



User Guide

AxioCam ERc 5s

Microscope Camera



We make it visible.

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Effective from: 12 / 2015

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1 About this guide

1.1 Introduction

Welcome to the AxioCam ERc 5s user guide.

The camera is a high-resolution digital camera with a color CMOS sensor for light-microscopy applications. To make it easier for you to set up the camera, please follow the instructions in these chapters step by step.

Content	Chapter	Content
	About this guide	Introduction and overview of this manual.
	Safety	Important information on the safe handling of the camera. Read this chapter before unpacking and operating the camera.
	Shipment	The contents of delivery and optional attachments will be described here.
	Technical data	Here you will find the camera's technical data.
	Connecting the camera	In this chapter, you will find detailed instructions on connecting and using the camera.
	Remote Control and OSD menu	This chapter lists the functions of the IR remote control and the functions in the On Screen Display (OSD) menu.
	Installing software and drivers	Here you will learn how to install the software and camera drivers.
	Acquiring images	This chapter provides the basics of image acquisition.
	Troubleshooting	In this chapter, we have listed some solutions to various problems. If you are still unable to solve your problem, contact ZEISS support.
	Maintenance	This chapter describes some measures for the maintenance and care of your camera. In case of greater damage, always contact ZEISS support.
	Disposal and Recycling	Important instructions for disposal and recycling.

1.2 Safety notes conventions

The safety notes in this document follow a system of risk levels, defined in the following manner:

CAUTION

Risk of personal injury

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury.

NOTICE

Risk of property damage

NOTICE indicates a property damage message. In addition, NOTICE is used for data loss or corrupt data.

Note

Indicates useful additional information. It helps you to make your daily work easier, but it is optional. There is no risk for personal injury or property damage involved.

1.3 Text formats and conventions

Bold texts

Bold is used for texts within the software like names of GUI elements (e.g. buttons, sections, tools, menus), buttons on a device, and product names (e.g. **MTB 2011**).

Font type "Courier"

Used for programming code, e.g. macro code as well as for anything that you would type literally when programming, including keywords, data types, constants, method names, variables, class names, and interface names.

Shortcuts and key commands

Shortcuts are written like *Ctrl+C*, meaning you should press *Ctrl*-Key and *C*-Key simultaneously.

Procedures

The following formats are used for procedures (instructive sequences):

Prerequisites ■ stands for a condition which must be fulfilled before starting with the action.

Procedure 1 stands for a single step the user is asked to perform.

Web-Links

Web links appear in blue text. To open the linked website, simply click on the link. Please make sure you have an internet connection established before opening the web link.

2 Safety

2.1 Safety Notes

The AxioCam ERc 5s has been manufactured and tested by ZEISS according to the regulations specified in CE and has left the manufacturer's premises in perfect working order. In order to ensure that this condition is maintained and to avoid any risks when operating the system, the user must comply with any notes and warnings contained in this manual. The manufacturer shall be exempt from statutory liability for accidents should the operator fail to observe the safety regulations.



Personal Injury

To avoid personal injury, read and adhere to the safety notes below.

- ◆ To avoid the risk of fire or explosion, do not use the camera near inflammable liquids or gases.
- ◆ Setup, expansions, re-adjustments, alterations, and repairs must be carried out only by persons who have been authorized by ZEISS.
- ◆ Do not allow any cables, particularly power cords, to trail across the floor, where they can be snagged by people walking past.
- ◆ Protect the cables from excessive heat (e.g. halogen lamps, microscope fluorescence illumination).

NOTICE

To avoid equipment damage, data loss, or corrupted data, read and adhere to the safety notes below.

- ◆ Protect the camera against mechanical impact. External damage may affect the operation of inner components.
- ◆ Keep chemicals and fluids away from the camera.
- ◆ Make sure there is sufficient ventilation of the camera head. Avoid direct exposure to sunlight and locations near heat sources (radiators, stoves). Overheating can cause noisy images.
- ◆ Use the camera in a clean and dry location.
- ◆ Attach all connectors firmly and securely.
- ◆ Use only the accessories supplied by ZEISS, when applicable.
- ◆ Use only normal microscope cleaning material to clean the camera housing.
- ◆ Contact your local ZEISS service organization if a repair is necessary.
- ◆ Save all your data, such as images, measurement data, archives, reports, forms and documents, at regular intervals on an external storage medium. Otherwise it cannot be avoided that access to this data may be lost as a result of operational errors or hardware defects. ZEISS accepts no liability for consequential damage resulting from insufficient data protection.

2.2 Limitation of liability

No warranty shall be assumed by ZEISS during the warranty period if the equipment is operated without observing the safety regulations. In any such case, ZEISS shall be exempt from statutory liability for accidents resulting from such operation.

