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Video Microscope Table MEA-VMTC-1 Manual

Imprint

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1 Introduction

1.1 About this Manual

This manual comprises all important information about the first installation of the hardware and software and about the daily work with the instrument. It is assumed that you have already a basic understanding of technical and software terms. No special skills are required to read this manual.

If you are using the device for the first time, please read the **important safety advice** before installing the **hardware** and **software**, where you will find important information about the installation and first steps.

There is a separate manual in online form available for the camera. The cameras and the respective software and manual are not products of MCS, but are provided by IDS Imaging Development GmbH.

1.2 Welcome to the Video Microscope Table MEA-VMTC-1

The MEA-VMTC-1 is a solid table with a **video microscope** underneath. It is intended to image the electrode field of a microelectrode array (MEA) in an amplifier placed on top of the table. The image is captured by an **USB 3.0 camera** and transferred to a computer via USB interface. The microscope lens is equipped with focus, zoom, and iris shutter.

The Video Microscope Table MEA-VMT exists in two versions, the **MEA-VMTC-1** with one video microscope and the **MEA-VMTC-2** with two video microscopes. The size of the table has been designed to accommodate all MEA-Systems. The MEA-VMTC-1 is compatible with all integrated MEA-Systems (MEA2100-60, MEA2100-120, MEA2100-256, MEA2100-Mini-Systems) and all MEA1060 amplifiers. The MEA-VMTC-2 is intended to be used with the MEA2100-2x60 or the MEA2100-2x32 headstages, to be able to image both MEAs simultaneously on the connected computer. Please read the MEA-VMTC-2 manual for more information about this type of video microscope table.

2 Important Information and Instructions

2.1 Important Safety Advice



Warning: Make sure to read the following advice prior to install or to use the device and the software. If you do not fulfill all requirements stated below, this may lead to malfunctions or breakage of connected hardware, or even fatal injuries.



Warning: Obey always the rules of local regulations and laws. Only qualified personnel should be allowed to perform laboratory work. Work according to good laboratory practice to obtain best results and to minimize risks.

The product has been built to the state of the art and in accordance with recognized safety engineering rules.

The device may only

- be used for its intended purpose;
- be used when in a perfect condition.
- Improper use could lead to serious, even fatal injuries to the user or third parties and damage to the device itself or other material damage.



Warning: The device and the software are **not** intended for medical uses and **must not** be used on humans. MCS assumes no responsibility in any case of contravention.

Malfunctions which could impair safety should be rectified immediately.

High Voltage

Electrical cords must be properly laid and installed. The length and quality of the cords must be in accordance with local provisions.

Only qualified technicians may work on the electrical system. It is essential that the accident prevention regulations and those of the employers' liability associations are observed.

- Each time before starting up, make sure that the mains supply agrees with the specifications of the connected computer.
- Check the USB cord for damage each time the site is changed. Damaged cords should be replaced immediately and may never be reused.
- Check the leads for damage. Damaged leads should be replaced immediately and may never be reused.
- Do not try to insert anything sharp or metallic into the vents or the case.
- Liquids may cause short circuits or other damage. Keep the device and the power cords always dry. Do **not** handle it with wet hands.

Requirements for the Installation

Make sure that the device is placed on a stable and even surface and is not exposed to direct sunlight. Do not place the device on top of a heat producing device.

2.2 Guarantee and Liability

The General conditions of sale and delivery of Multi Channel Systems MCS GmbH always apply. The operator will receive these no later than on conclusion of the contract.

Multi Channel Systems MCS GmbH makes no guarantee as to the accuracy of any and all tests and data generated by the use of the device or the software. It is up to the user to use good laboratory practice to establish the validity of his findings.

Guarantee and liability claims in the event of injury or material damage are excluded when they are the result of one of the following.

- Improper use of the device.
- Improper installation, commissioning, operation or maintenance of the device.
- Operating the device when the safety and protective devices are defective and/or inoperable.
- Non-observance of the instructions in the manual with regard to transport, storage, installation, commissioning, operation or maintenance of the device.
- Unauthorized structural alterations to the device.
- Unauthorized modifications to the system settings.
- Inadequate monitoring of device components subject to wear.
- Improperly executed and unauthorized repairs.
- Unauthorized opening of the device or its components.
- Catastrophic events due to the effect of foreign bodies or acts of God.

