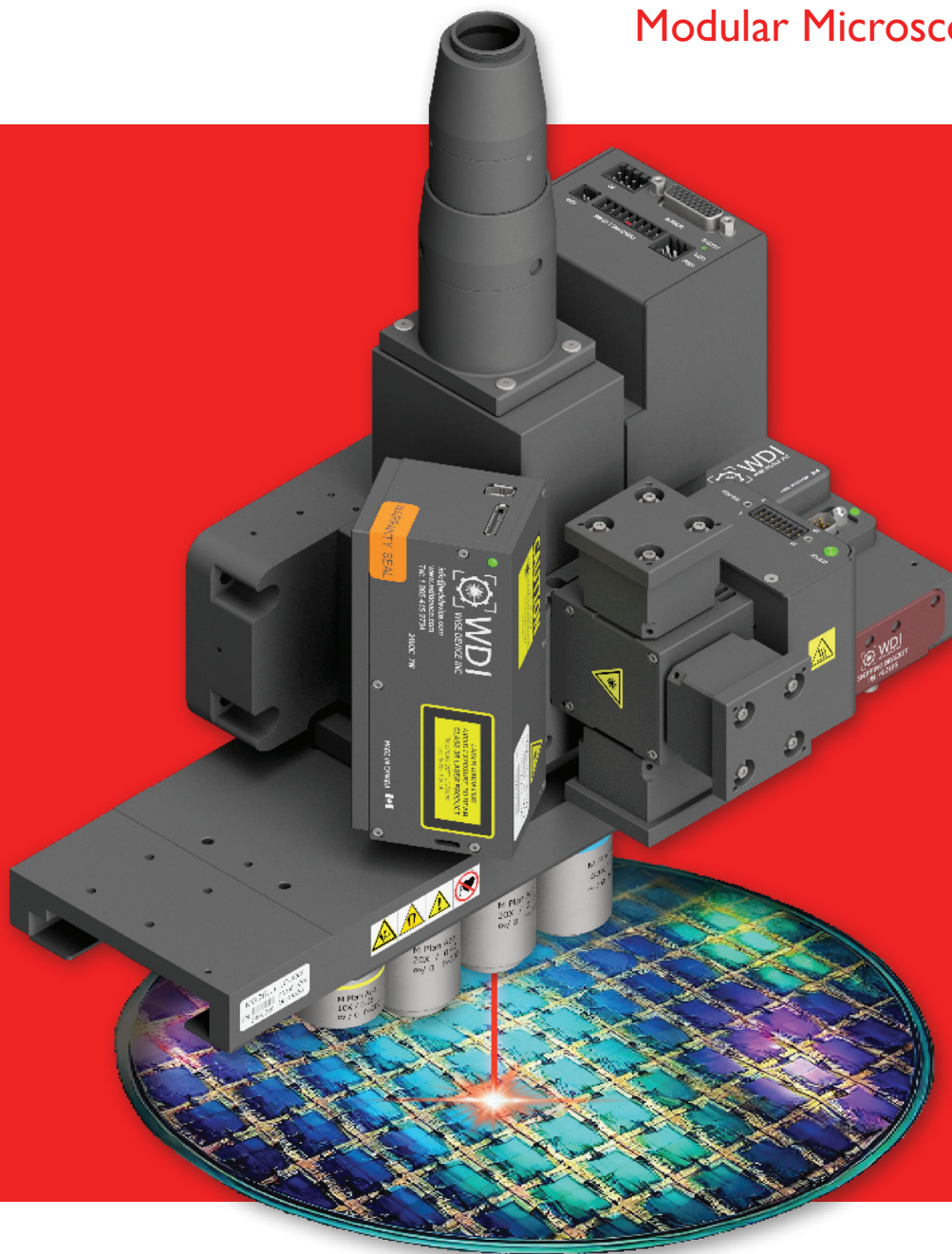




PFA-LN MMS

Precision Focus Automation
Modular Microscopy Systems

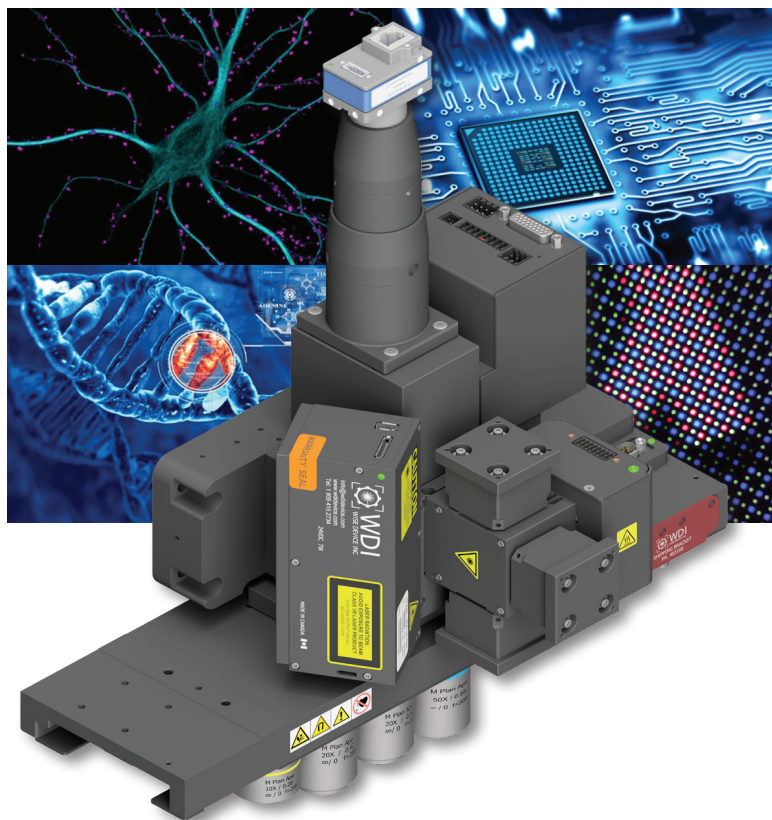


is a world leader in the design, manufacture and integration of OEM and complete microscopy automation solutions for the biomedical, metrology, electronics, semiconductor, and flat panel display markets.

NEXT GENERATION AUTOFOCUS

WDI's new PFA-DT and PFA-LN sensors couple the world's fastest most advanced autofocus technology with integrated automation components to create the perfect microscopy system solutions.

- ✓ New PFA-DT and PFA-LN autofocus sensors featuring upgraded and improved optics, imaging, processing and communication hardware and capabilities
- ✓ Improved communication between components increases reliability, speed and ease of integration
- ✓ MMS components with integrated controllers eliminate external devices and messy cabling
- ✓ Gigabit Ethernet communication provides greater reliability, speed and enhanced capabilities such as diagnostic and performance reporting and real-time analytic and statistical metrics



PFA-LN sensor and MMS solutions are designed for demanding microscopy imaging applications in biomedical, semiconductor, flat panel display and machine vision metrology.

PFA-LN FEATURES & BENEFITS



Speed

A 3 KHz standard sample rate, up to 5KHz in SWIFT Mode, improved processing power, memory and FPGA, coupled with Gigabit Ethernet communication create the fastest most flexible microscopy autofocus solution available today.



Accuracy

A new imaging sensor and algorithms provide autofocus accuracy to less than 0.25 of the objective DOF. New Multi Segment Processing ensures autofocus performance for complex, patterned and multi surface applications.



Integration

Simple optical alignment features, higher power, and enhanced laser shaping make PFA-LN easier to integrate optically and mechanically. An easy to use software application and SDK make integration straight forward.



Flexibility

PFA-LN can interface with many different types of Z motion systems including; Piezo, Stepper, Dover Motion's DOF-5 and WDI's new integrated Z stages. The sensor's configurable output supports both analog and digital step and direction.