2.3 Warranty

ZEISS shall be exempt from any warranty obligations should the user fail to observe the safety regulations. ZEISS only guarantees the safety, reliability, and performance of the system if the safety notes are closely observed.

2.4 Intended Use

NOTICE

The camera should only be used for training and research. The images / videos from this camera must not be used for the direct generation of diagnostic results.

3 Technical data

3.1 AxioCam ERc 5s Rev.2

Feature	Value				
Sensor type	Micron CMOS color sensor				
Number of pixels	2560 (H) x 1920 (V) = 5 megapixels				
Pixel size	2.2 µm x 2.2 µm				
Chip size	5.70 x 4.28 mm, corresponds to 1/2.5"				
Live image frame rates on PC (maximal values when using optimal hardware)	<table border="1"> <thead> <tr> <th>H x V:</th> <th>Frame rate @1 ms:</th> </tr> </thead> <tbody> <tr> <td>800 x 600</td> <td>20 fps</td> </tr> </tbody> </table>	H x V:	Frame rate @1 ms:	800 x 600	20 fps
H x V:	Frame rate @1 ms:				
800 x 600	20 fps				
Sensor subarea readout (ROI)	Adjustable				
Digitization	8 Bit / pixel				
Exposure times	10 us up to 2 s				
Interface (camera)	USB 2.0 mini, SD card slot, RJ 45 (LAN), HDMI (DVI-D)				
Interface (PC)	2x USB 2.0 Standard-A				
Optical interface	C-Mount adapter				
Dimensions in mm (H x W x D)	66 x 68 x 68				
Operating systems	Microsoft® Windows 7 x64 Ultimate SP1, Microsoft® Windows 7 x32 Ultimate SP1				
Certificate	CE, RoHS				
Power supply	Via USB 2.0 interface				
Environment conditions	5° ... + 45° Celsius, max. 80% relative air humidity, no condensation, free air circulation required				
Order number	426540-9901-000				

i Note

Computer hardware, operating system, and software may decrease the frame rates. Selecting a part of the sensor area or applying binning can increase the frame rate. All specifications are subject to change without notice.

3.1.1 Spectral Sensitivity

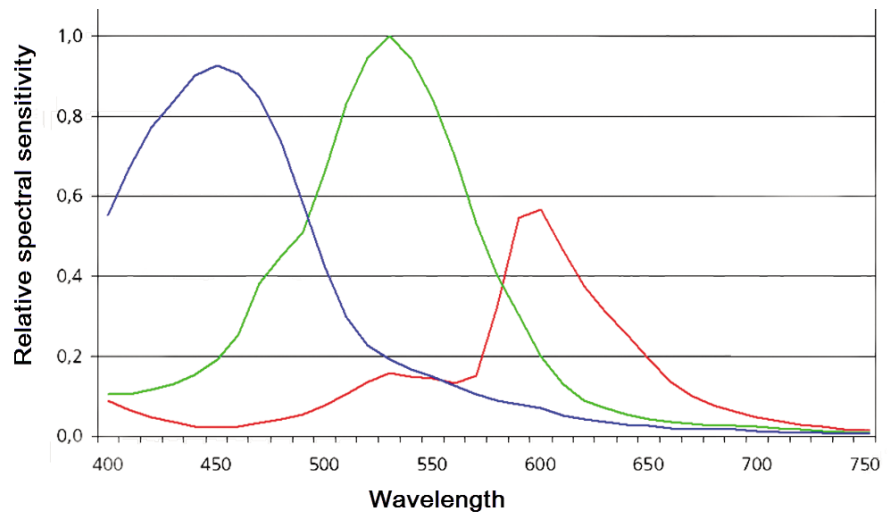


Fig. 3.1: Spectral Sensitivity AxioCam ERc 5s

4 Shipment

Content	Order No.
1 x AxioCam ERc 5s Rev.2 camera	426540-9901-000
1 x USB 2.0 data Y-cable	
1 x DVD with ZEISS software and device driver	

Accessory Package

The accessory package is optional. For any use without a PC, the accessory package is required.

Content	Order No.
1 x Power supply with country specific plug adapters	426540-0003-000
1 x SD (SDHC) memory card, 4GB, with protective case	
1 x SD card reader	
1 x HDMI to DVI cable	
1 x IR Remote Control	

