

## User Manual

# HMD\_CONNECTION

## Software

For all Trivisio HMDs



Subject to technical modifications

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## 1 Liability Limitation

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In no event shall the author be liable for damages, including any general, special, incidental or consequential damages arising out of the use or inability to use the program, including but not limited to loss of data or losses sustained by you or third parties or a failure of the program to operate with any other programs, even if such holder or other party had previously been advised of the possibility of such damages. This software is provided "as-is". No warranty of any kind is expressed or implied.

By installing the software you accept the end user license agreement and liability limitations.

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## 2 Introduction

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### 2.1 Software

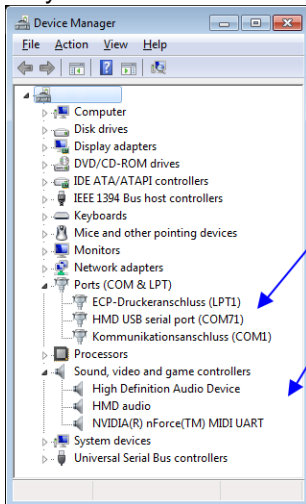
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HMD\_CONNECTION is a software that interacts with the Head-Mounted-Device (HMD ) through USB and enables the user to control parameters of the HMD, as well as to update the HMD firmware.

Depending on the state of HMD\_CONNECTION software, the HMD appears to the PC either

- as composite USB device (normal state) with
  - CDC interface (virtual COM port)
  - and Audio interface collection (AIC) of Audio device class v1.0 (USB\_ser driver with CDC\_ACM\_1.inf for CDC and standard audio driver for audio)
- or as DFU bootloader (ATMega32U4) (firmware update state)

As you can see in Windows device manager.



Please install the HMD\_CONNECTION software **before** you connecting the device the first to time to your PC.

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## 2.2 Hardware

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The Head-Mounted-Display (HMD) contains of 3 parts:

1. HMD part (head mounted body with oculars)
2. Cable
3. Dongle part (DVI or VGA) at the end of cable

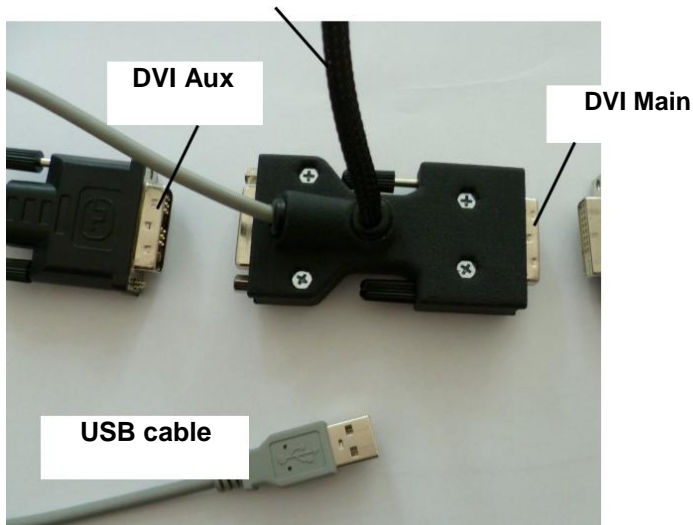
The Dongle has 2 input interface connectors

- Male for the Main channel
- Female for Aux channel. The Aux is connected to the video source by standard DVI or VGA cable. The

power is supplied by the USB cable. The adjustments of the HMD are controlled through USB, a standard USB cable coming from Dongle case.

To use the software properly both USB and video connector DVI/VGA must be connected to the PC.

### Cable to HMD



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## 3 Installation

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### 3.1 Download

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Please download the latest version of HMD\_CONNECTION from Trivisio website:

[www.trivisio.com/index.php/support/software](http://www.trivisio.com/index.php/support/software)

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### 3.2 Installation Process

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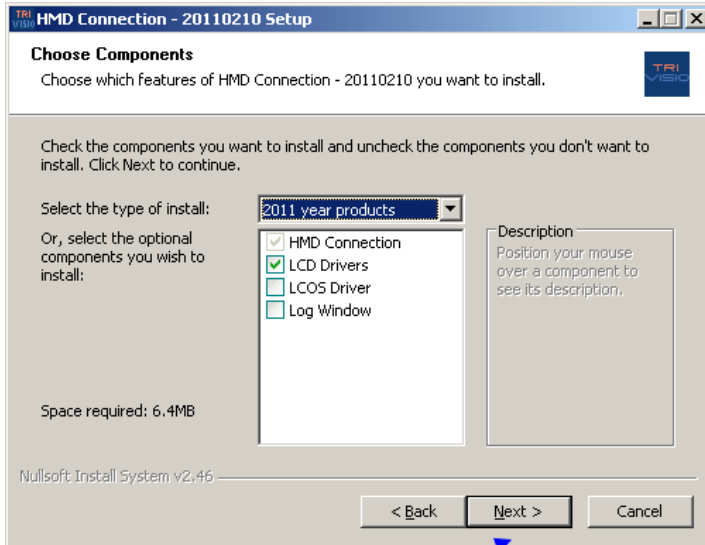
Please install the HMD\_CONNECTION software **before** you connect the device the first time to your PC:

Run the setup program (exe) and follow the instructions.



