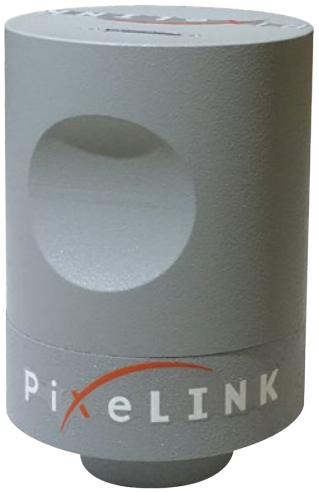
PixeLINK®
A NAVITAR COMPANY

M1 KIT

CMOS | ON SEMI VITA 1300 | GLOBAL SHUTTER



Ideal for use in any laboratory or industrial setting, PixeLINK cameras let you capture high-quality images with your existing microscope equipment. We will work with you to choose and integrate the optimal USB 3.0 camera for your microscopy project. Our microscope cameras and associated software are designed to offer consistent, superior quality image acquisition and performance.

KEY FEATURES

- 1.3MP CMOS
- 150 FRAMES Per Sec
- 4.8 µm
- 7.87 mm
- 10 BIT
- COLOR
- MONO
- USB 3

TYPICAL APPLICATIONS

- Live Cell Imaging
- Microbiology
- Cell Analysis
- Vision Correction
- Packaging
- Measurements
- Inspection
- Paint Analysis and Dirt Analysis

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DESCRIPTION

PixeLINK products will provide you with the most value for your high-quality life sciences applications. Our products are designed with thorough attention to image quality and application versatility.

PixeLINK microscopy cameras and software are tailored to high-productivity image acquisition applications where consistent quality and performance is expected and is an effective solution to any laboratory.

The M9 product is available as a kit and includes the M1 microscopy camera, µScope software and a USB 3.0 locking cable

1. Camera

The M1 camera is based on a CMOS global shutter sensor with a 1/2" optical format. The extensive built-in image processing possibilities (image pre-processing) result in outstanding image quality, less load on the system and higher performance. This camera provides the user choice of 8-bit or 10-bit digitization and a dynamic range of up to 53 dB.

2. µScope Microscopy Software

PixeLINK µScope software offers professional image analyses and features the latest in acquisition, analysis and reporting functionality. Some of these features include: Auto & Semi-Auto Calibration, Line Profiling, Image Processing, Image Stitching to create a mosaic of the "Big Picture", 3D Visualization, Auto Trace, Reflected light subtraction and Measurement and Annotation. Our drivers and software for your host computer enable advanced camera functionality.

3. USB 3.0 Cable

Two meter locking cable, certified USB3.0, Standard-A to Micro-B, for use with PL-D kits.

CAMERA FEATURES

- Great image quality
- Cylindrical housing to fit easily on a microscope
- Auto & manual exposure
- Programmable LUT
- Auto & Manual White Balance
- Gain
- Gamma
- Saturation
- Binning and Decimation
- Image Flip & Rotate
- Callbacks (Image Filters)

SENSOR FEATURES

- 1.3 MP (1280 x 1024) Resolution
- CMOS Global Shutter
- Monochrome and Color
- 150 fps at full resolution in 8-bit mode

SOFTWARE FEATURES

- PixeLINK µScope software , featuring the industry's best acquisition, analysis and reporting functionalities. (Please see Page 6 for a detailed overview).
- PixeLINK Capture Software, a real-time, interactive multi-camera application.
- PixeLINK SDK, providing full access to the PixeLINK API, as well as sample applications with full source code.

AVAILABLE CONFIGURATIONS

M1M-KIT-CYL
M1M-SE-CYL
M1M-PRO-CYL

M1C-KIT-CYL
M1C-SE-CYL
M1C-PRO-CYL

Color Space	µScope Version	Housing
C – Color	KIT - Essentials Version	BL – Board Level
M – Mono	SE -Standard Version	T – Trigger
NIR – Near Infrared	PRO - Professional Version	CYL - Cylindrical case

TECHNICAL SPECIFICATIONS

SENSOR	
Sensor	On Semi VITA 1300
Type	CMOS Global Shutter
Resolution	1.3 MP (1280 x 1024)
Pixel Pitch	4.85 µm x 4.8 µm
Active Area	7.87 mm diagonal
Peak QE	53%
PERFORMANCE SPECIFICATIONS	
FPN	<1% of signal
PRNU	<2% of signal0.4
Dynamic Range	53 dB (90dB with Extended Shutter Mode)
Bit Depth	8 or 10-bit
Color Data Formats	Bayer 8, Bayer 16, and YUV422
MECHANICALS	
Dimensions (mm)	88 x Ø54.01 (without lens mount)
Weight (g)	218.5 (without optics)
Mounting	C-Mount
INTERFACES	
Interface | Date rate	USB 3.0 | Micro-B | 5Gbps
Trigger Mode 0	Software
FRAME RATE	
Resolution	Free Running
1280 x 1024	150 fps
640 x 480	506 fps
Frame rates will vary based on host system and configuration	

