TRIVISIO

User Manual

ARvision-S-DVI

(with USB 2.0 or IEEE1394 FireWire Camera)



Subject to technical modifications

Copyright: Trivisio Prototyping GmbH, Herzogenbuscher Str. 14, D-54292 Trier

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WARNING

Before using the ARvision-S HMD please read carefully these safety instructions.

Read this handbook and use the ARvision-S 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 ARvision-S device and its capabilities before you use it for the first time.

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1 Safety Instructions

1.1 Prescribed Use

The product is designed to display video signals via a DVI port from a PC and to transfer captured images via a USB or IEEE1394 port to a PC. The power is supplied via a USB port.

1.2 Health Concerns

➔ WARNING: Eye Disease, Eye Injury, and Glaucoma

If you have been diagnosed with or are susceptive 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 ARvision-S, 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.

1.3 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.

1.4 Warning for Electrical Products

➔ To avoid any risk of electrocution, do not bring any part of the ARvision-S in contact with water when the device is connected to an AC outlet (e.g. when plugged to PC).

➔ Avoid using and storing the ARvision-S at wet, humid, dusty and smoky surroundings and extreme temperatures.

➔ Do not use ARvision-S at temperatures below 0°C and above +40°C. Avoid dropping or mechanical shock, as frame and displays may be deformed.

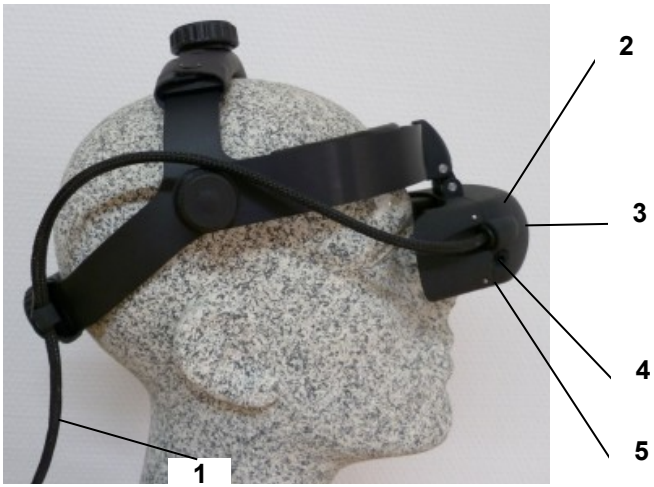
➔ Always switch off and unplug the ARvision-S when it will not be used.

➔ 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

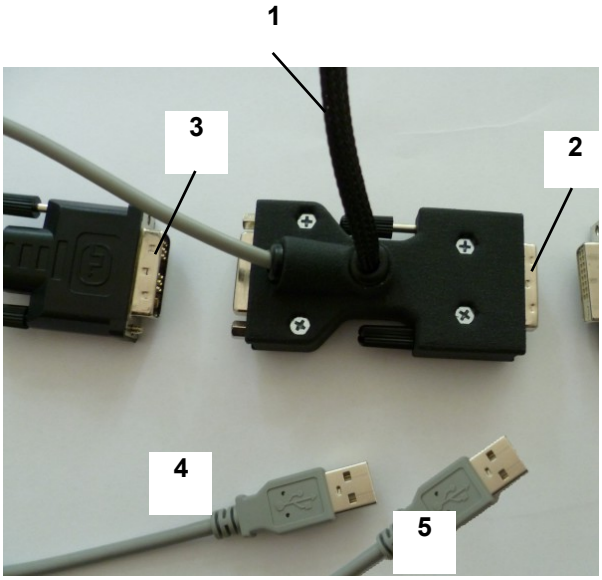
The HMD contains two **microdisplays** (2) to show the images. The **cable** (1) is permanently attached to the HMD and to the dongle element. The built-in color camera (3) provides the video signal to the power unit for output to a PC. Without a PC or external video source connected to the device there is no image visible inside the HMD ! Into the 3.5mm socket (4) earphones can be connected. There is a built-in microphone (5) 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
(5) USB cable for camera



3 General Operating Instructions

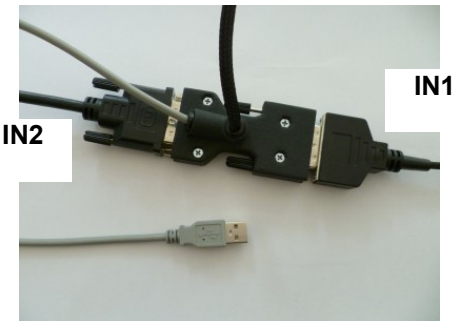
3.1 Installing Software

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 form another graphics card, see also stereoscopic options "3.8 Using Different Stereo Modes" page 14). The device will automatically recognize the correct signal.

