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User Guide for PROGRES GRYPHAX[®] Micromanager driver

The "Micromanager driver" for PROGRES GRYPHAX® USB 3.0 cameras enables user to operate with Micromanager - the open source microscope software solution. The driver delivers essential functionalities of PROGRES GRYPHAX® USB 3.0 cameras. Driver is supported under Windows operating systems.

The GRYPHAX Micromanager driver is part of PROGRES GRYPHAX® software installation (as of version 2.0.0 or newer).

General Preparation:

The Micromanager software version **1.4.23_20170731 – 32 bit** has to be installed <u>before</u> start installation of GRYPHAX Micromanager driver. Recommended USB 3.0 interface card (with Renesas chipset) has to be installed in advance!

Overview:

GRYPHAX camera operating under Micromanager software:

Device Property Browser		Limage.
Show cameras		File Edit Image Process Analyze Plugins Window Help
Show shutters		
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Show other devices		This contract the contract change and mes (dec) which and the
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Installation:

To install the GRYPHAX Micromanager driver, please run the PROGRES GRYPHAX® software installation version 2.0.0.0 (USB 3.0 Camera-v2.x.x.exe) or newer.

Latest PROGRES GRYPHAX® software can be downloaded from Jenoptik website for free after registration.

DOWNLOAD UPDATE

 Select the GRYPHAX Micromanager driver from "Choose Components" page and proceed with "Next".

📰 USB 3.0 Camera Setup				
Choose Components Choose which features of USB 3.0 Camera you want to install.				
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.				
Select components to install:	GRYPHAX GriedShow filter Molecular Devices Metame Micromanager TWAIN	Description Install Micromanager driver (32 bit) for Micromanager software version 1.4.23_20170721 - 32 bit.		
Space required: 177.3MB	< III >>			
Jenoptik Optical Systems GmbH —	< <u>B</u> ack	Next > Cancel		

2. Choose the install location of previously installed Micromanager software.

> <u>Note:</u> The GRYPHAX Micromanager driver must be installed at root folder of Micromanager installation: "...(x86)\Micro-Manager-1.4\"

Click on "Browse" button to choose alternative installation location.

USB 3.0 Camera Setup	
Choose Install Location	
Choose Install Location of MicroManager.	JENOPTIK
Setup will install the driver for GRYPHAX cameras f Select the folder of your current installation of Micr MicroManager installed, click Back and disable insta	or MicroManager in the following folder. Manager 32 Bit. If you don't have 32 Bit Illation of MicroManager driver.
Destination Folder	Browse
Destination Folder C:\Program Files (x86)\Micro-Manager-1.4 Space required: 148.8MB	Browse
Destination Folder C:\Program Files (x86)\Micro-Manager-1.4 Space required: 148.8MB Space available: 21.1GB	Browse
Destination Folder C:\Program Files (x86)\Micro-Manager-1.4 Space required: 148.8MB Space available: 21.1GB lenoptik Optical Systems GmbH	Browse

3. Follow the installation procedure to complete installation.





Hardware configuration:

After successful GRYPHAX Micromanager driver installation, please plug-in the PROGRES GRYPHAX USB 3.0 camera to USB 3.0 port at recommended interface card.

<u>Note:</u> To operate with GRYPHAX cameras under Micromanager software a hardware configuration file is mandatory. Please follow the next steps to configure hardware settings file.

For detailed information, please visit official Micro-Manager support website: <u>https://micro-manager.org/wiki/Micro-Manager_User%27s_Guide</u>

Start the Micromanager software & Micro-Manager-1.4 from installation directory <u>without</u> "Micromanager startup configuration".



To create a Micromanager configuration with GRYPHAX camera support, please navigate to the title bar of Micromanager and activate option: "Hardware Configuration Wizard..." from menu: "Tools".







a) Follow up the configuration wizard by modify existing configuration or by create of a new configuration. Proceed with "**Next**" button.



b) Add GRYPHAX hardware driver called: "DijSDKcamera" by mouse double click or "Add" button.



c) Change the Label (displayed hardware name) optionally and confirm by "OK" button.

🛓 Device: DijSDKcamera	Library: DijSDKcamera
Label DijSDKcamera	
	OK Cancel





d) After successfully adding the GRYPHAX camera driver to the list of "Installed Devices", please proceed with "Next" button.