SOFTWARE	
PixeLINK Capture	Test and Configuration Software
DirectShow	Bundled with PixeLINK Capture
TWAIN	Bundled with PixeLINK Capture
PixeLINK µScope	Measurement and Enhancement Tools
SDK	API, sample code and LABVIEW wrappers
ENVIRONMENTAL & REGULATORY	
Compliance	FCC Class B, CE & RoHS
Shock & Vibration	300 G & 20 G (10Hz - 2KHz)
Operating Temperature	0°C to 50°C (non-condensing)
Storage Temperature	-45°C to 85°C

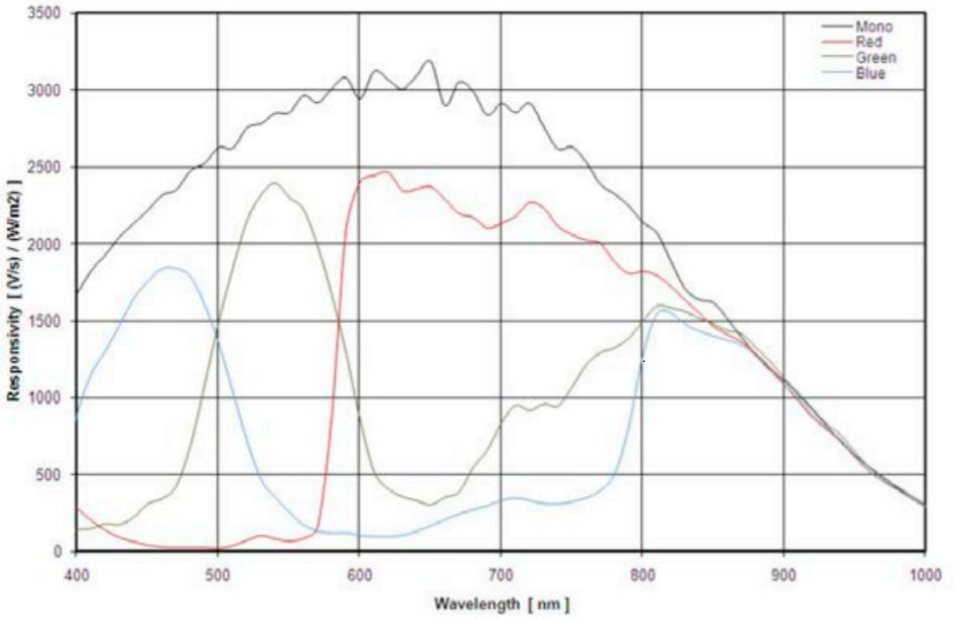
COMPUTER & OPERATING SYSTEM

	Windows	Linux x86	Linux ArmV7	Linux ArmV8
Processor	Intel i5 or better	Intel i5 or better	Arm7 (32 bit)	Arm8 (64 bit)
Memory	4GB recommended	4GB recommended	2GB	2GB
Hard Drive Space	150 MB	150 MB	50 MB	50 MB
Operating System	Windows 7/8/10	Ubuntu 14.04 /16.04 Desktop	Ubuntu 14.04 Desktop	Ubuntu 14.04/ 16.04 Desktop

POWER REQUIREMENTS	
Voltage Required	5V DC (from USB connector)

RESPONSIVITY CURVES

COLOR/MONOCHROME



PixeLINK µScope Software

PixeLINK µScope Essentials (ES) Software is an easy-to-use robust image capture tool optimized for productivity.

PixeLINK µScope Standard (SE) Software has added features, making it a highly productive image capture tool for microscopy.

PixeLINK µScope Pro (PRO) Software is for users needing more advanced tools for their microscopy requirements. This feature-rich application includes tools such as z-axis, extended focus imaging, shading correction, and reflected light subtraction.

