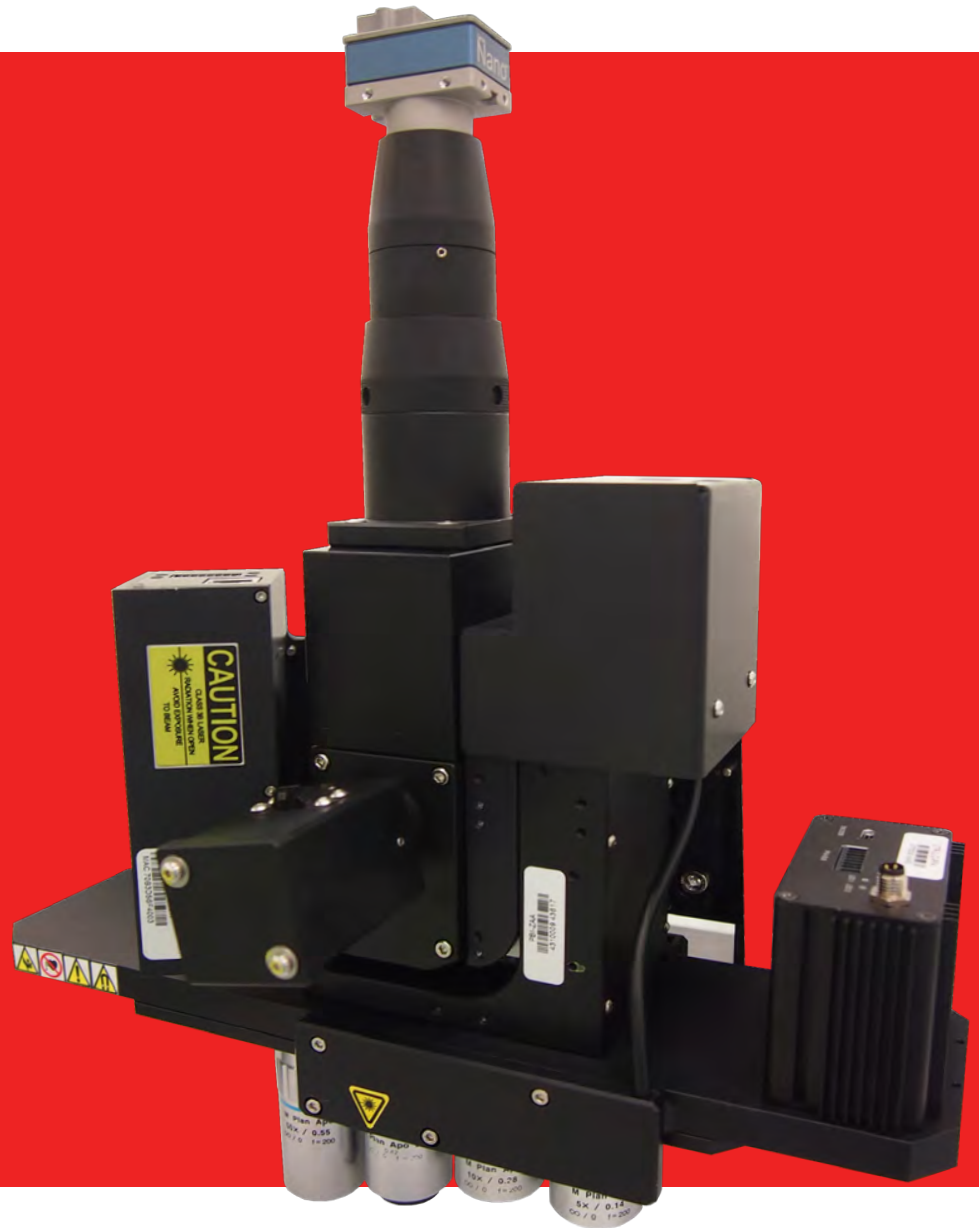


# PFA MMS

## Precision Focus Automation Modular Microscope System

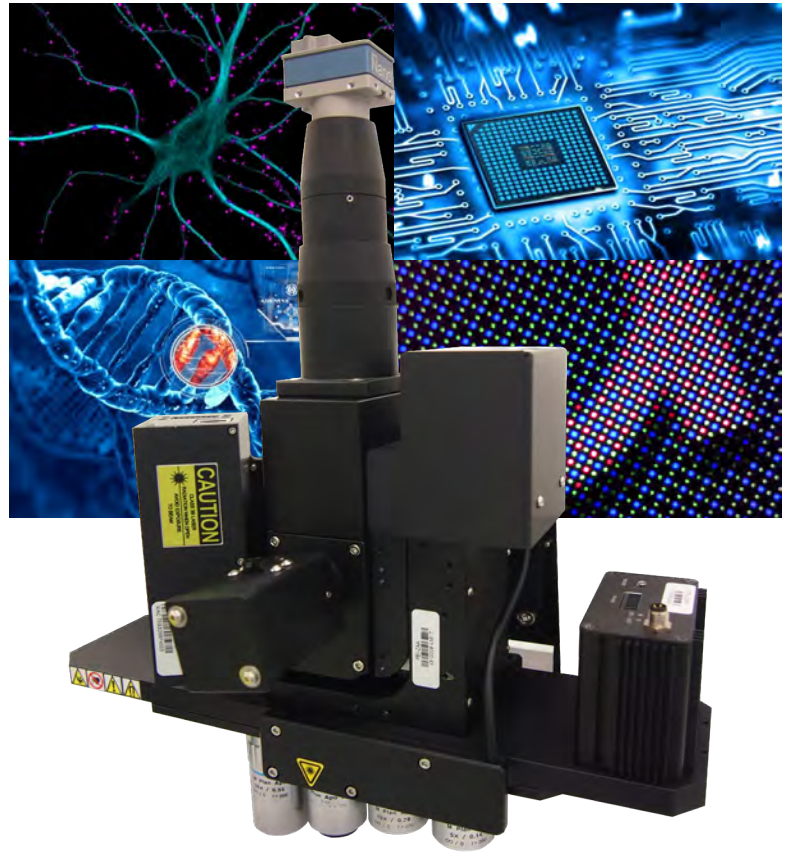


is a world leader in the design, manufacture and integration of OEM and complete microscopy automation solutions for the biomedical, metrology, electronics, semiconductor, and flat panel display markets.

# NEXT GENERATION AUTOFOCUS

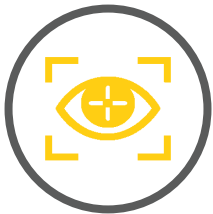
WDI's new PFA sensor couples the world's fastest most advanced autofocus technology with integrated automation components to create the perfect microscopy system solutions.

- ✓ New PFA autofocus sensor featuring upgraded and improved optics, imaging, processing and communication hardware and capabilities
- ✓ PFABUS™ communication between components increases reliability, speed and ease of integration
- ✓ PFA components including integrated control technology eliminate external devices and messy cabling
- ✓ Gigabit Ethernet and a Linux OS provides greater speed and enhanced capabilities



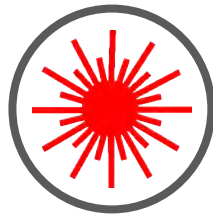
PFA sensor and MMS solutions are designed for demanding microscopy imaging applications in biomedical, semiconductor, flat panel display and machine vision metrology.

# PFA FEATURES & BENEFITS



## Imaging

PFA includes a significant jump in imaging technology with a new high end internal imaging sensor having 15 times greater sensitivity, a low noise global shutter, smaller pixels and a higher frame rate. This translates to greater speed and efficiency, suitability for low reflectance applications and enhanced laser & video autofocus performance.



## Optical

A new 100 mW internal laser together with improved beam shaping optics provide higher update rates and shorter measurement times with improved accuracy and reliability. The updated optics also make PFA less sensitive to ambient light, easier to align and integrate and give it a much larger capture and linear range.



## Computational

Now featuring "System on Chip" SOC power, the PFA sensor overcomes the limitations of previous autofocus technology. A new dual core processor with greatly increased FPGA and memory permit unlimited internal advanced processing functions and algorithms, real time image storage and advanced software capability.



