.1.2. 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.

7.10.1.3. Sending a TCP Binary Message (HEX-format)

The command is for sending a binary message in Hexadecimal format. This method **does not allow** escaping or inserting control 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.

7.10.2. UDP Message Sending via Ethernet

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.

7.10.2.1. Sending 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 Using Hexadecimal Codes section.

7.10.2.2. 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.

7.10.2.3. Sending a UDP Binary Message (HEX-format)

The command is for sending a binary message in Hexadecimal format via UDP protocol. This method **does not allow** escaping or inserting control 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.

7.10.3. Message Sending via RS-232 Serial Port

7.10.3.1. 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

- 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.

7.10.3.2. Sending a Text (ASCII-format) via RS-232

The command is for sending a command message in ASCII-format. This method **does not allow** escaping the control 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.

7.10.3.3. Sending a Binary Message (HEX-format) via RS-232

The command is for sending a command message in Hexadecimal-format. This method **does not allow** escaping the control 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.

7.10.4. 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).

7.10.5. Sending CEC Commands

ATTENTION! CEC command sending feature is available in UMX-HDMI-140-Plus model.

INFO: The hidden first 2 bytes of the CEC command is static, it refers to the logical address of the sender and the addressee. 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). Broadcast addressing is also possible (in this case it is 0F or 4F).

7.10.5.1. Sending an OSD String

Sending the OSD string consists of two steps. First, set the **CEC.OsdString** property with the desired text, after that, call the **CEC.send(set_osd)** method.

Step 1 – Setting the CEC.OsdString Property

Command and Response

- SET·/MEDIA/CEC/<port>.OsdString=<text>
- pw·/MEDIA/CEC/<port>.OsdString=<text>

Parameters

<text> Letters (A-Z) and (a-z), hyphen (-), underscore (_), numbers (0-9), and dot (.). Max length: 14 characters.

<port> HDMI input (I2) or output (O1) port.

Example

- SET /MEDIA/CEC/I2.OsdString=Lightware
- pw /MEDIA/CEC/I2.OsdString=Lightware

Step 2 – Call the CEC.send(set_osd) method

Command and Response

- CALL·/MEDIA/CEC/<port>:send(set_osd)
- mO /MEDIA/CEC/I2:send

Parameters

<port> HDMI input (I2) or output (O1) port.

Example

- CALL /MEDIA/CEC/I2:send(set_osd)
- mO /MEDIA/CEC/I2:send

7.10.5.2. Sending a CEC Command in Text Format

Command and Response

- CALL /MEDIA/CEC/<port>:send(<command>)
- mO /MEDIA/CEC/<port>:send

Parameters

<port> HDMI input (I2) or output (O1) port.

The followings are accepted as <command>:

image_view_on	standby	ok	back	up
down	left	right	root_menu	setup_menu
contents_menu	favorite_menu	media_top_menu	media_context_menu	number_0
number_1	number_2	number_3	number_4	number_5
number_6	number_7	number_8	number_9	dot
enter	clear	channel_up	channel_down	sound_select
input_select	display_info	power_legacy	page_up	page_down
volume_up	volume_down	mute_toggle	mute	unmute
play	stop	pause	record	rewind
fast_forward	eject	skip_forward	skip_backward	3d_mode
stop_record	pause_record	play_forward	play_reverse	select_next_media
select_media_1	select_media_2	select_media_3	select_media_4	select_media_5
power_toggle	power_on	power_off	stop_function	f1
f2	f3	f4		

Example

- CALL /MEDIA/CEC/I2:send(power_on)
- mO /MEDIA/CEC/I2:send

7.10.5.3. Send CEC Command in Hexadecimal Format

- CALL /MEDIA/CEC/<port>:sendHex(<hex_code>)
- mO /MEDIA/CEC/<port>:sendHex

Parameters

<hex_code> Accepted command is max. 30 character long (15 byte) in hexadecimal format.

<port> HDMI input (I2) or output (O1) port.

Example

- CALL /MEDIA/CEC/I2:sendHex(8700E091)
- mO /MEDIA/CEC/I2:sendHex

7.10.6. Sending Pronto Hex Codes in Little-endian Format via IR Port

INFO: This feature is available in UMX-HDMI-140-Plus models.

Command and Response

- CALL·/MEDIA/IR/D1:sendProntoHex(<hex_code>)
- mO·/MEDIA/IR/D1:sendProntoHex

Parameters

Identifier	Parameter description	Parameter values
<hex_code>	Pronto hex format code	Accepts 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 IR Interface section.

Example

- CALL /MEDIA/IR/D1:sendProntoHex (00006D0025000300A900A80015 003F00150 03F001 5003F0015001500150015001500150015001500150 0150015003F0015003F0015003F0015001500150015001500150 015001 5001500150015001500150015003F0015003F0015003F0015001 5001500150015001500150015001500150015001500150015001500 1500150015001500150015003F0015003F0015003F0015003F001500 3F0015000207A900A8001500150015006E0E)
- mO /MEDIA/IR/D1:sendProntoHex

TIPS AND TRICKS: Download a code which belongs to your controlled device from a web database from the Internet. The downloaded codes are mostly in little-endian format.

7.10.7. Sending Pronto Hex Codes in Big-endian Format via IR Port

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

Command and Response

- CALL·/MEDIA/IR/D1:sendProntoHexBigEndian(<hex_code>)
- mO·/MEDIA/IR/D1:sendProntoHexBigEndian

Parameters

Identifier	Parameter description	Parameter values
<hex_code>	Pronto hex format code	Accepts 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 IR Interface section.

Example

- CALL /MEDIA/IR/D1:sendProntoHexBigEndian(0000006d0025000300a900a80015 003f0015003f0015003f0015001500150015001500150015001500150 0150015001500150015003f0015003f0015003f0015001500150015001500150 1500150015001500150015001500150015003f0015003f0015 003f0015001500150015001500150015001500150015001500150015001 5001500150015001500150015003f0015003f0015003f0015003f0015 003f0015070200a900a80015001500150e6e)
- mO /MEDIA/IR/D1:sendProntoHexBigEndian

TIPS AND TRICKS: Learning raw IR code with a terminal program:

Step 1. Connect to the UMX-HDMI-140 series device with a terminal program.

Step 2. Push the desired button of the remote control to scan the raw IR code.

Step 3. Remove all the non-hexadecimal characters (e.g. spaces, h characters etc.) from the code.

The pronto hex code which learned by a Lightware device is big-endian format.

7.11. GPIO Port Configuration

INFO: Use the GET command to query a parameter.

