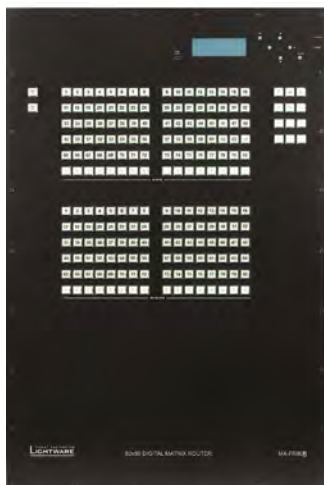


visual engineering  
**LIGHTWARE**



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MX-FR65R,  
with MX-CPU2

## IMPORTANT SAFETY INSTRUCTIONS

### Class I apparatus construction.

This equipment must be used with a mains power system with a protective earth connection. The third (earth) pin is a safety feature, do not bypass or disable it. 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.

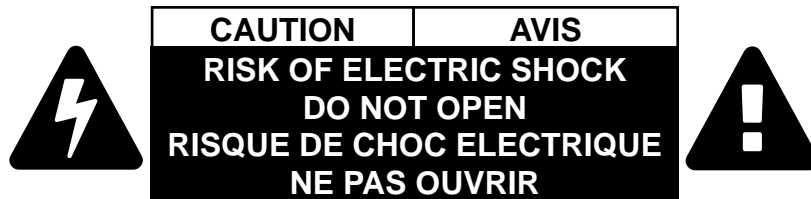
The appliance must be safely connected to multimedia systems. Follow instructions described in this manual.

### Ventilation

For the correct ventilation and 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.



### WEEE ( Waste Electrical & Electronic Equipment )

#### Correct Disposal of This Product

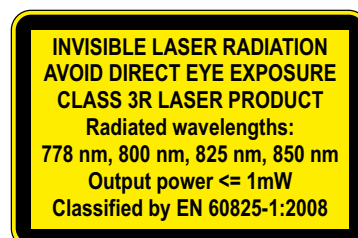


This marking shown on the product or its literature, indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle 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.

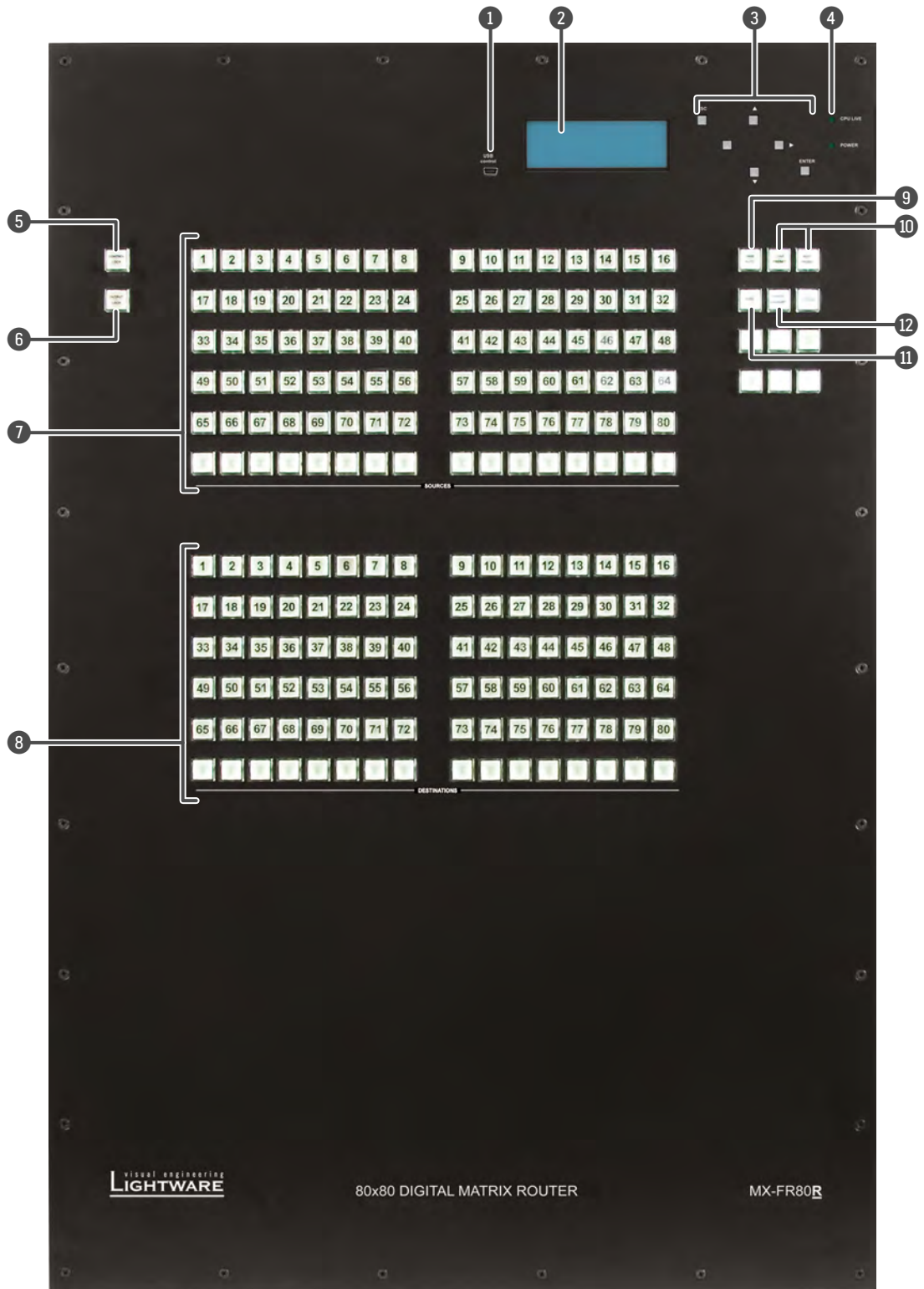
### Caution for Boards with Optical Module: Laser Product



