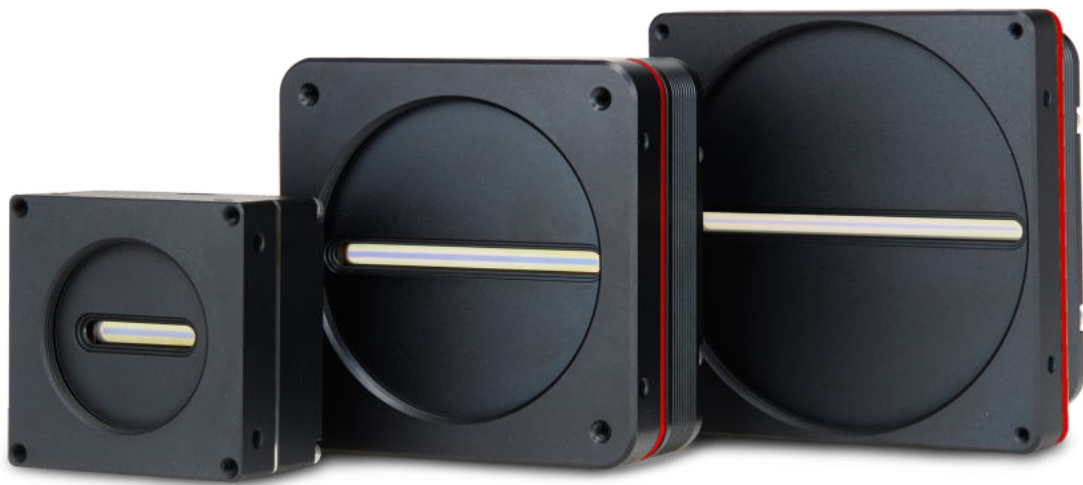


VT Series

High Sensitivity & High Speed TDI Line Scan Cameras



TDI

Next generation hybrid TDI line scan technology
Up to 250 kHz at 9k resolution and 100 kHz at 23k resolution
Greater sensitivity at faster speed with very low noise



®

VIEWORKS

vision.vieworks.com

VT Series – High Sensitivity TDI Line Scan Cameras

Overview

VT series, Vieworks' Time Delayed Integration line scan cameras, is designed for applications where faster line rates and higher sensitivity are crucial.

Vieworks' advanced TDI line scan technology based on the outstanding hybrid imaging sensors allows image captures as fast as 250 kHz line rates with up to 128× higher sensitivity using the M72 mount based VT-9K7X camera.

Even superior resolution and sensitivity, up to 23360 pixel resolution at 100 kHz line rate and 256× greater sensitivity can be achieved using the M95 mount based VT-23K3.5X camera.

A diverse lineup of VT TDI line scan cameras is now available at reasonable prices to meet various system design requirements including resolution, line rate, sensitivity and lens mount (M42/M72/M95) specifications.

VT series is available with Camera Link or the latest CoaXPress interface standard to meet application-specific requirements.

Featured with high speed and high sensitivity, this brand new technology is ideal for demanding applications such as flat panel display inspection, wafer inspection, printed circuit board inspection, and high-performance document scanning.

Main Features

- 3k / 4k / 6k / 9k / 12k / 16k / 18k / 23k TDI Line Scan Cameras
- Bidirectional Operations with up to 256 TDI stages
- CoaXPress or Camera Link Interface
- Anti-blooming
- Advanced PRNU and DSNU Correction
- Area Scan Mode for Camera Alignment

Applications

- Flat Panel Display Inspection
- Printed Circuit Board Inspection
- Wafer Inspection
- High Performance Document Scanning



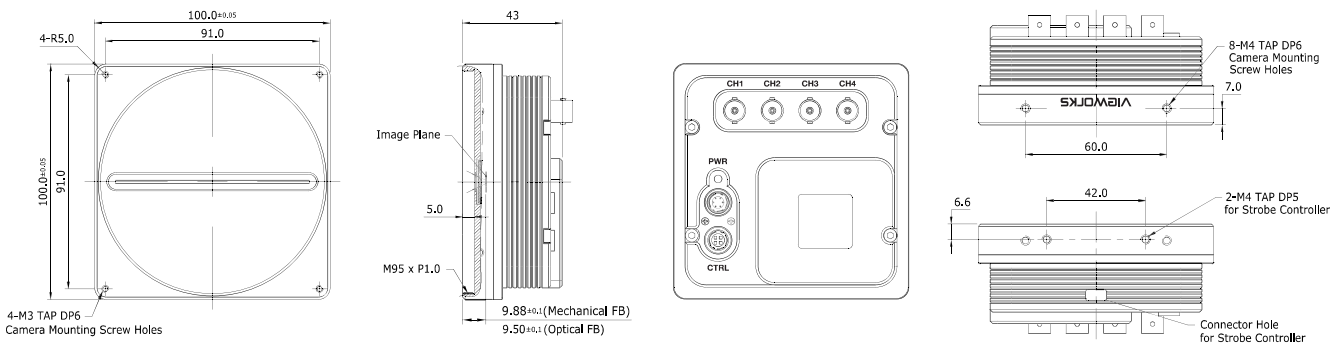
VT Series – High Sensitivity TDI Line Scan Cameras

