## visual engineering
# LIGHTWARE

# EDID Manager

# User's Manual

DVI SIGNAL DETECT    MONITOR PRESENT HOT PLUG

DVI IN (PC)    DVI OUT (MONITOR)

SOURCE CONNECTED
+5 V DVI

BURN    LEARN

RED: INVALID EDID MEMORY
GREEN: VALID EDID SELECTED

POWER

5 V
1A DC

MEMORY ADDRESS
X    Y

00: EDID TRANSPARENT
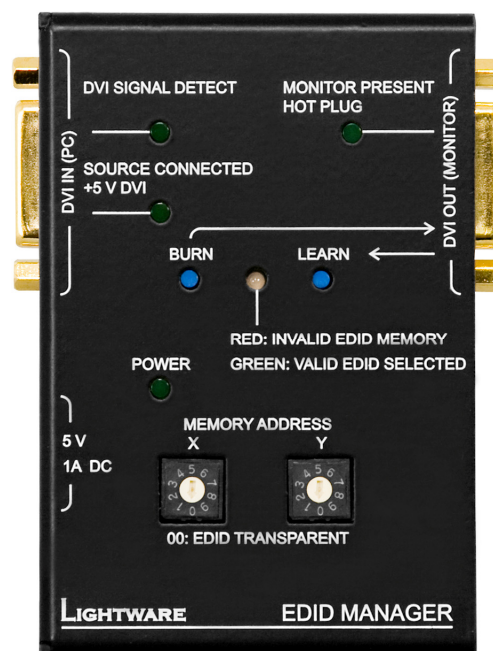
LIGHTWARE    EDID MANAGER

# SAFETY INSTRUCTIONS

Class II apparatus construction.

This 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 top cover will expose dangerous voltages. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.

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.

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

# 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 enviroment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibily 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.

# visual engineering
# LIGHTWARE

# $C\epsilon$
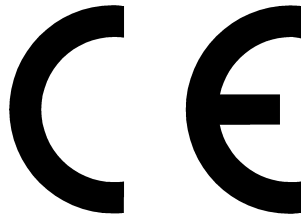
# DECLARATION OF CONFORMITY

We,

## Lightware Kft. 1071 Budapest Peterdy str. 15 HUNGARY

as manufacturer declare, that the products

## EDID Manager
( Computer Monitor Extender )

in accordance with the EMC Directive 2004/108/EC and the Low Voltage Directive 2006/95/EEC is in conformity with the following standards:

**EMI/EMC** .................................... **EN 55022 Class B**
**Safety**........... **UL, CUL, GS, CR, RCM, PSE, Class II**

**Date:**        01 October 2009

**Name:**        Gergely Vida ( Managing Director )

**Signed:**

# Table of contents

# 1.    General description

## 1.1.    Box contents

– EDID Manager

– User's manual

– Quick Start Guide

– +5V wall plug power adaptor

## 1.2.    Features

- **60 meter input cable compensation** – Using 22AWG high quality DVI cable, the input is automatically compensated for up to 60 meter cable length, which extends installation possibilities even on highest HDTV or computer resolutions. In case of lower pixel resolutions, this length can be even higher.

- **Advanced EDID Management** – The user can emulate any EDID on the EDID Manager's input, read out and store any attached monitor's EDID in 49 internal memory locations.

- **Supports all HDTV resolutions** – 720p, 1080i and 1080p etc. without HDCP encoding - Unencrypted HDTV signals up to 165 MHz pixel clock frequency regardless of the resolution passed through.

- **Signal Present LED** – Valid DVI clock signal is detected, when signal is applied to DVI IN.

- **Source and Monitor Connected LEDs** – Two LEDs indicate when a DVI source and display device is connected to the EDID Manager.

- **Top panel control** – EDID Address selection with two decimal rotary switches, Learn EDID and Burn EDID buttons are available for Advanced EDID Management.

