



Phantom S991
Front View



Phantom S991
Back View

PHANTOM S991

4K HIGH SPEED
MACHINE VISION CAMERA

937 fps at 4096 x 2304 resolution
CXP-over-Fiber for extreme high-speeds
High image quality, with low noise

FEATURES & BENEFITS

DESIGNED FOR EXTREME HIGH-SPEED MACHINE VISION

- The Phantom S991 uses renowned Phantom sensor technology to offer both high resolution imaging and high frame rates to achieve 9Gpx/sec (70 Gbps) throughput and over 900 fps at full resolution and over 70,000 fps at smaller resolutions.
- The S991 employs CoaXPress-over-Fiber (CXPoF) with CXP-12, the latest in high-speed machine vision technology, to deliver high throughput with ease of use. Two simple cables reliably transfer data, with very low latency.
- CXP 2.0 protocol is an industry accepted standard and supports extreme high frame rates.

PACKED WITH PHANTOM QUALITY

- 9 Mpx resolution with a 6.75µm pixel and 12-bit capabilities provides exceptional detail.
- Phantom image quality offers very low noise and high dynamic range for the clearest images.
- Flexible, with Rolling and Global shutter, 8-bit or 12-bit selection, and a full selection of signals.

IMAGE & SENSITIVITY

Sensor Type	CMOS, with Global / Rolling Shutter	
Maximum Resolution	4096 x 2304	
CAR Increments	128 x 4 (Bank A); 128 x 8 (Banks A & B)	
Pixel Size	6.75 μm	
Sensor Size	27.6 x 15.5 mm: 31.72 mm diagonal	
Bit Depth	12 bit, output in either 12-bit or 8 bit	
	EMVA 1288 Measurements (at 532 nm)	
	Global Shutter	Rolling Shutter
Quantum Efficiency %	49.2% color	48.3% color
Max. SNR (dB)	42.5	44.3
Absolute Sensitivity Threshold (p)	66.4 color	20.58 color
Saturation Capacity (e ⁻)	17960 color	26985 color
Temporal Dark Noise (e ⁻)	32.15	9.23
Dynamic Range (dB)	54.8	68.7

- Reported measurements were taken at 532 nm with both monochrome and color cameras

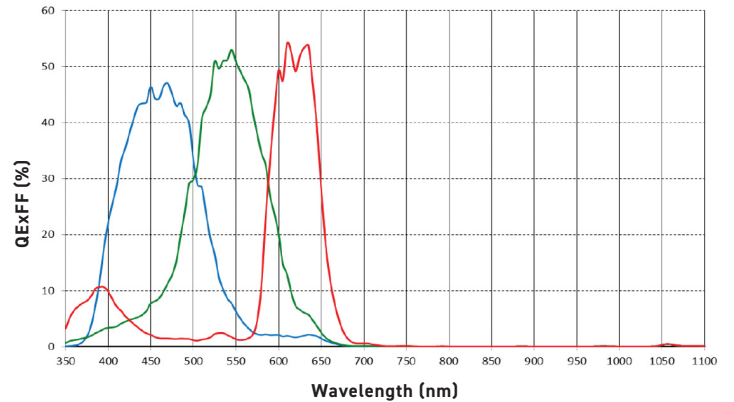
- Visit: www.phantomhighspeed.com/emva for more information on EMVA 1288



Phantom S991 Connectors

SPECTRAL RESPONSE

Quantum Efficiency Color



CONNECTIVITY & SIGNALS

QSFP+ Ports	Bank A Bank B	
Timecode	IRIG-B Modulated and Un-modulated	
Port Descriptions	Dedicated BNC	Timecode-in
	I/O BNCs	3 Ports
	Power	6-pin Fischer
	Ethernet (for programming only)	RJ45
I/O Signals - available on GPIO 0, 1, 2	Signal	I/O
	Trigger In	Input
	Trigger Out	Output
	Software Trigger Out	Output
	Strobe	Output
	Event	Input
	Ready	Output
	Memgate	Input
	Timecode In	Input
	Timecode out	Output
	User out	Output
	User in	Input



Phantom S991 with cables

FRAME RATES & EXPOSURE		
	12-bit	8-bit
Top FPS at Max Resolution	625	937
1 Megapixel FPS	2,640	2,640
Maximum FPS	52,080	52,080
Minimum FPS	30	
Minimum Exposure	5 μs	
Electronic Shutter	Global Shutter / Rolling Shutter	
Exposure Features	Extreme Dynamic Range (EDR), Auto Exposure	