### 3. Controls and Connections

#### 3.1. MX-FR80R and MX-FR65R

Front View



**LCD Control Panel:**

LCD control panel provides a wide range of the device, settings, and status information. Complex operations, backup savings can be done without any external controller.

- |          |                        |   |
|----------|------------------------|---|
| <b>1</b> | <b>USB control</b>     | USB connection for Lightware Device Controller Software.  |
| <b>2</b> | <b>Menu display</b>    | Displays status information and menu operation.   |
| <b>3</b> | <b>Menu navigation</b> | Up, down, left, right, escape, and enter buttons for menu navigation.                                   |
| <b>4</b> | <b>Status LEDs</b>     | CPU live LED blinks to indicate normal operation. Power LED lights green when the router is powered on. |

**Basic Control Panel:**

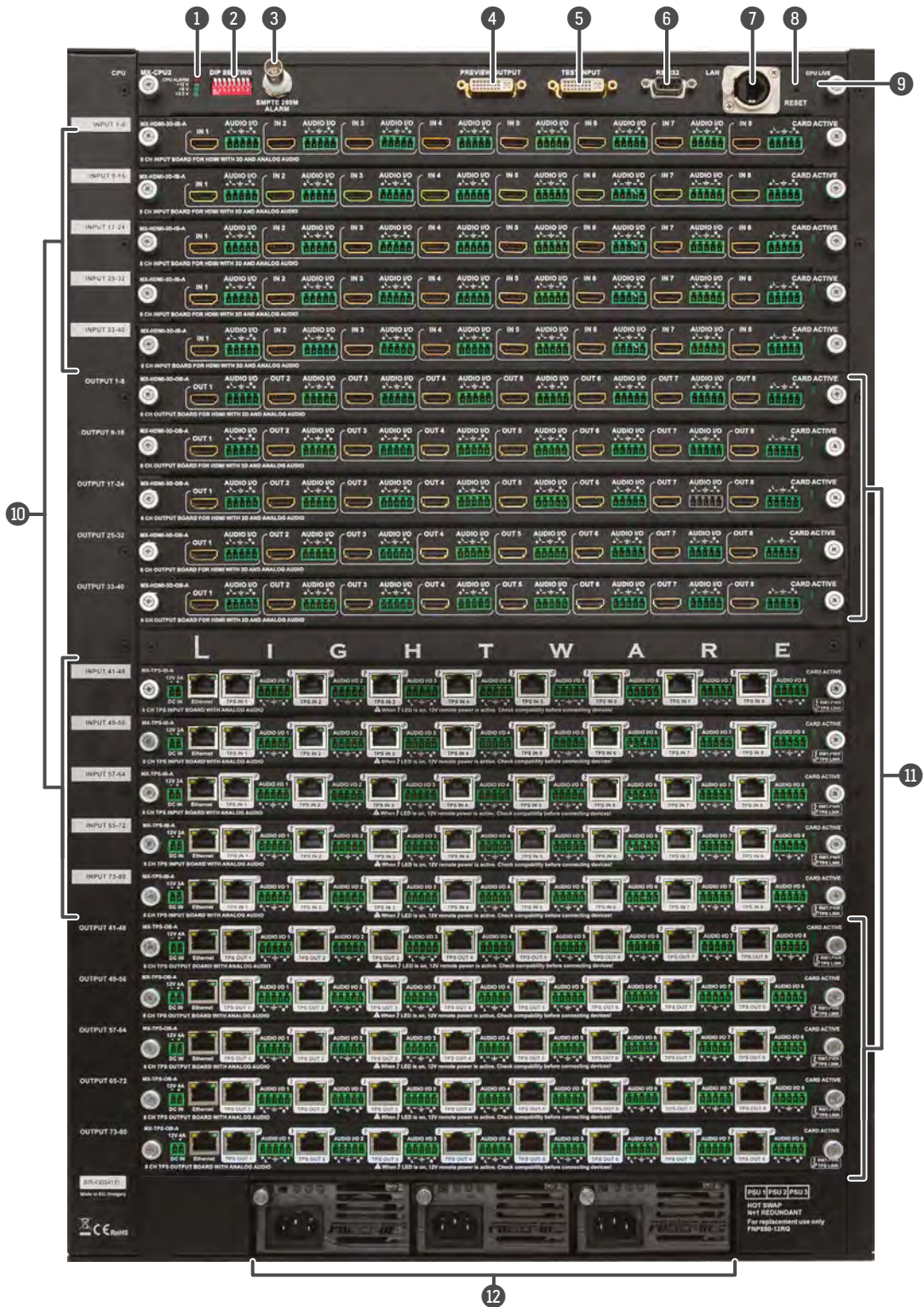
The basic control panel allows fast and easy operation of the main functions (e.g. switching, locking etc.) and gives their real time feedbacks (e.g. crosspoint state, a port is in use etc.).

- |           |                            |   |
|-----------|----------------------------|---|
| <b>5</b>  | <b>Control lock</b>        | Disables or enables front panel operation. When red is illuminated, all operations on front panel are prohibited.   |
| <b>6</b>  | <b>Output lock</b>         | Locks and protects one (or more) outputs. Inhibits accidental input changing on protected output.   |
| <b>7</b>  | <b>Source buttons</b>      | Source buttons have three functions: to select an input, to select a preset and to view the selected input's state (only in TAKE mode).                                 |
| <b>8</b>  | <b>Destination buttons</b> | Destination buttons have two functions: to select an output, or to view the selected output's state.  |
| <b>9</b>  | <b>Take / Auto</b>         | Displays the actual switching mode of the router (TAKE or AUTOTAKE). Long press toggles the switching mode, short press executes switching in TAKE mode.                |
| <b>10</b> | <b>Preset buttons</b>      | Load preset: apply a previously saved crosspoint preset from one of the preset memories.<br>Save preset: stores actual crosspoint state, in one of the preset memories. |
| <b>11</b> | <b>EDID mode</b>           | Switches the Menu display to EDID menu allowing EDID switch, EDID save etc.   |
| <b>12</b> | <b>Signal present</b>      | Displays live sources and attached sinks on source and destination buttons.   |