7.11.1. Set the Direction of a GPIO Pin

Command and Response

- SET·/MEDIA/GPIO/<GPIO_port>.Direction=<dir>
- pw·/MEDIA/GPIO/<GPIO_port>.Direction=<dir>

Parameters

<dir> direction of the GPIO pin: **I**=input; **O**=output

Example

- SET /MEDIA/GPIO/P1.Direction=I
- pw /MEDIA/GPIO/P1.Direction=I

7.11.2. Set the Output Level of a GPIO Pin

Command and Response

- SET·/MEDIA/GPIO/<GPIO_port>.Output=<value>
- pw·/MEDIA/GPIO/<GPIO_port>.Output=<value>

Parameters

<value> value of the GPIO pin: **H**=high level; **L**=low level

Example

- SET /MEDIA/GPIO/P1.Output=H
- pw /MEDIA/GPIO/P1.Output=H

7.11.3. Toggle the Level of a GPIO Pin

It toggles between the high and low level of the chosen output port.

Command and Response

- CALL·/MEDIA/GPIO/<GPIO_port>:toggle()
- pw·/MEDIA/GPIO/<GPIO_port>:toggle

Example

- CALL /MEDIA/GPIO/P1:toggle()
- mO /MEDIA/GPIO/P1:toggle

7.12. EDID Management

7.12.1. Query the Emulated EDIDs

Command and Response

- GET·/EDID.EdidStatus
- pr·/EDID.EdidStatus=<source>:E1;<source>:E2;<...>;<source>:E5

Parameters

Identifier	Parameter description	Parameter values
<source>	Source EDID memory place	**F#:** Factory EDIDs **U#:** User EDIDs **D#:** Dynamic EDIDs

Example

- GET /EDID.EdidStatus
- pr /EDID.EdidStatus=F89:E1;D1:E2;D1:E3;D1:E4;F89:E5

Emulated EDID memory for input port is listed with the EDID number that is currently emulated on the input.

7.12.2. Query the Validity of a Dynamic EDID

Command and Response

- GET·/EDID/D/D1.Validity
- pr·/EDID/D/D1.Validity=<validity>

Parameters

<validity>	**true** **false**

Example

- GET /EDID/D/D1.Validity
- pr /EDID/D/D1.Validity=true

The 'Validity' property is true, valid EDID is stored in D1 memory place.

7.12.3. Query the Preferred Resolution of an User EDID

Command and Response

- GET·/EDID/U/<user_edid>.PreferredResolution
- pr·/EDID/U/<user_edid>.PreferredResolution=<preferred_resolution>

Example

- GET /EDID/U/U2.PreferredResolution
- pr /EDID/U/U2.PreferredResolution=1920x1080p60.00Hz

> INFO: Use the **Manufacturer** property to query the manufacturer and the **MonitorName** property to query the name of the monitor.

7.12.4. Emulating an EDID to an Input Port

Command and Response

- CALL·/EDID:switch(<source>:<destination>)
- mO·/EDID:switch

Example

- CALL /EDID:switch(F49:E2)
- mO /EDID:switch

Parameters

Identifier	Parameter description	Parameter values
<source>	Source EDID memory place	**F#:** Factory EDIDs **U#:** User EDIDs **D#:** Dynamic EDIDs
<destination>	The emulated EDID memory of the desired input port.	**U#:** User EDIDs

7.12.5. Emulating an EDID to All Input Ports

Command and Response

- CALL·/EDID:switchAll(<source>)
- mO·/EDID:switchAll

Parameters

Identifier	Parameter description	Parameter values
<source>	Source EDID memory place	**F#:** Factory EDIDs **U#:** User EDIDs **D#:** Dynamic EDIDs

Example

- CALL /EDID:switchAll(F47)
- mO /EDID:switchAll

7.12.6. Copy an EDID to User Memory

ATTENTION! The (User) EDID memory slot will be overwritten without notification even if it was not empty.

Command and Response

- CALL·/EDID:copy(<source>:<destination>)
- mO·/EDID:copy

Parameters

Identifier	Parameter description	Parameter values
<source>	Source EDID memory place	**F#:** Factory **U#:** User **D#:** Dynamic
<destination>	The desired User EDID memory slot	**U#:** User

Many copy operations can be performed at the same time by using semicolons.

Example

- CALL /EDID:copy(D2:U2)
- mO /EDID:copy

7.12.7. Deleting an EDID from User Memory

Command and Response

- CALL·/EDID:delete(<U#>)
- mO·/EDID:delete

Example

- CALL /EDID:delete(U1)
- mO /EDID:delete

7.12.8. 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 factory default one. See the table in the Factory EDID List section.

7.13. LW3 Quick Summary

System Commands

Query the Product Name
- GET·/.ProductName

Set the Device Label
- SET·/MANAGEMENT/UID/DeviceLabel=<custom_name>

Query the Serial Number
- GET·/.SerialNumber

Query the Firmware Version
- GET·/SYS/MB.FirmwareVersion

Resetting the Device
- CALL·/SYS:reset()

Restore the Factory Default Settings
- CALL·/SYS:factoryDefaults()

Lock the Front Panel Buttons
- SET /MANAGEMENT/UI.ControlLock=<lock_status>

Disable the Default Function of the Front Panel Buttons
- SET /MANAGEMENT/UI/BUTTONS/<btn_id>.DefaultFunctionEnable=<btn_status>

Dark Mode
- SET /MANAGEMENT/UI/DARKMODE.DarkModeEnable=<darkmode_status>

Dark Mode Delay
- SET /MANAGEMENT/UI/DARKMODE.DarkModeDelay=<delay_time>

Video Port Settings

Query the Status of Source Ports
- GET·/MEDIA/VIDEO/XP.SourcePortStatus

Query the Status of Destination Port
- GET·/MEDIA/VIDEO/XP.DestinationPortStatus

Query the Video Crosspoint Setting
- GET·/MEDIA/VIDEO/XP.DestinationConnectionList

Switching Video Input
- CALL·/MEDIA/VIDEO/XP:switch(<in>:<out>)

Query the Video Autoselect Settings
- GET·/MEDIA/VIDEO/XP.DestinationPortAutoselect

Change the Autoselect Mode
- CALL·/MEDIA/VIDEO/XP:setDestinationPortAutoselect(<out>:<out_set>)

Query the Input Port Priority
- GET·/MEDIA/VIDEO/XP.PortPriorityList

Change the Input Port Priority
- CALL·/MEDIA/VIDEO/XP:setAutoselectionPriority(<in>(<out>):<prio>);(<in>(<out>):<prio>)

Mute an Input Port
- CALL·/MEDIA/VIDEO/XP:muteSource(<in>)

Unmute an Input Port
- CALL·/MEDIA/VIDEO/XP:unmuteSource(<in>)

Lock an Input Port
- CALL·/MEDIA/VIDEO/XP:lockSource(<in>)

Unlock an Input Port
- CALL·/MEDIA/VIDEO/XP:unlockSource(<in>)

Mute Output
- CALL·/MEDIA/VIDEO/XP:muteDestination(<out>)

Unmute Output
- CALL·/MEDIA/VIDEO/XP:unmuteDestination(<out>)

Lock Output
- CALL·/MEDIA/VIDEO/XP:lockDestination(<out>)