MODULAR MICROSCOPE COMPONENTS

PFA-LN Autofocus Sensor

The PFA-LN sensor, available in 450, 660, 785 and 850 nm wavelengths, now acts as the central controller with support for WDI's Z-Axis Actuators, LLC Linear Lens Changers and two 1.5 Amp LEDs or one 3 Amp HPLED.

MMS Z-Axis Actuators

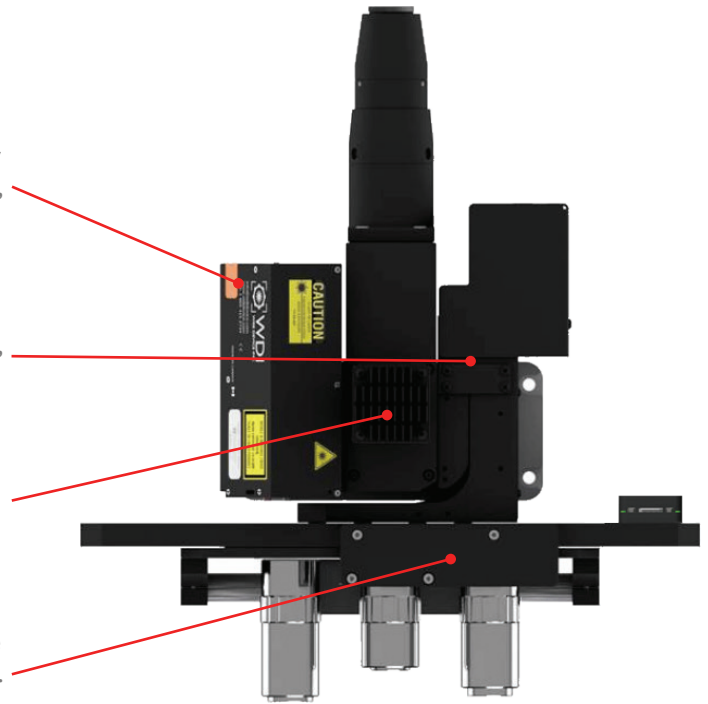
Control and communication are now integrated into a single unit Z-axis stage. With improved micro stepping and a resolution down to 40 nm, they may be used in single or multi-objective applications.

MMS Illuminators

For coaxial reflected light illumination MMS system may be equipped with a long life 1.5 Amp or 3 Amp LED, both directly powered and controlled by the sensor. An optional 5 Amp HPLED and Fast Pulse/ White RGB Illuminators are also available.

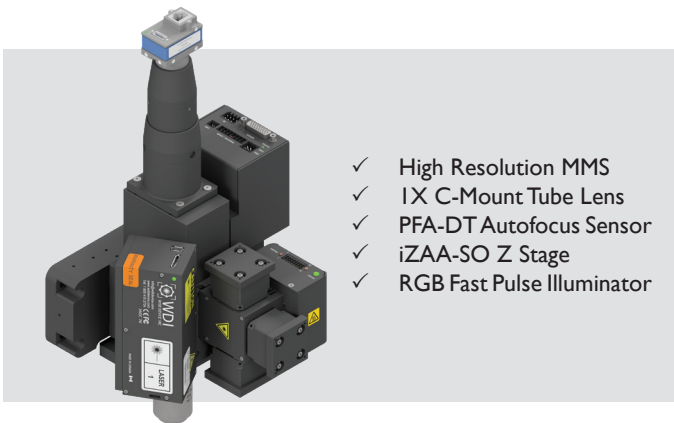
MMS Linear Lens Changers

Control and communication are now integrated into lens changers. The physical controller can be attached or separated if space is constrained. Two sizes of lens changer and variable lens inserts support from 2 to 6 objectives from any manufacturer.

