

**High Resolution Multi-Channel / Multi-Spectral Framing Cameras**

**SIM**



**SIM02**



**SIMX**



**SIMD**



**Capable of up to 1 Billion Frames Per Second.**

Using ultra high-resolution image intensifiers and no-compromise optical design, takes image quality to the next level.

**The ULTIMATE High-Speed Video Camera**

**Kirana**

**924 x 768**

**180 frames**

**5 Million fps**



The ultimate High-Speed video camera that combines the flexibility of video technology with the resolution of the ultra high speed framing camera.

**Flight Follower System**

**Tracker<sup>2</sup>**



- Large lightweight SiC mirror
- Sturdy 3-axis mount
- Ultra High Precision controls
- Multiple operation modes
- Custom control and analysis software

**HR Still Camera / 11mp**

**SIR3**



SIR cameras are designed to withstand the harsh outdoor environment and to provide high reliability and superior image quality.

**Scientific CCD Camera**

**T-Cam**



- Up to 4008(H) x 2688(V) 12 bit images
- Shuttering speed down to 1µs
- Comprehensive triggering controls
- Ethernet control

**Image Intensifier System**

**SIL2**



- High gain & high resolution image intensifier
- Up to 1,000,000 fps / shuttering down to 50ns
- Suitable for most type of high speed video camera.

**Camera Trigger**

**SI-OT3**



- Detection of projectiles >0.7mm diameter
- Interchangeable objective lens to ensure at least 1/20 obscuration of the field of view.

**Velocity Trigger System**

**SI-VT-SYS**



- Store 15,000 time intervals
- Capable of capturing 200,000 rounds per minute
- 4 Independent output channels

**Laser Illumination System**

**SI-LUX 640**



- Variable Pulse width
- Suitable for Shadowgraph & Schlieren imaging
- Minimises speckle & fringe effects

**Multi Head Framing Camera**

**Cerberus**

**WORLD FIRST**



- 1360 x 1040px
- upto 128 frames
- upto 64 camera heads
- upto 200 Million fps
- 3D Stereo Imaging

**High Power Flashes**

**SI-IF 300**



**SI-AD 500**



# SI-OT3



The Specialised Imaging Optical Trigger is a general purpose ruggedised optical detector. Employing the combination of a unique multi-segment photodiode array coupled with both high and low pass filtering results in a highly reliable trigger that is sensitive from 300nm to 700nm.

## SI-OT3 FEATURES

- Detection of projectiles >0.7mm diameter
- Interchangeable objective lens to ensure at least 1/20 obscuration of the field of view.
- Battery Operated (18-34V DC)
- Environmentally protected from dust and moisture.

## Detailed Specifications

<b>INPUT</b>	
Sensor	Multi-Segment Photodiode array. Sensitivity from 300nm to 700nm.
Optics	Standard F-mount Nikon lens
<b>OUTPUTS</b>	
Trigger	50Ω BNC Sockets (5V)
<b>VOLTAGE</b>	
Input	18-34V DC
<b>MOUNT</b>	
Mount	Standard 3/8-16 tripod mounting thread
<b>ENVIRONMENTAL</b>	
Operating Temperature	-10°C to +50°C
Humidity	10—90% RH non condensing
EMC	Meets all EC harmonised standards



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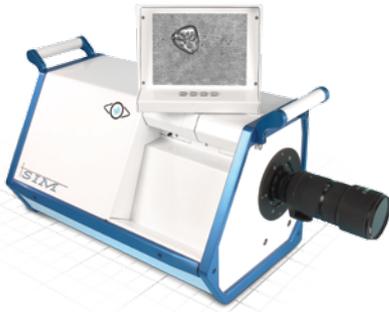
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## Detailed Specifications

# SIM



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### OPTICAL

Number of Channels	4 to 16
Optical Input	Single input beam splitting optics Channel can be fitted with individual filters
Lenses	Nikon F-mount
System Aperture	f2.8
Shutter	Electro-mechanical
Distortion	Nominally zero
Channel registration	Within one pixel after software correction
Intensity variation	Better than 5% across the image
Auxiliary Optical Channel Interface	Nikon F-mount bayonet