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



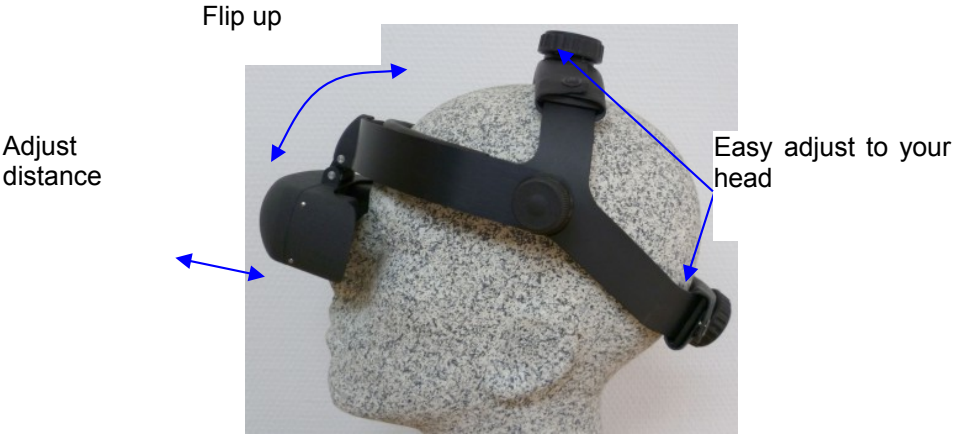
3.3 Attachment and Mechanical Adjustment

Putting on the HMD

➔ Put on the ARvision HMD. Place the headband around the back of your head and pull it just tight enough to make it fit safely and comfortably.

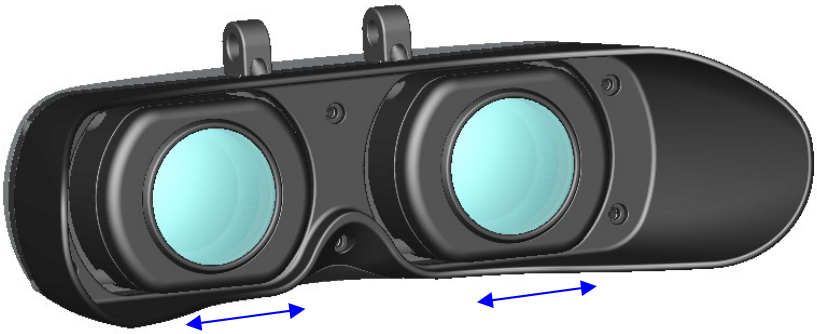
➔ On the displays inside the HMD, you can now see the pictures of your video sources.

➔ 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

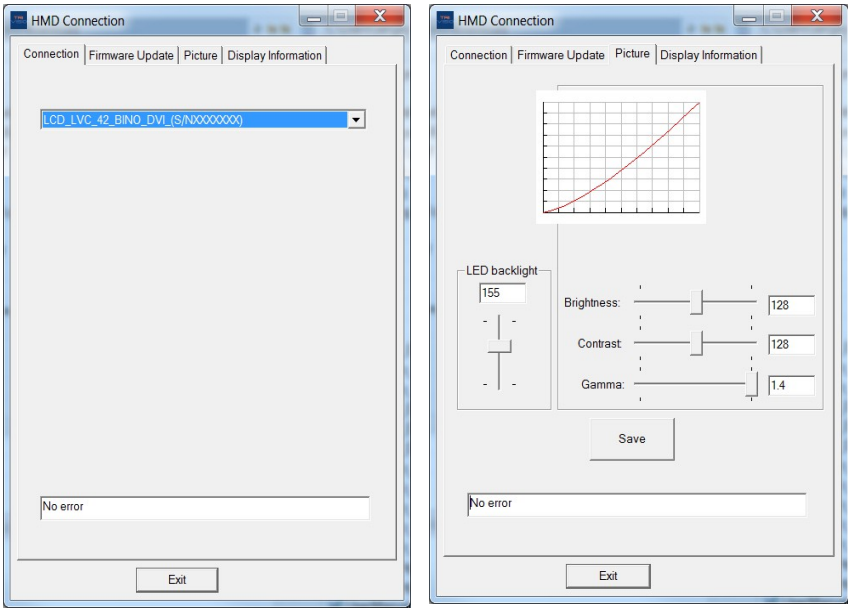
To optimize the position of the two displays, so that both images are seen as a single visual field, carefully move the oculars into the right position.



