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## **Video Microscope Table MEA-VMTC-2 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 on-line 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-2

The MEA-VMTC-2 is a solid table with two **video microscopes** underneath. It is intended to image two electrode fields of two microelectrode arrays (MEAs) in an amplifier placed on top of the table. The images are captured by **USB 3.0 cameras** and transferred to a computer via USB interface. The microscope lenses are equipped with a focus, zoom, and iris shutter. Illumination is provided by flexible LED lights, which are connected to an USB 3.0 hub together with the cameras.

The Video Microscope Table MEA-VMT exists in two versions, the **MEA-VMTC-2** with two video microscopes and the **MEA-VMTC-1** with one video microscope. The MEA-VMTC-1 is compatible with all integrated MEA-Systems (MEA2100-60, MEA2100-120, MEA2100-256, MEA2100-Mini-Systems) and all MEA1060 amplifiers. Please read the MEA-VMTC-1 manual for more information about this type of MEA-VMT.

For the MEA-VMTC-2 an USB 3.0 interface is recommended. The size of the table has been designed to accommodate all MEA-Systems respectively, especially the MEA2100-2x60 headstages, to be able to image both MEAs simultaneously on the connected computer.

## 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-2 is a solid table with two video microscopes underneath. The image is captured by a **USB 3.0 camera** and transferred to a computer via USB interface. Illumination is provided by flexible **LED lights**, which are also connected to the hub together with the cameras. 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.

The **USB 3.0 hub** is also connected to the underside of the table. Power for the cameras and LED lights is provided via the USB 3.0 port. It is recommended to use the appropriate power supply for the hub. 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-System placed on the table.



#### 3.1 Hardware Setup

**Important:** Please install the software before connecting the cameras to the computer! Please read also chapter "Software Installation" for detailed information.

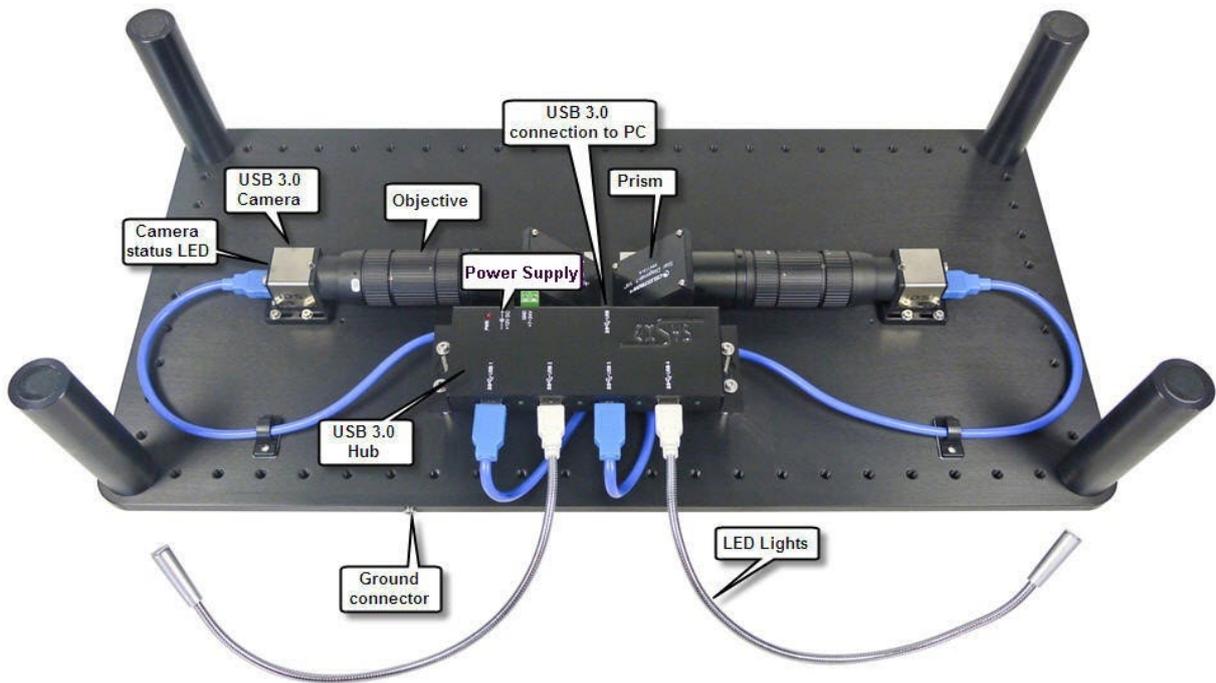
Place the MEA-VMTC-2 on a **stable and even surface**. The cameras are already connected with 0.5 m USB cables to the respective USB 3.0. It does not matter which port of the USB hub is used. Connect the flexible LED lights to the USB hub. Install the software and drivers for the cameras, please see chapter 4.1.