M95 Mount based VT Series Specifications



Model	VT-16K5X-E140A-64	VT-16K5X-H140A-256	VT-23K3.5X-E100A-64	VT-23K3.5X-H100A-256
Resolution (H × V)	16384 × 64	16384 × 256	23360 × 64	23360 × 256
Pixel Size	5.0 μm × 5.0 μm		3.5 μm × 3.5 μm	
Interface	CoaXPress (CXP-6, 4 CH)			
Max. Line Rate	140 kHz (@ROI 16384)		100 kHz (@ROI 23360)	
Max. Line Rate (2 × 2 Binning)	120 kHz		100 kHz	
Min. Line Rate	1 kHz			
Camera Image Memory	16 MB		23 MB	
Pixel Data Format	8 / 10 / 12 bit			
TDI Stage	64	64 / 128 / 192 / 256	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width			
Throughput	2.29 Gpix/s		2.34 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)			
Black Level	-255 ~ 255 at 8 bit			
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×			
Lens Mount	M95 × 1			
Dimension / Weight	100 mm × 100 mm × 43 mm / 608 g			
Temperature	Ambient Operating: 0°C ~ 50°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C			
Power	10 ~ 30 V DC			
Power Dissipation	Typ. 12.0 W		Typ. 15.0 W	
API SDK	Vieworks Imaging Solution 7.X			

Mechanical Dimension in mm



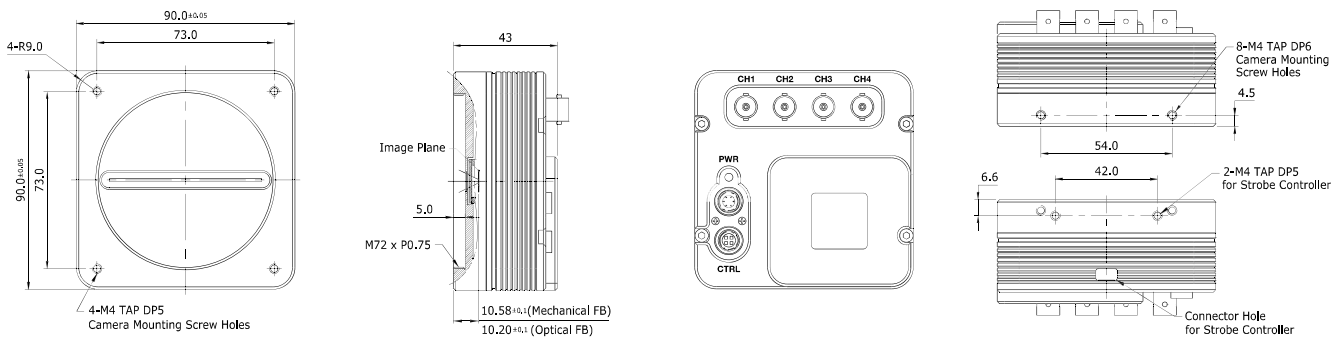
VT Series – High Sensitivity TDI Line Scan Cameras

M72 Mount based VT Series Specifications



Model	VT-6K10X-E170A-32	VT-6K10X-H170A-128	VT-9K7X-E250A-32	VT-9K7X-H250A-128
Resolution (H × V)	6240 × 32	6240 × 128	8912 × 32	8912 × 128
Pixel Size	10.0 μm × 10.0 μm		7.0 μm × 7.0 μm	
Interface	CoaXPress (CXP-6, 4 CH)			
Max. Line Rate	172 KHz (@ROI 6240)		250 KHz (@ROI 8912)	
Max. Line Rate (2 × 2 Binning)	-		208 KHz	
Min. Line Rate	1 KHz			
Camera Image Memory	6 MB		9 MB	
Pixel Data Format	8 / 10 / 12 bit			
TDI Stage	32	32 / 64 / 96 / 128	32	32 / 64 / 96 / 128
Trigger Mode	Free-Run, Timed, Trigger Width			
Throughput	1.07 Gpix/s		2.23 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)			
Black Level	-255 ~ 255 at 8 bit			
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×			
Lens Mount	M72 × 0.75			
Dimension / Weight	90 mm × 90 mm × 43 mm / 500 g			
Temperature	Ambient Operating: 0°C ~ 40°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C			
Power	10 ~ 30 V DC			
Power Dissipation	Typ. 10.0 W			
API SDK	Vieworks Imaging Solution 7.X			

