

# OLYMPUS®

Olympus is about life. About photographic innovations that capture precious moments of life. About advanced medical technology that saves lives. About information- and industry-related products that make possible a better living. About adding to the richness and quality of life for everyone. Olympus. Quality products with a **FOCUS ON LIFE**

REAL-TIME CONFOCAL  
MICROSCOPE

## MX50-CF

*UIS*  
UNIVERSAL  
INFINITY SYSTEM



# 0.18 $\mu$ m COMPATIBLE

## Clear Observation of Intricate Patterns

*Confocal Mode (CF1)*

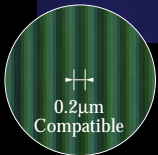


LMPLAPO150 BD

*Non-confocal Observation, Brightfield Mode*

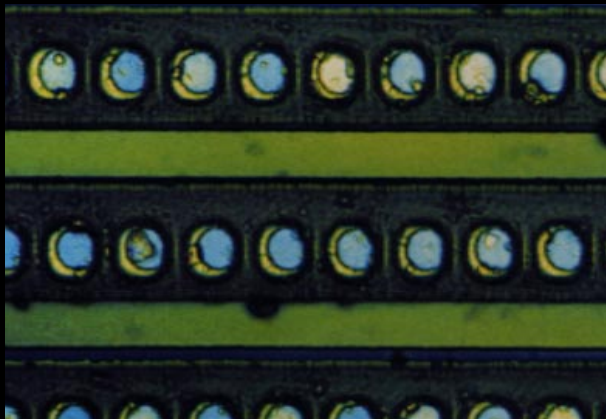


LMPLAPO150X BD



## Sharp Profile Images Right to the Edge

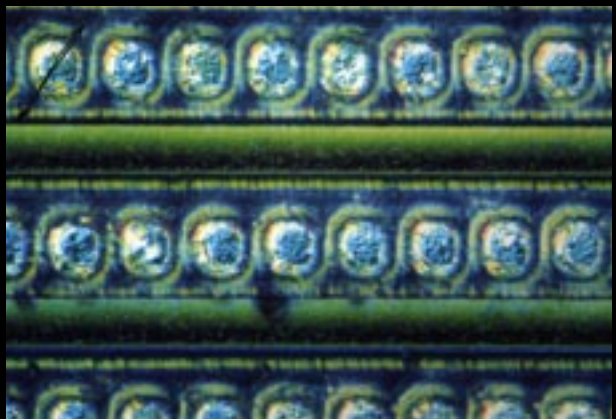
*Confocal Mode / Contact Hole*



UMPLFL100X BD

## Ideal for Inspecting Delicate Gaps and Warps

*Confocal DIC Mode / Contact Hole*



UMPLFL100X BDP

# UIS & CONFOCAL

## **Innovations in Optics Set New Standards in Brightness and Confocal Performance**

Developed through an advanced and comprehensive R & D program, the MX50-CF real-time confocal microscope sets new standards for both lateral/axial resolution and brightness in real-time confocal inspections. The system combines sophisticated Olympus UIS optics, already highly rated within the semiconductor industry, with the Nipkow Disk to further extend the instrument's confocal performance potential. With its high-intensity white light source and advanced light loss control capability, the MX50-CF leads its class in the critical areas of brightness and resolution, providing color information which conventional laser confocal microscopes cannot convey. This superior performance is of unrivaled value in the 0.18 $\mu$ m rule inspection of today's increasingly minimized and multi-layered LSI patterns.



# The Real-time Confocal Microscope that Leads the Way in Image Clarity and Operability

## The Ideal Combination for Confocal Microscopy: Nipkow Disk and UIS Optics

With images scanned by the Nipkow Disk and enhanced by the superior technological performance of Olympus UIS optics, the MX50-CF provides outstanding real-time confocal observation – accurately resolving original images of less than  $0.25\mu\text{m}$ . Images are further clarified by sectioning effects which allow easy inspection of bottom layers in multi-layer specimens and pinhole bottoms – all with unparalleled higher resolution and higher contrast than any other microscope in this class.

## Maximized Brightness Ensures Excellent Image Clarity Even at the Highest Magnifications

The incorporation of superior optical components and a higher mirror reflection factor enables the MX50-CF to minimize light loss and give significantly improved brightness during confocal observation. Bright images are achieved even under high magnification (e.g. via a 150x objective lens), making observation on monitor easier than ever.

