

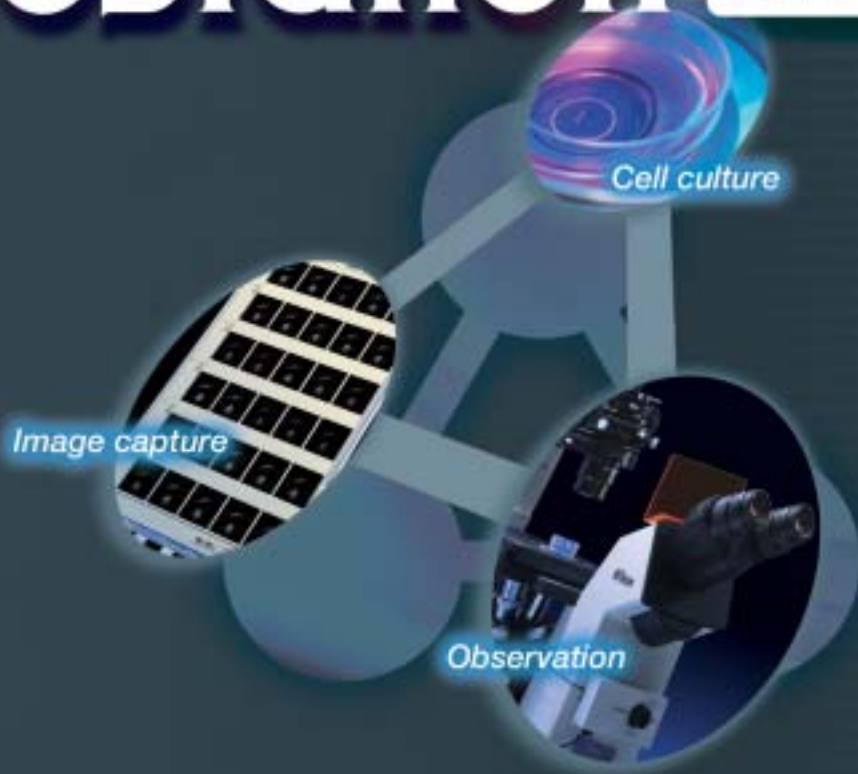


New!



Time Lapse Imaging System

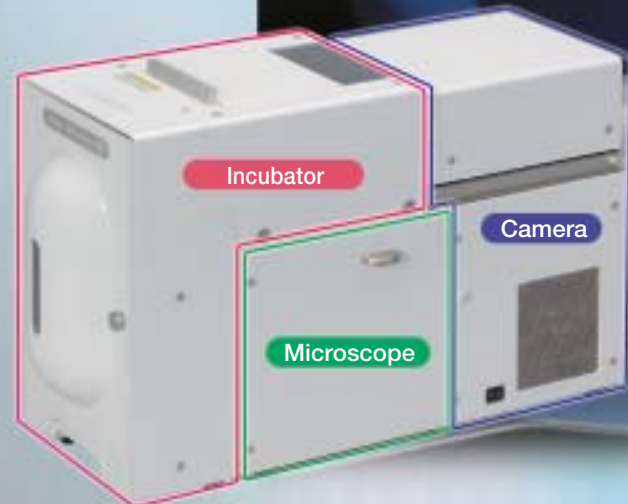
# BioStation IM



**Cell culture, observation and image capture —  
three functions incorporated into  
one single long-term time-lapse imaging system**