Mechanical Dimension in mm



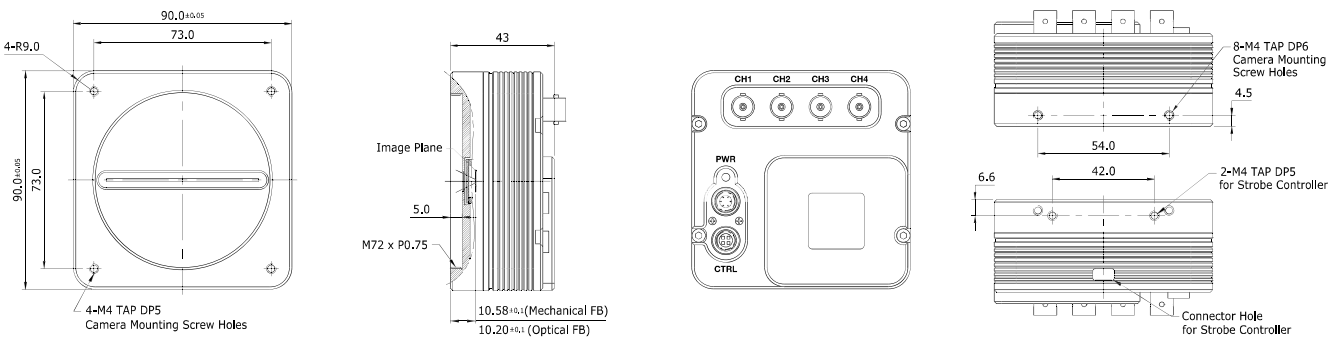
VT Series – High Sensitivity TDI Line Scan Cameras

M72 Mount based VT Series Specifications



Model	VT-12K5X-E200A-64	VT-12K5X-H200A-256	VT-18K3.5X-E140A-64	VT-18K3.5X-H140A-256
Resolution (H × V)	12480 × 64	12480 × 256	17824 × 64	17824 × 256
Pixel Size	5.0 μm × 5.0 μm		3.5 μm × 3.5 μm	
Interface	CoaXPress (CXP-6, 4 CH)			
Max. Line Rate	192 kHz (@ROI 12480) 200 kHz (@ROI 12000)		134 kHz (@ROI 17824) 140 kHz (@ROI 17120)	
Max. Line Rate (2 × 2 Binning)	172 kHz		140 kHz	
Min. Line Rate	1 kHz			
Camera Image Memory	12 MB		18 MB	
Pixel Data Format	8 / 10 / 12 bit			
TDI Stage	64	64 / 128 / 192 / 256	64	64/128/192/256
Trigger Mode	Free-Run, Timed, Trigger Width			
Throughput	2.40 Gpix/s		2.42 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)			
Black Level	-255 ~ 255 at 8 bit			
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×			
Lens Mount	M72 × 0.75			
Dimension / Weight	90 mm × 90 mm × 43 mm / 500 g			
Temperature	Ambient Operating: 0°C ~ 40°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C			
Power	10 ~ 30 V DC			
Power Dissipation	Typ. 10.0 W		Typ. 12.0 W	
API SDK	Vieworks Imaging Solution 7.X			

Mechanical Dimension in mm



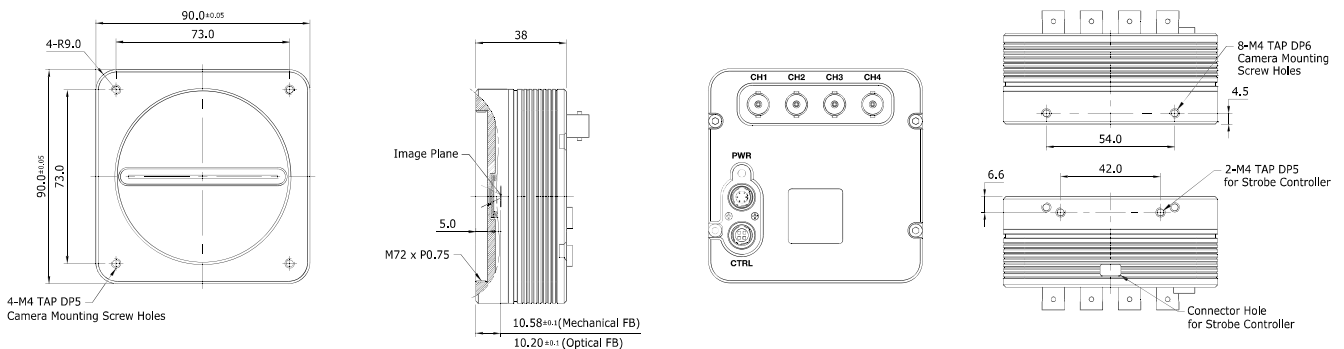
VT Series – High Sensitivity TDI Line Scan Cameras

