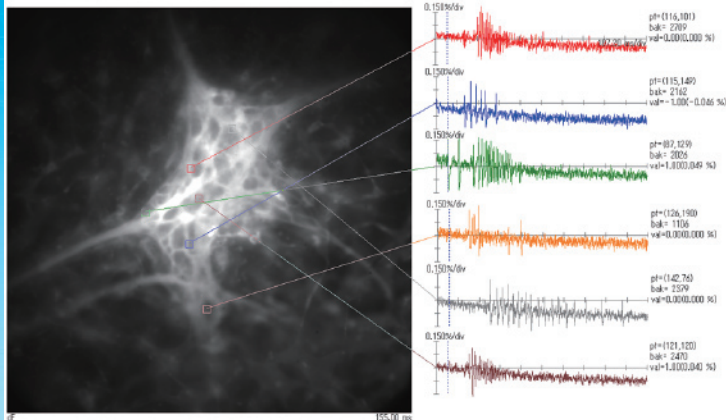
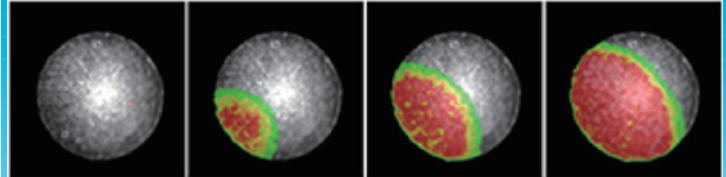


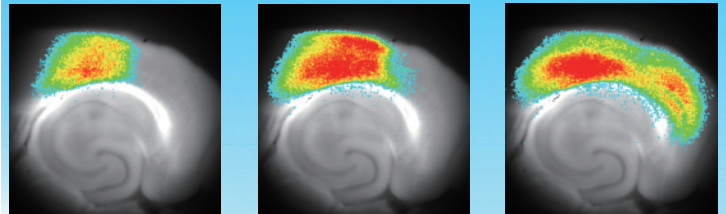
Membrane Potential / Calcium



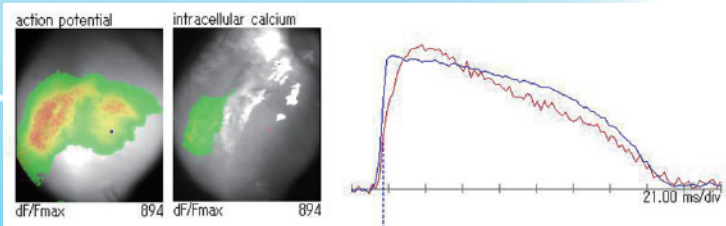
Membrane potential response of rat intestinal ganglion to nicotine administration



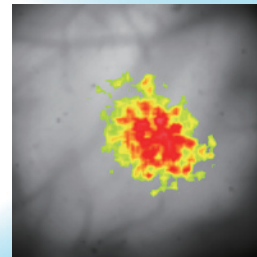
Action potential propagation in iPS cell-derived cardiomyocytes



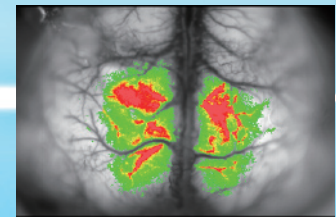
Membrane potential response of mouse brain slices to electrical stimulation



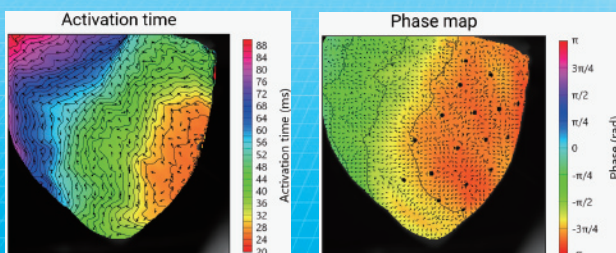
Simultaneous measurement of membrane potential / calcium in isolated rat heart