2.3 Operator's Obligations

The operator is obliged to allow only persons to work on the device, who

- are familiar with the safety at work and accident prevention regulations and have been instructed how to use the device;
- are professionally qualified or have specialist knowledge and training and have received instruction in the use of the device;
- have read and understood the chapter on safety and the warning instructions in this manual and confirmed this with their signature.

It must be monitored at regular intervals that the operating personnel are working safely.

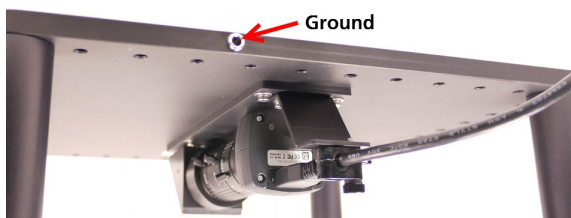
Personnel still undergoing training may only work on the device under the supervision of an experienced person.

3 Hardware

The MEA-VMTC-1 is a solid table with a video microscope underneath. The image is captured by an **USB 3.0 camera** and transferred to a computer via USB interface. There are M6 screw holes around the edge of the table, which can be used to screw down additional equipment, like a manipulator, for example.



A **ground connector** is located at the backside of the table, which can be used to connect it to the system ground of the MEA- or MEA2100-System placed on the table.



3.1 Hardware Setup

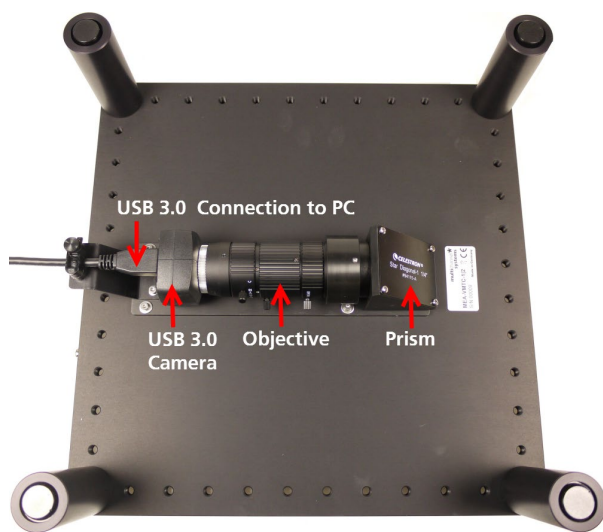
Important: Please install the software before connecting the camera to the computer. Please read chapter "Software Installation" for detailed information.

Place the MEA-VMTC-1 on a stable and even surface.

Connect the camera to a **USB 3.0 port** of your computer with the provided USB cable. After connecting to the computer, the control LEDs on the USB camera light up red, then orange, then green. The camera is now ready for operation.

Place your MEA amplifier on the table so that the **center of the MEA in the amplifier is aligned with the center of the camera hole** on the MEA-VMTC-1.

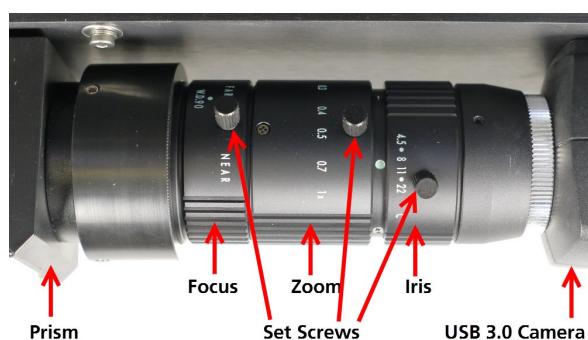
The MEA-VMTC-1 is equipped with a **ground connector** on the backside. If necessary, connect the table to the ground connector of your MEA- or MEA2100-System.



3.2 Video Microscope Operation

The MEA-VMTC-1 is equipped with a video microscope underneath the table. It consists of a prism, an objective with zoom, iris, and focus, and a USB 3.0 camera. You can control focus, iris and zoom with the three **adjusting rings** along the objective. Use the respective set screws of each ring to fix an appropriate adjustment.