**Imaging Solutions for your Cells' Environment**

# All-in-one package allows perfect time-lapse imaging of live cells

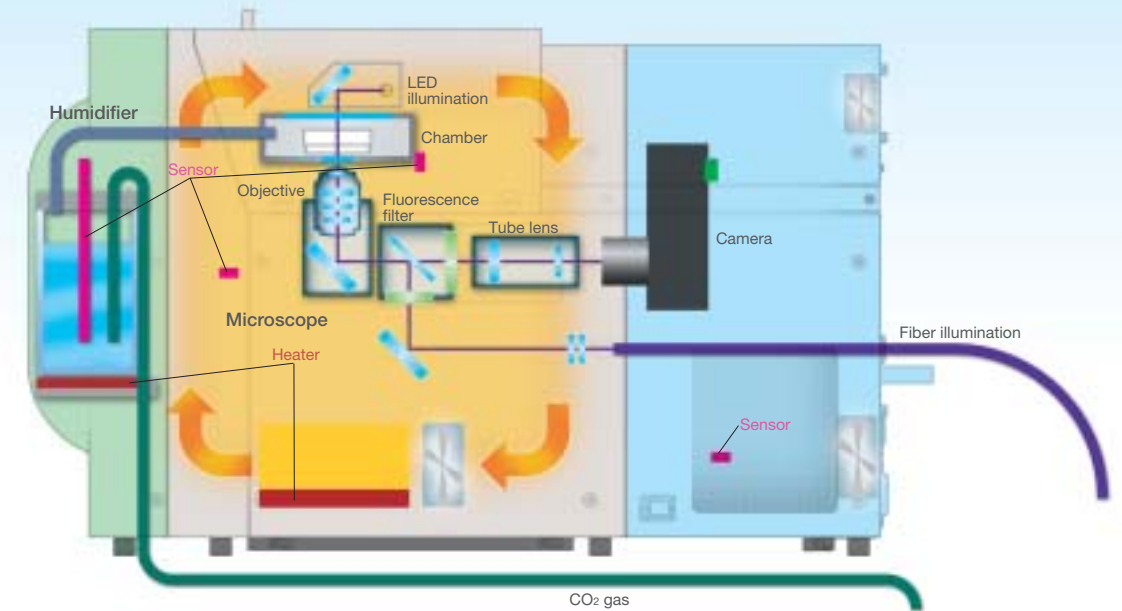


BioStation IM combines an incubator, a microscope and a cooled CCD camera in a compact body, allowing sophisticated time-lapse imaging, which until now has only been achieved with a complex system. As all elements necessary for cell culture and imaging are incorporated into one package, BioStation IM provides a stable environment in which everything from cell culture to image capture can be easily conducted. Moreover, focus drift caused by thermal change and mechanical instability, a common problem during lengthy observations, has been eliminated, enabling reliable time-lapse imaging in an optimal live cell environment.

## Time-lapse imaging in a controlled environment similar to an intravital environment

Cell culture, observation and image capture functions are beautifully integrated. No complex setup or alignment procedures that conventional time-lapse observation systems

require are necessary. BioStation IM provides an excellent cell culture environment coupled with a highly integrated easy-to-use microscope observation system for live cell imaging.



## Minimizing focus drift caused by temperature change

By precisely controlling the temperature of the cell culture unit, specimen unit and microscope unit with built-in heaters and fans, focus drift during lengthy time-lapse observation has been vastly reduced, enabling reliable time-lapse imaging. Moreover, BioStation IM boasts a newly developed focusing mechanism made from thermal-stable materials that are not affected by heat, therefore avoiding thermal expansion. Focus drift in the Z-axis direction has been reduced to a bare minimum.

## Minimizing focus drift caused by mechanical instability

Vibration of the specimen culture dish due to stage movement not only causes focus drift but can also change the optimum imaging point. BioStation IM's revolutionary motorized mechanics moves the objective lens instead of the stage. The objective lens can be moved in X-, Y- and Z-axis directions, so a broad 6mm x 6mm area can be observed without moving the dish at all. As the culture plate is fixed, media does not shake, thus there is no stress on cells, so it is possible to observe them in their original state in perfect focus.



Motorized objective lens movable in X, Y and Z directions

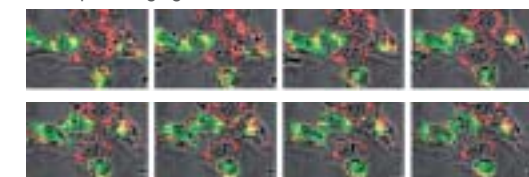
## Complete environmental control

BioStation IM contains four sensors that automatically maintain a stable internal environment of 37°C. In addition, the humidifier maintains a humidity level of 95% or higher (saturated vapor pressure) and the CO<sub>2</sub> gas mixer provides a stable supply of CO<sub>2</sub> of 5% concentration.



## Multichannel, multipoint time-lapse imaging modes

The BioStation IM's phase contrast and fluorescence imaging modes are motorized. Since all optical and mechanical components are motorized, multichannel, multipoint and magnification changes are all possible during time-lapse imaging.