Unlock Output
- CALL·/MEDIA/VIDEO/XP:unlockDestination(<out>)

HDCP Setting (Input Port)
- SET·/MEDIA/VIDEO/<in>.HdcpEnable=<hdcp_status>

Test Pattern Generator
- SET·/MEDIA/VIDEO/<in>.FreeRunMode=<tpg_mode>
- SET·/MEDIA/VIDEO/<in>.FreeRunResolution=<tpg_resolution>
- SET·/MEDIA/VIDEO/<in>.FreeRunColor=<RGB_code>

HDCP Setting (Output Port)
- SET·/MEDIA/VIDEO/<out>.HdcpModeSetting=<hdcp_mode>

HDMI Mode Settings (Output Port)
- SET·/MEDIA/VIDEO/<out>.HdmiModeSetting=<hdmi_mode>

Color Space Setting (Output Port)
- SET·/MEDIA/VIDEO/<out>.ColorSpaceSetting=<colorspace>

Audio Port Settings

Query the Status of Source Port

- GET·/MEDIA/AUDIO/XP.SourcePortStatus

Query the Status of Destination Port

- GET·/MEDIA/AUDIO/XP.DestinationPortStatus

Mute Audio Input

- CALL·/MEDIA/AUDIO/XP:muteSource(<in>)

Unmute Audio Input

- CALL·/MEDIA/AUDIO/XP:unmuteSource(<in>)

Mute Audio Output

- CALL·/MEDIA/AUDIO/XP:muteDestination(<in>)

Unmute Audio Output

- CALL·/MEDIA/AUDIO/XP:unmuteDestination(<out>)

Analog Audio Input Level Settings

- SET·/MEDIA/AUDIO/<in>.Volume=<level>
- SET·/MEDIA/AUDIO/<in>.Balance=<level>

Network Configuration

Query the DHCP State

- GET·/MANAGEMENT/NETWORK.DhcpEnabled

Change the DHCP State

- SET·/MANAGEMENT/NETWORK.DhcpEnabled=<DHCP_state>

Query the IP Address

- GET·/MANAGEMENT/NETWORK.IpAddress

Change the IP Address (Static)

- SET·/MANAGEMENT/NETWORK.StaticIpAddress=<IP_address>

Query the Subnet Mask

- GET·/MANAGEMENT/NETWORK.NetworkMask

Change the Subnet Mask (Static)

- SET·/MANAGEMENT/NETWORK.StaticNetworkMask=<netmask>

Query the Gateway Address

- GET·/MANAGEMENT/NETWORK.GatewayAddress

Change the Gateway Address (Static)

- SET·/MANAGEMENT/NETWORK.StaticGatewayAddress=<gw_address>

RS-232 Port Configuration

Protocol Setting

- SET·/MEDIA/UART/P1.ControlProtocol=<cont_protocol>

BAUD Rate Setting

- SET·/MEDIA/UART/P1.Baudrate=<baud_rate>

Databit Setting

- SET·/MEDIA/UART/P1.DataBits=<databit>

Stopbits Setting

- SET·/MEDIA/UART/P1.StopBits=<stopbit>

Parity Setting

- SET·/MEDIA/UART/P1.Parity=<parity>

RS-232 Operation Mode

- SET·/MEDIA/UART/P1.Rs232Mode=<rs232_mode>

Command Injection Mode

- SET·/MEDIA/UART/P1.CommandInjectionEnable=<CI_enable>

RS-232 Recognizer

Enable the Recognizer

- SET·/MEDIA/UART/P1.RecognizerEnable=<recognizer_enable>
- pw·/MEDIA/UART/P1.RecognizerEnable=<recognizer_enable>

Set the Delimiter Hex

- SET·/MEDIA/UART/RECOGNIZER.DelimiterHex=<delimiter>

Set the Timeout

- SET·/MEDIA/UART/RECOGNIZER.TimeOut=<timeout>

Query the Last Recognized Serial Message (Rx, RxHex, Hash)

- GET·/MEDIA/UART/RECOGNIZER.Rx
- GET·/MEDIA/UART/RECOGNIZER.RxHex
- GET·/MEDIA/UART/RECOGNIZER.Hash

Clear the Stored Last Recognized Serial Message

- CALL·/MEDIA/UART/RECOGNIZER:clear()

Set the Active Timeout

- SET·/MEDIA/UART/RECOGNIZER.ActivePropertyTimeout=<a_timeout>

Query the Last Recognized Serial Message (ActiveRx, ActiveRxHex, ActiveHash)

- GET·/MEDIA/UART/RECOGNIZER.ActiveRx
- GET·/MEDIA/UART/RECOGNIZER.ActiveRxHex
- GET·/MEDIA/UART/RECOGNIZER.ActiveHash

Infrared Port Configuration

Enable Command Injection Mode

- SET·/MEDIA/IR/<ir_port>.CommandInjectionEnable=<ci_status>

Enable/Disable Output Signal Modulation

- SET·/MEDIA/IR/D1.EnableModulation=<modulation>

Sending Message via the Communication Ports

Sending a TCP Message (ASCII-format)

- CALL·/MEDIA/ETHERNET:tcpMessage(<IP_address>:<port_no>=<message>)

Sending a TCP Text (ASCII-format)

- CALL·/MEDIA/ETHERNET:tcpText(<IP_address>:<port_no>=<text>)

Sending a TCP Binary Message (HEX-format)

- CALL·/MEDIA/ETHERNET.tcpBinary(<IP_address>:<port_no>=<HEX_message>)

Sending UDP Message (ASCII-format)

- CALL·/MEDIA/ETHERNET:udpMessage(<IP_address>:<port_no>=<message>)

Sending a UDP Text (ASCII-format)

- CALL·/MEDIA/ETHERNET:udpText(<IP_address>:<port_no>=<text>)

Sending a UDP Binary Message (HEX-format)

- CALL·/MEDIA/ETHERNET:udpBinary(<IP_address>:<port_no>=<HEX_message>)

Message Sending via RS-232 Serial Port

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>)

Sending an OSD String

- SET·/MEDIA/CEC/<port>.OsdString=<text>
- CALL·/MEDIA/CEC/<port>:send(set_osd)

Sending a CEC Command in Text Format

- CALL /MEDIA/CEC/<port>:send(<command>)

Send CEC Command in Hexadecimal Format

- CALL /MEDIA/CEC/<port>:sendHex(<hex_code>)

Sending Pronto Hex Codes in Little-endian Format via IR Port

- CALL·/MEDIA/IR/D1:sendProntoHex(<hex_code>)

Sending Pronto Hex Codes in Big-endian Format via IR Port

- CALL·/MEDIA/IR/D1:sendProntoHexBigEndian(<hex_code>)