- **Fiber cable support** – Self powered DVI fiber cables using +5V from DVI sources (VGA cards, etc.) usually consume more than 50 mA, which load is maximum allowed by DVI 1.0 standard. EDID Manager supports +5V 500 mA constant current output on DVI OUT to power long distance fiber optical cables.

- **Universal power adaptor** – EDID Manager is equipped with a universal +5V power adaptor, which accepts AC voltages from 100 to 240 Volts with 50 or 60 Hz line frequency.

## 1.3. Understanding EDID

### 1.3.1. Basics

EDID stands for Extended Display Identification Data. Simply put, EDID is the passport of display devices (monitors, TV sets, projectors). It contains information about the display's capabilities, such as supported resolutions, refresh rates (these are called Detailed Timings), the type and manufacturer of the display device, etc.

After connecting a DVI source to a DVI display, the source reads out the EDID to determine the resolution and refresh rate of the image to be transmitted.
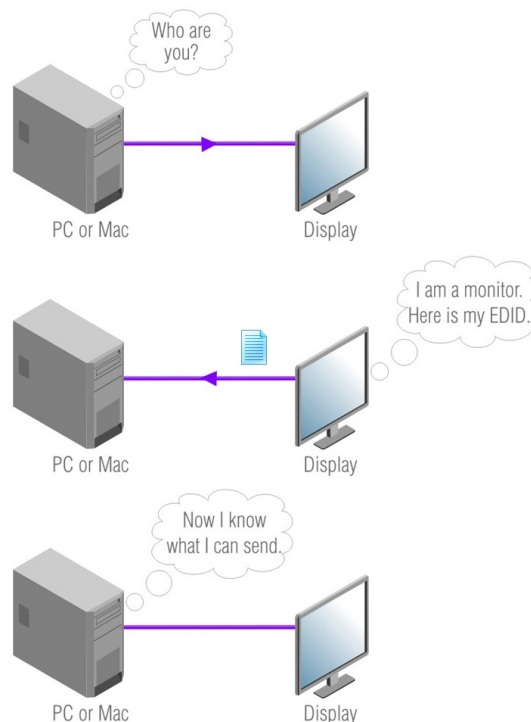


Most DVI computer displays have 128-byte long EDID structure. However, Digital Televisions and HDMI capable displays may have another 128 bytes, which is called E-EDID and defined by CEA (Consumer Electronics Association). This extension contains information about additional Detailed Timings, audio capabilities, speaker allocation and HDMI capabilities. It is important to know, that all HDMI capable devices must have CEA extension, but not all devices are HDMI capable which have the extension.

### 1.3.2. Common problems related to EDID

Problem: „My system consists of the following: a PC, then a Lightware EDID Manager, then a third party Distribution Amplifier, then an SXGA (1280x1024) LCD monitor and an XGA (1024x768) projector. I would like to see the same image on the monitor and the projector. What EDID should I chose on the EDID Manager?"

Solution: If you want to see the image on both displays, you need to select the resolution of the smaller display (in this case XGA), otherwise the smaller display may not show the higher resolution image.

Problem: „I turned the rotary switches on the EDID Manager 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 don't sense that EDID has been changed. You need to restart your source to make it read out the EDID again.

Problem: „I have an EDID Manager and I'm using a Lightware factory preset EDID. I would like to be able to choose from different resolutions, but my source allows only one resolution."

Solution: Most Lightware factory preset EDID allow only one resolution, forcing the sources to output only that particular signal. You need to select the Universal EDID (address 49). It supports all common VESA resolutions. Additionally it also features audio support.

## 1.4. Advanced EDID Management

Each DVI sink (e.g. monitors, projectors, plasma displays, and switcher inputs) 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 makes use of EDID data structure for the identification of 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 case of EDID readout failure or missing EDID the source will not output DVI video signal.

EDID Manager has advanced functions that help system integration. It stores and emulates 99 EDID plus the EDID of the display device which is connected to DVI OUT. Memory addresses from 01 to 50 are factory presets, while memories from 51 to 99 are user programmable. The EDID Manager stores the EDID of the last attached monitor or projector connected to DVI OUT in a non-volatile memory.