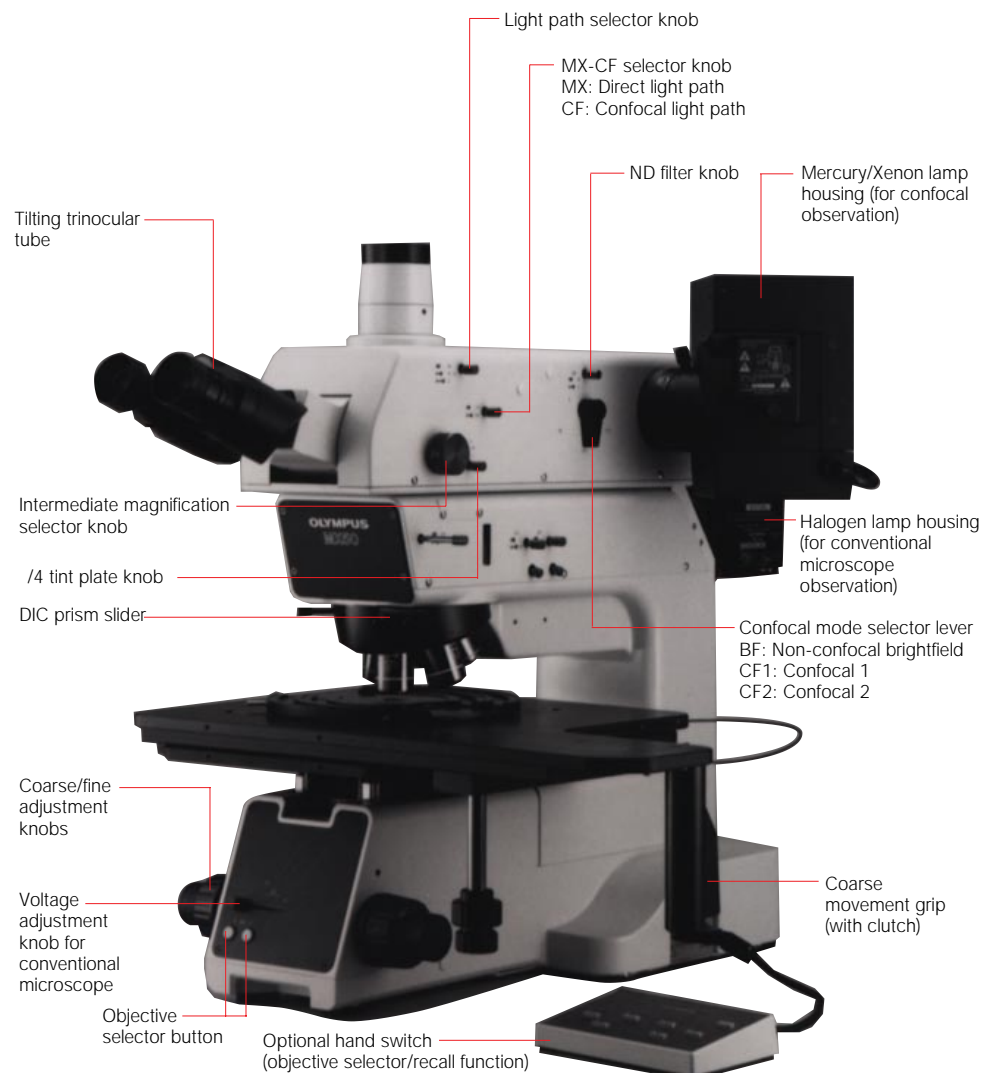
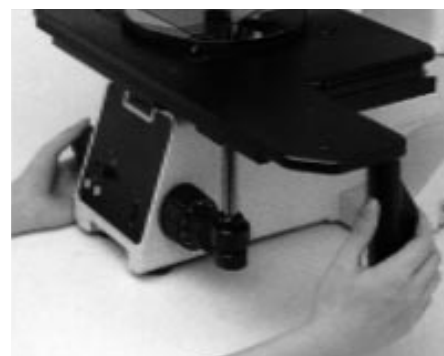
## A Range of Observation Modes Including Original Confocal DIC Microscopy

Four observation modes are available. Selection is at the touch of a lever for CF1 mode (priority on brightness for good color reproduction of the specimen), CF2 mode (priority on axial resolution power for sectioning effects), or BF mode (brightfield observation). Nomarski DIC microscopy can also be selected for confocal effects: with the DIC prism slider IN and the  $\lambda/4$  tint plate knob at OUT, the user can clearly observe and distinguish delicate textures that could not be recognized in general confocal modes.

