It's now a "intelligence", beyond a "function"
DIGITAL MICROSCOPE KH-1300
Breathtaking beauty, starting inspections all over again

Analog RGB connection realizes monitor output of 24 frames per second for first time among same-class microscopes
Largest image output among UXGA monitors of 24fps realizes genuine video inspection.

Equipped with IEEE1394.b for the first time in industry, this microscope is capable of transferring high resolution moving image of 15 frames per second to PCs
This microscope realizes video inspection on PC screens for the first time among same-class products.
Use of next-generation high-speed serial bus IEEE1394.b enables high-speed transmission.

DIGITAL MICROSCOPE
KH-1300
**Image that transcends the boundaries of digital expressions**

**Heart-moving world of microscope image**

2.11 million-pixel digital CCD camera was newly developed to reproduce natural colors, to create rich, desired images. The microscope succeeds in realizing the highest frame speeds—RGB output of 24 fps and IEEE1394 icon of 15 fps—and high-resolution, rich color gradation and high-quality image at the same time. Also, for better color reproduction, the microscope uses RGB filters that are coupled with newly designed low-pass filters for high-quality image.

**Newly developed CCD**

**Diagram of back focus fixing screw**

Back focus was designed from scratch to fit newly developed CCD, resulting in further convenience. Focus lock can be released by loosening back focus screw so that various types of lenses can be used. By adjusting indexes, default conditions can be easily recovered.

**Digitial Microscope KH-1300**

**Digital Charge Coupled Device**

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**Low-pass filter**

Passes low frequency and cuts off high frequencies. As a pioneer in microscopes, Hirox produces supreme images based on its knowledge and unique digital imaging technology.

**Interface that connects to the next generation.**

**Transmits high-resolution images thoroughly**

Realizes high-speed transmission of 800 Mbps for the first time in industry. Capable of maximum 15 fps image observations on PC screen.

**Next-generation interface IEEE1394.a**

IEEE1394 (IEEE1394) is seen to replace SCSI I/F as a high-speed hardware interface, with specified transmission speeds of 100 Mbps, 200 Mbps, 400 Mbps. KH-1300 introduces the so-called IEEE1394a, which represents cutting-edge high-speed transmission technology. Equipped with IEEE1394.a, which represents cutting-edge high-speed transmission technology, KH-1300 is able to connect directly to desktop PCs and to produce high-resolution, high-volume moving image at maximum 15fps in a quick and secure manner, helping to create unconventional systems and new observation environment. (43)

For example, the microscope enables not only moving image observations on desktop PCs with a sense of reality, but also preservation of both still and moving images with simple operations. (33)

Various image-related software can also be utilized when playing stored images. (44)

Until now, microscopes had various limitations even though they can be connected to PCs, and have been used chiefly for storing still images. With IEEE1394.a, the usability is improved and a system that can be applied to various scenes is guaranteed.
With abundant image production capabilities, the microscope performs superbly according to the environment.

**Two selections that stimulate minds**

Please pick lights that are best fit for purposes.

**Metal Halide Lamp**
To maximize sensitivity characters of the camera (dispersion characters/300nm-800nm), the visible light spectrum has to be covered on the side of light sources. In order to produce images of all samples thoroughly, metal halide lamp with high color reproduction capability detects samples that cannot be detected by other light sources. In addition, the lamp is able to last about six times the life of conventional products, a quality that makes it more accessible.

**Halogen lamp**
Because vaporized tungsten does not stick to walls and tubes, there occurs no reduction in the maintenance rate of light beams, which is usually caused by blackened glass bulbs, and the illumination level stays the same till the end. Also, a longer life of the lamp is realized by halogen cycles. It is a light source with stable results. It has been introduced in many cases at production sites with a relatively high level of use and other sections close to production lines and can be used under various environments.

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**Reproduces things as they are**

Hirox’s lens and light adaptor produce visual reality.

Through 360-degree rotative mirror, the microscope enables observations full of reality. Instead of tilting the lens, the microscope is easy to use, saves space and helps grasp the shape of an object freely through video inspections. It can be advantageous when a sample comes in a big size.
The MXG series is combining the Hirox MX Mount with the newly developed ACS function: Automatic Calibration Select. This original Hirox function detects and sends the magnification data to the main unit by using one of the smallest high-sensitivity sensors embedded into the lens. The lens calibration value is recognized automatically by the set of KIT-ACS, option (system 2).

**System configuration diagram**

**System 1**
- KA300A (Halogens Lamp specification)
- ACS FUNCTION (Auto Calibration Select)

**System 2**
- System 1 sends the magnification data to the main unit by using one of the smallest high-sensitivity sensors embedded into the lens.
- The lens calibration value is recognized automatically by the set of KIT-ACS.