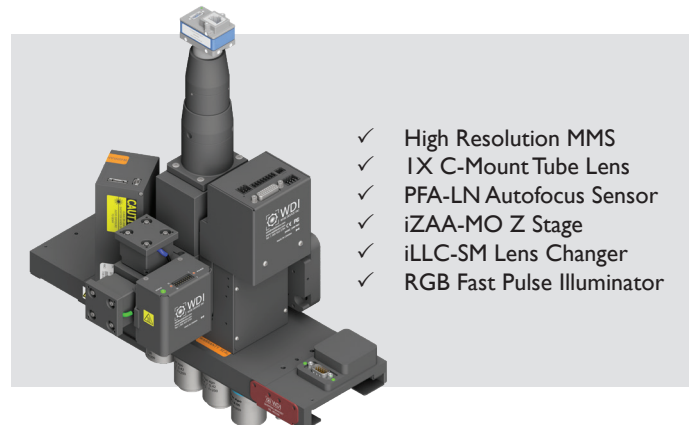


MMS solutions can be completely customized using standard components to include different combinations of camera mounts, tube lenses, illuminators, lens changers and Z axis actuators. Third party integration from suppliers such as Mitutoyo, Navitar and mag.x as well as custom designed solutions are also available.

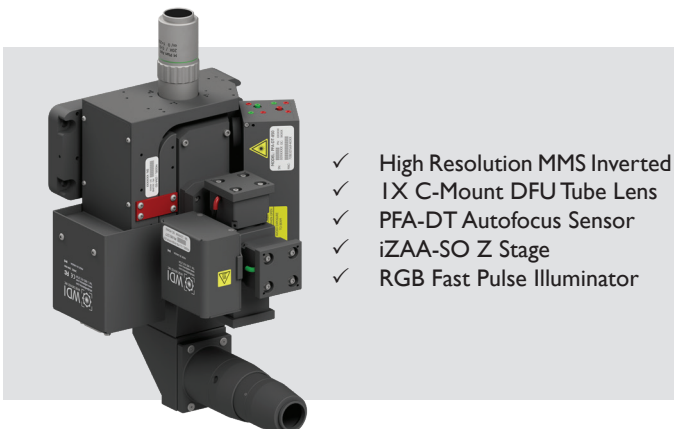
MODULAR MICROSCOPE SYSTEM EXAMPLES



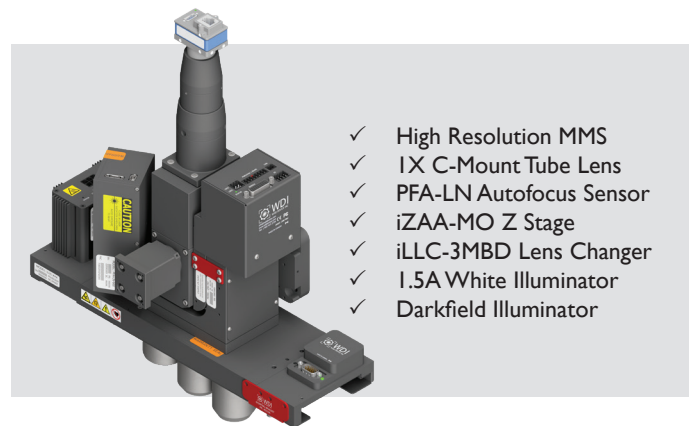
- ✓ High Resolution MMS
- ✓ 1X C-Mount Tube Lens
- ✓ PFA-DT Autofocus Sensor
- ✓ iZAA-SO Z Stage
- ✓ RGB Fast Pulse Illuminator



- ✓ High Resolution MMS
- ✓ 1X C-Mount Tube Lens
- ✓ PFA-LN Autofocus Sensor
- ✓ iZAA-MO Z Stage
- ✓ iLLC-SM Lens Changer
- ✓ RGB Fast Pulse Illuminator



- ✓ High Resolution MMS Inverted
- ✓ 1X C-Mount DFU Tube Lens
- ✓ PFA-DT Autofocus Sensor
- ✓ iZAA-SO Z Stage
- ✓ RGB Fast Pulse Illuminator



- ✓ High Resolution MMS
- ✓ 1X C-Mount Tube Lens
- ✓ PFA-LN Autofocus Sensor
- ✓ iZAA-MO Z Stage
- ✓ iLLC-3MBD Lens Changer
- ✓ 1.5A White Illuminator
- ✓ Darkfield Illuminator