M72 Mount based VT Series Specifications



Model	VT-9K7X-E120A-32	VT-9K7X-H120A-128	VT-12K5X-E100A-64	VT-12K5X-H100A-256
Resolution (H × V)	8912 × 32	8912 × 128	12480 × 64	12480 × 256
Pixel Size	7.0 μm × 7.0 μm		5.0 μm × 5.0 μm	
Interface	CoaXPress (CXP-6, 4 CH)			
Max. Line Rate	125 kHz (@ROI 8912)		100 kHz (@ROI 12480)	
Max. Line Rate (2 × 2 Binning)	125 kHz		100 kHz	
Min. Line Rate	1 kHz			
Camera Image Memory	9 MB		12 MB	
Pixel Data Format	8 / 10 / 12 bit			
TDI Stage	32	32 / 64 / 96 / 128	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width			
Throughput	1.11 Gpix/s		1.25 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)			
Black Level	-255 ~ 255 at 8 bit			
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×			
Lens Mount	M72 × 0.75			
Dimension / Weight	90 mm × 90 mm × 38 mm / 500 g			
Temperature	Ambient Operating: 0°C ~ 40°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C			
Power	10 ~ 30 V DC			
Power Dissipation	Typ. 10.0 W			
API SDK	Vieworks Imaging Solution 7.X			

Mechanical Dimension in mm



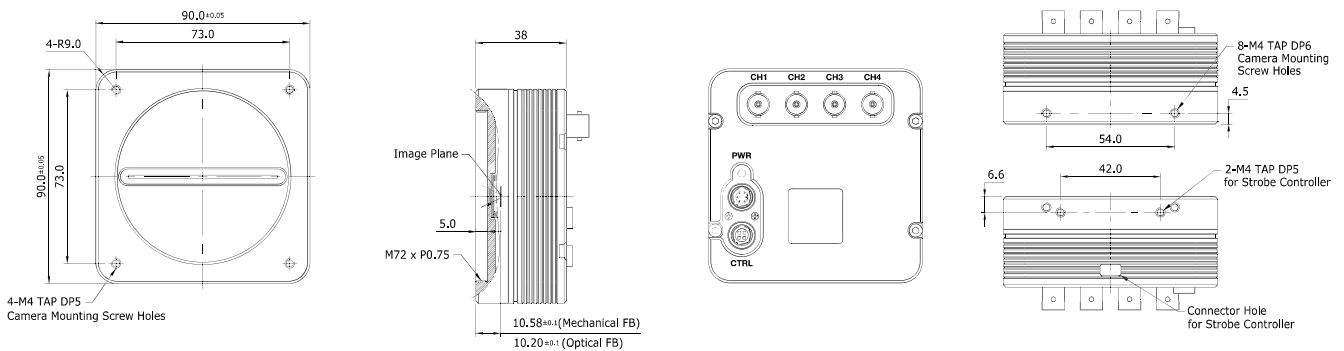
VT Series – High Sensitivity TDI Line Scan Cameras

M72 Mount based VT Series Specifications



Model	VT-18K3.5X-E80A-64	VT-18K3.5X-H80A-256
Resolution (H × V)	17824 × 64	17824 × 256
Pixel Size	3.5 μm × 3.5 μm	
Interface	CoaXPress (CXP-6, 4 CH)	
Max. Line Rate	80 kHz (@ROI 17824)	
Max. Line Rate (2 × 2 Binning)	80 kHz	
Min. Line Rate	1 kHz	
Camera Image Memory	18 MB	
Pixel Data Format	8 / 10 / 12 bit	
TDI Stage	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width	
Throughput	1.43 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)	
Black Level	-255 ~ 255 at 8 bit	
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×	
Lens Mount	M72 × 0.75	
Dimension / Weight	90 mm × 90 mm × 38 mm / 500 g	
Temperature	Ambient Operating: 0°C ~ 40°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C	
Power	10 ~ 30 V DC	
Power Dissipation	Typ. 12.0 W	
API SDK	Vieworks Imaging Solution 7.X	

Mechanical Dimension in mm



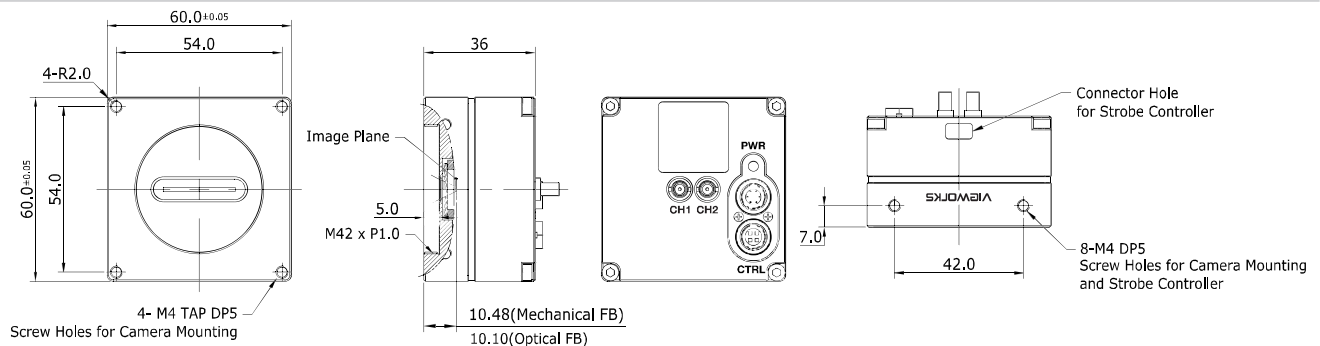
VT Series – High Sensitivity TDI Line Scan Cameras

