HIROX
http://www.hirox.com

HIROX-USA, Inc.
Corporate Office
100 Commerce Way, Hackensack, NJ 07601
Tel:201-342-2600 Fax:201-342-7322 Email:info@hirox-usa.com

CALL TOLL FREE
TO CONTACT A SALES ASSISTANT
1-866-HIROXUS
1 - 8 6 6 - 4 4 7 6 9 8 7

PHP-1111-C018-B_

HIROX
http://www.hirox.com

DIGITAL MICROSCOPE KH-8700 New

Next Generation 3D Digital Microscope

Fast, Easy and High Quality

Total Imaging Solutions

KH-8700

Fast
- The all new Hirox platform delivers fast operation and faster processing speeds.

Easy
- The premier choice in user friendly software, a digital microscope (DM) has never been easier to operate.

High Quality
- Images saved and taken with the KH-8700 are delivered with ultra-fine detail.

Portable

Handheld

Observation

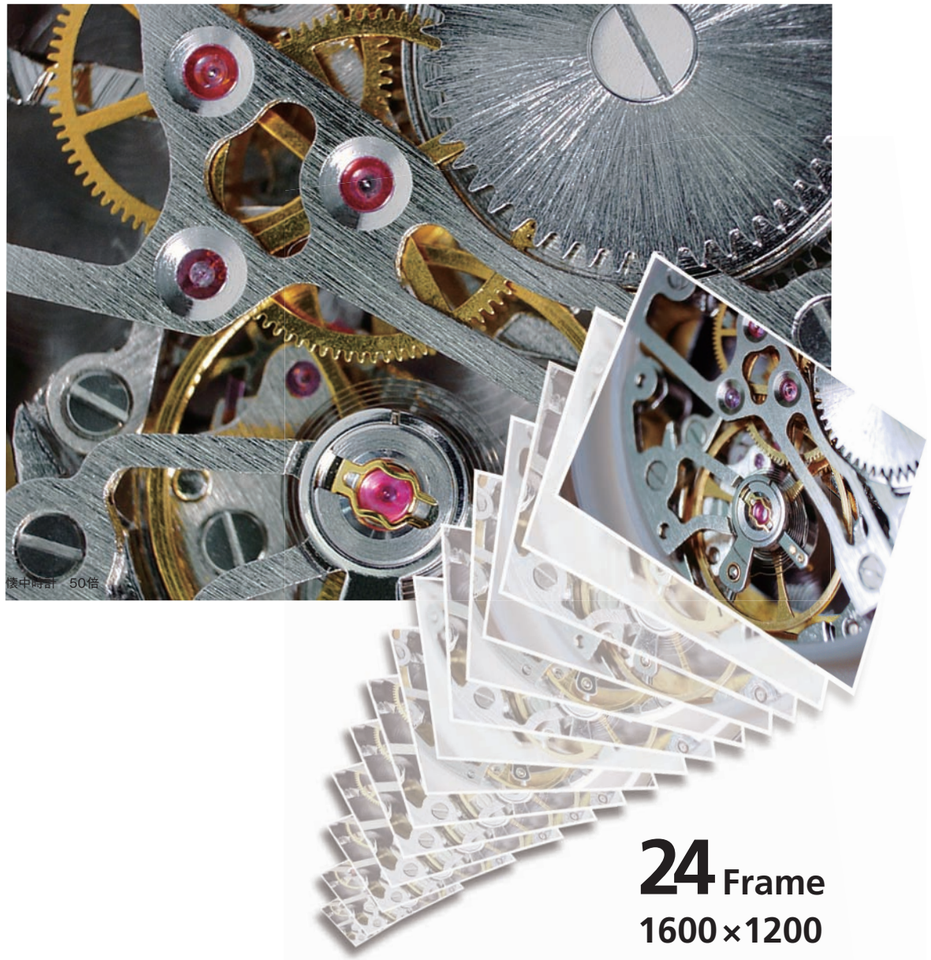
Obtain High Quality Images and Utilize Multiple Angles of Observation.

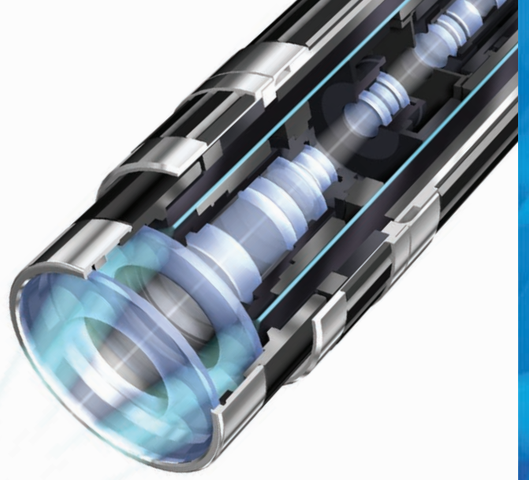
Noticing small but significant details is now a more efficient process than ever. Smooth functionality and fast performance is attained by combining our 24 frames/second output and the all new GENEX engine. By utilizing high intensity LED optics with a full HD monitor, the KH-8700 obtains optimal picture quality.

New

24 Frame /Second (First and Fastest for a DM)

The new high-speed Genex Graphics Processor allows Hirox's CCD camera to capture 24 fps with the continuous high-quality resolution of 1200 x 1600 pixels. This provides a great on-screen performance and live image operation is as smooth as the naked eye. Here, it is not necessary to change to a lower resolution setup, all of the functions work with 1200 x 1600 pixel resolution (UXGA).





New

High Intensity LED Light Source

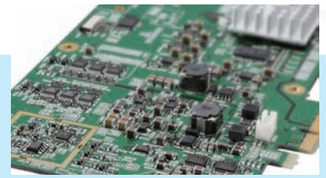
The new high intensity LED light source provides 5700K temperature, which closely portrays daylight color temperature (5500K) to re-produce true sample color images as well as full illumination immediately with no warm up time. The light source has an average lifetime of 30,000 hours, equivalent to over 10 years of usage (Note: 8 hours/day x 30 days x 12 months x 10 years).
In addition, the new light source is environment friendly with ¼ electronic consumption, less heat and UV.

New

Full High Definition LCD Monitor (First for a DM)

21.5" Full HD LCD monitor (1920 x 1080) is integrated into the KH-8700. It is one of the top grade high intensity pixel reproduction monitors displaying 16.77 million colors, a contrast ratio of 1000:1, and brightness of 300 cd/m^2. Monitor size has increased 80%, with a new aspect ratio of 9:16 instead of 3:4. The new aspect ratio allows our new software platform main menu and other function keys not to overlap with live images.

GENEX



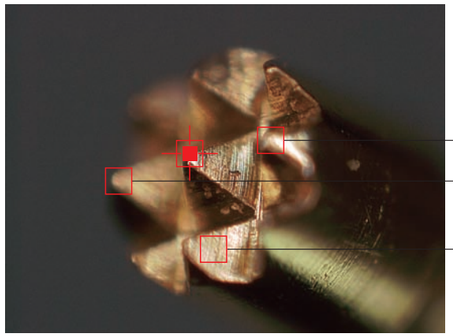
What is Genex?

The new graphics processor called, "Genex Engine," creates the fastest sample to on-screen ratio (24fps). For the first time ever in digital microscopy, the CCU (Genex) combines a high sensitivity compact CCD camera operating in a 32 bit image with high resolution at 1200 x 1600 pixels on the "Live Image."

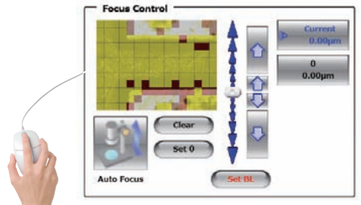
New

Point Focus (Auto Focus)

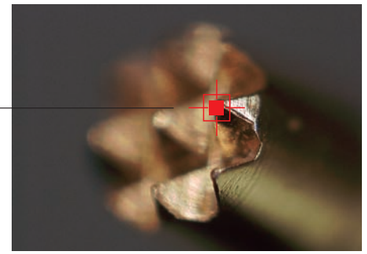
A key advantage in the line of Hirox digital microscopy is the ability to easily and quickly auto focus an image. Auto focusing an image at a rapid rate is due to our 0.05 micron pulse motorized z axis. All one has to do is double click the desired location on the monitor and the high speed software does the rest by automatically selecting the optimal focus point.



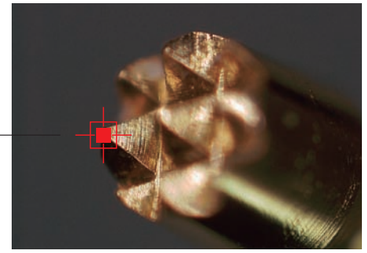
By obtaining focus information on the entire image, you can instantaneously focus on an arbitrary point simply by a mouse operation.



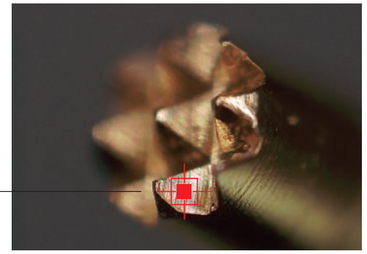
Focus information is always searchable with the focus indicator.



Contact Probe (200x)



Focusing on the Clicked Point

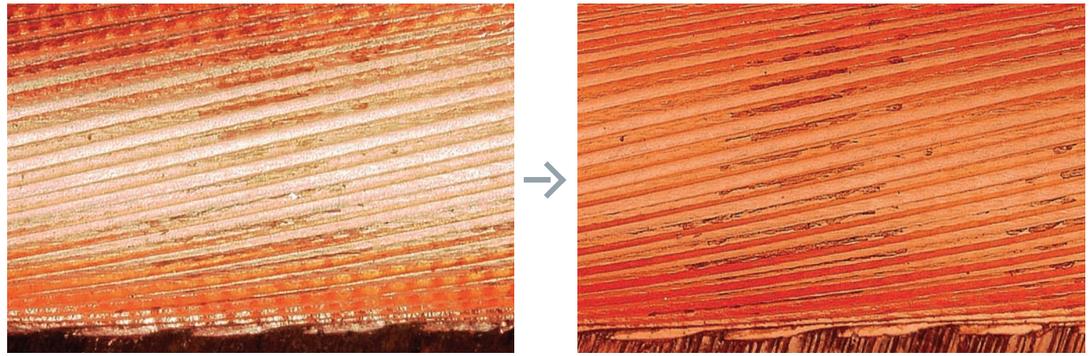


Focusing on the Clicked Point

High Dynamic Range (HDR) - Real Time

High Dynamic Range, an essential observation technology based on a Hirox original algorithm, reproduces a dynamic shutter range as a visual image. This function provides results through blending both the low and high boundaries of an image to give a clear and balanced result.