SOFTWARE FEATURES	ES	SE	PRO
PixeLINK api control	✓	✓	✓
time lapse capture and movie file production - crosshair on live preview	✓	✓	✓
save in multiple image file formats - jpg, jpeg, tif, tiff, bmp, gif, pcx, tga, mpg, mpeg, avi, mov, img,	✓	✓	✓
overlay - crosshair, grid mask, image, marker, time stamp	✓	✓	✓
image- mode change, clone, crop, resize, rotate	✓	✓	✓
multiple roi. shapes & copy, paste, crop roi	✓	✓	✓
grayscale, rgb, hsb, yuv	✓	✓	✓
image sequence control	✓	✓	✓
zoom control - 100% to 1600% and fit to window options	✓	✓	✓
annotation - line, arrow, polyline, spline, rectangle, ellipse, text	✓	✓	✓
image editing: undo, redo, copy, paste, paste new, delete, delete all, annotate, image information	✓	✓	✓
image processing - manual brightness, contrast, gamma, background subtraction, histogram, clone, crop, roi, resize, rotate, split, image mode change, grayscale, rgb, hsb, yuv pseudo color view		✓	✓
multiple window configuration options	✓	✓	✓
manual measurement tools - 3-point circle functionality, npoint circle measurement functionality, parallel line distance measurement, perpendicular distance measurement and object distance measurement. In addition, zoom-in window	✓	✓	✓
export to excel - images with measurement, calibration, annotations, measurement data, & statistics	✓	✓	✓
report generator - create, insert images and ole objects			✓
auto and semi auto calibration	✓	✓	✓
manual calbiration	✓	✓	✓
measurement parameters - area, max length, line length, center x and y, angle	✓	✓	✓
measurement data	✓	✓	✓
profile - straight line, polyline, parallel line, select and change	✓	✓	✓
line profiling - single, multiple, parallel and polyline commands provide gray/red/green/blue intensity values for specific lines within an image. Data of each pixel on the line can be exported to Microsoft® Excel		✓	✓
calibration marker (scale bar) can be placed on the live preview image, and burned in automatically	✓	✓	✓
Live Measurement and Overlay Settings: perform measurements on the live preview image, using the crosshair or grid masks to center and count. The grid masks include calibration data	✓	✓	✓
dynamic user interface	✓	✓	✓
image stitching			✓
z-axis extended focus imaging with displacement compensation			✓
3d visualization to clearly view complex structures			✓
auto trace using automatic edge detection			✓
fluorescent image composition			✓
fast and perfect focus enhancement			✓
shading correction			✓
reflected light subtraction			

µScope Features

Live Measurement and Overlay Settings: Users can perform measurements on the live preview image, using the crosshair or grid masks to center and count. The grid masks include calibration data. Calibration marker (scale bar) can be placed on the live preview image. The marker (scale bar) can also be burned on each captured image automatically. Any standard file format image can be chosen to see it above live preview image.

Calibration (Auto, Manual): All measurements start with an accurate calibration. Auto, Semi-Auto calibration functions allow the software to calculate the pixels-per-unit value automatically. Only setting the unit for the calibration scale and the distance between the scale marks is needed. This feature greatly improves the accuracy and repetition of measurements. Manual calibrations are easily added and saved for recall from a drop down menu. All calibrations can be saved as files, which let the calibration be retrieved by simply opening the saved files later. Calibration can be protected by password option. Two password options, one in calibration menu itself and the other in camera resolution option, protect calibration by unexpected change. A scale bar can be permanently added to each image. Scale bar properties for color, size and text are simple to optimize for any image background.

Time Lapse Capture and Movie File Production & Import into Power Point: Software features a Time Lapse Capture function that supports TIF, BMP and JPG file formats. The Time Lapse Capture function also includes an Auto Save feature by yyyy/mm/dd/hour/minute/second. You can save video movie recordings in AVI, MPG, MPEG, and MOV formats.

Export Into Excel® - with one mouse click: A single mouse click exports the original image with measurement, calibration, annotation overlay, measurement data, statistics, and chart.

Manual Measurement Tools: Including Various Perpendicular Distance: Software's versatile manual measurement features include tools for measuring lengths, areas, and angles and can even auto detect an object's outline and then make specified measurements. The software is equipped with a wide choice of powerful measurement tools including 3-point circle functionality, Npoint circle measurement functionality, parallel line distance measurement, perpendicular distance measurement and object distance measurement. In addition, a zoom-in window can be used to determine the accurate measuring point of an object. Once you've measured a specimen you can easily export all of the images, measurement data and statistics to an Excel® file. With PixeLINK µScope, comprehensive statistics and data are just one effortless mouse click away.

Line Profiling: Single, multiple, parallel and polyline commands provide Gray/Red/Green/Blue intensity values for specific lines within an image. The profile data of each pixel on the line can be exported to Microsoft® Excel.

Image Processing: Manual Brightness, Contrast, Gamma, Background Subtraction, Histogram, Clone, Crop, ROI, Resize, Rotate, Split, Image Mode Change, Grayscale, RGB, HSB, YUV Pseudo Color view, Full range of enhancement and morphology filters 8bit and 16bit per channel

Manual Measurements: Point Count, Straight Line, Circle by radius, Circle by N points, Circle by diameter, Circle by 3 points, rectangle, polygon, polyline, splice lines from a common point, auto trace, angle parallel lines, perpendicular width, perpendicular from common line, angle between 2 lines, distance, perpendicular distance.