**System 3**
- System 2 sends the magnification data to the main unit by using one of the smallest high-sensitivity sensors embedded into the lens.
- The lens calibration value is recognized automatically by the set of KIT-ACS.

**System 4**
- System 3 sends the magnification data to the main unit by using one of the smallest high-sensitivity sensors embedded into the lens.

**Specifications**
- **Shooting elements**: CLS model CCD
- **Filter wheels**: 4 plates
- **Frame rate**: 40 frames (RGB output)
- **White balance**: W4300 (5.6 Kev, 6.0 Kev, 6.4 Kev)
- **Shutter**: 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512, 1/1024, 1/2048, 1/4096, 1/8192, 1/16384
- **Image functions**: ... (for detailed setup, refer to manual)
- **Monitor**: 15" monitor
- **Control equipment**: XYZ stage
- **Dimensions**: 311 x 340 x 150 mm
- **Weight**: 3.5 kg

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**System configuration diagram**

**DIGITAL MICROSCOPE**
- KH-1300M (Metal Halide Lamp specification)
- KH-1300H (Halogen Lamp specification)

**DIGITAL MICROSCOPE**
- System configuration diagram
- Specifications

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**System configuration diagram**

**System 1**
- Using RGB connection realizes USG3A300 (300K f/300) image output of 15fps at maximum on PC screens.
- The lens calibration value is recognized automatically by the set of KIT-ACS.

**System 2**
- System 1 sends the magnification data to the main unit by using one of the smallest high-sensitivity sensors embedded into the lens.
- The lens calibration value is recognized automatically by the set of KIT-ACS.

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Appropriate inspection

Technology realized through balance between lens and light

- Sample image

**Application Software**

**IEEEE1394.b picture software (KIT-13b2)**

2 megapixel images taken by KH-1300 are sent at high-speed rate of 800 Mbps to PCs via IEEE1394.b cable. Enables live video inspection of maximum 15 fps, as well as preservation of still image and moving image.

### Setup menu

- Allows detailed settings on display and saving methods for live image, still image and moving image, as well as settings according to the performance of PCs.

#### Still and moving image storage

- VGA (640X480)
- XGA (1024X768)
- SXGA (1280X1024)
- EXGA (1600X1200)

### Easy operation due to tool bar

- One click of mouse allows switching between live image and free image. When the middle of camera is red, it indicates freeze. Blue indicates live situation.
- Click for saving live image or freeze image as still images. Allows images to be saved with ordinary file names but also enables consecutive data storage with consecutive clicks.
- Click for starting to store live image as moving image.
- Conditions of current displays are shown in a simple way. Four modes - Live, Freeze, REC, Error - are displayed

### Abundant 2D measuring software

- Allows various measurements on PC screens. Removes troublesome operations. Capable of high-precision measuring with the use of mouse.

### 3D display software

- Several images stored in PCs are combined and displayed as 3D Image. Offers new inspection scenes with colorful expressions.

### Stage control software (3 axial control)

- Enables high-precision measurement and control by being almost united with the system.

- Measuring mode
- Fiducial alignment functions
- Starting point registration
- Property sheet

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**Sample image**

- Vacuum electrode connection parts
- Solder connection surface
- Metal structure
- A particle (Among liquid)
- BGA

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**Setup menu**

- Allows detailed settings on display and saving methods for live image, still image and moving image, as well as selections according to the performance of PCs.

#### Setup menu

- Still image saved as: TIFF, jpg, bmp/moving Image as avi

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**Vacuum electrode connection parts**

- MXG-2016Z
- AD-2016C
diascopic stand

**Solder connection surface**

- MXG-2016Z
- AD-2016C
- AD-2016LOW
- Stand

**Land peel-off (Pb free)**

- MXG-5040RZ
- AD-5040VLS
- Lighting stand

**IC chip**

- MXG-10C
- OL-350

**Spinal cord nerves of money**

- MXG-10C
- OL-70
- Diascopic stand

**Excessive soldering**

- MX-2016Z
- AD-2016RLM
- Stand

**Whisker**

- MXG-5040RZ
- AD-5040RVS
- Lighting stand

**Metal structure**

- MXG-10C
- OL-140
- Stand

**A particle (Among liquid)**

- MXG-10C
- OL-350
- Polaried transmission lighting

**BGA**

- MX-BGAZ
- Special stand

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3D display software

- Several images stored in PCs are combined and displayed as 3D Image. Offers new inspection scenes with colorful expressions.

### Worktable display

- 3D image display
- 3D wire frame display

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**Sample image**

- Single crystal (super conductor)

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**Optional setup:**

- Needs PC kit/KIT-13b1 for KH-1300 and IEEE1394.b image input board/ZenkumanPFW-86. Maximum display speed of 15fps on PC screens may not be realized depending on CPU specifications.