High Reflection Sample (Metal Tube) (40x)

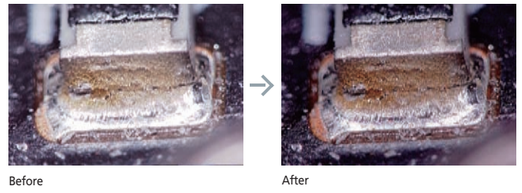


Before　　After

Transparent + Highly Reflective Sample (Connector) (120x)

Before　　After

High + Low Reflection Surface Sample (Composite) (200x)

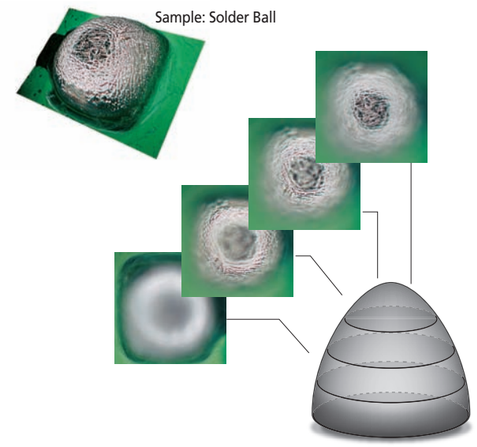


Before　　After

New

Quick 3D - One Push Operation (Fastest for a DM)

Just tapping on the touch screen scans from the bottom to top and creates 3D. Intuitive software provides the end user the ability to automatically detect focal planes, eliminating time in the procedure. Indicate the bottom most focal plane, and let the system do the rest.



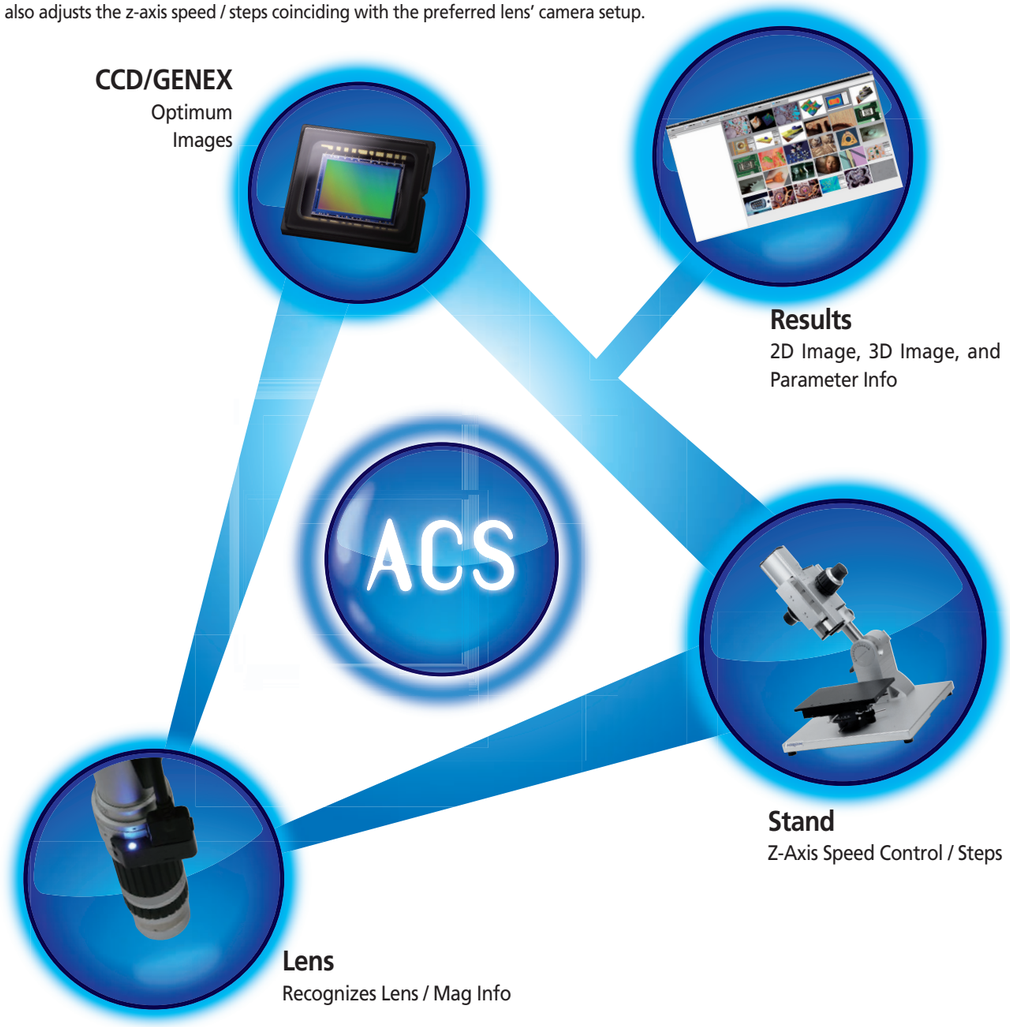
Measurement

Accurate Results with No Human Error

Incorporating various measurement technologies such as a highly accurate 3D measurement function, the KH-8700 outputs many values to answer your needs and objectives. In addition, the increased accuracy of measurement functionality has improved the usability for smarter and simpler operation.

The Unique Hirox ACS Communication

The Auto Calibration Select (ACS) sensor automatically applies the proper lens settings with each magnification or lens change, completely eliminating the need to choose proper calibration values. When a lens / mag is changed, the ACS feature also adjusts the z-axis speed / steps coinciding with the preferred lens' camera setup.



CCD/GENEX
Optimum Images

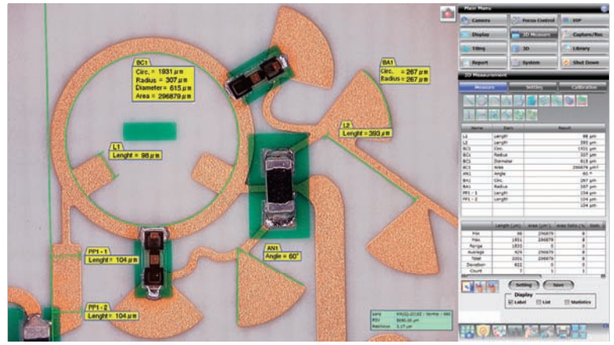
Results
2D Image, 3D Image, and Parameter Info

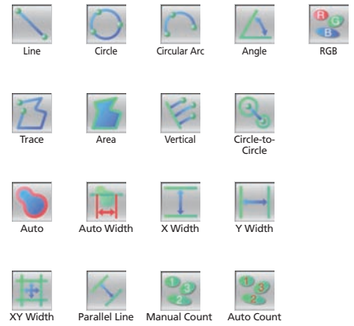
Stand
Z-Axis Speed Control / Steps

Lens
Recognizes Lens / Mag Info

2D Measurement

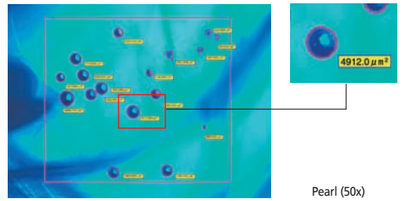
Measurements including length, area, and surface area can be taken in various styles. Using only mouse operation, the object on the monitor can be measured in real-time. In addition, the actual dimension and measurement results can be saved on the capture image or as a CSV file.





Auto Count (Binarization)

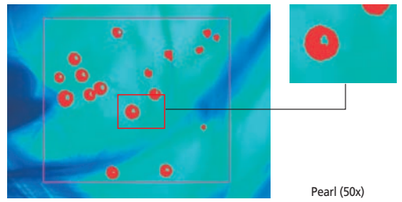
Advanced software provides the end user the ability to auto-count particles, detect particle size and ratio.



Pearl (50x)

Auto Count (RGB)

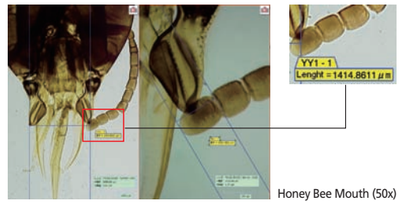
RGB function can be used to auto-count particles. Specify RGB color value or select a specific pixel, and the system automatically counts parts that have the same or similar RGB color.



Pearl (50x)

Multi View Measurement

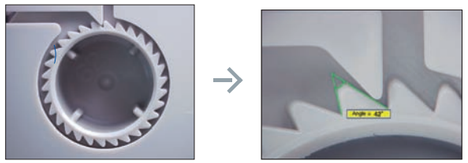
For the first time in the industry, Hirox is able to accurately use 2D measurement functions when splitting the monitor for multi-view display.



Honey Bee Mouth (50x)

Digital Zoom Measurement

By utilizing the real-time digital-zoom function, the end user can enhance pixels in order to locate the exact edge of a measurement, increasing accuracy and consistency.



Injection-Molded Gear (5x)

Calibration / Lens Settings

Cleaning up the menu to improve work efficiency; it is now possible to display other lens manufacturer's information and hide Hirox lenses you do not own.

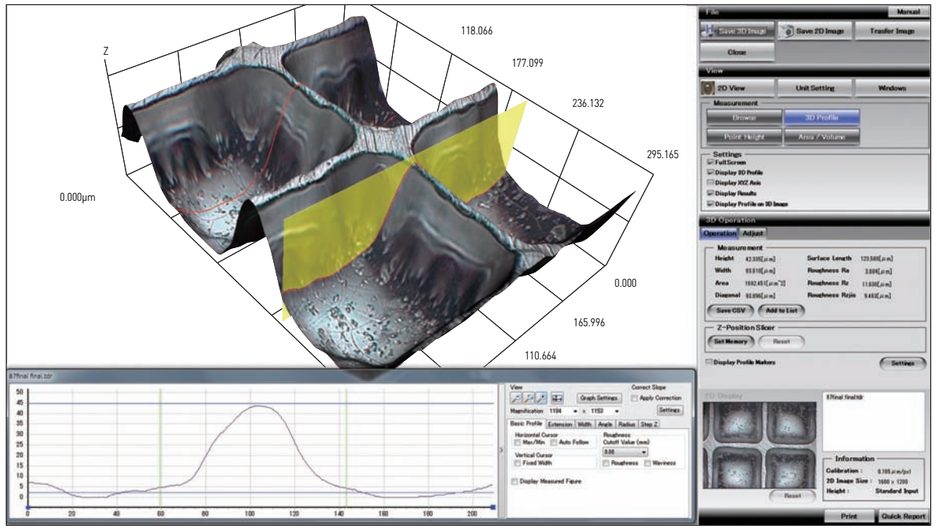
Result Display Setting

Based on your work scenario, measurement data displayed can be selected or deselected.

