Mikrotron OEM-Products for Weinberger

Mikrotron GmbH located in Unterschleissheim / Germany is a leading manufacturer of High-Speed Cameras and machine vision components for industrial and technical applications.

Our company has a worldwide exceptional market position, because of developing, manufacturing and distributing the complete product range of the machine vision domain: Cameras / framegrabber / Software and additional equipment – all from one source.

Highly qualified and experienced employees in close cooperation with young development engineers are the columns of the increasing success of our company.

We are proud of economical independence.

Productconsistency, top quality, as well as service and support puts your investment in our products on a firm economic base. Therefor the business confidence of our customers is the best sign.

Our cooperation with the Weinberger company

The Weinberger MiniVis and MacroVis camera series match with the Mikrotron MotionBLITZ Cube camera familiy in charackteristics and technical specifications. The cameras are produced for Weinberger as a OEM-version and differ only in camera housing color and the label.

Schema: classification of the camera types Weinberger - Mikrotron (you can find all technical informations about Mikrotron MotionBLITZ Cube cameras in our datasheets on the following sites)

SpeedCam MiniVis ECO	Mikrotron MotionBLITZ Cube 1
SpeedCam MiniVis	Mikrotron MotionBLITZ Cube 2
SpeedCam MiniVis e2	Mikrotron MotionBLITZ Cube 3
SpeedCam MacroVis	Mikrotron MotionBLITZ Cube 4
SpeedCam MacroVis VLS	Mikrotron MotionBLITZ Cube 5

Special Electronics
Digital SlowMotion
Image Processing MIKROTRON

Visualize the Invisible

A picture tells a story. What do 500 or 1.000 pictures tell about a second's event? Modern machines and production processes are too fast for visual analysis with the naked human eye. High speed video extends a second to a minute – providing insight that helps to immediately understand what's going on. No more guessing and trying.

See – know – act …and win. Slow motion provides competitive advantages through faster, better understanding of fast processes. Faster progress is seen in R&D, engineering, production, quality assurance and maintenance.

- **Inspection/monitoring of fast running machine parts**
- **Optimization of production machines**
- **Analysis of explosively processes**
- **Shock and vibration analysis**
- **Material testing, crash testing, quality control**
- **Movement analysis, ergonomics, sports**

Compact, Portable and Ready-to-Use

Any existing Gigabit Ethernet LAN can be used to connect MotionBLITZ® Cube to a standard PC or notebook. Also, operating of multiple cameras simultaneously from one or more stations is possible. The compact size of the camera, combined with the internal battery backup makes MotionBLITZ® Cube ideal for mobile and standalone use. With Mikrotron's user-friendly software, MotionBLITZ® Cube is easily installed and operated. Just one click gives you a live image for adjustment, or starts recording while you monitor the object on screen.

Flexible In Resolution and Speed

Free selection of RoI (Region of Interest) and frame rate enables the system to flexibly match any given recording situation. A few mouse clicks let you adjust the image sector to capture just as much as you need, at the required speed to see it sharp. A background maximizer calculates and sets best speed per RoI-size or best RoI per selected speed.

Triggering with History Function

Once started, the system records continuously to the image FIFO-buffer. The trigger signal starts the finishing process of the recording sequence. The history function lets the buffer keep a set number of frames in memory and fill the rest with post-trigger recording. Thus you can learn what made things happen that way. History size can be set from 0 to 100% of recording time. Archivation can be in standard BMP or AVI-file format on the hard disk of the connected PC.

Cube2 even goes one step further: its ImageBLITZ® feature allows object generated triggering by a selectable part of the RoI used as sensor.

- **Cube1 - up to 1,000 fps* at full 640 x 512 Res.**
- **Cube2 - up to 500 fps* at full 1280 x 1024 Resolution; up to 45,000 fps*at reduced Resolution**
- **Frame Rate and Resolution Adjustable**
- **Recording Time up to 3 / 6s at Maximum Resolution**
- **Internal Rechargeable Battery for Standalone Use**
- **Large Trigger and Recording Operations**
- **Optional - ImageBLITZ® Self-Trigger**
- **Gigabit Ethernet Interface**
- **Image Archiving in BMP and AVI File Format**
- **Windows™ Based Installation and User Interface Software and Documentation**

*fps: frames per second

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Model Types Cube1 (640 x 512, frame rate up to 1,000 fps)