Connect the USB 3.0 hub to a **USB 3.0 port** of your computer with the provided USB cable. It is recommended to use the power supply belonging to the USB hub included in the delivery, for operating both cameras and two LED lights.

After connecting to the computer, the control LEDs on the USB cameras light up red, then orange, then green. The cameras are now ready for operation.

Place your MEA amplifier on the table so that the **center of the MEA/s in the amplifier is aligned with the center of the camera hole/s** on the MEA-VMTC-2. Adjust the LED lights so they shine on your sample.

The MEA-VMTC-2 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-2 is equipped with one or two video microscopes underneath the table. They consist each 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 illumination.



## 4 Software

### 4.1 System Requirements

**Operating system:** One of the following Windows operating systems is required: Windows 10, Windows 8 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-2 a computer with an USB 3.0 port is required.

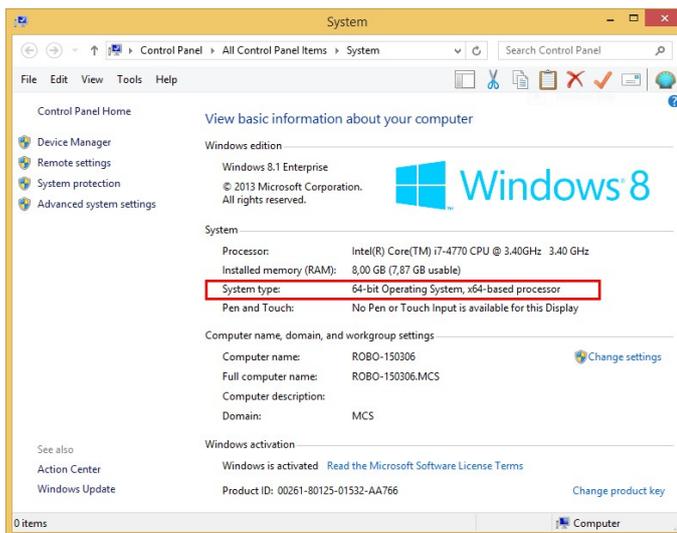
Important: Please make sure that you have full control over your computer as an administrator for installation the uEye software. Otherwise, it is possible that the installed software does not work properly. For operating the software, it is not necessary to have administrator rights.

### 4.2 Software Installation

#### Installing the uEye Camera Driver and Software

From the included CD, select the installation file for **32 or 64 bit operating systems**, depending on the operating system you use.

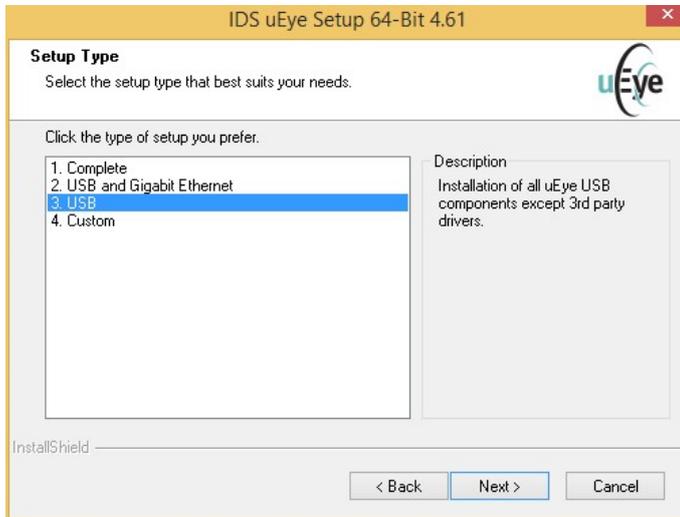
Please check the **Operating System** first.



