

resolution revolution

Vicon T-Series featuring the world's first 16 megapixel motion capture camera

T-Series

This is it.

The world's next generation motion capture camera - Vicon T-Series.

Ranging from 1 megapixel all the way up to 16 megapixels, 2D on-board tracking, streaming video through system-wide Gigabit Ethernet and remote lens control, the T-Series is like no other.

Welcome to the resolution revolution.







16 megapixels

Need to use tiny markers but also want to capture in a bigger volume? The T160 offers 16 megapixels of resolution for crystal clear images and full frame capture speeds up to 120fps. That's four times more resolution than any other motion capture camera. You can now accurately track the fastest details and the subtlest movements, in even the largest volumes.

2D on-board tracking

Want 3D data of the highest quality and precision? Who doesn't? Unlike other cameras, the T-Series sends extra 2D tracking information to your computer. This improves reconstruction and labelling, especially when markers are moving fast or undergoing extreme changes in velocity.







Gigabit Ethernet

Subayai. Rapido. Presto. Vite. Screaming Fast. It doesn't matter what language you speak, Gigabit Ethernet (or GigE) translates as fast. In fact 10 times faster than before. Speed is good - giving you an improved preview mode, where you get to see the full frame video picture at a usable frame rate. This means better diagnostics, making your system easier to set up and easier to use.



T-Series Technology

It's the attention to detail that gives T-Series its technical edge.

Inside the T-Series

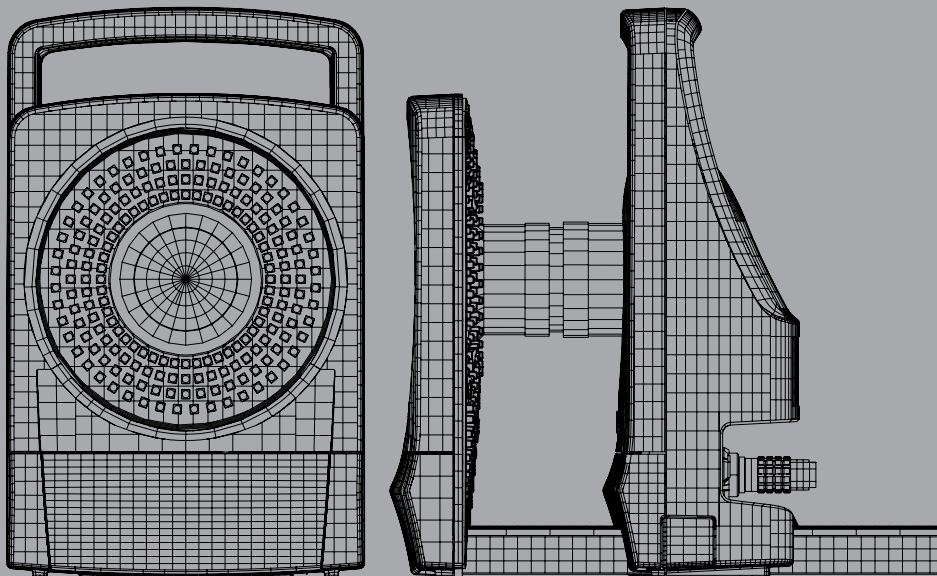
The T-Series is different – and not just on the outside, it's different on the inside as well. Every detail, from the custom-built sensor, to the strobe, the lens, the handle and even the cables. Details matter.

High Specification Materials

Cameras you can rely on. The T-Series has been manufactured using the most robust materials for the components and camera body as well as the highest quality connectors. As with previous Vicon cameras the T-Series will reliably serve you for years to come.

Powerful Strobe

T-Series strobes are powerful. Up to 320 high power LEDs give an even spread of light across the camera's field of view. Smaller markers in large volumes are easily identified. By providing more light output, the cameras are less sensitive to ambient lighting which reduces the challenges in uncontrollable lighting environments.



A detailed wireframe rendering of a Vicon T-Series camera, showing its complex internal and external structure. The camera is shown from a three-quarter perspective, highlighting its various components and the precision of its design. The wireframe is composed of numerous thin lines that define the camera's form, including its lens housing, sensor area, and mounting points. The background is a solid light gray, which makes the wireframe stand out prominently.