Click the "Next" button to continue installation process.

After accepting the EULA, you have to select the driver and software components you will need. Older devices were utilizing LCoS microdisplays (Liquid Crystal on Silicon), since 2011 most devices using LCD microdisplays (Liquid Crystal Displays). You can see an overview of HMDs and their microdisplays on the cover page.



After clicking "Next" button the HMD\_CONNECTION drivers and adjustment software GUI will be installed.

During installation process there is a third party software installed (FLIP from ATMEL) which is needed for the HMD firmware update, you will be prompted.

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## 4 Graphical User Interface (GUI)

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The Graphical User Interface (GUI) of the HMD\_CONNECTION software consists of 4 Tabs:

1. Connection
2. Firmware Update
3. Picture
4. Display Information

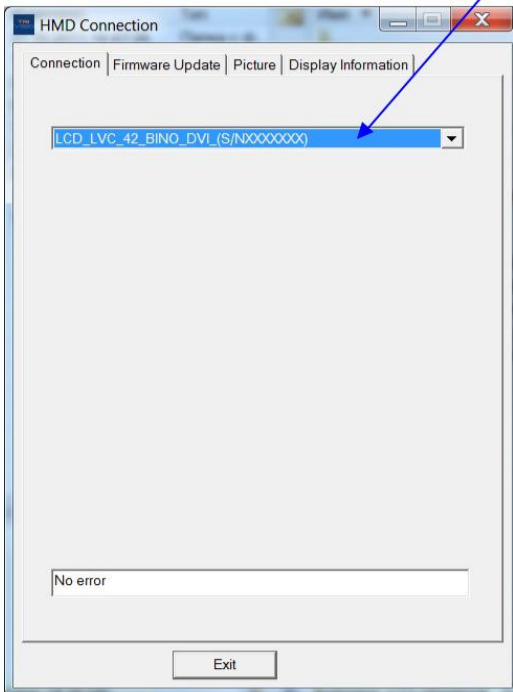
They are described in detail below.

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### 4.1 Connection

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You can see the name of HMD device(s) and select it for adjustments or firmware updates.





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## 4.2 Firmware Update

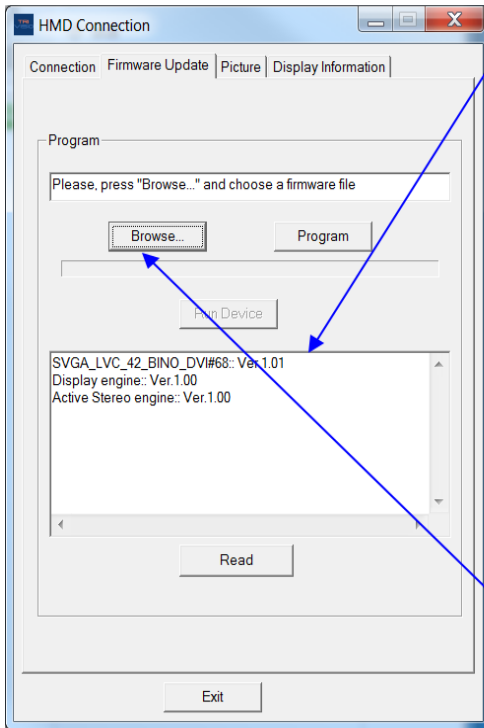
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In case you need to update the firmware of your HMD, please download the latest version from Trivisio website:  
[www.trivisio.com/index.php/support/software](http://www.trivisio.com/index.php/support/software)

Then unzip the files from `trivisio_hmd_firmware.zip` container. There are 2 or 3(for devices with active stereo hardware support) firmwares:

- i. Main firmware
- ii. Display\_engine firmware
- iii. Active\_stereo\_engine firmware

You can see main firmware version number.