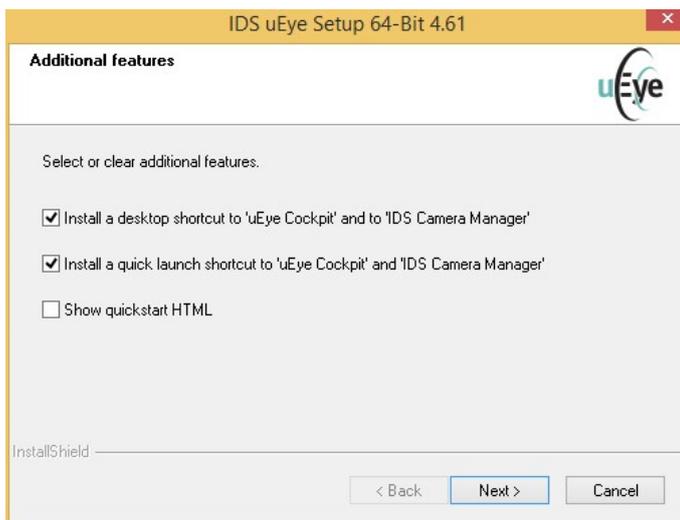
Open the "System" dialog from the Windows "Control Panel" and check the "System type".

## Installation of the uEye Software from the provided CD

Select the file "uEye32\_46100.exe" from the provided CD, if your data acquisition computer has a 32-Bit operation system. Select the file "uEye64\_46100.exe", if your data acquisition computer has a 64-Bit operation system. Follow the instructions of the uEye installation wizard.



Select the check boxes „Additional features“, if necessary.

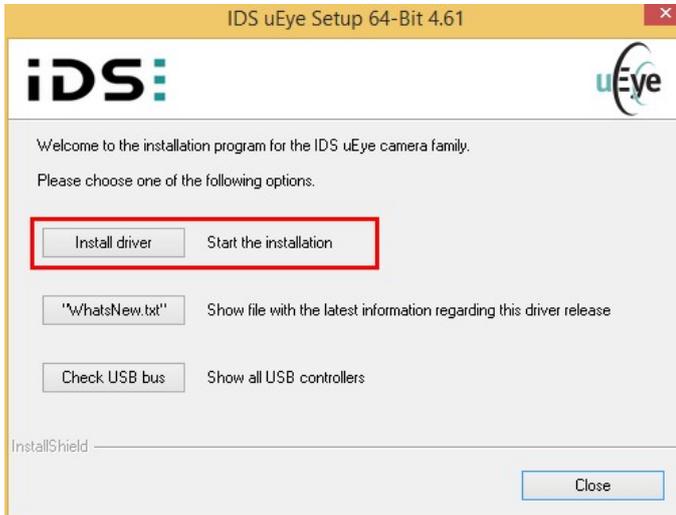


If a windows warning comes up, select "**Continue Anyway**". This will install all necessary drivers and the uEye software on your PC.

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

## USB 3.0 Driver Update

The “IDS uEye Setup 64-Bit 4.61” includes the installation and update of the driver. Older versions might cause problems in operating the USB 3.0 cameras. If problems occur, please check in the “**Windows Device Manager**” which kind of USB 3.0 chips are installed on your PC. Usually it is ASMedia, Intel or Renesas.



If you have a different manufacturer or if you are looking for the latest version, please check the manufacturers web site.

Installing MEA Monitor Software from the provided CD MEA-Monitor is a much **reduced version** of the **uEye** software with a few functions for operating the MEA-VMTC-2.



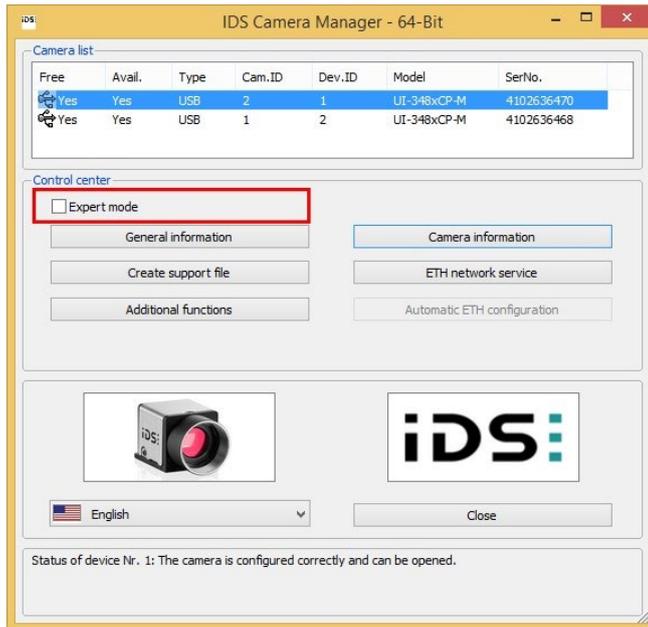
After installing uEye, please install the MEA-Monitor software. Start the “MEA-Monitor-1.0.5\_Full.exe” file from the included CD and follow the instructions of the installation wizard.