## Communication

PFA utilizes Gigabit Ethernet communication which provides greater speed, reliability and robustness as well as improved remote monitoring and system diagnostics. WDI integrated components now use PFABUS™ technology permitting a clean, reliable, EMI resistant cabling topology.

# MODULAR MICROSCOPE COMPONENTS

## PFA Autofocus Sensor

The PFA sensor, available in 680 nm or 785 nm wavelengths, now acts as the central controller with support for WDI ZAA and ZPS Z actuators, LLC Linear Lens Changers and two 1.5 Amp LEDs or one 3 Amp HPLED.

## PFA MMS Z Axis Actuators

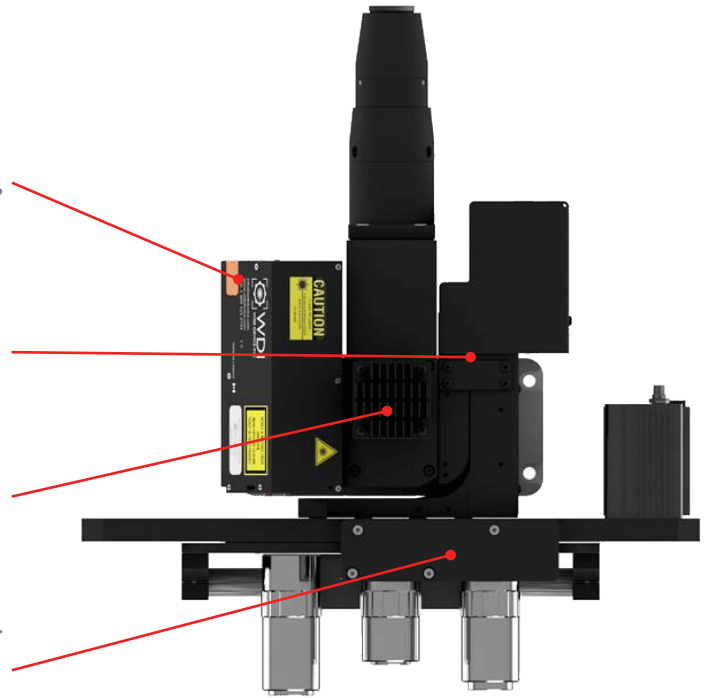
Control and communication are now integrated into PFA Z axis components. With improved micro stepping and a resolution of 0.04  $\mu\text{m}$  the PFA ZAA may be used in single or multi-objective applications.

## PFA MMS Illuminators

For coaxial reflected light illumination PFA MMS system may be equipped with a long life 1.5 Amp or 3 Amp LED, both directly powered and controlled by the PFA sensor. An optional 5Amp HPLED is also available.

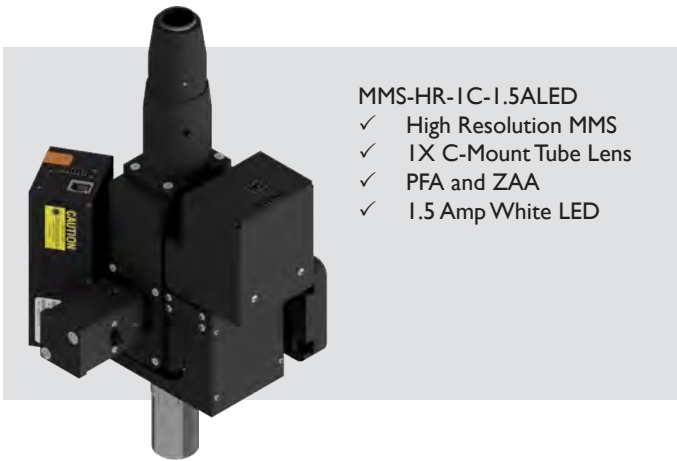
## PFA MMS Linear Lens Changers

Control and communication are now integrated into PFA lens changers. The physical controller can be mounted or unmounted if space is constrained. Two sizes of lens changer and customer objectives inserts support from 2 to 5 objectives from any manufacturer.