**INFO**

*The unlabeled buttons are disabled and reserved for future developments.*

Rear View



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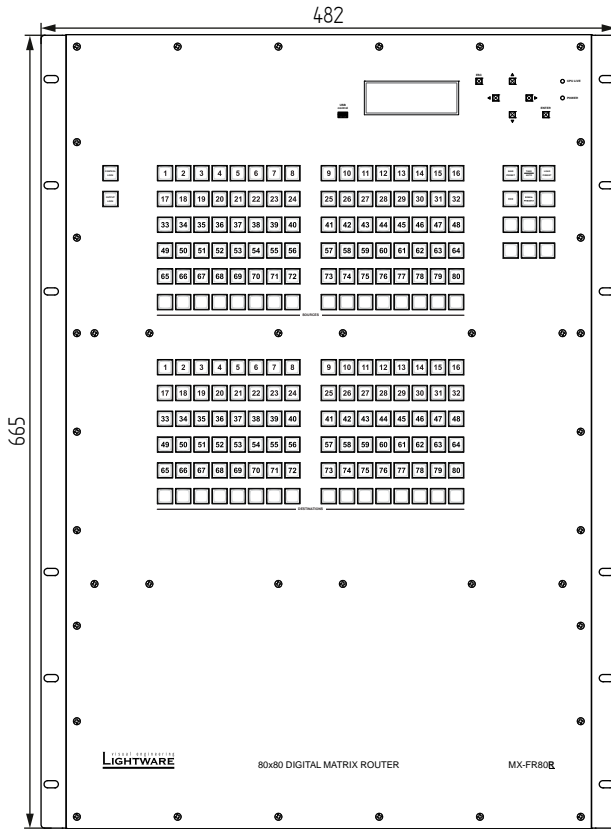
## Rear View Legend

- |                          |  |
|--------------------------|--|
| <b>1 Status LEDs</b>     | LED indicators for internal DC power voltages and alarm.   |
| <b>2 DIP settings</b>    | Special settings can be made with these switches.  |
| <b>3 Alarm out</b>       | Standard SMPTE 269M alarm output with BNC connector. See section <a href="#">3.6.5</a> on page <a href="#">34</a> for more information.  |
| <b>4 Preview output</b>  | DVI output connector, which is directly connected to the 80th output. See section <a href="#">3.6.2</a> on page <a href="#">30</a> for more information.   |
| <b>5 Test input</b>      | DVI input connector, which can be configured as an alternative for the 80th input. See section <a href="#">3.6.2</a> on page <a href="#">30</a> for more information.  |
| <b>6 Serial port</b>     | 9 pole D-SUB female connector for RS-232 serial connection. See section <a href="#">3.6.5</a> on page <a href="#">34</a> for more information.   |
| <b>7 Ethernet port</b>   | Locking RJ45 connector. Remote control port for connecting the unit to Local Area Network (LAN) and firmware upgrade can be also performed over this interface. See section <a href="#">3.6.4</a> on page <a href="#">32</a> for more information. |
| <b>8 Reset button</b>    | Reset button reboots the matrix. This is same as disconnecting from power source, and reconnect again.   |
| <b>9 CPU live</b>        | CPU live LED blinks to indicate normal operation.  |
| <b>10 Input boards</b>   | Modular input board slots. Connect DVI source devices to these connectors.   |
| <b>11 Output boards</b>  | Modular output board slots. Connect DVI sink devices to these connectors.  |
| <b>12 Power supplies</b> | Hot swap slots for power supply units. See section <a href="#">5.1</a> on page <a href="#">51</a> for more information.  |