GPIO Port Configuration

Set the Direction of a GPIO Pin

- SET·/MEDIA/GPIO/<GPIO_port>.Direction=<dir>

Set the Output Level of a GPIO Pin

- SET·/MEDIA/GPIO/<GPIO_port>.Output=<value>

Toggle the Level of a GPIO Pin

- CALL·/MEDIA/GPIO/<GPIO_port>:toggle()

EDID Management

Query the Emulated EDIDs

- GET·/EDID.EdidStatus

Query the Validity of a Dynamic EDID

- GET·/EDID/D/D1.Validity

Query the Preferred Resolution of an User EDID

- GET·/EDID/U/<user_edid>.PreferredResolution

Emulating an EDID to an Input Port

- CALL·/EDID:switch(<source>:<destination>)

Emulating an EDID to All Input Ports

- CALL·/EDID:switchAll(<source>)

Copy an EDID to User Memory

- CALL·/EDID:copy(<source>:<destination>)

Deleting an EDID from User Memory

- CALL·/EDID:delete(<U#>)

Resetting the Emulated EDIDs

- CALL·/EDID:reset()

8

Firmware Upgrade

This chapter is meant to help customers perform firmware upgrades 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. To get the latest software and firmware pack can be downloaded from www.lightware.com.

8.1. Backward Compatibility

Up to 1.1.0 firmware version, the previous firmware packages are in **.lfp** format (LFP1 file), the upgrade can be done with Lightware Device Updater v1 (LDU1) software.

Above 1.1.0 firmware version, the firmware package format is **.lfp2** (LFP2 file) the upgrade can be done with Lightware Device Updater v2 (LDU2) software.

8.2. About the Firmware Package (LFP2 File)

The firmware files are packed in an LFP2 package. You need only this file to do the upgrade on your device.

- This allows using the same LFP2 package for different devices.
- The package contains all the necessary components, binary, and other files; You do not have to get further files.
- There is a descriptor file in the package that contains each firmware with version number and a list showing the compatible devices. The descriptor is displayed after loading the LFP2 file in the LDU2.

INFO: 1.2.0 firmware version, UMX-HDMI-140 and UMX-HDMI-140-Plus can be upgraded with the same package.

8.3. Installation

Installation Modes

LDU2 has two installation modes: Normal and Snapshot.

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 versions can be installed for all users

ATTENTION! Using the Normal install as the default value is highly recommended.

Installation for Windows

Run the installer. If the User Account Control displays a pop-up message click **Yes**. During the installation you will be prompted to select the type of the installation:

Installation for macOS

Mount the DMG file with 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 the LDU2 into another location just drag the icon over the desired folder.

INFO: The Windows and the Mac application has the same look and functionality.

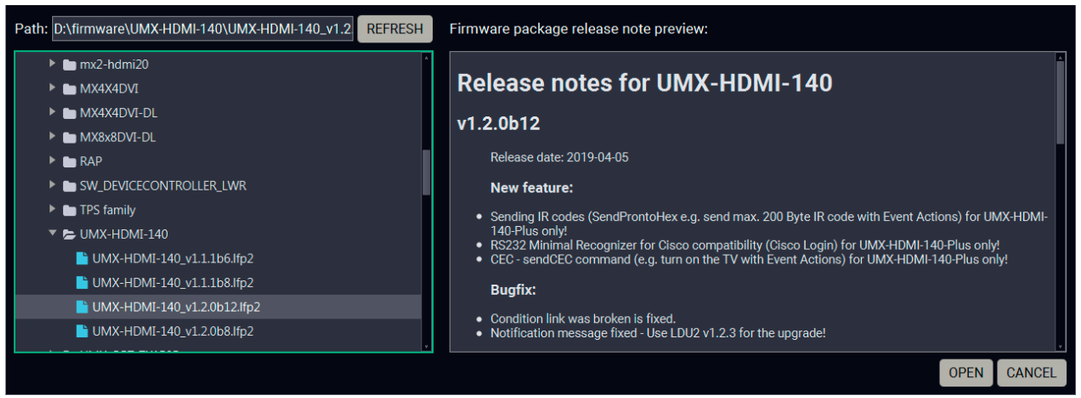
8.4. Firmware Upgrading Steps

ATTENTION! Before beginning the firmware upgrade, close all other programs which may conflict on the network (especially Lightware Device Controller software).

ATTENTION! While the firmware is being upgraded, the normal operation mode is suspended as the device is switched to bootload mode. Signal processing is not performed. Do not interrupt the firmware upgrade. If any problem occurs, reboot the unit and restart the process.

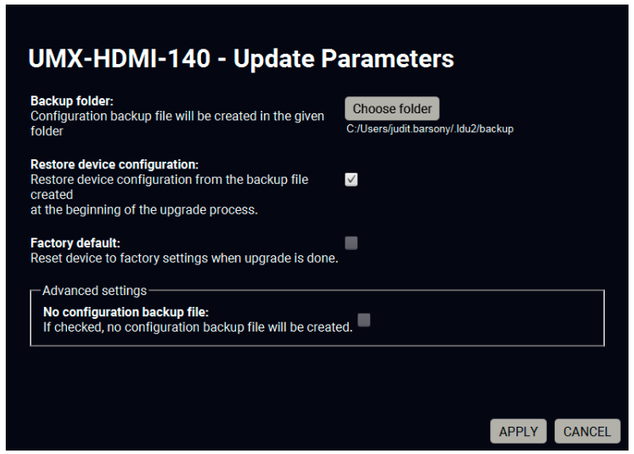
Step 1. Connect the computer to the same network as the UMX-HDMI-140 is located. Run the LDU2 software. The discovered and known devices are being loaded.

Step 2. Select the firmware package file (*.lfp2). When the file is selected the release note is displayed in the right window. Please read it carefully.

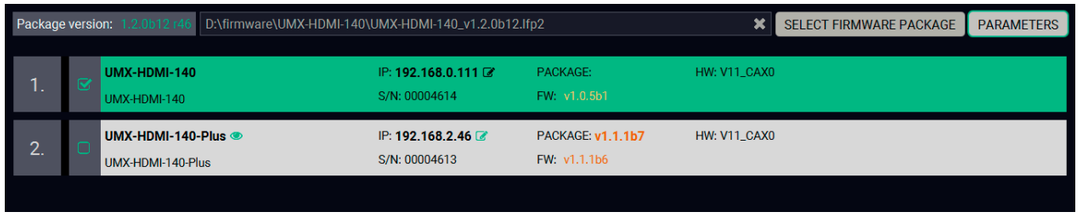


Step 3. Press the **Open** button. The listed devices – which are compatible with the firmware pack – are filtered automatically in the main screen.