The EDID emulated on the input can be copied from the EDID Manager's memory (static EDID emulation) or from the attached monitor (dynamic EDID emulation). For example, the EDID Manager can be set up to emulate the device, which is connected to DVI OUT, and the EDID automatically changes, if the monitor is replaced with another display device (as long as it has a valid EDID).

Info        *The user is not required to disconnect the DVI cable to change an EDID as opposed to other manufacturer's products. EDID can be changed even if source is connected to the input and powered ON.*

## 1.5. Fiber Cable powering

As special feature, EDID Manager is able to supply 500 mA current to power fiber optical transmitters like Lightware DVI-OPT-TX100 (Pin 14 on DVI OUT connector). Standard DVI outputs or VGA cards supply only 55 mA current on +5V output, thus unable to directly power a fiber optical cable.

Info        *EDID Manager does not check if the connected sink (monitor, projector or other equipment) supports Hotplug or EDID signals but outputs the signal immediately after it has been applied to the input.*

## 1.6.    Top view
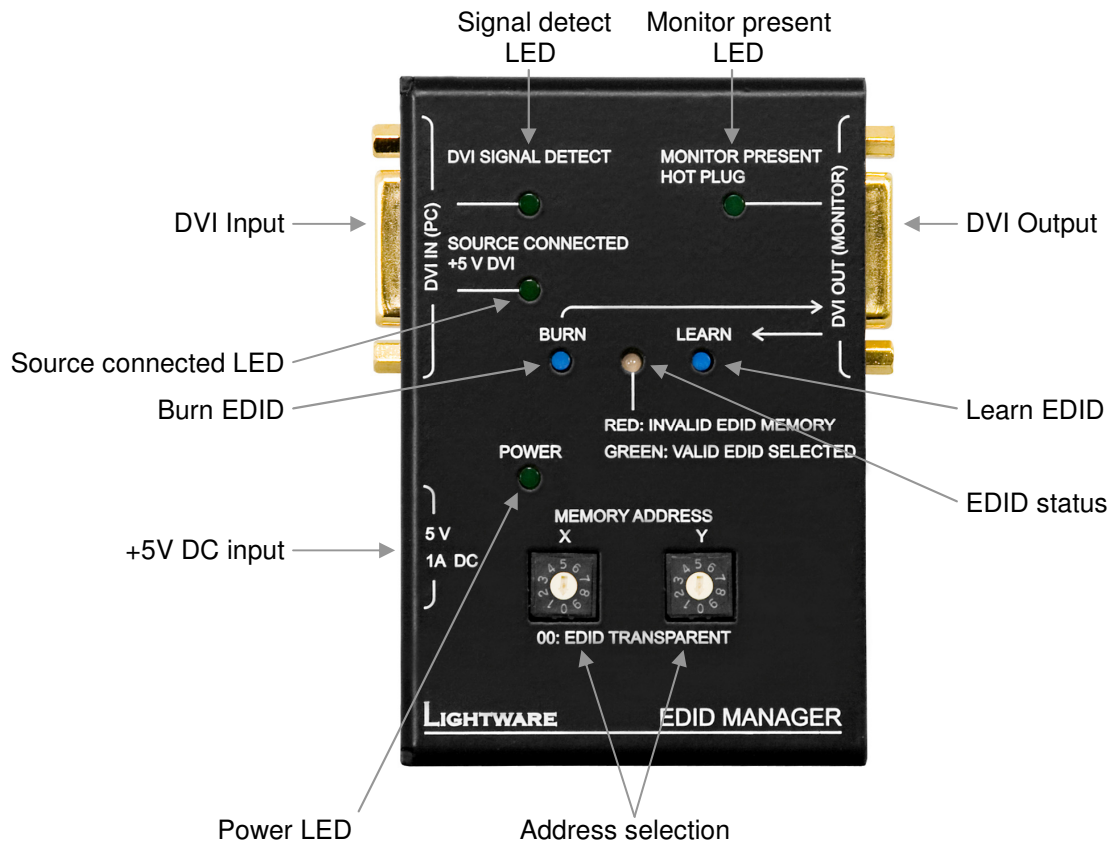


| | |
|---|---|
| **Signal detect LED** | Indicates if a valid DVI clock signal is present on the DVI IN connector. |
| **Monitor present LED** | Indicates if a powered display device (or matrix switcher, repeater, etc.) is connected to the DVI OUT connector and sends a valid Hot Plug Signal on Pin 16 through the DVI cable. |
| **DVI Input** | Connect one single link DVI-D or DVI-I cable (only digital pins are connected internally) between the DVI source and EDID Manager. The built-in automatic cable equalization circuit compensates for up to 60 meters at 1920x1080p 60 Hz resolution. For lower resolutions, even longer cables can be used. |
| **Source connected LED** | Indicates if +5V power signal is sent to Pin 14 of the input DVI connector by the DVI source (PC, Laptop, etc). |
| **Burn EDID** | Reprograms the attached DVI Matrix switcher's input EDID data. For more information, see chapter 2.5. |
| **+5V DC connector** | Connect the output of the supplied +5V power adaptor. CAUTION! Warranty void if damage occurs due to use of a different power source. |

| | |
|---|---|