Superfast FPGA and DSP

Using the fastest processors available, the T-Series will keep up with demanding tasks such as multiple character capture or high speed sports studies.

Custom-Built Sensor

The T-Series uses Vicon's latest innovation, the Vicon Avalon sensor. Avalon is the world's first 16 megapixel motion capture sensor capturing at 120 frames per second at full frame resolution. This resolution coupled with Vicon's grayscale centroid fitting delivers astonishing results within large volumes with tiny unobtrusive markers.

Soft Core Processor

A soft core processor has been designed specifically for the T-Series. Soft core processors allow the designer to select and implement features on the processor through firmware. Off-the-shelf processors are limited in their ability to connect to the FPGA processor limiting the amount and speed of data that can flow between them. New features can also be added easily without introducing a new piece of hardware.

Frame Store

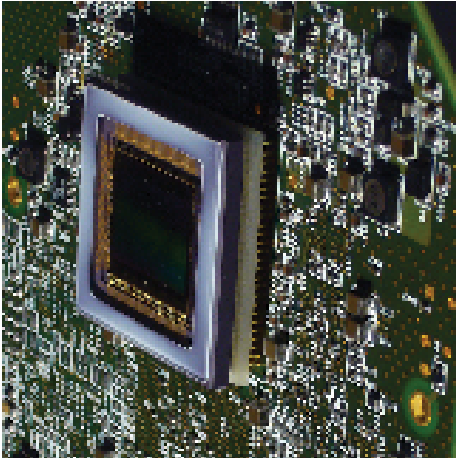
Using a built in frame store with the latest RLDRAM memory technology, full frame images are stored as they are read from the camera sensor. This provides a preview mode with a true snapshot of the image. Cameras without a frame store can show a 'torn' image if the object is moving, particularly noticeable during setup.

Gigabit Ethernet

Gigabit Ethernet is 10 times faster than previous Vicon cameras. T-Series uses custom engineered technology to provide power via the Gigabit Ethernet as well as synchronizing the cameras together. This extra bandwidth provides reliable preview data even when your system is pushed to the limit.

T-Series features

Many years of precision engineering have gone into the T-Series. From pixel to processor, from sensor to strobe, everything has been engineered to work beautifully.



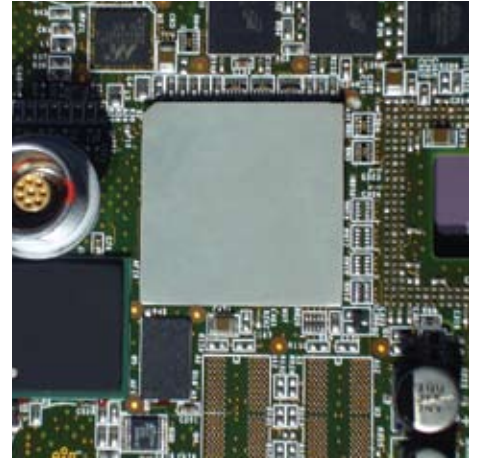
Vicon Avalon Sensor

Building on the success of the Vicon Vegas sensor, years of development went into the design of the Avalon sensor, the world's first 16 megapixel motion capture sensor. 16 megapixels at 120 frames per second cannot be achieved using off-the-shelf sensors.



Dark Current Management

Dark Current may sound like a phrase from a sci-fi film but it's real. And it's present in all optical capture systems creating noisy 3D data. T-Series has been engineered with electronic and firmware design as well as thermal management to control the effect of Dark Current.



Massive Processing Capabilities

Using powerful DSP and FPGA components the T-Series increases the throughput of marker data as well as enabling intelligent features such as 2D tracking on-board and a more usable preview mode. These intelligent features remove processing bottlenecks and make the system more scalable.



Strobe Removal

In the past Strobe removal has been tricky. Especially if your cameras are mounted high enough that they require a ladder to reach them. The T-Series has a simple push button mechanism that allows single handed removal of the strobe when adjusting the camera.



1 - 16 Megapixel Resolution

T-Series offers the widest choice of resolution so every application imaginable can be captured. From 1 megapixel, all the way up to the world's first 16 megapixel motion capture camera, T-Series ensures you get the choice of resolution you need.