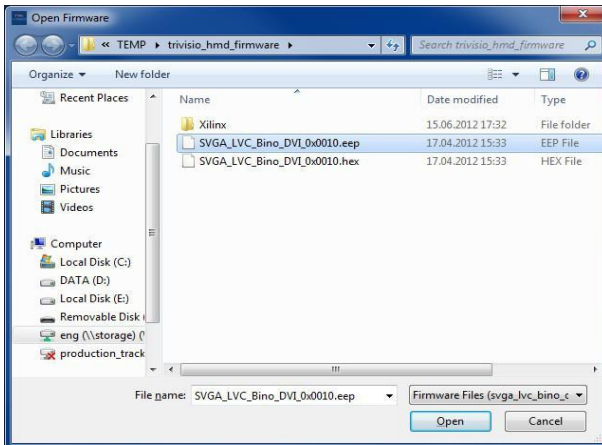
Select the appropriate firmware by clicking on "Browse" button.

#### 4.2.1 Main firmware update.

The main firmware consists of two files: \*.eep and \*.hex, those files should be updated both. The order of updating is not important.

**During the update process never unplug the device and do not shut down the computer and do not turn off the power !**

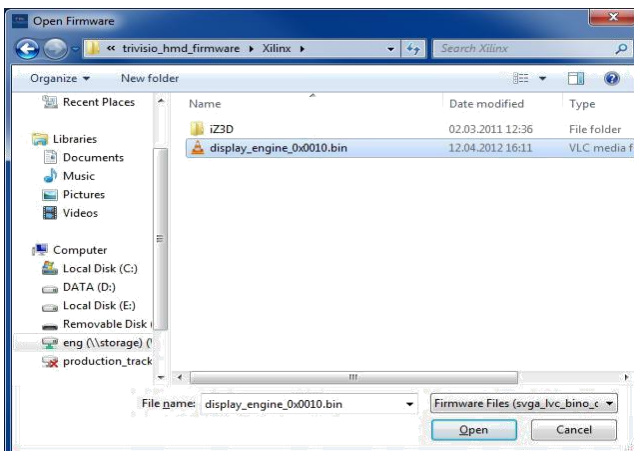
Browse \*.eep file, then click "Program" button. At this moment the device reconnected on USB as DFU Bootloader. The Image is turned off. Then the EEPROM memory (which contains the user parameters) programming starts. Wait until this is finished. Then browse \*.hex file, click "Program" button and the FLASH memory programming starts. Wait until this is finished.



When both files are updated, click on "Run Device" Button. The HMD is reconnected on USB as composite device (COM port + Audio). The video image appears on the display(s).

#### 4.2.2 Display\_engine firmware update

Browse display\_engine\_0x00xx.bin file from Xilinx folder of Trivisio firmware, then click "Program" button. Wait until this is finished.



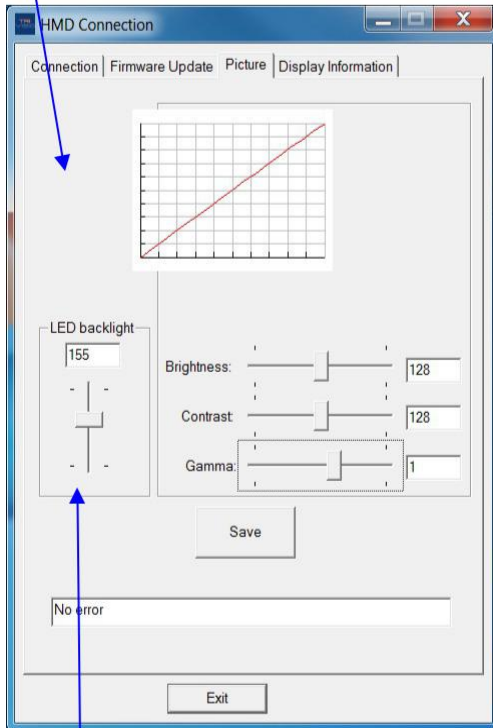
#### 4.2.3 Active\_stereo\_engine firmware update (for devices with active stereo hardware support)

Browse Active\_stereo\_engine \_0x00xx.bin file from Xilinx folder of Trivisio firmware, then click "Program" button. Wait until this is finished.