# Easy operation

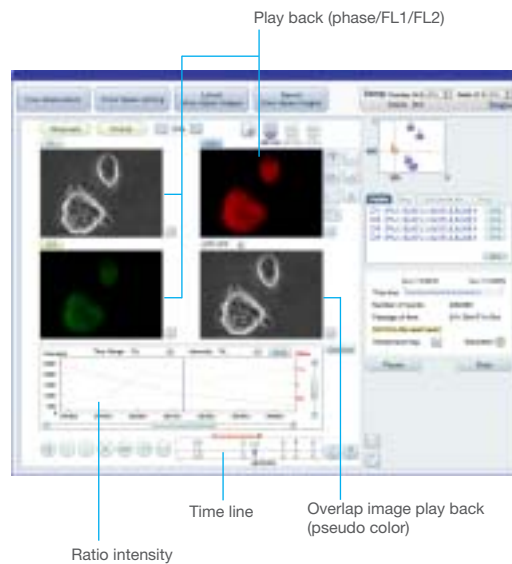
## Easy operation from a PC

BioStation IM provides fully motorized control from a PC, allowing users who are not accustomed to operating a microscope or camera to easily conduct observations and imaging. The user has only to set the culture dish in place and begin image recording. Everything from cell management to time-lapse imaging is automatically managed and accomplished.

### •Live image screen



### •Time-lapse-acquired image screen



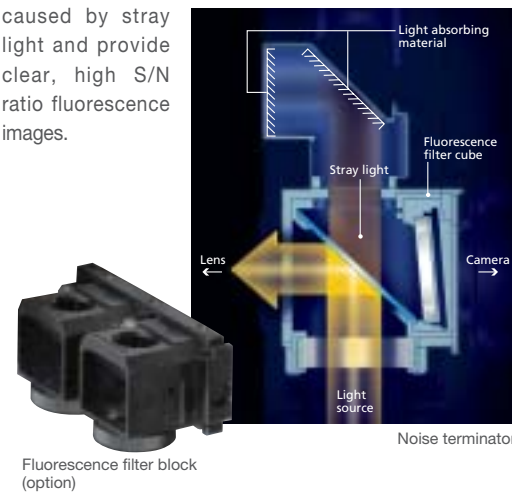
## Ergo controller with operational feel like a microscope

An ergo controller that allows X, Y, and Z directional movement with an operational feel similar to a microscope comes standard. It also allows changeover of magnifications, fluorescence filters, imaging/observation methods, and fluorescence shutter ON/OFF.



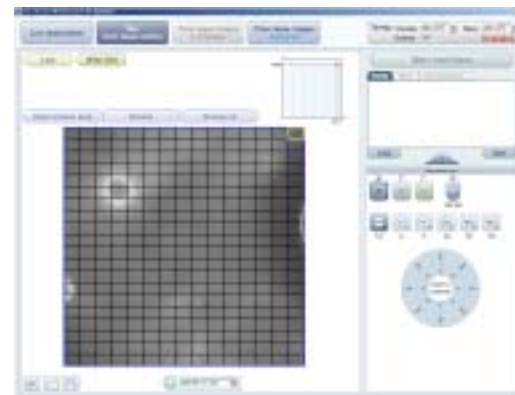
## Clear, high-contrast fluorescence observation

BioStation IM can hold two fluorescence filter blocks. Nikon's filter blocks, of which there is an extensive lineup, employ Nikon's original noise terminator to eliminate noise caused by stray light and provide clear, high S/N ratio fluorescence images.



## Widefield display

Because a wide 6mm x 6mm area can be displayed by image stitching, the whole image of a specimen can be observed. The point of time-lapse observation can be easily specified from the widefield image.



## Cell contamination prevention chamber

BioStation IM's chamber can be easily detached and sterilized in an autoclave (a high-temperature, high-pressure steam sterilizer). The glass top cover maintains a sealed environment that prevents the loss of humidity and CO<sub>2</sub> as well as contamination.



## Easy to confirm indicator

The outside indicator allows the user to easily determine the condition of the BioStation IM's internal environment.



## Cell-friendly illumination

Cell-friendly red LED illumination is used for phase contrast imaging. Moreover, the fluorescence illuminator shutter opens only when capturing images during fluorescence observation, therefore reducing photo-bleaching and phototoxicity of live cells.