Handle

Easy to handle. The T-Series handle has been ergonomically designed to enable easy removal from awkward trusses or tripods. Not only that, the handle enables the camera to be safely chained to a truss as well as being comfortable to carry.

A close-up, macro photograph of a camera lens element. The lens is dark, possibly black or dark grey, and shows a series of fine, concentric lines or ridges that create a textured, almost woven appearance. The lighting is dramatic, highlighting the edges and the intricate details of the lens surface. The background is dark and out of focus.

16 megapixel vision

The T160 offers 16 megapixels of resolution for crystal clear images and full frame capture speeds up to 120fps.

A close-up photograph of a sensor array, likely a depth sensor, showing a grid of small, light-colored, rectangular components arranged in concentric circles. The device has a black and silver finish. The text is overlaid on the left side of the image.

2D on-board tracking
T-Series sends extra 2D
tracking information to
improve reconstruction
and labelling.

T-Series features



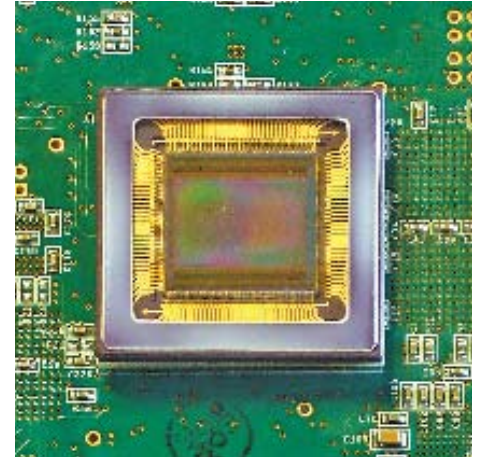
Remote Camera Control

Put away your ladders. If you're changing the position of your cameras frequently in a multi-use lab or studio, adjusting the focus and aperture is now done easily from the comfort of your chair. Vicon hardware and software is designed to extend the T-Series functionality to your computer giving you greater control during set-up.



Vicon Lens

Along with the Avalon and Vegas sensors, the Vicon lens has been custom-built for motion capture. The Vicon lens has a large image circle to ensure that the entire image is evenly illuminated, not just the center. Off-the-shelf lenses are designed to work with low resolution cameras and cannot be used with 16 megapixel sensors because of the limited resolving power. Resolving power is the lens's ability to measure differences of angles between markers.



Vicon Vegas Sensors

As well as the powerful Avalon sensor, T-Series cameras also use the proven 4 megapixel and 2 megapixel Vegas sensor. T-Series cameras can be used together regardless of the sensor, mix and match cameras to meet your needs. Vegas Sensors now also include a 1 megapixel version.



Dust Proof Connectors

The T-Series uses dust proof connectors to extend reliability of the cameras in dusty environments, for example busy production studios, sports halls and gymnasiums.



Gigacable

Improving on standard technology, T-Series cameras are powered and synchronized through the Ethernet Gigacable. These cables can be easily distinguished from other Vicon cables in your lab or studio by their distinctive blue colour.