| **DVI Output** | Connect one single link DVI-D or DVI-I cable (only digital pins are connected internally) between EDID Manager and display device. |
| | The output connector is able to supply 500 mA current on pin 14 to power fiber optical DVI extenders like DVI-OPT-TX100. |
| | If a long DVI cable is connected then equalization and reclocking may be necessary at the receiver end of the cable. |
| **Learn EDID** | Stores the EDID of the display device attached to DVI OUT in the selected memory address between 51…99. To learn the EDID, select an appropriate address with the rotary switches and press and hold the Learn button for two seconds. |
| **EDID status LED** | Function 1: displays the firmware version of the device. For more information, see chapter 2.1. |
| | Function 2: after applying a Hot Plug signal to DVI OUT, this LED indicates that the unit is reading the EDID from the connected display device. If the LED is blinking green then the EDID is valid, if blinking red, then the EDID is invalid or missing. |
| | Function 3: this LED indicates whether the selected EDID is valid (continuous green = valid, continuous red = invalid or empty memory selected). |
| | Function 4: after pressing the LEARN button, this LED indicates whether the learn process was successful (blinking green = successful, blinking red = unsuccessful). For more information, see chapter 2.2. |
| | Function 5: after pressing the BURN button, this LED indicates whether the burn process was successful (blinking green = successful, blinking red = unsuccessful). For more information, see chapter 2.5. |
| **Address selection** | The rotary switches select one of 100 EDID memory addresses. Addresses 1…50 are factory preset and 51…99 are user programmable. Address 00 enables transparent mode. For more information, see chapter 2.2. Use a flat head screwdriver that fits into the actuator. Avoid the use of keys, coins, knives and other sharp objects because they might cause permanent damage to the rotary switches. |

## 1.7.    Electrical connections

### 1.7.1.  DVI inputs and outputs

EDID Manager provides 29 pole „digital only" DVI-I connectors for input and output connections. Always use high quality DVI cable for connecting sources and displays.

The input has a built-in signal detection circuit with a LED indicator. The DVI Signal Detect LED lights green, if the input connector senses an active DVI signal.