## High-sensitivity cooled CCD camera

The BioStation IM has a built-in 2.0-megapixel monochrome CCD camera. Because of its high sensitivity, images can be captured quickly, reducing specimen photobleaching. The cooled mechanism reduces thermally-induced noise.

## Unrestricted setup location

BioStation IM's structure prevents outside light from entering. Therefore a darkroom is not necessary, even for time-lapse fluorescence observation. Moreover, its space-saving design means it will fit anywhere.

## Two models available according to culture vessel type

Models with magnifications of 20x, 40x, 80x for glass bottom dishes and 10x, 20x, 40x for plastic bottom dishes are available.

## Accessories

### •Mercury Precentered Fiber Illuminator — Intensilight

The high-intensity 130W mercury illuminator for fluorescence observation features a long-life lamp that lasts up to 2,000 hours. Optical fiber allows the light source to be placed away from the main equipment, reducing heat exposure.



### •CO<sub>2</sub> gas mixer



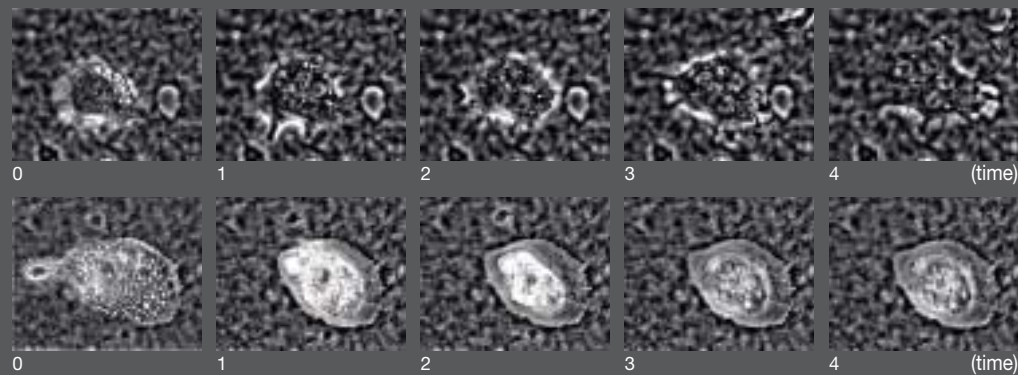
## Application examples of BioStation IM

BioStation IM can be used in areas such as RNAi, siRNA, miRNA, fusion of reporter molecules and cell signaling experiments.

### Cell multiplication, division and death (lengthy stability)

Primary-cultured rabbit osteoclast: 5-hour observation of static culture on dish coated with calcium phosphate

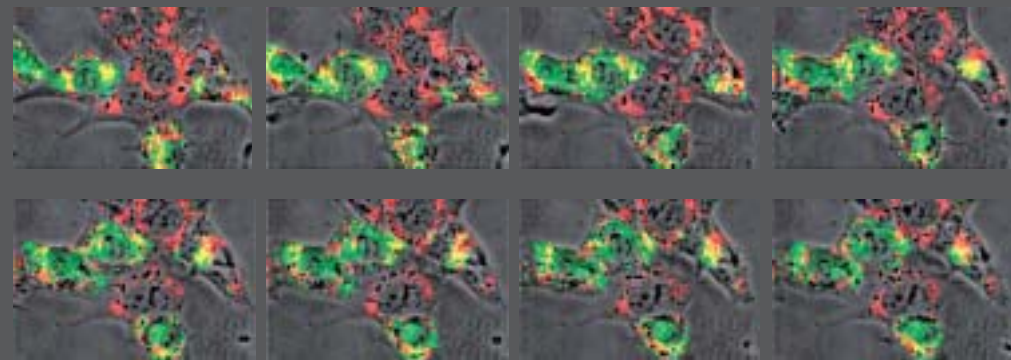
Courtesy of Dr. Yoshitaka Morimoto, Hamamatsu University School of Medicine



### Fluorescence protein expression, organelle localization and function (multicolor imaging)

Syrian Golden Hamster Kidney Fibroblast Cells (BHK-21 Cell line)  
EGFP-Peroxisomes (green),  
DsRed2-Mitochondria (red),  
and phase contrast image.