M42 Mount based VT Series Specifications



Model	VT-3K7X-E250A-32	VT-3K7X-H250A-128	VT-4K5X-E200A-64	VT-4K5X-H200A-256
Resolution (H × V)	3200 × 32	3200 × 128	4640 × 64	4640 × 256
Pixel Size	7.0 μm × 7.0 μm		5.0 μm × 5.0 μm	
Interface	CoaXPress (CXP-6, 2 CH)			
Max. Line Rate	250 kHz		200 kHz	
Max. Line Rate (2 × 2 Binning)	208 kHz		176 kHz	
Min. Line Rate	1 kHz			
Camera Image Memory	3 MB		4 MB	
Pixel Data Format	8 / 10 / 12 bit			
TDI Stage	32	32 / 64 / 96 / 128	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width			
Throughput	0.80 Gpix/s		0.93 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)			
Black Level	-255 – 255 LSB at 8 bit			
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×			
Lens Mount	M42 × 1 (C or F-mount is available upon request)			
Dimension / Weight	60 mm × 60 mm × 36 mm / 223 g			
Temperature	Ambient Operating: 0°C ~ 50°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C			
Power	10 – 30 V DC			
Power Dissipation	Typ. 3.5 W		Typ. 4.0 W	
API SDK	Vieworks Imaging Solution 7.X			

Mechanical Dimension in mm



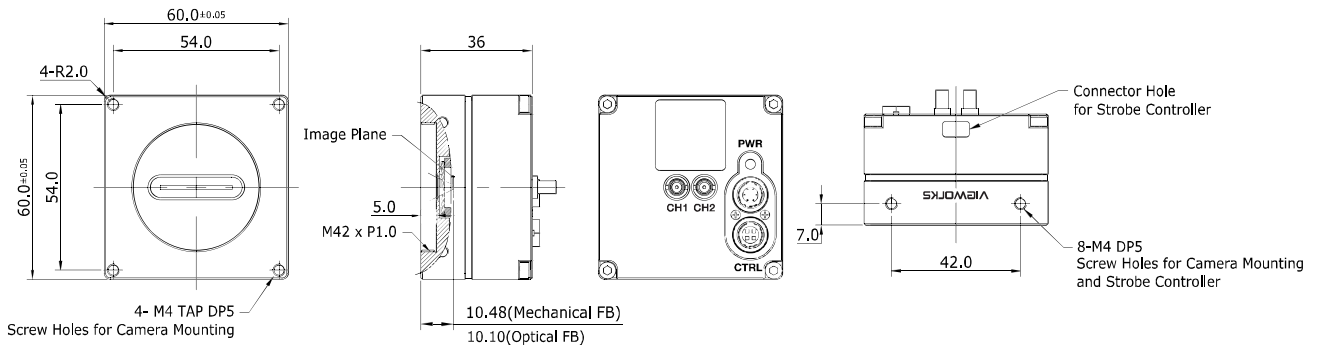
VT Series – High Sensitivity TDI Line Scan Cameras

M42 Mount based VT Series Specifications



Model	VT-6K3.5X-E160A-64	VT-6K3.5X-H160A-256
Resolution (H × V)	6560 × 64	6560 × 256
Pixel Size	3.5 μm × 3.5 μm	
Interface	CoaXPress (CXP-6, 2 CH)	
Max. Line Rate	160 kHz	
Max. Line Rate (2 × 2 Binning)	140 kHz	
Min. Line Rate	1 kHz	
Camera Image Memory	6 MB	
Pixel Data Format	8 / 10 / 12 bit	
TDI Stage	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width	
Throughput	1.05 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)	
Black Level	-255 – 255 LSB at 8 bit	
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×	
Lens Mount	M42 × 1 (C or F-mount is available upon request)	
Dimension / Weight	60 mm × 60 mm × 36 mm / 223 g	
Temperature	Ambient Operating: 0°C ~ 50°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C	
Power	10 – 30 V DC	
Power Dissipation	Typ. 4.5 W	
API SDK	Vieworks Imaging Solution 7.X	