5 Connecting the camera

5.1 Camera layout and cables

Camera Connections

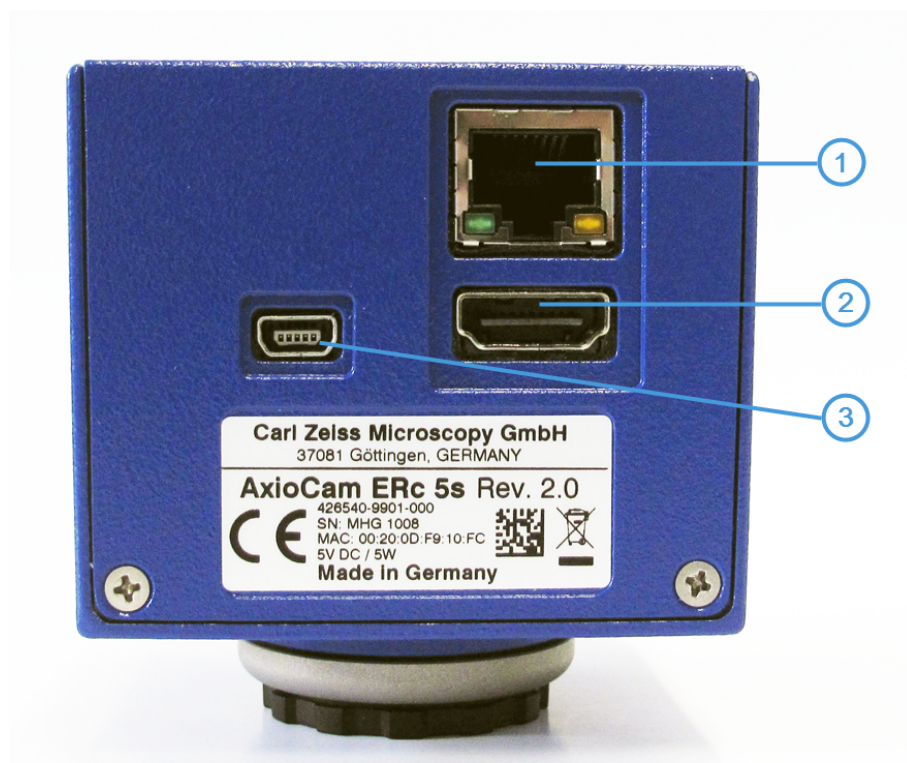


Fig. 5.1: Camera Connections

- 1** Fast Ethernet port for communication and image data transfer.
- 2** HDMI port for image data transfer to a monitor, TV, or projector.
- 3** (Mini) USB 2.0 port for communication and image data transfer, as well as power supply.

Camera Controls

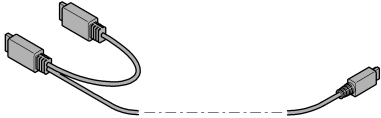

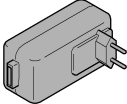
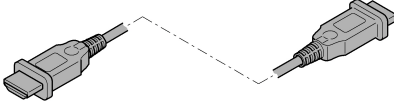




Fig. 5.2: Camera controls

- 1** LED function indicator
- 2** Capture button (Image / Video)
- 3** Receiver for IR remote control
- 4** AWB (Automatic white / gray balance) button
- 5** Card slot for SD / SDHC memory cards

Connecting Cables

The following connecting cables are required for voltage supply and use of the ports:

Name	Figure	Remarks
USB 2.0 Y cable		Connection between camera and PC / plug-in power supply
USB 2.0 cable (not supplied)		Connection between camera and plug-in power supply
Plug-in power supply Output 5 V DC, 1.0 A (optional)		Power cord 100-240 V 50 / 60 Hz
HDMI cable (not supplied)		Connection between camera and monitor, TV, or projector
HDMI / DVI adapter cable (optional)		Connection between camera and monitor / projector
Ethernet cable (not supplied)		Connection between camera and network or WLAN router

i Note

If the ZEISS Labscope / Matscope app is used, a commercially available WLAN router is required.

5.2 Connecting the camera to the mains supply

Prerequisites ■ The power supply has been adapted with the appropriate country-specific adapter.

- Procedure**
- 1 Insert the mini USB plug of the USB 2.0 cable into the mini USB port of the camera.
 - 2 Insert the USB plug of the USB 2.0 cable into the power supply and connect to a power outlet.

i Note

If the USB 2.0 Y cable is used for connection to the mains supply, leave the second USB plug unused. Using both USB plugs is only required if the device is to be operated on the PC. In the case of using the camera with a PC, both USB plugs should be plugged into the PC.

5.3 Connecting the camera to a display (without PC)

The camera can be connected to a monitor, TV, or projector for visualization of the live image data. The data at the HDMI output is in DVI format. Further HDMI functions (e.g. audio, communication between monitor and camera) are not supported. To enable the display of HD quality, it is recommended that only HD-capable devices be connected.