Hardware Configu	uration Wizard						X
Step 2 of 6: Add o	r remove devices						
Installed Devices							
Name	Adapter/Library	Description	Status	[Edit	Adding or Removing Devices	
Available Device: British Convustor British Convustor <t< td=""><td>MMCcre/Default DIJSDKcamera/ DIJSDKcamera/ da nera nera ccamera DIJSDKcar oteCamera ingControllers a IPort .M X ccessorChain</td><td>r con</td><td>IDefault OK</td><td></td><td>Periphera Remove</td><td> The list above displays all of the devices that will be handled by Micro-Manager in this configuration file. If you are making a new configuration file for the first time, please visit the Micro-Manager website (www.micro-manager.org) and look under Devices to find instructions for setting up all your devices. You can begin adding new devices whenever you're ready (click 'Add' button). If you need more help with deciding which devices to add, highlight a particular device and click Help (it really helps!). While adding a device you can choose to allow the wizard to recognize these devices automatically (recommended) or show all of the subdevices </td><td>E</td></t<>	MMCcre/Default DIJSDKcamera/ DIJSDKcamera/ da nera nera ccamera DIJSDKcar oteCamera ingControllers a IPort .M X ccessorChain	r con	IDefault OK		Periphera Remove	 The list above displays all of the devices that will be handled by Micro-Manager in this configuration file. If you are making a new configuration file for the first time, please visit the Micro-Manager website (www.micro-manager.org) and look under Devices to find instructions for setting up all your devices. You can begin adding new devices whenever you're ready (click 'Add' button). If you need more help with deciding which devices to add, highlight a particular device and click Help (it really helps!). While adding a device you can choose to allow the wizard to recognize these devices automatically (recommended) or show all of the subdevices 	E

e) Complete the hardware configuration by save of new / changed configuration and press "Finish" to exit the wizard.



f) Configuration of hardware support file is completed. Now you are prepared to operate with GRYPHAX USB 3.0 cameras together with Micromanager software.





Configure recommended memory settings:

To edit memory settings for Micromanager plug-in, please navigate to the title bar of Micromanager and open option: "Options..." from menu: "Tools".

🖞 Micro-Manager 1.4.23 20170731 - C:\Program Files (x86)\Micro 💷 💷 🗾 🖊					
File Tools Plugins Help					
3	Refresh GUI Rebuild GUI	rtion settings Save Preset			
	Script Panel Shortcuts Device Property Browser Stage Position List Multi-Dimensional Acquisition Mouse Moves Stage (Use Hand Tool) Pixel Size Calibration	+ - Edit Preset + - Edit ım/pix			
-	Hardware Configuration Wizard Load Hardware Configuration Reload Hardware Configuration Switch Hardware Configuration Save Configuration Settings As	channels Slow hist tch ignore % 2 🔔 Log hist			
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		 Micro-Manager 1.4.23 20170731 - C:\Program Plugins Help Refresh GUI Rebuild GUI Script Panel Shortcuts Device Property Browser Stage Position List Multi-Dimensional Acquisition Multi-Dimensional Acquisition Mouse Moves Stage (Use Hand Tool) Pixel Size Calibration Hardware Configuration Wizard Load Hardware Configuration Reload Hardware Configuration Switch Hardware Configuration Save Configuration Settings As Options 			

Change the "Sequence Buffer Size" between: 96 to 256 MB (recommended size to operate with GRYPHAX cameras).

For detailed information, please visit official Micro-Manager support website:

https://micro-manager.org/wiki/Micro-Manager Configuration Guide#Memory Settings

<u>Note:</u> The best working buffer size varies depending on used hardware and software environment!

Micro-Manager Options				
Display Background: Night ▼ Preferred Image Window Zoom: 33% ▼				
Sequence Buffer Size: 96 MB				
 Create metadata.txt file with Image Stack Files Save XY positions in separate Image Stack Files Do not ask for config file at startup Startup Script: MMStartup.bsh Close app when quitting MM 				
Enable debug logging Delete log files after 7 days Delete Log Files Now Sync exposure between Main and MDA windows Hide MDA display				
Reset Preferences Close				





To edit memory settings for ImageJ software, please navigate to the title bar of ImageJ and open option: "Options" from menu: "Edit".

🛓 ImageJ	Line Width Input/Output	
File Edit Image Process Analyze	Fonts	
Undo Strg+Z	Profile Plot Options	👌 Stk 🔊
*Recta Cut Strg+X Copy Strg+C	Rounded Rect Tool Arrow Tool Point Tool	
Paste Strg+V Paste Control	Wand Tool Colors Appearance	
Clear	Conversions	
Clear Outside	Memory & Threads	\leq
Fill Strg+F	Proxy Settings	
Draw Strg+D	Compiler	
Invert Strg+Umschalt+I	DICOM	
Selection	Misc	
Options	Reset	

Change the "Maximum memory" size to approx.: **350** MB (recommended size to operate with GRYPHAX cameras).

