

User Manual

LCD29-DVI

(optic see-through)



Subject to technical modifications

Copyright: Trivisio Prototyping GmbH, Karcherstrasse 10, D-67655 Kaiserslautern

WARNING

Before using the LCD29 HMD please read carefully these safety instructions.

Read this handbook and use the LCD29 device in strict accordance in order to prevent any damage to your eye, other injury, loss of visual functions, property damage or death.

Children under the age of fifteen may not use this product.

We strongly advise you to get familiar with the LCD29 device and its capabilities before you use it for the first time.

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1 Safety Instructions

1.1 Health Concerns

➔ **WARNING:** Eye Disease, Eye Injury, and Glaucoma

If you have been diagnosed with or are susceptible to eye disease, eye injury, or glaucoma consult your doctor before use and do not use without your doctor's approval.

➔ **CAUTION:** Heart Disease, High Blood Pressure

If you have a history of heart disease or high blood pressure consult your doctor before use and do not use without his approval.

➔ **CAUTION:** Seizures

If you have a history of temporary spasm, unconsciousness, or epileptic seizures from light stimulation, consult your doctor before use and do not use without his approval.

If any of the following symptoms occur, if using LCD29 HMD, stop using immediately and rest:

- eye fatigue or irritation,
- headaches or dizziness,
- aches and pain in the neck or shoulders,
- double vision,
- nausea or motion sickness,
- inability to focus on the displays.

Misuse or overuse of this product may result in eye damage, or loss of visual functions.

1.2 General Safety Hints

- ➔ Avoid getting the cable entangled around your neck, body or arms. Use the belt pouch for the power unit and wear the cable close to your body.
- ➔ To ensure that the device does not fall off during use, always use the headband, and have it tightened with an adequate tension.

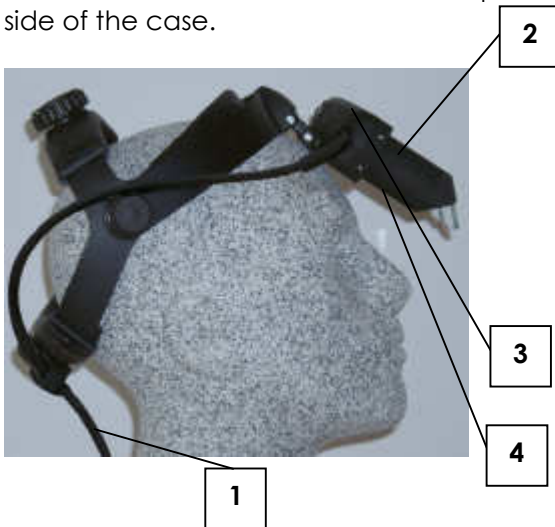
1.3 Warning for Electrical Products

- ➔ To avoid any risk of electrocution, do not bring any part of the LCD29 HMD in contact with water when the device is connected to an AC outlet (e.g. when plugged to PC).
- ➔ Avoid using and storing the LCD29 HMD at wet, humid, dusty and smoky surroundings and extreme temperatures.
- ➔ Do not use LCD29 HMD at temperatures below 0°C and above +40°C. Avoid dropping or mechanical shock, as frame and displays may be deformed.
- ➔ Always switch off and unplug the LCD29 HMD when it will not be used.
- ➔ In case of damage contact your retailer. There are no user serviceable parts. Only qualified service personnel should perform any service required on this product.

2 Description

2.1 Head Mounted Display HMD

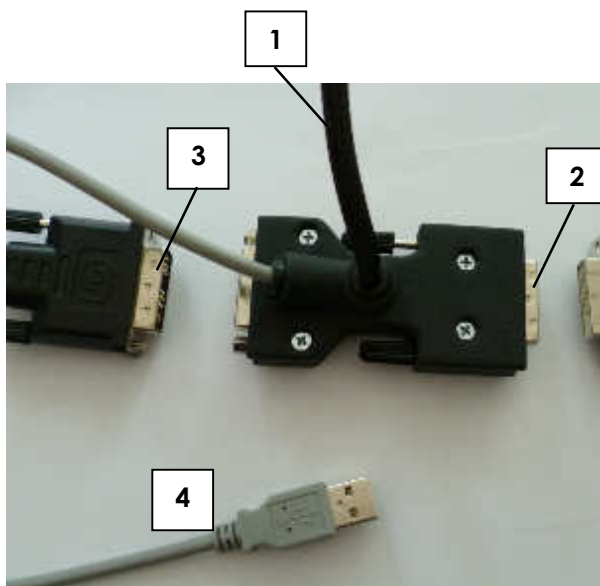
The HMD contains two **microdisplays** (2) to show the images. The **cable** (1) is permanently attached to the HMD and to the dongle element. Without a PC or external video source connected to the device there is no image visible inside the HMD. Into the 3.5mm socket (3) earphones can be connected. There is a built-in microphone (4) on the bottom side of the case.