### INTENSIFIER/CCD

Image Sensor	ICX285AL
Active CCD Pixels	1360 (H) x 1024 (V)
Pixel Size	6.45µm (H) x 6.45µm (V)
Dynamic Range	12 bits
Intensifier	18mm High-Resolution MCP Output window Fiber Optic Photocathode S25, others on request Phosphor Screen P43.
Gain	Variable up to 10,000
Dynamic resolution	>50 lp/mm

### TIMING PARAMETERS

System Clock	1GHz quartz crystal controlled
Inherent Delay	50ns
Exposure Modes (each image)	Single exposure or multiple exposures (Max. 8) per channel
Exposure Times	3ns – 10ms in 1ns steps independently variable (optional 3ns)
Interframe Times	0ns – 20ms in 1ns steps independently variable
Delay to 1st exposure	50ns – 10ms in 1ns steps independently variable
Flash output	3ns – 1ms in 1ns steps independently variable
Framing rates	up to 1 Billion fps
Separation Times	30ns to 20ms in 1ns steps independently variable

### INPUT/OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Timing Monitor Pulses	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Flash Trigger Outputs	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Focus Monitor	Integral 8.4" TFT display monitor with keypad control
Camera Interface	Data and command transfer via 100 Mbps ethernet Cable length 10m (standard), other lengths available 100F X fibre optic ethernet link (upto 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.

### ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5° to +40°C
Humidity	10 – 90% RH non condensing
Vibration shock	10 – 40Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards



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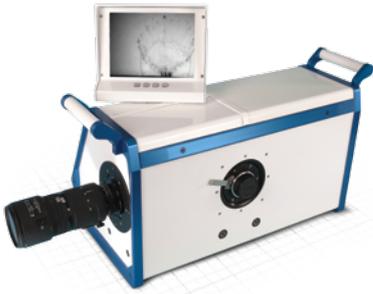
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## Detailed Specifications

# SIM02



### MODELS

	SIM02-4	SIM02-8	SIM02-16	SIM02-32
Number of Channels	2	4	8	16
Number of Images	4	8	16	32
Auxiliary Optical Channel Interface	Yes	Yes	Yes	No

### OPTICAL

Number of Channels	2 to 16
Optics	Single input beam splitting optics Channels can be fitted with individual filters
Lenses	Nikon F-Mount
System Aperture	f2.8
Shutter	Electro-mechanical
Distortion	Nominally zero
Channel Registration	Within one pixel after software correction
Intensity Variation	Better than 5% across the image
Auxiliary Optical Channel Interface	Nikon F-mount bayonet

### INTENSIFIER/CCD

Image Sensor	ICX285AL
Active CCD Pixel	1360 (H) x 1024 (V)
Pixel Size	6.45µm (H) x 6.45µm (V)
Dynamic Range	12 bits
Intensifier	18mm High resolution MCP Input window Fused Silica Output Window Fibre Optic Photocathode S25, others on request Phosphor screen P46
Gain	Variable up to 10,000
Dynamic resolution	>36lp/mm

### TIMING PARAMETERS

System Clock	1GHz quartz crystal controlled
Inherent Delay	50ns
Exposure Mode (each image)	Single exposure or multiple exposures (Max. 8) per channel
Exposure Time	3ns - 10ms in 1ns steps independently variable
Interframe Time	0ns - 20ms in 1ns steps independently variable
Delay to 1st exposure	50ns - 10ms in 1ns steps independently variable
Flash Outputs	3ns - 1ms in 1ns steps independently variable
Framing rates	up to 1 Billion fps
Separation Time (Multiple exposures on same channel)	30ns - 20ms in 1ns steps independently variable

### INPUT/OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Timing Monitor Pulses	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Flash Trigger Outputs	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Focus Monitor	Integral 8.4" TFT display monitor with keypad control
Camera Interface	Data and command transfer via 100Mbps Ethernet Cable length 10m (standard), other lengths up to 100m available 100FX fibre optic Ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats

### ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40 Hz Max. 10g in any direction
EMC	



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International Sales

## Detailed Specifications

# SIMD



### MODELS

	SIMD4	SIMD8	SIMD12	SIMD16	SIMD32
Number of Channels	2	4	6	8	16
Number of Images	4	8	12	16	32

