MPI Optical Solutions

MPI is working closely with leading optical suppliers to develop and optimize dedicated microscope solutions. This provides leading edge on-wafer observation and navigation. The selected optics are a perfect fit to the specific requirements of accurate probe placement on DC/CV, RF and mmW pads.

Single tube solution provides a large working distance at high magnification. Small form factors are ideal for RF, mmW and load-pull applications due to space restrictions inherent with the integration of test heads/tuners requiring shortest distance to DUT.

MPI is also offers state of the art high-power microscopes such as Motic PSM-1000 and Mitutoyo FS70 configured to address internal-node probing or Failure Analysis application requirements.

All optics include TV ports for being used with a number of 1080p HDMI cameras. Images are displayed on the monitor without additional computer requirements:

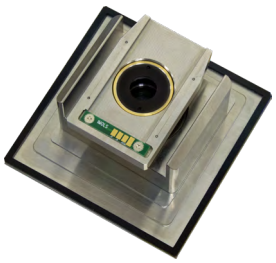
- Image can be captured directly onto the built-in mini SD card
- Remote control and/or direct camera buttons for various settings
- All required cables are included

MPI iMAG® SERIES

MPI iMAG® Series are unique high resolution digital imaging systems, designed especially for MPI manual and automated probe systems by providing an unsurpassed color image quality and ultra-fast color frame rate video speed for an optimal and very convenient wafer navigation.

The dedicated optical design guarantees that one camera pixel is always smaller than the optical resolving power of the used objective lenses, so that the 40x zoom range is limited finally by the performance of the M Plan APO optics only.
The large 1.1 inch, 6.55 MP quadratic sensor delivers the maximum of optically possible field of view (FOV) without any edge shadow effects and by iMAG-II, one additional second 12MP camera offers maximum on optical resolution.

iMAG® Series microscopes are equipped with automated objective lens detection system, so that SENTIO® will recognize it automatically as soon is placed in. The software will memorize the corresponding objective data, and all automated features can be performed right away without the need of additional pixel-to-micrometer calibration.
The operation of MPI Automated probe systems using iMAG® Series digital imaging systems are identified by intuitive, easy, safety and high productivity operation.



Automatic objective lens detection system

Main Features

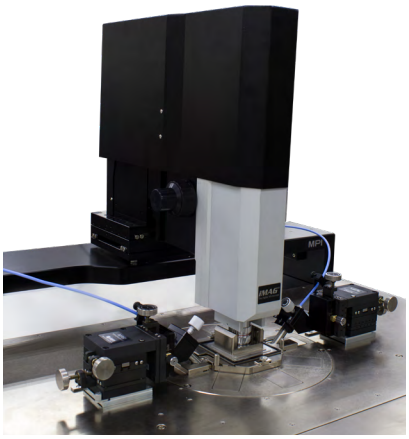
	iMAG-M	iMAG	iMAG Pro	iMAG-II	iMAG-II Pro
Max. video resolution	6.55 MP color			12 MP color	
Max. video speed	20 fps real color frame rate				
Max. picture resolution	2560 x 2560 pixel			4024 x 3036 pixel	
Max. lens Z drive range*	N/A	N/A	4 mm	N/A	4 mm
Automatic lens detection	N/A	Yes			
Lens compatibility	With any M Plan lenses				

**Depends on system's type and configuration*

Optical Specification

Objective Lens(1)	Optical Resolution(2) [µm]	N.A.	Working Distance [mm]	Depth of Focus(1) [± µm]	Max. FOV [µm](3) H	Max. FOV [µm](3) V
2x	5.0	0.055	34	90.91	9850	9850
5x LWD	2.0	0.13	45	14.03	3940	3940
5x	2.0	0.14	34	14.03	3940	3940
10x	1.0	0.28	33.5	3.51	1970	1970
20x	0.7	0.42	20	1.56	980	980