2.2 DVI Dongle

The DVI dongle contains the following elements:

- (1) HMD cable permanently attached
- (2) DVI connector, Main=Left channel
(connect to graphics card)
- (3) DVI socket, Aux=Right channel
(connect by cable from 2nd DVI graphics card output)
- (4) USB cable for power supply, audio and settings



3 General Operating Instructions

3.1 Installing Software

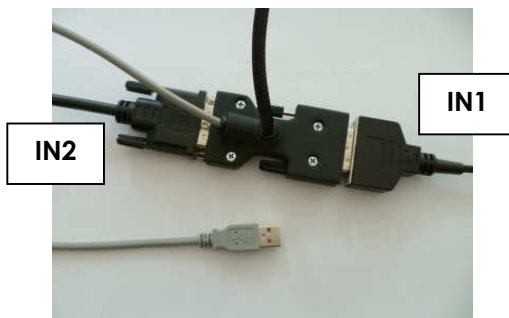
Please install the camera drivers and HMD adjusting software before you connect the device the first to time to your PC.

3.2 Connecting External Video Sources

To prevent damage to the electronic, first connect the video cables with your PC before you power on the device by connecting the USB cable. You can connect the device by plugging the DVI dongle directly into your graphics card (in case of HDMI output you can use converter plug) or by using DVI extender cable. This gives you Input1 (IN1) what is the main channel. You can also connect a second DVI signal to the Aux channel (IN2) from second DVI output of the same graphics card or from another graphics card, see also stereoscopic options "3.6

Using Different Stereo Modes" page 13). The device will automatically recognize the correct signal.

A static image can burn into the microdisplays after an extended period of time !



3.3 Attachment and Mechanical Adjustment

Putting on the HMD

- ➔ Put on the LCD29 HMD. Place the headband around the back of your head and pull it just tight enough to make it fit safely and comfortably.
- ➔ On the displays inside the HMD, you can now see the pictures of your video sources.
- ➔ Wearing the HMD you will see your surroundings only constricted. For this reason, please, move only carefully or not at all.



3.4 Adjusting the Interpupil Distance

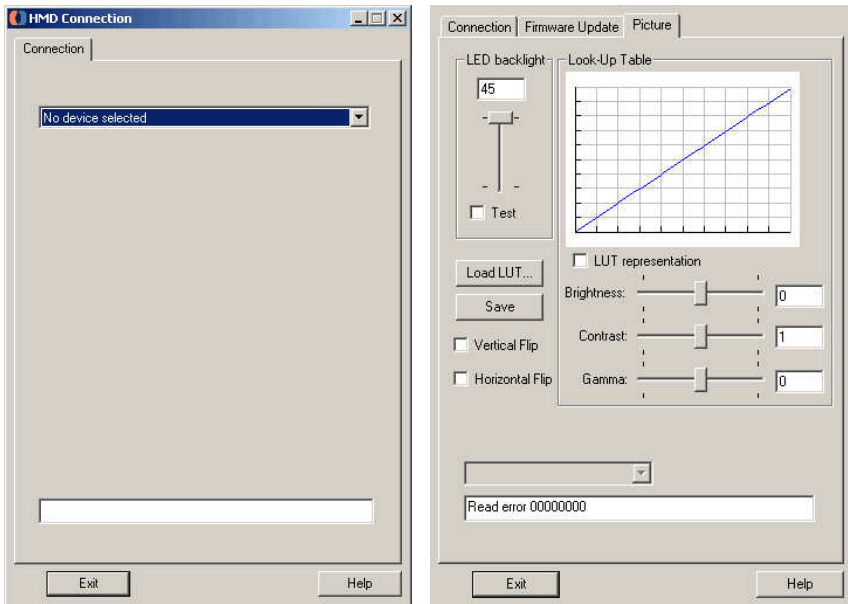
To optimize the position of the two displays, so that both images are seen as a single visual field, carefully move the oculars into the right position.