Technical Specifications

Performance	T160	T40	T20	T10	Notes
Camera maximum frame rate at full resolution	120 fps	370 fps	500 fps	250 fps	
Camera maximum frame rate at partial scan	2,000 fps	2,000 fps	2,000 fps	2,000 fps	
Camera frame rates	30-2,000 fps	30-2,000 fps	30-2,000 fps	30-2,000 fps	
Sensor Specification					
Sensor Type	CMOS	CMOS	CMOS	CMOS	
Sensor	AVALON-16 (Custom Vicon Sensor)	VEGAS-4 (Custom Vicon Sensor)	VEGAS-2 (Custom Vicon Sensor)	VEGAS-1 (Custom Vicon Sensor)	
Sensor Resolution	4704 X 3456	2352 x 1728	1600 x 1280	1120 x 896	
Number of Pixels	16,257,024	4,064,256	2,048,000	1,003,520	
Physical Sensor Size	18.35mm(H); 13.48mm(V); 22.77mm(Diagonal)	16.46mm(H); 12.10mm(V); 20.43mm(Diagonal)	11.20mm(H); 8.96mm(V); 14.34mm(Diagonal)	7.84mm(H); 6.27mm(V); 10.04mm(Diagonal)	
Optical Format	>1 inch	>1 inch	1 inch	2/3 inch	
Shutter Type	V-Shutter	Electronic freeze frame shutter	Electronic freeze frame shutter	Electronic freeze frame shutter	
On Camera Processing					
256 Shades and Grayscale Processing	Yes	Yes	Yes	Yes	Note 1
Grayscale Depth	10 bit	10 bit	10 bit	10 bit	
Sub pixel resolution	1,200,000 x 880,000 (1/256 pixel resolution)	600000 x 440000 (1/256 pixel resolution)	410000 x 325000 (1/256 pixel resolution)	287,000 x 229,000 (1/256 pixel resolution)	
On-Board Processors	3 processors	3 processors	3 processors	3 processors	Note 2
On-Camera Masking	Yes	Yes	Yes	Yes	Note 3
In-Camera Dynamic Large Blob Eliminator	Yes	Yes	Yes	Yes	Note 4
Software Masking	Yes	Yes	Yes	Yes	
Auto Masking	Yes	Yes	Yes	Yes	
On-Camera Thresholding	Yes	Yes	Yes	Yes	
2D Tracking	Yes	Yes	Yes	Yes	Note 5
Supersampling	Yes	Yes	Yes	Yes	
Camera Output Modes	5	5	5	5	Note 6
Full Frame Preview Output	Yes. See Preview mode above	Yes. See Preview mode above	Yes. See Preview mode above	Yes. See Preview mode above	Note 7
Back Focus Mode	Yes, using Preview mode	Yes, using Preview mode	Yes, using Preview mode	Yes, using Preview mode	
Strobe/Ringlight Specification					
Strobe Types Available	Near Infrared (780nm), Visible Red (623nm)	Near Infrared (780nm), Visible Red (623nm)	Near Infrared (780nm), Visible Red (623nm)	Near Infrared (780nm), Visible Red (623nm)	Note 8
Number of LEDs	320 (Visible); 252 (NIR)	320 (Visible); 252 (NIR)	320 (Visible); 252 (NIR)	320 (Visible); 252 (NIR)	
Cover Types Available	Not required	Not required	Not required	Not required	
Strobe Electronics	Integrated, software reprogrammable and controlled	Integrated, software reprogrammable and controlled	Integrated, software reprogrammable and controlled	Integrated, software reprogrammable and controlled	
Adjustable Illumination	Yes	Yes	Yes	Yes	Note 9
Adjustable Levels	1,000 (software controlled)	1,000 (software controlled)	1,000 (software controlled)	1,000 (software controlled)	
Physical					
Camera Housing	Complex mold custom die-cast aluminum	Complex mold custom die-cast aluminum	Complex mold custom die-cast aluminum	Complex mold custom die-cast aluminum	
Camera Body Dimensions	207mm(H) X 130mm(W) X 75mm(D)	207mm(H) X 130mm(W) X 75mm(D)	207mm(H) X 130mm(W) X 75mm(D)	207mm(H) X 130mm(W) X 75mm(D)	
Weight (Kg)	1.8 Kg including strobe, excluding lens	1.8 Kg including strobe, excluding lens	1.8 Kg including strobe, excluding lens	1.8 Kg including strobe, excluding lens	
Camera Architecture					
Software and Firmware upgradeable	Yes	Yes	Yes	Yes	
Upgrade Methods	Any standard transmission method including FTP, email, CD, USB stick etc.	Any standard transmission method including FTP, email, CD, USB stick etc.	Any standard transmission method including FTP, email, CD, USB stick etc.	Any standard transmission method including FTP, email, CD, USB stick etc.	
Cabling	Cat 5e	Cat 5e	Cat 5e	Cat 5e	Note 10