Display in High Resolution 3D

Fastest System to Create a 3D Model

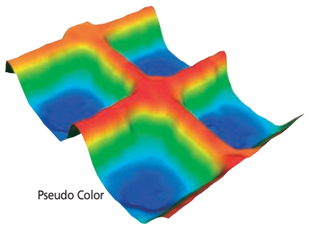
When capturing 10 image planes, it only takes 4 seconds to display a high quality 3D model. The integrated stepping motor allows for faster, smoother, and more accurate scanning with 0.05 um/pulse precision and 30 mm of automated travel. Paired with the CT-R01, controlling focus manually is a thing of the past.



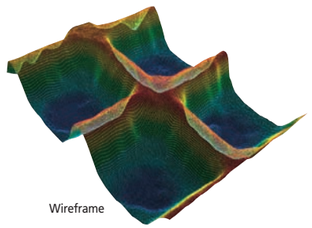
3D Viewer

3D Display

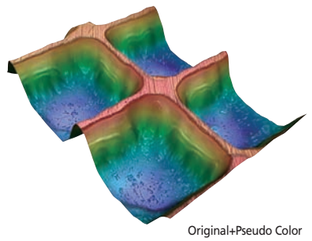
3D model information can be displayed as original color, pseudo, or as a wireframe, maximizing the amount of information that can be taken from a 3D model. Original and pseudo color can be mixed on the 3D model.



Pseudo Color



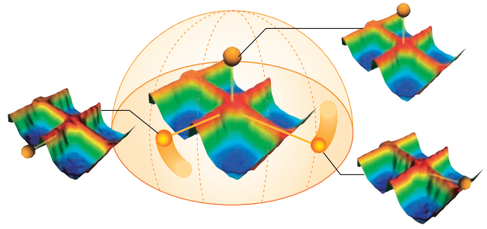
Wireframe



Original+Pseudo Color

Lighting (Flashlight)

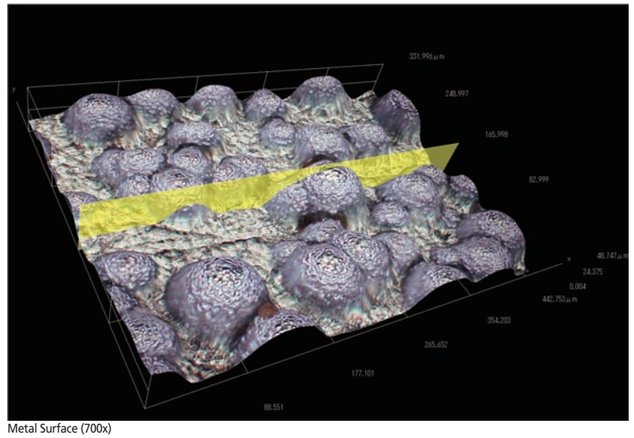
Manipulate the lighting digitally after building a 3D model in order to yield more data. Variable lighting through the software allows the end user to improve edge contrast after capturing.



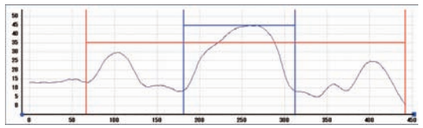
3D Profile Measurement

Numerical Data Supporting Accurate Analyses

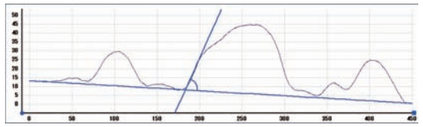
Quantify 3D data by associating the profile graph with the image display area. Intuitively measure 3D height information as well as have the capability to extract angle and radius data.



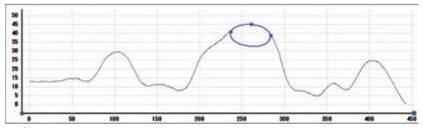
Metal Surface (700x)



Width and height measurement



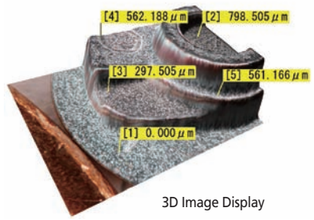
Angle measurement



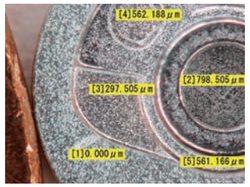
Radius measurement

Point Height Measurement

Display point height by simply clicking on the 3D model. With each click, height value labels are displayed from a standard zero point or a zero point can be set (new reference point) to a specific position on the model. Point height measurements are possible in both 2D and 3D rendered images.



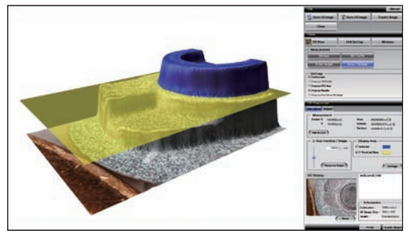
3D Image Display



2D Image Display

Volume and Area Measurement

The operator can adjust the slicer to measure volume, surface and cross-section area on the 3D model.



Roughness Measurement (Ra, Rz, Rzjis)

Engineering advances in the KH-8700's software includes profile line Roughness measurements giving the end user more quantitative data than before.

Level Correction

The level correction feature gives the end-user the ability to adjust the surface on the image without touching the sample.

Noise Filter and Reduction

The advanced Noise Filter reduces unwanted static and provides a more clear image.

Export 3D Models Files by CSV Format

The 3D models can be exported as a CSV file format into any other 3D analysis application software.

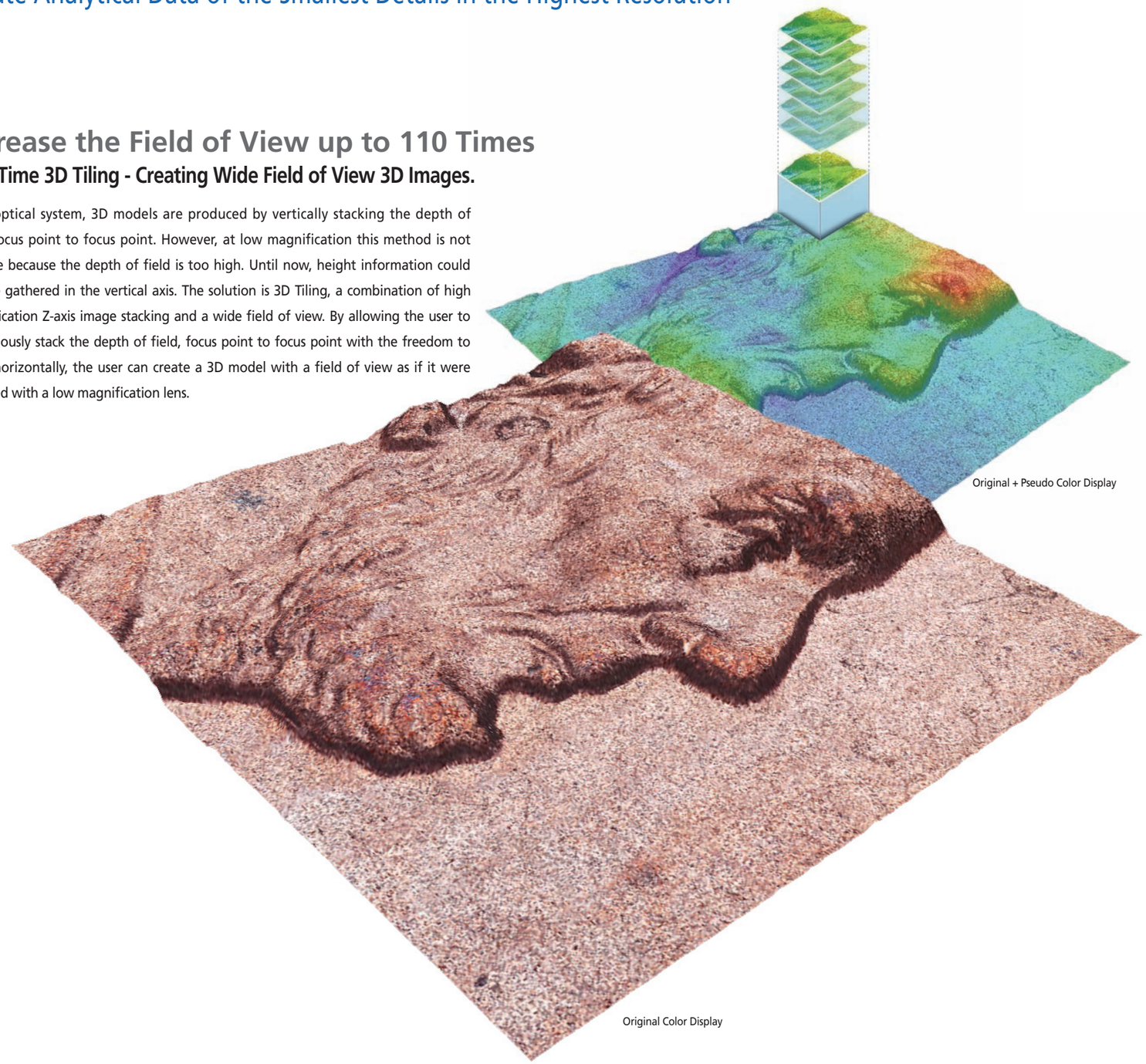
Capture and Record

Create Analytical Data of the Smallest Details in the Highest Resolution

Increase the Field of View up to 110 Times

Real-Time 3D Tiling - Creating Wide Field of View 3D Images.

In an optical system, 3D models are produced by vertically stacking the depth of field, focus point to focus point. However, at low magnification this method is not possible because the depth of field is too high. Until now, height information could only be gathered in the vertical axis. The solution is 3D Tiling, a combination of high magnification Z-axis image stacking and a wide field of view. By allowing the user to continuously stack the depth of field, focus point to focus point with the freedom to move horizontally, the user can create a 3D model with a field of view as if it were captured with a low magnification lens.