Membrane potential imaging in mouse in vivo brain

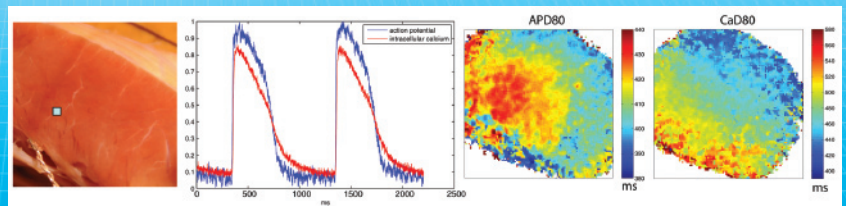


Flavoprotein fluorescence imaging in rat in vivo brain



Activation map and conduction velocity

Phase map



Simultaneous measurement of membrane potential / calcium in isolated human heart

Main Features

High Speed / Low Noise

High Dynamic Range

Synchronized Multi Camera

Expanded Functionality

Various I/O Connectors

Applications

- Membrane Potential Imaging
- Calcium Imaging
- Imaging with FRET, GCaMP, GEVI
- Intrinsic Imaging based on Hemoglobin and Flavoprotein
- Other High Speed Imaging

The Premier High-End Model for Various Types of Imaging

Multifunction High Speed CMOS Imaging System MiCAM05-N256

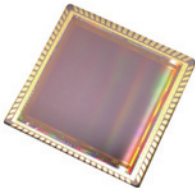
Spatial Resolution	: 256x256 - 32x32 pixels
Image Sensor Size	: 16.7mmx16.7mm
S/N Ratio	: >71dB
Camera Port	: 4
Memory	: 4GB
Maximum Frame Rate	: 1,923fps (256x256px) 5,556fps (128x128px) 20,000fps (32 x 32px)



Camera Head

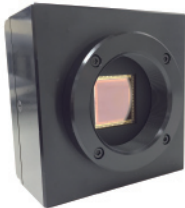
Originally designed large CMOS image sensor and large pixel

Active Area size : 17.6mmx17.6mm
Pixel size : 69μmx69μm



High spatial resolution, high speed and high S/N ratios

Number of Pixels : 256x256 pixels
Maximum Frame Rate : 1,923fps (at 256x256 pixels)
Dynamic range : >71dB

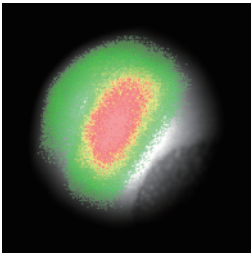


Wide dynamic range mode and high sensitivity mode by adjustable well depth

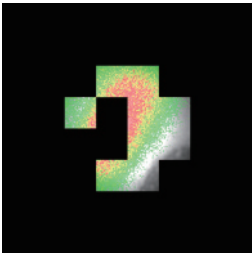
Wide dynamic range mode (D-mode) : 3,000,000 electrons
High sensitivity mode (S-mode) : 600,000 electrons

ROI readout for higher frame rates

Selectable Number of Pixels (HxV)		Maximum Frame Rate (fps)
256 x 256	Full Resolution	1,923
192 x 192	Square ROI	3,125
128 x 128		5,556
64 x 64		12,500
32 x 32		20,000
256 x 128	Horizontally Long Rectangle ROI	3,448
256 x 64		5,555
256 x 32		8,333
128 x 256	Vertically Long Rectangle ROI	3,333
64 x 256		5,000
32 x 256		7,143

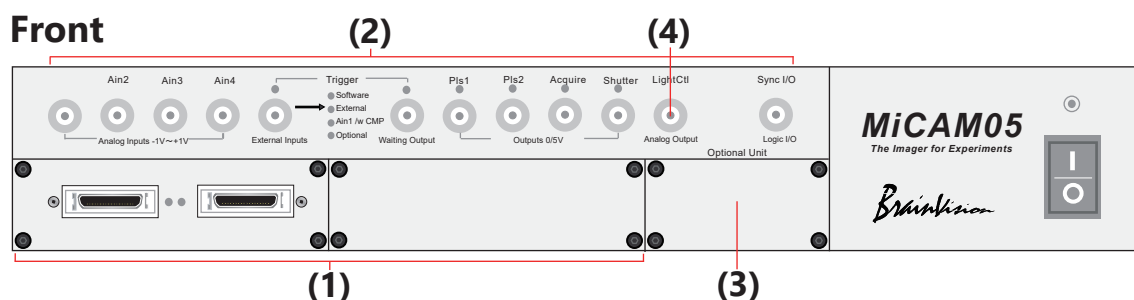


All pixels readout (256x256 pixels)



Multiple ROI readout (32x32 pixels x 9 area)

MiCAM05 Processor



(1) Up to four cameras can easily be connected

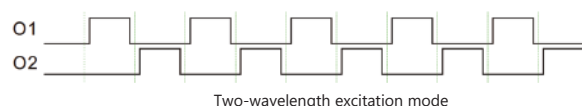
Simultaneous imaging of multiple fluorescent wavelengths and three-dimensional imaging from different angles.