<u>Note:</u> The best working memory size varies depending on used hardware and software environment!

Memory (32-bit)				
Maximum memory: 350 MB				
Keep multiple undo buffers				
Run garbage collector on status bar click				
OK Cancel Help				





Start Micromanager and select hardware configuration:

Start Micromanager application & Micro-Manager-1.4 from your installation directory.

Select hardware configuration with GRYPHAX USB 3.0 camera support from "Micromanager startup configuration dialog" to activate the

GRYPHAX cameras. Click on "..." button to load config file from PC.



To setup camera functions, please navigate to the title bar of Micromanager and open the "Device Property Browser" from menu: "Tools".

Afterwards, a new window will be open to view and edit camera property values.







At "Device Property Browser" all relevant camera values can be changed.

By option "**Extend property**" you can activate the extended property dialog with more function compared to the "Device Property Browser".

Afterwards, the GRYPHAX camera driver windows for camera settings and live preview will appear automatically.

At the driver settings window you can prepare all camera relevant settings to get best results from camera. Additionally, you can observe your settings e.g. white balance directly at the live preview window.

For further details, please see next pages.

device Property Browser			X
Show cameras Show shutters Show stages Show discrete changers Show other devices	😒 Refr	ad-only properties	5
Property	Valu	е	
DijSDKcamera-Automatic Setup	Yes		
DijSDKcamera-Binning	1		
DijSDKcamera-Black Point	0		•
DijSDKcamera-Capture shot	1920	x 1200	
DijSDKcamera-Color mode	Color		
DijSDKcamera-Contrast	50	∢ [۴.
DijSDKcamera-Extend property	No		
DijSDKcamera-Fast capture	No		
DijSDKcamera-Gain	1	< □	÷.
DijSDKcamera-Gamma	0.2	- E	4
DijSDKcamera-Intensity	70	•	
DijSDKcamera-Live	1920	x 1200	
DijSDKcamera-Minimize gain	Yes		
DijSDKcamera-Ocular View	0		
DijSDKcamera-Saturation	50	•	

<u>Note:</u> Due to the limitation of Micromanager, not all values and parameter of Device Property Browser can be adjusted during live preview or single image capture!

GRYPHAX camera driver windows for extended camera settings and live preview:







Overvie	ew of settings window:	DijSDK v1.2.6, Build 814,	32 bit
1.	Toolbar – contains most important tools	File Camera Help	
2.	Select active camera	Camera Device Camera	GRYPHAX::ARKTUR::030000002
3. •	Format - change image settings for:	Live Capture shot	3840 × 2160 • 3840 × 2160 • Enable •
•	Fast capture mode	U Minimize gain	Enable
•	Option – Minimize gain during capture	Automatic Setup U Intensity U Exp. time	Automatic Setup 70 0.030[s] 30.00[ms] 10.00
4.	Image parameter settings -	U Ocular View U Contrast U Saturation U Gamma	0 50 50 0.45
5.	Create / delete Shadings	U Black Point ■ Shading White shading Black shading	0 White shading Black shading
6.	Information field for help text & status	Minimize gain Minimize gain during capt ARKTUR C:\Windo	ure DijSDKcamera.ini PicNr[14473] Fps[0.3]

Note: All settings are saved (under folder: C:\Users\<user name>\AppData\Roaming\DijSDK\...) for each camera type and will be reused after open of driver again. Settings are not connected to individual camera serial numbers.

Toolbar:



The Toolbar of driver contains the following functions:

- Save camera settings manually to currently used settings file.
- Change between color mode and black / white mode for color cameras.*
- **START** Start / Stop Live image preview at the preview window.
 - Shot button to start transfer single capture shot image via driver interface.
- Agnifier tool to activate / deactivate magnifier glass at preview window.
- In Save image option to save last displayed live image from preview window to hard drive.
- White balance pipette to set manually white balance for color cameras at preview window.* *function available for color cameras only

PROGRES RVPHAX[®] series



Select camera:

To activate or change camera, select the appropriate camera from dropdown list of driver.

		4
Camera	GRYPHAX::ARKTUR::030000002	
		AU -

After activation of camera from dropdown list, the according settings to the camera type will be loaded from settings file and used.