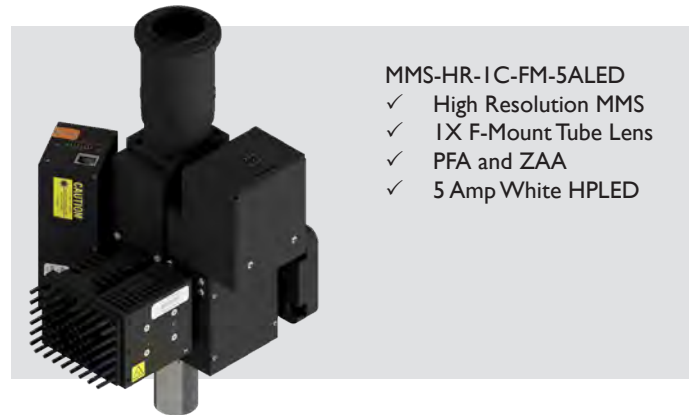


PFA MMS solutions can be completely customized using standard components to include different combinations of camera mounts, tube lenses, illuminators, lens changers and Z axis actuators. 3rd party integration from suppliers such as Mitutoyo, Navitar and QiOptiq as well as custom designed solutions are also available.

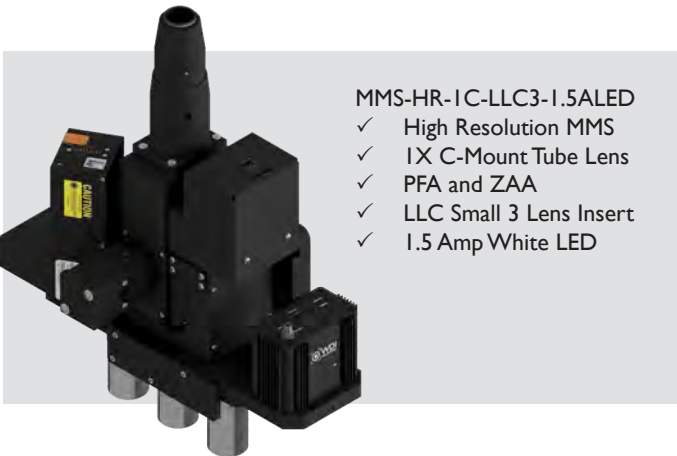
# MODULAR MICROSCOPE SYSTEMS



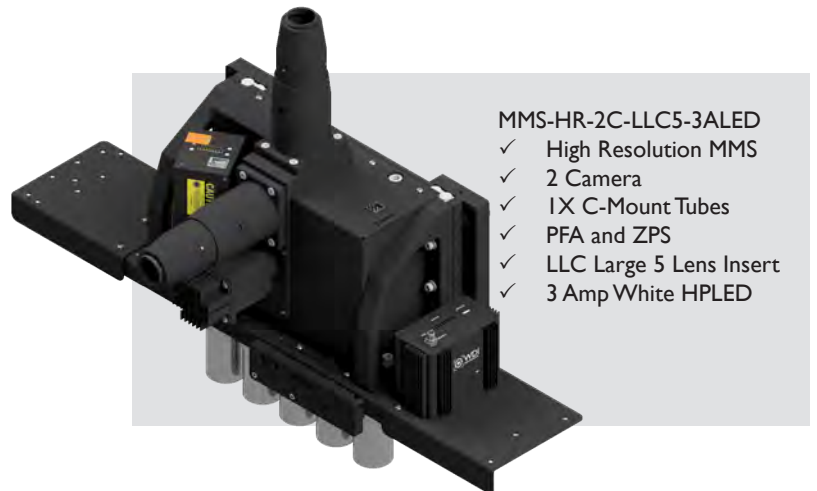
- MMS-HR-1C-1.5ALED**
- ✓ High Resolution MMS
  - ✓ 1X C-Mount Tube Lens
  - ✓ PFA and ZAA
  - ✓ 1.5 Amp White LED