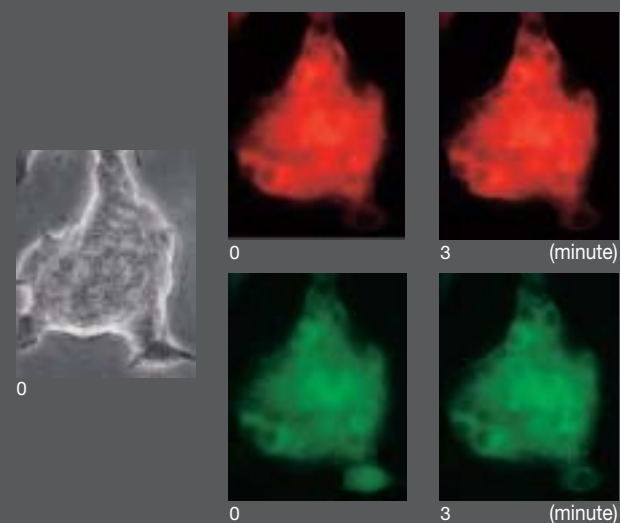
Courtesy of Dr. Mike Davidson, Florida State University



### Cellular signal, dual imaging of Ca<sup>++</sup> and PKC (various applications)

INS-1 cell with stably-expressed PKC-DsRed1 (red) and fluo4 (green) loading

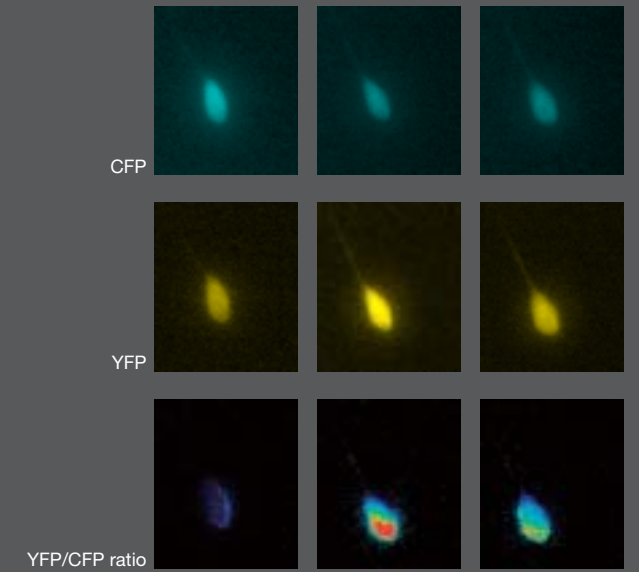
Courtesy of Dr. Hideo Mogami, Hamamatsu University School of Medicine



### Cellular signal, FRET imaging (various applications)

Glioma cell with forced expression of Yellow Cameleon (CFP: blue, YFP: yellow) stimulated with drug. YFP/CFP ratio images at bottom.

Courtesy of Dr. Tatsuro Kumada, Hamamatsu University School of Medicine



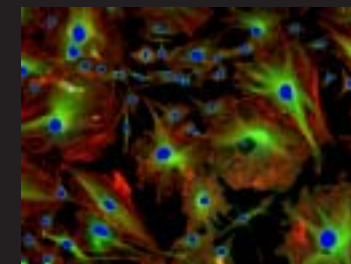
## Imaging software — NIS-Elements



Optional imaging software NIS-Elements enables a wide range of analysis from basic to advanced, including easy cell counting, morphological measurement, and intensity analysis of captured images.

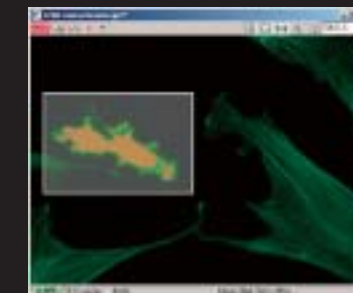
#### Object counting

Complicated procedures such as Thresholding, Morphology and Restrictions are pulled into one control window, simplifying the measurement process and boosting ease of use.



#### ROI statistics

Statistics pertaining to area and brightness of defined region of interest (ROI) can be easily collected.