GRYPHAX::ARKTUR::030000001	
GRYPHAX::SUBRA::0100000105	
GRYPHAX::NAOS::020000003	
GRYPHAX::ARKTUR::030000001	
GRYPHAX::ARKTUR::030000002	
GRYPHAX::PROKYON::060000004	

Note: In case of first camera start, the "Automatic setup" process will be proceed.

Format:

Under format section user can set-up <u>different</u> image resolution for live preview and capture shot.

Live	3840 x 2160	•
Capture shot	3840 x 2160	•

"Fast capture mode" reduces processing time and transfer time for image transfer via driver.

By activation of "*Fast capture mode*" the driver will use the selected <u>live resolution</u> for single shot (image transfer) instead of the selected capture shot resolution!

Fast capture	Disable 🗸	
Minimize gain	Enable 🗸	

By activation of option "*Minimize gain during capture*" the gain value will be minimized for capturing and adjusting the exposure time accordingly. This option is recommended and will reduce noise level and enhance image quality.





Camera image parameter:

Important: All *camera image parameter* are saved during close driver for each camera type and will be reused after open of driver again.

The *Automatic Setup* option can be used at any time <u>Automatic Setup</u> to set all camera image parameter to default values. Additionally, the automatic white balance and the color correction to the used light source will be applied and "Auto Exposure control" is enabled.

All camera image parameter can be adjusted by scroll slider or by enter of value.

Intensity	<u>75</u>
-	

The *Exposure control* option contains the following parameter: Intensity value, Exposure time and Gain value.

Intensity	75	
Exp. time	0.033[s]	33.00[ms]
Gain	1.00	

Set *Intensity* level to activate the automatic exposure control function. The selected value corresponds the mean intensity value in percent. Available range from 0 to 100%

Change **exposure time** value or **gain** value to activate manual exposure control.

<i>Ocular View</i> * – to adapt the color impression from the eyepieces (microscope) to the image on screen.	Ocular View	0
<i>Contrast</i> – to enhance image contrast for live and captured images	Contrast	50
Contrast to children indge contrast for live and captured indges.	Saturation	50
Saturation [*] – to change color saturation for live and captured images.	Gamma	0.45
<i>Gamma</i> – to change gamma value for live and captured images.	Black Point	0

Black Point – to enhance noise level in dark image areas.

*function available for color cameras only

Reset settings separately:

All *camera image parameter* can be reset to default value separately by pressing reset icon U.

Status bar information:

 Status bar displays the connected camera, settings location, frame number and frame rate.

 ARKTUR
 C:\Users...\DijSDKcamera.ini

 PicNr[4448] Fps[50.3]





Create / delete white shading:

White shading function corrects intensity variation across the image, caused by the microscope or objectives.

Click on the button "White shading" White shading to create a white shading correction. The driver will automatically create a white shading correction file for the connected camera type.

This will take up to some seconds, the progress indicator will be shown during creation. Press "Esc" will abort process.

:	Shading P	roce	ss Pres	ss Esc	to ab	ort		

After successfully white shading creation the button will change status to "Reset White"
Reset White

The white shading correction is now available and used. To deactivate the white shading press "**Reset White**" and the white shading correction file will be deleted and cannot be reloaded again. After reset / delete of shading file, a new shading file has to be created to activate shading again.

The shading files will be saved on: "C:\Users\<user name>\AppData\Roaming\DijSDK\" and are reused after driver restart and appropriate camera type is connected.

<u>Note:</u> Driver can save just one shading file for each camera type. The file is valid to the individual camera serial number!

Create / delete black shading:

Black shading function enhance noise level for long time exposed image.

Click on the button "Black shading" Black shading to create a black shading correction. The driver will automatically create a black shading correction file for the connected camera type.

This will take up to some <u>minutes</u>, the progress indicator will be shown during creation. Press "Esc" will abort process.

Shading P	roce	ss Pres	ss Esc	to ab	ort		

After successfully black shading creation the button will change status to "Reset Black" Reset Black

The black shading correction is now available and used. To deactivate the black shading press "**Reset Black**" and the black shading correction file will be deleted and cannot be reloaded again. After reset / delete of shading file, a new shading file has to be created to activate shading again.

The shading files will be saved on: "C:\Users\<user name>\AppData\Roaming\DijSDK\" and are reused after driver restart and appropriate camera type is connected.

<u>Note:</u> Driver can save just one shading file for each camera type. The file is valid to the individual camera serial number!





Capture / Transfer images:

To transfer single images press the "Shot" button on the toolbar. The live preview image will be stopped and a single image will be transferred by driver interface to the application.