| Pin | Signal | Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|-----|--------|
| 1 | TMDS Data2- | 11 | TMDS D1/3 Shield | 21 | TMDS Data5+ (nc) |
| 2 | TMDS Data2+ | 12 | TMDS Data3- (nc) | 22 | TMDS Clk Shield |
| 3 | TMDS D2/4 Shield | 13 | TMDS Data3+ (nc) | 23 | TMDS Clock+ |
| 4 | TMDS Data4- (nc) | 14 | +5V Power | 24 | TMDS Clock- |
| 5 | TMDS Data4+ (nc) | 15 | GND (for +5V) | 25 | R (not connected) |
| 6 | DDC Clock | 16 | Hot Plug Detect | 26 | G (not connected) |
| 7 | DDC Data | 17 | TMDS Data0- | 27 | B (not connected) |
| 8 | VSYNC (nc) | 18 | TMDS Data0+ | 28 | HSYNC (nc) |
| 9 | TMDS Data1- | 19 | TMDS D0/5 Shield | 29 | Analog GND |
| 10 | TMDS Data1+ | 20 | TMDS Data5- (nc) | | |

*Table 1. DVI-I "digital only" connector pin assignments*

**Cable length at inputs**

EDID Manager has an advanced built-in cable equalization circuit, which automatically provides cable length compensation. This circuit extends the maximum usable cable length to 60 meters using high quality 22AWG copper cable at WUXGA 1920x1200 graphics resolution.

| Cable type / Signal | 22 AWG<br>Reference type<br>DVI GEAR:  SHR DVI | 24 AWG<br>Reference type<br>TASKER:  TSK 1060 |
|---------------------|-----------------------------------------------|-----------------------------------------------|
| **Resolution** | **Max length (meter)** | **Max length (meter)** |
| **1920x1200;  1600x1200; 2048x1080p;  1080p** | 60 m | 50 m |
| **1680x1050;  1400x1050; 1280x1024** | 75 m | 62 m |
| **1024x768;  1365x768; 720p;  1080i;** | 92 m | 77 m |
| **800x600** | 100 m (calculated) | 84 m (calculated) |
| **640x480;  480p;  576p** | 120 m (calculated) | 100 m (calculated) |

*Table 2. Maximum DVI cable lengths at inputs*

# 2. Operation

## 2.1. Power

When building an electronic system, make sure that all of the devices are powered down before connecting them. Powered on devices may have dangerous voltage levels that can damage sensitive electronic circuits.

1. After the system is complete, connect the output of the +5V Power Adaptor to the EDID Manager. The unit is immediately powered ON.

   After the EDID Manager is initialized, the attached DVI source and monitor can be powered on.

2. After being powered on, the EDID Manager displays its firmware version using the EDID Status LED.

   The following example shows this process for a firmware version of 1.3.7

   RED blinks once → Short pause → GREEN blinks three times → Short pause → GREEN blinks seven times → Short pause → The normal function of the LED is in effect.

3. After indicating the firmware version, the EDID STATUS LED lights red for 2-3 seconds, then turns green if the selected EDID is valid, or remains red, if the selected EDID is invalid.

4. If a display device is connected to DVI OUT, the EDID Manager reads the EDID from the attached monitor's EDID memory.

   If the read process is successful, the GREEN LED blinks a few times then the EDID Status LED shows whether the selected EDID is valid (green) or not (red).

   If the read process is unsuccessful, the RED LED blinks a few times then the EDID Status LED shows whether the selected EDID is valid (green) or not (red).

*Info*    *If none of the LEDs light up upon power-up, the unit is most likely damaged and further use is not advised. Please contact* support@lightware.hu

## 2.2. Learning the EDID

The factory preset EDIDs cannot be changed by the user. Only addresses from 51 to 99 are user programmable.

1. After connecting the sink device to DVI OUT, use a screwdriver to select an empty memory address. EDID are stored in multiple programmable non-volatile memories.

   If the EDID status LED is illuminated RED, then the memory slot is empty and ready to be programmed. If GREEN, the memory was already used before, but still available for reprogramming.

2. Push the LEARN button on the top side of the EDID Manager and hold it down for approximately 3 seconds.

   Once the button is pushed the EDID status LED goes dark. If the teaching is successful, the GREEN EDID status LED blinks five times and stays illuminated. If the teaching is unsuccessful, the RED EDID status LED blinks five times and stays illuminated either red or green, depending on the status of the selected address.