Mechanical Dimension in mm



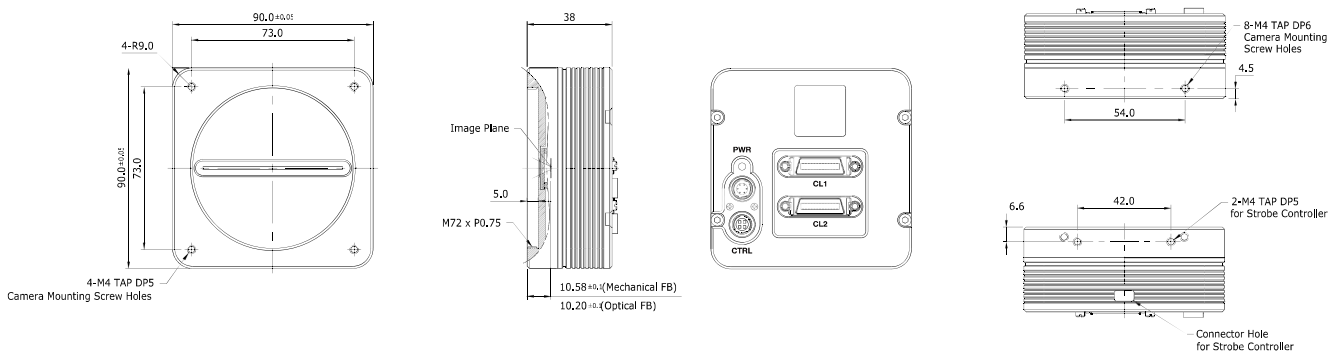
VT Series – High Sensitivity TDI Line Scan Cameras

M72 Mount based VT Series Specifications



Model	VT-4K7C-E120A-32	VT-4K7C-H120A-128	VT-4K14C-E120A-16	VT-4K14C-H120A-64	VT-9K7C-E80A-32	VT-9K7C-H80A-128
Resolution (H × V)	4096 × 32	4096 × 128	4096 × 16	4096 × 64	8912 × 32	8912 × 128
Pixel Size	7.0 μm × 7.0 μm		14.0 μm × 14.0 μm		7.0 μm × 7.0 μm	
Interface	Camera Link Base / Medium / Full / 10 Tap, 26-pin MDR Connector					
Max. Line Rate	125kHz (@ROI 4096)		125kHz (@ROI 4096)		94kHz (@ROI 8912)	
Max. Line Rate (2 × 2 Binning)	120 kHz		-		120 kHz	
Min. Line Rate	1 kHz					
Camera Image Memory	4 MB				9 MB	
Camera Link Pixel Clock	85 MHz					
Pixel Data Format	8 bit (2/4/8/10 Tap) / 10 bit (2/4 Tap) / 12 bit (2/4 Tap)					
TDI Stage	32	32/64/96/128	16	16/32/48/64	32	32/64/96/128
Trigger Mode	Free-Run, Timed, Trigger Width					
Throughput	0.51 Gpix/s		0.51 Gpix/s		0.83 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)					
Black Level	-255 ~ 255 at 8 bit					
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×					
Lens Mount	M72 × 0.75					
Dimension/Weight	90 mm × 90 mm × 38 mm / 500 g					
Temperature	Ambient Operating: 0°C ~ 40°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C					
Power	10 ~ 30 V DC					
Power Dissipation	Typ. 12.0 W					
Configuration SW	Configurator					

Mechanical Dimension in mm



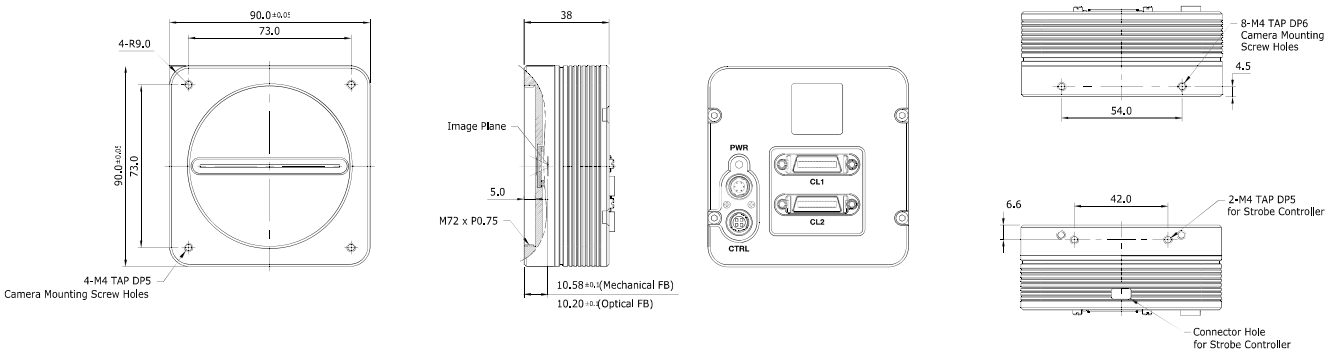
VT Series – High Sensitivity TDI Line Scan Cameras