Slide oculars to fit
IPD (inter pupilary 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.

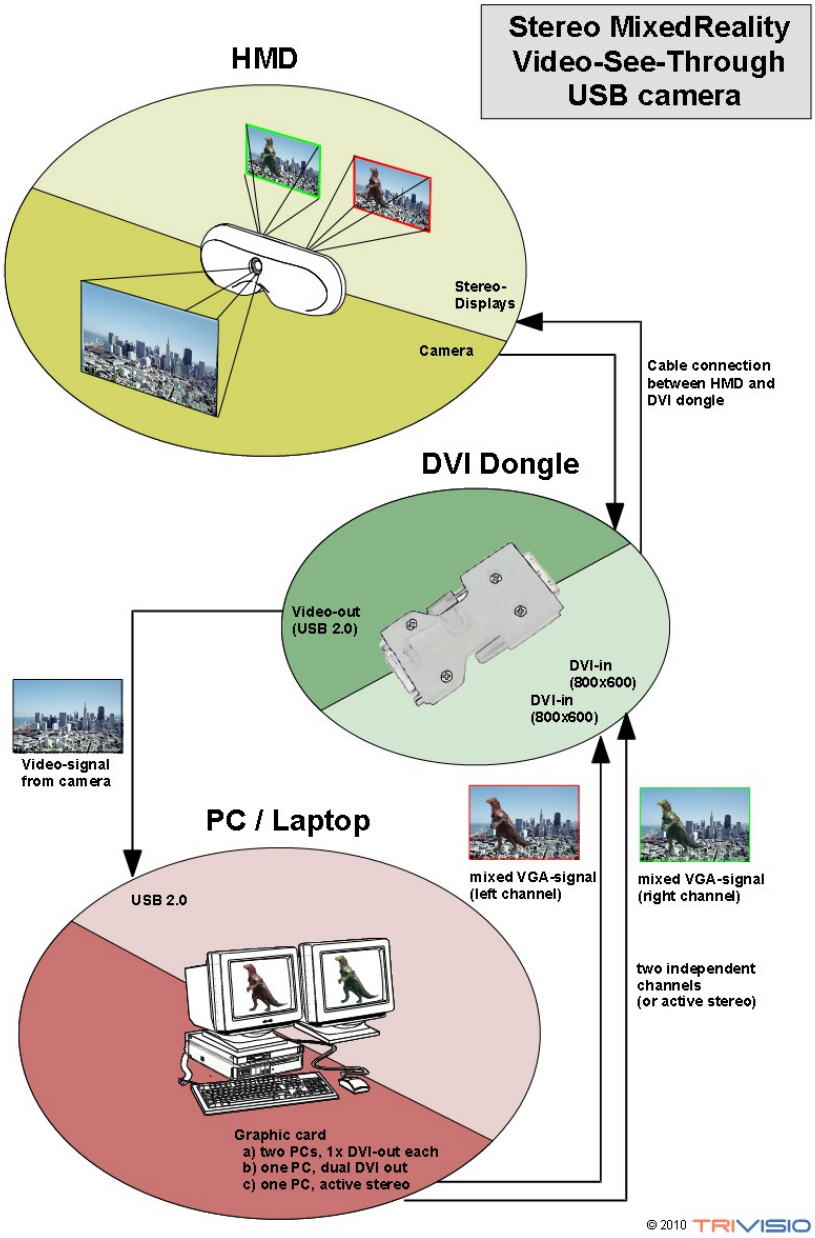


3.6 USB-Camera / Software

Please install first the camera driver software downloaded from www.trivisio.com according instructions before you connect the power unit with the PC using the USB-cables. Then power on the device and Microsoft Windows® will recognize new hardware automatic. To check the USB camera you can run the CameraViewer software. To avoid damage (and to prevent aging) please unplug the USB-cables between HMD and PC during lightning storm and when unused for long periods of time.