## Direct Path Ensures Clear Images in Conventional Microscopy

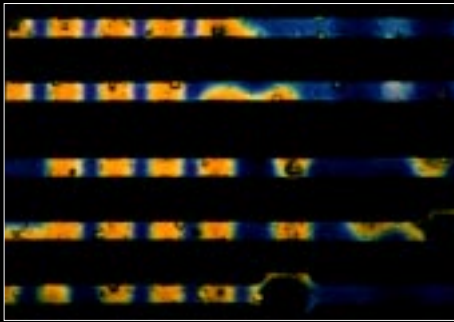
The MX50-CF allows easy switching between confocal image/non confocal observation. The direct observation path used during conventional microscopy procedures prevents image deterioration because the image does not have to go through the confocal contour relay path. The result is clear images – every time.

Intermediate magnification factors contained for high magnification observation  
 Tilting observation tube for comfortable operation  
 Frontal layout for ease of use  
 High-rigidity, anti-shock design for high magnification observation without disturbance  
 Greater color accuracy than conventional confocal microscopes: The MPLAPO objectives present images in colors closer to those of the actual specimen  
 Add-on to the MX50 for excellent operability  
 CE accredited  
 Major applications: bottom layer in multi-layer structures and metal layer on patterned wafer, magnetic head and new/metallic materials

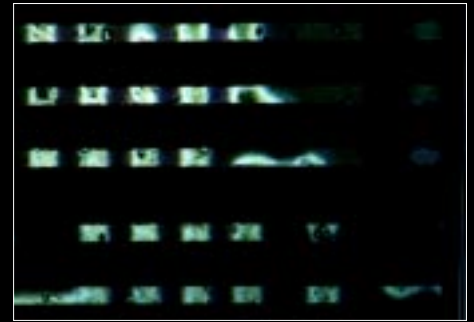


# Unrivalled Levels of Resolution and Contrast Achieved by Confocal Image and Microscope Image

## Observation of LSI



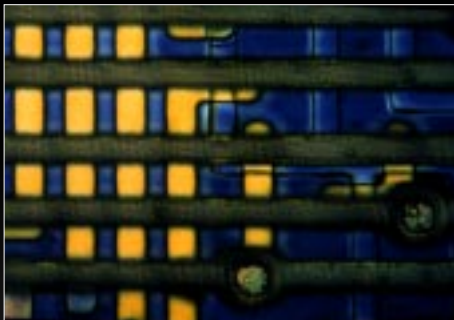
Top layer circuit  
Confocal mode (CF2)  
UMPLFL100X BD



Top layer circuit  
Confocal mode (CF2)  
MPLAPO100X BD



Top layer circuit  
Non-confocal observation, brightfield mode  
MPLAPO100X BD

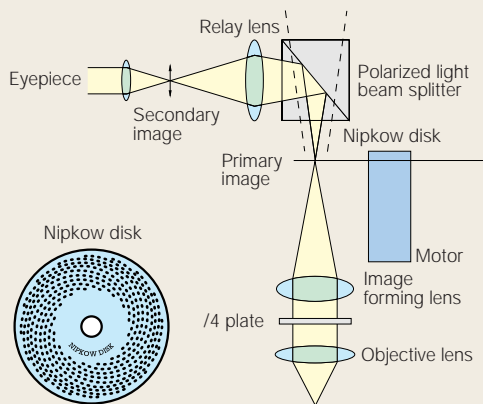


Bottom layer circuit  
Confocal mode (CF1)  
UMPLFL100X BD



Bottom layer circuit  
Confocal mode (CF1)  
MPLAPO100X BD

### Real-time Confocal Optics



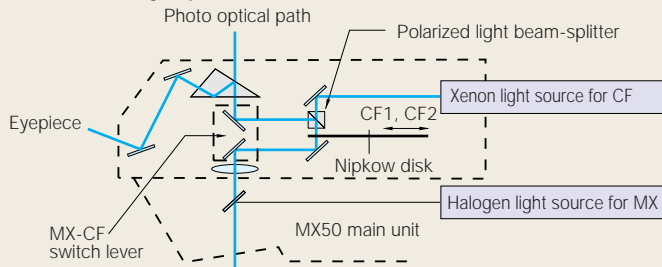
#### Fundamentals Of Real-time Confocal Optics