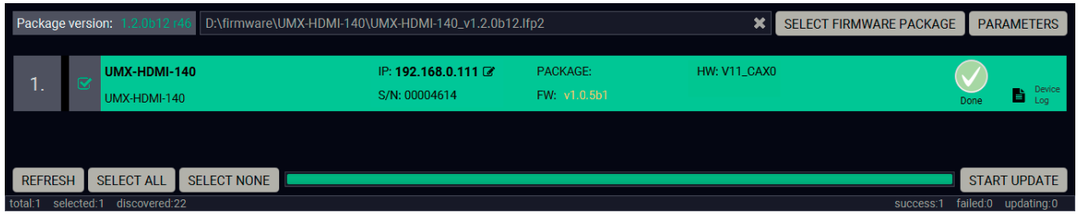
Step 4. **Parameters** button opens a window, where the location of the backup file can be set and factory default restore can be chosen after the firmware upgrade. Press **Apply** to accept.



Step 5. Select the desired devices and press the **Start Update** button. The upgrade takes about 10-12 minutes to finish which is independent of the number of the upgraded devices since the upgrades are processed simultaneously.



Step 6. Finish. Clicking on the icon, a log information is displayed in the Device Log window.



8.5. Keeping the Configuration Settings

By default, device configuration settings are restored when firmware upgrade 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. See the details in the Backup (Configuration Cloning) section.

The following flow chart demonstrates how this function works in the background.

1. **Start of the Upgrade**

   The device reboots and starts in bootload mode (firmware upgrade mode).

2. **Backup**

   The current configuration of the device is being saved into a configuration backup file on your computer. You can find a detailed list about the saved settings in the Content of Backup File section.

3. **Upgrade**

   The CPU firmware and the FPGA binary are changed to the newer ones in the package.

4. **Factory reset**

   Before the upgrade all configuration settings are restored to the factory default values.

5. **Conversion / Restore**

   Before the restore procedure the firmware package checks the backup data and if it is needed, a conversion is applied to avoid incompatibility problems between the firmware versions. After the conversion all configuration settings are restored to the device.
   When the factory default option is enabled in the Parameters window, the conversion / restore procedure will not be performed!

6. **End**

   Once the firmware upgrade procedure is finished, the device reboots and is ready to use.

The details about the procedure: when firmware upgrade starts, the first step is making a backup of the settings of the device. The firmware package checks the backup data and if it is needed, a conversion is applied to avoid incompatibility problems between the firmware versions. If you do not want to keep configuration settings, you can set the **Factory default** option enabled.

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.
- Link to LW2 protocol commands section.
- Link to LW3 protocol commands section.

At first, check front panel LEDs and take the necessary steps according to their states. For more information about status, LEDs refer to Front View and 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.	3.3.1
	Cable connection problem	Cables must fit very well, check all the connectors.	3.3
	The output is muted	Check the mute state of output ports.	5.5.6 6.3.6 7.4.2
	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).	5.6 7.12
	HDCP is disabled	Enable HDCP on the input and output port.	5.5.2 5.5.6 7.4.17 7.4.19
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.	5.5 7.4.18
	Video source is set to Testpattern input (I6)	Check the crosspoint settings	5.4 6.3.6 7.4.2
	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	5.5.4 LW2 6.3.6 LW3 7.5.7
	Output port is muted	Check the output port properties.	5.5.7 LW2 6.3.6 LW3 7.5.2
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.	5.5.6 LW3 7.4.20
	DVI EDID is emulated	Check the EDID and select and HDMI EDID to emulate.	5.6 LW3 7.12
CEC			
CEC communication does not work	Cable quality problem	Check the pinout of the HDMI cabel. CEC line could be missing in the low quality HDMI cables.	3.3
	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 to fit well; check the wiring of the plugs.	3.3.9
	RS-232 settings are different	Check the port settings of the switcher and the connected serial device(s).	5.7.1 LW3 7.7
	RS-232 mode is not right	Check the RS-232 mode settings (control, command injection, or disconnected)	5.7.1 LW3 7.7.6

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.	4.2.5 5.9.3 LW3 7.6.2
		Restore the factory default settings (with fix IP).	4.2.3 5.9.9 LW2 6.2.11
	IP address conflict	Check the IP address of the other devices, too.	
GPIO			
Connected device does not respond	Cable connection problem	Check the connectors to fit well; check the wiring of the plugs.	3.3.11
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	5.7.3 LW2 6.5.1 LW3 7.11.1
Miscellaneous			
Front panel buttons are out of operation	Buttons are set as locked in LDC	Unlock the buttons	5.9.1
	Original function of the buttons is disabled in LDC	Enable the function	
Error messages received continuously	Different protocol is set	Check the port protocol settings (LW2 / LW3) and use the proper protocol commands.	5.7.1 LW3 7.7.1

10

Technologies

The following sections contain descriptions and useful technical information 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 followings:

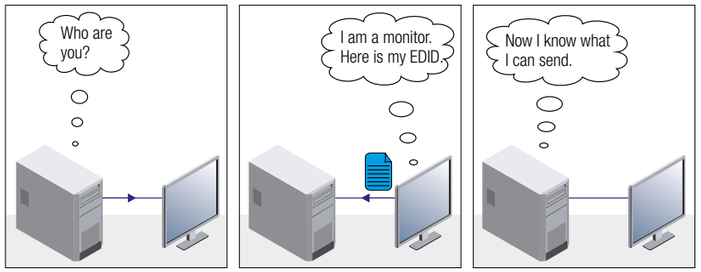
- EDID Management
- HDCP Management
- Pixel Accurate Reclocking

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 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 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 output 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 which helps to solve HDCP related problems. Complex AV systems often have both HDCP and non-HDCP components. The receiver allows transmitting 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.

Not HDCP-compliant Sink 1.

Non-HDCP compliant sink is connected to the receiver. 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 receiver, the image will not be displayed on the 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 receiver but the source would send protected content with encryption. If HDCP is enabled on the input port of the receiver, the source will send encrypted signal. The sink is not HDCP compliant, thus, it will not display the video signal (but blank/red/muted/etc. screen). If HDCP is disabled on the input port of the receiver, the source will not send the signal. The solution is to replace the display device to an HDCP-capable one.

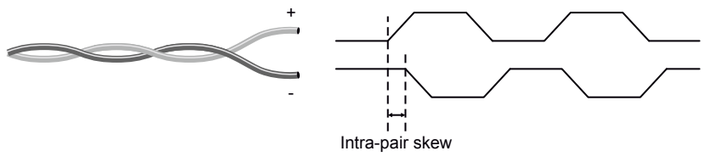
10.3. Pixel Accurate Reclocking

Signal reclocking is an essential important 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:

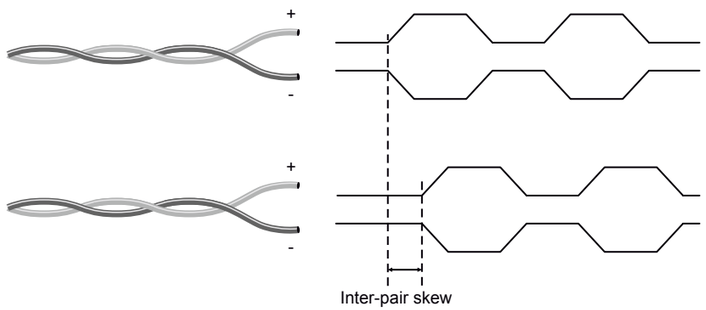
Intra-pair skew

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 DVI cable. It results in jitter.