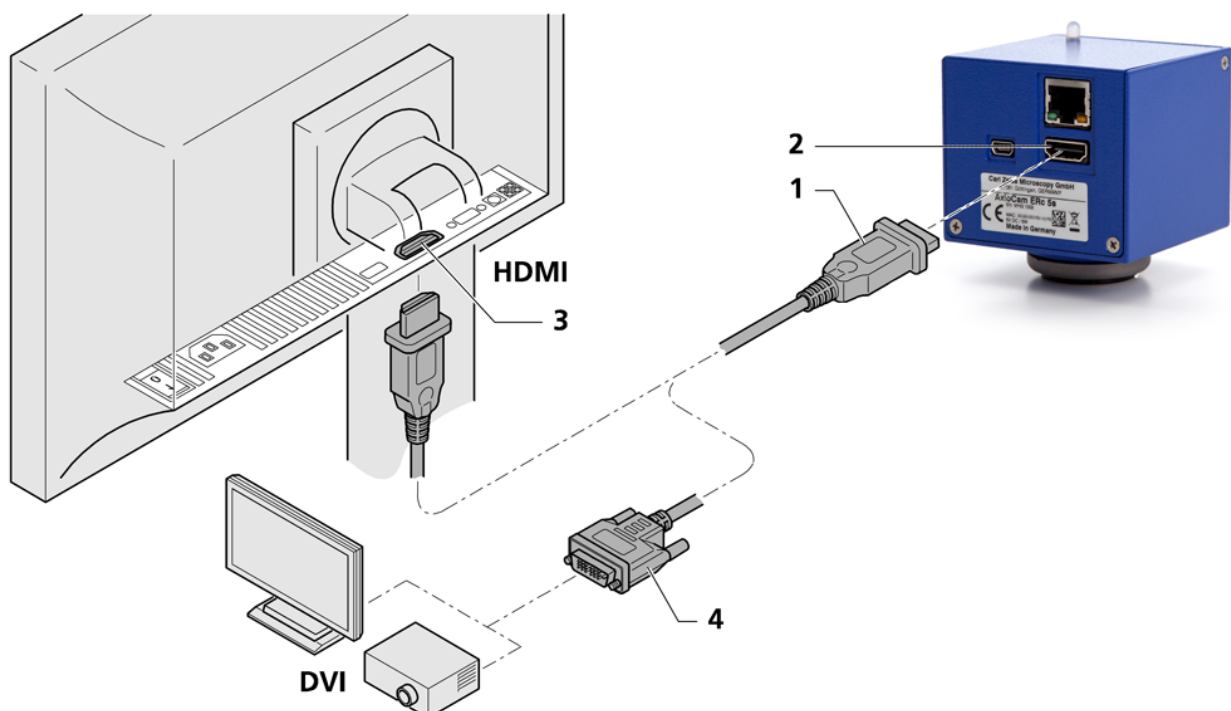


Fig. 5.3: Connecting the camera to a display / projector

Prerequisites ■ The monitor / projector has been set to 720p60.

- Procedure**
- 1 Insert the HDMI cable into the HDMI port of the camera (1 and 2).
 - 2 Insert the other end of the HDMI cable into the monitor / projector. Secure the HDMI plug on the jack on the monitor / projector (3).

i Note

If the monitor / projector has a DVI port and no HDMI port, an HDMI / DVI adapter cable or HDMI / DVI adapter will be required for the visualization of image data (4).

- 3 Set the monitor / projector's aspect ratio to 1:1 or Aspect. Refer to the documentation provided by the monitor / projector's manufacturer.
- 4 For further camera settings using the on-screen display menu (OSD), the remote control is required, see chapter *Remote Control* [▶ 18].
- 5 Connect the camera to the mains supply, see chapter *Connecting the camera to the mains supply* [▶ 15].
- 6 The camera's output has a default resolution of 720p60. To set the camera's resolution to 1080p30, press the **Input** button on the remote control, or change the resolution in the *Resolution Menu* [▶ 22]. In this case, make sure the monitor is set to accept a 1080p30 output (refer to monitor / projector's documentation from the manufacturer).

5.4 Connecting the camera to a network

Prerequisites ■ The camera is powered via the mains power supply, see chapter *Connecting the camera to the mains supply* [▶ 15].

- Procedure**
- 1 Insert the Ethernet cable into the camera's Ethernet port.
 - 2 Insert the other end of the Ethernet cable into a WLAN router.

If you want to use the camera together with the ZEISS **Labscope/Matscope** app, a WLAN router will be required. We recommend a high-performance 802.11n WLAN with sufficient free bandwidth. In the event of an overloaded or slow WLAN, the live image of the camera may be delayed or incorrectly displayed on the iPad.

Existing WLAN infrastructure may be used or a separate microscope WLAN may be set up. The camera will identify itself automatically to the network (DHCP) and will be automatically recognized by Labscope/Matscope, provided the iPad is on the same network.

For an overview of all ZEISS Microscopy apps and further information on Labscope/Matscope, visit: <http://www.zeiss.com/micro-apps>

5.5 Connecting the camera to a PC

The USB port is for supplying power to the camera and can also be used for data transfer to the PC. Due to the camera's power requirements, a Y-cable is required for transferring data to the PC.

- Procedure**
- 1 Insert the mini USB plug of the Y-cable into the mini USB port on the back of the camera.
 - 2 Insert the two USB 2.0 plugs on the other end of the Y-cable into the PC.