The MX50-CF's confocal scanning method is based on use of the Nipkow Disk. The Nipkow Disk has numerous pinholes on its primary image-forming disk: light passing through the pinholes is reflected off the specimen and back to the pinholes. However, since the pinholes are located on the primary image-forming disk, only light reflected onto the focused disk is transmitted through the pinholes: this is the confocal effect.

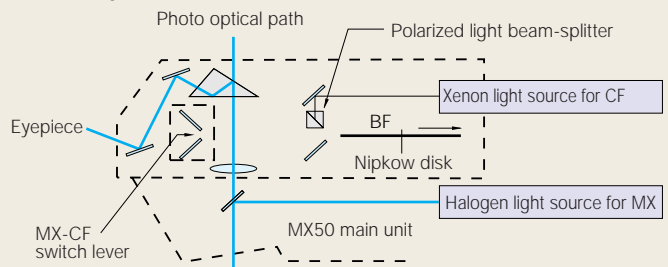
When the disk is rotated at high speed, the light beams passing through the pinholes will scan the specimen simultaneously; this allows a real-time image to be observed, as with an ordinary optical microscope. There are also two pinhole diameters on the disk; switching between them adjusts the confocal effects.

In conventional microscopy, illumination optics have not always been adequate for the high magnifications required for confocal observations; in particular, there tended to be insufficient brightness for accurate, detailed observation. To overcome this problem, Olympus has developed significant refinements to the illumination optics combined them with UIS optics to achieve today's highest standards of brightness and confocal effects.

#### Contour Relay Optical Path



#### Direct Optical Path



# Meeting Diverse Needs in Semiconductor Inspection: A Line-up that Only OLYMPUS Can Offer

As well as offering excellent performance as a stand-alone unit, the Olympus real-time confocal semiconductor inspection microscope can be combined with a wafer loader, making it a mini workstation, or upgraded to the AL1000 flexible wafer inspection system by the addition of an automatic stage.

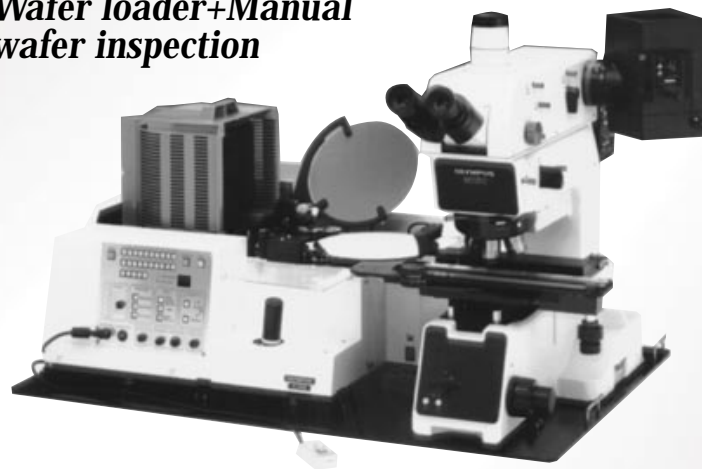
Olympus will continue to maintain its commitment to developing innovative systems based on real-time confocal semiconductor inspection microscopes — systems that meet our customers' diverse needs for clear, accurate, high-resolution inspection.