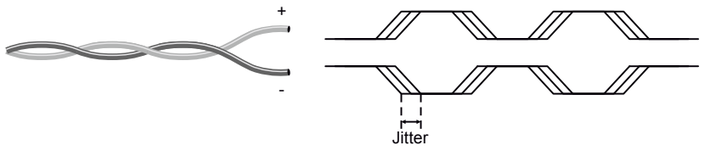
Inter-pair skew

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 color shift in the picture or sync loss.



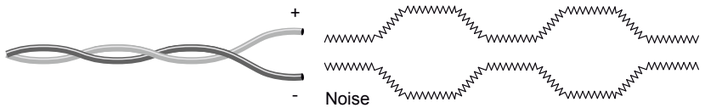
Jitter

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.



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.



11

Appendix

Tables, drawings, guides, and technical details as follows:

11.1. Specification

General

Compliance ..... CE
EMI/EMC ..... IEC/EN 55035:2017, IEC/EN 55032:2015
Safety ..... IEC/EN 62368:2014
Warranty ..... 3 years
Cooling ..... Passive
Operating temperature ..... 0 to +50˚C (+32 to +122˚F)
Operating humidity ..... 10% to 90%, non-condensing

Power

Power supply ..... 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)

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

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
Max. video resolutions ..... 1600x1200@60 Hz, 36 bit
..... 1920x1080@120Hz, 24 bit
..... 3840x2160@30 Hz, 24 bit
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

DisplayPort Input

DisplayPort connector type ..... 20-pole, DP 1.1a receptacle
Color depth ..... Deep color support up to 36 bits, 12 bit/color
Color space ..... RGB, YcbCr 4:4:4, YCbCr 4:2:2
Max. video resolutions ..... 2560x1600@60 Hz
..... 1920x1080@120 Hz, 24 bit
..... 4096x2400@30 Hz
3D support ..... Yes
HDCP compliant ..... Yes, 1.3

DVI-I Input with DVI-D support

Connector type ..... 29-pole, DVI-I
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
Max. video resolutions ..... 1600x1200@60 Hz, 36 bit
..... 1920x1080@120 Hz, 24 bit
..... 3840x2160@30 Hz, 24 bit
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

DVI-I Input with DVI-A support

Connector type.....29-pole, DVI-I
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 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
Max. video resolutions .....1600x1200@60 Hz, 36 bit
..... 1920x1080@120Hz, 24 bit
.....3840x2160@30 Hz, 24 bit
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

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)
Sampling frequency..... 48 kHz
Volume..... -95.62 – 0 dB
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
Sampling frequency..... 48 kHz
Volume..... -95.62 – 0 dB
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)
Connector type 1 x 3.5mm TRS and 1 x 3.5mm TS (approx. 1/8" jack)

Ethernet

Connector type.....Locking RJ45
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

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 followings 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 which shall be used in protocol commands.

Audio/Video Ports

Port name	Video port nr. (LW2 / LW3)	Emulated EDID memory	Audio port nr. (LW2 / LW3)
Analog audio in 1	-	-	I1
VGA in	I1	E1	-
HDMI in	I2	E2	I2
DP in	I3	E3	I3
DVI-D in	I4	E4	I4
DVI-A in	I5	E5	-
Analog audio in 2	-	-	I5
HDMI out	O1	-	O1

Infrared Ports

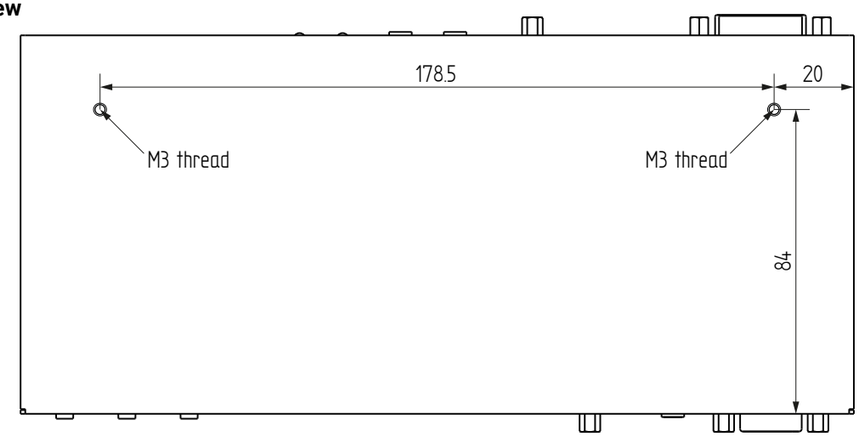
Port name	Port nr. (LW3)
IR input	S1
IR output	D1

11.4. Mechanical Drawings

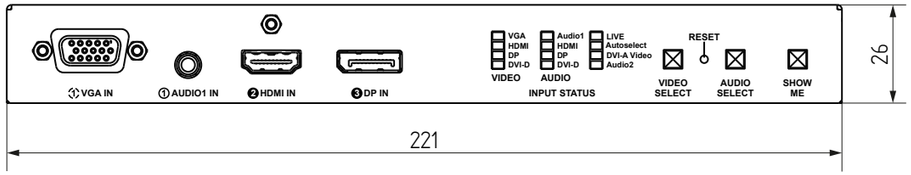
The following drawings present the physical dimensions of the device. Dimensions are in mm.

INFO: All models have the same size.

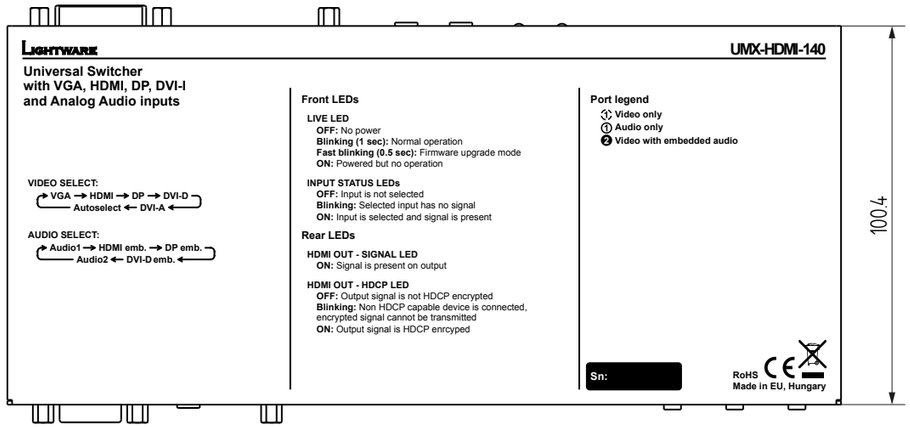
Bottom View



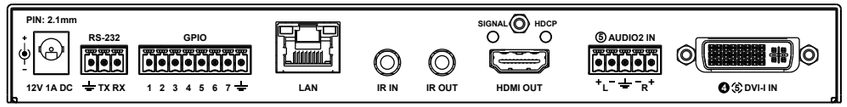
Front View



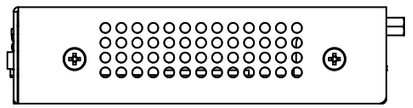
Top View



Rear View



Side View



11.5. Audio 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. Lightware products are usually built with 5-pole Phoenix connectors so we would like to help users assembling their own audio cables. See the most common cases below.