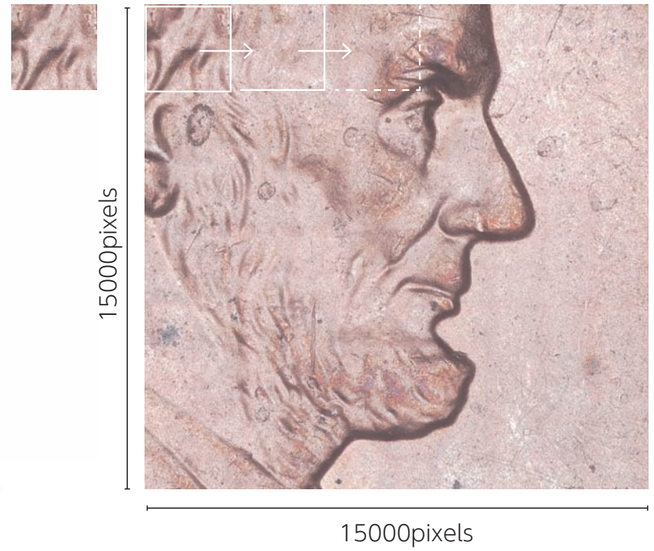
Original + Pseudo Color Display

Original Color Display

Real-Time 2D Tiling Feature

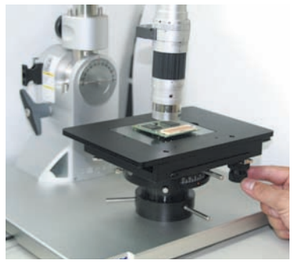
A Hirox Original Algorithm Achieves Quick and Seamless Tiling

It is a constant challenge for optical microscopes to capture with a high optical resolution and a wide field of view simultaneously. This new process does not require a specified position to match tile to tile. The image will automatically begin tiling seamlessly in real-time just by moving the XY stage. This Hirox original method increases the field of view from 1200 x 1600 pixels up to 15,000 x 15,000 pixels while retaining a high optical resolution.



Easy Operation and High Speed Processing

All you have to do is move the XY stage and the image will be tiled automatically by the software.



Moving the XY Stage

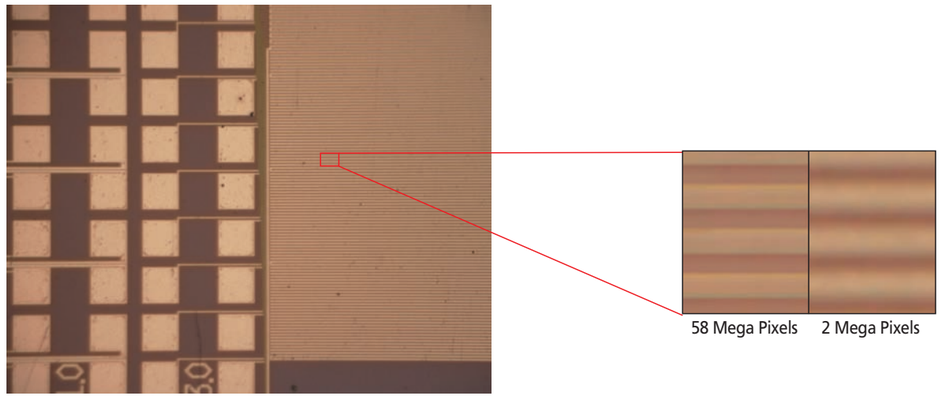
EDP (Enhanced Digital Processing)

To perfect an on-screen image, Hirox has created an Enhanced Digital Processing feature to improve images to the desired outcome.

New

58 Mega Pixel High Resolution Image

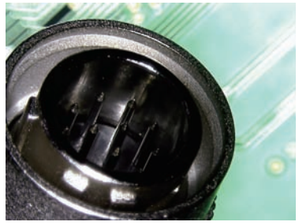
Constantly improving with technology, 58 mega pixel images are now supported to provide optimal resolution and on-screen clarity, also decreasing aliasing noise (pixilation) when controlling real-time digital zooms.



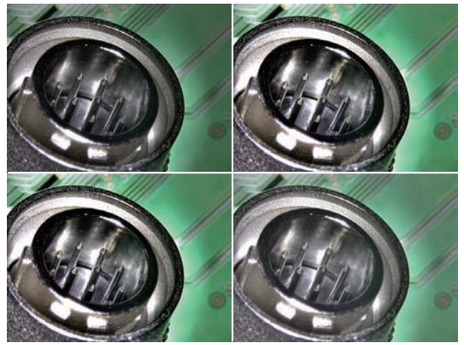
Printed Circuit Board

Preview Function for HDR, Anti-Halation and 3D Models

Preview your adjustments before processing an image. Various options are now imbedded into the KH-8700 to further broaden the field for image selection. Not only is this possible for HDR and Anti-Halation images, but 3D models as well.



Live Image (Cable Connector)



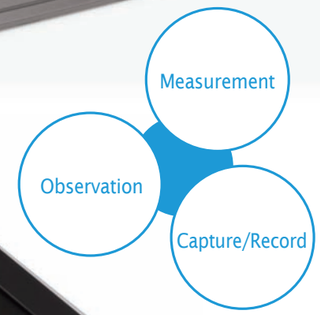
HDR Preview Images

New

Offering Seamless Observation, Measurement, and Capture/Record

Remote Device (CT-R01)

The user friendly controller simplifies operation by integrating all functions with a touch-screen. The remote device provides quick and easy operation. Main functions are displayed on the remote's home-screen for easy access. In addition, the device allows adjustments of shutter speed, the ability to quickly auto-white balance, and control Z-Axis movement as well as rotary speed/direction.



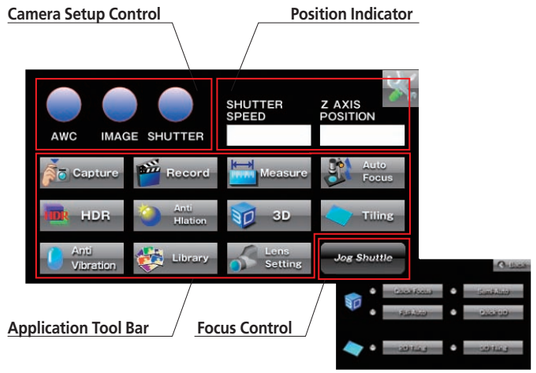
Large Touch Screen
4.3 inch monitor provides easy access to features.

Clear and Easy Menu
The menu was designed with icon and text to prevent confusion.

Jog Shuttle
Controlling motorized Z-Axis and rotary head.

Lighting Level Knob
Adjusting the lighting level of the on screen image.

Remove Device Menu Screen



Camera Setup Control -
Contains features such as white balance, image adjustment, and shutter speed.

Position Indicator -
This area indicates camera shutter speed and Z Axis position.

Application Tool Bar -
Simple operation allows one touch capture, recording, measurement, Auto Focus, HDR, and much more.

Focus Control -
Allows control by the jog dial of functions such as Z-axis movement and rotation speed.

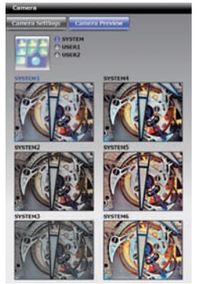
Capture and Record

Easy Operation Features

Designed for efficient interaction, an array of Hirox features help problems become solutions.

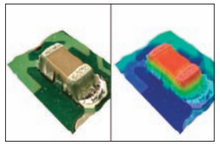
Camera Preview

In the Camera Preview function, display a variety of images for different perspectives to choose from. Adjust edge, chroma, and contrast, and have the ability to customize each image displayed with user preferences.



Split Window (Multi-View)

Multiple images can be simultaneously displayed for comparison. You can split the screen horizontally / vertically, or divide the screen into 4 windows. First in the industry to be able to access all functions when splitting the screen into vertical / horizontal comparisons or multi-view comparisons.



Anti-Vibration (Camera Stabilization)

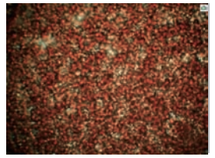
Some working environments can cause constant micron level shaking on microscopy stages. A solution to this problem is Hirox's new Anti-Vibration feature improving observations in adverse conditions.

Cutting Bit (20x)
[Before Image Stabilization]

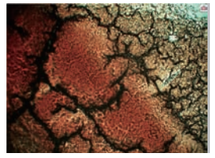
Cutting Bit (20x)
[After Image Stabilization]

Time Lapse

The KH-8700 can automatically take a sequence of frames at a specified interval to record changes over a set duration. To help reduce energy consumption, the LED lamp is only turned on when necessary.



Blood Serum (1500x)
[Recording Starts]



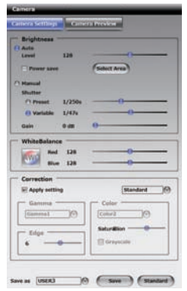
Blood Serum (1500x)
[Recording Ends]

Quick Launch

A quick launch feature is always present on screen to easily go to various controls that are most used. These controls include lighting adjustment, image capture, a print tab, and other shortcuts.

Camera Set-Up / Individual User

A log-in screen helps distinguish users in a multi-user work environment. Personal preferences such as system settings and image data can be saved to a unique user profile. This is particularly helpful with numerous operators each making observations and measurements on different objects.



External Ports

The KH-8700 system allows users to export/import data easily through 6 USB ports and a LAN port. Duplicating the screen is also quickly achieved through both an RGB port and a digital display port to connect via HDMI.

Library – Explorer

Cover all storage access through the Explorer tab. Organize files by selecting the detail setup. Be able to edit, connect to a network, burn files to a CD/DVD, and print any file directly from the Library.

Easy Report Writer

Save time by quickly transferring image files into the Easy Report Writer in order to make presentations. Several different templates are available or customize templates to taste. Reports can be printed, saved, or exported to spreadsheet applications.

Auto XY Stage

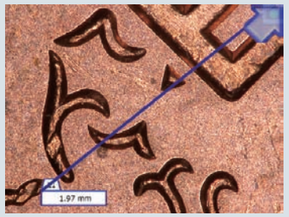
Total Imaging Solutions Motorized XYZ Axis Stage

Click Observation

XY Stage can be moved around by double clicking or dragging the mouse in the direction of travel on screen. Double-click can be combined with auto-centering as well as auto-focus function simultaneously.