(1) 5x lens is part of standard delivery
(2) Optical resolution and focal depth based on reference wavelength of 550 nm. The optical resolution is identical over the entire FOV (!)
(3) Max. FOV is valid for all iMAG Series



iMAG®-M – the digital microscope for MPI manual probe systems

MPI iMAG® embedded within SENTIO® Software Suite

MPI Automated MegaZoom AMZ12

- The non-plus-mega, single tube microscope with 12x programmable zoom
- Unique combination of large field of view and extremely high magnification
- Max. 46.2 mm working distance for stress-free probe replacement, cable and different RF probe reconfiguration
- Up to 1.68 µm optical resolution for excellent small pads probing and accurate placement on calibration standards
- TV port – standard c-mount
- Dedicated for all DC/CV, RF, mmW and load pull measurements
- Ideally combined with MPI XYZ or just Z programmable microscope movements

Objective Lens	7x	15x	15x LWD*
Optical zoom range	0.58x - 7.0x (programmable)	1.25x - 15.0x (programmable)	
WD	40.6 mm	46.2 mm	101 mm
Resolution	20.6 - 2.9 µm	11.18 - 1.68 µm	
DOF	± 1074.22 - ± 21.54 µm	±305.56 - ±6.88 µm	
N.A.	0.016 - 0.113	0.03 - 0.2	
FOV (H x V) w. SENTIO®	12.19 x 9.14 - 1.01 x 0.76 mm	5.66 x 4.24 - 0.47 x 0.35 mm	
LED coaxial illumination	5 W	5 W	
Power supply	110 V / 220 V, 8 W, CE, dimmable and On/Off programmable control		
Dimensions (W x D x H)	45 x 113 x 225 mm	45 x 113 x 208 mm	66 x 113 x 301 mm
Weight	Approx. 1200 g	Approx. 1200 g	Approx. 2900 g

**OP-AMZ12LWD-XXX*

MPI TS2000-SE with AMZ12 microscope

MPI MegaZoom MZ12

- The non-plus-mega, single tube microscope with 12x zoom
- Unique combination of large field of view and extremely high magnification
- Max. 46.2 mm working distance for stress-free probe replacement, cable and different RF probe reconfiguration
- Up to 1.68 µm optical resolution for excellent small pads probing and accurate placement on calibration standards
- TV port – standard c-mount
- 35 mm focus block with fine and fast movement, 90° tilting
- Dedicated for all DC/CV, RF, mmW and load pull measurements

Objective Lens	7x	15x	15x LWD*
Optical zoom range	0.58x - 7.0x	1.25x - 15.0x	1.25x - 15.0x
WD	40.6 mm	46.2 mm	101 mm
Optical resolving power	20.6 - 2.9 µm	11.18 - 1.68 µm	11.18 - 1.68 µm
DOF	± 1074.22 - ± 21.54 µm	±305.56 - ±6.88 µm	±305.56 - ±6.88 µm
N.A.	0.016 - 0.113	0.03 - 0.2	0.03 - 0.2
FOV (H x V) w. CAM-1080	12.41 x 6.98 - 1.03 x 0.58 mm	5.76 x 3.24 - 0.48 x 0.27 mm	5.76 x 3.24 - 0.48 x 0.27 mm
FOV (H x V) w. CAM-4000P	13.24 x 7.45 - 1.10 x 0.62 mm	6.14 x 3.46 - 0.51 x 0.29 mm	6.14 x 3.46 - 0.51 x 0.29 mm
FOV (H x V) w. SENTIO®	12.19 x 9.14 - 1.01 x 0.76 mm	5.66 x 4.24 - 0.47 x 0.35 mm	5.66 x 4.24 - 0.47 x 0.35 mm
LED coaxial illumination	5 W	5 W	5 W
Power supply	110 V / 220 V, 8 W, CE, manually dimmable and On/Off remote control		
Dimensions (W x D x H)	45 x 80 x 225 mm	45 x 80 x 208 mm	66 x 113 x 301 mm
Weight	Approx. 1000 g	Approx. 1000 g	Approx. 2900 g

**OP-MZ12LWD-XXX*

MPI SuperZoom SZ12

- 12x zoom single tube microscope
- Large 90 mm working distance for stress-free probe replacement and test heads/load-pull tuner integration
- 3.4 µm optical resolution for small pads probing and accurate placement on calibration standards
- TV port – standard c-mount
- 35 mm focus block with fine and fast movement, 90° tilting or linear Z, depends on the system's movement
- Standard coaxial LED illumination, ring illumination as option available (from MZ12)
- Dedicated for all DC/CV, RF, mmW and load pull measurements