MX50-CF

## **Manual wafer inspection**

## **Wafer loader+Manual wafer inspection**

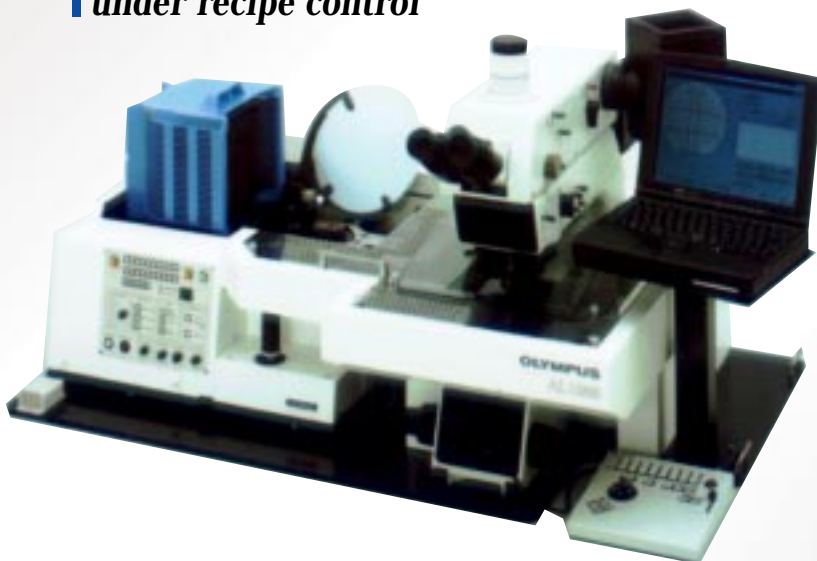


MX50-CF + AL100

### **Real-time Confocal Microscope + Wafer Loader**

Combining the MX50-CF with the AL100 wafer loader series (which offers the world's first micro/macro/back side 3-inspection feature) creates a mini workstation that 0.18 $\mu$ m compatible. Additional advantages include cost-effective performance and excellent space efficiency in clean room working environments.