No plug-in power supply is required for operation on the PC.

i Note

One USB 2.0 port is not enough to supply power to the camera. If only one plug is inserted, the camera will not receive sufficient power.

5.6 Function indicator

For the definitions of the LED color signals, refer to the list below:

Signal	Description
Green	Power supplied
Green flash	Cameras start sequence finished; Write to SD card
Red	Camera not ready
Red flash	Camera error
Off	No power supplied

6 Remote Control and OSD menu

6.1 Remote Control



Fig. 6.1: Remote Control

No.	Button	Standard function	Function in OSD menu
1	Menu	Activate menu	Exit menu
2	On	Turn On / Off HDMI output	Turn On / Off HDMI output
3	Arrow Up	Increase contrast	Up / increase value
	Arrow Down	Reduce contrast	Down / reduce value
	Arrow Left	Reduce brightness	Left
	Arrow Right	Increase brightness	Right
4	Enter	Trigger automatic white balance	OK (apply value)
5	Capture	Capture an image to SD card	Capture an image to SD card
6	Live	Clear screen of windows	Exit menu
7	Index	None	Go to top tier of menu
8	Record	Start / Stop recording video	Start / Stop recording video
9	Play	Clear screen of windows	Exit menu
10	Input	Toggle between 720p60 and 1080p30 outputs	Toggle between 720p60 and 1080p30 outputs

6.2 On Screen Display Menu

To open the On Screen Display (OSD) menu, press the **Menu** button on the Remote Control. The OSD menu for adjusting the settings will appear. The following menus are available for configuring the camera:

6.2.1 Color menu



Fig. 6.2: Color menu

Menu entry	Description
AWB	<p>The purpose of white balance is to calibrate the camera to the color temperature of the light source used. The AWB function of the camera supports the Continuous / Push button modes.</p> <p>In Continuous mode, the white balance is carried out continuously. In certain samples this may result in incorrect colors.</p> <p>To ensure that the white balance applies to the light source and not the main color of the sample, the Push button mode can be set. Here the white balance is carried out only once if the AWB / Enter button is pressed outside the OSD menu.</p>
Color Temp.	<p>This creates a white balance bias towards yellow (left) or blue (right). If AWB (see above) is set to Push button, the effect of this regulator is only visible after a white balance has been carried out with the AWB button (outside the OSD menu).</p>
Saturation	<p>The camera's images are in sRGB color space with an 8 bit color depth per channel. The color saturation per RGB value can be adjusted.</p> <ul style="list-style-type: none"> ■ Extreme left: Gray scales ■ Extreme right: Maximum color saturation
Gamma	<p>The gamma correction of the camera can be adjusted. Gamma 1 and 0.45 are available.</p>

6.2.2 Exposure Menu



Fig. 6.3: Exposure menu

Menu entry	Description
AET / AGC	<p>AET (automatic exposure time) and AGC (auto gain control) automatically ensure the correct brightness of the image when the setting is at Continuous. The settings are Once / Continuous / Off.</p> <p>In some situations (e.g. strong contrast within the specimen), the automatic setting may cause the image to be under- or overexposed. In this case, the automatic setting can be deactivated by switching to Off.</p> <p>A shorter exposure time with higher amplification (= more noise, but smoother live image) or a longer exposure with lower amplification (= less noise, less smooth live image) can be selected in Off mode.</p> <p>In Once mode, a one-time automatic adjustment will be carried out when confirmed with Enter, before being deactivated again.</p>
Auto level	<p>Influences the AET / AGC control when Continuous mode is set.</p> <ul style="list-style-type: none"> ■ Extreme left: very dark image ■ Extreme right: very bright image
Exposure	<p>The exposure time can be set within the range 20 μs to ~2s. The exposure time may be set automatically or manually. Manual setting is possible by selecting the AET / AGC control in Off mode.</p> <ul style="list-style-type: none"> ■ Extreme left: 20 μs ■ Extreme right: 2000 ms (2 s)
Gain	<p>The sensor amplification function can be set within the range 1x to 8x. Sensor gain may be set automatically or manually. Manual setting is possible by selecting the AET / AGC control in Off mode.</p> <ul style="list-style-type: none"> ■ Extreme left: no increased amplification (less image noise, less light sensitivity of sensor) ■ Extreme right: maximum amplification (strong image noise, high light sensitivity of sensor)