To optimize the sharpness of the picture via focus, please adjust the iris on a mean level, level 8 to 11, for example, and take care for adequate diffused lighting.



4 Software

4.1 System Requirements

Operating system: One of the following Windows operating systems is required: Windows 10, 8.1 and 7 (32 or 64 bit). Different installation files for the uEye software must be used for 32 and 64 bit operating systems.

Hardware: For MEA-VMTC-1 a computer with an USB 3.0 port is required.

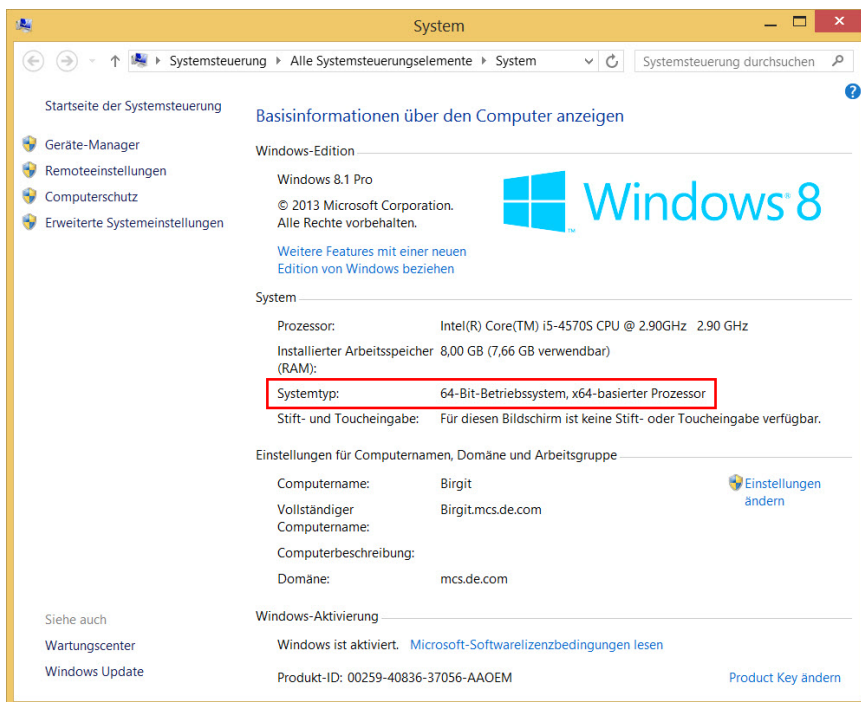
Important: Please make sure that you have full control over your computer as an administrator for installation the uEye software. Otherwise, it is possible that the installed software does not work properly. For operating the software it is not necessary to have administrator rights.

4.2 Software Installation

Installing the Software and the uEye Camera Driver

Before installing the software, please verify the type of operating system of the data acquisition computer, 32 or 64 bit.

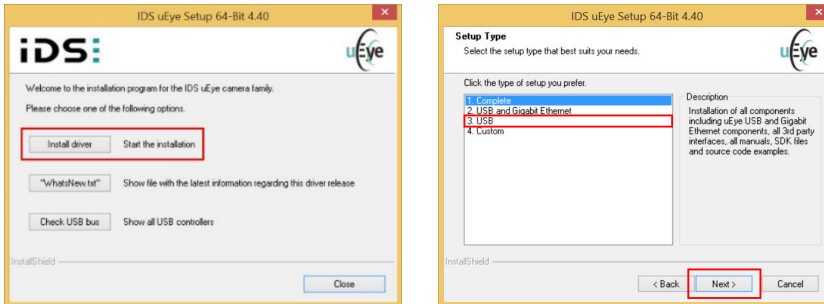
Windows start menu ► Control Panel ► System