### OPTICAL

Optics	Single input beam splitting optics Channels can be fitted with individual filters
Lenses	Nikon F-Mount
System Aperture	f2.8
Shutter	Electro-mechanical
Distortion	Nominally zero
Channel Registration	Within one pixel after software correction
Intensity Variation	Better than 5% across the image
Auxiliary Optical Channel Interface	Nikon F-mount bayonet (Optional)

### INTENSIFIER/CCD

Image Sensor	ICX285AL
Active CCD Pixel	1360 (H) x 1024 (V)
Pixel Size	6.45 µm (H) x 6.45 µm (V)
Dynamic Range	12 bits
Intensifier	18mm High resolution MCP Input window Fused Silica Output window Fibre Optic Photocathode S25, others on request Phosphor screen P46
Gain	Variable up to 10,000
Dynamic resolution	>36 lp/mm

### TIMING PARAMETERS

System Clock	1GHz quartz crystal controlled
Inherent Delay	50ns
Exposure Mode (each image)	Single exposure or multiple exposures (Max. 8) per channel
Exposure Time	3ns - 10ms in 1ns steps independently variable
Interframe Time	0ns - 20ms in 1ns steps independently variable
Delay to 1st exposure	50ns - 10ms in 1ns steps independently variable
Flash Outputs	3ns - 1ms in 1ns steps independently variable
Framing rates	up to 1 Billion fps
Separation Time	30ns - 20ms in 1ns steps independently variable

### INPUT/OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Timing Monitor Pulses	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Flash Trigger Outputs	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Camera Interface	Data and command transfer via 100Mbps ethernet cable length 10m (standard), other lengths up to 100m available 100FX fibre optic ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.

### ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40 Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards



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## Detailed Specifications

# SIMX



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### MODELS

	SIMX4	SIMX8	SIMX16
Number of Channels	4	8	16

### OPTICAL

Optics	Single input beam splitting optics Channels can be fitted with individual filters
Lenses	Nikon F-Mount
System Aperture	f2.8
Shutter	Electro-mechanical
Distortion	Nominally zero
Channel Registration	Within one pixel after software correction
Intensity Variation	Better than 5% across the image
Auxiliary Optical Channel Interface	Nikon F-mount bayonet (Optional)

### INTENSIFIER/CCD

Image Sensor	ICX285AL
Active CCD Pixel	1360 (H) x 1024 (V)
Pixel Size	6.45 µm (H) x 6.45 µm (V)
Dynamic Range	12 bits
Intensifier	18mm High resolution MCP Input window Fused Silica Output window Fibre Optic Photocathode S25, others on request Phosphor screen P43
Gain	Variable up to 10,000
Dynamic resolution	>50 lp/mm

### TIMING PARAMETERS

System Clock	1GHz quartz crystal controlled
Inherent Delay	50ns
Exposure Mode (each image)	Single exposure or multiple exposures (Max. 8) per channel
Exposure Time	3ns - 10ms in 1ns steps independently variable
Interframe Time	0ns - 20ms in 1ns steps independently variable
Delay to 1st exposure	50ns - 10ms in 1ns steps independently variable
Flash Outputs	3ns - 1ms in 1ns steps independently variable
Framing rates	up to 1 Billion fps
Separation Time (Multiple exposures on same channel)	30ns - 20ms in 1ns steps independently variable

### INPUT/OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Timing Monitor Pulses	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Flash Trigger Outputs	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Camera Interface	Data and command transfer via 100Mbps ethernet cable length 10m (standard), other lengths up to 100m available 100FX fibre optic ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.

### ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40 Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards



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## Detailed Specifications

# T-Cam



### OPTICAL

Number of Channels	1
Lenses	Nikon F-mount
System Aperture	Limited by lens
Distortion	Nominally zero

### CCD

	<b>SIS-43100</b>	<b>SIS-22100</b>
Image Sensor	KAI11002M	KAI4021M
Active CCD Pixel	4008 (H) x 2688 (V)	2048 (H) x 2048 (V)
Pixel Size	9µm (H) x 9µm (V)	7.4 µm (H) x 7.4 µm (V)
Dynamic Range	12 bits	12 bits

### TIMING PARAMETERS

System Clock	200MHz quartz crystal controlled
Inherent Delay	<70µs
Exposure Time	1µs—10ms in 5ns steps independently variable
Delay to 1st exposure	70µs—10ms in 5ns steps independently variable
Flash Outputs	400ns—1ms in 5ns steps independently variable

### INPUT/OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Flash Trigger Output	Pulse width (min. 10ns) and position user programmable. TTL into 50Ω
Camera Interface	Data and command transfer via Gigabit Ethernet. Cable length 10m (standard), other lengths up to 100m available 1000FX fibre optic Ethernet link (up to 2Krn) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.

### ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10—90% RH non condensing
Vibration shock	10—40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards



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## Detailed Specifications

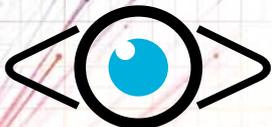
# Tracker<sup>2</sup>



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### MIRROR

Type  
Size (HxW) mm

Optical flat elliptical Silicon Carbide Mirror  
135x85x2

### TRACKING

Scan Ratio (SR)  
Scanning range (Max.)  
Scanning Distance  
Scanning Accuracy  
Positional Accuracy  
Calibration  
Projectile Velocity  
Projectile Drag  
Acceleration Angle

0.1 to 100  
(defined as the ratio of projectile velocity/stand-off distance)  
-50° to +50° / -60° to +60°  
>=2x standoff distance (distance from the line of flight to Tracker2)  
±0.2° (-45° to +50°)  
±0.02°  
Not required  
SR x Standoff distance  
0 to 100 m/s/m  
1° - 5° depending on scan rate  
(defined as the angle required to accelerate the mirror from rest to full scanning speed)

### OPERATING MODES

Fixed Velocity  
Velocity  
Position  
Drag  
Pre-defined profile  
Advanced User Functions  
Skewed Geometry

Single trigger using known velocity  
The scan is corrected using the measured velocity from at least 2 of the 8 available detector inputs.  
The scan position is corrected from the detector inputs. Known velocity is assumed.  
The scan is corrected using the measured velocity and drag from at least 3 of the 8 available detector inputs.  
Programmable Velocity Vs Time curve. Triggered using single trigger. Used for non-linear projectile trajectories.  
Specialised Imaging is prepared to customise modes of operation to user requirements.  
Allows non perpendicular operation

### CONTROL UNIT

System Clock  
Trigger Jitter

10MHz quartz crystal controlled  
<1us

### INPUT/OUTPUT SIGNALS

Detector In  
Trigger In  
Camera Trigger  
Communication Interface  
Software

BNC  
Rising or Falling Edge pulse  
Make/break  
TTL positive pulse  
Data and Command transfer via 1Gbps Ethernet  
Cable length 100m (standard). Other lengths available 1000FX fibre optic Ethernet link (up to 2Km) - optional  
Custom software compatible with Microsoft Windows Operating Systems for control and data archiving in various file formats

### ENVIRONMENTAL

Storage temperature  
Operating temperature  
Warmup Period  
Humidity  
Vibration shock  
EMC

-10°C to +74°C  
-5°C to +50°C  
Not Required  
10 - 90% RH non-condensing  
10 - 40Hz Max. 10g in any direction  
Meets all EC harmonized standards



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## Detailed Specifications

# SIL2



INTENSIFIER	SIL40HG50	SIL40NG50	SIL25HG50	SIL25NG50	SIL25HG50-X	SIL25HG50-D
Front Window	Fused Silica	Fused Silica	Fused Silica	Fused Silica	Fused Silica	Quartz
Output Window	Glass	Glass	Glass	Glass	Glass	Glass
Photocathode	S20	S20	S20	S20	S20	UV Enhanced S20
Output Phosphor	FS/10µs decay	FS/10µs decay	FS/10µs decay	FS/10µs decay	P46/300ns	P46/300ns
Input Area (diameter)	40mm	40mm	25mm	25mm	25mm	25mm
Spectral response (minimum)	15mA/W @ 214nm 55mA/W @ 450 nm 17mA/W @ 800 nm	17mA/W @ 214nm 55mA/W @ 450 nm 10mA/W @ 800 nm	15mA/W @ 214nm 48mA/W @ 450 nm 17mA/W @ 800 nm	20mA/W @ 214nm 53mA/W @ 450nm 17mA/W @ 800 nm	20mA/W @ 214nm 53mA/W @ 450nm 17mA/W @ 800 nm	20mA/W @ 220nm 53mA/W @ 450nm 17mA/W @ 800 nm
Radiant Gain (W/W @ 500nm)	100,000	10,000	100,000	10,000	100,000	500,000
Limiting resolution (Typical)	22 lp/mm	30 lp/mm	27 lp/mm	40 lp/mm	27 lp/mm	28 lp/mm
Frame Rate (Max. Fps)	100,000	100,000	100,000	100,000	1,000,000	1,000,000