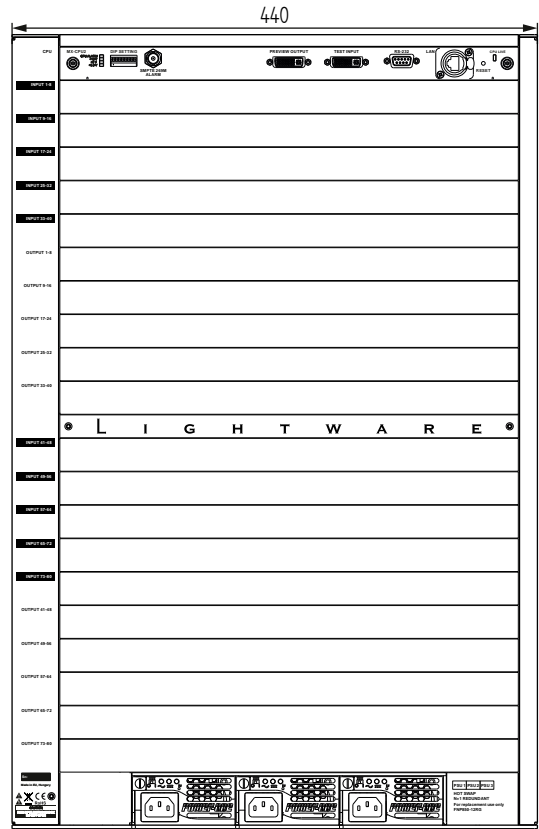
## 12.7. Mechanical Drawings

### 12.7.1. MX-FR80R and MX-FR65R

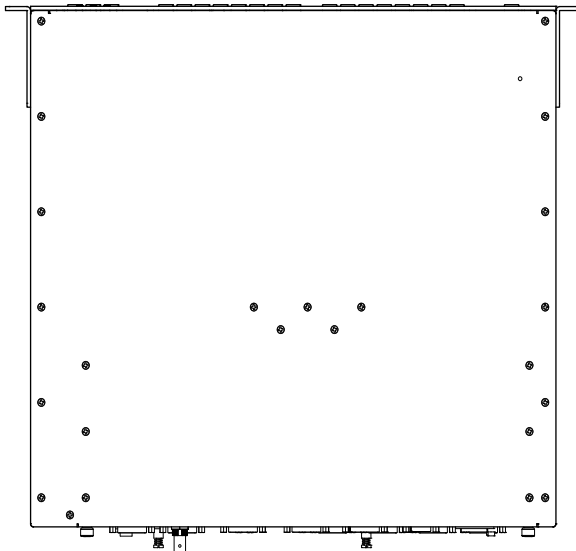
Front view



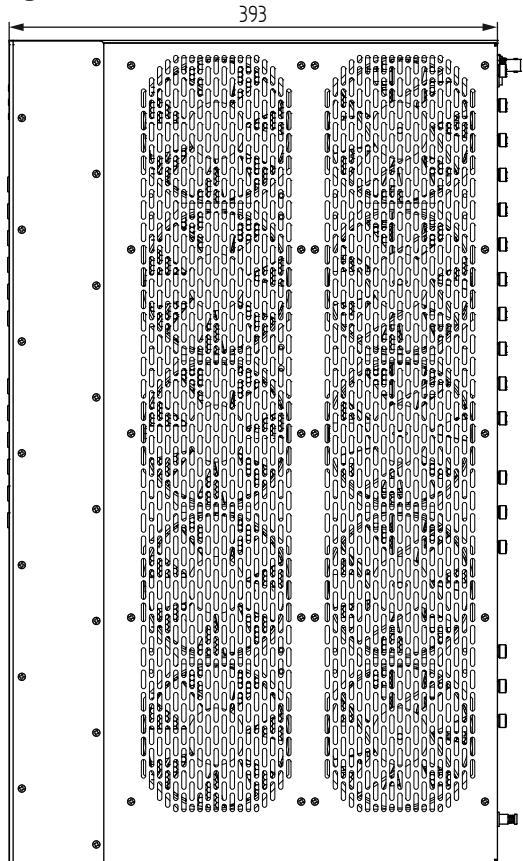
Rear view



Top view



Right view



## 12.8. Specifications

### 12.8.1. General

Compliance .....	CE
EMI/EMC .....	EN 55024:2011, EN 55032:2015
Safety .....	EN 60065:2014, Class I
Warranty .....	3 years
Operating temperature .....	0°C ~ +50°C
Humidity .....	10 ~ 90% RH
Power source .....	100-240 V AC; 50~60 Hz
AC power connector(s) .....	IEC-C14 receptacle

### 12.8.2. Matrix Frames

#### MX-FR80R and MX-FR65R

##### Power

Power consumption .....	max 2000 W (6830 BTU/hour)
Power supply unit(s) type.....	FNP850-12RG

##### Enclosure

Rack mount .....	Yes, 15U high
Dimensions .....	482W x 393D x 665H mm (19.0W x 15.5D x 26.2H inch)