## **Integrated wafer inspection under recipe control**

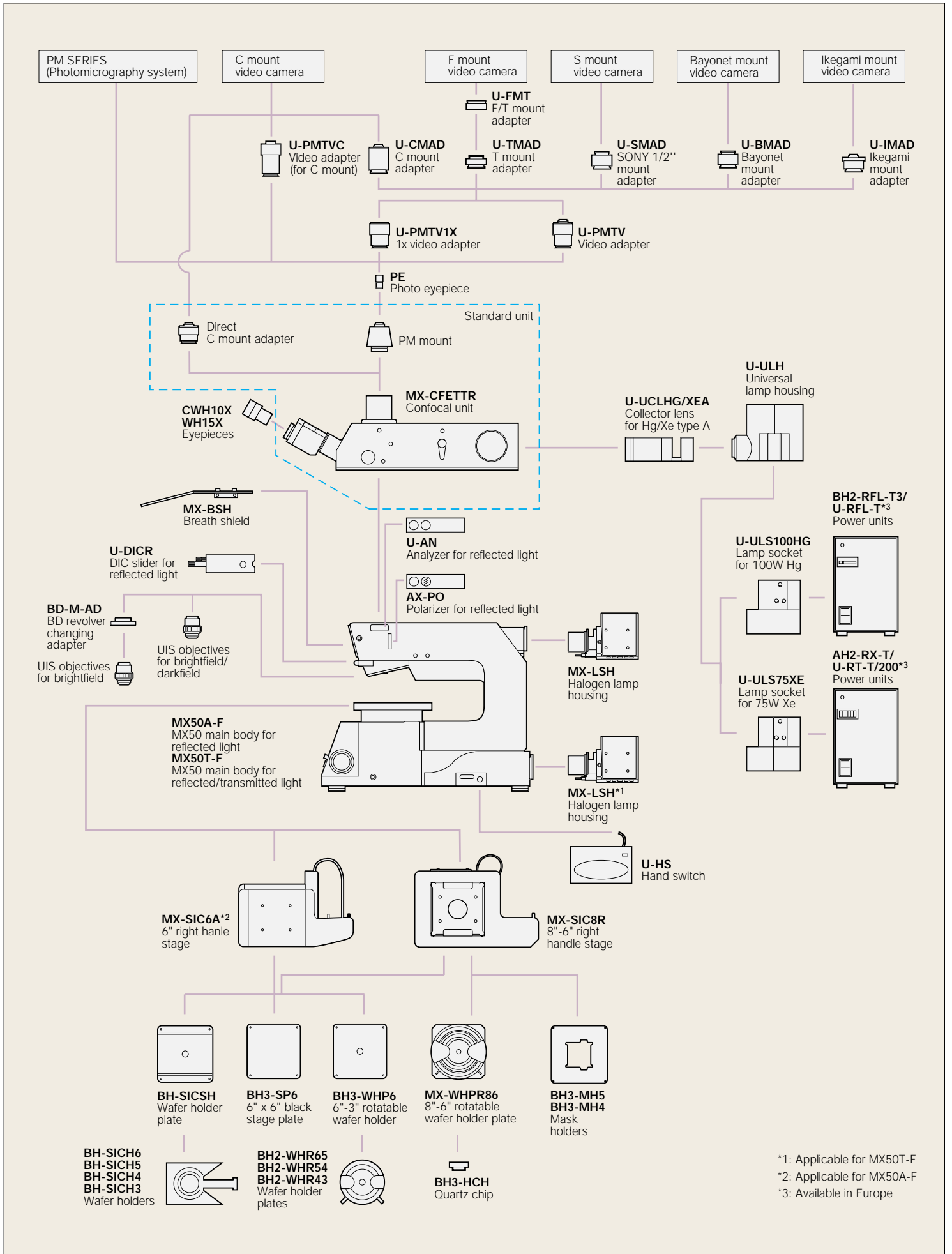


AL1000

### **Flexible Wafer Inspection System**

This powerful system is for inspecting super micro structures like the 64M DRAM. Wafer observation software is offered in menu form for stage-by-stage operation, and settings for sampling, die map, inspection time, microscopy method and objective magnification factor can all be made at the touch of a button.

# SYSTEM DIAGRAM



## MX50-CF specifications

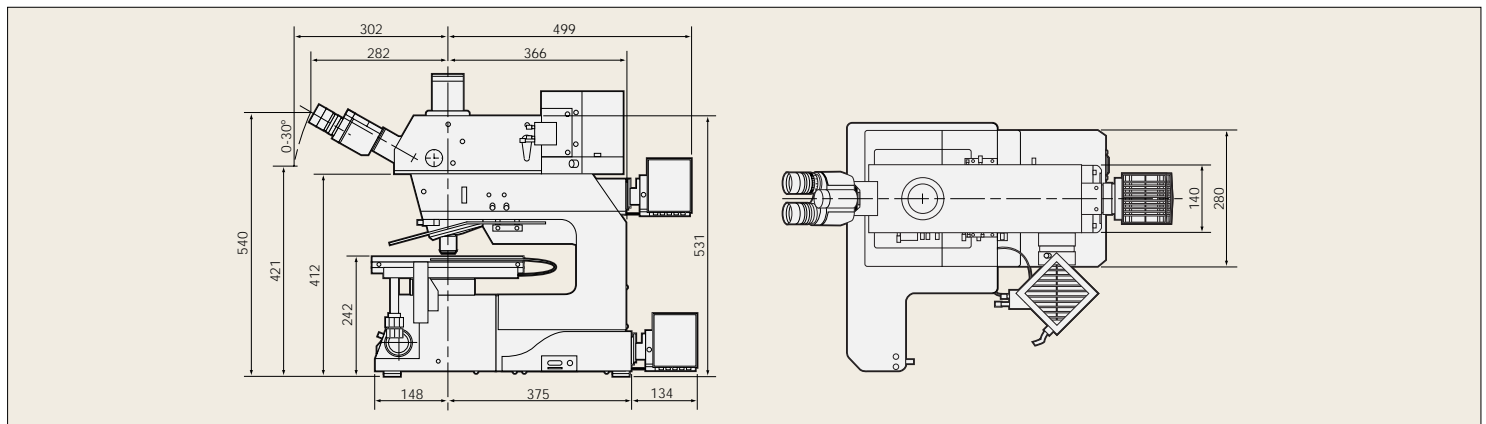
Item	specifications	
Microscope stand	Frame	8" arm-integrated frame with built-in transformer for reflected or reflected/transmitted light (switchable), and power supply for driving motorized revolving nosepiece
	Focus	Coaxial coarse and fine focus controls, vertical stage travel range: 32mm (2mm up and 30mm down from focus position) Fine focus stroke per rotation: 0.1mm, minimum fine focus adjustment graduation: 1µm, sensitivity: 1µm or less
	Revolving nosepiece	Hi-speed motorized quintuple nosepiece for brightfield/darkfield observations (adapter required for brightfield objectives)
	Incident illumination	100W Hg or 75W Xe light source (for confocal observation) 12V, 100W halogen bulb light source (for non-confocal observation)
	Stage	Stroke: 210 x 210mm roller guide slide mechanism (with use of MX-SIC8R) Belt drive system (no rack) Grip clutch function (vacuum stages mountable when combined with a wafer loader)
	Objectives	UIS objectives
	Eyepieces	CWH10X or WH15X
CF unit	Observation tube	Erect widefield tilting trinocular observation tube (0-30 degrees), F.N. 20
	Observation method	(1)Confocal observation CF1 (pinhole diameter: φ45µm) (2)Confocal observation CF2 (pinhole diameter: φ25µm) (3)Confocal DIC observation (for CF1 and CF2) (4)Non-confocal observation (brightfield/darkfield, Nomarski DIC)
	Intermediate magnification	Three steps selectable: 1.67x, 2x, 2.5x (BI) 1x, 1.2x, 1.5x (Photo tube)
Dimensions and weight	See diagram, approx. 55kg	