6.2.3 Resolution Menu

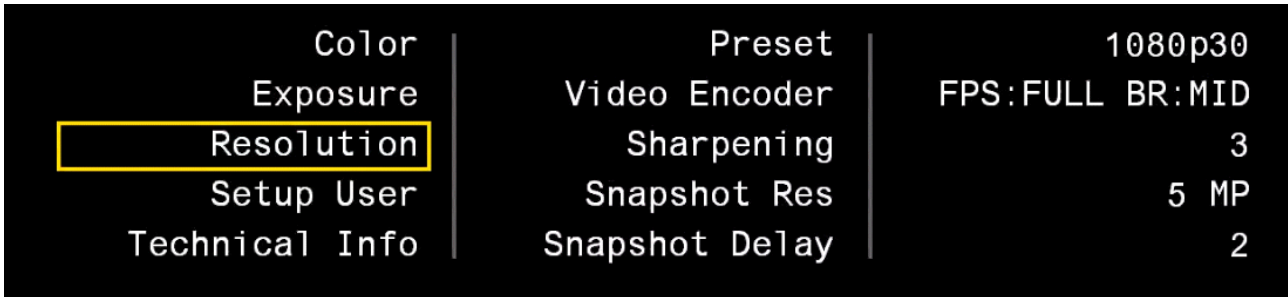


Fig. 6.4: Resolution menu

Menu entry	Description
Preset	<p>The following options are available:</p> <ul style="list-style-type: none"> ■ 720p60: HD resolution, 1280x720, 60 Hz ■ 1080p30: Full HD resolution, 1920x1080, 30 Hz <p>A default resolution of 720p60 has been set.</p> <p>Prior to conversion to the full HD resolution (1080p30), check that the monitor supports this option. If 1080p30 has already been activated and the monitor displays no image, follow the instructions as described in this chapter <i>Camera</i> [▶ 29].</p>
Video Encoder	<p>The live image and video recordings are influenced by this setting. The following settings are possible:</p> <ul style="list-style-type: none"> ■ FPS:HALF BR:HIGH: Half frame rate, high data rate (8 Mbit / s) ■ FPS:HALF BR:MID: Half frame rate, medium data rate (4 Mbit / s) ■ FPS:HALF BR: LOW: Half frame rate, low data rate (2 Mbit / s) ■ FPS:FULL BR:HIGH: Full frame rate, high data rate (8 Mbit / s) ■ FPS:FULL BR:MID: Full frame rate, high data rate (4 Mbit / s) ■ FPS:FULL BR:LOW: Full frame rate, low data rate (2 Mbit / s) <p>Half frame rate results in improved image quality with the same data rate.</p>
Sharpening	<p>Value range: 0 to 3.</p> <p>Edge flickering may occur in some HDMI monitors with a default value of 3, but this will disappear with lower values.</p>

Menu entry	Description
Snapshot Res (Res = resolution)	<p>The resolution for snapshots captured to the SD card can be defined here. The following modes can be set:</p> <ul style="list-style-type: none">■ as monitor on the HDMI port<ul style="list-style-type: none">– 1920x1080 (16:9 aspect ratio), when the camera is in 1080p mode (see default settings)– 1280x720 (16:9 aspect ratio), when the camera is in 720p mode (see default settings) <p>Advantages: Acquisition lasts < 1 second, small file sizes due to comparatively low resolution.</p> <ul style="list-style-type: none">■ 5 MP<ul style="list-style-type: none">– 2560x1920 (4:3 aspect ratio) – full sensor resolution, 5 megapixels <p>Advantages: full resolution, wider vertical image field.</p> <ul style="list-style-type: none">■ 2560x1440<ul style="list-style-type: none">– 2560x1440 (16:9 aspect ratio) <p>Advantages: high resolution (3.7 megapixels), same image field as in live image.</p>
Snapshot Delay	<p>This setting is useful when images are to be captured using the Capture button on the camera. Because pressing the button causes the microscope to shake, motion blur would be visible in the image with immediate exposure. This effect is avoided with a snapshot delay.</p> <p>The snapshot delay can be set between 0 and 10 seconds.</p>

6.2.4 Setup User Menu



Fig. 6.5: Setup User menu

Menu entry	Description
Date / Time	Date and time in year-month-day / hour-minute-second format. Each element can be adjusted using the Arrow Up/Arrow Down buttons. The new time can be set by pressing the Enter button. Date and time are integrated into the folder and file names on the SD card.
Flip image	The following modes are available for image mirroring: <ul style="list-style-type: none"> ■ FLIP H+V: horizontal and vertical mirroring ■ FLIP V: only vertical mirroring ■ FLIP H: only horizontal mirroring ■ OFF: no mirroring
Load Settings	The previously saved user settings (USER 1-4) can be loaded in this menu. Selecting FACTORY DEFAULT reinstates the default camera settings. After confirmation with Enter , the camera will be restarted. This may take several seconds. If the OSD menu is not available, the factory settings can be reinstated by pressing the Capture + AWB buttons on the camera (keep pressed for two seconds).
Save Settings	The current settings can be saved in a user storage location (USER 1-4). They can be automatically loaded in the Load Settings or Startup Set menus at a later point in time or each time the camera is switched on. Notice that if the settings are saved, Startup Set is automatically set to this new user storage location.
Startup Set	This setting determines which user storage location (USER 1-4) is to be loaded each time the camera is switched on.