## 12.9. I/O ports

### Inputs (MX-CPU2)

Connectors .....	29-pole DVI-I digital only
Input cable equalization .....	No
EDID emulation .....	Yes
Reclocking .....	Yes, Pixel Accurate Reclocking

### Outputs (MX-CPU2)

Connectors.....	29 pole DVI-I digital only
Output preemphasis.....	No
Reclocking .....	Yes, Pixel Accurate Reclocking
EDID read .....	Yes
+5V output current .....	500 mA continuous each, with overcurrent protection

### Signal

Data rate: .....	all between 25 Mbps and 2.25 Gbps / TMDS channel
Channels: .....	1x TMDS Clock + 3x TMDS Colors
Resolutions: .....	all between 640x480 and 1920x1200@60Hz or 2048x1080@60Hz
Color depth: .....	maximum 36 bits, 12 bit/color
Color format .....	RGB, YCbCr 4:4:4
HDTV resolutions: .....	720p, 1080i, 1080p
HDMI 1.3a compatible: .....	Yes (embedded audio)
HDCP compliant: .....	Yes

### Control

Front Panel buttons.....	Yes
Serial port connector.....	9 pole D-SUB female RS-232 or RS-422
Baud rate .....	57600 Baud, 8 bit, 1stop bit, no parity
Ethernet port connector .....	EtherCON, RJ45 female connector
Ethernet protocol.....	TCP/IP, HTTP, TFTP, Telnet
IP address assignment .....	fixed, DHCP, BOOTP, and AutoIP
Alarm output connector.....	SMPTE 269M standard BNC

### Control over Fiber and TPS

Selectable baud rate .....	Yes
Baud rate .....	9600, 19200, 36800, 57600
Sent/received data throughput .....	Maximum 54 byte
Maximum bandwidth .....	57600 bit/sec*

\* (RS-232, IP and USB control altogether)

## HDMI Input Board Including 4K, 3D and Deep Color



MX-HDMI-3D-IB



Part No: 9112 0007

### Description:

MX-HDMI-3D-IB provides eight channel HDMI 1.4a inputs with DVI and HDCP compliance supporting all 3D formats as well. The input board is available with audio option connectors: digital S/PDIF or analog stereo connectors are available for advanced audio functions (HDMI embedded audio signals are managed by the board as well). The MX-HDMI-3D-IB without the digital or analog audio option can handle HDMI embedded audio as well. Advanced professional functions such as HDCP enable/disable mode, Pixel Accurate Reclocking, Advanced EDID Management and Frame Detector are integrated.

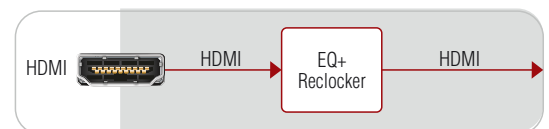
### Features:

- HDMI 1.4a; DVI and HDCP compliant
- 4K / UHD (30Hz RGB 4:4:4 , 60Hz YCbCr 4:2:0), HD video resolutions and all 3D formats are supported
- Advanced EDID Management and Frame Detector
- Pixel Accurate Reclocking
- Dolby TrueHD and DTS-HD Master Audio
- 36-bit deep color support
- Adjustable analog audio settings