## Objectives specifications

		N.A.	W.D.(mm)			N.A.	W.D.(mm)			N.A.	W.D.(mm)			N.A.	W.D.(mm)
UMPLFL	5x	0.15	20.0	UMPLFL	5xBDP	0.15	12.0	LMPLFL	5x	0.13	22.5	MPLAPO	2.5x	0.08	10.7
	10x	0.30	10.1		10xBDP	0.25	6.5		10x	0.25	21.0		20x	0.60	0.9
	20x	0.46	3.1		20xBDP	0.40	3.0		20x	0.40	12.0		50x	0.95	0.3
	50x	0.80	0.66		50xBDP	0.75	0.66		50x	0.50	10.6		100x*	0.95	0.35
	100x	0.95	0.31		100xBDP	0.90	0.31		100x	0.80	3.4		100xBD*	0.9	0.31
	5xBD	0.15	12.0	SLMPL	20x	0.35	21.0	5xBD	0.13	15.0	LMPLAPO	150x*	0.9	1.0	
	10xBD	0.30	6.5		50x	0.45	15.0	10xBD	0.25	10.0		150xBD*	0.9	1.0	
	20xBD	0.46	3.0					20xBD	0.40	12.0		250x	0.9	0.8	
	50xBD	0.80	0.66					50xBD	0.50	10.6		250xBD	0.9	0.8	
	100xBD	0.90	0.31					100xBD	0.80	3.3					

\* Recommended for high resolution confocal microscopy.

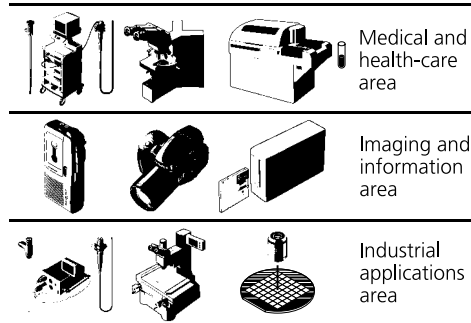
## Dimensions (unit: mm)



[www.olympusmicroimaging.com](http://www.olympusmicroimaging.com)

Specifications are subject to change without any obligation on the part of the manufacturer.

### Olympus business areas



**OLYMPUS**  
FOCUS ON LIFE

**OLYMPUS OPTICAL CO., LTD.**

2-43-2, Hatagaya, Shibuya-ku, Tokyo, Japan

**OLYMPUS OPTICAL CO. (EUROPA) GMBH.**

Postfach 10 49 08, 20034, Hamburg, Germany

**OLYMPUS INDUSTRIAL AMERICA INC.**

One Corporate Drive, Orangeburg, New York, 10962, U.S.A.

**OLYMPUS SINGAPORE PTE LTD.**

491B River Valley Road, #12-01/04, Valley Point Office Tower, Singapore 248373

**OLYMPUS OPTICAL CO. (U.K.) LTD.**

2-8 Honduras Street, London EC1V 0TX, United Kingdom

**OLYMPUS AUSTRALIA PTY LTD.**

31 Gilby Road, Mount Waverley, Victoria, 3149, Australia