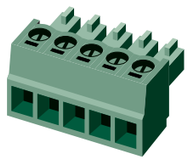
ATTENTION! Symmetric and asymmetric lines can be linked with passive accessories (e.g. special cables), but in this case half of the line level is lost.

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 and 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.

The Pinout of the 5-pole Phoenix Connector



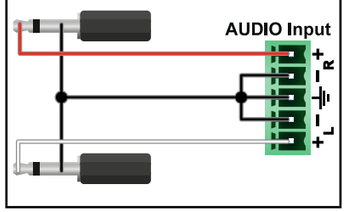
Pin nr.	Signal
1	Left+
2	Left-
3	Ground
4	Right-
5	Right+

Compatible Plug Type

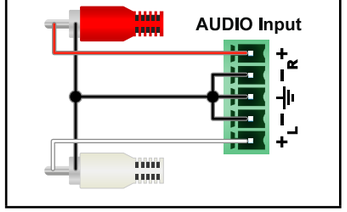
Phoenix® Combicon series (3.5mm pitch, 5-pole), type: MC 1.5/5-ST-3.5.

From Unbalanced Output to Balanced Input

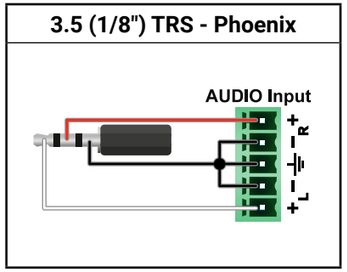
2 x 6.3 (1/4") TS - Phoenix



2 x RCA - Phoenix

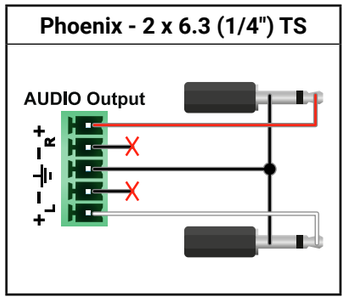


3.5 (1/8") TRS - Phoenix

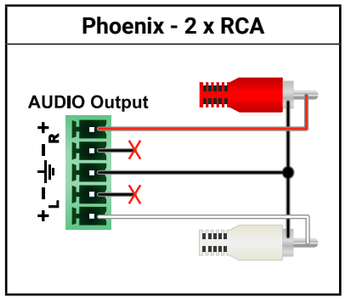


From Balanced Output to Unbalanced Input

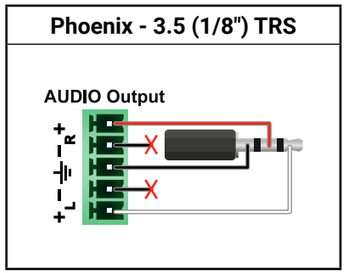
Phoenix - 2 x 6.3 (1/4") TS



Phoenix - 2 x RCA

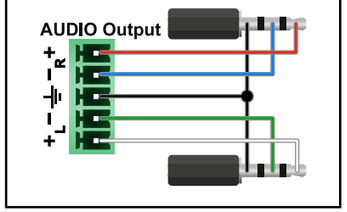


Phoenix - 3.5 (1/8") TRS

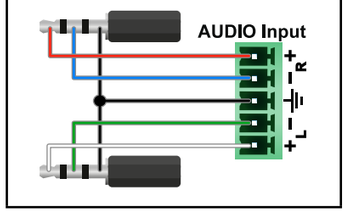


From Balanced Output to Balanced Input

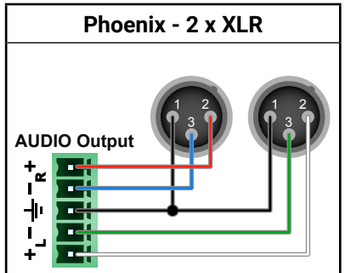
Phoenix - 2 x 6.3 (1/4") TRS



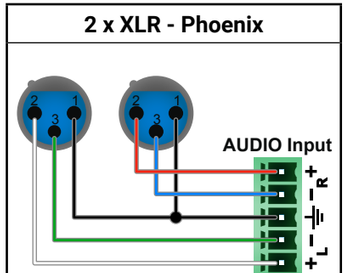
2 x 6.3 TRS (1/4") - Phoenix



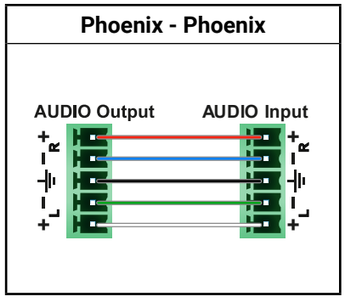
Phoenix - 2 x XLR



2 x XLR - Phoenix

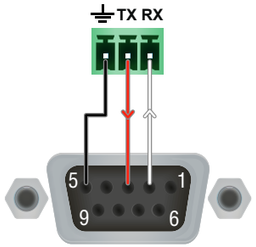
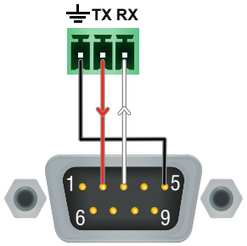


Phoenix - Phoenix



11.6. Wiring Guide for RS-232 Data Transmission

UMX-HDMI-140 is built with 3-pole Phoenix connector. See the below examples 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 - Phoenix	Lightware device and a DTE D-SUB 9 - Phoenix
 2: TX data transmit 3: RX data receive 5: Ground	 2: TX data receive 3: RX data transmit 5: Ground

11.7. 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

Parameter	Setting/Value
RS-232 settings	
Control protocol	LW2
Baud rate	57600
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.