- MMS-HR-1C-FM-5ALED**
- ✓ High Resolution MMS
  - ✓ 1X F-Mount Tube Lens
  - ✓ PFA and ZAA
  - ✓ 5 Amp White HPLED



- MMS-HR-1C-LLC3-1.5ALED**
- ✓ High Resolution MMS
  - ✓ 1X C-Mount Tube Lens
  - ✓ PFA and ZAA
  - ✓ LLC Small 3 Lens Insert
  - ✓ 1.5 Amp White LED



- MMS-HR-2C-LLC5-3ALED**
- ✓ High Resolution MMS
  - ✓ 2 Camera
  - ✓ 1X C-Mount Tubes
  - ✓ PFA and ZPS
  - ✓ LLC Large 5 Lens Insert
  - ✓ 3 Amp White HPLED

## PFA SENSOR SPECIFICATIONS

Feature		Feature	
Structured Light Pattern	Line	Line Processing Method	Dynamically Adjustable ROI
Laser Wavelengths Available	680 nm, 785 nm	Power Output	5 mW maximum
Stand Off Distance	300 mm maximum	Sampling Rate	3.5 kHz (ROI Mode 7 kHz)
Static Autofocus Accuracy	± 0.25 Objective DOF or better	Tracking Autofocus Accuracy	± 0.33 Objective DOF or better
Internal Image Sensor	1.3 MP 4.8 µm pixels 200fps	Shutter Type	Low Noise Global Shutter
Internal Processor	Dual Core ARM A9 @ 533 MHz	Memory	512 MB DDR3 & 32 MB Flash
PC Communication	Gigabit Ethernet	Operating System	Linux OS

Objective (NA)	Linear Range (µm)	Capture Range (µm)	3-Sigma Repeatability Error Limits (µm)	Autofocus Speed (ms)
5X/0.14	± 740	± 10000	< 2	< 75
10X/0.28	± 200	± 6000	< 1	< 65
20X/0.42	± 170	± 2300	< 0.5	< 120
50X/0.55	± 30	± 400	< 0.5	< 120

## PFA COMPONENT SPECIFICATIONS

Z Actuator Options & Specifications	Version	PFA-ZAA		PFA-ZPS
	Objectives	Single or LLC-SM		LLC-LG
	Motion Type	2 Phase Stepper with Integrated Controller		
	Travel Range	10 mm (± 5mm)		
	Maximum Resolution	0.04 µm/step	0.05 µm/step	
	Maximum Speed	10 mm/s		
	Maximum Acceleration	100 mm/s <sup>2</sup>		
	Micro Stepping	4, 8, 16, 32 or 64		
	Maximum Load	3.5 kg	6.5 kg	
Lens Changer Options & Specifications	Version	LLC-SM		LLC-LG
	Maximum # of Objectives	3 to 5		3 to 5
	Objectives Supported	Mitutoyo, Olympus, Zeiss, Nikon, Leica, QiOptiq, etc		
	Motion Type	Shaft Linear Motor with Fixed Forcer and Integrated Controller		
	Encoder	Linear Optical Encoder		
	Positioning Repeatability	±0.16 µm		
	Minimum Lens Change Speed	0.25 s Adjacent Lenses		
	Bearings	High Precision Cross-Roller with Anti-Creep		
Compliance	Clean Room Class 100 SEMI and CE			
Illuminator Options & Specifications	Version	ILL-WLED1.5	ILL-WHPLED3	ILL-WHPLED5
	Colours	White (others available upon request)		
	Operating Modes	DC & Pulse Width Modulation (Pulse Follow, & Pulse Trigger with 5 Amp)		
	Maximum Flux	950 klx	1600 klx	3100 klx
	Colour Temperature	5700 K	5700 K	6500 K
	Output Current	1.5 Amp	3 Amp	5 Amp
	Compliance	Clean Room Class 100 SEMI and CE		



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 40 optical, electrical, mechanical and software engineers, as well as scientists, who are dedicated to servicing our customers. We have locations in Canada and Poland, with service centers in Taiwan and South Korea. Contact WDI today to see how we can help solve your microscopy automation needs.

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