### OPTICAL

Front Lens mount F-mount  
Optical Coupling F-mount lens fitting

### MECHANICAL

Mounting 1/4 BSW standard Tripod mount in base  
Support Adjustable lens/camera support bars

### TIMING PARAMETERS

System Clock 200MHz, quartz crystal controlled.  
Inherent Delay (5ns jitter) 60ns  
Exposure Time 50ns—DC in 5ns steps independently variable  
Inter Exposure Time 50ns—25ms in 5ns steps independently variable  
Number of exposures Up to 64 in pulsed mode.  
Unlimited in REP (synchronous) mode

### INPUT/OUTPUT SIGNALS

Triggers (2 off) Electrical signal (BNC connector)  
Maximum Input level 50V  
Threshold variable from ± 25V  
Positive or Negative polarity, Make/Break  
50Ω or 1KΩ termination

Local Control Local keypad with LCD display  
Aux Outputs Pulse width and position user programmable (min. 5ns)  
TTL into 50Ω

Control Interface Remote control via Standard 100Mbps Ethernet  
Software Custom control software compatible with Microsoft Windows  
XP and Vista.

### ENVIRONMENTAL

Storage temperature -10°C to +50°C  
Operating temperature -5° to +40°C  
Humidity 10 - 90% RH non condensing  
Vibration shock 10 - 40Hz Max. 10g in any direction  
EMC Meets all EC harmonized standards



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## Detailed Specifications

# SIR3



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### OPTICAL

Number of Channels	1
Lenses	Nikon F-mount (ruggedized mounting system)
System Aperture	f 2
Shutter	Electro-mechanical
Distortion	Nominally zero
Coupling	CCD to MCP via FO
Vignetting	<3%
Intensity variation	Better than 5% across the image
Optical Viewfinder	Optional

### INTENSIFIER/CCD

	SIR3-18D	SIR3-25D	SIR3-40D
Image Sensor	ICX285AL	KAI4021M	KAI11002M
Active CCD Pixel	1360 (H) x 1024 (V)	2048 (H) x 2048 (V)	4008 (H) x 2688 (V)
Pixel Size	6.45 $\mu\text{m}$ (H) x 6.45 $\mu\text{m}$ (V)	7.4 $\mu\text{m}$ (H) x 7.4 $\mu\text{m}$ (V)	9 $\mu\text{m}$ (H) x 9 $\mu\text{m}$ (V)
Dynamic Range	12 bits	12 bits	12 bits

### TIMING PARAMETERS

System Clock	200MHz quartz crystal controlled.
Inherent Delay	<130ns
Imaging Mode	Single or Double image
Exposure Modes (each image)	Single exposure or multiple exposures (Max. 16 - subject to imaging conditions).
Exposure Times	10ns – 10ms in 5ns steps independently variable
Delay to 1st exposure	130ns – 10ms in 5ns steps independently variable
Flash output	20ns to 1ms in 5ns steps independently variable
Separation	30ns to 20ms in 5ns steps independently variable

### INPUT/OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from $\pm 25\text{V}$ Positive or Negative polarity, Make/Break 50 $\Omega$ or 1K $\Omega$ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from $\pm 25\text{V}$ Positive or Negative polarity, Make/Break 50 $\Omega$ or 1K $\Omega$ termination
Flash Trigger Output	Pulse width (min. 10ns) and position user programmable. TTL into 50 $\Omega$
Camera Interface	Data and command transfer via Gigabit Ethernet Cable length 100m (standard) 1000FX fibre optic Ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.

### ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10–90% RH non condensing
Vibration shock	10–40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards



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