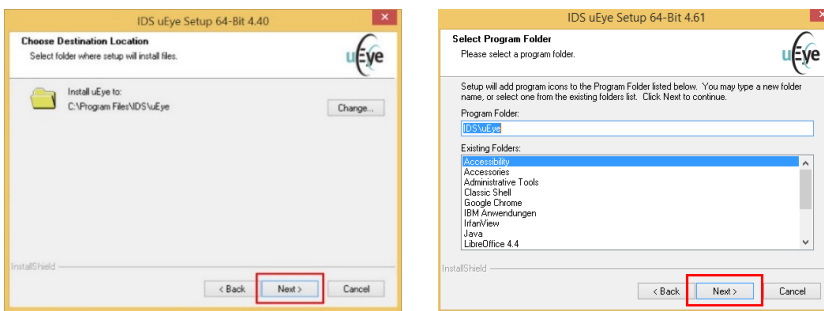
Installation of the uEye Software

From the provided CD, select the installation file for **32 or 64 bit operating systems**, depending on the operating system you use. Start the uEye-32bit.exe or uEye-64bit.exe and follow the instructions of the installation wizard. Select the "Install Driver" option, and then option 3 "USB".

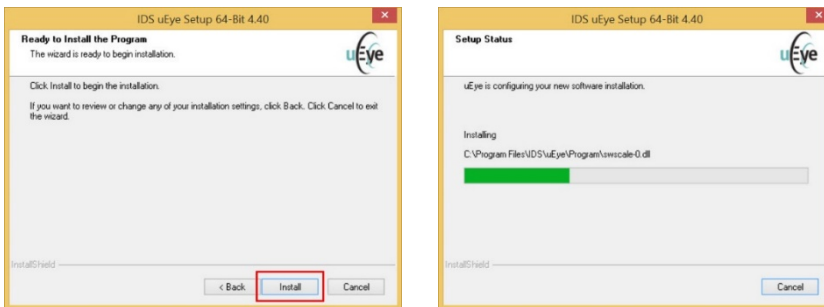
Please do not connect the camera before the installation of the uEye software.



Select the destination folder for the uEye program.

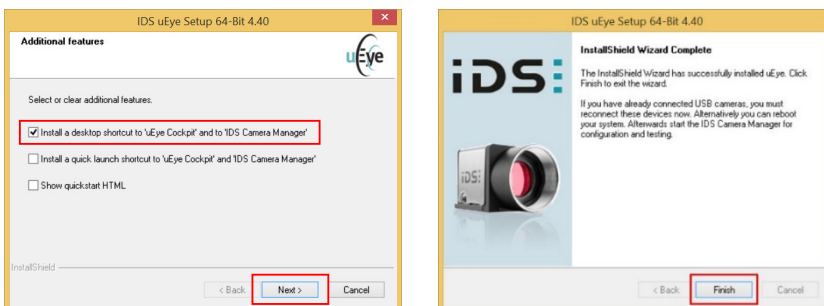


Start the installation



Please activate the check box for a shortcut to the desktop for uEye Cockpit and IDS Camera Manager.

Finish the installation process.