11.9. Factory EDID List

Mem.	Resolution	Type
F1	640 x 480 @ 60.00 Hz	D
F2	848 x 480 @ 60.00 Hz	D
F3	800 x 600 @ 60.32 Hz	D
F4	1024 x 768 @ 60.00 Hz	D
F5	1280 x 768 @ 50.00 Hz	D
F6	1280 x 768 @ 59.94 Hz	D
F7	1280 x 768 @ 75.00 Hz	D
F8	1360 x 768 @ 60.02 Hz	D
F9	1280 x 1024 @ 50.00 Hz	D
F10	1280 x 1024 @ 60.02 Hz	D
F11	1280 x 1024 @ 75.02 Hz	D
F12	1400 x 1050 @ 50.00 Hz	D
F13	1400 x 1050 @ 60.00 Hz	D
F14	1400 x 1050 @ 75.00 Hz	D
F15	1680 x 1050 @ 60.00 Hz	D
F16	1920 x 1080 @ 50.00 Hz	D
F17	1920 x 1080 @ 60.00 Hz	D
F18	2048 x 1080 @ 50.00 Hz	D
F19	2048 x 1080 @ 60.00 Hz	D
F20	1600 x 1200 @ 50.00 Hz	D
F21	1600 x 1200 @ 60.00 Hz	D
F22	1920 x 1200 @ 50.00 Hz	D
F23	1920 x 1200 @ 59.56 Hz	D
F24	2048 x 1200 @ 59.96 Hz	D
F25-F28	Reserved	D
F29	**Universal_DVI**	D
F30	1440 x 480i @ 60.05 Hz	H
F31	1440 x 576i @ 50.08 Hz	H
F32	640 x 480 @ 59.95 Hz	H
F33	720 x 480 @ 59.94 Hz	H

Mem.	Resolution	Type
F34	720 x 576 @ 50.00 Hz	H
F35	1280 x 720 @ 50.00 Hz	H
F36	1280 x 720 @ 60.00 Hz	H
F37	1920 x 1080i @ 50.04 Hz	H
F38	1920 x 1080i @ 50.00 Hz	H
F39	1920 x 1080i @ 60.05 Hz	H
F40	1920 x 1080i @ 60.05 Hz	H
F41	1920 x 1080 @ 24.00 Hz	H
F42	1920 x 1080 @ 25.00 Hz	H
F43	1920 x 1080 @ 30.00 Hz	H
F44	1920 x 1080 @ 50.00 Hz	H
F45	1920 x 1080 @ 60.00 Hz	H
F46	1920 x 1080 @ 60.00 Hz	H
F47	**Universal_HDMI_PCM**	H
F48	**Universal_HDMI_ALL**	H
F49	**Universal_HDMI_DC**	H
F50	720 x 480 @ 30.03 Hz	A
F51	720 x 576 @ 25.04 Hz	A
F52	640 x 480 @ 60.00 Hz	A
F53	640 x 480 @ 75.00 Hz	A
F54	800 x 600 @ 50.00 Hz	A
F55	800 x 600 @ 60.32 Hz	A
F56	800 x 600 @ 75.00 Hz	A
F57	1024 x 768 @ 49.99 Hz	A
F58	1024 x 768 @ 60.00 Hz	A
F59	1024 x 768 @ 75.03 Hz	A
F60	1280 x 768 @ 50.00 Hz	A
F61	1280 x 768 @ 59.94 Hz	A
F62	1280 x 768 @ 75.00 Hz	A
F63	1360 x 768 @ 60.02 Hz	A

Mem.	Resolution	Type
F64	1364 x 768 @ 50.00 Hz	A
F65	1364 x 768 @ 59.94 Hz	A
F66	1364 x 768 @ 74.99 Hz	A
F67	1280 x 1024 @ 50.00 Hz	A
F68	1280 x 1024 @ 60.02 Hz	A
F69	1366 x 1024 @ 60.00 Hz	A
F70	1400 x 1050 @ 50.00 Hz	A
F71	1400 x 1050 @ 60.00 Hz	A
F72	1400 x 1050 @ 75.00 Hz	A
F73	1920 x 540 @ 50.00 Hz	A
F74	1920 x 540 @ 60.00 Hz	A
F75	1920 x 1080 @ 50.00 Hz	A
F76	1920 x 1080 @ 60.00 Hz	A
F77	1600 x 1200 @ 50.00 Hz	A
F78	1600 x 1200 @ 60.00 Hz	A
F79	1920 x 1200 @ 59.96 Hz	A
F80	1920 x 1200 @ 50.00 Hz	A
F81-F88	Reserved	A
F89	**Universal_Analog**	A
F90	1920 x 2160 @ 59.99 Hz	D
F91	1024 x 2400 @ 60.01 Hz	D
F92	1920 x 2400 @ 59.97 Hz	D
F93	2048 x 2400 @ 59.98 Hz	D

Mem.	Resolution	Type
F94	2048 x 1536 @ 60.00 Hz	D
F95	2048 x 1536 @ 75.00 Hz	D
F96	2560 x 1600 @ 59.86 Hz	D
F97	3840 x 2400 @ 24.00 Hz	D
F98	1280 x 720 @ 60.00 Hz	H3D
F99	1920 x 1080 @ 60.00 Hz	H3D
F100	1024 x 768 @ 60.00 Hz	H
F101	1280 x 1024 @ 50.00 Hz	H
F102	1280 x 1024 @ 60.02 Hz	H
F103	1280 x 1024 @ 75.02 Hz	H
F104	1600 x 1200 @ 50.00 Hz	H
F105	1600 x 1200 @ 60.00 Hz	H
F106	1920 x 1200 @ 59.56 Hz	H
F107	2560 x 1440 @ 59.95 Hz	H
F108	2560 x 1600 @ 59.86 Hz	H
F109	3840 x 2400 @ 24.00 Hz	H
F110	3840 x 2160 @ 24.00 Hz	H
F111	3840 x 2160 @ 25.00 Hz	H
F112	3840 x 2160 @ 30.00 Hz	H
F113-F117	Reserved	
F118	**Universal_4K_PCM**	H4K
F119	**Universal_4K_ALL**	H4K
F120	3840 x 2160 @ 60.00 Hz	H4K

Legend

Type	Description
D	DVI EDID
H	HDMI EDID
A	Analog EDID
DL	Dual-Link DVI EDID
H3D	HDMI EDID with 3D support
H4K	HDMI EDID with 4K resolution support

11.10. Further Information

Limited Warranty Statement

1. Lightware Visual Engineering LLC (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 products warranty period.

Document Revision History

Rev.	Release date	Changes	Editor
1.0	13-03-2017	Initial version	Tamas Forgacs
2.0	19-09-2017	New document format, updated LW3 prog. ref. chapter	Tamas Forgacs
2.1	02-07-2018	Major updates for firmware v1.0.5b4 (factory default value changed, 40 event in event manager, RS-232 message sending is available in all modes); GPIO output voltage values	Judit Barsony
2.2	04-07-2018	CE compliance update and minor corrections	Judit Barsony
2.3	31-10-2018	1080p120 Hz signal support info added.	Laszlo Zsedenyi
2.4	17-12-2018	Major updates for v.1.1.1b5 firmware.	Judit Barsony
2.5	09-04-2019	Add UMX-HDMI-140-Plus model info	Judit Barsony

Contact Us

sales@lightware.com
+36 1 255 3800

support@lightware.com
+36 1 255 3810

Lightware Visual Engineering LLC.
Peterdy 15, Budapest H-1071, Hungary

www.lightware.com