### 4.3 Picture

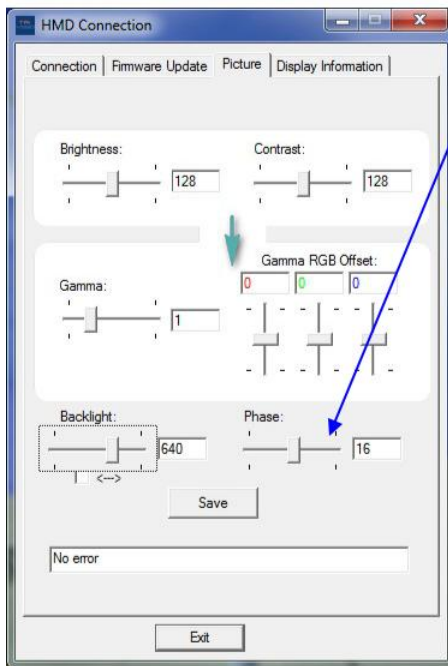
There are several controls listed in order of processing to adjust the Displays. The default values are in ( ):

- Brightness (128)
- Contrast (128)
- Gamma (1)



Backlight control allows to adjust backlight illumination of LCD microdisplays.

If HMD has analog VGA interface (old devices) the phase control is added and allows adjusting the phase of ADC sampling.

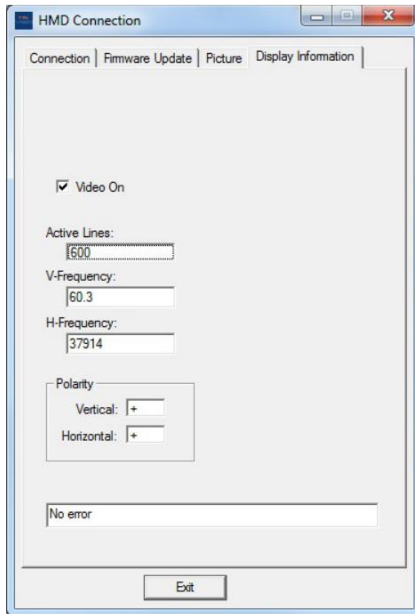


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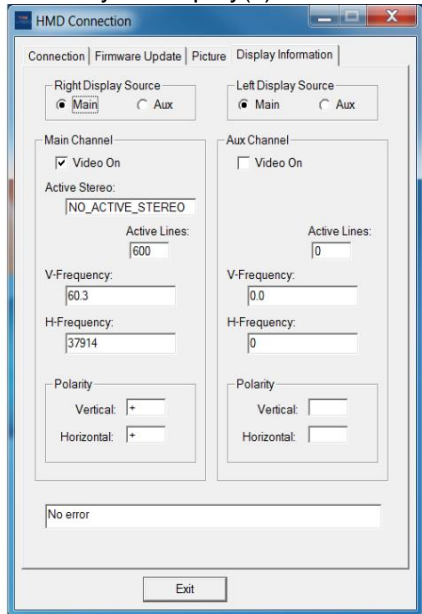
## 4.4 Display Information

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This tab can show the status information of your display(s):



Monocular HMD



Stereoscopic HMD

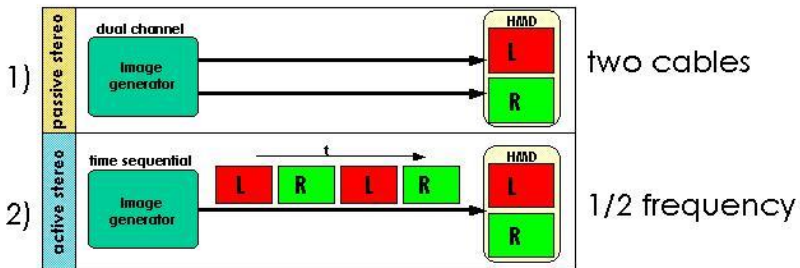
There are 2 input video interfaces inside the HMD's electronic (see also 2.2 Hardware page 3):

1. Main channel
2. Aux channel

The HMD can operate in 3 modes:

1. Mono  
The video image data is supplied to either of channels only, both displays (left and right) showing the same image.
2. Passive Stereo  
The video image data is supplied to both interfaces, either from 2 different PCs or from dual head graphics card. The right display is showing the image from Main channel, the left display is showing the image from Aux channel.
3. ActiveStereo  
The stereoscopic video image data is applied to the Main channel. Currently only frame interleaved encoding is supported (i.e. stereo driver from nVidia). Other active stereo encodings coming soon.

For more info see  
[http://trivisio.com/download/UserManual\\_ActiveStereo.pdf](http://trivisio.com/download/UserManual_ActiveStereo.pdf)



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## 5 Troubleshooting

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<b>Problem</b>	<b>Remedy</b>
The picture control tab is not active, no adjustments possible.	The USB cable is connected, but no DVI signal is supplied (check dongle connection, check graphics card settings)
Windows can not install the drivers properly	If you have connected the device before installing the software unplug the HMD and connect again. If this does not help, update driver manually by removing the device from Windows device manager and then re-connecting

**Please see also FAQ section on Trivisio's website.**

For all other problems please contact the Trivisio support.