Model Type	Monochrome/ Color	Recording Time at 640 x 512, 1,000 fps*	Photo sensivity accordant	ImageBLITZ® Option	Hi-G Option (100G)
MotionBLITZ® Cube1-3	M	3.3 sec.	200 ASA	Yes	-
MotionBLITZ® Cube1-6		6.5 sec.		Yes	-
MotionBLITZ® Cube1-3C	C	3.3 sec.	160 ASA	Yes	-
MotionBLITZ® Cube1-6C		6.5 sec.		Yes	-

Model Types Cube2 (1,280 x 1,024 at 500fps, up to 46,000 fps* at reduced resolution)

	Monochrome/ Color	Recording Time at 1,280 x 1,024, 500 fps*	Photo sensivity accordant	ImageBLITZ® Option	Hi-G Option (100G)
MotionBLITZ® Cube2-3	M	3.3 sec.	200 ASA	Yes	Yes
MotionBLITZ® Cube2-6		6.5 sec.		Yes	Yes
MotionBLITZ® Cube2-3C	C	3.3 sec.	160 ASA	Yes	Yes
MotionBLITZ® Cube2-6C		6.5 sec.		Yes	Yes

Technical Data:

	Cube1	Cube2
Max Resolution	640(H) x 512(V)	1,280(H) x 1,024(V)
Selectable Recording Rates	68-1000 fps*	12-45.000 fps* (Over 500 fps at reduced resulution)
Shutter Speed	Global Electronic Shutter from 1/40s to 1/250,000s	Global Electronic Shutter from 1/20s to 1/250.000s
Sensor	RGB color with BAYER filter or monochrome	
Camera Size	94 x 70x 110 mm (W x H x L)	
Weight	980 g (2.16 lbs.), without lens, incl. battery set	
Operating Temperature	+ 5….45°C (41 – 113°F)	
Battery Capacity	Recording mode: ca. 30 minutes; standby mode: ca. 1 hour	
Lens Mount	Standard C-Mount, optional Nikon / F-Mount with adapter	
Power Supply	10.5 - 24 V DC external power supply, or from internal battery	
Software	MotionBLITZ® Director operating software for Windows™ 2000/XP	
Frame Storage	BMP and AVI - file format	
Camera Input/ Outputs		
Camera-PC Interface	1000 /100 Ethernet interface (Gigabit Ethernet)	
Trigger and Synchronisation	Trigger- and Sync. Input, opto coupled	
Sync. Output	TTL-Sync., Strobe Signal	
Analog Input	0 - 2,5 V (8-Bit)	
Digital Input	4-Bit (TTL)	

*fps: frames per second

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Faster and Brighter

One thing was too often true in High Speed Video: 'There's never enough light.'
MotionBLITZ® Cube3 ends that truth. With an innovative, high sensitive 512(H) x 512(V) CMOS image sensor that even runs faster. That means less light necessary for helpful images, better depth of field, and clear high speed recordings where other cameras see nothing but shadows.

- **Monitoring of Engine and Process Dynamics**
- **Load and Resonance Analysis**
- **Material and Crash Test, Quality Assurance**
- **Explosion and Ballistic Studies**
- **Preventive and Reactive Maintenance**
- **Fluid Processes**
- **Motion Analysis in Medicine, Sports, Ergonomy, Biology**

Pre and Post Imaging: the Cube3 Ring Buffer

An internal ring buffer allows recording of a triggered event's history and progress. Images are recorded continuously, until stopped by trigger signal. Pre and post images of up to 16 events are buffered in the camera memory for further analysis. Time lengths are selectable up to 3 or 6 seconds altogether (dependent on model type).

Cube3 Recognizes the Event: ImageBLITZ® Self-Trigger

For event-driven self-triggered imaging, normally complex sensor technology is obligatory. ImageBLITZ® is a camera-internal self-triggering feature that enables to define a selectable area within the Region of Interest (RoI) as "sensor". Image recording is triggered in real-time by variation of brightness within the specified sector. The ImageBLITZ® self-trigger allows configuration by minimal effort on intuitive interface. Photoelectric relays and synchronizing to clock rate are not necessary (however, applicable).

Compact, Portable and Ready-to-Use

Any existing Gigabit Ethernet LAN can be used to connect MotionBLITZ® Cube3 to a standard PC or notebook. Also, operating of multiple cameras simultaneously from one or more stations is possible. The compact size of the camera, as well as the internal battery backup, make MotionBLITZ® Cube ideal for mobile and standalone use. Mikrotron's user-friendly, Windows-based recording software, MotionBLITZ® Director is quick to install and easy to operate. Just one click gives you a live image for adjustment, or starts recording while you monitor the object on screen.

- **Photo sensivity acc. to 2.000 / 800ASA**
- **Up to 2.500 fps* at 512 x 512 resolution**
  Up to 120.000 fps* at reduced resolution
- **CMOS sensor with selectable resolution (RoI)**
- **Recording time up to 3 / 6s at max. resolution**
- **Internal battery set for standalone operation**
- **ImageBLITZ® and external triggering**
- **Gigabit Ethernet interface for PC/notebook**
- **Image export in BMP or AVI format**
- **MotionBLITZ® Director for Windows™ 2000/XP**
- **Shock proof HiG Version (100G) available**

*fps: frames per second

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MotionBLITZ® Cube3
Ultra-Sensitive High Speed Buffer Camera

Faster and Brighter

MotionBLITZ® Cube3
512(h) x 512(v) pixels at 2,500 frames per second
up to 120,000 frames/sec. at reduced resolution

Available Models

Model Type	Monochrome/ Color	Recording Time at 512 x 512, 2,500 fps*	Photo Sensitivity accordant	ImageBLITZ® Option	Hi-G Option (100G)
MotionBLITZ® Cube3-3	M	3.3 sec.	2.000ASA	Yes	Yes
MotionBLITZ® Cube3-6		6.5 sec.		Yes	Yes
MotionBLITZ® Cube3-3C	C	3.3 sec.	800ASA	Yes	Yes
MotionBLITZ® Cube3-6C		6.5 sec.		Yes	Yes

Specifications:

Maximal Resolution	512(H) x 512(V) Pixel
Recording Speed	300 - 2,500 fps* at max. resolution, up to 120,000 fps* at reduced resolution
Pixel Size	16 x 16 µm
Active Sensor Area	8,19 x 8,19 mm, 11,58 mm diagonal
Illumination	9V/lux-sec at 550 nm, ADVref = 1V
Internal Dynamics	57 dB
Shutter	Electronic full frame shutter: min. 1/300 sec. up to 1/250,000 sec.
Lens Mount	C-Mount thread, optional: Nikon F-Mount bayonet using adapter
Operating Software	MotionBLITZ® Director for Windows™ 2000/XP
Export Formats	BMP images, AVI videos
Image Footer	256 characters per recorded sequence, appears on each frame
Camera Connections:	
Camera to PC	1000/100 Gigabit Ethernet (GigE) Interface
Trigger	External TTL signal and sync. input
Sync. Signals	TTL input/output
Analog Input	0 - 2,5 V (8-Bit ADC), digitally displayed per image
Digital Input	4-Bit TTL, incl. trigger, binary status per image
Technical Data:	
Dimensions	94x70x110 mm /3.7"x2.75"x4.3" (WxHxL)
Weight	980 g (2.16 lbs) incl. battery, without lens
Temperature Range	+ 5....45°C
Power Supply	Ext. power supply 10,5 - 24 V DC or internal battery
Battery Capacity	Recording mode: approx. 30 min. standby mode: approx. 1 hr

ImageBLITZ
Power
Trigger and external signals

*fps: frames per second

Date: 01/2008

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Fast and Compact:
a New High-Speed Generation

Fast Onboard Recording

Things are getting faster in modern industrial environment. Clock rates and velocities of up-to-date production lines or machine technology speed up, leading visual analysis into a new high speed challenge.

The Mikrotron MotionBLITZ® Cube4 is the latest of Mikrotron's Cube High-Speed Recording camera family, developed to face high-speed requirements by cutting edge camera technology.

Up to 1,000 fps are capable at the camera's 1280(H) x 1024(V) resolution, however increasable to impressing 93,000 fps by reduction of the Region of Interest (RoI).

Recording with History Function

The MotionBLITZ® Cube4 onboard ring buffer allows buffering of triggered events up to 3 seconds at full resolution and speed (extended buffer option). The history function allows pre and post event recording through free selection of frames or recording time.

The optional available ImageBLITZ® Auto Trigger even goes a step further: it allows object generated triggering directly through the camera by a selectable section of the RoI used as sensor.

Maximum Performance at Minimum Form Factor

The MotionBLITZ® Cube4 comes up with the smallest form factor ever for a high speed recording camera at this capability. A housing depth of appx. 92mm (C-Mount version) allows the MotionBLITZ® Cube4 to be utilized in an unrivalled manner even in cramped space conditions.

GigE Vision: Absolute Flexibility at High Transfer Rates

The MotionBLITZ® Cube4 Gigabit-Ethernet interface allows camera operation from any standard PC or Notebook at highest 1000 MBit/s transfer rates. Provided with a ruggedized Phoenix industrial plug, the Cube4 is designed for operation under real industrial conditions. Based on innovative GigE Vision communication standard, the Cube4 enables a multiplicity of image processing software to be frictionless attached.

A Great Variety of Extension Options

Get exactly the camera you need: MotionBLITZ® Cube4 offers a multiple range of optional all-purpose extensions. Many options from ring buffer upgrade to ImageBLITZ® Auto Trigger or multi Sequence recording are available. Even a Hi-G-Version is available.

- **Up to 1.000 fps* at 1280(H) x 1024(V) resolution**
- **Stepless adjustable Frame Rate up to 93.000 fps**
- **Smallest Form Factor, Minimal Housing Depth**
- **GigE Vision Interface & Phoenix Industrial Plug**
- **Standalone recording up to 1 h**
- **ImageBLITZ® Auto Trigger option**
- **Memory extension option**
- **Unrivalled price-performance relationship**

*fps (frames per second)

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Technical Data:

Sensor	Fast CMOS Sensor, 1280(H) x 1024(V) pixel 8-bit monochrome or RGB color with BAYER filter
Pixel Size	12 x 12 µm
Light Sensitivity	Monochrome: 1,600 bits/lux-sec @ 550nm, Vref=1V
Image Speed	28 – 1,000 fps @ full 1280(H) x 1024(V) resolution Up to 93,000 fps @ reduced resolution
Recording Time	1.5 sec. @ full resolution & 1,000 fps Extended recording times at reduced resolution and/or image speed
Shutter	Global Electronic Shutter from 2µsec to 1/ frame rate
Internal Dynamics	59 dB
Spectral bandwidth	400 – 800 nm
System design	Modular, scaleable and network-compatible concept via standard PC or notebook Synchronous processing of multiple cameras
Camera Size	93 x 69 x 92 mm (C-Mount) 93 x 69 x 128 mm (F-Mount option)
Weight	900 g , without lens
Environment	+5…45°C (41-113°F)
Battery Capacity	Recording mode: 1h ; standby mode 1.5 hours
Lens mount	C-Mount, F-Mount optional
Power supply	10,5 - 24V DC external power supply, or from internal battery
Power consumption	15W max
Software	MotionBLITZ® operator software for Windows 2000/XP™
Frame Storage	BMP and AVI - file format
Camera-PC interface	1000 /100 (Gigabit Ethernet)
Trigger	Trigger- and Sync. input on the camera
Synchronisation	TTL-Sync. output
Analog Input	0-2,5V (8-Bit)
Digital Input	4 Bit (TTL)

Optional Extensions:

Extended Buffer to 3 sec recording time @ full resolution & speed	ImageBLITZ®Auto Trigger	Multi sequence recording	F-Mount	Hi-G 100g Shock 100g / 25 msec Vibration 10g	Industrial Standard Phoenix Interface Plug	IRIG B Synchronisation

Recording Data:

Resolution	Frame Rate	Resolution	Frame Rate
1280(H) x 1024(V)	1.000 fps	1280(H) x 102(V)	10.000 fps
1280(H) x 512(V)	2.000 fps	1280(H) x 50(V)	20.000 fps
1280(H) x 204(V)	5.000 fps	1280(H) x 19(V)	50.000 fps
1280(H) x 146(V)	7.000 fps	1280(H) x 10(V)	93.282 fps

Date: 07/2007

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Extremely Fast with Supreme Light Efficiency

Mikrotron MotionBLITZ® Cube5 is the latest of Mikrotron's Cube High-Speed Recording camera family, developed to face high-speed requirements by cutting edge camera technology. Up to 5,000 fps are capable at the camera's 512(H) x 512(V) resolution, however increasable to impressing 195,000 fps by reduction of the Region of Interest (RoI). However, light is not an issue: the Cube's light sensititity of 1,000 / 800 ASA (monochrome / color) enables invaluable high speed recordings even in less illuminated applications.

Recording with History Function

The MotionBLITZ® Cube5 onboard ring buffer allows buffering of triggered events up to 3 seconds at full resolution and speed (extended buffer option). The history function allows pre and post event recording through free selection of frames or recording time. The optional available ImageBLITZ® Auto Trigger even goes a step further: it allows object generated triggering directly through the camera by a selectable section of the RoI used as sensor.

Maximum Performance at Minimum Form Factor

The MotionBLITZ® Cube5 comes up with the smallest form factor ever for a high speed recording camera at this capability. A housing depth of appx. 92mm (C-Mount version) allows the MotionBLITZ® Cube5 to be utilized in an unrivalled manner even in cramped space conditions.

GigE Vision: Absolute Flexibility at High Transfer Rates

The MotionBLITZ® Cube5 Gigabit-Ethernet interface allows camera operation from any standard PC or Notebook at highest transfer rates. Provided with a ruggedized Phoenix industrial plug, the Cube5 is designed for operation under real industrial conditions. Based on innovative GigE Vision communication standard, the Cube5 enables a multiplicity of image processing software to be frictionless attached.

A Great Variety of Extension Options

Get exactly the camera you need: MotionBLITZ® Cube5 offers a multiple range of optional all-purpose extensions. Many options from ring buffer upgrade to ImageBLITZ® Auto Trigger or multi sequence recording are available. The optional integrated F-Mount Lens mount provides a much larger field of view which results in an evenly exposed image. Even a Hi-G-Version is available.

- **1,000 / 800 ASA Light Sensitivity**
- **Up to 5,000 fps* at 512(H) x 512(V) Resolution**
- **Up to 195,000 fps by Infinitely Variable RoI**
- **Smallest Form Factor, Minimal Housing Depth**
- **GigE Vision Interface with Phoenix Industrial Plug**
- **Battery Pack for up to 1 h Operating**
- **Power Down Mode for 8h Data Retention**
- **Multisequence Recording**
- **ImageBLITZ® Auto Trigger**
- **Memory Extension**
- **Shock and Vibration Proof Version Available**
- **IRIG-B Frame Synchronisation**

*fps (frames per second)

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Technical Data

Light Sensitivity	1,000 ASA monochrome 800 ASA color
Sensor	Fast CMOS Sensor, 512(H) x 512(V) pixel 8-bit monochrome or RGB color with BAYER filter
Pixel Size	16 x 16 µm
Sensor Sensitivity (monochrome)	9V/lux-Sec. bei 550nm
Frame Speed	28 - 5,000 fps* @ full 512 (H) x 512 (V) resolution Up to 195,000 fps* with reduced resolution
Recording Time	1.5 sec. @ full resolution & 5,000 fps Extended recording times at reduced resolution and/or image speed
Shutter	Global Electronic Shutter from 2µsec to 1/ frame rate
Internal Dynamics	59 dB
Spectral Bandwidth	400 – 800 nm
System Design	Modular, scaleable and network-compatible concept via standard PC or notebook Synchronous processing of multiple cameras
Camera Size	93 (B) x 69 (H) x 92 (T) mm (C-Mount) 93 (B) x 69 (H) x 128 (T) mm (F-Mount)
Weight	900g, without lens
Environment	+5…45° C, (41-113°F)
Battery Capacity	Recording mode: 1h; standby mode 1.5 hours; Power Down mode 8 h
Lens Mount	C-Mount; F-Mount (option)
Power Supply	10,5 - 24V DC external power supply and internal rechargeable battery
Power Consumption	15W max
Software	MotionBLITZ® operator software for Windows 2000/XP™
Frame Storage	BMP and AVI - file format
Camera-PC Interface	1000/100 Ethernet Interface (Gigabit Ethernet)
Triggerung / Synchronisation	Ext. Trigger, ImageBLITZ / Sync.-Input on the camera (opto coupled)
Synchronisation	TLL-Sync. Output (opto coupled)
Analog Input	0-2.5V (8-Bit) (opto coupled)
Digital Input	4 Bit (TLL) (opto coupled)

*fps (frames per second)

Optional Extensions

Extended Buffer to 3 sec recording time @ full resolution & speed	ImageBLITZ®Auto Trigger	Multi sequence recording	F-Mount	Hi-G 100g Shock 100g / 25 msec Vibration 10g	Industrial Standard Phoenix Interface Plug	IRIG B Synchronisa-tion

Recording Data

Resolution	Frame Rate	Resolution	Frame Rate
512(H) x 512(V)	5,000 fps*	512(H) x 64(V)	40,000 fps*
512(H) x 256(V)	10,000 fps*	512(H) x 28(V)	80,000 fps*
512(H) x 128(V)	20,000 fps*	512(H) x 10(V)	195,000 fps*

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