(2) Various I/O connectors, and improved compatibility with external devices system

I/O connections can be synchronized with image acquisition and external devices.

(3) Synchronous lighting control of LED light source for multi-wavelength excitation imaging

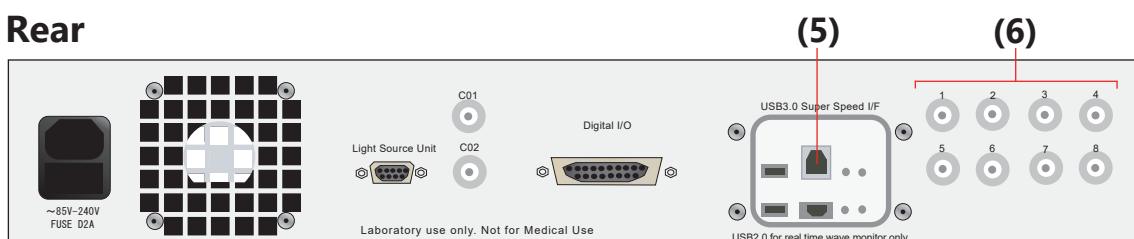
Outputs the lighting signal synchronized with each frame timing from MiCAM05 to multiple LED light sources for multiple-wavelength excitation imaging.



(4) Automatic light control and adjustment of light intensity

Automatically adjusts the intensity of the excitation light, depending on the saturation percentage of the image captured by the camera.

Rear



(5) Long-term data acquisition with USB3.0 high-speed data transfer

Disk Capacity	Pixles	Frame Rate (fps)	Number of recordable frames	Recordable time (min)
SSD 1TB	256 x 256	500	6,840,000	228.0
		1,000	6,840,000	114.0
		1,818	6,840,000	62.7
	128 x 128	500	27,360,000	912.0
		1,000	27,360,000	456.0
		5,263	27,360,000	86.6

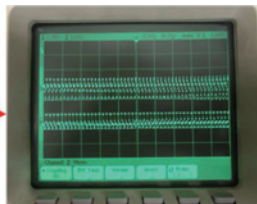
(*Approximate number of recordable frames and recordable time shown above are averaged values that were measured using the PC configuration which is included with MiCAM05. There is no guarantee that the results will be the same in all circumstances.)

(6) Continuous output of light intensity like light oscilloscope

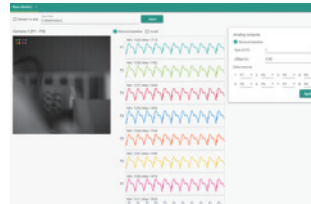
Waveforms of fluorescence change can be monitored in real time and output before, during, and after data acquisition.



Light intensity outputs from eight BNC connections



Monitor with an oscilloscope



Wave monitor on software

The Standard Model for Imaging with Excellent Balance of H

Multifunction High Speed CMOS Imaging System

MiCAM03-N256

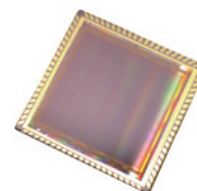
Spatial Resolution	: 256x256 pixels 128x128 pixels
Image Sensor Size	: 16.7mmx16.7mm
S/N Ratio	: >71dB
Camera Port	: 2
Memory	: 1GB
Maximum Frame Rate	: 1,000fps (256x256px) 1,000fps (128x128px)



Camera Head

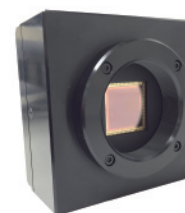
Originally designed large CMOS image sensor and large pixel