Live image will be restarted automatically at preview windows after transfer of single image.

Start / Stop Live:

To stop or restart live preview at the preview window, press live control button at the toolbar.



Preview window:

The *preview window* displays the live stream preview from the camera as well as the capture shot images.





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07745 Jena, Germany



Preview window tools and options:

Preview window contains the following tools and information at the toolbar:

XY[2048 X 1084] Zoom[110%] Fit to Window XY[603:18] RGB[88:79:67] Brightness[78] NORMAL Image dimensions (X/Y) of current live preview XY[3840 X 2160] Display of current selected zoom level from preview window Zoom[200%]

Zoom slider or scroll wheel to change zoom level. Left position out, right position zoom in.

Image overview as overlay to display whole image in case of 1:1 view or image zoom over live preview.

Note: To change image section, use the rectangle from overview.



zoom

Display Mode drop down menu Normal view to change between different view options: "Normal view" – view image as color or b/w image without histogram "Negative view" – invert image values to get negative image view "Full plot" – to activate RGB and gray channel of histogram as overlay "**Red plot**" – to activate red color channel of histogram as overlay "Green plot" – to activate green color channel of histogram as overlay "Blue plot" – to activate blue color channel of histogram as overlay "Gray plot" – to activate gray channel of histogram as overlay

Normal view	
Negate view	
Full plot	
Red plot	
Green plot	
Blue plot	
Gray plot	

Fit to screen function activated by button the live preview window.

Fit to Window

or by double click on left mouse button into

Fit to lens Fit to lens function to change back to 1:1 view and enable zoom slider.





Display of RGB values and image coordinates of corresponding mouse pointer position.

XY[783:550] RGB[136:81:115] Brightness[110]

Presentation mode – to change live preview window view between "full screen" and "normal window" by click on middle mouse button (scroll wheel) into the preview window. Whole live preview will be displayed on the screen.

Magnifier glass activated by Magnifier button to zoom in 4x times on live preview.

<u>Note:</u> By right-hand mouse click the magnifier appearance changes between "rectangle" and "circle glass".







Start live preview:

To start live preview from camera press "Live" button from main window. Micromanager will show live preview with preselected values from Device Property Browser at separate image window.

Start single image snap:

To start single image snap from camera press "Snap" Snap button from main window. Micromanager will capture a single image with pre-selected values from Device Property Browser at separate image window.

Warning message:

Micro-Manager driver will display the following warning message in case that previously cofigured memory size is insufficient to start live preview or single image capture.

Please change memory settings for Micro-Manager "Sequence Buffer Size" or reduce image resolution.

Change Exposure Time:

To edit exposure time value for live preview and single image snap by option: "Exposure" at Camera setting from Micromanager main window.

Exposure time value are displayed in "**ms**" milliseconds.

For detailed information, please visit official Micro-Manager support website:





Snap	Camera setting	js	Configuration	settings	Save
関 Live	Exposure [ms]	15	Group	Preset	
iii ⇒ Album	Binning	1 🔻			
Multi-D Acq.	Shutter	•	1		
🤣 Refresh	Auto shutter 🗸	Open			
lease <u>cite Micro-I</u>	Manager so funding	will continue!	·		
		Autofocus	Group: +	– Edit Preset:	+ - Ed
nage info (from ca Contrast Me	amera): 1920 X 1200 tadata Commen	Autofocus () X 4, Intensity ran	Group: +	Edit Preset:	+ - Ed
Contrast Me	tadata Commen	Autofocus Autofocus Image: State	Group: + nge: 8 bits, 0nm/p	Edit Preset	+ - Ed
Contrast Me	tadata Commen Top-Left Dde: Grayscale	Autorocus	Group: + nge: 8 bits, 0nm/p	Edit Preset	+ - Ed

https://micro-manager.org/wiki/Micro-Manager User%27s Guide#The Micro-Manager Main Window





Limitations:

- a) Micromanager software V1.4.23_20170731 32 bit (Device API version 67) support only.
- b) Only PROGRES GRYPHAX USB 3.0 camera supported.
- c) Windows 7 SP1 / 10 support only.
- d) Camera driver functionalities are limited due to the Micro-Manager limitations.

Learn more about PROGRES GRYPHAX® software and the easy workflows and tools.

Watch our video tutorials.

HELPFUL? We appreciate your feedback.

VIDEO TUTORIALS

FEEDBACK

We looking forward to hearing from you and remain sincerely,

Your PROGRES GRYPHAX® Team