M72 Mount based VT Series Specifications



Model	VT-12K5C-E60A-64	VT-12K5C-H60A-256	VT-18K3.5C-E40A-64	VT-18K3.5C-H40A-256
Resolution (H × V)	12480 × 64	12480 × 256	17824 × 64	17824 × 256
Pixel Size	5.0 μm × 5.0 μm		3.5 μm × 3.5 μm	
Interface	Camera Link Base / Medium / Full / 10 Tap, 26-pin MDR Connector			
Max. Line Rate	67kHz (@ROI 12480)		47kHz (@ROI 17824)	
Max. Line Rate (2 × 2 Binning)	100 kHz		80 kHz	
Min. Line Rate	1 kHz			
Camera Image Memory	12 MB		18 MB	
Camera Link Pixel Clock	85 MHz			
Pixel Data Format	8 bit (2/4/8/10 Tap) / 10 bit (2/4 Tap) / 12 bit (2/4 Tap)			
TDI Stage	64	64 / 128 / 192 / 256	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width			
Throughput	0.83 Gpix/s			
Gamma Correction	User Defined Lookup Table (LUT)			
Black Level	-255 ~ 255 at 8 bit			
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×			
Lens Mount	M72 × 0.75			
Dimension / Weight	90 mm × 90 mm × 38 mm / 500 g			
Temperature	Ambient Operating: 0°C ~ 40°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C			
Power	10 ~ 30 V DC			
Power Dissipation	Typ. 12.0 W			
Configuration SW	Configurator			

Mechanical Dimension in mm



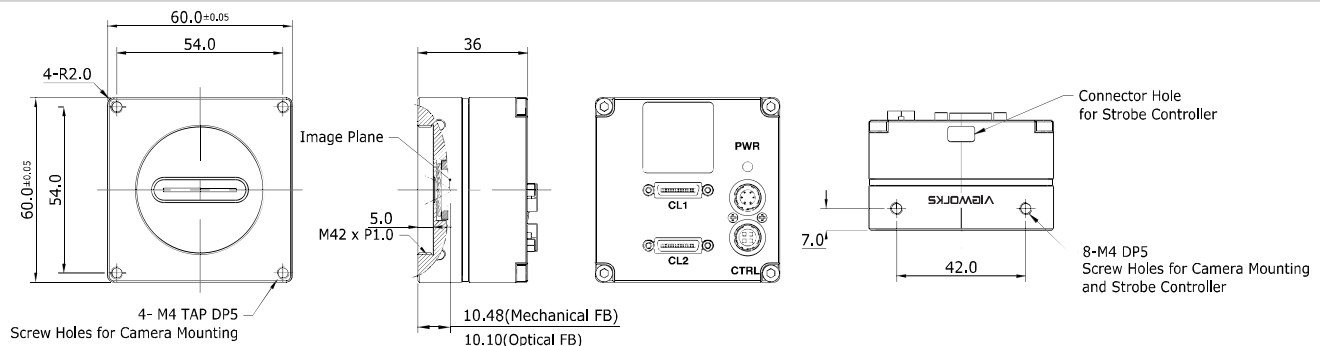
VT Series – High Sensitivity TDI Line Scan Cameras

M42 Mount based VT Series Specifications



Model	VT-3K7C-E100A-32	VT-3K7C-H100A-128	VT-4K5C-E100A-64	VT-4K5C-H100A-256
Resolution (H × V)	3200 × 32	3200 × 128	4640 × 64	4640 × 256
Pixel Size	7.0 μm × 7.0 μm		5.0 μm × 5.0 μm	
Interface	Camera Link Base / Medium / Full / 10 Tap, 26-pin SDR Connector			
Max. Line Rate	100 kHz		100 kHz	
Max. Line Rate (2 × 2 Binning)	100 kHz		100 kHz	
Min. Line Rate	1 kHz			
Camera Image Memory	3 MB		4 MB	
Camera Link Pixel Clock	40 MHz / 60 MHz / 80 MHz / 85 MHz			
Pixel Data Format	8 bit (2/4/8/10 Tap) / 10 bit (2/4 Tap) / 12 bit (2/4 Tap)			
TDI Stage	32	32 / 64 / 96 / 128	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width			
Throughput	0.32 Gpix/s		0.46 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)			
Black Level	-255 – 255 LSB at 8 bit			
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×			
Lens Mount	M42 × 1 (C or F-mount is available upon request)			
Dimension/Weight	60 mm × 60 mm × 36 mm / 223 g			
Temperature	Ambient Operating: 0°C ~ 50°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C			
Power	10 – 30 V DC			
Power Dissipation	Typ. 3.5 W		Typ. 4.0 W	
Configuration SW	Configurator			