Active Area size : 17.6mmx17.6mm
Pixel size : 69μm x 69μm



High spatial resolution, high speed and high S/N ratios

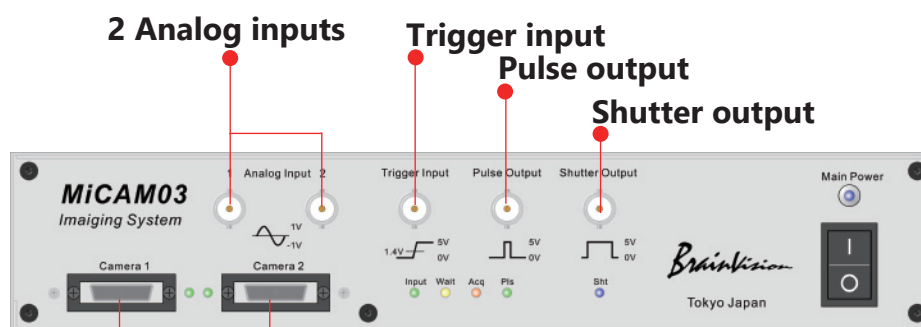
Number of Pixels : 256x256 pixels
Maximum Frame Rate : 1,000 fps (at 256x256 pixels)
Dynamic range : >71dB



Wide dynamic range mode and high sensitivity mode by adjustable well depth

Wide dynamic range mode (D-mode) : 3,000,000 electrons
High sensitivity mode (S-mode) : 600,000 electrons

MiCAM03 Processor



Up to two cameras can easily be connected

Simultaneous imaging of multiple fluorescent wavelengths and three-dimensional imaging from different angles.

Synchronous lighting control of LED light source for two-wavelength excitation imaging

Outputs the lighting signal synchronized with each frame timing from MiCAM03 to two LED light sources for dual wavelength excitation imaging.

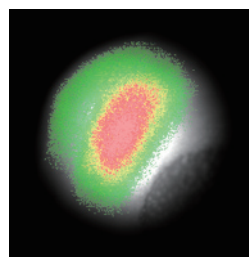


Two-wavelength excitation mode

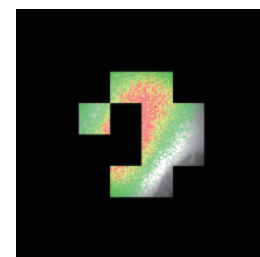
Optional Functions for MiCAM03-N256

ROI readout for higher frame rates

Selectable Number of Pixels (HxV)		Maximum Frame Rate (fps)
256 x 256	Full Resolution	1,923
192 x 192	Square ROI	3,125
128 x 128		5,556
64 x 64		12,500
32 x 32		20,000
256 x 128	Horizontally Long Rectangle ROI	3,448
256 x 64		5,555
256 x 32		8,333
128 x 256	Vertically Long Rectangle ROI	3,333
64 x 256		5,000
32 x 256		7,143



All pixels readout (256x256 pixels)



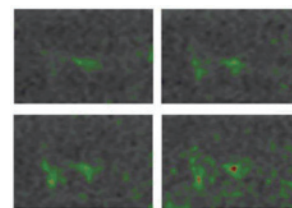
Multiple ROI readout (32x32 pixels x 9 area)

Long-term data acquisition with USB3.0 high-speed data transfer

Disk Capacity	Pixles	Frame Rate (fps)	Number of recordable frames	Recordable time (min)
SSD 1TB	256 x 256	500	6,840,000	228.0
		1,000	6,840,000	114.0
		1,818	6,840,000	62.7
	128 x 128	500	27,360,000	912.0
		1,000	27,360,000	456.0
		5,263	27,360,000	86.6

(*Approximate number of recordable frames and recordable time shown above are averaged values that were measured using the PC configuration which is included with MiCAM03. There is no guarantee that the results will be the same in all circumstances.)

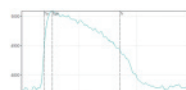
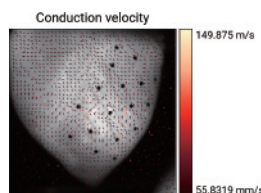
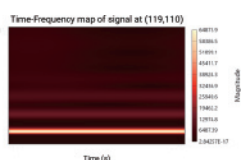
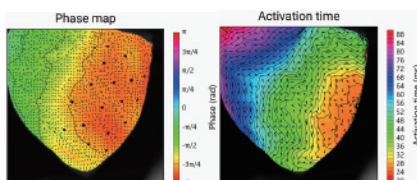
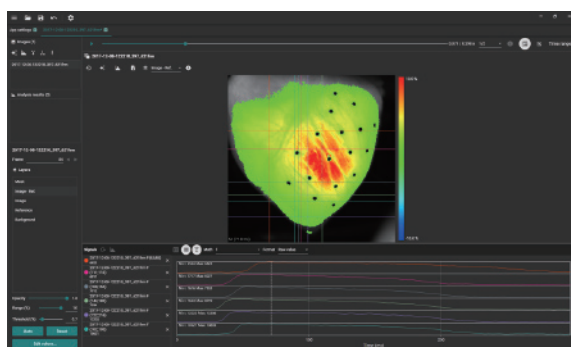
Time-lapse imaging