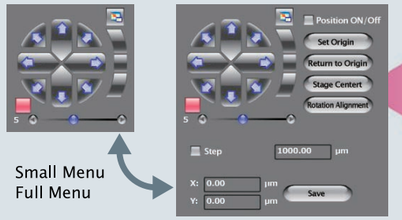
Extended Measurements

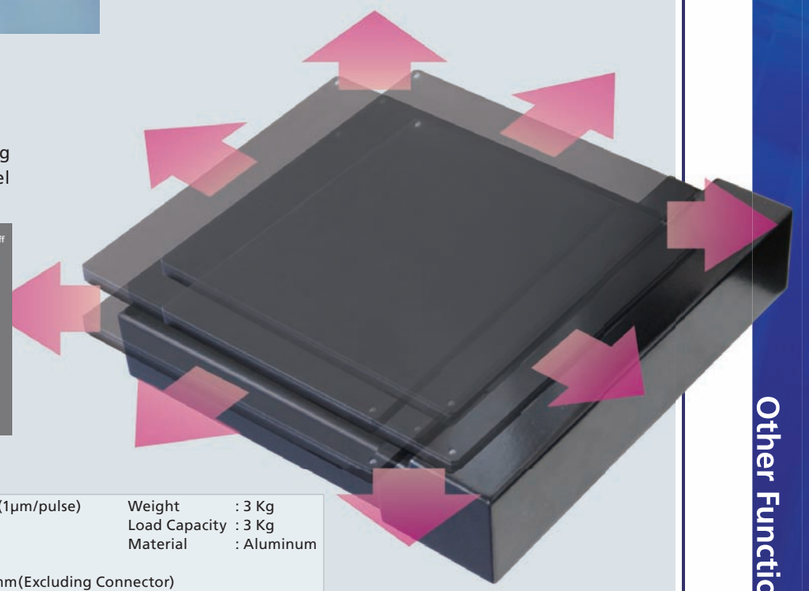
Extends 2D measurements beyond the field of view on a live image without the need for tiling.
Makes low mag measurements at higher magnifications.



Control Panel

Easily operates the auto XY stage utlizing the KH-8700 software. This control panel can also be control with the keyboard.





Specification

Motor	: 5 Phase Stepping Motor (1μm/pulse)	Weight	: 3 Kg
Resolution (Micro Step)	: 0.1μm = 1/20	Load Capacity	: 3 Kg
Working Range	: X = 50 mm, Y= 50 mm	Material	: Aluminum
Stage Maximum Speed	: 10 mm / sec		
Dimension(W/D/H)	: 250 mm / 223mm / 62.5 mm(Excluding Connector)		

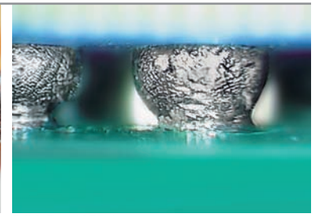
Applications

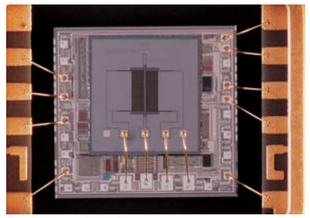
Creating a Wide Array of Applications for the Demands of Numerous Industries

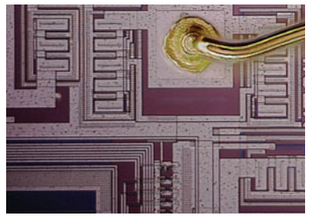
Electric/ Electronics

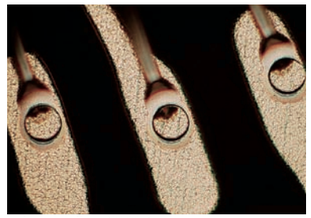

GFP (150x)


Electronic Component (100x)

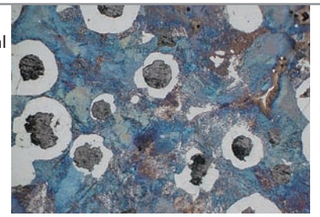

BGA Ball (150x)

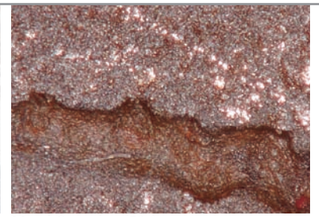

IC Package (100x)


IC Package (1000x)

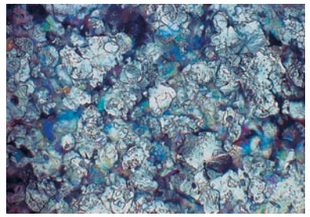

Wire Bonding (2000x)

Material/ Metallurgical

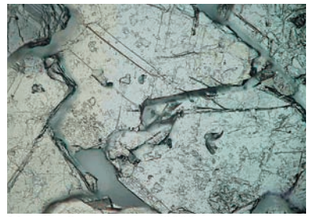

Metallographic Structure (700x)


Metal Corrosion (50x)

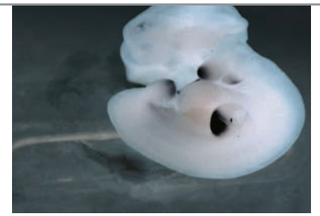

Fatigue Fracture (20x)


Silver Coating (1400x)

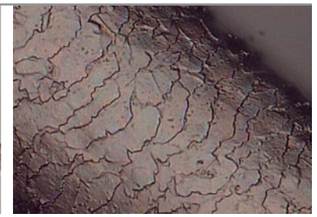

Section Fatigue Crack (50x)


Metallic Organization (2000x)

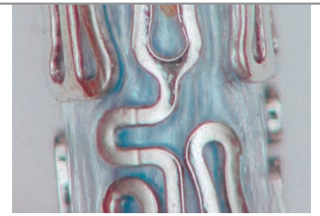
Organism/ Healthcare

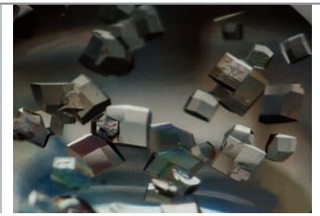

Mouse Fetus 10.5 Days after Conception (150x)

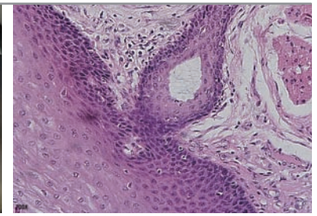

A Fruit Fly (100x) – Split Image


Hair Cuticle (3500x)

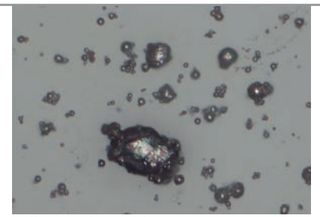
Medical/ Pharmaceutical


Stent (150x)


Protein Crystals (100x)


Smear Cell (2100x)

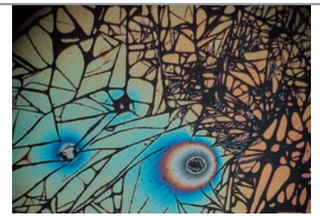
Forensic

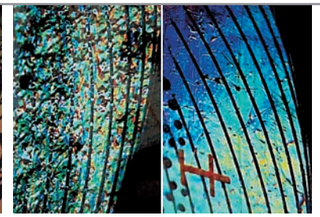

Bullet Powder Residue (1750x)

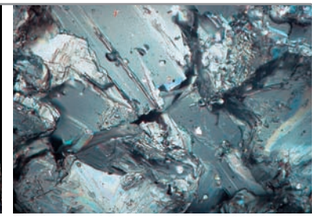

Textile Color Comparison (1000x) – Split Image

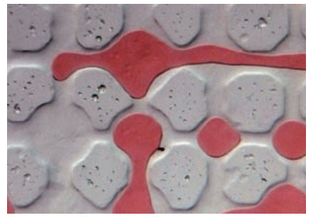

Bullet Shell Comparison (100x) – Split Image

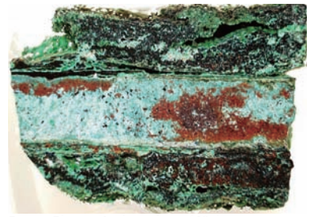
Other Applications


Carbon-Based Film (1000x)


Counterfeit Money (350x) – Split Image


Single Crystal Superconductor (1000x)


Petroleum Research (50x)


Borne Piece - Archaeology (40x)


Mechanical Watch (100x)

Lenses

High-resolution, high-precision, and high depth of field optical lenses made for everyday measurements. The MX(G) lenses can be used for highly complex 2D and 3D measurements down to the micron level.

High Resolution Macro Zoom Lens

MXG-MACROZ VI / MX-MACRO VI

0x-50x

The multi-functional macro zoom lens can achieve a view of the entire object and a magnification of up to 50x. A light source guide is integrated into the lens for diverse environments. This lens can be switched from a ∞-5x magnification lens to a 5x-50x par-focal magnification lens.

Model	MX - MACROZ VI / MXG - MACROZ VI	
Magnification	∞- 5x	5 - 50x
View (mm / inch)	- 61 / - 2.4"	61 - 6.1 / 2.4 - 0.24"
Working Distance	- 90 / - 3.54"	90 / 3.55"
ACS Option	N/A	Yes

Low Range High Resolution Zoom Lens

MXG-2016Z / MX-2016Z

20x-160x (6x-320x)

The high-performance zoom lens has a compact body, provides a high resolution image, and offers a large optical depth-of-field with the ability to utilize an even larger digital depth-of-field. The lens can be handheld and accommodates numerous applications through the attachment of 13 various adapters covering a magnification range of 6x-320x.

Model		MX - 2016Z / MXG-2016Z		
Adapter		Normal	Low	High
Magnification		20 - 160x	6 - 48x	40 - 320x
mm / inch	Working Distance	44 / 1.73''	132 / 5.2''	20 / 0.79''
	Horizontal View	15.4 - 2.0 / 0.61 - 0.08''	50.8 - 6.35 / 2 - 0.25"	7.62 - 0.95 / 0.3 - 0.04"
Depth of Field*		13.3 - 0.25 / 0.52 - 0.01''	170.45 - 4.20 / 6.71 - 0.17"	3.02 - 0.10 / 0.12 - 0.04"
ACS Option		Yes		

Middle Range High Resolution Zoom Lens with Optical 3D Rotation

MXG-5040RZ (SZ) / MX-5040RZ (SZ)

50x-400x (20x-800x)

This universal lens can be equipped with a wide selection of optical adapters. Attaching the rotary head adapter allows 360 Degree revolution with the ability to inspect at multiple angles. The various exclusive adapters snap-on, allowing one-touch replacement and a magnification range that expands observation from 20x-800x.