PFA-LN SENSOR SPECIFICATIONS

Feature	Value				Feature	Value
Structured Light Pattern	Line				IEC Certification	61326-1, 61010-1 and 60825-1
Laser Wavelengths Available	450 nm	660 nm	785 nm	850 nm	PC Communication	Gigabit Ethernet, RS485
Typical Output Power	1.1 mW	1.1 mW	0.9 mW	1.1 mW	Sampling Rate	Up to 3kHz (SWIFT 5 kHz)
Laser Classification	Class 3R				Static Autofocus Repeatability	± 0.25 Objective DOF or better
Standoff Distance	300 mm maximum				Tracking Autofocus Repeatability	± 0.33 Objective DOF or better

Objective	Numerical Aperture (NA)	DOF (µm)	Linear Range (µm)*	Capture Range (µm)*
5X	0.14	± 14	± 600	More than ± 4500
10X	0.28	± 3.5	± 170	More than ± 4500
20X	0.42	± 1.6	± 160	± 4300
50X	0.55	± 0.9	± 30	± 1000

MMS COMPONENT SPECIFICATIONS

Z-Stages	iZAA-SO	iZAA-MO	iZPS
Objectives/Compatible Lens Changers	Single Objective* (No Lens Changer)	Single Objective* or LLC2, LLC3, iLLC-SM, sLLC-SM	iLLC-LG, sLLC-LG, Rotary
Motion Type	2 Phase Stepper with Integrated Controller		
Travel Range	10 mm (± 5mm)		
Maximum Resolution (1/64 microstep)	39 nm/step		47 nm/step
Maximum Speed	10 mm/s		
Maximum Acceleration	120 mm/s ²		100 mm/s ²
Micro Stepping	2, 4, 8, 16, 32, 64, 128 or 256		
Maximum Load	1.0 kg	3.5 kg	6.5 kg
Weight	1.14 kg	1.16 kg	4.4 kg
Illuminator Support	Two 1.5A or One 3A LED Illuminator		

Linear Lens Changer	LLC2	LLC3	iLLC-SM	iLLC-LG
Maximum # of Objectives	2	3	3 to 5	3 to 6
Objectives Supported	Typically Mitutoyo ¹		Mitutoyo, Olympus, Zeiss, Nikon, Leica, mag.x, etc.	
Motion Type	Direct Drive Linear Motor			
Encoder	Linear Incremental Optical Encoder 78 nm Resolution			
Positioning Repeatability	±0.25 μm			
Minimum Lens Change Speed ²	0.4 s (35 mm spacing)	Adjacent: 0.4 s First-to-Last: 0.5 s (38 mm spacing)	Adjacent: 0.5 s First-to-Last: 0.6 s	Adjacent: 0.6 s First-to-Last: 1 s
Bearings	High Precision Crossed-Roller with Anti-Creep			

Illuminators	ILL-WLED1.5	ILL-WLED3
Colours	White (others available upon request)	
Operating Modes	Continuous, PWM, Pulse Follow, Pulse Trigger	
Maximum Flux	950 klx	1600 klx
Colour Temperature	5700 K	5700 K
Output Current	1.5 Amp	3 Amp

* Measured for 660 nm

* Target specifications, final specifications subject to change

¹ Thread adapters are available for conversion to other threads. Custom inserts available upon request.

² Measured with LLC fully loaded, default parameters, and 48 VDC power. Lower voltage may increase lens change times.



WDI is a world leader in the design, manufacture, and integration of OEM and complete microscopy automation solutions for the biomedical, metrology, electronics, semiconductor, and flat panel display markets. WDI's success lies in an innovative culture and ability to optimize and adapt our technology to customers' specific requirements by listening to their needs and gaining a deep understanding of their processes, applications and goals. WDI employs over 70 optical, electrical, mechanical and software engineers, as well as scientists, who are dedicated to servicing our customers. Contact WDI today to see how we can help solve your microscopy automation needs.



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