Example of Time-lapse imaging

Data Acquisition / Analysis Software

BV Workbench



Filters and data processing

- Invert polarity
- Data masking
- Normalization
- Spatial filter
- FIR low pass filter
- Drift removal
- ... etc.

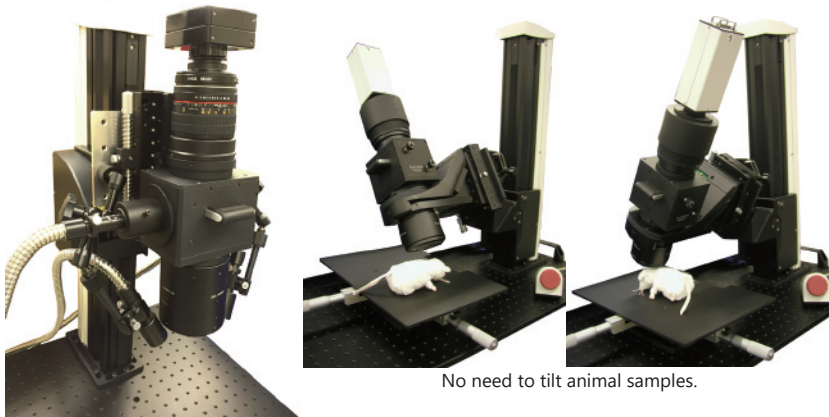
Data Analysis

- Activation time
- Action potential duration
- Conduction velocity
- Repolarization time
- Peak time
- Decay tau
- Phase map
- Dominant frequency
- ... etc.

Fluorescence Macroscope

- *Incompatible brightness with a wide field of view*
- *Optical axis can be tilted and rotated*

THT Macroscope



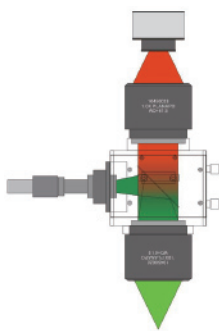
No need to tilt animal samples.

The THT macroscope is a fluorescence macroscope developed for detecting low light fluorescence that is emitted from the biological sample at a low magnification.

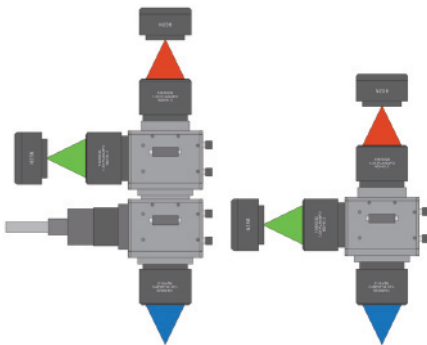
This macroscope has a very simple optical path combining two large-diameter objective lenses and a custom-made large fluorescent filter.

Custom-made systems can be constructed according to your request.

Simple structure:
specializing in imaging



Multifunction:
used as a fluorescence beam splitter



Low magnifications with High N.A values:
Detecting low light fluorescence with a wide field of view

Objective Lens	Condensing Lens (Camera Side)					
	0.63x	1x	1.6x	50mm	85mm	135mm
0.3x	0.48x	0.3x	0.19x	-	-	-
0.63x	1x	0.63x	0.4x	0.4x	0.69x	1.27x
1x	1.6x	1x	0.63x	0.64x	-	2x
1.6x	2.6x	1.6x	1x	1.02x	-	-
2x	3.2x	2x	1.26x	1.28x	2.23x	4x
5x	6.3x	4x	2.5x	-	4.48x	-