Annotation: Line, arrow, polyline, spline, rectangle, ellipse, text

Region of Interest- ROI with unique add/subtract capability: Rectangle, arbitrary rectangle, circle, arbitrary ellipse, polyline, spline, magic wand ROI itself can be saved to work with other images. The saved ROI can be placed on the exact same location of other images.

View and Zoom Image: Manual zoom In-Out, User Defined, Fit to Window, 1600% Zoom in Window for Accurate Edge Detect, sizeable context Window to view all open Images

Image Editing: Undo, Redo, Copy, Paste, Paste New, Delete, Delete All, Annotate, Image Information

Save Options & Supported Image File Formats: TXT File Format, image and measurement data together in Proprietary .img File Format for future editing and data collection. - jpg, jpeg, tif, tiff, bmp, gif, pcx, tga, mpg, mpeg, avi, mov, img, rpt, txt and etc.

Window View: Split Horizontal, Split Vertical, Cascade, Tile Horizontal, Tile Vertical, Arrange icons, Dynamic User Interface (UI), Classic, Modern

Time Lapse Sequence Control: Play Forward, Backward, Making Movie File (mpg, avi, mov) with Still Images, Split Single Image from Sequence File

µScope Features (...contd)

Z-Axis Extended Focus Imaging (EFI), with displacement compensation for stereo Microscopes: Samples with curves or of varying heights are difficult to bring into focus under highly magnified conditions. And more a stereomicroscope takes images with tilting due to its own structural characteristics. Thus, each image is out of its supposed position when you move microscope to the Z-axis getting the right focus. Our displacement compensation function allows you to rearrange these images automatically and manually. Software can combine a stack of images sequentially captured at different levels of focus and combine them into a single in-focus image. You can count on our software not to leave any trace of the composites.

3D Visualization: Clearly view complex structures: A Three-dimensional picture can be created from any image. The 3-D presentation is based upon intensity values of the image and can be displayed as a normal or wire frame image. Z axis information can easily be adjusted to optimize the 3-D effect. To better visualize an image in 3-D, software offers full 360 degrees of rotation on X-Y-Z axis. A 3D image can then saved in JPG, TIF or BMP format.

Image Stitching: Create a mosaic of the “Big Picture”: With our software, you can create auto and manual composites of continuously captured images in order to minimize the reduction in the field-of-view that typically comes with increased magnification. Combined images are automatically corrected for brightness without leaving any stitching mark.

Live Image Comparison: For fast inspection and size verification: For QA testing or quick go/no-go inspections any stored image can be used as a reference image onto which the live preview image is projected.

Combine Image Planes: Fluorescence Imaging: Merge and pseudo color monochrome images into a single RGB composite.

Auto Trace: Using an automatic edge detection algorithm, our software will perform an auto trace measurement function around a closed object. This function greatly increases accuracy and saves time when making measurements of complex shapes.

Shading Correction: The edge parts of captured image by low magnification have background shading frequently, which can be removed by the shading correction function. The color of the original image remains the same though. A standard image is acquired from a blank space on the slide glass, or from an out of focus image in a metallurgical specimen. Such a standard image is used to correct the background shading of all other captured images.

Report Generator: Create Report, Insert Image, Data and other OLE Objects.

Perfect Focus Enhancement: µScope Professional implements a perfect function of focus compensation irrespective of the status of lights and specimen. Live focus enhancement (Live extending focal depth) - By Live focus enhancement (Live extending focal depth), users can do Focus enhancement (Extending focal depth) on live preview window without capturing any image. So user can move stage on many different target locations while doing Focus enhancement on Live Image. Live measurement can be done on the same preview window also.

Reflected Light Subtraction: µScope Professional creates clear, evenly illuminated images by removing the bright saturated light from a highly reflective sample.

PixeLINK®
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DIGITAL IMAGING MADE SIMPLE

The use of PixeLINK machine vision cameras in biometric applications has been proven in numerous applications. Used by both end-users and OEMs, PixeLINK® has offered high quality, reliable off-the-shelf and custom biometric camera solutions to customers around the world.

Only PixeLINK can provide you with a custom biometric camera solution that matches your specific business need. Our custom design services will help you select and integrate the best machine vision camera for your particular application. Contact us today!

PixeLINK, a part of the Navitar family, designs and manufactures reliable industrial cameras and microscope cameras for any machine vision project or microscopy application. Used by both OEM and end-user customers, our custom and off-the-shelf cameras are used in imaging projects around the world.

At PixeLINK, we combine reliable industrial camera hardware with industry-leading software to offer unmatched off-the-shelf, OEM and industrial imaging solutions to customers.

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