Model		MX - 5040RZ (SZ) / MXG-5040RZ (SZ)		
Adapter		Normal	Low	High
Magnification		50 - 400x	20 - 160x	100 - 800x
mm / inch	Working Distance	54 / 2.13'' (63 / 2.48'')	80 / 3.15'' (80 / 3.15'')	20 / 0.79'' (29 / 1.14'')
	Horizontal View	6.1 - 0.78 / 0.24 - 0.03''	15.4 - 2.0 / 0.61 - 0.08''	3.05 - 0.39 / 0.12" - 0.02"
Depth of Field*		2.7 - 0.08 / 0.11" - 3.15 mil	16.81 - 0.58 / 0.66 - 0.02"	0.68 - 0.02 / 0.03" - 0.79 mil
ACS Option		Yes		

High Range / High Resolution 10x Co-Axial Zoom Lens

MXG-10C / MX-10C

35x-7000x

The high range optical zoom lens incorporates high expandability and the highest resolution in the MX(G) series. With six interchangeable objective lenses, the lens covers a magnification range of 35x-7000x. A directional lighting adapter is provided for co-axial vertical lighting to achieve intricate optical observation.

Model		MXG-2500 REZ					
Lighting Method		Co-Axial, Dark Field and Mixed					
Objective Lens		OL - 35	OL - 70 II	OL - 140	OL - 140 II	OL - 350 II	OL - 700II
Magnification		35 - 350x	70 - 700x	140 - 1400x	140 - 1400x	350 - 3500x	700 - 7000x
mm / inch	Working Distance	34 / 1.34''	21 / 0.83''	30.5 / 1.20''	12 / 0.47''	10.6 / 0.42''	3.4 / 0.13''
	Horizontal View	9.83 - 1.05	4.42 - 0.47	2.46 - 0.26	2.21 - 0.23	880 - 90 um	440 - 40 um
		0.39 - 0.04''	0.17 - 0.02''	0.10 - 0.01''	0.09 - 0.01''	30 - 3.54 mil	20 - 1.57 mil
ACS Option		Yes					

New

Dual Illumination Revolver Zoom Lens

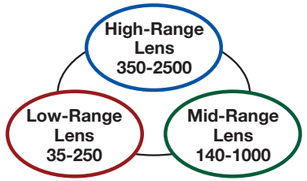
MXG-2500REZ

35x-2500x

Incredibly wide zoom range with a triple objective turret. The dual illumination mechanism provides both co-axial and ring lighting. The operator is free to choose either setting or a mix of both in order to cover a multitude of applications. The lighting system is integrated into the lens and no additional cables are required

Field of View from 8 mm ~ 0.12 mm

Turning the turret allows the operator to access each objective lens with an optical zoom range over 70 times the minimum magnification. Lens parfocality allows for sustained focus across the entire magnification spectrum from 35x-2500x. The ACS is integrated and recognizes the objective lens positioning as well as the zoom level.



Model		MXG-2500 REZ		
Lighting Method		Co-Axial, Dark Field and Mixed		
Range		Low-Range	Mid-Range	High-Range
Magnification		35-250x	140x-1000x	350x-2500x
mm / inch	Working Distance	10 mm / 0.39"		
	Horizontal View	8.71 - 1.22 mm	2.18 - 0.31 mm	0.87 - 0.12 mm
		0.34" - 0.05''	0.09" - 0.01"	0.03" - 47.2 mil
ACS Option		Yes		

MXG Lens Series

Lenses

Highly Compact, Extensive Field-of-View Macro Lens

MX-MACRO IV / MX-020Z-US:

∞-50x / ∞-20x

Model		MX - MACROZ IV
Magnification		0 - 50x
mm / inch	Horizontal View	∞ - 6.1 / 0.24''
	Working Distance	∞ - 21.44 / 0.84''
ACS Option		N/A

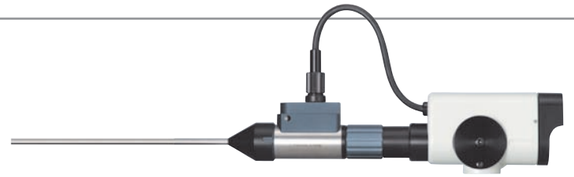
Model		MX - 020Z-US
Magnification		0 - 20x
mm / inch	Horizontal View	∞ - 15.4 / 0.61''
	Working Distance	∞ - 19 / 0.75''
ACS Option		N/A

Designed Simply to Support an Incredible Field-of-View

The aperture function varies lighting, and the magnification is correlative with working distance, expanding on available options for macro inspection, and image capture.

Straw-Scope Lens

MX-STZ Lens:



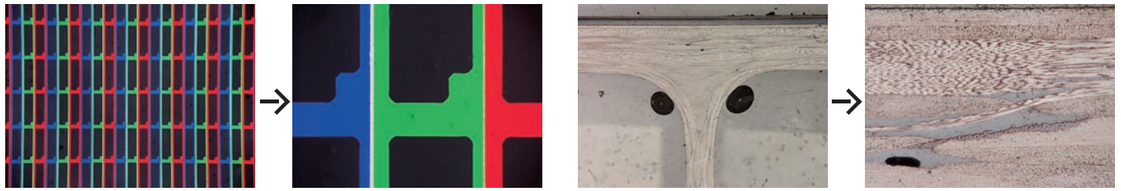
The Straw-scope Lens allows Observation in Congested Areas

The sleeve is designed with independent optical and lighting systems to achieve an outstanding resolution impossible for existing optical straw-scopes. Additional optical magnification allows the image to be rectangular instead of circular.

Model	MX - STZ / AD-STL	25-128	40-120	40-245	58-135	58-275
mm / inch	Outer Diameter	2.8 / 0.11''	4.0 / 0.16''	4.0 / 0.16''	4.0 / 0.16''	5.8 / 0.23''
	Effective Length	125 / 4.92''	120 / 4.27''	245 / 9.65''	135 / 5.31''	275 / 10.83''
	Direct View	0°				
	View Angle	40°				
	Adapter View Angle	90°				
	Adapter Diameter	3.05 / 0.12''	4.5 / 0.18''	4.5 / 0.18''	6.3 / 0.25''	6.3 / 0.25''

Wide Range Optical Zoom Lens

Hirox MX(G) lenses cover a large optical zoom range and even more than 10x by switching adapters. The par-focal MX(G) lenses retain working distance across the entire zoom range, target and accurate measurement to adjust the best focus point in the low magnification range. This provides efficient operation in finding the target and making accurate measurements by adjusting the best focus point in the low magnification range.



LCD (140x) LCD (1400x) Metal Cross Section (20x) Metal Cross Section (200x)

New

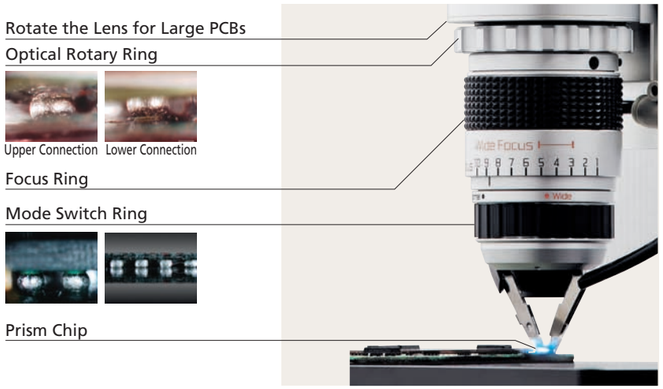
Easy and Accurate BGA Exterior Observation

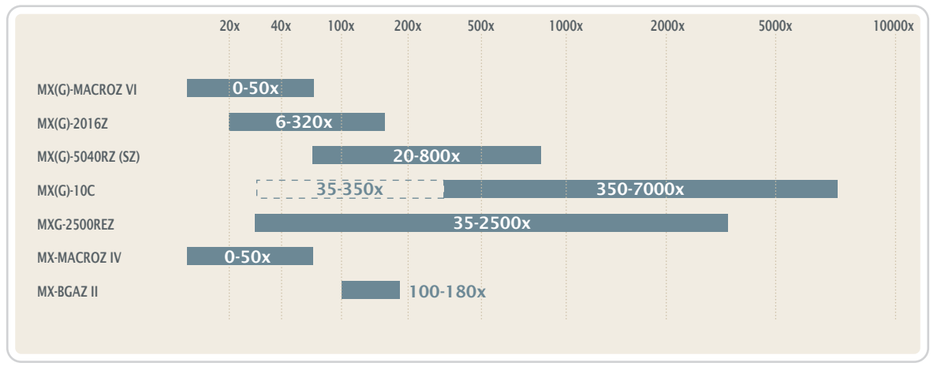
MX-BGAZ II:

Inspect the shape of all the components. The mode-switch ring changes from normal to wide mode enabling not only detailed observation of the BGA, but also confirmation of surrounding component integrity.

Prism chip structure	Soft spring structure for protecting substrates
Prism adaptation width	0.9mm
Observation angle	90 degrees or higher
Illumination methods	Optical multi illumination
Magnification	100 - 180x power *1
Operational distance	0.9 - 8.0mm *2
Weight	695g
ACS	No

*1: Mode Switch Ring set to 'Normal' magnification.
*2: Distance from the Prism tip to the BGA ball.





Optical Adapters

Acquire Various Views of the Object Using Hirox Original Optical Adapters

Variable Angle Lighting Adapter

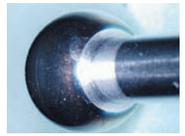
This adapter varies the lighting angle from vertical to lateral. This is effective for detecting scratches, burns and blotches.

Coin (20x)
[Vertical Lighting]

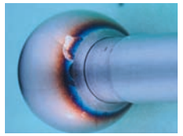
Coin (20x)
[Lateral Lighting]

Diffuse Lighting Adapter

Producing diffused and soft illumination in every direction, this adapter reduces strong reflections, allowing clear observations of metallic surfaces without halation.



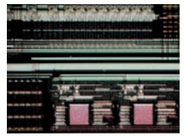
Ball Joint (40x)
[Vertical Lighting]



Ball Joint (40x)
[Diffuse Lighting]

Co-Axial Lighting Adapter

Observation through lighting that is parallel with the lens axis can be difficult to ascertain and inspect intensely reflective surfaces. With this adapter, the light is reflected perpendicular to the lens axis.

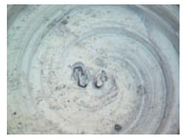


IC Pattern (1400x)
[Dark Field Lighting]

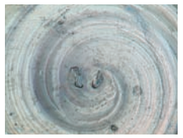
IC Pattern (1400x)
[Bright Field Lighting Using Co-Axial Lighting]

Co-Axial Directional Lighting Adapter

In comparison with standard high-resolution bright field images, this adapter can help clearly identify shapes on extremely microscopic surfaces.



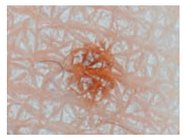
Bottom of a Can (250x)
[Vertical Lighting]



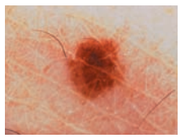
Bottom of a Can (250x)
[Co-Axial Directional Lighting]

Polarizing Adapter

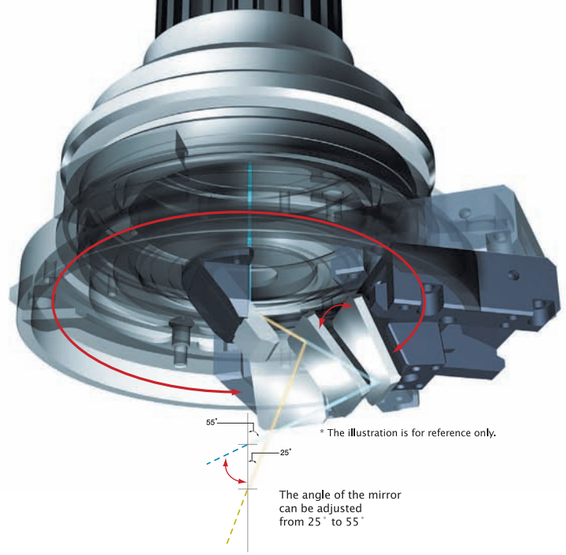
Polarizing filter is specialized to change the multi-directionality of natural light wave patterns and hones them to eliminate surface reflection and aid in the analysis of surface colors.



Freckle (50x)
[Lateral Lighting]



Freckle (50x)
[Polarized Lighting]

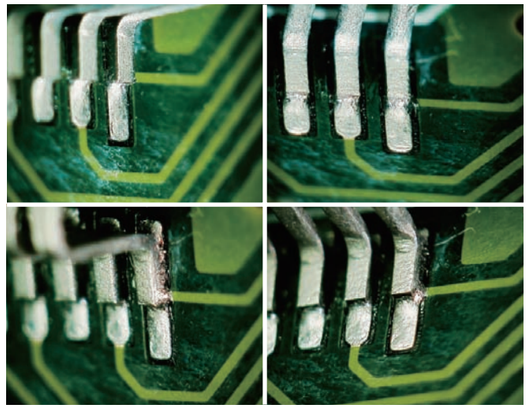


3D Rotary Head Adapter

These adapters rotate the mirrors to allow 360° observation of a subject's sides. The rotation makes it possible to easily obtain an understanding of the subjects shape. Subject size is of no concern. These adapters are HIROX original designs.

Easy Control of the Angle, Rotational Direction, and Speed

With the variable angle rotary-head, subjects can be captured as desired by operating a 360° degree rotating mirror vertically within 25 to 55 degrees. Rotation, direction, and speed can be controlled from software or remote device.



QFP Contacts (30x) (45°Observation Angle)
[Solder Application]

New

DIC Adapter (Differential Interface Contrast)

DIC is a beam-shearing interference system in which the linear polarized light is sliced into two rays. The technique produces a monochromatic image that effectively displays topography on the specimen. Depending on the difference in wavelength of the optical paths, a single shading streak on the brightest and darkest parts of the object's height difference can be observed over one hundred nanometers.

Indentations of LCD Conduction Poles (200x)
[Bright Field Lighting]

Indentations of LCD Conduction Poles (200x)
[Differential Interference]

Stands

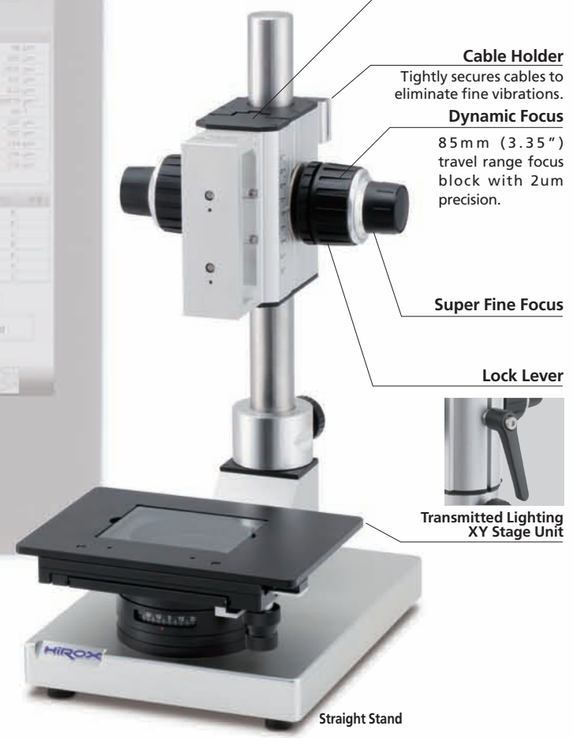
High Precision Straight and Free Angle Stand

A high performance lens only shows its power when it is operated. It is the stand that connects the lens to the operator's hand, meaning that the stand must have a high level of precision and be easy to use. The operator is free to choose 180 degrees of inclination and 360 degrees of stage rotation for target observation. This is combined with the option of the Electronic Focus Block (0.05um/pulse) for 3D observation and height measurements.

Dynamic Focus Control

With the motor controller built into the main unit , the stand is able to easily achieve extremely high precision. The stand also has an incredibly long travel range with 30mm of motor controlled travel and 85mm of manually controlled travel.

Free Angle Stand



High Precision Focus Block

Cable Holder
Tightly secures cables to eliminate fine vibrations.

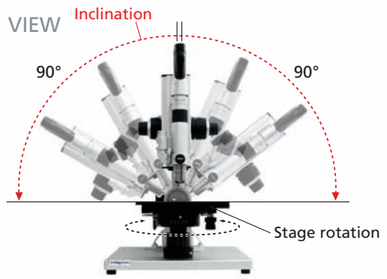
Dynamic Focus
85mm (3.35") travel range focus block with 2um precision.

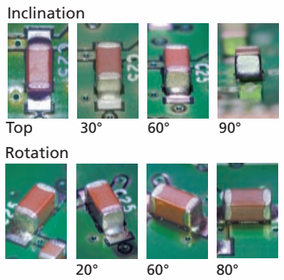
Super Fine Focus

Lock Lever

Transmitted Lighting XY Stage Unit

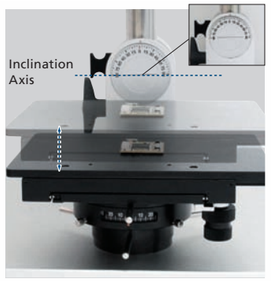
Straight Stand





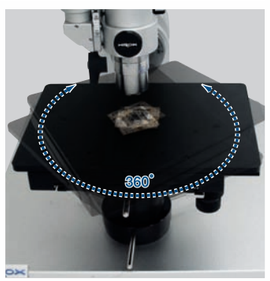
[Stage]
Stage Z-Movement

Easy Z-axis movement allows stress free inclination.



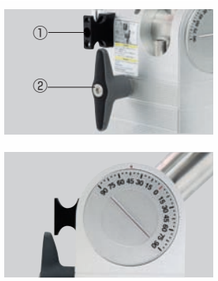
[Stage]
Flexible Operation

Reach unattainable angles with 360° rotation.



[Control Part]
Angle Adjustment

Inclinations safely stop at 45°, 60°, 90° and any angle within 180 degrees can be secured with the lock lever.



[Base]
Structured Stability and Vibration Absorber

Weight distribution designed to eliminate vibrations and a specialized material reduces a wide range of vibrations.

System Configuration

An extensive lens adapter line up and the connectivity of peripheral devices make it easy to build a customized configuration.

ST-G FB-E
Motorized Z-Axis
High Precision Stand

ST-GA FB-E XY-G
Motorized Z-Axis
Free Angle Stand

CT-R01
Remote Device

AD-C
C-mount adapter

FT-01
Foot Switch

Back side

Organized Cables

MXG-2016Z/MX-2016Z
20-160x zoom lens

MXG-5040RZ*/MX-5040RZ*
50-400x zoom lens

MXG-5040SZ/MX-5040SZ
50-400x zoom lens

MXG-10C/MX-10C
Coaxial vertical-lighting,
10x zoom lens

MXG-2500REZ
Revolver zoom lens,
35-2500x

MXG-MACROZ VI/
MX-MACROZ VI
Macro zoom lens,
0-50x

MX-MACROZ IV
Macro lens,
0-50x

MX-BGAZ II
BGA lens,
100-180x

MX-STZ28-125
Straw-scope lens
Diameter: 2.8-5.8 mm;
Length: 120-275 mm

MX-020Z-US
C-mount lens,
0-20x

■AD-2016H
Non-contact adapter

■AD-2016S
Variable lighting adapter

■AD-2016SV
Contact adapter

AD-2016LOW
Low-magnification adapter

AD-2016HI
High-magnification adapter

AD-2016RLD
Diffuse lighting adapter
for rotary head

AD-2016LOWR
Low-magnification
rotary head

AD-2016L(S/L)
Lateral viewing adapter

AD-2016D
Diffuse lighting adapter

AD-2016HIS
High-magnification,
variable-lighting adapter

AD-2016P
Polarizing adapter

AD-2016C
Coaxial, vertical-lighting
adapter

AD-2016RLM
Rotary head

AD-2016LH
Lens holder

■AD-5040HS
Non-contact adapter

AD-5040DS
Diffuse-lighting adapter

AD-5040SVS
Contact adapter

AD-5040LOWRS
Low-magnification
rotary head adapter

AD-5040HIRS
High-magnification
rotary head adapter

AD-5040RVS
Variable-angle
rotary head adapter

AD-5040RVD
Diffuse-lighting adapter
for rotary head

AD-5040LOWS
Low-magnification adapter

AD-5040HIS
High-magnification adapter

AD-5040SS
Variable-lighting adapter

AD-5040SHIS
High-magnification,
variable-lighting adapter

AD-5040CS
Coaxial vertical-lighting
adapter

AD-5040PS
Polarizing adapter

AD-5040VLS
Lift-off adapter

AD-5040SD
Snap-type adapter

■AD-5040H
Non-contact adapter

AD-5040LOW
Low-magnification adapter

AD-5040HI
High-magnification adapter

AD-5040SHI
High-magnification,variable-lighting adapter

CT-101
Moter controller

■AD-10S
Directional
lighting adapter

AD-10P
Polarizing adapter

AD-10R
Optical Rotary Adapter

AD-10DIC + AD-U-P200
DIC adapter

R-OL-D
Diffuse Adapter
for NR-405-OL

OL-35
Objective lens, 35-350x

OL-70 II
Objective lens, 70-700x

OL-140/OL-140 II
Objective lens, 140-1400x

OL-350 II
Objective lens, 350-3500x

OL-700 II
Objective lens, 700-7000x

NR-405-OL
Ring lighting for MX(G)-10C

■AD-25S1
Directional
lighting adapter

AD-25S2
Fixed-iris adapter

AD-25S3
Variable-iris adapter

AD-25S4
Center-iris adapter

AD-25P1
Polarizing adapter
(Set of 2 units)

AD-25P2
Single-wavelength
adapter

AD-25R1
Optical rotary adapter

NR-405-M4
Ring lighting for MX-MACROZ IV

HS-CH (V7)
Lens holder

AD-BGABL
Backlight

AD-STL28-125
Lateral viewing adapter

Others
φ3.3~6.3mm L120~275mm

ST-G Series Stands / Stages

STAND

High-precision stand
- Base plate and pole section (ST-G)
- High-precision block (FB-M)

Motorized Z-Axis High Precision Stand
- Base plate and pole section (ST-G)
- Motor block (FB-E)

STAGE•UNIT

XY stage unit
- XY stage block (XY-GX)
- Stage block (XY-C)

XY stage unit for transmitted lighting
- XY stage for transmitted lighting (XY-GBX)
- Stage block for transmitted lighting (XY-CB)
- Fiber for transmitting unit (R578)

High-precision angle stand
- Base plate and angle pole section (ST-GA)
- High-precision block (FB-M) and XY stage (XY-G)

Motorized Z-Axis Free Angle Stand
- Base plate and angle pole section (ST-GA)
- Motor block (FB-E) and XY stage (XY-G)

Standard Stands / Stages

STAND

ST-HE
Standard stand

ST-HL
Large stand

STAGE•UNIT

AS-XYL
Large slide stage

AS-XY
XY stage

AS-BH
BGA PCB holder

XY-GE-US/CT-X4-US
Auto XY Stage/
Controller

■ included in the microscope package.

Specifications

Main Control Unit (Basic Functions)

Camera	Imaging Device	1/1.8-inch, 2.11 Mega-pixel CCD Sensor
	Scanning Mode	Progressive Scan
	Total Pixels	2.11 Mega-pixels 1688 (H) x 1248 (V)
	Effective Pixels	2.01 Mega-pixels 1688 (H) x 1236 (V)
	Visual Pixels	1600 (H) x 1200 (V)
	Frame Rate	24 Frame at 1600 x 1200 Pixel Resolution
	High Dynamic Range (HDR)	32 Bit Resolution Process and 16 Bit Resolution Output
	Electronic Shutter	AUTO (1/24 ~1/100000)
		MANUAL (8, 4, 2, 1, 1/2, 1/4, 1/8, 1/24, 1/60, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/15000)
	Supercharge Shutter	Preference Setup (17 ~ 1/100000)
	Gain	Auto (0dB ~ 6dB), Manual (0, 3, 6, 9, 12dB), OFF
	White Balance	Auto (One Push), Manual (R, B)
	Camera Cable Length	2 Meter (Option: up to 10 meter extension)
	Back-Focus Adjustment	NOT Required
Image	Format	Exif-JPEG (compressed), Exif-TFF (non-compressed), BMP (non-compressed)
	Maximum Pixel Resolution	58 Mega-pixels - 8600 (H) x 6600 (V) (Non-Tiled Image)
	Maximum Pixel Size	225 Mega-pixels - 15000 Pixels (H) x 15000 Pixels (V) (Tiling Image)
	Movie Format	AVI (non-compressed), WMV (compressed)
Monitor	Display Size	Full HD LCD 21.5" Monitor
	Panel Size	18.75" (H) x 10.56" (V) - 476.2 (H) x 268.11 (V) mm
	Pixel Pitch	0.01" (H) x 0.01" (V) - 0.248 (H) x 0.248 (V) mm
	Number of Pixels	1920 (H) x 1080 (V)
	Display Color	Approx. 16,770,000 colors
	Brightness	300cd/m2 (typical)
	Contrast Ratio	1000:1 (typ)
	Viewing Angle	170° (Horizontal), 170° (Vertical)
Light Source	Lamp	High Intensity LED
	Lamp Life	30,000 hours (Average)
	Color Temperature	5700K
Output	Video	Analog RGB / Display Port (Requires higher than 1920x1080 Pixels)
	Step Motor	Z-Axis Step Motor Controller Port (5 Phase Motors Driver Integrated)
	Rotary Head	DC Motor Controller Port
Input	ACS Terminal	ACS Sensor Connection Port
	Keyboard and Mouse	Support 2.0 USB Keyboards and Mouse
	External Remote	Foot Switch (Freeze / Capture Image) Port
	Remote Device	Remote Device (CT-R01)
	Extra Controller	RS-232C Connector Port
Interface	LAN	10BASE-T/100BASE-TX/1000BASE-T
	USB 2.0	6 Ports (2 x Side, 4 x Back)
Storage Capability	Hard Disk Drive	500 GB Hard Drive (300 GB of Recording Capacity) Approx. 1,500,000 Images (compressed) to Approx. 50,000 Images (not compressed)
	Other Drives	USB 2.0 external CD-R/RW, DVD±R/+R, DVD/±RW/-RAM, HDD
Power Supply	Rated Voltage	AC100~240V, 50/60Hz
	Power Consumption	400W
Environmental Resistance	Ambient Temperature	5° C to 40°C (no freezing or condensation)
	Storage Temperature	-10° C to 50° C (no freezing or condensation)
	Relative Humidity	25 to 85% RH (no condensation)
	Atmosphere	Corrosive Gas Prohibited
Weight	Main Unit	Approx. 14 kg
	Camera	Approx. 1 kga
	Remote Device (CT-R01)	Approx. 0.5 kg
Dimensions	Main Unit	20.67" (W) x 17.51" (H) x 8.2" (D) - 525 (W) x 445 (H) x 210 (D) mm

Optional Motorized Z-Axis Specifications

FB-E	Stage Stroke Distance	30 mm (1.18") Motor / 85 mm (3.34") Manual
	Resolution	0.05 um (0.002 Mil) / pulse - 5 Phases Motor
	Repeatability	0.5 um (0.23 Mil)
	Weight	1 kg

Numerous Functions

Observation Settings	Camera Preview Function (displays automatically adjusted image previews)
	Auto Camera Settings / Camera Image Settings
	Mode Function (save camera settings)
	Auto Calibration Select (ACS) (zoom mag is automatically relayed to the system)
	Edge Enhancement Function
	Hue Correction and Chroma Correction Setting including Chroma ON/OFF
	Gamma Correction / Contrast Settings including Live Anti-Halation Mode
	Camera Shake Correction
	Brightness Level
	Light Source ON/OFF and adjustable lighting intensity
	White Balance (Auto / Manual)
Observation Tool and Enhanced Digital Processing	Quick Focus (Quick extended depth composition)
	Auto Focus (Point Focus) - Just Double Click
	HDR (High Dynamic Range) Function / HDR Preview Function
	Anti-Halation Function / Anti-Halation Preview Function
	Focus Control (Auto Z-axis controller) / Focus Indicator
	Rotary Head Control (Visual 3D image controller)
	Real-Time Digital Zoom
	High-Resolution Image Function
	Grid Settings (Various Functions are available)
	Image Adjustment (contrast, edge enhancement, noise removal, binarizing)
	Custom Tool Bar and Quick Function Key on Remote Device
2D Measurement Function	Distance, Angle, Radius, Diameter, Area, etc.
	High Resolution Measurement
	Auto Calibration (Auto / Manual) / Calibration Data Protection / Custom Lens List Setting
	Automatic Measurement (Auto-Count, Auto-Area, Auto-Edge Detection)
	Scale Display (Metric/English)
	Statistic Data Output from Measurement Result
	CSV output (Measurement Result)
	Image Data Parameter
3D Measurement Function	Depth Composition: AMF3D merge function: Auto Multi-focus 3D Merge function
	Depth Composition: APS function: Auto-Positioning function
	3D Multi-Focus (Quick 3D, Semi-Auto, Full-Auto, Manual) / 3D Model Preview Function
	HDR and Anti-Halation 3D Model / 3D Model Preview Function
	3D Display (Original Color / Wireframe / Pseudo Color Display)
	3D Model Illumination Simulation Function
	3D Profile Measurement (Height, Length, Angle, Radius etc.) on 3D Model Image or 2D Image
	3D Profile Roughness Measurement
	3D Volume and Area Measurement
	3D Image Height Point Measurement
	3D Image Map CSV Output (Import to Various 3D application Software)
	3D Model Level Correction / Noise Filter and Removal
Tiling	2D Tiling (Up to 15000 x 15000 pixels)
	3D Tiling (Up to 10000 x 10000 pixels)
Recording	Capture Still Image (1600×1200, 1440×1080, 1200×960, 1024×768, 800×600, 640×480)
	High-Resolution Image (8600×6600, 6400×3600, 3200×2400, 2400×1800)
	Movie - 1200x1600 (15FPS), 800x600 (24FPS) including Time Lapse (Timer Recording)
	Cropping Image
Library	Browser
	Explorer
Display	Split Monitor (Horizontal, Vertical, 4 window splitting) - All Functions are accessible
	Turning Over, ±90 Rotation
	Comments / Annotation
	Grid, Scale, Date, Comments, Annotation, Image Information
Utility	Easy Report Function and Export with Excel Format
	System / User Settings / Network Settings
	Password Protection (Calibration / User setup)
	Language Setting (English, Japanese)
	Help (Pop-up User Guide / Manual) / Version Information
	Printer / Compatible with a Foot Switch
Additional Software for PC	Free 3D Image File Viewing Software

[Compliance with the RoHS Environmental Protection Program]

Hirox is compliant with the [RoHS Directives] based on the fundamental principles and plan stated below. These directives regulate goods manufactured after October 2006 that use hazardous substances that have an adverse effect on the environment or human life.

■ Fundamental Principles: Recognizing that preservation of the environment is the greatest problem facing the human race, Hirox is working with all of its divisions to reduce its environmental impact.

■ Plan: In order to reduce the environmental impact of all manufacturing and consumption practices related to the production and sale of our digital microscopes as well as future products and services, Hirox is pursuing an environmental management program striving to achieve harmony with the environment.

RoHS Directive: Known as the "Directive for the reduction of the use of certain hazardous substances in electrical and electronic equipment." It is effective in all areas of the EU. The use of the following six hazardous substances in electrical and electronic equipment is regulated: Pb (lead), Cd (cadmium), Hg (mercury), hexavalent chrome, PBB (polybrominated biphenyl), and PBDE (polybrominated biphenyl).