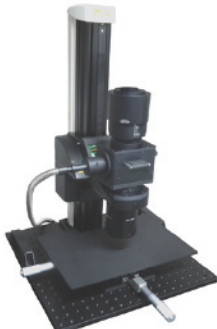
Various Types of Microscope Stands



Side illumination and dual wavelength imaging



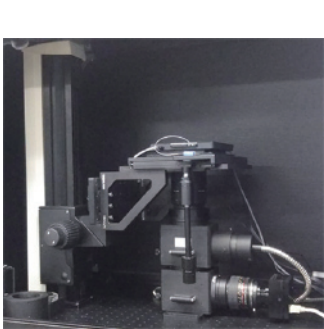
Olympus BX51WI stand and XY table



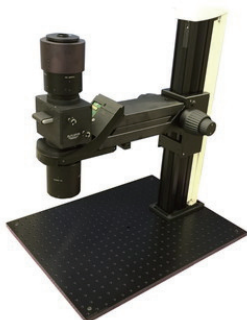
Epi-illumination and single wavelength imaging



High rigidity arm type for In Vivo sample



Inverted Type



Long arm Type



Epi-illumination and side illumination for dual wavelength imaging



Epi-illumination and side illumination for dual wavelength imaging, 90 degrees rotation



Horizontal imaging for Langendorff perfused heart

Other Equipments

High Resolution Imaging System

BV-XB1



For various imaging applications like Ca²⁺, intrinsic, GCaMP, FRET imaging

- 1920x1200 pixels and large sensor
- ESTM-9 can synchronize image acquisition with inputs/outputs of external equipment.

High-Powered LED Light Source

LEX3-B / LEX3-G

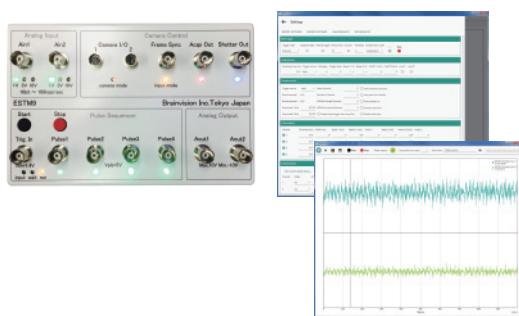


Brighter and more stable lighting for fluorescence imaging and photostimulation

- Blue (465nm) : output intensity 410mW/cm²
- Green (530nm): output intensity 360mW/cm²

Multifunction Electrical Stimulator

ESTM-9



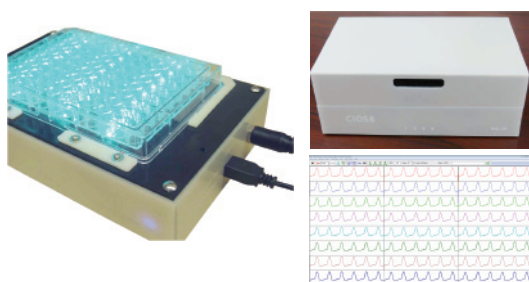
Stimulator for bioimaging

Easy to synchronize camera and peripheral devices

- Pulse outputs (4ch) / Analog outputs (2ch)
- Analog recording (2ch)
- External camera control / lighting control

Cardio Intrinsic Optical Signal Acquisition System

CIO8



Automatic counting of cardiomyocyte beating without fluorescent dye and electrode

- Real-Time detection for multiwell plate
- Easy to use and lightweight making it ideal for personal use
- Built-in temperature control and plate moving mechanism