## 2.3. Switching the EDID

1. Use a screwdriver to change the memory address on the top side of the EDID Manager.

   After either one of the rotary switches has been rotated the unit waits approximately 2 seconds before the selected EDID becomes active. If the EDID status is unchanged the EDID STATUS LED does not blink.

2. The address 00 (zero zero) has a special function. If a monitor is connected to DVI OUT, then its EDID is copied to the DVI IN connector. If no monitor is connected to the output then the EDID transmitted to the DVI IN connector is the EDID of the last connected monitor.

Info    *If an invalid EDID is selected, the EDID Manager does NOT give a HOT PLUG signal to the source connected to DVI input.*

Info    *After every EDID change, EDID Manager toggles the HOT PLUG signal for approximately 1 second. Some graphics cards or DVD players do not sense the HOT PLUG signal, and even if EDID has been changed, the set resolution is not affected. In this case the source device must be restarted, or powered OFF and ON again.*

## 2.4. Factory preset EDID list

Lightware factory preloaded EDID are specially provided to force graphic cards to output only the exact pixel resolution and refresh rate.

Universal EDID (address 49) allows multiple resolutions including all common VESA defined resolutions. In addition, it also features audio support. The use of universal EDID is advised for fast and easy system setup.

| MEMORY | Resolution | MEMORY | Resolution |
|--------|------------|--------|------------|
| 01 | 640x480@60 Hz | 26 | 1600x1200@50 Hz |
| 02 | 640x480@75 Hz | 27 | 1600x1200@60 Hz |
| 03 | 848x480@60 Hz 16:9 | 28 | 1920x1200@60 Hz |
| 04 | 800x600@50 Hz | 29 | 1920x1200@50 Hz |
| 05 | 800x600@60 Hz | 30 | 480i@59.94 Hz |
| 06 | 800x600@75 Hz | 31 | 640x480@59.94 Hz |
| 07 | 1024x768@50 Hz | 32 | 720x480p@60 Hz |
| 08 | 1024x768@60 Hz | 33 | 576i@50 Hz |
| 09 | 1024x768@75 Hz | 34 | 720x576p@50 Hz |
| 10 | 1152x864@75 Hz | 35 | 1280x720p@50 Hz |
| 11 | 1280x768@50 Hz | 36 | 1280x720p@60 Hz |
| 12 | 1280x768@60 Hz | 37 | 1920x1080i1 @50 Hz |
| 13 | 1280x768@75 Hz | 38 | 1920x1080i2 @50 Hz |
| 14 | 1360x768@60 Hz | 39 | 1920x1080i@60 Hz |
| 15 | 1364x768@50 Hz | 40 | 1920x1080p@24 Hz |
| 16 | 1364x768@60 Hz | 41 | 1920x1080p@25 Hz |
| 17 | 1364x768@75 Hz | 42 | 1920x1080p@30 Hz |
| 18 | 1280x1024@50 Hz | 43 | 1920x1080p1 @50 Hz |
| 19 | 1280x1024@60 Hz | 44 | 1920x1080p2 @50 Hz |
| 20 | 1280x1024@75 Hz | 45 | 1920x1080p@60 Hz |
| 21 | 1366x1024@60 Hz | 46 | 2048x1080p1 @50 Hz |
| 22 | 1400x1050@50 Hz | 47 | 2048x1080p2 @50 Hz |
| 23 | 1400x1050@60 Hz | 48 | 2048x1080p@60 Hz |
| 24 | 1400x1050@75 Hz | 49 | UNIVERSAL EDID |
| 25 | 1680x1050@50 Hz | 50 | 2560x1600@60 Hz |

*Table 3. Factory Preset EDID list*

## 2.5. Burning the EDID

Sink devices store their EDID information in a non-volatile memory (EEPROM, Electrically Erasable Programmable Read-Only Memory). Normally this memory is write protected in monitors and projectors, thus impossible to be modified by the Burn EDID function of the EDID Manager. Some of them however are not write protected, so users must be very careful when using this function.

