



# PHANTOM KT1640 KT1240 KT1610 KT1210

## HIGH-SPEED CAMERAS

### 4.2 Mpx BSI Sensor

2560 x 1664 at up to 3,750 fps (KT1640), up to 2,900 fps (KT1240)

### 1.0 Mpx BSI Sensor

1280 x 832 up to 15,640 fps (KT1610) up to 12,090 fps (KT1210)

## FEATURES & BENEFITS

### SMALL SIZE, BIG IMPACT

- Increased throughput capacity in a compact platform (12.5 X 12.5 X 16.3 cm) benefits stereo imaging applications by reducing overall system size and complexity
- Lightweight (3.2 kg) with mounting points on 4 sides and a removable handle makes installation simple

### WORKFLOW FLEXIBILITY

- Use 10Gb Ethernet for 7X faster data download directly from the camera's RAM buffer, up to 128 GB
- CF Express cards, SDI/HDMI video out and on-camera controls enable a secure and efficient untethered workflow

### KT1640 & KT1240 HIGH-SPEED, HIGH-RESOLUTION PRECISION

- 2560 x 1664 Back-side Illuminated (BSI) sensor ensures superior image performance due to increased pixel response
- Programmable I/O for advanced signals control, synchronization and precision triggering
- Sustained 16Gpx/s image throughput (KT1640), 12Gpx/s (KT1240), ensures maximum pixel resolution at any setting
- Reduce motion blur with exposure times down to 450 ns with Fast Option, independent of frame rate

### KT1610 & KT1210 ADVANCED SOLUTIONS FOR MOTION ANALYSIS

- 1280 x 832 Back-side Illuminated (BSI) sensor ensures superior image performance due to increased pixel response
- Programmable I/O for advanced signals control, synchronization and precision triggering
- Binned mode combines pixels for increased vertical resolution at the highest frame rates
- Reduce motion blur with exposure times down to 190 ns with Fast Option, independent of frame rate

**IMAGE & SENSITIVITY**

	KT1640 & KT1240		KT1610 & KT1210	
Sensor Type	CMOS, Back Side Illuminated (BSI) with Global Shutter			
Maximum Resolution	2560 x 1664	Binned 1280 x 832	1280 x 832	Binned 640 x 384
CAR Increments	512 x 32	Binned 256 x 64	256 x 32	Binned 128 x 64
Pixel Size (µm)	9.27	Binned 18.54	18.5	Binned 37.0
Sensor Size (mm)	23.7 x 15.4			
Bit Depth (ADCs)	12 bit			
	<b>EMVA 1288 Measurements (at 533 nm)</b>			
	Standard Mode	Binned Mode	Standard Mode	Binned Mode
Quantum Efficiency (%)	88.7 mono 73.5 color	84.2 mono	84.6% mono 77.0% color	83.0%
Max. SNR (dB)	39.8	45.2	39.9	45.8
Absolute Sensitivity Threshold (e <sup>-</sup> )	24.5 mono 22.4 color	59.8	23.9 mono 26.6 color	56.3
Saturation Capacity (e <sup>-</sup> )	9588 mono 9050 color	33,225	9,675 mono 9,968 color	37,882
Temporal Dark Noise (e <sup>-</sup> )	24.0	59.2	23.4	55.8
Dynamic Range (dB)	51.9	54.9	52.2	56.5

**MEMORY & STORAGE**

	KT1640 & KT1240		KT1610 & KT1210	
RAM Buffer	32GB, 64GB, 128GB RAM options			
Capture Duration**	<b>KT1640:</b> 32GB = 1.7s; 64GB = 3.3s; 128GB = 6.7s	<b>KT1240:</b> 32GB = 2s; 64GB = 4s; 128GB = 8s	<b>KT1610:</b> 32GB = 1.3s; 64GB = 2.6s; 128GB = 5.2s	<b>KT1210:</b> 32GB = 1.7s; 64GB = 3.4s; 128GB = 6.8s
Multi-Cine	Up-to 63 Partitions			
Non-Volatile Media	CF Express type B Approved cards at launch: Exascend 1TB Essential Series and Pro; Wise Advanced 1TB			
Media Transfer Rates	275 MB/s Full 32GB RAM save time = 2 minutes			

**FRAME RATES & EXPOSURE**

	KT1640 & KT1240		KT1610 & KT1210	
Top FPS at Max Resolution	<b>KT1640:</b> 3,750	<b>KT1240:</b> 2,900	<b>KT1610:</b> 15,640	<b>KT1210:</b> 12,090
Maximum FPS	<b>KT1640:</b> 421,000 KT1640-E225 225,000	<b>KT1240:</b> 326,270 KT1240-E225 225,000	<b>KT1610:</b> 687,500 std, 916,660 w/ FAST option* 225,000	<b>KT1210:</b> 687,500 std, 708,330 w/ FAST option* 225,000
Minimum FPS	100			
Frame Timer Clock	80 MHz		110 MHz	
Minimum Exposure	1.06 µs standard; 450 ns with FAST Option* Pulsed lighting techniques can reduce effective exposure to 200 ns or less		1.06 µs standard; 190 ns with FAST Option*	
PIV Features	Shutter-off mode with a straddle time of 290 ns (effective frame pair frequency of 3.44 MHz for frame straddling PIV)		Shutter-off mode with a straddle time of 274 ns (effective frame pair frequency of 3.64 MHz for frame straddling PIV)	
Exposure Features	Burst Mode; EDR (Extreme Dynamic Range); Auto-Exposure, Overexposure indication over video and in PCC			

**CONTROL**

Software & OS	Phantom PCC (Windows x64); SDK available for C/C++, C#, Python, MatLab and LabView
On-Camera Controls	Standard Feature. Access menu system with encoder, viewed on video monitor. Buttons for trigger, play and save – Color indicates current camera state.
Primary File Format	Phantom Cine RAW (.cine)
Alternative File Formats	Easily convert to formats including .mp4, Apple ProRes. mov, .avi, Tiff, JPG, DNG and many more using PCC. Cine files are directly compatible with many major video editing and motion analysis programs.
Software Features	Continuous Recording for automated workflows, Integrated Data Acquisition (NI-DAQ), support for DIC Calibration with Sync-Snapshot menu, automatic file naming, advanced Image Tools including Crop & Resample, Tone Curves, Filters and more.

**MECHANICAL**

Housing Variants	N/A
Size	4.9 x 4.9 x 6.4 in (125 x 125 x 163 mm); handle adds 1.9 in (48 mm)
Weight	7 lbs (3.2 kg)
Lens Mounts	F-Mount standard (aperture support for Nikon G-style lenses). Also available: Canon EF (with electronic focus and iris control), PL, C and M42. Mounts are easily interchangeable and can be removed to integrate with different optics.
Mounting Points	Standard 1/4x20 and 3/8" mounting points on bottom, with 1/4x20 and M5 mounting points on each side.
Internal Shutter	Standard, for remote black references
Cooling	Active cooling. Quiet mode disables fans during capture.

**ENVIRONMENTAL**

Operating Temperature	-10 to +50°C
Storage Temperature	-20 to +70°C
Operating Humidity	≤ 85% RH, non-condensing
Operational Shock	30G, 11msec sawtooth, 3 axes, 2 directions per axis, 10 shocks per direction (60 pulses total)
Operational Vibration	7.5 Grms, 50Hz-2KHz, 3 axes, 15 min/axis, IAW MIL-STD-202H Method 214-1, Test Condition B
Regulatory	<b>Made in the USA</b> <b>Emissions</b> – CE Compliant EN 61326-1, Class A <b>Immunity</b> – CE Compliant EN 61326-1, Class A <b>FCC</b> – CFR 47, Part 15, Subpart B & ICES-0003, Class A <b>Safety</b> – IEC 62368-1

**POWER**

AC Power Voltage Range	100-240 VAC, 160W power supply included 20-28V
Power Consumption	90W typical
Battery Options	Works with 24V battery sources only, input through primary power port

**SERVICES AND SUPPORT NETWORK**

Phantom cameras are supported by Vision Research's Global Service and Support network, providing PhantomCare services from multiple sites around the globe. Contact us about training courses and application services applying both simple and advanced high-speed scientific imaging techniques.

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