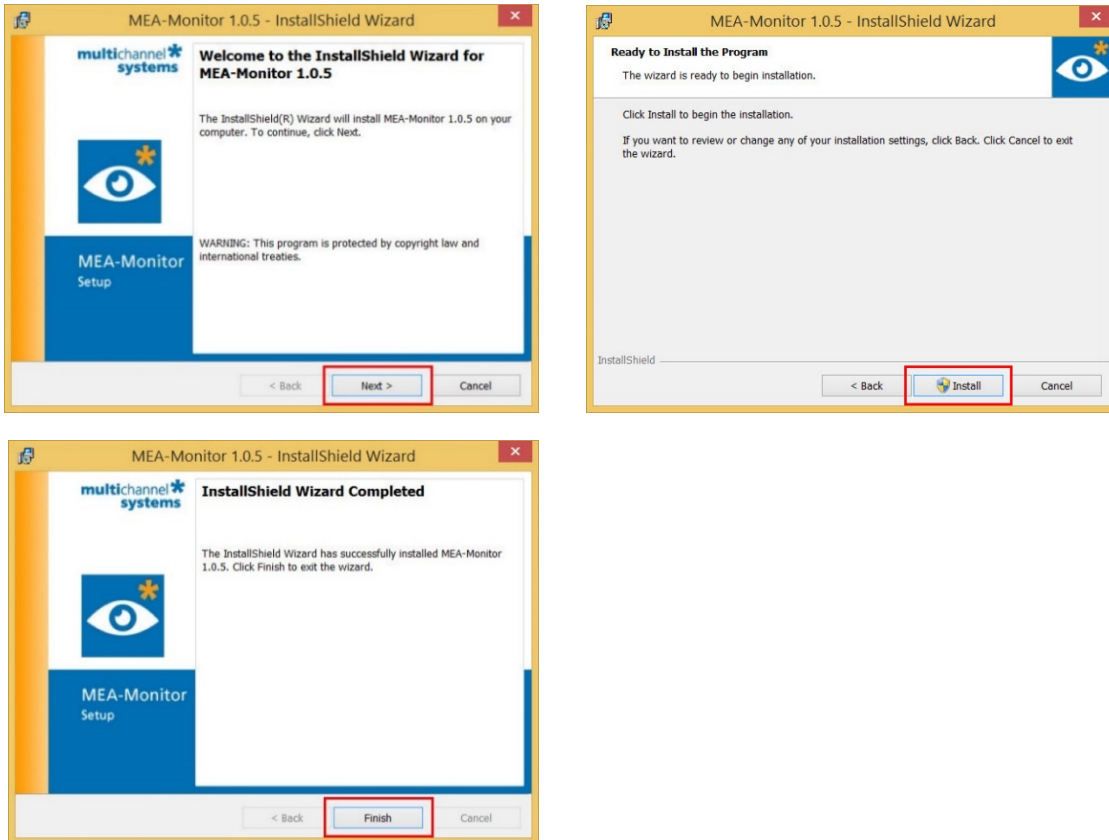


Important: Installation of the uEye software is necessary, and has to be done before installing MEA-Monitor.

MEA Monitor

MEA-Monitor is a much **reduced version** of the **uEye** software with a few functions that help operating the MEA-VMTC-1. After installing uEye, start the MEA-Monitor.exe from the included CD and follow the instructions of the installation wizard.

Start the installation.



Finish the installation process.

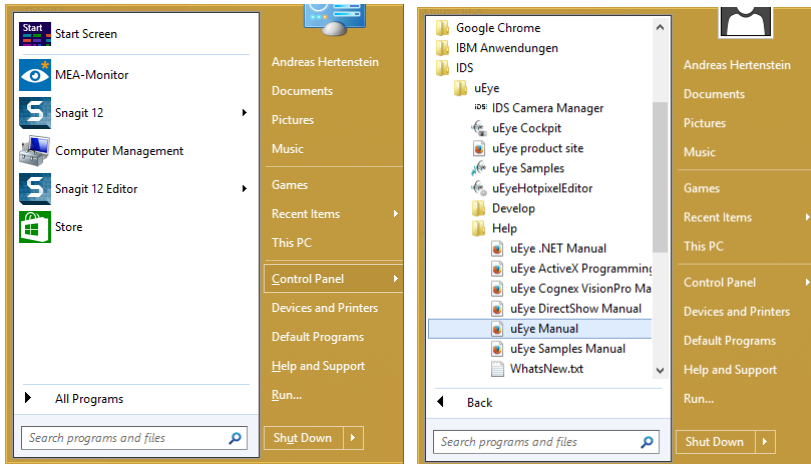


Use the **IDS Camera Manager** software to execute the camera. The **uEye Cockpit** software is an universal visualization software and **MEA Monitor** a visualization software, optimized for the MEA video microscope tables from Multi Channel Systems MCS GmbH. It is mandatory to install the uEye software before installing MEA Monitor.

uEye Manual

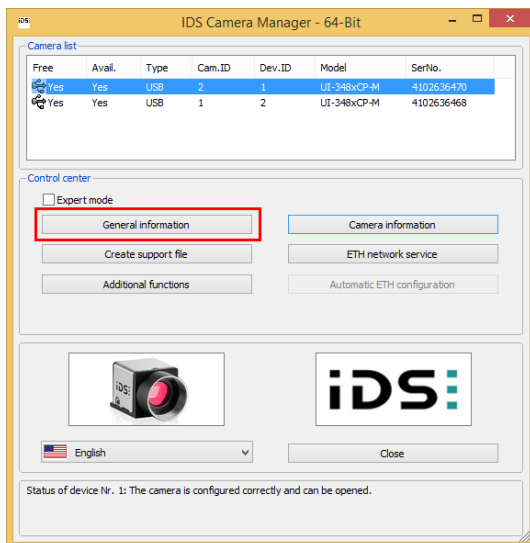
Please open the uEye Manual for detailed help, if necessary.