**<span style="color:red">Burning a wrong EDID can damage the display!</span>**

Users can burn EDID in the inputs of any DVI Matrix Switcher that doesn't have built-in EDID management function as long as its EEPROMs are not write protected.

1. After connecting the sink device to DVI OUT of EDID Manager, use a screwdriver to select the memory address of the EDID to be burnt.

   If the EDID status LED is illuminated GREEN, then the memory slot contains a valid EDID and it is ready to be burnt.

2. Push the BURN button and hold it down for approximately 10 seconds.

   Once the button is pushed the EDID status LED goes dark. After the 10 seconds, the EDID status LED becomes orange. Once the LED becomes orange, push and release the BURN button 3 times within 5 seconds. Now the burn process starts.

   If the EDID status LED blinks GREEN, then the burn process was successful. If it blinks RED, then the burn process failed.

# 3. Troubleshooting

## 3.1. There is no picture

**Check the cables**

Due to the high data rates, the cables must fit very well. DVI connectors have to be locked with screws, no tensions or breaches are allowed. If your source or display has more connectors then make sure that the proper interface is selected.

**Check the source equipment**

Check the Source Connected LED on the top side of the EDID Manager. This LED indicates the presence of the +5V signal coming from the DVI source. If it is not illuminated, then your DVI source is powered off, or its DVI output is inactive. Please refer to the user's manual of your DVI source.

**Check the incoming signal**

Check the DVI Signal Present LED on the top side of the EDID Manager. This LED indicates the presence of an active incoming DVI clock signal. If it is not illuminated, then no DVI clock signal is present at the input connector of the EDID Manager. Please check whether your source is configured to output a video signal.

Check whether your source is powered on and configured properly. If the source is a computer, then verify that the DVI output is selected and active. Try restarting your computer; if you get a picture during the booting process, you have to review the driver settings.

**Check the display status**

Check the Monitor Present Hotplug LED on the top side of the EDID Manager. This LED indicates the presence of the Hotplug signal coming from the attached display device. If it is not illuminated, then your display is not powered or not configured properly.

**Check EDID related problems**

Check the EDID Status LED on the top side of the EDID Manager. This LED indicates whether a valid EDID is selected. If it is illuminated RED, then an invalid EDID or an empty memory address is selected. Please select a valid EDID.

If the EDID Status LED is illuminated GREEN, then maybe your display device is not capable of receiving the sent video format. Try emulating your display device's EDID to the source. You will find help to this process in section 2.3. If you get a picture now, you have an EDID related issue, please read chapter 1.3 for more details.

**Check the EDID**

Maybe the data rate is too high for that type of cable. Try switching another EDID to the inputs with lower resolution. If the source is a computer and you are an expert user, you can try modifying the refresh rate, so you would be able to get it to work at higher resolutions over a noisy connection.