6.2.5 Technical Information Menu



Fig. 6.6: Technical Information menu

Menu entry	Description
Version	Current firmware version
MAC	MAC address of the built-in camera
IP	Currently used IP address
Destination IP	Currently used multicast target address
NETMASK	Currently used netmask

7 Installing software and drivers

Prerequisites ■ To acquire images with the AxioCam ERc 5s on a PC, you must install ZEISS software (e.g. ZEN or AxioVision). You will find the software installation on the DVD delivered. The camera drivers will be installed automatically during the installation of the software.

■ Before starting the installation of the software and drivers, the camera must be connected to the PC, see chapter *Connecting the camera to a PC* [▶ 17].

Procedure **1** Install the software according to the installation guide delivered with the software.

2 During the installation you will be asked to install the camera drivers. Follow the procedure by confirming the upcoming messages.

3 Restart your PC after the installation.

4 You can check in the device manager if the driver installation was successful.

You have installed the software and the camera drivers. You can now start acquiring images with your camera using ZEISS software. For more information, please read the software documentation.

7.1 Installing Labscope / Matscope App

From your iPad, go to the App Store and search for "Labscope" or "Matscope" by Carl Zeiss AG. Install the app as described.

8 Acquiring images

8.1 Introduction

The AxioCam ERc 5s is a high-resolution digital camera for color images. It is suitable for use as an accessory for educational and routine microscopy in laboratory environments and for use by trained laboratory personnel. It has been designed to be used in the field of light microscopy for general observation, routine work, and simple applications in which a sufficient amount of light is available.

Due to the fact that image acquisition is already covered in the ZEISS software manuals, image acquisition in ZEISS software is not a part of this guide. For more information on image acquisition with these software products, please refer to the corresponding software manuals and online help.

NOTICE

The camera should only be used for training and research. The images / videos from this camera must not be used for the direct generation of diagnostic results.

8.2 Acquiring the first image / video to the SD card

i Note

An SD card has a max. capacity of 4 GB, while an SDHC (HC = high capacity) has up to 32 GB. Prior to use on the PC, the SDHC card must be formatted in format FAT32.

Prerequisites ■ A SD / SDHC card has been inserted into the card slot of camera.

- Procedure**
- 1** Position your specimen on the microscope and adjust the microscope to see a focused image through the eyepieces.
 - 2** Set the microscope light path to divert the image to the camera (e.g. Adjust the tube slider of the microscope to **50% camera** and **50% eyepieces**).
 - 3** To acquire an image:
 - 1** Briefly press the **Capture** button on the camera to trigger an exposure.
The images are saved on the SD / SDHC card in JPG format.
 - 4** To record a video:

- 1 Press the **Capture** button for a longer moment to start a video recording.
- 2 Briefly press the **Capture** button once again to stop the video recording.

i Note

When recording a video directly to the SD card, the video is saved as a *.h264 file. The videos can be played back using standard software that includes a H.264/AVC decoder.

In the case that an existing solution is not already available on the PC, VLC media player is an optional solution. VLC media player is a free and open source media player and is available online at www.videolan.org. Please make sure to install the appropriate version for your operating system.

Only VLC for Windows has been tested. For Windows, please use Version 2.1.3 or newer.

8.3 Image acquisition with Labscope/Matscope

Upon first starting Labscope or Matscope, each screen starts with an overlaying information screen explaining the functions. Refer to these information screens for using the software. Disable or re-enable the information screens in the software's **Settings** menu on your iPad.

For further support in using Labscope / Matscope, see www.zeiss.com/microscopy/community. Please check both Labscope and Matscope threads for problem-solving notes.

9 Troubleshooting

9.1 Camera

Problem	Cause	Solution
LED is off.	The camera is not drawing power via the USB cable.	Connect the camera to a running PC (using both Y-cable plugs) or with a plugged-in power supply to an outlet.
	USB cable is not connected to a certified PSU.	Requirements: 5 V DC with at least 950 mA at output.
	USB cable is not suitable.	Use the originally supplied USB cable.
LED flashes red.	The camera indicates an error.	SD card is full: Insert a new card or delete images from the current card.
		SD card is write-protected: Push the locking slide on the card to "unlocked".
		SD card is defective or not formatted: Format SD card; replace SD card if error message does not disappear.
Buttons do not react, LED flashes red when a button is pressed.	The buttons are temporarily locked, as the camera is being accessed exclusively from the PC or network.	Control the camera via PC software or Zeiss app, or close the PC software or Zeiss app.
Firmware update not functioning.	For an update, an SD card must be inserted and the firmware update must be saved to a specified subfolder on the SD card.	Insert a formatted, unsecured SD card with at least 10 MB free memory space. Be sure to carefully follow the instructions enclosed with the firmware update.
Newly captured images are not visible in Microsoft Windows Explorer on the memory card.	Microsoft Windows Explorer has not updated the contents of the card.	Remove the memory card from the camera, wait for three seconds and re-insert it. Microsoft Windows Explorer will read the contents of the card again.
The camera "forgets" the date / time.	The buffer battery is empty.	Contact service to replace the buffer battery. Replacement requires special tools and therefore cannot be carried out by the customer.
The image has severe noise.	The amplification (gain) is set too high.	Reduce the gain and increase the exposure time instead.