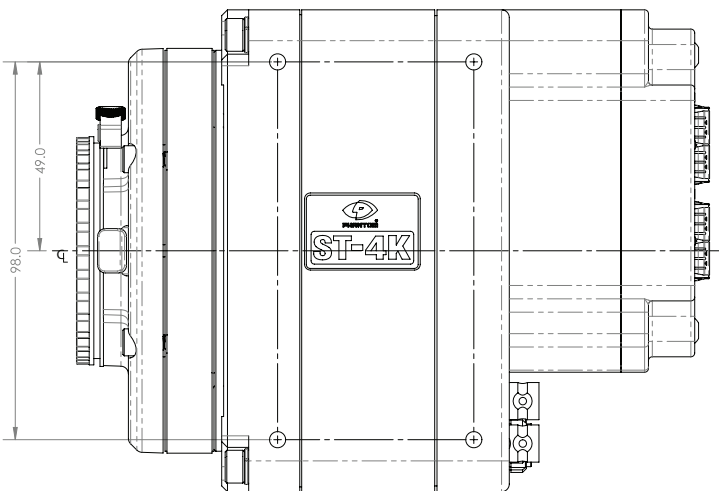
RESOLUTION		Bit Depth	FPS			
H	V		2 Fiber Banks		1 Fiber Bank	
			Global Shutter	Rolling Shutter	Global Shutter	Rolling Shutter
4096	2304	8-bit	937	937	465	465
		12-bit	620	620	310	310
3072	2000	8-bit	1,070	1,070	710	710
		12-bit	950	950	470	470
2048	1600	8-bit	1,340	1,340	1,340	1,340
		12-bit	1,340	1,340	890	890
1280	800	8-bit	2,630	2,640	2,630	2,640
		12-bit	2,630	2,640	2,630	2,640
1024	512	8-bit	4,030	4,060	4,030	4,060
		12-bit	4,030	4,060	4,030	4,060
1024	128	8-bit	13,840	14,200	13,840	14,200
		12-bit	13,840	14,200	13,840	14,200
1920	64	8-bit	23,270	24,300	23,270	24,300
		12-bit	23,270	24,300	16,180	16,900
2560	32	8-bit	35,280	37,710	28,220	30,170
		12-bit	35,280	37,710	18,810	20,110
2048	16	8-bit	47,550	52,080	47,550	52,080
		12-bit	47,550	52,080	31,700	34,720
128	4	8-bit	N/A	N/A	64,330	72,910
		12-bit	N/A	N/A	64,330	72,910

CONTROL

Operational Protocols	CXP-12, CoaXPress-over-Fiber (CXPoF), CXP 2.0 protocol compliant
Exposure Start	Programmed in GenICam and operates as FSYNC
Exposure Active	Frame state and exposure duration are controlled by an input signal, for synchronizing with systematic processes
Metadata Available	Meta data including Event ID, Event timestamp, Event payload can be streamed

MECHANICAL

Size	5 x 5 x 6.3" (125 x 125 x 159.7 mm)
Weight	7.0 lbs (3.2 kg)
Lens Mounts	F Mount standard, EOS, C, M42 and PL Mounts optional
Mounting Points	6 x 1/4-20, 16 x M5-0.8 mounting points
Internal Shutter	Standard, for remote black references
Cooling	Active cooling. Fans can be disabled via Quiet mode.



POWER

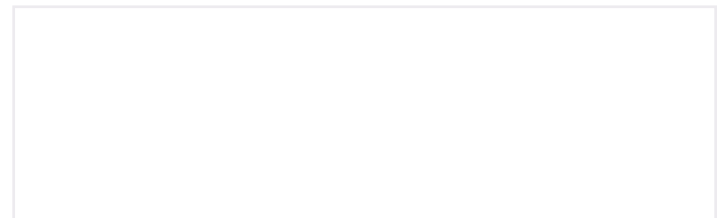
AC Power	80W 24V power supply included
Voltage Range	16-32 VDC

ENVIRONMENTAL

Operating Temperature	0 to +50°C
Storage Temperature	-20 to +70°C
Operational Shock	30G, sawtooth wave, 11 ms, +/- 10 pulses all axes
Operational Vibration	MIL-STD-202H Method 214-I; Test Condition A. Rated 7.5 Grms, 15 min/axis
Regulatory	Made in the USA Emissions – CE & UKCA Compliant EN 61326-1 Immunity – CE & UKCA Compliant EN 61326-1 FCC – CFR 47, Part 15, Subpart B & ICES-0003, Class A Safety – IEC 60950-1

GLOBAL SUPPORT NETWORK

Phantom cameras are supported by Vision Research's Global Service and Support network, providing PhantomCare services from multiple sites around the globe.



ABOUT VISION RESEARCH

Focused. Since 1950, Vision Research has been designing, and manufacturing high-speed cameras. Our single focus is to invent, build, and support the most advanced cameras possible.



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