# 4. Mechanical Drawings

## 4.1. Top view
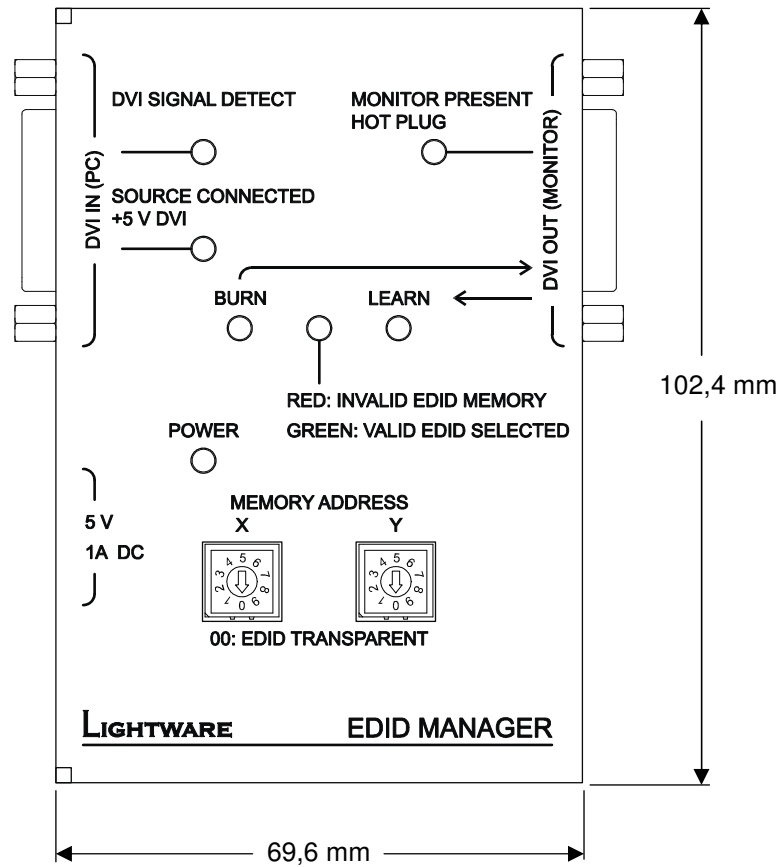


## 4.2. Side view
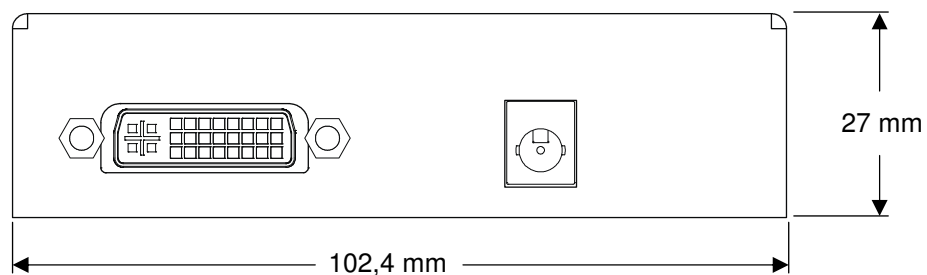
# 5.    Warranty

Lightware Visual Engineering warrants this product against defects in materials and workmanship for a period of three years from the date of purchase.

The customer shall pay shipping charges when unit is returned for repair. Lightware will cover shipping charges for return shipments to customers.

In case of defect please call your local representative, or Lightware at

Lightware Visual Engineering

1071. Budapest Peterdy str. 15, HUNGARY

Tel.:          +36 1 889 6177

Fax.:         +36 1 342 9903

E-mail:       support@lightware.hu

# 6. Specifications

**Video**

Standard ......................................................................................................... DVI 1.0

Color depth .........................................................................24 bits, 8 bit/color

Format.........................................................................................RGB only

Data rate .........................................  all between 25 Mbps and 1.65 Gbps /color

Resolutions (single link).................all between 640x480 and 1920x1200@60Hz

HDTV resolutions............................................................... 720p, 1080i, 1080p

HDCP compliant ........................................................................................No

Input equalization.................................................................+40 dB, automatic

Reclocking ................................................................................................No

EDID Emulation ...........................Yes, 50 factory preset, 50 user programmable

EDID Support.............................................................256 Byte Extended EDID

**General**

Connectors................................................................29-pole DVI-I digital only

Number of DVI inputs........................................................................... 1

Number of DVI outputs ........................................................................ 1

+5V output current (DVI)..............500 mA continuous with overcurrent protection

Power adaptor.............................. 100-240 V AC 50/60 Hz 0.6A to +5V DC 2.6A

Power consumption ..........................................................................1,5W typical

.................................... 4W max when powering a fiber extender on DVI output

Compliance .......................................................................................... CE

EMI/EMC..................................................................EN 55022 Class B

Safety.................................................... UL, CUL, GS, CR, RCM, PSE, Class II

Warranty ........................................................................................ 3 years

**Enclosure**

Rack mountable ........................................................................................No

Material ......................................................................................... 2 mm Metal

Dimensions .............................................102,4 mm W x 69,6 mm D x 27 mm H

Net Weight ...................................................................................... 175 g

NOTES: