KEYENCE

INSTANTLY OBSERVE ANY OBJECT
ENTIRELY IN FOCUS

THE NEW STANDARD FOR MICROSCOPES

DIGITAL MICROSCOPE VHX-5000 QUICK GUIDE

View any area completely in focus in less than a second
Advanced functions eliminate the need for focus adjustment



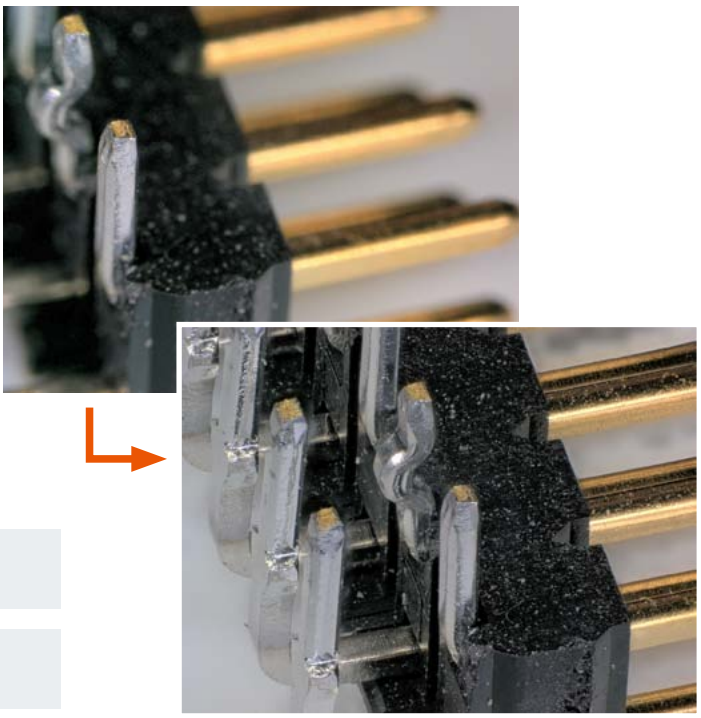
VHX
DIGITAL MICROSCOPE

VIEW ANY AREA COMPLETELY IN FOCUS WITH REAL-TIME DEPTH COMPOSITION

Due to the high frame rate of its camera, the VHX can quickly scan through the focal range of a sample and recognize areas of focus to build a fully-focused image. This provides intuitive and instant focusing, and satisfies the universal need for focused magnified observation.



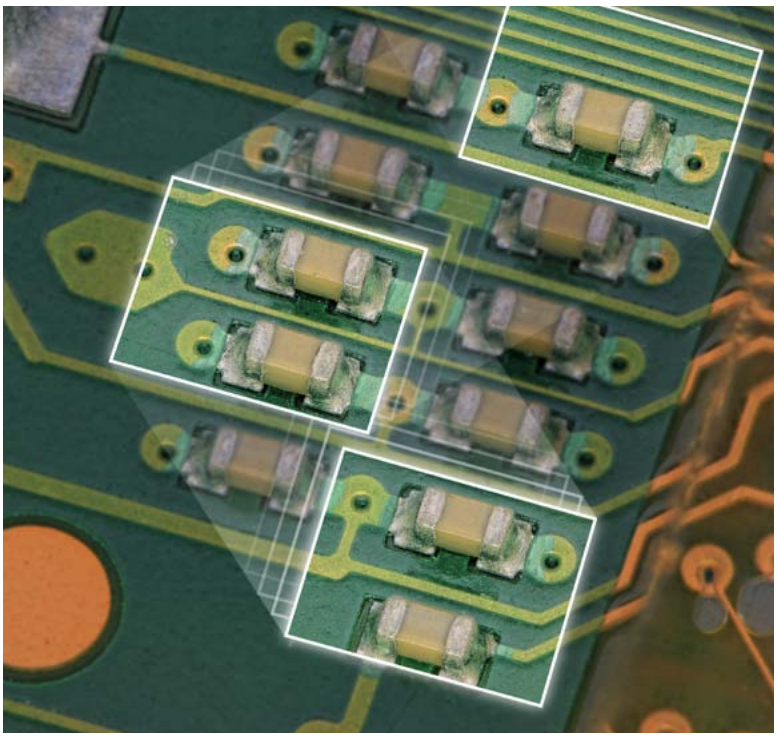
You can observe a fully-focused image instantly by just moving the motorized X-Y stage to a desired area.



Connector pins (50x)

Instant full focus eliminates manual adjustments

Faster observation and more thorough analysis using increased sample data





No need for focus adjustment



No need for manual depth composition

FULLY-FOCUSED OBSERVATION WITHOUT ANY USER ADJUSTMENTS

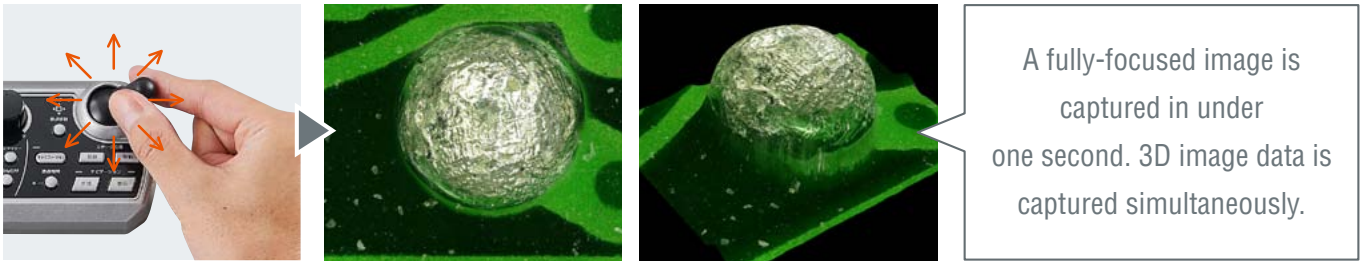
A fully-focused image can be captured in less than one second. To observe another area of interest, just move the stage and the system will automatically generate a fully-focused image of your target. The VHX has revolutionized observation by providing fully-focused images of objects without the need for focus adjustments or manual depth composition.

CONVENTIONAL



Select the field-of-view... adjust the focus... move the lens through the z range for composition... finally obtain a fully-focused image

VHX-5000

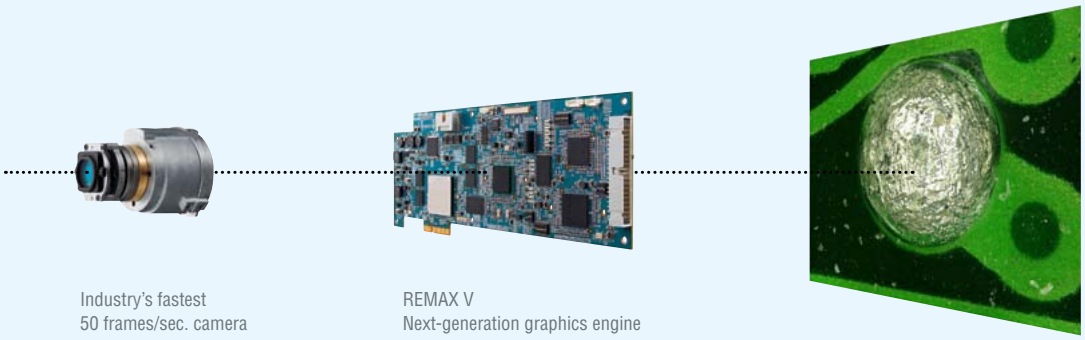


Just select the area to view... view a fully-focused image... view a 3D image

A fully-focused image is captured in under one second. 3D image data is captured simultaneously.

KEYENCE'S ORIGINAL DIGITAL FOCUSING TECHNOLOGY

The industry's fastest, 50 frames per second camera, sends out a large amount of image data with every focus position, and the REMAX V next-generation graphics engine processes this data at a super-high speed. This technology identifies the data with the best focus for each pixel and generates a fully-focused, magnified image instantly on the screen.

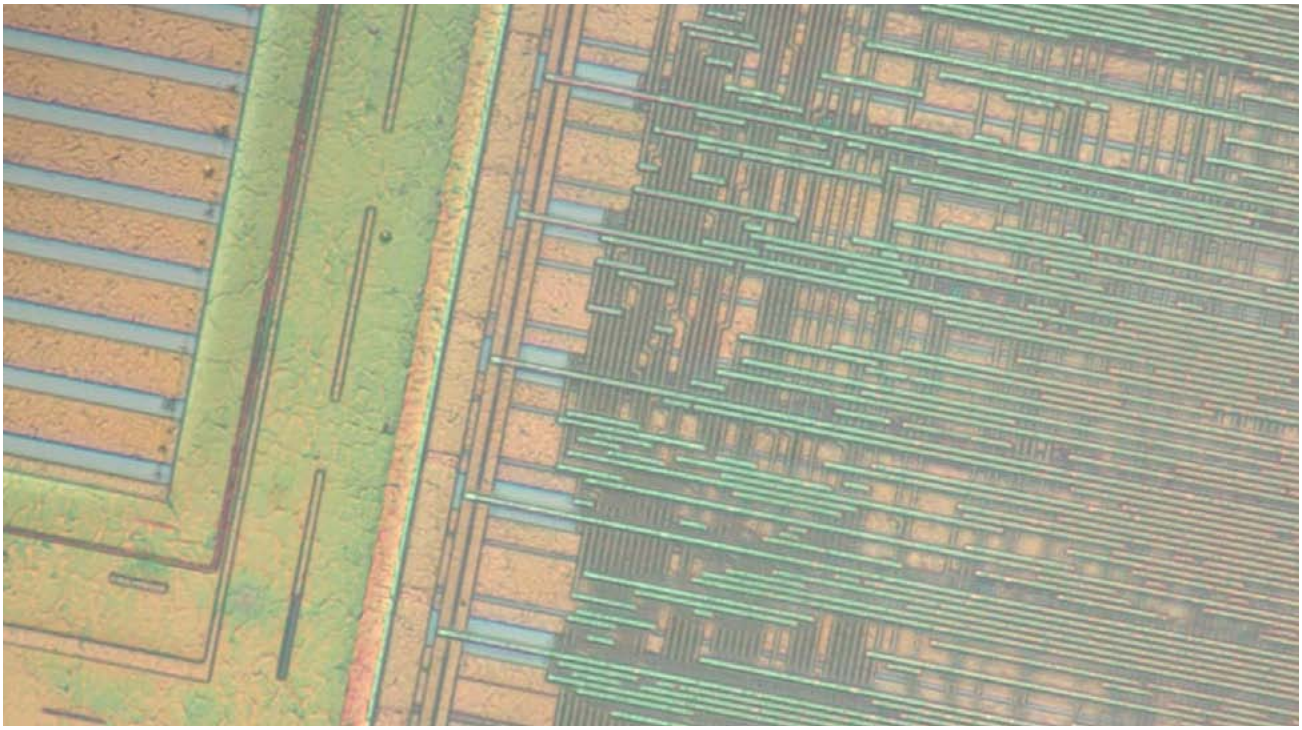


Industry's fastest 50 frames/sec. camera

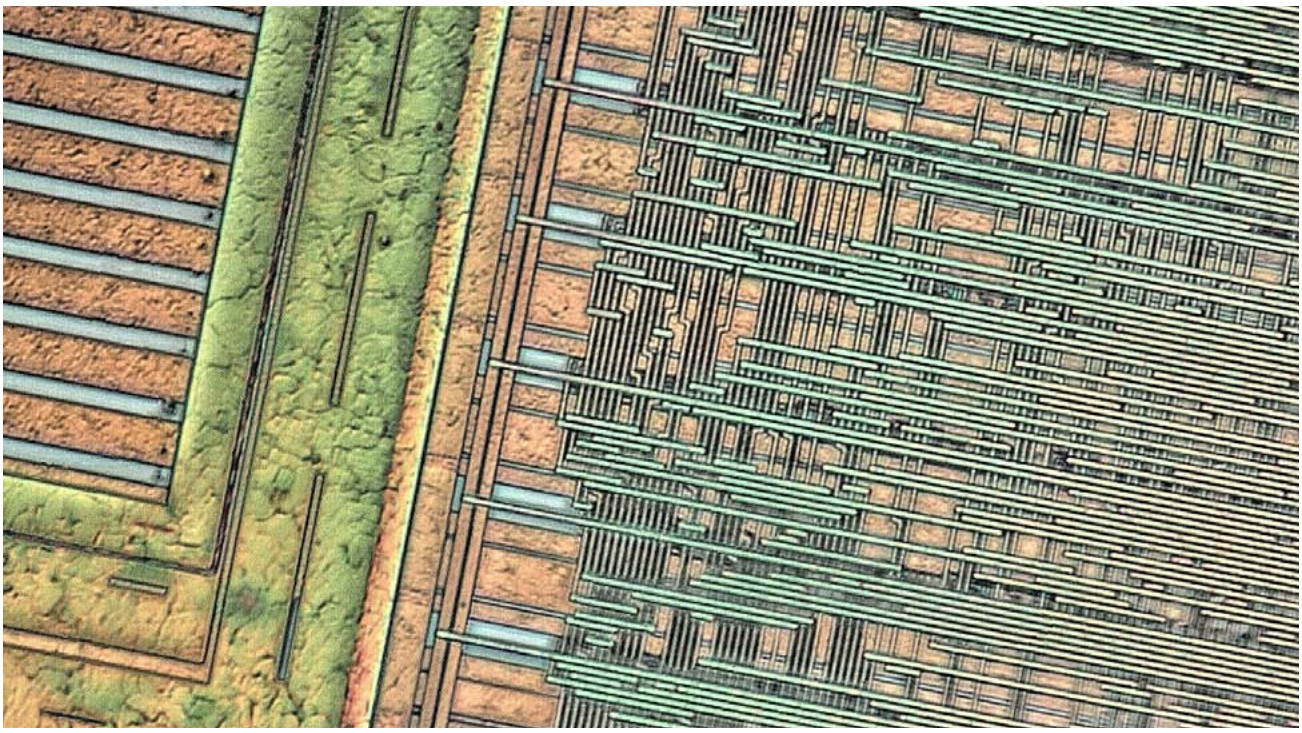
REMAX V Next-generation graphics engine

IMPROVING IMAGE RESOLUTION: HIGH-RESOLUTION HDR

A high-resolution image is obtained by using short-wavelength light and the HDR (High Dynamic Range) function to capture multiple images at varying shutter speeds. This produces a high color gradation image with high resolution and sharp contrast that was previously impossible to obtain.



Normal observation of IC (1500x)



High resolution HDR observation of IC (1500x)

SHORT-WAVELENGTH FILTER ACHIEVES HIGHER RESOLUTION
PIXEL SHIFT TECHNOLOGY

The optimal wavelength of light is selected based on the characteristics of the lens to capture sharp images with minimal chromatic aberration. By combining short wavelength light with KEYENCE's original pixel shift technology, image resolution can be increased by up to 25%.

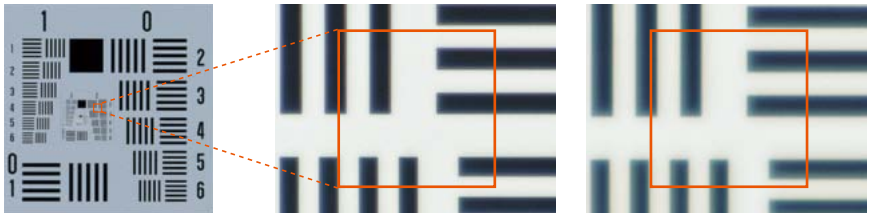
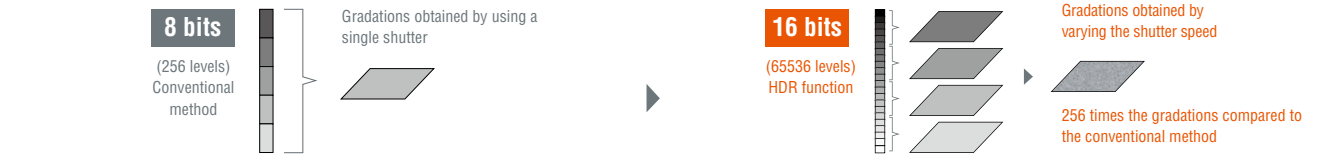


Chart | High resolution observation | Normal observation

HDR+ FUNCTION HDR High Dynamic Range

The camera captures multiple images at different brightness levels by varying the shutter speed, and then produces an image with a high level of color gradation data. This allows for clear observation of targets with glare or low contrast that would be impossible to image accurately with traditional microscopes. A new algorithm that accurately represents the colors of the target makes observation more similar to that with the naked eye.



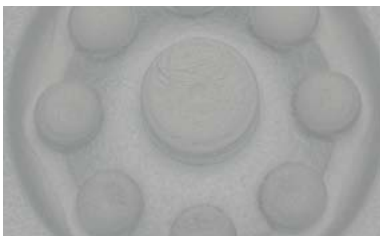
DISADVANTAGES

- The narrow range of brightness levels causes glare in areas that are oversaturated.
- Subtle changes in contrast cannot be visualized because of coarse color resolution.
- Colors differ between what the human eye sees and the captured image.

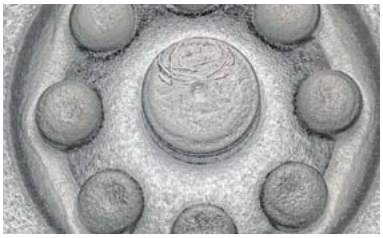
ADVANTAGES

- A wider range of brightness levels diminishes the perceived glare.
- Enhances low contrast areas for improved detail.
- Natural colors are accurately reproduced.

CONTRAST ENHANCEMENT

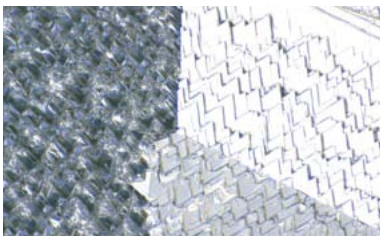


Conventional [8 bits]

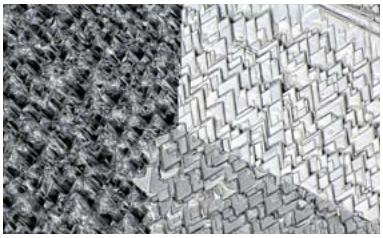


HDR [16 bits] Plastic cap (50x)

GLARE REMOVAL

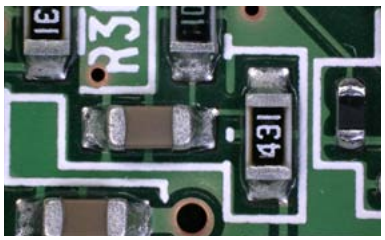


Conventional [8 bits]

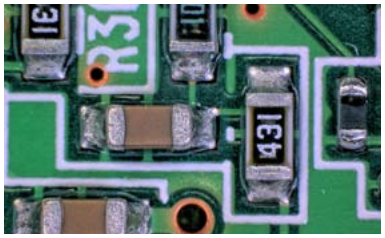


HDR [16 bits] Solar cell (50x)

COLOR REPRODUCTION



Conventional [8 bits]



HDR [16 bits] PC board (50x)

PRODUCT CONCEPT

ADVANCED USABILITY

The VHX covers all basic analysis operations - observation, image capture, and measurement - in a single unit.
Achieves fast, easy, and accurate imaging that cannot be accomplished with traditional optical microscopes.



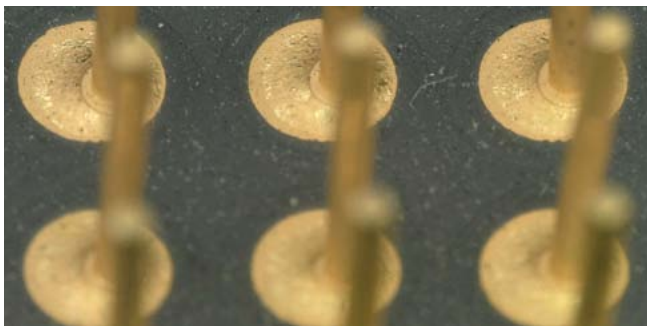


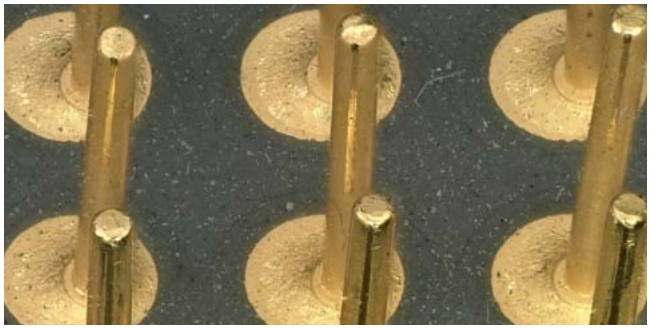
Even large samples can be observed non-destructively.

OBSERVATION

DEPTH-OF-FIELD 20 TIMES GREATER THAN OPTICAL MICROSCOPES

This is one of the fundamental features of VHX Digital Microscopes that greatly increases ease-of-use.
The lenses, camera, and graphics engine are designed to optimize the relationship between depth-of-field, resolution, and brightness.

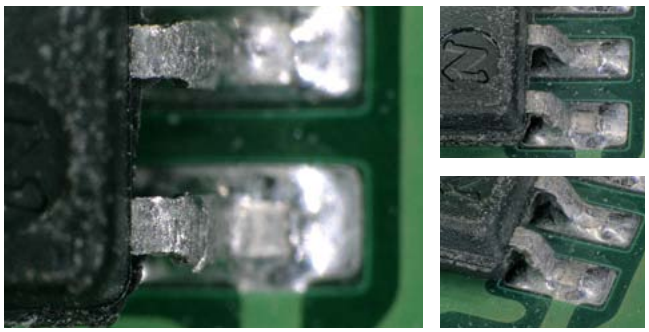




Pins (100x)

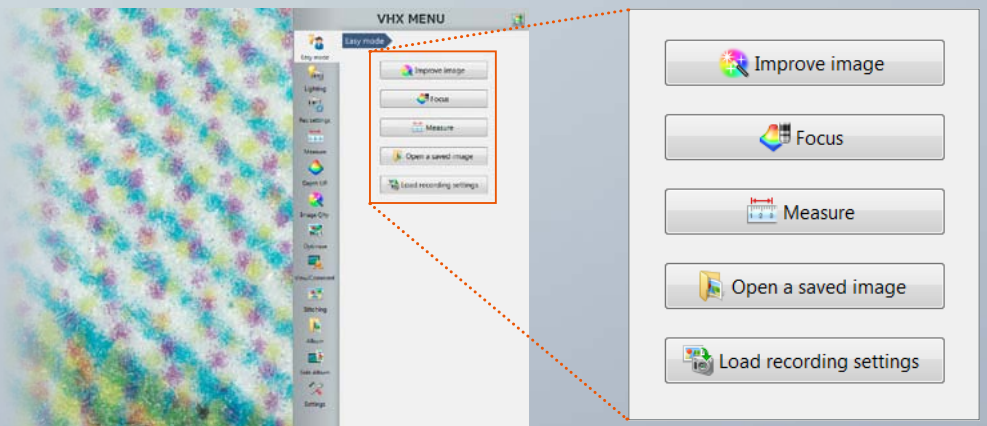
MULTI-ANGLE OBSERVATION

View an object from any angle by tilting the lens up to 90 degrees and rotating the stage 360 degrees. Because the stand and stage can be moved instead of the actual part, observing a target from various angles can be done without having to manipulate the part by hand.





EASY MODE PROVIDES EVERYONE WITH QUICK ACCESS TO ADVANCED FUNCTIONS



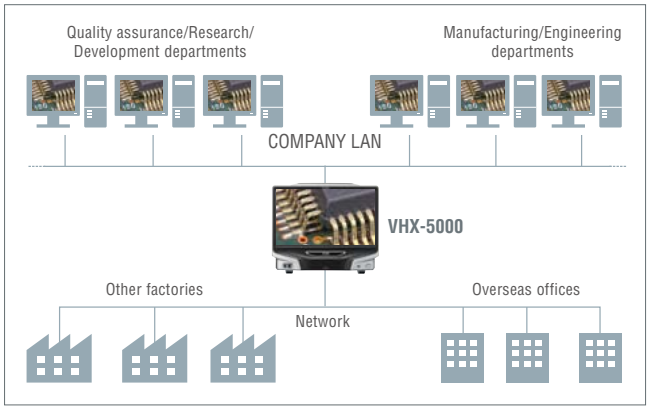
Easy Mode contains frequently used functions to allow everyone to perform analysis under optimal conditions. Even novice users can effectively utilize advanced functions.

IMAGE CAPTURE

RAPIDLY SAVE IMAGES AND DATA

The built-in 500 GB HDD allows images, videos, and measurement data to be saved to the system. The saved files can be viewed on a PC or other devices easily via LAN or USB. Templates can also be created to generate reports automatically.

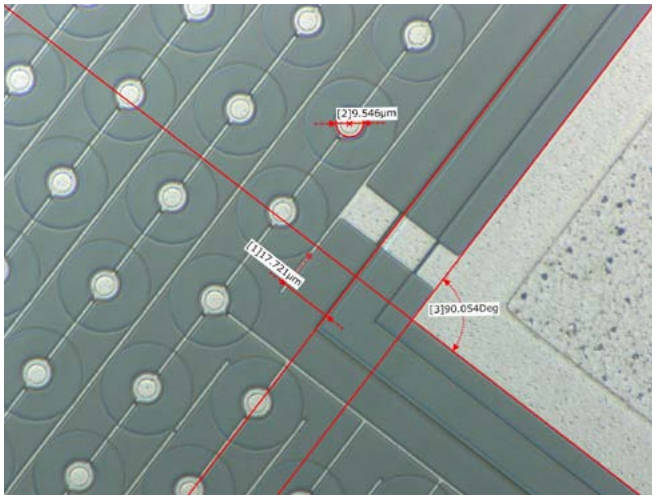


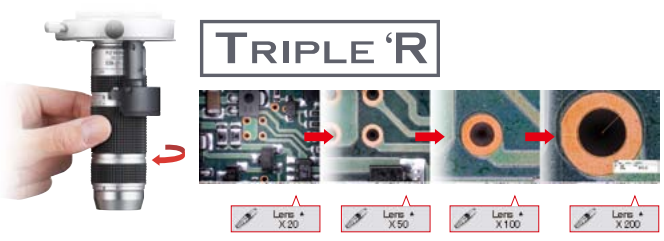


MEASUREMENT

MEASURE DIRECTLY ON THE SCREEN

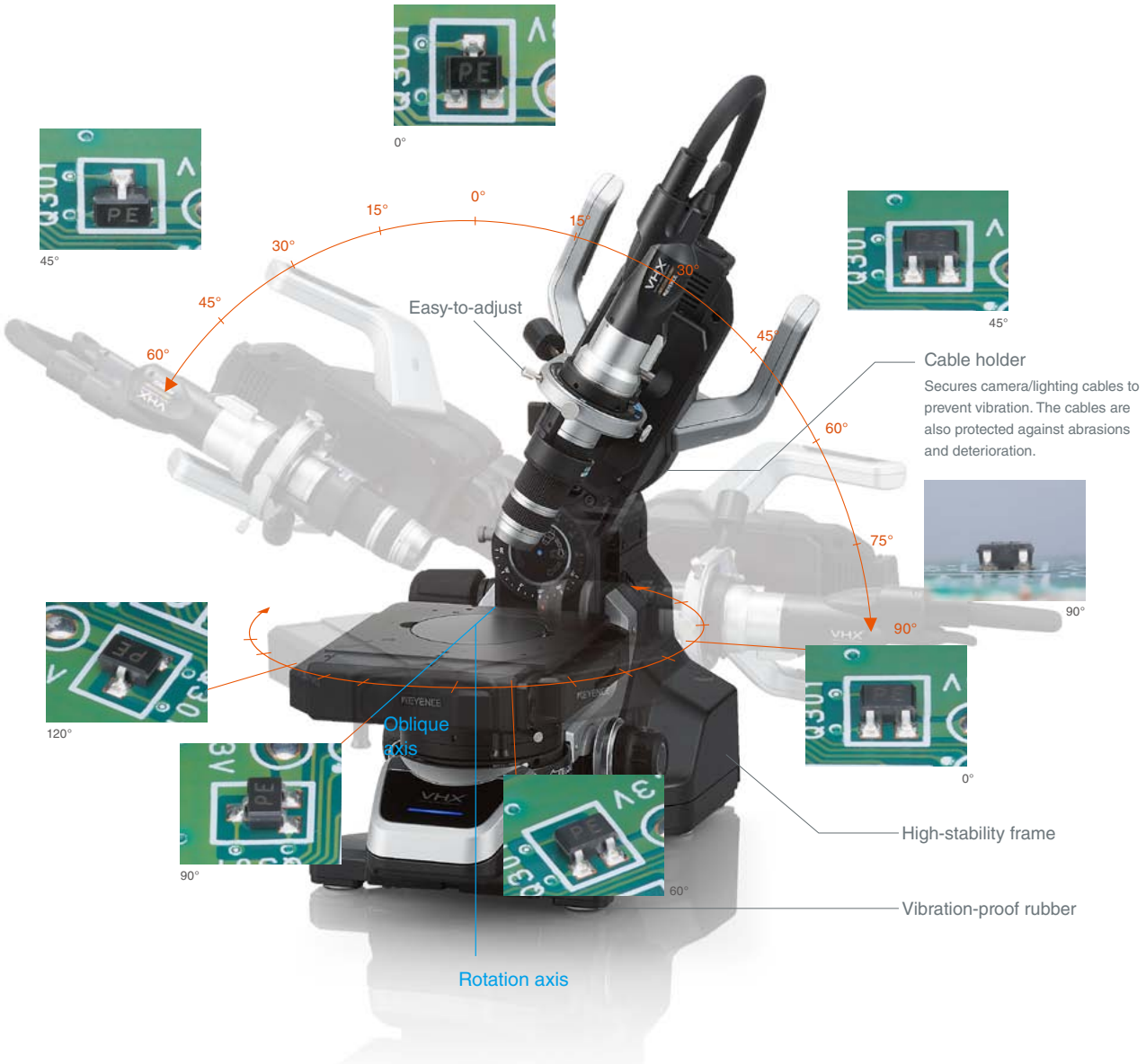
Dimensional measurements can be made on the microscope by just clicking the area to be measured with the mouse. Measurement data is stored with the image file for easy information sharing, and results can even be exported as a CSV file.





FREE-ANGLE OBSERVATION SYSTEM (XYZ MOTORIZED)

This versatile stand includes XY and Z axes controls for adjusting position and focus, and the stage can be rotated freely. A custom mechanism allows the camera and lens to be tilted around the object being viewed, while still keeping that object perfectly centered in the field-of-view.



FASTER Z-AXIS MOVEMENT

The maximum speed of the motorized Z-axis stage has increased to 17 mm 0.67"/sec. This significantly improves the auto-focus and depth composition speeds.

BETTER VIEWING REPEATABILITY

A new locking mechanism has been incorporated into the stand to ensure that the lens is set to 0 degrees.

IMPROVED SEISMIC CAPACITY

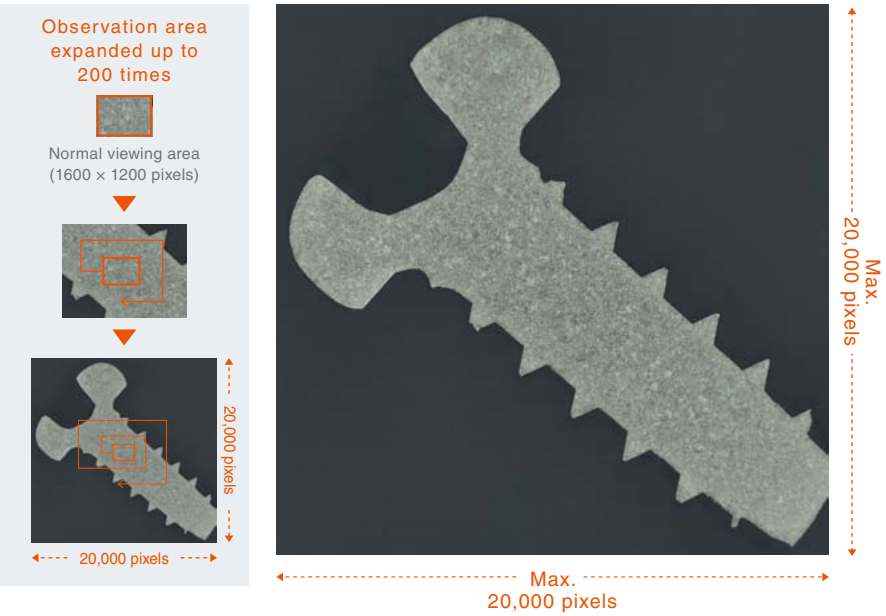
By using an aluminum die-cast frame for the stand, vibration-resistance has increased twofold over previous models.

BUILT-IN TILT ANGLE SENSOR

A built-in sensor detects the tilt angle of the stand. Now it is possible to display the angle on the observation screen or to save the condition during recording.

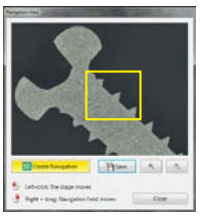
HIGH-RESOLUTION, WIDE AREA IMAGING: ULTRA HIGH-SPEED IMAGE STITCHING

With any optical system, as the magnification is increased the field-of-view decreases. The VHX incorporates an image stitching algorithm with a motorized XY stage to automatically move and stitch together adjacent images in real-time. This will provide users with a high-resolution (up to 20,000 x 20,000 pixels), overall view of the target, while preventing any misalignment typically associated with other stitching techniques.



NAVIGATION FUNCTION

The stitched image can be utilized as a navigation screen. Clicking on the position that you wish to observe will automatically move the stage to the selected location. The current field-of-view is outlined in yellow and the previously viewed field-of-view is outlined in red, making it easier to maneuver the stage. This function is also extremely useful for understanding which area of the target is being observed when imaging at a higher magnification.

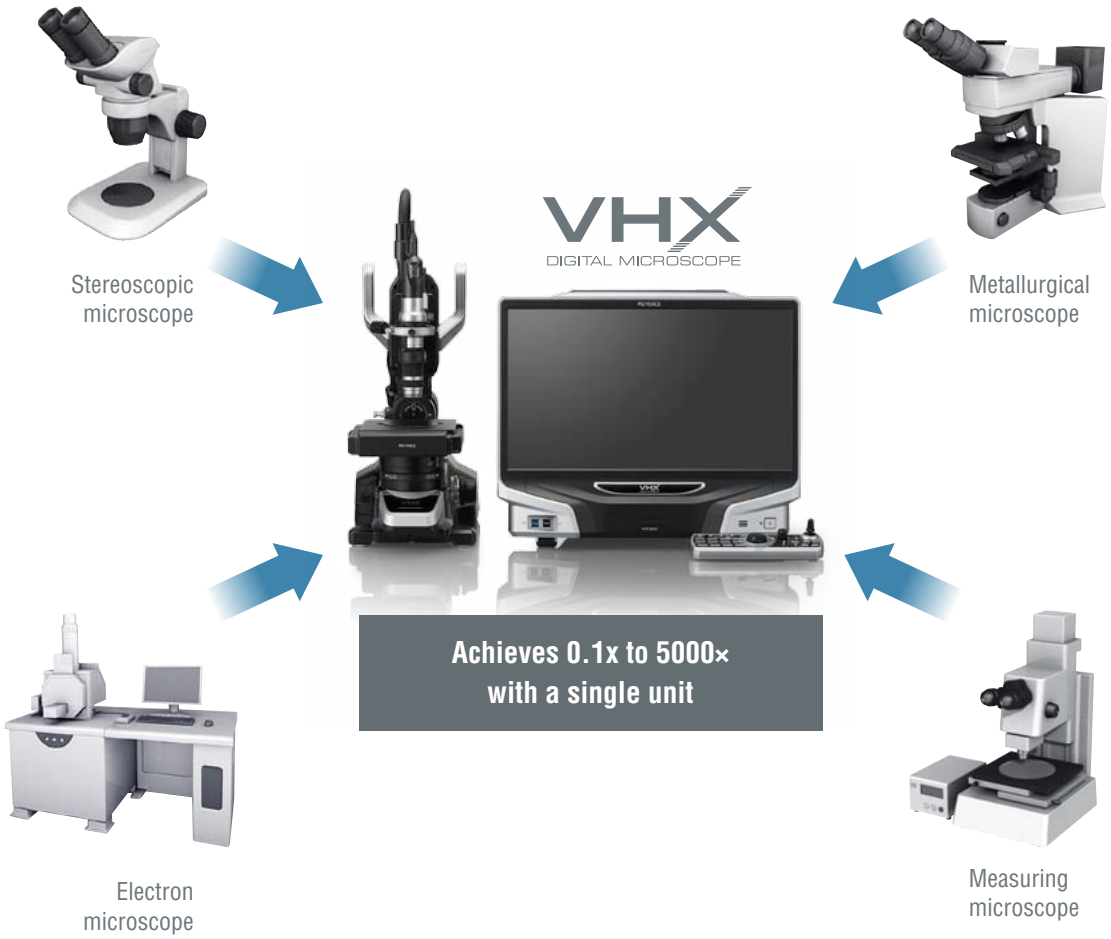


AUTO CORRECT FUNCTION

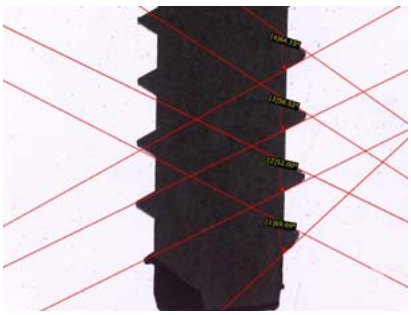
Produces a high-quality stitched image by automatically adjusting for brightness changes that can result from aberrations around the periphery of the lens.



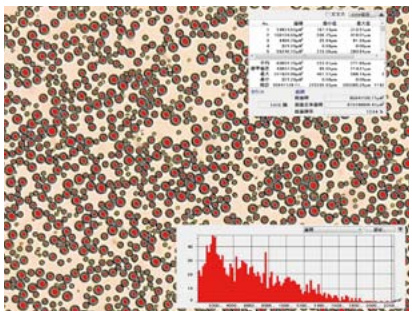
Conventional | Auto Correct



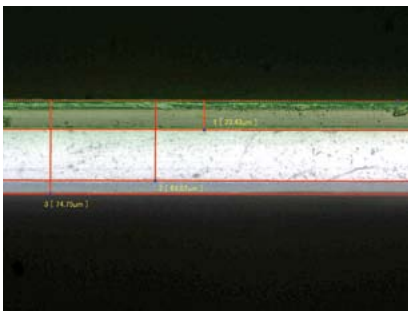
MEASURING MICROSCOPE



Screw measurement (50x)



Area measurement of emulsion (1000x)



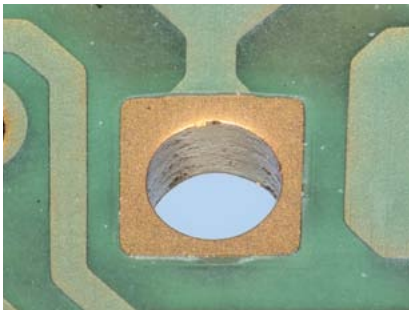
Cross-section of multi-layered film (1000x)

APPLICATIONS

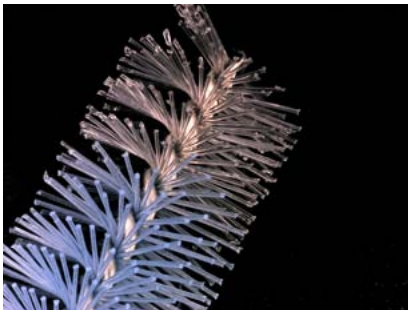
STEREOSCOPIC MICROSCOPE



Solder (100x)



PCB through hole (100x)



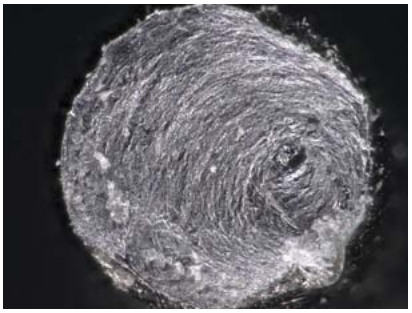
Brush (50x)



Gear (50x)

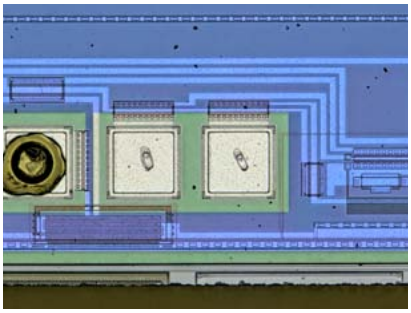


Fiber (50x)

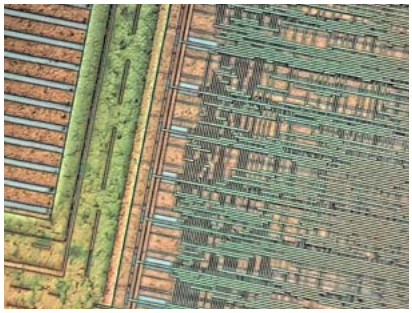


Fractured metal (200x)

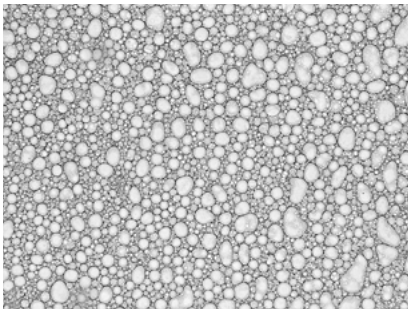
METALLURGICAL MICROSCOPE



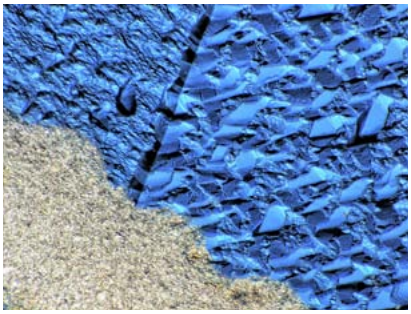
CCD (500x)



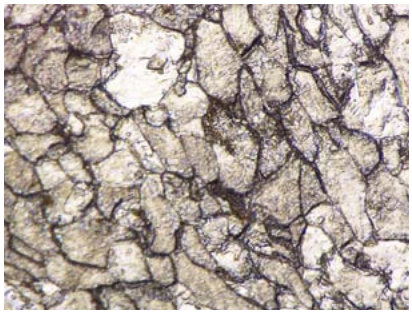
IC pattern (1500x)



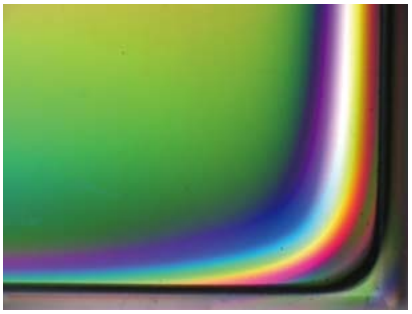
Emulsion (500x)



Solar cell (1000x)



Metal structure (2000x)



Residual stress (700x)

Providing non-contact profile and roughness measurements on nearly any material

3D LASER SCANNING MICROSCOPE
VK-X100/X200

- 200× - 24000× magnification
- 0.5 nanometer Z-axis resolution on almost any material
- High-resolution, large depth-of-field observation
- Profile and roughness measurements with zero sample preparation
- Measures thickness and uniformity of clear layers
- Acquires data on angles over 85 degrees
- Perform measurements with just a single click of the mouse



Measure form and contour over a wide area

NEW

ONE-SHOT 3D MEASURING MACROSCOPE
VR-3000

- Non-contact 3D measurement in as little as four seconds
- Place and press operation reduces user measurement variability
- XYZ calibration and traceability
- Measure profile, roughness, waviness, and other XYZ measurements
- Functions as an easy-to-use microscope
- Various tools and templates to improve accuracy and reduce measurement time



All-in-one high-speed imaging solution

HIGH-SPEED MICROSCOPE
VW-9000

- Record at up to 230,000 frames per second
- Fully-integrated system with built-in light source and LCD
- Setup and record in minutes
- Error Monitoring Function automatically detects changes in motion
- Quantify and analyze moving objects
- Provides on-site, magnified observation with microscope functionality



KEYENCE

CALL TOLL FREE | TO CONTACT YOUR LOCAL OFFICE **1-888-KEYENCE** 1-888-539-3623

www.keyence.com

SAFETY INFORMATION
Please read the instruction manual carefully in order to safely operate any KEYENCE product.

KEYENCE CORPORATION OF AMERICA

Corporate Office 669 River Drive, Suite 403, Elmwood Park, NJ 07407 PHONE: 888-539-3623 FAX: 855-539-0123 E-mail: keyence@keyence.com

Sales & Marketing Head Office 1100 North Arlington Heights Road, Suite 210, Itasca, IL 60143 PHONE: 888-539-3623 FAX: 855-539-0123

■ Regional offices

AL	Birmingham	**CO**	Denver	**IN**	Indianapolis	**MI**	Detroit	**NJ**	Elmwood Park	**OH**	Cincinnati	**SC**	Greenville	**TX**	Dallas
CA	N.California	**FL**	Tampa	**KS**	Kansas City	**MI**	Grand Rapids	**NY**	Rochester	**OH**	Cleveland	**TN**	Knoxville	**VA**	Richmond
CA	Los Angeles	**GA**	Atlanta	**KY**	Louisville	**MN**	Minneapolis	**NC**	Charlotte	**OR**	Portland	**TN**	Nashville	**WA**	Seattle
		IL	Chicago	**MA**	Boston	**MO**	St. Louis	**NC**	Raleigh	**PA**	Philadelphia	**TX**	Austin	**WI**	Milwaukee

KEYENCE CANADA INC.

Head Office PHONE: 905-366-7655 FAX: 905-366-1122 E-mail: keyencecanada@keyence.com
Montreal PHONE: 514-694-4740 FAX: 514-694-3206

KEYENCE MEXICO S.A. DE C.V.

PHONE: +52-81-8220-7900 FAX: +52-81-8220-9097
E-mail: keyencemexico@keyence.com

KA1-1024

The information in this publication is based on KEYENCE's internal research/evaluation at the time of release and is subject to change without notice.
Copyright (c) 2014 KEYENCE CORPORATION. All rights reserved.

VHX5000Digest-KA-C-US 1044-1 E611851 Printed in Japan