Slide oculars to fit
IPD (inter pupillary distance)

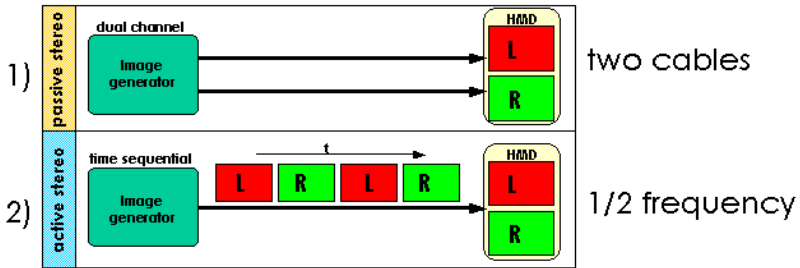
3.5 Adjusting the Image (by Software)

To adjust the image start the software "hmd_connection.exe" which can be downloaded from www.trivisio.com. Please install **first** the software according instructions **before** you connect the HMD with the PC using the DVI and USB-cable. After installation process plug in the DVI and USB cable to the PC to turn on the device. Windows will detect the hardware and install automatically. To adjust the image start the software "hmd_connection.exe" either from icon or start menu. Then select the HMD (also serial number is shown here). Then you can go to menu "Picture" and adjust the brightness, contrast and gamma of the image. You can also change the look-up table (LUT) or flip the image.



3.6 Using Different Stereo Modes

The electronics of your LCD29 HMD device allows two different stereo modes. The electronic is automatically detecting when active stereo signal is supplied by the graphics card.



3.7 Using Audio

After connecting the USB cable to your PC, Windows will detect the built-in microphone and also the earphones as audio devices.

3.8 Firmware update

In the need of a firmware update connect the device by a USB cable to the PC and turn on the device. Then run HMD-software "hmd_connection.exe" and choose the menu of new firmware. Select the firmware file by clicking on "Browse". The firmware is provided as "RIGHT_0x000?.hex" and "LEFT_VGA_DVI_0x000?.hex" files. Then click "Program". You should program these files one by one in the above mentioned order. After programming the last file the device will turn off automatically. **During the update process never unplug the device and do not shut down the computer and do not turn off the power !** If the device fails to turn on, try to reprogram "LEFT_VGA_DVI_0x000?.hex" file, holding the power-button pushed during the programming process.



4 Maintenance and Cleaning Instructions

To clean the HMD and control unit, use a damp cloth. A light rinsing agent may be added to the water. Do not use any detergents.

To clean the oculars of the HMD use a dry, clean cloth.

In case of damage contact your retailer. There are no user serviceable parts. Only qualified service personnel should perform any service required on this product.

5 Troubleshooting

| Problem | Cause | Remedy |
|---------------------------------------|--|-------------------------------------|
| Only dark, or only white image | Incorrect brightness. | See HMD software and adjust correct |
| No image | No DVI signal applied | Connect a video source (SVGA) |
| No image | Wrong resolution or frequency from graphics card | Set 800x600@60Hz |
| No image | Appliance switched off, no power connected | Plug USB cable to PC |
| Unsharp image | Dirt on beamsplitter | Clean beamsplitter |

All other problems should be performed by a trained and authorised service provider !

6 Returning used electronic devices in EU countries

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|  | <p>This HMD and accessories shall not be treated as household waste. The separate collection is a condition for reuse, recycling and utilisation of used electronic devices, which ensures the protection of resources. To comply with german ElektroG (Rücknahme und Entsorgung von Elektro- und Elektronikaltgeräten) and european WEEE (Waste Electrical and Electronic Equipment) electronic used devices from private households can be returned free of charge. For details please contact your local distributor or directly Trivisio Prototyping GmbH (www.trivisio.com).</p> |
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7 Technical Data

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|-----------------------|--|
| Microdisplays 2x | SVGA AMLCD 800x600 color (equals 1,440,000 pixels) |
| Display Color | 24 bit |
| Frame Rate | 60fps |
| See-through ratio | 50% |
| Overlap | 100% |
| Field of View | 28.9° diagonal (4:3, 23.1° (horiz), 17.3° (vert)) |
| Distortion | 1.3% (horiz), 0.8% (vert), 2.1% corner |
| Eye distance (IPD) | 55-72mm adjustable |
| Eye Relief | 25mm (edge of beamsplitter) |
| Eye Motion Box | 6mm (horiz) x 6mm (vert) |
| Video Interface | DVI-D |
| Stereoscopic Modes | Mono, passive stereo, active stereo |
| Audio (via USB) | Microphone integrated, 3.5mm socket for headset |
| Cable Length | 2.2m (optional 5m) |
| Power Consumption | Display 2.5W (5V, taken from USB port) |
| Operating Temperature | 0°C to +40°C |
| Weight | 320 g (without headband) |
| Dimensions (W/H/D): | 145mm/45mm/110mm |

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