Mechanical Dimension in mm



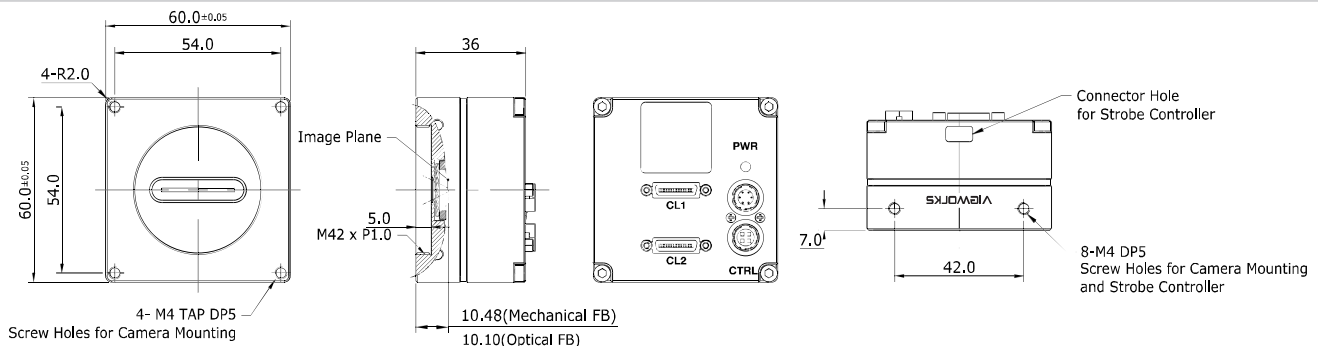
VT Series – High Sensitivity TDI Line Scan Cameras

M42 Mount based VT Series Specifications



Model	VT-6K3.5C-E100A-64	VT-6K3.5C-H100A-256
Resolution (H × V)	6560 × 64	6560 × 256
Pixel Size	3.5 μm × 3.5 μm	
Interface	Camera Link Base / Medium / Full / 10 Tap, 26-pin SDR Connector	
Max. Line Rate	100 kHz	
Max. Line Rate (2 × 2 Binning)	100 kHz	
Min. Line Rate	1 kHz	
Camera Image Memory	6 MB	
Camera Link Pixel Clock	40 MHz / 60 MHz / 80 MHz / 85 MHz	
Pixel Data Format	8 bit (2/4/8/10 Tap) / 10 bit (2/4 Tap) / 12 bit (2/4 Tap)	
TDI Stage	64	64 / 128 / 192 / 256
Trigger Mode	Free-Run, Timed, Trigger Width	
Throughput	0.66 Gpix/s	
Gamma Correction	User Defined Lookup Table (LUT)	
Black Level	-255 – 255 LSB at 8 bit	
Gain Control	Analog Gain: 1×, 2×, 3×, 4× / Digital Gain: 1.0× ~ 8.0×	
Lens Mount	M42 × 1 (C or F-mount is available upon request)	
Dimension/Weight	60 mm × 60 mm × 36 mm / 223 g	
Temperature	Ambient Operating: 0°C ~ 50°C (Housing: 10°C ~ 50°C), Storage: -40°C ~ 70°C	
Power	10 – 30 V DC	
Power Dissipation	Typ. 4.5 W	
Configuration SW	Configurator	

Mechanical Dimension in mm

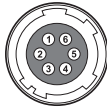


VT Series – High Sensitivity TDI Line Scan Cameras

Specifications

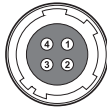
Connector Specification

Power



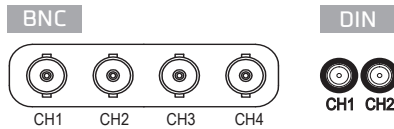
1 2 3: +12V DC, 4 5 6: GND
(HR10A-7R-6PB)

Control



1: Trigger IN, 2: Direction IN
3: DC Ground, 4: Strobe OUT+
(HR10A-7R-4S)

Data Transfer/Communications



CH1: Master Connection (75 Ω)

Connectors on camera body



Ordering Scheme

VT-23K 3.5 X-H 100 A-256	
Series	Sensor Options
VT Series	A - Vieworks
Sensor Resolution	Max. TDI Stages
3K - 3200 pixels	16 - 16 stages
4K - 4096 pixels / 4640 pixels	32 - 32 stages
6K - 6240 pixels / 6560 pixels	48 - 48 stages
9K - 8912 pixels	64 - 64 stages
12K - 12480 pixels	96 - 96 stages
16K - 16384 pixels	128 - 128 stages
18K - 17824 pixels	192 - 192 stages
23K - 23360 pixels	256 - 256 stages
Pixel Size	Line Rate
3.5 - 3.5 μm	40 - 47 kHz
5 - 5.0 μm	60 - 67 kHz
7 - 7.0 μm	80 - 80 kHz / 94 kHz
10 - 10.0 μm	100 - 100 kHz
14 - 14.0 μm	120 - 125 kHz
	140 - 140 kHz
	160 - 160 kHz
	170 - 172 kHz
	200 - 200 kHz
	250 - 250 kHz
Interface	Sensitivity
X - CoaXPress	E - Enhanced
C - Camera Link	H - Hyper