Optical zoom range	0.83x - 10.0x
Objective/ Auxiliary lens*	1x
WD	90 mm
Optical resolving power	16.78 - 3.36 µm
DOF	± 688 - ± 28 µm
N.A.	0.02 - 0.1
FOV (H x V) w. CAM-1080	8.67 x 4.88 - 0.72 x 0.41 mm
FOV (H x V) w. CAM-4000P	9.25 x 5.20 - 0.77 x 0.43 mm
FOV (H x V) w. SENTIO®	8.50 x 6.38 - 0.59 x 0.44 mm
TV port / C mount*	1x
Illumination*	LED coaxial illumination, 1 W
Power supply*	100 - 240 V, 1 W
Dimensions (W x D x H)*	46 x 74.5 x 241 mm
Weight*	890 g

MPI EyeZoom EZ12

- The unique microscope with ergonomically constructed trinocular eyepiece tube and 12x optical zoom
- 3.4 µm optical resolution for small pads probing and accurate placement on calibration standards
- Large 90 mm working distance for stress-free probe replacement and test heads/load-pull tuner integration
- TV port – standard c-mount
- 32 mm focus block with fine and fast movement, 90° tilting or linear Z, depends on the system's movement
- Standard coaxial LED illumination, ring illumination as option available (from MZ12)
- Dedicated for all DC/CV, RF, mmW and load pull measurements

Trinocular head	Widefield trinocular tube, 30° optical observation angle
Eyepiece	WF 20x, incl. collapsible rubber eye-guards
Optical pass ratio	Eyepiece : Camera C-mount = 50% : 50%
Optical magnification (eyepiece)	16x - 200x
IPD (inter-pupillary distance)	Adjustable range from 50 – 75 mm
Optical zoom range	0.83x - 10x (10:1)
WD	90 mm
Optical resolving power	3.4 µm
DOF	± 688 - ± 28 µm
N.A.	0.02 - 0.1
FOV (D)	6.9 – 0.56 mm (20x eyepiece)
FOV (H x V) w. CAM-1080	8.67 x 4.88 - 0.72 x 0.41 mm
FOV (H x V) w. CAM-4000P	9.25 x 5.20 - 0.77 x 0.43 mm
FOV (H x V) w. SENTIO®	8.50 x 6.38 - 0.59 x 0.44 mm
TV port (C-mount)	1x
LED coaxial illumination	1.75 W
LED ring illumination (option)	24 pcs., 53 mm outer diameter
Dimensions (W x D x H)	123 x 210 x 340 mm
Weight	Approx. 2.0 kg

MPI Stereo Microscope ST45

- Entry level stereo microscope
- 25x eyepiece for max. magnification
- TV port – standard c-mount
- 50 mm focus block (for pivot or tilt mount)
- Dedicated for DC/CV measurements
- A TV port for higher magnification or other optics is recommended for RF measurements

Trinocular head	45° inclined
Zoom objective lens	0.67x - 4.5x (6.7:1)
Eyepiece	25x
Auxiliary lens	1.0x
Optical magnification	16.8x - 112.5x
FOV (D)	13.4 - 2.0 mm
FOV (H x V) w. CAM-1080	10.75 x 6.04 - 1.60 x 0.90 mm
FOV (H x V) w. CAM-4000P	11.46 x 6.45 - 1.71 x 0.96 mm
WD	100 mm
TV port (C-mount)	1x
LED ring illumination	60 pcs., external remote control
Power supply	100 - 240 V, 7.2 W, CE
Dimensions (W x D x H)	45 x 85.5 x 269 mm
Weight	Approx. 550 g

Digital HDMI Cameras

CAM-4000

- 8 MP active resolution, 30p fps
- Versatile 4K HDMI camera
- No requirement of a computer for standard operation
- 4K Image can be captured directly onto the included 32 GB flash drive
- 1080p video can be store directly onto the included 32 GB flash drive
- On Screen Display UI controlled by mouse
- Ideal for documentation on the MPI manual TS series
- Wireless mouse and HDMI cable are included