After installing the software you find three icons on your desktop:

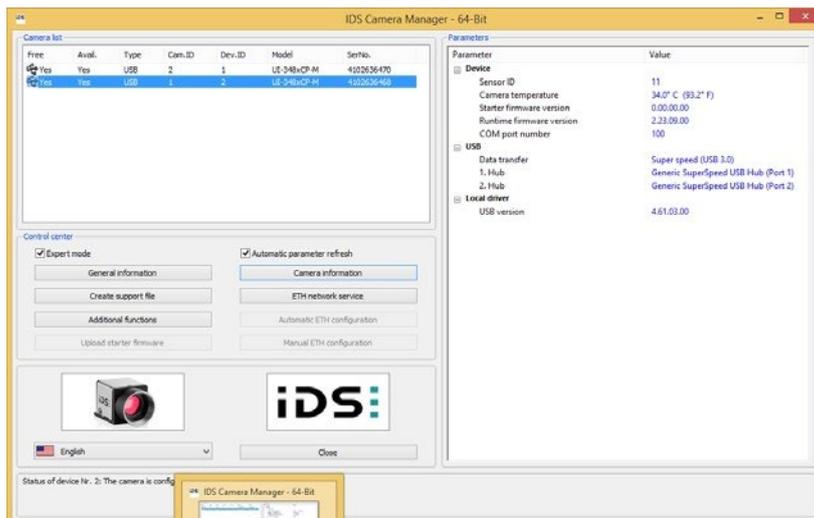


If you need help during the operation of the uEye software, please open the uEye manual via Windows **“Control Panel”** → **“uEye Manual”** or click **“Help”** in the software.

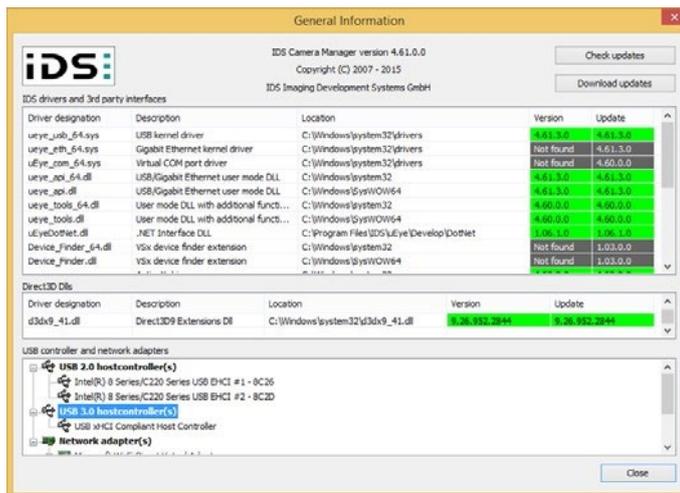
Use the **“IDS Camera Manager”**, for different purposes. Open the software and see **“Camera information”**, for example.



Click „Expert mode“ to read and to change settings for the cameras.



Use the "IDS Camera Manager", for example for checking uEye software updates.



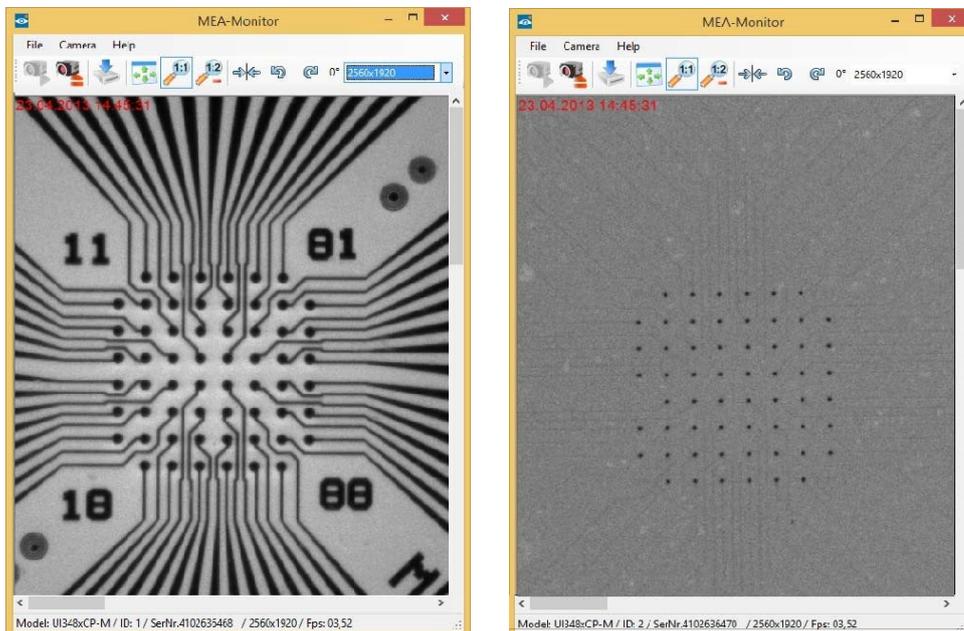
## 4.3 Software Operation

### 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-2, 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-2. 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.



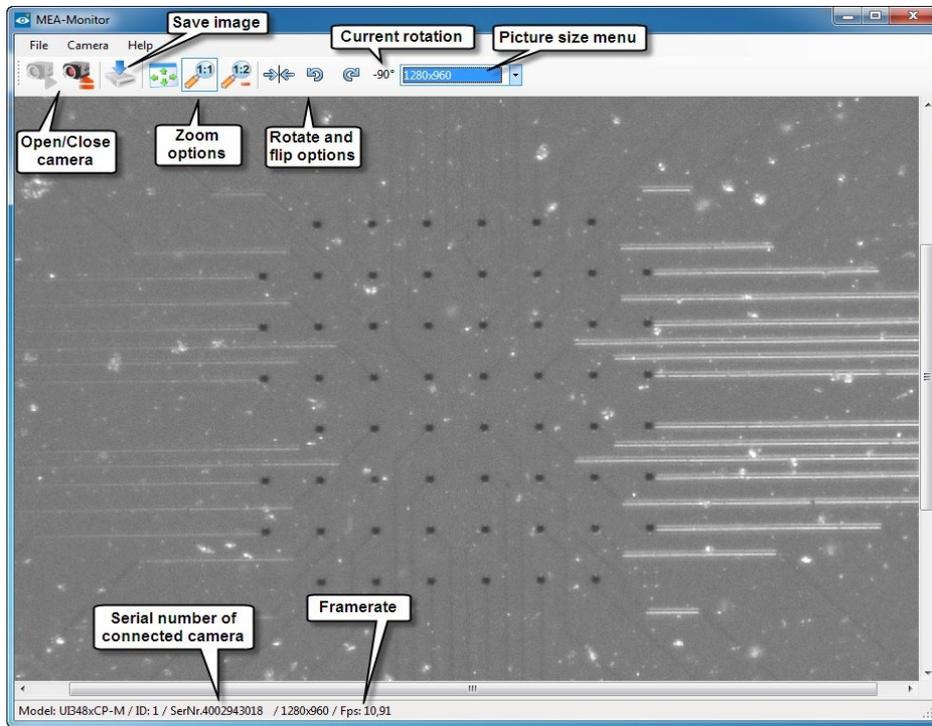
After opening the software, select "Open Camera" from the camera drop-down menu



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 the camera ID (factory settings: Left camera = ID 1, right camera = ID 2) 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 camera model, camera ID and 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-2** is a device to image MEAs inside MCS amplifiers.

<b>General characteristics</b>	
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)	355 mm x 305 mm x 92 mm
Weight of the MEA-VMTC-2	4350 g
Weight of the accessories	50 g
<b>Cameras</b>	UI-3480LE-M-GL (USB 3.0 monochrome 2560x1920 1/2 ")
Sensor type	CMOS
Frame rate	15.1 fps
Resolution	2560 x 1920
Shutter	Rolling shutter / global start shutter
Optical class	½"
Pixel class	5 MPixel
2 macro zoom lenses	Max. magnification: 0.3 – 1 OX Max. aperture ration: 1 : 4.5
<b>Power supply</b>	USB powered
<b>PC interface</b>	USB 3.0
<b>Operating system</b>	Windows 10, 8 or 7 (32 or 64 bit) English and German version supported
<b>Software</b>	
MEA-Monitor uEye	Version 1.0.5 and higher Version 4.90.6 and higher

## 6.2 Scope of Delivery

- 1 MEA-VMTC-2 with two integrated cameras
- 1 USB 3.0 cable
- 1 Grounding cable
- 1 USB stick with software and drivers
- 1 Manual

## 6.3 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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