Problem	Cause	Solution
The image is too dark or too bright.	AET / AGC (automatic exposure time / automatic gain control) has not been activated	Activate AET / AGC and select Continuous mode, or manually adjust the exposure time so that the setting is correct for the current light situation.
Monitor connected via HDMI / DVI does not display an image.	The camera is not delivering a signal, or signal is not compatible with the monitor.	Monitor switches to stand-by mode: Ensure that the camera has been switched on for at least 30 seconds and the LED lights up green. Check the plug connections on the camera and monitor.
Monitor displays an error message that after switch-over to 1080p resolution, the signal is outside the monitor specifications.	The monitor may not support a 1080p30 signal.	Hold down the Capture + AWB buttons on the camera body for two seconds to return the camera to 720p60 resolution. If the remote control is available, press the Input button to switch between 1080p30 and 720p60.
The camera forgets the settings (e.g. manual white balance, resolution) if the power supply is disrupted.	Settings were not stored.	If settings have been made for regular use, they must be saved before disconnecting the power, see chapter <i>Setup User Menu</i> [▶ 24].
Camera otherwise behaves abnormally.	The camera may have been brought into a non-intended state.	Restore all default camera settings via the OSD menu or by pressing the Capture + AWB buttons on the camera for two seconds. The camera will then restart and should be in a normal state.

9.2 Labscope / Matscope

Problem-solving notes for the use of the camera in conjunction with the network / WLAN and Labscope/Matscope app are to be found separately at the ZEISS website www.zeiss.com/microscope/community. Please check both Labscope and Matscope threads for problem-solving notes.

9.3 ZEN Software

9.3.1 The camera does not appear in the menu of selectable cameras

- Make sure that you have connected the camera and installed the software and drivers in accordance to the instructions in this manual.
- Make sure that you installed the software and drivers with administrative rights. Install the driver with administrative rights again if necessary.

9.3.2 You don't see a camera image on your screen

- Check the light path setting of the microscope.
- Is the status LED on the camera on? If not, check the cable connections between camera and computer.
- Execute a reset of the camera.
- Execute an automatic exposure measurement.
- Check the display adjustments for the live image.
- Check the aperture diaphragm of the microscope.
- Check the position of the beam splitter between the ocular and the TV port.

9.3.3 The color of my image does not correspond to the impression through the ocular

In case of color cameras:

- Check white balance and, if necessary, repeat white balance.
- Check the monitor's color temperature setting. If necessary, reduce this to the lowest value that can be set (usually 5200 K).

In case of monochrome cameras:

- Images of monochrome cameras are displayed by using overlay colors to represent the colors of fluorescence dyes on the monitor. If the color is different to the visual impression in the eyepiece, select a different overlay color.

9.4 Other

The color of the image on the monitor / projector does not correspond to the image in the software

- Simultaneous usage of the camera through both a monitor / projector (HDMI port) and through a PC (mini USB port) is not supported.

10 Maintenance

10.1 Optical System

The internal optical components of the camera should always be protected. If no lens, or TV adapter with optics, is screwed into the camera's C-Mount thread, the camera's sensor and protective glass must be protected by screwing the protective cap onto the camera's C-Mount thread.

10.2 Cleaning the infrared filter or protective glass

Contamination of the IR filter (for color cameras only) or the protective glass has an adverse effect on the quality of the resulting image (dark points, cloudy structures in the image). If there is dry dust on the front side of the infrared filter or protective glass, you can remove it with a soft brush or with cotton (wool). Use cleaning fluid for optics/lenses only to clean the IR filter. Do not use tap water to clean the IR filter.

11 Disposal and Recycling

This product has been developed, tested and manufactured in accordance with the applicable environmental provisions and directives of the European Union:

- The product and its accessories comply with EU directives 2002/95/EC (RoHS) and 2002/96/EC (WEEE), insofar as these apply to this product.
- ZEISS has implemented a take-back and recycling process that ensures that proper recycling is carried out in accordance with the aforementioned EU directives.
- Please contact your ZEISS sales/service organization for details relating to disposal and recycling.
- This product must not be disposed of with domestic waste or using municipal waste disposal services. In the event of resale, the seller must inform the buyer of the need to dispose of the product appropriately.



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