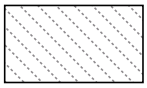
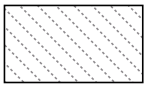
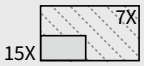
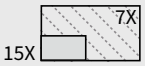
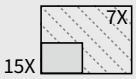
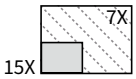
CAM-4000P

- 8 MP active resolution, 30 fps
- Versatile 4K HDMI camera
- No requirement of a computer for standard operation and measurement function
- The UI has functions: Measurement, Still image capture, Recording, Freeze, Cross line, and Gallery
- Image can be captured directly onto the included 16 GB micro SD card or self-prepare flash drive at 8 MP
- Video can be store onto included 16 GB micro SD card or self-prepare flash drive at 4K
- On Screen Display UI controlled by mouse
- Ideal for documentation on the MPI manual TS series
- USB 2.0 interface allows using the provided software: includes measurement, annotation and reporting tools
- Wireless mouse and all necessary cables are included

Technical Specifications	CAM-4000	CAM-4000P
Sensor type	CMOS	CMOS
Sensor size	1/1.8 in	1/1.8 in
Resolution (total pixel)	3840 x 2160 (8 MP)	3840 x 2160 (8 MP)
Pixel size	2.0 x 2.0 µm (UHD) 4.0 x 4.0 µm (FHD)	2.0 x 2.0 µm (UHD) 4.0 x 4.0 µm (FHD)
Live Display Mode (through HDMI)	3840 x 2160 (Ultra HD) @ 30 fps 1920 x 1080 (Full HD) @ 30 fps	3840 x 2160 (Ultra HD) @ 30 fps 1920 x 1080 (Full HD) @ 30 fps
Live Display Mode (through USB)	N/A	3840 x 2160 (Ultra HD) @ 30 fps
Memory card included	32 GB Flash drive	N/A
Capture format - video	1920 x 1080 (Full HD) @ 30 fps*	4K(30fps@3840 x 2160) H264/H265 encoded MP4 file in SD Card
On-board software (over the mouse)	Still image capture, Freeze, Cross line, Gallery	Zoom, Mirror, Comparison, Freeze, Measure, Cross, Browser Function
Extra software	N/A	MotiConnect for Android/iOS; Motic Images Plus 3.1 for Windows/ Mac OS
White balance	Automatic, manual	Automatic, manual
Remote control	Yes, mouse control with screen UI	
Power supply	DC 12V AC Adapter, 110 / 220 V, CE	DC 12V AC Adapter, 110 / 220 V, CE
Dimension (W x D x H)	46 x 46 x 56 mm	78 x 66 x 89 mm
Weight	Approx. 130 g	Approx. 460 g

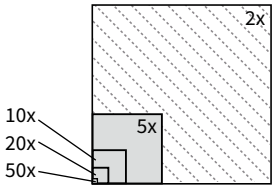
**Frames per second under optimal illumination conditions.*

Maximal Field of View (FOV) Overview

	CAM-4000	CAM-4000P	SENTIO®-3MP
SZ12 / EZ12	 9.25 x 5.20 mm	 9.25 x 5.20 mm	 8.50 x 6.38 mm
SZ12 / EZ12 (0.5x*)	 18.5 x 10.4 mm	 18.5 x 10.4 mm	 17 x 12.76 mm
MZ12	 7x: 13.24 x 7.45 mm 15x: 6.14 x 3.46 mm	 7x: 13.24 x 7.45 mm 15x: 6.14 x 3.46 mm	 7x: 12.19 x 9.14 mm 15x: 5.66 x 4.24 mm
AMZ12	N/A	N/A	 7x: 12.19 x 9.14 mm 15x & 15x LWD: 5.66 x 4.24 mm

**With optional 0.5x c-mount adapter.*

	iMAG®
2x	9.85 x 9.85 mm
5x	3.94 x 3.94 mm
10x	1.97 x 1.97 mm
20x	0.98 x 0.98 mm
50x	0.39 x 0.39 mm



See MPI Corporation's Terms and Conditions of Sale for more details.

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MPI global presence: for your local support, please find the right contact here:
www.mpi-corporation.com/ast/support/local-support-worldwide

MPI Global Presence