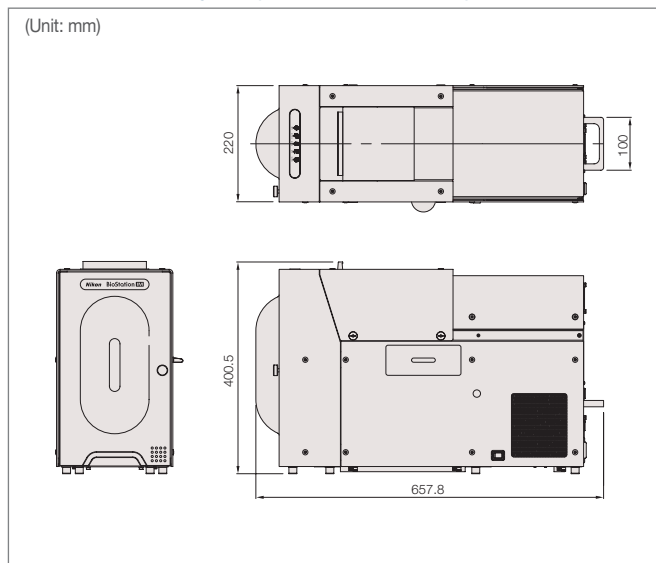


■ Specifications

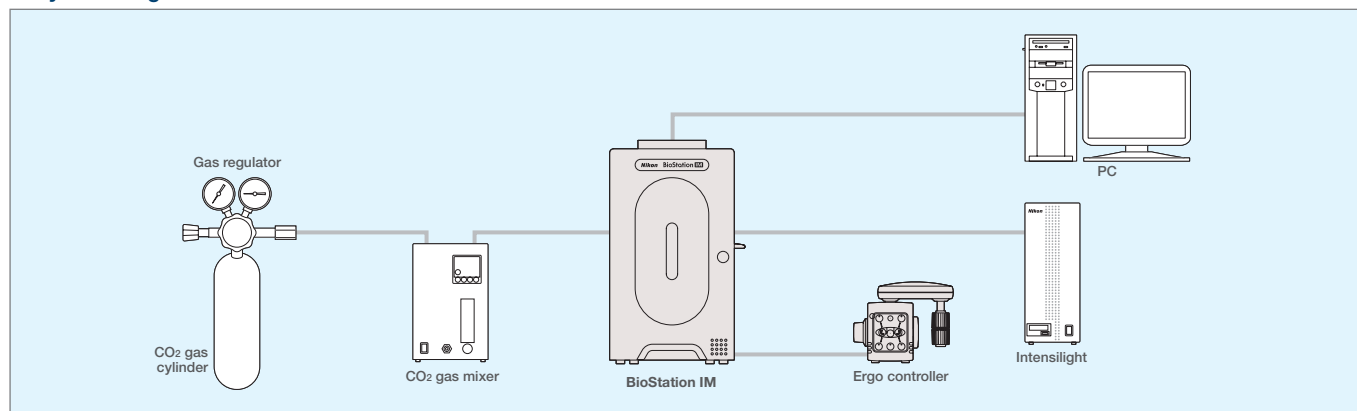
	CELL-S1 (for glass bottom dish)	CELL-S1-P (for plastic bottom dish)
Temperature control	37°C±0.1°C	
Humidity control	95% or higher (saturated vapor pressure)	
Water supply for humidification	Built-in bottle (270ml)	
CO <sub>2</sub> supply	Concentration and flow volume set by external mixer	
Observation vessel	φ 35mm glass bottom dish	φ 35mm plastic bottom dish
Observation method	Phase contrast (contrast DL), fluorescence	
Illumination	Phase contrast: red LED Fluorescence: external mercury illuminator Intensilight via fiber cable	
Fluorescence filter	Mountable up to two	
Objective lens magnification	40x (20x, 40x, 80x possible by switching tube lens)	20x (10x, 20x, 40x possible by switching tube lens)
Camera	Nikon 2-megapixel cooled monochrome camera	
Data format	ICS-IDS, JPEG, BMP, Tiff, PNG (still), WMV (movie)	
Imaging area	XY: 6 x 6mm (by objective lens movement) Z: 1.25mm	
Dimensions and weight (main body)	220W x 620D x 400H (excluding protrusions), approx. 30kg	

Note: Products for glass bottom dish and plastic bottom dish are different.

■ Dimensional diagram (CELL-S1/CELL-S1-P)



■ System diagram



Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. February 2007 ©2007 NIKON CORPORATION

**WARNING** TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.

\* Monitor images are simulated.  
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