Camera Architecture	T160	T40	T20	T10	Notes
Connectors	A single connection between Camera and Giganet. Single connector to strobe. Two serial ports in a single Auxiliary connector				Note 11
Power Supply	All power to the Cameras from the power supply within the Giganet				Note 12
Max. No. of Cameras Supported with Each Hub/Net	Up to 10 cameras per Giganet	Up to 10 cameras per Giganet	Up to 10 cameras per Giganet	Up to 10 cameras per Giganet	
Lens Type Supported	Vicon Lens / SLR	C-Mount / Vicon Lens / SLR	C-Mount	C-Mount	
Zoom Lens Supported	Yes	Yes	Yes	Yes	
Lenses Available (C-Mount)	None	Yes	Yes	Yes	
Lenses Available (35mm SLR)	Canon / Sigma (Canon EF Mount)	Canon / Sigma (Canon EF Mount)	None	None	
Motorized optics	With Canon / Sigma Lens	With Canon / Sigma Lens	No	No	Note 13
Plug and Play Compatibility	Yes	Yes	Yes	Yes	
Mixed Camera System Compatibility	Interoperable with MX-F40, MX-F20, MX-40+, MX-20+, MX-13+, MX-3+, MX-40, MX-13, MX-3				
System Connectivity/Communication	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet	
Maximum Number of Cameras in System	Unlimited	Unlimited	Unlimited	Unlimited	
Custom Control Interface	Yes	Yes	Yes	Yes	
Communication Status Indicators	Yes	Yes	Yes	Yes	
Integrated Camera Display Panel	Optional	Optional	Optional	Optional	
Camera Number Indicator	Optional	Optional	Optional	Optional	
Camera Status Indicators	On camera and in software	On camera and in software	On camera and in software	On camera and in software	
IP Addressable	Yes	Yes	Yes	Yes	
IP Reconfigurable	Yes	Yes	Yes	Yes	
Genlock to External Video Source	Yes	Yes	Yes	Yes	
Synchronize to General External Signal	Yes	Yes	Yes	Yes	
External Sync output	Yes	Yes	Yes	Yes	
External Sync box needed	No	No	No	No	
External VGA output	Not required	Not required	Not required	Not required	
External A/D Sync + Clock	Yes	Yes	Yes	Yes	Note 14
Camera Diagnostic Interface	Yes	Yes	Yes	Yes	
Cooling	Advanced thermal design	Advanced thermal design	Advanced thermal design	Advanced thermal design	
Camera protection level	IP 61	IP 61	IP 61	IP 61	

Notes

T160/T40/T20/T10

1 Full marker grayscale. Marker centers are calculated based on every pixel of grayscale available for the marker, not just the detected marker edges. An on-camera circularity test ensures merged or partially occluded markers which need high-level processing are sent in full grayscale to the PC.

2 1. Scalable multi-processor extracts grayscale markers from sensor image. Although one physical device, it provides parallel processing of datastream. 2. Digital Signal Processor (DSP) locates markers in 2D and calculates centers and radii. 3. High performance and highly configurable soft-processor streams grayscale and marker center data over Ethernet to host PC. Also handles housekeeping and configuration tasks.

3 On-camera masking removes areas of the sensor where undesirable static light sources are recorded, for example strobes from other cameras.

4 Camera firmware automatically removes undesirable image data including both large blobs (e.g. sunlight reflections) and/or an unusually large number of blobs.

5 The 2D tracking algorithms allow for the markers' movement to be tracked from frame to frame on the camera. This allows even fast motion of close markers to be easily processed.

6 Automatic (centers for circular markers, grayscale for overlapping/partially occluded markers), Centers Only, Grayscale Only, Centers / Grayscale, and Preview (the entire sensor image).

7 Ten times faster than previous generations of Vicon cameras and taking full advantage of the Gigabit Ethernet connection to the PC.

8 Near Infrared (780nm) and Visible Red (623nm) surface mount LED strobes. For Infra Red (850nm) strobes please call.

No requirement for secondary optics or strobe covers. This new generation of strobe is twice as bright as previous generations making setup in awkward environments easier.

9 With built-in temperature monitor.

10 Gigabit Ethernet with power and sync over Ethernet.

11 Using only connectors of the highest quality, guaranteeing reliable use for years to come.

12 700 Watts per Giganet.

13 18-50 mm Sigma lens available, others on request.

14 Internal A/D is synchronized to the cameras, but an external synchronization is programmable for third party equipment.

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