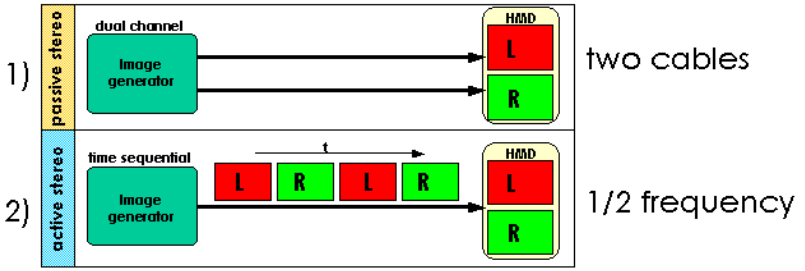
3.7 AR Setup

To use the device with AR function (augmented reality) the camera signal must be sent to a computer. Then the overlayed stereoscopic video signal from the PC can be directed into the power unit using one or two DVI cables (2). The PC-resolution must be set to 800x600@60Hz.


Stereo MixedReality
Video-See-Through
USB camera
HMD
Stereo-
Displays
Camera
Cable connection
between HMD and
DVI dongle
DVI Dongle
Video-out
(USB 2.0)
DVI-in
(800x600)
DVI-in
(800x600)
Video-signal
from camera
PC / Laptop
mixed VGA-signal
(left channel)
mixed VGA-signal
(right channel)
USB 2.0
two independent
channels
(or active stereo)
Graphic card
a) two PCs, 1x DVI-out each
b) one PC, dual DVI out
c) one PC, active stereo
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3.8 Using Different Stereo Modes

The electronics of your ARvision-S device allows two different stereo modes. The electronic is automatically detecting when actice stereo signal is supplied by the graphics card.



3.9 Using Audio

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

3.10 Adjusting Cameras

The focus can be manually adjusted by turning the camera lenses (1).



3.11 Firmware update

You can find instruction for firmware update procedure here http://trivisio.com/download/UserManual_HMD-connection.pdf

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.

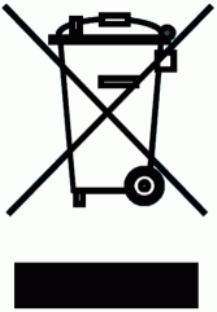
In case of damage contact your retailer. There are no user serviceable parts. Only qualified service personnel should perform any service required on this product.

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 grapics card	Set 800x600@60Hz
No image	Appliance switched off, no power connected	Plug USB cable to PC
Unsharp image	Focus of camera lens is not adjusted	Adjust the focus by turning the camera lens

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

6 Returning used electronic devices in EU countries

	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 (Rucknahme und Entsorgung von Elektro- und Elektronikaltgeraten) 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).

7 Technical Data

Camera	752x480 (max 61fps), USB 2.0 (optional IEEE1394)
Camera Sensor	1/3” CMOS, progressive scan, global shutter
Gain	auto/manual, 0 dB to 12 dB
Shutter Speed	auto/manual, 0.12 ms to 512 ms
Synchronization	external trigger, software trigger, or free-running
Focus	manually adjustable
Iris	fixed
Lens	6mm (0.9x vision), changeable by user, lens mount M12
Microdisplays 2x	SVGA AMLCD 800x600 color (equals 1,440,000 pixels)
Display Color	24 bit
Frame Rate	60fps
Overlap	100%
Field of View	41.8° diagonal (4:3, 33.7° (horiz), 25.2° (vert))
Distortion	3.1% (horiz), 1.9% (vert),4.0% corner
Eye distance (IPD)	55-72mm adjustable
Eye Relief	27mm
Eye Motion Box	7mm (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, Camera <1W (5V, taken from USB port)
Operating Temperature	0°C to +40°C
Weight	250 g (without headband)
Dimensions (W/H/D):	150mm x 42mm x 79mm

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