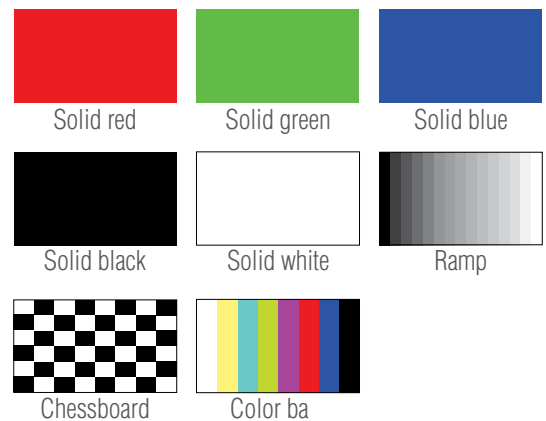
### Specifications

HDCP compliancy:	Yes
Max Resolution:	Up to 4K / UHD (30Hz RGB 4:4:4 , 60Hz YCbCr 4:2:0)
3D signal compatibility:	Frame packing, side-by-side, top-bottom
Input cable equalization:	20 dB
Power consumption (3.3 V) MX-HDMI-3D-IB & -IB-S:	0.79 A (typ.), 1.32 A (max.)
Power consumption (5 V) MX-HDMI-3D-IB & -IB-S:	0.56 A (typ.), 0.93 A (max.)
Calculated AC Power (W) MX-HDMI-3D-IB & -IB-S:	7.7 W (typ.), 12.9 W (max.)
Heat dissipation (BTU/h) MX-HDMI-3D-IB & -IB-S:	28 BTU/h (typ.), 47 BTU/h (max.)
Weight MX-HDMI-3D-IB & -IB-S:	809 g
Input connectors:	HDMI

### Port Diagram



### Available Video Patterns



### Test pattern generator video formats:

480p, 576p, 720p, 1080p, 1080p deep color

## HDMI Output Board Including 4K, 3D and Deep Color



MX-HDMI-3D-OB



Part No: 9113 0005

### Description:

MX-HDMI-3D-OB is an eight channel HDMI 1.4a output board, with DVI and HDCP compliance supporting all 3D formats. The output board is available with audio add-on connectors: digital S/PDIF or analog stereo connectors are available for advanced audio functions (HDMI embedded audio signals are managed by the board as well). The MX-HDMI-3D-OB without the digital or analog audio option can handle HDMI embedded audio as well. Pixel Accurate Reclocking, HDMI to DVI conversion are all incorporated. The board is compatible with deep color, Dolby TrueHD and DTS-HD audio.

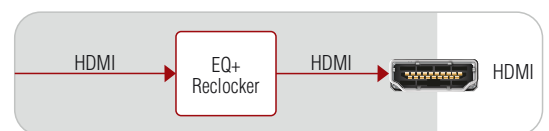
### Features:

- HDMI 1.4a; DVI and HDCP compliant
- 4K / UHD (30Hz RGB 4:4:4 , 60Hz YCbCr 4:2:0), HD video resolutions and all 3D formats are supported
- Advanced EDID Management and Frame Detector
- Pixel Accurate Reclocking
- Dolby TrueHD and DTS-HD Master Audio
- 36-bit deep color support
- Adjustable analog audio settings

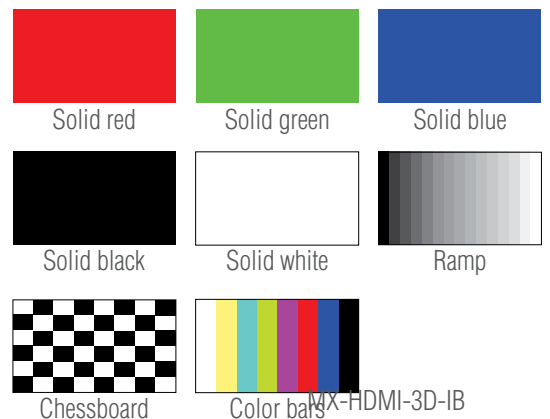
### Specifications

HDCP compliancy:	Yes
Max Resolution:	Up to 4K / UHD (30Hz RGB 4:4:4 , 60Hz YCbCr 4:2:0)
3D signal compatibility:	Frame packing, side-by-side, top-bottom
Power consumption (3.3 V) MX-HDMI-3D-OB & -OB-S:	0.79 A (typ.), 1.32 A (max.)
Power consumption (5 V) MX-HDMI-3D-OB & -OB-S:	0.56 A (typ.), 0.93 A (max.)
Calculated AC Power (W) MX-HDMI-3D-OB & -OB-S:	7.7 W (typ.), 12.9 W (max.)
Heat dissipation (BTU/h) MX-HDMI-3D-OB & -OB-S:	28 BTU/h (typ.), 47 BTU/h (max.)
Weight MX-HDMI-3D-OB & -OB-S:	809 g
Output connectors:	HDMI

### Port Diagram



### Available Video Patterns



**Test pattern generator video formats:**  
480p, 576p, 720p, 1080p, 1080p deep color