Windows start menu ► All Programs ► IDS\uEye\Help\uEye Manual



Updates for uEye Software

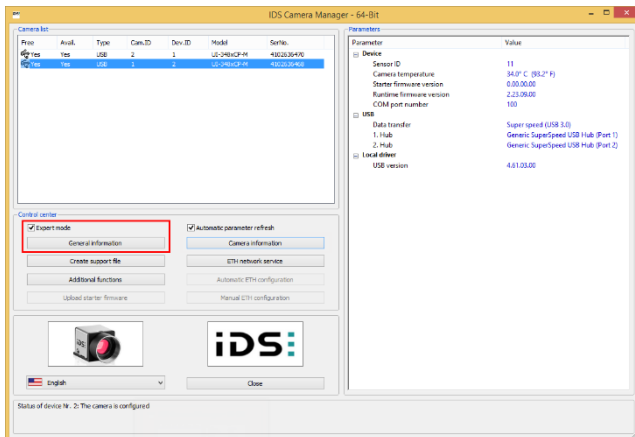
Please connect the camera to the data acquisition computer and start the **IDS Camera Manager**.



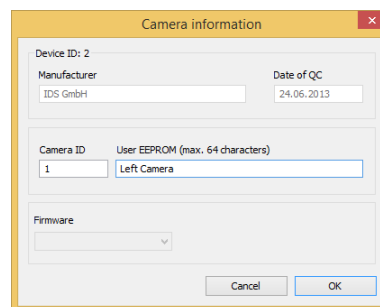
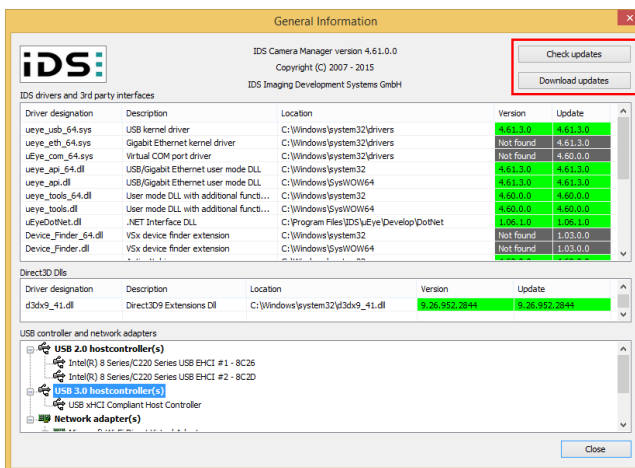
Click "General Information", check the software and driver updates and click the button "Download updates", if necessary.

USB Status and Camera Information

Click the check box "Expert mode" and "General Information".



Choose the camera and click the button "Camera Information".



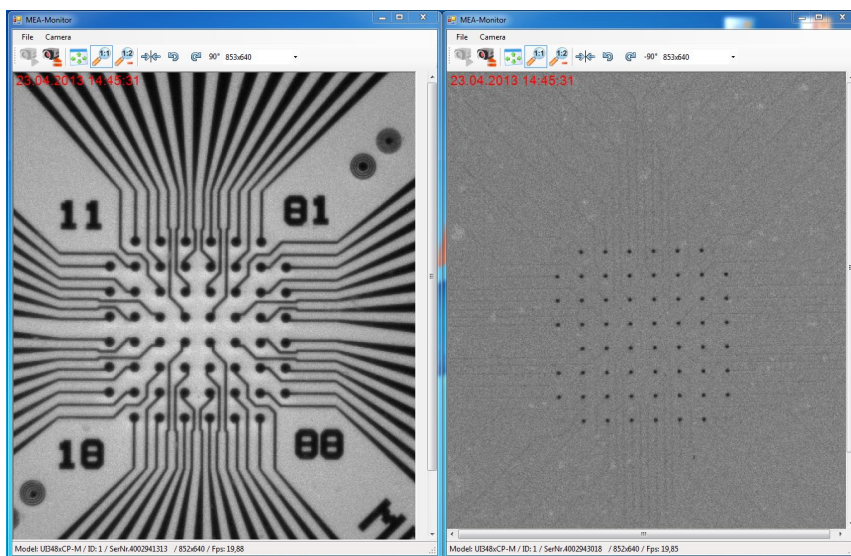
4.3 Software Operation

uEye Cockpit


The uEye Cockpit is provided by the camera manufacturer and offers extensive control functions for the USB 3.0 cameras. Open the software and select "Live Video". Please refer to the online manual of the software for detailed information (Help/uEye Manual). For the designated purpose of the MEA-VMTC-1, the complexity of uEye is usually **not necessary**, and you can use the easier to use control software **MEA-Monitor** instead.

MEA-Monitor

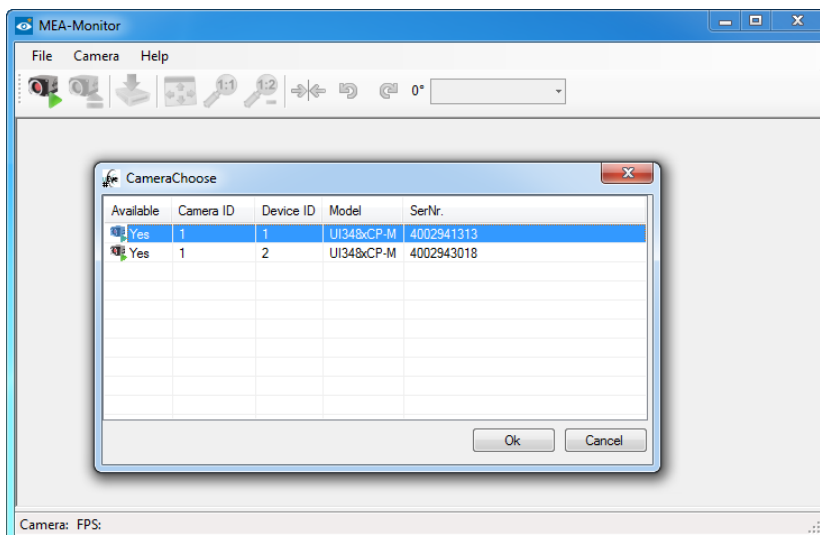
MEA-Monitor is a much **reduced version** of **uEye Cockpit**, which has only the necessary functions to operate the MEA-VMTC-1. Open the software once or twice, depending on whether you want to operate one camera or two cameras in parallel. Please see below an image of two MEAs imaged in parallel with **two instances** of MEA-Monitor.



After opening the software, select "Open Camera" from the camera drop-down menu or press

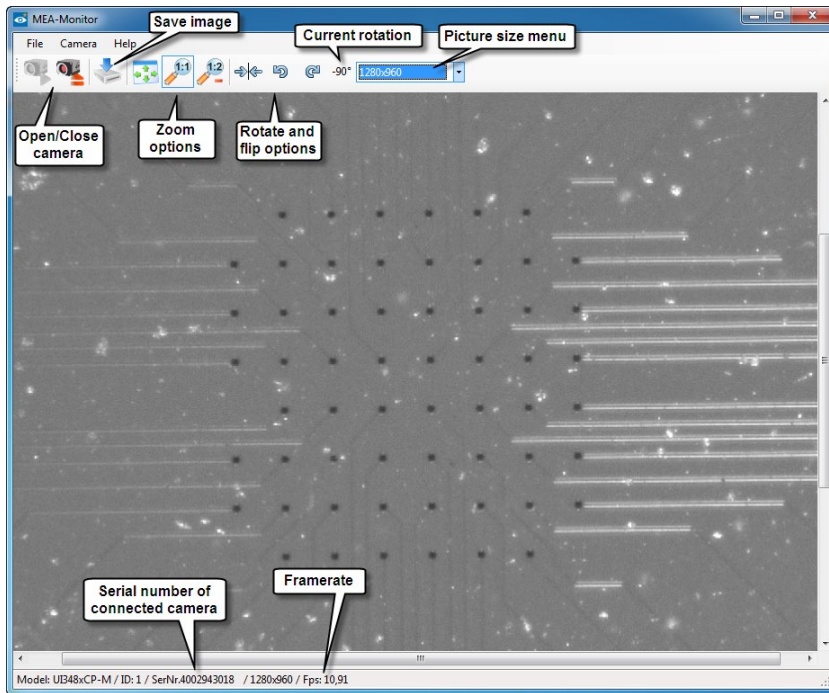
the respective icon .

A dialog will appear with **all available cameras**. Assign each instance of the software to one camera. The cameras can be identified by their **serial numbers**.



Use the “Stop Camera” command to assign a software instance to a different camera. Already assigned cameras will not be available.

The MEA-Monitor software offers only the most basic functions which are needed in routine work with slices or cells on MEAs. It is possible to **save** the actual image. You can fit the image automatically to the window or set the screen size to full or half the actual size. The actual **picture size** in pixels can be selected from a drop-down menu. The image can be **rotated** in both directions, the current rotation is shown. The image can also be **flipped** along a vertical axis.



The serial number, picture size and frame rate of the live image are displayed at the bottom of the MEA-Monitor window.

5 Troubleshooting

Most problems occur seldom and only under specific circumstances. In most cases, it is only a minor problem that can be easily avoided or solved.

If the problem persists, please contact your local retailer. The highly qualified staff will be glad to help you. Please inform your local retailer as well, if other problems that are not mentioned in this documentation occur, even if you have solved the problem on your own. This helps other users, and it helps MCS to optimize the instrument and the documentation.

Please pay attention to the safety and service information in chapter "Important Safety Advice". Multi Channel Systems MCS GmbH has put all effort into making the product fully stable and reliable but like all high-performance products, it has to be handled with care.

If you have any question or if any problem occurs that is not mentioned in this documentation, please contact your local retailer. The highly qualified staff will be glad to help you.

Observed Problems

- Camera not detected: Check status LED of the camera. If it is red, shortly disconnect USB cable from computer to reboot the camera.
 - Device not recognized: Check your USB driver, please see chapter "Software Installation" and upgrade, if necessary.
- Live image frame rate very low: Check whether device is connected to an USB 3.0 port.

Please keep information on the following at hand

- Description of the error (the error message text or any other useful information) and of the context in which the error occurred. The more information on the actual situation you can provide, the easier it is to track the problem.
- The serial number of the device. You will find it on the bottom side of the main unit.
- The software version you are currently using. Click on the "Help" button in the header of the main window of MEA-Monitor software. The displayed "About" dialog box shows the software version number.
- The operating system and service pack number on the connected computer.
- The hardware configuration (microprocessor, frequency, main memory, hard disk) of the connected computer. This information is especially important if you have modified the computer or installed new hard- or software recently.

6 Appendix

6.1 Technical Specifications

The **MEA-VMTC-1** is a device to image MEAs inside MCS amplifiers.

General characteristics

Operating temperature	10 °C to 50 °C
Storage temperature	0 °C to 50 °C
Relative humidity	10 % to 85 %, non-condensing
Dimensions (W x D x H)	305 mm x 305 mm x 92 mm
Weight of the MEA-VMTC-1 device	3480 g
Weight of accessories	50 g
Power supply	USB powered
PC interface	USB 3.0

Camera

Type / Manufacturer	UI-3480LE-M-GL (USB 3.0 monochrome 2560x1920 1/2")
Sensor type	CMOS
Frame rate	15.2 fps
Resolution (h x v)	2560 x 1920
Shutter	Rolling shutter / global start shutter
Optical class	1/2"
Resolution	4.92 MPixel
Pixel size	2.2 µm

Zoom lens

Type / Manufacturer	MLM3X-MP from COMPUTAR
Max. magnification	0.3 x – 1.0 x
Max. aperture ratio	1 : 4.5

Software

Operating system	Windows 10, 8 or 7 (32 or 64 bit), English and German version supported
MEA-Monitor	Version 1.0.5 and higher
uEye	Version 4.90.6

6.2 Scope of Delivery

- 1 MEA-VMTC-1 with integrated camera
- 1 USB 3.0 cable 1.80 m
- 1 Grounding cable
- 1 USB stick with software and drivers
- 1 Manual

7 Contact Information

Local retailer

Please see the list of official [MCS distributors](#) on the MCS web site.

Mailing list

If you have subscribed to the [Newsletter](#), you will be automatically informed about new software releases, upcoming events, and other news on the product line. You can subscribe to the list on the contact form of the MCS web site.

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