■ Specifications for MiCAM05 and MiCAM03

			System			
Name			MiCAM05-N256	MiCAM05-HR	MiCAM03-N256	MiCAM03-HR
Model			MC05-N256	MC05-HR	MC03-N256	MC03-HR
Standard System Configuration			Camera Head (1-4), Processor, PC, Monitor, Software		Camera Head (1-2), Processor, PC, Monitor, Software	
Supported OS			Windows 7/10 64bit		Windows 7/10 64bit	
			Camera Head			
Name			N256 camera	HR camera	N256 camera	HR camera
Model			N256CM	02HRCM	N256CM	02HRCM
Image Sensor			Original CMOS	Sony CCD	Original CMOS	Sony CCD
Active Pixels (H x V)			256 x 256	380 x 244	256 x 256	380 x 244
Active Image Area (H x V)			17.6mm x 17.6mm	6.4mm x 4.8mm	17.6mm x 17.6mm	6.4mm x 4.8mm
Pixels Size (H x V)			69μm x 69μm	16.8μm x 19.6μm	69μm x 69μm	16.8μm x 19.6μm
Shutter Mode			Global	Interline	Global	Interline
Maximum Frame Rate and Pixels (for 1 camera)			1,923fps (256x256px) 3,125fps (192x192px) 5,556fps (128x128px) 20,000fps (32x32px)	143fps (380x244px) 270fps (188x120px) 455fps (92x60px)	1,923fps (256x256px) 3,125fps (192x192px) 5,556fps (128x128px) 20,000fps (32x32px)	143fps (380x244px) 270fps (188x120px) 455fps (92x60px)
Quantum Efficiency			55%@550nm 50%@600nm	75%@550nm 50%@700nm	55%@550nm 50%@600nm	75%@550nm 50%@700nm
Well-Depth			3,000,000 e- / 600,000 e- (switching)	100,000e- (180x120px) / 12,000e- (180x120px, H-bin)	3,000,000 e- / 600,000 e- (switching)	100,000e- (180x120px) / 12,000e- (180x120px, H-bin)
Dark Noise			500 e- / 130 e-	60e- (3.7ms, 180x120px) / 20e- (3.7ms, 180x120px,H-bin)	500 e- / 130 e-	60e- (3.7ms, 180x120px) / 20e- (3.7ms, 180x120px,H-bin)
Dynamic Range			71dB	64dB	71dB	64dB
Lens Mount			M42 mount (Option: C or F mount)	C mount	M42 mount (Option: C or F mount)	C mount
			Processor			
Name			MiCAM05 processor		MiCAM03 processor	MiCAM03 processor (analog)
Model			MC05-PRC		MC03-PRC	MC03-PRC-A
Camera Interface			1 (up to 2)		1	
Camera Port			2 (up to 4)		2	
Slot for Optional Unit			1		-	
Buffer Memory Inside Processor			4GB (up to 8GB)		1GB	
Inputs for Analog Signal			4ch		2ch	
Input for External Trigger Signal			1ch		1ch	
Input/Output for Frame Timing Signal			1ch		1ch	
Output for Stimulus Pulse			2ch		1ch	
Output for Lighting Control			1ch		1ch	
Output for Synchronous Lighting Control of Multiple LED Light Sources			4ch (Option)		2ch	
Output for Real Time Light Intensity Monitor			8ch		-	
Output for Light Intensity Control			2ch		-	
Current Output			2ch		-	
Output for Acquisition Status			1ch		-	
Output for Trigger Wait Status			1ch		-	
Digital I/O Port			1 (25 pins)		1 (6 pins)	
Trigger Mode			Software, TTL External Input, Analog External Input, Usage of Optional Unit		Software, TTL External Input, Analog External Input	
Data Transfer Mode			USB3.0 (for basic functions) USB2.0 (for Real Time Light Intensity Monitor)		USB3.0	
Recording Mode			Temporary storage to PC RAM / Direct data saving to PC drive (SSD/HDD)		Temporary storage to PC RAM / Direct data saving to PC drive (SSD/HDD)	
			Software/License			
MiCAM-Basic (acquisition software)			✓		✓	
BV Workbench (with basic analysis function)			✓		✓	
BV Workbench license	Analysis		✓		Option (sold separately)	
	Acquisition		✓		Option (sold separately)	
	Optional Functions	Multiple ROI Readout for Higher Frame Rate	✓		Option (sold separately)	
		Long Term Acquisition (direct saving to disk)	✓		Option (sold separately)	
		Time-Lapse Acquisition	✓		Option (sold separately)	
High Resolution Camera Control		Option (sold separately)		Option (sold separately)		
BV_Ana (analysis software)			✓		Option (sold separately)	
SDK (for Visual C#.NET and MatLab)			Option (sold separately)		Option (sold separately)	

* Specifications & appearance are subject to change without prior notice due to continuous improvements.
* All products are made in Japan.

Developed and Manufactured by:



UI-building 7F, 2-2 Kanda-Ogawamachi,
Chiyoda-ku, Tokyo 101-0052 Japan
Tel: +81 3 5280 7108
Fax: +81 3 5280 7109
Email: info@brainvision.co.jp
URL: www.brainvision.co.jp

Contact Information:



940 South Coast Drive, Suite 160
Costa Mesa, CA 92626
Tel: +01 714 850 0797
Fax: +01 714 850 9308
Email: info@scimedia.com
URL: www.scimedia.com